

Improving EMS Safety with NEMESIS

Data:

A New Approach to Occupational Health Surveillance

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Dangerous Work

- ❑ Estimated 826,000 EMTs, paramedics and others in the U.S.
- ❑ Work environment exists at intersection of multiple industry sectors
 - Healthcare
 - Transportation
 - Public safety
- ❑ Exposed to occupational hazards associated with each



Dangerous Work



- ❑ **Same hazards as facility-based healthcare workers**
 - Exposure to infectious disease
 - Sharps injuries
 - Musculoskeletal injuries from lifting and moving patients
 - Workplace violence
- ❑ **Additional hazards associated with uncontrolled prehospital environment**
 - Hazardous materials
 - Rescue operations
 - Treating patients in moving ground and air vehicles during emergency transport

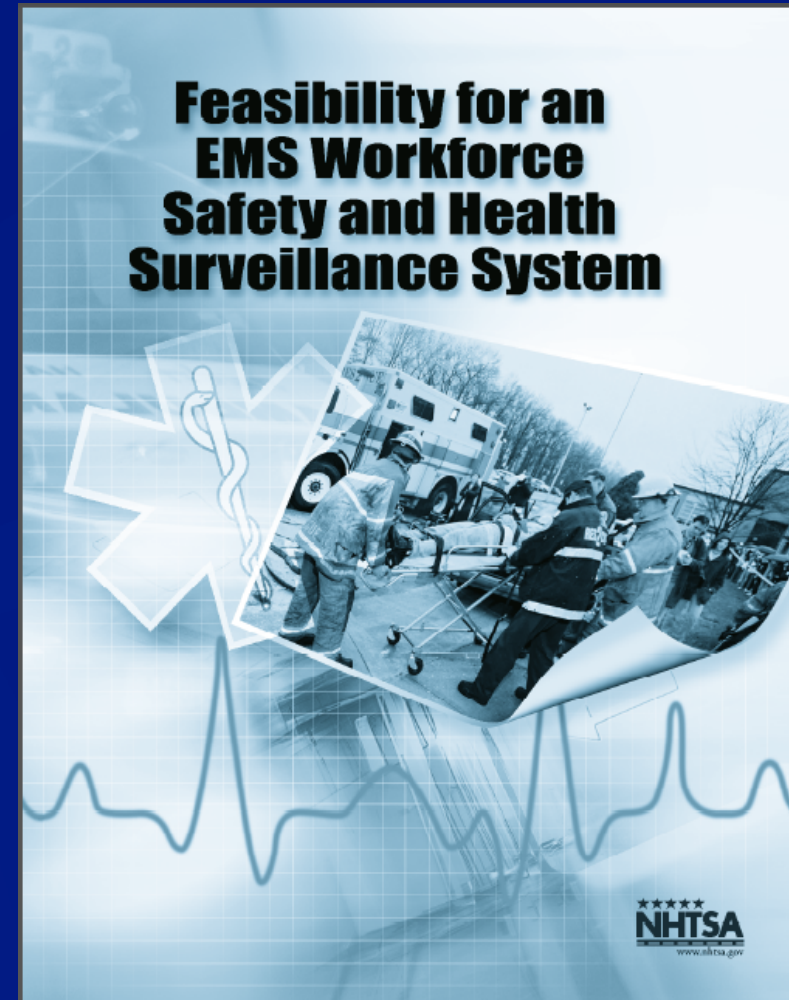
Injury and Exposure Rates

- ❑ **2016 follow-back study based on NEISS-Work* data from 2010-2014**
 - **8.6 ED-treated injuries/exposures per 100 FTE career EMS workers; > 4X rate for all workers**
 - **#1 event: Injuries due to lifting/carrying patients/equipment**
 - **#2 event: Exposures to hazardous substances**
- ❑ **2013 study of Bureau of Labor Statistics (BLS) data from 2006-2007**
 - **Lost workday injury rate among EMS 3X rate for all workers**
- ❑ **2011 study of combined 2003-2007 BLS Census of Fatal Occupational Injuries data**
 - **EMS fatality rates greater than rates for all workers**

*NEISS-Work: The National Electronic Injury Surveillance System -- Work Supplement

Sizing Up the Problem

- ❑ Full extent and nature of injuries and exposures among EMS workers remains unknown
- ❑ Inadequate surveillance
- ❑ 2007 NHTSA National Consensus Panel Report: “...no single...system exists...today that alone can serve as an effective surveillance data source for EMS workforce illness and injury”



Public Health Surveillance

- ❑ **“The systematic collection, consolidation, analysis and dissemination of data on specific disease”**
 - (Langmuir 1963)
- ❑ **“The ongoing and systematic collection, analysis, and interpretation of outcome-specific data for use in the planning, implementation, and evaluation of public health practice, closely integrated with the timely dissemination of these data to those who need to know”**
 - (Thacker, Berkelman 1988)

2007 NHTSA Report on EMS Surveillance

- ❑ **Examined 14 data sources/systems for surveillance potential**
- ❑ **Found all to be too limited in:**
 - **Scope of illness or injury surveillance**
 - e.g. Hazardous Substances Emergency Events Surveillance
 - **Or spectrum of the EMS workforce covered**
 - e.g. IAFF Death and Injury Survey, National EMS Memorial Database
 - **Or scope of injury or illness events covered**
 - e.g. CFOI, FARS, NEISS-Work
- ❑ **Data sources/systems examined did not collect data on contributing risk factors**
 - **Essential for designing interventions and prevention strategies**

Current National Occupational Health Surveillance for EMS

- ❑ **BLS Survey of Occupational Injuries and Illnesses (SOII)**
 - Based on employer-reported, OSHA recordable injuries from national sample of establishments
 - Sample size/composition issues
- ❑ **National Electronic Injury Surveillance System (NEISS-Work)**
 - NIOSH-Consumer Product Safety Commission (CPSC) collaboration
 - Emergency Department records of work-related visits from sample of hospitals
 - Small sample size
 - External denominator problem complicates calculation of rates
- ❑ **No risk factor information**

NEMESIS Data for EMS Occupational Health Surveillance



- ❑ **Potential source for national surveillance data**
 - Established 2009
- ❑ **Not reviewed by 2007 NHTSA National Consensus Panel**
- ❑ **Collects data on characteristics of EMS responses**
 - Demographic, operational, clinical
- ❑ **Collects data on occurrence and nature of EMS crews’:**
 - Injuries, fatal and non-fatal
 - Exposures, infectious and toxic
 - PPE use

NEMESIS Variables Relevant to Occupational Health Surveillance Among EMS Personnel

Legend		Dataset Level:	N National	S State	D Deprecated	
		Usage:	M = Mandatory	R = Required	E = Recommended	O = Optional
		Attributes:	N = Not Values	P = Pertinent Negatives	L = Nillable	C = Correlation ID
eOther						
0:1	eOther.01 - Review Requested					O
0:M	eOther.02 - Potential System of Care/Specialty/Registry Patient					O C
1:M	eOther.EMSCrewMemberGroup					C
0:M	eOther.03 - Personal Protective Equipment Used					O C
0:1	eOther.04 - EMS Professional (Crew Member) ID					O
1:1	eOther.05 - Suspected EMS Work Related Exposure, Injury, or Death	N	S	R		N, L
0:M	eOther.06 - The Type of Work-Related Injury, Death or Suspected Exposure		S	E		N, L, C
0:M	eOther.07 - Natural, Suspected, Intentional, or Unintentional Disaster					O C
0:1	eOther.08 - Crew Member Completing this Report		S	E		N, L

Outcomes/Conditions Under Surveillance

eOther.06

State

eOther.06 - The Type of Work-Related Injury, Death or Suspected Exposure

Definition

The type of EMS crew member work-related injury, death, or suspected exposure related to the EMS response.

National Element	No	Pertinent Negatives (PN)	No
State Element	Yes	NOT Values	Yes
Version 2 Element	E23_06	Is Nillable	Yes
Usage	Recommended	Recurrence	0 : M

Attributes

NOT Values (NV)
7701001 - Not Applicable 7701003 - Not Recorded 7701005 - Not Reporting

CorrelationID
Data Type: String minLength: 0 maxLength: 255

Code List

Code	Description
4506001	Death-Cardiac Arrest
4506003	Death-Injury Related
4506005	Death-Other
4506007	Exposure-Airborne Respiratory/Biological/Aerosolized Secretions
4506009	Exposure-Body Fluid Contact to Broken Skin
4506011	Exposure-Body Fluid Contact with Eye
4506013	Exposure-Body Fluid Contact with Intact Skin
4506015	Exposure-Body Fluid Contact with Mucosal Surface
4506017	Exposure-Needle Stick with Body Fluid Injection
4506019	Exposure-Needle Stick without Body Fluid Injection
4506021	Exposure-Toxin/Chemical/Hazmat
4506023	Injury-Lifting/Back/Musculoskeletal
4506025	Injury-Other
4506027	None
4506029	Other

Data Element Comment

Associated with eOther.04 (EMS Professional (Crew Member) ID).

Advantages of NEMESIS Data

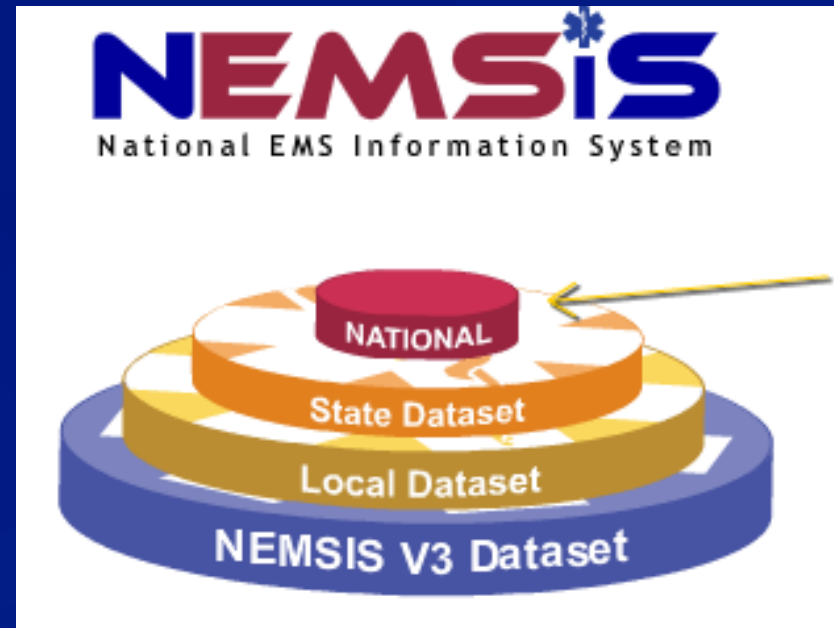
- ❑ **Informatics infrastructure exists to efficiently and quickly extend surveillance to nearly all of U.S.**
- ❑ **Large sample size**
 - Even within single state
 - Monthly or even weekly time series
- ❑ **Injury/exposure rates can be calculated**
 - Using internal denominator
 - “Per response” or “per person-response”
- ❑ **Rate estimates available for sub-state geographies**
- ❑ **Rich source of risk factor data**
 - Association of demographic, operational and clinical response characteristics with injury/exposure outcomes

Disadvantages of NEMESIS Data

- ❑ **Not a probability sample**
 - Not guaranteed to be representative
 - Potentially biased
- ❑ **Not all states collect all surveillance variables**
 - Other than eOther.05 (required), variables are recommended (eOther.06) or optional (eOther.03, eOther.04)
- ❑ **Key variables are nillable**
 - eOther.05
 - eOther.06

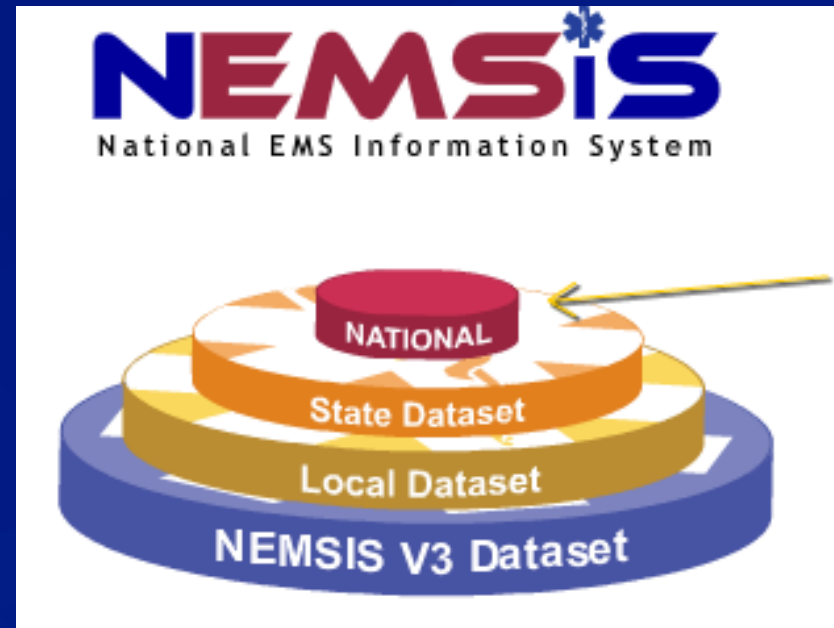
Role of States in Surveillance

- ❑ Only one of the NEMESIS data elements relating to injuries/exposures to EMS crew members (eOther.05) is included in the NEMESIS national dataset



Role of States in Surveillance

- ❑ Only one of the NEMSIS data elements relating to injuries/exposures to EMS crew members (eOther.05) is included in the NEMSIS national dataset
- ❑ Use of NEMSIS data as a source for occupational health surveillance requires partnering with state EMS authorities



NIOSH Project

- ❑ **Pilot Testing the Use of State EMS Response Data for Occupational Health Surveillance of EMS Workers**
 - 3-year feasibility study will pilot test the concept of using state Emergency Medical Services (EMS) response data collected in accordance with current National Emergency Medical Services Information System (NEMESIS) standards for national surveillance of occupational injury and toxic or infectious exposures among EMS personnel
- ❑ **Funded by CDC's Office of Public Health Preparedness and Response (OPHPR)**

NIOSH Project

□ Year 1

- Partner with NEMESIS TAC
- Partner with 3 states using version 3 and collecting all variables
 - Quarterly data uploads to NIOSH
 - Promotional/educational activities for EMS providers
- Initial data quality evaluation

□ Year 2

- Begin publishing quarterly surveillance reports
 - Frequency and proportion of responses resulting in each occupational fatality, injury or exposure type
 - Person-response denominated rates for each event type
 - Estimates stratified by key demographic, geographic variables
 - Monitor trends in these statistics using time series analysis methods

NIOSH Project

□ Year 3

- Continue publication of quarterly surveillance reports
- Use aggregated NEMESIS data to conduct analyses of associations between various geographic, demographic, clinical, responder, and operational characteristics of EMS responses, including EMS personnel's use of PPE, and the odds of each fatality, injury and exposure event type

□ Beyond

- Expand surveillance to additional states
- Improve and institutionalize surveillance informatics and procedures
- Identify risk factors based on surveillance findings
- Design, propose, implement targeted interventions (e.g. policy, practice, ambulance design)

The Ultimate Goal

- ❑ **Improve workplace safety for EMS personnel**
 - Reduce the occurrence of occupational injuries and exposures among EMS personnel

We need your help!

**NIOSH is seeking partners to participate in the pilot project now.
We will need expansion partners soon.**

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The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.