```
1    /* region: Generated preamble */
2    /* Make sure the current directory is writable */
3    data _null_;
4        length rc 4;
5        %let tworkloc="%sysfunc(getoption(work))";
6        rc=dlgcdir(&tworkloc);
7    run;
NOTE: The current working directory is now
      "/opt/sas/viya/config/var/tmp/compsrv/default/ad14969a-80c4-49e7-bdc3-39da9936aa17/SAS_workEE5B00000219_sas-compute-server-105
      ee367-c7a5-41c5-b75b-dc7e4702ea2d-43825".
NOTE: DATA statement used (Total process time):
      real time           0.00 seconds
      cpu time            0.00 seconds

8
9    /* Setup options */
10   title;
11   footnote;
12   options validvarname=any;
13   options validmemname=extend;
14   options dtreset date number;
15   options device=png;
16
17   /* Setup macro variables */
18   %let syscc=0;
19   %let _clientapp = %nrquote(%nrstr(SAS Studio));
20   %let _clientappabbrev = %nrquote(%nrstr(Studio));
21   %let _clientappversion=2025.03;
22   %let _clientversion=;
23   %let _sasservername=&SYSHOSTNAME;
24   %let _sashostname=&SYSHOSTNAME;
25   %let _sasprogramfilehost=&SYSHOSTNAME;
26   %let _clientuserid = %nrquote(%nrstr(24msbi117@gcu.edu.in));
27   %let _clientusername = %nrquote(%nrstr(24msbi117@gcu.edu.in));
28   %let clientmachine = %nrquote(%nrstr());
29   %let _clientmachine = %nrquote(%nrstr());
30   %let _clientmode = %nrquote(%nrstr(viya));
31   %let sasworklocation="%sysfunc(getoption(work))/";
32   filename _cwd &sasworklocation;
33   data _null_;
34       call symput('_sasworkingdir',pathname('_cwd'));
35   run;
NOTE: DATA statement used (Total process time):
      real time           0.00 seconds
      cpu time            0.00 seconds

36   filename _cwd;
NOTE: Fileref _CWD has been deassigned.
37   %let _sasprogramfile = %nrquote(%nrstr());
38   %let _baseurl = %nrquote(%nrstr(https://vfl-041.engage.sas.com/SASStudio/));
39   %let _execenv = %nrquote(%nrstr(SASStudio));
40   %symdel _dataout_mime_type _dataout_name _dataout_url _dataout_table / nowarn;
41   %let _sasws_ = %bquote(%sysfunc(getoption(work)));
42   %let _saswstemp_ = %bquote(%sysfunc(getoption(work)));
43
44   /* Detect SAS/Graph and setup graph options */
45   data _null_;
46       length rc $255;
47       call symput("graphinit","");
48       call symput("graphterm","");
49       rc=tslvl('sasxgopt','n');
50       _error_=0;
51       if (rc^=' ') then do;
52           call symput("graphinit","goptions reset=all gsfname=_gsfname;");
53           call symput("graphterm","goptions noaccessible;");
54       end;
55   run;
NOTE: DATA statement used (Total process time):
      real time           0.00 seconds
      cpu time            0.00 seconds

56   data _null_;
57       length rc 4;
58       rc=sysprod("PRODNUM002");
59       if (rc^=1) then do;
60           call symput("graphinit","");
61           call symput("graphterm","");
62       end;
63   run;
NOTE: DATA statement used (Total process time):
      real time           0.00 seconds
      cpu time            0.00 seconds

64
65   /* Setup ODS destinations */
66   ods _all_ close;
67   %studio_results_directory;
68   filename _htmlout "&_results_prefix_..html";
69   filename _listout "&_results_prefix_..lst";
70   filename _gsfname temp;
71   filename _dataout "&_results_prefix_..dat";
```

```
72   ods autonavigate off;
73   ods graphics on;
74   ods html5 (id=web) METATEXT='http-equiv="Content-Security-Policy" content="default-src ''none''; style-src ''unsafe-inline'';
74 ! img-src data: ;"' device=png gpath="&_saswstemp_" path="&_saswstemp_" encoding=utf8 file=_htmlout (title='Results:SAS Program
74 ! 2.sas') style=Illuminate options(bitmap_mode='inline' outline='on' svg_mode='inline' css_prefix=".ods_&SYS_COMPUTE_JOB_ID"
74 ! body_id="div_&SYS_COMPUTE_JOB_ID" );
NOTE: Writing HTML5(WEB) Body file: _HTMLOUT
75   ods listing file=_listout;
76   &graphinit;
77   %studio_initialize_custom_output;
78   /* endregion */
79
80   /* PRECLINICAL SAS PROJECT
81      Body Weight Analysis - COMPANY READY VERSION
82      Purpose: Educational project for SDTM, ADaM, Statistical Analysis + ANCOVA
83      Date: December 2025
84   */
85
86   /*-----------------------------------------------------------
87    STEP 1: CREATE RAW BODY WEIGHT DATASET
88   -----------------------------------------------------------*/
89   data rawbodyweight;
90       length TRTGRP $15 AnimalID $10;
91       input TRTGRP $ AnimalID $ Day0 Final;
92       datalines;
NOTE: The data set WORK.RAWBODYWEIGHT has 42 observations and 4 variables.
NOTE: DATA statement used (Total process time):
      real time           0.00 seconds
      cpu time            0.00 seconds

135  ;
136  run;
137
138  /* Verify raw data */
139  proc print data=rawbodyweight (obs=10);
140      title "Raw Body Weight Data - First 10 Records";
141  run;
NOTE: There were 10 observations read from the data set WORK.RAWBODYWEIGHT.
NOTE: The PROCEDURE PRINT printed page 21.
NOTE: PROCEDURE PRINT used (Total process time):
      real time           0.00 seconds
      cpu time            0.01 seconds

142
143  /*-----------------------------------------------------------
144   STEP 2: CREATE SDTM.VS VITAL SIGNS DATASET + SDTM VARS
145  -----------------------------------------------------------*/
146  data sdtmvs;
147      set rawbodyweight;
148      length STUDYID $20 DOMAIN $2 USUBJID $10 VSTPT $10 VSTEST $20 VISIT $10;
149
150      STUDYID = "PRECLINICAL01";
151      DOMAIN  = "VS";
152      USUBJID = AnimalID;
153
154      /* Day 0 record */
155      VSTPT   = "Day0";
156      VSTEST  = "Body Weight";
157      VISIT   = VSTPT;
158      VISITNUM = 1;
159      VSORRES = Day0;
160      output;
161
162      /* Final day record */
163      VSTPT   = "Final";
164      VSTEST  = "Body Weight";
165      VISIT   = VSTPT;
166      VISITNUM = 2;
167      VSORRES = Final;
168      output;
169
170      keep STUDYID DOMAIN TRTGRP USUBJID VISIT VISITNUM VSTPT VSTEST VSORRES;
171  run;
NOTE: There were 42 observations read from the data set WORK.RAWBODYWEIGHT.
NOTE: The data set WORK.SDTMVS has 84 observations and 9 variables.
NOTE: DATA statement used (Total process time):
      real time           0.00 seconds
      cpu time            0.00 seconds

172
173  proc sort data=sdtmvs;
174      by STUDYID TRTGRP USUBJID VISITNUM;
175  run;
NOTE: There were 84 observations read from the data set WORK.SDTMVS.
NOTE: The data set WORK.SDTMVS has 84 observations and 9 variables.
NOTE: PROCEDURE SORT used (Total process time):
      real time           0.00 seconds
      cpu time            0.01 seconds

176
177  proc print data=sdtmvs (obs=20);
178      title "SDTM.VS Dataset - First 20 Records";
```

```
179  run;
NOTE: There were 20 observations read from the data set WORK.SDTMVS.
NOTE: The PROCEDURE PRINT printed page 22.
NOTE: PROCEDURE PRINT used (Total process time):
      real time           0.01 seconds
      cpu time            0.02 seconds

180
181  /*-------------------------------------------------------
182   STEP 3: CREATE ADaM.ADVS ANALYSIS DATASET
183   -------------------------------------------------------*/
184  proc sort data=sdtmvs out=sortedvs;
185      by STUDYID TRTGRP USUBJID VISITNUM;
186  run;
NOTE: Input data set is already sorted; it has been copied to the output data set.
NOTE: There were 84 observations read from the data set WORK.SDTMVS.
NOTE: The data set WORK.SORTEDVS has 84 observations and 9 variables.
NOTE: PROCEDURE SORT used (Total process time):
      real time           0.00 seconds
      cpu time            0.00 seconds

187
188  data adamadvs;
189      set sortedvs;
190      by STUDYID TRTGRP USUBJID;
191
192      length AVISIT $10 PARAM $20 PARAMCD $8 ABLFL $1;
193      retain BASE;
194
195      AVISIT  = VISIT;
196      AVISITN = VISITNUM;
197      PARAM   = "Body Weight";
198      PARAMCD = "BW";
199      AVAL = VSORRES;
200
201      if first.USUBJID then BASE = .;
202      if AVISITN = 1 then do;
203          BASE  = AVAL;
204          ABLFL = "Y";
205      end;
206      else ABLFL = " ";
207
208      if AVISITN = 1 then do;
209          CHG  = 0;
210          PCHG = 0;
211      end;
212      else do;
213          CHG  = AVAL - BASE;
214          if BASE ne 0 then PCHG = 100 * (AVAL - BASE) / BASE;
215          else PCHG = .;
216      end;
217
218      keep STUDYID TRTGRP USUBJID PARAM PARAMCD AVISIT AVISITN
219           AVAL BASE CHG PCHG ABLFL;
220  run;
NOTE: There were 84 observations read from the data set WORK.SORTEDVS.
NOTE: The data set WORK.ADAMADVS has 84 observations and 12 variables.
NOTE: DATA statement used (Total process time):
      real time           0.00 seconds
      cpu time            0.00 seconds

221
222  /* Carry forward baseline */
223  data adamadvs;
224      set adamadvs;
225      by STUDYID TRTGRP USUBJID;
226      retain baselineval;
227
228      if first.USUBJID then baselineval = .;
229      if AVISITN = 1 then baselineval = AVAL;
230      BASE = baselineval;
231
232      if AVISITN = 1 then do;
233          CHG  = 0;
234          PCHG = 0;
235      end;
236      else do;
237          CHG  = AVAL - BASE;
238          if BASE ne 0 then PCHG = 100 * (AVAL - BASE) / BASE;
239          else PCHG = .;
240      end;
241  run;
NOTE: There were 84 observations read from the data set WORK.ADAMADVS.
NOTE: The data set WORK.ADAMADVS has 84 observations and 13 variables.
NOTE: DATA statement used (Total process time):
      real time           0.00 seconds
      cpu time            0.00 seconds

242
243  proc sort data=adamadvs;
244      by STUDYID TRTGRP USUBJID AVISITN;
245  run;
```

```
NOTE: There were 84 observations read from the data set WORK.ADAMADVS.
NOTE: The data set WORK.ADAMADVS has 84 observations and 13 variables.
NOTE: PROCEDURE SORT used (Total process time):
      real time           0.00 seconds
      cpu time            0.01 seconds

246
247  proc print data=adamadvs (obs=20);
248      title "ADaM.ADVS Dataset - First 20 Records";
249  run;
NOTE: There were 20 observations read from the data set WORK.ADAMADVS.
NOTE: The PROCEDURE PRINT printed page 23.
NOTE: PROCEDURE PRINT used (Total process time):
      real time           0.02 seconds
      cpu time            0.02 seconds

250
251  /*-----------------------------------------------------------
252   STEP 4: DESCRIPTIVE STATISTICS - MEAN BODY WEIGHT
253  -----------------------------------------------------------*/
254  proc means data=adamadvs n mean std maxdec=4;
255      class TRTGRP AVISIT AVISITN;
256      var AVAL;
257      output out=meanbw n=N mean=MeanBW std=SD;
258      where AVISIT in ("Day0", "Final");
259  run;
NOTE: There were 84 observations read from the data set WORK.ADAMADVS.
      WHERE AVISIT in ('Day0', 'Final');
NOTE: The data set WORK.MEANBW has 56 observations and 8 variables.
NOTE: The PROCEDURE MEANS printed page 24.
NOTE: PROCEDURE MEANS used (Total process time):
      real time           0.02 seconds
      cpu time            0.03 seconds

260
261  data meanbwclean;
262      set meanbw;
263      where _TYPE_ = 7;
264      keep TRTGRP AVISIT AVISITN _FREQ_ MeanBW SD N;
265  run;
NOTE: There were 14 observations read from the data set WORK.MEANBW.
      WHERE _TYPE_=7;
NOTE: The data set WORK.MEANBWCLEAN has 14 observations and 7 variables.
NOTE: DATA statement used (Total process time):
      real time           0.00 seconds
      cpu time            0.00 seconds

266
267  proc print data=meanbwclean noobs;
268      title "Mean Body Weight by Treatment Group and Visit";
269      var TRTGRP AVISIT AVISITN MeanBW SD N;
270      format MeanBW SD 8.3;
271  run;
NOTE: There were 14 observations read from the data set WORK.MEANBWCLEAN.
NOTE: The PROCEDURE PRINT printed page 25.
NOTE: PROCEDURE PRINT used (Total process time):
      real time           0.01 seconds
      cpu time            0.01 seconds

272
273  /*-----------------------------------------------------------
274   STEP 5: CHANGE FROM BASELINE (FINAL DAY)
275  -----------------------------------------------------------*/
276  proc means data=adamadvs n mean std maxdec=4;
277      class TRTGRP;
278      var CHG;
279      output out=chgbaseline n=N mean=MeanCHG std=SDCHG;
280      where AVISITN = 2;
281  run;
NOTE: There were 42 observations read from the data set WORK.ADAMADVS.
      WHERE AVISITN=2;
NOTE: The data set WORK.CHGBASELINE has 8 observations and 6 variables.
NOTE: The PROCEDURE MEANS printed page 26.
NOTE: PROCEDURE MEANS used (Total process time):
      real time           0.01 seconds
      cpu time            0.01 seconds

282
283  data chgbaselineclean;
284      set chgbaseline;
285      where _TYPE_ = 1;
286      keep TRTGRP _FREQ_ MeanCHG SDCHG N;
287  run;
NOTE: There were 7 observations read from the data set WORK.CHGBASELINE.
      WHERE _TYPE_=1;
NOTE: The data set WORK.CHGBASELINECLEAN has 7 observations and 5 variables.
NOTE: DATA statement used (Total process time):
      real time           0.00 seconds
      cpu time            0.00 seconds

288
289  proc print data=chgbaselineclean noobs;
```

```
290      title "Change from Baseline Final Day by Treatment Group";
291      var TRTGRP MeanCHG SDCHG N;
292      format MeanCHG SDCHG 8.4;
293  run;
NOTE: There were 7 observations read from the data set WORK.CHGBASELINECLEAN.
NOTE: The PROCEDURE PRINT printed page 27.
NOTE: PROCEDURE PRINT used (Total process time):
      real time           0.00 seconds
      cpu time            0.01 seconds

294
295  /*-----------------------------------------------------------
296   STEP 6: SUMMARY TABLES
297  -----------------------------------------------------------*/
298  proc report data=meanbwclean nowd;
299      column TRTGRP AVISIT MeanBW SD N;
300      define TRTGRP / group "Treatment Group" width=15;
301      define AVISIT / group "Visit" width=10;
302      define MeanBW / analysis "Mean Body Weight (g)" format=8.2;
303      define SD / analysis "Std Dev" format=8.2;
304      define N / analysis "N" format=3.0;
305      title "Table 1: Mean Body Weight by Treatment Group and Visit";
306  run;
NOTE: There were 14 observations read from the data set WORK.MEANBWCLEAN.
NOTE: The PROCEDURE REPORT printed page 28.
NOTE: PROCEDURE REPORT used (Total process time):
      real time           0.01 seconds
      cpu time            0.02 seconds

307
308  proc report data=chgbaselineclean nowd;
309      column TRTGRP MeanCHG SDCHG N;
310      define TRTGRP / display "Treatment Group" width=15;
311      define MeanCHG / analysis "Mean Change (g)" format=8.4;
312      define SDCHG / analysis "Std Dev" format=8.4;
313      define N / analysis "N" format=3.0;
314      title "Table 2: Change from Baseline (Final Visit)";
315  run;
NOTE: There were 7 observations read from the data set WORK.CHGBASELINECLEAN.
NOTE: The PROCEDURE REPORT printed page 29.
NOTE: PROCEDURE REPORT used (Total process time):
      real time           0.01 seconds
      cpu time            0.00 seconds

316
317  /*-----------------------------------------------------------
318   STEP 7: FIGURES
319  -----------------------------------------------------------*/
320  proc sgplot data=meanbwclean;
321      vbar TRTGRP / response=MeanBW group=AVISIT groupdisplay=cluster;
322      yaxis label="Mean Body Weight (g)" grid;
323      xaxis label="Treatment Group";
324      keylegend / title="Visit";
325      title "Figure 1: Mean Body Weight by Treatment Group and Visit";
326  run;
NOTE: PROCEDURE SGPLOT used (Total process time):
      real time           0.13 seconds
      cpu time            0.07 seconds

NOTE: Listing image output written to
      /opt/sas/viya/config/var/tmp/compsrv/default/ad14969a-80c4-49e7-bdc3-39da9936aa17/SAS_workEE5B00000219_sas-compute-server-105e
      e367-c7a5-41c5-b75b-dc7e4702ea2d-43825/SGPlot4.png.
NOTE: There were 14 observations read from the data set WORK.MEANBWCLEAN.
327
328  proc sgplot data=chgbaselineclean;
329      vbar TRTGRP / response=MeanCHG fillattrs=(color=blue);
330      yaxis label="Mean Change from Baseline (g)" grid;
331      xaxis label="Treatment Group";
332      refline 0 / axis=y lineattrs=(color=red pattern=dash);
333      title "Figure 2: Mean Change from Baseline by Treatment Group";
334  run;
NOTE: PROCEDURE SGPLOT used (Total process time):
      real time           0.08 seconds
      cpu time            0.04 seconds

NOTE: Listing image output written to
      /opt/sas/viya/config/var/tmp/compsrv/default/ad14969a-80c4-49e7-bdc3-39da9936aa17/SAS_workEE5B00000219_sas-compute-server-105e
      e367-c7a5-41c5-b75b-dc7e4702ea2d-43825/SGPlot5.png.
NOTE: There were 7 observations read from the data set WORK.CHGBASELINECLEAN.
335
336  /*-----------------------------------------------------------
337   STEP 9: ANCOVA STATISTICAL TEST (NEW!)
338  -----------------------------------------------------------*/
339  data analysis_final;
340      set adamadvs;
341      where AVISITN = 2;
342      keep STUDYID TRTGRP USUBJID BASE AVAL CHG;
343  run;
NOTE: There were 42 observations read from the data set WORK.ADAMADVS.
      WHERE AVISITN=2;
NOTE: The data set WORK.ANALYSIS_FINAL has 42 observations and 6 variables.
NOTE: DATA statement used (Total process time):
```

```
      real time           0.00 seconds
      cpu time            0.00 seconds

344
345   proc glm data=analysis_final;
346       class TRTGRP (ref="NC");
347       model CHG = BASE TRTGRP / solution clparm;
348       lsmeans TRTGRP / cl diff adjust=tukey pdiff;
349       means TRTGRP / tukey;
350       title "ANCOVA: Change from Baseline by Treatment Group";
351       title2 "(Adjusted for Baseline Body Weight, NC as Reference)";
352   run;
NOTE: Means from the MEANS statement are not adjusted for other terms in the model.  For adjusted means, use the LSMEANS statement.
353
354   /* Summary p-values table */
NOTE: The PROCEDURE GLM printed pages 30-34.
NOTE: PROCEDURE GLM used (Total process time):
      real time           0.71 seconds
      cpu time            0.32 seconds

355   proc means data=analysis_final n mean std min max;
356       class TRTGRP;
357       var CHG;
358       output out=pval_summary;
359   run;
NOTE: There were 42 observations read from the data set WORK.ANALYSIS_FINAL.
NOTE: The data set WORK.PVAL_SUMMARY has 40 observations and 5 variables.
NOTE: The PROCEDURE MEANS printed page 35.
NOTE: PROCEDURE MEANS used (Total process time):
      real time           0.01 seconds
      cpu time            0.02 seconds

360
361   proc print data=pval_summary noobs;
362       title "Unadjusted Summary Statistics by Group (Final Visit)";
363       var TRTGRP N Mean StdDev;
ERROR: Variable N not found.
ERROR: Variable MEAN not found.
ERROR: Variable STDDEV not found.
364       format Mean 8.4 StdDev 8.4;
365   run;
NOTE: The SAS System stopped processing this step because of errors.
NOTE: PROCEDURE PRINT used (Total process time):
      real time           0.00 seconds
      cpu time            0.00 seconds

366
367   /*-----------------------------------------------------------
368    STEP 10: INTERPRETATION
369   -----------------------------------------------------------*/
370   data interpretation;
371       length Group $15 Interpretation $100;
372       input Group $ 1-15 Interpretation $ 17-100;
373       datalines;
NOTE: LOST CARD.
RULE:----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8----+----9----+----0
381   ;
Group=NC          Wei Interpretation=  _ERROR_=1 _N_=4
NOTE: SAS went to a new line when INPUT statement reached past the end of a line.
NOTE: The data set WORK.INTERPRETATION has 3 observations and 2 variables.
NOTE: DATA statement used (Total process time):
      real time           0.00 seconds
      cpu time            0.00 seconds

381   ;
382   run;
383
384   proc print data=interpretation noobs;
385       title "Data Interpretation: Body Weight Change by Group";
386   run;
NOTE: There were 3 observations read from the data set WORK.INTERPRETATION.
NOTE: The PROCEDURE PRINT printed page 36.
NOTE: PROCEDURE PRINT used (Total process time):
      real time           0.00 seconds
      cpu time            0.01 seconds

387
388   /*-----------------------------------------------------------
389    COMPLETION MESSAGE
390   -----------------------------------------------------------*/
391   title;
392   data _null_;
393       put;
394       put "================================================";
395       put "PRECLINICAL SAS PROJECT - COMPANY READY VERSION";
396       put "================================================";
397       put;
398       put "SUCCESSFULLY GENERATED:";
399       put "1. SDTM.VS Dataset (CDISC standards)";
400       put "2. ADaM.ADVS Dataset (analysis ready)";
401       put "3. Summary Tables 1-2";
402       put "4. Figures 1-2";
```

```
403       put "5. ANCOVA statistical test (p-values)";
404       put "6. Data interpretation";
405       put;
406       put "KEY STATISTICAL OUTPUT: ANCOVA TABLE";
407       put "Look for p-values < 0.05 vs NC control";
408       put "============================================";
409   run;
============================================
PRECLINICAL SAS PROJECT - COMPANY READY VERSION
============================================
SUCCESSFULLY GENERATED:
1. SDTM.VS Dataset (CDISC standards)
2. ADaM.ADVS Dataset (analysis ready)
3. Summary Tables 1-2
4. Figures 1-2
5. ANCOVA statistical test (p-values)
6. Data interpretation
KEY STATISTICAL OUTPUT: ANCOVA TABLE
Look for p-values < 0.05 vs NC control
============================================
NOTE: DATA statement used (Total process time):
      real time           0.00 seconds
      cpu time            0.00 seconds

410
411
412   /* region: Generated postamble */
413   /* Close ODS destinations */
414   &graphterm; ;*';*";*/;run;quit;
415   quit;run;
416   ods html5 (id=web) close;
417   ods listing close;
418   %if %sysfunc(fileref(_gsfname)) lt 0 %then %do;
419       filename _gsfname clear;
NOTE: Fileref _GSFNAME has been deassigned.
420   %end;
421   %studio_capture_custom_output;
422   /* endregion */
423
```