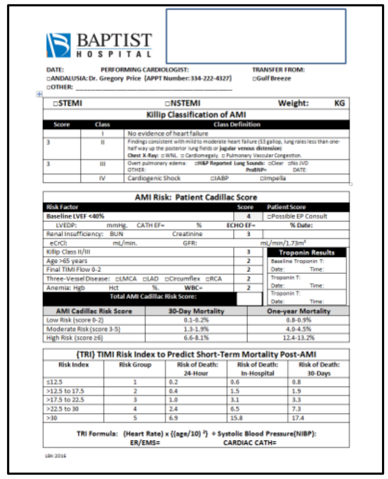
Leadership Saves Lives
Early Identification and In-House Treatment of Patients with AMI

The Problem: As the Leadership Saves Lives guiding coalitions began to systematically evaluate the root causes of mortality for their patients with AMI, they made a realization. Although most hospitals had well-refined care processes for patients arriving in the emergency department with STEMI, they had highly poorly designed care processes for patients with NSTEMI, and for patients developing an AMI after arrival.

The Response: Coalitions began to work together to create clearly defined care processes, seeking to apply the same rigor and process improvement approaches that they had used to improve their door-to-balloon processes. We present three case examples.

Case Study 1: AMI Risk Stratification

As part of their root cause analysis, some LSL hospitals identified the need for reliable classification of the most at risk AMI patients for (1) tracking of performance improvement over time and (2) proactive and multidisciplinary follow-up. One hospital decided to compare use of the TIMI and Cadillac scores. In addition to allowing the coalition to stratify their root cause analysis by patient acuity to check for anomalies, this tool traveled with the patient, allowing care providers to understand the history and severity of their presentation and tailor their care plan accordingly.


BAPTIST HOSPITAL

DATE: PERFORMING CARDIOLOGIST: TRANSFER FROM:
□ANDALUSIA: Dr. Gregory Price (APPT Number: 334-222-4327) □Gulf Breeze
□OTHER: ______

□STEMI □NSTEMI Weight: KG

Killip Classification of AMI

Score	Class	Class Definition
	I	No evidence of heart failure
3	II	Findings consistent with mild to moderate heart failure (S3 gallop, lung rales less than one-half way up the posterior lung fields or **jugular venous distension**) **Chest X-Ray:** □WNL □Cardiomegaly □Pulmonary Vascular Congestion
3	III	Overt pulmonary edema: □H&P Reported Lung Sounds: □Clear □No JVD OTHER: ProBNP= DATE:
	IV	Cardiogenic Shock □IABP □Impella

AMI Risk: Patient Cadillac Score

Risk Factor	Score	Patient Score
Baseline LVEF <40%	4	□Possible EP Consult
LVEDP: mmHg. CATH EF= %	ECHO EF=	% Date:
Renal Insufficiency: BUN Creatinine	3	
eCrCl: mL/min. GFR:		mL/min/1.73m²
Killip Class II/III	3	Troponin Results
Age >65 years	2	Baseline Troponin T: Date: Time:
Final TIMI Flow 0-2	2	
Three-Vessel Disease: □LMCA □LAD □Circumflex □RCA	2	Troponin T: Date: Time:
Anemia: Hgb Hct %. WBC=	2	
Total AMI Cadillac Risk Score:		Troponin T: Date: Time:

AMI Cadillac Risk Score	30-Day Mortality	One-year Mortality
Low Risk (score 0-2)	0.1-0.2%	0.8-0.9%
Moderate Risk (score 3-5)	1.3-1.9%	4.0-4.5%
High Risk (score ≥6)	6.6-8.1%	12.4-13.2%

{TRI} TIMI Risk Index to Predict Short-Term Mortality Post-AMI

Risk Index	Risk Group	Risk of Death: 24-Hour	Risk of Death: In-Hospital	Risk of Death: 30-Days
≤12.5	1	0.2	0.6	0.8
>12.5 to 17.5	2	0.4	1.5	1.9
>17.5 to 22.5	3	1.0	3.1	3.3
>22.5 to 30	4	2.4	6.5	7.3
>30	5	6.9	15.8	17.4

TRI Formula: (Heart Rate) x {(age/10) ²} ÷ Systolic Blood Pressure(NIBP):
ER/EMS= CARDIAC CATH=

LBK 2016

NSTEMI Process of Care Proposal

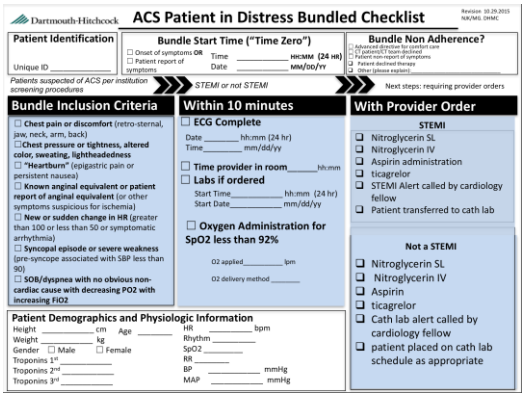
- All NSTEMI transfers have ECGs screened by cardiology attending at time of transfer request
- Define "At Risk" NSTEMI Patients
  - Refractory angina or resting/low threshold angina despite medical management
  - Grace Score >140
  - New or presumed new ST depressions on ECG
  - Significantly increasing temporal troponin pattern (>20%)
  - Signs or symptoms of heart failure
  - Hemodynamic instability
  - VT or VF
- All "At Risk" NSTEMI transfers verbally presented to attending by hospitalist or cardiology fellow as part of initial evaluation
- All "At Risk" NSTEMIs have echo evaluation for LV function and WMAs as part of the initial evaluation or at least within first 2-3 hours post admission

Case Study 2: NSTEMI Process of Care

Some LSL hospitals identified delays and a high level of variability in time to treatment for patients with NSTEMI. Working from their own data and staffing constraints, and integrating national guidelines, they developed and tested an operational definition to trigger timely review of patients with NSTEMI. The resulting process, was brought to life by a physician champion armed with data and the support of the coalition.

Case Study 3: ACS Patient in Distress

LSL hospitals identified need for more reliable and timely identification and care for patients whose AMI evolved in-house. The resulting AMI Patient in Distress bundle helped to standardize care processes and also empowered front-line nurses as part of the broader care team.



Dartmouth-Hitchcock **ACS Patient in Distress Bundled Checklist**

Revision 10.29.2015 NJK/MG DHMC

Patient Identification

Unique ID _____

Bundle Start Time ("Time Zero")

☐ Onset of symptoms OR ☐ Patient report of symptoms

Time _____ HH:MM (24 HR)

Date _____ MM/DD/YY

Bundle Non Adherence?

☐ Advanced disease by end of care
☐ ST patient/CT team declined
☐ Patient non-report of symptoms
☐ Patient declined therapy
☐ Other (please explain) _____

Patients suspected of ACS per institution screening procedures → *STEMI or not STEMI* → Next steps: requiring provider orders

Bundle Inclusion Criteria

☐ **Chest pain or discomfort** (retro-sternal, jaw, neck, arm, back)
☐ **Chest pressure or tightness, altered color, sweating, lightheadedness**
☐ **"Heartburn"** (epigastric pain or persistent nausea)
☐ **Known anginal equivalent or patient report of anginal equivalent** (or other symptoms suspicious for ischemia)
☐ **New or sudden change in HR** (greater than 100 or less than 50 or symptomatic arrhythmia)
☐ **Syncopal episode or severe weakness** (pre-syncope associated with SBP less than 90)
☐ **SOB/dyspnea with no obvious non-cardiac cause with decreasing PO2 with increasing FIO2**

Within 10 minutes

☐ **ECG Complete**
Date _____ hh:mm (24 hr)
Time _____ mm/dd/yy

☐ **Time provider in room** _____ hh:mm

☐ **Labs if ordered**
Start Time _____ hh:mm (24 hr)
Start Date _____ mm/dd/yy

☐ **Oxygen Administration for SpO2 less than 92%**
O2 applied _____ lpm
O2 delivery method _____

With Provider Order

STEMI

❑ Nitroglycerin SL
❑ Nitroglycerin IV
❑ Aspirin administration
❑ ticagrelor
❑ STEMI Alert called by cardiology fellow
❑ Patient transferred to cath lab

Not a STEMI

❑ Nitroglycerin SL
❑ Nitroglycerin IV
❑ Aspirin
❑ ticagrelor
❑ Cath lab alert called by cardiology fellow
❑ patient placed on cath lab schedule as appropriate

Patient Demographics and Physiologic Information

Height _____ cm Age _____
Weight _____ kg
Gender ☐ Male ☐ Female
Troponins 1st _____
Troponins 2nd _____
Troponins 3rd _____

HR _____ bpm
Rhythm _____
SpO2 _____
RR _____
BP _____ mmHg
MAP _____ mmHg

In this toolkit

The toolkit includes an editable PowerPoint deck on each of the three case studies, including rationale for the approach, the resulting tool, reflections on implementation experience, and a note about the importance of tailoring this approach to your local hospital context.