Pathology and Laboratory Medicine Domain Update

Presented by
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- Riki Merrick, MPH – Vernetzt, LLC - Planning Committee Co-Chair
Agenda

Intro to IHE
Pathology and Laboratory Medicine
Mission and Scope
Integration profiles:

PaLM TF 8.0 Final text
Laboratory Testing Workflow (LTW)
Laboratory Device Automation (LDA)
Laboratory Analytical Workflow (LAW) Profile
Laboratory Point of Care Testing (LPOCT)
Laboratory Code Set Distribution (LCSD)
Sharing Laboratory Reports (XD-Lab)

Trial Implementation profiles
Inter-Laboratory Workflow (ILW)
Anatomic Pathology Workflow (APW)
Anatomic Pathology Report to Public Health (ARPH)
Anatomic Pathology Structured Report (APSR)

Current Projects
Laboratory Clinical Communications (LCC)
Laboratory Specimen Handoff (LSH)
Specimen Event Tracking (SET)
Transfusion Medicine Administration (TMA)
IHE Lab Profile to US realm Lab guides Harmonization
APSR update
DICOM WG s collaboration to update APW
Data element registry white paper
Prepare to get soaked

TLA = Three Letter Acronyms and more…
Why IHE?

International standards represent usually the state-of-the-art and the best-of-bread blocks to build safe, interoperable, reproducible solutions of healthcare data exchange. However …

- They often carry a big number of options to accommodate various situations and requirements in the World.
- They hardly say how one should combine them into an e-Health solution involving multiple systems exchanging information with one another.
IHE basic terms

- An **integration profile** does not impose any particular architecture of systems, nor does it constrain the applications granularity.
- It identifies functional roles with precise information exchanges responsibilities assigned to them. These functional & interoperable roles are called **Actors**.
- A functionally homogenous flow of information between two Actors is called a **Transaction**.

**Example:**

Transaction [LAB-3]  
Order Results Management  
[←]  
Order Filler  

This Actor could be played by:
- a computerized physician order entry (CPOE) system
- an integrated Hospital Information System (HIS)
- an enterprise repository of diagnostic results

Na\(^+\) level = 138 mEq/L, in serum 07/24 7:30 am, from John Doe
IHE International joins healthcare professionals and IT vendors to build robust and relevant interoperability specifications.

IHE is organized per domains.

The integration profiles of a domain are assembled into the **domain Technical Framework**.

Each domain has a planning committee and a technical committee, or a single committee combining the two roles.
Connectathons

- Week-long testing sessions organized annually per continent (Japan, North-America, Europe …).
- Enable IT vendors to test the interoperability of their solutions with their peers.
- Accelerate the refinement of the specifications (integration profiles).
- Once finalized, the status of an Integration Profile changes from "Trial Implementation" to "Final Text", and the specification is then integrated into the domain Technical Framework.

Next Dates:
Japan: Sep 24 – 29, 2017
US: Jan 15 – 19, 2018
Europe: Apr 16 – 20, 2018
PaLM scope covers:

- representation and exchange of digital documents, structured data, and images associated with services performed by clinical laboratories and pathology laboratories on in-vitro specimens collected from a patient or a non-living material;
- steering of analytical and peri-analytical automated devices;
- representation and exchange of structured data related to specimen management, long term storage (for instance in biobanks) and reuse;
- secondary use of in-vitro diagnostic observations and related clinical observations;
- representation and exchange of structured data related to the workflows of transfusion medicine around blood product receivers.

(1): Laboratory specialties in scope: clinical chemistry, hematology, coagulation, blood gas, microbiology, immunology, transfusion medicine, HLA, fertility, AMP, cytogenetic, drug monitoring, toxicology, surgical pathology, autopsy, cytopathology, image cytometry, immunohistochemistry, clinical genomics
IT Systems in scope

- Electronic Healthcare Record Systems (EHR-S) in hospital and ambulatory care settings
- Clinical and/or anatomic pathology lab information systems (LIS)
- Public Health lab information management systems (LIMS)
- Electronic healthcare record shared infrastructures (PHR, HIE …)
- Robotic specimen container distributors
- Barcode labelers
- Robotic devices peri-analytical devices in the laboratory work area
- IVD analyzers in laboratory or on the point of care
- Middleware systems handling a set of analyzers and/or of peri-analytical devices, in laboratory or on the point of care
- Imaging modalities
- PACS and digital archive systems
- Biobank management systems
- Adverse Event tracking systems (if different from EHR-S)
IHE PaLM Technical Framework (IHE LAB TF)

- Volume 1: Profiles & Use Cases  (user view)
  - Laboratory Testing Workflow (LTW)
  - Laboratory Device Automation (LDA)
  - Laboratory Analytical Workflow (LAW) Profile
  - Laboratory Point of Care Testing (LPOCT)
  - Laboratory Code Set Distribution (LCSD)
  - Sharing Laboratory Reports (XD-Lab)

- Volumes 2a, 2b, 2c: Transactions
- Volume 2x: Appendices - common material for Transactions
- Volume 3: Content Modules

http://www.ihe.net/Technical_Frameworks/#PaLM

IHE PaLM v8.0 was just published on 6/21/2017
PaLM Domain Integration Profiles

- Supplements for Trial Implementation
  - in LAB domain:
    - Inter-Laboratory Workflow (ILW) Profile
    - "Graphics and simple Images in Results (GIR)" option on LTW Profile
  - In Anatomic Pathology Domain:
    - Anatomic Pathology Workflow (APW) in hospitals
    - Anatomic Pathology Structured Report (APSR)
    - Anatomic Pathology Report to Public Health (ARPH)

- Brief Description of Profiles developed by the PaLM Domain
  
  http://wiki.ihe.net/index.php/Profiles#IHE_Pathology_and_Laboratory_Medicine_.28PaLM.29_Profiles

 Trial Implementation
PaLM Profiles & players

- Transfusion Medicine (TMA)
- Digital Pathology
- LDA
- LAW
- LSH
- APSR 2
- XD-LAB
- Blood bank
- Clinicians & caregivers
- Specimen collection facility
- Lab order & report management
- Lab operational work area
- Subcontracting lab
- Biobank
- Public health
- LPOCT
- LTW
- LCC
- ILW
- LCSD
- SET
- ARPH

Final Text
Trial Implementation
Development
2017 cycle publication schedule for PaLM

- PaLM TF 8.0
- 3 supplements for Trial Implementation: APSR 2, LCC, TMA
- 3 supplements for Public Comment: APSR 2, LCC, TMA
- Structured Reporting & Data Elements Capture White Paper
- Digital Pathology White Paper
- Face to Face (CRS$4) Cagliari, Sardinia (Italy)

CPs:
- 252 & 253 for LAW
- 254 for LTW
- 255
Laboratory Testing Workflow (LTW)
Intra-hospital data exchange

- Ordering, scheduling, processing, and result reporting associated with IVD tests performed by clinical labs in healthcare institutions.
- 3 major use cases:
  - Specimen collected by orderer
  - Specimen collected by lab staff
  - Specimen collected by 3rd party
- Systems involved: HIS/EMR, LIS, LAS/middlewares
- Value proposition:
  - Enhances quality of care (reduces manual copy, redundant orders, orphan or lost specimens, transcription errors).
  - Improves throughput (saves phone calls and paper reports, streamlines tests scheduling, processing, reporting).
- Standard: HL7 2.5.1
Example of a set of systems implementing LTW
Laboratory Point Of Care Testing (LPOCT)

• Tests on specimen performed on the point of care or on patient bedside by caregivers, under the supervision of a clinical laboratory of the institution.

• Systems involved: HIS/EMR, LIS, point of care devices and data managers.

• Value proposition:
  – Shortcut for clinicians who produce and use their results at once for a limited panel of tests.
  – Minimizes patient blood collection.
  – The supervision by a clinical lab ensures a stable level of quality of the point of care testing process.

• Combined with the LTW profile and with PAM or PDQ profiles.

• Standard: POCT1-A from CLSI (which includes HL7 2.5.1 ORU)
LPOCT in combination with LTW and [PAM / PDQ]

Clinical wards running point of care testing

Option patient identity checking
Robotization

Lab Barcode Labeling (**LBL**)  
- Robotized delivery and labeling of containers at blood sample collection.  
- Systems involved: HIS/EMR, LIS, Robotic container selector & barcode printer.  
- Value proposition:  
  - Avoids selection of inadequate containers and prevents misidentification.  
  - Streamlines specimen collection.  
  - May be combined with LTW to let the LIS steer the printing of barcode labels performed by the CIS.

Lab Device Automation (**LDA**)  
- Automation of pre and post-analytical steps, such as specimen transportation, centrifugation, aliquoting, decapping, storage...  
- Systems involved: middleware, pre/post-analytical devices.  
- Value proposition:  
  - Streamlines the operations in the lab work area.  
  - Combined with LTW with the middleware playing a pivot role.
Laboratory Code Set Distribution (LCSD)
Synchronize test dictionaries

- Enables an application (e.g.; a LIS) owning a code set (batteries, tests and observations) to share it with other applications to further support data exchange between them.
- Systems: LIS, HIS/EMR, middleware, ...
- Value proposition
  - Reduces time of configuration of the interfaces between applications.
  - Smoothes the maintenance of the interfaces over time.

Owner of the common code set for batteries, tests and coded results (e.g.; LIS)

Lab orders (coded batteries and tests)

System involved in a lab orders/results workflow (e.g.; HIS)

Lab results

Replace previous version of the code set with this one

Standard: HL7 2.5 Chapter 8 (master files)
Sharing Laboratory Report (XD-LAB)

• A unique electronic format for the exchange/sharing of lab reports.

• Systems: LIS as content creator, HIS/EMR/EHR as content consumer, HIE/PHR as document registry/repository

• Value proposition
  – Both human-readable and machine-processable: The narrative text of each section is derived from the entry of structured data, carried below it.
  – May carry reportable conditions or outbreak identification, as structured data, therefore also usable in public health.

• National standard for laboratory result reporting in Austria, Switzerland, France and Saudi Arabia

• Regionally used in North America, Europe, Middle-East, Asia

Standards:
HL7 v3 CDA R2
LOINC, UCUM
Laboratory Analytical Workflow (LAW) IVD analyzers connectivity

- A multi-year joint effort of the IHE LAB Committee and the IVD Industry Connectivity Consortium (IICC)
- Purpose: exchange of information related to patient and QC test orders & their results between IVD testing systems and health informatics systems (LIS, middleware, ...)

**Analytical Work Order Step:**
A panel or test to be performed on a specimen in a container, assigned to an analyzer
LAW profile (continued)

• Value proposition:
  – Reduces complexity and variability of data exchange with IVD testing systems.
  – Simplifies installations and maintenance of connections
  – Offers analyzer vendors to declare supported options

• Standards:
  – HL7 2.5.1 + 2 pre-adoptions from 2.8 & 2.9
  – LOINC recommended
  – UCUM

Basis for CLSI standard: “Next Generation IVD interface = AUTO16” in 2017
LAW - IHE Conformity Assessment is available for vendor use
Inter Laboratory Workflow (ILW)  
Exchange Data between Laboratories

The transmission of sub-orders and specimens from a requesting lab to a subcontractor lab performing the tests and reporting back the results.

Value proposition:
- Reduces complexity and variability of data exchange between labs
- Simplifies installations and maintenance of connections

Standards:
- HL7 v2.5.1, LOINC recommended,
- UCUM
Anatomic Pathology Workflow (APW)
Exchange Anatomic Pathology Data in Hospitals

The transmission of orders, results including imaging related aspects of the workflow in a hospital system for surgical pathology, cytology, autopsy, tissue micro array.

Value proposition:
Prevents manual data entry errors by limiting the data entry to the person generating the data, making it available to other systems.

Standards:
- HL7 v2.5.1,
- LOINC,
- DICOM
- SNOMED CT
Anatomic Pathology Report to Public Health (ARPH)

The transmission of pathology results to Public Health Agencies like cancer registries

- based on APW message, supports additional elements of public health interest
- Connectathon tested

Standards:
- HL7 v2.5.1,
- LOINC,
- DICOM
- SNOMED CT
Laboratory Specimen Handoff (LSH)
Manage Specimen Transport Automation

- Provide common framework for IVD vendors to manage specimen passing in the laboratory
- Reduce design burden for Laboratory Automation Systems (LAS) and Specimen Processing Devices (SPD)

Standards:
HL7 v2.5.1 (and pre-adopt v2.9)
Specimen Event Tracking (SET)
Manage Specimen Transport Automation

- Provide common framework for IVD vendors to manage specimen passing in the laboratory in different settings (intra- and inter-organizations and facilities)

- Use cases:
  - #1 Specimen Collection Tracking
  - #2 Specimen Intra and Inter organization transfer
    - No/re-identification, reject by receiver
  - #3 Intra Laboratory IVD Specimen Tracking
  - #4 Biobank Specimen Tracking
    - Collection
    - Retrieve from biobank for testing (immediate or not)
  - #5 Specimen Derivation Tracking

- Reduce design burden for Laboratory Automation Systems (LAS) and Specimen Processing Devices (SPD)

Standards:
HL7 v2.5.1 (and pre-adopt v2.9)
Others TBD
Generalize Anatomic Pathology Structured Report (APSR 2)

- Create generic templates
- Enhance specimen collection section
- Created in Art-Décor tooling for better implementation experience (have conformance rule files (XML) as well as text)

Standards:
- HL7 v3 CDA R2
- LOINC
- DICOM
- SNOMED CT
### Art Décor view

<table>
<thead>
<tr>
<th>Item</th>
<th>DT</th>
<th>Card</th>
<th>Conf</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Art Décor view</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


- **Id**: 1.1.6.4.1.19076.1.8.1.1.1.1.1
- **Status**: Draft
- **Name**: Anatomic Pathology Structured Report Content Module
- **Effective Date**: valid from 2014-05-13 11:57:57
- **Version Label**: 2.0
- **Display Name**: Anatomic Pathology Structured Report Content Module

**Context**
- **Pathway / Label**: Pathology
- **CDA Document Level Template**: CDA Document Level Template
- **Open/Closed**: Open (other than defined elements are allowed)
- **Associated with**
  - Associated with 14 concepts
- **Used by / Uses**
  - Used by 1 transaction and 6 templates. Used 19 templates

**Relationship**
- **Specialization template**: 2.16.840.1.113883.10.1801 (2009 SEP 07)
- **Example**
  - example for use case #1

**Constraint**

A report may have several successive revisions over time, in case corrections or complements are provided by the custodian after the initial release of the report. The unique id of the current revision of the report is carried by the id element, and is composed of:

- iQmot, which SHALL be an OID.
- an optionally qualified version, which can be any string so that the concatenation of the two attributes root and extension provide a globally unique Id, which identifies this release of the report.
VOLUME 1 - PROFILES

10 Anatomic Pathology Structured Report (APSR) Profile

This content profile describes an anatomic pathology structured report (APSR) as a digital document to be shared or exchanged between pathology laboratories and other care providers and institutions.

Anatomic pathology structured reports document the findings on specimens removed from patients for diagnostic or therapeutic reasons. This information can be used for patient care, clinical research and epidemiology. Standardizing and computerizing anatomic pathology structured reports can facilitate the exchange and reuse of the content of these reports.

This content profile describes a digital anatomic pathology report shared in a human-readable format, which may include images, and which also contains findings and observations in a machine-readable format, to facilitate the integration of these into the database this content.

The scope of this IHE content profile covers all fields of anatomic pathology (cancers, benign neoplasms as well as non-neoplastic conditions) as well as cytopathology.

Goldsmith, J.D., et al., “Reporting guidelines for clinical laboratory reports in surgical pathology" Arch Pathol Lab Med, 2008: 132(10): p. 1608-16, is the first source of specification for this content profile. This article delineates the required, preferred, and optional content of the report.

This content profile is complemented by the "cancer checklists" produced by the College of American Pathologists, and by the "comptes rendus d’anatomopathologie: données minimales à renseigner pour une tumeur primitive" produced by the French society of pathology.

This profile has also benefited from the guidance on cancer AP reports provided by the North-American Association of Central Cancer Registries; some of the example snippets captured in the profile leverage the NAACCR Standards for Cancer Registries, Volume 3.1.

10.1 APSR Actors/Transactions

This section defines the actors, transactions, and/or content modules in this profile. General definitions of actors are given in the Technical Frameworks General Introduction Appendix A published here.

Figure 10.1-1 shows the actors directly involved in the APSR Profile and the direction that the content is exchanged.

A product implementation using this profile must group actors from this profile with actors from a workflow or transport profile to be functional. The grouping of the content module described in this profile to specific actors is described in more detail in the "Requirements" section.

![Figure 10.1-1 APSR Actor Diagram](image)

Table 10.1-1 lists the content module(s) defined in the APSR profile. To claim support with this profile, an actor shall support all required content modules (labeled "R") and may support optional content modules (labeled "O").

<table>
<thead>
<tr>
<th>Actors</th>
<th>Content Modules</th>
<th>Optionality</th>
<th>Reference</th>
</tr>
</thead>
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<tr>
<td>Content Creator</td>
<td>Anatomic Pathology Structured Report 1.3.6.1.4.1.19370.1.8.1.1.1.1</td>
<td>R</td>
<td>PaLM TF-3: 8.3.1.2</td>
</tr>
<tr>
<td>Content Consumer</td>
<td>Anatomic Pathology Structured Report 1.3.6.1.4.1.19370.1.8.1.1.1.1</td>
<td>R</td>
<td>PaLM TF-3: 8.3.1.2</td>
</tr>
</tbody>
</table>
Restructure Anatomic Pathology Workflow (APW 2)
Better integration into the PaLM Technical Framework

Part 1:
Integrate with PaLM TF transactions LAB-1 through LAB-5

Standards:
- HL7 v2.5.1,
- LOINC,
- DICOM
- SNOMED CT
Restructure Anatomic Pathology Workflow (APW 2)
Better integration into the PaLM Technical Framework

Part 2:
Create new laboratory image management profile under PaLM

Standards:
- HL7 v2.5.1
- LOINC
- DICOM
- SNOMED CT

Development
Part 3:
Add more laboratory image reporting capabilities in PaLM
Transfusion Medicine - Administration (TMA)

Tracking adverse events during administration

- First in family
- Event tracking during Administration (optional patient matching verification step) = green
- Future expansion: Assigning units to collecting units = orange

Standards:
HL7 v2.x, LOINC, SNOMED CT
**Current Projects**

Data Element Registry White paper

Conveying machine understandable semantics

**Need:** reusable, well defined elements across data exchange partners for exchange of Lab reports with multiple partners for diagnostic or secondary use (Public Health, research, clinical decision support, etc.)

**Solution:** Shareable Data Element Repository that:

- Has appropriate tags, metadata, context and vocabulary binding (which could be choices of appropriate vocabulary based on country)
- Has option to capture business rules / specific guidelines for specific use cases (at the domain / organization / country / regional level) that describe data element behavior
- Is bound to specific elements in one or more data exchange format specifications

**Next Steps**

- White paper describing use cases and need for structured reporting interoperability
- Call for vendors that see the benefit for content development to harmonize the format to allow for scalable (crowd sourced?) structured content development
Current Projects

Harmonize IHE transactions with

- Laboratory Technical Workflow (LTW)
- Laboratory Clinical Communication (LCC)
- Laboratory Code Set Distribution (LCSD)

US realm lab related Implementation Guides

- S&I Framework: Lab Results Interface (LRI) – HL7v2.5.1
- S&I Framework: Lab Orders from EHR (LOI) – HL7v2.5.1
- S&I Framework: Electronic Directory of Service (eDOS) – HL7v2.5.1

Joint HL7 Orders and Observations WG and IHE PaLM discovery project


Next Steps:
Identify where adjustments need to be made and create CPs
If you want to contribute

• Apply for IHE International Organizational Membership
  Visit: [www.ihe.net/apply](http://www.ihe.net/apply) (note IP Policy)
  Approved monthly by IHE International Board
  Review IHE's 600+ Organizational Members:
  [http://www.ihe.net/governance/member_organizations.cfm](http://www.ihe.net/governance/member_organizations.cfm)

• Join IHE Laboratory Planning & Technical Committees
  Mailing list: [https://groups.google.com/a/ihe.net/forum/#!forum/palm](https://groups.google.com/a/ihe.net/forum/#!forum/palm)

• Non-members have limited participation:
  Review & comment during Supplement Public Comment period
  Implement IHE Profiles and test them at connectathons
Thank you

- IHE International - [www.ihe.net](http://www.ihe.net)
- IHE Europe - [www.ihe-europe.net](http://www.ihe-europe.net)

- The complete program of educational webinars
  [http://www.iheusa.org/resources-education-webinars.aspx#webseries](http://www.iheusa.org/resources-education-webinars.aspx#webseries)

- Overview of over 100 existing IHE integration profiles
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANAPATH</td>
<td>Anatomic Pathology domain</td>
</tr>
<tr>
<td>ASIP Sante</td>
<td>Agence des Systemes d’Information Partages de Sante</td>
</tr>
<tr>
<td>ATNA</td>
<td>Audit Trail and Node Authentication</td>
</tr>
<tr>
<td>AWOS</td>
<td>Analytical Work Order Step</td>
</tr>
<tr>
<td>CAP</td>
<td>College of American Pathologist</td>
</tr>
<tr>
<td>CDA R2</td>
<td>Clinical Document Architecture Revision 2</td>
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<tr>
<td>CEN</td>
<td>European Committee for Standardization</td>
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<tr>
<td>CIS</td>
<td>Clinical Information System</td>
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<td>CLSI</td>
<td>Clinical and Laboratory Standards Institute</td>
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<td>CT</td>
<td>Consistent Time</td>
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<tr>
<td>DICOM</td>
<td>Digital Imaging and COMmunications in Medicine</td>
</tr>
<tr>
<td>eDOS</td>
<td>Electronic Directory of Services</td>
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<td>Electronic Health Record</td>
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<td>EMR</td>
<td>Electronic Medical Record</td>
</tr>
<tr>
<td>ETSI</td>
<td>European Telecommunication Standards Institute</td>
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<tr>
<td>HIE</td>
<td>Health Information Exchange</td>
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<tr>
<td>HIS</td>
<td>Health Information System</td>
</tr>
<tr>
<td>HL7</td>
<td>Health Level Seven</td>
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<tr>
<td>IEEE</td>
<td>Institute of Electrical and Electronics Engineers</td>
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<td>IETF</td>
<td>Internet Engineering Taskforce</td>
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<td>IICC</td>
<td>In-Vitro Diagnostics Industry Connectivity Consortium</td>
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<td>ISO</td>
<td>International Organization for Standardization</td>
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<td>IT</td>
<td>Information Technology</td>
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<td>ITU</td>
<td>International Telecommunication Union</td>
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<tr>
<td>IVD</td>
<td>In-Vitro Diagnostic</td>
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<tr>
<td>JAHIS</td>
<td>Japanese Association of Healthcare Information Systems Industry</td>
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<tr>
<td>LAS</td>
<td>Lab Automation System</td>
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<td>LIS</td>
<td>Laboratory Information System</td>
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<td>LOI</td>
<td>Lab Orders Interface</td>
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<td>LOINC</td>
<td>Logical Observation Identifiers Names and Codes</td>
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<td>LPOCT</td>
<td>Laboratory Point Of Care Testing</td>
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<tr>
<td>LRI</td>
<td>Lab Results Interface</td>
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<td>LTW</td>
<td>Laboratory Testing Workflow</td>
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<tr>
<td>OASIS</td>
<td>Organization for the Advancement of Structured Information Standards</td>
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<td>PAM</td>
<td>Patient Administration Management</td>
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<tr>
<td>PCD</td>
<td>Patient Care Device domain</td>
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<tr>
<td>PDQ</td>
<td>Patient Demographics Query</td>
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<tr>
<td>PHR</td>
<td>Personal Health Record</td>
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<td>POCDM</td>
<td>Point Of Care Demographics Manager</td>
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<tr>
<td>POCR</td>
<td>Point Of Care Result Generator</td>
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<td>QA</td>
<td>Quality Analysis</td>
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<tr>
<td>S&amp;I</td>
<td>Standards and Interoperability</td>
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<tr>
<td>SNOMED CT</td>
<td>Systematized Nomenclature of MEDicine Clinical Terms</td>
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<td>TMA</td>
<td>Transfusion Medicine - Administration</td>
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<tr>
<td>UCUM</td>
<td>Unified Codes for Units of Measure</td>
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<tr>
<td>US</td>
<td>United States</td>
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<tr>
<td>W3C</td>
<td>World Wide Web Consortium</td>
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<tr>
<td>XD-Lab</td>
<td>Sharing Laboratory Reports</td>
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<tr>
<td>XDM</td>
<td>Cross-Enterprise Document Media Exchange</td>
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<td>XDR</td>
<td>Cross-Enterprise Document Reliable Exchange</td>
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<tr>
<td>XDS</td>
<td>Cross-Enterprise Document Sharing</td>
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