

E•QUAL

EMERGENCY
QUALITY
NETWORK

Chest Pain Wave I

What Defines Quality in Chest Pain? - Metrics,
Outliers, and Actions

TCPi | Transforming Clinical
Practices Initiative

 American College of
Emergency Physicians®

ADVANCING EMERGENCY CARE 

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Presenters



Jim McCord, MD,
Cardiology



Chris Pergrem, MD,
Emergency Medicine



Josh Baugh, MD, MPP,
Emergency Medicine

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Disclosures

Jim McCord:

- Research Support: Roche, Siemens, Abbott
- Consultant: Roche, Siemens

Chris Pergrem:

- I currently am employed by, and own stock in Envision Physician Services

Mike's question:

- We have covered so many great topics related to low risk chest pain patients in the ED – troponin, decision tools, observation units, cardiac imaging.
- This naturally leads us to the next question:
 - How do you define quality of care for ED low risk chest pain patients?



Quality of Care in Low Risk Chest Pain in ED

James McCord MD

Henry Ford Heart & Vascular Institute

Dec 2017

Quality Issues in Chest Pain Evaluation ?

1. Missed AMI or death within 30 days
2. Cost Issues (time/money) for patients and Hospitals: markers, stress test, CTA
3. Avoiding harm: radiation, invasive procedures

MISSED DIAGNOSIS OF ACUTE CARDIAC ISCHEMIA IN THE EMERGENCY DEPARTMENT

Pope N Engl J Med 2000

RESULTS

- 1,855 with ACS

 - 889 AMI

 - 966 USA

- Missed Diagnosis

 - AMI 19 (2.1%) (0-11%)

 - USA 22(2.3%) (0-4.3%)

MISSED ACS in the ED

- 8-13 million/yr evaluated for possible ACS
- ~ 20% have ACS
- ~ 2% are missed in the ED
- 32,000 – 52,000 missed ACS/year in USA

Blomkalns, *Cardiology Clinics*, 2005

Medical-Legal Issues

- 25 % of all money paid in malpractice claims relates to missed ACS in the USA

AHA/ACC Testing Strategy

3.5.1. Discharge From the ED or Chest Pain Unit: Recommendations

Class IIa

1. **It is reasonable** to observe patients with symptoms consistent with ACS without objective evidence of myocardial ischemia (nonischemic initial ECG and normal cardiac troponin) in a chest pain unit or telemetry unit with serial ECGs and cardiac troponin at 3- to 6-hour intervals.^{196,197,199–201} (*Level of Evidence: B*)
2. **It is reasonable** for patients with possible ACS who have normal serial ECGs and cardiac troponins to have a treadmill ECG^{200–202} (*Level of Evidence: A*), stress myocardial perfusion imaging,²⁰⁰ or stress echocardiography^{203,204} before discharge or within 72 hours after discharge. (*Level of Evidence: B*)

COSTS

- Estimations are that \$10-12 billion spent annually in the US to evaluate patients in the ED with possible ACS
- Do not over test; do not keep the patient longer than is necessary !

Time: Rapid Rule-Out AMI Strategies

1. 1-hr delta protocol
2. Below LOD (level of detection) at presentation
3. These protocols involve high sensitivity troponin assays

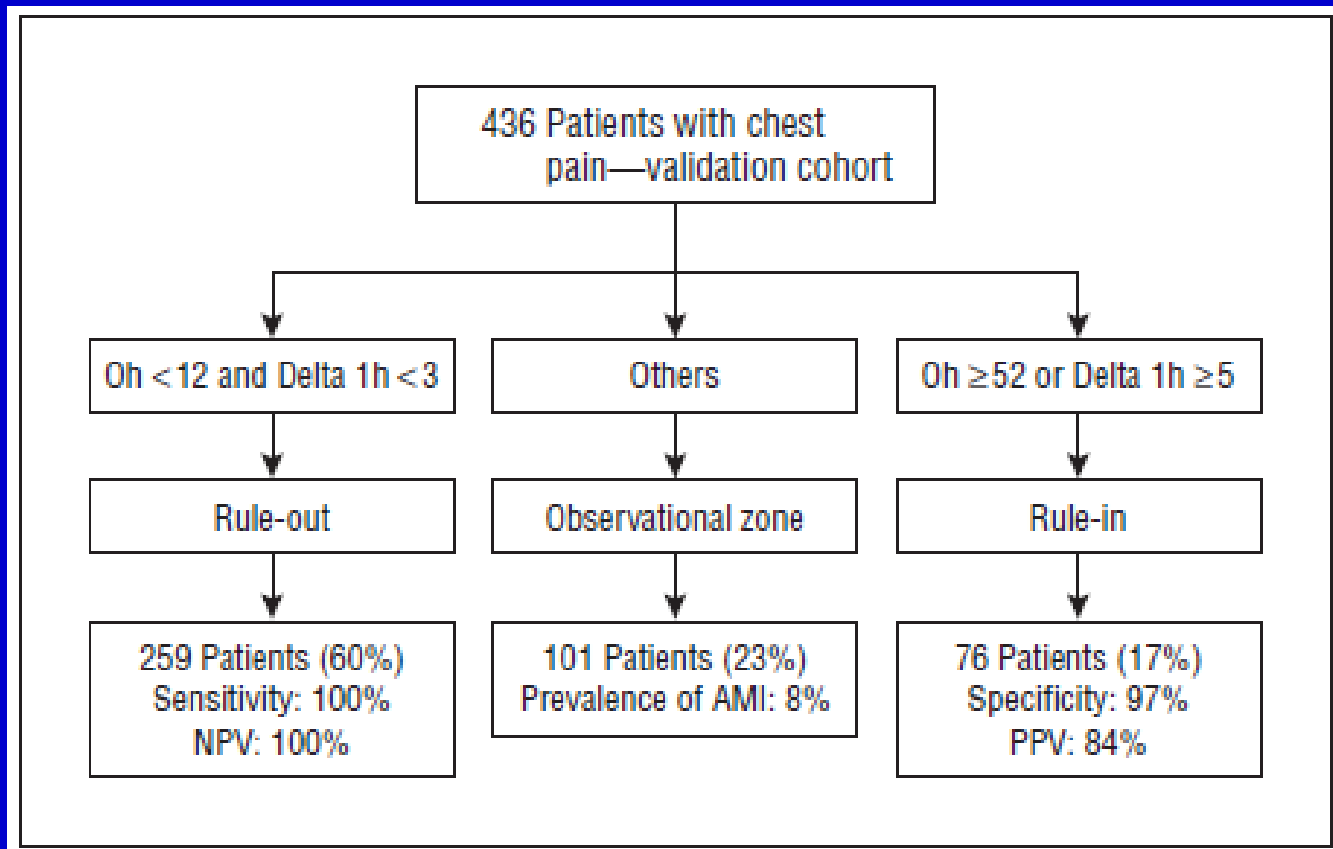
ORIGINAL INVESTIGATION

HEALTH CARE REFORM

One-Hour Rule-out and Rule-in of Acute Myocardial Infarction Using High-Sensitivity Cardiac Troponin T

Tobias Reichlin, MD; Christian Schindler, PhD; Beatrice Drexler, MD; Raphael Twerenbold, MD; Miriam Reiter, MD; Christa Zellweger, MD; Berit Moehring, MD; Ronny Ziller, MD; Rebeca Hoeller, MD; Maria Rubini Gimenez, MD; Philip Haaf, MD; Mihael Potocki, MD; Karin Wildi, MD; Cathrin Balmelli, MD; Michael Freese, RN; Claudia Stelzig, MSc; Heike Freidank, MD; Stefan Osswald, MD; Christian Mueller, MD, FESC

Diagnostic Algorithm: hs-cTnT

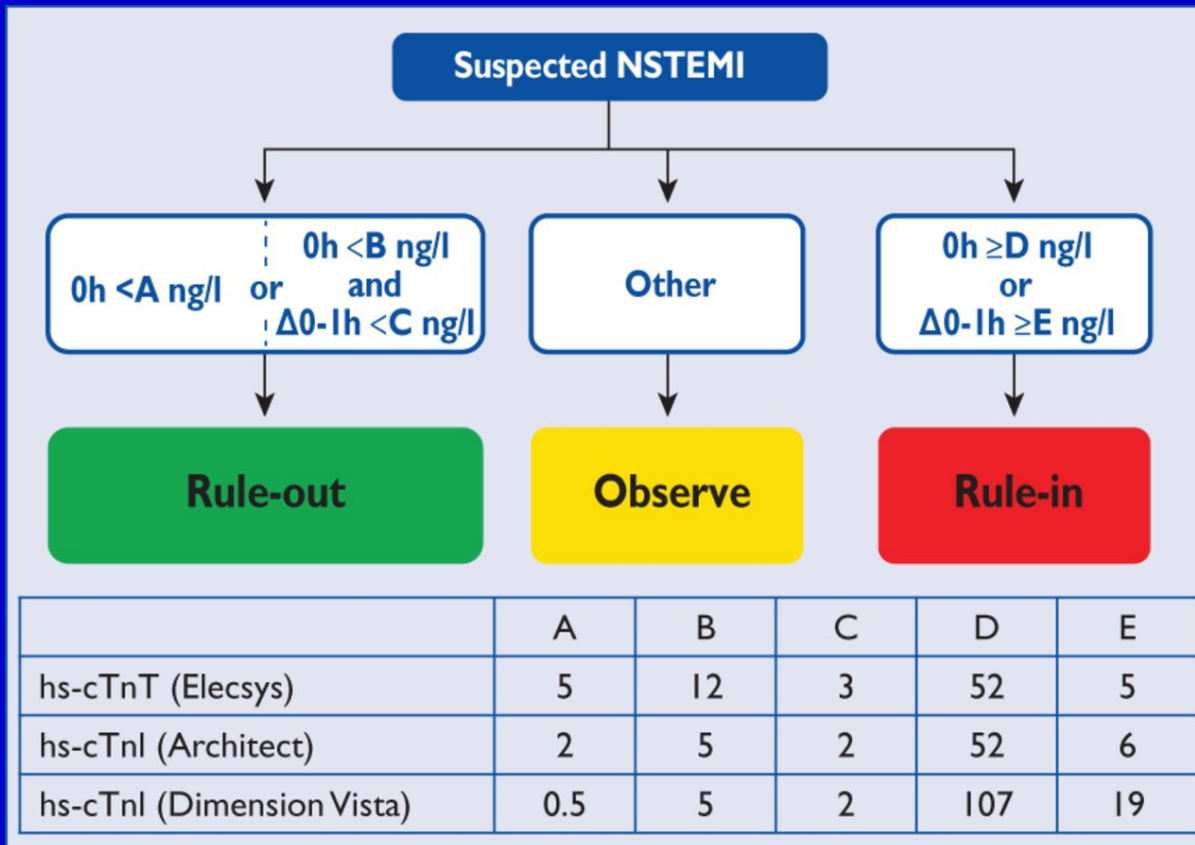


1-Hr Delta Trop Studies

- Sensitivity: 93.3-100%
- NPV: 98.6-100%

- # Pts that rule-out: 40-64%

0 h/1 h rule-in and rule-out algorithms using high-sensitivity cardiac troponins (hs-cTn) assays



CLINICAL PRACTICE GUIDELINE

2014 AHA/ACC Guideline for the Management of Patients With Non-ST-Elevation Acute Coronary Syndromes

A Report of the American College of Cardiology/American Heart Association
Task Force on Practice Guidelines

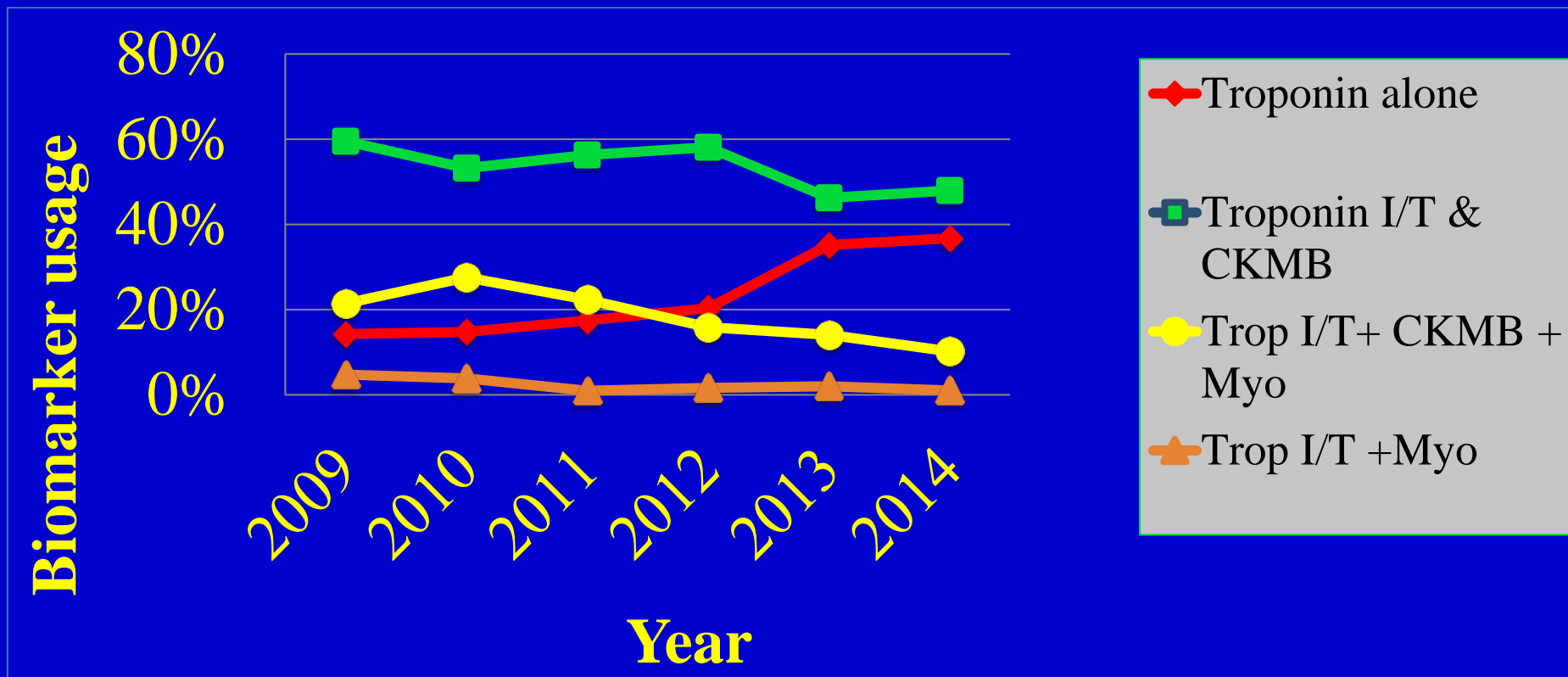
Developed in Collaboration With the Society for Cardiovascular Angiography and Interventions
and Society of Thoracic Surgeons

Endorsed by the American Association for Clinical Chemistry

CLASS III: NO BENEFIT

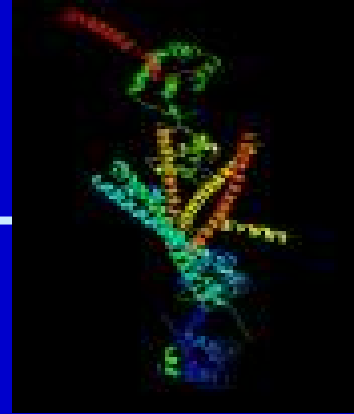
1. With contemporary troponin assays, creatine kinase myocardial isoenzyme (CK-MB) and myoglobin are not useful for diagnosis of ACS (158-164). (*Level of Evidence: A*)

US Trends in Biomarker Protocols



Cut-Points for Troponin

- Abnormal value exceeds the 99th % of a normal reference control group
- Major quality issue: use recommended cut-point !



Mike's question . . .

- Jim you raise some excellent points regarding missed MIs, cost, and ED troponin protocols.
- What about the really big issue – potential overuse of advanced cardiac imaging and the associated risks? Does that have a place in quality definitions?

Multi-Center Randomized Trials: CTA in ED

1. CT-STAT JACC 2011: 699 pts
2. ACRIN NEJM 2012: 1,370 pts
3. ROMICAT-II NEJM 2012: 1,000 pts

ACRIN STUDY: 1,370 Pts

	CTA	SOC
Revascularization	23(3%)	4(1%)

ROMICAT-II

Table 3. Resource Utilization, Radiation Exposure, and Costs of Care.*

Variable	Index Visit			Index Plus Follow-up Visit		
	CCTA (N= 501)	Standard Evaluation (N= 499)	P Value	CCTA (N= 501)	Standard Evaluation (N= 499)	P Value
Diagnostic testing — no. of patients (%) [†]			<0.001			<0.001
No testing [‡]	9 (2)	109 (22)		9 (2)	89 (18)	
1 test	376 (75)	337 (68)		359 (72)	350 (70)	
≥2 tests	116 (23)	53 (11)		133 (27)	60 (12)	
Functional testing — no. (%) [§]			<0.001			<0.001
SPECT	50 (10)	124 (25)		58 (12)	133 (27)	
Stress echocardiography	20 (4)	102 (20)		20 (4)	102 (20)	
ETT	12 (2)	147 (29)		22 (4)	162 (32)	
Invasive coronary angiography — no. (%)	54 (11)	36 (7)	0.06	59 (12)	40 (8)	0.06
Intervention — no. (%)						
PCI	24 (5)	14 (3)	0.14	27 (5)	17 (3)	0.16
CABG	5 (1)	4 (1)	0.99	5 (1)	4 (1)	0.99
Cumulative radiation exposure — mSv/patient [¶]	13.9±10.4	4.7±8.4	<0.001	14.3±10.9	5.3±9.6	<0.001

ROMICAT-II Costs- 30 Days

- CTA: \$4,289
- Standard: \$4,060

CT Scan utilization

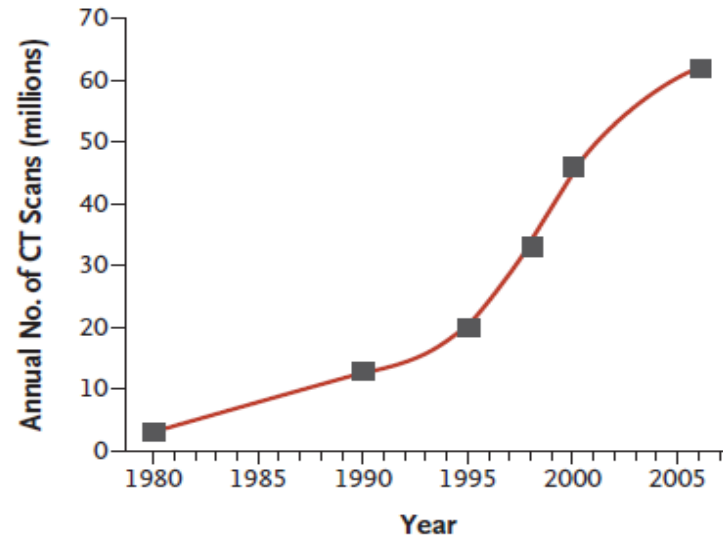


Figure 2. Estimated Number of CT Scans Performed Annually in the United States.

The most recent estimate of 62 million CT scans in 2006 is from an IMV CT Market Summary Report.³

Radiation from CT Scans

- Estimated that CT scans done in the US in 2007 resulted in 29,000 new cancers
- ~ 2% of all cancer in the US are from medical radiation

**RISK SCORES:
Should be Using One !**

CP Risk Scores in the ED

- TIMI Risk Score
- Heart Score
- Sanchis
- Modified Grace
- EDACS

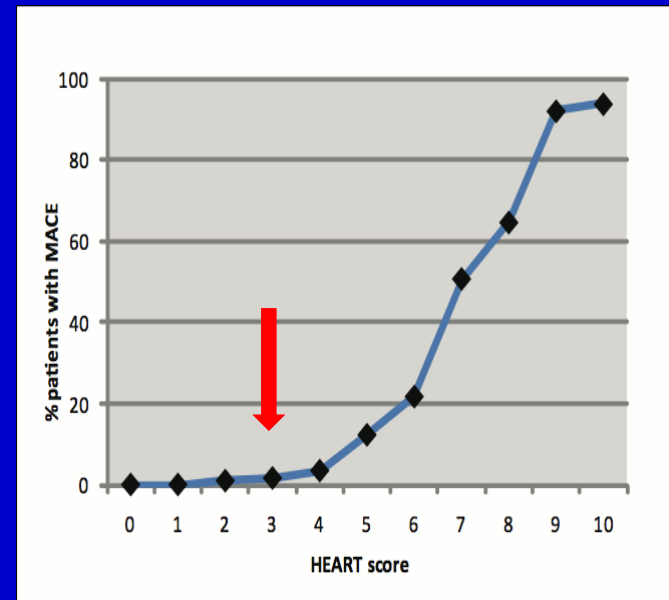
Traditional HEART Score

HEART SCORE		Points
<u>H</u> istory	Highly Suspicious	2
	Moderately Suspicious	1
	Slightly Suspicious	0
<u>E</u> CG	Significant ST-depression	2
	Non-specific repolarization abnormality	1
	Normal	0
<u>A</u> ge	≥ 65	2
	45-65	1
	≤ 45	0
<u>R</u> isk factors	3 or more risk factors	2
	1-2 risk factors	1
	No risk factors	0
<u>T</u> roponin	≥ 3x normal limit	2
	1-3x normal limit	1
	≤ normal limit	0
Total		

Score : 0-10

Traditional HEART Score

- Designed to risk stratify patients in the ED evaluated for possible ACS.
- Studied in >20,000 patients.
- Adverse Event at 30 days with HS ≤ 3 (0.6-3.6 %)



Low Risk ≤ 3

Marcoon, et al, Crit Path Cardiol, 2013

Backus, et al., Int J Cardiol, 2013

Six, et al., Crit Path Cardiol, 2013

TRAPID STUDY

- 1,282 pts evaluated for possible AMI
- 213 (17%) AMIs
- 1-hr delta algorithm missed 7 AMIs
- Sens AMI 96.7 %
- Modified HEART Score: apply hs-cTnT to HS

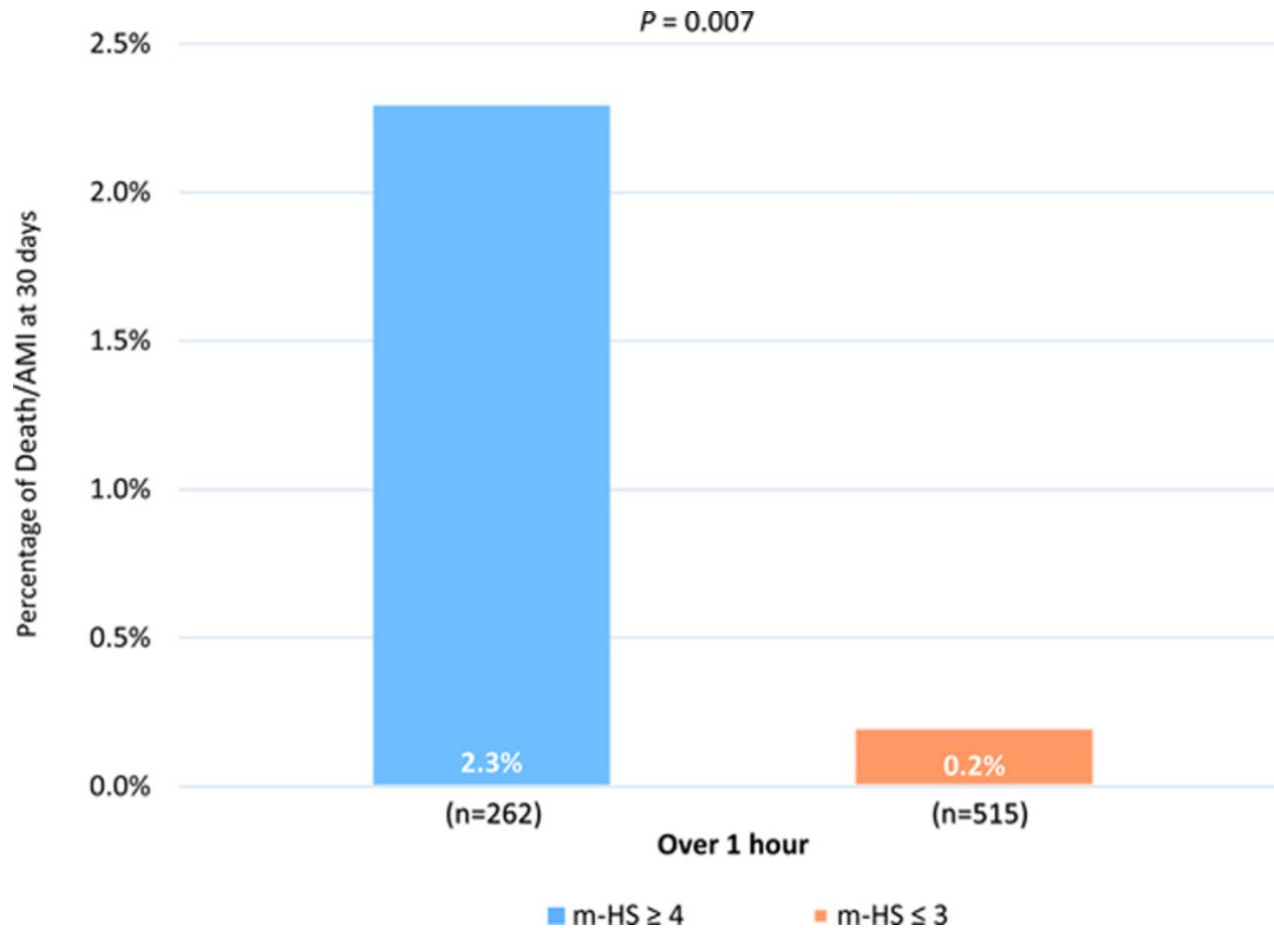
Original Article

Prognostic Utility of a Modified HEART Score in Chest Pain Patients in the Emergency Department

James McCord, MD; Rafael Cabrera, MD; Bertil Lindahl, MD; Evangelos Giannitsis, MD;
Kaleigh Evans, MD; Richard Nowak, MD; Tiberio Frisoli, MD; Richard Body, PhD;
Michael Christ, MD; Christopher R. deFilippi, MD; Robert H. Christenson, PhD;
Gordon Jacobsen, MS; Aitor Alquezar, MD, PhD; Mauro Panteghini, MD;
Dina Melki, MD, PhD; Mario Plebani, MD; Franck Verschuren, PhD; John French, PhD;
Garnet Bendig, PhD; Silvia Weiser, PhD; Christian Mueller, MD; for the TRAPID-AMI Investigators*

Circ Cardiovasc Qual Outcomes Feb 2017

Death/acute myocardial infarction (AMI) at 30 days based on modified HEART score (m-HS) and high-sensitivity cardiac troponin-T (hs-cTnT) <12 ng/L at 0 hour and delta 1 hour <3 ng/L.



James McCord et al. Circ Cardiovasc Qual Outcomes.
2017;10:e003101

Heart Score & 1-hr Algorithm

- 515/1282 (40 %) ruled-out by the 1-hr protocol and had $HS \leq 3$
- These patients likely can be discharged directly from the ED

QUALITY CONCLUSIONS

1. Time: do not keep patient longer than needed. Rapid rule-out AMI (0 or 1 hr).
2. Cardiac Markers: only use cTn (no CK-MB).
3. Use correct cut-point for cTn
4. Apply Risk Score and send home.
5. Avoid radiation (nuclear and CTA).
6. "Less is more"

END



JMCCORD1@HFHS.ORG

Mike's point . . .

- Jim that was really excellent!
- With that frame of reference, the next question is - how on earth do you measure quality? If you can't measure it, then it becomes really hard to make meaningful changes.
- For this question, let's turn to Chris Pergrem. Chris what do you think?



Measuring Quality of Care In low risk chest pain patients

Christopher Pergrem, MD, FACEP
ACEP eQUAL

What is “Quality”

- the degree of excellence of something
- the standard of something measured against similar things

In healthcare

- good outcome
- low complication rate
- improvement of disease or condition

Measuring quality

- ▶ Track use of a decision tool
 - ▶ HEART score, EDACS
- ▶ Track patients that had tool utilized appropriately
 - ▶ Percentage of LRCP patients that were not “admissions”
- ▶ Review and track disposition and outcomes
 - ▶ Discharge, observation, admission, return rates
- ▶ Track advanced interventions and outcomes
 - ▶ Stress testing, cCTA, Echo, MRI, Catheterization, None

We have data, now what?

- ▶ SHARE! Create a dashboard
 - ▶ Disposition rates
 - ▶ Advanced testing rates
 - ▶ Complication rates
 - ▶ Inpatient days (potential avoidable cost)
 - ▶ Observation days (potential avoidable cost)

Share with whom?

- ▶ Physicians (ED, hospitalists, cardiologist, primary care)
- ▶ Advance practice providers
- ▶ Hospital administration
- ▶ Group administration
- ▶ Quality committee
- ▶ Case managers
- ▶ Patients

Possible pitfalls of sharing

- ▶ Medicolegal – More to come....
- ▶ Termination of providers?
- ▶ Insurance companies excluding providers?
- ▶ Public reporting/opinion?
- ▶ Incentivizing care?

Mike's question:

1. Definition

2. Metrics

3. Action...

- Chris that was outstanding! Thanks!
- ... Now that we've talked about collecting all of this quality data, what can we do to use it most effectively?
- Now let's turn to Josh Baugh for a little quality intervention consult. Josh, what can you tell us?



Sharing data and anticipating
obstacles to change

Sharing Data

- Provide an initial snapshot
- Create active group dashboard
- Provide individual data

What to report

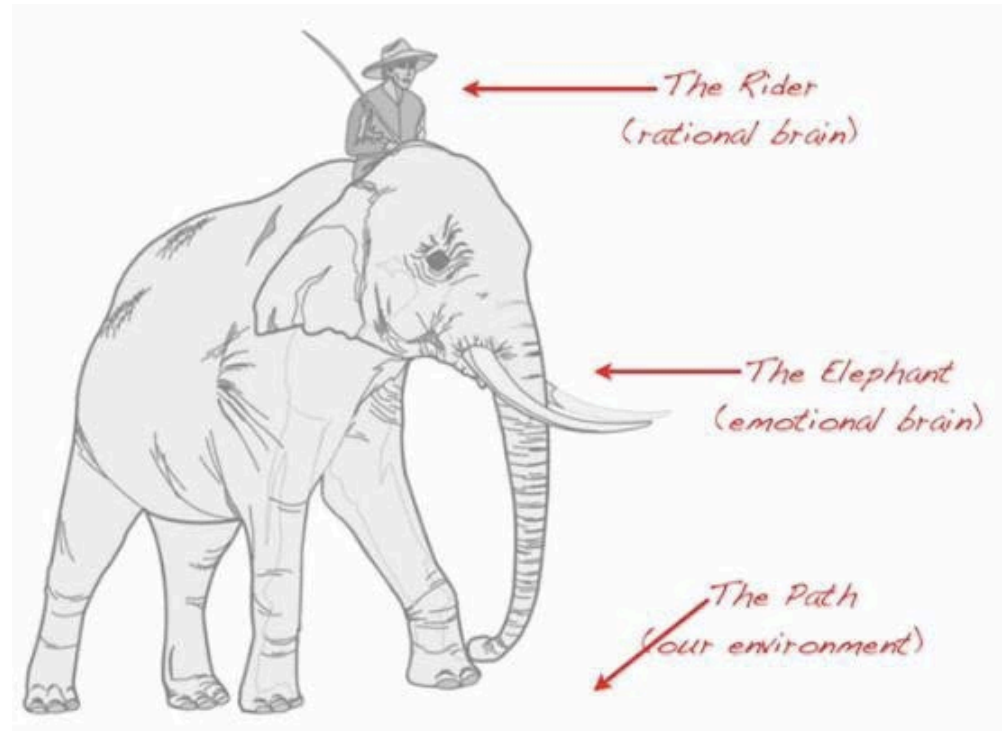
- % disposition of chest pain/LRCP pts
 - Obs, admit, discharge
- % advanced testing rate for chest pain/LRCP pts
- % of admitted and observed pts who rule in for ACS
- # of ACS pts discharged from ED in past 7 days
- Hospital bed days – actual, goal, avoidable days/cost
 - Observed and admitted patients

A red speech bubble graphic with a white outline, containing the text "Mike's question:". The bubble has a tail pointing downwards and to the right.

Mike's question:

- ... Hmmm.
- So it seems like this way of presenting and sharing data would work well if the project goes as planned, but what if the metrics in the data aren't changing as expected?
- How might you think about troubleshooting an ED pathway if behavior around chest pain care isn't improving as we would hope?"

Changing Behavior



* Heath, Chip, and Dan Heath. "Switch: How to change when change is hard." New York, NY (2010).

Information
Interventions
(Rider)



Motivation (Elephant)

- Facilitating accurate self-assessments
- Helping physicians resolve dissonance

* Tavis, C. and Aronson, E. Mistakes Were Made (but not by me): Why We Justify Foolish Beliefs, Bad Decisions, and Hurtful Acts. Harcourt Books: USA. Introduction & Chapter 1. (2007).

Motivation (Elephant)

■ Choosing the right incentives

- Personal pride
- Shaming ☹️
- Public lauding
- Finances \$\$

A decorative background featuring several curved, concentric lines in shades of gray, some solid and some dashed, creating a sense of motion or a circular path. A prominent red callout box is positioned on the left side of the slide, containing white text. The box has a small triangular pointer at the bottom center.

Decreasing
Friction
(Path)

- Creating a Good EMR Pathway
- Greasing Dispo Pathways

Summary

- Share data with dashboard and individual reports
- Consider three components of behavior change:
 - Knowledge of what to do
 - Motivation to do it
 - A clear path to get it done

Mike's wrap up questions

- So, for low risk chest pain patients in the ED we now have an idea of what quality looks like, how we can measure it, and then how to create meaningful changes in our practice using this information.
- This is a big step forward in our quality journey. Do you guys have anything that you would like to add? Any final suggestions?

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Questions? Contact the E-QUAL team at equal@acep.org

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