
Linking Immunization Registries State-to-State Using HL7 Message Transport

Danielle Reader-Jolley,
Nathan Bunker,
Mike Garcia

ABSTRACT

Objectives: Immunization programs recognize the need for state-to-state immunization registry communication when serving patients who have moved from another state, are transient, or who live in communities on state borders. Washington, Idaho, Arizona and Wyoming sought ways to facilitate providers' electronic access to individual patient records in the other states' immunization registries.

Methods: Legal and technical issues had to be resolved. Messaging protocols and security.

Results: Legal issues were addressed by state-specific, electronic user agreements requiring each provider to comply with the queried state registry's user agreement for each transaction. HL7 was used as the message protocol to send queries and return acknowledgements, possible matches, and data. The queried registry maintains records on users who have accessed the registry, complied with the user agreement, and the data copied to the querying IR.

Conclusions: This study provides an example of the first successful state-to-state implementation of the CDC's vision to electronically link statewide immunization registries. State-to-state secure HL7 registry communications supports the Healthy People 2010 immunization goal to enroll 95% of children aged 0-6 years in a fully operational, population-based immunization registry.

INTRODUCTION

Immunization programs recognize the need for state-to-state immunization registry (IR) communication when serving patients who have moved from another state, are transient, or who live in communities on state borders. Although many states have enacted legislation to enable internal state-based IRs which conform to public health exemptions under HIPAA, HIPAA and the federal government are silent on state-to-state sharing of immunization data.

Health Level Seven (HL7) [1] is a communication protocol to exchange data between electronic health information systems. The Centers for Disease Control and Prevention (CDC) Public Health Information Network (PHIN) [2] and the Committee on Immunization Registry Standards for Electronic Transactions (CIRSET) [3] have endorsed HL7 as the message transport and communication standard between IRs and external systems, including billing systems and electronic medical records, within individual states. HL7 defines four message formats (in addition to the ACK

[acknowledgement] format) for vaccination record query and response to that query.

- VXQ – Query for Vaccination Record
- VXX – Response to Query with Multiple Possible Matches
- VXR – Response to Query Returning the Vaccination Record
- QCK – Response to Query with No Matches

The CDC created a technical guide for the use of HL7 to transfer information between immunization systems [4] but the guide did not address a network of states sharing information, how messages would be transported, and how privacy and information sharing policies would be integrated.

This paper presents the first multi-state project initiated by state public health agencies to use HL7 messaging standards to exchange patient-level vaccination records.

METHODS

In 2004, the states of Washington, Idaho, Arizona, and Wyoming agreed to exchange immunization information across state

borders while still operating within each state's current registry policies and procedures. Four parties to the transfer of data were defined: the querying registry, the queried registry, the authorized healthcare provider, and the child and guardian. Two approaches to data sharing were identified: 1) two-way unsolicited data transmissions of all data, or 2) query-only for specific children and their immunization histories.

Legal and privacy issues

Each state assessed existing federal and state laws and regulations governing registry data sharing. A draft "Model Interstate Immunization Information Sharing Statute" [5] was reviewed. Stakeholders, including providers and guardians, were interviewed. Specific questions relevant to this project included

- 1) Is use of data compatible with that of the queried registry?
- 2) When crossing a state "line," where does each registry's (querying and queried) responsibility and authority end?
- 3) What is the best way to make sure that providers adhere to confidentiality and user agreements unique to each state?

Technical issues

Each state's registry had the ability to create, transmit, and receive messages in HL7 format. However, HL7 does not address message transport, security, authentication, network configuration, or routing protocols. CIRSET resolved some of these issues by recommending Secure HTTP (HTTPS) as the standard for message transport, security, and authentication. [6]

RESULTS

To date, completion of successful queries between the Washington registry (CHILD Profile) and the Idaho registry (IRIS) have been accomplished. Arizona is in the process of testing with Idaho and Washington.

Resolving legal issues with state-to-state sharing of health information posed the biggest challenge to this project. The states executed state-to-state information sharing agreements without passing specific legislation by doing the following:

- Opting to allow only patient-specific query versus unsolicited batch transfer of registry data.

- Requiring each querying provider to agree to a state-specific user agreement presented on-line by the queried IR before each transaction.
- Establishing security features to allow a queried IR to track who has accessed individual patient records in its registry.

State-to-state queries are used when a provider enters a new child into a registry and wishes to query another state for the child's latest record, particularly where the provider knows that the child has recently moved from that state.

The person making the query must be a registered user with a username and password in the querying IR, thus insuring initial authenticated access. The subject of the query must have a record in the querying registry, or one must be created, before a query is sent. After selecting (or creating) the child's record, the user accesses a drop-down menu of participating states and selects the state registry to query. This initiates a call-out to the queried registry.

The queried registry displays the queried state-specific information-sharing on-line user agreement form (Figure 1) to the user. In order for a user to gain access to the out-of-state registry data, he/she must accept the agreement. Once accepted by a user, the system assigns a user agreement identification number to the session. The "notice of agreement" link remains available for review of the agreement terms for the duration of the session. To indicate that the querying user has agreed to the queried state registry's user agreement, the user agreement identification number and the querying user username are sent with each message during the session.

The technical interaction begins when the querying system constructs a VXQ (query) message containing the selected patient's demographics. This message is sent using the HTTPS transport standard. All subsequent messages employ the same level of security.

The queried registry replies with a VXR, VXX or a QCK message. If no match (a QCK message) is returned, then the user is informed that no matches were found and the session is ended. The user may not change the query parameters and "fish" for a record.

If one matching record is found, the queried system returns a VXR message. If more than one possible patient matches are found, a VXX message containing limited demographic information about each possible match is returned to the user. The demographic information of each possible match is displayed beside the demographic information of the query subject so the user can select the best match. After the user definitively identifies a record, the querying registry will send a VXQ message to the other registry specifying the individual record, at which point the other registry returns the patient's immunization record (VXR message) to be displayed to the user. The user reviews and selects the immunizations to import. Once imported these data are merged with the patient's current immunization record in the home registry. No demographic information is imported or merged.

A security audit module at each registry tracks logins, changes to individual patient records, and queries which result in the return of individual records. The queried registry is responsible for logging queries from and data copied to out-of-state IRs. Registry administrators can review registry query logs at any time to determine which users have queried the system and which histories were retrieved.

CONCLUSIONS

In order for an IR to be PHIN-compatible, it must be able to accept and send messages in HL7 format. Currently most registries have a passive HL7 interface for accepting update messages, but many do not receive or send query messages. Thus, the first hurdle for state-to-state IR information exchange is enabling HL7 messaging capability.

In this pilot, legal issues posed a more significant obstacle. These were resolved by allowing each IR to evaluate each query on its own merits, removing the need for each state to coordinate blanket user agreements with every other state, and making the transaction comparable to a provider phoning another state registry and requesting an immunization record for a specific patient. Providers are given ultimate responsibility and accountability to comply with out-of-state registry user agreements.

One of *Healthy People 2010*'s immunization goals is to enroll 95% of children aged birth to 6 years in a fully operational, population-based immunization registry. State-to-state HL7 registry communication supports this goal by securely and appropriately sharing records for children who have moved from one state to another.

ACKNOWLEDGEMENTS

The authors acknowledge the helpful comments of Dr. Rebecca Wurtz and Tiffany Potter.

REFERENCES

1. Health Level Seven, www.hl7.org (accessed on ***)
2. Public Health Information Network (PHIN), <http://www.cdc.gov/phinf/index.htm> (accessed on ***)
3. Committee on Immunization Registry Standards for Electronic Transactions (CIRSET), <http://www.cirset.org>
4. Centers for Disease Control and Prevention, National Immunization Program, Immunization Registry Support Branch, "Implementation Guide for Immunization Data Transactions using Version 2.3.1 of the Health Level Seven (HL7) Standard Protocol: Implementation Guide Version 2.1," September 2002, <http://www.cdc.gov/nip/registry/hl7/hl7guide.pdf>
5. Every Child By Two (ECBT) & George Washington University, School of Public Health and Health Services, "Model Interstate Immunization Information Sharing Statute," February 2005, <http://www.ecbt.org/FINALModelInfo-sharingStatute1-25-05.doc>
6. CIRSET. Transport of immunization HL7 transactions over the Internet using secure HTTP, version 1.0, <http://www.cirset.org>, (accessed on **)

Scientific Technologies Corporation

4400 E. Broadway, Suite 705

Tucson, Arizona 85711

520-202-3333

www.stchome.com

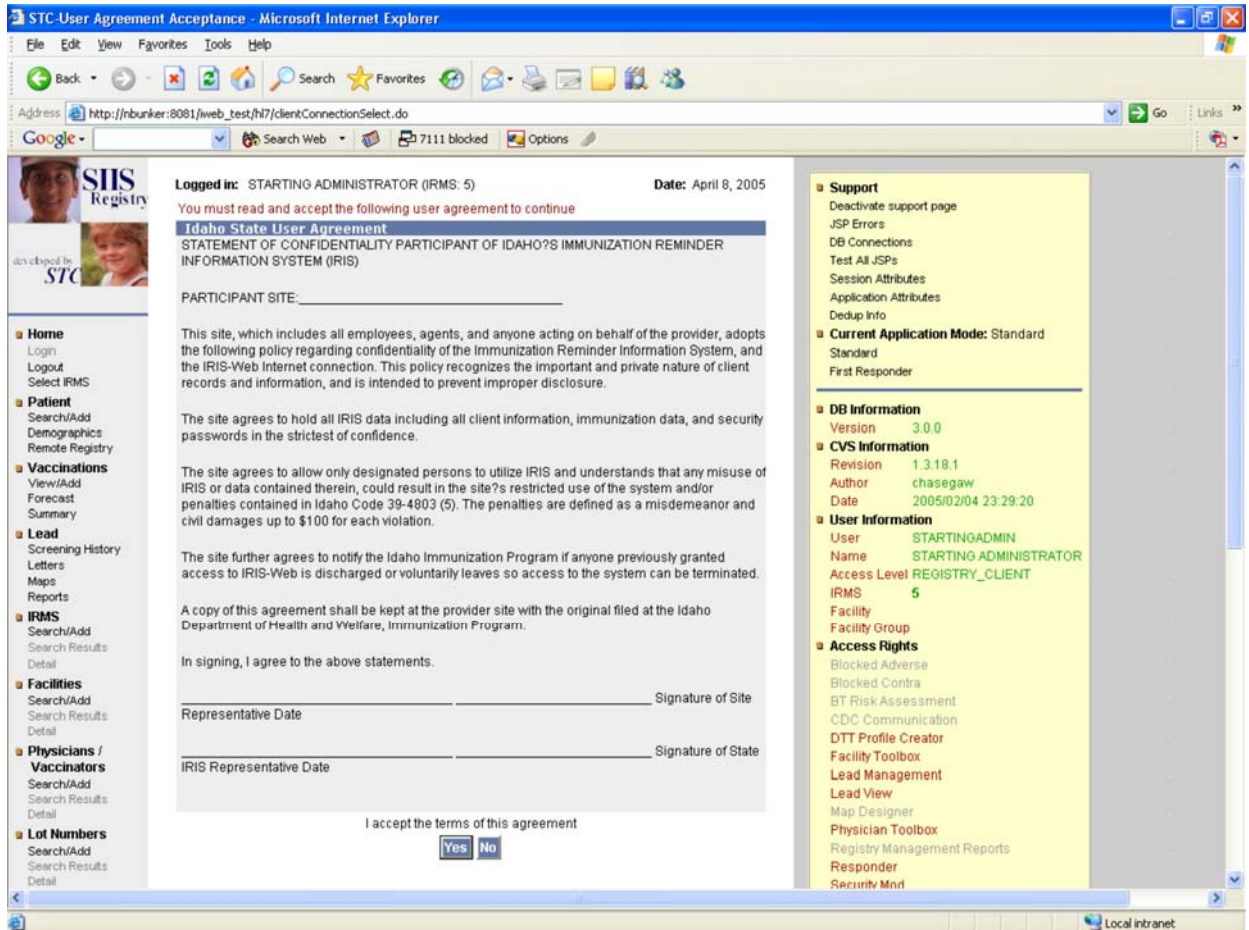


Figure 1. User Agreement Interface