



# ACC Middle East Conference 2018

In partnership with:



جمعية القلب السعودية  
Saudi Heart Association

## Optimizing STEMI Systems of Care

**Dipti Itchhaporia, MD, FACC, FESC**

Immediate Past Trustee, American College of Cardiology

Director of Disease Management, Hoag Hospital

Robert and Georgia Roth Endowed Chair for Excellence in  
Cardiac Care

Jeffrey M. Carlton Heart and Vascular Institute

Assistant Clinical Professor, University of California, Irvine





# Disclosure

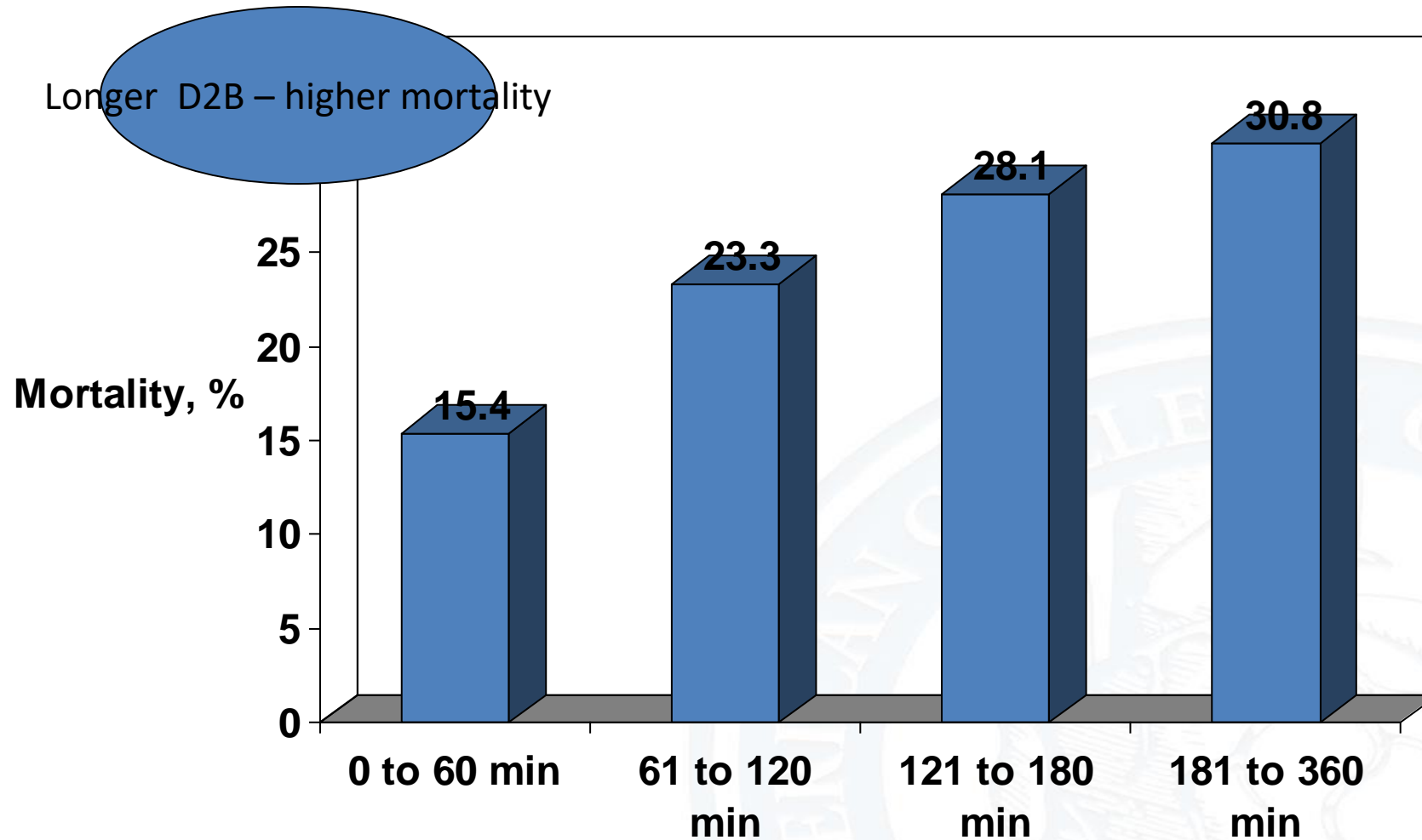
**I have no  
disclosures**



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# Time and Mortality in STEMI Patients

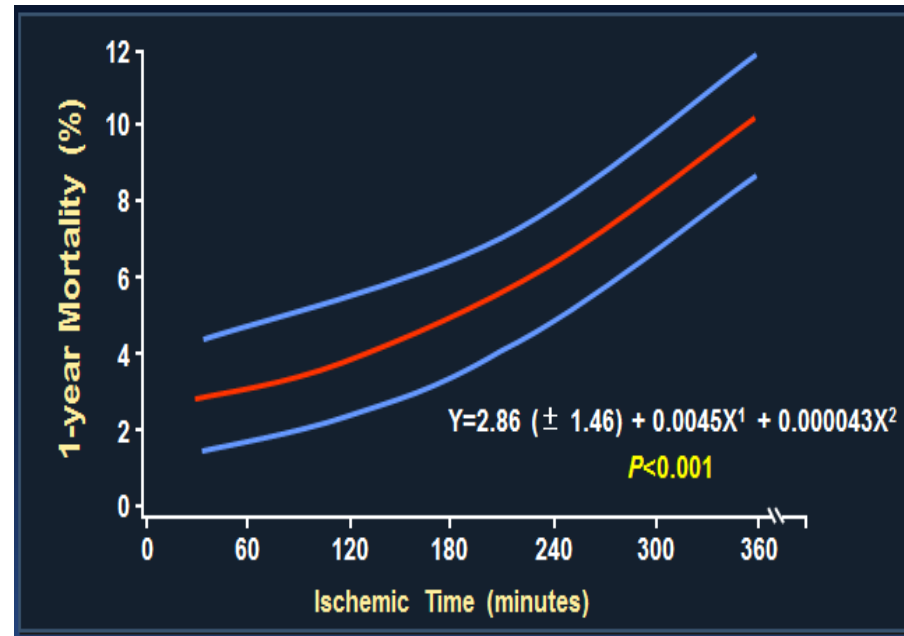
Shorter time from door-to-balloon (PCI) leads to lower risk of mortality



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Terkelsen CJ JAMA 2010;304:763-771

# Time from Symptom Onset to Treatment Predicts 1-year Mortality after Primary PCI



The relative risk of 1-year mortality increases by 7.5% for each 30-minute delay

De Luca et al. *Circulation* 2004;109:1223-1225



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# **Do whatever it takes** to reduce time from symptom onset to ER arrival and time from ER arrival to PCI!



**↑ Public awareness of MI Sx**

**CAD centers of excellence with  
lower DBTs and excellent outcomes**

**Regional coordination**

**Ambulance ECG telemetry**

**Ambulance/ER CCL activation**

**ICs sleep in hospital**

**Continual QI**



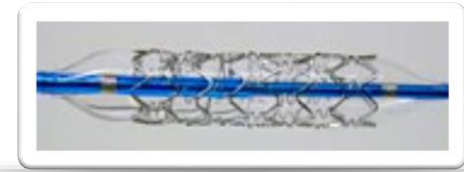
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Mehran, Roxana

# Barriers to Timely Reperfusion

- The patient

- Failure to promptly recognize symptoms
- Hesitation to seek medical attention



- Time to transport

- Mandated delivery to the closest hospital, regardless of PCI capabilities
- Long transport in rural areas



- Decision process on arrival

- Clot-busting drugs vs. PCI
- Off hours
- Transfer to PCI facility

- Time to implement treatment

- Procedural factors
- Team assembly



# The Reality of Today's Patients

- Not all STEMI patients call 9-1-1
  - 50% of STEMI patients present to their local emergency department (ED)
- “Walk-in” patients
- Rapid ECG
  - CODE 10 Established – ECG in under 10 minutes from time of arrival (DOOR TIME)
  - Operational Considerations
    - CODE 10 called overhead in ED
    - multiple available ECG machines
    - process in place to mobilize ECG machine and tech
    - training/ competency of Emergency Care Techs to perform ECG
    - high priority of ED MD to read ECG



# The Ideal Patient & System

- **Patients and the public:**
  - Recognize the symptoms of STEMI
  - Realize the importance of:
    - Activating emergency medical services (EMS) via 9-1-1 promptly
    - Getting treatment quickly
- **The ideal system:**
  - Promotes education efforts for the Emergency Medical System, the Emergency department personnel, cath lab staff, physicians and the patients.
  - Provides coordinated and patient-centered care





# Transport: Patient to ED by Ambulance

- Coordination with Emergency Medical System
- 12 Lead ECG performed in field
  - Appropriate ECG machines on ambulance capable of transmitting clean tracing
  - Training/ competency of EMT to perform ECG
- EMS transmits to Base Hospital, BH contacts Cardiovascular Receiving Center (CVRC)
  - Our institution is both a BH and CVRC
- Radio call to ED
  - Notifies ED MD, ED RN, Activates CATH LAB – simultaneously
  - ED MD contacts ED CALL PANEL On Call Interventional



# The Ideal Emergency Medical System (EMS)

- In an ideal system:
  - Ambulances are equipped with 12-lead ECG machines
  - EMS providers are trained to:
    - Use and transmit 12-lead ECGs
    - Care for STEMI patients
    - Provide feedback on performance and compliance with guidelines
  - Standardized point-of-entry (POE) protocols define patient transport rules
  - When there is STEMI, the cath lab is activated promptly
  - Patients transported to a STEMI-referral hospital remain on the stretcher with EMS present pending a transport decision
  - When “walk-in” patients present to a STEMI-referral hospital and require primary PCI, activation of EMS occurs
  - Hospitals close the communication gap with EMS



# PROCESS:STEMI Presentation: EMS v. Walk-In

## EMS

- STEMI Recognition by EMS Pre-Hospital Prior to “DOOR”
  - Education & Collaboration with EMS for timely and accurate 12 Lead ECG
- Pre-hospital activation of ED, CCU & CCL Team CODE STEMI
  - 30 minute arrival time
- ED MD interprets ECG upon pt arrival, repeats if necessary.

## Walk-In

- STEMI Recognition upon arrival of Walk-In CODE 10:
  - ECG within 10 min
- ED MD primary interpretation of ECG with *simultaneous* activation of IC and CCL TEAM



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# STEMI Treatment

**GOAL: Achieve D2B < 90 minutes <60 minutes**

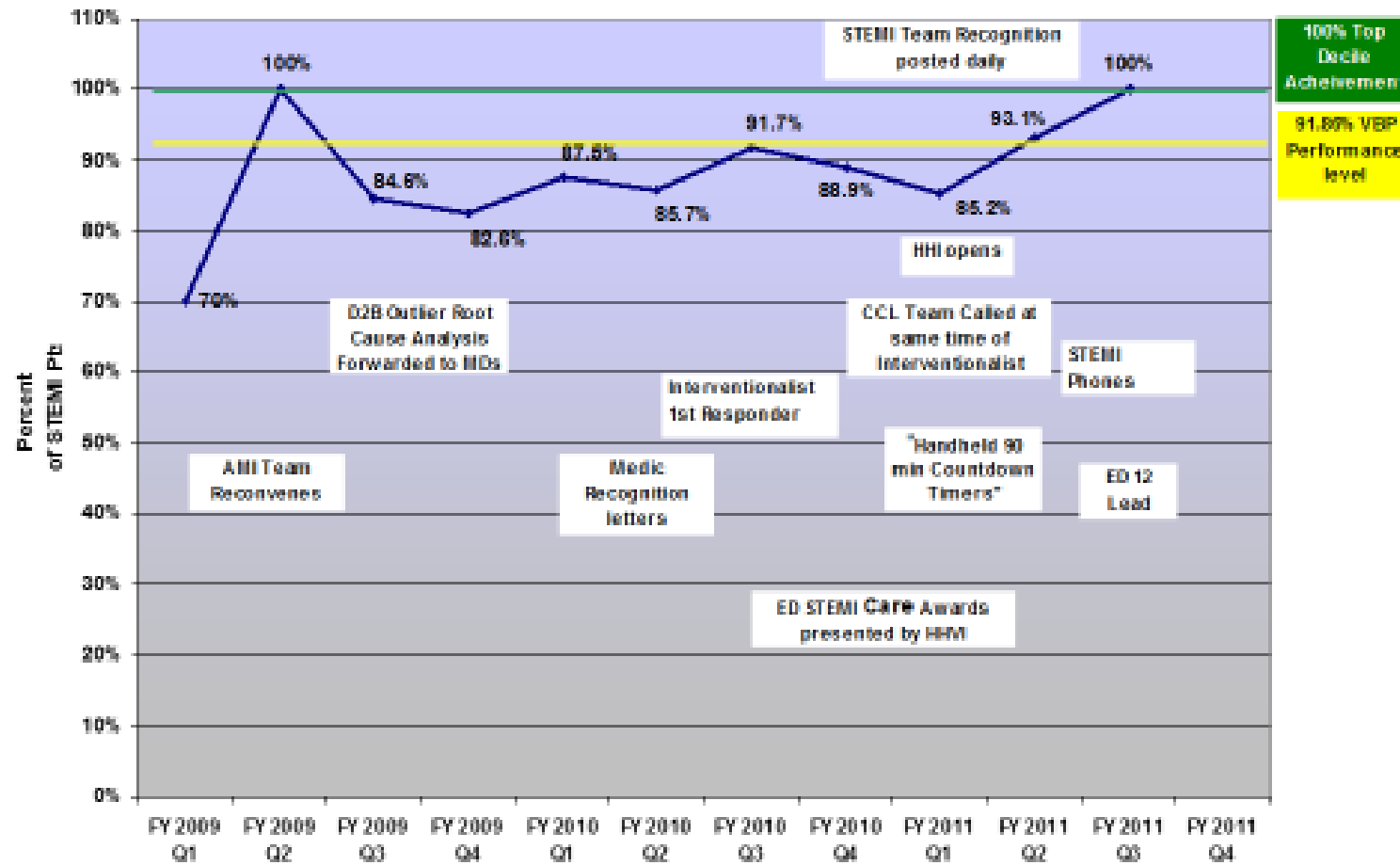
- Key Criteria
  - Early activation
  - Door to Data/ECG < 10 min
  - Door to Decision < 15 min
  - Door to Cardiac Cath Lab (CCL) < 30 minutes
  - CCL door to Ready for Stick < 10 min
  - CCL door to BLN < 45 min





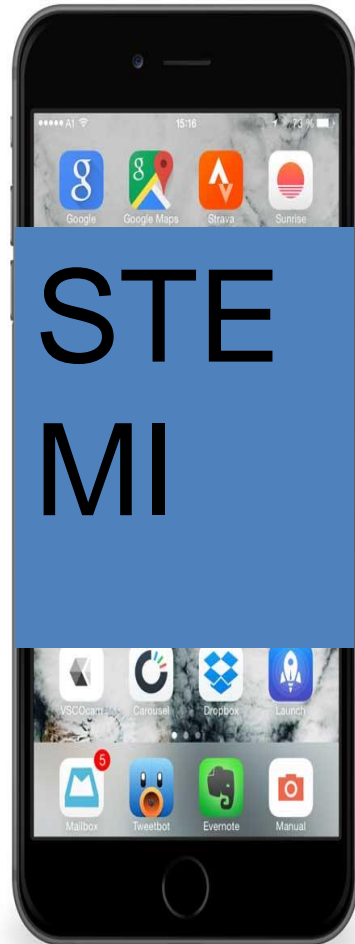
# Early Data

AMI Door-To-Balloon % Compliance within 90 Mins



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# Dedicated Mobile Phones in ED For STEMI Notification



## STEMI

- Programmed with IC Cell Numbers
- ED MD speaks directly with IC
- Program IC's cell phones with ED Cell identifier as "STEMI"




# Next Steps

## Tracking Progress

Create evaluation mechanism to track progress and outcomes- and give feedback



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 <b>Primary PCI Data Collection Form</b> <i>This is NOT a Permanent Part of the Patient's Record</i>			
	<b>Data Element</b>	<b>Time</b>	<b>Benchmark Time or Goal</b>
			<b>REFERENCE</b>
<b>Emergency Department Responsibility</b>	Date AND Time ED notified of patient arrival:		Please copy and attach: 1.) EMS field ECG, 2.) EMS run Sheet, 3.) ECG(s) from ED, 4.) ED triage sheet
	Arrival by: EMS <input type="checkbox"/> BLS <input type="checkbox"/> Walk-In <input type="checkbox"/>		
	OCS-EMS Identification (run) #:		
	Medical Record #:		
	Patient Age: <input type="text"/> Male <input type="checkbox"/> Female <input type="checkbox"/>		
	Date & time patient first arrives to Hoag:		"Door" ie.: Arrival to hospital
	ED Physician: <input type="text"/>		
	Initial ECG obtained: EMS <input type="checkbox"/> Hoag <input type="checkbox"/>		"Door to Data"
	Time 1st ECG obtained		National Goal = 10 minutes
	STEMI? Yes <input type="checkbox"/> No <input type="checkbox"/>		Hoag Goal < 10 minutes
	If EMS ECG, was the field interpretation confirmed? Yes <input type="checkbox"/> No <input type="checkbox"/>		
	ED calls Perfect Serve to activate Call Team		"Door to Decision"
ED calls Interventional Cardiologist		Hoag Goal < 15 minutes	
Interventional Cardiologist: <input type="text"/>			
Call Team arrival time to hospital:		Hoag Goal = < 30 minutes following notification	
Cardiologist arrival time to hospital:		Hoag Goal = < 30 minutes following notification	
Patient ready for transport to CCL:		ED arrival to CVL arrival Hoag Goal = < 40 minutes	
<b>Cardiac Cath Lab Responsibility</b>	Patient arrives in CCL from ED (Please document if room not available.)		"ED to lab" Hoag Goal < 5 minutes
	Patient ready - prepped & draped		"CCL door to ready" Hoag Goal < 10 minutes
	Local		"Lab ready to Stick Time" Hoag Goal = 0 minutes
	Artery Open (time of 1st balloon inflation)		"CCL arrival to balloon"
	Culprit artery: <input type="text"/>		Hoag Goal = < 45 minutes
	Immediate post-procedure pt disposition &/or location:		
	Total ED door to balloon (D2B) time =		Goal D2B = < 90 minutes
	Total EMS to balloon (E2B) time =		Goal E2B = < 90 minutes

# Primary PCI Data Collection Form

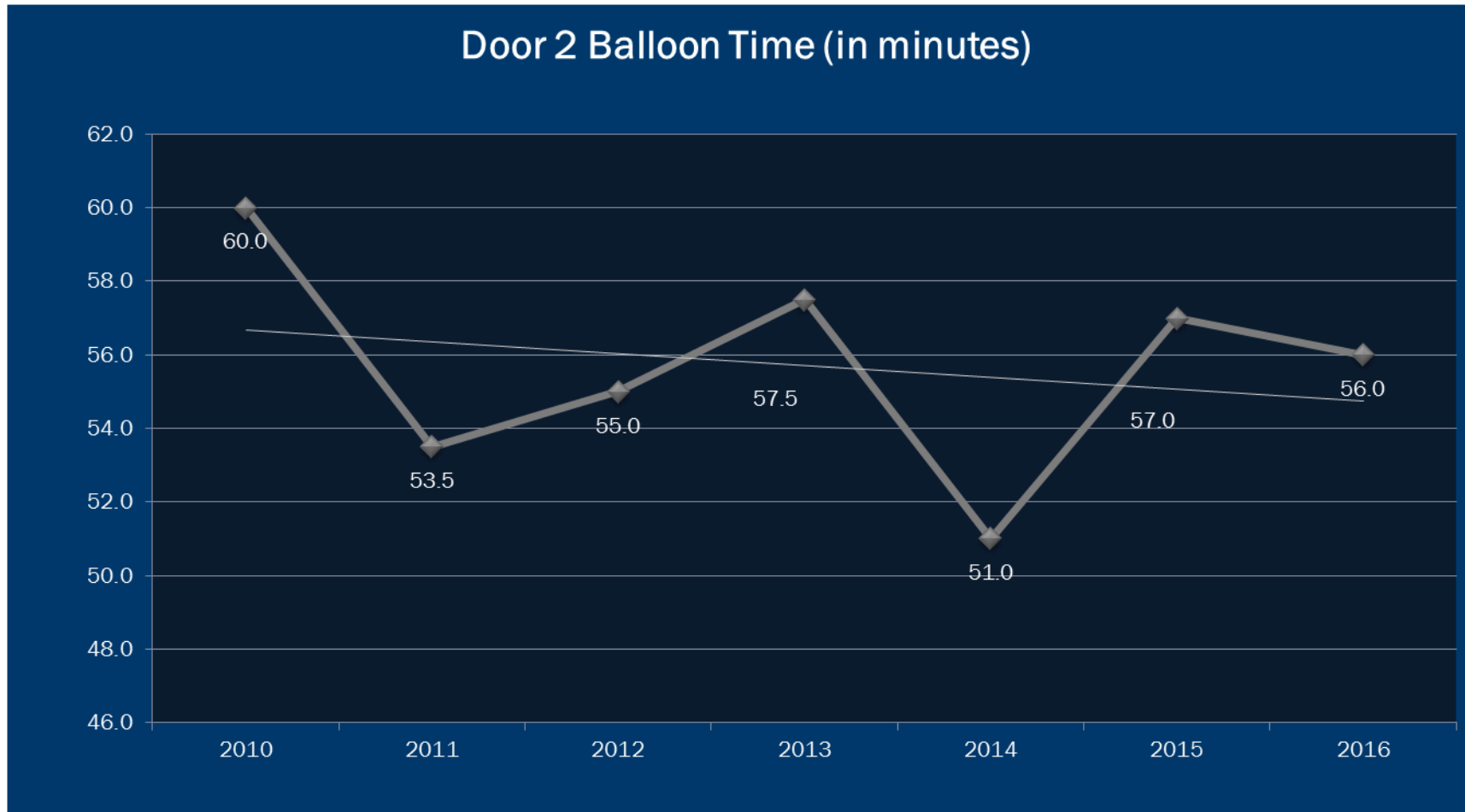
- Initiated Dec 2010
- Completed by designated CCL RN's
- Reviewed and reported by AMI Team Leaders
- Immediate, real-time feedback for all



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# Door 2 Balloon Time (in Minutes)



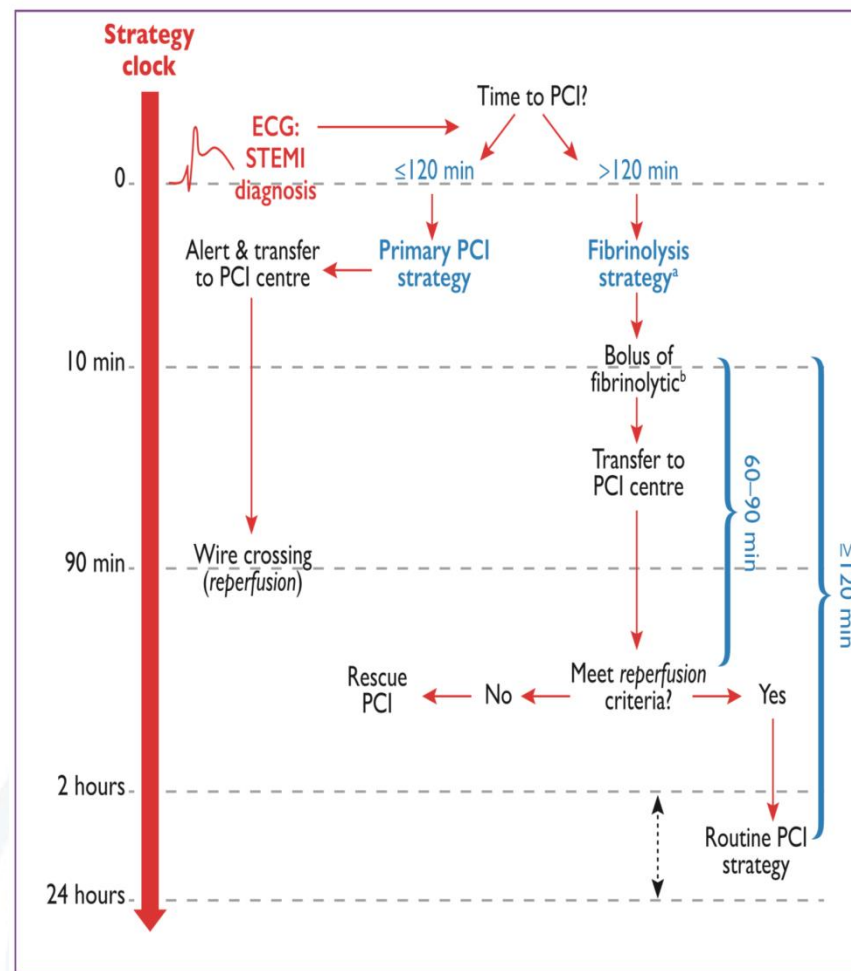
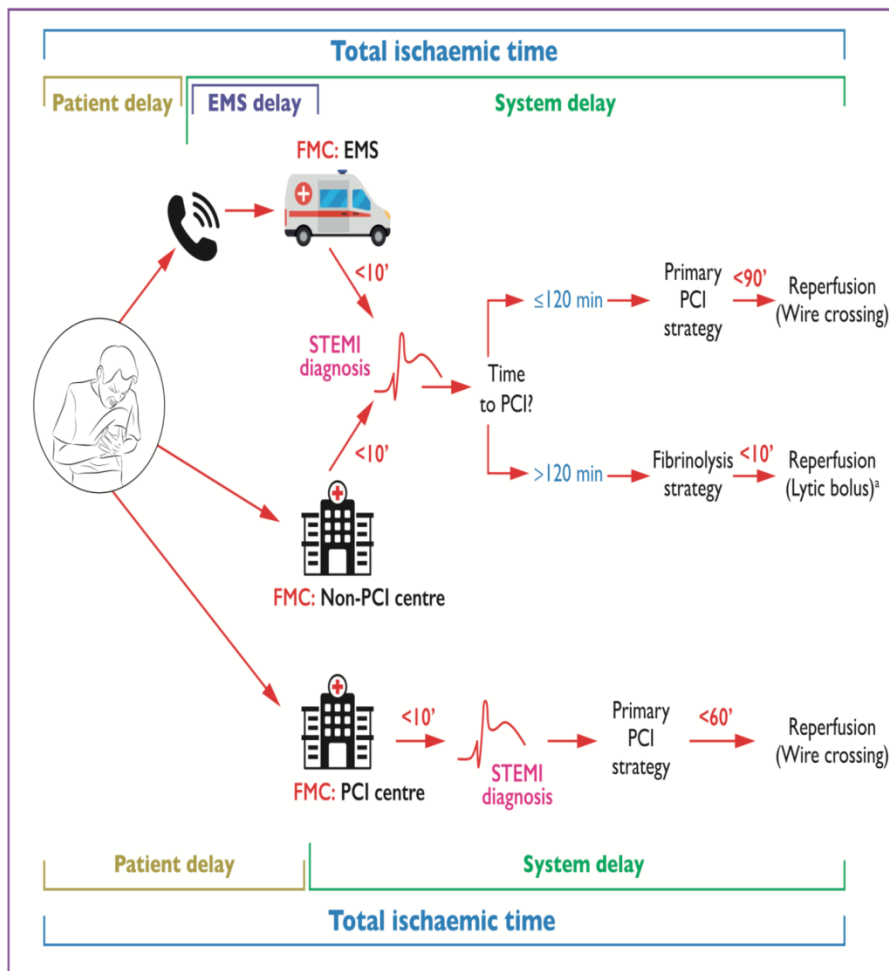
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# Partners for Success

- Patients and care givers
- EMS providers
- Physicians, nurses and other providers
- STEM-referral (non-PCI) hospitals
- STEMI-receiving (PCI-capable) hospitals
- Health systems
- Departments of health
- EMS regulatory authority / office of EMS
- Quality improvement organizations
- State and local policymakers



# Summary- STEMI Management



Kristensen, S. D. (2018). 2017 *European Heart Journal*, 39, 119-177.



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Thank you



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