

A scenic view of a valley with mountains in the background and trees in the foreground showing autumn foliage. The sky is filled with dramatic, dark clouds, and the sun is low on the horizon, casting a warm glow over the landscape. The foreground is dominated by tall, dry grasses and shrubs. In the middle ground, there are several large trees with vibrant yellow and orange autumn leaves. The background shows rolling hills and mountains under a cloudy sky.

**2019 NEMESIS Version 3  
Implementation Meeting  
August 11<sup>th</sup> – 13<sup>th</sup>**

**Welcome to Deer Valley!**

# Jon Krohmer, MD, FACEP

- Director of the Office of EMS, NHTSA
- Emergency Physician
- Served as:
  - NAEMSP President
  - Director, Health Services Corps
    - Immigration and Customs (DHS)
  - Deputy Chief Medical Officer
    - Dept. Homeland Security (DHS)



# EMS Data

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Past, present, & future

**Jon R. Krohmer, MD, FACEP, FAEMS**

August 12, 2019



# Disclosures

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## National Highway Traffic Safety Administration

- Director, Office of EMS
- Acting Associate Administrator,  
Office of Research and Program Development



## Caroline County, Maryland Department of Emergency Services

- EMS Medical Director



WHY???



NEMESIS



# NHTSA Office of EMS Mission

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To reduce death and disability by providing leadership and coordination to the EMS community in assessing, planning, developing, and promoting comprehensive, evidence-based emergency medical services and 911 systems.



# The Evolution of EMS Data



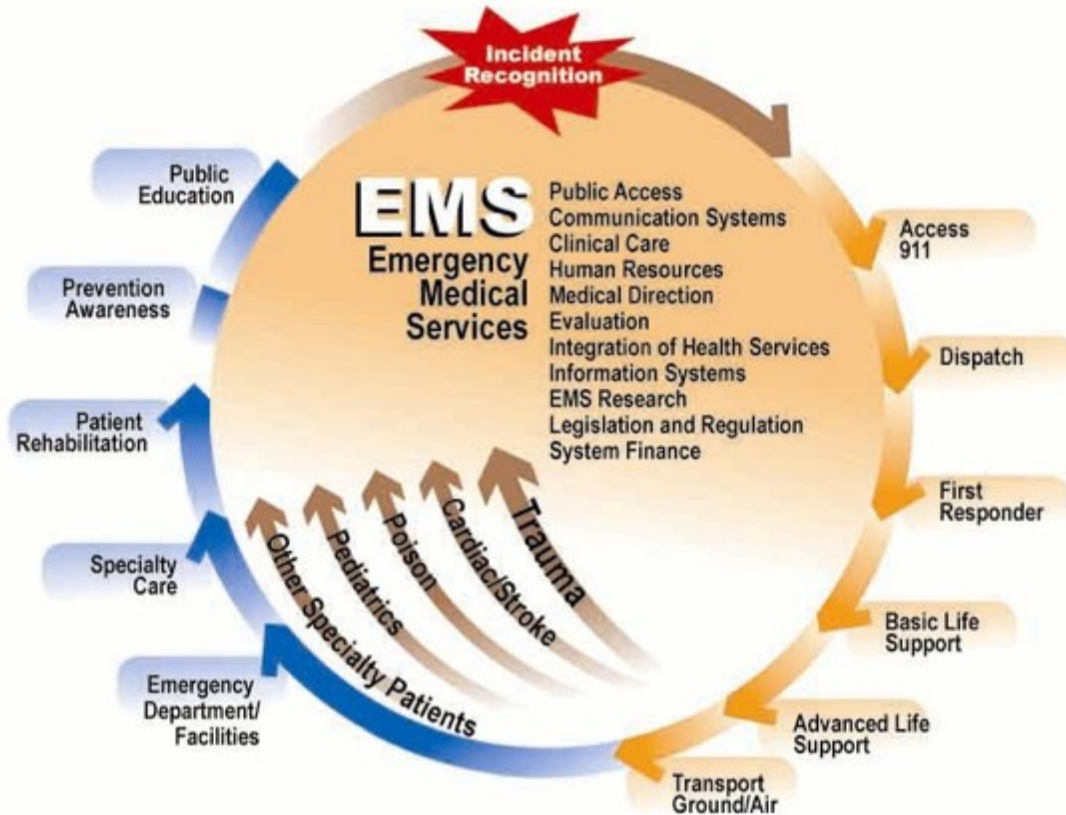
# EMS Agenda for the future

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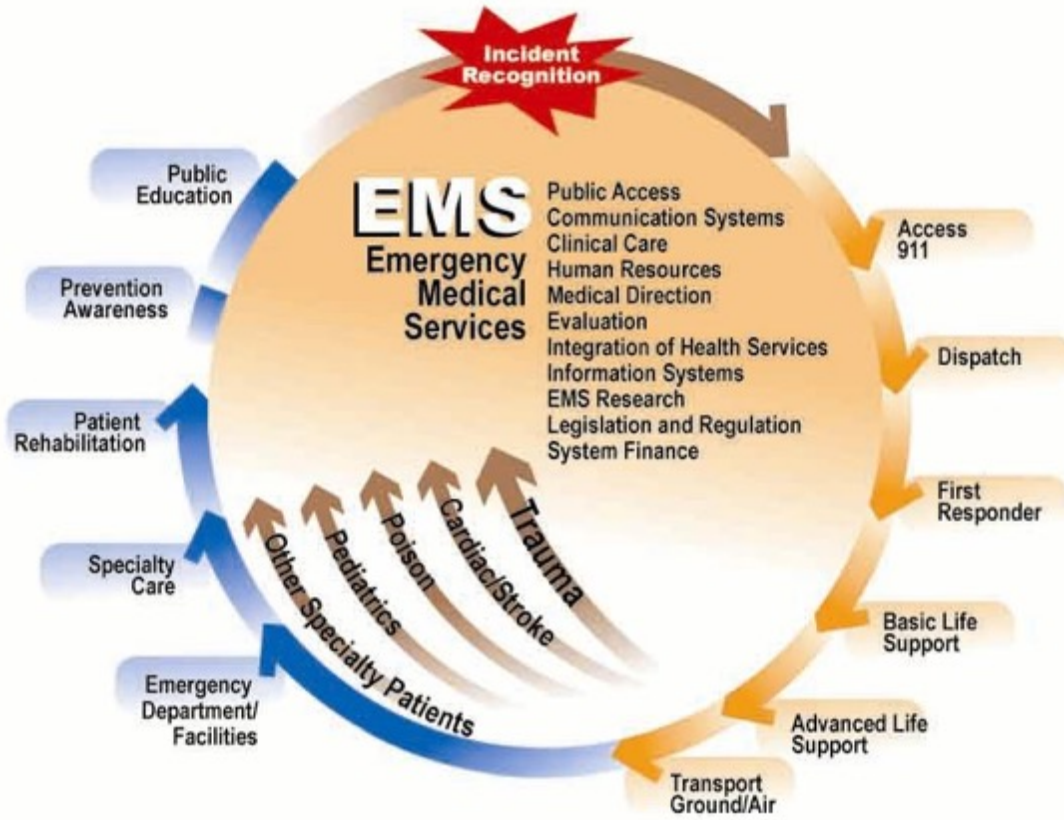




# EMS System



# EMS System



Patient



Clinician



Community



# EMS AGENDA 2050

A PEOPLE-CENTERED VISION FOR THE FUTURE  
OF EMERGENCY MEDICAL SERVICES



# Why People Centered?

“Because, while caring for our patients is our top priority, we must strive to understand and address the patient’s perspective, and meet the needs of patients’ loved ones and communities, as well as the clinicians who provide care.”



# The Guiding Principles

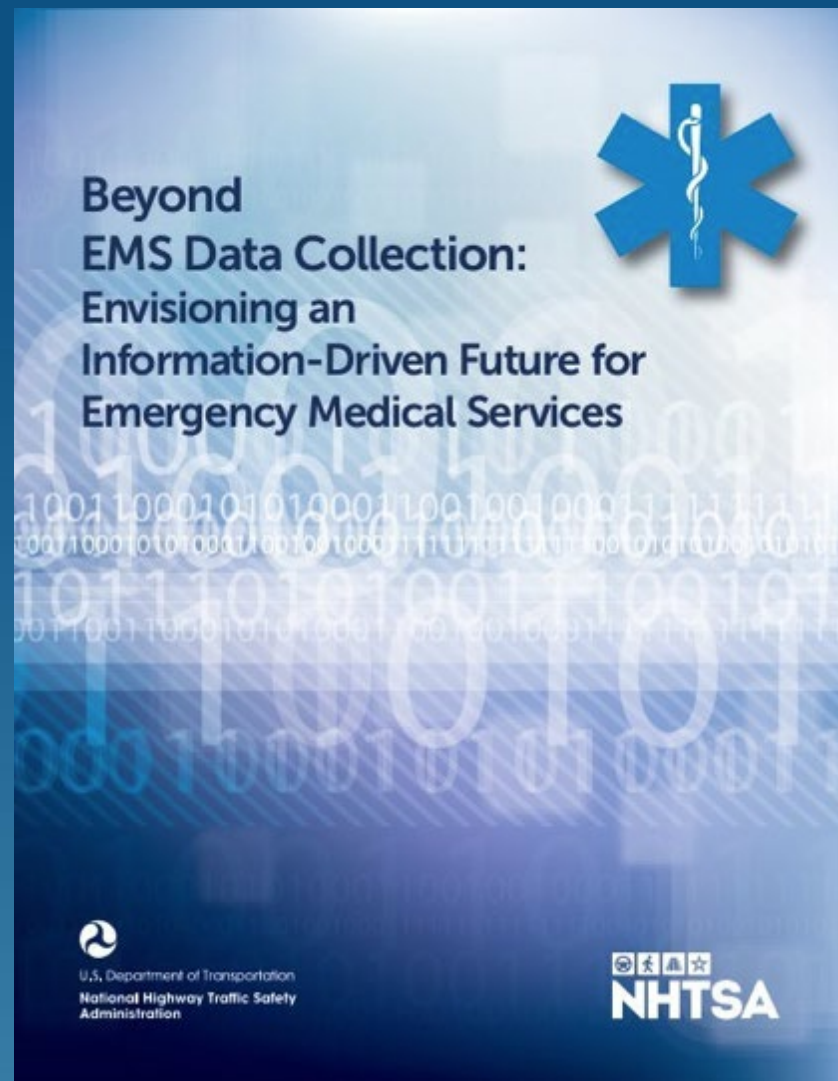
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# Emphasis on and clarity about data and information use

Creation of an information culture

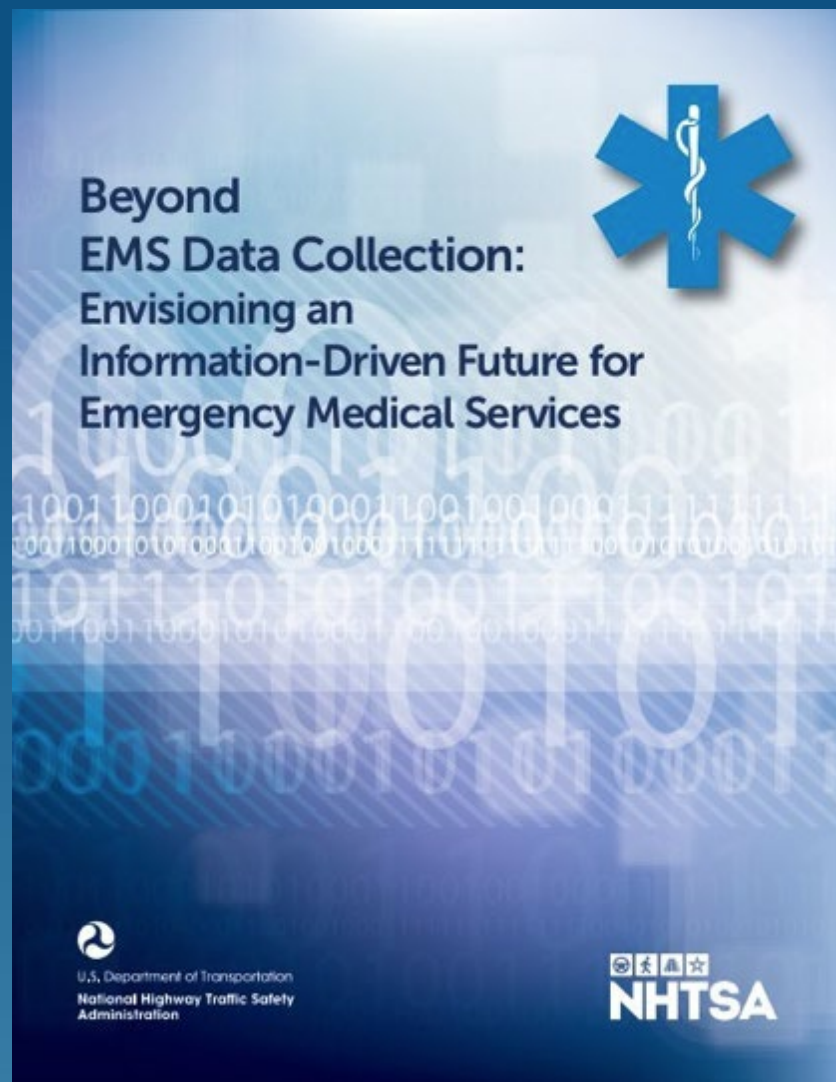
Ongoing information system development and improvement



Emphasis on and clarity about data and information use

Creation of an information culture

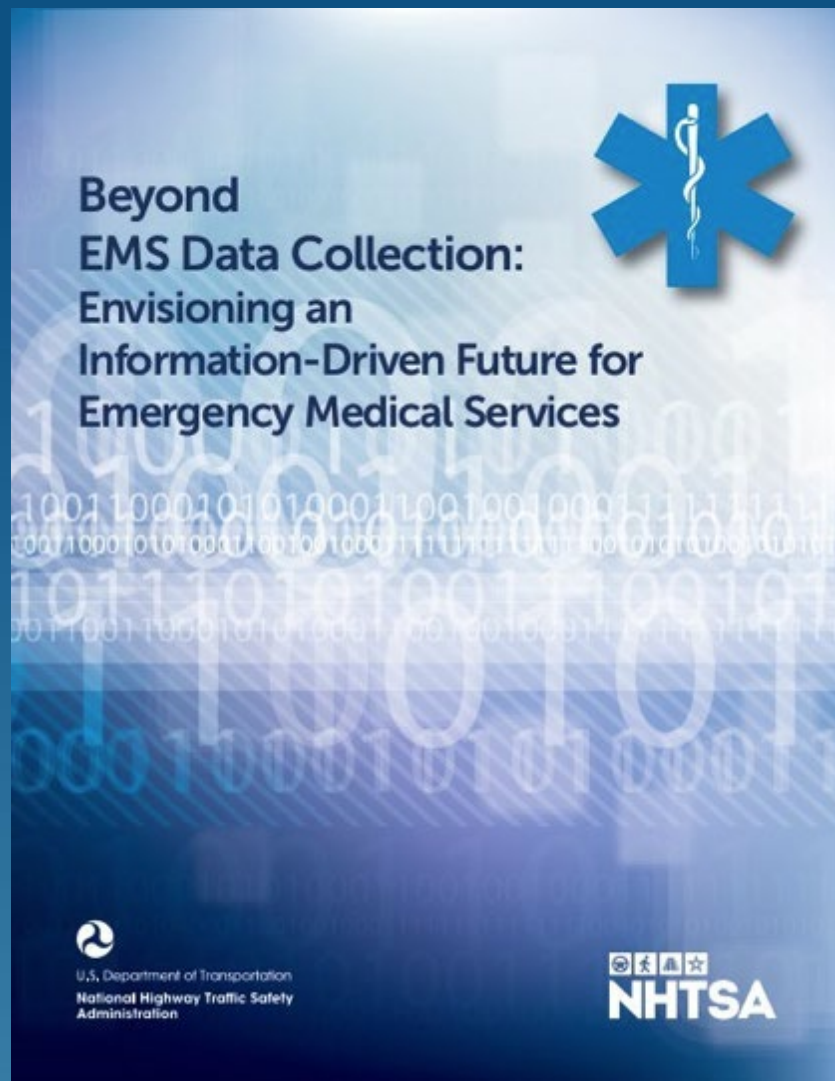
Ongoing information system development and improvement



Emphasis on and clarity about data and information use

Creation of an information culture

Ongoing information system development and improvement

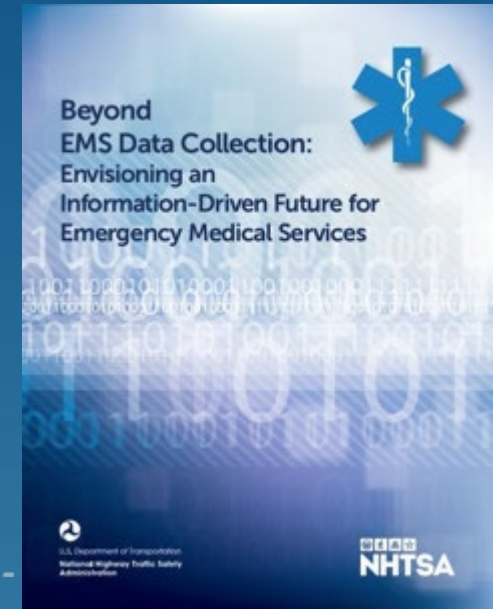




# Emphasis on and clarity about data and information use

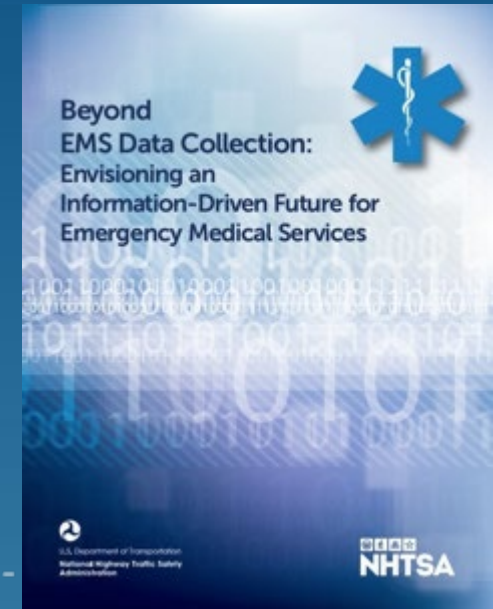
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- Create a system designed for patients, clinicians and local EMS organizations, not for policymakers and researchers
- Focus on the information data provides, not compliance



# Creation of an information culture

- Explain why data collection is important and useful
- Educate the workforce on data
- Create a cadre of EMS data experts



# Creation of an information culture

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# Creation of an information culture

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**Garbage In, Garbage Out**

# Creation of an information culture

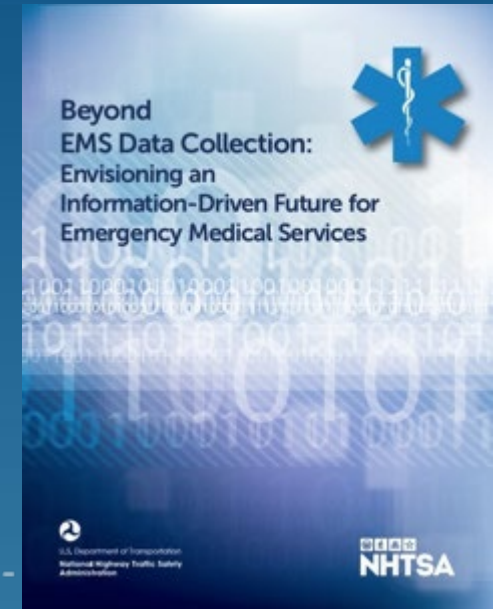


**Garbage Out, Garbage In**

# Ongoing information system development and improvement

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- Intuitive and user-friendly data entry
- Natural language processes and voice recognition technology



# Engagement

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# Engagement

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Expanding our stakeholder engagement to be more inclusive of the clinicians collecting data and the local systems using it





# Engagement

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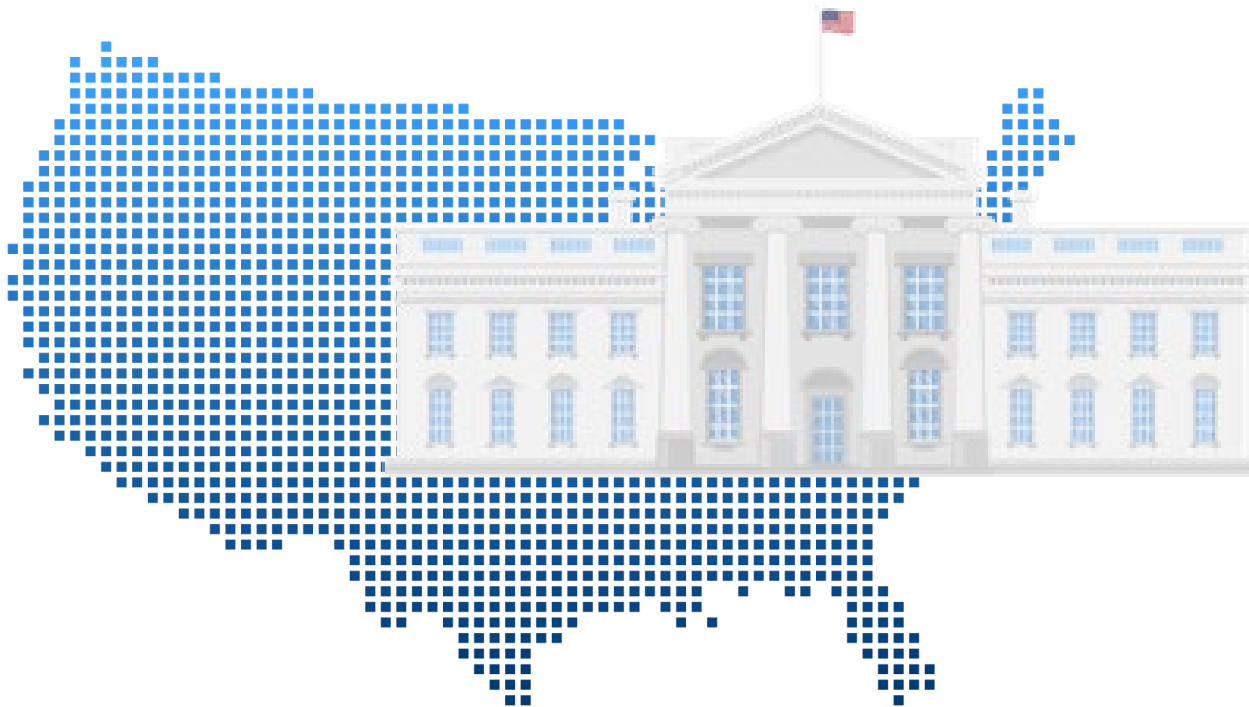
Using EMS Data at the Federal Level



# Engagement

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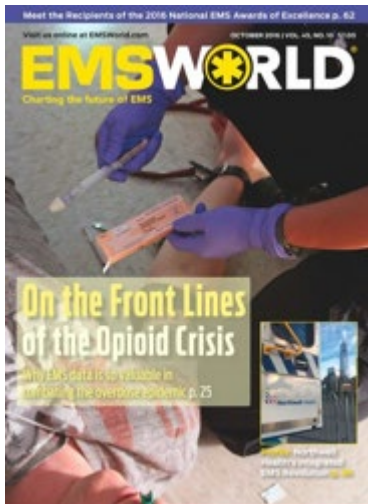
Using EMS Data at the Federal Level



# Engagement

Increased engagement at state and local levels – more with local field providers

“For the NOHD, NOEMS data is easier to access and more comprehensive than that of other sources.”



# Improvement

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# Improvement

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National EMS Quality Alliance



# Improvement

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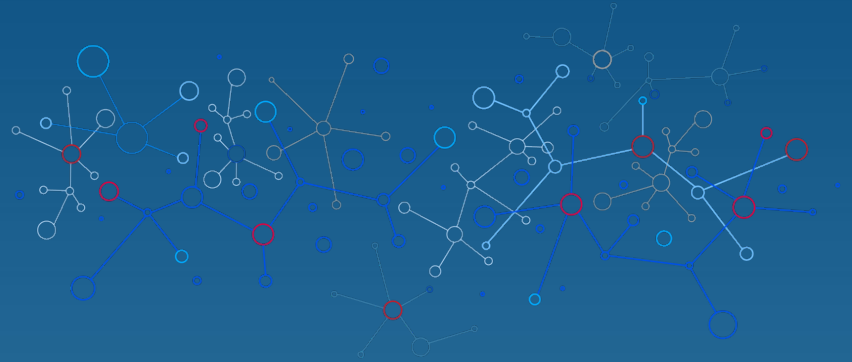
Measures Inform Dataset

Dataset Informs Measures



# Integration

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# Integration

## FEDERAL HEALTH IT STRATEGIC PLAN



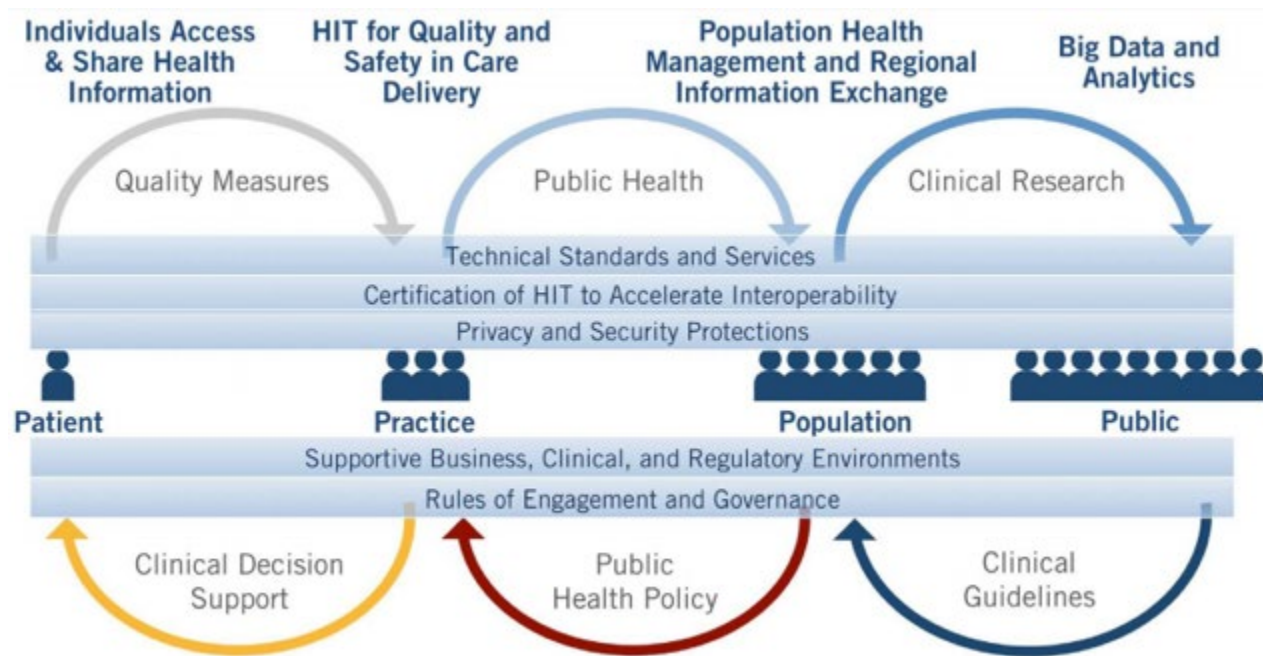
2015 – 2020



  
The Office of the National Coordinator for  
Health Information Technology



# Federal Health IT Interoperability Roadmap



The Office of the National Coordinator for Health Information Technology

# Integration

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**SHARING DATA,  
SAVING LIVES:**

The Hospital Agenda  
for Interoperability

# Integration

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Office of the National Coordinator: EMS and HIE  
National Security Council: Hospital – EMS data exchange  
NASEMSO / ACSCOT: EMS – Hospital data linkage

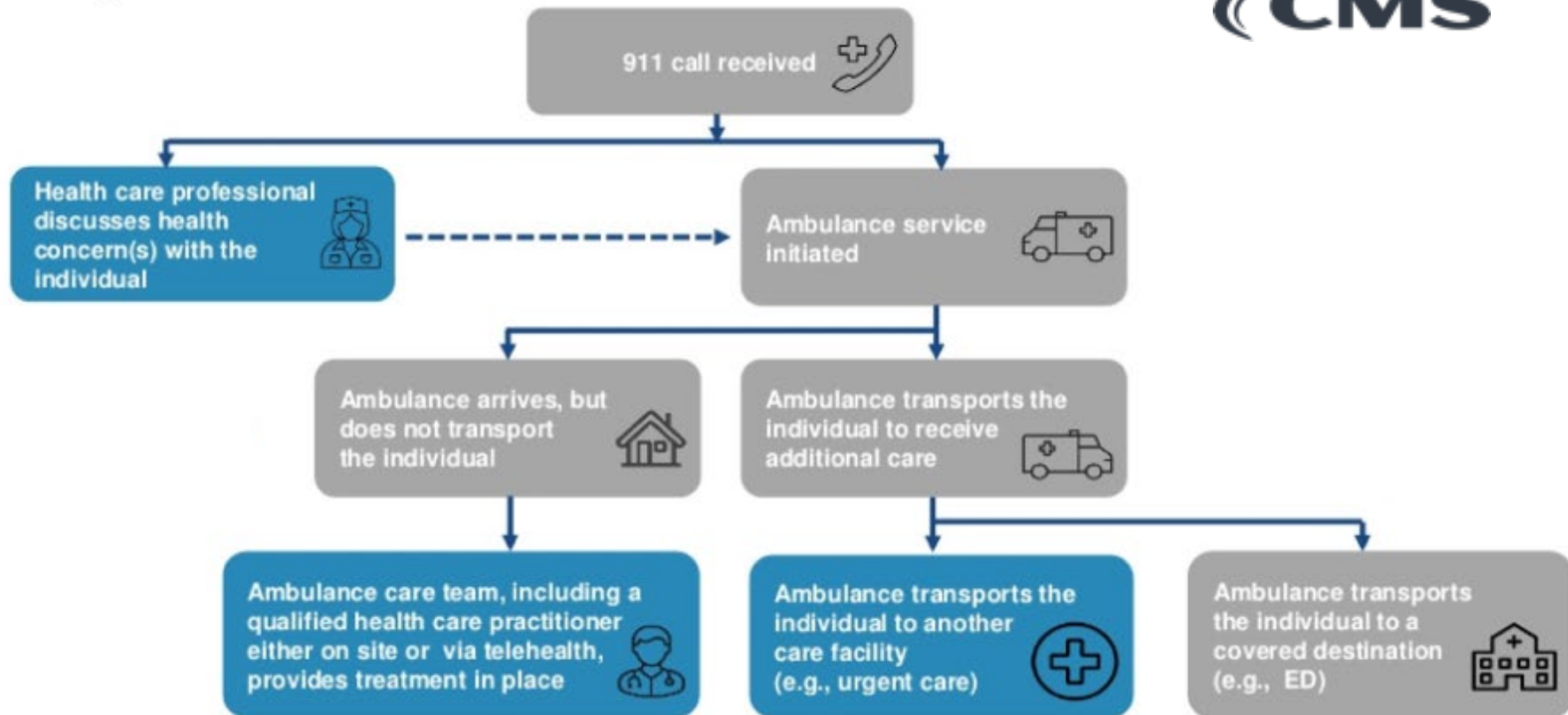
# The Future

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# The Future

Think beyond how EMS looks right now



# The Future

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Think beyond NEMSIS



# The Future

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Think beyond tomorrow

## Circulation: Cardiovascular Imaging

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ARTICLE

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 Tools  Share

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### Smartphone-Based Blood Pressure Measurement Using Transdermal Optical Imaging Technology

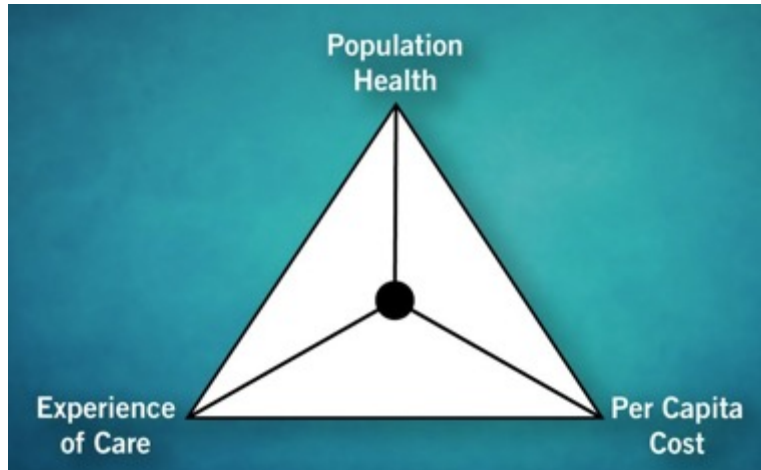
Hong Luo, Deye Yang, Andrew Barszczyk, Naresh Vempala, Jing Wei,  
Si Jia Wu, Paul Pu Zheng, Genyue Fu, Kang Lee , Zhong-Ping Feng 

Originally published 6 Aug 2019 | <https://doi.org/10.1161/CIRCIMAGING.119.008857> |  
Circulation: Cardiovascular Imaging. 2019;12



# The Future

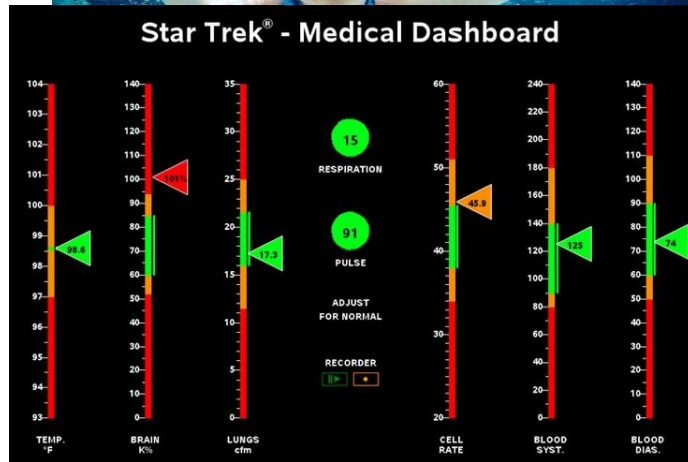
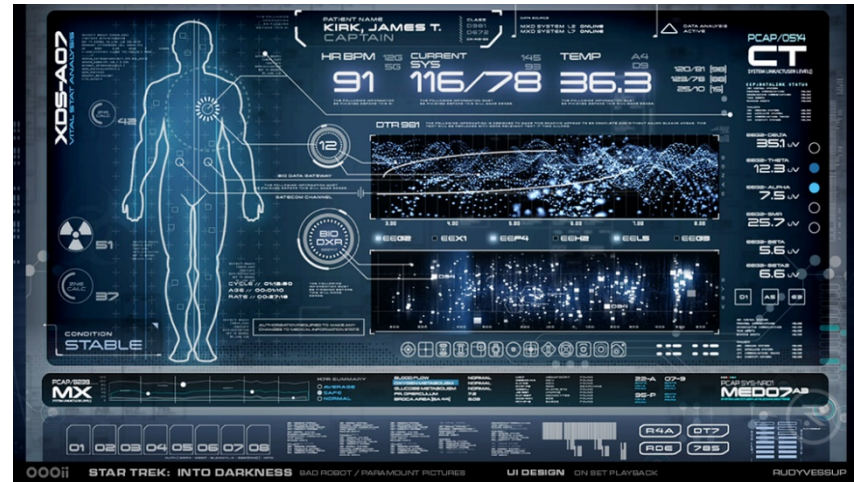
Think beyond our system





# The Future

What will my grandchildren expect NEMSIS will look like?



ePCR

# Better information leads to **better EMS**

**ems.gov**

**Jon R. Krohmer, MD, FACEP, FAEMS**

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(202) 366-9966



# ET3 User Interfaces/Data Transfer

## Emergency Triage, Treat, and Transport (ET3) Model

Center for Medicare and Medicaid Innovation (CMMI)  
Centers for Medicare & Medicaid Services (CMS)



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# Emergency Triage, Treat, and Transport (ET3) Model

August 12, 2019

Center for Medicare and Medicaid Innovation (CMMI)  
Centers for Medicare & Medicaid Services (CMS)

**PREDECISIONAL/FOR DISCUSSION PURPOSES ONLY AT  
NEMESIS V3 CONFERENCE. PLEASE DO NOT DISTRIBUTE.**



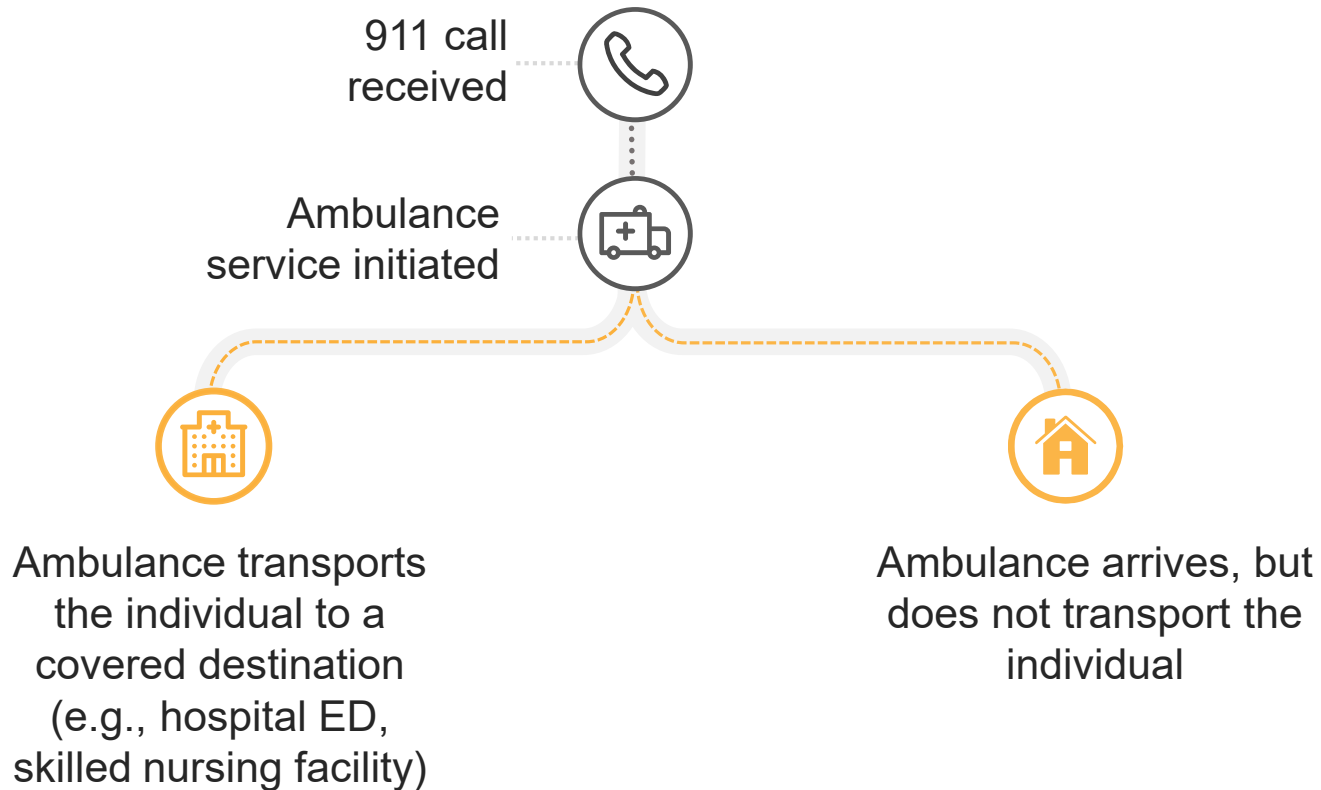
# Review of the Emergency Triage, Treat, and Transport (ET3) Model

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# Current State

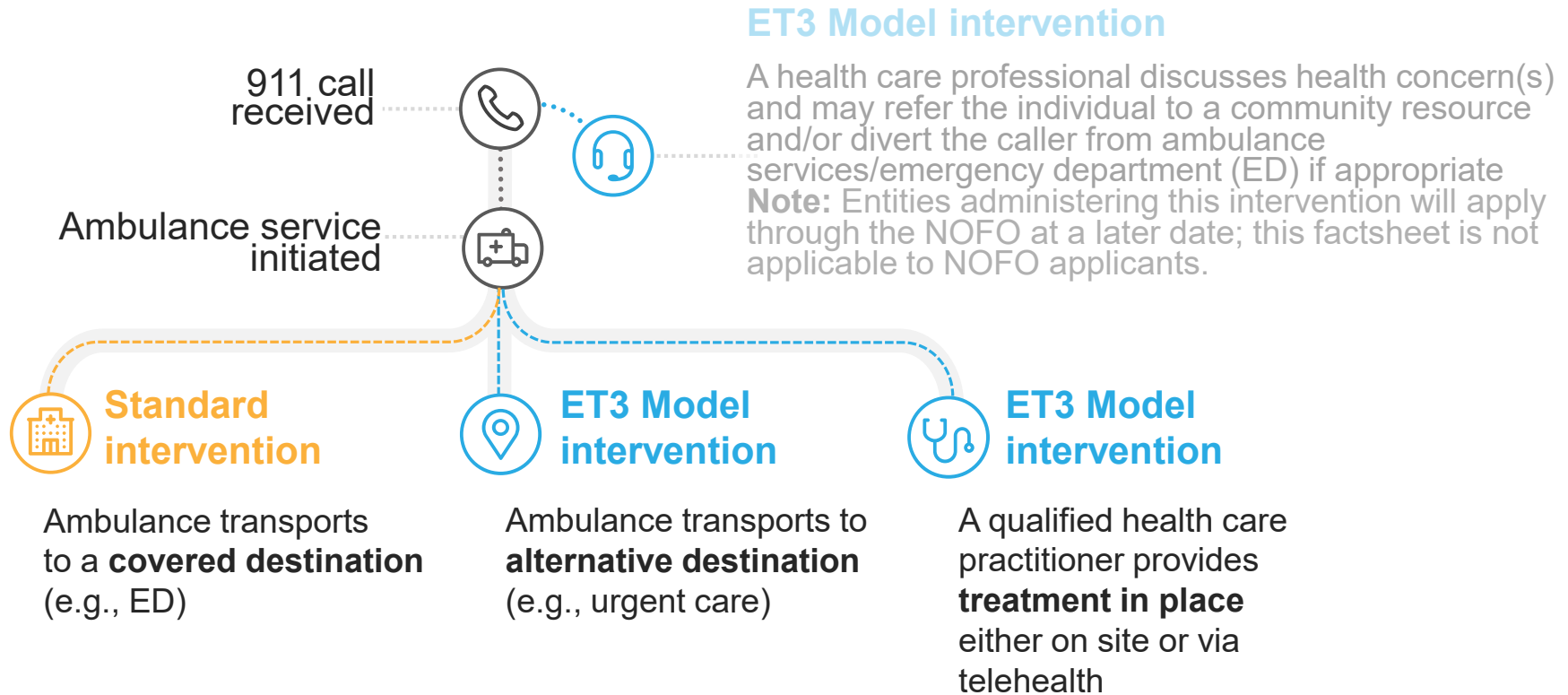
Medicare currently pays for emergency ground ambulance services only when beneficiaries are transported to a limited number of covered destinations even when a lower-acuity, lower-cost setting may more appropriately meet an individual's needs.



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# Re-aligning Incentives for Future State

ET3 Model interventions allow beneficiaries to get the care they need and enable ambulances to work more efficiently.



Blue = Model Services

Orange = Standard Medicare Services

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# Core Features of the ET3 Model

## Quality-adjusted payments for EMS innovations

- Provide new payment options for transport and treatment in place following a 911 call
- Tie payment to performance milestones to hold participants accountable for quality

## Enhanced monitoring and enforcement

- Build accountability through the monitoring of specific quality metrics and adverse events
- Include robust enforcement to ensure patient safety and program integrity



# Data Acquisition via NEMESIS

Monitor  
Patient Safety  
in Real Time

Rich data  
source familiar  
to Participants

New Data  
Source for  
CMS

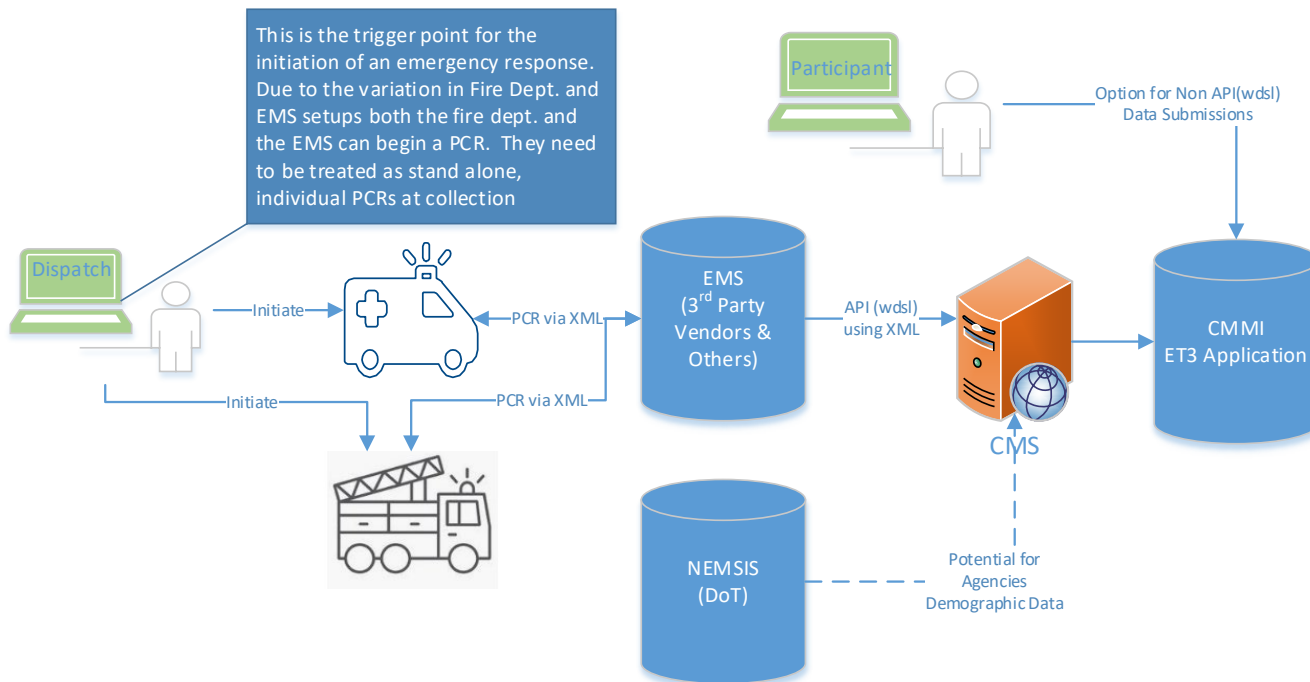
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# ET3 Model Applicant – Data Collection Plan

# Current Data Collection Approach

**Data Set.** CMMI is considering collecting a subset of the Patient Care Report (PCR) data sent to state repositories in coordination with National Highway and Traffic Safety Administration (NHSTA). The diagram below illustrates the tentative process under consideration:



Sample of PCR, NEMSIS, Data	
<b>Dispatch</b>	
Complaint Reported by Dispatch	
Dispatch Priority (Patient Acuity)	
Reason for Choosing Destination	
	.
	.
<b>Patient</b>	
Last Name	
First Name	
Middle Initial/Name	
	.
	.
<b>Response</b>	
EMS Agency Number	
Type of Service Requested	
Level of Care of This Unit	
	.
	.

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# Current Data Collection Approach Continued



**Integration.** CMMI plans to work with ET3 participants and their vendors to electronically submit the data via Web Services. This will factor in:

- CMS Security Requirements – CMS anticipates that the security standards used by Department of Transportation are the same as CMS security requirements
- CMMI still needs to complete it's technical setup



**Other Data.** At this time CMMI has put together a list of data elements to be collected. As the model progresses through implementation, there may be a need to for additional data elements to be added to that list

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# CMMI Questions for Discussion

- What will vendors need from CMMI to identify which ambulance suppliers/providers are in the ET3 model and therefore require data submissions?
- What is the projected cost for vendors to provide NEMESIS data to CMMI on a regular basis?
- Are any vendors willing to share their patient probabilistic matching business rules/logic with CMMI ET3 Model team? *Please note, CMMI is not interested in code.*
- In relation to patient probabilistic matching, are EMS agencies willing to share billing data to enable more robust patient identification?
- What is the average length of time that data is kept before archiving?
- Is the length the data is kept live and the archiving a total of 8 years?
- Are there peak volume periods; days, seasons, events, etc. for PCRs?
- What is the estimated cost to retrieve the cost from archiving?
- Will there be significant costs associated with a bulk send of data, January – June 2020, to CMMI?

# NEMESIS Conference Participant Questions?

Thank you for you time and participation!

**PREDECISIONAL/FOR DISCUSSION PURPOSES ONLY AT NEMESIS V3 CONFERENCE. PLEASE DO NOT DISTRIBUTE.**



# Overview of V3.5.0 Products

## Accounting of the V3.5.0 Revision Process

**NEMESIS TAC Team**

# Revision Process

- 126 Submitted revision requests
  - 61 balloted “Not in Scope”
    - 27 Declined, 29 Deferred, 5 completed/implemented
  - 65 balloted to move forward
    - 12 add/remove element, 32 add/remove value, 9 definition change, 12 technical fix
    - 34 “improved provider experience”, 20 “no change to provider experience”, 11 “some impact on provider experience”.
- Resulted in 264 revisions



# Assorted Highlights

- National Elements
  - Reduced from 165 (V3.4.0) to 155 (V3.5.0)
- Added/Promoted Elements
  - eTimes.17 - Unit Arrived at Staging Area Date/Time
  - ePatient.22 - Alternate Home Residence
  - eExam - Chest/Lungs Assessments separated
  - eSituation.18 - Date/Time Last Known Well
  - eHistory.20 - Current Medication Frequency
  - eOther.22 - File Attachment Name
  - eMedications.04 - Medication Administered Route
  - eScene.24 - First Other EMS or Public Safety Agency at Scene to Provide Patient Care
  - eDisposition.IncidentDispositionGroup
  - eDisposition.32 - Level of Care Provided per Protocol



# Assorted Highlights

- Schematron rules now in the data dictionary
- Updated “Suggested Lists” – shorter

## **eInjury.01 - Cause of Injury**

- In 2017, 1,365 ICD-10-CM codes reported.
  - The current suggested list has 25 Tier 1 classifications with 144 codes.
  - The revision has 17 Tier 1 classifications with 80 codes.
- The revised Suggested List represents 91.13% of all events with injury codes.

# Assorted Highlights

- StateDataSet becomes a NEMESIS standard
  - Added to the NEMESIS Data Dictionary
- Simplified eOutcomes section
  - (National elements only)
- Removed National Schematron rules related to non-National elements
- No more “pattern-based” National Schematron rules....Atomic!

# Controversial?

- ePatient.13 – now Sex or gender identification
- Patient Height/Length – not added to eExam
- eProcedures and eAirway not combined
- Reinstated a previously deprecated element
  - eArrest.10 - Therapeutic Hypothermia by EMS

# Items Requiring Education

- Revised eDisposition Section
- Expanded meaning to PNs
  - With a value (eMedications.03)
  - Without a value (ePatient.02)
  - With or without a value (eSituation.01)
- eVitals.16 - End Tidal Carbon Dioxide (ETCO<sub>2</sub>)
  - Added an attribute ETCO<sub>2</sub>Type (mmHg, %, kPa)
- eArrest includes CARES definitions

# NEMESIS UUIID

NEMESIS 3.5

Josh Legler, Data Consultant

# UUIDs

- Mandatory
- Auto-generated by “Collect Data” systems
- Used by “Receive & Process” systems as keys
- Unchanging for an object over time within a system
- No business meaning
- Use IETF RFC 4122 algorithm

e48cd734-01cc-4da4-ae6a-915b0b1290f6

# Elements that Have UUIDs

## DEMDataset

### DemographicReport

- dAgency.AgencyServiceGroup
- dAgency.AgencyYearGroup
- dContact.ContactInfoGroup
- dConfiguration.ConfigurationGroup
  - dConfiguration.ProcedureGroup
  - dConfiguration.MedicationGroup
- dLocation.LocationGroup
- dVehicle.VehicleGroup
  - dVehicle.VehicleCertificationLevelsGroup
  - dVehicle.YearGroup
- dPersonnel.PersonnelGroup
  - dPersonnel.ImmunizationsGroup
  - dPersonnel.LicensureGroup
  - dPersonnel.CertificationLevelGroup
- dDevice.DeviceGroup
- dFacilityGroup
  - dFacility.FacilityGroup

## EMSDataset

### PatientCareReport



# Uniqueness

Per national DEMDataSet Schematron schema:

- The same UUID cannot occur more than once within a DemographicReport

# PCR Identifier

## Pre-3.5.0

- dAgency.01 - EMS Agency Unique State ID
- dAgency.02 - EMS Agency Number
- dAgency.04 - EMS Agency State
  
- eRecord.01 - Patient Care Report Number
- eResponse.14 - EMS Unit Call Sign
- eTimes.03 - Unit Notified by Dispatch Date/Time

## 3.5.0

- dAgency.01 - EMS Agency Unique State ID
- dAgency.02 - EMS Agency Number
- dAgency.04 - EMS Agency State
  
- PatientCareReport UUID

# Issues

- Translation
  - 3.5.0 → 3.4.0: Yes
  - 3.4.0 → 3.5.0: No
- Agency switching vendors
- Personnel records in state systems

# Schematron

NEMESIS 3.5

Josh Legler, Data Consultant

# ISO Schematron Version

ISO/IEC 19757-3:2006 → ISO/IEC 19757-3:2016

- “This edition is backwards compatible with ISO/IEC 19757-3:2006...”
- “NOTE [...] was not part of ISO/IEC 19757-3:2006.”

# CHANGES IN NATIONAL RULES

# Data Dictionary Integration

eResponse.01

State
National

**eResponse.01 - EMS Agency Number**

**Definition**

The state-assigned provider number of the responding agency.

National Element	Yes	Pertinent Negatives (PN)	No
State Element	Yes	NOT Values	No
Version 2 Element	E02_01	Is Nillable	No
Usage	Mandatory	Recurrence	1 : 1

**Associated Performance Measure Initiatives**

Airway   Cardiac Arrest   Pediatric   Response   STEMI   Stroke   Trauma

**Constraints**

Data Type	minLength	maxLength
string	1	15

**Data Element Comment**

The EMS Agency Number in eResponse.01 can auto-populate from dAgency.02 EMS Agency Number in the demographic section.

**Associated Validation Rules**

Rule ID	Level	Message
nemSch_e011	Warning	EMS Agency Number in the patient care report should match EMS Agency Number in the agency demographic information.

# Shorter Assertion IDs

- 3.4.0: nemSch\_consistency\_eScene.07\_mci\_eScene.06
- 3.5.0: nemSch\_e068



# Fatal / Error / Warning

- Error: Likely due to software misconfiguration
  - When (*Element*) has a Not Value (Not Applicable, Not Recorded, or Not Reporting), it should be empty.
- Warning: Likely due to user mistake
  - Type of Destination should be recorded when Transport Disposition is "Transport by This EMS Unit...".

# National Elements Only

- Asserts are limited to national elements only:
  - ~~Date/Time of Event (per Medical Device) should not be earlier than Arrived at Patient Date/Time.~~
- With these exceptions:
  - Nil / Not Value / Pertinent Negative
  - UUID

# Assertions More Atomic

## 3.4.0

- When Cardiac Arrest is "Yes", the following information related to cardiac arrest and resuscitation should be recorded: **Cardiac Arrest Etiology, Resuscitation Attempted By EMS, Arrest Witnessed By, CPR Care Provided Prior to EMS Arrival, AED Use Prior to EMS Arrival, Cardiac Rhythm on Arrival at Destination**

## 3.5.0

- **Cardiac Arrest Etiology** should only be recorded when Cardiac Arrest is "Yes...".
- **Resuscitation Attempted By EMS** should be recorded when Patient Evaluation/Care is "Patient Evaluated and Care Provided" and Cardiac Arrest is "Yes...".
- **Arrest Witnessed By** should be recorded when Patient Evaluation/Care is "Patient Evaluated and Care Provided" and Cardiac Arrest is "Yes...".
- **AED Use Prior to EMS Arrival** should be recorded when Patient Evaluation/Care is "Patient Evaluated and Care Provided" and Cardiac Arrest is "Yes...".
- **Cardiac Rhythm on Arrival at Destination** should be recorded when Transport Disposition is "Transport by This EMS Unit..." and Cardiac Arrest is "Yes...".

# Assertions Rephrased

- The message starts with the element that most likely needs to be addressed
  - 3.4.0: When Possible Injury is "Yes", the following information related to injury should be recorded: **Cause of Injury**
  - 3.5.0: **Cause of Injury** should be recorded when Patient Evaluation/Care is "Patient Evaluated and Care Provided" and Possible Injury is "Yes".

# New Assertions

- Identified from full data dictionary review
  - Incident State should be recorded unless Unit Disposition is "Cancelled Prior to Arrival at Scene".
- Related to new elements/attributes
  - End Tidal Carbon Dioxide (ETCO2) should be no more than 100 when ETCO2 Type is "Percentage".

# StateDataSet

- StateDataSet is now a mandatory data set to be generated by “Receive & Process” systems, so there is now a national Schematron schema for StateDataSet.

# Candidate Release Resources

<https://nemsis.org/v3-5-0-revision/v3-5-0-candidate-release/>

# Compliance Testing Changes

Laurel Baeder, NEMESIS Compliance  
Officer



# State Data Set Testing

- StateDataSet will become a mandatory part of the NEMESIS Standard
- Collect Data Software will be tested on the ability to use a State Data Set
- Receive and Process Software will be tested on the ability to generate a State Data Set

# Schematron Generation

- Receive and Process Systems will be tested on their ability to generate Schematron files.

# Retesting and Recertification

- Under v3.5.0 we will require that software retest every 2 years, or at ever major revision (whichever comes sooner).
- We plan to implement a formal retesting process for v3.4.0 (and v3.5.0) beginning on Jan 1, 2020
- We will also make new test cases available yearly, to facilitate recertification.

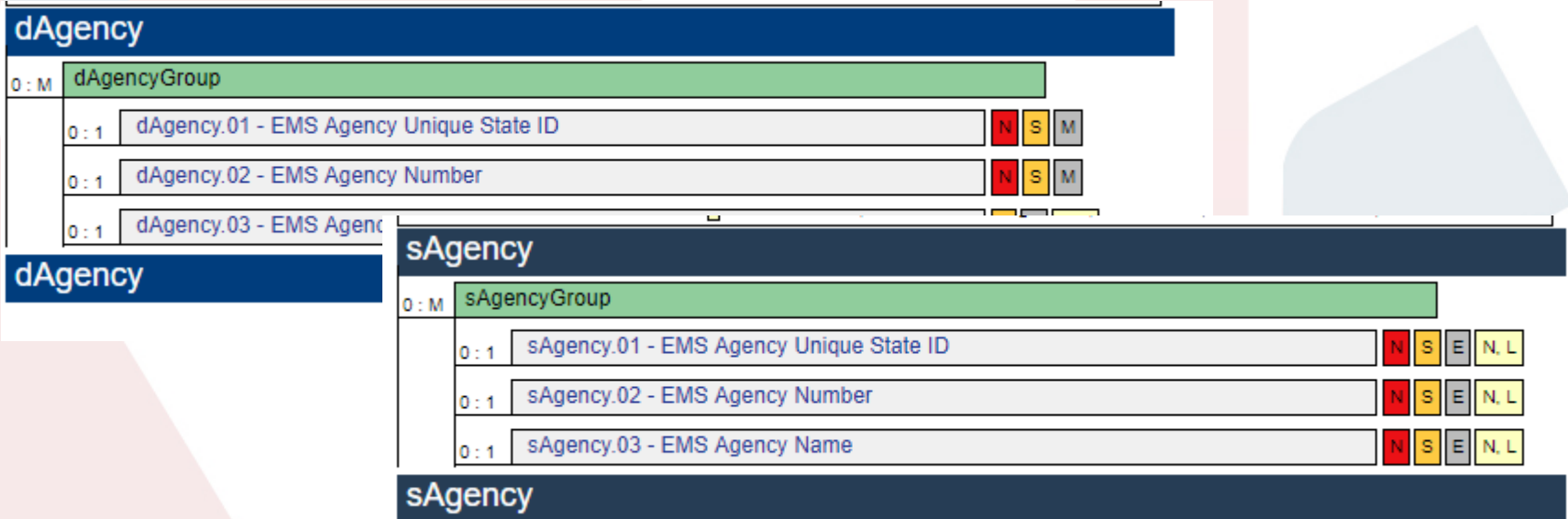
# Document Revisions

- In our Compliance documentation, we use the phrase “market-ready” to describe how complete software should be *before* testing
- Should we use different language?
- Should we hold software to a different level of completion before testing?

# StateDataSet Changes

# Renamed and renumbered

- The most apparent change to State Data Set was the renaming and renumbering of all elements to allow it to truly stand alone.



# Submission via WS

- In v3.5.0 we will require that the StateDataSet be submitted to the TAC via web services. This will facilitate faster distribution of this valuable data.

# Inclusion of State Software Info

- Much like the eRecord section in the PCR, the sSoftware section in StateDataSet will record the Software Company Name, Product Name, and Version Number.
- This will help the NEMESIS TAC work better with states and vendors, and allow up to provide more accurate and robust reports.



# Distribution Questions

- Does the current process of distribution, via GIT and the NEMESIS TAC website, work for states, agencies and vendors?
- Is there a different way we should be distributing this data?
- What other challenges to you see that we have no considered or addressed?

# NEMESIS Breakout Session Round #1



# Collaborating with NIST



*Securing the first responder of the future*

## PSCR Overview



*Securing the first responder of the future*

# PSCR Overview



**Public Safety Communications Research (PSCR) is the primary federal laboratory conducting research, development, testing, and evaluation for public safety communications technologies.**



## Sponsors



## Middle Class Tax Relief & Job Creation Act



## Partners at NIST



Communications Technology Laboratory

WIRELESS NETWORKS DIVISION

# Public Safety Innovation Accelerator Program (PSIAP)



## Grants and Cooperative Agreements

**WE'VE ALREADY AWARDED OVER \$52M  
AND MORE IS ON THE WAY**

PSCR works with public safety agencies, academic researchers, and industry partners in both technology and human/social areas, and system developers to support our mission and accelerate the advancement of public safety communications technologies. PSCR leverages Financial Assistance Awards in the form of grants and cooperative agreements to stimulate critical R&D, advanced engineering, and product development in key technology focus areas.



## Open Innovation Prize Challenges

Recently Launched Challenges:

[Haptic Interfaces for Public Safety](#)

*Launched March 18!*

[Expanding the SIM Card Use for Public Safety](#)

*Launched April 3!*

[Tech to Protect - Coding for Emergency Responders](#)

*Launched April 2!*

Creativity is critical to solving complex problems, developing new strategies, facilitating innovation, and driving organizational change. PSCR's Open Innovation focuses on advancing public safety communications by leveraging the expertise and innovative solutions from a diverse array of contributors and collaborators across the globe.

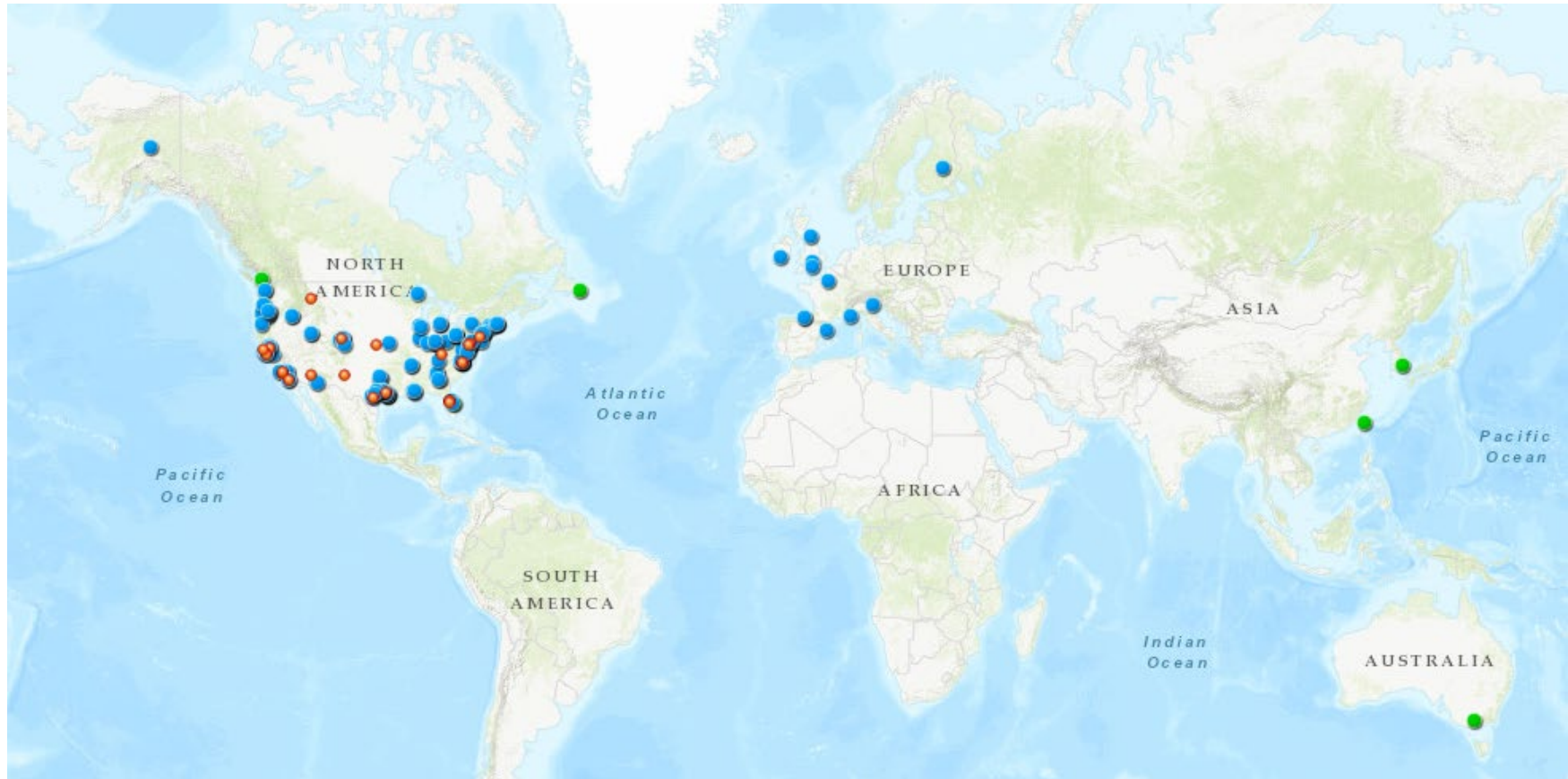
Our mission is to create a framework in which we can work with individuals, companies, organizations, and academic institutes in a rapid, more collaborative ways than traditional engagements. Our Open

**Get involved with  
Open Innovation!**

Become a public safety  
**SUBJECT MATTER EXPERT.**

We are ALWAYS looking for volunteers to  
evaluate contest results.

# External Funding





# 5 Key Research Areas

LMR to LTE

User Interface User Experience  
Mission Critical Voice

Location-Based Services  
Public Safety Analytics

Security  
Resilient Systems

Cross Cutting Research Areas

## PSCR Security Services

- Maintain Security of our Demonstration Network
- Provide Security overlay for all PSCR research
- Security specific research projects

## PSCR Security Projects

- **Public Safety Federated ICAM/Mobile Single Sign On (SSO)**
- Public Safety Handsets and Wearables Security
- Expanding the use of the SIM for Public Safety
- Mobile Application Security Vetting
- 3GPP SA3 Workgroup Support



# An Innovative Solution

NIST



# Prize Challenge

NIST



**USE YOUR SECURITY OR  
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# Teamwork

NIST



# National Cybersecurity Center of Excellence

## Overview for NEMESIS

Bill Fisher, National Cybersecurity Center of Excellence

August 2019



**Defined**



## > Mission

**Accelerate adoption of secure technologies:** collaborate with innovators to provide real-world, standards-based cybersecurity capabilities that address business needs





# > Engagement & Business Model

## DEFINE



### OUTCOME:

Define a scope of work with industry to solve a pressing cybersecurity challenge

## ASSEMBLE



### OUTCOME:

Assemble teams of industry orgs, govt agencies, and academic institutions to address all aspects of the cybersecurity challenge

## BUILD



### OUTCOME:

Build a practical, usable, repeatable implementation to address the cybersecurity challenge

## ADVOCATE



### OUTCOME:

Advocate adoption of the example implementation using the practice guide



# Public Safety Work



## > Project Challenge

- Mobile platforms offer a significant operational advantage to public safety stakeholders by providing access to mission critical information.
- These advantages can be limited if complex authentication requirements hinder PSFR personnel, especially when delay – even seconds – is a matter of containing or exacerbating an emergency situation.



# > Project Solution

## Multifactor Authentication (MFA) to Mobile Resources

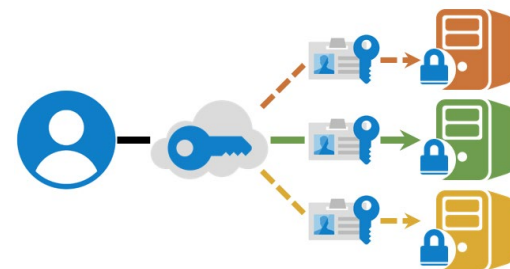
- Biometrics, external hardware authenticators and other authentication options

## Single Sign-on (SSO) to Mobile Resources

- Authenticate once with mobile native app or web apps
- Leverage initial MFA when accessing multiple applications

## Identity Federation

- Leverage directory services already in place
- Send identities across jurisdictional boundaries



# > NCCoE Benefits – Industry Collaboration

NCCoE brings in Industry experts to design and build the reference design:

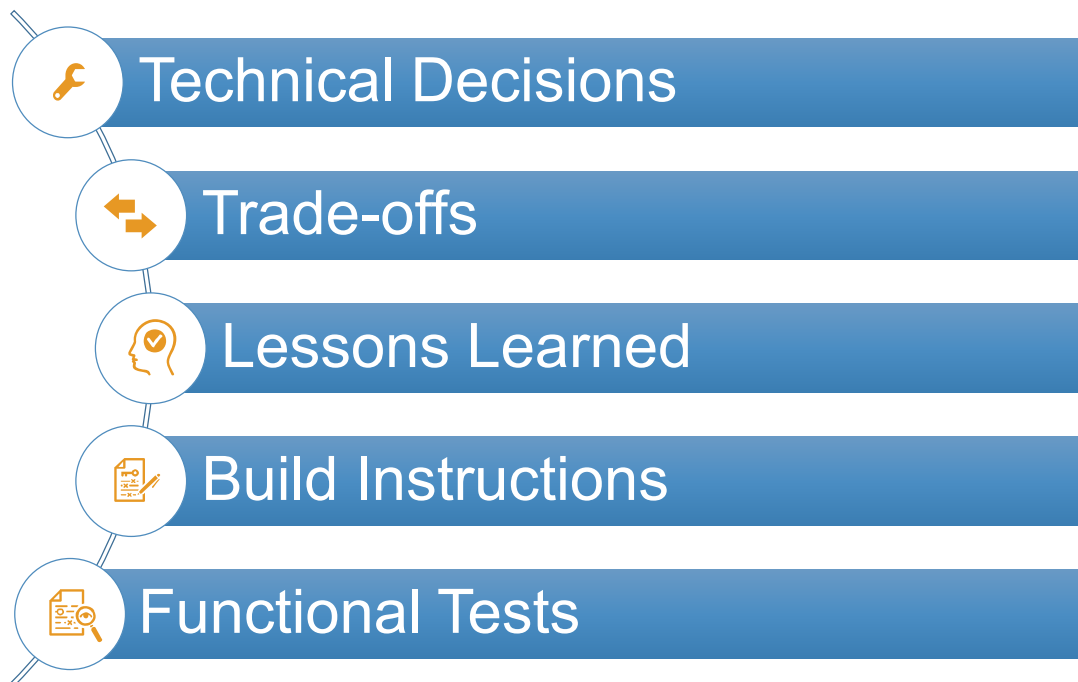
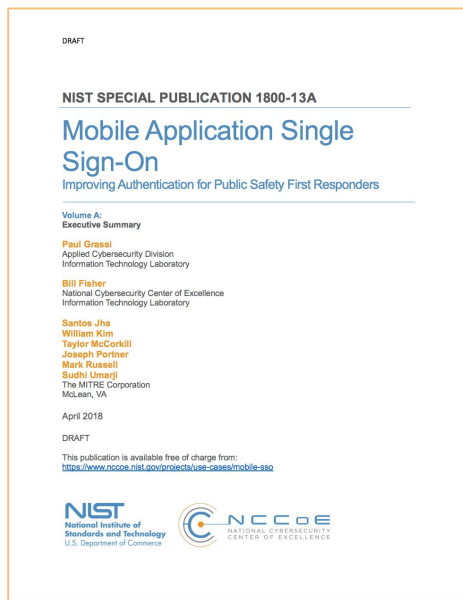


Mobile SSO Technology Vendor Build Team:



# > NCCoE Benefits – Practical Guidance

- Project will result in a freely available NIST Cybersecurity Practice Guide (SP 1800-13) including:





## Related Work



# > Healthcare Sector



## Projects

- [Securing Telehealth Remote Patient Monitoring Ecosystem Project Description](#)
- [Securing Picture Archiving and Communication Systems Project Description](#)
- Securing Wireless Infusion Pumps in Healthcare Delivery Organizations ([SP 1800-8](#)) [Check out our video here](#)
- Securing Electronic Health Records on Mobile Devices ([SP 1800-1](#))

## Join our Community of Interest

Email us at [hit\\_nccoe@nist.gov](mailto:hit_nccoe@nist.gov)





# Contact



## William Fisher, Security Engineer

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Project Updates: <https://nccoe.nist.gov/projects/use-cases/mobile-ss0>



<http://nccoe.nist.gov>

v



301-975-  
0200



[nccoe@nist.gov](mailto:nccoe@nist.gov)



**Questions?**



# Practical Mechanism for Linking EMS and Trauma Data

NEMESIS Technical Assistance Center  
University of Utah School of  
Medicine

# A NATIONAL TRAUMA CARE SYSTEM

**Integrating Military and Civilian  
Trauma Care Systems to Achieve  
Zero Preventable Deaths After Injury**

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## Study Sponsors

- American College of Emergency Physicians
- American College of Surgeons
- National Association of Emergency Medical Technicians
- National Association of EMS Physicians
- Trauma Center Association of America
- U.S. Department of Defense's U.S. Army Medical Research and Materiel Command
- U.S. Department of Homeland Security's Office of Health Affairs
- U.S. Department of Transportation's National Highway Traffic Safety Administration



 American College of  
Emergency Physicians®  
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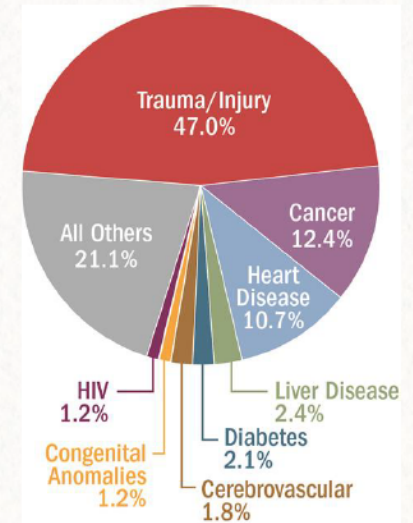
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**NAEMT**   
Serving our nation's EMS practitioners.

## Context

- **The Imperative**
  - The U.S. service members the nation sends into harm's way and every American should have the best possible chance for survival and functional recovery after injury.
- **The Urgency**
  - **Military burden:** ~6,850 service member deaths in Iraq and Afghanistan. Nearly 1,000 from potentially survivable injuries.
  - **Civilian burden:** 147,790 U.S. trauma deaths in 2014 - as many as 30,000 may have been preventable with optimal trauma care.
  - Threats from active shooter and other mass casualty incidents.
  - As wars end and service members leave the military, the knowledge, experience and advances in trauma care gained over past decade are being lost.
- **The Opportunity**
  - Existence of a military trauma system built on a learning system framework that has achieved unprecedented survival rates for casualties.
  - Organized civilian trauma system that is well positioned to assimilate recent wartime trauma lessons learned and serve as a repository and incubator for innovation during the interwar period.

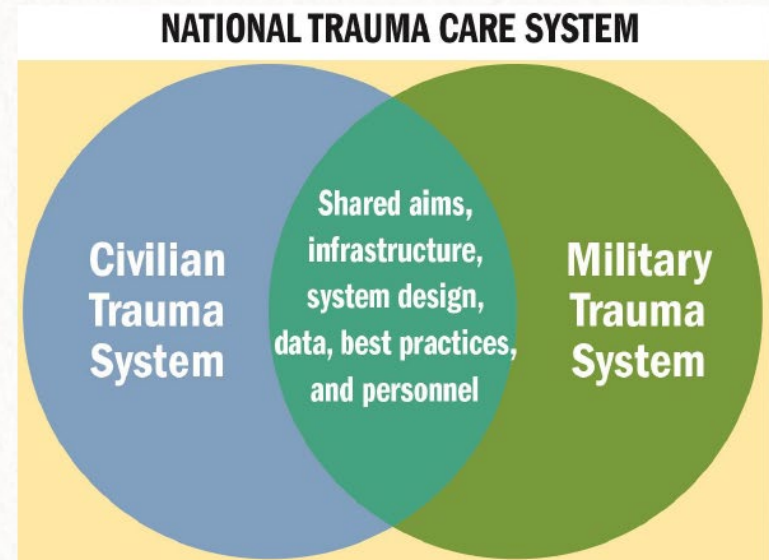


**Traumatic injury accounts for nearly half of all deaths for Americans under 46 years of age and cost the nation \$670B in 2013.**

## The Vision: A National Trauma Care System

A national strategy and joint military–civilian approach for improving trauma care is lacking. **A unified effort is needed to ensure the delivery of optimal trauma care to save the lives of Americans** injured within the United States and on the battlefield.

A national learning trauma care system would **ensure continuous improvement of trauma care best practices** in military and civilian sectors.



*“Military and civilian trauma care will be optimized together, or not at all.”*

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## Improving the Collection and Use of Data

**Recommendation 5: The Secretary of HHS and the Secretary of Defense, together with their governmental, private, and academic partners, should work jointly to ensure that military and civilian trauma systems collect and share common data spanning the entire continuum of care. Measures related to prevention, mortality, disability, mental health, patient experience, and other intermediate and final clinical and cost outcomes should be made readily accessible and useful to all relevant providers and agencies.**

- Congress and the White House should hold DoD and the VA accountable for enabling the linking of patient data stored in their respective systems.
- ACS, NHTSA, and NASEMSO should work jointly to enable patient-level linkages across the NEMESIS National EMS Database and the National Trauma Data Bank.
- HHS, DoD, and their professional society partners should jointly engage the National Quality Forum in the development of measures of the overall quality of trauma care. These measures should be used in trauma quality improvement programs, including ACS TQIP.

**Recommendation 9: All military and civilian trauma systems should participate in a structured trauma quality improvement process.**

- ACS should expand TQIP to encompass measures from point-of-injury/prehospital care through long-term outcomes, for its adult as well as pediatric programs.
- CMMI should pilot, fund, and evaluate regional, system-level models of trauma care delivery.

*Full list of actions detailed in bullets  
that follow the recommendation*

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## Our Charge

- Among the 11 recommendations is a recommendation that governmental, private, and academic partners work collaboratively to ensure that military and civilian trauma systems collect and share common data spanning the entire continuum of care. Specifically, the report recommends that:
  - *The American College of Surgeons (ACS), the National Highway Traffic Safety Administration, and the National Association of State EMS Officials (NASEMSO) should work jointly to enable patient-level linkages across the National Emergency Medical EMS Information System Project's National EMS Database and the National Trauma Data Bank.*
- The conceptual basis for this recommendation is the need for complete and accurate data representing the trauma care continuum.

# Use of a GUID

- What is a GUID?
  - GUID = Global Unique Identifier (electronically generated)
    - Originally created by Microsoft (used in Windows OS).
    - Globally unique (even if generated by disconnected, independent engines).
    - No other association, meaning or value.
      - Only use: identify a unique record.

- Example of a GUID

123e4567-e89b-12d3-a456-426350453501

Odds of a GUID Collision =  $2^{-122}$

Odds of Winning the Powerball =  $1^{-9}$

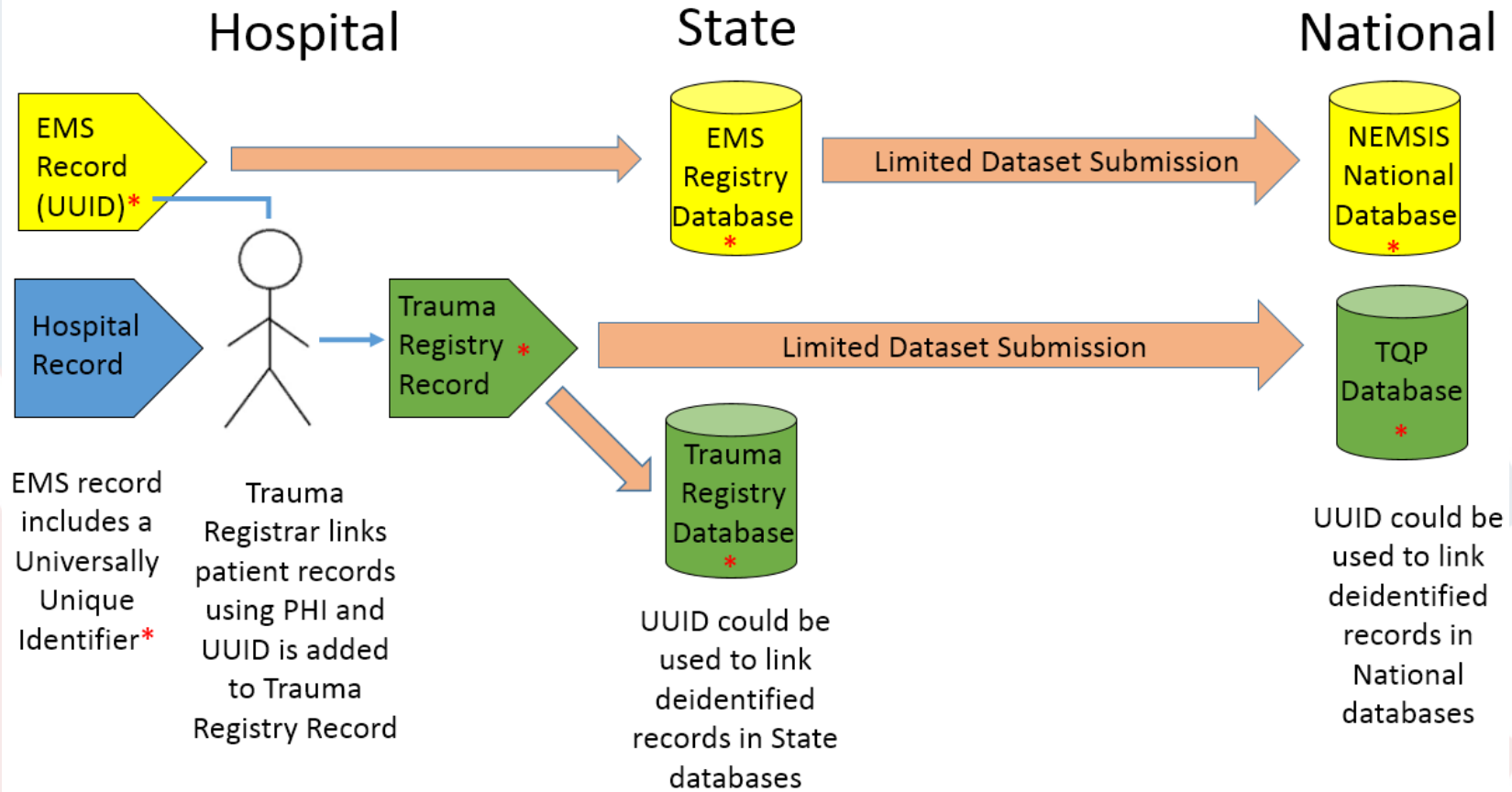
## How would we Implement a GUID (EMS Side)

- Generate and embed a GUID in a NEMESIS compliant Electronic Patient Care Report (ePCR)
  - A GUID will be added in the next revision of the NEMESIS standard.
  - Implementation is certain
    - All EMS Software is tested for compliance to the NEMESIS standard.
    - Automatically generated when an ePCR is initiated.
  - The GUID will remain with the ePCR during information exchanges

## How would we Implement a GUID (Trauma Side)

- The National Trauma Data Standard (NTDS) should add an element to document the NEMESIS GUID.
  - A hospital registrar uses established processes for connecting an EMS record to an inpatient record
    - Registrars deterministically link records with patient identifiers.
    - The NTDS currently includes 33 elements from the EMS record.
  - The GUID is exchanged electronically across systems...when electronic transfer of EMS data to the registry record has been developed
    - Less developed systems may rely on manual documentation and transfer of the GUID to the trauma registry record.
  - When sending data to the NTDB, the NEMESIS GUID will be included
- **The NTDB now incorporates a Nationally unique identifier to the associated NEMESIS record!**

# Suggested Use Case



## Value Added (Privacy and Ethics)

- The GUID has no intrinsic relationship to the patient.
  - Contains no PHI or PII or any inherent connect to the patient.
  - (i.e., the GUID is meaningless without access to both registries).
- Can be shared from the EMS agency...to the state...to the nation...with no lingering relationship to a patient, provider, hospital, or state.
- Could require modifications to NEMESIS and NTDB data use requirements.

## Value Added (Accessibility)

- Local hospital, EMS agency, state and national registries now all have the same unique link between EMS and hospital records for trauma patients.



## Value Added (Technical)

- Strong working relationship between NHTSA (NEMESIS) and ACS (NTDB).
- Allows de-identified national registries to be linked (NTDB to NEMESIS) without use of PHI or PII.
- Much more accurate and reliable than probabilistic linkage.
- Ensures a consistent process can be used across the Nation.

## Value Added (Quality)

- The initial “linkage” between an EMS record and a trauma registry record is completed by a trained registrar with full access to PHI and PII.
- If the GUID can be exchanged electronically between the EMS record and the trauma registry record, there is no chance for error due to human intercession.

## Value Added (Cost)

- Cost would be minimal....cost of adding an element to NTDB.
- The “opportunity” for linkage would be inherently available in the established NEMESIS standard and NTDB standard.
- No need for additional materials, software, or personnel.
- No technical expertise must be retained and maintained.
- No process is reliant on separate funding.

## Value Added (Political)

- National registries make linkage “available”
  - Hospitals and states can “opt out” by leaving the element blank when exchanging data.
  - Allows early adopters to begin, while laggards...do whatever laggards do...talk, poke holes, bicker, delay!
    - Reluctant parties are able to assess the value demonstrated by “doers”!

# State Utility

- All states now have a “direct link” mechanism between EMS data and Trauma data.
  - Reduced costs for existing state data collection efforts (e.g., CODES, FARS, CISS-type data collection programs).
  - Direct ability to compare trauma outcomes with EMS care, controlling for injury severity (ISS scores from the trauma registry)...(a DOT directive).

# National Utility

- Links two National health registries
  - Both registries now have enhanced value by including complete information from adjoining healthcare service.
  - Both registries remain de-identified.
- Fulfills DOT edict to associate vehicular injuries with injury severity.
- State and National registries are as current as the “call for data”.
  - Nationally: ACS = Quarterly?, NEMSIS = Real time (Ave. 7 minute delay).

# Strengths and Weaknesses

- Strengths
  - Simple to implement, low cost, precise, reliable.
  - Draws on strong relationship between NTDS and NEMESIS.
  - Data always remains de-identified.
- Weaknesses
  - Maybe perceived as a “unique identifier” passing to a national registry.
  - Requires that ACS and NHTSA remain partners.

“Start with what you got....and grow it”, Kathy G.

# NEMESIS Breakout Session Round #2





# Thank you for Attending!

