Cooperative Agreement #U60/CDC303019
NMDOH Scientific Laboratory Division's L-SIP Improvement Project
Final Report
July 27, 2011

GOAL

The L-SIP funding was used to expand the capabilities of our current Laboratory Information Management System (LIMS) by obtaining label printers and barcode scanners, as well as improving efficiencies in testing and staffing needs through the acquisition of the Abbott Architect system.

The original request included a contract for our LIMS contractor to develop report emailing capabilities and query development. Due to timing issues, the contract could not be executed, so, with permission from APHL, those monies were redirected to computer hardware, software, support and supplies.

BACKGROUND

Common concerns expressed by partners during New Mexico's Laboratory System Improvement Program meeting held on May 6, 2008 were turn-around times (Key Ideas 2.1.1), staffing (Key Idea 8.3.1), and availability of data (Key Ideas 1.1.3, 1.2.1, 1.2.5).

Since that time, the New Mexico Department of Health (NMDOH) Scientific Laboratory Division (SLD) has implemented a unified LIMS in the Biological Sciences Bureau and the Toxicology Bureau, with the final stages occurring in the Chemistry Bureau during the fall of 2011. This implementation has started addressing the availability of data issues by standardizing sample information into one database compared to 34 databases in the old system. SLD had bar code readers and printers throughout the laboratory for the implementation of the LIMS. However, funding limited the number of devices that could be installed.

SLD has also started integrated some instrumentation into the LIMS system which will improve both staffing and turn-around time efficiencies. However, instrumentation integration was not done in the Biological Services Bureau due to technological lags in instrumentation. SLD purchased the Abbott Architect system which allows for multiple testing (hepatitis A, B, C and HIV) to be run on one platform. Prior to this acquisition, each of the analyses listed above (for a total of 9 separate tests) were run individually on separate platforms which required multiple staff to perform the tests at different times as well as required them to manually enter results into the LIMS.

BUDGET

The L-SIP Financial Assistance funding was used to purchase the following:

Item	Cost
Large volume bar code printer	$2,419.00
Small volume bar code printer	$1,294.40
Bar code Readers/stands (5)	$1,102.50
Computer software	$10,600.00
Computer Hardware	$199.00
System Support	$1,237.50
Licensing	$986.52
supplies	$1,772.20
Total	$19,611.12

TASK SCHEDULE

We were not able to enact the original contract for information technology (IT) services which put us behind schedule. However, the integration of the Architect system is important to us and will be completed as soon as the components are received.

IMPACT

The additional bar code printers and readers will improve efficiency in sample receiving. The instrument interface will be instrumental in streamlining serological testing for nine hepatitis and HIV tests. Data loading will be completed electronically; therefore reducing data entry errors and reducing scientific staff time by eliminating manual entry, manual transference of results and quality control results. It will also release staff to be able to perform other testing, resulting in not only reduced turnaround times for the hepatitis and HIV tests, but potentially other tests that the staff will be able to work on instead of hepatitis and HIV. The reduced turn-around times will improve the ability of the partners to provide healthcare in a timely manner.

This project will help meet CAP certification requirements because the testing quality control will be integrated within the LIMS. Also, because the instrument integration allows for an almost automatic electronic upload of data for both the unknown samples and quality control samples, quality control and quality assurance documentation will be readily available.

APHL GOALS

This section addresses the specific concerns asked by APHL for this project.

1. **What had prevented this project from taking place earlier?**

The short answer is funding. In many cases, funding is available for the specific instrumentation, but is not available for the IT portion of the projects. For this project, the gaps occurred in the number of bar code printers and readers that we could purchase, as well as the IT connections to link the Architect system to SLD's LIMS. This funding helped address that gap.

2. **What examples or discussions during the assessment or follow-up identified the gap?**

Common concerns expressed by partners during New Mexico's Laboratory System Improvement Program meeting held on May 6, 2008 were turn-around times that were taking too long (Key Ideas 2.1.1), staffing shortages (Key Idea 8.3.1), and availability of data (Key Ideas 1.1.3, 1.2.1, 1.2.5).

At that time, we indicated that the new LIMS (that we were going to be implementing) should help with testing efficiencies which would help with the turn-around times and staffing needs. The new LIMS would also have capabilities that would enhance the availability of data.

As we've completed the various phases of implementation, we have seen some improvements in those areas. However, the implementation also highlighted additional areas where we could improve efficiencies within the system.

3. **What is the impact that completing this project has or will have on your laboratory system?**

As described in the 'IMPACT' section, the additional bar code printers and readers will improve efficiency in sample receiving. The instrument interface will be instrumental in streamlining serological testing for nine hepatitis and HIV tests. Data loading will be completed electronically; therefore reducing data entry errors and reducing scientific staff time by eliminating manual entry, manual transference of results and quality control results. It will also release staff to be able to perform other testing, resulting in not only reduced turnaround times for the hepatitis and HIV tests, but potentially other tests that the staff will be able to work on instead of hepatitis and HIV. The reduced turn-around times will improve the ability of the partners to provide healthcare in a timely manner.

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4. **Please identify other gaps that have not yet been addressed. What are the barriers to carrying out improvement projects that would address or correct the issue?**

In order to complete the LIMS implementation with the available funding, we developed the 80/20 implementation criteria. If it was high volume, critical, or had the capability of being integrated through IT into the LIMS, we tried to integrate the analysis into the LIMS. As the implementation has progressed, we have found that there are additional requirements that would either make the LIMS more efficient or more effective, for which we do not have a funding source identified.

The following additional LIMS requirements that need to be addressed at SLD are:

1. Billing capabilities: The LIMS was designed as a laboratory tool, not necessarily a fiscal tool. The LIMS that we are using does have a billing module, but due to funding, we are not able to configure or implement it. We were able to develop some

queries that pull information out of the LIMS that is downloaded into a spreadsheet for our Fiscal department. Unfortunately, this approach will not work once we implement the chemical testing portion because of the complexity of the billing. Funding to configure and implement this module would improve SLD's capability to bill appropriately for testing completed.

2. Instrument integration: The current funding for the LIMS did not allow for the integration of all of the analytical instruments at SLD. We determined which instruments had more quality control data, complex manual entry, or test volume to develop a matrix of what could be integrated. We have developed some protocols for instruments that are similar, but there are still others that were not as similar to those that were integrated or the testing was deemed not as high a priority because it was not either high volume or impact. Integration of this instrumentation would reduce manual data entry, further reducing potential data entry errors and improving scientist productivity.
3. Query development: The LIMS was supplied with the basic set of queries that can be used to pull data from the system. The vendor has also trained our IT staff to develop simpler queries. Unfortunately, there are more complex queries that are needed for quality control requirements that are needed for our certifying agencies that are not in the system and for which we do not have the capabilities. However, with additional funding, the queries can be developed either by the vendor or through training our IT staff. Funding to train our IT staff to do these queries would improve our quality control and quality assurance activities.
4. Computers: The LIMS implementation funding did not include funding for additional computers. The implementation process has highlighted the need for dedicated computers for the data entry and sample receipt throughout the laboratory. We've determined that computers that are already dedicated to an instrument should not have the additional software of the LIMS and/or bar code readers/printers installed because the additional software can interfere with the analytical instrumentation. Additional computers would streamline the sample receipt and testing processes.