Course Overview/Purpose

The Emergency Medical Services course addresses the specific reasons and design considerations for implementing Health Information Exchange in EMS systems. The course will discuss NEMSIS and HL7 national standards for representation of EMS information, examine potential strategies for moving EMS data around, discuss barriers that must be overcome to implement HIE, EMS recommendations related to HIE, and finally discuss models and next steps which Emergency Medical Services may want to consider as it develops its data exchange strategy.

Health Information Exchange

• How is HIE related to EMS?
  — Health Information Exchange allows health care professionals and patients to appropriately access and securely share a patient’s vital medical information electronically.

Electronic Exchange of Patient Information—What’s in the Middle??

AND MAGIC HAPPENS!!
Health Information Exchange

• Course Objective 2: Describe four reasons why Cal-EMSA trying to implement HIE related to EMS

Triple Aim of Health Care – Align EMS with Healthcare

Experience of Care Health of a Population Per Capita Cost

1. Safe
   Avoiding injuries to patients from the care that is intended to help them

2. Effective
   Services based on scientific knowledge to all who could benefit

3. Patient Centered
   Care that is respectful of and responsive to individual patient preferences, needs and values.

4. Timely
   Reducing waits and harmful delays

5. Efficient
   Avoiding waste of equipment supplies, ideas, and energy

6. Equitable
   Care does not vary in quality because of gender, ethnicity, geographic location or income.

Quality Improvement Frameworks – Improve Patient Care

• IOM’s Six Aims for Improvement

EHRs Support Provider Decision Making

• EHRs can help providers make efficient, effective decisions about patient care, through:
  • Improved aggregation, analysis, and communication of patient information
  • Clinical alerts and reminders
  • Support for diagnostic and therapeutic decisions
  • Built-in safeguards against potential adverse events

Disaster Preparedness

• Allow Patient Health Information to be available when patients are relocated
• Patient Tracking
• “Real-Time” Surveillance
**2013 HIE Project Goals**

Cal-OHII Grant to EMSA
- August – Dec 2013
- $300,000 Grant

**Deliverables**
- EMS Readiness Assessment for HIE (Lumetra)
- 3 Local Demonstration Projects
  - Monterey
  - Contra Costa County
  - Inland Counties EMS
- EMS and HIE Conference (Nov 2013)

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**Health Information Exchange**

- Course Objective 3: Describe the Stages of HIE Readiness.
- What percentage of EMS Providers had ePCR capability in 2013?

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**California HIE Readiness Assessment**

**Approximate Percentage of Agency Providers on ePCR or paper**

<table>
<thead>
<tr>
<th>ePCR</th>
<th>Paper</th>
</tr>
</thead>
<tbody>
<tr>
<td>73%</td>
<td>25%</td>
</tr>
</tbody>
</table>

75% of EMS providers are Stage 5 or above.

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**California HIE Readiness Assessment**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>HIE functional, bidirectional sharing of data between the ePCR and hospital based EHR, business and clinical intelligence.</td>
</tr>
<tr>
<td>6</td>
<td>EMS capable, Transfer of data from the ePCR to hospital based EHR.</td>
</tr>
<tr>
<td>5</td>
<td>EMS capable, Advanced clinical decision support for line medical direction through hospital Dashboard, proactive care management, and structured messaging.</td>
</tr>
<tr>
<td>4</td>
<td>ePCR entry, Computers have replaced the paper chart for “real-time” data entry, clinical documentation, and clinical decision support (emergency hospital protocols).</td>
</tr>
<tr>
<td>3</td>
<td>Beginning of a complete test data record (EDR), computers may be at remote locations.</td>
</tr>
<tr>
<td>2</td>
<td>Desktop access to PCR information entered after the call, multiple data sources.</td>
</tr>
<tr>
<td>1</td>
<td>Paper chart based.</td>
</tr>
</tbody>
</table>

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**California HIE Readiness Assessment**

Survey conducted on 11/21/2014.
### 2013 HIE Project Outcomes

<table>
<thead>
<tr>
<th>Monterey</th>
<th>Contra Costa</th>
<th>ICEMA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchased Hospital Data Exchange software</td>
<td>• Agency-level data systems analysis using HRI and Six-Sigma</td>
<td>• Purchased software for deploying real-time hospital dashboards</td>
</tr>
<tr>
<td>Established test environment</td>
<td>• Roadmap for EMS data integration with Contra Costa Health System Information Services</td>
<td>• Testing began</td>
</tr>
<tr>
<td>Software deployed; live transactions successful between AMR and Natividad Medical Center.</td>
<td>• Peer-to-Peer Connection</td>
<td>• Extension of capabilities of ImageTrend to NorCal EMS, North Coast EMS, parts of SSV EMS</td>
</tr>
<tr>
<td>• Peer-to-Peer Connection</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Health Information Exchange

- Course Objective 4: List some of the perceived barriers to implementing HIE

### Barriers to HIE

- Agencies at various stages of HIE system development
- No ePCR
- Myths about HIPAA and liability discourage patient data sharing
- Not everyone’s path to HIE success is the same
- New forms of collaboration across organizational boundaries raise policy questions that must be addressed

### Health Insurance Portability and Accountability Act (HIPAA)

- Emphasis on “Portability”
- Not a barrier to Health Information Exchange
- EMSA and LEMSAs are not covered entities
- EMSA and LEMSAs are public health oversight agencies
- Entitled to receive information
- EMS Providers and Health Information Exchanges use “Business Associate” Agreements

### Health Information Exchange

- Health information in real-time available for decision support
- EMS providers can send real-time data
- Real-time data available for providers
- Risk management and quality improvement
- “Business Associate” Agreements

Health Information Exchange

- Network of participating providers
- Data send to providers
- Data received by providers
- Permissions and security
- Information exchange
- Data sharing
What is Health Information Exchange?

Statewide electronic PCR
Real-time exchange
WHY?

US DHHS — electronic movement of health-related information among organizations according to nationally recognized standards

Goal:

WHY?

US DHHS — electronic movement of health-related information among organizations according to nationally recognized standards

Goal: facilitate access to and retrieval of clinical data to provide safer, timelier, efficient, effective, equitable, patient-centered care.
**Health Information Exchange**

- **Course Objective 5**: Using the PDCA Cycle as a model, describe how HIE fits into the entire scheme of Data Collection, Evaluation, and Quality Improvement

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**How Does This All Fit Together?**

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**PLAN**

- QI Plans Are Required

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**QI Indicators**

- (A) Personnel
- (B) Equipment and Supplies
- (C) Documentation
- (D) Clinical Care and Patient Outcome
- (E) Skills Maintenance/Competency
- (F) Transportation/Facilities
- (G) Public Education and Prevention
- (H) Risk Management

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**Quality Improvement Frameworks**

- Donabedian’s Quality of Care Framework
  - 1980s
  - Conceptualized three quality-of-care dimensions
    - **Structure** (Attributes of Setting)
    - **Process** (Good Medical Practices)
    - **Outcome** (Impact of Care)

---
DO -- Collect the Data

What is CEMSIS?

- California EMS Information System
- 3 Parts ....
  1. Concept of having a Statewide Data System
  2. Data Dictionary – NEMSIS 3
  3. Software Platform that we use to collect/analyze data – Now ImageTrend at ICEMA

Data system gaps

From 2012 CHCF project, we learned:

- Analysis: Core Measure data requirements + CEMSIS dictionary
- CEMSIS insufficient to answer priority questions
- Analysis: Current CEMSIS data quality
- Data quality varies greatly across state
- Fragmented adoption and implementation

Additional EMS data system gaps

| ePCR systems | ePCR device at point-of-service |
| LEMSA level | EMS data systems at the LEMSA level | NEMSIS 3 compliance |
| Provider level | | |

| Real-time HIE between hospital and field | NEMSIS 3 → HL7 standards |
| Bidirectional communication pathways | |

| ePCR systems | ePCR device at point-of-service |
| LEMSA level | EMS data systems at the LEMSA level | NEMSIS 3 compliance |
| Provider level | | |

| Real-time HIE between hospital and field | NEMSIS 3 → HL7 standards |
| Bidirectional communication pathways | |

| eTracking patients across jurisdictional boundaries | Wrist band identifiers at patient registration |
ePCR

Health Information Exchange

- Course Objective 6: Identify the benefits of using NEMSIS 3x Standards to implement ePCR and HIE

NEMSIS 3

- New Data Elements Definitions
- Not compatible with CEMSIS/NEMSIS 2.2.1
- Polling Completed for HealthLevel 7 (HL7) CDA for HIE Compatibility
- FHIR stands for Fast Healthcare Interoperable Resource.
  - FHIR combines the best features of HL7 V2, HL7 V3, and CDA, while leveraging the latest web service technologies.

January 1, 2017
NEMSIS will no longer accept Version 2.2.1 data

January 1, 2015
NEMSIS will begin accepting Version 3 data

EMS Data Standards

- EMSA may write regulations
- Use NEMSIS 3.3.4 standards for data
- ePCR and data system must be NEMSIS 3 Compliant
- Transmission with HL7 format (CDA from NEMSIS)
- “Real-Time” information from field to hospital
- Hospitals to participate in connecting with CHIO for Health Information Exchange
- Through HIE linkages, EMS Providers can complete their ePCR with Hospital disposition data for QI purposes

The Case for NEMSIS 3: Enhanced “Structure” Data

<table>
<thead>
<tr>
<th>Structure</th>
<th>Hospitals</th>
<th>Providers</th>
<th>LEMSAs</th>
<th>Locations</th>
<th>Policies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processes</td>
<td></td>
<td></td>
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<tr>
<td>Injury/Disease event</td>
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<tr>
<td>911 first contact</td>
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<tr>
<td>EMS dispatch</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Arrival on scene</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Patient care</td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Transport</td>
<td></td>
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<tr>
<td>Arrival at destination</td>
<td></td>
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<tr>
<td>Inpatient care</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Sub-acute recovery</td>
<td></td>
<td></td>
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</tbody>
</table>

OUTCOMES!
The Case for NEMSIS 3

The entire NEMSIS 3 data dictionary provides a standardized approach for all involved parties.

Provider Organizations

Local EMS Agencies

EMSA

NEMSIS

One Standard for Everyone

CHECK – EMS Core Measures

EMSSC Measures

28 Measures 2014

Hospital

CHIO

Data

National Trend towards Metrics and Core Measures

- Use of California Core Measures model is becoming widespread
- HRSA Rural Health Flex Grant Performance Measures Panel
- NASEMSP and NQF Core Measures Project for use in CMS Reimbursement
- NASEMSO Begins Revision of NHTSA and NEMSIS Performance Measures Document

ACT – System Changes

System Changes

Providers

LEMSA

EMSA

How is HIE related to EMS?

Health Information Exchange allows health care professionals and patients to appropriately access and securely share a patient’s vital medical information electronically.

Health Information Exchange (HIE)

Data

VAMC

CHIO

Hospital

28 Measures 2014
Three key forms of health information exchange

- **Directed Exchange** – ability to send and receive secure information electronically between care providers to support coordinated care
- **Query-based Exchange** – ability for providers to find and/or request information on a patient from other providers, often used for unplanned care
- **Consumer Mediated Exchange** – ability for patients to aggregate and control the use of their health information among providers

HIE and Meaningful Use

Meaningful use objectives are grouped into five patient-driven domains that relate to health outcomes policy priorities:

- Improve Quality, Safety, Efficiency
- Engage Patients & Families
- Improve Care Coordination
- Improve Public and Population Health
- Ensure Privacy and Security for Personal Health Information

Health Information Exchange is Happening Now

Health Information Exchange

- Course Objective 7:
  - List which data elements EMS needs to send to the Hospital from the scene and enroute to the hospital
  - List which data elements the Hospital wishes to receive

Health Information Exchange

- Course Objective 8:
  - List which data elements EMS wishes to receive from the Hospital in the field
  - List which data elements the Hospital would like sent during a prehospital patient encounter

Electronic Exchange of Patient Information—What’s in the Middle??
Health Information Exchange

- Course Objective 9: Describe methods of how patient health information can be exchanged in an EMS setting?
- What is the role of a CHIO?
- Will there be a patient information repository, or warehouse, of information?
- Will there be a Query every time information is needed?

Electronic Exchange of Patient Information—What’s in the Middle??
AND MAGIC HAPPENS!!

Vision of HIE and EMS
EMS Transport Providers and Receiving Hospitals, using Community Health Information Organizations (CHIO) as a hub, working together for “bidirectional” real-time health information exchange
Integrated with LEMS Data Systems for Quality Improvement

The Role of Public, Community Health Information Organizations (CHIO)

Model for Use of Community HIO

Community HIO

Multiple Ambulance Providers

Multiple Receiving Hospitals
Health Information Exchange

- Course Objective 10: Identify the two goals recommended by Audacious Inquiry to the ONC related to Health Information and EMS
HIE Implementation Roadmap for EMS

- Report from ONC in April 2014
- Must consider Emergency Preparedness
- Goal 1
  - Implement Provider ePCR (NEMSIS 3 Compliant)
  - Coordinate with Community HIO
  - Transmission to Hospital Dashboard
  - Incorporation of electronic data into EHR at hospital
- Goal 2
  - Disaster Portal for patient EHR accessibility (PULSE)

Goal 1 -- Developing EMS bidirectional data exchange with hospitals

- In this scenario, EMS personnel send data from their electronic patient care record (ePCR) to hospital EDs in "real-time".
- The hospitals make limited patient data available to EMS personnel for a query while in the field.
- Information from the ePCR is assimilated into the hospital EHR.
- Finally, patient outcome information to support EMS quality improvement objectives is sent from the hospitals to EMS providers.
- The support of an HIO that is responsible for mapping and routing the data among EMS providers and hospitals is the critical hub in this example.

Working Assumptions for EMS and HIE

- EMS Providers must have ePCR systems that are NEMSIS 3 Compliant
- Utilize HL7 language with the NEMSIS CDA
- Hospitals must be willing to accept ePCR data into their EHR
- Work with Community Health Information Organizations (HIOs) as the information hub
- Match EMS providers and EMS receiving hospitals
- DURSA -- California Data Use and Reciprocal Support Agreement (CalDURSA)

Goal 2 -- Creating a Disaster-response medical history portal:

- Using Integrating the Healthcare Enterprise (IHE) standards, we are interested in connecting health systems and HIOs to an interoperability broker that can be accessed via a web portal user interface.
- During a disaster (the definition of which is agreed upon by participants in advance), the web portal is activated.
- Healthcare professionals employed by health systems or participating with HIOs would be able to access patient records through their existing systems, and other allied healthcare professionals, such as emergency medical technicians and paramedics, would be able to access the portal through a URL.

Health Information Exchange

- Course Objective 11: Identify a method by which patients can keep their own information and share it with their healthcare provider when necessary during a disaster
Consumer Mediated Exchange
iBlueButton and ICEBlueButton

Next Steps for Data and EMS?

- Regulations to standardize data using National standards ie NEMSIS 3
- ePCR by Providers
- Data submission by providers to LEMSAs and EMSA

Next Steps for HIE and EMS?

- Ask questions of Community Health Information Organizations (CHIOs)

Health Information Exchange

- Course Objective 12: Identify steps that can be taken locally to prepare to implement HIE for your EMS system

Next Steps for HIE and EMS

- Fund Projects for Data, HIE, and Quality using limited PHHS Block Grant funds ($400,000)
- Seek Funding from ONC
  - Connecting Community HIOs with emergency ambulance providers and receiving Hospitals (Regional Project)
  - Developing a Disaster Portal (PULSE)
- HIE and EMS Conference -- Nov 17-19, 2014 in Los Angeles

Next Steps for HIE and EMS

- "One Patient, One Record"
- LEMSAs and Providers continue work on NEMSIS 3 adoption
- EMS Providers work to implement ePCR, using NEMSIS 3 data standards and tools
- EMS Providers collect and measure Core Measures at the Provider Level
- Begin Discussions with local CHIO and Hospitals to implement HIE
**Summary**

- Benefits of HIE for EMS
- Quality Improvement
- ePCR
  - NEMSIS 3 Data, NEMSIS Compliant, HL7
- EMS Core Measures and Metrics
- Make System Improvements
- Implementing Health Information Exchange
  - Field to CHIO to Hospital (and Back)

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**Thank you!**

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