Mission Stroke: Implementation of a Stroke Care Process Model Across An Integrated System
Presenters

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- Ameran Tooley BSN, RN, CCM

- We have no disclosures
Objectives

• Discuss the steps to build a Care Process Model (CPM)

• Demonstrate the use of data in hardwiring a new process

• Understanding the process, structure and outcomes of a standardized stroke system of care and the resources involved
Member Hospitals

1. Mission Hospital
2. Angel Medical Center
3. Blue Ridge Regional Hospital
4. McDowell Hospital
5. Transylvania Regional Hospital
6. Highlands-Cashiers Hospital
7. CarePartners
What's a Care Process Model?

- **Structure** for organizing and delivering care by disease processes, by procedure type or by preventative service
- **Process** based on evidence based clinical protocols are the building blocks of our Clinical Programs
- **Improved Outcomes** CPMs help us deliver consistent clinical care for all Mission Health patients, improve outcomes and improve safety, communication and engagement between patients, families and providers.
What’s in a CPM?

- Each CPM includes a decision tree (algorithm) for providers, and resources for other disciplines for standards of care that cross the continuum and transition points.
- Each CPM includes overview of models of care, diagnosis criteria and staging, goals, risk factors, therapies, interventions, metrics and scientific publication references.

Mission Stroke Program
A Continuum of Care Approach

1° prevention
Pre-hospital
ED
Hospital
Rehabilitation
2° prevention
EDUCATION -- Professional and public
Continuous Quality Improvement
Why CPM for Stroke?

• At its core it’s about doing the right thing for the right patient at the right time and right place
• Standardization of resources, supplies, communication, documentation… yields improved outcomes/safety, reduced cost, reduced waste
• Building blocks for development of a unified system of care
• Launching pad for others to achieve TJC stroke certification
• Platform supports flexibility – allowing us to respond to ever changing evidence in a more timely way
• All on the same team!
But where do we start?

- Administrative lead/support
- Kick off meeting with system-wide representation
- Team-made decision to tackle Ischemic Stroke first – in phases
  - Emergency
  - Hospital/Rehab
- Identify key stakeholders
- Define guidelines/metrics
- Good mix of “experts” (do you have everyone at the table that needs to be there?)
- Identify gaps in services/resources
Elements of the CPM

- Treatments
  - Pharmacy Formulary
  - Evidence Based
  - Costs

- Operational
  - Consultations
  - Process Flow
  - Paging
  - Alerts
  - Tele radiology
  - Tele stroke
  - Depression screening

- Guidelines/Protocols
  - Clinical Practice Guidelines
  - Protocols/Power Plans
  - Policies

- Education
  - Patient/Family Education
  - Staff/EMS Education
  - Documentation Iview
  - NIHSS training/utilization
  - Dysphagia screening

- Tele radiology
- Tele stroke
- Depression screening

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- Documentation Iview
- NIHSS training/utilization
- Dysphagia screening
Care Process Model

Intracerebral Hemorrhage

Care Process Model

Non-Traumatic Subarachnoid Hemorrhage
Expansion of Stroke Program

GWTG – Stroke
TJC Acute Stroke Ready
COMPASS
RAPID CTP
Data Driven Performance Improvement
“D” should be for DATA

- Monitoring the Gains, exploring the Opportunities
- Baseline, Trending, Comparison data
- Outcomes, Results, Communication
- Metrics that support evidenced based care
- Track performance, Benchmark
- Define
- Measure
- Analyze
- Improve
- Control
The Data Process

Inputs Collection

Data Management

Automate
The Data Flow..

- System CS Meetings
- Affiliate CS Meetings
- System Quality Meetings
- TJC Reporting
- Leadership CPM report out
- Physician Metrics
- Stroke Coordinators
- Managers
- Physicians
- Nurses
- Stroke Leads at Affiliates

- Stroke Coordinator
- Physicians
- Affiliate Teams
- Leadership
- Multidiscipline

Individual monitoring
ED and Inpatient

Weekly CS & Tele-stroke Log

Quarterly and Annual Reports

Monthly Meetings

- System CS Meetings
- Affiliate CS Meetings
- System Quality Meetings
SORRY, WE JUST CAN'T TRUST YOU...
Metrics Defined in the CPM

- Quality/Safety Regulatory Outcome Metrics
- Patient Experience Metrics
- Transitional Metrics
- Process Metrics

Care Process Model

METRICS

These metrics are to serve as important elements in the creation of templates in the electronic medical record (EMR) and will be pulled and reported as they become available in our information systems.

The following metrics will be used by Mission Health as a measure of the quality care we provide. These measures are based on national health standards of care and signal critical points in the care of patients with ischemic stroke.

- **Quality/Safety/Regulatory Outcome Metrics**
  - PowerPlan Compliance
  - Complication rates
  - Mortality rates
  - LOS
  - Cost per case
  - Readmissions within 30 days
  - CMS/TC Core Measures
  - Percentage of patients with Stroke Disparities Quality Indicators completed upon discharge

- **Patient Experience Metrics**
  - Patient satisfaction scores

- **Transitional Metrics**
  - Percentage of COMPASS patients with completed two day phone call
  - Percentage of COMPASS patients with a follow-up Post Stroke Clinic Appointment
  - Utilization and Communication of the RACE Score in EMS transported patients with Acute Stroke Symptoms

- **Process Metrics**
  - Time of Symptom Discovery to Acute Ischemic Stroke Treatment
  - Percentage of Telestroke utilization for acute stroke
  - Percentage of ischemic stroke patients with documented pre-morbid, discharge and 90-day modified Rankin
### Average Minutes Door to:

<table>
<thead>
<tr>
<th>Event</th>
<th>Average Mins</th>
</tr>
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<tbody>
<tr>
<td>Pre-Notification</td>
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<td>-2</td>
</tr>
<tr>
<td>Medical Provider</td>
<td>4</td>
</tr>
<tr>
<td>Neuro Arrive</td>
<td>-8</td>
</tr>
<tr>
<td>CS CT Begin</td>
<td>15</td>
</tr>
<tr>
<td>CT-non Interpret (View)</td>
<td>-25</td>
</tr>
<tr>
<td>Glucose Result</td>
<td>8</td>
</tr>
<tr>
<td>PT/INR Result</td>
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<tr>
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<tr>
<td>% of Pre-Notifications w/ Pre-Activation</td>
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<td>Door to Medical Provider</td>
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<tr>
<td>EMS Arrivals w/ Pre-Notification</td>
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### Average Mins: Door to:

<table>
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<th>Metric</th>
<th>Average Mins</th>
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<tr>
<td>Door to tPA Admin Result &lt;= 60 mins</td>
<td>16</td>
</tr>
<tr>
<td>Door to Platelets Result &lt;= 45 mins</td>
<td>36</td>
</tr>
<tr>
<td>Door to tPA Admin Result &lt;= 45 mins</td>
<td>16</td>
</tr>
<tr>
<td>Door to Glucose Result &lt;= 45 mins</td>
<td>8</td>
</tr>
<tr>
<td>Door to CS CT Exam Begin &lt;= 20 mins</td>
<td>16</td>
</tr>
<tr>
<td>Door to CT-non Interpret (View) &lt;= 45 mins</td>
<td>25</td>
</tr>
<tr>
<td>Door to CT-non Complete (View) &lt;= 25 mins</td>
<td>8</td>
</tr>
<tr>
<td>Door to CS CT Begin &lt;= 20 mins</td>
<td>16</td>
</tr>
<tr>
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<tr>
<td>Code Stroke Activate</td>
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<td>Door to Medical Provider</td>
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### Overall Average Table

<table>
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<th>% Fail</th>
<th>% Med</th>
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<tr>
<td>Door to Platelets Result &lt;= 45 mins</td>
<td>36</td>
<td>77.8%</td>
<td>7</td>
<td>2</td>
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<tr>
<td>Door to tPA Admin Result &lt;= 45 mins</td>
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<tr>
<td>Door to Glucose Result &lt;= 45 mins</td>
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<td>1</td>
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<tr>
<td>Door (or Neuro Called) to Neuro Arrive &lt;= 20 mins</td>
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<tr>
<td>% of Pre-Notifications w/ Pre-Activation</td>
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<td>0</td>
<td>9</td>
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<tr>
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<td>0</td>
<td>9</td>
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<tr>
<td>Door to Medical Provider</td>
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<td>2</td>
<td>9</td>
</tr>
<tr>
<td>EMS Arrivals w/ Pre-Notification</td>
<td>-18</td>
<td>100.0%</td>
<td>0</td>
<td>0</td>
<td>9</td>
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</tbody>
</table>
Mission Hospital Outcome Metrics

GWTG Risk-Adjusted Mortality Ratio (Ischemic-Only)

Length of Stay for Ischemic Stroke

- Risk Adjusted (Expected) Mortality Rate
- Observed Mortality Rate
- Linear (Observed Mortality Rate)
Mission Hospital

Percent Alteplase Door to Needle Time < 45 mins and < 30 mins

N=429
IR Stroke NOW!

Mission Hospital Door to Puncture

Cases
AVG Mins
Mission Hospital Dysphagia Screen

% Patients who received a dysphagia screen prior to PO

- Pre CPM
- New Dysphagia policy
- Dysphagia Dashboard

UCL = 0.8639

\( \bar{X} = 0.715 \)

LCL = 0.5661

N = 2937
Angel Medical Center (ASRH) Dysphagia Screen

GWTG % Completed Dysphagia Screens

- Individual Value
- Month
- Pre App
- Post App
- UCL = 114.19%
- $\bar{X} = 85.20\%$
- LCL = 56.21%
Affiliate Hospital Improvements in Stroke with CPM

- Total number Code Strokes increased 98% 2015 over 2016
- Growth in Alteplase use
  - 2014 to 2015 = 88%
  - 2015 to 2016 = 120%
  - 2016 to 2017 = 45%
3/20/2018 Case Example of Excellence

- MCD door to perfusion: 167 mins
- MCD door to Puncture: 113 mins
- MCD door to Mission IR: 101 mins
- Door In to Door Out: 55 mins
- Arrival To TPA given: 36 mins
- Door to PT/INR Complete: 14 mins
- Door to CT Interpreted: 10 mins
- Time of call to Neurologist on robot: 7 mins
- Time to Neurologist Called: 4 mins
- Time to ED MD Eval in minutes: 6 mins

80 mins to TICI 3
AMC STK Measures CY 2016 and 2017

>85%

2016 (n=26)  2017 (n=26)

- STK1: 100%  100%
- STK2: 100%  92%
- STK3: 100%  100%
- STK4: arrive by 2 tx by 3
- STK5: 100%  93%
- STK6: 100%  97%
- STK7: 88%  89%
- STK8: 100%  100%
- STK9: 100%  97%
- STK10: 100%  83%
- NIHSS: 100%  92%
Data Driven Results

• A multidisciplinary team culture
• Improved Patient Care
• Improved Outcomes
• Reward and Recognition
Stroke Coordinator - Outreach, Acute Stroke Resource and Education, from pre-hospital and beyond!
Survey Monkey to assess knowledge and learning needs

- What was the knowledge base?
- Where was the need?
- What were the gaps?
- Where was my focus?
- How to deliver the education?
STROKE ASSESSMENT TOOLS

CINCINNATI PREHOSPITAL STROKE SCALE

Facial Droop
- Normal: Both sides of face move equally
- Abnormal: One side of face does not move at all

Arm Drift
- Normal: Both arms move equally or not at all
- Abnormal: One arm drifts compared to the other

Speech
- Normal: Patient uses correct words with no slurring
- Abnormal: Slurred or inappropriate words or mute

The Cincinnati Prehospital Stroke Scale is sometimes referred to as the FAST scale, where F=face, A=arm, S=speech, and T=time. This acronym is also used to teach patients and families to recognize signs and symptoms and respond in a timely matter.

RACE SCALE
- RACE is a validated tool used to determine stroke severity and localizing the area affected by the stroke.
- The RACE scale is a simplification of the NIHSS scale using those items with a higher ability to predict the presence of a large vessel occlusion.
- The RACE scale evaluates 5 items: facial palsy, arm paresis, leg paresis, eye/head deviation, and aphasia/agnosia, with a total score of 0-9.
- A cumulative score is received and a score ≥ 5 is indicative of an ELVO stroke with a sensitivity of 85%.

NIHSS Scale
The NIHSS is a 15-item neurologic examination stroke scale used to evaluate the effects of acute cerebral infarction on the levels of consciousness, language, neglect, visual-field loss, extraocular movement, motor strength, ataxia, dysarthria, and sensory loss.

- The National Institutes of Health Stroke Scale (NIHSS) can be used as a clinical stroke assessment tool to evaluate and document neurological status in stroke patients.
- The stroke scale is valid for predicting lesion size and can serve as a measure of stroke severity.
- The NIHSS has been shown to be a predictor of both short and long-term outcome of stroke patients.
EMS

- Stroke Con-Ed
- RACE training
- Triage and Destination Plan Development
- Annual EMS symposiums
- EMS Week events/celebrations
- EMS Peer Reviews
- Radio calls for PI, feedback
- Monthly Code Stroke report including RACE use and accuracy; patient outcomes
Monthly EMS Code Stroke report

- Sent to agency training officers and leadership
- Feedback on RACE use and accuracy, discharge disposition, treatments or reasons for no treatment

<table>
<thead>
<tr>
<th>Arrive Date [Encounter]</th>
<th>Admit Mode</th>
<th>Discharge Disposition</th>
<th>EMS Pre-Notify</th>
<th>Door to tPA (mins)</th>
<th>LVO Door to IR Table (mins)</th>
<th>Reason not given tPA</th>
<th>RACE</th>
<th>1st NIHSS Score</th>
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<tr>
<td>3/7/2018 8:32</td>
<td>County EMS</td>
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<td>County Rescue Squad</td>
<td>Discharge to Rehab</td>
<td>Y</td>
<td>-</td>
<td>48</td>
<td>on full dose Lovonox</td>
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<td>Y</td>
<td>36</td>
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Emergency Department new provider on-boarding:

- System ED MDs/FNPs/PAs
- Code Stroke activation process/algorithms
- Power plan usage
- Metrics
- RACE understanding
- Annual Education

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Emergency Department: Stroke Update 2018

Alteplase/Activase IV (tPA) for Ischemic Stroke

<table>
<thead>
<tr>
<th>Total Signs Parameters</th>
<th>Completed</th>
<th>Discontinued</th>
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<tbody>
<tr>
<td>Vital Signs</td>
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<tr>
<td>Neuro Signs</td>
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<td></td>
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<td>Temperature/Oral cavity</td>
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<td></td>
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<tr>
<td>Medications</td>
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<tr>
<td>Alteplase</td>
<td>Completed</td>
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<tr>
<td>Sodium Chloride 0.9% (Normal Saline)</td>
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</table>

Officers responsible for stroke/over 180 or 120 greater than 120, Alteplase 4.5 mg (tPA), Full Dose for Ischemic Stroke, Inclusion dose equal 90% of total dose (Maximum 90 mg). Total IPA dose is 0.9 mg/kg...
System-Wide Mock Codes

- ED
- In-patient units

Stroke Continuing Education

- Collaboration with regional educators, department leaders and stroke specialists
- Continuing education for the system hospitals
- Modified and updated as needed based on location need and new evidence
Outreach events

• Teaching F.A.S.T. and assessing for stroke risk factors
• Several counties across WNC
• Stroke education for all ages
• More to come....

WNC Mountain State Fair

Heart month BP screening and stroke risk assessment

Safety Camp for Kids

Live-Well Expo
Weekly Code Stroke report

- System-wide (Six hospitals)
- Weekly snapshot of
  - Numbers of activated Code Strokes
  - Treatment numbers and Door-to-treatment time (alteplase/IA); as well as reasons not treated
  - Average times for quality metrics
  - Documentation compliance
  - EMS agency/Mode of arrival
  - RACE
  - Symptom onset window (<4 hours; >4<24 hours)
  - CT type (CT non-contrast, CTA, CTP)
Feedback on Endovascular cases to EMS, ED, IR teams

- Hospital and Team-specific case posters are created and shared with the teams and their leadership

Keep them updated!!

Mission Hospital Interventional Stroke Revascularization

Acute Ischemic Stroke Feedback

**Patient History:**

**Conclusion:**

Pt discharged …………

**Patient Care Team**

ED:
Pharmacist:

EMS:
 Neurologist
 Interventional Team:

Symptom onset witnessed
Arrival to MMH via County EMS @
Door to alteplase/TPA mins
Door to Groin Puncture minutes

Contact Stroke Coordinator for Follow-up: Erika.Prezas2@msj.org
Brain Pins

- Given to staff members exhibiting excellence in stroke care
  - ED, IR, CT, Pharmacy, Rapid Response, etc.

- Started at the Hub but has since been shared with the spoke hospitals

- Names are placed on the “Wall of Fame”

*Keep them encouraged!!*
Any questions?