The RACE State Meeting

December 13th, 2013

Regional **A**pproach to **C**ardiovascular **E**mergencies *Cardiac Arrest Resuscitation System*

HeartRescue PROJECT

RACE

Cardiac Arrest Resuscitation System

Objectives:

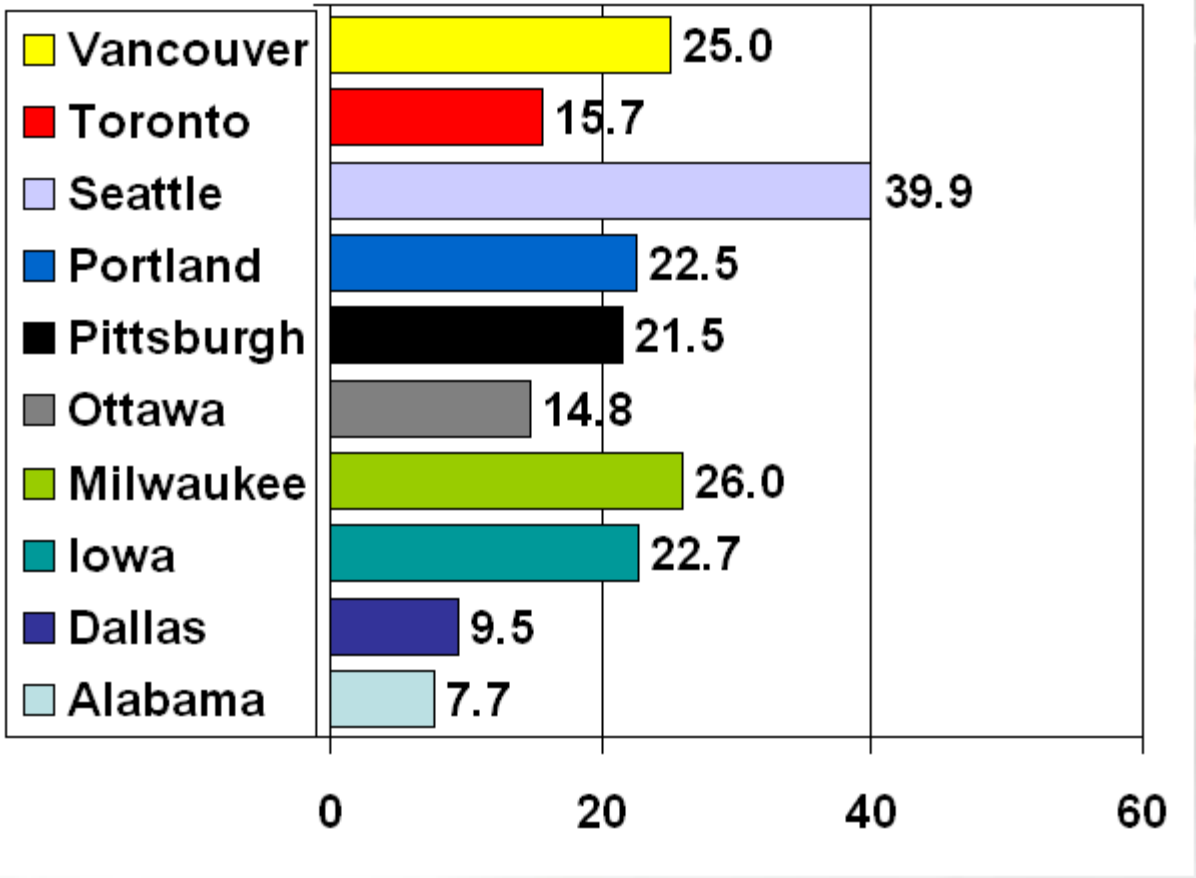
- Discuss the RACE CARS Project
- Review STEMI and Cardiac Arrest Data
- Discuss the latest in STEMI and Cardiac Arrest guidelines
- List strategies to help you improve care of you STEMI and Cardiac Arrest patients.

The Statistics:

- Sudden Cardiac Arrest (SCA) is the 3rd 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

Variation in survival VF arrest
Resuscitations Outcomes Consortium

Survival to discharge



Nichol JAMA. 2008;300(12):1423-1431

"Where you live should not determine whether you live"

HeartRescue PROJECT

HeartRescue Partners

Medtronic FOUNDATION

Goals:

Program Goals

Improved Survival Rates

50% improvement in SCA survival in program states

- Partner grants

Improved Reporting

Increase and improve measurement of SCA nationwide

- Common data set and registry (CARES)
- SCA national index

Improved National and Global Impact

Expand nationally and internationally

- Expand grant program
- SCA Community Playbook

Medtronic FOUNDATION

HeartRescue PROJECT

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.

National Highlights - Year 3:

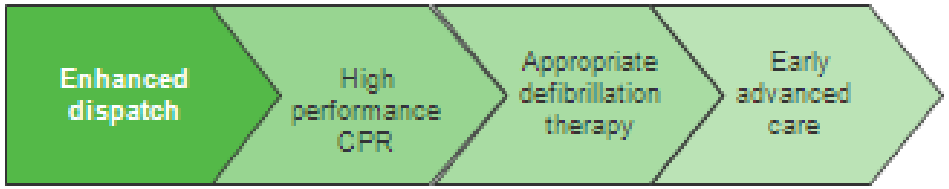
- Partner programs now covering 70% or more of state populations
  - OHCA data elements submitted to CARES Registry for 2011, 2012
  - 990 survivors in 2011 to 1,495 in 2012
- Presented project activities to 1,500 EMS leaders at 8 conference events
- State partners hosted 25+ Resuscitation Academies reaching 1,200+ EMS leaders with best practice education
- Over 5.3 million people saved a life virtually with Save-a-Life Simulator on http://www.HeartRescueNow.com
- Accepted for publication in American Heart Journal, 'Multistate implementation of guideline-based cardiac resuscitation systems of care: Description of the HeartRescue Project'

How to improve:

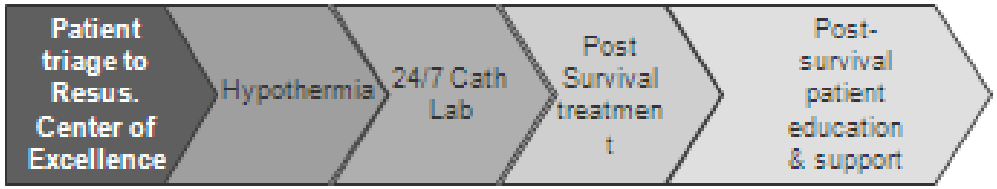
Improving SCA Survival

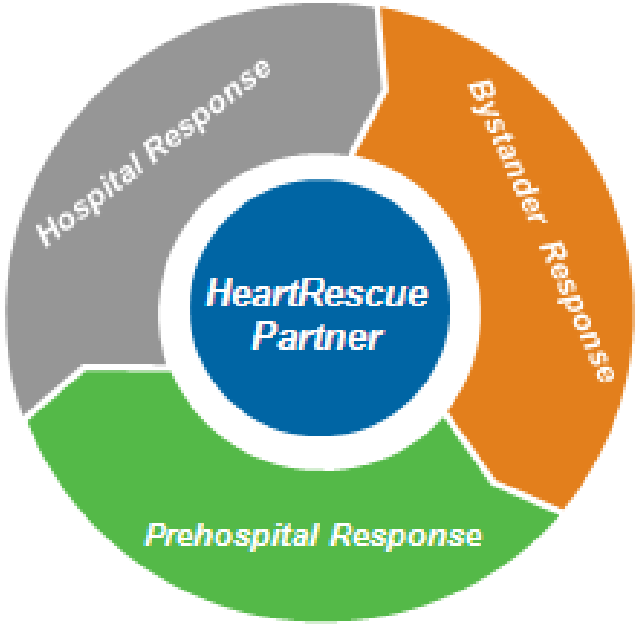
1: Bystander Response

2: Prehospital Response



3: Hospital Response





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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.

Adult Chain of Survival

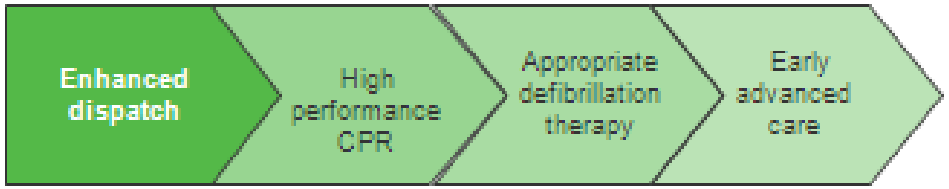
1. Immediate recognition of cardiac arrest and activation of the emergency response system
2. Early CPR with an emphasis on chest compressions
3. Rapid defibrillation
4. Effective advanced life support
5. Integrated post–cardiac arrest care

How to improve:

Improving SCA Survival

1: Bystander Response

2: Prehospital Response



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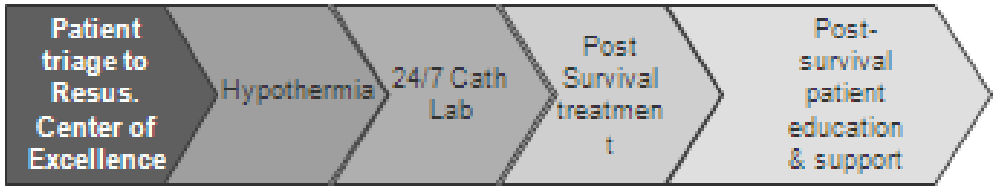

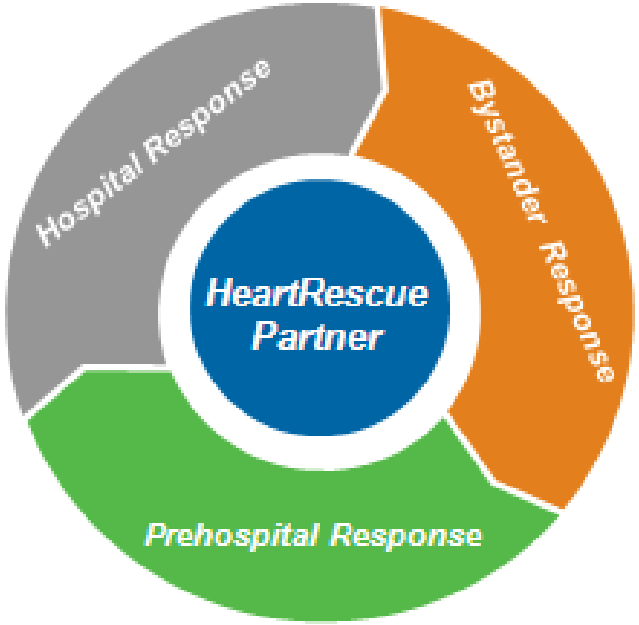

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Pre-hospital: Telecommunications:

- 2 question approach:
  - Are they conscious?
  - Are they breathing normally?
- Immediate instruction on compression only CPR
- QI on all cardiac arrests:
  - Time to recognition
  - Time to first compression
- Provide EMS any data needed for CARES

Pre-hospital: First Responders

- Adopt the Team Approach to Resuscitation
- Adopt High Quality CPR concepts
- Practice and practice with EMS
- Feedback on performance
- Provide EMS any data needed for CARES

Pre-hospital: EMS

- Adopt the Team Approach to Resuscitation
- Adopt High Quality CPR concepts
- Practice and practice with First Responders
- Feedback on performance
- Practice ALS skills while CPR being performed
- Run Resuscitation at Scene
- Collect data
- Provide feedback

Hospital

- Post cardiac arrest care
  - Strong physician leader
  - Cardiac arrest team / coordinator
  - ICU / hypothermia / cath. / neurology protocols
  - Limited data measurement and feedback
- EP evaluation / Implantable defibrillators
- Community support / training

All Hospitals:

- Lead community education efforts
- Train all employees in some level of CPR based on job classification
  - Orientation and ongoing yearly training
- Train patient and families on recognition and compression only CPR on discharge

Establish Hospital Plans:

- Protocol for cardiac arrest patients.
- Cardiac arrest centers
  - Accept pts regardless of bed availability
  - Cath Lab 24/7 Protocols in place for cooling
  - Data Collection and Feedback
  - Identify a hospital coordinator
  - Commitment to community education

Hospital

Hospital Response

- Optimize cardio-pulmonary function & vital organ perfusion after ROSC
- Transport/transfer to appropriate hospital or CCU with comprehensive post cardiac arrest treatment system of care.
- Identify and treat advanced ACS & other reversible causes
- Control temperature to optimize neurological recovery.
- Anticipate, treat, & prevent multi-organ dysfunction. Include avoiding excessive ventilation and hyperoxia.

Survivor Support

- At discharge refer survivors / families to resources for physical rehab to cope with brain injury.
- Provide honest and specific answers to questions
- Provide patient diagnosis specific resources about condition
- Share knowledge about what to expect & how to react when systems are experienced post discharge.
- Provide ICD coaching and coping skills

Community

- Challenges
  - First Responder and EMS response times vary, usually > 4 minutes, rural communities even longer
  - CPR should be initiated within 4 minutes or brain damage begins to occur, survival is not likely after 10 minutes without CPR
  - AED locations and maintenance status often unknown
- First 3 links in the chain of survival involves the Community:
  - Recognition and access
  - CPR with focus on compression only
  - Rapid defibrillation - AED

RACE
Cardiac Arrest Resuscitation System

Community: Statewide Strategies

Goal: ***to improve bystander CPR rates and AED use***

- Movie Theater PSA
- Grants Program
- Regional Community Education Networks
- Development of Website Resources
- Survivor Celebrations
- Track

Community: Statewide Strategies

Movie Theater PSA

- 19 week run (Aug ‘13 – early Jan ‘14)
- ~6 million impressions
- In selected NC markets:
  - Asheville – Regal Biltmore Grande Stadium
  - Concord – Carolina Mall Stadium 8 & AMC Concord Mills 24
  - Gastonia – Regal Franklin Square Stadium 14
  - Greenville – Regal Greenville Grande Stadium 14
  - Rocky Mount – Premiere Theatre 14
  - Southport – Surf Cinemas
  - Wilmington – Regal Mayfaire Stadium 16
  - Winston Salem – The Grand 18 - Winston-Salem

Quality Improvement

You cannot improve what you do not measure.

CARES

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

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

RACE
Cardiac Arrest Resuscitation System

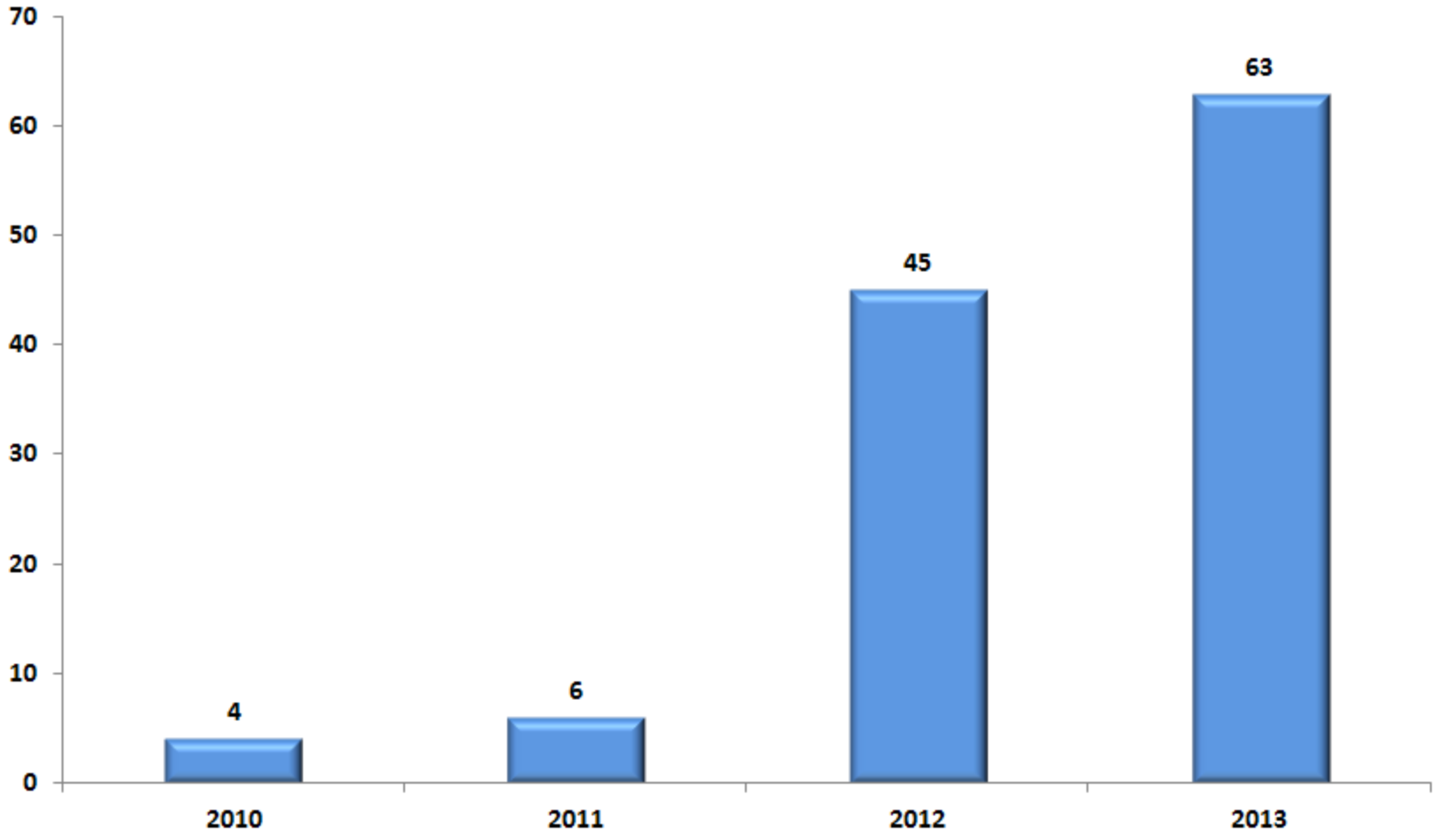
CARES Registry

Number of EMS Agencies in CARES by Year

December, 2013

HeartRescue PROJECT
Every second counts. Every action matters.

myCares.NET



RACE
Cardiac Arrest Resuscitation System

CARES Registry

NC CARES Records

December, 2013

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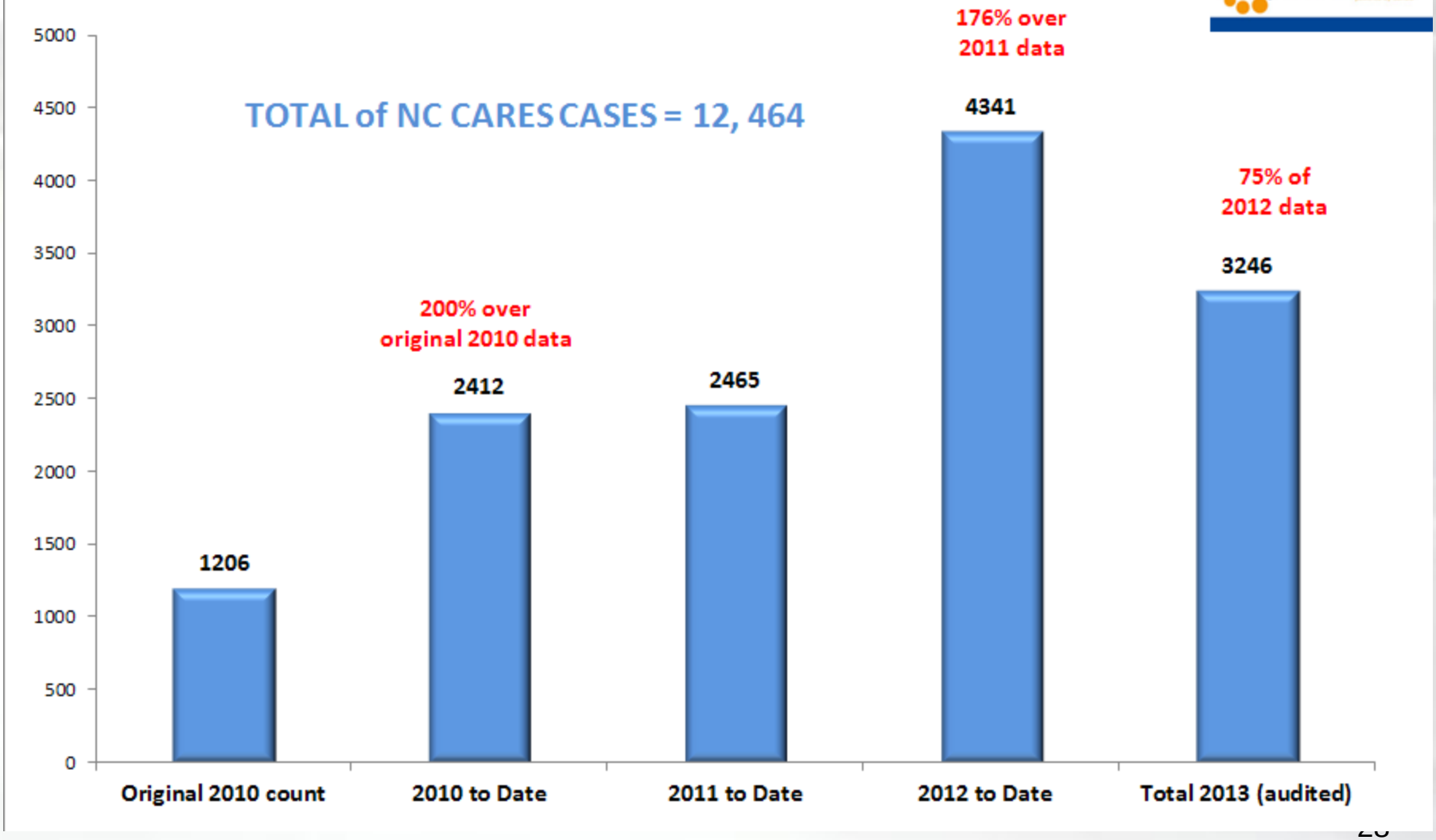

Hospital Report

	Total (%)	Admission (%)	Discharge (%)
Pre-Hospital Characteristics	**N**	**N (%)**	**N (%)**
Gender = Male	N (%)	N (%)	N (%)
Mean Age	X	---	---
Initial Rhythm			
Shockable	N (%)	N (%)	N (%)
Unshockable	N (%)	N (%)	N (%)
Witnessed Status			
Unwitnessed	N (%)	N (%)	N (%)
Bystander Witnessed	N (%)	N (%)	N (%)
Witnessed by 911 Responder	N (%)	N (%)	N (%)
Sustained ROSC			
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 (%)	----

Feedback

- All Resuscitation Team members get outcomes of the arrest
- Establish feedback plan
- Requires EMS, First Responders, Hospitals, and Telecommunications to establish a contact and build relationships

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%

Single best plan per hospital: RACE OPERATIONS MANUAL:

Regimen A – Primary PCI

Preferred if able to meet time goals

(To be used with institution specific standing orders/protocols for ST-elevation myocardial infarction patients)

ELIGIBLE PATIENTS

- Within 12 hours of symptom onset.
- ST-segment elevation in 2 or more contiguous leads >1mm or left bundle branch block.
- Primary angioplasty is also the best option for:
  - Cardiogenic Shock; Killip class III or >.
  - Possible ST-elevation MI but uncertain of diagnosis.
  - Contraindication to fibrinolysis.
  - Physician or patient preference.

Goal is to open artery with angioplasty balloon within 90 minutes of arrival to first hospital or first medical contact.

- Emergency department physician makes the decision about need for primary angioplasty, if possible. Consultation should be limited to situations of uncertainty.
- Notify PCI hospital of an ST-elevation MI in need of primary angioplasty.
- Complete EMTALA form as a priority.
- Fax patient records including ECG to receiving hospital WHILE PATIENT IN TRANSFER.
- Continuous IV infusions should only be used if required for stability during transfer.

OTHER MEDICATIONS

1. Heparin: Bolus at 70 IU/kg IV bolus. No maintenance infusion during transfer.
2. Aspirin: 325 mg chewed.

PRN Medications:

1. Nitroglycerin paste 1 to 2 inches topically PRN chest pain.
2. Morphine Sulfate 2-10mg IV for chest pain unrelieved by Nitroglycerin PRN.

Reperfusion Regimen B – Fibrinolysis

(To be used with institution specific standing orders/protocols for ST-elevation myocardial infarction patients)

ELIGIBLE PATIENTS

- Within 12 hours of symptom onset.
- ST-segment elevation in 2 or more contiguous leads >1mm or left bundle branch block.
- Absence of contraindications (see below).

FIBRINOLYTIC [tenecteplase (TNK) or reteplase (rPA)]

Tenecteplase (TNK) regimen
Single IV bolus over 5 seconds

Use TNK dose chart at right to determine dose.
Patient weight _____ kg
Patient-specific dose _____ mg
(NOT TO EXCEED 50mg)

Patient Weight (kg)	TNK (mg)	Volume TNK to be administered (ml)
< 60	30	6
≥ 60 to < 70	35	7
≥ 70 to < 80	40	8
≥ 80 to < 90	45	9
≥ 90	50	10

OR

Reteplase (rPA) regimen
10 units IV over 2 minutes given twice at 30-minute intervals.

In nurses' notes and MAR, please note EXACT TIME of fibrinolytic administration, and obtain ECG 30 minutes after fibrinolytic administered.

OTHER MEDICATIONS:

1. Heparin:
   a. Bolus at initiation of TNK or rPA - 60 IU/kg IV bolus (maximum 4,000 IU).
   b. Maintenance 12 IU/kg/h (maximum 1,000 IU) to achieve activated partial thromboplastin time (APTT) 1.5 to 2 times control, maintained for 48 hrs.
2. Aspirin 325 mg chewed.

Absolute contraindications
- ❒ Any prior intracranial hemorrhage
- ❒ Known structural cerebral vascular lesion (for example arteriovenous malformation)
- ❒ Known malignant intracranial neoplasm (primary or metastatic)
- ❒ Ischemic stroke within 3 months EXCEPT acute ischemic stroke within 3 hours
- ❒ Suspected aortic dissection
- ❒ Active bleeding or bleeding diathesis (excluding menses)
- ❒ Significant closed head or facial trauma within 3 months

Relative contraindications
- ❒ History of chronic severe, poorly controlled hypertension
- ❒ Severe hypertension on presentation (systolic blood pressure greater than 180 mm Hg or diastolic blood pressure greater than 110 mm Hg)
- ❒ History of prior ischemic stroke greater than 3 months, dementia, or known intracranial pathology not covered in contraindications
- ❒ Traumatic or prolonged (greater than 10 minutes) CPR or major surgery (less than 3 weeks)
- ❒ Recent (within 2 to 4 weeks) internal bleeding
- ❒ Noncompressible vascular punctures
- ❒ Pregnancy

Conclusions:

- Cardiac arrest is common and the third leading cause of death.
- Victims of out of hospital cardiac arrest are unlikely to survive
- Simple interventions in the chain of survival are likely to improve survival
- Data drives change

Let's Change the Face of Cardiac Arrest