



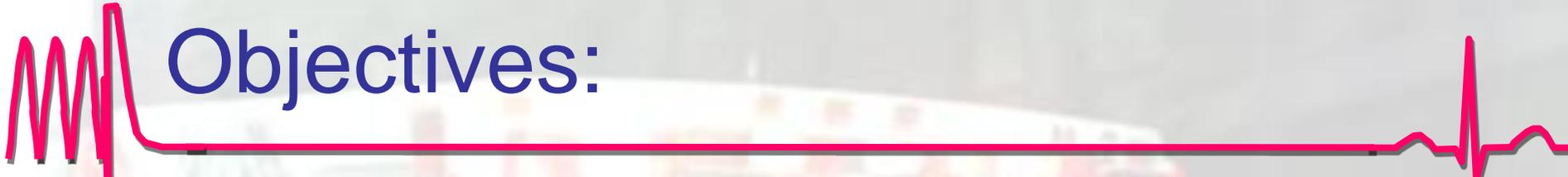
Regional Approach to Cardiovascular Emergencies
Cardiac Arrest Resuscitation System

2013 Data Report

Clark Tyson, MS, NREMT-P
NC CARES Coordinator
June 26, 2014

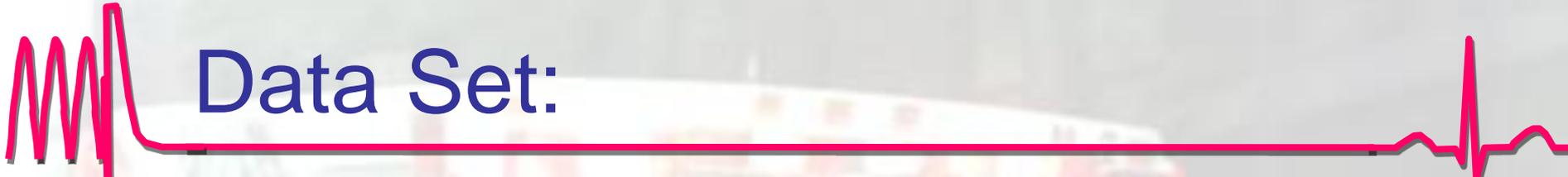
clark.tyson@dm.duke.edu





Objectives:

- Report the findings from 2013 CARES data collections efforts.
- Demonstrate that quality improvement efforts are working.
- Provide strategies to improve cardiac arrest survival in the non-traumatic sudden cardiac arrest.



Data Set:

- Cardiac etiology cases only
- Represents NC collection efforts through 12/31/13
- 61 EMS systems included representing 75% of NC's population
- On agency breakdown slides:
 - agency must have 12 months data,
 - >95% data completion rate and
 - >20 cases to be included.

Slides are a description of data collected under field conditions.
No attempt has been made to control for different variables that may affect results.



Volume



North Carolina CARES

CASE Volume by Year

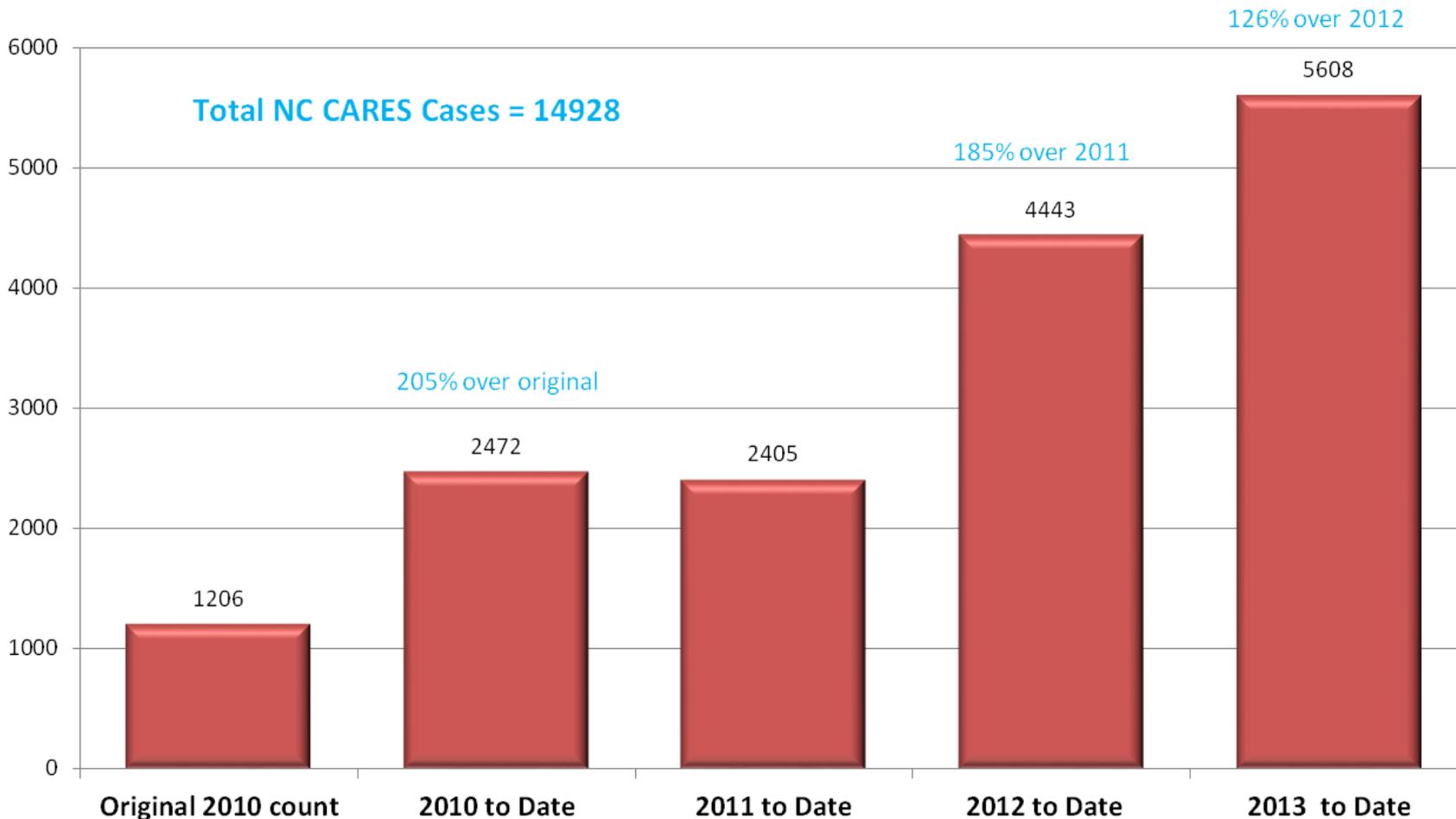
2010 - 2013

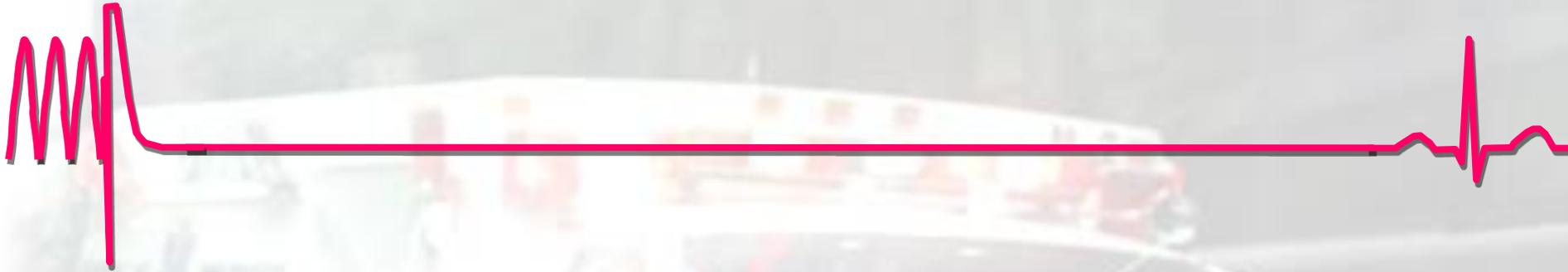
April 8, 2014



HeartRescue
PROJECT

Every second counts. Every action matters.

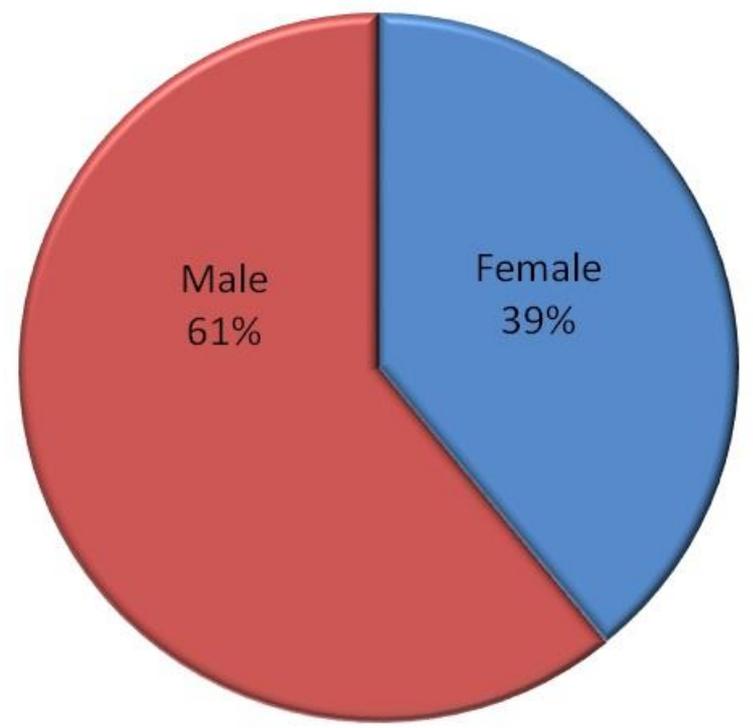
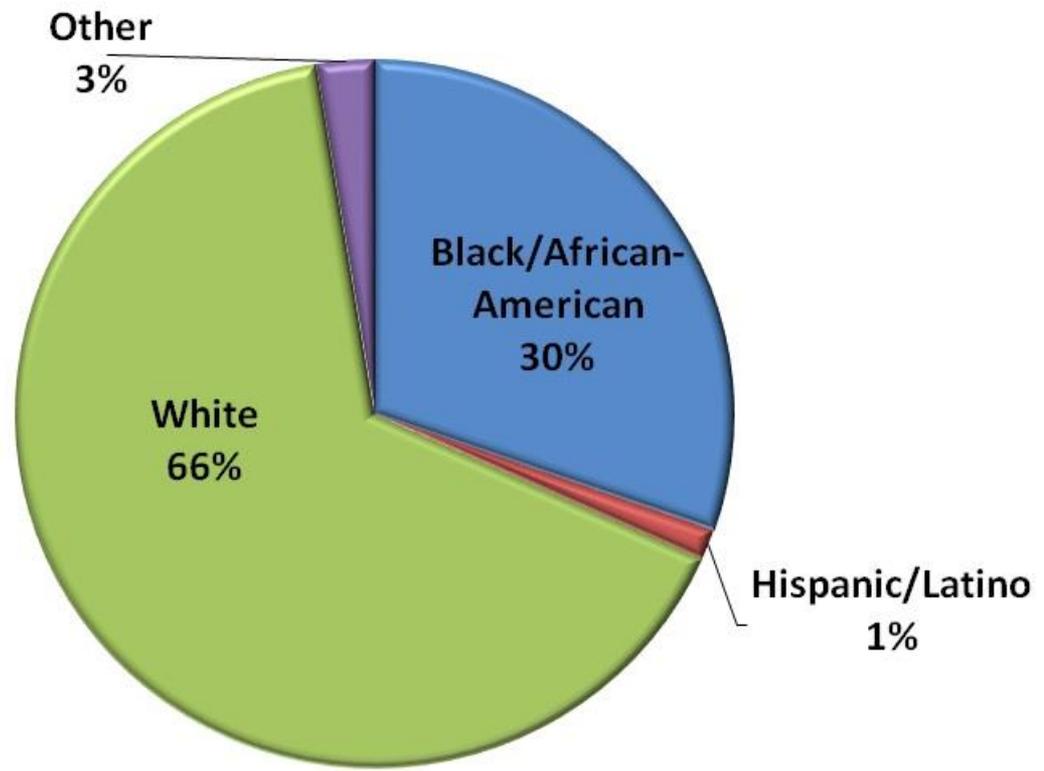




Demographics



North Carolina CARES Gender & Racial Breakdown 2013 July 1, 2014

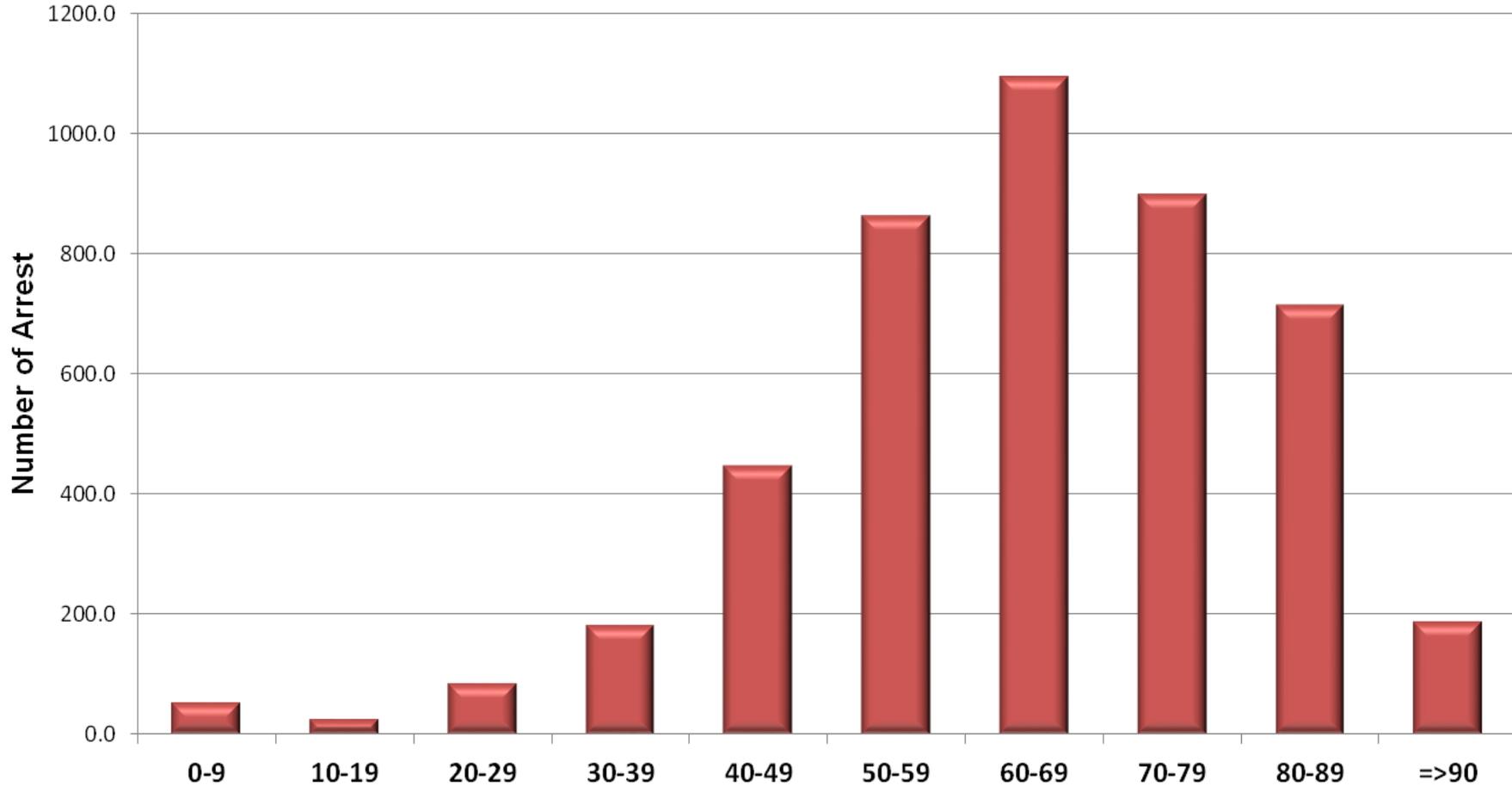




North Carolina CARES

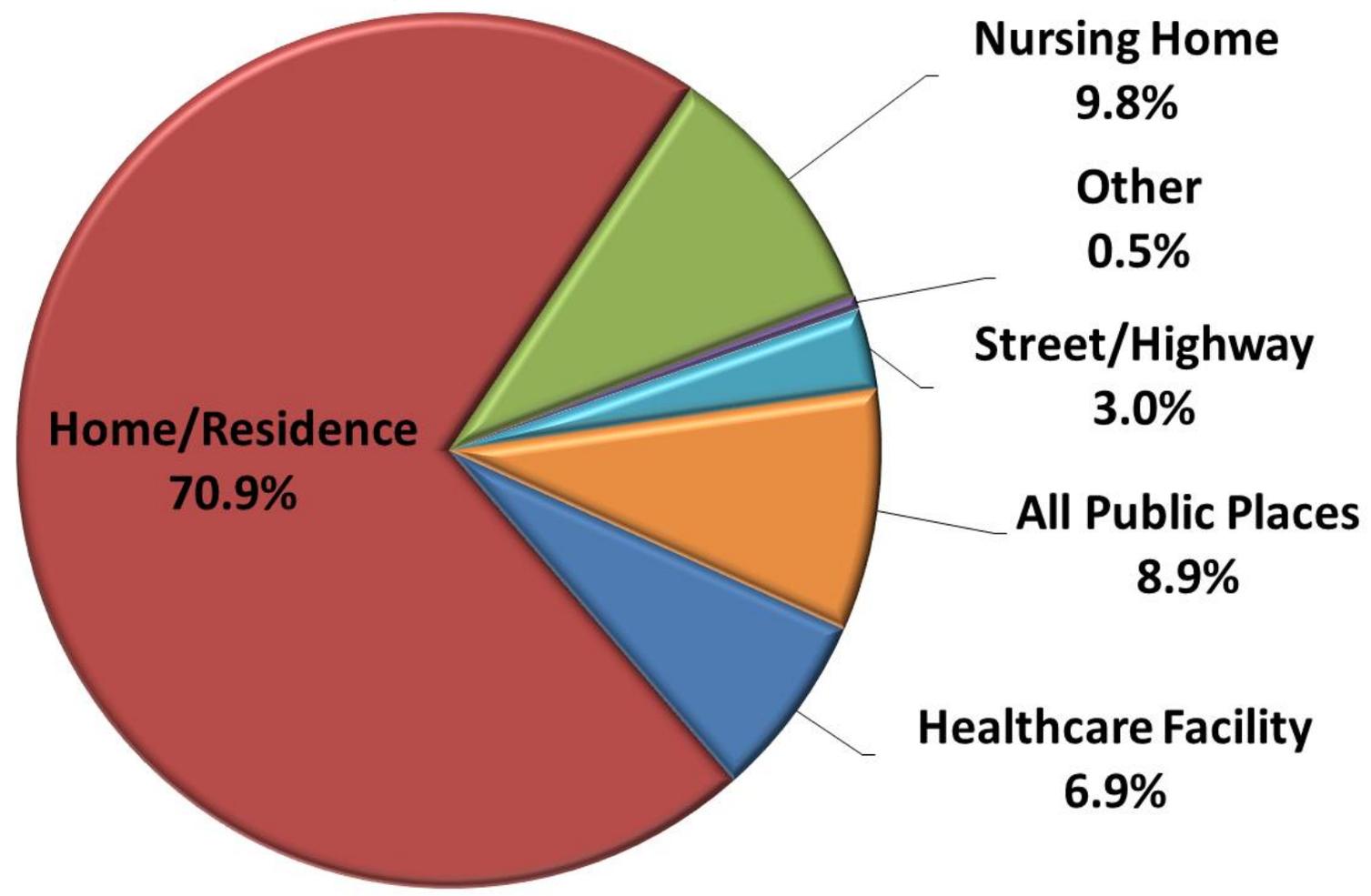
Cardiac Arrest by Age Range

May 27, 2014



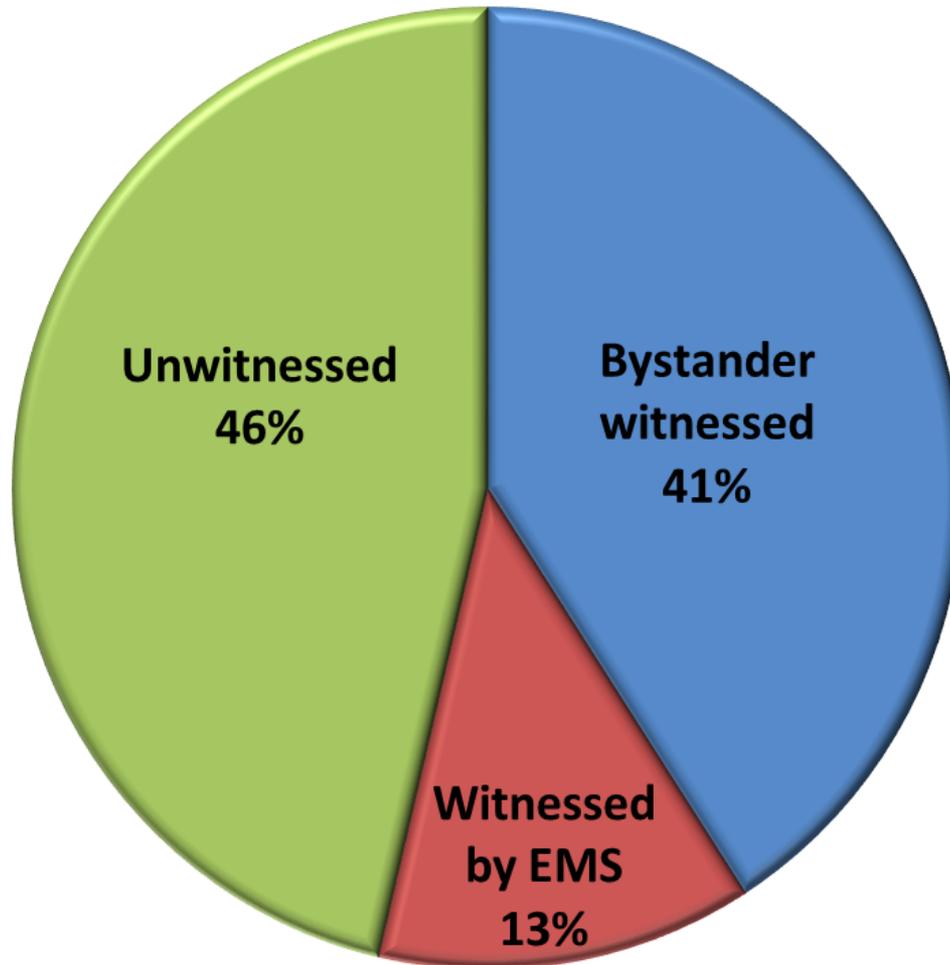


North Carolina CARES Location of Arrest 2013 May 13, 2014



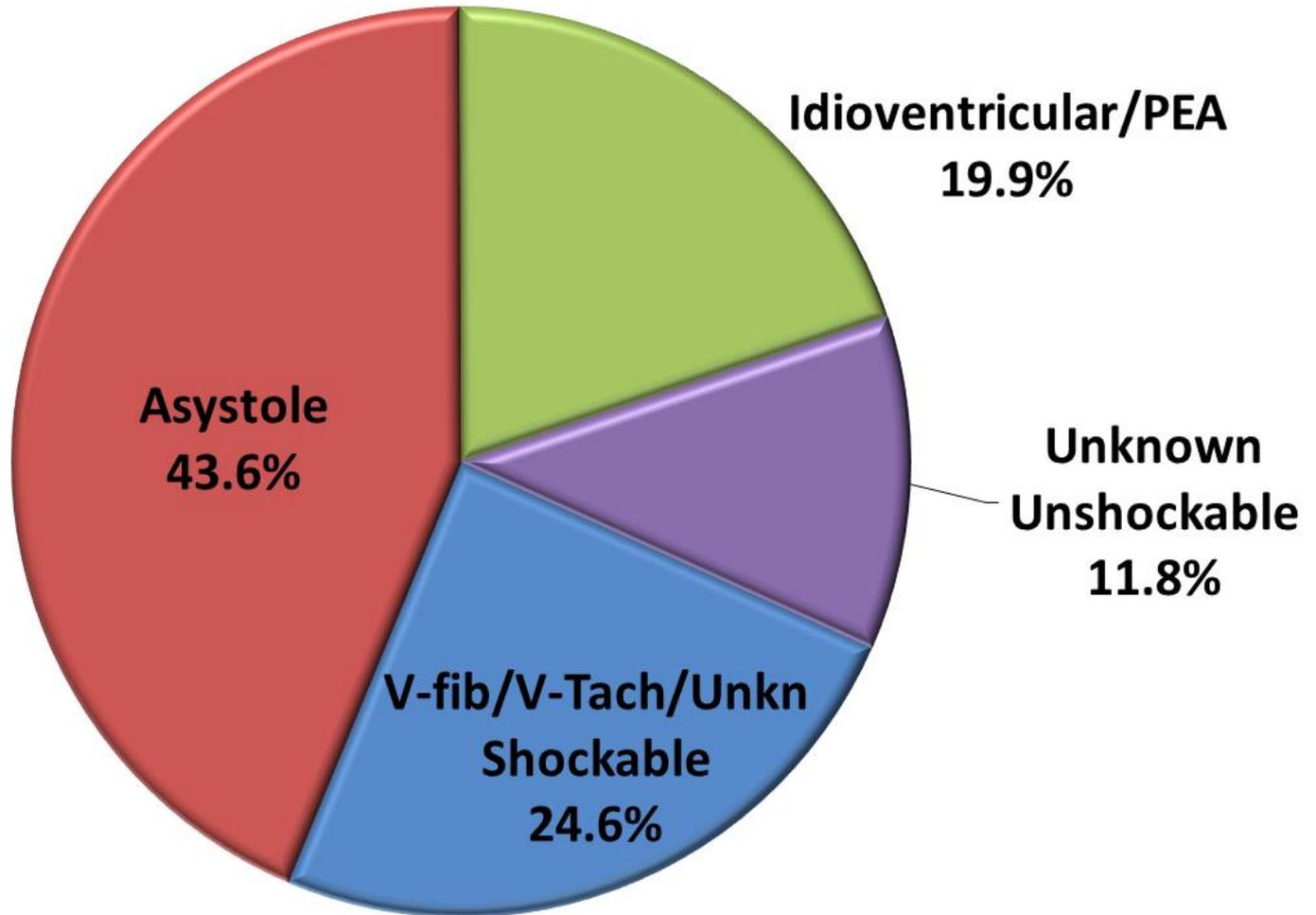


**North Carolina CARES
Witnessed By
2013
May 13, 2014**





**North Carolina CARES
Initial Rhythm
2013
May 13, 2014**

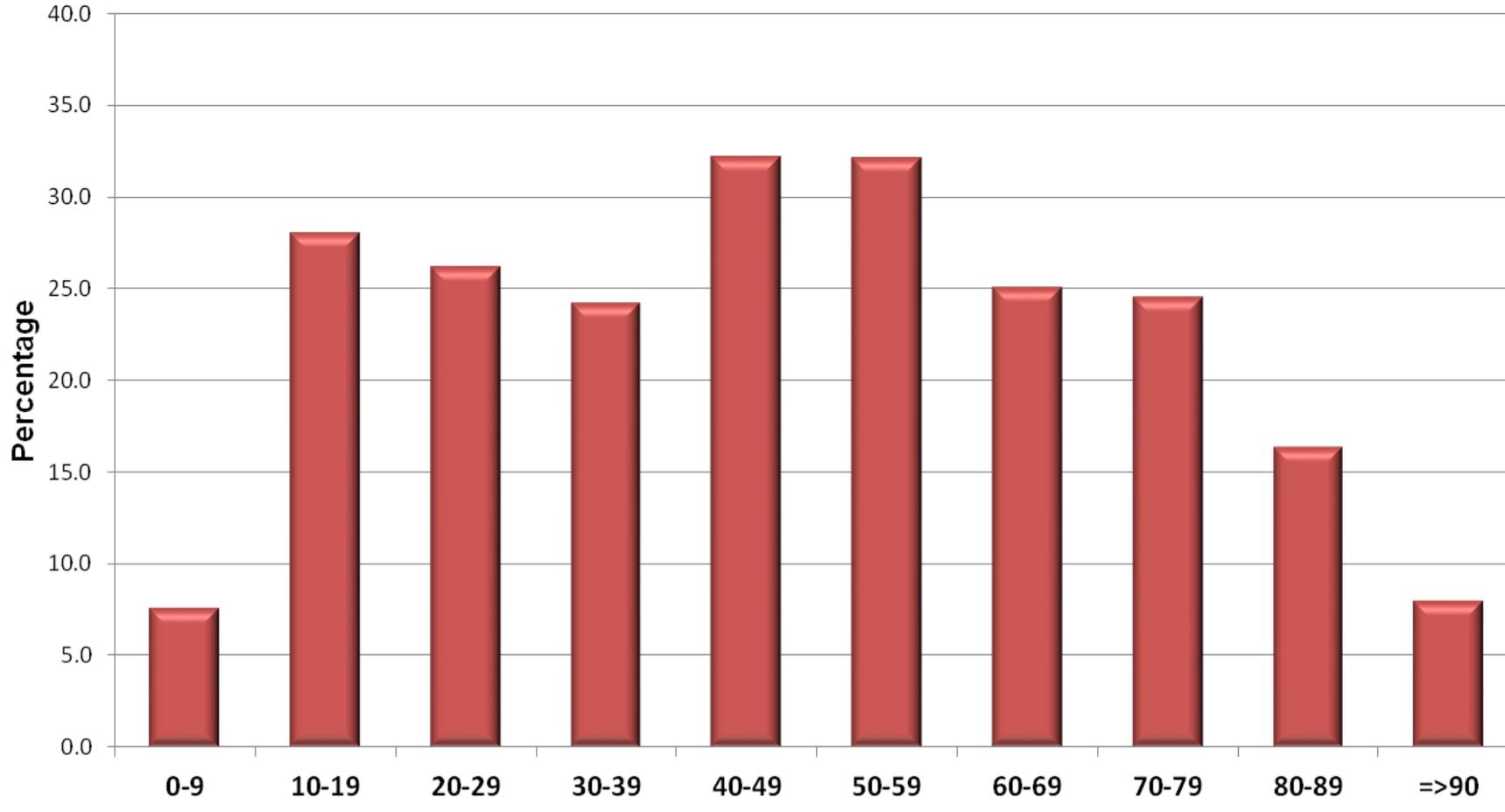


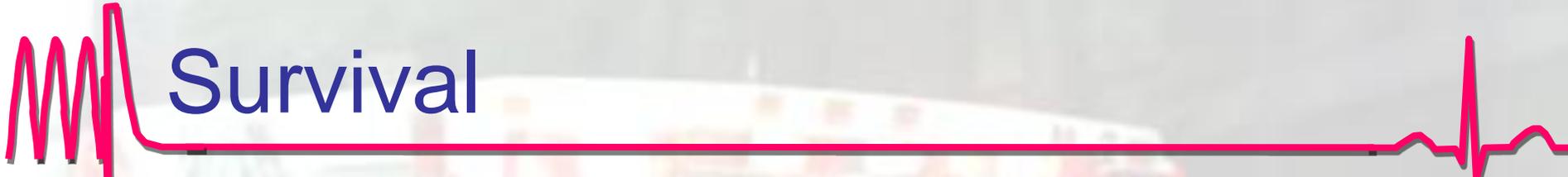


North Carolina CARES

Shockable Rhythm Rate by Age Range

May 28, 2014





Survival

- Overall Survival Rate:
 - all patients discharged from the hospital alive
- Overall with Good Neurological Outcome:
 - all patients discharged alive with CPC score of 1 or 2.
- Utstein:
 - patients with a bystander witnessed arrest of cardiac etiology found in a shockable rhythm



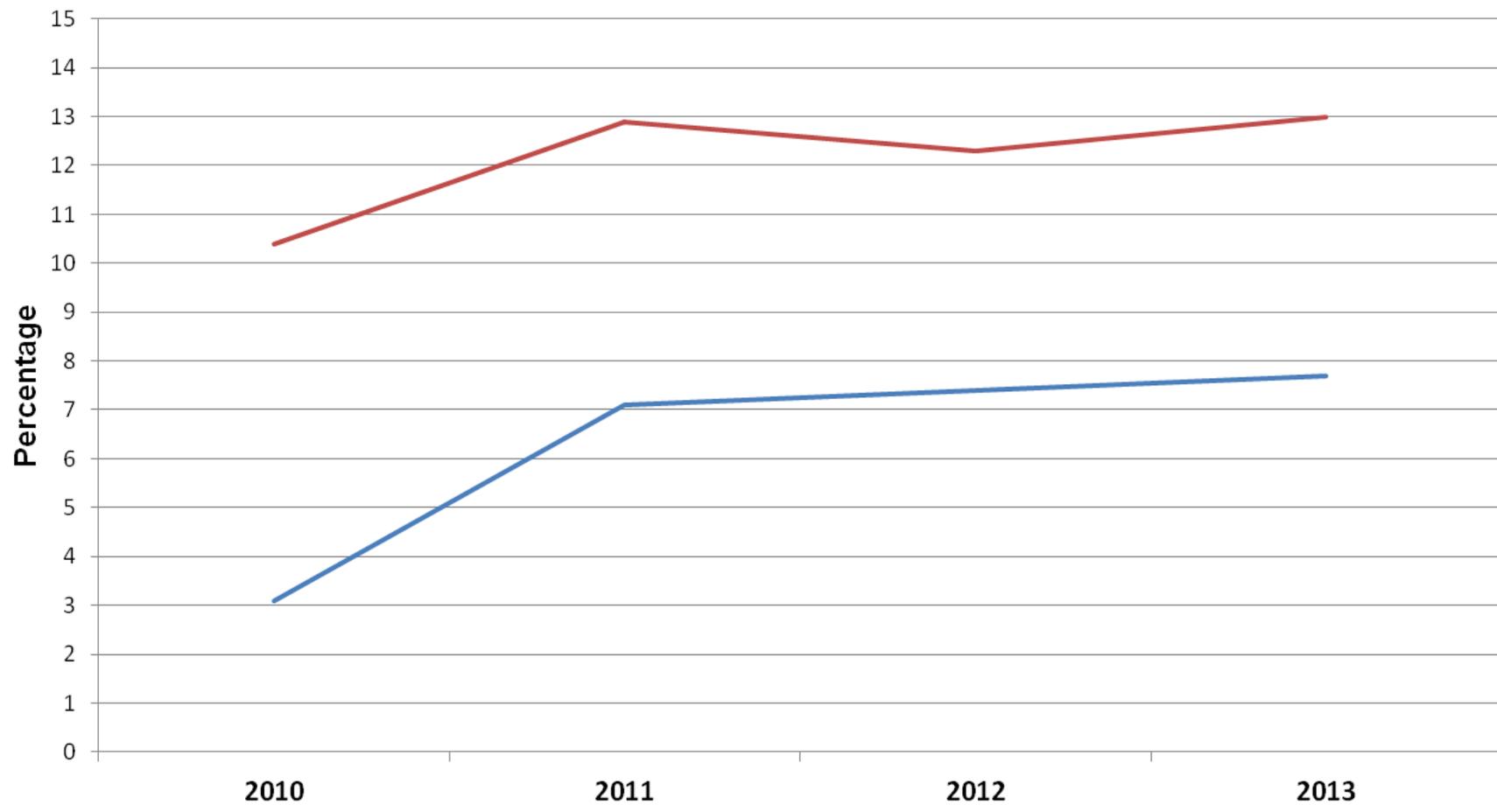
North Carolina CARES

Overall Survival with Good Neuro Rates

May 27, 2014



— Pre RACE CARS Agencies — RACE CARS added Agencies





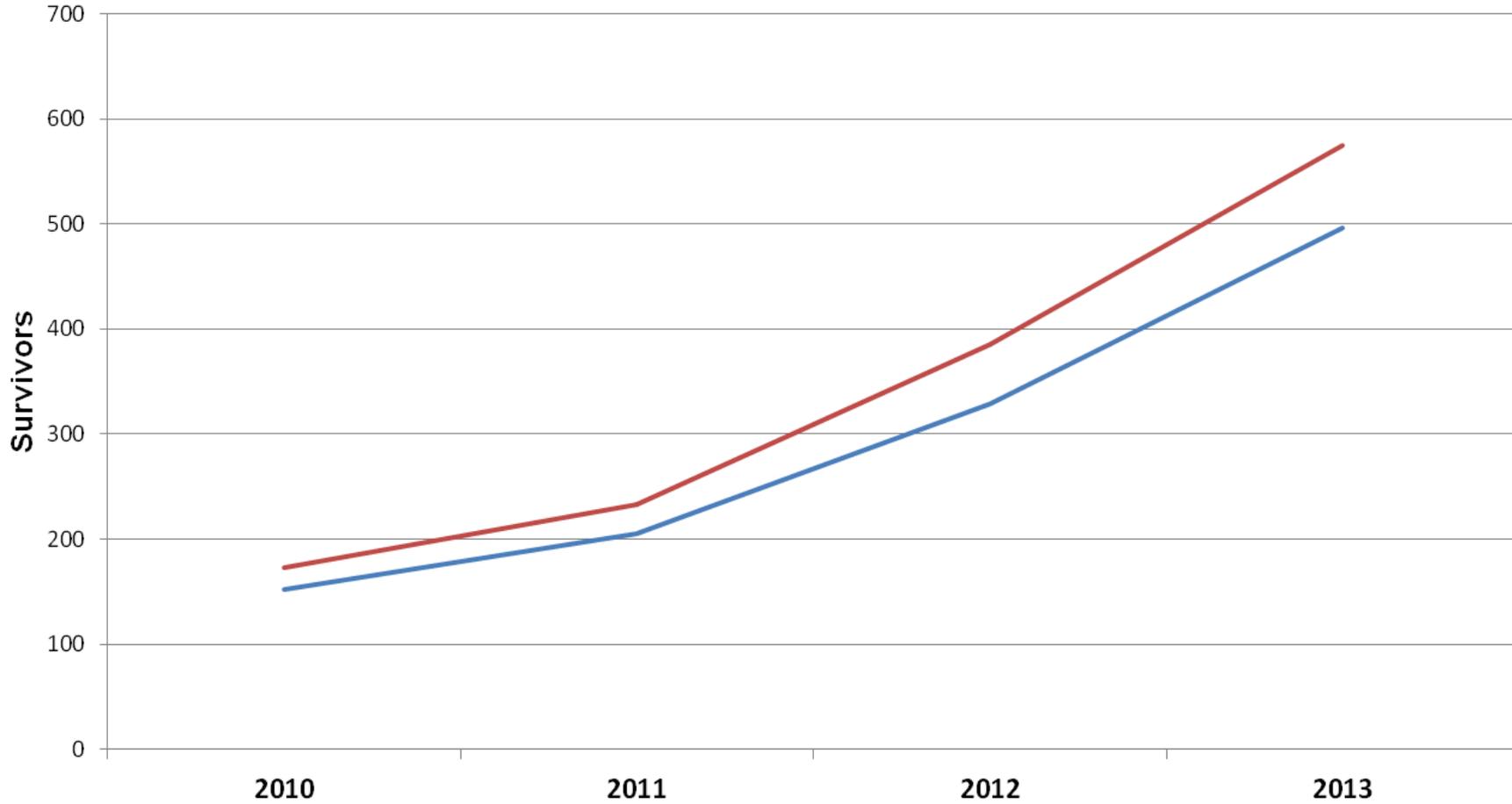
North Carolina CARES

Survivors by Year

May 27, 2014



— Overall Survival — Survival with good neuro





North Carolina CARES

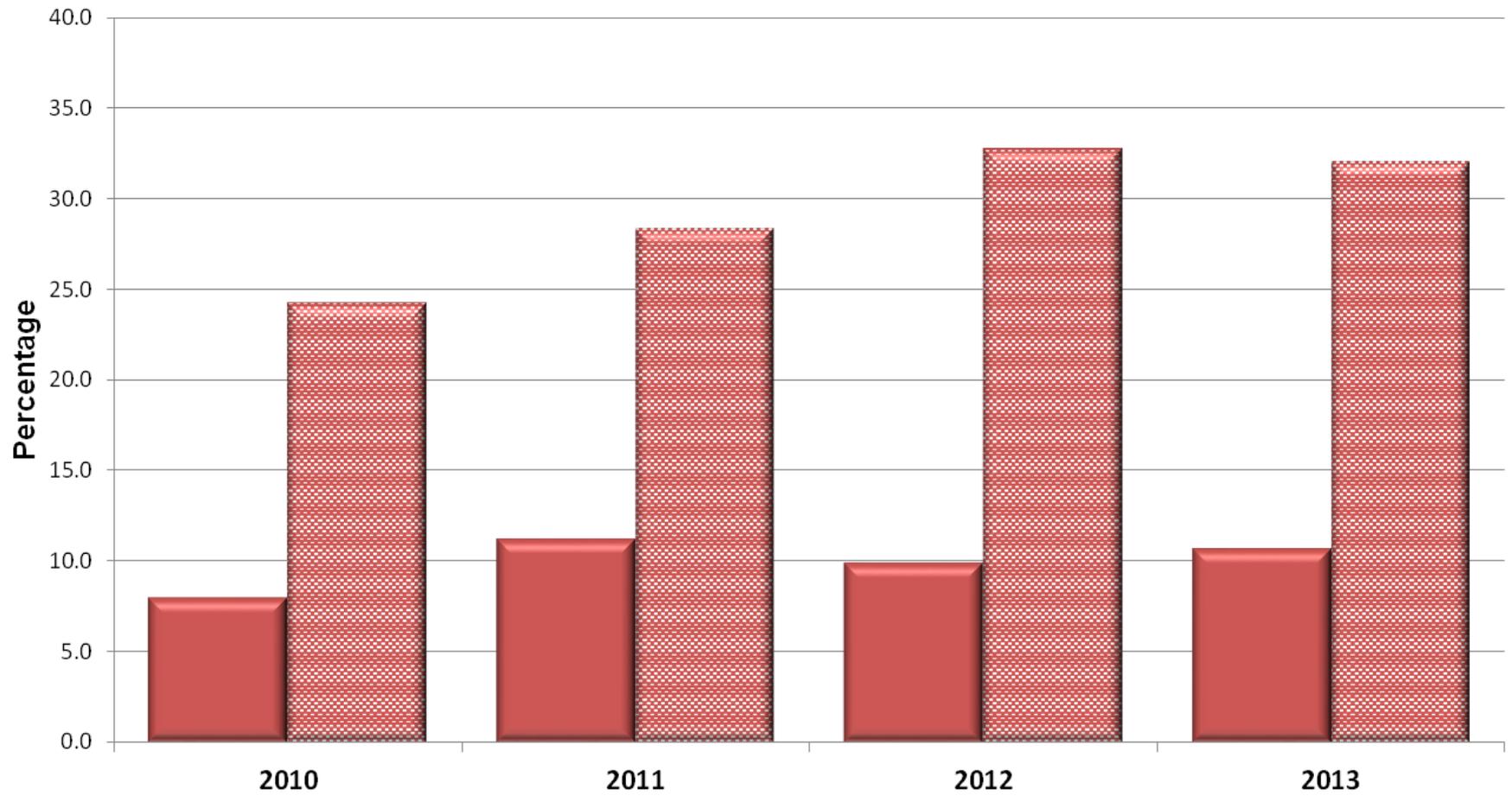
Overall Survival vs Utstein Survival Rates

2010 - 2013

May 12, 2014



■ NC Overall Survival Rate ■ NC Utstein



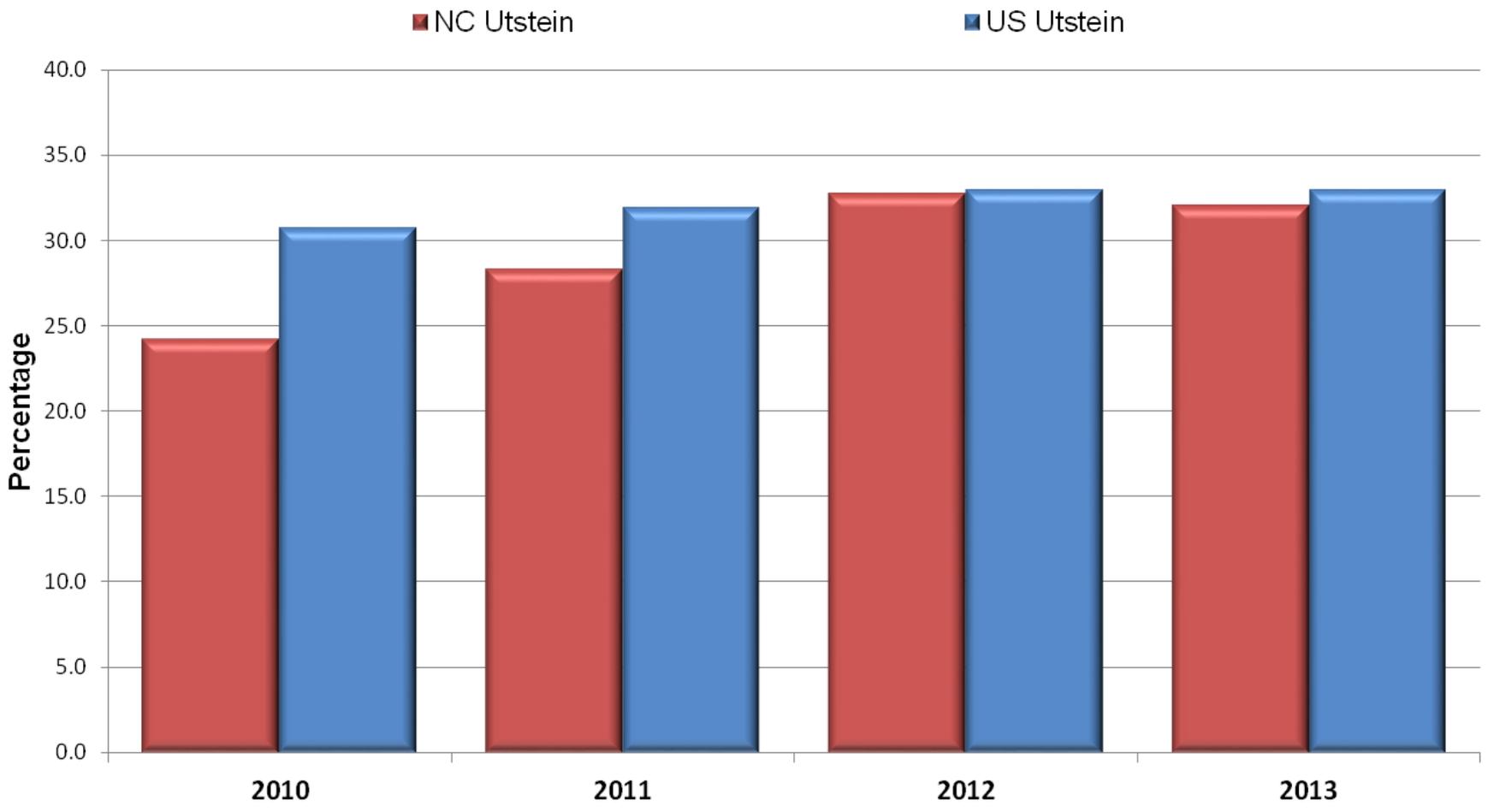


North Carolina CARES

NC vs US Utstein Survival RATES

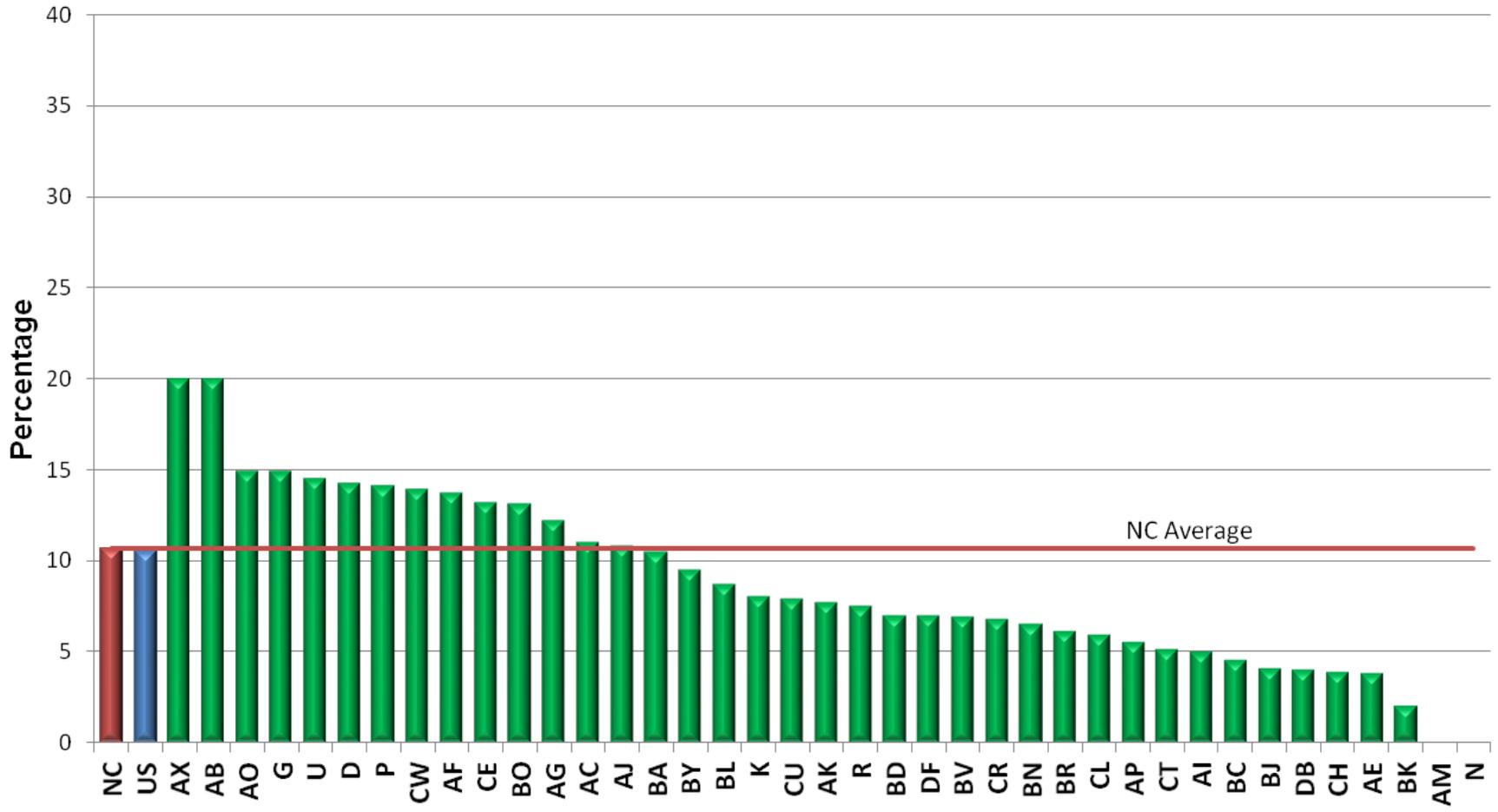
2010 - 2013

May 12, 2014





North Carolina CARES Overall Survival Rates by Agency 2013 May 12, 2014



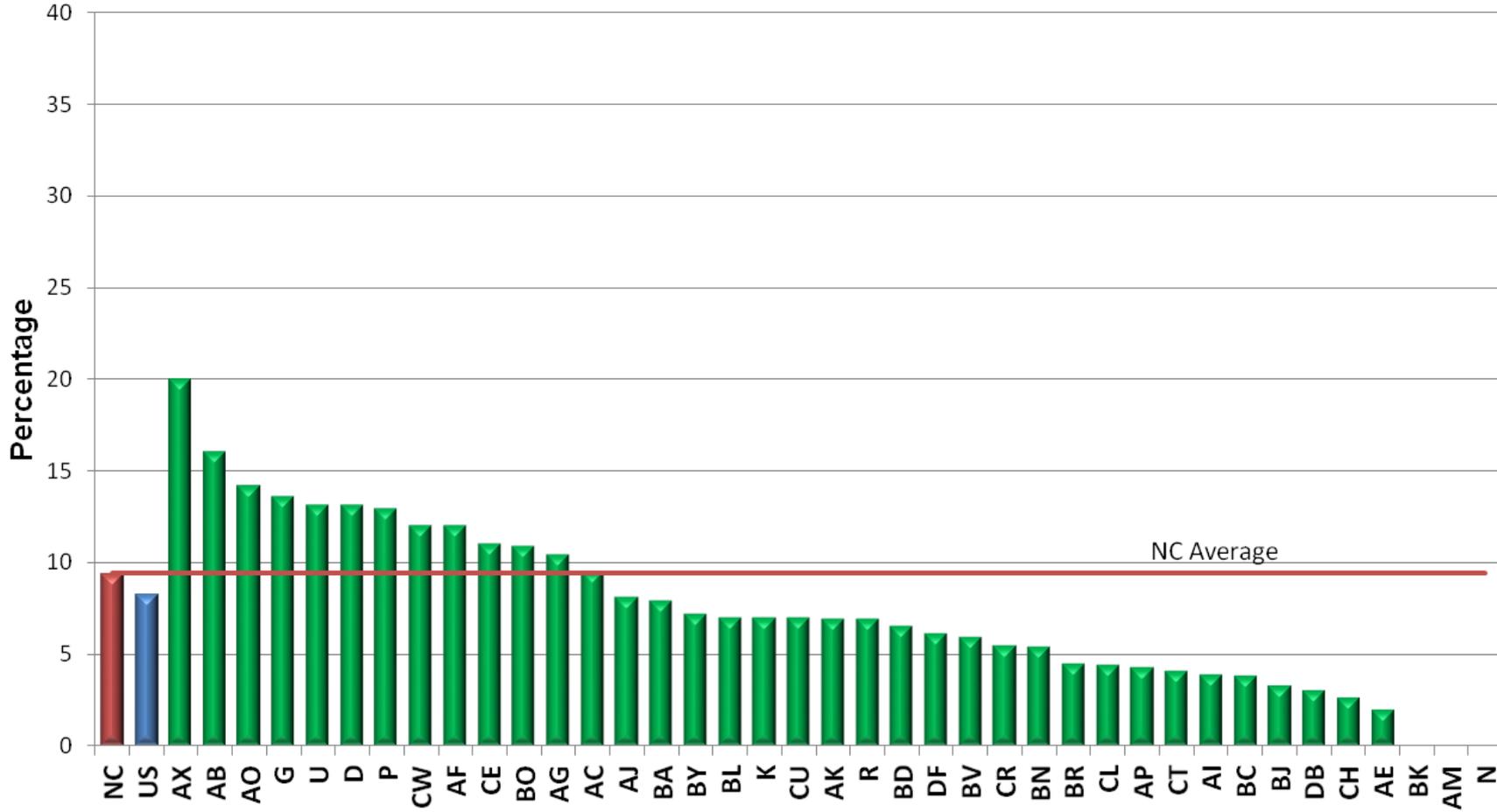


North Carolina CARES

Overall Survival with Good Neuro Rates by Agency

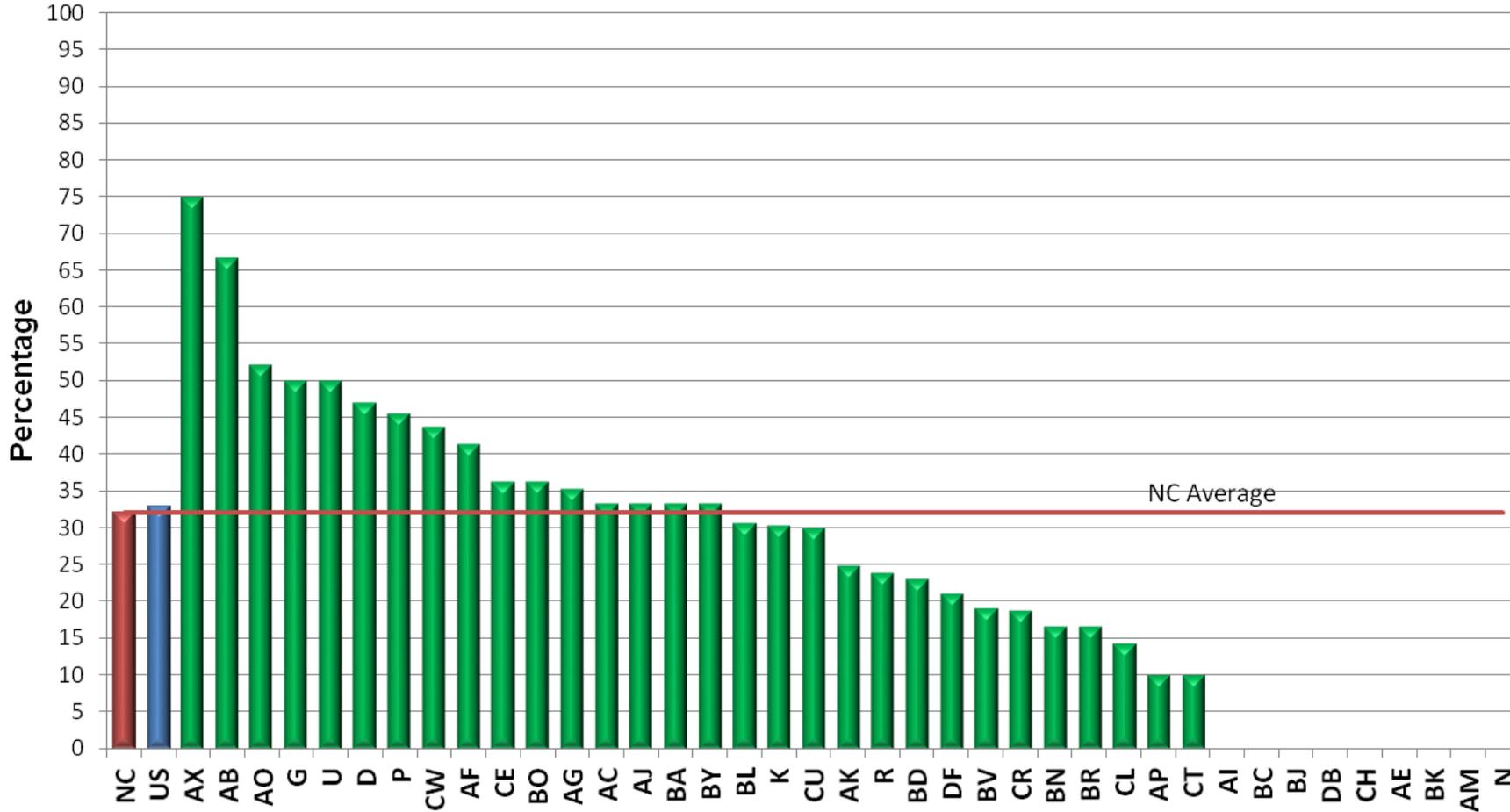
2013

May 12, 2014





North Carolina CARES Utstein Survival Rates by Agency 2013 May 12, 2014





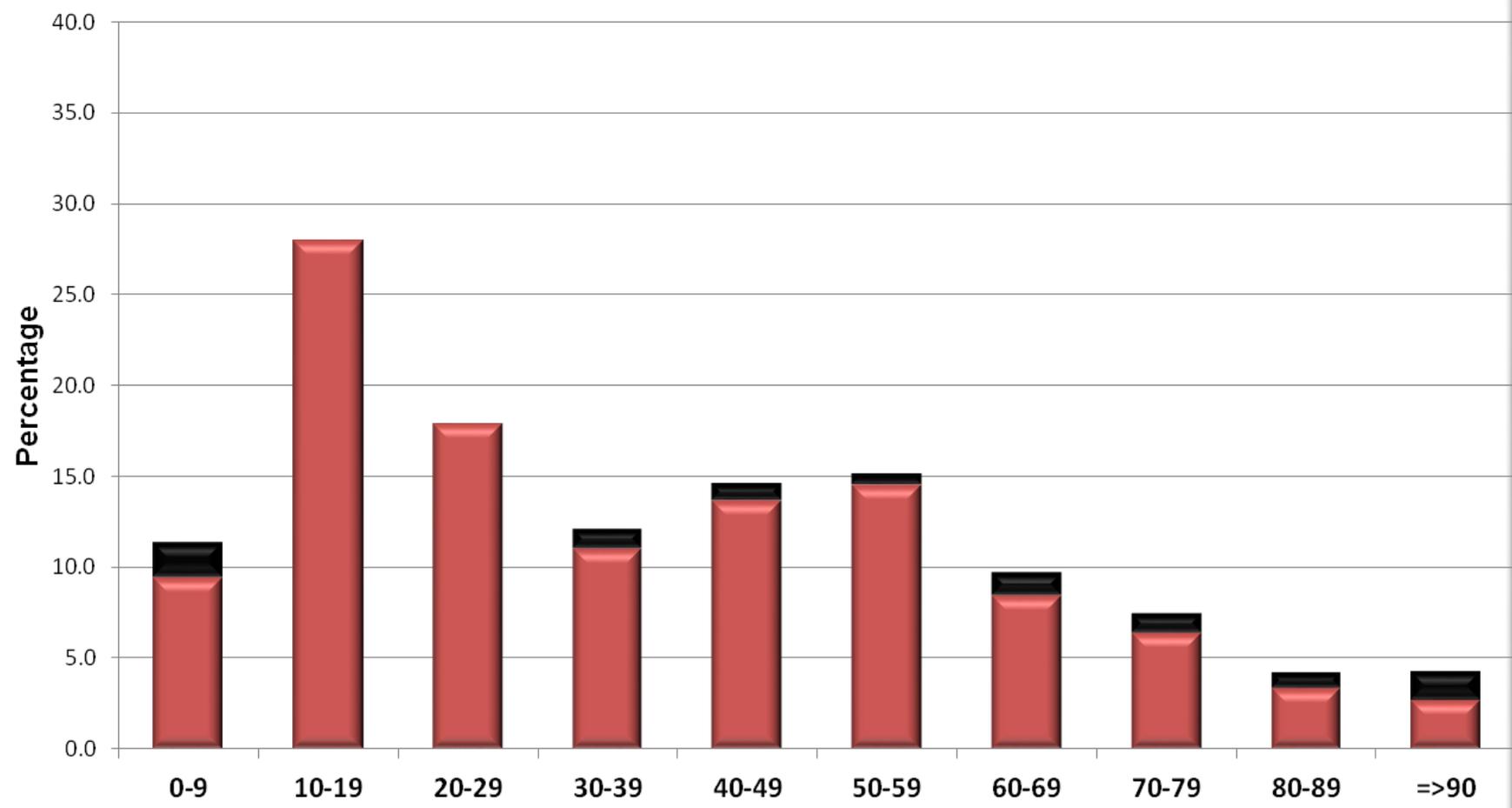
North Carolina CARES

Overall Survival Rate by Age Range

May 27, 2014



■ Overall with Good Neuro ■ Poor Outcomes





North Carolina CARES

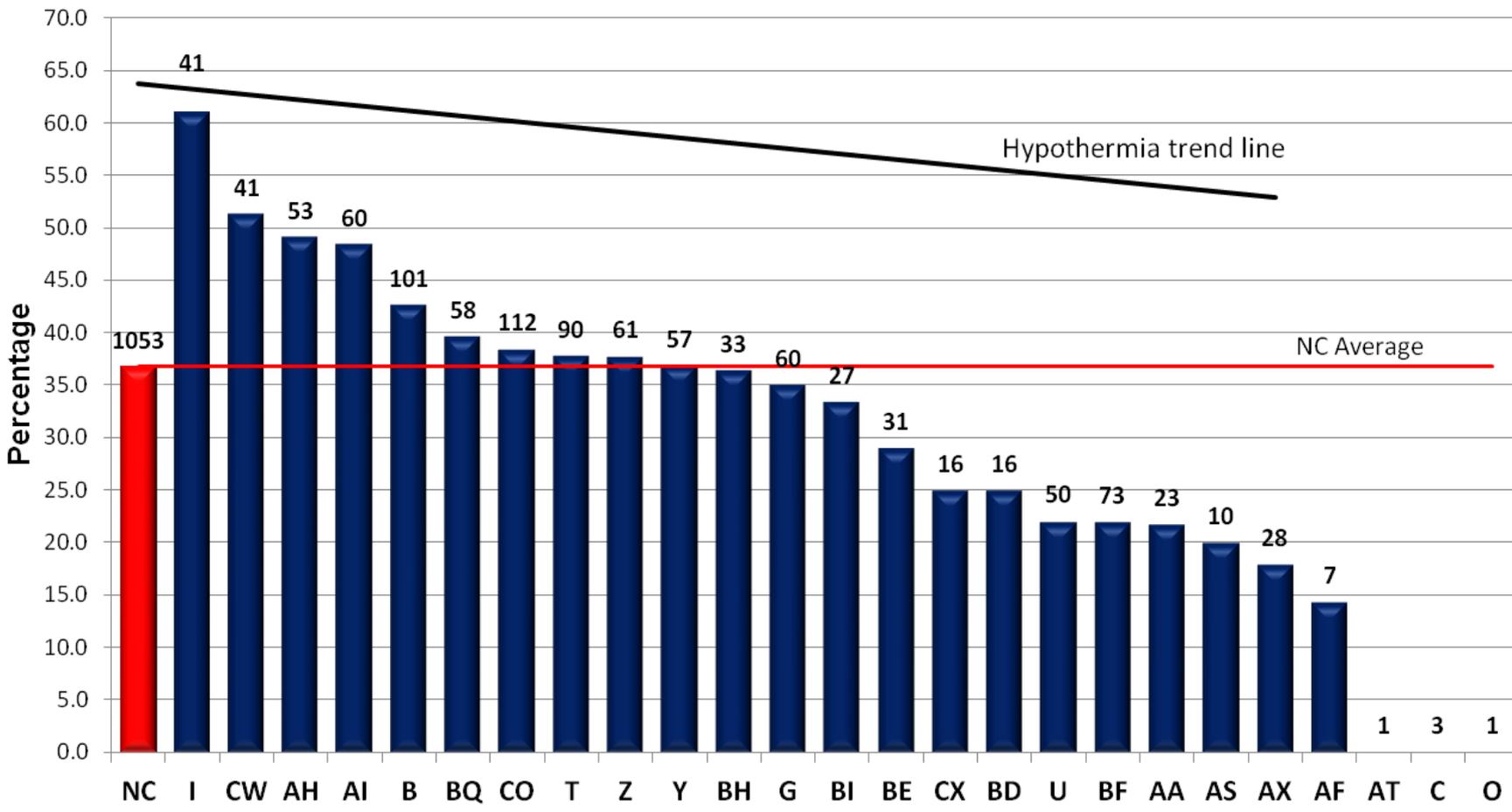
Survival Rate with Good Neurological From Patients Admitted to Hospital



For PCI Hospitals

2013

May 28, 2014



N = Number patients admitted to hospital



Improvement Strategies

- Improving survival requires strengthening the entire chain of survival.
- Pre-Hospital distills to 4 factors:
 - Reduce time from arrest to CPR
 - Reduce time from arrest to defibrillation
 - Improve the quality of CPR
 - Provide appropriate ALS care in timely manner



Strategies for EMS

- Resuscitate the patient where they are found.
 - Provided scene safe and space adequate
 - Terminate resuscitation on scene
- Use a blind insertion airway vs. intubation
- Use Pit Crew style CPR
 - Minimize interruptions in compressions
 - Minimize peri-shock pause
 - Maximize quality of compressions / ventilations



Strategies for EMS continued



- Transport the patient to a cardiac arrest center
 - Hypothermia
 - 24/7 cath lab
 - Specialized post arrest care
- Cardiac Arrest Specific Quality Improvement efforts
 - Post event debriefing
 - 100% case review
 - Track metrics over time

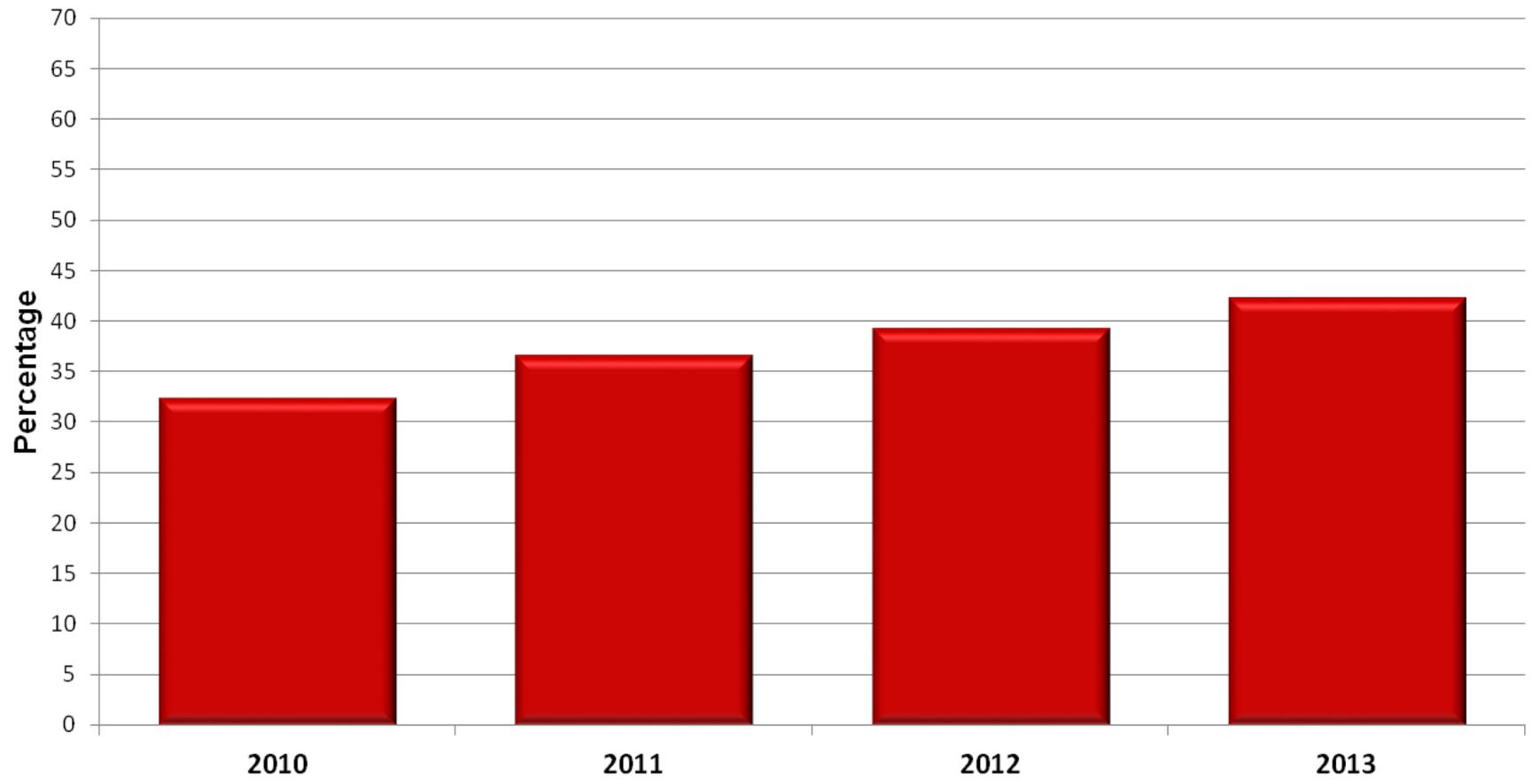
A red ECG line graphic is overlaid on the top of the image. It starts with a regular rhythm on the left, then transitions to a flat line in the middle, and ends with a single sharp peak on the right. The background is a blurred photograph of an ambulance with its lights on, parked on a street.

Bystander CPR



North Carolina CARES

NC Bystander CPR Rate
2010 - 2013
June 26, 2014

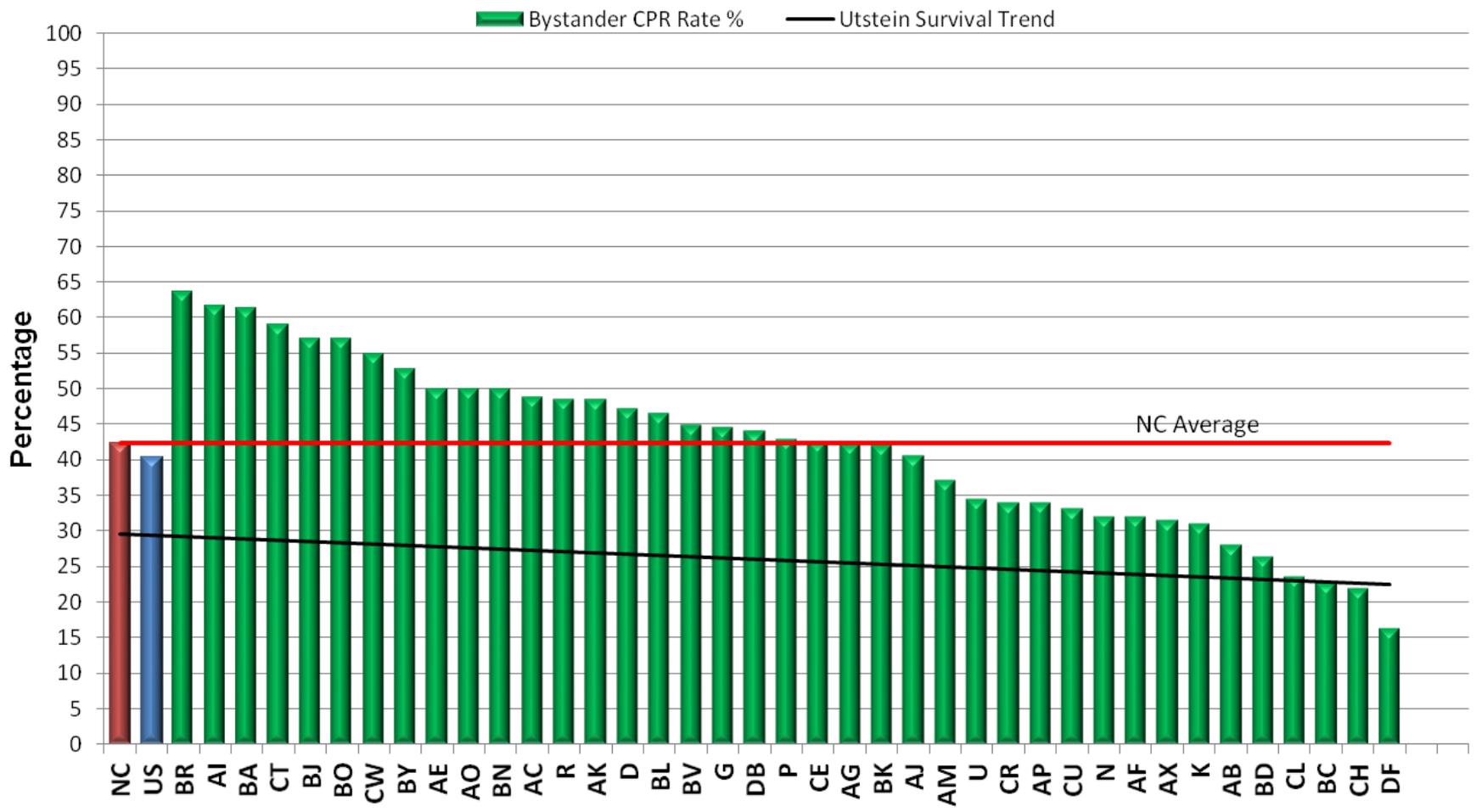




North Carolina CARES Bystander CPR Rates by Agency with Utstein Survival Rates



2013
May 12, 2014



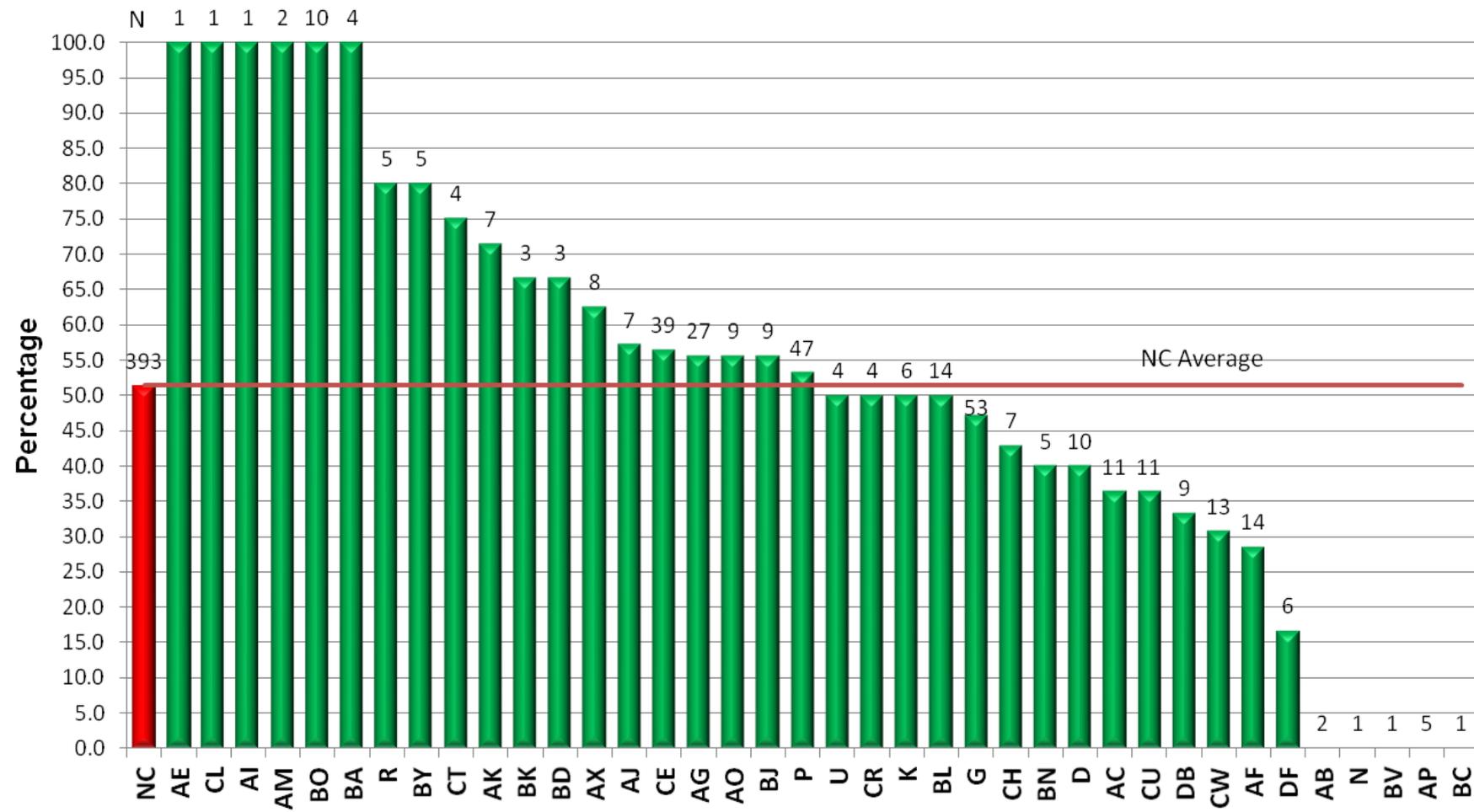


North Carolina CARES

Bystander CPR Rates in Public Places

2013

May 14, 2014



For Agencies with a cardiac arrest in a public place.

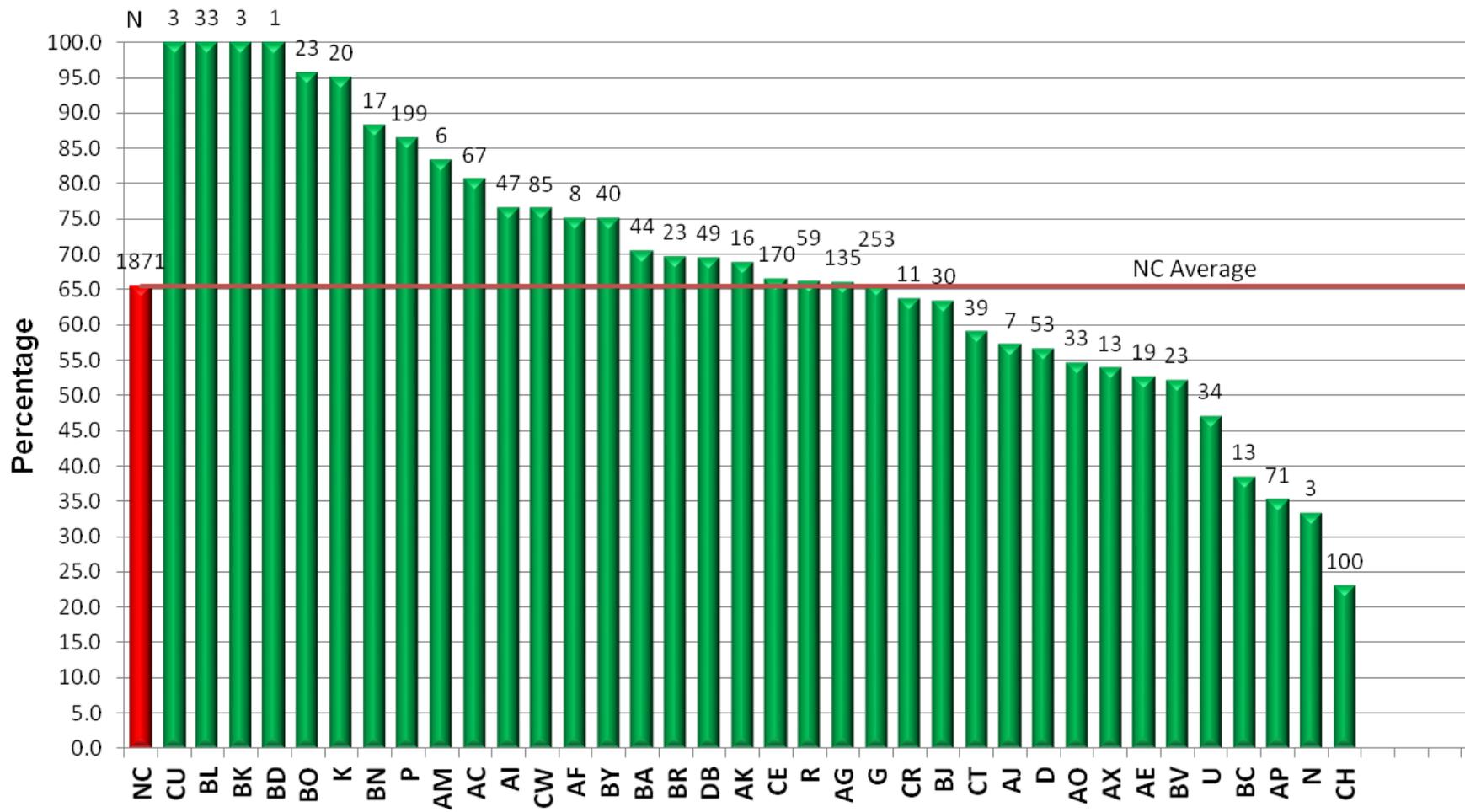


North Carolina CARES

% Telecommunicator Assisted CPR

2013

May 14, 2014

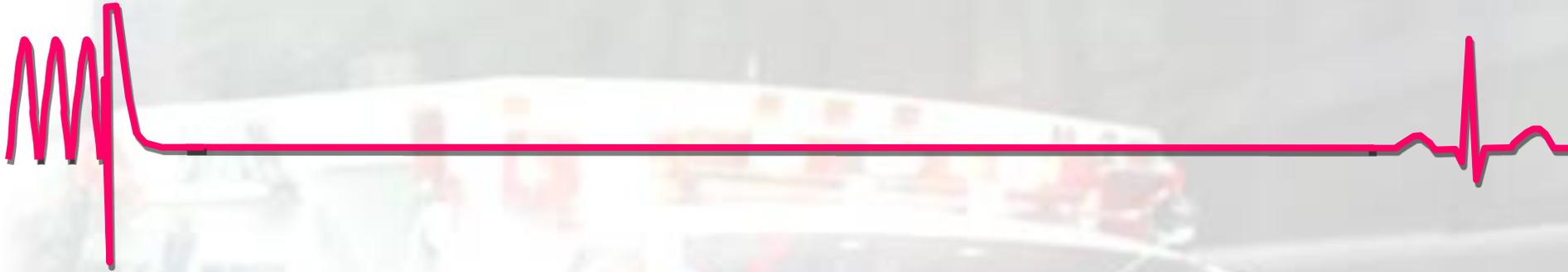


As a percentage of cases prearrival instructions given.



Improvement Strategies

- Reduce time to CPR by increasing bystander CPR
 - Educate Public on recognition of SCA, calling 9-11, and compression only CPR
 - Enhanced telecommunications:
 - 2 question approach: are they conscious and are they breathing normally - if the answer is no, they should move to the cardiac arrest arm of their protocols.
 - Recognition of agonal respirations
 - Assertive techniques to encourage bystander CPR
 - Coaching techniques to encourage the bystander while performing CPR
 - QI program to include monitoring of time to recognition of SCA, time to first instruction for CPR, and time to first compression



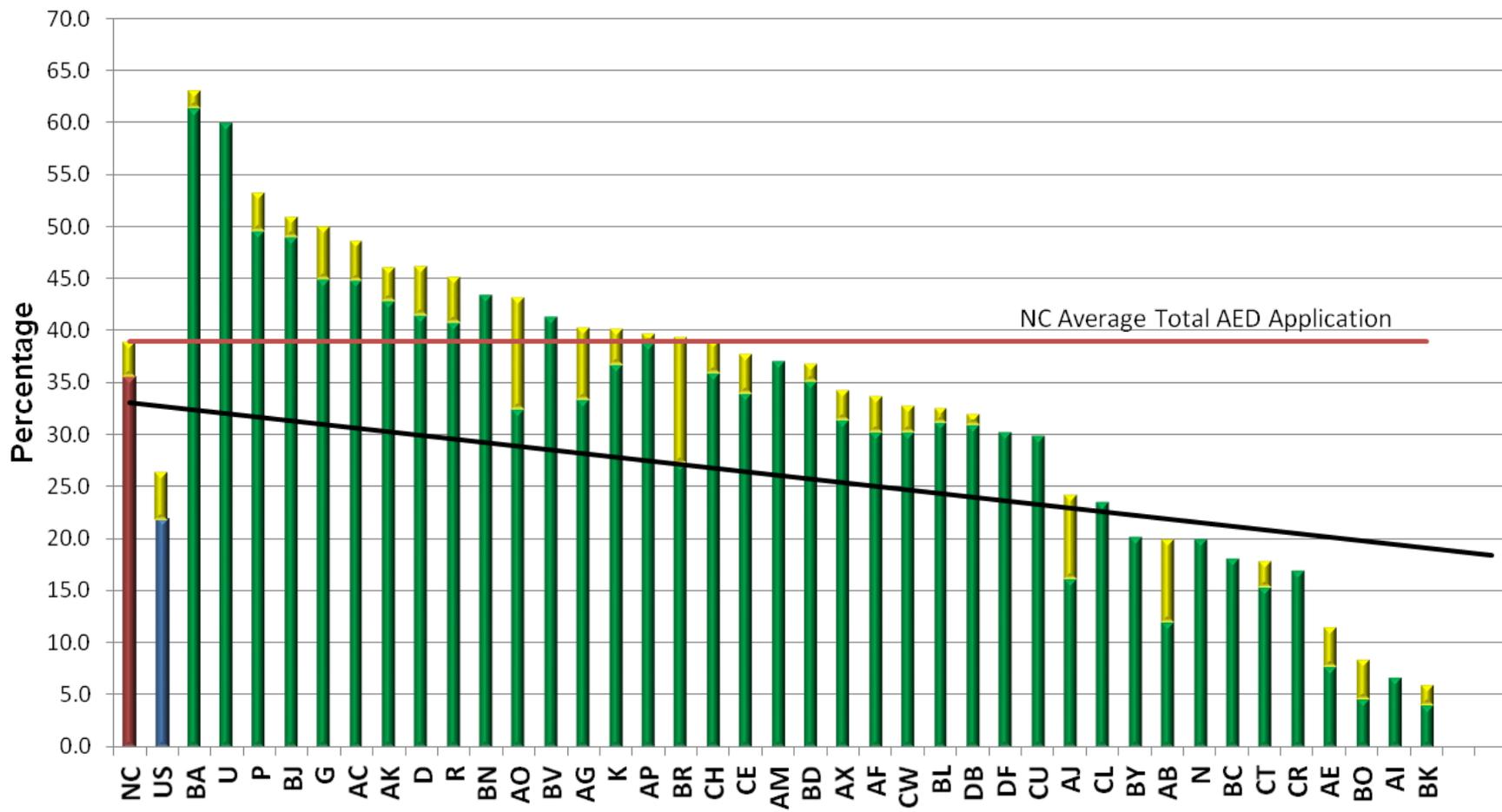
AED Usage



North Carolina CARES AED Application Rates by Agency 2013 May 13, 2014

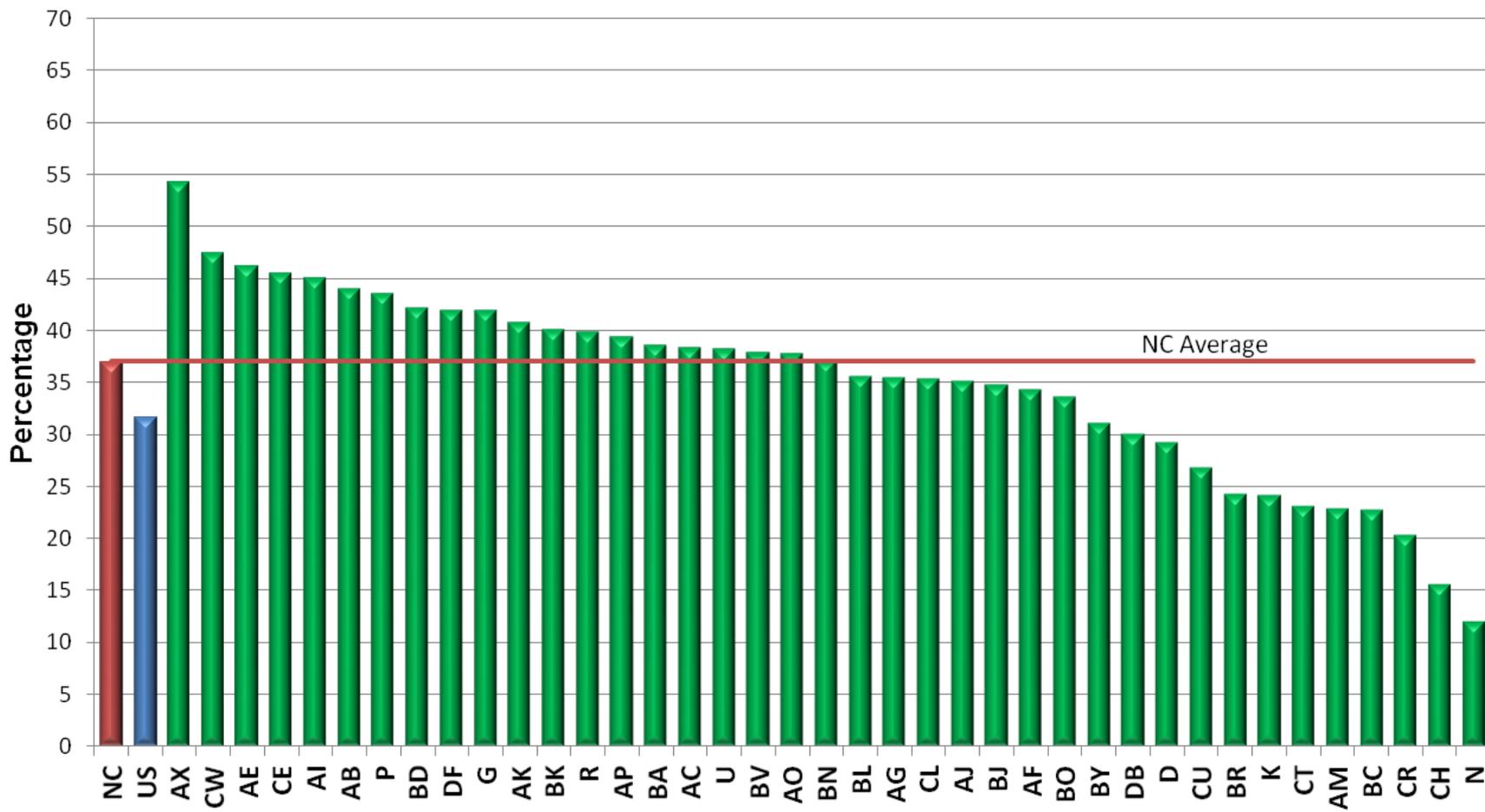


■ AED by First Responders
 ■ AED by Bystander
 — Utstein Survival Trend





North Carolina CARES ROSC Rates by Agency 2013 May 14, 2014



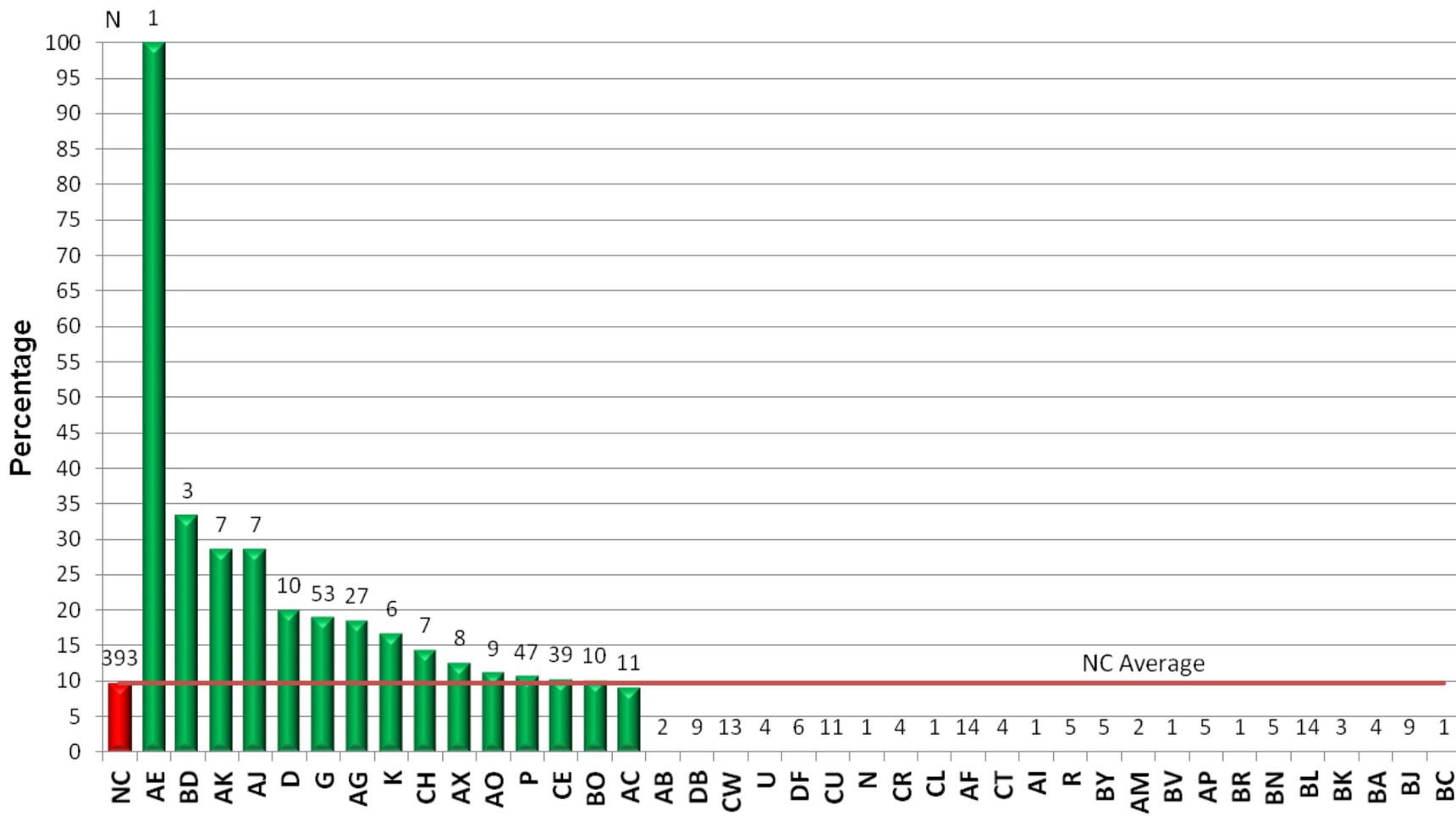


North Carolina CARES

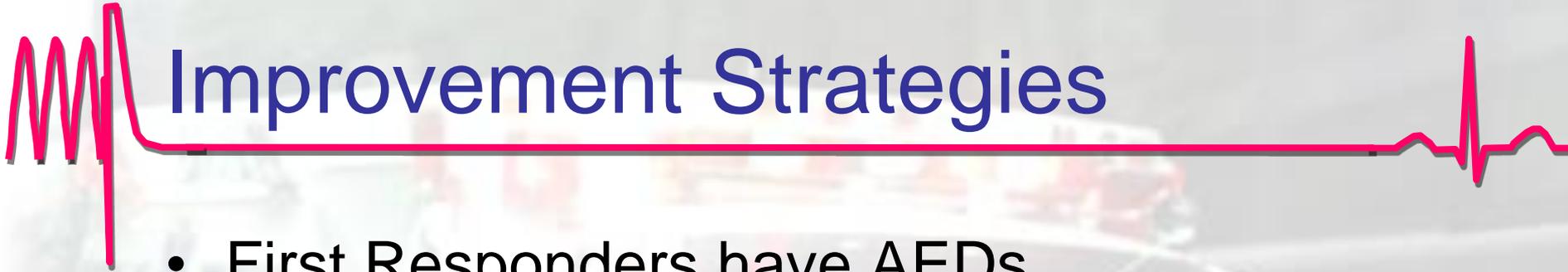
Bystander AED Application Rates in Public Places

2013

May 14, 2014



For Agencies with a cardiac arrest in a public place.



Improvement Strategies

- First Responders have AEDs
- Identification of existing AED's
- Report location to 9-11 centers
- Placement of AED's through community funding (grants, foundations, Fire House Subs)
- Signs where AED's are located
- AED location on building evacuation plans posted in building
- Plans to insure proper AED maintenance / pads and batteries



Other Measures



North Carolina CARES

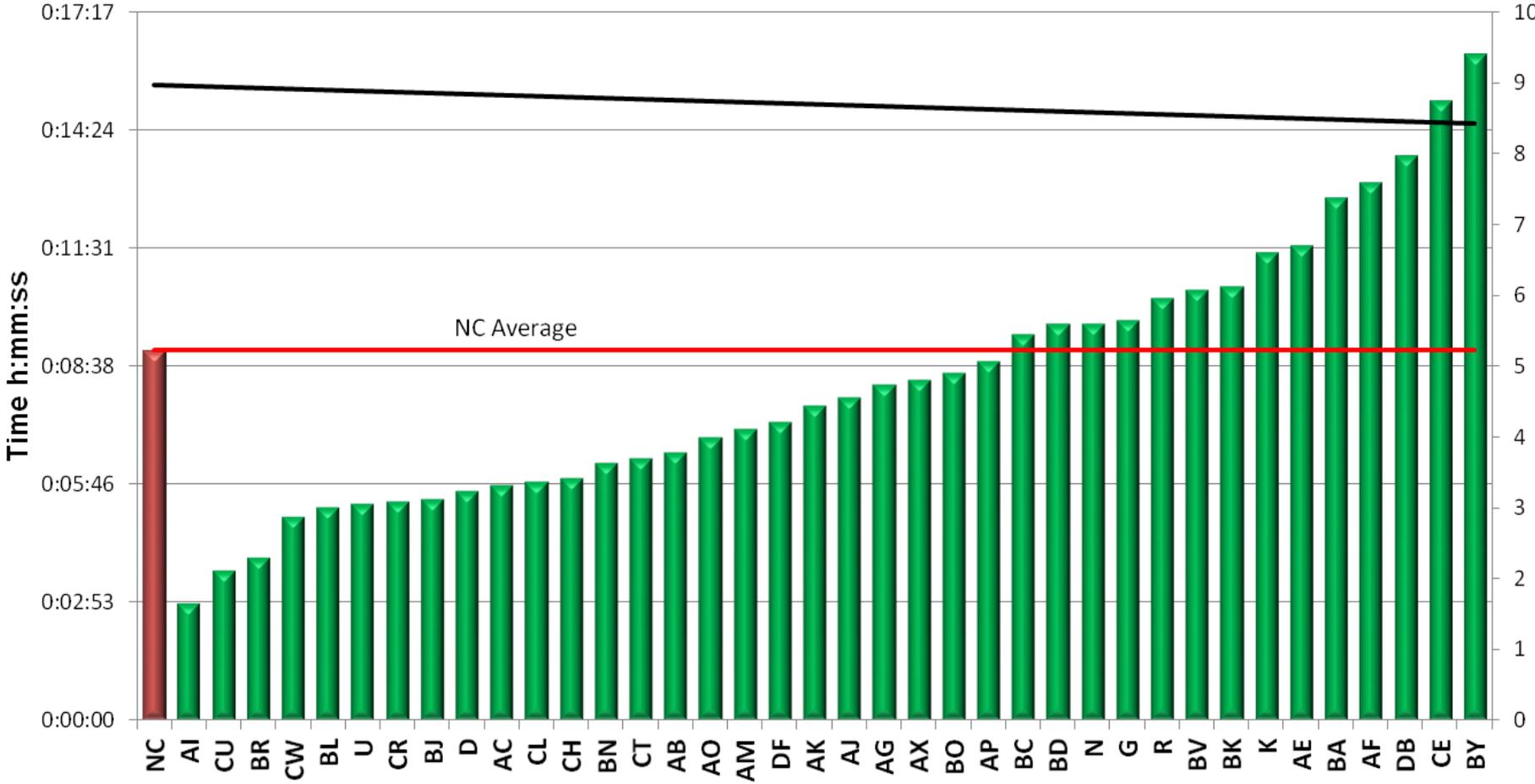
Average Time to CPR

2013

May 14, 2014



Average of Time to CPR Overall Survival Trend Line





North Carolina CARES

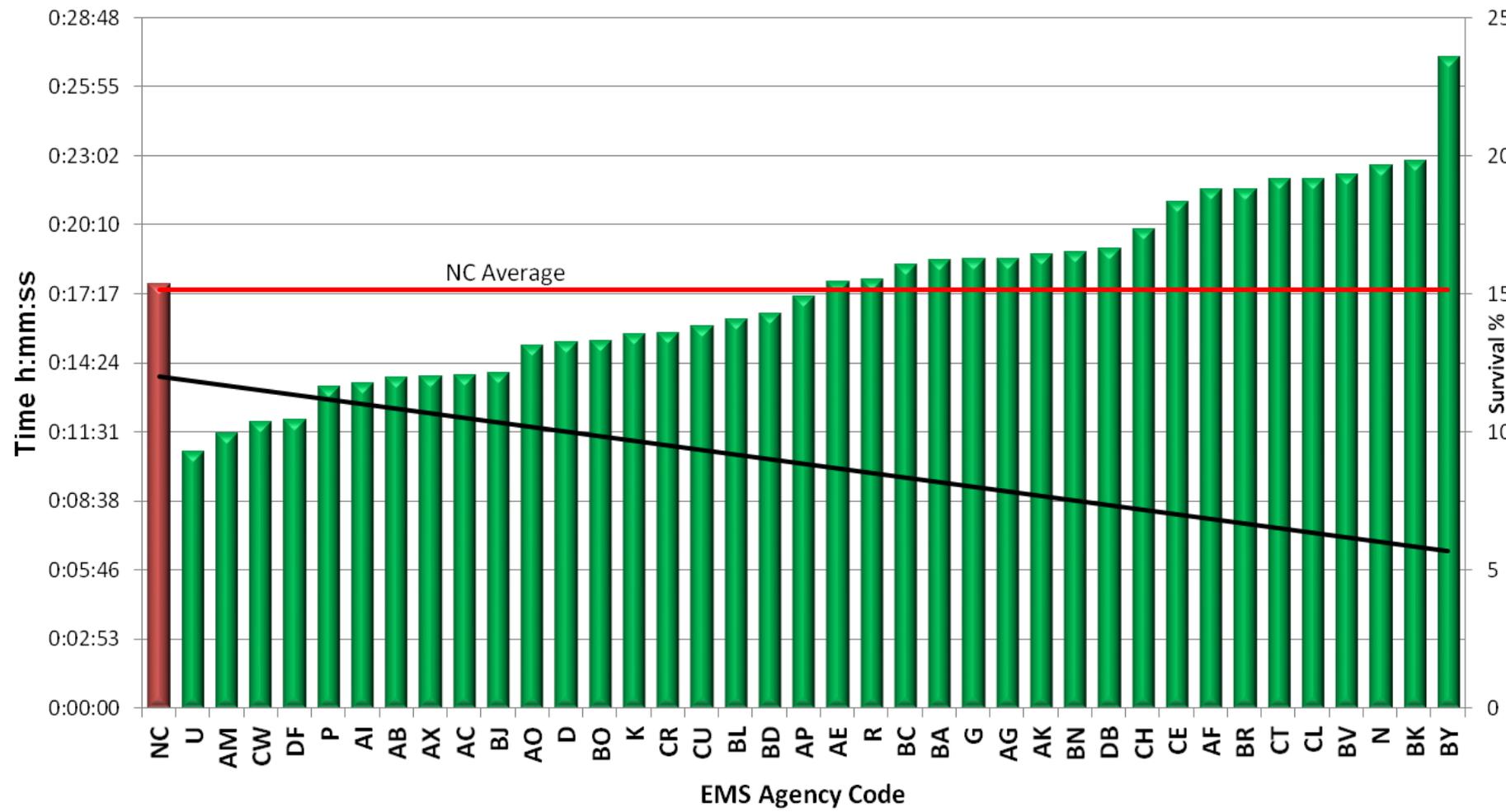
Average Time to Defibrillation

2013

June 26, 2014



█ Average Time to Defib
 — Overall Survival Trend Line

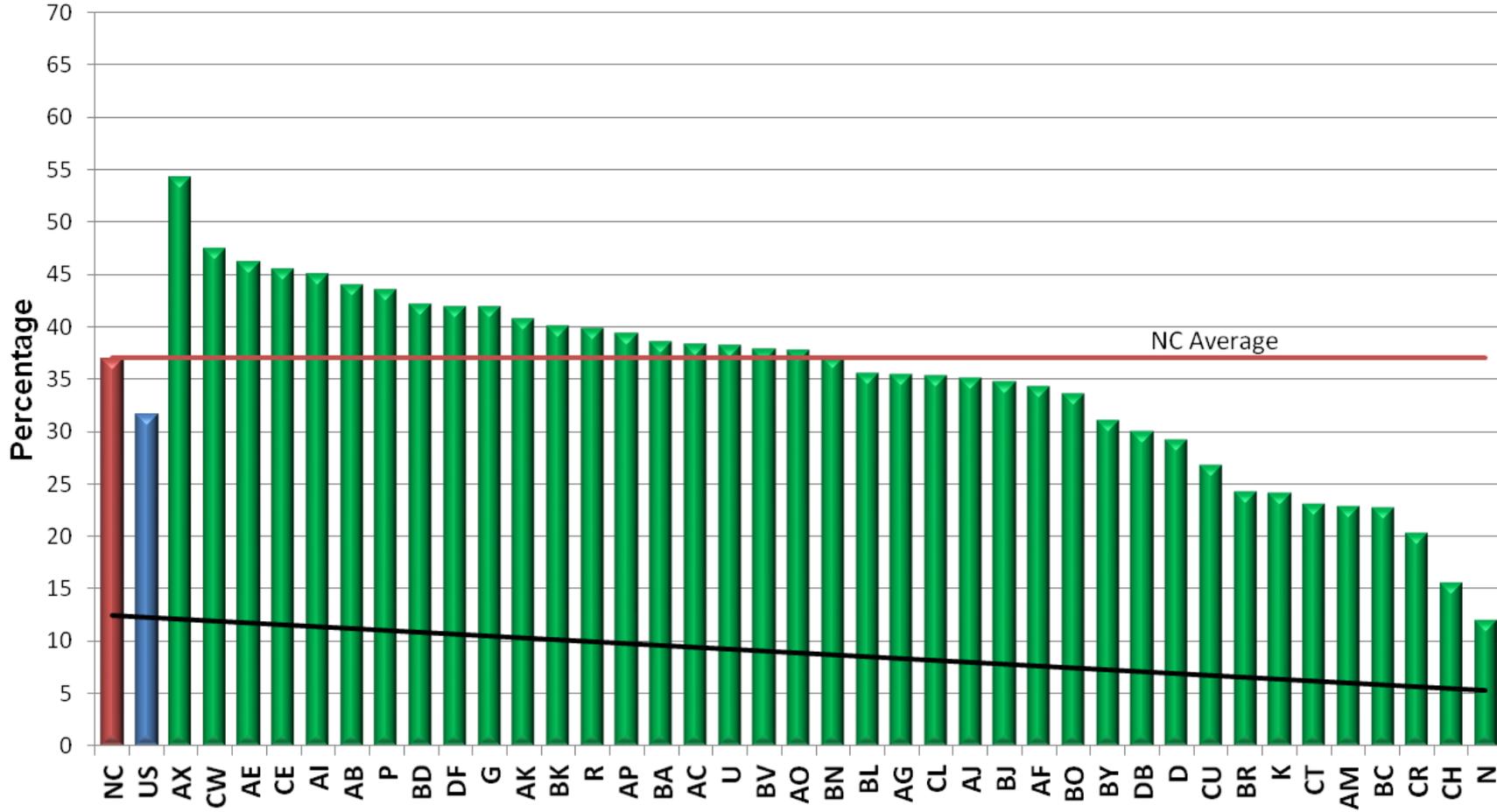




North Carolina CARES ROSC Rates by Agency 2013 May 14, 2014



ROSC % Overall Survival Trend



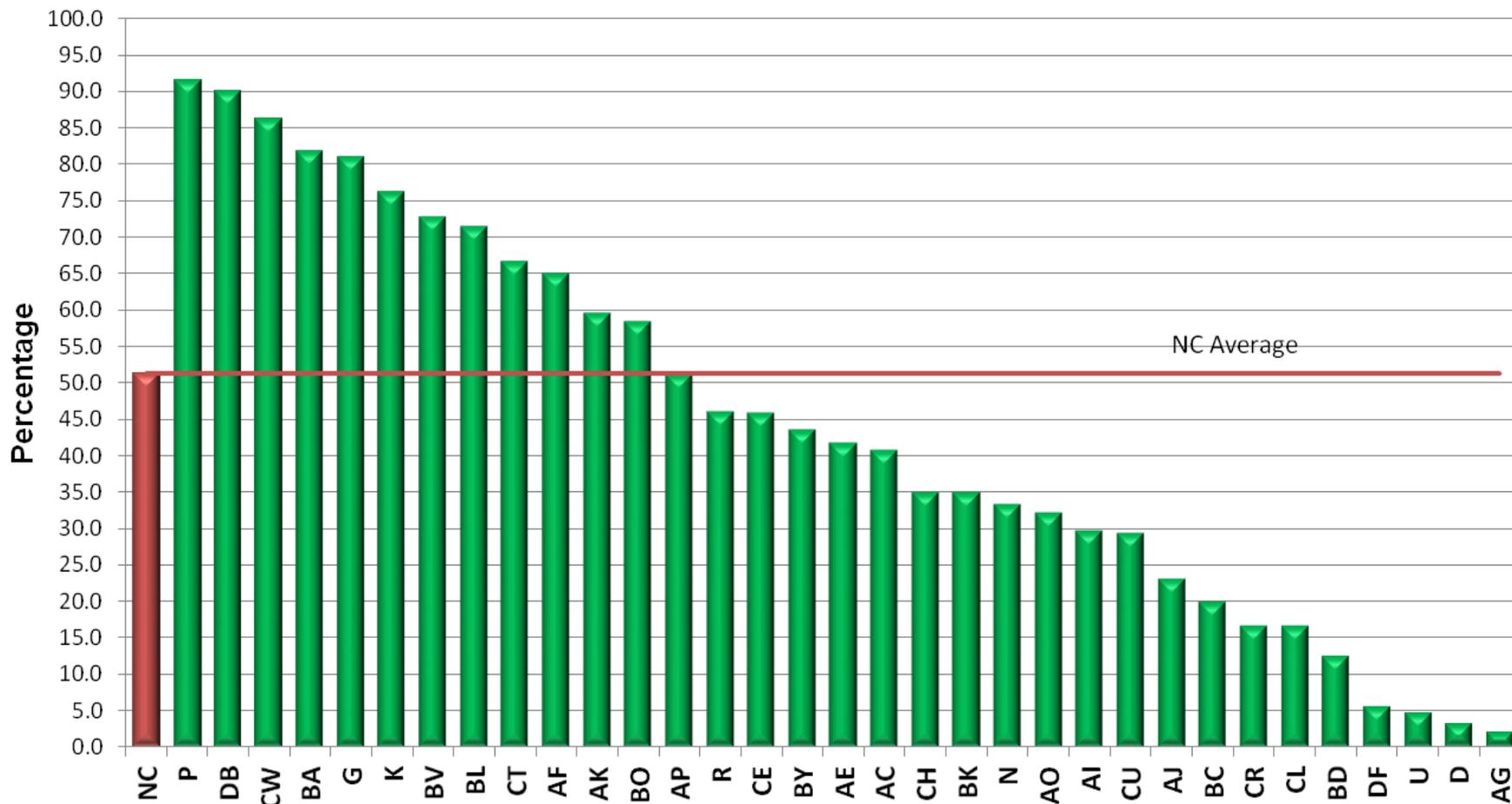


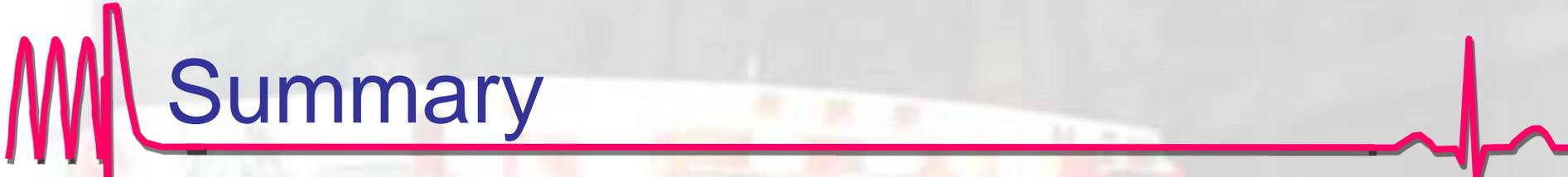
North Carolina CARES

Hypothermia Rates in Pts. with ROSC

2013

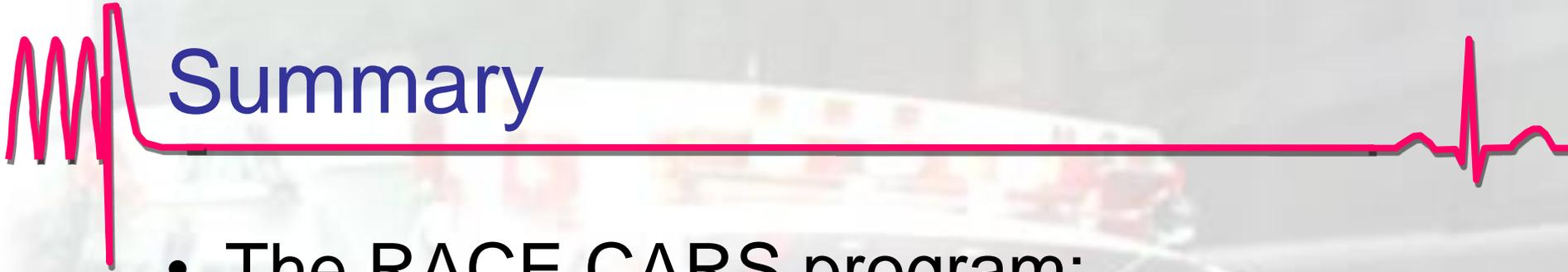
May 14, 2014





Summary

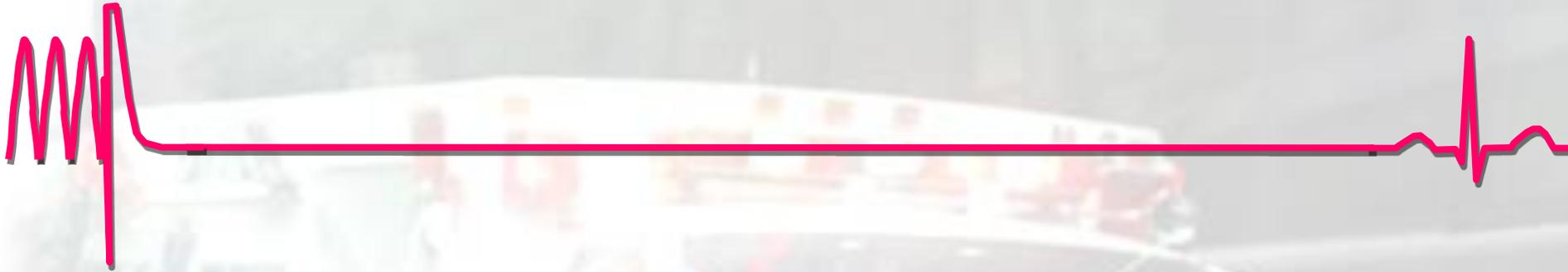
- **Survival rates show steady improvement** when viewed as two separate groups of agencies (Pre or Post RACE CARS participation in CARES).
- Aggregate survival rates lack of improvement is attributed to dilution caused by the introduction of many new agencies just beginning improvement efforts.
- The absolute number of survivors has increased drastically over three years. Increased case volume is partially responsible but this is a great indicator of the potential of this program.



Summary

- The RACE CARS program:
 - Improved Community response.
 - Improved telecommunicators assisted CPR
 - Pit Crew Style High Performance CPR for first responders and EMS
 - A QI process focused on cardiac arrest
 - Transporting patients to cardiac arrest centers
 - Therapeutic hypothermia care

Works !



HeartRescue

RACE CARS is the NC portion of
HeartRescue

The Numbers

North Carolina	Year		
	<u>2011</u>	<u>2012</u>	<u>2013</u>
Submitted Cases, n	2356	4386	5547
Overall survival to discharge	10.6%	9.8%	11.1%
Bystander-witnessed survival	14.2%	14.5%	15.4%
Utstein survival	30.3%	32.2%	31.3%
Bystander CPR	35.6%	38.2%	40.6%
Survivor count, n	233	385	575
Intact survivors, n (CPC 1/2)	205	329	496

1,030 Intact Survivors!



Key RACE CARS Accomplishments

- 83% of North Carolina's population covered by the CARES registry.
- 1,030 intact survivors from SCA over a 3 year period.
- Educated representatives from every link in the chain of survival from the community through the hospital link.
- Launched a Public Service Announcement in movie theaters featuring recognition of SCA, calling 9-11, and compression only CPR that had 6.2 million impressions.
- Awarded 7 community grants with the goal of improving survival in their community including partnerships with hospitals, EMS, Fire, telecommunications, law enforcement, Parks and Rec, Churches, Visitor Centers, Schools, and Health Departments.



Key RACE CARS Accomplishments

- Trained thousands of community members in compression only CPR at the NC State Fair, NASCAR Races, and local community events.
- Inspired local volunteers to run training sessions at community events - someone trained at one of our events saved her grandmother's life when she collapsed from SCA.
- Used the CAREs registry data to study the difference between agencies using the High Performance CPR (HPCPR) approach versus those who do not, and have implemented a target improvement program with agencies not using HPCPR, have low survival rates, and a large volume of SCA victims.
- Launching a telecommunications training program and an In-hospital HPCPR training program across NC.

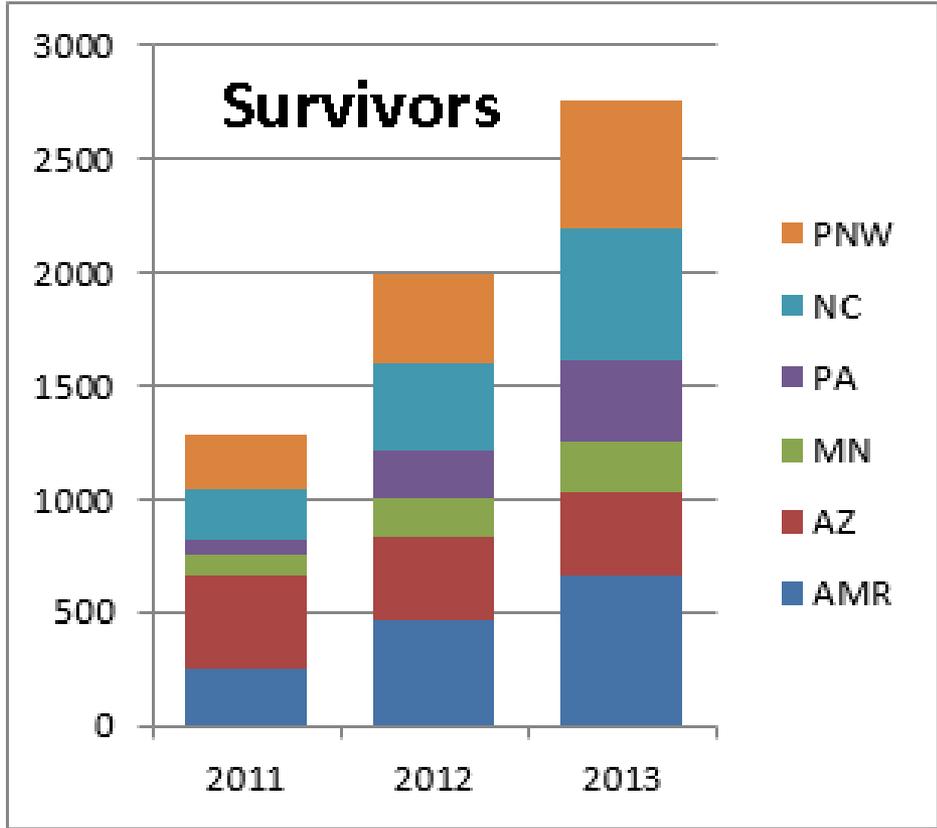
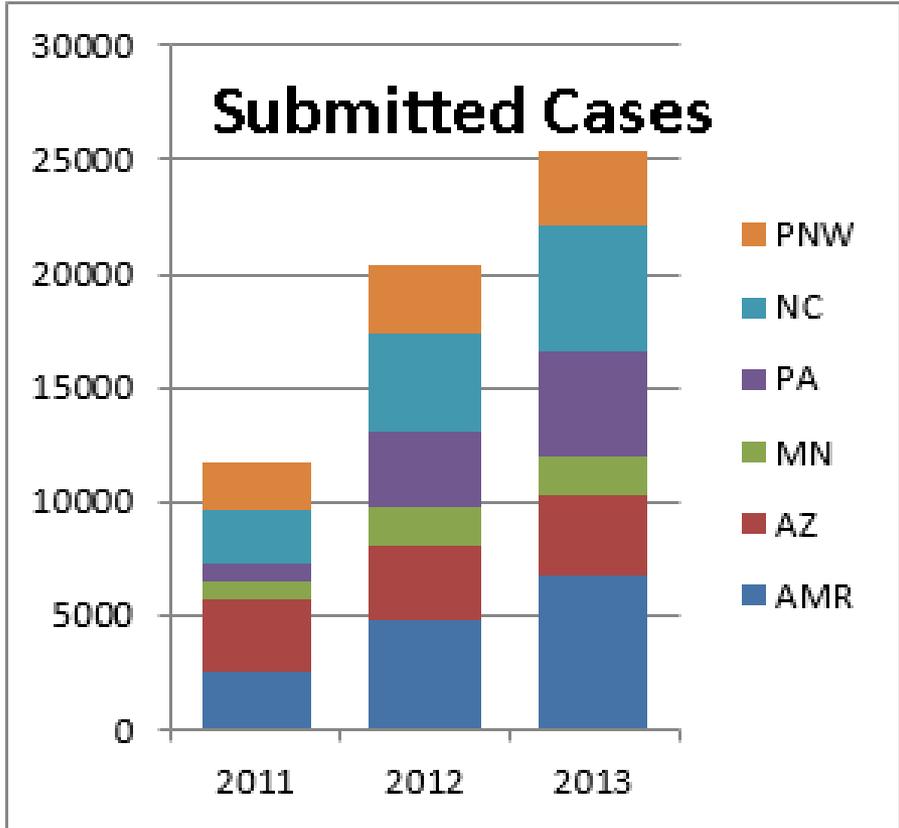


HR Snapshot 2011-2013

- Total cases of out-of-hospital cardiac arrest captured using the CARES registry climbs each year of the program. **More than 80% of geographies funded by the program are now covered by HeartRescue data collection and care improvement efforts.**
- The number of total **survivors** continues to increase over time (**2,763 in 2013**) despite fluctuations in survivor rates year to year.
- A key driver to improving survival is increasing **bystander CPR**, yet nationally on average only one in four victims of SCA receive bystander CPR. HR Partners are moving forward on this goal and showing gradual population-based improvements **well above the national average.**
- The bystander witnessed survival rates show overall positive trends from 2011 to 2013. Sites with a decline in 2013 may be attributed to expanding efforts to include 'late comer' lower performing communities with low survival rates, bringing down the overall rate. Also noted is lower case capture in 2011 for PA (see state page) and decline in AZ rate due to a delay in getting 2013 from a few key agencies, so not completely representative at this time.
- We expect to see survival rates continue to improve over time, as systems mature in their data collection, and implement changes to their systems of care for these patients.

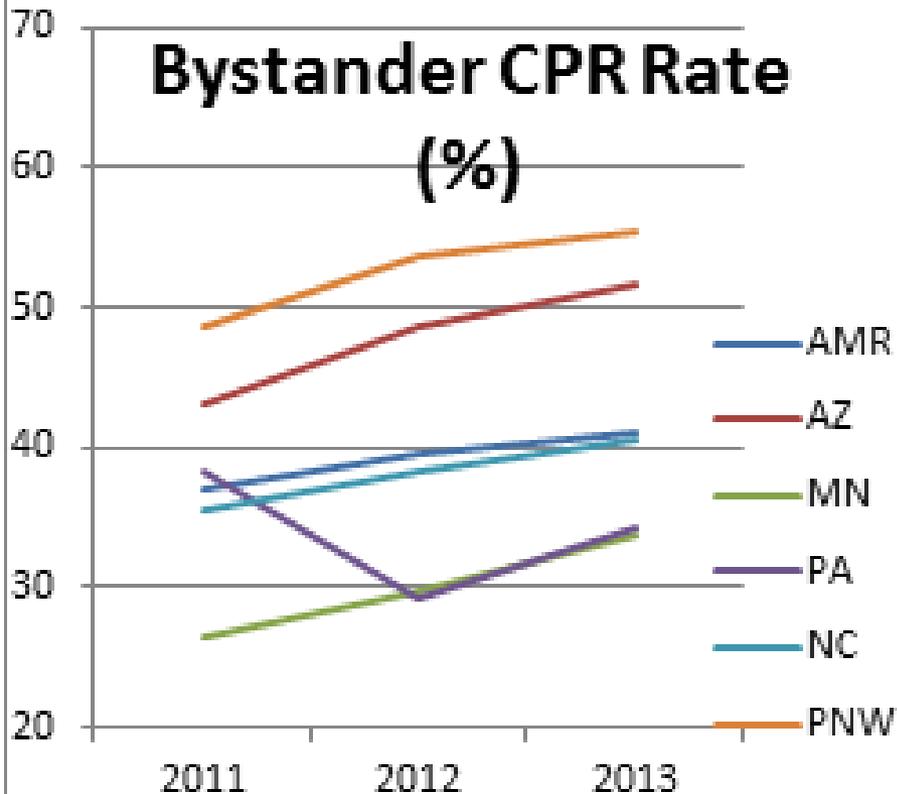


HR Data

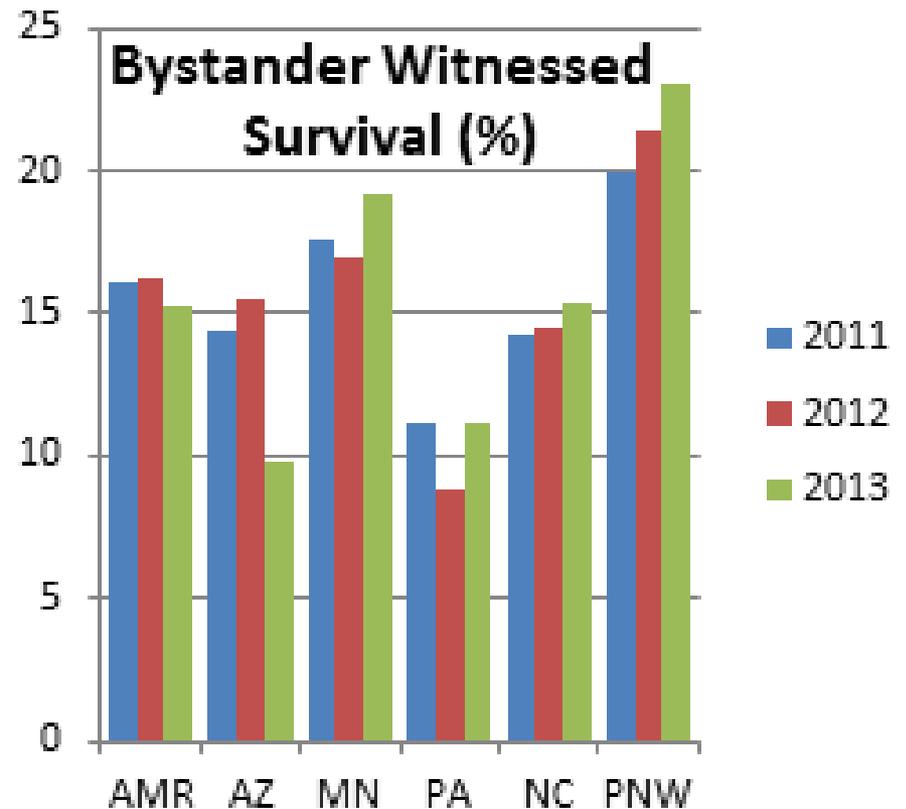


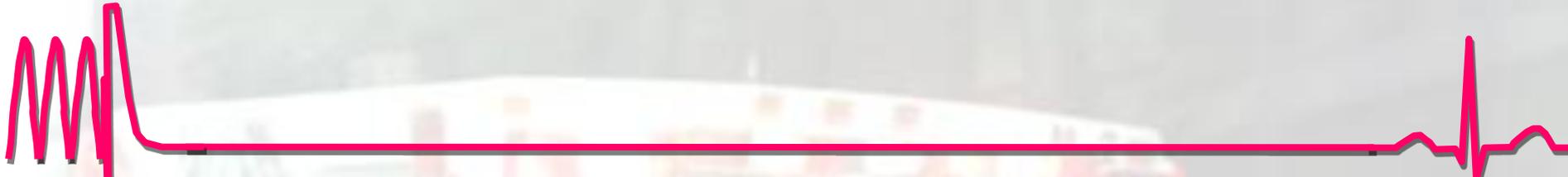
HR Data

Bystander CPR Rate (%)



Bystander Witnessed Survival (%)





Please share this information with you administrators, staff, telecommunications, hospitals, Fire and EMS systems, and local government.

We hope that you find this information useful.

If you have questions please contact Clark Tyson

clark.tyson@dm.duke.edu