

**Brendan G. Carr, MD, MA,
MSHP***LDI Senior Fellow.**Assistant Professor of Emergency
Medicine and Epidemiology
University of Pennsylvania***Charles C. Branas, PhD***LDI Senior Fellow,**Associate Professor of Epidemiology
University of Pennsylvania*

Time, Distance, and Access to Emergency Care in the United States

Editor's note: As national health care reform advances, increasing attention is being paid to the adequacy of existing resources to meet health care needs. Do we have the right mix of providers and facilities? Are they located and organized efficiently? These persistent questions are especially relevant to the provision of emergency care, in which timely access can save lives. This Issue Brief describes the first national study of population access to emergency care, taking into account the locations of emergency departments (EDs), people, and transportation.

Access to emergency care can be lifesaving

Access to emergency care can be lifesaving for conditions such as acute myocardial infarction, ischemic stroke, sepsis, cardiac arrest, and severe injury. These conditions have proven interventions that save lives but that require rapid access to an appropriately equipped and staffed ED that can triage, stabilize and provide definitive treatment or rapid transfer to definitive care at another hospital.

- Not all EDs provide the same services. A common perception is that higher volume teaching EDs located at referral hospitals provide more comprehensive care than their smaller community counterparts. Although many non-academic hospitals provide comprehensive emergency care, no categorization system exists that characterizes ED capabilities or the emergency care resources available within their parent hospitals.
- The lack of knowledge about individual EDs is an important barrier for both researchers and policymakers. Without adequate data, policymakers cannot develop systems to efficiently deliver patients to the most appropriate level of emergency care.
- A model regionalized care system exists for trauma care. Trauma centers are embedded in EDs but are independently accredited to meet strict requirements related to the immediate diagnosis and treatment of severe injuries. These systems include formal designation of resources available and formal transfer networks within regions. No such system exists for non-trauma emergency care-sensitive conditions.

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Study generates national estimates of timely access to various types of EDs

To begin to fill knowledge gaps about ED care, Carr and colleagues used an ED database and census information to estimate the percentage of the population that could reach an ED by ground ambulance within 30, 45, and 60 minutes.

- The investigators used 2003 data from the National Emergency Department Inventories. These data include location, annual visit volume, and presence of postgraduate residency training programs. Higher volume EDs were classified as those treating more than one patient per hour, 24 hours a day, 365 days a year ($\geq 8,760$ patients per year), and further categorized as treating 2 or more patients per hour ($\geq 17,520$ patients per year) and 3 or more patients per hour ($\geq 26,280$ patients per year).
- Population information was based on census blocks identified by the U.S. Census Bureau, a geographic unit containing 600 to 3,000 people. Each block group's population was assigned a point in space that was nearest to most of its residents, and its distance was then calculated from emergency departments.
- Based on previous work, ambulance driving times were calculated as 20.1 miles per hour in urban areas, 47.5 miles per hour in suburban areas, and 56.4 miles per hour in rural areas. Additional minutes, also from previous work, were added to account for the average time from receipt of the emergency call to ambulance departure, and for time spent on the scene. Access calculations included the possibility of crossing state lines to arrive at the nearest ED.

Nationwide access to some type of ED is good, but less than half the population has timely access to a teaching hospital ED

The study identified 4,809 hospitals with general EDs, which had a total of 113.9 million visits in 2003. About two-third of EDs were higher-volume facilities, 29% of which were located in nonurban areas. The median number of annual visits was 18,089.

- Overall, 71% of the U.S. population has access to an ED within 30 minutes, 94% within 45 minutes, and 98% within one hour.
- Access to higher-volume EDs was similar: 68% of the population has access to a higher-volume ED within 30 minutes, 90% within 45 minutes, and 95% within one hour.
- Access to teaching hospital EDs was more limited: 16% of the population has access within 30 minutes, 32% within 45 minutes, and 44% within one hour.

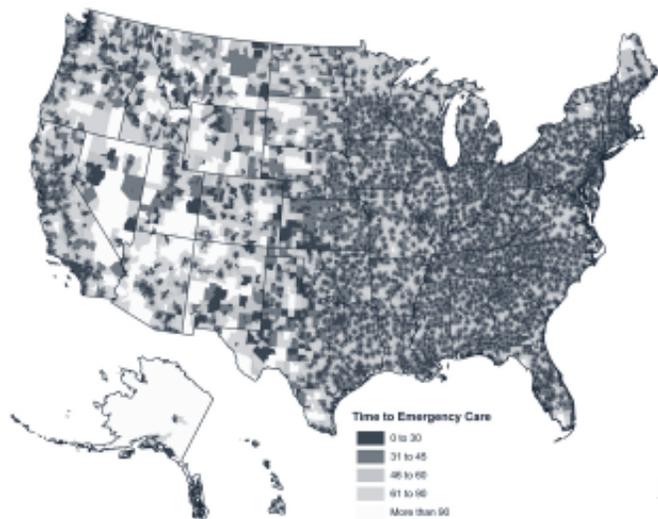
Geographic disparities in ED access exist by region & rurality

These national estimates mask considerable variability in population access by region and by state. The table below shows access by ED volume, teaching status, and census region.

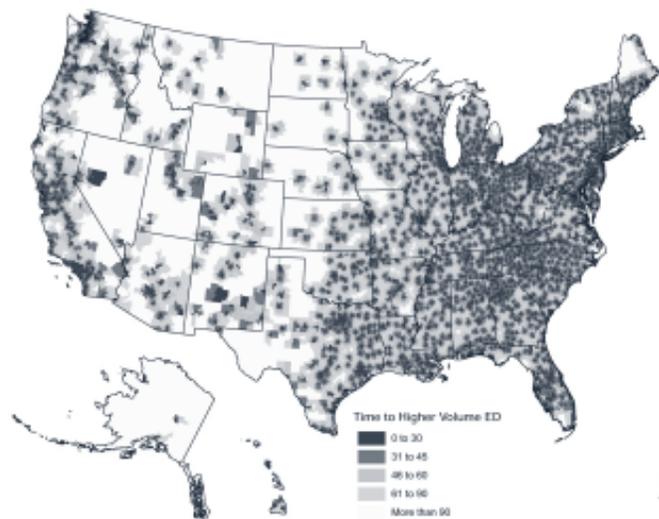
| | High Volume ≥ 1 visit/hour | | Teaching Hospital | |
|-----------|---------------------------------|----------|-------------------|----------|
| | 30 Mins. | 60 Mins. | 30 Mins. | 60 Mins. |
| US | 67.8 | 95.3 | 15.7 | 44.3 |
| Northeast | 75.6 | 99.1 | 30.9 | 66.9 |
| Midwest | 64.6 | 92.3 | 17.3 | 48.3 |
| South | 65.1 | 96.3 | 11.6 | 36.2 |
| West | 68.2 | 93.9 | 8.9 | 37.2 |

- Overall, access to higher-volume EDs (≥ 1 visit per hour) was high within 60 minutes, but showed some variability in access within 30 minutes. The Northeast had the greatest access to higher-volume EDs within 30 minutes (76%), followed by the West (68%), Midwest, and South (65%). Access within 30 minutes to the busiest EDs (≥ 3 visits per hour) ranged from 45.6% in the Northeast to 35.4% in the South. The maps on the next page illustrate the geographic variability in ED access.

Percentage of population with access to high volume and teaching hospital EDs



Access to any ED (driving only)



Access to a higher-volume ED (driving only)

- Access to teaching hospital EDs was much more limited and showed the most regional variability. The Northeast had the highest access within 30 minutes (31%) followed by the Midwest (17%), South (12%) and West (9%).
- Rural states had less access to all types of EDs. The percentage of a state's population living in rural areas was directly related to lack of access to any ED within 30 minutes. Access to high-volume EDs within 30 minutes for the most urban states ranged from 74% to 86% and from 45% to 54% for the most rural states. Some relatively rural states, such as Alaska, Idaho, Montana, Nevada, and Wyoming, had no access to a teaching ED because of the lack of teaching hospitals.

POLICY IMPLICATIONS

This study is the first step in building a comprehensive emergency care system designed to meet population needs. It demonstrates that the majority of the population has access to an ED within 60 minutes, but reveals variability by region and state for higher-volume EDs and teaching EDs. Moreover, fundamental knowledge and transparency about the emergency care capabilities of US EDs is lacking.

- Future efforts should be directed toward better understanding the capabilities of EDs to provide comprehensive and timely emergency services. An ED categorization scheme, coupled with these access data, would provide a framework for the development of regionalized delivery systems for emergency care-sensitive conditions.
- A model for regionalized emergency care should be developed that bridges the many specialty interests within the house of medicine. Trauma systems have used principles of operations research to develop a sophisticated prehospital regionalization system in which non-trauma hospitals are bypassed by ambulances to ensure that patients are rapidly delivered to trauma care. Prehospital regionalization has improved access to care and outcomes for the severely injured, but this type of regionalization represents only one solution to the problem. Novel solutions and an ongoing planned expansion of the emergency care system are required to optimize access to vital services.

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POLICY IMPLICATIONS

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- Health information technology may help to improve access to emergency care. Although telemedicine has been described for stroke and trauma care in underserved areas, these practices are not widespread and development has been restricted by administrative (billing and privacy) concerns.
- Rural populations present particular challenges when seeking to optimize emergency care delivery. A variety of approaches have been proposed, including subsidizing rural hospitals, providing physician incentives to serve rural hospitals, identifying specialty centers, and improving out-of-hospital and interhospital referral networks. It is likely that multiple approaches will be needed to improve inequities in access.
- Emergency care planning should be performed from the population perspective, as all Americans are at risk for medical and surgical diseases requiring rapid time and resource intensive interventions, including the medical sequelae of natural and man-made disasters.

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Janet Weiner, MPH, Associate Director for Health Policy, Editor

David A. Asch, MD, MBA, Executive Director

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*3641 Locust Walk
Philadelphia, PA 19104-6218
215.898.5611
fax 215.898.0229
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