

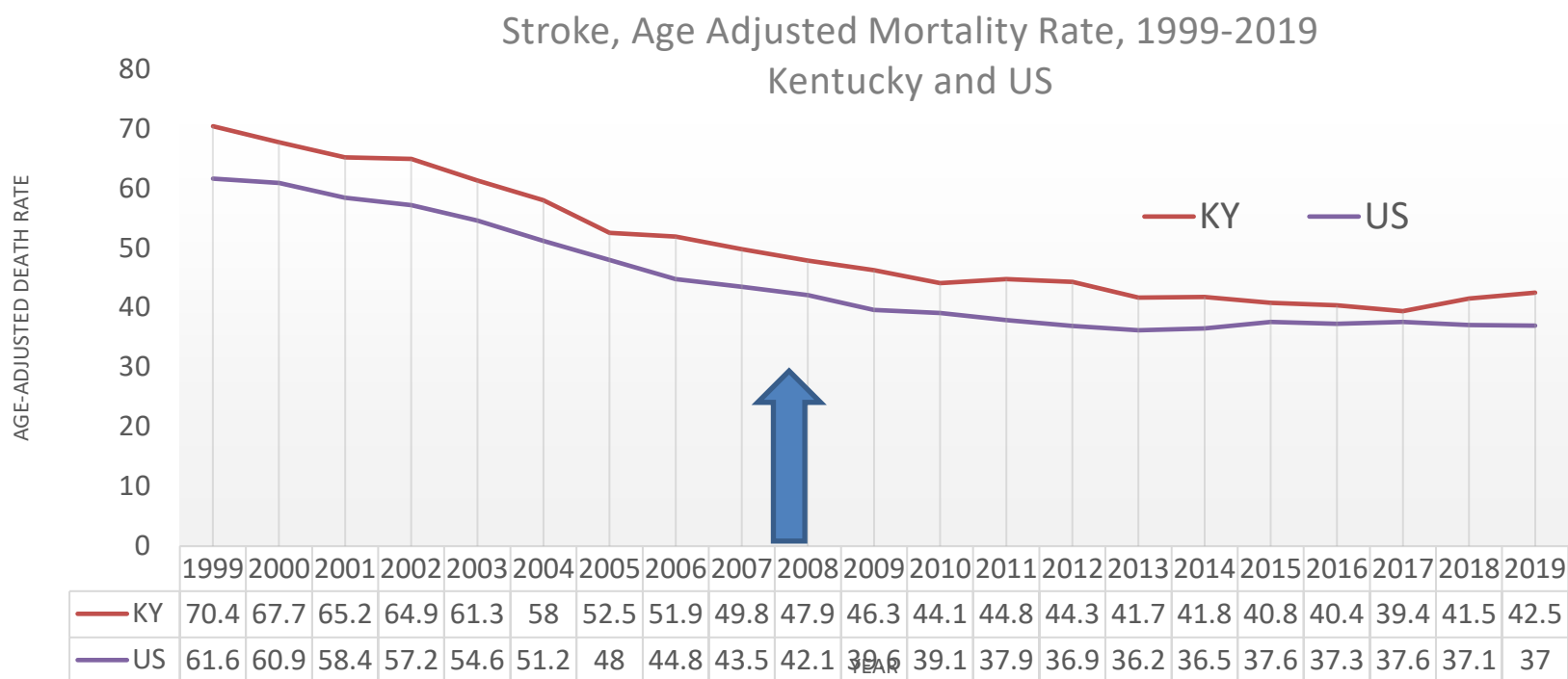
# Kentucky Stroke Systems of Care

September 22, 2022



Kari Moore, MSN, AGACNP-BC, ANVP-BC, FAHA  
Chair, SEQIP  
Co-PI, Kentucky Paul Coverdell Acute Stroke Program

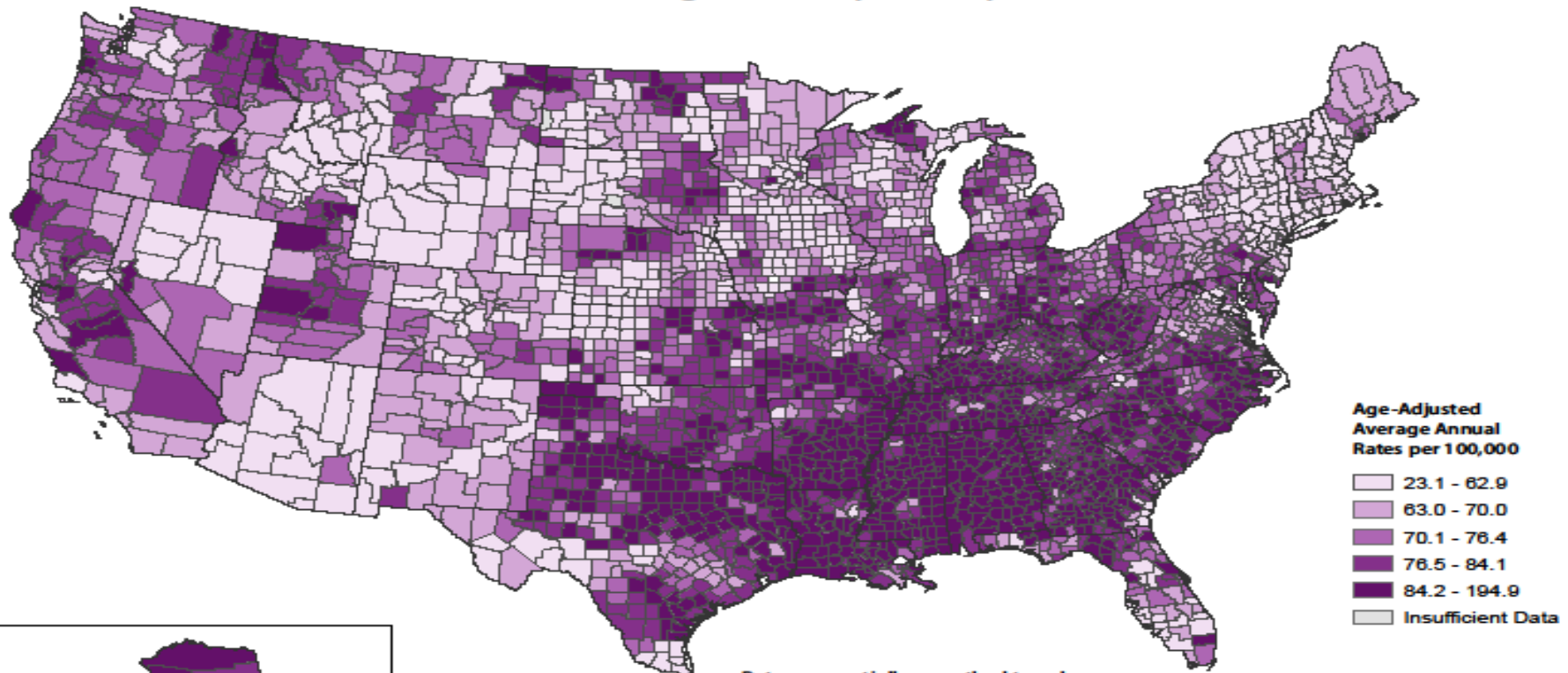
# Stroke, Age-adjusted Death Rate, 1999-2019, Kentucky and US



Source: CDC WONDER Online Database. Accessed at <http://wonder.cdc.gov/ucd-icd10.html> on Sept 6, 2021

# Kentucky is in the Stroke Belt

**Stroke Death Rates, 2014 - 2016  
Adults, Ages 35+, by County**



Rates are spatially smoothed to enhance the stability of rates in counties with small populations.

Data Source:  
National Vital Statistics System  
National Center for Health Statistics



Prevalence among adults aged 18+ , 2019	Kentucky (CI)	US
Adults who have been told they have angina or coronary heart disease	4.9% [4.3-5.6%]	3.9%*
Adults who have been told they had a heart attack (MI)	5.4% [4.8-6.1}	4.3 %*
Adults who have been told they have had a stroke	4.3% [3.7-5.0]	3.2%*
Adults who reported ever having CHD or myocardial infarction (MI)	7.8 [6.9-8.6]	6.3%*
Adults who are current smokers	24.4% [22.8-26.1]	16.0%*
Adults who have been told they have high blood pressure	(37.6%) (36-39.2)	32.3%*
Adults who have been told they have high cholesterol	37.9% (36.1-39.7)	33.1%*
Obesity among adults >=18 years (BMI 30.0-99.8)	36.4 % [34.6- 38.3]	32.1%*
Overweight (BMI 25.0-29.9)	35.4% [33.6 – 37.1]	34.6%*
Overweight or obesity among adults >= 18 years	71.5% [69.7-73.2]	67% (65.5-69]
Adults who have been told they have diabetes	11.7% (10.8-12.6)	10.7%*
Adults who reported having any kind of health care coverage.	91.7% (90.6-92.7}	89.0%*
Adults who have been told they have depression	26.4% (24.7-28)	19.9%*
Alcohol consumption (heavy drinkers, adult men > 14 drinks/week, adult women > 7 drinks/week	6.8% (5.7-7.8)	6.5%*
Did not participate in enough aerobic & muscle strengthening exercises to meet guidelines	83.9% (82.2-85.7)	76.8%*
Did not participate in any physical activities in the past month	31.5% [29.7-33.3)	26.3%

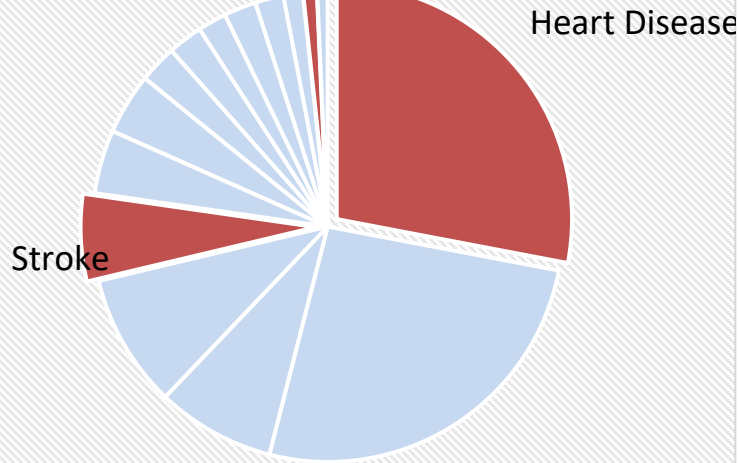
Source: BRFSS Prevalence and Trends Data, 2019. Accessed at [cdc.gov/brfss/brfssprevalence/](https://cdc.gov/brfss/brfssprevalence/) on June 24, 2021, June 28-29, 2021



# Leading causes of death in Kentucky, 2019

## 15 Leading Causes of Death in Kentucky, 2019

Essential hypertension and hypertensive renal disease→



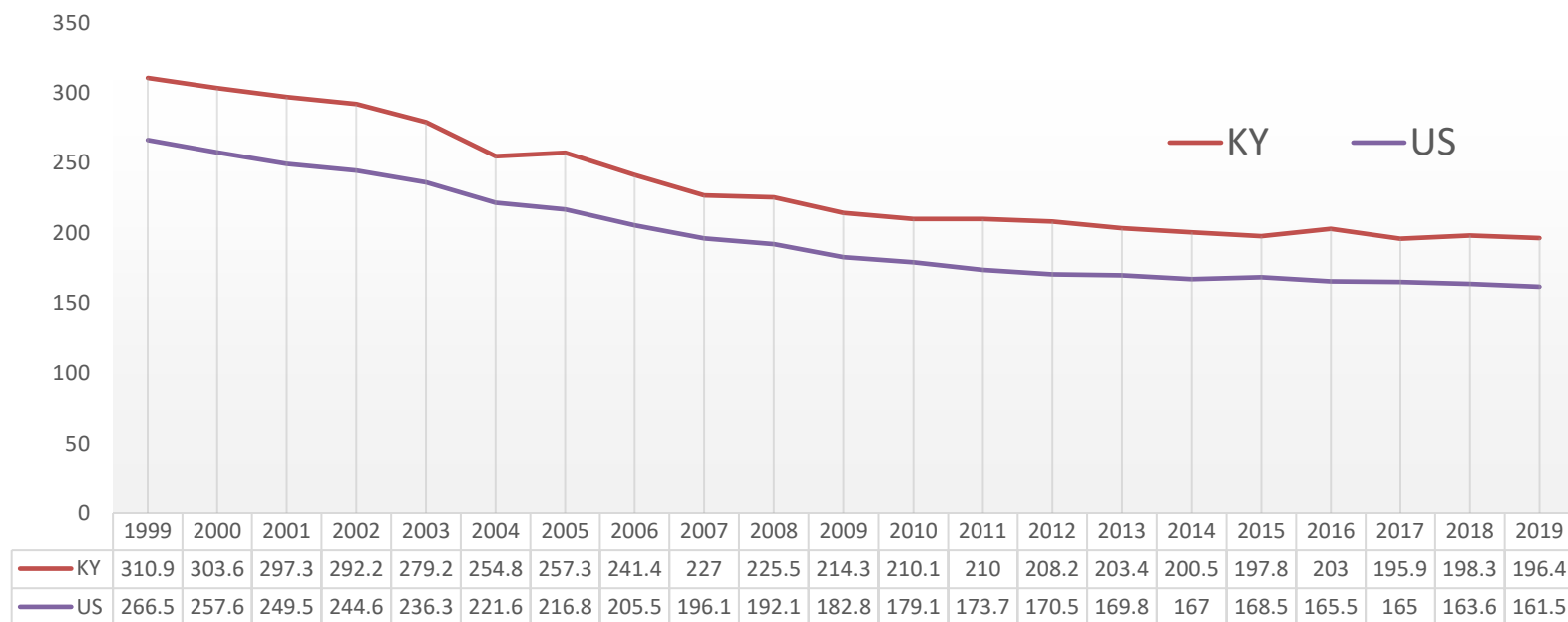
15 Leading causes of Death in Kentucky, 2019	Age Adjusted Death Rate	Number of Deaths
Heart Disease	196.4	10742
Cancer	176.4	9975
Accidents (unintentional injuries)	68.1	3121
Chronic lower respiratory diseases	62.4	3517
Cerebrovascular diseases (Stroke)	42.5	2296
Alzheimer disease	32.1	1684
Diabetes mellitus	29.1	1611
Nephritis, nephrotic syndrome and nephrosis (Kidney disease)	18.2	997
Septicemia	16.7	918
Suicide	16.5	756
Influenza and pneumonia	15.7	850
Chronic liver disease and cirrhosis	13.7	750
Parkinson disease	9.6	507
Essential hypertension and hypertensive renal disease	7.1	378
Pneumonitis due to solids and liquids	5.1	272

Source: CDC WONDER Online Database, Accessed at <https://wonder.cdc.gov/controller/datarequest/D76.jsessionid=E76D448C9E254A592E53234C2E56> on June 23, 2021



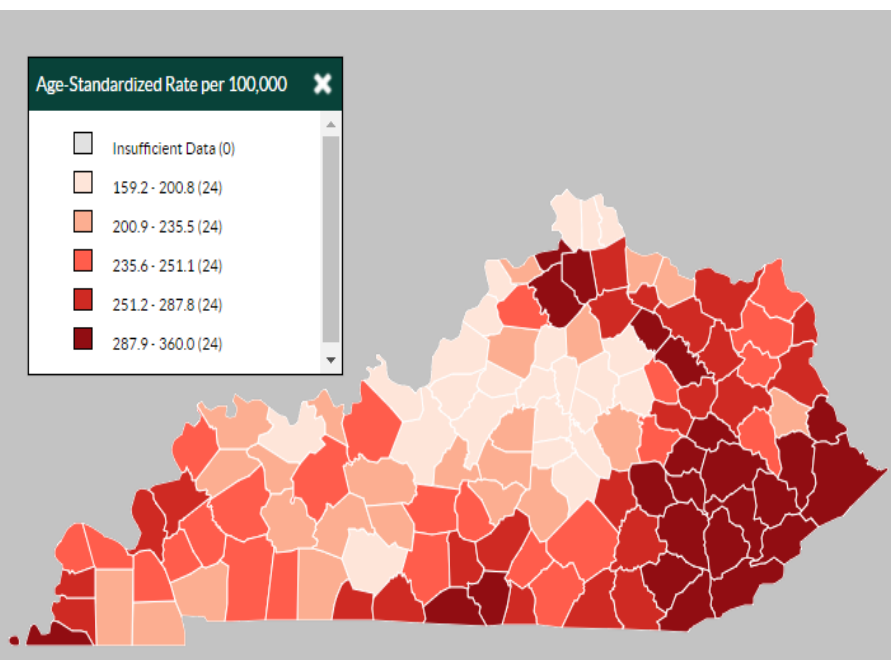
# Heart Disease, Age-Adjusted Death Rate, Kentucky and US, 1999-2019

Diseases of the Heart, Kentucky versus US, Age-adjusted Mortality Rate, 1999-2019

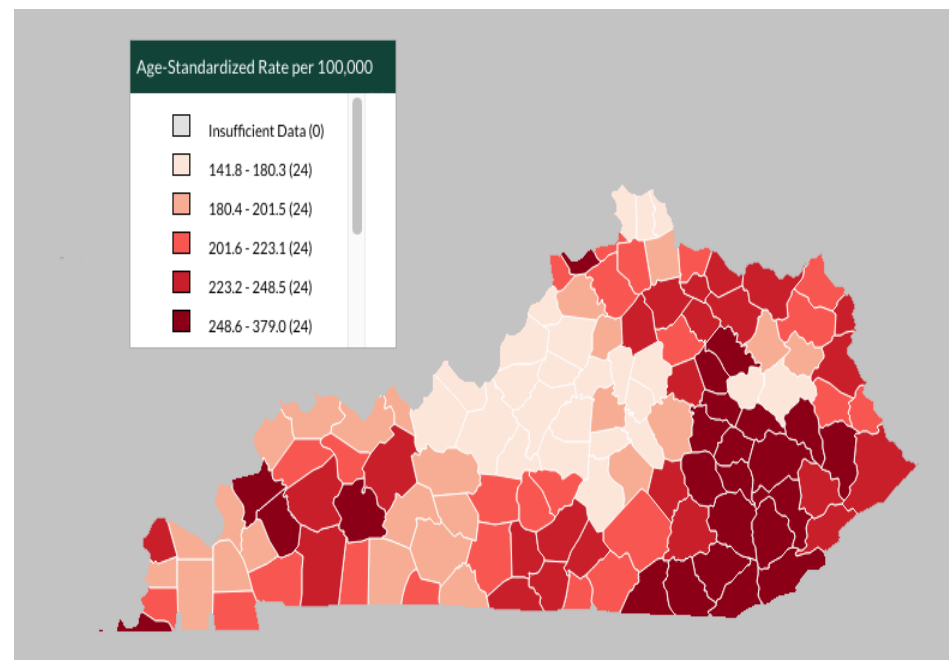


# Heart Disease, Age Standardized Death Rate per 100,000, All Ages, All Races, Both Genders

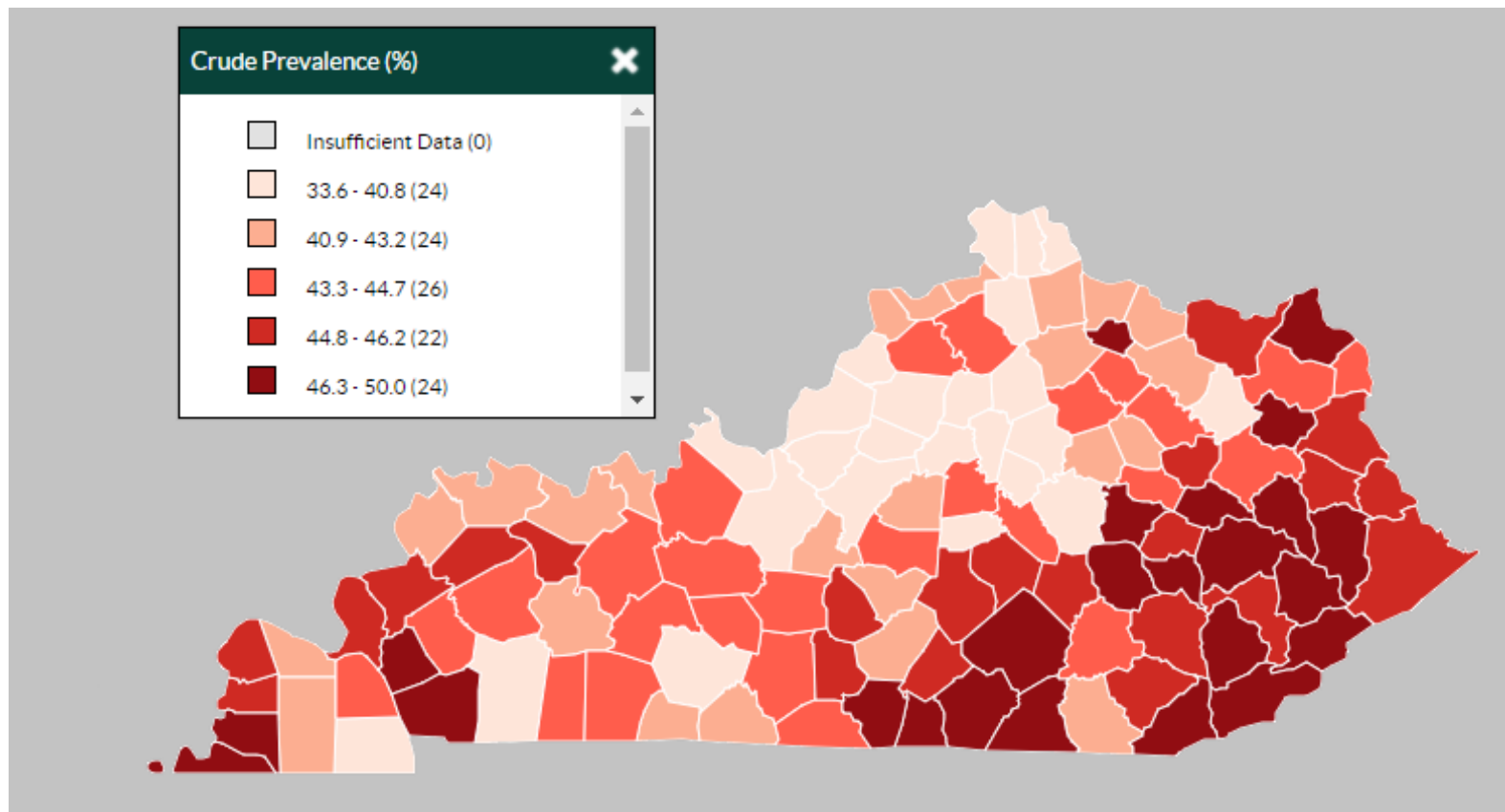
**2007-2009**



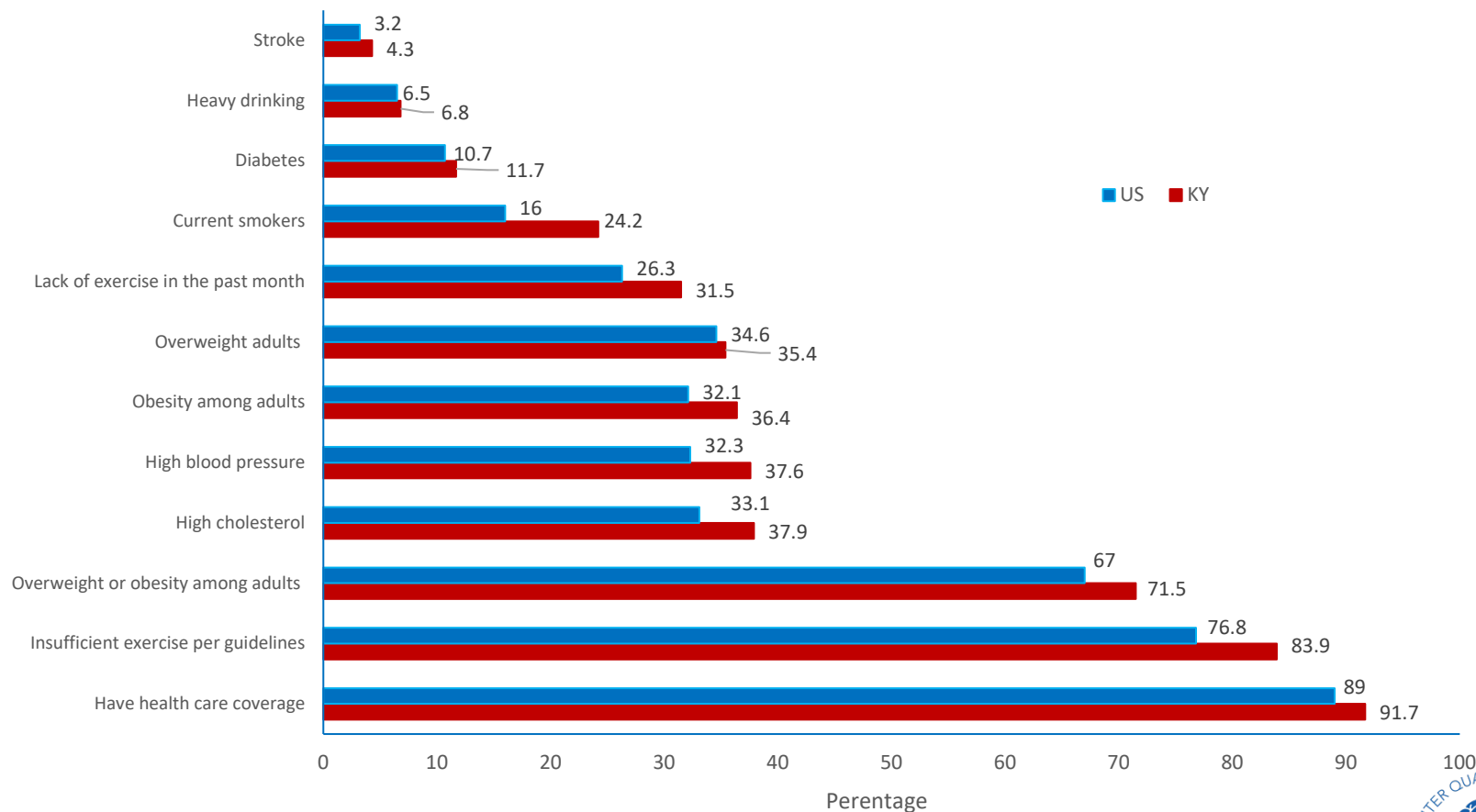
**2017-2019**



# High Blood Pressure Prevalence among Adults aged 18+, 2017



# Stroke risk factors prevalence in adults in Kentucky compared to the US 2019



# Heart Disease and Stroke Prevention Program

## Workshop 2006

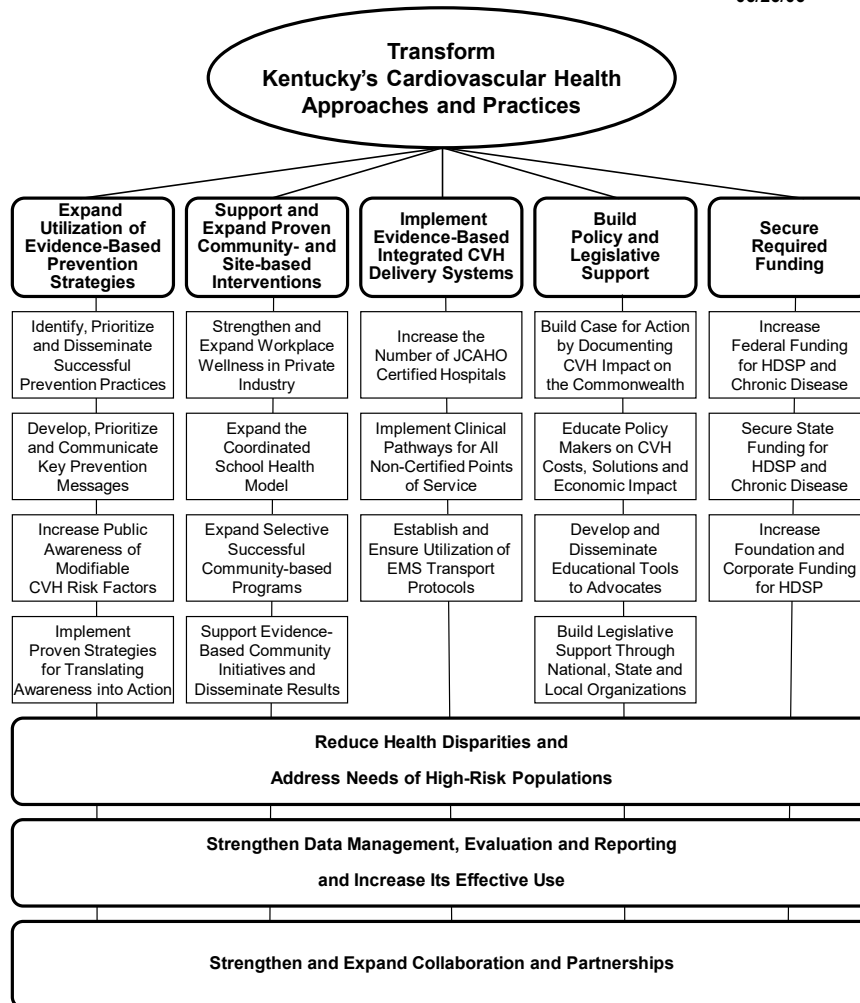
- Heart Disease and Stroke Content Experts
- Public Health
- EMS
- Other Key stakeholders



# Strategic Map 2006-2009

## Kentucky State Cardiovascular Health Plan Strategic Map: 2006-2009

Draft  
06/26/06



# Invitation to Participate (2008)

Dear Sirs:

Very exciting things are happening in Kentucky with regard to Stroke Care, and we would like your hospital to play an important role.

The partnership between the Kentucky Heart Disease and Stroke Prevention Program, American Stroke Association and the Cardiovascular Health Care Delivery Systems Subcommittee has developed the "Stroke Encounter Quality Improvement Project" (SEQIP). This is a three-year project to implement evidence-based integrated cardiovascular health delivery systems, and to support and advance the quality of care available to stroke patients in Kentucky through a hospital based stroke registry.

As a Get With The Guidelines<sup>SM</sup> Stroke hospital, you are invited to join this project. Because you're a participant in SEQIP, the Kentucky Heart Disease and Stroke Prevention Program will cover your standard annual cost (\$1,100.00) of the Patient Management Tool over the three year project period. This will not cover any additional costs your hospital may have for also selecting to use the Joint Commission-enhanced version.

Your hospital will be involved in improving stroke care in Kentucky by collaborating with hospitals and key stakeholders to improve the quality of care given to stroke patients. As a collaborative, the group will be able to review data and focus on participating hospitals' quality improvement activities, to enhance performance. The group will engage in teleconferences and meetings to exchange best practices and drive performance improvement.

As a participant in SEQIP, you will need to complete an amendment to your current contract with Outcome allowing the Kentucky Heart Disease and Stroke Prevention Program to have access to your hospital's patient level data.

If your hospital will be joining the initiative, please complete the attached contract addendum and follow the mailing instructions. **This will need to be completed by June 15, 2008.** If you do not plan to join the initiative, please contact me ([bonitaA.bobo@ky.gov](mailto:bonitaA.bobo@ky.gov)) so we can open this opportunity to other hospitals in the state.

Sincerely,

Bonita Bobo, RN  
Program Manager  
Kentucky Department for Public Health  
Heart Disease and Stroke Prevention Program



Kentucky Cabinet for Health and Family Services •  
Heart Disease and Stroke Prevention Program  
275 East Main Street • HS2WE • Frankfort, KY 40621  
Program Manager, Bonita Bobo • (502) 564-7996 • [BonitaA.Bobo@ky.gov](mailto:BonitaA.Bobo@ky.gov)





# What Is SEQIP

- Stroke Encounter Quality Improvement Project (SEQIP)
  - Statewide Quality Improvement Initiative
  - Developed by the Kentucky Heart Disease and Stroke Prevention Taskforce and AHA
  - 3-year project to implement evidence-based stroke delivery systems and improve quality of care for stroke patients



# Lets Get Started

**February 3, 2009**  
**You're Invited!**

  
American Heart Association  
Learn and Live

**Kentucky Stroke Encounter Quality Improvement Project (SEQIP) Meeting**  
8 a.m.—Noon










**Kentucky Heart Disease and Stroke Task Force Meeting**  
1 p.m.—5 p.m.

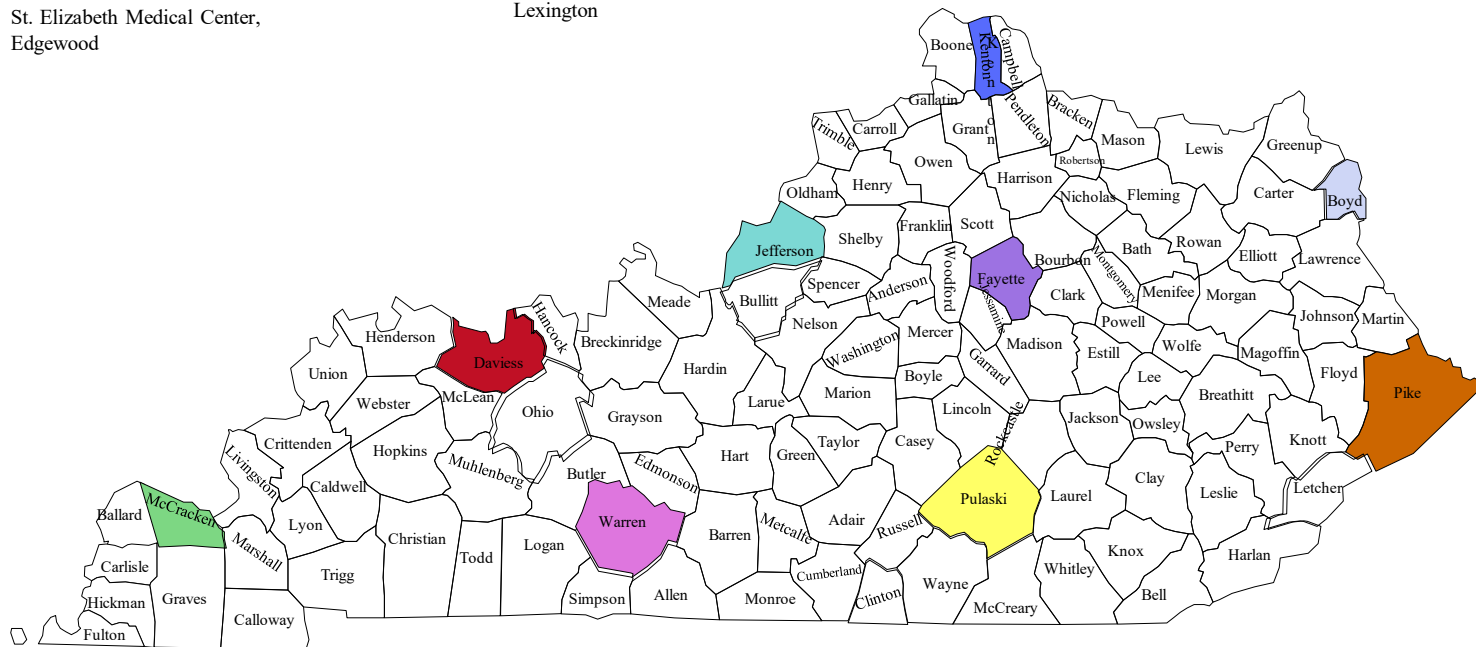
**Tuesday, February 3, 2009**  
**Masterson's**  
1830 S. Third St., Louisville

Lunch provided at Noon

Please RSVP at [debra.eichenberger@heart.org](mailto:debra.eichenberger@heart.org) or 502.371.6023 by Thursday, January 29th.

# SEQIP HOSPITALS Kentucky

	Western Baptist Hospital, Paducah		Baptist Hospital East, Louisville
	Owensboro Medical Health Park, Owensboro		Jewish Hospital, Louisville
	The Medical Center, Bowling Green		Norton Audubon Hospital, Louisville
	Lake Cumberland Regional Hospital, Somerset		Norton Hospital, Louisville
	Pikeville Medical Center, Pikeville		Norton Suburban Hospital, Louisville
	Kings Daughters Medical Center, Ashland		Sts. Mary and Elizabeth Hospital, Louisville
	St. Elizabeth Medical Center, Edgewood		University of Louisville Hospital, Louisville
			Central Baptist Hospital, Lexington
			University of Kentucky Hospital, Lexington



# SEQIP Profile-Initial Meeting

- 16 Hospitals Joined June 2008 through April 2009
- 6 Joint Commission Primary Stroke Centers
- Three Hospitals Actively Seeking PSC Certification
- 2,358 Patient Encounters 7/1/08-4/3/09



# SEQIP Meeting

- Meet and Greet
- Burden of Stroke in KY
- Discuss Core Measures and Abstraction
- Review Historical Data
- Discuss Quality Improvement Opportunities
- Develop QI Plan



# SEQIP Meeting Outcome

- Discussed Measure Descriptions
- Shared Best Practices/Encourage Hospital Collaboration
- Chose one Measure for Quality Improvement for Year One
- Development of Action Plan

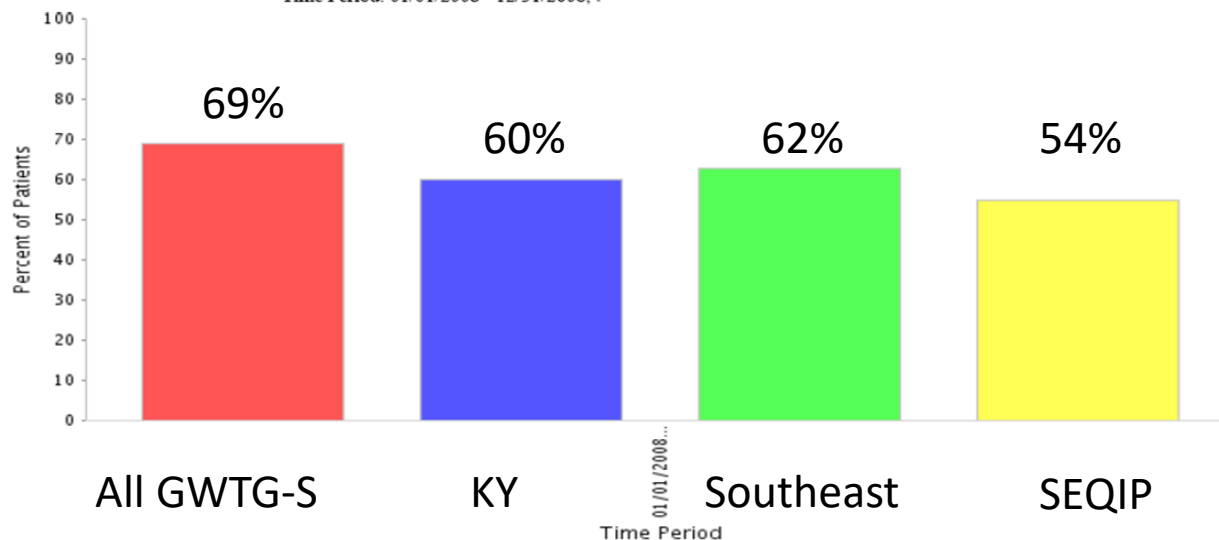


# Dysphagia Screening GWTG-S Data

## Dysphagia Screen\*

Percent of patients with ischemic, or hemorrhagic stroke who undergo screening for dysphagia with a simple valid bedside testing protocol before being given any food, fluids, or medication by mouth.

Time Period: 01/01/2008 - 12/31/2008; †



■ All Hospitals ■ All KY Hospitals ■ East South Central Hospitals ■ Kentucky SEQIP

Data For: Dysphagia Screen*				
Benchmark Group	Time Period	Numerator	Denominator	% of Patients
All Hospitals	01/01/2008 - 12/31/2008	102250	148471	68.9%
All KY Hospitals	01/01/2008 - 12/31/2008	1521	2549	59.7%
East South Central Hospitals	01/01/2008 - 12/31/2008	5365	8594	62.4%
Kentucky SEQIP	01/01/2008 - 12/31/2008	1141	2093	54.5%



# Action Plan

## Kentucky SEQIP - Action Plan for Quality Improvement Dysphagia Screen (2009-2010)

February 3, 2009

After reviewing aggregate hospital performance data from SEQIP hospitals, the group will be implementing a statewide Quality Improvement Plan in an effort to improve the care of stroke patients with regard to Dysphagia Screening and Aspiration Pneumonia.

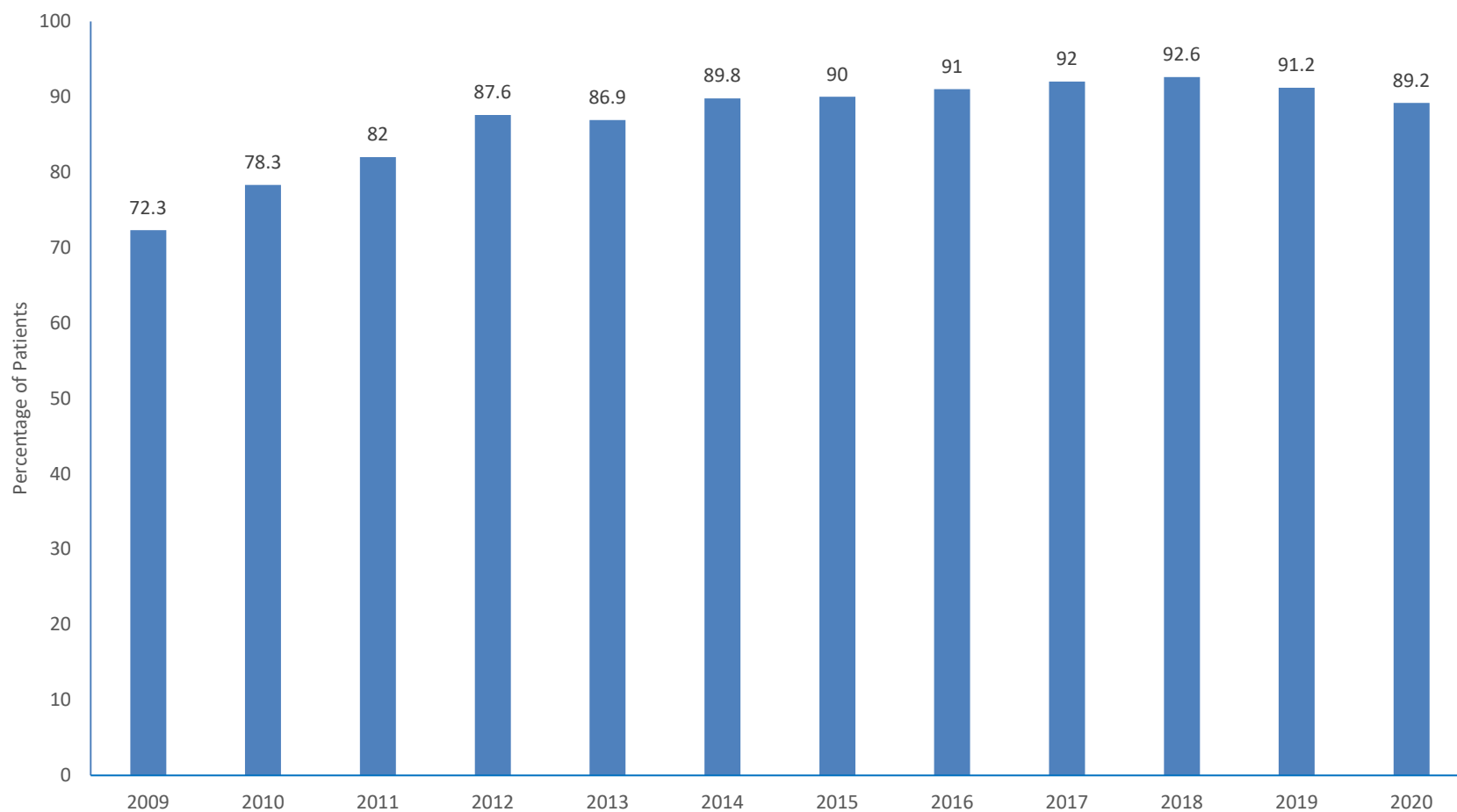
Action	Hospital Action	Resources Needed	2009 Completion Date
Establish Hospital Baseline and Identify Obstacles/Opportunities for Improvement	Review small sample size of your GWTG Dysphagia Data. Drill down the data to determine why patients may not have had a dysphagia screen or swallowing study. Create a spreadsheet of reasons why patients were not included in numerator (not screened)	GWTG Reports  <b>March 25<sup>th</sup> <u>SEQIP</u> (11AM) Teleconference – Open Forum Discussion/ Dysphagia Help Session and short presentation on Dysphagia Screening by Nancy Swigert, SLP Central Baptist Hospital</b>	Prior to March 25 <sup>th</sup> Teleconference
Assemble Key Hospital Personnel and Draft Ideal Policy  <i>***If your hospital already has a screening tool and your data reflects compliance below 85%, consider the <u>CQI</u> process to evaluate gaps in your hospitals performance***</i>	Identify and recruit a team of professionals within your hospital who are <u>key</u> to improving dysphagia screening. i.e. Speech, OT, Nursing (ED and Unit). <u>Draft</u> the ideal policy specific to your facility which addresses how dysphagia screening should be integrated into your stroke care to include who, how and when it will be performed.	Sample policies and screening tools from other <u>SEQIP</u> hospitals.  <b>May 27<sup>th</sup> <u>SEQIP</u> (11AM) Teleconference- Progress Reports by Hospitals and Open Forum Discussion/ Dysphagia Help Session</b>	Between March 25 <sup>th</sup> and May 27 <sup>th</sup>



# Action Plan

Action	Hospital Action	Resources Needed	2009 Completion Date
Dysphagia Policy Completed	Policy formalized and integrated into medical structure.  Educate, train and credential all stroke care staff (ED, Nursing, Physicians)	Dysphagia Screening Tool Completed Policy Speech Language Pathology staff  <b>July 29<sup>th</sup> SEQIP (11AM) Teleconference- Topic TBD</b>	Between May 27 and July 29
Implement, Monitor, Evaluate and Identify Gaps	Complete staff training Monitor staff performance	Staff competency checklist or credentialing  GWTG Data  <b>September 30<sup>th</sup> SEQIP (11AM) Teleconference- Topic TBD</b>  <b>OR FACE TO FACE IF WE HAVE TASK FORCE MEETING</b>	Between July 29 <sup>th</sup> and December 31st
<u>SEQIP</u> Members to begin discussing 2010 Plan – Patient Education  Review Statewide <u>SEQIP</u> Data for Dysphagia Screen and Patient Education	<u>SEQIP</u> Members to draft report for CDC regarding first QI Project: Dysphagia  Draft Plan to improve Patient Education Measure	<b>November 18<sup>th</sup> SEQIP (11AM) Teleconference- Kari and Paula to determine</b>	Begin discussions in September

# Dysphagia Screening



# ISC Presentation



# SEQIP Mission

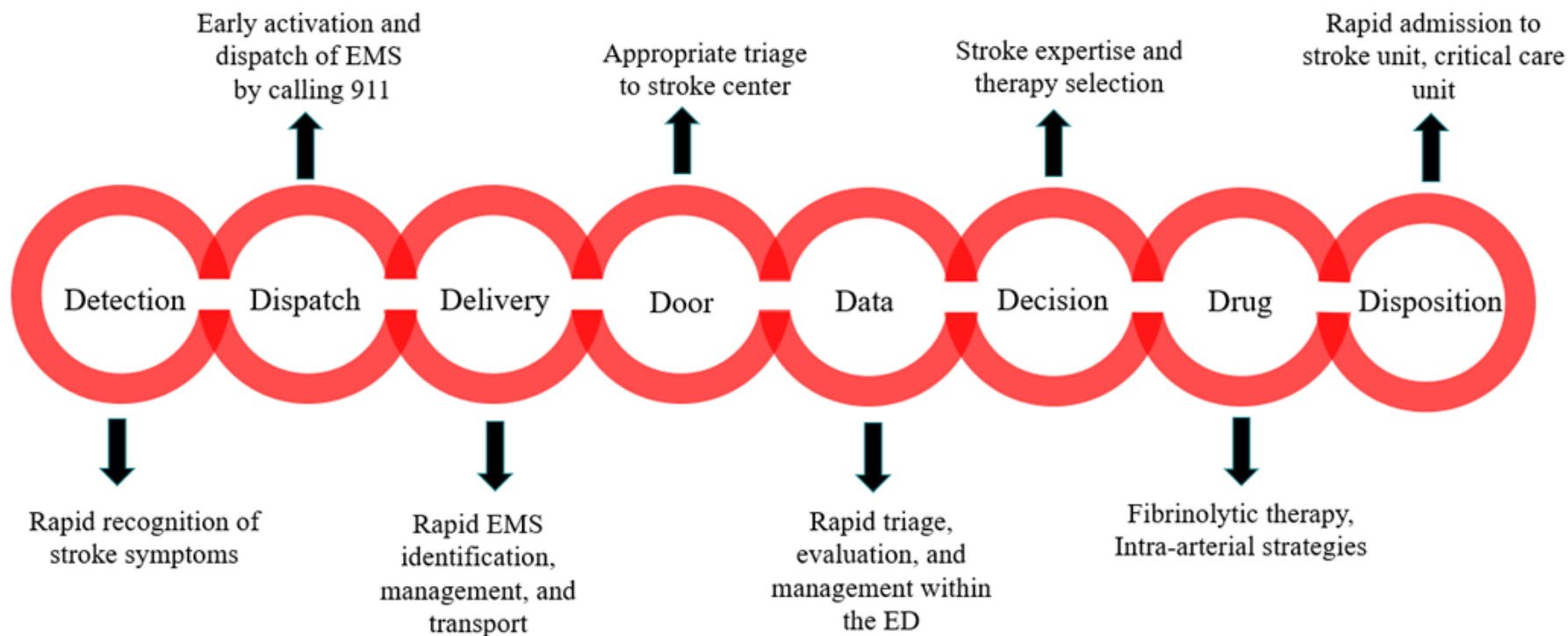
## STROKE ENCOUNTER QUALITY IMPROVEMENT PROJECT (SEQIP)

Mission, Membership, Policy, and Governing Structure

The mission of Stroke Encounter Quality Improvement Project is to advance acute stroke care management and reduce stroke disparities in Kentucky



# Stroke Chain of Survival



Adapted from Ashcraft, S., Wilson, S.E., Nystrom, K.V., et al. (Stroke, 2021)



# Kentucky Legislation

## 211.575 Statewide system for stroke response and treatment

- Department of Public Health shall establish and implement a plan for achieving continuous QI in the quality of care provided under a statewide system for stroke response and treatment.
  - Includes database aligned with stroke consensus metrics
  - Utilization of GWTG or another nationally recognized program
  - Require PSCs to report to the database each stroke case
- Coordination among voluntary organizations to avoid redundancy, sharing of information among HCPs
- Application of evidence-based treatment guidelines
- Data oversight statewide process for PI
- Provide report to Governor annually

Effective: July 12, 2012

History: Created 2012 KY. Acts ch. 106, sec. 1, effective July 12, 2012



# Kentucky Legislation

## **216B.0425** Certification designations for stroke care for acute care hospitals

Primary stroke center certification, acute stroke ready certification, and comprehensive stroke center certification mean certification for acute care hospitals issued by the Joint Commission, the American Heart Association or another cabinet approved nationally recognized organization that provides disease-specific certification for stroke care.

Cabinet shall maintain a list of certified stroke centers by level and post the list on its Web site and provide periodic updates to the Kentucky Board of Emergency Medical Services (KBEMS).

KBEMS shall share the list with each EMS provider at least annually, and as new centers are designated.

Requires EMS agencies to have stroke triage protocols

Effective: June 24, 2015

History: Amended 2015 Ky. Acts ch. 9, sec. 1, effective June 24, 2015 – Created 2010 Ky. Acts ch. 67, sec. 1, effective July 15, 2010.



# Kentucky Board of EMS (KBEMS, 2013)

## Cardiac and Stroke Care (CSC) Members

### Purpose

The 2006 Institute of Medicine (IOM) Report Emergency Medical Services at the Crossroads, reported significant challenges facing the EMS system nationally, and Kentucky faces similar issues. Kentucky is large and diverse with contrasting regional needs. It has large rural areas with EMS systems sometimes staffed by volunteers and without easy access to PCI and Stroke care centers. EMS providers operate on multiple sets of clinical protocols making it difficult to assure that all Cardiac and Stroke patients receive the same standard of care across the Commonwealth.

There is limited regional access to PCI and Stroke care centers due to census, finance, and issues of specialist recruitment. The purpose of the CSC is to assemble a panel of experts from rural and urban areas of Kentucky to evaluate systems of care both in and out of the hospital setting, to identify opportunities for improvement, implement interventions targeting improvement, and to evaluate successes and challenges incorporating sustainability. This collaborative effort among disciplines shall allow individuals from rural and urban areas to discuss the needs of their specific communities, and break down barriers to advanced care in all areas of our state.

### Specifically, the Cardiac and Stroke Care subcommittee shall:

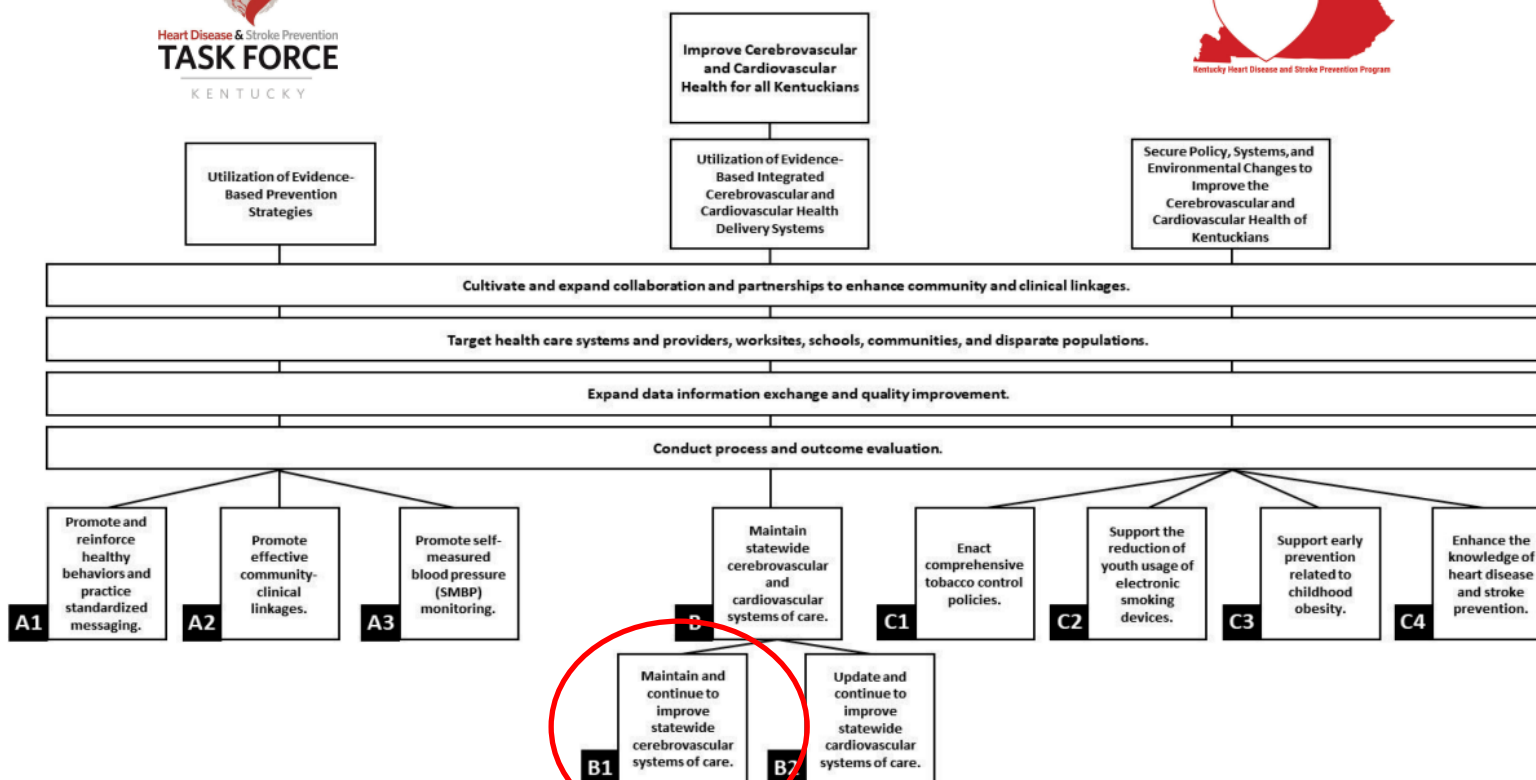
- Identify and convene experts and partners to guide the statewide approach to definitive treatment of cardiac and stroke cases and recommend project interventions.
- Implement and evaluate a comprehensive AMI and Stroke access assessment targeting 120 counties in the Commonwealth of Kentucky.
- Collaborate with system engineers to analyze EMS system capabilities and the capabilities of regional healthcare facilities and specialty care centers.
- Begin implementation of quality improvement initiatives prioritized by expert groups.
- Identify policy initiatives based on the findings of the assessment and the expert group recommendations.
- Promote and advocate for educational programs, protocol updates and a regionalized EMS system of care.
- Establish a minimum data set for Cardiac and Stroke care that can be reported by EMS Systems & Healthcare facilities for ongoing research.
- Implement a reassessment to evaluate progress, remaining challenges, and clarify questions on the initial assessment.
- Develop a gap analysis for ongoing evaluation of progress and strategy success with identification of future steps.





# Strategic Map 2020-2023

## Kentucky Heart Disease and Stroke Prevention Task Force Strategic Map and Plan: 2020-2023



# HDSP State Plan

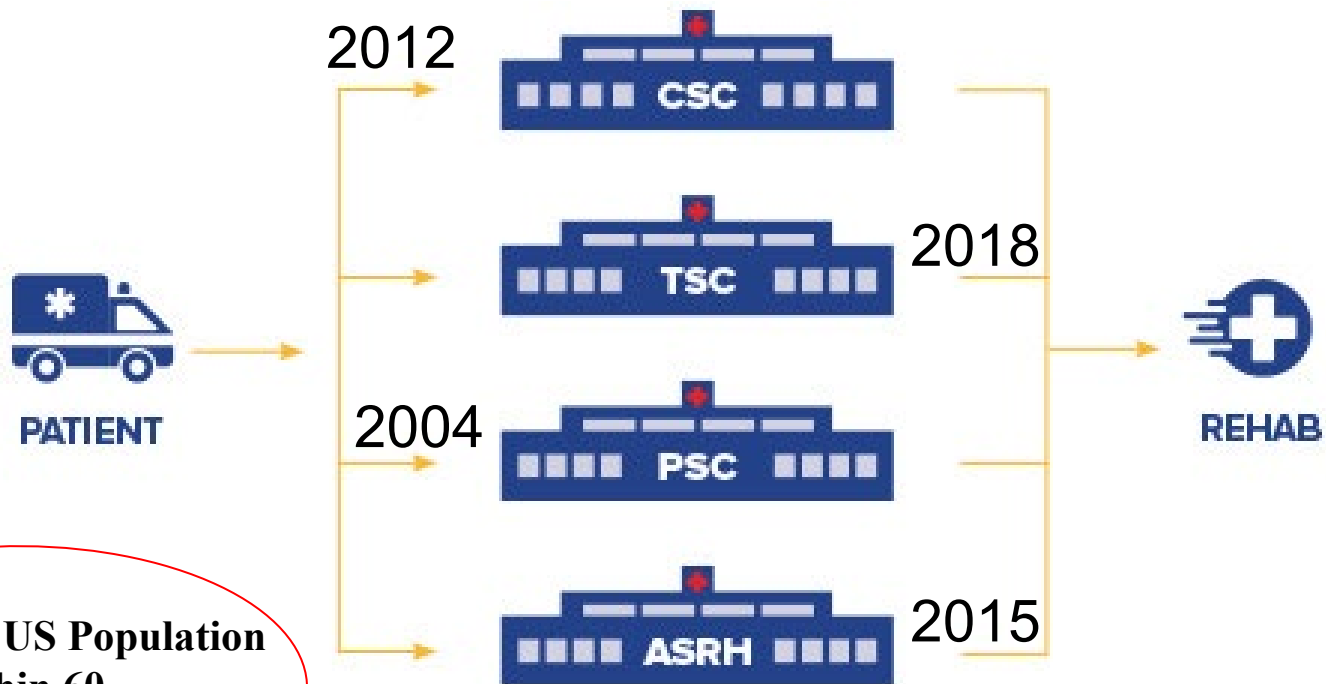
## Kentucky Heart Disease and Stroke Prevention Task Force Strategic Map and Plan: 2020-2023

Goal B: Utilization of Evidence-Based Integrated Cerebrovascular and Cardiovascular Health Delivery Systems	
Objective B: Maintain statewide cerebrovascular and cardiovascular systems of care.	
Objective B1: Maintain and continue to improve statewide cerebrovascular systems of care.	
Strategy 1	Action Items
Continue to identify opportunities for improvement within current cerebrovascular systems of care.	Continue to identify and map certified stroke centers by certification levels as defined by KRS 216B.0425, and disseminate to Kentucky Board of Emergency Medical Services (KBEMS). <ul style="list-style-type: none"> <li>- Acute stroke ready hospitals</li> <li>- Primary stroke centers</li> <li>- Thrombectomy-capable stroke centers</li> <li>- Comprehensive stroke centers</li> </ul>
	Continue collaboration with Kentucky Hospital Association's (KHA) Rural Hospital Flexibility program.
	Continue to partner with Kentucky hospitals to increase acute stroke treatments (intravenous tissue plasminogen activator and mechanical thrombectomy).
	Continue to identify emergency medical services (EMS) agencies which have a field transport protocol for stroke and provide expert consultation/evaluation to ensure said protocols are up to date with the most current science.
	Partner with KBEMS to determine stroke specific data points available for capture and reporting.
	Implement pilot project for EMS feedback, training, and education to improve local systems of care.
	Continue collaboration with the KBEMS subcommittee, Cardiac and Stroke Care.
	Disseminate and provide access to current evidence-based dispatch protocols for stroke.
	Partner with KBEMS for continued development of inter-facility transport protocols for all stroke subtypes.
	Assess inter-facility emergent transfer needs to meet recommended time goals.
	Disseminate KBEMS inter-facility transport protocols at local and regional levels.
	Establish a pediatric stroke subcommittee.

## Kentucky Heart Disease and Stroke Prevention Task Force Strategic Map and Plan: 2020-2023

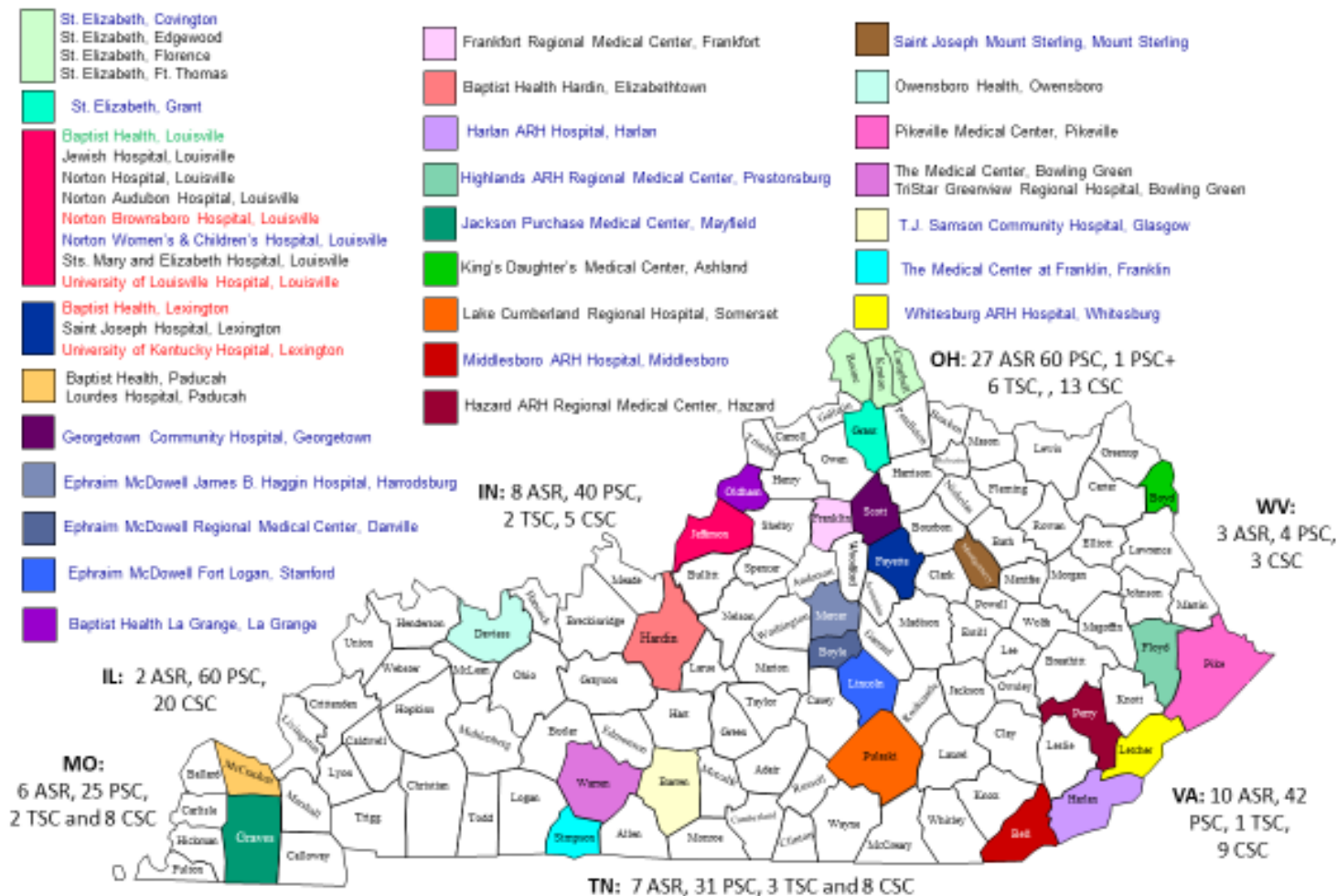
Goal B: Utilization of Evidence-Based Integrated Cerebrovascular and Cardiovascular Health Delivery Systems	
Objective B: Maintain statewide cerebrovascular and cardiovascular systems of care.	
Objective B1: Maintain and continue to improve statewide cerebrovascular systems of care.	
Strategy 2	Action Items
Continue Stroke Encounter Quality Improvement Project (SEQIP) through FY 2023.	Assess current SEQIP members for continued participation by March 2020.
	Recruit at least one hospital pursuing thrombectomy-capable certification by March 2022.
	Continue to utilize registry to develop and implement action plans around quality metrics and education.
	Continue to develop and disseminate Stroke Registry Data Summary in accordance with KRS 211.575, which goes to the governor and the Legislative Research Commission and includes recommendations for improving stroke systems of care.
Strategy 3	Action Items
Continue to engage and support hospitals maintaining and achieving stroke center certification.	Disseminate the Kentucky strategic map and plan to target hospitals by December 2020.
	Continue to provide support for stroke program development to target hospitals.
	Update and disseminate stroke resources through Kentucky Heart Disease and Stroke Prevention (KHDSP) Task Force website (KHDSPtaskforce.com) annually.
Strategy 4	Action Items
Continue collaboration among healthcare systems and public health to disseminate standardized messaging.	Implement action items from Goal A - Objective A1: Strategy 1: Promote and reinforce healthy behaviors and standardized messaging.

# Stroke Center Levels of Certification



**$\geq 50\%$  of US Population  
is not within 60  
Minutes of a PSC**

# Kentucky Certified Stroke Centers



**The Joint Commission, ACHC and DNV Certified Stroke Centers in KY:**

Acute Stroke Ready Hospitals (16) Primary Stroke Centers in Kentucky (19)

Thrombectomy-Capable Stroke Center (1) Comprehensive Stroke Centers (4)

REV. June 2022



# SEQIP Meetings

- Burden of Stroke in KY
- Discuss Core Measures and Abstraction
- Review Data
- Share Best Practices/Encourage Hospital Collaboration
- Choose Measures for Quality Improvement
- Development Action Plans



# Steering Committee Members

- Lisa Bellamy, BHS, RN, CPHQ (UK HealthCare/Norton Healthcare - Stroke Care Network)
- Lonna Boisseau ( Kentucky Heart Disease and Stroke Prevention Program)
- Lynn Hundley, MSN, RN, APRN, CNRN, CCNS, ANVP-BC, FAHA (Norton Healthcare, Inc.)
- Polly Hunt, BS, BSN, RN (King's Daughters Medical Center - Ashland)
- Rachel Jenkins, MSN, RN (ARH)
- Abby Loechler, MPH (American Heart Association)
- Kari Moore, MSN, RN, APRN, AGACNP-BC, FAHA (University of Louisville, Department of Neurology)
- Tabitha Drane RN, MSN (Owensboro Health)
- Bill Singletary, BA, BSN, RN, MBM (The Medical Center at Bowling Green)
- Kyle Williams, RN, CFRN, CEN, EMT-P (Air Methods)



# SEQIP Subcommittees

- **Subcommittees with chairs**
  - EMS Outreach and Education
    - Lacy Shumway - [Norton Healthcare](#)
  - Disease Specific Care Certification Initiatives
    - Lisa Bellamy, BHS, RN, CPHQ – [UK Healthcare/Norton Healthcare Stroke Care Network](#)
    - Rachel Jenkins, MSN, RN – [ARH](#)
    - Betty McGee, MSN, RN, CEN – [St. Elizabeth](#)
    - Polly Hunt, BSN, RN – [King's Daughters Hospital - Ashland](#)
  - Data Analysis and Performance Improvement
    - Lisa Taylor, MPH – [UofL Health](#)
  - Navigating the Stroke Continuum of Care
    - Carrie Crockett, MSSW, CSW – [UofL Health](#)
  - Community and Public Health Education and Outreach
    - Natalie Littlefield, MPH – [KY Heart Disease and Stroke Prevention Program](#)
  - Door In Door Out (DiDo)
    - Bill Singletary, BA, BSN, RN, MBM – [The Medical Center](#)
  - Inpatient Code Stroke
    - Danielle Topliffe, BSN, RN, SCRNP – [UofL Health](#)
  - Door to Device
    - Lindsey Siewert, MSN, APRN, CCRN -[Norton Brownsboro](#)
  - Stroke Coordinator Education Consortium
    - Rachel Jenkins, MSN, RN - [ARH](#)





# Annual report to Kentucky Governor

- Burden of CV disease in KY
- SEQIP overview
- Executive summary with demographics to include types of stroke and performance measure results
- Full graphical data to include performance measure results for most current available data
- Recommendations for the task force to improve cerebrovascular systems of care



## Kentucky Stroke Encounter Quality Improvement Project (SEQIP)



Kentucky Heart Disease and Stroke Prevention Task Force

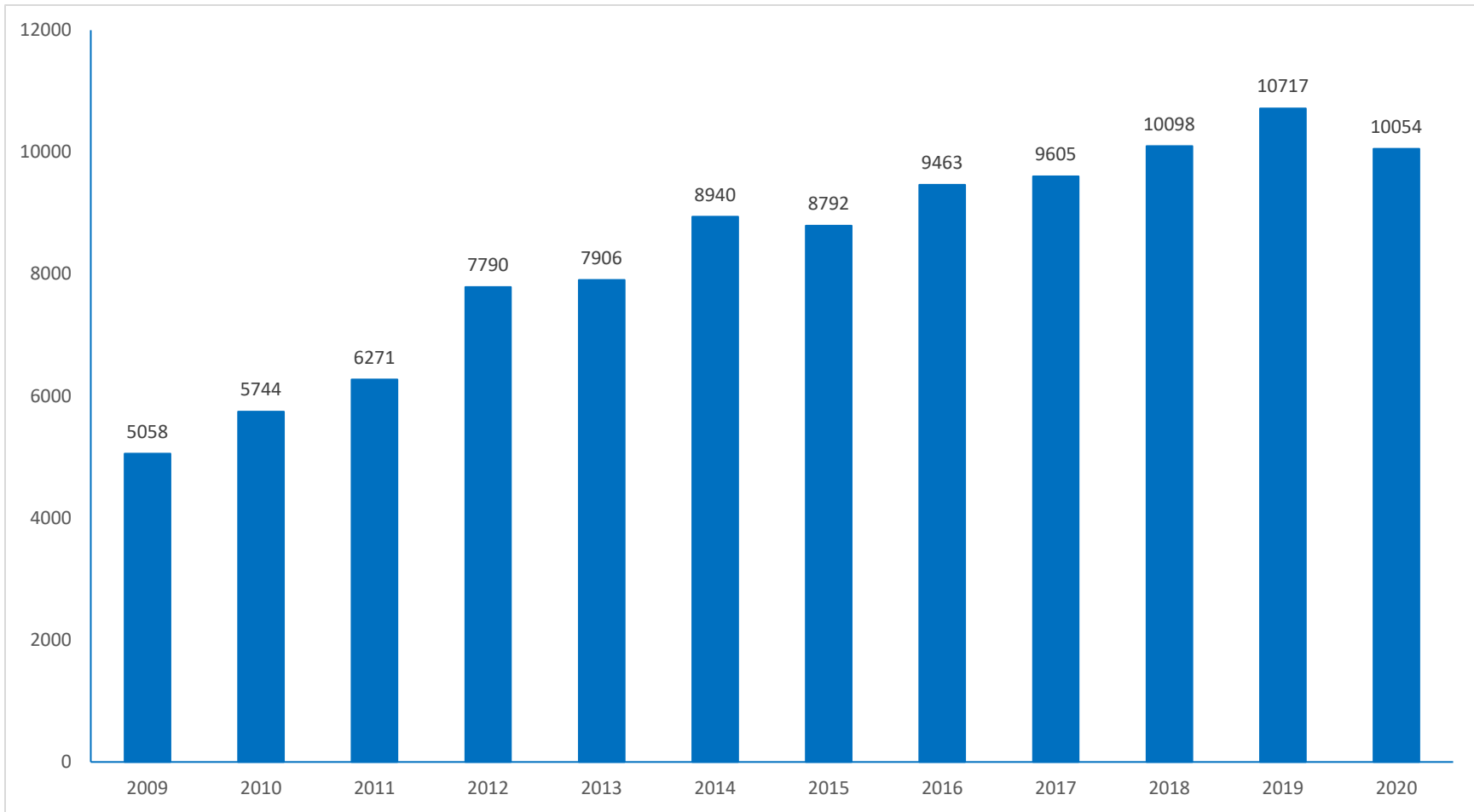
SEQIP Registry 2020 Data Summary

2022 Annual Report





# SEQIP Registry Volume



# Registry Volume/State Volume

■ Kentucky SEQIP -2018 ■ Kentucky SEQIP -2019 ■ Kentucky SEQIP -2020

Diagnosis										
Note: Time periods/Categories at the end of the graph and data table have been omitted because there were no patient records during that time.										
Benchmark Group	Time Period	Ischemic stroke	Transient ischemic attack (<24 hours)	Subarachnoid Hemorrhage	Intracerebral Hemorrhage	Stroke not otherwise specified	No stroke related diagnosis	Elective Carotid Intervention only	Blank ("Missing diagnosis")	Total
Kentucky SEQIP	2018	7875 (78%)	871 (8.6%)	319 (3.2%)	979 (9.7%)	37 (0.4%)	14 (0.1%)	3 (0%)	1 (0%)	10099
	2019	8257 (78.3%)	917 (8.7%)	311 (2.9%)	1013 (9.6%)	27 (0.3%)	14 (0.1%)	2 (0%)	7 (0.1%)	10548
	2020	7819 (78.8%)	734 (7.4%)	317 (3.2%)	986 (9.9%)	11 (0.1%)	28 (0.3%)	1 (0%)	22 (0.2%)	9918

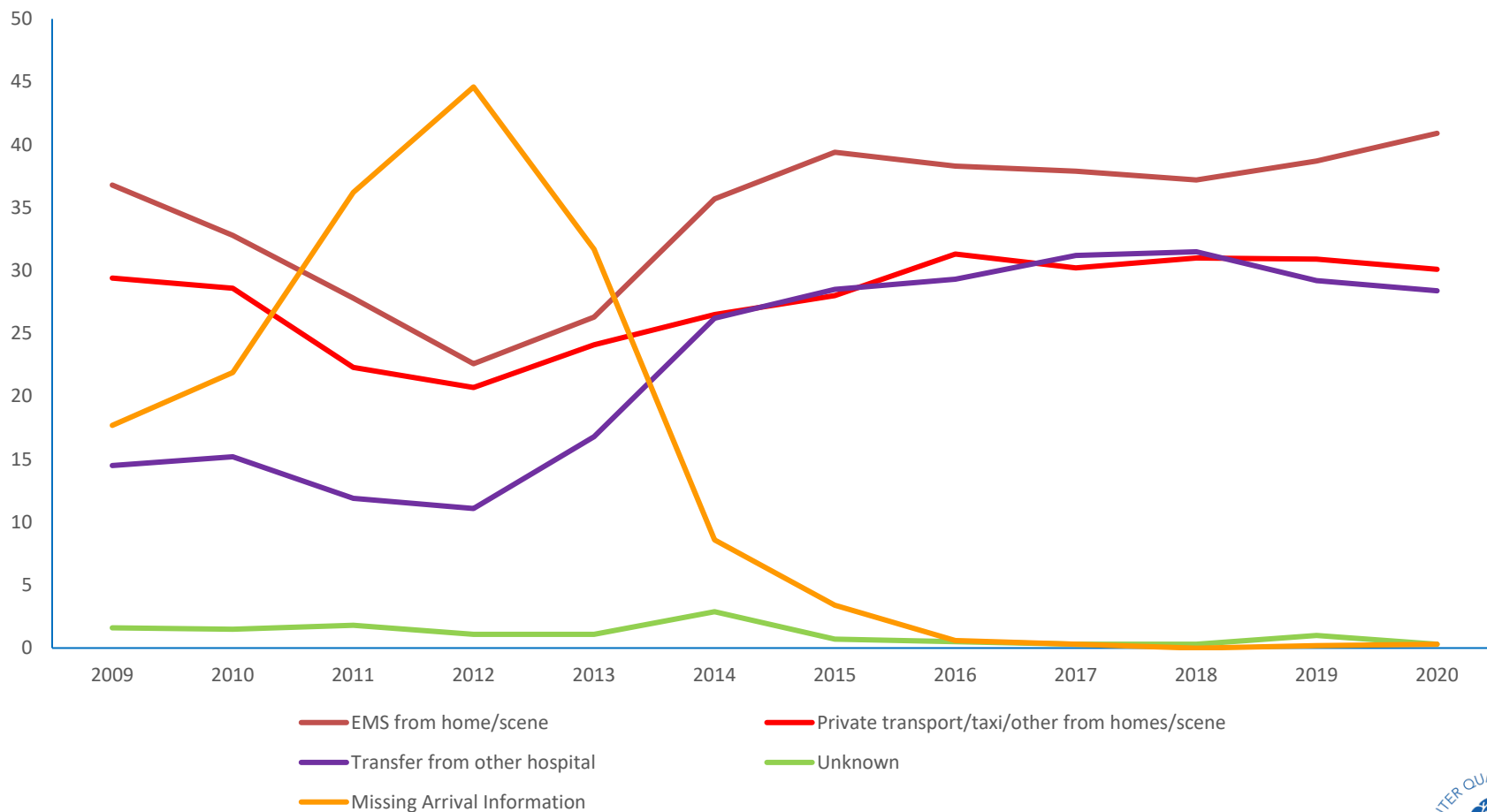
- 2020 State Volume: 10,994
- 2019 State Volume: 11,677 =
- 2018 State Volume: 11,636
- 90% of stroke/TIA patients in 2020 SEQIP data
- 90% of stroke/TIA patients in 2019 SEQIP data
- 87% of stroke/TIA patients in 2018 SEQIP data

Primary Dx: AIS, ICH, TIA

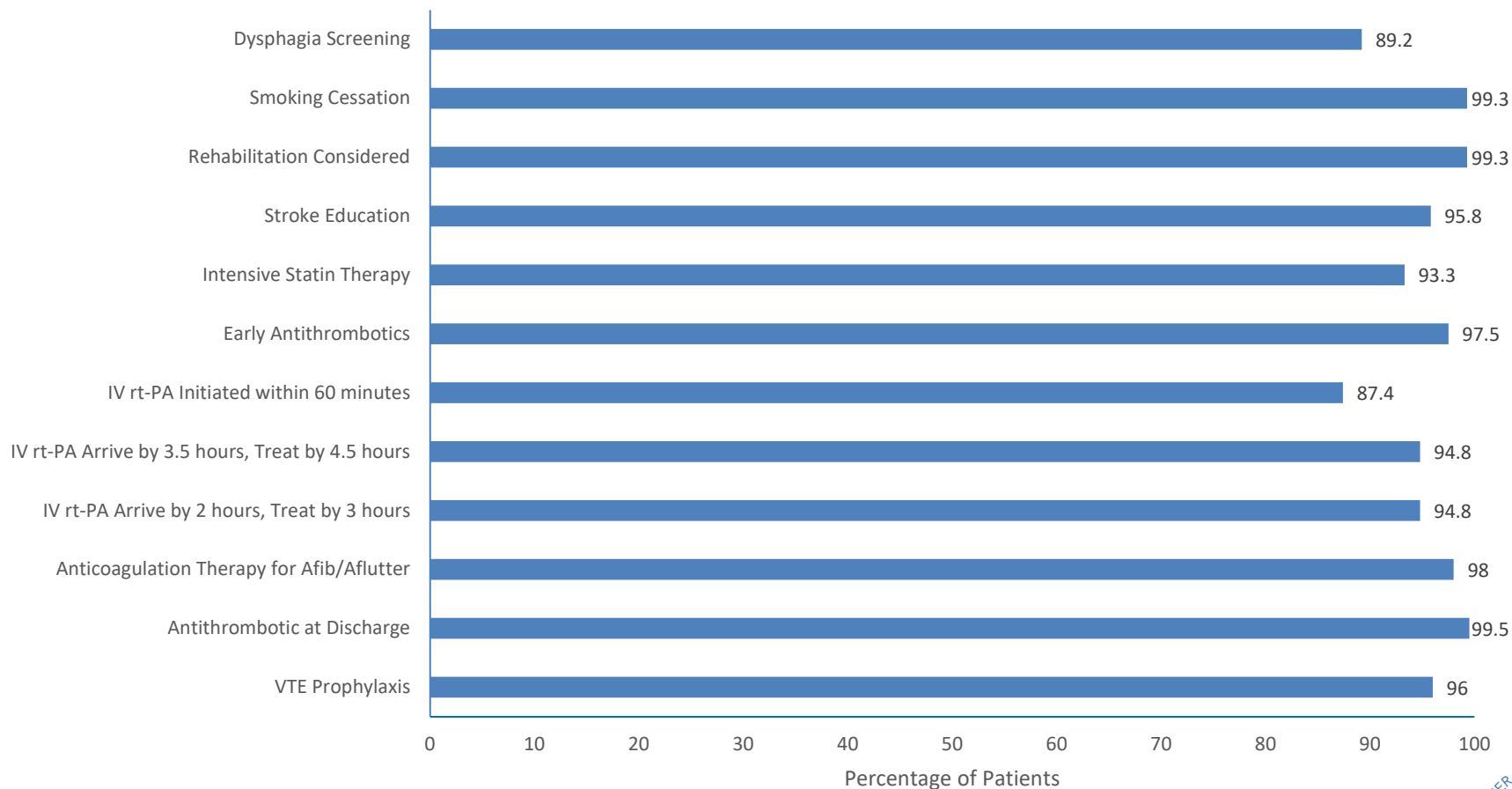
Source: Kentucky Hospital Inpatient Claims; Cabinet for Health and Family Services



# Arrival Mode



# 2020 SEQIP Stroke Measures



GWTG-S Kentucky Registry Data, 2020



# SEQIP STROKE CORE MEASURES

Stroke Measure	2009	2018	OR (CI)	p-value
IV tPA arrive by 2 hours, treat by 3 hours	59.60%	88.50%	5.219 (3.555, 7.702)	<0.0000001
IV tPA Arrived by 3.5 hours Treat by 4.5 hours	27.90%	66.00%	5.008 (3.964, 6.347)	<0.0000001
Dysphagia Screening	72.30%	93.00%	5.073 (4.522, 5.691)	<0.0000001
Stroke Education	65.00%	96.90%	16.79 (13.97, 20.29)	<0.0000001
Anticoagulation for Afib/Aflutter	92.00%	98.30%	5.006 (2.950, 8.723)	<0.0000001
LDL Documented	82.10%	95.10%	4.26 (3.701, 4.911)	<0.0000001
Rehabilitation Considered	93.50%	99.10%	7.569 (5.749, 10.06)	<0.0000001
Early Antithrombotic	94.80%	97.50%	2.153 (1.713, 2.707)	<0.0000001
Antithrombotic at Discharge	98.50%	99.60%	3.565 (2.290, 5.631)	<0.0000001
Smoking Cessation	98.50%	99.70%	4.841 (1.912, 13.620)	0.0003273
In Hospital Mortality	8.02%	5.39%	0.6528 (0.5712, 0.7460)	<0.0000001
Discharge Home Disposition	44.68%	49.80%	1.228 (1.148, 1.314)	<0.0000001

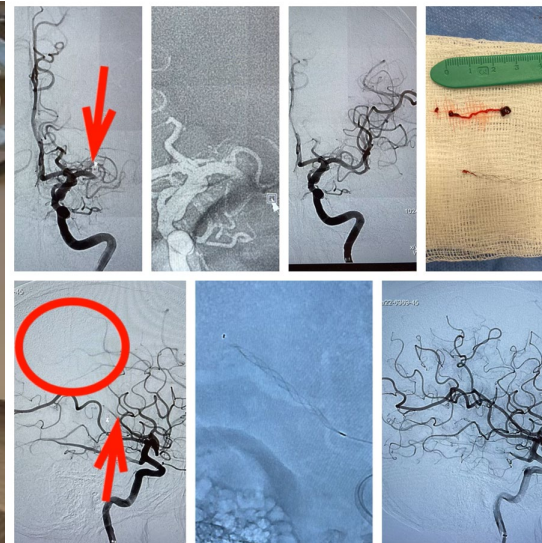
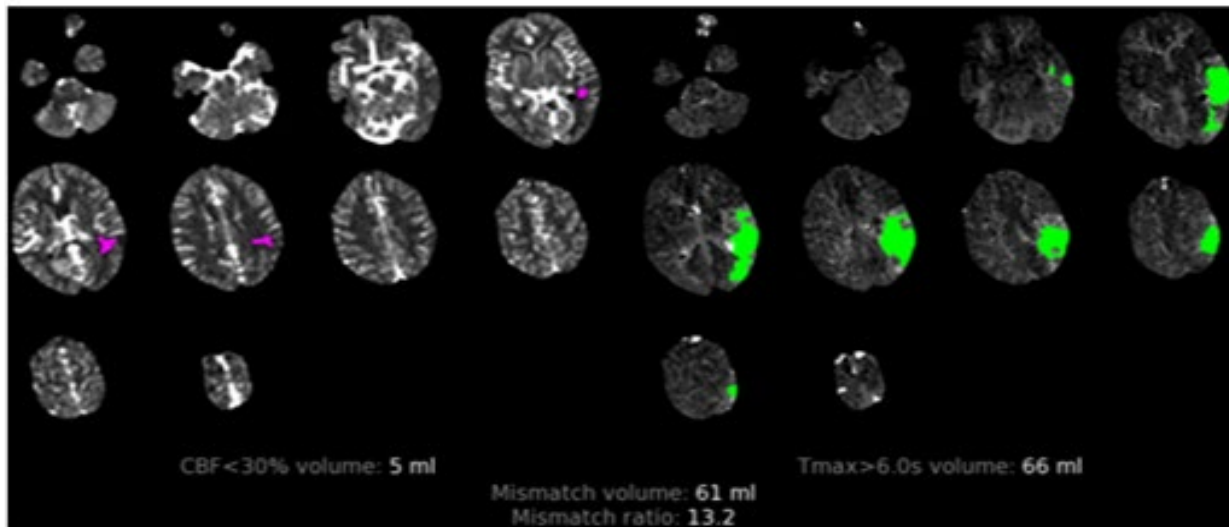
GWTG-S Kentucky Registry Data, 2020

# Outcomes Pre Target-Stroke vs Phase I and Phase II

	Pre-Target Stroke	Target Stroke Phase I	Target Stroke Phase II						
	2004-2009 n=14944	2010-2013 n=23489	2014-2018 n=41085	OR (95% CI) Pre TS vs Phase I	p-value	OR (95% CI) Pre TS vs Phase II	p-value	OR (95% CI) Phase I vs Phase II	p-value
<b>In Hospital Mortality</b>	9.74%	7.45%	7.04%	1.94 (1.80, 2.08)	<0.0001	1.13 (1.06, 1.21)	0.0002	0.94 (0.89, 1.00)	0.0571
<b>Discharge Home</b>	37.04%	44.61%	47.42%	1.37 (1.31, 1.43)	<0.0001	1.5 (1.48, 1.59)	<0.0001	1.12 (1.08, 1.16)	<0.0001
<b>EMS Prenotification</b>	9.84%	8.13%	16.38%	0.81 (0.75, 0.87)	<0.0001	1.79 (1.69, 1.91)	<0.0001	2.21 (2.10, 2.34)	<0.0001
<b>Ambulatory Status Independent</b>	38.04%	24.62%	38.06%	0.53 (0.51, 0.56)	<0.0001	1.00 (0.96, 1.04)	0.039	1.88 (1.82, 2.00)	<0.0001
<b>Arrive by EMS</b>	49.76%	25.10%	37.42%	0.34 (0.32, 0.35)	<0.0001	0.60 (0.58, 0.62)	<0.0001	1.77 (1.71, 1.84)	<0.0001

GWTG-S Kentucky Registry Data, 2020

# Mechanical Thrombectomy/Clot Retrieval



# Mechanical Thrombectomy

Performance measure	Kentucky SEQIP hospitals	All GWTG-S® stroke registry hospitals performing EVT
Arrival time to skin puncture	86 minutes (median)	70 minutes (median)
Arrival to opening blood vessel	103 minutes (median)	92 minutes (median)
Percent of patient's blood flow restored	90%	86%
Rate of restoring blood flow within 120 minutes of arrival	66 %	68%
Favorable outcome	44% of patients	41% of patients

*GWTG-S Kentucky Registry Data, 2020*





# Current SEQIP Initiatives

- Standardized Community Messaging
- EMS Education/Data Pilot in Louisville Metro
- Stroke Core Measures
- Reperfusion therapy times
- Post Discharge Care
- Door In Door Out – DiDo
- Inpatient Code Stroke
- EMS Education Modules
- Paul Coverdell National Stroke Program
- Stroke Coordinator Education Consortium



# SEQIP Participating Hospitals

(Founding Members\*)

Baptist Health Floyd  
Baptist Health Hardin  
Baptist Health Louisville\*  
Baptist Health LaGrange  
Baptist Health Lexington\*  
Baptist Health Madisonville  
Baptist Health Paducah\*  
Barbourville ARH  
Cardinal Hill Rehab Hospital  
Clark Regional Medical Center  
Ephraim McDowell James B. Hagan  
Ephraim McDowell Regional Medical Center  
Frankfort Regional Medical Center  
Georgetown Community Hospital  
Greenview Regional Hospital  
Harlan ARH  
Highlands Regional Medical Center ARH  
Jackson Purchase Medical Center  
King's Daughters Medical Center\*  
Lake Cumberland Regional Hospital\*  
Lourdes Hospital  
Mary Breckenridge ARH  
McDowell ARH  
Middlesboro ARH  
Morgan County ARH

Norton Audubon Hospital\*  
Norton Brownsboro Hospital  
Norton Hospital\*  
Norton Women's and Children's Hospital\*  
Our Lady of The Way ARH  
Owensboro Health Regional Hospital\*  
Paintsville ARH  
Pikeville Medical Center\*  
Saint Joseph Hospital  
Saint Joseph East Hospital  
St. Elizabeth Edgewood\*  
St. Elizabeth Florence  
St. Elizabeth Ft. Thomas  
St. Elizabeth Covington  
St. Elizabeth Grant County  
The Medical Center-Bowling Green\*  
Three Rivers Medical Center  
TJ Samson  
Tug Valley ARH Regional Medical Center  
UK Healthcare\*  
University of Louisville Hospital\*  
UofL Health Mary & Elizabeth\*  
UofL Health Jewish Hospital\*  
UofL Health Shelbyville  
Whitesburg ARH



# SEQIP Website

<https://khdspataskforce.com/stroke-systems-of-care/>



## Stroke Systems of Care



Subcommittees

Resources

Meetings

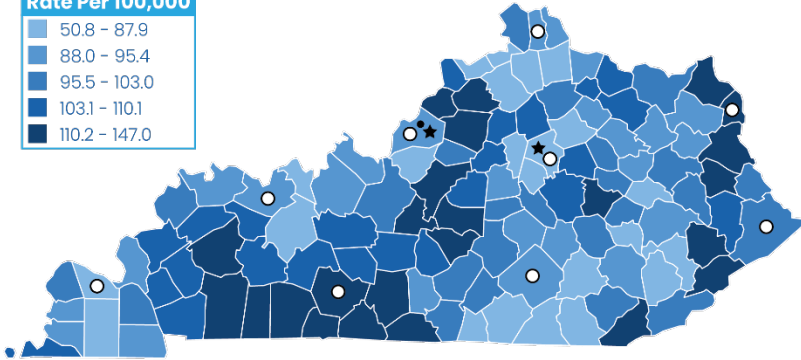
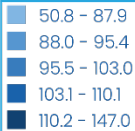
Membership

KY Coverdell



# Stroke Mortality

## 2006-2008 Rate Per 100,000



## SEQIP Hospitals, March 2009

### ★ Hospitals certified:

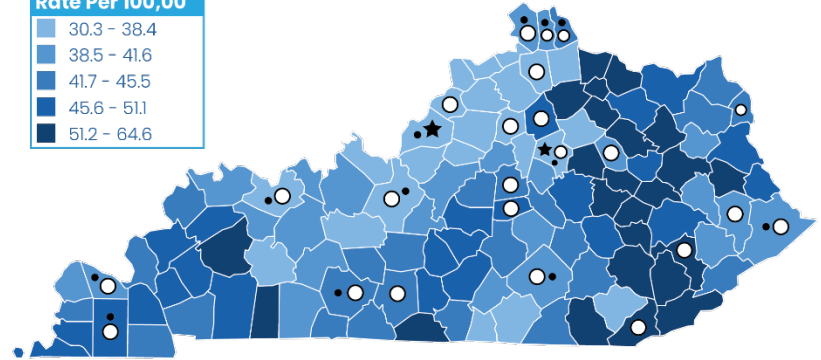
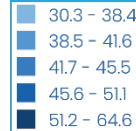
- University of Kentucky Hospital, Lexington (Fayette)
- Baptist Health Louisville (Jefferson)
- University of Louisville Hospital, Louisville (Jefferson)
- Jewish Hospital (Jefferson)
- Sts. Mary & Elizabeth Hospital, Louisville (Jefferson)
- Norton Hospital, Louisville (Jefferson)

- Hospital certified longer than 5 years

### ○ Hospitals not yet certified:

- King's Daughter's Medical Center, Ashland (Boyd)
- Owensboro Health, Owensboro (Davies)
- Baptist Health Lexington (Fayette)
- Norton Audubon Hospital, Louisville (Jefferson)
- Norton Suburban Hospital, Louisville (Jefferson)
- St. Elizabeth Hospital, Edgewood (Kenton)
- Baptist Health Paducah (McCracken)
- Pikeville Medical Center, Pikeville (Pike)
- Lake Cumberland Regional Hospital, Somerset (Pulaski)
- The Medical Center, Bowling Green (Warren)

## 2017-2019 Rate Per 100,000



## SEQIP Hospitals, 2019

### ★ Original hospitals certified in 2009:

- University of Kentucky Hospital, Lexington (Fayette)
- Baptist Health Louisville (Jefferson)
- University of Louisville Hospital, Louisville (Jefferson)
- Jewish Hospital (Jefferson)
- Sts. Mary & Elizabeth Hospital, Louisville (Jefferson)
- Norton Hospital, Louisville (Jefferson)

- Hospital certified longer than 5 years

### ○ Hospitals certified after March 2009:

- T.J. Samson Community Hospital, Barren
- Middlesboro ARH, Bell
- St. Elizabeth Florence, Boone
- King's Daughters Medical Center, Boyd
- Ephraim McDowell Regional Medical Center, Boyle
- St. Elizabeth Ft. Thomas, Campbell
- Owensboro Medical HealthPark, Daviess
- Baptist Health Lexington, Fayette
- Saint Joseph Hospital, Fayette
- Highlands ARH Regional Medical Center, Floyd
- Frankfort Regional Medical Center, Franklin
- St. Elizabeth Grant Hospital, Grant
- Jackson Purchase Medical Center, Graves
- Hardin Memorial Hospital, Hardin
- Norton Audubon Hospital, Jefferson
- Norton Brownsboro Hospital, Jefferson
- Norton Women's and Kosair Children's Hospital, Jefferson
- St. Elizabeth Edgewood, Kenton
- St. Elizabeth Covington, Kenton
- Baptist Health Paducah, McCracken
- Ephraim McDowell James B. Haggins Hospital, Mercer
- St. Joseph Mount Sterling, Montgomery
- Baptist Health LaGrange, Oldham
- Hazard ARH, Perry
- Pikeville Medical Center, Pike
- Lake Cumberland Regional Hospital, Pulaski
- Georgetown Community Hospital, Scott
- Greenview Regional Hospital, Warren
- The Medical Center - Bowling Green, Warren





# Kentucky SEQIP Accomplishments

2008

**2008:** Creation of SEQIP (Stroke Encounter Quality Improvement Project) a collaboration between the American Heart /Stroke Association and the Kentucky Heart Disease and Stroke Program (KDHDSP). A voluntary group of hospitals dedicated to improving stroke care in KY including working toward designation of primary stroke centers.

2009

**2009:** Inaugural SEQIP Meeting and launch of first state based Quality Improvement Plan #1, Dysphagia Screen. SEQIP achieved a 28.9% increase in proportion of eligible patients (n=27616) receiving screening (from 62.87% to 91.81%).

2010

**2010:** Passage of Senate Bill 1: Defining Primary Stroke Center Certification

State based QI Plan #2: Between 2009 and 2014, SEQIP achieved a 25.2% ↑ in patients eligible to receive rt-PA from 60.4% to 85.7%. Also increased the proportion of eligible patients receiving rt-PA (D2N <60 minutes) from 22.3% to 75.5%, an ↑ of 53.2%. And a ↓ in median door to needle time of 24 minutes (from 75 to 51 minutes).

2011

**2011:** State based Quality Improvement Plan #3, Target: Stroke. Improving Door to Needle times for IV-tPA administration in eligible patients. Decreased D2N time in minutes to tPA administration from 75 to 51 minutes over three years.

2011

**2011:** Systems of Care Delivery: Rural and Critical Care Access hospitals. Develop Stroke Education and resources for Physicians and Nurses these hospitals., a partnership with KY Hospital Association.

2012

**2012:** Passage of House Bill 467: Continuous quality improvement in the care provided under a statewide system for stroke response and treatment., including stroke registry for certified primary stroke centers.

2013

**2013:** Systems of Care Delivery: EMS. SEQIP members join KBEMS Cardiac and Stroke Sub-committee. Begin discussion of updating EMS Transport Protocols.

2014

**2014:** Systems of Care Delivery: EMS. Introduce to KBEMS Hospital Inter-facility Transport Protocol. Begin discussion of EMS and Dispatch Education Plan including Survey for Dispatchers.



# Kentucky SEQIP Accomplishments

2015	2016	2017	2018	2019	2020	2021	2022
<p><b>2015:</b> Passage of Senate Bill 10: Amending definition of stroke center designations as Acute Stroke Ready, Primary Stroke Center and Comprehensive Stroke Center. Bill also addresses EMS stroke protocols.</p> <p>Stroke Webinar Series for KY Rural and Critical Access hospitals, partnership with KY Hospital Association.</p>	<p><b>2016:</b> Presented SEQIP Abstracts on Statewide Dysphagia and Alteplase Administration and D2N Times at International Stroke Conference.</p> <p>Stroke Webinar Series for KY Rural and Critical Access hospitals, partnership with KY Hospital Association.</p>	<p><b>2017:</b> Revised recommended KBEMS stroke transport protocol to include severity scales-CSTAT</p> <p>Launched QI Plan for increasing alteplase utilization rates for the 3-4.5 hour window</p> <p>Bi-Monthly Data Abstraction calls implemented</p> <p>SEQIP Charter Revised</p>	<p><b>2018:</b> Interfacility transfer guideline post alteplase added to stroke protocol (FEB)</p> <p>Stroke Prenotification Algorithm created (SEPT)</p> <p>Stroke Systems Gap Analysis for HDSP Plan</p> <p>Continuum of Care Webinars</p>	<p><b>2019:</b> Standardized Public Awareness Messaging</p> <p>QCOR Poster Presentation – GIS Mapping to Analyze GWTG Data</p> <p>KBEMS finalized 18 data collection points</p> <p>Door In-Door Out (DIDO) QI Action Plan Launched</p> <p>Stroke Survivor community resources development and dissemination</p> <p>Leadership Org Chart</p>	<p><b>2020:</b> Present abstracts at ISC.</p> <p>1) KY SEQIP Statewide collaboration to improve alteplase utilization, decrease D2N times, and impact outcomes: A 10-year review 2) Can Stroke SOC Improve Measure Compliance and Outcomes Through Statewide Hospital Collaboration?</p> <p>Louisville Metro EMS Pilot Program-training, data sharing &amp; feedback</p> <p>Pediatric Stroke Subcommittee</p> <p>SEQIP Webinars</p>	<p>SEQIP Website</p> <p>Paul Coverdell National Acute Stroke Program</p>	



# Summary

- SEQIP created to improve cerebrovascular Stroke Systems of care
- Increased membership from 16 to 50 hospitals, 1 acute rehab hospital, 3 EMS agencies, and other stakeholders
- Certified stroke centers increased from 6 to 40
- SEQIP sustained with no funding
- Significantly increased alteplase utilization and decreased DTN times c/w national data
- Ongoing performance improvement
- Ongoing collaboration with EMS, hospitals, and community partners
- Ongoing advocacy and sharing of best practices to drive policy
- Take a deeper dive into outcomes and publish findings

