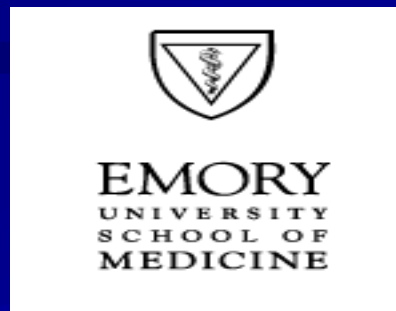




Development of a National Out-of-Hospital Cardiac Arrest Surveillance Registry

ICEM Singapore 2010

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Presenter Disclosure Information

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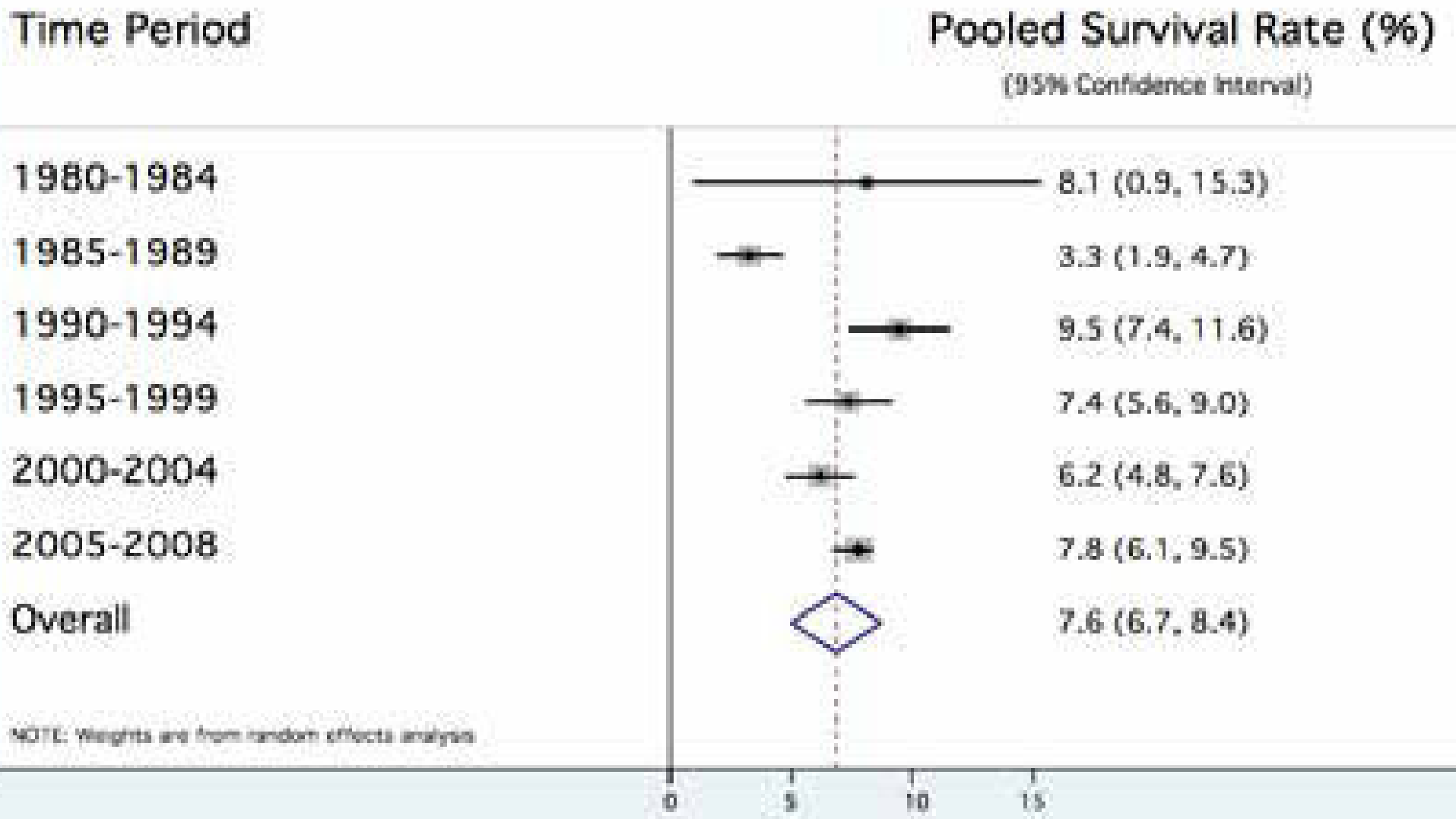
CARES – Cardiac Arrest Registry to Enhance Survival

Funding for CARES is provided by a cooperative agreement from the Centers for Disease Control and Prevention (CDC).
Grant number MM-0917-05

FINANCIAL DISCLOSURE:

No relevant financial relationship exists

Predictors of Survival from Out-of-Hospital (OHCA) A Systemic Review and Meta-Analysis



There is significant variation in cardiac arrest incidence and outcome in North America

Published national study on variation in Cardiac Arrest...

...found significant variation in incidence and outcome

Regional Variation in Out-of-Hospital Cardiac Arrest Incidence and Outcome

Region	Incidence (per 100,000)	Outcome (Survival %)
Alabama	10.0	8.0
Arizona	15.0	12.0
California	20.0	15.0
Colorado	25.0	18.0
Connecticut	30.0	20.0
Delaware	35.0	22.0
Florida	40.0	25.0
Georgia	45.0	28.0
Illinois	50.0	30.0
Indiana	55.0	32.0
Iowa	60.0	35.0
Kansas	65.0	38.0
Kentucky	70.0	40.0
Louisiana	75.0	42.0
Maine	80.0	45.0
Massachusetts	85.0	48.0
Michigan	90.0	50.0
Minnesota	95.0	52.0
Mississippi	100.0	55.0
Missouri	105.0	58.0
Montana	110.0	60.0
Nebraska	115.0	62.0
Nevada	120.0	65.0
New Hampshire	125.0	68.0
New Jersey	130.0	70.0
New Mexico	135.0	72.0
New York	140.0	75.0
North Carolina	145.0	78.0
North Dakota	150.0	80.0
Ohio	155.0	82.0
Oklahoma	160.0	85.0
Oregon	165.0	88.0
Pennsylvania	170.0	90.0
Rhode Island	175.0	92.0
South Carolina	180.0	95.0
South Dakota	185.0	98.0
Tennessee	190.0	100.0
Texas	195.0	102.0
Utah	200.0	105.0
Vermont	205.0	108.0
Virginia	210.0	110.0
Washington	215.0	112.0
West Virginia	220.0	115.0
Wisconsin	225.0	118.0
Wyoming	230.0	120.0

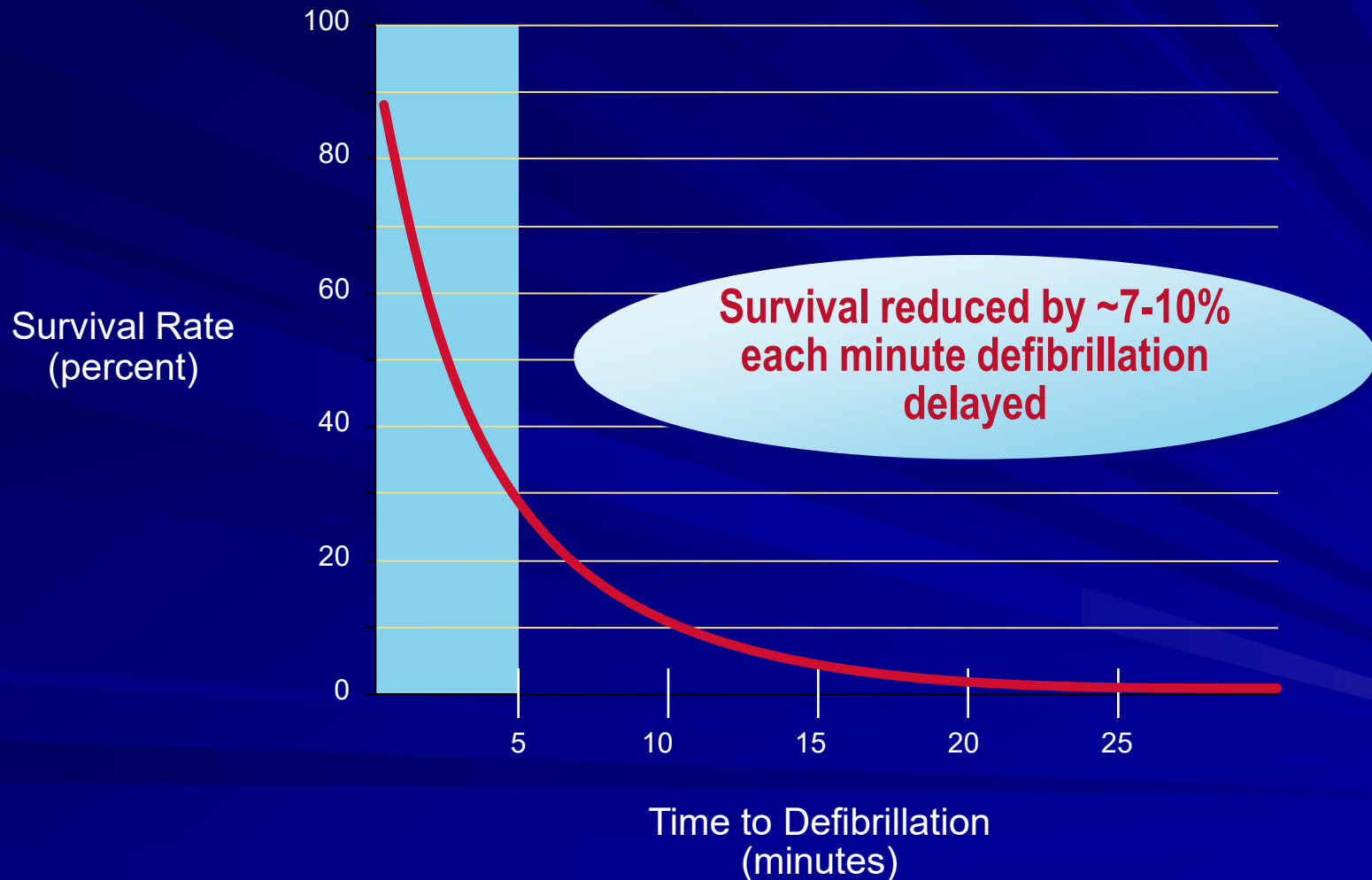
Disparity in survival for first arrest rhythm of vfib ranged anywhere from 8- 40%

2/3 of the time, bystanders are not initiating CPR

"In this study involving 10 geographic regions in North America, there were significant and important regional differences in out-of-hospital cardiac arrest incidence and outcome."

Drastic improvements in the response and treatment of SCD are needed to eliminate the 5 fold differences in survival

OHCA is a Prehospital Disease



Can we do better?

Domino's vs. EMS



■ Hungry?

- 30 minutes call-to door guaranteed.
- Customer input for QI
- Cost: \$10.95 (plus tip)



■ Cardiac Arrest?

- Call-to-door time rarely tracked
- No performance metrics, no QI
- Cost: ***Priceless***

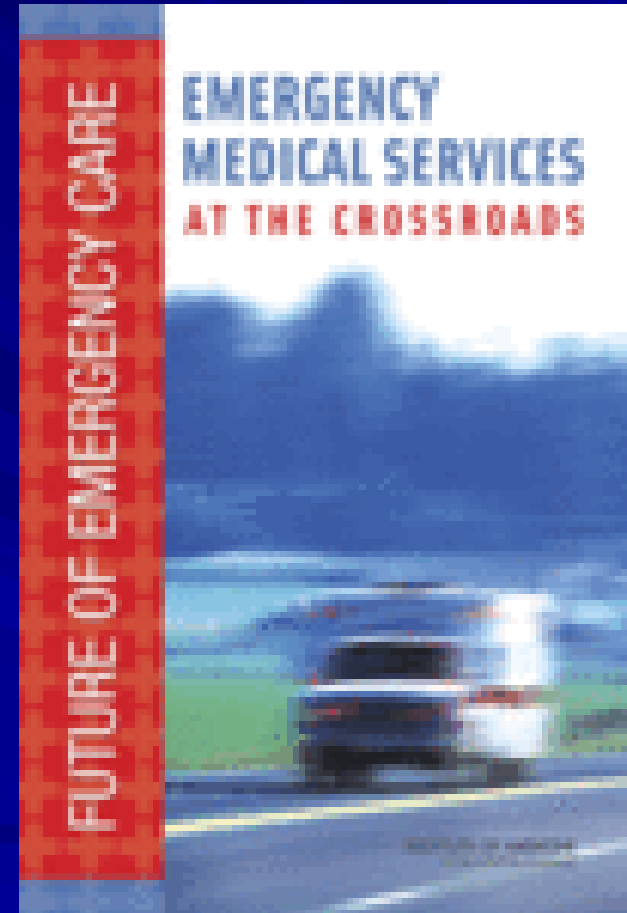


“Most cities don’t measure their performance effectively, if at all. They don’t know how many lives they are losing, so they can’t determine ways to increase survival rates.”

- Bob Davis, “Six Minutes to Live” USA Today, 2003

Institute of Medicine Report on EMS

“What is missing is a standard set of measures that can be used to assess the performance of the emergency and trauma care system within each community, as well as the ability to benchmark that performance against statewide and national performance metrics.”



**You can't manage what
you can't measure!**

**The first step to improving survival rates is to begin
collecting data in order to better understand performance**

What can we attribute the variation in survival to?

Links in the “Chain of Survival”



Early
Access

Early
CPR

Early
Defibrillation

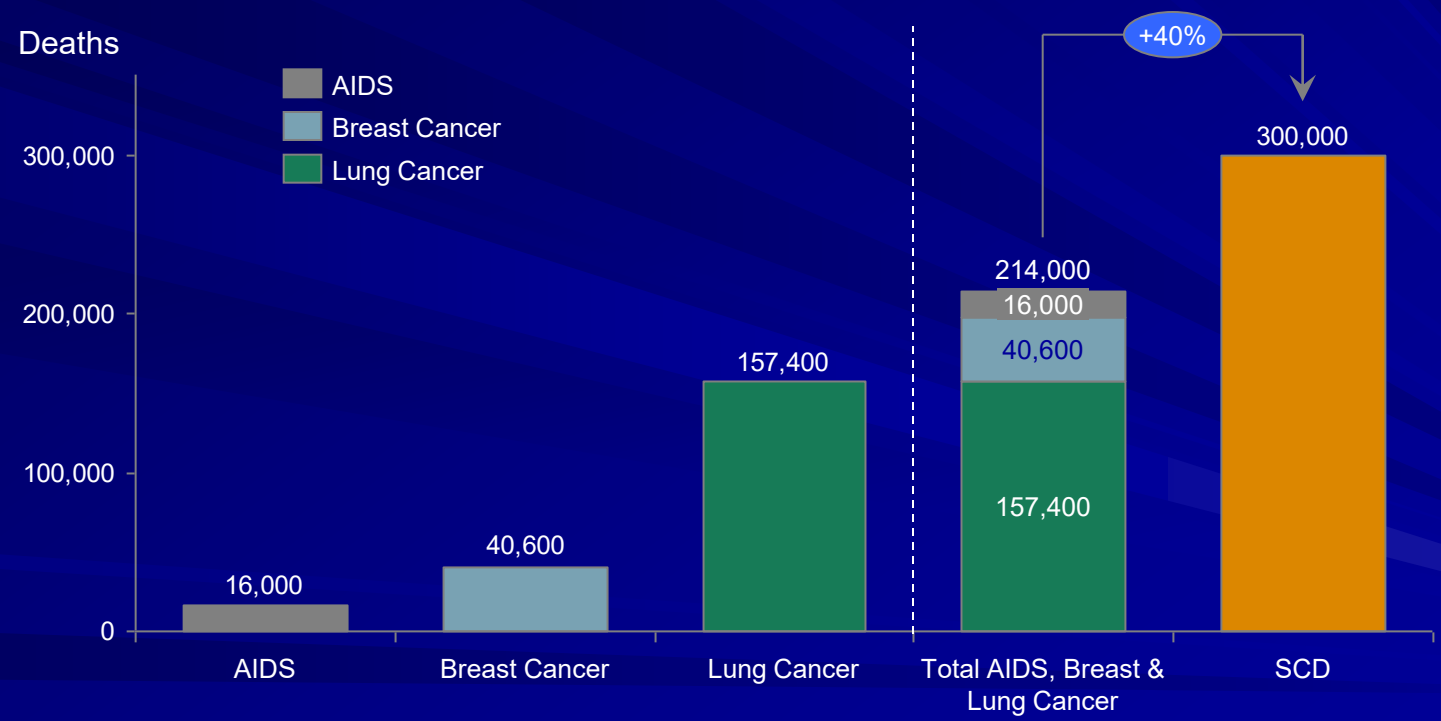
Early
Advanced Care

Disparate outcomes are almost certainly due to timeliness and quality of treatment

Cardiac Arrest is a leading cause of death in the United States

More deaths result from SCD than AIDS, breast cancer and lung cancer combined

SCD compared to other diseases



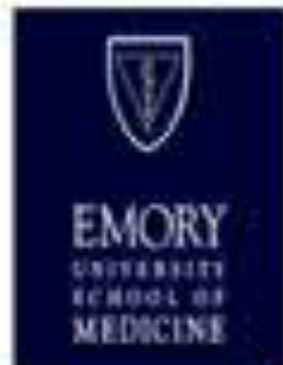
SCD may be under/over-estimated because no uniform national data collection system currently exists in the US



Welcome To:

Cardiac Arrest Registry to Enhance Survival (CARES)

Sponsored by:



Log In to myCares™

Username:

Password:

[Log In](#)

[Did you forget your password?](#)



[More information on CareS](#)

[Press on CareS](#)

[Frequently Asked Questions](#)

[Current CareS Participants](#)

CARES

The Cardiac Arrest Registry to Enhance Survival (CARES) was initiated in October 2004 as a cooperative agreement between the Center for Disease Control and Prevention (CDC) and the Department of Emergency Medicine at Emory University School of Medicine to identify incidents of prehospital cardiac arrest. The CARES Program is designed to consolidate all essential data

CARES as a uniform data collection system for OHCA

Need for a registry

- Data collection into a registry at the regional, state or national level enables providers or EMS systems to benchmark their outcomes and results with other communities
- Allows for identification of strengths and weaknesses used to improve the quality of care
- Steps toward making cardiac arrest a reportable disease

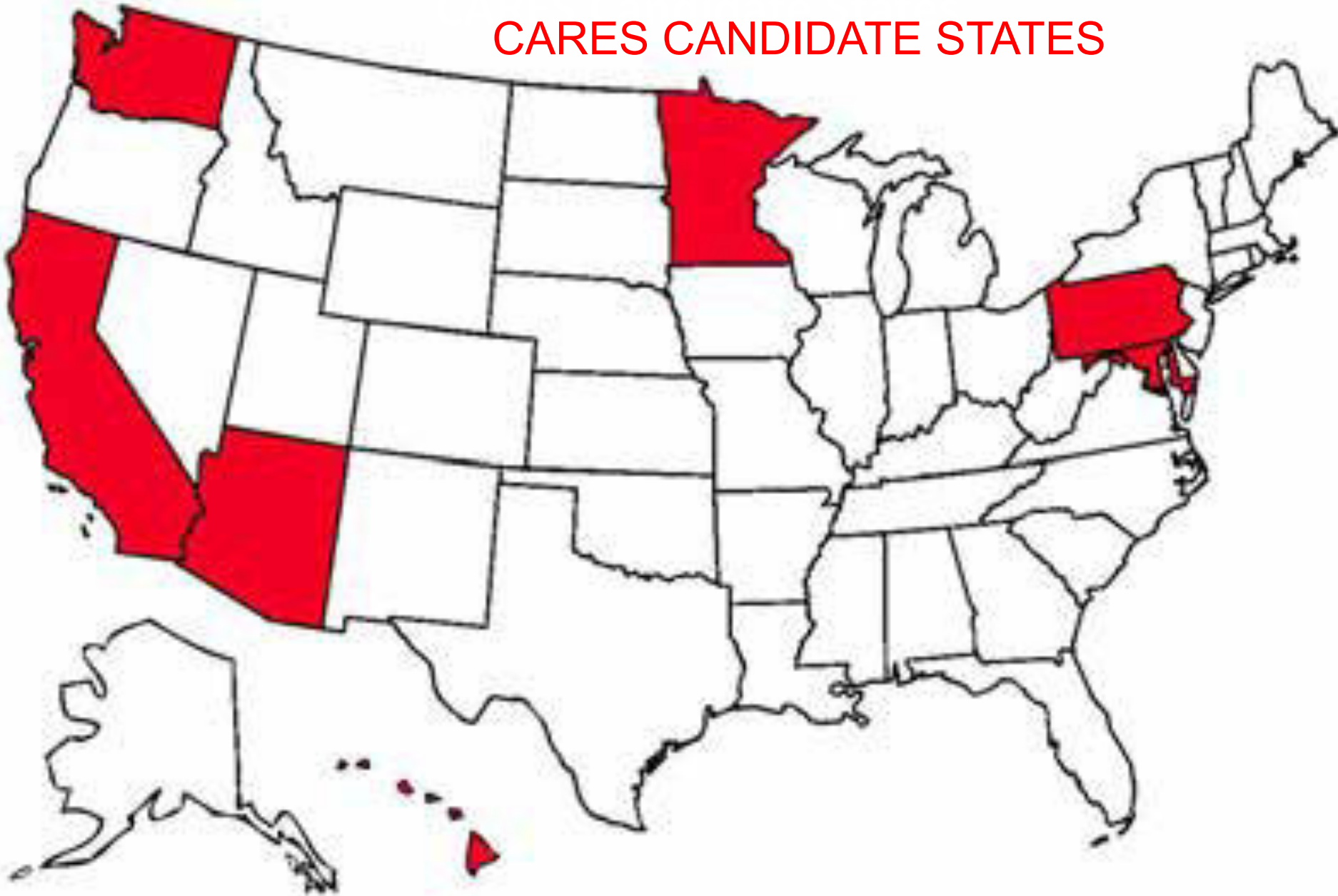
CARES

Data collection mechanism

- Makes the data collection process more efficient - linkage between EMS, Hospital and CAD outcome
- Benchmarking capabilities
- Measurement tool



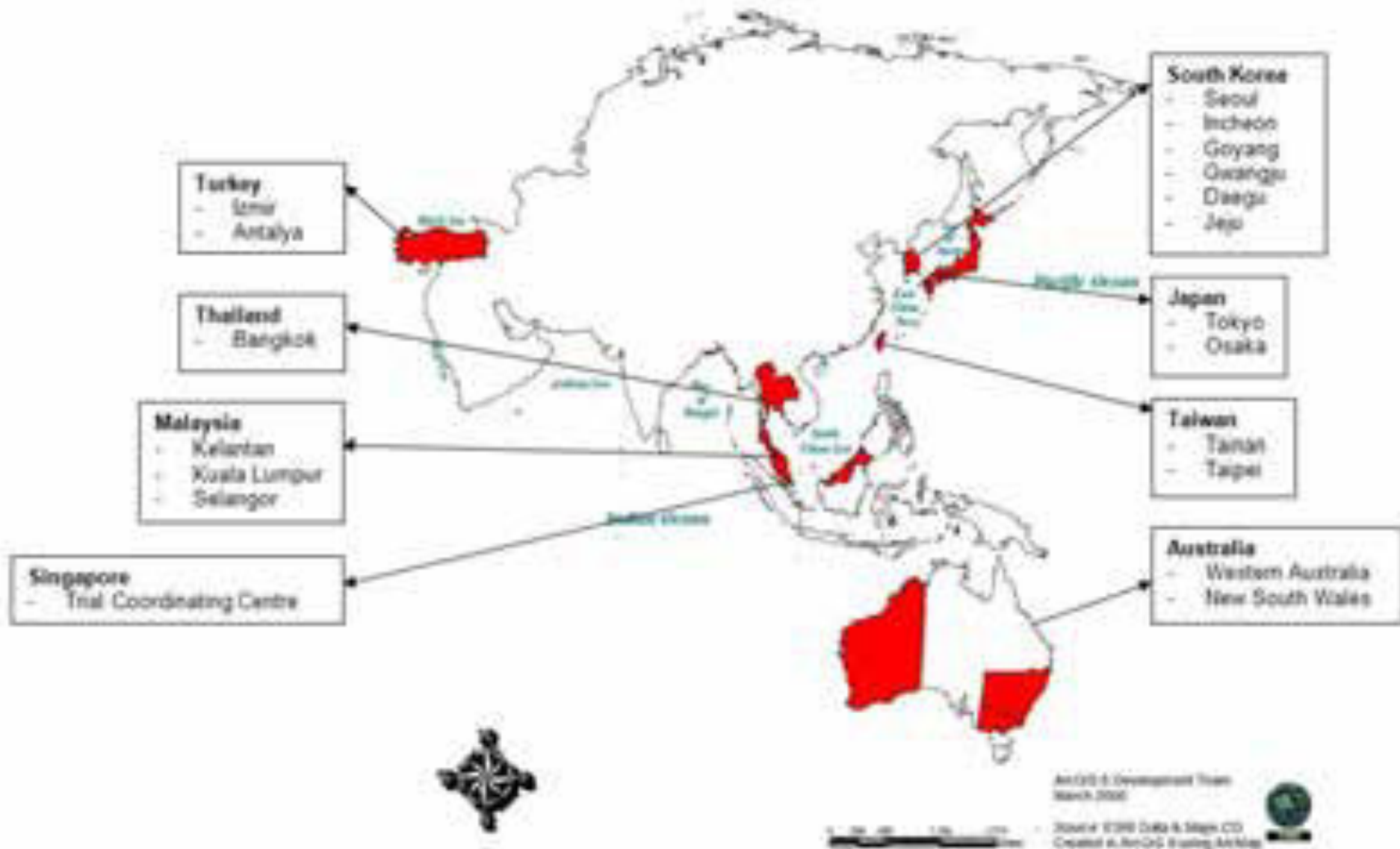
CARES CANDIDATE STATES



CARES International Candidates



PAROS Participating Countries



CARES

- Allows communities to determine OHCA outcomes & identify high risk groups and neighborhoods
- Enables clinical benchmarking to identify opportunities for improvement and track the diffusion of new therapies
- Promotes accountability to improve the quality and impact of prehospital care

CARES software is web based

Allows for the consolidation of three separate silos of data

Sansio

- Mainframe housed in Duluth, MN USA

Internet database system

- <https://mycares.net>
- HIPAA compliant security

Reporting features

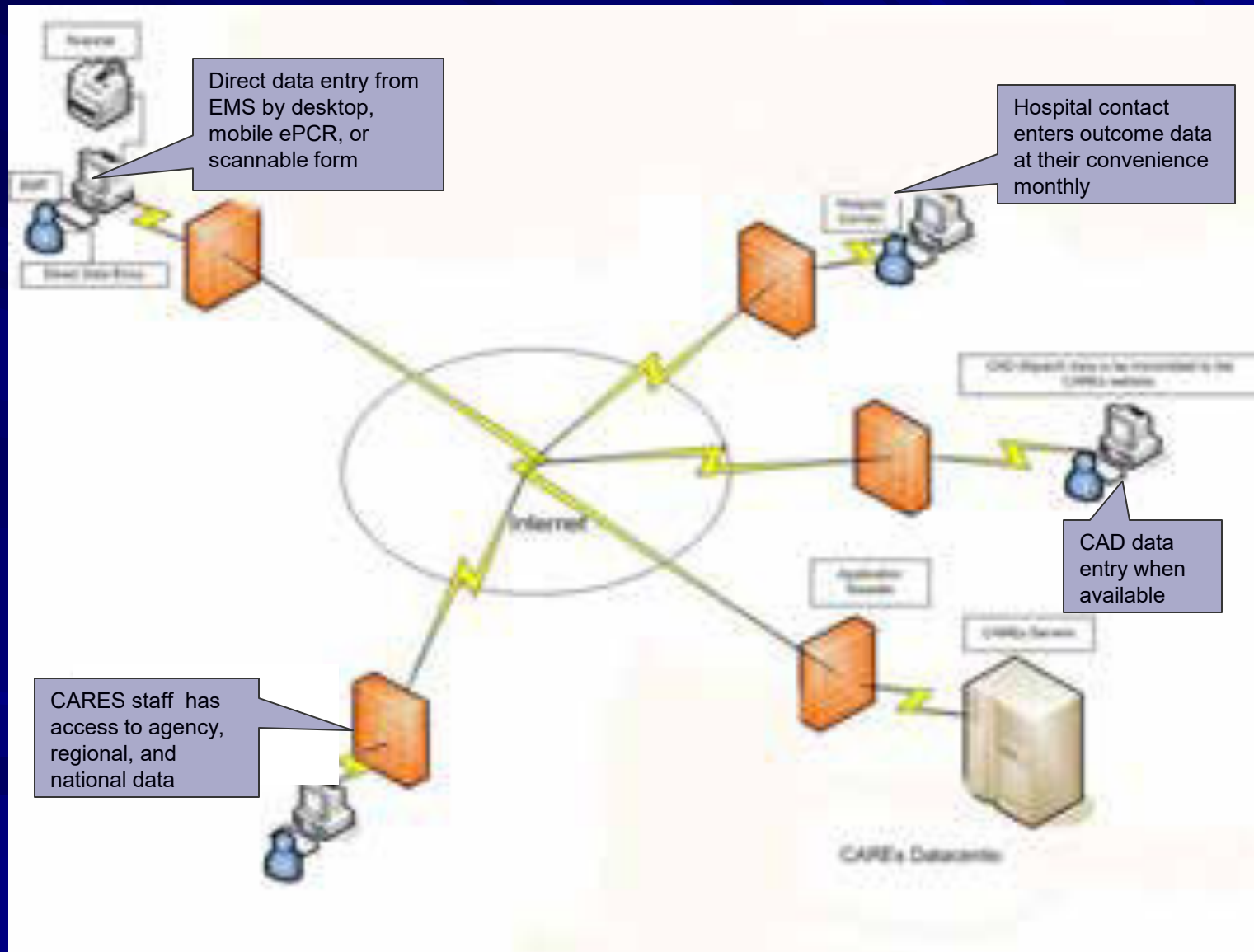
- Utstein Survival Reports
- EMS/FR response time reports
- Demographic reports
- Excel Export

Unifies EMS, 911 dispatch, and hospital data

- Any EMS system throughout US



CARES Surveillance Network



CARES has three methods for EMS data collection

Direct entry online, mobile field entry, and optically scanned forms

Direct entry online

- Data can be entered directly into the registry wherever there is internet connection by CARES EMS contact or EMS field providers/supervisors



Mobile field entry

- Data can be automatically extracted from the electronic Patient Care Report which then auto-populates the CARES registry.



Optically scanned forms

- The CARES dataset can be completed in paper format and then optically scanned to populate the registry.



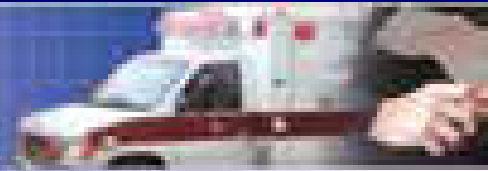
The State of Hawaii EMS Electronic Patient Care Record (e-PCR) System

CPR

Cardiac Arrest	Arrest Time Prior to EMS Arrival
Yes, After EMS Arrival	
Cardiac Arrest Etiology	CPR Attempted
Presumed Cardiac	Attempted Defibrillation
Arrest Witnessed By	Any Return of Spont. Circulation
Witnessed by Healthcare Provider	Yes, Prior to EOC Arrival and at the EOC
First Monitored Rhythm	Rhythm on Arrival at Destination
Normal Sinus Rhythm	
Date/Time CPR Discontinued	Reason CPR Discontinued
12/15/2009	

CARES Triage **OK** **Cancel**

Hospital component



Home | Setup | eCares | Reports | Tools | Log Out

Hospital Section: Please complete the following questions:

Emergency Room Outcome:

- Resuscitation terminated in ED
- Admitted to ICU/CCU
- Admitted to floor
- Transferred to another acute care facility from the ED

Hospital Outcome:

- Died in the hospital
- Discharged alive
- Transferred to another acute care hospital
- Patient has not been disposed
- Unknown

Discharge from the hospital:

- Home/Residence
- Rehabilitation facility
- Skilled nursing facility
- Unknown

Neurological Outcome/Discharge from hospital:

- Good Cerebral Performance
- Moderate Cerebral Disability
- Severe Cerebral Disability
- Coma, vegetative state
- Unknown

Hypothermia Information:

Did hypothermia (core temp < 36°C) occur in the hospital?

- Yes
- No

Hospital Comments:

Save

Ultimate Goals of CARES

Create a model national cardiac arrest registry capable of identifying and tracking all cases in a defined geographic area

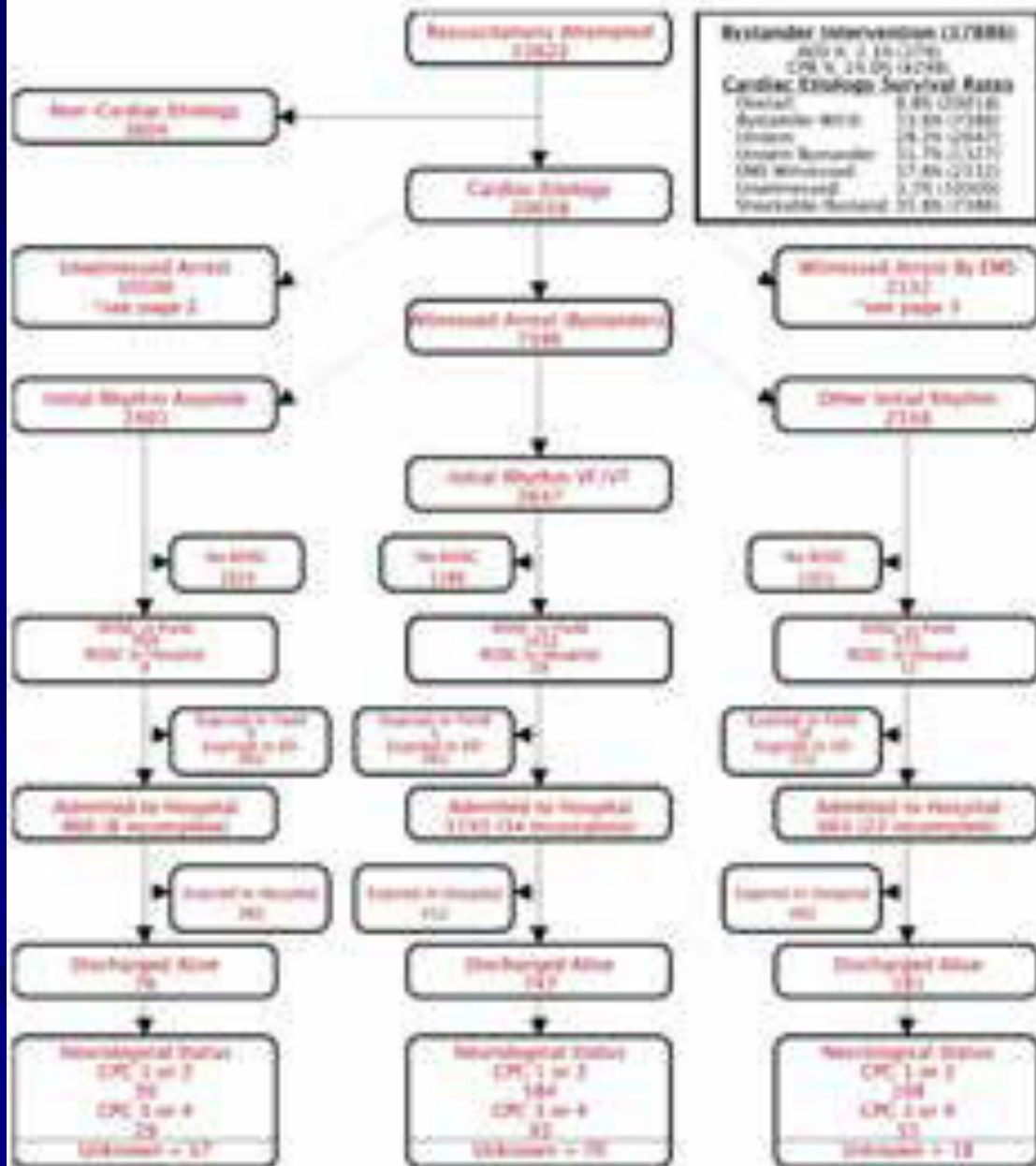
Helps EMS and the larger community identify:

- Who is affected
- When and where cardiac arrests occur
- Which elements of the system are functioning well and those that are not
- How changes can be made to improve cardiac arrest outcomes

The goal is to help communities improve cardiac arrest survival

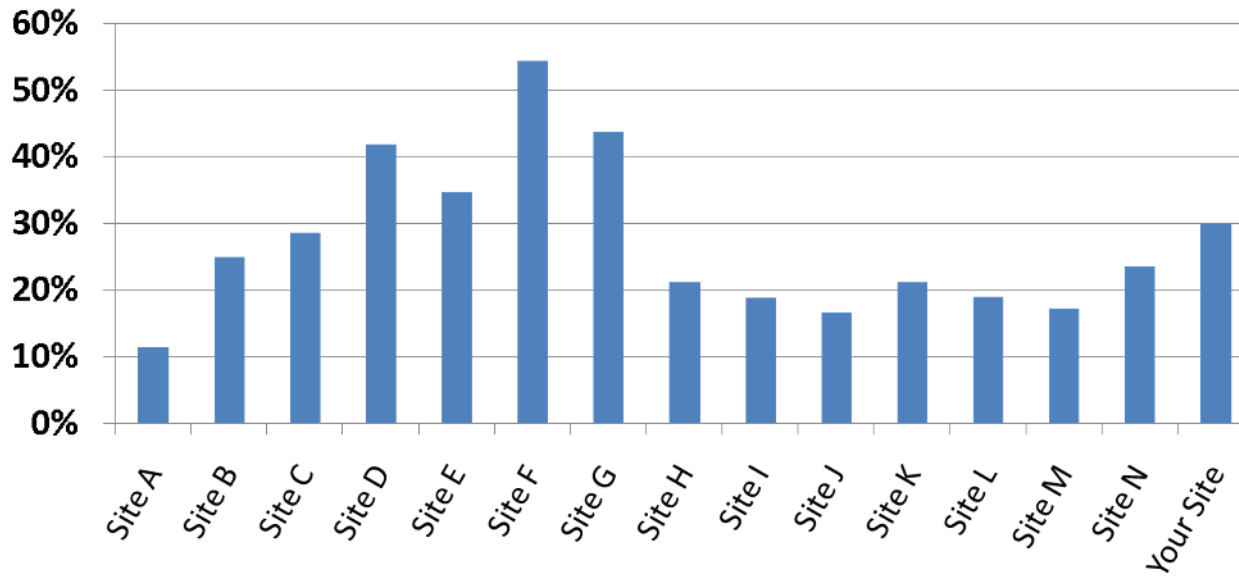
Utstein Survival Report

Registry Dates: Network Case Report From 10/1/2002 Through 10/31/2006



National Utstein Data

Utstein Survival: October 2008 - March 2009



Number of Utstein Survivors by Site:

Site A - 10
Site B - 2
Site C - 8
Site D - 13

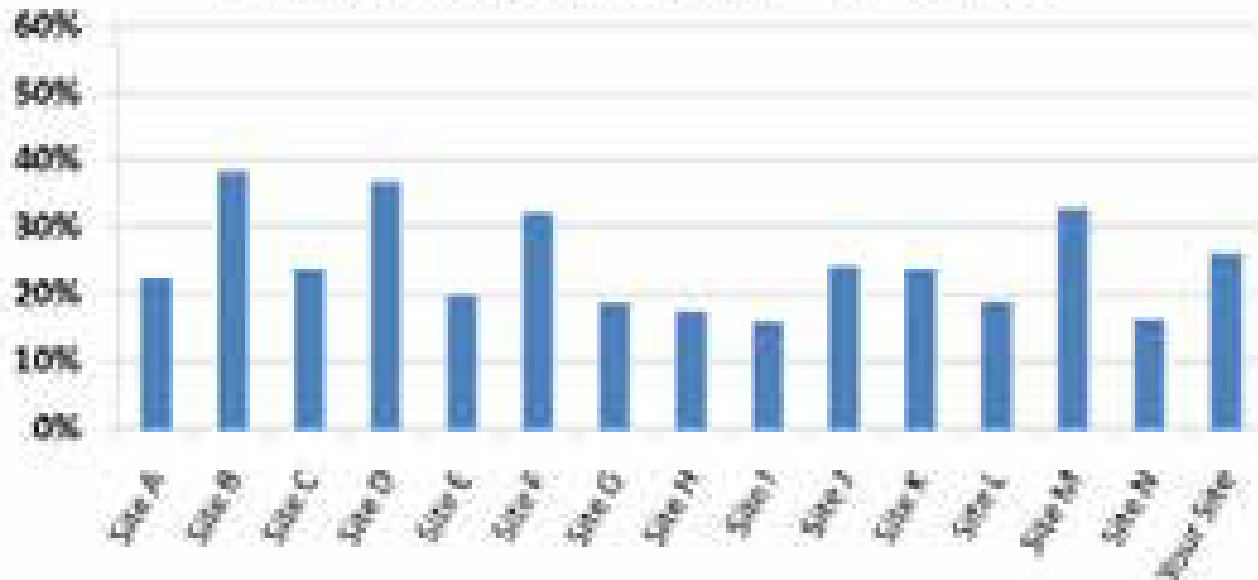
Site E - 8
Site F - 6
Site G - 7
Site H - 4

Site I - 3
Site J - 5
Site K - 4
Site L - 4

Site M - 16
Site N - 4
Your Site - 3

National Bystander CPR Data

Bystander CPR: October 2008 - March 2009



Number of Events of Cardiac Arrest by Site

Site A - 700
 Site B - 38
 Site C - 185
 Site D - 354

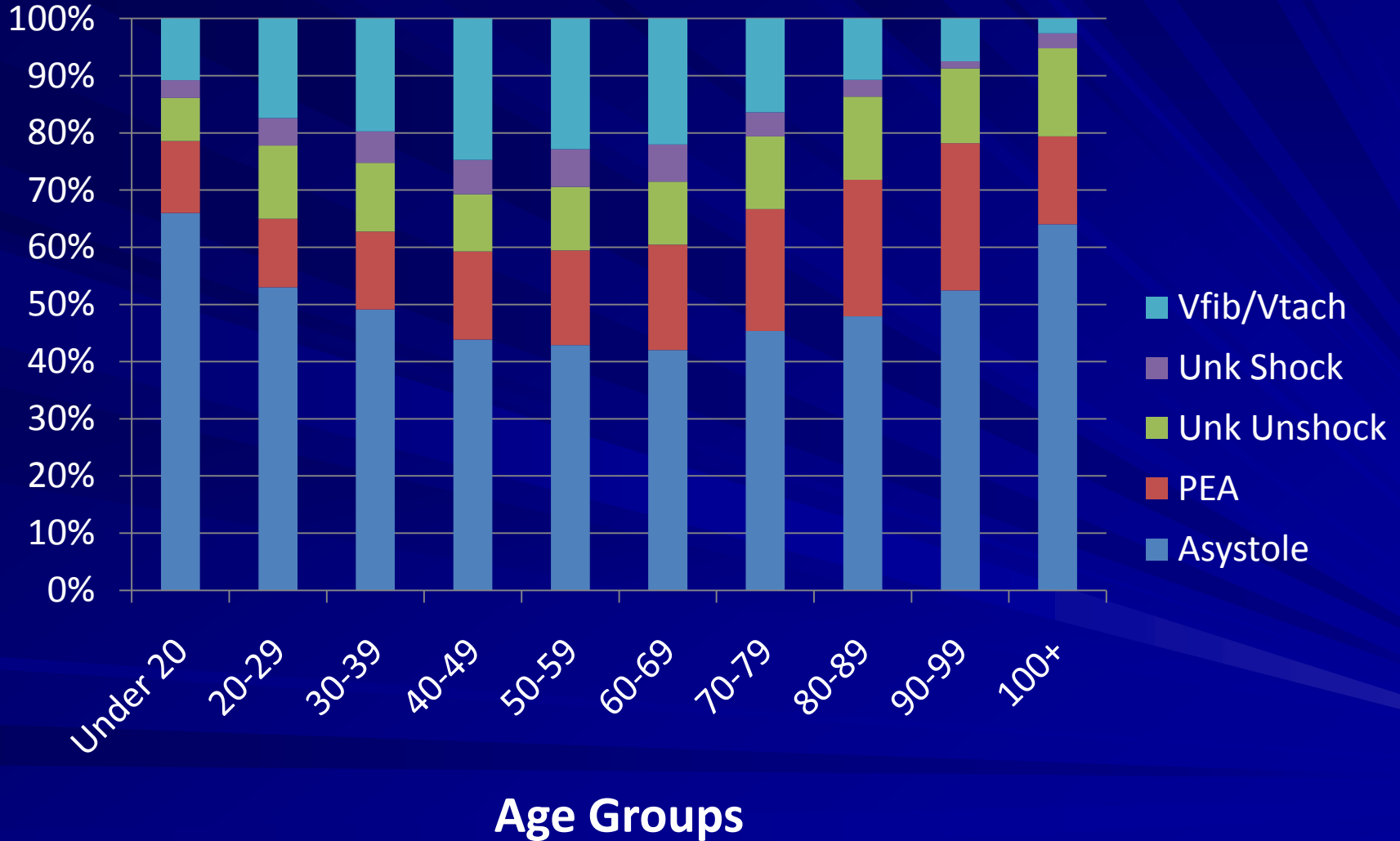
Site E - 156
 Site F - 20
 Site G - 178
 Site H - 143

Site I - 87
 Site J - 221
 Site K - 188
 Site L - 178

Site M - 858
 Site N - 77
 Four Sites - 87

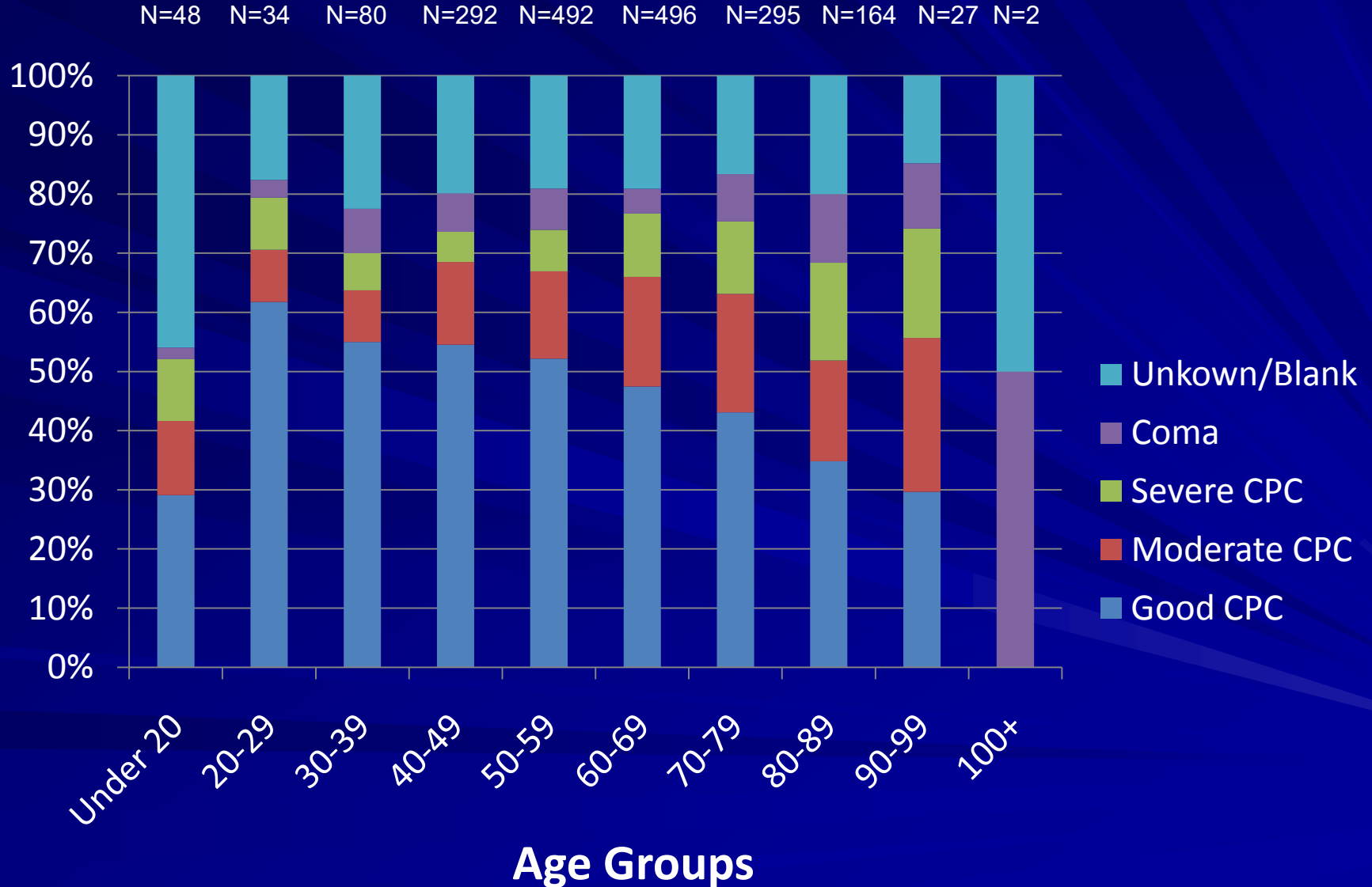
Initial Rhythm by Age Group

CARES Data 10.1.05-12.31.09



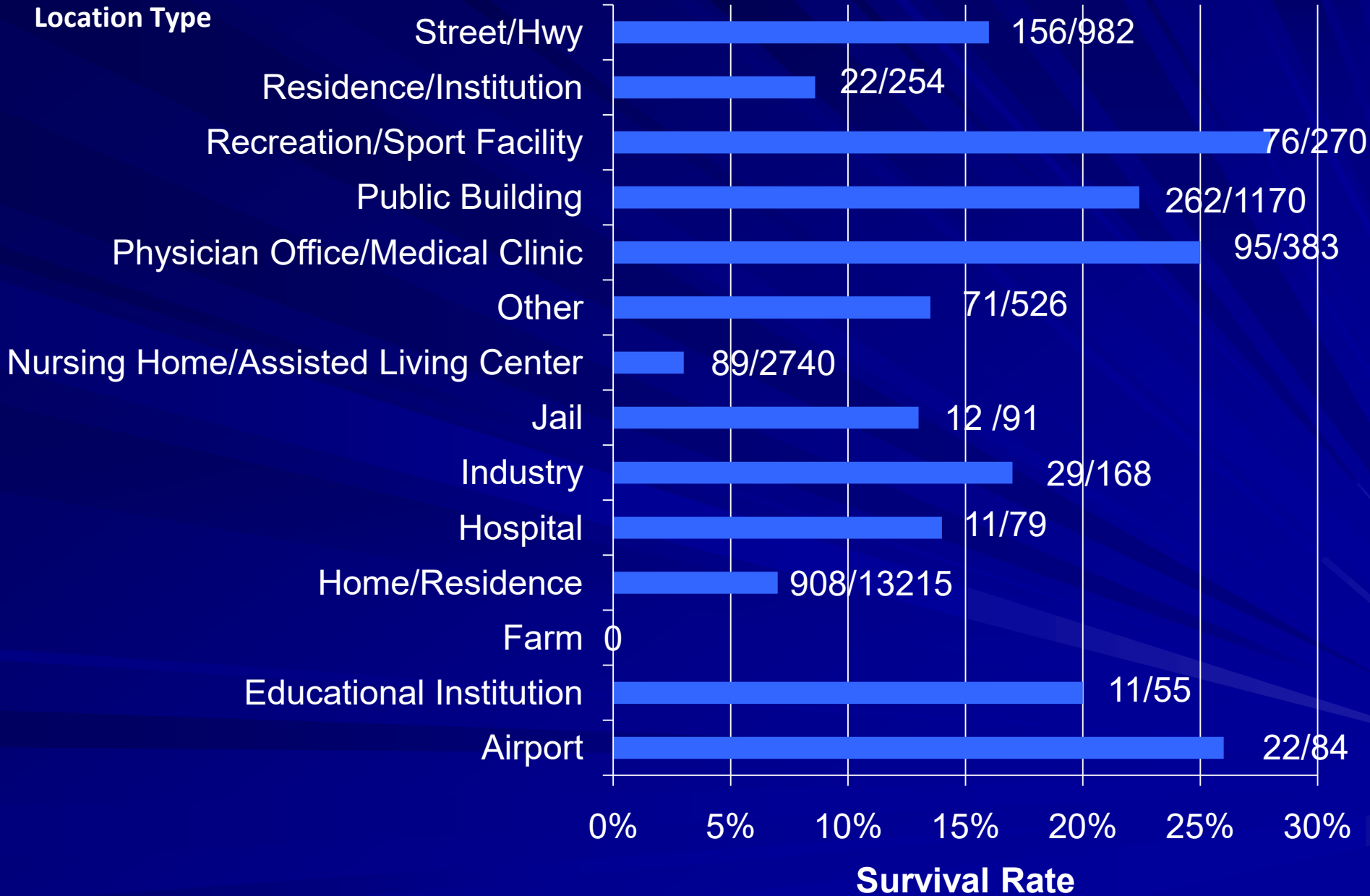
Survivorship by Age Group and Neurological Status

CARES Data 10.1.05-12.31.09

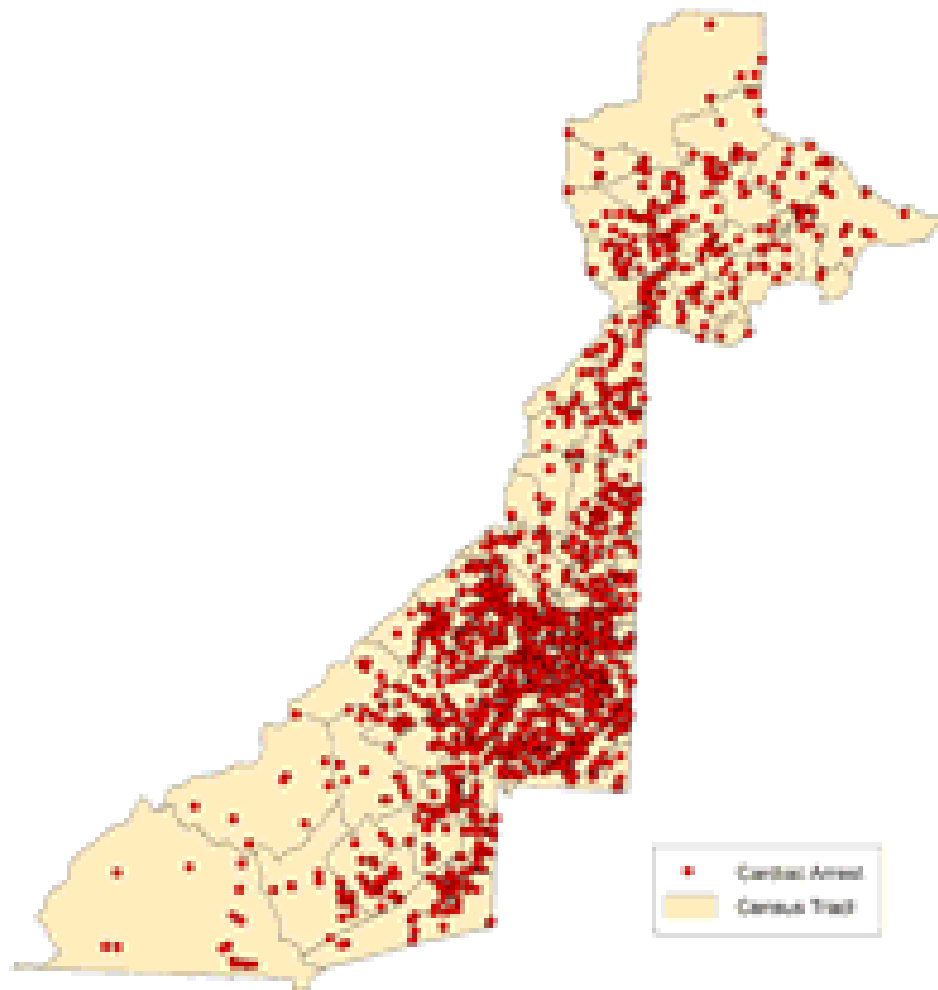


Survival Rate by Location Type

CARES Data 10.1.05-12.31.09



Out-of-Hospital Cardiac Arrests
CARES data - Fulton County, Georgia, 2005-2008

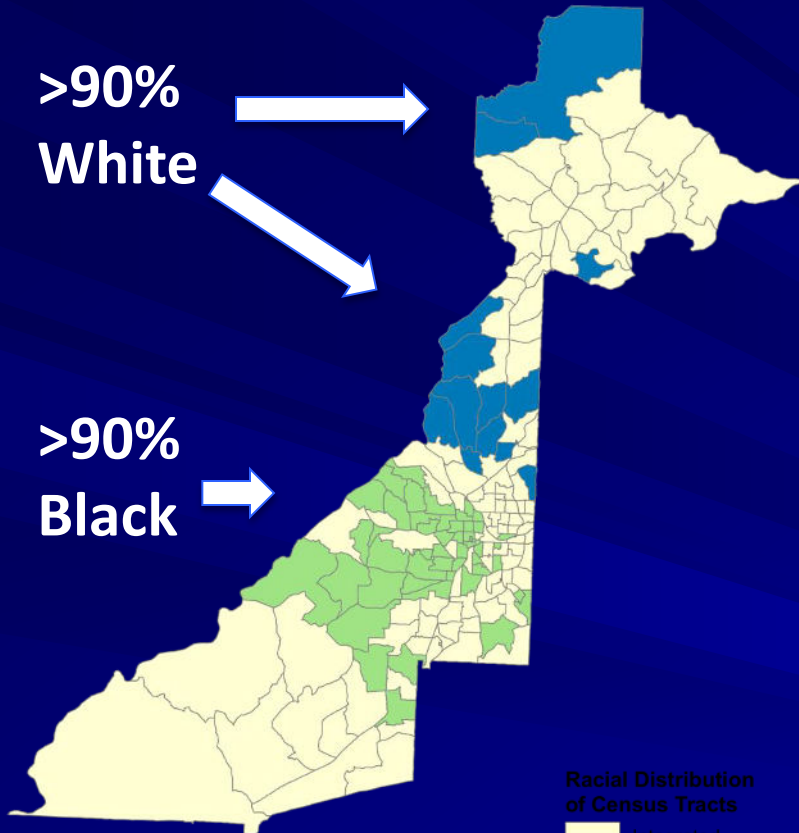


0 2.5 5 10 miles
Scale bar

Racial Distribution Cares Data - Fulton County, GA

>90%
White

>90%
Black



Racial Distribution of Census Tracts

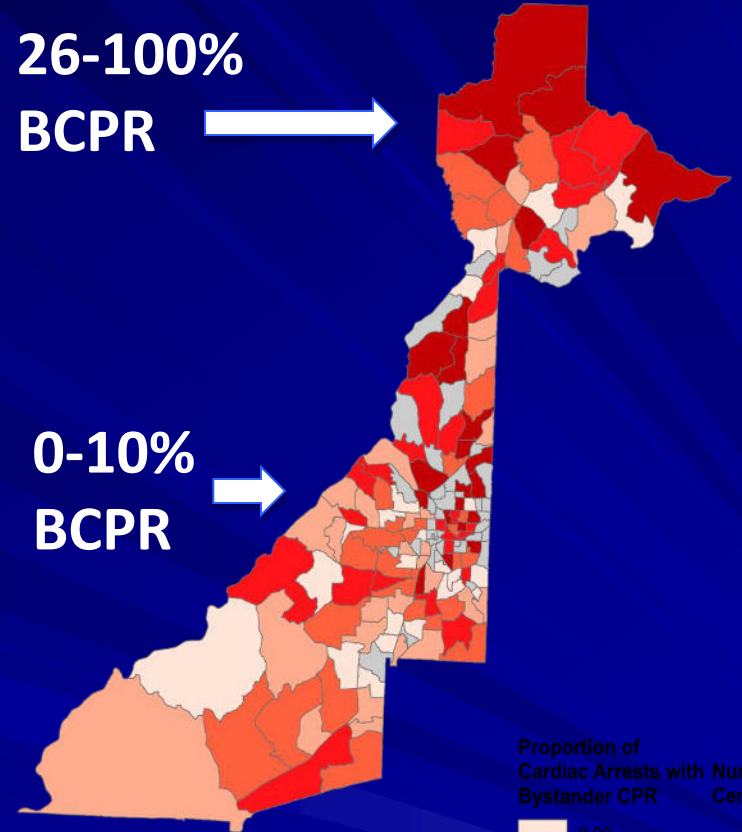
- Integrated
- >= 90% Black
- >= 90% White

0 3 6 12 Miles

Cardiac Arrests with Bystander CPR Cares Data - Fulton County, GA

26-100%
BCPR

0-10%
BCPR

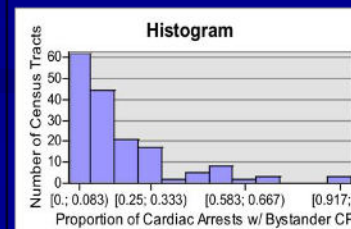


Proportion of Cardiac Arrests with Bystander CPR

- | Proportion of Cardiac Arrests with Bystander CPR | Number of Census Tracts |
|--|-------------------------|
| 0.00 | 22 |
| 0.01 - 0.10 | 29 |
| 0.11 - 0.14 | 29 |
| 0.15 - 0.25 | 26 |
| 0.26 - 1.00 | 22 |
| Insufficient data* | 39 |

* Minimum 5 cardiac arrests per census tract

0 3 6 12 Miles



OHCA Bystander CPR Status by Median Household Income

	Private Unwitnessed	Private Witnessed	Public Unwitnessed	Public Witnessed
Median Income <\$21,600	0.15	0.23	0.28	0.41
Median Income \$21,601-\$30,500	0.14	0.20	0.25	0.35
Median Income \$30,501-\$42,000	0.15	0.22	0.30	0.44
Median Income \$42,001-\$62,000	0.19	0.29	0.38	0.48
Median Income >\$62,000	0.28	0.38	0.41	0.55

CARES Summary

- **Provides a model for a national OHCA surveillance registry**
- **CARES software integrates EMS, 911, and hospital data**
- **Survival reports provide „realtime“ feedback**
- **Allows communities to internally & externally benchmark**
- **Ultimate goal is to improve cardiac arrest survival**

CARES Summary

- **We have learned a great deal about OHCA, but have failed to translate this into better treatments and outcomes.**
- **Widespread disparities still persist**
- **We need to refocus on the “Chain of Survival”**
- **Use data to improve performance!**
- **CARES/PAROS international collaboration**



CARES WEBSITE

<https://mycares.net>

bmcnall@emory.edu