



Massachusetts Data Brief

Overview

Primary Stroke Service (PSS) designation in Massachusetts indicates health care facility readiness to evaluate and treat acute stroke patients 24 hours a day. Massachusetts PSS facilities [submit data](#) to the Bureau of Health Care Safety and Quality (BHCSQ) as part of licensing. After clinical evaluation, eligible patients with acute ischemic strokes can be treated with alteplase, a drug that dissolves stroke causing clots, improving patient recovery and outcome.¹ Evaluation for treatment involves ruling out medical contraindications and evaluation by computerized tomography (CT). Current recommendations encourage prompt evaluation and treatment of eligible patients, specifically facilities should perform a CT scan and administer alteplase treatment within 60 minutes of facility arrival.² Research shows an expanded window of 4.5 hours from patient last known well to treatment is effective.³

Findings

Table 1. Massachusetts PSS Facility Reported Stroke Characteristics, 2018 (N=15,390)

Stroke Type	Count	Percent
Ischemic	10,436	67.8
Transient Ischemic	2,585	16.8
Subarachnoid	598	3.9
Hemorrhagic	1,730	11.2
Not otherwise specified	41	0.27
Race		
White	12,729	82.7
Black and Afr American	1,219	7.9
Asian	462	3.0
Am. Indian/Alaska Native	28	0.2
Hawaiian/ Pacific Islander	9	0.1
Multi and other	15	0.1
Undetermined	928	6.0
Hispanic Ethnicity	780	5.1
Gender		
Female	7,880	51.2

- In 2018, 68 Massachusetts PSS facilities reported 15,390 strokes*, including 10,436 ischemic strokes (67.8%). If ischemic strokes are identified quickly, they can be treated with alteplase.
- Among stroke patients, the median age was 74 years and the mean age was 72.
- NIHSS measures the severity of a stroke on a scale of 0 to 42, with a lower score representing a lower severity stroke. In 2018, the MA median score among reported patients was 3.
- 7,880 (51%) of all reported strokes occurred in women.
- 928 patients (6.0%) had no race data submitted, which may result in undercounting of some groups.
- 780 (5.1%) strokes were reported in patients of Hispanic ethnicity.
- The median time from arrival at the facility to CT scan was 24 minutes among ischemic stroke patients.
- Among ischemic stroke patients treated with alteplase, the median time from last known well to treatment was 135 minutes.

* Does not include patients who had elective carotid procedures, no stroke related diagnosis, or had symptom onset while already admitted to an acute care facility

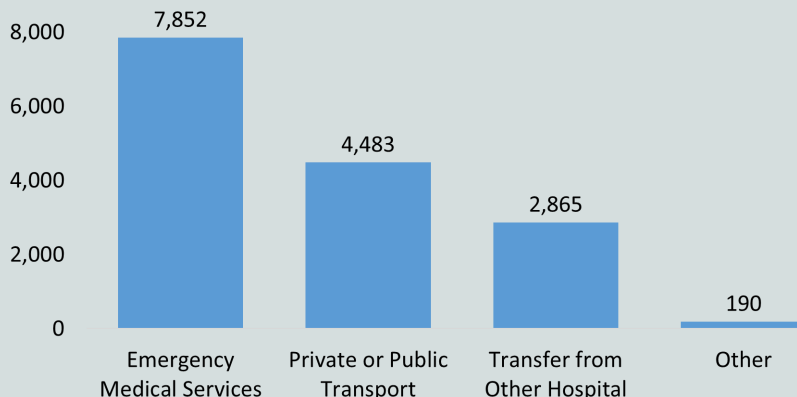
PSS Patient Transportation

Patients arriving by Emergency Medical Services (ambulance) have better outcomes and numerous stroke awareness campaigns advocate calling 911⁴

- For ischemic strokes, the median time from LKW to emergency department arrival was 4.8 hours**
- 4,483 patients (29%) arrive at the emergency department in a private vehicle or on public transportation, which may delay facility arrival

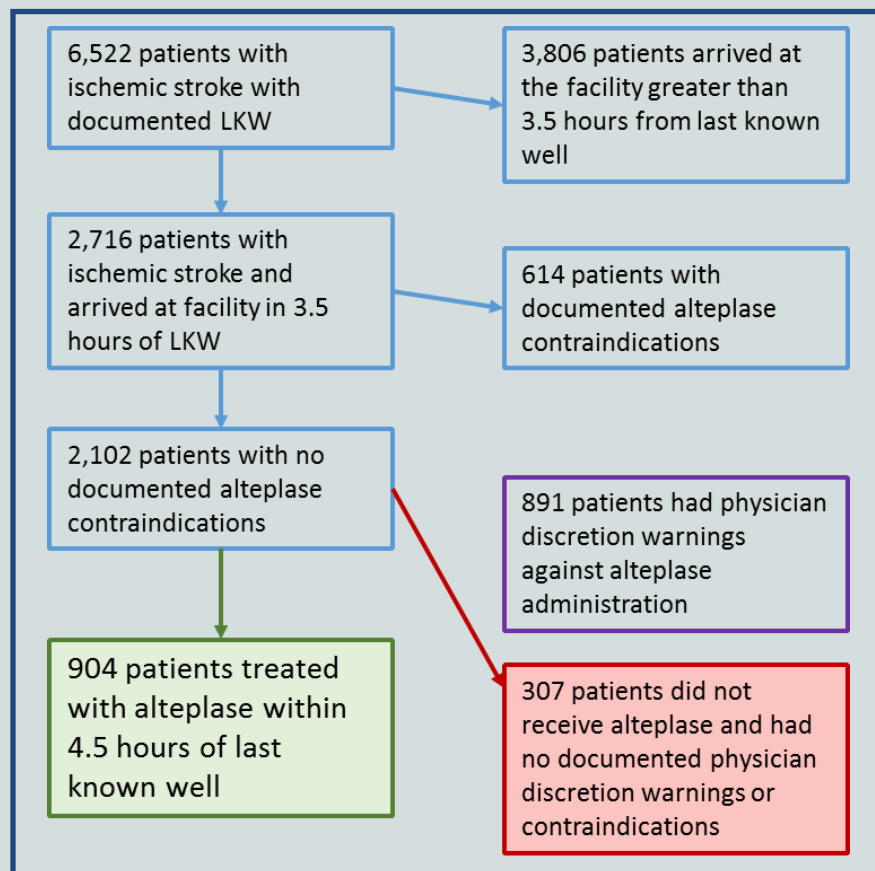
**Does not include patients who left against medical advice or died during stroke admission

Patient Transport to MA PSS Facilities, 2018 (N= 15,390)





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Patients with ischemic stroke and documented last known well time

- 6,522 had time of last known well (LKW) documented, but only 2,716 of these arrived at a PSS facility within 3.5 hours. This arrival window allows enough time for a patient to be evaluated and treated with alteplase, if appropriate.
- 614 patients had contraindications and were not treated, and an additional 891 patients had documented physician discretion warnings.
- 904 (43%) of ischemic stroke patients who arrived in 3.5 hours and had no drug contraindications were treated with alteplase within 4.5 hours
- 307 (14.6%) of these patients were not treated with alteplase and had no documented physician discretion warnings.
- 335 patients arriving within 3.5 hours of LKW did not have a CT performed within 60 minutes of ED arrival.

Top 5 Physician Discretion Warnings

- Rapid improvement
- Severity too mild
- Patient or family refusal
- Facility unable to determine eligibility
- Seizure at onset with postictal residual neurological impairment

Recommendations

Not all patients that could benefit from alteplase are receiving treatment in the expanded 4.5 hour window. Outside of label contraindications, the most common reported reasons for not administering alteplase are the stroke severity is too mild or refusal by the patient or family. Additional education and provider communication with patients and their families could reduce treatment refusal.

29% of reported strokes arrived at the hospital in a private vehicle or on public transportation. Many public awareness campaigns, including FAST⁴ advocate calling 9-1-1. Additional education, at the community and facility level, is needed to encourage EMS use.

Methods: Data were extracted from the MA PSS IQVIA module on August 14, 2019, only completed patients discharged between January 1, 2018 and December 31, 2018 were included. All patients already admitted to an acute care facility or admitted for elective carotid procedures or no stroke diagnosis were excluded. Patient evaluation and treatment for alteplase treatment was limited to completed patients records diagnosed with ischemic stroke with a documented last known well date and time. Acute length of stay calculation excludes patient who left against medical advice, died, or were transferred to another acute care facility.

Citations

1. Wardlaw JM, et al. Recombinant tissue plasminogen activator for acute ischemic stroke. *Lancet*. 2012;370(9834):2364-2372.
2. American Heart Association/American Stroke Association. AHA/ASA Ischemic Stroke Performance Measures. Retrieved from http://my.americanheart.org/idc/groups/ahamh-public/@wcm/@sop/@spub/documents/downloadable/ucm_451933.pdf (2019, Oct 11).
3. Hacke, W., Kaste, M., et al. (2008). Thrombolysis with Alteplase 3 to 4.5 Hours after Acute Ischemic Stroke. *The New England Journal of Medicine*, 359, 1317-1329.
4. United Kingdom Department of Health (2009, Feb 9). Stroke: Act F.A.S.T. Awareness Campaign. Retrieved from the United Kingdom National Archives (2019, Oct 2).