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What is the “ADAM OTHER” Class of Datasets, and When Should it be Used?

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Strategy | Digital | Technology | Operations

Outline

ADaM fundamental principles

ADaM dataset classes and standard dataset structures

The OTHER Class of ADaM datasets

ADaM OTHER in the universe of analysis datasets

When the OTHER class should and should not be used

Concluding thoughts

CDISC ADaM

- Clinical Data Interchange Standards Consortium (CDISC)
- Analysis Data Model (ADaM)
 - Model for observed and derived subject data enabling analysis and supporting review
 - Influenced by needs of FDA statistical and medical reviewers
 - Preferred by FDA
 - Will be required by FDA for new studies no earlier than Dec. 18, 2016
 - Transparent: Materializes and exposes derivation
 - Fundamental Principles
 - Standard data and metadata structures
 - standard variables
 - dataset and variable naming conventions
 - rules
 - etc.

The Evolution of ADaM

- First, there was a philosophy: **Fundamental Principles**

ADaM Fundamental Principles

- Analysis datasets and their associated metadata must:
 - facilitate clear and unambiguous communication
 - provide traceability between the analysis data and its source data (ultimately SDTM)
 - be readily useable by commonly available software tools
- Analysis datasets must:
 - be accompanied by metadata
 - be analysis-ready

Fundamental Principles have Practical Effects - A Few Examples

- *Analysis datasets and their associated metadata must:*
 - *facilitate clear and unambiguous communication*
 - Flag imputed dates
 - Keep all observed and derived records, not just those analyzed
 - *provide traceability between the analysis data and its source data (ultimately SDTM)*
 - Include traceability variables, e.g. --SEQ
 - Metadata traceability always required
- *Analysis datasets must:*
 - *be analysis-ready*
 - Ideally, “One PROC away” from results
 - Minimal or no data manipulation in analysis programs

The Evolution of ADaM

- First, there was a philosophy: Fundamental Principles
- Then there were standard data structures: **Classes of ADaM Datasets**

Four Classes of ADaM Datasets – But only Three Standard Data Structures

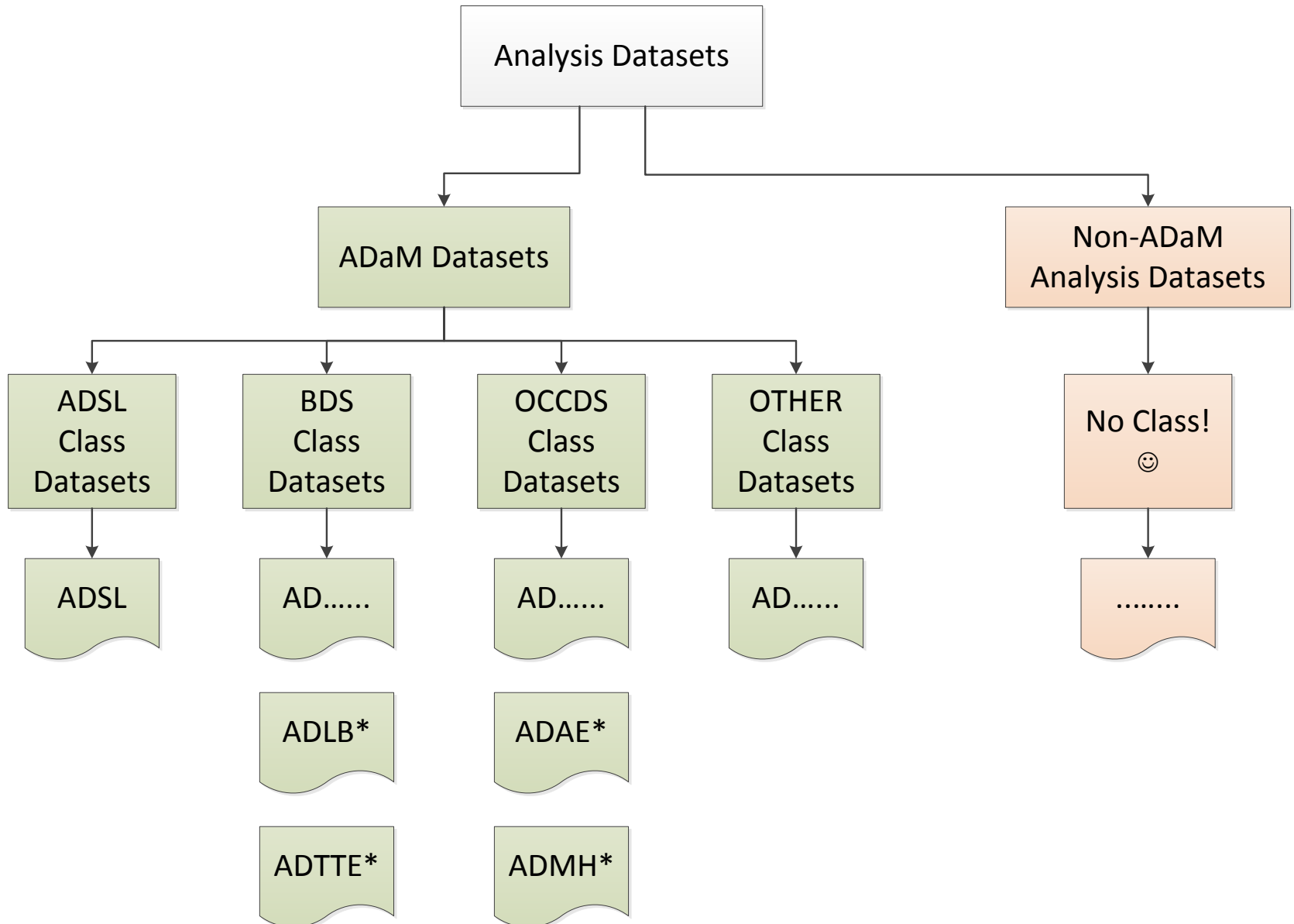
1. Subject-Level Analysis Dataset (**ADSL**)
 - only member of this class is ADSL
2. Basic Data Structure (**BDS**)
 - the Swiss Army Knife vertical structure
3. Occurrence Data Structure (**OCCDS**)
 - Generalization of ADAE, will be finalized in 2015
4. Other (ADAM **OTHER**)
 - This class has no standard structure!

Note: the OTHER Class is called ADAM OTHER in the CDISC Controlled Terminology for CLASS

The OTHER Class

- Purpose is to support analyses that cannot be supported by the ADaM dataset structures that have been defined to date
- Datasets of the OTHER Class must:
 - follow the ADaM Fundamental Principles
 - follow all ADaM dataset and variable naming conventions, etc. as much as possible
- The OTHER Class shrinks as the CDISC ADaM Team defines new Classes and structures
 - e.g., BDS (2009), ADTTE in BDS (2012), ADAE (2012), OCCDS (2015)
- But the OTHER Class is unlimited and grows each time someone needs something that is not yet addressed

ADaM OTHER in the Universe of Analysis Datasets



So what have we seen so far?

- Not all analysis datasets are ADaM datasets
- “ADaM datasets” is not a synonym of “analysis datasets”
- Non-ADaM analysis dataset \neq ADaM dataset of the OTHER Class
- There are standard ADaM data structures (ADSL, BDS, OCCDS)
- The ADaM OTHER Class doesn't have a standard structure

The OTHER Class has no standard structure ... so ... can I use the OTHER Class to do whatever I like?

- *“I really don’t like the BDS vertical dataset structure. I prefer a horizontal structure. Can I make a horizontal dataset like I am used to and call it an OTHER class dataset?”*
- Probably not!
- OTHER is not a loophole to drive a truck through
- ADaM is a data standard
- FDA wants sponsors to use the ADaM data standard
- Use an ADaM standard structure when a standard structure is capable of enabling the analysis

Why choose an ADaM standard data structure when it is capable of enabling the analysis?

- Use standard structures when you can, because they help:
 - **Everyone:** Facilitate advances in medicine
 - **Your peers:** Improve communication (including at PharmaSUG!)
 - **Your company:** Data integration, systems, people onboarding, partnering
 - **Regulatory agencies:** Make FDA more effective
 - reduce learning curve in new submissions
 - support FDA review tools
- You benefit too:
 - Fewer oddities to explain in metadata and reviewer's guide
 - Enable portable skills (good for the resume!)
- Don't use OTHER unless the standard structures are not capable of supporting the analysis

We all have a stake in the standard structures

- What would happen if most people decided to “deviate a little bit” from the standard structures?
- Is that harmless?
- Is there a slippery slope?
- Would we have a data standard?

- ADaM standard structures handle more situations than you might think at first glance
- Designing ADaM datasets, especially BDS, is a creative process
- Become familiar with all the tools in the BDS toolbox

- Please think twice!

When can I use OTHER?

- We have just seen that you should use the standard data structures when you can
- Now we will look at 4 situations where it may make sense to use OTHER
- There may be others

Reason #1 for an ADaM OTHER Class dataset: No standard structure can enable the analysis

- If ADSL, BDS and OCCDS cannot support the analysis, then the OTHER class can be used
 - Must follow ADaM fundamental principles, naming conventions, etc.
- Example: Multivariate Analysis of Variance (MANOVA)
 - More than one dependent variable is needed on the same row
- Example: Correlation Matrix
 - The variables to be correlated must be on the same row
- Note: True statistical multivariate analysis is rare in Pharma
 - Virtually all hypothesis testing in Pharma involves univariate analysis (one analysis variable on the left hand side of the model statement)
 - BDS works great for univariate analyses (ANCOVA, CMH, TTE, ...)
- Note: A horizontal OTHER Class dataset can often be created by transposing a BDS dataset, using BDS PARAMCD for the analysis variable names (but this is not always simple)

Reason #2 for an ADaM OTHER Class dataset: Listing view

- Someone wants/needs to see analysis variables side-by-side
 - This can be a legitimate need of statistician or reviewer
- An ADaM dataset of the OTHER Class, or even a non-ADaM dataset, can be created to support eyeball review of data
 - If it follows ADaM fundamental principles etc., can be ADaM OTHER Class
- However, such a dataset should not be used as the input dataset to the statistical analysis if ADSL, BDS, or OCCDS would suffice

Reason #3 for an ADaM OTHER Class dataset: Pre-ADSL dataset

- Example: a pre-ADSL dataset that assembles facts to be used when deriving per-protocol population flag PPROTFL in ADSL, e.g.
 - Was the subject compliant enough with the prescribed therapy?
 - Did the subject take certain disqualifying concomitant medications?
 - Did the subject violate dietary restrictions?
- This dataset could be like a BDS dataset, with a parameter PARAM for each of these facts; but it probably won't be BDS-compliant
 - It won't have planned treatment
 - It won't have variables copied from ADSL
 - If it follows ADaM fundamental principles etc., can be ADaM OTHER Class
- This dataset won't be used for analysis
 - If these facts are needed for analysis, create ADSL variables to contain them

Reason #4 for an ADaM OTHER Class dataset: Intermediate dataset

- Example: an EX-plus (ADEX?) dataset is needed for statistician review
 - SDTM EX
 - Plus some SDTM EX supplemental qualifiers
 - Plus some columns copied from ADSL
 - Plus some derived variables
 - If it follows ADaM fundamental principles etc., can be ADaM OTHER Class
- Note: Renaming EXTRT to PARAM and some other variable to AVAL does not make this a BDS dataset
- This dataset should not be used for the statistical analysis
- A compliant BDS dataset (ADEXSUMM?) may be derived from this intermediate dataset
 - Parameters summarizing aspects of exposure for analysis

Not Valid Reasons for OTHER

- It's going to cost us a lot to change to the standard ADaM structures
- I am used to a certain layout
- I don't want to learn something new
- I want to do it my way

Concluding Thoughts

- CDISC ADaM has rules, but can still express the science
 - There is plenty of room for expression within ADSL, BDS, OCCDS
 - Designing ADaM datasets is a creative process
 - The ADaM OTHER Class is available for use when there is a need that can't be met by the standard ADaM dataset structures
 - Don't be afraid of it but use it only when necessary

References

- www.cdisc.org/adam
- <http://www.fda.gov/ForIndustry/DataStandards/StudyDataStandards/default.htm>

Questions?

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