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%_mprintto;
options notes nosource;
proc datasets lib=work nolist memtype=data kill; quit;
/* Standard - leave this */
%let TFL_Part=%scan(&_SASPROGRAMFILE,-3,%str(/));

/* Standard - leave this */
data _null_;
    tmp="%TFL_Part";
    if tmp not in ("dev" "qc") then call symput("TFL_Part", "prod");
    call symput('TFLpath', compress("&_SASPROGRAMFILE",""));
run;
%put NOTE:
=====;
%put NOTE: Covance Study Number : 000000106324;
%put NOTE: Client Protocol ID   : ZRHR-REXC-03-EU;
%put NOTE: Program Name        : tl_anlpkparam.sas;
%put NOTE: Purpose             : table and figure of PK paramters;
%put NOTE: ;
%put NOTE: Input Data           : ADAM.ADPP;
%put NOTE: Output               : L_15_04_04_39(PK) T_15_2_4_39(PK) ;
%put NOTE: Macros Called        : _MPRINTTO;
%put NOTE: ;
%put NOTE: Programmed by        : cvn_ahall;
%put NOTE: Creation Date        : 2014-30-07;
%put NOTE: SAS Version          : 9.3;
%put NOTE: ;
%put NOTE: == Latest Run
=====;
%put NOTE: Run by                : &sysuserid;
%put NOTE: Date/Time             :
%sysfunc(putn(%sysfunc(date()),e8601da.))T%sysfunc(putn(%sysfunc(time()),
e86011z.));
%put NOTE: ;
%put NOTE: == Modification History
=====;
%put NOTE: Date          Initials    No. Reason;
%put NOTE: ;
%put NOTE:
=====;
options notes source source2 nofullstimer validvarname=upcase missing=' '
noquotelenmax/*turn off warnings about quoted strings to long*/;;
ods _all_ close;
ods listing;

*=====;
* START OF PROGRAM CODE
*=====;
data adsl;
    set adam.adsl(where=(pprotfl='Y'));
    if index(trt01a,'THS 2.2') then colord=1;
    output;
    if index(trt01a,'CC') then colord=2;

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        output;
        if index(trt01a,'SA') then colord=3;
        output;
run;

proc sort data=adsl nodupkey out=adsl1;
    by colord subjid;
run;

proc freq data=adsl1(where=(not missing(colord))) noprint;
    table colord/ out =totals2(drop=percent rename=(count=total));
run;

data _null_;
    set totals2;
    call symput('tot'||strip(put(colord,best.)),strip(put(total,best.)));
run;
*****;
* read in data ;

*****;

%macro anal(param=, tabno=, title=, reference=);

/*formats macro and appendix output macros*/
%include
"/cvn/projects/prj/development/000000106324/dev/adhoc/TMPLTMIX.sas";

proc sort data=adam.adpp(where=(
    not missing(aval) and pprotfl='Y' and anl01fl='Y' and
    upcase(parcat1)="&param"))
    out=adpp;
    by subjid paramcd;
run;

data adpp1 noanal;
    attrib param1 length=$100;
    set adpp;
    if index(paramcd,'CMAX') THEN PARAM1='C`{sub peak}
('||strip(avalu)||')';
    else if index(paramcd,'TMAX') THEN PARAM1='t`{sub peak}
('||strip(avalu)||')';
    else if index(paramcd,'CAVG') THEN PARAM1='C`{sub avg}
('||strip(avalu)||')';
    if index(paramcd,'CMAX') or index(paramcd,'CAVG') then do;
        if aval not in (.,0) then do;
            logaval=log(aval);
            output adpp1;
        end;
    else output noanal;
end;
else output adpp1;
run;

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/*treatment and parameter formats to display text rather than numbers for
listing*/
%fmt(datain=adpp1, start=paramn, label=param1, name=param);
%fmt(datain=adpp1, start=trtan, label=trta, name=trt);

data adppmod;
    set adpp1;
    format paramn param. trtan trt. ;
run;

proc sort data=adppmod; by paramn subjid; run;

title1 j=1 "PAGESPLIT"; /*do not change*/
title2 j=1 'Parameter: #byvall';
title3 j=1 'Proc Mixed Procedure';
TITLE4 J=L "The where clause used on the dataset adam.adpp: pprotfl='Y'
and anl01fl='Y'";
%let tflno=L_15_04_04_&tabno(PK);

%mixout1(fileout=/cvn/projects/prj/data/000000106324/TFL/&TFL_Part./&tfln
o);
options ps=28;

options nobyline;

proc mixed data=adppmod(where=(index(paramcd,'TMAX')=0)) method=reml
maxiter=200 order=internal;
    by paramn;
    class trtan sexc ucpdgr1;
    model logaval = trtan sexc ucpdgr1 / outp=pred ;
    lsmeans trtan / pdiff alpha=0.05 cl ;
    ods output lsmeans=lsmeans;
    ods output diffs=diffs ;
    ods output covparms=covparms(rename=(estimate=residual));
run;

/*Residual Plots*/
title3 j=1 'Residual Plots';
options ps=27; /*change this for proc plot*/

proc rank data=pred out=resid normal=vw ;
by paramn;
ranks nscore;
var resid;
run;

proc plot data=resid hpercent=50;
by paramn;
plot resid*pred / vref=0;
plot resid*nscore;

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run;
quit;

/*data counts*/
proc univariate data=adppmod(where=(index(paramcd,'TMAX')=0)) noprint;
  by paramn;
  class trtan;
  var logaval;
  output out=num1 n=n1;
run;

data diffs1;
  merge diffs covparms ;
  by paramn;
run;

data tabout;
length out $100 stat $100;
  set lsmeans(in=a) diffs1(in=b) num1(in=c);
  /*ordering columns of treatments*/
  if b then colord=3;
  else if trtan=1 then colord=1;
  else if trtan=2 then colord=2;

  /* N row*/
  if c then do;
    ord=1;
    stat='n';
    out=compress(put(n1,best.));
    output;
  end;

  if a then do;
    /*Back transformation*/
    estimatee=exp(estimate);
    lower=exp(lower);
    uppere=exp(upper);

    /*Gmean (CV%) row*/
    ord=2;
    stat='Geometric LS Mean (CV%)`{super 1}';
    out=compress(put(round(estimatee,0.01),8.2));
    output;
    /*95% CI row*/
    ord=3;
    stat='95% CI';
    out=compress(put(floor(100*lower)/100,8.2))||',
'||compress(put(ceil(100*uppere)/100,8.2));
    output;
  end;
  if b then do;
    /*Back transformation*/
    estimatee=exp(estimate);

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        lowere=exp(lower)*100;
        uppere=exp(upper)*100;
        geocv=sqrt((exp(residual)-1)*100**2);
/*Gmean (CV%) row*/
        ord=2;
        stat='Geometric LS Mean (CV%)`{super 1}';
        out=compress(put(round(100*estimatee,0.01),8.2))||'
('||compress(put(ceil(100*geocv)/100,8.2))||')';
        output;
/*95% CI row*/
        ord=3;
        stat='95% CI';
        out=compress(put(floor(100*lowere)/100,8.2))||',
'||compress(put(ceil(100*uppere)/100,8.2));
        output;
        end;
run;

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/*Tmax analysis*/

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data tpeak;
set adppmod(where=(index(paramcd,'TMAX')));
run;
title3 j=1 'Proc Nparlway procedure';

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proc nparlway hl alpha=.05 data=tpeak;
    by paramn;
    class trtan;
    var aval;
    ods output HodgesLehmann=HodgesLehmann;
run;

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proc univariate data=tpeak noprint;
    by paramn;
    class trtan;
    var aval;
    output out=meds    n=n1 median=med;
run;

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data tpeakout;
length out $100 stat $100;
    set meds(in=a) HodgesLehmann(in=b) ;
    tpeak=1;
    /*ordering columns of treatments*/
    if b then colord=3;
    else if trtan=1 then colord=1;
    else if trtan=2 then colord=2;
/*columns 1 and 2*/
    /* N row*/
    if a then do;
        ord=1;

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        stat='n';
        out=compress(put(n1,best.));
        output;
/*Median row*/
        ord=2;
        stat='Median';
        out=compress(put(round(med,0.01),8.2));
        output;
    end;
/*Column 3*/
    if b then do;
/*Median row*/
        ord=2;
        stat='Median';
        out=compress(put(round(shift,0.01),8.2));
        output;
/*95% CI row*/
        ord=3;
        stat='95% CI`{super 2}';
        out=compress(put(floor(100*lowercl)/100,8.2)||',
'||compress(put(ceil(100*uppercl)/100,8.2));
        output;
    end;
run;

data out;
    set tabout tpeakout;
run;

/*transpose for output*/
proc sort data=out;
    by paramn ord colord tpeak;
run;

proc transpose data=out out=allout(drop=_NAME_) prefix=col;
    by paramn ord stat tpeak;
    id colord;
    var out;
run;

%mixout2(blankn=68, halfblnk=Y,title=Listing 15.4.4.&tabno. &title);

/* Standard - macro for paging */
%macro outrtf(blankn=68, halfblnk=N, ref=);

/* treatment column headers and footnotes */
/*group 1*/

%let col1=THS 2.2#(N=&tot1);
%let col2=CC#(N=&tot2);
%let col3=THS 2.2:CC Ratio#(%);

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%if &halfblnk=N %then %let halfblnk=;
%else %if &halfblnk=Y %then %let halfblnk=~;

/* Standard - just change the number to match the listing you're working
on. Also change the letters in the*/
/* bracket, eg ccb = current cigarette brands. Make sure to do this at
the top of the code too. */

    %let tflno=T_15_02_04_&tabno.(PK);

    options replace;
    data table.T_15_02_04_&tabno.;
    set allout;
    run;
    options noreplace;

/* Standard - leave this */
%let TFL_Part=%scan(&_SASPROGRAMFILE,-3,%str(/));

/* Standard - leave this */
data _null_;
    tmp="%TFL_Part";
    if tmp not in ("dev" "qc") then call symput("TFL_Part", "prod");
    call symput('TFLpath', compress("&_SASPROGRAMFILE",""));
run;

/*page numbers*/
data paging;
    set allout end=a;
    if tpeak=1 then page=2;
    else page=1;
    if a then call symput("tpage",compress(put(page,best.)));
run;

/* Standard - leave this */
options number nodate orientation=landscape papersize=&p_pgsize missing='
' NOQUOTELENMAX/*turn off warnings about quoted strings too long*/;
ods escapechar='`';
%let linetop = \brdrt\brdrs\brdrw30; * needs to be 1.5pt so calculated
in twips (1/20 pt) ;
%let linebot = \brdrb\brdrs\brdrw30;
%let linebot2 = \brdrb\brdrs\brdrw15;

ods path stdlib.tl06324 (read) ;
ods results off;
ods rtf toc_data/* contents*/
file="/cvn/projects/prj/data/000000106324/TFL/&TFL_Part./&tflno..rtf"
style=tl06324 startpage=yes headery=1440 footery=1440 ;
ods noproctitle;

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%do i=1 %to &tpage;

ODS PROCLABEL = ' ';
title ;
footnote;
%let wd=0;

data comp;
    set paging end=eof;
    by paramn ord;
    where page=&i;
    flag=1;
    if tpeak=1 then call symput('COL3', 'THS 2.2 - CC');
    call symput('grp',compress(put(analgrln,best.)));
    /* Amend title as needed */
    _firtitl="Table 15.2.4.&tabno &title";
    _upcas=(length(_firtitl)-
length(compress(_firtitl,'ABCDEFGHIJKLMNOPQRSTUVWXYZ')))/2;
    len=&blankn.-length("(Page &i of &tpage)");
    if eof then do;
        call symput('_FSRTITL', trim(left(_firtitl)));
        call symput('_blankn', compress(put(len,best.)));
    end;
    drop _firtitl _upcas len;
run;

ods listing close;

* most set up in template others below;
* title arial 12pt bold with 12pt paragraph space below;
* all headers to be arial 11pt bold;
* data arial 10pt;
* headers to be central, text values left aligned and numeric centered
around decimal point;
/* Update with your variables as needed */
proc report data = comp headline headskip missing nowd spanrows split =
'#'
%IF &I=1 %THEN %DO; CONTENTS=' ' %END; %ELSE %DO; CONTENTS='' %END;;
    column flag page paramn ord stat coll col2 col3;

    define flag / order noprint;
        define page / order order = internal noprint;
        define paramn / group style={just=left cellwidth=2.5cm}
"Parameter";
        define ord / order order=internal noprint;
        define stat / display style={just=left cellwidth=3cm}
"Statistic";
        define coll / display style={just=c cellwidth=3cm}
style(header)={just=center} "&coll";
        define col2 / display style={just=c cellwidth=3cm}
style(header)={just=center} "&col2";

```



```

        define col3          / display style={just=c cellwidth=3cm}
style(header)={just=center} "&col3";

        break after page / page;

        break before flag / page %IF &I=1 %THEN %DO;
            CONTENTS="&_FSRTITL" %END; %ELSE %DO; CONTENTS='' %END;;

        compute before page / style={protectspecialchars=off};
            line "&linetop";
        endcomp;

        compute before _page_ / style={just=left protectspecialchars=off};
            line "\b\fs24\sa24&_FSRTITL." ; * \b = bold, \fs24 is font
size 12pt, \sa24 is space after 12pt;
            line "&linebot";
        endcomp;

        compute after paramn;
            line " ";
        endcomp;

compute after _page_ / style={just=left protectspecialchars=off
pretext="&linetop."};
    line "Note: CC = Conventional cigarettes; THS = Tobacco Heating
System.";
LINE 'Note: 1: Geometric LS Mean and 95% CI are the adjusted geometric
least squares means based on an ANOVA model conducted on log-transformed
values with study arm, sex and CC consumption reported at screening as
fixed effect factors. Geometrical CV% of the ratio is estimated from the
residual mean squares.';
LINE "Note: 2: 95% CI are estimated only for the median difference based
on the Hodges-Lehmann estimate.";
    line "";
    line "Appendix &ref.";
    line "Path: &TFLpath." &_blankn.*"\~\~" "(Page &i of
&tpage)";
    line "Program Run: &sysdate &sysuserid Program Status:
&status";
        endcomp;

run;
%end;
ods rtf close;
ods results on;
ods path reset;

%mend ;

%outrtf(blankn=68, halfblnk=Y, ref=&reference);

%mend;

```

```
%anal(param=NICOTINE, tabno=39,title=%str(Analysis of Plasma Nicotine  
Concentration Parameters on Day 5 - FAS), reference=15.2.4.37);
```

```
%anal(param=COTININE, tabno=40,title=%str(Analysis of Plasma Cotinine  
Concentration Parameters on Day 5 - FAS), reference=15.2.4.38);
```

```
proc printto ; run;
```

```
*=====;  
* END OF PROGRAM CODE ;  
*=====;
```