1. Identify two goals of quality stroke care
2. Identify three stroke metrics that can be monitored for patients receiving thrombolytic therapy
3. Summarize the NIH Stroke Scale, modified Rankin Score (mRS) and outcome metrics used in quality assessment of stroke
4. Describe the basic process for instituting a peer review program for the review of complications of care
5. Identify three key time-related metrics in caring for a patient receiving thrombolytic therapy
6. Describe the PDSA methodology for improving quality outcomes and how it can be used to specifically improve processes surrounding stroke care
Diverse Audience
Healthcare has changed just as much....

THEN

NOW

VISITING HOURS
12.30pm-2.00pm
4.30pm-7.00pm

"Don't look at me! You're meant to be discharged!"

Medicare.gov | Hospital Compare

The Official U.S. Government Site for Medicare

The Joint Commission
<table>
<thead>
<tr>
<th><strong>HOSPITAL COMPARE</strong></th>
<th><strong>UPMC Presbyterian</strong></th>
<th><strong>Pennsylvania Average</strong></th>
<th><strong>National Average</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ischemic STK pts who got medicine to break up blood clot w/in 3 hrs. after symptoms started</td>
<td>96%</td>
<td>81%</td>
<td>81%</td>
</tr>
<tr>
<td>Ischemic STK pts. Who received medicine known to prevent complications caused by blood clots w/in 2 days of hospital admission</td>
<td>96%</td>
<td>99%</td>
<td>98%</td>
</tr>
<tr>
<td>Ischemic or hemorrhagic STK pts. Who received treatment to keep blood clots from forming anywhere in the body w/in 2 days of hospital admission</td>
<td>99%</td>
<td>98%</td>
<td>97%</td>
</tr>
<tr>
<td>Ischemic STK pts. Who received a prescription for medicine known to prevent complications caused by blood clots at discharge</td>
<td>100%</td>
<td>100%</td>
<td>99%</td>
</tr>
<tr>
<td>Ischemic STK pts. With a type of irregular heartbeat who were given a prescription for a blood thinner at discharge</td>
<td>100%</td>
<td>98%</td>
<td>97%</td>
</tr>
<tr>
<td>Ischemic STK pts. Needing medicine to lower bad cholesterol who were given a prescription for this medicine at discharge</td>
<td>99%</td>
<td>98%</td>
<td>97%</td>
</tr>
<tr>
<td>Ischemic or hemorrhagic STK pts. Or caregivers who received written educational materials about stroke care and prevention during the hospital stay</td>
<td>97%</td>
<td>95%</td>
<td>94%</td>
</tr>
<tr>
<td>Ischemic or hemorrhagic STK pts. Who were evaluated for rehabilitation services</td>
<td>100%</td>
<td>99%</td>
<td>98%</td>
</tr>
</tbody>
</table>
1) Minimize Brain Injury through early identification and expeditious triage

2) Reperfusion of the brain is KING, but its reign is short!!
   a) Institution of medical reperfusion therapy w/in first few hours
   b) Transfer to higher level of care for advanced therapy (MER)

3) Hemorrhage Management (HT, ICH, SAH)

4) Prevention of Complications of Care

5) Aim for the most optimal functional recovery following stroke

6) Examine Patient Outcomes and Hospital Processes

MER=Mechanical Endovascular Reperfusion
Models of Stroke Care...So Many Choices

CSC
75-200
Primary Stroke Center
1000-1200
Acute Stroke Ready Hospitals
1200-1800

Academic Med Centers, Tertiary Care
Wide range hospitals, standard STK care, STK units, uses tPA
Rural Hospitals, drip & ship, tele-medicine
Where do you begin?

- “Have to’s” versus “Nice to’s”
- Use Stroke Metrics to improve your Stroke Program
  - Identify areas for improvement... Process Measures → Outcomes Measures
  - Understand gaps in care (use multidisciplinary team to assist)
  - Adjust processes to optimize care
NIHSS at Discharge
Discharge Dispositions
90 day mRS

Hospital wide Readmission Rates
STK Readmission Rates

Complications of Care:
VTE Rates (PPx)
Aspiration PN (BDS)
EVD Complication Rate

mRS=Modified Rankin Scale
**NIH Stroke Score** - standardized tool measuring the level of impairment caused by stroke in acute phase of care

Expected vs. Unexpected Complications
- Aspiration Pneumonia (BDS)
- VTE Events
- Hospital wide readmission rates (stroke’s contribution)
- LOS (Too long vs. short?)...bounce backs

### Modified Rankin Scale (mRS)

**Gold Standard for measuring long term outcome following stroke**

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No symptoms</td>
</tr>
<tr>
<td>1</td>
<td>No significant disability, despite symptoms; able to perform all usual duties and activities</td>
</tr>
<tr>
<td>2</td>
<td>Slight disability; unable to perform all previous activities but able to look after own affairs without assistance</td>
</tr>
<tr>
<td>3</td>
<td>Moderate disability; requires some help, but able to walk without assistance</td>
</tr>
<tr>
<td>4</td>
<td>Moderately severe disability; unable to walk without assistance and unable to attend to own bodily needs without assistance</td>
</tr>
<tr>
<td>5</td>
<td>Severe disability; bedridden, incontinent, and requires constant nursing care and attention</td>
</tr>
<tr>
<td>6</td>
<td>Death</td>
</tr>
</tbody>
</table>

(90 day mRS thrombolytic therapy)
## Comprehensive Stroke Center Specific Metrics

<table>
<thead>
<tr>
<th>Metric</th>
<th>Benchmark</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Diagnostic Angiograms Complication Rates</strong></td>
<td>&lt; 1%</td>
</tr>
<tr>
<td><strong>Endovascular Therapy</strong></td>
<td><strong>NEW! 2017 CSTK9</strong></td>
</tr>
<tr>
<td>• Door to Groin</td>
<td><em>90 min?</em></td>
</tr>
<tr>
<td>• Door to Final Reperfusion</td>
<td><em>60 min</em> (looking at 45 min.)</td>
</tr>
<tr>
<td>• Door to Needle</td>
<td>&lt; 6% (tPA)</td>
</tr>
<tr>
<td>• Symptomatic Hemorrhage rates (IV tPA &amp; MER)</td>
<td></td>
</tr>
<tr>
<td><strong>Carotid Stent/Endarterectomy (CAS/CEA)</strong></td>
<td>Asymptomatic &lt; 3%</td>
</tr>
<tr>
<td>• Peri-procedural Complication Rates</td>
<td>Symptomatic &lt; 6%</td>
</tr>
<tr>
<td>• 30 day Stroke &amp; 30 day Mortality Rates</td>
<td></td>
</tr>
<tr>
<td><strong>EVD Complication Rates</strong></td>
<td></td>
</tr>
<tr>
<td>• Infection</td>
<td></td>
</tr>
<tr>
<td>• Hemorrhage</td>
<td></td>
</tr>
<tr>
<td>• Insertion Difficulty</td>
<td></td>
</tr>
<tr>
<td><strong>90 day mRS following thrombolytic therapy</strong></td>
<td>Goal: 0-2</td>
</tr>
</tbody>
</table>
UPMC Presbyterian established an interdisciplinary program-level peer review process
• Allows for introspective examination of services provided
• Creates opportunity to identify and further classify potentially preventable complications
• Complications examined across all stroke patient populations and standard of care assigned
  – Process failure, personnel performance, natural hx. of disease
• Complications identified concurrently during abstraction process by Quality Nurse
• Reviewed monthly by assigned attending physician
• Medical and Surgical cases split (cannot review your own case)
• Standard of Care assigned
• Documentation of LOOP CLOSURE
• Excel spreadsheet for tracking purposes and paper trail for TJC
• CSC Oversight Committee agreed upon review of following complications:
  – Hemorrhage post stroke for all pts. receiving IV t-PA and/or MER Therapy
  – Endovascular procedural complications: vessel perforation, dissection, groin complications etc.
  – Unanticipated Death
  – Peri-procedural stroke and peri-procedural death
  – Surgical complications (CAS/CEA/clips/coils)
UPMC Stroke Institute

PEER REVIEW: Privileged and Confidential

Fin #__________  Patient Name______________________________

Indication for Review ________________________________

Following review of the electronic health record and all pertinent imaging, assign one of the following standards of care:

- **Category 0**: An event related to documentation issues as a result of the natural disease process
- **Category 1**: A predictable event within accepted standards of care
- **Category 2**: Any unpredictable event within accepted standards of care
- **Category 3A**: An event related to minor deviations from accepted standards of care with an adverse outcome
- **Category 3B**: An event related to minor deviations from accepted standards of care without an adverse outcome
- **Category 4A**: An event related to major deviations from accepted standards of care with an adverse health outcome
- **Category 4B**: An event related to major deviations from accepted standards of care without an adverse outcome

**Minor/Major Deviations in Standards of Care**

- If 3A, 3B, 4A or 4B are selected above, complete the following: Outcome appears to be related to:

  **Physician Performance**
  - Judgment
  - Failure to Diagnose/Treat
  - Overall Patient Management
  - Technique
  - Behavior
  - Untimely Initiation of Treatment
  - Insufficient/Inadequate Documentation

  **System/Process Failure**
  - Lab
  - X-Ray
  - Specific Dept.
  - Other ________

  **Staff**
  - Nursing
  - Ancillary
  - Other ________

  **Natural History of the Disease**

Reviewer’s Signature________________________________________ Date________________________
Action Plan (if applicable):

Chairman Review Date ________________________________
Summary/Closing Comments ________________________________

______________________________
______________________________
______________________________
• 17 yr. female PMH: migraines collapses on basketball court w/ right weakness/aphasia
• Air-lifted to Children’s Hospital, triaged as trauma, NIHSS 23 w/ MCA syndrome
• Initial CTH neg. hemorrhage, + gray/white changes left MCA area, CTA= left MCA M1 thrombus
• Treatment w/ IV tPA, transfer to UPMC Presbyterian for possible MER
Left M1 MCA Thrombus
PRE-intervention Angiogram
Clock is Ticking......

LSW 7:30p 0:00
IV tPA at OSH 2:37
PUH IR Suite Arrival 2:58
IR Suite-Groin Puncture 3:19
Final Reperfusion Achieved TICI 2b 3:38

UPMC Presbyterian Endovascular Metrics

Door to Groin 0:21
Groin to Initial Reperfusion 0:19
Door to Final Reperfusion (TICI 2b) 0:40
Thrombus blocking flow to left M1 MCA segment

Successful recanalization left M1 MCA achieved after single pass of Stentriever-assisted manual aspiration thrombectomy; TICI 2b reperfusion score
Thrombectomy procedure complicated by seizure at end of case

Despite thrombectomy, developed large territory MCA infarct on serial imaging

Posterior Decompressive hemicraniectomy w/ duraplasty

Stroke w/u identified Factor V Leiden as stroke mechanism

Extubated POD#3, cleared for dysphagia diet, NIH 15 awake, globally aphasic, lateral gaze & marked right sided weakness

POD#4 transferred for aggressive inpatient pediatric stroke rehabilitation NIH=15 and a mRS 5
One Patient, Many Metrics

- Pre hospital identification, medical treatment (tPA) then transfer to CSC
- Straight to Imaging suite, IR Procedure times
- Symptomatic Hemorrhage?
- If EVD present, any complications?
- Bedside Dysphagia Screening-Aspiration Pneumonia?
- VTE ppx- PE/DVT?
- mRS at DC, mRS @ 90 day
- DC disposition
Follow Up 6 weeks post stroke

- mRS at discharge from PUH = 5 (Severe disability-bedridden, cannot walk, incontinent & requiring constant nursing care/attention)
- 6 weeks intensive rehab
- Progressed quickly maximizing her mobility, speech remained most profound deficit
  - Mobilized from car to seat at Pens game!
- Discharged home w/ parents:
  - Ambulating w/ single point cane w/ supervision
  - Min assist w/ stairs & tub bathing
  - Supervision w/ all transfers & toileting
  - Eating a regular diet
  - Speech-remains expressively aphasic MAX assist w/ communication, mod assist w/ problem solving
- On track to Graduate w/ her class in June 2016; mRS 3
• **PDSA (Plan, Do, Study, Act)**
  – 4 stage problem solving model used for improving a process or carrying out change
• **TJC expects Comprehensive Stroke Centers to utilize this methodology in process improvement initiatives**
• **Exemplifies that CSC approaches problems in a systematic fashion**
  – Describe problem
  – Examination of Current State
  – Analyze causes/ develop alternatives
  – Implement plan
  – Study/Reflect if improvement achieved
  – Standardize the improvement
| **P** Plan | - Identification of insufficient hand-off of the basic elements of care for the stroke patient between Inpatient Nursing Staff and the staff of Interventional Radiology (IR)  
- Multidisciplinary workgroup created including all key stakeholders such as clinical nursing staff, administration, informatics department and stroke leadership  
- Workgroup identified the basic elements required to review and document during the hand-off of care  
- Engagement of informatics team to build an electronic document to act as a communication tool to entire multidisciplinary team  
- Education strategy developed by Stroke Programmatic Nurse Specialists (ICU and non-ICU) to be utilized to roll out education and documentation expectations during hand-off |
| **D** Do | - Staff in both areas educated during a 12 week period regarding expectations of verbal patient hand offs and the associated documentation  
- Paper documentation of NIHSS, vital signs etc. for the first 3 months of the project.  
- Performed Face to Face hand off between Inpatient nursing staff and IR staff for all stroke patients undergoing interventional procedures  
- Four weeks after project initiation, daily real time audits performed by unit based leadership to observe quality of the hand off and proper documentation of the identified basic care elements that included  
  - Pre/Post NIHSS, WAKE Scores, Vital Signs, Neurologic exams, and Vascular checks  
  - Feedback given directly to RNs involved in hand off |
| **S** Study | - Reviewed feedback from the nursing staff of these two areas (IR, Inpt.) to gain insight on the process  
- Reviewed audit data for a 6 month period to determine patterns, trends and areas for improvement  
- Identified several key issues  
  - Particular units w/ poor compliance for the new process  
  - Increased turnover for IR staff  
  - On-call IR RNs w/ delayed arrival to hospital causing prolonged wait times for inpatient staff to provide hand-off resulting in procedure delays  
  - Remodeling of IR suites occurred causing a shift of patients from IR holding area to PACU-these RNs not NIHSS certified  
  - Variations in care identified between same day surgery (SDS) patients undergoing diagnostic angiograms and subsequently discharged to home vs. admitted to inpatient floors  
- Documentation of neurologic exams and vascular checks had the lowest % of compliance during the first month  
- Paper forms cumbersome, ignored by the rest of the clinical team because all other documentation is electronic  
- Need to address staff turnover in the two areas and the need for frequent education of the outlined process |
| **A** Act | - Provided real time feedback for all fallouts  
- IR Hand off made a part of the unit based nursing orientation and annual nursing competencies for associated areas  
- Process instituted that if on-call IR RN is delayed arriving to hospital for any reason, hand off report is given directly to the interventionist and/or anesthesia  
- All PACU RNs became NIHSS certified  
- Care distinctions made in the electronic order sets for SDS patients being discharged to home vs. admitted (i.e. decreased post procedure neuro exams from 6 hrs. to 3 hrs.)  
- Paper forms removed, all documentation made part of the electronic health record  
- Created Delivery of Care Excellence Subgroup that meets monthly to discuss opportunities for process improvement. Comprised of nursing and IR leadership |
Quality Tools for the Stroke Nurse

- Quality Net (CMS)
  - www.qualitynet.org
- The Joint Commission (TJC)
  - www.jointcommission.org
- American Stroke Association Online Network
  - www.cscnetwork.heart.org
- Hospital Compare
  - www.medicare.gov/hospitalcompare

- Microsoft Office Products (Database)
  - Excel, Access
References

• Patel, N.BA. et al. (2012). Simple and Reliable Determination of the Modified Rankin Scale Score in Neurosurgical and Neurological Patients: The mRS-9Q. *Neurosurgery*: 71, 971-975.