Ischemic Stroke Snapshots in New York State: 2010 Versus 2014

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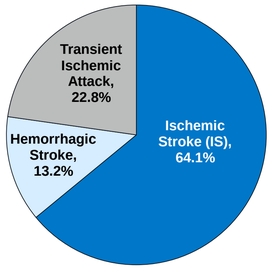
Introduction

The burden of stroke in New York State (NYS) is significant.

Stroke was the 4th leading cause of death in NYS in 2014.[1]

	Top 10 Causes of Death in 2014	Deaths (N)
1	Diseases of the Heart	42,425
2	Malignant Neoplasms	34,794
3	CLRD	6,696
4	Cerebrovascular Disease	6,036
5	Accidents	5,571
6	Pneumonia	4,421
7	Diabetes Mellitus	3,998
8	Alzheimer's Disease	2,578
9	Septicemia	2,509
10	Nephritis, Neph Syndrome et al	2,148
	Total Deaths	**147,488**

Stroke and transient ischemic attacks accounted for over 41,000 hospital discharges in 2014.



Ischemic Stroke Hospital Discharge Rates in New York State

2010			2014		
Population	Ischemic Stroke (N) (NY Residents Only)	Rate (per 10,000)	Population	Ischemic Stroke (N) (NY Residents Only)	Rate (per 10,000)
19,378,102	23,792	12.3	19,746,227	26,015	13.2

Study Goal

To compare patient demographics (gender, age group, race/ethnicity), ischemic stroke (IS) hospital discharge rates, and treatment for IS in NYS for calendar years 2010 and 2014.

Data Sources and Methodology

Data Source

The Statewide Planning and Research Cooperative System (SPARCS), an all-payer database with patient level data on demographics, diagnoses, treatments, services, and charges for every acute care hospital discharge in NYS.[2]

Years of Analysis

January 01, 2010 through December 31, 2010

January 01, 2014 through December 31, 2014

Methodology

The SPARCS administrative data was used to identify all discharges associated with acute ischemic stroke (IS) using ICD-9 Codes (433.x1, 434.x1, 436, 437.x1) as well as the demographics for patients with a diagnosis of IS.

The primary treatment for acute IS is thrombolysis with recombinant tissue plasminogen activator (tPA) which was identified using procedure code 99.10. Endovascular treatments such as mechanical thrombectomy were approved by the FDA in 2004 to open vessels and may be used to treat more severe acute IS. These treatments were identified using procedure code 39.7x.

Two-proportion z-tests were used to determine if there was a significant difference ($p < 0.05$) in the percentage of IS cases in each demographic variable category and in the percentage of patients receiving each type of treatment in 2010 versus 2014.

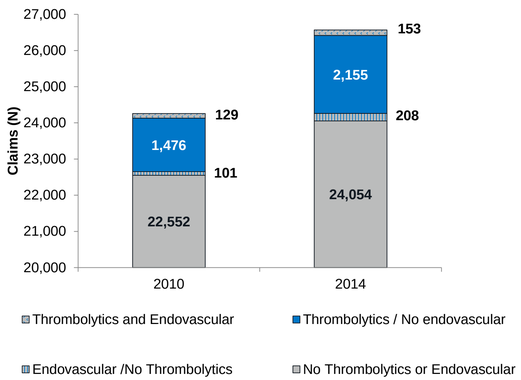
Results

Ischemic Stroke Demographics in New York State

	2010		2014		
	Claims (N)	Claims (%)	Claims (N)	Claims (%)	
All Acute Ischemic Strokes with Occlusion	**24,258**	**100.00**	**26,570**	**100.00**	
ICD-9 Description (ICD-9 Code)					
Occlusion and Stenosis of Basilar Artery (433.01)	114	0.47	142	0.53	
Occlusion and Stenosis of Carotid Artery (433.11)	1,271	5.24	1,497	5.63	
Occlusion and Stenosis of Vertebral Artery (433.21)	147	0.61	198	0.75	
Occlusion and Stenosis of Multiple and Bilateral Artery (433.31)	124	0.51	111	0.42	
Occlusion and Stenosis of Other Specified Precerebral Artery (433.81)	61	0.25	59	0.22	
Occlusion and Stenosis of Unspecified Precerebral Artery (433.91)	7	0.03	6	0.02	
Thrombosis of Cerebral Arteries (434.01)	541	2.23	628	2.36	
Cerebral Embolism (434.11)	3,844	15.85	4,564	17.18	**
Cerebral Artery Occlusion, Unspecified (434.91)	18,061	74.45	19,302	72.65	**
Acute but Ill-Defined Cerebrovascular Disease (436)	88	0.36	63	0.24	*
Crude Mortality Rate					
Claims With an Outcome of Death or Hospice	2,139	8.8%	2,292	8.6%	
Gender					
Female	12,886	53.12	13,552	51.00	**
Male	11,371	46.88	13,017	48.99	**
Race/Ethnicity					
Hispanic	2,097	8.64	2,300	8.66	
Non-Hispanic White	14,993	61.81	15,512	58.38	**
Non-Hispanic Black	4,756	19.61	5,265	19.82	
Non-Hispanic Other or Unknown	2,329	9.60	3,493	13.15	**
Unknown	83	0.34	0	0.00	**
Age Group					
0 to 49 years old	1,954	8.06	2,017	7.59	
50 to 69 years old	7,955	32.79	9,369	35.26	**
70 and older	14,349	59.15	15,184	57.15	**
Treated at New York State Stroke Designated Center					
Stroke Designated Center (SDC)	19,812	81.67	24,623	92.67	**
Not Stroke Designated	4,446	18.33	1,947	7.33	**

* Statistically significant ($p<0.01$); ****** Statistically significant ($p < 0.001$)

Treatment for Ischemic Stroke in New York State



	2010	2014	
Any Thrombolytics (tPA)			
SDC	7.2%	9.2%	**
Not SDC	4.1%	2.4%	**
Any Endovascular			
SDC	0.8%	1.5%	**
Not SDC	1.6%	0.1%	**
No Treatment			
SDC	92.5%	90.0%	**
Not SDC	94.8%	97.5%	**

Treatment for Ischemic Stroke, NYS (Not mutually exclusive)	2010		2014		
	Claims (N)	Claims (%)	Claims (N)	Claims (%)	
Any Thrombolytics (tPA)	1,605	6.6	2,308	8.7	**
Any Endovascular	230	0.9	361	1.4	**

Discussion and Conclusions

Discussion: Demographics

- There was an increase in IS cases from 24,258 to 26,570 between 2010 and 2014.
- The demographic distributions showed small, but statistically significant, differences between 2010 and 2014.
- Those individuals who experienced IS with occlusion tended to be female, non-Hispanic White, and 50 years of age or older.
- The crude mortality rate dropped from 8.8% in 2010 to 8.6% in 2014. This was not a statistically significant difference.

Discussion: Treatment

- The percentage of IS cases treated at NYS SDCs increased from 82% in 2010 to 93% in 2014 ($p<0.001$).
- tPA treatments increased from 7.2% to 9.2% ($p<0.001$) at SDCs and decreased from 4.2% to 2.4% at non-SDCs ($p< 0.001$).
- Statewide, tPA administration increased from 6.6% to 8.7% ($p < 0.001$) and the use of endovascular treatments increased from 0.9% to 1.4% ($p < 0.001$) between 2010 and 2014.

Key Findings

- Overall, the use of tPA and/or endovascular treatments for patients diagnosed with IS increased between 2010 and 2014 in New York State, but the use of these treatments is still limited.
- Increases in treatment were primarily for patients admitted to NYS SDCs and this may be partially attributable to quality improvement initiatives at the SDCs around tPA administration.

Future Work

- Additional research is needed to compare the outcomes for those patients treated with tPA, endovascular treatment, both tPA and endovascular treatment, and those patients who receive no treatment for IS with occlusion.
- Additional research is also needed to identify treatment barriers and to develop a change package to encourage QI initiatives to increase the use of tPA and endovascular therapy to treat IS.

Acknowledgements & Author Affiliations

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References

1. NYSDOH. Vital Statistics of New York State 2014. Downloaded from: http://www.health.ny.gov/statistics/vital_statistics/2014/
2. NYSDOH. Statewide Planning and Research Cooperative System (SPARCS) Data Set. http://www.health.ny.gov/statistics/sparcs/