



## Health Information Exchange Issue Brief: National Emergency Medical Services Use Cases

### Introduction

This report sets the stage for discussion and collaboration among Emergency Medical Service (EMS) agencies, Health Information Exchange (HIE) organizations, and the health communities and customers they serve. The primary audiences are EMS and HIE entities and their many clients. Perhaps the most important anticipated benefits from the implementation of these, or related, use cases are the many lives that could benefit from increased and improved sharing of information between these organizations in support of the communities they serve.

The goals of this report include summarizing and understanding the use cases for EMS to participate in health information exchange<sup>1</sup>, understanding how EMS participation can enhance and improve data sharing enabled through this exchange, and understanding how these improvements could in turn increase the ability for HIE organizations to sustain and expand their services to their customers. Additional goals of this issue brief are to position the use cases in the context of population health, care coordination, and new models of health care delivery, as well as foster more discussion about how EMS, HIEs, and communities can collaborate.

EMS systems are universally regarded as an essential part of the health care delivery system today.<sup>i</sup> A 2007 Institute of Medicine report stated, “EMS operates at the intersection of health care, public health, and public safety and therefore has overlapping roles and responsibilities. Often local EMS systems are not well integrated with any of these groups and therefore receive inadequate support from each of them.”<sup>ii</sup> The absence of health IT and integration through exchange of health information seems to mirror the absence of service integration.

In recent years, growing concerns about health care costs, shrinking clinical resources, and the need for disaster preparedness has led to changes in the relationships and dynamics between local communities and their EMS providers in recognition of this critical

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<sup>1</sup> Health information exchange can refer to the action of exchanging information electronically as a verb or to organizations that support the exchange of health information, i.e., the HIE. For the purposes of this paper, we use “exchange of health information” to represent the verb and upper case “HIE” to represent the organizations.

component of their health care systems. This issue brief focuses on how HIEs and EMS can work together to complement these changes with the exchange of health information.

### Why HIEs and EMS Should Collaborate

EMS agencies can benefit from the improved and consolidated health information that HIEs provide to their participating organizations. The need for information about an individual's health during a disaster was an important driver for health IT adoption and electronic exchange of information. During major U.S. disasters and emergencies over the past decade, e.g., Katrina, there was a higher risk of inappropriate treatment, and even deaths resulting from limited access to needed health records. These same issues persist each time a paramedic is faced with an unconscious or non-communicative patient exhibiting potentially life-threatening symptoms.<sup>iii</sup> If EMS first responders knew vital information such as chronic illnesses, recent hospitalizations and lab results, as well as medications and allergies, they would be able to make more informed, and often better, life-saving decisions.

HIEs often provide access to necessary health information. In addition, HIE data from participating hospitals can assist EMS agencies with quality measures that increasingly must be met. Data regarding the outcomes related to trauma, stroke, and cardiac events are perhaps of the highest priority.<sup>iv</sup>

EMS agencies increasingly maintain information about emergency transport patients and patients that place emergency calls but do not need emergency care. This information, combined with HIE accessible information, can provide a more complete understanding of a patient's health status. It can also help inform ambulatory clinicians and hospitals about patients' health needs, risk of avoidable hospital readmission, and social determinants of health that contribute to frequent emergencies and emergency department visits.

New, mobile integrated models of care, such as "Community Paramedicine<sup>[i]</sup>", are emerging. In these new care models, paramedics expand their roles by leveraging their unique community-based relationships and vantage point. Because they are often the first, and sometimes only, clinicians to see the patients' living environment they can bring unique contributions to care management and population health.

HIE organizations can increase their use by expanding their network of clinical service providers. EMS agencies can be new customers and contributors to a timely health information infrastructure that helps to modernize and improve the local health care delivery system. EMS data can help HIEs enhance the growing number of event notification systems that provide clinical alerting to providers about hospitalizations and emergency department (ED) visits. This data and EMS data are increasingly being used for hot spotting,<sup>v</sup> an assessment of how to improve care and address heavy utilization and

potential overutilization of acute care services. As HIEs offer more analytic services, this data can improve acute and emergency care services.

Patients, communities, and health care providers may experience some of the greatest benefits from this collaboration between EMS and HIEs. First, patients can receive more appropriate emergency medical treatment. Second, patients can get assistance accessing other health and social services when emergency services are not the right resource. Third, health systems can improve care coordination and transitions of care between EMS, hospitals, and specialty care, and also gain more insight into the underlying causes of high emergency and acute care utilization.

Brief Summaries of Use Cases: Making the case for engaging EMS in HIE

**Day-to-day operations Use Case Overview**

Problem to Solve	Improve immediate treatment of EMS patients and their continued care in Emergency Departments (EDs)
Data Needed	Current medical information regarding lab results, medications, allergies, chronic illnesses, and recent surgeries, contact information for primary and specialty care
<p><b>Participants</b> - EMS, HIEs, Hospitals, and primary and specialty care</p> <p><b>Workflow</b></p> <ul style="list-style-type: none"> <li>EMS staff determine patient identification and then access pertinent medical data relative to new or pre-existing conditions when first encountering an emergency patient</li> <li>Once EMS staff assess and intervene as needed on the patient’s behalf, the EMS electronic patient care record (ePCR) can then send information to the receiving ED to support patient admission and treatment</li> </ul> <p><b>Electronic exchange options</b> - HIE single access to multiple EHRs, EHR secure messaging, bi-directional exchange with EHRs, dual use of an emergency repository that also supports disaster response</p>	
Benefits and References	<p>Improved daily EMS emergency response services, timelier information to EDs, and improved quality metrics</p> <p>References: California HIE ONC award, San Diego Beacon, Disasters and Emergency Response HIE Services report and Regenstrief</p>

**Mobile Integrated Health Care and Community Paramedicine Use Case Overview**

Problem to Solve	Improve care coordination and population health and increase appropriate utilization of emergency and urgent care services
Data Needed	Current medical information regarding lab results, medications, allergies, chronic illnesses and recent surgeries; health and social services information regarding current providers and services; utilization information and social determinants of health
<p><b>Participants</b> - EMS, HIEs, Hospitals, primary and specialty care, community-based health service organizations</p> <p><b>Workflow<sup>vi</sup></b></p> <p>Community Paramedics (CPs) become an integral part of the community care continuum and support patient pre and post hospitalization</p>	



<ul style="list-style-type: none"> <li>• Prehospital services - assess patients not needing emergency treatment and assist them with access to primary care and social services and transport to alternative care and services settings</li> <li>• Post hospital – provide follow up care post discharge, support for patients with severe and multiple chronic illnesses and partner with community to provide preventive care to the underserved</li> </ul> <p><b>Electronic exchange options</b> - HIE single access to multiple EHR systems in the target community and bi-directional exchange with multiple EHRs</p>	
Benefits and References	<p>Patients, communities and health systems all benefit from mobile integrated care in which EMS is an extension of care for non-emergencies and emergencies, EMS agencies can expand their services model and reduce unnecessary 911 calls and HIEs can support an expanded services/client network</p> <p>References: Minnesota Tri-County Health Care EMS, CA HIE ONC award, San Diego Beacon, Disasters and Emergency Response HIE Services report and Regenstrief</p>

### Emergency preparedness Use Case Overview

Problem to Solve	Better access to needed health information during a disaster for support during evacuation, improved clinical care when transported to remote new care settings, and improved continuity of care in adverse situations
Data Needed	Disaster response medical history data – indication that assistance is needed in the event of an evacuation; pertinent medical information if emergency care is needed, contact information for primary care and specialist
<p><b>Participants</b> - EMS and other first responders, HIEs, Hospitals, public health and primary care and specialty care professionals who are accepting patients from a disaster location</p> <p><b>Workflow</b></p> <ul style="list-style-type: none"> <li>• Disaster management team quickly identify individuals needing special transport</li> <li>• First responders query a system, or systems, that enable patient look up across multiple systems and ultimately link the responders to needed information across EHR and HIE systems</li> <li>• Clinicians caring for relocated patients from a disaster have access to needed current and recent medical information to facilitate care</li> </ul> <p><b>Electronic exchange options</b> - an emergency repository, an interoperability broker (PULSE - Patient Unified Lookup System for Emergencies), consumer mediated exchange in which individuals maintain their aggregate information and systems to link to the designated system, and bi-directional EHR/Personal Health Record communication (particularly once needed information sources have been located)</p>	
Benefits and References	<p>Improved disaster management (i.e., disaster medical care, patient tracking and family reunification), individual care, continuity of care, and deployment of resources</p> <p>References: KatrinaHealth model, Disasters and Emergency Response HIE Services report and California Health information Readiness Assessment</p>

### Conclusions

EMS agencies, HIE organizations, and the communities they serve can all benefit significantly by collaborating in one or more of the aforementioned use cases. The use cases discussed are just some of the ways in which EMS, HIE, and health and community services providers can better share information and improve many aspects of health services.



All three use cases represent important gaps in today's U.S. health care systems. Communities that have begun to more tightly integrate EMS services into their health care system have focused on a particular need in their community that would most benefit their residents and address gaps in their services. The approaches for exchanging health information that are most appropriate for each community are dependent on the existing health IT infrastructure. Mature HIEs that can create interfaces that readily translate between ePCRs and EHRs may be the most cost effective way to implement one or more of these use cases.

Several communities that are working to implement one or more use cases highlighted the importance of starting small. Interested organizations should identify the community needs that are most pressing and determine how to enable needed exchange of health information in support of specific community goals. EMS agencies and HIE organizations can start a dialogue in their communities with the relevant stakeholders for one or more of the use cases to see where interest and support lie for addressing the problems and piloting the supporting information exchange. Use this report as introductory material for these discussions.

As noted in the HIE Services in Support of Disaster Preparedness and Emergency Medical Services report<sup>vii</sup>, one challenge that a disaster preparedness health IT solution faces is its infrequent use and the willingness of stakeholders to invest due to limited, albeit critical, use. Infrequent use of a system also may limit its likely use in an emergency. These challenges suggest that the further exploration of multiple uses for systems like PULSE is warranted. Perhaps a regional system that serves multiple states or is designed for rural areas that have similar needs for daily support of individuals in remote locations would help define a combined use case.

### Additional Resources

#### *Federal Resources*

- [Emergency Care Coordination Center, U.S. Department of Health and Human Services](#)
- [Health Information Exchange services in Support of Disaster Preparedness and Emergency Medical Response](#) (San Diego and Katrina)
- [State Health Information Exchange Cooperative Agreement Program](#)
- [NHIN Trial Implementations Emergency Responder Use Case Requirements Document](#)
- [Patient Unified Lookup System For Emergencies \(PULSE\)](#)

#### *Federal Agencies*

- [Office of the National Coordinator for Health Information Technology \(ONC\)](#)



- [Office of the Assistant Secretary for Preparedness and Response \(ASPR\)](#)

#### *EMS Information Exchange*

- [Emergency Medical Services: The Frontier in Health Information Exchange \(Regenstrief\)](#)
- [Emergency Medical Services At the Cross Roads](#)
- [NEMSIS performance measures](#)
- [California EMS Authority Health Information Exchange Readiness Assessment/Survey](#)
- [California EMS Authority Health Information Exchange Resources](#)
- [Lessons from KatrinaHealth](#)

#### *Community Paramedicine*

- [Assessment of the status of Mobile Integrated Healthcare and Community Paramedicine in states and Territories](#)
- [Community Paramedicine: A Promising Model for Integrating Emergency and Primary Care \(San Diego\)](#)
- [How 4 Cities are Making Community Paramedicine Work for Them](#)
- [Tri-County Health Care EMS Case Study](#)

#### Important Terms

**Clinical alerting or ADT alerts** - Automated clinical alerts based on hospital admissions, discharge, and transfer (ADT) events; messages indicating a change in a patient's status in relationship to care transitions

**Electronic Health Record (EHR)** – A digital version of a patient's paper chart. EHRs are real-time, patient-centered records that make information available instantly and securely to authorized users

**Electronic Patient Care Record (ePCR)** – Term used by EMS providers for their increasingly standardized automated records. The standards are set by the National EMS Information System (NEMSIS) organization, a national effort to standardize data collected by EMS agencies.

**Health Information Exchange** (or exchange of health information as used in this issue brief)– is the action of using an electronically-based system which allows doctors, nurses, pharmacists, other health care providers, and patients to appropriately access and securely share a patient's vital medical information electronically, thus improving the speed, quality, safety, and cost of patient care



There are currently 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 or Patient Mediated Exchange – ability for patients to aggregate and control the use of their health information among providers

**Health Information Exchange (sometimes referred to as HIEs)** – refers to organizations that serve as facilitators of health information exchange by providing the governance, policy, legislation, trust and collaboration necessary to bring together the many different stakeholders that exchange health information.

**Interoperability** – The architecture or standards that make it possible for diverse EHR systems to work compatibly in a true information network

**Patient mediated exchange** (see above, under Health Information Exchange)

**Query-based exchange** (see above, under Health Information Exchange)

**Secure message** – A way to communicate with health care providers using the Internet, similar to email, but with extra security to protect health information

**Transitions of Care (TOC)** – Actions which involve patients being referred or transported to other provider locations or facilities, most commonly from hospitals to rehab or nursing home, and referring patients from primary care physicians to specialty care providers. Providers seeking EHR incentives must meet TOC measures regarding transmission of summary of care records when transitioning or referring patients to another provider or care setting.

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<sup>i</sup> Community Paramedicine: A Promising Model for Integrating Emergency and Primary Care July 2013  
<http://www.naemt.org/Files/MobileIntegratedHC/UC%20Davis%20Community%20Paramedicine%20Report.pdf>

<sup>ii</sup> Emergency Medical Services At the Crossroads 2007 p.38



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- iii HIE Services in Support of Disaster Preparedness and Emergency Medical Services April 21, 2014  
Audacious Inquiry report for ONC  
[http://www.healthit.gov/sites/default/files/hiefordisasterresponse\\_final\\_04232014.pdf](http://www.healthit.gov/sites/default/files/hiefordisasterresponse_final_04232014.pdf)
  - iv NEMESIS performance measures <http://www.nemesis.org/referenceMaterials/performanceMeasures.html>  
also references on p.12 of Ai 2014 report
  - [i] Community Paramedicine: A Promising Model for Integrating Emergency and Primary Care July 2013
  - v Hot Spotting Guide Aims to Reduce Hospital Visits and Improve Care  
<https://www.aamc.org/newsroom/reporter/january2014/366340/hotspotting.html>
  - vi Community Paramedicine: A Promising Model for Integrating Emergency and Primary Care July 2013 p.8
  - vii HIE Services in Support of Disaster Preparedness and Emergency Medical Services April 21, 2014 p.21