NEMSIS
The Role of EMS Data Collection and Linkage to Hospital Data

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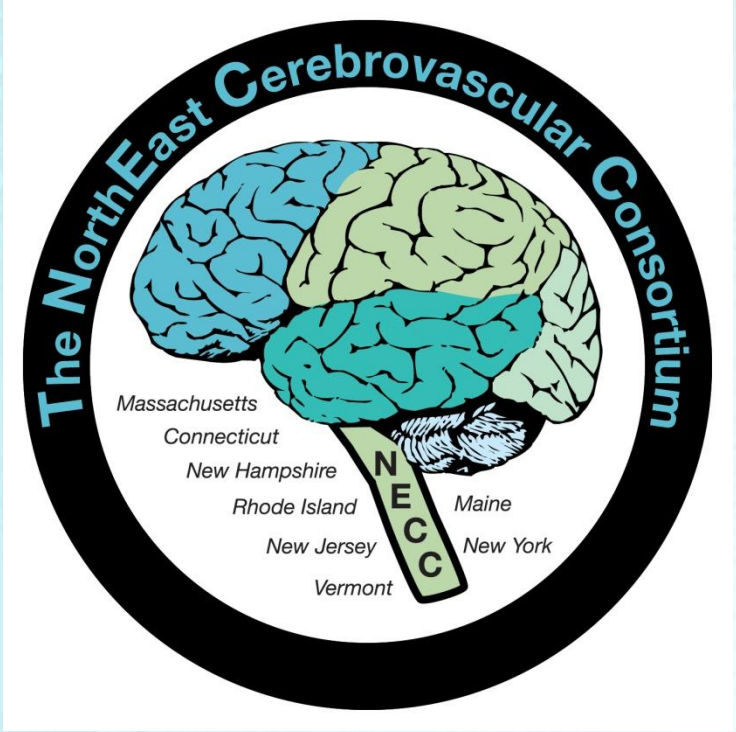
Presenter Disclosure Information

- Jane H. Brice MD, MPH
- NEMSIS and EMS Data

- FINANCIAL DISCLOSURE:
- No relevant financial relationship exists


The NorthEast Cerebrovascular Consortium
Massachusetts
Connecticut
New Hampshire
Rhode Island
New Jersey
Vermont
NECC
Maine
New York

Thank you

NEMSIS
TECHNICAL ASSISTANCE CENTER

I stole, pilfered, plundered, absconded, filched, purloined, appropriated, lifted, and nicked many of the slides you will see today

(with permission of the NEMSIS technical assistance center)

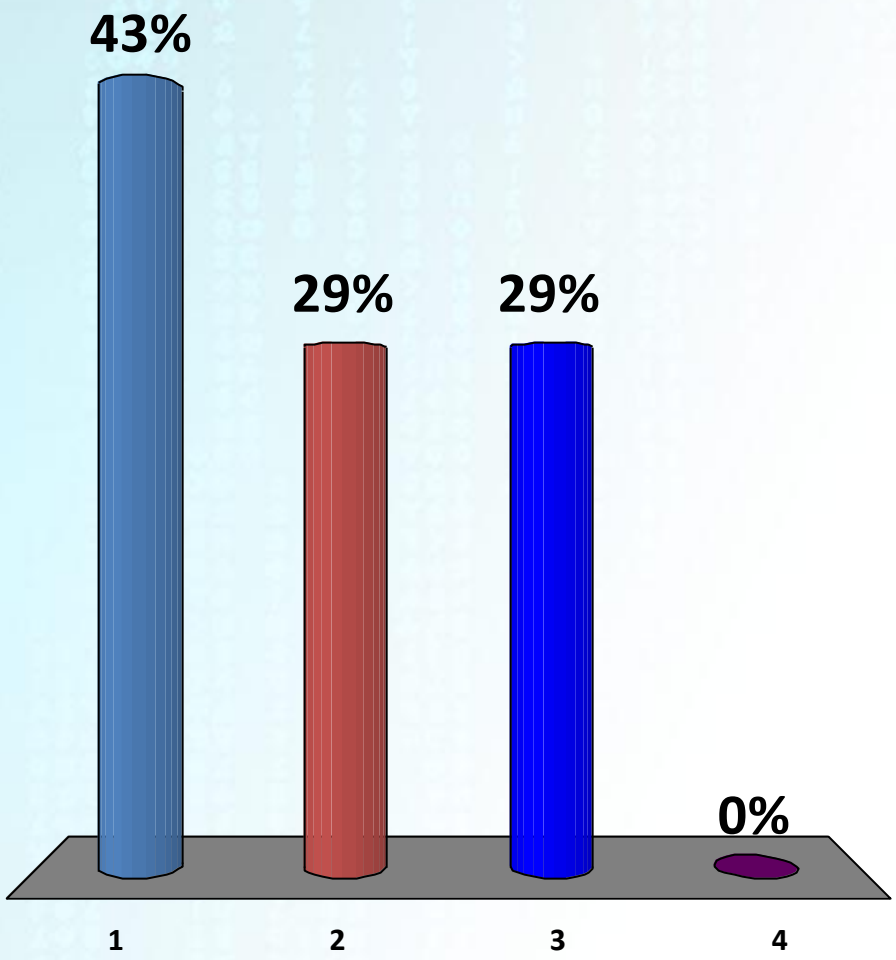
Thank you

Objectives

- To provide an overview of NEMSIS
- To explain how NEMSIS works
- To discuss EMS data collection
- To explore ways in which NEMSIS version 3 will allow for stroke performance improvement

Are you a

1. EMS Provider
2. Nurse
3. Doctor
4. Other healthcare provider



History of EMS Data

- We can date it back to the "modern age of EMS"
  - 1966: *Accidental Death and Disability*

"A review of ambulance services in the United States indicates a paucity of information and a limited framework for the collection of data on and the evaluation of current ambulance services." (Page 13)

History of EMS Data

- First attempt was made for uniform data collection in 1992 - 1993
  - The NHTSA EMS Data Elements Version 1
    - Great try, the spirit was there
    - Too loose of a standard
    - EMS relatively uneducated to the potential of computer technology

History of EMS Data

- States began to develop their own systems
  - Recognized need
  - Wanted common definition and language
- In the late 90's a second attempt was made…
  - The NEMSIS Project

History of EMS Data

- Late 90's, the National Association of State EMS Directors decided there was a NEED for uniform data collection

- Began a campaign to educate the federal partners
- Worked to develop experts and funding

- The concept for the NEMSIS project was born

The Need

- EMS Research
  - Generate hypothesis
  - Evaluate cost-effectiveness
  - Identify problems and target issues
- EMS Reimbursement
  - National fee schedule and reimbursement rates
- EMS Education
  - Curriculums
  - Local Education
- EMS Outcomes
  - Something other than death
  - System evaluation

History of EMS Data

– 2003:The EMS Outcomes Evaluation Project:

"No local, state, or federal databases were suitable for use due to inconsistent data definitions, inconsistent data formatting, and variation in inclusion criteria." *(Page 8)*

http://www.nhtsa.dot.gov/people/injury/ems/emsoutcomes03/

The Original Team

- NASEMSD
  - Project Management, Regional Meetings Operational Support
- Greg Mears, MD (Principal Investigator)
- NEDARC
  - Clay Mann, PhD, Co-Investigator
  - Mike Dean, MD, Co-Investigator
  - Technical Assistance
- State Data-Managers

The Money

- NHTSA
  - EMS Division (Primary)
- HRSA
  - EMS-C, Trauma, and EMS
- American Heart Association
  - Support for EMS Software Development

The Consensus

Professional Organizations

- AAA
- AAMS
- ACEP
- ACS-COT (NTDB)
- AHA (NRCPR)
- EMSOP
- IAFC
- IAFF
- NAEMD
- NAEMSP
- NAEMT
- NASEMSD
- NENA

Federal Partners

- CDC
- FEMA
- HRSA-EMSC
- HRSA-EMSC/NEDARC
- HRSA-EMSC/NRC
- HRSA-ORHP
- HRSA-Trauma/EMS
- NHTSA

This Desire…

- Turned into the revision of the National EMS Dataset
- More than just a dictionary
  - Why each element exists
  - The use and purpose of each element
  - How to store and send the data
  - How they interact with each other

NEMSIS

- Contract through the University of North Carolina
- Started with 4 states submitting data
- National EMS database begun

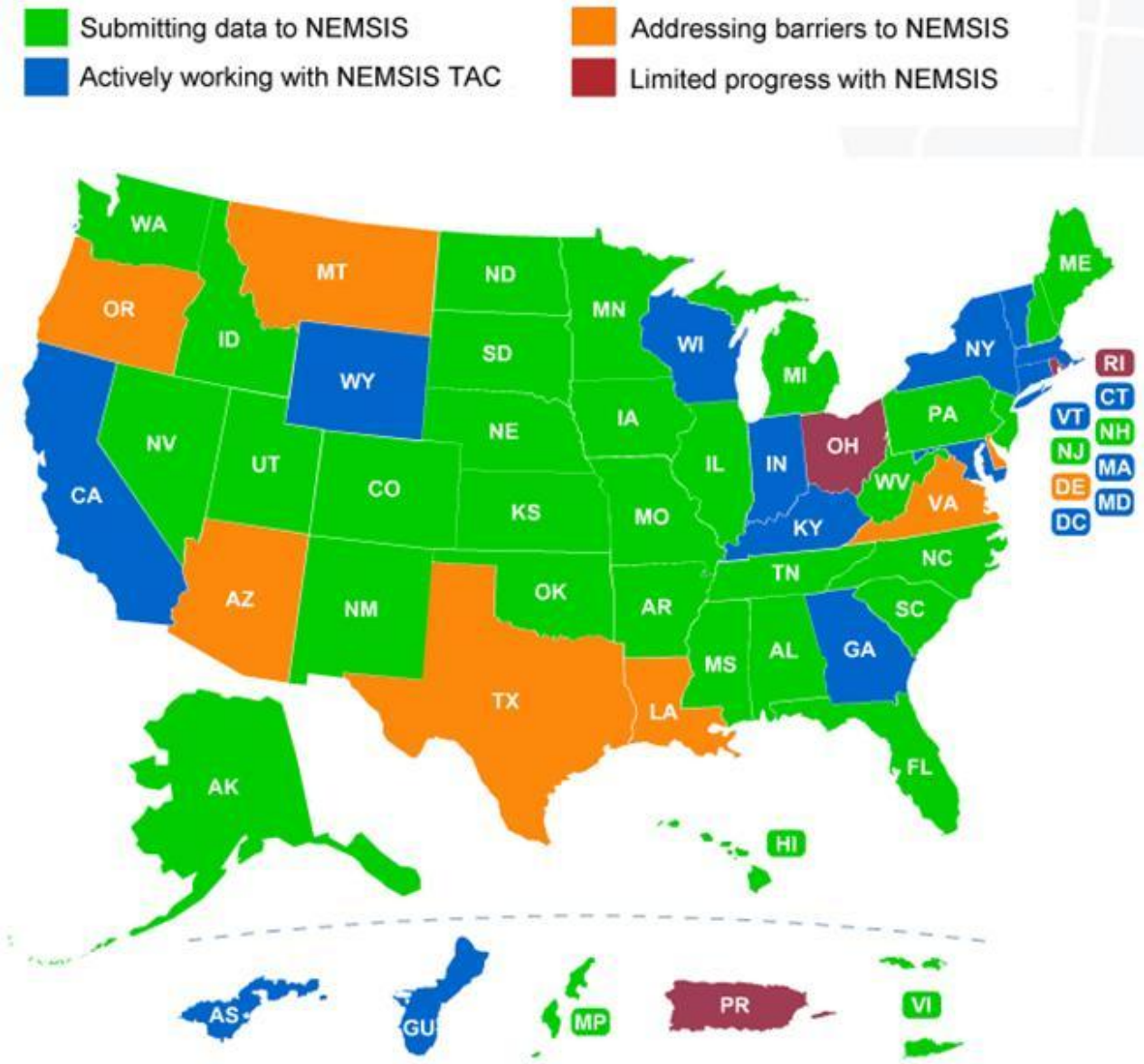
NEMSIS

- The TAC picked up the work at the end of the Pilot phase of NEMSIS (Sept 2005)
  - University of Utah received the grant
  - Utah contracted with University of North Carolina to continue their efforts
- The goal is to collect data from states and territories to populate the National EMS Database

NEMSIS

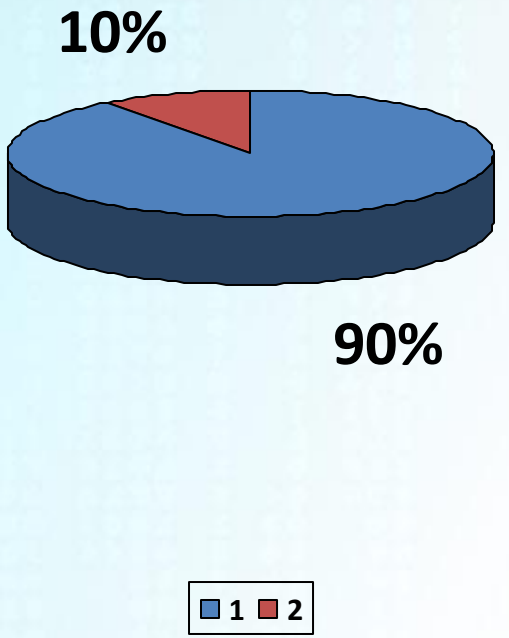
- 2006 – 5 states submitting data
- 2007 – 15 states submitting data
- 2011 – 30 states submitting data

State & Territory Information



Does you EMS System use electronic medical records?

1. Yes
2. No



NEMSIS Overview

- National EMS Information System
- Two components:
  - Demographic dataset:
    - Standardized set of data fields that describe an EMS system
  - EMS dataset:
    - Standardized set of definitions describing an EMS event

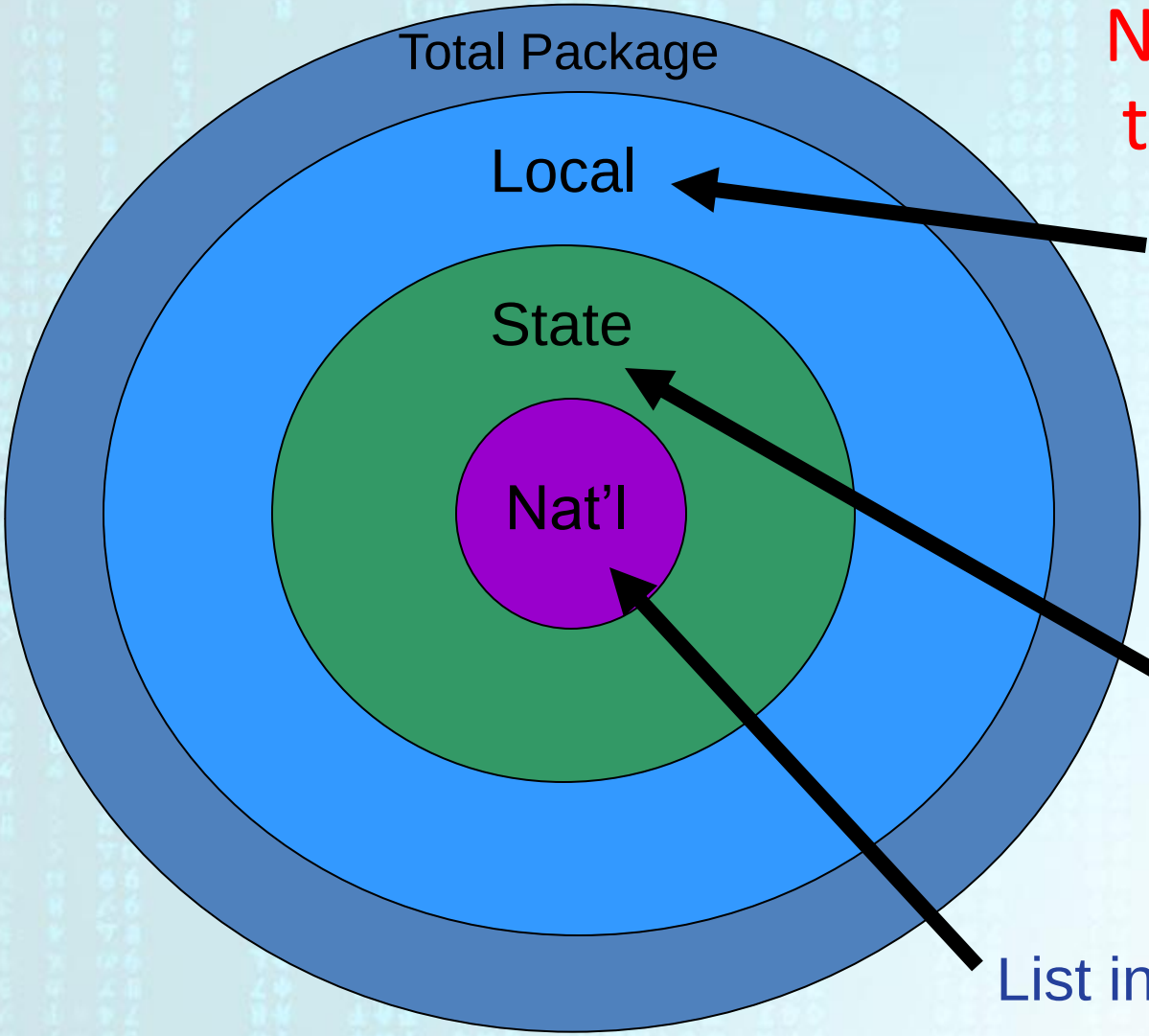
NEMSIS Overview

- Both components have the following:
  - XML (eXtensible Markup Language) formats
  - XSD (XML Schema Definition)
- Provides the capability of moving data from one system to another
- XML provides the method on which data is stored
- XSD provides the definition and rules for a field

Key Features

- Expandable dataset
- Portability
- Able to draw data from multiple vendors
- Reporting mechanism

NEMSIS Overview



Number of fields to be collected:

States/Regions set the minimum number of fields

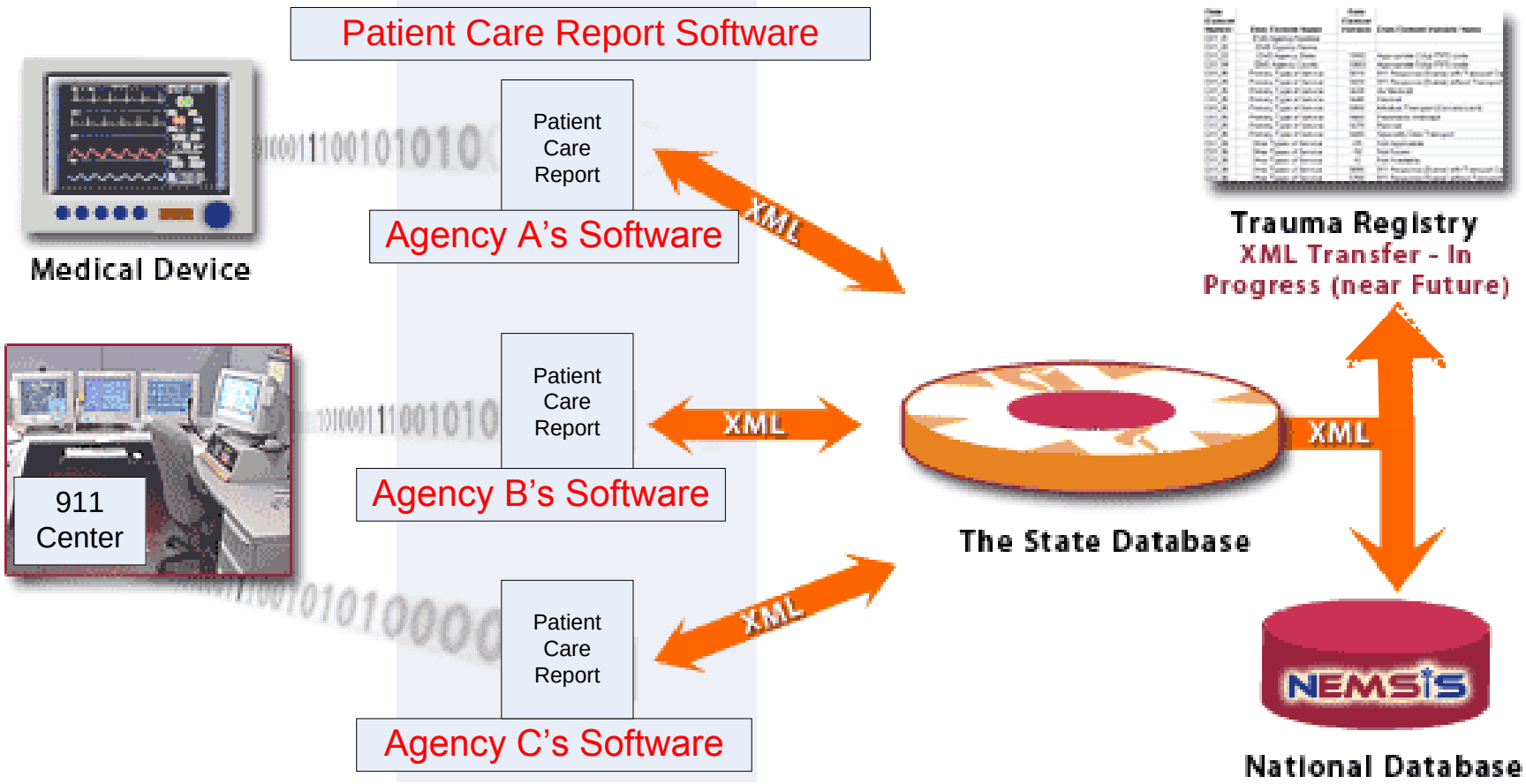
State Data Dictionary

List in current dictionary

Portability

- Portability means:
  - Ease of movement of the data
  - Commonality of the elements to be moved
  - Software vendors developing applications that can be used across the country

THE PORTABILITY OF DATA - the NEMSIS STANDARD.



Software Vendors

- Estimated to be over 70 EMS software vendors in the nation
- Most vendors have entered the compliance certification process

Reporting Mechanism

- National reporting structure
  - Two kinds of reports
  - Canned reports
  - NEMSIS National Event Data Cube
    - Developed to provide users general data browsing access to a subset of elements extracted from the National EMS Database
    - Aggregate data

Reporting Mechanism

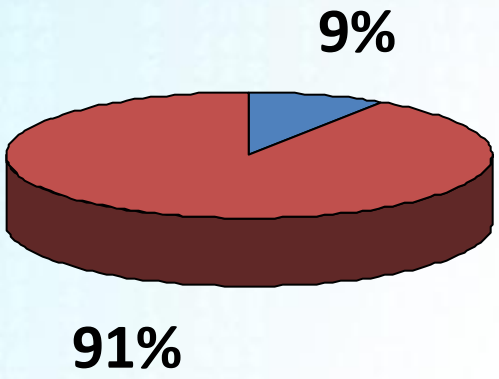
- State and local report
  - Developed by each state in collaboration with NEMSIS TAC
  - User-defined Reports

Performance Improvement

- Goal
  - Integrate EMS into the health information structure to enable performance improvement
  - Portable data collected in a systematic fashion and shared across healthcare infrastructure
  - Two way flow of information

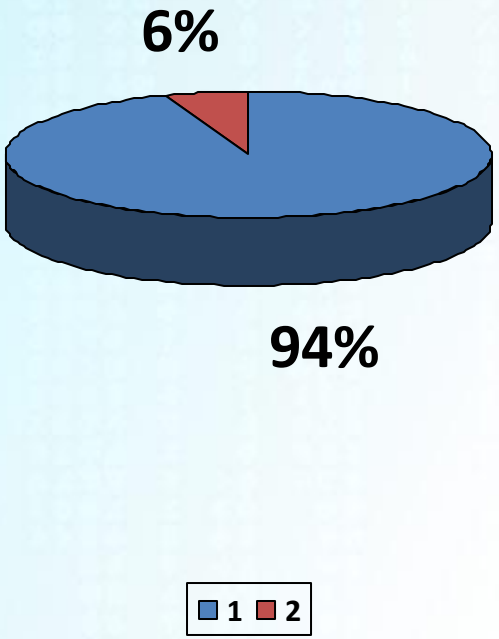
EMS Providers only
Are you able to access hospital outcomes of your patients?

1. Yes
2. No



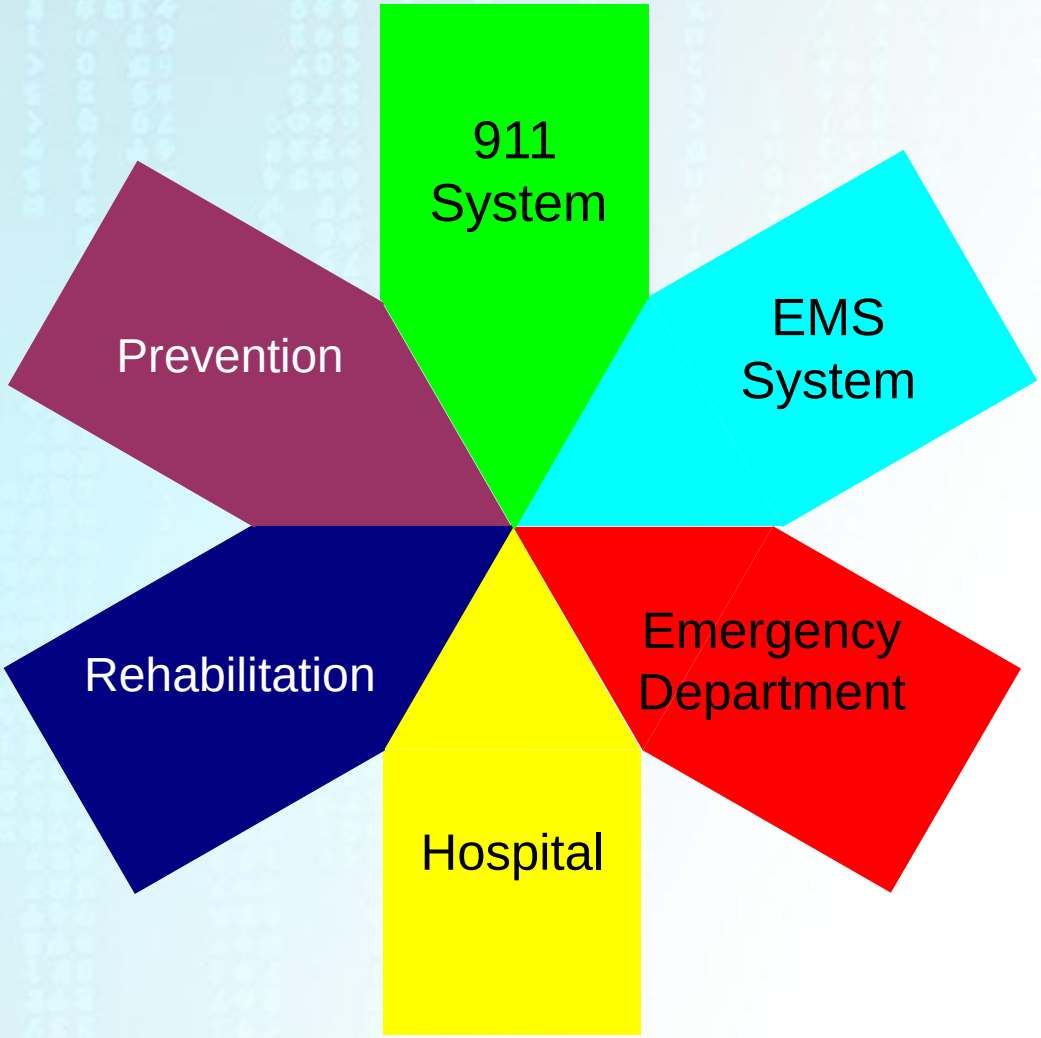
Hospital Personnel only
Are you able to access EMS records for your patients?

1. Yes
2. No



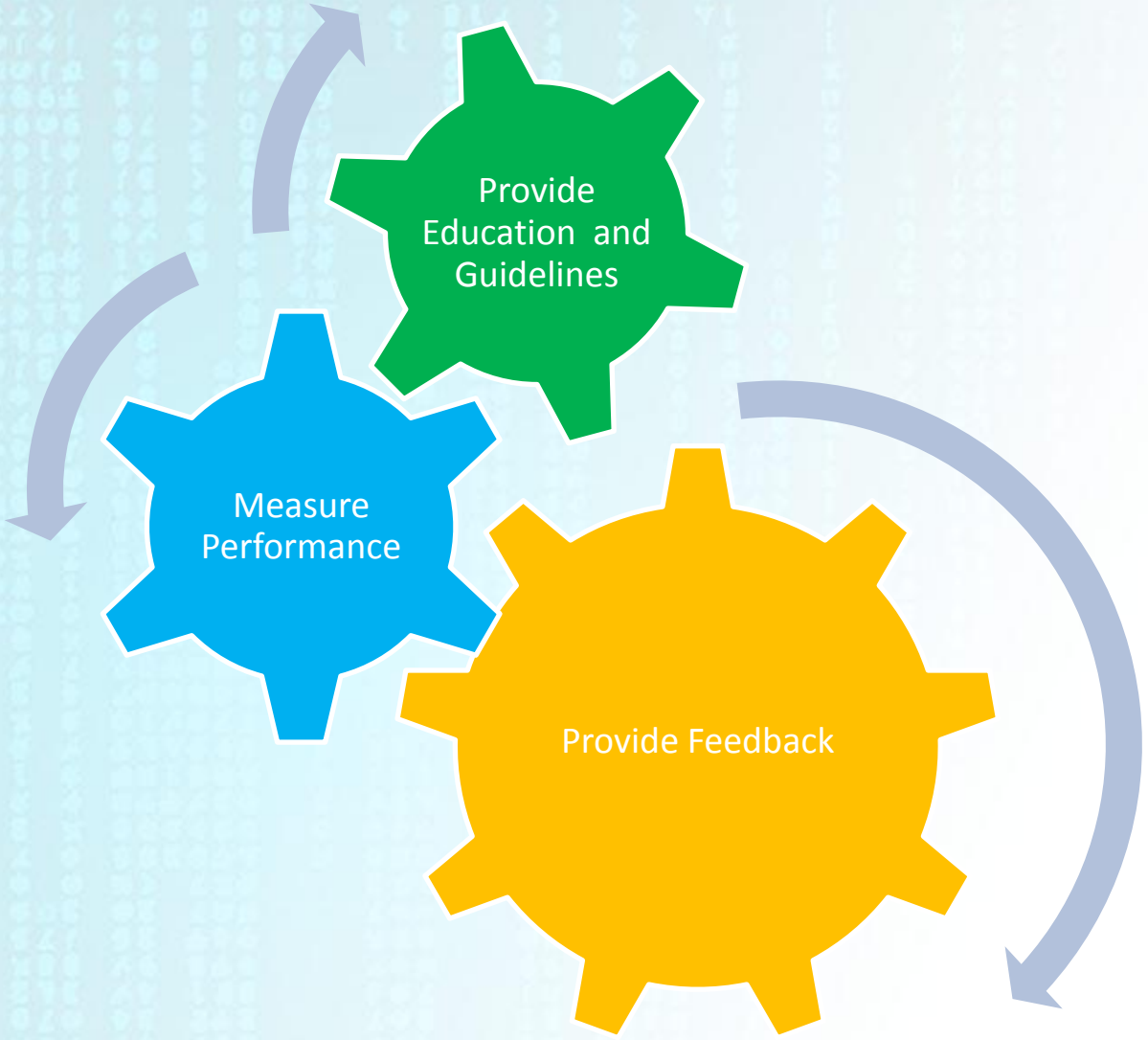
Where We Need to Be

EMS as one piece of a health care puzzle



The Data Sources

EMS Stroke Plan of Care



NEMSIS version 3

- Scheduled to be final by end of October
- Compliance testing period begins November

NEMSIS NHTSA Uniform PreHospital Dataset	Version 2.2.1	Version 3.0
Demographic Data Elements	110	133 (25%)
Existing (Version 2)	86 (78%)	86 (65%)
New		47 (35%)
Retired	23 (22%)	
EMS Data Elements	318	405 (75%)
Existing (Version 2)	257 (81%)	257 (63%)
New		148 (37%)
Retired	57 (19%)	
Overall Total	428	538
Existing (Version 2)	348 (81%)	343 (64%)
New		195 (36%)
Retired	80 (19%)	

Stroke Specific Elements in version 3

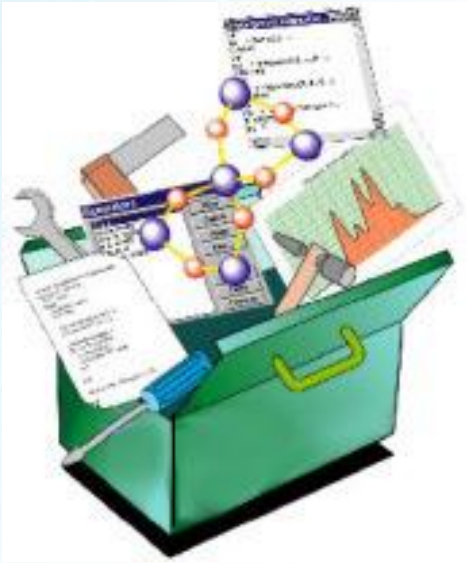
Symptom Onset	Time of onset of symptoms in 24 hour format
Last Known Well	If time of symptom onset unknown, when was the person last known symptom free in 24 hour format
Sx on Waking	Did the patient awaken with symptoms? Yes/No
FAST Score	Initial Face/Arm/Speech Test: Face Droop / Arm Drift / Slurred, Garbled Speech (Possible cumulative score 0-3)
Hospital	Receiving hospital code
PSC	Is the receiving hospital a Primary Stroke Center?

Stroke Toolkit

- Performance improvement tool
- Draws information from statewide EMS electronic medical record
- Provide direct feedback to agencies and personnel about their performance

What is an EMS Toolkit?

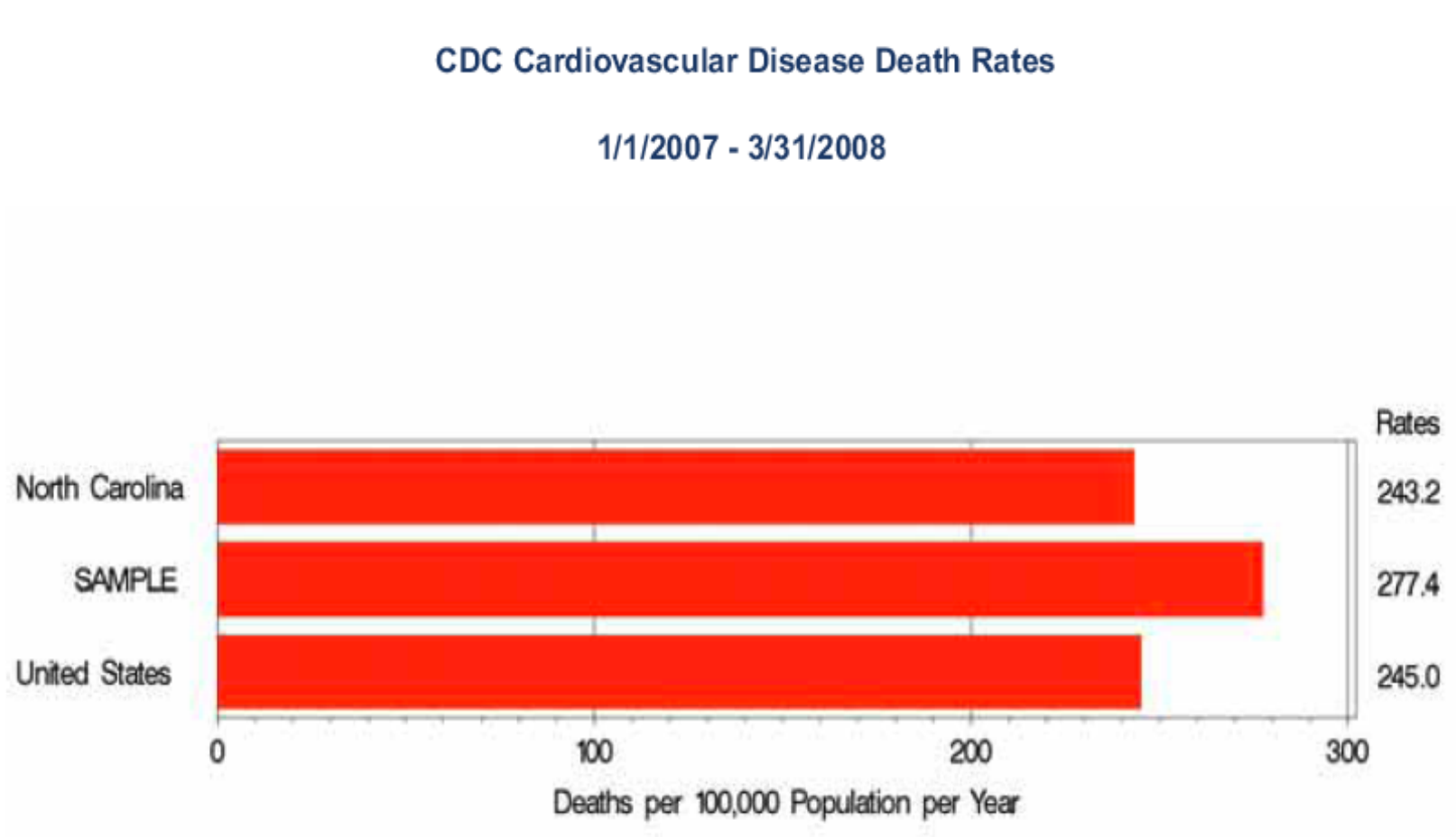
- Detailed Report
- Evaluates an EMS specific topic
  - Patient Care
  - Service Delivery
  - Personnel Performance
- Benchmarking with state and similar systems
- **Recommendations for improvement**
- Continuous use



EMS Acute Stroke Care Toolkit

- Overview of EMS Acute Stroke Care
- Performance feedback on:
  - Data Quality
  - EMS System
  - EMS Personnel Performance
  - EMS Patient Outcomes
  - EMS Education and Community Outreach

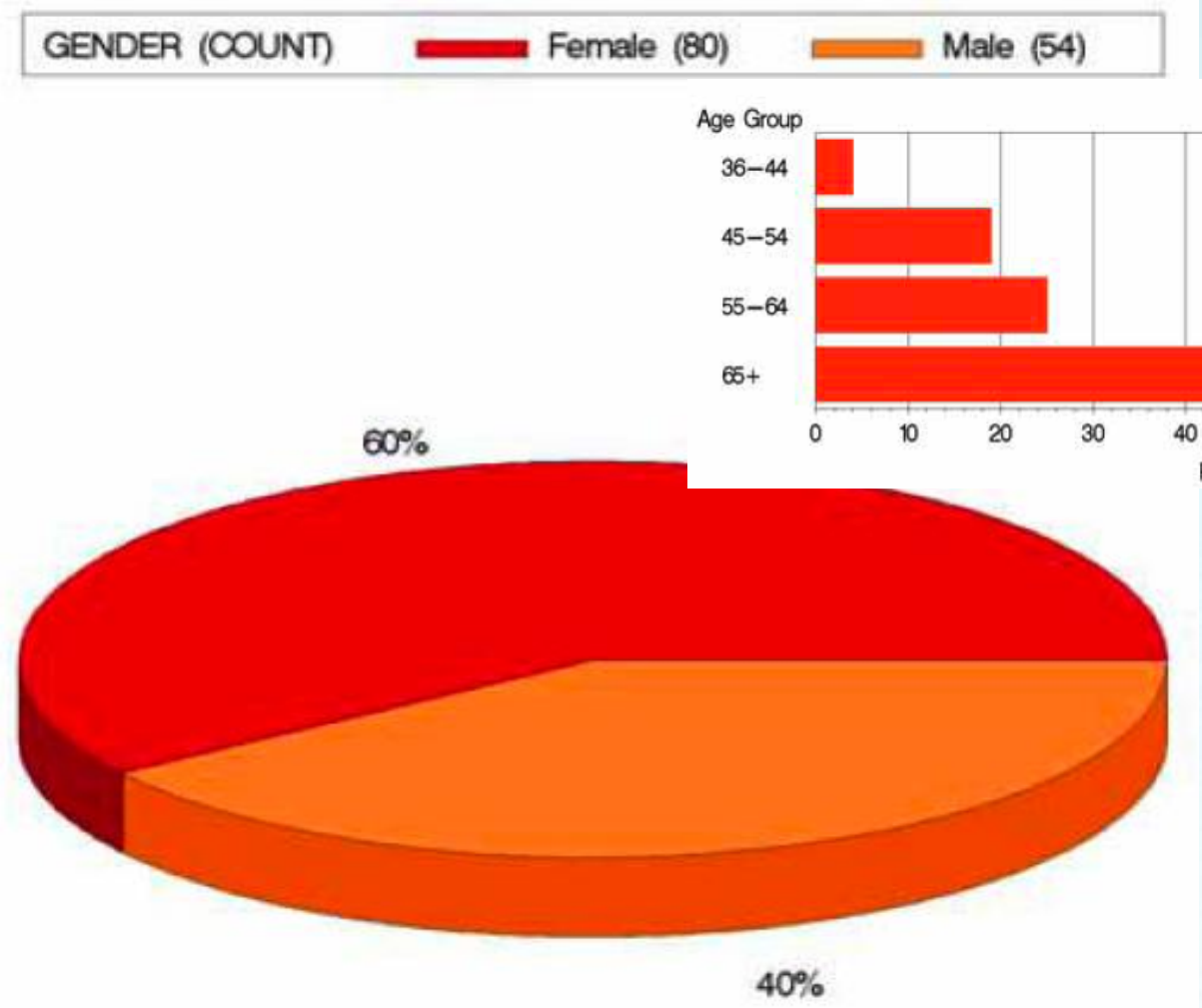
County Statistics

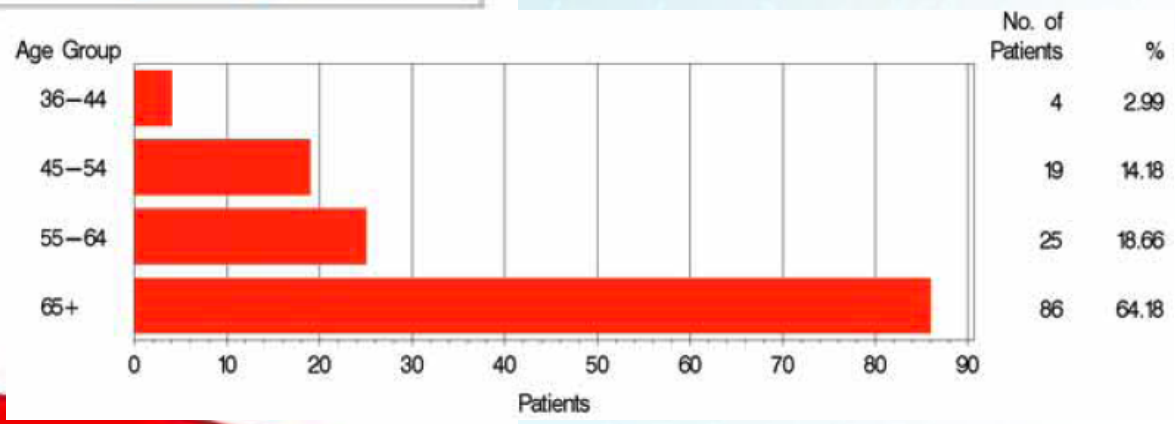


System Capabilities

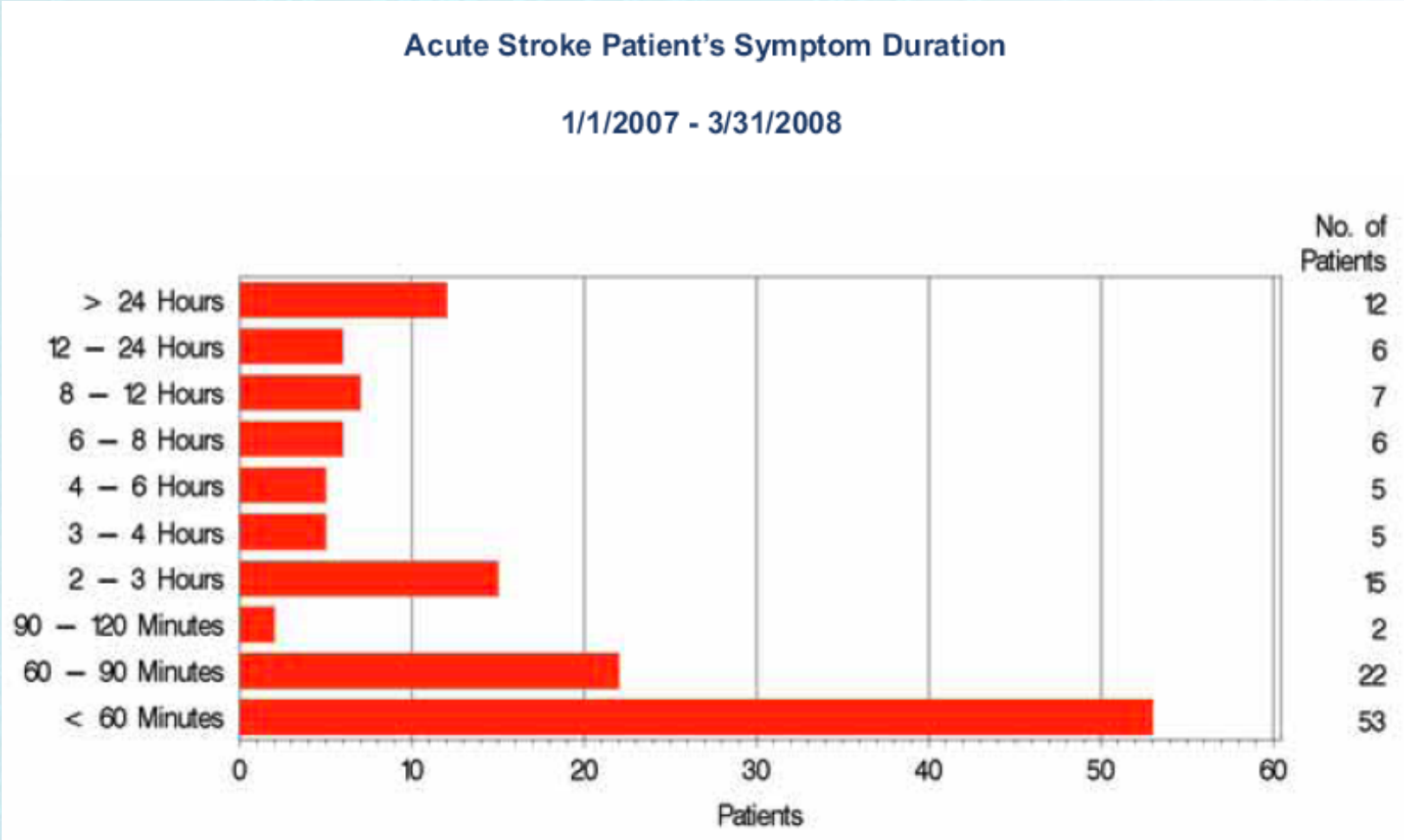
	EMS System	Population Group Average	Area Group Average	State Average
EMS Capabilities				
* Highest Level of Service	EMT-P	100% EMT-P	89% EMT-P	87% EMT-P
* % of Population covered by First Responders	100%	80%	69%	69%
* % of 911 Dispatch Center Trained in Stroke Recognition	100%	69%	25%	30%
* % of EMS Personnel Trained in Stroke Recognition and Treatment	100%	73%	90%	71%
* Written Stroke Plan addressing patient destinations	Yes	3 (12%) Yes	4 (11%) Yes	8 (8%) Yes
Dispatch Center				
* Basic 911	No	6 (24%) Yes	7 (19%) Yes	18 (18%) Yes
* Enhanced 911	Yes	20 (80%) Yes	27 (75%) Yes	81 (80%) Yes
* EMD	Yes	22 (88%) Yes	25 (69%) Yes	63 (62%) Yes
* Phase 2 Compliance	Yes	18 (72%) Yes	25 (69%) Yes	55 (54%) Yes

Patient Demographics



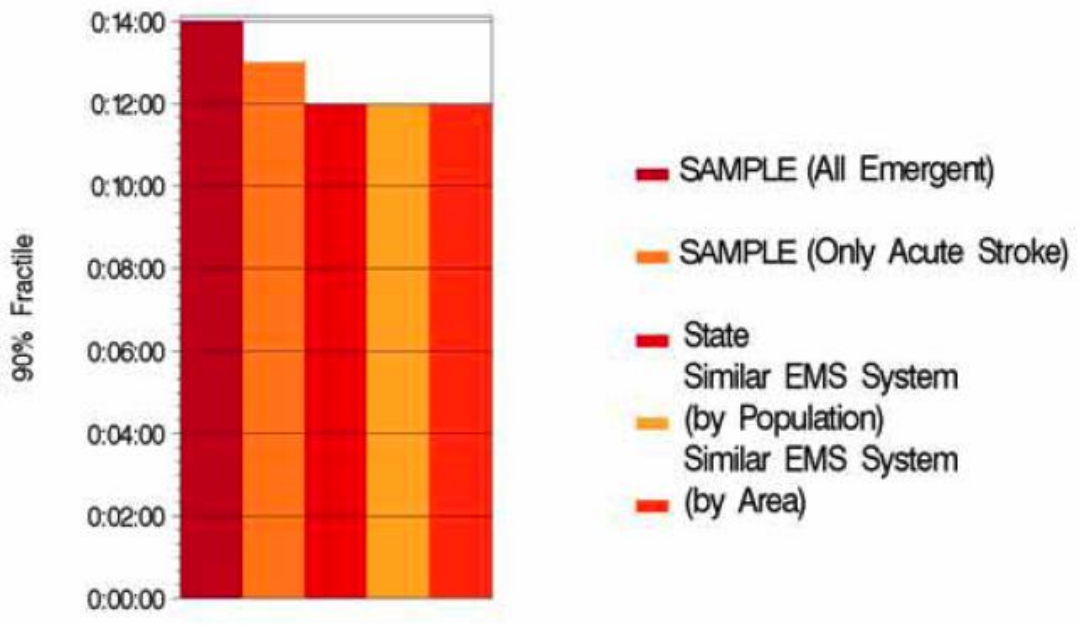


Symptom Duration/Onset



EMS Response Times

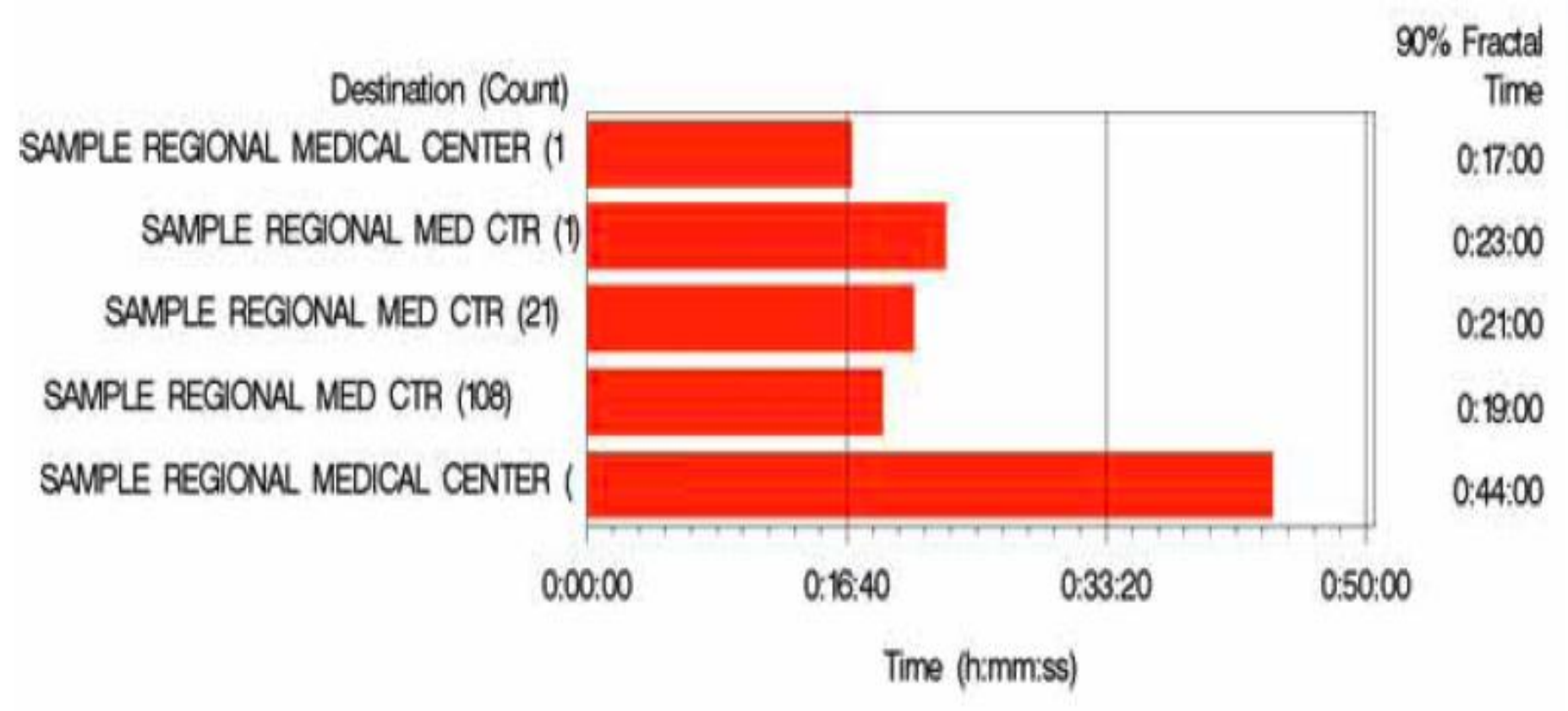
System	Events (n)	Min Value	Max Value	Avg Value	90% Fractile	Std Deviation
EMS System (All Emergent)	5,530	0:00:00	0:38:00	0:08:06	0:14:00	0:04:18
EMS System (Acute Stroke)	122	0:00:00	0:25:00	0:08:05	0:13:00	0:04:21
State	27,203	0:00:00	1:54:02	0:06:39	0:12:00	0:04:30
Similar EMS System (by Pop)	6,584	0:00:00	1:54:02	0:06:31	0:12:00	0:04:26
Similar EMS System (by Area)	11,966	0:00:00	1:54:02	0:06:36	0:12:00	0:04:47



Personnel Performance

Personnel ID	Patients	Stroke Screen	Glucose Level	Thrombolytic Screen	Scene Time of <10 minutes	Documentation of Symptom Onset	Cardiac Rhythm
PXXXXXX	3	3 (100%)	3 (100%)	1 (33%)	2 (67%)	3 (100%)	3 (100%)
PXXXXXX	5	5 (100%)	4 (80%)	3 (60%)	2 (40%)	5 (100%)	5 (100%)
PXXXXXX	1	1	1	1	0	1	1
EMS System Average	134	129 (96%)	97 (72%)	59 (44%)	40 (30%)	134 (100%)	129 (96%)
State Average	5198	4836 (93%)	4521 (87%)	214 (4%)	1985 (38%)	2850 (55%)	3399 (65%)

Destination Decisions



Patient Outcomes

Sample Acute Stroke Patient Outcome Information

1/1/2007 - 3/31/2008

Patient PCR Number	Date of Care	Symptom Onset Time Noted	Stroke Screen Obtained	Glucose Checked	Scene Time = <10 min.	Emergency Dept. Disposition	Hospital Disposition
XXX-XXX	XX/XX/XX	Yes	Yes	Yes	No	TRANSFERRED	TRANSFER TO HOSPITAL
XXX-XXX	XX/XX/XX	Yes	No	No	No	TRANSFERRED	TRANSFER TO HOSPITAL

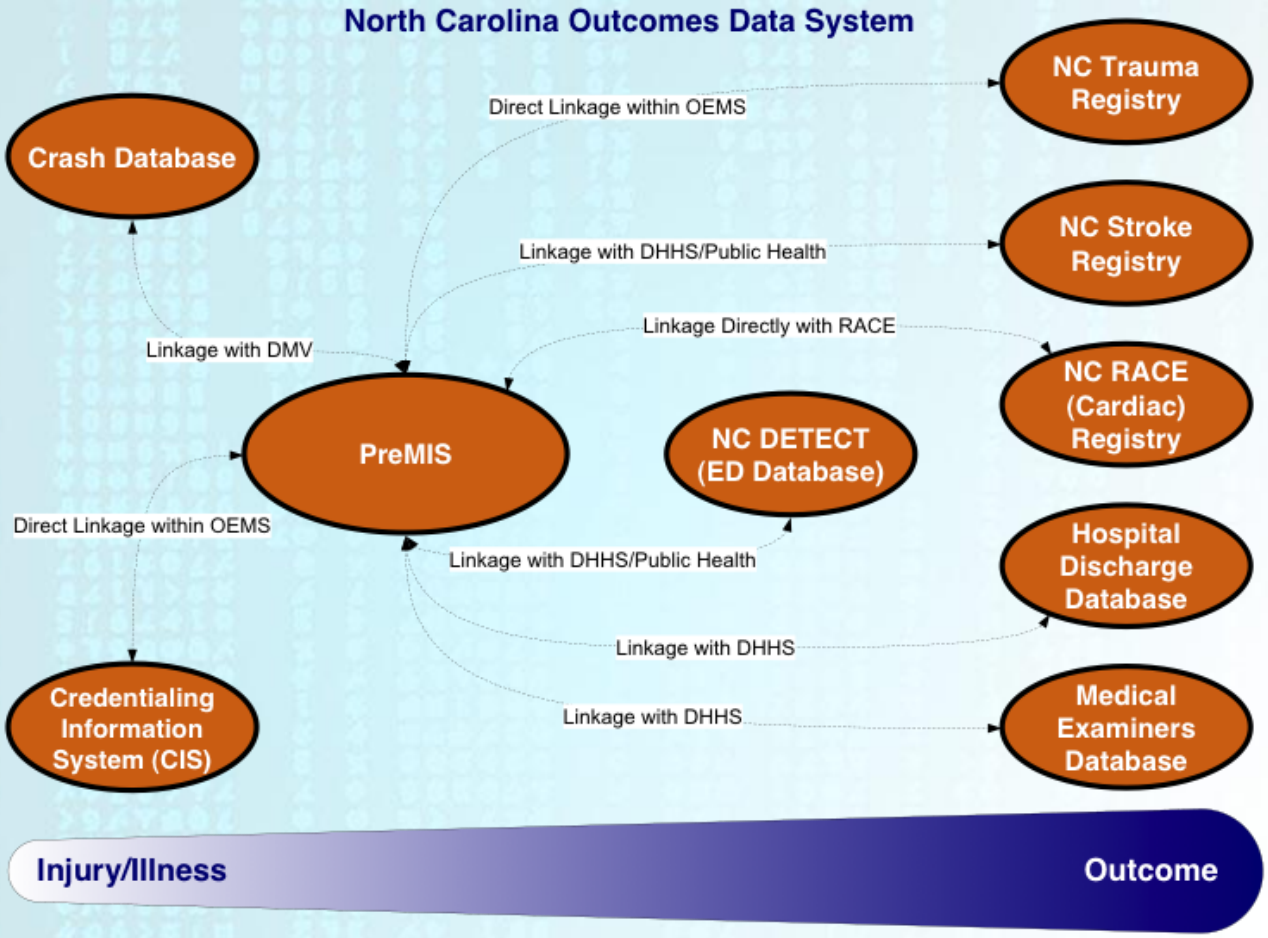
Data Linkages

- EMS hamstrung by inability to receive consistent patient feedback
- Difficulty to get better at recognizing stroke without feedback

Data Linkages

- To allow EMS personnel to track their patient through the continuum of care
- To allow hospital personnel to track their patient back to the first medical encounter
- To improve care and collaboration

North Carolina Data Linkages



North Carolina Data Linkages

- We have recently completed two data linkages that will help:
  - North Carolina Stroke Care Collaborative (SCC), a CDC funded Paul Coverdell National Acute Stroke Registry
  - North Carolina Disease Event Tracking and Epidemiologic Collection Tool (NC DETECT)

North Carolina Data Linkages

- Pilot project to link EMS records with Stroke Registry
- For 753 NCSCC Registry patients who arrived by EMS, 473 (63%) were matched to EMS records
- Match failures due to incorrect date/time stamp and inability to find a corresponding EMS record

North Carolina Data Linkages

- NC DETECT: The North Carolina Disease Event Tracking and Epidemiologic Collection Tool (NC DETECT)
  - Collects de-identified data on EVERY emergency department visit
  - Goal to provide statewide early event detection and timely public health surveillance
  - Collaboration between North Carolina Division of Public Health (NC DPH) and the UNC Department of Emergency Medicine

North Carolina Data Linkages

- Given present data quality
- Able to link about 60% of Emergency department records at present
- In EMS system submitting quality data, linkage goes up dramatically (some as high as 80%)

North Carolina Data Linkages

- Allows for a two way flow of information
  - From EMS to hospital
  - From hospital to EMS
- Performance Improvement
- Research

Data Exchange

EMS Stroke Plan of Care