Chasing Perfection in Neurosurgery

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Department of Neurosurgery
Geffen School of Medicine at UCLA
Risk-Adjusted Mortality

Source: UHC Clinical Database
Neurosurgery Mortality Ratio
Observed/Expected

Discharge Quarter

Observed / Expected Ratio

Q1  Q2  Q3  Q4  Q1  Q2  Q3  Q4  Q1  Q2  Q3  Q4  Q1  Q2  Q3  Q4
RRUMC Total Inpatient Mortality Ratio
Observed/Expected

Discharge Quarter


Observed / Expected Ratio
UCLA RR Mortality O/E Ratio
April 2015 - March 2016 (Recent Year)
UHC Risk Adjusted Mortality: April 2015-March 2016
RRUMC Cranial Neurosurgery Service Line and the Top 20 US News and World Report Programs
Cranial Neurosurgery Service Line
Risk Adjusted Mortality by Quarter

![Graph showing observed mortality versus expected mortality for different hospitals from Q1 2014 to Q4 2015.](image-url)
Craniotomy: Mortality

Source: UHC Clinical Database
Quality and Safety Management Report
October-December 2015 (Q4)

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Relative Performance</th>
<th>Denom</th>
<th>Observed</th>
<th>Target</th>
<th>UHC Median</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post Procedure Mortality (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>IQI08 Esophageal resection</td>
<td></td>
<td>2</td>
<td>0.0</td>
<td>0.0</td>
<td></td>
<td></td>
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<tr>
<td>IQI09 Pancreatic resection</td>
<td></td>
<td>25</td>
<td>0.0</td>
<td>1.9</td>
<td>0.0</td>
<td>16/113</td>
</tr>
<tr>
<td>IQI09a Pancreatic resection with pancreatic cancer</td>
<td></td>
<td>12</td>
<td>0.0</td>
<td>1.9</td>
<td>0.0</td>
<td>22/ 90</td>
</tr>
<tr>
<td>IQI09b Pancreatic resection without pancreatic cancer</td>
<td></td>
<td>13</td>
<td>0.0</td>
<td>2.4</td>
<td>0.0</td>
<td>15/ 96</td>
</tr>
<tr>
<td>IQI11 AAA repair</td>
<td></td>
<td>11</td>
<td>18.2</td>
<td>1.8</td>
<td>0.0</td>
<td>96/ 96</td>
</tr>
<tr>
<td>IQI11a AAA repair open and ruptured</td>
<td></td>
<td>0</td>
<td></td>
<td>33.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IQI11b AAA repair open and unruptured</td>
<td></td>
<td>3</td>
<td>0.0</td>
<td>3.5</td>
<td>0.0</td>
<td>13/ 27</td>
</tr>
<tr>
<td>IQI11c AAA repair endovascular and ruptured</td>
<td></td>
<td>0</td>
<td></td>
<td>0.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IQI11d AAA repair endovascular and unruptured</td>
<td></td>
<td>8</td>
<td>25.0</td>
<td>2.5</td>
<td>0.0</td>
<td>78/ 89</td>
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<tr>
<td>IQI12 CABG</td>
<td></td>
<td>63</td>
<td>1.6</td>
<td>1.5</td>
<td>2.1</td>
<td>32/108</td>
</tr>
<tr>
<td>IQI13 Craniotomy</td>
<td></td>
<td>162</td>
<td>1.9</td>
<td>3.2</td>
<td>5.0</td>
<td>22/123</td>
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<tr>
<td>IQI14 Hip replacement</td>
<td></td>
<td>17</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>83/113</td>
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<tr>
<td>IQI30 PTCA</td>
<td></td>
<td>68</td>
<td>19.1</td>
<td>3.8</td>
<td>3.1</td>
<td>116/118</td>
</tr>
<tr>
<td>IQI31 Carotid endarterectomy</td>
<td></td>
<td>9</td>
<td>0.0</td>
<td>1.5</td>
<td>0.0</td>
<td>59/112</td>
</tr>
</tbody>
</table>
Craniotomy

UHC RANK, 2014: 36/122
UHC RANK, 2015: 19/129
UCLA Stroke Center

Source: UHC Clinical Database; UCLA Decision Support
### UHC: UCLA Risk-Adjusted Mortality, 2015

<table>
<thead>
<tr>
<th>In Hospital Mortality (%)</th>
<th>Relative Performance</th>
<th>Denom</th>
<th>Observed</th>
<th>Target</th>
<th>UHC Median</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Percent</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IQI15 AMI mortality</td>
<td>▽</td>
<td>257</td>
<td>10.9</td>
<td>6.3</td>
<td>5.2</td>
<td>111/127</td>
</tr>
<tr>
<td>IQI16 Heart Failure</td>
<td>▽</td>
<td>420</td>
<td>4.8</td>
<td>3.2</td>
<td>3.1</td>
<td>111/133</td>
</tr>
<tr>
<td>IQI17 Acute stroke</td>
<td>▽</td>
<td>556</td>
<td>8.3</td>
<td>14.3</td>
<td>9.8</td>
<td>11/132</td>
</tr>
<tr>
<td>IQI17a Acute stroke subarachnoid</td>
<td>▽</td>
<td>69</td>
<td>13.0</td>
<td>20.2</td>
<td>16.7</td>
<td>12/117</td>
</tr>
<tr>
<td>IQI17b Acute stroke hemorrhagic</td>
<td>▽</td>
<td>144</td>
<td>14.6</td>
<td>27.9</td>
<td>19.6</td>
<td>9/130</td>
</tr>
<tr>
<td>IQI17c Acute stroke ischemic</td>
<td>▽</td>
<td>343</td>
<td>4.7</td>
<td>7.6</td>
<td>5.7</td>
<td>16/130</td>
</tr>
<tr>
<td>IQI18 Gastrointestinal Hemorrhage</td>
<td>▽</td>
<td>182</td>
<td>3.3</td>
<td>2.9</td>
<td>2.0</td>
<td>101/132</td>
</tr>
<tr>
<td>IQI19 Hip Fracture</td>
<td>▽!</td>
<td>15</td>
<td>13.3</td>
<td>1.9</td>
<td>2.3</td>
<td>126/127</td>
</tr>
<tr>
<td>IQI20 Pneumonia</td>
<td>▽</td>
<td>172</td>
<td>5.8</td>
<td>3.7</td>
<td>2.7</td>
<td>126/136</td>
</tr>
<tr>
<td>IQI32 AMI mortality w/o transfers</td>
<td>▽</td>
<td>197</td>
<td>11.2</td>
<td>6.1</td>
<td>4.6</td>
<td>117/126</td>
</tr>
</tbody>
</table>
Acute Stroke

UHC RANK, 2014: 13/125
UHC RANK, 2015: 11/132

<table>
<thead>
<tr>
<th>Relative Performance</th>
<th>Denom (n)</th>
<th>Observed</th>
<th>Target</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recent Year</td>
<td>556</td>
<td>8.3</td>
<td>14.3</td>
<td>11/132</td>
</tr>
</tbody>
</table>

### In Hospital Mortality - IQI17 Acute Stroke (%)

**UCLA Value**

- Cases (denom.)
- Numerator
- Observed
- Expected
- Smoothed
- Risk Adjusted

**UHC Population**

- 10th
- 25th
- 50th
- 75th
- 90th
- Mean

<table>
<thead>
<tr>
<th>Cases (denom.)</th>
<th>556</th>
<th>148</th>
<th>358</th>
<th>572</th>
<th>854</th>
<th>1,124</th>
<th>605</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numerator</td>
<td>46</td>
<td>11</td>
<td>28</td>
<td>55</td>
<td>92</td>
<td>125</td>
<td>61</td>
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<tr>
<td>Observed</td>
<td>8.3</td>
<td>5.9</td>
<td>7.8</td>
<td>9.8</td>
<td>12.4</td>
<td>14.2</td>
<td>10.6</td>
</tr>
<tr>
<td>Expected</td>
<td>14.3</td>
<td>5.9</td>
<td>7.8</td>
<td>9.4</td>
<td>10.7</td>
<td>13.4</td>
<td>9.5</td>
</tr>
<tr>
<td>Smoothed</td>
<td>4.9</td>
<td>5.6</td>
<td>7.2</td>
<td>9.2</td>
<td>10.6</td>
<td>11.9</td>
<td>9.1</td>
</tr>
<tr>
<td>Risk Adjusted</td>
<td>4.8</td>
<td>5.3</td>
<td>7.2</td>
<td>9.3</td>
<td>10.8</td>
<td>12.4</td>
<td>9.3</td>
</tr>
<tr>
<td>O/E</td>
<td>0.57</td>
<td>0.64</td>
<td>0.87</td>
<td>1.11</td>
<td>1.29</td>
<td>1.49</td>
<td></td>
</tr>
</tbody>
</table>
SUBARACHNOID HEMORRHAGE

UHC RANK, 2014: 5/114
UHC RANK, 2015: 12/117
HEMORRHAGIC STROKE

UHC RANK, 2014: 18/123
UHC RANK, 2015: 9/130

Jan 2015 - Dec 2015 (recent year)

<table>
<thead>
<tr>
<th>Relative Performance</th>
<th>Denom (n)</th>
<th>Observed</th>
<th>Target</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recent Year</td>
<td>144</td>
<td>14.6</td>
<td>27.9</td>
<td>9/130</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Value</th>
<th>10th</th>
<th>25th</th>
<th>50th</th>
<th>75th</th>
<th>90th</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cases (denom.)</td>
<td>144</td>
<td>30</td>
<td>82</td>
<td>138</td>
<td>207</td>
<td>268</td>
</tr>
<tr>
<td>Numerator</td>
<td>21</td>
<td>6</td>
<td>13</td>
<td>25</td>
<td>43</td>
<td>58</td>
</tr>
<tr>
<td>Observed</td>
<td>14.6</td>
<td>12.0</td>
<td>15.2</td>
<td>19.6</td>
<td>23.5</td>
<td>28.1</td>
</tr>
<tr>
<td>Expected</td>
<td>27.9</td>
<td>14.3</td>
<td>16.6</td>
<td>20.0</td>
<td>22.9</td>
<td>25.3</td>
</tr>
<tr>
<td>Risk Adjusted</td>
<td>11.4</td>
<td>12.4</td>
<td>16.8</td>
<td>21.8</td>
<td>27.1</td>
<td>31.8</td>
</tr>
<tr>
<td>O/E</td>
<td>0.52</td>
<td>0.57</td>
<td>0.77</td>
<td>0.99</td>
<td>1.24</td>
<td>1.45</td>
</tr>
</tbody>
</table>
Mortality Reduction: What did we do?

• UHC
• Documentation – comorbidities
• Mortality review – every mortality, Monday am
• Data review - all faculty
• Evaluate mortality causes: intracerebral hemorrhage (ICH)
  • Code Brain – expedite imaging and treatment of ICH cases
• Palliative care, inpatient hospice
Readmissions

Source: UHC Clinical Database; UCLA Decision Support
Percent All-Cause 30 Day Readmissions
RRUMC UHC Cranial Neurosurgery Service
Cranial Neurosurgery Service Line
Percent All-Cause 30 Day Readmissions
Neurosurgery Spine Service Line Percent All-Cause 30 Day Readmissions
Neuro ICU

Source: Epidemiology, URSA Health
Paul Vespa, MD
CLABSI

UCLA Ronald Reagan
Unit-Specific Report
RR 6ICU Healthcare-Associated Infection (HAI) Rates through April 2016

Unit: 6ICU
Date Range: May-15 Apr-16
(12 months)

CLABSI

Rate
# Infections
per 1,000 CVC Days

# of infections


Monthly SIR ratios may not exist for this unit, as represented by a blank, because SIR ratios are only calculated by NHSN when the Expected number of infections >=1.

2014 Total: 2.43
2015 Total: 1.37
2016 YTD: 0.00
CAUTI

CAUTI

CLIP

Unit CLIP Bundle Compliance Rate has been 100% for 8 of the previous 12 months.

Data points reflect those months in which at least one (1) CLIP form was submitted.
UCLA Health System
Oct - Dec 2010 (Q4)
Neurosurgery

Definition - Neurosurgery
Product lines are defined by UHC and displayed in the CDB. This product line includes inpatient discharges in MS-DRGs 20-27, 31-33, 40-42 (base MS-DRGs 10-12, 14, 17). This list is based on the effective MS-DRGs for the reported current quarter. Bad data, nonviable neonates, organ harvest cases, and records with a null expected mortality are excluded. For prior periods, product line assignments were based on the effective MS-DRGs at that time.

<table>
<thead>
<tr>
<th>Relative Performance</th>
<th>Denom (Cases)</th>
<th>Obs/Exp Ratio</th>
<th>UHC Median</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Quarter</td>
<td>231</td>
<td>0.55</td>
<td>0.72</td>
<td>34/112</td>
</tr>
<tr>
<td>Recent Year</td>
<td>977</td>
<td>0.87</td>
<td>0.79</td>
<td>73/114</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cases (Mortality)</th>
<th>Observations</th>
<th>Expected Deaths</th>
<th>Observed Mortality (%)</th>
<th>Expected Mortality (%)</th>
<th>Observed/Expected Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Quarter</td>
<td>231</td>
<td>12.71</td>
<td>3.03</td>
<td>5.50</td>
<td>0.55</td>
</tr>
<tr>
<td>Last Quarter</td>
<td>245</td>
<td>13.23</td>
<td>4.49</td>
<td>5.03</td>
<td>0.89</td>
</tr>
<tr>
<td>Recent Year</td>
<td>977</td>
<td>53.49</td>
<td>4.81</td>
<td>5.47</td>
<td>0.87</td>
</tr>
</tbody>
</table>

Data Source: UHC CDB
Related Report: UHC QSMR
Contact: Mike Olinen, Olinen@uhc.edu

Recent Year Five Base MS-DRGs with Highest Excess Deaths (>=25 cases):

<table>
<thead>
<tr>
<th>Base MS-DRGs</th>
<th>Description</th>
<th>Cases</th>
<th>O/E Ratio</th>
<th>Excess Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>CRANIOTOMY W/ MAJOR DEVICE/ACUTE COMPLEX CNS PDX</td>
<td>92</td>
<td>1.13</td>
<td>3.05</td>
</tr>
<tr>
<td>17</td>
<td>PERIPHERAL/CRANIAL PROCESSES</td>
<td>78</td>
<td>1.94</td>
<td>0.97</td>
</tr>
</tbody>
</table>

Recent Year UHC Top-10 Mortality O/E in Neurosurgery:

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Mort O/E</th>
<th>Cases</th>
<th>LOS O/E</th>
<th>Readmit Rate</th>
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</thead>
<tbody>
<tr>
<td>WASHINGTON</td>
<td>0.00</td>
<td>307</td>
<td>0.94</td>
<td>5.42</td>
</tr>
<tr>
<td>PREMEDCTR</td>
<td>0.00</td>
<td>38</td>
<td>0.77</td>
<td>11.76</td>
</tr>
<tr>
<td>NYU</td>
<td>0.29</td>
<td>885</td>
<td>1.11</td>
<td>6.65</td>
</tr>
<tr>
<td>DENHEALTH</td>
<td>0.34</td>
<td>112</td>
<td>1.13</td>
<td>4.90</td>
</tr>
<tr>
<td>IU HEALTH-UNIVERSITY</td>
<td>0.46</td>
<td>314</td>
<td>1.04</td>
<td>6.83</td>
</tr>
<tr>
<td>HOPKINS</td>
<td>0.49</td>
<td>1,618</td>
<td>1.03</td>
<td>6.32</td>
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<tr>
<td>TUFTS</td>
<td>0.49</td>
<td>429</td>
<td>1.13</td>
<td>5.51</td>
</tr>
<tr>
<td>BEAUMONT-ROYALOAK</td>
<td>0.50</td>
<td>617</td>
<td>1.13</td>
<td>5.03</td>
</tr>
<tr>
<td>UCSD</td>
<td>0.51</td>
<td>362</td>
<td>1.20</td>
<td>6.96</td>
</tr>
<tr>
<td>METHODIST HOUSTON</td>
<td>0.52</td>
<td>824</td>
<td>0.95</td>
<td>5.83</td>
</tr>
</tbody>
</table>

Mortality Rate (%)
Mortality 2010: UCLA Neurosurgery

- Observed Mortality: 4.8%
- Expected Mortality: 5.5%
- UCLA O/E Ratio: 0.87
- UHC Median: 0.79

- National UHC RANK: 73/114
- National percentile: Bottom 35%
Disclosures

Equity – NeuralAnalytics

Equity – Vision Tree Software
Health care in the United States is not as safe as it should be—and can be. At least 44,000 people, and perhaps as many as 98,000 people, die in hospitals each year as a result of medical errors that could have been prevented, according to estimates from two major studies. Even using the lower estimate, preventable medical errors in hospitals exceed attributable deaths to such feared threats as motor-vehicle wrecks, breast cancer, and AIDS.
What are the problems?

Complexity

Variation

Imprecise Data

Un-coordination
Noun: Perfection

• The condition of being free, or as free as possible, from all flaws or defects.

Verb: To Perfect

• To improve something until it is flawless, or as flawless as possible
We are going to relentlessly chase perfection, knowing full well that we will not catch it, because nothing is perfect. But we are going to chase it, because in the process, we will catch excellence. We are not remotely interested in just being good.

Vince Lombardi
Perfection is an impossibility,

But striving for perfection
is not an impossibility.

John Wooden
Because we work as though on the brink of an abyss and walk as though on thin ice, go all out to seek ultimate perfection.

Prof. Liu Chengji
Quality

The degree to which the clinical process and the patient outcome approaches perfection, every time.
Perfect Game : Baseball

A game in which a pitcher pitches a victory that lasts a minimum of nine innings and in which no opposing player reaches base.

Thus, the pitcher cannot allow any hits, walks, hit batsmen, or any opposing player to reach base safely for any other reason: in short, "27 up, 27 down". (But not 81 strikes)

The feat has been achieved 23 times in MLB history – 21 times since the modern era began in 1900, most recently by Félix Hernández of the Seattle Mariners on August 15, 2012
US Commercial Air Travel Fatalities: 1994-2012
(9,000,000 flights/yr)
Average Cost of Flatscreen TVs
Is it possible to approach perfection in healthcare in a systematic and reproducible way?

Do we know how to do it?
Evolution: Brain Tumor Surgery

1889: 49% mortality
1899: 39% mortality
1910: 14% mortality, Harvey Cushing
1925: 2.5% mortality, Walter Dandy

1934-1960: mapping and preservation of function, Wilder Penfield
Evolution: Brain Tumor Surgery

Today

• 1% mortality
• Preservation of function (fMRI, DTI, awake mapping)
• 2-4 days in the hospital (outpatient?)
• Cosmetic reconstruction
• Return to work in 3-4 weeks
An Intervention to Decrease Catheter-Related Bloodstream Infections in the ICU

Peter Pronovost, M.D., Ph.D., Dale Needham, M.D., Ph.D., Sean Berenholtz, M.D., David Sinopoli, M.P.H., M.B.A., Haitao Chu, M.D., Ph.D., Sara Cosgrove, M.D., Bryan Sexton, Ph.D., Robert Hyzy, M.D., Robert Welsh, M.D., Gary Roth, M.D., Joseph Bander, M.D., John Kepros, M.D., and Christine Goeschel, R.N., M.P.A.

Peter Pronovost, MD, Intensivist, Johns Hopkins
THE PROBLEM
Central Line Associated Blood Stream Infection (CLABSI)

Each year in the United States
80,000 catheter-related infections

28,000 deaths

Average cost of care is $45,000 each = $2.3 billion annually
THE INTERVENTION
Central Line Bundle (Checklist, Protocol)

1. Hand hygiene

2. Maximal barrier precautions

3. Chlorhexidine skin antisepsis

4. Optimal catheter site selection, avoidance of the femoral vein

5. Daily review, prompt removal of unnecessary lines
THE RESULT

After Central Line Bundle Applied

Mean rate per 1000 catheter-days decreased from 7.7 to 1.4.

80% reduction in infection

(P<0.002)
Atul Gawande: Better

• Three Skills, Key Abilities

• One: identify failure and success
• Two: devise solutions
• Three: implement
COLLABORATION

• Paul Vespa
• Jeff Saver
• Dan Hanley
• Issam Awad
• Mario Zucarello
• Noriko Salamon
• Manny Blanco

• Ben Ellingson
• Nader Pouratian
• Lynn McCullogh
• Nancy McLaughlin
• Jody Anderson
• Barbara Anderson
• Eric Behnke
Principles

• Define the goal

• Measure failure and success

• Devise the solution and implement (standardize, PROTOCOLS)
Value-based Neurosurgery

The example of microvascular decompression surgery

Nancy McLaughlin, MD, PhD, Farzad Buxey, Karen Chaw, Neil A. Martin, MD
Mapping the Care Episode
Case Study: Glioma is Discovered Via MRI at Outside Hospital

Value Stream Map (VSM)

**OPPORTUNITY (OR) WASTE**

**Operational**
- Better communication with UCLA referral services and community MD's
- Pt delayed in seeing MD
- Do consents and H&P in clinic
- Post-op imaging from outside centers hard/slow to load onto our computers
- Need all info available on the chart for dictation (path, referring MD, imaging)
- Inappropriate calls to the department
- Patients discharged from hospital without follow-up appointments or studies ordered
- Ensure if patient will return to referring physician
- Automated cancellations

- Computer downtime (c-view)
- Standardize imaging submissions
- Equipment maintenance & availability
- After hour availability
- Case setup variability
- Automatic labs
- Distance between MD office and OR/hospital
- Pre-op medical clearance
- Multiple personnel changes in OR
- Not enough imaging techs for intra-op fluoro or CT

- Wait for ped in PACU (occupies OR)
- Slow computers
- Communication on transfer
- Paging wrong person
- Orders written to be done in PACU
- Labs drawn by anesthesia and nurses

- DC barriers (meds, ride, coordinations, expectations)
- Inefficient communication between pt and providers
- Resident staff communicating with attending
- Delay in transfers
- Bed placement
- Outdated equipment
- Alarms are too noisy and disruptive
- DC lounge — criteria and resources
- Pre-encounters inaccurately captured as re-audits
- Completion of forms (disability, insurance, etc.)

- No master plan
- Scheduling scans after pt is discharged
- Difficulty for pt to make PO visit
- Administrative assistant not notified of pt DC
- Medical records not available to PCP

**Clinical**
- Dictation errors, need proofreading
- No films/complete records at time of appointment (pt unprepared)
- Double-booked appointments
- Written and digitized medical records
- Late patients
- Rooms stocked with incorrect supplies
- Directing patient to correct specialist

- Long OR turnover
- Acquisition of outside medical records/scans, referrals
- Pre-op clinic/OPR checklist
- Anesthesia induction availability
- Disability and other forms
- Unnecessary emails
- Surgical site marking
- Inadequate nurse-anesthesia handoff

- Coordination between NS & NCC
- Pain management
- Slow response time from staff
- Proper and timely dictation
- Too many supplies in room (cluttered)
- Discharge orders
- Routine vital signs
- Mgnt and WBC on floor

- PO plan not written/defined
- Transition of care back to PCP or other specialty (communication)
- Lack PO imaging
- PCP changes treatment inappropriately
- Pt lost in f/u

**Referring PCP**
- Clinic Visit
- Testing/Imaging
- Labs

**Rehab**
- Writing Order
- Home
- SNF
- Acute Rehab

**Post-Op Clinic**
- Referring Visit
- Testing/Imaging
- Labs

**Discharge**
- - Follow-up Visit
- - Testing/Imaging
- - Labs

**Floor**
- Equipment maintenance & availability
- Delay in transfers
- Bed placement
- Outdated equipment
- Alarms are too noisy and disruptive
- DC lounge — criteria and resources
- Pre-encounters inaccurately captured as re-audits
- Completion of forms (disability, insurance, etc.)

**Post-Op ICU**
- Med/Surg Care
- Testing/Imaging
- Labs
- Pain Management
- Supplies

**Post-Op PACU**
- Med/Surg Care
- Testing/Imaging
- Labs
- Pain Management
- Supplies

**OR**
- Med/Surg Care
- Testing/Imaging
- Labs
- Pain Management
- Supplies

**Pre-Op**
- Med/Surg Care
- Testing/Imaging
- Labs
- Pain Management
- Supplies

**PACU**
- Med/Surg Care
- Testing/Imaging
- Labs
- Pain Management
- Supplies

**Referral System**
- Referral From:
  - Self
  - Primary Care
  - ED
  - Acquisition of:
    - Outside Med Records and Imaging
    - Consults
    - Op Notes

**Referral into System**
- Clinic Visit
- Testing/Imaging
- Labs
- Consults
- H & P

**UCLA Outpatient NS Clinic**
- Microscope Set-up
- Brainlab Set-up
- Anesthesia
- Tumor Resection
- Documentation
- Tumor Harvesting for Vaccine

**Supplies**
- Blood Products
- Drugs
- Surgical Supplies

**1 2 3 4 5**

**1**
- Need for pt to see Med
- Testing/Imaging
- Labs
- Discharge orders
- Routine vital signs
- Mgnt and WBC on floor

**2**
- Automation lab
- Distance between MD office and OR/hospital
- Pre-op medical clearance
- Multiple personnel changes in OR
- Not enough imaging techs for intra-op fluoro or CT

**3**
- Long OR turnover
- Acquisition of outside medical records/scans, referrals
- Pre-op clinic/OPR checklist
- Anesthesia induction availability
- Disability and other forms
- Unnecessary emails
- Surgical site marking
- Inadequate nurse-anesthesia handoff
Mapping the Care Elements
Process map: Pre-op phase - Nutrition

LEGEND

- **BLACK**: PATIENT
- **RED**: Nursing
- **GREEN**: ATTENDING MD
- **LIGHT GREY**: Receptionist, clerk
- **PURPLE**: PT, OT, ST, SW, Pharm, etc
- **ORANGE**: TEAM
Complete inventory of processes

Process mapping of each care item in pre-, intra-, post-operative phase of care: **41+4 maps**
What is NERVS

- Multidisciplinary Care redesign initiative

- Multiple care points: Mobilization, Pain management, Patient education, etc

- On-going since June 2014

- 893 patients to date

- Real-time auditing weekly, Data review bimonthly by core NERVS team
Weeks 1-106
Percent of Mobilization Goals Passed

YEAR ONE
YEAR TWO

Week
Reasons Why Each Goal Was Not Passed

Goal #1
- PONV: 3.72%
- Pain: 7.31%
- Passed Goal Late: 6.34%
- Refusal: 8.97%
- Deficit: 3.72%
- Passed Goal Late: 2.48%
- Passed Goal Late: 3.72%

Goal #2
- Passed Goal Late: 4.72%
- Deficit: 6.90%
- Passed Goal Late: 2.76%
- Passed Goal Late: 7.25%
- Passed Goal Late: 4.26%
- Passed Goal Late: 1.50%
- Passed Goal Late: 5.87%

Goal #3
- Passed Goal Late: 9.18%
- Passed Goal Late: 3.57%
- Passed Goal Late: 7.78%
- Passed Goal Late: 2.81%
- Passed Goal Late: 1.87%
- Passed Goal Late: 0.64%
- Passed Goal Late: 10.46%
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- Passed Goal Late: 0.64%
Top Five Surgeries with Patients Failing Mobilization Goals Due to PONV

<table>
<thead>
<tr>
<th>Surgery Type</th>
<th>Failed due to PONV</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tumor Resection</td>
<td>19</td>
<td>13.48%</td>
</tr>
<tr>
<td>TNTS</td>
<td>16</td>
<td>25.81%</td>
</tr>
<tr>
<td>Retrosigmoid Tumor Resection</td>
<td>8</td>
<td>40.00%</td>
</tr>
<tr>
<td>SSC Dehiscence Repair</td>
<td>7</td>
<td>53.85%</td>
</tr>
<tr>
<td>MVD</td>
<td>6</td>
<td>30.00%</td>
</tr>
</tbody>
</table>

Next step is to drill down on surgery specific etiologies
Prevention of failing mobilization goals due to PONV...

1. Review of anti-emetic medication
2. GO one step further! Could this be a secondary effect to pain medication?
3. Patient education tool regarding post-op diet and anti-emetic medications (PONV TIP SHEET) in collaboration with Nutrition and Pharmacy
4. Development of Post-Operative Diet for PONV for patients’ first few meals in collaboration with Nutrition and CareConnect team
Top Five Surgeries with Patients Failing Mobilization Goals Due to Pain

<table>
<thead>
<tr>
<th>Surgery Type</th>
<th>Failed Due to Pain</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tumor Resection</td>
<td>17</td>
<td>12.06%</td>
</tr>
<tr>
<td>TNTS</td>
<td>8</td>
<td>12.90%</td>
</tr>
<tr>
<td>MVD</td>
<td>4</td>
<td>20.00%</td>
</tr>
<tr>
<td>Aneurysm Clipping</td>
<td>3</td>
<td>30.00%</td>
</tr>
<tr>
<td>SSC Dehiscence Repair</td>
<td>3</td>
<td>23.08%</td>
</tr>
</tbody>
</table>

Same process for pain: Drilling down on surgery-specific etiologies
Developing Clinical Protocols for Each Program

**RECOVERY ROADMAP TO DISCHARGE**

**Neoplasms of the Brain (Benign & Malignant)**

**TYPICAL HOSPITAL STAY: 2 - 4 DAYS**

---

**DAY OF ADMISSION TO B3 - Transfer from ICU**

- Initiate Order to Recommend Follow Recovery Roadmap - MD
- Complete Medication Reconciliation Form - MD
- Consider Rehab (PT/O/T/Speech) Consultation - MD
- Consider Social Work Consultation - MD
- Other Considerations:
  - Consider Radiation Oncology Consultation - MD
  - Consider Neuro-Oncology Consultation - MD
  - Consider Medical Oncology Consultation - MD

**ASSESSMENT/TREATMENT**

- Discontinue Central Line If Appropriate - MD
- Discontinue Foley Catheter If Appropriate - MD
- Conduct Blood Sugar Monitoring and Prescribe Insulin Coverage (As Appropriate) - MD
- Check Wound: Dressing Management Surgeon Specific - RN

**TEACHING**

- Discuss Medication Management (Decadron) - RN
- Inform Family of Discharge Plan - Discuss Transportation - Provide Family With Information for Recovery - RN

**MOBILITY/REHAB**

- Initiate Early Mobilization - Ensure Fall Precautions - RN
- Apply DVT Prophylaxis - RN

**NUTRITION**

- Appropriate Diet: Advance as Tolerated (Regular, Soft) - RN

**MEDICATION**

- Oral Analgesics - MD
- Antiepileptic Medications - MD
- Steroid Taper with Acid Blocker - MD
- DVT Prophylaxis (as appropriate) - MD
- Stool Softeners - MD

---

**POST OPERATIVE DAY TWO**

- Consider Rehab (PT/O/T/Speech) Consultation - MD
- Consider Social Work Consultation - MD
- Other Considerations:
  - Consider Radiation Oncology Consultation - MD
  - Consider Neuro-Oncology Consultation - MD
  - Consider Medical Oncology Consultation - MD

**ASSESSMENT/TREATMENT**

- Discontinue Central Line If Appropriate - MD
- Discontinue Foley Catheter If Appropriate - MD
- Check Antiepileptic Levels - MD
- Conduct Blood Sugar Monitoring and Prescribe Insulin Coverage (As Appropriate) - MD
- Check Wound: Dressing Management Surgeon Specific - RN

**TEACHING**

- Discuss Medication Management (Decadron) - RN
- Inform Family of Discharge Plan - Discuss Transportation - Provide Family With Information for Recovery - RN

**Picker Questions**

1. During This Hospital Stay, Did You Get Information In Writing About What Symptoms Or Health Problems To Look Out For After You Leave The Hospital? - RN
2. During This Hospital Stay, Did MDs, RNs, Or Other Hospital Staff Talk With You Regarding The Help You Need When You Leave The Hospital? - RN
3. Did They Tell You When You Could Resume Your Usual Activities, Such As When To Go Back To Work Or Drive A Car? - RN
4. Did the MDs and RNs Give You or Someone Close to You All The Information They Need To Help You Recover? - RN

**MOBILITY/REHAB**

- Initiate Early Mobilization - Ensure Fall Precautions - RN
- Apply DVT Prophylaxis - RN

**NUTRITION**

- Appropriate Diet: Advance as Tolerated (Regular, Soft) - RN

**MEDICATION**

- Oral Analgesics - MD
- Antiepileptic Medications - MD
- Steroid Taper with Acid Blocker - MD
- DVT Prophylaxis (as appropriate) - MD
- Stool Softeners - MD

---

**CASE MANAGEMENT**

- Inform Case Manager of Patient Status and Discharge Requirements - MD
Value-based Neurosurgery

The example of microvascular decompression surgery

Nancy McLaughlin, MD, PhD, Farzad Buxey, Karen Chaw, Neil A. Martin, MD
Summary of Interventions

**PRE-OPERATIVE**
- Discussion of the expected LOS 1-2 PO days

**INTRA-OPERATIVE**
- Introduction of a comprehensive time-out
  - Technical improvements - closure

**POST-OPERATIVE**
- Standardization of discharge criteria
- Modifying PM rounds: Identification of patients for AM discharge, initiating discharge prep
- Standardization of discharge instruction sheets, steroid taper, suture removal, and FU appointment
Value based neurosurgery: Microvascular decompression surgery

- Total 49 pts: Mean age 56 yrs; 31 TN; 18 HFS
  - Group 1 2008 – 18 months: 20 patients
  - Group 2 2011 – 18 months: 29 patients
- Rate of complete resolution or significant improvement: 97% TN and 100% HFS
- No mortality
Figure 3. Percent of patients discharged by POD2 and POD3 before noon

Group 1: 3 readmissions, 3 reoperations for CSF leak

Group 2: 1 readmission, 0 reoperations
Defining: “Perfect Surgery”

1. No mortality
2. No post-operative complication
3. Resolution of symptoms
4. Discharged home
5. Post-operative LOS 2 days or less
6. Discharge by noon
7. No readmissions related to surgery
8. No need for repeat surgery

Pre-Redesign: 5% perfect surgery

Post-Redesign: 31% perfect surgery
From Quality to Value

Value = Quality/Cost
COST: How do we measure it now?

1) With difficulty – most current efforts generally focus on “charges’

2) The best current surrogates may include
   1) ICU length of stay
   2) Overall length of stay
   3) Reoperation rate
   4) Readmission rate
Risk-Adjusted Mortality:

Department

Source: UHC Clinical Database
Systematic measurement and evaluation of the predetermined outcomes of a process, and the subsequent use of information to improve the process based on expectations of the customer.

– Donabedian
<table>
<thead>
<tr>
<th>Service Line</th>
<th>Oct - Dec 2011 (Q4)</th>
<th>Jan 2011 - Dec 2011 (recent year)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Summary</strong></td>
<td></td>
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<tr>
<td>Post-Surgical</td>
<td>722</td>
<td>3,091</td>
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<tr>
<td>Quality and Accountability Aggregate</td>
<td>3,393</td>
<td>14,044</td>
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<tr>
<td>Total Inpatient</td>
<td>3,616</td>
<td>15,833</td>
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<tr>
<th>Service Line</th>
<th>Denom (Cases)</th>
<th>Obs Mort(%)</th>
<th>Obs/Exp Ratio</th>
<th>UHC Median</th>
<th>Rank</th>
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<td>Post-Surgical</td>
<td>722</td>
<td>2.35</td>
<td>1.45</td>
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<td>1.10</td>
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<td>57/77</td>
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<td>Total Inpatient</td>
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<td>1.07</td>
<td>0.85</td>
<td>59/78</td>
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<td>Total Inpatient</td>
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<td>Heart Transplant or Implant of Heart Assist System</td>
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<td>HIV</td>
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<tr>
<td>Surgery General</td>
<td>194</td>
<td>2.58</td>
</tr>
<tr>
<td>Trauma</td>
<td>195</td>
<td>2.05</td>
</tr>
<tr>
<td>Urology</td>
<td>41</td>
<td>0.00</td>
</tr>
<tr>
<td>Vascular Surgery</td>
<td>13</td>
<td>0.00</td>
</tr>
<tr>
<td>Ventilator Support</td>
<td>32</td>
<td>37.50</td>
</tr>
</tbody>
</table>

**Legend**
- Substantially Worse than Target Range: Performance > 90th percentile of peer group
- Worse than Target Range: Performance > 50th percentile of peer group
- 95th percentile of peer group
- Substantially Better than Target Range: Performance < 10th percentile of peer group

**Quality Alert Screening Criteria:**
- Most recent 8 quarters mortality higher than expected and one of the most recent 4 quarters has O/E Ratio >= 1.4
- Any 2 data points in the most recent 4 quarters have O/E Ratio >= 1.4

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# UCLA Health System  
**Oct - Dec 2011 (Q4)**  
**Neurosurgery**

## Definition - Neurosurgery
Service lines are defined by UHC and displayed in the CDB. This service line includes inpatient discharges in MS-DRGs 20-27, 31-33, 40-42 (base MS-DRGs 10-12, 14, 17). This list is based on the effective MS-DRGs for the reported current quarter. Trauma, burn, and cases with any ICD-9 procedure code 30.73 and 39.72 are excluded. Bad data, nonviable neonates, hospices, and records with a null expected mortality are excluded. For prior periods, service line assignments were based on the effective MS-DRGs at that time.

<table>
<thead>
<tr>
<th>Relative Performance</th>
<th>Denom (Cases)</th>
<th>Obs/Exp</th>
<th>UHC Median</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Quarter</td>
<td>230</td>
<td>1.40</td>
<td>1.00</td>
<td>86/114</td>
</tr>
<tr>
<td>Recent Year</td>
<td>319</td>
<td>1.02</td>
<td>0.94</td>
<td>56/114</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Current Quarter</th>
<th>Last Quarter</th>
<th>Recent Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cases (denom.)</td>
<td>230</td>
<td>195</td>
</tr>
<tr>
<td>Observed Deaths</td>
<td>14.1</td>
<td>7.7</td>
</tr>
<tr>
<td>Expected Deaths</td>
<td>7.84</td>
<td>8.87</td>
</tr>
<tr>
<td>Observed Mortality (%)</td>
<td>4.78</td>
<td>3.59</td>
</tr>
<tr>
<td>Expected Mortality (%)</td>
<td>3.41</td>
<td>4.35</td>
</tr>
<tr>
<td>Observed/Expected Ratio</td>
<td>1.40</td>
<td>0.70</td>
</tr>
</tbody>
</table>

## Benchmarks:

### Data Source: UHC CDB  
**Related Report:** UHC QSMR

### Recent Year Five Base MS-DRGs with Highest Excess Deaths (≥20 cases):

<table>
<thead>
<tr>
<th>Base MS-DRG 12</th>
<th>CRANIOTOMY/ENDOVASCULAR INTRACRANIAL PROCES</th>
<th>496</th>
<th>1.59</th>
<th>3.70</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base MS-DRG 10</td>
<td>INTRACRANIAL VASCULAR PROCES W/ PDX HEMORRAGE</td>
<td>30</td>
<td>1.07</td>
<td>0.34</td>
</tr>
</tbody>
</table>

## Recent Year UHC Top-10 Mortality O/E in Neurosurgery

- **STELIZABETH**: 0.00, 41, 0.99, 22.08
- **IU_HEALTH-UNIVERSITY**: 0.00, 26, 1.63, 4.35
- **FRESNEDICTR**: 0.00, 24, 0.99, 10.00
- **WASHINGTON**: 0.23, 230, 0.98, 3.49
- **EMORY_MIDTOWN**: 0.35, 170, 1.64, 7.28
- **NYU**: 0.40, 501, 5.10, 7.13
- **BEAUMONT-ROYALOAK**: 0.44, 467, 1.08, 4.81
- **BRIHAM**: 0.92, 735, 2.59, 6.06
- **METHODIST_HOUUSON**: 0.56, 491, 1.10, 4.56
- **IU_HEALTH-METHODIST**: 0.90, 576, 1.64, 4.28

### Mortality O/E in Neurosurgery

- **Most O/E**: Cases, LOS O/E, Readmit Rate

### Legend

- **Substantially Worse than Target Range**: Performance > 90th percentile of peer group
- **Worse than Target Range**: Performance > 50th percentile of peer group
- **Within Target Range**: Performance <= 50th percentile of peer group
- **Substantially Better than Target Range**: Performance < 10th percentile of peer group
- **Quality Alert Warning**: Quality alert screening criteria triggered (only for current quarter)
- **Interpret with Caution**: Low volume, excluded from top-10

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Mortality Reduction: What did we do?

• UHC
• Documentation – comorbidities
• Mortality review – every mortality, Monday am
• Data review - all faculty
• Evaluate mortality causes: intracerebral hemorrhage (ICH)
  • Code Brain – expedite imaging and treatment of ICH cases
• Palliative care, inpatient hospice
### ENGAGING CLINICIANS

#### Stages of Grief Quality Measurement

<table>
<thead>
<tr>
<th>Kübler-Ross</th>
<th>Shannon Sims, MD, PhD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Denial</td>
<td>There’s not a problem</td>
</tr>
<tr>
<td>Anger</td>
<td>Data are <em>completely</em> wrong</td>
</tr>
<tr>
<td>Bargaining</td>
<td>Need different metrics</td>
</tr>
<tr>
<td>Depression</td>
<td>My patients are sicker</td>
</tr>
<tr>
<td>Acceptance</td>
<td>OK, maybe we can do better</td>
</tr>
<tr>
<td>MEDICARE ID</td>
<td>HOSPITAL NAME</td>
</tr>
<tr>
<td>-------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>050262</td>
<td>UCLA-REAGAN</td>
</tr>
<tr>
<td>050262</td>
<td>UCLA-REAGAN</td>
</tr>
<tr>
<td>050262</td>
<td>UCLA-REAGAN</td>
</tr>
<tr>
<td>050262</td>
<td>UCLA-REAGAN</td>
</tr>
<tr>
<td>050262</td>
<td>UCLA-REAGAN</td>
</tr>
<tr>
<td>050262</td>
<td>UCLA-REAGAN</td>
</tr>
<tr>
<td>050262</td>
<td>UCLA-REAGAN</td>
</tr>
<tr>
<td>050262</td>
<td>UCLA-REAGAN</td>
</tr>
<tr>
<td>050262</td>
<td>UCLA-REAGAN</td>
</tr>
<tr>
<td>050262</td>
<td>UCLA-REAGAN</td>
</tr>
</tbody>
</table>
UHC Risk Model Calculator

Indicate which coding variables in column A are present for each individual patient by placing a 1 for present and 0 for absent within the 'Value' column.

<table>
<thead>
<tr>
<th>Explanatory Variable</th>
<th>Value</th>
<th>Coeff</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>1</td>
<td>-3.176</td>
<td>-3.176</td>
</tr>
<tr>
<td>Palliative Care</td>
<td></td>
<td>2.571</td>
<td>0</td>
</tr>
<tr>
<td>Loss Consc &gt;24 Hrs w/o Return Pre-Level</td>
<td></td>
<td>2.455</td>
<td>0</td>
</tr>
<tr>
<td>Vent on Admission Day</td>
<td></td>
<td>2.027</td>
<td>0</td>
</tr>
<tr>
<td>Sec Dx Group: Shock</td>
<td></td>
<td>1.855</td>
<td>0</td>
</tr>
<tr>
<td>Male, 85 &lt;= Age &lt; 90</td>
<td></td>
<td>1.101</td>
<td>0</td>
</tr>
<tr>
<td>Ventriculostomy</td>
<td></td>
<td>0.910</td>
<td>0</td>
</tr>
<tr>
<td>Male, 80 &lt;= Age &lt; 85</td>
<td></td>
<td>0.872</td>
<td>0</td>
</tr>
<tr>
<td>Any Dx Group: Hypotension</td>
<td></td>
<td>0.784</td>
<td>0</td>
</tr>
<tr>
<td>CC Renal Failure</td>
<td></td>
<td>0.496</td>
<td>0</td>
</tr>
</tbody>
</table>
Weekly Mortality Review
Monday, 7 am

<table>
<thead>
<tr>
<th>Mortalities (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name</strong></td>
</tr>
<tr>
<td><strong>MRN</strong></td>
</tr>
<tr>
<td><strong>Admit type</strong></td>
</tr>
<tr>
<td><strong>Admit source</strong></td>
</tr>
<tr>
<td><strong>Unit</strong></td>
</tr>
<tr>
<td><strong>Hosp Srvcs</strong></td>
</tr>
<tr>
<td><strong>DoB</strong></td>
</tr>
<tr>
<td><strong>Admit Date</strong></td>
</tr>
<tr>
<td><strong>Eff Date</strong></td>
</tr>
<tr>
<td><strong>Disp</strong></td>
</tr>
<tr>
<td><strong>Attending</strong></td>
</tr>
<tr>
<td><strong>LoS</strong></td>
</tr>
<tr>
<td><strong>Admit Dx</strong></td>
</tr>
<tr>
<td><strong>Surgery</strong></td>
</tr>
</tbody>
</table>
Neurosurgery Mortality Ratio
Observed/Expected

![Graph showing observed/expected ratio over quarters from Q1 2012 to Q4 2014. The ratio fluctuates but remains below 1.00, indicating lower than expected mortality.](image-url)
Neurosurgery Deaths (Percent Observed)
UCLA RR Mortality O/E Ratio
Jan 2014 - Dec 2014 (Recent Year)

- Trauma: 0.55
- Neurology: 0.72
- Neurosurgery: 0.72
- Cardiac Surgery: 0.79
- General Medicine: 0.92
- Cardiology: 0.94
- Neonatology: 0.99
- Pulmonary/Critical Care: 1.07
- Medical Oncology: 1.08
- HIV: 1.11
- General Surgery: 1.14
- Transplant Services: 1.29
- Thoracic Surgery: 1.48
- Bone Marrow Transplant: 2.07
- Gynecologic Oncology: 2.87
<table>
<thead>
<tr>
<th>Relative Performance</th>
<th>Denom (Cases)</th>
<th>Obs Mort(%)</th>
<th>Obs/Exp Ratio</th>
<th>UHC Median</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiac Surgery</td>
<td>909</td>
<td>3.08</td>
<td>0.87</td>
<td>0.89</td>
<td>52/114</td>
</tr>
<tr>
<td>Cardiology</td>
<td>1,274</td>
<td>3.61</td>
<td>1.03</td>
<td>0.95</td>
<td>88/124</td>
</tr>
<tr>
<td>General Medicine</td>
<td>6,097</td>
<td>2.77</td>
<td>0.90</td>
<td>0.86</td>
<td>75/130</td>
</tr>
<tr>
<td>General Surgery</td>
<td>2,306</td>
<td>2.12</td>
<td>0.97</td>
<td>0.90</td>
<td>87/129</td>
</tr>
<tr>
<td>Gynecologic Oncology</td>
<td>87</td>
<td>1.15</td>
<td>2.63</td>
<td>0.68</td>
<td>87/92</td>
</tr>
<tr>
<td>Gynecology</td>
<td>419</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>17/72</td>
</tr>
<tr>
<td>HIV</td>
<td>25</td>
<td>4.00</td>
<td>1.51</td>
<td>0.83</td>
<td></td>
</tr>
<tr>
<td>Medical Oncology</td>
<td>749</td>
<td>5.07</td>
<td>0.93</td>
<td>0.84</td>
<td>88/130</td>
</tr>
<tr>
<td>Neonatology</td>
<td>832</td>
<td>2.28</td>
<td>1.08</td>
<td>0.68</td>
<td>102/112</td>
</tr>
<tr>
<td>Neurology</td>
<td>1,926</td>
<td>1.66</td>
<td>0.53**</td>
<td>0.93</td>
<td>11/128</td>
</tr>
<tr>
<td>Neurosurgery</td>
<td>835</td>
<td>3.23</td>
<td>0.69*</td>
<td>0.98</td>
<td>25/127</td>
</tr>
<tr>
<td>Obstetrics</td>
<td>2,196</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>40/108</td>
</tr>
<tr>
<td>Orthopedics</td>
<td>382</td>
<td>0.79</td>
<td>0.77</td>
<td>0.85</td>
<td>52/122</td>
</tr>
<tr>
<td>Otolaryngology</td>
<td>668</td>
<td>0.00</td>
<td>0.00</td>
<td>0.84</td>
<td>1/87</td>
</tr>
<tr>
<td>Plastic Surgery</td>
<td>49</td>
<td>0.00</td>
<td>0.00</td>
<td>1.33</td>
<td></td>
</tr>
<tr>
<td>Pulmonary/Critical Care</td>
<td>264</td>
<td>28.79</td>
<td>1.14</td>
<td>0.96</td>
<td>105/121</td>
</tr>
</tbody>
</table>
UHC Risk Adjusted Mortality: UCLA Cranial Neurosurgery

Top 20 US News and World Report Programs, 2014
Neurosurgical Mortality - UCLA

Admission Diagnosis

- ICH: 33%
- Bleed (SAH, SDH): 22%
- Ischemic CVA: 16%
- Tumor: 11%
- Other: 2%
- Hydrocephalus: 2%
- Status epilepticus: 2%
- Infection- non surgical: 2%
- Infection- surgical: 2%
- Trauma: 1%
- Post cardiac arrest: 1%
- Encephalopathy: 1%
AHA/ASA Guideline

Guidelines for the Management of Spontaneous Intracerebral Hemorrhage
A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association

The American Academy of Neurology affirms the value of this guideline as an educational tool for neurologists.

Endorsed by the American Association of Neurological Surgeons, the Congress of Neurological Surgeons, and the Neurocritical Care Society
Class I

- **Rapid neuroimaging** with CT or MRI is recommended to distinguish ischemic stroke from ICH (I; A).

- Admit to ICU, Stroke Unit

- **Treat coagulopathy, hypertension, seizures, and hyperglycemia**

- **Surgical Treatment of ICH**: Patients with cerebellar hemorrhage, who are deteriorating neurologically or have hydrocephalus, should have surgical removal of the hemorrhage (I; B).
1. EMS Pre-Notification
2. Rapid Triage and Stroke Team Notification
3. Transfer Directly to CT
4. POC Laboratory Testing
UCLA Stroke Center: Code Stroke
ED, Stroke Neurology, Neuroradiology, Neurosurgery, Neuro-ICU

• Pre-arrival positioning of stroke team in ED:
• Pre-arrival notification of CT/MR
• Rapid case feedback quality improvement form
• Weekly case review
• Monthly data review
Improving ICH Risk-Adjusted Mortality (O/E ratio) vs US News Top 10
Improving ICH Risk-Adjusted Mortality: Comparison to US News Top 20

2012

Jan-Jun 2015
Risk-Adjusted Mortality: Individual Surgeon
How Do You Get Buy-In?
Clinical Quality Program

The UCLA Neurosurgical Clinical Quality Program

The UCLA Neurosurgery Clinical Quality Program is a comprehensive approach for improving quality of care, enhancing patient safety, increasing efficiency and reducing costs.

The Program involves a multidisciplinary team of faculty members, residents, nurses and care partners, therapists, pharmacists, Infection Control specialists, Patient Affairs liaisons, and Medical Center Finance Department representatives.

http://neurosurgery.ucla.edu/quality
Public Reporting on Safety and Quality
Hospital Compare, Physician Compare
Financial Incentives, Penalties
Value Based Purchasing:
- measuring and reporting comparative performance
- paying providers differentially based on performance

VBP Financial Impact
A Few Reminders

- Initially, all hospitals will lose 1% of their Medicare payments (in 2013).
- A hospital’s VBP score determines how much of that 1% they can earn back.
- Top performers (nationally) have the potential to earn back their initial 1% and more.
• 82% of health plans consider the development of new payment models a major priority

• 75% of health insurers are making a major effort to convert from fee-for-service to value-based payments

• 75% of plans intend to automate information exchange with doctors in the next 12 to 18 months so they can expand value-based payment models

May, 2013
Patients Directed to High Quality/Value Hospitals and Surgeons
Free Cardiac And Spine Surgery For Walmart Employees At Six Hospitals

Starting next year 1.1 million US Walmart employees and their dependents will be eligible for free heart, spine, and transplant surgery at 6 highly regarded health care organizations. Walmart employees will have no out-of-pocket costs, including travel, lodging and food for the patient and a caregiver.

On Thursday the company announced that its “Centers of Excellence” program, which had previously provided free transplants to Walmart employees, would expand to include heart and spine surgeries. Here are the six health care organizations involved in the program:

- Cleveland Clinic in Cleveland, Ohio
- Geisinger Medical Center in Danville, Pa
- Mayo Clinic sites in Rochester, Minn., Scottsdale/Phoenix, Ariz., and Jacksonville, Fla.
- Mercy Hospital Springfield in Springfield, Mo
- Scott & White Memorial Hospital in Temple, Texas
- Virginia Mason Medical Center in Seattle, Wash
The Professional Case for Quality

It is the fundamental expression of professional excellence
It serves patients best
It is the right thing to do

“The role of the clinical department chair is to guarantee excellence”
AND TWO MORE THINGS
Surgical Innovation

Minimally Invasive Technique

New Procedures

New Technology
ICH: Trajectories
Suction Point #1
2/3 of the distance to the distal margin of the hematoma

Right Supraorbital Burrhole; Eyebrow incision

Documentation of suction point #1 by screenshot
Aspiration of hematoma and measurement of hematoma volume
SURGICAL VIRTUOUSITY
Deliberate Practice

High concentration practice beyond one's comfort zone
Deliberate Practice

1. Deliberate practice is an activity designed specifically to improve performance,
2. The practice activity can be regularly repeated.
3. The practice activity provides feedback on a continual basis.
4. Deliberate practice is highly demanding mentally, whether it’s purely physical or mental –
True Professional: Charlie Drake
He has kept handwritten notes and drawings on every major case that he has operated upon, highlighting the clinical history and physical findings and the details of the operation, postoperative course, and follow-up.
Dr. Drake’s Case Notes

Fig. 2. Notes on the first patient in whom a fenestrated clip was used. Drake kept personal records of each aneurysm case. This page contains drawings that outline the shape and size of the aneurysm, as well as records on the patient’s history, the operative technique used, and the patient’s initial postoperative period. In the left lower corner Drake outlined the mechanism of the clip’s usage.

Fig. 3. Continuation of the notes shown in Fig. 2, providing the patient’s postoperative course and follow-up data.
FIG. 37. Operative sketches showing method of transcortico-ventricular exposure of tumour in third ventricle (spongioblastoma polare).
Surgical Simulation and Rehearsal
Chasing Perfection

• Eliminate the Flaws
• Improve every element
• Expand the Possible

• Perfect the neurosurgical care of today
• Invent new solutions for the untreatable
  (Invent the neurosurgery of tomorrow,