Analysis Results Metadata Specification Version 1.0 for Define-XML Version 2

Prepared by
CDISC ADaM Metadata Sub-Team

[redacted]

Notes to Readers

- This is the specification for the Analysis Results Metadata extension of Version 2.0 of the CDISC Define-XML standard.
- This document is intended for companies and individuals involved in the analysis of clinical data that will be submitted to regulatory authorities.

Revision History

Date	Version	Summary of Changes
2015-01-27	1.0	Final version 1.0 incorporating all changes identified during the public comment period
2014-09-10	1.0 DRAFT	Draft for public review

Warranties Notice: see Appendix C

TABLE OF CONTENTS

1. Purpose of this document

This specification describes an Analysis Data Model (ADaM) Analysis Results Metadata extension to the Define-XML 2.0.0 model for the purpose of submissions to regulatory agencies such as the United States Food and Drug Administration (FDA) as well as for the exchange of analysis datasets and key results between other parties. This Analysis Results Metadata extension is based on the metadata model as described in the CDISC ADaM Analysis Data Model Version 2.1 document.

The Define-XML version 2 is an extension to the Operational Data Model (ODM) version 1.3.2.

Because analysis datasets are developed to support specific analyses, ADaM (see ADaM version 2.1 document) has this additional metadata component that is not found in the Study Data Tabulation Model (SDTM).

Analysis Results Metadata provide traceability for a given analysis result to the specific ADaM data that were used as input to generating the analysis result; they also provide information about the analysis method used and the reason the analysis was performed. Analysis Results Metadata are an optional ADaM metadata component according to the ADaM version 2.1 document. However, best practice is that they be provided to assist the reviewer by identifying the critical analyses, providing links between results, documentation, and datasets, and documenting the analyses performed.

The current version of the ADaM standard is available at http://www.cdisc.org/adam. Define-XML version 2 can be used to transmit metadata for analysis datasets designed according to the ADaM Implementation Guide (ADaMIG) versions 1.0 and higher as well as for other types of analysis files. The Analysis Results Metadata extension requires version 2 of Define-XML.

This document is intended for companies and individuals involved in the analysis of clinical data that will be submitted to regulatory authorities.

2. Abbreviations and References

2.1. Definitions and Abbreviations

ADaM	Analysis Data Model - developed by CDISC.
ADaMIG	Analysis Data Model Implementation Guide - developed by CDISC
BDS	Basic Data Structure
eCTD	Electronic Common Technical Document
FDA	United States Food and Drug Administration
ODM	Operational Data Model – developed by CDISC as an XML format for transmission and archive of clinical trials data and metadata
OID	ODM object identifier
PDF	Portable Document Format – an open standard for document exchange developed by Adobe Systems
SAP	Statistical Analysis Plan
SEND	Standard for Exchange of Nonclinical Data - developed by CDISC
SDTM	Study Data Tabulation Model - developed by CDISC
URI	Uniform Resource Identifier - a string of characters used to identify a resource on the internet
URL	Uniform Resource Locator
W3C	World Wide Web Consortium
XLink	XML Linking Language – developed by the W3C
XML	Extensible Markup Language - developed by the W3C
XPT	SAS transport file – an open standard for data transmission developed and maintained by SAS
XSL	Extensible Stylesheet Language – developed by the W3C for the purpose of transforming and formatting XML documents

2.2. References

The documents referenced during the development of this Define-XML Analysis Results Metadata Specification may be accessed via the links provided below.

- CDISC website
  http://www.cdisc.org
- ODM Version 1.3.2
  http://www.cdisc.org/odm
- CDISC Define-XML Specification Version 2.0.0
  http://www.cdisc.org/define-xml
- ADaM - CDISC ADaM Analysis Data Model Version 2.1
  http://www.cdisc.org/adam
- ADaMIG - CDISC ADaM Implementation Guide Version 1.0
  http://www.cdisc.org/adam
- ADaM Examples in Commonly Used Statistical Analysis Methods Version 1.0
  http://www.cdisc.org/adam
- ADAE - CDISC ADaM Data Structure for Adverse Event Analysis Version 1.0
  http://www.cdisc.org/adam
- ADTTE - CDISC ADaM Basic Data Structure for Time-to-Event Analysis Version 1.0
  http://www.cdisc.org/adam
- Controlled Terminology
  http://www.cancer.gov/cancertopics/cancerlibrary/terminologyresources/cdisc
- XML Schema Validation for Define.xml White Paper
  http://www.cdisc.org/define-xml
- Updated Pilot SDTM/ADaM Submission Package
  http://www.cdisc.org/sdtmadam-pilot-project
- FDA Study Data Standards Resources Page
  http://www.fda.gov/forindustry/datastandards/studydatastandards/default.htm

3. Conformity and General Issues

This section supplements the corresponding section, "Conformity and General Issues", of the Define-XML V2.0 specification. All conformity requirements described in the Define-XML V2.0 specification are also applicable to Analysis Results Metadata extensions in ADaM define.xml files. Note that all conformity requirements described in the ODM v1.3.2 specification are also applicable to Define-XML files as they are based on the ODM 1.3.2 model.

3.1. File Conformity

The namespace URI for version 1.0.0 of the Analysis Results Metadata is:
http://www.cdisc.org/ns/arm/v1.0

Throughout this document, the following conventions are used for namespaces:

- ODM elements and attributes are in the default namespace (i.e. they have no namespace prefix)
- Define-XML elements use the namespace prefix "def"
- Define-XML attributes use the namespace prefix "def" only if they appear within ODM elements or within Analysis Results Metadata elements
- Analysis Results Metadata elements use the namespace prefix "arm"
- Analysis Results Metadata attributes use the namespace prefix "arm" only if they appear within ODM elements or within Define-XML elements

Note that these namespace prefixes are used throughout this document and are recommended as best practice to make it easier for users to understand and implement the Analysis Results Metadata extension of Define-XML, and aid in the comparison of documents. In practice other namespace prefixes can be used as long as the *define.xml* conforms to the rules of XML Namespaces.

Any XML included in a Define-XML document that is not described in this specification is considered an extension.

3.2. Define-XML Document Structure

The example below shows the XML that would comprise the minimal structure of any ODM 1.3.2 document that contains a Define-XML document with Analysis Results Metadata. It illustrates a valid Define-XML document header and the gray box illustrates the set of elements that comprise this standard in the order in which they should appear in a valid Define-XML file.

An XSL stylesheet can optionally be referenced between the XML header and the ODM element. This allows the *define.xml* file to be easily viewed in a web browser. If a stylesheet reference is provided then a browser can open the *define.xml* file and display it according to the stylesheet. For a browser to correctly show the *define.xml* the referenced stylesheet must exist at the location specified. If a relative location is given for the stylesheet, it is relative to the location of the *define.xml* file.

The Define-XML standard does not dictate how a stylesheet should display a *define.xml* file. An example stylesheet is provided, however this can be altered to satisfy alternate visualization needs.

This example references a stylesheet contained in the same location as the *define.xml* file:

```
<?xml-stylesheet type="text/xsl" href="define2-0-0.xsl"?>
```

If a stylesheet reference is not provided, a browser will display the XML contents of the *define.xml* file.

```
<?xml version="1.0" encoding="UTF-8"?>
<ODM xmlns="http://www.cdisc.org/ns/odm/v1.3"
  xmlns:def="http://www.cdisc.org/ns/def/v2.0"
  xmlns:xlink="http://www.w3.org/1999/xlink"
  xmlns:arm="http://www.cdisc.org/ns/arm/v1.0"
  ODMVersion="1.3.2" FileType="Snapshot" FileOID="CDISC-Sample"
  CreationDateTime="2014-03-28T11:07:23:00"
  Originator="CDISC ADaM Metadata Team">
  <Study OID="cdisc01">
    <GlobalVariables>
      <StudyName>CDISC Sample</StudyName>
      <StudyDescription>CDISC-Sample Data Definitions</StudyDescription>
      <ProtocolName>CDISC-Sample</ProtocolName>
    </GlobalVariables>
    <MetaDataVersion OID="MDV.CDISC01.ADaMIG.1.0.ADaM.2.1"
      Name="Study CDISC-Sample, Data Definitions"
      Description="Study CDISC01, Data Definitions"
      def:DefineVersion="2.0.0"
      def:StandardName="ADaM-IG"
      def:StandardVersion="1.0">
        < Supplemental Data Definitions (def:SupplementalDoc) >
        < Value Level Metadata (def:ValueListDef) >
        < Where Clause Definitions (def:WhereClauseDef) >
        < Domain Level Metadata (ItemGroupDef) >
        < Variable Level Metadata (ItemDef) >
        < Controlled Terminology Metadata (CodeList) >
        < Computational Algorithms (MethodDef) >
        < Comments (def:CommentDef) >
        < Referenced Documents (def:leaf) >
        < Analysis Results Metadata (arm:AnalysisResultDisplays) >
    </MetaDataVersion>
  </Study>
</ODM>
```

Figure 3.2 : Define-XML document structure

4. General Specifications for Analysis Results Metadata

The purpose of the Define-XML Analysis Results Metadata extension is to support the interchange of CDISC ADaM key Analysis Results Metadata for clinical research applications in a machine-readable format. An important use case for adding Analysis Results Metadata to Define-XML 2.0.0 is to support the review of analysis results and their relation to submitted clinical trial data in CDISC ADaM format. The key components in ADaM Analysis Results Metadata are:

- Analysis Display metadata definitions
  - Analysis Result metadata definitions
    - Analysis parameter(s)
    - Analysis dataset(s)
      - Analysis variable(s)
      - Selection criteria
    - Documentation
    - Programming statements

The following subsections will explain general concepts and also provide illustrations of how these components are included in Define-XML. Appendix B shows how the various elements in the define.xml file are being rendered by the sample stylesheet. Note that most examples in this document are based on the Updated Pilot SDTM/ADaM Submission Package published on the CDISC website. These examples were originally based on an extension to Define-XML v1.0.0 and have been updated to reflect the Define-XML v2.0.0 standard. A subset of this update is included as a sample package with the publication of this document.

Analysis Results Metadata describe the major attributes of a specified analysis result found in a clinical study report or submission.

Analysis Results Metadata are not needed for every analysis included in a clinical study report or submission. The sponsor determines which analyses should have Analysis Results Metadata. For example, the sponsor might elect to provide Analysis Results Metadata only for the primary efficacy analysis and the secondary efficacy analyses being considered for a marketing claim. When analysis results metadata is provided for a specific result within that display, there is no requirement to describe all individual results within a display. For example, analysis results metadata may be provided for complex statistics (e.g., p-values) but not necessarily for descriptive statistics like mean or median.

4.1. Analysis Display Metadata Definitions

Analysis results include statistical displays (e.g., text, tabular or graphical presentation of results) or inferential statistics such as p-values or estimates of treatment effect. The word “Display” is used instead of “Table” as it is more generic, referring to tabular or graphical presentation of results.

Analysis Results Metadata provide a link between analysis results and the data used to generate it in a standard format and a predictable location. This allows reviewers to link from an analysis result to important information describing the analysis such as the reason for performing the analysis, and the dataset(s) and selection criteria used to generate the analysis.

The inclusion of Analysis Results Metadata in an ADaM define.xml file is optional. When it is provided, it is grouped by analysis display metadata. The analysis display metadata part consists of the display identifier (e.g., the table or figure number) and a full description of the display within the submitted document. This is typically the title of display, including additional information if needed to describe and identify the display (e.g., analysis population). It may also include a reference to the analysis display in the clinical study report.

Since a display may include several analysis results of interest (e.g. different p-values) which are computed differently, each analysis display section has either one or more analysis results subsections which include metadata on the individual result of interest (see Section 4.2 Analysis Result Metadata Definitions).

4.1.1. Example of Analysis Display Metadata in Define-XML

The following example shows the analysis display metadata for a Table named "Table 14-3.01" in the clinical study report and titled "Primary Endpoint Analysis: ADAS-Cog - Summary at Week 24 - LOCF (Efficacy Population)" (see attributes and child elements of element *arm:ResultDisplay*).

A reference to the location of that display in the clinical study report is provided (see child element *def:DocumentRef*). This table is located at page 49 (see child element *def:PDFPageRef*). The name of the clinical study report PDF document and its relative path compared to the location of the define.xml file is stored as the value of attribute *xlink:href* of the *def:leaf* element with the same ID value as the *leafID* value in the *def:DocumentRef* child element.

Two results of interest within this display are presented (see the two occurrences of child element *arm:AnalysisResult*).

```
  <def:leaf ID="LF.Table-14-3.01"
    xlink:href="../../../../../53-clin-stud-rep/535-rep-effic-safety-stud/5351-stud-
rep-contr /cdiscpilot01/cdiscpilot01.pdf">
    <def:title>Table 14-3.01</def:title>
  </def:leaf>

  <arm:AnalysisResultDisplays>
    <arm:ResultDisplay OID="RD.Table_14-3.01" Name="Table 14-3.01">
      <Description>
        <TranslatedText xml:lang="en">Primary Endpoint Analysis: ADAS-Cog - Summary at
Week 24 - LOCF (Efficacy Population)
        </TranslatedText>
      </Description>
      <def:DocumentRef leafID="LF.Table-14-3.01">
        <def:PDFPageRef PageRefs="49" Type="PhysicalRef"/>
      </def:DocumentRef>
      <arm:AnalysisResult>
      …
      </arm:AnalysisResult>
      <arm:AnalysisResult>
      …
      </arm:AnalysisResult>
    </arm:ResultDisplay>
  …
  </arm:AnalysisResultDisplays>
```

4.2. Analysis Result Metadata Definitions

An analysis display may include more than one analysis result of interest. The metadata for an individual analysis result within a display provides links between the result, external documentation, source ADaM dataset(s), and documents the analyses performed, either textual in the documentation section or with the aid of programming code in the programming statements section.

Each result must be identifiable via a result description.

Furthermore the rationale for performing this analysis at the planning stage (e.g., “SPECIFIED IN SAP”, “REQUESTED BY REGULATORY AUTHORITY”) and the purpose of the analysis within the body of evidence/report (e.g., “PRIMARY OUTCOME MEASURE”) must be specified. Note that there are extensible ADaM controlled terminologies for the values of both types of information. See Section 5.3.5 arm:AnalysisResult Element for further details.

If the analysis result requires the selection of one or more specific parameter values from a BDS dataset, a reference to the specific variable must also be specified.

4.2.1. Example of Analysis Result Metadata in Define-XML

This example shows the analysis result metadata (see element *arm:AnalysisResult*) for the first of the two results from the example in Section 4.1.

The result of interest is the ”Dose response analysis for ADAS-Cog changes from baseline” (value of child element *Description*). This particular analysis was “SPECIFIED IN SAP” (value of attribute *AnalysisReason*) with the purpose of “PRIMARY OUTCOME MEASURE” (value of attribute *AnalysisPurpose*).

The availability of attribute *ParameterOID* indicates that one or more specific analysis parameters are of interest for the given result. The *ParameterOID* value matches the *ItemDef OID* of variable PARAMCD. The interaction between the parameter code variable reference, the parameter code variable definition and the selection of the values of interest as part of the selection criteria will be described in the following Section.

```
  <ItemDef OID="IT.ADQSADAS.PARAMCD"
      Name="PARAMCD" SASFieldName="PARAMCD" DataType="text" Length="8">
    <Description>
      <TranslatedText xml:lang="en">Parameter Code</TranslatedText>
    </Description>
    <CodeListRef CodeListOID="CL.PARAMCD_ADQSADAS"/>
    <def:Origin Type="Assigned"/>
  </ItemDef>
  …
  <arm:ResultDisplay OID="RD.Table_14-3.01" Name="Table 14-3.01">
    …
    <arm:AnalysisResult OID="AR.Table_14-3.01.R.1"
      ParameterOID="IT.ADQSADAS.PARAMCD"
      AnalysisReason="SPECIFIED IN SAP"
      AnalysisPurpose="PRIMARY OUTCOME MEASURE">
      <Description>
        <TranslatedText xml:lang="en">Dose response analysis for ADAS-Cog changes from
baseline
        </TranslatedText>
      </Description>
      <arm:AnalysisDatasets>
      …
      </arm:AnalysisDatasets>
      <arm:Documentation>
      …
      </arm:Documentation>
      <arm:ProgrammingCode>
      …
      </arm:ProgrammingCode>
    </arm:AnalysisResult>
     <arm:AnalysisResult>
    …
    </arm:AnalysisResult>
  </arm:ResultDisplay>
```

4.3. Analysis Parameter(s) Definitions

From a reviewer's perspective, it is useful to easily identify the analysis parameter (i.e., its short reference name PARAMCD and its full descriptive value stored in PARAM) in the BDS analysis dataset that is the focus of the analysis result. These metadata are not applicable if the result is not based on a BDS analysis dataset.

If the same type of analysis is performed on multiple parameters, all possible parameters should be listed (e.g. descriptive statistics on a set of laboratory parameters). If parameter lists are specified, the values in the succeeding metadata fields should apply to all.

The following example shows how the analysis parameter(s) should be specified in Define-XML.

4.3.1. Examples of Analysis Parameter(s) in Define-XML

The specification of attribute *ParameterOID* for a given analysis result indicates that the analysis result is focused on one or more values of PARAMCD/PARAM in the given BDS analysis dataset. The *OID* of the respective *ItemDef* for the variable PARAMCD must be specified in that case.

When an analysis result is based on specific analysis parameter(s), the selection of the appropriate PARAMCD value(s) must be part of the selection criteria for the respective analysis dataset. The selection criteria are specified in the *def:WhereClauseDef* element which is referenced by the *def:WhereClauseRef* child element of the *arm:AnalysisDataset* element. The child element *RangeCheck* of *def:WhereClauseDef* makes reference to the same *ItemDef OID* as the *arm:AnalysisResult* attribute *ParameterOID* (see attribute *def:ItemOID*), i.e. the item definition of the PARAMCD variable. The respective PARAMCD values of relevance can be derived from the attribute *Comparator* and the *CheckValue* child elements of *RangeCheck* (here: PARAMCD EQ "ACTOT"). Note that the derivation of applicable PARAMCD values also works with other comparator values allowed as *def:WhereClauseDef* comparators. For example, the IN comparator can be used to specify multiple parameters. Refer to Sections 5.3.11 and 5.3.11.1 for a full definition of elements and attributes which appear in the example and can or must be used with the elements *def:WhereClauseDef* and *RangeCheck*.

Since both the PARAMCD and the respective PARAM values are of interest to any user of the analysis results metadata, the corresponding PARAM value for PARAMCD="ACTOT" in this example can be retrieved via the Codelist specified for PARAMCD in dataset ADQSADAS (see *CodeListRef* in the *ItemDef* for the PARAMCD variable). The PARAM value corresponding to the specified PARAMCD value is the respective Decode specified in the "ADAS-Cog Parameter Code" Codelist for *CodeListItem CodedValue*="ACTOT".

```
<def:WhereClauseDef OID="WC.Table_14-3.01.R.1.ADQSADAS">
  <RangeCheck Comparator="EQ" SoftHard="Soft" def:ItemOID="IT.ADQSADAS.PARAMCD">
    <CheckValue>ACTOT</CheckValue>
  </RangeCheck>
  …
</def:WhereClauseDef>
…

<ItemDef OID="IT.ADQSADAS.PARAMCD"
   Name="PARAMCD" SASFieldName="PARAMCD" DataType="text" Length="8">
   <Description>
   <TranslatedText xml:lang="en">Parameter Code</TranslatedText>
   </Description>
   <CodeListRef CodeListOID="CL.PARAMCD_ADQSADAS"/>
   <def:Origin Type="Assigned"/>
  </ItemDef>
  …
<CodeList OID="CL.PARAMCD_ADQSADAS" Name="ADAS-Cog Parameter Code"
  DataType="text" SASFormatName="$QSADAS">
  …
  <CodeListItem CodedValue="ACTOT" OrderNumber="15">
    <Decode>
      <TranslatedText xml:lang="en">Adas-Cog(11) Subscore</TranslatedText>
    </Decode>
  </CodeListItem>
</CodeList>
…
<arm:AnalysisResult OID="AR.Table_14-3.01.R.1"
  ParameterOID="IT.ADQSADAS.PARAMCD">
  …
  <arm:AnalysisDataset ItemGroupOID="IG.ADQSADAS">
    <def:WhereClauseRef WhereClauseOID="WC.Table_14-3.01.R.1.ADQSADAS" />
    …
  </arm:AnalysisDataset>
  …
</arm:AnalysisResult>
```

4.4. Analysis Dataset(s) Definitions

As part of the analysis results metadata, it is important to identify the name of the dataset or datasets used to generate the analysis result. In most cases, this is a single dataset. However, if the analysis result requires joining multiple datasets, all of the datasets and a comment describing the join or how the multiple datasets are to be used can be provided. In addition to the dataset or datasets, the selection or subset of records used for the analysis and the analysis variable or variables to be analyzed should be described as part of the Analysis Dataset(s) Metadata.

4.4.1. Examples of Analysis Dataset(s) in Define-XML

In the example below, the element *arm:AnalysisDatasets* contains children elements (*arm:AnalysisDataset*) for the two analysis datasets, ADAE and ADSL respectively. Both of these datasets are needed to create the analysis result. The *def:CommentDef* element referred to from the *def:CommentOID* attribute is used to provide the reviewer with further instructions on how to use or join the datasets in order to reproduce the desired result. The purpose of the comment in the example below is to describe that ADSL is used to obtain the denominator for percentages whereas ADAE is used to obtain the count and numerator of the percentage.

```
  <ItemGroupDef OID="IG.ADSL" Name="ADSL" SASDatasetName="ADSL" Repeating="No"
    IsReferenceData="No" Purpose="Analysis" def:Structure="one record per subject"
    def:Class="SUBJECT LEVEL ANALYSIS DATASET" def:CommentOID="COM.ADSL"
    def:ArchiveLocationID="LF.ADSL">
    <Description>
      <TranslatedText xml:lang="en">Subject-Level Analysis</TranslatedText>
    </Description>
    …
  </ItemGroupDef>
  …
  <ItemGroupDef OID="IG.ADAE" Name="ADAE" SASDatasetName="ADAE" Repeating="Yes"
    IsReferenceData="No" Purpose="Analysis"
    def:Structure="one record per subject per adverse event"
    def:Class="OCCURRENCE DATA STRUCTURE"
    def:CommentOID="COM.ADAE" def:ArchiveLocationID="LF.ADAE">
    <Description>
      <TranslatedText xml:lang="en">Adverse Events Analysis Dataset</TranslatedText>
    </Description>
    …
  </ItemGroupDef>
  …
  <def:CommentDef OID="COM.JOIN-ADSL-ADAE">
    <Description>
      <TranslatedText xml:lang="en">Get denominators for percentages from ADSL and
counts and numerators from ADAE. Join ADAE with ADSL based on the unique subject
identifier (USUBJID) keeping only records in ADAE for the numerator.</TranslatedText>
    </Description>
    </def:CommentDef>
    …
  <arm:AnalysisResultDisplays>
      …
      <arm:AnalysisDatasets def:CommentOID="COM.JOIN-ADSL-ADAE">
        <arm:AnalysisDataset ItemGroupOID="IG.ADAE">
          <def:WhereClauseRef WhereClauseOID="WC.Table_14-5.02.R.1.ADAE" />
          <arm:AnalysisVariable ItemOID="IT.ADAE.AEBODSYS"/>
          <arm:AnalysisVariable ItemOID="IT.ADAE.AEDECOD"/>
        </arm:AnalysisDataset>
        …
        <arm:AnalysisDataset ItemGroupOID="IG.ADSL">
        …
        </arm:AnalysisDataset>
      </arm:AnalysisDatasets>
    …
  </arm:AnalysisResultDisplays>
```

4.4.2. Analysis Variable(s) Definitions

Analysis variable(s) specify the variable(s) to be analyzed. The variable(s) must exist in the dataset(s) defined in the Analysis Results Metadata. If more than one variable is analyzed, each variable has to be referenced. At least one analysis variable must be provided for any given analysis result.

4.4.2.1. Examples of Analysis Variable(s) in Define-XML

The following example illustrates the analysis variable for a Table identified by number “Table 14-3.01“ in the clinical study report.

In the example, the OID of the analysis variable CHG is provided in the attribute ItemOID of the element arm:AnalysisVariable which is the child element of arm:AnalysisDataset.

Please notice that the names of the referenced variables will be taken from the *Name* attribute of the *ItemDef* with the specified *OID*. They cannot be deduced from the *ItemOID* attributes (OIDs are identifiers, and not necessarily descriptive of content).

```
<ItemDef OID="IT.ADQSADAS.CHG" Name="CHG" SASFieldName="CHG" DataType="integer"
  Length="8">
  <Description>
    <TranslatedText xml:lang="en">Change from Baseline</TranslatedText>
  </Description>
  <def:Origin Type="Derived"/>
</ItemDef>
…
<arm:ResultDisplay OID="RD.Table_14-3.01" Name="Table 14-3.01">
  …
  <arm:AnalysisDatasets>
    <arm:AnalysisDataset ItemGroupOID="IG.ADQSADAS" >
       <def:WhereClauseRef WhereClauseOID="WC.Table_14-3.01.R.1.ADQSADAS" />
       <arm:AnalysisVariable ItemOID="IT.ADQSADAS.CHG"/>
    </arm:AnalysisDataset>
  </arm:AnalysisDatasets>
  …
</arm:ResultDisplay>
```

4.4.3. Selection Criteria Definitions

The selection criteria describe the analysis subset of a dataset required to derive a result for a display in a machine readable form, e.g., the numerator and/or denominator. It is a complete list of the variables and their values used to identify the records selected from the dataset for the analysis. This information is required if the analysis does not include every record in the analysis dataset.

The selection criteria are defined by one or more conditions. When there are multiple conditions the selection criterion is defined by the logical AND of all the conditions. A complex selection criterion involving parentheses and logical ORs of conditions is not supported by the Define-XML, but can be implemented by 1) Breaking down the metadata into separate result identifiers for each statistic 2) Creating an additional analysis flag in the source dataset to represent the necessary complex subsetting required for the single analysis result.

In the case where an analysis result depends on more than one dataset, a selection criteriion can be included for each dataset.

4.4.3.1. Examples of Selection Criteria in Define-XML

In the example below, the selection criteria are represented for two datasets. ADAE and ADSL were used in the creation of Table 14-5.02 with only one result (R.1) provided. The selection criterion for ADAE is [TRTEMFL='Y' and AESER='Y'] which subsets the Adverse Events Analysis dataset to Treatment Emergent Serious Adverse Events.

The selection criterion for ADSL is [SAFFL='Y'] which subsets the Subject Level Analysis dataset to the Safety Population. Note that the inclusion of SAFFL='Y' in the selection criteria for ADAE [SAFFL='Y' and TRTEMFL='Y' and AESER='Y'] would produce matching results due to the algorithm for the Treatment Emergent Flag.

Please notice that the name of the referenced variables will be taken from the *Name* attribute of the *ItemDef* with the specified *OID*. They cannot be deduced from the *def:ItemOID* attributes.

Refer to Sections 5.3.11 and 5.3.11.1 for a full definition of elements and attributes which appear in the example and can or must be used with the elements *def:WhereClauseDef* and *RangeCheck*.

```
<def:WhereClauseDef OID="WC.Table_14-5.02.R.1.ADAE">
  <RangeCheck Comparator="EQ" SoftHard="Soft" def:ItemOID="IT.ADAE.TRTEMFL">
    <CheckValue>Y</CheckValue>
  </RangeCheck>
  <RangeCheck Comparator="EQ" SoftHard="Soft" def:ItemOID="IT.ADAE.AESER">
    <CheckValue>Y</CheckValue>
  </RangeCheck>
</def:WhereClauseDef>
…
<def:WhereClauseDef OID="WC.Table_14-5.02.R.1.ADSL">
  <RangeCheck Comparator="EQ" SoftHard="Soft" def:ItemOID="IT.ADSL.SAFFL">
    <CheckValue>Y</CheckValue>
  </RangeCheck>
</def:WhereClauseDef>
…
    <arm:AnalysisDatasets >
      <arm:AnalysisDataset ItemGroupOID="IG.ADAE">
        <def:WhereClauseRef WhereClauseOID="WC.Table_14-5.02.R.1.ADAE" />
      …
      </arm:AnalysisDataset>

      <arm:AnalysisDataset ItemGroupOID="IG.ADSL">
        <def:WhereClauseRef WhereClauseOID="WC.Table_14-5.02.R.1.ADSL"/>
      </arm:AnalysisDataset>
    </arm:AnalysisDatasets>
```

4.5. Documentation Definitions

The optional documentation section for each analysis result is used to provide information on the analysis performed using textual description. One or more links to other documents, such as the study protocol or the study statistical analysis plan, can also be added. If the documentation section is used then the text description is required even if it is just "See reference" with a link to a reference provided.

The contents of the documentation depend on the level of detail required to describe the analysis itself, whether or not the sponsor is providing a corresponding analysis generation program, and sponsor-specific requirements and standards. This documentation section remains free form, i.e. it is not a subject to a rigid structure or controlled terminology.

4.5.1. Examples of Documentation in Define-XML

This example shows the documentation element for "Table 14-5.02 Incidence of Treatment Emergent Serious Adverse Events by Treatment Group". The example includes both a text description (element *Description*) and a link to a Section of the SAP in the Clinical Study Report (element *def:DocumentRef*).

The *Description* child element contains a summarization of what is presented in the table, e.g., "Unique count of subjects that experienced an Adverse Event by Preferred Term, System Organ Class, and Treatment Group and percentages based on the number of subjects in the safety population within each treatment group. The total number of times an event occurred was recorded by Preferred Term, System Organ Class, and Treatment Group. Fisher's exact test was used for treatment comparison of event rates."

In this example, there is one *def:DocumentRef* element referencing a *def:leaf* which in turn contains *XLink* information linking to the clinical study report. The *def:DocumentRef* contains the child element *def:PDFPageRef* which points to page 430 of the clinical study report or Section 11.2 of the SAP.

```
  <def:leaf ID="LF.SAP-SEC-11.2"
    xlink:href="../../../../../53-clin-stud-rep/535-rep-effic-safety-stud/5351-stud-
rep-contr/cdiscpilot01/cdiscpilot01.pdf">
    <def:title>SAP Section 11.2</def:title>
  </def:leaf>
  …

  <arm:ResultDisplay OID="RD.Table_14-5.02" Name="Table 14-5.02">
  …
    <arm:Documentation>
      <Description>
        <TranslatedText xml:lang="en">Unique count of subjects that experienced an
Adverse Event by Preferred Term, System Organ Class, and Treatment Group and
percentages based on the number of subjects in the safety population within each
treatment group. The total number of times an event occurred was recorded by Preferred
Term, System Organ Class, and Treatment Group. Fisher's exact test was used for
treatment comparison of event rates.
        </TranslatedText>
      </Description>
      <def:DocumentRef  leafID="LF.SAP-SEC-11.2">
        <def:PDFPageRef PageRefs="430" Type="PhysicalRef"/>
      </def:DocumentRef>
    </arm:Documentation>
    …
  </arm:ResultDisplay>
```

4.6. Programming Statements Definitions

The software programming code used to perform the specific analysis can be specified in the Programming Statements section. This includes, the model statement (using the specific variable names), technical specifications needed for reproducing the analysis (e.g., covariance structure), the output specifications, dataset(s) and variable(s) used, and selection criteria for records.

The programming statements can be provided in the Define-XML or in an attached external file. The name and version of the applicable software package should be specified either as part of this section or in another document, such as an Analysis Data Reviewer's Guide.

The programming statements provide documentation about how the specific analysis result/statistic was created.

Analysis datasets, compliant with the ADaM principle "analysis-ready", should be amenable to subsetting for analysis via easily-specified selection criteria in the programming statements. The programming statements are mainly for analysis method specifications. They should be concise and easy to use, in order for reviewers to be able to replicate the results with minimal or no programming effort.

This metadata item is considered optional.

4.6.1. Examples of Programming Statements in Define-XML

The following examples illustrate the use of programming statements for tables in the clinical study report.

The name and version of the software package are specified in the metadata as the value of the attribute *Context* of the element *arm:ProgrammingCode* in both examples.

In the first example, the programming statements are provided in element *arm:Code* while in the second example the code is in a linked external file by the child element *def:DocumentRef*. See definition of *leafID* for the details on links.

The input dataset(s), parameter(s) used in the model, and the selection criteria should be consistent with those defined in results metadata parts of Analysis Dataset(s), Analysis Parameter(s), and Analysis Variable(s) together with the selection criteria respectively.

Example of providing the programming statements in a define.xml file

```
<arm:ProgrammingCode Context="SAS version 9.2">
  <arm:Code >
    proc glm data = ADQSADAS;
      where EFFFL='Y' and ANL01FL='Y' and AVISIT='Week 24' and PARAMCD="ACTOT";
      class TRTPN SITEGR1;
      model CHG = TRTPN SITEGR1 BASE;
      means TRTPN;
      lsmeans TRTPN / OM STDERR PDIFF CL;
    run;
  </arm:Code>
</arm:ProgrammingCode>
```

Example of providing the programming statements in an external file

```
<def:leaf ID="LF.at14-5-02.sas"
  xlink:href="../programs/at14-5-02-sas.txt">
  <def:title>at14-5-02.sas</def:title>
</def:leaf>
…
<arm:ProgrammingCode Context="SAS version 9.2">
  <def:DocumentRef leafID="LF.at14-5-02.sas" />
</arm:ProgrammingCode>
```

5. Specification

5.1. Define-XML Analysis Results Metadata Extension Scope

A define.xml file extended by Analysis Results Metadata provides metadata for a set of key analysis results (i.e. tables, figures, or individual p-values) in addition to metadata on analysis datasets, variables and associated information described in the Define-XML V2.0 specification. This can be used for the regulatory submission of ADaM datasets for:

- A single clinical study
- An integrated summary

5.2. Analysis Results Metadata in the Define-XML Structure

Analysis Results Metadata are an extension to the CDISC Define-XML V2.0 and so Define-XML files follow the same basic structure as ODM files. A Define-XML file extended by Analysis Results Metadata includes the following key content components:

- XML header, the ODM root element, Study and MetaDataVersion
- Information about linked PDF documents such as Clinical Study Report (CSR), Statistical Analysis Plan (SAP), Protocol, Analysis Data Reviewer's Guide, or about linked program files in the file format requested by the regulatory authorities
- Dataset definitions
- Variable definitions
- Parameter Value definitions (including Where Clause definitions)
- Controlled Terminology definitions
- Analysis Derivation definitions
- Comment definitions
- **Key analysis results definitions**

The sections that follow describe what an Analysis Results Metadata extension to the Define-XML file can contain. Each of the elements are described in the sections below in the order in which they occur in the XML. Elements that may be used in more than one context are presented where they first appear in the document.

The description of elements which are already defined in the Define-XML v2.0.0 standard and need to be populated with Analysis Results Metadata specific contents focus on the Analysis Results Metadata specific use in this specification. Refer to the Define-XML v2.0.0 specification for other uses of those elements.

Note that the section hierarchy in this document does not reflect the XML structure. For example, the *arm:AnalysisResultDisplays* and *arm:ResultDisplay* elements are described at the same level in this document, however, the *arm:ResultDisplay* element in the XML is a child of the *arm:AnalysisResultDisplays* element.

Each section begins with a brief description of the element and is followed by an element table, and an attribute table.

An element table describes the different aspects of an element's definition while the attribute table describes the element's attributes. The following templates illustrate the layouts of these tables, including headers and descriptions of the content.

Element Table Template

Element Name:	*Name of the element*
Element XPath:	*XPath showing where the element belongs in the XML*
Element Textual Value:	*A description of the value of the element. If an element has no text value (e.g. it has child elements instead), then this cell is populated with "None".*
Usage	Requirement: *This is populated with one of three values:* • *"Required" when at least one instance of the element is required* • *"Optional" when the element is optional* • *"Conditional" when at least one instance of the element is required under certain conditions. It will include the conditions under which the element is Required.* Cardinality: *This indicates the number of instances expected (e.g.* "Exactly One", "One or More", *etc.)* Business Rule(s): *This is populated with rules that have to be satisfied in addition to an XML schema validation for a define.xml document to be considered compliant with the Define-XML v2.0.0 specification.* Other Information: *This is populated with any other information about the element, including the conditions under which the element is included, how the schema is applied to support the model, relative position of the element in the model, etc.*
Attributes:	*A comma-delimited list of the attributes of this element. If the element has no attributes, this is populated with* "None".
Child Elements:	*A comma-delimited list of the immediate child elements of this element. If the element has no child elements, this is populated with "None". The order of child elements shown in the specification is the order in which they must appear in a define.xml file.* *A link to a child element will be provided when the child element is described in a different section of the document and not under a sub-section of the element being described or in the section or subsection immediately following the current element.*

Attribute	Usage	Allowable Values	Description
Name of the attribute	*This is populated with* "Required" *when the attribute is required, "Optional" when the attribute is optional, or* "Conditional" *when the attribute is required under certain conditions.* *It will include the conditions under which the attribute is Required.* *Default: This will be populated with a default value if one is provided in the specification.*	*Any combination of the following:* Allowable Value: *The only allowed value* Allowable Values: *A comma-delimited list of the allowable values* Value Description: *A textual description of allowable values* See Appendix *xx:* *A reference to an appendix including a hyperlink to the appendix* Sample: *An example*	*A textual description of the attribute beyond what is included in the Allowable Values column.* Business Rule(s): *Rules that have to be satisfied in addition to schema validation for a define.xml document to be considered compliant with the Define-XML v2.0.0 Analysis Results Metadata specification.*

5.3. Define-XML Specification Details

5.3.1. arm:AnalysisResultDisplays Element

The first XML element for the Analysis Results Metadata extension is the *arm:AnalysisResultDisplays* element. It must be included in an ADaM define.xml file, which also includes the dataset metadata, when Analysis Results Metadata is provided.

If Analysis Results Metadata are provided, it is included within this element.

Element Name:	arm:AnalysisResultDisplays
Element XPath:	/ODM/Study/MetaDataVersion/arm:AnalysisResultDisplays
Element Textual Value:	*None*
Usage	Requirement: Required (in the context of this specification) Cardinality: Exactly One Other Information: This is the root element/container for any Analysis Results Metadata included in an ADaM define.xml file.
Attributes:	*None*
Child Elements:	arm:ResultDisplay

5.3.2. arm:ResultDisplay Element

The element *arm:ResultDisplay* contains the metadata per analysis display (i.e., table, listing or figure).

Element Name:	arm:ResultDisplay
Element XPath:	/ODM/Study/MetaDataVersion/arm:AnalysisResultDisplays/arm:ResultDisplay
Element Textual Value:	*None*
Usage:	Requirement: Required Cardinality: One or More Other Information: Contains the metadata for a display and must be included for every analysis display which is described by Analysis Results Metadata.
Attributes:	OID, Name
Child Elements:	Description, def:DocumentRef, arm:AnalysisResult

Attribute	Usage	Allowable Values	Description
OID	Required	Text	Unique identifier for the display
Name	Required	Text Sample: Table 14.1	Display name which uniquely identifies the display in the report (e.g. Table or Figure number).

5.3.3. Description Element

For the specification of Analysis Results Metadata, the *Description* element is used for analysis result display titles. It is also used for description of specific analysis results within a display. It may be used for a description of how to join multiple analysis datasets, if more than one analysis dataset is required as input for a specific analysis result. It is also used for the documentation (i.e. the textual description of the statistics) of the analysis result.

Element Name:	Description
Element XPath(s):	/ODM/Study/MetaDataVersion/def:CommentDef/Description /ODM/Study/MetaDataVersion/arm:AnalysisResultDisplays/arm:ResultDisplay/Description /ODM/Study/MetaDataVersion/arm:AnalysisResultDisplays/arm:ResultDisplay/arm:AnalysisResult/Description /ODM/Study/MetaDataVersion/arm:AnalysisResultDisplays/arm:ResultDisplay/arm:AnalysisResult/arm:Documentation
Element Textual Value:	*None*
Usage	Requirement: Required Cardinality: Exactly One
Attributes:	*None*
Child Elements:	TranslatedText

5.3.3.1. TranslatedText Element

Element Name:	TranslatedText
Element XPath(s):	/ODM/Study/MetaDataVersion/def:CommentDef/Description/TranslatedText /ODM/Study/MetaDataVersion/arm:AnalysisResultDisplays/arm:ResultDisplay/Description/TranslatedText /ODM/Study/MetaDataVersion/arm:AnalysisResultDisplays/arm:ResultDisplay/arm:AnalysisResult/Description/TranslatedText /ODM/Study/MetaDataVersion/arm:AnalysisResultDisplays/arm:ResultDisplay/arm:AnalysisResult/arm:Documentation/Description/TranslatedText
Element Textual Value:	*text string*
Usage	Requirement: Required Cardinality: One or More • Multiple TranslatedText child elements can be used to provide the dataset description in different languages. One for each language in which the description is desired. Business Rules: • A child TranslatedText element in English (without attribute xml:lang or with xml:lang="en") is required when files are submitted to the FDA.
Attributes:	xml:lang
Child Elements:	*None*

Attribute	Usage	Allowable Values	Description
xml:lang	Optional Default: "en"	Allowable Values: see: http://www.rfc-editor.org/rfc/bcp/bcp47.txt Samples: "en" for English "en-GB" for British English	Code representing the language of the enclosed text value. Business Rule: xml:lang should be unique within parent element.

5.3.4. def:DocumentRef Element

For the specification of Analysis Results Metadata, the *def:DocumentRef* element may be included in the *arm:ResultDisplay*, *arm:Documentation*, *arm:ProgrammingCode* and *def:CommentDef* elements. The *def:DocumentRef* element references the *def:leaf* element that identifies an external PDF document or program file.

The element *def:DocumentRef* may be used for references to

- analysis displays in a clinical study report/integrated summary
- documentation of the analysis as specified in the SAP and/or protocol
- program files

Element Name:	def:DocumentRef
Element XPath:	/ODM/Study/MetaDataVersion/def:CommentDef/def:DocumentRef /ODM/Study/MetaDataVersion/arm:AnalysisResultDisplays/arm:ResultDisplay/ def:DocumentRef /ODM/Study/MetaDataVersion/arm:AnalysisResultDisplays/arm:ResultDisplay/ arm:AnalysisResult/arm:Documentation/def:DocumentRef ODM/Study/MetaDataVersion/arm:AnalysisResultDisplays/ arm:ResultDisplay/arm:AnalysisResult/arm:ProgrammingCode/def:DocumentRef
Element Textual Value:	*None*
Usage	Requirement: Optional Cardinality: Zero or More Business Rule: In the context of an electronic submission, only documents included in the electronic submission should be referenced. Other Information: Refer to the Define-XML V2.0.0 specification for other, not Analysis Results Metadata specific, possible occurrences of def:DocumentRef in a define.xml file.
Attributes:	leafID
Child Elements:	def:PDFPageRef

Attribute	Usage	Allowable Values	Description
leafID	Required	Text Must be a legal XML name. XML names can basically contain any alphanumeric character, and also underscore, hyphen and period, but no whitespace. Furthermore, an XML name can not start with a number, hyphen or period.	Reference to the unique ID of the def:leaf element that contains the location of a PDF or program file.

5.3.4.1. def:PDFPageRef Element

This element is the container for specific PDF page references in external document references (e.g. the page number of an analysis display in the clinical study or integrated summary report, or the page number of a referenced SAP section in the clinical study or integrated summary report appendix).

Element Name:	def:PDFPageRef
Element XPath:	/ODM/Study/MetaDataVersion/def:CommentDef/def:DocumentRef/def:PDFPageRef /ODM/Study/MetaDataVersion/arm:AnalysisResultDisplays/arm:ResultDisplay/def:DocumentRef/def:PDFPageRef /ODM/Study/MetaDataVersion/arm:AnalysisResultDisplays/arm:ResultDisplay/arm:AnalysisResult/arm:Documentation/def:DocumentRef/def:PDFPageRef ODM/Study/MetaDataVersion/arm:AnalysisResultDisplays/arm:ResultDisplay/arm:AnalysisResult/arm:ProgrammingCode/def:DocumentRef/def:PDFPageRef
Element Textual Value:	*None*
Usage	Requirement: Optional Cardinality: Zero or More Other Information: Refer to the Define-XML V2.0.0 specification for other, not Analysis Results Metadata specific, possible occurrences of def:DocumentRef in a define.xml.
Attributes:	Type, PageRefs, FirstPage, LastPage
Child Elements :	*None*

Attribute	Usage	Allowable Values	Description
Type	Required	Allowable Values: PhysicalRef NamedDestination	Type of page for page references indicated in the PageRefs attribute. Business Rule: When Type="NamedDestination", the referenced PDF file should include the association between each NamedDestination and the corresponding physical page.
PageRefs	Conditional Required if FirstPage and LastPage are not provided.	Text Samples: “145” “145 176 200” “Table_14.1”	List of physical PDF pages or destination names separated by a space.
FirstPage	Conditional Required if PageRefs is not provided	Integer	First page in a range of pages. Note that the way to indicate the range of pages depends on the associated Type attribute provided.
LastPage	Conditional Required if PageRefs is not provided	Integer	Last page in a range of pages. Note that the way to indicate the range of pages depends on the associated Type attribute provided.

5.3.5. arm:AnalysisResult Element

The *arm:AnalysisResult* element holds the metadata pertaining to one individual analysis result (e.g. a specific p-value) in an analysis display.

Element Name:	arm:AnalysisResult
Element XPath:	/ODM/Study/MetaDataVersion/arm:AnalysisResultDisplays/arm:ResultDisplay/ arm:AnalysisResult
Element Textual Value:	*None*
Usage	Requirement: Required Cardinality: One or More
Attributes:	OID, ParameterOID, AnalysisReason, AnalysisPurpose
Child Elements:	Description, arm:AnalysisDatasets, arm:Documentation, arm:ProgrammingCode

Attribute	Usage	Allowable Values	Description
OID	Required	Text	Unique identifier of the analysis result within a display
ParameterOID	Conditional Required when the analysis result is based on specific parameter(s) from a BDS structured dataset	Text	OID of the ItemDef of the variable PARAMCD in the analysis dataset needed to generate the respective result.
AnalysisReason	Required	Text Extensible ADaM Controlled Terminology (Name: Analysis Reason, CDISC Submission Value: ANLREAS, Code: C117744) "SPECIFIED IN PROTOCOL", "SPECIFIED IN SAP", "DATA DRIVEN", "REQUESTED BY REGULATORY AGENCY"	The rationale for performing this analysis. It indicates when the analysis was planned. Business rule: If a specific analysis was pre-specified in both protocol and SAP, specify "SPECIFIED IN SAP" as the analysis reason.

Attribute	Usage	Allowable Values	Description
AnalysisPurpose	Required	Text Extensible ADaM Controlled Terminology (Name: Analysis Purpose, CDISC Submission Value: ANLPURP, Code: C117745): "PRIMARY OUTCOME MEASURE", "SECONDARY OUTCOME MEASURE", "EXPLORATORY OUTCOME MEASURE"	The purpose of the analysis within the body of evidence (e.g., section in the clinical study report).

5.3.6. arm:AnalysisDatasets Element

The element *arm:AnalysisDatasets* is the container for one or more analysis datasets which are needed to create the respective analysis result.

Element Name:	arm:AnalysisDatasets
Element XPath:	/ODM/Study/MetaDataVersion/arm:AnalysisResultDisplays/arm:ResultDisplay/ arm:AnalysisResult/arm:AnalysisDatasets
Element Textual Value:	*None*
Usage	Requirement: Required Cardinality: Exactly One
Attributes:	def:CommentOID
Child Elements:	arm:AnalysisDataset

Attribute	Usage	Allowable Values	Description
Def:CommentOID	Conditional Required if there is more than one analysis dataset needed to create the respective result	Text	Reference to the unique ID of a def:CommentDef element that contains the comment. Sample: OID of the def:Comment element which includes the description of how to join multiple analysis datasets if more than one input analysis dataset is needed for the respective analysis result.

5.3.7. arm:AnalysisDataset Element

The element *arm:AnalysisDataset* holds the metadata (e.g. record selection criteria, analysis variables) of a specific analysis dataset needed to create the respective analysis result.

Element Name:	arm:AnalysisDataset
Element XPath:	/ODM/Study/MetaDataVersion/arm:AnalysisResultDisplays/arm:ResultDisplay/ arm:AnalysisResult/arm:AnalysisDatasets/arm:AnalysisDataset
Element Textual Value:	*None*
Usage	Requirement: Required

	Cardinality: One or More
Attributes:	ItemGroupOID
Child Elements:	def:WhereClauseRef, arm:AnalysisVariable

Attribute	Usage	Allowable Values	Description
ItemGroupOID	Required	Text	OID of the ItemGroupDef, which includes the metadata (e.g. name and label) of the respective analysis dataset.

5.3.7.1. def:WhereClauseRef Element

Element references the *def:WhereClauseDef* that describes the selection criterion needed to select the required subset of records from the specified analysis dataset to create the respective analysis result.

Element Name:	def:WhereClauseRef
Element XPath:	/ODM/Study/MetaDataVersion/arm:AnalysisResultDisplays/arm:ResultDisplay/ arm:AnalysisResult/arm:AnalysisDatasets/arm:AnalysisDataset/def:WhereClauseRef
Element Textual Value:	*None*
Usage	Requirement: Conditional Cardinality: Zero or One Business Rules: A where clause reference must be specified if the respective analysis dataset includes more records than used for the creation of the result (e.g. other parameters, other timepoints, repeated measurements).
Attributes:	WhereClauseOID
Child Elements:	*None*

Attribute	Usage	Allowable Values	Description
WhereClauseOID	Required	Text	OID of the def:WhereClauseDef element which includes the specification of the where clause (selection criteria) to be applied on the analysis dataset the create the analysis result.

5.3.7.2. arm:AnalysisVariable Element

The element *arm:AnalysisVariable* is used to provide the reference for every analysis variable needed to create the respective analysis result.

Element Name:	arm:AnalysisVariable
Element XPath:	/ODM/Study/MetaDataVersion/arm:AnalysisResultDisplays/arm:ResultDisplay/ arm:AnalysisResult/arm:AnalysisDatasets/ arm:AnalysisDataset/arm:AnalysisVariable
Element Textual Value:	*None*
Usage	Requirement: Conditional Cardinality: Zero or More Business Rules: At least one analysis variable element must be available for any given analysis result. If there are more than one analysis datasets specified for a specific result, the analysis variable element may be available for one of the respective datasets only.
Attributes:	ItemOID

Child Elements:	*None*

Attribute	Usage	Allowable Values	Description
ItemOID	Required	Text	OID of the ItemDef element which includes the metadata (e.g., name and label) of the respective analysis variable.

5.3.8. arm:Documentation Element

arm:Documentation is the parent element for additional documentation provided as free text and/or references to external documents like the Statistical Analysis Plan (SAP), or the Protocol.

Element Name:	arm:Documentation
Element XPath:	/ODM/Study/MetaDataVersion/arm:AnalysisResultDisplays/arm:ResultDisplay/ arm:AnalysisResult/arm:Documentation
Element Textual Value:	*None*
Usage	Requirement: Optional Cardinality: Zero or One
Attributes:	*None*
Child Elements:	Description, def:DocumentRef

5.3.9. arm:ProgrammingCode Element

arm:ProgrammingCode is the parent element for programming statements and/or a reference to the program used to perform the specific analysis.

Element Name:	arm:ProgrammingCode
Element XPath:	/ODM/Study/MetaDataVersion/arm:AnalysisResultDisplays/arm:ResultDisplay/ arm:AnalysisResult/arm:ProgrammingCode
Element Textual Value:	*None*
Usage	Requirement: Optional Cardinality: Zero or One
Attributes:	Context
Child Elements:	arm:Code, def:DocumentRef

Attribute	Usage	Allowable Values	Description
Context	Optional	Text Sample: “SAS Version 9.2”	The name and version of the computer language used for the actual programming statements provided.

5.3.10. arm:Code Element

The element *arm:Code* is used to specify the programming statements pertaining to the decribed analysis result.

Element Name:	arm:Code
Element XPath:	/ODM/Study/MetaDataVersion/arm:AnalysisResultDisplays/arm:ResultDisplay/ arm:AnalysisResult/arm:ProgrammingCode/arm:Code
Element Textual Value:	Text (i.e. Programming statements pertaining to the decribed analysis result)
Usage	Requirement: Optional Cardinality: Zero or One Business Rule: The programming statements provided within this element should be understandable without any further references (e.g. definitions of macro parameters). The input dataset(s), parameter(s), analysis variable(s) and the selection criteria specified within the code should be consistent with those provided in respective individual analysis results metadata elements.
Attributes:	*None*
Child Elements:	*None*

5.3.11. def:WhereClauseDef Element

In the context of Analysis Results Metadata, the *def:WhereClauseDef* element is used for specifying selection criteria for analysis datasets.

Element Name:	def:WhereClauseDef
Element XPath:	/ODM/Study/MetaDataVersion/def:WhereClauseDef
Element Textual Value:	*None*
Usage	Requirement: Conditional Cardinality: Zero or More Business Rules: • A def:WhereClause is required for each unique value of the WhereClauseOID attribute value in a def:WhereClauseRef element within the arm:AnalysisDataset elements. • The analysis datasets should be designed to allow for simple selection criteria (i.e., expressions with comparators EQ, NE, LT, LE, GT, GE, IN, NOTIN and AND as the only valid join operator for multiple expressions). Other Information: Refer to the Define-XML v2.0.0 specifications for further usage of this element beyond the purpose of Analysis Results Metadata.
Attributes:	OID, def:CommentOID
Child Elements:	*RangeCheck*

Attribute	Usage	Allowable Values	Description
OID	Required	Text	Unique ID for the WhereClauseDef. See the ODM specification section 2.11 for OID considerations.

Attribute	Usage	Allowable Values	Description
def:CommentOID	Conditional Required when RangeCheck includes def:ItemOID values that belong to different ItemGroupDef elements	Text	Reference to the unique ID of a def:CommentDef that contains the narrative of the way to join the datasets involved in the Where Clause. Note that this attribute is not used in the context of Analysis Results Metadata. For Analysis Results Metadata the respective attribute of the element arm:AnalysisDatasets is used.

5.3.11.1. RangeCheck Element

For Analysis Results Metadata, the *RangeCheck* element is used to specify an individual component of a selection criterion (e.g. ITTFL EQ "Y", PARAMCD EQ "TOTSCORE", or AVISIT IN("Day 1", "Day 8", "Day 15")).

Element Name:	RangeCheck
Element XPath:	/ODM/Study/MetaDataVersion/def:WhereClauseDef/RangeCheck
Element Textual Value:	Contains an individual comparison specification defining the Where Clause condition.
Usage	Requirement: Required Cardinality: One or More • Each def:WhereClauseDef element must have at least one RangeCheck child element. Other Information: • If multiple RangeChecks are given the condition is the logical AND of all the RangeChecks. Business rule: • If specific analysis parameters are the focus of an analysis result, there must be a RangeCheck for the respective PARAMCD values.
Attributes:	Comparator, SoftHard, def:ItemOID
Child Elements:	*CheckValue*

Attribute	Usage	Allowable Values	Description
Comparator	Required	Allowable Values: LT LE GT GE EQ NE IN NOTIN	Comparison operator for Where Clause.

Attribute	Usage	Allowable Values	Description
SoftHard	Required	Allowable Values: Soft Hard	If an actual data value fails the constraint, it is either rejected (a Hard constraint) or a warning is produced (a Soft constraint). Business Rule: The SoftHard attribute has no meaning in the Define-XML context. Although ODM requires a value equal to "Hard" or "Soft", neither value implies any meaning to the enclosing RangeCheck or WhereClauseDef element.
def:ItemOID	Required	Text	Reference to the unique ID of an ItemDef (i.e. a variable's metadata definition like name and label) that is used to compare with the CheckValue.

5.3.11.2. CheckValue Element

The *CheckValue* element specifies the comparison value for the parent element *RangeCheck*. When the IN or NOTIN operator is used, more than one *CheckValue* element can be specified.

Element Name:	RangeCheck
Element XPath:	/ODM/Study/MetaDataVersion/def:WhereClauseDef/RangeCheck/CheckValue
Element Textual Value:	The comparison value
Usage	Requirement: Required Cardinality: One or More
Attributes:	*None*
Child Elements :	*None*

5.3.12. def:CommentDef Element

In the context of Analysis Results Metadata, the *def:CommentDef* element is used to provide textual information on how to use or join the specified analysis datasets if more than one analysis dataset is needed to create the described analysis result. The *def:CommentOID* attribute in *arm:AnalysisDatasets* must reference a valid *def:CommentDef*.

Element Name:	def:CommentDef
Element XPath:	/ODM/Study/MetaDataVersion/def:CommentDef
Element Textual Value:	*None*
Usage	Requirement: Conditional • Required for each unique value of the def:CommentOID attribute within the arm:AnalysisDatasets. Cardinality: One or More Business Rule: • Must contain the child Description element or the child def:DocumentRef element Other Information: • When the comment is provided in an External file the def:leafID attribute of the def:CommentDef element must be included and the Description element can include a short descriptive reference to the External file. • Note that each distinct comment is expected to have a unique def:CommentOID and can be referenced from different variables. Refer to the Define-XML v2.0.0 specifications for further usage of this element beyond the purpose of Analysis Results Metadata.
Attributes:	OID
Child Elements:	Description, def:DocumentRef

Attribute	Usage	Allowable Values	Attribute
OID	Required	Text	Unique ID for the CommentDef. See the ODM specification section 2.11 for OID considerations.

5.3.13. def:leaf Element

For Analysis Results Metadata, this element contains the XLink information (e.g., URL of referenced PDF documents or program files) referenced by *leafID* from *def:DocumentRef*.

Element Name:	def:leaf
Element XPath:	/ODM/Study/MetaDataVersion/def:leaf
Element Textual Value:	*None*
Usage	Requirement: Conditional Cardinality: One or More Business Rule: One for each def:DocumentRef included in the *define.xml* document. Other Information: Refer to the Define-XML v2.0.0 specifications for a definition of this element beyond the purpose of Analysis Results Metadata.
Attributes:	ID, xlink:href
Child Elements:	def:title

Attribute	Usage	Allowable Values	Description
ID	Required	Text	Unique ID for the def:leaf. See the ODM specification section 2.11 for OID requirements and considerations. Business Rules: The def:leaf ID attributes must be unique within the define.xml document, i.e. there can be no 2 def:leaf elements with the same ID attribute.
xlink:href	Required	Text	URL that can be used to identify the location of a document or dataset file relative to the folder containing the define.xml file. If the file is not located in the same folder as the define.xml file, a relative file path should be included. Business Rules: For regulatory submissions to the FDA or other regulatory authorities, the locations specified have to conform to locations allowed in the eCTD and requirements of the specific regulatory authority (e.g., FDA's Study Data Technical Conformance Guide) as applicable.

5.3.13.1. def:title Element

For analysis results metata, the def:title element includes the label for the document or program file reference.

Element Name:	def:title
Element XPath:	/ODM/Study/MetaDataVersion/def:leaf/def:title
Element Textual Value:	Text with the label for the document or dataset reference.
Usage	Requirement: Required Cardinality: Exactly One Other Information: Refer to the Define-XML v2.0.0 specifications for further usage beyond the pupose of Analysis Results Metadata.
Attributes:	*None*
Child Elements:	*None*

6. Global Element Ordering

Following the order of elements is a part of conformance to the Define-XML, therefore, all of the elements of Define-XML V2.0 including the Analysis Results Metadata extension are listed below in their correct order for your reference. Please see the Analysis Results Metadata Version 1.0 and CDISC Define-XML Version 2.0 specifications for usage of the elements.

Elements specific to the Analysis Results Metadata extension are written in red. Elements which are already included in the Define-XML v2.0 specifications and and have an extended use in context with Analysis Results Metadata are written in orange.

```
<ODM>
  <Study>
  <GlobalVariables>
    <StudyName>
    <StudyDescription>
    <ProtocolName>
  <MetaDataVersion>
    <def:AnnotatedCRF>
      <def:DocumentRef>
    <def:SupplementalDoc>
      <def:DocumentRef>
    <def:ValueListdef>
      <ItemRef>
        <def:WhereClauseRef>
    <def:WhereClauseDef>
      <RangeCheck>
        <CheckValue>
    <ItemGroupDef>
      <Description>
        <TranslatedText>
      <ItemRef>
      <def:leaf>
        <def:title>
    <ItemDef>
      <Description>
        <TranslatedText>
      <CodeListRef>
      <def:Origin>
        <def:DocumentRef>
          <def:PDFPageRef>
      <def:ValueListRef>
    <CodeList>
      <EnumeratedItem>
        <Alias>
      <CodeListItem>
        <Decode>
          <TranslatedText>
        <Alias>
      <ExternalCodeListItem>
      <Alias>
    <MethodDef>
      <Description>
        <TranslatedText>
      <FormalExpression>
      <def:DocumentRef>
        <def:PDFPageRef>
    <def:CommentDef>
      <Description>
        <TranslatedText>
      <def:DocumentRef>
        <def:PDFPageRef>
    <def:leaf>
      <def:title>
```

```
<arm:AnalysisResultDisplays>
  <arm:ResultDisplay>
    <Description>
      <TranslatedText>
    <def:DocumentRef>
      <def:PDFPageRef>
    <arm:AnalysisResult>
      <Description>
        <TranslatedText>
      <arm:AnalysisDatasets>
        <arm:AnalysisDataset>
          <def:WhereClauseRef>
          <arm:AnalysisVariable>
      <arm:Documentation>
        <Description>
          <TranslatedText>
         <def:DocumentRef>
          <def:PDFPageRef>
      <arm:ProgrammingCode>
        <arm:Code>
        <def:DocumentRef>
          <def:PDFPageRef>
```

7. Acknowledgments

This specification was developed by the CDISC ADaM Metadata Sub-Team.

Contributing authors:

- Kim Minkalis, Independent Consultant
- Lex Jansen, SAS Institute Inc.
- Lin Yan, Celgene Corporation
- Monika Kawohl, Accovion GmbH
- Sally Cassells, Next Step Clinical Systems LLC

Contributing reviewers:

- Jeff Abolafia, Rho Inc
- Karin LaPann, Theorem Clinical Research
- Michelle Barrick, Eli Lilly and Company
- Terek Peterson, Theorem Clinical Research
- Timothy Young, Accenture

Appendix A: XML Schema

The examples in this document are included in an XML file as part of the DefineXML 2.0 Analysis Results Metadata extension publication. This XML file references (directly or indirectly) the following schema files:

ARM 1.0 schema	schema/cdisc-arm-1.0/arm1-0-0.xsd
	schema/cdisc-arm-1.0/arm-extension.xsd
	schema/cdisc-arm-1.0/arm-ns-.xsd
Define-XML 2.0 schema	schema/cdisc-define-2.0/define2-0-0.xsd
	schema/cdisc-define-2.0/define-ns.xsd
	schema/cdisc-define-2.0/define-extension.xsd
	schema/cdisc-define-2.0/xlink.xsd
	schema/cdisc-define-2.0/xml.xsd
	schema/cdisc-define-2.0/xmldsig-core-schema.xsd
ODM 1-3-2 Schema	schema/cdisc-odm-1.3.2/ODM1-3-2.xsd
	schema/cdisc-odm-1.3.2/ODM1-3-2-foundation.xsd
	schema/cdisc-odm-1.3.2/xlink.xsd
	schema/cdisc-odm-1.3.2/xml.xsd
	schema/cdisc-odm-1.3.2/xmldsig-core-schema.xsd

Appendix B: Visualizing Analysis Results Metadata

This appendix shows how the various elements in the define.xml file are being rendered by the sample stylesheet. The numbers link the display elements to the underlying XML.

Analysis Results Metadata (Summary) for Study CDISC-Sample

1 Table 14-3.01 Primary Endpoint Analysis: ADAS-Cog - Summary at Week 24 - LOCF (Efficacy Population) 2
Dose response analysis for ADAS-Cog changes from baseline 3
Pairwise comparisons to placebo for ADAS-Cog changes from baseline 4

Table 14-5.02 Incidence of Treatment Emergent Serious Adverse Events by Treatment Group
Incidence of Treatment Emergent Serious Adverse Events by Treatment Group

```
<arm:AnalysisResultDisplays>

  <arm:ResultDisplay OID="RD.Table_14-3.01" Name="Table 14-3.01">  1
    <Description>
2     <TranslatedText xml:lang="en">Primary Endpoint Analysis: ADAS-Cog - Summary at Week 24 - LOCF (Efficacy Population)</TranslatedText>
    </Description>
    <def:DocumentRef leafID="LF.Table-14-3.01">
      <def:PDFPageRef PageRefs="49" Type="PhysicalRef"/>
    </def:DocumentRef>
    <arm:AnalysisResult
      OID="AR.Table_14-3.01.R.1"
      ParameterOID="IT.ADQSADAS.PARAMCD"
      AnalysisReason="SPECIFIED IN SAP"
      AnalysisPurpose="PRIMARY OUTCOME MEASURE">
      <Description>
3       <TranslatedText xml:lang="en">Dose response analysis for ADAS-Cog changes from baseline</TranslatedText>
      </Description>
      <arm:AnalysisDatasets>                                                    [5 lines]
      <arm:Documentation>                                                       [8 lines]
      <arm:ProgrammingCode Context="SAS version 9.2">                           [8 lines]
    </arm:AnalysisResult>
    <arm:AnalysisResult
      OID="AR.Table_14-3.01.R.2"
      ParameterOID="IT.ADQSADAS.PARAMCD"
      AnalysisReason="SPECIFIED IN SAP"
      AnalysisPurpose="PRIMARY OUTCOME MEASURE">
      <Description>
4       <TranslatedText xml:lang="en">Pairwise comparisons to placebo for ADAS-Cog changes from baseline</TranslatedText>
      </Description>
      <arm:AnalysisDatasets>                                                    [5 lines]
      <arm:Documentation>                                                       [8 lines]
      <arm:ProgrammingCode Context="SAS version 9.2">                           [10 lines]
    </arm:AnalysisResult>
  </arm:ResultDisplay>
```

Analysis Results Metadata (Detail) for Study CDISC-Sample

Table 14-3.01

Display	Table 14-3.01 Primary Endpoint Analysis: ADAS-Cog - Summary at Week 24 - LOCF (Efficacy Population)
Analysis Result	**Dose response analysis for ADAS-Cog changes from baseline** (3)
Analysis Parameter(s)	PARAMCD = "ACTOT" (Adas-Cog(11) Subscore) (4)
Analysis Variable(s)	CHG (Change from Baseline) (5)
Analysis Reason	SPECIFIED IN SAP (6)
Analysis Purpose	PRIMARY OUTCOME MEASURE (7)
Data References (incl. Selection Criteria)	ADQSADAS [PARAMCD = "ACTOT" and AVISIT = "Week 24" and EFFFL = "Y" and ANL01FL = "Y"] (8) (9)
Documentation	Linear model analysis of CHG for dose response; using randomized dose (0 for placebo; 54 for low dose; 81 for high dose) and site group in model. Used PROC GLM in SAS to produce p-value (from Type III SS for treatment dose). (10) SAP Section 10.1.1 (11)

Programming Statements	[SAS version 9.2] (12)
	`proc glm data = ADQSADAS;`
	`  where EFFFL='Y' and ANL01FL='Y' and AVISIT='Week 24' and PARAMCD="ACTOT";`
	`  class SITEGR1;`
	`  model CHG = TRTPN SITEGR1;`
	`run;`

```
<arm:ResultDisplay OID="RD.Table_14-3.01" Name="Table 14-3.01">
  <Description>
    <TranslatedText xml:lang="en">Primary Endpoint Analysis: ADAS-Cog - Summary at Week 24 - LOCF (Efficacy Population)</TranslatedText>
  </Description>
  <def:DocumentRef leafID="LF.Table-14-3.01">
    <def:PDFPageRef PageRefs="49" Type="PhysicalRef"/>
  </def:DocumentRef>
  <arm:AnalysisResult
    OID="AR.Table_14-3.01.R.1"
    ParameterOID="IT.ADQSADAS.PARAMCD"
    AnalysisReason="SPECIFIED IN SAP"
    AnalysisPurpose="PRIMARY OUTCOME MEASURE">
    <Description>
      <TranslatedText xml:lang="en">Dose response analysis for ADAS-Cog changes from baseline</TranslatedText>
    </Description>
    <arm:AnalysisDatasets>
      <arm:AnalysisDataset ItemGroupOID="IG.ADQSADAS" >
        <def:WhereClauseRef WhereClauseOID="WC.Table_14-3.01.R.1.ADQSADAS" />
        <arm:AnalysisVariable ItemOID="IT.ADQSADAS.CHG"/>
      </arm:AnalysisDataset>
    </arm:AnalysisDatasets>
    <arm:Documentation>
      <Description>
      <TranslatedText xml:lang="en">Linear model analysis of CHG for dose response; using randomized dose (0 for placebo;
      54 for low dose; 81 for high dose) and site group in model. Used PROC GLM in SAS to produce p-value
      (from Type III SS for treatment dose).
      </TranslatedText>
      </Description>
      <def:DocumentRef  leafID="LF.SAP-SEC-10.1.1">
        <def:PDFPageRef PageRefs="429" Type="PhysicalRef"/>
      </def:DocumentRef>
    </arm:Documentation>
    <arm:ProgrammingCode Context="SAS version 9.2">
    <arm:Code>
      proc glm data = ADQSADAS;
        where EFFFL='Y' and ANL01FL='Y' and AVISIT='Week 24' and PARAMCD="ACTOT";
        class SITEGR1;
        model CHG = TRTPN SITEGR1;
      run;
    </arm:Code>
    </arm:ProgrammingCode>
  </arm:AnalysisResult>
```

```
<def:WhereClauseDef OID="WC.Table_14-3.01.R.1.ADQSADAS">
  <RangeCheck Comparator="EQ" SoftHard="Soft" def:ItemOID="IT.ADQSADAS.PARAMCD">
    <CheckValue>ACTOT</CheckValue>
  </RangeCheck>
  <RangeCheck Comparator="EQ" SoftHard="Soft" def:ItemOID="IT.ADQSADAS.AVISIT">
    <CheckValue>Week 24</CheckValue>
  </RangeCheck>
  <RangeCheck Comparator="EQ" SoftHard="Soft" def:ItemOID="IT.ADQSADAS.EFFFL">
    <CheckValue>Y</CheckValue>
  </RangeCheck>
  <RangeCheck Comparator="EQ" SoftHard="Soft" def:ItemOID="IT.ADQSADAS.ANL01FL">
    <CheckValue>Y</CheckValue>
  </RangeCheck>
</def:WhereClauseDef>
```

Appendix C: Representations and Warranties, Limitations of Liability, and Disclaimers

CDISC Patent Disclaimers
It is possible that implementation of and compliance with this standard may require use of subject matter covered by patent rights. By publication of this standard, no position is taken with respect to the existence or validity of any claim or of any patent rights in connection therewith. CDISC, including the CDISC Board of Directors, shall not be responsible for identifying patent claims for which a license may be required in order to implement this standard or for conducting inquiries into the legal validity or scope of those patents or patent claims that are brought to its attention.

Representations and Warranties
"CDISC grants open public use of this User Guide (or Final Standards) under CDISC's copyright."

Each Participant in the development of this standard shall be deemed to represent, warrant, and covenant, at the time of a Contribution by such Participant (or by its Representative), that to the best of its knowledge and ability: (a) it holds or has the right to grant all relevant licenses to any of its Contributions in all jurisdictions or territories in which it holds relevant intellectual property rights; (b) there are no limits to the Participant's ability to make the grants, acknowledgments, and agreements herein; and (c) the Contribution does not subject any Contribution, Draft Standard, Final Standard, or implementations thereof, in whole or in part, to licensing obligations with additional restrictions or requirements inconsistent with those set forth in this Policy, or that would require any such Contribution, Final Standard, or implementation, in whole or in part, to be either: (i) disclosed or distributed in source code form; (ii) licensed for the purpose of making derivative works (other than as set forth in Section 4.2 of the CDISC Intellectual Property Policy ("the Policy")); or (iii) distributed at no charge, except as set forth in Sections 3, 5.1, and 4.2 of the Policy. If a Participant has knowledge that a Contribution made by any Participant or any other party may subject any Contribution, Draft Standard, Final Standard, or implementation, in whole or in part, to one or more of the licensing obligations listed in Section 9.3, such Participant shall give prompt notice of the same to the CDISC President who shall promptly notify all Participants.

No Other Warranties/Disclaimers. ALL PARTICIPANTS ACKNOWLEDGE THAT, EXCEPT AS PROVIDED UNDER SECTION 9.3 OF THE CDISC INTELLECTUAL PROPERTY POLICY, ALL DRAFT STANDARDS AND FINAL STANDARDS, AND ALL CONTRIBUTIONS TO FINAL STANDARDS AND DRAFT STANDARDS, ARE PROVIDED "AS IS" WITH NO WARRANTIES WHATSOEVER, WHETHER EXPRESS, IMPLIED, STATUTORY, OR OTHERWISE, AND THE PARTICIPANTS, REPRESENTATIVES, THE CDISC PRESIDENT, THE CDISC BOARD OF DIRECTORS, AND CDISC EXPRESSLY DISCLAIM ANY WARRANTY OF MERCHANTABILITY, NONINFRINGEMENT, FITNESS FOR ANY PARTICULAR OR INTENDED PURPOSE, OR ANY OTHER WARRANTY OTHERWISE ARISING OUT OF ANY PROPOSAL, FINAL STANDARDS OR DRAFT STANDARDS, OR CONTRIBUTION.

Limitation of Liability
IN NO EVENT WILL CDISC OR ANY OF ITS CONSTITUENT PARTS (INCLUDING, BUT NOT LIMITED TO, THE CDISC BOARD OF DIRECTORS, THE CDISC PRESIDENT, CDISC STAFF, AND CDISC MEMBERS) BE LIABLE TO ANY OTHER PERSON OR ENTITY FOR ANY LOSS OF PROFITS, LOSS OF USE, DIRECT, INDIRECT, INCIDENTAL, CONSEQUENTIAL, OR SPECIAL DAMAGES, WHETHER UNDER CONTRACT, TORT, WARRANTY, OR OTHERWISE, ARISING IN ANY WAY OUT OF THIS POLICY OR ANY RELATED AGREEMENT, WHETHER OR NOT SUCH PARTY HAD ADVANCE NOTICE OF THE POSSIBILITY OF SUCH DAMAGES.

Note: The CDISC Intellectual Property Policy can be found at
http://www.cdisc.org/system/files/all/article/application/pdf/cdisc_20ip_20policy_final.pdf