Project Closeout Report

Presented to the IT Committee March 13, 2014

Project Name: ND Immunization Information System (NDIIS) Interoperability

Agency: ND Department of Health (NDDoH)

Business Unit/Program Area: Disease Control

Project Sponsor: Kirby Kruger

Project Manager: Mark Molesworth

<table>
<tr><th colspan="2">Objectives</th></tr>
<tr><th>Project Objectives</th><th>Measurement Description</th></tr>
<tr><td colspan="2">This section will have both External (E) and Internal (I) objectives. External will be defined as those objectives necessary to meet the stipulations of the federal grant funding source and internal will be those objectives that are specifically defined by NDDoH.

Caveat: Due to the scope changes and federally-approved extension of the project, each objective stating, “by August 31, 2012” should be read, “by August 31, 2013”.</td></tr>
<tr><td colspan="2">Business Need/Problem #1: To comply with the grant requirements, NDDoH must increase the number of bi-directional, EHR-NDIIS practice-based connections available (no interfaces exist at this time).</td></tr>
<tr><td>Objective 1 (E): By August 31, 2012, increase the number of enhanced EHR-NDIIS practice-based interfaces available by 100 percent.

Met/Not Met: Met</td><td>Baseline: 0 percent

Target: Progress towards achievement of the objective will be determined by the number of enhanced immunization practices divided by the total number of immunization practices.

Measurement:

Post Project: The health systems below represent 119 provider practice sites.

Altru Health Systems – Grand Forks
Trinity Health – Minot
Essentia Health – Fargo
Sanford Health – Fargo
Sanford Health – Bismarck
North Dakota Health Information Network</td></tr>
<tr><td>Objective 2 (I): By August 31, 2012, create interfaces between the four primary Electronic Health Record (EHR) vendors, including their highest volume North Dakota customers (Cerner, Centricity, Epic, Indian Health Services Resource and Patient Management System (RPMS)).

Met/Not Met: Partially Met</td><td>Baseline: 0

Target: 4

Measurement:

Post Project: Due to the evolving nature of the health systems choice of EMR vendors, the number of EHRs exchanging data with the NDIIS is 3. They are Epic, Centricity, and Cerner. RPMS was not fully bi-directional and is targeted for the phase II interoperability effort.</td></tr>
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Objectives	
Project Objectives	Measurement Description
Business Need/Problem #2: To comply with the grant requirements, NDDoH must increase the number of real time, practice-based electronic immunization transactions reported to the NDIIS each week.	
Objective 1 (E): By August 31, 2012, increase the number of practice-based electronic immunization transactions reported to the NDIIS each week by 10 percent. Met/Not Met: Met	Baseline: 0 percent Target: Progress towards achievement of the objective will be determined by the number of electronic transactions each week before enhancement divided by the baseline number of electronic enhancements. Measurement: Post Project: For the period beginning September 1 and ending December 31, 2013 the average number of practice-based electronic immunization transactions reported to the NDIIS each week is 12,308, representing 56.5 percent of all transactions
Objective 2 (I): By August 31, 2012, the number of practice-based electronic immunization transactions reported to the NDIIS will be 50 percent of all reported transactions. Met/Not Met: Met	Baseline: The baseline for electronic submissions is 0 percent. A baseline of submissions by the target providers shows they account for 54 percent of all reported transactions. Target: Progress towards achievement of the objective will be determined by the number of electronic transactions each week before enhancement divided by the total transactions each week after enhancement. Measurement: 56.5 percent of all transactions reported to the NDIIS were electronic
Business Need/Problem #3: To comply with the grant requirements, NDDoH must maintain the percent of immunization data received by the NDIIS in a timely manner.	
Objective 1 (E): By August 31, 2012, maintain the percent of immunization data received by the NDIIS within 30 days of administration at a minimum of 90 percent. Met/Not Met: Met	Baseline: 93 percent Target: Progress towards achievement of the objective will be determined by querying NDIIS data and determining the percent of immunization data received by the NDIIS within 30 days of administration. Measurement: Post Project: 96 percent

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Objective 2 (I): By August 31, 2012, increase the percent of immunization data received by the NDIIS within seven days of administration to a minimum of 90 percent. Met/Not Met: Not Met	Baseline: 76 percent Target: Progress towards achievement of the objective will be determined by querying NDIIS data and determining the percent of immunization data received by the NDIIS within seven days of administration. Measurement: 82.8 percent While this did not meet the target goal of 90 percent, it is likely that the measurement was skewed by several technical issues which caused delays not attributable to the providers. The project team will measure this objective again in Q2 2014.

Schedule Objectives					
Met/ Not Met	Original Baseline Schedule (in Months)	Final Baseline Schedule (in Months)	Actual Schedule (in Months)	Variance to Original Baseline	Variance to Final Baseline
Met	24	36	37	-54%	-8.3%

Budget Objectives					
Met/ Not Met	Original Baseline Budget	Final Baseline Budget	Actual Costs	Variance to Original Baseline	Variance to Final Baseline
Met	$569,634	$620,021	$589,954	-3.6%	+2.5%

Major Scope Changes

1.) Upgraded the Orion Health Rhapsody Integration Engine software from version 3.0 to 4.1
2.) Updated the engine to accept HL7 2.3.1 messages allowing for providers with HL7 2.3.1 certified EMRs to create interoperability
3.) Created an on-boarding process to improve communication and ensure providers/EMRs were capable of creating interoperability
4.) Created an automated test site to allow providers to test HL7 messages for the purpose of determining capability of creating interoperability and validating Meaningful Use Stage 1
5.) Created the ability to manage provider site mapping centrally within the HL7 engine
6.) Created a SOAP/HTTPS transport system to reduce reliance on TCP/VPN, improving reliability and saving costs
7.) Integrated with the ND Health Information Network allowing for providers with less advanced EMRs to create interoperability and improving sustainability
8.) Contracted to research and create a long term sustainability plan for interoperability
9.) De-scoped the Indian Health Services interoperability deliverable due to lack of readiness and moved the effort to 2014
10.) De-scoped the final 25 percent of the Mid Dakota interoperability deliverable due to the end of the grant funding period and continued the effort outside of the original project

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Lessons Learned
Utilize a pilot site – Immunization interoperability has been a technical goal for several years and this project was on the leading edge of both technology and electronic medical records (EMR) maturing to the point wherein interoperability was attainable. Due to the lack of history and lessons learned, working with a single pilot provider and EMR proved critical to the success of the overall project. Onboarding exercise – As a result of the pilot and subsequent lessons-learned exercise, the project team developed a detailed onboarding process which included the identification of the interoperability transport type, thorough gap analysis between the vendor product capabilities and the NDIIS specifications, formalized technical testing, and a detailed two-stage user acceptance testing process using ambulatory staff familiar with immunizations. Test with aged production data – Due to the complex nature of immunizations, it proved difficult to create dummy test cases to cover the many scenarios. A testing process was created using a set of aged production data in a secure test environment to validate each provider site's ability to submit electronic messages in accordance with the NDIIS specification guide. Condensed NDIIS Specification Guide – At the onset of this project, ND was only one of three states to utilize Vaccines For Children (VFC) requirements. This greatly complicated the interoperability effort since all vendor EMR's were certified by the Center for Disease Control, but VFC was not a requirement and therefore not included as out of the box functionality in the EMR. Due to the complexity of the CDC and ND specification guides, many of the technical representatives who participated in the original on-boarding processes did not recognize these deficiencies in their product until mid-stream in the interoperability effort. This resulted in long delays and complicated development efforts on the part of the vendor to bring the EMR into compliance with the additional ND specifications. As a result, the NDIIS project team created a condensed specification guide identifying only those additional specifications required by ND, but not by the CDC, and bolstered the on-boarding process to include early identification of the vendor's capability to meet those requirements. Communication – As with all complex projects involving multiple team members across multiple disciplines, communication is critical and the lack thereof is often the root cause of issues and/or delays.

Success Stories
Duplicate Data Entry Savings – By far the most beneficial element of the interoperability project was the elimination of duplicate data entry for provider participants. Due to existing state law, the collection of immunization for children is required and the existing NDIIS application was custom-built to provide high data quality and safeguards. However, as providers began to adopt their own EMRs, the lack of interoperability between the two systems created a need for the provider staff, often nursing staff, to enter the immunization data once in the provider EMR and then a second time in the NDIIS registry. Data collected during Q4 2013 indicates the participating providers in total submitted an average of 76,375 messages per month. Using an average wage of $28 and a 60 to 90 second per immunization model, participating providers have saved between $35,896 and $53,463 per month or $430,752 to $641,550 per year across the state. Based on the final actual cost, the investment return will be realized in 11 to 16.5 months. As we on-board additional providers, these savings to providers will continue to grow. Adult Immunizations – State law does not require the submission of adult immunizations, therefore the decision to submit them to the registry was left to individual providers and the number of adult immunizations captured was relatively low. Due to interoperability all childhood and adult vaccinations captured in the immunization registry. This provides opportunities for the Department of Health to be able to assess adult immunization coverage using the NDIIS. The percentage of North Dakota adults with at least one dose of vaccine in the NDIIS increased from 72.7 percent in 2012 to 80 percent in 2013.

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ND Health Information Network – At the onset, it was understood that the process of creating interoperability would be costly and time consuming. As the project progressed it became evident that the cost of maintaining the multiple interoperability connections and resource needs from both business and technical staff would increase substantially and remain long after the temporary federal grant funds were expended. As the NDIIS does not receive state funds to operate, the project team conducted a sustainability planning exercise. One of the most promising outcomes was the relationship that the NDIIS has built with the NDHIN. As a result, a single interoperability transport was built between the NDIIS and the NDHIN to pass HL7 messages and the majority of existing interoperability connections and all future connections to providers will be routed through the NDHIN and subsequently passed to the immunization registry. The NDHIN will assume responsibility for the health of the primary connection to each provider and the NDIIS will support new connections with testing and technical expertise. An added bonus of this relationship will be that providers who are not connected to the NDIIS, but are connected to the NDHIN will have the ability to gain access to patient immunization records using the NDHIN query capabilities.

Fully Bi-directional, Real-time Transactions - (no batch input) - State law was instrumental in motivating both providers and vendors at a time when both are faced with multiple priorities - Vendors complied with stringent requirements for vaccines for children.

National Recognition – Based upon an abstract submitted to the Public Health Information Network Conference, representatives of the NDDoH Immunization Program have been invited to present at a national conference to promote the use of on-boarding standards and practices related to immunization interoperability. The NDDoH Immunization Program previously spoke about the NDIIS interoperability initiative at the American Immunization Registry Association and the North Dakota Public Health Association Conferences.