

# Dataset Integrity Check for the Restoring Insulin Secretion - Adult Medication Study (RISE Adult Medication)

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## 1 Standard Disclaimer

The intent of this DSIC is to provide confidence that the data distributed by the NIDDK repository is a true copy of the study data. Our intent is not to assess the integrity of the statistical analyses reported by study investigators. As with all statistical analyses of complex datasets, complete replication of a set of statistical results should not be expected in secondary analysis. This occurs for a number of reasons including differences in the handling of missing data, restrictions on cases included in samples for a particular analysis, software coding used to define complex variables, etc. Experience suggests that most discrepancies can ordinarily be resolved by consultation with the study data coordinating center (DCC), however this process is labor-intensive for both DCC and Repository staff. It is thus not our policy to resolve every discrepancy that is observed in an integrity check. Specifically, we do not attempt to resolve minor or inconsequential discrepancies with published results or discrepancies that involve complex analyses, unless NIDDK Repository staff suspect that the observed discrepancy suggests that the dataset may have been corrupted in storage, transmission, or processing by repository staff. We do, however, document in footnotes to the integrity check those instances in which our secondary analyses produced results that were not fully consistent with those reported in the target publication.

## 2 Study Background

The RISE Adult Medication Study was a partially double-blind, placebo-controlled, four-arm clinical trial. Study participants were randomized into four groups and received treatment for 12 months. During the treatment period, the first group received Metformin alone; the second group received Glargine for three months, followed by Metformin for the remaining nine months; the third group received Liraglutide in combination with Metformin; and the fourth group was treated with placebo. Following the 12-month treatment period, each group underwent treatment withdrawal for three months. Insulin sensitivity and beta-cell function was evaluated at baseline, the end of the treatment period, and the end of the withdrawal period.

## 3 Archived Datasets

All data files, as provided by the Data Coordinating Center (DCC), are located in the RISE Adult Medication study data package. For this replication, variables were taken from the derived datasets: `riseadult_basedata.sas7bdat`, `riseadult_otherlabdata.sas7bdat`, `riseadult_baseline.sas7bdat`, `riseadult_clamp.sas7bdat`, `riseadult_clampdata.sas7bdat`, `riseadult_screen.sas7bdat`, `riseadult_ogttdata.sas7bdat`, and `riseadult_screendata.sas7bdat`.

## 4 Statistical Methods

Analyses were performed to duplicate results for the data published by Sharon L. Edelstein [1] in *Diabetes Care* in 2019. To verify the integrity of the datasets, descriptive statistics were computed.

## 5 Results

For Table 1 in the publication [1], Table 1 – Baseline physical and demographic characteristics by treatment group, Table A lists the variables that were used in the replication and Tables B-1 to B-8 compare the results calculated from the archived data file to the results published in Table 1.

## 6 Conclusions

The results of the replication are within expected variation to the published results. Only the race stratification for “White” was provided and could be verified.

## 7 References

[1] Sharon L. Edelstein. “Lack of Durable Improvements in  $\beta$ -Cell Function Following Withdrawal of Pharmacological Interventions in Adults With Impaired Glucose Tolerance or Recently Diagnosed Type 2 Diabetes.” *Diabetes Care* 2019 Sep; 42(9): 1742-1751. <https://doi.org/10.2337/dc19-0556>.

**Table A: Variables used to replicate Table 1 – Baseline physical and demographic characteristics by treatment group**

<b>Characteristic</b>	<b>dataset.variable</b>
Weight (kg)	riseadult_clamp.weight
BMI (kg/m <sup>2</sup> )	riseadult_screen.scbmi
HbA1c	riseadult_otherlabdata.hba1c
Fasting glucose (mmol/L)	riseadult_ogttdata.gluc_05
Fasting C-peptide (nmol/L)	riseadult_ogttdata.cpep_05
2-h glucose (mmol/L)	riseadult_ogttdata.gluc120
Systolic BP (mmHg)	riseadult_baseline.sbp
Diastolic BP (mmHg)	riseadult_baseline.dbp
Total cholesterol (mmol/L)	riseadult_otherlabdata.chol
LDL cholesterol (mmol/L)	riseadult_otherlabdata.ldl
HDL cholesterol (mmol/L)	riseadult_otherlabdata.hdl
Treatment	riseadult_basedata.treatment
Race	riseadult_basedata.race
Sex	riseadult_basedata.sex
Glycemic Group	riseadult_screendata.diabetes
Hypertensive	riseadult_baseline.baantihyp
BP-lowering medication use	riseadult_baseline.baliplow
Lipid-lowering medication use	riseadult_baseline.bainsul

**Table B-1:** Comparison of values computed in integrity check to reference article Table 1 values. Glargine followed by metformin Cohort (N, %)

		<b>Glargine followed by metformin</b>					
		<b>N</b>			<b>%</b>		
		<b>Manuscript</b>	<b>DSIC</b>	<b>Diff</b>	<b>Manuscript</b>	<b>DSIC</b>	<b>Diff</b>
<b>Sex</b>	<b>Women</b>	23	23	0	34.3	34.3	0
	<b>Men</b>	44	44	0	65.7	65.7	0
<b>Race/ethnicity</b>	<b>White</b>	37	37	0	55.2	55.2	0
	<b>Black</b>	21	N/A	N/A	31.3	N/A	N/A
	<b>Hispanic (any)</b>	5	N/A	N/A	7.5	N/A	N/A
	<b>All other</b>	4	N/A	N/A	6	N/A	N/A
<b>Glycemic group</b>	<b>IGT</b>	50	50	0	74.6	74.6	0
	<b>Diabetes</b>	17	17	0	25.4	25.4	0
<b>Hypertensive</b>	<b>No</b>	17	17	0	25.4	25.4	0
	<b>Yes</b>	50	50	0	74.6	74.6	0
<b>BP-lowering medication use</b>	<b>No</b>	33	33	0	49.3	49.3	0
	<b>Yes</b>	34	34	0	50.7	50.7	0
<b>Lipid-lowering medication use</b>	<b>No</b>	36	36	0	53.7	53.7	0
	<b>Yes</b>	31	31	0	46.3	46.3	0

**Table B-2:** Comparison of values computed in integrity check to reference article Table 1 values. Liraglutide followed by metformin Cohort (N, %)

		<b>Liraglutide followed by metformin</b>					
		<b>N</b>			<b>%</b>		
		<b>Manuscript</b>	<b>DSIC</b>	<b>Diff</b>	<b>Manuscript</b>	<b>DSIC</b>	<b>Diff</b>
<b>Sex</b>	<b>Women</b>	29	28	1	42.6	42.4	0.2
	<b>Men</b>	39	38	1	57.4	57.6	-0.2
<b>Race/ethnicity</b>	<b>White</b>	40	39	1	58.8	59.1	-0.3
	<b>Black</b>	20	N/A	N/A	29.4	N/A	N/A
	<b>Hispanic (any)</b>	6	N/A	N/A	8.8	N/A	N/A
	<b>All other</b>	2	N/A	N/A	2.9	N/A	N/A
<b>Glycemic group</b>	<b>IGT</b>	49	47	2	72.1	71.2	0.9
	<b>Diabetes</b>	19	19	0	27.9	28.8	-0.9
<b>Hypertensive</b>	<b>No</b>	25	24	1	36.8	36.4	0.4
	<b>Yes</b>	43	42	1	63.2	63.6	-0.4
<b>BP-lowering medication use</b>	<b>No</b>	34	33	1	50	50	0
	<b>Yes</b>	34	33	1	50	50	0
<b>Lipid-lowering medication use</b>	<b>No</b>	41	40	1	60.3	60.6	-0.3
	<b>Yes</b>	27	26	1	39.7	39.4	0.3

**Table B-3:** Comparison of values computed in integrity check to reference article Table 1 values. Metformin Alone Cohort (N, %)

		metformin alone					
		N			%		
		Manuscript	DSIC	Diff	Manuscript	DSIC	Diff
<b>Sex</b>	<b>Women</b>	37	36	1	56.9	56.3	0.6
	<b>Men</b>	28	28	0	43.1	43.8	-0.7
<b>Race/ethnicity</b>	<b>White</b>	34	34	0	52.3	53.1	-0.8
	<b>Black</b>	19	N/A	N/A	29.2	N/A	N/A
	<b>Hispanic (any)</b>	6	N/A	N/A	9.2	N/A	N/A
	<b>All other</b>	6	N/A	N/A	9.2	N/A	N/A
<b>Glycemic group</b>	<b>IGT</b>	49	49	0	75.4	76.6	-1.2
	<b>Diabetes</b>	16	15	1	24.6	23.4	1.2
<b>Hypertensive</b>	<b>No</b>	16	15	1	24.6	23.4	1.2
	<b>Yes</b>	49	49	0	75.4	76.6	-1.2
<b>BP-lowering medication use</b>	<b>No</b>	30	29	1	46.2	45.3	0.9
	<b>Yes</b>	35	35	0	53.8	54.7	-0.9
<b>Lipid-lowering medication use</b>	<b>No</b>	45	44	1	69.2	68.8	0.4
	<b>Yes</b>	20	20	0	30.8	31.3	-0.5



**Table B-4:** Comparison of values computed in integrity check to reference article Table 1 values. Placebo Cohort (N, %)

		Placebo					
		N			%		
		Manuscript	DSIC	Diff	Manuscript	DSIC	Diff
<b>Sex</b>	<b>Women</b>	25	25	0	37.3	37.3	0
	<b>Men</b>	42	42	0	62.7	62.7	0
<b>Race/ethnicity</b>	<b>White</b>	30	30	0	44.8	44.8	0
	<b>Black</b>	21	N/A	N/A	31.3	N/A	N/A
	<b>Hispanic (any)</b>	11	N/A	N/A	16.4	N/A	N/A
	<b>All other</b>	5	N/A	N/A	7.5	N/A	N/A
<b>Glycemic group</b>	<b>IGT</b>	49	49	0	73.1	73.1	0
	<b>Diabetes</b>	18	18	0	26.9	26.9	0
<b>Hypertensive</b>	<b>No</b>	23	23	0	34.3	34.3	0
	<b>Yes</b>	44	44	0	65.7	65.7	0
<b>BP-lowering medication use</b>	<b>No</b>	40	40	0	59.7	59.7	0
	<b>Yes</b>	27	27	0	40.3	40.3	0
<b>Lipid-lowering medication use</b>	<b>No</b>	39	39	0	58.2	58.2	0
	<b>Yes</b>	28	28	0	41.8	41.8	0

**Table B-5:** Comparison of values computed in integrity check to reference article Table 1 values. Glargine followed by metformin Cohort (Mean, SD)

	Glargine followed by metformin					
	Mean			SD		
	Manuscript	DSIC	Diff	Manuscript	DSIC	Diff
Weight (kg)	104.4	104.3	0.1	20	20.22	-0.22
BMI (kg/m <sup>2</sup> )	35	34.98	0.02	5.9	5.8	0.1
HbA1c (mol/mmol)	39.9	39.94	-0.04	3.6	3.59	0.01
HbA1c (%)	5.8	5.8	0	0.33	0.33	0
Fasting glucose (mmol/L)	6.22	6.22	0	0.74	0.78	-0.04
Fasting C-peptide (nmol/L)	1.34	1.34	0	0.69	0.69	0
2-h glucose (mmol/L)	10.3	10.26	0.04	2.4	2.35	0.05
Systolic BP (mmHg)	127.7	127.7	0	12	11.96	0.04
Diastolic BP (mmHg)	78.7	78.72	-0.02	9.5	9.52	-0.02
Total cholesterol (mmol/L)	4.21	4.22	-0.01	0.96	0.96	0
LDL cholesterol (mmol/L)	2.41	2.41	0	0.77	0.77	0
HDL cholesterol (mmol/L)	1.12	1.12	0	0.24	0.24	0
Non-HDL cholesterol (mmol/L)	3.09	3.09	0	0.92	0.92	0

**Table B-6:** Comparison of values computed in integrity check to reference article Table 1 values. Liraglutide followed by metformin Cohort (Mean, SD)

	Liraglutide followed by metformin					
	Mean			SD		
	Manuscript	DSIC	Diff	Manuscript	DSIC	Diff
<b>Weight (kg)</b>	104.2	104.77	-0.57	21	20.76	0.24
<b>BMI (kg/m<sup>2</sup>)</b>	35.6	35.71	-0.11	5.8	5.86	-0.06
<b>HbA1c (mol/mmol)</b>	38.6	38.59	0.01	4.3	4.29	0.01
<b>HbA1c (%)</b>	5.69	5.68	0.01	0.39	0.39	0
<b>Fasting glucose (mmol/L)</b>	6.11	6.1	0.01	0.5	0.51	-0.01
<b>Fasting C-peptide (nmol/L)</b>	1.25	1.25	0	0.43	0.43	0
<b>2-h glucose (mmol/L)</b>	9.9	9.83	0.07	2.2	2.2	0
<b>Systolic BP (mmHg)</b>	126.1	125.76	0.34	13.3	12.91	0.39
<b>Diastolic BP (mmHg)</b>	75	75.03	-0.03	9.3	9.22	0.08
<b>Total cholesterol (mmol/L)</b>	4.39	4.36	0.03	0.91	0.89	0.02
<b>LDL cholesterol (mmol/L)</b>	2.56	2.53	0.03	0.81	0.8	0.01
<b>HDL cholesterol (mmol/L)</b>	1.15	1.15	0	0.25	0.26	-0.01
<b>Non-HDL cholesterol (mmol/L)</b>	3.23	3.21	0.02	0.86	0.85	0.01

**Table B-7:** Comparison of values computed in integrity check to reference article Table 1 values. Metformin Alone Cohort (Mean, SD)

	metformin alone					
	Mean			SD		
	Manuscript	DSIC	Diff	Manuscript	DSIC	Diff
<b>Weight (kg)</b>	98.1	98.54	-0.44	18.6	18.62	-0.02
<b>BMI (kg/m<sup>2</sup>)</b>	35	35.08	-0.08	5.1	5.13	-0.03
<b>HbA1c (mol/mmol)</b>	39.5	39.55	-0.05	4.3	4.36	-0.06
<b>HbA1c (%)</b>	5.77	5.77	0	0.4	0.4	0
<b>Fasting glucose (mmol/L)</b>	6.21	6.19	0.02	0.67	0.67	0
<b>Fasting C-peptide (nmol/L)</b>	1.23	1.23	0	0.42	0.41	0.01
<b>2-h glucose (mmol/L)</b>	10.1	9.98	0.12	2.4	2.3	0.1
<b>Systolic BP (mmHg)</b>	127.1	127.28	-0.18	13.3	13.37	-0.07
<b>Diastolic BP (mmHg)</b>	77.8	77.83	-0.03	11.1	11.17	-0.07
<b>Total cholesterol (mmol/L)</b>	4.51	4.52	-0.01	0.94	0.95	-0.01
<b>LDL cholesterol (mmol/L)</b>	2.68	2.71	-0.03	0.81	0.81	0
<b>HDL cholesterol (mmol/L)</b>	1.17	1.17	0	0.3	0.3	0
<b>Non-HDL cholesterol (mmol/L)</b>	3.34	3.35	-0.01	0.9	0.91	-0.01

**Table B-8:** Comparison of values computed in integrity check to reference article Table 1 values. Placebo Cohort (Mean, SD)

	Placebo					
	Mean			SD		
	Manuscript	DSIC	Diff	Manuscript	DSIC	Diff
<b>Weight (kg)</b>	101.6	101.69	-0.09	19.3	19.44	-0.14
<b>BMI (kg/m<sup>2</sup>)</b>	34.4	34.68	-0.28	5.9	6.02	-0.12
<b>HbA1c (mol/mmol)</b>	39.1	39.09	0.01	4.7	4.67	0.03
<b>HbA1c (%)</b>	5.73	5.73	0	0.43	0.43	0
<b>Fasting glucose (mmol/L)</b>	6.08	6.05	0.03	0.58	0.62	-0.04
<b>Fasting C-peptide (nmol/L)</b>	1.16	1.15	0.01	0.44	0.43	0.01
<b>2-h glucose (mmol/L)</b>	10.1	10.09	0.01	2.3	2.27	0.03
<b>Systolic BP (mmHg)</b>	125.3	125.33	-0.03	14.6	14.65	-0.05
<b>Diastolic BP (mmHg)</b>	76.7	76.67	0.03	11.4	11.42	-0.02
<b>Total cholesterol (mmol/L)</b>	4.26	4.27	-0.01	0.98	0.98	0
<b>LDL cholesterol (mmol/L)</b>	2.42	2.43	-0.01	0.79	0.79	0
<b>HDL cholesterol (mmol/L)</b>	1.15	1.15	0	0.33	0.33	0
<b>Non-HDL cholesterol (mmol/L)</b>	3.11	3.12	-0.01	0.92	0.92	0

## Attachment A: SAS Code

```
options nocenter validvarname=upcase fmtsearch=(formats) nofmterr;

title '/prj/niddk/ims_analysis/RISE/prog_initial_analysis/RISE_Adult_Medication/RISE.Adult.dsic.sas';
run;

* RISE Adult Primary.pdf ;

*****;
* INPUT ;
*****;
libname orig '/prj/niddk/ims_analysis/RISE/private_orig_data/RISE Adult Medication/';
libname screen '/prj/niddk/ims_analysis/RISE/private_orig_data/RISE_10_30_2020/';

/*
libname fmts '/prj/niddk/ims_analysis/LOGIC/private_created_data/';

PROC FORMAT CNTLIN = fmts.algsformats;

*/

*****;
* MACROS ;
*****;
%macro readin(lib, ds);
  data &ds;
    set &lib..&ds;
  run;

  proc contents data=&ds;
  title3 "&ds";
  run;
%mend;

* produce n and %;
%macro npercent(rownum, var, varf, subset, subsetname);
  proc freq data=analy noprint;
    where &subset = 1;
    tables &var/list missing out=tbl1&subsetname;
  run;

  data tbl1&subsetname;
    length covar covarf $100;
    set tbl1&subsetname;
    covar = "&var";
    covarf = put(&var,&varf.);
    rownum = &rownum;
  run;

  data prnt&subsetname;
    set prnt&subsetname tbl1&subsetname;
```

```

run;
%mend;

%macro univ(rownum, var, subset, subsetname);

proc univariate data=analy outtable= univ&subsetname noprint;
  where &subset=1;
  var &var
  ;
run;

data univ&subsetname;
  length covarf $100 _var_ $25;
  set univ&subsetname;
  covarf = "&subset";
  rownum = &rownum;
run;

data prntuniv&subsetname;
  set prntuniv&subsetname univ&subsetname;
run;

%mend;

*****;
* FORMATS ;
*****;
proc format;
  value novalue
    . = "No Value"
  other = " Value"
  ;

  value racegf
    1='White'
    2='Other'
  ;

  value sexf
    1='Male'
    2='Female'
  ;

  value ynf
    1 = 'yes'
    .,2 = 'no'
  ;

run;

%readin(orig, riseadult_baseline);

```

```

%readin(orig, riseadult_basedata);
%readin(orig, riseadult_clampdata);
%readin(orig, riseadult_clamp);
%readin(orig, riseadult_exitform);
%readin(orig, riseadult_history);
%readin(orig, riseadult_loclab);
%readin(orig, riseadult_ogttdata);
%readin(orig, riseadult_ogtt);
%readin(orig, riseadult_otherlabdata);
%readin(orig, riseadult_runend);
%readin(orig, riseadult_runstart);
%readin(orig, riseadult_screen);
%readin(orig, riseadult_slpq_adu);
%readin(orig, riseadult_smbg);
%readin(orig, riseadult_status);
%readin(orig, riseadult_unsched);
%readin(orig, riseadult_visit);
%readin(screen, riseadult_screendata);

proc freq data=RISEADULT_BASEDATA;
  tables treatment/missing;
run;

proc freq data=RISEADULT_BASEDATA;
  where treatment="GLARGINE + METFORMIN";
  tables AGEGROUP
         RACE
         SEX      /missing;
run;

proc means data=RISEADULT_OTHERLABDATA;
  where visit ="BAS";
  var HB1C;
run;

proc sort data=RISEADULT_BASEDATA;
  by RISE_REPOSITORY_ID;
run;

proc sort data=RISEADULT_OTHERLABDATA;
  where visit="BAS";
  by RISE_REPOSITORY_ID;
run;

proc sort data=riseadult_baseline;
  by RISE_REPOSITORY_ID;
run;

proc sort data=riseadult_clamp;
  where visit="BAS";
  by RISE_REPOSITORY_ID;
run;

proc sort data=riseadult_clampdata;

```



```

    where visit="BAS";
  by RISE_REPOSITORY_ID;
run;

proc sort data=RISEADULT_SCREEN;
  by RISE_REPOSITORY_ID;
run;

proc sort data=riseadult_ogttdata;
  where visit="BAS";
  by RISE_REPOSITORY_ID;
run;

proc sort data=riseadult_screendata;
  by RISE_REPOSITORY_ID;
run;

data analy;
  merge riseadult_basedata      (in=in1 keep=rise_repository_id treatment agegroup race sex)
        riseadult_otherlabdata  (in=in2 keep=rise_repository_id hbalc chol hdl ldl trig vldl)
        riseadult_baseline     (in=in3 keep=rise_repository_id weight1 weight2 weight3 dbp sbp baantihyp baliplow BAANTIHYP BAINSUL)
        riseadult_clamp        (in=in4 keep=rise_repository_id weight )
        riseadult_clampdata     (in=in5 keep=rise_repository_id acprmax airg airmax)
        RISEADULT_SCREEN       (in=in6 keep=rise_repository_id scbmi)
        riseadult_ogttdata     (in=in7 keep=rise_repository_id GLUC_05 CPEP_05 gluc120)
        riseadult_screendata    (in=in8 keep=rise_repository_id diabetes gluc000s gluc120s)
        ;
  by rise_repository_id;

  if treatment = 'GLARGINE + METFORMIN'      then treat_grp1 = 1;
  if treatment = 'LIRAGLUTIDE + METFORMIN'  then treat_grp2 = 1;
  if treatment = 'METFORMIN'                then treat_grp3 = 1;
  if treatment = 'PLACEBO'                  then treat_grp4 = 1;

  * Conversions provided by Sharon in email 10/6/20:          ;

  * Glucose: multiply by 0.0555          ;
  GLUC_05mod = GLUC_05*0.0555;
  gluc120mod = gluc120*0.0555;

  * Insulin: multiply by 7.462          ;
  BAINSUL_pmol_l = BAINSUL*7.462;

  * C-peptide: divide by 3.003003      ;
  CPEP_05_nmol_l = CPEP_05/3.003003   ;

  * Triglycerides divide by 88.57      ;
  trig_mmol_L = trig/88.57;

  * HbA1c: Multiply by 10.93 and then subtract 23.5 ;
  HbA1c_mol_mmol = HbA1c*10.93-23.5;

  * SI units for lipids is to divide by 38.67 (or multiply by 0.0259)..;
  chol_mmol_L = chol * 0.0259;

```

```

ldl_mmol_L = ldl * 0.0259;
hdl_mmol_L = hdl * 0.0259;
non_hdl_mmol_L = chol_mmol_L - hdl_mmol_L; * Non-HDL cholesterol (mmol/L) ;

* ratio;
trig_hdl = trig_mmol_L/hdl_mmol_L ;

* Hypertensive Adults were defined as hypertensive if sbp>=130 or dbp>=85 or antihyp=1 from BASELINE form;
if sbp>=130 or dbp>=85 or BAANTIHYYP=1 then hypertensive = 1;
else hypertensive = 2;

*skip pattern - missing and NO grouped together;
if BAANTIHYYP in(.,2) then BAANTIHYYPmod = 2;
else BAANTIHYYPmod = BAANTIHYYP;
if baliplow in(.,2) then baliplowmod = 2;
else baliplowmod = baliplow;

run;

proc freq data=analy;
tables treat_grp1*treat_grp2*treat_grp3*treat_grp4*treatment/list missing;
tables hypertensive*sbp*dbp*BAANTIHYYP/list missing;
tables BAANTIHYYPmod*BAANTIHYYP/list missing;
tables baliplowmod*baliplow/list missing;
tables diabetes/missing;
run;

* Cohort: Glargine followed by metformin;

* med, q1, q3;
data prntunivg_m;
* length _VAR_ $100;
set _null_;
run;

* Age continuous is NOT provided, skip;
%univ(8 , Weight , treat_grp1 , G_M);
%univ(9 , scbmi , treat_grp1 , G_M);
%univ(10 , HbA1c_mol_mmol , treat_grp1 , G_M);
%univ(11 , hbalc , treat_grp1 , G_M);
%univ(12 , GLUC_05mod , treat_grp1 , G_M);
*Fasting insulin (pmol/L) ; * 95% CI not calculating;
%univ(14 , CPEP_05_nmol_l , treat_grp1 , G_M);
%univ(15 , glucl20mod , treat_grp1 , G_M); *2-h glucose (mmol/L) ;
%univ(16 , sbp , treat_grp1 , G_M);
%univ(17 , dbp , treat_grp1 , G_M);
%univ(18 , chol_mmol_L , treat_grp1 , G_M);
%univ(19 , ldl_mmol_L , treat_grp1 , G_M);
%univ(20 , hdl_mmol_L , treat_grp1 , G_M);
*Triglycerides (mmol/L); * 95% CI not calculating;
*Triglyceride/HDL ratio ;
%univ(21 , trig_hdl , treat_grp1 , G_M); * Variable lost, Inconclusive;
%univ(22 , non_hdl_mmol_L , treat_grp1 , G_M); *Non-HDL cholesterol (mmol/L);

```

```

data prntunivg_m;
  set prntunivg_m;
  _median_ = round(_median_ , 0.1);
  _q1_     = round(_q1_     , 0.1);
  _q3_     = round(_q3_     , 0.1);
  _mean_   = round(_mean_   , 0.01);
  _std_    = round(_std_    , 0.01);
run;

proc print data=prntunivg_m;
  var rownum _var_ covarf _nobs_/* _median_ _q1_ _q3_ _min_ _max_*/ _mean_ _std_;
  title3 "Cohort: Glargine followed by metformin";
run;

data prntg_m;
  * length _VAR_ $100;
  set _null_;
run;

%percent(2, Sex          , SEXF  , treat_grp1, g_m);
%percent(3, Race        , RACEgF , treat_grp1, g_m);
%percent(4, diabetes    , ynf  , treat_grp1, g_m); *Glycemic group, waiting for new file;
%percent(5, hypertensive, ynf  , treat_grp1, g_m);
%percent(6, BAANTIHYPmod, ynf  , treat_grp1, g_m);
%percent(7, baliplowmod , ynf  , treat_grp1, g_m);

data prntg_m;
  set prntg_m;
  percent = round(percent,0.1);
run;

proc sort data=prntg_m;
  by rownum covarf;
run;

proc print data=prntg_m;
  var rownum covar covarf count percent;
run;

* Cohort: Liraglutide followed by metformin;

* med, q1, q3;
data prntunivl_m;
  * length _VAR_ $100;
  set _null_;
run;

* Age continuous is NOT provided, skip;
%univ(8  , Weight          , treat_grp2 , l_m);
%univ(9  , scbmi           , treat_grp2 , l_m);

```

```

%univ(10 , HbA1c_mol_mmol , treat_grp2 , l_m);
%univ(11 , hba1c , treat_grp2 , l_m);
%univ(12 , GLUC_05mod , treat_grp2 , l_m);
*Fasting insulin (pmol/L) ; * 95% CI not calculating;
%univ(14 , CPEP_05_nmol_l , treat_grp2 , l_m);
%univ(15 , gluc120mod , treat_grp2 , l_m); *2-h glucose (mmol/L) ;
%univ(16 , sbp , treat_grp2 , l_m);
%univ(17 , dbp , treat_grp2 , l_m);
%univ(18 , chol_mmol_L , treat_grp2 , l_m);
%univ(19 , ldl_mmol_L , treat_grp2 , l_m);
%univ(20 , hdl_mmol_L , treat_grp2 , l_m);
*Triglycerides (mmol/L); * 95% CI not calculating;
*Triglyeride/HDL ratio ;
%univ(21 , trig_hdl , treat_grp2 , l_m); * Variable lost, Inconclusive;
%univ(22 , non_hdl_mmol_L , treat_grp2 , l_m); *Non-HDL cholesterol (mmol/L);

data prntunivl_m;
set prntunivl_m;
 _median_ = round(_median_ , 0.1);
 _q1_ = round(_q1_ , 0.1);
 _q3_ = round(_q3_ , 0.1);
 _mean_ = round(_mean_ , 0.01);
 _std_ = round(_std_ , 0.01);
run;

proc print data=prntunivl_m;
var rownum _var_ covarf _nobs_/* _median_ _q1_ _q3_ _min_ _max_*/ _mean_ _std_;
title3 "Cohort: Liraglutide followed by metformin";
run;

data prntl_m;
* length _VAR_ $100;
set _null_;
run;

%percent(2, Sex , SEXF , treat_grp2, l_m);
%percent(3, Race , RACEgF , treat_grp2, l_m);
%percent(4, diabetes , ynf , treat_grp2, l_m); *Glycemic group, waiting for new file;
%percent(5, hypertensive , ynf , treat_grp2, l_m);
%percent(6, BAANTIHYPMOD , ynf , treat_grp2, l_m);
%percent(7, baliplowmod , ynf , treat_grp2, l_m);

data prntl_m;
set prntl_m;
percent = round(percent,0.1);
run;

proc sort data=prntl_m;
by rownum covarf;
run;

proc print data=prntl_m;
var rownum covar covarf count percent;

```

```

run;

* Cohort: metformin alone;

* med, q1, q3;
data prntunivmet;
  * length _VAR_ $100;
  set _null_;
run;

* Age continuous is NOT provided, skip;
%univ(8   , Weight           , treat_grp3 , met);
%univ(9   , scbmi            , treat_grp3 , met);
%univ(10  , HbA1c_mol_mmol   , treat_grp3 , met);
%univ(11  , hbA1c           , treat_grp3 , met);
%univ(12  , GLUC_05mod       , treat_grp3 , met);
*Fasting insulin (pmol/L)           ; * 95% CI not calculating;
%univ(14  , CPEP_05_nmol_l   , treat_grp3 , met);
%univ(15  , gluc120mod       , treat_grp3 , met); *2-h glucose (mmol/L)           ;
%univ(16  , sbp              , treat_grp3 , met);
%univ(17  , dbp              , treat_grp3 , met);
%univ(18  , chol_mmol_L      , treat_grp3 , met);
%univ(19  , ldl_mmol_L       , treat_grp3 , met);
%univ(20  , hdl_mmol_L       , treat_grp3 , met);
*Triglycerides (mmol/L); * 95% CI not calculating;
*Triglyeride/HDL ratio ;
%univ(21  , trig_hdl         , treat_grp3 , met); * Variable lost, Inconclusive;
%univ(22  , non_hdl_mmol_L   , treat_grp3 , met); *Non-HDL cholesterol (mmol/L);

data prntunivmet;
  set prntunivmet;
  _median_ = round(_median_ , 0.1);
  _q1_     = round(_q1_     , 0.1);
  _q3_     = round(_q3_     , 0.1);
  _mean_   = round(_mean_   , 0.01);
  _std_    = round(_std_    , 0.01);
run;

proc print data=prntunivmet;
  var rownum _var_ covarf _nobs_/* _median_ _q1_ _q3_ _min_ _max_*/ _mean_ _std_;
  title3 "Cohort: metformin alone";
run;

data prntmet;
  * length _VAR_ $100;
  set _null_;
run;

%percent(2, Sex           , SEXF   , treat_grp3, met);

```

```

%percent(3, Race          , RACEgF , treat_grp3, met);
%percent(4, diabetes     , ynf    , treat_grp3, met); *Glycemic group, waiting for new file;
%percent(5, hypertensive , ynf    , treat_grp3, met);
%percent(6, BAANTIHYPmod , ynf    , treat_grp3, met);
%percent(7, baliplowmod  , ynf    , treat_grp3, met);

data prntmet;
  set prntmet;
  percent = round(percent,0.1);
run;

proc sort data=prntmet;
  by rownum covarf;
run;

proc print data=prntmet;
  var rownum covar covarf count percent;
run;

```

```
* Cohort: Placebo;
```

```

* med, q1, q3;
data prntunivplac;
  * length_VAR_ $100;
  set _null_;
run;

```

```

* Age continuous is NOT provided, skip;
%univ(8 , Weight          , treat_grp4 , plac);
%univ(9 , scbmi           , treat_grp4 , plac);
%univ(10 , HbA1c_mol_mmol , treat_grp4 , plac);
%univ(11 , hbalc          , treat_grp4 , plac);
%univ(12 , GLUC_05mod     , treat_grp4 , plac);
*Fasting insulin (pmol/L) ; * 95% CI not calculating;
%univ(14 , CPEP_05_nmol_l , treat_grp4 , plac);
%univ(15 , gluc120mod     , treat_grp4 , plac); *2-h glucose (mmol/L) ;
%univ(16 , sbp            , treat_grp4 , plac);
%univ(17 , dbp            , treat_grp4 , plac);
%univ(18 , chol_mmol_L    , treat_grp4 , plac);
%univ(19 , ldl_mmol_L     , treat_grp4 , plac);
%univ(20 , hdl_mmol_L     , treat_grp4 , plac);
*Triglycerides (mmol/L); * 95% CI not calculating;
*Triglyceride/HDL ratio ;
%univ(21 , trig_hdl       , treat_grp4 , plac); * Variable lost, Inconclusive;
%univ(22 , non_hdl_mmol_L , treat_grp4 , plac); *Non-HDL cholesterol (mmol/L);

```

```

data prntunivplac;
  set prntunivplac;
  _median_ = round(_median_ , 0.1);
  _q1_     = round(_q1_     , 0.1);
  _q3_     = round(_q3_     , 0.1);

```

```

    _mean_    = round(_mean_    , 0.01);
    _std_     = round(_std_     , 0.01);
run;

proc print data=prntunivplac;
  var rownum _var_ covarf _nobs_/* _median_ _q1_ _q3_ _min_ _max_*/ _mean_ _std_;
  title3 "Cohort: Placebo";
run;

data prntplac;
  * length _VAR_ $100;
  set _null_;
run;

%npercent(2, Sex          , SEXF   , treat_grp4, plac);
%npercent(3, Race         , RACEgF , treat_grp4, plac);
%npercent(4, diabetes     , ynf    , treat_grp4, plac); *Glycemic group, waiting for new file;
%npercent(5, hypertensive , ynf    , treat_grp4, plac);
%npercent(6, BAANTIHYPmod , ynf    , treat_grp4, plac);
%npercent(7, baliplowmod  , ynf    , treat_grp4, plac);

data prntplac;
  set prntplac;
  percent = round(percent,0.1);
run;

proc sort data=prntplac;
  by rownum covarf;
run;

proc print data=prntplac;
  var rownum covar covarf count percent;
run;

```