



HIE DISCOVERY REPORT FOR NORTH COAST EMERGENCY MEDICAL SERVICES

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Introduction

North Coast Emergency Medical Services (NCEMS) is a Local Emergency Medical Service Agency (LEMSA). LEMSA's are agencies authorized by California's EMS (Emergency Medical Service) Act as outlined in California Health & Safety Code, Division 2.5, Section 1797.200ⁱ. The purpose of this agency is to provide planning, organization, oversight, and administration of emergency services for the region's constituent counties of Del Norte, Humboldt and Lake. As part of their role, NCEMS is exploring opportunities to improve pre-hospital patient care and outcomes. This discovery includes the evaluation of Health Information exchange (HIE) as a mechanism to obtain or provide patient data to improve services at the point of care. Additionally, patient outcome data can be analyzed to create training case studies and guide future improvement of care.

Health care providers have been actively working to collect and exchange electronic health information over the last decade. The greatest increase of adoption of electronic health records has occurred after the Health Information Technology for Economic and Clinical Health (HITECH) Act of 2009. This program, along with meaningful use incentive money, has shown that as of April 2015, 88% of all eligible California hospitals have been paid for participation in the Centers for Medicare and Medicaid Services (CMS) Electronic Health Record (EHR) incentive program. This percentage is compared to the national average of 95%. California's office based eligible providers show a 53% participation rate, similar to the 54% average across the USA.ⁱⁱ

Many hospitals, clinics and private doctor's offices have been working to increase the exchange of electronic health information with other entities and with the patients that they serve. The incentivized process has helped to drive the software companies to keep up with these requirements. In order for providers to qualify for meaningful use dollars, they must use a software system that has met the Office of the National Coordinator for Health Information Technology (ONC) certification criteria. This qualification program and incentive money was not extended to emergency medical services (EMS) nor their personnel. Although it is recognized that EMS is an access point and important part of the healthcare system, there has not been a large adoption of electronic health records or electronic health information exchanges in this service area at this time.

The purpose of this discovery project is to provide information to guide the development, implementation and improvement of capabilities related to health information exchange. To achieve this goal, we have worked to identify what systems are already in place and seek opportunities to leverage those systems. As part of this process, we have identified prospects, gaps, barriers and costs associated with improving communication and care through electronic health information exchanges.

Executive Summary

Health Information Exchange (HIE) can help to connect EMS providers with hospital doctors and nurses to improve patient care and health outcomes. With the electronic exchange of key data elements such as a patient problem list, advanced directives, medication and allergies, providers can increase documentation efficiency and reduce medical errors. Providing this data in the pre-hospital care setting, at the first point of contact, should be an integral part of our health care system.

Although the HIE concept has been in existence for some time, HIE adoption and interconnectivity is limited. Today's current HIE landscape has limited live data sharing interoperability and is isolated to regional demographic areas. Historic barriers to creating a Federal or State HIE infrastructure have been identified as including: delays in EHR adoption, poor internet connectivity, cost and fees to support an ongoing HIE services and market demand.ⁱⁱⁱ

Efforts are currently in place to overcome the existing HIE barriers. Federal funding, state funding, adoption of EHR and ePCR by providers has increased, partly due to grant funding and partly due to partner engagement in understanding how data exchange can enhance business workflow and improve patient care outcomes. EMSA has recently received a 2.75 million dollar grant to encourage connectivity and exchange between existing Health Information Organizations (HIOs) which currently does not exist statewide. In addition, this same grants hopes to assist at least two LEMSA's with connectivity and exchange between ePCR and EHR.

In addition to the grant support for initiation, it is critical to develop a strong business use case for ongoing sustainability, stability and utilization. It is important to engage end users to see the value of exchange both pre and post patient transfer. A patient in distress may not be the best medical historian or able to communicate their medical history. Health information exchange can help reduce documentation errors in the field and help providers, at all skill levels, to know what allergies, problems and other health data items exist for a patient.

The purpose of this document is to outline notes gathered regarding both the obstacles and potential solutions for an HIE/ EMS data exchange for the North Coast EMS services area. North Coast EMS has a history of modeling successful ePCR adoption and looking at innovative data solutions. Its small size and nature can help provide a point of reference for other organizations to ensure that adopted models are successful and scalable. In addition, NCEMS, due to its close community ties, can work in an agile solution oriented partnership on the path of data exchange. Since EMS providers only serve a few hospitals, recurring patient encounters are more likely to build valuable patient data exchanges between EMS and hospital providers.

Objective 4: Technical Requirements for EMS to Hospital Exchange

4.1 Assess Projected and possible data linkages between ICEMA and HIE's in California

At the time of this report, Inland Counties Emergency Medical Agency (ICEMA) is actively building an HIE interface and Health Information Hub between ImageTrend (their emergency patient care record software) and Inland Empire HIE (IEHIE). However this pilot project is not connected to other HIE's. ImageTrend is the ePCR (electronic Patient Care Report) software solution used by EMS personnel. The ImageTrend enterprise software solution has been extended to North Coast EMS who can use this software solution and report from a subset of the enterprise data. Since North Coast EMS has already partnered with ICEMA ImageTrend solution, they are naturally exploring ways to leverage this HIE branch that is targeted to be placed into production this year.

IEHIE uses the HIE model of creating a centralized patient database. The benefits of this model allow for ease of data queries. Downsides of this model include the reliance of participants to submit data in a consistent manner, and possible data duplication from multiple providers. All patient data is stored in the HIE under a master patient index. IEHIE uses Orion as their platform for data storage and exchange. Orion Health offers a proprietary HIE software solution allowing IEHIE to connect to various provider EHR's and systems using standard HL7 exchanges. In addition to maintaining a master patient record, the software also allows for the generation and exchange of Continuity of Care Documents (CCD). These documents can be shared through Direct Messaging, another HIE service with anyone who has a direct account.

Currently Inland Empire, and its partnership with ConnectHealthcare provides service to hospitals, clinics and providers in Napa, Sonoma, Yolo, Solano, San Bernardino, Riverside and Orange Counties. Specifically Connect HealthCare is the HIO covering Sonoma, Napa, Yolo and Solano counties. Organizations that use ConnectHealthcare also have access to the IEHIE clinical data repository. Although Sonoma county borders part of the North Coast EMS service area, there is not currently any overlap. Other than transitional patients, it is unlikely that the data collected in the IEHIE database would assist local patient care.

As of Sept 2015, IEHIE does not have any current nor proposed plans to partner or connect with other HIE's or HIE service areas. New connections would be evaluated and based on need presented by HIE consumers. Any data information exchange between the healthcare providers in North Coast EMS's constituent counties and the IEHIE database at this time would have to occur through direct messaging and the exchange of a CCD.

IEHIE is open to exploring future partnerships with North Coast EMS or other HIE's on NCEMS's behalf. IEHIE was not able to describe general costs associated with participation in HIE or Direct Messaging services. They have requested that NCEMS provide specific use cases prior to discussion of pricing.

4.2 Identify shared linkages between HIE's serving the NCEMS region and the Inland Empire HIE, i.e. the HIE serving the ICEMA region.

The NCEMS region spans two HIE service areas. With services in Del Norte, Humboldt and Lake Counties, the organization spans a large geographic region. There are two HIE service providers that span this area: Redwood Med Net and NCHIN (North Coast Health Information Network).

Inland Empire HIE, the initial HIE partner with ICEMA and ImageTrend, borders service areas with Sonoma and Napa counties. However there is no overlap with the direct NCEMS service area at this time. However, IEHIE does provide some service overlap in Sonoma and Napa counties with Redwood Med Net, another HIE organization, which does provide HIE services to Mendocino and Humboldt counties.

At the time of the inquiry, NCHIN has the ability to connect with Redwood Med Net. However it was not currently active at this time due to lack of demand.

4.3 Assess whether identified linkages meet the interoperability goals set forth in the HITECH Act and/or promoted by ONC.

The goals set forth by the HITECH act are broad. Five goals were set as part of the Office of the National Coordinator for Health Information Technology (ONC) 2011-2015^{iv} strategic plan. There are 5 main objectives outlined:

- 1) Goal I: Achieve Adoption and Information Exchange through Meaningful Use of Health IT
- 2) Goal II: Improve Care, Improve Population Health, and Reduce Health Care Costs through the Use of Health IT
- 3) Goal III: Inspire Confidence and Trust in Health IT
- 4) Goal IV: Empower Individuals with Health IT to Improve their Health and the Health Care System
- 5) Achieve Rapid Learning and Technological Advancement

Although the primary focus and incentive funding targeted hospitals and physician provider offices, the overall intent of the ONC's HITECH second goal is far reaching into all healthcare fields and domains. Additionally, portions of the act help to define and create standards for privacy, security and interoperability.^v HIMSS (Healthcare Information and Management Systems Society), a non-profit organization dedicated to building a forum for sharing advancements in health information technology, approved a full one page document on the definition of Interoperability on April 5th 2013.^{vi} To summarize this definition, the data must be exchanged in a manner where the receiving system does not have to interpret the data. The data must be preserved and unaltered as it moves from one system to another.

The incentives associated with the HITECH act involve a series of benchmarks or phased approach. It wasn't until Meaningful Use Stage II, with 2014 being the first year for Stage II attestation. However, with required software upgrades for ICD-10 preparedness and based on lessons learned, these standards were updated for 2014 criteria. At this time, only hospital, physician and some midlevel providers were included for eligibility for receiving MU dollars. Many other healthcare professionals

such and behavioral health or EMS providers were not included in the eligible provider description. In addition, many offices were allowed to flex their attestation to stage one, due to these same delays in criteria definition and costs associated with upgrades. Not all providers are currently interested in achieving meaningful use dollars. As payment penalties come in the future, provider participation may increase. On October 6th 2015, these alternative measures were adopted. As the measure currently stands, it encourages 10% or more of patient transitions of care to be performed electronically with a summary of care record. This electronic transmission must be via the Certified Electronic Health Record Technology (CEHRT). For many groups and providers, this incentive program has helped to increase the adoption of these technologies.

The sample below is from https://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/Downloads/Stage3_EP.pdf

This outlines the measure for attestation compliance:

Objectives for 2015 through 2017	Measures for Providers in 2015 through 2017	Alternate Exclusions and/or Specifications
Objective 5: Health Information Exchange	<p>Measure: The EP that transitions or refers their patient to another setting of care or provider of care must (1) use CEHRT to create a summary of care record; and (2) electronically transmit such summary to a receiving provider for more than 10 percent of transitions of care and referrals.</p> <p>Exclusion: Any EP who transfers a patient to another setting or refers a patient to another provider less than 100 times during the EHR reporting period.</p>	<p>Alternate Exclusion: Provider may claim an exclusion for the Stage 2 measure that requires the electronic transmission of a summary of care document if for an EHR reporting period in 2015, they were scheduled to demonstrate Stage 1, which does not have an equivalent measure.</p>

A detailed description of C-CDA architecture can be reached at <http://www.healthit.gov/policy-researchers-implementers/consolidated-cda-overview> accessed on Sept 28th 2015. To utilize the HIE or any C-CDA exchange, the organization must have a fully functional EHR and utilize C-CDA documents. With NEMESIS v3x, fields still being defined within the architecture of ImageTrend, it is unclear if they will be able to consume C-CDA compliant data fields.

ImageTrend, the ePCR vendor used by North Coast EMS has pledged to write custom interfaces using the C-CDA formats and standard with the caveat that they will map any field that is stored in the system. At this time the vendor has not created a universal platform for HIE exchange. This has benefits in that the interface can be customized to meet the needs between two organizations. The downside is that the effort and cost does not offer the affordability of scale. In addition, this then raises the question of field value standardization. NEMESIS v3x field values do not describe the same data storage formats that are used by many EHR's.

Objective 5: Dataset Analysis

5.1 Determine Current Dataset Collection by NCEMS region hospitals and other health care providers

Our current local hospitals and emergency departments are using EHR's that are meaningful use certified. In short, this means that medications, allergies, problem lists, diagnosis and orders etc. are stored as discrete data elements. However none share the same EHR vendor system unless they are part of the same parent organization. This means that the patient record is stored in various electronic formats and has potential for electronic exchange. All are engaged in some format of data exchange as outlined in section 5.3.

Hospital	City	County	EHR Vendor
Sutter Coast Hospital	Crescent City	Del Norte	Epic
St. Joseph's Hospital	Eureka	Humboldt	Meditech
Redwood Memorial Hospital (part of St. Joseph)	Fortuna	Humboldt	Meditech
Mad River Hospital	Arcata	Humboldt	CPSI
Sutter Lakeside Hospital	Clear Lake	Lake	Epic
Clear Lake Hospital (Adventist)	Clear Lake	Lake	Cerner

5.2 Inform NCEMS region hospitals and healthcare providers about the dataset available to NCEMS

The goal of the IEHIE is to allow doctors, clinics, hospitals and other healthcare providers such as EMS to review and access medical records from participating providers, including EMS providers. As of September 2015, the initial design specifications for the HIE between ICEMA and ImageTrend have been identified. The project resulted in the ability to transmit and receive patient Demographic Data via the following data points:

EMR (Local) Identifier	PID-3.1	PatientIdentifierList/IDNumber	Required	ePatient.01
Last Name	PID-5.1	PatientName/FamilyName	Required	ePatient.02
First Name	PID-5.2	PatientName/GivenName	Required	ePatient.03
Middle Name	PID-5.3	PatientName/MiddleName	Optional	ePatient.04
Date of Birth	PID-7.1	DateTimeOfBirth	Required	ePatient.17
Sex	PID-8	Sex	Required	ePatient.13
Demographics - Address	PID-11.1	PatientAddress/StreetAddress	Required	ePatient.05
Demographics - City	PID-11.3	PatientAddress/City	Required	ePatient.06
Demographics - State	PID-11.4	PatientAddress/StateOrProvince	Required	ePatient.08
Demographics - Zipcode	PID-11.5	PatientAddress/ZipOrPostalCode	Required	ePatient.09
PhoneNumber-Home	PID-13.1	PhoneNumberHome/Text	Required	ePatient.18

According to Mark Roberts, Data Manager - State of California, and ICEMA- Identifying common data points and message send/ receive triggers proved to be more challenging than expected. There currently is not a mechanism in place to query an encounter to pull or push ePCR data once an encounter had been updated. The projected grant also did not include patient look up from the field by the transporting EMS provider.

Additional challenges around data collection involve the time spent and information gathered by the end user. For example, the current ImageTrend data fields excel file master list: "NISEDefinition" was reviewed. This issue with this format is that many fields are not populated by EMS personnel as the information is not timely to the encounter, data is in a required field but marked as N/A, unknown etc. There is not pre-access to patient health records, nor follow up access currently to collect info like current medications, allergies etc.

In the spirit of the project a sample use case for exchanging data was designed. The ultimate goal being to improve patient care:

Ideal EMS/ HIE data scenario:

The first responder arrives on scene of a medical emergency. The patient, while not in acute distress is in need of assistance due to a fall. The responder takes the California ID of the patient and swipes the card reader attached to a mobile device. The application on the iPad will pull up the ID of the patient and collect basic Demographic data. Name, DOB, Sex, Height, and a distinct patient ID- the driver's license number.

The application then queries the local HIE for a matching patient ID. From a list of displayed possible patient matches displayed on their mobile device, the EMS personnel select the correct person in the HIE database and obtain their last hospital data if available. The EMS responder can also use this index to post their ePCR or other health data in a format that is consumable to the hospital such as a C-CDA.

The hospital, upon being alerted of the pending arrival of the patient can retrieve the health and demographic information from the HIE and incorporate this information into the online direction they provide to the arriving EMS personnel and/or into the emergency department's clinical decision making process upon the patient's arrival.. This care record would indexes and available for the HIE members. Administrators or EMS personnel can later retrieve the clinical data outcomes to evaluate.

There are many key stakeholders who support the improvement of health data exchange. Among those were these specific individuals contacted as part of this discovery process:

List of contacts and SME (Subject Matter Experts) queried

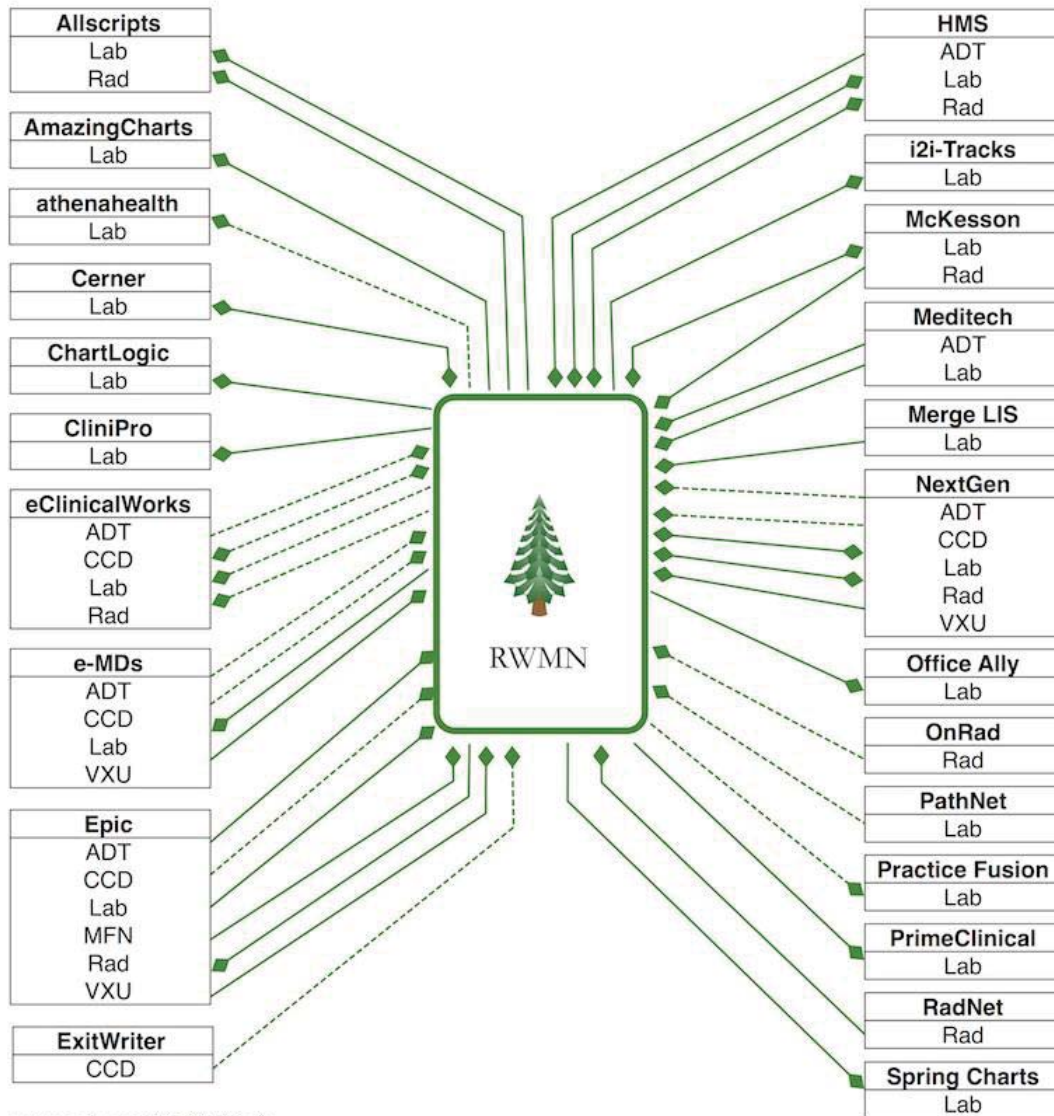
Contact Name	Contact Organization	Contact Info
Louis Bruhnke, Associate Director	North Coast EMS	707.455.2081 x 3, louis@northcoastems.com
Tom McGinnis	EMS Systems Division Chief	916.431.3695, Tom.mcginis@emsa.ca.gov
Dan Chavez, Executive Director	San Diego Health Connect	619.573.4445, dchavez@sdhealthconnect.org
Greg DeBacker, Senior Programmer	North Coast Health Information Network	707.267.9581, gdebacker@northcoasthin.org
Mark Roberts	Data Manager, State of California	909-388-5804, Mark.Roberts@cao.sbcounty.gov
Cassandra McTaggart, Chief	Health Information Policy & Standards Division	Cassandra.mctaggart@ohi.ca.gov

Will Ross	Redwood MedNet	wross@redwoodmednet.org 707.462.6369 [office]
Leo Pak, CIO Inland Empire HIE	Inland Empire HIE	lpak@iehie.org
Jack Buell	Sutter Lakeside Hospital	707-262-5150
Jeremy Sutton, Implementation Manager,	SutterLink and My Health Online Sutter Physician Services	916.854.6235 SuttoJ@sutterhealth.org
Todd York, Senior Account Executive	ImageTrend	952.469.6226, tyork@imagetrend.com
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Douglas Butler, ALS Coordinator – EMS Data Systems Project Manager	Coastal Valleys EMS Agency	Douglas.Butler@sonoma- county.org
Steve Engle, COO	Mad River Community Hospital	707-826-8277, SEngle@madriverhospital.com
June Iljana, HIE in EMS Project Coordinator	California Emergency Medical Services Authority	(916) 431-3723, June.iljana@emsa.ca.gov
Robert Cothren	California Health eQuality	Robert.cothren@ca-hie.org
TBD	St. Helena Hospital (Clear Lake)	(707) 994-6486
Nicole Lamm	Nicole Lamm, Sutter Lakeside Emergency Department Nurse Manager	Lamm, Nicole <lammn@sutterhealth.org>

5.3 Determine which datasets generated by local hospitals and other healthcare providers are available to HIE's serving the NCEMS region

The two HIE service providers that span the North Coast EMS region are Redwood Med Net and NCHIN (North Coast Health Information Network). Of the two, our findings indicate that Redwood MedNet, which serves Mendocino and Humboldt Counties, appears to be the most promising partner for data exchange.

The Redwood MedNet site- <http://redwoodmednet.org/projects/hie/interfaces.html> (last accessed on 9/28/2015) displays the following types of current data exchanges with EHR software:



In addition to RWMN current activities, RWMN seems to be active in many local initiatives which speaks for long term sustainability. One of its partner organizations is Sutter Hospital, which operates Epic software. We have confirmed that Epic is used in the emergency department. Another mutual partner of Redwood MedNet is Clearlake hospital. Clearlake Hospital runs Cerner EHR software, this is the software used in the emergency department.

Our other local HIE offers services in a more limited capacity. At <https://northcoasthin.org/>, last accessed on 9/28/2015 the following data exchange services were noted.

- North Coast Health Information Network (Del Norte and Humboldt Counties)
 - St. Joseph Health System
 - Currently providing electronic laboratory results.
 - Currently able to receive a discharge summary report
 - Mad River Community Hospital
 - Receiving electronic lab data and a discharge summary for the provider.
 - Humboldt Del Norte Foundation for Medical Care/ Independent Practice Association members
 - Electronic lab data and CCD's in conjunction with electronic referrals
 - Open Door Community Health Centers
 - Receiving electronic lab data and providing and receiving CCD's in conjunction with electronic referrals

During the course of this project- the following trading partner or element had been **removed** from the site whereas they had been outlined as goals in May 2015:

- St. Joseph Health System
 - Will provide CCD's, however they are currently restructuring their portal.
 - Note: St. Joes system is currently implementing their 11 sites and the timeline is unknown.
- Mad River Community Hospital
 - Target is to provide and receive CCD's in conjunction with electronic referrals.
- United Indian Health Services
 - Receiving electronic lab data and providing and receiving CCD's in conjunction with electronic referrals
 - Humboldt County Department of Health and Human Services
 - Receiving electronic lab results.

5.4 Based on the results of activities 5.1-5.3 above, analyze the potential for exchanging EMS data with hospitals and other healthcare providers within the NCEMS region.

Based on the results, it seems that the strongest candidate for EMS data exchange is Redwood MedNet and the two hospitals in its region: Clear Lake Hospital and Sutter Lakeside Hospital. As for the exact format of the exchange, we are still working to define that piece. There is not currently a confirmed best practice model in place to draw upon. San Diego Health Connect currently has the highest data exchange success rates. The precise data exchange format is unknown at this time and varies between the 5 ePCR vendors that they partner with. However potential outcomes and designs have been identified and recommendations include utilizing the C-CDA format for data exchange as the current healthcare field standard.

An alternate data exchange option is to explore Direct Messaging. As referenced later in this document, Direct messaging allows the secure transmission of patient data between systems without a specific end to end point. Much like e-mail, participating providers sign up for a secure messaging address. Either within a messaging portal, or within many EHR software, provider can manually select the provider to share information with. Direct messaging allows the same key elements of data to be exchanged (attachments with either C-CDA or PDF etc), however it is dependent on a manual human process to both select and send data to be received and/ or to integrate messages received to other providers

5.5 Determine which, if any, data elements or datasets currently unavailable in the NCEMS region might be desirable in the future.

At this point, the collection of actual data elements is not currently perceived as the primary barrier. Transmission routes, variance of data collection format between NEMSIS and EHR and obtaining the data in a live, real time request model has been the primary barrier identified by this discovery project.

So long as adequate resources are directed at HIE expansion, future providers will be able to access an HIE to pull down patient information as needed to guide treatment decisions. But the currently reality is that there is not an infrastructure, or funding to maintain that infrastructure.

Barriers-

- NEMSIS V3.x data definitions
- Variance with NEMSIS data dictionary from ePCR and EHR.
- Standards in transport of discrete data fields.
- Connection of HIE Hubs (or lack thereof)
- Cost to establish and then maintain each HIE hub, or connectivity between.
- No discussion of Direct Messaging in the EMS community?
- CCD or CCD-A is not a current data communication design in the EMS community.
- Hospital Discharge Summary holds limited data

Objective 6: Authorization Framework review

Objective 6.1 Determine the legal framework under which NCEMS may participate in the electronic exchange of protected patient data with regional HIE's, hospitals or other healthcare entities. i.e. governing state and local regulations.

The upcoming approved Assembly Bill No. 503 for California Section 1797.122 Health and Safety Code regulation supports the legal framework for data access by LEMSA organizations to support continuity of patient care and data collection. Existing HIPPA regulation outlines guidance for protected patient data exchange. In addition, it would allow a health facility to release patient information to emergency medical service providers and local EMS agencies

Amended Assembly Bill No. 503 for California Section 1797.122 Health and Safety Code:
http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160AB503

Last activity 9/9/2015: Enrolled and presented to the Governor at 4 p.m, Update as of 9/30/2015- the bill has been signed!

The bill reads as follows:

SECTION 1. It is the intent of the Legislature to encourage data sharing between emergency medical services providers and hospitals in order to improve system effectiveness, quality of care, and the impact of emergency medical services on death and disability.

SEC. 2. Section 1797.122 is added to the Health and Safety Code, to read:

1797.122. (a) Notwithstanding any other law, a health facility as defined in subdivision (a) or (b) of Section 1250 may release patient-identifiable medical information under the following circumstances:
(1) To an EMS provider, information regarding a patient who was treated, or transported to the hospital by, that EMS provider, to the extent that specific data elements are requested for quality assessment and improvement purposes.

(2) To the authority or the local EMS agency, to the extent that specific data elements are requested for quality assessment and improvement purposes.

(b) An EMS provider, local EMS agency, and the authority shall request only those data elements that are minimally necessary in compliance with Section 164.502 (b) and Section 164.514 (d) of Title 45 of the Code of Federal Regulations.

(c) The authority may develop minimum standards for the implementation of data collection for system operation, patient outcome, and performance quality improvement.

(d) For purposes of this section, "EMS provider" means an organization employing an Emergency Medical Technician-I, Advanced Emergency Medical Technician, Emergency Medical Technician-Paramedic, registered nurse, or physician for the delivery of emergency medical care to the sick and injured at the scene of an emergency, during transport, or during an interfacility transfer.

There was a second bill that stalled in 2014-

http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201320140AB1621

Assembly Bill No. 1621 an act to add Section 1797.119 to the Health and Safety Code, relating to emergency medical services. Introduced by Assembly Members Lowenthal and Rodriguez on February 06th 2014. This bill's last activity was on 11/30/2014 where it was placed on appropriations suspense file. No updates have been made

This bill would have required the authority to utilize its California Emergency Medical Services Information System (CEMSIS) and adopt a single statewide standard for the collection of information regarding prehospital care to determine and monitor the quality and effectiveness of the statewide emergency medical services system, compliant with the most current National Emergency Medical Services Information System (NEMSIS) standards, and to avoid unnecessary duplication of data collection at the local level. The bill would require the authority to develop regulations and standards for electronic patient care record systems used by local EMS agencies and local prehospital EMS providers to ensure compatibility with CEMSIS. The bill would require the authority to comply with its provisions on or before July 1, 2016

A third bill for EMS was passed on September 30th 2015: Assembly Bill No. 1129, add to section 1797.22 Unlike AB1621 The main purpose of this bill is to require emergency medical care providers to use an electronic health record (EHR) system that exports data compliant with current CEMSIS and NEMSIS standards. This bill does NOT mandate the use of a specific EHR system

Objective 6.2 Determine the NHIN Foundation technical specifications governing NCEMS's exchange of protected patient data with regional HIE's, hospitals or other healthcare entities.

The Nationwide Health Information Network (NHIN), a program under the Office of the National Coordinator for Health Information Technology (ONC), was established in 2004 to provide guidance for secure health information exchange at national, state and local levels over the internet. Today the team provides guidance to the ONC who has set forth the meaningful use and HIPAA standards. One of the products of NHIN was the direct project- launched in 2010.

More information about the DIRECT project can be found here:
<http://wiki.directproject.org/file/view/DirectProjectOverview.pdf>

The ONC is the "keeper" of the certificate program which includes a defined process to ensure EHR's meet the technology, functionality and security standards for information sharing. NCEMS's exchange of protected patient data would need to comply with HIPPA security guidelines. Meaningful use attestors are required to comply with the implementation of requirements under 45 CFR 164.308(a)(1).

The entire requirement is posted on the internet, however a factsheet, covering the key points of data is located:

https://www.cms.gov/regulations-and-guidance/legislation/ehrincentiveprograms/downloads/securityriskassessment_factsheet_updated20131122.pdf

Key elements include the following:

Security Areas to Consider		Examples of Potential Security Measures
Physical Safeguards	<ul style="list-style-type: none"> Your facility and other places where patient data is accessed Computer equipment Portable devices 	<ul style="list-style-type: none"> Building alarm systems Locked offices Screens shielded from secondary viewers
Administrative Safeguards	<ul style="list-style-type: none"> Designated security officer Workforce training and oversight Controlling information access Periodic security reassessment 	<ul style="list-style-type: none"> Staff training Monthly review of user activities Policy enforcement
Technical Safeguards	<ul style="list-style-type: none"> Controls on access to EHR Use of audit logs to monitor users and other EHR activities Measures that keep electronic patient data from improper changes Secure, authorized electronic exchanges of patient information 	<ul style="list-style-type: none"> Secure passwords Backing-up data Virus checks Data encryption
Policies & Procedures	<ul style="list-style-type: none"> Written policies and procedures to assure HIPAA security compliance Documentation of security measures 	<ul style="list-style-type: none"> Written protocols on authorizing users Record retention
Organizational Requirements	<ul style="list-style-type: none"> Business associate agreements 	<ul style="list-style-type: none"> Plan for identifying and managing vendors who access, create or store PHI Agreement review and updates

Many of the technical safeguards are the responsibility of the EHR or ePCR vendor and will need to be confirmed within their technical design.

It is interesting to note the additional information as found on:

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4371395/>

Health care organizations participating in health information exchange initiatives develop and codify their data governance policies in a variety of legal documents, collectively known as data sharing agreements (DSAs).⁴ Some common types of DSAs include Data Use Agreements (DUA), Business Associate Agreements (BAA), and Participation Agreements (PA)

Under the HIPAA Privacy Rule, covered entities—which include most health care providers, health plans, and health clearinghouses—are permitted to use or disclose PHI without patient authorization for treatment, payment, or health care operations, among other purposes specified by the Rule.¹²

Non-covered entities are required to comply with most provisions of HIPAA when they are engaged by a covered entity as a business associate to provide services or complete health care functions on its behalf, in which case a business associate agreement (BAA) is required.¹³ BAAs ensure that business

associates engaged by a covered entity comply with applicable HIPAA privacy and security standards and protocols. As of September 2013 under the HIPAA Omnibus Final Rule, the Privacy and Security rules are directly applicable to business associates of covered entities, meaning they are directly liable for noncompliance with the regulations. ¹⁴ However, this development occurred as the Beacon program was concluding, and thus did not apply to the Beacon Communities' DSA development efforts.

Objective 6.3 Evaluate the potential need for, or benefit of, (e.g. HIE or hospital data release) IRB approval of NCEMS exchange of protected patient data with regional HIE's, hospitals or other healthcare entities.

The best resource for understanding Institutional Review Board (IRB) is located here:
<http://www.hhs.gov/ocr/privacy/hipaa/understanding/coveredentities/research.html>
last accessed 9/29/2015

A covered entity may always use or disclose for research purposes health information which has been de-identified (in accordance with 45 CFR 164.502(d), and 164.514(a)-(c) of the Rule) without regard to the provisions below.

The site also provides a decision chart for determining IRB review needs:
<http://www.hhs.gov/ohrp/policy/checklists/decisioncharts.html>

Based on the review of the regulations that the decision tree, our recommendation is that any data shared shall be de-identified and aggregated for statistical review.

Objective 6.4 Identify contacts within academic institutions for the possible establishment of an IRB process for NCEMS's exchange of protected patient data with HIE's, hospitals or other healthcare entities.

This task was not completed based on the finding above.

Objective 6.5 Make specific management database authorization framework recommendations base on the outcomes of Objectives 3, 4 and 5.

It is recommended that NCEMS either pursue a direct point to point HIE secure HL7 messaging standard using the C-CDA format, including PDF exchange for non-discrete data points or engage in secure DIRECT messaging with information trading partners, ensuring that a business associate agreement, or direct trust certificate is obtained prior to data transmission. The publication 45 CFR 164.308(a)(1). and security checklists provided should create the specific database authorization framework guidelines as needed for storing PHI.

Objective 7: Cost Analysis

Objective 7.1 Describe the costs normally associated with establishing and maintaining data linkages with database vendors, HIE's, hospitals and other healthcare providers.

A sample budget for implementation and ongoing support costs has been created. Due to unknown specific interface requirements, the budget is an estimate based on currently known variables. Best practice would be to build a detailed technical roadmap utilizing interface architects, and send that roadmap to vendors for bidding.

Objective 7.2 Based on the outcomes of Objectives 3, 4, 5, and 6, identify the likely costs associated with the most promising of each patient data exchange option, to include the additional hardware and infrastructure costs required to maintain interoperability.

All known costs have been estimated. Without a clear hospital commitment, costs for the hospital participation and any hardware/ infrastructure needs are still unknown. The local hospital that can directly determine their participation priorities is in an area with a local HIE with limited interoperability. The two target hospitals with a strong HIE partner are owned and administered by out of the area parent companies. It is recommended the any future budget have contingency funds allocated for these unknowns.

Objective 7.3 Evaluate the data exchange options identified in Activity 7.2

Recommendation options (ranked by perceived likelihood of successful outcome):

- 1) Utilize the current HL7 data structure C-CDA standards to set up a scalable solution for data exchange between ImageTrend, Redwood MedNet, Sutter Hospital and/or Clearlake Hospital. Leverage the lessons learned by San Diego Health Connect as a base project to establish exchange protocols and partner engagement, exchanging some discrete data as possible, allowing non matching data points to be sent via PDF.
- 2) Utilize Direct messaging protocols to send ePCR and receive discharge data as PDF documents, allowing a demographic data match. CCD documents in an XML formats can be exchanged as well.
- 3) Engage in one full point to point pilot with HL7 C-CDA exchange between hospital and ePCR, only exchanging data that can be consumed in a within fixed discrete data fields.

Objective 8: Charting the course to real-time EMS HIE:

Objective 8.1 Identify past or ongoing initiatives to provide real-time electronic PHI to EMS responders in the field.

There are two key ImageTrend HIE projects in California. One current live project with San Diego Health connect where a federated data model is used to exchange a PDF ePCR and hospital discharge report/face sheet. The second was a recent pilot with ImageTrend and ICEMA to exchange patient demographic data.

Objective 8.2 Describe the real-time electronic PHI provided to EMS responders in the field and the objective sought through the provision of that data.

San Diego Health Connect provides a real time data exchange with EMS providers and participating hospitals. The electronic exchange uses HL7 messaging to deliver non-discrete data in a PDF format. A Slide presentation SDHC_EMShub_CAHIE_092515 outlines the format and data paths used by the organization and is part of this discovery collateral.

Objective 8.3 Given the outcomes of Objectives 3, 4, 5, 6 and 7, describe the likely technological and regulatory challenges - as well as the likely associated costs – involved in providing the types of electronic PHI described in Activity 8.2.

Analysis of regulatory challenges has deemed that regulations are not the primary nor a significant barrier. Implementation cost, limits of local HIE coverage service areas and data set type mismatch have been identified as the primary barriers to exchange.

There are still many unknowns to the costs associated with each participating entity. A sample budget for 1 HIE, 2 Hospitals, and 5 EMS providers is as follows:

NCEMS HIE & Imagetrend Costs	
<i>assuming 18 month project</i>	
ImageTrend	
Vendor Interface fees	
ImageTrend HIH Hub with Elite	\$ 20,000.00
ePCR export Set up	\$ 3,200.00
Outcome Data Import Setup	\$ 3,200.00
ImageTrend Hospital Information Hub + Annual Support	\$ 6,600.00
ICEMA Hosting	\$ 6,600.00
Maintence +1 year (project duration)	\$ 13,200.00
Partner Hospital #1	
Vendor Interface fees (Eg Epic HL7 C-CDA point to point exchange)	\$ 20,000.00
Project Management/ Technical Consulting .1 FTE x 18 months @130	\$ 37,440.00
Partner Hospital #2	
Vendor Interface fees (Eg Cerner HL7 C-CDA point to point exchange)	\$ 20,000.00
Project Management/ Technical Consulting .1 FTE x 18 months @130	\$ 37,440.00
HIO	
Implementation / Interface Build * 3 (ImageTrend, and 2 Hospitals)	\$ 15,000.00
Project Management .1 FTE x 18 months @\$100	\$ 28,000.00
Annual Fees for project duration	\$ 4,000.00
EMS Providers	
Field Devices Stipend (10 units) iPad 4GLTE @\$900	\$ 9,000.00
Connectivity Fees- Data plans for 10 units * 1 year, 5GB per month	\$ 4,800.00
ePCR incentive funds (5000 encounters *2\$ each)	\$ 10,000.00
EKG/ Vitals with bluetooth technolgy * 8 units @\$3000 each	\$ 24,000.00
Staff Training Stipend	\$ 1,000.00
NCEMS	
Project Management .1 FTE x 18 months @155	\$ 44,640.00
Grant Administration .1 FTE x 18 months	\$ 10,000.00
Clinical Consultant Stipend	\$ 5,000.00
Site Visits and Travel	\$ 10,000.00
Total	\$ 333,120.00

An alternate budget, using direct messaging as an option could look as follows:

NCEMS Direct Messaging Budget	
<i>assuming 1 year project</i>	
ImageTrend	
Vendor Interface fees	
ImageTrend HIH Hub with Elite - to create C-CDA for Direct messaging	\$ 20,000.00
ePCR export Set up to consume direct messages	\$ 3,200.00
Outcome Data Import Setup to consume direct message files	\$ 3,200.00
ImageTrend Hospital Information Hub + Annual Support	\$ 6,600.00
ICEMA Hosting	\$ 6,600.00
Maintenance +1 year (project duration)	\$ 13,200.00
Partner Hospital #1	
No fees for Direct Messaging, assumes hospital adopts EHR technology	
Partner Hospital #2	
No fees for Direct Messaging, assumes hospital adopts EHR technology	
HIO	
Direct Messaging address for each EMS Provider (10) at \$100 per year per	\$ 1,000.00
Project Management .1 FTE x 6 months @\$100	\$ 9,600.00
Additional year of Direct fee's stipend.	\$ 1,000.00
EMS Providers	
Field Devices Stipend (10 units) iPad 4GLTE @\$900	\$ 9,000.00
Connectivity Fees- Data plans for 10 units * 1 year, 5GB per month	\$ 4,800.00
ePCR incentive funds (5000 encounters *2\$ each	\$ 10,000.00
Staff Training Stipend	\$ 1,000.00
EKG/ Vitals with bluetooth technolgy * 8 units @\$3000 each	\$ 24,000.00
NCEMS	
Project Management .1 FTE x 12 months @155	\$ 29,760.00
Grant Administration .1 FTE x 12 months	\$ 5,000.00
Clinical Consultant Stipend	\$ 5,000.00
Site Visits and Travel	\$ 3,000.00
	\$ 155,960.00
Contingency @ 10% for unknown project risks	
Total	\$ 155,960.00

Objective 8.4 Given the outcome of Activity 8.2 and 8.3 determine the most promising and practical real-time electronic PHI that might be provided to NCEMS EMS responders in the field.

Our findings indicate that the most promising and practical outcome would be to emulate the current structure utilized by San Diego Health Connect as a base project. This would also include establishing exchange protocols and partner engagement, providing a federated model of patient index for search and match, exchanging some discrete data as possible, allowing non matching data points to be sent via PDF. However a higher reaching goal would be to ensure that C-CDA architecture is utilized to allow for future scalability.

Data exchange options:

- ICEMA Data available (C-CDA architecture)
 - ImageTrend Patient ePCR
 - Targeted discrete data:
 - Allergies
 - Medications
 - Procedures
 - Diagnosis
 - Vitals
 - Patient Demographics
 - ePCR as PDF- assumes that EHR's don't have current 1to1 EMS data points
- Sutter Lakeside Hospital and/ or St. Helena Clearlake Hospital Data
 - CCD (Continuing Care Document in XML format as defined by MU Stage II criteria) and or
 - Discharge Summary
 - Targeted discrete data:
 - Allergies
 - Medications
 - Procedures
 - Diagnosis
 - Patient Demographics

In an ideal world- ICEMA would query your database, get a patient match for common Lake county patients, and be able to “consume” at least parts of a CCD from Sutter Lakeside Hospital to obtain allergies, medications and a problem list. Additionally, ICEMA could send the ePCR wrapped in some sort of C-CDA package- with both discrete and PDF data, to send vitals, treatments and assessments. In a conversation with Sutter Lake Hospital, they already have some connectivity with Redwood MedNet, but we would be also looking to help provide grant funding to build out a better exchange of data.

For the provider volume- there are 5 providers in Lake County. For purposes of the pilot, we would be trying to engage 2-3 providers to participate. Overall NCEMS transport volume is about 20,000 transports for the year- with less than 5000 transports/ data requests being anticipated a calendar year of Sutter Lakeside data exchanges, and pilot participants even less than that to start.

Additional information regarding C-CDA architecture, and other HIE methods can be found at these links:

<http://bluebuttonconnector.healthit.gov/apps/>

<http://bluebuttonplus.org/>

The following link displays guidance to developers on current standards for HL7 C-CDA's:

<http://bluebuttonplus.org/healthrecords.html> lasted accessed on 9/28/2015

Whenever the C-CDA is generated for patients, it should have the following fields, if they exist in the dataholder's system. These fields are not required, just possible elements of the record:

Section	Description	Quick Link
Header	Patient information and demographics	Jump to XML
Allergies, Adverse Reactions, and Alerts	Includes status and severity of each.	Jump to XML
Encounters	Surgeries, ED visits, etc.	Jump to XML
Immunizations	Immunizations and vaccines	Jump to XML
Medications	As prescribed by the provider	Jump to XML
Care Plan	Planned activities and encounters	Jump to XML
Discharge Medications	Part of hospital discharge summary	Jump to XML
Reason for Referral	Written reason for referral	Jump to XML
Problem List	Concerns, complaints, and observations	Jump to XML
Procedures	History of procedures	Jump to XML

Functional and Cognitive Status	List of impairments	Jump to XML
Results	Includes laboratory tests	Jump to XML
Social History	Observations like smoking, drinking, etc.	Jump to XML
Vital Signs	Includes height, weight, blood pressure, etc.	Jump to XML
Discharge Instructions	Written discharge instructions	Jump to XML

Additional Notes: The NEMESIS V2 and V3.x data tables were reviewed by an EHR business analyst for common data point of value:

The following data points perceived to be of value to consume by EMS personnel- these elements hold similar data types even if the underlying structure is different.

V2 element	V2 element name	V3 element number	V3 Element name	V3 usage
E06_01	LAST NAME	ePatient.02	Last Name	Recommended
E06_02	FIRST NAME	ePatient.03	First Name	Recommended
E06_16	DATE OF BIRTH	ePatient.17	Date of Birth	Recommended
E06_06	PATIENT'S HOME COUNTY	ePatient.07	Patient's Home County	Required
E06_07	PATIENT'S HOME STATE	ePatient.08	Patient's Home State	Required
E06_08	PATIENT'S HOME ZIP CODE	ePatient.09	Patient's Home ZIP Code	Required
E06_11	GENDER	ePatient.13	Gender	Required
E06_12	RACE	ePatient.14	Race	Required
E06_14	AGE	ePatient.15	Age	Required
E06_15	AGE UNITS	ePatient.16	Age Units	Required
E07_01	PRIMARY METHOD OF PAYMENT	ePayment.01	Primary Method of Payment	Required
E12_19	ALCOHOL/DRUG USE INDICATORS	eHistory.17	Alcohol/Drug Use Indicators	Required
E14_01	DATE/TIME VITAL SIGNS TAKEN	eVitals.01	Date/Time Vital Signs Taken	Required
E14_02	OBTAINED PRIOR TO THIS UNITS EMS CARE	eVitals.02	Obtained Prior to this Units EMS Care	Required
E18_01	DATE/TIME MEDICATION ADMINISTERED	eMedications.01	Date/Time Medication Administered	Required
E18_02	MEDICATION ADMINISTERED PRIOR TO THIS UNITS EMS CARE	eMedications.02	Medication Administered Prior to this Units EMS Care	Required
E18_03	MEDICATION GIVEN	eMedications.03	Medication Given	Required
E18_05	MEDICATION DOSAGE	eMedications.05	Medication Dosage	Required
E18_06	MEDICATION DOSAGE UNITS	eMedications.06	Medication Dosage Units	Required
E19_01	DATE/TIME PROCEDURE PERFORMED SUCCESSFULLY	eProcedures.01	Date/Time Procedure Performed	Required
E19_02	PROCEDURE PERFORMED PRIOR TO THIS UNITS EMS CARE	eProcedures.02	Procedure Performed Prior to this Units EMS Care	Required
E19_03	PROCEDURE	eProcedures.03	Procedure	Required
E12_07	ADVANCED DIRECTIVES	eHistory.05	Advance Directives	Recommended
E12_08	MEDICATION ALLERGIES	eHistory.06	Medication Allergies	Recommended
E12_10	MEDICAL/SURGICAL HISTORY	eHistory.08	Medical/Surgical History	Recommended
E12_14	CURRENT MEDICATIONS	eHistory.12	Current Medications	Recommended

Evaluate elements that could impact decision making at the point of care- and that are likely to have a discrete data “home” in a hospital EHR:

V2 element	V2 element name	V3 element number	V3 Element name	V3 usage
E06_01	LAST NAME	ePatient.02	Last Name	
E06_02	FIRST NAME	ePatient.03	First Name	Recommended
E06_16	DATE OF BIRTH	ePatient.17	Date of Birth	Recommended
D04_06	MEDICATIONS GIVEN	dConfiguration.09	EMS Agency Medications	Mandatory

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E06_06	PATIENT'S HOME COUNTY	ePatient.07	Patient's Home County	Required
E06_07	PATIENT'S HOME STATE	ePatient.08	Patient's Home State	Required
E06_08	PATIENT'S HOME ZIP CODE	ePatient.09	Patient's Home ZIP Code	Required
E06_11	GENDER	ePatient.13	Gender	Required
E06_12	RACE	ePatient.14	Race	Required
E06_14	AGE	ePatient.15	Age	Required
E06_15	AGE UNITS	ePatient.16	Age Units	Required
E07_01	PRIMARY METHOD OF PAYMENT	ePayment.01	Primary Method of Payment	Required
E09_04	POSSIBLE INJURY	eSituation.02	Possible Injury	Required
E09_11	CHIEF COMPLAINT ANATOMIC LOCATION	eSituation.07	Chief Complaint Anatomic Location	Required
E09_12	CHIEF COMPLAINT ORGAN SYSTEM	eSituation.08	Chief Complaint Organ System	Required
E09_13	PRIMARY SYMPTOM	eSituation.09	Primary Symptom	Required
E09_14	OTHER ASSOCIATED SYMPTOMS	eSituation.10	Other Associated Symptoms	Required
E09_15	PROVIDERS PRIMARY IMPRESSION	eSituation.11	Provider's Primary Impression	Required
E09_16	PROVIDER'S SECONDARY IMPRESSION	eSituation.12	Provider's Secondary Impressions	Required
E10_01	CAUSE OF INJURY	eInjury.01	Cause of Injury	Required
E11_01	CARDIAC ARREST	eArrest.01	Cardiac Arrest	Required
E11_02	CARDIAC ARREST ETIOLOGY	eArrest.02	Cardiac Arrest Etiology	Required
E11_03	RESUSCITATION ATTEMPTED	eArrest.03	Resuscitation Attempted By EMS	Required
E11_08	ESTIMATED TIME OF ARREST PRIOR TO EMS ARRIVAL	eArrest.14	Date/Time of Cardiac Arrest	Required
E14_01	DATE/TIME VITAL SIGNS TAKEN	eVitals.01	Date/Time Vital Signs Taken	Required
E12_07	ADVANCED DIRECTIVES	eHistory.05	Advance Directives	Recommended
E12_08	MEDICATION ALLERGIES	eHistory.06	Medication Allergies	Recommended
E12_09	ENVIRONMENTAL/FOOD ALLERGIES	eHistory.07	Environmental/Food Allergies	Optional
E12_10	MEDICAL/SURGICAL HISTORY	eHistory.08	Medical/Surgical History	Recommended
E12_11	MEDICAL HISTORY OBTAINED FROM	eHistory.09	Medical History Obtained From	Optional
E12_12	IMMUNIZATION HISTORY	eHistory.10	The Patient's Type of Immunization.	Optional
E12_13	IMMUNIZATION DATE	eHistory.11	Immunization Date	Optional
E12_14	CURRENT MEDICATIONS	eHistory.12	Current Medications	Recommended
E12_15	CURRENT MEDICATION DOSE	eHistory.13	Current Medication Dose	Optional
E12_16	CURRENT MEDICATION DOSAGE UNIT	eHistory.14	Current Medication Dosage Unit	Optional
E12_17	CURRENT MEDICATION ADMINISTRATION ROUTE	eHistory.15	Current Medication Administration Route	Optional
E14_01	DATE/TIME VITAL SIGNS TAKEN	eVitals.01	Date/Time Vital Signs Taken	Required
E14_03	CARDIAC RHYTHM	eVitals.03	Cardiac Rhythm / Electrocardiography (ECG)	Required

HIE DISCOVERY FOR THE NORTH COAST EMS REGION

E14_04	SBP (SYSTOLIC BLOOD PRESSURE)	eVitals.06	SBP (Systolic Blood Pressure)	Required
E14_07	PULSE RATE	eVitals.10	Heart Rate	Required
E14_09	PULSE OXIMETRY	eVitals.12	Pulse Oximetry	Required
E14_11	RESPIRATORY RATE	eVitals.14	Respiratory Rate	Required
E14_13	CARBON DIOXIDE	eVitals.16	Carbon Dioxide (CO2)	Required
E14_14	BLOOD GLUCOSE LEVEL	eVitals.18	Blood Glucose Level	Required
E14_22	LEVEL OF RESPONSIVENESS	eVitals.26	Level of Responsiveness (AVPU)	Required
E14_23	PAIN SCALE	eVitals.27	Pain Score	Required
E18_01	DATE/TIME MEDICATION ADMINISTERED	eMedications.01	Date/Time Medication Administered	Required
E18_02	MEDICATION ADMINISTERED PRIOR TO THIS UNITS EMS CARE	eMedications.02	Medication Administered Prior to this Units EMS Care	Required
E18_03	MEDICATION GIVEN	eMedications.03	Medication Given	Required
E18_05	MEDICATION DOSAGE	eMedications.05	Medication Dosage	Required
E18_06	MEDICATION DOSAGE UNITS	eMedications.06	Medication Dosage Units	Required
E19_03	PROCEDURE	eProcedures.03	Procedure	Required
E20_15	CONDITION OF PATIENT AT DESTINATION	eDisposition.19	Condition of Patient at Destination	Required
E12_07	ADVANCED DIRECTIVES	eHistory.05	Advance Directives	Recommended
E12_08	MEDICATION ALLERGIES	eHistory.06	Medication Allergies	Recommended
E12_10	MEDICAL/SURGICAL HISTORY	eHistory.08	Medical/Surgical History	Recommended
E12_14	CURRENT MEDICATIONS	eHistory.12	Current Medications	Recommended

Objective 8.5 Identify the most promising options for providing real-time electronic patient PHI to NCEMS responders in the field with the likely associated cost and approximate time required to implementation.

In addition to findings outlined in objective 8.4, our experience is that a newly written interface can take between 6 months to a year to complete. Understanding the HIE interfaces are new to the EMS community, a timeline of 18 months, to include key stakeholder engagement and detailed interface requirements has been outlined. A sample budget to obtain those objectives has been outlined at a high level, with an estimated cost of \$333,120.00.

Objective 8.6 Based on the outcome of Activity 8.5, establish a plan for providing real-time electronic patient PHI to NCEMS responders in the field.

A sample project budget, timeline and objectives have been outlined. Initial discovery shows that a one to two point HIE exchange would take about 18 months to implement with an estimated cost of \$333,120.00.

Objective 8.7 Develop a one-hour presentation describing the HIE discovery project findings.

A slide deck describing project, objectives, service areas, findings, challenges and a proposed timeline has been developed. See PowerPoint file called **North Coast EMS HIE Discovery Sept 2015.pptx**

Appendix- Definition of Terms

- ADT- Admit Discharge Transfer
- CCD – Continuity of Care Document
 - An US specific requirement for electronic document exchange standard for sharing patient summary information
 - XML based markup standard
 - HL7 format
 - Considered an acceptable format for exchange for Meaningful Use Stage I
- C-CDA- Consolidated Clinical Document Architecture
 - Used in stage II of meaningful use for healthcare providers to exchange patient data regularly in transitions of care.
 - Required to contain the following data set:
 - Patient Name
 - Sex
 - Date of Birth
 - Race
 - Ethnicity
 - Preferred Language
 - Smoking Status
 - Clinical Problems
 - Medications
 - Medication Allergies
 - Laboratory Tests
 - Laboratory Values/ Results,
 - Vital Signs,
 - Care Plan (includes goals and instructions)
 - Procedures
 - Care Team members
 - Optional information
 - Encounter Diagnosis
 - Immunizations
 - Referral Reason
 - Discharge Instructions
- DEEDS- Data Elements for Emergency Department Systems
- EHR- Electronic Health Record
- EMS- Emergency Medical Services
- HL7- A set of international standards for transferring clinical data between software applications and used by healthcare providers.
- ICEMA – Inland Counties Emergency Medical Agency

- Serves Inyo, Mono and San Bernardino Counties
<http://www.sbcounty.gov/icema/main/default.aspx>
- IEHIE- Inland Empire Health Information Exchange
- ImageTrend – ePCR software, certified NEMESIS 3 Compliant
- LEMSA- Local Emergency Medical Service Agency
- PCR or ePCR – (electronic) Patient Care Reporting
- NCEMS- North Coast Emergency Medical Services
- NEMESIS- National EMS (Emergency Medical Services) Information System
- NEMESIS Version 3.4.0
 - Updated data configuration to improve data quality and move to HL7 (Health Level 7) and ANSI standards (America National Standards Institute).

ⁱ <http://emsaac.org/about/lemsas> accessed 5/19/2015

ⁱⁱ <http://dashboard.healthit.gov/quickstats/quickstats.php> “Health IT Quick Stats: Fast Facts about Health IT Adoption in Health Care” accessed 5/8/2015

ⁱⁱⁱ *NORC | Key Challenges to Enabling Health Information Exchange and How States Can Help, August 2014 Presented by: NORC at the University of Chicago. Available from*
https://www.healthit.gov/sites/default/files/state_hie_evaluation_stakeholder_discussions.pdf

^{iv} <http://www.healthit.gov/sites/default/files/utility/final-federal-health-it-strategic-plan-0911.pdf>
 accessed 4/6/2015

^v <http://www.healthit.gov/policy-researchers-implementers/select-portions-hitech-act-and-relationship-onc-work> accessed 4/6./2015

^{vi} <http://www.himss.org/files/FileDownloads/HIMSS%20Interoperability%20Definition%20FINAL.pdf>