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and eleventh government environmental laboratory conference

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Rhode Island Convention Center
Strengthening Informatics Competencies in the Laboratory Workforce
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“I’m jealous—I wish I’d had access to this when I was first starting out. It encompasses and condenses years worth of knowledge into a few hours. It gives people starting out in a laboratory, not even in informatics specifically, but in a lab in general a real head start.”
The Need…

Building Informatics capacity in the lab has become critical because data and information is a lab product as well as great science now.

Building lab Informatics workforce capacity involves everyone. This includes the people providing services for the lab, the management, and professionals using lab information. Of course, that includes the lab professionals too!

Just building a single informatics super human is just not enough. So how do we truly build capacity?
What informatics knowledge gaps exist in your lab?

Data quality is not always as important as scientific rigor to everyone.

The flow of information and how it relates to laboratory process and information outcomes is not often thought about.

Having a conversation with the IS person about a computing tech need is often painful.

What the heck is this dang LIMS system I have to use now?

You want me to do what with a LOINC???

We have to spend a billion dollars on this thing called an integration broker to move “HL-what” messages?

How do the relationships with data drive everything from matching specimens to results up through complex data analytics?

Laboratorians don’t always know how important their data/information is and how its used in public health.

Consumers of laboratory data/information don’t really know how complex lab informatics really is.

Technology service providers don’t always understand what goes on in a lab.
Some History

How did this all begin?

*The business practice of LIMS...* working on the Lab Informatics Assessment tool taught us that we have to teach and explain informatics aligned with the relevance of the functions and processes in the lab and not just what the IT technology did.

*How to teach it?...* Training in informatics had to evolve to not just “tell” what things are and start building base level informatics skills and show how they are really applied and important. Along the way build these skills to meet competencies with effective informatics concepts. The relevance of data the down stream impacts is a critical base idea all must learn.

*All must learn...* Build these competencies in everyone in the lab and focus specific, higher order complexity skills in various roles in the lab. Not just build the one mighty informatician and expect that person will provide all the needs.

*Its not just the lab...* Expand the training impact so critical external parties understood lab informatics to strengthen the success of service for the lab and consumers of lab information/data.

*Access needs to be free...* At least the base level courses had to be easily available and free if we were serious about moving the entire lab population forward in informatics.

*Many contributors ...* Many people were involved, through the informatics committee, to teach us what needed to be taught for lab informatics capacity...
Curriculum Overview

Three base courses are designed to build on each other and establish an understanding of a set of concepts that drive how we think and use Informatics across the lab. Then a series of more specialized courses will be developed focusing on specific roles to build deeper skills and competencies.

First Three Courses:

The Life of a Specimen: This follows a specimen and its associated data through the path it takes from its origination to becoming a result. You will start to see how data quality is critical, data relationships are created and how they impact the lab process, and how process and flow of data is critical to understanding informatics. The course is designed to help you see how data elements build around a specimen as it traverses the path.

The Life of a Result: Once a specimen transforms into a result(s) then you will see how the data is used, what its impact is, and the events it triggers. This course examines what impacts the result has both inside the lab and outside where consumers of lab data/information apply what it tells them. More concepts are explored such as where the data lives in a structure, how it moves, and how different ways the data can be used. Expanding the understanding how informatics and data/information coming from the lab has an impact is an important part of understanding why informatics is so important.
Laboratory Informatics Systems: Data and information lives in computing technology systems both in the lab and outside. This third course dives into typical “systems” that provide the support to drive informatics in the lab. The systems talk to each other and understanding how this occurs and what is communicated is part of this. The course drills down on functions that each system provides and teaches more technical concepts how driving the system.

One of the most significant informatics systems is the LIMS (The laboratory Information Management System). You will examine all the capabilities of a LIMS and how it facilitates informatics functions in the lab. The course will give you a working knowledge how the LIMS technology integrates data with lab process.

The systems that are connected outside the lab are discussed and automation systems such as instrument controlling computers are explored. More data specific concepts are explored around standards critical to making a system efficient as you traverse the functions of an informatics lab system to drive the concept of interoperability.
Paving the Way

*Foundational knowledge* This starting course series opens the door to more complex and advanced topics in informatics that build on each other. Once people start gaining competencies in understanding the building blocks of lab informatics then broader success learning more complex concepts make sense and they can see the relevance.

*Where could these courses go next?* Focusing on more complex skills both in data science and data manipulation as well as technology skills to deliver informatics solutions is explored in future courses. Various roles in the lab require specializations that we have mapped out in a document explaining the full lab informatics spectrum.
Building the Curriculum
An Instructional Designer’s Perspective
Building a Curriculum to Meet the Need

Deanne Watts, MA
Specialist Master, Federal Human Capital
Deloitte Consulting
Guiding Principles

- Provide foundational knowledge of laboratory informatics to a broad audience/multiple roles
- Provide free courses 24/7 to large, geographically dispersed audience
- Use adult learning principles and multimedia learning best practices
- Use scenario/example where possible
- Use plain language
Course Development Process

Storyboard Creation
- Create Objectives and Course Outline*
- Content Gathering
- Storyboard Slide Creation with Audio Script*

Course Development
- Final Review Cycle
- Translate storyboards into courseware screens with text, graphics, and video
- Record and synch audio in courseware

Implementation
- Upload to CDC TRAIN for testing
- Go Live
- Market course offerings to core audiences

Extensive feedback and review cycles *
Course Features and Benefits

Introduction to Laboratory Informatics: Life of a Specimen Course Information Flow in the Laboratory

Life of a Specimen Flow

PRE-ANALYTIC PHASE
- Collection, Labeling, and Communication
  - Collect specimen
  - Label specimen
  - Communicate test requisition information
- Transportation
  - Package and Transport specimen to laboratory
- Receiving and Evaluating Quality
  - Receive specimen
  - Store specimen
  - Accessioning
  - Evaluate quality

ANALYTIC PHASE
- Testing and Recording Results
  - Perform testing prep
  - Complete tests
  - Analyze results
  - Record results

POST-ANALYTIC PHASE
- Communicating Results
  - Communicate results to the submitter and other stakeholders
- Storage/Disposal
  - Store or dispose of specimen

Resources Map Play/Pause Back Forward Audio on/off Exit Closed captioning Opens resources Opens table of contents Opens glossary
Course Demonstration

Life of a Specimen Flow

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- Communicating Results
  - Communicate results to the submitter and other stakeholders
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  - Store or dispose of specimen
Laboratory Informatics Curriculum: Perspectives on Workforce Development

John Ridderhof, DrPH, HCLD (ABB)
Division of Laboratory Systems
APHL
6/13/2017

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Excellent Laboratories, Outstanding Health
Outline

• PHL Informatics --- Background
• Leveraging Categorical Efforts with Cross-cutting solutions
• Evolving focus on Workforce
• New Directions?
What do these have in common??

Vision 2020: Building a Sustainable Public Health Laboratory System
A Candid Conversation with Public Health Laboratory Scientists and Partners on the Future of the US Public Health System

November 2016

LEI
LABORATORY EFFICIENCIES INITIATIVE
Transforming to a Sustainable Public Health Laboratory System

WORKFORCE TRAINING & SKILLS

Executives and Employees Agreed the Top 3 Training Needs Are:
1. Influencing policy development
2. Understanding the relationship between a new policy and many types of public health problems
3. Assessing the broad array of factors that influence specific public health problems

Roughly 1 in 2 respondents indicated that health departments provide sufficient technology training for the current workforce.

Although Public Health Informatics (PHI) is a very small segment of the public health workforce, workers across different disciplines indicated that more emphasis needs to be placed on the use of electronic health data.

Most Important Skills Identified by Workers

- Gather reliable information................. 96%
- Communicate effectively with different audiences................. 92%
- Persuade others to act..................... 91%

Percent of Workers Aware of Emerging Trends

- ACA........................................ 92%
- Quality Improvement....................... 83%
- Health IT.................................. 81%
- Evidence-Based Practice................... 75%
- PH/Primary Care Integration.............. 74%
- Cross-Jurisdictional Sharing............... 72%
- PHI Systems Research...................... 52%
- Health in All Policies...................... 52%

To read the full Journal of Public Health Management and Practice PHI WINs supplement, visit: http://journals.lww.com/phmnp/toc/2015/11001

APHL
ASSOCIATION OF PUBLIC HEALTH LABORATORIES

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The Graduate, circa 2017
Just one word, “Informatics”
In the beginning, there was LITS and LITS Plus

• Limited LIMS vendors for PHLs  (Trivia---name?)
• CDC developed and supported LIMS for PHLs (LITS, LITS Plus)
• Recognition that government as vendor was unsustainable
Key Informatics Frameworks

- Defining system requirements for LIMS so that PHLs will be able to match their needs with commercial software products
- 16 Business processes
For many scientists, Informatics is ____
Informatics: Changing the Perceptions

For many scientists, Informatics is _____ “Daliesque”
Developed by informatics SMEs so labs can assess capabilities across the laboratory enterprise

# Informatics SA--19 Capability Areas

<table>
<thead>
<tr>
<th>CA #1</th>
<th>Laboratory Test Request and Sample receiving</th>
<th>CA #11</th>
<th>Contract and Grant Management</th>
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<tr>
<td>CA #2</td>
<td>Test Preparation, LIMS Processing, Test Results Recording and Verification</td>
<td>CA #12</td>
<td>Training, Education and Resource Management</td>
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<tr>
<td>CA #3</td>
<td>Report Preparation and Distribution</td>
<td>CA #13</td>
<td>Laboratory Certifications/Licensing</td>
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<td>Laboratory Test Scheduling</td>
<td>CA #14</td>
<td>Customer Relationship Management</td>
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<td>CA #5</td>
<td>Prescheduled Testing</td>
<td>CA #15</td>
<td>Quality Control (QC) and Quality Assurance (QA) Management</td>
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<td>CA #6</td>
<td>Specimen and Sample Tracking/Chain of Custody</td>
<td>CA #16</td>
<td>Laboratory Safety and Accident Investigation</td>
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<tr>
<td>CA #7</td>
<td>Media, Reagents, Controls: Manufacturing and Inventory</td>
<td>CA #17</td>
<td>Laboratory Mutual Assistance/Disaster Recovery</td>
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<tr>
<td>CA #8</td>
<td>Interoperability and Data Exchange</td>
<td>CA #18</td>
<td>Core IT Services: Hardware, Software and Services</td>
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<tr>
<td>CA #9</td>
<td>Statistical Analysis and Surveillance</td>
<td>CA #19</td>
<td>Policies and Procedures, including Budgeting and Funding</td>
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<tr>
<td>CA #10</td>
<td>Billing for Laboratory Services</td>
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133 Capability Statements!
Foundational to creating and sustaining a capable, well-trained, and prepared laboratory workforce

- Defines expected levels of performance and knowledge across 15 areas
- 19 Informatics capabilities translate to sub-domains
Funding is categorical, informatics is foundational

Key Program Contribution Examples

• PHEP supports LIMS and IT support staff
• ELC Health Information systems branching into PHL informatics
• ELRTA can assist PHLs with coding for ELR
• Programs, such as TB and AR, helping to build interstate web portals on AIMS
• PHLIP/Influenza helped develop AIMS
Informatics and the Public Health Workforce

• There exists an urgent need for enhanced commitment to informatics as a core competency for all public health workers, and particularly the small percentage of public health workers who are “informatics specialists.”

Domain 8: Maintain a Competent Public Health Workforce

Standard 8.2: Ensure a Competent Workforce through Assessment of Staff Competencies, the Provision of Individual Training and Professional Development, and the Provision of a Supportive Work Environment
## Training Needs Assessment

- Project team from NH and NJ selected competencies and subcompetencies
- NH Staff rated their confidence in performing the competency
- Scored highest in ethics and safety, lowest in informatics
- NH is developing trainings for the lowest rated competencies
- Tool will be available on the APHL Competencies website
• There are training programs and resources that focus on informatics or laboratory sciences in public health, but none that specifically address the need for specialized expertise in managing the informatics enterprise within the PHL context.

• Ref: Summary of conference calls in August and September of 2014 between CDC SMEs, APHL, APHL Informatics committee
CDC Laboratory Training website: www.cdc.gov/labtraining
302 Training Courses in CDC FY2016

- Emergency Response 47%
- Infectious Disease 23%
- Advanced Molecular Detection 14%
- Biosafety 10%
- Quality Management 3%
- Environmental Health 3%
Training Based on the Competency Guidelines for Public Health Laboratory Professionals
Challenge: PHL Informatics Specialists

APHL white paper—consolidated IT barrier to onsite SME staff

2011


2015 (Updated)

Strengthening Informatics Capacities and Promoting Best Practices

- CDC Public Health Informatics Forum
  - CDC program and informatics SMEs
  - Address core competencies for CDC staff
  - Foster information exchange across programs
Strengthening Informatics Capacities and Promoting Best Practices

- CMS requested CDC support for educational materials on laboratory informatics basics
  - Emphasis on coding and interoperability for clinical laboratory staff
Surveillance Strategy

The future: Case Reports from EHR

- Need to use LOINC and SNOMED coding
- Will PHLs implement ETOR capability to report into EHR?
Building Surveillance Capacity

CLINICIAN

Electronic Health Record (EHR)

LABORATORY

Laboratory Information System (LIMS)

Electronic Case Report (eCR) combining clinical and laboratory data for reporting laboratory-confirmed cases to public health

EPIDEMIOLOGIST

Integrated Surveillance System/ NEDSS-Base System (NBS)

eCR: The Future of Surveillance?

- Data in Action: Case reporting, Trends Analysis, Studies, Containment

= Request/Report
Informatics Self Assessment Tool
“Practice-based learning”

Did you miss the deadline?
The SA Tool is now open through August 4, 2017.
Join the 21 labs who are using this to better understand and strengthen their capabilities. Get on the map!
Visit https://satool.aphl.org/ to get started

Laboratories are using the newly designed SA Tool to:

• **Advocate:**
The tool highlights strengths and gaps and gives you the data you need to communicate needs for funding, resources, and support.

• **Grow:**
Monitor your longitudinal progress or compare capabilities across domains within your laboratory.

• **Contribute:**
All data is aggregated to establish a National Report Card. Help us identify national trends and strengthen the public health infrastructure.
Thoughts for the Future

• Ensure core informatics competencies for all PHL staff as a prerequisite for national strategies for ETOR, ELR, etc.
• Explore Laboratory Informatics Fellowships
• Include informatics competencies in all APHL/CDC fellowships
• Establish a national curriculum to promote core management skills in addition to training in test technologies
• Promote and develop the “hybrid” model of laboratory scientists who become informatics specialists
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QUESTIONS?