

Welcome to...

Introduction to Laboratory Informatics: Life of a Specimen



This course is the first part of a two-part introductory course on laboratory informatics. You will learn about informatics processes related to the life of a specimen in a laboratory. The second introductory course will be the **Introduction to Laboratory Informatics: Life of a Result** course.

Course purpose:

- Build a foundation in the core concepts of laboratory informatics for laboratory professionals
- Explain laboratory informatics in the context of public health

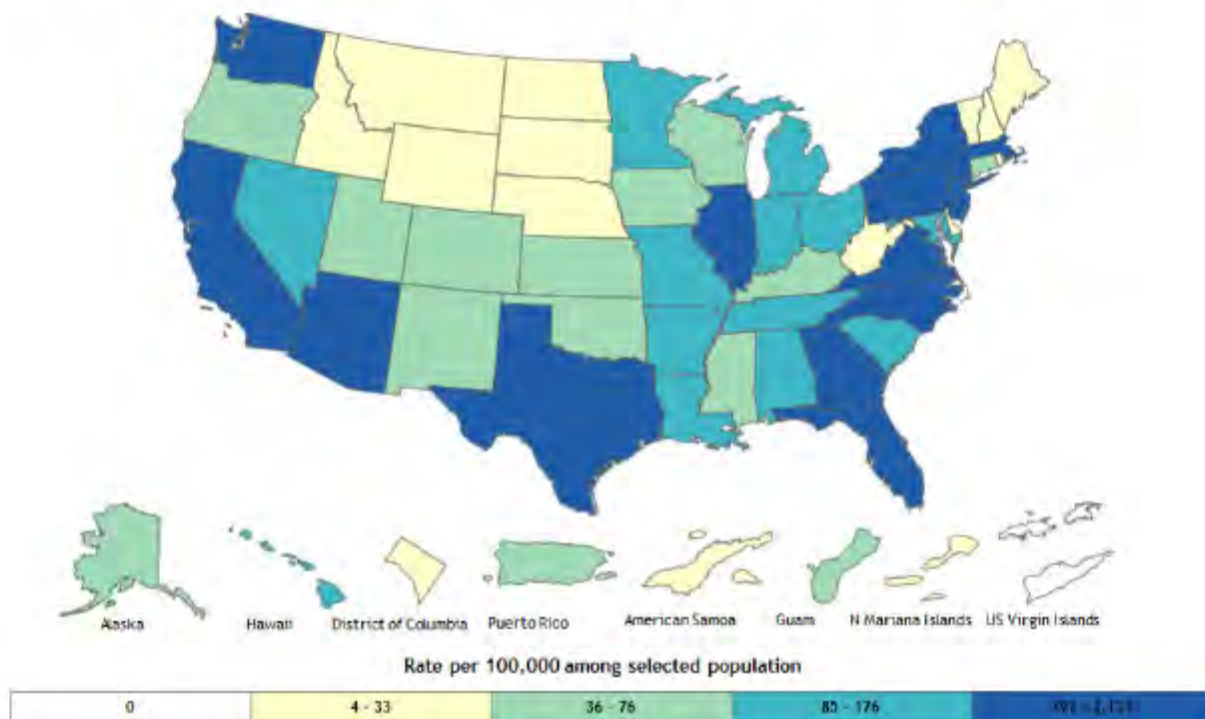


NOTE: Although the course was developed for public health laboratories, the practices are universal in clinical and other laboratories.

Note that while the primary focus of this course is informatics in a public health laboratory, most of these practices are universal to informatics in clinical and other laboratories.

Tuberculosis Information

In 2015, TB cases increased in U.S. for the first time in 23 years ²⁻⁴



Twenty-seven states and the District of Columbia, or DC, each reported an increase in TB cases compared to 2014. Having this public health information readily available and easily shareable with providers can create greater awareness among health providers of a potential outbreak.

Who is Involved in Laboratory Informatics?



Laboratory Informaticians

Formal or informal subject matter experts in laboratory informatics who ensure quality data and efficient processes within the information flow support laboratory functions



Managers/Directors/Administrators

Policy, decision makers, and implementers who oversee or support laboratory operations to ensure sustainability and functionality of information systems



IT/IS Personnel

Maintain physical and virtual functionality of hardware and software of information systems



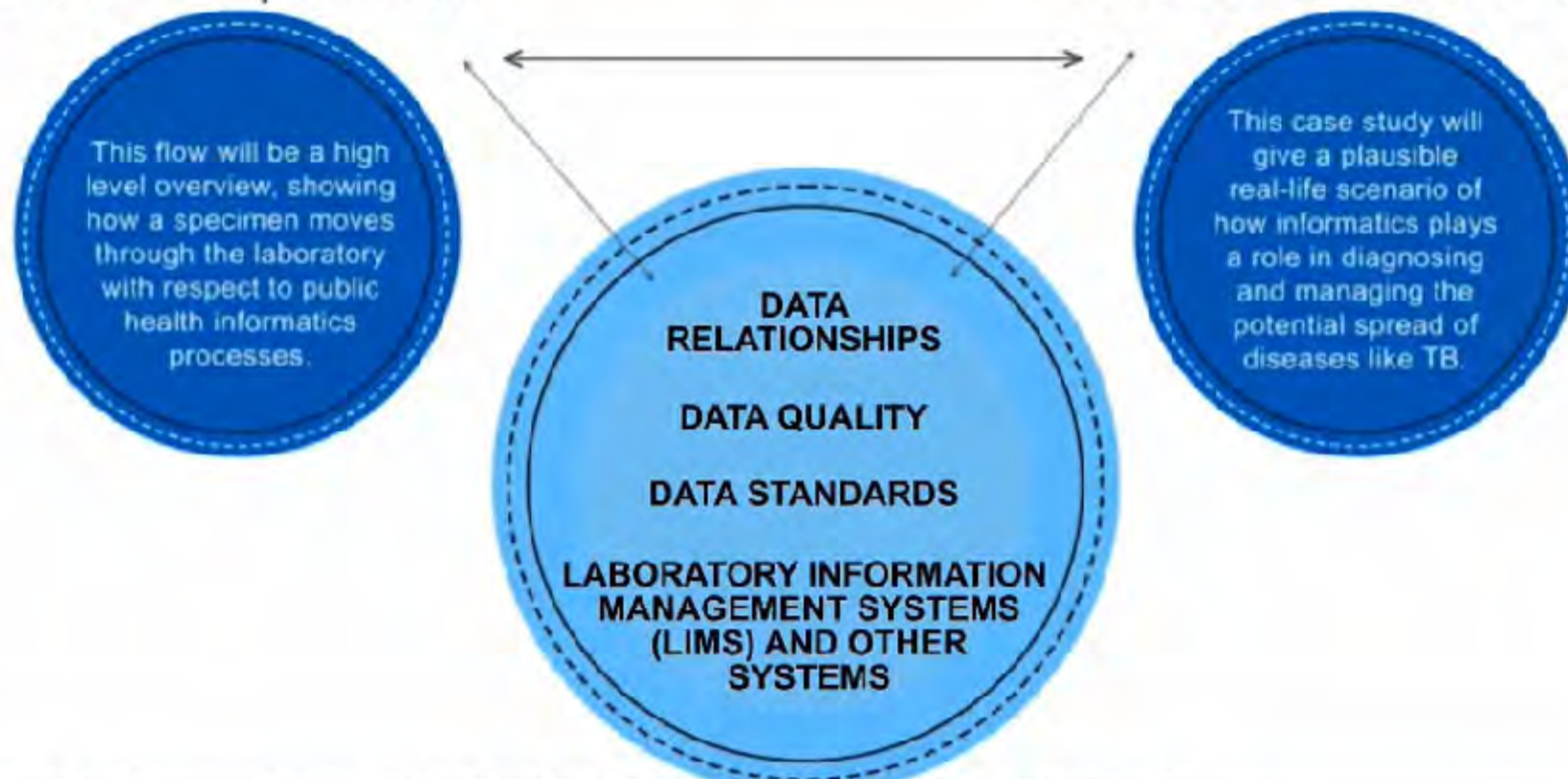
Other Laboratory Professionals

All of these tasks support the laboratory in their daily operations. Information Technology, or IT, and Information Systems, or IS support and security personnel are responsible for the core IT hardware, software, and services from a maintenance and troubleshooting standpoint.

Key Concepts Overview

Life of a Specimen

Tuberculosis Example



Let's discuss these key concepts before we look at them through the life of a specimen, starting with data relationships.

Data Standards

Data standards provide a method to convey information in valid, meaningful, and actionable ways. There are many types of data standards; however, we will focus on data representation and data exchange standards. They include:

ICD Standards ⁵

The U.S. health system's health adaption of International Classification of Diseases (ICD) list of six-character codes to describe patient diagnoses.

SNOMED CT ⁶

A coding ontology used primarily to code the test results, such as identification of an organism.

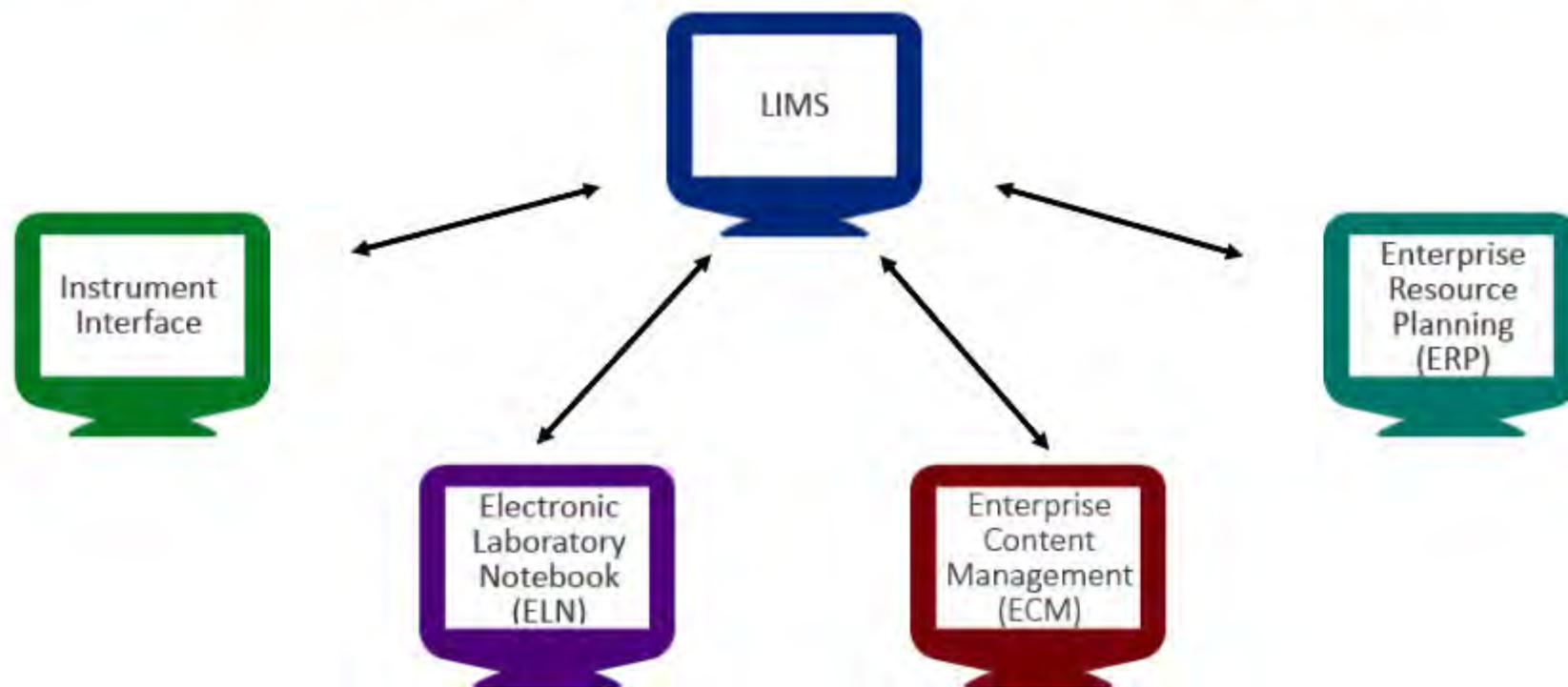
LOINC ⁷

A coding system defined by six specific attributes that identify exactly what test was performed on a specimen.

HL7® ⁸

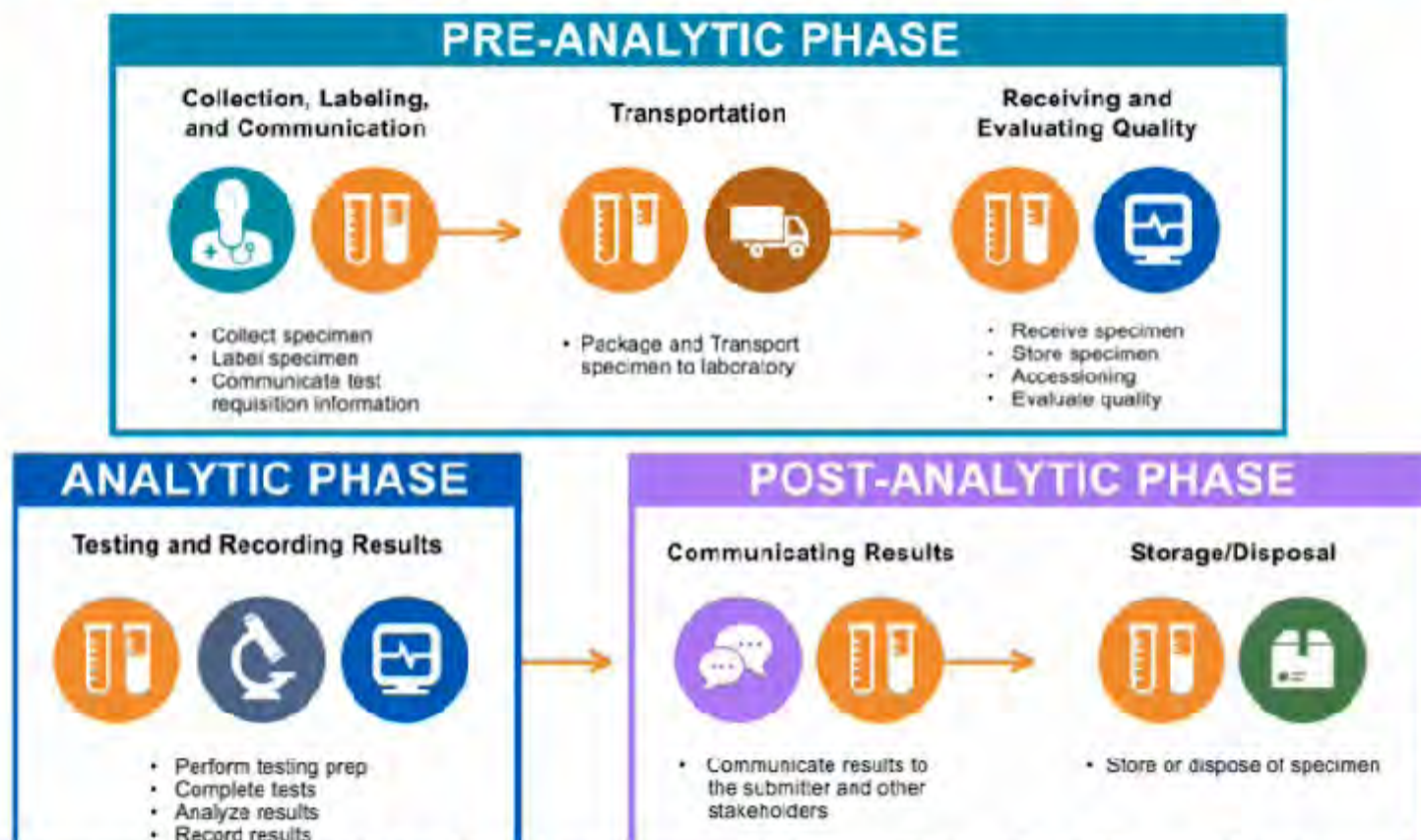
HL7 defines standards that govern the electronic message structure used to build messages coming from and to the laboratory systems such that the receiver can understand how to interpret the message.

How Does a LIMS Differ from Other Laboratory Systems?



These systems can include those that interface with laboratory instruments, the electronic laboratory notebook, or ELN, the electronic content management system, or ECM, and the enterprise resource planning system, or ERP.

Life of a Specimen Flow Overview



For each phase of the diagram, we will cover the high-level flow and provide an example from our TB story. Click in the pre-analytic phase or select the forward arrow to examine the steps within the pre-analytic phase for the life of a specimen.

PRE-ANALYTIC PHASE

Collection, Labeling, and Communication



DATA
STANDARDS



DATA
QUALITY



LIMS & OTHER
SYSTEMS



1a. Collect specimen



- Identify the concern
- Decide what tests are needed
- Collect type of specimen needed
- Capture the data required to meet regulatory requirements

1b. Label specimen

- Patient Name or unique identifier
- Other patient data (e.g., Age, Sex)
- Specimen metadata



NOTE

Check the label for errors. Errors will follow the specimen and have an effect on the results.

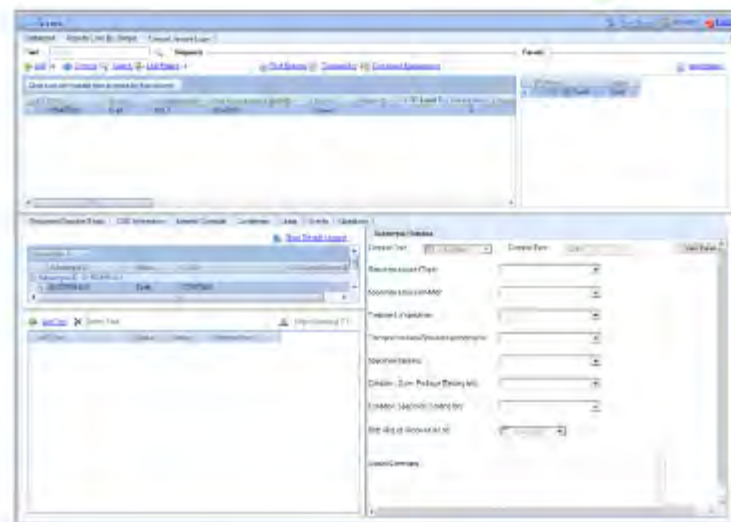
It is important to check the label for accuracy and completeness because any wrong or missing information at this point will follow the specimen throughout its life in the laboratory and negatively impact the results or cause the specimen to be rejected for testing.

ANALYTIC PHASE

Recording Results

TB EXAMPLE

- Results can be recorded both manually and through automation into the LIMS.
- It is important that a quality check be completed during this process so that errors in recording test results are not made.
- After each additional test is completed, the specimen record in the LIMS must be updated to reflect additional information. This updated information in the LIMS can help with diagnosis and final analysis.



Error



Relationship



Select the data error and data relationship icons to learn more.



NOTE

Ensuring accurate results in the LIMS is critical for accurate analysis, patient diagnosis, and public health use of the data



Thank you!