ARIZONA DEPARTMENT OF HEALTH SERVICES

BUREAU OF EMERGENCY MEDICAL SERVICES AND TRAUMA SYSTEM

PERFORMANCE IMPROVEMENT TOOLKIT:

STROKE

AZ-PIERS 2013

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Report No. 14-2-EMS-STROKE

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Purpose:

The purpose of this report is to provide agencies with a baseline level of comparison on their performance in stroke. This report can be used to support Quality Assurance initiatives in their communities.

This report analyzes four stroke performance measures:

1. Improve the documentation of the time the patient was last known well,
2. Increase the documentation of appropriate assessments in stroke patients,
3. Increase the frequency of hospital pre-notification,
4. Increase the frequency of transports to a stroke center.

Methodology:

The Arizona Prehospital Information & EMS Registry System (AZ-PIERS) was analyzed to find records where a potential stroke could have occurred. The "suspected stroke" records in this analysis were pulled on June 13, 2014, and had:

1. A unit notified date range of January 1, 2013, to December 31, 2013, AND
2. *Patient Disposition* (E20_10) equal to "Dead on scene," "Treated and transferred," or "Treated and transported,"
3. *Provider's Primary Impression* (E09_15) or *Provider's Secondary Impression* (E09_16), or *Dispatch Complaint Report* (E03_01) equal to "Stroke/CVA."

The Hospital Discharge Database (HDD) was used to confirm stroke cases. In the HDD, a stroke was identified by an ICD-9 code between 430.0 to 437.0. A total of 18,321 stroke cases were identified in 2013. Due to the low number of linked stroke records, most of the report focuses on "suspected strokes" instead of hospital confirmed strokes.

LinkPlus was used to match a total of 704 AZ-PIERS records with the HDD. The hospital admission date matched the unit notified date.

Limitations:

If a patient received care for a stroke involving more than one submitting EMS agency, that patient would be counted multiple times (once for each EMS agency encounter).

There are three possibilities in reporting a "No/Not Documented" for data elements:

- The ePCR vendor failed to properly map the data element,
- The provider failed to document the procedure,
- The provider failed to perform the procedure.

Lastly, state benchmarks are restricted to only include those agencies participating in the registry. If your agency is not currently participating please visit us on our AZ-PIERS homepage for information on how to sign up.

Table 1: Demographics for stroke patients in AZ-PIERS

	N	%
Total	3,891	100%
Age (years)		
Missing	4	0.1%
<45	256	6.6%
45-54	439	11.3%
55-64	498	12.8%
65-74	874	22.4%
75-84	1,028	26.4%
≥85	792	20.3%
Gender		
Missing	38	0.97%
Female	1,981	50.9%
Male	1,872	48.1%
Race		
Missing	2,362	60.7%
American Indian or Alaskan Native	93	2.39%
Asian	9	0.23%
Black or African American	41	1%
Native Hawaiian or Other Pacific Islander	2	0.05%
Other Race	85	2.18%
White	1,299	33.3%
Patient Discharge Status		
Treated and transported	3,503	90%
Treated and transferred	388	9.9%

A total of 3,891 patients met the criteria in AZ-PIERS.

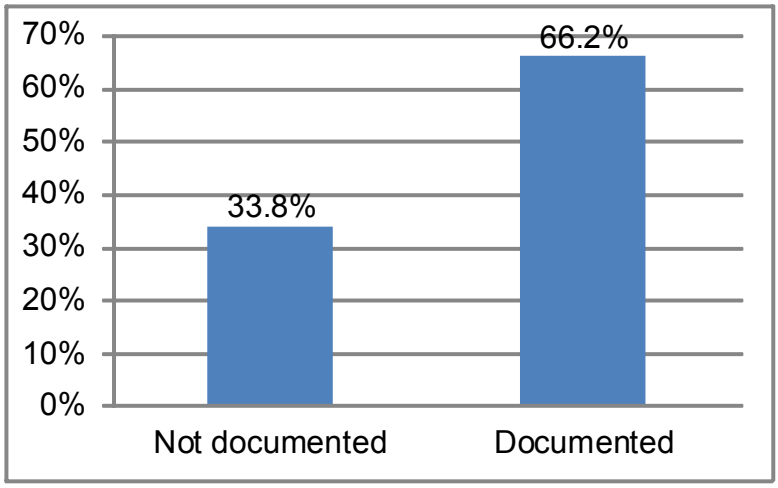
Males made up 48.1% of suspected strokes. The largest proportion of patients were 75-84 years of age. Strokes occurred in older adults (>65 years of age) more commonly than any other age demographic (69%).

The documentation of *Race* (E06_12) is slowly increasing by field providers. However, this variable is still missing in many cases (60.7%). Resources are available online to assist EMS agencies in collecting this important piece of information:

- http://www.hretdisparities.org/Howt-4176.php
- http://www.hretdisparities.org/uploads/ResponseMatrix.ppt
- http://www.azdhs.gov/bems/documents/data/the-importance-of-demographic-data.pdf

Performance Measure 1: Improve the documentation of the time the patient was last known well

Graph 1: Documentation of incident date/time for stroke patients (n=3,891)



Most providers documented a patient's "last known well" time (66.2%). However, a third of patients were missing this vital time in their records. As stroke is a time sensitive condition, proper documentation in the field allows for hospitals to tailor their treatment for the best possible outcome for the patient.

Through this information, EMS agencies can target their education of stroke recognition by the public. Optimizing patient outcomes requires a system initiative of stroke identification by the community, an activation of EMS, and a rapid transport to the nearest and most appropriate facility.

Table 2: Documentation of incident date/time for stroke patients

	N	%
Total cases	3,891	100%
Not documented	1,315	33.8%
Documented	2,576	66.2%

This data element is collected through *Incident or Onset Date/Time* (E05_01). There are three possibilities in reporting a "No/Not Documented" for data elements:

- The ePCR vendor failed to properly map the data element,
- The provider failed to document the procedure,
- The provider failed to perform the procedure.

Performance Measure 2: Increase documentation of appropriate assessments in stroke patients

Graph 2: Documentation of blood glucose for stroke patients (n=1,606)

Oftentimes, stroke symptoms are hard to differentiate from diabetic issues. For that reason, providers are asked to test a patient's blood glucose level. There was a documentation of blood glucose levels in 76% of patients who had a positive result for a stroke scale assessment.

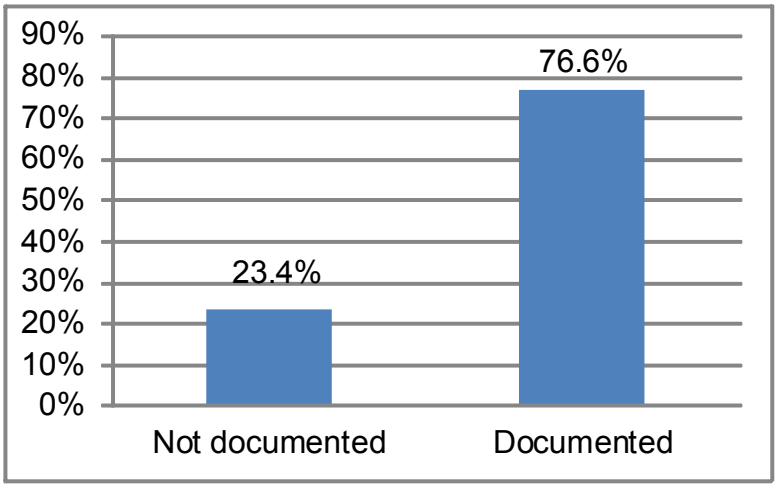


Table 3: Documentation of blood glucose for stroke patients

	N	%
Total cases with positive stroke assessment	1,606	100%
Blood glucose assessment		
Not documented	376	23.41%
Documented	1,230	76.58%

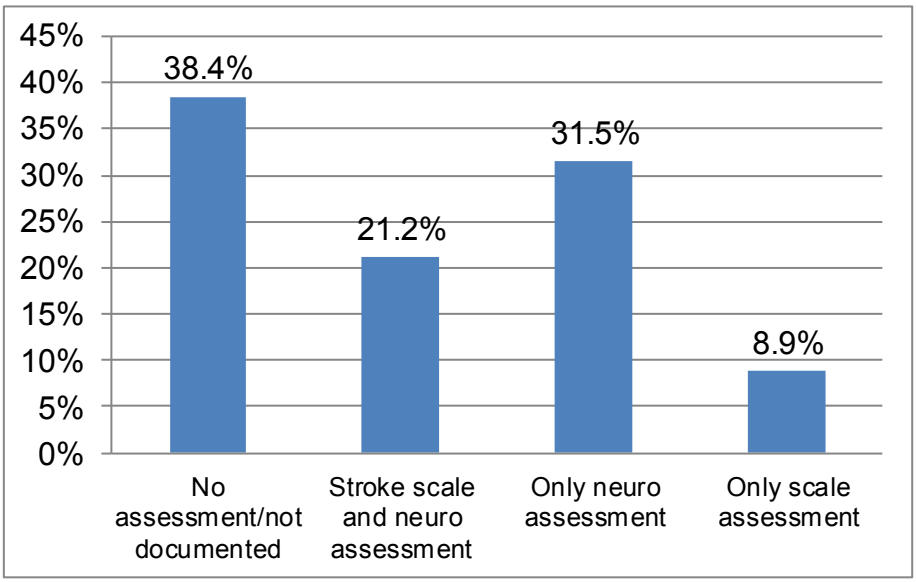
Blood glucose was measured through *Blood Glucose Level* (E14_14). There are three possibilities that can occur in reporting a "No/Not Documented" for data elements:

- The ePCR vendor failed to properly map the data element,
- The provider failed to document the procedure,
- The provider failed to perform the procedure.

Agencies can access their data quality report by logging into AZ-PIERS, clicking on Data Exchange, Data Posting, and Data Posting Report. Patient records that fail to meet schema will be shown under the "Failed" tab.

Performance Measure 2: Increase documentation of appropriate assessments in stroke patients

Graph 3: Documentation of assessments for stroke patients (n=3,891)



In 38% of stroke calls, a provider failed to document or perform a stroke or neurological assessment.

In AZ-PIERS, a stroke call was defined as the

- Dispatch center reports a "Stroke/CVA," OR,
- The provider has a primary or secondary impression of "Stroke/CVA."

Statewide, EMS agencies documented assessments in either *Stroke Scale* (E14_24) or *Neurological Assessments* (E16_24).

In patients who received an assessment, neurological evaluations were more common (31%) than stroke scales (8.8%).

Table 4: Documentation of stroke assessments

	N	%
Total	3,891	100%
No assessment completed / OR not documented	1,495	38.4%
Stroke scale AND neurological Assessment	825	21.2%
Neurological assessment	1,225	31.4%
Stroke scale assessment	346	8.8%

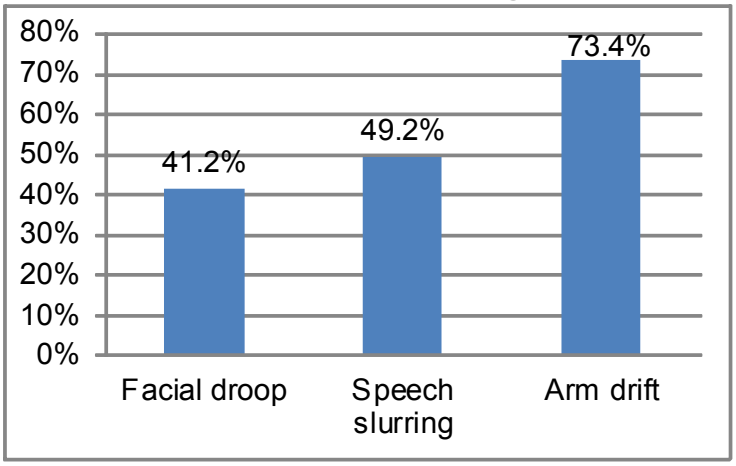
Table 5: Results of stroke assessments

	N	%
Total	3,891	100%
No assessment completed / OR not documented	1,495	38.4%
Positive assessment	1,606	41.2%
Negative assessment	790	20.3%

Of the 2,396 assessments that were done on stroke patients, 41% of patients had a positive result and 20% had a negative result.

Performance Measure 2: Increase documentation of appropriate assessments in stroke patients

Graph 4: Results of neurological assessments for patients (n=1,359)



In the 1,359 assessments, the most common positive indicator for a stroke patient was an arm drift (73.4%). Other indicators that were found to be positive, was speech slurring (49%) and facial droop (41%).

Table 6: Results of neurological assessments (n=1,359)

	N	%
Total cases	1,359	100%
Facial droop		
Negative	799	58.8%
Positive	560	41.2%
Speech slurring		
Negative	691	50.8%
Positive	668	49.1%
Arm drift		
Negative	361	26.5%
Positive	998	73.4%

Systemic trends in neurological assessments for stroke can be studied in the future. Table 5 presents cases in which a provider believed the patient was undergoing a stroke, but was not necessarily confirmed at a hospital.

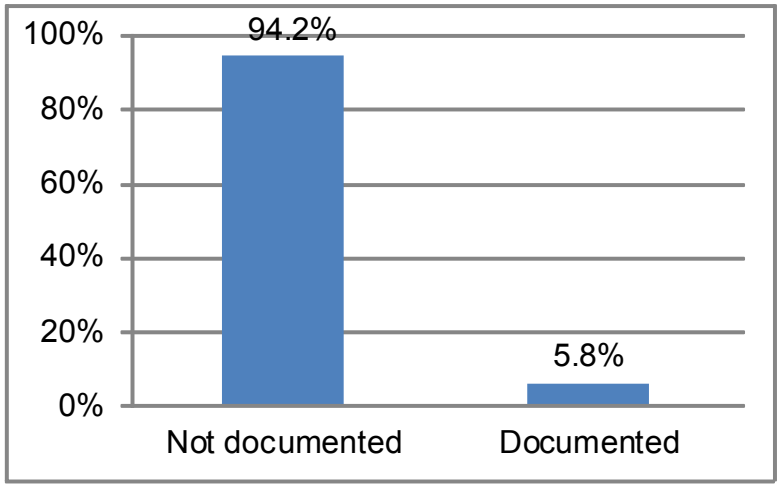
Table 7: Therapeutic window for patients with positive assessments

Stroke treatments are founded on the ability for patients to receive care in a timely manner. Unfortunately, the therapeutic window was missing a majority of cases (95%) as *Receiving Hospital Contacted Date/Time (IT5_71)* was used. Future reports will use Patient Arrival at Destination Date/Time (E05_10) as an alternative element.

	N	%
Total cases with positive stroke assessment	1,606	100%
Therapeutic time window		
Missing	1,518	94.5%
≤3 hours	73	4.5%
>3 hours	15	0.93%

Performance Measure 3: Increase the frequency of hospital pre-notification for a stroke patient

Graph 5: Documentation of facility notification time for stroke patients (n=1,606)



Given the time constraints, stroke patients should receive definitive care as soon as possible. This requires that EMS agencies and hospitals collaborate on best practices to appropriately and effectively activate stroke resources in a timely manner.

Table 8: Documentation of facility notification time for stroke patients

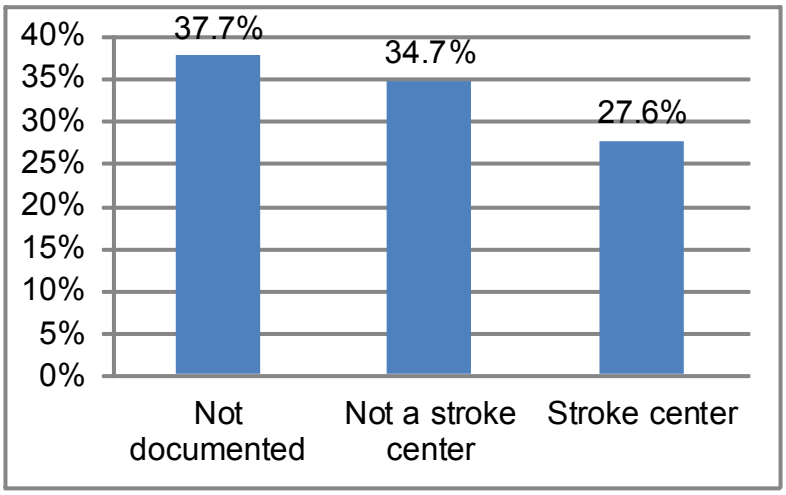
	N	%
Total cases	1,606	100%
Facility notification time		
Not documented	1,513	94.2%
Documented	93	5.79%

Most records failed to properly document the time they notified a facility of a possible stroke (94%). This variable is captured through *Receiving Hospital Contacted Date Time (for STEMI or Stroke* (IT5_71).

A modification has been made in the dataset to allow the variable to be collected through the Procedures (D04_04) using Contacted Receiving Hospital (code 154127).

Performance Measure 4: Increase the frequency of transports to a stroke center

Graph 6: Hospital destination for stroke patients



A large proportion of records in suspected stroke patients failed to document a destination hospital (37%). Destination hospital is collected through Patient Arrived at Destination Date/Time (E05_10).

Lastly, only 27% of suspected stroke patients were transported to a stroke center.

A listing of stroke centers can be found:

http://www.qualitycheck.org/consumer/searchResults.aspx?zip=&dist=-1&idx=0&s=-1&st=AZ&st_nm=ARIZONA&careId=544

Table 9: Hospital destination for suspected stroke patients

	N	%
Total cases treated and transported	3,503	100.00%
Not documented	1,320	37.68%
Not a stroke center	1,215	34.68%
Stroke center	968	27.63%

Patients who met the stroke inclusion criteria were linked to the HDD (presented on next page) through:

- *Unit Notified By Dispatch Date/Time* (E05_04),
- *Patient Last Name* (E06_01), *Patient First Name* and (E06_02), *Patient Gender* (E6_11),
- *Date of Birth* (E06_16).

Accuracy in these fields by EMS agencies allow for a more successful link. It is important to note that the providers who record destination hospital have a better success rate in linkage.

Table 10: Suspected stroke cases linked to HDD

Total cases linked by assessment result	Total AZPIERS cases	
	N	%
Not documented	219	31.10%
Positive assessment	391	55.53%
Negative assessment	94	13.35%
Total cases	704	100.00%

There were a total of 704 cases that were linked with AZ-PIERS. Of these confirmed stroke cases, 56% of ePCRs recorded assessments with a positive indicator; 13% recorded assessments with a negative indicator. Assessments were missing in 31% of hospital confirmed stroke cases.

Table 11: Discharge status for hospital confirmed stroke cases

	N	%
Total linked cases	704	100%
Discharge status of linked cases		
Home	255	36.2%
Transferred to Acute Care	17	2.4%
ALF/Rehab/SNF/Long Term Care	300	42.6%
Left Against Medical Advice	10	1.4%
Expired	54	7.6%
Hospice	68	9.6%

ALF=Assisted Living Facility, SNF=Skilled Nursing Facility

Of the 704 linked stroke cases, the largest proportion were discharged to a facility that provided additional services to their patients (42%). Typically, patients in long term care and skilled nursing facilities require a high level of care for activities of daily living (nursing, physical/occupational therapy). Future initiatives should look at a more thorough understanding of a patient's functional abilities following their stroke.

The proportion of patients who were discharged home was 36%; stroke mortality in Arizona was 17.3%.