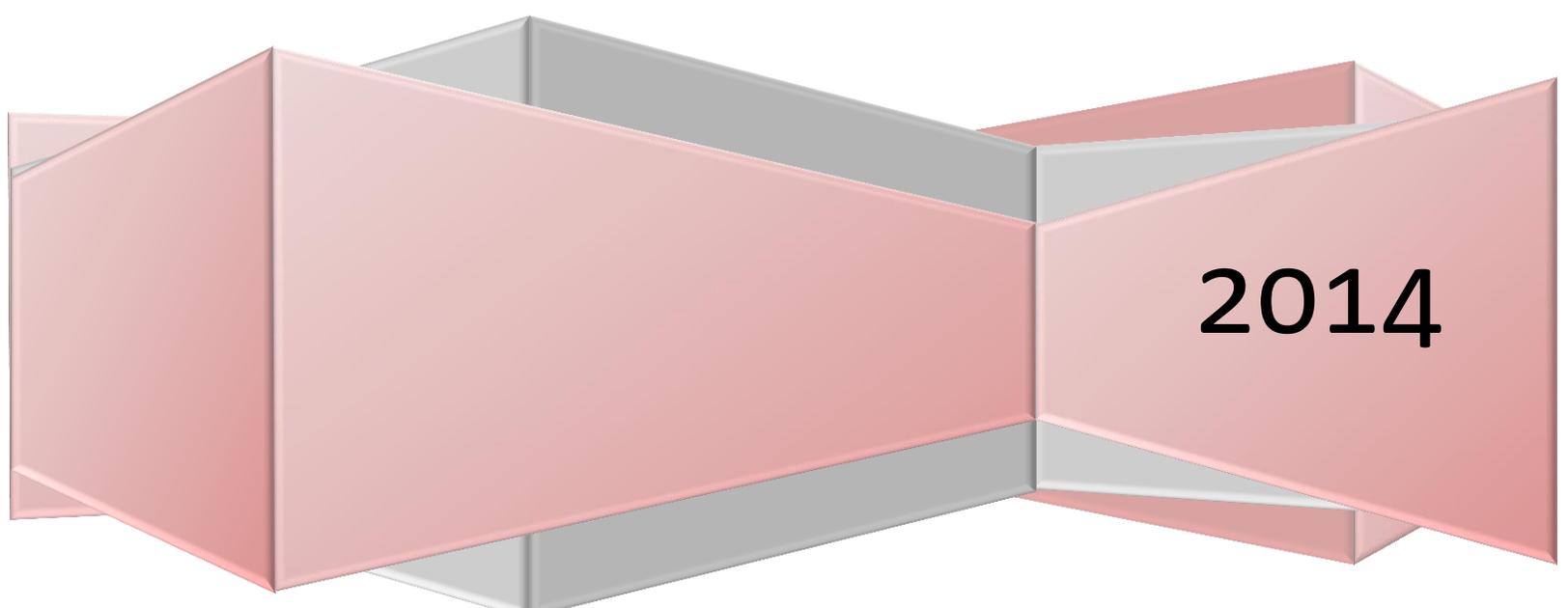


**Texas Council on Cardiovascular Disease and Stroke & Texas
Department of State Health Services**

Heart Attack and Stroke Data Collection Initiative – Rider 97

**Regional Advisory Council Heart Attack and
Stroke Data Report**



2014

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Katherine Wiechnicki, RN, MPH
Manager, Chronic Disease Branch
Health Promotion and Chronic Disease Prevention Section
Texas Department of State Health Services

Karla Granado, MPH
Program Specialist
Texas Heart Disease and Stroke Program
Health Promotion and Chronic Disease Prevention Section
Texas Department of State Health Services

Nimisha Bhakta, MPH
Manager, Office of Surveillance, Evaluation and Research
Health Promotion and Chronic Disease Prevention Section
Texas Department of State Health Services

Thomas Stephan, MFA
Manager, Information Services
Health Promotion and Chronic Disease Prevention Section
Texas Department of State Health Services

Patty Moore, PhD
Section Director
Health Promotion and Chronic Disease Prevention Section
Texas Department of State Health Services

Roberto L. Rodriguez, MD, MPH
Medical Officer
Health Promotion and Chronic Disease Prevention Section
Texas Department of State Health Services

Introduction

Heart disease and stroke are the number one and number four leading causes of death in Texas, respectively ¹. In order to advance reduction in death and disability, it is important to analyze the current state of systems of care for both conditions by collecting and analyzing data. The project data collection efforts focus on pre-hospital and hospital stroke and heart attack data elements, with a particular focus on ST-segment elevation myocardial infarction (STEMI). The 22 Regional Advisory Councils (RACs) were surveyed and asked to report stroke and STEMI data elements for their Trauma Service Area (TSA). The objective of the data collection survey was to gain an understanding of the prevalence of STEMI and stroke in Texas, evaluate pre-hospital components of the systems of care, and treatment of stroke patients. Survey findings will be used to assess policies and practices regarding delivery of stroke and STEMI care across the state and identify areas of opportunity for quality improvement.

Methodology

With guidance from the Texas Council on Cardiovascular Disease and Stroke, Governor's EMS and Trauma Advisory Council (GETAC), and the DSHS Office of Surveillance, Evaluation and Research (OSER), the Texas Heart Disease and Stroke Program developed an online survey using Survey Monkey (<https://www.surveymonkey.com>) to gather pre-hospital and hospital stroke and STEMI regional data. Prior to dissemination of the survey, DSHS held a conference call with the RACs on May 30, 2014 to discuss the purpose and contents. The survey was pilot-tested with two RACs before the survey link was emailed on June 2, 2014 to all the participants. A Frequently Asked Questions (FAQ) document was attached to assist RACs in completing the survey.

The survey was open from June 2 to September 1, 2014. There were a total of 23 questions in the survey, consisting of the following elements: RAC leadership and contact information, pre-hospital stroke and STEMI data, and stroke treatment and admissions for DSHS stroke-designated and non-designated hospitals.

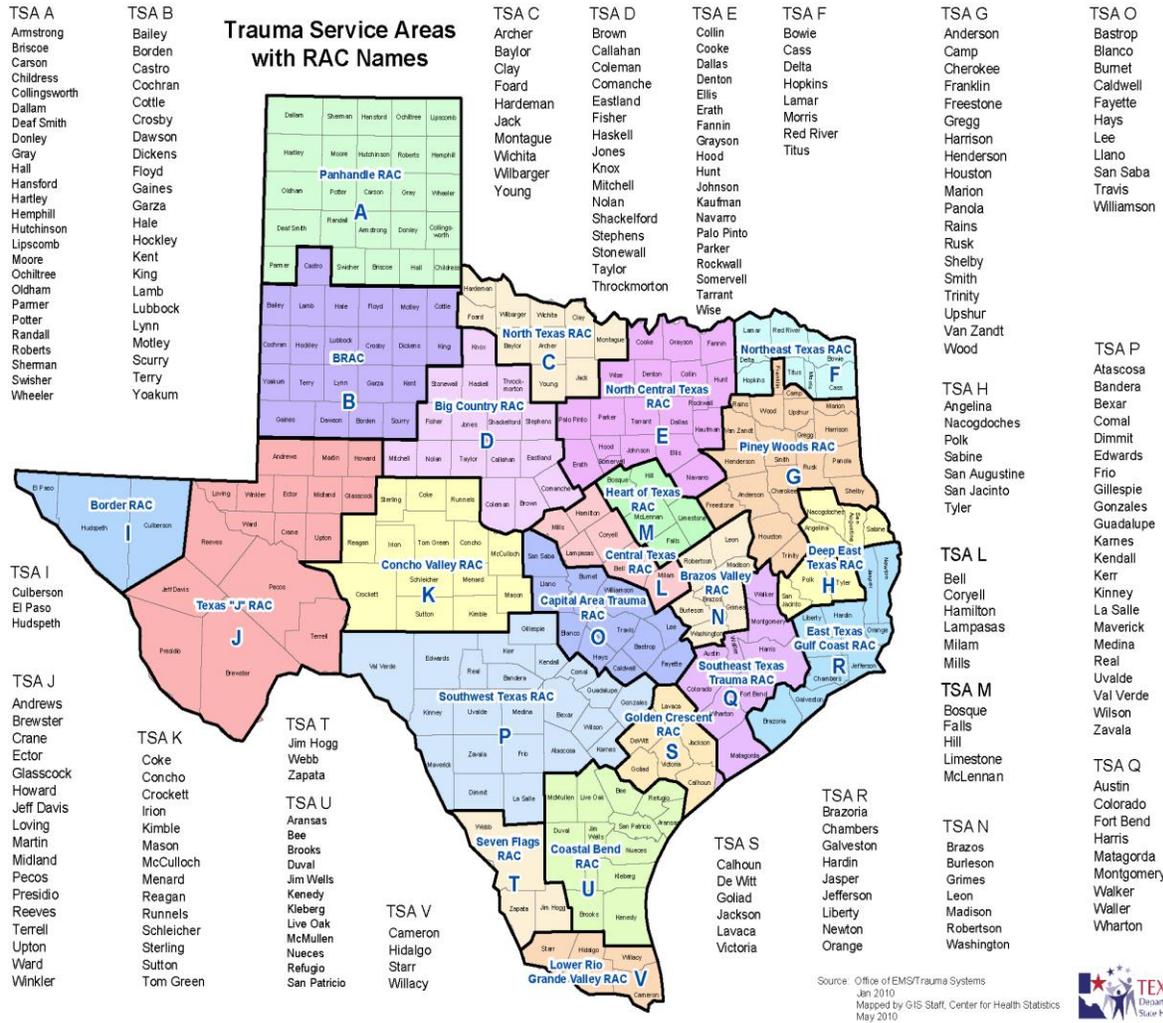
Data Analysis

The participation rate from RACs was 100 percent however some data points were missing. OSER cleaned the data to remove duplicate entries and followed up with RACs to clarify some unusual data points reported. All data analysis was done using Microsoft Excel 2010. We analyzed the survey response and described in the results section.

Results

Figure 1 below shows the geographic coverage of the 22 RACs in Texas, all of which were represented in the survey.

Figure 1. Map of trauma service areas with RAC names, October 2006

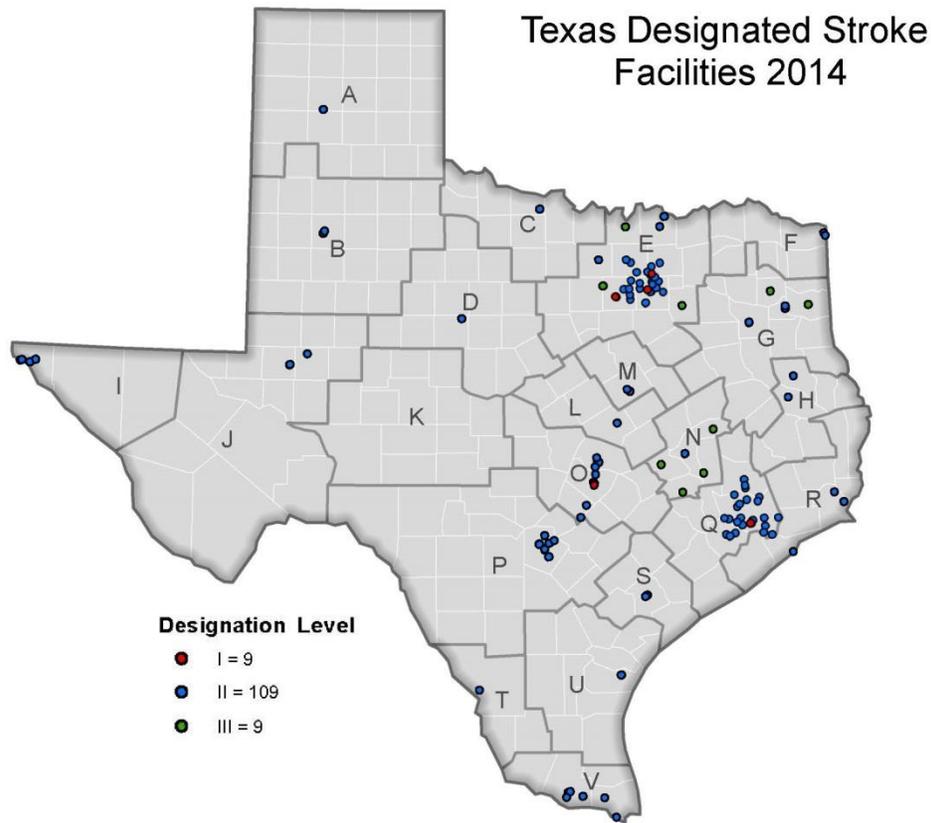


Introduction to Stroke System of Care

Heart attack and stroke systems of care encompass disease prevention, acute care, chronic care, and rehabilitation. For heart attack and stroke, high quality care, which includes rapid diagnosis and treatment, can mean the difference between a positive and detrimental outcome.

The DSHS Office of EMS/Trauma Systems Group designates stroke facilities in the state of Texas. There are three levels of stroke designation: Comprehensive Level I, Primary Level II, and Support III. Each level has their own set of requirements; however, all require hospital participation in RAC activities. The map below displays the geographic location of designated stroke facilities as of April 2014.

Figure 2. Map of Texas Designated Stroke Facilities, April 2014



Source: Office of EMS/Trauma Systems Coordination
 Map Source: Center for Health Statistics, GIS
 April 2014

Table 1 below includes the total number of DSHS designated stroke facilities and the level of designation for each TSA as of September 2014.

Table 1. Number of DSHS designated stroke facilities by designation level and RAC, September 2014.

TSA	Total Number of DSHS Stroke Designated Facilities	Number of Stroke Facilities		
		Comprehensive Level I	Primary Level II	Support Level III
A	1		1	
B	2		2	
C	1		1	
D	1		1	
E	37	3	31	3
F	2		2	
G	6		4	2
H	2		2	
I	6		6	
J	3		3	
K	0			

L	1		1	
M	2		2	
N	5		1	4
O	10	3	7	
P	9		9	
Q	29	5	24	
R	3		3	
S	2		2	
T	1		1	
U	1		1	
V	7		7	
Total	131	11	111	9

- There are only three TSAs or RACs with Comprehensive Level I facilities (E, O, and Q).
- There are 15 RACs with five or less designated facilities and one of these does not have any DSHS designated facilities.

Acute suspected stroke runs

RACs were asked to report the number of acute suspected stroke emergency medical services (EMS) runs. The definition for an acute suspected stroke run included documentation that the EMS unit was dispatched for a patient 18 years or older with the caller reporting the presence of signs and symptoms of a stroke.

Signs and symptoms included:

- ❖ Sudden numbness or weakness of face, arm or leg especially on one side of the body.
- ❖ Sudden confusion, trouble speaking or understanding.
- ❖ Sudden trouble seeing in one or both eyes.
- ❖ Sudden trouble walking, dizziness, loss of balance or coordination.
- ❖ Sudden severe headache with no known cause.



Figure 3 displays total number of stroke EMS runs reported by RACs from January to June 2014. **Figure 4** displays total number of stroke EMS runs per 10,000 Individuals for the same time period. Each RAC was placed into a category based on the number of stroke runs reported, with darker shading representing a higher number of reported runs per 10,000 individuals. Several RACs identified EMS participation or RAC capacity to report and collect this data as a barrier. As a result, the documented data may be incomplete.

Figure 3. Total Number of Stroke EMS Runs, by RAC, Jan-June 2014

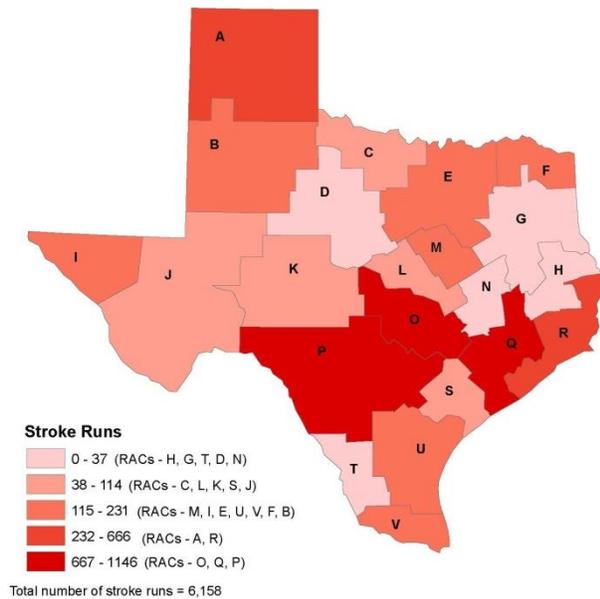
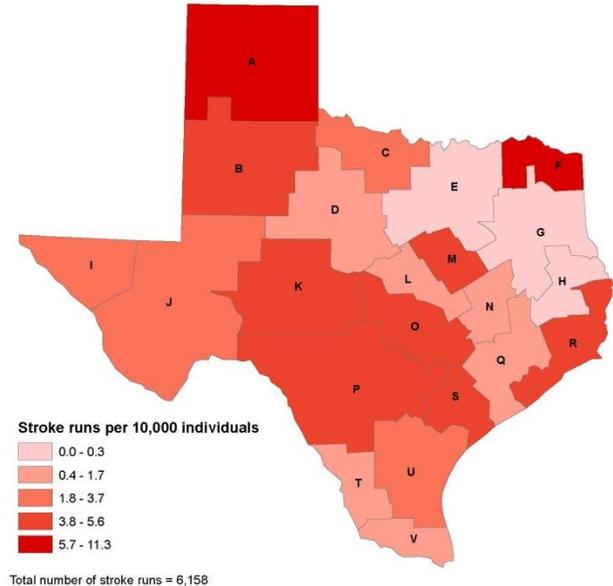


Figure 4. Stroke Runs per 10,000 Individuals, by RAC, Jan-June 2014

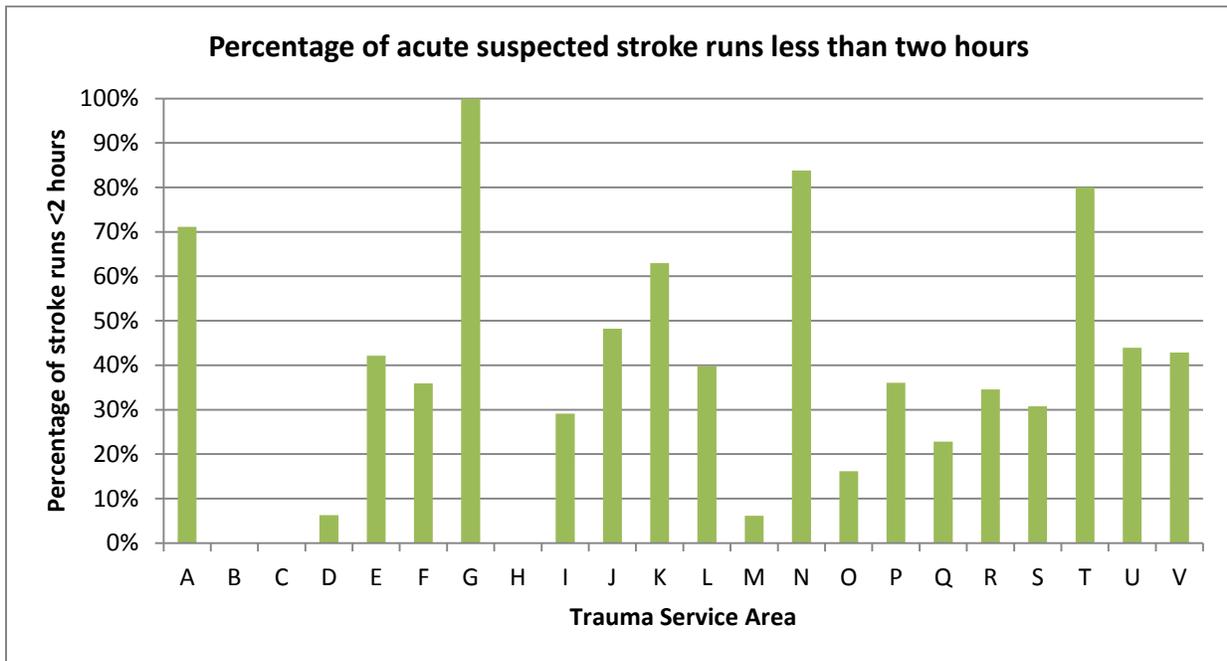


- The total number of acute suspected stroke runs reported from January to June 2014 was 6,158.
- The total number of runs reported ranged from 3 to 1,146 with the average being 279.
- There were five RACs (A, O, P, Q, R) that reported more than 231 suspected EMS stroke runs each (see **Figure 3**).
- Some of the RACs had missing or incomplete data, so **Figure 4** may show lower number of runs per 10,000 people.
- All but one RAC reported this data element.

Stroke transport

The survey asked RACs to report how many of acute suspected stroke runs resulted in the patient arriving at the hospital in less than two hours.

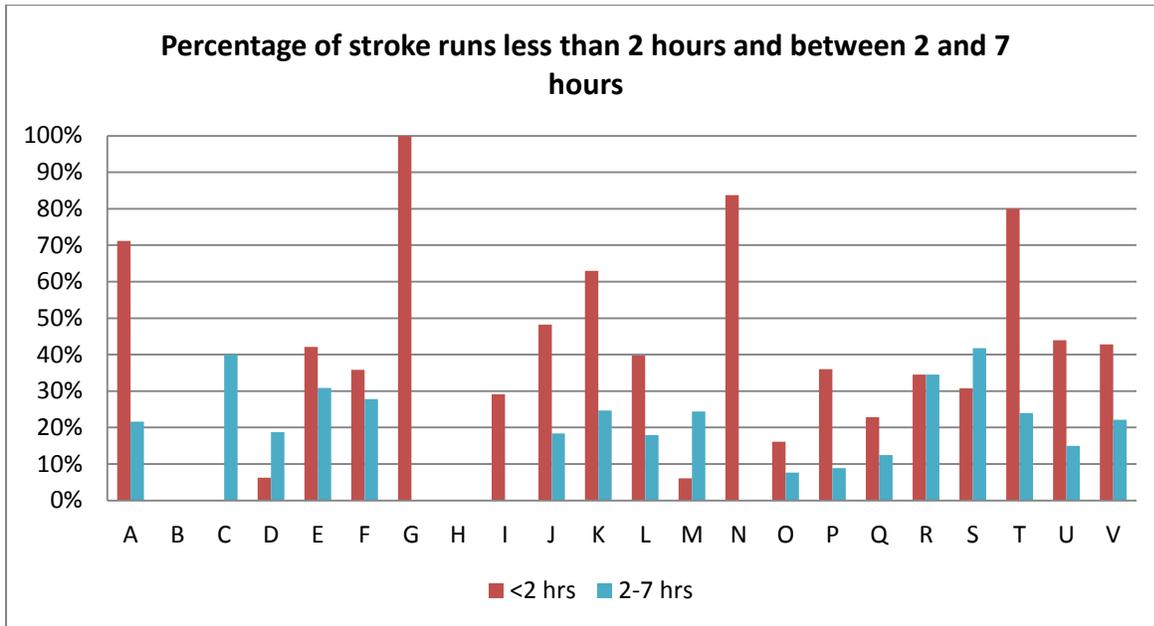
Figure 5. Percentage of acute suspected stroke runs less than two hours



- Among the 19 RACs who reported complete data, 34% of all acute suspected stroke runs reported were less than two hours.
- Three RACs did not report any data, of which one stated this data was not collected through their EMS reporting software. One RAC (H) was not able to report total number of acute suspected stroke runs.
- 14 RACs reported 50% or less of their stroke runs were less than two hours.
- Two RACs reported 51-75% of their stroke runs were less than two hours.
- Three RACs reported 76-100% of their stroke runs were less than two hours, of which one RAC reported 100%.

Figure 6 below illustrates the total number of suspected stroke runs where the patient arrived at the hospital in less than two hours and between two and seven hours from last known well for each RAC. Several RACs who reported none to limited data stated their EMS reporting system did not collect data on stroke runs for the specified time frame.

Figure 6. Percentage of stroke runs less than two hours and between two and seven hours

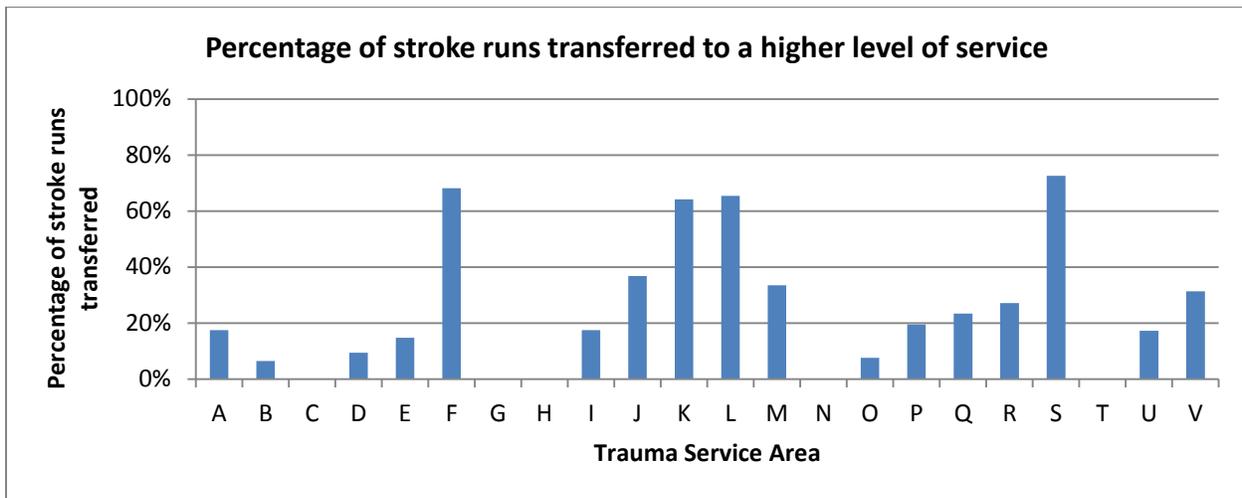


- 17 RACs reported data for both data elements (<2 hours and between 2-7 hours).
- Among these 17, 34% of all acute suspected stroke runs reported were less than 2 hours and 18% were between two and seven hours.
- 13 out of the 17 RACs reported a higher percentage of patients arriving at the hospital in less than 2 hours from last known well versus arriving between 2 and 7 hours from last known well.

Stroke transfers

The RACs were asked to report the total number of acute stroke transfers to a higher level of service. This includes any suspected stroke run where the patient was seen at one hospital prior to being transferred to another hospital with a higher level of service. A total of 18 RACs reported 1,417 stroke transfers to a higher level of service.

Figure 7. Percentage of stroke runs transferred to a higher level of service



- Among the 17 RACs who reported completed data, 23% of all acute suspected stroke runs reported were transferred to a higher level of service.
- Five RACs did not report any data or it was incomplete, of which two stated they were not able to collect the data.
- Nine RACs reported 25% or less of their stroke runs were transferred to a higher level of service.
- Four RACs reported 26-50% of their stroke runs were transferred to a higher level of service.
- Four RACs reported more than 50% of their stroke runs were transferred to a higher level of service.
 - These four RACs have 2 or less designated stroke facilities in their TSA. For those that do have a designated facility, they are primary level II facilities.

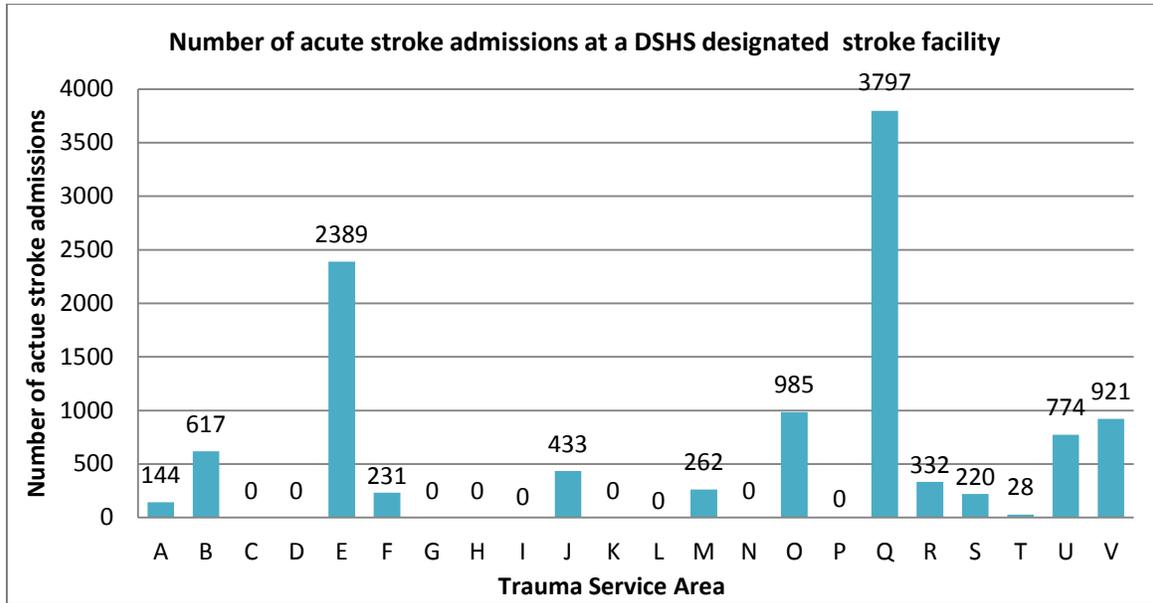
Acute stroke admissions and treatment at DSHS designated stroke facilities

Several hospital data elements were requested from RACs including data from DSHS designated stroke facilities related to stroke admissions, fibrinolytics, and endovascular treatments. In order to avoid data duplication with other DSHS Heart Attack and Stroke Data Collection projects, the RACs were asked not to report data from hospitals that are participating in the American Heart Association Get with the Guidelines (GWTG) Stroke Program for all of the stroke hospital data elements. For this reason, much of the data reported is incomplete to date.

RACs were asked to report the number of patients 18 years or older who were discharged with a final clinical diagnosis related to stroke, which includes Transient Ischemic Attack (TIA), acute ischemic stroke, subarachnoid hemorrhage, and intracerebral hemorrhage.

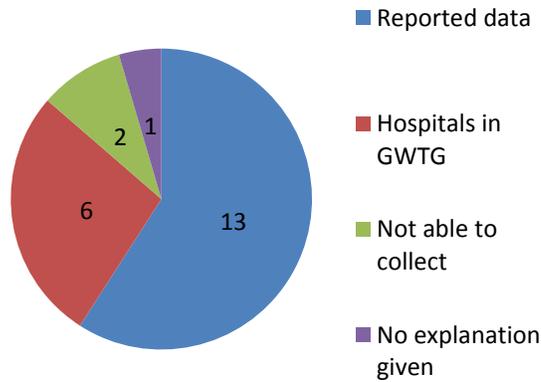
A total of 11,133 acute stroke admissions were reported by 13 of the RACs for January-June 2014. These are stroke admissions only from those hospitals that are not in the GWTG-Stroke program and were able to submit their data to the RACs. The most stroke admissions reported by one RAC was 3,797. Acute stroke admissions reported by each RAC can be seen in **Figure 8**.

Figure 8. Number of acute suspected stroke admissions at a DSHS stroke designated facility



Additional information for those RACs that did not report stroke admissions data is provided in **Figure 9**.

Figure 9. Reasons for non-reporting of stroke admissions

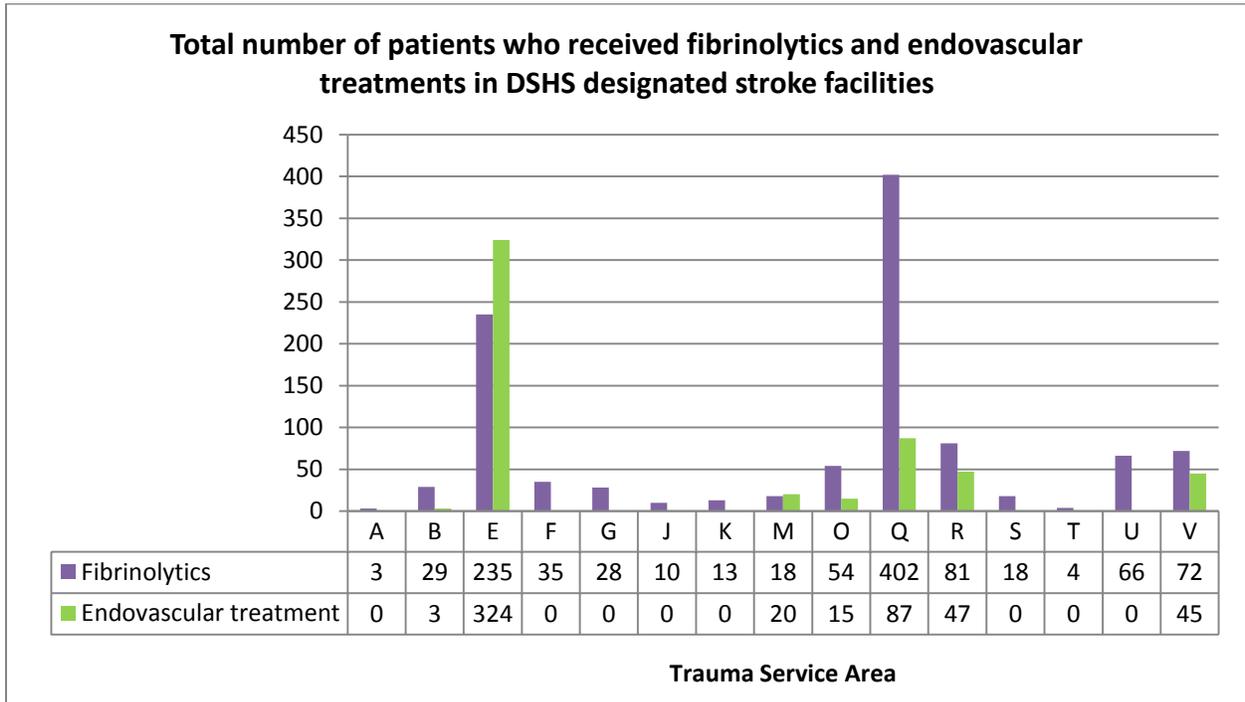


- Nine of the 22 RACs did not report any data.
- Among these nine, six reported that the designated stroke facilities in their TSA were already participating in the GWTG-Stroke program.*
- Among these nine, two reported that they were not able to collect the data from the designated stroke facilities in their TSA.
- Among these nine, one did not provide an explanation for missing data.

*These 6 RACs did not report data for designated stroke facilities.

From January to June 2014, a total of 1,068 patients were reported to have received intravenous (IV) fibrinolytics or tPA at a DSHS designated stroke facility, while 541 received an endovascular treatment.

Figure 10. Total number of patients who received fibrinolytics and endovascular treatments in DSHS designated stroke facilities

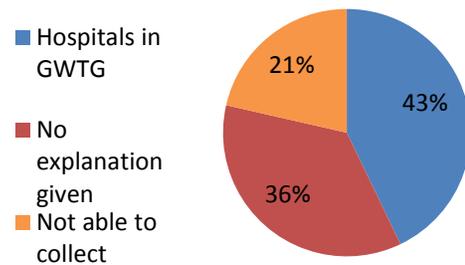


Note: This figure only includes information for 15 RACs that responded to at least one of the survey questions (i.e. fibrinolytics or endovascular treatments).

- Two RACs reported more patients receiving endovascular treatments versus fibrinolytics.
- RAC A reported that no endovascular treatments were performed in its TSA.

- 15 RACs reported data for patients receiving fibrinolytics and only 8 reported data for endovascular treatments.
- 14 RACs did not report data for endovascular treatments in their TSA; however, most cited that the hospitals reporting were already in GWTG.
 - Among these 14 RACs, 36% did not provide an explanation for not reporting data while 21% stated they were not able to collect this information from hospitals.

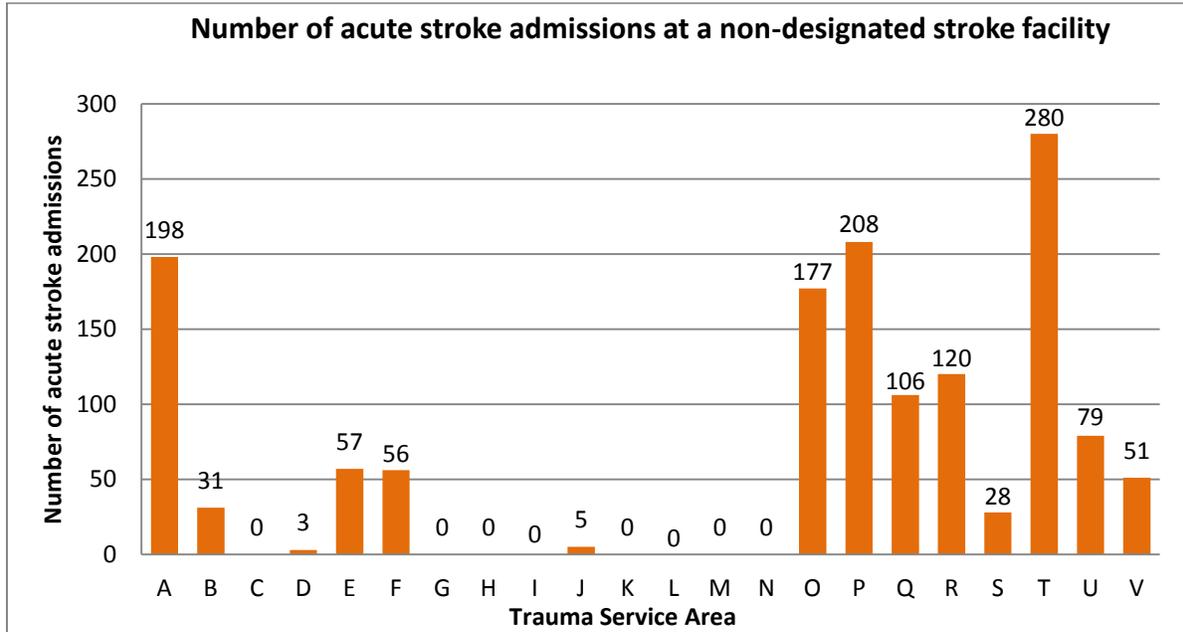
Figure 11. Reasons for non-reporting of stroke treatment



Acute stroke admissions and treatment at non-designated stroke facilities

A total of 1,399 stroke admissions at a non-designated stroke facility between January to June 2014 were reported by 14 RACs, with 280 being the highest number of admissions reported by one RAC. The number of stroke admissions by TSA is provided in **Figure 12**.

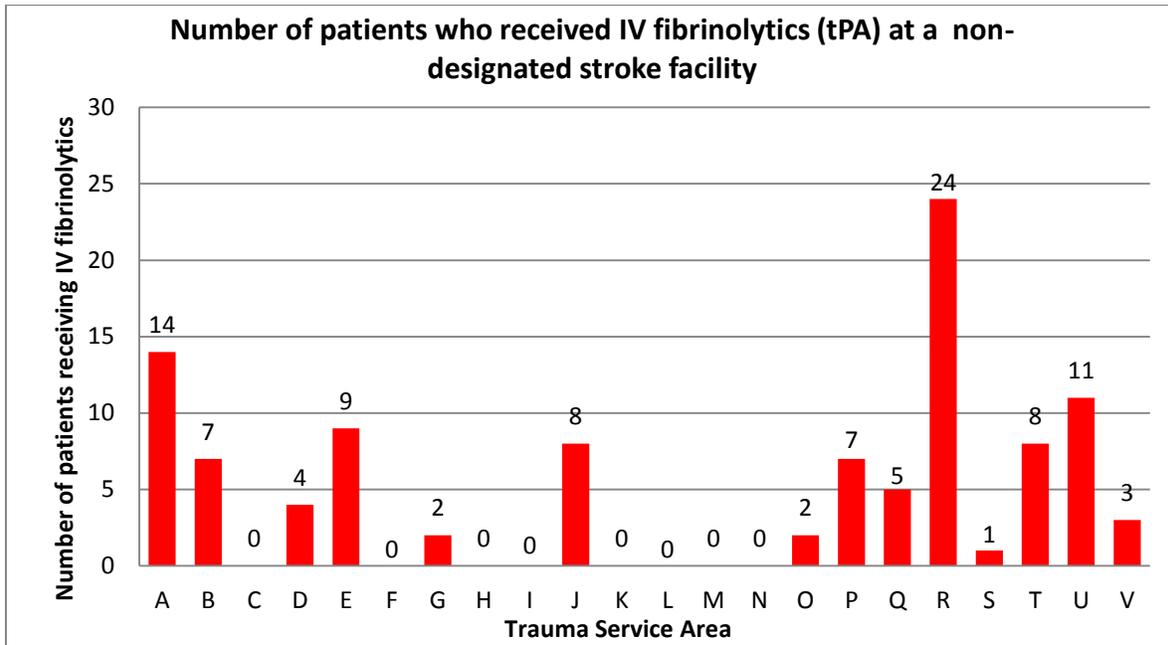
Figure 12. Number of acute stroke admissions at a non-designated stroke facility



- Six of the 14 RACs reported more than 100 stroke admissions each.
- Three of the 14 RACs (A, P, T) reported more stroke admissions in a non-designated facility than a designated stroke facility.
 - Among these three RACs, one reported that all their designated stroke facilities utilize GWTG therefore no data was reported.
 - Among these three RACs, two have only one designated stroke facility in their TSAs (A and T).
- Among the eight RACs that did not report data, three stated they were not able to collect data from non-designated stroke facilities and one specified that the non-designated stroke facilities in their TSA did not see or treat these patients.

Between January and June 2014, 14 RACs reported that a total of 105 patients received IV fibrinolytics or tPA at a non-designated stroke facility. The highest number reported by one RAC was 24 while the lowest number reported was one.

Figure 13. Number of patients who received IV fibrinolytics (tPA) at a non-designated stroke facility



- Four of the 14 RACs reported more patients receiving IV fibrinolytics in a non-designated stroke facility than a designated stroke facility.
 - Among these four RACs, two have only one designated stroke facility in their TSAs (A and T).
 - Among these four RACs, two did not report any data for designated stroke facilities because they were not able to collect the data or all the designated hospitals in their TSA were enrolled in GWTG.
- Among the 8 RACs that did not report data, three stated they were not able to collect data from non-designated stroke facilities and one specified that the non-designated stroke facilities in their TSA did not see or treat these patients.

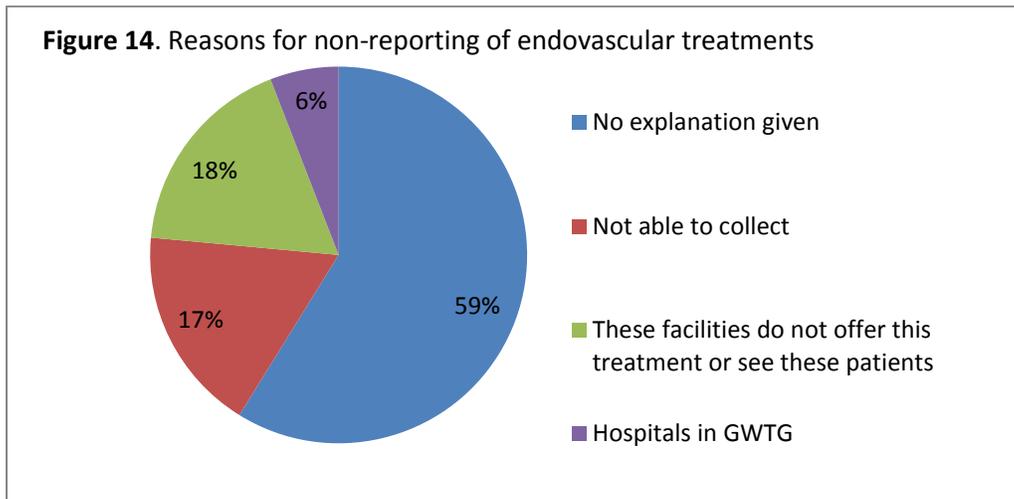
RACs were asked to report number of patients receiving endovascular treatments at a non-designated stroke facility. A total of 44 were reported with 30 being the highest reported from one RAC. **Table 2** below includes the totals reported by five RACs.

Table 2. Number of endovascular treatments in a non-designated stroke facility by TSA

TSA	Number of endovascular treatments in non-designated stroke facility
A*	0
B	4
P	30
Q	2
T	8

*RAC A reported that no endovascular treatments were performed in their TSA.

Figure 14 below includes the reasons for RACs not reporting this data.



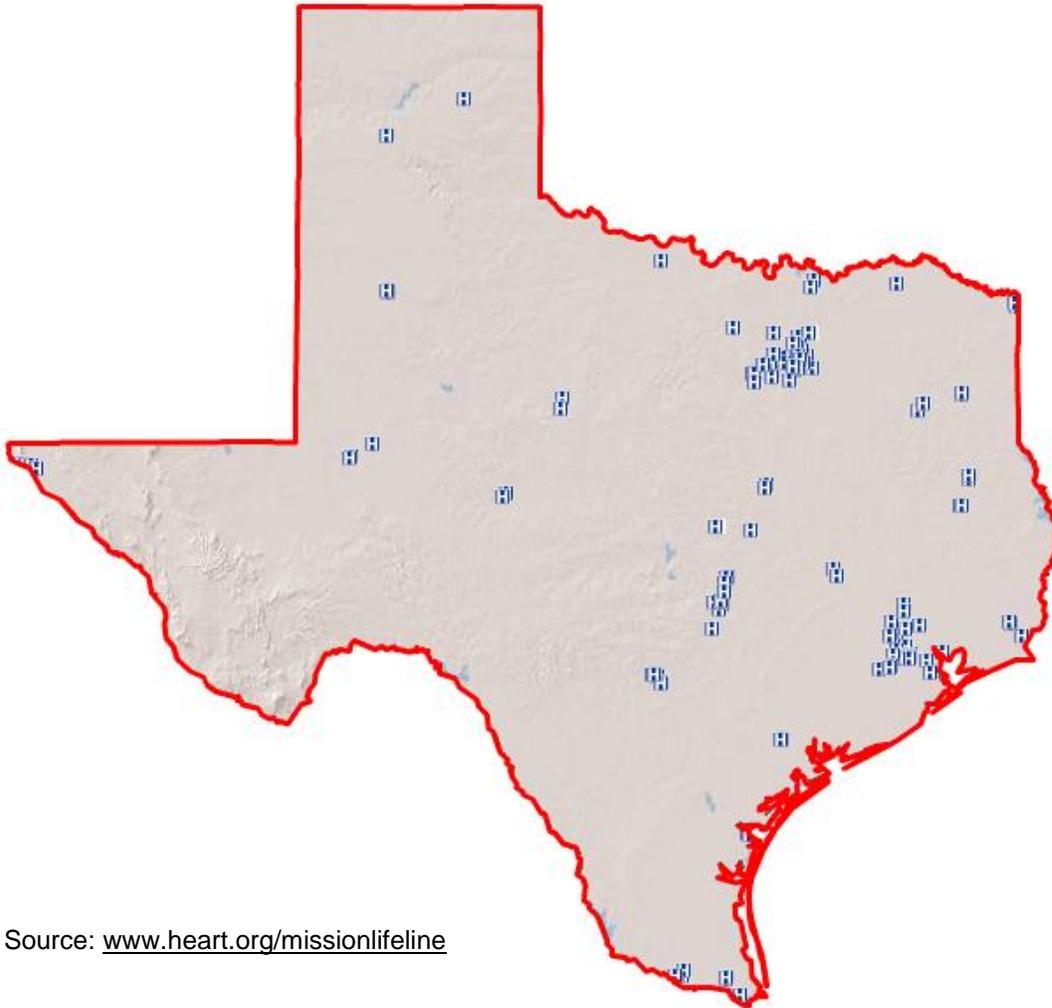
- Among the 17 RACs that did not report any data, 10 of these did not provide an explanation.
- Among the 17 RACs, three were not able to collect the data.
- Among the 17 RACs, three reported that the non-designated stroke facilities did not offer this treatment or see stroke patients
- Among the 17 RACs, one reported that the non-designated stroke facilities were enrolled in GWTG.

Introduction to STEMI System of Care

RACs were asked to report on three data elements related to the STEMI system of care including the total number of STEMI runs, total number of STEMI runs with 12 lead electrocardiograms (ECGs) transmitted and total number of STEMI runs less than 30 minutes. It is important to understand prevalence of STEMIs in Texas, as well as the transport time and pre-hospital diagnosis, both critical components of the STEMI system of care. An EMS unit equipped with 12-lead equipment is able to identify a STEMI patient and communicate this to the hospital, leading to activation of the catheterization lab and a more efficient system of care.

Figure 15 below displays the PCI capable hospitals in Texas². Hospitals are considered PCI capable if they have a catheterization lab that is available 24 hours a day and are able to perform percutaneous coronary interventions (PCIs). There are gaps in PCI capability across the state primarily in the western and southern regions, primarily rural areas.

Figure 15. Map of PCI capable hospitals in Texas, October 2014



Source: www.heart.org/missionlifeline

Table 3 below includes the approximate number of PCI capable facilities by TSA.

Table 3. Number of PCI capable hospitals by TSA

TSA	Total Number of PCI Capable Hospitals
A	2
B	2
C	1
D	2
E	44
F	0
G	3
H	4
I	6
J	2

K	2
L	3
M	2
N	2
O	14
P	16
Q	30
R	8
S	2
T	1
U	2
V	6
Total	154

- There are 15 RACs with five or less PCI capable hospitals.
 - One of these RACs does not have any PCI capable hospitals.

STEMI runs

RACs were asked to report the number of STEMI runs defined by patients 18 years or older with a STEMI, as defined by the EMS agency protocol, noted on a pre-hospital ECG who were transported directly to an acute care hospital. **Figure 16** below illustrates the total number of STEMI EMS runs reported by RAC for January through June 2014. **Figure 17** displays the number of STEMI runs per 10,000 Individuals, reported for the same time period. Several RACs identified EMS participation or RAC capacity to report and collect this data as a barrier. As a result, the documented data may be incomplete.

Figure 16. Total Number of STEMI EMS Runs, by RAC, Jan-June 2014

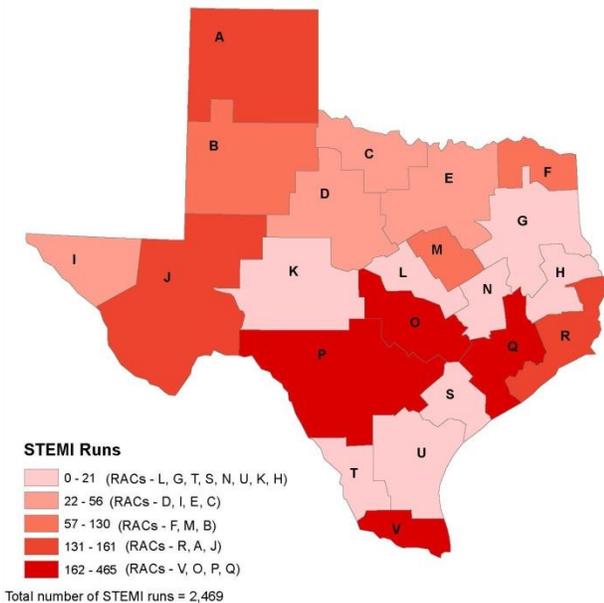
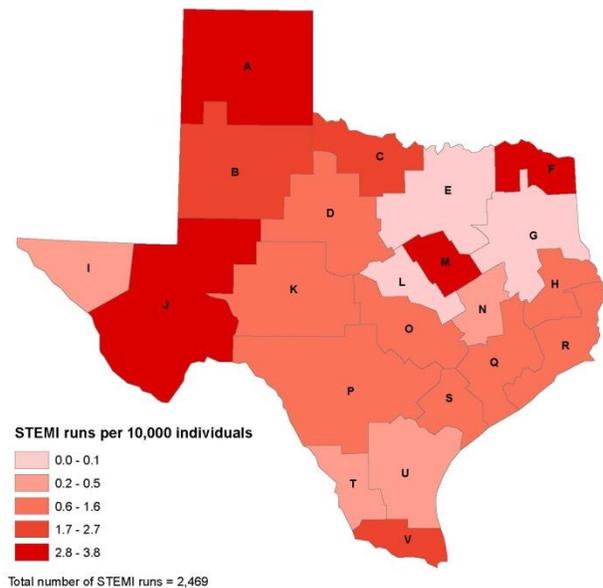


Figure 17. STEMI Runs per 10,000 Individuals, by RAC, Jan-June 2014

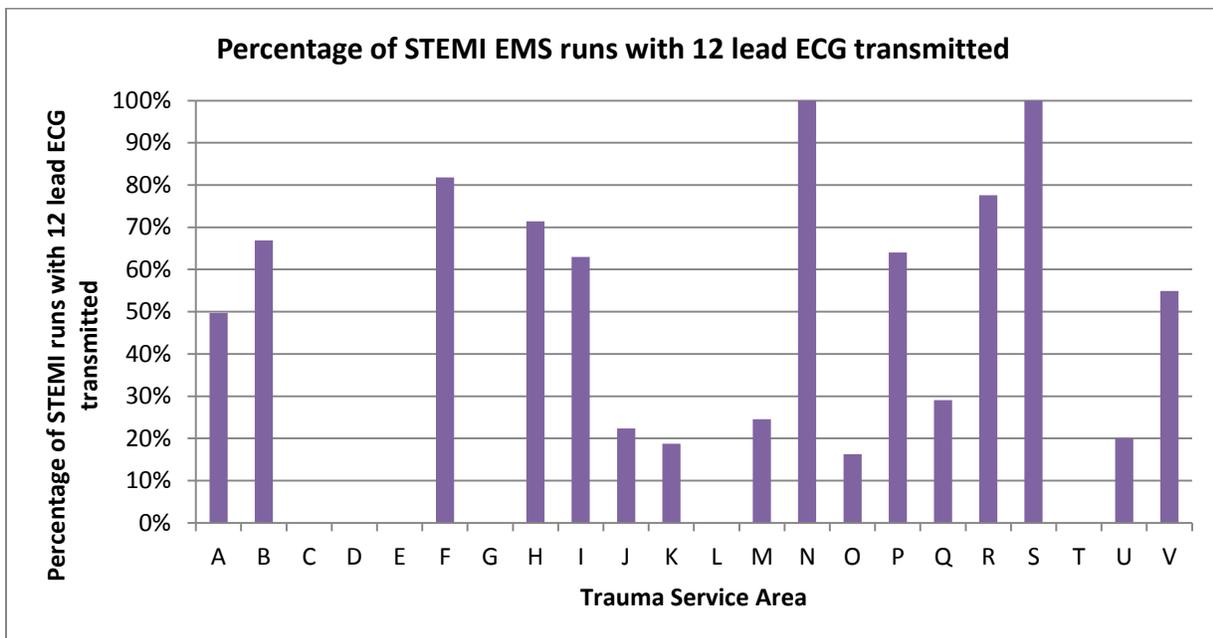


- The total number of STEMI runs reported from January to June 2014 was 2,469.
- The highest number of STEMI runs by one RAC was 465.
- Four RACs (O, P, Q, V) reported more than 161 STEMI runs each.
- Some of the RACs had missing or incomplete data, so **Figure 17** may show lower number of runs per 10,000 people.

Transmission of 12 lead ECG

RACs were asked to report on the number of patients of the previously reported number of STEMI runs that received a pre-hospital 12 lead ECG which was communicated to the receiving hospital as an electronic transmission or by phone. **Figure 18** illustrates the percentage of STEMI runs where a 12 lead ECG was transmitted to the receiving hospital.

Figure 18. Percentage of STEMI EMS runs with 12 lead ECG transmitted



- Among the 16 RACs who reported complete data, 46% of all STEMI runs reported had a 12 lead ECG transmitted to the receiving hospital.
- Six RACs did not report any data or it was incomplete, of which one RAC stated they were not able to collect this data.
- Seven RACs reported 50% or less of their STEMI runs had a 12 lead ECG transmitted.
- Five RACs reported 51-75% or more of their STEMI runs had a 12 lead ECG transmitted.
- Four RACs reported 76-100% of their STEMI runs had a 12 lead ECG transmitted, of which two RACs reported 100%.

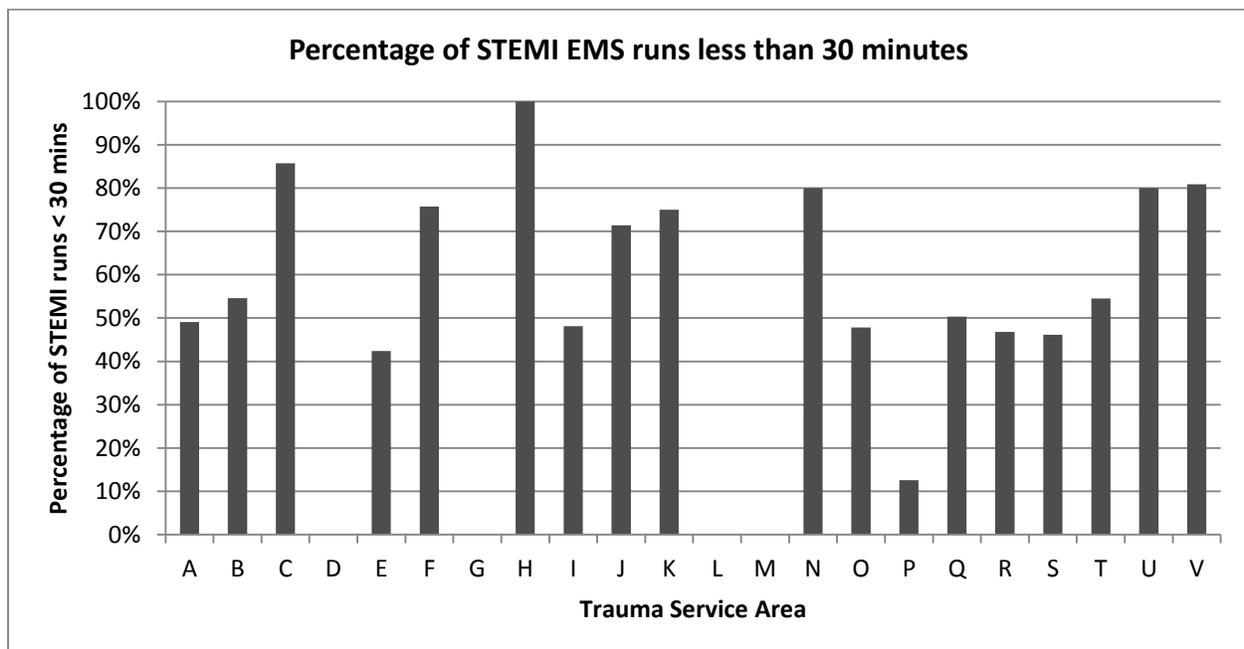


In a 2014 survey conducted on the STEMI system of care, twelve RACs responded that more than 80% of their EMS agencies had at least half of their units with 12 lead capabilities.

STEMI transport

The RACs were surveyed to collect data on number of STEMI runs for which first field contact to the hospital that was less than 30 minutes.

Figure 19. Percentage of STEMI EMS runs less than 30 minutes



- Among the 18 RACs who reported complete data, 52% of all STEMI runs reported were less than 30 minutes.
- Four RACs did not report data, of which one stated they were not able to collect this information.
- Eight RACs reported 50% or less of their STEMI runs were less than 30 minutes.
- Four RACs reported 51-75% of their STEMI runs were less than 30 minutes.
- Six RACs reported 76-100% of their STEMI runs were less than 30 minutes, of which one RAC reported 100%.

Conclusion

It is important to note the substantial findings from the stroke and STEMI data. First, 68% of RACs have five or less designated stroke facilities and PCI-capable hospitals in their TSA. The use of emergency medical services for stroke and STEMI patients is evident in the number of reported runs for each condition, 6,158 and 2,469, respectively. The runs reported only included those that occurred during the first two quarters of 2014 (January-June).

In terms of transport time, less than half (34%) of reported stroke runs were less than two hours. A little over half (52%) of STEMI runs were less than 30 minutes. In addition, 46% of STEMI runs reported had a 12 lead ECG transmitted to the receiving hospital.

There were more stroke admissions reported for DSHS designated stroke facilities (11,133) than non-designated stroke facilities (1,399). In addition, the majority of RACs reported more patients receiving fibrinolytics than endovascular treatments.

Limitations

There were limitations to the data reported by the RACs. The RACs were dependent on not only their own data collection systems, but those of the EMS agencies and hospitals. Therefore, many RACs noted the difficulty in collecting the data from these stakeholders for various reasons such as EMS reporting software was not set up to collect the data being requested, low participation, minimal RAC capacity to collect the data, or the information was not readily available. Many RACs did not submit complete data for every data element that was requested. In order to gain an accurate understanding of the systems of care, it is important to have complete data. For this reason, many RACs have indicated they are working with the stakeholders in their TSAs to increase capability to collect and the report the data that is being requested.

References

1. 2012 Texas Mortality data, Vital Statistics Unit, Center for Health Statistics, Texas Department of State Health Services.
2. American Heart Association. (2014). Retrieved from www.heart.org/missionlifeline.