

SYSTEMS BASED APPROACH TO OUT-OF-HOSPITAL CARDIAC ARREST

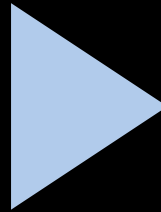


Kenneth A Scheppke, MD
Chief Medical Officer
Palm Beach County Fire Rescue
State EMS Medical Director
Florida Department of Health



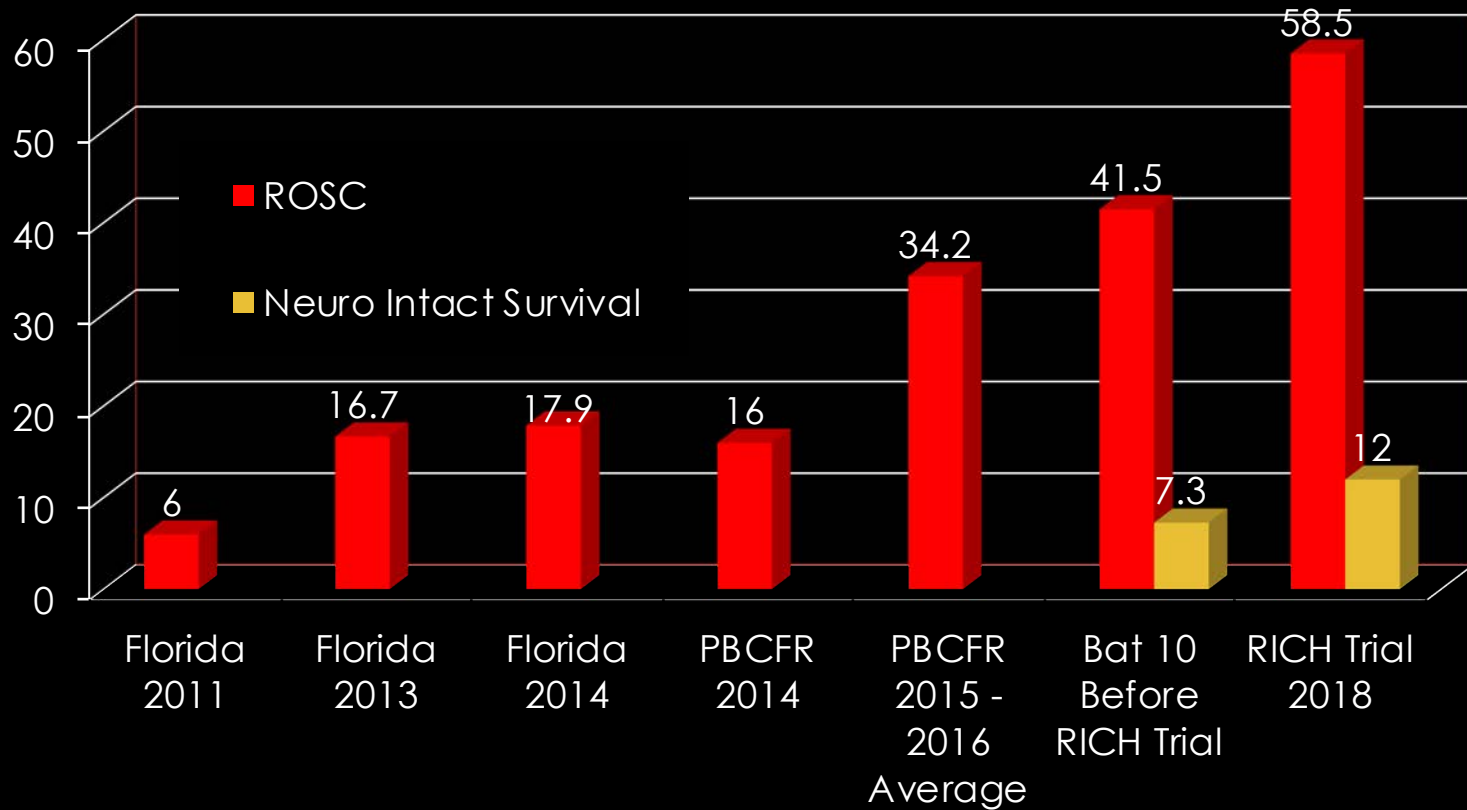
CASE REPORT

42 y/o
married male
and father of
two returns
home after
exercising
and collapses

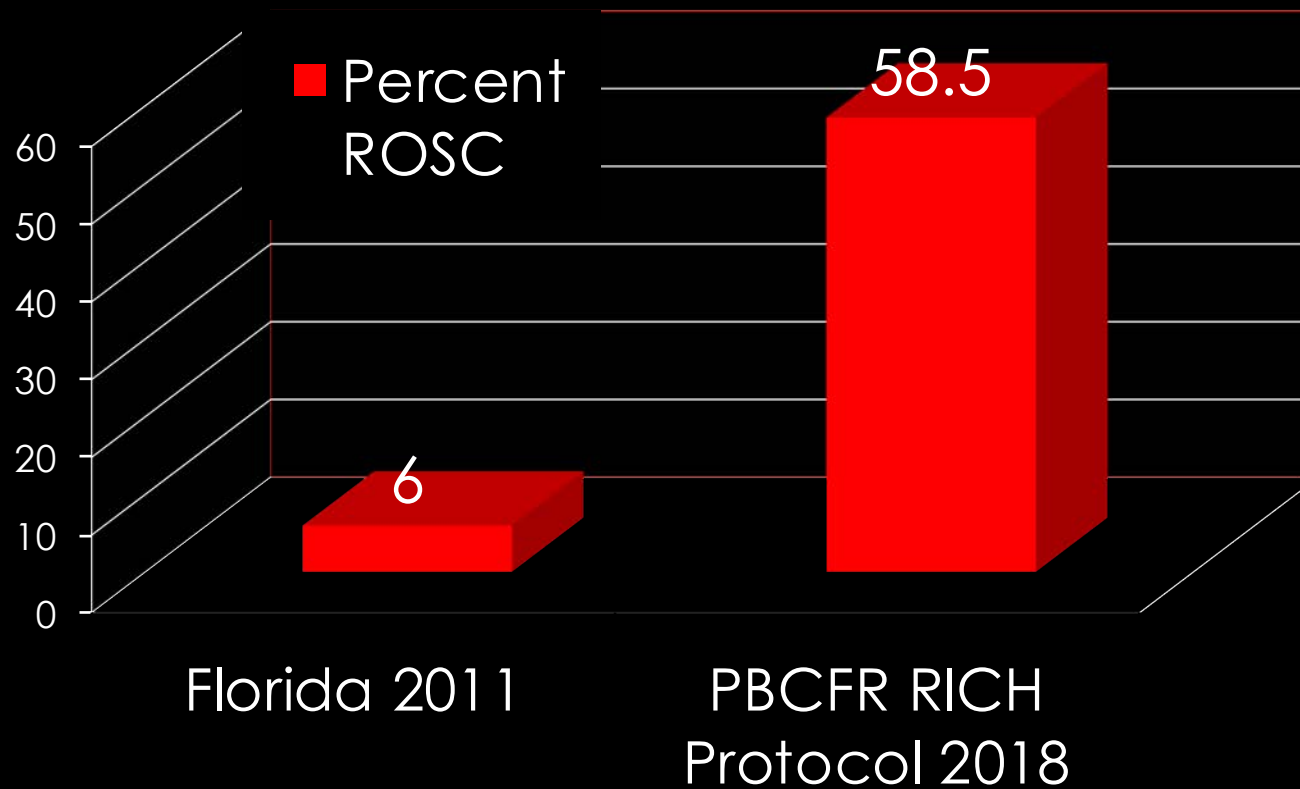


Chain of
Survival
enacted
with every
link in the
chain utilized

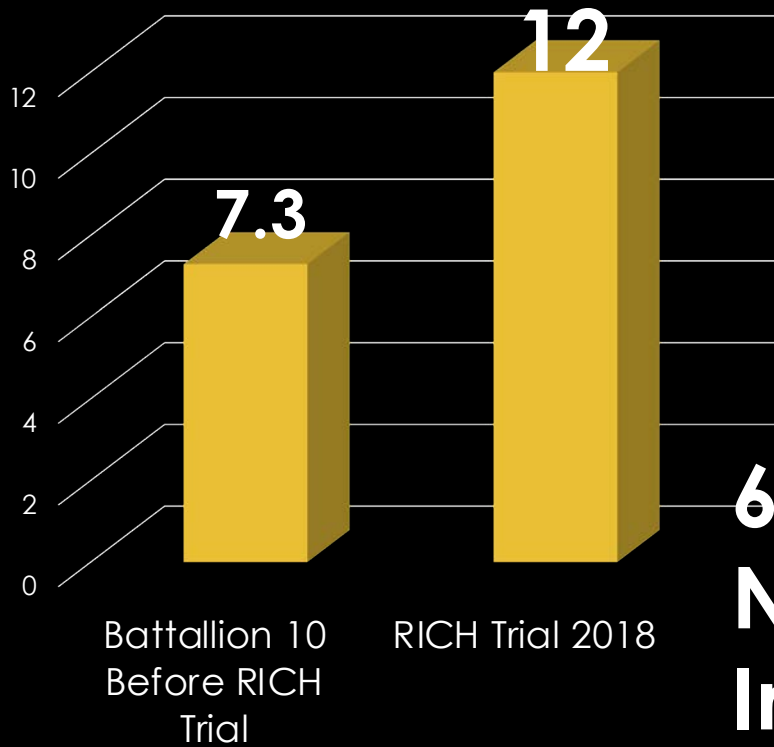
EFFECT OF SYSTEM CHANGES ON ROSC



EFFECT OF SYSTEM CHANGES ON ROSC 2011 TO 2018



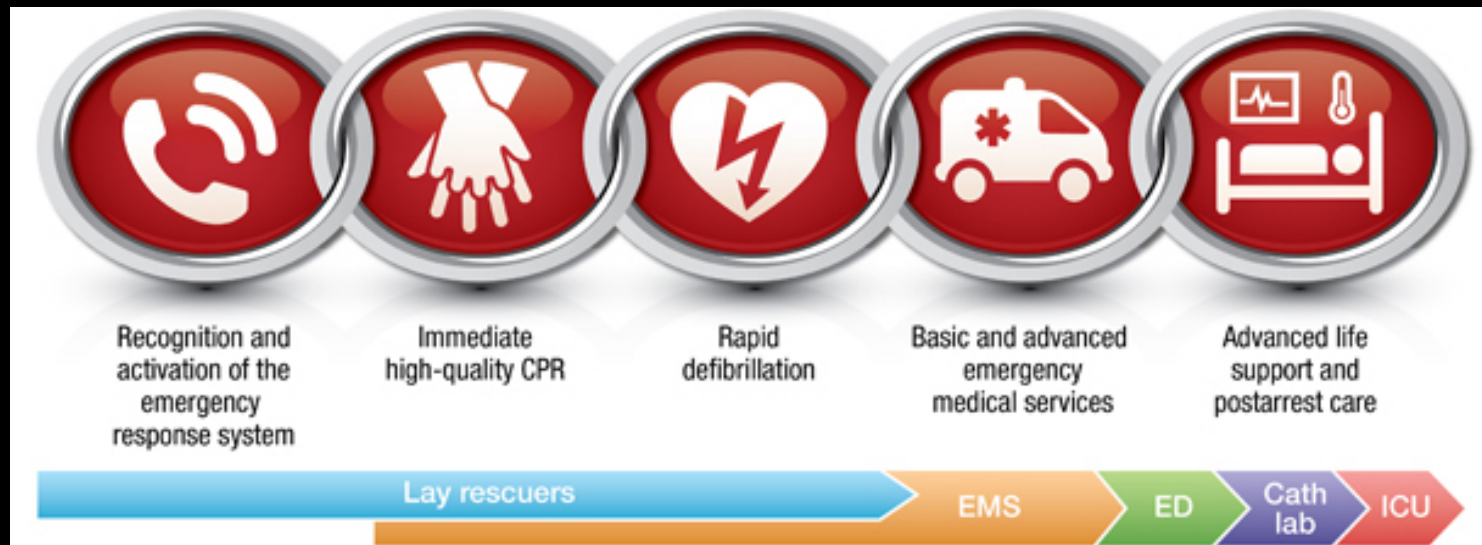
RICH TRIAL EFFECT ON NEURO INTACT SURVIVAL



65% increase in Neurologically Intact Survival



FIXING THE BUNDLE OF CARE





PRE-PRE-HOSPITAL PROJECTS

Goals:

- Develop an army of CPR trained laypersons
- Teach them to use the PulsePoint App
- Do this perpetually and for free

911 CALL RECEIVED PROJECTS



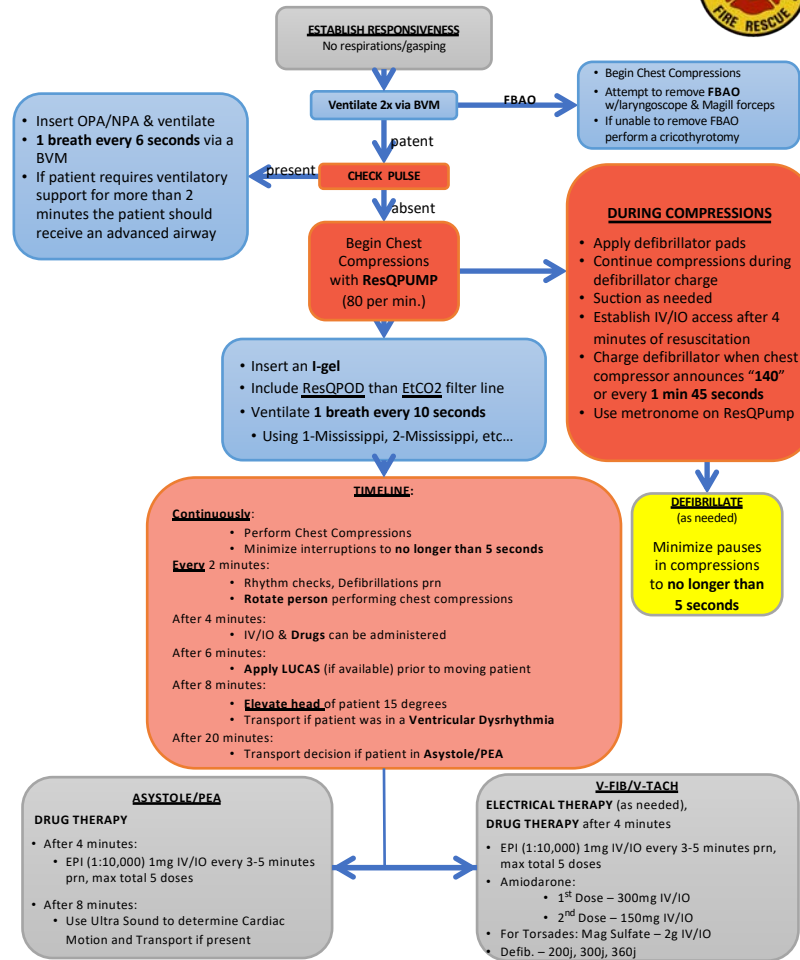
No No GO Dispatcher Life
Support

Fear of Pushing on an alive
persons chest converted to
fear of failing to push on a
dead persons chest

ACD CPR WITH ITD



RICH TRIAL CARDIAC NON-TRAUMA ARREST (ADULT ONLY) (Rescue Pump, I-Gel, Continuous Chest Compression, Head Up)



Revision
06/18

RICH TRIAL (ADULT)

PRE-HOSPITAL EMS PROJECTS: THE RICH TRIAL

- Rescue Pump
- iGel with ResQPod
- Continuous Compressions
- Head Up position

Flow Oriented Therapy



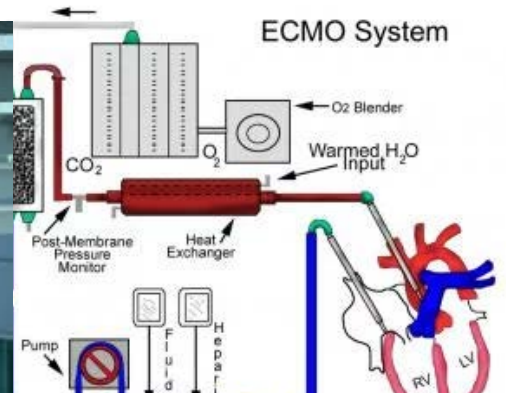
SOME OF OUR RESCUERS MIGHT BE
PULLING UP A LITTLE TOO HARD



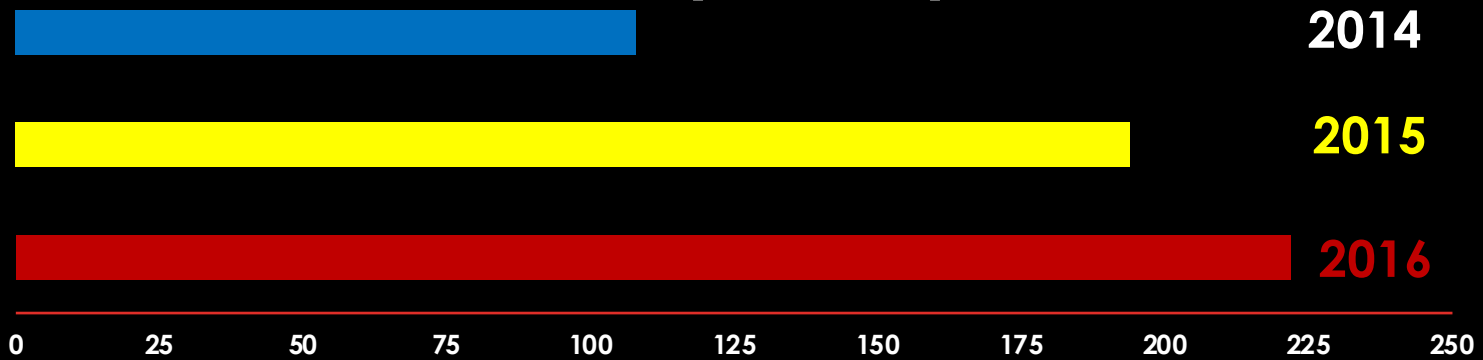
HICKY OF HOPE



RESUSCITATION CENTERS



Total Number of Out of Hospital Cardiac Arrest Patients Resuscitated by EMS (by Year)



Cardiac Arrest Centers

- ▶ Karl Sporer
- ▶ Alameda County EMS Agency

Improving Cardiac Arrest Outcomes

- ▶ Pulsepoint
- ▶ CPR 7- train 10,000 seventh graders each year
- ▶ Dispatch CPR
- ▶ Universal Mechanical CPR Device
- ▶ Pit Crew
- ▶ Impedance Threshold Device
- ▶ CARES Registry
- ▶ Cardiac Arrest Centers in 2013

ORIGINAL CONTRIBUTIONS

CONTINUOUS QUALITY IMPROVEMENT EFFORTS INCREASE SURVIVAL WITH FAVORABLE NEUROLOGIC OUTCOME AFTER OUT-OF-HOSPITAL CARDIAC ARREST

Karl Sporer, MD, Michael Jacobs, BS, Leo Derevin, BS, Sue Duval, PhD, James Pointer, MD

ABSTRACT

Objective: To assess system-wide implementation of specific therapies focused on perfusion during cardiopulmonary resuscitation (CPR) and cerebral recovery after Return of Spontaneous Circulation (ROSC). **Methods:** Before and after retrospective analysis of an out-of-hospital cardiac arrest database. Implementation trial in the urban/suburban community of Alameda County, California, USA, population 1.6 million, from November 2009–December 2012. Adult patients with non-traumatic out-of-hospital cardiac arrest (OHCA) who received CPR and/or defibrillation. The impedance threshold device was used throughout this study and there was an increased use of mechanical CPR (mCPR) and in-hospital therapeutic hypothermia (HTH). **Results:** Rates of ROSC, survival to hospital discharge and Cerebral Performance Category (CPC) scores were compared using univariate and multivariable analyses. A total of 2,926 adult non-traumatic patients with OHCA received CPR during the study period. From 2009–2011 to 2012, there was an increase in ROSC from 29.0% to 34.4% ($p = 0.003$) and a non-significant increase in hospital discharge from 10.2% to 12.0% ($p = 0.16$). There was a 76% relative increase in survival with favorable neurologic function between the two periods, as determined by $CPC \leq 2$, from 4.5% to 7.9% (unadjusted

OR = 1.80; CI = 1.31, 2.48; $p < 0.001$). After adjusting for witnessed arrest, bystander CPR, initial rhythm (VT/VF vs. others), placement of an advanced airway, EMS response time, drugs administered, and age, the OR was 1.61 (1.10, 2.36; $p = 0.015$). Using a stepwise multivariable logistic regression model, the independent predictors of $CPC \leq 2$ were 2012 (vs. 2009–2011; $p = 0.022$), witnessed arrest ($p < 0.001$), initial rhythm VT/VF ($p < 0.001$), and advanced airway (inverse association $p < 0.001$). Additional analyses of the three prescribed therapies, separately and in combination, demonstrated that for those patients admitted to the hospital, mCPR with HTH had the biggest impact on survival to hospital discharge with $CPC \leq 2$. **Conclusions:** Specific therapies within a system of care (mCPR, HTH), developed to enhance circulation during CPR and cerebral recovery after ROSC, significantly improved survival by 74% with favorable neurologic function following OHCA. **Key words:** emergency Service; hospital/statistics & numerical data; out-of-hospital cardiac arrest/complications; out-of-hospital cardiac arrest/therapy; hypothermia; induced/methods; ventricular fibrillation/etiology; out-of-hospital cardiac arrest/mortality

PREHOSPITAL EMERGENCY CARE 2017;21:1–6

INTRODUCTION

Annually, over 400,000 people suffer non-traumatic

Cardiac Arrest Centers

- ▶ Directed all SCA patients with ROSC to our STEMI/Cardiac Arrest Centers in 2013
- ▶ Memorandum of Understanding
 - ▶ CARES participation
 - ▶ Internal Therapeutic Hypothermia Policy
 - ▶ Internal STEMI after ROSC Policy
 - ▶ Process data and outcomes
- ▶ Two LUCAS Devices- ED and Cath Lab
- ▶ Quarterly Meetings

Cardiac Arrest Centers

- ▶ Improvements

- ▶ Increased incidence of Cath during Cardiac Arrest
- ▶ Champions of mechanical CPR devices
- ▶ Variation of TH and Cardiac Catherization after ROSC
- ▶ Combining Hospital Code Blue QI with the prehospital cardiac arrest QI



Progressive Systemwide Collaboration

Alameda County (Calif.) EMS coordinates with clinical stakeholders to improve cardiac arrest survival

By Michael J Jacobs, EMT-P & Karl A Sporer, MD, FACEP, FACP

every year, more than 400,000 people suf-

changes and the resulting improvement in cardiac arrest resuscitation.

The endorsed system of care for OHCA by ALCO

ORIGINAL RESEARCH

Variations in Cardiac Arrest Regionalization in California

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Introduction: The development of cardiac arrest centers and regionalization of systems of care may improve... EMS...
agenc... ment

ORIGINAL RESEARCH

Variations in Cardiac Arrest Regionalization in California

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Introduction: The development of cardiac arrest centers and regionalization of systems of care may improve survival of patients with out-of-hospital cardiac arrest (OHCA). This survey of the local EMS agencies (LEMSA) in California was intended to determine current practices regarding the treatment

Cardiac Arrest Centers

- ▶ Survey of California EMS Agency
- ▶ Formal Regionalized Cardiac Arrest Care
 - ▶ Los Angeles County
 - ▶ Alameda County
 - ▶ Twenty Counties
- ▶ Direct all ROSC patients to STEMI Center
- ▶ Only 36% of EMS Agencies have survival outcomes available



San Antonio-

Resuscitation Centers-
Cardiac Arrest Management-
A New Vision for Care



UT Health
San Antonio
School of
Health Professions

The Office of the Medical Director Serves
SAFD 1.4 Million ++ Population
3+ Cardiac arrests a day





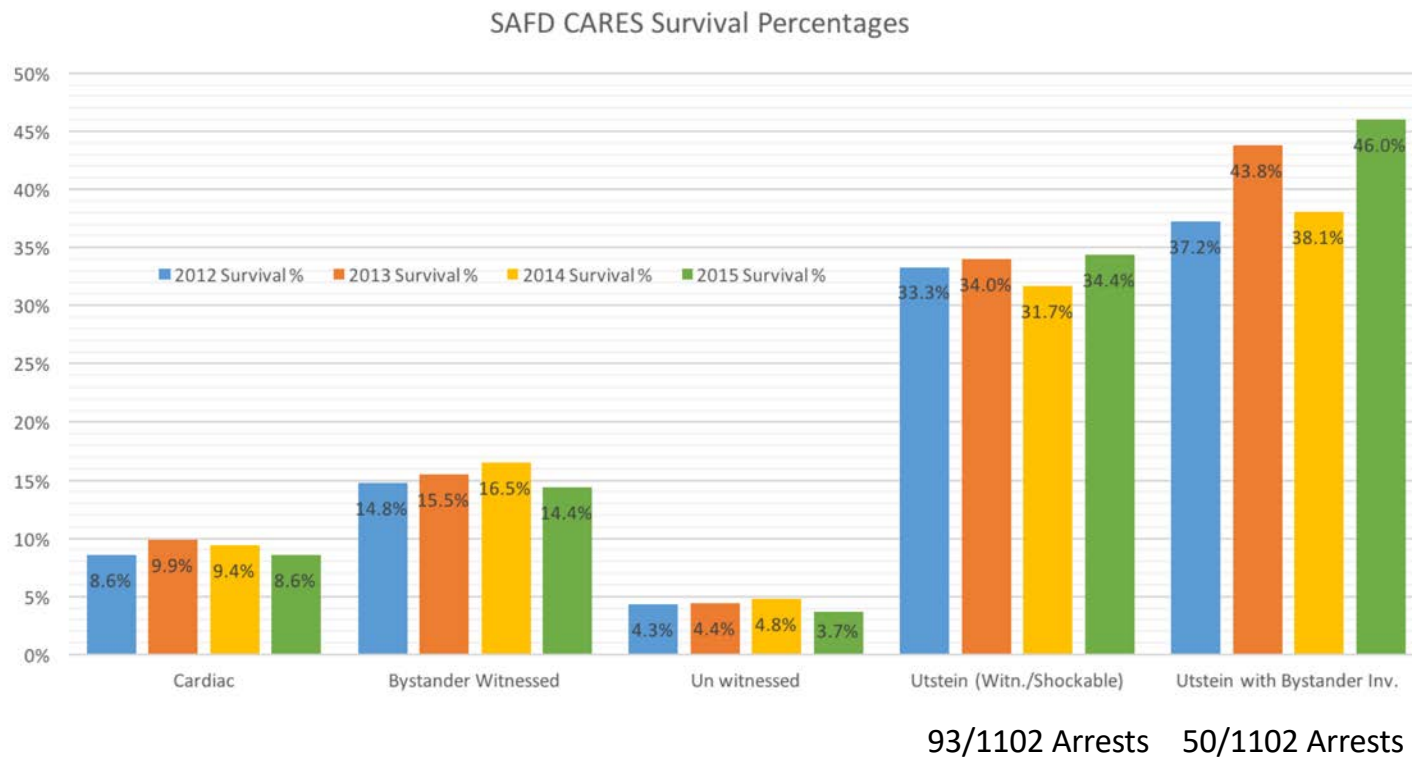
CUTTING EDGE APPROACH TO IMPROVE CARDIAC ARREST SURVIVAL

651-403-5636

www.TakeHeartAmerica.org



We are Stuck in a RUT.....need to get better



We need more CPR and Community Engagement

Resuscitation Centers ???

- STEMI PCI center with adequate volume
- CP Center Accreditation
- Hemodynamic support such as Impella/ ECMO
- Pacer and AICD capability
- Robust Pulmonary-Critical Care
- Neuro, GI, Nephro, ID, PMR (EEG)
- FTE's for Medical Direction, QA and oversight

Resuscitation Centers

- Targeted Temperature Management :
 - Cooling all ROSC, ALL rhythms if no purposeful movement to command on arrival for 24 hrs after reaching TTM Temp (33 or 36 degrees)
 - After 24 hrs at Temp allow gradual rewarming 0.25 ° C per hour passively
 - Hyperglycemic Control
 - Seizure monitoring and Myoclonus Control

Resuscitation Centers

- Multi-disciplinary Rounds
- Physical Therapy, PMR, and Nutrition on admission
- Family – Social and Pastoral Support
- Need a Nurse Program manager “Attack Nurse”
- Track and Report Outcomes
- Survivor Support and Family Engagement after discharge
- In House Cardiac Arrest Program

Resuscitation Centers

- Key Drivers:
 - ROSC with STEMI direct to cath lab- cooled
 - ROSC no stemi to cath lab within 2 hours and cooled
 - **Comprehensive Resuscitation Center**
Persistent V-Fib/Vtach to cath lab
(also Cardiogenic Shock)
 - Witnessed with bystander CPR or TCPR
 - NO significant co- morbid conditions age < 70
 - Load Early and Head to ECMO center with LUCAS 3.1

Thank You

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42 y/o married male and father of two returns home after exercising and collapses

CASE REPORT

- 911 Called No, No Go Dispatcher CPR Started
- 14 y/o Son just learned CPR in School program
- Medics perform Pit Crew CPR and transport in head up position to Resuscitation Center
- Resuscitation Center takes patient to cath lab, places impella, starts ecmo and cools patient.