

# Out-of-hospital cardiac arrest: Studies tackle deadly public health problem

February 10 2023

---



Credit: Pixabay/CC0 Public Domain

The sudden cardiac arrest of NFL football player Damar Hamlin during a televised game in early January shocked the nation, but his recovery following emergency resuscitation efforts administered on the field did

something more: it showed how critical—and lifesaving—CPR can be.

Out-of-hospital cardiac arrest claims the lives of nearly 350,000 people in the United States each year, making it a major public health problem, according to the [American Heart Association](#) (AHA). Only about 10% of those who experience these events survive, which makes recoveries like Hamlin's all the more remarkable.

"Survival following out-of-hospital cardiac arrest is still dismal, but it is improving," said George Sopko, M.D., M.P.H., program director of the resuscitation branch of NHLBI's Division of Cardiovascular Sciences and a medical officer. "We need to do a lot better."

For the last two decades, researchers supported by the NHLBI have been trying to do just that, and their efforts are helping. The current survival rate for out-of-hospital cardiac arrest cases, while still low, is nearly double what it was in 2000.

A key driver of the improvement: the [Resuscitation Outcomes Consortium](#) (ROC), a network of 10 medical centers in the U.S. and Canada that studied the issue from 2006-2015. ROC focused attention on resuscitation research that until then had been scant and mainly observational. ROC worked with hospitals, Emergency Medical Services, and emergency departments to conduct evidence-based clinical trials to evaluate promising treatments for out-of-hospital cardiac arrests and severe trauma. These interventions included new drugs, tools, strategies, and techniques that revolutionized the treatment and care of cardiac arrest.

"ROC was a gamechanger in resuscitation research," Sopko said. "Its clinical trials changed the guidelines and filled in missing gaps, taking the guesswork out of CPR and other resuscitation efforts."

Now NHLBI supports a new emergency care network: The Strategies to Innovate Emergency Care Clinical Trials Network (SIREN). [SIREN](#) is a practical and scientific extension of ROC and has been a successful collaboration with other NIH institutes (notably the National Institute of Neurological Disorders and Stroke) since 2015.

"SIREN builds upon the foundation of ROC and is addressing important clinical issues in emergency care and resuscitation science," said Emily Tinsley, Ph.D., a program officer in the Heart Failure and Arrhythmias Branch of the NHLBI's Division of Cardiovascular Sciences and a clinical trials specialist. "Within SIREN, NHLBI is supporting multiple [clinical trials](#) focused on improving outcomes in [emergency care](#), including out-of-hospital cardiac arrest," she said.

With this development, NHLBI is moving the needle on cardiac arrest survival even further with two major new research studies.

## **Learning more about cooling the body**

A four-year clinical trial called [ICECAP](#) (Influence of Cooling Duration on Efficacy in Cardiac Arrest Patients), launched in 2019, aims to determine how long comatose patients who have been resuscitated after cardiac arrest need to be cooled therapeutically to improve their health and survival outcomes.

Early resuscitation studies have found that cooling the body immediately after cardiac arrest increases blood flow to the brain and helps prevent permanent damage, which can occur after just a few minutes. This kind of cooling also can speed recovery. Healthcare providers use various techniques—some with cooling blankets, ice packs, or cooling pads—to bring the body temperature down to a few degrees below normal. In some cases, they cool the body internally by injecting cool fluids into the bloodstream. The duration of this cooling technique, called therapeutic

hypothermia, usually lasts 24 hours.

"We now know that cooling works," Sopko said, noting that body cooling was used to treat the NFL's Hamlin in the moments after his collapse. "What we don't know is how long and what temperature you need for best results and which patients are the best candidates."

To answer those questions, SIREN researchers started ICECAP, which targets up to 1,800 patients at approximately 60 hospitals across United States. The patients are randomized to cooling of 91 degrees Fahrenheit (normal body temperature is around 98.6 degrees F) for a minimum of 6 hours up to 72 hours. The final findings will benefit future patients who have experienced this sort of trauma following cardiac arrest.

## **Addressing geographic and regional disparities**

Another area of research will home in on findings from earlier studies that showed disturbing disparities in patient survival, both across different regions of the country and within different regions of a state. In essence, where a person experiences a cardiac arrest can make the difference between living or dying.

Cardiac arrest victims in rural or remote regions often face unique challenges. They're usually long distances from major hospitals and lack access to life-saving equipment like automated external defibrillators, or AEDs, portable devices that deliver electric shocks to the heart. In addition, cardiac care in these areas tends to be fragmented, largely due to the lack of integration and coordination among locally run dispatch centers and acute care hospitals.

To address this problem, the NHLBI has launched [RACE-CARS](#) (Randomized Cluster Evaluation of Cardiac Arrest Systems). The 7-year trial started in July 2020 and is being conducted in 50 urban and rural

counties in North Carolina. The trial tests a customized set of targeted community-based interventions to improve survival, including a variety of first responder and bystander strategies aimed at achieving faster access to CPR (cardiopulmonary resuscitation) and a higher rate of defibrillator use by bystanders to improve outcomes.

"If you live in a rural area that's not very close to a hospital, it might take EMS 10 or 15 minutes or more to get to the scene," Tinsley explained.

"By that time, the window of time to save them is already over."

"Where you live should not determine whether you live," Tinsley added.

"Our research is trying to help to close those regional cardiac care gaps and boost survival outcomes."

RACE-CARS will inform how to better implement community and EMS interventions across North Carolina. Researchers hope that the lessons learned from the trial can help standardize care across other states' EMS agencies and boost implementation of guideline-based cardiac care nationwide and perhaps worldwide.

## **Recognizing the importance of CPR education**

CPR training is critical, Sopko said, not just for professionals, but for lay people, as well. Most cardiac arrests occur outside of the hospital, and most of those occur at home and in public places. Yet, bystanders or laypersons get involved in resuscitation efforts only half the time at best.

"That's a big problem," Sopko said. "Everyone should learn CPR. Even if you don't know how to do it, you should be able to dial 911 and get help." Having more strategically located defibrillation machines would also be an important step, he added.

The dramatic scene on the NFL field involving Damar Hamlin was a

cautionary tale—one Hamlin himself has publicly recognized. He has now partnered with the AHA to bring more attention to CPR education. Messages like his that back up the research are important, Sopko said.

"What we saw on that field was that the timely delivery of layperson and expert resuscitation saves lives," he said. "NHLBI-funded research has helped establish the national blueprint for facilitating more recoveries like this in the future. If everyone learned CPR, imagine how many more lives would be saved."

Provided by NIH/National Heart, Lung and Blood Institute

Citation: Out-of-hospital cardiac arrest: Studies tackle deadly public health problem (2023, February 10) retrieved 21 June 2024 from <https://medicalxpress.com/news/2023-02-out-of-hospital-cardiac-tackle-deadly-health.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.