LEVERAGING A MULTI-STATE COLLABORATIVE FOR DEVELOPING IMMUNIZATION INFORMATION SYSTEM ENHANCEMENTS
OR HOW TO DO MORE WITH LESS

Mary Beth Kurilo, MPH, MSW
ALERT Immunization Information System Manager
Oregon State Public Health Division

Michael Flynn, BS, MA
NYSIIS Technical Development Lead
New York State Department of Health
Take Home Points

• IIS’s must continue to evolve

• Efficiencies can be gained/resources can be saved through shared development of IIS functionality

• This project offers an model for collaborative development and cost-sharing
Overview

• State of IIS

• WIR Consortium

• Cost-Sharing Development Model
  – HL7 2.5.1 upgrade
  – Future areas for potential collaboration
Current State of IIS

- Many IIS projects have been around for years
- Increasing role in health information exchange
- Enhancements & modifications based on original code and methodologies
- Core application may not be benefitting from newer solutions
WIR Consortium

- 18 states or municipalities have adopted the Wisconsin Immunization Registry (WIR), a public domain system built by the State of Wisconsin
  - Two additional states use select functions within the WIR system

- The system is supported and/or hosted by various vendors or State IT Departments

- Projects are independent in how they maintain and enhance their instance of the application
Example Of IIS Development, Wisconsin, New York, Oregon

Public Domain System Built by State of Wisconsin, Implemented by 13 other states

Modified and Implemented by State of New York

Further Modified and Implemented by State of Oregon
States Using the WIR System

Also includes the Virgin Islands and Puerto Rico
HL7 2.5.1, A Common Goal

• Projects are expected to handle HL7 2.5.1 messages

• Previous enhancements based off of existing code

• This presented an opportunity to upgrade to code
  – Increase efficiencies for processing
  – Solution to be flexible for future enhancements
  – Take advantages of open source solutions

• Problem was this would be too costly for any one project to do.
Data Exchange Improvement Project (DEIP)

• Call went out to WIR project to see who would be interested in collaborative effort.

• Participating projects
  – Hawaii, Minnesota, New Mexico, New York, Oregon, Virginia

• Final solution available to the rest of WIR consortium once completed
Collaborative for HL7 2.5.1 Enhancement
Pre-Project Expectations

• **Benefits**
  – Cost-effective
  – Able to leverage collective experience
  – Enhancements may also extend to other data exchange components
  – Decreases in system development, testing time

• **Challenges**
  – Contracting and procurement models are not inclusive of collaborative approach
  – WIR platforms vary among states
  – Necessitates agreement and compromise among states
Key Collaborative Administration

Resources
- Resources pooled
- Projects assessed what funds they could contribute, and what restrictions, if any, accompanied those funds
- Required coordination of vendor contracts, grant funds, and other resources

Governance
- Limited phase 1 to six participating states
- One project stepped forward to lead and facilitate project calls
- All decisions were discussed, and input actively solicited
- Silence interpreted as consent
**Project Steps**

- **Green Box:** All 6 states using same vendor; vendor was employed to develop Project Plan and analyze parser and architecture options.

- **Blue Box:** Each state chose component within project plan to fund and developed contract amendments or allocated funding as needed.

- **Dark Blue Box:** Each state’s technical staff compared specifications and surfaced state-level differences that needed to be accommodated.
Existing Data Exchange Architecture

**Flat File**
- Parse File into IR DOM Objects
- Validate File Format
- Crosswalk Values
- Validate Field Values
- Apply Business Rules
- Reconcile Reactions
- Apply Error Messages
- Apply Error Messages

**HL7 2.3.1**
- Parse File into IR DOM Objects
- Validate File Format
- Crosswalk Values
- Validate Field Values
- Apply Business Rules
- Reconcile Reactions
- Apply Error Messages
- Apply Error Messages

**HL7 2.4**
- Parse File into IR DOM Objects
- Validate File Format
- Crosswalk Values
- Validate Field Values
- Apply Business Rules
- Reconcile Reactions
- Apply Error Messages
- Apply Error Messages
Changes to Data Exchange

• DEIP made many changes to Data Exchange
  – Java upgrade
  – Combined multiple Data Exchange processes
  – Domain object consolidation to remove duplicated classes
  – Replaced HL7 parsing/writing with HAPI
  – New shared validation for Flat File & all HL7 versions
  – Table driven crosswalk
  – Unified and configurable error messages
  – Reorganized business rules to be more object centric
  – And other techie stuff
The flat file format and both HL7 versions were all independent.

Read the file, validated fields (date checks, numeric checks, etc), crosswalk values, and applied error messages.

The duplicated code resulted in duplicated effort for enhancements, duplicated bugs, and inconsistencies between file formats.
Example 1 – HL7 Parsing/Writing

New Approach

- Common code has been pulled from the document processors and put into new shared Translator and Validator classes to remove redundant code and make it easier to maintain
Example 1
HL7 Parsing/Writing - HAPI

• HAPI - an open source Java library that can read and write HL7

• Currently utilized in HL7 Document processing
  – file-format validation
  – parsing HL7
  – writing HL7

• Validating HL7 file format can be further separated into:
  – Segment validation
    • checks for missing, extra, or out of sequence segments
  – Field validation
    • checking for R, RE, O (Required or Optional fields)
  – Field constraints
    • handling of optional fields that send information but is not stored in the system
Example 2 – Error Messages
Previous Approach

- Error message text was scattered throughout the code
  - Document Processors
  - Business Rule Processors

- No single consolidated list of messages

- Some duplication of messages or similar messages
  - HL7 2.3.1 – invalid birth date
  - HL7 2.4 – invalid birth date
  - Flat Document Processor – invalid date of birth
Example 2 – Error Messages

New Approach

• All error messages are now table driven
  – Part of the new table driven crosswalk
  – Crosswalk result is the full text that will be displayed

• Easy to update and configure

• Example:
  – “INVALID_ADMINBY_FIRST_NAME”
  – “Informational error - Invalid administered by first name (<FIRSTNAME>). No value stored.”
Current Status

• Should be operational in New York in October
• Being tested in New Mexico
• Being developed in Oregon; implementation scheduled for Fall
• Minnesota, Hawaii, and Virginia come next
• Nebraska, Maryland, and Iowa have will be using the solution also.
Key Lessons Learned

• Coordination of resources is not trivial
  – State contracting and procurement procedures demand significant lead time

• Know your collaborators
  – Solid relationships smoothed the path to decision-making

• Ask questions

• Allow for flexibility
  – Scope, outcomes, implementation
What Do the Projects Think

• Yes there was a cost savings
• Yes, we believe we are getting a better solution
• May not have leveraged the collective experience like we thought
• Not as timely as we hoped.
What Did the Vendor Think

- Logistics

- Schedule Adjustments – Partnering in a Multi-client environment (adjusting to change)

- Open collaboration – Everyone having a voice and merging different ideas

- Communication of Value – Tangible Business versus Technical
Opportunities for Collaboration?

- Immunization Forecasting
- Inventory and Ordering
- Electronic transfer of VFC Status
- CDC VTRCKS Interface

- Web Services
- Meaningful Use
- Statewide HIE
- HL7 Upgrades

- Early Hearing Data
- WIC/Imm Interface
- Blood Lead Screening

- Priority Group Tracking
- Mass Vaccination Capture
- SNS/Inventory Interface
- Pharmaceutical Tracking
Take Home Points

• Efficiencies can be gained/resources can be saved through shared development of IIS functionality

• This project offers an early model for collaborative development and cost-sharing
Questions and Contact Information

- Mary Beth Kurilo, MPH, MSW
  MARY.BETH.KURILO@STATE.OR.US

- Michael Flynn, BS, MA
  MKF06@HEALTH.STATE.NY.US

- Thanks to our partners in Hawaii, Virginia, New Mexico and Minnesota