Dataset Integrity Check for the DCCT/EDIC Ocular Data Files

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Contents

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 Epidemiology of Diabetes Interventions and Complications (EDIC) study was initiated as follow-up to examine the long-term effects of the original DCCT interventions on diabetic complications such as cardiovascular events and advanced retinal and renal disease. Over 90 percent of participants from the DDCT study were followed by the EDIC study. Similar to the DCCT study, glycosylated hemoglobin values, fasting lipid levels, serum creatinine values, and other risk factors for cardiovascular disease were measured at different intervals for participants. Cardiovascular complications were assessed with standardized means and classified by an independent committee. The EDIC study has found that intensive diabetes therapy reduced risk of cardiovascular disease in patients with type 1 diabetes and that the differences in outcomes between the intensive and conventional therapy groups persist after long-term study.

3 Archived Datasets

All SAS data files, as provided by the Data Coordinating Center (DCC), are located in the data package. For this replication, variables were taken from the 'ocular.sas7bdat' dataset only.

4 Statistical Methods

Analyses were performed to duplicate results for the data published by The DCCT/EDIC Research Group in The New England Journal of Medicine on April 30, 2015. To verify the integrity of the dataset, descriptive statistics were computed.

5 Results

For Table 1 in the publication [1], <u>Ocular Operations and Risk Reduction with Intensive Therapy among the Patients during Follow-up</u>, Table A lists the variables that were used in the replication and Table B compares the results calculated from the archived data files to the results published in Table 1. The results of the replication are almost an exact match to published results.

6 Conclusions

The NIDDK repository are confident that the DCCT/EDIC Ocular data files to be distributed are a copy of the manuscript data with only inconsequential discrepancies.

7 References

[1] Intensive Diabetes Therapy and Ocular Surgery in Type 1 Diabetes, The DCCT/EDIC Research Group; The New England Journal of Medicine 2015; 372:1722-1733. DOI: /10.1056/NEJMoa1409463.

Table A: Variables used to replicate Table 1. Ocular Operations and Risk Reduction with Intensive Therapy among the Patients during Follow-up.

Characteristic	Variable(s)
Therapy Group	conv
Any (patients with >= 1 operations)	anysurg2
All (total operations)	tn_surg2
Any surgery, operations/1000 patient yr	y_srg2
Type of surgery	
Cataract extraction	
Patients with operations	anycata
Patients with operations in both eyes	anycatab
All operations	tn_cata
Operations/1000 patient yr	y_cata
Vitrectomy, retinal detachment, or both	
Patients with operations	vtrd
Patients with vitrectomy only	anyvit
Patients with operations in both eyes	anyvtrdb
All operations	tn_vtrd
Operations/1000 patient yr	y_vtrd
Glaucoma-related operations	
Patients with operations	anyliop
Patients with operations in both eyes	anyliopb
All operations	tn_liop
Operations/1000 patient yr	y_liop
Cornea-related operations	
Patients with operations	anycor
Patients with operations in both eyes	anycorb
All operations	tn_cor
Operations/1000 patient yr	y_cor
Enucleation	
Patients with operations	anyenuc
Patients with operations in both eyes	anyenucb
All operations	tn_enuc
Operations/1000 patient yr	y_enuc
YAG Posterior Capsulotomy	
Patients with operations	anyyag
Patients with operations in both eyes	anyyagb
All operations	tn_yag
Operations/1000 patient yr	y_yag
Surgery Not Related to Diabetes	
Refractive Error Surgery	
Patients with operations	lasi

Characteristic	Variable(s)
Patients with operations in both eyes	laisb
All operations	tn_lasi
Operations/1000 patient yr	y_lasi
Oculoplastic operations	
Patients with operations	ocular.plas
Patients with operations in both eyes	ocular.plasb
Operations/1000 patient yr	y_plas

Table B: Comparison of values computed in integrity check to reference article Table 1 values

Operation	Intensive Therapy Group			Conventional Therapy Group		
	Manuscript (N=711)	DSIC (N=711)	Difference (N=0)	Manuscript (N=730)	DSIC (N=730)	Difference (N=0)
	no. (%)	no. (%)	no. (%)	no. (%)	no. (%)	no. (%)
Diabetes-Related Ocular Surgery						
Any (patients with >=1 operations)	63 (8.9)	63 (8.9)	0 (0)	98 (13.4)	98 (13.4)	0 (0)
All (total operations)	130	130	0	189	189	0
Type of Surgery						
Cataract extraction						
Patients with operations	42 (5.9)	42 (5.9)	0 (0)	61 (8.4)	61 (8.4)	0 (0)
Patients with operations in both eyes	27 (3.8)	27 (3.8)	0 (0)	29 (4.0)	29 (4.0)	0 (0)
All operations	69	69	0	90	90	0
Vitrectomy, retinal detachment, or both						
Patients with operations	29 (4.1)	29 (4.1)	0 (0)	50 (6.8)	50 (6.8)	0 (0)
Patients with vitrectomy only	26 (3.7)	26 (3.7)	0 (0)	45 (6.2)	45 (6.2)	0 (0)
Patients with operations in both eyes	12 (1.7)	12 (1.7)	0 (0)	13 (1.8)	13 (1.8)	0 (0)
All operations	42	42	0	75	75	0
Glaucoma-related operation						
Patients with operations	9 (1.3)	9 (1.3)	0 (0)	14 (1.9)	14 (1.9)	0 (0)
Patients with operations in both eyes	6 (0.8)	6 (0.8)	0 (0)	9 (1.2)	9 (1.2)	0 (0)
All operations	15	15	0	23	23	0
Cornea-related operations						
Patients with operations	2 (0.3)	2 (0.3)	0 (0)	3 (0.4)	3 (0.4)	0 (0)
Patients with operations in both eyes	1 (0.1)	1 (0.1)	0 (0)	1 (0.1)	1 (0.1)	0 (0)
All operations	3	3	0	4	4	0
Enucleation						
Patients with operations	1 (0.1)	1 (0.1)	0 (0)	1 (0.1)	1 (0.1)	0 (0)
Patients with operations in both eyes	0	0	0	1 (0.1)	1 (0.1)	0 (0)
YAG posterior capsulotomy						
Patients with operations	3 (0.4)	3 (0.4)	0 (0)	4 (0.5)	4 (0.5)	0 (0)
Patients with operations in both eyes	2 (0.3)	2 (0.3)	0 (0)	1 (0.1)	1 (0.1)	0 (0)

Operation	Intensive Therapy Group			Conventional Therapy Group		
	Manuscript (N=711)	DSIC (N=711)	Difference (N=0)	Manuscript (N=730)	DSIC (N=730)	Difference (N=0)
	no. (%)	no. (%)	no. (%)	no. (%)	no. (%)	no. (%)
All operations	5	5	0	5	5	0
Surgery not related to diabetes						
Refractive error surgery						
Patients with operations	24 (3.4)	24 (3.4)	0 (0)	22 (3.0)	22 (3.0)	0 (0)
Patients with operations in both eyes	23 (3.2)	23 (3.2)	0 (0)	17 (2.3)	17 (2.3)	0 (0)
All operations	47	47	0	44	44	0
Oculoplastic operations						
Patients with operations	7 (1.0)	7 (1.0)	0 (0)	7 (1.0)	7 (1.0)	0 (0)
Patients with operations in both eyes	2	2	0	5	5	0

Operation	Intensive Therapy Group			Conventional Therapy Group		
	Manuscript (N=711)	DSIC (N=711)	Difference (N=0)	Manuscript (N=730)	DSIC (N=730)	Difference (N=0)
	operations/ 1000 patient- yr	operations/ 1000 patient- yr	operations/ 1000 patient- yr	operations/ 1000 patient- yr	operations/ 1000 patient- yr	operations/ 1000 patient- yr
Diabetes-Related Ocular Surgery						
Any (patients with >=1 operations)	3.95	3.95	0	6.24	6.24	0
All (total operations)	8.01	7.99	0.02	11.64	11.58	0.06
Type of Surgery						
Cataract extraction						
Patients with operations	2.61	2.61	0	3.80	3.80	0
Patients with operations in both eyes						
All operations	4.25	4.24	0.01	5.54	5.52	0.02
Vitrectomy, retinal detachment, or both						
Patients with operations	1.80	1.80	0	3.14	3.14	0
Patients with vitrectomy only						
Patients with operations in both eyes						
All operations	2.59	2.58	0.01	4.62	4.60	0.02
Glaucoma-related operation						
Patients with operations	0.55	0.55	0	0.86	0.86	0
Patients with operations in both eyes						
All operations	0.92	0.92	0	1.42	1.41	0.01
Cornea-related operations						
Patients with operations	0.12	0.12	0	0.18	0.18	0
Patients with operations in both eyes						
All operations	0.18	0.18	0	0.25	0.25	0
Enucleation						
Patients with operations	0.06	0.06	0	0.06	0.06	0
Patients with operations in both eyes						

Operation	Intensive Therapy Group			Conventional Therapy Group		
	Manuscript (N=711)	DSIC (N=711)	Difference (N=0)	Manuscript (N=730)	DSIC (N=730)	Difference (N=0)
YAG posterior capsulotomy						
Patients with operations	0.18	0.18	0	0.25	0.25	0
Patients with operations in both eyes						
All operations	0.31	0.31	0	0.31	0.31	0
Surgery not related to diabetes						
Refractive error surgery						
Patients with operations	1.49	1.49	0	1.36	1.36	0
Patients with operations in both eyes						
All operations	2.89	2.89	0	2.71	2.70	0.01
Oculoplastic operations						
Patients with operations	0.43	0.43	0	0.43	0.43	0
Patients with operations in both eyes						

Attachment A: SAS Code

```
/*****************************************************************************/
/** Programmer:  Patty Griffin                                          **/
/** Date:        December 22, 2015                                      **/
/** DSIC for DCCT_EDIC\OCULAR data                                      **/
/** Reproduce tables in article                                        **/
/** Updated by: Allyson Mateja                                         **/
/** Date Updated: December 30, 2015                                    **/
/*****************************************************************************/
title1 "%sysfunc(getoption(sysin))";
title2 " ";

*** File containing macro for examining each dataset ***;
%include 'borrowed_macro.sas';

libname edic "/prj/niddk/ims_analysis/DCCT_EDIC/private_orig_data/OCULAR/";

options nofmterr;
%global caser;
%let caser=conv;


****************************************************;
**   Input                                       **;
****************************************************;
proc sort data = edic.ocular out=ocular;
  by MASK_PAT dtedyear;
run;

data table1;
  set ocular;
  by MASK_PAT dtedyear;

  if last.MASK_PAT;        **keep last year of follow-up;

  **dtedyear = 0 will identify baseline;

run;
/*
proc freq data = table1;
  table *conv  *conv *conv  / missing;
run;
*/

proc freq data=table1;
  tables &caser/missing list;
  title3 'Case Counts';


%macro datachunk();

%freqdata1(order=1, invar=ANYSURG2, level=("1"), levelname="Any (patients >= 1)" );
```

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```
%sumdata1 (order=2, invar=TN_SURG2);
%freqdata1(order=3, invar=ANYCATA, level=("1"), levelname="Cataract extractions");
%freqdata1(order=4, invar=ANYCATAB, level=("1"), levelname="Cataract extractions (both)");
%sumdata1 (order=5, invar=TN_CATA);
%freqdata1(order=6, invar=ANYVTRD, level=("1"), levelname="Vitrectomy, incl. detachment");
%freqdata1(order=7, invar=ANYVIT, level=("1"), levelname="Vitrecetomy only");
%freqdata1(order=8, invar=ANYVTRDB, level=("1"), levelname="Vitrectomy, incl. detachment (both)");
%sumdata1 (order=9, invar=TN_VTRD);
%freqdata1(order=10, invar=ANYLIOP, level=("1"), levelname="Glaucoma-related");
%freqdata1(order=11, invar=ANYLIOPB, level=("1"), levelname="Glaucoma-related (both)");
%sumdata1 (order=12, invar=TN_LIOP);
%freqdata1(order=13, invar=ANYCOR, level=("1"), levelname="Cornea-related");
%freqdata1(order=14, invar=ANYCORB, level=("1"), levelname="Cornea-related (both)");
%sumdata1 (order=15, invar=TN_COR);
%freqdata1(order=16, invar=ANYENUC, level=("1"), levelname="Enucleation");
%freqdata1(order=17, invar=ANYENUCB, level=("1"), levelname="Enucleation (both)");
%freqdata1(order=18, invar=ANYYAG, level=("1"), levelname="YAG capsulotomy");
%freqdata1(order=19, invar=ANYYAGB, level=("1"), levelname="YAG capsulotomy (both)");
%sumdata1 (order=20, invar=TN_YAG);
%freqdata1(order=21, invar=ANYLASI, level=("1"), levelname="Refractive/LASIK");
%freqdata1(order=22, invar=ANYLASIB, level=("1"), levelname="Refractive/LASIK (both)");
%sumdata1 (order=23, invar=TN_LASI);
%freqdata1(order=24, invar=ANYPLAS, level=("1"), levelname="Oculoplastic");
%freqdata1(order=25, invar=ANYPLASB, level=("1"), levelname="Oculoplastic (both)");
%sumdata1 (order=26, invar=TN_PLAS);




%mend datachunk;


****************************************************;
*** Column processing;                          **;
****************************************************;
title3 'Table 1 stats';

data accumfreq1 accummean1 accummedian1 accuminert1 accumsum1;
  set _null_;

%datachunk();

data accumtab1;
  set accumfreq1 accummean1 accummedian1 accuminert1 accumsum1;
run;

proc sort data=accumtab1;
  by &caser orderer;

proc print data=accumtab1 noobs;
  by  &caser;
  pageby &caser;
  title3 'Table 1 stats (list)';
```

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```
   where &caser in (0 1);

data new_years;
        set table1;
        newyear = max(edicyear, y_srg2, y_cata, y_vtrd, y_liop, y_cor, y_enuc, y_yag, y_lasi, y_plas);

proc means data = table1 sum noprint;
        var y_srg2;
        where conv=0;
        output out = srg_sum sum=sum;

proc freq data=table1 noprint;
        tables ANYSURG2 /out = srg_freq;
        where ANYSURG2 = 1 and conv=0;

data frequencies;
        merge srg_sum
              srg_freq;
        event_rate = 1000 * (count/sum);

proc print data=frequencies;
        var event_rate;
        title3 'Any - operations per 1000 person years Intensive Therapy Group';

proc means data = table1 sum noprint;
        var y_srg2;
        where conv=1;
        output out = srg_sum sum=sum;

proc freq data=table1 noprint;
        tables ANYSURG2 /out = srg_freq;
        where ANYSURG2 = 1 and conv=1;

data frequencies;
        merge srg_sum
              srg_freq;
        event_rate = 1000 * (count/sum);

proc print data=frequencies;
        var event_rate;
        title3 'Any - operations per 1000 person years Conventional Treatment Group';

proc means data=new_years sum noprint;
        var newyear;
        where conv=0;
        output out = years_int_sum sum = sum;

proc means data=table1 sum noprint;
        var tn_surg2;
        where conv = 0;
        output out = total_sum sum=count;

data frequencies;
        merge years_int_sum
              total_sum;
   event_rate = 1000* (count/sum);
```

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```
proc print data=frequencies;
      var event_rate;
      title3 'All operations - event rate per 1000 person years Intensive Therapy group';

proc means data=new_years sum noprint;
      var newyear;
      where conv=1;
      output out = years_conv_sum sum = sum;

proc means data=table1 sum noprint;
      var tn_surg2;
      where conv = 1;
      output out = total_sum sum=count;

data frequencies;
      merge years_conv_sum
            total_sum;
   event_rate = 1000* (count/sum);

proc print data=frequencies;
      var event_rate;
      title3 'All operations - event rate per 1000 person years Conventional Treatment group';

proc means data = table1 sum noprint;
      var y_cata;
      where conv=0;
      output out = cat_sum sum=sum;

proc freq data=table1 noprint;
      tables ANYCATA /out = cat_freq;
      where ANYCATA = 1 and conv=0;

data frequencies;
      merge cat_sum
            cat_freq;
      event_rate = 1000 * (count/sum);

proc print data=frequencies;
      var event_rate;
      title3 'Cataract surgeries - operations per 1000 person years Intensive Therapy Group';

proc means data = table1 sum noprint;
      var y_cata;
      where conv=1;
      output out = cat_sum sum=sum;

proc freq data=table1 noprint;
      tables ANYCATA /out = cat_freq;
      where ANYCATA = 1 and conv=1;

data frequencies;
      merge cat_sum
            cat_freq;
      event_rate = 1000 * (count/sum);
```

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```
proc print data=frequencies;
      var event_rate;
      title3 'Cataract surgeries - operations per 1000 person years Conventional Treatment Group';

proc means data=table1 sum noprint;
      var tn_cata;
      where conv = 0;
      output out = total_sum sum=count;

data frequencies;
      merge years_int_sum
            total_sum;
  event_rate = 1000* (count/sum);

proc print data=frequencies;
      var event_rate;
      title3 'All cataract operations - event rate per 1000 person years Intensive Therapy group';

proc means data=table1 sum noprint;
      var tn_cata;
      where conv = 1;
      output out = total_sum sum=count;

data frequencies;
      merge years_conv_sum
            total_sum;
  event_rate = 1000* (count/sum);

proc print data=frequencies;
      var event_rate;
      title3 'All cataract operations - event rate per 1000 person years Conventional Treatment group';

proc means data = table1 sum noprint;
      var y_vtrd;
      where conv=0;
      output out = vit_sum sum=sum;

proc freq data=table1 noprint;
      tables ANYVTRD /out = vit_freq;
      where ANYVTRD = 1 and conv=0;

data frequencies;
      merge vit_sum
            vit_freq;
      event_rate = 1000 * (count/sum);

proc print data=frequencies;
      var event_rate;
      title3 'Vitrectomy, retinal detachment, or both - operations per 1000 person years Intensive Therapy Group';

proc means data = table1 sum noprint;
      var y_vtrd;
      where conv=1;
      output out = vit_sum sum=sum;

proc freq data=table1 noprint;
```

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```
        tables ANYVTRD /out = vit_freq;
        where ANYVTRD = 1 and conv=1;

data frequencies;
        merge vit_sum
              vit_freq;
        event_rate = 1000 * (count/sum);

proc print data=frequencies;
        var event_rate;
        title3 'Vitrectomy, retinal detachment, or both - operations per 1000 person years Conventional Treatment Group';

proc means data=table1 sum noprint;
        var tn_vtrd;
        where conv = 0;
        output out = total_sum sum=count;

data frequencies;
        merge years_int_sum
              total_sum;
   event_rate = 1000* (count/sum);

proc print data=frequencies;
        var event_rate;
        title3 'All vitrectomy operations - event rate per 1000 person years Intensive Therapy group';

proc means data=table1 sum noprint;
        var tn_vtrd;
        where conv = 1;
        output out = total_sum sum=count;

data frequencies;
        merge years_conv_sum
              total_sum;
   event_rate = 1000* (count/sum);

proc print data=frequencies;
        var event_rate;
        title3 'All vitrectomy operations - event rate per 1000 person years Conventional Treatment group';

proc means data = table1 sum noprint;
        var y_liop;
        where conv=0;
        output out = glau_sum sum=sum;

proc freq data=table1 noprint;
        tables ANYLIOP /out = glau_freq;
        where ANYLIOP = 1 and conv=0;

data frequencies;
        merge glau_sum
              glau_freq;
        event_rate = 1000 * (count/sum);

proc print data=frequencies;
        var event_rate;
```

```
          title3 'Glaucoma-related operation - operations per 1000 person years Intensive Therapy Group';

proc means data = table1 sum noprint;
        var y_liop;
        where conv=1;
        output out = glau_sum sum=sum;

proc freq data=table1 noprint;
        tables ANYLIOP /out = glau_freq;
        where ANYLIOP = 1 and conv=1;

data frequencies;
        merge glau_sum
              glau_freq;
        event_rate = 1000 * (count/sum);

proc print data=frequencies;
        var event_rate;
        title3 'Glaucoma-related operation - operations per 1000 person years Conventional Treatment Group';

proc means data=table1 sum noprint;
        var tn_liop;
        where conv = 0;
        output out = total_sum sum=count;

data frequencies;
        merge years_int_sum
              total_sum;
   event_rate = 1000* (count/sum);

proc print data=frequencies;
        var event_rate;
        title3 'All galucoma operations - event rate per 1000 person years Intensive Therapy group';

proc means data=table1 sum noprint;
        var tn_liop;
        where conv = 1;
        output out = total_sum sum=count;

data frequencies;
        merge years_conv_sum
              total_sum;
   event_rate = 1000* (count/sum);

proc print data=frequencies;
        var event_rate;
        title3 'All glaucoma operations - event rate per 1000 person years Conventional Treatment group';

proc means data = table1 sum noprint;
        var y_cor;
        where conv=0;
        output out = cor_sum sum=sum;

proc freq data=table1 noprint;
        tables ANYCOR /out = cor_freq;
        where ANYCOR = 1 and conv=0;
```

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```
data frequencies;
      merge cor_sum
            cor_freq;
      event_rate = 1000 * (count/sum);

proc print data=frequencies;
      var event_rate;
      title3 'Cornea-related operations - operations per 1000 person years Intensive Therapy Group';

proc means data = table1 sum noprint;
      var y_cor;
      where conv=1;
      output out = cor_sum sum=sum;

proc freq data=table1 noprint;
      tables ANYCOR /out = cor_freq;
      where ANYCOR = 1 and conv=1;

data frequencies;
      merge cor_sum
            cor_freq;
      event_rate = 1000 * (count/sum);

proc print data=frequencies;
      var event_rate;
      title3 'Cornea-related operation - operations per 1000 person years Conventional Treatment Group';

proc means data=table1 sum noprint;
      var tn_cor;
      where conv = 0;
      output out = total_sum sum=count;

data frequencies;
      merge years_int_sum
            total_sum;
  event_rate = 1000* (count/sum);

proc print data=frequencies;
      var event_rate;
      title3 'All cornea operations - event rate per 1000 person years Intensive Therapy group';

proc means data=table1 sum noprint;
      var tn_cor;
      where conv = 1;
      output out = total_sum sum=count;

data frequencies;
      merge years_conv_sum
            total_sum;
  event_rate = 1000* (count/sum);

proc print data=frequencies;
      var event_rate;
      title3 'All cornea operations - event rate per 1000 person years Conventional Treatment group';
```

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```
proc means data = table1 sum noprint;
      var y_enuc;
      where conv=0;
      output out = enuc_sum sum=sum;

proc freq data=table1 noprint;
      tables ANYENUC /out = enuc_freq;
      where ANYENUC = 1 and conv=0;

data frequencies;
      merge enuc_sum
            enuc_freq;
      event_rate = 1000 * (count/sum);

proc print data=frequencies;
      var event_rate;
      title3 'Enucleation - operations per 1000 person years Intensive Therapy Group';

proc means data = table1 sum noprint;
      var y_enuc;
      where conv=1;
      output out = enuc_sum sum=sum;

proc freq data=table1 noprint;
      tables ANYENUC /out = enuc_freq;
      where ANYENUC = 1 and conv=1;

data frequencies;
      merge enuc_sum
            enuc_freq;
      event_rate = 1000 * (count/sum);

proc print data=frequencies;
      var event_rate;
      title3 'Enucleation - operations per 1000 person years Conventional Treatment Group';

proc means data = table1 sum noprint;
      var y_yag;
      where conv=0;
      output out = yag_sum sum=sum;

proc freq data=table1 noprint;
      tables ANYYAG /out = yag_freq;
      where ANYYAG = 1 and conv=0;

data frequencies;
      merge yag_sum
            yag_freq;
      event_rate = 1000 * (count/sum);

proc print data=frequencies;
      var event_rate;
      title3 'YAG - operations per 1000 person years Intensive Therapy Group';

proc means data = table1 sum noprint;
      var y_yag;
```

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```
        where conv=1;
        output out = yag_sum sum=sum;

proc freq data=table1 noprint;
        tables ANYYAG /out = yag_freq;
        where ANYYAG = 1 and conv=1;

data frequencies;
        merge yag_sum
              yag_freq;
        event_rate = 1000 * (count/sum);

proc print data=frequencies;
        var event_rate;
        title3 'YAG - operations per 1000 person years Conventional Treatment Group';

proc means data=table1 sum noprint;
        var tn_yag;
        where conv = 0;
        output out = total_sum sum=count;

data frequencies;
        merge years_int_sum
              total_sum;
   event_rate = 1000* (count/sum);

proc print data=frequencies;
        var event_rate;
        title3 'All YAG operations - event rate per 1000 person years Intensive Therapy group';

proc means data=table1 sum noprint;
        var tn_yag;
        where conv = 1;
        output out = total_sum sum=count;

data frequencies;
        merge years_conv_sum
              total_sum;
   event_rate = 1000* (count/sum);

proc print data=frequencies;
        var event_rate;
        title3 'All YAG operations - event rate per 1000 person years Conventional Treatment group';

proc means data = table1 sum noprint;
        var y_lasi;
        where conv=0;
        output out = lasi_sum sum=sum;

proc freq data=table1 noprint;
        tables ANYLASI /out = lasi_freq;
        where ANYLASI = 1 and conv=0;

data frequencies;
        merge lasi_sum
              lasi_freq;
```

```
        event_rate = 1000 * (count/sum);

proc print data=frequencies;
        var event_rate;
        title3 'Refractive error surgery - operations per 1000 person years Intensive Therapy Group';

proc means data = table1 sum noprint;
        var y_lasi;
        where conv=1;
        output out = lasi_sum sum=sum;

proc freq data=table1 noprint;
        tables ANYLASI /out = lasi_freq;
        where ANYLASI = 1 and conv=1;

data frequencies;
        merge lasi_sum
              lasi_freq;
        event_rate = 1000 * (count/sum);

proc print data=frequencies;
        var event_rate;
        title3 'Refractive error surgery - operations per 1000 person years Conventional Treatment Group';

proc means data=table1 sum noprint;
        var tn_lasi;
        where conv = 0;
        output out = total_sum sum=count;

data frequencies;
        merge years_int_sum
              total_sum;
   event_rate = 1000* (count/sum);

proc print data=frequencies;
        var event_rate;
        title3 'All LASIK operations - event rate per 1000 person years Intensive Therapy group';

proc means data=table1 sum noprint;
        var tn_lasi;
        where conv = 1;
        output out = total_sum sum=count;

data frequencies;
        merge years_conv_sum
              total_sum;
   event_rate = 1000* (count/sum);

proc print data=frequencies;
        var event_rate;
        title3 'All LASIK operations - event rate per 1000 person years Conventional Treatment group';

proc means data = table1 sum noprint;
        var y_plas;
        where conv=0;
        output out = plas_sum sum=sum;
```

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```
proc freq data=table1 noprint;
      tables ANYPLAS /out = plas_freq;
      where ANYPLAS = 1 and conv=0;

data frequencies;
      merge plas_sum
            plas_freq;
      event_rate = 1000 * (count/sum);

proc print data=frequencies;
      var event_rate;
      title3 'Oculoplastic operations - operations per 1000 person years Intensive Therapy Group';

proc means data = table1 sum noprint;
      var y_plas;
      where conv=1;
      output out = plas_sum sum=sum;

proc freq data=table1 noprint;
      tables ANYPLAS /out = plas_freq;
      where ANYPLAS = 1 and conv=1;

data frequencies;
      merge plas_sum
            plas_freq;
      event_rate = 1000 * (count/sum);

proc print data=frequencies;
      var event_rate;
      title3 'Oculoplastic operations - operations per 1000 person years Conventional Treatment Group';


*** Macro ***;
%macro freqdata1(order=, invar=, level=, levelname= );

data data0 data1;
  set _null_;

  proc freq data=table1 noprint;
      tables &invar*&caser/out=data0 outpct missing;
      format _all_;
      run;

data data1;
  set data0;
  length LEVEL $100 LEVELNAME $100;
  LEVEL=strip(&invar);
  LEVELNAME=strip(&levelname);


  data data1(keep=&caser name LEVEL LEVELNAME CHARALL ORDERER);
    set data1;
    length name $100 CHARALL $100;
    name=upcase("&invar");
    PCT_DISP=round(PCT_COL,0.1);
```

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```
       CHARALL=compress(put(COUNT,8.))||" ("||compress(put(PCT_DISP,8.1))||")";
       ORDERER=&order;
       if level in &level then output data1;

data accumfreq1;
   set accumfreq1 data1;

%mend freqdata1;

%macro meandata1(order=, invar=, roundvar=, digit=);
proc means data=table1 mean stddev min max  noprint;
       var &invar;
       class &caser;
       output out=data1 mean=mean stddev=stddev min=min max=max ;
       run;

data data1(drop=_TYPE_ _FREQ_ mean stddev min max );
   set data1;
   length name CHARALL $100;
   name=upcase("&invar");
   mean=round(mean,&roundvar);
   stddev=round(stddev,&roundvar);
   min=round(min,&roundvar);
   max=round(max,&roundvar);
   CHARALL=compress(put(mean,8.&digit))||" ± "||compress(put(stddev,8.&digit));
   ORDERER=&order;
   output;
   ORDERER=ORDERER+.01;
   CHARALL=compress(put(min,8.&digit)||"-"||put(max,8.&digit));
   output;

data accummean1;
   set accummean1 data1;

%mend meandata1;

%macro mediandata1(order=, invar=, roundvar=, digit=);
proc means data=table1 median p25 p75 min max noprint;
       var &invar;
       class &caser;
       output out=data1 median=median p25=p25 p75=p75 min=min max=max;
       run;

data data1(drop=_TYPE_ _FREQ_ median p25 p75 min max);
   set data1;
   length name CHARALL $100;
   name=upcase("&invar");
   median=round(median,&roundvar);
   min=round(min,&roundvar);
   max=round(max,&roundvar);
   ORDERER=&order;
   CHARALL=compress(put(median,8.&digit));
   output;
   ORDERER=ORDERER+.01;
   CHARALL="range= " || compress(put(min,8.&digit)||"-"||put(max,8.&digit));
   output;
```

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```
   ORDERER=ORDERER+.02;
   CHARALL="IQ= " ||compress(put(p25,8.&digit)||"-"||put(p75,8.&digit));
   output;

data accummedian1;
   set accummedian1 data1;

%mend mediandata1;


%macro sumdata1(order=, invar=);
proc means data=table1 sum noprint;
       var &invar;
       class &caser;
       output out=data1 sum=sum;
       run;

data data1(drop=_TYPE_ _FREQ_ sum);
   set data1;
   length name CHARALL $100;
   name=upcase("&invar");
   ORDERER=&order;
   CHARALL="sum= " || compress(put(sum,6.));
   output;

data accumsum1;
   set accumsum1 data1;

%mend sumdata1;

%macro inertdata1(order=);

data inert1;
   length orderer &caser 8.;
   orderer=&order.;
   &caser=-1;
   output;
   orderer=&order.;
   &caser=0;
   output;
   orderer=&order.;
   &caser=1;
   output;

data accuminert1;
   set accuminert1 inert1;

%mend inertdata1;
```