Surviving MI

AN ACC QUALITY INITIATIVE

Cardiology Presence Around the Clock
Thursday, December 3, 2015

Quality Improvement for Institutions

How this webinar is organized

Time	Topic
12:00pm	Welcome and Introductions
12:05pm -12:50pm	Cardiology Presence Around the Clock
	University of Michigan Medical Center *Ann Arbor, Michigan*
	Sentara Cardiology Specialists *Norfolk, VA*
	Sanford Heart Center *Fargo, ND*
12:50pm	Q&A
12:57pm	Wrap-up and Next Steps

Quality Improvement for Institutions

Speakers

Richard Kovacs, MD, FACC
Professor of Clinical Medicine at Indiana University School of Medicine, and Clinical Director of the Krannert Institute of Cardiology

Susan Farkas, MD, FACC
Clinical Associate Professor of Medicine, University of North Dakota and cardiologist with Sanford Heart Center
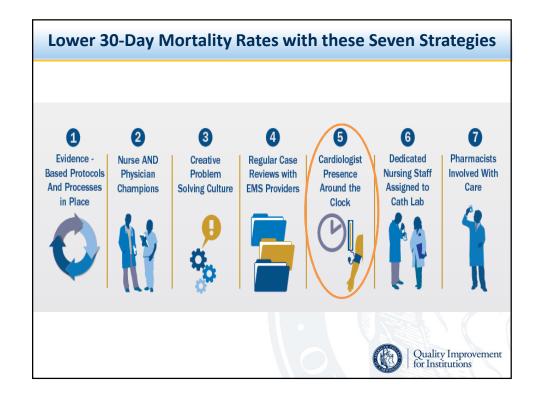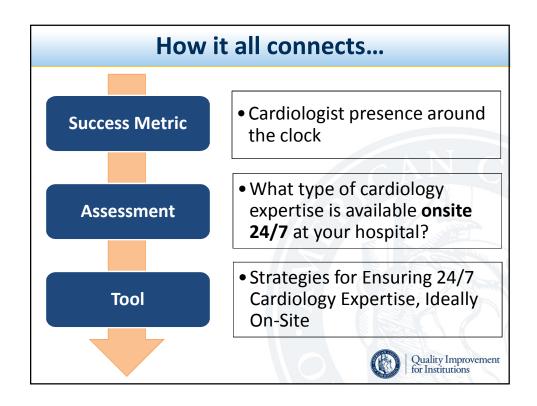
Eric R. Bates, MD, FACC
Professor of Internal Medicine, University of Michigan
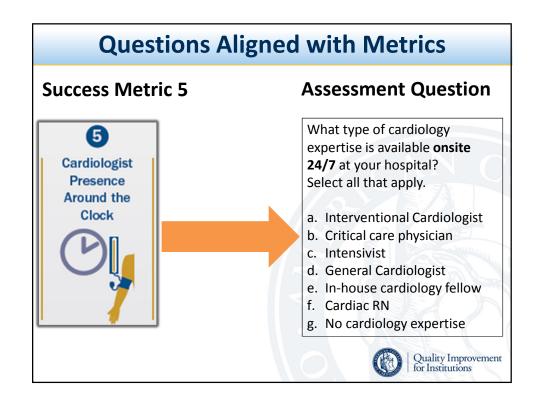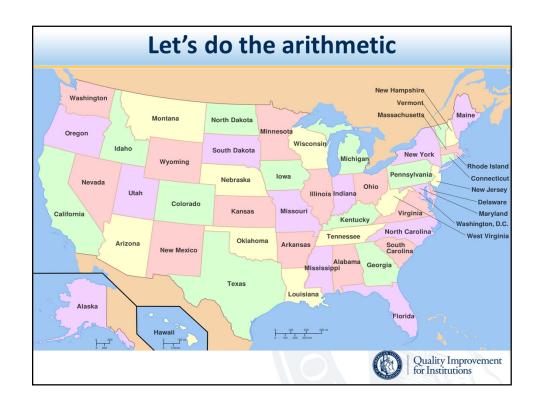
John E. Brush, Jr., MD, FACC
Professor of Medicine, Eastern Virginia Medical School and an interventionalist with Sentara Cardiology Specialists

Quality Improvement for Institutions

Lower 30-Day Mortality Rates with these Seven Strategies

1 Evidence - Based Protocols And Processes in Place

2 Nurse AND Physician Champions

3 Creative Problem Solving Culture

4 Regular Case Reviews with EMS Providers

5 Cardiologist Presence Around the Clock

6 Dedicated Nursing Staff Assigned to Cath Lab

7 Pharmacists Involved With Care

Quality Improvement for Institutions

How it all connects…

Success Metric
- Cardiologist presence around the clock

Assessment
- What type of cardiology expertise is available **onsite 24/7** at your hospital?

Tool
- Strategies for Ensuring 24/7 Cardiology Expertise, Ideally On-Site

Quality Improvement for Institutions

Questions Aligned with Metrics

Success Metric 5

5
Cardiologist Presence Around the Clock

Assessment Question

What type of cardiology expertise is available **onsite 24/7** at your hospital?
Select all that apply.

a. Interventional Cardiologist
b. Critical care physician
c. Intensivist
d. General Cardiologist
e. In-house cardiology fellow
f. Cardiac RN
g. No cardiology expertise

Quality Improvement for Institutions

Let's do the arithmetic

Let's do the arithmetic

- 5,000 Hospitals
- 1,000 PCI Capable Hospitals
- 25,000 Board Certified Cardiologists
- 6,000 Board Certified Interventionalists

Surviving MI Webinar

Eric R. Bates, M.D.

Professor of Internal Medicine

University of Michigan

Conflict of Interest: None

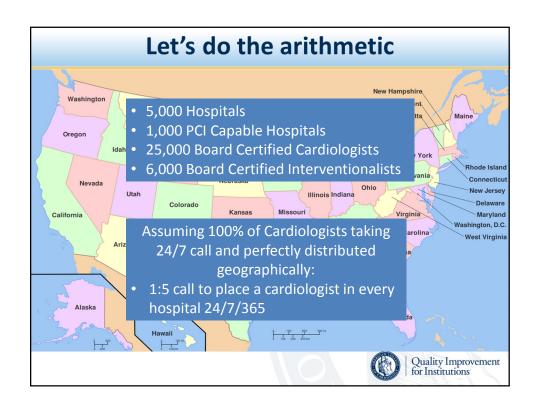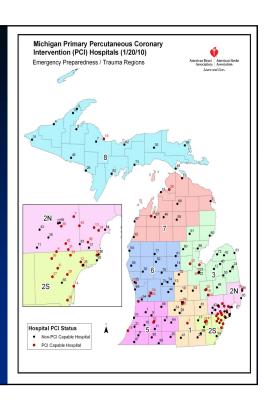**EMS**
  Providers: 800
  Regional Authorities: 65

Trauma Regions: 8

Receiving Hospitals: 47
  On-site Surgery: 33
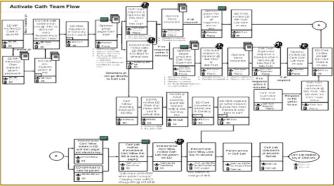 **No On-site Surgery: 14**

Referring Hospitals: 90

Michigan Primary Percutaneous Coronary Intervention (PCI) Hospitals (1/20/10)
Emergency Preparedness / Trauma Regions

Plan/Do: The Case For Improvement

University of Michigan Health System

Round 1:

1. **Single call activation**
2. **Pre-hospital activation**
3. **Standardize single page with Cath Lab team**
4. **Standardize ED and Cath Lab processes**

Activate Cath Team Flow

Check/Act: Verifying Outcomes

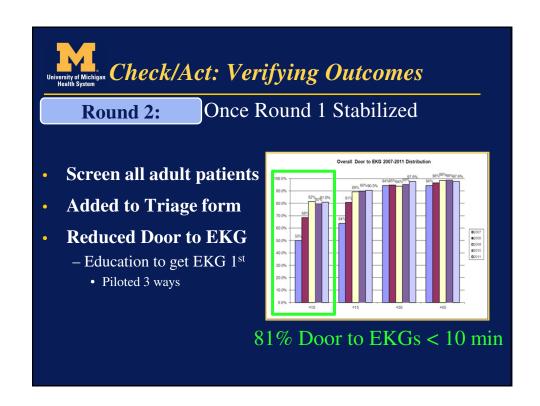University of Michigan Health System
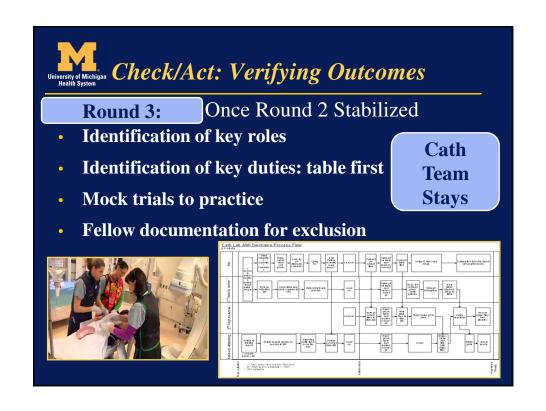
Round 1:

- **Initial EMS changes:**
  - Pre-hospital activation:
    - Positive machine read AMI
  - Use same EKG pads:
    - EMS←→ED←→Cath Lab
  - Standard handoff to ED RN
    - Change stretcher, med box, …
  - Share results of patient impact with individual staff

Check/Act: Verifying Outcomes

Round 2: Once Round 1 Stabilized

- **Screen all adult patients**
- **Added to Triage form**
- **Reduced Door to EKG**
  – Education to get EKG 1st
    • Piloted 3 ways

Overall Door to EKG 2007-2011 Distribution

81% Door to EKGs < 10 min

Check/Act: Verifying Outcomes

Round 3: Once Round 2 Stabilized

- **Identification of key roles**
- **Identification of key duties: table first**
- **Mock trials to practice**
- **Fellow documentation for exclusion**

Cath Team Stays

Cath Lab AMI Swimlane Process Flow

Check/Act: Verifying Outcomes

University of Michigan Health System

Round 4: Once Round 3 Stabilized
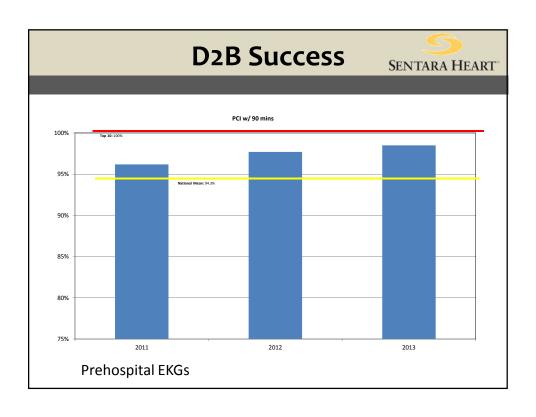
- **Focus on getting EKG 1st**

- **Reduce patient contact to EKG**

- **Reduce positive EKG to ED notification**
  - Give more time for Cath Lab and ED

- **Real-time feedback/follow-up with staff from UofM to us to staff**

Check/Act: Verifying Outcomes

University of Michigan Health System

Round 5: Once Round 4 Stabilized

1. **Analyze and develop countermeasure to Activation that do not go to the Cath Lab**

Activation that do not go to Cath Lab

Cath Lab Activation Analysis

- Increased overall # activation
- Increased % not sent to lab

Real-Time Monitoring and Problem Solving

- **Recap e-mail is sent within 48-72 hours of case**

- **Outlines any issues that occurred for immediate follow-up**

- **Gives real-time feedback to staff**

- **Sent to EMS**

  On-going cross-departmental monthly meetings

Example Recap E-mail

Cath Lab Activation Algorithm

Surviving MI Webinar
STEMI Regionalization

John E. Brush, Jr., MD, FACC
Sentara Cardiology Specialists
Eastern Virginia Medical School
Norfolk, Virginia

SENTARA HEART

D2B Success

SENTARA HEART™

PCI w/ 90 mins

Top 10: 100%

National Mean: 94.3%

Prehospital EKGs

Our Challenge

SENTARA HEART™

Referral Hosptial Distance Map

Sentara Hospitals
1. Sentara Bayside Hospital
2. Sentara CarePlex Hospital
3. Sentara Leigh Hospital
H Sentara Norfolk General Hospital/Sentara Heart Hospital
5. Sentara Obici Hospital
H Sentara Virginia Beach General Hospital
7. Sentara Williamsburg Regional Medical Center

Sentara Outpatient Centers and Campuses
8. Greenbrier HealthPlex
9. Sentara BelleHarbour
10. Sentara Gloucester Medical Arts
11. Sentara Obici Outpatient Center
12. Sentara Port Warwick
13. Sentara Princess Anne
14. Sentara St. Luke's
15. Virginia Beach Ambulatory Surgery Center

Competitor Facilities
- Approved Riverside Site
- Competitor Hospital
- Competitor Outpatient Campus

Our Challenge

SENTARA HEART™
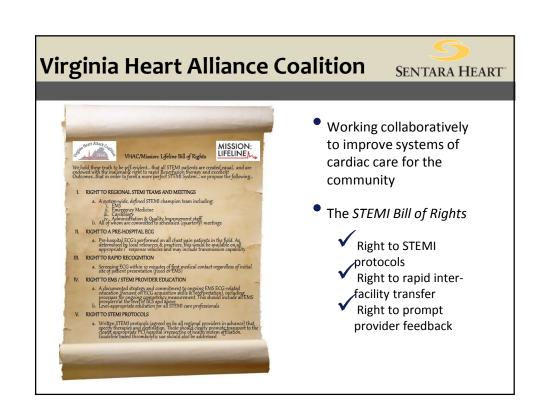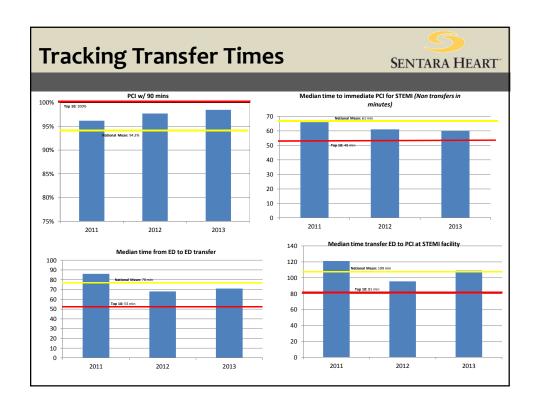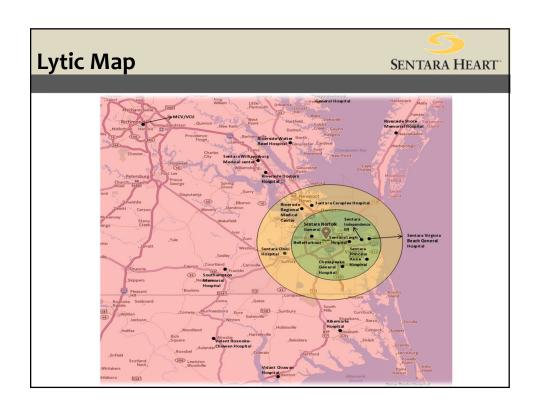
- Water barriers, tunnels, bridges, distance
- Different municipalities
- Different states
- Different hospital systems
- Different cardiology groups
- Different EMT systems

Private Practice Challenge SENTARA HEART™

- Covering multiple hospitals, administrator's demands, unrealistic demands of small hospitals.
- Large geographic distances, multiple call MDs
- Call coverage, call ratios, call back up, simultaneous STEMIs
- Changing to lytic strategy for outlying hospitals to address FMC to reperfusion times.
- Drip and ship strategies, protocols

Virginia Heart Alliance Coalition SENTARA HEART™

VHAC/Mission: Lifeline Bill of Rights

We hold these truth to be self-evident... that all STEMI patients are created equal, and are endowed with the inalienable right to rapid Reperfusion therapy and excellent Outcomes...that in order to form a more perfect STEMI System... we propose the following...

I. RIGHT TO REGIONAL STEMI TEAMS AND MEETINGS
a. A system-wide, defined STEMI champion team including:
    i. EMS
    ii. Emergency Medicine
    iii. Cardiology
    iv. Administration & Quality Improvement staff
b. All of whom are committed to scheduled (quarterly) meetings

II. RIGHT TO A PRE-HOSPITAL ECG
a. Pre-hospital ECG's performed on all chest pain patients in the field. As determined by local resources & practices, this would be available on all appropriate response vehicles and may include transmission capability

III. RIGHT TO RAPID RECOGNITION
a. Screening ECG within 10 minutes of first medical contact regardless of initial site of patient presentation (fixed or EMS)

IV. RIGHT TO EMS / STEMI PROVIDER EDUCATION
a. A documented strategy and commitment to ongoing EMS ECG-related education (focused on ECG acquisition skills & interpretation), including processes for ongoing competency measurement. This should include all EMS providers at the level of BLS and above
b. Level-appropriate education for all STEMI care professionals

V. RIGHT TO STEMI PROTOCOLS
a. Written STEMI protocols (agreed on by all regional providers in advance) that specify therapies and destination. Those should clearly promote transport to the closest appropriate PCI hospital irrespective of health system affiliation. Guideline based thrombolytic use should also be addressed

- Working collaboratively to improve systems of cardiac care for the community

- The *STEMI Bill of Rights*

  ✓ Right to STEMI protocols
  ✓ Right to rapid inter-facility transfer
  ✓ Right to prompt provider feedback

Tracking Transfer Times

SENTARA HEART™

PCI w/ 90 mins

Top 10: 100%

National Mean: 94.3%

(Bar chart showing values for 2011, 2012, 2013)

Median time to immediate PCI for STEMI *(Non transfers in minutes)*

National Mean: 61 min

Top 10: 48 min

(Bar chart showing values for 2011, 2012, 2013)

Median time from ED to ED transfer

National Mean: 78 min

Top 10: 53 min

(Bar chart showing values for 2011, 2012, 2013)

Median time transfer ED to PCI at STEMI facility

National Mean: 109 min

Top 10: 81 min

(Bar chart showing values for 2011, 2012, 2013)

Lytic Map

SENTARA HEART™

Lytic Protocol

SENTARA HEART

Purpose:

- The purpose of this document is to create a protocol for consistent treatment and transfer of STEMI patient presenting to Riverside Shore Memorial Hospital, Southampton, Albemarle and Outer Banks Hospital.

- This protocol follows the recommendations of the 2013 ACC/AHA STEMI guidelines and the recommendation of VHAC

- The current guidelines have a CLASS I recommendation to administer thrombolytic therapy to STEMI patients if primary PCI cannot be performed within 120 minutes of first medical contact.

- To meet this guideline recommendation, given the logistical limitations, a "drip and ship" strategy will be used, unless contraindicated.

Debriefing Sheet

SENTARA HEART

Name of Hospital				
EMS STEMI Debriefing Summary Report				
Patient ID: LW	Gender: Female	Age: 74		
Date: 2/19/2014	Presenting Complaint: Chest Pain			
EMS Unit: NFD	**Actual Time**	**EMS to STEMI Facility**	**Transfer to STEMI Facility Goal**	
Onset of Symptoms	13:40			
First Medical Contact	13:55		0:00	
EKG done	13:56		0:05	
EKG Transmitted to Facility	13:56	*< 30 mins*	0:05	
Lytic Administration Time	NA		Within 30 mins ED arrival	*< 30 mins*
ED Discharge from Transfer Facility	NA			
Patient Arrival at STEMI Facility	14:12	Run Time = 17 mins	0:25	
ED EKG done	NA		0:30	
Time STEMI called	13:57		0:30	
Cardiologist Arrival in ED	14:10		0:50	*< 30 mins*
Cath Team Arrival in ED	14:10	*< 60 mins*	0:50	
Time Patient leaves ED	14:15		0:55	
Patient on Cath Table	14:20		1:00	
Intervention Time	14:35	Run Time = 23 mins	1:30	*< 30 mins*
Total D2B Time:	**40 mins**	**60 minutes**	**90 minutes**	**90 mins**
EMS Team Members:	Jeff Doe, Jane Doe, John Doe			
ED Physician	Dr. Smith			
Cardiologist	Dr. Jones			

This is a 74 year old female with early presentation of inferior STEMI. At cath, found to have occluded mid-RCA and underwent rapid reperfusion with placement of a single bare metal stent. Residual non-obstructive disease in the LAD, Cx. Preserved LV systolic function by echo and Vgram. Did well post-MI/PCI with-out post-infarct angina and no evident CHF, arrhythmia or early bleeding or vascular complication. Plan follow-up with PCM/cardiologist with anticipated cardiac rehab referral. If available , please add the patients perception of care from FMC to discharge.

Implementation

SENTARA HEART

- Sub dashboard to demonstrate performance based on Lytic map
- Nightingale performance
- Work with ED to hardwire door to EKG times
- STEMI regional education through SHH Learning Center

Regionalization
Cooperation
Buy-in
Measurement of FMC to Reperfusion
ML STEMI Accelerator Program

32

16

Cardiology Presence Around the Clock
Susan Farkas, MD, FACC
Clinical Associate Professor of Medicine, University of North Dakota
School of Medicine and Health Sciences
Governor, ACC/ND
Cardiologist, Sanford Heart Center
Fargo, North Dakota
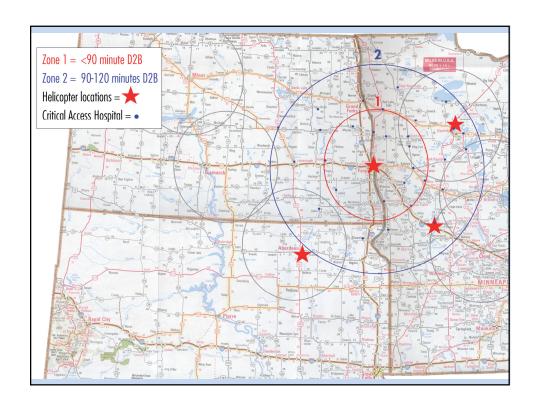
North Dakota

- 68,976 square miles, with a 2014 estimated population of 739,482 people - 375,742 living in rural ND (USDA-ERS).

- According to the U.S. Census Bureau, 89.6% of the state's population is white, 5.4% is American Indian & Alaska Native, and 2.9% is of Hispanic/Latino origin.

Zone 1 = <90 minute D2B
Zone 2 = 90-120 minutes D2B
Helicopter locations = ★
Critical Access Hospital = ●

North Dakota Healthcare

- 55 certified hospitals (Kaiser, 2013)

- 36 hospitals identified as Critical Access Hospitals (Flex Team, 9/2015)

- 54 Rural Health Clinics (CMS, 2015)

- 4 Federally Qualified Health Centers provide services at 16 sites (NACHC, 2013)

- 6 "Big" hospitals in 4 major cities

SANFORD
HEALTH

Minnesota Healthcare

- 131 hospitals (Kaiser, 2013), 84 of which are located in rural areas (North Carolina Rural Health Research and Policy Analysis Center, 12/2008)
- 79 hospitals identified as Critical Access Hospitals (Flex Team, 9/2015)
- 88 Rural Health Clinics (CMS, 2015)
- 17 Federally Qualified Health Centers provide services at 74 sites (MNACHC, 2012)

SANF⊕RD HEALTH

Sanford Health

- Largest rural healthcare provider in the U.S.
- Largest medical facility in ND and SD
- Areas served: Iowa, Minnesota, Nebraska, Oklahoma, Ghana, Mexico, and California
- Number of employees ~ 30,000
- Hospital-clinic system ~ 450 beds
- 12 cardiologists
- 3-4 interventional cardiologists
- 6 non-invasive (including 2 invasive) cardiologists
- 3 electrophysiologists
- 2 cardiac surgeons

SANF⊕RD HEALTH
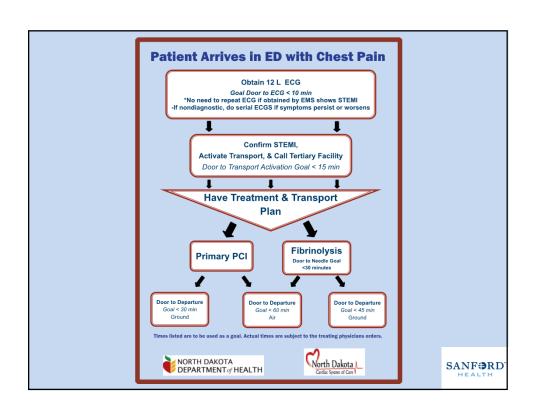
Sanford Health

Cardiology coverage during day (7:30 am – 5:00 pm)

- One non-interventional cardiologist on hospital service
- Two to three interventional cardiologists in cath lab

Cardiology coverage nights (5:00pm – 7:30 am) and weekends – Take call from home
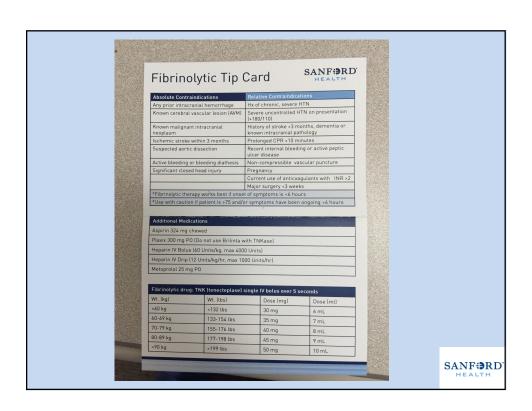
- One non-interventional cardiologist
- One interventional cardiologist

SANF⊕RD
HEALTH

Patient Arrives in ED with Chest Pain

Obtain 12 L ECG
Goal Door to ECG < 10 min
*No need to repeat ECG if obtained by EMS shows STEMI
-If nondiagnostic, do serial ECGS if symptoms persist or worsens

Confirm STEMI, Activate Transport, & Call Tertiary Facility
Door to Transport Activation Goal < 15 min

Have Treatment & Transport Plan

Primary PCI

Fibrinolysis
Door to Needle Goal <30 minutes

Door to Departure
Goal < 30 min
Ground

Door to Departure
Goal < 60 min
Air

Door to Departure
Goal < 45 min
Ground

Times listed are to be used as a goal. Actual times are subject to the treating physicians orders.

NORTH DAKOTA DEPARTMENT *of* HEALTH

North Dakota
Cardiac System of Care

SANF⊕RD
HEALTH

How does it work?

- Chest Pain Protocol Flow Chart is posted in every ND ED
- One Call nurse receives phone calls 24/7 (dedicated number)
  - Patient's EKG is faxed to One Call Nurse
  - Nurse e-mails EKG to the on-call cardiologist (alerted to incoming e-mail via text message)
    - On-call cardiologist determines if STEMI is present
  - If ST elevation is present, the on-call interventionalist, cath lab nurse, and charge administrator also receive the EKG
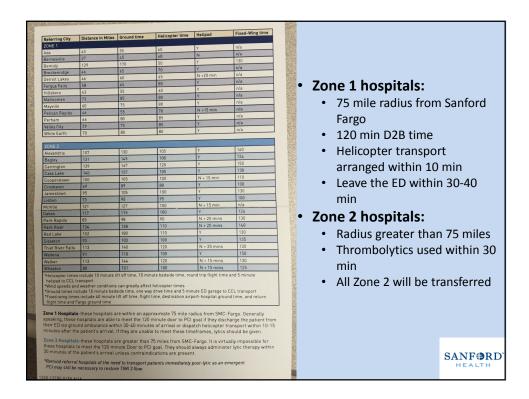- On-call cardiologist decides whether thrombolytics will be used *(factor to consider: helicopter availability on site)*
- If patient is in the ED or is a walk-in, ED or clinic physician will discuss patient case with on-call cardiologist

SANFORD HEALTH

Fibrinolytic Tip Card — SANFORD HEALTH

Absolute Contraindications	Relative Contraindications
Any prior intracranial hemorrhage	Hx of chronic, severe HTN
Known cerebral vascular lesion (AVM)	Severe uncontrolled HTN on presentation (>180/110)
Known malignant intracranial neoplasm	History of stroke >3 months, dementia or known intracranial pathology
Ischemic stroke within 3 months	Prolonged CPR >10 minutes
Suspected aortic dissection	Recent internal bleeding or active peptic ulcer disease
Active bleeding or bleeding diathesis	Non-compressible vascular puncture
Significant closed head injury	Pregnancy
	Current use of anticoagulants with INR >2
	Major surgery <3 weeks

*Fibrinolytic therapy works best if onset of symptoms is <6 hours
*Use with caution if patient is >75 and/or symptoms have been ongoing >6 hours

Additional Medications
Aspirin 324 mg chewed
Plavix 300 mg PO (Do not use Brilinta with TNKase)
Heparin IV Bolus (60 Units/kg, max 4000 Units)
Heparin IV Drip (12 Units/kg/hr, max 1000 Units/hr)
Metoprolol 25 mg PO

Fibrinolytic drug: TNK (tenecteplase) single IV bolus over 5 seconds

Wt. (kg)	Wt. (lbs)	Dose (mg)	Dose (ml)
<60 kg	<132 lbs	30 mg	6 mL
60-69 kg	133-154 lbs	35 mg	7 mL
70-79 kg	155-176 lbs	40 mg	8 mL
80-89 kg	177-198 lbs	45 mg	9 mL
>90 kg	>199 lbs	50 mg	10 mL

SANFORD HEALTH

Referring City	Distance in Miles	Ground time	Helicopter time	Helipad	Fixed-Wing time
ZONE 1					
Ada	45	55	60	Y	n/a
Barnesville	27	45	60	N	n/a
Bemidji	129	170	50	Y	130
Breckenridge	46	65	70	Y	n/a
Detroit Lakes	46	60	65	N +20 min	n/a
Fergus Falls	58	65	80	Y	n/a
Hillsboro	43	55	60	Y	n/a
Mahnomen	73	85	80	Y	n/a
Mayville	60	75	80	Y	n/a
Pelican Rapids	46	55	70	N +15 min	n/a
Perham	66	80	85	Y	n/a
Valley City	59	75	85	Y	n/a
White Earth	70	80	80	Y	n/a
ZONE 2					
Alexandria	107	130	105	Y	160
Bagley	131	145	100	Y	124
Carrington	139	167	120	Y	150
Cass Lake	140	157	105	Y	130
Cooperstown	100	105	100	N + 15 min	110
Crookston	69	89	80	Y	100
Jamestown	95	105	100	Y	130
Lisbon	73	95	95	Y	100
McVille	121	127	100	N + 15 min	n/a
Oakes	117	115	100	Y	124
Park Rapids	85	98	90	N + 20 mins	130
Park River	134	138	110	N + 20 mins	140
Red Lake	152	180	110	Y	130
Sisseton	93	103	100	Y	135
Thief River Falls	113	140	120	N + 20 mins	130
Wadena	91	110	100	Y	150
Walker	113	144	120	N + 15 mins	130
Wheaton	80	101	100	N + 15 mins	125

*Helicopter times include 10 minute lift off time, 10 minute bedside time, round trip flight time and 5 minute helipad to CCL transport
*Wind speeds and weather conditions can greatly affect helicopter times
*Ground times include 10 minute bedside time, one way drive time and 5 minute ED garage to CCL transport
*Fixed-wing times include 40 minute lift off time, flight time, destination airport-hospital ground time, and return flight time and Fargo ground time

Zone 1 Hospitals-these hospitals are within an approximate 75 mile radius from SMC-Fargo. Generally speaking, these hospitals are able to meet the 120 minute door to PCI goal if they discharge the patient from their ED via ground ambulance within 30-40 minutes of arrival or dispatch helicopter transport within 10-15 minutes after the patient's arrival. If they are unable to meet these timeframes, lytics should be given.

Zone 2 Hospitals-these hospitals are greater than 75 miles from SMC-Fargo. It is virtually impossible for these hospitals to meet the 120 minute Door to PCI goal. They should always administer lytic therapy within 30 minutes of the patient's arrival unless contraindications are present.

*Remind referral hospitals of the need to transport patients immediately post-lytic as an emergent PCI may still be necessary to restore TIMI 3 flow.

- **Zone 1 hospitals:**
  - 75 mile radius from Sanford Fargo
  - 120 min D2B time
  - Helicopter transport arranged within 10 min
  - Leave the ED within 30-40 min
- **Zone 2 hospitals:**
  - Radius greater than 75 miles
  - Thrombolytics used within 30 min
  - All Zone 2 will be transferred

SANF☉RD
HEALTH

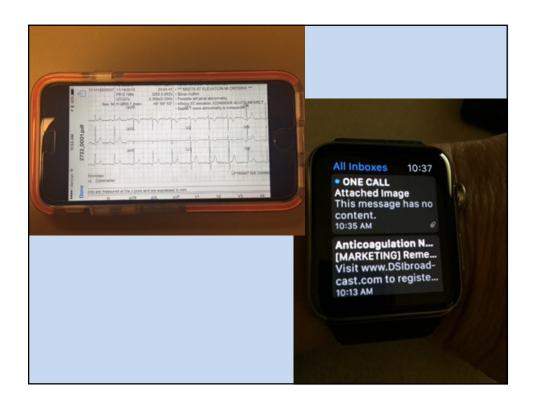
Zone 1 - How does it work?

- Patient calls 911, local EMS arrives
- Closest hospital may not have cath lab
  - For many patients, they are in the D2B primary PCI area if they *don't* stop at the closest hospital
- EMS transmits the EKG automatically to One Call nurse and emailed to the hospital with cath lab
  - ECG then sent to on-call cardiologist and interventionalist simultaneously
- Cath lab called in/activated by the One Call nurse

SANF☉RD
HEALTH

Zone 2 - How does it work?

- 911 call
  - EMS arrives and finds the closest ED hospital (outside of primary PCI circle)
- EKG faxed to One Call
- Physician to physician discussion and decision about thrombolysis made
- Transport arranged independent of results of thrombolysis
- EMS continually updates One Call with changes in patient status

SANFORD HEALTH

On Arrival at Sanford – How does it work?

- Upon arrival to ED, if patient still experiencing pain and EKG changes are present after thrombolytic administration, then cath lab team activated
- Non-interventionalist makes the decision and manages the patient throughout hospital stay
  - One Call informed to contact the cath team and interventionalist

SANFORD HEALTH

Sanford ED - How does it work?

STEMI Presents to Sanford ED
- One Call contacts the team, while simultaneously cardiologist on call is paged
- Both interventionalist and non-interventionalist take call from home but come in when paged; all on-call cardiologists arrive in-house in $\leq$ 20 min
- If there is a cardiac arrest, with an unresponsive, intubated patient, the on-call in house Intensivist will also be at the bedside (hypothermia protocol)

SANFORD HEALTH

In-House at Sanford – How does it work?

In-house STEMI or NSTEMI/USA

- In-house Rapid Response Team evaluates patient and contacts cardiologist (hospital service or on-call after hours)
- On-call cardiologist receives EKG at home through One Call email
- On-call cardiologist activates cath lab through One Call
  - One Call contacts team and interventionalist

SANF☺RD HEALTH

Sanford - How does it work ?

- Standardized approach to antiplatelet therapy
  - Choice of DAT is based on availability in the ED
- The cath lab team gets updates and ETA while the cath lab is being readied
- The cath lab team does not stay in house but does not live farther than 20 min away
- For night calls, interventionalist comes to the hospital immediately
  - does not live farther than 20 minutes away (no traffic)
  - in bad weather, they stay in the hospital
  - may stay in hospital if it is busy
- Noninterventionalist
  - does HPI
  - arranges family care and orders
  - makes management decisions in coordination/consultation with the interventionalist
  - follows patient until discharge

SANF☺RD HEALTH

Sanford - How does it work?

At Discharge
- Patient leaves hospital with discharge meds
- Patient or family picks up free antiplatelets (1 month supply) from pharmacy

ECG/Echo service available 24/7
- Studies can be read, discussed with referring provider as need be, and reported promptly using home computer or handheld devices

SANFORD
HEALTH

Next Steps

1. Have a quality improvement team available
2. Complete online self-assessment at CVQuality.ACC.org/SurvivingMI
3. Use the Assessment results to identify success metrics to improve
4. Implement at least 2 strategies or tools
5. Share your story online
6. Post to the listserv

Quality Improvement for Institutions

Thank You

Surviving MI
AN ACC QUALITY INITIATIVE

Please submit your questions for the moderated question and answer session.

**SurvivingMI@acc.org
CVQuality.ACC.org/SurvivingMI**

Quality Improvement for Institutions

Quality Improvement for Institutions

The Quality Improvement for Institutions program combines the ACC's NCDR data registries with toolkits and proven hospital-based quality improvement initiatives like Hospital to Home, the D2B Alliance and Surviving MI.

Simple Solutions. Big Impact. CVQuality.ACC.org.

Quality Improvement for Institutions