

Second Edition

A GUIDE FOR EFFECTIVE QUALITY IMPROVEMENT: IMPROVING ACUTE CORONARY SYNDROME CARE FOR HOSPITALIZED PATIENTS

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The Society of Hospital Medicine (SHM) thanks all the members of the Acute Coronary Syndrome Expert Panel, a distinguished group of subject matter experts representing the fields of hospital medicine, cardiology and pharmacy. Their expertise was essential to the construction of this *Implementation Guide* for improving inpatient acute coronary syndrome.

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SHM is dedicated to the continuous improvement of the products and services that are offered. This *Implementation Guide* continues to be a work in progress and reflects the constantly changing state of the evidence and best practices. Constructive criticism and feedback are highly encouraged and welcome via email to acs@hospitalmedicine.org.

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Welcome to the second edition of the *Acute Coronary Syndrome (ACS) Implementation Guide*, which is designed to enhance the efficiency and reliability of your quality improvement efforts in order to close the gap between best practices and what we currently do in caring for the inpatient with acute coronary syndrome (ACS). ACS is one of the top reasons for admissions in our hospitals and a major source of overutilization of resources—and therefore costs—for our institutions. The *Implementation Guide* is built on the foundation of the core principles of quality improvement, personal experiences and evidence-based medicine. A redesign in process, workflow and information is needed in order to implement effective regimens and protocols that optimize care for the hospitalized patient with ACS in your institution. The second edition encompasses the addition of additional antiplatelet medications available in the market as well as accommodates recent guidelines and nomenclature in the treatment of ACS. Thorough knowledge of the treatment of ACS is considered a Core Competency of Hospital Medicine and whether your practice treats these patients during the “upstream” portion of their treatment (from symptom onset to intervention) or “downstream” (from intervention until admission), understanding the tools used to stratify our ACS patients for treatment, complications and transitions of care is essential.

In contrast to the first edition of the *Implementation Guide*, we begin with a thorough review of ACS, with further sections addressing evidence-based treatment strategies and methods to assure compliance and reduce readmissions. The second part of the second edition is an update of performance improvement methodologies to be used by your group to further show your organization value.

The *Implementation Guide* is not meant to be a “one-size-fits-all” program, but only a guide. Also, in contrast to the original edition, links to multiple sources have been added to further assist the end user.

Essential elements for reaching breakthrough levels of improvement in the care of the ACS inpatient include:

I. Part One: Acute Coronary Syndrome

- A. Etiology of ACS** and review of the new nomenclature established in 2014 that retitles unstable angina/NSTEMI as NSTEMI-ACS.
- B. Initial Evaluation of Patients Suspected of ACS** including assessment of symptoms and variations with presentation. This discussion will include identification of ECG changes and evidence-based recommendations for initial management.
- C. Risk Stratification** is critical to determine the modality of treatment whether it be via an invasive method and the timing of the intervention in addition to predetermine the risks involved with treatment, which is mostly bleeding.
- D. Imaging and Diagnostics in Acute Coronary Syndrome** is also important to understand and a major source of overutilization of resources. The timing of the studies compared to symptoms is the key to gaining the most from these studies. This section will discuss what the latest evidence reveals about non-invasive studies used in ACS to ascertain appropriate diagnosis and determine plan of treatment.
- E. Therapeutic Management.** The second edition addresses the different P2Y12 medications available in the market, including the most recent guidelines for the timing of their use. This section also addresses the use of anticoagulation and essential non-antithrombotic therapeutics as well.
- F. Discharge and Transitions** is recognized as a key component in assuring patient safety, compliance and avoidance of readmissions. This section will reveal best practices to assure appropriate transitions of care.

II. ACS Quality Improvement Program

- A. Essential First Steps** starting with obtaining institutional support for an ACS Performance Improvement (PI) program to identifying key stakeholders, forming a committee and establishing measures. This section will discuss best practice methods in building engagement in addition to quality improvement resources available for team members.
- B. In-Depth Analysis of Current Processes and Failures** introduces methods to identify areas in which gaps occur in addition to introducing critical QI tools like process flow mapping.
- C. How Will You Know You Are Making a Difference?** This section will show key principles of data collection in reporting data in addition to methods to structure, process outcomes and trend metrics. These metrics will allow the team to build a business case for your ACS improvement efforts.
- D. Moving from Problems to Solutions** using multidisciplinary team developmental intervention methods that link the team's efforts to the rest of the providers in the organization, including PI processes that aid in implementation in addition to recognizing opportunities in patient education and medication safety.

How to Use the *Implementation Guide*

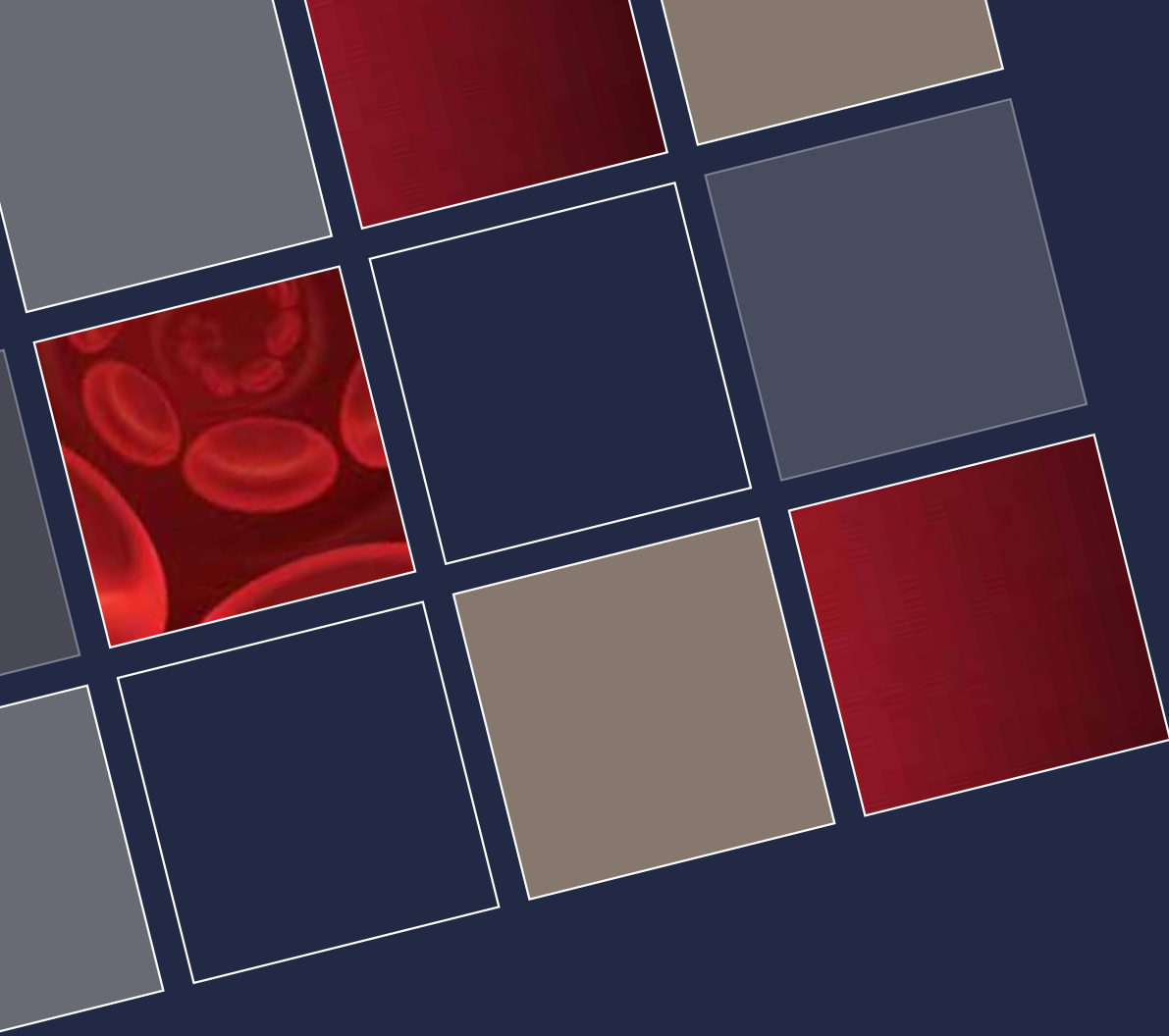
Although it is designed to assist leaders who are starting from scratch, the *Guide* can also benefit teams that have already made considerable progress, as it is unlikely that any institution is performing optimally in all areas. We recommend that all users initially review [Section II. Part A Essential First Steps and Part B In-Depth Analysis of Current Processes and Failures](#), which will help to assess your current status on all of the elements explained in these sections. Completing these sections first will put you in a position to proceed with good institutional support and to intelligently prioritize areas for intervention and allocation of resources.

Although the information is presented in an order that may facilitate the development of quality improvement efforts in many settings, you may find it difficult to follow our sequential order, as activities presented in different sections often occur in parallel in real-life settings. Your team should eventually assess and attempt to improve the full range of quality issues involving care of patients with ACS.

The *Guide* incorporates sections of all the essential elements described above to achieve breakthrough improvement. In addition, we highlight important topics and improvement tools such as run charts, process mapping and methods to hold the gains and spread your improvement methods. Methods for demonstrating financial return on investment are also presented.

This *Guide* leverages resources in the Society of Hospital Medicine (SHM) website, particularly the [Acute Coronary Syndrome \(ACS\) Toolkit](#). The *Guide* provides links to guidelines, key references and examples of order sets, algorithms, protocols and educational materials that can be invaluable to your team. We strongly encourage using these materials to build an order set or protocol that you implement while following the general improvement framework presented in the rest of the *Guide*. This framework calls for a multidisciplinary team effort, specific goals, reliable and practical metrics, and monitoring and learning from variation from your protocol. Ignoring these principles can lead to mediocre results and disillusionment.

Following these methods can enable you to demonstrate the value of quality improvement work to your medical center and insurers, both because of the outcomes obtained and because of the cost savings often inherent in higher quality care. With ACS in particular, the pay for reporting/performance initiatives already exist that dramatically improve your ability to demonstrate value to your institution. Demonstrating value in quality improvement and cost savings can then be leveraged for protected time for hospitalists and others to improve the quality of care and safety of the hospitalized patient.



Section I: Acute Coronary Syndromes

Etiology of ACS
Initial Evaluation
Risk Stratification
Imaging and Diagnostics
Therapeutic Management
Discharge and Transitions

A. Etiology of ACS

Acute coronary syndrome (ACS) is a term that encompasses unstable angina (UA), myocardial infarction not associated with ST elevation on the ECG (NSTEMI) and myocardial infarction associated with ST elevation on the ECG (STEMI). All these conditions exist as points along a continuum of the same pathophysiologic process. The unifying mechanism for these conditions is a change, decrease or disruption of coronary blood flow, such that the supply of blood to the myocardium does not meet the demand of that tissue. These conditions classically involve unstable atherosclerotic plaque in the coronary arteries, albeit to different degrees. The degree of reduction in coronary flow typically determines where in the continuum of ACS the patient will present. UA typically represents the “beginning” of the continuum, with disruption of a vulnerable plaque. A completely occlusive thrombus usually results in transmural ischemia and, if sustained long enough, results in ST-elevation myocardial infarction, the “final” component of this clinical syndrome.

Unstable Angina/NSTEMI (NSTE-ACS)

2014 American Heart Association/American College of Cardiology (AHA/ACC) guidelines on the management of unstable angina/NSTEMI have retitled the disease entity as “NSTE-ACS,” which emphasizes the continuum between UA and NSTEMI. At presentation, patients with UA and NSTEMI can be indistinguishable and are therefore considered together under one term “NSTE-ACS.” Development of atherosclerotic disease is a long, chronic process involving arterial inflammation and endothelial dysfunction. The major risk factors for developing atherosclerosis are smoking, family history of premature atherosclerotic disease, dyslipidemia, diabetes mellitus and hypertension. These factors have been validated and well established from large, long-term epidemiological studies and can explain the development of coronary atherosclerosis and acute coronary syndromes in most cases.^{1,2}

Atherosclerosis typically results from the repetitive insult of these common risk factors, which attracts lipid-laden macrophages under the arterial intima, leading to the development of atherosclerotic plaque. The plaque enlarges in size because of the growth of vasa vasorum and the further accumulation of lipids. The vasa vasorum of the arterial walls occasionally erodes because of the high local concentration of matrix metalloproteinases releasing blood and blood products into the soft plaque, leading to plaque expansion and an aggravated inflammatory response because of the blood products.³ Activated macrophages and T lymphocytes at the edge of a plaque increase the expression of enzymes such as metalloproteinases that cause thinning and disruption of the plaque. Ultimately, it is this plaque disruption that leads to acute coronary syndromes.

UA is clinically defined as the presence of symptoms, and possibly ECG changes, suggestive of ischemia (ST-segment depressions or T-wave inversions). If biomarker evidence of bionecrosis is also present, again with or without changes on the ECG, then the term NSTEMI is invoked. Therefore, historically, the salient distinguishing feature between the two conditions has been evidence of cardiac bionecrosis.

Section 1.A: Etiology of ACS (continued)

It has been postulated that unstable angina simply represents a degree of myocardial cell death/necrosis that occurs below the sensitivity limit of our historical assays.⁴ With the advent of highly sensitive assays, cardiac cell injury and death can be more accurately detected, which is the reason that recent guidelines have united the terms into NSTEMI-ACS. Regardless, once identified, these conditions categorize patients at markedly elevated risk of future adverse cardiovascular morbidity and mortality.

There are generally two different clinical scenarios that would result in acute coronary syndrome. The first is the result of acute rupture of a vulnerable atherosclerotic plaque. This leads to an intense local prothrombotic state because of release tissue factors and other platelet aggregatory factors, bringing about platelet aggregation which leads to variable degrees of occlusion and impaired coronary vascular flow.¹

The second clinical scenario that can lead to acute coronary syndrome is commonly referred to as “Demand Ischemia.” In this situation, the supply of blood through the coronary arteries is unable to keep up with increased demand, usually caused by concomitant critical illness. Common examples include hyperdynamic states such as fever, tachyarrhythmias, hyperthyroidism and severe hypotension or reduced oxygen delivery from hypoxemia or severe anemia. Underlying coronary atherosclerotic plaque can be obstructive, non-obstructive or even non-existent in this scenario. Ultimately, myocardial oxygen delivery is reduced because of the inability of the blood supply to keep up with the demand of the myocardium. This results in NSTEMI-ACS.

Other possible, but far less common, causes of acute coronary syndromes are coronary vasospasm, cocaine-induced coronary vasospasm and spontaneous coronary dissection, which can be seen most classically in pregnant or peri-partum women.

STEMI

ST elevation myocardial infarction is caused by complete occlusion of a coronary artery. STEMI is a true medical emergency, and appropriate protocols and algorithms must be triggered as soon as this condition is diagnosed. Patients presenting with persistent ST-segment elevation require prompt reperfusion therapy (either pharmacological or catheter-based) to restore flow as soon as possible in the occluded infarct-related artery. Delays in revascularization and restoration of blood flow are associated with significantly worse outcomes, likely due to lesser degrees of myocardial salvage. Patients suffering STEMI are at elevated risk of complications that include cardiac arrhythmia, pump failure/excessive sympathetic stimulation and conduction disturbance. Mechanical problems may also result from dysfunction or disruption of critical myocardial structures (e.g., mitral regurgitation [MR], rupture of the interventricular septum, ventricular aneurysm formation and free-wall rupture) and may require a combination of pharmacological, catheter-based and surgical treatments.^{5,6,7}

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B. Initial Evaluation of Patients Suspected of ACS

I. Evaluation of the NSTEMI-ACS Patient

Patients presenting to the emergency room with an ST-elevation myocardial infarction (STEMI) have certainly been addressed with appropriate treatment policies in most hospital emergency rooms across the country. However, far fewer decision-making models and algorithms exist for risk-stratifying patients presenting with unspecified chest pain, unstable angina (UA), or non-STEMI (NSTEMI). 2014 Guidelines have combined both terms to NSTEMI-ACS, since at presentation they are indistinguishable and in reality constitute a clinical continuum. Establishing a protocol that acknowledges important prognostic indicators will likely result in lower hospital and/or managed care expenses and a greater likelihood of a successful conclusion for these patients.

Appropriate assessment of these patients includes an evaluation of their symptoms, ECG and biomarkers.

II. Evaluation of Symptoms

The first step in the evaluation of a patient is an assessment of the patient's presenting symptoms.

A thorough history and a full description of the chest pain are essential to the process of recognizing a patient with ACS. The history of the presenting complaints should include its character, onset, severity and duration. Jaw, neck, epigastric or arm pain may occur as isolated events or jointly with a chest pain complaint. The presence of associated symptoms, such as dyspnea, nausea or diaphoresis should be elicited. Correlation of the symptoms with activity or rest, position or activity (eating, deep inspiration, etc.) can lead to further refinement of the differential diagnosis.

Classically, chest pain has been divided into three basic categories: typical angina, atypical angina and non-cardiac chest pain.¹

1. *Classic or typical angina* is defined as having all three of the following features:
 - A. Central in location
 - B. Exacerbated by physical exertion or emotional stress
 - C. Relieved promptly with rest or nitroglycerin. The chest pain typically lasts less than five minutes and may radiate to the neck, jaw, shoulder or arms.
2. *Atypical chest pain* is defined as having only one or two of the three classic features.
3. *Non-cardiac chest pain* is defined as having none of the classic features.

This reductionist view may be overly simplistic, however. It also runs the risk of missing those patients who present with silent ischemia. This is particularly true in patients who are older, female, post-operative or diabetic. As well, patients may present with *anginal equivalents*, such as jaw, neck, ear, arm, shoulder, back or epigastric pain, unexplained fatigue and new or worsened exertional dyspnea, all of which may occur in the absence of a chest pain complaint. These symptoms, combined with knowledge of the age and sex of the patient, can be highly predictive of the presence of acute coronary syndrome.

Section 1.B: Initial Evaluation of Patients Suspected of ACS (continued)

The initial risk stratification of these patients is often carried out in the emergency department (ED) and involves determining the likelihood that the presenting signs and symptoms represent acute coronary syndrome because of obstructive coronary artery disease (CAD) (Table 1).

Table 1. Likelihood That ACS Symptoms Result from CAD

Feature	High Likelihood <i>Any of the following</i>	Intermediate Likelihood <i>Absence of high-likelihood features and any of the following</i>	Low Likelihood <i>Absence of high- or intermediate-likelihood features, but may have</i>
History	Chest or left arm pain or discomfort as chief symptom reproducing previously documented angina; known history of CAD, including MI.	Chest or left arm pain or discomfort as chief symptom. Age > 70 years. Male sex. Diabetes mellitus.	Probable ischemic symptoms in absence of any intermediate-likelihood characteristics. Recent cocaine use.
Examination	Transient MR hypotension, diaphoresis, pulmonary edema or rales.	Extracardiac vascular disease.	Chest discomfort reproduced by palpation.
ECG	New or presumably new transient ST-segment deviation (> 0.05 mV) or T-wave inversion (> 0.2 mV) with symptoms.	Fixed Q waves. Abnormal ST segments or T waves not documented as new.	T-wave flattening or inversion in leads with dominant R waves. Normal ECG.
Cardiac markers	Elevated cardiac troponin I, troponin T or CK-MB.	Normal	Normal

Pertinent physical examination findings should also be noted and may point to other less frequent but certainly serious underlying causes of chest pain. For example, asymmetrical peripheral pulses, an early diastolic murmur and “tearing” substernal chest pain with radiation to the back or interscapular region might indicate an aortic dissection. A systolic murmur to the base of the neck suggests aortic stenosis, whereas a systolic murmur that decreases with strain effort by a valsalva maneuver might suggest hypertrophic cardiomyopathy, either of which could certainly cause an inordinate demand for oxygen because of myocardial hypertrophy. Pleuritic-type chest pain may be a result of a pulmonary embolus, pneumothorax or pneumonia.

Table 2 presents a brief description of the initial evaluation and highlights the important symptomatic features, physical findings, ECG changes and biomarkers.

TABLE 2. Initial Evaluation Process
History — chest discomfort
<ul style="list-style-type: none"> a. Characterization b. Location c. Severity d. Duration e. Frequency f. Radiation <p>Note: The elderly, diabetics, women and patients with chronic renal failure have atypical symptoms.</p>
Risk factors
<ul style="list-style-type: none"> a. Age b. Sex c. Family History of CAD d. Smoking e. Hyperlipidemia f. Hypotension g. Diabetes h. Previous CAD i. Cocaine Use
Physical exam — identify high-risk features
<ul style="list-style-type: none"> a. JVD b. Rales c. Heart Murmurs d. S3 or S4 or Gallops e. Peripheral Edema f. Hypotension g. Bradycardia
12-Lead ECG
<ul style="list-style-type: none"> a. New or Presumably New ST Depression or b. T-wave Inversion c. Transient ST/T Changes With Pain d. Deep Symmetric T-wave Inversion V1-V5-6 (Wellen's phenomenon)
Cardiac biomarkers
<ul style="list-style-type: none"> a. Troponin I or T b. CK-MB c. CK-MB Mass

III. Evaluation of the ECG

The ECG is instrumental in the patient's initial evaluation. STEMI is defined as ST-segment elevation ≥ 1 mm in at least two contiguous leads. Also of importance are transient ST-segment changes of 0.5 mm or more that occur when the patient is symptomatic and resolve when the patient becomes asymptomatic. Such findings strongly suggest acute ischemia and a higher likelihood of underlying severe-grade CAD. Patients with a ST-segment depression and symptoms are initially considered to have an NSTEMI-ACS on the basis of whether positive cardiac biomarkers are present or absent, respectively.² There are other causes of ST-segment changes. Left ventricular (LV) aneurysm, pericarditis, myocarditis, Prinzmetal's angina, early repolarization, Takotsubo cardiomyopathy and Wolff-Parkinson-White (WPW) syndrome also might cause an ST-segment elevation. Significant global ST segment depression in all lead groups, with ST elevation in aVR, suggests the presence of triple-vessel CAD or Left Main disease.

Inverted T waves can also indicate NSTEMI-ACS. Of particular importance, deep T-wave inversions in the precordial leads strongly suggests acute ischemia involving the left anterior descending coronary artery.⁵

In certain scenarios, the standard 12-lead ECG may not be diagnostic of acute coronary syndrome. For example, an acute MI due to occlusion of the left circumflex coronary artery is notorious in presenting with a non-diagnostic 12-lead ECG. Right ventricular infarcts may manifest ST-segment changes that can only be visualized on a "Right-sided ECG," in the V4R through V6R leads. A posterior infarct might be revealed by the "posterior leads" V7 through V9 or ST-segment depression in leads V1 and V2.

IV. Initial Management

Once the diagnosis of NSTEMI-ACS is made, the acute management of the patient involves the pursuit of the following goals:

1. Symptom relief.
2. Assessment/stabilization of the patient's hemodynamic status.
3. Risk estimation.
4. Choice of management strategy: an "early invasive" approach vs. a "conservative" strategy of medical therapy alone.
5. Initiation of antithrombotic therapy.
6. Initiation of additional therapeutics (i.e., statin, beta-blocker).

One of the most important decisions that a hospitalist will confront with a NSTEMI-ACS patient is determining whether to follow a course of conservative or invasive management.

As opposed to patients with STEMI, patients with NSTEMI-ACS do not usually require immediate reperfusion. That said, an initial management decision should be made early in the hospital course on whether to pursue an "early invasive" strategy or an "initial conservative" management plan. Of note, the "early" time period in this context is considered to be within the first 24 hours after hospital presentation, as shorter/more immediate time periods have not consistently proven to be superior.³ One exception was ISAR-COOL, where the average time to angiography in the "early invasive" arm was < 6 hours, and there was a statistically significant outcome benefit in the group versus the comparator group.⁴ Most trials investigating this topic, however, define "early invasive" as within 24 hours. The randomized trials and

meta-analyses performed in the contemporary era have, for the most part, reported improved outcomes with an early invasive approach, especially in high-risk sub-groups.^{5,6,7,8} The outcomes that were significantly better in the “early invasive” arms usually involved reduced hospitalizations and rates of recurrent angina. The modern trials have not consistently proven a mortality benefit with an “early invasive” approach.

One of these trials was the TIMACS trial, which randomized more than 3,000 patients to one of the two management strategies.⁹ There was no overall difference for the composite primary endpoint. But when the populations were stratified according to the GRACE (Global Registry of Acute Coronary Events) score, patients in the highest tertile of the GRACE risk score (>140) experienced a sizeable and significant reduction in the incidence of the primary ischemic endpoint, from 21.0% to 13.9% (HR: 0.65; 95% CI: 0.48 to 0.89; $p < 0.006$). There was no difference in outcome (6.7% versus 7.6% in the delayed and early groups, respectively; HR: 1.12; 95% CI: 0.81 to 1.56; $p < 0.48$) observed among patients in the lower two risk tertiles (GRACE score <140).

Patients who receive a “conservative” approach represent a very heterogeneous group. Some are deemed to be low risk, and therefore not likely to benefit from an attempt at revascularization, whereas others may be deemed to be at too high risk for cardiac catheterization. The contemporary trials provide support for a strategy of early angiography and intervention to reduce ischemic complications in patients, particularly among those at high risk. A more delayed approach is reasonable in low- to intermediate-risk patients. If a “delayed” or conservative approach is chosen, it is imperative to treat these patients with optimal medical therapy, as several studies have suggested that these patients are undertreated with evidence-based medicine.^{10,11,12}

Regardless of the choice of an initial management strategy, if recurrent symptoms/ischemia, heart failure or serious arrhythmias subsequently appear, then diagnostic angiography should be performed.

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C. Risk Stratification

I. Risk Stratification in NSTEMI-ACS

Whereas STEMI patients in every hospital system have a defined treatment plan, with a logical and stepwise algorithm that dictates care and appropriate treatment, NSTEMI-ACS patients often have a range of treatment options. Patients with high-risk features or life-threatening NSTEMI-ACS should be treated with early coronary angiography. Patients who are more stable upon initial presentation require appropriate risk stratification to ensure adequate therapeutic decision-making. The likelihood of an adverse clinical outcome, such as future myocardial infarction, stroke, heart failure, recurrent ischemia, serious arrhythmia or death, will affect treatment decisions. As well, patients initially deemed stable and lower risk and sent to observation may develop changes in their clinical status during the observation unit stay, altering their level of risk. Therefore, appropriate prognostication of risk allows for optimal downstream management of the ACS patient.

Multiple risk assessment tools have been proposed, validated and promoted for the evaluation of the ACS patient. For a risk assessment tool to be effective it should have a high degree of prognostic discriminatory capacity, and the variables used in constructing the tool should have independent prognostic information. The variables should also be part of a routine medical evaluation and be assessable at the bedside early after presentation.

Other Risk Assessment Strategies

Goldman et al. made one of the earliest contributions to risk assessment of patients presenting with chest pain. They initially described a computer-derived protocol to aid in the management of acute chest pain in the emergency room (1982). They also described a risk assessment algorithm derived from an assessment of the risk of developing a major cardiac event within 72 hours and using older age, male sex, description of pain similar to prior MI or worse than prior angina, systolic BP less than 110 mm Hg, rales above the bases on initial physical exam and initial ECG changes suggestive of MI or ischemia as the variables. Patients were then assigned to one of four groups according to the risk of an event within 24 hours, from very low to high risk. All of these risk assessments also included patients who had STEMI but were useful in determining the disposition of a patient from the ER to the ICU, step-down unit or observation unit and the appropriate intensity of subsequent medical care.

In 2000, Antman and colleagues described the TIMI risk score (Table 3) for the NSTEMI-ACS patient, which initially divided patients into mild-, intermediate- and high-risk categories based on seven equally weighted prognostic indicators.²

The TIMI risk score is a simple tool composed of seven indicators obtained at initial presentation.

Table 3. TIMI Risk Score

<p>1. Age 65 years or older.</p> <p>2. Three or more of the traditional coronary risk factors: History of CAD Hypertension Hypercholesterolemia Diabetes Currently a smoker Early family history in first-degree relative</p>	<p>3. Documented CAD with known stenosis of vessel \geq 50%.</p> <p>4. ST deviation noted on ECG.</p> <p>5. Two or more anginal episodes in the past 24 hours.</p> <p>6. Aspirin use in the past week.</p> <p>7. Elevated cardiac biomarkers (either CPK-MB or troponin).</p>
<p>Score 0-2: mild risk Score 3-4: intermediate risk Score 5-7: high risk</p>	

Section 1.C: Risk Stratification (continued)

The score was validated in several clinical trials of ACS patients and has performed adequately when tested in an unselected ED population. The risk score assesses the risk of major adverse cardiac events, from a low of 4.7% for a risk score of 0-2 to a very high risk of 40.9% for a score of 6-7. The rate of death, myocardial infarction or urgent revascularization significantly increased based on TIMI risk scores, from a low 5% for a risk score of 0-1 and 20% for a TIMI risk score of 4 to more than 40% with a score of 6-7. Patients with a TIMI high-risk score of 5-7 are highly recommended for early coronary angiography.

There are two other recognized risk prediction models (the PURSUIT and GRACE models) that are accurate in predicting the risk of a poor outcome in a patient with NSTEMI-ACS. The PURSUIT risk model predicts the probability of death or infarction/reinfarction in the first 30 days following an ACS event. The GRACE model predicts all-cause mortality in the six months following a diagnosis of ACS.

The PURSUIT risk model is based on the PURSUIT trial and provides a guide in the clinical decision-making process.⁵ Specific parameters were identified that increase the probability of death or infarction/reinfarction. Increasing age plays a prominent role in estimating the probability of death or infarction in the first 30 days following an event. The specific risk indicators described in the PURSUIT risk model are advanced age, male sex, worsening anginal class in the six weeks preceding the event, higher heart rate, lower systolic blood pressure, signs of heart failure and ST depression. All the factors contribute to a higher morbidity or mortality probability in the 30 days following an acute coronary syndrome.⁶

The GRACE risk model, described by Eagle et al., uses eight variables: older age, Killip class, systolic BP, ST segment deviation, cardiac arrest during presentation, serum creatinine level, positive initial cardiac biomarker and heart rate.⁷ It has been used to predict hospital deaths as well as to assess all-cause mortality from hospital discharge to six months. This model includes the patient's serum creatinine in determining the overall risk of the patient. The score can range from a low of only one point to a high of 263 points. A score of only one point would be for a patient less than 40 years old with a resting heart rate < 50, systolic blood pressure > 200 mm Hg, no ST-segment depression, initial serum creatinine < 0.4, no cardiac biomarker elevation, the admitting hospital having PCI capability and the patient with neither a history of CHF nor MI. The highest possible score, 263 points, would be given to a patient more than 90 years old with a resting heart rate > 200, a systolic blood pressure < 80 mm Hg, ST-segment depression on ECG, an initial serum creatinine ≥ 4, no PCI capability at the admitting hospital and a history of congestive heart failure (CHF) and MI. A prediction for all-cause mortality is provided by the GRACE model; for example, a score of 180 points indicates a 25% probability of death in the first six months after discharge. A nomogram is available that predicts mortality risk for each patient, ranging from 0% to 50% for scores of 70-210 points, respectively.⁸

In addition to these risk scores, there are high-risk indicators based on randomized clinical trials, nonrandomized studies and observational registries (Table 2). NSTEMI-ACS patients with any of these risk indicators are recommended for a consultation by a cardiologist early in the triage period and considered for coronary angiography. Maintaining a careful vigilance for these high-risk indicators, listed in Table 4, is prudent, particularly when a cardiologist hasn't been consulted yet and no cardiac catheterization is being contemplated. These recommendations are carefully outlined in the American College of Physicians' publication *ACP Medicine* 2007 edition and described as having a Class I recommendation and Level A evidence of support.

Table 4. High-Risk Indicators

Previous history of CABG procedure.	Signs or symptoms of congestive heart failure.
Previous PCI, particularly in past six months. Elevated troponin level. New ST-segment depression. Sustained ventricular tachycardia. Hemodynamic instability.	Depressed left ventricular function (ejection fraction < 40%). Recurrent angina at rest or during low-level activity despite intensive medical therapy. High-risk findings on noninvasive stress test.

It is interesting to note that the occurrence of nonsustained ventricular tachycardia (lasting < 30 seconds) during the first 48 hours of an acute myocardial infarction does not have long-term prognostic significance. Alternatively, asymptomatic sustained ventricular tachycardia more than 48 hours out, particularly in patients with an ejection fraction of 35% or less, has a potentially higher risk for sudden cardiac death and generally prompts consideration for an implantable cardiac-defibrillator.

The 2007 ACC/AHA guidelines note patients with the high-risk features of age greater than 70 years, prior revascularization or MI, ST-segment deviation, heart failure, LV function $\leq 40\%$ and diabetes could benefit from an invasive strategy.⁹ In those patients with NSTEMI-ACS, a history of a prior PCI in the past six months suggests restenosis, and the ACC guidelines note a repeat PCI can often effectively treat such patients. NSTEMI-ACS patients with a prior CABG were also mentioned as another subgroup for whom early coronary angiography was usually indicated.

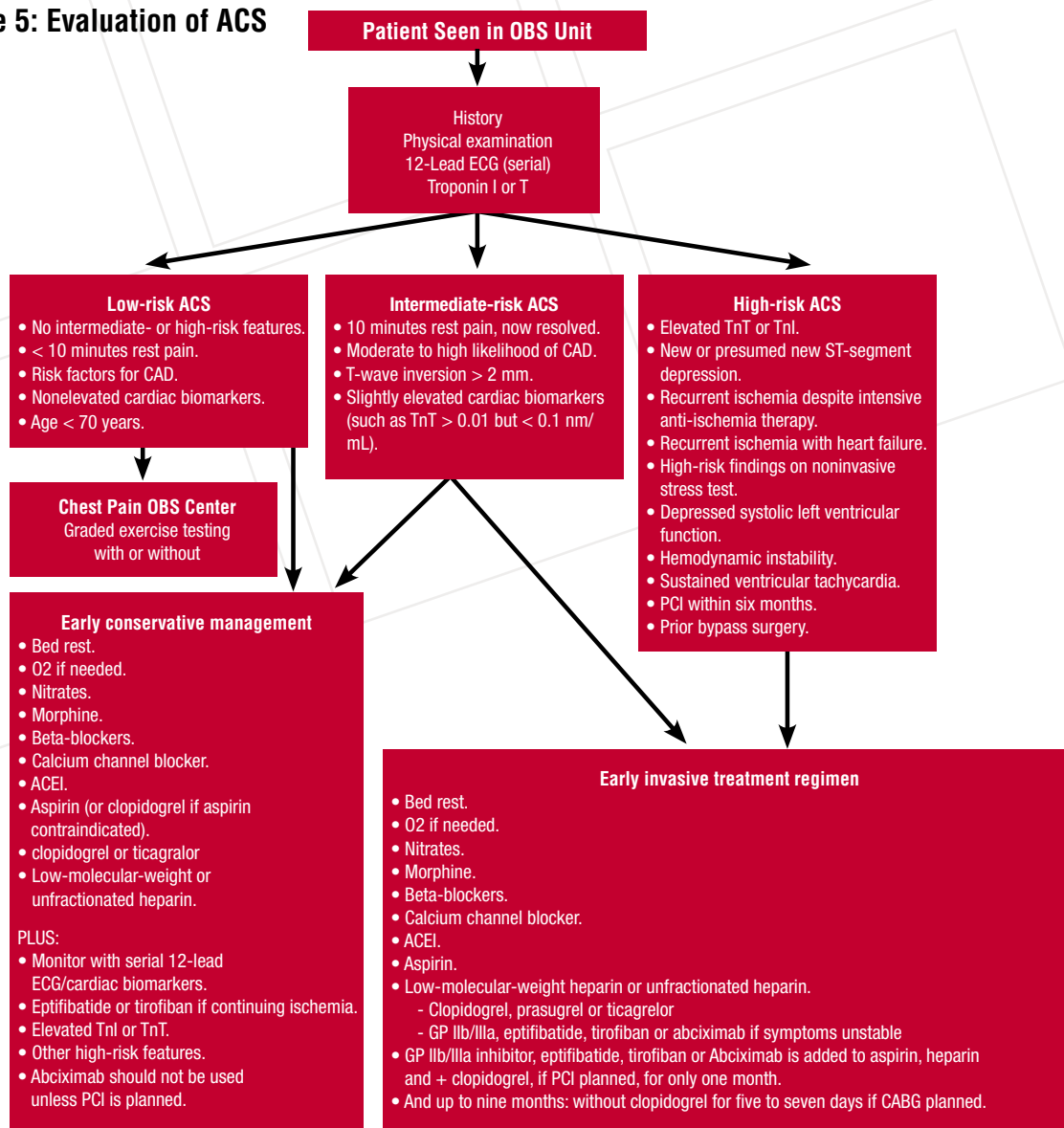
If it is determined that a patient's likelihood of ACS is high, the patient should be admitted to an ICU or a monitored progressive care unit and should not be sent to an observation unit. If it is believed that the likelihood of ACS is low, the patient may either be discharged home to be followed up by their physician in the next few days or be admitted to an observation unit.

Intermediate-likelihood patients often end up in observation units, but some may require hospitalization in a progressive care unit. It must be stressed that ultimately, regardless of the risk assessment tool used, risk stratification is a dynamic ongoing process and should be reassessed periodically from initial presentation to discharge.

Section 1.C: Risk Stratification (continued)

Table 5 is a flow diagram outlining different management strategies that can be used after a risk assessment along the lines outlined above.

Table 5: Evaluation of ACS



Appropriate usage of these risk scores and prognostic indicators increases the likelihood of appropriate and efficient use of resources, allowing patients the best opportunity for an optimal outcome.

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Section 1.D: Imaging and Diagnostics in Acute Coronary Syndrome

D. Imaging and Diagnostics in Acute Coronary Syndrome

The appropriate identification and management of the patient presenting with possible NSTEMI-ACS remains problematic even in the current era of medical diagnostics and therapeutics. Among the large number of patients who present with possible NSTEMI-ACS nationwide, the actual incidence of true or definite NSTEMI-ACS is quite low.^{1,2} Additionally, patients with true NSTEMI-ACS are at risk of a poor outcome, and effective therapies are time sensitive. Therefore, large numbers of such patients are admitted to hospitals for prolonged observation to find the few patients with definite NSTEMI-ACS. Most of these patients ultimately are found not to have had an acute ischemic syndrome, resulting in significant overutilization of resources.

Stress and/or functional cardiac testing play an important role in the diagnosis, risk stratification and initial management of the patient with possible NSTEMI-ACS. These patients generally report typical or atypical angina but have negative biomarkers and a non-ischemic ECG during the initial observation period. At the end of this observation period, the patient can be reevaluated with cardiac imaging (resting nuclear scan or echocardiography), CT angiography and/or stress testing (exercise treadmill test, stress echocardiography, or stress nuclear testing).

Rest Cardiac Imaging

Echocardiography can be useful in the diagnosis of patients with NSTEMI-ACS in certain settings. When the ECG is non-diagnostic because of baseline abnormalities (chronic left bundle branch block, paced rhythms or chronic repolarization changes), reversible wall motion abnormalities that are identified at the time of chest pain can document the presence of ischemia as well as the coronary territory involved and the amount of jeopardized myocardium.

Nuclear cardiac imaging can also be useful in the initial evaluation of patients with possible NSTEMI-ACS. Acute rest myocardial perfusion imaging (MPI) performed during or within two hours of chest pain has a high negative predictive value, ranging from 99% to 100%, for excluding myocardial infarction as well as for predicting the absence of future cardiac events.^{3,4} In fact, current guidelines recommend that patients with possible NSTEMI-ACS and normal acute rest MPI results do not need to be hospitalized. Multiple studies, including prospective randomized trials, have shown that these patients may be safely discharged from the ED and scheduled for an outpatient stress test and follow-up within one week.^{5,6} These studies have also shown significant cost savings, as well as shorter lengths of hospital stay.⁷ Alternatively, patients with abnormal acute rest MPI results have a high probability of NSTEMI-ACS and require hospital admission for observation and treatment.

Neither of these tests require any significant amount of preparation time, and they do not require the patient to be NPO, or to avoid any medications.

CT Angiography

ECG-gated coronary CT angiography with intravenous administration of iodinated contrast has now been in use for more than 10 years. Coronary CT angiography requires sophisticated equipment for acquisition and analysis, and continued technical improvements in CT equipment have made acquisition of high-quality non-invasive coronary angiograms widely available, with significantly reduced levels of radiation exposure. Coronary CT angiography has been evaluated in multiple emergency department-based studies. In this setting, it is of most use in rapidly and definitively evaluating patients who have chest pain, but in whom the clinical assessment suggests that there is only a low to intermediate likelihood that the presentation is related to coronary heart disease.⁸

In a patient who presents to the emergency room with possible NSTEMI-ACS, a CT coronary angiogram can be performed during a single breath-hold; if the angiogram is normal or nearly so, the patient can be safely discharged much more quickly than would be possible if multiple serial ECGs, troponins or stress testing were to be performed.

Section 1.D: Imaging and Diagnostics in Acute Coronary Syndrome (continued)

Because the test requires ECG-gating, patients with arrhythmias are typically not candidates for a CT angiogram. As well, patients with significant tachycardia can be difficult to evaluate due to artifact caused by the rapid motion of the heart. Therefore, patients who are to receive a CT angiogram typically will be given a dose of a beta-blocker prior to the test in order to slow the heart rate, allowing for a higher diagnostic capability. This can be administered either intravenously or orally.

Appropriate use guidelines published by the American College of Cardiology/American Heart Association support the use of coronary CT angiography for definitive diagnosis of both patients with acute symptoms suspicious of acute coronary syndrome, but low to intermediate probability of coronary artery disease.⁹

Stress Testing

Stress testing plays a role in the risk stratification of patients with NSTEMI-ACS and an intermediate probability of having CAD.¹⁰ Patients sent for testing need to be carefully selected, as those at high risk for adverse outcomes (patients with recurrent rest angina, hemodynamic instability or severe LV dysfunction despite medical therapy) would not benefit from further risk stratification. Those patients should be referred for coronary angiography. Likewise, patients with a low likelihood of CAD after the initial evaluation also should not receive noninvasive testing, as even an abnormal test finding is unlikely to prompt additional therapy to reduce risk further.

Most patients presenting with NSTEMI-ACS, however, do not fall into these clearly high- or low-risk categories and are therefore appropriate candidates for risk stratification with noninvasive testing. The patients who are candidates are those who are pain-free, have either a normal or non-ischemic ECG, and have normal cardiac biomarker measurements on admission and after six to 12 hours of observation. In some settings, a more rapid “rule-out” can be performed, shortening the time down to two to four hours. These patients may be considered for an early symptom-limited stress test in an attempt to elicit ischemia. This can be performed as an alternative to inpatient admission from the ED or even as an outpatient within 72 hours. Importantly, patients who are referred for outpatient stress testing should be given precautionary pharmacotherapy (e.g., Acetylsalicylic Acid, sublingual Nitroglycerin and/or beta-blockers) while awaiting results of the stress test.

Type of Stress Test

The choice of test depends on the patient’s ability to exercise and the availability of different testing modalities at the individual institution. Patients who are capable of exercise and who have a normal or near-normal ECG can be evaluated with routine symptom-limited exercise stress testing. Patients with an ECG pattern that would interfere with interpretation of the ST segment (LV hypertrophy, resting ST-segment changes or paced rhythms) should have an exercise test with either nuclear perfusion or echocardiography imaging. Those who cannot exercise and those with a chronic left bundle branch block should receive pharmacological stress testing. A general consensus holds that nuclear stress tests have higher sensitivity for the detection of ischemia, whereas a stress echocardiography has higher specificity.^{1,2}

Typically, beta-blockers or other rate-controlling medications would be held prior to the test, so as to allow the attainment of a target heart rate and a level of exertion that would be diagnostic for the evaluation of ischemia.

It is also important to note that caffeine can interfere with the interpretation of adenosine-based pharmacologic stress testing (adenosine, dipyridamole, regadenoson), and therefore should be held for 24 hours prior to the test.

Section 1.D: Imaging and Diagnostics in Acute Coronary Syndrome (continued)

Stress Test Interpretation

Provocation of ischemia or ischemic ECG changes at a low workload is usually the result of significant disease and is associated with an increased risk for adverse outcomes. These patients generally should be referred for coronary angiography. Alternatively, the ability to achieve a higher workload (> 6.5 METS) without evidence of ischemia is associated with a better prognosis; these patients can often be safely managed conservatively.

The imaging modalities can also be used to identify those patients at high risk for adverse outcomes. Findings of severe resting LV dysfunction (LVEF < 0.35), large perfusion defects (particularly if anterior) or multiple perfusion defects of moderate size induced by stress are just a few examples of these high-risk features. Alternatively, normal or small myocardial perfusion defects at rest or with stress or normal stress echocardiographic wall motion or minimal changes in small resting defects identify patients who can be safely managed as outpatients.¹²

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E. Therapeutic Management of NSTEMI-ACS

Unlike patients with STEMI, patients with NSTEMI-ACS usually do not require immediate reperfusion. An initial triage decision should be made regarding whether to pursue an “early invasive” course vs. an “initial conservative” course. Randomized trials have evaluated these two approaches, with most studies in the contemporary era revealing improved outcomes with an “early invasive” approach. These trials have not, however, consistently revealed a mortality benefit. The ICTUS trial, for example, reported a decrease in rates of recurrent NSTEMI-ACS and hospitalization. In patients with a high TIMI score, an “early invasive” approach has more convincingly been shown to result in better outcomes, as reported in the TACTICS and TIMACS trials.

Updated ACC/AHA guidelines continue to favor an “early invasive” strategy, especially in high-risk patients. Once a revascularization strategy has been chosen, adjunctive therapies should be initiated. Antithrombotic therapies play a critical role in the management of the NSTEMI-ACS patient.

I. Antithrombotic Treatment in ACS

Antithrombotic treatment in ACS is discussed in the context of STEMI and NSTEMI-ACS with oral antiplatelets, heparins, platelet-GPIIb/IIIa inhibitors, direct thrombin inhibitors and warfarin.

A. Antiplatelet Therapy

1. Aspirin

Aspirin is the mainstay of antiplatelet therapy in the ACS patient. Evidence of benefit for aspirin in this setting is well-established and unequivocal. Aspirin can be dosed at 81 to 325mg. Current guidelines recommend a dose of 325mg non-enteric coated aspirin at presentation, followed by a maintenance dose of under 100mg.

Dual antiplatelet therapy is standard of care in the contemporary era.¹ There is currently a range of medications that can be added to Aspirin. These agents have been designed to inhibit the ADP receptor or the GPIIb/IIIa receptor.

2. P2Y₁₂ Receptor Inhibitors

P2Y₁₂ receptor inhibitor therapy is an important component of antiplatelet therapy in patients with UA/NSTEMI and has been tested in several large trial populations with NSTEMI-ACS. Clopidogrel (Plavix), ticlopidine (Ticlid), ticagrelor (Brilinta) and prasugrel (Effient) are all members of this class.

Clopidogrel – The most commonly used ADP antagonist is clopidogrel, which is also the most well-studied medication in this class. In the CURE trial, patients randomized to ASA/Plavix vs. ASA alone benefited from a 20% lower rate of Major Adverse Cardiac Effects (MACE).² As the onset of action is slow for this drug, trials have also looked at different loading regimens. Clopidogrel is absorbed as an inactive pro-drug, and must be converted to its active form by cytochrome P450 enzymes in the liver, specifically CYP 2C19 which can result in drug-drug interactions. Patients with certain polymorphisms in the genes for these enzymes, or who are taking medications that interfere with this enzymatic pathway, may not have as much active drug in their bloodstream, leading to decreased platelet inhibition and significant variability in the degree of antiplatelet effect. Genetic testing is not mandated by the FDA or by the ACC/AHA guidelines at this time. The ACC/AHA guidelines simply recommend consideration of this testing on a case-by-case basis.¹

Section 1.E: Therapeutic Management of NSTEMI-ACS

Ticagrelor (Brilinta) is absorbed as an active drug. It was studied in the PLATO trial, which analyzed the outcomes of 18,000 ACS patients. 65% of these underwent revascularization, and 35% were treated medically.³ The rate of ischemic events was 20% lower in the Ticagrelor group as compared to the Clopidogrel group. Outcomes with Ticagrelor were not statistically superior to Clopidogrel when used in conjunction with a full-dose Aspirin, and therefore an aspirin dose greater than 100mg should not be used. Because of its reversible inhibition of the P2Y12 receptor, Ticagrelor is associated with more rapid functional recovery of circulating platelets. While this may represent a potential advantage for patients with ACS who require early CABG, it may pose a problem for noncompliant patients (especially given its twice-daily dosing regimen). The FDA approved ticagrelor on July 20, 2011. The FDA issued a “Boxed Warning” for Ticagrelor, cautioning against its use in patients with active bleeding or a history of intracranial hemorrhage.

Prasugrel (Effient) is absorbed as an inactive pro-drug (much like clopidogrel), but it is rapidly metabolized by esterases into an active form. It was studied in the TRITON-TIMI 38 trial, which enrolled more than 13,000 patients with ACS, and randomized them to treatment with either Prasugrel or Clopidogrel, with the concurrent use of Aspirin.⁴ In this study, however, all patients were undergoing PCI. Therefore, the findings do not apply to medically managed ACS patients. In patients undergoing an invasive approach, this drug was associated with a 20% lower rate of MACE, driven predominantly by a difference in nonfatal MIs (most of which were asymptomatic).

The TRILOGY-ACS trial compared prasugrel with clopidogrel in medically managed patients with NSTEMI.⁵ There was no significant difference in outcomes.

In TRITON-TIMI 38, Prasugrel was associated with a significant increase in the rate of TIMI major hemorrhage, TIMI major and non-CABG bleeding, as well as higher fatal and life-threatening bleeding. Bleeding risk was higher in patients with prior history of stroke or TIA, or who were older than 75 or weighed less than 60kg. Therefore, this drug is not recommended for use in these populations.

Both ticagrelor and prasugrel perform much faster than clopidogrel, reaching equilibrium in platelet inhibition in under an hour. The absolute degree of platelet inhibition is much more with these two drugs, and the effect is much more consistent. The FDA approved the use of prasugrel and ticagrelor based on data from head-to-head comparison trials with clopidogrel, in which prasugrel and ticagrelor were respectively superior to clopidogrel in reducing clinical events but at the expense of an increased risk of bleeding. It is important to note that the data supporting the use of prasugrel and ticagrelor come solely from single, large trials.

Discontinuation: Caution is advised for discontinuation of these medications prior to elective, non-cardiac surgery. There is significantly increased risk of recurrent cardiovascular events due to the premature discontinuation of P2Y12 inhibitors. It is advisable to consult a cardiologist. Ideally, elective non-cardiac procedures should be deferred until the patient finishes the appropriate course of therapy. Current ACC/AHA guidelines recommend dual antiplatelet therapy for a full year after placement of a drug-eluting stent, and up to a month for a bare metal stent¹. If the patient can tolerate one year of dual antiplatelet therapy that would be optimal. For clopidogrel, discontinuation at least five days prior to surgery is recommended. Discontinuation for a period of at least seven days in patients receiving prasugrel and a period of at least five days in patients receiving ticagrelor is recommended.

Ticlopidine (Ticlid): The use of Ticlopidine is rare in the contemporary era, due to its delayed onset of action and association with TTP. It is not recommended in the 2012 Update to the ACC/AHA UA/NSTEMI guidelines.¹

3. Platelet-GPIIb/IIIa Inhibitors

The surface of a platelet is abundant with glycoprotein IIb/IIIa (GPIIb/IIIa) receptors. Activation of platelets via this receptor leads to conformational change and results in an increased affinity to fibrinogen.¹ This promotes aggregation and linking, resulting in thrombosis. GPIIb/IIIa inhibitors competitively bind to these receptors and therefore inhibit platelet aggregation.

Previously, these agents were used much more commonly. The evidence, which supported their use, predated the trials that established the benefits of clopidogrel, early invasive therapy and contemporary medical treatments in patients with ACS. Now, with routine pre-treatment of patients with thienopyridines, the role of the GPIIb/IIIa inhibitor is less clear. In certain settings, like unstable patients where invasive treatment is unavailable, however, they still may play a role in the management of ACS. For NSTEMI-ACS patients in whom an initial conservative (i.e., noninvasive) strategy is selected, there is less evidence of benefit. Therefore, the use of these agents as part of triple antiplatelet therapy may not be supported, especially in non-high-risk populations or when there is a concern for increased bleeding risk.

The GPIIb/IIIa inhibitors currently available are:

1. Abciximab, a Fab fragment of a humanized murine antibody.
2. Eptifibatid: a synthetic GPIIb/IIIa antagonist with cyclic heptapeptide containing the KGD (Lys-Gly-Asp) sequence.
3. Tirofiban: another synthetic GPIIb/IIIa antagonist and a nonpeptide mimetic of the RGD (Arg-Gly-Asp) sequence of fibrinogen.

II. Anticoagulant Therapy

Anticoagulant therapy is recommended for all patients with NSTEMI-ACS, as rupture of an atherosclerotic plaque is the inciting event in most ACS episodes. Plaque rupture leads to thrombotic occlusion of the vessel lumen. Therefore, interruption of the action of thrombin is a key component of the prevention of continued myocardial damage.

A. Unfractionated heparin

Historically, most patients experiencing an ACS have received unfractionated heparin (UFH). Studies have clearly shown a benefit of anticoagulant therapy over placebo.⁶

B. Low-Molecular-Weight Heparin (LMWH)

Because of the poor bioavailability and marked variability in anticoagulant response among patients treated with unfractionated heparin, alternative medications have been investigated in NSTEMI-ACS. LMWH is associated with a significantly reduced event rate compared with ASA alone and with UFH. The FRISC trial, which used dalteparin, showed a 63% reduction in risk of death or MI during the first six days and also a significant decrease after 40 days.⁷ The FRIC study did not show this result with the use of dalteparin.⁸

In the ESSENCE trial, which used enoxaparin, the composite outcome of death, MI or recurrent angina was reduced by 16% on day 14 and by 19% on day 30.⁹ TIMI 11B showed reduced death, MI and need for revascularization on day 8 from 14.5% to 12.4% and on day 43 from 19.6% to 17.3%.¹⁰ The rate of death or MI was reduced from 6.9% to 5.7% on day 14 and from 8.9% to 7.9% on day 43.

The FRAXIS study showed trends toward more frequent death and more frequent death or MI in nadroparin-treated patients. Long-term benefit — FRISC, FRIC, TIMI 11B — did not show a benefit of treatment beyond the acute phase. In thrombolytic- and aspirin-treated patients with STEMI, LMWH is more effective than UFH and placebo in preventing reinfarction. LMWH is also better than placebo in reducing mortality. The FRISC 11 trial, which had a different study design, showed some benefit of LMWH after three months in a selected patient population in whom angiography was delayed. So ease of administration, reduced need for monitoring and comparable or better results make LMWH a good choice for the general population. However, there is a lower incidence of minor bleeding with UFH.

- C. Fondaparinux:** Fondaparinux is a selective factor Xa inhibitor. It is a synthetic pentasaccharide that is a highly selective inhibitor of factor Xa. Fondaparinux selectively binds antithrombin III, inducing a conformational change that increases the anti-Xa activity of antithrombin III more than 300 times, which results in dose-dependent inhibition of factor Xa.¹¹ In the OASIS-5 trial, fondaparinux was studied in more than 20,000 patients with NSTEMI-ACS. It was associated with a lower risk of death and reinfarction as well as fewer bleeding events. The patients who obtained the most benefit were those who were medically treated.¹²
- D. Bivalirudin:** Bivalirudin is a direct thrombin inhibitor. It is a synthetic analogue of hirudin, which binds reversibly to thrombin. Bivalirudin has been evaluated in clinical trials involving more than 20,000 patients, in the setting of elective PCI, ACS/NSTEMI and even STEMI. Rates of ischemic endpoints are not different with the use of bivalirudin, but bleeding rates are as much as 50% lower, as compared to other anticoagulants.^{13,14,15}
- E. Warfarin:** Therapeutic use of Warfarin is not recommended in the setting of ACS in either the 2007 guidelines, or in the 2012 update.¹⁶ It is recommended only for long-term usage in those patients with additional indications for usage of Warfarin (i.e., atrial fibrillation, LV thrombus, etc.).

III. Non-Antithrombotic Therapeutics

Patients with ACS require many medications during their acute hospitalization, several of which will continue beyond the hospitalization. Some of these medications have highly specific indications depending on risk stratification, type of ACS and likelihood of PCI. These considerations are of most concern in the area of antithrombotics. Therefore, a more detailed discussion of these agents is provided. Most of the other medications, though, are indicated for all types of ACS, and their mechanisms of action should be clear to physicians leading improvement efforts in the area of ACS. For these agents, a briefer discussion follows immediately.

- A. Beta-blockers:** Beta-blockers should be given to all patients with suspected ACS without contraindications. With ongoing evidence of ischemia, chest pain or refractory hypertension, the initial dose should be given intravenously, otherwise if not contraindicated the oral route is preferred. In patients with evidence of hemodynamic compromise, use of IV beta-blockers may actually increase mortality.¹⁷ In patients with known CAD, beta-blockers should be continued at discharge. Relative contraindications include: heart block, symptomatic bradycardia, hypotension, reactive airway disease and decompensated systolic dysfunction. In those patients with cardiovascular contraindications, consultation with a cardiologist may be used to best determine the risk-benefit profile.

- B. Nitroglycerin:** In patients who present with symptoms of ongoing ischemia, particularly chest discomfort, nitroglycerin (NTG), usually sublingually (SL), should be given. If effective, the initial dosing can be followed by a longer-acting route of administration, such as intravenously. Nitrate-induced hypotension is usually fluid responsive. Use of nitrates in the outpatient setting should be considered but is not required for all patients being discharged after an admission for ACS. Patients given prescriptions for SL NTG need to be educated on the proper use of NTG and the role of EMS. Caution should be used in patients with hypotension. Nitrates must be avoided within 24 hours of PDE Inhibitors.
- C. Morphine:** Morphine can be a useful adjuvant therapy in patients with ongoing chest pain, agitation or symptomatic pulmonary venous congestion. Generally, morphine should be used after NTG for these symptoms. Opioid-induced hypotension is usually fluid responsive.
- D. ACE inhibitors:** All patients with ACS complicated by systolic dysfunction and/or diabetes should be prescribed an angiotensin-converting enzyme inhibitor (ACEI) if their blood pressure tolerates it. In addition, an ACEI should be considered for all patients with ACS. If initiated, the ACEI should be continued after the patient is discharged.
- E. Calcium channel blockers:** The role of calcium channel blockers (CCBs) is more limited in ACS than the above medications. They can be used as antianginal therapy (or to control blood pressure) when beta-blockers are contraindicated or when beta-blocker and nitrate therapy is not adequately controlling anginal symptoms. Generally, long-acting CCBs are preferred. Short-acting dihydropyridine CCBs should not be used without the concurrent use of a beta-blocker to prevent tachycardia.
- F. HMG CoA reductase inhibitors (statins):** A statin is indicated for all patients with ACS. Currently, it is recommended to use the highest tolerated dose of a high-efficacy statin. Statin therapy should be instituted prior to hospital discharge, with some data supporting the initiation of statins at the time of ACS diagnosis. The most evidence-based drug is atorvastatin 80 mg/day, which was used in the PROVE IT-TIMI 22 and MIRACL trials. Statins should be continued long-term after discharge. Dose titration can occur in the outpatient setting as needed.

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F. Discharge and Transition Guidelines

More than 30% of discharged patients do not understand the purpose and/or proper use of their discharge instructions on returning home. Careful and well-thought-out transitioning of care among the different settings of the ACS patient is a vital component of optimizing treatment in both inpatient and, eventually, outpatient settings. Although communication during transitions of care is important for all hospitalized patients, it is particularly important for those admitted with ACS. During hospitalization, risk stratification, medications and interventions initiated in one setting (such as the ED) drive important medical decisions in other areas (such as the CCU). In addition, in many components of ACS care, timing is essential. Without seamless transitions, accurate timing can become problematic and interfere with ACS care being outstanding. All transitional communications should be done in a manner that allows an opportunity for questions and review of the data. All stakeholders involved in the treatment of the patient in outpatient or inpatient settings must be included in the transition. Taking into consideration that communication is a core competency of hospital medicine, team members from each care setting must be aware of their integral roles in improving ACS outcomes. This includes prehospital personnel, ED providers, the PCP (if any), cardiology consultants, discharge planners/social workers, pharmacists, consultants if needed to manage comorbidities, nutritionists, cardiac rehab personnel and nursing personnel in every care setting.

I. Prehospitalization

Prehospitalization is a critical point for critical times for the patient with ACS, particularly during a STEMI: decisions not only affect the outcomes but also affect inpatient course and lay the groundwork for care after discharge. For ACS in particular, early identification and understanding of a patient's risk for further ischemic events is critical to determining the therapeutic course, and evidence shows that timely intervention decreases morbidity and mortality.

Notably, the evaluation and risk stratification of patients with ACS are hospitalist core competencies; the initiation of a beta-blocker and antiplatelet therapy are considered by the Center for Medicare and Medicaid Services (CMS) to be core measures by which to measure the quality of hospital care.

Information gathering and evaluation begins in the emergency department and the hospitalist should seek additional medical and medication history from family or caregivers to determine an informed risk assessment. Medication reconciliation should be started during prehospitalization. Getting an accurate medication history may be complicated by the lack of a reliable source and the medical team should involve the patient's family and/or caregivers as a resource to confirm the patient's medications, including OTCs and supplement use. Contact with the PCP is appropriate during prehospitalization to further confirm the patient's history, provide valuable insight and determine upcoming gaps to care during transitions of care and discharge. When available, having a clinical pharmacist in the ED to assist in medication reconciliation and history gathering is immensely helpful. As models of care continue to evolve into an integrated model the process of information gathering should in theory become more efficient.

Whether or not the patient will require immediate coronary intervention, the following information will be required while transitioning care from the ED and/or Outpatient Center. (Please see the flow sheet on the following page.)

Section 1.F: Discharge and Transitions (continued)

Where physician order entry programs are not available, the use of standardized order sets will be extremely helpful for all stakeholders in addressing all clinical standards. The initiation of beta-blockers and antiplatelet medications is vital during this time. [\(Please see the example order sets in the Clinical Tools Section.\)](#)

- Stat ECG;CBC
- INR
- Mg
- CK-MB, troponins
- Fasting lipid
- Electrolytes
- Glucose
- Stool guaiac
- Old ECG
- Records
- Medication reconciliation. Initiation of:
 - Beta-blockers (core measure)
 - Antiplatelets (core measure)
 - Statins
 - ACE inhibitors when indicated
 - Anticoagulation
- Risk assessment
- TIMI score
- Cardiac consult

II. Hospitalization

Communication deficits between the hospitalist and PCP show that recognizing barriers and finding solutions is especially important given the complex nature of ACS and the importance of adhering to secondary prevention measures. A successful transition from the hospital to primary care rests largely on the quality of communication between the hospitalist and the PCP. However, only 56% of PCPs expressed satisfaction with the communication they have with hospitalists, indicating that improvement is needed. The PCPs surveyed noted that direct and frequent communication is desired, with three-quarters preferring to speak with the hospitalist by phone at both the patient's admission and discharge. However, direct communication between providers was infrequent, occurring in only three percent to 20 percent of cases.

Risk assessment should continue throughout the hospital stay as additional diagnostic information is acquired and consultations are provided. Medication history should be re-evaluated 24 hours after the patient is admitted.

Section 1.F: Discharge and Transitions (continued)

During patients' hospitalizations and transitions through different levels of care, it is recommended that stakeholders share the following information. Patients and their caregivers must communicate throughout their hospitalization. In addition, a patient's condition must be communicated with that patient's primary care physician. Discharge planning should be initiated soon after admission, including identification of the needs or limitations that patients or their families may have at discharge.

- ECG (serial if indicated)
 - CBC (if LMWH or UFH is in use for treatment) or PT/PTT (if anticoagulation is required)
 - CK-MB, troponins (serial if indicated)
 - Renal functions (if contrasted studies performed)
 - VTE prophylaxis
 - Old ECG
 - Cardiology consultant
 - Additional consultants
 - Medication reconciliation:
 - Beta-blockers (core measure)
 - Antiplatelets (core measure)
 - Statins
 - ACE inhibitors when indicated
 - Cardiac rehab
 - Case management
 - Patient and family education
 - If angiography documentation of results and intervention if required
- Determining barriers toward transitions
 - Poor literacy
 - Poor English proficiency
 - Poor understanding of medical jargon
 - Inadequate time with the clinician for questions and answers
 - Poor cognition
 - Lack of communication between healthcare professionals, specifically among physicians
 - Financial barriers to medication use
 - Psychological
 - Echo:
 - Type
 - Result
 - Stress test
 - Type
 - Result

Clearly, the amount of information required to be communicated is large. Project BOOST® is a program sponsored by the Society of Hospital Medicine (SHM) to assess areas of risk-specific interventions in continuity of care.

Another tool is Project RED (Re-Engineered Discharge).

III. Discharge and Transitional Care

The optimal time to educate patients and their caregivers about their disease process and treatment is during the discharge process. The date of discharge and necessary ancillary services should be identified to patients and caregivers as far in advance of discharge as possible. Detailed instructions in both the discharge summary and patient instructions should be reviewed with and provided to patients. Outpatient follow-up arrangements should be made prior to discharge. Outpatient follow-up appointments with a PCP, even if the patient does not have one, and with subspecialists, must be provided. Although verbal communication is the standard of care when transitioning a patient's care to the outpatient arena, the discharge summary is often the only tool available to communicate the patient's hospital course and outpatient treatment plan and should be dictated contemporaneously. A detailed explanation of the patient's diagnosis is important, including location of the infarct and/or which coronaries were involved. All complications as well as all comorbidities should be listed.

A detailed explanation of the patient's clinical course, complications, recommended follow-up care for these complications and procedures performed should be included in the discharge summary. If coronary intervention was done, listing the location of stent(s) and the type used is also recommended.

All supporting tests and their results should be added. The results of echocardiogram and stress testing performed during the hospitalization should be included.

The patients' cognitive status should be included.

Medication reconciliation is a major patient safety goal, in addition to a Joint Commission standard. Instructions on titration and duration of these medications should be included in the summary. The following medications should be part of the patient's regimen and discussed in the discharge summary:

1. Beta-blockers
2. ACE/ARB for blood pressure control and EF% less than 40
3. ASA between 81 and 162 mg per day for life. Note dose should be < 100mg if the patient is on Ticagralor
4. Statin
5. Sublingual NTG
6. DAPT (ASA plus clopidogrel, ticagrelor or prasugrel): maintenance dosing for one year on all drug-eluting stents, and a minimum of one month, but one year is recommended.

The following medications should be part of the patient's regimen and discussed in the discharge summary:

See [Appendix H: Discharge Planning Checklist](#) for an example of a discharge summary template.

Discharge Summary

- *Diagnoses* (elaborate)
 - MI — location, complications (heart failure, arrhythmias, hematomas and potential EF%)
- *Comorbidities* — diabetes mellitus, lipids, hypertension, renal disease
- *Medications*
 - Core measures (reason not prescribed)
 - ACE/ARB
 - ASA
 - Beta-blockers
 - Statin
 - Medication Reconciliation
 - SL NTG
 - DAPT: length of treatment should be stated
 - Titration of appropriate medications
- *Procedures*
 - Type of stent (metal versus drug-eluting), location
 - Complications (hematoma, transfusion)
 - If echo
 - Type
 - EF%
- *Follow-up appointment*
 - PCP
 - Cardiologist
 - Appropriate other consultants — cardiac rehabilitation
- *Follow-up testing*
 - ETT
 - Type
 - Time frame
 - Echo — if indicated after NSTEMI and STEMI
 - Pertinent lab work (hemoglobin, INR, LFT if on statin at four weeks, creatinine)
- *Code status*
- *Activity*
- *Diet*
- *Wound care*
 - Groin wound
- *Treatment course*
 - Include patient's cognitive level
 - Discharge LDL
 - Discharge creatinine
 - If on coumadin, INR
 - If on statin, LFTs

[CC to all providers, including home health care]

Discharges Follow-Up Appointment

The discharge follow-up appointment is a very important step in preventing rehospitalizations and is considered a best practice. Project BOOST® and Project RED endorse the importance of creating the discharge follow-up appointment by dedicating one of the foundational components to this concept.

Engaging the Patient and Family in Discharge Planning

The Agency for Healthcare Research and Quality (AHRQ) developed a discharge planning guide that encourages patient and family involvement. The IDEAL Discharge Planning strategy focuses on the patient and family members with the goal of reducing adverse events after hospital discharge and the prevention of hospital readmissions. IDEAL is an acronym standing for the five principles in this discharge approach.

Section 1.F: Discharge and Transitions (continued)

“**I**” for “Include” the patient and family as full partners in the discharge planning process.

“**D**” in IDEAL stands for “Discuss” with the patient and family some key metrics (i.e., describe what life will be like at home, review medications, highlight warning signs and problems, explain the test results and make follow-up appointments).

“**E**” stands for educate both the patient and family at hospital admission and at times of shift change between nursing staff, educate the patient on the medication at the time of administration, and of course on day of discharge.

“**A**” stands for “Assess.” Assess the understanding of the patient or family or caregiver by providing key information in small chunks. Also ask for them to repeat the key information (i.e., teach back so they can explain what they learned).

“**L**” stands for “Listen.” Listen to the patient and/or caregiver and honor their wishes, goals, preferences, etc.

Also consider empowering the patients through educational activities related to their conditions, how to best manage their diet, the importance of medication adherence, etc. These educational activities should be provided to the patient throughout the hospital stay and not just on the day of discharge.

There are other steps that hospitals can employ to encourage patient engagement. **The American Hospital Association (AHA)** released a guide in 2013 outlining five steps hospitals can take to fully engage patients and their families. This strategy was geared to help hospitals become more patient and family focused in their delivery of care. The five steps consist of:

- (1) Developing a clear vision through discussions with patients, families, staff and senior leaders
- (2) Determining improvement opportunities by utilizing feedback from senior leaders, staff and patients and families
- (3) Prioritizing based on existing needs and plan effectively utilizing empowered staff to support the engagement strategies
- (4) Monitoring progress by evaluating select measures that can quickly help you determine whether processes and outcomes are changing; share the results in an easy-to-understand format with your staff, senior leaders and the public
- (5) Providing ongoing implementation support by reviewing the available literature and remaining current with other tools and information about patient and family engagement.

AHRQ offers evidence-based patient engagement tips. These strategies were developed to help hospitals eliminate communication gaps among patients, family members and healthcare providers. The four strategies were field tested and evaluated in three hospitals on the East Coast. The four strategies advise hospitals to:

- (1) Form patient-family advisory councils which help hospitals incorporate the patient’s perspective into the planning, delivery and evaluation of healthcare services.
- (2) Improve front-line communication: upon admission to the hospital, have informational material ready for the patient and or caregiver. Materials can include information on the hospital and/or the patient’s admission. A care coordinator or bedside nurse is advised to go over the material with the patient.
- (3) Explain bedside shift reports: engage the patient and/or caregiver and family in the bedside shift report so everyone is aware of the patient’s status and plans for the day (any tests, medications being started, any procedures being requested, etc.). Consider a door hanger sign that says one of two things (“Wake me please for the shift report” or “Please do not disturb during your shift report”).
- (4) Engage the patient and family in discharge planning: utilize the IDEAL framework from AHRQ to engage the patient and family in the discharge process.

Consider the Physician-Patient Pledge

The physician-patient pledge is a creative way to engage the patient into taking ownership of their health. The creative pledge can actually be a two-way street. Perhaps the physician can also take a pledge with the patient to explain all of their treatment options, be transparent, reinforce the patient's goals, communicate effectively with all healthcare providers involved in the care of the patient and listen and honor the patient and/or caregiver's wishes.

Outpatient Follow-up Phone Calls

Discharge phone calls are one tool that hospitals can employ to help reinforce critical information that patients may forget as they go through the discharge process. The discharge phone call can accomplish a few things, namely review the care plan, confirm that the patients were able to acquire their medications, reinforce medication instructions, remind patients about follow-up appointments and identify any medication-related issues. This intervention can support the inpatient to outpatient transition and help reinforce that the patients need to be engaged in their health. Having a post-discharge phone call can also provide valuable information back to the organization as patients provide their feedback on the process.

With regards to who should make the phone call, a member of the inpatient team might be considered most suitable for this task as they will be familiar or have access to the patient's hospitalization and know key facts about their case including why the patient was hospitalized, what medications were changed, added and/or dropped during the hospitalization, when the follow-up appointment is scheduled and what remaining tests or labs need to be completed or followed-up on.

Transitions of Care Phone Line (“Hot Line”)

Some institutions have created a dedicated transitions of care phone line so patients or their advocates can call with questions related to their medications, hospitalization, follow-up appointments, test results and/or follow-up procedures and tests. This phone line can be staffed by a number of representatives from the healthcare team but may be optimally managed by a pharmacist since many of the issues that surface post-discharge relate to the development of adverse drug events, access to medications or other medication-related problems. This phone line is not intended to serve as a substitute for the post-discharge phone calls by the hospital representative or PCP to the patient, but merely as another resource for the patients or caregivers to access should they have problems after the initial telephone encounter.

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Additional Resources

The Act in Time to Heart Attack Signs

The National Heart, Lung, and Blood Institute's (NHLBI's) Office of Prevention, Education, and Control launched an educational campaign. This collaboration between NHLBI, the American Heart Association, the American Red Cross and the American Council on Aging aimed to educate the public about the importance of acting fast in response to heart attack symptoms.

[View NHLBI's Act in Time to Heart Attack Signs Site.](#)

The National Transitions of Care Coalition The National Transitions of Care Coalition (NTOCC) was formed to bring together thought leaders and healthcare providers from various care settings to address improving the quality of care coordination and communication when patients are transferred from one level of care to another. [Visit the NTOCC website](#) to learn more about the news and resources from NTOCC.

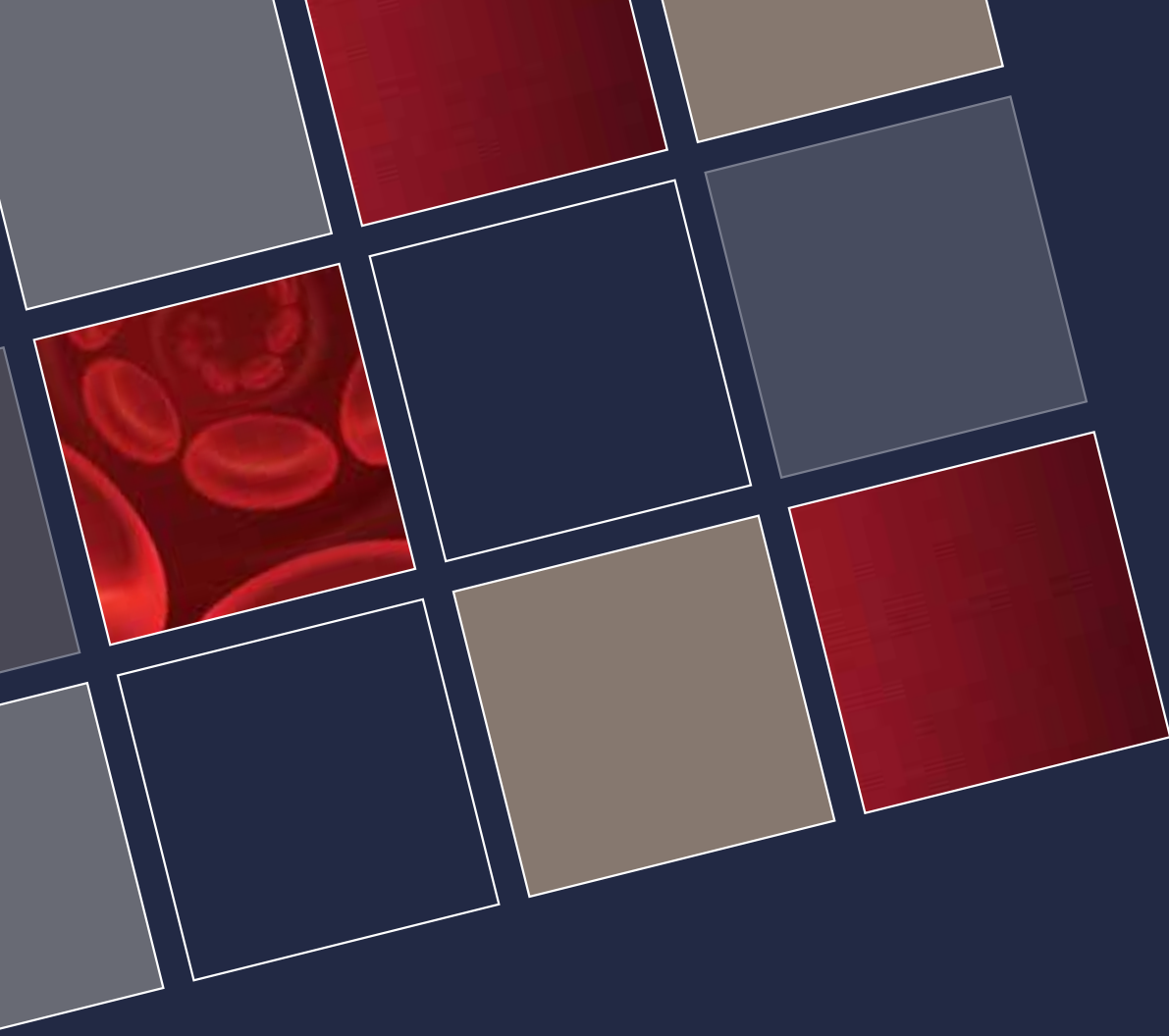
American Heart Association (AHA) Get with the GuidelinesSM (GWTG) The AHA GWTG program provides tools and resources to help the healthcare team to treat patients according to the guidelines. [View the AHA GWTG program.](#)

ACTION Registry[®]-GWTGTM is a risk-adjusted, outcomes-based [quality improvement program](#) that focuses exclusively on high-risk STEMI/NSTEMI patients. It helps hospitals apply ACC/AHA clinical guideline recommendations in their facilities and provides invaluable tools to measure care and achieve quality improvement goals.

Other Advertisement Awareness Campaigns

1. Go Red for Women - The American Heart Association
2. NHBLI (National Heart, Lung, and Blood Institute) and The Heart Truth. Through the power of sharing personal stories related to heart health, the NHBLI and its partners team up to motivate others to make a commitment to lower their individual risk of heart disease.

(See [Appendix H: ACS Discharge Planning Checklist](#) for an example discharge summary template).



Section 2: First Steps Analysis Making a Difference Solutions

Section 2.A: Essential First Steps

A. Essential First Steps

Garnering Institutional Support, Assembling a Team, and Understanding the Framework for Improvement

I. Introduction: Recognizing and Defining the General Quality Problem

Quality Improvement (QI) in healthcare is aimed at improving services and outcomes for patients and populations. It takes place through systematic examination of care delivery and uses a structured process for evaluation and follow-up in order to facilitate and monitor improvement. Quality projects typically develop from the recognition of a gap between the level of care that is optimal and best supported by the evidence, contrasted with the care that is actually being delivered to patients, and can utilize a variety of improvement concepts and tools to facilitate analysis and help guide change. Projects should be designed with specific aims or objectives in mind, emphasize a team-based approach, work within set time lines and use metrics that examine not only outcomes, but care infrastructure and processes as well.

II. Optimal Care for the Inpatient Hospitalized for Acute Coronary Syndrome

When beginning any QI initiative, it is critical to develop an understanding of the subject matter. While team leaders should be thoroughly familiar with the principles of acute coronary syndrome management in the hospital setting, they do not need to be cardiologists. The *Acute Coronary Syndrome (ACS) Toolkit* contains many important reviews, position papers and guidelines on ACS care, and reviewing the annotated bibliography of key literature should bring you up to date quickly. **Section II** provides an in-depth review of current concepts and management recommendations for ACS care as well. Other team members who may contribute expertise that will help facilitate project design and implementation should also be identified early.

III. Looking into the Gap

In order to begin the improvement process, it is important to have an understanding of current processes and standards of care. **In-Depth Analysis of Current Processes and Failures**, can help you look into the details of the care you currently provide, and may help you recognize opportunities for improvement. Numerous quality improvement methods and tools can then be useful in developing your framework for improvement, and are discussed in more detail in **Appendix C**. Examples of well-known improvement methodologies include: LEAN, Six Sigma and the IHI Framework for Improvement. These methods can be helpful in setting an overall strategic plan for your work. Well-known improvement tools include: brainstorming, process mapping, failure mode and effects analysis (FMEA) and PDSA cycle analysis to facilitate rapid change. These tools will be helpful in designing work plans to assist you to reach your stated aims. Once aims and goals are selected, **How Will You Know You Are Making a Difference?** can help provide an overview of metrics related to quality improvement, with emphasis on measures of process, resources and outcomes.

IV. Obtaining Institutional Support

In order to enhance your improvement efforts, your team needs buy-in and support from both local stakeholders and administrative leadership at various levels. Although you may not have robust data on ACS care at the outset, you may be able to use data already being collected for the CMS Hospital Compare and/or PQRI reporting programs, which can then be used to garner additional support and demonstrate the importance of the project. If pre-existing data is unavailable, often a quick review of a small sample of patients can provide you with some numbers to convey the reality and scope of the problem to others, and help you enlist members to join your team. As you are only trying to gather enough information to form a committed multidisciplinary team, methodologic statistical rigor is less important at this stage. [Building the Business Case for Your ACS Improvement Efforts](#), describes some of these issues in more depth as well, and may be used to show that improvements in ACS care delivery can be both cost effective and of higher overall quality. [Appendix B: Draft Memo to Administration or Executives](#) may help provide you with more evidence for your case in making ACS care a priority with your clinical leadership. Regular communication with administration, either by a direct reporting structure or by involving a senior administrator in the team, is highly recommended before you go any further.

Task

Meet with members of your administration. Prepare “talking points” and some preliminary information you have collected demonstrating the need for the administration’s attention. Review the information in [Appendix B: Draft Memo to Administration or Executives](#) and [Building the Business Case for Your ACS Improvement Efforts](#) to help you convince your administrative leaders of the importance of supporting a program to improve ACS care in the hospital. Include local data you have collected as you see appropriate.

Task Assignment _____ (TEAM LEADER)

Time Line for Completing _____ (TEAM LEADER)

V. Stakeholder/Committee/Special Group Reporting and Approval Process

Identifying key stakeholders and determining who needs to be aware of your efforts are important steps for increasing the likelihood of early adoption and implementation of your QI project. Without adequate representation and buy-in from your core groups, it will be difficult to gain credibility for the project and without appropriate input, feedback and tracking, the likelihood of reaching your goals and sustaining success will be very challenging. With regards to ACS care, typically the groups may include representation from:

1. Hospital medicine
2. Graduate training representation
3. Cardiology faculty
4. Cardiology fellows
5. Pharmacists
6. Nursing leadership and staff
7. Voluntary internists
8. Emergency room physicians
9. Nutritionist/dietician
10. Health information department/IT
11. Home care/Social work
12. Observation unit staff
13. Patient safety/Quality departments
14. Representative from administration

Each team must decide who will be the key members essential for the development and implementation of the initiative. Input from other hospital staff outside the core group may be required periodically, and others may serve as ad hoc ACS team members as needed (for example, representatives from billing/coding services or finance).

Task 2A

Identify key stakeholders, committees and special groups that need to be aware of your efforts to improve the quality of ACS care.

Stakeholders:

Committees:

SECTION 2.A: Essential First Steps (continued)

Special Groups:

Task 2B

Clarify the reporting structure and approval process for the recommendations that come from your group. Examples may include approval of order sets, development of pathways as an intervention and approval for specific resources if necessary.

Special Groups:

Approval Process:

Assignment of Task 2A _____ (TEAM LEADER)

Assignment of Task 2B _____ (TEAM LEADER)

Time Line for Beginning and Completing _____

VI. Pulling the Team Together

Members of each ACS team should include a team leader, a content expert, a team facilitator and several process owners, including representation from frontline staff. While projects may often be initiated by regulatory or fiscal mandate from administration, clinical leaders who see a big gap between current practice and well-known standards of care can often be successful in recruiting others to their cause.

A. Team Leader: This is usually a physician lead, and could be a hospitalist, cardiologist, emergency department (ED) physician or other clinical lead. The team leader is responsible for calling meetings, summarizing work plan recommendations and communicating directly with administration and other appropriate medical staff committees. The team leader should be a respected member of the medical staff, with some topical expertise in the treatment of ACS care, but does not have to be considered a formal expert. More importantly, the team leader needs to have the commitment and perseverance to drive the entire process forward, while helping organize the group in a way that emphasizes both structure and participation from all team members. In some cases, there may actually be several small group leads, whose involvement will vary as the focus changes.

For example, an ED physician may lead efforts to improve the transition of the ACS patient from the ED to the floor, whereas a hospitalist may lead efforts to improve the timely initiation of therapies and communication among the multidisciplinary team on the wards. Alternatively, a cardiologist or other individual may lead the entire effort. In any case, a coordinated effort is required across the entire spectrum of care for the project to be successful.

Section 2.A: Essential First Steps (continued)

- B. Content Expert:** A cardiologist may not always be the team leader, and may not always have the time or expertise to spearhead the effort to improve ACS care at your institution. However, cardiology buy-in and assistance in reviewing and formulating ACS order sets, protocols and educational materials are essential, and will lend authority to the team's recommendations and interventions. Approaching and enlisting a prominent and respected cardiologist as an active ally at the onset of your efforts is one of the most important moves to make in forming your team. Because many of the metrics you will be interested in will be driven by external organizations, it is important that your lead cardiologist be aware of, and open to, adapting patient care toward improving these specific metrics moving forward.
- C. Team Facilitator:** The team facilitator's main duties are in helping the group leader with the organizational structure, team rules, setting of time lines and appropriate use of QI tools that can be practically used to facilitate improvement. Mastery of QI tools and concepts at the onset of the project is not necessary; however, a willingness to learn and introduce them to the team as the project moves forward is of great value. Sometimes one person can be both team facilitator and team leader, but for more ambitious projects or for projects involving buy-in from disparate physician and nursing groups, a separate facilitator is very strongly recommended.
- D. Process Owners:** Participation of frontline personnel (physicians, nurses, physician extenders and pharmacists, for example) is essential to having an effective team trying to optimize the treatment of ACS. Adequate involvement from staff who provide the day-to-day care is critical in terms of understanding both the relevant issues and barriers to improvement. Lack of engagement in this regard will hamper your efforts to move forward with implementation.

Task

Fill out the names and contact information for members of your ACS team (see bottom of page 32)* Construct a team roster and group email to help the team communicate.

Task Assignment _____ (TEAM LEADER)

Time Line for Forming Team and Calling First Team Meeting Together _____

SECTION 2.A: Essential First Steps (continued)

Acute Coronary Syndrome (ACS) Team Roster

Team Leader Name _____ Email _____
Phone _____ Pager _____

Team Facilitator Name _____ Email _____
Phone _____ Pager _____

Content Expert Name _____ Email _____
Phone _____ Pager _____

Hospitalist 1 Name _____ Email _____
Phone _____ Pager _____

Hospitalist 2 Name _____ Email _____
Phone _____ Pager _____

Nursing Lead Name _____ Email _____
Phone _____ Pager _____

Internist/PCP Name _____ Email _____
Phone _____ Pager _____

Senior Administrator Name _____ Email _____
Phone _____ Pager _____

Pharmacist Name _____ Email _____
Phone _____ Pager _____

QI Staff Name _____ Email _____
Phone _____ Pager _____

IT Name _____ Email _____
Phone _____ Pager _____

Nurse (Ward) Name _____ Email _____
Phone _____ Pager _____

Section 2.A: Essential First Steps (continued)

PA/NP (Unit)	Name _____	Email _____
	Phone _____	Pager _____
Nutritionist/Dietician	Name _____	Email _____
	Phone _____	Pager _____
Case Manager	Name _____	Email _____
	Phone _____	Pager _____
Laboratory	Name _____	Email _____
	Phone _____	Pager _____
ED Personnel	Name _____	Email _____
	Phone _____	Pager _____
Unit Clerk	Name _____	Email _____
	Phone _____	Pager _____
Patient Representative	Name _____	Email _____
	Phone _____	Pager _____
CPOE Expert	Name _____	Email _____
	Phone _____	Pager _____
Administration	Name _____	Email _____
	Phone _____	Pager _____

*Your team roster may vary from this, and you should be flexible as you move forward, in order to address the different aspects needed to achieve optimal care for the inpatient with ACS at your institution. You may identify only three or four key personnel at the outset, but may draft others onto the team as additional roster needs become clear.**

VII. Quality Improvement Resources

Understanding the basics of quality improvement (QI) methodology, concepts and improvement tools are of major importance for effective project implementation and strategy for improvement. Having an improvement framework that identifies: a) what you are trying to accomplish (aims); b) what changes you will undertake (interventions, or tests of change); and c) how you will know the change is an improvement (measures)*, will dramatically enhance a team's chances of achieving breakthrough improvement that is both effective and sustainable. At least one or two members in your group should become familiar with the general framework for improvement and with proven QI tools and change concepts, and these are reviewed further in the slides on Quality Improvement Theory in the [ACS Toolkit](#). Some examples of change concepts include waste reduction, workflow improvement and reduction in variation, and these can be helpful in setting priorities and strategic vision for the project. Examples of well-known QI tools include brainstorming, process mapping and PDSA (Plan, Do, Study, Act) cycle analysis, and you will find that each of these items in your quality "tool-kit" can be useful in approaching different aspects of your project. Medical center resources — such as a patient safety officer, a QI leader or a QI facilitator — may be available at your institution, and you should identify these individuals and enroll them in your cause in the earliest stages if possible. Other local and national agencies and organizations also offer basic training and information related to quality improvement, and some of these are referenced for you in [Appendix C](#).

*The Model For Improvement; IHI.org.

Tasks

Identify In-house QI Resources.

In-house Resource 1 Name _____ Contact _____

In-house Resource 2 Name _____ Contact _____

Review the slide presentation on Quality Improvement Theory in the [ACS Toolkit](#).

Get more information on a few key tools at the websites listed in [Appendix C](#).

Task Assignments _____

Time Line for Initiation and Completing _____

VIII. Establishing Team Rules

At your very first team meeting, it is helpful to have a general discussion regarding team rules and expectations for the project. Having everyone understand the importance of the initiative, their role in its ability to be successful and the deliverables expected at the endpoint will greatly improve your chances for effective implementation. Some examples of general rules are listed below, and can be used as a starting point; however, the team should be able to modify the rules as needed to support the project over time, then acknowledge and officially record them to ensure consistency. As part of these rules, it should be made clear that potential members notify the leader quickly if they cannot devote the requisite time and effort needed, so that a suitable replacement can be found. Timely minutes, as well as a quick turnaround for comments/corrections, should also be the expectation. The team facilitator is usually given the task of gaining consensus and enforcing the team rules. While to some, team rules may appear a bit “preachy,” the key principle that must be maintained is this: everyone on the team must be encouraged to speak up, and their views must be respected. Traditional concepts of rank have to go “out the window.” A unit clerk should feel comfortable telling the lead physician, “I don’t think that will work because of [reason]. Why don’t we try it this way?”

Task

Establish team rules and post a large, readable version at each team meeting ([Appendix D: Team Ground Rules](#)).

Task Assignment _____

(TEAM FACILITATOR)

Team Ground Rules . . .

- All team members and opinions are equal.
- Team members will speak freely and in turn.
 - We will listen attentively to others.
 - Each must be heard.
 - No one may dominate.
- Problems* will be discussed, analyzed or attacked (not people).
- All agreements are kept unless renegotiated.
- Once we agree, we will speak with “one voice” (especially after leaving the meeting).
- Honesty before cohesiveness.
- Consensus versus democracy: we each get our say, not our way.
- Silence equals agreement.
- Members will attend regularly.
- Meetings will start and end on time.

IX. Establish General Aims

Establishing stated aims and goals early on in your project is essential for maintaining focus and motivating the team, as well as setting appropriate expectations for your initiative. Aims should ultimately be specific, measurable and time defined, and should specify the population or populations for whom you want to improve care; however, until you have a baseline evaluation and reliable metrics, team-supported general aims or goals can still be very important for galvanizing action and establishing clarity of purpose. At the outset, one important task is to define the scope of your efforts. Do you want to limit your efforts to the core CMS and/or PQRI measures, or do you want to expand beyond these almost certain requisite goals? While it is tempting to begin with a broad view of the potential improvement scope affecting all aspects of the care of patients with ACS, starting with more focused efforts utilizing “small tests of change.” followed by spread of your improvement methods to other areas, is a well-tested approach, and may be the most practical depending on your institutional support for QI.

The bottom lines are: a) think BIG, but don't bite off more than you can chew, and b) serial testing and learning on a small scale can make even very large projects more manageable.

Some Examples of General Aims

General Aim 1: Substantially improve ACS treatment/care for hospitalized patients.

General Aim 2: Decrease ACS readmissions.

General Aim 3: Improve the ACS core measures.

General Aim 4: Improve education of patients and healthcare providers about ACS management.

Some Examples of Specific Aims

General Aim 1: Substantially improve ACS treatment and care for hospitalized patients by:

- *Decreasing ACS readmissions by 10% on one designated unit within 30 days.*
- *Improving ACS core measure compliance by 20% on all units within 90 days.*
- *Educating all providers on ACS standards of care on one designated unit within 30 days.*

As your team develops, your challenge will be to further define many of your general aims, which will require developing well-defined metrics and more specific, time-defined goals and deliverables. For example, what aspects of ACS care do you want to improve first? What are the factors that lead to a readmission? Which of the ACS core measures needs the most improvement? How do we educate about ACS care?

Task

Establish General Aims

General Aim 1 _____

General Aim 2 _____

General Aim 3 _____

Task assignment: The Improvement Team

Due Date: First team meeting

B. In-Depth Analysis of Current Processes and Failures

I. Performing an Institutional Assessment of Current Care

One of the first steps in improving care is a thorough survey of your current care environment, order sets, methods for assessing and tracking ACS patients and a variety of other factors. This section provides a framework for such an assessment. Again, you may wish to focus on selected portions of the assessment at first, but eventually, essentially all these items need to be assessed and improved on in order to achieve optimal care.

Note: You might find it helpful to use process mapping when you do your assessment of selected areas of interest.

Process Flow Mapping: A Critical QI Tool has more information on and examples of process mapping.

Assessment Item 1: Institutional Support

- *Is buy-in from administration and a communication/medical staff committee reporting structure defined and in place? Do you have the resources available for forming a team and supporting its efforts in formulating order sets, protocols, educational programs and metrics to optimize the care of the inpatient with ACS? Do you have an executive staff sponsor?*

A team working on an improvement effort this large requires the recognition by hospital administration and medical staff committees of the importance of improving ACS patient care. If you have not already enrolled the administration in your cause, **Obtaining Institutional Support** will assist you in doing so and in defining the medical staff entities your team needs to report to. Because of the importance of ACS quality care measures in the CMS core measures and the PQRI measures, this recognition should be relatively straightforward.

Assessment Item 2: Presence of a Multidisciplinary Team to Address Issues

- *Have you formed a truly multidisciplinary team or steering committee that works on the front lines of healthcare delivery, as outlined in **Pulling the Team Together**? If not, do so now. You will not be able to complete the survey without the knowledge of representatives from all disciplines. Importantly, an appropriate team for the entire spectrum of ACS care will include members who can represent all the areas of a medical center that patients may encounter from the time they enter the emergency department to the moment they are transitioned out of the facility.*

Assessment Item 3: Reliable Data Flow and Metrics

- *What is the dashboard of measures your institution uses to assess its care of patients with acute coronary syndrome?*
- *What is your method for identifying patients with ACS? Do you only include AMI patients, or do you broaden your catchment to include those patients with other ACSs requiring hospitalization?*
- *Is the methodology for acquiring and recording ACS measures standardized and reliable?*
- *Are potential gaps in patient care identified in real time, or is the process retrospective? If it is retrospective, what is the lag time? Is that acceptable?*
- *How is the data communicated to the frontline caregivers?*
- *Are there any concerns about data integrity and accuracy?*

Help on data flow, formulating metrics and presenting data is available in [Section II: In-Depth Analysis of Current Processes and Failures](#).

Assessment Item 4: **Standardized Order Sets for ACS Care**

- *What order sets/protocols for ACS care and monitoring already exist?*
- *Do your order sets include guideline-recommended, evidence-based practices such as rapid identification and risk stratification using accepted methods such as TIMI risk scores, identification of patients requiring immediate cardiac catheterization, appropriate assessment of LV function and stress testing for diagnosis and prognosis?*
- *Do your order sets include guideline-recommended, standardized care processes such as monitoring beta-blocker use, aspirin use, ACE inhibitor use and/or other medication measures?*
- *Does your order set help to achieve success in meeting the ACS core measures?*

Visit the [ACS Toolkit Clinical Tools section](#) for examples of order sets and care maps.

Assessment Item 5: **Inpatient ACS Management**

- *How is care initiated in the ED and then transitioned to the appropriate inpatient setting and provider? When is the inpatient team notified of the patient?*
- *Who takes care of most ACS patients? Are there different care strategies depending on the type of coronary artery disease identified (unstable angina, non-ST-segment-elevation myocardial infarction (NSTEMI), or ST-segment-elevation myocardial infarction (STEMI))?*
- *How is the care coordinated with cardiology? Are specific aspects of ACS care always managed by a cardiologist? How is the care coordinated among hospitalists and other members of the care team?*
- *Are there specific patients who are always cared for by a specific physician group? Are there criteria for this triage decision?*
- *Is there a daily review process regarding a patient's ACS care?*
- *How well is a patient's medical regimen managed? What proportion of patients are discharged with aspirin, beta-blocker or statin therapy?*
- *How is advance care planning integrated into the inpatient management plan?*
- *How are patients evaluated for eligibility for devices such as AICDs? Is there a standard approach across providers?*
- *How are issues related to medications and polypharmacy assessed and managed?*

Assessment Item 6: Transitions of Care

- *Do you have a standard approach for transitioning patients from one setting in your medical center to another, for example, from the CCU to the floor?*
- *What is the readmission rate for patients with ACS?*
- *What are the most common reasons for readmission?*
- *What is the relationship between readmission and core measure performance?*
- *Is follow-up standardized?*
- *Are there any programs available for self-management after discharge?*
- *How is care coordinated with the follow-up physician? What information is transmitted to the follow-up physician? Are there specific mechanisms to assure that appropriate information regarding interventions, particularly stent placement, is communicated to the physician(s) responsible for follow-up?*
- *Is there assurance that the medical regimen on discharge is tailored to the patient, that the patient can afford and understand it, that medications are covered by the patient's insurance, that the patient has defined follow-up and that any specific drug monitoring is clearly understood?*
- *How do you identify patients who need translation of verbal and written instructions?*
- *How is medication reconciliation handled at these interfaces?*

Assessment Item 7: Educational Issues

- *Do you have a comprehensive ACS patient educational process in place?*
- *Is there a template in place for ordering ACS self-management education materials for patients?*
- *Who is responsible for the teaching?*
- *Do you routinely assess the learner as part of the educational process?*
- *Do you include information on community resources and further outpatient education if needed?*
- *Is up-to-date and comprehensive written information provided as appropriate?*
- *Do you have a reliable method to educate the patient whose primary language is other than English?*

Staff education and certification

- *Do you have a complete educational program in place for care of the inpatient with ACS?*
- *Is it widely available via intra- or Internet access?*
- *Is it interactive in the form of learner-based modules?*
- *Are the modules tailored to the nurses? Tailored to physicians and other providers?*
- *If yours is a teaching institution, is education appropriately targeted at house staff?*
- *Does your program address institution-specific order sets as well as general principles?*
- *Is there mandatory participation by key providers?*
- *Is the educational program case based?*
- *Is there any method for tracking participation or competence/understanding of the most important concepts?*

Pharmacy issues

- *Do pharmacists review the use of medications?*
- *Have formulary issues between the inpatient and outpatient settings been identified and resolved?*
- *How has medication reconciliation been integrated into ACS care?*
- *Are pharmacists involved in patient education?*
- *Do pharmacists help ensure patient access to medications prior to discharge?*

Building and Implementing a Comprehensive Educational Program is designed to assist you in successfully building, implementing and tracking the results of a comprehensive educational program.

Performing an institutional assessment can be daunting at first. Remember, you don't have to fix or assess everything at once.

Task

Perform an Institutional Assessment of Your Current Practice

- Task 1** Administrative support assignment _____
Time line for completing _____
- Task 2** Multidisciplinary team assignment _____
Time line for completing _____
- Task 3** Data flow/metrics assignment _____
Time line for completing _____
- Task 4** Standardized order sets assignment _____
Time line for completing _____
- Task 5** Self-management assignment _____
Time line for completing _____
- Task 6** Transitions in care assignment _____
Time line for completing _____
- Task 7** Educational issues assignment _____
Time line for completing _____

Your team should reconvene to discuss the assessments as they become available, and review the assessments as you move to improve each of the focus areas.

II. Process Flow Mapping: A Critical QI Tool

Achieving your quality improvement goals will almost certainly require that substantial changes be made to whichever process you target. Although you may think that you understand the gaps between your current process and the best practice, formally mapping the process will reveal any gaps that would otherwise be overlooked. It will also provide your team with a better understanding of the process in general. Process mapping is simply documenting everything that happens in a given process. [The Institute for Healthcare Improvement \(IHI\)](#) and the [American Society for Quality](#) websites provide more in-depth information about process mapping. Often, the major steps of the process are defined first, and then each step is analyzed in detail (see examples of process flow maps in [Appendix E: ACS Proposed Process of Care](#)). In some cases the major steps in a process can be accurately defined by a single individual (such as the team leader). However, usually no single individual is able to complete a detailed analysis of all the steps. This highlights the importance of the multidisciplinary team in completing this exercise. It is critical that the process map that outlines current care captures the true current state, not an optimized flow. The current state map allows the entire team to reflect on where the opportunities for high-impact improvement may lie.

Once the process is mapped, the gaps between the current process and the best practice will become apparent. The members of the team with the most detailed understanding of the best practice will be able to recognize the gaps and highlight them for the team. The assessment questions, presented earlier in this section, can also help team members to recognize the gaps. It may be that after reviewing your high-impact opportunities, a more drilled-down process map focused on the specific area of interest may be required to identify specific strategies for improvement.

Ideally, this process will leave the team with a list of gaps that need to be addressed in order to achieve the team's goals, and this list will be used to create interventions.

Section 2.C: How Will You Know You Are Making a Difference? Collecting Data and Devising Metrics

C. How Will You Know You Are Making a Difference? Collecting Data and Devising Metrics

I. Introduction

Data collection, analysis and presentation are key to the success of any hospital quality improvement initiative. This is especially true in ACS, where there are multiple core measures and publicly reported data elements, as well as high morbidity and mortality and substantial medicolegal liability. These factors combine to enable the ACS management team to track improvements in processes and outcomes for effective ACS patient management, to make necessary changes to their quality improvement efforts and to provide administrative personnel with financial justification for their time and labor. This section discusses the underlying key principles of data collection, analysis and reporting. The section on collecting data and devising metrics presents an overview of this rapidly evolving field as compiled from a number of groups actively working in this area and the relatively few published reports of this work from the medical literature.

It is the intent of the Society of Hospital Medicine's (SHM's) Acute Coronary Syndrome Advisory Board to provide a practical approach to data collection and measurement of the quality of inpatient ACS management and to provide guidance for more uniform reporting of ACS metrics in the literature. The metrics should be considered in at least two and possibly three domains. Consider using metrics that address structures such as, does your facility have an integrated team to provide rapid assessment and initiation of the cardiac catheterization lab? Is there a coordinated, protocol-driven, evidence-based protocol to guide transitions of care between the ED and the hospital medicine service and between cardiology and hospital medicine? Process measures will be a key aspect of assessing any improvements the team is making. For instance, using door to balloon time can be used as a measure of the process of that integrated team's success in rapidly getting a patient with STEMI to the cath lab. Finally, important clinical outcomes in the areas of intervention should be considered. As example, 30-day mortality may be a particularly pertinent outcome for patients requiring emergent diagnostic catheterization.

II. Underlying Key Principles of Data Collection and Reporting

General considerations

- Prioritize what you collect. Do not be a “DRIP” (data rich, info poor).
- To guide the performance improvement process, it is essential that the ACS team track performance longitudinally using a standard set of metrics.
- At a minimum, CMS core measures data should be collected on ACS, including:
 - (a) Adequate reperfusion therapy for STEMI (fibrinolytic agent received within 30 minutes of hospital arrival or percutaneous coronary intervention (PCI) received within 90 minutes of hospital arrival).
 - (b) Smoking cessation advice/counseling given and documented.
 - (c) 30-day risk-adjusted heart attack mortality.
 - (d) Aspirin at arrival.
 - (e) Aspirin at discharge.
 - (f) ACE inhibitor or ARB for left ventricular systolic dysfunction.
 - (g) Beta-blocker at arrival.
 - (h) Beta-blocker at discharge.
- Measuring outcomes is important, but focusing on performance indicators is essential for obtaining quick feedback and will allow the team to focus on the important steps that lead to improved outcomes.
- Sampling/paper collection is quite acceptable if automated data collection is not yet possible. Collect just enough data to inform the team of baseline processes and clinical performance indicators and whether the team’s efforts are making a difference.
- Carefully define what results are desired; imagine the end product of data collection and reporting, and make sure it’s what the team can use to document progress and prompt continued quality improvement efforts.
- Define how data will be collected and reported and assign responsibility for carrying this out.
- Try different methods and measures — they will evolve over time.

ACS Data

- Automated data collection (and reporting) is preferable whenever possible.
- Use of the core measures data set reduces duplication of work that the institution is already doing.
- Ideally, data should be downloaded to a central database that interfaces with the hospital/system’s main data repositories so that the data can be analyzed in conjunction with patient, service and unit data. Even if data cannot be analyzed using an automated data integration strategy, the more refined the data are the easier it will be to review trends and look for outliers.
- This rapidly generates LARGE amounts of data, so the manner in which data results are interpreted, presented and distributed to stakeholders requires thought, which is optimally done early in the process.
- Service floor— and healthcare provider—specific data are helpful.
- Data collection and analysis should be separated for each point of care applicable to the overall improvement plan, including the emergency department and critical care and non-critical care units, because the processes and goals of care of each of these care settings are distinct. Providers in these areas will respond more favorably to “their own data” than to aggregated, non-attributable institutional data.

Section 2.C: How Will You Know You Are Making a Difference? Collecting Data and Devising Metrics (continued)

III. Structure Metrics

The typical ACS quality improvement program revolves around critical evaluation and improvement of the structure of ACS care: processes, protocols, team composition and responsibilities, and systematic feedback to and within the team. Not all quality improvement programs in the area of ACS will have structure outcomes, but in order to change outcomes (the ultimate goal), there must be a structure that can support the implementation of processes that are felt to lead to better outcomes. This is the most basic step in a quality improvement project. Examples in the area of ACS might include:

1. A multidisciplinary cardiac catheterization initiation team that does not require a cardiologist to start the process of STEMI care.
2. Communication tools that allow better hand-off of information around ACS care as a patient moves through the system.
3. Order sets for patients with ACS that are tailored to their risk based on formal risk stratification tools. Visit the [ACS Toolkit Clinical Tools](#) section for examples of order sets and care maps.
4. Embedded clinical decision support systems for institutions that have EMRs in the area of ACS.
5. A comprehensive method in place to review and update the tools utilized in ACS care, whether they are hand-off (transition of care) tools, paper order sets or embedded electronic decision support.

IV. Process Metrics

Process metrics are probably the most useful metrics for assessing the success of interventions in ACS. They are used to determine if the steps anticipated to lead to better outcomes are being met. They could include categories such as:

- Use of forms or pathways (visit the [ACS Toolkit Clinical Tools](#) section for examples of order sets and care maps).
- Adherence to recommended prescribing patterns.
- Door-to-balloon.

Most of the CMS core measures are, in fact, process measures. They are used because they are easier to measure, directly correlate with the ACS treatment team's efforts and are probably more responsive to an intervention than outcome measures. It is important to realize, however, that improving process measures is only an intermediate step and does not assure improved outcome measures. These are better conceived as two-layer metrics. In the first pass, all patients with ACS would comprise the denominator. This allows access to the raw numbers of how many patients are meeting the quality measure. However, it may be of more interest to know the percentage of patients *without a contraindication* who met the measure. In this metric, the denominator would be smaller than the overall denominator. Current core measures related to ACS include:

- *Percentage of patients receiving ASA* — this is a core measure. If not given during the hospitalization, documentation should reflect the reason for not giving the medication.
- *Percentage of patients receiving beta-blocker* — this is a core measure. If not given during the hospitalization, documentation should reflect the reason for not giving the medication.
- *Percentage of patients receiving ACE/ARB* — indicated for blood pressure control and EF < 40%. This is also indicated as a frontline BP medication for diabetics if tolerant with beta-blockers.
- *Percentage of patients receiving statin* — standard of care for all ACS patients.
- *Percentage of patients receiving dietary consultation* — standard of care for all ACS patients.
- *Percentage of smokers receiving smoking cessation instructions* — standard of care for all ACS patients.
- *Percentage of delayed reporting of high-risk abnormal labs* — patient safety issue. This is measured in order to seek out opportunities for process improvement.
- *Percentage of patients receiving cardiac risk assessment* — standard of care for all ACS patients.

Section 2.C: How Will You Know You Are Making a Difference? Collecting Data and Devising Metrics (continued)

- *Percentage of patients with LVEF recorded on dismissal* — it is important to recognize patients with EF < 40% in order to initiate therapy against unfavorable remodeling of the left ventricle.
- *Compliance with documentation of communication with primary care physician (PCP)* — patient safety issue. This is measured in order to seek out opportunities for process improvement in transitions and continuity of care.
- *Compliance with medication reconciliation* — patient safety issue. This is measured in order to seek out opportunities for process improvement. It is an important Joint Commission standard.
- *Percentage of appointments with PCP within one week* — patient safety issue. This is measured in order to seek out opportunities for process improvement in transitions and continuity of care.

V. Outcome Metrics

Outcome metrics are not only important for public reporting and assuring payors of quality performance, they also directly indicate how well patients are faring in the institution. These are the metrics that are the most important to improve and should tie directly into the quality goals. Outcome metrics may reflect clinical outcomes, cost savings outcomes or hospital performance outcomes. A quality improvement project may have more than one goal, but it is important to maintain a practical and feasible approach, especially at the beginning. For example, ACS mortality can be affected by a multitude of internal and external factors, some of which are outside the scope or control of the improvement project. It is sensible therefore to approach such projects in a stepwise fashion, focusing on those factors that are controllable and can be improved upon, and then the impact of each of those efforts on the broader outcome can be assessed. Examples of outcome metrics might include:

- In-hospital mortality (a recommended metric).
- 30-day risk-adjusted heart attack mortality (a CMS core measure).
- 30-day readmission rates (a recommended metric).
- Percentile performance on specific metrics listed at <http://www.medicare.gov/hospitalcompare/>.

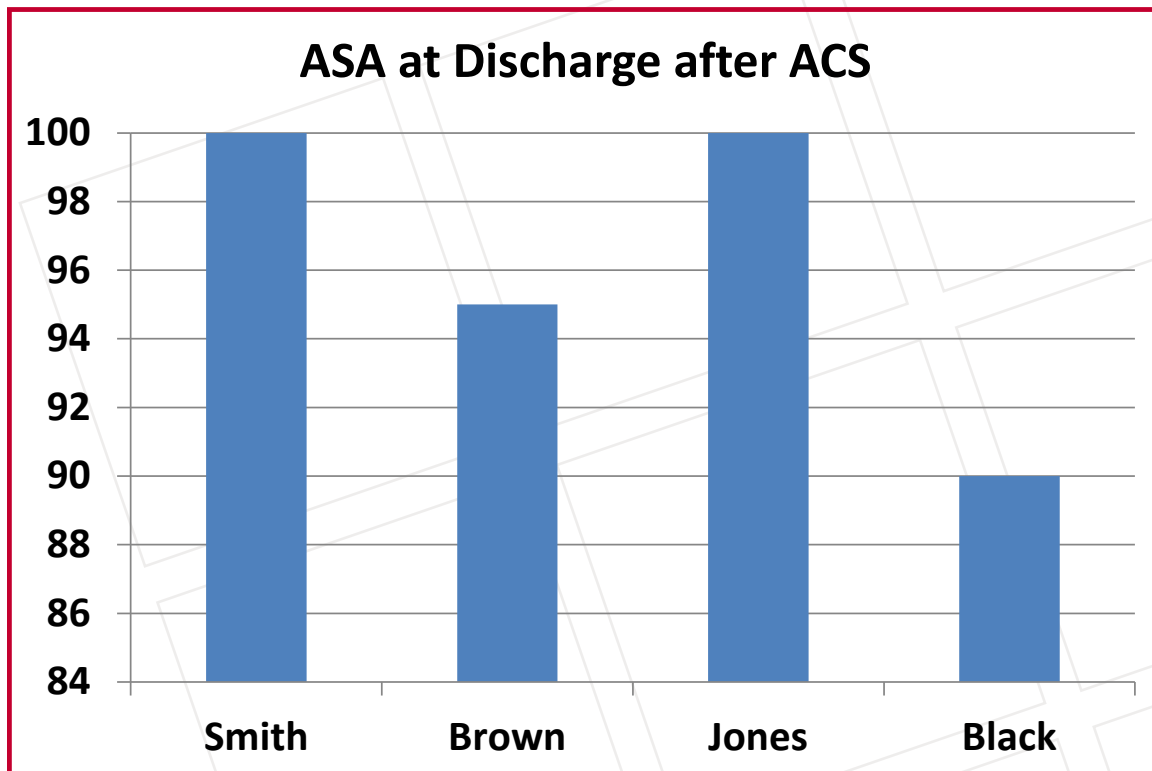
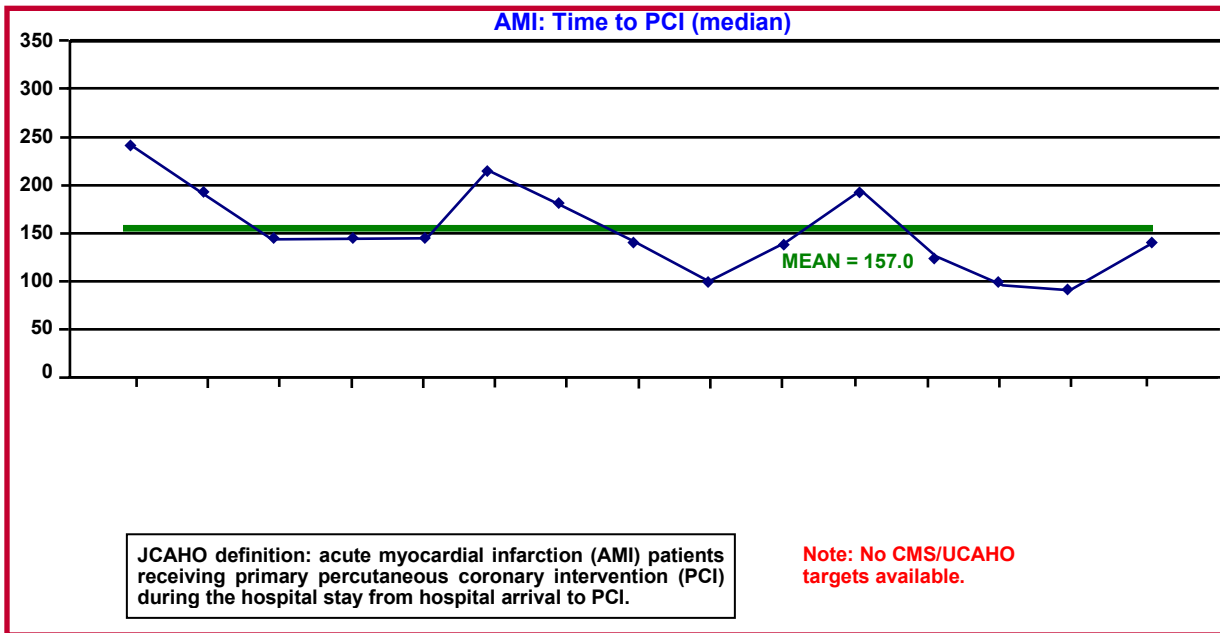
VI. Trending Data Over Time: Run Charts

Metric data can be presented in multiple formats, including tables, bar graphs, pie graphs and run charts. Although tables of average performance may be the easiest to build, it may not be the most useful way of representing the data. Stakeholders can gain a better overall understanding of data when they are shown in different graphical presentations. For data associated with changes over time, strongly consider using run charts. Run charts have several advantages over before-and-after summaries: it is easier to see the effects of different aspects of interventions on specific measures as they occur, a quicker picture of whether an intervention is working can be developed (although one must be careful not to jump to conclusions too quickly with too little data), it is easier to separate out the impact of an intervention from broader trends and it is intuitively easier to interpret data graphically displayed as a run chart rather than as a table. Important components of run charts include: (1) well-labeled axes, with time usually on the X axis and performance on the Y axis; (2) a clearly marked line identifying the goal rate that is easy to see; and (3) points connected with a line that demonstrate actual performance over time. Time stamps, often using a vertical line, should highlight different components of the improvement project or external changes that may affect the metric of interest. In the example on the following page, minutes to PCI is on the Y axis, and time is on the X axis. The green bar marks the target and the points, and the blue line designates performance.

Section 2.C: How Will You Know You Are Making a Difference?

Collecting Data and Devising Metrics (continued)

Bar graphs may be most helpful when looking at data at a more refined level than the entire medical center. If, for instance, physician-to-physician variation is being studied, graphs in which each physician of interest is represented by a bar are more intuitive to interpret. In these graphs, the Y axis should be performance and the X axis should be physician or physician group. Each bar should have confidence intervals associated with it to better describe how precise the estimates are. It is helpful to use a horizontal line across all the bars to demonstrate average performance.



Section 2.C: How Will You Know You Are Making a Difference? Collecting Data and Devising Metrics (continued)

VII. Assessing Processes of ACS Care

As new order sets, algorithms and guidelines are implemented, the quality improvement team will need to assess whether its efforts are leading to the desired changes in practice. A finding that outcomes of interest are suboptimal after an intervention demands further investigation. For example, it may be that new order sets, developed to improve the quality and consistency of care, might not be used uniformly. Their use might require encouragement, incentives (or disincentives) and monitoring.

If the new tools are not being used, explore the reasons why. Are they not usable or available? Are they too distant from current work flow? Do the end users not have adequate buy-in with the tools? These are key questions to answer if care is to be improved. Once tools are being used, it is important to consider ongoing monitoring of their use. A change in tool use later should prompt an investigation for the root cause of the change. Perhaps operative definitions have changed, or staff members previously assigned to this area have been reassigned, or the tool itself needs revision.

Although systematic collection of data continuously over time may be optimal, sometimes it can be very overwhelming for individuals primarily involved in patient care to imagine developing a sustainable system of ongoing data collection. To this end, it is important to be mindful of resource constraints and consider using strategies such as intermittent sampling to help identify a gap and monitor it over time. This approach has limitations, but offers a way to help teams less familiar with data collection get started. It is better to monitor at a lower level than not to monitor at all.

Consider using summary graphs and/or run charts rather than raw data as the improvement process proceeds and is monitored. Also, remember that although average time and average rate of compliance may be key numbers for reporting and reviewing performance, understanding the variation around these averages can be even more helpful in understanding why performance is not meeting desired targets.

VIII. Going from General Aims to Specific Aims

It is in this step that actionable and measurable goals are set. The basic goals will remain the same; it is just that based on understanding how change will be measured, where the process starts and what aims are realistic, one will be able to articulate a much clearer goal. These goals should be derived from baseline data and should be associated with a specific time frame for monitoring and desired improvement.

Here are some examples of converting a general aim to a specific aim:

General Aim: To transition patients with STEMI to cardiac catheterization faster.

Specific Aim (Option 1): To reduce the average door-to-PCI time from 145 minutes to 90 minutes within six months.

Specific Aim (Option 2): To increase the percentage of patients whose door-to-PCI time is 90 minutes or less from 25% to 90% within six months.

Specific Aim (Option 3): To reduce the percentage of patients whose door-to-PCI time is greater than 300 minutes from 10% to less than 2% within six months.

Note that each of these specific aims is related to the general aim, is measurable and yet might suggest a slightly different approach to the intervention. Understanding which aim best fits the institution's needs is possible only after reviewing baseline data to look for patterns, trends and outliers.

Section 2.C: How Will You Know You Are Making a Difference? Collecting Data and Devising Metrics (continued)

IX. Building the Business Case for Your ACS Improvement Efforts

Building the business case is an essential part of quality improvement efforts, particularly those that require significant institutional investment. Remember, investments are not only dollars spent but also time and resources spent. Fortunately, ACS is a sufficiently high-profile clinical, reporting and medicolegal issue that it is unlikely a “hard sell” will be required for appropriate and necessary resources. In this clinical area it is much more likely that institutional leaders will be asking for evidence of improvement rather than to prove the worth of the effort.

Because ACS care yields a large number of richly data-driven interventions, many external agencies have made ACS quality metrics a cornerstone of their quality assessment. Most important are those managed by the federal government. The CMS hospital core measure set has several AMI quality metrics that are referred to throughout this *Guide*. The Physicians Quality Reporting Initiative (PQRI), also managed federally, has a similar emphasis on measures of patients with coronary artery disease.

These initiatives are steadily transitioning from pay-for-reporting to pay-for-performance. Core measures results may impact payors' positions on contracts with hospitals. All-cause 30-day readmission after MI can have significantly negative financial implications for hospitals. The performance of all hospitals that report their institutional data is published publicly on the Hospital Compare website. It is quite simple not only to look at one hospital but also to compare the performance of competing hospitals on these measures of ACS care. No administrator wants his or her hospital to be at the bottom in this sort of high-profile public setting, nor can the typical hospital absorb financial penalties for poor performance. These realities will position institutional support firmly behind ACS quality improvement efforts.

D. Moving from Problems to Solutions

I. Multidisciplinary Teams — Developing Interventions: Linking the Improvement Team and the Care Team

The role of the improvement team is to optimize ACS care delivery, much of which can be accomplished through standardization and incorporation of specific, evidence-based practices into routine care delivery. Routinization and consistency are critical to success. Across a population of patients, one of the most common sources of suboptimal care is interprovider and even intraprovider inconsistency. In fact, a graph that depicts improved system performance over time almost always shows a progressive narrowing of the range of performance data points.

The development of protocols that help to standardize the care delivered is an essential part of improved care delivery. The best protocols provide standardization while preserving the ability of the clinician to use his or her best judgment to customize care for special patient situations or circumstances. Unlike deviation from the protocol that arises from nonadherent provider behavior or lack of interest or familiarity with a protocol, variation that occurs because of special patient situations is acceptable when the reason is documented and the action is clinically sound. The protocol should make that clear. The best protocols follow straightforward principles.

Principle 1

Keep it simple and intuitive for the end user. There will inevitably be trade-offs between the depth of the detailed guidance the team wants to give providers, and the simplicity of the forms and processes the end users must follow. Most of the time, simpler is better. Minimize the number of unnecessary steps.

Principle 2

Try to avoid interrupting the existing work flow. The proposed intervention needs to fit into the work flow of the care team and cannot diminish efficiency. Ideally, the intervention would improve efficiency and eliminate waste and rework. Involve frontline workers in alpha- and beta-testing to make sure plans are feasible and that order sets/protocols are easy to use. Default orders that articulate the starting point for the care of most patients are a good place to begin to standardize care. Get input from frontline staff on how to make implementation go smoothly. Clinicians should want to use new order sets and tools if they are constructed properly.

Principle 3

Design reliability into the process. The healthcare setting is incredibly complicated. Part of the improvement team's mission is to engineer higher reliability into the processes of ACS care. The results are likely to be disappointing if a new protocol, despite any and all fanfare around its launch, relies solely on such traditional methods as standardized order sets, personal checklists, "working harder next time," feedback on compliance and "awareness and training."

**Adapted from the Developing Interventions — Linking the Improvement Team and the Care Team chapter of the [Heart Failure Implementation Guide](#), by Lakshmi Halasyamani, MD.*

All these methods are helpful (and some are necessary), but they are not sufficient for achieving breakthrough improvement. To have a greater likelihood of success, at least one of the following methods must be designed into the quality intervention to enhance the probability that each patient will receive the correct kind of therapy for his or her particular clinical scenario.

High-Reliability Strategies

Desired action is the **default** action (not doing the desired action requires opting out).

Desired action is **prompted** by a reminder or a decision aid.

Desired action is **standardized** into a process (take advantage of work habits or patterns of behavior so that deviation is immediately noticed by the provider).

Desired action is **scheduled** to occur at known intervals.

Responsibilities for desired action are **redundant**.

Algorithms and reminders are **incorporated** into the order sets.

Examples of these methods as they apply to ACS:

- Incorporate metrics for door-to-PCI data into the ACS admission orders set.
- Develop forced functions that require a specific action to be taken or the reason it is not to be documented — such as documentation about why an aspirin (immediately) or beta-blocker (within 24 hours) is not administered to patients with ACS.
- Make sure orders are pertinent to each care environment and facilitate transition to the next care environment, such as 324mg ASA in the ED and 81-162mg ASA daily thereafter.
- Integrate daily data review into processes for multiple members of the care team.

Principle 4

Pilot the protocol/order set on a small scale before attempting wide implementation. Inevitably there will be changes required that simply are not appreciated until the protocol is actually used in patient care. It's best to “fail faster” by piloting on a small scale and making those needed adjustments before expecting the protocol to be implemented more broadly. The pilot can be as simple as a paper algorithm that a handful of providers on one unit use for a two-week period.

Principle 5

Monitor the use of the protocol and order set: expect variation from the protocol and learn from it. Over time, reduce variation by incorporating provider behavior such as shortcuts and workarounds that remain consistent with the evidence basis. Rolling out the protocol is really only a beginning. Learn from variations in your process. Why isn't the order set being used in some areas? Can it be integrated into other heavily used order sets? Which service needs more focused educational efforts? Which patient types just don't “fit” into the protocol — can the protocol be modified so that it fits more patients and situations? The idea is to minimize practice variability while retaining variation based on clinically appropriate adjustments for individual patient factors.

II. Layer Interventions — Beyond Protocols: Layering Reliability

Consider the following hierarchy of reliability in implementing programs to enhance ACS care. Keep in mind that the improvement team is creating several linked protocols and order sets. These levels pertain to each protocol and order set and transitions to the next care setting must be incorporated into them. Focusing on only one aspect of care (such as risk stratification occurring in the ED) will result in suboptimal management as patients flow from one setting to the next.

Level 1 *State of Nature, i.e., Chaos*

The institution has no standardized order sets or protocols. Reliance on individual expertise and experience is the only strategy to achieve quality care. Expect:

- ACS core measure performance to be uneven across measures and/or across time.
- Uneven training/knowledge by providers.
- High rates of preventable readmissions.
- Dissatisfaction of patients with the care they receive for their ACS.

Level 2 *Average: Incomplete Order Sets/Protocols*

- The institution has order sets with some but not all information necessary to effectively manage patients with ACS.
- Detailed guidance is available in stand-alone protocols, but these are not well integrated into the order sets or work flow.

Level 3 *Integrated Order Sets/Protocols*

Level 3 is the entry point for most serious QI efforts; some would term this method “indication-based order sets,” meaning each order set is for a specific purpose (e.g., primary diagnosis of ACS versus secondary diagnosis of ACS), and some guidance for proper ordering, administration and monitoring is integrated into it. Aids for decision making created by the multidisciplinary team are available to support clinicians at the point of care or in the order sets. However, clinicians may be frustrated in having to enter multiple order sets and work through redundant information.

Remember that providers should always retain the freedom to deviate from the protocol specifically to meet the needs of a given patient. Eventually, with successive refinements, the protocol should drive management choices for the great majority of patients.

Level 4 *Specific Algorithms and Protocols*

The general order sets and protocols are supported by more detailed, comprehensive, institution-specific algorithms and protocols that promote a standardized and evidence-based approach, and additional performance-improvement strategies are used. Furthermore, patients with either a primary or secondary ACS diagnosis are identified, and ACS care is optimized across the care continuum.

Guidance from local algorithms and protocols is reinforced at the point of care whenever possible. Remember, some trade-offs are inherent to this more guided and algorithmic methodology. As more and more of your preferred algorithms and regimens are integrated into the order set, variability in ordering is reduced because the choices available to prescribers and patients are more limited. Also, education must continue, as always, because healthcare providers must understand the rationale for the protocol in order to know when to wisely deviate from it. At Level 4, the care of 70%-80% of an institution’s patients with ACS may be optimized—a significant gain representing excellence.

Level 5 *Oversights “Identified and Mitigated”**

Achievement of Level 5 represents a profound leap in quality. At this level, care is improved by an order of magnitude, which is a rare achievement in healthcare. All the conditions of Level 4 exist, plus there is now a strategy to identify and address those management oversights that inevitably occur. Level 5 may be impractical or unsustainable without an electronic-reporting mechanism and proper metrics, which were reviewed in [Section II.C](#).

Section 2.D: Moving From Problems to Solutions (continued)

Level 6 Achieving True Excellence

As in Level 5, almost all patients receive ACS care and other testing/therapy per protocol, and every patient not addressed by the protocol is channeled through the identify-and-mitigate strategy. In level 6 the efficacy of mitigation itself is immediately assessed, and its own failures are immediately remedied. Most importantly, the failure modes of mitigation are systematically analyzed and eliminated.

The table below outlines several quality improvement strategies to consider, most of which can be used to leverage having ACS management protocols in the work flow. Providers, pharmacists, nurses, even patients can refer to the ACS protocols for clarity, confidence or advocacy. With additional layers to the overall ACS effort, include at least one high-reliability mechanism in the design.

*Nolan T, Resar R, Haraaden C, Griffin F. White Paper: Improving the reliability of health care. Institute for Healthcare Improvement. Innovation Series 2004. Available at: <http://www.ihl.org/IHI/Results/WhitePapers/ImprovingtheReliabilityofHealthCare.htm>. Accessed December 1, 2006.

Armamentarium of QI Strategies

QI Strategies	Specific Ideas for Management
Provider education	Didactic sessions on ACS (e.g., noon conference, grand rounds, etc.) or, better yet, comprehensive educational programs with mandatory participation and performance (certification). Distributed educational materials (e.g.,pocket cards, handbooks). Intranet or Web-based educational programs.
Provider reminder systems	Prompts nested within paper admission/transfer/post-op order sets supported by guides for insulin ordering (insulin protocol). Prompts within CPOE to follow ACS care recommendations. Stickers on charts or posters in order-writing areas.
Facilitated relay of clinical data to providers	Alerts to physicians by means other than the medical record (e.g., page, electronic alert, phone call, email to provider about patients with gaps in ACS care or patients not on recommended therapies).
Audit and feedback on performance to providers	Feedback on core measure performance, readmission rate and mortality to individual providers or groups of providers (with or without benchmarking top performers).
Patient education	Programs dedicated to assessing the learner, teaching “survival skills” (especially in the immediate post-discharge period) and other materials (e.g., pamphlets, physician or nurse teaching patient or caregiver, closed-circuit TV program in patient rooms).
Organizational or operational change	Administrative support personnel dedicated to ensuring preview of tools and development of patient education materials. Clinical support personnel dedicated to collecting data and creating useful reports on ACS management (see Section II.C: <i>How Will You Know You Are Making A Difference? Collecting Data and Devising Metrics</i>). Hospital-wide (or unit- or service-specific) teams or individuals with regular responsibility to focus on ACS management.
Incentives, regulation and policy	Provider directed: Honor recognition of highest performers each month or quarter. Financial incentives based on achievement of ACS management goals. Punitive actions for failure to meet minimum performance or to cooperate with improvement efforts (suspension of privileges, stockade in town square, etc.). Health system directed: Enforced policy mandating use of ACS management protocols and order sets (e.g., patient cannot be discharged without having appropriate HF instructions.).

Source: Adapted from Shojania KG, McDonald KM, Wachter RM, Owens DK. Series Overview and Methodology. 2004. Closing the Quality Gap: A Critical Analysis of Quality Improvement Strategies; Vol. 1. Available at: <http://www.ahrq.gov/downloads/pub/evidence/pdf/qualgap1/qualgap1.pdf>.

III. Action-Oriented Learning: Plan–Do–Study–Act

No plan survives its first contact with reality, particularly if it aims high. Especially in the complex hospital environment, there will always be unforeseen glitches when trying to change and improve entrenched practices. Rapid cycles of action-oriented learning using the Plan–Do–Study–Act (PDSA) model may allow quality teams to start small, then scale up quickly.

Start by planning (Plan) an intervention and then testing (Do) it. The next step (Study) is critical. Observe the test, paying close attention to competing demands and physical space. Most important, ask those involved in the test what worked and what did not, and listen carefully. Ask them for alternative ideas, pitch others and talk it out. The idea is to get a read on what could or should be done differently from how the team originally planned it. The last step is to make changes in the original intervention to improve its performance (Act).

The following table highlights the advantages of PDSA and provides principles for doing it well.

Advantages of PDSA and Principles for Success
Advantages of PDSA
<ul style="list-style-type: none"> Allows valuable modifications to improve effectiveness or preserve productivity. Allows “failures” to come to light without undermining performance and momentum. Identifies areas of resistance that might undermine the plan and spread to other units. Allows costs and side effects of the change to be assessed. Increases certainty that change will result in improvement. Allows for detailed documentation of improvement.
Principles for Success
<ul style="list-style-type: none"> Start new changes on the smallest possible scale, such as one patient, one nurse, one provider. Run just as many PDSA cycles as necessary to gain confidence in a change, then spread incrementally. Spread incrementally to more patients, then more nurses, then more providers, and finally more units. Balance changes in the overall system to ensure other processes are not adversely stressed. Pay special attention to preserving productivity and work flow.

Whoever observes and studies the test should record lessons and the suggested modifications. These should be shared at regularly scheduled multidisciplinary team meetings.

The IHI has a preprinted [PDSA Work Sheet](#) you may find helpful to download.

Plan–Do–Study–Act Work Sheet for Testing Change

- Aim**
- Describe the aim of this project.
 - Every aim will require multiple smaller tests of change.
 - Describe your first (or next) test of change.
 - Person responsible.
 - When to be done.
 - Where to be done.
- Plan**
- List tasks needed to set up this test of change.
 - Person responsible.
 - When to be done.
 - Where to be done.
 - Predict what will happen when the test is carried out.
 - Measures to determine if prediction succeeds.
- Do**
- Describe what actually happened when you ran the test.
- Study**
- Describe the measured results and how they compared to the predictions.
- Act**
- Describe what modifications to the plan will be made for the next cycle from what you learned.

IV. Patient Education

All patients and/or their families/caregivers should have an understanding of their disease process. Instructions should describe “heart attack” and its underlying causes at an appropriate medical literacy level.

- Clear information about the patient’s diet and follow-up care should be reviewed and documented in the instructions. Ideally, appointments should be set for follow-up visits prior to hospital discharge.
- All the patient’s medications should be reconciled at the time of discharge with the med list from admission. Medication information should be reviewed with and presented to the patient, the patient’s caregivers and all providers accepting the patient’s care as an outpatient. All medications should be explained to the patient and/or the patient’s caregivers at an appropriate medical literacy level, offering the following information:
 - Reason for taking each medication.
 - Detailed instruction on how and when to take each medication.
 - Assurance that gaps on access to medications and outpatient resources have been identified and resolved.
 - Major side effects of each medication.

Section 2.D: Moving from problems to solutions (continued)

- Patients and caregivers should be given written instructions, reviewed with them before discharge, that explain:
 - Symptoms that require the patient to contact his or her PCP or other physician
 - Follow-up appointments (preferably scheduled for the patient)
 - Reasons for and scheduling of follow-up studies
 - Post-discharge physical and resumption of personal and professional activities
 - Dietary/nutritional advice
 - Wound care (if pertinent)

A member of the care transition team should confirm that the patient has the necessary financial resources to fill all prescriptions (or, even better, to have the first 30 days' medications delivered to the bedside before discharge), and that the patient has the necessary transportation resources to attend follow-up appointments.

Specific to the ACS discharge, the following principles should be kept in mind:

Patient/Caregiver Information

Diagnosis: Provide clear explanation of diagnosis and inform patient he or she has had acute coronary syndrome or “heart attack,” as appropriate. Be sure to use language and terminology that is appropriate for the patient’s and caregiver’s level of medical literacy.

Follow-up appointment: Recommend that follow-up appointments be made before discharge.

Diet: Explain that diet should be low fat, low cholesterol.

Medications

Point out new and changed prescriptions, as well as meds that are being continued from before the hospitalization.

Clear instructions not to stop meds (especially antiplatelets) without consulting their provider. Explain what each medication does and why each is needed for this patient.

Give specific instructions about typical and atypical angina and how to use nitroglycerin.

Appropriate use of SL nitroglycerin: If you have chest discomfort, use a nitroglycerin tablet under your tongue or the spray every five minutes until pain is gone or for up to 15 minutes. You should call 911 and request an ambulance to bring you to the hospital if the chest discomfort lasts for more than 15 minutes or requires more than three nitroglycerin tablets or sprays.

Side effects: bleeding, headache, fatigue, arthralgias, orthostasis.

Informing and starting OTC medications.

Reinforcement of medication review and/or compliance by VNA or acute rehab or skilled nursing facility to which the patient has been referred.

When to call the doctor

Specific instructions.

Follow-up tests

Reason for tests.

When tests will take place.

Activity

When to return to work.

Sex.

Activities of daily living.

Activities to avoid.

Physical therapy, cardiac rehabilitation referral.

Smoking Cessation

If you smoke or use tobacco products, QUIT.

If you have quit smoking or using tobacco products in the previous 12 months, continue to abstain from using them.

Limit your exposure to secondhand smoke.

Talk to your doctor about available treatments and medications to help you quit smoking.

Wound Care

PACER/ICD.

Key Points for Educational Tools*

A medication calendar or list should be provided to all patients at the time of discharge

- This should provide clarity of the general timing of when medications should be administered.

All educational material should be provided in language that the patient and caregivers easily understand.

- Whenever possible, material should be provided in the patient's first language and a translator utilized for educational sessions.
- Educational handouts that describe medication indications and side effects may also be beneficial. Examples include Micromede[®] CareNotes System or MedTeach[®].

In-house systems should be utilized to help facilitate a clear and concise medication list.

Educational Tools*

Medication calendar (Samples can be viewed in the ACS Toolkit at www.hospitalmedicine.org.)

- Recommended time of day.
- Indication.
- Special administration instructions.
 - Take with food or empty stomach.
 - Separate from other medications.

Medication List

- New medications.
- Medications discontinued from prior to admission.
- Medications continued from prior to admission.
- Medications only to be used as needed.
- All changes made to medication regimen prior to hospitalization should be emphasized with both the patient and caregiver.

Medication containers

- Pillboxes help facilitate compliance with a medication regimen post-discharge.
- Should be done with the assistance of a caregiver, pharmacist or home-health aide to ensure accuracy.

View [Appendix F: Health Care Provider ACS Patient/Caregiver Education Reference Guide](#) and the [Acute Coronary Syndrome Toolkit Clinical Tools](#) section for a formatted and modifiable healthcare provider patient/caregiver education reference guide developed by the ACS Discharge and Transitions Workgroup.

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*"Key Points for Educational Tools," adapted from the *Medication in Heart Failure Patients Reference Guide*, developed by Lindsay Arnold, PharmD, member of the SHM Heart Failure Initiative Polypharmacy Workgroup.

V. Medication Safety and Polypharmacy

Patients admitted with ACS often require complex medication regimens throughout their hospitalization and upon transition back to the community. In addition to the medications that are primarily aimed at the patient's coronary artery disease, these patients will often have comorbid conditions such as diabetes, hypertension or congestive heart failure that all require several medications independently. Unfortunately, because many patients admitted with ACS are elderly, the risk of side effects and the dangers of polypharmacy are increased. Thus, the safe use of these complex regimens will be an important part of the standardization of ACS care across institutional stakeholders.

There are several key steps to consider in an effort to maximize medication safety and minimize unnecessary polypharmacy. These can include:

- Use a standard approach to verify medication reconciliation as the patient moves throughout the hospitalization, from ED to transition out of the hospital.
- Develop standard protocols for drug monitoring when appropriate, such as standard heparin nomograms and daily platelet counts for patients on heparin.
- Maintain appropriate drug-drug interaction checking, especially for those drugs likely to be used in ACS patients, such as beta-blockers and negative chronotropic calcium channel blockers, or ACE I and spironolactone.
- Use the medication reconciliation process as an opportunity to discontinue medications no longer required.
- Engage your hospital pharmacists to actively participate in the care of the ACS patient, i.e., monitoring the high-risk antithrombotic and antiplatelet agents for adverse effects, providing patient education, ensuring the patient has access to medications prior to discharge.
- Assure that appropriate monitoring systems are in place for patients being discharged on medications that require such monitoring.
- Provide a complete list of medications and indications to the patient and the physicians seen in follow-up.

Providing patients with written information about their new medications can be very useful. See the [ACS Toolkit Clinical Tools](#) section for resources you might be able to use to provide your patients with this type of information.

VI. Building and Implementing a Comprehensive Educational Program*

A comprehensive educational program usually involves educating both staff and patients/caregivers.

Staff Education

The role of education in quality improvement is complex. Educational efforts alone are unlikely to result in major, sustained changes in practice. On the other hand, it would be unrealistic to believe that an institution could enact major changes in the attitudes, knowledge and practices of its staff without some kind of systematic and comprehensive transfer of information. How much the success of a quality improvement effort depends on education is contingent on the complexity of the intervention and the baseline knowledge of the key staff members in the areas of interest. For example, if the goal of a quality improvement effort were simply to increase the number of ACS patients discharged from the hospital with a prescription for an ACE inhibitor, a simple electronic reminder system might be effective, and might not require any education beyond what is stated in the reminder. However, if the goal is to change practice in more substantial ways, particularly if the desired change depends on the acquisition of new knowledge, education takes on a more important role.

When developing educational materials for use in a quality improvement project, a few rules should be kept in mind:

1. Direct educational efforts toward imparting both general and institution-specific knowledge, the former to support the initiative and the latter about the practical applications of the interventions (such as familiarity with an order set or institutional policy). The first step in any educational initiative is to define the learning objectives. Specifically noting what is to be changed in an area, such as knowledge, attitudes, skills or behaviors, is critical to engaging learners and setting expectations for change in behavior. Learners also need to understand how the effects of the initiative will be measured.
2. Define the target audience (and the objectives for them). Educating people about what they do not need to know is wasteful, but failing to educate even a few of those who do need to know can undermine the success of the project. Recognize that educational efforts often need to be directed toward people from many disciplines and with different levels of training, and that the objectives and strategies may differ depending on the specific target audience.
3. Do not reinvent the wheel. In many cases, at least some of the necessary educational materials (especially the general knowledge part) may already exist.
4. Plan the delivery. After creating the objectives and the material, determine how to deliver the content, based in large part on the size and diversity of the target audience. Easy access to training is a key factor. Usually, the most cost-effective way to accomplish broad-based training is Internet- or intranet-based learning modules, often augmented with hands-on or lecture materials. However, even if the educational materials are widely accessible, it might still be difficult to make sure all key personnel participate.

*Adapted from the Building and Implementing a Comprehensive Educational Program chapter of the *Glycemic Control Implementation Guide*, by Dave Wesorick, Cheri Lattimer, Nancy Skinner, Robert Rushakoff, Greg Maynard.

Some methods to optimize participation include:

- a. Make participation mandatory for important topics. Mandatory participation is fairly common among nursing, pharmacy and ancillary staff and is usually well accepted. It is more difficult to mandate physician staff to participate in educational programs, particularly at institutions that use the open medical staff model, but it may be possible if the education is directed toward a discrete group whose leadership is committed to the project (e.g., a residency program). Although mandatory educational programs can assure exposure, they are not always the most effective educational method. Use mandatory education only when absolutely necessary.
- b. Make the educational program as enjoyable as possible. Regardless of whether the training is mandatory, educational programs are more effective if they are concise, clear, case-based and interactive. If the learning objectives are stated to affect behavior, make sure that the program does not simply provide education aimed at improving knowledge, but also provides specific guidance about how to change the behavior.
5. Create other incentives for participating if the education cannot be made mandatory. The incentives offered usually depend on the resources available. Hospitalist groups or other providers may get recognition or a competitive advantage for certification or full participation in training. CME, CEU and Pharmacy educational credits may be valuable for many learners. Remember, food can a very effective incentive. Evaluate and track the participation and performance of staff in the educational program and the impact of the educational program as a whole. Even the best educational module will have no effect on those not exposed to it. Keeping track of who has and has not been educated will allow the latter to be identified for special intervention. If the process is mandatory, the intervention might be disciplinary, but even for nonmandatory programs, the QI team might be able to come up with innovative ways of making sure that everyone is educated. For example, members of the QI team could provide abbreviated, one-on-one education for noncompliant members of the target group (academic detailing). The worst-case scenario would be to post an educational module on the Internet and just assume that everyone has completed it. Likewise, it is important not to equate participation with performance. Always evaluate performance, and this evaluation should again be based on the learning objectives that you initially developed. Modern Web-based learning modules allow evaluation of performance on questions as well as tracking participation.

In the future, hospitals might require completion of some educational modules as part of the credentialing process for its professionals. Many hospitals already use this type of online education for topics that are mandated by regulatory agencies (such as infection control or fire safety) because they can be tracked and reported. This mechanism is appealing from a QI standpoint, where the success of a project often hinges on the education of many people with diverse backgrounds. However, it is important to remain cautious about relying solely on the mandatory approach, as the effectiveness of these mandatory educational modules may be lessened if they are overused.

Identify the Target Audience and the Learning Objectives

Improving inpatient ACS management requires a broad educational effort for nearly all nurses, pharmacists and physicians who see patients in the emergency department, on the medical floors, in the intensive care units and in the cardiac catheterization lab. It may also be appropriate to create similar lists for clerks or others who may be part of the project. Practitioners should stay up to date on the current care practices to ensure they provide the best care for their patients. Much of the core clinical care practices can be reviewed in the [ACS Toolkit](#), in particular in the [Education Resources](#) section. It is important to remember that this field can change rapidly, so always verify that updated guidelines and references are being used.

Be Efficient: Use Resources Already Available

The SHM [ACS Toolkit](#) features links to slide sets and other available educational products.

When choosing from these products, make sure that their learning objectives and target audience overlap with your targets.

Evaluating and Tracking Performance of Staff

Create a roster of all those on staff who need the training, stratified by type of care provider and whether each person's participation is mandatory or optional.

Try to evaluate not only participation but also actual performance and comprehension. Use questions in the educational program that address core knowledge, skills, attitudes and behaviors addressed in the learning objectives. Objectives are often role-specific; for example, if an objective is to improve the use of beta-blockers, assessing a clerk's knowledge of the role of these medications in ACS may have less value than in measuring how that same clerk has learned about the process of assuring beta-blocker use in patients with ACS. Map out the time lines for delivery, and plan incentives/strategies for reaching voluntary participants. Measuring educational outcomes along the way can serve as important intermediate measures for assessing progress towards success.

Building/Implementing a Comprehensive Educational Program: Patient/Caregiver Education

Patient education is important in the management of ACS, given the complexities involved in the medications used in treating patients post-ACS, as well as the dietary and lifestyle modifications that may be required. A successful patient education program requires the following steps:

1. *Assess the patient.* To be successful, an educator must assess the learner's medical literacy level, current knowledge, cognitive abilities and motivation to learn. Hospitals wishing to achieve excellence in patient education will need to incorporate patient assessment into their educational initiatives.
2. *Define what knowledge is essential for the patient to know.* ACS education cannot take place solely in the hospital. Trying to teach everything about ACS can easily overwhelm inpatients, especially if the patient is also dealing with comorbidities such as diabetes mellitus, hyperlipidemia and/or hypertension. However, some skills and knowledge are considered essential for patients or their caregivers to understand in order to be able to appropriately manage their disease at home. These essential skills/knowledge for secondary prevention are to:
 - Understand the basic definition of ACS.
 - Understand comorbid conditions and know how to manage the comorbid conditions that affect their coronary disease.
 - Have timely follow-up with the primary care physician and a cardiologist, if indicated.
 - Comply with the discharge medication regimen, even if it is a complex mix of medications.
 - Understand the need to return to the ED for any change in the frequency or severity of symptoms.
3. *Decide who will teach the patient.* This is really dependent on local variables. Qualified candidates to be primarily responsible for this teaching would include nurses, pharmacists or physicians.
4. *Teach the teachers.* The best way to ensure that hospitalized patients will learn what they need to know is to standardize the educational process.
5. *Decide what will trigger the educational effort.* Will it be done for all patients with ACS? Will it be reserved only for those with "special needs" or multiple medications? What mechanism will be used to ensure every patient gets the education he or she needs?
6. *Make sure the educational program has been successful.* Just as patients must be assessed before an educational effort, they must also be assessed afterward to make sure they can demonstrate mastery of the new knowledge or skills.

VII. Transitions of Care and Discharge

Discharge and Transition Guidelines

More than 30% of discharged patients do not understand the purpose and/or proper use of their discharge instructions on returning home. Careful and well-thought-out transitioning of care among the different settings of the ACS patient is a vital component of optimizing treatment in both inpatient and, eventually, outpatient settings. Although communication during transitions of care is important for all hospitalized patients, it is particularly important for those admitted with ACS. During hospitalization, risk stratification, medications and interventions initiated in one setting (such as the ED) drive important medical decisions in other areas (such as the CCU). In addition, in many components of ACS care, timing is essential. Without seamless transitions, accurate timing can become problematic and interfere with ACS care being outstanding. All transitional communications should be done in a manner that allows an opportunity for questions and review of the data. All stakeholders involved in the treatment of the patient in outpatient or inpatient settings must be included in the transition. Taking into consideration that communication is a core competency of hospital medicine, team members from each care setting must be aware of their integral roles in improving ACS outcomes. This includes pre-hospital personnel, ED providers, the PCP (if any), cardiology consultants, discharge planners/social workers, pharmacists, consultants if needed to manage comorbidities, nutritionists, cardiac rehab personnel and nursing personnel in every care setting.

Pre-hospitalization

Whether or not the patient will require immediate coronary intervention, the following information will be required while transitioning care from the ED and/or outpatient center. **(Please see the example sheet.)**

Where physician order entry programs are not available, the use of standardized order sets will be extremely helpful for all stakeholders in addressing all clinical standards. The initiation of beta-blockers and antiplatelet medications is vital during this time **(Please see the example of order sets.)**

Stat ECG

CBC

INR

Mg

CK-MB, troponins

Fasting lipid

Electrolytes

Glucose

Stool guaiac

Old ECG

Records

Medication reconciliation. Initiation of:

— Beta-blockers (core measure)

— Antiplatelets (core measure)

— Statins

— ACE inhibitors when indicated

Risk assessment

TIMI score

Cardiac consult

Hospitalization

During patients' hospitalizations and transitions through different levels of care, it is recommended that stakeholders share pertinent information in an ongoing fashion with each other and with patients/caregivers. In addition, a patient's condition must be communicated with that patient's primary care physician. Medication reconciliation is also vital to patient safety during the transition of care. Discharge planning should be initiated soon after admission, including identification of the needs or limitations that patients or their families/caregivers may have at discharge.

- ECG (serial if indicated)
 - CBC (if LMWH or UFH is in use for treatment) or PT/PTT (if anticoagulation is required)
 - CK-MB, troponins (serial if indicated)
 - Renal functions (if contrasted studies performed)
 - VTE prophylaxis
 - Old ECG
 - Cardiology consultant
 - Additional consultants
- Medication reconciliation
 - Beta-blockers (core measure)
 - Antiplatelets (core measure)
 - Statins
 - ACE inhibitors when indicated
 - Cardiac rehab
 - Echo
 - Type
 - Result
 - Stress test
 - Type
 - Result
 - Angiography results and interventions

Clearly, the amount of information required to be communicated is large. To facilitate and standardize the documentation of this information in a format that is useful for transitions, the ACS Transitions Workgroup, led by David L. Klocke, has developed an easy-to-use tool. This tool can be used from ED to discharge and by all members of the healthcare team. There are two versions of the tool available: one version is a "ready-to-use" tool that can be easily implemented. The second version allows the tool to be adapted to a specific institution. Although this second version may take a little extra work to get started, using it may be important to having the tool better fit your institution. This tool was built using Excel so it can easily be used to generate data that can then be easily collected for quality improvement monitoring. [See Appendix G: Transitions Tool](#) or go to the [ACS Toolkit](#) to view the transitions tool.

Discharge

The optimal time to educate patients and their caregivers about their disease process and treatment is during the discharge process. The date of discharge and necessary ancillary services should be identified to patients and caregivers as far in advance of discharge as possible. Detailed instructions in both the discharge summary and patient instructions should be reviewed with and provided to patients. Outpatient follow-up arrangements should be made prior to discharge. Outpatient follow-up appointments with a PCP, even if the patient does not have one, and with subspecialists must be provided. Although verbal communication is the standard of care when transitioning a patient's care to the outpatient arena, the discharge summary is often the only tool available to communicate the patient's hospital course and outpatient treatment plan and should be dictated contemporaneously. [See Appendix H: Discharge Planning Checklist](#) for an example of a discharge summary template.

Discharge Summary

Diagnoses (elaborate)

MI — location, complications (heart failure, arrhythmias, hematomas and potential EF%)

Comorbidities — diabetes mellitus, lipids, hypertension, renal disease

Medications

- Core measures (reason not prescribed)
- ACE/ARB
- ASA
- Beta-blockers
- Statin
- Medication RECONCILIATION
- SL NTG:
- DAPT: how long? (review literature)
- Titration of appropriate medications

Procedures

- Type of stent (metal versus drug-eluting), location
- Complications (hematoma, transfusion)
- If echo
 - Type
 - EF%

Follow-up appointment

- PCP
- Cardiologist
- Appropriate other consultants — cardiac rehabilitation

Follow-up testing

- ETT
 - Type
 - Time frame
- Echo — if indicated after NSTEMI and STEMI
- Pertinent lab work (hemoglobin, INR, LFT if on statin at four weeks, creatinine)

Code status

Activity

Diet

Wound care

- Groin wound

Treatment course

- Include patient's cognitive level
- Discharge LDL
- Discharge creatinine
- If on coumadin, INR
- If on statin, LFTs

[CC to all providers, including home health care]

A detailed explanation of the patient's diagnosis is important, including location of the infarct and/or which coronaries were involved. All complications as well as all comorbidities should be listed.

A detailed explanation of the patient's clinical course, complications, recommended follow-up care for these complications and procedures performed should be included in the discharge summary. If coronary intervention was done, listing the location of stent(s) and the type used is also recommended.

All supporting tests and their results should be added. The results of echocardiogram and stress testing performed during the hospitalization should be included. The patient's cognitive status at the time of discharge should be included. Medication reconciliation is a major patient safety goal, in addition to a Joint Commission standard. Instructions on titration and duration of these medications should be included in the summary. The following medications should be part of the patient's regimen and discussed in the discharge summary:

1. Beta-blockers
2. ACE/ARB for blood pressure control and EF% less than 40.
3. ASA between 81 and 162 mg per day for life. Note dose should be < 100mg if the patient is on Ticagrelor
4. Statin.
5. Sublingual NTG.
6. DAPT (ASA plus clopidogrel, ticagrelor or prasugrel): maintenance dosing for one year on all drug-eluting stents, and a minimum of one month, but one year is recommended.

Section 2.D: Moving From Problems to Solutions (continued)

It is highly recommended that physician appointments be made for the patient prior to discharge. Follow-up instructions should be provided in detail, including any necessary follow-up studies to be performed in the outpatient setting. Groin or sternum wound care instructions should also be provided. Lifestyle changes should be included in the summary. (See [Appendix G: ACS Discharge Planning Checklist](#) for an example discharge summary template).

Appendix A: SHM Acute Coronary Syndrome Advisory Board

First Edition Authors and Editors

SHM thanks all the members of the Acute Coronary Syndrome Advisory Board, who encompass a distinguished panel of experts with representation from the fields of hospital medicine, cardiology, pharmacy, nursing, case management, social work and other organizations whose expertise was essential to the construction of this *Implementation Guide* for improving inpatient acute coronary syndrome.

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SHM is dedicated to the continuous improvement of the products and services that we offer. This *Implementation Guide* continues to be a work in progress and reflects our constantly changing state of the evidence and best practices; we highly encourage and welcome constructive criticism and feedback via email to acs@hospitalmedicine.org.

Draft Memo to Administration or Executive

Date:

MEMO

To: [Hospital Administrator/CMO/COO/CEO]

From: Dr. [Hospitalist]

Re: Optimizing Care for Acute Coronary Syndrome (ACS) Patients

Dear Dr./Mr./Ms. [administrator]:

Acute coronary syndrome (ACS) is a common diagnosis for our medical inpatients. In addition to its high prevalence, ACS has both high morbidity and high mortality rates.

As you know, the care for ACS patients is under increasing national scrutiny through initiatives such as the CMS core Measure Program. Adherence to evidence-based guidelines is very low, with the quality of care ranging widely among hospitals and physicians. Were we to standardize our care, our medical center would have an opportunity to distinguish itself.

Because our hospital medicine group cares for a large portion of ACS patients at this medical center and we have a well-established interest in quality improvement, with your support, we are prepared to lead a multidisciplinary effort to optimize ACS management.

Please let me know when we can meet to discuss further this significant opportunity to provide better hospital care.

On behalf of our patients and our hospital, thank you for your time and interest.

Sincerely,

Joe Hospitalist, MD

Executive Summary of QI Initiative

Executive Summary

Describe in one to two paragraphs the goals of your program and how it will benefit the institution.

Project Overview

Background and Institutional Needs

Your background should provide a global perspective of the problem and data specific to your institution. End with a clear description of how your institution will benefit from the project. The background should be limited to two to three paragraphs. Use benchmark data related to rates of hospital core measure performance described elsewhere in this *Implementation Guide*. The most recent institutional data may be available through the quality assurance department, or extractable as described elsewhere in this implementation guide.

Project Goal/Objectives

Project goals and objectives should be expressed in measurable terms. Indicate a time frame for achievement. Aim for goals that are reasonable and achievable.

Project Time Line (Table)

Present a clear plan for completing the project. Use a table to show milestones and associated goal dates. Indicate the start date on which the time line is dependent.

Project Team

Indicate on the time line the personnel (type and percentage or amount of time) required to complete the project. Consider using an Advisory Board to assist with political issues, internal approval processes and communications across departments.

Project Budget (Table)

Present a clear table detailing your budget. Detail costs associated with research personnel, project evaluation and reporting, project management, administrative or clerical support, project equipment and supplies, and overhead (if applicable).

Research Protocol (Optional)

Research Questions

Demonstrate a focused project by limiting research questions to those that are “need to know” versus those that are “nice to know.” Future projects can address additional research questions. Be sure research questions and project objectives are congruent. Be sure you have budgeted the right resources and planned a time line to answer your research questions.

Research Methods

Detail data collection methods and timetables. Indicate how researcher biases will be addressed. Consider how data collection methods might affect patient confidentiality regulations.

Human Subjects Approval

Indicate if you are seeking institutional review board approval for use of human subjects and how the issue will be addressed.

Appendix C: Web Resources to Enhance Working Familiarity with Key QI Tools

WEB

The **Institute for Healthcare Improvement** has an excellent Website that reviews a model for improvement, as well as providing **QI tools** that you can actually download. Although registration is needed to download the tools, this is a quick and free resource.

The **American Society for Quality** has an excellent, user-friendly site with overviews of the major **quality improvement tools**. Explore this section with particular attention to run charts, SPC charts, process flow diagrams and FMEA.

The **Society of Hospital Medicine** has an **Acute Coronary Syndrome Toolkit** that can support an entire QI effort, offering a primer on quality improvement theory, covering the pertinent literature, providing tools to raise awareness and hosting interactive ask-the-expert and peer-to-peer forums as a means of sharing experiences with the wider hospital medicine community.

Intermountain Healthcare is a recognized leader in the performance-improvement field and in integrating performance improvement with all of its key clinical endeavors. The **Institute for Healthcare Delivery Research**, led by Dr. Brent James, has a wealth of presentations and other information available at no charge.

Institute for Clinical Systems Improvement is a nonprofit independent site dedicated to promoting collaborative quality improvement based out of Minnesota and some surrounding states. **Find out more information about their quality improvement initiatives.**

Team Ground Rules . . .

- All team members and opinions are equal.
- Team members will speak freely and in turn.
 - We will listen attentively to others.
 - Each must be heard.
 - No one may dominate.
- Problems will be discussed, analyzed, or attacked (not people).
- All agreements are kept unless renegotiated.
- Once we agree, we will speak with “one voice” (especially after leaving the meeting).
- Honesty before cohesiveness.
- Consensus versus democracy: we each get our say, not our way.
- Silence equals agreement.
- Members will attend regularly.
- Meetings will start and end on time.



FROM **Banner Baywood Heart**
Hospital

and **Medical Center**

Courtesy of **Mark Starling, MD**

The following is an example of a complete toolbox for standardization of care for patients with ACS and suspected ACS from ED to DC at 1 institution. It is an excellent example of a set of tools that include process flow diagrams, order sets, prediction rules, and communication tools. These tools were developed using a multidisciplinary team that included physicians, nurses, administrators, quality specialists, and management engineering. Although it may be tempting to directly use this one-stop shopping toolbox to transform the care of ACS patients at your institution, using shortcuts will ultimately not lead to the best-possible performance for your institution. Rather, it is best to use these and all the tools in this guide as examples and starting points. It is essential that you go through the steps outlined in this guide to determine when to use and how to adapt these tools to your local needs.

ACUTE CORONARY SYNDROME Proposed Process of Care



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APPENDIX E: Acute Coronary Syndrome Proposed Process of Care

GUIDELINES — DEFINITION

This guideline is designed for the general use of most cardiac patients, but it may need to be adapted to meet the special needs of an individual patient as determined by the patient's caregiver.

Statement of purpose

Review and improve the process of care from the ED to discharge for patients with acute coronary syndrome.

Goals

For all ACS patients, our goals are:

- To standardize the processes of care to coordinate hospital resources;
- To make the process of care simple and efficient for the cardiologists to manage their ACS patients;
- To guarantee a consistent and high level of care to all ACS patients;
- To establish a smooth, efficient working/transfer process between the BBMC Emergency Department and the BBHeart Hospital for all ACS patients;
- To perform in the top 10th percentile for CMS/JCAHO core measure quality indicators.



**Banner Baywood Heart
Hospital**

Acute Coronary Syndrome

October 26, 2005

Banner Baywood Heart Hospital and Medical Center

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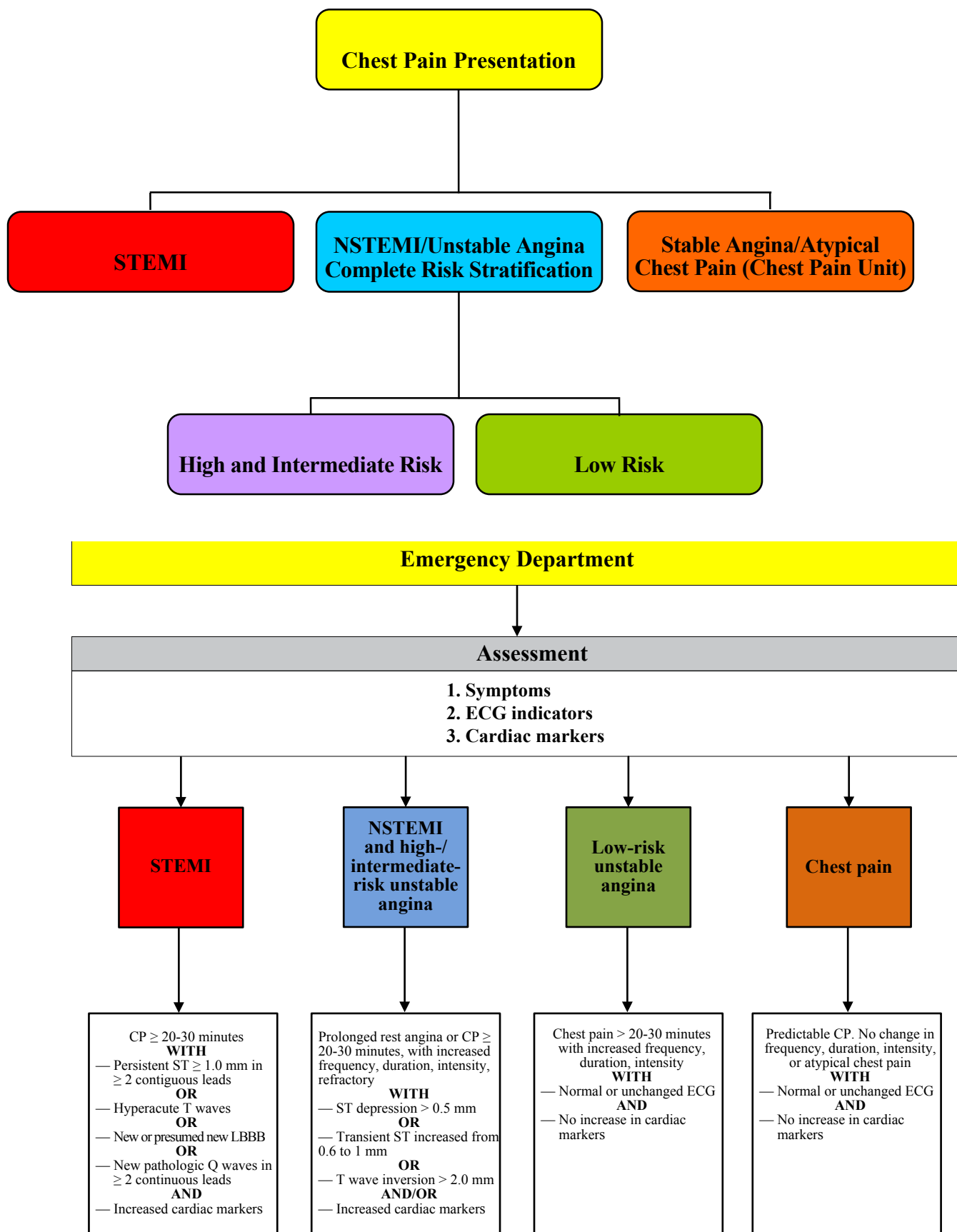
General chest pain orders

1. STAT 12-lead ECG. PRN recurrent chest pain
 - If inferior AMI, do a 15 lead ECG to rule out RV infarct
2. Pulse oximetry, O₂ 2 L per NC, titrate to maintain SpO₂ ≥ 92%
3. Obtain initial set of vital signs and repeat as needed. Continuous ECG monitoring.
4. Obtain IV access(s)
5. Medications:
 - STAT Aspirin 325 mg chew PO if not already given and not allergic
 - If unable to take PO, give Aspirin 300mg PR
 - Nitroglycerin 0.4 mg SL every 5 minutes X 3 PRN chest pain
 - Morphine 2-4 mg IV every 5 minutes PRN ongoing chest pain to a max of 10 mg every 1 hour
6. Labs:
 - CMP, CBC, Magnesium
 - Cardiac Markers: CK-MB, Troponin-I, Myoglobin
 - PT/INR if patient previously on warfarin (Coumadin[®])
7. STAT Portable CXR.
8. Old charts / ECGs to Emergency Department
9. Diet and Activity: NPO except medications; strict bed rest
10. Additional Orders: _____

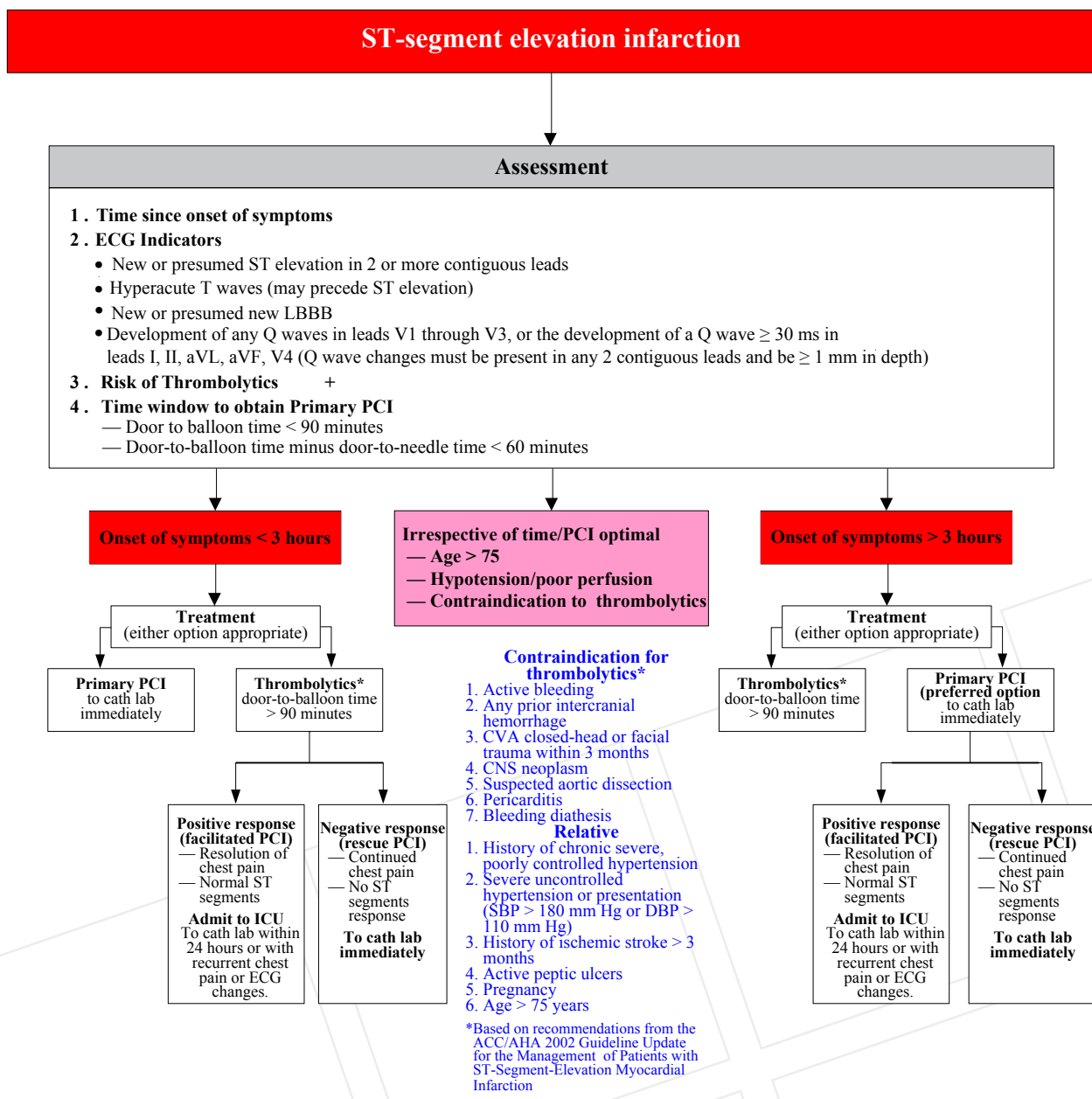
Physician signature _____ Date/time _____

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APPENDIX E: Acute Coronary Syndrome Proposed Process of Care



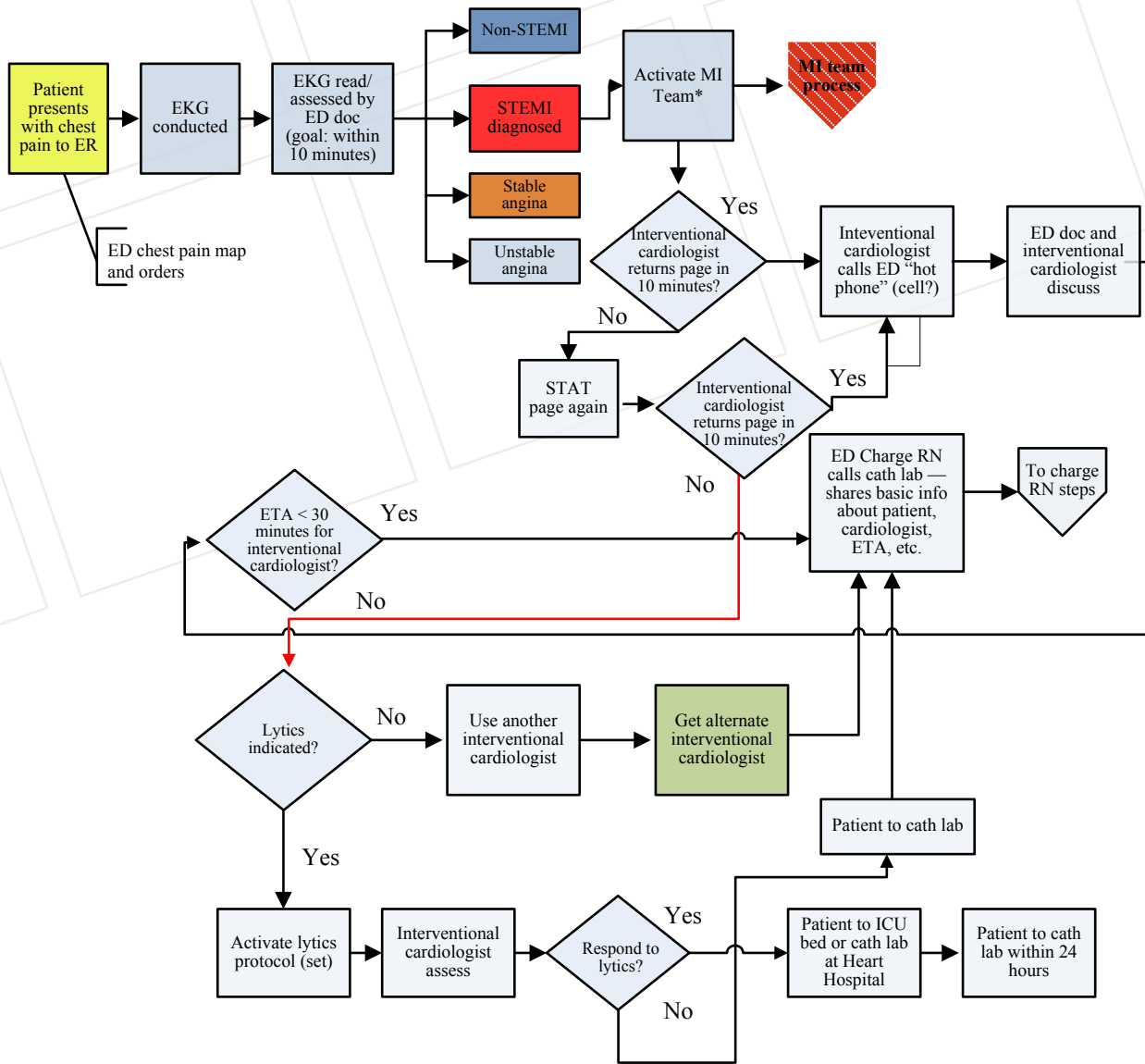
APPENDIX E: Acute Coronary Syndrome Proposed Process of Care



APPENDIX E: Acute Coronary Syndrome Proposed Process of Care

STEMI Updated 4-4-05

ED doctor FOCUS 1

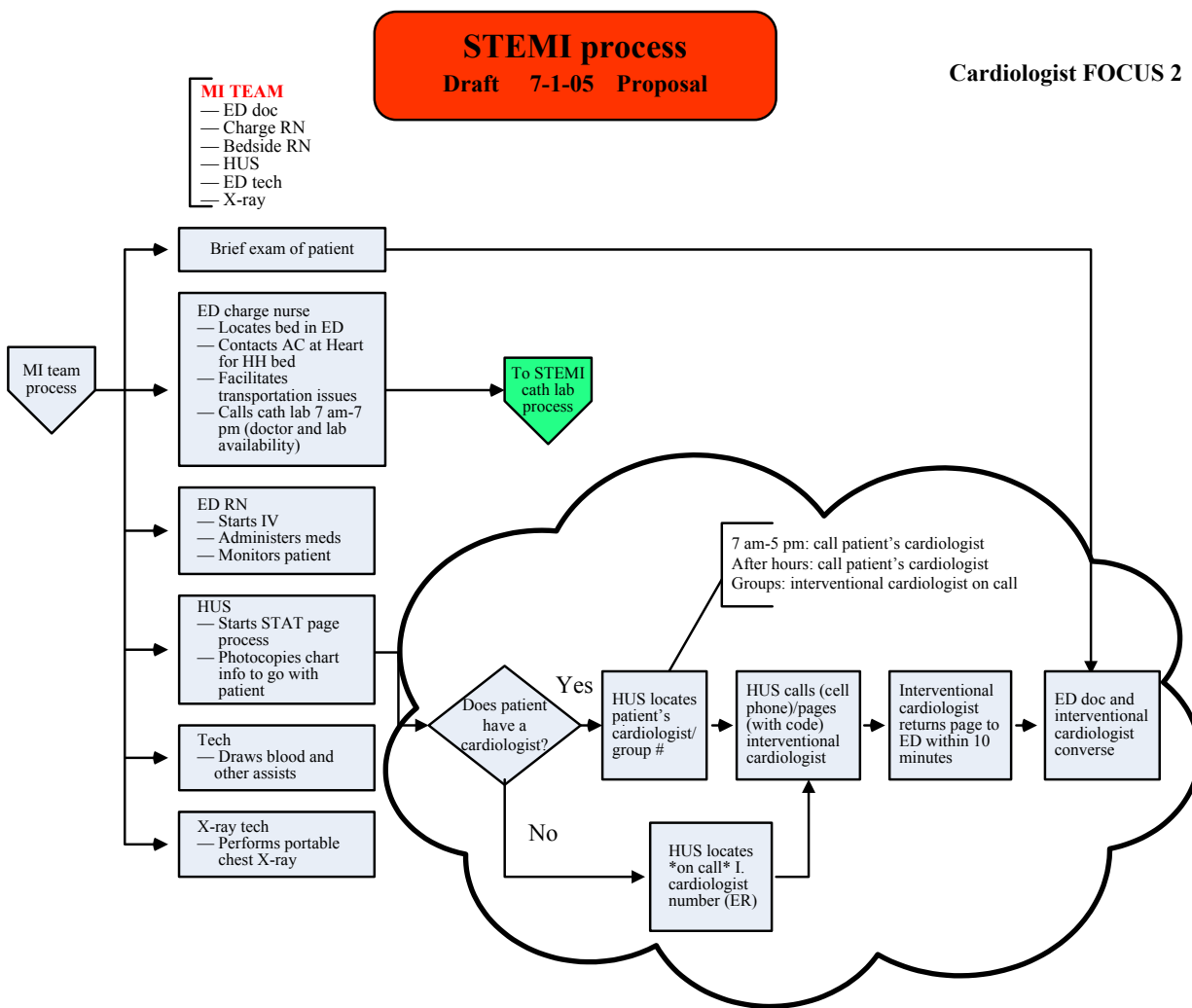


For ACS

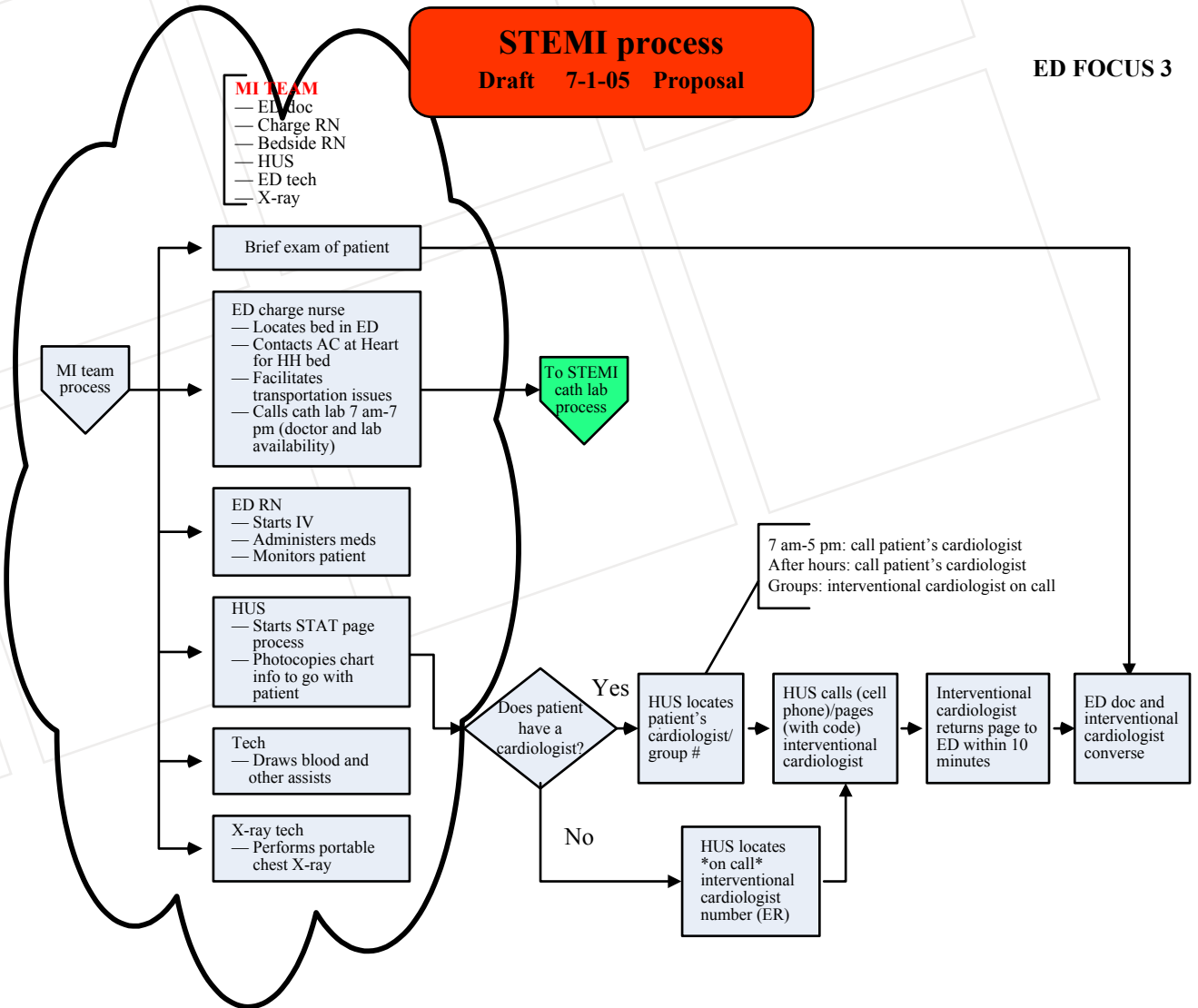
Answering service — use 911 page for ??????

Criterion for oncall: <30 minutes to be on-site

APPENDIX E: Acute Coronary Syndrome Proposed Process of Care



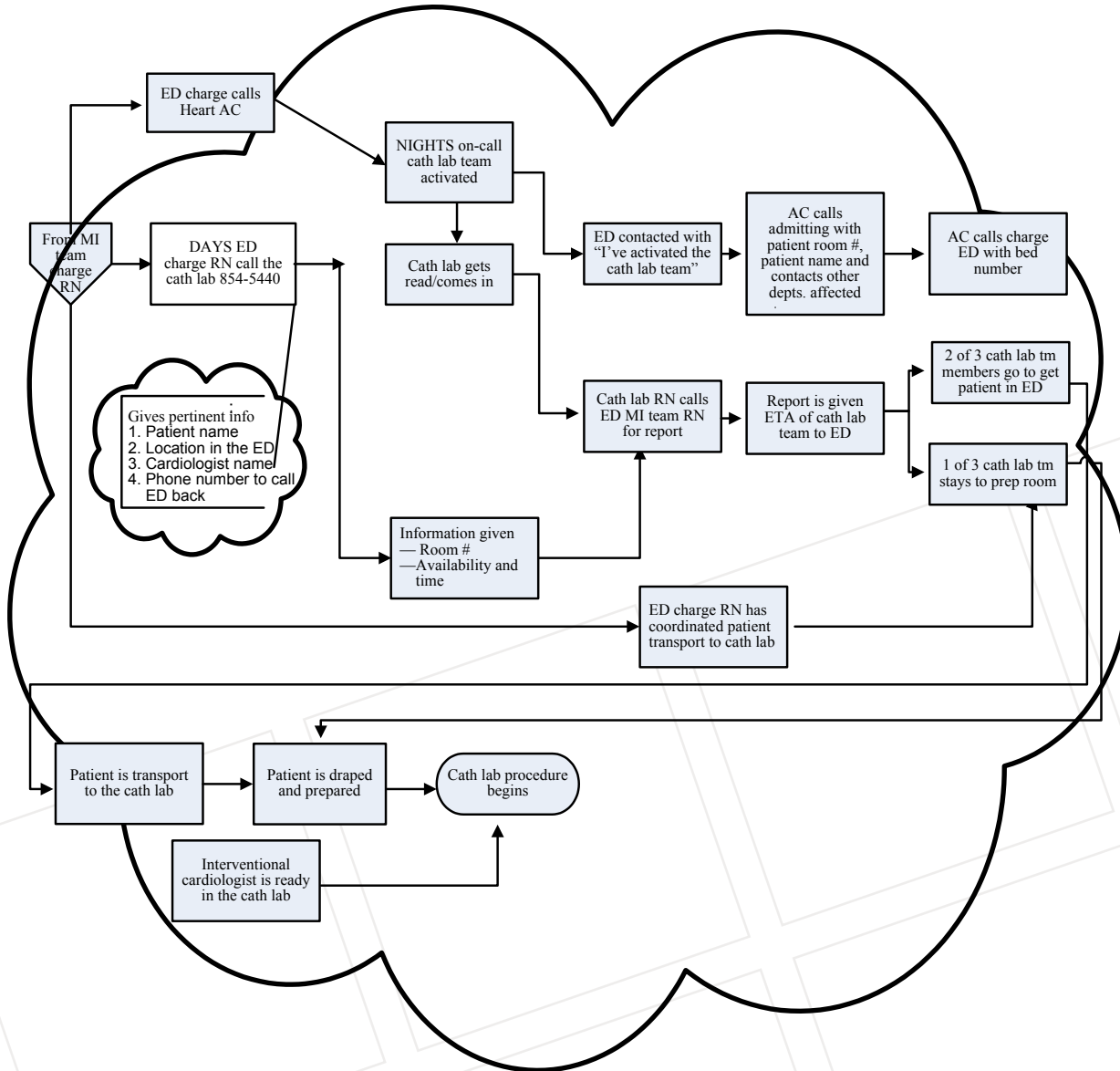
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APPENDIX E: Acute Coronary Syndrome Proposed Process of Care

STEMI process Draft 4-4-05 Proposed

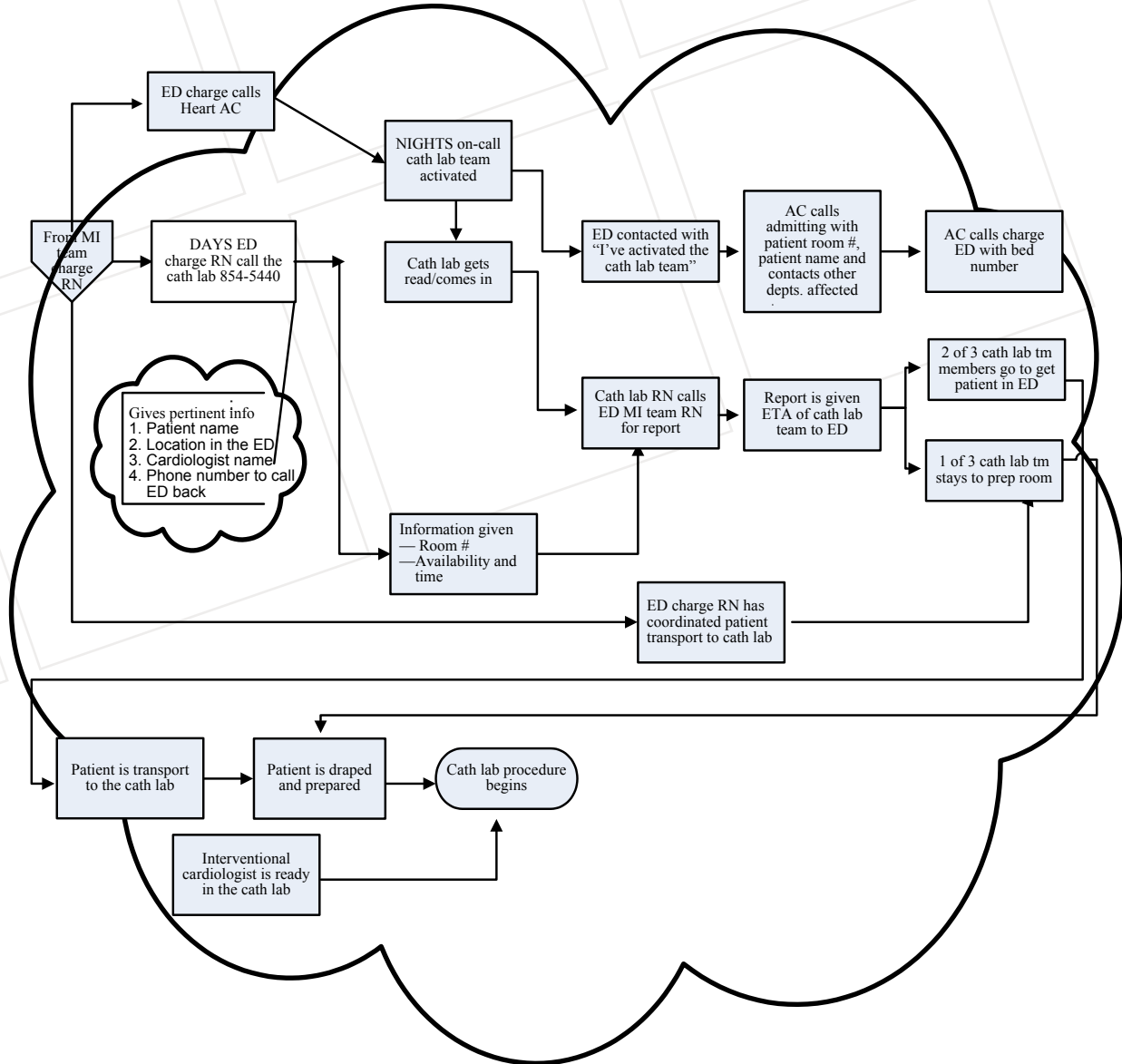
Cath lab FOCUS 4



APPENDIX E: Acute Coronary Syndrome Proposed Process of Care

STEMI process Draft 4-4-05 Proposed

Cath lab FOCUS 4



ER STEMI orders

1. STAT call to cardiologist: _____

2. Allergies: _____

3. Patient's weight _____ kg estimated actual

Check all appropriate boxes

4. Medications:

- STAT aspirin 325 mg chew PO if not already given and not allergic
If unable to take PO, give aspirin 300 mg PR
If patient has a **TRUE** aspirin allergy, give clopidogrel 75 mg PO
 DO NOT GIVE ASPIRIN. Reason: _____

- Metoprolol 5 mg IV every 5 minutes x 3 doses
Hold if HR < 55, SBP < 90, radiographic or clinical evidence of active CHF

- Metoprolol 25 mg PO X 1, give 15 minutes **after last IV dose**
Hold if HR < 55, SBP < 90, Radiographic or Clinical Evidence of Active CHF
 DO NOT GIVE A BETA-BLOCKER.

Reason: _____

- Nitroglycerin 0.4 mg SL every 5 minutes X 3 PRN chest pain
If chest pain not relieved, start nitroglycerin IV at 10 µg/minutes and titrate for pain relief maintaining SBP ≥ 90 mm Hg.

- Morphine 2-4 mg IV every 5 minutes PRN ongoing chest pain to a max of 10 mg every 1 hour

- Lorazepam 0.5-1 mg IV/PO 1 time PRN anxiety

- Ondansetron 4 mg IV 1 time PRN nausea

- Acetaminophen 650 mg PO/PR one time PRN discomfort / headache

5. Thrombolytic therapy (**Goal — administer within 30 minutes of arrival to ED**)

Reteplase (RPA, Retavase®) 10 + 10 units IV 30 minutes apart

Half dose Reteplase (RPA, Retevase®) 10 units IV for facilitated or rescue PCI

6. Anticoagulation:

Enoxaparin 30 mg IV bolus followed by enoxaparin 1 mg/kg subcutaneous (round to nearest 10 mg)

Heparin dosing (round to nearest 50 units)

1. Intravenous heparin loading dose: if lytic ordered, **give heparin bolus prior to lytic**

Dose (60 units/kg) = _____ units (maximum dose of 4000 units)

2. Intravenous heparin infusion rate:

Infusion rate (12 units/kg per hour) = _____ units/hr (maximum of 1000 units/hour)

3. Obtain aPTT 6 hours after infusion begins

7. IV fluids: _____

8. Additional meds/orders: _____

Physician signature _____ Date/time _____

Revision 11/16/05

APPENDIX E: Acute Coronary Syndrome Proposed Process of Care

STEMI Care Map – Emergency Department	
CONSULTATION	<input type="checkbox"/> Interventional cardiologist
ASSESSMENT	Brief, targeted history and physical performed by physician Continuous telemetry with ST segment monitoring System assessment, pain assessment Vital signs with pulse ox I&O Weight <input type="checkbox"/> Bleeding precautions with thrombolytics
LABS	<ul style="list-style-type: none"> • CK-MB, troponin, myoglobin • CMP, magnesium, CBC • PT (if patient previously on warfarin) • Guiac all stools
DIAGNOSTICS/ INTERVENTIONS	<ul style="list-style-type: none"> • 12-lead ECG completed and read within 10 minutes • PCXR stat • Obtain IV access <input type="checkbox"/> PCI (Primary Coronary Intervention) <input type="checkbox"/> Facilitated PCI/Rescue PCI <input type="checkbox"/> Thrombolytics
MEDICATIONS	MONA <input type="checkbox"/> STAT ASA (325 mg — chew) <input type="checkbox"/> Ntg (0.4 mg sublingual STAT x 3, IV) <input type="checkbox"/> Morphine <input type="checkbox"/> Lopressor 5 mg IV every 5 minutes x 3 <input type="checkbox"/> Lopressor 25 mg PO (give first dose 15 minutes after last IV dose) <input type="checkbox"/> Heparin/lovenox
RESPIRATORY CARE	O ₂ @ 2L NC Maintain O ₂ sats > 92%, titrate O ₂ as indicated
ACTIVITY/SELF-CARE	Strict bed rest
NUTRITION	NPO, except medications
EDUCATION	Diagnosis and treatment Plan for disposition Pain scale
OUTCOMES	Patient is pain free Door to balloon time < 90 minutes (cardiac cath lab) Door to needle time < 30 minutes (thrombolytics)

STEMI admission orders

Admit to: ICU Telemetry IU

1. Diagnosis: acute coronary syndrome: _____
2. Admitting specialist: _____ Admitting internist: _____

Initiate orders 3-13

3. Initiate STEMI care map
4. Emergency protocol
5. Cardiac rehab consult
6. Oxygen 2 L per NC. Titrate to maintain SpO₂ > 92%
7. Cardiac diet
8. Peripheral IV, saline lock if not in use
9. Labs:
 - Admit Labs: **IF NOT DONE IN ED** — troponin I and CK-MB at 0, 6, and 12 hours, CBC, CMP, magnesium, PT/INR if patient previously on warfarin, fasting lipid profile, UA
 - Daily Labs: CBC, BMP, magnesium, PT/INR if patient on warfarin phosphorus Other _____
 - PRN Labs: RN may obtain as clinically indicated: CXR, ABG, Hgb/Hct, BMP, magnesium, aPTT, PT/INR, CKMB until enzymes peak
10. ECG on admission, daily for 3 days, and PRN chest pain.
11. Chest X-ray: daily for 2 days or _____
12. Finger-stick blood glucose AC and HS. Initiate moderate sliding-scale insulin protocol.
If patient not diabetic and has a fasting blood sugar < 110, discontinue blood glucose monitoring.
13. Follow potassium and magnesium protocol.

Initiate the following medications, check all appropriate boxes:

14. Medications
 - STAT aspirin 325 mg chew PO if not already given in ED and not allergic, then start 81 mg PO daily
If unable to take PO, give aspirin 300 mg PR
If patient has a **TRUE** aspirin allergy, give clopidogrel 75 mg PO daily
 DO NOT GIVE ASPIRIN. Reason: _____
 - Give clopidogrel 75 mg PO daily, in addition to aspirin therapy
 - Metoprolol 25 mg PO every 6 hours x 48 hours total, then 50 mg PO BID,
Hold for HR < 55 or SBP < 90, radiographic or clinical evidence of active CHF
or: _____ . Hold for HR < _____ or SBP < _____
 DO NOT GIVE A BETA-BLOCKER. Reason: _____
 - Captopril 6.25 mg PO every 8 hours, begin within 24 hours of STEMI, hold for SBP < 100
or: _____ , hold for SBP < _____
 DO NOT GIVE AN ACE INHIBITOR. Reason: _____
 - Losartan 25 mg PO daily, hold for SBP < 100
or: _____ , hold for SBP < _____
 - **DO NOT GIVE AN ARB.** Reason: _____
 - Pravastatin 80 mg PO at bedtime or: _____
 DO NOT GIVE A STATIN. Reason: _____
 - Senakot 1 tablet PO BID. If no results use BCOC.
 - Lorazepam 1 mg PO/IV every 4 hours PRN anxiety/sleep
 - Temazepam 15 mg PO at bedtime PRN sleep, may repeat x 1
 - Acetaminophen 650 mg PO/PR every 4 hours PRN discomfort/headache
(do *not* exceed 4 g/day total acetaminophen)
 - Ondansetron 4 mg IV every 6 hours PRN nausea
 - Antacid of choice

APPENDIX E: Acute Coronary Syndrome Proposed Process of Care

15. Anticoagulation:

- Regular dose enoxaparin 1 mg/kg subcutaneous every 12 hours (round to nearest 10 mg)
- Renal dose enoxaparin (CrCl <30 ml/minute)
Enoxaparin 1 mg/kg subcutaneously every 24 hours (round to nearest 10 mg)
- Heparin dosing (round to nearest 50 units)
 1. Target aPTT is 57-80 seconds
 2. Obtain aPTT 6 hours after infusion begins
- 3. **If aPTT OBTAINED within 12 hours of initiation of thrombolytic therapy:**
 - **DO NOT** discontinue or decrease infusion unless significant bleeding occurs or aPTT > 150
 - **DO ADJUST** rate of infusion if aPTT < 57 seconds
- 4. Heparin dosage adjustments:

aPTT (sec)	Bolus dose	Hold infusion	Rate change	Repeat aPTT
<45	70 units/kg	No	↑ 2 ml/hour (200 units/hour)	6 hours
45-56	None	No	↑ 1 ml/hour (100 units/hour)	6 hours
57-80	None	No	None	12 hours x 1, then daily
81-100	None	No	↓ 1 ml/hour (100 units/hour)	12 hours
>100	None	60 minutes	↓ 2 ml/hour (200 units/hour)	6 hours

*Repeat aPTT draw time is to begin at time the adjustment is made (ie, when infusion held or changed)

16. IV fluids: _____

17. Additional meds/orders: _____

Physician signature _____ Date/time _____

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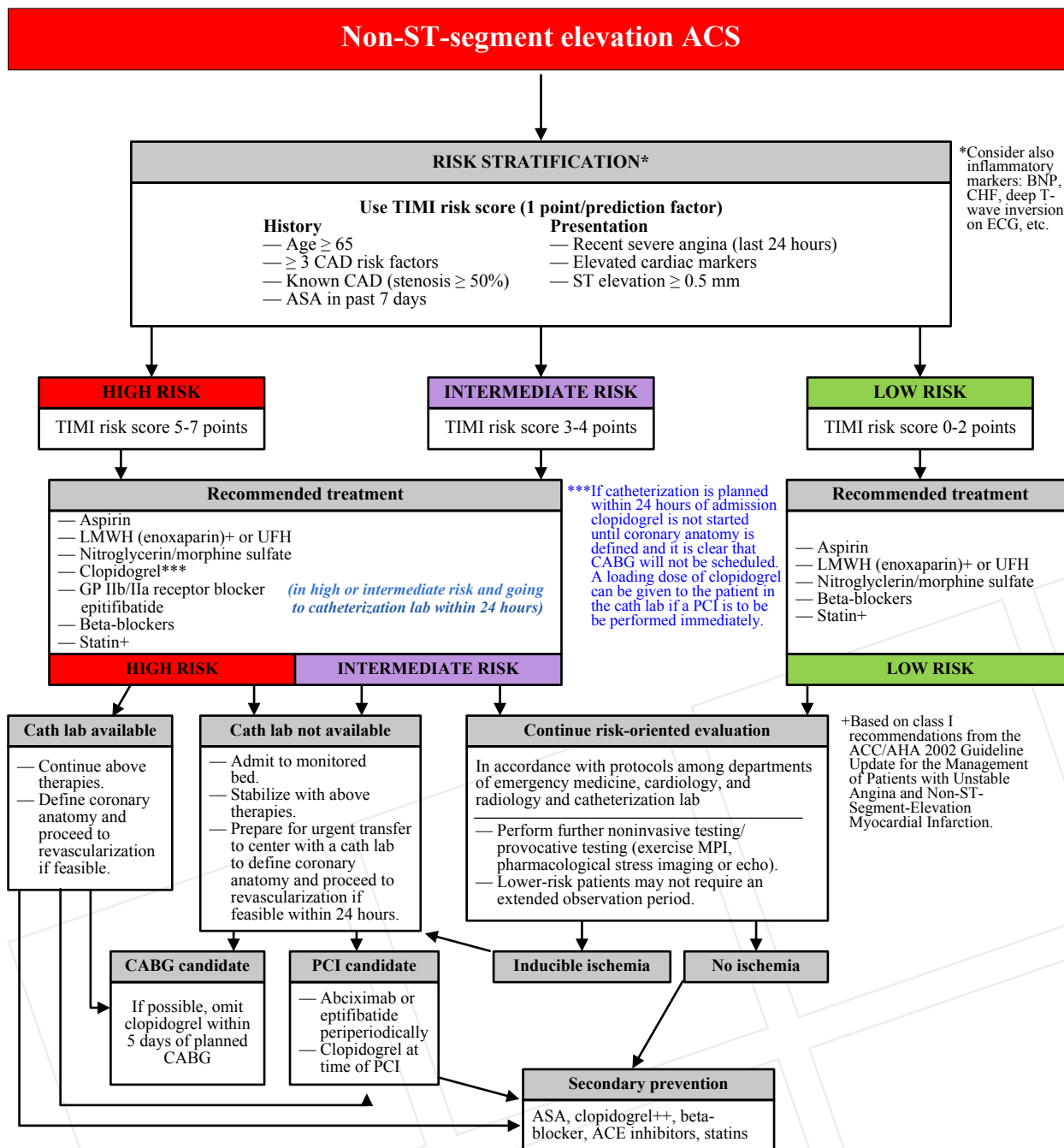
APPENDIX E: Acute Coronary Syndrome Proposed Process of Care

Aspect of Care	Thrombolytics	STEMI	Primary PCI	Discharge
	Admission/day 1 Date _____	Day 2 Date _____	Day 3 through discharge Date(s) _____	
CONSULTATIONS	<input type="checkbox"/> Cardiac rehab <input type="checkbox"/> Dietary (nutrition screen) <input type="checkbox"/> Social work <input type="checkbox"/> Chaplain <input type="checkbox"/> Clinical pharmacist Address needs as identified	<input type="checkbox"/> Cardiac rehab <input type="checkbox"/> Dietary (nutrition screen) <input type="checkbox"/> Social work <input type="checkbox"/> Chaplain <input type="checkbox"/> Clinical pharmacist Address needs as identified	<input type="checkbox"/> Cardiac rehab <input type="checkbox"/> Dietary (nutrition screen) <input type="checkbox"/> Social work <input type="checkbox"/> Chaplain <input type="checkbox"/> Clinical pharmacist Address needs as identified	<input type="checkbox"/> Cardiac rehab <input type="checkbox"/> Dietary (nutrition screen) <input type="checkbox"/> Social work <input type="checkbox"/> Chaplain <input type="checkbox"/> Clinical pharmacist Address needs as identified
ASSESSMENT	<input type="checkbox"/> Admission database <input type="checkbox"/> COA <input type="checkbox"/> Advance directive <input type="checkbox"/> Bleeding precautions with thrombolytics <input type="checkbox"/> Continuous telemetry with ST segment monitoring <input type="checkbox"/> Systems assessment every 4 hours <input type="checkbox"/> VS with pulse ox and pain assessment: ICU = every hour Tele = every 4 hours <input type="checkbox"/> I&O every shift <input type="checkbox"/> Daily AM weight	<input type="checkbox"/> Bleeding precautions with thrombolytics <input type="checkbox"/> Continuous telemetry with ST segment monitoring <input type="checkbox"/> Systems assessment every 4 hours <input type="checkbox"/> VS with pulse ox and pain assessment: ICU = every hour Tele = every 4 hours <input type="checkbox"/> I&O every shift <input type="checkbox"/> Daily AM weight	<input type="checkbox"/> Continuous telemetry with ST segment monitoring <input type="checkbox"/> Systems assessment every 4 hours <input type="checkbox"/> VS with pulse ox and pain assessment every 4 hours <input type="checkbox"/> I&O every shift <input type="checkbox"/> Daily AM weight	<input type="checkbox"/> Continuous telemetry with ST segment monitoring <input type="checkbox"/> Systems assessment every 4 hours <input type="checkbox"/> VS with pulse ox and pain assessment every 4 hours <input type="checkbox"/> I&O every shift <input type="checkbox"/> Daily AM weight
LABS	<input type="checkbox"/> Review of ED labs <input type="checkbox"/> CK-MB, troponin (0, 6, 12 hours) <input type="checkbox"/> Fasting lipid profile <input type="checkbox"/> UA <input type="checkbox"/> H/H, plts with thrombolytics <input type="checkbox"/> PTT per heparin protocol <input type="checkbox"/> FS blood glucose if diabetic <input type="checkbox"/> Guiac all stools	<input type="checkbox"/> H/H, plts with thrombolytics <input type="checkbox"/> BMP, magnesium <input type="checkbox"/> PT, PTT per heparin protocol <input type="checkbox"/> FS blood glucose if diabetic <input type="checkbox"/> Guiac all stools	<input type="checkbox"/> H/H, plts with thrombolytics <input type="checkbox"/> BMP, magnesium <input type="checkbox"/> PT, PTT per heparin protocol <input type="checkbox"/> FS blood glucose if diabetic <input type="checkbox"/> Guiac all stools	<input type="checkbox"/> H/H, plts with thrombolytics <input type="checkbox"/> BMP, magnesium <input type="checkbox"/> PT, PTT per heparin protocol <input type="checkbox"/> FS blood glucose if diabetic <input type="checkbox"/> Guiac all stools
DIAGNOSTICS/ INTERVENTIONS	<input type="checkbox"/> Cath lab procedure: _____ <input type="checkbox"/> IABP <input type="checkbox"/> 12-lead ECG AM/PRN <input type="checkbox"/> PCXR prn EF% = _____	<input type="checkbox"/> IABP <input type="checkbox"/> 12-lead ECG AM/PRN	<input type="checkbox"/> Echocardiogram (at the discretion of the cardiologist) <input type="checkbox"/> 12-lead ECG AM/PRN	<input type="checkbox"/> 12-lead ECG AM/PRN
MEDICATIONS	MONA <input type="checkbox"/> IV Ntg <input type="checkbox"/> Heparin/enoxaparin Active medications: <input type="checkbox"/> ASA <input type="checkbox"/> Plavix (PCI, allergy to ASA) <input type="checkbox"/> Beta-blocker <input type="checkbox"/> ACEI/ARB (begin within 24 hours) <input type="checkbox"/> Statin <input type="checkbox"/> Insulin protocol (goal: BG < 150) <input type="checkbox"/> Discussed with physician for nonactive medications <input type="checkbox"/> MAR corrections to pharmacy	MONA <input type="checkbox"/> IV Ntg <input type="checkbox"/> Heparin/enoxaparin Active medications: <input type="checkbox"/> ASA <input type="checkbox"/> Plavix (PCI, allergy to ASA) <input type="checkbox"/> Beta-blocker <input type="checkbox"/> ACEI/ARB (begin within 24 hours) <input type="checkbox"/> Statin <input type="checkbox"/> Insulin protocol (goal: BG < 150) <input type="checkbox"/> Discussed with physician for nonactive medications <input type="checkbox"/> MAR corrections to pharmacy	Active medications: <input type="checkbox"/> ASA <input type="checkbox"/> Plavix (PCI, allergy to ASA) <input type="checkbox"/> Beta-blocker <input type="checkbox"/> ACEI/ARB (begin within 24 hours) <input type="checkbox"/> Statin <input type="checkbox"/> Insulin protocol (goal: BG < 150) <input type="checkbox"/> Discussed with physician for nonactive medications <input type="checkbox"/> MAR corrections to pharmacy	Active medications: <input type="checkbox"/> ASA <input type="checkbox"/> Plavix (PCI, allergy to ASA) <input type="checkbox"/> Beta-blocker <input type="checkbox"/> ACEI/ARB (begin within 24 hours) <input type="checkbox"/> Statin <input type="checkbox"/> Insulin protocol (goal: BG < 150) <input type="checkbox"/> Discussed with physician for nonactive medications <input type="checkbox"/> MAR corrections to pharmacy
RESPIRATORY CARE	<input type="checkbox"/> Maintain O ₂ sats > 92% <input type="checkbox"/> Titrate O ₂ as indicated	<input type="checkbox"/> Maintain O ₂ sats > 92% <input type="checkbox"/> Titrate O ₂ as indicated	<input type="checkbox"/> Maintain O ₂ sats > 92% <input type="checkbox"/> Wean O ₂ to room air	<input type="checkbox"/> Maintain O ₂ sats > 92% <input type="checkbox"/> Wean O ₂ to room air
ACTIVITY/ SELF-CARE	<input type="checkbox"/> Bed rest until enzymes have peaked and removal of sheaths — position of comfort <input type="checkbox"/> BRP if no discomfort/distress	<input type="checkbox"/> Bed rest until sheath removal, then OOB as tolerated <input type="checkbox"/> Chair for meals <input type="checkbox"/> Monitored ambulation: 25-100 feet (1-2 times) Distance walked: _____	<input type="checkbox"/> Chair for meals <input type="checkbox"/> Monitored ambulation: 50-200 feet (2-4 times) Distance walked: _____	<input type="checkbox"/> Chair for meals <input type="checkbox"/> Monitored ambulation: 150-300 feet (2-4 times) Distance walked: _____
NUTRITION	<input type="checkbox"/> NPO until stable, then progress to clear liquids (N/V, CP free)	<input type="checkbox"/> Cardiac diet — progress from NPO as tolerated	<input type="checkbox"/> Cardiac diet (ADA if indicated)	<input type="checkbox"/> Cardiac diet (ADA if indicated)
ADDITIONAL ELEMENTS OF CARE	<input type="checkbox"/> Pain <input type="checkbox"/> Skin/tissue integrity <input type="checkbox"/> Elimination <input type="checkbox"/> High fall risk <input type="checkbox"/> Other: _____	<input type="checkbox"/> Pain <input type="checkbox"/> Skin/tissue integrity <input type="checkbox"/> Elimination <input type="checkbox"/> High fall risk <input type="checkbox"/> Other: _____	<input type="checkbox"/> Pain <input type="checkbox"/> Skin/tissue integrity <input type="checkbox"/> Elimination <input type="checkbox"/> High fall risk <input type="checkbox"/> Other: _____	<input type="checkbox"/> Pain <input type="checkbox"/> Skin/tissue integrity <input type="checkbox"/> Elimination <input type="checkbox"/> High fall risk <input type="checkbox"/> Other: _____

APPENDIX E: Acute Coronary Syndrome Proposed Process of Care

COMFORT CARE	<input type="checkbox"/> Partners in caring <input type="checkbox"/> Back rub <input type="checkbox"/> Pet therapy <input type="checkbox"/> Reiki therapy <input type="checkbox"/> Spiritual care <input type="checkbox"/> Humor therapy <input type="checkbox"/> Other: _____	<input type="checkbox"/> Partners in caring <input type="checkbox"/> Back rub <input type="checkbox"/> Pet therapy <input type="checkbox"/> Reiki therapy <input type="checkbox"/> Spiritual care <input type="checkbox"/> Humor therapy <input type="checkbox"/> Other: _____	<input type="checkbox"/> Partners in caring <input type="checkbox"/> Back rub <input type="checkbox"/> Pet therapy <input type="checkbox"/> Reiki therapy <input type="checkbox"/> Spiritual care <input type="checkbox"/> Humor therapy <input type="checkbox"/> Other: _____	<input type="checkbox"/> Partners in caring <input type="checkbox"/> Back rub <input type="checkbox"/> Pet therapy <input type="checkbox"/> Reiki therapy <input type="checkbox"/> Spiritual care <input type="checkbox"/> Humor therapy <input type="checkbox"/> Other: _____
EDUCATION *Document on patient education record — see reverse	<input type="checkbox"/> Change of Heart Book <input type="checkbox"/> Smoking cessation <input type="checkbox"/> Diagnosis and treatment <input type="checkbox"/> Pain scale <input type="checkbox"/> Cardiac rehab for MI education and activity	<input type="checkbox"/> Smoking cessation <input type="checkbox"/> Diet/weight/exercise <input type="checkbox"/> Risk factor modification <input type="checkbox"/> Cardiac rehab for MI education and activity <input type="checkbox"/> Films as appropriate	<input type="checkbox"/> Smoking cessation <input type="checkbox"/> Reinforce education <input type="checkbox"/> Home activity/exercise plan <input type="checkbox"/> Cardiac rehab for MI education and activity <input type="checkbox"/> Films as appropriate	<input type="checkbox"/> Smoking cessation <input type="checkbox"/> Reinforce education
CARE COORDINATION	Care coordination rounds Care coordination team: <input type="checkbox"/> Specialist <input type="checkbox"/> Internist <input type="checkbox"/> Charge nurse <input type="checkbox"/> Patient's nurse <input type="checkbox"/> Case manager <input type="checkbox"/> Social Work <input type="checkbox"/> Other _____	Care coordination rounds Care coordination team: <input type="checkbox"/> Specialist <input type="checkbox"/> Internist <input type="checkbox"/> Charge nurse <input type="checkbox"/> Patient's nurse <input type="checkbox"/> Case manager <input type="checkbox"/> Social Work <input type="checkbox"/> Other _____ <input type="checkbox"/> Home health referral <input type="checkbox"/> Community health referral <input type="checkbox"/> Outpatient cardiac rehab order obtained and arranged	Care coordination rounds Care coordination team: <input type="checkbox"/> Specialist <input type="checkbox"/> Internist <input type="checkbox"/> Charge nurse <input type="checkbox"/> Patient's nurse <input type="checkbox"/> Case manager <input type="checkbox"/> Social Work <input type="checkbox"/> Other _____ <input type="checkbox"/> Arrangements for discharge discussed with patient and significant other(s)	Discharge instructions given to patient: <input type="checkbox"/> Medications <input type="checkbox"/> Diet <input type="checkbox"/> Activity <input type="checkbox"/> Home exercise <input type="checkbox"/> S/S to report to doctor <input type="checkbox"/> Follow-up <input type="checkbox"/> Smoking cessation <input type="checkbox"/> Outpatient cardiac rehab
OUTCOMES	<input type="checkbox"/> Patient pain free (without angina) <input type="checkbox"/> Hemodynamic stability — SBP > 90 mmHg HR > 50 Stable cardiac rhythm	<input type="checkbox"/> Patient pain free (without angina) <input type="checkbox"/> Hemodynamic stability	<input type="checkbox"/> Patient without arrhythmias <input type="checkbox"/> Patient and significant other verbalize understanding of all education and teaching	<input type="checkbox"/> Medications appropriately prescribed <input type="checkbox"/> Patient and significant other verbalize understanding of all medications <input type="checkbox"/> Smoking cessation counseling provided
SIGNATURES	AM RN: _____ PM RN: _____ _____ _____	AM RN: _____ PM RN: _____ _____ _____	AM RN: _____ PM RN: _____ _____ _____	AM RN: _____ PM RN: _____ _____ _____

APPENDIX E: Acute Coronary Syndrome Proposed Process of Care



ER NSTEMI/UA high- to intermediate-risk orders

1. STAT call to cardiologist: _____

2. Allergies: _____

3. Patient's weight: _____ kg estimated actual

4. TIMI risk score: _____

Check all appropriate boxes

5. Medications

- STAT Aspirin 325 mg chew PO if not already given and not allergic
If unable to take PO, give aspirin 300 mg PR
If patient has a **True** aspirin allergy, give clopidogrel 75 mg PO
 DO NOT GIVE ASPIRIN. Reason: _____
- Metoprolol 5 mg IV every 5 minutes x 3 doses
Hold if HR < 55, SBP < 90, radiological or clinical evidence of active CHF
Metoprolol 25 mg PO x 1, give 15 minutes **after last IV dose**
Hold if HR < 55, SBP < 90, radiological or clinical evidence of active CHF
 DO NOT GIVE A BETA-BLOCKER. Reason: _____
- Nitroglycerin 0.4 mg SL every 5 minutes x 3 PRN chest pain
If chest pain not relieved, start nitroglycerin IV at 10 µg/min, titrate for pain relief maintaining SBP ≥ 90 mm Hg
- Morphine 2-4 mg IV every 5 minutes PRN ongoing chest pain to a max of 10 mg every hour
- Lorazepam 0.5-1 mg PO 1 time PRN anxiety
- Ondansetron 4 mg IV every 6 hours PRN nausea
- Acetaminophen 650 mg PO/PR every 4 hours PRN discomfort/headache
(do *not* exceed 4 g/day total acetaminophen)

6. Anticoagulation

- Enoxaparin 1 mg/kg subcutaneous every 12 hours (round to nearest 10 mg)
- Renal dose enoxaparin (CrCl < 30 ml/min)
Enoxaparin 1 mg/kg subcutaneously every 24 hours (round to nearest 10 mg)
- Heparin dosing (round to nearest 50 units)
 1. Intravenous heparin loading dose:
Dose (60 units/kg) = _____ units (maximum dose of 4000 units)
 2. Intravenous heparin infusion rate:
Infusion rate (12 units/kg per hour) = _____ units/hour (maximum of 1000 units/hour)
 3. Obtain aPTT 6 hours after infusion begins

7. Initiate glycoprotein IIb/IIIa inhibitors as requested by cardiologist

- Eptifibatide (Integrelin®)
For normal renal function: eptifibatide 180 µg/kg IV bolus over 2 minutes, then 2 µg/kg/min IV infusion
- Eptifibatide (Integrelin®)
For CrCl < 50 ml/min: eptifibatide 180 mcg/kg IV bolus over 2 minutes, then 1 mcg/kg/min IV infusion

8. IV fluids: _____

9. Additional meds/orders: _____

Physician signature _____ Date/time _____

Revision 11/16/05

ER unstable angina low-risk orders

1. STAT call to cardiologist: _____
2. Allergies: _____
3. Patient's weight: _____ kg estimated actual
4. TIMI risk score: _____

Check all appropriate boxes

5. Medications

- STAT aspirin 325 mg chew PO if not already given and not allergic
If unable to take PO, give aspirin 300 mg PR
If patient has a **TRUE** aspirin allergy, give clopidogrel 75 mg PO
 DO NOT GIVE ASPIRIN. Reason: _____
- Metoprolol 25 mg PO 1 time
Hold if HR < 55, SBP < 90, radiographic or clinical evidence of active CHF
 DO NOT GIVE A BETA-BLOCKER. Reason: _____
- Nitroglycerin 0.4 mg SL every 5 minutes x 3 PRN chest pain
If chest pain not relieved, start nitroglycerin IV at 10 µg/min, titrate for pain relief maintaining SBP ≥ 90 mm Hg
- Morphine 2-4 mg IV every 5 minutes PRN ongoing chest pain to a max of 10 mg every hour
- Lorazepam 0.5-1 mg PO 1 time PRN anxiety
- Ondansetron 4 mg IV every 6 hours PRN nausea
- Acetaminophen 650 mg PO/PR every 4 hours PRN discomfort/headache
(do not exceed 4 g/day total acetaminophen)

6. Anticoagulation

- Enoxaparin 1 mg/kg subcutaneously every 12 hours (round to nearest 10 mg)
- Renal dose enoxaparin (CrCl <30 mL/min)
Enoxaparin 1 mg/kg subcutaneously every 24 hours (round to nearest 10 mg)
- Heparin dosing (round to nearest 50 units)
 1. Intravenous heparin loading dose:
Dose (60 units/kg) = _____ units (maximum dose of 4000 units)
 2. Intravenous heparin infusion rate:
Infusion rate (12 units/kg per hour) = _____ units/hour (maximum of 1000 units/hour)
 3. Obtain aPTT 6 hours after infusion begins

7. IV fluids: _____

8. Additional Meds/orders: _____

Physician signature _____ Date/time _____

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APPENDIX E: Acute Coronary Syndrome Proposed Process of Care

Non-STEMI/Unstable Angina Care Map — Emergency Department	
CONSULTATION	<input type="checkbox"/> Cardiologist
ASSESSMENT	Brief, targeted history and physical performed by ED physician Risk stratification to — ↑ high/intermediate risk ↑ low risk Continuous telemetry with ST segment monitoring System assessment, pain assessment Vital signs with pulse ox I&O Weight
LABS	<ul style="list-style-type: none"> • CK-MB, troponin, myoglobin • CMP, Magnesium, CBC • PT (if patient previously on warfarin) • Guiac all stools
DIAGNOSTICS/ INTERVENTIONS	<ul style="list-style-type: none"> • 12-Lead ECG completed and read within 10 minutes • PCXR stat • Obtain IV access
MEDICATIONS	<p style="text-align: center;">MONA</p> <ul style="list-style-type: none"> <input type="checkbox"/> STAT ASA (325 mg — chew) <input type="checkbox"/> Ntg (0.4 mg sublingual STAT x 3, IV) <input type="checkbox"/> Lopressor 5 mg IV every 5 minutes x 3 <input type="checkbox"/> Lopressor 25 mg PO (hold HR < 55, SBP < 90, CHF) <input type="checkbox"/> Heparin/lovenox <input type="checkbox"/> GP IIb/IIIa (high- and intermediate-risk patients only)
RESPIRATORY CARE	O ₂ @ 2L NC Maintain O ₂ sats > 92%, titrate O ₂ as indicated
ACTIVITY/SELF-CARE	Bed rest
NUTRITION	NPO, except medications
EDUCATION	Diagnosis and treatment Plan for disposition Pain scale
OUTCOMES	Patient is pain free Patient hemodynamically stable Cardiologist to direct patient care

APPENDIX E: Acute Coronary Syndrome Proposed Process of Care

NSTEMI/UA high- to intermediate-risk admission orders

Admit to: ICU Telemetry IU

1. Diagnosis: acute coronary syndrome: _____
2. Admitting specialist: _____ Admitting internist: _____

Initiate orders 3-13.

3. Initiate NSTEMI/UA High-/intermediate-risk care map
4. Emergency protocol
5. Cardiac rehab consult
6. Oxygen 2 L per NC. Titrate to maintain SpO₂ > 92%
7. Cardiac diet
8. Peripheral IV, saline lock if not in use
9. Labs
 - Admit labs: **IF NOT DONE IN ED** — troponin I and CK-MB at 0, 6, and 12 hours, CBC, CMP, magnesium, PT/INR if patient previously on warfarin, fasting lipid profile, UA
 - Daily labs: CBC, BMP, magnesium, PT/INR if patient on warfarin phosphorus other _____
 - PRN labs: RN may obtain as clinically indicated: CXR, ABG, Hgb/Hct, BMP, magnesium, aPTT, CKMB until enzymes peak
10. ECG on admission, daily for 3 days, and PRN chest pain
11. Chest X-ray: daily for 2 days or _____
12. Finger-stick blood glucose AC and HS. Initiate moderate sliding-scale insulin protocol.
If patient not diabetic and has a fasting blood sugar <110, discontinue blood glucose monitoring.
13. Follow potassium and magnesium protocol.

Initiate the following medications; check all appropriate boxes.

14. Medications

- STAT aspirin 325 mg chew PO if not already given in ED and not allergic, then start 81 mg PO daily
If unable to take PO, give Aspirin 300 mg PR
If patient has a **TRUE** aspirin allergy, give clopidogrel 75 mg PO daily
 DO NOT GIVE ASPIRIN. Reason: _____
- Give clopidogrel 75 mg PO daily, in addition to aspirin therapy
- Metoprolol 25 mg PO every 6 hours x 48 hours total, then 50 mg PO BID
Hold for HR < 55 or SBP < 90, radiographic or clinical evidence of active CHF
or: _____, hold for HR < _____ or SBP < _____
 DO NOT GIVE A BETA-BLOCKER. Reason: _____
- Captopril 6.25 mg PO every 8 hours, hold for SBP < 100
or: _____, hold for SBP < _____
 DO NOT GIVE AN ACE INHIBITOR. Reason: _____
- Losartan 25 mg PO daily, hold for SBP < 100
or: _____, hold for SBP < _____
 DO NOT GIVE AN ARB. Reason: _____
- Pravastatin 80 mg PO at bedtime or:
 DO NOT GIVE A STATIN. Reason: _____
- Senakot 1 tablet PO BID; if no results, use BCOC.
- Lorazepam 1 mg PO/IV every 4 hours PRN anxiety/sleep
- Temazepam 15 mg PO at bedtime PRN sleep, may repeat x 1
- Acetaminophen 650 mg PO/PR every 4 hours PRN discomfort/headache
(do not exceed 4 gm/day total acetaminophen)
- Ondansetron 4 mg IV every 6 hours PRN nausea
- Antacid of choice

APPENDIX E: Acute Coronary Syndrome Proposed Process of Care

15. Anticoagulation

- Regular dose enoxaparin 1 mg/kg subcutaneous every 12 hours (round to nearest 10 mg)
- Renal dose of enoxaparin (CrCl < 30 mL/min) enoxaparin 1 mg/kg subcutaneous every 24 hours (round to nearest 10 mg)
- Heparin dosing (round to nearest 50 units)
 1. Target aPTT is 57-80 seconds
 2. Obtain aPTT 6 hours after infusion begins
 3. Heparin dosage adjustments

aPTT (sec)	Bolus dose	Hold infusion	Rate change	Repeat aPTT
< 45	70 units/kg	No	↑ 2 ml/hour (200 units/hour)	6 hours
45-56	None	No	↑ 1 ml/hour (100 units/hour)	6 hours
57-80	None	No	None	12 hours x 1, then daily
81-100	None	No	↓ 1 ml/hour (100 units/hour)	12 hours
> 100	None	60 min	↓ 2 ml/hour (200 units/hour)	6 /hour

*Repeat aPTT draw time to begin at time the adjustment is made (ie, when infusion held or changed).

16. Glycoprotein IIb/IIIa inhibitor: _____

- Eptifibatide (Integrelin®)
 - For normal renal function:** eptifibatide 180 mcg/kg IV bolus over 2 minutes, then 2 mcg/kg/min IV infusion
- Eptifibatide (Integrelin®)
 - For CrCl < 50 ml/min:** eptifibatide 180 mcg/kg IV bolus over 2 minutes, then 1 mcg/kg/min IV infusion

17. IV fluids: _____

18. Additional meds/orders: _____

19. Cardiac diagnostic procedures

- Exercise stress test
- Adenosine stress test
- Dobutamine stress test
- Transthoracic ECHO
- Stress ECHO

Test to be scheduled and performed if enzymes are negative and there is no ongoing chest pain. If either present, contact attending cardiologist

Diagnostic test to be read by _____ Number _____

- Cardiac catheterization (cardiologist to schedule procedure)

Physician signature _____ Date/time _____

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APPENDIX E: Acute Coronary Syndrome Proposed Process of Care

Non-STEMI/Unstable Angina (High and Intermediate Risk)

Aspect of care	Admission/day 1 Date _____	Day 2 Date _____	Day 3 through discharge Date(s) _____	Discharge Date _____
CONSULTATIONS	<input type="checkbox"/> Cardiac rehab <input type="checkbox"/> Dietary (nutrition screen) <input type="checkbox"/> Social work <input type="checkbox"/> Chaplain <input type="checkbox"/> Clinical pharmacist Address needs as identified	<input type="checkbox"/> Cardiac rehab <input type="checkbox"/> Dietary (nutrition screen) <input type="checkbox"/> Social work <input type="checkbox"/> Chaplain <input type="checkbox"/> Clinical pharmacist Address needs as identified	<input type="checkbox"/> Cardiac rehab <input type="checkbox"/> Dietary (nutrition screen) <input type="checkbox"/> Social work <input type="checkbox"/> Chaplain <input type="checkbox"/> Clinical pharmacist Address needs as identified	<input type="checkbox"/> Cardiac rehab <input type="checkbox"/> Dietary (nutrition screen) <input type="checkbox"/> Social work <input type="checkbox"/> Chaplain <input type="checkbox"/> Clinical pharmacist Address needs as identified
ASSESSMENT	<input type="checkbox"/> Admission database <input type="checkbox"/> COA <input type="checkbox"/> Advance directive <input type="checkbox"/> Continuous telemetry with ST segment monitoring <input type="checkbox"/> Systems assessment every 4 hours <input type="checkbox"/> VS with pulse ox and pain assessment: ICU = every hour Tele = every 4 hours <input type="checkbox"/> I&O every shift <input type="checkbox"/> Daily AM weight	<input type="checkbox"/> Continuous telemetry with ST segment monitoring <input type="checkbox"/> Systems assessment every 4 hours <input type="checkbox"/> VS with pulse ox and pain assessment every 4 hours <input type="checkbox"/> I&O every shift <input type="checkbox"/> Daily AM weight	<input type="checkbox"/> Continuous telemetry with ST segment monitoring <input type="checkbox"/> Systems assessment every 4 hours <input type="checkbox"/> VS with pulse ox and pain assessment every 4 hours <input type="checkbox"/> I&O every shift <input type="checkbox"/> Daily AM weight	<input type="checkbox"/> Continuous telemetry with ST segment monitoring <input type="checkbox"/> Systems assessment every 4 hours <input type="checkbox"/> VS with pulse ox and pain assessment every 4 hours <input type="checkbox"/> I&O every shift <input type="checkbox"/> Daily AM weight
LABS	<input type="checkbox"/> Review of ED labs <input type="checkbox"/> CK-MB, troponin (0, 6, 12 hours) <input type="checkbox"/> Fasting lipid profile <input type="checkbox"/> UA <input type="checkbox"/> PTT per heparin protocol <input type="checkbox"/> FS blood glucose if diabetic <input type="checkbox"/> Guiac all stools	<input type="checkbox"/> CBC, BMP, magnesium <input type="checkbox"/> PT, PTT per heparin protocol <input type="checkbox"/> FS blood glucose if diabetic <input type="checkbox"/> Guiac all stools	<input type="checkbox"/> CBC, BMP, magnesium <input type="checkbox"/> PT, PTT per heparin protocol <input type="checkbox"/> FS blood glucose if diabetic <input type="checkbox"/> Guiac all stools	<input type="checkbox"/> CBC, BMP, magnesium <input type="checkbox"/> PT, PTT per heparin protocol <input type="checkbox"/> FS blood glucose if diabetic <input type="checkbox"/> Guiac all stools
DIAGNOSTICS/ INTERVENTIONS EF% = _____	<input type="checkbox"/> Echocardiogram <input type="checkbox"/> Cath lab procedure: _____ <input type="checkbox"/> IABP <input type="checkbox"/> Adenosine stress test (at discretion of cardiologist) 12-lead ECG AM/PRN PCXR PRN	<input type="checkbox"/> Echocardiogram (if not done on day 1) <input type="checkbox"/> Cath lab procedure: _____ <input type="checkbox"/> IABP <input type="checkbox"/> Adenosine stress test (at discretion of cardiologist) 12-lead ECG AM/PRN PCXR PRN	12-lead ECG AM/PRN	12-lead ECG AM/PRN
MEDICATIONS Protocols — Emergency <input type="checkbox"/> Potassium <input type="checkbox"/> Magnesium <input type="checkbox"/> Insulin <input type="checkbox"/> BCOC <input type="checkbox"/>	MONA <input type="checkbox"/> IV Ntg <input type="checkbox"/> Heparin/enoxaparin <input type="checkbox"/> GP IIb/IIIa Active medications <input type="checkbox"/> ASA <input type="checkbox"/> Plavix (PCI, allergy to ASA) <input type="checkbox"/> Beta-blocker <input type="checkbox"/> ACEI/ARB (begin within 24 hours) <input type="checkbox"/> Statin <input type="checkbox"/> Insulin protocol (goal BG < 150) <input type="checkbox"/> Discussed with physician for nonactive medications <input type="checkbox"/> MAR corrections to pharmacy	MONA <input type="checkbox"/> IV Ntg <input type="checkbox"/> Heparin/enoxaparin <input type="checkbox"/> GP IIb/IIIa Active medications <input type="checkbox"/> ASA <input type="checkbox"/> Plavix (PCI, allergy to ASA) <input type="checkbox"/> Beta-blocker <input type="checkbox"/> ACEI/ARB (begin within 24 hours) <input type="checkbox"/> Statin <input type="checkbox"/> Insulin protocol (goal BG < 150) <input type="checkbox"/> Discussed with physician for nonactive medications <input type="checkbox"/> MAR corrections to pharmacy	Active medications <input type="checkbox"/> ASA <input type="checkbox"/> Plavix (PCI, allergy to ASA) <input type="checkbox"/> Beta-blocker <input type="checkbox"/> ACEI/ARB (begin within 24 hours) <input type="checkbox"/> Statin <input type="checkbox"/> Insulin protocol (goal BG < 150) <input type="checkbox"/> Discussed with physician for nonactive medications <input type="checkbox"/> MAR corrections to pharmacy	Active medications <input type="checkbox"/> ASA <input type="checkbox"/> Plavix (PCI, allergy to ASA) <input type="checkbox"/> Beta-blocker <input type="checkbox"/> ACEI/ARB (begin within 24 hours) <input type="checkbox"/> Statin <input type="checkbox"/> Insulin protocol (goal BG < 150) <input type="checkbox"/> Discussed with physician for nonactive medications <input type="checkbox"/> MAR corrections to pharmacy
RESPIRATORY CARE	<input type="checkbox"/> Maintain O ₂ sats > 92% <input type="checkbox"/> Titrate O ₂ as indicated	<input type="checkbox"/> Maintain O ₂ sats > 92% <input type="checkbox"/> Titrate O ₂ as indicated	<input type="checkbox"/> Maintain O ₂ sats > 92% <input type="checkbox"/> Wean O ₂ to room air	<input type="checkbox"/> Maintain O ₂ sats > 92% <input type="checkbox"/> Wean O ₂ to room air
ACTIVITY/ SELF-CARE	<input type="checkbox"/> BRP if no discomfort/distress	<input type="checkbox"/> Bedrest until sheath removal, then OOB as tolerated <input type="checkbox"/> Chair for meals <input type="checkbox"/> Monitored ambulation: 25-100 feet (1-2 times) <input type="checkbox"/> Distance walked: _____	<input type="checkbox"/> Chair for meals <input type="checkbox"/> Monitored ambulation: 50-200 feet (2-4 times) <input type="checkbox"/> Distance walked: _____	<input type="checkbox"/> Chair for meals <input type="checkbox"/> Monitored ambulation: 150-300 feet (2-4 times) <input type="checkbox"/> Distance walked: _____
NUTRITION	<input type="checkbox"/> Cardiac diet — progress from NPO as tolerated	<input type="checkbox"/> Cardiac diet (ADA if indicated)	<input type="checkbox"/> Cardiac diet (ADA if indicated)	<input type="checkbox"/> Cardiac diet (ADA if indicated)
ADDITIONAL	<input type="checkbox"/> Pain	<input type="checkbox"/> Pain	<input type="checkbox"/> Pain	<input type="checkbox"/> Pain

APPENDIX E: Acute Coronary Syndrome Proposed Process of Care

ELEMENTS OF CARE	<input type="checkbox"/> Skin/tissue integrity <input type="checkbox"/> Elimination <input type="checkbox"/> High fall risk <input type="checkbox"/> Other: _____	<input type="checkbox"/> Skin/tissue integrity <input type="checkbox"/> Elimination <input type="checkbox"/> High fall risk <input type="checkbox"/> Other: _____	<input type="checkbox"/> Skin/tissue integrity <input type="checkbox"/> Elimination <input type="checkbox"/> High fall risk <input type="checkbox"/> Other: _____	<input type="checkbox"/> Skin/tissue integrity <input type="checkbox"/> Elimination <input type="checkbox"/> High fall risk <input type="checkbox"/> Other: _____
COMFORT CARE	<input type="checkbox"/> Partners in caring <input type="checkbox"/> Back rub <input type="checkbox"/> Pet therapy <input type="checkbox"/> Reiki therapy <input type="checkbox"/> Spiritual care <input type="checkbox"/> Humor therapy <input type="checkbox"/> Other: _____	<input type="checkbox"/> Partners in caring <input type="checkbox"/> Back rub <input type="checkbox"/> Pet therapy <input type="checkbox"/> Reiki therapy <input type="checkbox"/> Spiritual care <input type="checkbox"/> Humor therapy <input type="checkbox"/> Other: _____	<input type="checkbox"/> Partners in caring <input type="checkbox"/> Back rub <input type="checkbox"/> Pet therapy <input type="checkbox"/> Reiki therapy <input type="checkbox"/> Spiritual care <input type="checkbox"/> Humor therapy <input type="checkbox"/> Other: _____	<input type="checkbox"/> Partners in caring <input type="checkbox"/> Back rub <input type="checkbox"/> Pet therapy <input type="checkbox"/> Reiki therapy <input type="checkbox"/> Spiritual care <input type="checkbox"/> Humor therapy <input type="checkbox"/> Other: _____
EDUCATION *Document on Patient Education Record — see reverse	<input type="checkbox"/> Change of Heart Book <input type="checkbox"/> Smoking cessation <input type="checkbox"/> Diagnosis and treatment <input type="checkbox"/> Pain scale <input type="checkbox"/> Cardiac rehab for ACS education and activity	<input type="checkbox"/> Smoking cessation <input type="checkbox"/> Diet/weight/exercise <input type="checkbox"/> Risk factor modification <input type="checkbox"/> Films as appropriate	<input type="checkbox"/> Smoking cessation <input type="checkbox"/> Reinforce education <input type="checkbox"/> Home activity/exercise plan <input type="checkbox"/> Films as appropriate	<input type="checkbox"/> Smoking cessation <input type="checkbox"/> Reinforce education
CARE COORDINATION	Care coordination rounds Care coordination team <input type="checkbox"/> Specialist <input type="checkbox"/> Internist <input type="checkbox"/> Charge nurse <input type="checkbox"/> Patient's nurse <input type="checkbox"/> Case manager <input type="checkbox"/> Social work <input type="checkbox"/> Other: _____	Care coordination rounds Care coordination team <input type="checkbox"/> Specialist <input type="checkbox"/> Internist <input type="checkbox"/> Charge nurse <input type="checkbox"/> Patient's nurse <input type="checkbox"/> Case manager <input type="checkbox"/> Social work <input type="checkbox"/> Other <input type="checkbox"/> Home health referral <input type="checkbox"/> Community health referral <input type="checkbox"/> Outpatient cardiac rehab order obtained and arranged	Care coordination rounds Care coordination team <input type="checkbox"/> Specialist <input type="checkbox"/> Internist <input type="checkbox"/> Charge nurse <input type="checkbox"/> Patient's nurse <input type="checkbox"/> Case manager <input type="checkbox"/> Social work <input type="checkbox"/> Other <input type="checkbox"/> Arrangements for discharge discussed with patient and significant other(s)	Discharge instructions given to patient: <input type="checkbox"/> Medications <input type="checkbox"/> Diet <input type="checkbox"/> Activity <input type="checkbox"/> Home exercise <input type="checkbox"/> S/S to report to doctor <input type="checkbox"/> Follow-up <input type="checkbox"/> Smoking cessation <input type="checkbox"/> Outpatient cardiac rehab
OUTCOMES	<input type="checkbox"/> Patient pain free (without angina) <input type="checkbox"/> Hemodynamic stability — SBP > 90 mm Hg — HR > 50 — Stable cardiac rhythm	<input type="checkbox"/> Patient pain free (without angina) <input type="checkbox"/> Patient with stable cardiac rhythm	<input type="checkbox"/> Patient with stable cardiac rhythm <input type="checkbox"/> Patient and significant other verbalize understanding of all education and teaching	<input type="checkbox"/> Medications appropriately prescribed <input type="checkbox"/> Patient and significant other verbalize understanding of all medications <input type="checkbox"/> Smoking cessation counseling provided
SIGNATURES	AM RN: _____ PM RN: _____ _____ _____ _____ _____	AM RN: _____ PM RN: _____ _____ _____ _____ _____	AM RN: _____ PM RN: _____ _____ _____ _____ _____	AM RN: _____ PM RN: _____ _____ _____ _____ _____

Unstable angina low-risk admission orders

Admit to: ICU Telemetry IU

1. Diagnosis — acute coronary syndrome: _____
2. Admitting specialist: _____ Admitting internist: _____

Initiate orders 3-13

3. Initiate NSTEMI/UA low-risk care map
4. Emergency protocol
5. Cardiac rehab consult
6. Oxygen 2 L per NC. Titrate to maintain SpO₂ > 92%
7. Cardiac diet
8. Peripheral IV, saline lock if not in use
9. Labs
 - Admit labs: **IF NOT DONE IN ED** — troponin I and CK-MB at 0 and 6 hours, myoglobin at 0 and 3 hours, CBC, CMP, magnesium, PT/INR if patient previously on warfarin, fasting lipid profile, UA
 - Daily PT/INR if patient on warfarin
 - PRN Labs: RN may obtain as clinically indicated: CXR, ABG, Hgb/Hct, BMP, Magnesium, aPTT, CKMB until enzymes peak
10. ECG on admission, and PRN chest pain
11. Chest X-ray **IF NOT DONE IN ED**
12. Finger-stick blood glucose AC and HS. Initiate moderate sliding-scale insulin protocol.
If patient not diabetic and has a fasting blood sugar < 110, discontinue blood glucose monitoring.
13. Follow potassium and magnesium protocol

Initiate the following medications and check all appropriate boxes.

14. Medications
 - STAT aspirin 325 mg chew PO if not already given in ED and not allergic, then start 81 mg PO daily
If unable to take PO, give aspirin 300 mg PR
If patient has a **TRUE** aspirin allergy, give clopidogrel 75 mg PO daily
 DO NOT GIVE ASPIRIN. Reason: _____
 - Give clopidogrel 75 mg PO daily, in addition to aspirin therapy
 - Metoprolol 25 mg PO BID, Hold for HR < 55, SBP < 90, radiographic or clinical evidence of active CHF
or: _____, hold for HR < _____ or SBP < _____
 DO NOT GIVE A BETA-BLOCKER. Reason: _____
 - Captopril 6.25 mg PO every 8 hours, hold for SBP < 100
or: _____, hold for SBP < _____
 DO NOT GIVE AN ACE INHIBITOR. Reason: _____
 - Losartan 25 mg PO daily, Hold for SBP < 100
or: _____ hold for SBP < _____
 DO NOT GIVE AN ARB. Reason: _____
 - Pravastatin 80 mg PO at bedtime or: _____
 DO NOT GIVE A STATIN. Reason: _____
 - Senakot 1 tablet PO BID. If no results, use BCOC.
 - Lorazepam 1 mg PO/IV every 4 hours PRN anxiety/sleep
 - Temazepam 15 mg PO at bedtime PRN sleep, may repeat x 1
 - Acetaminophen 650 mg PO/PR every 4 hours PRN discomfort / headache
(do not exceed 4 gm/day total acetaminophen)
 - Ondansetron 4 mg IV every 6 hours PRN nausea

APPENDIX E: Acute Coronary Syndrome Proposed Process of Care

15. Anticoagulation:

- Regular dose enoxaparin 1 mg/kg subcutaneously every 12 hours (round to nearest 10 mg)
- Renal dose enoxaparin (CrCl < 30 ml/min)
Enoxaparin 1 mg/kg subcutaneously every 24 hours (round to nearest 10 mg)
- Heparin dosing (round to nearest 50 units)
 1. Target aPTT is 57-80 seconds
 2. Obtain aPTT 6 hours after infusion begins
 3. Heparin dosage adjustments

aPTT (sec)	Bolus dose	Hold infusion	Rate change	Repeat aPTT
< 45	70 units/kg	No	↑ 2 ml/hour (200 units/hour)	6 hours
45-56	None	No	↑ 1 ml/hour (100 units/hour)	6 hours
57-80	None	No	None	12 hours x 1, then daily
81-100	None	No	↓ 1 ml/hour (100 units/hour)	12 hours
> 100	None	60 minutes	↓ 2 ml/hour (200 units/hour)	6 hours

*Repeat aPTT draw time to begin at time the adjustment is made (ie, when infusion held or changed).

16. IV fluids: _____

17. Additional meds/orders: _____

18. Cardiac diagnostic procedures

- Exercise stress test
- Adenosine stress test
- Dobutamine stress test
- Transthoracic ECHO
- Stress ECHO

Test to be scheduled and performed if enzymes are negative and there is no ongoing chest pain. If either present, contact attending cardiologist

Diagnostic test to be read by _____ Number _____

- Cardiac catheterization (cardiologist to schedule procedure)

Physician signature _____ Date/time _____

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APPENDIX E: Acute Coronary Syndrome Proposed Process of Care

Unstable Angina (Low Risk)

Aspect of care	Admission/day 1 Date _____	Day 2 through discharge Date(s) _____	Discharge Date _____
CONSULTATIONS	<input type="checkbox"/> Cardiac rehab <input type="checkbox"/> Dietary (nutrition screen) <input type="checkbox"/> Social work <input type="checkbox"/> Chaplain <input type="checkbox"/> Clinical pharmacist Address needs as identified	<input type="checkbox"/> Cardiac rehab <input type="checkbox"/> Dietary (nutrition screen) <input type="checkbox"/> Social work <input type="checkbox"/> Chaplain <input type="checkbox"/> Clinical pharmacist Address needs as identified	<input type="checkbox"/> Cardiac rehab <input type="checkbox"/> Dietary (nutrition screen) <input type="checkbox"/> Social work <input type="checkbox"/> Chaplain <input type="checkbox"/> Clinical pharmacist Address needs as identified
ASSESSMENT	<input type="checkbox"/> Admission database <input type="checkbox"/> COA <input type="checkbox"/> Advance directive Continuous telemetry with ST segment monitoring Systems assessment every 4 hours VS with pulse ox and pain assessment every 4 hours I&O every shift Daily AM weight	Continuous telemetry with ST segment monitoring Systems assessment every 4 hours VS with pulse ox and pain assessment every 4 hours I&O every shift Daily AM weight	Continuous telemetry with ST segment monitoring Systems assessment every 4 hours VS with pulse ox and pain assessment every 4 hours I&O every shift Daily AM weight
LABS	<input type="checkbox"/> Review of ED labs <input type="checkbox"/> Myoglobin (0, 3 hours) <input type="checkbox"/> CK-MB, troponin (0, 6 hours) <input type="checkbox"/> Fasting lipid profile <input type="checkbox"/> UA PTT per heparin protocol FS blood glucose if diabetic Guiac all stools	CBC, BMP, magnesium PT, PTT per heparin protocol FS blood glucose if diabetic Guiac all stools	CBC, BMP, magnesium PT, PTT per heparin protocol FS blood glucose if diabetic Guiac all stools
DIAGNOSTICS/ INTERVENTIONS EF% = _____	<input type="checkbox"/> Echocardiogram <input type="checkbox"/> Stress test 12-lead ECG AM/PRN PCXR PRN	<input type="checkbox"/> Echocardiogram (if not done on day 1) <input type="checkbox"/> Cath lab procedure: _____ 12-lead ECG AM/PRN PCXR PRN	12-lead ECG AM/PRN
MEDICATIONS Protocols — Emergency <input type="checkbox"/> Potassium <input type="checkbox"/> Magnesium <input type="checkbox"/> Insulin <input type="checkbox"/> BCOC <input type="checkbox"/>	MONA <input type="checkbox"/> SL Ntg <input type="checkbox"/> Heparin/enoxaparin Active medications <input type="checkbox"/> ASA <input type="checkbox"/> Plavix (PCI, allergy to ASA) <input type="checkbox"/> Beta-blocker <input type="checkbox"/> ACEI/ARB (begin within 24 hours) <input type="checkbox"/> Statin <input type="checkbox"/> Insulin protocol (goal BG < 150) <input type="checkbox"/> Discussed with physician for nonactive medications <input type="checkbox"/> MAR corrections to pharmacy	MONA <input type="checkbox"/> SL Ntg <input type="checkbox"/> Heparin/enoxaparin Active medications <input type="checkbox"/> ASA <input type="checkbox"/> Plavix (PCI, allergy to ASA) <input type="checkbox"/> Beta-blocker <input type="checkbox"/> ACEI/ARB (begin within 24 hours) <input type="checkbox"/> Statin <input type="checkbox"/> Insulin protocol (goal BG < 150) <input type="checkbox"/> Discussed with physician for nonactive medications <input type="checkbox"/> MAR corrections to pharmacy	Active medications <input type="checkbox"/> ASA <input type="checkbox"/> Plavix (PCI, allergy to ASA) <input type="checkbox"/> Beta-blocker <input type="checkbox"/> ACEI/ARB (begin within 24 hours) <input type="checkbox"/> Statin <input type="checkbox"/> Insulin protocol (goal BG < 150) <input type="checkbox"/> Discussed with physician for nonactive medications <input type="checkbox"/> MAR corrections to pharmacy
RESPIRATORY CARE	Maintain O ₂ sats > 92% Titrate O ₂ as indicated	Maintain O ₂ sats > 92% Titrate O ₂ as indicated	Maintain O ₂ sats > 92% Wean O ₂ to room air
ACTIVITY/ SELF-CARE	BRP if no discomfort/distress	Bed rest until sheath removal, then OOB as tolerated Chair for meals Monitored ambulation: 25-100 feet (1-2 times) Distance walked: _____	Chair for meals Monitored ambulation: 150-300 feet (2-4 times) Distance walked: _____
NUTRITION	Cardiac diet NPO for procedures	Cardiac diet (ADA if indicated) NPO for procedures	Cardiac diet (ADA if indicated)
ADDITIONAL ELEMENTS OF CARE	<input type="checkbox"/> Pain <input type="checkbox"/> Skin/tissue integrity <input type="checkbox"/> Elimination <input type="checkbox"/> High fall risk <input type="checkbox"/> Other: _____	<input type="checkbox"/> Pain <input type="checkbox"/> Skin/tissue integrity <input type="checkbox"/> Elimination <input type="checkbox"/> High fall risk <input type="checkbox"/> Other: _____	<input type="checkbox"/> Pain <input type="checkbox"/> Skin/tissue integrity <input type="checkbox"/> Elimination <input type="checkbox"/> High fall risk <input type="checkbox"/> Other: _____
COMFORT CARE	<input type="checkbox"/> Partners in caring <input type="checkbox"/> Back rub <input type="checkbox"/> Pet therapy <input type="checkbox"/> Reiki therapy <input type="checkbox"/> Spiritual care	<input type="checkbox"/> Partners in caring <input type="checkbox"/> Back rub <input type="checkbox"/> Pet therapy <input type="checkbox"/> Reiki therapy <input type="checkbox"/> Spiritual care	<input type="checkbox"/> Partners in caring <input type="checkbox"/> Back rub <input type="checkbox"/> Pet therapy <input type="checkbox"/> Reiki therapy <input type="checkbox"/> Spiritual care

APPENDIX E: Acute Coronary Syndrome Proposed Process of Care

	<input type="checkbox"/> Humor therapy <input type="checkbox"/> Other: _____	<input type="checkbox"/> Humor therapy <input type="checkbox"/> Other: _____	<input type="checkbox"/> Humor therapy <input type="checkbox"/> Other: _____
EDUCATION <small>*Document on Patient Education Record — see reverse</small>	<input type="checkbox"/> Change of Heart Book <input type="checkbox"/> Smoking cessation Diagnosis and treatment Pain scale Cardiac rehab for ACS education and activity	<input type="checkbox"/> Smoking cessation Diet/weight/exercise Risk factor modification Films as appropriate	<input type="checkbox"/> Smoking cessation Reinforce education
CARE COORDINATION	Care coordination rounds Care coordination team: <input type="checkbox"/> Specialist <input type="checkbox"/> Internist <input type="checkbox"/> Charge nurse <input type="checkbox"/> Patient's nurse <input type="checkbox"/> Case manager <input type="checkbox"/> Social work <input type="checkbox"/> Other _____	Care coordination rounds Care coordination team: <input type="checkbox"/> Specialist <input type="checkbox"/> Internist <input type="checkbox"/> Charge nurse <input type="checkbox"/> Patient's nurse <input type="checkbox"/> Case manager <input type="checkbox"/> Social work <input type="checkbox"/> Other _____ <input type="checkbox"/> Home health referral <input type="checkbox"/> Community health referral <input type="checkbox"/> Outpatient cardiac rehab order obtained and arranged	<input type="checkbox"/> Discharge instructions given to patient: Medications Diet Activity Home exercise S/S to report to doctor Follow-up Smoking cessation Outpatient cardiac rehab
OUTCOMES	Patient pain free (without angina) Hemodynamic stability — SBP > 90 mm Hg HR > 50 Stable cardiac rhythm	Patient pain free (without angina) Patient with stable cardiac rhythm	Medications appropriately prescribed Patient and significant other verbalize understanding of all medications Smoking cessation counseling provided
SIGNATURES	AM RN: _____ AM RN: _____ _____ _____	AM RN: _____ AM RN: _____ _____ _____	AM RN: _____ AM RN: _____ _____ _____

Chest pain unit: chest pain of possible cardiac origin

1. Place in chest pain unit (CPU) on observation status time: _____
2. Diagnosis: _____
3. Consult cardiologist on movement to CPU: _____
4. Allergies: _____
5. Patient's weight _____ kg estimated actual

Initiate orders 5-12

6. Initiate chest pain unit care map
7. Oxygen 2 L per NC. Titrate to maintain SpO₂ > 92%
8. Cardiac diet
9. Peripheral IV, saline lock if not in use
10. Labs
 - Cardiac markers: troponin I and CK-MB at 0 and 6 hours, myoglobin at 0 and 3 hours
 - BMP, CBC, fasting lipid profile, PT/INR if patient previously on warfarin (Coumadin®)
 - TSH
11. Second ECG 6 hours after initial ECG, and PRN for persistent or recurrent chest pain (notify physician)
12. Portable CXR. **IF NOT DONE IN ED**
13. Education: offer materials as appropriate: Smoking cessation Diet CAD CHF

Initiate the following medications, check all appropriate boxes.

14. Medications
 - STAT aspirin 325 mg chew PO if not already given in ED and not allergic, then start 81 mg PO daily
If unable to take PO, give aspirin 300 mg PR
If patient has a **TRUE** aspirin allergy, give clopidogrel 75 mg PO daily
 - Nitroglycerin 0.4 mg SL every 5 minutes x 3 PRN chest pain
If chest pain not relieved, start nitroglycerin IV at 10 mcg/min, titrate for pain relief maintaining SBP ≥ 90 mm Hg
 - Morphine 2-4 mg IV every 5 minutes PRN ongoing chest pain to a max of 10 mg every hour
 - Lorazepam 1 mg PO/IV every 4 hours PRN anxiety/sleep
 - Acetaminophen 650 mg PO/PR every 4 hours PRN discomfort / headache
(do *not* exceed 4 gm/day total acetaminophen)
 - Ondansetron 4 mg IV every 6 hours PRN nausea
 - Senakot 1 tablet PO BID PRN constipation. If no results, use BCOC.
 - Antacid of choice
15. IV fluids: _____
16. Additional meds/orders: _____

17. Cardiac diagnostic procedures

- Exercise stress test
- Adenosine stress test
- Dobutamine stress test
- Transthoracic ECHO
- Stress ECHO

Test to be scheduled and performed if enzymes are negative and there is no ongoing chest pain. If either present, contact attending cardiologist

Diagnostic test to be read by _____ Number _____

- Cardiac catheterization (cardiologist to schedule procedure)

18. Disposition: Discharge patient if ordered by consultant and cardiac markers are negative

Physician signature _____ Date/time _____

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APPENDIX E: Acute Coronary Syndrome Proposed Process of Care

Chest Pain Unit Care Map – Emergency Department (Low Risk, Stable Angina, Atypical Chest Pain)	
CONSULTATION	<input type="checkbox"/> Cardiologist: _____
ASSESSMENT	Brief, targeted history and physical performed by ED physician Continuous telemetry with ST segment monitoring System assessment, pain assessment Vital signs with pulse ox I&O Weight
LABS	<ul style="list-style-type: none"> • Myoglobin at 0, 3 hrs • CK-MB, Troponin at 0, 6, 12 hrs • CMP, Magnesium, CBC • PT (if patient previously on warfarin) • Guiac all stools
DIAGNOSTICS/ INTERVENTIONS	<ul style="list-style-type: none"> • PCXR • Obtain IV access <input type="checkbox"/> Exercise stress test <input type="checkbox"/> Adenosine stress test <input type="checkbox"/> Dobutamine stress test <input type="checkbox"/> Stress ECHO <input type="checkbox"/> TEE <input type="checkbox"/> Cardiac catheterization
MEDICATIONS	MONA <input type="checkbox"/> STAT ASA (325 mg — chew) <input type="checkbox"/> Ntg (0.4 mg sublingual STAT x 3, IV)
RESPIRATORY CARE	O ₂ @ 2L NC Maintain O ₂ sats > 92%, titrate O ₂ as indicated
ACTIVITY/SELF-CARE	Bedrest, advance to BRP as tolerated
NUTRITION	NPO until stable, then advance to cardiac diet as tolerated
EDUCATION	Diagnosis and treatment Plan for disposition Pain scale
OUTCOMES	Patient is pain free Patient is hemodynamically stable Cardiologist to direct patient care

APPENDIX F: Health Care Provider ACS Patient/Caregiver Education Reference Guide

Key Education Principles

Patient/Caregiver Information

- *Diagnosis*: Provide clear explanation of diagnosis and inform patient he or she has had an Acute Coronary Syndrome.
- *Follow-up appointment*: Recommend that follow-up appointments be made before discharge.
- *Diet*: Explain that diet should be low fat, low cholesterol.

Medications

- What's new and need to continue.
- Do not stop without calling MD.
- What the medications do.
- Instructions
- *Appropriate use of SL nitroglycerin*: If you have chest discomfort, use a nitroglycerin tablet under your tongue or the spray every five minutes until pain is gone or for up to 15 minutes. You should call 911 and request an ambulance to bring you to the hospital if the chest discomfort lasts for more than 15 minutes or requires more than three nitroglycerin tablets or sprays.
- *Side effects*: bleeding, headache, fatigue, arthralgias, orthostasis.
- Informing and starting OTC medications.
- Reinforcement of medication review and/or compliance by VNA or acute rehab or skilled nursing facility to which the patient has been referred.

When to call the doctor

- Specific instructions.

Follow-up tests

- Reason for tests.
- When tests will take place.

Activity

- When to return to work.
- Sex.
- Activities of daily living.
- Activities to avoid.
- Physical therapy, cardiac rehabilitation referral.

Smoking cessation

- If you smoke or use tobacco products, QUIT!
- If you have quit smoking or using tobacco products in the previous twelve months, continue to abstain from using them.
- Limit your exposure to secondhand smoke.
- Talk to your doctor about available treatments and medications to help you quit smoking.

APPENDIX F: Health Care Provider ACS Patient/Caregiver Education Reference Guide

Wound care

- PACER/ICD.

Key Points for Educational Tools*

- A medication calendar or list should be provided to all patients at the time of discharge
 - This should provide clarity of the general timing of when medications should be administered.
- All educational material should be provided in language that patient & caregivers easily understand.
 - Whenever possible, material should be provided in the patient's first language and a translator utilized for educational sessions.
 - Educational handouts that describe medication indications and side effects may also be beneficial. Examples include Micromedex® CareNotes System or MedTeach®.
 - In-house systems should be utilized to help facilitate a clear & concise medication list.

Educational Tools*

- Medication calendar (samples can be viewed in the ACS Resource Room at www.hospitalmedicine.org).
 - Recommended time of day.
 - Indication.
 - Special administration instructions.
 - Take with food or empty stomach.
 - Separate from other medications.
- Medication list.
 - New medications.
 - Medications discontinued from prior to admission.
 - Medications continued from prior to admission.
 - Medications only to be used as need.
 - All changes made to medication regimen prior to hospitalization should be emphasized with both the patient and caregiver.
- Medication containers.
 - Pillboxes help facilitate compliance with a medication regimen post-discharge.
 - Should be done with the assistance of a caregiver, pharmacist or home-health aide to ensure accuracy.

View the [Acute Coronary Syndrome Toolkit Clinical Tools](#) section for a formatted health care provider patient/caregiver education reference guide developed by the [ACS Discharge and Transitions Workgroup](#).

APPENDIX F: Health Care Provider ACS Patient/Caregiver Education Reference Guide

**Key Points for Educational Tools and Educational Tools adapted from the Medication in Heart Failure Patients Reference Guide, developed by Lindsay Arnold, PharmD, member of the SHM Heart Failure Initiative Polypharmacy Workgroup.*

References

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APPENDIX G: ACS Transitions Tool



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ACS TRANSITION TOOL	OSH-Tertiary MD	Prehospital/EMS-ED	ED MD-ED-MD	ED-Cath. Lab	ED-CCU/Tele	CCU-Tele	Tele-Rehab?	Tele-Home/SNF/Rehab
Communication								
Phone								
Face to face								
Advance directives								
Patient/family informed								
Diagnostics								
Stat ECG								
CBC								
INR								
Mg								
CK-MB, troponins								
Fasting lipid								
Electrolytes								
Glucose								
Stool guiac								
Old ECG								
Records								
Risk assessment	Optional	Optional	Required	Required	Required			
TIMI score (1 point for each)								
Age ≥ 65								
≥ 3 CAD risk factors								
Know ≥ 50% occlus.								
ASA past 7 days								
Severe angina last 24 hours								
Elevated cardiac markers								
ST deviation ≥ 0.5 mm								
TOTAL								
Cardiac consult								
Echo								
Type								
Result								
Stress test								
Type								
Result								
Therapeutics								
Oxygen								
Nitrates								
Morphine								
Aspirin								
Contraindication?								
Beta-blocker								
Contraindication?								
Anticoagulation								
Contraindication?								
LMWH								
Heparin								
Lytics								
Contraindication?								
Type/dose								
ACE/ARB								
Contraindication?								
Statin								
Contraindication?								
Iib/IIla								
Clopidrogel								
Insulin (SSI)								
Intervention (PCI)								
Door-to-balloon time								
Diet consult								
Education								
Smoking cessation								
Cardiac Rehab.								

APPENDIX G: ACS Transitions Tool

QI tools **ACUTE CORONARY SYNDROME** **shm**

ACS Transition Tool	Prehospital/ED	ED-Cath Lab	ED-CCU/Tele	CCU-Tele	Tele-Floor	Floor-Rehab	Floor/Home/ SNF
Communications		Check all communications completed					
Phone	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Face-Face	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Advance Directives	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Patient-Family	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Diagnostics							
Stat ECG	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CBC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Electrolytes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Troponin	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
BNP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CKMB	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mg	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Glucose	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Old ECG	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Records	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Risk Assessment							
TIMI Score 1 point for each							
Age ≥ 65	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
≥ 3 CAD Risk Factors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Known $\geq 50\%$ Occlusion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ASA past 7 days	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Severe angina last 24 hours	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Deviated cardiac markers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ST Deviation ≥ 0.5 mm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Total	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cardiology Consult	<input type="checkbox"/>	Result	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Echocardiogram	<input type="checkbox"/>	Result	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stress Test	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Type	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Result	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Therapeutics							
Oxygen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nitrate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Morphine	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aspirin	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Contraindication	<input type="checkbox"/> Yes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Beta blocker	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Contraindication	<input type="checkbox"/> Yes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Heparin	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LMWH	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unfractionated heparin	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coumadin	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lytic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Contraindications	<input type="checkbox"/> Yes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Type/dose	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

View the [Acute Coronary Syndrome Toolkit Clinical Tools](#) section for downloadable versions of the formatted & modifiable Transitions Tool developed by the [ACS Discharge & Transitions Workgroup](#).

APPENDIX H: ACS Discharge Planning Checklist

Follow-up testing: ETT — type and time frame Echo — if indicated after NSTEMI and STEMI Pertinent lab work (hemoglobin, INR, LFT if on statin at 4 weeks, creatinine)	x x x x		x x x x
All pending labs or tests, responsible person to whom results will be sent ³	x		x
Code status	x		
Documentation of patient education and understanding ■ Diet ■ Signs and symptoms of a heart attack ■ Activity ■ Medications ■ Wound care (groin wound)	x x x x x x	x x x x x	
Smoking cessation	x	x	x
Treatment course: Include patient's cognitive level Discharge LDL Discharge creatinine If on coumadin, INR If on statin, LFTs	x x x x x x		x x x x x x
Any anticipated problems and suggested interventions and whom to call	x	x	x
24/7 Call-back number	x	x	
Identify referring and receiving providers, including home health care	x	x	

x = required o = optional

***Patient Instructions:** Provide instructions that are culturally appropriate and in the patient's primary language that is written at a 6th-grade level.

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