Penn study: Chances of surviving cardiac arrest depend on where patients are treated

Patients fare better in large, high-volume hospitals; findings illustrate need to standardize post-arrest care

(PHILADELPHIA) – Efforts to fight the toll of cardiac arrest have typically focused on pre-hospital factors -- bystander CPR education and improvement, public defibrillation programs, and quicker EMS response. But new research from the University of Pennsylvania School of Medicine reveals that the hospital where patients are cared for after being resuscitated plays a key role in their chances of survival following these incidents, which takes the lives of more than 300,000 Americans each year.

Patients in large, urban, and teaching hospitals are more likely to survive compared to those in small, often rural, non-academic hospitals, according to a study published recently in the journal *Intensive Care Medicine*. A second study, published in *Resuscitation*, suggests that patients who are cared for in the highest volume intensive care units after cardiac arrest are also most apt to survive. The findings points to a need to explore the development of specialized, regional post-cardiac arrest care centers modeled after those that treat serious trauma patients, says lead author Brendan Carr, MD, an assistant professor of Emergency Medicine and Epidemiology, and associate director of the Division of Emergency Care Policy & Research.

Carr's findings also underscore the importance of the recent move by New York City to require ambulances to take cardiac arrest patients to hospitals that provide therapeutic hypothermia -- the so-called "cooling" therapy that protects against damage to the brain and other organs in the crucial hours after the heart is restored to its normal rhythm -- even if those facilities are further away.

"We are describing the variability that exists in cardiac arrest outcomes – not at the level of the patient but at the level of the hospital. Hospitals with more resources and hospitals with higher volumes have better outcomes," Carr says. "There are two possible implications: Either we

need to get everyone up to speed on how to optimize survival, or we need to selectively transfer patients to hospitals that have expertise in the post-arrest period."

The two studies, which examined a combined 115,000 cases in two different national datasets, also point to an overall improvement in cardiac arrest care. Over the course of the five years studied, the authors found a small reduction in mortality that translates to about 11,000 additional lives saved per year -- a significant decrease for a condition that is typically fatal. Better survival odds are multifactorial, but likely related to advances in critical care, the recognition of the role of hypothermia, and the creation of national guidelines for post-cardiac arrest care.

"There has been a fundamental shift such that we now recognize the condition patients experience after cardiac arrest as a treatable disease," says senior author Robert Neumar, MD, PhD, associate professor of Emergency Medicine and associate director of Penn's Center for Resuscitation Science, and Chair of the Advanced Cardiac Life Support Subcommittee for the American Heart Association. "Among the patients that regain a pulse after cardiac arrest, only one out of three survive to hospital discharge, and there appears to be significant variability among hospitals. Further research is needed to determine if this variability in outcome is caused by the quality of post-cardiac arrest care. If it is, we need to identify best practices and develop mechanisms to deliver optimal care for all patients."

Carr and his colleagues say further study of post-cardiac arrest care among these large, urban, and teaching hospitals will be crucial in mapping strategies that maximize a patient's chances to be discharged without the neurological deficits that often plague cardiac arrest survivors. And he emphasizes that practitioners can learn lessons from the connections between the way hospitals care for patients with cardiac arrest and other emergent conditions.

"For me, cardiac arrest is the tip of the iceberg with respect to disparities in care for time-sensitive conditions," Carr says. "Whether you've had a cardiac arrest, a stroke, or a heart attack, it is our job to build a system that promises you the best possible care no matter where you are, who you are, or what time of day it is."

PENN Medicine is a $3.6 billion enterprise dedicated to the related missions of medical education, biomedical research, and excellence in patient care. PENN Medicine consists of the University of Pennsylvania School of Medicine (founded in 1765 as the nation's first medical school) and the University of Pennsylvania Health System.

Penn's School of Medicine is currently ranked #4 in the nation in *U.S.News & World Report*'s survey of top research-oriented medical schools; and, according to most recent data from the National Institutes of Health, received over $379 million in NIH research funds in the 2006 fiscal year. Supporting 1,700 fulltime faculty and 700 students, the School of Medicine is recognized worldwide for its superior education and training of the next generation of physician-scientists and leaders of academic medicine.

The University of Pennsylvania Health System (UPHS) includes its flagship hospital, the Hospital of the University of Pennsylvania, rated one of the nation's top ten "Honor Roll" hospitals by *U.S.News & World Report*; Pennsylvania Hospital, the nation's first hospital; and Penn Presbyterian Medical Center. In addition UPHS includes a primary-care provider network; a faculty practice plan; home care, hospice, and nursing home; three multispecialty satellite facilities; as well as the Penn Medicine at Rittenhouse campus, which offers comprehensive inpatient rehabilitation facilities and outpatient services in multiple specialties.