

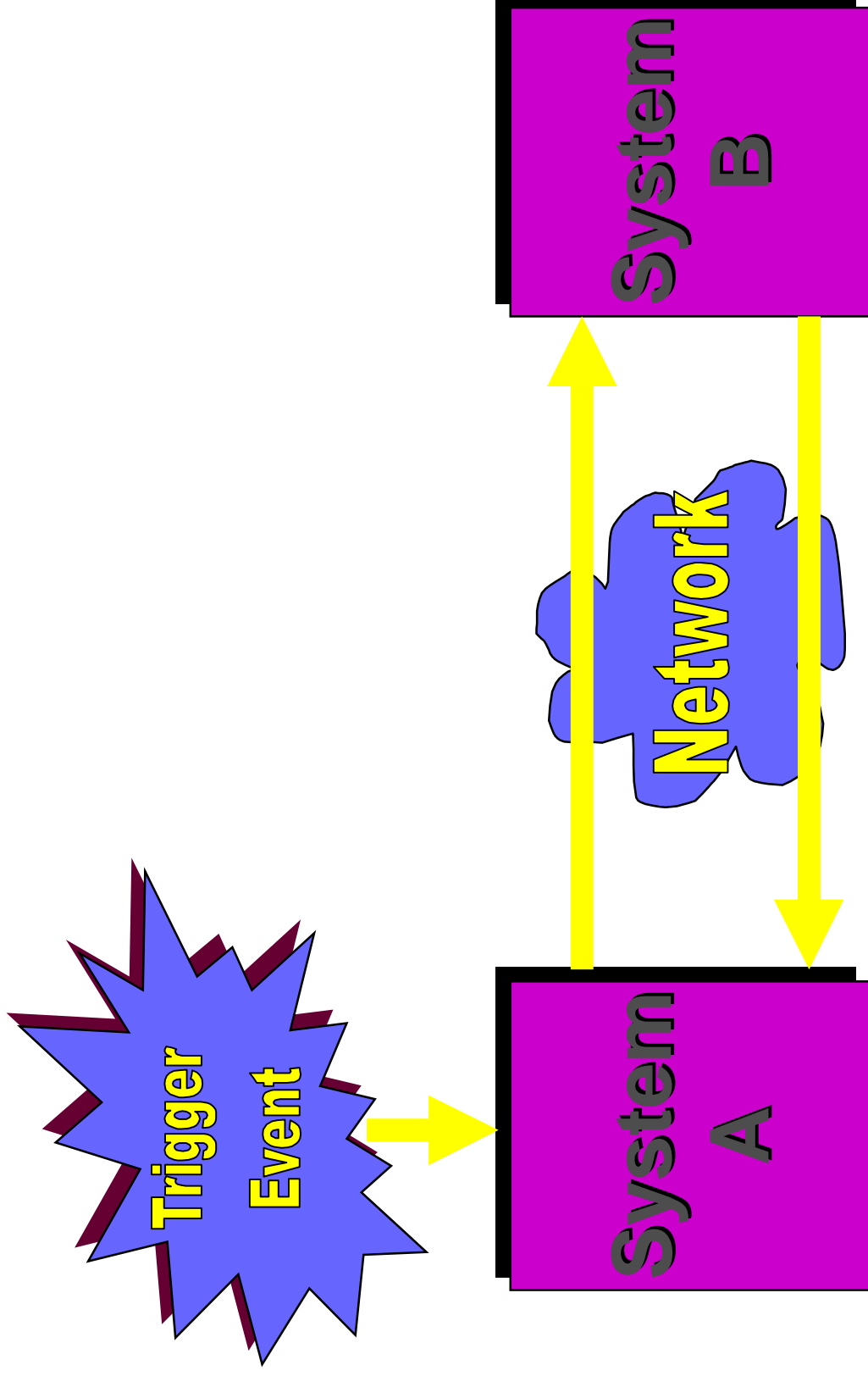
Important LOINC facts

- LOINC: Logical Observation Identifier Names and Codes (23,000+ names and codes)
- Copyright protected by Regenstrief Institute
- LOINC is free for use for all purposes
- Governed by the LOINC Committee
 - Clement McDonald, Chair
 - Stan Huff, Co-chair
- Open public meetings at least once a year
- LOINC is supported by grants from Regenstrief Institute, and the US National Library of Medicine

Access to LOINC

- Download files: www.regenstrief.org/loinc/loinc.htm
 - Email: loinc@regenstrief.iupui.edu
 - List servers at www.hl7.org
 - Background information:
 - www.regenstrief.org/loinc/background.htm
 - Next public meeting:
 - October 25 and 26
 - Salt Lake City, Utah
- For details see: www.regenstrief.org/loinc/loincmtg.htm

Context of LOINC Use: Messaging



Interoperability

- Main Entry: **in·ter·op·er·a·bil·i·ty**
Function: *noun*
Date: 1977
: ability of a system (as a weapons system) to use the parts or equipment of another system
Source: Merriam-Webster web site

- **interoperability**
: ability of two or more systems or components to **exchange information and to use the information** that has been exchanged.
Source: IEEE Standard Computer Dictionary: A Compilation of IEEE Standard Computer Glossaries, IEEE, 1990

Functional interoperability

Semantic interoperability

HL7 Lab Result Message

```
MSH|^~\&|OADD||DADD||19941122100053||ORU^M01|
PID||661041||GARDNER^REED^M|
PV1||I|E7^703^^LDS|
OBR||^A000520|LYTES^Serum Electrolytes|
OBX|1|NM|NAS^Serum Sodium|1|138|mmol/L|
OBX|2|NM|K^Serum Potassium|1|3.2|mmol/L|
OBX|3|NM|CL^Serum Chloride|1|114|mmol/L|
OBX|4|NM|CO2^Serum CO2|1|24|mmol/L|
```

So we are all using HL7, what is the problem?

- Site 1:
OBX|1|CE|ABO^ABO GROUP||O^Type O|
- Site 2:
OBX|1|CE|BLDTYP^ABO GROUP||TYPEO^Type O|
- Site 3:
OBX|1|CE|ABOTYPE^ABO GROUP||OPOS^Type O|

The goal

- Site 1:
OBX|1|CE|883-9^ABO GROUP||F-D1250^Group O|
- Site 2:
OBX|1|CE|883-9^ABO GROUP||F-D1250^Group O|
- Site 3:
OBX|1|CE|883-9^ABO GROUP||F-D1250^Group O|

Agree on a universal coding system for clinical observations.

Focus

- **Value for ‘Observation Identifier’ (Seq. #3) of OBX**
 - Or the name of the observation in other standards
- **Result names first, then orderables**
 - Orderables are built based on the tests they contain
- **Name should facilitate automated or manual matching (fully specified)**
 - Create local labels as needed
 - Standard LOINC short names
- **One common identifier for tests that are ‘clinically’ the same**

LOINC Objective

Create universal observation identifiers (test codes) for use in data exchange standards that follow a name-value pair strategy (HL7, DICOM, ASTM, CEN, etc.).

LOINC Approach

- **Collect names and descriptions**
 - **IHC, VA, Regenstrief, Mayo Clinic, Vendors**
- **Formulate a model to represent the individual pieces of information in the name (axes, degrees of freedom)**
 - **Concept based – need definitions with atomic terms**
 - **Recognize synonyms in the representations – is a “progress report” different from a “progress note”?**
 - **The individual axes should come from a standard or reference terminology**
 - **Avoid strategies that lead to “combinatorial explosion”**
- **Create “fully specified names”**
- **Fix model as needed**
 - **Do any distinct entities have the same name?**
 - **Do any entities that are the same have different names?**
- **Repeat process until no more fixes are needed**

Building from others

- **IUPAC - Henrik Olesen**
 - **component**
 - **system**
 - **kind-of-property**
- **SNOMED - multi-axial approach**
- **Previous work by Arden Forrey**

General Form of LOINC Names

LOINC codes are created systematically using a six axis model

<component> : <property> :

<timing> : <system> :

<scale> : <method>

2947-0 SODIUM :SCNC :PT :BLD :QN

The first 5 parts are mandatory, but *method* is optional.

Laboratory LOINC Subject Areas

- **Chemistry**
- **Urinalysis**
- **Toxicology**
- **Hematology**
- **Microbiology**
- **Antibiotic Susceptibilities**
- **Immunology/Serology**
- **Genetic testing**







Sodium Measurements

2947-0	SODIUM	:SCNC	:PT	:BLD	:QN
2948-8	SODIUM	:SCNC	:PT	:CSF	:QN
2949-6	SODIUM	:SCNC	:PT	:DIAF	:QN
2950-4	SODIUM	:SCNC	:PT	:FLU	:QN
2951-2	SODIUM	:SCNC	:PT	:SER/PLAS	:QN
2952-0	SODIUM	:SUB	:24H	:STL	:QN
2953-8	SODIUM	:SUB	:72H	:STL	:QN
2954-6	SODIUM	:SCNC	:PT	:SWT	:QN
2955-3	SODIUM	:SCNC	:PT	:UR	:QN
2956-1	SODIUM	:SRAT	:24H	:UR	:QN
2958-7	SODIUM/POTASSIUM	:SCRTO	:PT	:SWT	:QN
2959-5	SODIUM/POTASSIUM	:SCRTO	:PT	:UR	:QN

Antibiotic Susceptibility

11-7	AMIKACIN	:SUSC	:PT	:ISLT	:QN	:MBC
12-5	AMIKACIN	:SUSC	:PT	:ISLT	:QN	:MIC
13-3	AMIKACIN	:SUSC	:PT	:ISLT	:SQ	:AGAR DIFF
14-1	AMIKACIN	:SUSC	:PT	:ISLT+SER	:SQ	:SBT
15-8	AMOXICILLIN	:SUSC	:PT	:ISLT	:QN	:MBC
16-6	AMOXICILLIN	:SUSC	:PT	:ISLT	:QN	:MIC
17-4	AMOXICILLIN	:SUSC	:PT	:ISLT	:SQ	:AGAR DIFF
18-2	AMOXICILLIN	:SUSC	:PT	:ISLT+SER	:SQ	:SBT

Clinical LOINC Subject Areas

- Vital Signs
- Hemodynamic measures
- Fluid Intake/Output
- Body Measurements
- Emergency Department
- Respiratory Therapy
- Document sections
- Standard survey instruments 
- Ophthalmology measurements 
- EKG (ECG)
- Cardiac Ultrasound
- Obstetrical Ultrasound
- Discharge Summary
- History & Physical
- Pathology Findings
- Colonoscopy/Endoscopy 
- Radiology reports 
- Clinical Documents 
- Tumor Registry 

Some Examples

<u>Code</u>	<u>Component</u>	<u>Prop</u>	<u>TIME</u>	<u>System</u>	<u>Scale</u>	<u>Method</u>
8302-2	BODY HGHT	LEN	PT	^PATIENT	QN	
3140-1	BODY SURF	AREA	PT	^PATIENT	QN	DERIVED
8331-1	BODY TEMP	TEMP	PT	MOUTH	QN	
8319-6	BODY TEMP	TEMP	12H^MIN	XXXX		QN
8629-8	Q WAVE DPT	ELPOT	PT	HEART	QN	EKG
8632-2	QRS AXIS	ANGLEPT		HEART	QN	EKG
8642-1	PUPIL DIA	LEN	PT	EYE.RIGHT	QN	AUTO
21611-9	AGE	TIME	PT	^PATIENT	QN	EST
21612-7	AGE	TIME	PT	^PATIENT	QN	REPORT
19867-1	CAPACITY.VITAL	VOL	PT	RESP SYS	QN	
9279-1	BREATHS	NRAT	PT	RESP SYS	QN	
11882-8	GENDER	FIND	PT	^FETUS	NOM	US

More complex examples

9273-4 NEONATAL APGAR ^2M POST BIRTH FCN PT
^PATIENT ORD

9192-6 FLUID OUTPUT.URINE VRAT 24H URINARY
TRACT QN

11892-7 GESTATIONAL AGE TIME PT ^FETUS
QN US.ESTIMATED FROM A.C.HADLOCK84

10105-5 ST SLOPE.LEAD V6 ELPOTRAT PT
HEART QN EKG

8431-9 INTRACHAMBER SYSTOLIC PRES PT
HEART.VENTRICLE.LEFT.OUTFLOW TRACT QN

8283-4 CIRCUMFERENCE.MAX LEN PT CALF.RIGHT
QN

Clinical Document Names

11490-0	DISCHRG NOTE	FIND	PT	^PATIENT	NAR
	PHYSICIAN				
22029-3	PHYSICAL EXAM	FIND	PT	^PATIENT	NAR
11504-8	OPERATIVE NOTE	FIND	PROC	REPORT^PAT	NAR
11506-3	PROG NOTE.TOTAL	FIND	PT	^PATIENT	NAR
11508-9	PROG NOTE.TOTAL	FIND	PT	^PATIENT	NAR
	PHYSICAL THERAPY				
11509-7	PROG NOTE.TOTAL	FIND	PT^	^PATIENT	NAR
	PODIATRY				
11510-5	PROG NOTE.TOTAL	FIND	PT	^PATIENT	NAR
	PSYCHOLOGY				
11507-1	PROG NOTE.TOTAL	FIND	PT	^PATIENT	NAR
	OCCUPATIONAL THERAPY				

Sections of Operative Note

	TYPE	PT
10216-0 OPERATIVE NOTE FLUIDS ^PATIENT NAR		PT
8724-7 OPERATIVE NOTE DESCRIPTION ^PATIENT NAR	FIND	PT
10217-8 OPERATIVE NOTE INDICATIONS ^PATIENT NAR	IMP	PT
10830-8 OPERATIVE NOTE COMPLICATIONS ^PATIENT NAR	IMP	PT
10218-6 OPERATIVE NOTE POSTOP DX ^PATIENT NAR	IMP	PT
10219-4 OPERATIVE NOTE PREOP DX ^PATIENT NAR	IMP	PT
10221-0 OPERATIVE NOTE SPECS TAKEN ^PATIENT NAR	FIND	PT
10223-6 OPERATIVE NOTE SURG PROC ^PATIENT NAR	FIND	PT
10222-8 OPERATIVE NOTE SURG COMPLIC ^PATIENT NAR	IMP	PT

US Government Initiatives Involving LOINC

- Proposal for use in Claims Attachments (HIPAA)
- DEEDS Database (Dan Pollock, CDC)
- Electronic Laboratory Reporting (CDC)
- Proposal for Cancer Registries (NAACCR, CDC)
- Included as part of UMLS Metathesaurus

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Laboratory LOINC Committee

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Literature References

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