

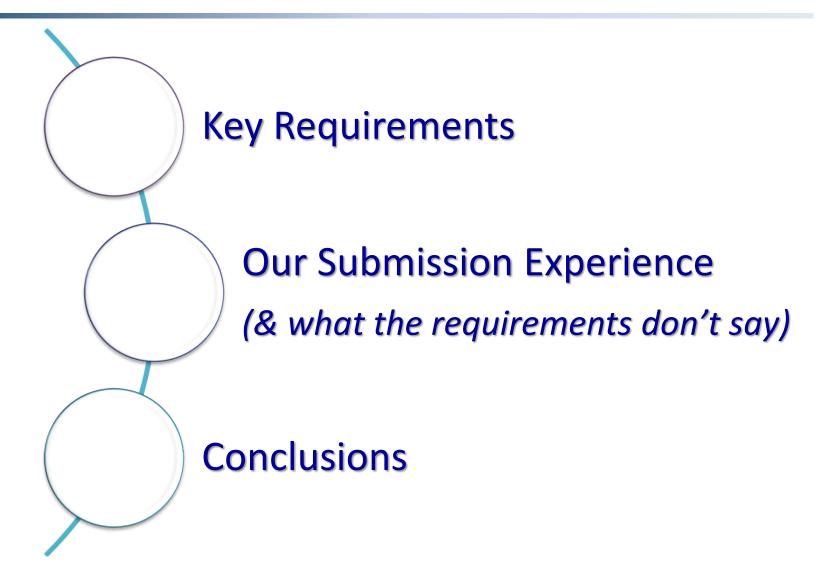


Shaping the Future of Drug Development

Submission Experience (with FDA)

Laura Phelan, Cytel Inc. **GUF CDISC - Genève / 04 December 2018**





Key Requirements



Providing Regulatory Submissions in Electronic Format — Submissions Under Section 745A(a) of the Federal Food, Drug, and Cosmetic Act

Electronic not paper submission

Providing Regulatory
Submissions
In Electronic Format —
Standardized Study Data

Must use data standards

STUDY DATA
TECHNICAL CONFORMANCE GUIDE

Technical Specifications Document

How to submit using standards

Key Requirements



FDA Data Standards Catalog

Use	Data Exchange Standard	Exchange Format	Standards Development Organization (SDO)	Supported Version	Supported Implementation Guide Version	FDA Center(s)	Date Support Begins (MM/DD/YYYY)	Fnde	Date Requirement Begins (MM/DD/YYYY)	Date Requirement Ends	Statutory, Regulatory, or Guidance Authority	Information Sources
Documents	PDF	PDF	Adobe	1.7	N/A	CBER, CDER, CDRH	11.20.2012				_	For CDRH only: eCopy Program for Medical Device Submissions
Clinical and Non- Clinical study data sets - Transport	SAS (XPORT)	XPT	SAS	5	SAS Technical Support TS-140	CDER, CBER	Ongoing		12/17/2016 [1] 12/17/2017 [2]		Standardized Study Data	For CDER and CBER only: Technical Conformance Guide
Clinical and Non- Clinical study data sets - Transport	SAS XPORT	XPT	SAS	5	SAS Technical Support TS-140	CDRH, CFSAN, CVM	Ongoing				Standardized Study Data	For CDRH only: eCopy Program for Medical Device Submissions
← → Ir	Instr. & Column Descriptions Submission Data Exchange Stds SubmissionTerminology Stds Change History											

Terminology Standard	Terminology Standards Development and/or Maintenance Organization		FDA Center(s)	Date Support Begins (MM/DD/YYYY)	Date Support Ends	Date Requirement Begins (MM/DD/YYYY)	Date Requirement Ends	Examples of Use	Statutory, Regulatory, or Guidance Authority	Information	Sources	
Medical Dictionary for Regulatory Activities (MedDRA)	Maintenance and Support Services Organization (MSSO)	8 or earlier	CBER, CDER	Ongoing	03/15/2019 [1] 03/15/2020 [2]		03/15/2019 [1] 03/15/2020 [2]	CDISC AE Domain	Standardized Study Data	MedDRA.org	Study Data Technical Conformance Guide	
MedDRA	MSSO	Current Version	CBER, CDER	08/31/2017		03/15/2019 [1] 03/15/2020 [2]		CDISC AE Domain	Standardized Study Data	왕 <u>MedDRA ora</u>	Study Data Technical Conformance Guide	
← →	Instr. & Column Descriptions Submission Data Exchange Stds SubmissionTerminology Stds						ds Change I	Change History : 4				

Key Requirements....and do not forget



5

PORTABLE DOCUMENT FORMAT (PDF) SPECIFICATIONS

Technical Specifications Document

"...optimize PDF for fast web view..."

Specifications for eCTD Validation Criteria US Food and Drug Administration Specifications for eCTD Validation Criteria Number: 1204 File checks Group: File name contains invalid characters: tilde(~), forward Description: 200 slash(/), backslash(\), colon(:), asterisk(*), question mark(?), 201 single quote('), double quote(") less than(<), greater than(>), pipe(|), or space() Severity Description: Low **US DTD Version** 2.01 and 3.3 **Effective Date:** 3/10/2008 Problem: The file name contains invalid characters. **Corrective Action:** Modify your SOPs to ensure file names do not contain invalid characters. **Guidance Source:** ICH eCTD Specification V3.2.2 Appendix 2 after becomber 17, 2010. Technical rejection criteria is being added to the existing eCTD validation criteria to enforce the deadlines (see below). FDA will

give the industry 30 days' notice on the eCTD website prior to the criteria

the required standards specified in the FDA Data Standards Catalog.

The FDA may <u>refuse to file (RTF) for NDAs and BLAs</u>, or <u>refuse to receive (RTR)</u> for ANDAs, an electronic submission that does not have study data in conformance to

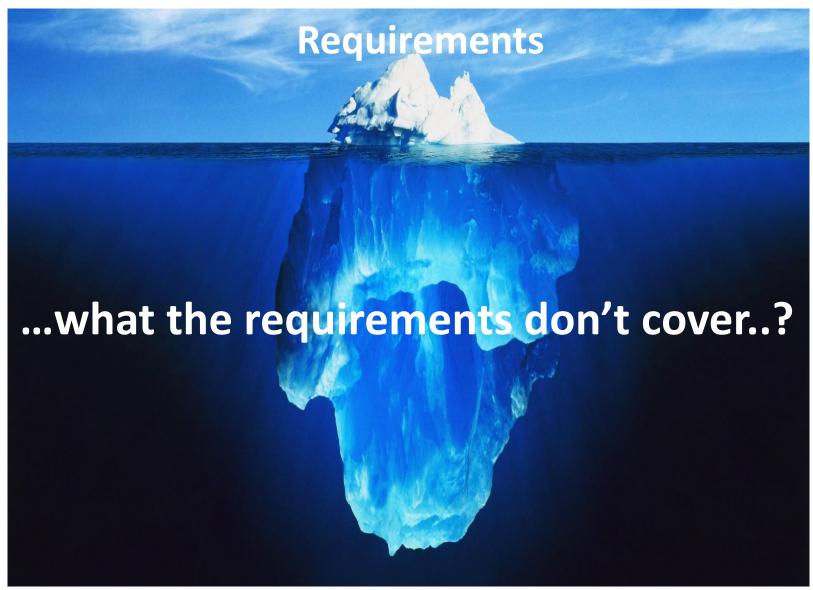
becoming effective.

"File name exceeds max. length (64 chars)..."

"A Trial Summary (TS) dataset must be present ..."

Our submission experience





Our submission experience



Indication 1 SDTM Ig 3.2, ADaM 1.0, define 2.0	Indication 2 SDTM Ig 3.1.3, ADaM 1.0, define 1.0						
6 SDTMs	10 SDTMs						
	5 ADaMs						
ISE (3) & ISS (6) ~1100 subjects	ISS (10) ~2400 subjects						
Cytel: CDISC migration & Pooling - Advise							
Sponsor: final package &	FDA interaction - Decide						

Our submission experience



- Results metadata to submit or not submit?
- External References where, how?
- Mock Submission feedback and what's negotiable?
- Screening failures include?
- BIMO who?
- Epoch how complex to make SE domain?
- Medical dictionaries upversioning from SDTM to ADaM?
- Special characters which can stay?

Results Metadata (ARM)



- To submit or not submit?
 - Not mandatory (yet)
 - Requires define v2.0
 - Indic 1: details in adrg

Submit ARM, reviewer likes it

7. Submission of Programs

All programs used to derive the ADaM datasets are part of the submission, and available upon request. Output programs are also part of the submission, and available upon request.

All submitted programs will execute on a PC environment running Windows and SAS version 9.2 or later.

The intent is to give the reviewer the possibility to review how derivations has been done and models used in the analysis; however the programs have some macro and environment dependencies so they are not executable without making ad-hoc modifications.

Program Name	Output	Inputs ⁺	Macro Used [*]
adsl.sas	adsl	adefbase, dm, suppdm, ds, vs, qs, mg, zg, ex, suppex, zr, suppzr, sv, ae, cm, lb, zs, yg, suppyg	
		adsl mh (where MHPRESP='Y' and MHTERM='OSTEOARTH RITIS OF THE KNEE') or (MHCAT="PRIMARY DIAGNOSIS" and mhscat = "OSTEOARTHRITIS IN OTHER LOCATIONS")	
adoa.sas	adoa	suppmh (where qnam in ("MHACRA","MHACRS"," MHACRC","MHACRKP","	

External References



- When, where, how?
 - Xml limited 1000 chars*

Value Leve	Value Level Metadata (ValueList.ADXMSUM.PARAMCD)										
Value	Label	Туре	Controlled Terms or Format	Comment							
FRACT2	Active T2 Lesions Free Status	text	ΥN	Derive per subject/parameter. Equals Y if subject has no Lesions/Subject/Scan, equals 'N' otherwise using the non-imputed lesions/subject/scan (where ANL01Fl='Y'.) For Unknown lesion free status, i.e., number of subjects with AVALC = 'Y' (number of subjects with (AVALC Y' or 'N') across all treatment groups, 'p'. b) Call the number of subjects in each treatment with AVALC='UNK', 'n1', n2' and 'n3' respectively. c) Multiple 'n1', n2' and 'n3' by 'p' call the results 'r1', 'r2' and 'r3'. Round 'r1', 'r2' and 'r3' to the nearest integer, call the results 's1', 's2' and 's3'. d) Randomly assign 's1' of the 'n1' subjects to AVAL= 1 (AVALC='Y') and the remainder to AVAL = 0 ('AVALC='N'). Repeat for the other treatment arms. How to randomly assign: Generate 'n1' numbers between 0 and 1 using RANJANJAL cod INCO representation in the other treatment arms. How to randomly the others 0 as per SAP Sections 8.4 and 9.5.1. The others 0 as per SAP Sections 8.4 and 9.5.1.							

Value Leve	alue Level Metadata (ValueList.ADMSQOL.PARAMCD)									
Value	Label	Туре	Controlled Terms or Format	Comment						
Sli	ghtly b	et	ter	Derived from QS.QSSTRESN as per SAP, reference 8: 'Vickrey BG, Hays RD, Harooni R, Myers LW, Ellison GW. A health-related quality of life measure for multiple sclerosis. Qual Life Res 1995 Jun;4(3):187-206.'.						

*at the time of these submissions

External References



ADaM-IG 1.0

Analysis Data reviewer's Guide

Rescue Medications Consumption De SF-12 Composite Score Derivation A

- Analysis Datasets
- Parameter Value Level Metadata
- Controlled Terminology
- ► Analysis Derivations
- ▶ Comments

Standard

Study Name

Study Description

Protocol Name

Metadata Name

Metadata Description

← Top left define.xml

ADT	Analysis Date	integer	DATE9	Derived:
				Numeric SAS date part from SDTM YR.YRDTC when from IVRS reported rescue medications
				(PARAMCD='RMEDIVRS'). When rescue medications consumption is derived from the concomitant
				medications page (PARAMCD='RMEDCM'), the date is derived by using the date in the range of star
				(CM.CMSTDTC) and end of medication (CM.CMENDTC). More details can be found in the Rescue
				Medications Consumption Derivation document.
				Rescue Medications Consumption Derivation Page <u>1</u>

Documentation

See more details about in the Analysis Reviewer Guide

Analysis Data reviewer's Guide Page 23



Much better

Mock Submission feedback



- FDA says «Jump!» how high?
 - Associated Persons domains
 - Feedback: «stick to the model»
 - Negotiated : a waiver
 - Define version 1.0 vs 2.0

Use	Data Exchange Standard	Exchange Format	Standards Development Organization (SDO)	Supported Version	Supported Implementation Guide Version	FDA Center(s)	Date Support Begins (MM/DD/YYYY)	Date Support Ends (MM/DD/YYYY)
Study data definition	Define	XML	CDISC	1.0	N/A	CDER, CBER	Ongoing	03.15.2018

Define.xml

Outdated version of Define-XML standard

Support for Define-XML v1.0 is ending by 2018-03-18 [3]

Mock Submission feedback



Other findings

Data Issues

There are major data ADaM-to-SDTM traceability issues

AD0253: Record key from SDTM AE is not traceable to <u>ADaM</u> ADAE (not enough ADAE recs)

- Originally kept ADAE.SAFFL='Y'
 - Bad idea keep all AEs.
 - OCCDS v1.0: "one record per record in SDTM domain"
- Recommendation:
 - Include AE, DM, EX in Pinnacle validation of ADaM

(based on) Mock Submission feedback



- ISS STUDYID
 - ADSL.STUDYID=«STUDY 1»
 - Non-ADSL.STUDYID=«STUDY1», «STUDY2» or «STUDY3»
 - "AD0256: USUBJID value does not exist in the ADaM ADSL domain"
 - "AD0196: Required STUDYID value is null"
 - Pi messages imply lack of integrity
 - Replaced non-ADSL.STUDYID with ASTUDYID (traceability)
 - Non-ADSL.STUDYID = ADSL.STUDYID

Screening Failures



- Include in SDTM?
 - Indic. 2 Yes, needed for ADaM

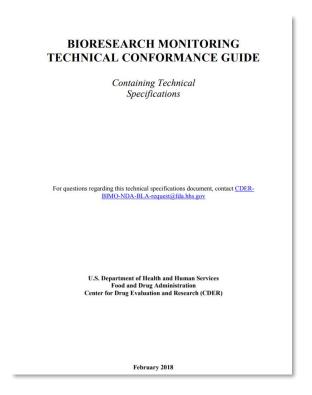
- Indic. 1 No
 - FDA asked for it later

Our recommendation: keep in SDTM

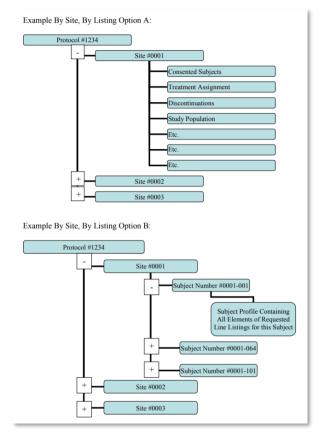
BIMO who?



- Bioresearch Monitoring
 - Advises FDA on site selection for inspection



READ it!



BIMO who?



- By site listings
 - Raw + some derived variables
 - «by subject» or «by site»

B ☐ STUDY 1

B ☐ Site 002

☐ Listing a: Consented Subjects
☐ Listing b: Treatment assignment
☐ Listing c: Discontinuations
☐ Listing d: Study Population
☐ Listing e: Inclusion/Exclusion Criteria
☐ Listing f: Adverse Events
☐ Listing g: Important Protocol Deviations
☐ Listing h1: Relapse Count Data during xxx - ITT Analysis Set and Safup Analysis Set

- CLINSITE dataset
 - define
 - adrg (optional)

- | Variable | Variable
- "If the applicant is submitting a Reviewer's Guide"

			,			
Dataset	Description	Class	Structure	Purpose	Keys	Location
CLINSITE	Summary-level clinical site data	ADAM OTHER	One record per site ID per planned treatment arm	Analysis	SITEID, ARM	clinsite.xpt

Analysis Datasets for BIMO

EPOCH (TA & SE)



How complex?

– If lucky...

STUDYID	DOMAIN	ARMCD	ARM	TAETORD	ETCD	ELEMENT	TABRANCH	TATRANS	EPOCH
EX3	TA	AA	A-Open A	1	SCRN	Screen	Randomized to Treatment A		Screen
EX3	TA	AA	A-Open A	2	DBA	Treatment A	Assigned to Open Drug A on basis of response evaluation		Double Blind
EX3	TA	AA	A-Open A	3	OA	Open DRUG A			Open Label

Probably get this...

DOMAIN	ARMCD	ARM	TAETORD	ETCD	ELEMENT	TABRANCH	TATRANS	EPOCH
TA	CHD	High Dose	1	PRE	SCREENING	Randomized to High Dose		Screening
TA	CHD	High Dose	2	CTRT	TREATMENT CYCLE			1st Treatment
TA	CHD	High Dose	3	CTRT	TREATMENT CYCLE			1st Treatment
TA	CHD	High Dose	4	CTRT	TREATMENT CYCLE			1st Treatment
TA	CHD	High Dose	5	CTRT	TREATMENT CYCLE			1st Treatment
	CHD	High Dose	6	FUP	FOLLOW-UP		If not assigned at End of Follow-Up to Re-Treatment subject immediately	Follow-Up
TA							starts with Follow-Up Re-Treatment Epoch	
TA	CHD	High Dose	7	CTRT	TREATMENT CYCLE			Re-Treatment
TA	CHD	High Dose	8	CTRT	TREATMENT CYCLE			Re-Treatment
TA	CHD	High Dose	9	FUPRT	FOLLOW-UP RE-TREATMENT			Follow-Up Re-Treatment
TA	CHD	High Dose	10	ITPTERM	INITIAL TREATMENT PERIOD FINAL VISIT/ET		If converted to CDMS go to Element OLMPWSH (TAETORD 20); 2) If converted to McDonald MS go to Element LTFUTRT (TAETORD 13)	End of Initial Treatment Period
TA	CHD	High Dose	11	LTFU	LONG-TERM FOLLOW-UP		switch to LTFU Treat (TAETORD 13) if McDonald Conversion; 2) switch to OLMPWSH (TAETORD 20) if CDMS conversion	
TA	CHD	High Dose		LTFUTERM	LONG TERM FOLLOW-UP FINAL VISIT/ET		Switch to STERM (TAETORD 23) Element at end of this Element	End Long Term Follow-Up
TA	CHD	High Dose	13	LTFUTRT	LTFU TREATMENT CYCLE		If subject converts to CDMS MS switch to OLMPWSH (TAETORD 20) Element immediately	LTFU Treatment
TA	CHD	High Dose	14	LTFUTRT	LTFU TREATMENT CYCLE		If subject converts to CDMS MS switch to OLMPWSH (TAETORD 20) Element immediately	LTFU Treatment
TA	CHD	High Dose	15	LTFUFUP	LTFU TREATMENT FOLLOW-UP		If not assigned at End of Follow-Up to LTFU Re-Treatment (TAETORD 16) switch immediately to LTFURFUP (TAETORD 18); If subject converts to CDMS MS switch to OLMPWSH (TAETORD 20) Element immediately	LTFU Follow-Up Treatment
TA	CHD	High Dose	16	LTFUTRT	LTFU TREATMENT CYCLE		If subject converts to CDMS MS switch to OLMPWSH (TAETORD 20) Element immediately	LTFU Re-Treatment
TA	CHD	High Dose	17	LTFUTRT	LTFU TREATMENT CYCLE		If subject converts to CDMS MS switch to OLMPWSH (TAETORD 20) Element immediately	LTFU Re-Treatment
TA	CHD	High Dose	18	LTFURFUP	LTFU RE-TREATMENT FOLLOW-UP		If subject converts to CDMS MS switch to OLMPWSH (TAETORD 20) Element immediately	LTFU Follow-Up Re-Treatment
TA	CHD	High Dose	19	LTFTTERM	LTFU TREATMENT FINAL VISIT/ET		Switch to STERM (TAETORD 23) Element at end of this Element	End Long Term Follow-Up Treatment
TA	CHD	High Dose	20	OLMPWSH	OPEN LABEL MAINTENANCE WASHOUT PERIOD			Maintenance Washout
TA	CHD	High Dose	21	OLMPTRT	OPEN LABEL MAINTENANCE TREATMENT PERIOD			Open Label Maintenance
TA	CHD	High Dose	22	OLMPTERM	OLMP TREATMENT FINAL VISIT/ET			End of Open Label Maintenance Period
TA	CHD	High Dose	23	STERM	FINAL STUDY VISIT			End of Study

Trial Design: TA and EPOCH



- Prepare Trial Design
 - Based on «reality» data checks vs protocol(s)
 - with, or <u>before</u>, aCRF

- SE.EPOCH

Due to overlaps in the SV domain, visits which slot into one or more EPOCHs are assigned using priority rule:

ЕРОСН	Priority
Pre-Study	4 th
1st Treatment	1 st
Follow-up	3rd
Re-Treatment	2 nd
Follow-Up Re-Treatment	3rd
End of Study	5 th

NEW!!! SDTM Ig 3.3

4.1.3.1 EPOCH Variable Guidance

Sponsors should not impute EPOCH values, but should, where possible, assign EPOCH values on the basis of CRF instructions and structure, even if EPOCH was not directly collected and date/time data was not collected with sufficient precision to permit assignment of an observation to an EPOCH on the basis of date/time data alone. If it is not possible to determine the EPOCH of an observation, then EPOCH should be null. Methods for assigning EPOCH values can be described in the Define-XML document.

Medical Dictionaries



- Study MedDRA 11.0 & 17.1 2 versions ?
 - Reconciled AEs after DB lock
 - Use AEPV?
 - Pi split domains errors!!

Luuru		-			
Issu	e Summary				
Source	Pinnacle 21 ID	Publisher ID	Message	Severity	Found
AE					
	CT2001	FDAC340	AEACN value not found in 'Action Taken with Study Treatment' non-extensible codelist	Error	4
	SD0005	FDAC044	Duplicate value for AESEQ variable	Error	4883
	SD0008	FDAC346	Value for AEDECOD not found in MedDRA dictionary	Error	95
	SD0080	FDAC208	AE start date is after the latest Disposition date	Error	16
	SD1095	FDAC072	Invalid dataset name for split domain	Error	1

– ZA (custom)

3.3.18. ZA – Adverse Events Pharmacovigilance Reconc.

The ZA domain represents Adverse Events which have been reconciled with the Pharmacovigilance AE database after the study was closed and events in ZA are coded using MedDRA v17.1. Included are all adverse events as available in the domain AE, and with the same legacy mapping, however

Controlled Terminology (External Dictionaries)				
AEDICT2_F, Reference Name (AEDICT2_F)				
External Dictionary	Dictionary Version			
MedDRA	17.1			
AEDICT_	F, Reference Name (AEDICT_F)			
External Dictionary	Dictionary Version			
MedDRA	11.0			

Medical Dictionaries



- Upversioning from SDTM to ADaM?
 - v20.0 in ISS
 - Traceability AEBODSYS

Use ABODSYS, ADECOD

030710				
ADAEA,	AD0047: Required variable is	Error	30	AEBODSYS, AEDECOD,
ADAEP,	not present			AETERM, AESER and
ADAEM,				AESEQ are not present as
ADAED,				they are displayed as
ADAEC,				ABODSYS, ADECOD,
ADAEO				ATERM, ASER and ASEQ
				respectively.
				As data is a pool of
				multiple SDTM domains
				(AE, CE and ZA
				domains), in order to have
				all records in one variable,
				Axxx variables have been
				used instead of AExxx.

Pi Error explained

Special characters



Requirements:

- "..restricted to ASCII ..(printable values below 128)"

In practice:

- Replaced 0-31
 - «WARNING: Non-ASCII Char Removed: PDTEXT=compliance less than 70%"

Special non-ascii characters (bytes 1 to 32) were replaced in the DV domain with a blank which did not change the text but allowed for full readability.

But not 32-128

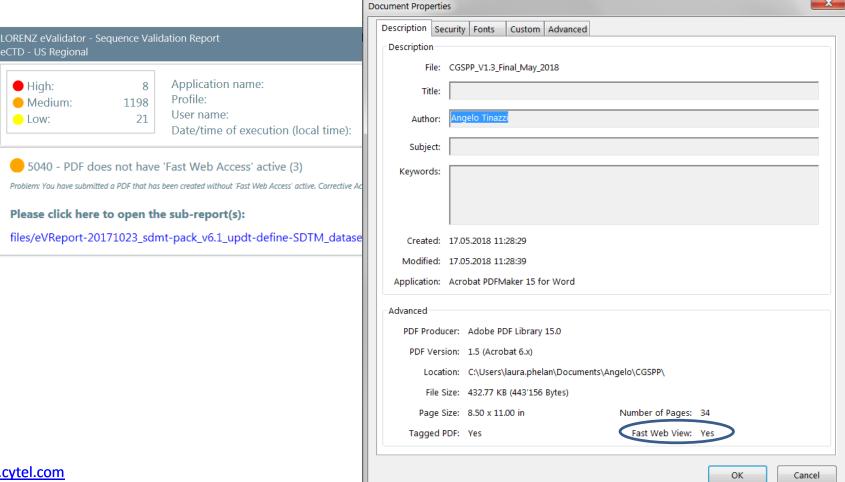
Pinnacle 21 ID	Publisher ID	Message	Description	Category	Severity
			Variables value must not include non-ASCII or non-printable characters (outside of 32-126 ASCII		
			code range), limited to variables which values may be converted into new variable name or label (-		
SD1029	FDAC214	Non-ASCII or non-printable characters in variable	-TEST,TESTCD,PARM,PARMCD, QLABEL, QNAM).	Format	Error

Lorenz Validator



Further from the PDF Specs

– Lorenz eValidator (http://www.lorenz.cc/index.cfm). (free!)



Conclusion



- Important to share experiences
 - Phuse Working group :
 - "Industry Experiences Submitting Standardized Study Data to Regulatory Authorities"





Merci

Des questions?



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Web: www.Cytel.com



BACK UP SLIDES

Gap Analysis



- Why?
 - Do you have everything?

- Protocol(s) vs raw & external data

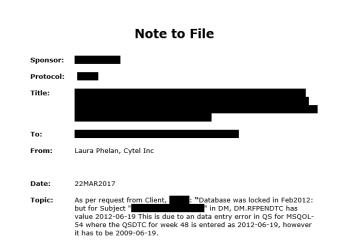
– External data – is there DST for all?

— If legacy CSR, have all data to reproduce?

DB Issues



- Closed legacy studies?
- Example:
 - DB lock Feb2012
 - Subject X last date (RFPENDTC) June 2012
 - uncorrected data entry error
- Result:
 - Hardcoding
 - NTF



Legacy CSR Discrepancies



What if we don't match?

- Discrepancies
 - Determine cause
 - Describe in ADRG

8 Appendix

8.1 Discrepancies in outputs

Following the mapping of the raw data to SDTM, <u>ADaM</u> datasets were re-programmed and outputs reproduced. This section summarizes the discrepancies in the outputs results identified during this process (from SDTM->ADaM->TLF) as compared to the original Clinical Trial Report of version 2). Discrepancies are discussed by domain/subdomain.

The newly produced outputs (when different to CSR only) are available in section 8.2.

Output domain	Output sub-domain	CSR Output impacted	Short Description and Reasons
1. Screen Failure	TLFs with Reasons for screening failure	Table 2	1. N= records in the database reflecting the total number of unique subjects. However, N= is presented in the CSR for "All Screened Subjects" population, table 2. As per study design and mentioned in ADRG section "3.4 Subject Issues that Require Special Analysis Rules" subjects could be re-screened and receive a different subject (USUBJID) number. We cannot identify these cases as a. there is no flag clarifying 'rescreened' subjects in the database. b. the SAP and CSR gave no definitions of the derivation of "All Screened Subjects".

ISS cohorts

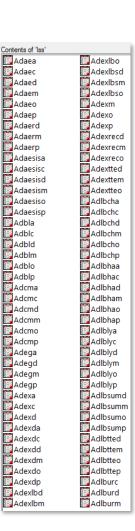


- Pooling cohorts in 1 ADaM complex?
 - 6 cohorts
 - Option 1: 1 ADaM all cohorts?
 - Option 2: split = ADAEA/ADAEC/ADAED/ADAEO....

Pi – not recognize ADAEx

6.1 Conformance Inputs

Pinnacle configuration file has been adjusted in order to be able to run the checks on ADAEx
datasets. In fact, datasets are not strictly named ADAE, but the naming convention used in the
ISS is ADAE concatenated with the cohort suffix (see section 2.2). ADAE checks were not
running on it, so we had to adjust the configuration file to have proper checks applied on it.



Level of detail in csdrg, adrg



How much is too much?

-We were asked to include reason : only need QNAM /description as per template