Minnesota Hospital Stroke Quality Improvement Survey 2010

Summary Report

Minnesota Department of Health

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MINNESOTA MDH DEPARTMENT OF HEALTH

Minnesota Hospital Stroke Quality Improvement Survey 2010

Introduction

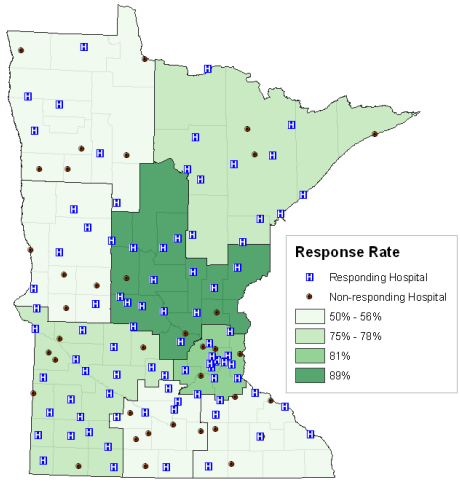
In 2009, stroke accounted for 2,023 deaths in Minnesota, making it the fourth leading cause of death in the state. Stroke was the third-leading cause of death for several years; this change in position is reflective of an overall 38% decline in the stroke death rate between 2000 and 2009. However, the overall burden of stroke remains high: stroke was the principal reason for 11,775 hospitalizations and nearly $350 million in total inpatient charges in 2008.[1]

Baseline data on stroke care capacity among acute care hospitals in Minnesota were collected and reported in 2006.[2] We conducted this survey to both assess changes in stroke care capacity among acute care hospitals since 2006 as well as to understand the current needs and opportunities for statewide improvement in stroke care.

Methods

The survey was developed to be consistent with an inventory of stroke care capacity conducted on hospitals participating in the Centers for Disease Control and Prevention Paul Coverdell National Acute Stroke Registry[3] program. Questions were cross-matched for consistency with the 2006 survey and reviewed for consistency with standards recommended by the Brain Attack Coalition for Primary Stroke Center certification.[4]

Figure 1: Hospital Response Rate by EMS Region



Data Source: Minnesota Hospital Stroke Quality Improvement Survey 2010
Map by MDH Heart Disease & Stroke Prevention Unit, April 2011

The intended eligible survey population was acute care hospitals serving the adult population. Hospitals were identified from the Minnesota Department of Health Facility and Provider Compliance Division list of health care organizations in the state. Hospitals that primarily serve special populations, including children, were excluded from the assessment frame. Recipients were mainly directors of nursing or quality improvement. We sent paper surveys to 131 hospitals in Minnesota in June 2010. One follow-up survey was mailed in August 2010 to non-respondents. The survey was closed in September 2010.

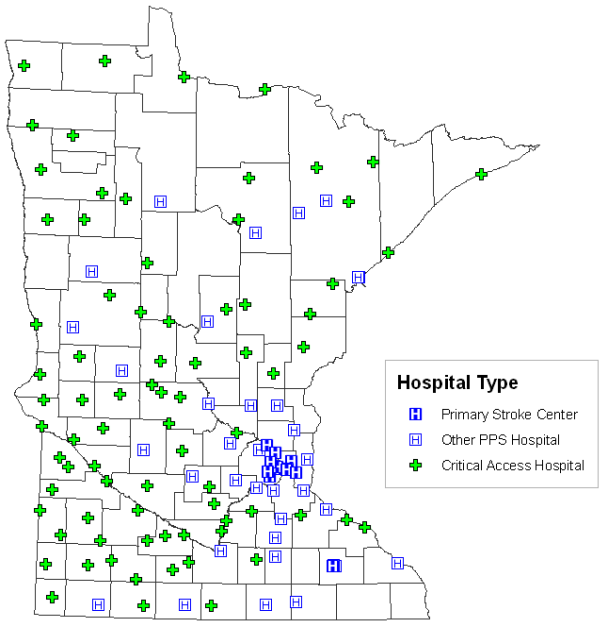
Figure 1 illustrates the response rate to the survey by Minnesota's eight EMS regions. More than 80% of acute care hospitals in the metro and central regions provided responses, compared to 75-80% in the northeast and southwest regions, and 50-56% of hospitals in the northwest, west central, south central, and southeast regions.

[1] Peacock JM and Shanedling S. (2011) Heart Disease and Stroke in Minnesota: 2011 Burden Report. St. Paul, MN: Heart Disease & Stroke Prevention Unit, Center for Health Promotion, Health Promotion and Chronic Disease Division, Minnesota Department of Health.
[2] Minnesota Acute Stroke Treatment System Survey 2006, Summary Report. Minnesota Heart Disease and Stroke Prevention Unit, Minnesota Department of Health, December 2006.
[3] http://www.cdc.gov/DHDSP/programs/stroke_registry.htm
[4] http://www.stroke-site.org/coalition/stroke_center.html

Due to a technical error, two questions were not originally included in the survey mailed in June 2010. Respondents were contacted via email and were requested to answer these two questions. Only half of these respondents answered these questions, thus these results are not shown due to the significant number of missing responses.

No statistical analyses beyond simple frequencies were calculated. Data from critical access hospitals (CAH, n=56) are presented separately from hospitals that participate in the inpatient prospective payment system (PPS, n=32). We selected a number of questions to depict in maps to illustrate differences in key stroke capacity and practice issues around the state.

Figure 2: Type of Acute Care Hospital, 2010



Data Sources: Joint Commission, MDH Office of Rural Health & Primary Care
Map by MDH Heart Disease & Stroke Prevention Unit, April 2011

Results

A total of 90 hospitals responded to the survey. Two hospitals returned blank surveys as they indicated themselves as non-acute care or specialty (e.g., long-term care) hospitals. The final response was 88 out of 129 eligible hospitals (69%). All results are shown in the maps and tables in the following sections.

Figure 2 illustrates the location of acute care hospitals in Minnesota, illustrating the location of 14 Primary Stroke Centers, the remaining acute care hospitals participating in Medicare's Prospective Payment System (PPS hospitals), and Critical Access Hospitals. As of 2010, the state's 14 Primary Stroke Centers are limited in the Twin Cities metro and Rochester. The remaining PPS hospitals are scattered throughout the state in cities and larger regional towns, with the remaining 78 critical access hospitals located in small rural communities throughout the state, with high concentrations in the northern, central, and southwestern counties.

Discussion

This survey identified several areas and opportunities for improvement in stroke care.

- Only 58% of respondents indicated that EMS pre-notified them of incoming strokes all of the time, and only 25% of the time is a rapid response stroke team always called. We believe that the immediate mobilization of a rapid response team can be a key step towards improving care for stroke patients.
- Among critical access hospitals, one-quarter do not have a protocol for emergency ischemic stroke, and one-third do not have a protocol of emergency hemorrhagic stroke. We believe that all hospitals, including critical access hospitals, should adopt protocols for stroke.
- In addition, three-quarters of hospitals do not currently receive telemedicine consultation services for stroke. This is an opportunity for assistance that can be explored and expanded.
- Nearly two-thirds of hospitals do not have a stroke care unit. Research suggests that the presence of a stroke unit in a hospital is associated with higher quality of care.
- Just 56% of hospitals indicated that they provided at least one community public education event about stroke in the past year. Public education for stroke is a key issue.

A few changes since the 2006 survey are worth highlighting:

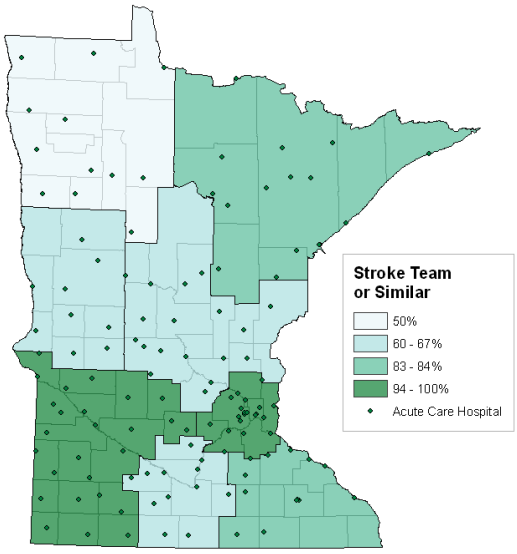
- Approximately 82% of hospitals reported having emergency department protocols for acute stroke, compared to 57% in 2006.
- Only 13% reported having a designated stroke team, but now 27% have one.
- In 2006, 18% reported having a designated stroke unit for stroke patients, while 34% report having one now.
- While Minnesota had only six hospitals certified as Primary Stroke Centers in 2006, in 2010, we had 14.

We acknowledge several limitations to this study, which should be taken into consideration when evaluating these results. Comparisons to the 2006 survey should consider that a few questions were differently worded; the actual respondents were likely different; the hospitals who responded were not matched. In addition, the non-response of over 50 hospitals (31%) must not be considered lightly; it is possible that stroke care capacity is far different (better or worse) than reported due to non-response bias. In addition, accuracy of responses is limited to the respondent's knowledge of his/her facility. None of the responses were verified. Despite these limitations, these data are valuable for planning and developing systems of care in Minnesota.

The maps on the following pages highlight the variation in stroke care capacity at Minnesota hospitals through some of the most important acute, sub-acute, and rehabilitation care measures included in this survey. The tables that follow show the results of all survey questions.

These survey results will guide the efforts of the Minnesota Department of Health and its partners in developing the stroke care capacity and improving stroke quality of care in Minnesota hospitals. For more information, please contact the Minnesota Department of Health at (651) 201-5412, email health.stroke@state.mn.us or visit www.health.state.mn.us/cvh.

Figure 3: Presence of a Stroke Team or Similar Care Team

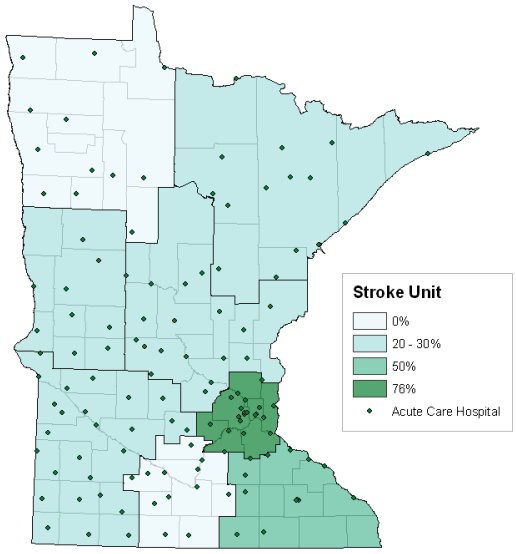


Data Source: Minnesota Hospital Stroke Quality Improvement Survey 2010
Boundaries depict the eight Minnesota EMS regions

Map by MDH Heart Disease & Stroke Prevention Unit, April 2011

Figure 3 shows whether hospitals have a stroke team or a similar care team operating in the Emergency Department when potential stroke patients arrive. 94 - 100% of responding acute care hospitals in the metro and southwest regions have a stroke team, compared to 83-84% in the northeast and southeast regions, 60-67% in the central, west central, and south central regions, and just 50% of hospitals in the northwest region. As a reminder, all acute care hospitals in the state are shown on the map.

Figure 4: Presence of Stroke Unit for Inpatient Care



Data Source: Minnesota Hospital Stroke Quality Improvement Survey 2010
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Figure 4 shows whether hospitals have a stroke unit for the inpatient care of stroke patients in the sub-acute phase. 78% of responding acute care hospitals in the metro region have a stroke unit, compared to 50% of hospitals in the southeast region, and 20-30% of hospitals in the northeast, central, west central, and southwest regions. None of the responding hospitals in the northwest or south central regions report having a stroke unit.

Figure 5: Weekday availability of Physical, Occupational, and Speech Therapy

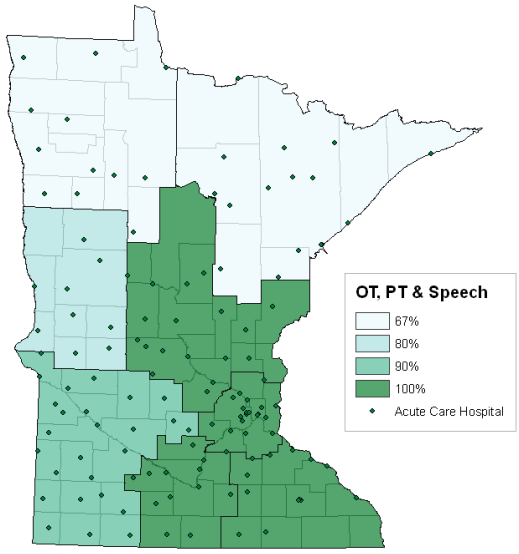

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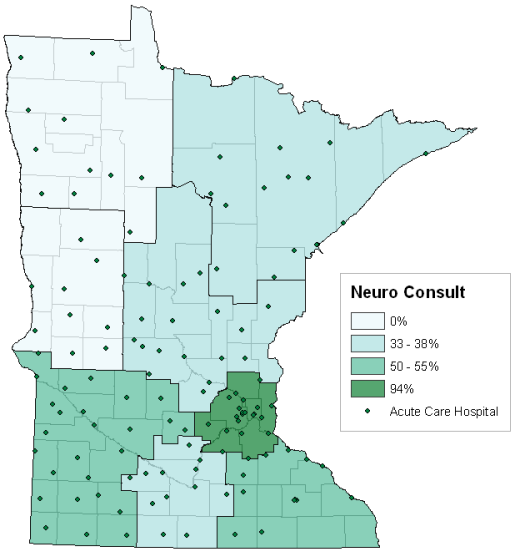
Figure 5 shows those hospitals that offer physical therapy, occupational therapy, and speech therapy at least on weekdays. All responding acute care hospitals in the metro, central, south central and southeast regions indicated they offer all three of these rehabilitation services, compared to 90% in the southwest region, 80% in the west central region, and just 67% of responding hospitals in both the northeast and northwest regions.

Figure 6: Full-time availability of Neurology Consultation

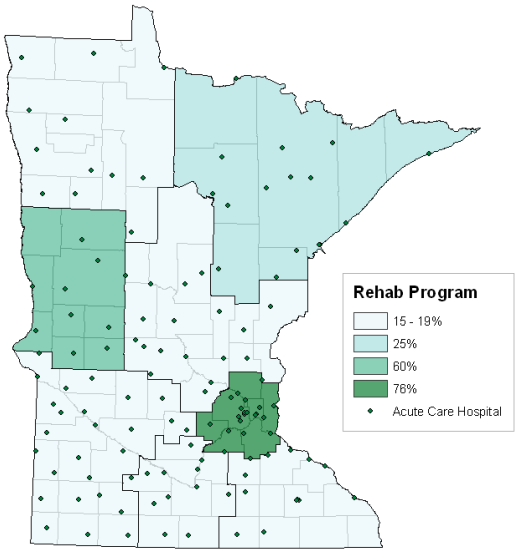


Data Source: Minnesota Hospital Stroke Quality Improvement Survey 2010
Boundaries depict the eight Minnesota EMS regions

Map by MDH Heart Disease & Stroke Prevention Unit, April 2011

Figure 6 shows those hospitals that have access to neurology consults on a full-time basis. 94% of responding acute care hospitals in the metro region offer neurology consults on a full time basis, compared to 50-55% of hospitals in the southwest and southeast regions, and just 33-38% of hospitals in the northeast, central, and south central regions. None of the responding hospitals in the northwest and west central regions reported having access to full-time neurology consultations.

Figure 7: Stroke Rehabilitation Program, consistent with TJC or CARF standards

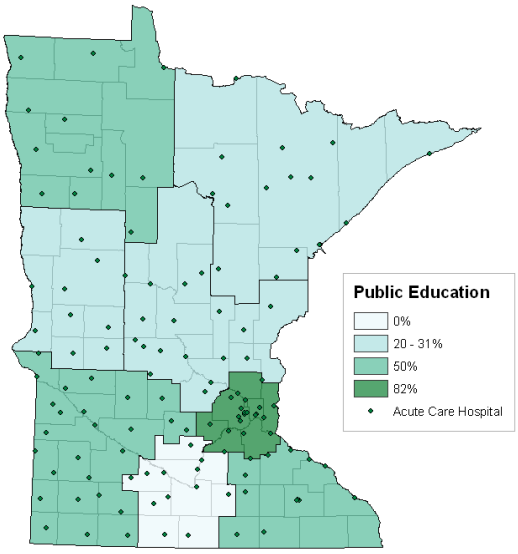


Data Source: Minnesota Hospital Stroke Quality Improvement Survey 2010
Boundaries depict the eight Minnesota EMS regions

Map by MDH Heart Disease & Stroke Prevention Unit, April 2011

Figure 7 shows those hospitals that offer a stroke rehabilitation program, consistent with standards described by the Joint Commission (TJC) or the Commission on Accreditation of Rehabilitation (CARF). 76% of responding acute care hospitals in the metro region offer a stroke rehabilitation program, compared to 60% in the west central region, 25% in the northeast region, and just 15-19% of responding hospitals in the northwest, central, southwest, south central, and southeast regions.

Figure 8: Public Education Activities in Previous Year

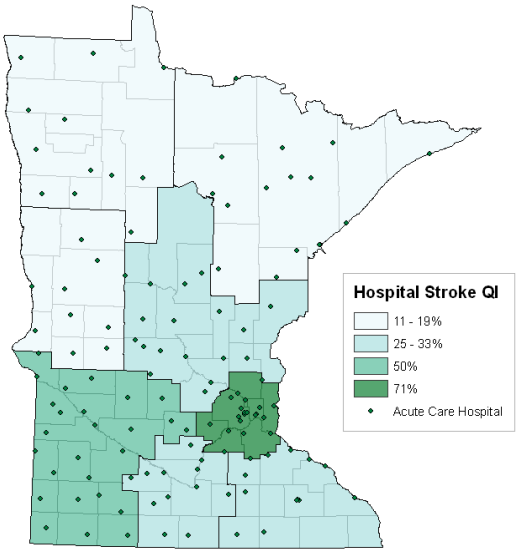


Data Source: Minnesota Hospital Stroke Quality Improvement Survey 2010
Boundaries depict the eight Minnesota EMS regions

Map by MDH Heart Disease & Stroke Prevention Unit, April 2011

Figure 8 shows those hospitals that have conducted at least one public education event or activity in the previous year. 82% of responding acute care hospitals in the metro region report engaging in public education activities, compared to 50% of hospitals in the northwest, southwest, and southeast regions, 20-31% of hospitals in the northeast, central, and west central regions, and none of the responding hospitals in the south central region.

Figure 9: Presence of Stroke Quality Improvement Initiatives



Data Source: Minnesota Hospital Stroke Quality Improvement Survey 2010
Boundaries depict the eight Minnesota EMS regions

Map by MDH Heart Disease & Stroke Prevention Unit, April 2011

Figure 9 shows those hospitals that are currently engaged in an organized quality improvement (QI) initiative around stroke. These include the Minnesota Stroke Registry, a Paul Coverdell National Acute Stroke Registry program, sponsored by CDC, the American Heart Association's Get With the Guidelines (GWTG) – Stroke program, and occasional in-house data collection and quality improvement initiatives. 71% of responding hospitals in the metro region are engaged in QI for stroke, compared to 50% of hospitals in the southwest region, 25-33% of hospitals in the central, south central, and southeast regions, and just 11-19% of hospitals in the northeast, northwest, and west central regions.

Tables

Emergency Medical Services (EMS)

Is there a written plan for receiving patients with suspected stroke via EMS?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
No	11	34	29	52	40	45
Yes	21	66	27	48	48	55

Is there initial notification by EMS regarding a suspected stroke case in transport to your hospital?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
Always	19	59	32	57	51	58
Sometimes	13	41	24	43	37	42
Never	0	0	0	0	0	0

If there is initial notification by EMS regarding a suspected stroke case, does it lead to notification of the stroke team?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
Always	10	31	12	21	22	25
Sometimes	9	28	12	21	21	24
Never	8	25	18	32	26	30
No pre-notification	2	6	3	5	5	6
Missing	3	9	11	20	14	16

If there is initial notification by EMS regarding a suspected stroke case, does it lead to activation of written stroke protocols?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
Always	8	25	7	13	15	17
Sometimes	8	25	15	27	23	26
Never	4	13	3	5	7	8
None	0	0	3	5	3	3
Missing	12	37	28	50	40	45

Emergency Care – Diagnostic and Therapeutic Services

Does your hospital provide the following diagnostic and therapeutic procedures?

	PPS (Other)		CAH		Total	
	Yes (N=32)	%	Yes (N=56)	%	Yes (N=88)	%
Computed Tomography (CT)	32	100	55	98	87	99
Magnetic Resonance Imaging (MRI)	32	100	41	73	73	83
Diffusion imaging (MRI)	29	91	20	36	49	56
Perfusion imaging (MRI)	21	66	11	20	32	36
Computerized Tomography Angiography (CTA)	26	81	16	29	42	48
Magnetic Resonance Angiography (MRA)	28	88	29	52	57	65
Cerebral Angiography	17	53	4	7	21	24
Transcranial doppler (TCD)	13	41	3	5	16	18
Transthoracic echo (TTE)	25	78	20	36	45	51
Transesophageal echo (TEE)	20	63	6	11	26	30
Interventional endovascular neuroradiology	11	34	0	0	11	13
Carotid duplex imaging/ultrasound	31	97	35	63	66	75
Carotid endarterectomy	18	56	2	4	20	23

Does your hospital have the capability to perform CT scan 24/7?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
Yes, including weekends	32	100	54	96	86	98
Weekdays only	0	0	1	2	1	1
No/missing	0	0	1	2	1	1

Does your hospital have the capability to interpret CT scan 24/7?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
Yes, always	20	63	27	48	47	53
No	0	0	1	2	1	1
Missing	12	38	28	50	40	45

Does your hospital have the capability to perform brain MRI 24/7?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
Yes, including weekends	21	66	1	2	22	25
Weekdays only	5	16	13	23	18	20
No	6	18	40	71	46	52
Missing	0	0	2	0	2	2

Does your hospital have the capability to interpret brain MRI 24/7?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
Yes, including weekends	25	78	12	21	37	42
Weekdays only	1	3	9	16	10	11
No	4	13	34	61	38	43
Missing	2	6	1	2	3	3

Does the lab operate 24/7?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
Yes, including weekends	32	100	56	100	88	100

Are stroke relevant blood work-ups (coagulation, CBC, basic metabolic panel, etc.) completed with results back within 45 minutes?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
Always	23	72	45	80	68	77
Sometimes	8	25	11	20	19	22
Never	0	0	0	0	0	0
Missing	1	3	0	0	1	1

Emergency Care – Triage and Treatment

Does your hospital treat stroke patients in the ED beyond stabilization during the acute phase?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
No	15	47	30	54	45	51
Yes	17	53	26	46	43	49

Does your hospital have a designated acute stroke team?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
No	15	47	49	88	64	73
Yes	17	53	7	13	24	27

If no, do you have similar infrastructure or resources with similar functions as a stroke team?

	PPS		CAH		Total	
	N = 15	%	N = 49	%	N = 64	%
No	6	40	16	33	22	34
Yes	9	60	33	67	42	66

Does your hospital receive stroke consultation services from another hospital via telemedicine?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
No	29	91	42	75	71	81
Yes, including weekends	2	6	14	25	16	18
Missing	1	3	0	0	1	1

Does your hospital have a written protocol or care pathway in place for:
Emergency care for ischemic strokes? (Including diagnostic imaging and labs)

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
No	3	9	13	23	16	18
Yes	29	91	43	77	72	82

	% Yes		
	PPS N=32	**CAH N=56**	**Total N=88**
Does the protocol address initial stabilization?	91	77	82
Does the protocol address diagnostic tests?	88	77	81
Does the protocol address treatment options?	88	77	80

Emergency care for hemorrhagic strokes? (Including diagnostic imaging and labs)

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
No	6	19	19	34	25	28
Yes	26	81	37	66	63	72

	% Yes		
	PPS N=32	**CAH N=56**	**Total N=88**
Does the protocol address initial stabilization?	84	70	71
Does the protocol address diagnostic tests?	78	68	74
Does the protocol address treatment options?	78	63	68

Protocol for IV tPA administration?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
No	1	3	7	13	8	9
Yes	31	97	49	88	80	91

Protocol for IV tPA administration – beyond 3 hours?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
No	12	38	28	50	40	45
Yes	20	62	28	50	48	55

Protocol for IA tPA (intra-arterial)?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
No	22	69	53	95	75	85
Yes	10	31	3	5	13	15

Inpatient management (including rehabilitation assessment)

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
No	6	19	25	45	31	35
Yes	26	81	31	55	57	65

Protocol for admission orders?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
No	5	16	22	39	27	31
Yes	27	84	34	61	61	69

Protocol for dysphagia screening?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
No	4	13	22	39	26	30
Yes	28	87	34	61	62	70

Discharge protocols?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
No	11	34	34	61	45	51
Yes	21	66	22	39	43	49

Inpatient Care

Does your hospital have a stroke care unit?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
No	11	34	47	84	58	66
Yes	21	66	9	16	30	34

If your hospital has a stroke care unit, where is it located (check all that apply)?

	PPS		CAH		Total	
	Yes (N=21)	%	Yes (N=9)	%	Yes (N=30)	%
ICU	16	76	5	56	21	70
General Ward	21	100	9	100	30	100

If your hospital has a stroke care unit, does it have telemetry or continuing cardiac and respiratory monitoring?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
No	10	31	46	82	56	64
Yes	22	69	10	18	32	36

Does your hospital have an intensive care unit (ICU)?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
No	3	9	30	54	33	38
Yes	29	91	26	46	55	63

Does your hospital provide stroke-specific intensive care?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
No	13	41	51	91	64	73
Yes	19	59	5	9	24	27

Does your hospital have a dedicated neuro-ICU?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
No	28	88	56	100	84	95
Yes	4	13	0	0	4	5

Does your hospital have a neuro-intensivist?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
No	26	81	56	100	82	93
Yes	6	19	0	0	6	7

Does your hospital have neurosurgical services on-staff?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
No	19	59	55	98	74	84
Yes	13	41	1	2	14	16

Does your hospital have neurosurgical services available within two hours of patient arrival (may be on-staff or at a remote location)?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
Always	21	66	9	16	30	34
Sometimes	5	16	11	20	16	18
Never	5	16	33	59	38	43
Missing	1	3	3	5	4	5

Does your hospital have neurosurgical services available 24/7? (may be on-staff or at a remote location)

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
No	9	28	40	71	49	56
Yes	23	72	16	29	39	44

Does your hospital provide stroke consultation services to another hospital via telemedicine?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
No	27	84	52	93	79	90
Yes, including weekends	4	13	1	2	5	6
Missing	1	3	3	5	4	5

Do all stroke patients receive an ECG in the ED or on admission to the hospital?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
No	6	19	13	23	19	22
Yes	26	81	43	77	69	78

Do all stroke patients receive continuous ECG monitoring for at least 24 hours during admission?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
No	14	44	30	54	44	50
Yes	18	56	26	46	44	50

Is there a "stroke code" in your hospital (process for rapid treatment of inpatient strokes)?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
No	17	53	42	75	59	67
Yes	15	47	14	25	29	33

Are the following services available on a full-time basis to inpatient care?
Physical Therapy

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
Yes, weekdays	1	3	27	48	28	32
Yes, always	31	97	29	52	60	68

Occupational Therapy

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
Yes, weekdays	6	19	38	68	44	50
Yes, always	26	81	17	30	43	49
Missing	0	0	1	2	1	1

Speech Therapy

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
No	0	0	8	14	8	9
Yes, weekdays	10	31	42	75	52	59
Yes, always	22	69	6	11	28	32

Neurology consultation

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
No	8	25	37	66	45	51
Yes, weekdays	3	9	4	7	7	8
Yes, always	20	63	15	27	35	40
Missing	1	3	0	0	1	1

Discharge Services

Does your hospital provide stroke education for stroke patients and/or their caregivers?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
No	3	9	9	16	12	14
Yes	29	91	47	84	76	86

Does your hospital use a standardized screening tool, consistent with national guidelines, to assess functional status for stroke patients?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
No	11	34	23	41	34	39
Yes	21	66	33	59	54	61

Does your hospital use a protocol, consistent with TJC or CARF standards, for referral to post-stroke care?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
No	12	38	48	86	60	68
Yes	20	63	8	14	28	32

Does your hospital have a rehabilitation program, consistent with TJC or CARF standards, designed for stroke patients?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
No	11	34	49	88	60	68
Yes	21	66	7	13	28	32

Certification and Education

Does your hospital have either residency or fellowship programs?

	PPS		CAH		Total	
	N=32		N=56		N=88	
	Yes	% Yes	Yes	% Yes	Yes	% Yes
Neurology	6	19	0	0	6	7
Emergency Medicine	5	16	0	0	5	6
Other residency/ fellowship programs	15	47	3	5	18	20

Is your hospital certified as a Joint Commission Primary Stroke Center (TJC PSC)?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
No	16	50	56	100	72	82
Yes	14	44	0	0	14	16
Application in progress	1	3	0	0	1	1
Missing	1	3	0	0	1	1

Is your hospital designated as a stroke center by your state or other organization (other than Joint Commission Primary Stroke Center)?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
No	29	91	56	100	85	97
Yes	3	9	0	0	3	3

Does your hospital meet guidelines for a Comprehensive Stroke Center (based on Brain Attack Coalition or other published guidelines)?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
No	24	75	56	100	80	91
Yes	8	25	0	0	8	9

Did your hospital participate in any stroke related clinical research studies within the last year?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
No	23	72	55	98	78	89
Yes	9	28	1	2	10	11

Did your hospital provide at least one public education event about stroke prevention, symptoms recognition or treatment options within the last year?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
No	14	44	21	38	49	56
Yes	18	56	21	38	39	44

Do the key hospital staff (ED, stroke unit, stroke team, ICU, etc.) involved in stroke care receive a minimum of eight (8) hours of continuing stroke education annually?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
No	20	62	54	96	74	84
Yes	12	38	2	4	14	16

Quality Improvement

Which describes your current inpatient health records system?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
Electronic, almost zero paper	10	31	7	13	17	19
Hybrid, paper and electronic	21	66	37	66	58	66
Paper only	0	0	11	20	11	13
Missing	1	3	1	2	2	2

Does your hospital participate in the American Heart Association Get With The Guidelines-Stroke program?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
No	18	56	50	89	68	77
Yes	14	44	6	11	20	23

If no, does your hospital regularly collect stroke quality of care data using another system?

	PPS		CAH		Total	
	N = 32	%	N = 56	%	N = 88	%
No	22	69	42	75	64	73
Yes	10	31	14	25	24	27

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