One in four Americans lacks timely access to optimal care during time-sensitive medical emergencies

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(PHILADELPHIA) - Although most Americans live close to some type of emergency room, as many as one in four Americans are more than an hour away from the type of hospital that's most prepared to save their life during a time-sensitive medical emergency, according to a new University of Pennsylvania School of Medicine study published in the journal *Annals of Emergency Medicine*. Since little is known about which U.S. hospitals are best equipped and staffed to tackle emergent illnesses like stroke, cardiac arrest, heart attack and the severe bloodstream infection sepsis, many more Americans may be in peril because no system exists to transport them to the right hospital at the right time.

"Whether you are bleeding to death from an injury, having a heart attack , or having a stroke, the common denominator is time. In those life-threatening emergencies, we must blindly rely upon the system to rapidly deliver us to the care that we need," says lead author Brendan Carr, MD, MA, MS, an assistant professor of Emergency Medicine and Epidemiology and senior fellow in Penn's Leonard Davis Institute of Health Economics. "If we knew what services were provided where, we could design a system that would do that for patients everywhere in the country."

The new study, conducted with collaborators from the Emergency Medicine Network (www.emnet-usa.org) at Massachusetts General Hospital, shows that 71 percent of Americans have access to an

emergency department of some kind within 30 minutes, and 98 percent can reach one within an hour. But on a state-by-state basis, the findings suggest that many of those nearby facilities may not be able to provide care for the most emergent conditions.

Research shows that hospitals that treat a higher volume of patients tend to have more resources - staffing, specialized imaging equipment and care protocols - and ultimately, better patient outcomes. Residents of rural states appear to be much less likely to have access to those types of facilities, according to the new study. In South Dakota, for instance, just 13 percent of the population has access within 60 minutes to an emergency department that sees three or more patients per hour; in Montana, only 8 percent do. Even in the more populous, urban Northeast, only about half of residents in Maine and Vermont can reach one of those higher-volume emergency departments within an hour. Overall, the authors found that less than half of Americans have access to a teaching hospital, which tend to offer more sophisticated treatments and be staffed by subspecialists round-the-clock, in an hour.

The nation's regionalized trauma care system allows for emergency medical service providers to bypass the closest hospital and bring severely injured patients to accredited facilities which meet specific care benchmarks. Carr suggests that this same model could be applied to care for other time-sensitive conditions like heart attack and stroke. But without any centralized inventory of emergency department capabilities or resources available at all times of day and night within individual hospitals - such as a 24-hour cardiac catheterization laboratory, round-the-clock neurologic or neurosurgical expertise, or in-house critical care specialists - emergency medical services planners are unable to efficiently deliver acutely ill patients to the place that is best prepared to care for them.

Time spent stabilizing and transferring patients can have dire

consequences, Carr says. Following a stroke, patients must receive clot-busting drugs within three hours for the best chance at avoiding long-term cognitive or physical impairments. After a heart attack, recommendations call for a "door-to-balloon" time -- for cardiac catheterization to unblock clogged coronary arteries -- of no more than 90 minutes. And specialized care delivered following cardiac arrest, including cooling therapy and cardiac catheterization, has been shown to improve survival.

Among possibilities for boosting care quality in rural or other underserved areas, the authors suggest subsidizing rural hospitals or offering incentives for physicians to practice at those facilities, improving interhospital referral networks and identifying hospitals that can specialize in treatment of certain emergent illnesses. Carr, who serves as associate director of Penn's Division of Emergency Care Policy and Research, sees the new findings as a first step in improving the United States' emergency care system.

Building a comprehensive emergency care system, however, requires us to think differently about how we provide emergency care, Carr says. "We know that hospitals think every day about how to improve the care they give their patients, but those discussions are siloed, largely taking place only in individual hospitals," he says. "A truly comprehensive emergency care system, however, needs to be built from a population health perspective, with groups of EMS providers and hospitals thinking collaboratively about how to provide the best emergency care to their region."

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