Background

Upon adoption of PRISM for STD surveillance and case management in April 2016, TDH made significant changes to the application and databases to meet state-specific programmatic needs. This included a module for mapping ELR to a set of tables based on 15 data elements common in a lab message.

Methods

New labs were required to match the ELR Mapping table based on the following 15 data elements:
- SendingApplication
- OrderCode
- ObservationCode
- ObservationAlternateName
- ResultType
- ResultDescription
- ResultCode
- ResultNumeric
- AlternateResult
- AlternateResultDescription
- AlternateResultCode
- AlternateResultName
- ObservationName
- ObservationAlternateName
- Result

Sentinel labs were sent to a Mapping Hold table so that SQL rules could be written to automatically map them. Examples of rules for each data element include:

- If ObservationName LIKE '%GONORRHEA%' then DS_DiseaseCategory = 'Gonorrhea'
- If AlternateResultCode = '<20' AND DS_DiseaseCategory = 'HIV' then DS_DiseaseCategory = 'Gonorrhea'
- If ObservationName LIKE '%GONORRHEA%' then DS_DiseaseCategory = 'Gonorrhea'

Advantages of auto mapping:
- Positive step towards standardization of lab results.
- Reduction in human error - new unmapped labs no longer require human intervention (manual mapping) in order to be imported and sent to a user’s task list.
- Time saved - users are able to see results in their task lists almost immediately instead of waiting for them to be mapped.

Disadvantages of auto mapping:
- Requires maintenance and updates, but this should decrease over time.
- The most frequently edited rules were for HIV. This is not surprising since the HIV diagnostic testing algorithm is very complex and many laboratories send results in different formats.
- The mapping module in Figure 3 still exists as a way to track incoming labs and write new SQL rules based on those labs.
- No audit mechanism is currently in place to determine how mappings are updated.
- Addition of an audit mechanism has been requested because understanding why some rules don’t work will only help to improve them.

Results

Hyperlinks to the TDH Rhapsody daily and Rhapsody daily modules for mapping ELR to a set of tables based on 15 data elements common in a lab message.

2,569 new mappings created
- 2,460 automatic
- 109 manual or edited

189,177 ELR/PTBMIS labs imported into PRISM/ELR table
- 152,694 automatic
- 36,483 manual or edited

35,782 HIV tests
- 35,782 HIV tests
- 2,460 automatic
- 109 manual or edited

Conclusions

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Acronyms & Abbreviations

ELR: electronic lab reporting
HL7: Health Level 7
PRISM: Patient Reporting Investigation Surveillance Manager
PTBMIS: Patient Tracking Billing Management Information System
STD: sexually transmitted disease/infection
TDH: Tennessee Department of Health
XML: extensible markup language
Advantages and Disadvantages of Auto Mapping: A Closer Look

- Positive step towards standardization of lab results. Our analysis of the previous method of manually mapping labs showed errors and inconsistencies in the mappings of test names and test results that will be avoided by an automated process.

- Reduction in human error—new unmapped labs no longer require human intervention (manual mapping) in order to be imported and sent to the user’s task list.

- Time saved—users are able to see results in their task lists almost immediately instead of waiting for them to be mapped. PRISM imports HL7 and PTBMIS labs three times per day. Previously, unmapped labs would wait to be manually mapped twice a week by program staff. They can now be auto mapped as soon as they are imported.

- Requires maintenance and updates. On its first day in production, PRISM automatically created 464 new mappings based on the SQL rules. Since then, the daily number of new mappings created has been <30, with the numbers decreasing over time.
  - The most frequently edited rules are for HIV-related tests. This is not surprising since the HIV diagnostic testing algorithm is very complex and many laboratories send results in different formats.
  - Any time a new lab is onboarded, or a current lab changes test methods, new rules will need to be written.
  - The mapping module in Figure 3 still exists as a way to track unmapped labs and write new SQL rules based on those labs.

- No audit mechanism is currently in place to determine how mappings are updated.
  - Addition of an audit mechanism has been requested because understanding why some rules don’t work will only help to improve them.

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