How to make early rule out strategies for ACS work?

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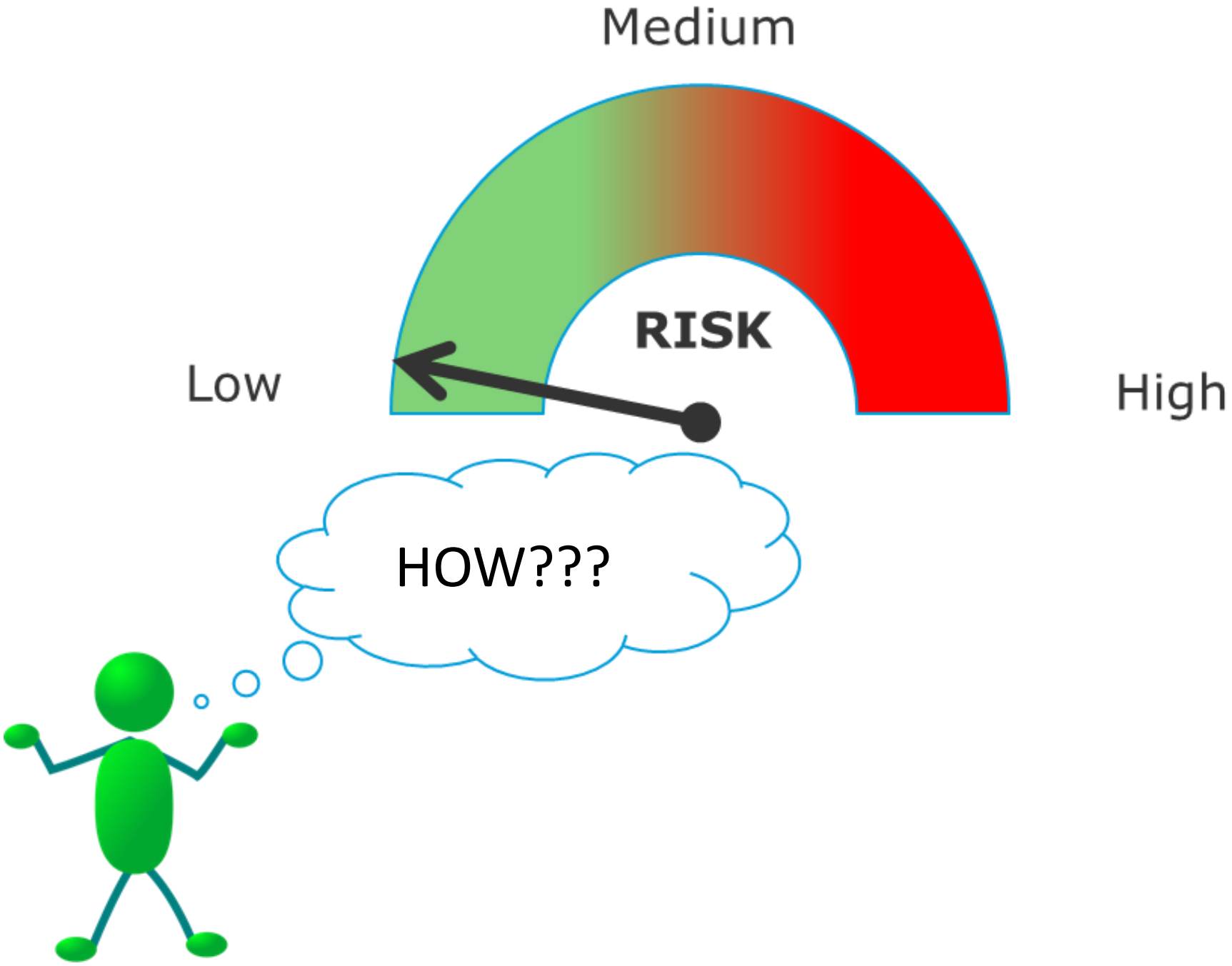
80,000 ED presentations per year

6,000 patients with chest pain

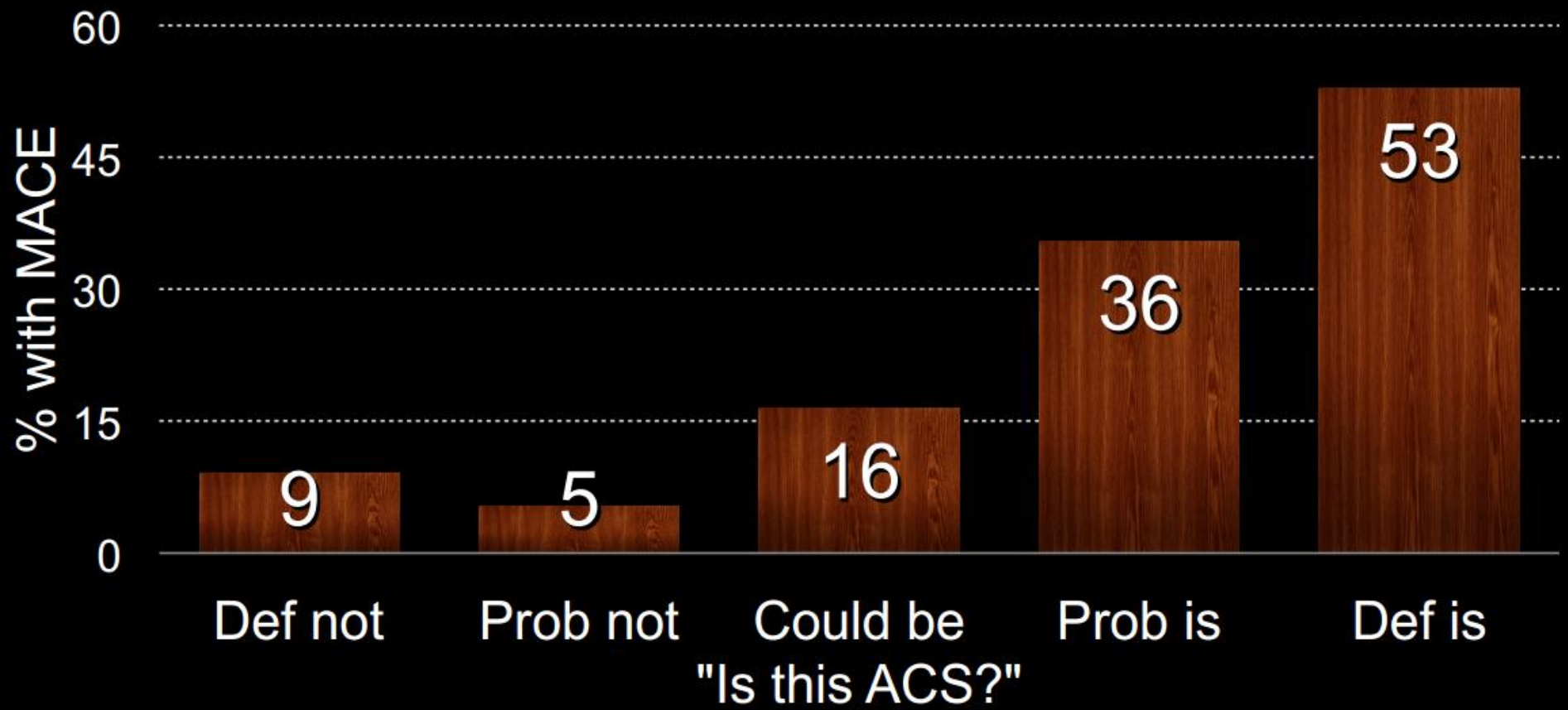
1,000 patients with ACS

5,000 patients without ACS


Medium
RISK
Low
High
HOW???

Well, we're all great diagnosticians, isn’t it?

CLINICIAN GESTALT



Body et al emerg med j 2014

LOW RISK
HIGH RISK
NO RISK

Risk assessment

TIMI RISK SCORE for UA/NSTEMI

HISTORICAL	POINTS
Age ≥ 65	1
≥ 3 CAD risk factors (FHx. HTN. ↑ chol. DM. active	1
Known CAD (stenosis ≥ 50%)	1
ASA use in past 7 days	1
PRESENTATION	
Recent (≤24H) severe angina	1
↑ cardiac markers	1
ST deviation ≥ 0.5 mm	1

RISK SCORE = Total Points (0 - 7)

RISK OF CARDIAC EVENTS (%) BY 14 DAYS IN TIMI 11B*

RISK SCORE	DEATH OR MI	DEATH, MI OR URGENT REVASC
0/1	3	5
2	3	8
3	5	13
4	7	20
5	12	26
6/7	19	41

ACS Risk Model

At Admission (in-hospital/to 6 months) | At Discharge (to 6 months)

Age: Years

HR: bpm

SBP: mmHg

Creat.: mg/dL

CHF: Killip Class

SI Units

- [ ] Cardiac arrest at admission
- [ ] ST-segment deviation
- [ ] Elevated cardiac enzymes/markers

Probability of	Death	Death or MI
In-hospital	--	--
To 6 months	--	--

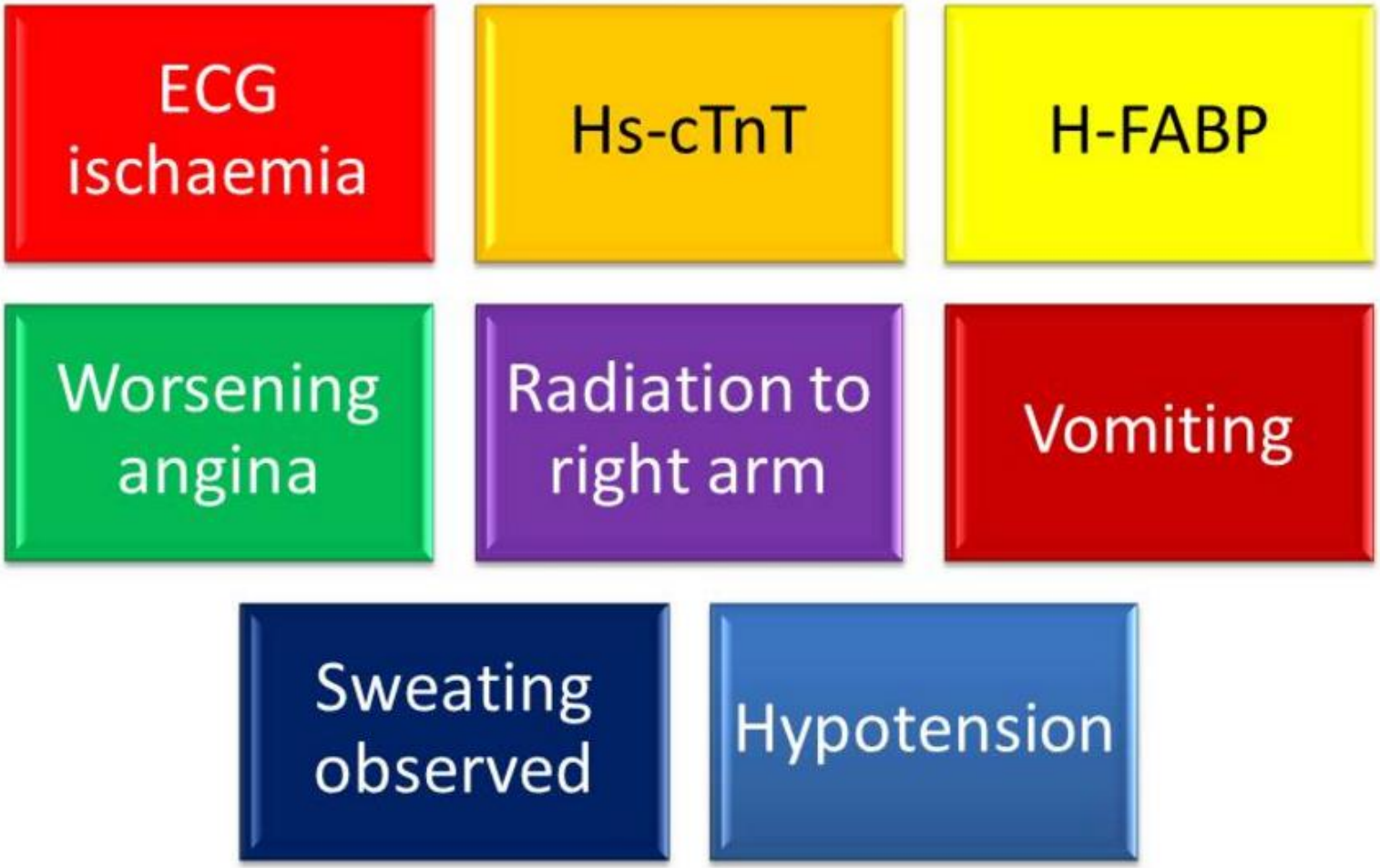
Reset | Display Score

Calculator | Instructions | GRACE Info | References | Disclaimer

HEART score for chest pain patients

History (anamnesis)	Highly suspicious	2	
	Moderately suspicious	1	
	Slightly or non-suspicious	0	
ECG	Significant ST-deviation	2	
	Non specific rep disturbance / LBTB / PM	1	
	Normal	0	
Age	≥ 65 year	2	
	45 – 65 year	1	
	≤ 45 year	0	
Risk factors	≥ 3 risk factors *or* history of (treated) atherosclerosis	2	
	1 or 2 risk factors	1	
	No risk factors known	0	
Troponin	≥ 3x normal limit	2	
	1-3x normal limit	1	
	≤ normal limit	0	
		Total	

The **MACS** Rule



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HEART-TIMI-GRACE

Discriminative performance (n=2388)

	All MACE	Death/ AMI	ACS	p value HEART vs
HEART	**0.83**	**0.82**	**0.86**	
TIMI	0.75	0.70	0.78	< 0.0001
GRACE	0.70	0.71	0.72	< 0.0001

Risk groups and proposed policy when using the HEART score (pooled results n=6174)

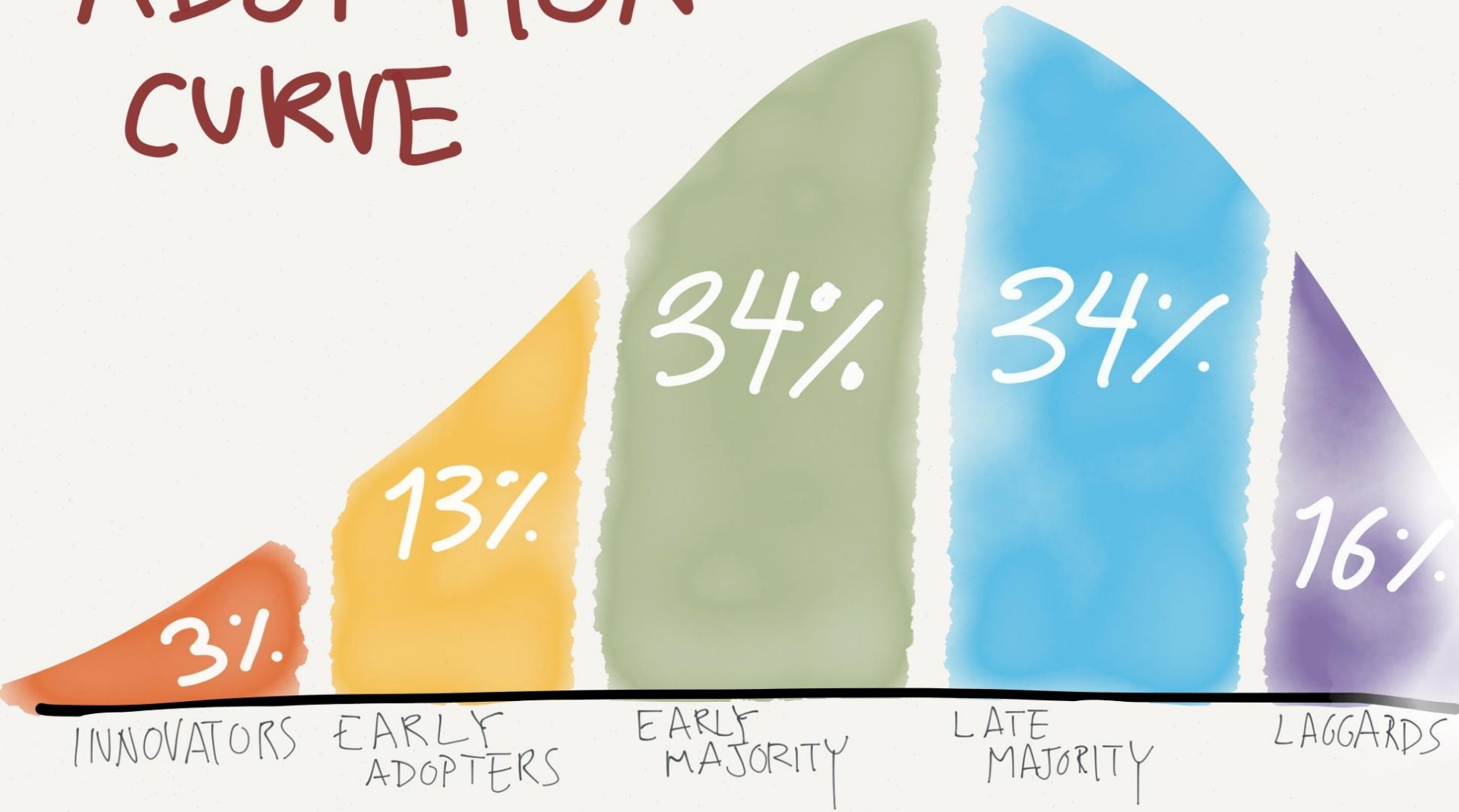
HEART	~ % pts	MACE/n	MACE	Death	Proposed Policy
0-3	32%	38/1993	1.9%	0.05%	Discharge
4-6	51%	413/3136	13%	1.3%	Observation, risk management
7-10	17%	518/1045	50%	2.8%	Observation, treatment, CAG

www.heartscore.nl

Paper	Pts	HEART Score ≤3	MACE in HEART ≤3 (n)	MACE in HEART ≤3 (%)
Six 2008	120	39	1	2.6%
Backus 2010	880	303	3	0.9%
Mahler 2011	1070	904	5	0.6%
Backus 2013	2388	870	15	1.7%
Mahler 2013	991	200	2	1%
Melki 2013	410	247	1	0.4%
Six 2013	2906	820	14	1.7%
Visser 2014	255	85	5	5.9%
Leite 2015	174	98	2	2%
Mahler 2015	141	66	0	0%
Sun 2016	8255	4039	72	1.8%
TOTAL	17,590	7,671	120	1.6%

43.6% low risk group with 1.6% MACE risk

THE ADOPTION CURVE



Hot Wheels

Casey Parker
@broomedocs

Volgen

If you were to open a new ED. which ACS score would you employ? @louiseacullen @richardbody @barbrabackus

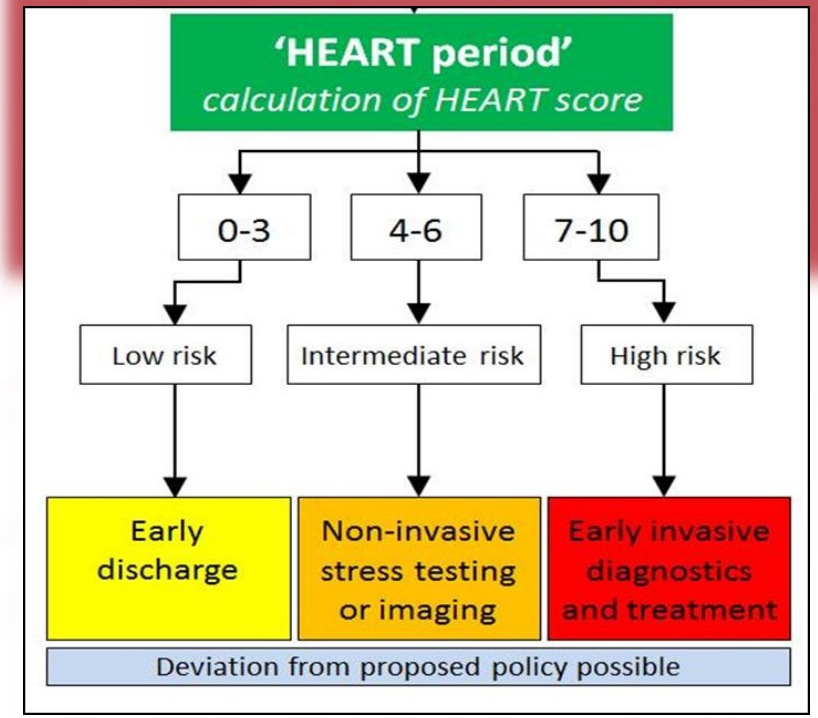
Vertaling bekijken

7%	TIMI
6%	GRACE
83%	HEART ✓
4%	PURSUIT

114 stemmen • Uitslag

Collaboration
Evidence
Applicability
Readiness
Believers

HEART impact trial



3666 inclusions

1833 Usual Care

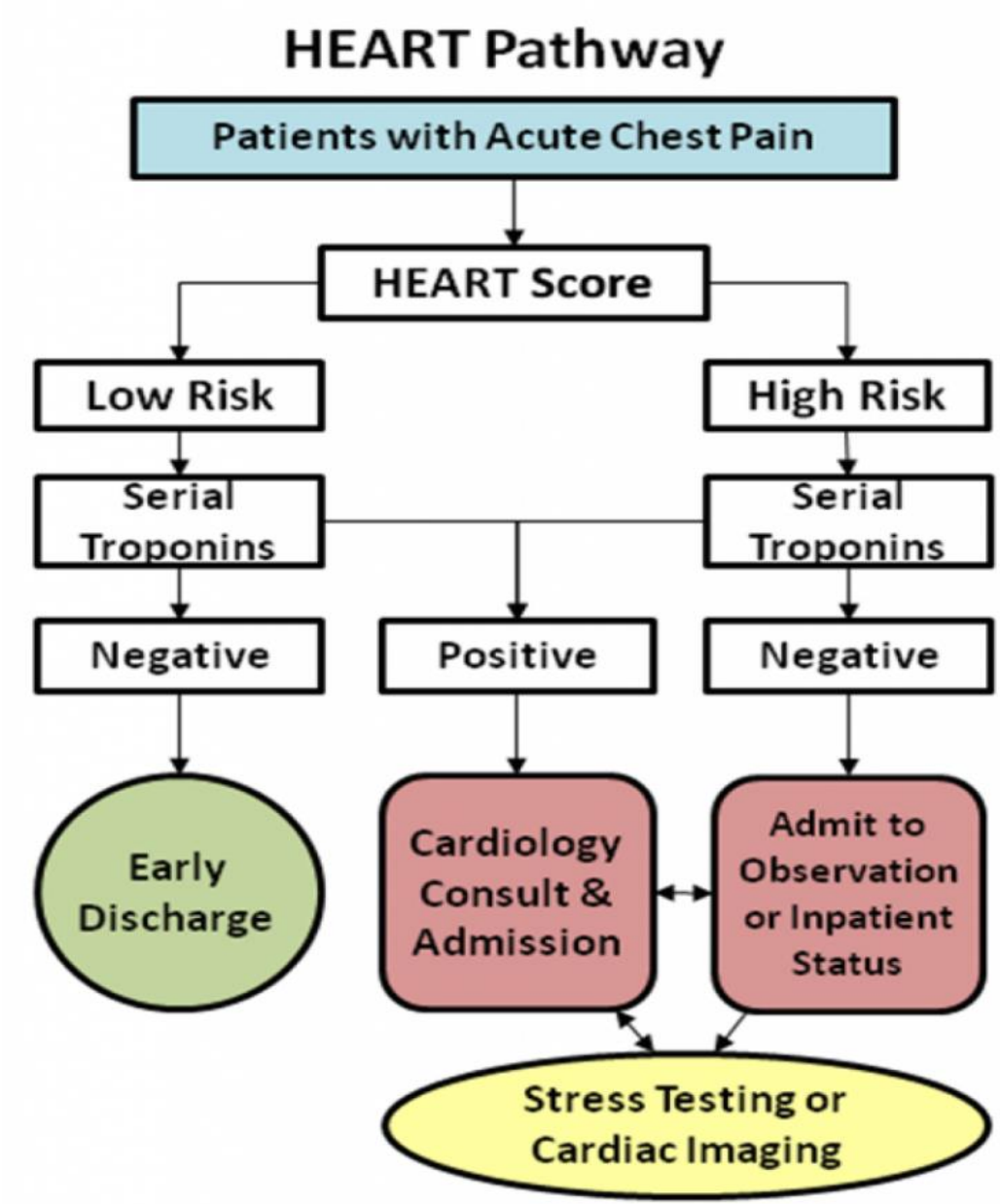
1833 HEART intervention

18 patients FU - / drop out

1827 Usual Care

1821 HEART intervention

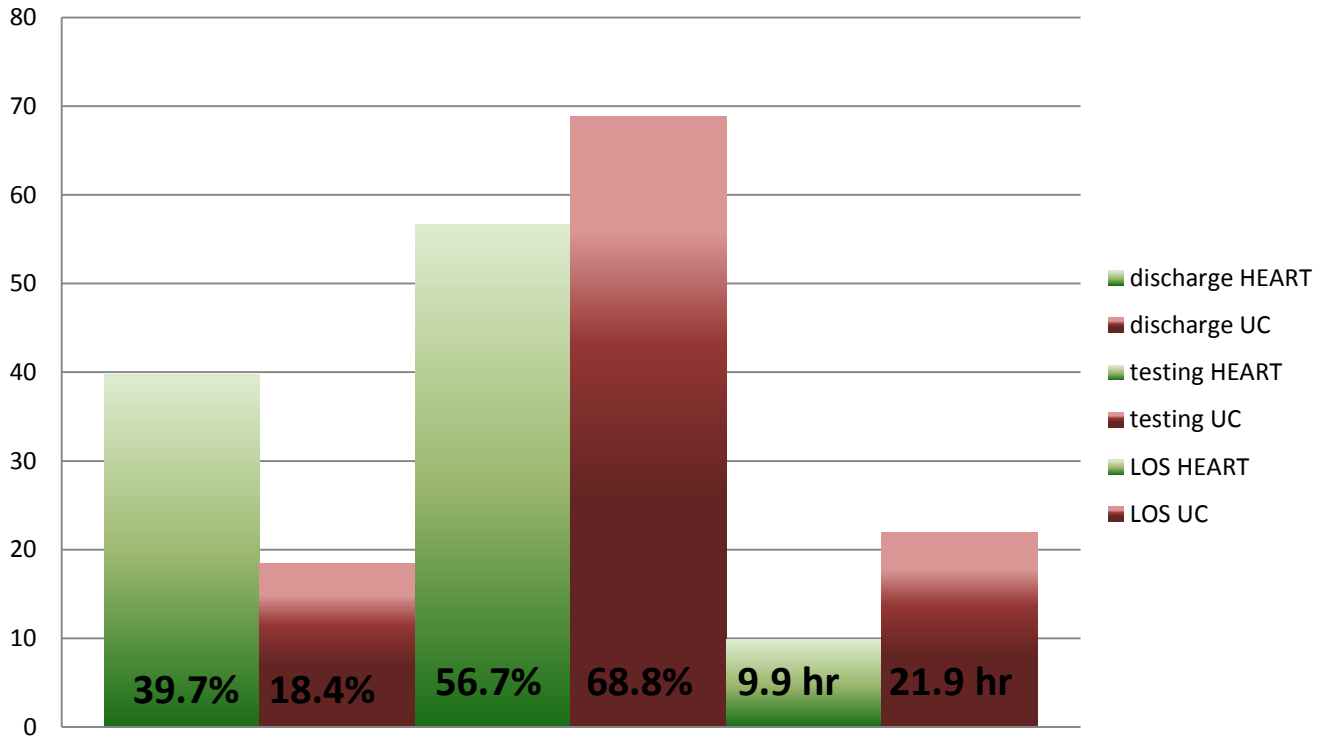
No difference between groups, HEART safe to use
Limited impact on daily practice



Mahler, Crit Card Qual Outc, 2015 (8), 195-203

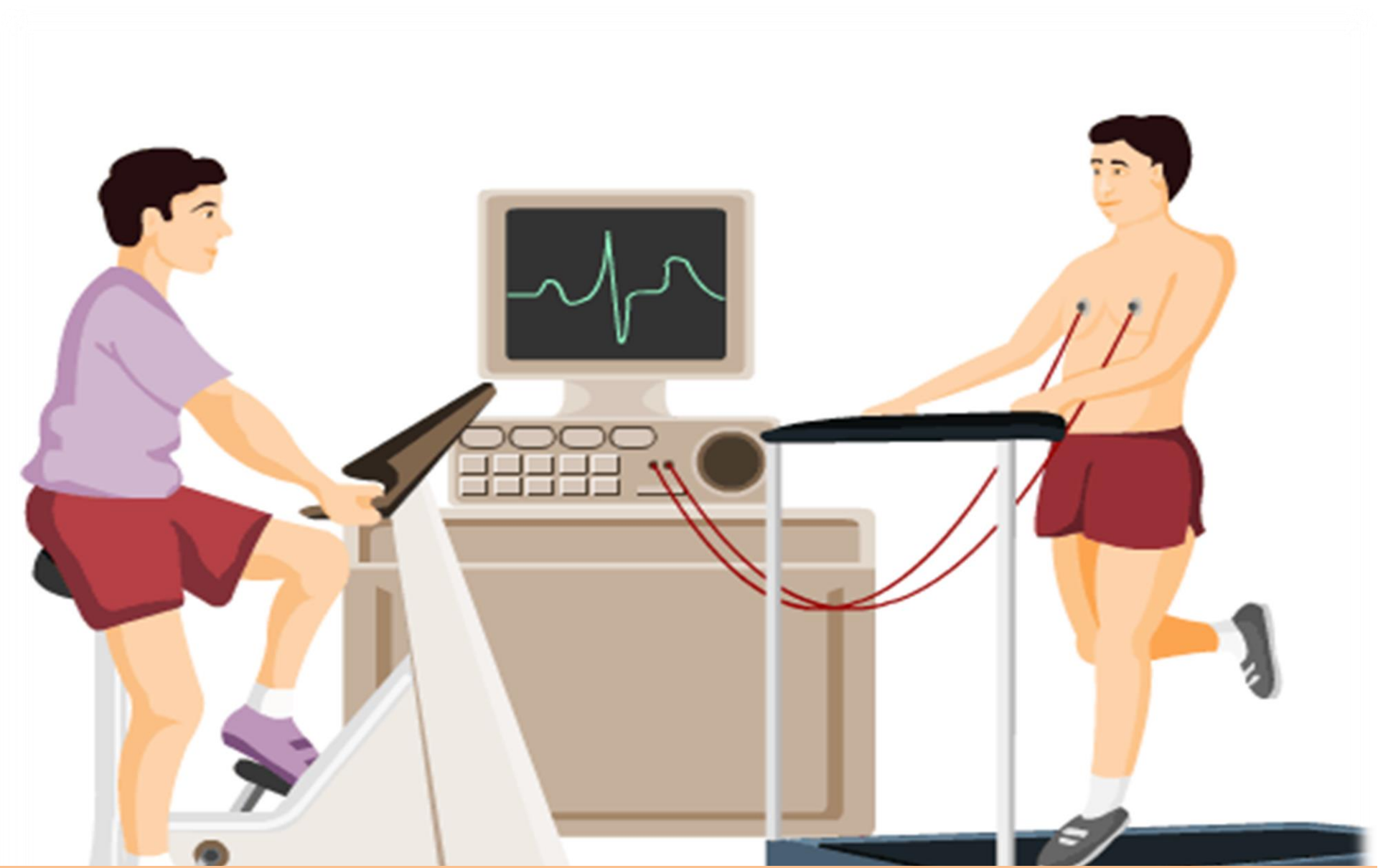
HEART Pathway study

- 282 patients with 141 patients in each arm of the study
- HEART Pathway identified of 46.8% of patients as low risk
- Zero patients identified as low risk had a MACE



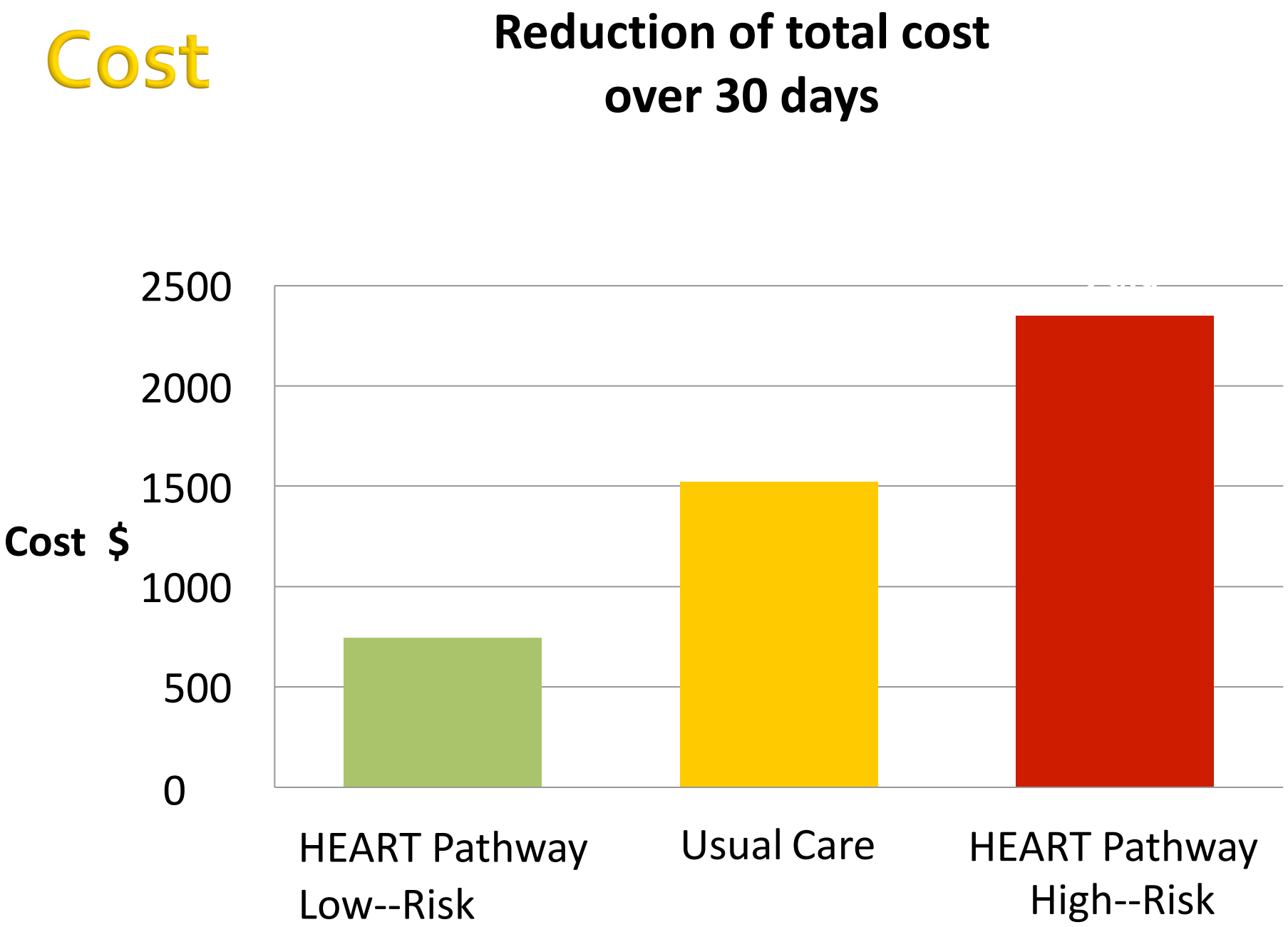
Increased the early discharge rate by 21% (p=0.0002)

Decreased median length of stay by 12 hours (p=0.013)



Decreased cardiac testing by 12% (p=0.048)

Cost


Reduction of total cost over 30 days
Cost $
2500
2000
1500
1000
500
0
HEART Pathway Low--Risk
Usual Care
HEART Pathway High--Risk

UNIVERSITY of MARYLAND
SCHOOL OF MEDICINE

DEPARTMENT OF EMERGENCY MEDICINE

SHARED
DECISION MAKING

What's Next?

UNIVERSITY of MARYLAND MEDICAL SYSTEM

1 Your Chest Pain Diagnosis

Our testing so far has NOT shown any evidence of a heart attack. This is based on a blood test, an electrocardiogram (ECG), your exam, and your risk factors.[1] It is recommended that a repeat blood test and ECG be performed during your emergency department visit to further rule out a heart attack.

However, even if everything today is normal, your chest pain may be an early warning sign of a possible FUTURE heart attack or heart complication.

2 Further Evaluation

Further evaluation and testing will help check if your heart is working correctly. Understanding your risk of having a heart attack or heart complication can help decide how to best proceed with your care in the Emergency Department.

[1] Factors used to determine your risk:

- History
- ECG
- Age
- Risk Factors for heart disease
- Troponin

3 Your Personal Risk Evaluation

If your repeat blood test is negative, your risk of having a heart attack or heart complication within the next 30 days can be determined by comparing you to people with similar factors[1] who also came to the Emergency Department with chest pain.

Of every

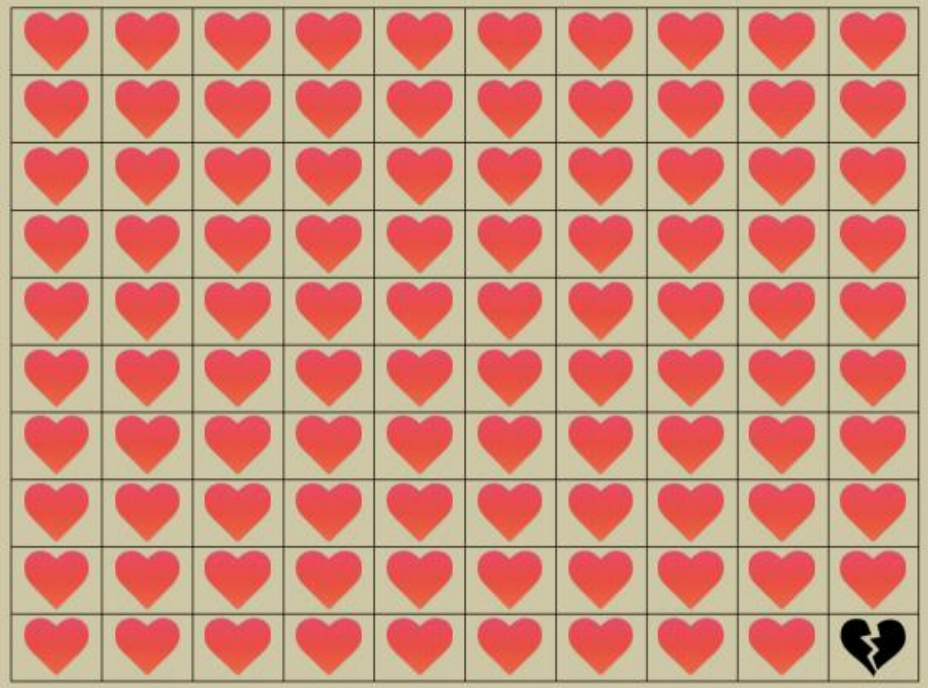
100

people with factors like yours who came to the Emergency Department with chest pain…

1

had a heart attack or a heart complication within 30 days of their Emergency Department visit,

99
did not.



4 Would You Like to Have Further Testing Now or Would You Like to Make an Appointment?

☐ I would like a repeat blood test and if negative, be discharged for follow-up with a primary care physician or cardiologist

☐ I would like to be placed in observation for further testing. I understand this will increase my length of stay in the emergency department and/or hospital.

☐ I will decline a repeat blood test and will follow up with a primary care doctor or cardiologist. I understand that my risk for a heart attack or heart complication increases to about 2 out of every 100 patients by doing so.

I was explained and understand my Personal Risk Evaluation as well as the importance of follow up. If my symptoms worsen or I am unable to get follow up within 1 week, I will return to the ED.

_____ _____ _____
Patient/Caregiver Signature Date Time

_____ _____ _____
Provider Signature Date Time

The HEART score

Easy

And

Reliable

Tool

www.heartscore.nl

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