Kentucky Stroke Encounter Quality Improvement Project (SEQIP)

Kentucky Heart Disease and Stroke Prevention Task Force

SEQIP Registry 2019 Data Summary

2021 Annual Report

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Acknowledgements

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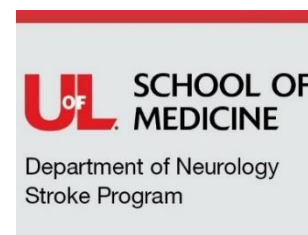
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Purpose

This data report is compiled pursuant to KRS 211.575, which requires the Kentucky Department for Public Health (KDPH) to establish and implement a plan to address continuous quality improvement for stroke care. KDPH is required to provide an annual report to the governor and the Legislative Research Commission that includes data, related findings, and recommendations to improve the delivery of stroke care efforts in Kentucky.

Burden of Cerebrovascular Disease in Kentucky

Stroke was the fifth highest cause of death in Kentucky in 2019. According to the Kentucky Behavioral Risk Factor Surveillance System (KyBRFS) data from 2019, 5.0% of Kentuckians reported they had experienced a stroke at some time in their life. That represents an increase from 4% in 2018. Additionally, 41% of Kentuckians report they have hypertension, the number one risk factor for stroke[2]. That is also an increase from 36% in 2018. The age-adjusted death rate from stroke varies by county, as shown in the map below, when using stroke mortality data from 2016 through 2018, for individuals of all races, ethnicities, and genders, aged 35 years and older[3].
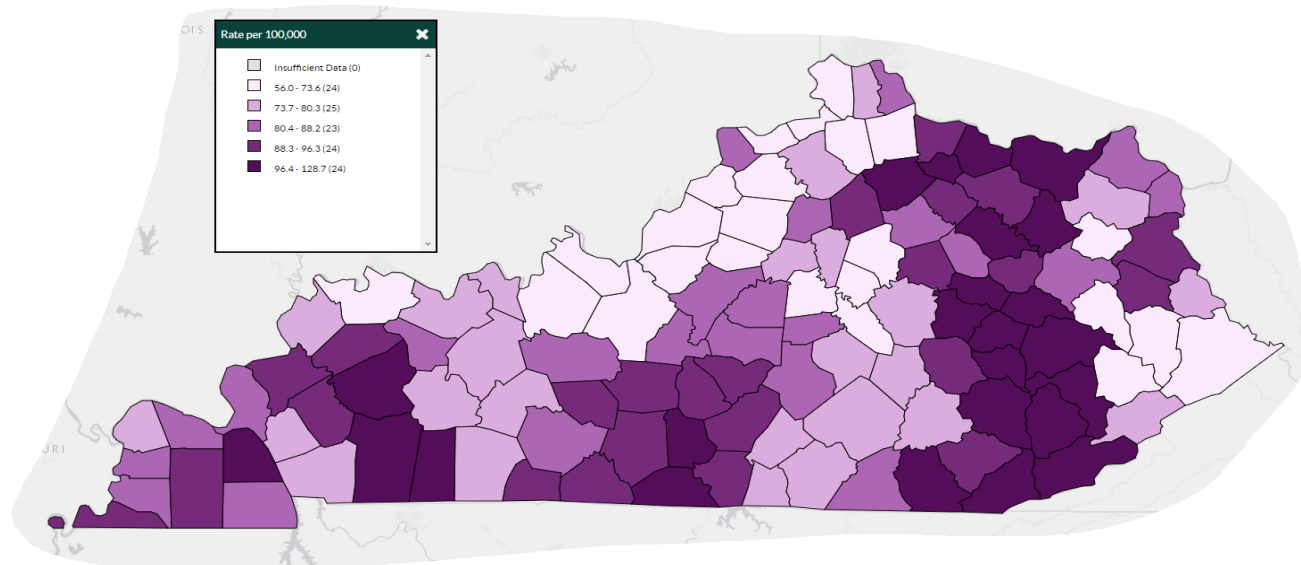

A stroke, also called a 'brain attack', occurs when blood flow to the brain is reduced or cut off, and brain cells begin to die from lack of oxygen. The effects of a stroke depend on the severity of the brain damage but range from temporary weakness of the arm or leg, to permanent paralysis, loss of the ability to speak, and sometimes death. A transient ischemic attack (TIA) occurs when a blood clot temporarily blocks blood flow to the brain. The symptoms occur rapidly and usually resolve in a short period of time with no permanent damage to brain tissue[1]. There are two types of stroke, ischemic and hemorrhagic. Ischemic strokes are caused by loss of blood flow to the brain due to blockage of blood vessels providing blood flow to the brain and hemorrhagic strokes are caused by bleeding into the brain due to rupture of a blood vessel. Nationally, ischemic strokes account for 87% of all strokes, while intracerebral hemorrhage accounts for 10% and subarachnoid hemorrhage for 3%. Stroke is a leading cause of disability in the United States and reduces mobility in more than half of stroke survivors who are 65 years of age and older[2.]

Stroke Encounter Quality Improvement Project (SEQIP)

The Kentucky Stroke Encounter Quality Improvement Project was created in 2009 as a statewide quality improvement initiative to advance stroke systems of care in Kentucky by developing collaboration among hospitals and other stakeholders in the Commonwealth to reduce disparities in stroke care and increase reperfusion therapies by impacting the D's of Stroke Care (stroke chain of survival) (Figure 1)[4].

Figure 1. D's of Stroke Care
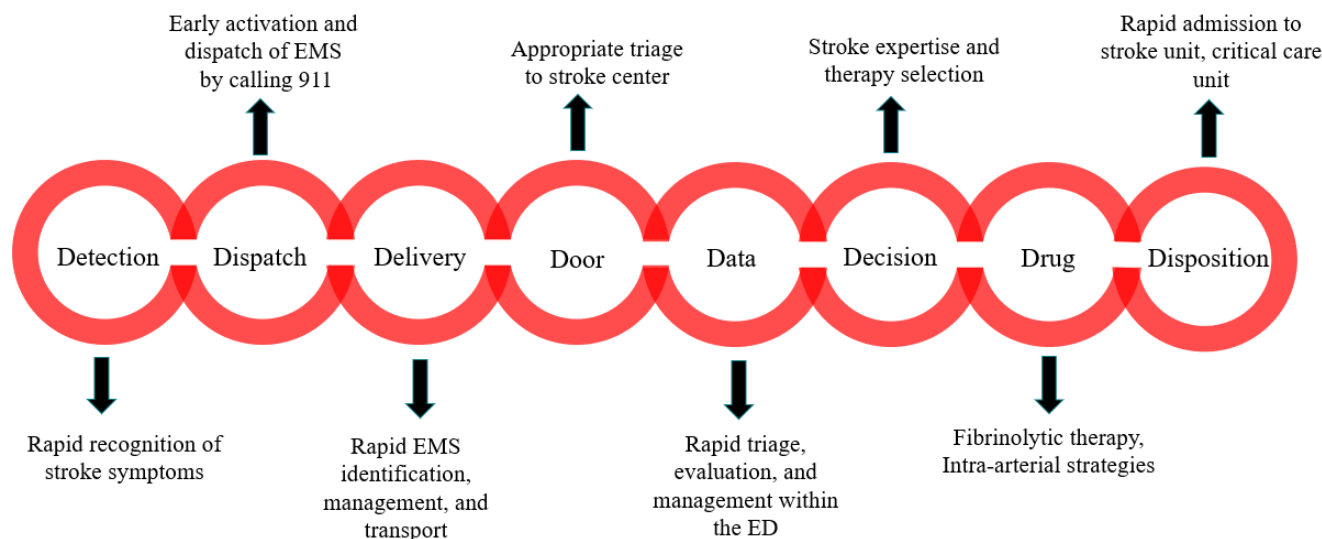
SEQIP's goals are:

- To adopt evidence-based guidelines and standards for practice
- To implement evidence-based integrated cerebrovascular systems of care
- To support and advance the quality of care available to stroke patients in Kentucky
- To share best practices and encourage collaboration among membership
- To identify and map certified stroke centers in the state
- To engage and recruit hospitals to seek certification as Comprehensive Stroke Center, Thrombectomy Capable Stroke Center, Primary Stroke Center, and Acute Stroke Ready Stroke Center
- To evaluate quality data and identify opportunities for collaboration with partners outside of SEQIP
- To address the entire stroke system of care including pre-hospital stroke care, stroke rehabilitation, transitions of care, and patient outcomes
- To develop and disseminate an annual report to the governor and legislature, including recommendations for improving stroke systems of care
- To support the passage of state policies that advance the implementation of stroke systems of care

SEQIP includes hospitals that are stroke certified by The Joint Commission (TJC) as Comprehensive, Primary, and Acute Stroke Ready per KRS 216B.0425 (effective July 15, 2010), as well as hospitals certified by other nationally recognized agencies such as DNV or Healthcare Facilities Accreditation Program (DNV or HFAP) or hospitals seeking to advance stroke care in the community in which they

serve. To aid in achieving their goals, SEQIP created the following subcommittees to address the stroke spectrum of care and chain of survival.
- EMS Outreach and Education
- Disease Specific Certification Initiatives
    o Comprehensive Stroke Centers
    o Thrombectomy-Capable Stroke Centers
    o Primary Stroke Centers
    o Acute Stroke Ready Hospitals
- Data Analysis and Performance Improvement
- Navigating the Stroke Continuum of Care
- Community and Public Health Education and Outreach
- Door in Door Out (DiDo)

The Kentucky Department for Public Health's Heart Disease and Stroke Prevention (KHDSP) Program, in collaboration with the KHDSP Task Force, developed the Kentucky Heart Disease and Stroke Prevention Strategic Map and Plan for 2017- 2019. SEQIP members were active participants in the development and creation of the map and are committed to furthering the initiatives outlined in the plan for continued improvement in stroke systems of care in the commonwealth. To view specific SEQIP objectives and action items from the 2017-2019 strategic map, along with progress notes and a gap analysis undertaken at the end of 2019, see the Appendix.

SEQIP Registry Data
The data presented in this report are based on 23 of the 25 certified stroke centers that provided mandatory data for calendar year 2019 (Table 1). There are currently 40 hospitals engaged in SEQIP. Data from these additional centers will be reflected in future reports as data use agreements are obtained. Stroke registry data for 2019 included 10,548 patients. Since 2008, more hospitals have become stroke certified resulting in a steady increase in data submission and registry cases (Figure2).

Table 1. Certified Stroke Centers Reporting Data

2019 Certified Hospitals	Hospitals whose data are included in this report	Hospitals required to submit data per KRS 211.575
Baptist Health LaGrange	√	√
Baptist Health Lexington	√	√
Baptist Health Louisville	√	√
Baptist health Paducah	√	√
Frankfort Regional Medical Center		√
Greenview Regional Hospital		√
Hardin Memorial Hospital	√	√
Jackson Purchase Medical Center	√	√
Jewish Hospital	√	√
King's Daughter's Medical Center	√	√
Lake Cumberland Regional Hospital	√	√
Norton Audubon Hospital	√	√
Norton Brownsboro	√	√
Norton Hospital	√	√
Norton Women's and Children's Hospital	√	√

2019 Certified Hospitals	Hospitals whose data are included in this report	Hospitals required to submit data per KRS 211.575
Owensboro Health Regional Hospital	√	√
Pikeville Medical Center	√	√
Saint Joseph Hospital	√	√
St Elizabeth Healthcare Edgewood	√	√
St Elizabeth Healthcare Florence	√	√
St. Elizabeth Healthcare Ft Thomas	√	√
Sts. Mary and Elizabeth Hospital	√	√
The Medical Center at Bowling Green	√	√
University of Kentucky	√	√
University of Louisville Hospital	√	√

Figure 2. SEQIP Registry Case Volume
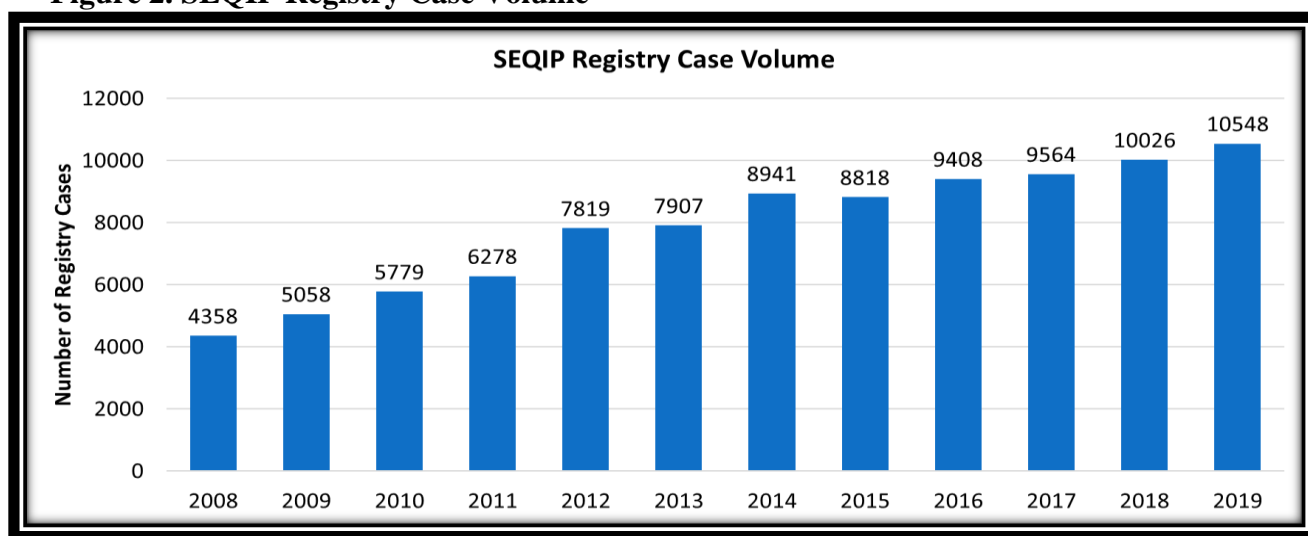
In 2019, 78% of SEQIP patients had ischemic strokes, 9% had TIA, 10% had intracerebral hemorrhages, and 3% had subarachnoid hemorrhages. 41% of stroke registry patients were ≤ age 65, 47% were age 66-85, and 12% were 85 years of age or older; 50.4% were male and 49.6% were female. The race of patients was predominantly white at 88%, followed by black at 10%, and 1% for Latino/Hispanic individuals, with the remaining 1% including Asians, American Indian, or Pacific Islander.

Stroke registry patients had the following common stroke risk factors: 76% of patients had hypertension, 47% had high cholesterol, 35% had diabetes, 26% had a previous stroke 23% used tobacco, and 17% had atrial fibrillation/flutter.

Time is brain and stroke is a medical emergency. Upon recognition of stroke symptoms, activation of emergency medical services (EMS) is recommended for rapid transport to the hospital where patients can be evaluated immediately upon arrival and evaluated for emergent treatment options to reverse symptoms. In 2019, the mode of transport to SEQIP certified stroke centers was 31% via private vehicle, 39% via EMS, 30% transfers from other hospitals, and 0.3% of transport modes were not documented.

SEQIP hospitals monitor evidence-based performance measures endorsed by the American Heart/Stroke Association and The Joint Commission certification body as well as DNV and HFAP for the treatment and management of stroke patients from hospital to discharge. The 12 measures are: IV alteplase Administration; Time to IV alteplase Administration < 60 Minutes; Antithrombotics Prescribed by Hospital Day 2; Venous Thromboembolism (VTE) Prophylaxis; Antithrombotics Prescribed at Discharge; Anticoagulation for Atrial Fibrillation/Flutter at Discharge; NIH Stroke Scale Performed; Dysphagia Screen Performed Before Oral Intake; Statin Medication Prescribed at Hospital Discharge; Stroke Education Provided; Smoking Cessation Counseling During Hospital Stay; and Assessed for Rehabilitation Needs.

The nationally recognized goal for the above performance measures is >85% achievement for each measure. SEQIP hospitals met and exceeded this goal for all measures during calendar year 2019. Adherence to each metric is shown in the graph below (Figure 3).

Figure 3. 2019 Performance Measure Compliance

2019 SEQIP Stroke Performance Measures

Measure	% of Patients Meeting Goal
Smoking Cessation Counseling During Hospital Stay	99%
Dysphagia Screen Performed Before Oral Intake	92%
NIH Stroke Scale Performed	94%
Assessed for Rehabilitation Needs	99%
Stroke Education Provided	98%
Statin Medication Prescribed at Hospital Discharge	99%
Antithrombotics Prescribed by Hospital Day 2	97%
Time to IV alteplase Administration < 60 Minutes	86%
IV alteplase Administration	96%
Anticoagulation for Atrial fibrillation/flutter at Discharge	98%
Antithrombotics Prescribed at Discharge	99%
Venous Thromboembolism (VTE) Prophylaxis	96%

■ % of Patients Meeting Goal

In 2019 SEQIP analyzed registry data from 2009-2018. Data in the tables below demonstrate how stroke care delivery at certified stroke centers in the Commonwealth has significantly improved over the last 10 years. The sharing of best practices among SEQIP hospitals, ongoing community education, and collaboration with EMS colleagues and other stakeholders has resulted in more patients being treated with IV alteplase (the only clot busting drug FDA approved to reverse ischemic stroke symptoms and decrease disability) and faster administration of IV alteplase from patient time of arrival to the hospital, resulting in saved brain tissue. The median door to drug administration time has decreased by 27 minutes in the last 10 years at participating SEQIP hospitals.

Efforts to increase administration of IV alteplase to eligible patients and decrease the amount of time it takes hospitals to administer the medication from time of patient arrival to the hospital are significantly reducing disability (Table 2). As more patients have been treated with the clot-busting drug, we have

seen a decrease in hospital mortality by more than 8%, 20% more stroke survivors being discharged to home, and 44% of patients receiving IV alteplase are now able to walk independently at discharge.

Table 2. Thrombolytic Therapy (IV alteplase) Administration

IV Alteplase n = 4404	2009	2018	OR (CI)	p-value
% of all ischemic stroke patients receiving IV alteplase	4.6%	8.8%	1.996 (1.671,2.383)	< 0.00001
IV alteplase arrive by 2 hours, treat by 3 hours	59.6%	88.5%	5.219 (3.555, 7.702)	<0.0000001
IV alteplase arrive by 3.5 hours, treat by 4.5 hours	27.9%	66%	5.008 (3.964, 6.347)	<0.0000001
In Hospital Mortality	11.7%	3.6%	0.317 (0.173, 0.582)	0.00016
Discharge Home Disposition	28.4%	48%	2.318 (1.599, 3.362)	< 0.0001
Walk Independently at Discharge	32%	43.6%	1.633 (1.137,2.343)	0.00359

SEQIP's sharing of best practices continues to increase hospital compliance with evidence-based performance measures. This has led to more patients being treated with appropriate medications for secondary stroke prevention – such as statins and antithrombotics; dysphagia (swallow) screen before oral intake; smoking cessation; evaluation for rehab services; stroke education on modifiable vascular risk factors, medications, hospital follow up, signs and symptoms of stroke; and EMS activation. As a result of process improvement initiatives across the stroke chain of survival, more stroke patients are being discharged home and in-hospital mortality for all stroke patients (even those without IV alteplase treatment) has decreased. (Table 3).

Table 3. Performance Measure Outcomes

Stroke Performance Measure	2009	2018	OR (CI)	p-value
Dysphagia Screening Before Oral Intake	72.%	93%	5.073 (4.522, 5.691)	< 0.0000001
Stroke Education Provided	65%	97%	16.79 (13.97, 20.29)	< 0.0000001
Anticoagulation afib/flutter at Discharge	92%	98%	5.01 (2.95, 8.723)	< 0.0000001
LDL Documented	82%	95%	4.26 (3.701, 4.911)	< 0.0000001
Assessed for Rehabilitation Needs	94%	99%	7.569 (5.749, 10.06)	< 0.0000001
Antithrombotics Prescribed by Day 2	95%	98%	2.153 (1.713, 2.707)	< 0.0000001
Antithrombotics Prescribed at Discharge	98.5%	99.6%	3.565 (2.29,5.631)	< 0.0000001
Smoking Cessation Counseling	98.5%	99.7%	4.841 (1.912, 13.62)	0.0003273
In Hospital Mortality	8%	5%	0.653 (0.571, 0.746)	< 0.0000001
Discharge Disposition Home	45%	50%	1.228 (1.148, 1.314)	< 0.0000001

Current Stroke Systems of Care Process Improvement Initiatives

SEQIP continues to work on improving compliance with the performance measures discussed above. In addition to these efforts the following initiatives are currently being addressed:

- Standardized messaging for vascular risk factors and the signs and symptoms of stroke across the continuum of care
- Post hospital discharge resources for stroke patients and providers

- Geographical mapping with registry data to evaluate, develop, and implement targeted stroke messaging to the community, referral facilities, and EMS
- Creating best practice protocols to decrease transfer times to tertiary facilities
- Collaborating with the Kentucky Board of Emergency Medical Services (KBEMS) to implement a stroke pilot in the Louisville Metro between hospitals and EMS agencies focused on education, orientation, use of stroke screening and severity scales in the field, prehospital activation, and data sharing on patient outcomes
- Continuing to host educational webinars for healthcare providers
- Creating a SEQIP website with resources for membership

Recommendations for the Cabinet for Health and Family Services

Stroke cases are added to the SEQIP registry by individual hospital data abstractors, both in real-time and after patient discharge. The Joint Commission requires all data for the calendar year be entered in the registry by March 31 of the following year for consideration of award status. Because of this lag in reporting time, data for the yearly SEQIP report is not from the prior calendar year (i.e., calendar year 2019 data was not completely entered until March 31, 2020). This reporting deadline means the yearly SEQIP report aggregates data from two calendar years prior.

The SEQIP steering committee requests the Kentucky Cabinet for Health and Family Services support changing the deadline for the final SEQIP report to a September 1 deadline, which will allow us to include the most recent data from the previous calendar year in the annual report.

Sources

1. National Stroke Association, What is Stroke? https://www.stroke.org/understand-stroke/what-is-stroke/
2. Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Division of Population Health. BRFSS Prevalence & Trends Data [online]. 2019. [accessed March 22, 2021]. URL: https://www.cdc.gov/brfss/brfssprevalence/
3. Centers for Disease Control and Prevention. Interactive Atlas of Heart Disease and Stroke [online]. 2021. [accessed March 7, 2021. URL: https://nccd.cdc.gov/DHDSPAtlas/?state=State
4. Ashcraft, S., Wilson, S.E., Nystrom, K.V., et al. (2021). Care of the Patient with acute ischemic stroke (Prehospital and acute phase of care): Update to the 2009 comprehensive nursing care scientific statement. *Stroke*;52:00-00. DOI: DOI: 10.1161/STR.0000000000000356

Appendix

KHDSP Task Force Strategic Map and Plan 2017-2019		SEQIP Progress and Gap Analysis
Objective: Improve statewide cerebrovascular systems of care		Performed Q4 2019
Strategy 1	**Action Items**	
Identify and improve 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). 　- Acute Stroke Ready Hospitals 　- Primary Stroke Centers 　- Comprehensive Stroke Centers	**Gap** Add Thrombectomy-Capable Stroke Center certification to legislation (created by The Joint Commission in 2018)
	Continue collaboration with Kentucky Hospital Association's (KHA) Rural Hospital Flexibility Program.	**Achieved** Continue as goal for 2020-2023
	Partner with Kentucky hospitals to increase intravenous therapy (IV) tissue plasminogen activator (t-PA) utilization.	**Improved** Continue as goal and add acute treatments
	Disseminate KBEMS statewide inter-facility stroke transfer during or after IV t-PA protocol.	**Partially met** Continue as goal, not well utilized
	Identify Emergency Medical Service (EMS) agencies which have a field transport protocol for stroke.	**Gap** Identified inconsistent protocols (State Protocol vs. Medical Director approved by agency)
	Partner with KBEMS to determine stroke specific data points available for capture.	**Achieved** Continue as goal for 2020-2023
	Explore pilot project for EMS feedback utilizing proposed data elements.	**Achieved** Add pilot as goal for 2020-2023
	Continue collaboration with the KBEMS subcommittee, Cardiac and Stroke Care.	**Achieved** Continue as goal for 2020-2023
	Enhance EMS interaction and support of dispatch centers.	**Gap** Goal modified for 2020-2023
	Partner with KBEMS for continued development of inter-facility transport protocols for all stroke subtypes.	**Gap** Add acute ischemic stroke without thrombolytic therapy, and hemorrhagic stroke protocols as goal for 2020-2023
Strategy 2	**Action Items**	
Continue SEQIP through FY 2019.	Assess current Stroke Encounter Quality Improvement Project (SEQIP) members for continued participation by March 2016.	**Achieved**
	Recruit at least one hospital pursuing Acute Stroke Ready certification by March 2017.	**Achieved** Currently 11 ASR, change goal to TSC for 2022
	Utilize registry to develop and implement an action plan around quality metrics and education.	**Achieved**
	Develop and disseminate Stroke Registry Data Summary in accordance with KRS211.575, which goes to the governor and legislature and includes recommendations for improving stroke systems of care.	**Achieved**
Strategy 3	**Action Items**	
Continue to engage hospitals to become stroke certified.	Disseminate the Kentucky state plan for Stroke Systems of Care and statewide map to target hospitals by December 2016.	**Achieved**
	Monitor and provide support for stroke program development to target hospitals through December 2019.	**Achieved** Continue for 2020-2023 (currently 40 SEQIP hospitals)
	Update and disseminate KHA stroke resources.	**Gap** Move to KHDSP Task Force website with SEQIP tab for current resources
Strategy 4	**Action Items**	
Develop collaboration among healthcare systems and public health in the state to standardize messaging.	Provide patient and family education regarding signs and symptoms of stroke.	**Achieved**
	Provide patient and family education regarding the importance of calling 911.	**Achieved**
	Provide patient and family education regarding primary and secondary prevention of stroke.	**Achieved**