

# Health Policy Brief

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## **Ambulance Diversion.** Efforts to mitigate ambulance diversion have been effective, but questions remain for future progress.

### WHAT'S THE ISSUE?

Ambulance diversion is a controversial strategy for temporarily relieving overcrowding in emergency departments (EDs). When a hospital invokes diversion status, incoming ambulances are directed to other facilities. As a response to ED congestion—first cited in [a 1990 article](#) in the journal *Hospital Topics*—less severely injured patients were transported to other nearby facilities.

At that time, ambulance diversion was viewed as a relatively rare option for coping with unexpected events or crises, but the phenomenon became a frequent occurrence over the next decade. In [2003](#), according to a 2006 study in the *Annals of Emergency Medicine*, 45 percent of EDs in the United States reported having gone on diversion status during the previous year, and in urban hospitals the rate was almost 70 percent. The study also reported that there were about half a million incidents of ambulance diversion in 2003—an average of about one per minute.

In the short term, ambulance diversion provides breathing room to the ED that invokes diversion status, allowing it to return to optimal functioning as it processes the overflow of patients. If the situation continues for an extended period, however, it can create a domino effect, triggering nearby facilities—now clogged with the diverted patients—to themselves go on diversion status. It can also lead to

delays in medical care for patients elsewhere in the health care system. If an ambulance cannot bring people to the nearest facility, they have to be transported longer distances to receive necessary treatment. This increased travel time can reduce the availability of ambulances for new calls for other patients awaiting emergency medical service.

Despite these drawbacks, persistently high ED traffic has led to the continued use of ambulance diversion as a strategy for managing patient volume. “With the belief that ambulance diversion is a quick way to reduce hospital and ED overcrowding, many hospitals regularly use ambulance diversion,” noted [a 2015 editorial](#) in the *American Journal of Emergency Medicine*. “However, experts believe the practice does little if anything to reduce crowding; and research also suggests that diversion has negative patient care consequences.”

While research has linked ambulance diversion to delays in treatment and related indicators, such studies have often used diversion as a proxy for ED overcrowding. Given the many factors implicated in generating such conditions, experts generally consider restricting ambulance diversion, on its own, to be an ineffective and shortsighted strategy for addressing the problem. In recent years, studies from California, Massachusetts, and elsewhere have focused on efforts to reduce or ban ambulance diversion as part of comprehensive and coordinated approaches to alleviating ED

# 279

minutes

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congestion and improving patient flow, both within hospitals and among multiple facilities across a city or region.

### WHAT'S THE BACKGROUND?

EDs play a critical function in the US health care system. They are generally expected to accept any patient who arrives seeking treatment, even at times of high volume and surging numbers of visitors. According to the Centers for Disease Control and Prevention, EDs in the United States receive more than 130 million patient visits a year, with more than 20 million patients arriving in ambulances.

Yet congestion in EDs has become an issue of major concern for multiple reasons. One is that the phenomenon has been attributed to increased usage combined with net loss of EDs in urban areas. Indeed, [three major 2006 Institute of Medicine \(IOM\) reports](#) on various aspects of emergency care declared the state of hospital-based EDs to be “a national crisis,” finding that the system was “[at the breaking point.](#)” [According to the reports](#), EDs were playing an increasingly important role in the provision of medical care, with a 44 percent rise in ED visits in the decade between 1993 and 2003.

More recent data from the American Hospital Association shows that per capita demand grew from 359 ED visits per 1,000 people in 1993 to 423 per 1,000 people in 2013. Yet the number of hospitals with EDs serving non-rural populations fell at an average rate of 89 per year, from 2,446 in 1990 to 1,779 in 2009, according to a *Journal of the American Medical Association (JAMA)* study. Risk factors for closure included low profit margins, safety-net status, and a high proportion of patients in poverty.

The 2006 IOM reports noted another major problem: the “highly fragmented” structure of the system for transporting patients from the site of illness or injury to a health care facility. Many regions had—and still have—multiple 911 call centers as well as emergency medical services agencies that dispatch ambulances. But these centers and agencies often do not coordinate effectively with each other, with EDs in their region, or with city and state public health agencies. As a result, the efficient flow of patients through the system suffers, and one ED might experience serious overcrowding while a nearby ED might be relatively empty. At the federal level, multiple agencies have some jurisdiction over parts of the emergency

care system, which creates challenges in pursuing regulatory and legislative fixes.

The most immediate impact of ED overcrowding on care is to increase the time patients wait to be seen. Overcrowding also places greater strains on ED personnel and resources and negatively affects staff morale. Such conditions do not arise in a vacuum; they are partly a function of events and developments elsewhere in the network of hospital-based care. When inpatient slots are full, for example, ED visitors who need continuing inpatient treatment and are therefore not discharged must be “boarded” until a space opens up in the appropriate unit. This results in delays in needed care and longer wait times for those still arriving at the ED in need of treatment for critical injuries and illness.

Only recently has there been a concerted effort to collect national data on these metrics. In 2015 the national median time from ED arrival to placement in an inpatient bed was 279 minutes. Of that time, patients spent ninety-nine minutes waiting for a bed after the decision had been made to admit them. In some cases, patients can be boarded for days in the ED, triggering further backups in traffic flow.

### WHAT'S THE DEBATE?

Ambulance diversion was initially described and deployed as a temporary strategy for EDs to cope with a surge in visitors—a potential safety valve. But over time, it became apparent that ambulance diversion might relieve congestion in one facility while creating unintended negative effects elsewhere in the region’s health care system—on the quality of patient care, ambulance turnaround time, and capacity at other EDs. Moreover, hospitals generally made their own decisions and set their own thresholds regarding diversion. This variation could lead to unpredictable impacts elsewhere in the system, disproportionately affecting patient populations that already experienced reduced access to health care services.

[A review of the literature in 2006](#) identified patterns in the phenomenon. Apart from unexpected crises, the review found that overcrowding and diversion were more likely to occur at times of peak ED volume during the day (from midafternoon to early evening), week (on Mondays), and year (during flu season). The review also reported other factors associated with diversion at specific facilities, including number of available hospital beds,

# 306

## hours

A study of 202 California hospitals found that facilities serving the highest percentages of minority ED visitors were on diversion for 306 hours, compared to only 75 hours for hospitals with the lowest percentages of minority visitors.

**“The ACA did not include specific provisions about ambulance diversion. But the primary care system is not prepared to address the needs of the many millions of newly insured people, so EDs could see a continued increase in demand.”**

number of admitted patients at the hospital overall as well as in the ED, and volume of ambulance arrivals. County hospitals and trauma centers were more likely to experience diversion than other settings were.

Ambulance diversion has been found to cause delays in hospital arrival for diverted patients. The 2006 review reported that delays ranged from 1.7 to 5.0 minutes. While delays in accessing treatment might not affect outcomes for most ED patients, they can be deadly for those suffering from conditions requiring immediate care. [A 2010 study](#) in New York City, for example, found that higher levels of diversion were associated with more deaths from acute myocardial infarction (AMI), although data gaps limit the robustness of the findings.

Similarly, in 2011 [a study in JAMA](#) found that patients with AMI had higher mortality rates at thirty days, ninety days, nine months, and one year if their nearest ED experienced at least twelve hours of diversion on their date of admission. A 2015 study in California by the same research group identified one mechanism leading to negative outcomes, noting that “patients whose nearest hospital ED had significant ambulance diversions experienced reduced access to hospitals with cardiac technology.” These patients were almost 5 percent less likely to undergo revascularization and almost 10 percent more likely to die than patients nearest to other facilities.

Ambulance diversion also raises questions of equity. Urban hospitals tend to be more crowded and therefore more likely to go on diversion status than facilities elsewhere and such EDs are disproportionately used by minority populations. This situation is exacerbated by the trend of hospital closures in urban locations and other areas with disadvantaged populations. [A 2012 study](#) of 202 California hospitals found that facilities serving the highest percentages of minority ED visitors were on diversion for 306 hours, compared to only 75 hours for hospitals with the lowest percentages of minority visitors.

Efforts to control diversion have demonstrated some positive impacts. For example, some facilities have enforced policies that limit the practice to short periods of time, such as one-hour or three-hour increments, or have tested total bans. [A 2013 study](#) reported outcomes for two six-month periods at a major Midwest trauma center, just before and just after the implementation of a no-diversion pol-

icy. During the no-diversion period, the rates of people who left the center without treatment and those who left without being seen dropped almost 20 percent, and discharged patients were treated more quickly than during the prior six months, although no differences in mortality rates were found.

Yet many articles have described successful efforts to reduce diversion rates through the use of broader methods of handling and managing ED patient traffic, instead of just by restricting the practice. These efforts have included the appointment of nurses as “ED flow coordinators,” regional agreements and coordinated policies about when to invoke diversion status, and enhanced use of technology to monitor and balance available resources with patient needs. In Cleveland, four major hospitals added staff, increased the number of inpatient beds, and took other steps to prepare for a no-diversion agreement that went into effect earlier this year.

In 2009 Massachusetts became the first (and so far only) state to ban ambulance diversion, demonstrating that such restrictions do not disrupt the provision of care when enacted in conjunction with policies to improve the flow of patients. The state’s Department of Public Health gave hospitals six months’ notice to prepare and create strategies to mitigate the impact of the diversion ban. These successful strategies included hiring extra staff to process patients more quickly, increasing the occurrence of inpatient bed rounding, creating an inpatient “surge pod” for patients currently being boarded in the ED, and identifying a cohort of clinicians for deployment when inevitable staff shortages arise.

“Despite fears that the ban would lead to increased ED crowding and ambulance delays, the steps hospitals took to improve patient flow in the wake of the ban prevented such problems,” noted [a report](#) from the Agency for Healthcare Research and Quality about the Massachusetts effort. (The sole exception to the ban was when a hospital’s ED experienced overcrowding because of a fire, flood, or some other internal crisis.)

Before the ban, ambulance diversion had occurred frequently, with EDs in the Boston area spending almost 3,000 hours collectively on diversion status in 2007—six times as many hours as ten years before. [After the ban](#), the length of time in the ED for patients admitted to the hospital fell by 10.4 minutes at nine hospitals in the Boston area, while patients sub-

sequently discharged did not see any increase in time spent in the ED. Despite concerns that halting diversion status could increase ambulance turnaround time, the average turnaround time fell by more than two minutes. [A qualitative study](#) also found that ED clinicians and administrators strongly supported the ban and believed that it improved the quality of care and boosted patient satisfaction.

### WHAT'S NEXT?

Ambulance diversion remains a critical issue at EDs across the country. Yet addressing it is complex because it is a symptom of the larger problem of ED and hospital overcrowding. Focusing solely on altering diversion strategies, therefore, might lead to temporary relief but is unlikely to resolve the overall problems that diversion is supposed to address. As recent research has shown, approaches to overcrowding that incorporate additional strategies alongside limitations on diversions are more likely to be effective in generating long-term changes. Moreover, greater regional communication and cooperation can minimize the likelihood of a domino effect that flips one hospital after another into diversion status.

In addition to seeking to improve patient care, hospitals recognize that they have a significant financial incentive to grapple with

ambulance diversion, since sending patients away results in revenue losses. [One study at an urban teaching hospital](#) calculated that each hour of diversion was associated with a loss of more than \$1,000 in revenue from patients brought by ambulance, while implementation of changes that limited diversion led to increased revenue of almost \$200,000 a month. Yet widespread progress in mitigating diversion has not occurred.

The Affordable Care Act (ACA) did not include specific provisions about ambulance diversion. But the primary care system is not prepared to address the needs of the many millions of newly insured people, so EDs could see a continued increase in demand. Although the rise in urgent care centers could mitigate the impact, a recent post-ACA survey conducted by the American College of Emergency Physicians revealed a concerning statistic: 70 percent of respondents stated that their ED would not be adequately prepared for substantial increases in patient volume. Further research on the ACA's impact on ED usage should help health care officials and administrators develop comprehensive policies to improve patient flow and reduce ambulance diversion that are appropriate for the new environment. ■

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