Cardiac Arrest Registry to Enhance Survival
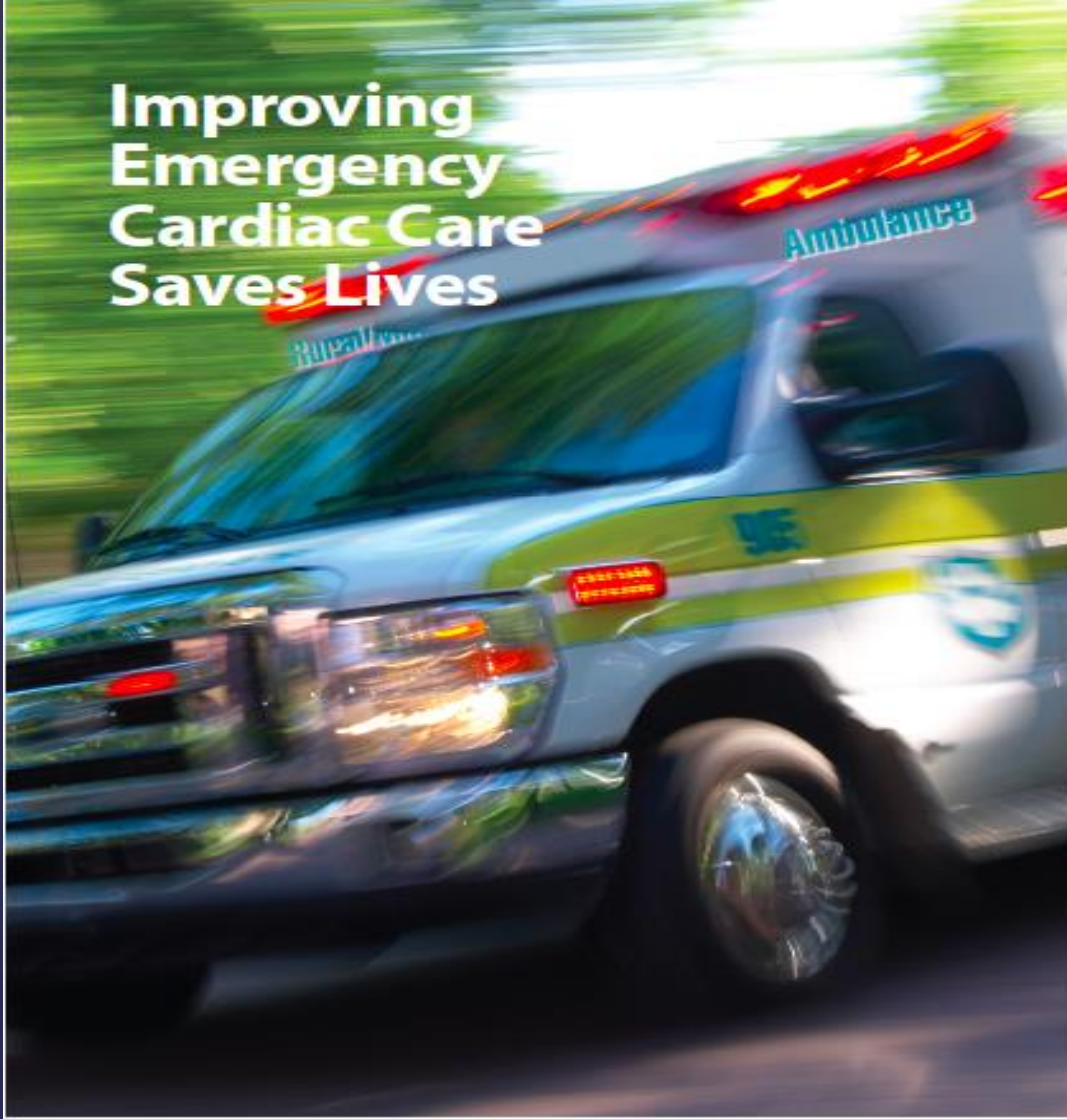
Richard Alcorta, MD
Melanie Gertner, BS
MIEMSS

Establishment & Purpose of CARES

Centers for Disease Control
and Prevention (CDC)
Atlanta, GA 30341

August 5, 2014

Bryan McNally, MD, MPH
Assistant Professor of Emergency Medicine
Section of Pre-hospital and Disaster Medicine
Department of Emergency Medicine
Emory University School of Medicine
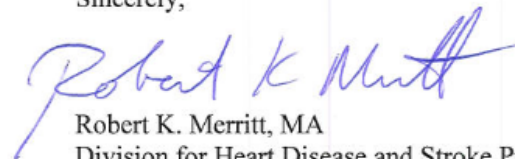531 Asbury Circle – Annex, Suite N340
Atlanta, GA 30322

Dear Dr. McNally:

The Department of Emergency Medicine at the Emory University School of Medicine is collaborating with the Centers for Disease Control and Prevention (CDC) to conduct the Cardiac Arrest Registry to Enhance Survival (CARES) Program (see attached Memorandum of Understanding (MOU) executed on June 30, 2014). The purpose of CARES is to help local communities identify and track cases of out-of-hospital cardiac arrest and identify opportunities for improvement in the treatment and ultimate survival of such events.

The Centers for Disease Control and Prevention (CDC) supports public health activities pursuant to the Standards for Privacy of Individually Identifiable Health Information promulgated under the Health Insurance Portability and Accountability Act (HIPAA) [45 CFR Parts 160 and 164]. Under this rule, covered entities may disclose, without individual authorization, protected health information to public health authorities authorized by law to collect or receive such information for the purpose of preventing or controlling disease, injury, or disability, including, but not limited to, the reporting of disease, injury, vital events such as birth or death, and the conduct of public health surveillance, public health investigations, and public health interventions. The definition of a public health authority includes entities acting under a grant of authority from and an agreement/contract with such public agency.

Therefore, the CDC considers CARES to be a quality improvement intervention and public health surveillance activity, for which disclosure of protected health de-identifiable health information by covered entities is subject to 45 CFR § 164.512(b) of the Privacy Rule.

Sincerely,

Robert K. Merritt, MA
Division for Heart Disease and Stroke Prevention

Attachments (1)

Therefore, the CDC considers CARES to be a quality improvement intervention and public health surveillance activity, for which disclosure of protected health de-identifiable health information by covered entities is subject to 45 CFR § 164.512(b) of the Privacy Rule.

CARES Mission Statement

To help communities determine standardized outcome measures for out-of-hospital cardiac arrest allowing for quality improvement efforts and benchmarking capability to improve care and increase survival.

CARES Vision Statement

To become the standard out-of-hospital cardiac arrest registry for the United States allowing for uniform data collection and quality improvement in each state and nationally.

Quality Improvement Elements of a Resuscitation System

Measurement

Benchmarking

Feedback/ Change
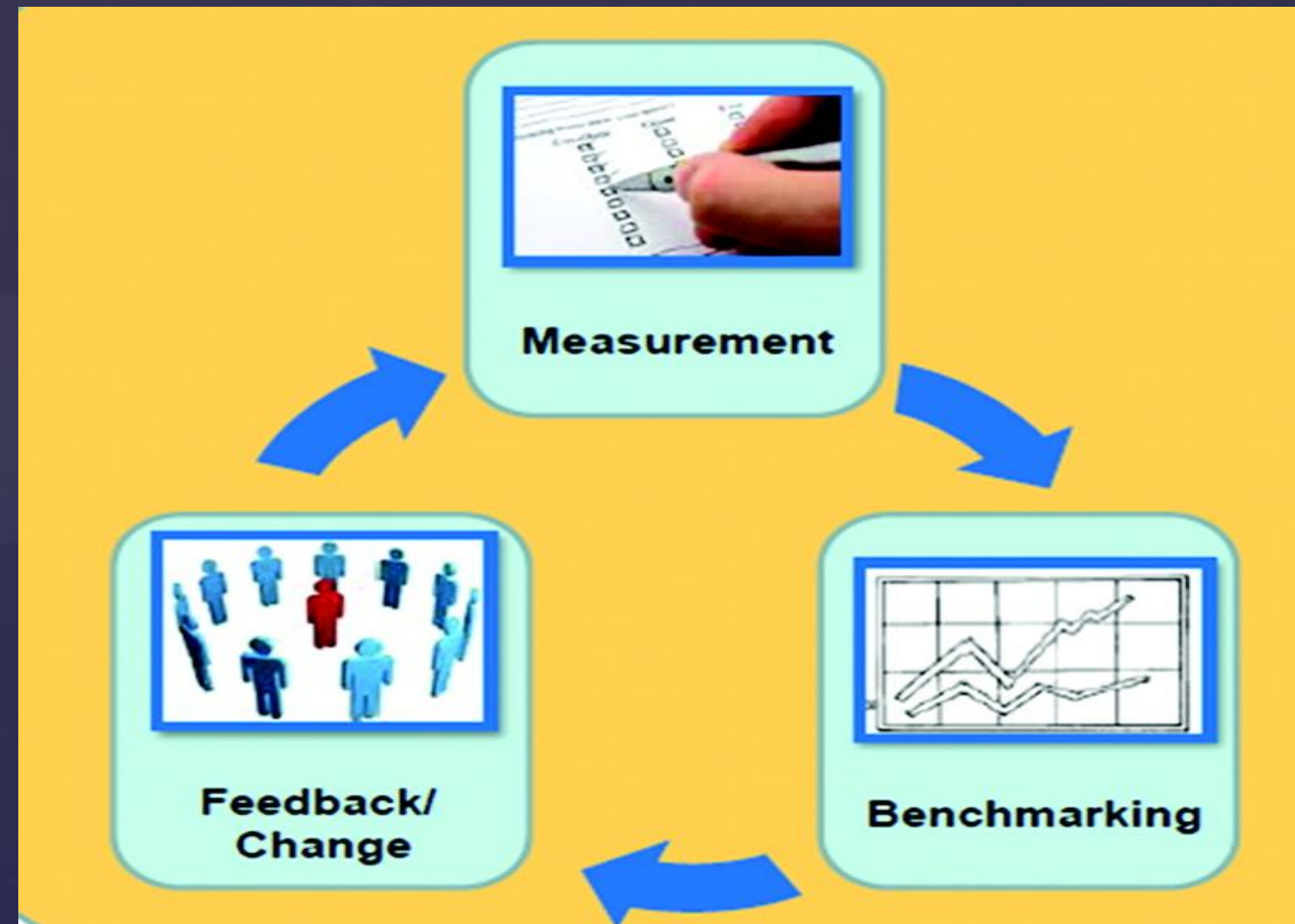
Developing a culture of high quality resuscitation.

Travers AH, et al. (2010) Circulation;122:S676-S684

CARES Software is web-based

Allows for the consolidation of three separate silos of data

Internet database system

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

Reporting features

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

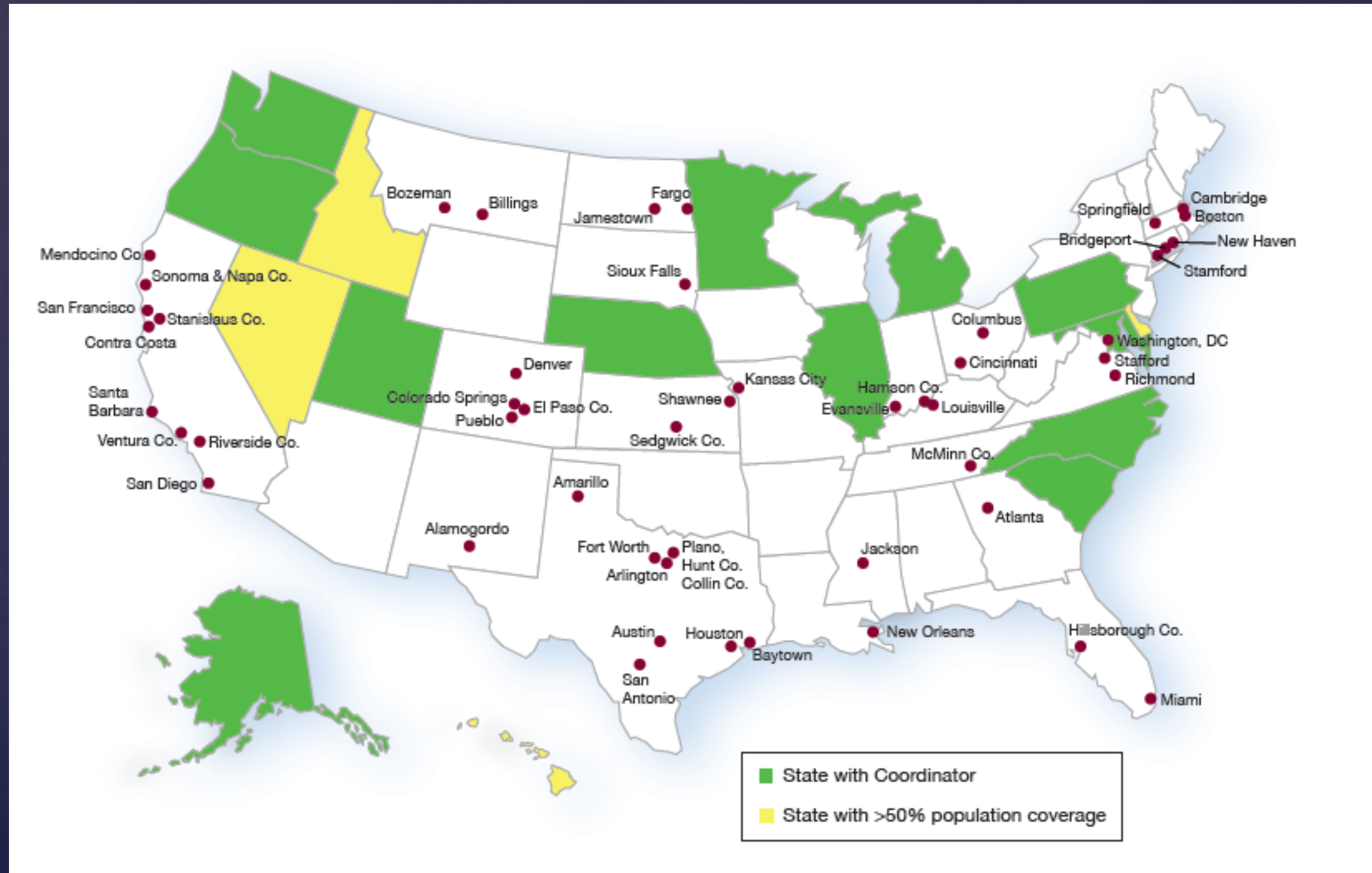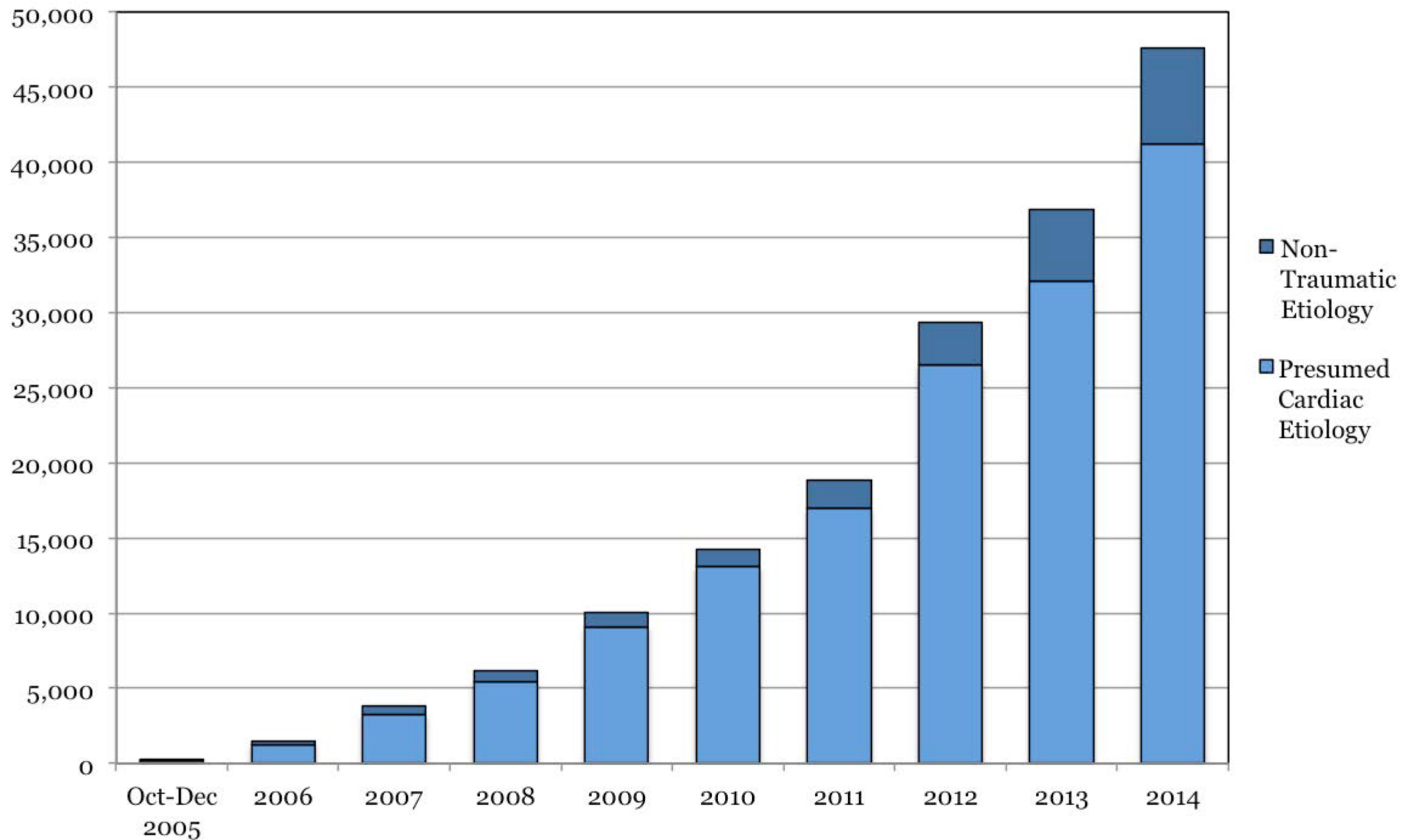## Unifies EMS, 911 dispatch and hospital data

- Any EMS system throughout US

CARES Participant Map 2015

CARES Annual Call Volume

CARES Data Helps to Identify:

- Who is affected by out-of-hospital cardiac arrest
- When and where the events occur
- What parts of the system are working well
- What parts of the cardiac care system could work better
- How emergency cardiac treatment can be improved

Benefits of Participation in CARES

- Join a network of communities working to increase survival from SCA

- Compare your community to local, state, and national performance for benchmarking

- Use simple, HIPAA-compliant software to link EMS and hospital data into one record

- Access multiple, real-time reporting features

- Receive training and ongoing support from CARES state coordinator

CARES Pilot Program

- Ongoing Pilot with Howard County EMS and Howard County General Hospital - Johns Hopkins Medicine.

- Howard County EMS currently has a separate "cardiac arrest" tab on their run form.

- Howard County General Hospital – JHM then completes a portion of the CARES record.

- Goal of pilot – successful data capture and submission to CARES.

EMS Information

EMS Data Collection

Direct entry online

- Data can be entered directly into the registry wherever there is an 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.

Changes to the Cardiac Arrest Tab in eMEDS®

- The layout of the Cardiac Arrest Tab has been updated to allow for ease of entry.

- Creation of a few new questions to gather essential information.

- All jurisdictions will see the revised "Cardiac Arrest" tab on the run form.

Key Concept

- All information must be entered into 1 eMEDS® record to be passed to CARES.
  - *The personnel of the transport unit may need to gather information from other units that were on scene prior to their arrival.*

New eMEDS® Layout

General Information

** Be Sure all Patient Information is Documented in ONE (1) Record **

** Only 1 Unit to Document "Dead at Scene". All others document "Operational Support" **

First Responding Agency

Other than the transporting ambulance, was there any other agency or unit on location (CARES-16.1)

[▼] ⊕

If yes to the above question, what was the first agency or unit on scene OTHER THAN the transporting ambulance (CARES-16.2)

[▼] ⊕

Other, please explain [Other Unit or Agency CARES-16.2]

[   ]

Part C : Arrest Information

Arrest Witnessed? (CARES-19)

[▼] ⊕

Cardiac Arrest? (CARES-20)

[Yes, Prior to EMS Arrival   ▼] ⊕

Presumed Cardiac Arrest Etiology (CARES-21)

[▼] ⊕

*Arrest Prior to EMS Arrival

[▼] ⊕

Other, (please explain) [Cardiac Arrest Etiology - CARES]

[   ]

Resuscitation Information

Resuscitation Attempted By 911 Responder (or AED Shock given prior to EMS Arrival) (CARES-22)

[▼] ⊕

*Resuscitation Attempted

[No items selected] ⊕

Who Initiated CPR? (CARES-23)

[▼] ⊕

Was an AED applied prior to EMS Arrival? (CARES-26)

[▼] ⊕

Who First Applied AED? (CARES-27)

[▼] ⊕

Who First Defibrillated Patient? (CARES-28)

[▼] ⊕

CARES EMS Data Elements

Part A : Demographic Information

1 - Street Address (Where Arrest Occurred)

2 - City   **3 - State**   **4a - Zip Code**   **4b - County**

MD

5 - First Name   **6 - Last Name**

7 - Age   **9 - Date of Birth**   **10 - Gender**   **11 - Race/Ethnicity**

○ Days ○ Months ○ Years

DOB Unknown ☐

- ○ American-Indian/Alaska
- ○ Asian
- ○ Black/African-American
- ○ Hispanic/Latino
- ○ Native Hawaiian/Pacific Islander
- ○ Unknown
- ○ White

12 - Medical history

☐ No   ☐ Unknown   ☐ Cancer   ☐ Diabetes   ☐ Heart Disease   ☐ Hyperlipidemia

☐ Hypertension   ☐ Renal Disease   ☐ Respiratory Disease   ☐ Stroke   ☐ Other

Part B : Run Information

13 - EMS Agency ID

000000000911911

14 - Date of Arrest

15 - Incident #

First Responding Agency

16 - Fire/First Responder

sort

17 - Destination Hospital

sort

CARES EMS Data Elements

Part C :Arrest Information

18 - Location Type

○ Home/Residence ○ Healthcare Facility ○ Other: Specify
○ Public/Commercial Building ○ Place of Recreation [_____]
○ Street/Hwy ○ Industrial Place
○ Nursing Home ○ Transport Center

19 - Arrest Witnessed

○ Witnessed Arrest
○ Unwitnessed Arrest

20 - Arrest After Arrival of 911 Responder

○ Yes
○ No

21 - Presumed Cardiac Arrest Etiology

○ Presumed Cardiac Etiology
○ Trauma
○ Respiratory
○ Drowning
○ Electrocution
○ Other
[_____]

Resuscitation Information

22 - Resuscitation attempted by 911 Responder (or AED shock given prior to EMS arrival)

○ Yes
○ No

23 - Who Initiated CPR

○ Not Applicable
○ Lay Person
○ Lay Person Family Member
○ Lay Person Medical Provider
○ First Responder (non-transport provider)
○ Responding EMS Personnel

24 - Type of Bystander CPR Provided

○ Compressions and ventilations
○ Compressions only
○ Ventilations only

25 - Were Dispatcher CPR instructions provided:

○ Yes
○ No
○ Unknown

26 - Was an AED applied prior to EMS arrival

○ Yes, with defibrillation
○ Yes, without defibrillation
○ No

27 - Who First Applied the AED

○ Lay Person
○ Lay Person Family Member
○ Lay Person Medical Provider
○ First Responder (non-transport provider)

If yes, was it applied by Police:

○ Yes
○ No

28 - Who First Defibrillated the Patient

○ Not Applicable
○ Lay Person
○ Lay Person Family Member
○ Lay Person Medical Provider
○ First Responder (non-transport provider)

If yes, did the Police defibrillate the patient:

○ Yes
○ No

○ Responding EMS Personnel

29 - Did 911 Responder perform CPR:

○ Yes ○ No

CARES EMS Data Elements

First Cardiac Arrest Rhythm of Patient and ROSC Information

30 - First Arrest Rhythm of Patient

- ○ Ventricular Fibrillation
- ○ Ventricular Tachycardia
- ○ Asystole
- ○ Idioventricular/PEA
- ○ Unknown Shockable Rhythm
- ○ Unknown Unshockable Rhythm

31 - Sustained ROSC (20 consecutive minutes) or present at end of EMS care:

- ○ Yes, but pulseless at end of EMS care (or ED arrival)
- ○ Yes, pulse at end of EMS care (or ED arrival)
- ○ No

32 - Was hypothermia care provided in the field

○ Yes ○ No

33 - End of Event

○ Pronounced in the Field ○ Pronounced in the ED ○ Effort ceased due to DNR ○ Ongoing Resuscitation in ED

34 - When did sustained ROSC first occur:

- ○ Never
- ○ After Bystander CPR only
- ○ After Bystander defib shock
- ○ After 911 Responder CPR only
- ○ After 911 Responder Defib. shock
- ○ After ALS
- ○ Unknown

35 - Estimated time of arrest	36 - Time of 1st defibrillatory shock	37 - Time of 1st CPR
hh :mm :ss	hh :mm :ss	hh :mm :ss

New Questions

Other Than the Transporting Ambulance, Was There Any Other Agency or Unit on Location?

Yes

No

If "Yes" to the Above Question, What Was the First Agency or Unit on Scene OTHER THAN the Transporting Ambulance?

Resuscitation Attempted by 911 Responder

Yes

No, but AED shock delivered prior to EMS Arrival

No

Was an AED applied prior to EMS Arrival?

Yes, With Defibrillation

Yes, Applied without Defibrillation

No

Who first applied the AED?

Lay Person

Lay Person Family Member

Lay Person Medical Provider

Non-Transporting Fire/EMS Unit

Law Enforcement

EMS (Transporting Unit Personnel)

Not Applicable (NO AED Used)

Who first defibrillated patient?

Lay Person

Lay Person Family Member

Lay Person Medical Provider

Non-Transporting Fire/EMS Unit

Law Enforcement

EMS (Transporting Unit Personnel)

Not Applicable (Device Not Used)

Was hypothermia care provided in the field?

Yes

No

Sustained ROSC

(20 Consecutive Minutes) or Present at End of EMS Care?)

No

Yes, but Pulseless at End of EMS Care (or ED Arrival)

Yes, Pulse at End of EMS Care (Or ED Arrival)

End of Event

Pronounced in the Field

*Pronounced in the ED (EMS present at time of)*

*Effort ceased due to DNR*

Ongoing Care in ED

EMS Jurisdictional Coordinator Access within the CARES Website

- Log in to the CARES website to view dashboard setup for your jurisdiction

- Search records that have already been exported to CARES

- Audit records that are "flagged" for review

- View incomplete forms by hospital

- Run reports to show outcomes and to have the ability to benchmark.
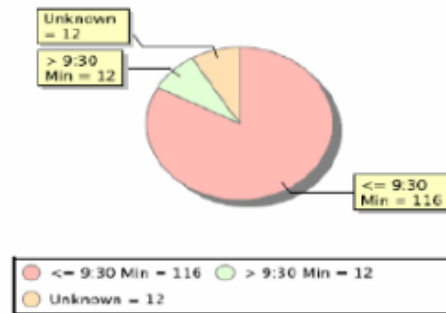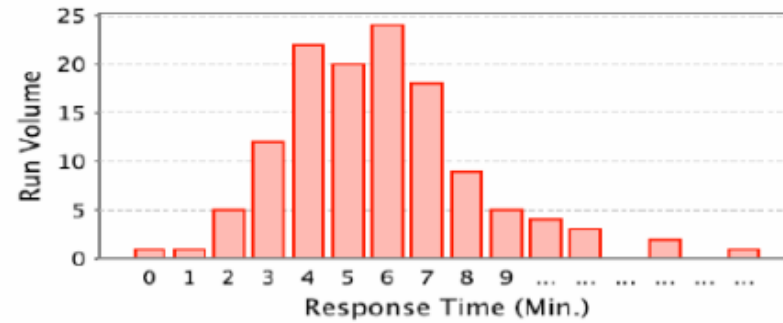
Sample CARES EMS Dashboard
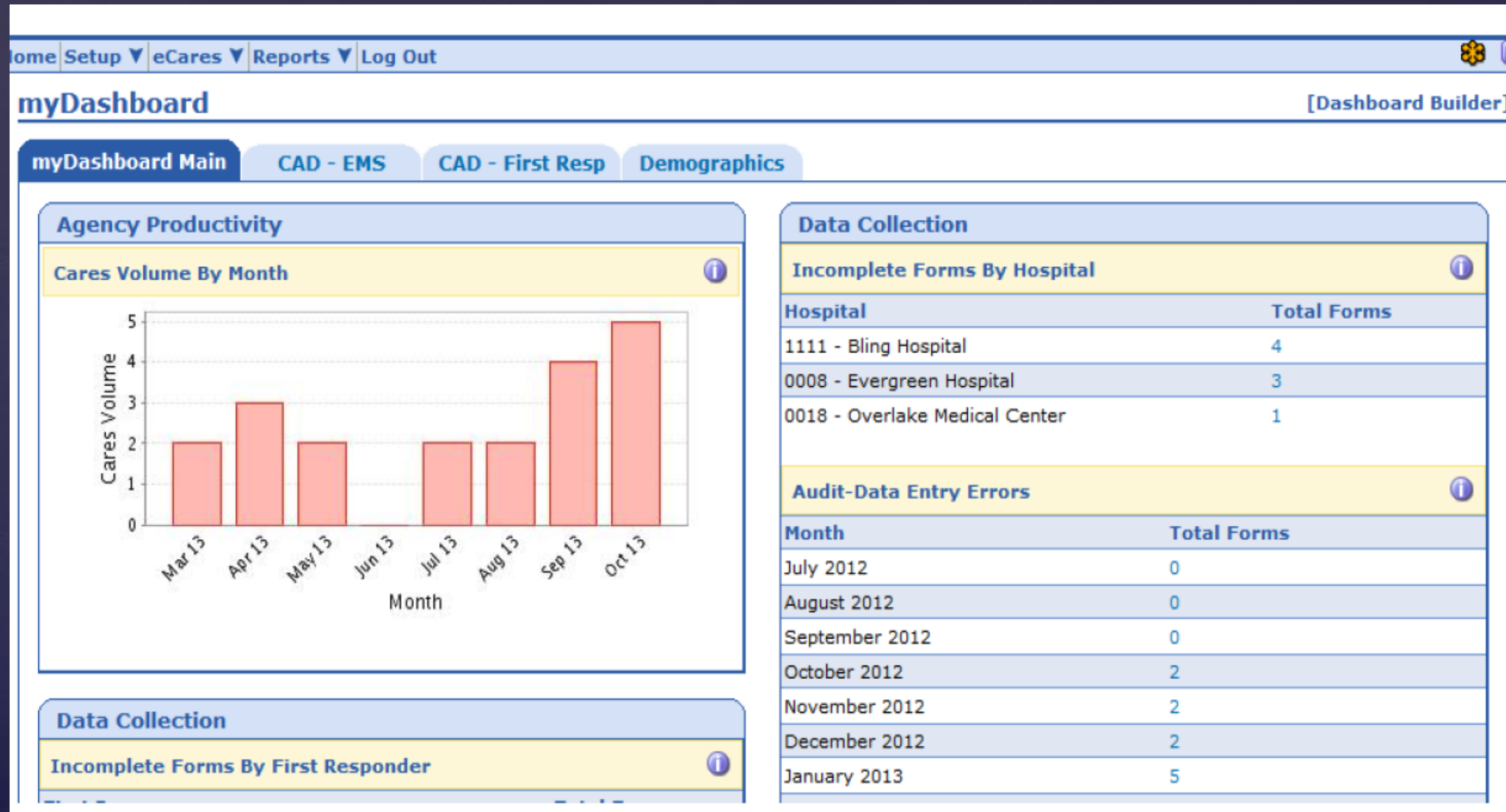
Utstein Survival Report
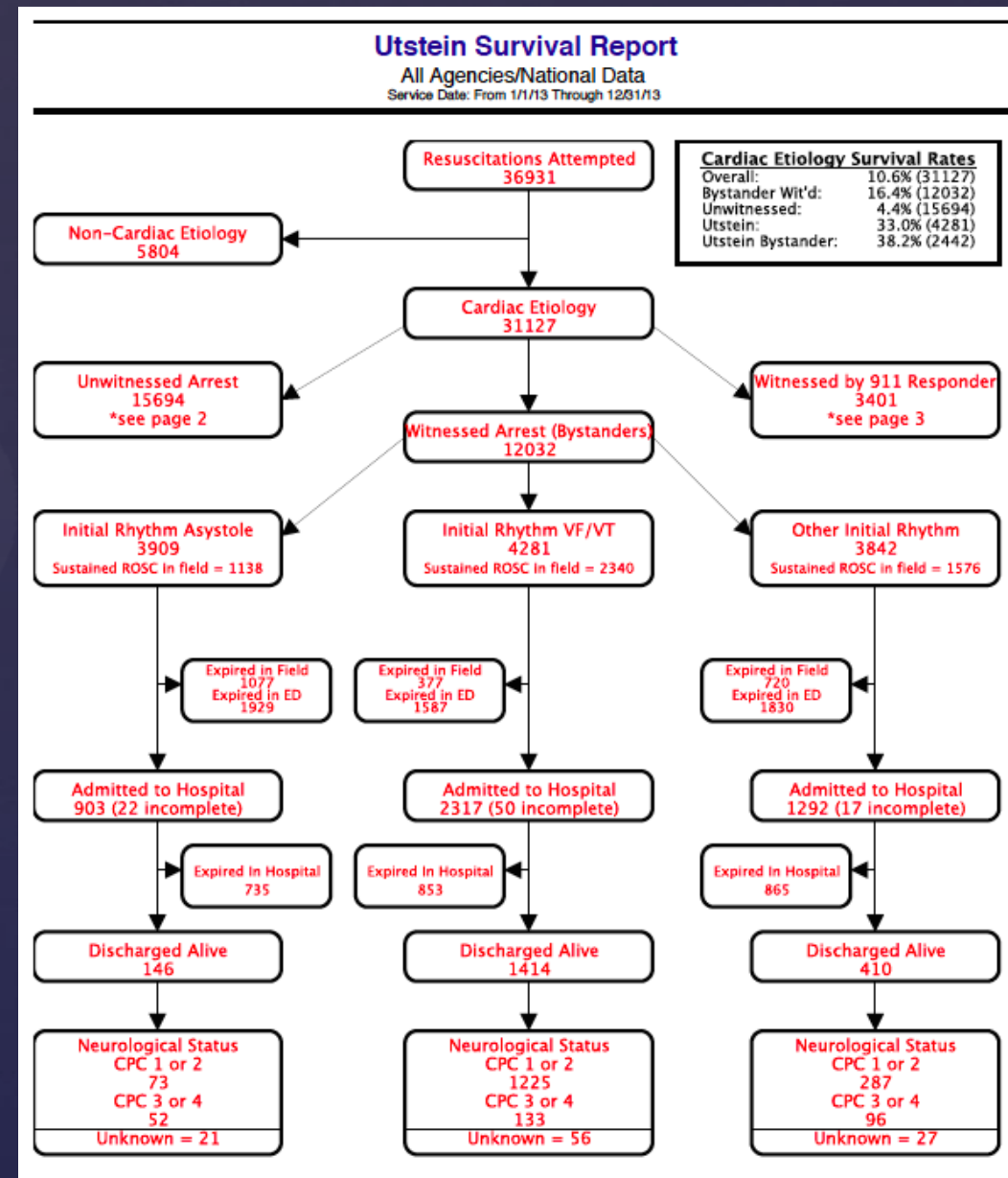
Test Data

Sample EMS CAD Times Report
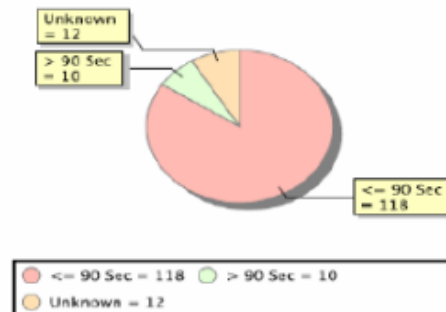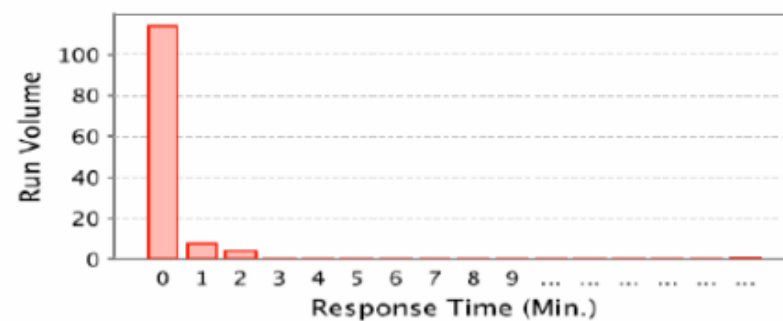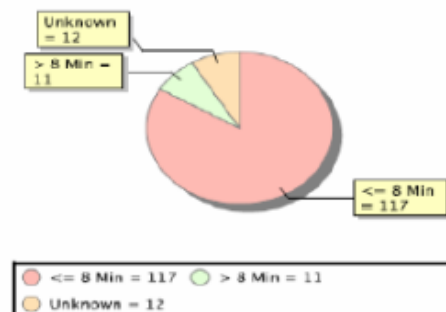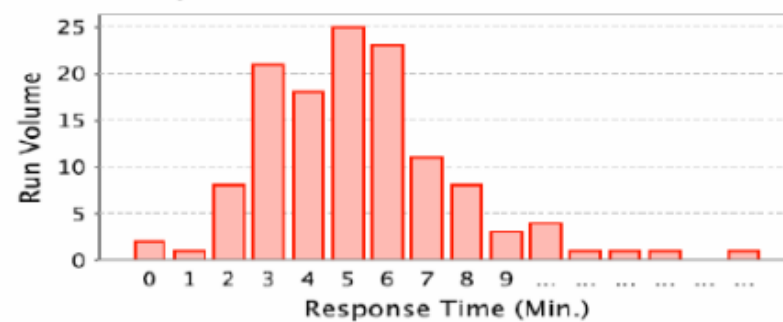
Hospital Information
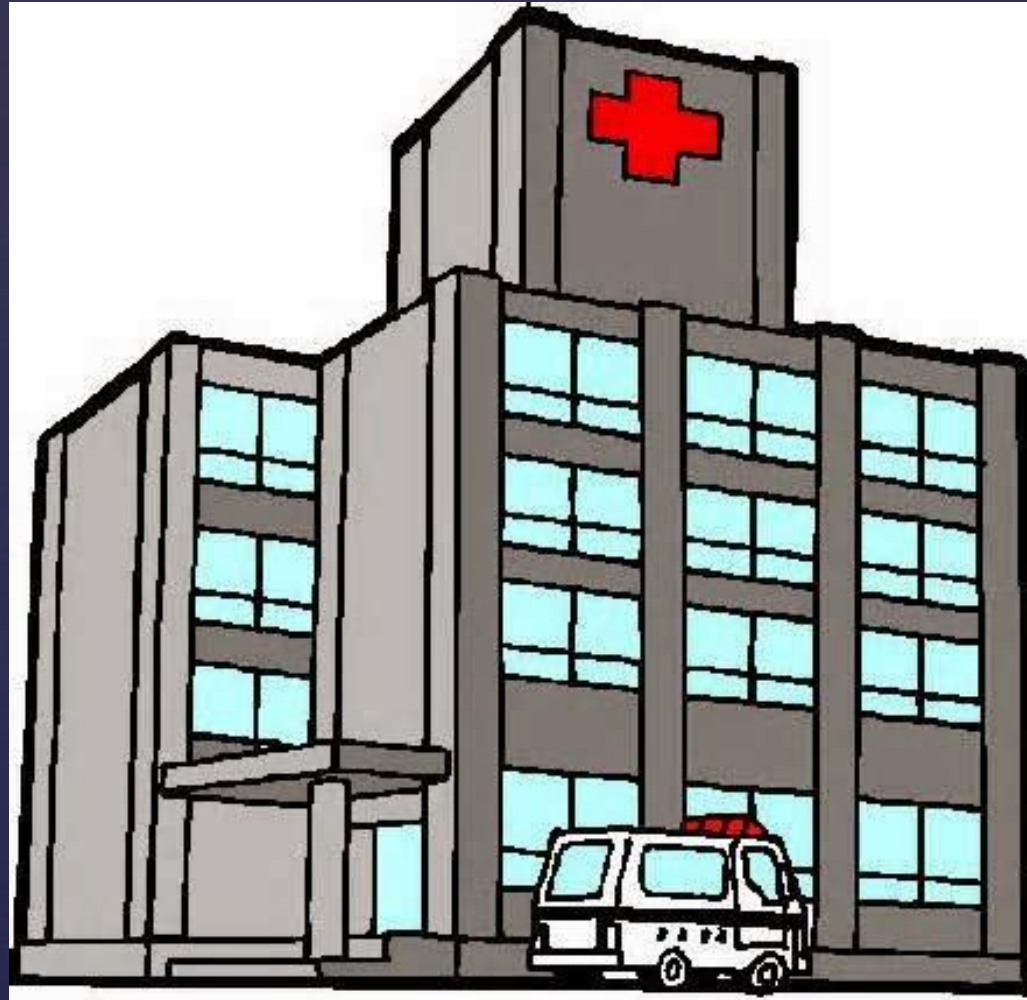
Hospital Participation in CARES

- The number of records per year at each hospital that will need to be entered into CARES will be relatively small.

- Participation in CARES is voluntary.

- We have a vision of statewide collaboration.

- Therefore, outcome data can be fed back to the hospitals and the EMS community.

Hospital Participation in CARES

- Identify a contact person at your hospital.

- The contact person should have access to medical records.

- The contact person will be sent e-mail notifications when the hospital receives an out-of-hospital cardiac arrest patients via EMS.

- Outcome data will then need to be entered for those patients into the CARES website.

Hospital Coordinator Access within the CARES Website

- Log in to the CARES website to view a dashboard set up for your hospital.

- Enter hospital data and relevant comments into the patient records.

- Searching of records by many different data elements.

- Run report to show outcomes.

Sample CARES Hospital Dashboard
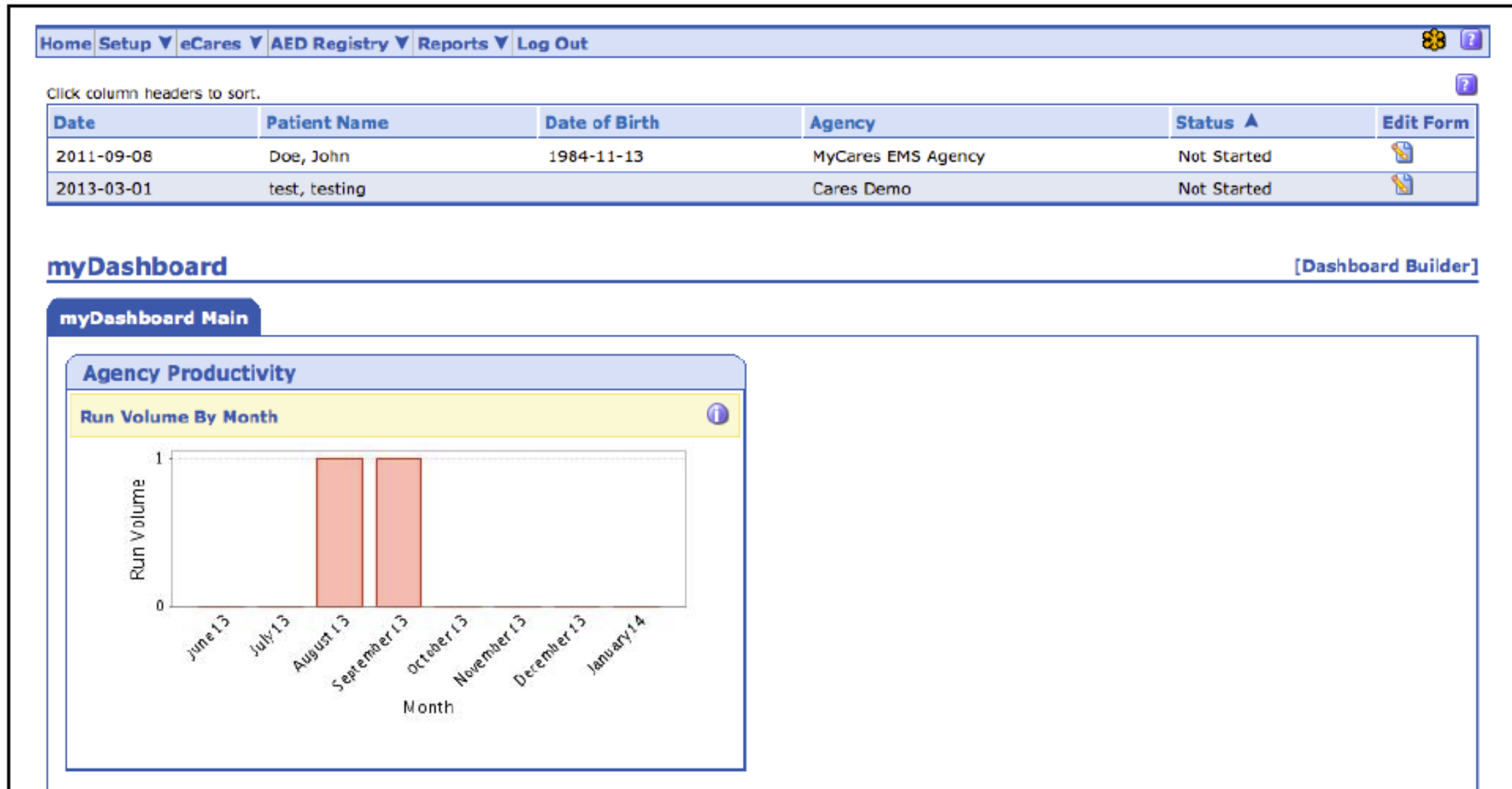
Hospital Data Elements

Part E: Hospital Section - Please complete the following questions

46 - ER Outcome
- ○ Resuscitation terminated in ED
- ○ Admitted to hospital
- ○ Transferred to another acute care facility from the ED

47 - Was hypothermia care initiated or continued in the hospital
- ○ Yes
- ○ No

48 - Hospital Outcome
- ○ Died in the hospital
- ○ Discharged alive
- ○ Patient made DNR

If yes, choose one of the following:
[▼]

- ○ Transferred to another acute care hospital
- ○ Not yet determined

49 - Discharge From The Hospital
- ○ Home/Residence
- ○ Rehabilitation facility
- ○ Skilled Nursing Facility/Hospice

50 - Neurological Outcome At Discharge From Hospital
- ○ Good Cerebral Performance (CPC 1)
- ○ Moderate Cerebral Disability (CPC 2)
- ○ Severe Cerebral Disability (CPC 3)
- ○ Coma, Vegetative State (CPC 4)

Transferred To: [▼] sort [   ]

Hospital procedures

51 - Was the final diagnosis acute myocardial infarction: ○ Yes ○ No

52 - Coronary Angiography Performed: ○ Yes ○ No ○ Unknown

If yes, provide date and time: [   ] - [hh] : [mm]

53 - Was a cardiac stent placed: ○ Yes ○ No ○ Unknown

54 - CABG performed: ○ Yes ○ No ○ Unknown

55 - Was an ICD placed and/or scheduled: ○ Yes ○ No ○ Unknown

Hospital Comments

[   ]

De-Identification Process of Records

- Audits will be performed at the state level by the CARES state coordinator.

- Once each record has been has been reviewed and deemed as complete and accurate for both, EMS and Hospital data, it will be de-identified.

- De-identification translates into First/Last Name and DOB being removed from the CARES record permanently and locking it.

CARES Hospital Report

CARES Hospital Report (Non-Traumatic Etiology)

Inclusion Criteria: Etiology=Non-Traumatic Arrest; Resuscitation Attempted by 911 Responder; End of Event = Pronounced in ED or Ongoing Resuscitation in ED
Final Destination Hospital: CARES Medical Center | Direct/Transferred: All Direct/Transferred | State: PR | Service Date: From 1/1/13 Through 12/31/13

Total Number of CARES Patients - Hospital Column   8
   Direct from EMS   8
   Transferred from another facility   0

Pre-Hospital Characteristics	Hospital: CARES Medical Center			State: PR			National		
	Total (%)	Survived to Admission (%)	Survived to Discharge (%)	Total (%)	Survived to Admission (%)	Survived to Discharge (%)	Total (%)	Survived to Admission (%)	Survived to Discharge (%)
Pre-Hospital Characteristics	8	8 (100.0)	8 (100.0)	2	2 (100.0)	2 (100.0)	26934	10296 (38.2)	3786 (14.1)
Gender									
Male	6 (75.0)	6 (100.0)	6 (100.0)	1 (50.0)	1 (100.0)	1 (100.0)	16325 (60.6)	6125 (37.5)	2474 (15.2)
Female	2 (25.0)	2 (100.0)	2 (100.0)	1 (50.0)	1 (100.0)	1 (100.0)	10608 (39.4)	4171 (39.3)	1312 (12.4)
Mean Age	54.0	--	--	38.0	--	--	62.0	--	--
Initial Rhythm									
Shockable	4 (50.0)	4 (100.0)	4 (100.0)	1 (50.0)	1 (100.0)	1 (100.0)	6819 (25.3)	3613 (53.0)	2160 (31.7)
Unshockable	4 (50.0)	4 (100.0)	4 (100.0)	1 (50.0)	1 (100.0)	1 (100.0)	20110 (74.7)	6681 (33.2)	1625 (8.1)
Witnessed Status									
Unwitnessed	6 (75.0)	6 (100.0)	6 (100.0)	1 (50.0)	1 (100.0)	1 (100.0)	11483 (42.6)	3452 (30.1)	866 (7.5)
Bystander Witnessed	0 (0.0)	0 (NaN)	0 (NaN)	0 (0.0)	0 (NaN)	0 (NaN)	11192 (41.6)	5042 (45.1)	2101 (18.8)
Witnessed by 911 Responder	2 (25.0)	2 (100.0)	2 (100.0)	1 (50.0)	1 (100.0)	1 (100.0)	4254 (15.8)	1797 (42.2)	816 (19.2)
Sustained ROSC* in field	4 (50.0)	4 (100.0)	4 (100.0)	1 (50.0)	1 (100.0)	1 (100.0)	11541 (42.8)	8483 (73.5)	3438 (29.8)
Hypothermia care initiated in the field†	4 (50.0)	4 (100.0)	4 (100.0)	2 (100.0)	2 (100.0)	2 (100.0)	4331 (16.1)	2921 (67.4)	980 (22.6)
Utstein‡ Arrest	0 (0.0)	0 (NaN)	0 (NaN)	0 (0.0)	0 (NaN)	0 (NaN)	4041 (15.0)	2323 (57.5)	1414 (35.0)

In-Hospital Characteristics	Hospital: CARES Medical Center		State: PR		National	
	Total (%)	Survived to Discharge (%)	Total (%)	Survived to Discharge (%)	Total (%)	Survived to Discharge (%)
Died in ED	0 (0.0)	--	0 (0.0)	--	16638 (61.8)	--
Admitted to hospital	8 (100.0)	8 (100.0)	2 (100.0)	2 (100.0)	10296 (38.2)	3786 (36.8)
Hypothermia care initiated/continued in hospital (among admitted patients)†	7 (87.5)	7 (100.0)	2 (100.0)	2 (100.0)	4979 (48.4)	1787 (35.9)
Discharged alive	8 (100.0)	--	2 (100.0)	--	3786 (14.1)	--
Discharged with good/moderate CPC	5 (62.5)	--	1 (50.0)	--	3071 (11.4)	--

Supplemental Hospital elements (analysis limited to questions with Yes or No response only)

	Hospital: CARES Medical Center		State: PR		National	
Myocardial infarction diagnosis	1 (100.0)	1 (100.0)	0 (NaN)	0 (NaN)	2122 (17.4)	998 (47.0)
Coronary angiography performed	0 (0.0)	0 (NaN)	0 (NaN)	0 (NaN)	2158 (19.0)	1472 (68.2)
Cardiac stent placed	0 (NaN)	0 (NaN)	0 (NaN)	0 (NaN)	996 (8.7)	704 (70.7)
CABG performed	0 (NaN)	0 (NaN)	0 (NaN)	0 (NaN)	140 (1.2)	133 (95.0)
ICD placed/scheduled	0 (NaN)	0 (NaN)	0 (NaN)	0 (NaN)	700 (6.2)	682 (97.4)

PLEASE NOTE:
- Patients are included in the report of the final facility of care. Patients transferred out of your facility (from the ED or after hospital admission) are not included in this report.
- This report includes only those calls with completed hospital data.
- From 2005-2012, CARES collected arrests of presumed cardiac etiology. In 2013, CARES expanded to include all non-traumatic arrests.
- CARES case: A non-traumatic out-of-hospital cardiac arrest event where resuscitation is attempted by a 911 responder (CPR and/or defibrillation). This would also include patients that received an AED shock by a bystander prior to the arrival of 911 responders.

*Return of Spontaneous Circulation (ROSC) is defined as the restoration of a palpable pulse or a measurable blood pressure. Sustained ROSC is deemed to have occurred when chest compressions are not required for 20 consecutive minutes and signs of circulation persist.
†Field and hospital hypothermia became mandatory CARES questions on November 1, 2010. Hypothermia data prior to this date may be incomplete.
‡Utstein patient: arrest witnessed by a bystander and found in a shockable rhythm.

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Conclusion

National
- Increased emphasis on OHCA data collection
- Need for a national registry

State
- Allows for additional benchmarking opportunities
- Local support from CARES-supported & trained coordinator

Community
- Allows stakeholders to identify who, when & where of OHCA
- Provides measurement tool for quality improvement with minimal burden to local EMS agencies and hospitals

Questions?

Melanie Gertner

MD CARES State Coordinator

mgertner@miemss.org