

# Software Tools for working with CDISC ODM, SDTM, Lab and define.xml

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XML4Pharma



# A software overview is always ...

- Incomplete
- Biased
- So ...

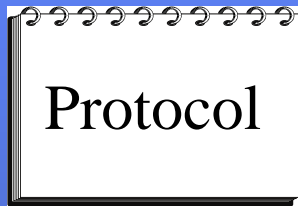
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# The CDISC Models

- CDISC **ODM**: Standard for exchange, storage and archiving of clinical study data and metadata
- CDISC **Lab**: Exchange of laboratory data
  - ASCII, XML, SAS, HL7 implementation
- CDISC **SDTM**: standard for submission of clinical data sets to the FDA
- CDISC **CRT-DDS** (define.xml):  
**C**ase **R**eport **T**abulations **D**ata **D**efinition  
**S**pecification

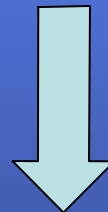
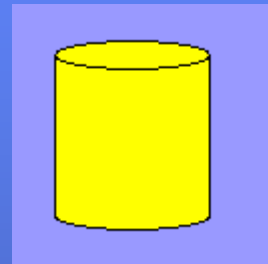
# CDISC end-to-end



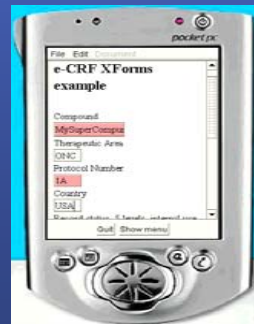
CDISC ODM  
Study Description  
XML



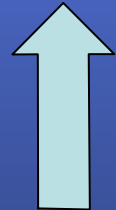
CRO DB



eCRF



XML-Signature  
XML



Rel.Database  
XML XML Database  
CDMS



**Investigators copy of submitted e-CRF**

Investigator: Investigator

Submitted at: Oct 4, 2005 9:09:26 AM

Form: Physical Exam

Group: Physical Exam, General

Group code: IG.PHYEX\_1

Question	Response	Question code	Response code
Compound	P001	IT.F_DRUG	
Therapeutic Area	Oncology	IT.TAREA	ONC
Protocol Code	P001	IT.FNO	
Country	Germany	IT.SCTRY	DE
Record status, 5 levels, Internal use	Source verified, not queried	IT.F_STATUS	S

Group: Physical Exam, Body System

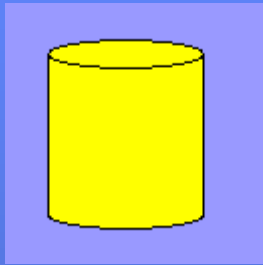
Group code: IG.PHYEX\_2

Question	Response	Question code	Response code
Physical Exam Body	Head	IT.BODY_SVS	S

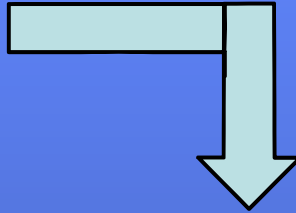
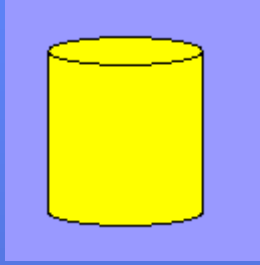


# CDISC end-to-end

CRO



WS  
XML

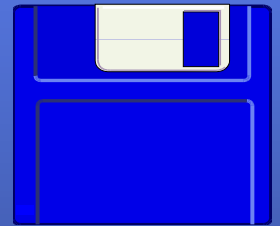


Sponsor

Rel.Database

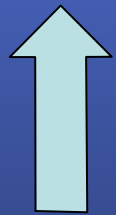
XML Database XML

CDMS

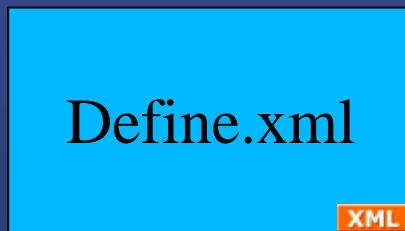
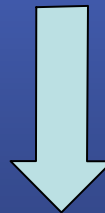


ADaM  
SDTM

SAS  
Transport 5



Lab data



# Protocols

- No CDISC Protocol Standard yet
- So no tools yet
- CDISC ODM Study setup should be automatically generated from the (CDISC) Protocol document

# Tools to create ODM Study Setups

- Create Item, ItemGroup definitions, Forms, Visits ..., and save them as ODM
- Tools available :
  - **Origin** (Formedix)
  - **XC Designer** (DataLabs)
  - **ODMDesigner** (XML4Pharma)

# CDISC ODM based CMD / EDC systems

- Commercial
  - **Marvin** (Xclinical)
  - **Express** (Formedix)
- Open Source :
  - **Visitrial** (Granite Health Systems)
- Many other export ODM Data
- Some import ODM Data



# CDISC ODM and eCRF

- The ODM Study definition contains all information to automatically create eCRFs
- This has been implemented by a good number of eCRF vendors
- Demo application (using XForms) at :  
[www.XML4PharmaServer.com](http://www.XML4PharmaServer.com)

Study Event ID : system-generated

Subject ID 001 \*

Group: Physical Exam, General

Compound: MySuperCompound Maximum length is 8 characters.

Therapeutic Area: Oncology

Protocol Code: P001

Country: Germany

Record status, 5 levels, internal use: Source verified, queried

Group: Physical Exam, Body System

Insert after selected Group

Remove selected Group

Physical Exam Body System: Lungs

Normal/Abnormal/Not Done: Abnormal

Smoking damage observed

Comment

Insert after selected Group

Remove selected Group

Weight <sup>fp</sup> 80.4

Gender <sup>fp</sup>  Female  Male

Date of Birth <sup>fp</sup>  5 / 7 / 1957

Ethnic Group <sup>fp</sup>

Submit

May 1957

Sun	Mon	Tue	Wed	Thu	Fri	Sat
28	29	30	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	1
2	3	4	5	6	7	8

Today: 3/9/2004

ld show a calendar control.

# Why use ODM for eCRF ?

- Format already CDISC
- Easily appendable to ODM file for transfer
- All information is there
- Ideal for native XML database
- Standard XML tools usable
  - XML-Signature, XML-Security
  - Web Services
  - ...

# Standard XML tools (usable for ODM)

- **XML-Signature, XML-Security**
  - Many implementations available: Apache, IBM, Verisign, Microsoft ...
- **Web Services**
  - Many implementations available: Apache Axis, .Net, Perl, C++, ...
- **Native XML databases:**
  - Tamino ... eXist ... Oracle

Demos of all these available at [www.XML4PharmaServer.com](http://www.XML4PharmaServer.com)

# CDISC ODM and conformity

- 70-80% of the rules can be described in the XML-Schema
- 20-30% can only be described in the spec itself
- Use a **Conformity Checker**
  - **ODMConform** (Assero)
  - **ODMChecker** (XML4Pharma)

File

**Results from checking the CDISC ODM Document**

Checking ODM file

C:\CDISC\_ODM\_Checker\CDISC\_ODM\_Checker\_v0.6\testfiles\ODM1.2\CTChicago\_XSchema\_not\_conform.xml

**Level 1 ERROR** when reaching line 3

Incorrect value for attribute

Found : **"Absent"**

The attribute should have one from the the following list of values :

All, Metadata, AdminData, ReferenceData, AllClinicalData, SingleSite, SingleSubject

**Level 1 ERROR** when reaching line 3

The value **"Absent"** of attribute **"Granularity"** on element **"ODM"** is not valid with respect to its type, **"Granularity"**.

**Level 2 WARNING** when reaching line 3

ODM Version mismatch

No **"ODMVersion"** attribute was found although the presence of an XML-Schema indicates that the ODM Version is 1.2

Documents based on ODM 1.2 should have ODMVersion=**"1.2"**

ODM Version 1.2 will be supposed further

**Level 1 ERROR** when reaching line 69

The value **"Axxxxxxxxxxxxxx"** of attribute **"SASDatasetName"** on element **"ItemGroupDef"** is not valid with respect to its type, **"sasName"**.

The attribute length is more than 8 characters or contains invalid characters.

# Tools for working with CDISC Lab files

- Implementations: ASCII, XML, SAS, HL7
- PHT has/had a CDISC **Lab Viewer**
- **Covance** is forerunner
- CDISC **Lab Checker**
  - ASCII version
  - XML version

*Available online*
- Server implementation running at **Gereq**

# Tools for working with CDISC Lab files

- Lab ASCII to Lab XML Converter
  - Available online
- Conversion from Lab (XML) to ODM
  - Use XSLT
  - Several demo stylesheets available from different consultants



# Working with ODM in SAS

- SAS Proc CDISC
- Tekoa Toolkit and Tekoa Statistical Reporting from Zürich Biostatistics (ZBI)

# From ODM to submission

- How do we convert ODM into submission data ?
- SDTM is a specification, not a format
- Submission data in define.xml and SAS Transport 5
- Later: ALL data in define.xml

# Convert ODM into SDTM

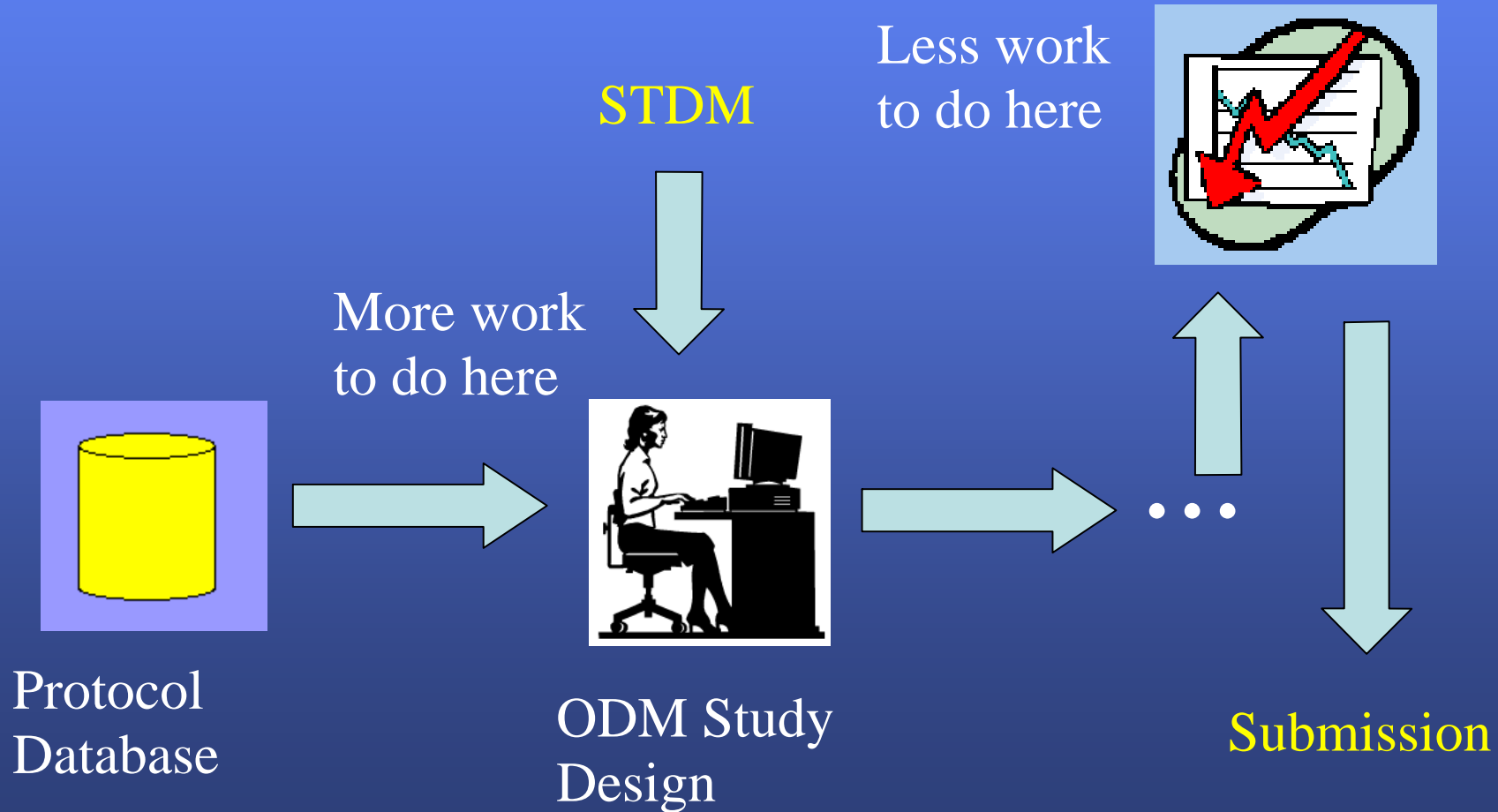
- Use SAS, or ...
- Use other commercial software
  - OC2SDS (Oracle Clinical)
  - WebSDM (Lincoln Techn.)
- Write custom software
  - Some CDMS vendors do ...
  - Some sponsors / end-users do ...

# ODM to SDTM Considerations

- Where implement SDTM in the chain ?
- Several scenarios are possible



# Using SDTM from the start on





## Global Study Variables

Includes	Protocols	Study Event Definitions	Form Definitions	It			
	OID	Name	Repeat...	IsRe...	SASDataset...	Domain	
	IG.AE	Adver...	Yes	No	AE	AE Domain	AE O
	IG.CONM...	Conc...	Yes	No	CONMED	Conmed Domain	Conf
	IG.DEMOG	Dem...	Yes	No	DEMOG	Demog Domain	Dem
	IG.DRUG...	Treat...	Yes	No	DRUG_TRT	Treatment Dom...	Trea
	IG.PHAR...	Phar...	Yes	No	PHARMO1	PK Domain	PK C
	IG.PHYEX	Physi...	Yes	No	PHYEX	PE Domain	PE C
	IG.REFS...	Sam...	Yes	Yes	REFSAMP		

## Select a Domain



Domain Code	Domain Name	Category
DM	Demographics	Special-Purpose Domains
CG	Comments	Special-Purpose Domains
CM	Concomitant Medications	Interventions
EX	Exposure	Interventions
SU	Substance Use	Interventions
AE	Adverse Events	Events
DS	Disposition	Events
MH	Medical History	Events
DV	Protocol Deviations	Events
DA	Drug Accountability	Findings
EG	ECG Tests	Findings
IE	Inclusion/Exception Exceptio...	Findings
LB	Laboratory Tests	Findings
MB	MicroBiology	Findings
QS	Questionnaires	Findings
PC	Pharmacokinetics Concentr...	Findings
PP	Pharmacokinetics Paramet...	Findings
PE	Physical Examinations	Findings
SC	Subjects Characteristics	Findings
VS	Vital Signs	Findings
TE	Trial Elements	Trial Design Domains
TA	Trial Arms	Trial Design Domains
TV	Trial Visits	Trial Design Domains
SE	Subject Elements	Trial Design Domains
SV	Subject Visits	Trial Design Domains
TI	Trial Inclusion/Exclusion Crit...	Trial Design Domains
TS	Trial Summary	Trial Design Domains
SUPPQUAL	Supplemental Qualifiers	Special-Purpose Domains
RELREC	Relate Records	Special-Purpose Domains
OTHER	Other	Other

OK

Cancel

Validate

Load from Library

Add Row

Suggest OIDs

Save to Library

# Tools for working with Define.xml

- The standard is young, so ...
- **Viewing**: the CDISC distribution already comes with a stylesheet for viewing as HTML in a browser
- CDISC ODMChecker will be extended for define.xml files
- A **editing tool** is currently in development

# Should SAS Clinical Developers learn XML ?

- SAS Transport 5 is obsolete within 3-4 years
- The FDA is going ... XML
- SAS is going ... XML
- XML is THE exchange data format
- October 2004: DIA Meeting Washington:  
2/3 of the XML course attendees were SAS  
developers



# Thank you for your attention

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