

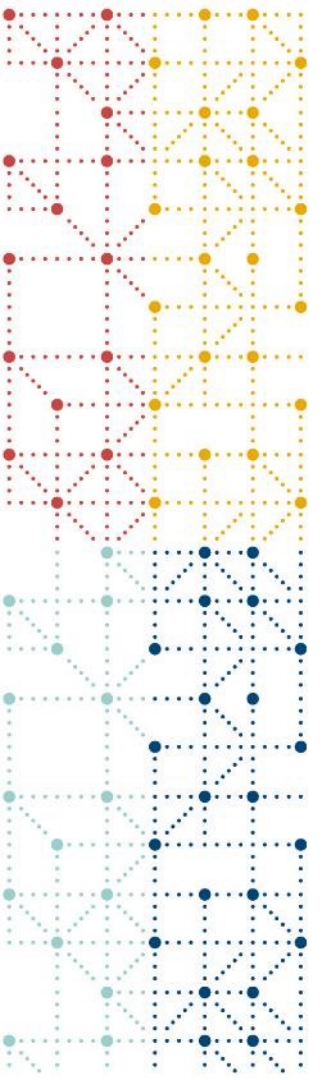
CDISC Analysis Results Standards - Approach and Development Update

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Agenda

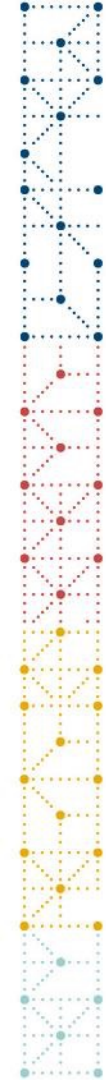
1. Analysis Results Current and Future State
2. Analysis Result Standards Goals
3. Analysis Results Standards Development Update
 - Analysis Results Concepts Selection
 - Extended ARM Elements of a Table/ARM Technical Specs
4. COSA and Open-source TFL Designer
5. ARS Deliverables

Row	STUDYID	USUBJID	MIDS	CEDECOD	WASAEYN	ASTDTIM
1	XYZ	000001	HYPO 1	Hypoglycemia	Y	07SEP2012 22:29:00
2	XYZ	000001	HYPO 2	Hypoglycemia	N	10SEP2012 09:12:00
3	XYZ	000001	HYPO 3	Hypoglycemia	N	10SEP2012 23:05:00
4	XYZ	000001	HYPO 4	Hypoglycemia	N	11SEP2012 15:24:00
5	XYZ	000001	HYPO 5	Hypoglycemia	N	18SEP2012 11:39:00
6	XYZ	000002	HYPO 1	Hypoglycemia	N	22OCT2012 13:28:00
7	XYZ	000002	HYPO 2	Hypoglycemia	N	25OCT2012 13:59:00
8	XYZ	000002	HYPO 3	Hypoglycemia	N	17Nov2012 05:01:00

[illegible]

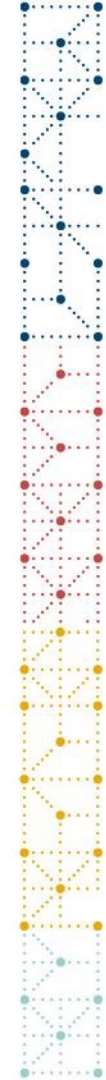
Table		Period, Treatment to Post-Treatment Treatment difference result (LS-Mean, confidence interval, p-value)	
PARAM	RESULT IDENTIFIER	PARAM	RESULT
DISP	PARAM	DISP	PARAM
DISP	ANALYSIS VARIABLE	DISP	ANALYSIS VARIABLE
ANALYSIS REASON	ANALYSIS REASON	ANALYSIS REASON	ANALYSIS REASON
ANALYSIS PURPOSE	ANALYSIS PURPOSE	ANALYSIS PURPOSE	ANALYSIS PURPOSE
ANALYSIS DATASET	ANALYSIS DATASET	ANALYSIS DATASET	ANALYSIS DATASET
PARAM	PARAM	PARAM	PARAM
DISP	DISP	DISP	DISP
DISP	ANALYSIS VARIABLE	DISP	ANALYSIS VARIABLE
ANALYSIS REASON	ANALYSIS REASON	ANALYSIS REASON	ANALYSIS REASON
ANALYSIS PURPOSE	ANALYSIS PURPOSE	ANALYSIS PURPOSE	ANALYSIS PURPOSE
ANALYSIS DATASET	ANALYSIS DATASET	ANALYSIS DATASET	ANALYSIS DATASET
ANALYSIS VARIABLE	ANALYSIS VARIABLE	ANALYSIS VARIABLE	ANALYSIS VARIABLE
ANALYSIS REASON	ANALYSIS REASON	ANALYSIS REASON	ANALYSIS REASON
ANALYSIS PURPOSE	ANALYSIS PURPOSE	ANALYSIS PURPOSE	ANALYSIS PURPOSE
ANALYSIS DATASET	ANALYSIS DATASET	ANALYSIS DATASET	ANALYSIS DATASET

ARM for define.xml



Analysis Results Current State

- Static results created for Clinical Study Report
- May be hundred of tables in PDF format, often difficult to navigate
- No or limited traceability (e.g., to protocol, SAP, ADaM data)
- Expensive to generate and only used once, no or limited reusability
- ARM v1.0 describes *metadata* about displays (PDF) and results (at high level), no formal analysis and results model or results data.
- Lack of features to drive automation
- Limited regulatory use cases



Analysis Results Desired Future State

- Formal model for describing analyses and results as data
- Facilitate automated generation of results
- From electronic (PDF) to machine readable results, with context and metadata to source
- Improved navigation and reusability of analyses and results
- Support storage, access, processing and reproducibility of results
- Traceability to Protocol/SAP and to input ADaM data
- Open-source tools to design, specify, build and generate analysis results

Principles for CDISC ARS Implementation



Analysis Results Standards Goals



Analysis Results Metadata Technical Specification (ARM-TS), to support automation, traceability, and creation of data displays



Define an Analysis Results Data (ARD) structure, to support reuse and reproducibility of results data



Illustrate and exercise ARD and ARM-TS with a set of common data displays

Concepts Team Consulted Published Layouts

- PH

Scatterplot and Shift Table Summary of Absolute Lab values –
Lab Test 1 Minimum Baseline vs Minimum Post-baseline

- Treatment

- T1

(N = xxx)

-

T2

(N = xxx)

- JPI

PL

(N = xxx)

- Re

N = number of subjects in each group using the referer demographics.

3.14安全性の解析（バイタルサイン、身体的所見及び安全性に関連する
Table summary of vital signs by visit

<Parameter> BDS.PARAM

<Visit> BDS.AVISIT

n

Mean (SD)

Median

Min - Max

BDS.AVAL

上記例は、絶対値の集計の場合。

バイタルサインのベースラインからの変化量を集計する必要がある場合
る場合は BDS.PCHG を使用する

- Sub-team

Table 3. Laboratory Abnormalities that Worsened from Baseline to Grade 3 or 4
Occurring in $\geq 1\%$ of Patients with dMMR Endometrial Cancer Receiving
Product in Study

Laboratory Test	Product N = 104	
	All Grades ^a %	Grade 3 or 4 ^a %
Hematology		
Decreased lymphocytes	37	9
Decreased leukocytes	21	2.9
Chemistry		
Decreased albumin	30	2.9
Increased creatinine	27	2.9
Increased alkaline phosphatase	25	2.9
Increased aspartate aminotransferase	16	1.9
Increased alanine aminotransferase	15	2.9
Electrolytes		
Decreased sodium	26	4.8
Increased calcium	15	1.9
Decreased potassium	15	1.9

^a Consists of new onset of laboratory abnormality or worsening of baseline laboratory abnormality.

List of Analysis Display, Concepts

Analysis Title

- Summary of Analysis Populations and Subject Disposition
- Summary of Demographics
- Summary of Protocol Deviations
- Summary of Medical History by System Organ Class and Preferred Term
- Summary of Concomitant Medications by Anatomic Classification and Preferred Term
- Overall Summary of Treatment-Emergent Adverse Events
- Summary of Treatment Emergent Adverse Events by SOC and PT
- Summary of TEAE System Organ Class and Preferred Term by Maximum Severity
- Summary of Observed and Change from Baseline by Scheduled Visits – <Lab Panel Name>
- Shift from Baseline for Laboratory Tests by Treatment Group - <Lab Panel Name>
- Summary of ECG Overall Interpretation Findings by Visit
- Summary of Observed and Change from Baseline by Scheduled Visits – Vital Signs

Extended ARM Elements for a Table Development*

Output

Identifiers

Study ID

Task

Type

Style

File

Display

Identifiers

Display Template

Title/Footnote

Analysis Set

Analysis Group

Result

Identifiers

Result Group

Result Variable

Where Clause

Result Statistics

Prog. Code Ref

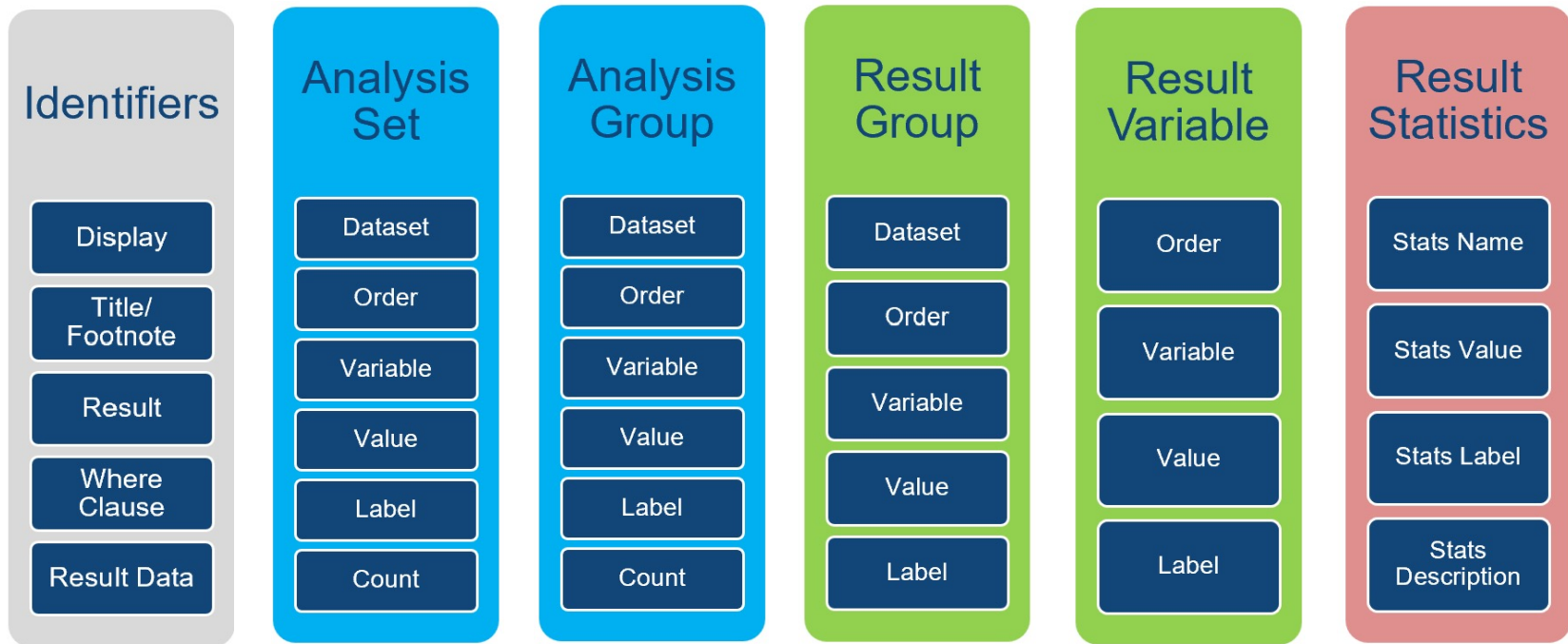
ARM Technical Specification*

- Prospective focus on automation, traceability, and creation of data displays
- Linked, modular, flexible and tool agnostics
- Supports meta-programming
- Serves a different purpose than ARM for Define-XML

Output	StudyID
	AnalysisTask
	AnalysisSetLabel
	OutputOrder
	DisplayID
	Filename
	OutputVersion
	FileType
	StyleID
Display	DisplayID
	ReferenceDisplayID
	Version
	Name
	Title
	DisplaySectionID
	AnalysisSetID
	AnalysisGroupID
	DisplayTemplateID
Result	Document
	DisplayID
	AnalysisResultID
	Version
	ResultDescription
	DisplayPattern
	Reason
	Purpose
	Dataset
	AnalysisVariable
	AnalysisGroupID
	WhereClauseID
	GroupingByVar
	GroupingByOrdFmt
	Documentation
	ProgrammingCodeContext
	ProgrammingCode
	CodeReference
Style	StyleID
	StyleContext
	ElementName
	ElementValue
Display Section	DisplaySectionID
	ReferenceDisplayID
	Section
	SectionSubID
	Order
	Label
	Text
	Reference
Analysis Set	AnalysisSetID
	Dataset
	Order
	Variable
	Comparator
	Value
	CompoundExpression
Analysis Group	AnalysisGroupID
	Dataset
	Order
	Variable
	Comparator
	Value
	CompoundExpression
Template	DisplayTemplateID
	TemplateContext
	ElementName
	ElementValue
Where Clause	WhereClauseID
	Dataset
	Order
	Variable
	Comparator
	Value
	Compound Expression

*Work in progress

Analysis Result Dataset Model – Key Elements*



* Work in progress

Need for Open-Source Tools

- Need for tool that can leverage available CDISC analysis results standards/templates
- The newly formed CDISC Open-Source Alliance supports, promotes, and sometimes sponsors open-source software projects that create tools for implementing or developing CDISC standards to drive innovation in the CDISC community

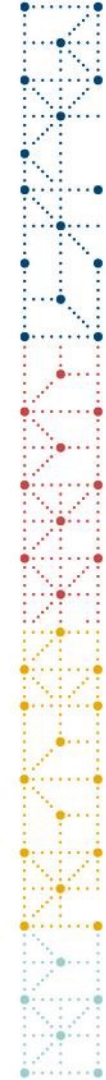




TFL Designer

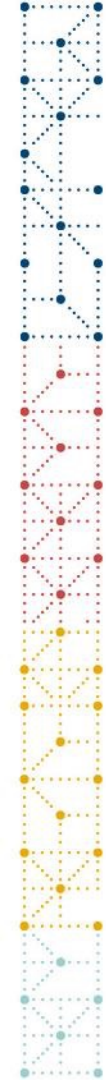
- The TFL Designer has been approved under COSA as a tool to be developed that can leverage available CDISC analysis results standards/templates and accelerate generation of the TFL shells and support metadata driven automation in development of ADaM and TFLs
- Open-source tool to design tables, figures, and listings (TFL) and generate associated metadata to support clinical trial data analysis and reporting

<https://github.com/bhavinbusa/tfldesigner/>



Analysis Results Standards Deliverables

- Content Scope: common safety analyses
- Deliverables for v1.0
 - Machine readable mock displays made accessible through an “eTFL portal”
 - ARM Technical Specification
 - New Model and Implementation Guide to represent analysis results
 - Terminology
 - Identification of Conformance Rules
- Internal Review target Q2, 2022



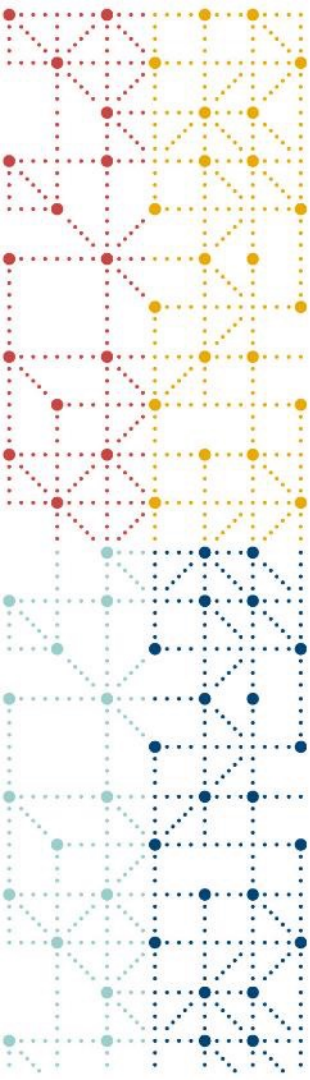
US PHUSE Connect ARS Workshop

- **Part I [45 mins]**

- Analysis Results Current and Future States
- Overview of the draft CDISC Analysis Results Standard
 - Analysis Results Metadata Technical Specification (ARM-TS)
 - Analysis Results Dataset (ARD)
- Application of ARM-TS & ARD for selected Analysis Results (Safety Tables)
- Update on Open-source TFL Designer

- **Part II [45 mins]**

- Hands-on workshop: Implementation of Analysis Results Standards [participants will get an opportunity to work on few examples and provide their feedback]
- Q&A session



Thank you!

