

A strategic community intervention to improve cardiac arrest survival

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Background

Out of hospital cardiac arrest (OHCA) is one of the leading causes of death in Europe and North America. Several life-saving interventions have been described that, if carried out fast by lay or trained bystanders, may dramatically increase survival. This includes early cardiac arrest recognition, quick and high-quality cardiopulmonary resuscitation (CPR) including chest compressions and early use of an automated external defibrillator (AED) followed by advanced life support carried out by emergency medical services (EMS). However, the unique circumstances of OHCA that predominantly occur in private homes where only minutes separate the outcome between survival with good neurologic function and irreversible brain damage or death renders it a major health problem which may only be tackled by community and systems interventions.

Adult Out-of-Hospital Chain of Survival

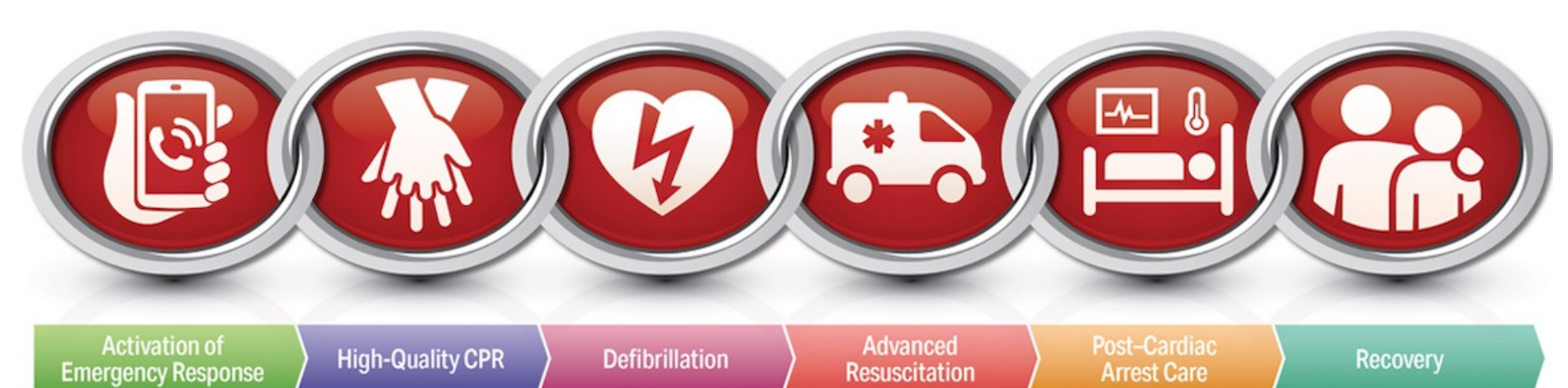


Figure 1 Out of hospital chain of survival

Aims & Methods

The Regional Approach to Cardiovascular Emergencies – Cardiac Arrest Resuscitation System (RACE-CARS) study will be a cluster-randomized registry based trial that will test a strategic community intervention to improve survival from OHCA in North Carolina.

The four interventions that will be tested are

- 1) optimizing 911 cardiac arrest recognition and first responder and EMS dispatch
- 2) increase dispatch CPR instructions to bystanders
- 3) comprehensive public CPR and AED trainings and
- 4) expanding first responder roles to accelerate delivery and use of AEDs.

As EMS care is mostly organized at county level, each county will comprise a unit and 50 counties in North Carolina will be randomized to intervention versus usual care. The primary outcome is survival to hospital discharge with good neurologic function (Figure 2).

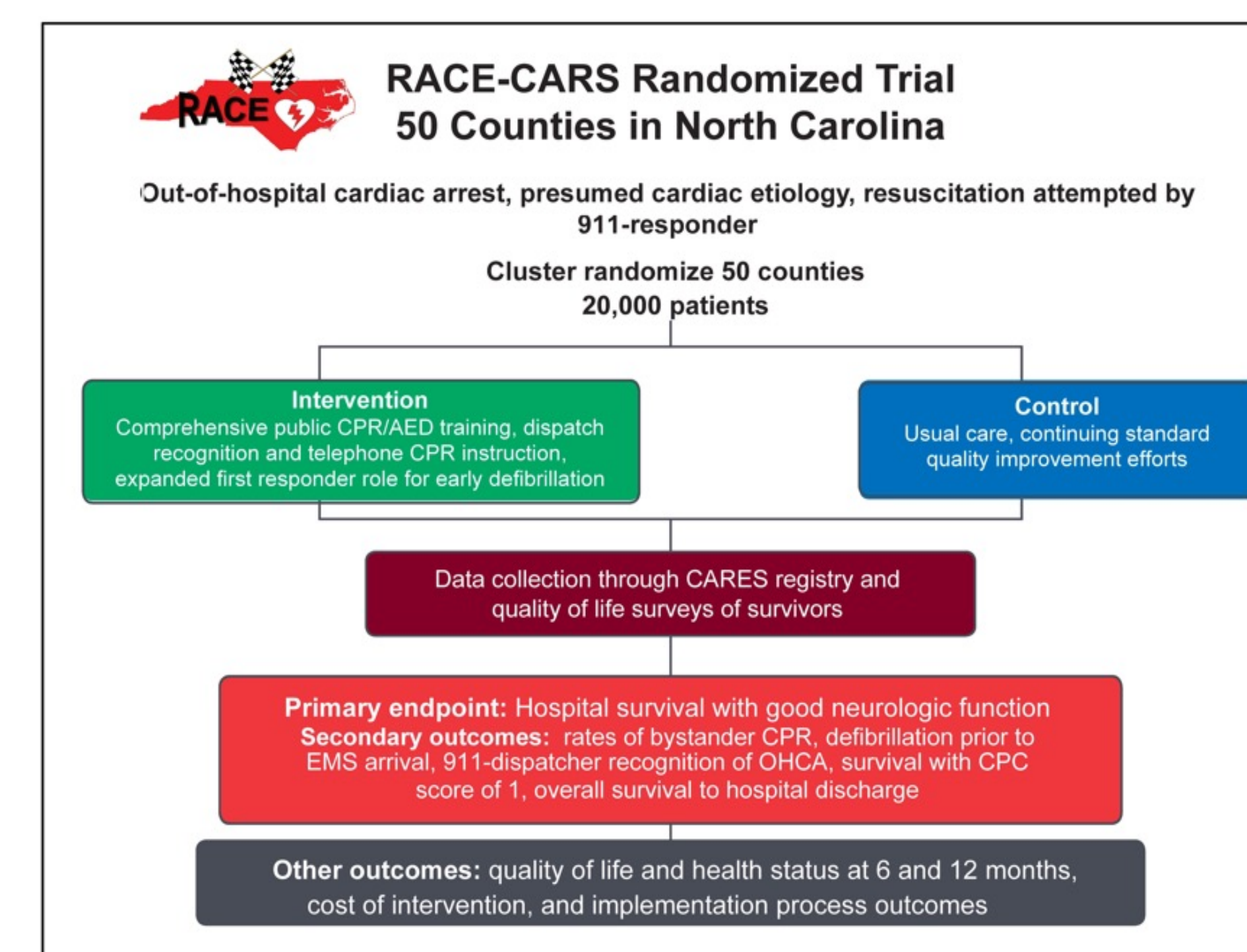


Figure 2 Design of the RACE-CARS trial

Important secondary outcomes are

- 1) rates of bystander CPR and
- 2) defibrillation prior to EMS arrival (by bystander or first responder).
- 3) Other secondary outcomes are the rate of 911-dispatch recognition of CA, survival with good neurological outcome, survival to hospital discharge, and quality of life and neurological functional status following hospital discharge.

One innovative aspect of this trial is the design as a randomized controlled registry based trial based on an existing data collection system, the Cardiac Arrest Registry to Enhance Survival (CARES) registry.

The CARES registry captures detailed information on important metrics of care and outcomes following cardiac arrest using standardized international Utstein definitions for clinical variables and outcomes. A CARES analyst reviews every record for completeness and accuracy. Therefore, there is a standardized and virtually complete data capture in place across the 50 counties to be randomized.

Prior experience

The HeartRescue cardiac arrest project initiated a multifaceted quality improvement program in 11 counties in North Carolina. This community-wide intervention included lay people, EMS staff, first responders and hospital administrators. The intervention led to an increase in the combination of bystander CPR and first-responder defibrillation from 14.1% to 23.1%, translating to an increase in survival with good neurological outcome from 7.1% to 9.7% (figure 3).

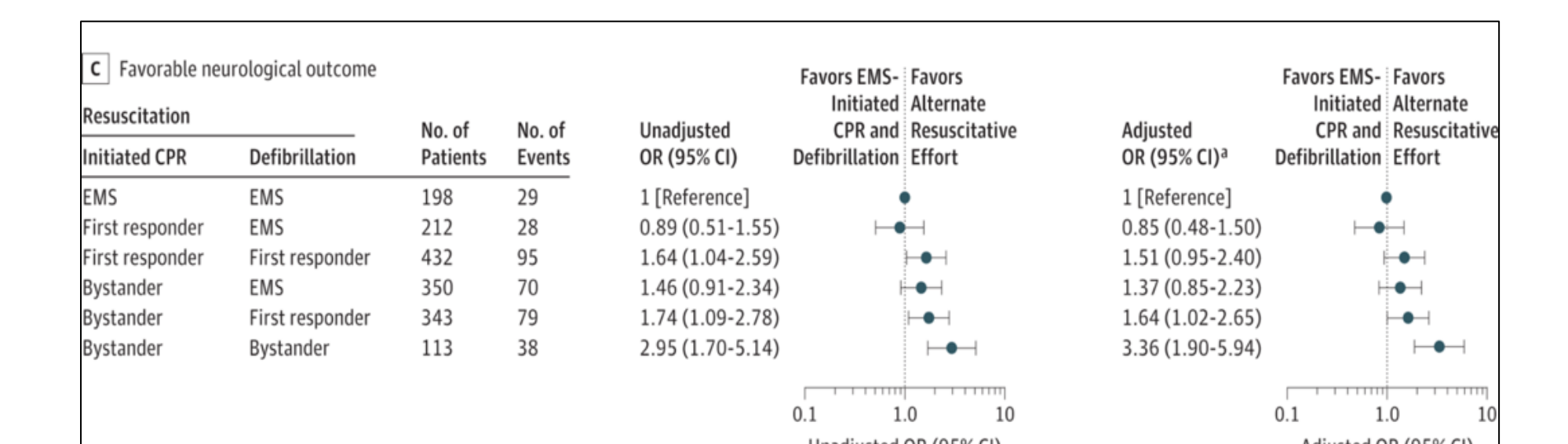


Figure 3 Results of the HeartRescue project