The Future of Clinical Data: The Evolving Impact of CDISC and HL7 Standards

CLINICAL DATA INTERCHANGE STANDARDS CONSORTIUM

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Topics

- FDA and HL7
- CDISC and HL7
- CDISC standards for today
- Is HL7 the answer?
- A future vision for clinical data
Source: FDA PDUFA IV IT Plan  
Note: FDA Plans to revise to clarify acceptance of both CDISC SDTM XPT and HL7 XML 2009-2013 and beyond.


FDA Messages on Standards

• “The World is Round”
  – Clinical data are not flat and cannot be exchanged using flat two-dimensional files without significant loss of meaning

• FDA is transitioning to a “round view of the world” of clinical research
  – CDISC-HL7 standard will get us there

• SDTM is here to stay
  – Will transition from a standard submission format to a standard view of data in support of simple analyses (e.g. distribution, means, etc.)

• But Flat Files Don’t Inherently Capture the Tree Structure, which is itself important to understand the data
  – Better approach: data model that inherently captures relationships at the point of collection and can transmit them.

Source: Dr. Armando Oliva
What is the Janus Data Pyramid?
Structured Scientific Data Management System

Exchange Layer

Persistence Layer

Database Layer

Data Mart & Special Purpose Layer

Analysis Layer

Results Layer

Source: Lilliam Rosario, FDA 2009
What is the Janus Data Pyramid?

Source: Clyde Ulmer, FDA NCTR 2010
**Vision:** Better Long-Term Integration with EHRs to Support Clinical Research and Surveillance

Source: Dr. Armando Oliva
Can We Stack Round Data?

• Is the flat file format the problem, or the fact that some relationships are never recorded or never collected?

• And clinical data can be arranged hierarchically with proper timing information and keys – even in SDTM

• While raw patient data may be rounder, is it really suited for aggregate, structured, dimensional data for analysis?
  – Isn’t clinical data recorded and collected on flat forms and analyzed in flat tables?

• And is a transport format optimized for sending short transactions best for a complete study worth of data – after data are cleaned, processed, amended, restructured?
  – And how do we ensure that FDA views match sponsor’s?
The Role of CDISC vs. HL7

**CDISC**
- Represents clinical research domain
- Community of clinical research workers
- Flexible process to facilitate wide acceptance of research standards
- Standards written for clinical research workers
- FDA observers
- Moving to content focus

**HL7**
- Represents many diverse healthcare domains
- Communities of IT modelers and developers
- Rigid, accredited, complex model-driven development processes
- Standards written for application developers
- FDA sponsor/initiator
- Harmonizing V2, V3, CDA
Defining SDTM for a non-XPT World

Source: Dave Iberson-Hurst
SDTM: a Standard for Today

- Based on FDA1999 Guidance
  - Withdrawn 2009

- Compromised to fit legacy data and SAS XPT
  - Insufficient metadata
  - Limitations on variable names, text length, datatypes
  - Lack of codelists, supplemental qualifiers, etc.

- Struggles with complex data scenarios

- Criticized by FDA for gaps and variability

- Fuzzy lines between tabulations and analysis

- Thus, not the ultimate answer, but good enough – and improvable
Transitioning SDTM for HL7

Source: Dave Iberson-Hurst
Realizing HL7 Benefits Requires Disruptive Process Changes

- Protocol ⇄ HL7 Study Design Message
- IND Process ⇄ Study Participation Msg
- SDTM/ADaM/Define ⇄ HL7 Subject Data Msg
- eCTD ⇄ RPS
- New standards ⇄ prescribed standards
  - eStability, Non-Clinical, etc.
- E2B ⇄ ICSR
- eCRF ⇄ EHR HL7 messages and documents?
- Flat SAS Datasets ⇄ Round, Convoluted XML
**Vision:** Better Long-Term Integration with EHRs to Support Clinical Research and Surveillance

Source: Dr. Armando Oliva
ICSR: Key Driver for HL7 Convergence

• Next ISO/HL7/CEN/ICH standard AE reporting format (E2B-R3)
• Provides rationale for sending HL7 clinical data
  – FDA wants ICSR to replace SAEs in clinical data
• Significant process implications: timing, content, state
  – Requires integrated tools not yet available today
  – Requires seamless equivalence of complete terminologies (e.g., MedDRA, ICD9, SNOMED)
• But as long as semantics and meaning are the same, does the message format have to be?
  – Integration occurs in the database, not between messages.
The Future of Clinical Data

Non-Protocol / Protocol

Procedures & / Observations
Analysis
Interpretation
Question

CDISC
A Future Vision for Clinical Data

• All studies are defined with standardized, structured, machine readable protocols, designs, plans
• Health data in native form – procedures and observations
  – Direct primary patient observations
  – Meta-observations
  – Context observations
  – Analysis observations
• HL7 raw data with common semantics seems well suited to this observational, transactional, interoperable world
• SDTM & ADaM views (perhaps as ODM) will also need to be submitted to support clinical review and analysis
  – But these must evolve to leverage direct healthcare data in “new” SDTM and ADaM views
Observations on the Future

• HL7 can provide a model, methods and terminology controls
  – But V3 XML may change
• HL7 transport will likely transmit direct patient observation and care records (allowing drilldown to round data)
• CDISC data structures bridge the gap from the raw data stream to structured clinical trial views of the data
• So go with the flow: Don’t worry about the RIM, DMIMs, RMIMs or the transport mechanism – and trust BRIDG
• Keep the faith: CDISC standards like SDTM, ODM, ADaM will be there while HL7 is tested, proven, and ready for use in the interoperable world. And trust CDISC to adapt.
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Thank you

“The best way out is always through.”

-- Robert Frost

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