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Understanding SE, TA, TE Domains

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ABSTRACT

The FDA clearly request that the subject element table (SE) be part of the submission data. In order to derive the SE domain, the trial domains Trial element (TE), and Trial Arm (TA) also need to be defined and part of the data. This paper will discuss how the Trial domains TE, TA contributes to the derivation of the SE domain and will provide one interpretation of the derivations needed to achieve a compliant and useful SE domain.

INTRODUCTION

With all the work that goes into the definition of the Trial Domains, it make sense to invest in the efforts needed to produce a SE domain that accurately describes the actual order of elements followed by the subject, together with the start date/time and end date/time for each element. The domain will also include the unplanned elements that are important to clearly understand the path of a subject in a given trial. This paper is intended for programmers that have a working knowledge of the CDISC SDTM data standard.

DATA STRUCTURE

The three domains contain a number of common topic and/or synonym variables. These variables have different requirements in each table.

TE – COMMON

ELEMENT and ETCD are variables sourced in TE. ETCD as the topic variable is required on every observation. Only the plan values for ETCD are part of the domain.

TA – COMMON

ELEMENT and ETCD are variables sourced in TE. In TA, ETCD can repeat multiple times, it is now a record qualifier. Only the plan values defined in TE are part of the domain.

TAETORD is sourced in TA. TAETORD defines the sequence of each element within each Arm.

EPOCH is sourced in TA. The field is required and all valid EPOCH are defined in TA.

SE – COMMON

ELEMENT and ETCD are variables sourced in TA. If an element differ from planned elements ETCD will take the value UNPLAN.

TAETORD is sourced in TA. TAETORD defines the sequence of each element within each Arm.

EPOCH is sourced in TA. All valid EPOCH are defined in TA.

SE –SPECIAL REQUIREMENT FOR SESEQ

In most of the domains, the derivation of the Sequence Number is not specified. In contrast here, SESEQ is expected to be consistent chronological order. The chronological order is provided by the required variable SESTDTC.

CREATION OF SE DOMAIN

SE – Specification for the for the Subject Elements Domain Model

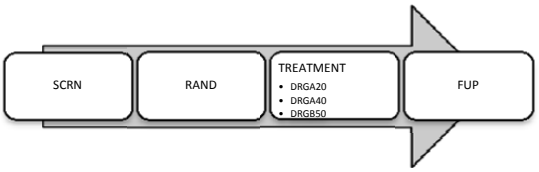
se.xpt, Subject Elements — Version 3.2. One record per actual Element per subject.

Variable Name	Variable Label	Type	Controlled Terms, Codelist or Format	Role	CDISC Notes	Core
STUDYID	Study Identifier	Char		Identifier	Unique identifier for a study.	Req
DOMAIN	Domain Abbreviation	Char	SE	Identifier	Two-character abbreviation for the domain.	Req
USUBJID	Unique Subject Identifier	Char		Identifier	Identifier used to uniquely identify a subject across all studies for all applications or submissions involving the product.	Req
SESEQ	Sequence Number	Num		Identifier	Sequence Number given to ensure uniqueness of subject records within a domain. Should be assigned to be consistent chronological order.	Req
ETCD	Element Code	Char	*	Topic	1. ETCD (the companion to ELEMENT) is limited to 8 characters and does not have special character restrictions. These values should be short for ease of use in programming, but it is not expected that ETCD will need to serve as a variable name. 2. If an encountered Element differs from the planned Element to the point that it is considered a new Element, then use "UNPLAN" as the value for ETCD to represent this Element.	Req
ELEMENT	Description of Element	Char	*	Synonym Qualifier	The name of the Element. If ETCD has a value of "UNPLAN" then ELEMENT should be Null.	Perm
SESTDTC	Start Date/Time of Element	Char	ISO 8601	Timing	Start date/time for an Element for each subject.	Req
SEENDTC	End Date/Time of Element	Char	ISO 8601	Timing	End date/time for an Element for each subject.	Exp
TAETORD	Planned Order of Element within Arm	Num		Timing	Number that gives the planned order of the Element within the subject's assigned ARM.	Perm
EPOCH	Epoch	Char	(EPOCH)	Timing	Epoch associated with the Element in the planned sequence of Elements for the ARM to which the subject was assigned	Perm
SEUPDES	Description of Unplanned Element	Char		Synonym Qualifier	Description of what happened to the subject during this unplanned Element. Used only if ETCD has the value of "UNPLAN".	Perm

** Indicates variable may be subject to controlled terminology, (Parenthesis indicates CDISC/NCI codelist code value)*

PROGRAMMING SPECIFICATIONS

Simple Design



ARM A: SCRN, RAND, DRGA20, FUP

ARM B:SCRN, RAND, DRGA40, FUP

ARM C:SCRN,RAND, DRGB50, FUP

For this simple example, let start by examining the following Trial Elements:

ETCD	ELEMENT	TESTRL	TEENRL
SCREEN	Screening	PROTOCOL MILESTONE, INFORMED CONSENT OBTAINED	
RAND	Randomization	PROTOCOL MILESTONE, RANDOMIZED	
DRGA20	Drug A 20 mg	Dose of A 20 mg	
DRGA40	Drug A 40 mg	Dose of A 40 mg	
DRGB50	Drug B 50 mg	Dose of B 50 mg	
FUP	Follow-up	COMPLETED, DISPOSITION EVENT when EPOCH= TREATMENT	COMPLETED, DISPOSITION EVENT when EPOCH= FOLLOW-UP

Steps

*Evaluate each element start rule in order to make sure the start of an element can be identified programmatically. Since every element is consecutive with no gap, the programming will target the starting date of each element. The end date will be completed with the start date of the element immediately following the current element. Only the end of the last element is needed.

Treatment Element

Using the exposure data identify every start date of exposure at a planned dose level: DRGA20, DRGA40, and DRGB50. While going thru the exposure data you can identify UNPLAN treatment element, let say a subject received the drug A at a dose level of 60 mg, you could assign ETCD=UNPLAN with SEUPDES="Subject received the drug A dose level of 60 mg".

Arm Treatment Element

Now that you have identified all the elements for a subject, you can verify against the subject ARM specific plan elements defined in TA. You can have per example a subject planned to be exposed only to DRGB50 who got exposed to DRGA20. In that situation, you can assign ETCD=UNPLAN with SEUPDES="Subject was exposed to element DRGA20".

Completing the SE domain

Get the data about all additional elements defined in the TE domain.

Copy value of SESTDTC from the next element to the current element. Look up PROC EXPAND, this SAS Procedure can be useful to complete this task.

Get the end date of the last element for the subject.

Sort the dataset in chronological order and derive SESEQ.

Sample SE

USUBJID	SESEQ	ETCD	SESTDTC	SEENDTC	TAETORD	EPOCH	SEUPDES
001	1	SCRN	2013-01-12	2013-01-15	1	SCREENING	
001	2	RAND	2013-01-15	2013-01-15	2	SCREENING	
001	3	DRGA20	2013-01-15	2013-02-28	3	TREATMENT	
001	4	FUP	2013-02-28	2013-03-30	4	FUP	
002	1	SCRN	2013-02-12	2013-02-15	1	SCREENING	
002	2	RAND	2013-02-15	2013-02-15	2	SCREENING	
002	3	DRGA20	2013-02-15	2013-03-29	3	TREATMENT	
002	4	UNPLAN	2013-03-29	2013-04-28		TREATMENT*	Subject was exposed to element DRGB50
002	5	FUP	2013-04-28	2013-04-30	4	FUP	

*Sponsor has to decide how to populate EPOCH for the UNPLAN elements.

SDTM COMPLIANCE

1. The SE domain should be considered as required for a FDA submission.

   Can be used to populate EPOCH and ELEMENT in other domains.
2. All subjects having completed at least one element defined in TE should be present.
3. SESTDTC can't be missing.
4. No gap exists between elements.
5. For planned element, the values for the variable ETCD and ELEMENT should match with TE domain.

CONCLUSION

This paper presents a simple interpretation of the implementation of a compliant SE Domain. This domain seams to cause a lot of challenges for the programming team. I think that a good review of the Trail Design domains is necessary to facilitate further the development of this domain.

REFERENCES

PROC EXPAND

http://support.sas.com/documentation/cdl/en/etsug/60372/HTML/default/viewer.htm#etsug_expand_sect015.htm

CONTACT INFORMATION

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