

# Neurosciences Service Line & Stroke Update

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**COOK COUNTY**  
**HEALTH**

# Neurosciences Service Line

- Neurology with multiple subspecialties
- Neurosurgery with expertise in Trauma, spine and vascular
- Neurocritical care Program with Neurosciences ICU
- Neurotrauma/ NCC consult service
- Joint Commission Certified Stroke Center
- Tele Stroke Service
- Physical Medicine and Rehabilitation Services
- Ambulatory Services at Stroger, Provident and Blue Island



# Neuro Critical care Service

## Admitting Team

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24 x7 Admitting inpatient  
critical care service

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NSICU is the home base  
and receiving tertiary care  
program

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Admissions primarily  
through ER and Direct  
Admissions to NSICU

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Neuro critical care  
Consults to be provided to  
other ICU units across  
CCH



# NSICU Ribbon Cutting





# Advanced Neuromonitoring Systems



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NPi®-300  
Pupillometer



NPi®-300 Wireless  
Charging Station



## Pupillometry Program

I view  
charting

Training of  
providers  
and Nursing

NPi<sup>®</sup>-300  
Pupillometer



NPi<sup>®</sup>-300 Wireless  
Charging Station



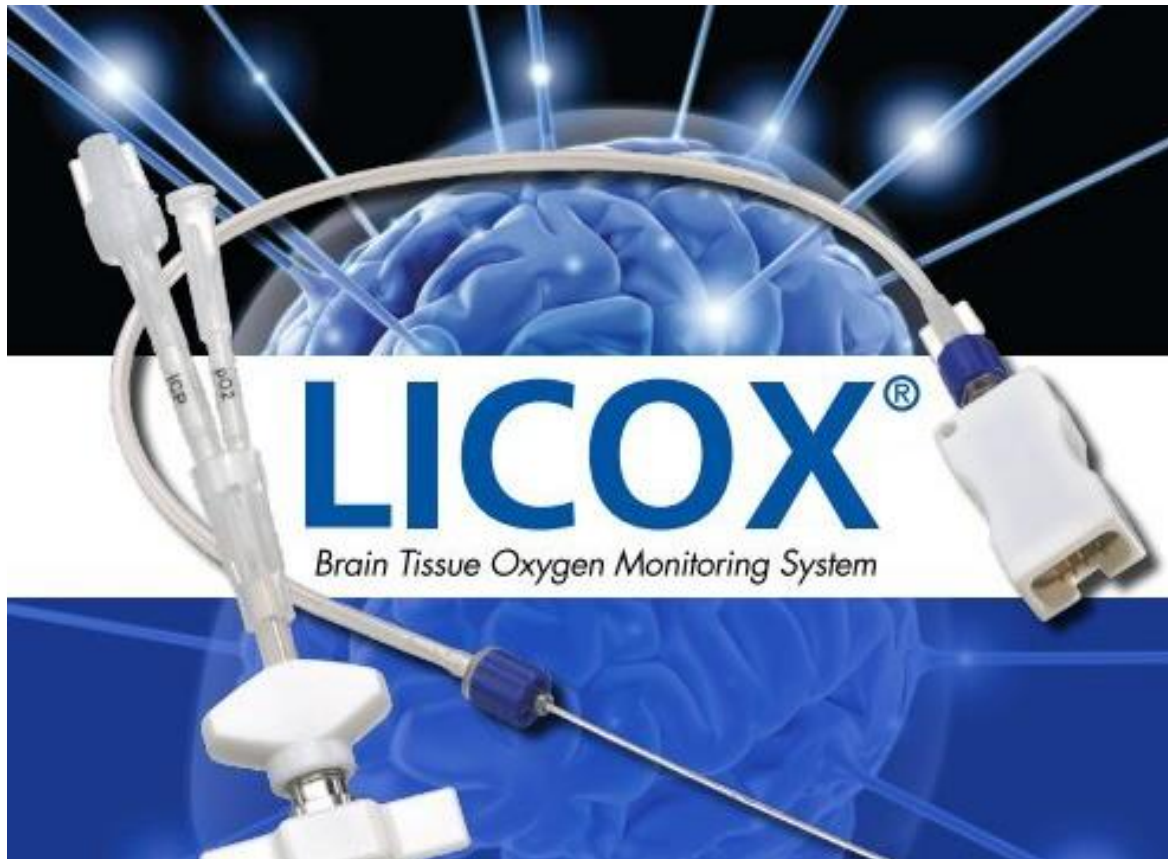
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# ICP Monitoring System

- Tip of 1.3 mm diameter
- Single Button Zeroing of transducer
- Interfaces with multiple patient monitors



# Brain Tissue O<sub>2</sub> Monitoring



## The Licox Monitor

- Measures the amount of Oxygen (O<sub>2</sub>) that is reaching the brain tissue
  - Partial Pressure of Brain Tissue Oxygenation ( $P_{bt}O_2$ )
  - Normal  $P_{bt}O_2$ : 25-35 mmHg
- Continuous, real time measurement





# Continuous Critical EEG Monitoring & Management



Continuous EEG  
Workflow



NCC gets notified



Stat continuous EEG order



Alerts EEG tech & Remote Monitoring Team



Stat reading in 1 hour and at regular intervals



NCC team manages and modifies medications / anesthetics  
against seizure activity or burst suppression target

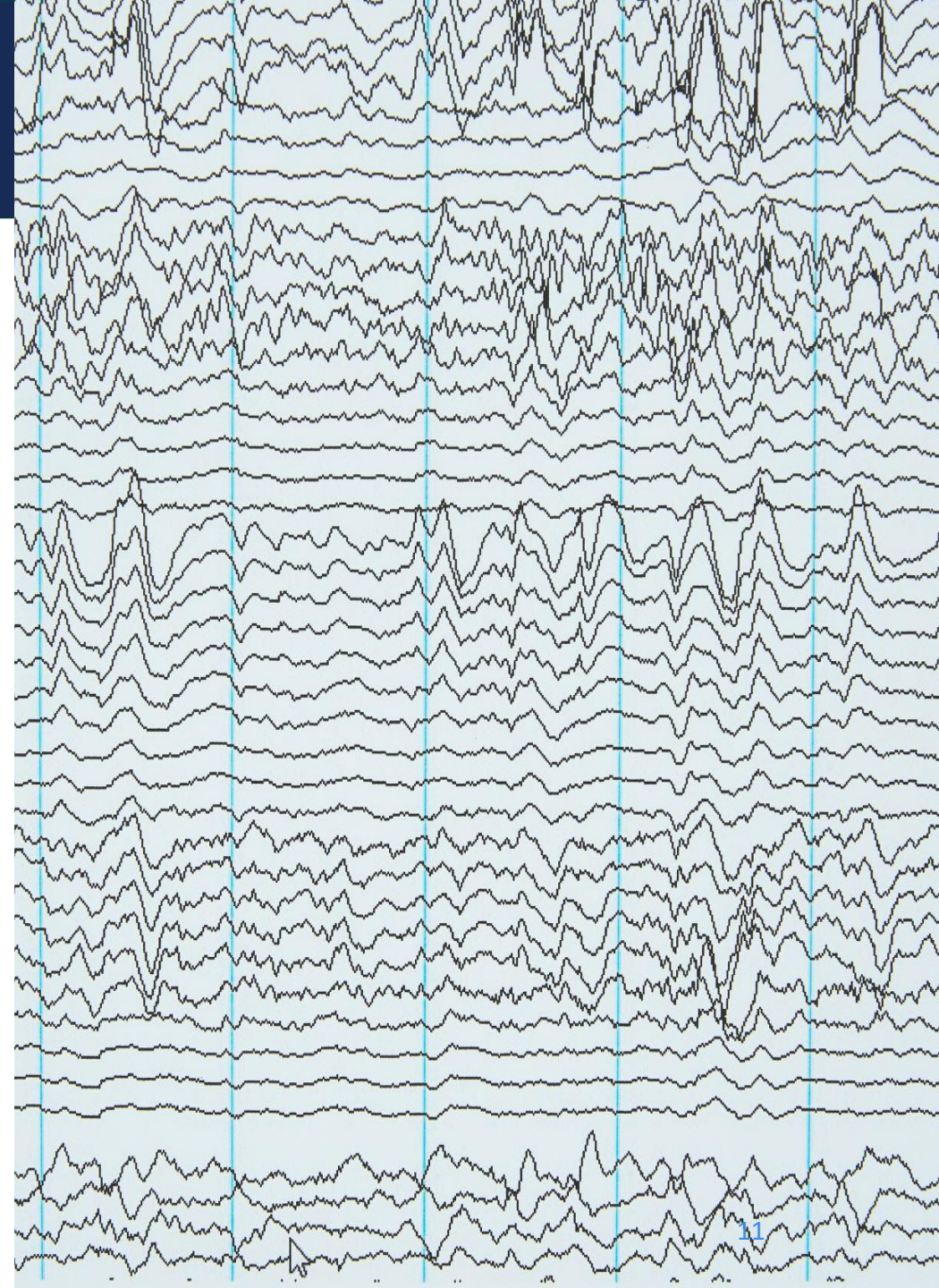
# Continuous Critical Care EEG Monitoring





# Continuous Critical EEG Monitoring FY 2024

- 250+ studies performed
- 500+ days of monitoring
- 10,000+ hours of continuous Brain waveform monitoring
- Successful abortion of refractory and super refractory status epilepticus cases

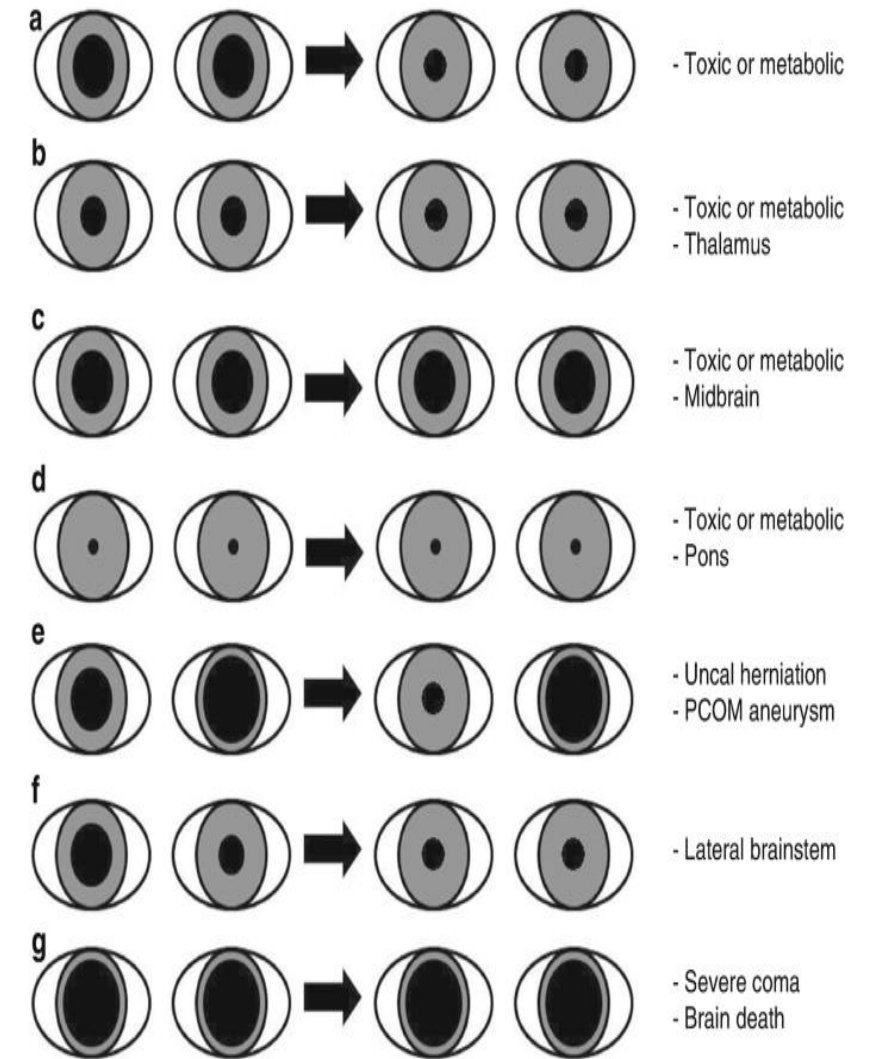
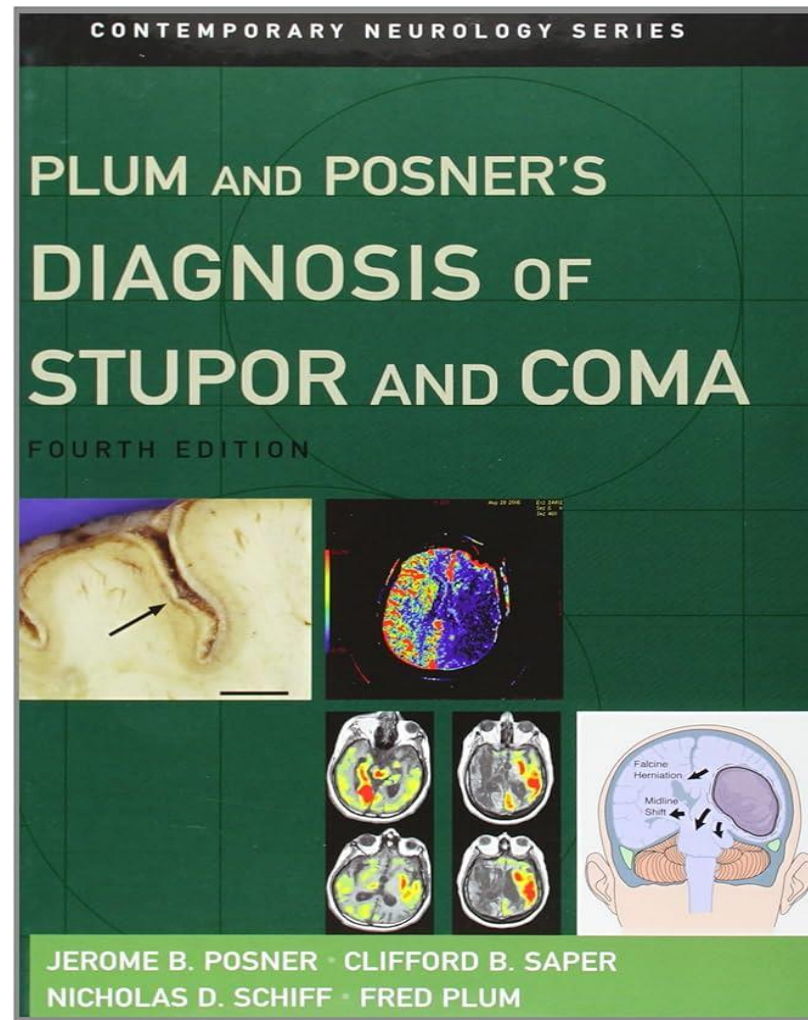


# Continuous Critical EEG Monitoring

- Multiple seizures and encephalopathic / unresponsive patient
- Subclinical seizures / electrographic status
- Severe TBI – Refractory ICP Management and brain waves
- Burst suppression monitoring and anesthetics management
- Post cardiac Arrest management and Prognostication







## Large left Epidural Hematoma with Fixed and Dilated Pupils

# Large left Epidural Hematoma with Fixed and Dilated Pupils

- Comatose for several days
- Critical and unpredictable Neuro ICU course
- EEG monitoring started showing indicators of good outcome
- Successfully extubated, intact comprehension and discharged to IPR



## KNOW STROKE | WHO IS AT RISK?

Make the stroke call. 9-1-1  
[stroke.nih.gov](http://stroke.nih.gov)



Stroke can strike anyone.

# African Americans, Hispanics

& 55+ are most at risk.



Stroke is more common in women and the number of strokes increases with age.

# 2x

Stroke kills twice as many  
**African Americans** as Caucasians, with  
more severe & disabling effects.

Sources: NIH/National Institute of Neurological Disorders and Stroke. (n.d.). Preventing Stroke. Retrieved from [www.ninds.nih.gov](http://www.ninds.nih.gov). • American Stroke Association. (n.d.). Conditions: Understanding Stroke Risk. Retrieved from [www.strokeassociation.org](http://www.strokeassociation.org).



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# Stroke Disparities

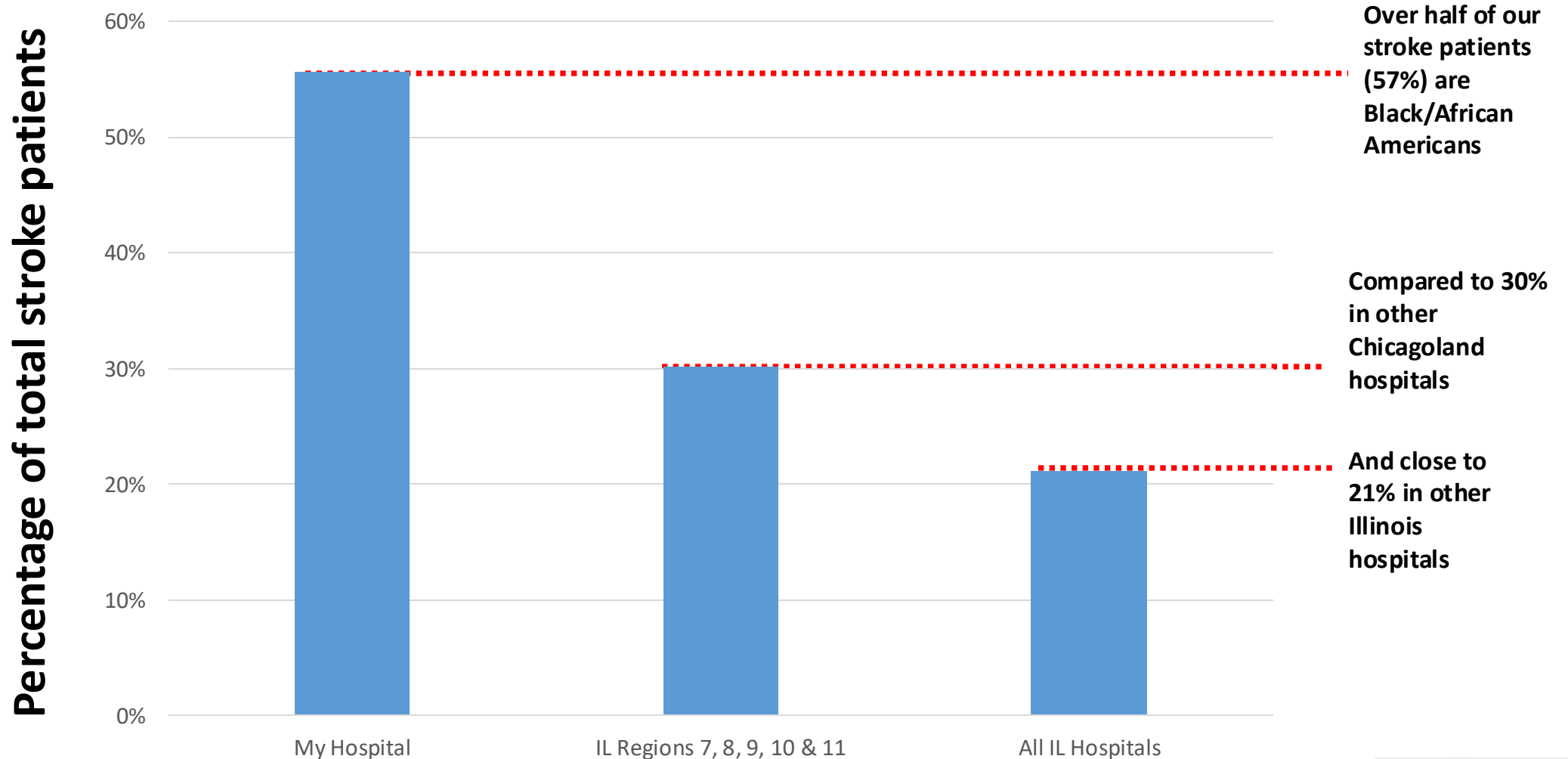
- In Chicago:
  - Above-average rates are found among blacks
    - Disproportionately burdened with stroke risk factors
  - Higher stroke mortality rates in communities with:
    - larger proportions of black residents
    - lower median household incomes
- Blacks (29.5%) are less likely than whites (41.3%) to be able to identify the warning signs of a stroke
  - Delays time in getting to a hospital
  - Delays in getting time-sensitive treatment that can help to reduce mortality and morbidity





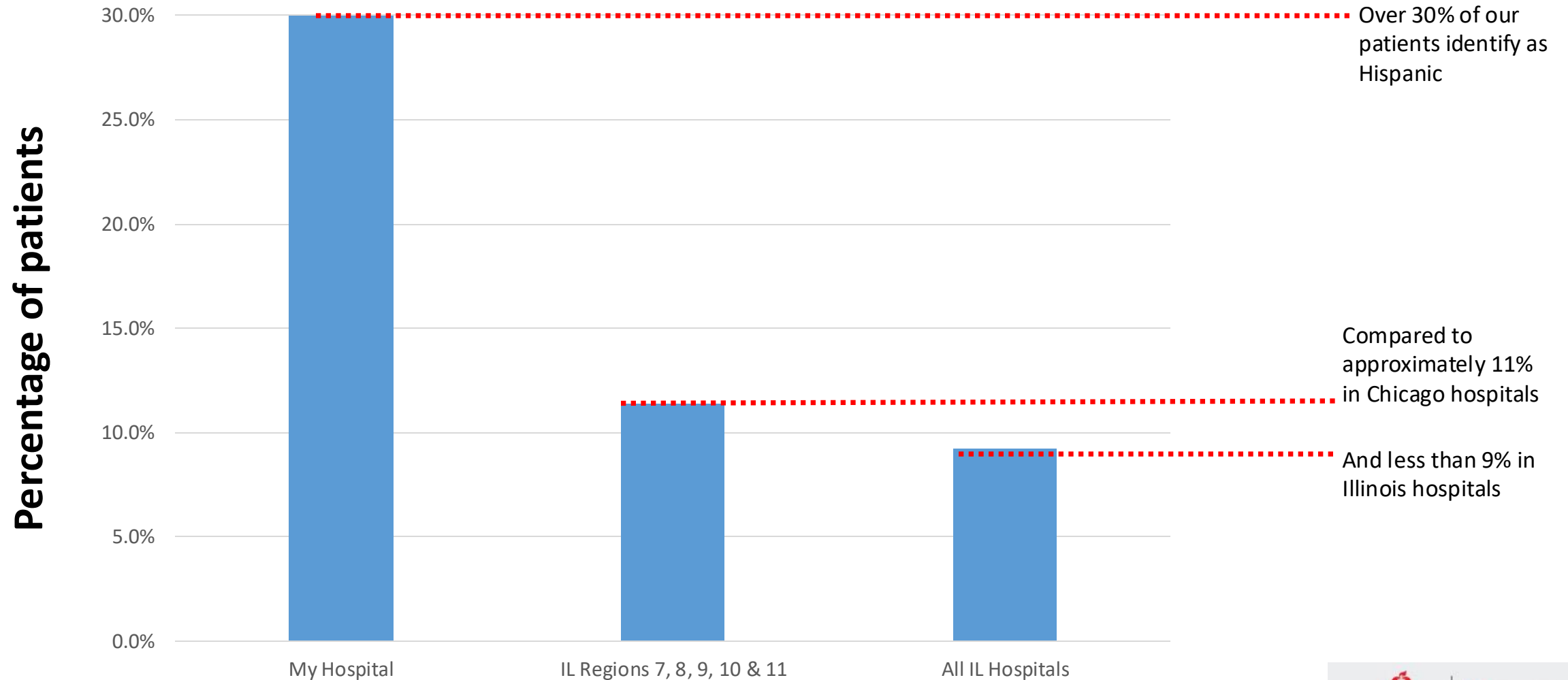
# Get with the Guidelines<sup>®</sup>

## Percentage of black or African American patients

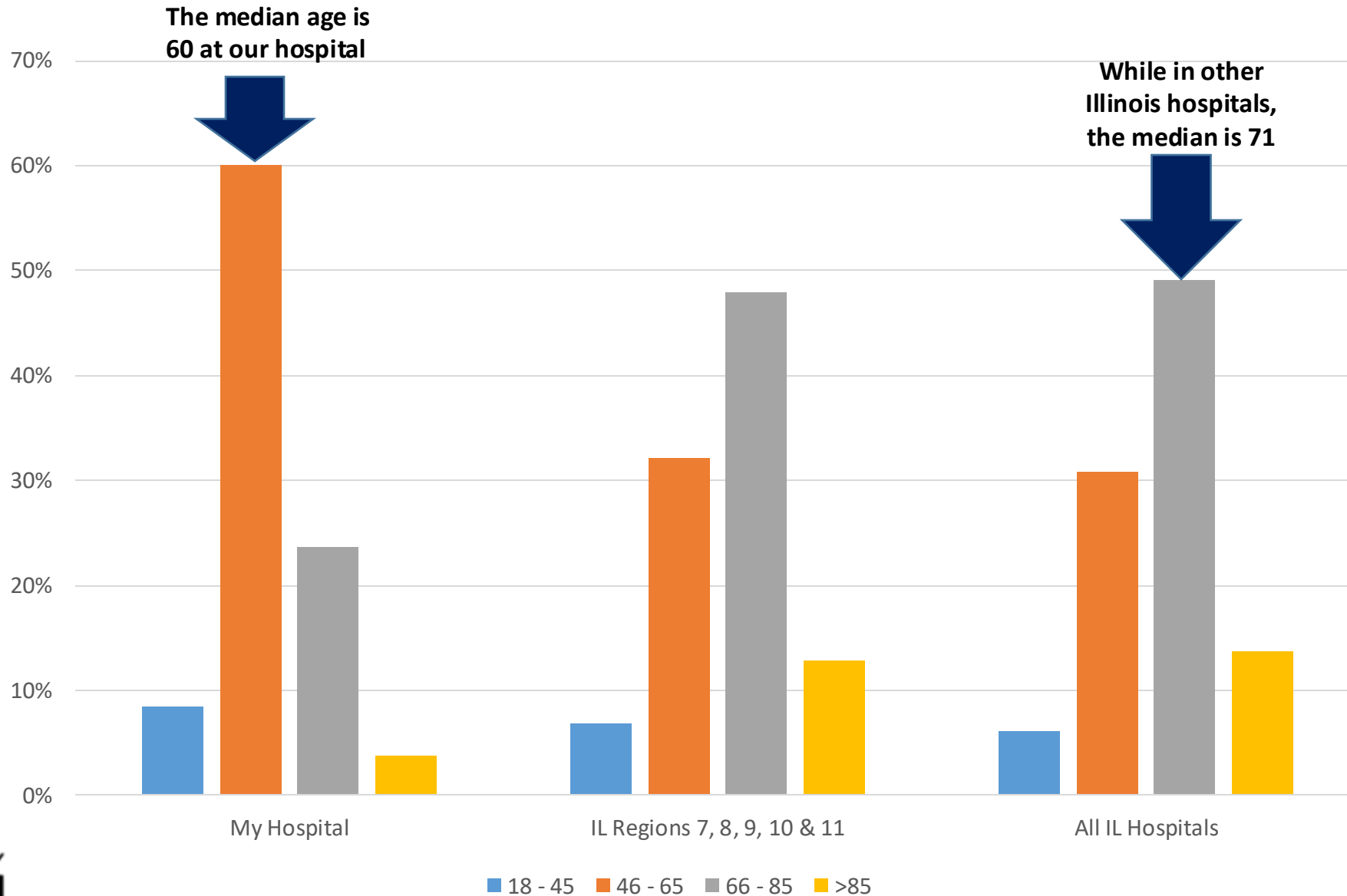


# Get with the Guidelines<sup>®</sup>

## Percentage of patients with Hispanic Ethnicity

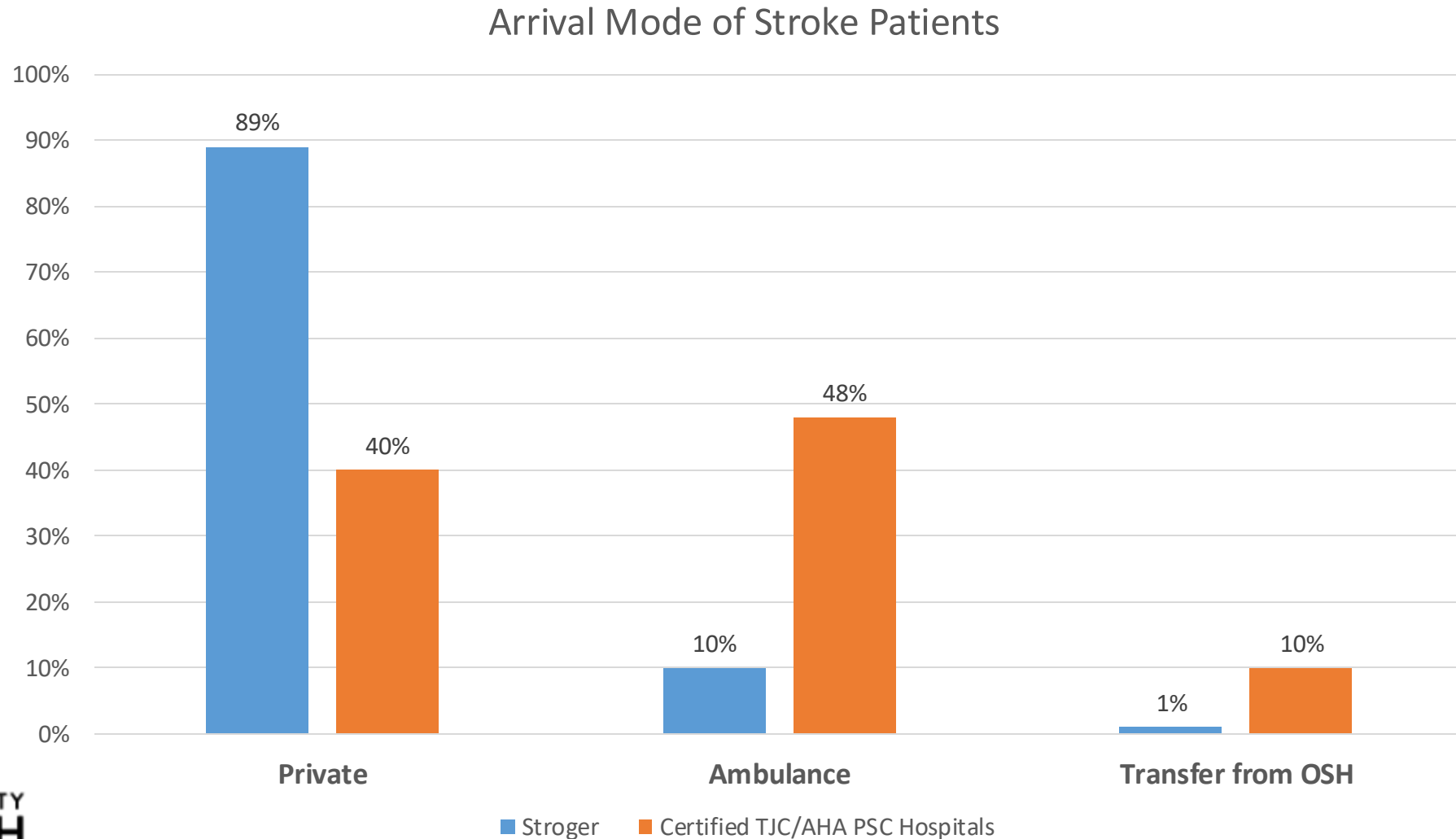


# Our stroke patients are younger, black and Hispanic



# Arrival Mode

## Stroger Hospital vs. All TJC/AHA PSC Hospitals





# Adult smoking rate

	National	Illinois	Chicago	Stroke inpatient population 2024
% of smokers	11.6%	12.4%	19.6%	27%

# Stroke Mortality Rates Vary in Local Communities in a Metropolitan Area

## Racial and Spatial Disparities and Correlates

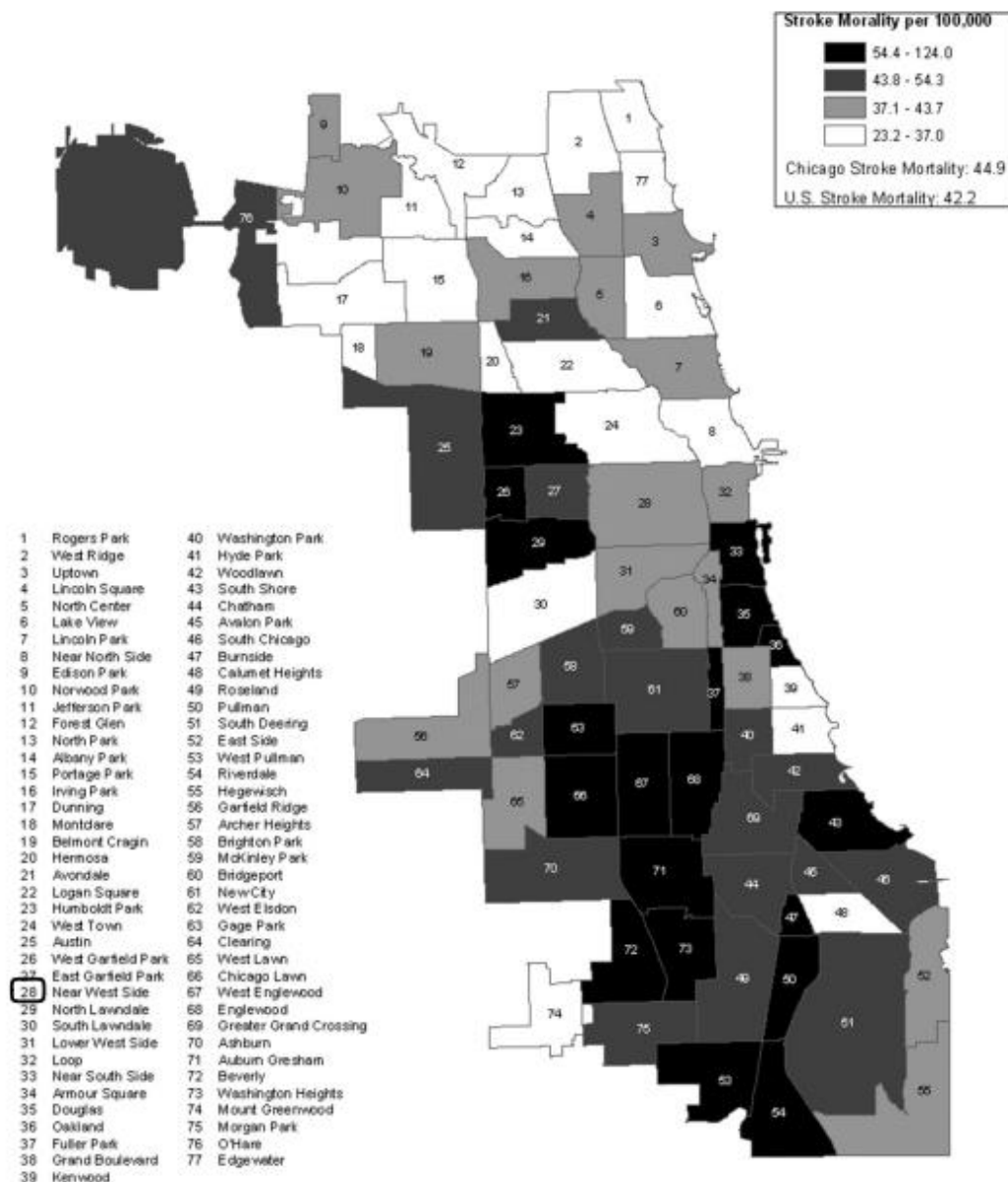
Bijou R. Hunt, MA; Deepa Deot, BS; Steven Whitman, PhD

**Background and Purpose**—For the past decade, stroke has held steady as one of the top 4 leading causes of death in the United States. Aggregated data provide information about how the country or individual states are faring with respect to stroke mortality, but disaggregation provides data that may facilitate targeted interventions and community engagement.

**Methods**—We analyzed deaths from stroke to residents of Chicago to calculate age-adjusted stroke mortality rates (AASMRs). We calculated AASMRs for Chicago by race/ethnicity, sex, and community area. We also examined the correlation between AASMR and (1) racial/ethnic composition of a community area and (2) median household income.

**Results**—The AASMR for Chicago (44.9 per 100,000 population) was significantly higher than the national rate (42.2). Within both the United States and Chicago, the highest AASMRs were found among non-Hispanic blacks, followed by non-Hispanic whites, and then Hispanics. There was a strong, positive correlation between the proportion of black residents in a community area and the AASMR (0.58). There was a strong, negative relationship between household income and the AASMR for the entire city (−0.56) and for the predominantly black community areas (−0.47).

**Conclusions**—These data provide insight into where the worst stroke mortality problems reside in Chicago. We anticipate that the data can be used to work toward the development of solutions to the high stroke mortality rates observed in several of Chicago's community areas and in similar communities throughout the United States. (*Stroke*. 2014;45:2059-2065.)



# “Healthy Lungs” Initiative

- Trained health educators discuss the benefits, barriers and motivation to stop smoking with patients
- For those willing to quit, health educators develop a personalized quit plan
  - Incorporated action-oriented strategies
  - Substitutes for smoking urges
  - Coping with temptations
  - Commitment to create a smoke-free home
- Offer four follow-up telephone calls over three months



# Stroke Awareness Month



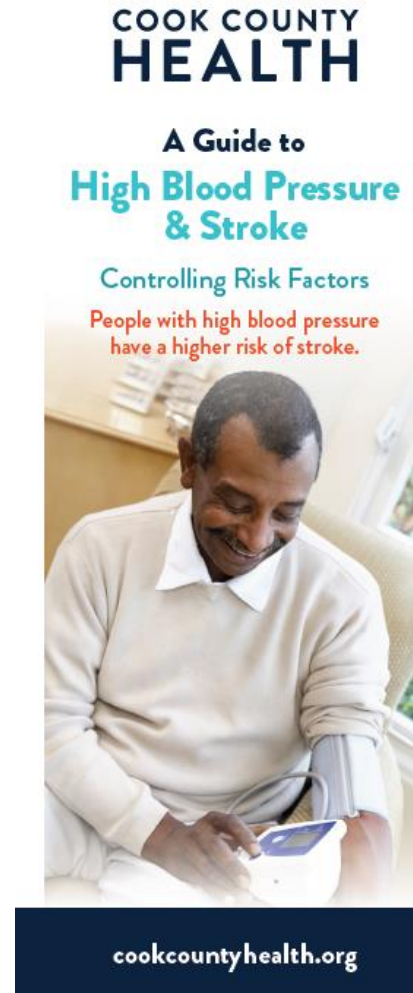






# Community Stroke Education

- Stroke education events across the city
- Cermak Health Fair
- Stroke education at quarterly advisory councils across our community
- Partnering with community clinics to provide stroke education to our hypertensive patients



# Stroke Awareness Month – CBS News



# Stroke Clinic

- Multidisciplinary Stroke clinic
- Stroke Risk Factors Modification
- Individualized Education
- Evaluation of therapy needs in the same visit
- Focused stroke prevention treatments

# Tele stroke Service

## Acute Stroke Service

- Tele stroke carts in Stroger and Provident
- Acute Stroke cases managed via Telemedicine
- Tele neurocritical care capability in Neuro ICU
- 300+ Acute Stroke Alerts
- Partner with community Hospitals and provide

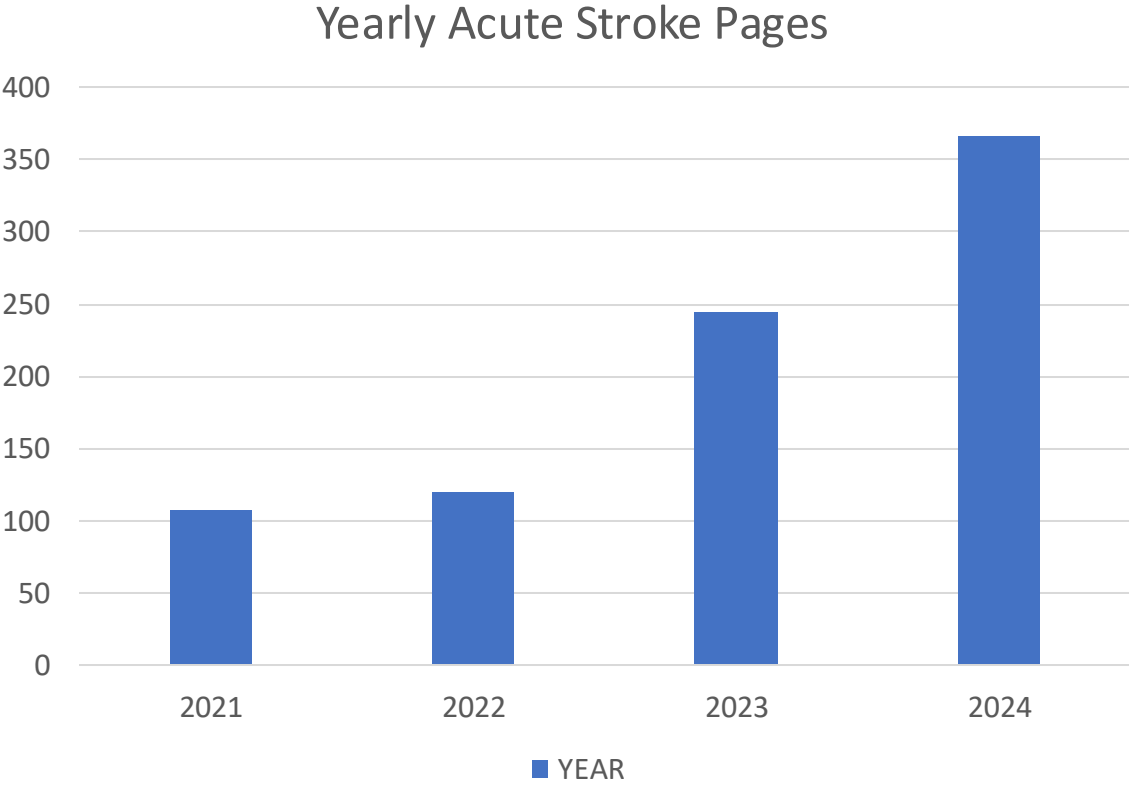
Tele stroke service



# Acute Stroke Activation Alerts

## Annual Totals

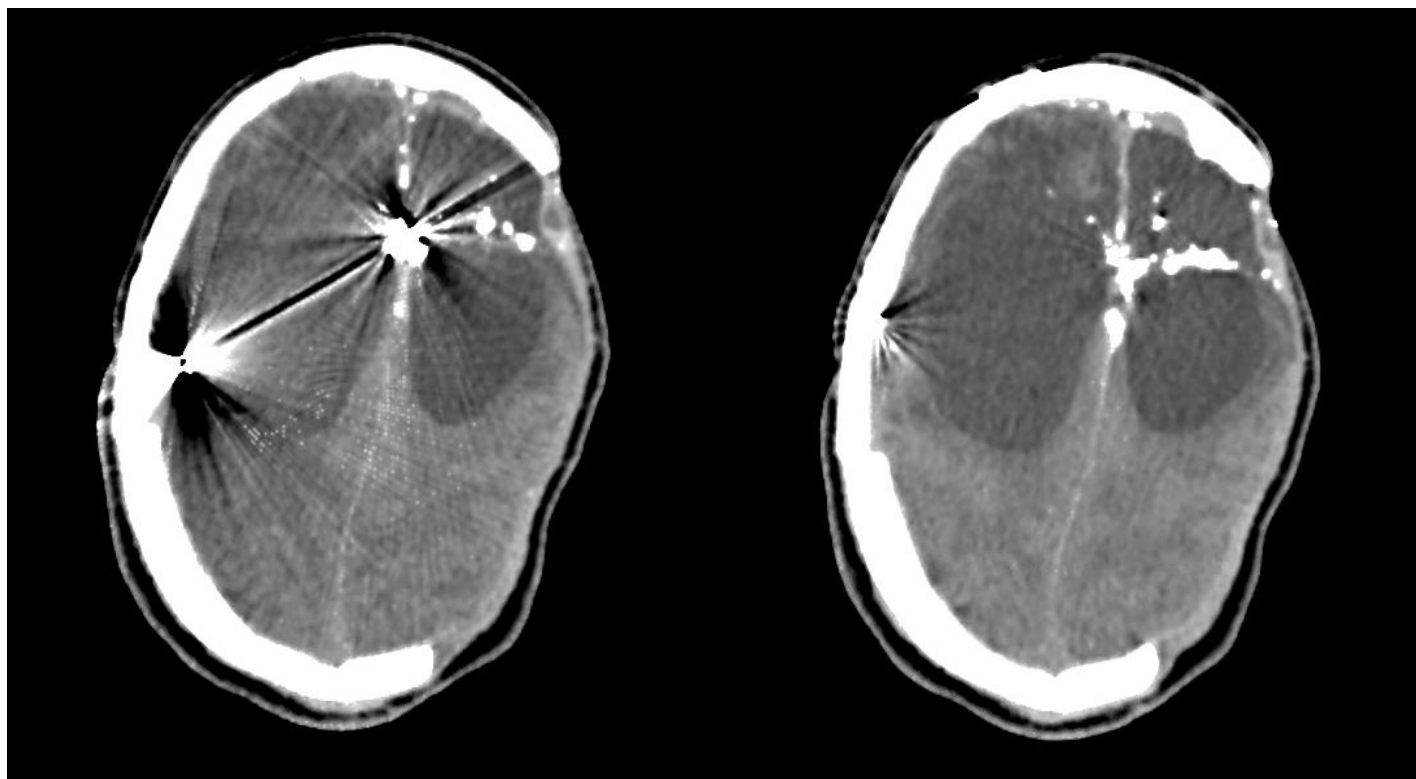
YEAR	TOTAL STROKE PAGES
2021	107
2022	120
2023	245
2024	366





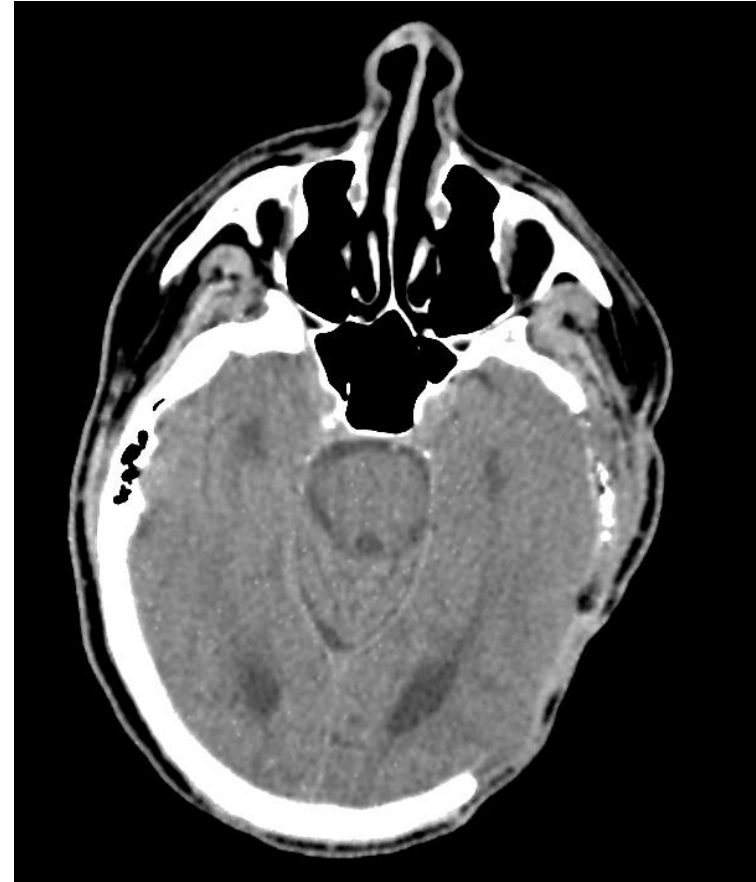
# Penetrating TBI with comatose exam

- 15+ ICP Crisis Episodes were treated successfully
- Refractory to hyperosmolar therapy
- Burst suppression for 5 days



# Severe Traumatic Brain Injury – ICP Crises

Discharged to Shirley Ryan  
Treadmill with support x 3 months  
Transitioned to full PO diet



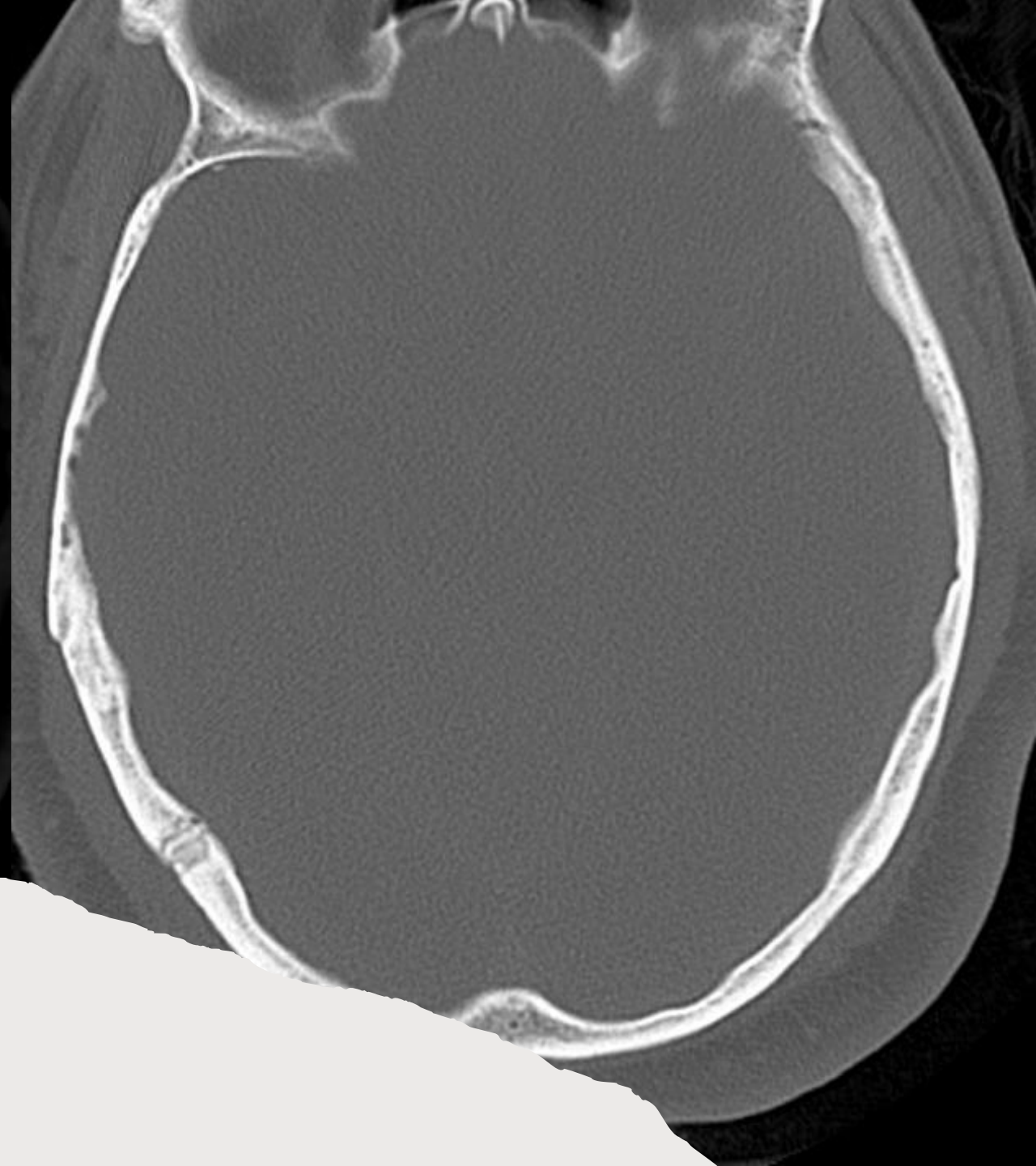
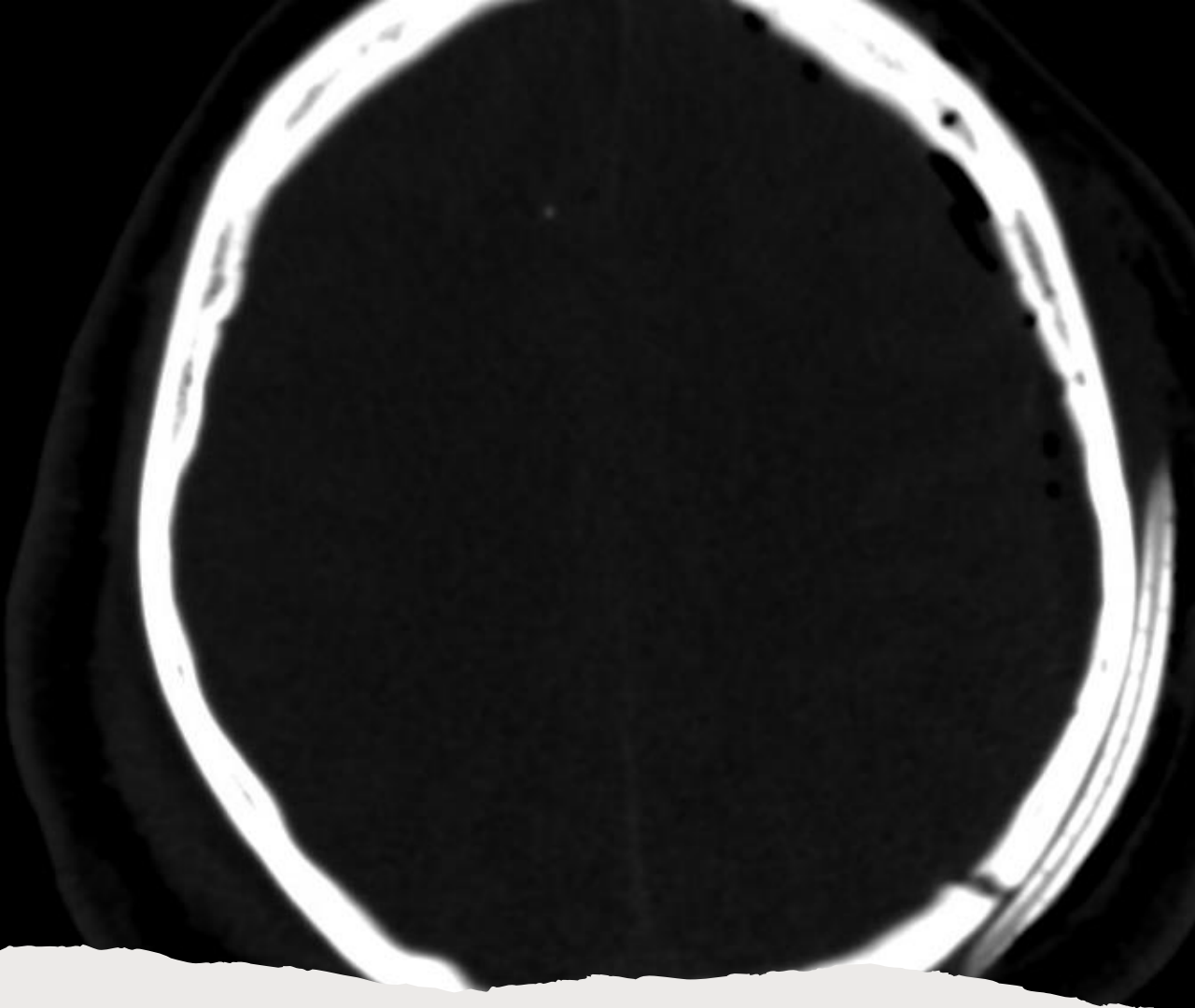
# Neuro Trauma & Brain Hemorrhage

- 30-year-old patient with severe TBI – Traumatic Brain Injury at Olympia Fields ER
- Large Brain Hemorrhage – Unconscious – Initial resuscitation
- Declining Brain function on arrival to Stroger
- Trauma , Neurosurgery and Neurocritical care teams activated

# Neuro Trauma & Brain Hemorrhage







**Skull Fractures**  
Traumatic Brain Injury



## First 6 Hours

- Emergent Brain Surgery
- Critical on arrival to Neuro ICU
- ICP monitors placed and close neuro monitoring and management while patient remained unresponsive.



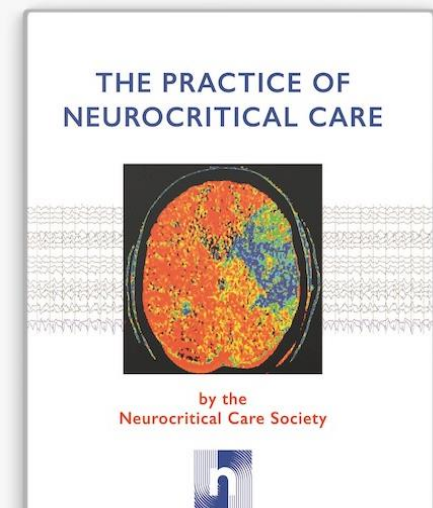
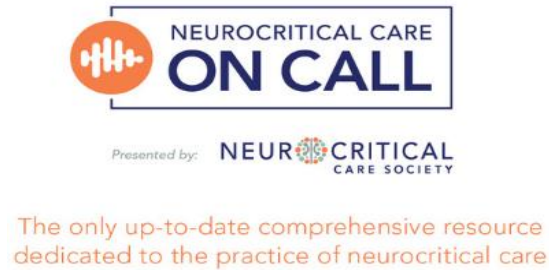


# Neuro ICU Course

- Eye opening and responding on Day 03
- Extubated- off ventilator on Day 04
- Critical Neuro ICU course in next few days
- Started following all commands, walking independently and speaking by 1 week
- Neuro rehab evaluations and therapies
- Discharged to home – independent with neuro functions and speech

# Neurocritical care Physicians

- M Soheli Ahmed
- Ajit Indavarapu
- Sayona John
- Fady Mousa
- Patti Raksin





# Accomplishments- Neurosciences

Recruitment across Neurosciences Service Line

Implementation of Neurocritical Care Admitting and Neuro trauma consult service

Opening of Neurosciences ICU

Implementation of Continuous EEG Program with 24/7 Remote Monitoring

Pilot and implementation of VNS neurosurgical program

Tele Stroke Program and American Heart Association Get with the Guidelines Stroke – Gold Plus Achievement

ENLS certification for physicians, APPs and Residents/ Fellows



# Planned Activities & Goals - Neurosciences

Build Neurointerventional program

Collaborate with Radiology for system wide AI based CT perfusion neuroimaging system

Advance to Thrombectomy capable & Comprehensive Stroke Center

Partner with community hospitals to offer Acute Tele neuro and Tele stroke service

Expand VNS Neurosurgical Program for non-epileptic indications

Launch Brain Recovery Multidisciplinary Clinic

Recruit PM & R attendings and partner with Inpatient Rehab facilities

Partner with GME for Neurology training programs

