

Semantic Interoperability

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Levels of Semantic Interoperability

- Remember that the degree of semantic interoperability required varies depending on what you are going to do with the data
- Examples
 - Clinical Messaging
 - Electronic Lab Reporting
 - Clinical Data Repository

Content Standards

- Who – patient
- Who – provider
- **When both sides use the same codes for these – life is good!**
- (When – encounter number for billing number)
- Where – location/addresses

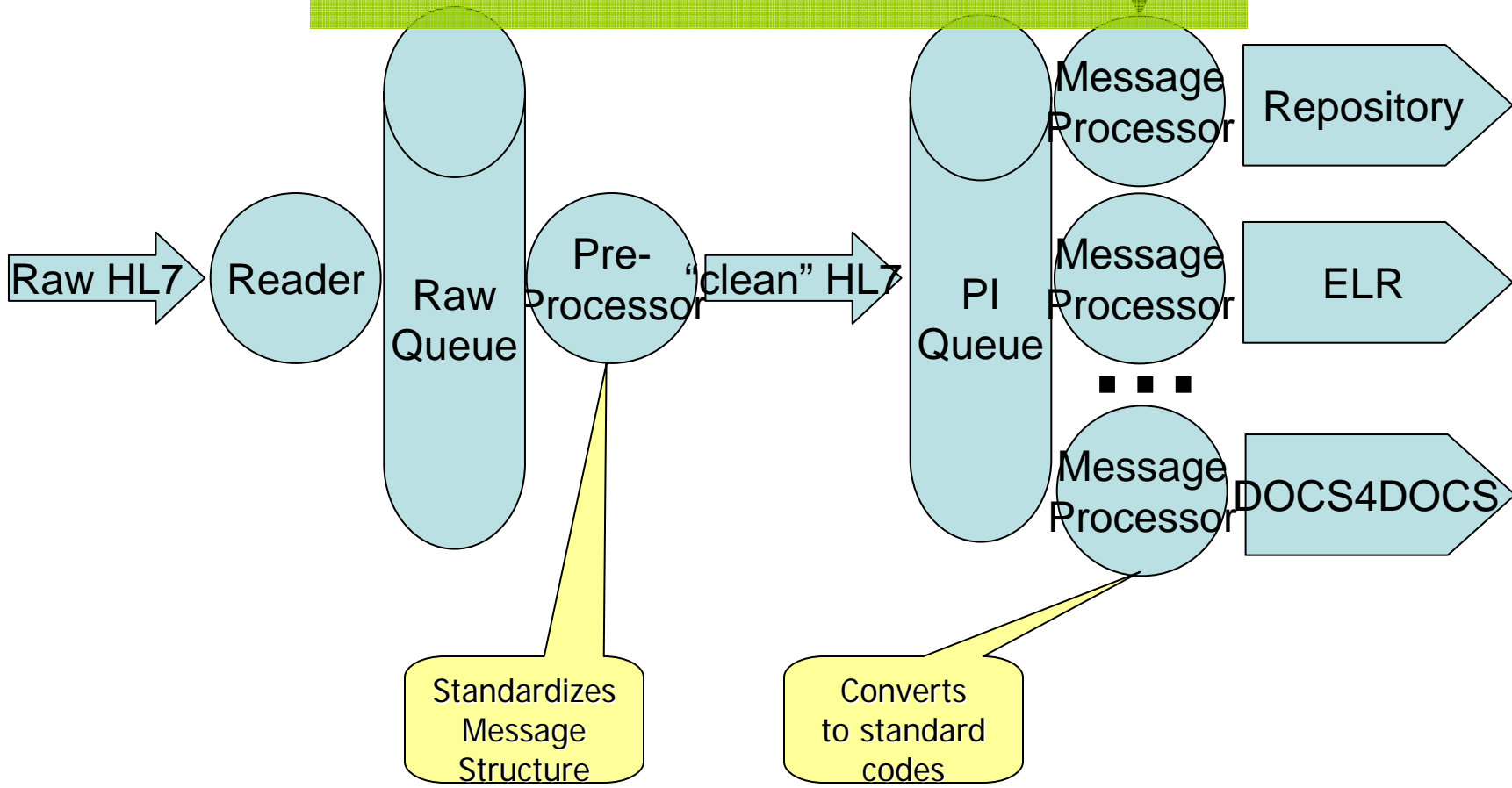
The road to Standardization

- Use HL7 to standardize the message (the data base structure)
- Use LOINC to standardize the what :measurements and survey instruments (observation/report IDs)
- Use RxNorm to standardize the medication
- Use SNOMED to standardize the organisms (and maybe some of the answers)

Message Flows

On the way in!

Institution Specific Mapping Table



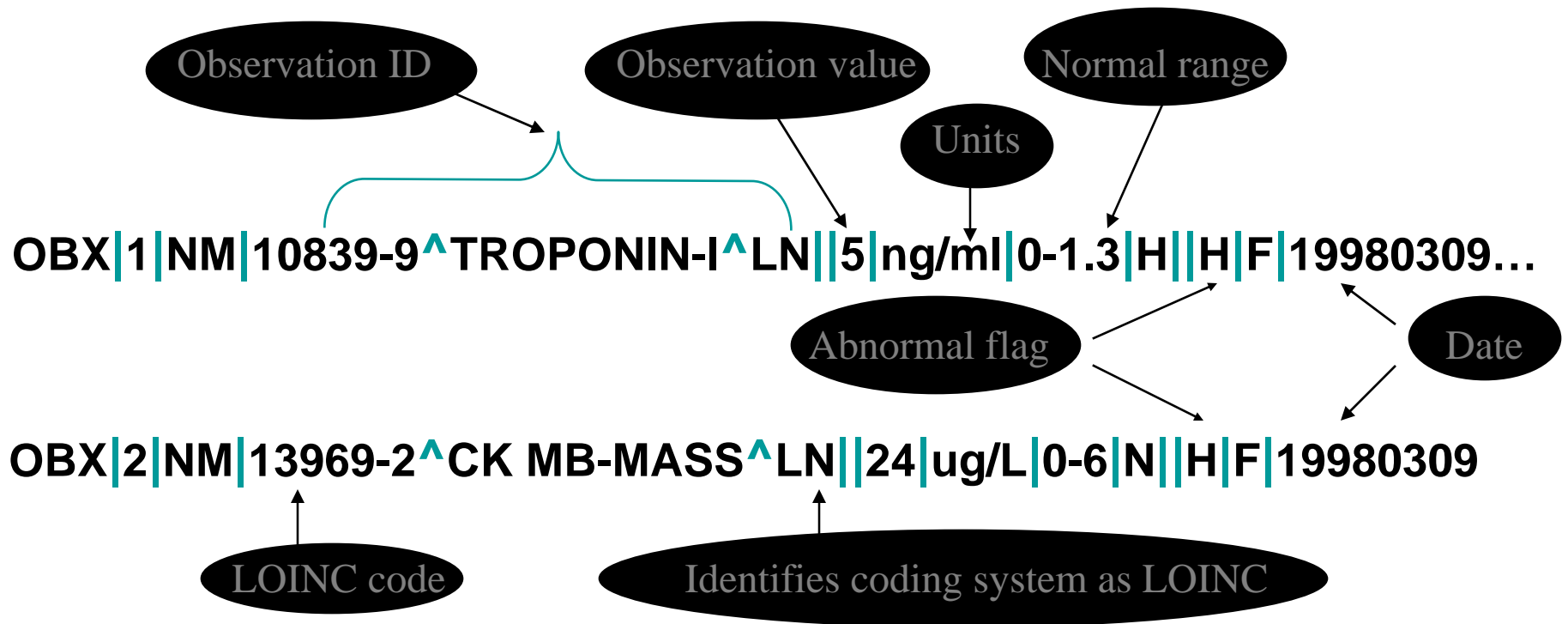
Don't make it complicated!

- HL7 2.x works just fine
- Problems all come from flagrant disregard of the HL7 specs e.g.:
 - Coded data sent without codes or coding system (just text)
 - Units appear in value field instead of units field
- Technical improvements (including new standards) can't fix this

HL7 message issues

- Coding
- Results
 - Results often hidden (text with it)
 - Combined results (no shigella, salmonella or E. coli ..., GC isolated but no Chlamydia, if you suspect your patient has M. tuberculosis)
- Abnormal flag
- Corrections/changes

OBX for serum Troponin-I and a CK MB



Says patient had a serum troponin value of 5 ng/mL, and a serum CK MB value of 24 ug/L.

Code standards – LOINC®

- Database of 32,000 observation identifiers
- Six part formal name
- Short name
- LOINC code with check digit
- All available at no cost for research or commercial purposes
- Available on internet
 - <http://www.loinc.org>
- Mapping/browsing program (RELMA)

Example of LOINC codes

718-7:HEMOGLOBIN:MCNC:PT:BLD:QN:

Hgb Bld mCnc *

26464-8:LEUKOCYTES:NCNC:PT:BLD:QN:

WBC # Bld *

2160-0:CREATININE:MCNC:PT:SER/PLAS:QN:

Creat SerPl mCnc *

1920-8:ASPARTATE AMINOTRANSFERASE:CCNC:PT:SER/PLAS:QN:

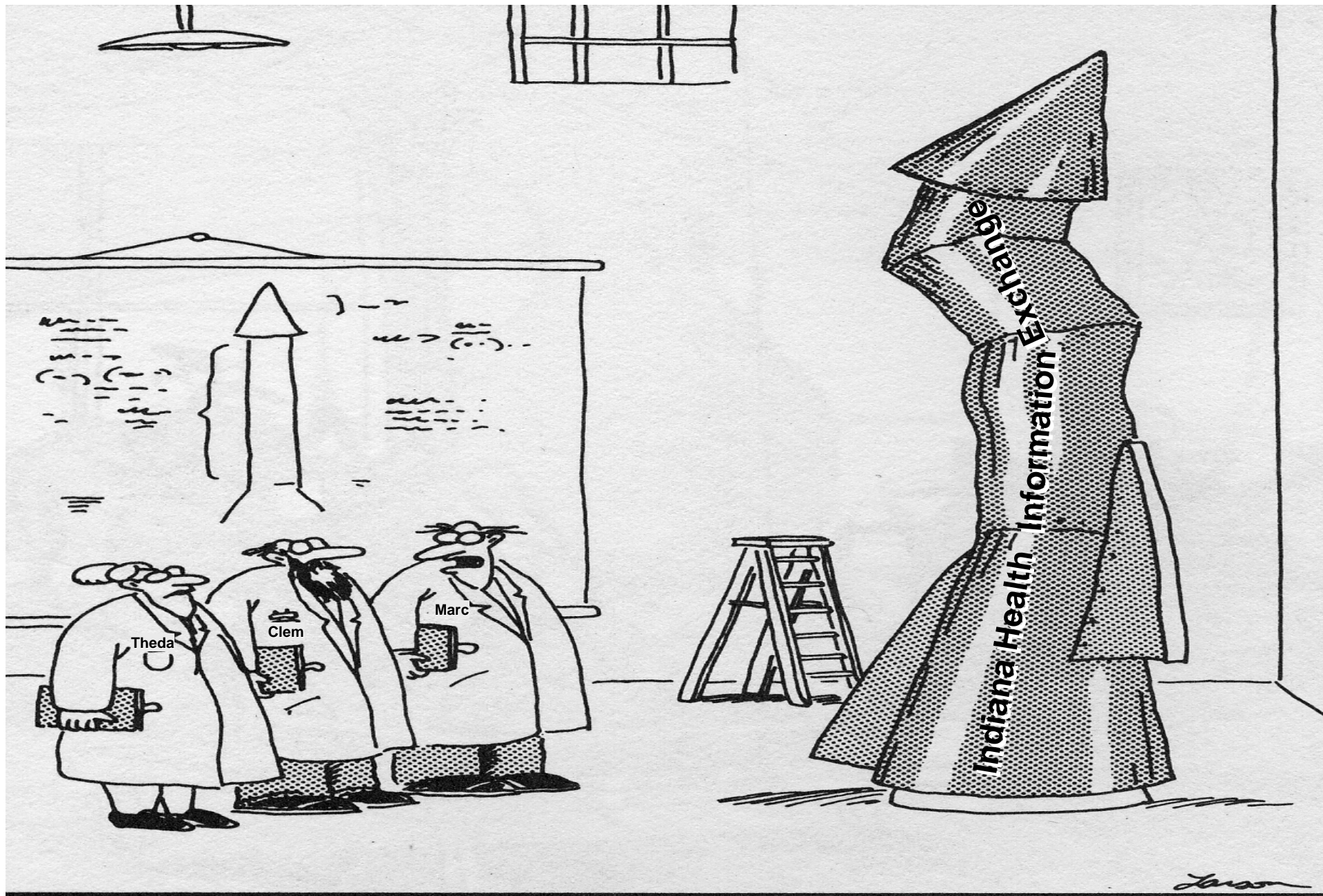
AST SerPl cCnc *

8634-8:TIME:PT:HEART:QN:EKG QT INTERVAL

8508-4:INTRAVASCULAR SYSTOLIC:PRES:PT:BRACHIAL ARTERY:QN

8496-2:INTRAVASCULAR DIASTOLIC:PRES:PT:BRACHIAL ARTERY:QN

* LOINC short names



“It’s time we face reality, my friend. ... We’re not exactly rocket scientists.”

C!TL HIE Taxonomy

Level	Description	Examples
1	Non-electronic data	No PC/information technology
2	Machine-transportable data	Fax/Email
3	Machine-organizable data	Structured messages, non-standard content/data
4	Machine-interpretable data	Structured messages, standardized content/data

Data formats

Hx: pt is a 34 yr old W/F c/o 3d hx NVD.
PMH: Pappy ciga. 30. FH: M & S lung CA.

HPI: Patient is a 38 year old white female complaining of a 3 day history of nausea, vomiting and diarrhea.
PMH: questionable appendectomy
FH: mother died at age 82 of lung

Vital Signs	Height: <input type="text" value="64"/> inches	Weight: <input type="text"/> pounds
	Temperature: <input type="text" value="98.6"/> degrees F	Temperature site: <input type="text"/>
Pulse: <input type="text" value="133"/>	Respirations: <input type="text" value="18"/>	Blood pressure: <input type="text" value="120"/> / <input type="text" value="80"/> mm Hg
<input type="button" value="OK"/> <input type="button" value="Cancel"/>		

- Continuous
(big, complete, easy, dumb)
- Discrete -- text
(small, partial, easy, +- smart)
- Discrete -- codes
(small, partial, hard, smart)

Structuring Data Costs

