Largest statewide coordinated care effort improves survival, reduces time to heart attack treatment

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An ambitious effort to coordinate heart attack care among every hospital and emergency service in North Carolina improved patient survival rates and reduced the time from diagnosis to treatment, according to Duke University Medical Center researchers who spearheaded the program.

"When treating heart attacks, the most important care decisions need to take place before the patient is brought to the hospital," says James Jollis, M.D., a Duke cardiologist and first author of the findings published today in the journal *Circulation*. "These procedures should be in place in every hospital and every emergency service system in the country."

RACE-ER (Reperfusion of Acute Myocardial Infarction in Carolina Emergency Departments – Emergency Response) is the largest voluntary statewide heart attack care intervention ever undertaken in the United States. Thousands of health care professionals from North Carolina's 119 hospitals collaborated with more than 500 emergency service agencies across 53,000 square miles. RACE-ER is an extension of an earlier pilot program that covered five North Carolina regions and brought together 10 PCI centers and 55 hospitals in 2007.

From July 2008 through December 2009, RACE-ER decreased the time from first contact to medical treatment from 103 minutes to 91 minutes when patients were brought directly to hospitals that performed

angioplasty, now known as percutaneous coronary intervention (PCI). Of those patients, 52% were treated within 60 minutes.

Treatment times for patients transferred from non-PCI hospitals to PCI centers improved from 117 minutes to 103 minutes. Thirty-nine percent of transferred patients were treated within 90 minutes by December 2009.

"Our intervention demonstrates how competing healthcare entities can work together to overcome the systematic barriers that prevent timely heart attack treatment," says Jollis. "We were able to embed a standard of care that was independent of what hospital the patient was brought to or where the heart attack occurred. By the end of our intervention, our protocols were adopted by state regulation for all EMS agencies, and all hospitals agreed to continue supporting regional care."

RACE-ER focused on treatment of the most deadly form of heart attack known as STEMI (ST Segment Elevation Myocardial Infarction), which occurs when a sudden blockage in a coronary artery damages the heart muscle. Each year, about 300,000 people have a STEMI, according to the American Heart Association. National guidelines call for blocked arteries to be opened medically or surgically within 90 minutes of a patient's first contact with the emergency medical system, either paramedic arrival, or arrival of self-transported patients at the hospital door.

"Every second counts when it comes to salvaging the heart muscle and saving lives," says Christopher Granger, M.D., a Duke cardiologist and co-author of the study. "This statewide effort was designed to treat patients faster regardless of the challenges posted by geography or healthcare settings. We coordinated a system of care that starts when the 911 call comes in, includes the care patients receive in the ambulance, and the treatment they undergo at hospitals to restore blood flow in

blocked heart arteries. As a result, when patients were treated within the 90-minute door-to-device goal, we were able to reduce mortality rates to 2.2 percent." By comparison, the mortality rates stands at 5.7 percent when door-to-device treatment exceeds the 90-minute goal.

RACE-ER also emphasizes the need for paramedics to diagnose heart attacks in the field using ECGs, which can provide necessary information to mobilize interventional cardiology teams. The North Carolina researchers showed that pre-hospital ECG rates for patients transported to PCI hospitals by emergency medical services (EMS) increased from 67 percent to 88 percent.

Using this approach, patients are transported directly to waiting catheterization laboratories. Prior evidence shows paramedics can reliably diagnose heart attacks, and more than half of patients are treated within 60 minutes of hospital arrival.

Duke is now working with the American Heart Association to implement programs similar to RACE-ER in 20 regions across the country including New York City, Philadelphia, Detroit, San Antonio and Phoenix.

During the next two years, the Regional Systems of Care Demonstration Project – Mission: Lifeline® STEMI Systems Accelerator program will bring together cardiologists, emergency medicine physicians, administrators, nurses, and paramedics from each region to help them implement coordinated programs specific to their needs.

Data will be collected so each region can measure their success.

Provided by Duke University Medical Center