

EMERGENCY MEDICAL SERVICES AND STROKE CARE IN MINNESOTA

Minnesota Emergency Medical Services Stroke Care Survey 2006



Summary Report

December 2006



Key Findings

Stroke Patient Transportation

- Overall, 93% of ambulance services reported that strokes are typically treated as urgent by dispatch in most cases.
- 28% of respondents indicated that first responders typically provided nothing more than vital signs on suspected stroke patients or no information at all.
- 4% responded that comprehensive information is provided by first responders, while 58% at least provided vital signs and would mention that they had a suspected stroke patient.
- Overall, 62% of agencies reported not having a policy determining where acute stroke patients are transported.
- Most ambulance services (91%) do not typically bypass one or more hospitals to transport suspected stroke patients to a hospital with more stroke care capabilities.
- In most cases (85%), respondents felt that suspected stroke patients received immediate attention at the destination hospital, but only 7% of respondents reported that stroke patients had a stroke team waiting for them at the hospital upon arrival.
- A total of 79% of respondents have a policy to notify hospitals in advance to be ready to provide urgent care for incoming stroke patients, and most (89%) will treat a suspected stroke patient as an urgent patient.

Pre-Hospital Care and Management of Stroke Patients

- Over 78% of agencies have some sort of written protocol or standard operating procedure for the management of a suspected stroke patient.
- Approximately 42% of agencies utilize the Cincinnati Stroke Scale (or a simplified version) for assessment of possible stroke patients.
- 34% of respondents said that their providers always provide verbal reports of stroke scale findings to hospital staff.
- Overall, 21% reported that their staff sometimes provide this information, and 37% never or rarely report this information.

Training

- Most of the respondents reported that personnel are trained on stroke once a year (49%) or every two-to-three years (31%).
- Respondents prefer that stroke education be made available annually (57%) or semi-annually (25%).
- Conferences or seminars provided by their own agencies were preferred by 79% of respondents as an effective means for training, particularly EMT-B providers.
- Regional conferences and statewide conferences were also popular choices.
- Utilizing internet-based training for obtaining continuing education and contact hours was a common preference.

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Introduction

In 2004, 2,540 people in Minnesota died due to stroke, making it the third highest cause of death in the state.¹ Moreover, there were over 11,500 hospitalizations for stroke in 2003.² Estimated costs for stroke hospitalizations reach \$53 million.² In sum, the burden of stroke in Minnesota due to its incidence, mortality rate, and costs is unacceptably high.

In order to plan and implement both efficient and strategic interventions for reducing the burden of stroke in Minnesota, it is necessary to understand the current capacity and system for stroke care. We lack this baseline level of information on many fronts, not least of which is in the pre-hospital emergency medical services arena. Because systems-level improvements in the pre-hospital setting have a potentially high impact on the burden of stroke, we chose to assess stroke care by Minnesota ambulance services.

In January 2006, the Minnesota Stroke Partnership decided to conduct a project to develop and implement training programs for Minnesota emergency medical service (EMS) providers on stroke issues. The Steering Committee was uncertain of the content for these trainings, as well as the formats in which they should be conducted. Moreover, the Committee knew that it would likely take a subgroup of EMS experts, providers, and instructors to actually conduct the trainings. Thus, the Committee recommended that a task force of EMS experts and providers be convened to spearhead this effort.

This task force determined that prior to actually developing and implementing training curricula, an *assessment of current practices and knowledge* was needed. This assessment was intended primarily to be the first phase of the larger training project. It was expected that the assessment would confirm the notion that training content should be varied depending on EMS provider type (e.g., emergency medical technicians vs. paramedics, first responders vs. ambulance services, paid staff vs. volunteers, providers in greater Minnesota vs. providers in metropolitan areas). In addition, the methods of delivery may be varied (e.g., courses at regional conferences, web-based courses, teleconferences, videoconferences, webinars, statewide conferences, etc.). This was the first ever statewide assessment of pre-hospital stroke care in Minnesota.

Methods

The survey was developed in collaboration with selected members of the Minnesota Stroke Partnership with clinical expertise in stroke care and experience as emergency medical services professionals. The purpose of this assessment was:

- To understand pre-hospital stroke care capacity and practices among Minnesota ambulance services.
- To understand what training needs exist regarding stroke, and what vehicles of training and education are most effective for emergency medical services personnel.

Questions were written and beta-tested by a sample of ambulance directors before being finalized. The final survey (Appendix A) was approved by the Minnesota Department of Health Institutional Review Board in May 2006.

The list of recipient ambulance services was obtained from the Minnesota Emergency Medical Services Regulatory Board. EMS agencies providing only air transport or facility-to-facility transport services were excluded. The survey was sent to 240 directors overseeing 257 ambulance services in June 2006 with a joint cover letter from the Minnesota Stroke

¹ Source: Minnesota Department of Health, Center for Health Statistics.

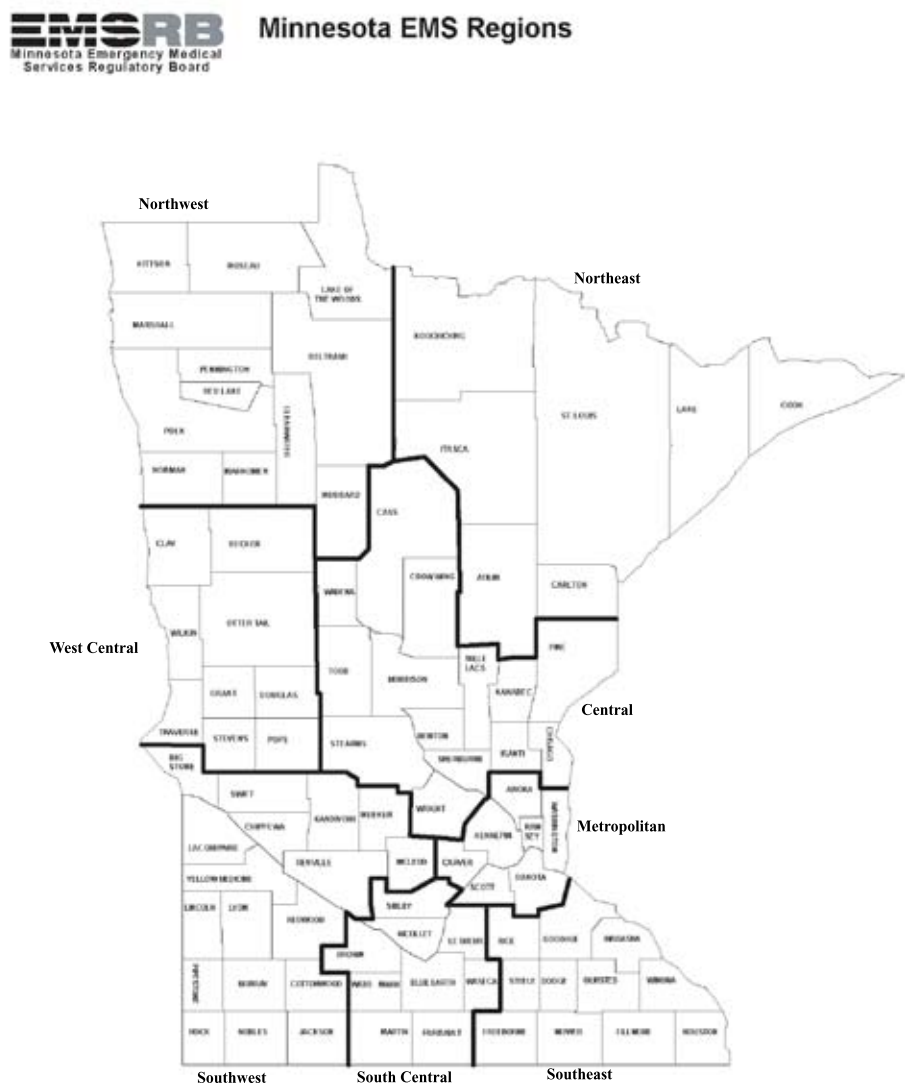
² Source: Minnesota Department of Health, Minnesota Hospital Discharge Dataset. Note: This figure does not include stroke admissions at Rochester Methodist and St. Mary's Medical Center in Rochester, MN, nor either of the two Veterans Administration hospitals in Minnesota, thus the actual number of annual stroke hospitalizations is likely much higher than stated.

Partnership and the Minnesota Department of Health. In addition, respondents were given the option to complete the survey online. Two follow-up letters were sent to ambulance services not responding within six weeks. The survey was closed in August 2006.

Results

A total of 199 (77%) surveys representing of 257 ambulance services in Minnesota were completed. Data are presented by Minnesota EMS region and overall. The eight EMS regions in Minnesota include the following: (1) Metropolitan (Minneapolis/St. Paul); (2) Central; (3) Northeast; (4) Northwest; (5) West Central; (6) Southwest; (7) South Central; (8) Southeast. These are depicted in Figure 1.

Figure 1. Map of Minnesota EMS Regions (map courtesy of Minnesota Emergency Medical Services Regulatory Board)



General Information

Question 1: Please estimate the number of EMS personnel in your service.

Overall, the sum total of estimated number of personnel equalled 401 first responders and 5,539 EMT-Basic (66%), EMT-Intermediate (3%) and EMT-Paramedic (31%) (Figure 2). The sum total of estimated paid staff was 2,267 (44%) versus 2,926 (56%) volunteer staff (Figure 3)

Figure 2. Percentage of personnel by type (EMT-B, EMT-I, EMT-Paramedic) and EMS region.

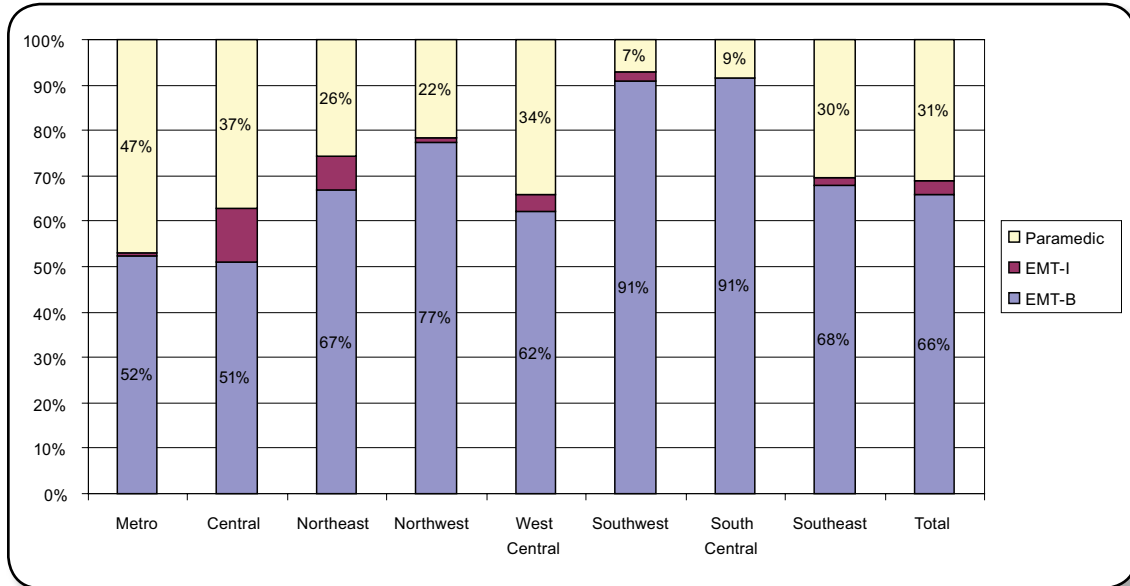
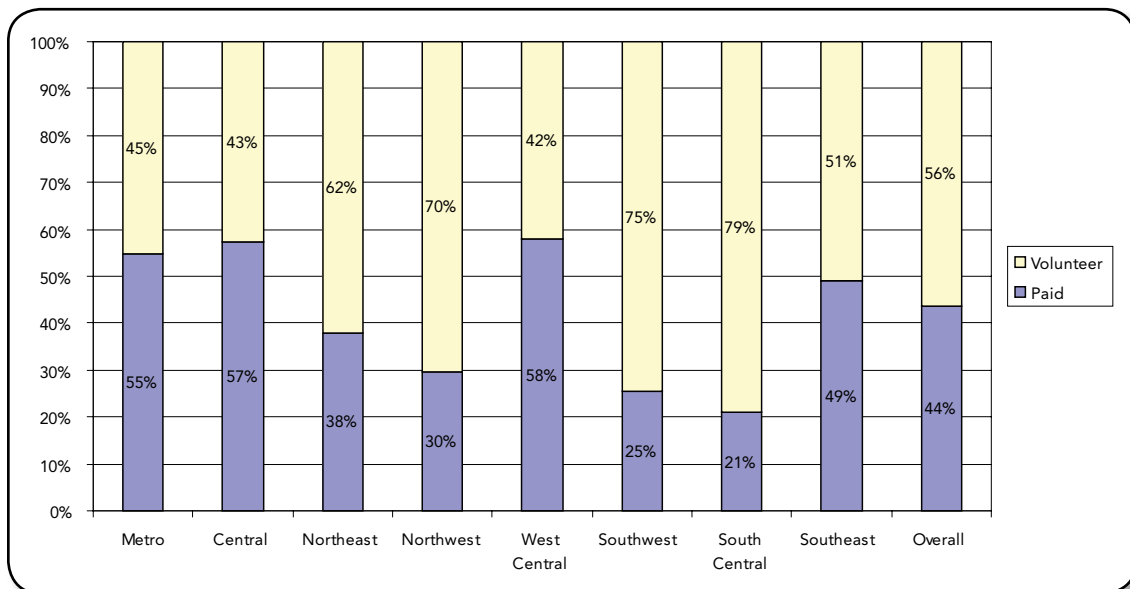


Figure 3. Percentage of personnel by paid vs. volunteer staff and EMS region.



Question 2:

Which EMS Region do you primarily service?

Overall, 199 surveys were completed, representing 77% of all agencies.

Table 1. Survey respondents by region.

Region	Respondents	Percent of Region
Metro	23	85%
Central	25	89%
Northeast	23	72%
Northwest	13	65%
West Central	14	74%
Southwest	44	75%
South Central	24	75%
Southeast	33	82%
Overall	199	77%

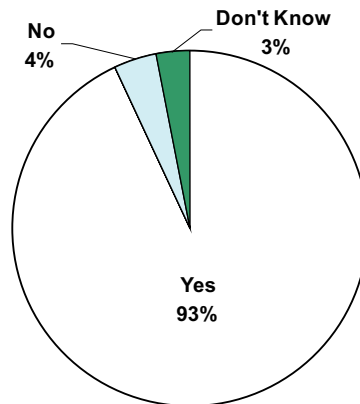
Stroke Patient Transportation

Question 3:

Are strokes typically treated as emergent (urgent) by dispatch?

Overall, 184 respondents (93%) reported that strokes are typically treated as emergent events by dispatch. (Figure 4)

Figure 4. Strokes typically treated as emergent by dispatch.

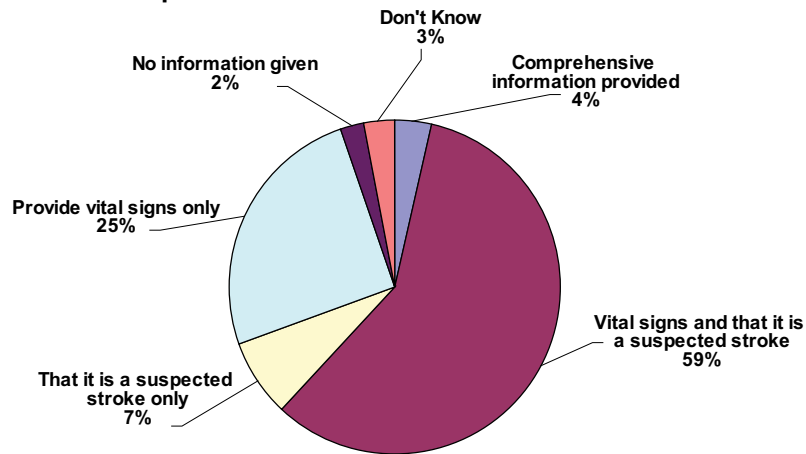


Question 4:

What do your first responders typically provide your ambulance staff upon arrival on a suspected stroke patient?

Overall, seven respondents (4%) reported that their ambulance staff receive comprehensive information from first responders regarding suspected stroke patients. 110 respondents (58%) reported that in most cases, vital signs information and the suspicion that the patient is a stroke case is provided. In contrast, 48 respondents (25%) reported that first responders typically only provide vital signs information to ambulance staff, and 14 (7%) reported that first responders typically inform ambulance staff that suspected stroke case with no additional information. In very few cases is no information provided to ambulance staff.

Figure 5. Information typically provided by first responders on a suspected stroke patient.

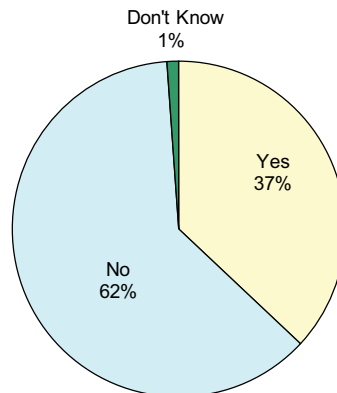


Question 5:

Do you have a written policy to determine where acute stroke patients are transported?

Overall, 73 respondents (37%) reported that they have a written policy which indicates where acute stroke patients are to be transported.

Figure 6. Written policy to determine where acute stroke patients are transported.



Question 6:

Please list the hospitals that stroke patients are typically transported to most often:

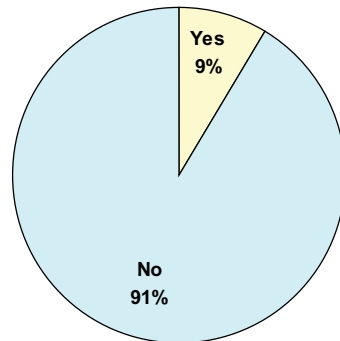
The results of this question are omitted due to privacy concerns and will only be used for planning purposes.

Question 7:

Do you typically bypass one or more hospitals to transport suspected stroke patients to a hospital with more stroke care capabilities?

Overall, 17 respondents (9%) reported that they typically bypass at least one hospital to take a suspected stroke patient to a hospital with greater stroke care capacity. The vast majority (91%) would not; based on several comments written into the survey, patients are often (if not typically) transported to a hospital of their choice first, and if there is no preference, they are transported to the nearest hospital.

Figure 7. One or more hospitals are typically bypassed to transport suspected stroke patients to a hospital with more stroke care capabilities.

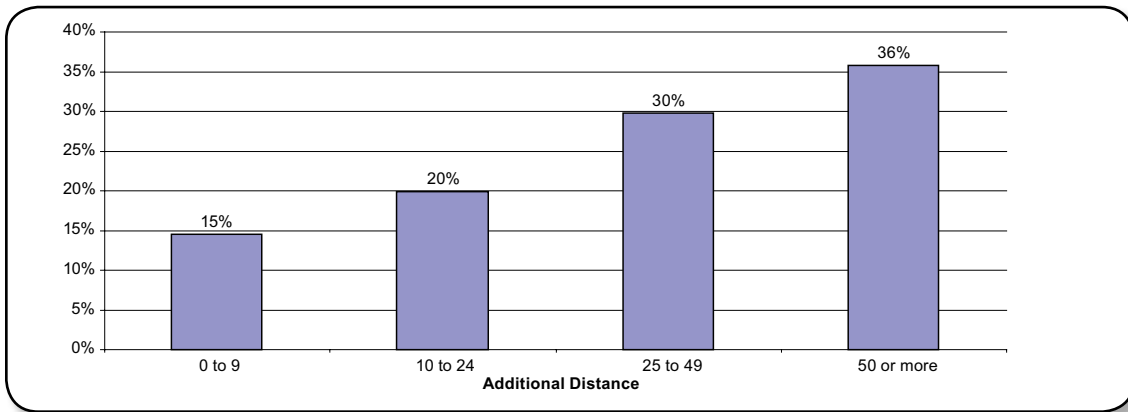


Question 8:

If you would bypass a hospital to go to another with greater stroke care capabilities, what would be the average additional distance driven to the final destination hospital?

Of 151 respondents, 22 (15%) reported that the additional distance to a destination hospital after bypassing a closer hospital would be between 0 and 9 miles. 30 respondents (20%) said the additional distance would be between 10-24 miles, 45 respondents (30%) would have to travel an additional 25-49 miles, and 54 (36%) would have to travel over 50 miles to get to a final destination hospital.

Figure 8. Average additional distance driven to a final destination hospital if other hospital is bypassed.

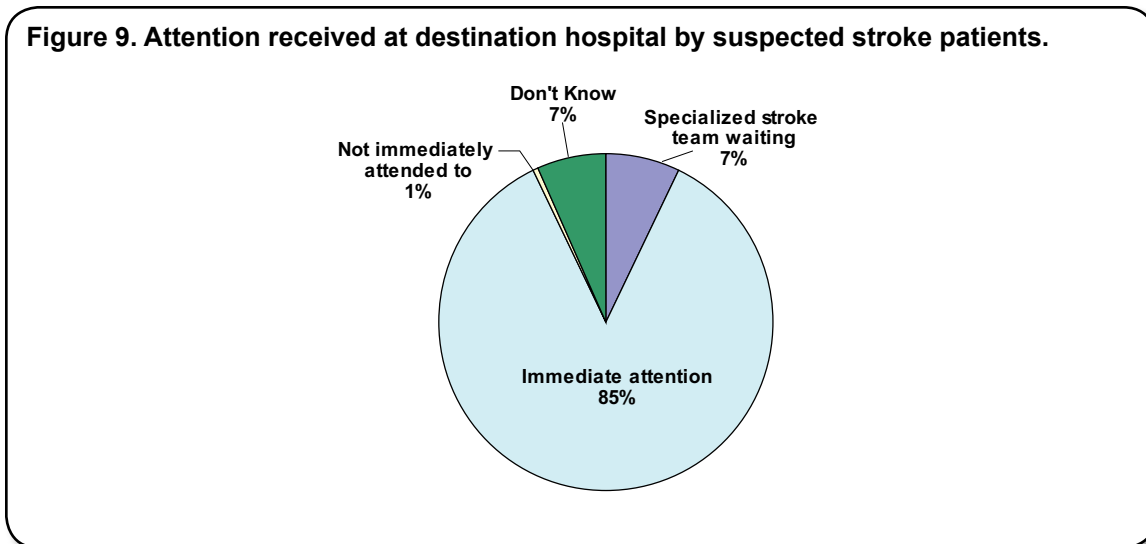


Question 9:

What kind of attention do your suspected stroke patients typically receive at the destination hospital?

Overall, 14 respondents (7%) reported that in their opinion, suspected stroke patients were received by a specialized stroke team, ready and waiting for the patient to arrive. The majority of respondents (N = 168, 86%) felt that their suspected stroke patients were attended to immediately. Only one respondent felt that their suspected stroke patients were not attended to immediately.

Figure 9. Attention received at destination hospital by suspected stroke patients.

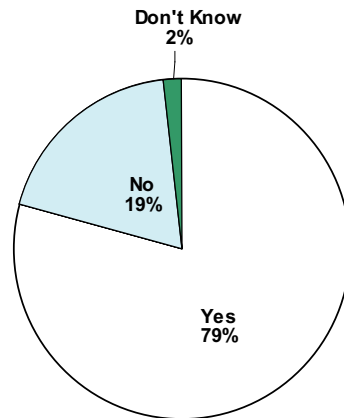


Question 10:

Is it your policy to notify hospitals in advance for all stroke patients who may be candidates for emergent/urgent care (where "urgent" means that a stroke team might be activated, staff are ready and act with urgency to attend to patient, etc.)?

It is a policy for the majority (N = 155, 79%) of respondents to provide advance notice to hospitals regarding stroke patients who need urgent care. A total of 38 (19%) respondents reported that this was not a policy for their agency.

Figure 10. Policy exists to notify hospitals in advance for all stroke patients who may be candidates for urgent care.

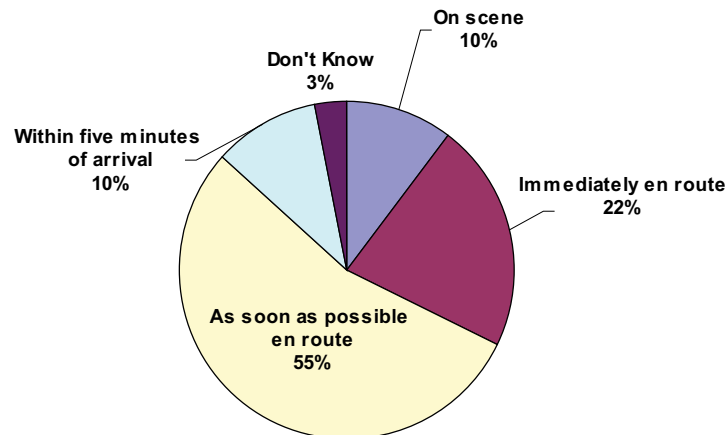


Question 11:

How early do EMS personnel typically activate the alert system for a stroke patient to the destination hospital?

Overall, 20 respondents (10%) reported that their personnel typically activate the alert system to the destination hospital for a stroke patient while on scene. 42 respondents (22%) activate the alert system immediately en route, while the majority (N = 105, 54%) alert the hospital as soon as possible en route. For 10% of respondents (N = 20), the alert system is activated within five minutes of their destination.

Figure 11. How early EMS personnel typically activate alert system for a stroke patient.

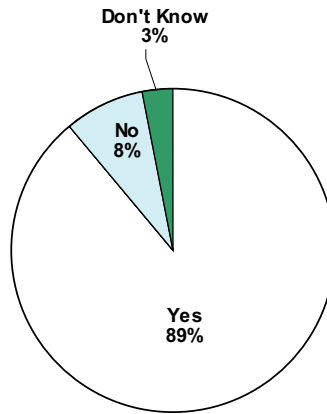


Question 12:

Suppose your ambulance crew has a suspected stroke patient with stable vital signs. Will the ambulance crew treat him/her as an emergent (urgent) patient?

The majority of respondents (N = 175, 89%) felt that their personnel treat suspected stroke patients as emergent cases.

Figure 12. Ambulance crew treats stable, suspected stroke patient as an emergent patient.

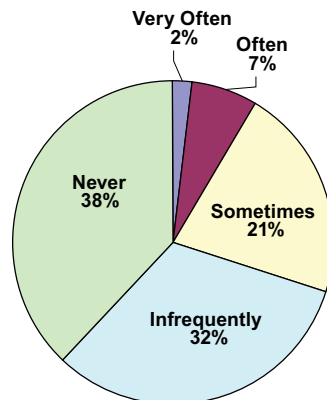


Question 13:

How frequently do you utilize a helicopter for transporting suspected stroke patients?

Helicopter transport is infrequently used overall. Four (2%) respondents reported using helicopter for transporting suspected stroke patients very often, and 13 (7%) use helicopter often. 42 respondents (21%) reported using helicopter sometimes, while the majority (N = 138, 70%) infrequently or never use a helicopter.

Figure 13. Frequency of helicopter use for transporting suspected stroke patients.



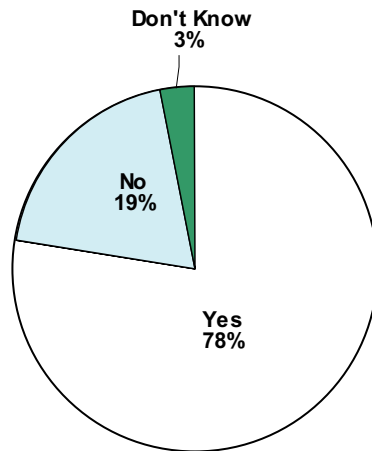
Pre-Hospital Care and Management of Stroke Patients

Question 14:

Do you have a written protocol or standing operating procedure (SOP) for **management** of a suspected stroke patient?

Overall, 152 respondents (78%) reported that they have a written protocol for management of suspected stroke patients, while 39 (19%) do not.

Figure 14. Standard operating procedure or written protocol for management of suspected stroke patients.

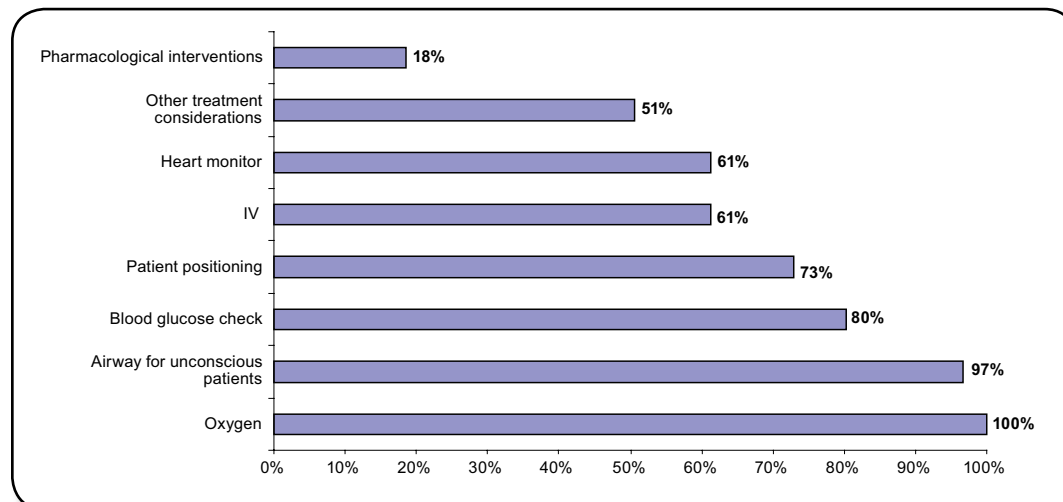


Question 15:

If Yes, please identify the treatments that are included in your written stroke SOP.

Respondents were given eight treatment options to identify as to whether they are included in their written stroke standing operating procedures. The most common options included were oxygen (100%), airway for unconscious patients (97%), and blood glucose check (80%). Pharmacological interventions were infrequently included (18%).

Figure 15. Treatments included in written stroke standard operating procedure.

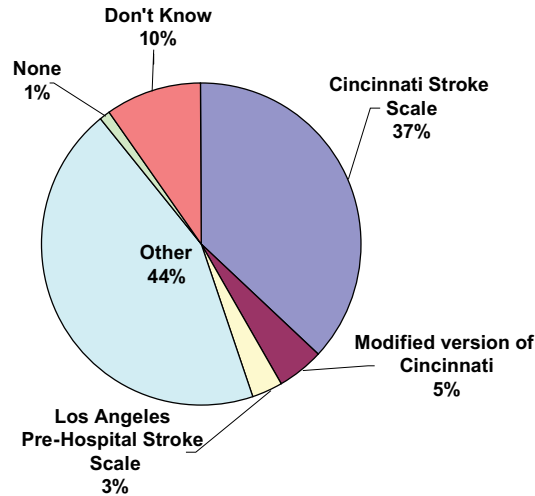


Question 16:

Which one of the following stroke scales are typically used by your personnel?

Overall, 83 respondents (42%) reported that the Cincinnati Stroke Scale, or a modified version of the Cincinnati Stroke Scale, is typically used by their personnel. Seven respondents (3%) reported that they use the Los Angeles Pre-hospital Stroke Scale. 38% of respondents (N = 75) reported using another scale; six respondents reported using the Glasgow Coma Scale.

Figure 16. Stroke scales used by personnel.

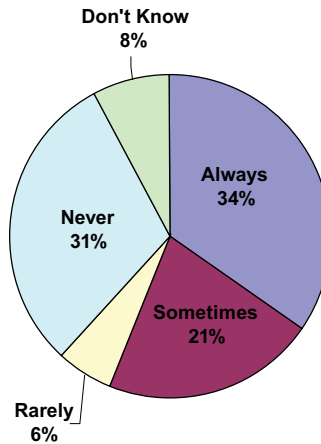


Question 17:

How often do your providers verbally report stroke scale findings to the destination hospital staff?

Overall, 68 respondents (35%) reported that their personnel always verbally report their stroke scale findings to destination hospital staff. 42 respondents (21%) reported that this happens sometimes, while 71 respondents (36%) reported that this is rarely or never done.

Figure 17. Frequency that providers verbally report stroke scale findings to destination hospital staff.



Question 18:

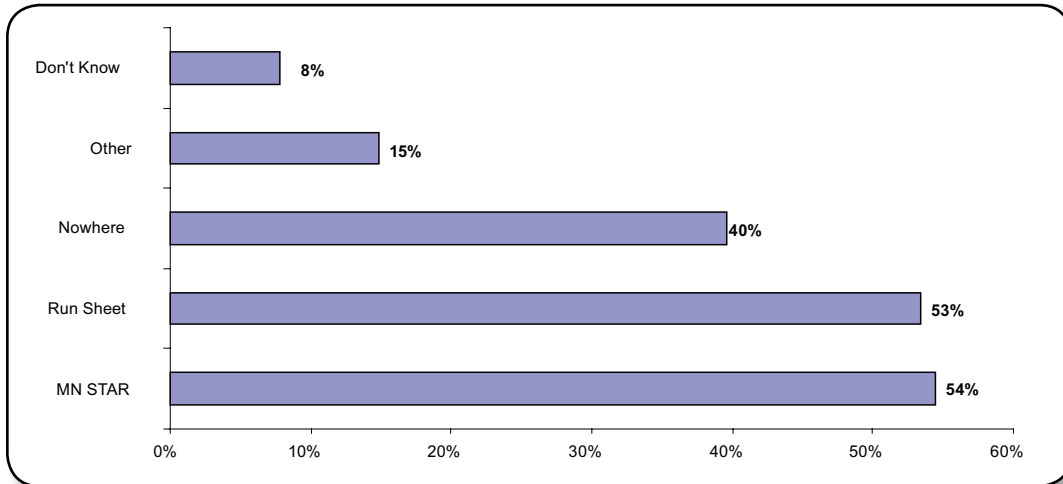
Do your providers record stroke scale data anywhere?

Question 19:

If Yes, Where?

Stroke scale data are recorded by 53% of responding agencies (N = 102). Just over half of these respondents reported that they record this information on the MNSTAR system and/or on a run sheet. Approximately 40% do not record this information anywhere.

Figure 18. Location of recorded stroke scale information.



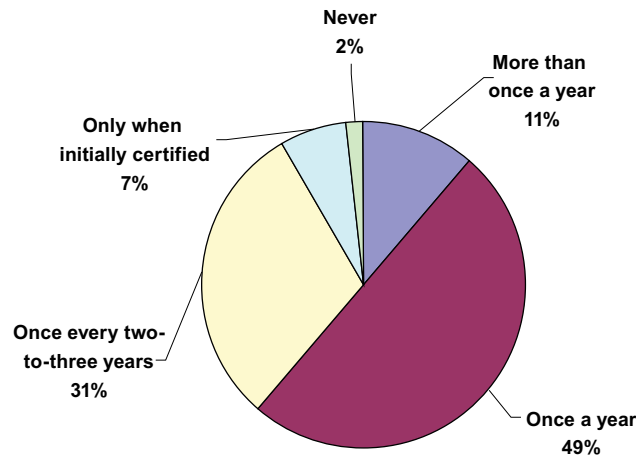
Training

Question 20:

How frequently are your personnel trained on stroke?

Overall, 22 respondents (11%) reported that their personnel are trained on stroke more than once a year. Half of the respondents reported that training occurs once a year (N = 97, 50%), and nearly one-third reported training occurs every two or three years (N = 60, 31%). A handful (N=16, 7%) reported that personnel are only trained when initially certified, or have never attended a training.

Figure 19. Frequency that personnel are trained on stroke.

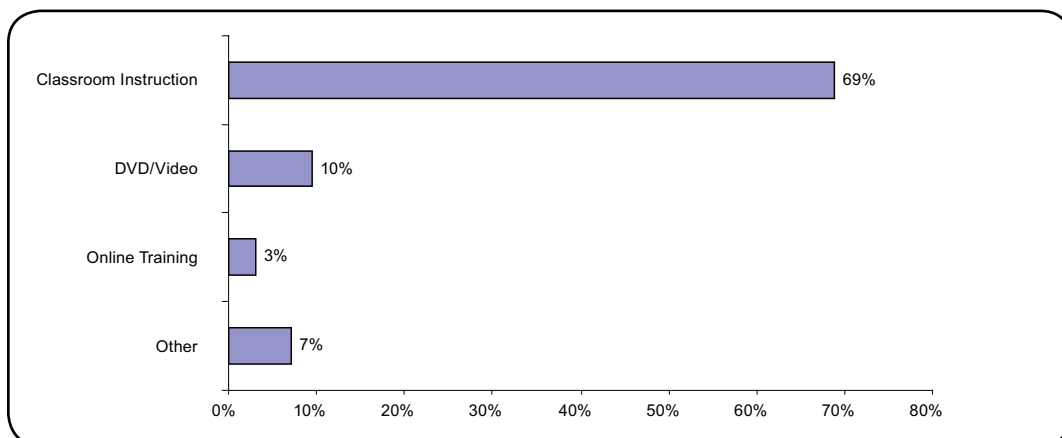


Question 21:

What forms of training on stroke are offered or encouraged by your organization?

Overall, 139 respondents (69%) reported that some in-person seminar/classroom training was offered or encouraged by their organization. 19 respondents (10%) reported that personnel used DVD or videos for training on stroke. Few respondents (N = 6, 3%) reported that online training was offered or encouraged. Fourteen respondents offered other types of training on stroke, including run reviews, EMT/ACLS refresher courses, sending personnel to the Arrowhead regional conference, or training at staff meetings.

Figure 20. Forms of training on stroke offered or encouraged by organization.

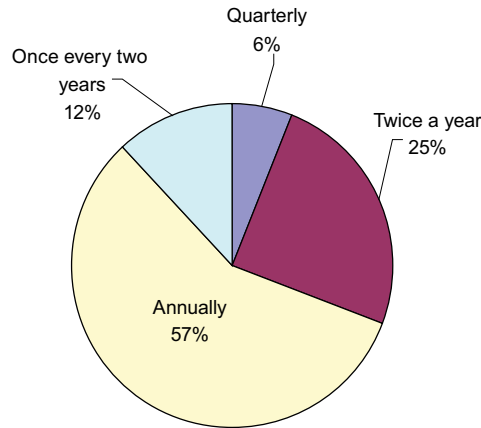


Question 22:

How frequently would you prefer that training opportunities for **stroke education** be made for your providers?

The majority of respondents preferred that stroke education training opportunities be made available semi-annually (N = 48, 25%) or annually (N = 111, 57%).

Figure 21. Preferred frequency of stroke education training opportunities.



Question 23:

What forms of training, **in general**, (continuing education, for obtaining contact hours) for your EMS providers are most effective?

The most frequently cited forms of training reported as most effective included regional conferences, statewide conferences, agency conferences and seminars, and personal computer-based trainings. The most commonly reported form of training was agency-sponsored conferences or seminars for EMT-Basic providers (positively reported in 79% of surveys). This form of training was also reported as effective for paramedics (32% of responses). Internet (Web)-based trainings were the second-most common method for paramedics (22%), with regional and statewide conferences about equally cited (18% and 16%, respectively). Teleconferences, videoconferences, and national conferences were least frequently cited as effective training vehicles.

Table 2. Percentage of all respondents indicating preference for training forms and methods.

Format	EMS – Basic	EMS – Intermediate	EMS - Paramedic	Paid Staff	Volunteer Staff
Personal Computer-based (Using the internet/ World-Wide-Web)	32%	8%	22%	16%	10%
Personal Computer-based (Using a CD-ROM)	20%	5%	12%	8%	9%
Teleconference Call	1%	0%	2%	1%	0%
Videoconference Call	3%	1%	4%	3%	1%
Your Own Agency/ Organization-sponsored conferences/seminars	79%	12%	32%	24%	26%
Regional Conferences	45%	6%	18%	12%	15%
Statewide Conferences	28%	6%	16%	11%	10%
National Conferences	3%	0%	2%	1%	1%
Other (please describe):	12%	0%	7%	6%	2%

Discussion

Urgency of Suspected Stroke Patients. Most respondents felt that dispatch considered strokes as emergent events. Moreover, most agencies have a policy to call the destination hospital in advance to notify them about the need for urgent attention for a potential stroke patient. This alert is typically given as soon as possible en route to the destination hospital, if not sooner. Very few services utilize a helicopter for transport of stroke patients. Transport by helicopter may not be practical nor worthwhile within the metropolitan area of Minneapolis and St. Paul. However, services in rural areas should consider utilizing air transport in cases where the window for thrombolytic therapy to be effective is still open for a patient.

The majority of respondents thought that hospital emergency staff attended to suspected stroke patients immediately. In some cases, respondents mentioned that a specialized stroke team typically received stroke patients at the hospital. Several respondents commented on or suggested the need to encourage neurologists, emergency staff, and hospitals in general to agree on guidelines and protocols for care.

Transport of Suspected Stroke Patients. While 78% of ambulance services have a written protocol for management of stroke patients, only 38% have a written policy for where acute stroke patients are to be transported. Based on the comments from this survey as well as anecdotal information, the patient or the patient's family is often (if not typically) asked for their preference of destination hospital. Often, the closest hospital (with an emergency department) is determined to be the destination hospital. The majority of hospitals in Minnesota claim to be prepared to either treat or transfer stroke patients. However, ambulance services should consider transporting stroke patients to a Joint Commission for the Accreditation of Healthcare Organizations (JCAHO) certified Primary Stroke Center if possible. This consideration may be difficult to adopt, however, as more than two-thirds of hospitals indicated that bypassing to a hospital with greater stroke care capacity would add at least 25 miles to the travel distance.

Management of Suspected Stroke Patients. As noted above, most ambulance services have a written protocol for management of suspected stroke patients. The most commonly utilized diagnostic tool for stroke patients is the Cincinnati Stroke Scale – or a simplified version of this tool. Overall, stroke scale information used in the pre-hospital setting is reported to hospital staff inconsistently. That is, many reported that their personnel always reported this information, but many only report it sometimes or never. This simple information may be useful to hospital staff in order to expedite treatment. Consideration should be made towards incorporating verbal notification of stroke scale information into an organizations policies.

Training. CD-ROM-based or web-based training curricula were suggested as effective vehicles for training ambulance personnel, particularly for volunteer staff who cannot attend regional or statewide conferences. Very few respondents indicated that online training, particularly on stroke, was being utilized. In addition, respondents cited conferences or seminars sponsored by their own agency most frequently as a vehicle of training, especially for EMT-B level personnel. Regional and statewide conferences were also frequently cited training forums for all levels of EMS professionals.

The *Minnesota Emergency Medical Services Stroke Care 2006* survey identified several areas where improvements in pre-hospital stroke care capacity should be addressed. The following are suggestions for areas which ambulance organizations individually – or a statewide collaboration of stakeholders – may consider making systems-level changes to improve pre-hospital stroke care in Minnesota.

- Strokes should continue to be treated as emergent events by pre-hospital emergency medical service personnel in Minnesota.
- A large proportion of respondents (25%) reported that first responders typically only provide vital signs information to ambulance staff regarding a suspected stroke case, while not providing information that they suspect it is a stroke. Consideration should be made to teach first responders the signs of a stroke and to communicate this to ambulance personnel.
- All ambulance service organizations should be encouraged to utilize the Cincinnati Stroke Scale as the standard for assessment of suspected stroke patients. This is the most commonly used scale currently by Minnesota ambulance personnel. By having all ambulance organizations voluntarily adopt use of the Cincinnati Stroke Scale, a common standard for training and education of ambulance personnel can be established.
- Similarly, hospital emergency staff should be informed that this standard is being encouraged, and pre-hospital providers should include in their standard operating procedures to always verbally provide this information to the hospital emergency department staff. This will potentially aide in the efficiency of care provided in the destination hospital.
- Pre-hospital EMS providers need to be informed where primary stroke centers are located and educated about recent recommendations for stroke systems of care.
- Training for pre-hospital EMS providers on stroke issues should be provided on an annual or semi-annual basis. This training should be offered, but not mandated for ambulance personnel.
- Classroom education or regional conferences and seminars are likely the most effective methods for education and training. Internet-based training should also be provided as an option for continuing education.

Project Limitations

There are some limitations this survey which should be considered. Accuracy of responses was limited to respondents' knowledge of stroke practices and capacity. It is unknown to what extent respondents queried more informed colleagues to answer questions for which they were unsure. In addition, self-reported information has the potential for bias towards positive answers when the opposite may be true. Moreover, none of the responses were confirmed by external review or formal inquiry. Although there are limitations to this survey, these data are valuable towards planning changes and developing a training curricular for pre-hospital stroke care in Minnesota.

Conclusions

The results of this assessment will guide the Minnesota Department of Health Heart Disease and Stroke Prevention Unit and the Minnesota Stroke Partnership in planning for systems-level intervention and training programs to improve pre-hospital stroke care in Minnesota. In addition, we hope that emergency medical service organizations take these results and be motivated to make appropriate changes in their agencies to improve the quality of care for their stroke patients.

For more information about this survey or the Minnesota Stroke Partnership, please contact the Minnesota Heart Disease and Stroke Prevention Unit at (651) 201-5413.

Acknowledgements

The Heart Disease and Stroke Prevention Unit at the Minnesota Department of Health wishes to thank the Minnesota Stroke Partnership EMS Stroke Task Force members for their involvement on this project:

- Mary Hedges, Minnesota Emergency Medical Services Regulatory Board
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- Mike Reid, Allina Medical Transport
- Lance Ross, Metropolitan Emergency Services Board
- Tom Vanderwal, Greater Northwest Emergency Medical Service
- Gary Wingrove, Gold Cross/Mayo Medical Transport

Appendix A. Survey



Minnesota Emergency Medical Services Stroke Care Survey 2006

Thank you for taking the time to complete this short survey. Your responses will help the Minnesota Stroke Partnership in developing and delivering appropriate training curricula for your personnel. We will communicate the results of this survey to you upon completion, as well as steps that will be taken to address needs that you tell us about. Should you have any questions about the survey or the work of the Minnesota Stroke Partnership, please contact Albert Tsai at (651) 201-5413 or by email at albert.tsai@health.state.mn.us. Thanks again!

Regards,

Albert Tsai, PhD, MPH
Minnesota Department of Health

Mary Hedges, MPA
Minnesota Emergency Medical Services Regulatory Board

Please Return Survey By June 30, 2006

Choose one of three methods to reply:

1. Complete survey online at: www.health.state.mn.us/emsstrokesurvey
2. Return by fax: **(651) 201-5800**, or
3. Return by Mail to: Albert Tsai

Minnesota Department of Health
P.O. Box 64882
St. Paul, MN 55164-0882

Your Contact Information (please print and correct if necessary)

Agency/Organization: «Ambulance_Service_Name»

Name: «First_Name» «Last_Name»

Phone:

Information About Your Organization

1. Please estimate the number of EMS personnel in your service:

Category	Number of personnel
First Responders	
EMT-Basic	
EMT-Intermediate	
EMT-Paramedic	
Paid	
Volunteer	

2. Which EMS Region do you primarily service? (Choose only one)

- a. Metro (Minneapolis/St. Paul)
- b. Central
- c. Northeast/Arrowhead
- d. Northwest
- e. West Central
- f. Southwest
- g. South Central
- h. Southeast

Stroke Patient Transportation

3. Are strokes typically treated as emergent (urgent) by dispatch?

- a. Yes
- b. No
- c. Don't Know

4. What do your first responders typically provide your ambulance staff upon arrival on a suspected stroke patient?

- a. Comprehensive information about the suspected stroke patient
- b. Some information about signs/symptoms/vital signs, and that patient is a suspected stroke victim
- c. That she/he is a suspected stroke patient, but nothing more
- d. Just information about signs/symptoms/vital signs
- e. No information at all
- f. Don't Know

5. Do you have a written policy to determine where acute stroke patients are transported?

- a. Yes
- b. No
- c. Don't Know

6. Please list the hospitals that stroke patients are typically transported to most often:

- a. Hospital 1 (first option):
- b. Hospital 2 (second option):

7. Do you typically bypass one or more hospitals to transport suspected stroke patients to a hospital with more stroke care capabilities?

- a. Yes
- b. No
- c. Don't Know

8. If you would bypass a hospital to go to another with greater stroke care capabilities, what would be the average additional distance driven to the final destination hospital?

- a. 0-9 miles
- b. 10-24 miles
- c. 25-49 miles
- d. 50+ miles

9. What kind of attention do your suspected stroke patients typically receive at the destination hospital?

- a. Specialized stroke team is waiting and ready to care for patient
- b. Patient is attended to immediately (patient can be registered immediately, nursing staff starts evaluation)
- c. Patient is not immediately attended to
- d. Don't Know

10. Is it your policy to notify hospitals in advance for all stroke patients who may be candidates for emergent/urgent care (where “urgent” means that a stroke team might be activated, staff are ready and act with urgency to attend to patient, etc.)?

- a. Yes
- b. No
- c. Don't Know

11. How early do EMS personnel typically activate the alert system for a stroke patient to the destination hospital?

- a. On scene
- b. *Immediately* en route
- c. As soon as possible, en route
- d. Within five minutes of arrival to destination
- e. Don't Know

12. Suppose your ambulance crew has a suspected stroke patient with stable vital signs. Will the ambulance crew treat him/her as an emergent (urgent) patient?

- a. Yes
- b. No
- c. Don't Know

13. How frequently do you utilize a helicopter for transporting suspected stroke patients?

- a. Very Often
- b. Often
- c. Sometimes
- d. Infrequently
- e. Never

Pre-Hospital Care and Management of Stroke Patients

14. Do you have a written protocol or standing operating procedure (SOP) for **management** of a suspected stroke patient?

- a. Yes
- b. No
- c. Don't Know

15. If **Yes**, please identify the treatments that are included in your written stroke SOP.

Treatment	Yes	No
Patient Positioning		
Oxygen		
I.V.		
Heart Monitor		
Pharmacological interventions		
Blood glucose check		
Airway for unconscious patients		
Other treatment considerations		

16. Which one of the following stroke scales are typically used by your personnel? (Choose only one)

- a. Cincinnati Stroke Scale
- b. Modified version of Cincinnati Stroke Scale
- c. Los Angeles Pre-hospital Stroke Scale
- d. Other, please specify:
- e. None
- f. Don't Know

17. How often do your providers verbally report stroke scale findings to the destination hospital staff?

- a. Always
- b. Sometimes
- c. Rarely
- d. Never
- e. Don't Know

18. Do your providers record stroke scale data anywhere?

- a. Yes
- b. No
- c. Don't Know

19. **If Yes**, Where (check all that apply)?

- a. MN STAR System
- b. Run Sheet (paper)
- c. Other, please specify:

Training

20. How frequently are your personnel trained **on stroke**?

- a. More than once a year
- b. Once a year
- c. Once every two-to-three years
- d. Only when initially certified
- e. Have never attended a training

21. What forms of training on **stroke** are offered or encouraged *by your organization*?

Format	Hours per Year	Title of Training (if available)	Title of Presenter/ Instructor
In-person seminar/classroom			
Online (Internet/WWW)			
DVD or Video			
Other, please specify:			

22. How frequently would you prefer that training opportunities for **stroke education** be made for your providers?

- a. Monthly
- b. Quarterly
- c. Twice a year
- d. Annually
- e. Once every two years

23. What forms of training, **in general**, (continuing education, for obtaining contact hours) for your EMS providers are most effective? (Check all that apply)

Format	EMS – Basic	EMS – Intermediate	EMS - Paramedic	Paid Staff	Volunteer Staff
Personal Computer-based (Using the internet/ World-Wide-Web)					
Personal Computer-based (Using a CD-ROM)					
Teleconference Call					
Videoconference Call					
Your Own Agency/Organization-sponsored conferences/ seminars					
Regional Conferences					
Statewide Conferences					
National Conferences					
Other (please describe):					

24. Your feedback on this survey and its contents are appreciated. Please use this space for any comments.

Thank you for completing this survey!

Appendix B. Comments (Question 24)

1. It's difficult to treat strokes since territory treatment of strokes is still being debated. Each individual neurologist has different guidelines/protocols for treatment of strokes.
2. We treat all our runs as an emergency as our closest hospital is 15 minutes away. Depending on what direction the run is on.
3. Please also consider in personnel non-EMT, non-first responder (drivers and bystanders). PLEASE DO NOT USE THIS INFO TO DESIGNATE MORE MANDATED TRAINING. I do not have enough hours in the month to train Rural EMS volunteers as it is. Always remember this....
4. You should probably ask more of treatment capabilities and EMS knowledge of each facilities level of care for triaging stroke patients for optimal care within time to treatment parameters. This is especially critical in the rural outstate areas of Minnesota
5. This survey does not fit our service well; we have multiple hospitals in a very large service area, two of which have stroke centers. We have many training opportunities for our staff but personnel may go to different sites.
6. Concern on volunteer services we want staff highly trained but overwhelming them with educational requirements. Need concise direct info for crew. Need a listing of which hospitals have stroke teams. Those hospitals need to let crews know what info they need so they can decide on stroke team activation.
7. We operate our ALS service by sub-contracting Allina medics and staffing <deleted> FD EMTs. We are depending on the fact that the Allina medics are in touch with SOP and other directives that may not be consistent with my answers.
8. Handling a stroke patient as "urgent" does not necessarily mean they are transported red lights and siren. Many of our <deleted> crews at our multiple site alert the dispatcher from the scene that a patient is a "Priority Patient".
9. Staffing at our <deleted> site is also at an ALS level - achieved by using paramedic from our <deleted> roster teamed with an EMT in <deleted>. The <deleted> hospital might be bypassed by this crew if the call location is actually closer to <deleted>.
10. I only listed 7 EMT staff. Be aware that the crews in <deleted> are at an ALS level because we use a paramedic out of <deleted> location/roster to make up the ALS crew. All of our <deleted> sites have primarily or exclusively ALS crew level of s....
11. These responses also reflect our scene response patient's who originate in <deleted>, primarily <deleted> County where we are the primary ALS/911 service. The <deleted> hospital may be by-passed (diverted) for urgent stroke patients after obtaining directions...
12. Crews occasionally notify dispatch from scene that this is a "Priority Patient" and the dispatch then telephones hospital to prepare for this critical patient. This might include a severe stroke patient.
13. Handling a stroke patient does not mean they will necessarily be transported red lights and siren.

14. We are in an extreme rural setting. Hospitals and physicians have different opinions regarding stroke. It is difficult to be aggressive with care due to different views. Hospitals and physicians need to be more educated on a universal level, otherwise, what we do in the field can't change or have consistency.
15. We have some members that attend training and classes around our area-but most of our training is done at monthly meetings by our training officers and we do the 24-hour refresher through <deleted> County Ambulance, <deleted> MN. I don't remember hearing about those stroke scales - I would like more info on that.
16. The <deleted> fire department is a BLS Ambulance service that responds as First Response to EMS calls within our area. Patients are treated and transferred to care of <deleted> ALS ambulances for transportation.
17. We are rural - our hospitals are 20+ miles out in all directions. We don't bypass hospitals. The patient/family decide where the patient goes. Paramedic intercept is 10 - 15 minutes out. It's sometimes faster to just get the patient to the hospital.
18. We have police paramedics and firefighter EMTs. Therefore the question on 1st responder info being passed on is not applicable. We have no volunteers but do have paid-on-call firefighters. Since most people mistakenly call them volunteers that is how I r.....
19. We will generally transport suspected stroke patients to <deleted>. They have a CT Scan/MRI for our area that is the closest facility in our area. We try to get patient to hospitals within the 1st hour of stroke onset. If CT scan is down we transport to <deleted> or <deleted>. Those hospitals are 20-25 minutes away. If <deleted> can get treatment started then have patient transferred to <deleted> area hospitals by ALS.
20. I would like to see a good DVD put out by the state. FREE Also a CD-Rom class so services can do this at home to refresh on strokes.
21. Good updated training. DVD or VCR tapes for immediate care and EMT Basic Training with emphasis on new treatment for stroke and evaluation. With volunteers it's often very difficult to train outside of a training session.
22. I feel we need more online classes on stroke, treatments. We are still developing a plan of care to initiate the stroke plan of care. I could use some help in staff recognition of the need for expedition of CT and treatment with the three-hour window.
23. We are centrally located between <deleted> and <deleted>. Both have CT scanners so we have no 1st or 2nd choice for hospitals. We try to accommodate the patient and patient's family. Prior to <deleted> getting the CT, we would give them the patient information regarding <deleted> as an option, and let them make the choice.
24. Since we are located a great distance from a hospital that has greater stroke care capabilities, it would be beneficial to have a "state" policy on alert system as guidelines for the treatment of stroke patients.
25. Due to being so rural and short staffed it's best to have training come to us. I would really like the results of this survey. In our small service territory it seems we have a lot of TIA/ CVA patients that we transport, either patient pickups and then for CT scans or transfers to bigger facilities, but we don't have near the training that we have for cardiac patients.

26. We have a unique service focusing on the <deleted> and not responding to 911 calls. Our folks are repositioned at large events and only respond to needs at that event. Ergo our answers may be a bit different.
27. I feel that our hospital is very aware of the importance to diagnose early and properly treat stroke victims. They are also not hesitant to transport to a more advanced medical facility and are aggressive in making timely decisions.
28. <deleted> hospital ED does have a stroke response team protocol but this education has not been taken out to the regional pre-hospital providers. There is no place on the MN Star report to calculate a stroke scale.
29. For our service, stroke victims or suspected stroke victims are treated with O2 and rapid transport. Call ahead to destination and give verbal update en route.
30. Our service is comprised of 18 paid on call EMTBs and one fulltime EMTB. Some of us have had some training in the Cincinnati Stroke scale and use some of it. We are planning on doing more training for the entire staff. Our ED is always notified immediately.
31. I think that training on this topic isn't given enough. A variety of training options made available, such as a video or online, would greatly help.
32. Great Survey
33. I love it
34. Good survey. I think many rural volunteer ambulance services are under-trained in strokes.
35. <deleted> medical director and I are reviewing the stroke guidelines, and written letters to the ERs about the CTs and staff hours and calling ahead to have their CT ready for <deleted> patients. Thanks, <deleted> - Please send info.
36. Would think use of a CD-Rom would be beneficial. Not aware of availability.
37. Recommended SOPs for CVA and other medical emergencies that services could use as a baseline to develop their own.
38. I filled this out about our staffing only. Did not include first responders we work with. I also did not include call from our hospital to a higher level of care hospitals.
39. I feel this survey was well thought out. I believe it will benefit all services to help get stroke patients to the appropriate hospital.
40. It would be really nice to have a program like the Epilepsy Foundation's Status Epilepticus or the SIDS center's video based training. That way, ambulance managers could facilitate QUALITY stroke education. The AHA Stroke video is good, but mostly aimed...
41. It would be nice to get the state or EMSRB to sponsor some training to come into our area.
42. On question #5, I understand that our medical directors are in the process of determining which hospitals will be designated "stroke hospitals".

43. We are a rural ambulance service with hospitals a minimum of 25 miles apart. Nearly all stroke patients are taken to the same hospital, however the on duty crew notifies the receiving hospital immediately en route to the scene of a possible stroke patient and gives an update when patient is loaded and being transported to hospital. The hospital does not have a "stroke team" but is always prepared and awaiting our arrival. There is minimum delay at the local hospital in transporting the stroke patient to a higher level of care.
44. We seem to have more problems getting our sick people to call 911 or go into an ER or clinic. Our nursing home staff needs to be updated and trained on how to care for stroke patients, they wait too long before calling us. We get very upset and I have spoken with the educating staff there.
45. Handling stroke patients emergently/urgently, does not necessarily mean red lights and siren.

Emergency Medical Services and Stroke Care in Minnesota – Summary Report. Minnesota Emergency Medical Services Stroke Care Survey 2006. Minnesota Heart Disease and Stroke Prevention Unit, Minnesota Department of Health, December 2006.

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