

## [case study]

# *A Collaboration to Develop a Logical Design for Public Health Laboratory Information Management Systems*

One of a series of case studies on strategic application and management of health information systems.

**The critical need for public health laboratories (PHLs) to have efficient electronic laboratory information management systems (LIMS) stimulated a collaboration in 2002-2003 to accurately define LIMS requirements common to all PHLs across the country. Funded by The Robert Wood Johnson Foundation, the collaboration brought together the experience of 16 designated public health laboratories, the oversight of the Association of Public Health Laboratories (APHL) and its Informatics Committee, and the collaborative approach and public health informatics expertise of the Public Health Informatics Institute.**

**The result was a requirements document articulating the work performed in a PHL, stated as 16 business processes and the relationships among them, and a statement of over 500 LIMS requirements that span the processes. APHL made the LIMS requirements document<sup>1</sup> available to all PHLs in November 2003, and numerous PHLs use it to guide their purchase and development of LIMS.**

## Challenge

Additional refinement of the requirements, known as a logical design, would, however, enable PHLs to further focus vendors' LIMS products or better develop their own LIMS. PHLs' positive response to the requirements document and the momentum built by the requirements project encouraged APHL and the Institute to take

the next step. The challenges of a logical design project were twofold: Was there enough value in the greater detail of the logical design such that a number of PHLs would commit to participate in a lengthy, intensive collaboration? Would the detailed and technical nature of the project prove to be a barrier to PHLs finding and articulating the commonality among them, as they had in the requirements project?

## Solution

The Next Step project began in November 2003, again funded by The Robert Wood Johnson Foundation. Response to a call for PHLs to participate in the logical design collaboration was positive: 26 PHLs volunteered to contribute their laboratory experience and expertise. Over the next 18 months, a core workgroup representing six PHLs met six times, with APHL providing coordination and oversight, and the Institute contributing facilitation and IT expertise. The workgroup translated the requirements definition into a set of logical design specifications, which was then reviewed and approved by the larger collaboration.

The resulting document, completed in March 2005, provides the basis for developing a physical design that vendors or PHL programmers can use to create a physical implementation

of a public health LIMS. The logical design document<sup>2</sup> consists of two parts. The first part includes the business processes considered most essential to laboratory operation. It also includes sections on associated business processes, the design for key master files, eight workgroup discussion papers on complex and cross-cutting issues that informed the resulting logical design, and discussion of the design needs of PHLs that are not commonly found in a typical clinical laboratory setting.

The second part of the logical design document includes the supporting business processes—those that are independent from each other and the core processes, but which must be considered as extensions of the core processes.

The resulting logical design document for public health LIMS:

- Provides the specifics for future implementations of LIMS that PHLs and commercial vendors alike require.
- Ensures that public health LIMS will have a high degree of interoperability, enabling better data flow among PHLs and federal and local agencies, and improving PHLs' capacity for mutual assistance in a crisis situation.
- Gives a framework for future independent or collaborative development initiatives.

*Collaboratively developing the logical design for a public health information system ensures a high degree of interoperability.*

Like the collaboratively developed requirements document, the two-part logical design document is the general property of APHL. It is available to all public health laboratories.

## Impact

APHL 2004 survey data show that most PHLs have a strong need for highly functional, cost-effective LIMS solutions. The majority of PHLs were seeking to replace or upgrade LIMS in 2004, yet PHL budgets are inadequate to meet their LIMS needs. With the requirements and logical design documents now available, PHLs are better positioned to negotiate with vendors to meet their LIMS needs or to build LIMS themselves.

Currently, three to six vendors offer PHL products that meet many of the requirements specified in the LIMS requirements document; it remains to be seen whether vendors will continue to refine their products in line with the more detailed LIMS logical design. In addition, several states are now developing and/or refining existing in-house LIMS using the requirements and logical design, and several states are beginning to collaboratively design a new public health LIMS directly from the logical

design. Because the requirements and logical design are the most costly phases of the information systems implementation life cycle, the risk associated with subsequent phases of public health LIMS solutions development has been sharply reduced. PHLs that participated in the logical design collaboration report that it is being used to guide their purchase of commercial LIMS. Others are collaboratively developing LIMS guided by the logical design.

## Conclusion

This project demonstrated that the logical design for public health information systems, based on previously defined business processes and requirements specifications, can be effectively and efficiently developed through a highly collaborative process. Strong sponsorship and skilled facilitation, project management, and communication with project partners are critical to the success of such collaborations, as is commitment by the collaboration's participants. The extent to which the logical design will be used by other PHLs and vendors will be closely watched so that other public health programs and agencies can benefit from the experience.

## Notes

<sup>1</sup> *LIMS Requirements Document*. <http://www.aphl.org/programs/informatics>

<sup>2</sup> *LIMS Logical Design Document*. <http://www.aphl.org/programs/informatics>

## Resources

Public Health Informatics Institute and Association for Public Health Laboratories. (2004). *Batteries Not Included: Understanding the total cost of ownership for a commercial off-the-shelf public health laboratory information management system*. Decatur, GA: Public Health Informatics Institute.

Public Health Informatics Institute. (2004). *Case Study: Developing a Charter for a Collaborative Requirements Project*. Decatur, GA: Public Health Informatics Institute.

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