

# Proposal for Demonstrating at California Connects 2014



Use this template to communicate critical information for each demonstration proposed for the **2014 California Connects Interoperability Exhibition**, to be held at the *Connecting California to Improve Patient Care in 2014* conference sponsored by Redwood MedNet.

Prospective participants in California Connects 2014 must complete a proposal following this template for each proposed demonstration, and submit it for approval to the California Connects Steering Committee via email c/o Karen Boruff at [karen.boruff@ca-hie.org](mailto:karen.boruff@ca-hie.org). Please see the California Connects 2014 page at <http://www.ca-hie.org/projects/california-connects-2014> for more information. Direct any questions to Karen Boruff at [karen.boruff@ca-hie.org](mailto:karen.boruff@ca-hie.org) or Rim Cothren at [robert.cothren@ca-hie.org](mailto:robert.cothren@ca-hie.org).

## 1. Demonstration Synopsis

Please provide a title for your demonstration and a brief description of the demonstration. Try to limit the description to no more than 100 words. The title and description will appear on our web site in advance of the Exhibition to attract meeting participants to your demonstration.

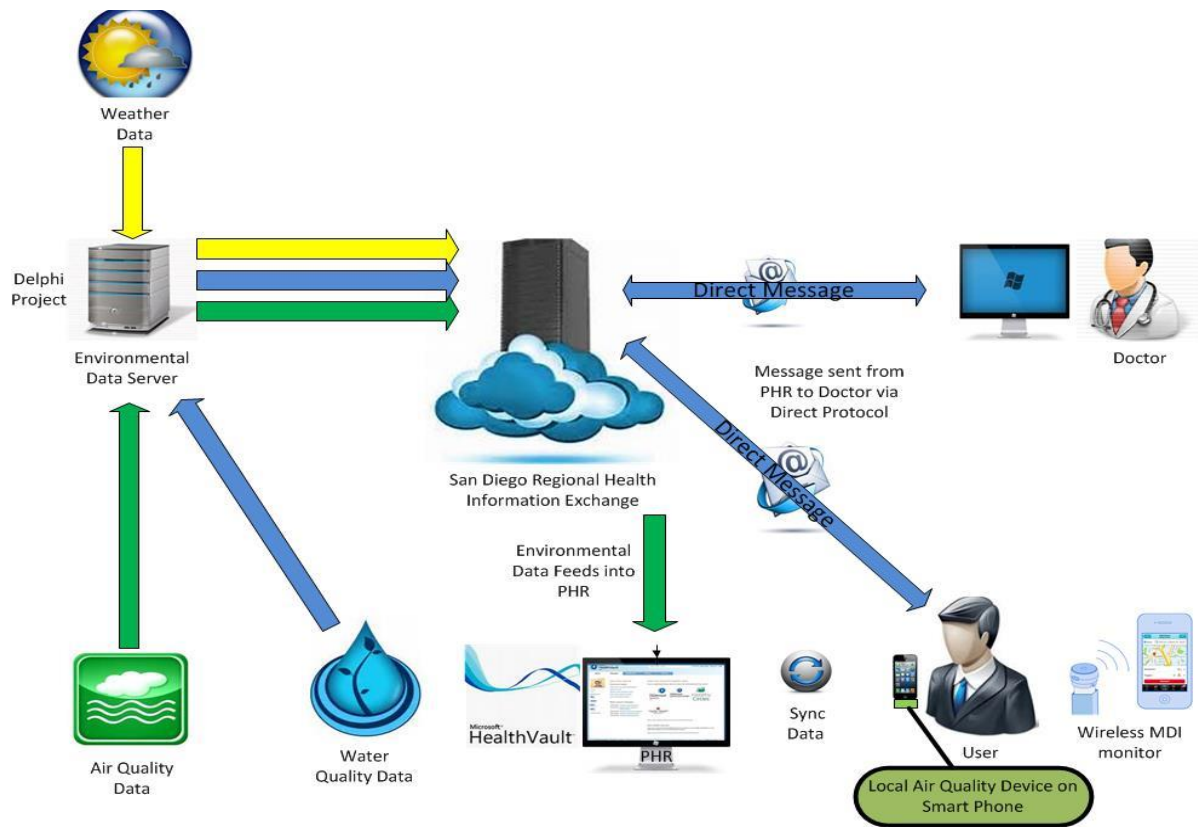
### **UCSD Asthma/Geo-Health PHR Pilot**

UCSD and San Diego Health Connect demonstrate secure and reliable bidirectional transport of patient data between end-users of NATE community HISPs and patient-owned PHRs using information from asthma patients. Patients with uncontrolled asthma often require acute treatment with multi-dose inhalers (MDI). We leverage a UCSD School of Engineering device “CitiSense” which measures air quality in real-time with a geo location and sends data to a smartphone. The asthma patient also has an additional device attached to their smartphone that uses wireless MDI monitoring to count the number of puffs a patient takes and their geo location in real-time. These two data elements are analyzed at SDHC and return a summary document for the patient and provider leveraging the Direct Protocol. Custom treatment plans are then rendered by the provider and communicated back to the patient via Direct Protocol messaging.

## 2. Demonstration User Story

Please provide a user story describing the demonstration, with specific emphasis on its clinical relevance. Be specific, illustrating how you will weave the technology you are demonstrating into real clinical flow.

A UCSD Health System patient sees her medical provider due to asthma complications. The patient's provider recommends two new devices that may be beneficial for the patient to control their asthma. One device is the commercially-available *Propeller Health* (previously Asthmopolis) MDI counter, which will monitor her rescue inhaler usage. The second device is an environmental air quality monitor called *CitiSense* that is given to the patient by the provider to continually monitor the patient's surrounding air quality. Although the EMR used by the provider has a tethered PHR, it does not currently accept device data from outside sources. Therefore, the provider also recommends the patient register for a Microsoft *HealthVault* account, which has device data integration capability.



A CCD of the patient's medical record is created for the patient and exported to their *HealthVault* account. The patient uses the devices for the next month. The patient initially finds the devices interesting and often checks on the air quality summaries and MDI usage information available to her, but she quickly gets busy with other things and forgets about the devices.

During the same time, the patient's asthma continues to be uncontrolled and she uses her rescue inhaler often.

Because the patient's asthma continues to be a problem, she makes another appointment with the primary care provider. Prior to the appointment, the patient send the device data to her provider through her *HealthVault* account. The provider and patient review the image summaries that incorporate the environmental air quality data with the MDI usage information so see if they can identify any patterns. It turns out that the air quality is not optimal for an asthmatic at a coffee shop that she frequents near a busy intersection near her work. The air quality is also less than optimal at a friend's house she often visits, who is also a smoker. Her MDI data also shows that it is used more often when she visits these areas. With this new information, the patient decides to find a new coffee shop for her morning coffee. Her friend also decides to quit smoking or when she does, smokes outside away from the patient. Now realizing how these data can help them improve her asthma control, she continually checks the data available to her so she can take control of her own health.

### **3. Goals and Objectives of the Demonstration**

Please provide a brief description of the goals and objectives of the demonstration, emphasizing what you expect your audience to learn. Be sure to indicate how your demonstration aligns with the objectives and guidelines found in the California Connects Demonstration Charter at <http://www.ca-hie.org/projects/california-connects-2014/charter>.

Those viewing the demonstration will see how to enable exchange by installing the NATE trust bundle that enables patient-mediated exchange with PHRs, and adopting their voluntary requirements for transparency and disclosure for sending data via Direct messaging, which includes:

1. NATE policies that require uniqueness of the inbound Direct message address, not able to be re-purposed for another patient or other use,
2. If provenance is available, it will be maintained,
3. Agreeing to maintain the C-CDA as if immutable, or indicate if record has been changed by the patient, and
4. Patient authentication is required for sending Direct messages.

They will also learn the value of baseline requirements for a participating HISP to provide an automatic reply: for example, contact your provider if your message is an emergency, and for a receiving provider to have local autonomy to accept or not accept any message.

#### 4. Participant Information

Please list information about the primary organization and any supporting organizations and/or sponsors for the demonstration. The primary organization will be responsible for creating, testing, and showcasing the demonstration. Supporting organizations might be collaborating to demonstrate the user story or otherwise deserve recognition. A sponsor may be funding or otherwise providing resources for the development of the demonstration.

##### 4.1. Primary Organization

Name of the organization UCSD and San Diego Health Connect

Role in the demonstration Principle Investigators

Point of contact:

##### 4.2. Supporting Organization(s)

Name of the organization San Diego Health Connect

Role in the demonstration Co-demonstrator for Direct Messaging

Name of the organization Microsoft

Role in the demonstration Co-demonstrator for PHR and Azure Cloud Services

Name of the organization UCSD School of Engineering

Role in the demonstration Co-demonstrator for “CitiSense” Mobile Air Quality measuring device

Name of the organization Propeller Health

Role in the demonstration Co-demonstrator for MDI monitoring Device

Name of the organization CAL IT2

Role in the demonstration Co-demonstrator for Environmental Data Source

Name of the organization The Simi Group

Role in the demonstration Microsoft Azure Analytics and Visualization Tools

##### 4.3. Demonstration Sponsor(s)

Name of the organization National Association for Trusted Exchange (NATE)

Role in the demonstration Direct Messaging Protocols and Policy

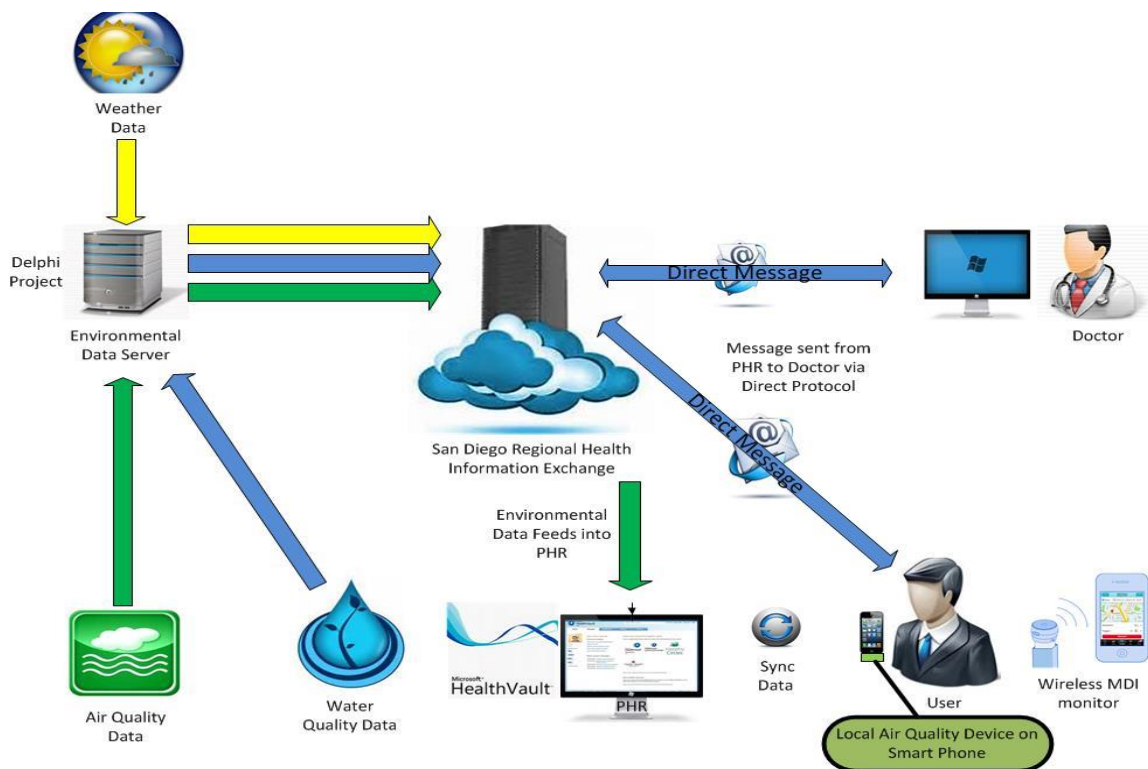
Name of the organization San Diego Health Connect

Role in the demonstration HIE

## 5. Technical Information

### 5.1. Business Workflow

Please provide a description of the business workflow for the user story, showing the various actors and systems involved in the health information exchange. A diagram may be used.



Use Case 1: Structured data is sent to the patient in their PHR.

The provider identifies a patient with a PHR and sends them a summary of their medical history by performing a query on the HIE and producing a Continuity of Care Document (CCD). This CCD is produced in two formats: 1) a human readable PDF; and 2) an XML message to export to other systems. See the following figures for a rendering of the CCD in PDF and XML, and a screen shot of the secured message. The provider then attaches the CCD to a Direct message which is then sent to the patient's personal health record (PHR), their Microsoft HealthVault account. The patient accesses the message and imports the CCD.



reporting tools that the community can easily read and interpret, such as the air quality index, the patient can distinguish between healthy and unhealthy areas.

Air Quality Index (AQI) Values	Levels of Health Concern	Colors
When the AQI is in this range:	...air quality conditions are:	...as symbolized by this color:
0 to 50	Good	Green
51 to 100	Moderate	Yellow
101 to 150	Unhealthy for Sensitive Groups (U.S.G)	Orange
151 to 200	Unhealthy	Red
201 to 300	Very Unhealthy	Purple
301 to 500	Hazardous	Maroon

Air quality data are downloaded into their PHR. The data elements captured are: Carbon Monoxide, Ozone, Particle Pollution and Sulfur Dioxide. The data are stored on an environmental table that is displayed in the web application.

$$AQI = \frac{I_{HI} - I_{LO}}{BP_{HI} - BP_{LO}} \times (C_{O_3} - BP_{LO}) + I_{LO}$$

**AQI** = Air Quality Index  
**I<sub>LO</sub>** = Index value at the lower limit of the AQI category  
**I<sub>HI</sub>** = Index value at the upper limit of the AQI category  
**BP<sub>LO</sub>** = Break-point concentration at lower limit of AQI category  
**BP<sub>HI</sub>** = Break-point concentration at upper limit of AQI category  
**C<sub>O<sub>3</sub></sub>** = 8-hour ozone concentration

This is done in conjunction with receiving data from the “city sense” device that plugs into their smartphone. The software and device on the Smart phone allows for real-time air quality analysis and geo-location for the patient. These data are then synchronized with their PHR. The PHR will also display the overlaid data in a visual format for the patient.



## Use case 2: Structured patient data is sent by the patient from their PHR to the provider.

The patient with a history of asthma is currently using a mobile device that counts the number of triggers for an MDI. These data are sent to both their Smart phone using the phone's built-in Bluetooth technology, and sent to their PHR. The patient now wants to contact their provider. Using their PHR, the patient sends a Direct message which includes data from the mobile MDI device, city sense and Delphi environmental data. The provider is able to receive and open the message displaying the number of MDI triggers which are geo-located on a map and then overlaid with the air quality data from both Delphi and city sense. The provider now has a full picture of the patient's health and surrounding environment to better assess their healthcare needs. The provider is then able to exchange information with the patient directly into their PHR using direct messaging.



### 5.2. Technical Standards

Please provide a brief discussion of the technical transport and content standards used in the demonstration. Include security, authentication and authorization standards as necessary. Please review <http://www.ca-hie.org/projects/california-connects-2014/charter> for the technical priorities for California Connects 2014.

This demonstration will illustrate:

- The Continuity of Care Document (CCD) in human-readable PDF format and machine-readable XML format.
- The Direct specification in the Applicability Statement for Secure Health Transport v1.1, employing SMTP and S/MIME and X.509 certificates with DNS discovery.
- The Implementation Guide for Direct Project Trust Bundle Distribution v1.0 proposed by ONC as part of the Direct Project working group to retrieve trust bundles, employing simple GET operations over HTTPS, and signed PKCS7 bundles of X.509 certificates.

### 6. Maturity of the Demonstrated Technologies

Please describe the maturity of the technologies highlighted in your demonstration, and when they might be available for use, and what barriers there are to reducing them to practice, if any. Technologies in the demonstration might be emerging and experimental, under development and soon to be available, or commercially available now.



All technology used for the demonstration are off the shelf tools combined to create each use case.