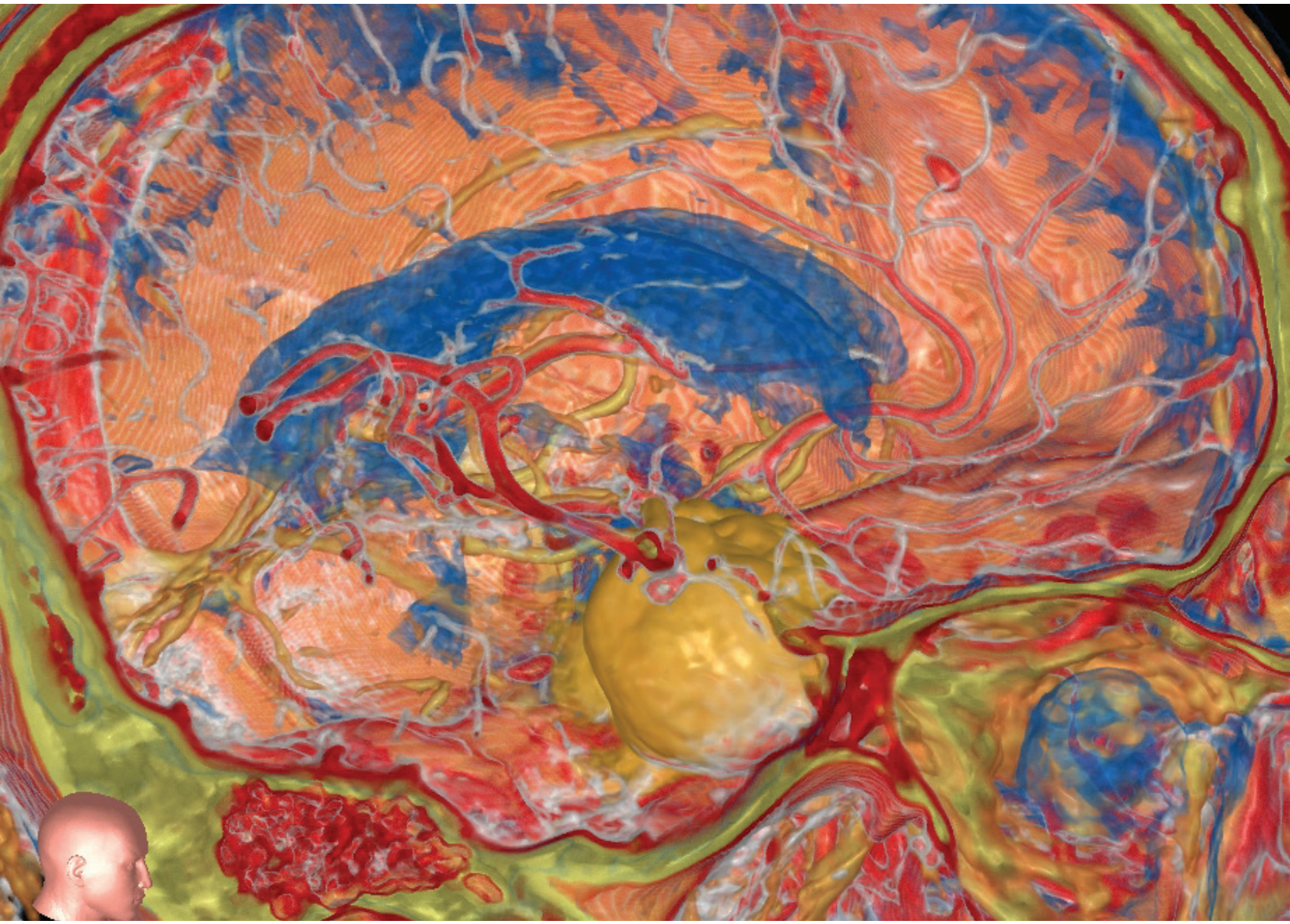
David Geffen School of Medicine | UCLA Health



# VALUE-BASED NEUROSURGERY

*CHASING PERFECTION IN NEUROSURGERY*

## 2015 CLINICAL REPORT

UCLA NEUROSURGERY

# KEY ACHIEVEMENTS

UCLA NEUROSURGERY

## 1 MORTALITY:

- **NEUROSURGERY** – Over the past 2 years, we have significantly reduced the UHC risk-adjusted mortality rate, passing from the 84th percentile (97/114) in Q1 2012 to the **13th percentile (18/128)** for the most recent quarter of data, Q2 2015.
- **SPINE** – The SMUCLA Spine Program has the **lowest risk-adjusted mortality** among the US News and World Report Top 20 Best Hospitals for Neurology and Neurosurgery, and is ranked 7th out of 89 in risk-adjusted mortality in UHC.

## 2 READMISSIONS:

- **NEUROSURGERY** – RRUMC is ranked **2nd in all-cause readmission** rates among the US News and World Report Top 20 Best Hospitals for Neurology and Neurosurgery.
- **SPINE** – The SMUCLA Spine Program is ranked **4th in all-cause readmisison** rates among the US News and World Report Top 20 Best Hospitals for Neurology and Neurosurgery.

## 3 STROKE:

The UCLA Stroke Center has been awarded the **"Target: Stroke" Honor Roll Elite Plus** status for expedited stroke care in 2015. This quality award has only been given to approximately 30 out of 1000 stroke centers in the US.

## 4 PROGRAM SPECIFIC DASHBOARDS:

In collaboration with the Faculty Practice Group and Quality Analytics, we have successfully developed **automated dashboards for the majority of our subspecialty programs.** These dashboards will both facilitate and empower our program directors to lead targeted quality initiatives.

## 5 VALUE-BASED NEUROSURGERY – COMPREHENSIVE CARE REDESIGN:

In the past year, we have successfully redesigned strategies and **implemented process improvement initiatives** targeting key care points throughout the episode of care. This care redesign has had widespread positive effects on numerous quality metrics and patient satisfaction.

## 6 PATIENT SATISFACTION – PAIN MANAGEMENT:

For both Neurosurgery and Spine, we have successfully improved pain management during hospitalization.

## 7 NURSING EXCELLENCE:

In 2015, RRUMC received its **3rd Magnet Certification.** This elite award of nursing excellence has been awarded to fewer than 6% of all US hospitals.

DECEMBER 2015

# DEPARTMENT OF NEUROSURGERY
# 2015 CLINICAL VALUE REPORT




DEPARTMENT CHAIR
Neil A. Martin, MD

EDITORS
Jody Anderson
Gena Behnke
Nancy McLaughlin, MD, PhD
Neil A. Martin, MD



ACKNOWLEDGMENTS

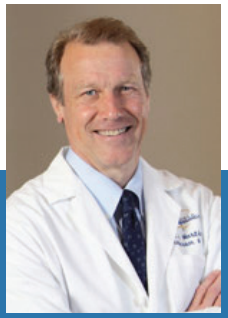
**Faculty Practice Group & Office of Health Informatics and Analysis**
Robin Clarke, MD
Andrew Hackbarth

**Patient Satisfaction (HCAHPS)**
Namgyal Kyulo
Xiangqun (Jennifer) Lu
Tony Padilla

**(CGCAHPS)**
Samuel Skootsky, MD
Lateia S. Taylor


***Cover Illustration:***

*Medial sphenoid wing meningioma. Image provided by Surgical Theater virtual reality Surgical Navigation Advanced Platform (SNAP.)*



# MESSAGE FROM THE CHAIRMAN

The faculty and staff of the Department of Neurosurgery are delighted to present this update on the UCLA Department of Neurosurgery Quality Program. The Quality Program in Neurosurgery has continued to develop and includes physicians in neurosurgery, neurological critical care, hospital medicine, and neuro-anesthesiology, along with our colleagues in the OR, ICU, and medical/surgical nursing. The team also includes physical therapists, pharmacists, case managers, social workers, and departmental administrative staff. We benefit from the engagement and insight of our Patient and Family Advisory Council. The program has been coordinated with and supported by the leadership and administrative teams of UCLA Health, the Ronald Reagan and Santa Monica UCLA Medical Centers, and the Faculty Practice Group.

Our previous report largely described the structure and agenda of our program. We are now primarily focused on reporting the quantitative measurements that define the results of our program. In the key metrics, in program after program, we have seen clear progressive year-over-year improvements. The measurements of our clinical performance, in the majority of critical areas, place our programs in the company of the nation's most exceptional academic medical centers.

The principal lesson of our efforts in quality program has been very clear: with sustained, creative team effort, major improvements in care are possible. And I want to emphasize - ***we are not done***.

The program has been generously supported by our Health System, by the Office of the President of the University of California, and by visionary philanthropists. Without this support and the dedicated efforts of our entire team, the program would not have been successful. I want to acknowledge all the talented and dedicated participants in this program. Most importantly, on behalf of our patients and their families, who are at the center of this work and benefit most from these efforts – thank you all!

Through the last five years we have developed a vision for our program – ***to chase perfection in neurosurgical care***. With the help of so many, this year we moved several steps closer to the ultimate goal of perfect neurosurgery.

Sincerely,

Neil A. Martin, MD
Professor & W. Eugene Stern
Chair in Neurosurgery

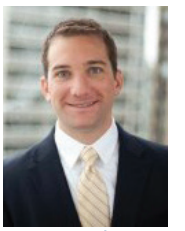
**Jody Anderson**
Director of Quality Analytics

**Barbara Anderson**
Unit Director
Neuroscience/Trauma ICU

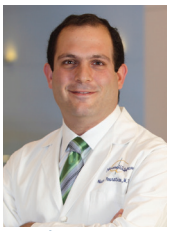
**Julie Byrd**
Administrative Nurse
Neurosurgery

**Marvin Bergsneider**
Professor
Co-Director, Pituitary Tumor Program

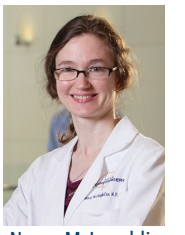
**Langston Holly**
Professor
Director, UCLA Spine Center



**Steven Cohen**
Chief Administrative Officer
Neurosurgery



**Nader Pouratian**
Associate Professor
Director of Quality, Neurosurgery



**Nancy McLaughlin**
Assistant Clinical Professor
Neurosurgery

**Barbara Van De Wiele**
Professor, Executive Vice Chair
Anesthesiology & Perioperative Medicine

**Jeffrey Saver**
Professor of Neurology
Co-Director, UCLA Stroke Center

**Derek Wilcox**
Unit Director
6N

**Paul M. Vespa**
Professor
Neurosurgery & Neurology
Director, Neurocritical Care Program

# ABOUT THE **UCLA** DEPARTMENT OF NEUROSURGERY

The Department of Neurosurgery at UCLA delivers clinical care on two campuses: the **Ronald Reagan UCLA Medical Center** (RRUMC), dedicated to cranial neurosurgery, and the **Santa Monica UCLA Medical Center** (SMUCLA), dedicated mostly to spinal neurosurgery.

## THE **CLINICAL PROGRAMS** INCLUDE:

**CEREBROVASCULAR**
- Aneurysms & AVMs
- Stroke

**BRAIN TUMOR**
- Neurosurgical Oncology (gliomas)
- Pituitary Tumors
- Meningiomas
- Skull Base Tumor

**SPINE & PERIPHERAL NERVE**
- Spine
- Peripheral Nerve

**EPILEPSY**

**STEREOTACTIC AND FUNCTIONAL**
- Stereotactic Radiosurgery (SRS)
- Functional Neurosurgery

**NEUROTRAUMA & CRITICAL CARE**
- Brain Injury Research Center
- Neurocritical Care

**PAIN**

**PEDIATRIC NEUROSURGERY**

*The Department of Neurosurgery strives to invent the future of neurosurgery by improving neurosurgical treatment of brain and spinal conditions through innovative research and development, by providing **optimal value of care** for our patients and training the next generation of neurosurgical pioneers.*

## THE **RESEARCH PROGRAMS** IN NEUROSURGERY AT UCLA INCLUDE:

- Brain Injury Research Center (BIRC)
- Brain Tumor
- Clinical Informatics
- Cerebrovascular
- Neurocognitive
- Pediatric Epilepsy
- Peripheral Nerve
- Spine
- Stroke
- VALUE Research

## UCLA NEUROSURGERY RECOGNITION AND AWARDS:

- **No. 7 Neurosurgery Department according to U.S. News and World Report**
- **No. 2** in **National Institutes of Health** (NIH) **research grants** (2014)
- **No. 2 in the U.S. for scholarly research**
- **Joint Commission National Quality Approval** awarded to **UCLA Stroke Center**
- **The UCLA Stroke Center is a designated center** of the **NIH-funded Specialized Programs of Translational Research in Acute Stroke** (SPOTRIAS)
- **Nine clinicians** in total in the UCLA Neurosurgery Department have been **voted BEST DOCTOR IN AMERICA**.

# ON THE FOREFRONT OF
# VALUE-BASED CARE DELIVERY

The UCLA Department of Neurosurgery has pioneered numerous safety and quality initiatives that have subsequently been implemented throughout the UCLA Campus and the University of California Health System.

In recent years, the concept of ***value of care*** has become the overarching framework guiding care delivery. In addition to delivering the best outcome and achieving a perfect patient experience, care needs to be delivered in a cost-conscious way.

## THE KEY FEATURES IN THE DEPARTMENT OF NEUROSURGERY, ESSENTIAL TO ITS LEADERSHIP IN VALUE-BASED CARE DELIVERY

***One clear mission statement:*** Provide a perfect and flawless patient experience, every time, any time.

***Exceptional dedication to delivering optimal care:*** By all care providers including faculty members, residents and fellows, nursing, care partners, therapists, pharmacists, and care coordinators.

***Essential collaborations with new partners:*** Performance Excellence specialists, Patient Affairs liaisons, Quality Analytics, Quality and Patient Safety, Risk Management, and medical center finance department representatives.

***Unique access to and critical review of electronic quality and financial data:*** Diligent review of data to assure appropriateness of patient population, specificity of informatic queries, and clinical pertinence of metrics. Various sources of data are utilized for verification purposes.

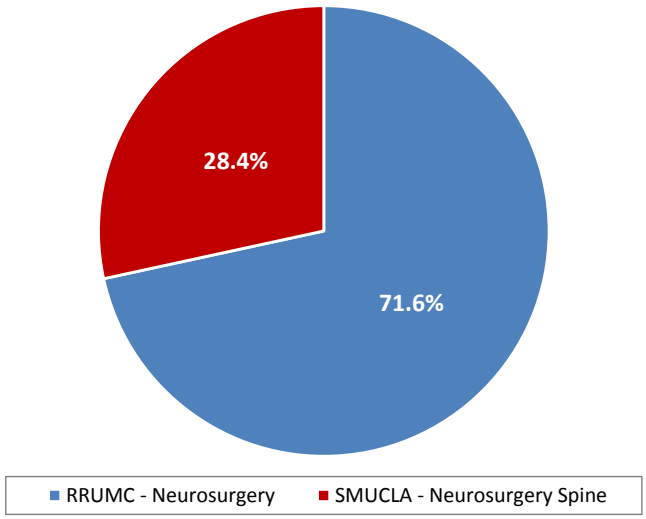
***Outstanding collaborative care:*** Through various committees, frontline care providers and administrators review data ***together***, identify areas that need improvement, prioritize quality initiatives, collaborate for action planning and implementation, monitor initiatives following implementation, and ***together*** assure sustainability.

***This report presents the results of important initiatives undertaken in 2014-2015 to improve the value of delivered care. Metrics developed by the department for specific initiatives and measures collected by national organizations are presented.***

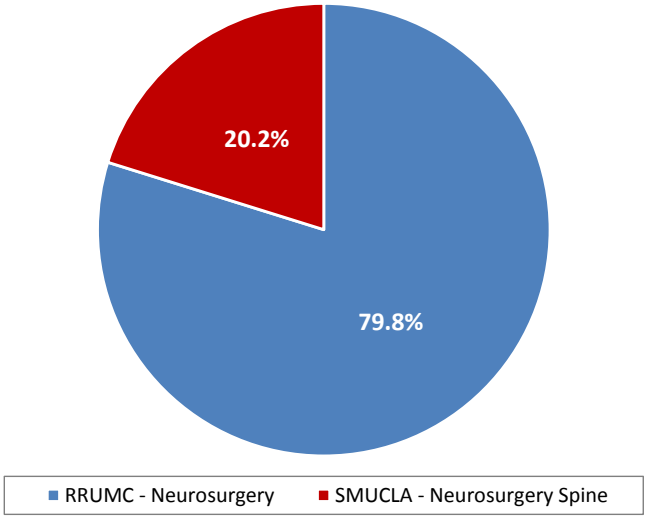
UCLA NEUROSURGERY

# SURGICAL **VOLUME**

## Procedure Volume by Location
## UCLA Department of Neurosurgery - 2014



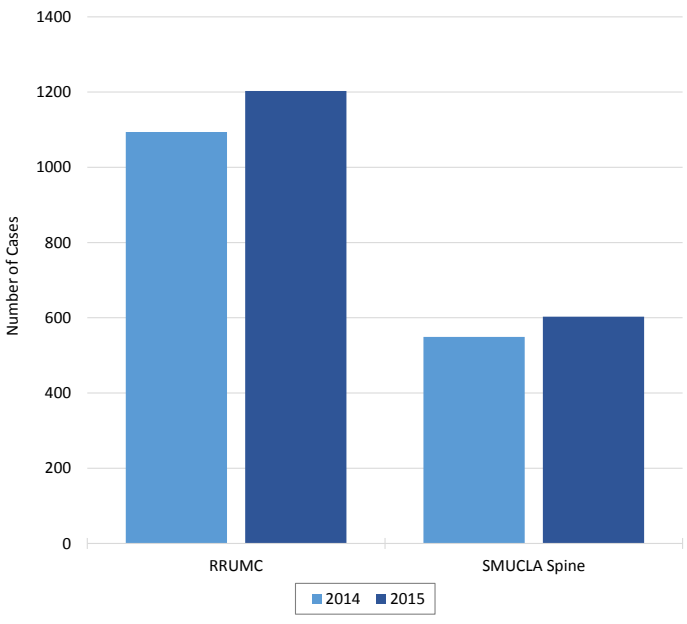

## Procedure Volume by Location
## UCLA Department of Neurosurgery - 2015




Source: Epic Clarity Database, custom query

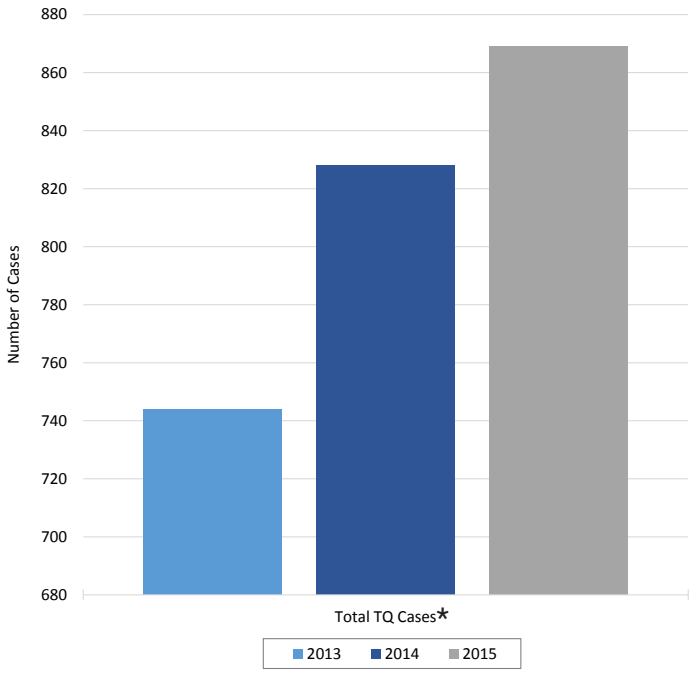
*The Department of Neurosurgery at UCLA performs **over 2,000 procedures** between the Ronald Reagan UCLA Medical Center and the Santa Monica Medical Center*

## Surgical Volume has Increased 10% in 2015




Source: UCLA Health System Decision Support

## Constant Growth in Neuroscience Tertiary and Quaternary Case Volume

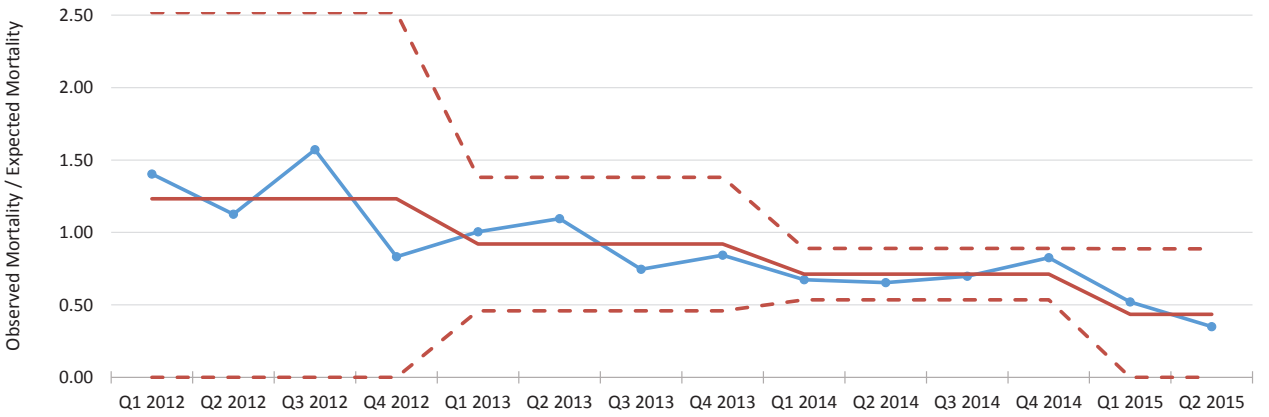



*Tertiary and Quaternary cases are comprised of adult patients treated at Ronald Reagan UCLA Medical Center, almost all cranial cases, of particularly high acuity, requiring specialized clinical facilities and services

# MORTALITY REDUCTION

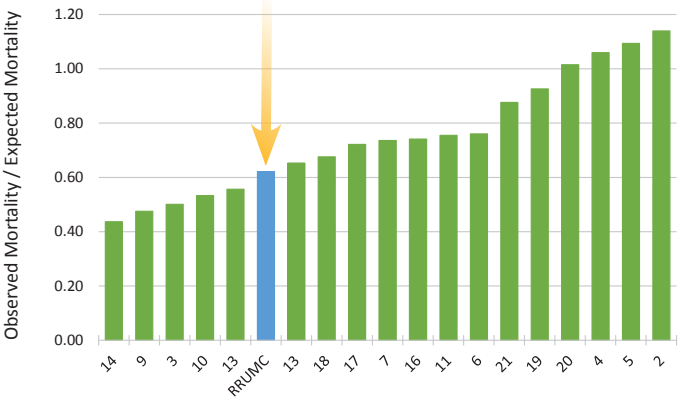
## RRUMC Neurosurgery has **Significantly Reduced** its Risk Adjusted Mortality from 1.32 in Q1 2012 to 0.35 in Q2 2015

UHC Risk Adjusted Mortality: RRUMC Cranial Neurosurgery Service Line



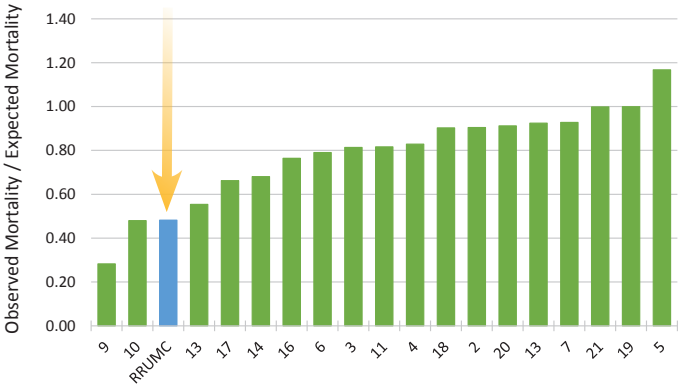

## UHC Cranial Neurosurgery Service Line Risk Adjusted Mortality

RRUMC and the US News and World Report Top 20 Best Hospitals for Neurology and Neurosurgery, Fiscal Year 2015




## UHC Neurology Service Line Risk Adjusted Mortality

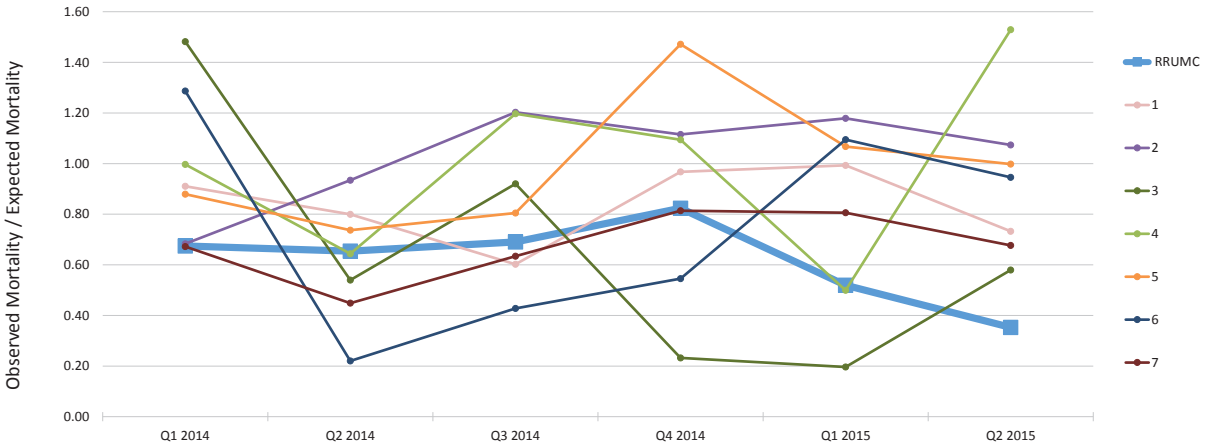
RRUMC and the US News and World Report Top 20 Best Hospitals for Neurology and Neurosurgery, Fiscal Year 2015




*UHC Neurology service line includes many patients managed by Neurosurgery and the Neuro-ICU

## UHC Cranial Neurosurgery Service Line Risk Adjusted Mortality

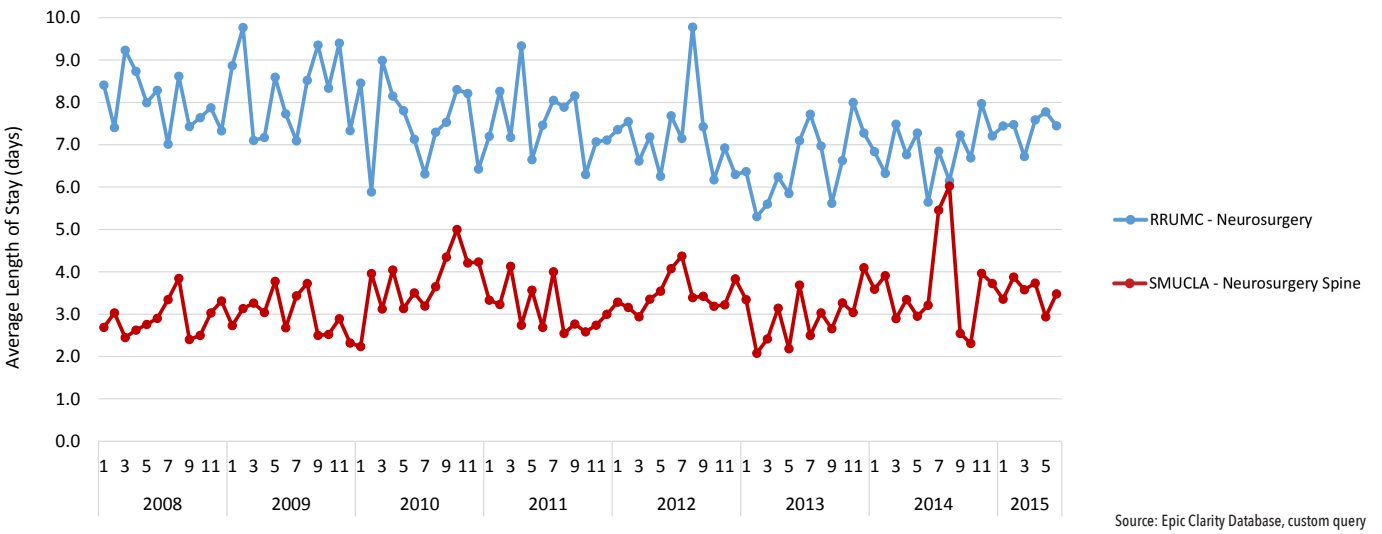
RRUMC and Select US News and World Report Top 20 Best Hospitals for Neurology and Neurosurgery




Source: UHC's Clinical Database

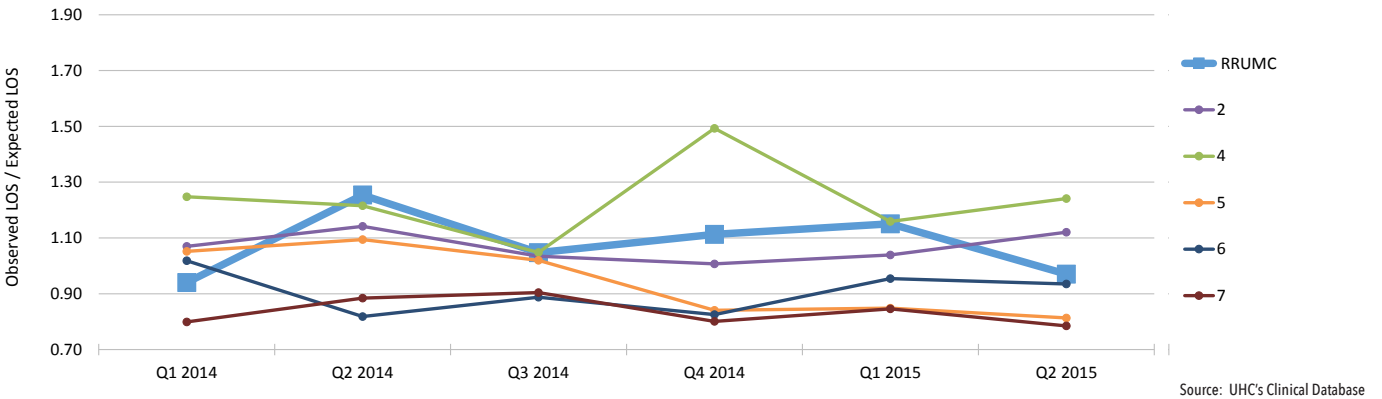
# LENGTH OF STAY

## Average Length of Stay - UCLA Neurosurgery and Spine



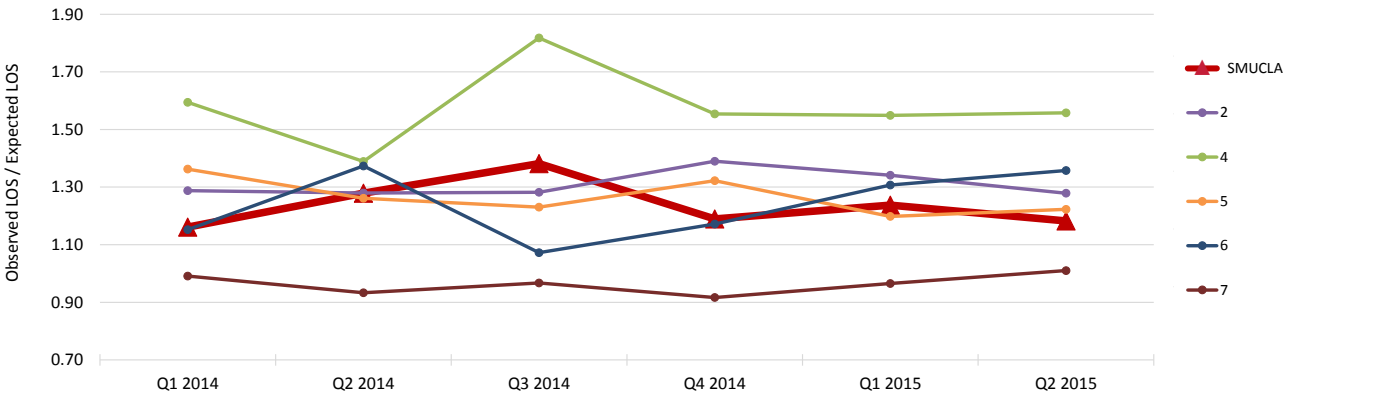

Source: Epic Clarity Database, custom query

## UHC Length of Stay Index, RRUMC - Cranial Neurosurgery Service Line and Select US News and World Report Top 20 Best Hospitals for Neurology and Neurosurgery




Source: UHC's Clinical Database

## UHC Length of Stay Index, SMUCLA - Spinal Surgery Service Line and Select US News and World Report Top 20 Best Hospitals for Neurology and Neurosurgery




Source: UHC's Clinical Database

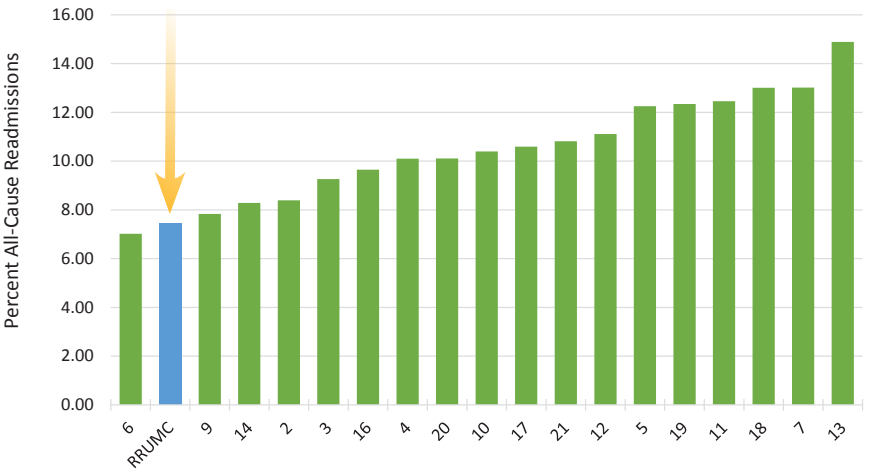
# READMISSION REDUCTION

*The Department of Neurosurgery is continuously striving to eliminate all preventable readmissions.*

*Our efforts to deliver optimal care are supported by on-going monitoring of readmissions with weekly case reviews.*

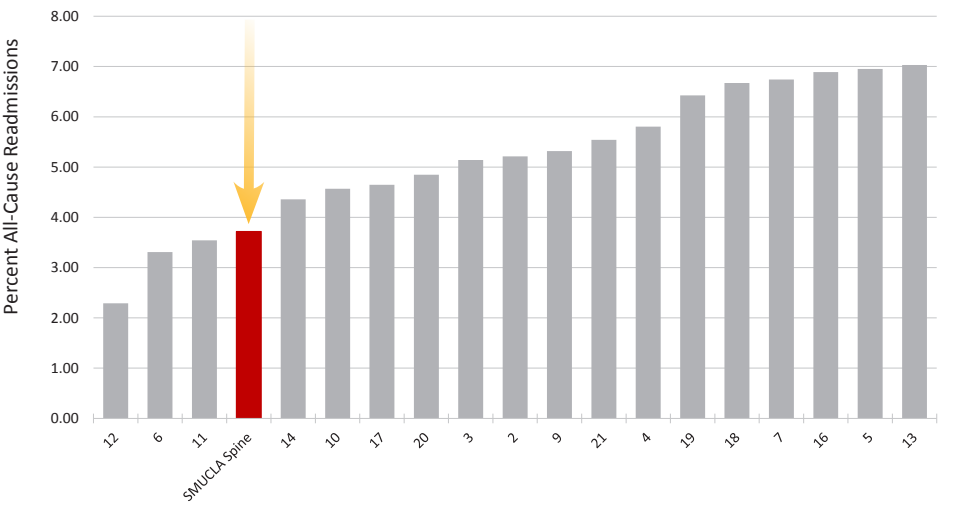
## RRUMC is Ranked 2nd in All-Cause Readmission Rates

UHC Percent All-Cause 30-Day Readmissions: RRUMC Cranial Neurosurgery Service Line and the US News and World Report Top 20 Best Hospitals for Neurology and Neurosurgery, Fiscal Year 2015



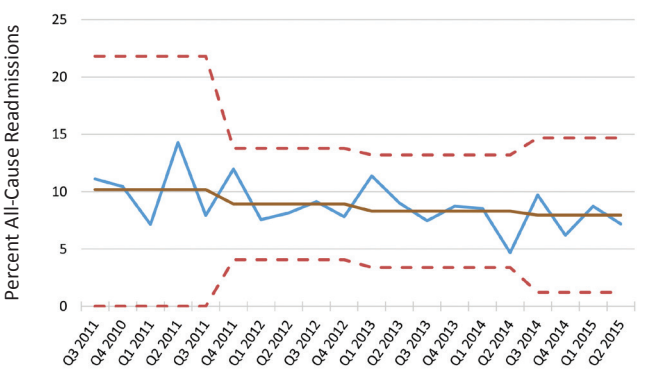

## SMUCLA is Ranked 4th in All-Cause Readmission Rates

UHC Percent All-Cause 30-Day Readmissions: SMUCLA Spinal Surgery Service Line and the US News and World Report Top 20 Best Hospitals for Neurology and Neurosurgery, Fiscal Year 2015

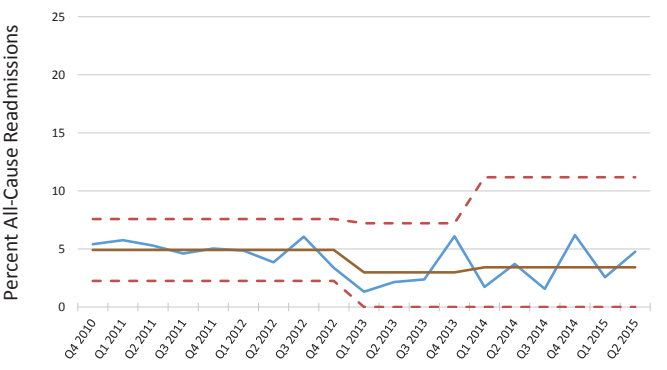



Source for all graphs: UHC's Clinical Database

## RRUMC Cranial Neurosurgery Service Line Percent All-Cause 30-Day Readmissions



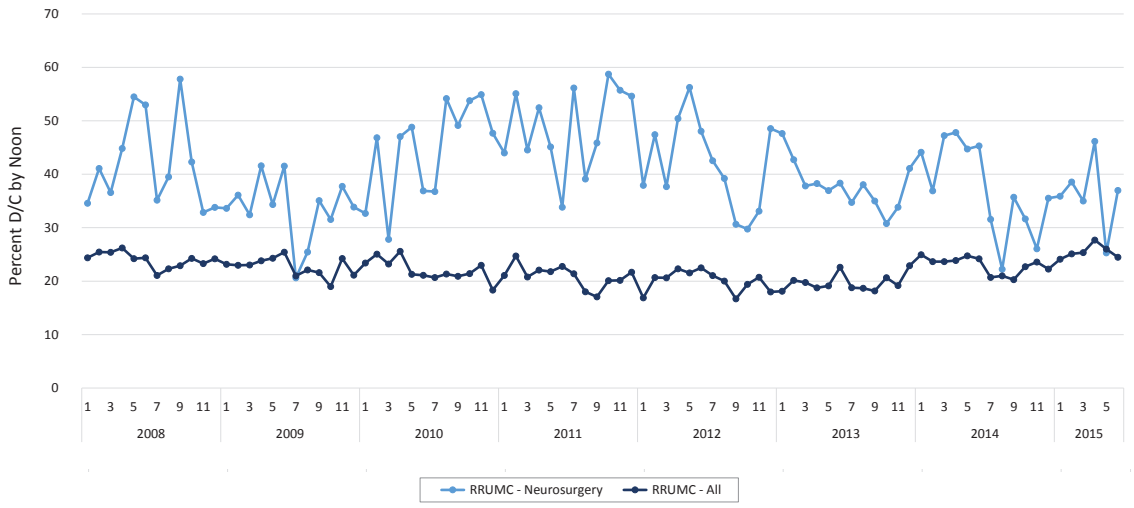

## SMUCLA Spinal Surgery Service Line Percent All-Cause 30-Day Readmissions



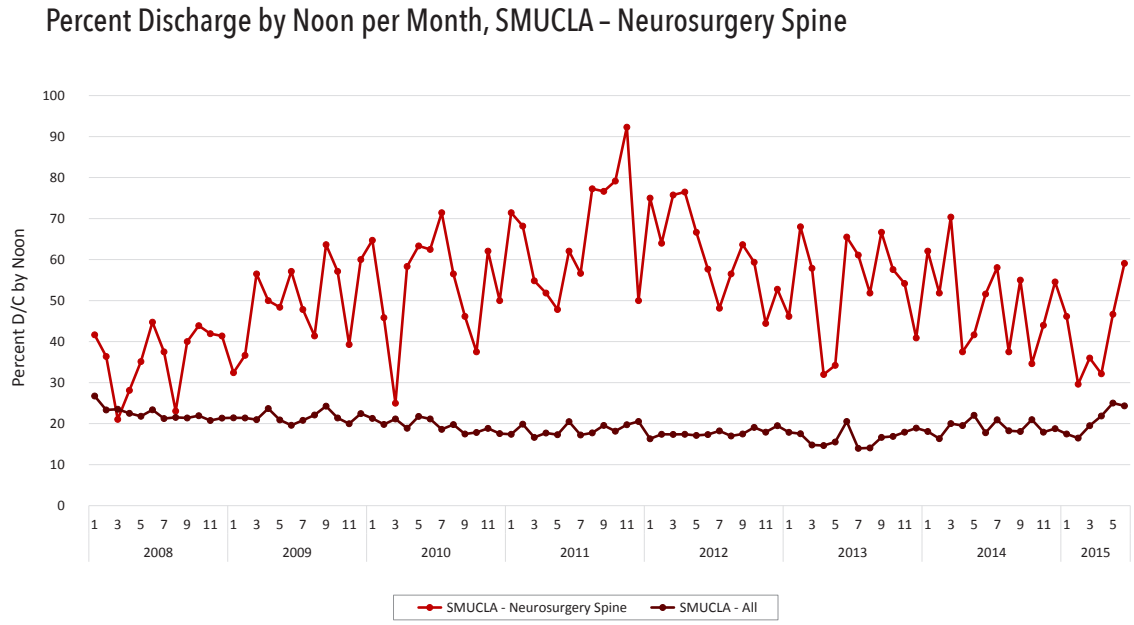
# DISCHARGE BY NOON

The Department of Neurosurgery is improving patient flow by targeting discharge by noon at both RRUMC and SMUCLA.

Our initiatives have addressed the causes of discharge delays, improved communication with patients and their families regarding the date and time of discharge, and resolved delays due to transportation and incomplete paperwork.




*The UCLA Department of Neurosurgery has had sustained improvement in discharge by noon, and consistently outperforms RRUMC and SMUCLA hospital-wide discharge by noon performance*

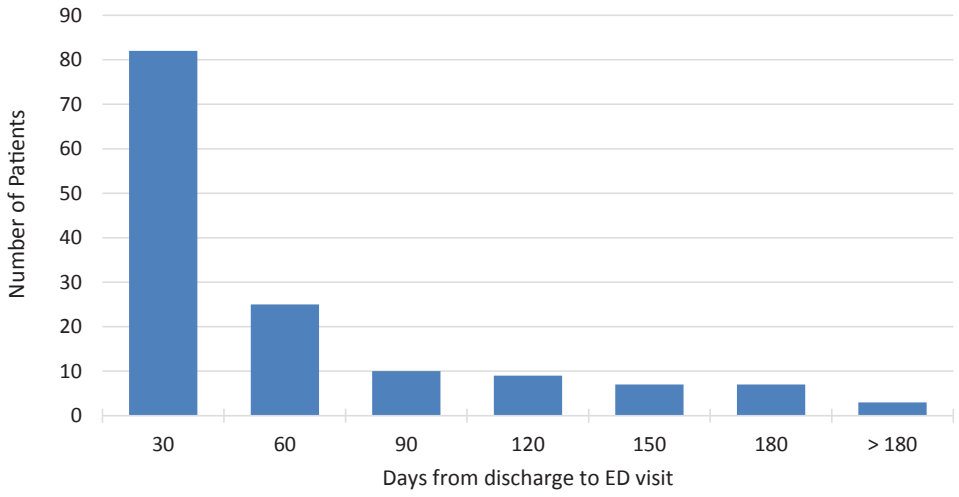



Source: Epic Clarity Database, custom query

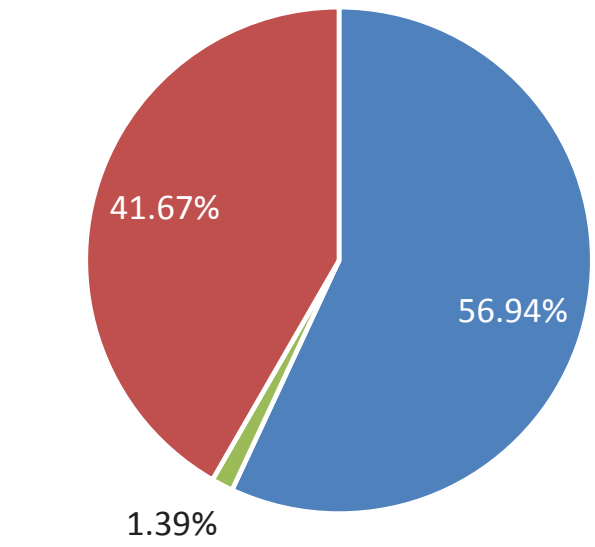
# RETURN TO EMERGENCY DEPARTMENT:
## ROOT CAUSE ANALYSIS

In 2015, the Hospitalist service, in collaboration with the Department of Neurosurgery, aimed to characterize the incidence and etiology of Emergency Department visits within six months following an index admission to UCLA Neurosurgery.

### 57% of Neurosurgery ED Visits Occur within the First Month




### 42% of Patients with ED Visits are Readmitted to the Hospital




### Reasons for ED Visits within the First Month after Discharge

| Reasons for Return to the ED | |
|---|---|
| New/worsening pain issue | 21 |
| New/worsening neurological symptom or sign | 14 |
| Infectious disease | 12 |
| Miscelaneous | 10 |
| Rule-out medical issue | 7 |
| Cardiovascular - vascular | 6 |
| Surgical complication | 6 |
| Abnormal imaging/laboratory | 3 |
| Iatrogenic | 3 |
| Psychiatric | 2 |
| **Total number of patients** | **84** |

Source: Epic Clarity Database, custom query

## PROCESS IMPROVEMENTS UNDER IMPLEMENTATION

1. Improve coordination of post-operative care before patient discharge:
   a) Coordinate appointment with primary care physician within one week of discharge
   b) Coordinate appointment with neurosurgeon within one week of discharge
2. Improve patient education regarding:
   a) What to look out for after surgery
   b) Pain management
3. Establish easy access pathways for rapid clinical assessments

# STROKE AND NEUROVASCULAR

## ACCREDITATIONS

- Comprehensive Stroke Center, certified by the Joint Commission, since 2012
- Primary Stroke Center, certified by the Joint Commission, since 2005
- Get with the Guidelines Stroke Gold Plus, recognized by AHA/ASA since 2010
- Target: Stroke Honor Roll Elite Plus, recognized by AHA/ASA since 2015

## INNOVATIONS

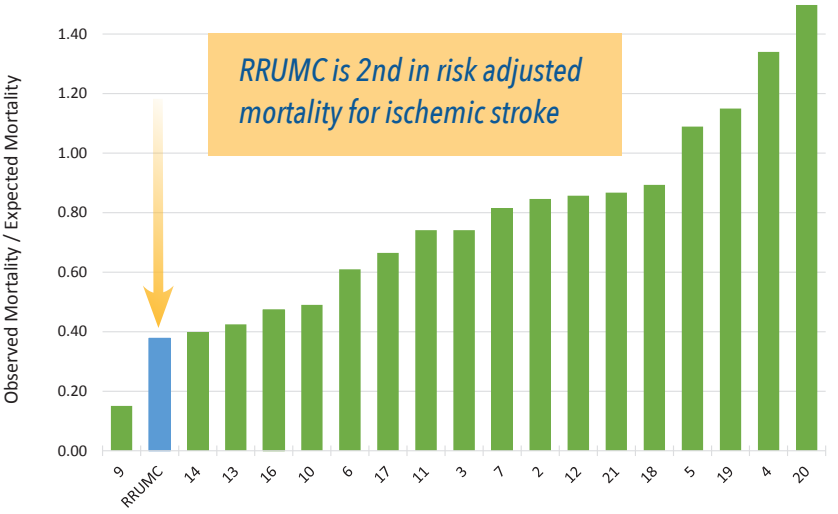
- First mechanical thrombectomy device therapies for acute ischemic stroke: stent and coil retrievers–invented/ developed at UCLA.
- First clinical cellphone PACS system for remote review of CT and MRI scans in acute stroke developed at UCLA.
- First Neuro ICU-adjacent comprehensive stroke imaging center with CT, PET, 3T, and MRI.
- First cerebral blood flow (CBF) laboratory to use bedside xenon CBF studies and transcranial doppler for stroke critical care and research.

TOP GRAPHS
Source: UHC Clinical Database; Ischemic stroke - primary ICD9 diagnosis codes: 433.01, 433.1, 433.11, 433.21, 433.31, 433.81, 433.91, 434, 434.01, 434.11, 434.91

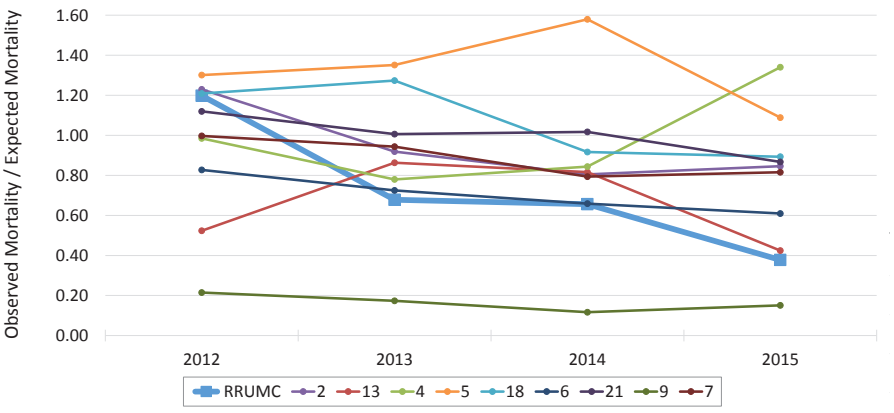
LOWER GRAPH
*GWTG: Get with the Guidelines
PAA: Performance Achievement Award
This composite is made from these seven measures: IT rt-PA 2 Hour, Early Antithrombotics, Antithrombotics, Anticoagulation for Atrial Fibrillation, DVT Prophylaxis, LDL 100 or ND, and Smoking Cessation.

## ISCHEMIC STROKE: MORTALITY

RRUMC and the US News and World Report Top 20 Best Hospitals for Neurology and Neurosurgery, Q1-Q2 2015

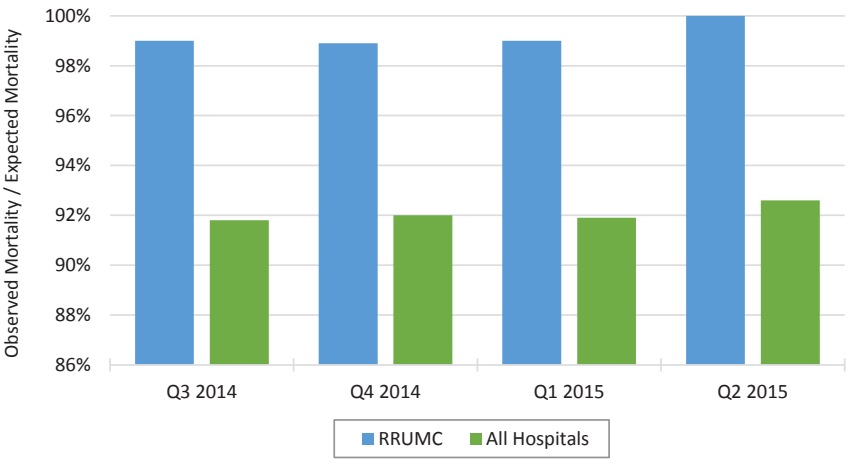



RRUMC and the US News and World Report Top 10 Best Hospitals for Neurology and Neurosurgery



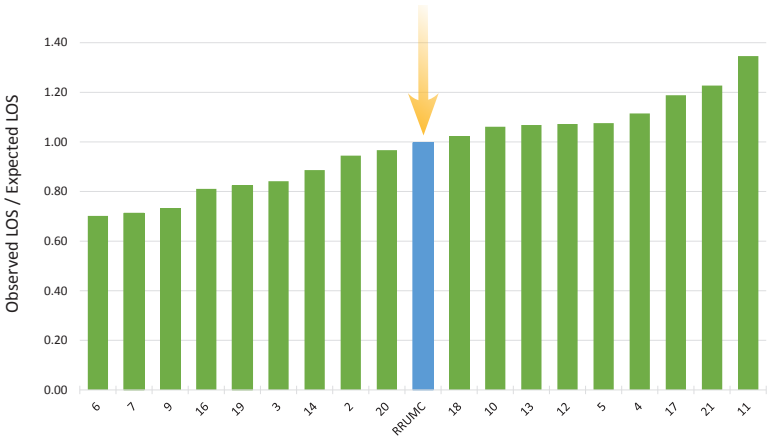

## GET WITH THE GUIDELINES/ PERFORMANCE ACHIEVEMENT AWARD

Defect Free Measure of the 7 Consensus GWTG/PAA* Measures

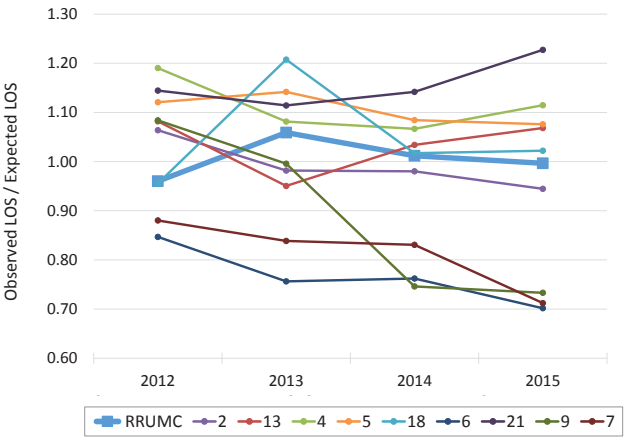


## ISCHEMIC STROKE: LENGTH OF STAY

RRUMC and the US News and World Report Top 20 Best Hospitals for Neurology and Neurosurgery, Q1-Q2 2015

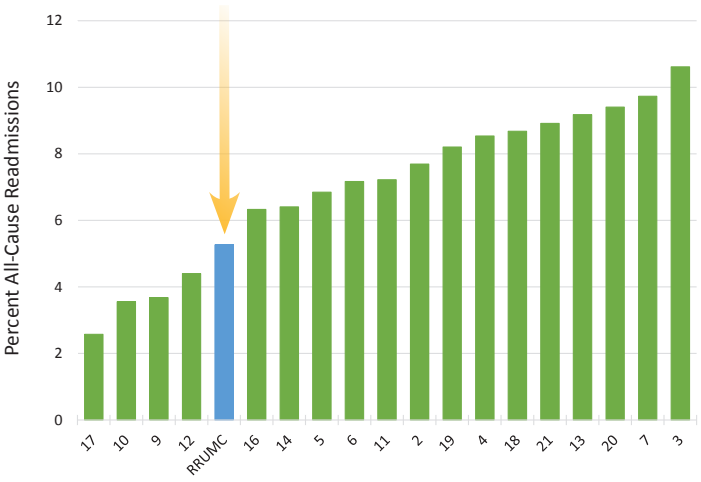



RRUMC and the US News and World Report Top 10 Best Hospitals for Neurology and Neurosurgery

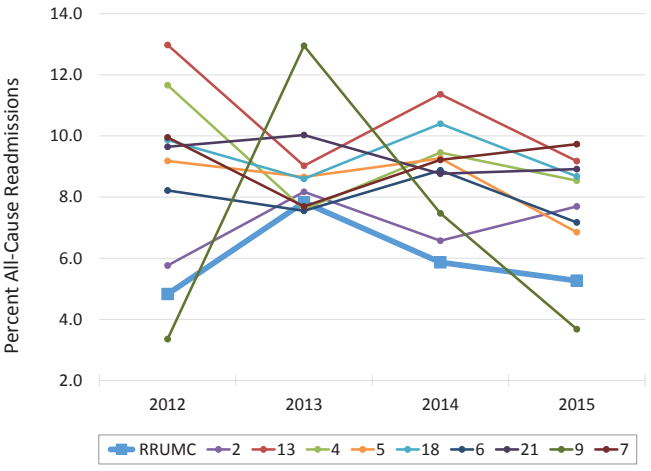



## ISCHEMIC STROKE: ALL-CAUSE 30-DAY READMISSIONS

RRUMC and the US News and World Report Top 20 Best Hospitals for Neurology and Neurosurgery, Q1-Q2 2015

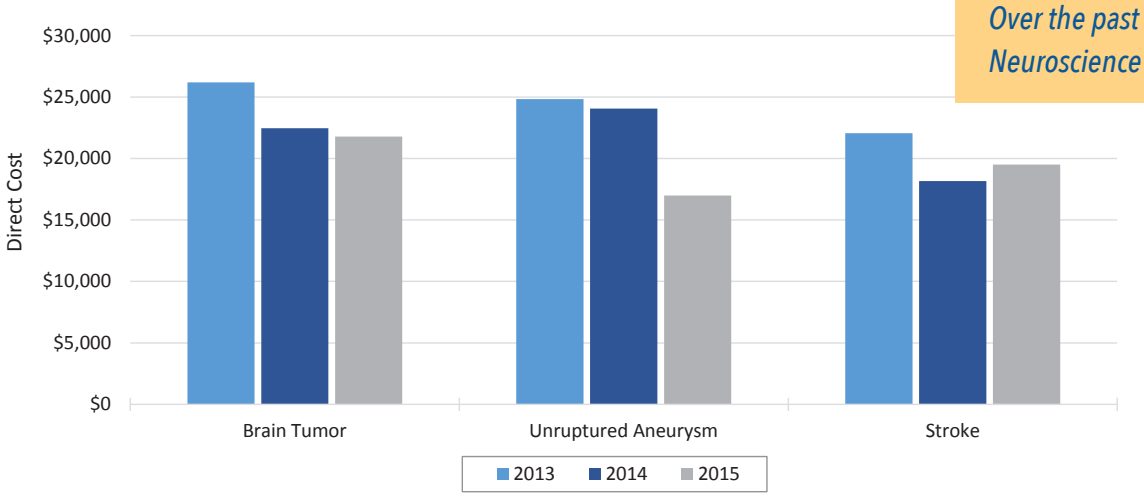



RRUMC and the US News and World Report Top 10 Best Hospitals for Neurology and Neurosurgery




## DIRECT COST OF NEUROSCIENCE TERTIARY AND QUATERNARY CASES

*Over the past two years, direct cost of Neuroscience TQ cases has decreased*

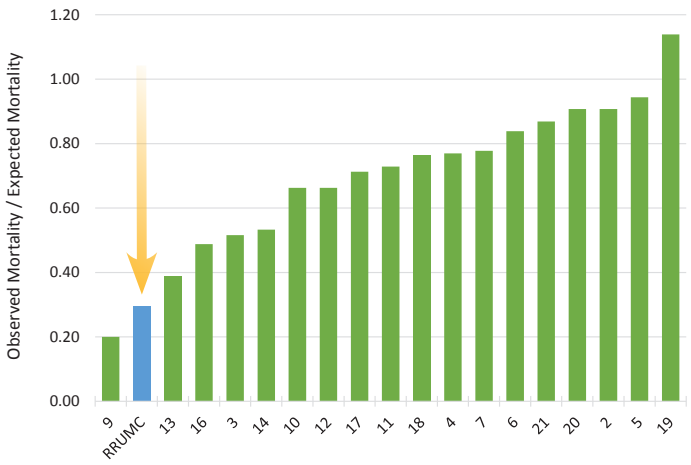



TOP GRAPHS
Source: UHC Clinical Database; Ischemic stroke - primary ICD9 diagnosis codes: 433.01, 433.1, 433.11, 433.21, 433.31, 433.81, 433.91, 434, 434.01, 434.11, 434.91

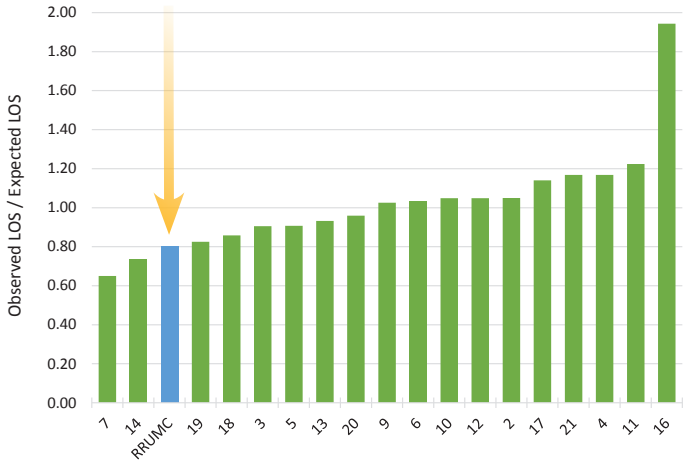
BOTTOM GRAPH
Source: UCLA Health System Decision Support

## RRUMC IS **2ND** IN RISK ADJUSTED MORTALITY AND **3RD** IN LENGTH OF STAY FOR INTRACEREBRAL HEMORRHAGE PATIENTS

**UHC Intracerebral Hemorrhage Risk Adjusted Mortality:** RRUMC and the US News and World Report Top 20 Best Hospitals for Neurology and Neurosurgery, Fiscal Year 2015




**UHC Intracerebral Hemorrhage Length of Stay:** RRUMC and the US News and World Report Top 20 Best Hospitals for Neurology and Neurosurgery, Fiscal Year 2015

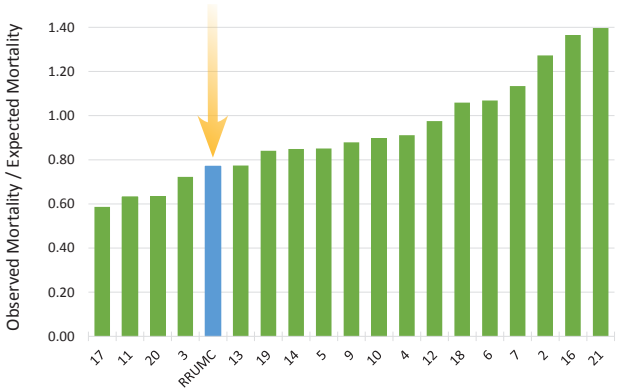



The Department of Neurosurgery is dedicated to offering cutting edge care for patients with **intracranial hemorrhages**.

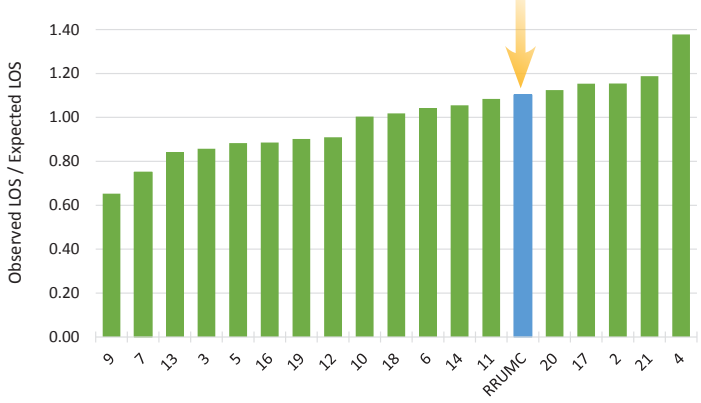
For spontaneous intracerebral hemorrhage, the Department of Neurosurgery is perfecting minimally invasive surgical techniques to evacuate intracerebral hematoma in specific patients. **UCLA** is one of the seven sites for the **Intraoperative CT-guided Endoscopic Surgery for ICH** (ICES) trial.

## RRUMC IS ACTIVELY WORKING ON IMPROVING RISK ADJUSTED MORTALITY AND LENGTH OF STAY FOR SUBARACHNOID HEMORRHAGE PATIENTS

**UHC Subarachnoid Hemorrhage Risk Adjusted Mortality:** RRUMC and the US News and World Report Top 20 Best Hospitals for Neurology and Neurosurgery, Fiscal Year 2015




**UHC Subarachnoid Hemorrhage Length of Stay:** RRUMC and the US News and World Report Top 20 Best Hospitals for Neurology and Neurosurgery, Fiscal Year 2015



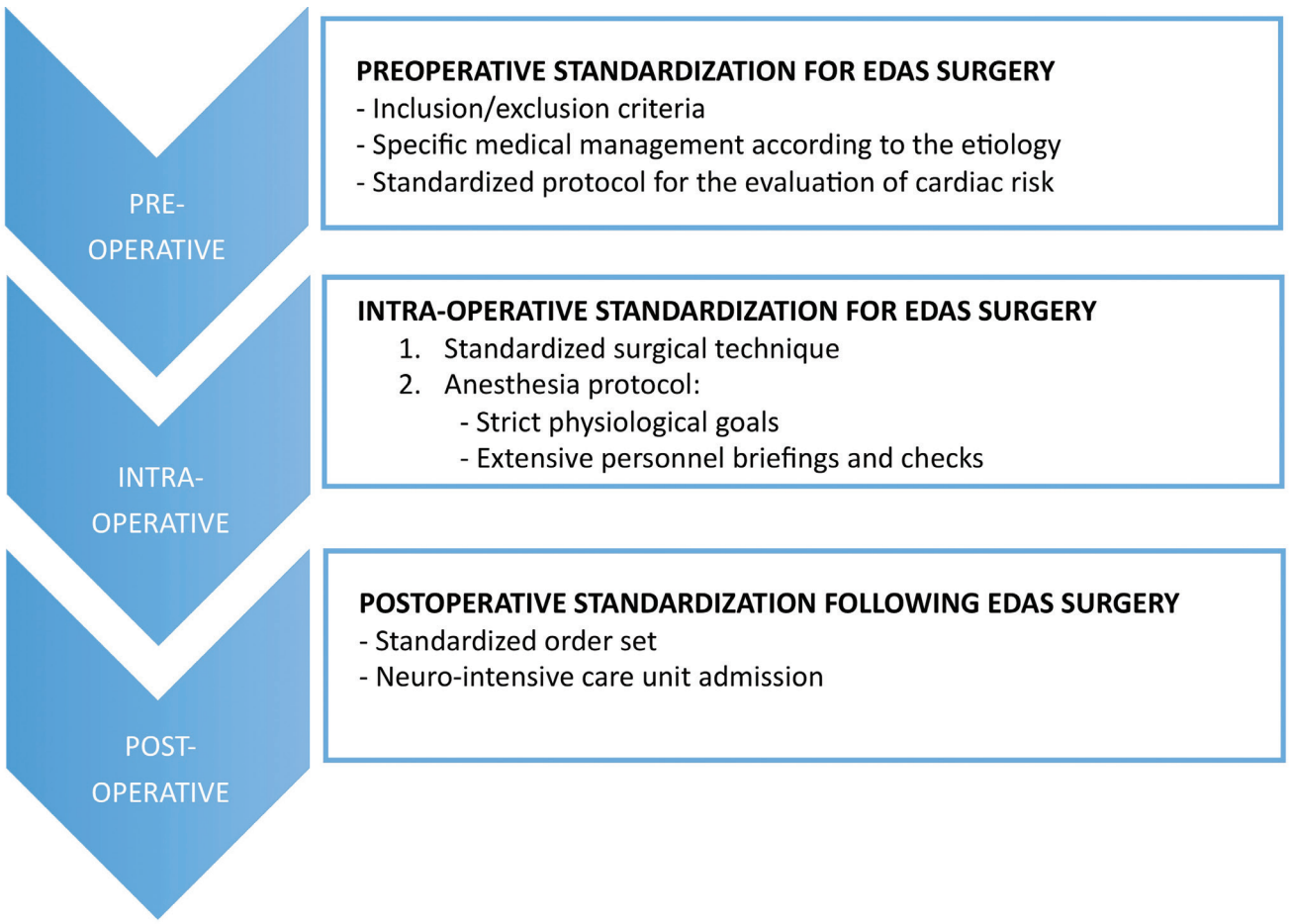

Source: UHC Clinical Database; ICH - primary ICD9 diagnosis code 431, SAH - primary ICD9 diagnosis code 430

# INDIRECT VASCULARIZATION

**Encephaloduroarteriosynangiosis** commonly refered to as **(EDAS)** is a form of indirect revascularization that has been employed for the treatment of pediatric moyamoya disease.

At UCLA, we have pioneered the use of **EDAS** for adult patients with intracranial stenoocclusive disease such as moyamoya disease or intracranial atherosclerosis.

## STANDARDIZED PROCESSES DEVELOPED TO REDUCE VARIABILITY IN PATIENT CARE AND ULTIMATELY IMPROVE PATIENT CLINICAL OUTCOME




*The introduction of standardized checklists, structured specific perioperative briefings, strict anesthesia management, and open surgeon-anesthesiologist communication systems has **significantly reduced** the variability of care for this patient population and **favorably impacted the rates** of perioperative complications.*

*The clinical outcomes we have obtained are notably better than previously reported studies, with a **reduction in the rates of stroke** from 42% at 1 year to 6% at 2 years.*

# CODE BRAIN INITIATIVE

In 2014, a multidisciplinary interdepartmental collaborative was created to optimize the initial assessment and care provided for intracerebral hemorrhage patients.

The multidisciplinary team developed the **Code Brain Initiative**, aiming to: 1) rapidly identify patients with potential life threatening neurologic emergencies, 2) expedite their medical management, and 3) coordinate initial neuroimaging.

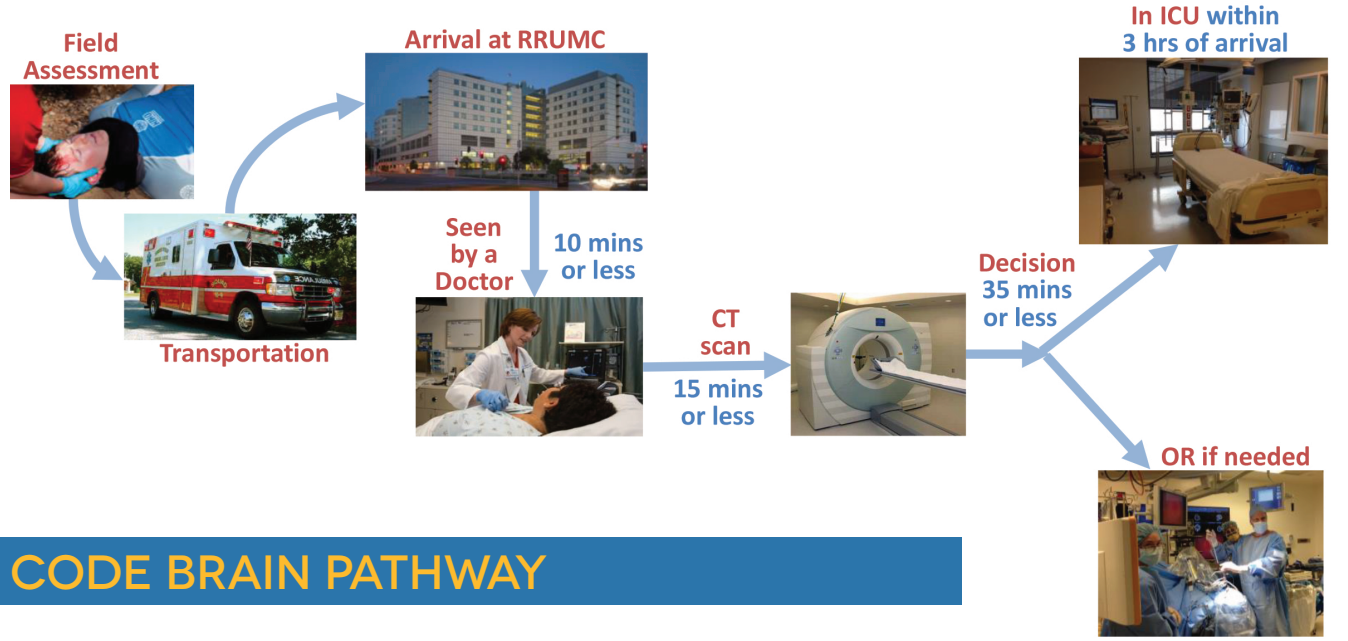
An automated dashboard to monitor the Code Brain Initiative is being developed.

| Dashboard Metrics |
|---|
| Time from ED arrival to being seen by a physician |
| Time from ED arrival to neuroimaging |
| Time from ED arrival to arrival in ICU |
| Time from arrival to blood pressure target met |
| Time from arrival to initiation of INR reversal (if needed) |
| Time from arrival to ICU bed request orders |
| Time from bed request to orders written |
| ICU LOS |
| Mortality within 30 days |

## KEY ACHIEVEMENTS

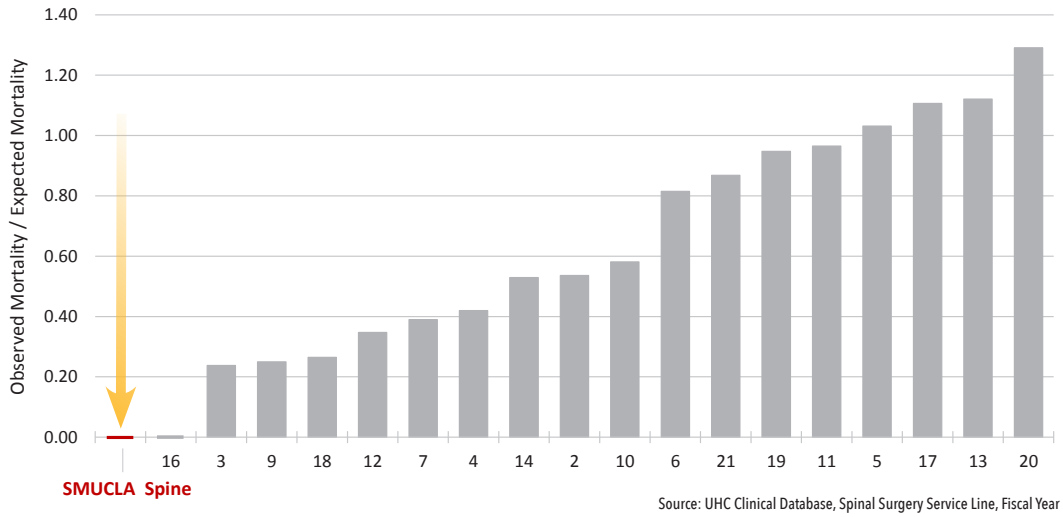
in the past year include:

- Defining the target patient population
- Process mapping the ideal care pathway
- Defining process and outcome metrics
- Developing an ICH care protocol for the Emergency Department
- Hardwiring the ICH care protocol in the electronic medical record
- Educating all involved care providers




## CODE BRAIN PATHWAY

## SMUCLA Spine Program has the **Lowest** Risk-Adjusted Mortality among the US News and World Report Top 20 Best Hospitals for Neurology and Neurosurgery




Source: UHC Clinical Database, Spinal Surgery Service Line, Fiscal Year 2015

INFECTION RATE
**0.58%**

RE-OPERATION RATE
**1.16%**

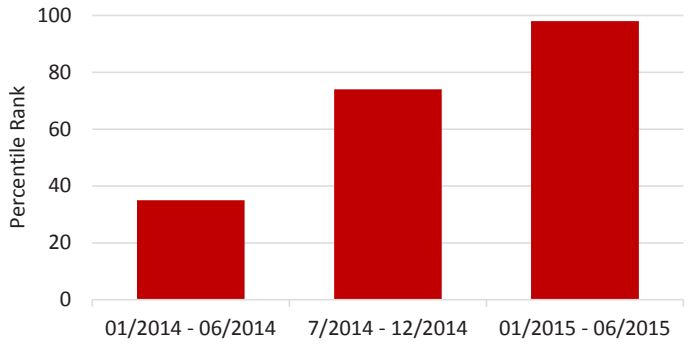
READMISSION RATE
**2.53%**

## UCLA patients have better pain relief outcomes following lumbar surgery than the national benchmark

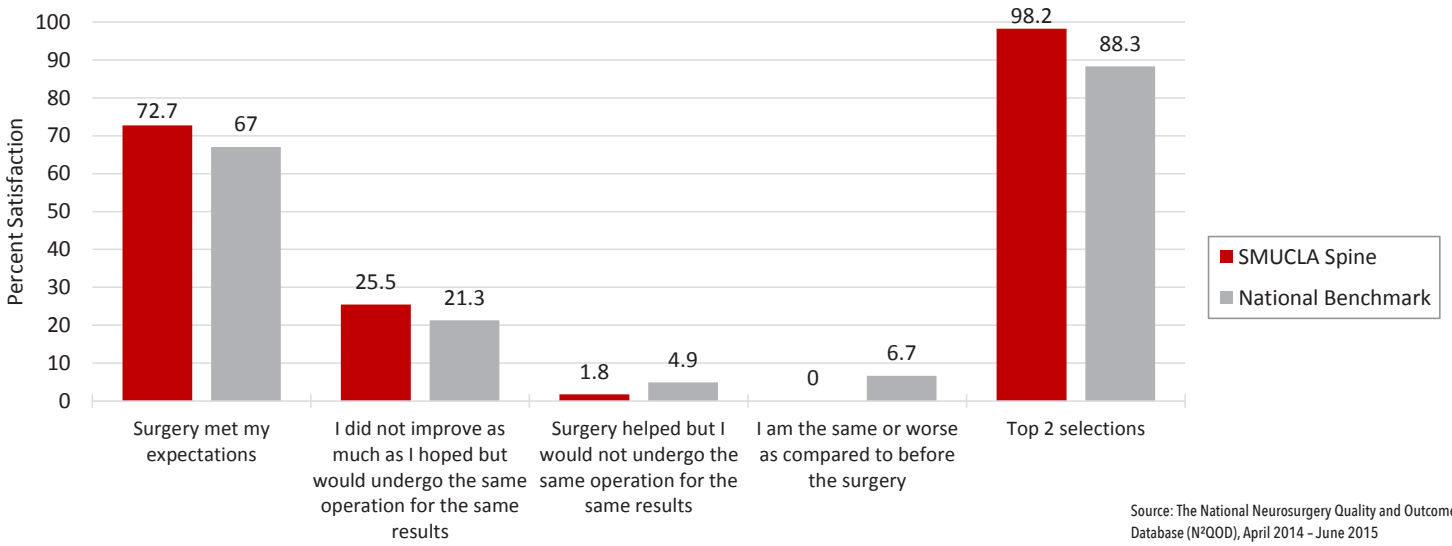
| (Mean ± SD) | Time | SMUCLA Spine | National Benchmark |
|---|---|---|---|
| Back Pain | Baseline | 6.0 ± 2.9 | 6.5 ± 2.8 |
| | 3 Month | 2.1 ± 1.9 | 3.0 ± 2.8 |
| Leg Pain | Baseline | 7.7 ± 2.1 | 6.9 ± 2.7 |
| | 3 Month | 1.8 ±2.2 | 2.4 ± 3.0 |

Source: The National Neurosurgery Quality and Outcomes Database (N²QOD), April 2014 – June 2015

## Improving HCAHPS Patient Satisfaction Percentile Rank for "Pain Well Controlled during Stay"




## Patients' Satisfaction following Lumbar Surgery is above the National Benchmark



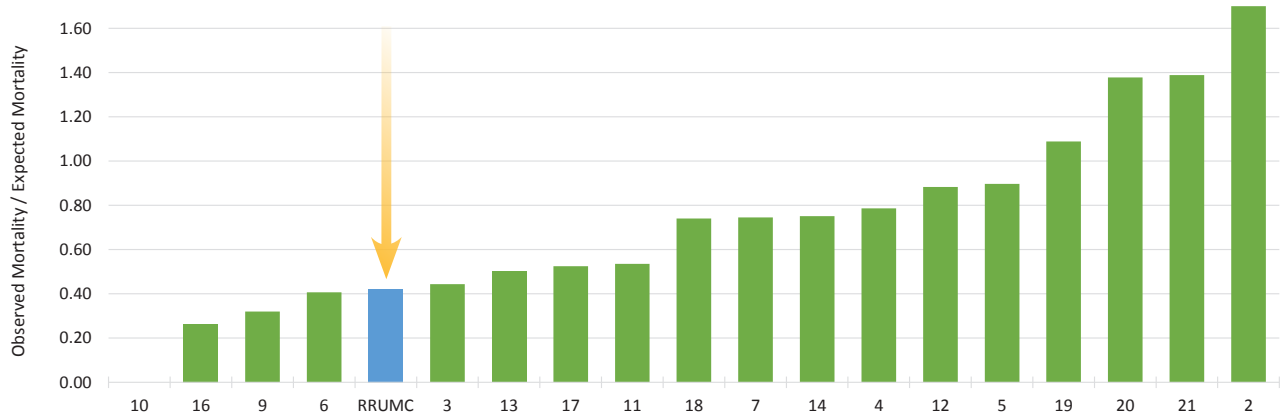

Source: The National Neurosurgery Quality and Outcomes Database (N²QOD), April 2014 – June 2015

# BRAIN TUMOR PROGRAM

*RRUMC Brain Tumor Program is currently **5th** in Risk Adjusted Mortality*

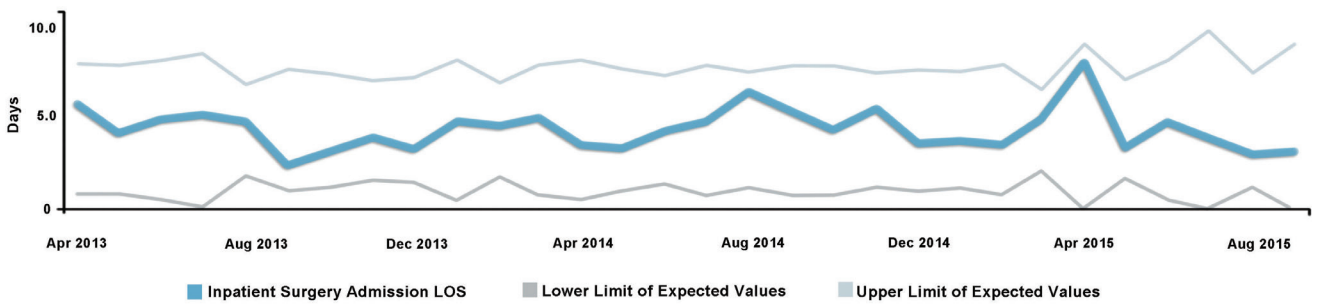
## UHC BRAIN TUMOR RISK ADJUSTED MORTALITY*

RRUMC and the US News and World Report Top 20 Best Hospitals for Neurology and Neurosurgery, Fiscal Year 2015




Source: UHC Clinical Database, primary ICD9 diagnosis codes: 191, 191.1, 191.2, 191.3, 191.4, 191.5, 191.6, 191.7, 191.8, 191.9, 192.1, 225.0, 225.2, 225.3, 225.4, 225.5, 225.6, 225.7, 225.8, 225.9, 237.5, 237.6, 198.3

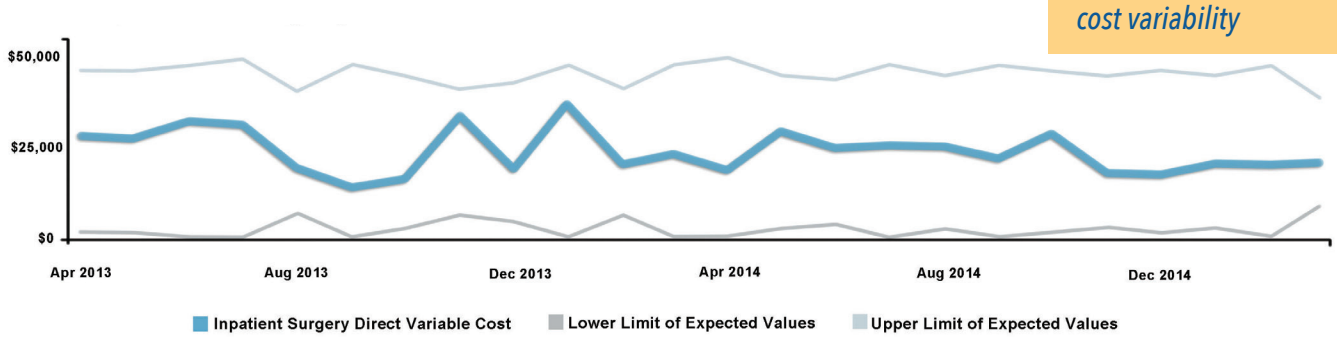
## LENGTH OF STAY FOR BRAIN TUMOR PATIENTS*




Source: Value Analytics report

## INPATIENT TUMOR RESECTION SURGERY AND HOSPITALIZATION DIRECT VARIABLE COST*

*Implementation of a detailed OR checklist has resulted in reducing cost variability*




Source: Value Analytics report

## BRAIN TUMOR INTEGRATED PRACTICE UNIT INITIATIVES:

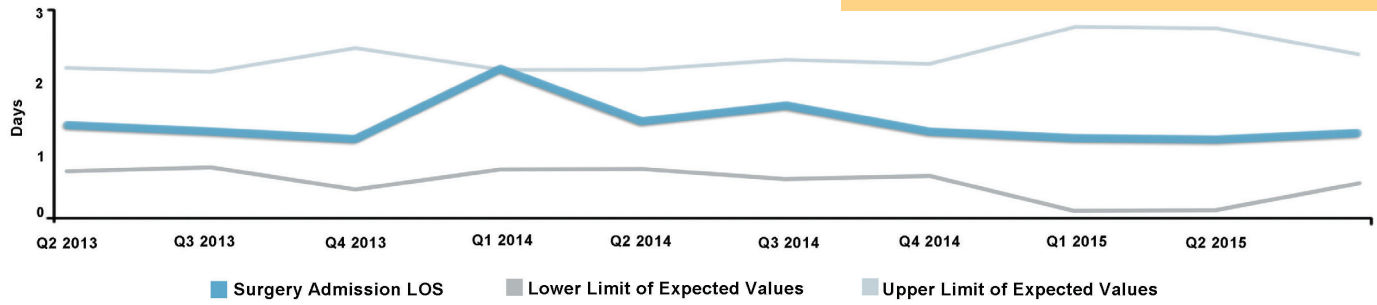
- Process mapping of a brain tumor patient throughout the entire episode of care within various tracks
- Streamlined pre-operative and intra-operative checklists to maintain consistency in OR procedures for brain tumor patients
- Nurse Navigator assuring coordination of care and support to patients and families throughout their treatment

*The data presented is specifically for the Meningioma-Glioma-Metastasis patients, representing the largest subpopulation of brain tumor patients.

# DEEP BRAIN STIMULATION

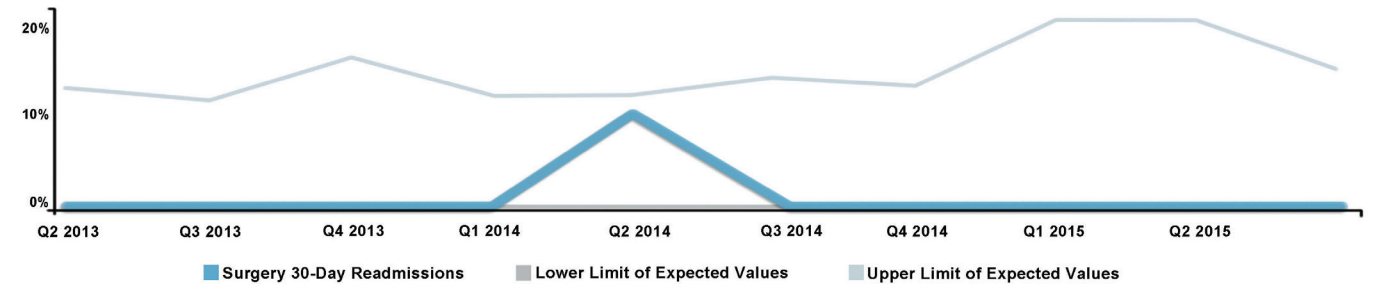
## INPATIENT DBS SURGERY ADMISSION LENGTH OF STAY

*The vast majority of elective DBS patients go home the day after surgery*

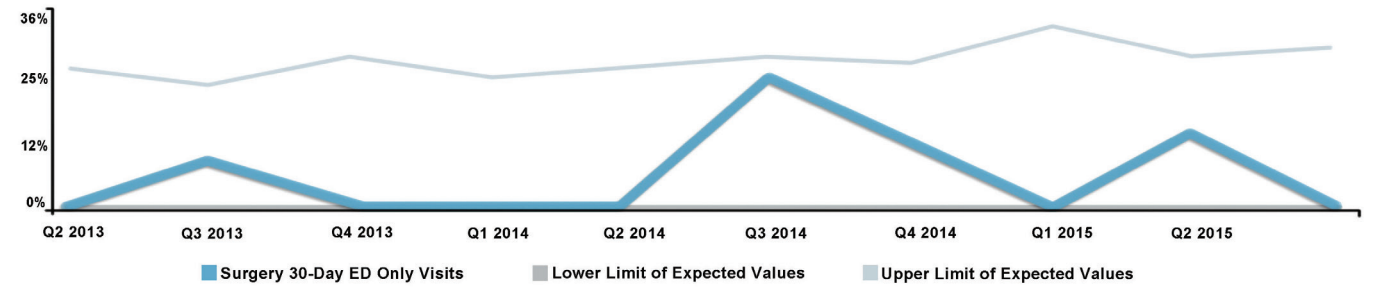



## DBS SURGERY 30-DAY READMISSIONS

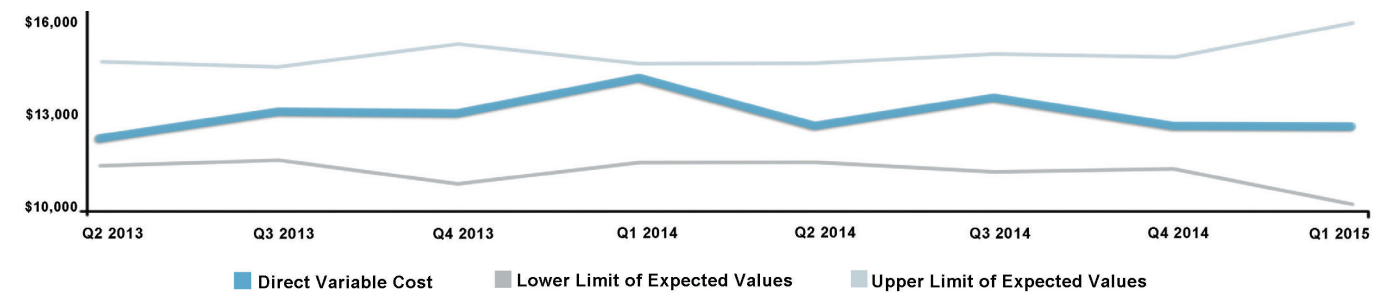
*In the last 15 months, **only one** elective DBS patient was readmitted to the hospital within 30 days*




## DBS 30-DAY EMERGENCY DEPARTMENT ONLY VISITS




## DBS SURGERY ADMISSION DIRECT VARIABLE COSTS (includes both unilateral and bilateral stimulator implantations)




Source for all graphs: Value Analytics report

# NEURO-INTENSIVE CARE UNIT

## THE ICU OF THE FUTURE

*MISSION STATEMENT: To deliver state-of-the-art, evidence-based care using advanced techniques and approaches to guarantee high quality care, best possible outcomes, and lowest risks for the patient*

## VENTILATOR-ASSOCIATED PNEUMONIA PREVENTION INITIATIVE

A new Ventilator-Associated Pneumonia initiative was launched in July 2015 throughout UCLA intensive care units. This new initiative, termed utilization of subglottic suction ETT, targets traumatic brain injury, polytrauma, and prolonged cardiothoracic surgery patients.

| Ventilator-Associated Pneumonia (VAP) Prevention Method | Implemented at UCLA | Efficiency Issues |
|---|---|---|
| Head of bed up 45° | Yes | Patients slip, angle is less |
| PEEP | Yes | Consistently done |
| Chlorhexidine mouth wash (SOD) | Yes | Consistently done |
| Daily sedation interruption | Yes | Pentobarbituric coma / deep sedation used |
| Daily weaning trials | Yes | Delayed in coma patients |
| Saline prior to suctioning | Yes | Consistently done |
| Early tracheostomy | Yes | Day 7-10, some variability |
| Selective gut decontamination | No | Controversial |
| Silver coated ETT | No | Enterprise approach needed |
| Subglottic suction | No | NEW TRIAL JULY 2015 |
| ETT biofilm removal devices | No | Never trialed at UCLA |
| Probiotics | No | NEW TRIAL - LACTOBACILLUS DEC 2015 |

## INFECTION CONTROL PROTOCOL

- Admission screening for MRSA and MDR
  - *All transfers from outside hospitals/SNFs*
- Isolation for MRSA, MDR, C. difficile
- New bed/room cleaning protocol
  - *New cleaning protocol for high contact areas*
  - *Prospective cleaning/waxing during vacancy times*
- Neuro-Infectious Disease Service January 2015
- Foley Removal Protocol Sept 2015
- 'Sterile Precautions' Protocol:
  - *Nurses and Physicians treat the unit like a sterile field*
- Pharmacy rounding with ICU team to facilitate antibiotic selection
- Quarterly meeting between ICU QA team and Hospital Epidemiology
- Probiotics to prevent C. difficile *(December 2015)*

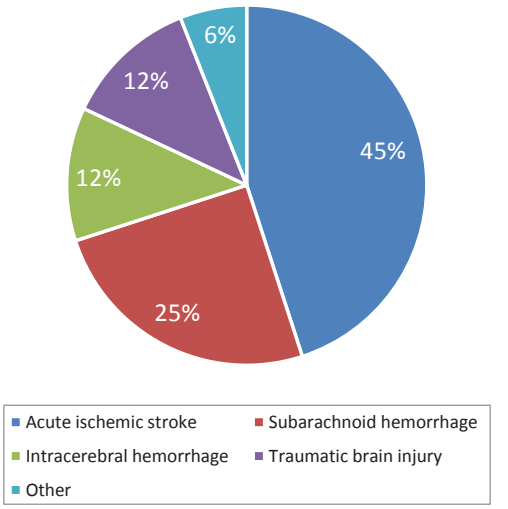
## UCLA'S NEUROCRITICAL CARE ONE CALL–IMMEDIATELY ACCEPT POLICY

This initiative, implemented in March 2015, provides all Emergency Departments in the region with the ability to rapidly and efficiently transfer by ground or by air acutely brain-injured patients to UCLA Ronald Reagan Medical Center for advanced emergent care.

A bed is kept always open 24/7/365 for immediate intake of acute (under 12 hour) ischemic stroke, intracranial hemorrhage, and traumatic brain injury patients.

In the first 6 months after inception, the Neurocritical Care One Call - Immediately Accept Policy was used for transfer of 58 patients to UCLA.

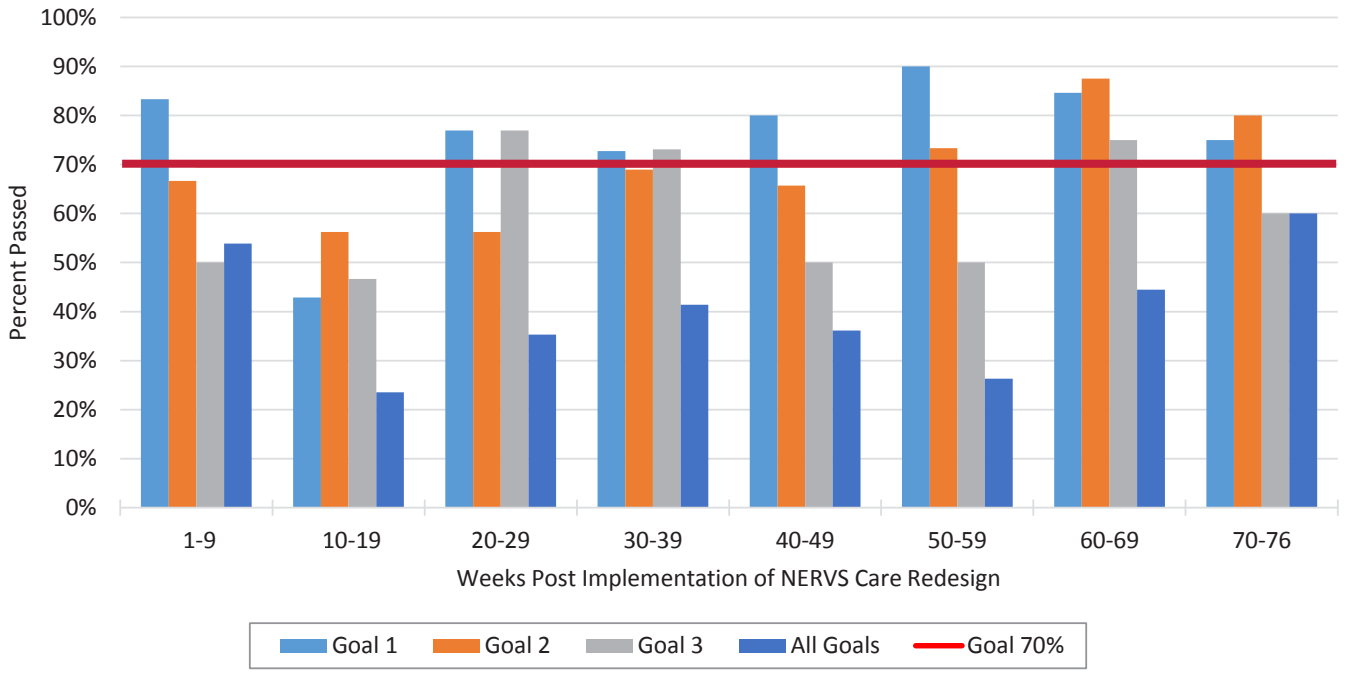
Diagnoses for These Patients were:




## EARLY MOBILITY INITIATIVE

A new multidisciplinary early mobility initiative is being launched, encouraging safe mobility as tolerated by each patient. It involves utilizing specialized equipment to maximize mobilization even in patients that may have profound neurological impairments.

In the Last 6 Months, the Percentage of Elective Adult Cranial Neurosurgery Patients Passing all Early Mobility Goals has Doubled, Reaching 60%




**Goal 1**: Sit upright at bedside for 5 minutes, by 10pm POD0 **Goal 2**: Walk 5 feet to chair & sit in chair for 5 minutes, by 9am POD1
**Goal 3**: Ambulate 50 feet with RN assistance, by 12pm POD1

Source: manual chart extraction

# COMPREHENSIVE NEUROSURGERY CARE REDESIGN

The Department of Neurosurgery is leading a comprehensive care redesign initiative called **NERVS** (Neurosurgery Enhanced Recovery after surgery, Value, and Safety)

## IN JUNE 2014 NEUROSURGERY BEGAN THE IMPLEMENTATION OF REDESIGNED CARE FOR **THE TOP 4 CARE ITEMS**:

- **Communication between care providers**
- **Pain management**
- **Patient education**
- **Physical exercise and mobilization**

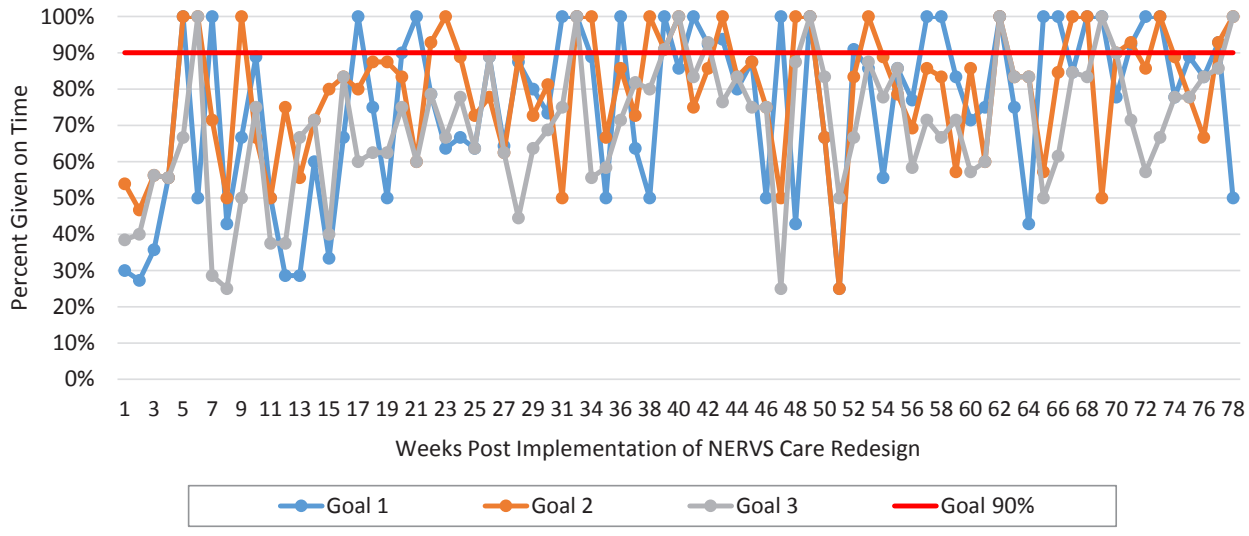
## KEY TO CONTINUOUS HIGH PERFORMANCE IN DELIVERING REDESIGNED CARE INCLUDED:

- **Support by leadership** that the redesigned care is the standard of care for neurosurgical patients
- **Real-time auditing** by NERVS nurses enabling identification of goals of care that need completion by a specific time to keep patient on track to early recovery
- **Bimonthly data review by the core NERVS team**, making sure performances are circled back to the various care providers, celebrating successes, and reviewing circumstances having prevented completion of goals
- **Continuous education** to assure various elements of the redesigned care are performed per protocol: huddles, bathroom literature, NERVS dashboard in 6ICU and 6N, etc.

## PATIENT EDUCATION

We engage patients early-on regarding their recovery, informing them before and during their hospitalization what to expect after surgery. Standardized discharge information is now provided early on, preparing patients and families for their return home.

We Aim to Have 90% of NERVS Patients Satisfy Their Education Goals on Time - Wherever They Are! (PACU, ICU, Floor)




**Goal 1**: Patient received education related to POD0 Road to Recovery on POD0 **Goal 2**: Patient received education related to POD1 Road to Recovery and POD1 Discharge information on POD1 **Goal 3**: Patient received education related to POD2 Road to Recovery and POD2 Discharge information on POD2

## SAMPLE OF PROCESS IMPROVEMENTS INTEGRATED IN CARE DELIVERY TO IMPROVE PAIN EXPERIENCE

**Pre-hospitalization**

1. Discussion of PO pain management strategies in the standardized pre-operative information packet and video
2. Include pain management in the document Your Road to Recovery, given pre-operatively
3. Capture pain history in clinic (Pre-op pain risk assessment tool)

**Intra-hospitalization**

1. Standardized PO pain order set with around the clock acetaminophen
2. Train the care providers to use the Pain Board and assess tolerable pain
3. Use of non-pharmaceutical pain management strategies as early as POD0

**Post-hospitalization**

1. Introduce recovery questionnaire to be filled at their one month PO visit, including pain management satisfaction
2. Restructure post-discharge phone call performed by 6N nursing

We strongly believe **NERVS** will be **THE** care redesign model of integrated optimal surgical care delivery throughout the patient's entire episode of care.

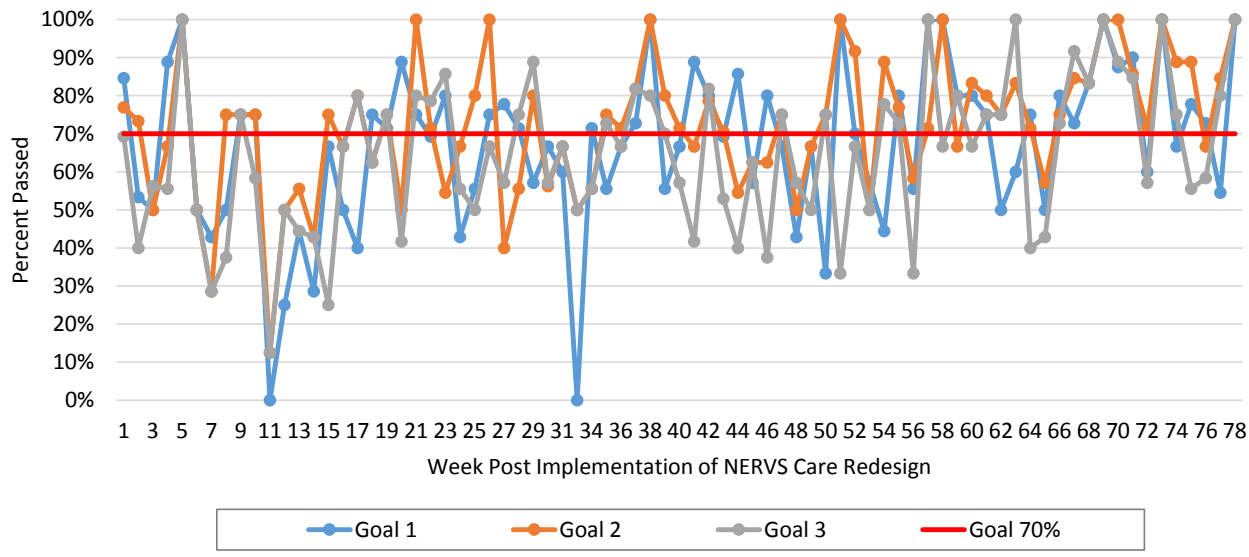
## PAIN MANAGEMENT

When patients are involved in their pain assessment and management, their pain experience may be significantly improved. The table above highlights some of the process improvements coordinated across the continuum of care.

## EARLY MOBILIZATION

Before NERVS, post-operative mobilization was inconsistent and impossible to track. After implementation of the redesigned care process, more than 70 percent of our NERVS patients are mobilized early on, without any falls related to early ambulation.

We aim to have at least 70% of NERVS Patients Pass Their Mobilization Goals on Time - Wherever They Are! (PACU, ICU, Floor)

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*Special thanks to the NERVS multidisciplinary team for their dedication to the care redesign initiative and thank you to Mr. Richard Rodstein, Consultant in Quality, for his valuable guidance.*

# PATIENT SATISFACTION

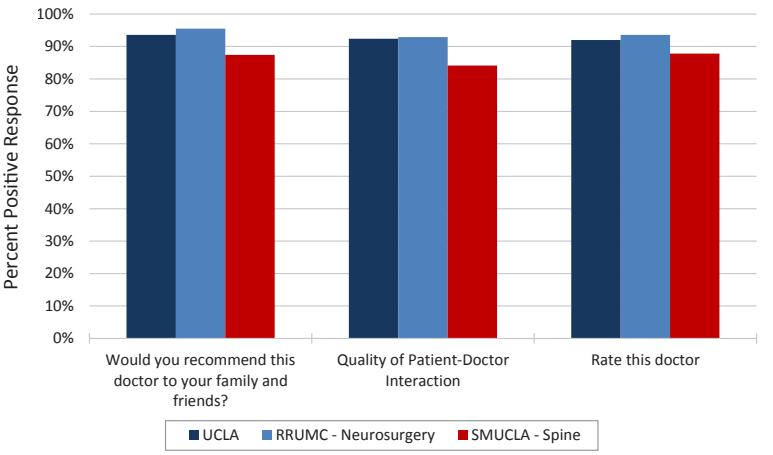
*Patient satisfaction is a major component of improved value of delivered care, a priority for the Department of Neurosurgery.*

*Patient satisfaction has been a pillar in the development of our redesigned care program termed NERVS (Neurosurgery Enhanced Recovery after surgery, Value, and Safety: see pages 22 & 23), resulting in improved performance regarding specific HCAHPS questions.*

*Clinician and Group Consumer Assessment of Healthcare Providers and Systems

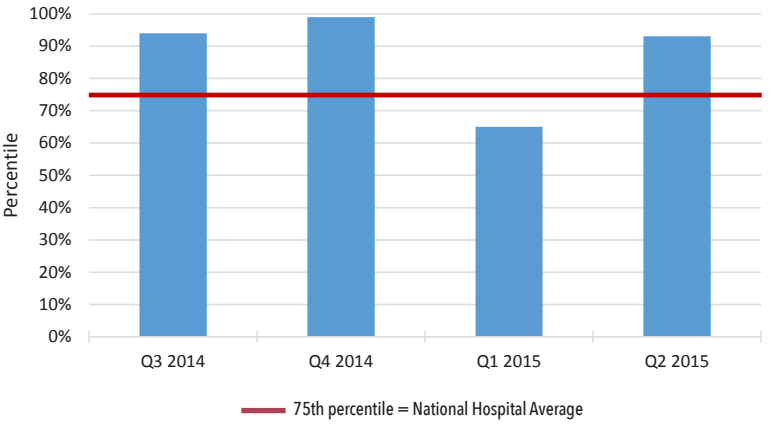
*Hospital Consumer Assessment of Healthcare Providers and Systems

## CGCAHPS* Survey - Calendar Year 2014

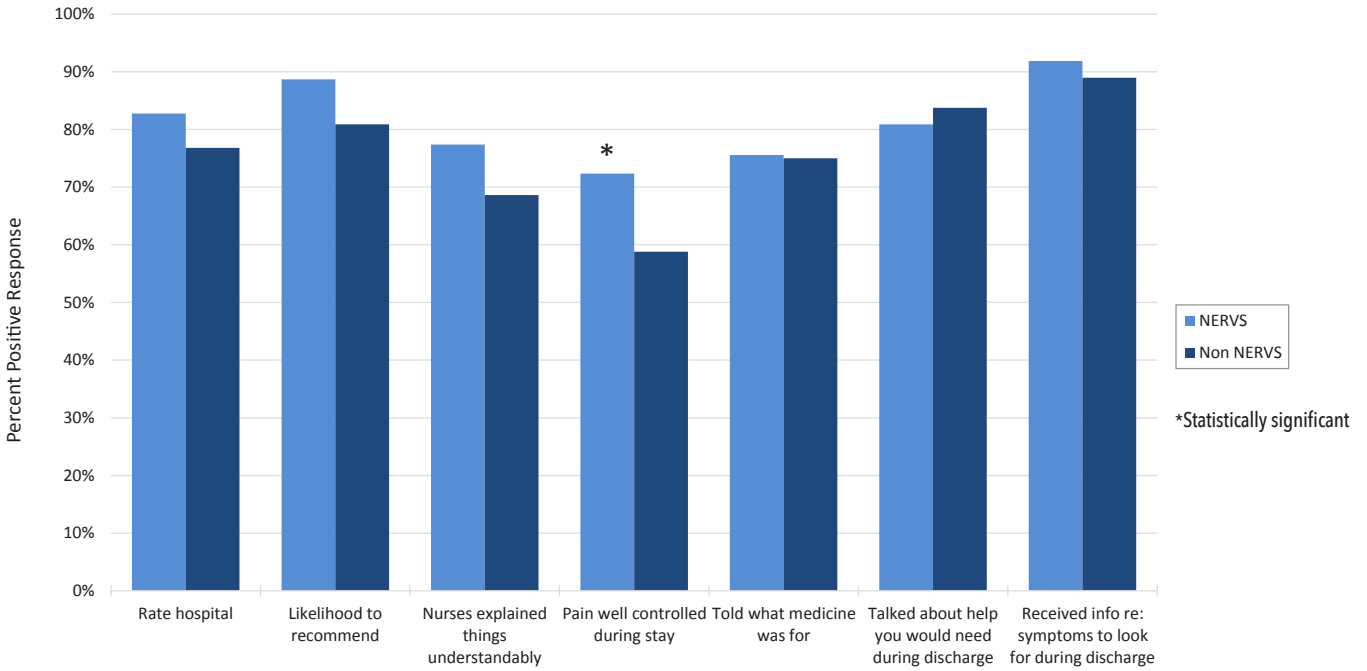



## HCAHPS* Survey, RRUMC-Neurosurgery, Fiscal Year 2015

*Question: Would you recommend this hospital to your friends and family?*




## HCAHPS Patient Satisfaction is Improving following Implementation of NERVS Care Redesign




*Statistically significant

# NEUROSURGERY **PATIENT** AND **FAMILY ADVISORY COUNCIL**

The voice of our patients and their families is essential to the Department of Neurosurgery. The Neurosurgery **Patient and Family Advisory Council (NPFAC)** was launched in the spring of 2012 as an opportunity to facilitate collaboration between the Neurosurgery physicians, staff, patients and families.

The NPFAC is co-chaired by Wendy Tucker, the wife of a former patient, and Steve Cohen, the Chief Administrative Officer for the department. It is composed of a number of former patients and family members (spouses and parents) treated for a variety of conditions as well as members of the Department of Neurosurgery, including several nurse practitioners and the Director of Quality Analytics.

*The mission of the Neurosurgery PFAC is to create an **active partnership** based on **mutual respect** between physicians, nurses, staff, patients and families to enhance the patient and family experience*

**The NPFAC is one of the first PFACs formed within UCLA Health.**

Significant achievements in 2015 include:

- **Developing a Peer Support Program**
- Developing the patient-oriented UCLA Neurosurgery app
- **Evaluating a telemedicine pilot for post-operative clinical evaluations**
- Revising standardized pre-operative patient information packet as well as discharge education
- **Revising the Neurosurgery pre-operative video**
- Providing input to UCLA Department of Nursing application to renew Magnet Certification

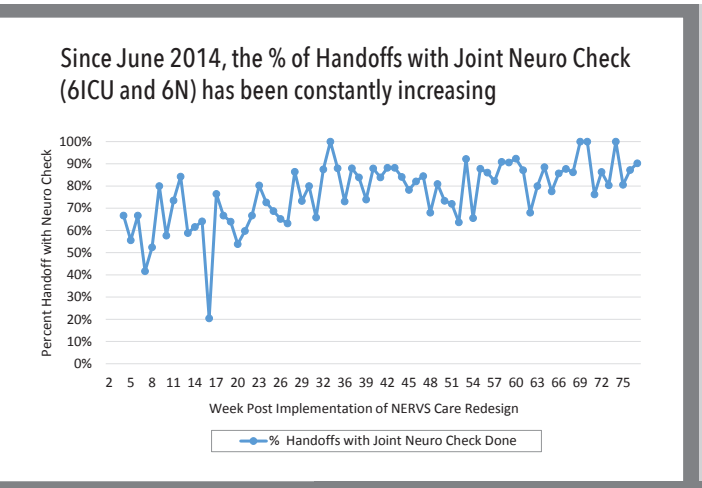
Members of the Neurosurgery Patient and Family Advisory Council

# NURSING LED INITIATIVES

## SHIFT BEDSIDE HANDOFF:

In 6ICU, it is the standard of care to complete a shift bedside handoff.

In 2014, 6N adopted the same practice, integrating patients and families into the healthcare team.




LEGEND

6ICU

6N

Both

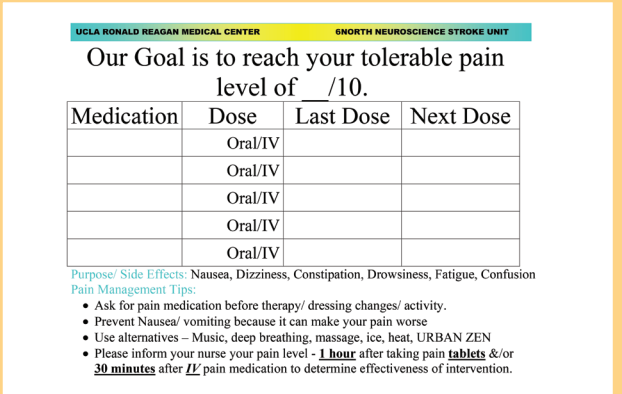
## CAUTI REDUCTION:

Successful reduction of the CAUTI rate from initiatives undertaken in the past year have successfully lowered the rate of CAUTI from a baseline average rate of 3.92 in fiscal year 2014 to a current average rate of 2.97 for fiscal year 2015.

Neuro-ICU has been selected as a pilot unit to test two new peri-care products with the potential to further reduction of CAUTIs.

## MAGNET RECOGNITION:

RRUMC just received our 3rd magnet certification. Magnet Recognition is the highest honor an organization can receive for nursing excellence and is the gold standard for professional nursing practice.



UCLA RONALD REAGAN MEDICAL CENTER — 6NORTH NEUROSCIENCE STROKE UNIT

Our Goal is to reach your tolerable pain level of __/10.

| Medication | Dose | Last Dose | Next Dose |
|---|---|---|---|
| | Oral/IV | | |
| | Oral/IV | | |
| | Oral/IV | | |
| | Oral/IV | | |
| | Oral/IV | | |

Purpose/ Side Effects: Nausea, Dizziness, Constipation, Drowsiness, Fatigue, Confusion

Pain Management Tips:

- Ask for pain medication before therapy/ dressing changes/ activity.
- Prevent Nausea/ vomiting because it can make your pain worse
- Use alternatives – Music, deep breathing, massage, ice, heat, URBAN ZEN
- Please inform your nurse your pain level - **1 hour** after taking pain **tablets** &/or **30 minutes** after ***IV*** pain medication to determine effectiveness of intervention.

## PAIN BOARD/TOLERABLE PAIN:

In 2014, 6N nursing has developed a pain board to help empower patients regarding the management of their pain. Patients note their pain goal, medication name, and next dosage time.

## MEDICATION CARDS:

To help improve patients' understanding concerning their medication, large print medication cards were designed, explaining the purpose of the medication and the potential side effects.

## URBAN ZEN TRAINING:

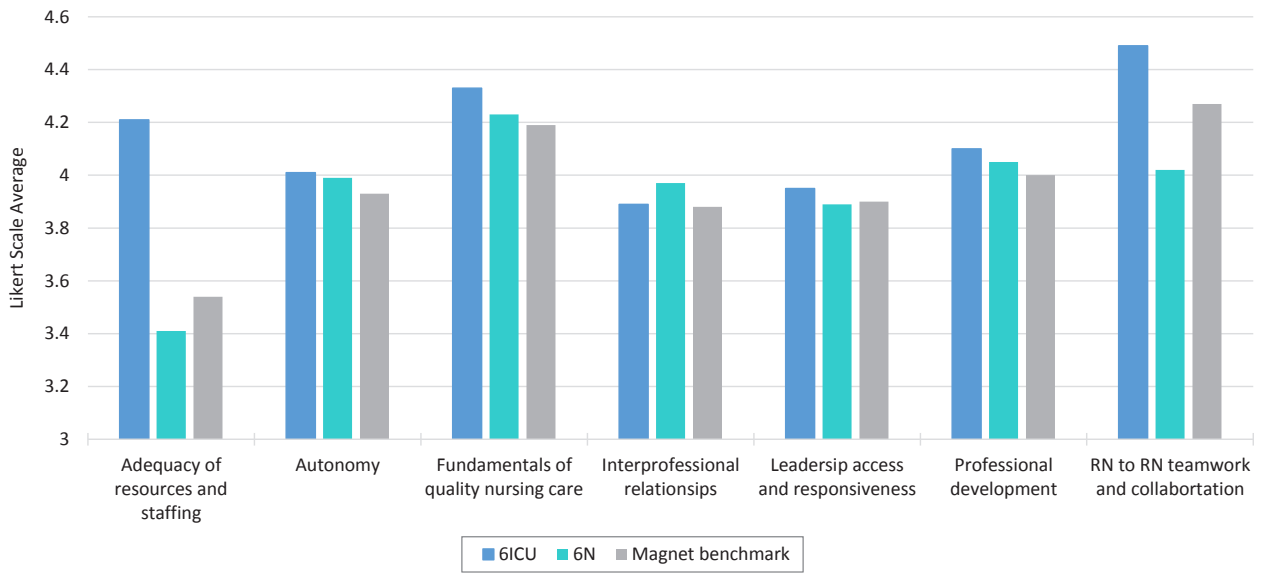
In 2014-2015, nurses from 6N have been trained in Urban Zen, a toolbox of non-pharmaceutical techniques to help anxious patients or those in pain decrease their perception of pain. Urban Zen relaxation techniques such as aromatherapy oils have become a favorite among our patients.


## OR TO ICU DIRECT ADMISSION:

6ICU implemented a protocol for direct admissions/transfers from the operating room to the ICU. The protocol includes a standardized handover tool and huddle between anesthesia, the surgeon, intensivist, and ICU nurse to ensure patient safety and flawless communication between providers.

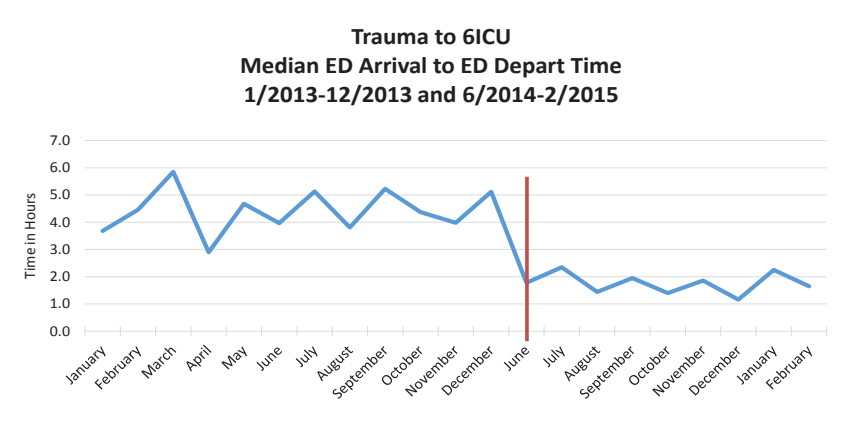
## RN ENGAGEMENT AND SATISFACTION RESULTS:

Neurosurgery nurses report great job satisfaction: The 6ICU outperforms the national Magnet benchmark in ALL of the 7 categories measured, and 6N outperforms the national benchmark in 5 of the 7 categories.




## RAPID TRAUMA TO ICU:

In partnership with the Emergency Department (ED), the 6ICU decreased the amount of time trauma patients spend in the ED through better communication, admission orders being written earlier, and by having a bed on standby for emergency patients.



# RESIDENT LED INITIATIVES

## ASSESSING VALUE OF CARE OF INTRACEREBRAL HEMORRHAGE PATIENTS

Daniel Hirt, MD

This project aimed to identify possible improvements in treatment algorithms to ultimately improve value of care for these critically ill patients. Patients were retrospectively identified using ICD-9 coding. Clinical data was collected via chart review. Cost data was provided by the Ronald Reagan Financial Services Department.

The project is led collaboratively by the Department of Neurosurgery and the Department of Medicine Statistics Core.

*"These kind of analyses are crucial in the future, within a healthcare system that is in constant flux. Patient care should always be of the utmost importance, but value must be taken into account, especially when resources are being utilized without rendering any benefit to the patient's care and outcome."*

## STANDARDIZING THE DISCHARGE SUMMARY

Jos'lyn Woodard, MD

The standardization of the discharge summary is intended to assure complete and consistent communication between the patient's surgical team and their outpatient physicians.

The project included: 1) surveys of intern classes, residents, and nurse practitioners regarding current discharge summary practices; 2) review of essential content determined by various stakeholders (hospital, neurosurgeon, hospitalist, internal medicine); 3) elaboration of a standardized discharge summary template; 4) review by quality improvement staff; 5) hardwiring of the template in the electronic health record; 6) implementation.

*"Creating communication tools, decision-making tools, and transparent assessment of our interventions will be the intended focus of my clinical research over the next few years. This project reinforced the need for such aims."*

## IMPROVING CARE PROCESSES BY EXAMINING ADVERSE EVENTS IN A TERTIARY NEUROSURGICAL DEPARTMENT

Matthew Garrett, MD

This project's goal was three-tiered: 1) improve documentation of adverse events (readmissions, reoperations, morbidity and mortality); 2) document the discussion held after each event; 3) elaborate action plans to prevent further incidents.

Every week adverse events were compiled electronically and the list was updated by the chief resident. Discussions with the residents, faculty, and the chairman were documented as well as quality improvement propositions.

*"I learned that attempting to identify weaknesses or possible improvements in the neurosurgery care process is challenging in the single center setting as adverse events were too varied and too infrequent. If I were to attempt this project again I would look into compiling data from a consortium of large volume centers."*

# TECHNOLOGY AND QUALITY IMPROVEMENTS

## Information technology is the cornerstone to the optimization of care delivery effectiveness

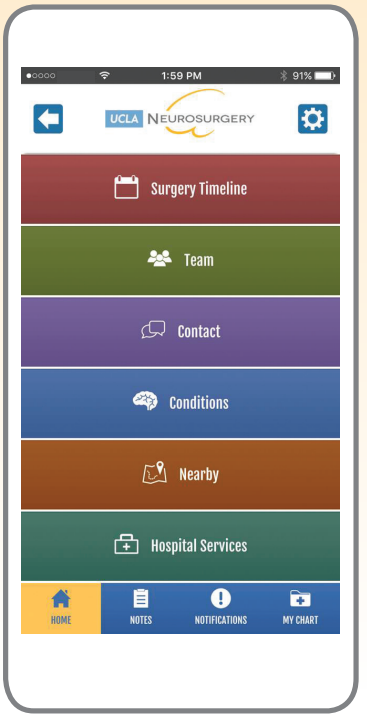
The UCLA Department of Neurosurgery strives to innovate in the field of healthcare informatics through several endeavors, including the design of hardware and software for mobile technologies.


### SURGICAL NAVIGATION PLATFORM

Since April 2014, the Department of Neurosurgery has implemented the use of a Surgical Navigation Advanced Platform (SNAP) for complex vascular and tumoral cases. The SNAP intra-operative guidance is connected to the BrainLAB navigation system and provides advanced imaging capabilities including detailed modeling and 3D virtual reality image manipulation. The SNAP enhances neurosurgeons' preoperative consultations with patients, planning of complex surgical procedures, and navigational aid during surgery to improve treatment and outcomes.

### UCLA NEUROSURGERY APP

In 2015, the Department of Neurosurgery developed a patient-oriented app. The neurosurgery app provides our patients and their family members with a step-by-step education on the surgical process as well as reminders of how to prepare for surgery at different intervals leading up to the surgical date. The app also includes information on the care team, medical conditions, and hospital and area amenities.




### TELEHEALTH PATIENT VISITS

In 2015, the Department of Neurosurgery has continued its pursuit of innovation by making telehealth visits available to patients. Telehealth visits enable patients and providers to take part in face-to-face video session within the comfort of their home or office, preventing long waits and decreasing potential financial burdens. Currently, telehealth visits are offered to pilot patients for their two week post-operative visits and post-operative wound checks.

# DASHBOARDS

*The UCLA Department of Neurosurgery is at the forefront of data-driven value-based initiatives, leading the future of the digital and interactive dashboards, their utilization, and integration in daily care*

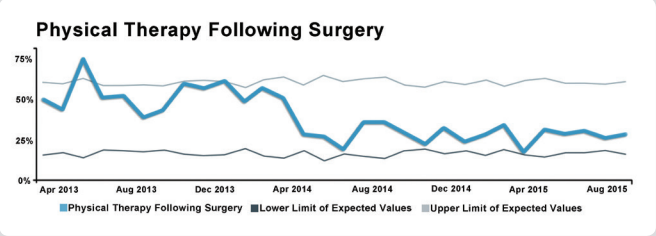
## NERVS CARE REDESIGN DASHBOARD

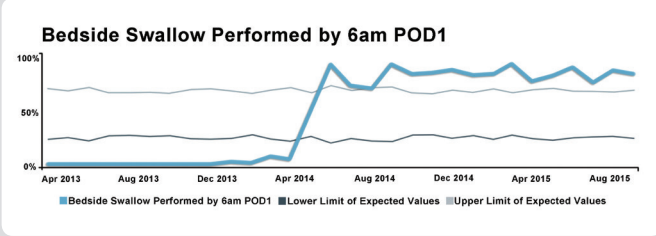
Over 150 metrics are collected automatically, reviewed bi-monthly by the NERVS core redesign team, and shared with the front line providers. Access to these data and real-time feedback to the clinical staff has been essential to the success of the initiative.

### DATA COMPONENTS INCLUDED IN THE NERVS CARE REDESIGN DASHBOARD

| Goal Measures | Intermediate Outcomes | Process measures |
|---|---|---|
| Discharge home | Mobilization goals | Bedside swallow exam before 6am POD1 |
| LOS | IV pain med administered after 8am POD1 | PT order on or before 9am POD1 |
| Cost for surgical care admission | Vomiting before end of POD1 | Foley removed by 7am POD1 |
| Moderate or Severe Pain before end of POD5 | Patient education POD0, POD1, POD2 | Assessment of tolerable pain |

### EXTRACT OF THE NERVS CARE REDESIGN DASHBOARD




## CARE COORDINATION DASHBOARD

Over 100 metrics are collected for the dashboard and reviewed monthly by Neurosurgery administrative and clinical staff. Data in the dashboard allows staff to measure, track and maintain quality of care. Monthly review of the dashboard also provides time to both celebrate successes and identify and troubleshoot areas needing improvement.

### DATA COMPONENTS OF THE NERVS CARE COORDINATION DASHBOARD

| Overview | UHC | Quality & Safety | Patient satisfaction | Operations |
|---|---|---|---|---|
| Number of discharges | Comparator hospital data | Infection rates | HCAHPS - percent positive | Escort response times |
| Average length of stay | Mortality O/E | Handwashing | HCAHPS - percentile rank | % PT orders done within 24 hrs |
| Discharge by noon | All 30-day readmissions | Stroke Center data | HCAHPS data - overall | Housekeeping times |
| Transfer center statistics | Risk adjusted length of stay | ICU Bundle data | HCAHPS data - physicians | Stat sodium times |
| | Sepsis related mortality | Glucose control metrics | HCAHPS data - nursing | Routine sodium times |

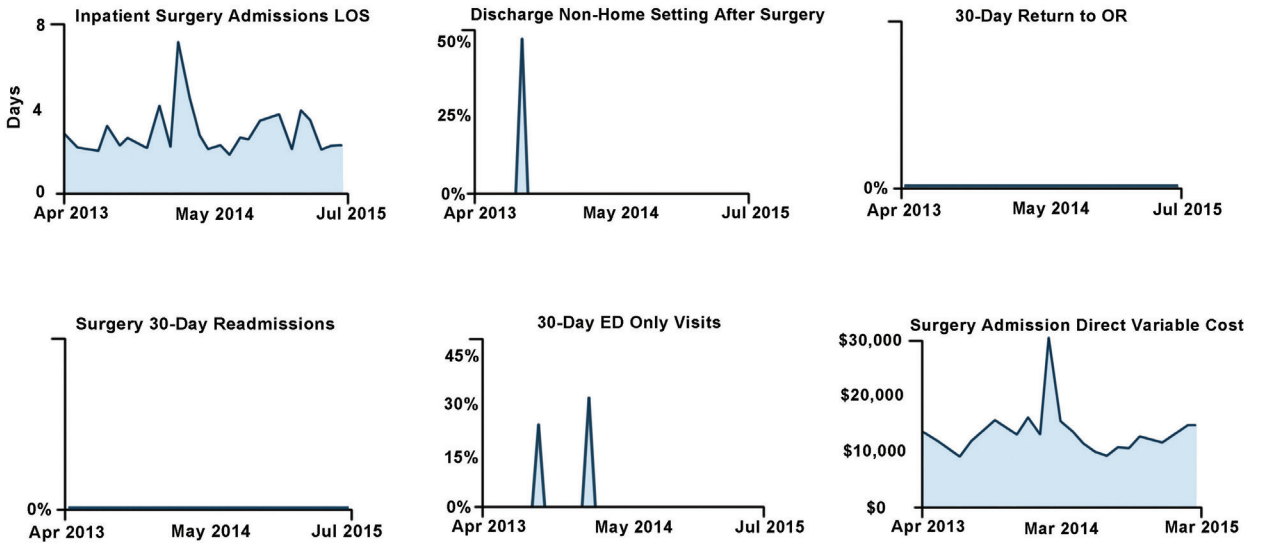
## EXTRACT OF THE CARE COORDINATION DASHBOARD

| | Infection Control | | | | | | | | 2016 | 2015 |
|---|---|---|---|---|---|---|---|---|---|---|
| Unit | Measure | Target | Mar 2015 | Apr 2015 | May 2015 | Jun 2015 | Jul 2015 | Aug 2015 | FYTD | LFYTD |
| 6ICU | CLABSI rate/1000 CentralLine Days | 2.66 | 0.00 (0/295) | 2.49 (1/402) | 2.89 (1/346) | 0.00 (0/291) | 2.23 (1/449) | 0.00 (0/406) | 1.12 | 1.46 |
| 6N | CLABSI rate/1000 CentralLine Days | | 0.00 (0/73) | 0.00 (0/98) | 0.00 (0/76) | 0.00 (0/117) | 0.00 (0/147) | 0.00 (0/123) | 0.00 | 2.81 |

# PROGRAM SPECIFIC DASHBOARD

Over the past year, the Neurosurgery Department has been developing dashboards for each clinical program. These dashboards use innovative methods such as natural language processing of providers' notes in addition to CPT and ICD9/ICD10 codes to precisely identify the correct patient populations for each dashboard. This allows program directors to have unique access to data specific to their subspecialty, including process and outcome measures developed specially for their patient population. These dashboards can also be used to target and track improvement initiatives particular to their program.

## EXTRACT OF THE MICROVASCULAR COMPRESSION SYNDROME PROGRAM DASHBOARD




## EXTRACT OF THE STROKE PROGRAM DASHBOARD

| | PSC Performance Measures | AHA Target | UCLA Target | Q1 2015 | Q2 2015 | Q3 2015 |
|---|---|---|---|---|---|---|
| STK-1 | VTE Prophylaxis | 85% | 90% | 100% | 100% | 100% |
| STK-4 | Thrombolytic Therapy Given Within One Hour of Arrival for Symptoms Within 2 Hours of Arrival | 85% | 90% | 100% | 100% | 100% |
| STK-6 | Statins Started Before Discharge | 85% | 90% | 100% | 100% | 100% |
| CSTK-01 | NIHSS Score Performed for Acute Ischemic Stroke at Arrival | 85% | 90% | 84.2% | 84.6% | 94.6% |
| CSTK-04 | Procoagulation Reversal Initiation for ICH | 85% | 90% | 100% | 100% | 100% |
| CSTK-06 | Nimodipine Treatment Administered | 85% | 90% | 85.7% | 75.0% | 100% |
| CSTK-08 | Post-Treatment Reperfusion Grade | 75% | 85% | 100% | 66.7% | 100% |

**Selected Recent Publications**:

1. Buchanan C, Hernandez E, Anderson J, et al. *Analysis of 30-day readmissions in neurosurgical patients: surgical complication avoidance is key to quality improvement*. J Neurosurg. 2014 Jul;121(1):170-5.
2. McLaughlin N, Rodstein J, Burke MA, Martin NA. *Demystifying process mapping: A key step in neurosurgical quality improvement initiatives*. Neurosurgery. 2014 Aug;75(2):99-109; discussion 109
3. McLaughlin N, Upadhyaya P, Buxey F, Martin NA. *Value-based neurosurgery: measuring and reducing the cost of microvascular decompression surgery*. J Neurosurg. 2014 Sep;121(3):700-8.
4. McLaughlin N, Burke MA, Setlur NP, et al. *Time-driven activity based costing: A driver for provider engagement in cost containment initiatives and value-based redesign*. Neurosurg Focus. 2014 Nov;37(5):E3.
5. McLaughlin N, Martin NA, Upadhyaya P, et al. *Assessing the cost of contemporary pituitary care.* Neurosurg Focus. 2014 Nov;37(5):E7.
6. McLaughlin N, Khalessi AA, Martin NA. H*ealth care economics in neurosurgery: There is no turning back*. Neurosurg Focus. 2014 Nov;37(5):Introduction.
7. McLaughlin N, Ong, M, Tabbush V, et al. *Contemporary healthcare economics: An overview*. Neurosurg Focus. 2014 Nov;37(5):E2.
8. Fallah A. *Time to rethink postoperative seizure outcomes for curative resective epilepsy surgery*. Epilepsy Behav. 2014 Dec;6(41):53-54.
9. Kaplan AL, Agarwal N, Setlur NP, et al. *Measuring the cost of care in benign prostatic hyperplasia using time-driven activity-based costing (TDABC)*. Healthc (Amst). 2015 Mar;3(1):43-8.
10. McLaughlin N, Garrett MC, Emami L, et al. *Integrating risk management data in quality improvement initiatives within an academic neurosurgery department*. J Neurosurg. 2015 Jul 31:1-8. [Epub ahead of print]
11. McLaughlin N, Jin P, Martin NA. *Assessing early unplanned reoperations in neurosurgery: Opportunities for quality improvement*. J Neurosurg. 2015 Jul;123(1):198-205.
12. Fallah A. *Moving beyond evidence-based medicine: Incorporating patient values and preferences*. Epilepsy Behav. 2015 Nov. pii: S1525-5050(15)00566-1.

**Presentations**:

Oral: 15 total – including 81th AANS (2013); CNS (2013); 25th Annual National Forum on Quality Improvement in Health Care – IHI (2013); UHC (2013); CANS (2013; 2014), NASBS (2014); CFNS (2014); CNS (2014); AANS (2014), Pituitary Centers of Excellence Conference (2015)

**Grants**:

1. University of California Center for Health Quality and Innovation Quality Enterprise Risk Management (CHQIQERM); Delivering Value-Based Neurosurgery: The Neurosurgery Enhanced Recovery, Value, and Safety (NERVS) protocol; $250,000 over three years; 08/2013 – present
2. University of University of California Structured Redesign to Achieve Value-Based Care; $50,000/year for 3 years; 2014 – present
3. University of California Center for Health Quality and Innovation Quality Enterprise Management (CHQIQERM); UC Care Check: A standardized multidisciplinary approach to improve neurosurgical patient outcomes and care experiences; Five-site collaborative; $1.25 million over three years; 08/3013 – present

UCLA NEUROSURGERY

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David Geffen School of Medicine | UCLA Health