WebEDR as a Web-Based Automated Data Review Tool

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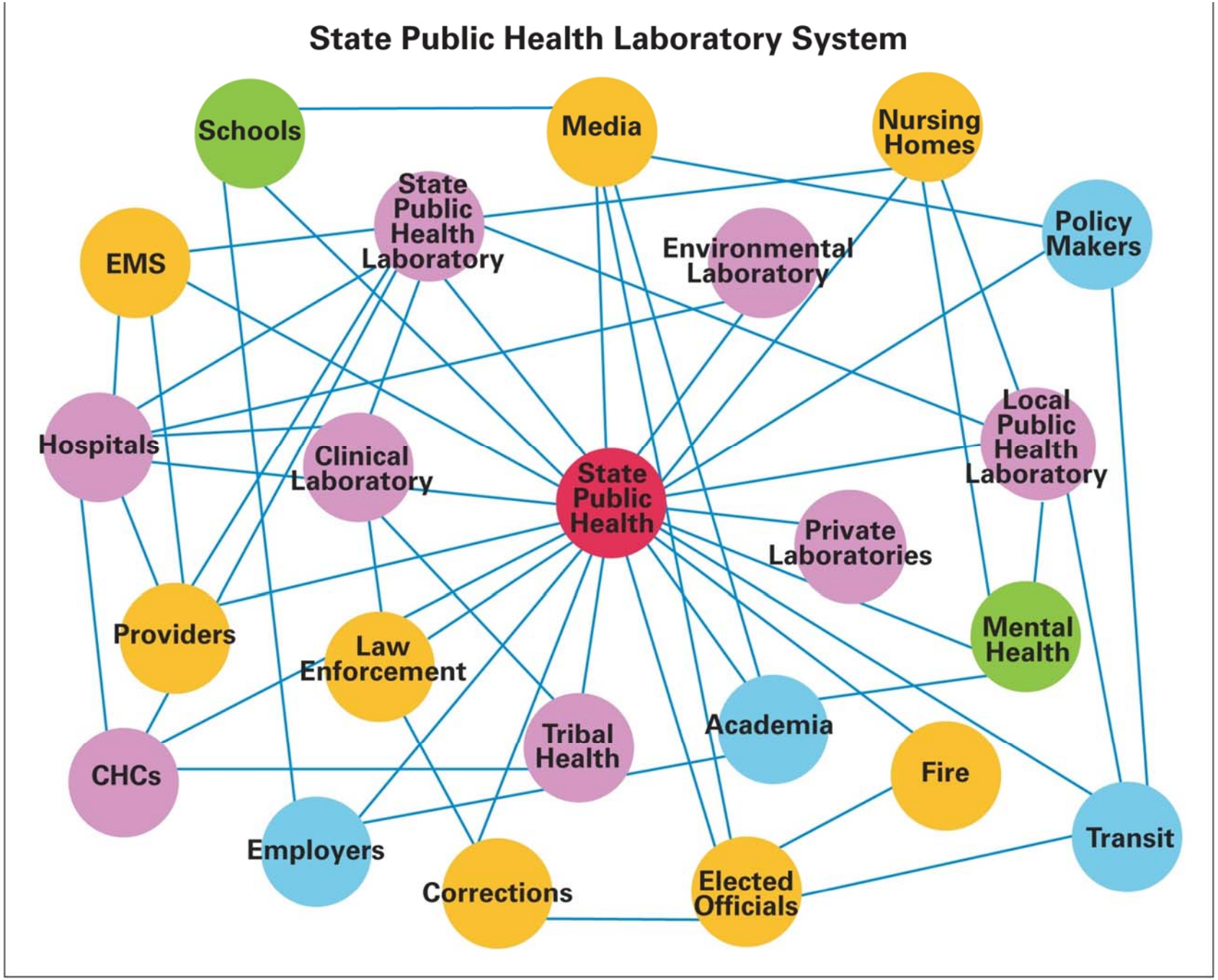
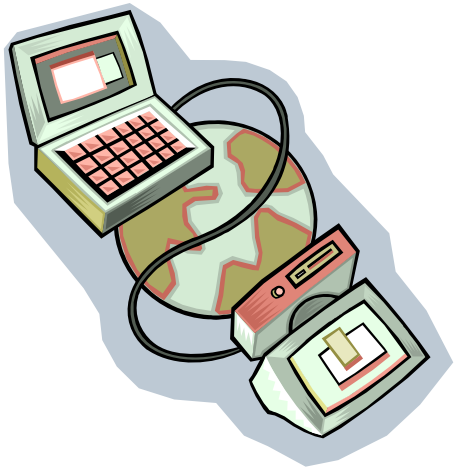
Outline

- Background on Environmental Lab Informatics
- Standardizing Electronic Data Deliverables
- Steps in Automated Data Review
- WebEDR as an Example
- How does WebEDR work
- It is possible (a real-world example)!

APHL
Analysis, Answers, Action


State Public Health Laboratory System
Schools
Media
Nursing Homes
State Public Health Laboratory
Policy Makers
EMS
Environmental Laboratory
Hospitals
Clinical Laboratory
Local Public Health Laboratory
State Public Health
Private Laboratories
Providers
Law Enforcement
Mental Health
Tribal Health
Academia
CHCs
Fire
Transit
Employers
Corrections
Elected Officials

APHL Environmental Informatics Goal:



1.) Develop & implement an electronic data flow directly from environmental laboratories to multiple state and federal agencies

2.) Standardize this delivery with data exchange standards that are agnostic to program, matrix, and methods

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ENVIRONMENTAL LABORATORY
ELECTRONIC DATA MANAGEMENT

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Need a single, nationally-standardized lab reporting format.

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That…

- Follows a Staged Approach
  Spreadsheet or levels of XML
- Includes Laboratory and Substances
  LCS, MS, MSD and Generated Samples, Surrogates or DMCs
- Supports Automated Data Review
  Contains sufficient data for automated assessment

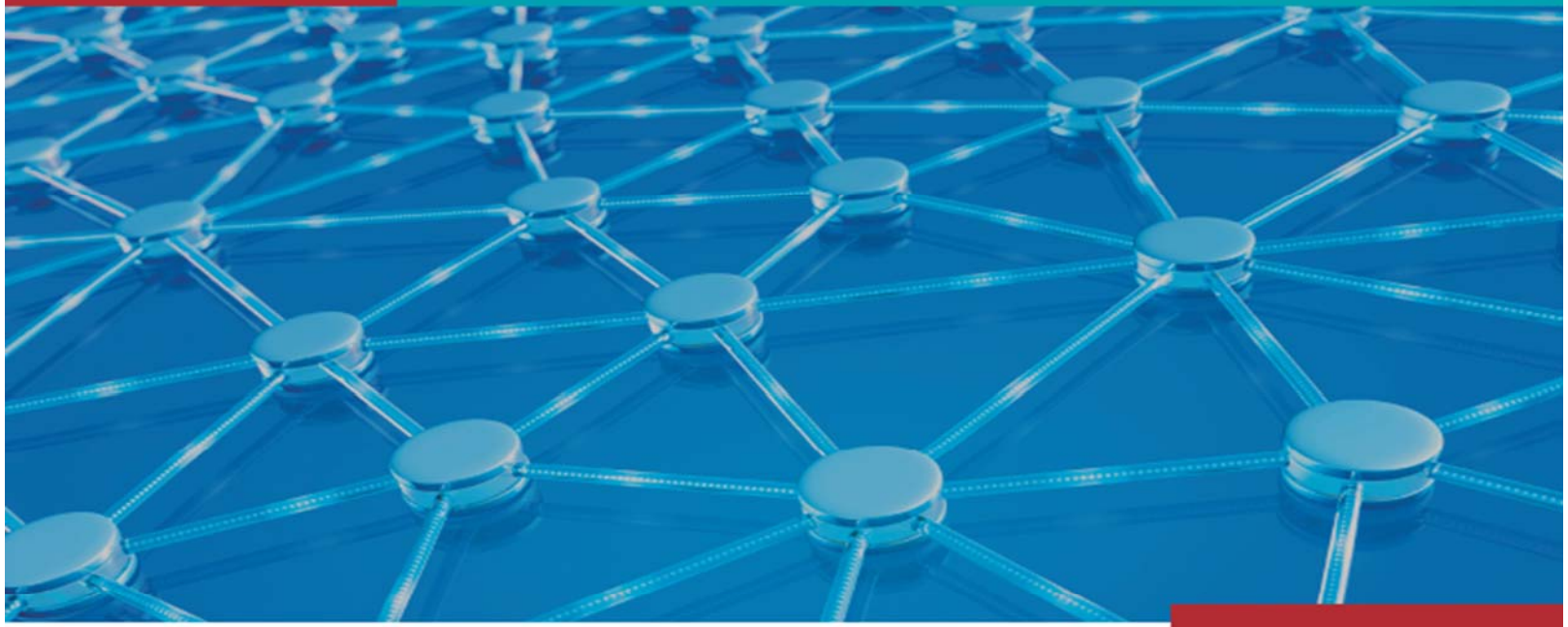
A Standardized Electronic Data Deliverable is Needed

… and

- Allows the Efficient capture of data
  Optimized data groups, no redundancies
- Is agnostic to Method, Matrix, Program
  Application of Data Elements across multiple programs
- Allows Web Service mediated Data Exchange
  Data is shareable between end-users

Requirements for Environmental Electronic Data Delivery Submissions

APHL Report



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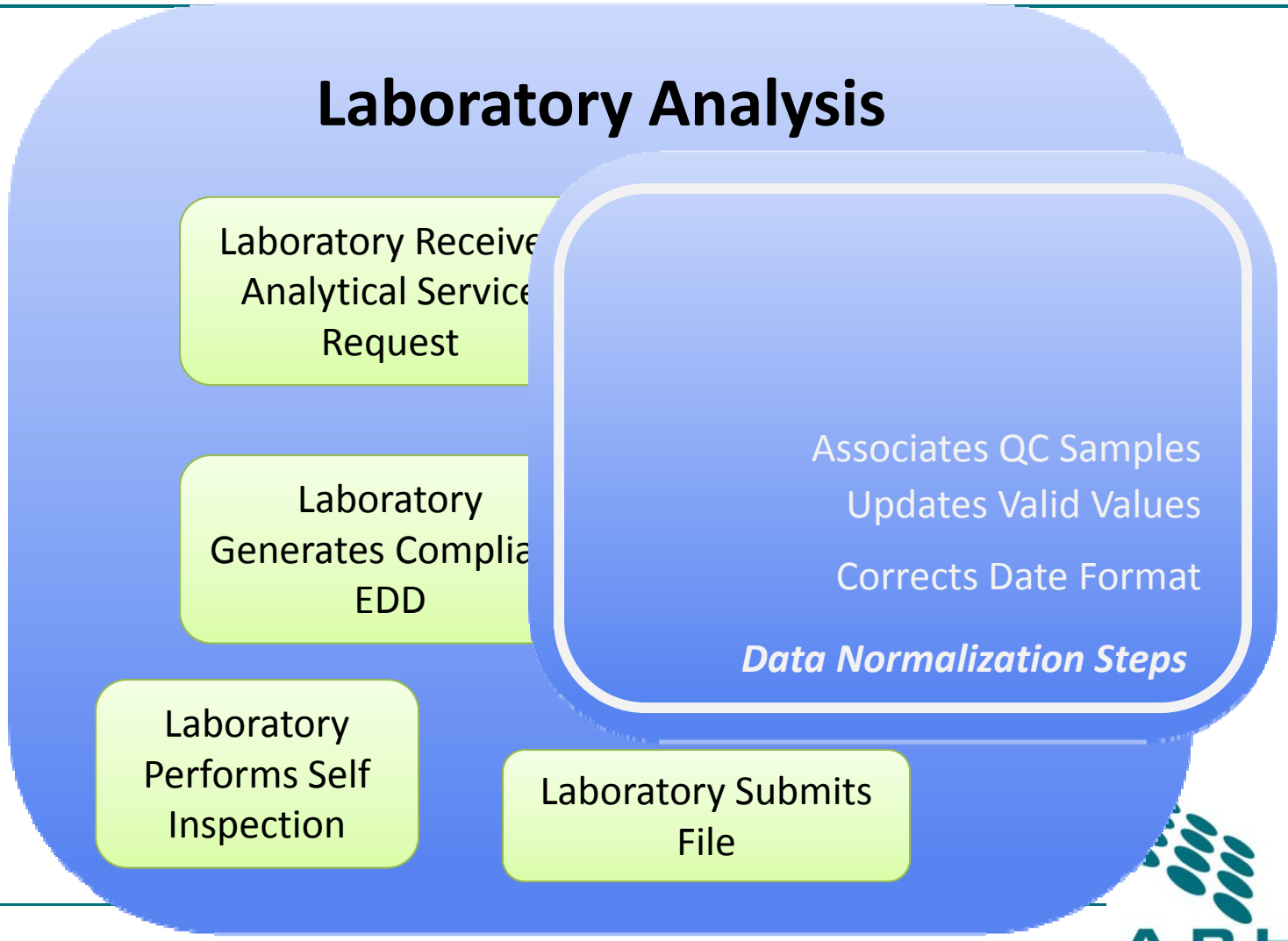
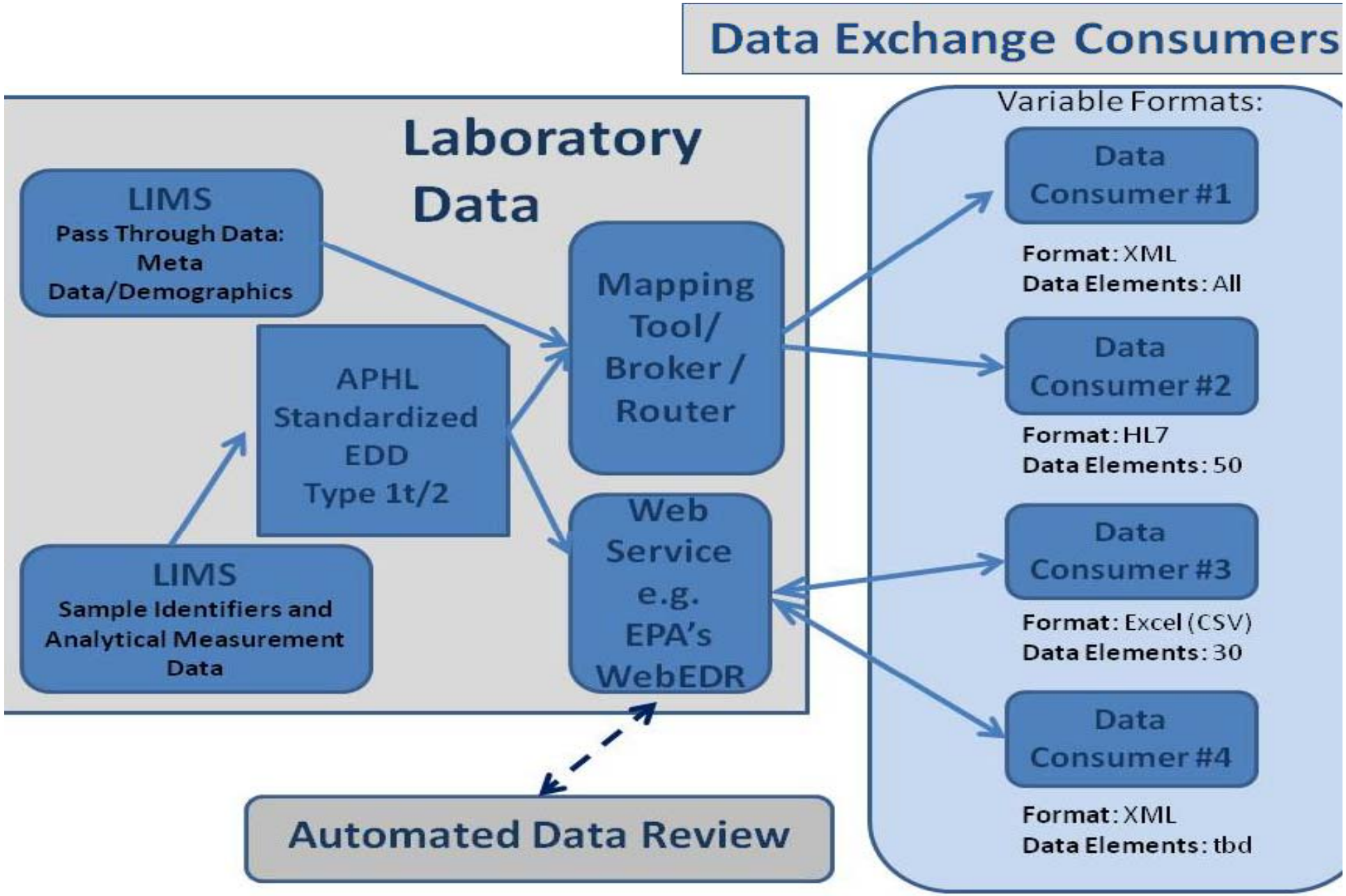
What Are the Typical Steps to Collect and Report Data Electronically ?



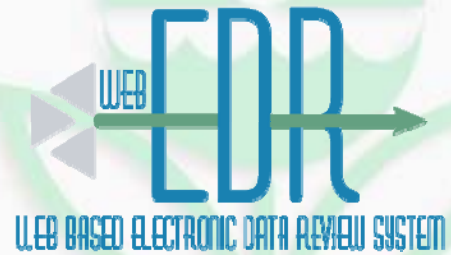

Data Exchange Consumers
Laboratory Data
LIMS
Pass Through Data: Meta Data/Demographics
APHL Standardized EDD Type 1t/2
LIMS
Sample Identifiers and Analytical Measurement Data
Mapping Tool/ Broker / Router
Web Service e.g. EPA's WebEDR
Automated Data Review
Variable Formats:
Data Consumer #1
Format: XML
Data Elements: All
Data Consumer #2
Format: HL7
Data Elements: 50
Data Consumer #3
Format: Excel (CSV)
Data Elements: 30
Data Consumer #4
Format: XML
Data Elements: tbd

ADR Assures Accountability

- Certification assures capability
- Reporting raw data (including QC) assures accountability
- Measurement Quality Objectives include:
  - Completeness
  - Sequence
  - Frequency
  - Limits

An option for Automated Data Review and interoperability may be **ERLN WebEDR**

Web-based Electronic Data Review (WebEDR) Overview



What is WebEDR?

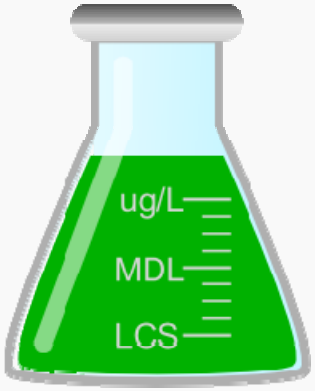
- An Environmental Response Laboratory Network (ERLN) web-based tool that performs automated data evaluation of Electronic Data Deliverables (EDDs)
  - Standardizing the evaluation of overall data quality
  - User-defined Measurement Quality Objectives (MQOs) provide an adaptable review environment
  - Accepts ERLN Data Submission Types 1, 1t, and 2 and Staged Electronic Data Deliverables (SEDD) versions 5.1 and 5.2

Who can use WebEDR?

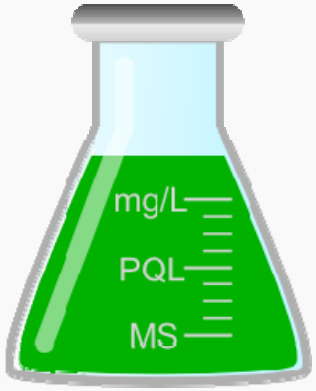
- **Laboratories**
  - Approved ERLN member laboratories
  - Non-ERLN laboratories on a case-by-case basis
- **Data Reviewers** - EPA approved users that support data review activities including
  - Environmental Response Incidents
  - Routine Analytical Services
  - Remedial Site Monitoring
  - Environmental Compliance
- **Other Reviewers**
  - EPA approved environmental program personnel requiring access to external electronic data review

Why use WebEDR?

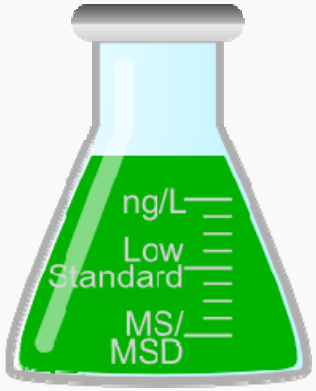
Laboratory Data Normalization



Laboratory 1
(results)



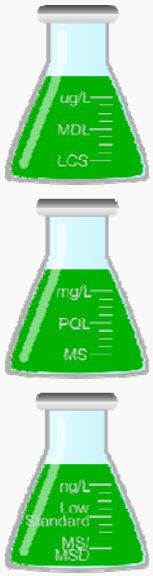
Laboratory 2
(results)



Laboratory 3
(results)

- **Variation in electronic data deliverables including:**
  - Differences in LIMS software
  - Laboratories interpretation of reporting requirements
  - Laboratory Internal Review
  - Absence of a standardized EDD

These variances cause a breakdown data uniformity…



Result	Units	Reporting Limit
0.25	ug/L	MDL

Result	Units	Reporting Limit
0.25	mg/L	PQL

Result	Units	Reporting Limit
0.25	ng/L	Low_Standard

Why use WebEDR?

Expedited Data Review and Results

Electronic data review processes the laboratories final submission file in seconds

Data reviewers notified by email of deliverables ready for review

Measurement Quality Objectives (MQO)

Tests derived from the National Functional Guidelines (NFG) for analytical data evaluation and review for Organic and Inorganic data

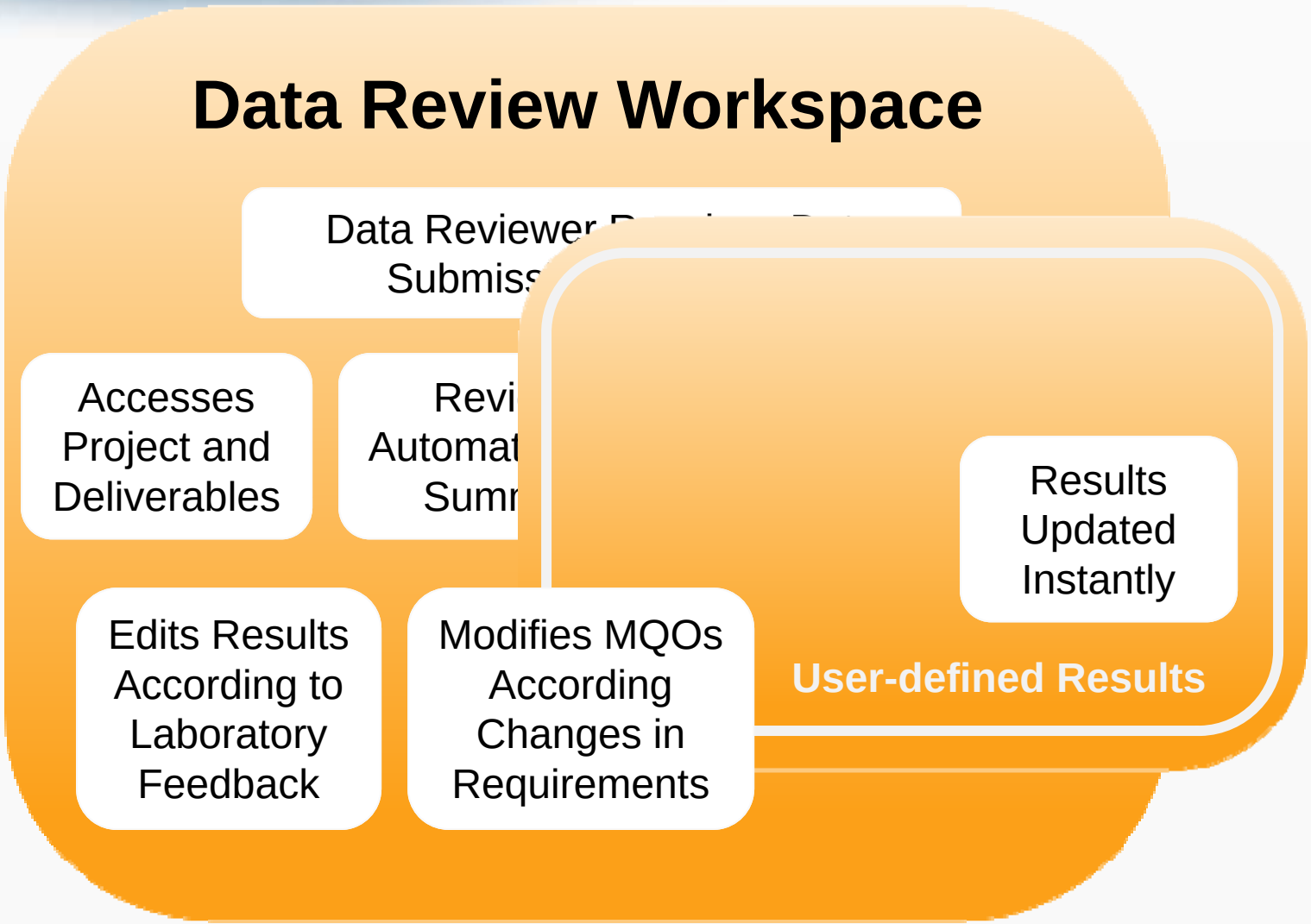
107 Tests

65% Non-method specific tests

MQO Test Definitions

Preliminary	EDD is checked for basic formatting of data elements and structure
Completeness	Verification of method required data fields and values
Sequence	Validation of analytical sequence
Frequency	Validation of QC sample and calibration occurrence
Limit Check	Comparison of results against method specified acceptance criteria

WebEDR Data Review Workflow



2011 EPA Office of Radiation and Indoor Air (ORIA) Proficiency Testing (PT) Study

Samples analyzed for Uranium-234, 235, 238 by Alpha Spectrometry.

Data were:

- Collected successfully from multiple laboratories
- Evaluated at a central site for data quality
- Processed and normalized by the WebEDR system

ORIA Uranium PT Study - Participants

Number	Laboratory Type	Submitted Spreadsheet Deliverable	Submitted XML Deliverable
4	State	3	1
4	Department of Energy	3	1
11	Commercial	5	6

Contact Information

Contact Schatzi Fitz-James at EPA Headquarters for information on how to access WebEDR:

Schatzi Fitz-James

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Contact Information

Thanks for your attention

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