Stroke Coordinator: ROI

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Disclosure

Lynn Hundley has no actual or potential conflict of interest in relation to this presentation.

Kathy Morrison has no actual or potential conflict of interest in relation to this presentation.
Norton Healthcare, Louisville, KY

- Four adult facilities
- All JC Primary Stroke Centers
  - NH, NAH, NBH in 2010
  - NSMH in 2011
- Combined total of 1250 stroke discharges in 2012
- Comprehensive capabilities primarily at NBH, also available at NH
Penn State Hershey Medical Center

• 563 bed University Hospital & Children’s Hospital
• Magnet Designation since 2007
• Joint Commission Comprehensive Stroke Center 2013
• LionNet Telestroke Hub
OBJECTIVE

To relate incremental inpatient stroke volume, length of stay improvements and program growth to rationalize the direct cost incurred for the role of stroke coordinator.
AKA: Self Preservation
Hospital giant Kentucky One Health has laid off about 500 people to help close a $218 million deficit in a rapidly changing healthcare industry marked by job cuts across the nation.
Forecasting the Future of Stroke in the United States
A Policy Statement From the American Heart Association and American Stroke Association

- Cost increase predictions from 2012-2030
  - Total direct annual stroke related medical costs expected to increase from $71.55 billion to $183.13 billion
  - Real indirect annual costs projected to rise from $33.65 billion to $56.54 billion
  - Overall annual costs of stroke projected to increase to $240.67 billion by 2030 (129% increase)

Stroke 2013; 44: 2361-2375
Forecasting the Future of Stroke in the United States
A Policy Statement From the American Heart Association and American Stroke Association

• Aging population =
  – Increase in prevalence of stroke
  – Additional 3.4 million people with stroke in 2030
  – By 2030 nearly 4% of the US population is projected to have had a stroke

*Stroke* 2013; 44: 2361-2375
• Retrospective review of a national inpatient sample in the US from 2001-2008:
  – Median hospital costs in 2008 dollars were $14,102
  – Average 2008 Medicare payments were $10,098 for intravenous thrombolysis without complication and $13,835 for intravenous thrombolysis with major complication
  – Loss of ~$4000 for each patient with a good outcome
  – Loss of ~$4000 for each patient with disability or mortality

Stroke 2012; 43: 1131-1133
The DRG system is in place to incentivize hospital efficiency

Strategies for decreasing cost revolve largely around the formation of stroke units and stroke programs

Savings of ~$55 million per 1000 patients

*Stroke* 2012; 43: 1131-1133
Association Between Stroke Center Hospitalization for Acute Ischemic Stroke and Mortality

- Observational study – n=30,947
  - 49.4% to designated stroke centers
- Data from: NY statewide planning & research cooperative system from 2005-2006
- Mortality follow up for 1 year
- Included GI hemorrhage & AMI to determine if findings were specific to stroke
- Main outcome measure: 30-day all cause mortality

*JAMA* 2011; 305 (4): 373-380
Association Between Stroke Center Hospitalization for Acute Ischemic Stroke and Mortality

• Admission to designated stroke centers associated with lower 30 day all cause mortality
  – 12.5% vs 10.1% (p<.001)
  – 2.5% absolute reduction in all cause mortality – sustained out to 1 year

• Increased use of thrombolytic therapy in stroke centers
  – 1.7% vs 4.8% (p<.001)

• Outcome differences specific for stroke
  – Similar all cause mortality for GI bleed and AMI

*JAMA* 2011; 305 (4): 373-380
Primer for the next study: QALY

- Quality adjusted life year: QALY
  - A measure of disease burden, including both the quality and the quantity of life lived.
  - Used in assessing the value for money of a medical intervention
  - The QALY is based on the number of years of life that would be added by the intervention
    - Each year in perfect health is assigned the value of 1.0 down to a value of 0.0 for being dead
    - Extra years not lived in full health, then the extra life-years are given a value between 0 and 1 to account for this
  - Often used in cost-utility analysis to calculate the ratio of cost to QALYs saved for a particular health care intervention.
  - Interventions with a lower cost to QALY saved (incremental cost effectiveness) ratio ("ICER") tend to be preferred over an intervention with a higher ratio

Wikipedia
Model to project lifetime outcomes & costs of 2 hypothetical cohorts of 75 AIS patients
  – Admitted to PSC
  – Admitted to non-PSC
Costs data based on Medicare reimbursement & other published sources

Conclusions:
• Treatment of AIS patients in a PSC appears to be cost effective
• Efforts should be made to increase opportunities for patients to reach PSCs
• Findings support recommendations for establishing more PSCs

*Stroke 2012 (43); 1617-1623*
• How did they arrive at those conclusions?
  – Incremental cost-effectiveness ratio (ICER) for AIS care in a PSC compared with non-PSC was $23,990/QALY
    • Well below the societal ‘willingness to pay’ threshold
  – More patients treated = lower ICERs
  – 500 patients/year = ICER of $16,589
  – For a PSC that treats 75 AIS patients/year
    • ~16.8 life years or 11.3 QALYs may be gained per annual cohort

Stroke 2012 (43); 1617-1623
Analysis of the Costs and Payments of a Coordinated Stroke Center and Regional Stroke Network

- Retrospective analysis – St Luke’s Neuroscience Institute
- Total costs/payments for treating AIS patients during program evolution
- N=1570
- Analyses stratified by:
  - Demographic characteristics, outcomes, treatments, time and comorbidities

*Stroke. 2013;(44): 2254-2259*
Analysis of the Costs and Payments of a Coordinated Stroke Center and Regional Stroke Network

• Changes to SLNI program over study time:
  – Increase in transfers from enlarging network of referring hospitals
  – Increased use of IV rtPA from 13.6% in 2005 to 28.5% in 2010
  – Growth of regional network to >70 hospitals

*Stroke. 2013;(44): 2254-2259*
Program elements to grow referral network and improve efficiency of care on arrival to SLNI:

- Focused stroke education to referring ED staff and EMS
- Streamlined transfer process: 1 phone #, standardized faxed order sets & transport protocols
- 24/7 coverage by neuro-critical care nurse (2008) as 1st responder for SLNI ED cases
- Expansion of guideline based standardized order sets & care paths

Stroke. 2013;(44): 2254-2259
Analysis of the Costs and Payments of a Coordinated Stroke Center and Regional Stroke Network

• Results
  – Total costs remained consistent over time
  – Demonstrated that providing comprehensive stroke care with improved access and treatment may be financially feasible for other hospitals

• Implication
  – Increase in costs for personnel and technology likely offset by improved efficiencies in process

*Stroke. 2013;(44): 2254-2259*
Analysis of the Costs and Payments of a Coordinated Stroke Center and Regional Stroke Network

• Additional notable discussion points:
  – SLNI total costs may be lower than national estimates published in the Brinjikji study
    • 4%-23% across stratified patient populations
    • No difference in total costs over time after accounting for inflation between 2005 & 2007, or 2005 & 2010
    • Ongoing efforts to improve quality metrics likely contributed to greater efficiencies, shorter lengths of stay, and reduced costs
  – Implication
    • Increase in costs for personnel and technology likely offset by improved efficiencies in process

*Stroke. 2013;(44): 2254-2259*
• Less disability associated with use of rt-PA
• Use of rt-PA increased in PSCs
• Less disability = less lifetime cost
• Stroke units (Class I, Level A)
  – 17-28% reduction in death
  – 7% increase in being able to live at home
  – 8% reduction in length of stay
  – 19% increase in good outcomes

Stroke. 2011;(42): 2651-2665
Who sails that ship?
Five Essential Elements of Multidisciplinary Stroke Teams

- Interdisciplinary team structure
  - Medical director, Clinical Stroke Coordinator, vascular neurologists, neurosurgeons, neuroscience nurses
- System Standardization
- Data-driven approach
- Continuing education
- Prevention
In a successful stroke center:

The Stroke Coordinator Does
With a whole crew of resources!
Stroke Coordinator: *Lynchpin of the stroke team*

“Many hospital stroke programs fail, and the primary reason is they lack a strong stroke coordinator. Almost universally, programs that fail or backslide in performance are those that lost a stroke coordinator or did not have one and tried to tack it on to someone else's job. Having seen a few hundred stroke programs, I can unequivocally make this statement.“

-- Timothy Shepherd, PhD

*Rodak 2013: Becker Hospital Review*
Stroke Coordinator Qualities

- Anyone with a passion for neuroscience and detailed work
- Sound organization and communication skills
- Ability to teach at all different levels
- Interest in and experience with neuroscience

“Easier to take a person who has a passion for neuroscience and understands neuroscience technically, and train them to be a coordinator, than take a coordinator and train them in neuroscience.” – Tim Shepherd

Rodak 2013: Becker Hospital Review
Strong Leaders Benefit Patients & Hospital

• Hospitals becoming financially accountable for meeting quality measures related to stroke care
• In order to ensure hospitals meet these goals they need to have strong stroke program leaders:
  – Stroke Coordinator
  – Physician Champion

Rodak 2013: Becker Hospital Review
Create a Financial Case for a Stroke Coordinator

Calculate direct costs – salary, benefits, equipment, support staff, etc

– Published financial assumptions are available

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<th>Type</th>
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</table>

Calculate payer mix, reimbursement and cost-per-inpatient-day

- **Payer Mix**
  - 65% Medicare -- 4% Self Pay
  - 5% Medicaid -- 2% Other
  - 25% Managed Care/Commercial

- **Stroke/TIA**  
  - \( N = 300 \)  
  - MS-DRG: 61-72
  - Contribution Margin $3,092/case  ($927,600)
  - Direct cost $1,102/day
  - Baseline ALOS 5.5 days (1,650 days)

- **Neurovascular Surgical/Endovascular**  
  - \( N = 40 \)  
  - MS-DRG: 21-27
  - Contribution Margin $12,729/case  ($509,160)
  - Direct cost $2,000/day
  - Baseline ALOS 10 days (400 days)

Projected decrease in LOS = 8%

- Decrease of 132 days, or $145,464 saved
- Decrease of 32 days, or $64,000 saved

Don’t forget the financial impact of improved outcomes

• Calculate complication rates (pneumonia 3%)
• Calculate cost/case of complication rates
  – Pneumonia, DVT, PE (Increase of $33,155)
• Effective dysphagia screening at bedside can reduce aspiration pneumonia by 50%  (Hinchey, et al. *Stroke* 2005;36)

3% of 340= 10.2 patients with pneumonia ($338,181)
50% reduction = $169,090 in “cost avoidance”
Now that you understand how you make a difference....
Quality Measures

• January 1, 2013 – required to report the stroke 8 to avoid 2% penalty
• Publicly reported data
• January 1, 2014 – required to report 2 additional measures
• These results will affect reimbursement in FY2016 (Oct 1, 2015-Sept 30, 2016)
• For 2014, CMS also removing the requirement for ‘participation in a systematic clinical database registry for stroke care’
What else??

- Don’t just track data, TREND your data:
  - Identify opportunities for improvement
    - Within quality measures
  - Demonstrate program cost effectiveness
    - Trend length of stay before program initiation
    - Trend readmission rates
    - Trend complication rates
      - sICH
      - Aspiration pneumonia
      - VTE
  - Trend and compare discharge destination
    - Should see larger numbers of patients go home or to acute rehab
Benefits of Stroke Units

• This just doesn’t happen
• You took the time to prepare your staff
• Do pre/post knowledge assessments
  – Include needs assessments for ongoing education
  – Consider a novice to expert approach
• Remember, those benefits are attributed to all of the above!
Useful Connections

• Strategic planning resources
• Financial analysts
  – This is where you get your LOS, readmission rate data
  – Ask for a program profitability report
• Clinical effectiveness/Quality
• Risk management
NOW FOR SOME EXAMPLES...
Implementation of an oral hygiene protocol for the prevention of aspiration pneumonia on a neuroscience unit

L. Hundley MSN, RN, ARNP, CCRN, CNRN, CCNS; N. Seraphine RN, BSN, MS; S. Cronin Ph. D, RN, BC
Baptist Hospital East

Background
The hospital wide total of aspiration pneumonia (AP) cases in patients with either stroke or cervical spine surgery during 2008 was 18. Four of those cases were exclusive to the neuroscience unit. Although AP incidence decreased with implementation of a dysphagia screening protocol for stroke patients, approximately 3% continue to develop AP.

Significance
Aspiration pneumonia is the infectious process caused by inhalation of oropharyngeal secretions colonized by pathogenic bacteria. Pneumonia is the most common respiratory complication in all-stay deaths. Aspiration pneumonia not only causes increased lengths of stay, but increases morbidity and mortality as well. Stroke patients that develop AP are 10% more likely to be discharged to extended care facilities. Depending upon severity, the cost of AP can range from $15,000-$65,000 per case. The Centers for Disease Control (CDC) has published guidelines and recommendations for all acute care hospitals to develop and implement a comprehensive oral hygiene program for patients at risk for healthcare-associated pneumonia.

Clinical Question
For high-risk neuroscience patients, will the use of an aggressive oral care protocol reduce the risk/documented aspiration pneumonia (AP)?

Literature Review

- Yuen & Volesko (2001): Evidence exists in the literature related to inadequacy of oral care. Although nurses may perceive oral care as routine and common sense, the task is not always performed effectively.
- Development and implementation of a comprehensive oral hygiene protocol for patients in acute care settings or residents in long-term care facilities who are at risk for healthcare-associated pneumonia.

Systemic Reviews:
- Scannapieco et al. (2003): Several intervention studies show that improved oral hygiene measures can reduce the incidence of pneumonia.
- Oral colonization by respiratory pathogens, often by poor hygiene and periodontal disease, appears to be associated with nosocomial pneumonia.

Project Implementation Method

- Populated oral care cleansing kit containing enough product for 24 hours of every 4 hour cleansing with an anti-plaque solution (Glycopyrronium chloride 59%) and sodium bicarbonate, covered oral suction, suction catheters, suction tubing, and mouth moisturizer.
- The hourly rounding sheet was adapted to include a plan for documentation of oral care.

- An education sheet entitled “Preventing Pneumonia in the Hospital” was developed to distribute to patients, family/caregivers of those patients, and staff. The education sheet was developed with collaboration from speech language pathologists. All direct patient care staff on the neuroscience unit were required to attend. A poster was developed and displayed in the break room. Tracking of compliance was done via log utilization and documentation. Tracking of AP rates started 2 months after implementation to allow for incorporation into practice.

Oral Care Protocol:

For patients taking PO:

- Brush teeth before feeding
- Brush teeth after feeding
- Rinse mouth after feeding
- Ask patient to rinse mouth with water
- Apply mouth moisturizer in tips of mouth

Patient Education Sheet - Preventing Pneumonia in the Hospital:

References

- Gershanovitz, E. et al. (2006). Assessment of current practice among patients in whom oral health is a priority. JAMA, 295(20), 2369-2378.
Inverse relation of dysphagia screening to aspiration pneumonia

- **Q1 2007**
  - Quarterly percent of patients undergoing Dysphagia Screening: 10.00%
  - Annual percent of patients with aspiration pneumonia: 0.00%

- **Q2 2007**
  - Quarterly percent of patients undergoing Dysphagia Screening: 9.00%
  - Annual percent of patients with aspiration pneumonia: 1.00%

- **Q3 2007**
  - Quarterly percent of patients undergoing Dysphagia Screening: 8.00%
  - Annual percent of patients with aspiration pneumonia: 2.00%

- **Q4 2007**
  - Quarterly percent of patients undergoing Dysphagia Screening: 7.00%
  - Annual percent of patients with aspiration pneumonia: 3.00%

- **Q1 2008**
  - Quarterly percent of patients undergoing Dysphagia Screening: 6.00%
  - Annual percent of patients with aspiration pneumonia: 4.00%

- **Q2 2008**
  - Quarterly percent of patients undergoing Dysphagia Screening: 5.00%
  - Annual percent of patients with aspiration pneumonia: 5.00%

- **Q3 2008**
  - Quarterly percent of patients undergoing Dysphagia Screening: 4.00%
  - Annual percent of patients with aspiration pneumonia: 6.00%

- **Q4 2008**
  - Quarterly percent of patients undergoing Dysphagia Screening: 3.00%
  - Annual percent of patients with aspiration pneumonia: 7.00%
# Stk DCs over time

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<th>Year</th>
<th>DCs</th>
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<td>2008</td>
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<tr>
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<td>1044</td>
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<tr>
<td>2012</td>
<td>1256</td>
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58%
Program Growth: rt-PA Treatments

- 2010: 17
- 2011: 28
- 2012: 53
- 2013: 74
Don’t forget to Benchmark

**How Do We Compare?**

Door to Needle < 60 minutes
Profitability Report

Data to include:

- # stroke discharges by type
- Case mix index
- Average severity
- Net revenue
- Fixed costs
- Variable costs
- Direct margin
- Net margin
Valuable Resources

• American Association of Neuroscience Nurses
  – Special focus group list-serve: Stroke

• American Heart/American Stroke Association
  – www.heart.org
  – Your AHA Staff Consultant

• Your local fellow stroke coordinators
  – Political boundaries are invisible for us
References


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