Estimates of Emergency Department Capacity: United States, 2007

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In 2006, the Institute of Medicine (IOM) released a report titled "*Hospital-Based Emergency Care: At the Breaking Point,*" which identified weaknesses in the nation's ability to respond to large-scale emergency situations, whether disease outbreaks such as pandemic influenza, naturally occurring disasters, or acts of terrorism (1). Over the last several decades, the role of emergency departments (EDs) has expanded from treating seriously ill and injured patients to providing urgent unscheduled care to patients unable to gain access to their providers in a timely fashion and to providing primary care to Medicaid beneficiaries and persons without insurance. EDs are now frequently overloaded. One of the most common factors related to ED crowding is the inability to transfer ED patients to an inpatient bed once a decision has been made to admit them (2). As the ED begins to "board" patients, the space, the staff, and the resources available to treat new patients are further reduced. A consequence of overcrowded EDs is ambulance diversion, in which EDs close their doors to incoming ambulances. The resulting treatment delay can be catastrophic for the patient. Approximately 500,000 ambulances are diverted annually in the United States (i.e., one ambulance diversion per minute) (3).

The National Hospital Ambulatory Medical Care Survey (NHAMCS), inaugurated in 1992, is the longest continuously running nationally representative survey of hospital ED utilization. The NHAMCS is conducted by the Centers for Disease Control and Prevention's National Center for Health Statistics (NCHS). This Health E-stat provides ED level estimates for items that were added to the 2007 NHAMCS hospital induction interview in response to the IOM report (1).

Although large EDs (annual visit volume greater than 50,000) in metropolitan statistical areas (MSAs) comprised 17.7 percent of EDs (data not shown), they accounted for 43.8 percent of all ED visits (Figure). The implication is that small EDs (annual visit volume less than 20,000) may not experience crowding and, therefore, have little need for some of the techniques suggested in the IOM report. The IOM recommendations are particularly important for large, urban EDs, which experience higher visit volumes.

About one-half of all hospitals with EDs had a bed coordinator or bed czar, 58.2 percent had elective surgeries scheduled 5 days a week, and 66.1 percent had bed census data available instantaneously (Table). Electronic medical records (EMRs), either all electronic or part paper and part electronic, were used in 61.6 percent of EDs. EMR systems have also been defined as basic (patient demographics, problem lists, clinical notes, orders for prescription, and viewing laboratory and imaging results) or fully functional (prescription orders sent electronically, warnings of drug interactions or contraindications, orders for tests, out-of-range test levels highlighted, medical history and followup, and reminders for guideline-based interventions in addition to the basic elements) (4). Basic EMR systems were reported by 14.9% of EDs (data not shown); however, the estimate for fully functional EMR systems was unreliable.

More than one-third of EDs had an observation or clinical decision unit. Admitted ED patients were "boarded" for more than 2 hours in the ED while waiting for an inpatient bed in 62.5 percent of EDs. Among EDs that "boarded" patients, 14.8 percent used inpatient hallways or another space outside the ED when it was critically overloaded. In the previous 2 years, 24.3 percent of EDs increased the number of standard treatment spaces. Although 19.5 percent of EDs expanded their physical space in the last 2 years, 31.5 percent of those that did not expand their physical space plan to do so within the next 2 years. The frequency of use of ED patient care techniques was as follows: bedside registration (66.1%), computer-assisted triage (40.0%), zone nursing (35.3%), electronic dashboard (35.2%), separate fast track unit for nonurgent care (33.8%), "pool" nurses (33.2%), full capacity protocol (21.1%), and radio frequency identification tracking (9.8%).

The table presents estimates of ED characteristics by ED visit volume and MSA status. When compared with small EDs, large EDs were more likely to have a bed coordinator in their hospitals (71.2% compared with 33.8%); have an observation or clinical decision unit (53.5% compared with 32.5%); "board" patients for more than 2 hours in the ED while waiting for an inpatient bed (86.5% compared with 39.0%); and use bedside registration (89.0% compared with 54.2%), computer-assisted triage (62.2% compared with 24.3%), and zone nursing (61.9% compared with 19.0%).

EDs with over 20,000 annual visits comprised 70.5 percent of EDs in MSAs. When compared to EDs in non-MSAs, EDs in MSAs were more likely to have a bed coordinator or bed czar in their hospital (60.7% compared with 30.0%) and "board" patients for more than 2 hours in the ED while waiting for an inpatient bed (77.4% compared with 32.8%).

Additional information about ED utilization is available from the NCHS Ambulatory Health Care website: www.cdc.gov/nchs/nhamcs.htm.

References

1. Institute of Medicine. Hospital-Based Emergency Care: At the Breaking Point. Washington, DC: National Academy Press. 2006.

2. General Accounting Office. Hospital Emergency Departments: Crowded Conditions Vary Among Hospitals and Communities. Washington, DC: General Accounting Office. 2003.

3. Burt CW, McCaig LF, Valverde RH. Analysis of ambulance transports and diversions among U.S. emergency departments. Ann Emerg Med 47(4):317-326.

4. DesRoches CM, Campbell EG, Rao SR, Donelan K, Ferris TG, Jha A, et al. Electronic health records in ambulatory care -- a national survey of physicians. N Engl J Med 359:50-60. 2008.

Figures

ED visits by volume and metropolitan status: United States, 2007

*Figure does not meet standards of reliability or precision.
NOTE: ED is emergency department, MSA is metropolitan statistical area.
SOURCE: CDC/NCHS, National Hospital Ambulatory Medical Care Survey, 2007.
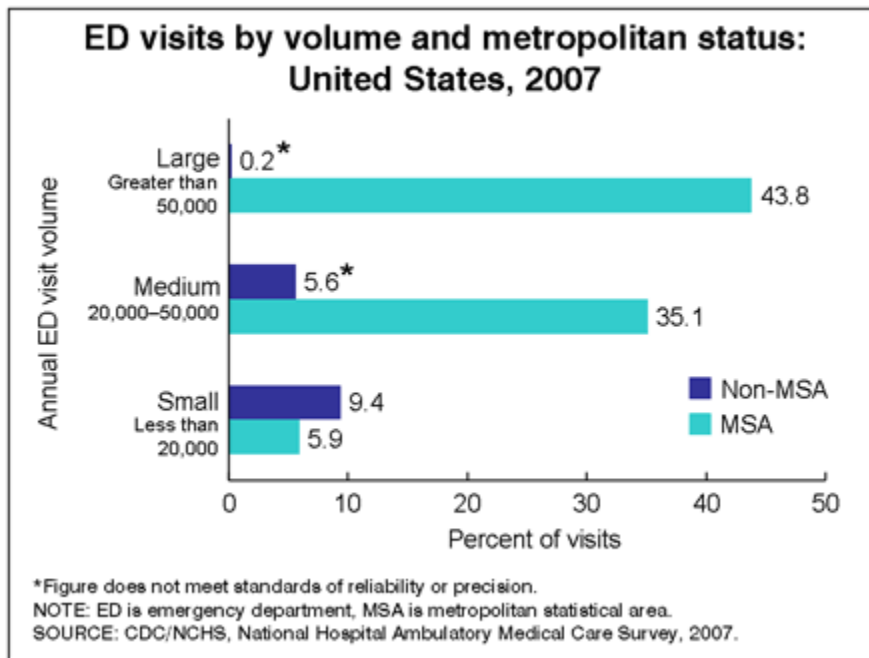
Tables

Table. Percent distribution of emergency departments and corresponding standard errors, by hospital and emergency department characteristics, according to emergency department visit volume and metropolitan status: United States, 2007

			ED annual visit volume						Metropolitan status			
			Less than 20,000		20,000 to 50,000		50,000 or more		MSA		Non-MSA	
	Total[1]											
Hospital and ED characteristics	All EDs	SE	Percent distribution	SE	Percent distribution	SE	Percent distribution	SE	Percent distribution	SE	Percent distribution	SE
All EDs	100.0	…	100.0	…	100.0	…	100.0	…	100.0	…	100.0	…
Hospital characteristics												
Number of days in a week that elective surgeries are scheduled												
0-4	11.9	3.2	22.7	6.4	*0.7	0.7	*4.0	1.8	*4.2	1.9	27.4	8.2
5	58.2	3.9	58.5	7.2	61.5	5.2	50.9	5.2	57.5	4.0	59.5	8.4
6-7	13.6	2.4	*4.5	2.8	17.0	4.1	31.6	5.7	19.2	3.4	*2.3	2.1
Unknown or blank	16.3	2.9	*14.2	4.7	20.8	4.3	13.5	3.5	19.1	3.5	*10.8	4.8
Hospital has bed coordinator or bed czar												
Yes	50.5	4.0	33.8	7.0	63.3	5.2	71.2	4.9	60.7	4.2	30.0	8.3
No	42.6	4.3	60.5	7.5	30.2	5.1	17.6	4.9	32.3	4.2	63.3	9.2
Unknown or blank	6.9	1.9	*5.6	3.3	*6.5	2.0	11.2	3.3	7.0	1.6	*6.7	4.6
How often hospital bed census data are available												
Instantaneously	66.1	4.0	71.2	6.9	60.5	5.6	62.6	5.2	61.8	4.1	74.6	8.4
Every 4 hours	3.1	0.9	*0	…	*5.1	2.7	*7.7	3.4	*4.7	1.3	*0	…
Every 8 hours	*3.7	1.1	*2.2	1.3	*3.6	2.2	*8.3	3.0	*4.9	1.5	*1.5	1.4
Every 12 hours	*2.8	1.4	*3.4	2.6	*2.5	1.8	*2.0	1.4	*4.3	2.1	*0	…
Every 24 hours	18.8	3.6	21.7	6.4	20.1	4.1	*8.4	2.6	17.2	3.5	22.0	8.4
Other	*0.7	0.6	*1.3	1.3	*0	…	*0.5	0.3	*0.1	0.1	*1.9	1.9
Unknown or blank	4.7	1.0	*0.2	0.2	8.1	2.4	10.5	2.9	7.1	1.6	*0	…
ED characteristics												
ED uses electronic medical records												
Yes, all electronic	18.9	3.4	*12.1	5.5	24.6	3.7	26.3	5.5	22.8	4.0	*10.9	6.2
Yes, part electronic	42.7	4.0	34.2	6.5	48.7	4.8	54.6	6.0	45.4	3.8	37.4	8.8
No	37.8	4.8	53.7	7.7	25.5	4.9	17.9	4.9	30.8	4.5	51.6	10.6
Unknown or blank	*0.7	0.4	*0	…	*1.3	0.9	*1.3	1.3	*1.0	0.6	*0	…
ED has observation or clinical decision unit												
Yes	35.6	3.4	32.5	6.1	30.7	4.5	53.5	6.0	39.1	4.0	28.7	6.6
No	62.8	3.4	67.5	6.1	66.5	4.7	42.8	5.9	58.5	4.1	71.3	6.6
Unknown or blank	*1.6	0.7	*0	…	*2.9	1.6	*3.7	2.0	*2.5	1.0	*0	…
Observation or clinical decision unit is adminstratively part of the ED or inpatient side of the hospital[2]												
Part of ED	51.5	6.1	*	…	83.9	6.1	67.9	7.3	64.7	6.9	*	…
Part of inpatient side of hospital	40.7	6.0	*	…	*7.5	3.8	28.7	7.2	24.5	5.9	*	…
Unknown or blank	*7.9	3.9	*	…	*8.6	5.1	*3.4	2.0	*10.8	5.3	*	…
Admitted ED patients ever "boarded" for more than 2 hours in the ED while waiting for an inpatient bed												
Yes	62.5	4.5	39.0	7.7	83.3	3.5	86.5	4.6	77.4	3.8	32.8	9.1
No	34.8	4.5	61.0	7.7	11.9	3.1	*7.6	3.8	18.6	3.8	67.2	9.1
Unknown or blank	*2.7	0.9	*0	…	*4.8	2.0	*5.9	2.6	*4.0	1.3	*0	…
If ED is critically overloaded, admitted ED patients are "boarded" in inpatient hallways or in another space outside the ED												
Yes	14.8	2.9	*10.9	5.3	17.3	4.1	20.4	4.2	16.7	3.0	*10.9	6.6
No	80.1	3.3	85.5	5.8	75.2	5.1	74.4	4.2	78.6	3.4	83.0	7.5
Unknown or blank	5.2	1.5	*3.6	2.6	*7.5	2.5	*5.2	2.3	4.7	1.4	*6.1	3.5
ED went on ambulance diversion in 2006												
Yes	22.0	2.5	*9.3	3.7	33.6	4.9	34.1	4.6	31.1	3.5	*3.7	2.5
No	54.7	3.8	75.5	6.1	41.6	6.1	23.5	4.8	41.2	4.2	81.7	7.1
Unknown or blank	23.3	3.2	*15.2	5.3	24.9	4.6	42.3	5.3	27.7	3.6	*14.6	6.7
Ambulance diversion is actively managed on a regional versus hospital level												
Yes	53.9	4.7	*	…	47.9	6.4	63.8	5.9	53.0	4.4	*	…
No	30.6	3.9	*	…	40.0	6.0	24.6	5.1	35.0	4.1	*	…
Unknown or blank	15.5	3.5	*	…	*12.1	3.8	*11.6	4.2	12.0	3.0	*	…
Hospital continues to admit elective or scheduled surgery cases when ED is on ambulance diversion												
Yes	62.1	4.8	*	…	64.6	6.3	72.9	5.9	62.1	4.7	*	…
No	18.7	4.4	*	…	*14.5	5.0	8.0	3.1	18.7	4.3	*	…
Unknown or blank	19.2	3.2	*	…	20.8	4.9	19.2	5.4	19.3	3.5	*	…

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	All emergency departments[1]		Fewer than 20,000		20,000–50,000		Over 50,000		Metropolitan area		Not metropolitan area	
	Percent	SE	Percent	SE	Percent	SE	Percent	SE	Percent	SE	Percent	SE
ED increased the number of standard treatment spaces in last 2 years												
Yes	24.3	3.0	*13.8	4.8	31.1	4.0	39.6	4.9	32.4	3.2	*8.1	5.1
No	74.0	3.1	85.2	4.8	66.5	4.0	58.0	4.9	65.4	3.3	91.2	5.2
Unknown or blank	*1.7	0.7	*1.0	1.0	*2.4	1.2	*2.4	1.4	*2.2	0.9	*0.7	0.7
ED's physical space was expanded in last 2 years												
Yes	19.5	3.0	*15.1	5.2	20.1	3.8	30.4	5.6	23.6	3.2	*11.3	5.7
No	78.1	3.2	84.9	5.2	75.1	4.4	65.6	5.7	74.3	3.3	85.7	6.4
Unknown or blank	*2.4	1.1	*0	…	*4.9	3.0	*3.9	2.0	*2.1	0.8	*2.9	2.9
ED plans to expand physical space in next 2 years[3]												
Yes	31.5	4.0	23.0	6.7	43.7	6.1	34.8	6.3	38.6	4.8	*19.3	8.4
No	50.5	4.4	58.5	7.4	37.8	5.8	49.9	6.2	43.6	4.7	62.3	9.0
Unknown or blank	18.0	3.6	*18.4	6.2	18.5	4.4	*15.3	4.6	17.8	3.8	*18.4	7.2
ED uses:												
Bedside registration	66.1	4.6	54.2	7.6	71.0	5.6	89.0	3.0	70.3	4.7	57.7	9.8
Computer-assisted triage	40.0	3.4	24.3	5.8	50.7	4.7	62.2	5.4	51.6	3.8	*16.9	6.1
Separate fast track unit for nonurgent care	33.8	3.3	*9.7	3.4	49.3	5.4	69.3	5.1	44.7	4.5	*12.0	5.1
Separate operating room dedicated to ED patients	*3.7	1.3	*2.8	2.4	*2.6	0.9	*8.1	2.6	3.8	0.9	*3.5	3.4
Electronic dashboard[4]	35.2	4.0	*13.2	5.0	53.3	5.1	60.2	5.3	45.9	4.7	*13.8	5.7
Radio frequency identification tracking[5]	9.8	2.1	*4.5	3.0	12.5	3.5	19.0	4.2	12.4	2.3	*4.7	3.8
Zone nursing[6]	35.3	3.2	19.0	5.1	44.6	5.5	61.9	5.1	43.9	4.4	*18.3	6.2
"Pool" nurses[7]	33.2	3.5	27.5	6.3	41.1	5.3	33.6	5.8	38.3	4.0	23.1	8.3
Full capacity protocol[8]	21.1	2.9	16.5	5.2	23.4	4.4	29.1	5.3	24.8	3.1	*13.8	6.3
None of the above	13.1	3.2	25.6	6.5	*2.1	1.3	*0	…	*8.3	3.2	*22.4	7.3

… Category not applicable.

* Figure does not meet standards of reliablity or precision. Only an asterisk (*) appears in the table if the estimate is based on fewer than 30 cases in the sample data. Estimates based on 30 or more cases include an asterisk if the relative standard error of the estimate exceeds 30 percent.

0 Quantity equals zero.

0.0 Quantity more than zero, but less than 0.05.

[1]Number of sampled records: All emergency departments (N=337); Fewer than 20,000 (N=66); 20,000-50,000 (N=140); Over 50,000 (N=131); Metropolitan area (N=292); and Not metropolitan area (N=45).

[2]Denominator is number of EDs with observation or clinical decision units.

[3]Denominator is number of EDs that did not expand their physical space in the last 2 years.

[4]An electronic dashboard displays updated patient information and integrates multiple data sources.

[5]Radio frequency identification tracking shows the exact location of patients, caregivers, and equipment.

[6]Zone nursing refers to all of a nurse's patients being located in one area.

[7]"Pool" nurses are those that can be pulled to the ED to respond to surges in demand.

[8]A full capacity protocol allows some admitted patients to move from the ED to inpatient corridors while awaiting a bed.

NOTE: ED is emergency department, MSA is metropolitan statistical area, and SE is standard error.