



  
**MONTANA**  
CARDIOVASCULAR HEALTH PROGRAM

**MONTANA**  
Stroke Initiative



PROGRESS IN STROKE TREATMENT  
CAPACITY IN **MONTANA** AND  
**NORTHERN WYOMING**

**EMERGENCY**



# INTRODUCTION

Stroke, the fifth leading cause of death in Montana (1) and one of the leading causes of death in Wyoming, remains a serious and disabling disease. Treatment to prevent disability in acute stroke is now available for certain underlying causes of stroke, but evidence to support these treatments is based on evaluation and treatment within 3 hours of symptom onset to preserve brain tissue. (2) Coordinating diagnostic evaluation and treatment with thrombolytic agents in acute ischemic stroke requires coordination with Emergency Medical Services (EMS) and prompt Emergency Department (ED) responses according to well-defined protocols to ensure timely care. To recognize that specific stroke care processes are in place, a certification process has been established. (3) Some referral hospitals in Montana have become certified as stroke centers in recent years.

Ensuring the availability of diagnostic technology, services, and personnel for acute stroke care in small rural hospitals is an ongoing challenge in Montana and northern Wyoming. Critical Access Hospitals (CAH) face particular problems with 24/7 staffing and distance from specialty referral centers for many conditions. In a 2004 assessment of hospitals in Montana and northern Wyoming, the Montana Stroke Initiative, a cooperative partnership between the Montana Cardiovascular Health

Program and others interested in stroke across the state, documented gaps in services for stroke in rural and frontier counties. (4) Stroke specialists and others then began a coordinated effort to address the gaps which were identified in the 2004 survey. In addition, several key referral hospitals in Montana obtained Primary Stroke Center (PSC) certification from the Joint Commission on Accreditation of Hospital and Health Care organizations (JCAHO). (5) Education programs were held about stroke, and public education campaigns were conducted across the region to increase the level of awareness about stroke as an urgent, treatable medical problem. A special web site for stroke resources was established (<http://www.montanastroke.org/Protocols.htm>), and sample protocols were distributed to all CAH in Montana.

To assess progress in addressing stroke, all hospitals across the region were surveyed again in 2008. This report presents findings from the 2008 survey and compares the results with the previous survey. The results document remarkable progress during the past four years in the capacity to evaluate and treat stroke in small and large hospitals across Montana and northern Wyoming.



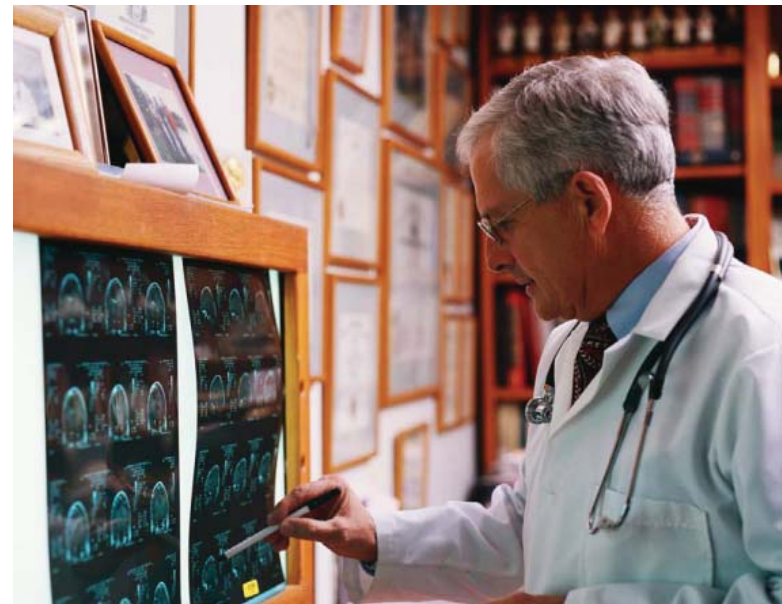
## METHODS

The Montana Cardiovascular Health Program received a list of all 64 hospitals in Montana from the Montana Hospital Association website, and a list of nine hospitals in northern Wyoming was obtained from the Wyoming Heart Disease and Stroke Prevention Program Manager in 2004. Five specialty hospitals were excluded because they did not provide acute care for adults. For the remaining 68 hospitals, a letter was sent with the 2008 survey instrument to the Chief Medical Director/Officer of each facility notifying them of the survey, explaining the purpose and encouraging their Stroke/ED Supervisor/Director to complete the survey. A similar letter was sent to the Stroke/ED Supervisor/Director explaining the purpose of the survey and encouraging them to complete it. A self-addressed stamped envelope was included in the letter for their convenience in returning the completed survey. The questionnaire also provided a fax number for respondents who would rather send the completed survey electronically than the mail. To increase the response rate, telephone reminder calls were made two weeks after the initial mailing to those who had not returned a completed survey, and a second survey was sent to non-respondents.

The survey consisted of 68 questions that assessed availability of diagnostic, treatment and educational services in the pre-hospital, hospital and community

setting. To evaluate the responses, hospitals were classified into three categories: Primary Stroke Center (PSC), Critical Access Hospital (CAH) or Other. Although there were no formally certified stroke centers in 2004, four hospitals in the region were working toward accreditation from JCAHO and have since become formally certified. Therefore, these hospitals were classified as PSC for both the 2004 and 2008 surveys. Hospitals that are limited service hospitals designed to provide essential services in rural communities and that obtained Centers for Medicare and Medicaid Services certification (6) were defined as a CAH, and the remaining hospitals that were neither formally designated as PSC or CAH were classified as Other.

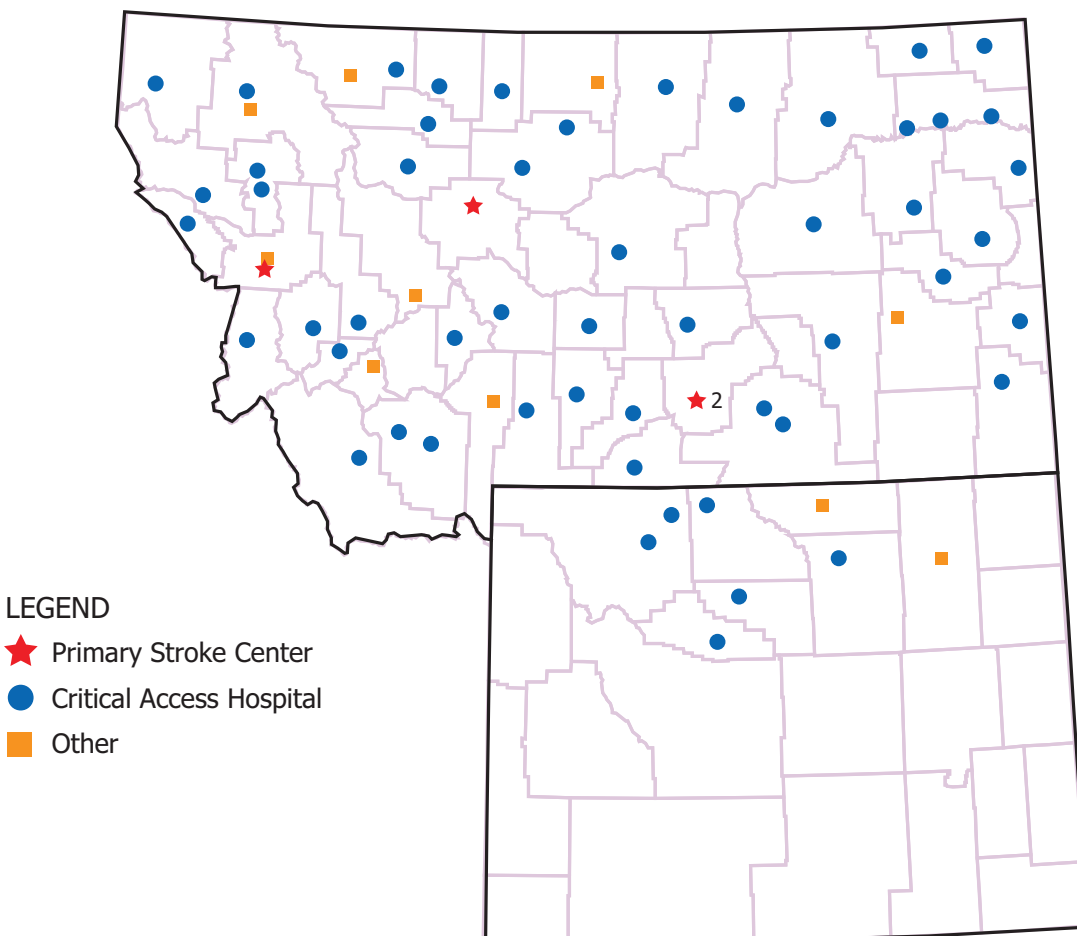
Data analyses were completed using SPSS V14.0 software (SPSS Inc., Chicago, IL). Chi-square tests were used to compare differences in the availability of individual diagnostic tests, programs and personnel for acute stroke care stratified by type of hospital.



# RESULTS

In 2008, there were 68 non-specialty hospitals in Montana and northern Wyoming. There was a slight increase in the survey response rate from 85% (58 of 68) in 2004 to 91% (62 to 68) in 2008. The locations of the four PSC, 53 CAH and the 11 remaining other hospitals are shown on the map of Montana and Wyoming. (Figure 1)

**FIGURE 1.** Location of hospitals, by hospital type, Montana and northern Wyoming, 2008.





From 2004 to 2008, overall and particularly among CAH, there were significant improvements in the availability of an EMS in-field stroke victim assessment tool (e.g., Cincinnati stroke scale or Los Angeles pre-hospital screen), and community stroke awareness programs. Additionally, there were also improvements in the availability of written protocols for stroke in the ED and a written tissue plasminogen activator (rtPA) protocol for thrombolytic therapy of acute ischemic stroke during the same time-period.

**TABLE 1.** Availability of pre-hospital and hospital services/programs, by hospital type, Montana and northern Wyoming, 2004 and 2008

	PSC		CAH		Other		Total	
	Pre (4)	Post (4)	Pre (39)	Post (49)	Pre (15)	Post (10)	Pre (58)	Post (63)
<i>Pre-hospital</i>	%	%	%	%	%	%	%	%
In-field assessment tool	100	100	47	72*	50	44	51	70*
Mechanism to pre-notify hospital by EMS	100	100	92	94	100	100	95	95
Professional stroke education for EMS		100		74		50		72
Community stroke awareness program	100	75	14	49*	13	75*	20	54*
<i>Hospital services</i>								
Written ED stroke protocol	100	100	45	81*	64	89	54	83*
Written rt-PA protocol for acute ischemic stroke	100	100	64	80	67	100	67	84*
Administered rt-PA for stroke in past year		100		49		63		55
Established relationship to transfer acute stroke	0	25	87	96	87	86	81	90
Stroke diagnostic capabilities	100	100	54	67	80	100	64	74
CT scan	100	100	54	100*	80	100	64	100*
CT scan available 24/7	100	100	82	92	100	80	90	91

\*P-value  $\leq$  0.05

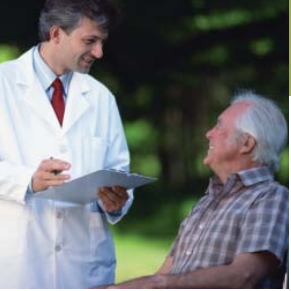


CT scan availability, overall, significantly improved from 64% in 2004 to 100% in 2008 with over 90% having 24/7 availability. This improvement was again especially notable among CAH where CT scan availability increased from about 50% in 2004 to 100% availability in 2008. (Table 1) Overall, there was also significant improvement in the availability of stroke teams from 5% in 2004 to 24% in 2008. (Table 2) In addition, the percentage of hospitals reporting that stroke rehabilitation services were available in their facility or within their community increased from 65% in 2004 to 74% in 2008; however, this improvement did not reach statistical significance.

**TABLE 2.** Availability of hospital inpatient services, programs, and personnel, by hospital type, Montana and northern Wyoming, 2004 and 2008

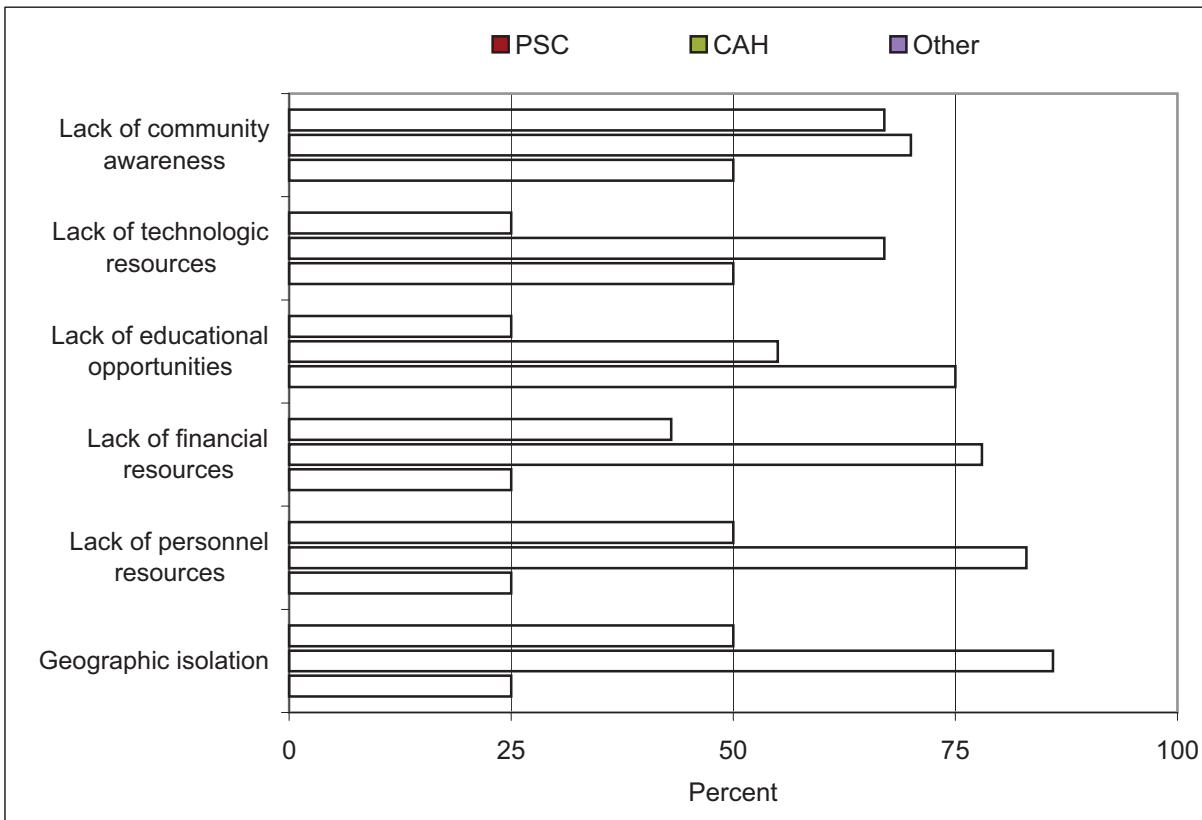
	PSC		CAH		Other		Total	
	Pre (4)	Post (4)	Pre (39)	Post (49)	Pre (15)	Post (10)	Pre (58)	Post (63)
<i>Services/Programs</i>	%	%	%	%	%	%	%	%
Intensive Care Unit	100	100	51	39	73	100	60	52
Stroke Unit	50	100	5	0	0	22	7	10
Rehabilitation services	100	100	63	69	60	89	65	74
Intervention capabilities	75	75	13	6	31	22	22	13
24/7 intervention capabilities	100	67	80	100	50	100	75	88
Stroke registry/database		100		30		33		35
Professional education opportunities		100		67		50		67
<i>Personnel</i>								
Acute stroke team	75	100	0	18*	0	22	5	24*
Acute stroke team available 24/7	100	100		88		100	100	93
Neurologist available 24/7	100	75	33	83	63	50	77	69

\*P-value  $\leq$  0.05



In 2008, the survey included additional questions focused on barriers to stroke care that were not asked in 2004. Among the PSC, the three top barriers included lack of community awareness (50%), lack of technologic resources (50%) and lack of educational opportunities (75%). Among CAH, over 75% of respondents identified lack of financial resources, lack of personnel resources and geographic isolation as barriers to stroke care while among the remaining hospitals surveyed, lack of community awareness was the major barrier. (Figure 2)

**FIGURE 2.** Barriers to stroke care, by hospital type, Montana and northern Wyoming, 2008.





## CONCLUSION

The findings of the 2008 survey show very substantial improvements in the capacity to evaluate and treat acute stroke across the region. Such improvements would not have happened without the cooperation of Emergency Medical Services, the Montana Rural Healthcare Performance Improvement Network, stroke centers and stroke neurologists across the state. Critical Access Hospitals have been particularly active in developing and adopting protocols and coordinating care with referring facilities to reach stroke victims in rural Montana. Resources to address stroke continue to grow across the region. The stroke web site is updated periodically as a resource for health professionals to access current information and tools such as standing orders and stroke screens. In addition, a telemedicine project has been initiated, which provides a two-way audio/video link between EDs in rural hospitals to a stroke neurologist at a Primary Stroke Center.

## CONTRIBUTORS

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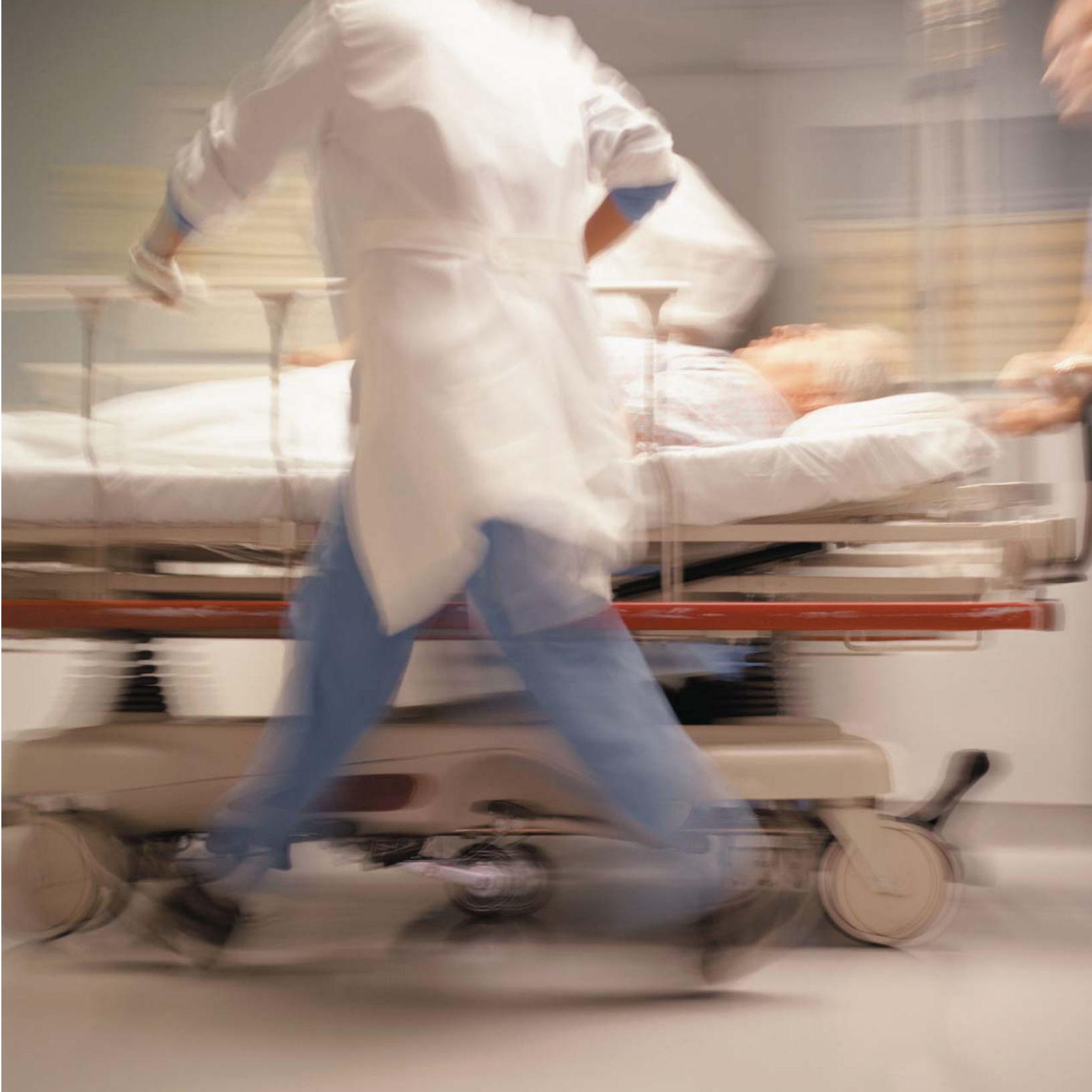


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