Lessons Learned Generating a Standard XML File for CDC and Client Data Messaging

The Idaho Department of Health and Welfare Bureau of Laboratories (IBL) began considering the idea of an XML extract for electronic environmental reporting and for Laboratory Response Network for Chemical Threats (LRN-C) messaging as a result of an Association of Public Health Laboratories (APHL) webinar “LIMS Requirements for an Environmental Data Exchange Template” presented by John (Jack) Krueger, Informatics Consultant. The focus of the webinar was for laboratories to use a standard electronic format to provide environmental chemistry results to their clients. If all laboratories were to use the same standard electronic reporting format, then all clients could expect the same data in the same format regardless of the laboratory or LIMS used by the laboratory. During the webinar, Jack Krueger noted that one of his partners is ChemWare, Inc., provider of the Horizon Laboratory Information Management System. IBL has been using the Horizon system since early 2008.

Following the webinar, representatives from IBL contacted Jack Krueger for more information on his project. APHL and Jack were both interested in IBL piloting the new message format to use for potential environmental clients and possibly messaging LRN-C data to CDC. IBL contacted CDC to determine if there was a possibility of the LRN-C project accepting the XML file “as-is” (not changing it to an HL7 message). Unfortunately LRN-C was not able to accept the XML file, but IBL determined that the XML message could be easily converted using the Rhapsody integration engine. IBL also reached out to ChemWare regarding the work they had already completed with Jack. By the end of this exploratory period APHL, ChemWare, and IBL decided to work together on a pilot project to generate an XML file from Horizon that could be used for both environmental chemistry reporting and LRN-C reporting. The pilot project included APHL funding Chemware for 20 hours of configuration assistance, and Chemware providing an additional 20 hours of configuration assistance at no cost to APHL or IBL.

ChemWare had already created the initial XML file extract process in association with Jack Krueger so the project began with IBL making the configuration changes necessary on their database to generate that standard message. Once the initial message had been created it was a simple matter of confirming that the data required by the LRN-C program was included.

IBL had obtained the messaging requirements documentation for LRN-C from the LIMSi (Laboratory Information Management System Integration) team. At the time IBL undertook this project, there were no labs sending LRN-C messages electronically to CDC. There is now a pilot group of laboratories (including IBL) that are working with the LIMSi team to complete the electronic messaging process for LRN-C. Because the LRN-C messaging requirements are still being refined it remains necessary for a certain amount of flexibility.

As with all messaging projects, once the data had been extracted from the IBL LIMS it was necessary to confirm that all elements required by the client (CDC or other clients) were present. Next, for those clients that required the data in a different format (e.g., CDC), it was necessary to build the conversion process in Rhapsody. Throughout the process we had identified data elements that were required for messaging but were not included in the original XML definition. The APHL standard XML file focused on messaging laboratory generated data which can be consistent among various laboratories and LIMS systems. Because IBL wanted to send more than ‘just the facts’ it was necessary to expand upon the original format. Thankfully, our vendor ChemWare was always ready to make the necessary changes for us. Rather than modify the original XML data extract, our vendor created a second XML process. At this time, IBL plans to only use the custom XML process with the additional data elements but if a client requests the standard message that can be provided as well.

Although IBL is not yet sending messages from their production environment, the ability to do so is available and new partners are being identified as possible recipients of the XML data. Throughout this project, IBL has learned a few lessons that could be helpful to other laboratories embarking down a similar path.

* Realize even going backwards is a step forward. In 2010, IBL was part of the pilot group for LRN-B messaging so going into this project it was understood that for every two steps forward there could be one going back.
* Create a comprehensive list of all the data elements that are required by your various clients.
  + Look at the reports that you currently generate;
  + Documents provided by agencies (i.e., DEQ, CDC) that might list the data elements that are required;
  + Think creatively about the items you may want in the future; and
  + Ensure the identified data elements are included both in your LIMS and in whatever data file is created; most of the effort at IBL has been centered on confirming and creating those data elements.
* Be flexible.
  + In reviewing the XML standard data elements for environmental customers, it was determined that some environmental customers would want additional information from the testing (i.e., comments). While the standard XML file reporting project was completed, a secondary file was also created to include additional fields that IBL staff thought environmental clients may request.
  + Since the LIMSi LRN-C messaging documentation is being refined through this pilot project, it is necessary to realize that even if you created a comprehensive list there still might be something missing. The flexibility of ChemWare and their willingness to work with us to create the needed XML file was necessary for our success.
* Learn a new language. One of the more difficult tasks was making sure that everyone involved was using the same words in the same way. An LRN-C message may use the same words that data fields in your LIMS use but in an entirely different way. Just looking at the documentation doesn’t always make it clear what the actual data element will be.
* Think creatively. The timing of when you send a message out of your LIMS can be just as important as how. The LRN-B messaging process is to send the result for a single sample to CDC as soon as it has been peer reviewed and released. We had to stand on our head and think a little differently when it came time to look at messages to other environmental clients and LRN-C messages.
  + For environmental clients, the messages are sent when all the work for several samples from the same client identified for a specific project are completed and released by the manager.
  + For LRN-C, a message is sent not for a single sample but an entire work batch or instrument run. This meant identifying a new method within our LIMS to trigger that message.

IBL is thankful for the opportunity to work on this project. Because of the APHL webinar by Jack Krueger, an interest by IBL employees to try something new, the willingness of ChemWare to pilot with IBL, and the financial support of APHL we are very close to achieving our goals.