Harnessing the Power of PROC CONTENTS and SELECT INTO: SEPARATED BY

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Agenda

- Introduction
- Create EX from EC
- Create ADDS from DS and SUPPDS
- Benefits

Introduction

- Need to create SDTM (Study Data Tabulation Model) and ADaM (Analysis Dataset Model) datasets in clinical trials
- In some cases, need to derive datasets from existing ones by extracting, transforming, or modifying attributes. Doing this manually can be time-consuming.
- PROC CONTENTS: provide dataset metadata such as variable names, labels, and data types
- SELECT INTO: SEPARATED BY: store variables of interest to a macro variable
- Combining these two techniques can make data manipulation more efficient

EC (Exposure as Collected)

EC variable names

SAS: VIEWTABLE: Work.Ec (Exposure as Collected)

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USUBJID	ECTRT	ECCAT	ECDOSTOT	ECSTDY	ECENDY
M12345-6666-8888	Drug 1	GENERAL EXPOSURE	300	1	6
M12345-6666-8888	Drug 2	GENERAL EXPOSURE	15	1	1
M12345-6666-8888	Drug 1	GENERAL EXPOSURE	600	7	28
M12345-6666-8888	Drug 1	PK EXPOSURE		1	1

EC variable labels

SAS: VIEWTABLE: Work.Ec (Exposure as Collected)

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Unique Subject Identifier	Name of Treatment	Category of Treatment	Total Daily Dose	Study Day of ECSTDT	Study Day of ECENDT
M12345-6666-8888	Drug 1	GENERAL EXPOSURE	300	1	6
M12345-6666-8888	Drug 2	GENERAL EXPOSURE	15	1	1
M12345-6666-8888	Drug 1	GENERAL EXPOSURE	600	7	28
M12345-6666-8888	Drug 1	PK EXPOSURE		1	1

EX (Exposure)

- EX variable names

SAS: VIEWTABLE: Work.Ex (Exposure)

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USUBJID	EXTRT	EXCAT	EXDOSTOT	EXSTDY	EXENDY
M12345-6666-8888	Drug 1	GENERAL EXPOSURE	300	1	6
M12345-6666-8888	Drug 2	GENERAL EXPOSURE	15	1	1
M12345-6666-8888	Drug 1	GENERAL EXPOSURE	600	7	28

- EX variable labels

SAS: VIEWTABLE: Work.Ex (Exposure)

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Unique Subject Identifier	Name of Treatment	Category of Treatment	Total Daily Dose	Study Day of EXSTDT	Study Day of EXENDT
M12345-6666-8888	Drug 1	GENERAL EXPOSURE	300	1	6
M12345-6666-8888	Drug 2	GENERAL EXPOSURE	15	1	1
M12345-6666-8888	Drug 1	GENERAL EXPOSURE	600	7	28

Create EX from EC--What Need to Do?

- Remove PK records
- Replace “EC” in the variable names with “EX”
- Replace “EC” in the variable labels with “EX”

Create EX from EC--PROCESS

- Use WHERE statement to drop PK exposure records
- Use PROC CONTENTS to get the EC metadata containing name and label

SAS: VIEWTABLE: Work.Varinfo

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Variable Name	Variable Label
ECCAT	Category of Treatment
ECDOSTOT	Total Daily Dose
ECENDY	Study Day of ECENDT
ECSTDY	Study Day of ECSTDT
ECTRT	Name of Treatment
USUBJID	Unique Subject Identifier

- Use SELECT INTO: SEPARATED BY to create a macro variable &chgvarlist: ECCAT=EXCAT ECSTDY=EXSTDY ECENDY=EXENDY….

Create EX from EC--PROCESS

- Use RENAME statement to update the variable names

SAS: VIEWTABLE: Work.Ec

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Variable names are updated

USUBJID	EXTRT	EXCAT	EXDOSTOT	EXSTDY	EXENDY
M12345-6666-8888	Drug 1	GENERAL EXPOSURE	300	1	6
M12345-6666-8888	Drug 2	GENERAL EXPOSURE	15	1	1
M12345-6666-8888	Drug 1	GENERAL EXPOSURE	600	7	28

SAS: VIEWTABLE: Work.Ec

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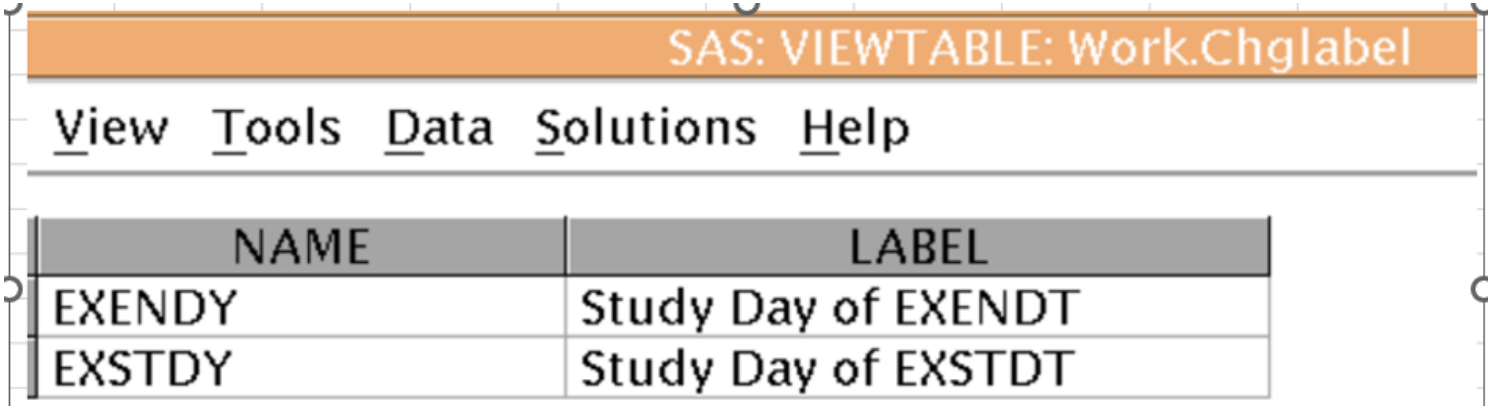
Labels need to be updated

Unique Subject Identifier	Name of Treatment	Category of Treatment	Total Daily Dose	Study Day of ECSTDT	Study Day of ECENDT
M12345-6666-8888	Drug 1	GENERAL EXPOSURE	300	1	6
M12345-6666-8888	Drug 2	GENERAL EXPOSURE	15	1	1
M12345-6666-8888	Drug 1	GENERAL EXPOSURE	600	7	28

Create EX from EC--PROCESS

- Use PROC CONTENTS to get the updated EC metadata
- Use TRANWRD function to change “EC” in the labels to “EX”


SAS: VIEWTABLE: Work.Chglabel

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NAME	LABEL
EXENDY	Study Day of EXENDT
EXSTDY	Study Day of EXSTDT

- Use SELECT INTO: SEPARATED BY to create a macro variable &chglabelist: EXSTDY='Study Day of EXSTDT’ EXENDY='Study Day of EXENDT'….

Create EX from EC--PROCESS

- Use LABEL statement to update variable labels

EX variable names

SAS: VIEWTABLE: Work.Ex (Exposure)

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USUBJID	EXTRT	EXCAT	EXDOSTOT	EXSTDY	EXENDY
M12345-6666-8888	Drug 1	GENERAL EXPOSURE	300	1	6
M12345-6666-8888	Drug 2	GENERAL EXPOSURE	15	1	1
M12345-6666-8888	Drug 1	GENERAL EXPOSURE	600	7	28

EX variable labels

SAS: VIEWTABLE: Work.Ex (Exposure)

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Unique Subject Identifier	Name of Treatment	Category of Treatment	Total Daily Dose	Study Day of EXSTDT	Study Day of EXENDT
M12345-6666-8888	Drug 1	GENERAL EXPOSURE	300	1	6
M12345-6666-8888	Drug 2	GENERAL EXPOSURE	15	1	1
M12345-6666-8888	Drug 1	GENERAL EXPOSURE	600	7	28

Create EX from EC--SAS Codes

```
33 /*Read in EC*/
34
35 data ec;
36   set saslib.ec;
37   where lowcase(eccat)='general exposure';
38   domain ='EX';
39 run;
40
41 /*Update variable name*/
42
43 proc contents data=ec out=varinfo(keep =name label) noprint;
44
45 proc sql noprint;
46   select trim(name) || '=EX' || substr(name, 3)
47   into :chgvarlist separated by ' '
48   from varinfo
49   where lowcase(name) like 'ec%';
50 quit;
51
52 %put &chgvarlist;
53
54 data ec;
55   set ec;
56   rename &chgvarlist;
57 run;
58
```

```
59 /*Update variable label*/
60
61 proc contents data=ec out=chglabel(keep=name label) noprint;
62 run;
63
64 data chglabel;
65   set chglabel;
66   where index(label,'ECSTDT') or index(label,'ECENDT') or index(label,'ECSTTM') or index(label,'ECDT');
67   label =tranwrd(label,'EC', 'EX');
68 run;
69
70 proc sql noprint;
71   select trim(name)||'='||"'"||trim(label)||"'"
72     into :chglabelist separated by ' '
73     from chglabel;
74 quit;
75
76 %put &chglabelist;
77
78 data ex(label ="Exposure");
79   set ec;
80   label &chglabelist;
81 run;
```

Create ADDS from DS and SUPPDS

- Transfer the primary reasons about screen failure, study drug and study discontinuation from DS to ADDS
- Transfer any reasons from SUPPDS to ADDS

Create ADDS from DS and SUPPDS--PROCESS

- Merge DS and SUPPDS and create DS2

SAS: VIEWTABLE: Work.Ds2

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From DS | From SUPPDS

USUBJID	DSSEQ	DSSCAT	DSDECOD	DSDECOD1	DSDECOD2	DSDECOD4	DSDECO25
M12345-6666-8888	1	STUDY	DEATH				
M12345-6666-8888	2	DRUG 1 COMPLETION	PROGRESSIVE DISEASE	ADVERSE EVENT	WITHDRAWAL BY SUBJECT		
M12345-6666-8888	3	DRUG 2 COMPLETION	PROGRESSIVE DISEASE	ADVERSE EVENT	WITHDRAWAL BY SUBJECT		

- Use PROC CONTENTS to get the DS2 metadata containing name and label

SAS: VIEWTABLE: Work.Suppdsdec

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NAME	LABEL
DSDEC100	Standardized Disposition Term 100
DSDECO25	Standardized Disposition Term 25
DSDECO47	Standardized Disposition Term 47
DSDECO70	Standardized Disposition Term 70
DSDECO99	Standardized Disposition Term 99
DSDECOD	Standardized Disposition Term
DSDECOD1	Standardized Disposition Term 1
DSDECOD2	Standardized Disposition Term 2
DSDECOD4	Standardized Disposition Term 4
DSSCAT	Subcategory for Disposition Event
DSSEQ	Sequence Number
USUBJID	Unique Subject Identifier

Create ADDS from DS and SUPPDS--PROCESS

- Use SELECT INTO: SEPARATED BY to create a macro variable &suppdsdeclist: DSDECOD1 DSDECO25 DSDEC100….
- Use ARRAY KK &suppdsdeclist and DO I=1 TO DIM(KK) to put SUPPDS reasons to AVALC

SAS: VIEWTABLE: Work.Ds3

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USUBJID	DSSEQ	DSSCAT	DSDECOD1	DSDECOD2	AVALC	PARAMCD
M12345-6666-8888	2	DRUG 1 COMPLETION	ADVERSE EVENT	WITHDRAWAL BY SUBJECT	ADVERSE EVENT	STDYTRT1
M12345-6666-8888	2	DRUG 1 COMPLETION	ADVERSE EVENT	WITHDRAWAL BY SUBJECT	WITHDRAWAL BY SUBJECT	STDYTRT1
M12345-6666-8888	3	DRUG 2 COMPLETION	ADVERSE EVENT	WITHDRAWAL BY SUBJECT	ADVERSE EVENT	STDYTRT2
M12345-6666-8888	3	DRUG 2 COMPLETION	ADVERSE EVENT	WITHDRAWAL BY SUBJECT	WITHDRAWAL BY SUBJECT	STDYTRT2

Create ADDS from DS and SUPPDS--PROCESS

- Combine primary reasons and any reasons to create ADDS

SAS: VIEWTABLE: Work.Ds2

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From DS | From SUPPDS

USUBJID	DSSEQ	DSSCAT	DSDECOD	DSDECOD1	DSDECOD2	DSDECOD4	DSDECO25
M12345-6666-8888	1	STUDY	DEATH				
M12345-6666-8888	2	DRUG 1 COMPLETION	PROGRESSIVE DISEASE	ADVERSE EVENT	WITHDRAWAL BY SUBJECT		
M12345-6666-8888	3	DRUG 2 COMPLETION	PROGRESSIVE DISEASE	ADVERSE EVENT	WITHDRAWAL BY SUBJECT		

SAS: VIEWTABLE: Work.Adds

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USUBJID	PARAMCD	AVALC	CRIT1	CRIT1FL	SRCDOM	DSSEQ
M12345-6666-8888	STDY	DEATH	PRIMARY REASON	Y	DS	1
M12345-6666-8888	STDYTRT1	PROGRESSIVE DISEASE	PRIMARY REASON	Y	DS	2
M12345-6666-8888	STDYTRT1	ADVERSE EVENT			SUPPDS	2
M12345-6666-8888	STDYTRT1	WITHDRAWAL BY SUBJECT			SUPPDS	2
M12345-6666-8888	STDYTRT2	PROGRESSIVE DISEASE	PRIMARY REASON	Y	DS	3
M12345-6666-8888	STDYTRT2	ADVERSE EVENT			SUPPDS	3
M12345-6666-8888	STDYTRT2	WITHDRAWAL BY SUBJECT			SUPPDS	3

Create ADDS from DS and SUPPDS--SAS Codes

```
113 %joinsupp_1(library=sdtm,domain=ds);
114 %adam_date(libdsinf=sdtm,dsinf=DM,libdsin=work,dsin=ds_supp,invar=dsstdtc,dsout=ds,prefix=ast,convonly=n);
115
116 data ds2;
117   set ds;
118   length avalc $50 srcdom $6 paramcd $10;
119   srcdom ="DS";
120   avalc=dsdecod;  /*Primary Reasons from DS*/
121   if lowcase(dsscat)="study" then paramcd ="STDY";
122   else if lowcase(dsscat)="drug 1 completion" then paramcd ="STDYTRT1";
123   else if lowcase(dsscat)="drug 2 completion" then paramcd ="STDYTRT2";
124 run;
125
126 proc contents data =ds2 out=suppdsdec(keep=name label) noprint;
127 run;
128
129 proc sql noprint;
130   select distinct name into : suppdsdeclist separated by ' ' from suppdsdec
131     where index(lowcase(name),"dsdec") and lowcase(name)^="dsdecod";
132 quit;
133 %put &suppdsdeclist;
134
135 data ds3;
136   set ds2;
137   array kk &suppdsdeclist;
138   do i =1 to dim(kk);
139     if kk(i) ^="" then do;
140       avalc=kk(i);          /*Any reasons from SUPPDS*/
141       srcdom ="SUPPDS";
142       output;
143     end;
144   end;
145 run;
146
147 data adds;
148   retain usubjid paramcd avalc crit1 crit1fl srcdom dsseq ;
149   set ds3 ds2;
150   if srcdom='DS' then do;
151     crit1='PRIMARY REASON';
152     crit1fl='Y';
153   end;
154   keep usubjid paramcd avalc crit1 crit1fl dsseq srcdom;
155 run;
156
157 proc sort data=adds;
158   by usubjid paramcd srcdom avalc;
159 run;
160
```

Benefits

- Avoid listing all related variables
- Increase efficiency
- Reduce errors