





# **RACE CARS**

## **Regional Approach to CV Emergencies**

### **Project Overview**

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<https://racecars.dcri.duke.edu/>  
<http://www.heartrescueproject.com/>



# RACE CARS



- Review the RACE Project's history
- Review NC Cardiac Arrest Data
- Discuss strategies to improve Cardiac Arrest Care



If we can't  
save them,



RACE CARS

# RACE CARS

Regional  
Approach to  
Cardiovascular  
Emergencies

Cardiac  
Arrest  
Resuscitation  
System



Every Second Counts. Every Action Matters.

# History STEMI Systems in NC:

“RACE moved beyond the cath lab and PCI hospitals to focus on EDs, EMS, hospital networks, and associated communication and transport systems.” Heart.org

“AHA’s Mission: Lifeline – A Call to Arms for Emergency Medicine” ACEP News Jan 2009

**RACE Pilot  
1st STEMI  
System**

**RACE  
65 hospitals/  
Multiple EMS Agencies**

**RACE - ER  
Entire State**

**RACE CARS Goal:  
Improve OOHCA  
survival by 50% by 2015**

**Mission Lifeline  
RACECARS**

2003

2005

2006

2007

2008

2009

2010

2011 - 2015

“Racing Against the Clock: A North Carolina-based project becomes a model for discovery-to-balloon”

Richard R. Rogoski 2008

“RACE: A Herculean attempt to improve STEMI care”

Nov 12, 2007 Lisa Nainggolan

## Implementation of a Statewide System for Coronary Reperfusion for ST-Segment Elevation Myocardial Infarction

**Background:** Despite 17 decades of evidence demonstrating benefits from prompt coronary reperfusion, evidence continues to show that many patients with ST-segment elevation myocardial infarction (STEMI) are treated too slowly or not at all.

**Objectives:** To establish a statewide system for emergency coronary intervention to improve outcomes for patients with STEMI.

**Design and Setting:** A statewide reperfusion system was implemented to provide rapid access to coronary intervention for patients with STEMI. The system was implemented in 2007 and is now in place across the state.

**Results:** A total of 1,000 patients with STEMI were treated at 100 hospitals across the state. The system was implemented in 2007 and is now in place across the state.

**Conclusions:** A statewide reperfusion system was implemented to provide rapid access to coronary intervention for patients with STEMI. The system was implemented in 2007 and is now in place across the state.

“North Carolina’s RACE program cuts door-in door-out times for STEMI patients”

Jun 28, 2011 Reed Miller

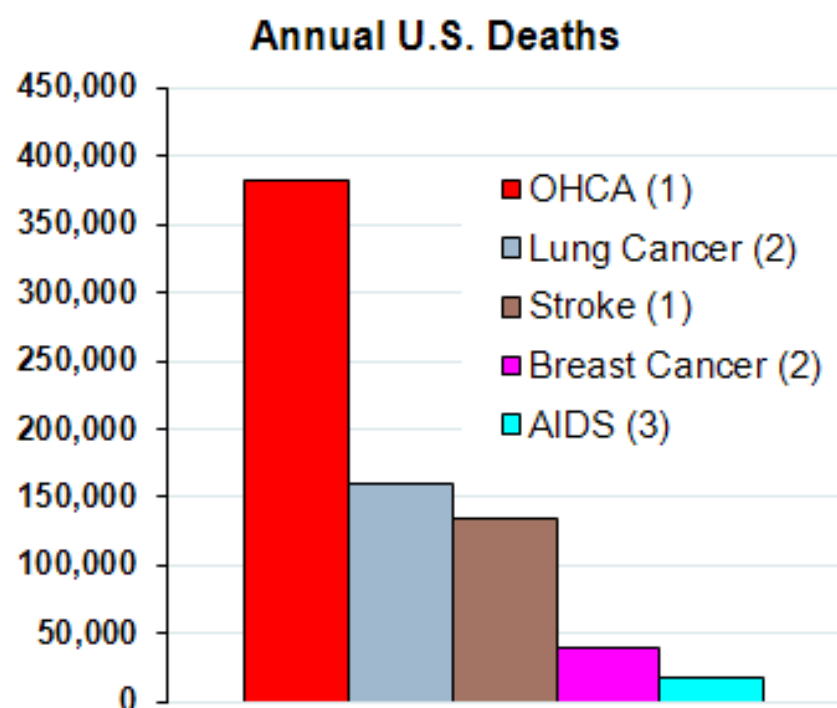


# The Statistics:

- Sudden Cardiac Arrest (SCA) is the 3<sup>rd</sup> leading cause of death in the US
- Survival rates have not changed in 30 years
- 80% of SCA die before they reach the hospital
- National Public Health Crisis



## Out-of-Hospital Cardiac Arrest: Overlooked Cause of Death



- ▶ Wide variance in local, regional, economic and ethnic survival rates
- ▶ Current data collection sporadic, minimizing motives for systemic improvement

(1) American Heart Association Heart Disease and Stroke Statistics – 2012 Update.

(2) Cancer.org - 2012.

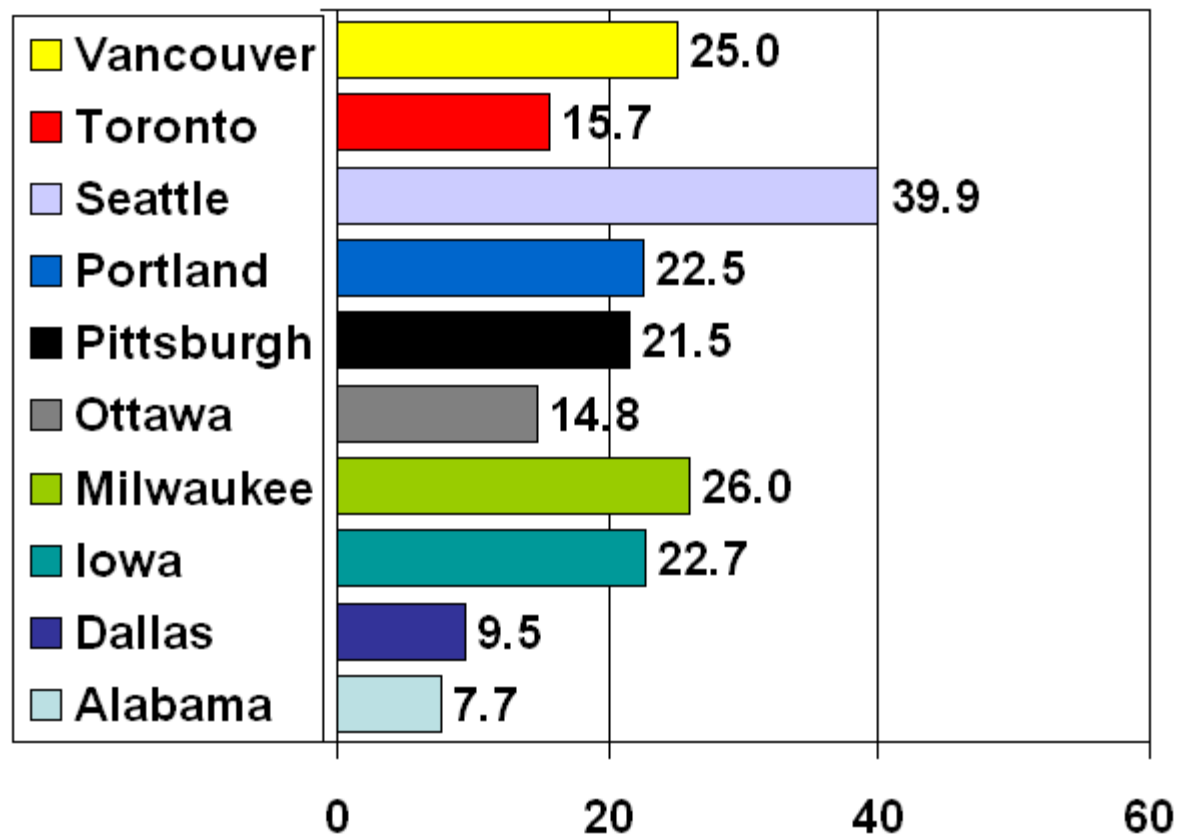
(3) U.S. HIV & AIDS Statistic Summary. Avert.org.

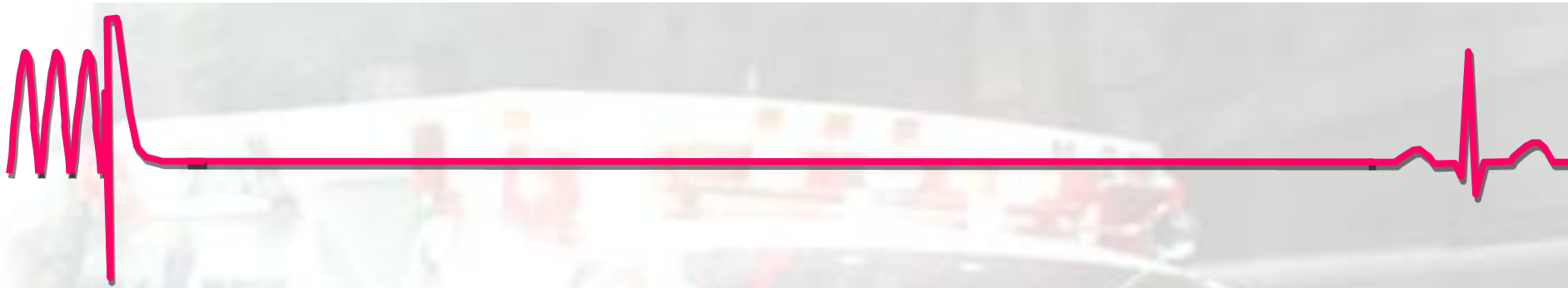


# Variation in survival VF arrest

## Resuscitations Outcomes Consortium

### Survival to discharge





*“Where you live should  
not determine  
whether you live”*



# HeartRescue Partners





## HeartRescue Partners



### Program Goals:

**Goal 1:** Improve Survival of Cardiac Arrest by 50% over 5 years in geographies we fund.

**Goal 2:** Increase and improve measurement of Sudden Cardiac Arrest.

**Goal 3:** Expand and improve national and global impact of the HeartRescue Project.

### Program Results FY12- Q1FY13:

1. Partner programs now covering 50% or more of state populations, and reported on baseline and 2011 survival outcomes. **900 survivors reported in 2011.**
2. New partners in FY12 (AMR), and FY13 (University of Illinois)
3. All partners hosted 25 Resuscitation Academies and eLearning webinars reaching 1,000+ EMS/Hospital leaders with best practice education
4. Partners presented to 1,200 EMS leaders at 8 events to date.
5. 3 million people saved a life virtually with Save-a-Life Simulator on HeartRescueNow.com





# HeartRescue Flagship Premier Partner Program:

## **1st Chain: Community Response**

- i. Early SCA Recognition
- ii. Early 911
- iii. Early and effective bystander CPR or CCC
- iv. Early Public Access to AED

## **2nd Chain: Pre-Hospital Response**

- i. Enhanced dispatch
- ii. Enhanced/high performance CPR or CCC
- iii. Defibrillation care (e.g. one shock therapy for VF patients)
- iv. Pre-hospital hypothermia
- v. Drug delivery (e.g. Intra-osseous drug delivery)

## **3rd Chain: Hospital Response**

- i. Patient triage to Resuscitation Center of Excellence
- ii. Hypothermia as indicated by local protocol
- iii. 24/7 Cath Lab
- iv. Patient indicated therapies provided (e.g. ICD, PTCA, stent, CABG)
- v. Post survival patient and family education and support



# CPC Score:

Cerebral Performance Category

**GOAL-ALIVE WITH GOOD  
NEURO OUTCOMES**



*The level at the time of discharge*

**Level 1:** Alert, able to work and lead a normal life.

**Level 2:** Conscious and able to function independently, but may have hemiplegia, seizures, or permanent memory or mental changes.

**Level 3:** Conscious, dependent on others for daily support, functions only in an institution or at home with exceptional family effort.

**Level 4:** Coma, vegetative state.



# Cardiac arrest in North Carolina:

~ 5000-8000 per year (ED vs. EMS records)

## NC Office of EMS Preliminary data

- Statewide Cardiac Arrests: 5,213
- EMS Return of Spontaneous Circulation: 1,845 (35%)
- Arrived at Emergency Department Alive: 1,034 (20%)
- Admitted to Hospital Alive: 589 (11%)
- Discharge from Hospital Alive :not available... likely under 5%



## High Point NC:



### High Point girl saves teammate's life by performing CPR

Posted on: 11:34 am, April 19, 2013, by [Web Staff](#), updated on: 11:44am, April 19, 2013

- Paris White collapses during practice
- Weslyan Academy Softball Teammates learned CPR in 8<sup>th</sup> grade
- Others arrive from AED on school property
- “It was really scary for me because it was the difference between life and death,”



# Adult Chain of Survival



1. Immediate recognition of cardiac arrest and activation of the emergency response system
2. Early CPR with an emphasis on chest compressions
3. Rapid defibrillation
4. Effective advanced life support
5. Integrated post–cardiac arrest care

# *Elements of success:*

- Witnessed
- Recognition, 911
- Medical dispatch
- Bystander CPR
- 1<sup>st</sup> responder AED
- Hypothermia protocol





# CARES

- **C**ardiac
- **A**rrest
- **R**egistry to
- **E**nhance
- **S**urvival



# Data Collected

- Basic Demographics
- Basic Incident /Response Details
- Arrest Details
- CPR Details
- AED Usage
- EMS Interventions
- Outcome



# CARES Participation



## EMS Participation by County

- Participating
- Some Agencies Participating
- In progress
- Future Site

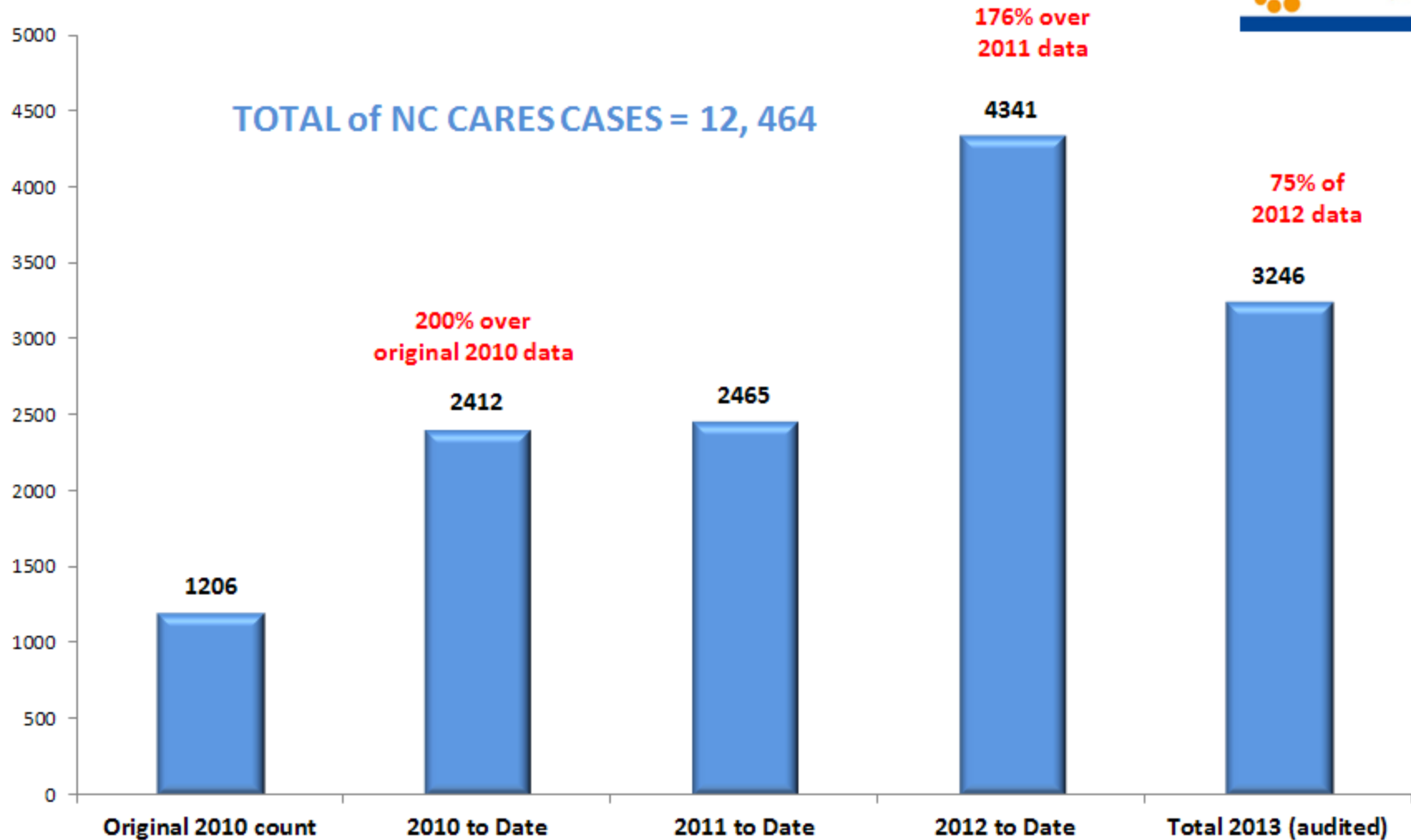
## Hospital Participation

- Participating
- Priority Recruitment Patients in System
- Listed Destination
- Future Site

**63 EMS Agencies**  
**80 Hospitals**  
**82% NC Population**



# CARES Registry NC CARES Records December, 2013

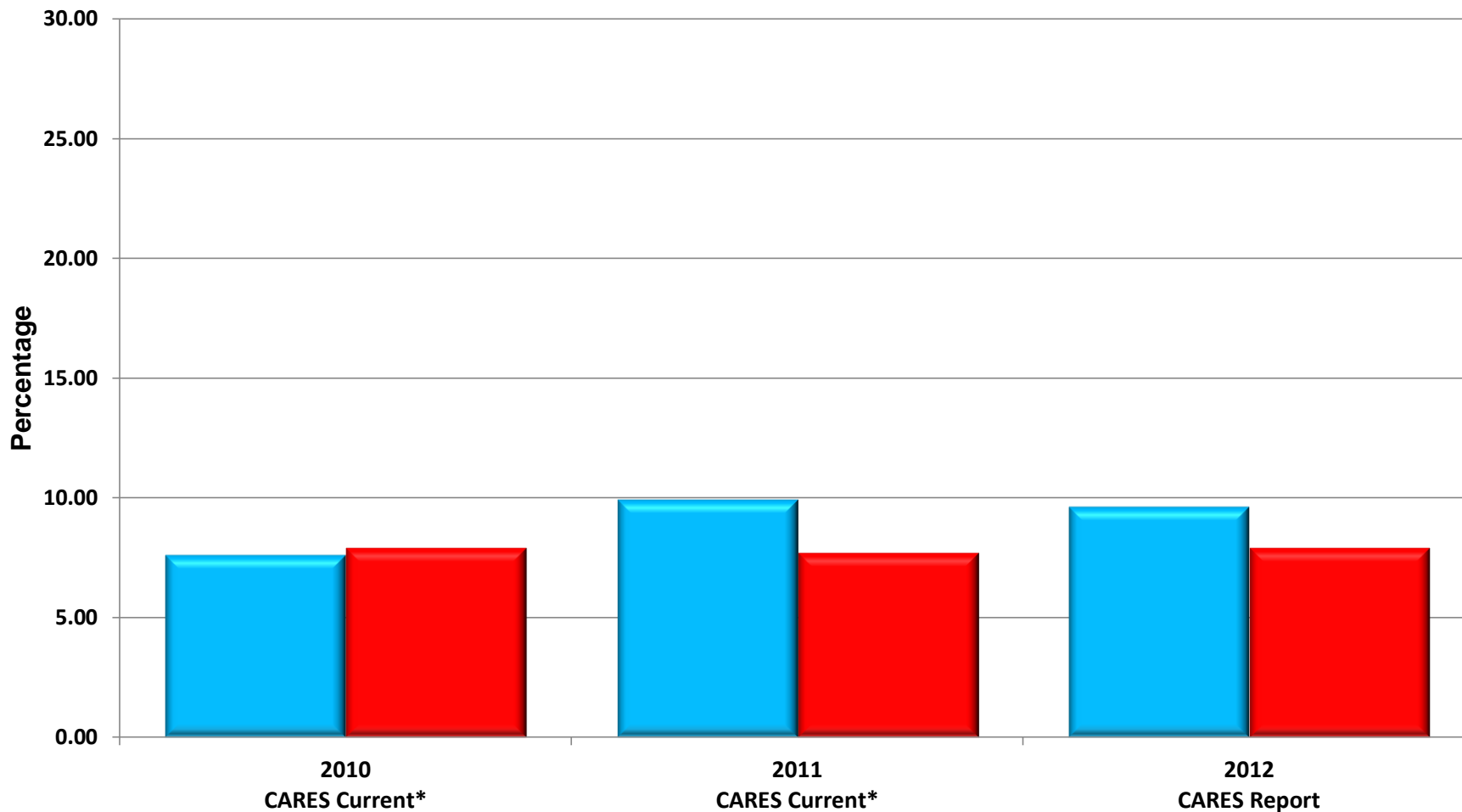




# North Carolina CARES Overall Survival with Good Neurological Outcome 2010 - 2012 May 23, 2013



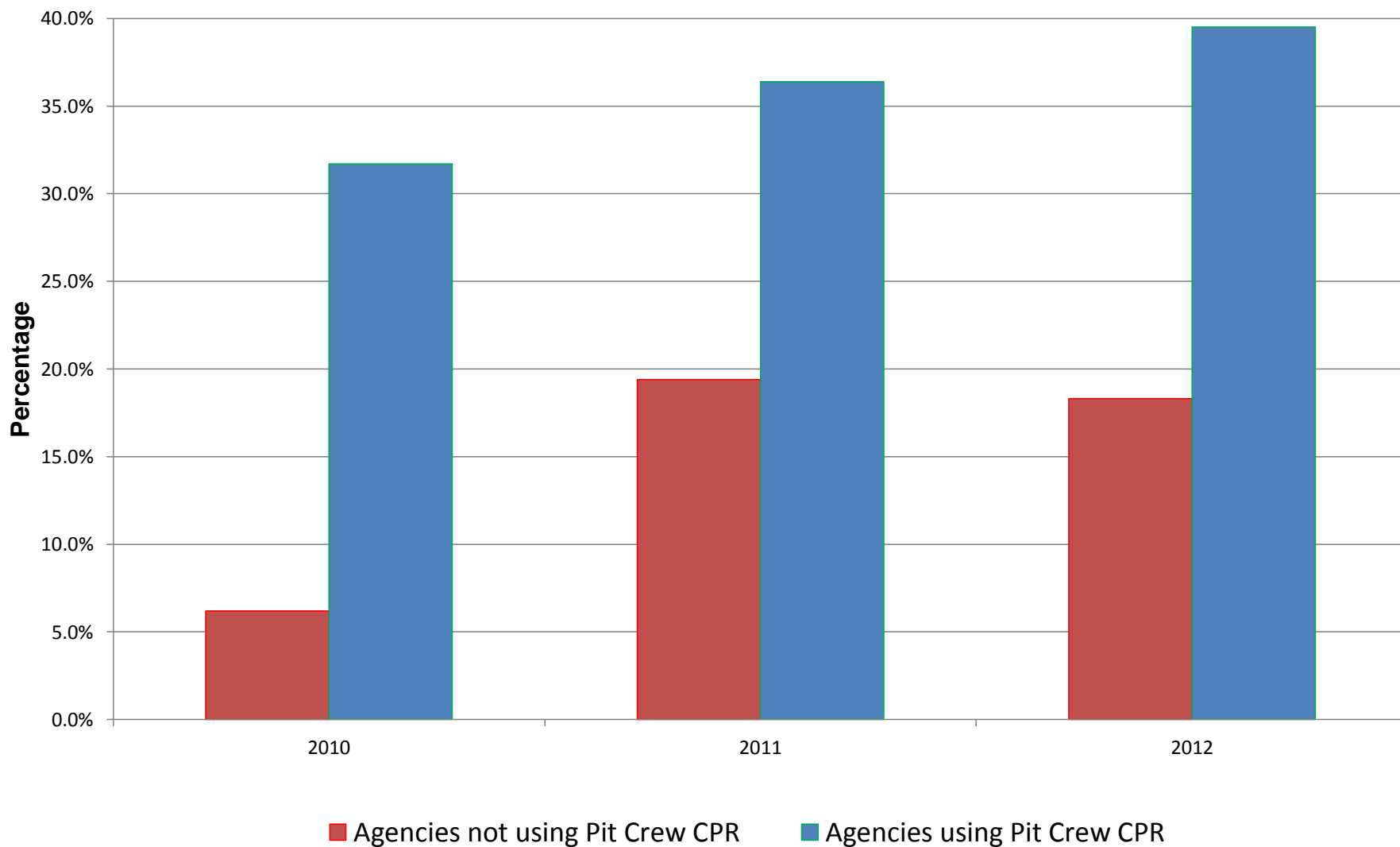
■ NC Overall w/ Good Neuro ■ US Overall w/ Good Neuro



\* Data run 4/23/2013



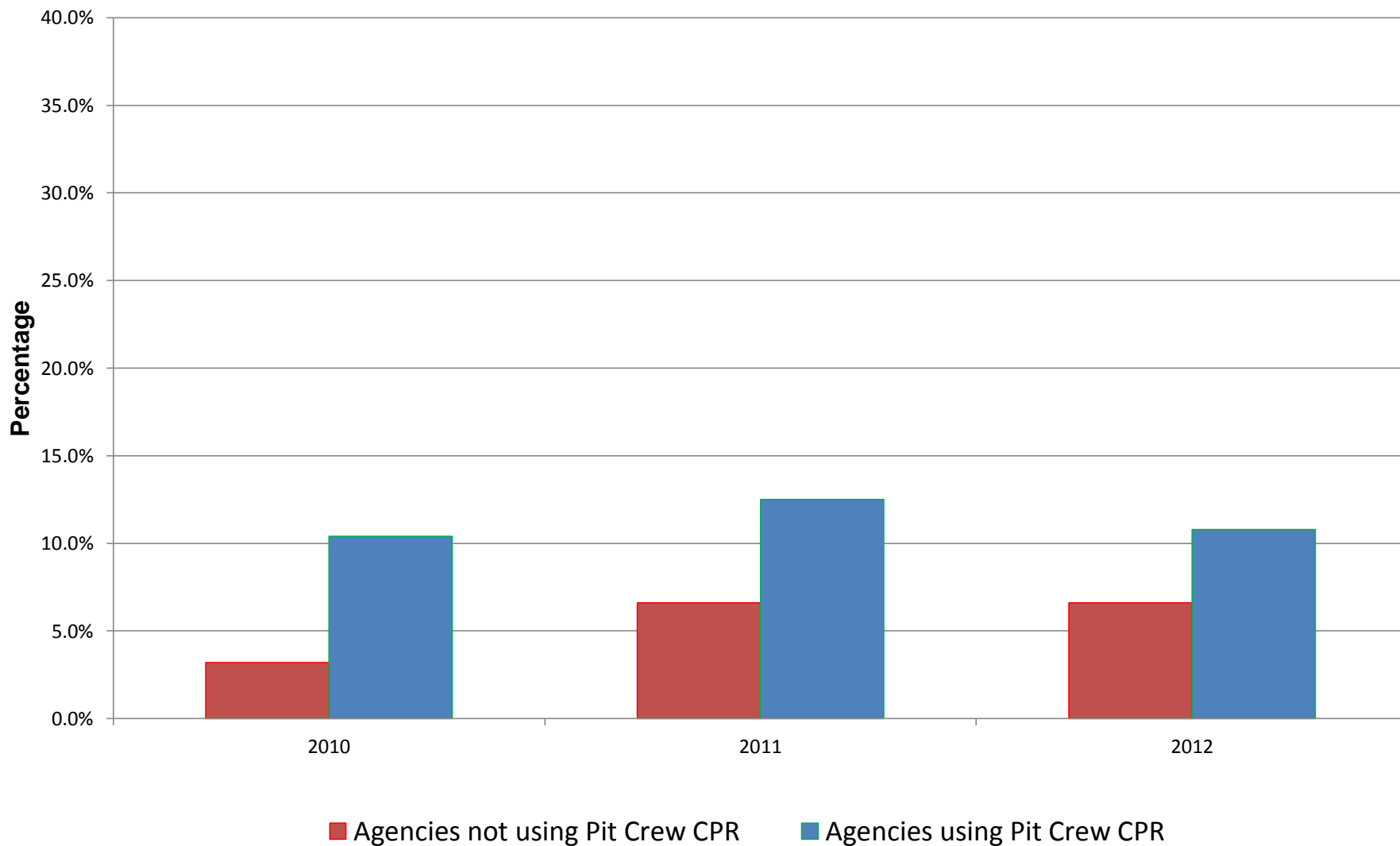
**North Carolina CARES**  
**Utstein Survival Rates**  
**2010- 2012**  
**October 10, 2013**







**North Carolina CARES**  
**Overall Survival Rate with Good Neuro**  
**2010- 2012**  
**October 10, 2013**





# Hospital Report



	Total (%)	Admission (%)	Discharge (%)
<b>Pre-Hospital Characteristics</b>	<b>N</b>	<b>N (%)</b>	<b>N (%)</b>
Gender = Male	N (%)	N (%)	N (%)
Mean Age	X	---	---
Initial Rhythm			
Shockable	N (%)	N (%)	N (%)
Unshockable	N (%)	N (%)	N (%)
<b>Witnessed Status</b>			
Unwitnessed	N (%)	N (%)	N (%)
Bystander Witnessed	N (%)	N (%)	N (%)
Witnessed by 911 Responder	N (%)	N (%)	N (%)
<b>Sustained ROSC</b>			
No Sustained ROSC	N (%)	N (%)	N (%)
Sustained ROSC in field, pulseless at ED arrival	N (%)	N (%)	N (%)
Sustained ROSC in field, pulse at ED arrival	N (%)	N (%)	N (%)
Hypothermia care initiated in the field	N (%)	N (%)	N (%)



# Hospital Report



## In-Hospital Characteristics

Total (%)

Discharge (%)

Died in ED	N (%)	---
Admitted to hospital	N (%)	N (%)
Hypothermia care initiated/continued in hospital	N (%)	N (%)
Myocardial infarction	N (%)	N (%)
Coronary angiography performed	N (%)	N (%)
Cardiac stent placed	N (%)	N (%)
CABG performed	N (%)	N (%)
ICD placed/scheduled	N (%)	N (%)
Discharged alive	N (%)	---
Discharged with good/moderate CPC	N (%)	----



# North Carolina

- Estimated Cardiac Arrest 2012  
- 7189
- Estimated Survivors Overall 2012  
- 755
- A 1% change in overall survival = 72 lives

Extrapolated from 2012 CARES Data based upon population reporting per month.





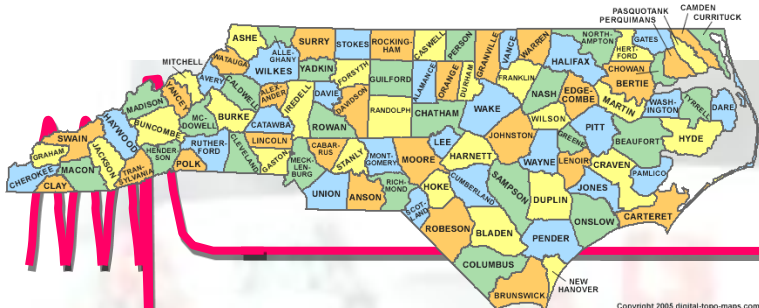
# NC Success Stories:

- Pregnant Woman/School Teacher – Charlotte
- Legislator-Raleigh
- Police Officer - Yadkinville
- Baseball Coach-Winston-Salem
- Former Girl scout performs CPR-Durham
- Rural EMS: Stokes County Survival Rate 66%

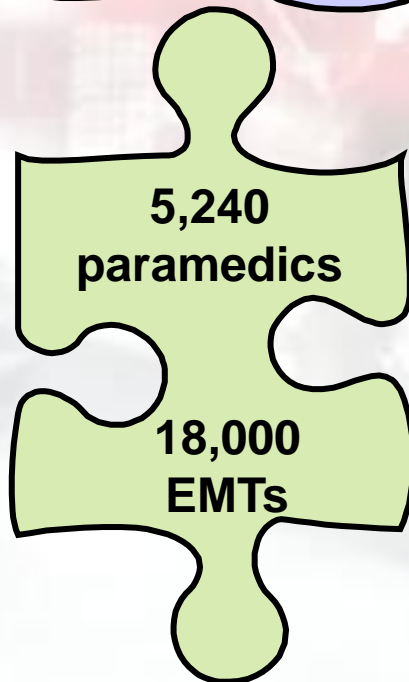
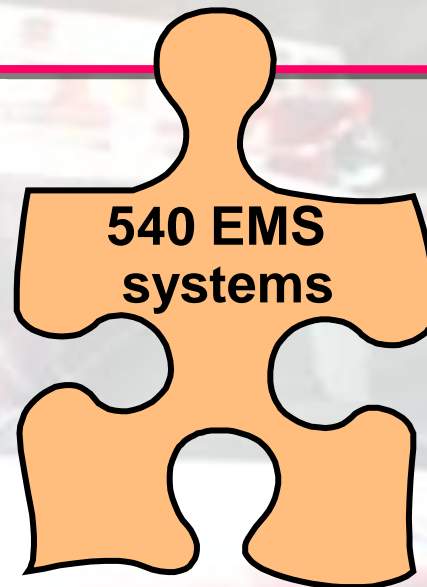
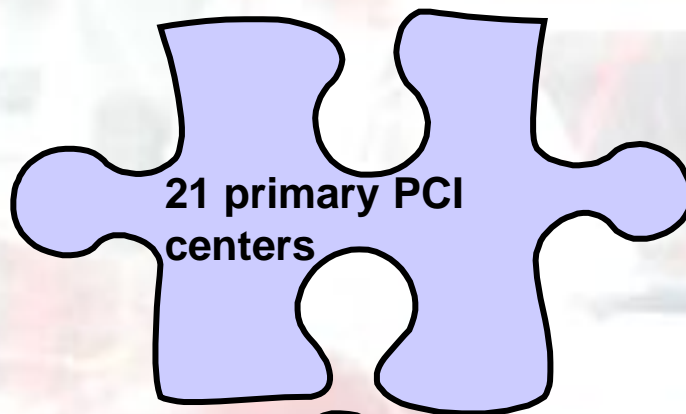


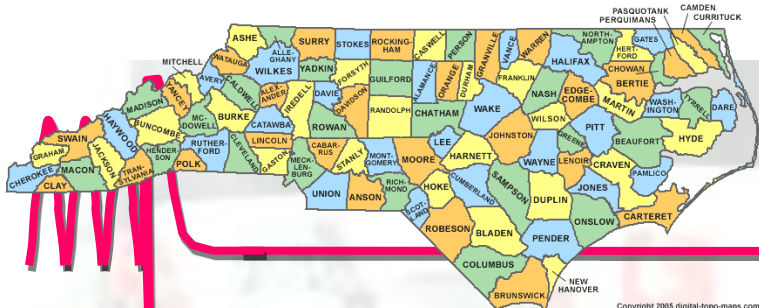
# Next Steps

- Develop regional EMS and referral hospital treatment and transfer plans
- Expand collection of data to all counties (CARES & INTCAR)
- Expand adoption of team-based resuscitation method to all EMS agencies and Emergency Departments
- Data Feedback to all providers
- Roll out community education of hands-only CPR



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**Integrated, Systematic  
AMI Care**



