Injury Surveillance Systems: The Importance of Data Integration

Emergency Medical Services Component

Maryland Traffic Records Forum

June 16, 2015, 1:00 – 2:00
Concurrent Session 2C
Room A303 - Maritime Institute

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Injury Surveillance System (ISS)

- Provides Supplementary Crash Information through:
  - frequency, severity, nature of injuries
  - enables integration of data
  - permits accessibility of data

Diagram:
- Crash → EMS Data → Emergency Department Data → Vital Records Data
- Crash → EMS Data → Hospital Data → Vital Records Data
- Crash → EMS Data → Trauma Registry Data → Vital Records Data
Maryland ISS Data Sets

- **EMS** - electronic **Maryland Emergency**
  medical services **Data System** (eMEDS)

- **ED and Hospital** - **Health Services Cost Review Commission** (HSCRC)

- **Trauma Registry** - **Maryland Trauma Registry** (MTR)

- **Vital Records** - Death Certificate and Multiple Cause of Death files
<table>
<thead>
<tr>
<th><strong>Maryland Ambulance Information System</strong></th>
<th><strong>Data Source</strong></th>
<th><strong>MAIS Runsheet</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First</strong></td>
<td>1984-2004</td>
<td><strong>EMS</strong></td>
</tr>
</tbody>
</table>

**Maryland Ambulance Information System**

<table>
<thead>
<tr>
<th><strong>Response Location:</strong></th>
<th><strong>Eliminate:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patient Name:</strong></td>
<td><strong>Eliminate:</strong></td>
</tr>
<tr>
<td><strong>Parent/Guardian:</strong></td>
<td><strong>Eliminate:</strong></td>
</tr>
<tr>
<td><strong>Patient Address:</strong></td>
<td><strong>Eliminate:</strong></td>
</tr>
<tr>
<td><strong>Home Phone:</strong></td>
<td><strong>Eliminate:</strong></td>
</tr>
</tbody>
</table>

**Documentation of Times**

<table>
<thead>
<tr>
<th><strong>911 Call</strong></th>
<th><strong>Amb Call</strong></th>
<th><strong>Dpt Sta</strong></th>
<th><strong>Arr Loc</strong></th>
<th><strong>Dpt Loc</strong></th>
<th><strong>Arr Hosp</strong></th>
<th><strong>Rtn Serv</strong></th>
<th><strong>Cpr Bnd</strong></th>
<th><strong>High Staff</strong></th>
<th><strong>No Care Rendered</strong></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>First Vitals</strong></th>
<th><strong>Signs/Symptoms</strong></th>
<th><strong>Injury Type</strong></th>
<th><strong>Conditions</strong></th>
<th><strong>ECG</strong></th>
<th><strong>Med Pts</strong></th>
<th><strong>Med Pts</strong></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Lungs</strong></th>
<th><strong>Safet Equipment Used</strong></th>
<th><strong>Start By</strong></th>
<th><strong>Wittnessed</strong></th>
<th><strong>Citizen</strong></th>
<th><strong>BLS</strong></th>
<th><strong>ALS</strong></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Trauma ID</strong></th>
<th><strong>Airway Ventilation</strong></th>
<th><strong>Procedures</strong></th>
<th><strong>AED Start By</strong></th>
<th><strong>CPR Mech</strong></th>
<th><strong>Cotol Blx</strong></th>
<th><strong>Ob Delivery</strong></th>
<th><strong>Pass</strong></th>
<th><strong>Rescue Bnd</strong></th>
<th><strong>ROSC at ED</strong></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Transport By</strong></th>
<th><strong>Reason Hospital Chosen</strong></th>
<th><strong>Provider</strong></th>
<th><strong>Signature</strong></th>
<th><strong>EMS Reviewer</strong></th>
<th><strong>Glucose</strong></th>
<th><strong>Mileage</strong></th>
</tr>
</thead>
</table>

**Notes:**
- EMS: Emergency Medical Services
- MAIS: Maryland Ambulance Information System
- First: First Responders
- Data Source: Data collected from 1984-2004
- MAIS Runsheet: Runsheet data from the Maryland Ambulance Information System

**Columns:**
- **Response Location:** Details of the location where the emergency response occurred
- **Eliminate:** Information to be removed or not applicable
- **Patient Name:** Name of the patient
- **Parent/Guardian:** Name of the parent or guardian
- **Patient Address:** Address of the patient
- **Home Phone:** Contact number for home
- **911 Call:** Time of the 911 call
- **Amb Call:** Time of the ambulance call
- **Dpt Sta:** Time of departure from the station
- **Arr Loc:** Time of arrival at the location
- **Dpt Loc:** Time of departure from the location
- **Arr Hosp:** Time of arrival at the hospital
- **Rtn Serv:** Time of return service
- **Cpr Bnd:** Time of CPR
- **High Staff:** Time of high staff response
- **No Care Rendered:** Time of no care rendered
- **First Vitals:** Vital signs and symptoms
- **Signs/Symptoms:** Additional signs and symptoms
- **Injury Type:** Type of injury
- **Conditions:** Medical conditions
- **ECG:** Electrocardiogram
- **Med Pts:** Medical patients
- **Lungs:** Lung status
- **Safet Equipment Used:** Safety equipment used
- **Trauma ID:** Trauma identification
- **Airway Ventilation:** Airway and ventilation status
- **Procedures:** Medical procedures performed
- **AED Start By:** Automated External Defibrillator
- **CPR Mech:** CPR mechanism
- **Cotol Blx:** Cotol bolus
- **Ob Delivery:** Obstetrical delivery
- **Pass:** Presence
- **Rescue Bnd:** Rescue band
- **ROSC at ED:** Return of spontaneous circulation at the emergency department
- **Transport By:** Type of transport
- **Reason Hospital Chosen:** Reason for choosing hospital
- **Provider:** Provider name
- **Signature:** Signature of provider
- **EMS Reviewer:** EMS reviewer name
- **Glucose:** Blood glucose level
- **Mileage:** Distance traveled

**Additional Notes:**
- Data is organized with columns and rows for easy readability.
- Certain data entries are marked as **Eliminate** or not applicable.
- The data covers a period from 1984 to 2004.
Maryland ISS Data Sets

- **EMS** - electronic **Maryland Emergency Medical Services Data System (eMEDS)**
- **ED and Hospital** - **Health Services Cost Review Commission (HSCRC)**
- **Trauma Registry** - **Maryland Trauma Registry (MTR)**
- **Vital Records** - Death Certificate and Multiple Cause of Death files
<table>
<thead>
<tr>
<th>Call Type:</th>
<th>Disposition: Treated, Transported by This Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resp, Mode: No Lights or Sirens</td>
<td></td>
</tr>
<tr>
<td>Urgency: 911 Response</td>
<td></td>
</tr>
<tr>
<td>Location: Home/Residence</td>
<td></td>
</tr>
<tr>
<td>Address: 161 Arthur Ave, Colesville, MD 21904</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Patient Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name: Doe, John</td>
</tr>
<tr>
<td>Address: 161 Arthur Ave, Colesville, MD 21904</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cell Disposition</th>
<th>PSAPI 01:14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disposition: Treated, Transported by This Unit</td>
<td></td>
</tr>
<tr>
<td>PSAPI: Date and Time</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Response Time and Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start Miles: 0</td>
</tr>
<tr>
<td>Scene Miles: 0</td>
</tr>
<tr>
<td>To Scene: 0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unit Personnel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crew Member: Dillard, Jason</td>
</tr>
<tr>
<td>Crew Member Level: Paramedic</td>
</tr>
<tr>
<td>Crew Member Role: Primary Patient Caregiver</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Call Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Destination: Harford Memorial Hospital - 220</td>
</tr>
<tr>
<td>Destination Type: Hospital (or Free-standing ED)</td>
</tr>
<tr>
<td>Vehicle Type: Ambulance</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Factors Affecting Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Patient Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chief Complaint:</td>
</tr>
<tr>
<td>O2 Sat:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Primary Symptom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breathless</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Inc. Date: 03/11/2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incident #: 14003342</td>
</tr>
</tbody>
</table>
eMEDS Characteristics

- Procured Application thru ImageTrend Inc. (2012)
  - Supported through MHSO/TRCC for RFP
- Meets National EMS Information System (NEMSIS) version 2.2.1 standards
- EMS Unit Based per 911 Call Response (EMS Demand)
- Includes per Patient Encounter Documentation (EMS Response & Outcome)
Existing eMEDS Implementation
Phased-in starting March, 2012

Utilizing eMEDS

Operational Programs
- Annapolis City – LIVE
- Ocean City - LIVE
- BWI Airport - LIVE
- Ft. George Meade - LIVE
- Aberdeen Proving Ground - LIVE
- MSP Aviation Command - LIVE
- NSA Bethesda – LIVE
- US Naval Academy EMS - Live
- 20+ Commercial Services - LIVE
eMeds Patient Care Record

Upload Image
eM Edwards Patient Care Record
eMeds Injury Types

Cause of Injury
- Aircraft Related
- Assault
- Bicycle
- Bites
- Chemical Poisoning
- Child Battering
- Drowning
- Drug Poisoning
- Electrocution / Electric Shock (Non-Lightning)
- Excessive Cold
- Excessive Heat
- Explosion
- Falls
- Fire and Flames
- Firearm Assault
- Firearm Injury (Unintentional)
- Firearm Self Inflicted
- Lightning

Machinery
- Mechanical Suffocation
- Motor Vehicle Non-Traffic
- Motor Vehicle - Traffic
- Motorcycle (E81X.1)
- Non-Motorized Vehicle (E848.0)
- Not Applicable
- Other Injury
- Pedestrian - Traffic
- Radiation Exposure
- Sexual Assault
- Smoke Inhalation
- Stabbing/Cutting Unintentional (E986.0)
- Stabbing/Cutting Intentional
- Struck by Blunt/Thrown Object (E968.2)
- Venomous Stings (Plants, Animals)
- Water Transport Accident
### Patient Safety Equipment Used

- Protective Safety Belt
- Child Restraint
- Eye Protection
- Helmet Worn
- Lap Belt
- No Safety Equipment/Devices Used
- Other
- Personal Floatation Device
- Protective Clothing Gear
- Protective Non-Clothing Gear
- Shoulder Belt
- Not Applicable
Integration vs. Interface Linkage

**Integration:** The discrete linking of databases for analytical purposes.

**Interface:** A seamless, on-demand connectivity and high degree of interoperability between systems that supports critical business processes and enhance data quality.

NHTSA Traffic Records Program Assessment Advisory publication
The Benefits of Integration

- **NHTSA “6 Pack” performance measures**
  - Timeliness (How soon are records available)
  - Accuracy (Percentage of records with no errors)
  - Completeness (Percentage of records with missing critical elements)
  - Uniformity (NEMSIS compliant)
  - Integration (Percentage of records linked to other datasets)
  - Accessibility (Demonstration of shared access)

- **EMS** – Knowledge of injury severity and triage thought process at the scene.

- **MTR** – Knowledge of conditions (BAC) and outcomes (z/w scores)
eMeds Integration Capabilities

- Crash Outcomes Data Evaluation System (CODES)
- In-Patient/Out-Patient Hospital Discharges (HSCRC)
  - Linked spinal cord injuries MTR – unlinked case pointed out higher rate of false positives than first thought.
- Fatal Accident Reporting System (FARS)
  - Meet reporting requirements established by NHTSA
eMEDS Interface Capabilities

- Computer Aided Dispatch (CAD)
- Hospital Dashboard (ePCR exchange)
  - Initial transport record link (JHH Pediatrics)
  - Non-Transport record(s) link (STEMI)
- MTR – eMEDS record retrieval
- Advance Automatic Crash Notification (AACN) - Pilot
- Cardiac Arrest Registry to Enhance Survival (CARES) - Pilot
- Health Information Exchange – Grant Application
911 Call Time Performance Measurement

eMEDS EMSOPS 911 Time Completion Percent

Percent Completion of Total Calls

CY 2011 to 2013 1st Qtr Months

Allegany Co.
Anne Arundel / Annapolis
BWI Airport
Baltimore City
Baltimore Co.
Calvert Co.
Carroll Co.
Cecil Co.
Dorchester Co.
Frederick Co.
Garrett Co.
Harford Co.
Kent Co.
MSP (MIEMSS)
Queen Anne’s Co.
St. Mary’s Co.
Washington Co.
Wicomico Co.
eMEDS and Maryland HIE

- Push eMEDS records through CRISP
- Meet the hospital standard for data transfer (HL7)
- Utilize master patient index algorithm to link

Hospital Benefit – Potential
- Move data directly into hospital registry systems
- Have all EMS encounters as part of the patient EMR

EMS Benefit – Potential
- Knowledge/tracking of expose incidents
- Linkage to hospital medical records through primary key
- Answer: Does what we do make a difference?