

SAS Clinical Programming Advance Training (100 hours of Lectures & Tutorials)

- **Familiarize with sample study Case Report Forms (CRFs), Raw Database, Statistical Analysis Plan, and Mock Tables - 6 hours**
 - Proc Contents of database
 - Identify names of datasets and variables to be used for each table
 - Create a SAS program for formats of variables for display in tables
 - Hint: usage of PROC CONTENTS, PROC PRINT, MACRO, LIBNAME, TITLE, FOOTNOTE
- **Familiarize with frequently used terms in Programming - 2 hours**
 - Descriptive Statistics (N, Mean, SD, Median, Min, Max)
 - Baseline and Demographic Statistics (age, gender, weight, height, race)
 - Scheduled and unscheduled visits, Visit Windows
 - Analysis Population flags (Randomized, Full Analysis Set)
 - Last observation carried forward (LOCF)
 - Medical History (past medical conditions data collected in CRFs)
 - Adverse events (MedDRA, body system, investigator terms, preferred terms)
- **Creating Analysis Database - 24 hour**
 - Create DEMOG, EFFICACY, and AE analysis datasets
 - Merge treatment group, gender and race information to each analysis dataset
 - Identify baseline visit for each patient
 - Create Visit Windows in the efficacy and vital signs
 - Ensure only one record per visit per patient is usable per window algorithm
 - Create an additional record flagged as an Endpoint visit for each patient
 - Create variable for duration on study for each patient in DEMOG dataset
 - Merge study completion or discontinuation information to DEMOG dataset
 - Create a variable of change from baseline to each visit for each patient
 - Checking of LOG for ERRORS and WARNING messages
 - Hint: usage of LIBNAME, SORT, MERGE, RETAIN, FIRST, LAST, OUTPUT, NODUPKEY, LENGTH, ARRAY, DO LOOP, WHERE, KEEP, DROP, RENAME, LABEL, PROC TRANSPOSE, PUT, INPUT, IF-THEN-ELSE, MACROS
- **Create Few Listings - 8 hours**
 - Demographic information
 - Adverse Events
 - Efficacy data by treatment and visit
 - Hint: usage of Proc Print, TITLE, FOOTNOTE, FORMAT, OBS
- **Write SAS Code to create tables and print results using PROC PRINT - 20 hours**
 - Demographic table
 - Descriptive statistics of vital signs
 - Descriptive statistics of efficacy variables
 - Patient counts for each adverse event by body system and treatment group
 - Perform analysis with statistical analysis procedures specially PROC TTEST, PROC GLM, PROC MIXED, PROC LOGISTIC, PROC LIFETEST. SAS Code is provided by Statistician to perform statistical analysis
 - Usage of Output Delivery System (ODS)
 - Hint: usage of LIBNAME, SORT, MERGE, PROC MEANS, PROC FREQ, sas functions, PROC UNIVARIATE, PROC PRINT, TITLE, FOOTNOTE, ARRAY, DO LOOP, WHERE, KEEP, DROP, RENAME, LABEL, PROC TRANSPOSE, FILENAME, PROC PRINTTO, LET,

SYMPUT, SYMGET, SUBSTR, PUT, INPUT, IF-THEN-ELSE, LEFT, TRIM, COMPRESS, Concatenation of character variables, MACROS

- **PROC REPORT usage for creating Tables and Listings - 24 hours**
 - Standard statements used in PROC REPORT module
 - OPTIONS for Proc Report module
 - Macro for creating titles and footnotes with specified alignment
 - Manipulate data for display in tables - usage of DROP, KEEP, RENAME, ARRAY, TITLE, FOOTNOTE, DO LOOP, TRANSPOSE, FIRST, LAST, WHERE, MACROS, create macro variables for display of number of patients in column header using data _null_ data steps, program for indenting of text variables for stacking in a column
 - Hint: usage of macros, LET, SYMPUT, SYMGET, SUBSTR, FILENAME, pagination of outputs
- **SAS Graph - 8 hours**
 - Line diagram
 - Bar charts
- **Quality control of tables - 8 hours**
 - Write SAS code to verify results programmed by other Programmer
 - Check titles and footnotes
- **Participants will be grouped in 4 teams, and each team will program a set of 4 tables of Safety and Efficacy, making a total of 16 distinct tables, which will be eventually shared by all participants**
- **Create a spreadsheet of tables programmed by all participants**
- **Mentoring: one-to-one meeting, evaluation, and guidance**

Eligibility

. Advance Training:

Participants must be proficient in Base module of SAS Software.