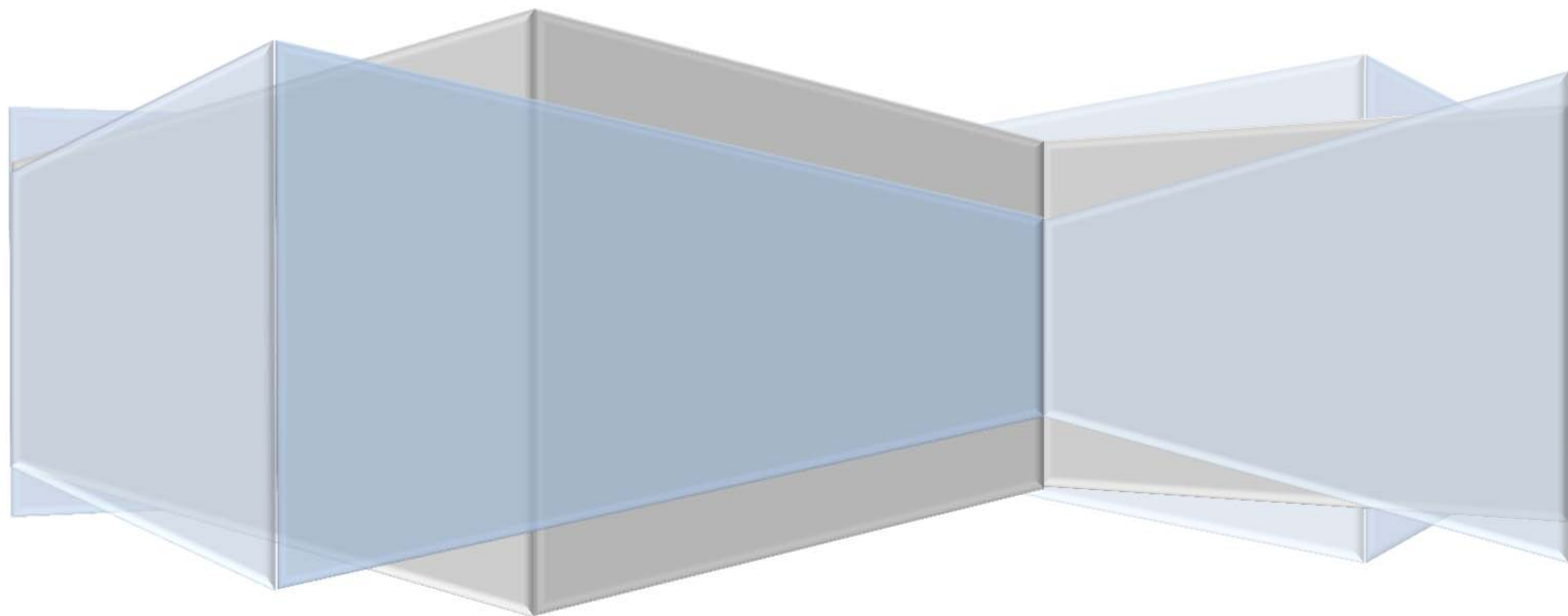**Contra Costa Emergency Medical Services**
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Bi-Directional Pre-Hospital Health Information Exchange

A Summary of Countywide EMS Data Integration Efforts Supporting Valued Based Patient Care

Contra Costa EMS Staff Report
August 2016

Introduction

Stimulated by the implementation of the Affordable Care Act, The State of California EMS Authority with support from the Office of the National Coordinator (ONC) has made it an expectation for all EMS Agencies to support bi-directional exchange of patient care data collected during the provision of Emergency Medical Services (EMS) to hospitals, public health, registries and state and federally mandated reporting. This is designed to support a wide variety of activities including:

- Patient safety
- High utilizer population management
- Public health and ACA patient care initiatives
- STEMI, Stroke, Cardiac Arrest, Trauma Systems of Care performance
- Quality and patient safety initiatives to achieve desired outcomes in environments grappling with limited resources and funding.
- Current and future State and National registries and reporting mandates for:
    - California Stroke Registries
    - Get with the Guidelines STEMI System Reporting
    - Trauma System Reporting
    - EMS-ED Transfer of Care Time
    - POLST (Physician Orders for Life Sustaining Treatment)
    - CARES (Cardiac Arrest Registry for Enhanced Survival)
- PULSE (Patient Unified Lookup System for Emergencies) Disaster Communications supporting patient movement (

The Contra Costa EMS (CCEMS) efforts build on a foundation of well-established partnerships, working with system experts to wholly integrate EMS patient data with hospital data, thus completing a full account of patient care from the inception of a 9-1-1 call to the discharge of that patient from the hospital. Over the five years the CCEMSA been focused on realistic, local solutions using current data resources and interface technology. This report provides a high level update for Contra Costa EMS stakeholders.

EMS Data System Problem: Silos, Silos, Everywhere

In 2013, EMSA awarded CCEMS grant funding to conduct an analysis of the EMS system's current data infrastructure. That study revealed untapped potentials for meaningful use associated with the preponderance of complex, user-unfriendly data systems and silos created that simply were unable to communicate with each other integration. The data systems in place were not interoperable.

This lack of interoperability created data management environments that were difficult for Fire-EMS first responders, ambulance providers, hospitals, County Public Health and the EMS Agency statutorily responsible for optimal county-wide coordination of emergency services. This resulted in laborious manual data entry, difficult access to basic analytics for performance reporting and situational awareness.

Bi-Directional Exchange

Bi-directional exchange is essential to supporting the Office of the National Coordinator and State EMS Authority required SAFR (Search, Alert, File and Reconcile) functions. The EMS Agency will be using First Watch as our county-wide EMS Data Hub to connect EMS related data platforms to achieve this this level of functionality and upgrading the system to First Pass as the primary tool for provider agency and EMS Agency. This will allow hospital discharge and patient disposition information to finally be available to the EMS provider agencies as part of their quality and medical oversight providing a level of data integration and analytics that will assist all end-users in their care of the patient.

Upcoming federal and state mandates associated with PULSE (Patient Unified Lookup System for Emergencies), Health Care Registries for Cardiac Arrest for Enhance Survival (CARES), Ambulance Patient Transfer of Care (APOT), Stroke and Physician orders for Life-Sustaining Treatment (POLST), Prehospital Core Measures, High Utilizer Initiatives, Public Health Global community efforts and care coordination optimization required for valued-based reimbursement.

Options for bi-directional exchange will be configured to use current hospital electronic health care record platforms through EPIC's peer to peer CARE Everywhere model and/or have the opportunity to work with other software based models such as EDIE (Pre-Manage ED). In addition the EMS Agency is in the process of partnering with health care system providers to enhance options for real time dashboards and status screens, population based analytics supporting situation awareness in normal and catastrophic conditions

The EMS Agency is working with EMS System partners to enhance their capability to develop new initiatives between first responders, ambulance, hospitals and the health care community at large. Activities implementing bi-directional data exchange will be designed with the end-user in mind to enhance coordination of services matching patient need to health care resource while being sensitive to staff workflows by focusing on interfaces between data systems. In the new model data will be optimized to flow based on patient need. An EMS system infrastructure project of this scope will take some time but long term will bring significant opportunities to enhance patient care including options for community para-medicine and alternative mobile medical services.

Background and Significance

The 2013 Contra Costa EMS data system analysis produced three core deliverables that were intended to address a long-term strategic process of aligning and integrating EMS data systems with those of the patient's hospital medical record to enhance the

delivery of coordinated patient care services. As a result of that study Contra Costa EMS formed a Data Integration Working Group composed of interested stakeholders to explore solutions and next steps. That report also informed the Fitch EMS Modernization Study[1] and the 2015 ambulance RFP[2] data integration requirements.

The Working Group has been active since 2013 and was integral to the submission of a +EMS Local Assistance Grant Application in January 27, 2016. Although the CCEMS did not receive the award, our innovative peer to peer model using EPIC received praise from the California EMS Authority and the ONC.

Description of Area Served: CCEMS Operational Area Data

Enormous amounts of data are collected to support EMS operations in Contra Costa County. The EMS system provides coordinated emergency services for over 1.1 million people. Services are coordinated and delivered through public-private partnerships with Fire-EMS first responders trained at the basic or advanced life support level coupled with single-role paramedic and EMT staffed ambulances providing transport. The following are some of the operational area demographics as of 2015:

- The county consists of 802 square miles of rural, suburban, and urban communities.
- The population is ethnically and economically diverse.
- The operational area is served by eight (8) community hospitals with basic emergency department (ED) services.
- Five (5) of the eight (8) hospitals are designated STEMI and Cardiac Arrest Receiving Centers.
- Six (6) of the eight (8) hospitals are designated Stroke Receiving Centers.
- There is one (1) level II Trauma Center among the community hospitals.
- There are three (3) 9-1-1 ambulance providers in the county:
  o Moraga Orinda Fire Protection District provides 2% of all transports.
  o San Ramon Fire Protection District provides 6% of all transports.
  o American Medical Response provides 92% of all 9-1-1 transports.
- There are nine (9) BLS and CCT providers in the county.
- Since 2008, the community hospitals see approximately 400,000 ED patients per year.
- In 2015, the EMS system responded to 94,278 calls and transported over 73,064 patients.
- As of 2015, the Electronic Health Record (EHR) platform for all Contra Costa County community hospitals is Epic[3].
- As of 2016, Contra Costa Prehospital electronic Patient Care Record (ePCR) will be part of efforts to identify and reduce EMS and Emergency Department patients who are high utilizers.

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[1] Link to EMS system Review Documents http://cchealth.org/ems/system-review.php#simpleContained3
[2] Link to EMS RFP process http://cchealth.org/ems/rfp.php
[3] San Ramon Medical Center utilizes Cerner EHR software, which is CARE Everywhere accessible.

HIE Solution and System Integration

Rather than using a traditional health information exchange organization (HIO), CCEMS has found that using an HIE environment supported by Epic's CARE Everywhere allows the system to achieve the same results while utilizing existing infrastructure. CARE Everywhere functions as an enterprise HIO supporting the exchange of information between unaffiliated entities. Although Contra Costa County's community hospitals are using Epic, each hospital's platform is unique. CARE Everywhere is the common conduit allowing for seamless transfer of a patient's health record between unaffiliated entities. CARE Everywhere also has the capability to include additional connections to other unaffiliated entities, including sub-acute and tertiary facilities that augment the County's acute care health system. Care Every-where's interoperability similarly supports specialty consultation between community hospitals and regional specialty centers such as UCSF and UC Davis.

- In 2010, Contra Costa Community Hospital Leadership individually selected Epic with the intent of regional interoperability supporting the potential for whole community HIE between the facilities as part of healthcare reform.
  - Kaiser is a legacy user of Epic throughout California.
  - Bay Area Sutter facilities are implementing Epic.
  - UCSF and UC Davis provide specialty services to partner hospitals and also use Epic as their EHR.
- Coalition partner Contra Costa Regional Medical Center (CCRMC) is the County's only regional hospital, which has 20 emergency department beds, and in 2015 served:
  - 49,197 ED encounters, averaging 134 patients per day.
  - Received 12,842 patients via EMS, representing 17% of all patients transported by ambulance.
- Coalition partner American Medical Response (AMR) serves 92% of the county and will continue to provide emergency ambulance services as a member of a new EMS service delivery model through Contra Costa Fire Protection District. In 2015 AMR Contra Costa:
  - Responded to 85,767 calls.
  - Transported 67,564 patients.
  - In 2015 AMR transported approximately 5,500 patients to CCRMC for Emergency Department treatment.
- CARE Everywhere, Epic's interoperability platform, exchanges patient data with other health institutions, HIEs, and government agencies on the eHealth Exchange (formally the Nationwide Health Information Network).

Coalition Preparedness: A Track Record of Engagement and HIE Readiness

CCEMS has over 25 EMS partners providing data to support the medical and system oversight of patient care delivery and the coordination of emergency medical services. The Contra Costa EMS System has mature Trauma, STEMI (ST Elevation Myocardial Infarction), Stroke and Cardiac Arrest systems of care and is an experienced participant in local, state, and national data registries, including Trauma One, State Core Metrics,

California Stroke Registry, Mission Lifeline, and CARES (Cardiac Arrest Registry to Enhance Survival).

Current
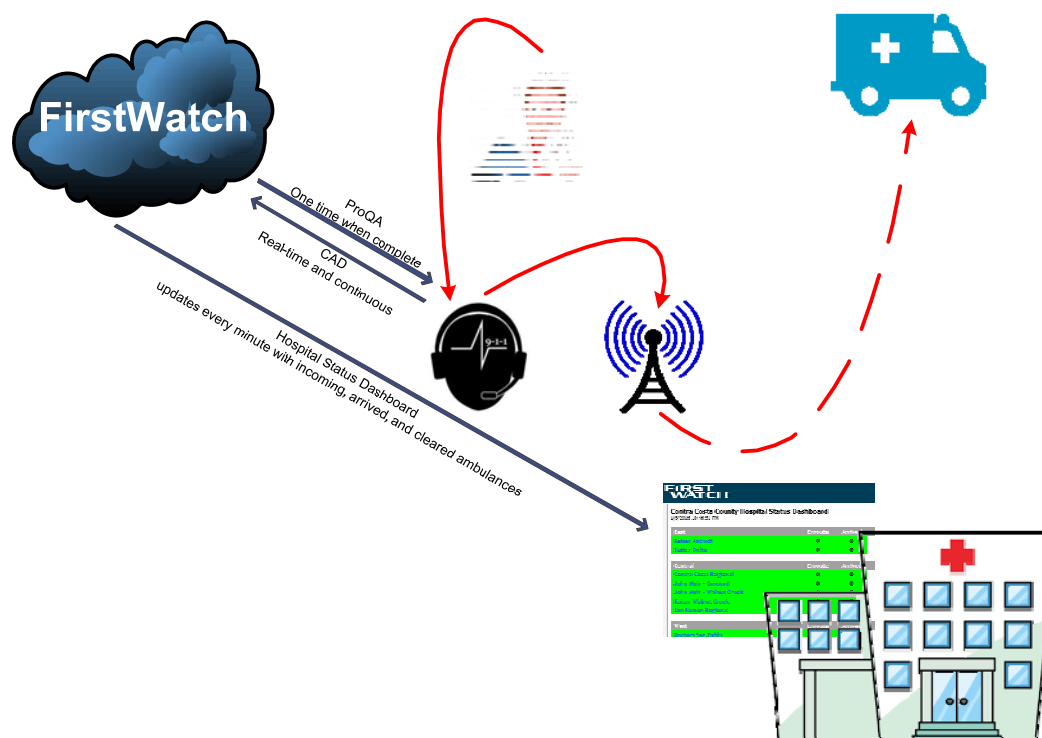
Figure 1. *Contra Costa County current HIE data infrastructure capabilities*

For the past five years, CCEMS has been using near real-time dashboard technology with FirstWatch to manage actual offload times between all EMS System community hospitals. All community hospitals routinely share patient information between facilities, private providers, and clinics through CARE Everywhere and Epic portals. Some additional elements depicting coalition preparedness are listed below:

- 90% of the 9-1-1 operational area is supported by a single prehospital EHR (MEDS). As of January 1, 2016, all in-county fire department first responder agencies have the option of using MEDS to support a single patient care record for each EMS encounter over the next 2-5 years.
- MEDS is currently NEMSIS 3.3 compliant and will be 3.4 compliant in early 2016.
- All EHR systems introduced by EMS providers must be NEMSIS 3.4 compliant by January 2017.
- HL7-ready EHR platforms have been available since 2014.
- FirstWatch Hospital Dashboard available for all in-county community hospitals.
- In 2015, Epic's recommendations for documenting EMS and patient transport (ASAP) were reviewed by CCEMS / CCHS / ccLink(Epic) and the HIE Working Group.

- In 2014, CCEMS collaborated with stakeholders and created a model Continuity of Care Document (CCD) with AMR and Kaiser which will be used for this project and includes the following data elements:

Patient Name	Receiving Hospital
Date of Birth	ED Arrival Time
Age	Patient Acuity
Ethnicity	ED Disposition
Race	Transferred to
Language of Preference	ED Disposition Time
Last 4 digits of SSN	ED Diagnosis (ICD 10)
Homeless?	Discharge Date and Time
Encounter ID	Discharge Disposition
Hospital Medical Record Number	Discharge Diagnosis (ICD 10)

CCEMS and our partners are committed to developing the infrastructure required for our proposed solutions for each of the +EMS functions that will not require translation software. We understand that a tremendous amount of work will be required, but we are confident that our existing and proposed infrastructure and coalition partners will be successful in achieving each of the goals proposed while improving patient care, safety, and billing when compared to a traditional HIE.

Description of Proposed Work With Methodology For Achieving: Search, Alert, File, and Reconcile Functionality.
CCEMS is pleased to address each of the requirements for the four functions outlined within this proposal. Each of the functions, Search, Alert, File, and Reconcile are discussed in detail as projects below:

Proposed Search Function

Using CARE Everywhere's proven algorithm for patient matching and records return, the Search feature is designed to allow EMS providers to search for a limited data set such as health problems, medications, allergies, and advanced directives at the patient's side using demographic information. The intent of search is to streamline workflow by requiring Search to be accomplished within the prehospital EHR. Recognizing that human error is a significant factor in data entry, the proposed Search feature will validate through the proposed Reconcile feature.
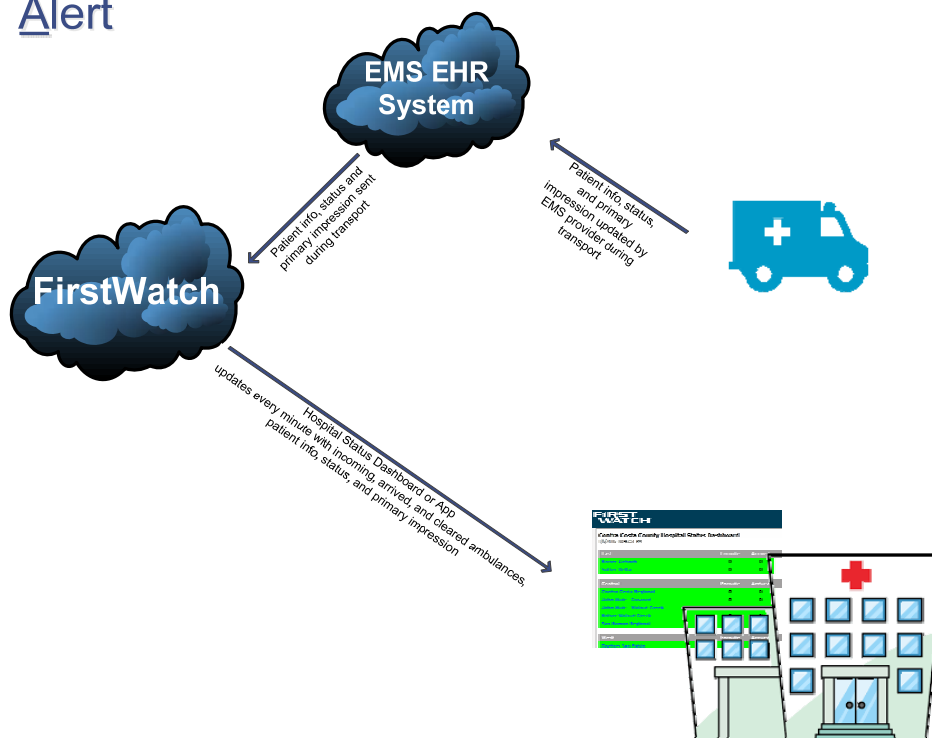
Search
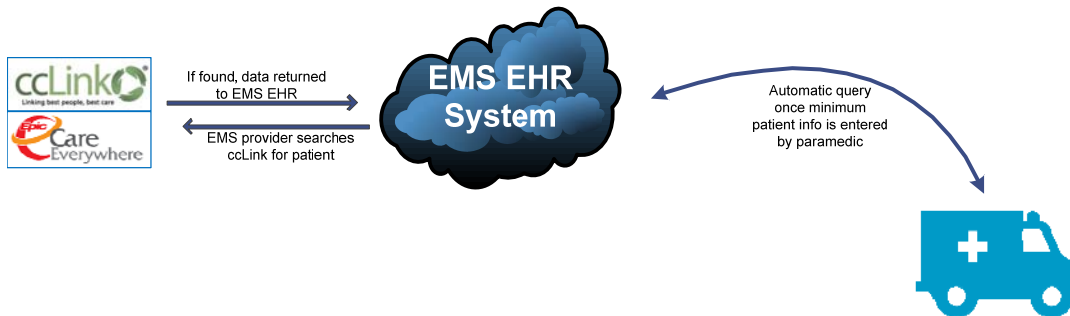
Proposed Alert Function

The Alert feature is designed to notify the receiving hospital that a patient is being transported by ambulance to their facility. This feature will include the patient's status and will be visually displayed to provide key patient metrics, including the paramedic's primary impression for the patient.

Alert

Proposed File Function

The File feature is designed to populate the prehospital EHR information into the longitudinal hospital EHR as discrete data. This feature will include more detailed

information than that previously transmitted through the Alert feature. The hospital user will have the ability to view and option to incorporate the prehospital EHR data into the hospital EHR.
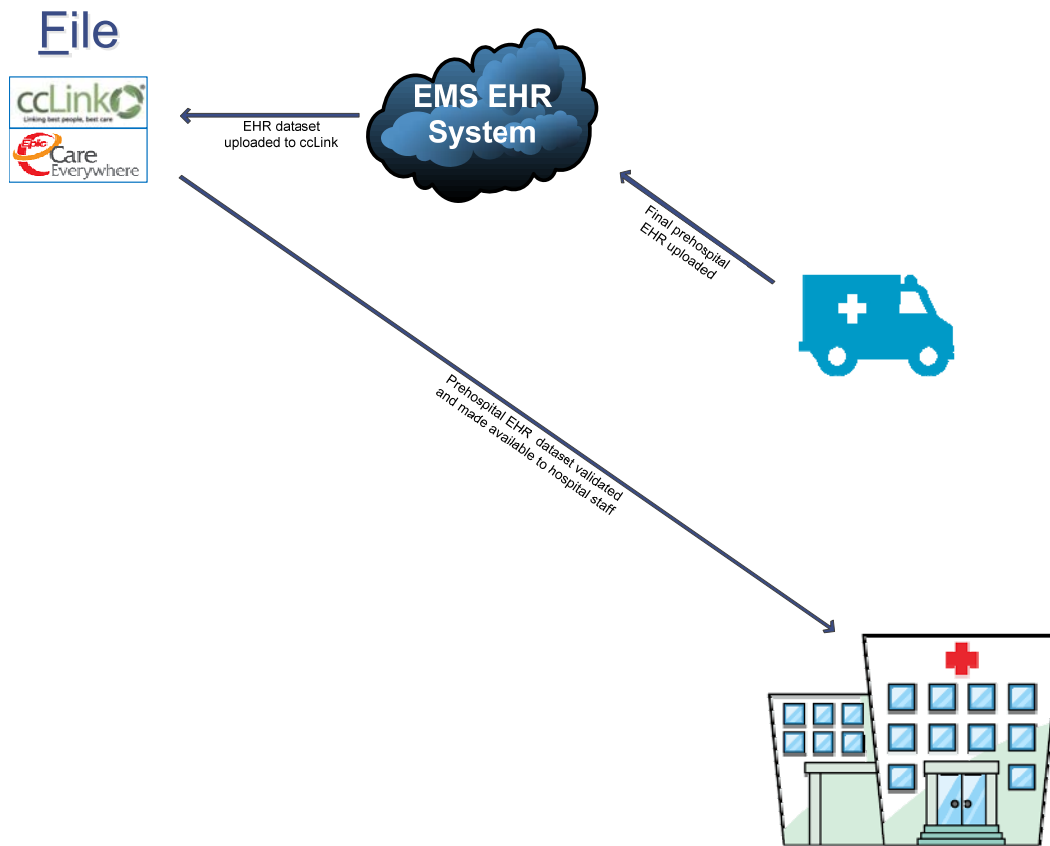
Proposed Reconcile Function

Using proven methodology used by FirstWatch in Sedgwick County, Kansas, we propose leveraging proven solutions from all coalition partners for the Reconcile feature. It is designed to merge a comprehensive set of outcome and billing information from the patient's hospital EHR back into the prehospital EHR and FirstWatch's data set to allow for quality analysis, benchmarking, and system improvement. This feature will include detailed information such as patient insurance information, discharge diagnosis (ICD-10 code(s)), and length of stay, if applicable.

Reconcile
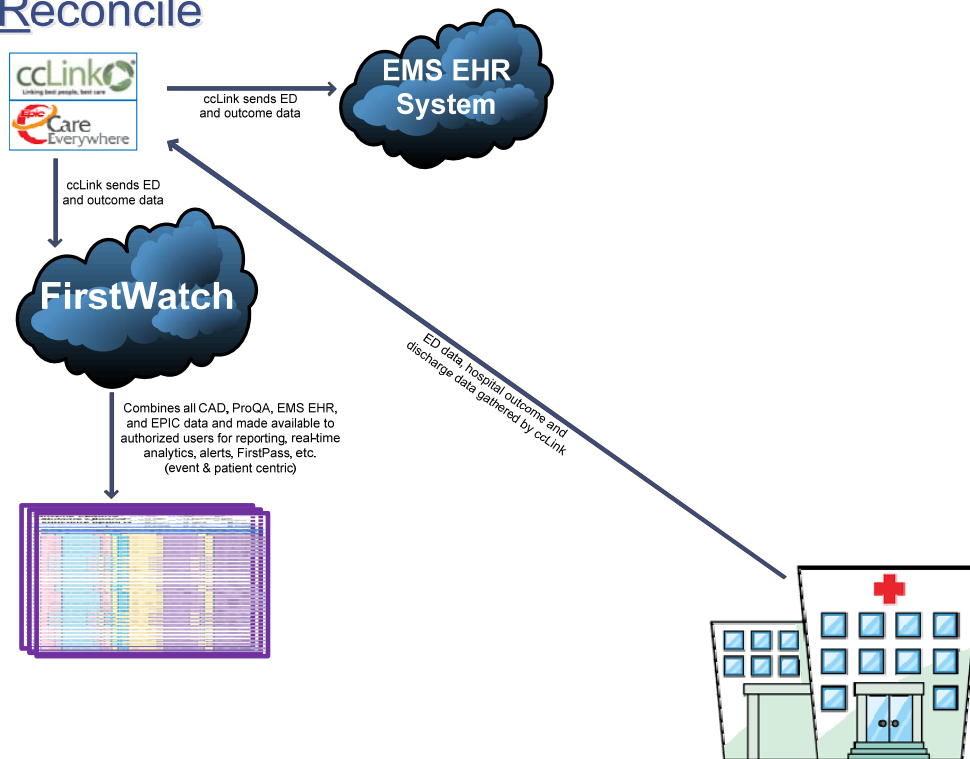
Summary

Please be advised that recent legislation AB503, AB1129, AB1223, and SB19 requires all Local EMS Agencies to plan, promote, and implement prehospital and emergency department bi-directional health care information exchange within the next 18months.

In preparation for health information exchange between local community hospitals and EMS System providers, the Contra Costa EMS Agency advises the following:

- All EMS transport agencies permitted in Contra Costa County must be capable of sending a prehospital continuity of care document (CCD) directly to the receiving hospital's medical records system no later than January 2018.
- All community hospitals in Contra Costa County must be capable of consuming a prehospital electronic health record (EHR) CCD no later than January 2018.
- All prehospital EHRs must be compliant with new state EMS Data system requirements as specified in the January 5, 2016 California EMSA letter.

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To learn more about local EMS Health Information bi-directional exchange efforts please contact Contra Costa Emergency Medical Services. To learn more about state and national EMS and Health System bi-directional exchange please visit http://www.emsa.ca.gov/HIE.