Emergency Medical Services (EMS) Data Integration to Optimize Patient Care

AN OVERVIEW OF THE SEARCH, ALERT, FILE, RECONCILE (SAFR) MODEL OF HEALTH INFORMATION EXCHANGE

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Introduction

This resource[1] highlights how emergency medical services (EMS) and health information exchange (HIE) organizations can work together to improve data sharing. This resource also profiles five different state and local health information technology (health IT) initiatives that allow first responders access to electronic health information to improve day-to-day patient care as well as disaster response. This report can assist EMS officials and HIE organizations to understand:

- the potential benefit of HIE and EMS coordination;
- the new California Search, Alert, File, Reconcile (SAFR) model for health information exchange and how it is being implemented by five communities;
- successes and challenges experienced by the five communities as they work to integrate EMS and HIE; and
- ideas and next steps to move HIE and EMS integration forward in their state or locality.

The ability for EMS providers to have access to relevant health data (such as past medical problems, medications, allergies, and end-of-life decisions) is critical, especially for field paramedics and emergency staff. This is important because patients or their caregivers may be unavailable or unable to provide basic, reliable health information about the patient during a crisis. In a disaster situation, an HIE organization connected with EMS can help to ensure patient tracking and resource coordination is available to those who may be displaced from their normal location or health care team.

EMS and Health Information Exchange

As first responders, EMS providers often have to make quick, life-saving decisions without any patient health information during emergencies. HIE allows emergency medical technicians and paramedics to appropriately access and securely share a patient's vital medical information electronically. HIE refers to the secure and timely sharing of electronic health data across the boundaries of health care institutions.[2]

A patient's history is critical to appropriate care in the field. EMS agencies increasingly provide scheduled non-emergent care in partnership with local health systems. Conveying information gathered at the scene can be vital to the receiving facility and can influence patient care decisions. EMS providers affect outcome measures, quality of care, and patient satisfaction both on the scene and in route to the hospital. As noted in the *Federal Health IT Strategic Plan 2015-2020*, "[f]or example, EMS practitioners

[1] This educational resource was developed under the contract #GS-23F-9755H. This resource is designed to provide background on the piloted SAFR model and community work around HIE and EMS. References to the SAFR model and to any other specific resources, tools, products, process, service, manufacturer, or company does not constitute its endorsement or recommendation by the U.S. Government or the U.S. Department of Health and Human Services. The information contained in this resource is not intended to serve as legal advice nor should it substitute for legal counsel. This resource is not exhaustive, and readers are encouraged to seek additional detailed technical guidance to supplement the information contained herein.

[2] Relatedly, an HIE organization is an entity that oversees or facilitates the exchange of health information among a diverse group of health care stakeholders within and across regions, according to nationally recognized standards. (www.healthit.gov/sites/default/files/ltpac_value_prop_factsheet_6-21-16.pdf). In this resource, HIE refers to the act of health information exchange. When referring to organizations that support HIE, the term "HIE organization" will be used.

provider stabilizing care and transportation services; having access to a patient's salient clinical information as a first responder can improve patient health and safety. Access to linked outcomes data from hospitals can help EMS systems measure performance, improve their provision of care, and provide timely feedback to providers." [3]

EMS is an essential part of the health care delivery system. The 2011 National EMS Assessment revealed that the over 825,000 credentialed EMS practitioners in the United States respond to an estimated 36.5 million calls for service and transport 28 million patients to hospitals each year. [4] Moreover, community paramedicine, or mobile integrated health care, is an emerging model for integrating EMS providers into a community to support public health goals in non-emergent settings. [5] A 2007 National Academy of Medicine (formerly 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."[6]

EMS Data in the Broader Health System

"EMS data [are] health care data. Information from EMS is an important part of the medical record and it has incredible value to patients and downstream health providers. Seamlessly integrating this information and making it available in electronic health records is vital to the continuum of care, but that has not yet been realized in much of the country."

Noah Smith, EMS Specialist, National Highway Traffic Safety Administration (NHTSA) Office of Emergency Medical Services, U.S. Department of Transportation.

Access to patient information from an HIE organization is especially important to field paramedics and emergency department (ED) staff. Patients or their families may be unable to provide reliable information that can affect initial care decisions and long-term outcomes. Knowledge of relevant health data, such as recent hospitalizations, past medical history, medications, allergies, preferred health care facilities, as well as end-of-life decisions, enables EMS providers to provide the most appropriate pre-hospital patient care and ensure transport to the proper health care facility. In addition, EMS may collect information from caregivers that can assist other providers with developing the best plan for the patient's care. This process improves the transition of care from one health care professional to another. The HHS Office for Civil Rights issued earlier guidance making it clear that EMS/ambulance service providers are providing *treatment* within the meaning of the Health Insurance Portability and Accountability Act of 1996 (HIPAA) Privacy Rule. Likewise, EMS may be business associates to relevant providers of treatment. In such cases, disclosures or transmissions of patient information to or from the provider and or hospitals are permissible without obtaining patient consent.[7] Where the EMS is not a

[3] ONC, *Federal Health IT Strategic Plan 2015-2020*. https://www.healthit.gov/sites/default/files/9-5-federalhealthitstratplanfinal_0.pdf. (p. 16).
[4] Federal Interagency Committee on Emergency Medical Services (FICEMS). *2011 National EMS Assessment. U.S. Department of Transportation, National Highway Traffic Safety Administration* (2011). www.ems.gov/pdf/2011/National_EMS_Assessment_Final_Draft_12202011.pdf
[5] Kizer, Kenneth W., MPH, Karen Shore, PhD, and Aimee Moulin, MD. *Community Paramedicine: A Promising Model for Integrating Emergency and Primary Care*. (July 2013). https://www.ucdmc.ucdavis.edu/iphi/publications/reports/resources/IPHI_CommunityParamedicineReport_Final%20070913.pdf
[6] The National Academies of Sciences, Engineering and Medicine formerly known as the Institute of Medicine (IOM), *Emergency Medical Services: At the Crossroads*. (2007). https://www.nap.edu/catalog/11629/emergency-medical-services-at-the-crossroads
[7] HHS, *When an ambulance service delivers a patient to a hospital, is it permitted to report its treatment of the patient and patient's medical history to the hospital, without the patient's authorization?* (2002). http://www.hhs.gov/hipaa/for-professionals/faq/273/when-an-ambulance-delivers-a-patient-can-it-report-its-treatment-without-authorization/index.html; See also 45 Code of Federal Regulations (CFR) 164.506. https://www.gpo.gov/fdsys/pkg/CFR-2011-title45-vol1/pdf/CFR-2011-title45-vol1-sec164-506.pdf.

business associate of the provider, state or local laws apply, or organizational policies apply, then patient consent to receive or transmit may be required. That may also be true where EMS wishes to involve non-HIPAA organizations (like social services agencies) in exchange of information.

The electronic patient care report (ePCR), EMS's equivalent of an electronic health record (EHR), is an important part of the patient's overall health record and should be integrated with the patient's longitudinal health record. Interoperability between EMS provider and hospital information systems—which can be facilitated through an HIE organization—can help realize the promise of better clinical care, improved clinical decision support, and improved measurement of system performance and population health can be achieved.

What is the EMS Search, Alert, File, and Reconcile (SAFR) Model?

SEARCH, ALERT, FILE, AND RECONCILE FUNCTIONS

There are many components needed to advance HIE in EMS seamlessly. The SAFR model, developed by the State of California Emergency Medical Services Authority (EMSA), focuses on these components with the goal of advancing bidirectional data exchange (from an HIE organization to the on-scene EMS provider, and from the EMS provider back to the receiving facility and the HIE organization) and supporting quality improvement and research.[8] The SAFR model serves as an HIE framework for EMS by defining, in easy to understand terms, the minimum functionality necessary to achieve HIE. The SAFR model advances data sharing goals critical to EMS through the four functions defined below.

- **SEARCH: Improve prehospital clinical decision-making and patient care.** Search individuals' health information for past medical history, medications, allergies, and end-of life decisions (i.e., Physician Orders for Life Sustaining Treatment [POLST] or do-not-resuscitate orders [DNR]) to enhance clinical decision-making in the field.
- **ALERT: Improve receiving hospital preparedness, transitions of care, and**

Access to Patient History via HIE Can Impact Care Decisions and Outcomes

Situation #1: EMS finds an individual face down and non-responsive and needs to confirm information provided by a family member

HIE Benefit: Access the data from an HIE organization to determine if the patient has been recently hospitalized and view their health history

Situation #2: EMS has multiple ED options for patient transport

HIE Benefit: Access past medical history and determine the preferred versus closest hospital so the patient can be treated by doctors with access to their complete EHR and to minimize repeated tests

Situation #3: Disaster coordination and response

HIE Benefit: Ensure more effective care delivery, patient tracking, and resource coordination during major disasters and emergencies for patients who are displaced from their normal location or health care team

[8] Search, Alert, File, Reconcile (SAFR) Functionality for Emergency Medical Services was developed by the California Emergency Medical Services Authority (Smiley, D., Iljana, J., and Stanfield, R.) under ONC Cooperative Agreement #90IX0006/01-00 (2015).

patient care. Alert the receiving hospital about an individual's status directly onto a dashboard in the ED to provide decision support and prepare for an individual's arrival—especially for conditions requiring time-sensitive treatment or therapy—such as trauma, heart attack, or stroke.

- **FILE: Build a better longitudinal patient record.** File the structured data of the EMS patient care report directly into the receiving facility's EHR system for ease of access and better continuity of care.
- **RECONCILE: Improve overall care and population health.** Reconcile EHR information (including diagnoses, disposition, billing, and payment) back into the EMS patient care report for use in quality improvement of the EMS system, clinical quality measures, and population health, making EMS a full participant in the exchange of electronic health information. For EMS care teams, the verification of billing and payment information can provide information critical to demonstrate return on investment.

SAFR MODEL: HISTORY AND DEVELOPMENT

The California EMSA was awarded a cooperative agreement from the Office of the National Coordinator for Health Information Technology (ONC) in July 2015 to assess how EMS providers could best leverage patient data available through HIE organizations to improve patient outcomes. The funding also enabled California EMSA to pilot new EMS HIE workflows in two local regions by connecting EMS providers with hospitals using two different HIE organizations' vendors. California developed the SAFR model to:

- Demonstrate the value proposition for EMS HIE integration.
- Explain how HIE has the potential opportunity to optimize EMS services by obtaining patient demographic, allergy, and recent hospitalization data that can improve care decisions and outcomes.
- Show how EMS providers can integrate their workflows and practices to leverage patient information available in HIE organizations.
- Demonstrate ways in which EMS can share prehospital data with other providers.
- Explain how exchanging health information can support quality and process improvement as well as EMS outcomes research.
- Begin to design and list the necessary consumable data elements expected to be exchanged during each function of the SAFR model.

In July 2016, California began two pilot SAFR implementations to enable complete data sharing between EMS agencies and their local HIE organizations. These pilot projects aim to develop all four SAFR technical capabilities and, by spring 2017 will connect EMS providers using ePCR systems and hospitals to two HIE organizations that will be used as information hubs (San Diego Health Connect and OCPRHIO, an HIE organization based in Orange County). EMS agencies will begin accessing health information and implementing redesigned workflows in January 2017.

California will use what they learn from these pilots to revise and refine the SAFR model based on stakeholder feedback and other evaluation processes. The pilot projects can help communities think through how to share prehospital data and take advantage of past medical history data available through HIE organizations.

While this is a new model, a number of communities have begun to implement EMS HIE use cases and portions of the SAFR model. The experiences of these communities can inform policy development decisions and provide assistance to others who want to integrate HIE into their EMS systems. Initiatives in California, Denver, Indianapolis, Oklahoma, and Rochester, New York have each independently developed EMS use cases and implemented components of the SAFR model. Although not an exhaustive list of states and communities working in this space, the profiles detailed in Appendix A can help support others moving forward.

Critical EMS HIE Integration Success Factors

Compiled below are critical success factors reported by the five EMS HIE Integration Initiatives (hereinafter referred to as “Initiatives”) working to exchange health data with EMS. These initial experiences and factors noted below can serve as a reference for others interested in working with EMS providers and HIE organizations to exchange data.

Identify a Strong EMS Champion: The Initiatives noted that a strong leader and champion can help a community convene all relevant stakeholders to help work through EMS workflow redesigns, technical obstacles and operational change. For example, this champion may be a local EMS agency medical director, a fire chief, or ED physician.

Engage and Partner with EMS Early: The Initiatives report that engaging with local EMS agencies early in the HIE organization, hospital, and other care provider onboarding process is important. They also note that EMS should be considered an equal partner supporting community health information exchange. EMS should consider being a voice at the table so that decisions around how information is shared integrate with the EMS workflow and information needs in the field. EMS should consider being ready to both access community data and share their prehospital data with other providers.

Educate EMS Providers on HIE: Involved stakeholders should not assume that EMS providers are familiar with HIE means of accessing patient data. HIE organizations should consider helping to educate EMS providers about health information exchange and how access to patient records can improve their service levels and patient outcomes. Some initiatives used the SAFR functions as a way to explain the benefit and use of HIE to EMS providers.

Rely on National EMS Data Standards: EMS has developed and implemented a data collection standard for point-of-care interactions. The National EMS Information System (NEMSIS) standard is now on its third version, is Health Level 7 (HL7)-compliant, and is the basis for interoperability between EMS and HIE.[9] The Initiatives note that EMS agencies interested in HIE should consider adopting the NEMSIS Version 3 standard.

Know Your EMS Agency Customers: Each EMS agency may have different funding, skill sets, workloads, training needs, and ability to implement workflow changes. Likewise, each EMS agency will have a different need for and make different use of patient data. Initiatives noted that If you operate in

[9] More information on the National EMS Information System can be found at www.NEMSIS.org.

a community with multiple covered entities as defined by the Health Insurance Portability and Accountability Act (HIPAA), consider whether it would be helpful to develop unique onboarding approaches tailored to their organizational requirements and obligations pursuant to HIPAA. In communities sharing data across the spectrum of community partnerships with non-covered entities (e.g., housing), ensure there is a strategic and operational plan to support lawful data exchange in light of existing legal requirements related to patient consent. Operational plans should include development of appropriate consent management tools, data use agreements, and contracts.

Partner with HIE Organizations that have both Resources and a Critical Volume of Patient Data: The Initiatives noted that the communities should not underestimate the need for a robust and operational HIE organization with technical resources to assist EMS agencies and ePCR vendors in building and testing required interfaces. Initiatives also noted that HIE organizations should consider the importance of EMS data and allocate technical resources to work closely with vendors to build necessary integration. Even with an EMS and HIE champion advancing the priority forward, many initiatives noted that EMS and health information integration is most successful when the majority of hospitals and large provider groups share data to an HIE organization. This is because EMS providers may not continue to use the Search function and access the HIE to look for patient data unless they have early success in locating patient records. Some Initiatives noted that, in some case, it might make sense to wait to begin an EMS provider pilot until there is access to a critical mass of historical patient data to support successful adoption.

Assess your ePCR and EHR Vendor Capabilities: EMS stakeholders should consider the need to continue to educate ePCR and hospital EHR vendors about the opportunities for improved patient outcomes with EMS and health information integration. Initiatives noted that EMS agencies, HIE organizations, and hospitals should communicate a strong message to their vendors to elevate EMS health information integration as a priority for their development roadmaps.

Pilot Now; Apply Learning as You Go: The Initiatives noted that the use of a capabilities assessment of the ePCR vendor to determine how to onboard EMS providers as HIE users is helpful. Begin to send data, even if in PDF format. Start small, work to share health data directly with a hospital's EHR system, especially if a local or state HIE organization does not exist, lacks critical volume of patient data, or has few resources. Consume what is available and begin to apply the SAFR components as they are made available.

Challenges and Potential Solutions to EMS HIE Integration

Currently, few EMS systems are connected to an HIE organization or to other electronic health records systems. One of the key obstacles to EMS HIE integration reported by the Initiatives is funding. To address these challenges, states and communities interested in identifying potential funding sources can now explore how Health Information Technology for Economic and Clinical Health (HITECH) funds can support pilot EMS HIE integration programs. In addition, the Centers for Medicare & Medicaid Services (CMS) State Medicaid Director's Letter 16-003 updates guidance on the availability of CMS 90/10 funding to now support HIE onboarding and systems for EMS providers, if they are coordinating care with an eligible provider. Letter 16-003 expands the scope of expenditures eligible for the 90 percent matching rate, and supports the goals of, *Connecting Health and Care for the Nation: A Shared*

Nationwide Interoperability Roadmap Version 1.0 published by ONC in October 2015. In September 2016, NHTSA (with representatives from ONC and CMS) hosted a webinar for the EMS community on this potential funding source. A recording and presentation are available from www.ems.gov/ems-focus.html.

There are also many challenges associated with sharing of EMS data, including funding, integrating proprietary ePCRs and EHRs, and the need for collaboration between all involved organizations. On the federal level, ONC is working with the NHTSA Office of EMS, HHS's Assistant Secretary for Preparedness and Response (ASPR), state and local EMS agencies, and HIE organizations across the country on efforts that support the integration of EMS data into care delivery. Some potential solutions to overcome these challenges include:

Developing a Shared Vision Among Stakeholder Organizations to Build Required Infrastructure and Functionality: These efforts include creating a joint, shared vision for EMS HIE data sharing and establishing clear communication between all stakeholder organizations. In addition, developing a vision that supports providers, HIE organizations, vendors, and local EMS agencies in creating the infrastructure necessary for secure two-way exchange between EMS, other health care providers, facilities and payers is important. Developing strategies to support decision-making, maintain community focus, and motivate stakeholders to continue to make progress toward full EMS HIE integration is also key.

Supporting the Standardization of EMS Data to Support HIE: One example of an important community advancement toward standardization is the adoption of NEMSIS Version 3 data standards and upgrading older systems to enable interoperability that can facilitate health data communication and support EMS and ED provider workflow.

Working with Vendors: This includes bringing ePCR, EHR, and HIE vendors together to discuss EMS HIE integration needs and functionality that would support successful implementation of bidirectional exchange of prehospital data. In some communities, vendors have been reluctant or unable to dedicate resources to implement the appropriate software upgrades and new functionality required for EMS HIE integration. Appendix B provides specific information on ePCR readiness to support EMS HIE integration and shares a more detailed look at the current state of ePCR developers and what specific challenges they are facing.

Educating EMS Providers, HIEs and the Public on the Impact of EMS HIE Integration on Patient Health Outcomes: It is also critical to advance national awareness regarding the importance of integrating EMS providers into HIE to improve care and create longitudinal patient health care records.

How are EMS Agencies Implementing the SAFR Model?

Table 1 below provides a brief overview of how the five HIE/EMS initiatives profiled in this document are accessing HIE data to improve EMS services and to impact patient outcomes.

Table 1: Profiles of Communities Implementing EMS HIE SAFR Model or other EMS Use Cases

	HIE Organization	Start Date of EMS-HIE Efforts	Funding Source	No. of EMS Agencies and Users with HIE Access	SAFR Elements in Use
California	San Diego Health Connect and OCPRHIO, under contract to the California Emergency Medical Services Authority (EMSA)	2013—Research and Development of SAFR Model April 2015 through July 2017—Planning and implementing a (1) San Diego /Orange County pilot and (2) an Imperial County pilot	ONC HITECH Grant- Advance Interoperable Health Information Technology Services to Support Health Information Exchange	3	- **Search, Alert, File, Reconcile** to be operational in the 3 EMS agencies by July 2017 - One agency, San Diego Health Connect (an HIE organization in San Diego County) currently has an EMS hub that supports the **Alert** function.
Colorado	Colorado Regional Health Information Organization (CORHIO)	2014	South Metro Fire Rescue Authority - Shared cost savings model with payers, Employee Retirement Income and Security Act (ERISA), Medicaid and Self-insured Plans	1 (Operational) 6 (Implementing) 4 (Planning)	- **Search -** by Dispatch Health (private entity) for non-acute patients - **Reconcile** – by South Metro EMS
Indianapolis	Indiana Health Information Exchange (IHIE)	2004	Indianapolis Emergency Medical Services/IHIE	1 (Users: 300 EMS providers accessing HIE)	- **Search**
Oklahoma	MyHealth	2004—Initiative began 2010—Search ability integrated 2015—File ability integrated 2016—Re-connected to new ePCR	EMSA	3 (Users: >200)	- **Search** - **File**
Rochester	Rochester	2006—Initiative	New York Health Care	17 (covering 13	- **Alert**

	HIE Organization	Start Date of EMS-HIE Efforts	Funding Source	No. of EMS Agencies and Users with HIE Access	SAFR Elements in Use
	Regional Health Information Network (RHIO)	began 2009—Initiative became operational 2016—Reimplementation of Initiative began	Efficiency and Affordability Law (HEAL) grant funding	counties & 12,630+ users)	- **Reconcile**

Potential Steps to Take for EMS HIE Integration

Based upon the lessons learned from the five EMS HIE Integration Initiatives profiled in this document (see Appendix A), if an EMS agency or an HIE organization is ready to share and contribute patient data, there are several steps they may consider taking to begin the process toward integration.

1. Identify an EMS champion who can engage community stakeholders, articulate the value of information exchange, and lead the charge.
2. Engage and partner with local or state HIE organizations and health systems to discuss how to begin to implement data exchange with EDs and an HIE organization.
3. Evaluate ePCR vendor capability and available resources that might be able to assist you in developing immediate and long-term EMS use cases and goals, including the potential for updating to the most recent NEMSIS Version 3 standard.
4. Determine funding sources, both for short and long-term pilots.
5. Consider whether adoption of the SAFR model for health information exchange would be beneficial and begin to implement and include the core data elements in pilot projects.
6. Establish early cooperation with all involved parties, including community leaders from EMS, HIE organizations, state Medicaid, local health systems, hospitals, and ePCR vendors.
7. Consider reaching out to communities and vendors who have already begun EMS HIE integration to understand their use cases, paths forward and challenges to help inform your plan.

Several communities are profiled in Appendix A and can serve as a valuable resource as lessons learned and successes that are based on their unique experiences connecting and exchanging data with an HIE. The California EMSA also developed resources around EMS HIE integration and the SAFR model, with ONC support, and those resources are noted in Appendix C. These resources also may be of assistance to others embarking on EMS HIE integration.

Appendix A: EMS HIE Integration Profiles

CALIFORNIA

Overview

In 2013, California EMSA began exploring how to improve technology for EMS providers who were not eligible professionals under the Medicare and Medicaid EHR Incentive Programs. California EMSA believed that the future would require EMS integration with hospital electronic health records with the ultimate goal of eliminating the paper patient care report (PCR) that paramedics drop off at the hospital.

EMSA received funding from the California Office of Information Integrity to study EMS HIE integration (EMSA Dispatch). Initial research revealed that EMS providers were not yet aware and did not understand the concept of HIE and the potential and benefits for EMS. With additional local grants, California EMSA hosted HIE conferences in both 2013 and 2014 to bring the state EMS community together to begin discussing HIE and how prehospital providers could change their workflows to support data exchange.

Based on knowledge gained through its two HIE conferences, California EMSA knew that HIE for EMS was not well understood. EMS providers had different understandings of what HIE is and how it could support prehospital patient care. Through an HHS IDEA Lab grant awarded in April 2014, California EMSA and HHS representatives from ONC and ASPR worked collaboratively to develop the Patient Unified Lookup System for Emergencies (PULSE) architecture. It is through this architecture that California EMSA and their state partners will begin to create the structure to connect all 40+ HIE organizations in California to support a disaster use case. (For more information, see HHS Idea Lab.)

Under the ONC Advance Interoperable Health Information Technology Services to Support Health Information Exchange grant, California EMSA then developed the SAFR model to describe the minimum functional aspects of EMS HIE data exchange. The SAFR model created a framework and defined concrete data elements and functions that explained HIE concepts in terms applicable to the EMS community. EMSA also developed a work group called Consumable Data and Transport to create the list of specifications for the SAFR functionality and the specific elements to be moved.

California State Law Requires Electronic Health Records

As part of a broader effort to encourage information exchange, California passed a law in 2015 that requires every EMS provider to have an electronic health record that is interoperable. All EMS agencies are required to implement a NEMSIS Version 3 compliant system by December 31, 2016.

[AB 1129/ CA Health and Safety Code 1797.227]

EMS HIE Integration

California EMSA is funding two regional pilots:

- San Diego and Imperial Counties with San Diego Health Connect as the HIE organization
- Orange County with OCPRHIO as the HIE organization

As of July 2016, California EMSA is finalizing the agreements for the grant-funded pilots in San Diego, Orange and Imperial Counties. California EMSA has three functionality milestones as part of the ONC grant:

Adoption: Defined as completion of agreements and successful test of information exchange.
Exchange: Defined as exchange information during the Search and Alert phases.
Interoperability: Defined as moving information during the File and Reconcile phases.

All three components are targeted to be initiated by December 2016 with the full pilot completed by July 2017.

The Alert function is already being used in multiple locations in California. Orange County, San Diego, Inland County, Sacramento, and Riverside's EMS are implementing the Alert function. Ventura and Santa Barbara counties are in the implementation planning phases. Using the Alert function, paramedics post information they collect on the patient and push the information to an HIE organization. This data can then be accessed in the ED through a web portal, making it a much easier lift.

The California EMSA pilots will help inform emerging national standards for EMS data collection and assess the prehospital data elements that are most critical to ED care. The pilots can also help determine which post-transport data elements are appropriate and most useful for hospitals to share with EMS for quality improvement and outcomes research.

California EMSA is also working closely with the NHTSA to inform them of their experience and how to best refine current NEMSIS Version 3 data standards to serve all stakeholder needs and to support a more national approach to EMS data collection and sharing.

Funding

California EMSA received a combination of funding from ONC and the Centers for Disease Control and Prevention (CDC), Preventive Health and Health Services Block Grant to bring EMS representatives from 33 different communities in California together in three large conferences (2013, 2014, and 2016). The purpose of these conferences were to begin to evaluate the value proposition of HIE and how EMS agencies could ultimately plan for and adopt bidirectional exchange of data between EMS and ED providers. Funding was provided to several local EMS agencies to begin the feasibility planning for HIE adoption.

Challenges

California faces two immediate challenges. California is working to complete all technical requirements and ePCR functionality by the end of December 2016. While this is an aggressive timeline, it would allow EMSA to then focus on interoperability efforts.

California has over 40 HIE organizations. However, there is not a single point for EMS providers to connect to for a consistent EMS hub. Therefore, building a statewide interoperable system across the HIE organizations poses a significant challenge.

Contact Information:
Leslie Witten-Rood
EMSA HIE/EMS Project Manager
leslie.witten@emsa.ca.gov
(916) 431-3723

DENVER-SOUTH METRO

Overview

Colorado hospitals began connecting to the Colorado Regional Health Information Organization (CORHIO) in 2004, and all large health systems were connected by the end of 2015. CORHIO's PatientCare360 portal is now rich with patient data with 60 out of the 70 hospitals in Colorado connected. The remaining 16 hospitals participate in the Quality Health Network HIE organization, which connects with CORHIO to enable access to patient data from the western part of the state.

Denver's South Metro Fire and Rescue protects 179 square miles in Arapahoe and Douglas counties with a population of 203,500 and 6 EMS providers as part of South Metro Fire and Rescue and another 33 users as part of the Colorado Springs Fire Department that is managed by the City of Longmont Office of Emergency Management and Dispatch Health. The service area has experienced rapid growth in EMS demand as well as long term post-acute care access. With limited resources and a large increase in the most expensive components of care, the South Metro Fire Chief Rick Lewis and Dr. Mark Prather began to explore more efficient ways to improve service delivery and reduce costs.

South Metro Fire and Rescue contracted with Dispatch Health, a private entity, in 2014 to:

- Improve prehospital care by providing EMS providers with access to patient information available in CORHIO;
- Follow-up and assess the appropriateness of the transport and the outcome of care; and
- Access the community health record (i.e., CORHIO's longitudinal health record) to identify high utilizers for case management.

CORHIO developed a specific EMS user role in their PatientCare360 portal to provide access to only a subset of HIE patient data pertinent to EMS providers (e.g., demographics, allergies, recent hospitalizations).

EMS HIE Integration

The South Metro/Dispatch Health/CORHIO EMS model functions with the Search and Reconcile aspects of the SAFR model and acts as a unidirectional information access portal to obtain patient data at the time of care (Search) and to obtain patient outcome information afterward (Reconcile).

Dispatch Health Triage Model for Non-Acute Cases

South Metro redesigned workflows and 911 triage protocols to allow operators to request patient-specific identifiers, not just address information, while still adhering to HIPAA requirements. In cases that the 911 dispatcher identifies a call as non-critical, Dispatch Health sends a nurse practitioner along with EMS to evaluate and determine whether the patient requires transport or can be treated in the field. In this scenario, the 911 dispatcher has access to the community health record to follow specific triage protocols and the nurse practitioner and EMS provider have access to triage and treat the patient on the scene. All emergency personnel are working on getting information back from both EMS and Dispatch Health into the community health record. While this model demonstrates HIE use during prehospital care and has resulted in significant cost savings and patient satisfaction results, it is not yet widespread.

As of July 2016, 10 additional EMS agencies are implementing the South Metro EMS HIE non-acute triage and in-field care use case. Six have become active in the past year, with four additional agencies in the implementation phase. Dispatch Health is optimistic that additional counties, EMS agencies and payers will realize the same appropriate non-acute care cost avoidance benefits as South Metro.

Dispatch Health is in discussions with agencies throughout the country to determine whether this type of model can also be successful in their communities. South Metro and Dispatch Health's success in such a short time period was facilitated by several factors that may not be replicable in all communities:

- Strong EMS Leadership to generate support for a new EMS triage and service model for non-acute patients
- Hospital and payer willingness to accept and contract with a new transport and payment model for such cases

A robust relationship with an HIE organization that allows for access to useful information access in the field. Quality Improvement

South Metro, and one other EMS agency in the area, has developed a follow up protocol to review all patients transferred to a hospital to determine their outcome and confirm that the transport was appropriate. This protocol supports EMS' continuous quality improvement activities and identifies areas for increased training of EMS providers.

Case Management for Frequent ED Users

South Metro also accesses CORHIO to identify frequent users of ED services and assess the cause of their ED use. They implemented a program to follow up with this subset of patients to ask them questions about their ED experience from an individual patient satisfaction perspective all the way through actual utilization management and coordination with primary care physicians.

Funding

In order to support this program, South Metro engaged major health care payers, ERISA plans, Medicaid, and self-insured employee plans to enter into a cost savings arrangement for low acuity cases. Cost savings associated with avoiding costly hospital transport for non-acute patients enables payment for the Dispatch Health onboard nurse practitioner as well as EMS provided services. South Metro believes that the payment model enables all parties to receive equitable and fair payment for the services they provide. South Metro negotiated a percentage to split cost avoidance between Dispatch Health, South Metro and payers. This arrangement worked for all parties.

Through partnership with CORHIO, both South Metro and Dispatch Health were able to focus their efforts on their mission of improving the health of the communities they serve, rather than the development of new health IT infrastructure. Further, these types of models will be the beneficiaries of new Implementation Advanced Planning Document (IAPD) funding to support the integration of EMS services into HIE programs.

South Metro conducted a claims analysis of 400 patients over a six to nine month period and identified a total estimated cost savings of $1 million through EMS partnership with a nurse practitioner related to the transport for non-acute cases. South Metro took data from the Colorado all payer claims database

and overlaid it with ERISA plan and EMS transport financials to determine cost savings for all low acuity cases where they otherwise would have transported the patient to the ED.

Despite the growth in demand for EMS transport services, South Metro has been able to reduce costs with this nurse practitioner through the non-acute cases triage approach.

Challenges

According to CORHIO, the biggest challenge was establishing the initial consent for dispatch and EMS to participate in HIE. CORHIO has a narrow approach to data use, which became a barrier to HIE access. Prior to workflow changes, 911 Dispatch and EMS were not considered HIPAA covered entities for the purpose of HIE access. Once the appropriate business associate agreement (BAA) was executed, and access to PHI on behalf of South Metro Fire and Rescue was established, Dispatch was able to properly disclose these data to responders within the meaning of "treatment" under HIPAA and to access information contained in CORHIO. [10]

The next phase of functionality will be to incorporate bidirectional information exchange by enabling data to be uploaded from the EMS providers to CORHIO. This next phase will involve the ePCR vendors/developers to add functionality to their technology to enable EMS to integrate pre-hospital documentation with the ED data to add to the longitudinal community health record.

CORHIO priced the HIE access for EMS at a standard per user pricing and, according to CORHIO, this made services cheaper than most cell phone contracts. CORHIO has purposely focused on making sure financing is the lowest barrier. Integrating results will be another huge cost and service addition as this project moves forward.

Contact Information:
Morgan Honea, CEO
CORHIO
mhonea@corhio.org
www.corhio.org

[10] See 45 CFR 164.501 and 45 CFR 164.506; See also Office for Civil Rights (OCR) issued HIPAA guidance related to EMS: http://www.hhs.gov/hipaa/for-professionals/faq/273/when-an-ambulance-delivers-a-patient-can-it-report-its-treatment-without-authorization/index.html

INDIANAPOLIS

Overview

The Indiana Health Information Exchange (IHIE), a non-profit organization, was launched in 2004, in partnership with the Regenstrief Institute. Over the past 12 years, IHIE has expanded through much of Indiana. The Indianapolis Emergency Medical Services Electronic Patient Care Reporting/Indiana Network for Patient Care program is a collaboration between the Indianapolis EMS, the Regenstrief Institute, the IHIE and health IT vendors working to make HIE information accessible in the field.

Indianapolis EMS provides prehospital services for the city of Indianapolis. Their 300 EMS providers run 100,000 calls per year, and cover 75 percent of Marion County, Indiana.

EMS HIE Integration

Indiana's EMS integration began with a desire to provide EMS with additional information to improve patient care. Their EMS integration was the first in the country.

Indiana currently uses the Search function of the SAFR model. On scene or in the ambulance, an authenticated EMS provider can query a patient record using an internet-connected tablet. This record is then pulled from IHIE and attaches to the patient's prehospital record. The EMS provider does not have to sign into a separate portal, as a single sign-on search system is integrated into their ePCR system. The initial query is based upon last name, first name, date of birth, and gender. If a conflict arises, the EMS provider is asked to enter a zip code or social security number. Once this information is accessed, the provider can view EMS-relevant data including the patient's clinical history, medications, allergies and the last time they were in the hospital. This information can inform treatment and transport destination for the patient.

Indiana has added functionality to be able to pull a patient's previous electrocardiograms (EKGs), so that EMS providers can compare previous EKGs to EKGs from on the scene, and at times can expedite catheterization lab activation and rapid intervention in acute myocardial infarction cases. Because the system currently uses unidirectional information access, the EMS provider still provides a hard copy of the patient report directly to ED staff, who then scans the ePCR report into the patient's hospital record.

Funding

As a first step to receive funding, a proof of concept and collaboration model was created. Indianapolis EMS funded the initial cost of the vendor component of the project from a grant. Both Indianapolis EMS and IHIE/Regenstrief saw the advantage of the concept and worked jointly to make the project work. Indianapolis EMS is looking to create more collaborative partnerships to expand the functionality and share the ongoing operational costs, which may help with ongoing funding.

Challenges

One of the biggest initial challenges in Indiana was getting the EMS providers to look up patient information once they had the capability to do so. During the EMS HIE access roll out, Indianapolis noted that, though the technology is easy to use, they did not emphasize the value to EMS providers enough. This resulted in slow adoption. Based on this initial experience, IHIE developed additional onboarding and educational tools. Now, EMS crews can learn about the capabilities and benefits in several ways, including an eLearning System.

As Indianapolis changed its ePCR system, they had to rebuild the system interfaces, which has led to downtime. As pre-hospital ePCR vendors update or change their systems the EMS agency should consider whether it is necessary to take into account the overall impact on the system interfaces, including the functional, technological, and financial impacts.

Contact Information:
Tom Arkins, EMT-P, BS
Chief of IT and Informatics
Thomas.Arkins@IndianapolisEMS.org
(317) 426-1294

OKLAHOMA

Background

MyHealth Access Network (MyHealth) is an Oklahoma non-profit health information exchange, which links more than 2,000 providers and their patients in a community-wide health information system.

Oklahoma's Emergency Medical Services Authority (EMSA) is Oklahoma's largest provider of pre-hospital emergency medical care, providing ambulance service to more than 1.1 million residents in central and northeast Oklahoma. EMSA was established in Tulsa in 1977, and later expanded to include Bixby, Jenks, and Sand Springs. EMSA began providing service to Oklahoma City and suburbs in 1990. Each year, EMSA responds to 170,000 calls and transports 150,000 patients.

EMS HIE Integration

EMSA had been trying to get EMS data into the MyHealth HIE since 2004 and started to have success in in 2012 after switching ePCR vendors. EMSA switched to a vendor that was already NEMSIS Version 3-compliant and had developed HL7 interface capabilities, and within six months was working to interface and connect to MyHealth. As MyHealth gained more experience with EMSA's data, it was able to improve their electronic Master Patient Index system to allow for non-patient centered data (i.e., incident centric vs. patient centric) to be matched better with patients already participating in health information exchange. Because of this change, MyHealth was able to get the interface between the ePCR and the HIE organization to work effectively.

EMSA has been working to integrate the use of the Search and File capabilities of the SAFR model with MyHealth. EMS providers have been able to search MyHealth for patient data using a web browser, and have been able to view information such as encounter information vitals, labs, allergies, the patient's doctors, and the normal hospital and/or clinics where they receive care. This access may inform treatment and transport decisions in the absence of on-scene information.

While EMS providers can access this information through MyHealth, given current system interoperability, EMS providers still need to manually import the data into the patient's ePCR using copy and paste functions. One of the goals of the new implementation will be to develop a more automatic electronic import capability.

In this model, ePCR forms can be electronically filed into the HIE record. EMS providers usually finish the ePCR documentation within an hour of transporting the patient to the hospital. During the run, the EMS provider typically calls in patient information to the ED. No information is available to the receiving facility until the EMS provider uploads the report. Once the EMS provider completes a run and finalizes the report, the data goes through NEMSIS validation. The report is then uploaded to MyHealth and made available to all authorized providers.

EMS HIE Use Case Example

EMS providers found an unresponsive patient face-down in someone else's yard with no reliable witnesses or historians.

The EMS providers were able to access the patient's information via MyHealth (thanks to a driver's license in the patient's pocket), discover a history of epilepsy, and identify an appropriate receiving facility based on the patient's current primary care providers.

To prevent unauthorized information access, MyHealth established a clinical quality committee of medical directors and clinical leads. For each user role, including EMS providers, the committee decides the appropriate level of access to the HIE organization. EMS providers can obtain data pertinent to emergent prehospital care but do not have privileges to examine the patient's full database.

To encourage widespread use of the HIE database, MyHealth also offers organizations a "Missed Opportunities" report that flags cases where there was HIE data available for a patient but it was not accessed.

Future plans for EMSA and MyHealth include working to pull the MyHealth information directly into the ePCR. Their long term vision is to use the wealth of patient data in MyHealth available to EMS providers to support better patient outcomes. EMSA's process is replicable and transferable for communities with one HIE organization and one primary ePCR system.

Funding

EMSA's regular budget was the source of funding for this initiative. Their vendor was highly supportive and provided technical resources to work with on the EMS HIE use case to further expand their product capabilities and bring lessons learned from Oklahoma to other communities.

Challenges

One of EMSA's biggest challenges, from the start, was working with an ePCR vendor to understand the business case and the value of EMS participating in health information exchange. In addition, MyHealth continues to work through identified issues related to the sharing of health data between EHR vendors and the 260 practices that connect to the HIE organization.

Contact Information:
Frank Gresh, CIO
Emergency Medical Services Authority
greshf@emsa.net
(405) 297-7053

MyHealth Access Network
myhealth@myhealthaccess.net
918-236-3434

ROCHESTER

Overview

The Rochester RHIO (Regional Health Information Organization) infrastructure was funded through Health Care Efficiency and Affordability Law for New Yorkers (HEAL) grants beginning with a $6 million dollar grant in 2008. EMS connectivity was funded through one of the HEAL NY Phase 5 - Advancing Interoperability and Community-wide EHR Adoption in New York State grants. Rochester RHIO is part of the New York State Health Information Network—New York (SHIN-NY) that connects the eight state regional HIOs. Additional information about the SHIN-NY system can be found at:

- SHIN-NY Spotlight – April 1, 2016 Issue I
- NYEC News - May 25, 2016 Volume 71

The Rochester RHIO EMS use case is a local model to incorporate EMS data into the overall HIE organization and views EMS data as a small, but important percentage of the total data that can make a large impact on patient care.

Rochester RHIO conducted outreach and connected 18 hospitals as well as other community social services groups with its strong technical onboarding team. Today, Rochester RHIO covers 13 counties with many types of EMS service models with varying resources and sizes; Monroe County (where Rochester sits) services 38 different fire districts. These agencies range from commercial for-profit to not-for-profit to volunteer. As there is no single ePCR platform used among these 65 different entities, Rochester RHIO prioritized ePCR connectivity with vendors and agencies that are both capable and willing to integrate with the RHIO. Connecting to the RHIO is particularly difficult for smaller agencies with limited resources.

Rochester RHIO stated that it is their hope that payment reform will result in increased support for EMS HIE integration and ED use. NY State is currently redesigning its Medicaid program. Medicaid is now working with preferred provider systems and has included interfacing and integrating prehospital care data with hospital data as a priority. Agencies are acknowledging that prehospital data is needed for a complete longitudinal patient record.

EMS HIE Integration

EMS providers keep their patient records on a separate ePCR server that they can access independently from Rochester RHIO. EMS can pull up patient demographic data from a previous encounter and prepopulate the ePCR documentation.

The Rochester model has implemented functionality where information can be transmitted from the EMS provider to Rochester RHIO. Filed ePCR reports can be accessed by any HIE end user (e.g. ED staff, primary care providers, or case managers) using the regular query function from Rochester RHIO’s web portal. Rochester RHIO received feedback from ED doctors that indicated a desire for a standardized format and to view only a few clinically important data fields from the prehospital report (e.g., history of present illness, past medical history, current medications, allergies, vital signs, and prehospital interventions). As with many providers adopting and using HIE, Rochester RHIO has seen a large variation across emergency departments, and expects the same variation with EMS HIE data flow as prehospital data becomes more integrated.

Rochester RHIO implemented two SAFR functions: Alert and Reconcile. They are now reevaluating their new HIE platform technology to improve upon what had been implemented in the past. Below are the functions that had been operational until they began the HIE platform migration:

ALERT: Notifications go out to all providers who have signed up for the Rochester RHIO's event notification service. If a consenting patient is admitted/discharged from an inpatient stay, an ED visit or calls an ambulance, the provider is notified.

RECONCILIATION: EMS has implemented an informal reconciliation process, which includes information such as diagnoses, disposition, billing, and payment. The EMS Medical Director has access to the query portal for case-specific outcome analysis. The reconciliation function is not yet a systematic process; but EMS agencies are very interested in developing a more comprehensive reconciliation method to promote quality improvement initiatives and on-going training. Rochester RHIO plans to evaluate the implementation of a formal reconciliation process, which will help identify the technical, process and policy implications.

TRIAGE REDESIGN: Rochester RHIO is working with their local Delivery System Reform Incentive Payment (DSRIP) organization, Finger Lakes Preferred Provider System (FLPPS), on their new ED triage project. Every patient is evaluated to determine if there is a more appropriate alternative care provider. The project is focusing on how to get folks linked into the program and monitored.

DEVICE DATA INTEGRATION: Rochester RHIO is evaluating how to share prehospital monitoring device information with the ED prior to patient arrival. EMS' goal is to share EKG data from the scene, as well as data from other monitoring devices and pulse oxygen monitoring feeds before the ePCR is completed. While they are able to transmit the data, EMS needs to work with hospital EHR vendors to determine where to send and store the data.

Funding

Rochester RHIO used the HEAL grant funds to pay vendors to connect to the RHIO. Individual agencies were not charged. Part of the regular interfaces included the connection, and the terms of the arrangement for the ePCR connections pleased Rochester RHIO.

Rochester RHIO believes that they were able to negotiate a good price for the ePCR connections. Rochester RHIO covers the cost for the smaller volunteer agencies. There was no significant added expense after the grant ended. Even after the grants concluded, Rochester RHIO had loyalty from people who initially connected.

Challenges

Rochester RHIO encountered some initial resistance when discussing integration with EMS agencies. For example, Rochester RHIO found that many EMS agencies do not understand the value proposition or the need to be connected to the HIE organization. The Rochester RHIO noted that, with competing priorities, this continues to be a challenge.

Another issue is the timing and release of ePCR data to the ED. Initial information exchange between the EMS crew and the receiving hospital staff occurs via radio communication and direct face-to-face

discussion. In Rochester RHIO's model, access to the ePCR documentation may be delayed because some ePCRs do not allow reports to be transported to the RHIO until they are completed, reviewed and finalized by EMS. The timing of the completion of the ePCR has prevented EMS from automatically alerting the ED through transmission of preliminary information. ePCR documentation is often not electronically available until the patient has been received and evaluated by ED staff.

A challenge that hindered the workflow was that EMS dispatch was not able to obtain or send information to identify the patient appropriately. Therefore, EMS providers were not able to query the RHIO until they were on scene and could confirm patient identity themselves. Once on scene, providers were able to search for patient information but because of rapid transport times, EMS sometimes opted not to take this extra step. As part of the RHIO's technical platform upgrade, this function is being redesigned.

Data formatting has also been an issue when alerting outside providers. Rochester RHIO has had access to a rich data set, but primary care physicians or EDs are not able to consume the data. Rochester RHIO had to work with its customer's EHR vendors to develop a system in which incoming XML data could be adapted to the appropriate style sheets to allow the information to be shared with other EHRs.

Rochester RHIO is upgrading their HIE technology platform and will need to reestablish its connections with their EMS providers given that the older platform limited the amount of data integration that could be supported. Much of the EMS HIE integration work Rochester RHIO had previously completed is now being upgraded. With the new technology platform there is more flexibility and opportunity to look at new approaches to integrate EMS data.

Contact Information:
Gloria Hitchcock
Director Care Improvement Initiatives
Rochester RHIO
gloria.hitchcock@grrhio.org
(585) 481-2967

Appendix B: An Overview of EMS Electronic Prehospital Care Report Vendor Readiness

There are approximately 40 ePCR vendors—mostly small companies with limited resources—that have or are in the process of updating to be NEMSIS Version 3 compliant (See NEMSIS 3-Compliant Vendors). A few vendors have invested in EMS and HIE integration and have found success with willing hospital partners. Other vendors are beginning to work on pilot projects to determine how best to integrate patient data from local hospitals or HIE organizations and incorporate it into the EMS ePCR record.

Working with hospitals and HIE organizations is a somewhat new and still a transforming business focus for ePCR vendors. ePCR vendors traditionally concentrated on servicing the needs of EMS personnel and EMS agencies to support documentation, billing, and transport specific information needs. ePCR vendors are now determining ways in which their systems can serve to incorporate external information resources to serve the individual patient more effectively.

There are many challenges facing ePCR vendors as it relates to EMS and HIE integration. All five EMS HIE Integration Initiatives identified in this resource continue to identify solutions to these many challenges. The results and lessons learned from the SAFR pilot projects in California may offer some potential overarching solutions, especially regarding how to grow and expand EMS information systems. Vendors are increasingly aware of stakeholder interest in incorporating the SAFR functions into their products. Ongoing engagement among interested stakeholders around EMS HIE integration and roadmaps toward integration are expected to continue. For example, HIE organizations and EMS officials continue to educate ePCR vendors and express interest in the new SAFR model and the value proposition it may provide for EMS and HIE integration.

The Initiatives encountered challenges and considerations when working toward EMS and HIE integration, below are ideas identified by the Initiatives:

EMS and HIE Organizational and System Constraints

- EMS agencies often have limited funding to support adding functionality to their ePCR systems and developing custom interfaces to an HIE organization.
- EMS provider implementation of ePCR systems can vary based on local and state requirements; this variation among implementations increases the challenges of integration with HIE organizations.
- Every HIE infrastructure is different and requires different custom interfaces to EMS ePCR systems.

EMS ePCR Vendor Capability Limitations to Support HIE Integration

- EMS and EHRs have different data elements and standards, which can create challenges on how to accept and store prehospital data.
- The existing ePCR XML architecture was built to support ambulance transport data that is event based, not patient based. ePCR vendors have to consider how to modify their event based systems to integrate with identity-based EHR systems.
- For EMS HIE integration, ePCR vendors and EMS agencies may need to consider whether redesign of workflows and documentation to support a patient centered approach to capture

structured data elements is needed to assist in the sharing and integration of HIE patient records.

- EMS system vendors have focused on becoming NEMSIS 3 compliant and are only now beginning to develop the functionality required for bi-directional exchange.
- ePCR vendors, as a group, are in the beginning stages of developing functionality to enable EMS providers to:
  - Send an initial ePCR to the ED but then allow EMS providers to update or overwrite the initial ePCR record to finalize the report.
  - Update the ePCR to reflect patient outcome data from the HIE organization to support quality improvement.
  - Push or retrieve EMS patient outcome data to both state EMS and public health agencies as well as the National EMS database. (For more information on this database please see NEMSIS EMS Database.)

EHR Vendor Ability to Consume Prehospital Data

- The Initiatives also noted that there are additional considerations around the compatibility of EHR systems for the purposes of HIE. The National Association of EMTs completed an analysis of the impact on the EMS vendor industry and have messaged the need for HIE compatibility. (See NAEMT 2016 EMS Data Report.)
- Current practices include EMS attaching a PDF of the patient's ePCR to the electronic record; the PDF format does not allow the information to be consumed by an HIE organization or hospital EHR. The Initiatives note that many EHRs currently are not structured to receive NEMSIS 3 data in HL7 format and that further refinement of the NEMSIS 3 elements to align with the 18 Continuity of Care Document (CCD) data elements may assist in ePCR/EHR integration.

Appendix C: Additional EMS HIE Resources

California EMSA

California EMSA Audacious Inquiry 2014 research study to determine how EMS providers could benefit from HIE funded by a HHS Idea Lab grant. (Idea Lab EMS Project)

California EMSA HIE Summit Overview Information with links to past presentations. (CA EMSA)

Adopting HIE in EMS in CA - Connecting EMS to the broader health care system through health information exchange. February 18, 2016. (Adopting HIE for EMS Providers)

Denver South Metro

CORHIO HIMSS 2016 Presentation by CEO Morgan Honea entitled "HIE Applications in Emergency Settings." March 11, 2016. (CORHIO HIMSS 2016 Presentation)

ONC EMS HIE Reference Documents

ONC recently developed several documents for Health Information Exchange (HIE) organizations and EMS officials to share with their state and community partners. These resources promote a better understanding of the importance of health information exchange and emergency medical services.

Fact Sheet: Emergency Medical Services & Health Information Exchange: What do you need to know?

Health Information Exchange & Emergency Medical Services

ONC EMS Use Case Issue Brief

ONC Presentation at EMSA CA 2016 Summit entitled "California EMS to HIE: A Statewide & National Strategy for e-Preparedness." Lee Stevens, Office of Policy, and Rachel Abbey, Office of Programs (ONC CA EMSA Presentation)