National Healthline Responses to a Stroke Scenario
Implications for Early Intervention

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Background and Purpose—Acute stroke is a time-dependent emergency in which patients often arrive outside of the therapeutic treatment windows. To determine the role that healthlines may have in promoting early presentation, this study evaluated patterns of healthline triage of potential stroke patients.

Methods—Phone numbers of healthlines at 82 United States hospitals with neurology residencies were acquired. Each healthline was called and the operator was presented with a standardized scripted stroke patient scenario. The operator was asked to choose 1 of 4 responses that could be given to the patient (wait for symptom resolution, contact a primary care physician, drive to a local urgent care center, call 911 for ambulance transport). The operator was then asked to name common signs and symptoms of stroke. If the operator transferred the call, the process was repeated.

Results—Forty-six healthlines participated, with 22% recommending that the patient contact a primary care physician. The remaining 78% recommended calling 911. Calls were transferred at least once in 18 cases, and 24% of the operators could not name 1 sign or symptom of stroke.

Conclusions—Nearly one-quarter of potential stroke patients were routed away from emergent treatment for the described scenario. By diverting patients away from emergency therapy, patients are in jeopardy of “falling” out of the windows for therapy. Improved stroke education for healthline personnel may result in stroke patients arriving at an emergency department more urgently. (Stroke. 2007;38:2376-2378.)

Key Words: consultation ■ referral ■ stroke ■ telephone

Acute stroke is a time-sensitive condition, and previous studies have examined the reasons for delay in patient presentation to an emergency department.1–4 There is overwhelming evidence that stroke patients who arrive at an emergency department by emergency medical services have shorter prehospital time delays.1–7

Many hospitals provide a healthline that patients can call for medical advice. When patients have stroke symptoms they may choose to seek direction from a healthline operator. It is critically important that callers describing possible stroke symptoms be advised of the need to call 911 to increase the likelihood that eligible patients present to an emergency department within the treatment windows. To our knowledge, no study to date has examined healthline operators’ knowledge of the signs and symptoms of stroke or the appropriateness of the advice given to potential stroke patients or their families.

Subjects and Methods
The Electronic Residency Application Service (ERAS) by the Association of American Medical Colleges was used to identify neurology residencies located within the United States. Hospitals affiliated with these residencies and their corresponding main phone numbers (our definition of “healthlines”) were located from the residency websites. In cases in which the residency websites did not list a hyperlink or phone number for an affiliated hospital, the Google Internet search engine was used to locate the hospital’s website and phone number. If >1 hospital was associated with a residency, only 1 hospital was chosen for inclusion in the study.

Each healthline was called and the operator was presented with a standardized scripted stroke scenario (Figure 1). The operator was asked to choose which 1 of the 4 responses would be given to the patient. Option “d” of the scripted scenario (call 911) was considered the correct response. The operator was then asked to name common signs and symptoms of stroke. If the operator transferred the call, the process was repeated. This study received expedited approval by the West Virginia University Institutional Review Board for the Protection of Human Subjects. The requirement for informed consent was waived. Data were entered into Microsoft Excel (version 2003; Microsoft Inc, Redmond, Wash) and imported into SPSS (version 13.0; SPSS Inc, Chicago, Ill) for analysis.

Results
Figure 2 shows the flow of participants (healthlines) through the study. Forty-six healthlines from 27 states (Figure 3) and 41 cities participated. The combined population of these cities was 30 121 684, and >3 million

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Residents were older than 65. Nineteen healthlines were located at hospitals with a Joint Commission (JCAHO)-certified primary stroke center.

Overall, 10 healthlines (22%) recommended that the patient contact their primary care physician. The remaining 78% recommended emergency medical services transport. Among healthlines at hospitals with a JCAHO stroke center, 6 (32%) recommended contacting the primary care physician. The most common reason cited for transferred calls was transfer to the emergency department. Almost one-fourth of the operators (24%) could not name even 1 sign or symptom of stroke. Four of the 10 operators that recommended primary care physician contact named at least one correct sign or symptom of stroke.

**Discussion**

Nearly one-quarter of participating healthline operators routed potential stroke patients away from emergency treatment in the described hypothetical scenario, and the original phone call was transferred at least once by 39% of the participants.

Most stroke patients do not receive reperfusion therapy because they present outside of the established treatment windows.8,9 Although the cause of this delay is multifactorial,
awareness of stroke signs and symptoms\textsuperscript{3} and recognition of the need to seek urgent treatment\textsuperscript{4,10} have been associated with earlier emergency department presentation. These 2 factors may help explain why 22\% of the operators failed to give the correct advice (call 911). One-fourth could not name a sign or symptom of stroke (awareness factor), and the 40\% of operators who gave the incorrect response but could recall at least one sign or symptom of stroke may not have understood the urgency of stroke.

There are limitations to our study. Hospitals with neurology residencies were chosen under the assumption that they would be the most aggressive in directing patients to call 911. However, this choice may introduce bias into the results because these hospitals may not represent the full spectrum of all hospital healthlines. Furthermore, not all of the hospitals associated with each residency program were called, and our response rate was 56\%. However, we feel that the demographics of the municipalities served by the participating healthlines represent a broad spectrum that mirrors the whole country. Finally, the caller identifying himself as a researcher may also have affected the response. However, it must be noted that the caller did not mention that the patient scenario was a stroke or an emergency.

Summary
By diverting patients away from emergent evaluation, stroke patients are in jeopardy of “falling” out of the narrow therapeutic windows. Improved stroke education for healthline personnel may reduce the time to presentation for many stroke patients by increasing the frequency of callers directed to call 911. At a minimum these operators should be trained to recognize the elements of the Cincinnati Prehospital Stroke Scale (facial droop, arm drift, slurred speech), although hospitals should emphasize calling 911 for stroke symptoms rather than calling a healthline. Future studies should examine how to best educate healthline operators in taking a history of potential stroke patients and include more community hospitals.

Disclosures
None.

References
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