

Understanding and Implementing PHIN Notification Messaging

PHIN Stakeholders Conference

May 14, 2003

Four Questions for this Presentation

- Why create a standard?
- How was the standard created?
- What has been created?
- How do you implement it?

Many Applications/Many Standards

- In the beginning, CDC (and CDC public health partners) supported 80+ independent surveillance systems.
- Some used NETSS to report cases.
 - ◆ One core record
 - ◆ Many extended records
- Some did their own thing
 - ◆ Tuberculosis reporting
 - ◆ Sexually Transmitted Disease reporting
 - ◆ HIV/AIDs reporting
- Reporting from provider to public health had nothing in common with reporting within public health.

Industry Standard or Custom Implementation?

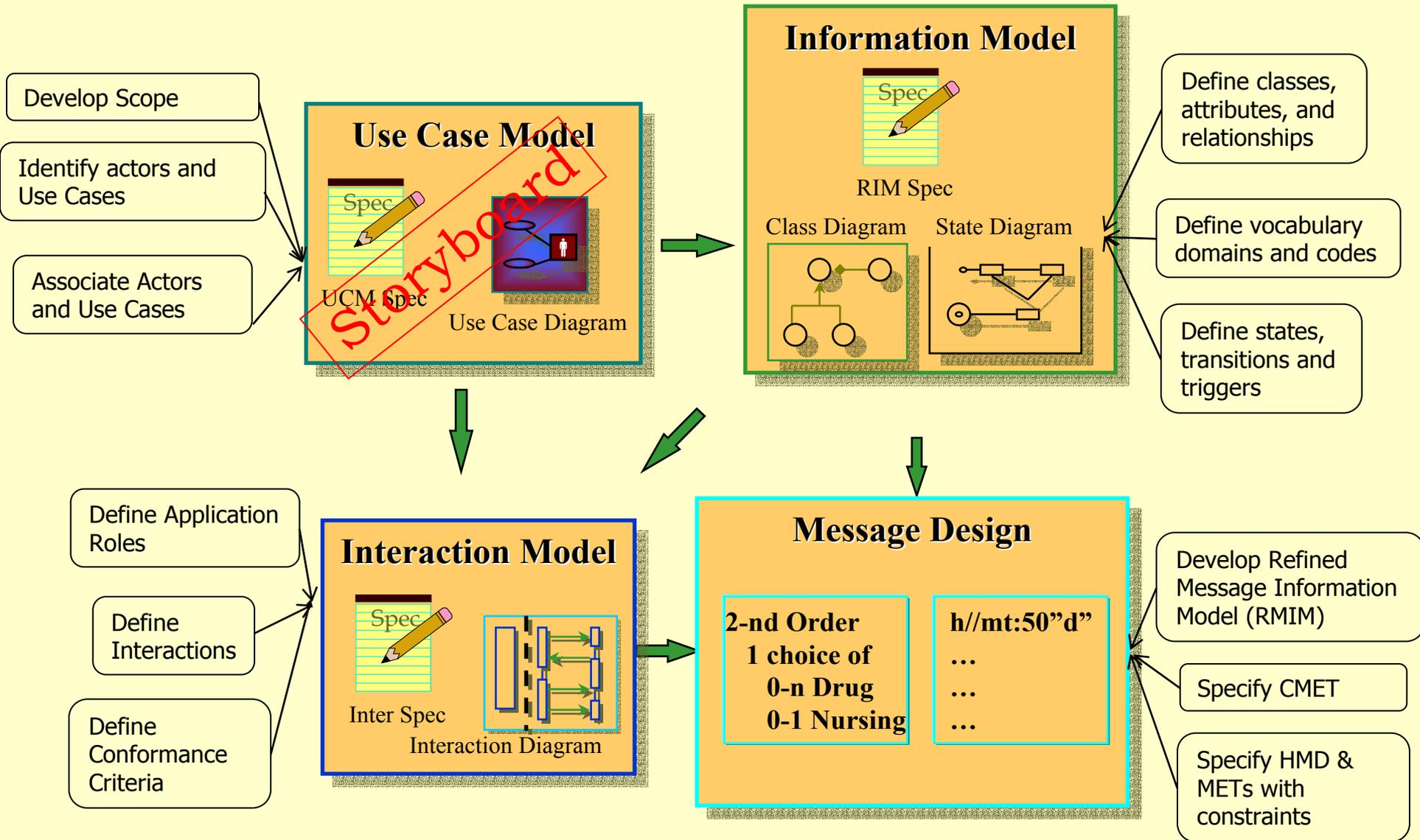
- Given a clear need for a public health standard to support Notification Messaging, how was such a standard to be constructed?
- Answer: Use a broad based, widely accepted healthcare industry standard.
- Why?
 - ◆ Public health would make use of a solid base of work that was already in place.
 - ◆ Use of an accepted standard would add credibility and solidity to the effort.
 - ◆ Using a healthcare standard would make it easier to bring in data flows directly from healthcare providers.
 - ◆ The Federal eGovernment Initiative said so.

Additional Public Health Messaging Projects

- Vital Statistics
 - ◆ Provide a specification for Birth and Death information.
 - ◆ Bob O'Doherty from Colorado will touch on work in this area.
- Antimicrobial Use Reporting (AUR)
 - ◆ Monthly provider reporting of antibiotics use and organism susceptibility.
- FDA Drug Notification
 - ◆ Support Drug Reaction reporting using an upgraded Notification Message
- FDA Stability Reporting

- Design based on *consensus* Reference Information Model - ties message elements to explicit semantic definitions
- Adaptable to current and future technology bases - requires abstract expression of standard data structure
- Vocabulary-level interoperability - requires robust data type(s) for coded data
- Explicit conformance model - means that optional elements in the specification must be eliminated where ever possible

Methodology for Message Construction



A Key Premise: Shared Vocabulary

- Interoperability goes beyond creation of common formats – it requires shared concepts, shared vocabularies
- Today, we have some standardization, but it is disease and program specific.
- The proposed Notification Message must (and do) include a well defined vocabulary.
- Doing so requires attention to:
 - ◆ Vocabulary concepts and format
 - ◆ Procedures for rolling out and implementing vocabulary items
 - ◆ Procedures for updating and revising these items.

XML Based Messaging

- “technology-free’ message specification is a basic premise of HL7 Version 3.
- XML is the first implementation technology (ITS), and will be used for public health Notification Messages.
- Note:
 - ◆ Messages are XML documents.
 - ◆ Using XML taps into a broad-based technology direction.
 - ◆ XML is new. People will need to be trained, and tooling is still being rolled out.

Building Specifications for Public Health

- Define Requirements
 - ◆ Map relevant data to the HL7 Reference Information Model using the HL7 (Visio) toolset. This becomes the source a specific message model.
 - ◆ Document interchange requirements using the HL7 process.
- Perform Analysis
 - ◆ Use HL7 tooling to define:
 - Specific message model (RMIM)
 - Message specifications (HMD)
 - XML schemas.
 - ◆ Address vocabulary issues by looking at HL7 domains first, but not last.
- Lay the Basis for Implementation
 - ◆ Create mappings between message elements and source and target databases.

Requirements for Notification

- Message header consistent with ebXML
- Notification information including sender/receiver
- Case/Investigation information
- Case subject (patient) information
- Clinical observations, lab results, other relevant information items
- Interventions associated with the case
- Contacts of the case subject (secondary contacts as well)
- Additional information: encounters, related notifications, specimen information
- CREATE ONE SPECIFICATION TO SUPPORT ALL TYPES OF NOTIFICATION

A Pattern for the Message Contents

CaseReport
(PORR_RM100001)
This message is used for the reporting of notifiable diseases on the part of public health agencies and BT response teams.

Sender

Receiver

Notification

Case Subject

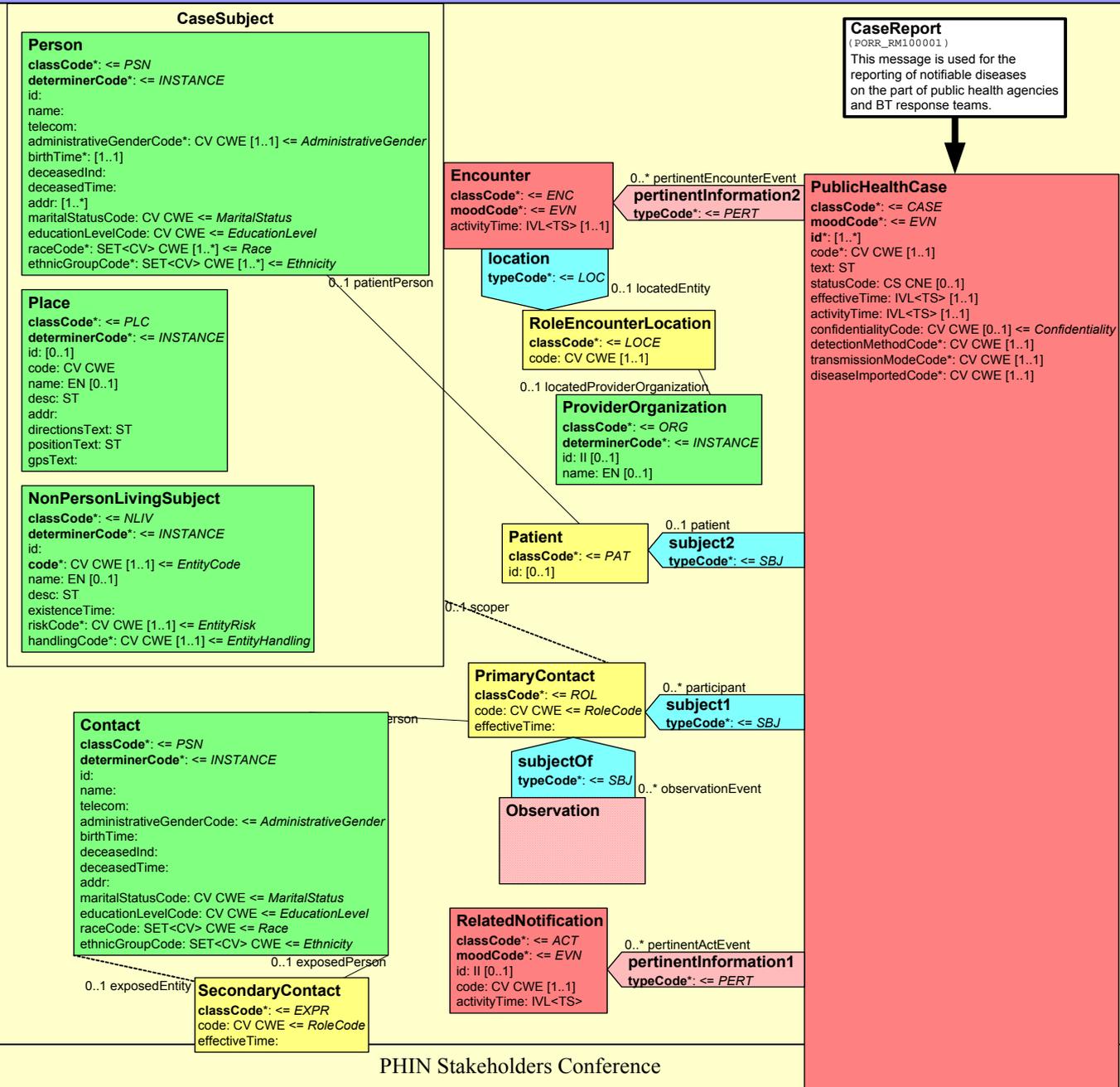
Case Contacts

PublicHealthCase

Observations

Interventions
(Drug/Vaccine Administration,
Procedure)

Message Model Detail I



Documentation for the Message

- Notification Message Basic Description
 - ◆ Message requirements and methodology
 - ◆ Message contents
 - ◆ Background HL7 information
- Disease Specific Implementation Guides
(completed for Hepatitis, Bacterial Meningitis, Measles, Rubella, Pertussis)
 - ◆ Mapping between a list of relevant attributes and the HL7 message structure
 - ◆ Vocabulary
 - ◆ Object Identifiers

Constructing a Useful Vocabulary

- The message requires a vocabulary specification for each coded attribute in the message.
- These specifications are based on the development effort for the NEDSS Base System.
 - ◆ Many are drawn from HL7 vocabularies
- You should note the **key role** of “Observation.code”, i.e., observation type.

The specification is based around the notion that a notification includes many observations. In the past, i.e., NETSS, these were carried as explicit data elements. Most of these are observations. The Observation code serves to identify the observation type (like a Service Master in a hospital)

Who's on First?

- Anytime two computer systems try to interoperate, identification is always a key question.

Consistent identification is a requirement for PHIN to work.

- This includes identification of:
 - ◆ persons & organizations,
 - ◆ software instances,
 - ◆ the namespaces within which identifiers can be considered unique,
 - ◆ vocabulary items.
- HL7 has crafted a consistent process for managing identifiers through the use of Object Identifiers – OIDs.

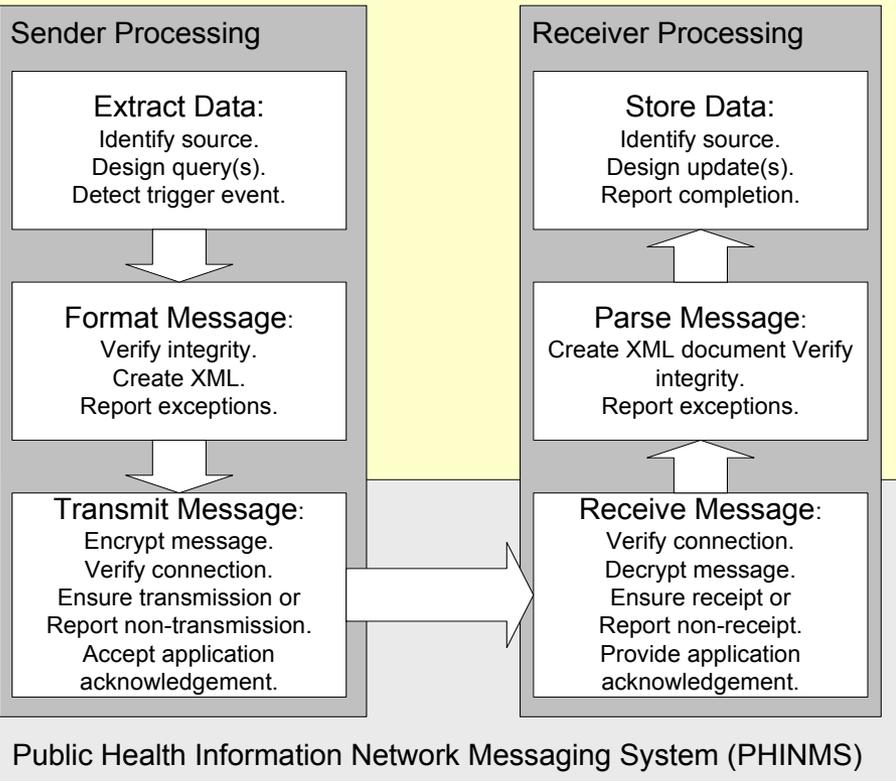
Using the PHIN Web Site to deliver product

- Notification Message Documentation
 - ◆ Notification Message Basic Description
 - ◆ Current Implementation Guides
- Message Schemas
 - ◆ The package of schemas includes
 - Notification message schema
 - Message “wrappers”
 - Common Message Element Types (CMETs)
- Example Messages
 - ◆ Only one so far
- Additional Supporting Material
 - ◆ HL7 Refined Message Information Models
 - ◆ HL7 RIM repository
- Note: You would need the HL7 tools to create your own schemas. HL7 members can download these from the HL7 website.

Implementation Issues

Define Transaction
Define data to be passed.
Agree on transaction format.
Agree on messaging parameters: trigger, acknowledgements.

Define Communication Environment
Install, e.g., PHINMS
Agree on exchange environment, e.g., ebXML
Share messaging partner IDs, define network address, address encryption procedures.



- Context Definition
 - ◆ CDC has defined the transaction
 - ◆ PHIN MS (Messaging Service) can support communication
- Message Processing
- Data extraction and message formatting are tightly bound together
- This is the area where tools can play a role.

Implementation and the NEDSS Base System

- The capability to deliver Notification Messages is a deliverable of the NEDSS Base System.
- As new programs are implemented (PAMs), this will include support of the appropriate implementation guide.
- NBS implementers should:
 - ◆ Keep on top of updates to required vocabularies.
 - ◆ Be aware of – and contribute to – updates to the implementation guides.

Non-NEDSS Base System Implementers

- Need to implement message creation on their own.
- Can either make use of the PHIN MS or emulate its behavior.
- Once the initial implementation is in place, will need to:
 - ◆ Keep track of new implementation guides
 - ◆ Keep on top of vocabulary updates
 - ◆ Use OIDs for identifier management

- Managing and Moving Messages (this is what PHIN MS does) requires consideration of:
 - ◆ Supporting the ebXML standard
 - ◆ Supporting PHIN encryption using Verisign
 - ◆ Handling acknowledgement of message receipt
 - ◆ Providing logging and archiving at the message level

Mapping and Data Extraction

- Creating a mapping between the Notification Message and an organization's own data structures is the first step towards creating a message instance.
 - ◆ States should use the Implementation Guide as a manual for this process.
 - It provides lists the attributes of interest,
 - It provides an NBS oriented set of descriptions for elements.
- The data extraction process will be conditioned by:
 - ◆ the chosen strategy for creating XML instances,
 - ◆ the DBMS storing the data,
 - ◆ the kinds of transformation that will be required.

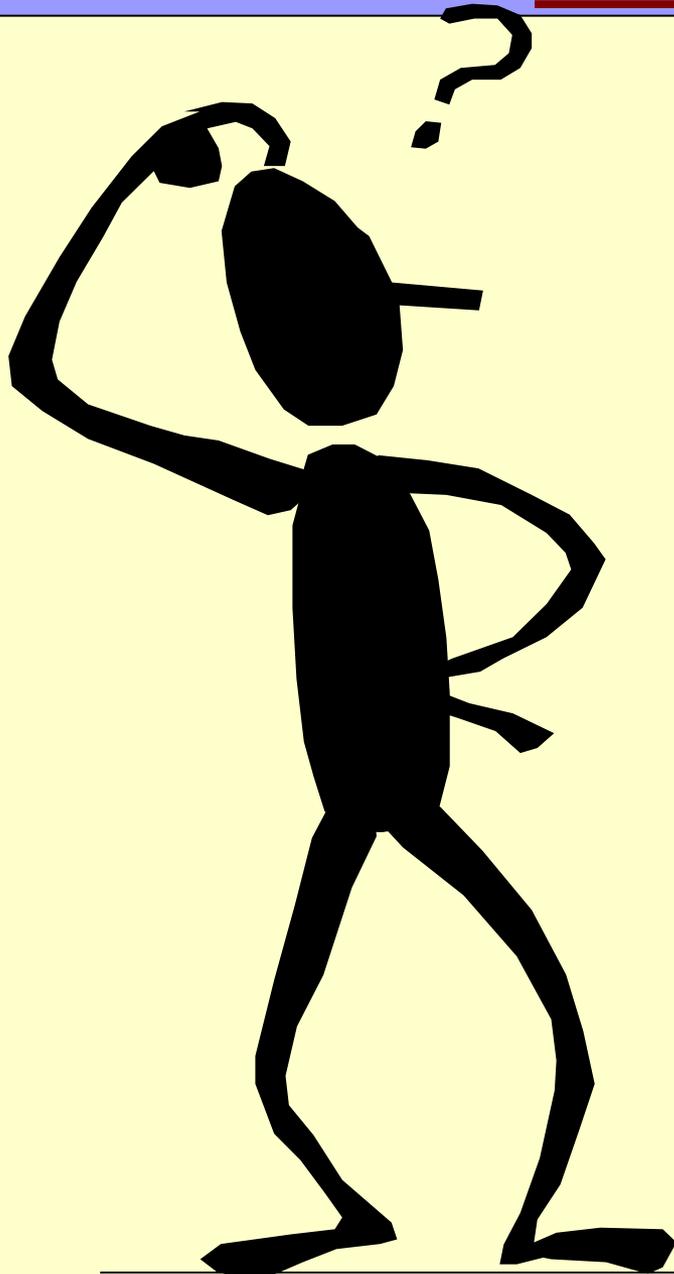
Creating Message Instances

- Once data has been extracted, it needs to be formatted as a compliant XML document
- Essentially this involves application of the mapping in the implementation guide, and fidelity to the rules of XML
- Third party tools may be available to help.
- Note, there is no hard and fast boundary between data extraction and instance creation.

To Summarize

- CDC has specified an HL7 Version 3 message to support case notification in the PHIN.
- Documentation has been provided for the Notification Message, and for disease-specific Implementation guides.
- Implementation involves extracting the needed data, and creation of a compliant XML instance,

Additional Questions



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