



KENTUCKY DEPARTMENT FOR PUBLIC HEALTH

Kentucky Stroke Encounter Quality Improvement Project (SEQIP) 2026 Annual Report

Our mission is to improve the health and safety of people in Kentucky through prevention, promotion and protection.

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KENTUCKY.**
CABINET FOR HEALTH
AND FAMILY SERVICES


Kentucky Public Health
Prevent. Promote. Protect.



Contents

Citation	3
Legislation	3
Executive Summary	3
Recommendations	4
Stroke Hospitalizations	5
Table 1. 2025 Inpatient hospital charges for stroke and TIA* by patient ADD	5
Stroke Mortality	6
Table 2. Leading Causes of Death in Kentucky, 2025	6
Table 3. Leading Causes of Death in USA, 2025.....	6
Figure 1. Age-Adjusted Stroke Mortality: A U.S. State-Level Overview, 2025	7
2025 Stroke Registry Data	8
Figure 2. Number of all patient records by year in the 2025 SEQIP stroke registry.....	8
Figure 3. Rate of strokes in 2025 registry, by patient county per capita (Kentucky residents only)	8
Table 4. 2025 SEQIP stroke registry patient demographic information and summary.....	9
National Institute of Health Stroke Scale (NIHSS) Score	10
Figure 4. Distribution of NIHSS scores grouped by severity in the 2025 SEQIP registry	10
AHA/ASA Stroke Performance Measures.....	11
Figure 5. Kentucky SEQIP 2025 GWTG-Stroke Performance Measures	11
Figure 6. Percent receiving intravenous thrombolytic therapy within 60 minutes from arrival	11
Appendix A: Participating SEQIP Hospitals.....	12

Citation

Kentucky Department for Public Health (KDPH). The Stroke Encounter Quality Improvement Project (SEQIP) Stroke Registry 2026 Annual Report. Frankfort, Kentucky: Cabinet for Health and Family Services, Kentucky Department for Public Health, Heart Disease and Stroke Prevention (KHDSP) Program, 2026.

Legislation

This annual report, as mandated by Kentucky Revised Statutes 211.575, is written to establish a data oversight process and a plan for achieving continuous quality improvement in the statewide system for stroke response and treatment. Its primary objectives include analyzing data from the stroke database to assess care quality, identifying potential interventions to enhance stroke care in specific geographic regions of Kentucky, and providing recommendations to the Department of Public Health and the Kentucky General Assembly to improve the delivery of stroke care across the state.

Executive Summary

The Stroke Encounter Quality Improvement Project (SEQIP) was created in 2009 as a voluntary statewide stroke quality improvement initiative of the Kentucky Heart Disease and Stroke Prevention Task Force - Cardiovascular Health Delivery Systems Subcommittee, Kentucky Department for Public Health's, Heart Disease and Stroke Prevention (KHDSP) Program, and the American Heart Association/American Stroke Association (AHA/ASA). The mission of SEQIP is to advance stroke systems of care and reduce stroke disparities in Kentucky.

- In 2025, Kentucky had 11,788 inpatient stroke and transient ischemic attack (TIA) admissions, costing \$1.15 billion, with average charges ranging from \$50,879 in Northern Kentucky to \$124,367 in the Kentuckiana Regional Planning & Development Agency (KIPDA), and average lengths of stay varying from 4.05 days in Purchase to 6.56 days in KIPDA.
- In 2025, cerebrovascular diseases like strokes and TIAs were the fifth leading cause of death in Kentucky (2,365 deaths, 4.29%), compared to fourth nationally (5.04%). Kentucky ranked 21st in age-adjusted stroke mortality at 39.3 per 100,000, tied with Washington state.
- The National Institutes of Health Services (NIHSS) data for 2025 indicated 38.9% of cases were minor strokes (scores 1–4), while 7.9% were severe (scores 21–42), reflecting continued improvement in documentation completeness, with undocumented severity falling to just 6.0% of cases.
- Hypertension remained the top modifiable stroke risk factor across all age groups, with smoking and obesity more prevalent in younger adults (18–45 years).

SEQIP has grown from 16 founding hospitals in 2009 to 64 member hospitals today by prioritizing evidence-based care and meeting national door-to-drug time targets for reperfusion therapies, with 89.0% of eligible patients treated within 60 minutes in 2025.



Recommendations

The 2026 SEQIP Annual Report, mandated by Kentucky Revised Statutes 211.575, aims to enhance Kentucky's statewide stroke response and treatment system through data oversight and continuous quality improvement, addressing a significant stroke burden.

Based on the 2026 SEQIP Annual Report findings, SEQIP steering committee presents the following specific recommendations to the Kentucky General Assembly:

1. Hypertension Control Initiative

Finding: Hypertension remains the #1 modifiable risk factor across all age groups for stroke in Kentucky.

Recommendation: Fund implementation of a Statewide Hypertension Awareness and Control Campaign (CARE Collaborative) at all Kentucky Federally Qualified Health Centers (FQHCs), local health departments, and regionally selected primary care clinics to reduce stroke and cardiovascular disease events, morbidity, and mortality.

2. Emergency Medical Services (EMS) System Evaluation and Enhancement

Finding: Significant gaps exist in EMS utilization for acute stroke symptoms, with county-level variations in stroke outcomes potentially linked to EMS coverage and availability.

Recommendation: Fund comprehensive EMS evaluation to:

- Assess why citizens are not utilizing EMS and 911 for acute stroke symptoms
- Link prehospital and hospital care delivery data
- Support regional EMS, provider, and nursing education
- Improve door-to-needle times for thrombolytic administration

3. Stroke Systems of Care Coordination

Finding: Despite meeting national door-to-drug targets, significant variations exist across area development districts (ADDs), as charges ranged from \$50,879 to \$124,367; lengths of stay from 4.05 to 6.56 days.

Recommendation: Fund systematic approach to address the stroke continuum of care, including:

- An epidemiologist position to analyze stroke quality metrics and EMS data
- Regional Stroke Symposiums for best practice sharing
- Quality improvement initiatives across all 64 member hospitals
- Primary care provider education on current evidence for vascular risk factor reduction

These targeted investments will address identified care gaps, and ensure Kentucky continues its progress in reducing stroke mortality and improving outcomes for all citizens. SEQIP prioritizes evidence-based care through coordinated stroke systems and meets national door-to-drug time targets for reperfusion therapies (under 45 minutes, or 30 minutes when feasible), despite bleeding risks, to reduce brain damage.



Stroke Hospitalizations

In 2025, Kentucky's inpatient hospital data for stroke and TIA, as presented below, shows the state recorded 11,788 admissions, with an average length of stay of 5.73 days and average charges of \$97,359 per admission, totaling \$1.15 billion. KIPDA had the highest number of admissions (2,489) and total charges (\$309.2 million), while Buffalo Trace had the fewest admissions (101) and lowest total charges (\$9.3 million). Length of stay varied from 4.05 days in Purchase to 6.56 days in KIPDA. Some ADDs, like KIPDA (\$124,367 average charge) and Lincoln Trail (\$120,367), had higher charges alongside longer stays. In contrast, other categories, like Out of State (\$113,166) and Bluegrass ADD (\$109,994), had high charges despite more moderate stays (5.60 and 6.23 days, respectively).

Table 1. 2025 Inpatient hospital charges for stroke and TIA by patient ADD*

Area Development District (ADD)	Admissions (Counts)	Average Length of Stay (Days)	Average Charge	Total Charges
01 - Purchase	430	4.05	\$64,899	\$27,906,657
02 - Pennyryle	377	4.36	\$53,570	\$20,195,872
03 - Green River	403	4.23	\$50,973	\$20,542,250
04 - Barren River	655	4.90	\$64,842	\$42,471,191
05 - Lincoln Trail	765	5.83	\$120,367	\$92,080,410
06 - KIPDA	2,489	6.56	\$124,216	\$309,174,767
07 - Northern Kentucky	855	5.19	\$50,879	\$43,501,530
08 - Buffalo Trace	101	6.01	\$92,569	\$9,349,469
09 - Gateway	220	5.51	\$63,472	\$13,963,908
10 - FIVCO	392	4.66	\$63,319	\$24,820,902
11 - Big Sandy	437	5.29	\$83,896	\$36,662,544
12 - Kentucky River	305	5.77	\$87,422	\$26,663,587
13 - Cumberland Valley	645	6.12	\$100,660	\$64,925,783
14 - Lake Cumberland	599	6.20	\$115,549	\$69,213,600
15 - Bluegrass	1,993	6.23	\$109,994	\$219,217,337
Out of State	1,122	5.60	\$113,166	\$126,972,567
Total	11,788	5.73	\$97,359	\$1,147,662,374

Source: Kentucky Health Facilities and Services Data, Inpatient Admissions, Kentucky Cabinet for Health and Family Services, Office of Data Analytics. (*ICD-10 codes: I60-I609, I61-I619, I63-I639, G450-G452, G458-G459)



Stroke Mortality

In 2025, Kentucky's mortality data showed heart disease leading (11,692 deaths, 21.23%), followed by cancer (10,876 deaths, 19.75%), chronic lower respiratory diseases (3,652 deaths, 6.63%), accidents (3,145 deaths, 5.71%), and cerebrovascular diseases (2,365 deaths, 4.29%). In the U.S., heart disease topped the list (695,842 deaths, 20.46%), followed by cancer (623,173 deaths, 18.32%), accidents (186,231 deaths, 5.48%), cerebrovascular diseases (171,516 deaths, 5.04%), and chronic lower respiratory diseases (148,556 deaths, 4.37%).

Cerebrovascular diseases ranked lower in Kentucky (fifth) than nationally (fourth), with a lower death share (4.29% vs. 5.04%). Notably, the ordering of the top five causes also differed between Kentucky and the nation: while accidents ranked 3rd nationally, ahead of cerebrovascular disease, Kentucky's chronic lower respiratory diseases held the 3rd spot instead, with accidents falling to 4th. Together, heart disease and cancer accounted for roughly 41% of all deaths in both Kentucky and the U.S., underscoring that despite these regional differences in the lower rankings, the two leading causes of death remain broadly consistent nationwide.

The National Center for Health Statistics (NCHS) 113 selected causes of death include the following categories with their corresponding ICD-10 codes: Diseases of Heart (I00-I09, I11, I13, I20-I51), Malignant Neoplasms (C00-C97), Chronic Lower Respiratory Diseases (J40-J47), Accidents (Unintentional Injuries) (V01-X59, Y85-Y86), and Cerebrovascular Diseases (Strokes) (I60-I69).

Table 2. Leading Causes of Death in Kentucky, 2025

(Source: Kentucky Office of Vital Statistics)

Rank	Cause of Death	Total Deaths	Percent of all Deaths
1	Diseases of heart	11,692	21.23%
2	Malignant neoplasms	10,876	19.75%
3	Chronic lower respiratory diseases	3,652	6.63%
4	Accidents	3,145	5.71%
5	Cerebrovascular diseases	2,365	4.29%

Table 3. Leading Causes of Death in USA, 2025

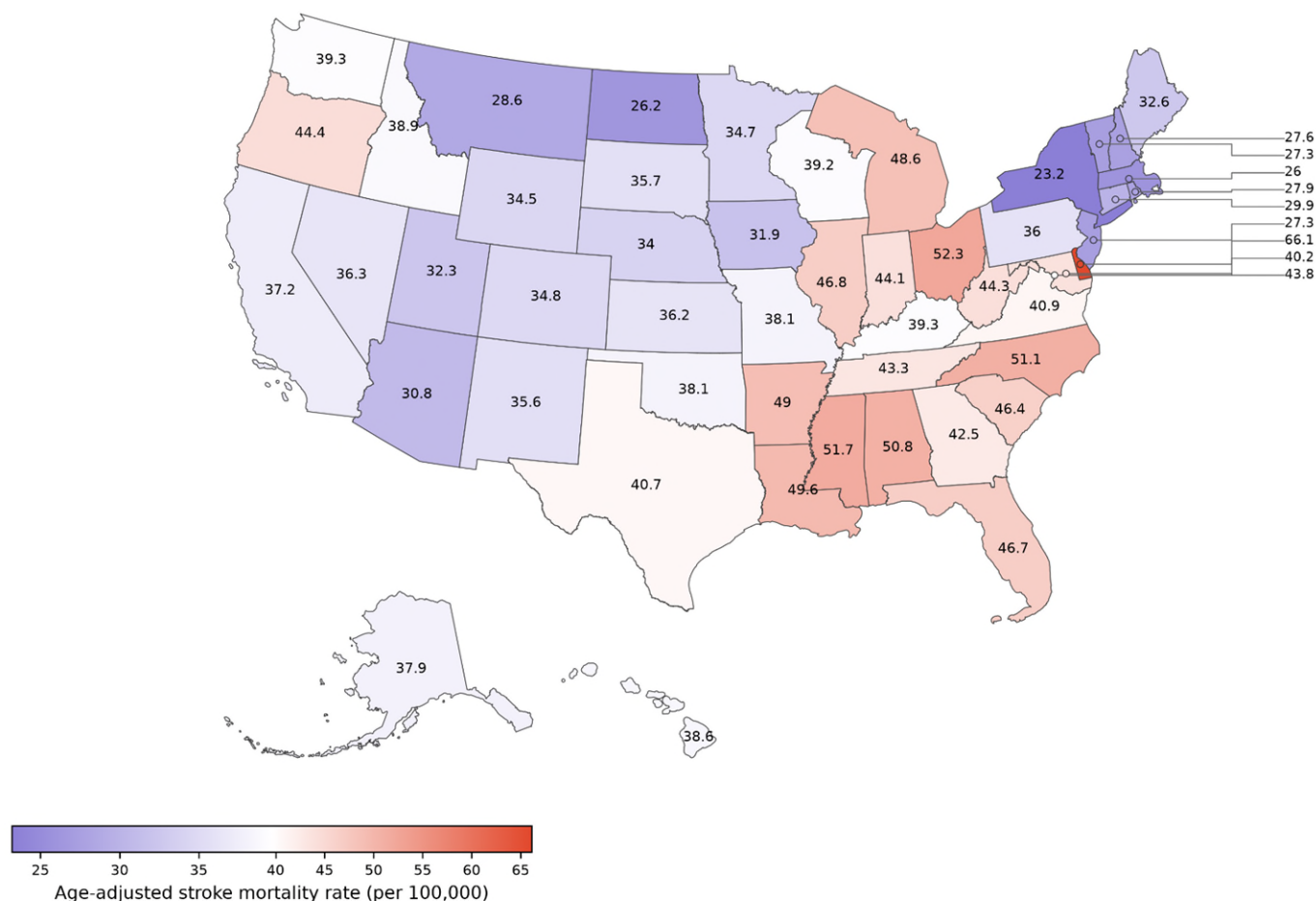
(Source: Centers for Disease Control and Prevention, NCHS)

Rank	Cause of Death	Total Deaths	Percent of all Deaths
1	Diseases of heart	695,842	20.46%
2	Malignant neoplasms	623,173	18.32%
3	Accidents	186,231	5.48%
4	Cerebrovascular diseases	171,516	5.04%
5	Chronic lower respiratory diseases	148,556	4.37%



In 2025, Kentucky ranked 21st in the U.S. for age-adjusted stroke mortality at 39.3 per 100,000 (tied with Washington), with 2,240 stroke deaths among 4,588,372 residents. This was well below Delaware (66.1), Ohio (52.3), and Mississippi (51.7), and just under Tennessee (43.3) and Texas (40.7, ranked 19th). Nationally, cerebrovascular disease ranked fourth among causes of death (5.04%), versus fifth in Kentucky (4.29%). Heart disease and cancer dominated both Kentucky (21.23%, 19.75%) and the U.S. (20.46%, 18.32%), with Kentucky's chronic lower respiratory disease (6.63%, third) still outranking stroke, unlike nationally.

Figure 1. Age-Adjusted Stroke Mortality: A U.S. State-Level Overview, 2025



Top Five States: Delaware (66.1, Rank 1), Ohio (52.3, Rank 2), Mississippi (51.7, Rank 3), North Carolina (51.1, Rank 4), Alabama (50.8, Rank 5)

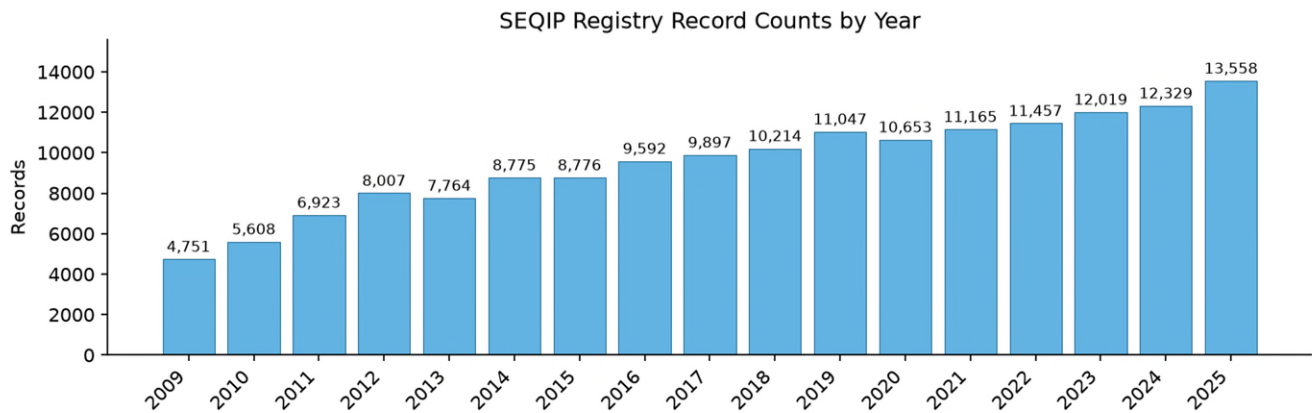
Bottom Five States: New York (23.2, Rank 51), Massachusetts (26.0, Rank 50), North Dakota (26.2, Rank 49), Vermont (27.3, Rank 47), New Jersey (27.3, Rank 47)



2025 Stroke Registry Data

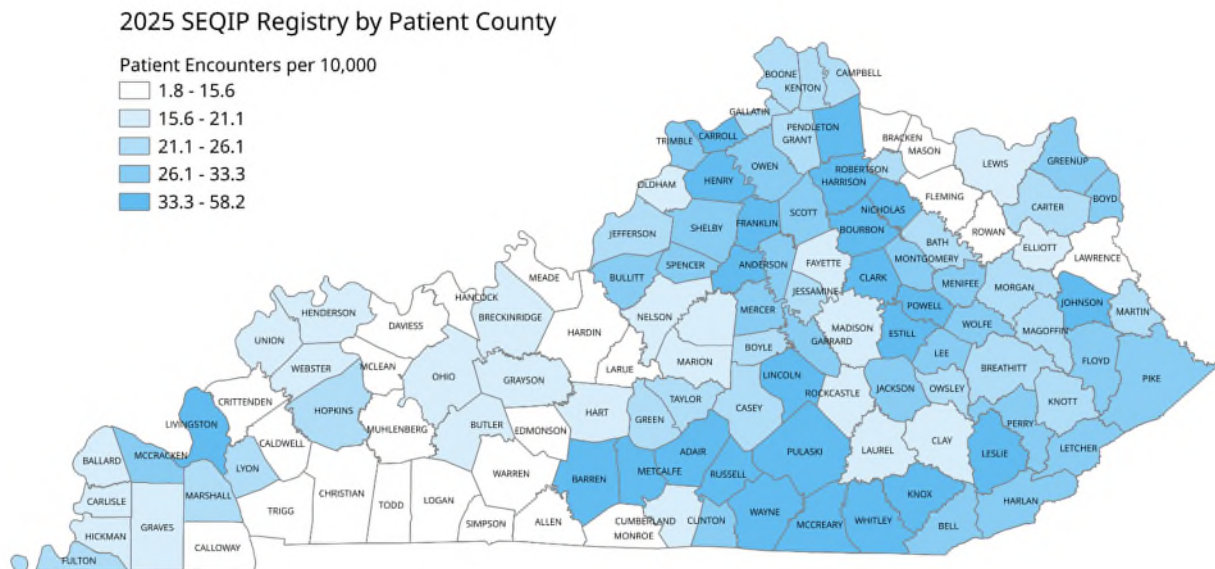
Stroke cases are added to SEQIP registry by individual hospital data abstractors, in real time and after patient discharge. SEQIP collects data on measures related to stroke care that are for the treatment and management of stroke from hospital admission to discharge.

Figure 2. Number of all patient records by year in the 2025 SEQIP stroke registry



Jefferson County recorded the highest raw count by far (2,107, or 26.1 per 10,000), followed by Fayette (642) and Kenton (386), while Todd (2), Hancock (3), and Robertson (5) counties had the fewest. However, raw counts largely reflect population size. When adjusted for population, Bourbon County had the highest rate (58.2 per 10,000), followed by Pulaski (51.4) and Leslie (50.0). The lowest rates were posted by Todd (2.4), Christian (2.0), and Calloway (3.6).

Figure 3. Rate of strokes in 2025 registry, by patient county per capita (Kentucky residents only)



There were 13,558 records in SEQIP registry for 2025 and 31 records were excluded from the below table due to those records being incomplete. The values in the table represent counts and the percentages in the parentheses show the relative proportion for that value within each age group. Four groups of adult ages were created to highlight data trends across the lifespan; the 'Overall' column is on the right.

Table 4. 2025 SEQIP stroke registry patient demographic information and summary

	18 to 45 years (N=949)	46 to 65 years (N=4,461)	66 to 85 years (N=6,755)	86+ years (N=1,362)	Overall (N=13,527)
Sex					
Female	477 (50.3%)	1,975 (44.3%)	3,594 (53.2%)	925 (67.9%)	6,971 (51.5%)
Male	472 (49.7%)	2,486 (55.7%)	3,161 (46.8%)	437 (32.1%)	6,556 (48.5%)
Race					
White	755 (79.6%)	3,751 (84.1%)	6,119 (90.6%)	1,272 (93.4%)	11,897 (88.0%)
Black	136 (14.3%)	519 (11.6%)	485 (7.2%)	64 (4.7%)	1,204 (8.9%)
Unable to determine	46 (4.8%)	150 (3.4%)	111 (1.6%)	14 (1.0%)	321 (2.4%)
Asian/American Indian/Native Hawaiian	12 (1.3%)	41 (0.9%)	40 (0.6%)	12 (0.9%)	105 (0.8%)
Stroke Type					
Ischemic Stroke	539 (56.8%)	3,235 (72.5%)	4,958 (73.4%)	1,070 (78.6%)	9,802 (72.5%)
Hemorrhagic	219 (23.1%)	580 (13.0%)	841 (12.5%)	112 (8.2%)	1,752 (13.0%)
Transient Ischemic Attack (< 24 hours)	101 (10.6%)	448 (10.0%)	730 (10.8%)	156 (11.5%)	1,435 (10.6%)
Unable to determine	90 (9.5%)	192 (4.3%)	215 (3.2%)	24 (1.8%)	521 (3.9%)
Elective Carotid Intervention only	0 (0.0%)	4 (0.1%)	7 (0.1%)	0 (0.0%)	11 (0.1%)
Length of Stay (days)					
Mean (SD)	5 (8.2)	5.1 (8.5)	4.9 (7.4)	4.6 (4.4)	5 (7.6)
Median [Min, Max]	2.2 [0, 93.4]	2.7 [0, 230.2]	3 [0, 251.1]	3.6 [0, 46.4]	3 [0, 251.1]



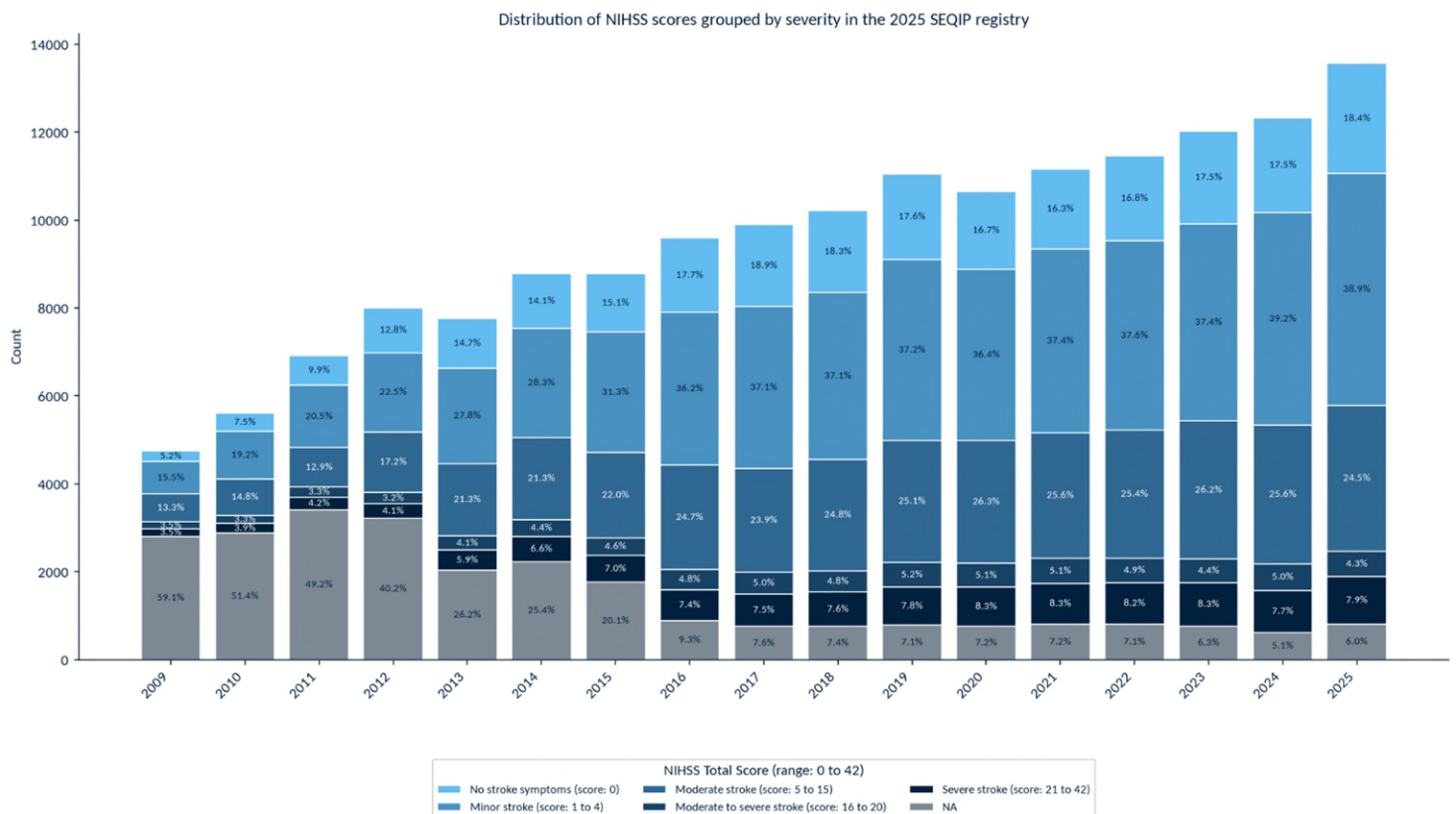
Patients between 18 and 45 years old had a notably higher rate of hemorrhagic stroke compared to older groups, at 23.1% versus just 8.2% among patients aged 86 and older. This youngest group also had a greater share of Black patients, at 14.3%, compared to only 4.7% in the oldest age category. As age increased, ischemic stroke became increasingly dominant, rising steadily from 56.8% of cases in the youngest group to 78.6% among those 86 and older. The older age groups were also more likely to be White, climbing from 79.6% to 93.4%.

Sex distribution was roughly the same among younger patients before shifting to a male majority during midlife (55.7% in the 46 to 65 age group). In the oldest group, sex distribution swung back toward a strong female majority of 67.9%. Length of hospital stay also declined modestly with age, from a mean of 5.0 days among the youngest patients down to 4.6 days among the oldest.

National Institute of Health Stroke Scale (NIHSS) Score

Among cases with documented NIHSS severity, minor stroke (score 1–4) has consistently been the most common category throughout the registry's history, rising steadily from 15.5% of cases in 2009 to 38.9% in 2025.

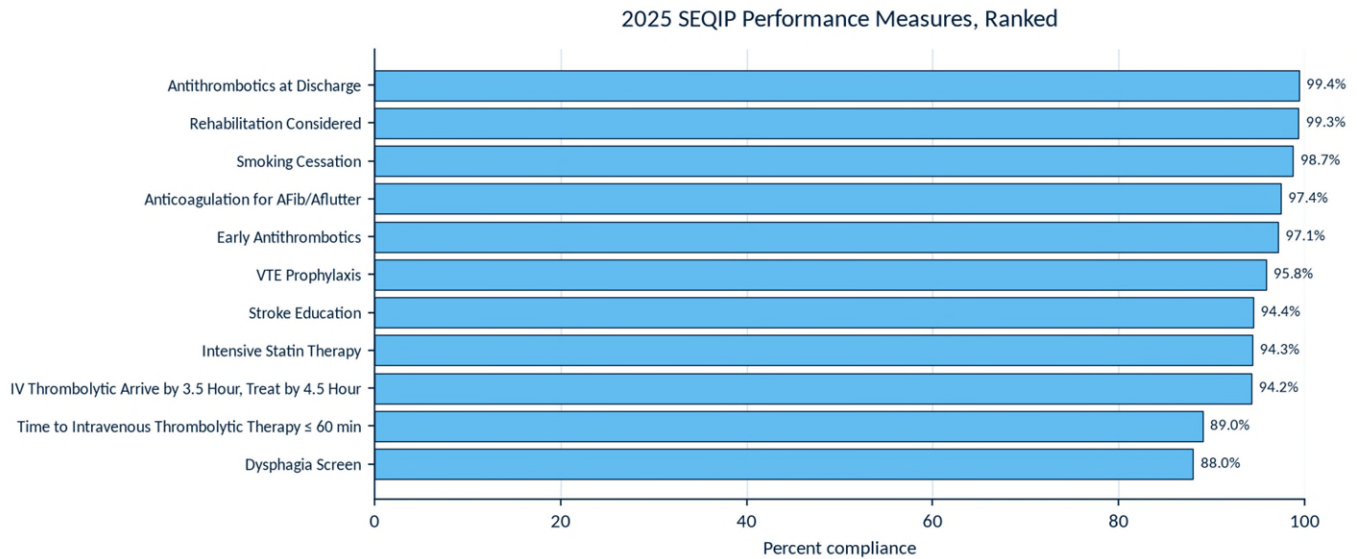
Figure 4. Distribution of NIHSS scores grouped by severity in the 2025 SEQIP registry



AHA/ASA Stroke Performance Measures

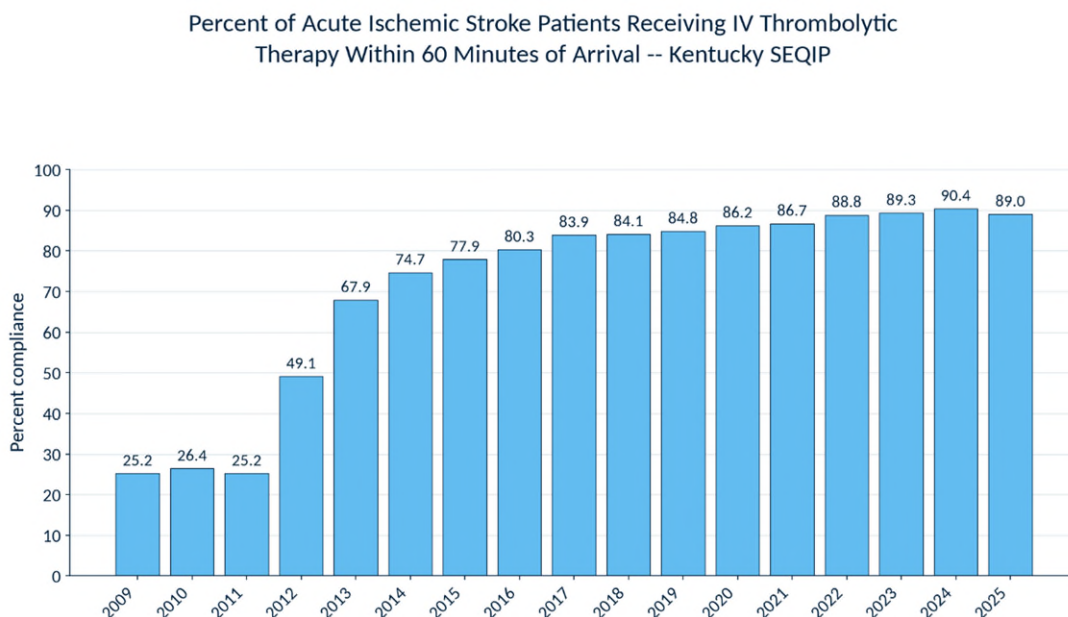
In 2025, SEQIP performance measures were generally strong, with most rates above 94%. Antithrombotics at Discharge (99.4%) and Rehabilitation Considered (99.3%) led, while Dysphagia Screen (88.0%) and Time to IV Thrombolytic Therapy $\leq$ 60 min (89.0%) trailed.

Figure 5. Kentucky SEQIP 2025 GWTG-Stroke Performance Measures



From 2009 to 2025, Kentucky SEQIP hospitals showed strong gains in door-to-needle times for IV thrombolytics. The 60-minute benchmark rose from 25.2% to 89.0% (peaking at 90.4% in 2024).

Figure 6. Percent receiving intravenous thrombolytic therapy within 60 minutes from arrival



Appendix A: Participating SEQIP Hospitals

BAPTIST HEALTH LaGRANGE	Mercy Health Marcum and Wallace Hospital
Baptist Health Corbin	Middlesboro ARH Hospital
Baptist Health Hardin	Morgan County ARH Hospital
Baptist Health Lexington	Norton Audubon Hospital
Baptist Health Louisville	Norton Brownsboro Hospital
Baptist Health Madisonville (REGIONAL MEDICAL CENTER)	Norton Hospital
Baptist Health Paducah	Norton Women's and Children's Hospital
Barbourville ARH Hospital	Ohio County Hospital
Bowling Green-Warren County Community Hospital dba The Medical Center at Albany (FKA Clinton County Hospital, Inc.)	Owensboro Health
CHI Saint Joseph East	Paintsville ARH Hospital
CHI St. Joseph Healthcare - Kentucky	Pikeville Medical Center
Carroll County Memorial Hospital	Russell County Hospital
Centerpoint - Georgetown	St. Elizabeth Edgewood
Centerpoint Health – Paris	St. Elizabeth Florence
Centerpoint Health – Winchester	St. Elizabeth Ft. Thomas
Centerpoint Health- Versailles	Sts. Mary and Elizabeth Hospital
Deaconess Henderson Hospital	Summers County ARH Hospital
Deaconess Union County	T.J. Samson Community Hospital
Ephraim McDowell Fort Logan Hospital	TJ Health Columbia (FKA Westlake Regional Hospital)
Ephraim McDowell James B. Haggin Memorial Hospital	The Med Center at Russellville
Ephraim McDowell Regional Medical Center	The Medical Center at Bowling Green - Kentucky
Frankfort Regional Medical Center	The Medical Center at Caverna
Greenview Regional Hospital (TriStar)	The Medical Center at Franklin



Harlan ARH Hospital	The Medical Center at Scottsville
Harrison Memorial Hospital	Tug Valley ARH Regional Medical Center
Hazard ARH Regional Medical Center	UK HealthCare
Highlands Regional Medical Center	University of Louisville Hospital
King's Daughters Medical Center	UofL Health - Jewish Hospital
Lake Cumberland Regional Hospital	UofL Health - Shelbyville
Mary Breckinridge ARH Hospital	UofL Health South Hospital
McDowell ARH Hospital	Whitesburg ARH Hospital
Mercy Health Lourdes Hospital	

