APHL Informatics

Everything You Wanted(?) to Know About ELR But Were Afraid to Ask

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Agenda

- ELR 101
- ELR Use Cases
- Laboratory Data Exchange Projects
- Related Initiatives and Other Groups
- Challenges and Opportunities

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Prepare to Get Soaked……

1. TLA = Three Letter Acronym

ELR 101

- "Big" ELR versus "Small" ELR
- Traditional use of the acronym is to represent electronic reporting of state-mandated reportable conditions to public health agencies
  - It may or may not be HL7

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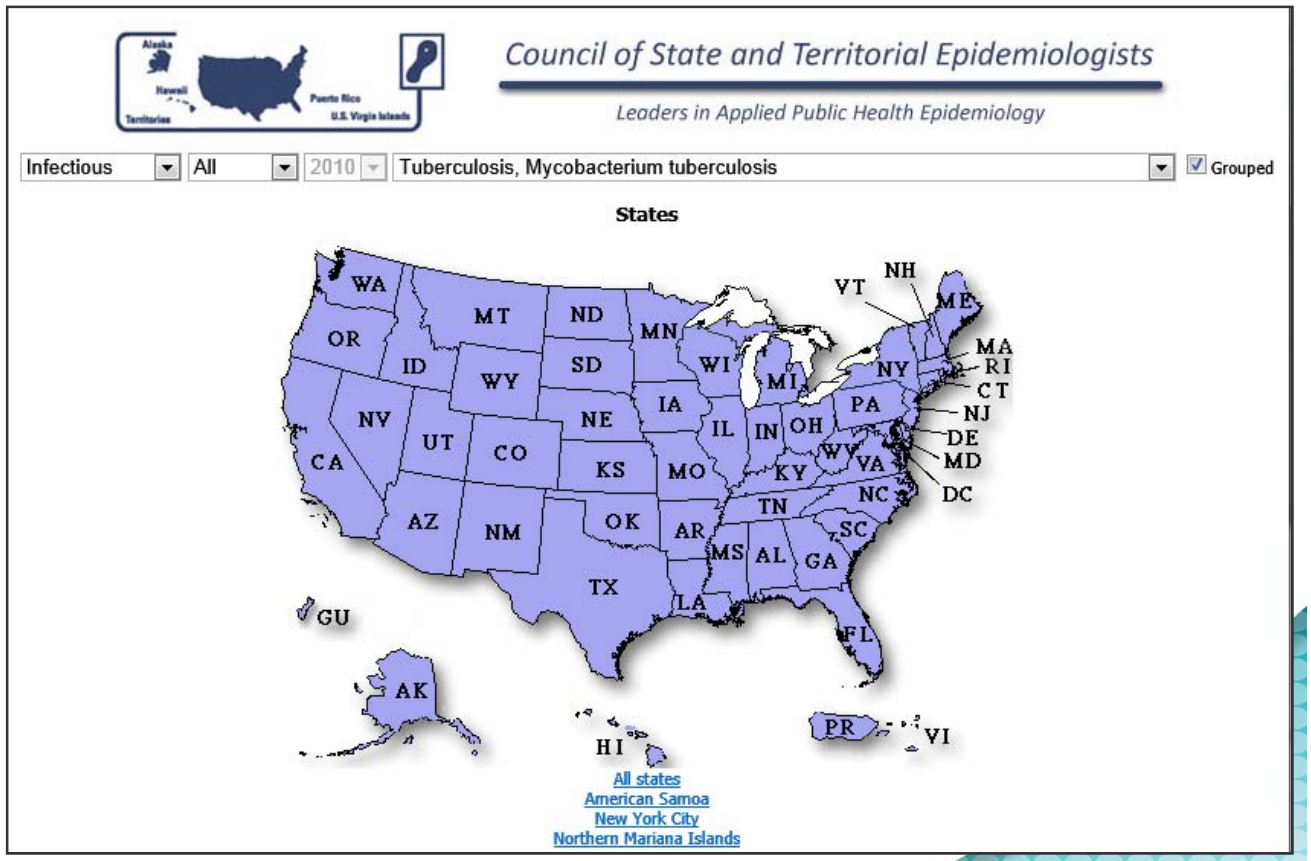
ELR 101 – Traditional ELR

Council of State and Territorial Epidemiologists (CSTE) Website

State Reportable Conditions Assessment (SRCA)

-

http://www.cste2.org/izenda/entrypage.aspx



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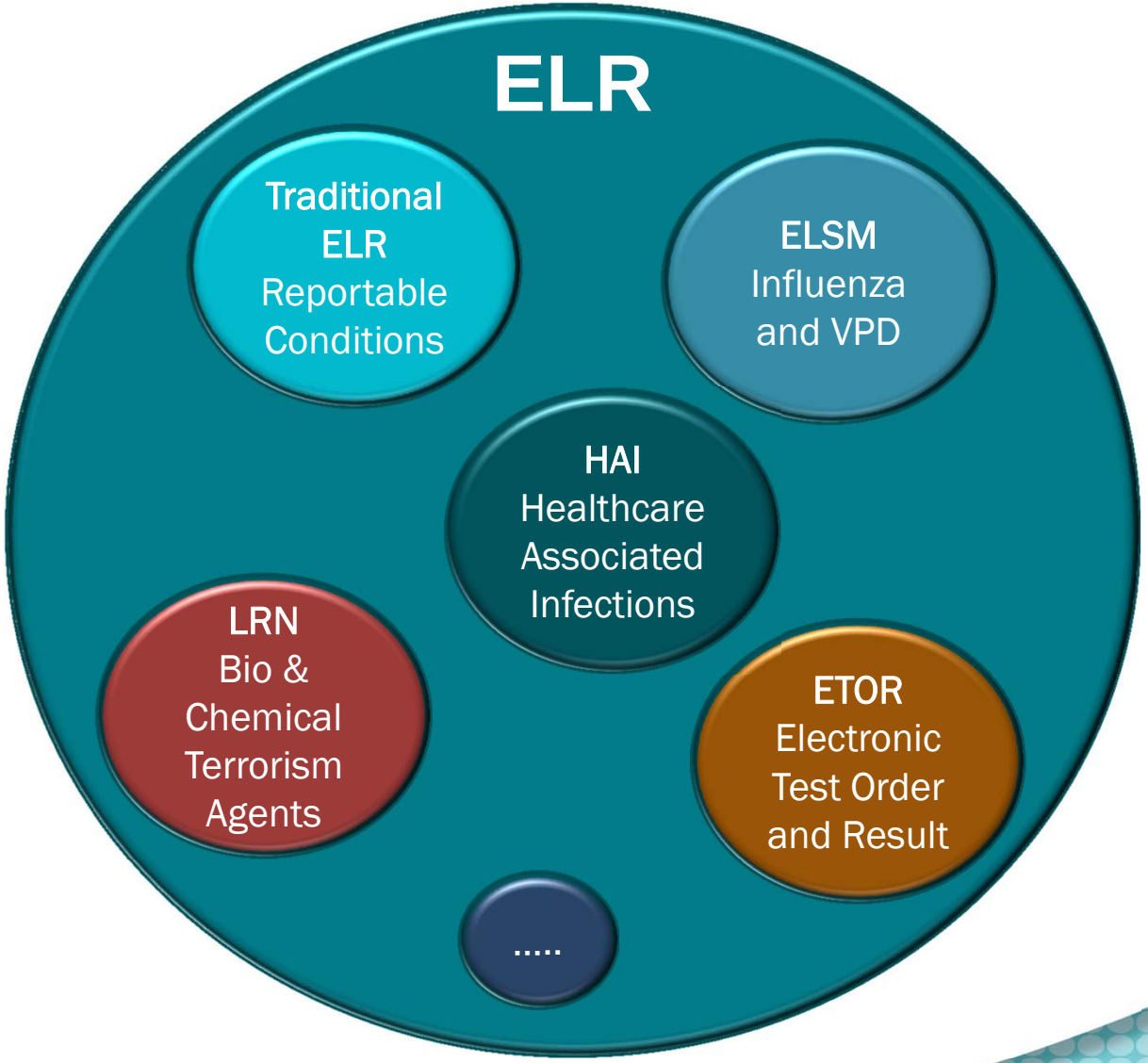
ELR 101 – A Broader Definition



More generically, ELR can refer to ***any*** electronic reporting of laboratory results

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ELR 101 – Alphabet Soup

- It is not enough for a message to be ELECTRONIC
- What we are trying to achieve is INTEROPERABILITY
- In order to understand, ELR, you must understand some basic concepts of INTEROPERABILITY

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Syllabus

- Interoperability in a Nutshell
- Three Types of Interoperability:

1. Technical
2. Semantic
3. Syntactic

Interoperability 101 - Definitions

Wikipedia: a property referring to the ability of diverse systems and organizations to work together (inter-operate)

IEEE - the ability of two or more systems or components to exchange information and to use the information that has been exchanged.

Interoperability 101 – A Picture

Interoperability in a Nutshell

Old School

New School

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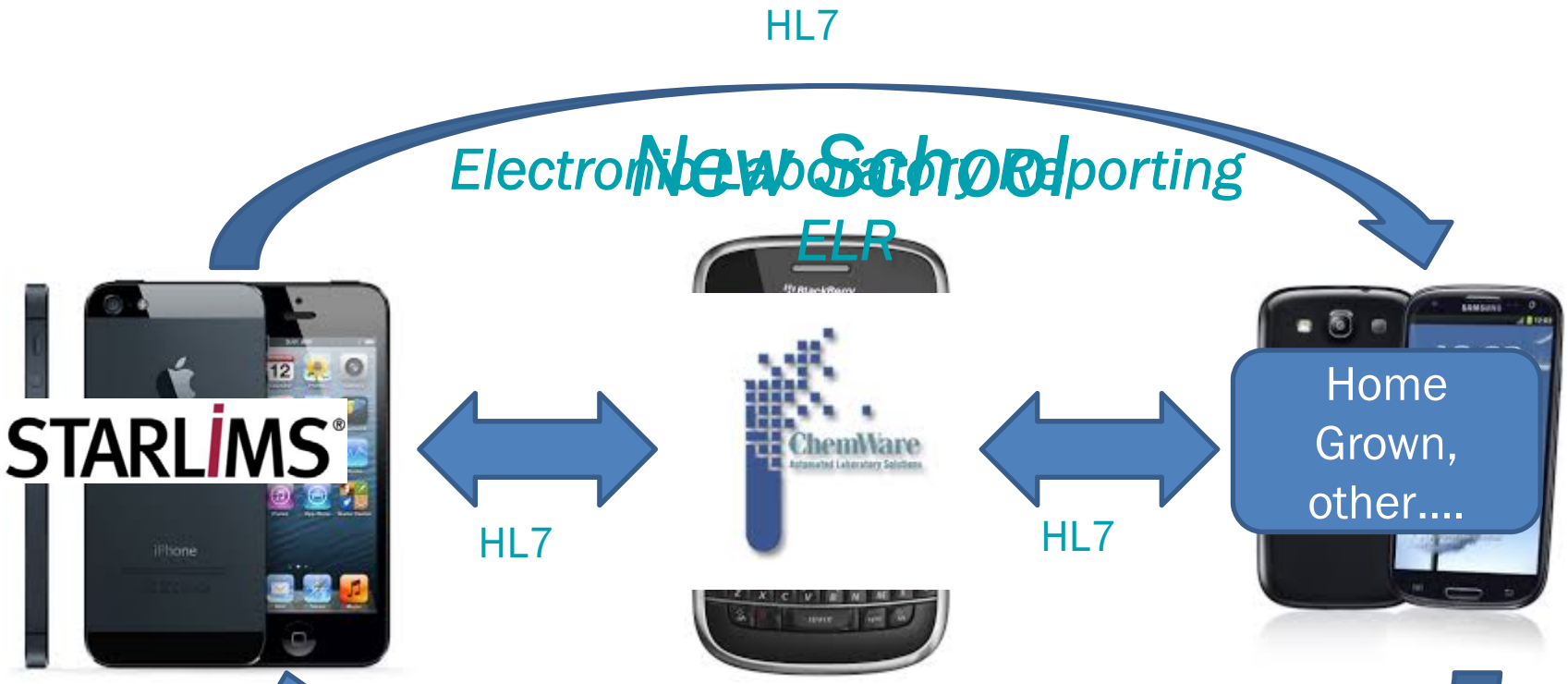
Interoperability – The ELR Way



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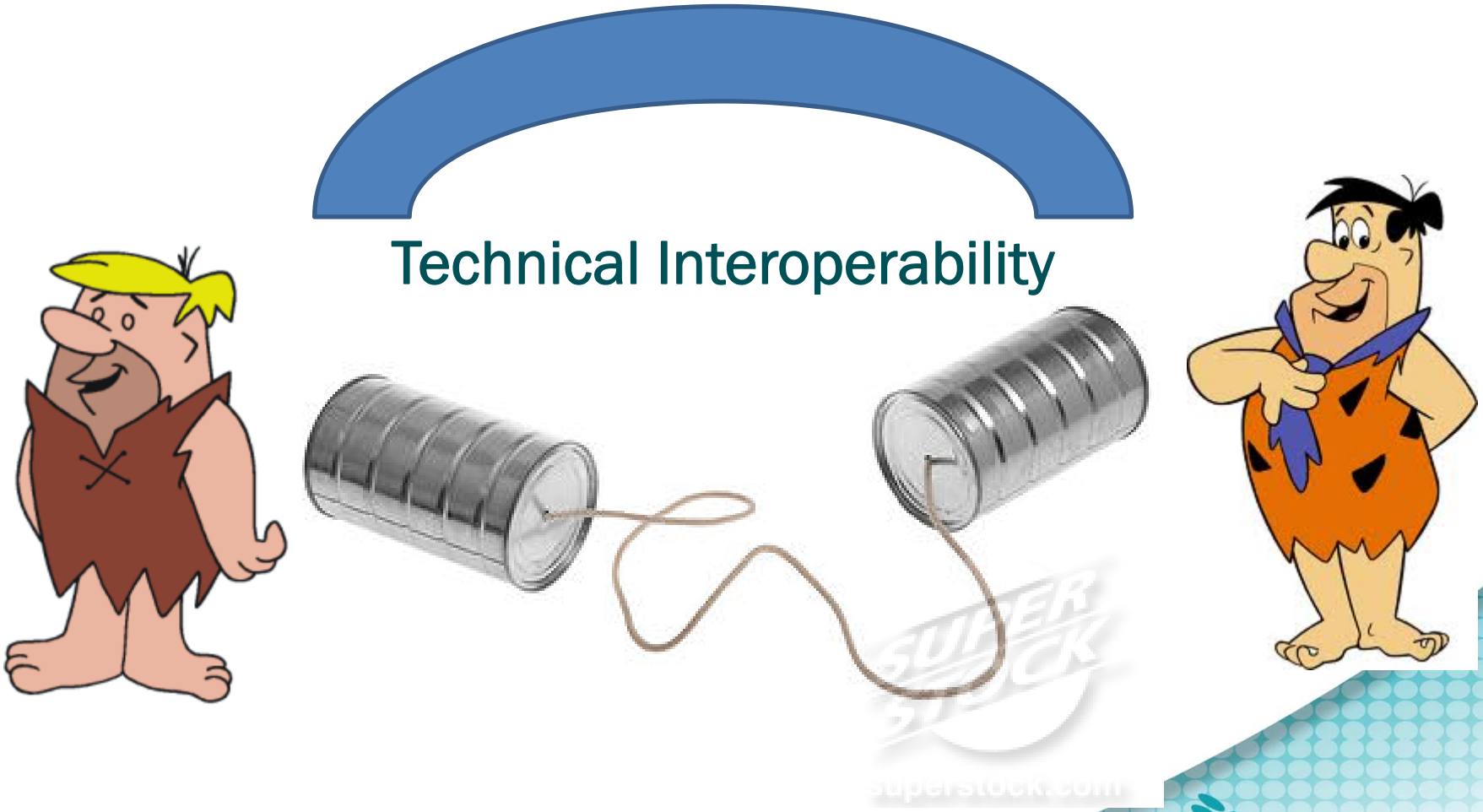
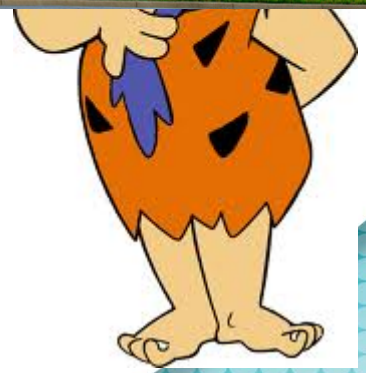
Interoperability 101 – A Picture



Technical Interoperability

Internet

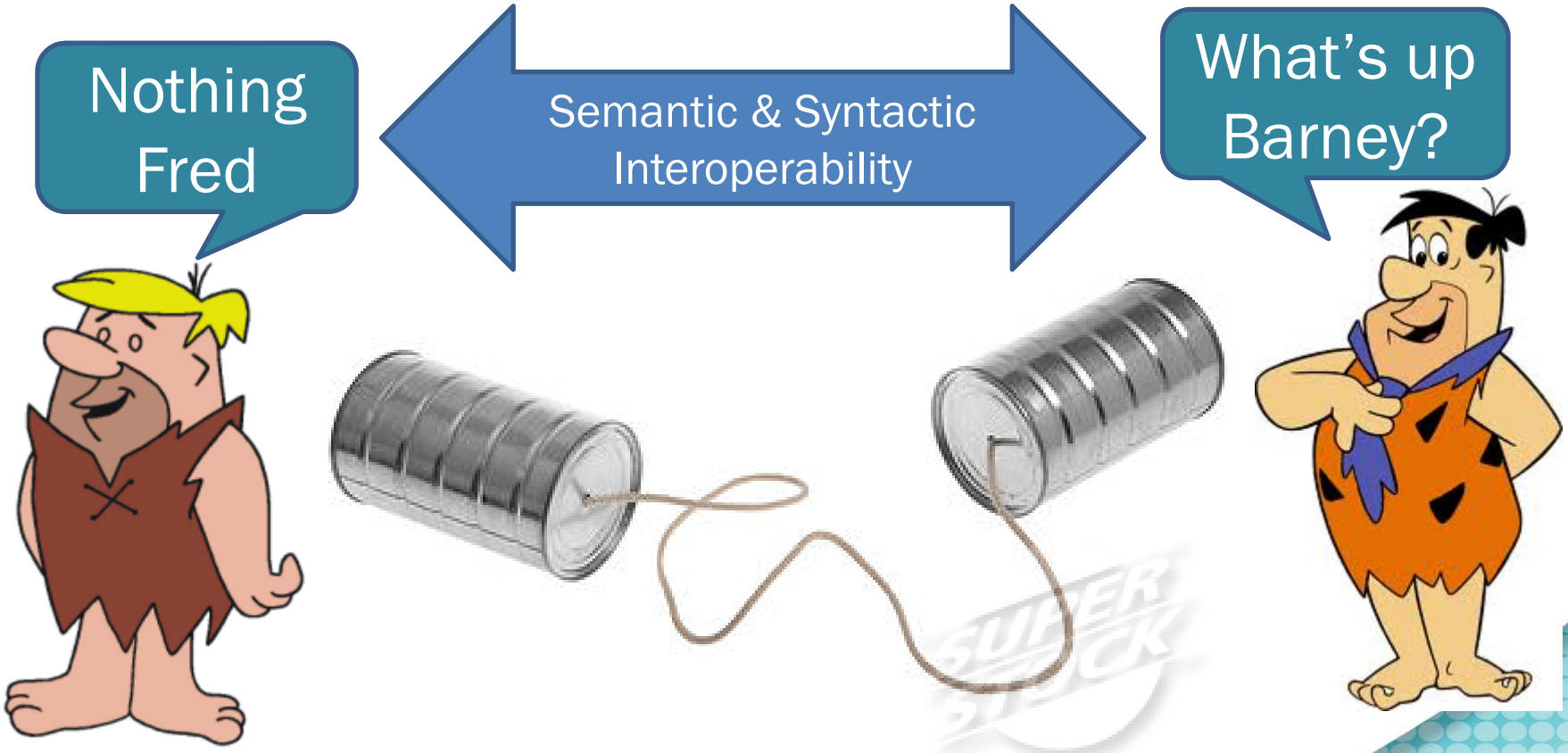


Interoperability 101

Technical Interoperability – How do we CONNECT with each other?

- Application = PHINMS
- Data Highway = Internet

Interoperability 101 – A Picture



Semantic Interoperability

Found Flu B with a PCR Test .

- Dr. Gilligan

We tested sample with the probe & target amplification test .
The result was Influenza Virus B .

- Dr. Munster

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Semantic Interoperability

Computers understand codes better than natural language

SNOMED

Found Flu B (407478001) with a PCR Test (48509-4).

- Dr. Gilligan

LOINC

LOINC

We tested sample with the probe & target amplification test (48509-4). The result was Influenza Virus B (407478001).

- Dr. Munster

SNOMED

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Syntactic Interoperability

"Powerful you have become, the dark side I sense in you."

- Yoda

"You have become powerful, I sense the dark side in you."

- My Sixth Grade Grammar Teacher's interpretation

Syntactic Interoperability

Herman Munster5555555540478243321313Mockingbird LaneLilyEddieGraveDiggerSpot

222 Rocky Way6785132678Fred FlinstonePebblesDinoGeoligicalEngineerWilma

Name	Address	Spouse	Children	Pets	Phone	SSN	Job
Herman Munster	1313 Mockingbird Lane	Lily	Eddie	Spot	404-782-4332	555-55-5555	Grave Digger
Fred Flinstone	222 Rocky Way	Wilma	Pebbles	Dino	678-513-2678	N/A	Geoligical Engineer

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Syntactic Interoperability

Found Flu B (407478001) with a PCR Test (48509-4).

- Dr. Gilligan

The computer needs to know *where* to look in the message. It counts pipes (|)

OBX |||| 48509-4 ^ Flu AV+Flu BV RNA XXX PCR^ LN ^ 010 ^ PCR Test ^ L|

We tested sample with the probe & target amplification (38379-4) Result was Mycobacterium tuberculosis complex DNA detected (260373001)

- Dr. Munster

HL7

OBX |||| 48509-4 ^ Flu AV+Flu BV RNA XXX QI PCR ^ LN ^ 11 ^ probe & target amplification^ L|

Semantic & Syntactic Interoperability

Lab 1 HL7 Message:

OBX | | | 48509-4 ^ Flu AV+Flu BV RNA XXX QI PCR^ LN ^ 010 ^ PCR Test ^ LC |

Lab 2 HL7 Message:

OBX | | 48509-4 ^ Flu AV+Flu BV RNA XXX QI PCR ^ LN ^ 11 ^ probe & target amplification^

Computer can read and process

The HL7 message can also carry the human-readable test (and result)

Interoperability 101

Syntactic & Semantic Interoperability – How do we UNDERSTAND each other?

- Syntax = Format = HL7
- Semantics = Universal Terminology
  - LOINC = Tests
  - SNOMED = Results

HL7

Health Level Seven

Provides the structure of data – for lab in US:

- Message type = purpose (order, result, directory)
- Message segment = chapter topic (patient, order, result)
- Message field = detail information according to chapter topic

More info at: www.hl7.org

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LOINC

Logical Observation Identifiers Names and Codes

Encodes the test ordered or performed based on:

- Analyte
- Result type and format
- Method
- Sample type
- Collection time (one time vs duration)

More info at: www.loinc.org

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SNOMED

Sytematized NOMenclature Of MEDicine

Encodes the result:

- Organisms for microbiology
- Qualitative results for all sorts of tests
- Clinical findings

More info at: http://www.ihtsdo.org/snomed-ct/

(it can also be used for specimen type and source site)

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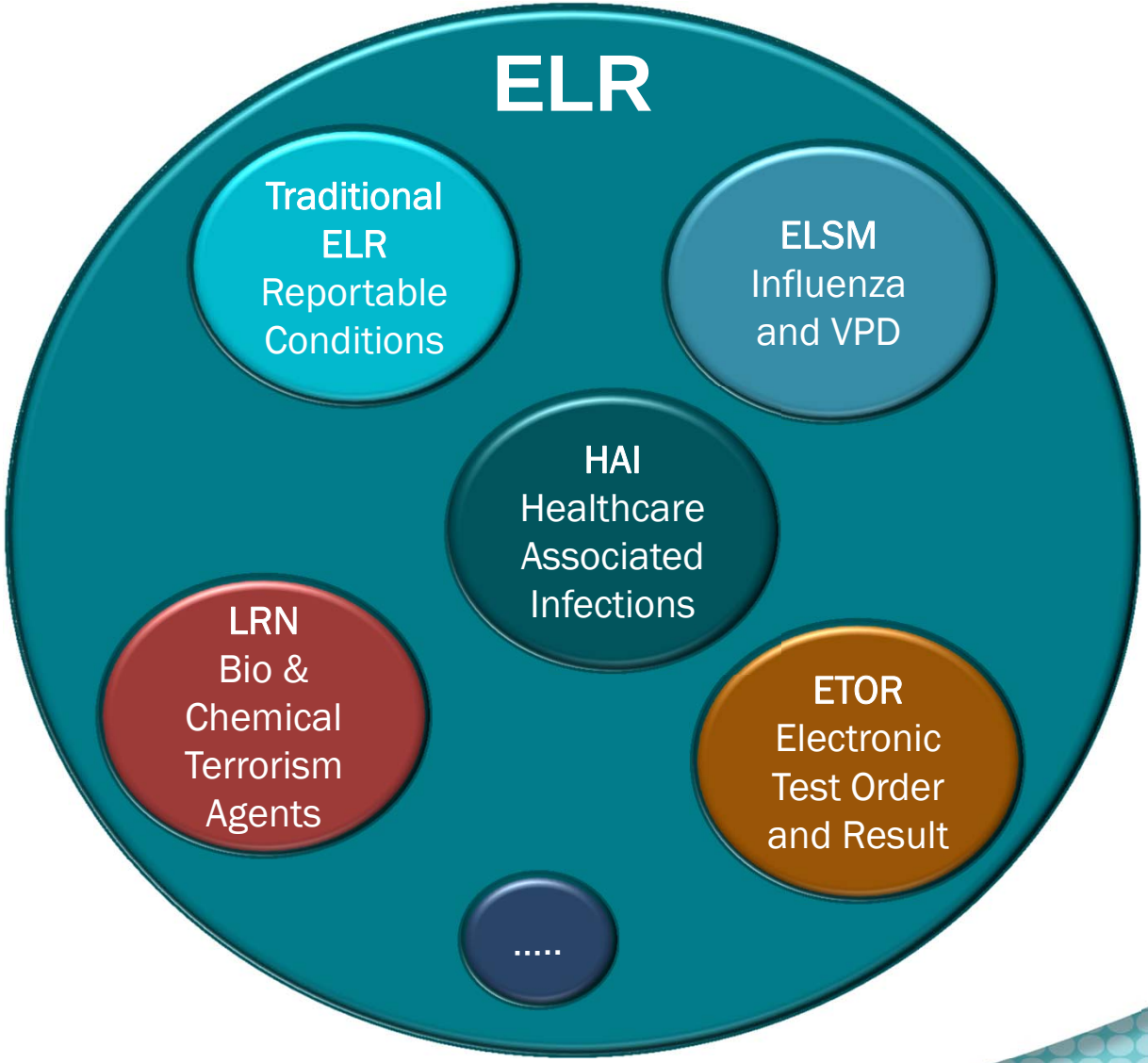
ELR 101 – A Broader Definition



More generically, ELR can refer to ***any*** electronic reporting of laboratory results

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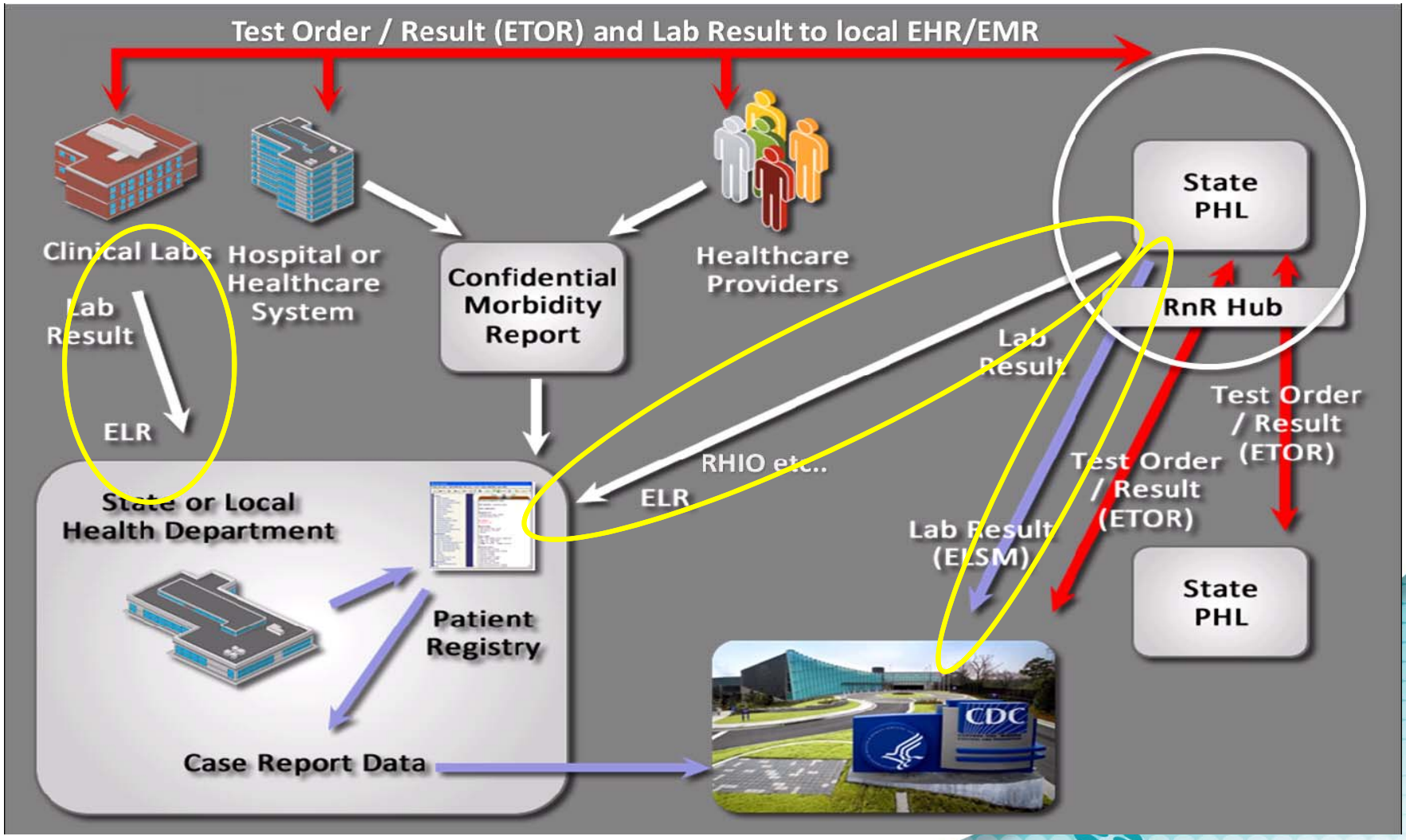
The Big Picture



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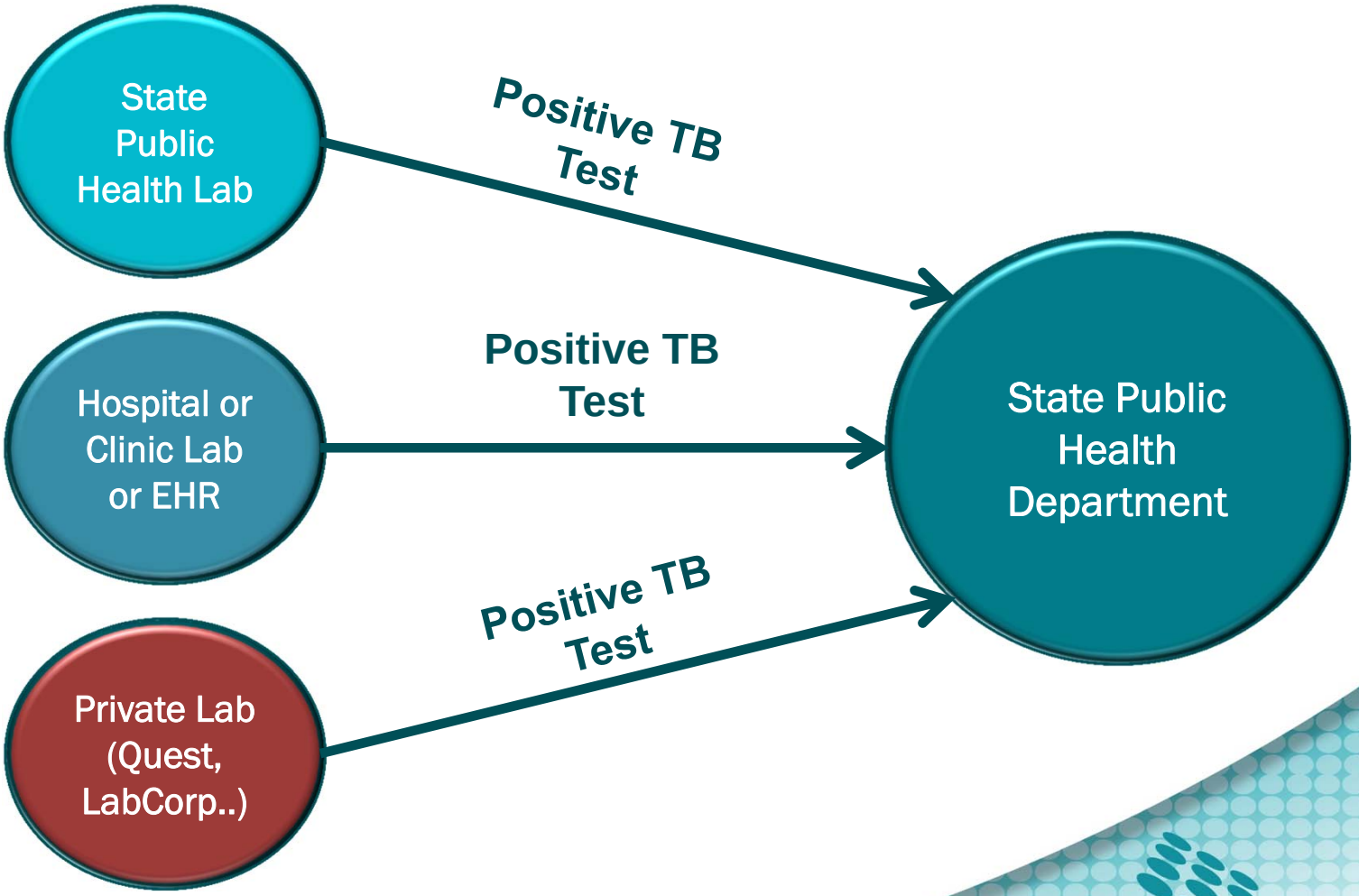
Traditional ELR - Reportable Conditions



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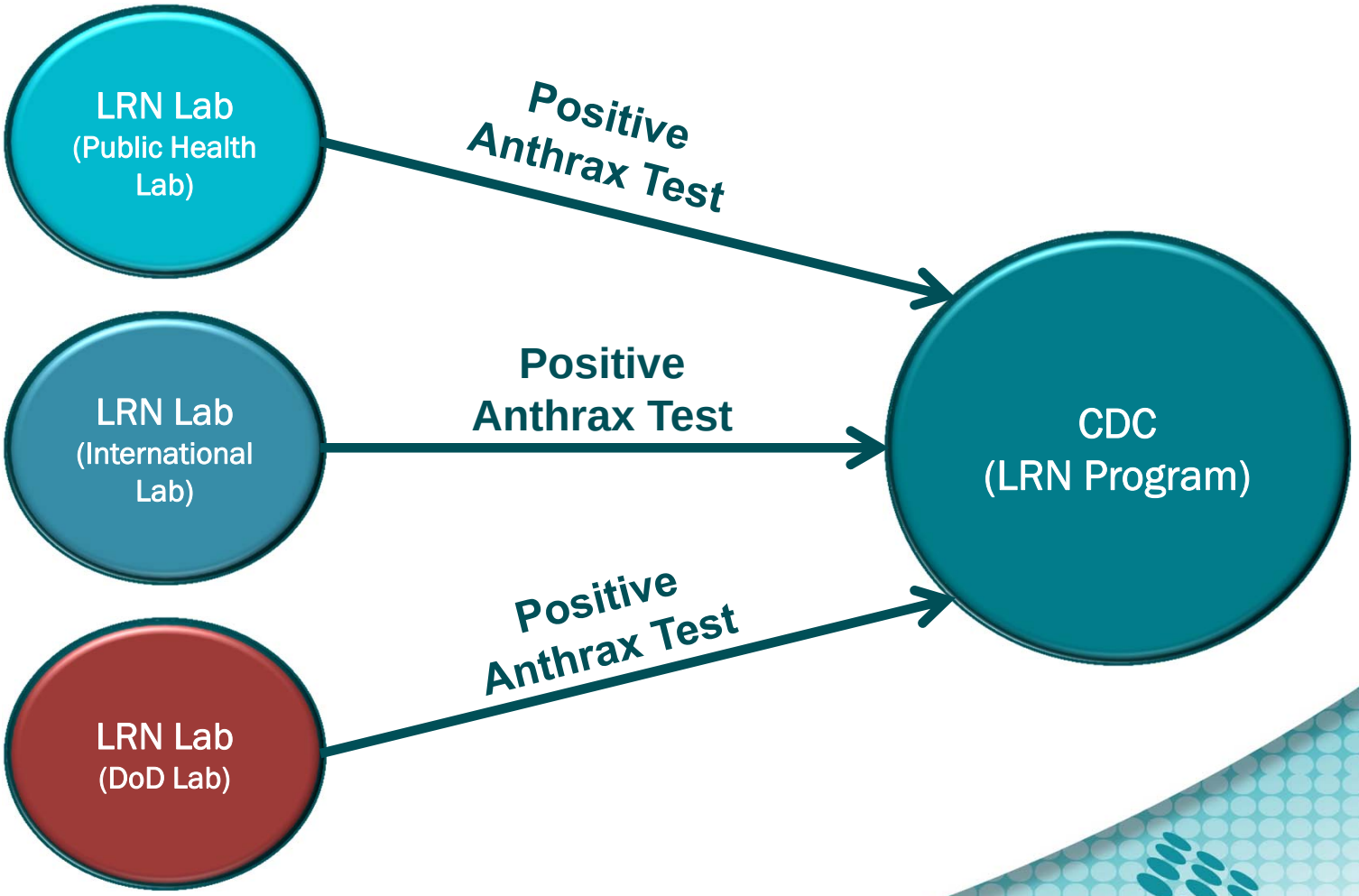
LRN – LIMS Integration (LIMSi)



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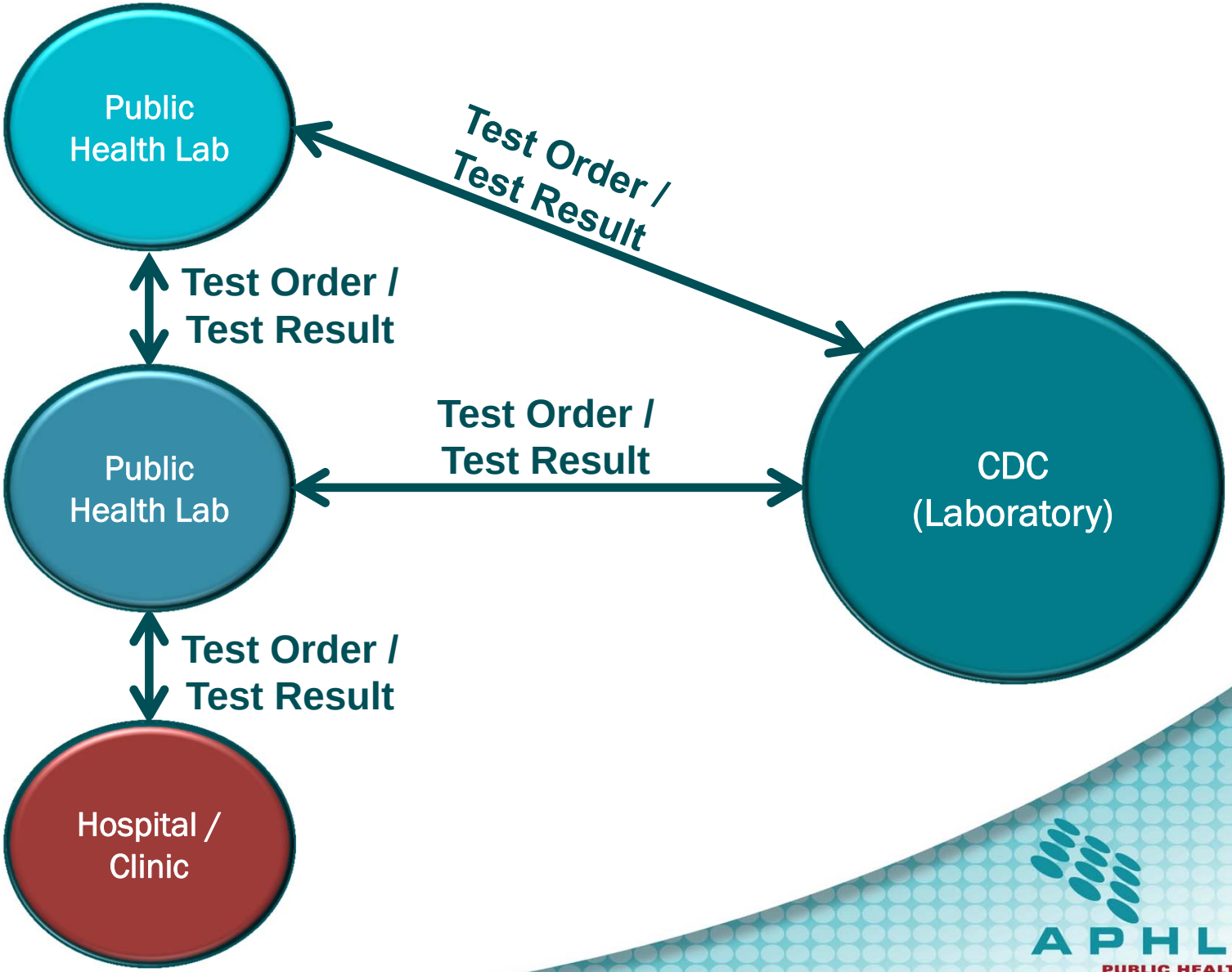
Electronic Test Order and Result (ETOR)



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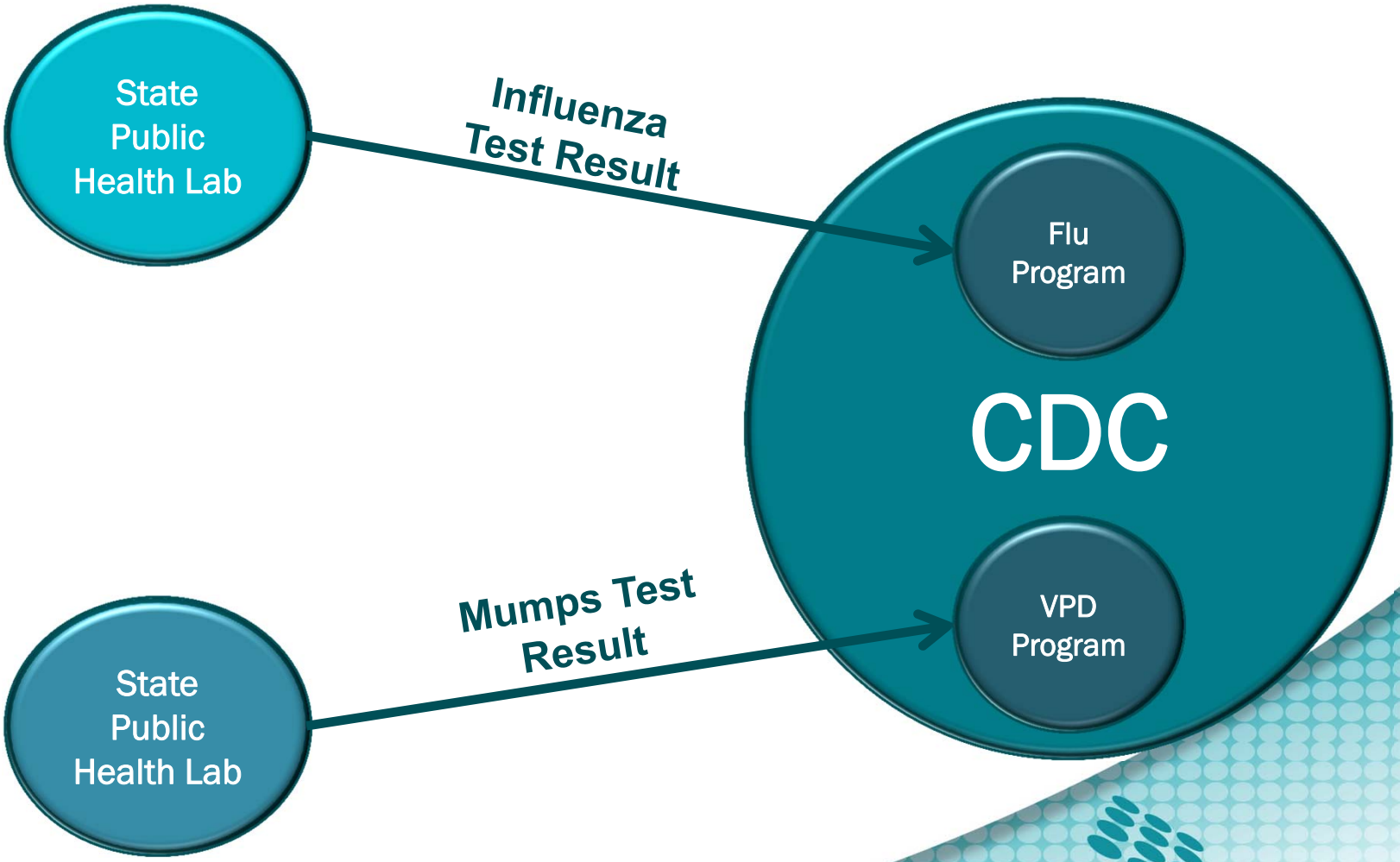
Electronic Laboratory Surveillance Message (ELSM)



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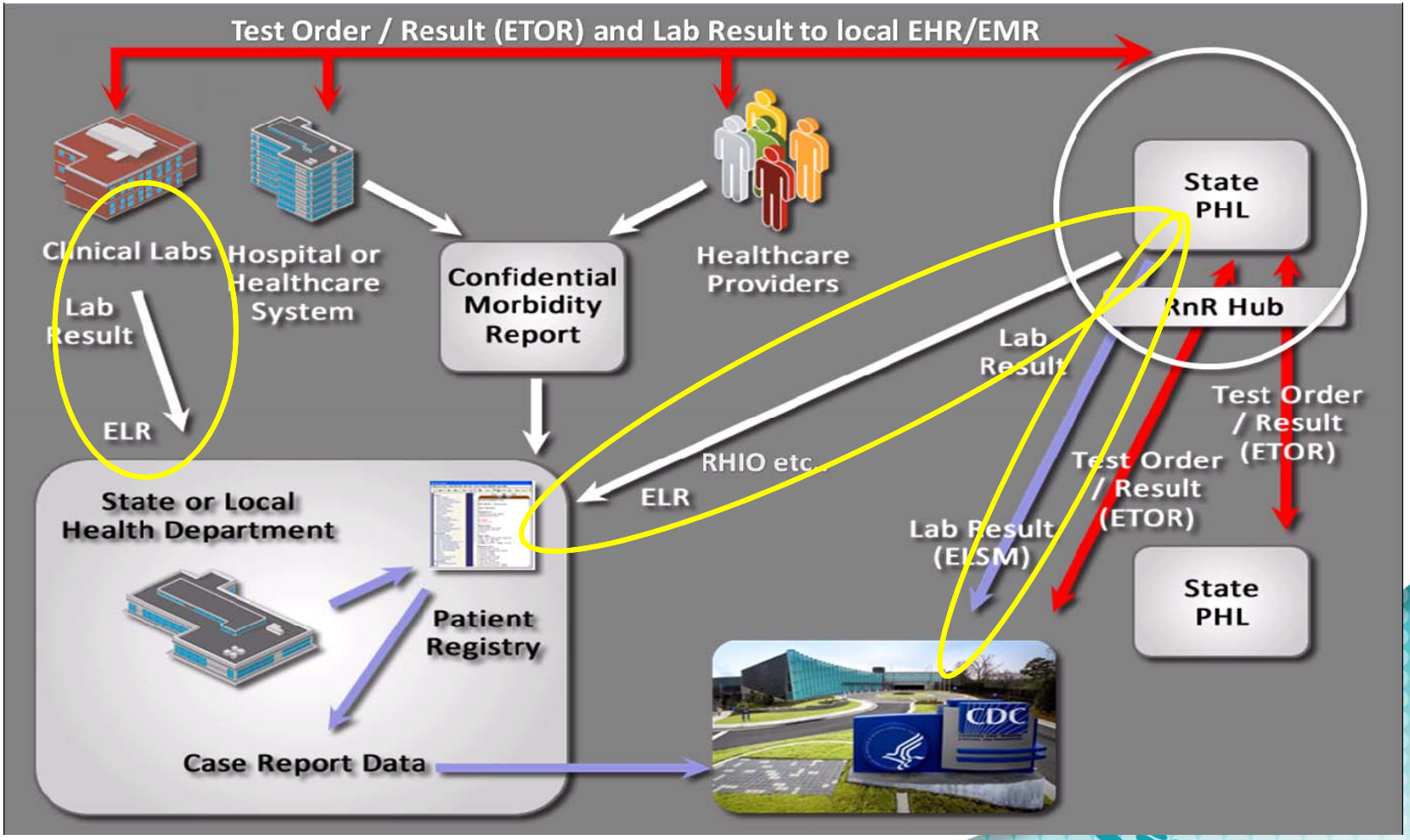
The Big Picture



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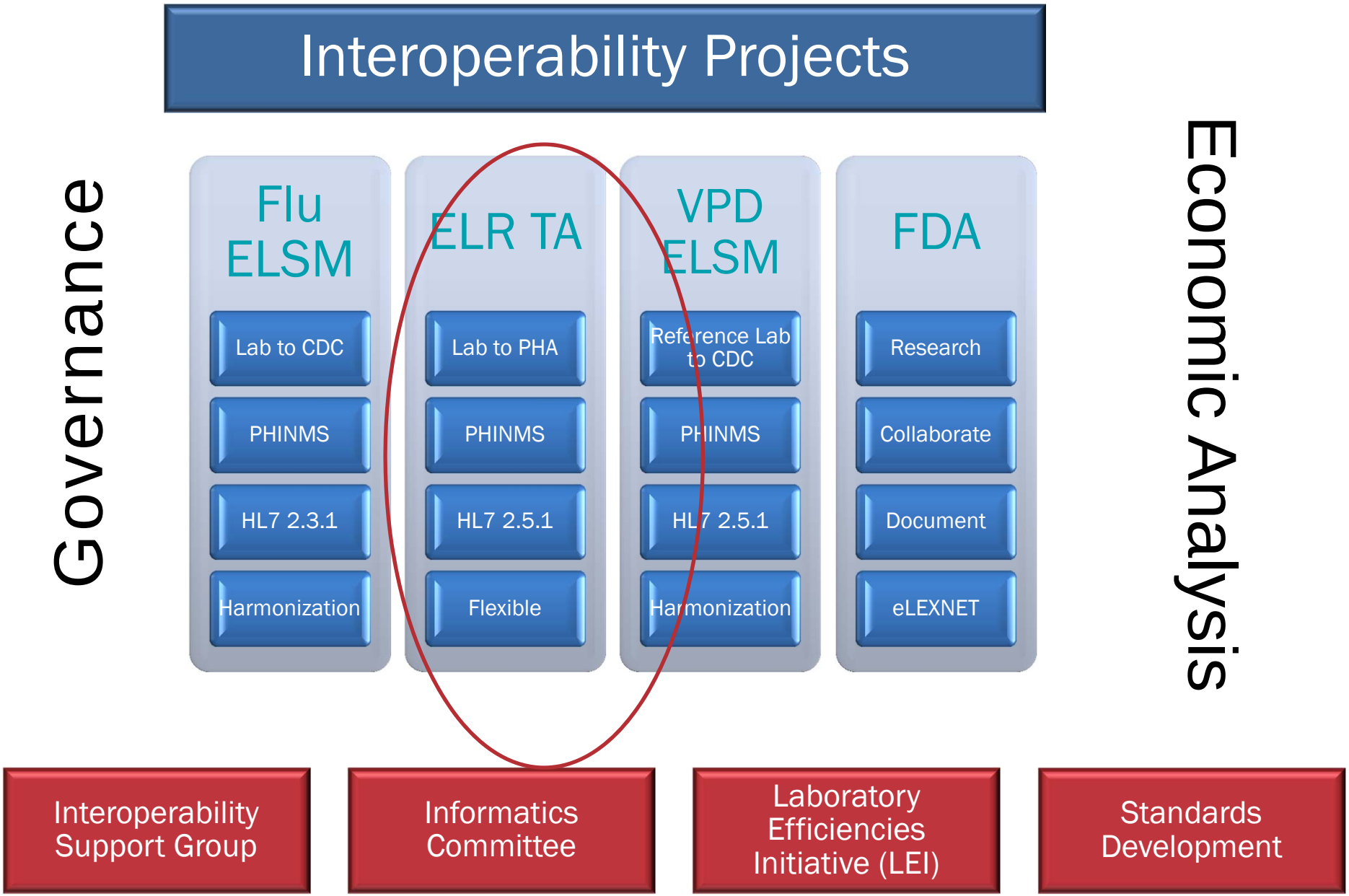
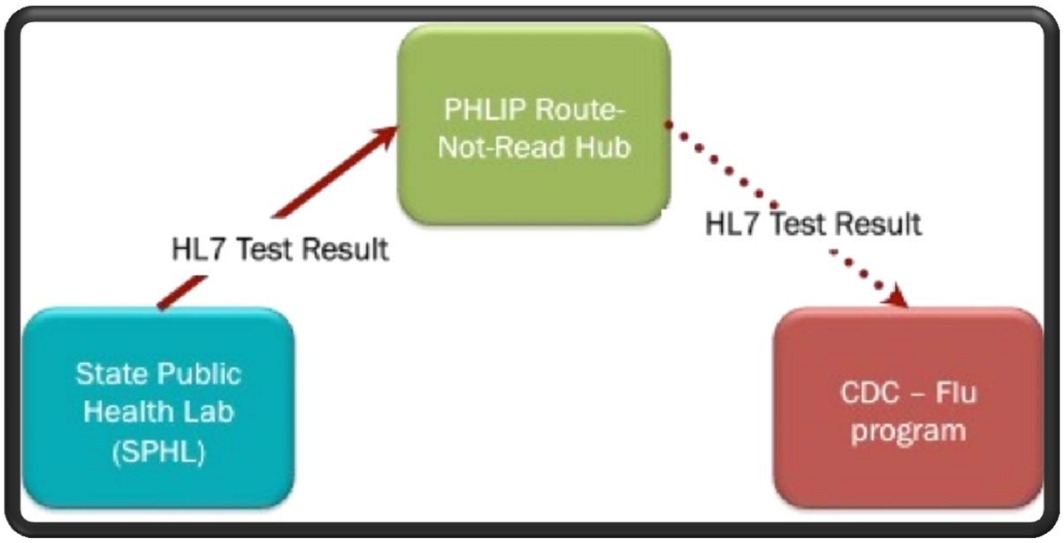

Interoperability Projects
Governance
Economic Analysis
Flu ELSM
Lab to CDC
PHINMS
HL7 2.3.1
Harmonization
ELR TA
Lab to PHA
PHINMS
HL7 2.5.1
Flexible
VPD ELSM
Reference Lab to CDC
PHINMS
HL7 2.5.1
Harmonization
FDA
Research
Collaborate
Document
eLEXNET
Interoperability Support Group
Informatics Committee
Laboratory Efficiencies Initiative (LEI)
Standards Development

Senders and Receivers

Flu ELSM

- Lab to CDC
- PHINMS
- HL7 2.3.1
- Harmonization

PHLIP focus: the Sender Side



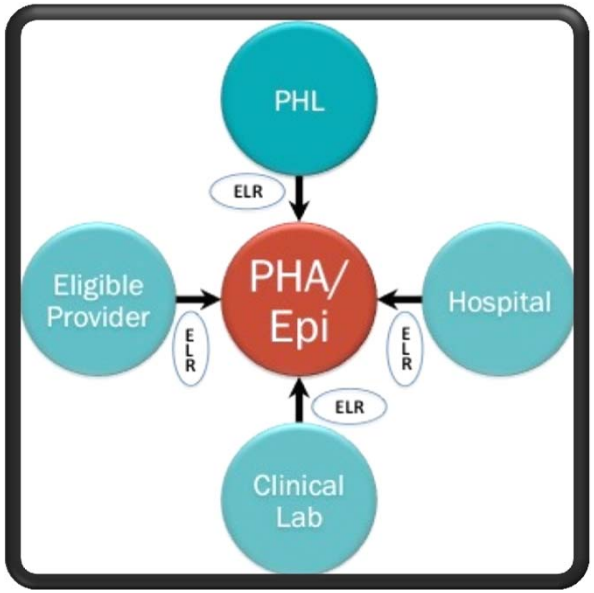
PHLIP helps PHLs **send ELSM** messages to the CDC

Senders and Receivers

ELR TA

- Lab to PHA
- PHINMS
- HL7 2.5.1
- Flexible

ELR TA focus: the Receiver Side



ELRTA helps PHAs **receive** ELR messages from PHLs and other partners, though ELRTA TATs may work with senders, too

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ELR TA

Electronic Laboratory Reporting Technical Assistance

The ELR TA program supports electronic laboratory reporting across a wide range of stakeholders.

- Offer *remote* and/or *on-site* assistance based on the assessment
- Provide service offerings only (and not Hardware, Software)
- Knowledge transfer key priority of assistance model
- Simple TA request process – submit standard TA request form to CDC

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Standards Development

- HL7: ELR Profiles
- ONC S&I Framework
- NIST
- PHDSC
- LMCoP; VMCoP

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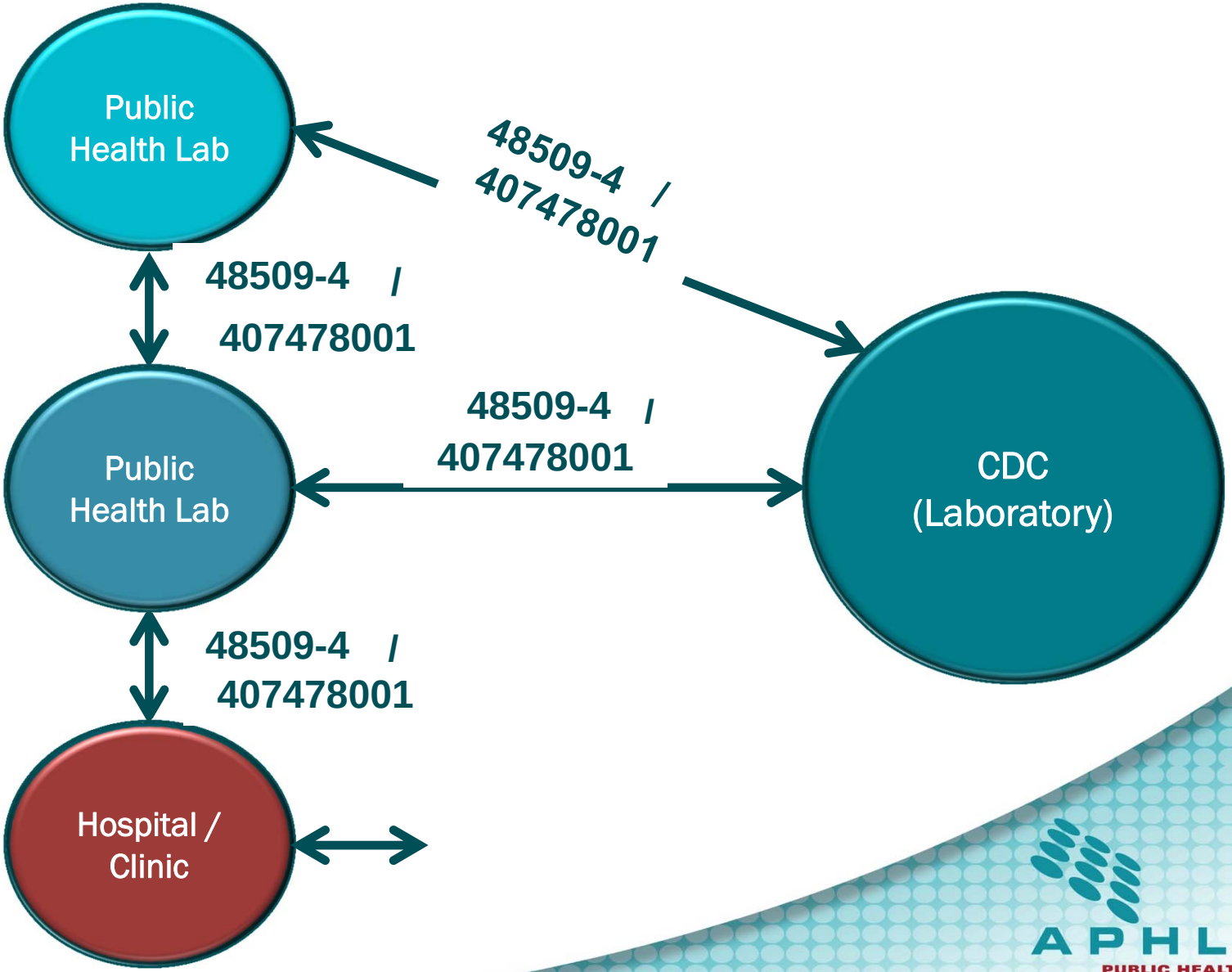
Why Standardize?…Back to Semantics



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National Initiatives

- National Initiatives and Meaningful Use

  Moving us from dozens of standards towards a handful of standards

  Focus on:

  - Immunization Information Systems (IIS)
  - Electronic Laboratory Reporting (ELR)
  - Syndromic Surveillance (SS)
  - http://www.cdc.gov/EHRmeaningfuluse/index.html

National Initiatives, cont.

- Laboratory Results Interface (LRI):

  http://wiki.siframework.org/Lab+Results+Interface+(LRI)+Initiative

  Meaningful Use Alignment: Incorporate lab results into EHR as structured data. Supports objectives for Decision Support, Quality Reporting, Transitions in Care, and Electronic copies of Clinical Summaries and Discharge Instructions.

  Is named in MU Stage 2 - Certification2014

  - Public Health Lab Results Workgroup
    - Harmonize the laboratory data exchange between public health and clinical care with the Lab Reporting Interface specification by incorporating the Public Health HL7 implementation guide into design of LRI.
    - Resulted in Publication of ELR R2 as a profile on the LRI guide named in proposed MU rule for certification 2015

National Initiatives, cont.

- Laboratory Orders Interface (LOI):

  http://wiki.siframework.org/Laboratory+Orders+Interface+Initiative

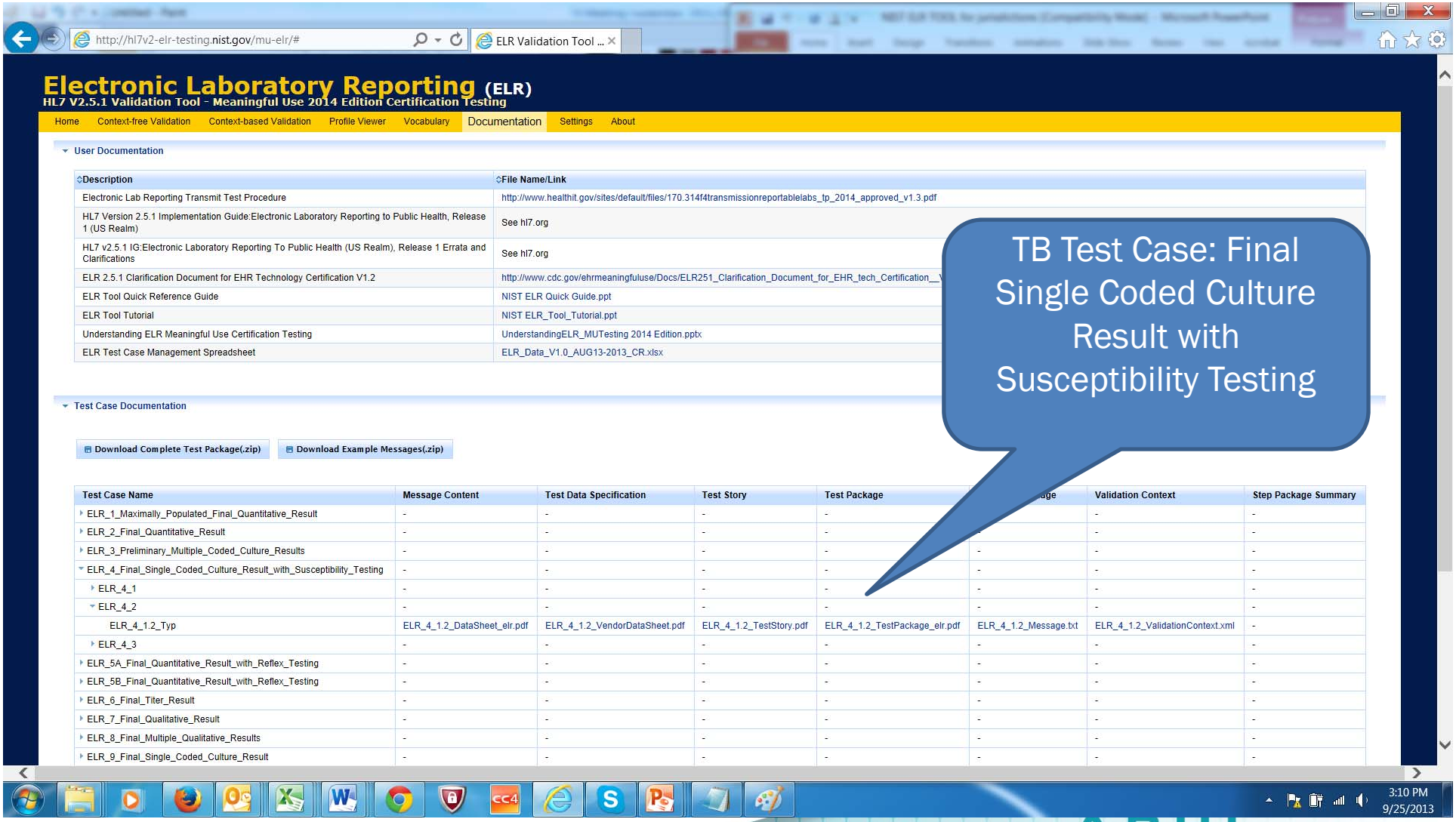
  To enable ambulatory primary care physicians to electronically manage (order, add, request cancelation) lab test requests – "close the circle" for round trip orders and results

  Establish the nationwide Implementation Guide for electronic submission of Lab Orders from Ambulatory EHRs

  Build on existing HL7 2.5.1-based lab order guide

  Is named in proposed MU rule for certification 2015

NIST Tools


http://hl7v2-elr-testing.nist.gov/mu-elr/#
ELR Validation Tool ...
Electronic Laboratory Reporting (ELR)
HL7 V2.5.1 Validation Tool - Meaningful Use 2014 Edition Certification Testing
Home
Context-free Validation
Context-based Validation
Profile Viewer
Vocabulary
Documentation
Settings
About
User Documentation
Description
File Name/Link
Electronic Lab Reporting Transmit Test Procedure
http://www.healthit.gov/sites/default/files/170.314f4transmissionreportablelabs_tp_2014_approved_v1.3.pdf
HL7 Version 2.5.1 Implementation Guide:Electronic Laboratory Reporting to Public Health, Release 1 (US Realm)
See hl7.org
HL7 v2.5.1 IG:Electronic Laboratory Reporting To Public Health (US Realm), Release 1 Errata and Clarifications
See hl7.org
ELR 2.5.1 Clarification Document for EHR Technology Certification V1.2
ELR Tool Quick Reference Guide
NIST ELR Quick Guide.ppt
ELR Tool Tutorial
NIST ELR_Tool_Tutorial.ppt
Understanding ELR Meaningful Use Certification Testing
UnderstandingELR_MUTesting 2014 Edition.pptx
ELR Test Case Management Spreadsheet
ELR_Data_V1.0_AUG13-2013_CR.xlsx
Test Case Documentation
Download Complete Test Package(.zip)
Download Example Messages(.zip)
Test Case Name
Message Content
Test Data Specification
Test Story
Test Package
Validation Context
Step Package Summary
ELR_1_Maximally_Populated_Final_Quantitative_Result
ELR_2_Final_Quantitative_Result
ELR_3_Preliminary_Multiple_Coded_Culture_Results
ELR_4_Final_Single_Coded_Culture_Result_with_Susceptibility_Testing
ELR_4_1
ELR_4_2
ELR_4_1.2_Typ
ELR_4_1.2_DataSheet_elr.pdf
ELR_4_1.2_VendorDataSheet.pdf
ELR_4_1.2_TestStory.pdf
ELR_4_1.2_TestPackage_elr.pdf
ELR_4_1.2_Message.txt
ELR_4_1.2_ValidationContext.xml
ELR_4_3
ELR_5A_Final_Quantitative_Result_with_Reflex_Testing
ELR_5B_Final_Quantitative_Result_with_Reflex_Testing
ELR_6_Final_Titer_Result
ELR_7_Final_Qualitative_Result
ELR_8_Final_Multiple_Qualitative_Results
ELR_9_Final_Single_Coded_Culture_Result
TB Test Case: Final Single Coded Culture Result with Susceptibility Testing
3:10 PM
9/25/2013

How to download example message from the NIST 2014 ELR tool

- Go to http://hl7v2-elr-testing.nist.gov/mu-elr/
- Click the 'Documentation tab'
- Click the arrow next to 'Test Case Documentation'
- Click the arrow next to 'Test Case Name'
- Click the arrow next to the individual user story - there are three for each test case
- Scroll over to the "Example Message column" and click to download example message.

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Challenges

- Multiple Standards
- Requires specialized technical skills
- Requires additional software / hardware
- Diverse systems
- Maintenance of interfaces
- Data Sharing Agreements
- $$

Questions / Discussion

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