



Organizing Deliverables for Clinical Trials

Hansjörg Frenzel

16-Oct-2013

The Concept of Analyses and Its
Implementation in EXACT

Deliverables of the Study

- Defined in Protocol and Contract
 - Interim Analysis
 - Final Analysis
 - Data Monitoring Committee Listings
 - Data Safety Update Reports
- Ad-hoc Requests
 - Data Monitoring Reports
 - TFLs supporting a publication



The Study

	Autoexec.sas	3 KB
	Autoexec_AXC.sas	3 KB
	Autoexec_AXC.sas.bak	2 KB
	Autoexec_DMC.sas	3 KB
	Autoexec_DMC.sas.bak	3 KB
	Autoexec_HF.sas	3 KB
	Autoexec_HF.sas.bak	2 KB
	Autoexec_MR.sas	2 KB
	Autoexec_Publications.sas	3 KB

- Multiple AUTOEXEC files
- Naming is inconsistent

```

25 ¶
26 ***·Run·for·Interim·or·Final·analysis·;¶
27 %let Interim·==·Interim·Analysis\.;/*·in·case·you·want·to·work·on·the·interim·analysis·*/¶
28 %let Interim·==·;/*·default·--·if·you·want·to·run·the·final·analysis·*/¶
29 ¶
30 ¶
31 ***·SAS·Libraries·***·;¶
32 %macro SASLib·;¶
33 ..%if·"%&interim"·eq·"Interim·Analysis"·%then·%do·;¶
34 ....libname·raw·....."&StudyRoot.\Interim·Analysis\Raw\Study·Database"·access=readonly·;¶
35 ....libname·ECG·....."&StudyRoot.\Interim·Analysis\Import\ECG·Data"·access=readonly·;¶
36 ....libname·IVRS·....."&StudyRoot.\Interim·Analysis\Import\IVRS"·access=readonly·;¶
37 ....libname·LAB·....."&StudyRoot.\Interim·Analysis\Import\Lab·Data"·access=readonly·;¶
38 ....libname·SDTM_DB·....."&StudyRoot.\Interim·Analysis\SDTM·Database"·;¶
39 ....libname·ADaM_DB·....."&StudyRoot.\Interim·Analysis\ADaM·Database"·;¶
40 ..%end·;¶
41 ..%else·%do·;¶
42 ....libname·raw·....."&StudyRoot.\Data\Raw\Study·Database"·access=readonly·;¶
43 ....libname·ECG·....."&StudyRoot.\Data\Import\ECG·Data"·access=readonly·;¶
44 ....libname·IVRS·....."&StudyRoot.\Data\Import\IVRS"·access=readonly·;¶
45 ....libname·LAB·....."&StudyRoot.\Data\Import\Lab·Data"·access=readonly·;¶
46 ....libname·SDTM_DB·....."&StudyRoot.\Data\SDTM·Database"·;¶
47 ....libname·ADaM_DB·....."&StudyRoot.\Data\ADaM·Database"·;¶
48 ..%end·;¶
49 %mend·;¶
50 %SASLib·;¶
51 ¶
52 ***·Output·locations·***·;¶
53 %let figures·==·&StudyRoot.\&Interim.Listings\Figures·;¶
54 %let listings·==·&StudyRoot.\&Interim.Listings\Listings·;¶
55 %let tables·==·&StudyRoot.\&Interim.Listings\Tables·;¶
56 ¶

```



AUTOEXEC.SAS

```
28 %  
29 %let ListType.=DMC.Listings.;%  
30 %*let ListType.=DSUR.Reports.;%  
31 %  
32 ***.SAS.Libraries.***;%  
33 libname raw....."&StudyRoot.\Data\Raw".access=readonly.%;  
34 libname ECG....."&StudyRoot.\Data\Import\ECG\Data".access=readonly.%;  
35 libname IVRS....."&StudyRoot.\Data\Import\IVRS".access=readonly.%;  
36 libname IVRS....."&StudyRoot.\Data\Import\Lab\Data".access=readonly.%;  
37 libname SDTM_DB....."&StudyRoot.\Data\&ListType.\SDTM.Database".%;  
38 libname ADaM_DB....."&StudyRoot.\Data\&ListType.\ADaM.Database".%;  
39 %  
40 ***.Output.locations.***;%  
41 %let figures.=&StudyRoot.\Data\&ListType.\Listings.%;  
42 %let listings.=&figures.%;  
43 %let tables.=&figures.%;  
44 %
```



AUTOEXEC.SAS

```
28 ¶
29 %let ListType.=DMC.Listings.;¶
30 %*let ListType.=DSUR.Reports.;¶
31 ¶
32 ***.SAS.Libraries.***;¶
33 libname raw....."&StudyRoot.\Data\Raw".access=readonly.;¶
34 libname ECG....."&StudyRoot.\Data\Import\ECG\Data".access=readonly.;¶
35 libname IVRS....."&StudyRoot.\Data\Import\IVRS".access=readonly.;¶
36 libname IVRS....."&StudyRoot.\Data\Import\Lab\Data".access=readonly.;¶
37 libname SDTM_DB.."&StudyRoot.\Data\&ListType.\SDTM.Database";¶
38 libname ADaM_DB.."&StudyRoot.\Data\&ListType.\ADaM.Database";¶
39 ¶
40 ***.Output.locations.***;¶
41 %let figures.=&StudyRoot.\Data\&ListType.\Listings.;¶
42 %let listings.=.
43 %let tables.=.
44 ¶
```

```
26 ¶
27 %let ShipName.=Shipment.3.;¶
28 ¶
29 ***.SAS.Libraries.***;¶
30 libname SDTM_DB.."&StudyRoot.\Data\SDTM.Database";¶
31 libname ADaM_DB.."&StudyRoot.\Listings\Medical.Review\&ShipName.\Data";¶
32 ¶
33 ***.Output.locations.***;¶
34 %let figures.=&StudyRoot.\Listings\Medical.Review\&ShipName.\Output.;¶
35 %let listings.=&figures.;¶
36 %let tables.=&figures.;¶
37 ¶
```



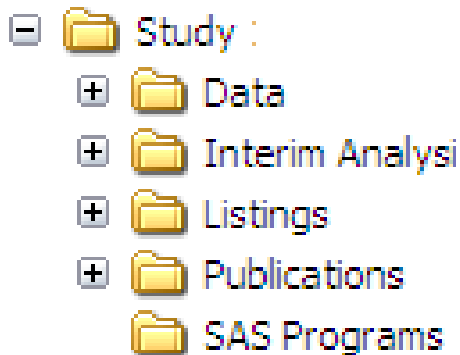
AUTOEXEC.SAS

```
28 ¶
29 %let ListType.=DMC.Listings.;¶
30 %*let ListType.=DSUR.Reports.;¶
31 ¶
32 ***.SAS.Libraries.***.;¶
33 libname raw....."&StudyRoot.\Data\Raw".access=readonly.;¶
34 libname ECG....."&StudyRoot.\Data\Import\ECG\Data".access=readonly.;¶
35 libname IVRS....."&StudyRoot.\Data\Import\IVRS".access=readonly.;¶
36 libname IVRS....."&StudyRoot.\Data\Import\Lab\Data".access=readonly.;¶
37 libname SDTM_DB.."&StudyRoot.\Data\&ListType.\SDTM.Database";¶
38 libname ADaM_DB.."&StudyRoot.\Data\&ListType.\ADaM.Database";¶
39 ¶
40 ***.Output.locations.***.;¶
41 %let figures.=&StudyRoot.\Data\&ListType.\Listings.;¶
42 %let listings.=.
43 %let tables.=.
44 ¶
```

```
26 ¶
27 %let ShipName.=Shipment.3.;¶
28 ¶
29 ***.SAS.Libraries.***.;¶
30 libname SDTM_DB.."&StudyRoot.\Data\SDTM.Database";¶
31 libname ADaM_DB.."&StudyRoot.\Listings\Medical.Review\&ShipName.\Data";¶
32 ¶
33 ***.Output.locations.***.;¶
34 %let figures.=.
35 %let listings.=.
36 %let tables.=.
37 ¶
```

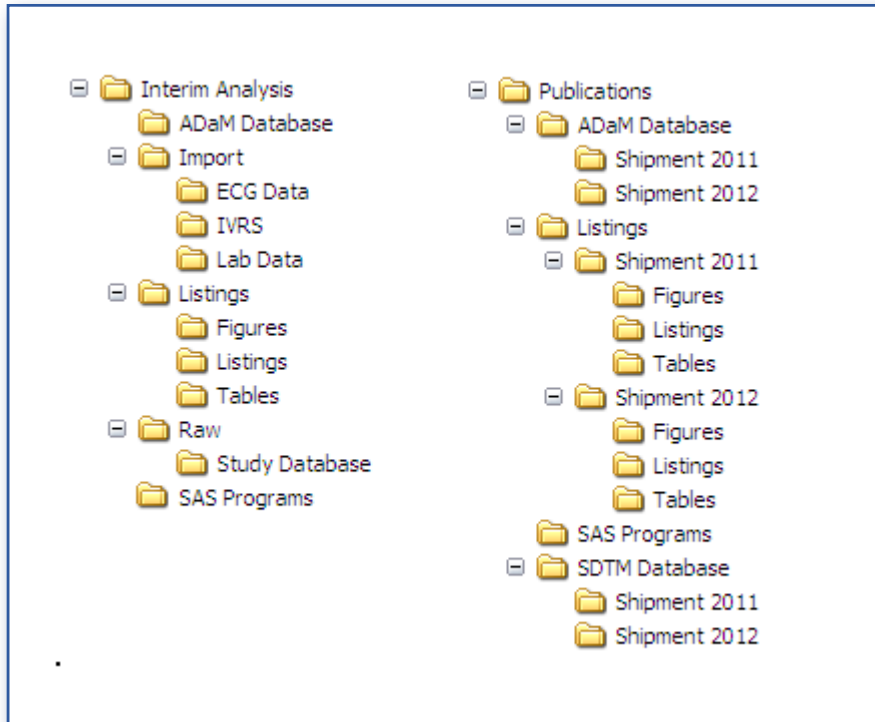
```
30 ***.SAS.Libraries.***.;¶
31 libname SDTM_DB.."&StudyRoot.\Publications\SDTM.Database\&Shipment";¶
32 libname ADaM_DB.."&StudyRoot.\Publications\SDTM.Database\&Shipment";¶
33 ¶
34 ***.Output.locations.***.;¶
35 %let figures.=&StudyRoot.\Publications\Listings\&Shipment\Figures.;¶
36 %let listings.=&StudyRoot.\Publications\Listings\&Shipment\Listings.;¶
37 %let tables.=&StudyRoot.\Publications\Listings\&Shipment\Tables.;¶
38 ¶
```

Root Folder Structure



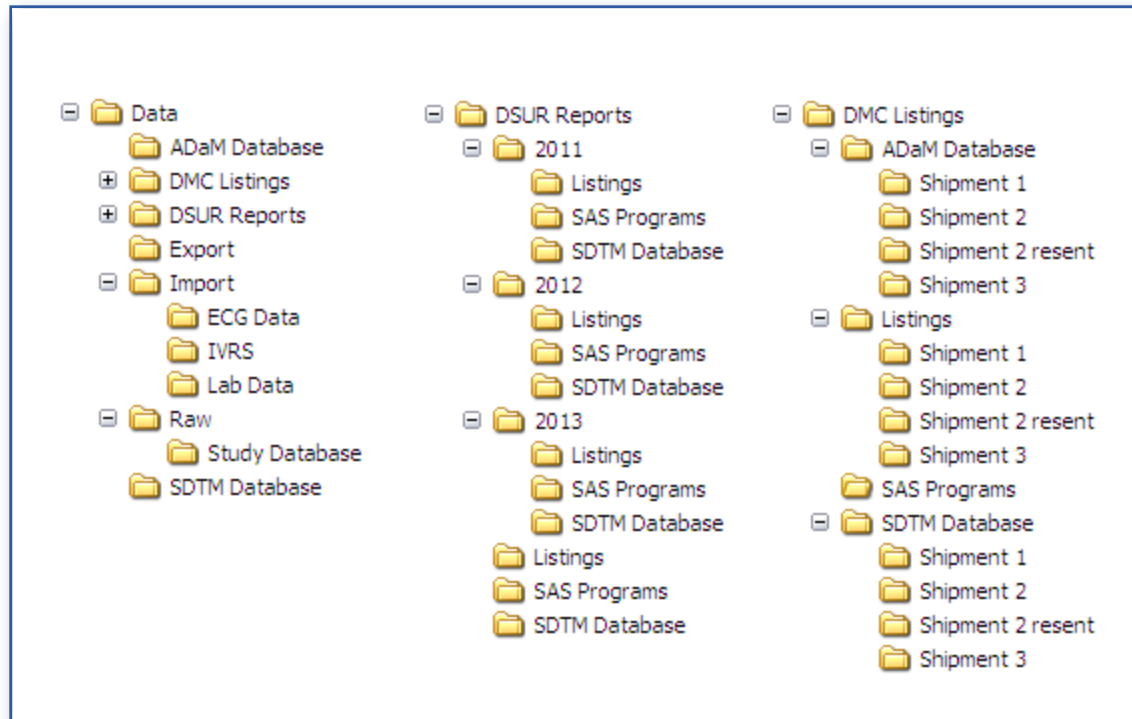
- Simple Structure:
 - Data
 - Listings
 - SAS Programs
- Two additional Folders destined to specific analyses

Interim Analysis & Publications Subfolder



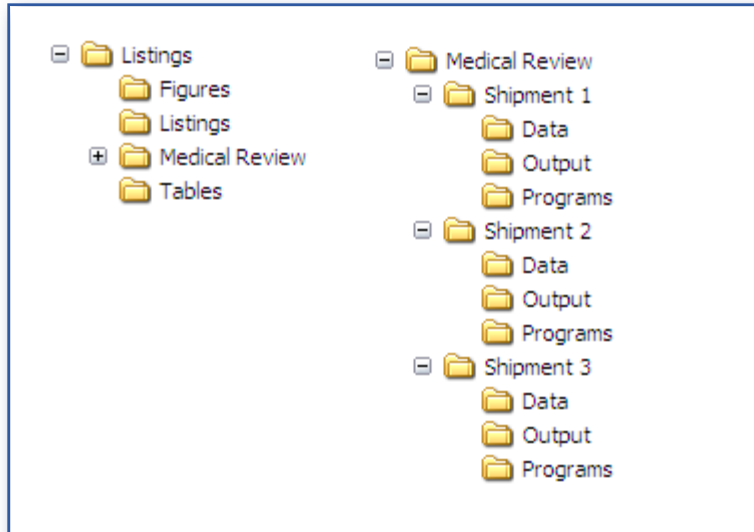
- Both folders follow different organizational patterns

Data Folder



- Additional Folders in a sub-folder
- Again inconsistencies in the folder patterns

Listings Folder



- Medical Review information are hidden in the Listings folder

- Consistency of Folder Structure
 - DMC and DSUR sub-folders in the DATA folder
 - Both sub-folders have different organization patterns
 - Medical Review sub-folder is stored in the listing folder
 - Folders for publication TFLs and Interim Analysis are stored in the top folder layer of the study
 - There is no separate folder structure for the Final Analysis
- Multiple AUTOEXEC files with inconsistent naming



A Clear Difference

The Solution

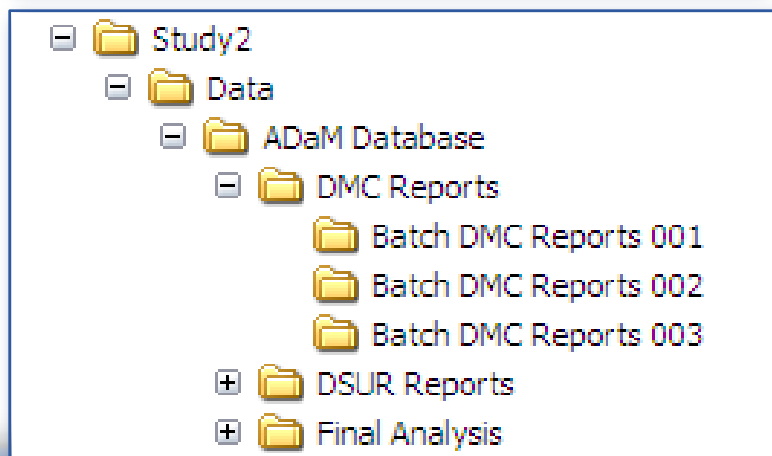
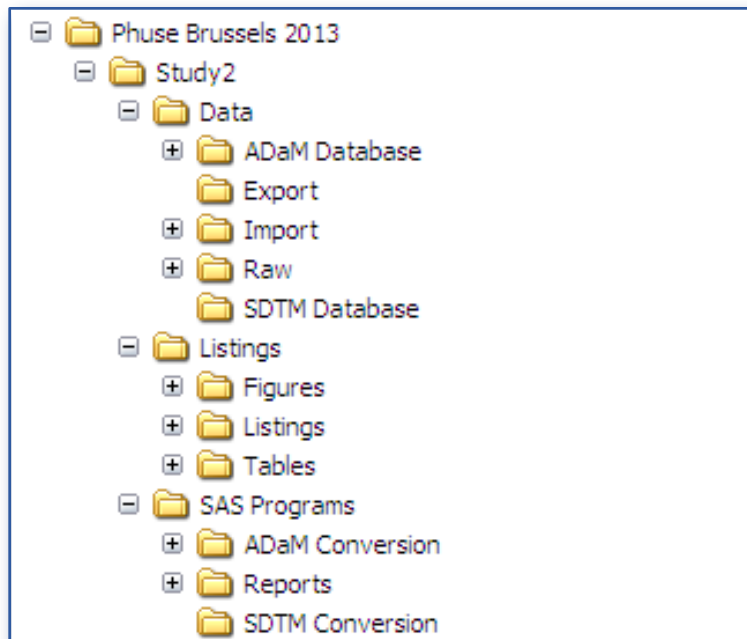
Analyses and Batches



Analysis

- Covers different types of deliverables
 - Final Analysis
 - Interim Analysis
 - DMC Reports
 - Medical Review Reports
 - DSUR Reports
 - Publication
 - Client Request
 - Define your own

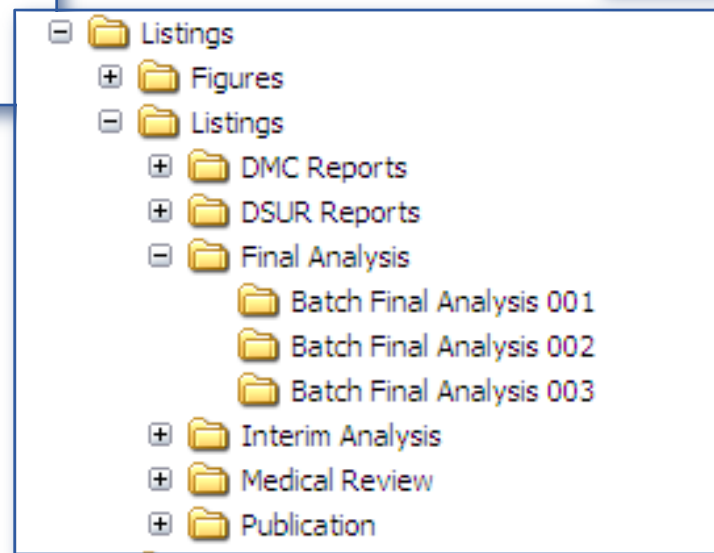
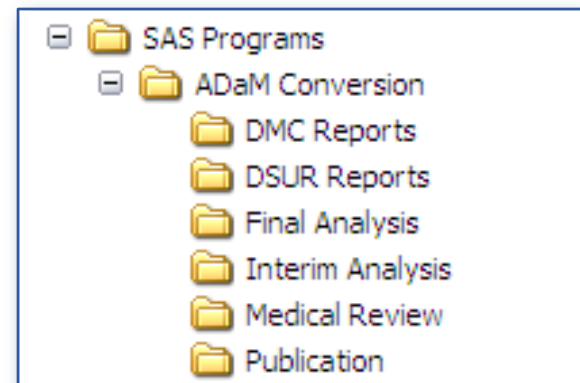
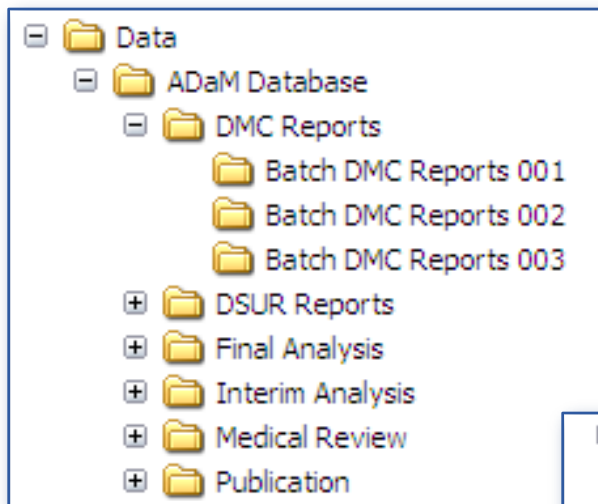
- Covers periodical updates
- Batches are different sets of output files of a specific deliverable over time.
- Batch <Analysis> <consecutive number in Z3.style>
 - Batch Interim Analysis 001
 - Batch DMC Report 002
 - ...



- Standard folder structure remains simple
- For each analysis a sub-folder is created in every standard folder
- For each batch a sub-folder is created in the respective analysis-folder



Some Examples





AUTOEXEC.SAS

```
1  /******  
2  -----DO NOT EDIT THE NEXT 4 LINES-----  
3  PROGRAM.NAME: $RCFile: autoexec.sas, v.$  
4  REV/REV.AUTH: $Revision: 1.02.$ / $Author: FrenzelH_SAS.$  
5  REV.DATE: $Date: 2013/10/13 08:12:55.$ ... GMT  
6  -----DO NOT EDIT THE 4 LINES ABOVE-----  
7  CLIENT/PROJ: www.Phuse.eu / Presentation  
8  PURPOSE: AUTOEXEC-- Provide global settings and access to file system  
9  INPUT.FILES: --  
10 OUTPUT.FILES: --  
11 MACROS.USED: --  
12 NOTES:   
13 .....  
14 Copyright (C) 2013 PRA International All Rights Reserved.  
15 *****/  
16  
17 ***.study.location.on.the.file.servers.***;  
18 %global Server Client Project StudyRoot;  
19 %let Server = FILESERVER;  
20 %let client = PhUSE.Brussels.2013;  
21 %let study = Study.2;  
22  
23 %let StudyRoot = \\&Server.\&Client.\&Study.;  
24  
25 ***.Analysis.and.Batch.***;  
26 %global Analysis.Batch.BatchID;  
27 %let Analysis = Interim.Analysis;  
28 %let Batch = 001;  
29 %let BatchID = Batch.&Analysis.&Batch;  
30  
31 ***.SAS.Libraries.***;  
32 libname raw "&StudyRoot.\Data\Raw" access=readonly;  
33 libname ECG "&StudyRoot.\Data\Import\ECG.Data" access=readonly;  
34 libname IVRS "&StudyRoot.\Data\Import\IVRS" access=readonly;  
35 libname SDTM_DB "&StudyRoot.\Data\SDTM.Database";  
36 libname ADaM_DB "&StudyRoot.\Data\ADaM.Database\&Analysis\&BatchID";  
37  
38 ***.Output.locations.***;  
39 %let figures = &StudyRoot.\Listings\Figures\&analysis.\&BatchID;  
40 %let listings = &StudyRoot.\Listings\Listings\&analysis.\&BatchID;  
41 %let tables = &StudyRoot.\Listings\Tables\&analysis.\&BatchID;  
42
```



A Clear Difference

Implementation

Of the Solution in EXACT

- IDE for SAS Programming
- One SDTM database for each study
- One analysis for each deliverable type
 - One ADaM database for every analysis
 - One set of TFLs for every analysis



Analysis Interface

Kinship EXACT - TRAINHJF

File Edit View Study Manager Tools Reports Help

CDISC SDTM CDISC ADaM

Analysis

Analysis List

- ClientRequest1a
- FinalAnalysisA
- FinalAnalysisB
- FinalAnalysisC
- FinalAnalysisZ
- IND1a
- IND2a
- InterimAnalysis0a
- InterimAnalysis2a
- QC_Analysis1a
- QC_Analysis1b

View Analysis

Analysis Group: ClientRequest Number (n): 1 Branch (a): a

Analysis Code: ClientRequest1a

Analysis Description: A request from the client that fits none of the categories CodingTransfer, DataShipmentTestDatabase, DatabaseFreeze, DatabaseLoc, DataShipment, APDataShipment, DraftTFL, IDMC, DMC, IND, FinalAnalysis, InterimAnalysis, SafetyUpdate, ShellTFL, Specifications, P

Analysis Output Location: \\Kcfile\TRAIN\TRAINHJF\EXACT\Training\Bio-Statistics\ClientRequest1a

Analysis Status: Draft

Analysis Details

Categories :

- Default Settings
- Data Source
- Analysis Template
- Common Analysis Titles
- Common Analysis Footnotes

Default Settings

Orientation: ☐ Portrait ☒ Landscape ☐ Turn on User Audit Change Reasons

SAS Log Debug Mode: Normal

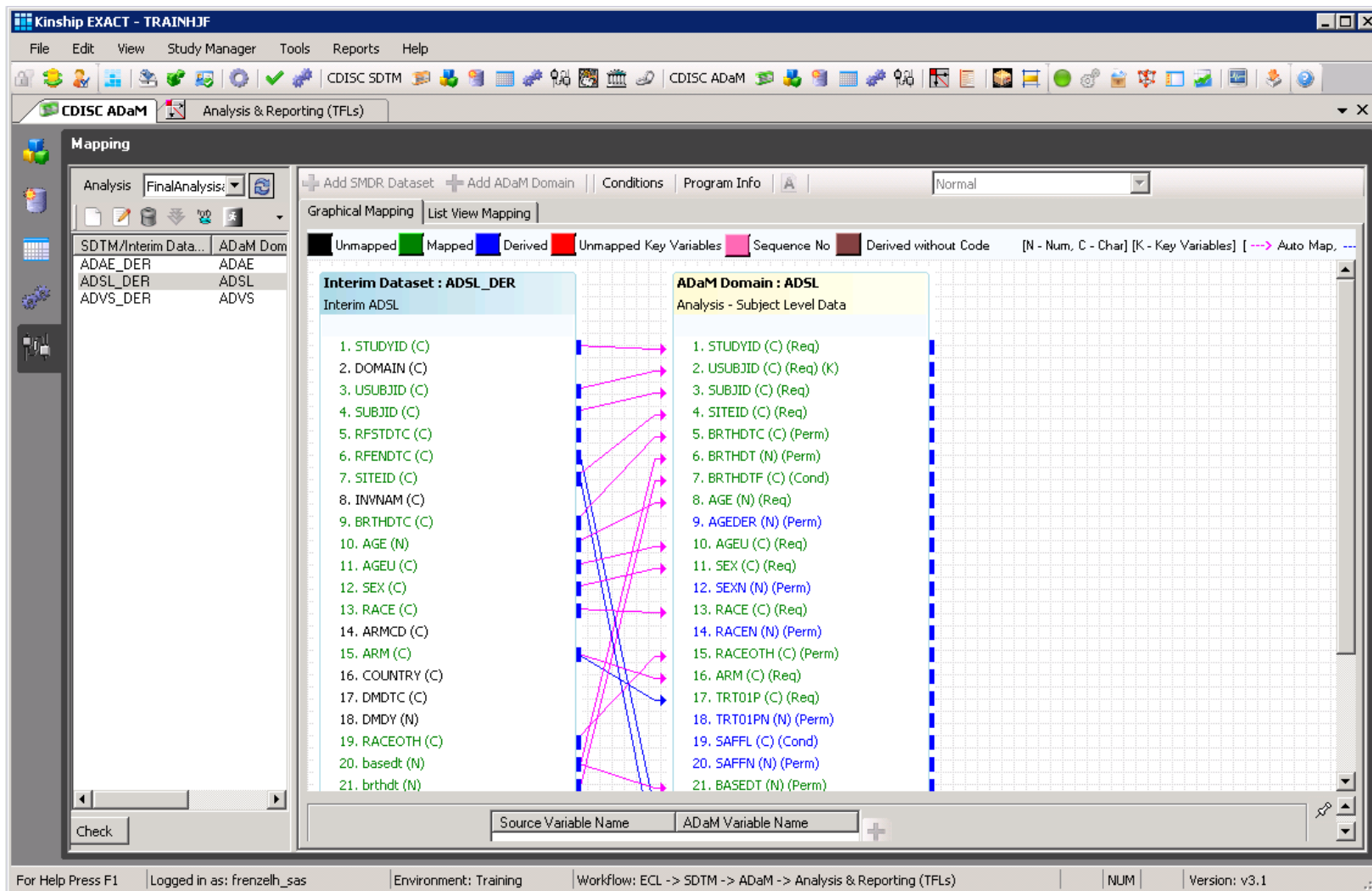
Output Report Types: ☒ RTF ☐ PDF ☒ LST ☐ HTML

SAS Proc Output Types: ☐ RTF ☐ PDF ☒ LST ☐ HTML

Sponsor Metadata Version for TFLs: Select

For Help Press F1 | Logged in as: frenzelh_sas | Environment: Training | Workflow: ECL -> SDTM -> ADaM -> Analysis & Reporting (TFLs) | NUM | Version: v3.0.1

Configure Conversion Programs



Kinship EXACT - TRAINHJF

File Edit View Study Manager Tools Reports Help

CDISC SDTM CDISC ADaM Analysis & Reporting (TFLs)

Mapping

Analysis: FinalAnalysis

SDTM/Interim Data... ADaM Dom

ADAE_DER ADAE

ADSL_DER ADSL

ADVS_DER ADVS

Graphical Mapping List View Mapping

Unmapped Mapped Derived Unmapped Key Variables Sequence No Derived without Code [N - Num, C - Char] [K - Key Variables] [---> Auto Map, ...]

Interim Dataset : ADSL_DER

Interim ADSL

1. STUDYID (C)
2. DOMAIN (C)
3. USUBJID (C)
4. SUBJID (C)
5. RFSTDTC (C)
6. RFENDTC (C)
7. SITEID (C)
8. INVTNAM (C)
9. BRTHDTC (C)
10. AGE (N)
11. AGEU (C)
12. SEX (C)
13. RACE (C)
14. ARMCD (C)
15. ARM (C)
16. COUNTRY (C)
17. DMDTC (C)
18. DMDY (N)
19. RACEOTH (C)
20. basedt (N)
21. brthdt (N)

ADaM Domain : ADSL

Analysis - Subject Level Data

1. STUDYID (C) (Req)
2. USUBJID (C) (Req) (K)
3. SUBJID (C) (Req)
4. SITEID (C) (Req)
5. BRTHDTC (C) (Perm)
6. BRTHDT (N) (Perm)
7. BRTHDTF (C) (Cond)
8. AGE (N) (Req)
9. AGEDER (N) (Perm)
10. AGEU (C) (Req)
11. SEX (C) (Req)
12. SEXN (N) (Perm)
13. RACE (C) (Req)
14. RACEN (N) (Perm)
15. RACEOTH (C) (Perm)
16. ARM (C) (Req)
17. TRT01P (C) (Req)
18. TRT01PN (N) (Perm)
19. SAFFL (C) (Cond)
20. SAFFN (N) (Perm)
21. BASEDT (N) (Perm)

Source Variable Name ADaM Variable Name

For Help Press F1 | Logged in as: frenzelh_sas | Environment: Training | Workflow: ECL -> SDTM -> ADaM -> Analysis & Reporting (TFLs) | NUM | Version: v3.1

Tables, Figures, Listings

Kinship EXACT - TRAINHJF

File Edit View Study Manager Tools Reports Help

CDISC SDTM CDISC ADaM

Analysis & Reporting (TFLs)

Analysis & Reporting (TFLs)

Mockup Type: Table
Analysis: FinalAnalysisa
Data Domain: E_DS (E_Disposition)
Fetch

Mockup Type: Table
Analysis: FinalAnalysisa
Data Domain: E_DS (E_Disposition)

Mockup Name: TM_DS_T_X_001
Description: Subject disposition by treatment

Categories:

Variable Name	Variable Label	Data Type	Variable Type
USUBJID	Unique Subject Identifier	Character	Categorical
TRTGRP	Treatment Group	Character	Categorical
SCREEN	Screened Subjects	Numeric	Categorical
RAND	Randomized	Numeric	Categorical
STDCOMP	Study Completed	Numeric	Categorical
EXTPRD	Subjects entered Extensi...	Numeric	Categorical
COMPEXT	Completed Extension Phase	Numeric	Categorical
DISCEXT	Discontinued Before com...	Numeric	Categorical

Variable Details

GMDR Domain: E_DS (E_Disposition)

Variable Name: USUBJID

Variable Label: Unique Subject Identifier

Data Type: Character

Variable Type: Categorical

Format: Select

Report Display Label: Subjects Enrolled

Mockup Value:

Case: Select

☐ Desired Case

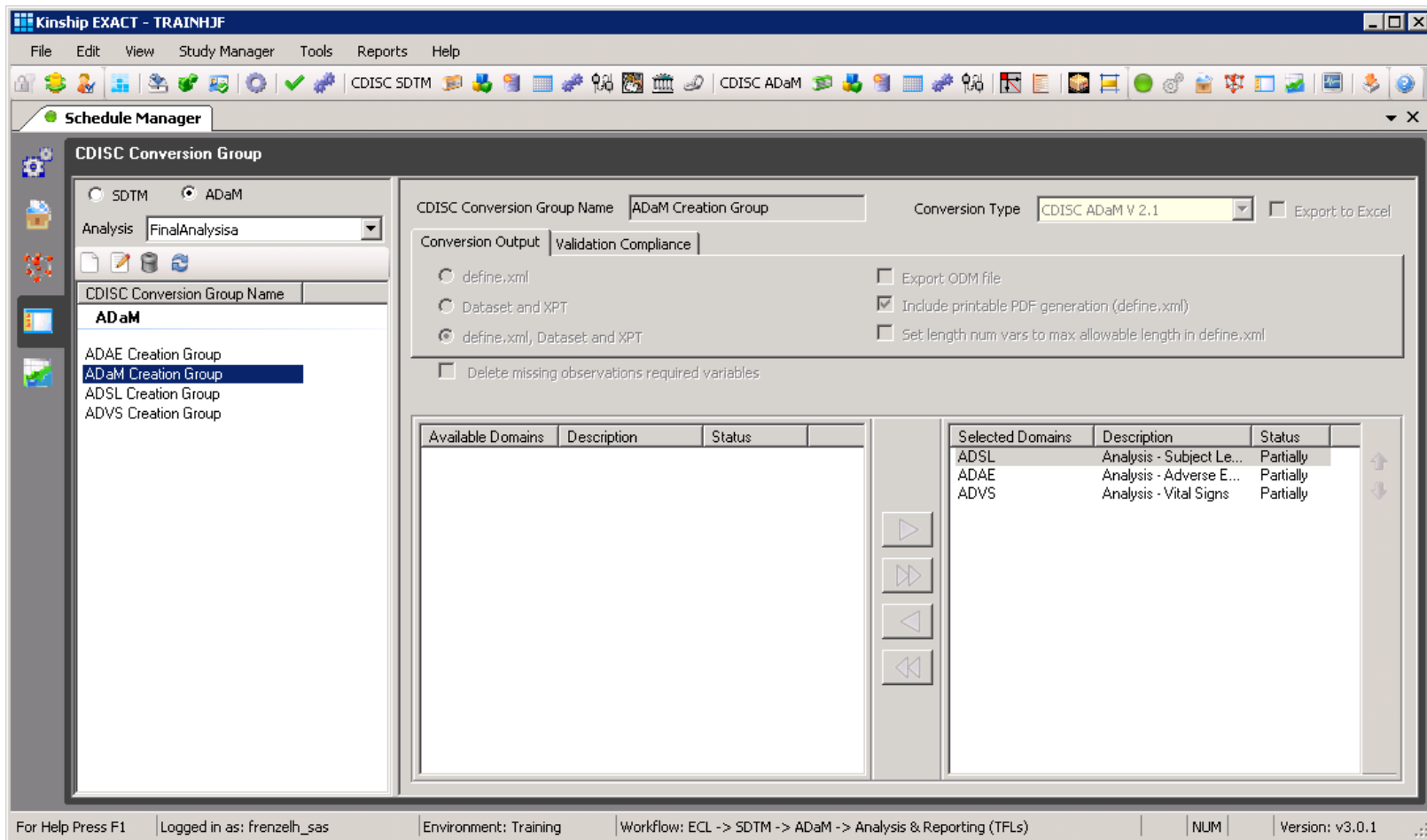
☐ Report Display Variable

☐ Analysis Variable

Report Configurations

For Help Press F1 | Logged in as: frenzelh_sas | Environment: Training | Workflow: ECL -> SDTM -> ADaM -> Analysis & Reporting (TFLs) | NUM | Version: v3.1

Configure Batch runs



The screenshot shows the Kinship EXACT - TRAINHJF software interface. The main window is titled "Schedule Manager" and displays the "CDISC Conversion Group" configuration. The "CDISC Conversion Group Name" is set to "ADaM Creation Group". The "Conversion Type" is set to "CDISC ADaM V 2.1". The "Analysis" dropdown is set to "FinalAnalysisa". The "CDISC Conversion Group Name" field is also set to "ADaM".

The "Conversion Output" section shows the following options:

- ☐ define.xml
- ☐ Dataset and XPT
- ☒ define.xml, Dataset and XPT

The "Validation Compliance" section shows the following options:

- ☐ Export ODM file
- ☒ Include printable PDF generation (define.xml)
- ☐ Set length num vars to max allowable length in define.xml
- ☐ Delete missing observations required variables

The "Available Domains" table is empty. The "Selected Domains" table contains the following data:

Available Domains	Description	Status
ADSL	Analysis - Subject Le...	Partially
ADAE	Analysis - Adverse E...	Partially
ADVS	Analysis - Vital Signs	Partially

The status bar at the bottom shows: "For Help Press F1 | Logged in as: frenzelh_sas | Environment: Training | Workflow: ECL -> SDTM -> ADaM -> Analysis & Reporting (TFLs) | NUM | Version: v3.0.1".

Schedule Batch-Runs

Kinship EXACT - TRAINHJF

File Edit View Study Manager Tools Reports Help

CDISC SDTM CDISC ADaM

Schedule Manager

Scheduler

Search In Date Look For 2013-09-24

Schedule Name	Status	Last Run Time	Next Run Time	Created By	Last Run By
frenzelhansjoerg-LabDataExtraction	Finished	2012-04-11T10:10:26		frenzelh_sas	
frenzelhansjoerg-PK_Data_Extraction	Finished	2012-04-11T10:20:29		frenzelh_sas	
frenzelhansjoerg-CLIN2SAS	Finished	2012-04-11T10:30:54		frenzelh_sas	
frenzelhansjoerg - DM - SUPPDM Dataset cr...	Finished	2012-04-12T07:03:54		frenzelh_sas	
frenzelhansjoerg - AE dataset creation	Finished	2012-04-13T08:14:48		frenzelh_sas	
frenzelhansjoerg - ADSL Schedule	Finished	2012-04-13T05:43:54		frenzelh_sas	
frenzelhansjoerg - AEAE Schedule	Finished	2012-04-13T07:31:59		frenzelh_sas	
frenzelhansjoerg - ADVS Schedule	Finished	2012-04-13T08:26:05		frenzelh_sas	frenzelh_sas

Schedule Name: ☒ Adhoc Status: ☐ Maintain Data Sources ☐ Prepare Batch for External SAS Execution

Schedule Type: ☐ Single Event ☐ Multiple Event

Single Event

Event Type:

Extraction Group:

Period

Start Date:

End Date:

(hh : mm : ss)

Start Time:

Rerun Every: day(s)

Error Handling

Error Handling:

Error Interval Type: Error Interval:

Run Time

Last Run Date: Next Run Date:

Last Run Time: Next Run Time:

For Help Press F1 | Logged in as: frenzelh_sas | Environment: Training | Workflow: ECL -> SDTM -> ADaM -> Analysis & Reporting (TFLs) | NUM | Version: v3.1



Batch Manager

Kinship EXACT - TRAINHJF

File Edit View Study Manager Tools Reports Help

CDISC SDTM CDISC ADaM

Batch Manager

Schedules: **frenzelhansjoerg - ADaM Databases**

☐ Filter by Date

From: 2013-08-23 Till: 2013-08-23 **Fetch**

Schedules: **frenzelhansjoerg - ADaM Database Schedules**

From: N/A Till: N/A

Schedule - Tree

- Schedule - frenzelhansjoerg - ADaM Database Schedules
 - Batch ID - 7052
 - SC - ADaM Creation Group**

Domain Na...	Conversion ...	Status	Start Date Time	End Date Time
Analysis - Su...	ADaM Crea...	Successfully Completed	2012-04-13T08:30:37	2012-04-13T08:30:40
Analysis - Ad...	ADaM Crea...	Successfully Completed	2012-04-13T08:30:40	2012-04-13T08:30:43
Analysis - Vit...	ADaM Crea...	Successfully Completed	2012-04-13T08:30:43	2012-04-13T08:30:45

Program Name	Execution Status	Program Status	Start Date Time	End Date Time
ADSL	Successfully Completed	Successfully Completed	2012-04-13T08:30:40	2012-04-13T08:30:40

OS : WIN, X64_ESRV (KCISASC1), SAS Version : 9.2

File	Type	Date	File Size
ADAE.log	log	4/13/2012 8:30:43 AM	8 KB
ADSL.log	log	4/13/2012 8:30:39 AM	10 KB
ADVS.log	log	4/13/2012 8:30:45 AM	9 KB
define.log	log	4/13/2012 8:30:48 AM	31 KB
VariableDerivation_ADAE.log	log	4/13/2012 8:30:40 AM	1 KB
VariableDerivation_ADASL.log	log	4/13/2012 8:30:37 AM	1 KB
VariableDerivation_ADVS.log	log	4/13/2012 8:30:43 AM	1 KB
adsl.sas7bdat	sas7bdat	4/13/2012 8:30:45 AM	22 KB

For Help Press F1 | Logged in as: frenzelh_sas | Environment: Training | Workflow: ECL -> SDTM -> ADaM -> Analysis & Reporting (TFLs) | NUM | Version: v3.0.1



A Clear Difference