

# **Inova and Operation Stroke – Continuing Success... Despite Challenges**

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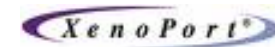
**Medical Director Neurodiagnostic Lab**

**Co-Chair Operation Stroke Northern Virginia**



**INOVA FAIRFAX HOSPITAL  
INOVA ALEXANDRIA HOSPITAL**

# Disclosures (JWC) - consultant, speaker, advisory board or research:



# Inova Health System

- **Comprehensive Health Care System located in Northern Virginia**
  - six acute care hospitals
  - home health
  - inpatient and outpatient rehabilitation
  - long term care facilities
  - clinics/urgent care centers
  - community education programs



# Inova Health System



**VISION**

To be the best health care system in the world.

**MISSION**

To improve the health of the diverse community we serve through excellence in patient care, education and research.

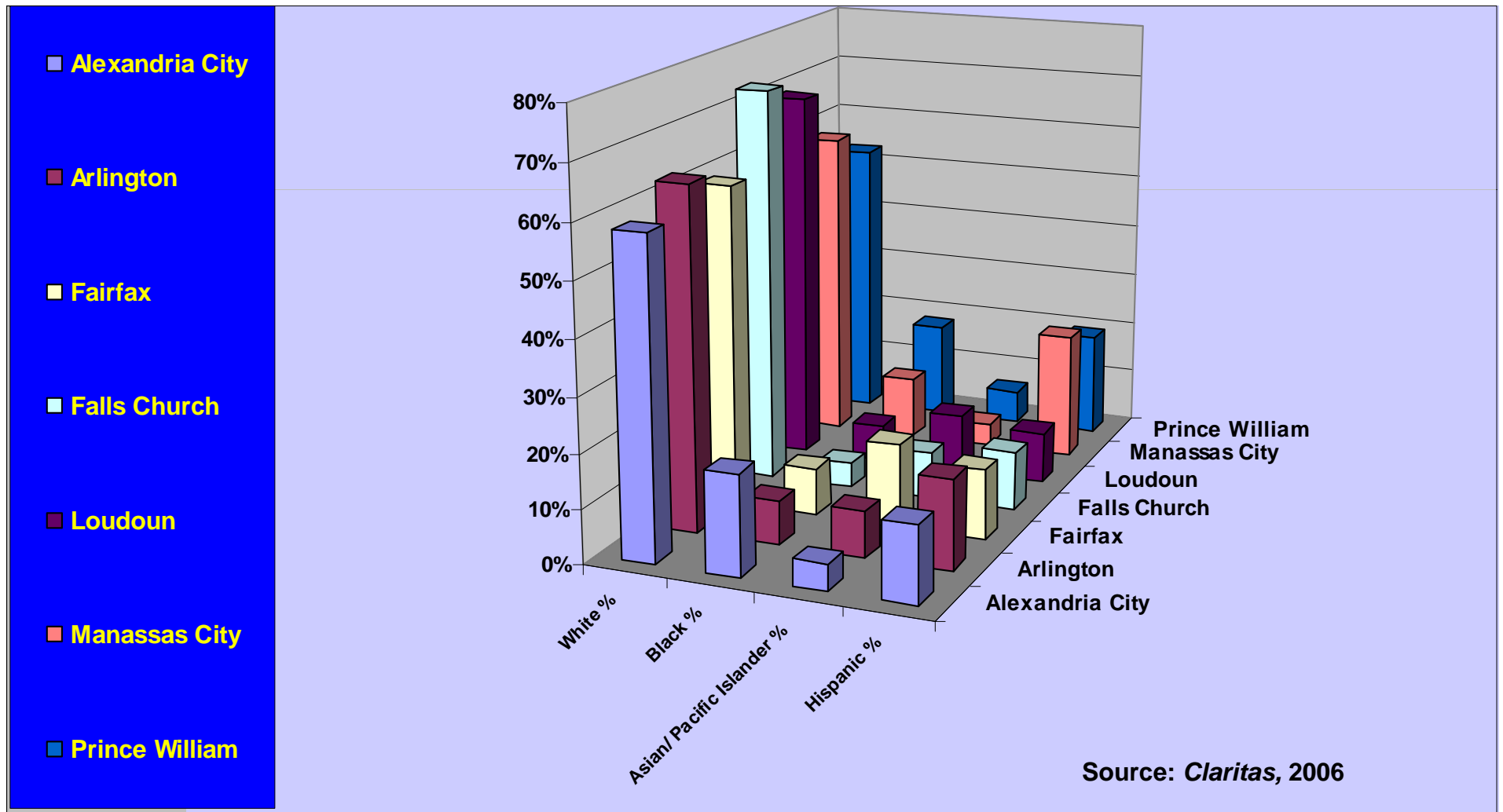




# Inova Fairfax Hospital

- **833-bed regional medical center with Level 1 trauma services**
- **Magnet nursing facility**
- **Campus includes Heart and Vascular Institute and Hospital for Children**
- **Over 85,000 ED visits with ~30% pts admitted**
- **5 adult critical care units**
- **Affiliated medical schools**
  - **Georgetown U.**
  - **George Washington U.**
  - **Virginia Commonwealth University**
- **Affiliated nursing schools**
  - **George Mason University**
  - **Marymount University**
  - **Catholic University**
- **Comprehensive Health Science Library**
- **Transplantation programs**

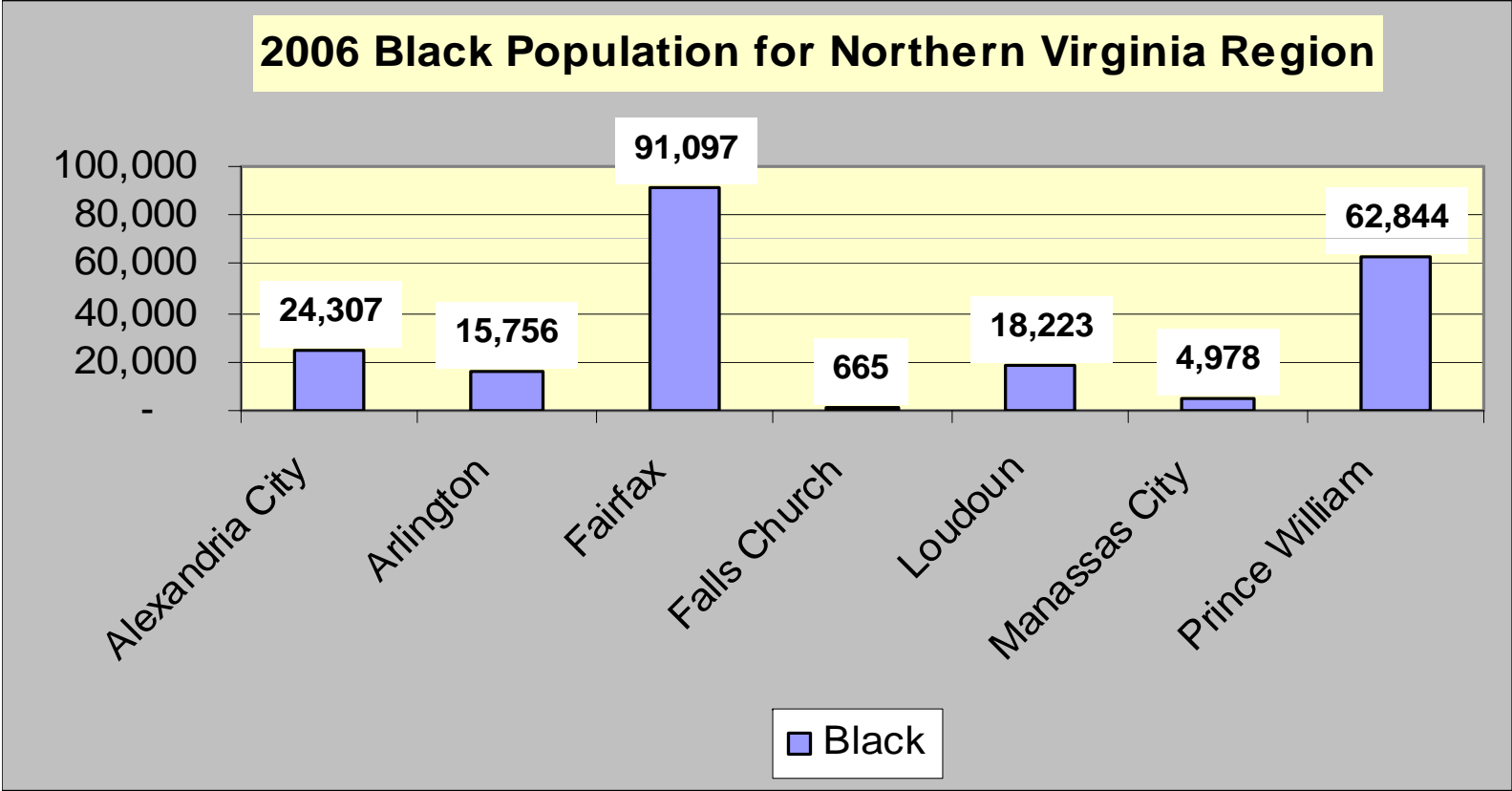
# Northern VA Population Breakout by Race : 2006



# **Operation Stroke Initiatives**

- **Implemented Brain Attack Coalition guidelines across system hospitals**
- **Demonstrated improved awareness of and educated the community on warning signs and 911 through a broad based social marketing campaign**
- **Developed community health education materials in six languages and launched a stroke website**
- **Sponsored conferences for Stroke Survivors, Caregivers and HealthCare Professionals**
- **Created position of CNS for Operation Stroke in the Community Health Division**

# 2006 District 8: Population by Race & Ethnicity



Source: Claritas, 2006

# Cerebrovascular Coverage

- **Monthly call schedule designed to provide 24/7 coverage to neuroscience patients**
  - Neurology
  - Neurosurgery
  - Interventional Neuroradiology
  - Critical Care Intensivists
  - Neurosurgery Physician Assistants
  - Cerebrovascular Nurse Practitioners

# Scope of Service Today

- **Opened 16 bed Neuroscience Intensive Care Unit (2004)**
- **Creating comprehensive regional referral center for stroke care (ongoing)**
- **Research**
- **Interventional Neuroradiology Procedures**

# Scope of Service Today

- **Stroke Unit**
  - Opened 12 beds February 2007
  - Expanded to 28 beds November 2007
  - Cardiac Telemetry
  - Nurse patient ratio 1:4
  - Future plans:
    - Expansion to 32 beds
    - Four Progressive Care beds

# Scope of Service Today

- **All patients on the Stroke Unit require:**
  - Neurologist as attending or consultant
  - Order set
  - Pathway

# Scope of Service Today

- **16-bed NSICU**
  - **continuous cardiac monitoring**
  - **hemodynamic monitoring**
  - **ICP monitoring**
  - **management of increased ICP**
  - **Nurse Patient Ratio 1:2**
  - **average daily census: 14.5**

# Scope of Service Today

- **Interventional Neuroradiology**
  - **24/7 coverage**
  - **All stroke patients screened for:**
    - **Intra-arterial thrombolytics**
    - **Merci device procedure**
    - **Stent placement**
    - **Research protocols**
  - **INR physicians responsible for assessment of vaso-vetebral strokes**
  - **Collaborate closely with Cerebrovascular neurologists, neurosurgeons, nurse practitioners and Stroke Response Nurses**

# Pre-Hospital: Emergency Medical Response

- **Scott Weir, M.D., IFH ED Physician Liaison for Fairfax County**
- **James Vafier, M.D., IAH ED Physician Liaison for City of Alexandria**
  - **Program provides hours Stroke specific competency training, certification, bi-annual continuing education, in-station drills and web-based CME**
  - **Current protocol emphasizes:**
    - **identification of potential stroke-related symptoms utilizing the Cincinnati Stroke Scale**
    - **accurate identification of symptom onset**
    - **prevention of secondary insults**
    - **early notification of the Stroke Response Nurse/Team at the receiving facility.**

# Community Education

- **2008 May -- Stroke Month activities:**
  - **“Stroke Awareness: What you know can save your life!”**
    - **Community lecture by Dr. John W. Cochran, Medical Director, Operation Stroke**
    - **EMS Breakfast/Appreciation Event for Alexandria EMS**

**–Blood Pressure and Cholesterol Screenings, Health Fairs, Media Events, Community Education**

# Community Education

- **2008 May - Stroke Month activities:**
  - **Month-long “Stroke is a Medical Emergency” displays and distribution of stroke related collaterals in English and Spanish**
  - **Power-to-End-Stroke staff presentations at local churches**

# State of Virginia Proclamation

**Special recognition by the State Legislature bestowed to Inova Fairfax and Inova Alexandria Hospitals for efforts to reduce the debilitating effects of stroke in our community by achieving designation as JCAHO Primary Stroke Centers.**



# History of the Stroke Response RN Program

- **Outgrowth of r-tPA research**
- **Research nurses**
  - responded for patients within 3-hour window.
  - assessed patients with NIHSS
  - gained physician confidence for nurses in this role

# History of SRN Program

- **Neuroscience nurses**
  - unit training developed by expert clinicians
  - mentored by the research RNs for first 6 weeks
  - followed same standards as research protocol
  - responded initially to patients within three hour window

# Stroke Response Process

- **At IFH Stationed in the ED Communications Room October 2007; IAH Combination of ED and Stroke Unit Nurses**
- **Notification may be with EMS call**
- **Increased sense of urgency in medical, nursing, and ancillary staff**
- **Performs initial assessment and NIHSS**
- **Facilitates rapid transport to CT/CTA**

# Stroke Response Process

- **Contacts neurologist and presents assessment findings**
- **Physicians make decision for r-tPA**
- **ED/critical care nurses administer r-tPA**
- **Provides continuity of care for patient and family from ED to ICU**

# SRN Competence

- **Initially selected: senior neuroscience nurses**
  - Charge staff with minimum of 1year experience
  - All staff trained in NIHSS - part of patient admission / discharge assessment
- **NIHSS training built into the Neuro fellowship for new staff**

# Scope of Service Today

## Emergency Department

- Regional Referral Center
- 50% hemorrhagic patients referred
- Neurosurgical services



# Acute Stroke Care Hospital Roles

## Virginia Hospitals

### Comprehensive Stroke Centers (Level 1)

- 1A- CJW MC - Chippenham (also Level 2)
- 1B- CJW MC - Johnston-Willis (also Level 2)
- 2- Inova Fairfax Hospital (also Level 2)
- 3- VCU Medical Center
- 4- Sentara Norfolk General Hosp (also Level 2)
- 5- University of Virginia MC (also Level 2)

### Primary Stroke Centers (Level 2)

- 6- Saint Mary's Hospital
- 26A- Henrico Dr's Hospital - Parham
- 26B- Henrico Dr's Hospital - Forest
- 7- Inova Alexandria Hospital
- 45- Sentara Leigh Hospital
- 8- Sentara Virginia Beach General Hosp
- 9- Winchester Medical Center

### Basic Stroke Service (Level 3)

- 10- Alleghany Regional Hospital
- 11- Augusta Medical Center
- 12- DePaul Medical Center
- 13- Buchanan General Hospital
- 14- Bedford Memorial Hospital
- 15- Carilion Franklin Memorial Hospital
- 16- Carilion Giles Memorial Hospital
- 17- Carilion Roanoke Memorial Hospital
- 18- Carilion New River Valley Medical Ctr
- 19- Lynchburg General Hospital
- 20- Chesapeake Regional Medical Center
- 21- Community Memorial Health Center
- 22- Culpeper Regional Hospital
- 23- Danville Regional Medical Center
- 24- Fauquier Hospital
- 25- Halifax Regional Hospital
- 27- John Randolph Medical Center
- 28- Johnston Memorial Hospital
- 29- Lewis-Gale Medical Center
- 30- Inova Loudoun Hospital
- 31- Mary Washington Hospital
- 32- Manyview Medical Center
- 33- Memorial Hosp of Martinsville & Henry Cty
- 34- Memorial Regional Medical Center
- 35- Mountain View Regional Medical Center
- 36- Norton Community Hospital
- 37- Sentara Obici Hospital
- 38- Potomac Hospital
- 39- Riverside Regional Med Ctr

- 40- Riverside Tappahannock Hospital
- 41- Riverside Walter Reed Hospital
- 42- Russell County Medical Center
- 43- Sentara Bayside Hospital
- 44- Sentara CarePlex Hospital
- 46- Shore Memorial Hospital
- 47- Southern Virginia Regional Med Ctr
- 48- Twin County Regional Hospital
- 49- Virginia Hospital Center
- 50- Warren Memorial Hospital
- 51- Lonesome Pine Hospital
- 52- Sentara Williamsburg Regional MC
- 53- Wythe County Community Hospital

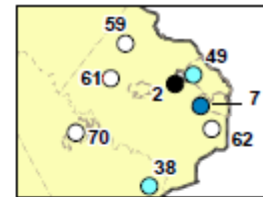
- ### Initial Entry Access (Level 4)
- 54- Bath County Community Hospital
  - 55- Bon-Secours Richmond Community Hospital
  - 56- Bon-Secours St. Francis MC
  - 57- Children's Hospital of the King's Daughters
  - 58- Clinch Valley Medical Center
  - 59- Columbia Reston Hospital Center
  - 60- Dickenson Community Hospital
  - 61- Inova Fair Oaks Hospital
  - 62- Inova Mount Vernon Hospital
  - 63- Lee Regional Medical Center
  - 64- Martha Jefferson Hospital
  - 65- Mary Immaculate Hospital
  - 66- Montgomery Regional Hospital
  - 68- Page Memorial Hospital
  - 69- R.J. Reynolds Patrick County Mem Hosp
  - 70- Prince William Hospital
  - 71- Pulaski Community Hospital
  - 72- Rappahannock General Hospital
  - 73- Retreat Hospital
  - 74- Rockingham Memorial Hospital
  - 75- Shenandoah Memorial Hospital
  - 76- Smyth County Community Hospital
  - 77- Southampton Memorial Hospital
  - 78- Southside Community Hospital
  - 79- Southside Regional Med Ctr
  - 80- Stonewall Jackson Hospital
  - 81- Tazewell Community Hospital

- Level 1 – Comp. Stroke Ctr.
- Level 2 – Primary Stroke Ctr.
- Level 3 – Basic Stroke Service
- Level 4 – Initial Entry Access

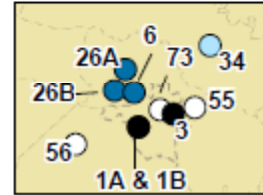
## Stroke System of Care Regions

- Southwestern Va
- Northern Va
- Eastern Va
- Central Va

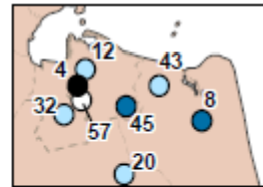
Hospital Stratification System and survey design developed by Tim Shephard, RN, PhD, CNRN, CNS with input from other members of the Virginia Stroke Systems Leadership Team.



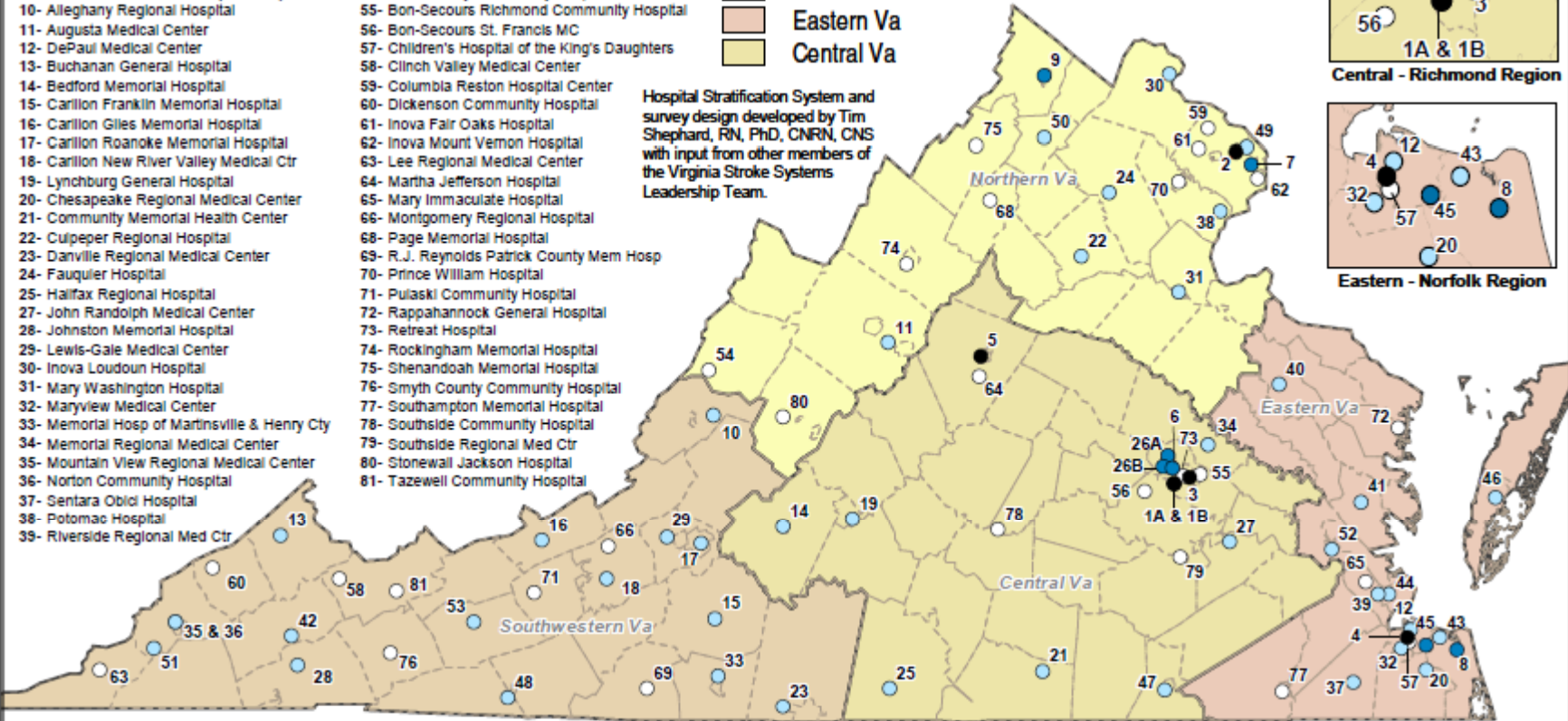
Northern - Fairfax Region



Central - Richmond Region



Eastern - Norfolk Region



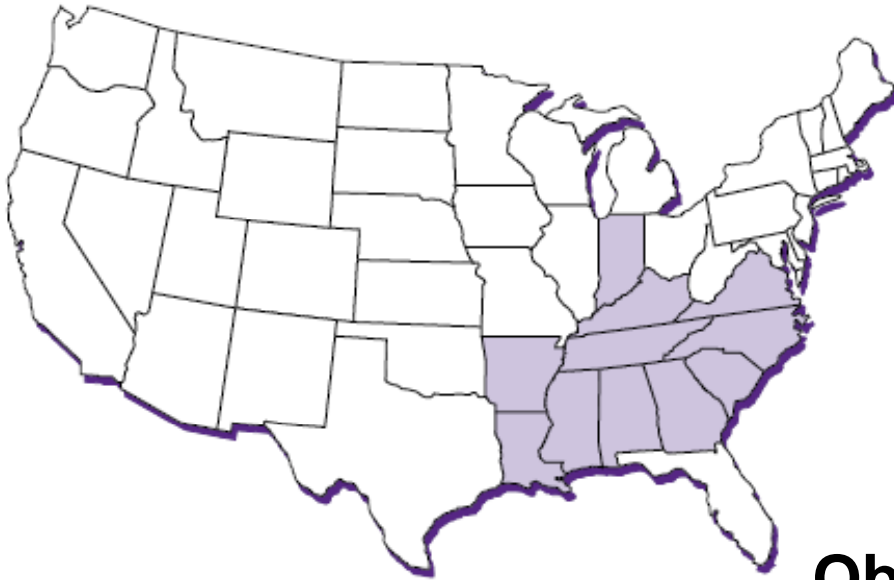
### Scale Legend



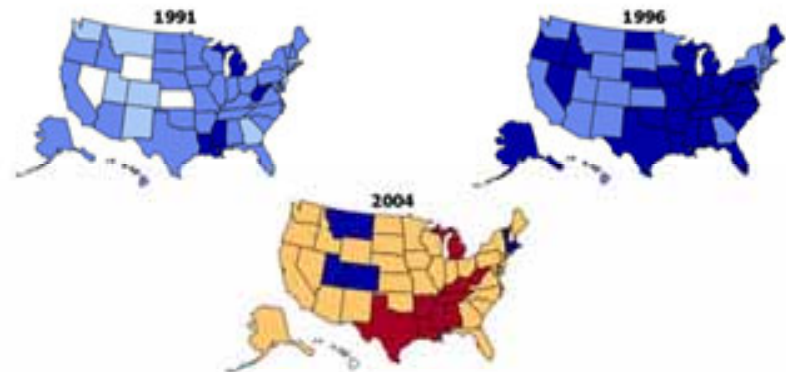
The American Stroke Association Policy Statement "Recommendations for the Establishment of Stroke Systems of Care" advises identifying the roles of hospitals that treat acute stroke in the state. The stratifications presented on this map were derived from information reported by the hospitals during a statewide survey process, with new Joint Commission (formerly JCAHO) Level 2 (Primary Stroke Center) certifications added quarterly. The stratifications do not in any way reflect the quality of care provided at each facility. An opportunity will be provided at least annually for hospitals to update this information.

Map Prepared by:  
UVA Planning & Market Research  
Rev: 05/09/08  
ESRI Business Map 4.5

# Stroke Belt



# Obesity Trends in US Adults



Centers for Disease Control and Prevention

# Problem:

## 1000+ Stroke Discharges

- No Organized plan
- No Stroke Unit
- No specially trained stroke nurses

# Solution: Partnered with ASA and started Operation Stroke in 1999

- Trained Stroke Response Nurses
- Eventually 24/7 coverage
- NIH Stroke Scale Trained
- Mission to evaluate all strokes

## Problem:

In 2002 Neurology Refuses to take call for ED and claims tPA experimental, dangerous and not effective

- Neurology Section votes to refuse to take call unless paid
- (what you want me to do is wrong, but if you pay me I will do it)

Solution: MEC votes to compel all active staff to cover ED Management hires one neurologist to cover stroke

- Plan was for him to work with other willing neurologists
- Increase tPA use
- We had closed the gap!

Problem: That one neurologist does not collaborate, tries to do everything himself, 'cannot take it any more' and quits suddenly November 2004

- Gap is back
- tPA use falls

# Solution: 9 neurologists volunteer to cover stroke call November 2004

- 6 of 9 from my group
- I become interim director of stroke services
- We apply for Primary Stroke Center
- True collaboration with the stroke nurses

# Problem: 2005 - Stroke Team overworked, morale shaky

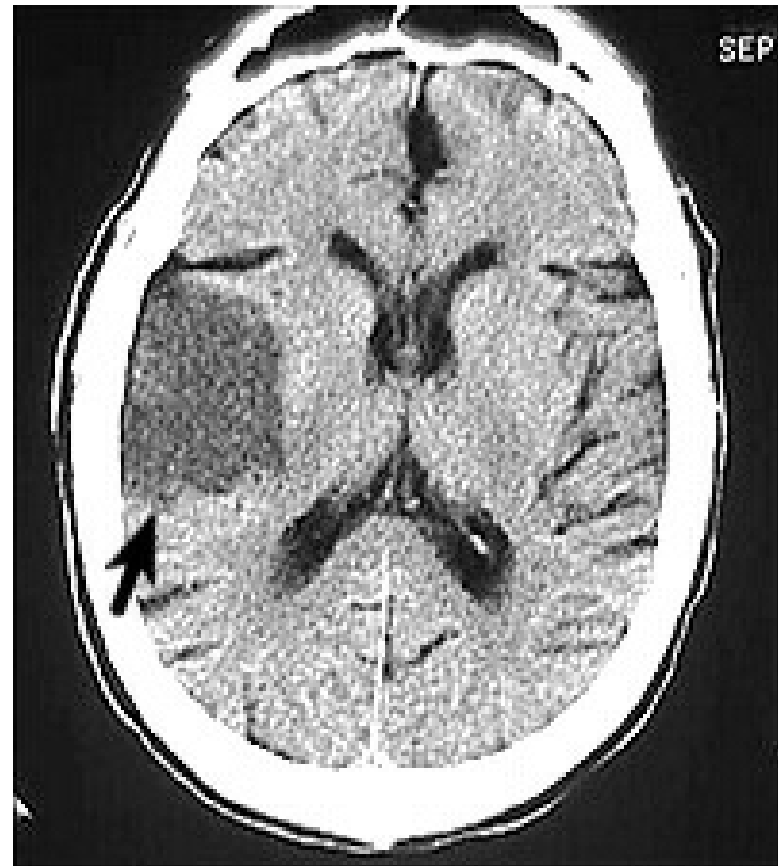
- Group of 5 or 6 covering 30+ patients
- 6-8 consults daily

**Solution: NPs hired, initially one shared with group and hospital now soon to have 3**

- Help support stroke team nurses
- Round with Stroke Neurologist
- We achieve Primary Stroke Center status June 2005

# Problem: Compliance with ASA Pathways and Guidelines below target

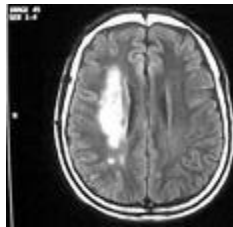
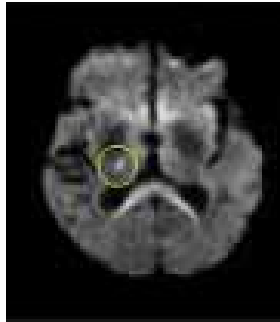
- Physician use of order-sets spotty
- Patients scattered throughout hospital



# Solution: 2007 Open 36 bed dedicated Stroke Unit

- Patients Cohorted
- Pathway and order-set use improves

# To get “clot buster” treatment:



- Arrive < 3 hours of *known onset*
- Not have any reason not to get it (recent surgery, very large stroke, seizure)
- Get CT scan and blood work
- Agree to treatment

# Problem: tPA and IA intervention use disappointing

- Erratic use
- Below expectations
- Near National Average



## **We investigated...**

- 169 not seen by Stroke Team
- 36 in Critical Care most with ICH
- 63 stroke diagnosed after admission to hospital too late for intervention
- 43 direct admits
- 27 post op in patients admitted for other reasons
- 57 Kaiser patients
- Most did not go to Neuroscience Unit

## **We made changes...**

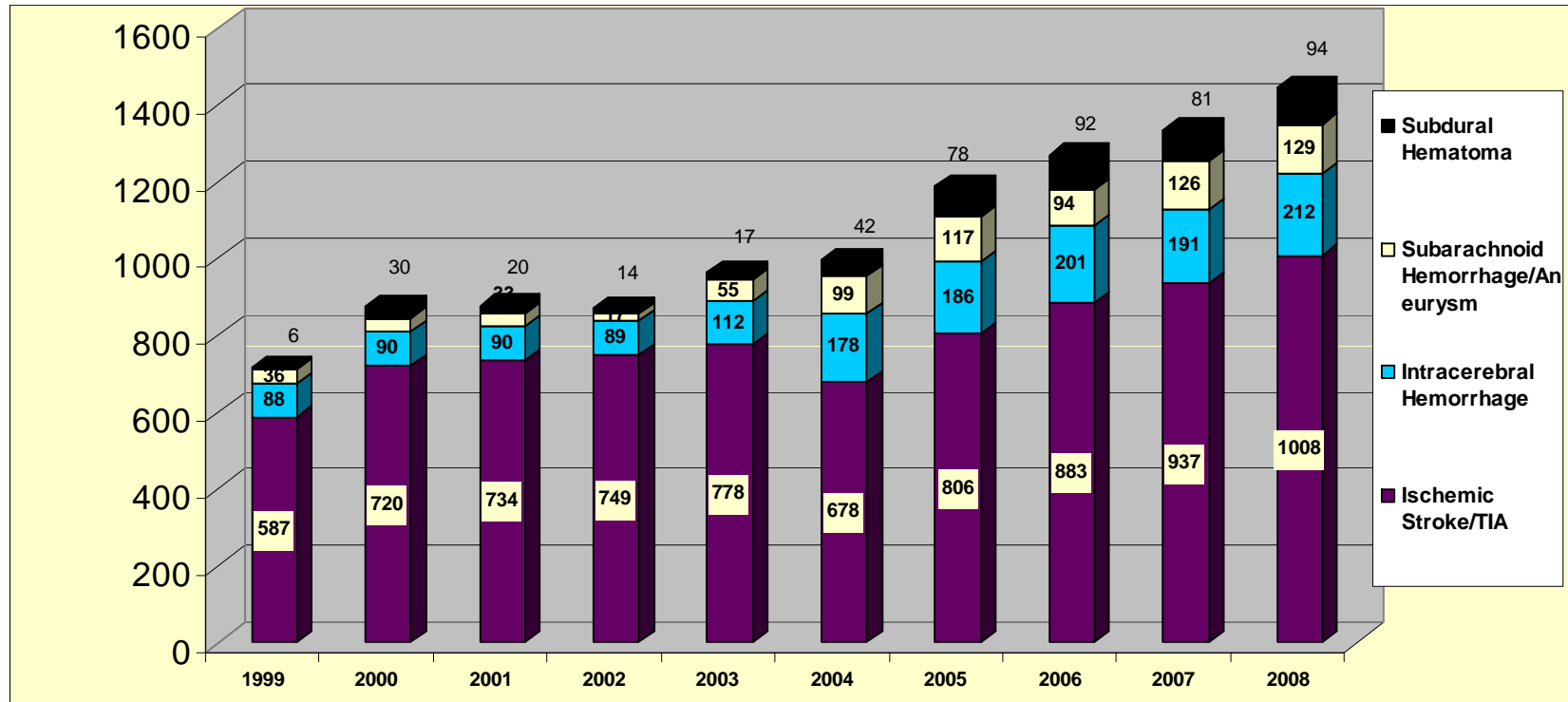
- Avoid direct admission of stroke without involving Stroke Team
- Stroke Team should see all strokes regardless of when diagnosis made
- Stroke Unit helps!

# Neurosurgery

- For most of the last 30 years there were enough neurosurgeons in the market
- Most did all of neurosurgery, not just spines
- ER call was desirable
- Several Neurosurgery groups

I believe our Heavenly Father invented man because he was disappointed in the monkey.  
- *Mark Twain in Eruption*

# Inova Fairfax Hospital Stroke Program Patient Volume: 1999-2008



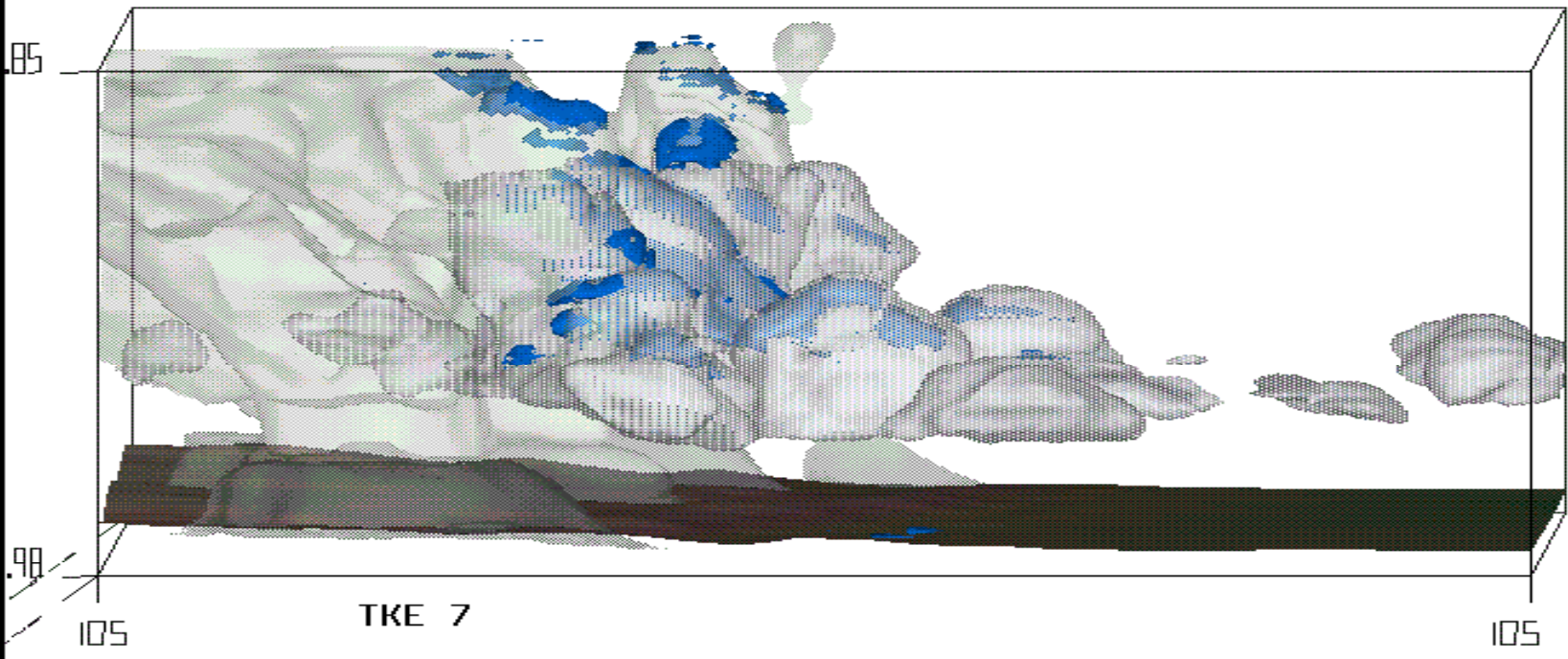
Stable/predictable  
Neurosurgery  
Volumes

Increased  
Neurosurgical  
Volumes





12:02:00  
00012  
2 of 18  
Wednesday



Domain 3  
J923 (49-66)

Vis5D

# Manpower Response

- Hired 3 Neurosurgeons
- Encouraged practices to do the same (one actually did)
- Academic program across the river hired one

# Tom Sawyer Effect: “looks like fun can I do that”



Concern about (not) being involved in future of Neurosurgery precipitated by:

- Development of Neuroscience Department
- Hiring Neurosurgeons by hospital
- Increase number of private Neurosurgeons
- Search and eventual placement of Chair of Neuroscience
- Regional Referral Network

# The Future

- Regional 1-703-776-8000 for unencumbered access to the hospital
- IFH and IAH maintain PSC Certification; ILH achieves PSC and other Inova Hospitals either become certified or have plan to provide treatment including telestroke and transport
- Combined Neurology and Neurosurgery at IFH to form Neuroscience Department – New Chair last year
- New Technology to Treat More Patients: Telemedicine, Improved Imaging (penumbra), New Devices
- Town – Gown conundrum evolution of buy vs. build – embedded physicians vs. salary guarantees
- Statewide Stroke Initiative: Cooperation with other Comprehensive Stroke Centers, Telemedicine - VSSTF
- Destination Service for Cerebrovascular Services at IFH includes Interventional Neuroradiology, Vascular Neurosurgery and Stroke Neurology
- April 3, 2009 Inova Health Systems Hosts Conference: “Achieving and Maintaining Stroke Center Certification – No Hospital Left Behind!”

# IFH Number One Stroke Program in Virginia!

IAH Top 10%, IFH Top 5% Nationally!  
ILH PSC Certification Pending

- Healthgrades
- Based on Objective Data over Several Years, not just a Popularity Contest (Though we Strive to be Popular Nonetheless!)



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