

Electronic Transmission of Laboratory Information and Oversight of Laboratory Information Systems

CDC Perspective

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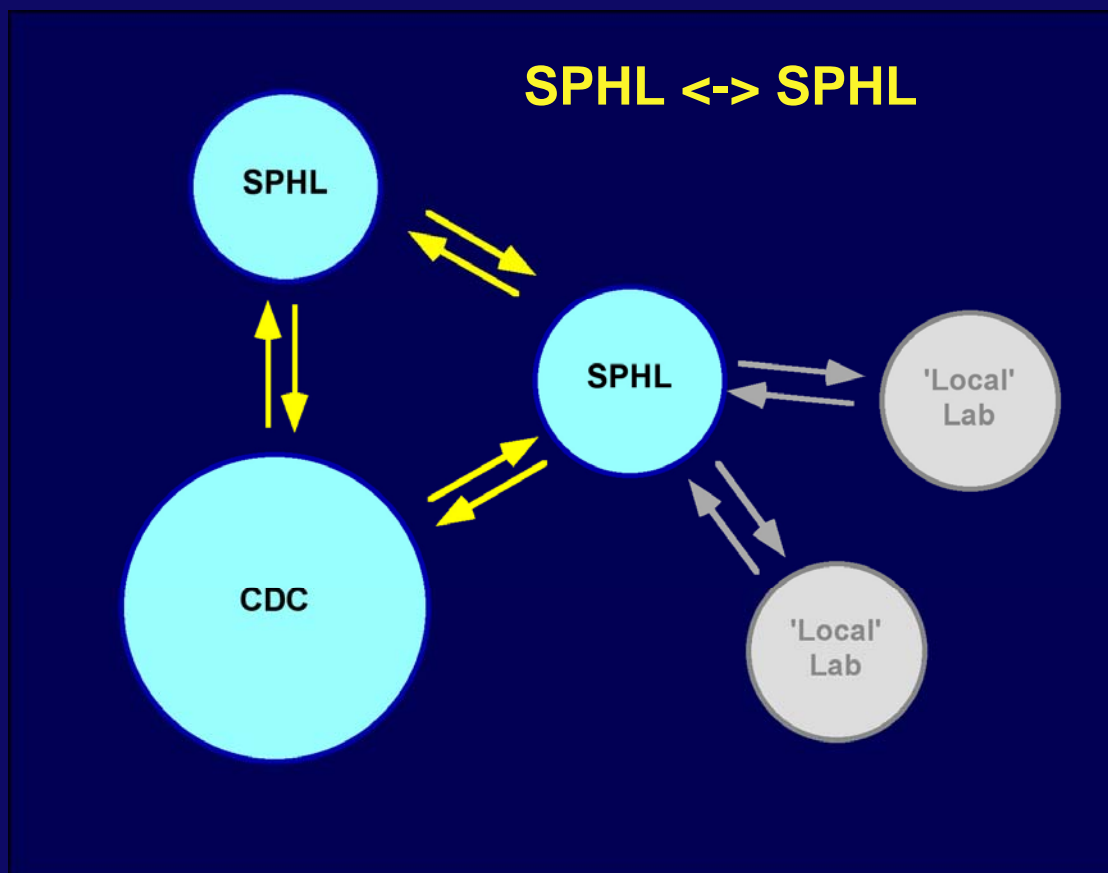
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Public Health Laboratory Interoperability Project (PHLIP) Scope

**SPHL <-> CDC
(50+ Laboratories)**



Public Health Laboratory Interoperability Project (PHLIP)

Scope

Laboratory

Electronic Test Order – Results Reporting (ETOR)

SPHL <-> CDC

- Submission of Test Requests
- Reporting of Results

SPHL <-> SPHL

- Surge Capacity e.g., Emergencies
- Routine Testing

Epidemiology

Electronic Laboratory Surveillance Message (ELSM)

- Submission of Case Reports e.g., Influenza cases

Public Health Laboratory Interoperability Project (PHLIP)

CDC Infectious Disease Laboratory Perspective

Laboratory Reference Testing

LIMS: Specimen-centric (Not patient-centric)

Laboratories report:

- 'Final' answers
- 'Component' results: tests used to arrive at final answers

Results:

- Patient management
- Public Health applications
 - Outbreak investigation/control
 - Public Health policy implications

Retrieve data from LIMS to support PH activities

Public Health Laboratory Interoperability Project (PHLIP) Multi-Institution Data Exchange

Data exchanged:

Specimen information:

- Specimen type
- Specimen source (Anatomic) site

Results reported:

- Test names
- Result terms

Public Health Laboratory Interoperability Project (PHLIP) Multi-Institution Data Exchange

**Standard Terminology
(Vocabulary)**

**Common Set of Agreed-upon Terms
(Harmonized Vocabulary)**

Or

**Accommodate Multiple Terms
(Exchange of Precise Terms)**

Public Health Laboratory Interoperability Project (PHLIP) Specimen Data Exchange

SNOMED-CT* Coding System Hierarchies

Clinical Findings (Disease)

Disorder (Disease)

Specimen Type

Body Structure (Anatomic Site)

Organism (Names)

* Systematized Nomenclature of Medicine -- Clinical Terms (IHSTDO)

Public Health Laboratory Interoperability Project (PHLIP)

SNOMED-CT* Body Structure Hierarchy

Concept: Entire upper arm

ConceptID	DescriptionID	Status of Term	Term
302538001	698451010	Fully Specified Name:	Entire upper arm (body structure)
302538001	444276014	Preferred:	Entire upper arm
302538001	2551347016	Synonym:	Upper arm
302538001	2646859019	Synonym:	UA - Upper arm
302538001	1227121016	Synonym:	Arm
302538001	444277017	Synonym:	Arm between shoulder and elbow

Public Health Laboratory Interoperability Project (PHLIP) Vocabulary

Specimen Types
Specimen Source Sites

Adopt Standard Convention

- **Identify concept for term**
- **Use ConceptID = Proxy for preferred term**

Public Health Laboratory Interoperability Project (PHLIP)

Specimen Type

Wound

VTSL
SNOMED CT Core Browser

Concepts Descriptions Codes Roots Main Menu

Concept Search Results: 1-5 of 5 Records

New Concept Search:

Concept ID [Active; Inactive]	Fully Specified Name	Hierarchy
258531008	Wound swab (specimen)	Specimen
119365002	Specimen from wound (specimen)	Specimen
122566000	Fluid specimen from wound (specimen)	Specimen
119366001	Specimen from wound abscess (specimen)	Specimen
122568004	Exudate specimen from wound (specimen)	Specimen

1-5 of 5 Records

Public Health Laboratory Interoperability Project (PHLIP)

Specimen Type

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Specimen from wound

Parent(s):

(Select a parent to make it the "Current Concept".)

Lesion sample (specimen)

Current Concept:

Specimen from wound (specimen)

Child(ren):

(N=3) (Select a child to make it the "Current Concept".)

Fluid specimen from wound (specimen)

Specimen from wound abscess (specimen)

Wound swab (specimen)

ConceptID: 119365002

Current Concept:

Fully Specified Name: Specimen from wound (specimen)

ConceptId: 119365002

Defining Relationships:

Is a Lesion sample (specimen)

Specimen source morphology Wound (morphologic abnormality)

This concept is fully defined.

Descriptions (Synonyms):

Fully Specified Name: Specimen from wound (specimen)

Preferred: Specimen from wound

Related Concepts:

- All "Is a" antecedents -
- All descendents and related subtypes -

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Specimen Type

Bronchial Washings/Bronchial Lavage

FSN:
Specimen from lung obtained
by bronchial washing procedure
(specimen)

Preferred:
Specimen from lung obtained
by bronchial washing procedure

Synonym:
Bronchial washings

Synonym:
Bronchial lavage

Current Concept:

Fully Specified Name: Specimen from lung obtained by bronchial washing procedure (specimen)
ConceptId: 122609004

Defining Relationships:

Is a Specimen from lung (specimen)
Is a Specimen obtained by lavage (specimen)

Group 1

Specimen source topography [Lung structure \(body structure\)](#)
Specimen procedure [Bronchoscopic irrigation \(procedure\)](#)

This concept is primitive.

Descriptions (Synonyms):

Fully Specified Name: Specimen from lung obtained by bronchial washing procedure (specimen)
Preferred: Specimen from lung obtained by bronchial washing procedure
Synonym: Bronchial washings

Related Concepts:

- [All "Is a" antecedents](#) -
- [All descendents and related subtypes](#) -

Public Health Laboratory Interoperability Project (PHLIP)

Specimen Source (Anatomic) Site: Arm

Parent(s):

(Select a parent to make it the "Current Concept".)

Entire body part (body structure)

Upper arm structure (body structure)

Current Concept:

Entire upper arm (body structure)

Current Concept:

Fully Specified Name: Entire upper arm (body structure)

ConceptId: 302538001

Defining Relationships:

Is a Entire body part (body structure)

Is a Upper arm structure (body structure)

This concept is primitive.

Fact Relationships:

Part of Entire upper limb (body structure)

Qualifiers:

[View Qualifying Characteristics and Facts](#)

Descriptions (Synonyms):

Fully Specified Name: Entire upper arm (body structure)

Preferred: → Entire upper arm

Synonym: → Upper arm

Synonym: → UA - Upper arm

Synonym: → Arm

Synonym: → Arm between shoulder and elbow

Descriptions (Synonyms):

Fully Specified Name: Entire upper arm (body structure)

Preferred: Entire upper arm

Synonym: Upper arm

Synonym: UA - Upper arm

Synonym: Arm

Synonym: Arm between shoulder and elbow

Public Health Laboratory Interoperability Project (PHLIP)

Specimen Source (Anatomic) Site

Arm

ConceptID	DescriptionID	Status of Term	Term
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Precision - Unambiguity

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ConceptID

- Cannot specify sufficiently precise terms
- Need to accommodate multiple synonyms?

DescriptionID

- Specifies a precise term
- Accommodates multiple synonyms

Public Health Laboratory Interoperability Project (PHLIP)

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Test Order (Requests) and Results Reporting (ETOR)

Public Health Laboratory Interoperability Project (PHLIP)

Test Orders - Results

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System of Questions and Answers Codes

Question	Answer
LOINC	SNOMED-CT
Identification	<i>Salmonella enterica</i> subsp. I
Serovar	Serovar Brisbane

If answer but no question – have to formulate question

???????	Antigenic formula I 28:z:e,n,z15
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Public Health Laboratory Interoperability Project (PHLIP)

Test Orders - Results

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LOINCs

- 'Availability limited'
- 'High-level' codes
- Not sufficiently 'granular' for PHLIP
- Developed PHLIP codes:
 - PLT codes

Public Health Laboratory Interoperability Project (PHLIP)

ETOR

Test Order: Salmonella Identification & Serotyping Battery

'Final' results

Identification: *Salmonella enterica* subspecies I
Serovar: Salmonella Brisbane
Antigenic formula: I 28:z:e,n,z15

'Component' results

Phenotypic Test Results:

Indole-Peptone Water:	Negative	Methyl Red:	Positive at day 2
Voges Proskauer – O'Meara	Positive at day 1	Citrate – Simmons:	Positive at day 1
H ₂ S-TSI	Negative	Urea hydrolysis:	Negative
Phenylalanine deaminase	Negative	Lysine decarboxylase:	Positive at day 1
Arginine dihydrolase:	Positive at day 2	Ornithine decarboxylase:	Positive at day 1
Motility:	Positive at day 1	KCN – Growth in:	Negative
Malonate utilization:	Negative	Glucose (D-) Acid:	Positive at day 1
Glucose (D-) Gas:	Positive at day 1	Lactose fermentation:	Negative
Sucrose fermentation:	Negative	Mannitol (D-) fermentation	Positive at day 1
Dulcitol fermentation:	Positive at day 1	Inositol (myo-) fermentation:	Positive at day 1
Adonitol fermentation:	Negative	Arabinose (L-) fermentation:	Positive at day 1
Sorbitol (D-) fermentation:	Positive at day 1	Rhamnose (L-) fermentation:	Positive at day 1
Raffinose fermentation:	Negative	Xylose (D-) fermentation:	Positive at day 1
Maltose fermentation:	Positive at day 1	Cellobiose fermentation:	Negative
Trehalose fermentation:	Positive at day 1	Erythritol fermentation:	Negative
α-Methyl-D-Glucoside fermentation:	Negative	Melibiose fermentation:	Positive at day 2
Esculin hydrolysis:	Negative	Glycerol fermentation:	Negative
Arabitol (D-) fermentation:	Negative		

Public Health Laboratory Interoperability Project (PHLIP) ETOR

Test Codes: 'Component' Tests

Code	Name	
PLT110	Salmonella Identification and Serotyping Battery	
Code	Name	Interpretation: Example
COMPONENT TESTS		
PLT113	Indole – Peptone Water	Negative
PLT114	Methyl Red	Positive at day 2
PLT115	Voges Proskauer – O'Meara	Negative
PLT116	Citrate – Simmons	Positive at day 1
PTL117	H2S - TSI	Positive at day 1
PLT118	Urea hydrolysis	Negative
PLT119	Phenylalanine deaminase	Negative
PLT120	Lysine decarboxylase	Positive at day 1
PLT121	Arginine dihydrolase	Positive at day 2
PLT158	H2S – Peptone Iron Agar	Positive at day 1
FINAL RESULTS		
56474-0	Salmonella subspecies (conclusion test) Salmonella Islt Cult	Salmonella enterica subspecies I
20951-0	Salmonella serotype Salmonella Sertyp Islt Aggl	Serovar Brisbane
PLT112 56475-7	Salmonella antigenic formula Salmonella sp Ag form Islt Aggl	Antigenic formula I 28:z:e,n,z15

PHLIP 'PLT'
Codes



LOINC's



Public Health Laboratory Interoperability Project (PHLIP) ETOR

Test Codes: PCR Tests

- Only One LOINC Code for PCR tests
- PCR Tests: Different Types *and* Targets
 - Conventional
 - Reverse Transcriptase
 - Real Time
 - Real Time-Reverse Transcriptase
- Differ in Sensitivity: Should not be grouped under single code
- Need unique codes for each test type AND target
- Use PHLIP (PLT) Test Codes

Public Health Laboratory Interoperability Project (PHLIP) ETOR

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Result Terms
SNOMED-CT Codes

Public Health Laboratory Interoperability Project (PHLIP) ETOR

Result Terms

- Use available SNOMED-CT codes
 - Positive, Negative
- Need additional reporting terms
 - Positive at day 1 etc
 - Typing terms e.g., serovar, antigenic formula
- Developed PHLIP result codes:
 - PLR codes

Public Health Laboratory Interoperability Project (PHLIP)

ETOR

Result Terms: Same test type (Same LOINC) Different result terms

- Reporting terms
 - Positive, negative, equivocal
 - Detected, not detected, indeterminate
- Need standardized reporting terms

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LESSONS LEARNED

THINK STRATEGICALLY

- Plan for the future
- Avoid shortcuts that
 - may not serve the long-term need
 - require major revisions in the future
- Use precise, unambiguous codes