

```

%_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        : tlf_anlmceq.sas;
%put NOTE: Purpose              : table and figure outputs of MCEQ data;
%put NOTE: ;
%put NOTE: Input Data           : ADAM.ADQSSU;
%put NOTE: Output               : L_15_04_04_49(MCEQ) T_15_02_04_49(MCEQ)
F_15_01_02_39(MCEQ) ;
%put NOTE: Macros Called        : _MPRINTTO;
%put NOTE: ;
%put NOTE: Programmed by        : cvn_ahall;
%put NOTE: Creation Date        : 2014-11-06;
%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: 16June14   MJ         1/ Removed SD, corrected rounding,
amended footnote, amended N to n;
%put NOTE: 16June14   MJ         2/ Amended fig name;
%put NOTE: 01Aug2014  AMH        3) Centre Output;
%put NOTE: 01Aug2014  AMH        4) Add where statement to listing;
%put NOTE: 01Aug2014  AMH        5) Ammend Footnotes;
%put NOTE: 01Aug2014  AMH        6) ammend title;
%put NOTE: 01Aug2014  AMH        7) Add additional appendix reference;
%put NOTE: 15SEP2014  APH        8) Move figure and title footnotes
outside of plot;
%put NOTE:                9) Output dataset used in figure to xls
sheet;
%put NOTE: 02OCT2014  APH        10) Add full stop to footnote;

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%put NOTE:
=====;
options notes source source2 nofullstimer validvarname=upcase missing=' '
NOQUOTELENMAX/*turn off warnings about quoted strings to long*/;
ods _all_ close;
ods listing;

%include
"/cvn/projects/prj/development/000000106324/dev/adhoc/TMPLTMIX.sas";

*=====;
* START OF PROGRAM CODE ;
*=====;

*****;
* read in data ;
*****;
/* Calculate totals for products */

data adsl;
    set adam.adsl(where=(fasfl='Y'));
run;

proc sort data=adsl nodupkey out=adsl1;
    by trt01an trt01a subjid sexc;
run;

proc freq data=adsl1(where=(not missing(trt01an))) noprint;
    table trt01an*trt01a/ out =tot(drop=percent rename=(count=total));
run;

data tot2;
    set tot;
    call symput('tot' || compress(put(trt01an,best.)),
compress(total));
run;

proc sort data=adam.adqspa(where=(index(paramcd,'MCEQ') and not
missing(chg) and fasfl='Y')) out=adqspal;
    by paramn usubjid;
run;

/*treatment and timpoint formats to display text rather than numbers for
listing*/

%fmt(datain=adqspal, start=trtan, label=trta, name=trt);
%fmt(datain=adqspal, start=avisitn, label=avisit, name=vis);
%fmt(datain=adqspal, start=sexn, label=sexc, name=sex);
%fmt(datain=adqspal, start=ucpdgrln, label=ucpdgrl, name=con);
%fmt(datain=adqspal, start=paramn, label=param, name=var);

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data adqspa;
    set adqspa1;
    format trtan trt. avisitn vis. paramn var. sexn sex. ucpdgrln con.;
run;

title1 j=1 "PAGESPLIT"; /*do not change*/
title2 j=1 'Variable: #byvall';
title3 j=1 'Proc Mixed Procedure';
TITLE4 J=L "The where clause used on the dataset adam.adqspa: fasfl='Y'";
/* 4) AMH 01Aug2014 */
%let tflno=L_15_04_04_48(MCEQ);

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

proc mixed data=adqspa order=internal;
    by paramn;
    class subjdn sexn ucpdgrln trtan avisitn;
    model chg = base sexn ucpdgrln trtan avisitn trtan*avisitn /
outp=pred;
    repeated avisitn / subject=subjdn type=un;
    lsmeans trtan / pdiff alpha=0.05 cl;
    lsmeans trtan*avisitn / pdiff alpha=0.05 cl;
    ods output lsmeans=lsmeans;
    ods output diffs=diffs(where=( _avisitn=avisitn and trtan=1));
run;

/*residual Plots*/
title3 j=1 'Residual Plots';
TITLE4 J=L "The where clause used on the dataset adam.adqspa: fasfl='Y'";
/* 4) AMH 01Aug2014 */
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;
run;
quit;

%mixout2(blankn=69, halfblnk=N,title=Listing 15.4.4.48 Analysis of
Change from Baseline in MCEQ Questionnaire Subscales - FAS); /* 6) AMH
01Aug2014 */

/*data counts*/

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/*timepoints*/
proc univariate data=adqspa noprint;
  by paramn;
  class trtan avisitn;
  var chg;
  output out=num1 n=n1;
run;
/*overall*/
proc sql;
create table num2 as
select paramn, trtan, count(distinct usubjid) as n1
from adqspa
where not missing(chg)
group by paramn, trtan;
quit;

/*Manipulate datasets for output all relevent stats on each row*/
/* _____ */
data tabout;
  length out $100 stat $100;
  set lsmeans(in=a) diffs(in=b) num1(in=c) num2(in=d);
  /*ordering columns of treatmnents*/
  colord=trtan;
  if _trtan=2 then colord=3;
  /* N row*/
  if c or d then do;
    ord=1;
    stat='n';
    out=compress(put(n1,best.));
    output;
  end;
  /*mean (sd) row*/
  if a or b then do;
    ord=2;
    stat='LS Mean';
    out=compress(put(round(estimate,0.01),8.2));
    if colord>3 then out=compress(out)/*||'
('||compress(put(round(stderr,0.001),8.3))||')'*/;
    output;
  /*95% CI row*/
    ord=3;
    stat='95% CI';
    low=floor(100*lower);/* 1 MJ 16June14 */
    upp=ceil(100*upper);/* 1 MJ 16June14 */
    out=compress(put(low/100,8.2))||',
'||compress(put(upp/100,8.2));/* 1 MJ 16June14 */
  /*      out=compress(put(round(lower,0.01),8.2))||',
'||compress(put(round(upper,0.01),8.2));*/
    output;
  end;
run;

/*Add labels for timepoint labels*/

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/* _____ */
data tabout1;
    attrib avisit length=$100;
    set tabout ;
/* timepoint label*/
avisit=put(avisitn,vis.);
/*overall timepoint label*/
    if missing(avisitn) then do;
        avisitn=0;
        avisit='Overall';
    end;
run;

/*transpose for output*/
proc sort data=tabout1;
    by paramn avisitn ord colord;
run;

proc transpose data=tabout1 out=ttabout(drop=_NAME_) prefix=col;
    by paramn avisitn avisit ord stat;
    id colord;
    var out;
run;

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

%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_48(MCEQ);

/*page numbers*/
data paging;
    set ttabout;
    by paramn avisitn;
    flag=1;
    retain ln 0 page 1;
    if first.avisitn then ln+1;
    if ln>4 then do;
        page+1;
        ln=1;
    end;
    if last.paramn then call symput("tpage",compress(put(page,best.)));
run;

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/* Standard - leave this */
options number nodate orientation=landscape papersize=&p_pgsz missing='
';
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;

%do i=1 %to &tpage;

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

data comp;
    set paging end=eof;
    by paramn avisitn ord;
    where page=&i;
    /* Amend title as needed */
    _firtitl="Table 15.2.4.48 Analysis of Change from Baseline in
MCEQ Questionnaire Subscales - FAS"; /* 5) AMH 01Aug2014 */
    _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;
ods proclabel = ' ';

* 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 split = '#'
spanrows

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%IF &I=1 %THEN %DO; CONTENTS=' ' %END; %ELSE %DO; CONTENTS='' %END;;
    column flag page paramn avisitn avisit ord stat coll-col3 ;
    define flag / order noprint;
    define page      / order order = internal noprint;
    define paramn     / group style={just=left cellwidth=2.5cm}
"Subscales";
    define avisitn    / order order=internal noprint;
    define avisit     / group style={just=left cellwidth=2.1cm} "Time
point";
    define ord        / order order=internal noprint;
    define stat       / display style={just=left cellwidth=2cm}
"Statistic";
    define coll       / display style={just=c/*d*/ cellwidth=2cm}
style(header)={just=center} "THS 2.2#(N=&tot1)";
    define col2       / display style={just=c/*d*/ cellwidth=2cm}
style(header)={just=center} "CC#(N=&tot2)";
    define col3       / display style={just=c/*d*/ cellwidth=2cm}
style(header)={just=center} "THS 2.2-CC"; /* 3) AMH 01Aug2014 */

    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 avisitn;
    line " ";
endcomp;

compute after _page_ / style={just=left protectspecialchars=off
pretext="&linetop."} ; /* 5) AMH 01Aug2014 */
    LINE "Note: CC = Conventional cigarettes; SA = Smoking
abstinence; THS = Tobacco Heating System.";
    line "Note: Adjusted least squares (LS) means and confidence
intervals (CIs) from an ANCOVA model with study arm, sex, CC consumption
reported at screening,";
    line "      day and study arm*day fitted as fixed effect factors
with baseline fitted as a covariate. Day fitted as a repeated factor.
Where baseline is defined as the last ";
    LINE "      assessment prior to Day 1 product use for THS 2.2 and
CC subjects and prior to 06:29 AM on Day 1 for SA subjects.";

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        line "Note: Comparison overall time points is the main
comparison."; /* 1 MJ 16June14 */
        LINE "Note: MCEQ subscales reported on a 7-point scale (1-7).
Higher scores indicate greater intensity on that scale."; /* 10) APH
02OCT2014 */
/*        line "Note: CC = Conventional cigarettes; SA = Smoking
abstinence; THS = Tobacco Heating System.";*/
        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 ;

%outtrtf(blankn=69, halfblnk=N, ref=15.4.4.48 and 15.3.6.13); /* 7) AMH
01Aug2014 */

/*Figure Output*/
/*
_____*/
proc sort data=tabout1(where=(colord>2 and ord=2)) out=fig; by paramn
colord; run;

data figpag;
    set fig;
    by paramn colord;
    /*overall timepoint no series plot*/
    if avisitn ne 0 then series=estimate;
    else avisitn=99.5;
    collab="THS 2.2 - "||trim(left(put(_trtan,trt.)));
    retain page 0;
    if first.paramn then page+1;
    if last.paramn then call symput("tpage",compress(put(page,best.)));
    keep paramn avisitn estimate lower upper page avisit series colord
collab;
run;

/* Ensure ODS listing, html etc is turned off to prevent */
/* temporary or junk image files being produced */
title; footnote;
options notes source source2 nofullstimer validvarname=upcase
        nonumber nodate orientation=portrait papersize=&p_pgsz missing=' ';

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ods graphics on; /* As we are effectively using ODS graphics we need to
ensure that it is turned on */
ods graphics / noborder height=14 cm width=16 cm; /* Removes border
around the image */
ods path reset;
ods exclude all;
/* please include styles template */
%let temp=/cvn/projects/prj/development/000000106324/dev/macro/;
%include "&temp.figtmpl.t.sas";

%let blankn=70;
%macro graph();

%let ref=15.4.4.48 and 15.3.6.13; /* 7) AMH 01Aug2014 */
%let tflno=F_15_01_02_38(MCEQ);

/* treatment column headers and footnotes */

%fmt(datain=figpag, start=avisitn, label=avisit, name=tpoint);
%fmt(datain=figpag, start=colord, label=collab, name=col);

/* 9) APH 15SEP2014 */
PROC SQL;
CREATE TABLE PLOT2 AS
SELECT AVISIT, PUT(AVISITN,VIS.) AS AVISITN, PUT(PARAMN,VAR.) AS PARAMN,
ESTIMATE, LOWER, UPPER
FROM FIGPAG;
QUIT;

PROC EXPORT
DATA=PLOT2
DBMS=XLSX
OUTFILE="/cvn/projects/prj/data/000000106324/TFL/&TFL_Part./&tflno..xlsx"
REPLACE;
SHEET=Sheet1;
RUN;
/* 9) APH 15SEP2014 */

ods rtf toc_data
file="/cvn/projects/prj/data/000000106324/TFL/&TFL_Part./&tflno..rtf"
style=t106324_g startpage=yes headery=1440 footery=1440;

%do i=1 %to &tpage;

data plot;
set figpag end=eof;
where page = &i;
call symput("var",trim(left(put(paramn,var.)))) );
call symput("trt",trim(left(put(trtan,trt.))));
/* Amend title as needed */

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        _firtitl="Figure 15.1.2.38 MCEQ Subscales Change from Baseline
Least Squares Mean Differences and 95% CI - FAS"; /* 5) AMH 01Aug2014
*/
        if eof then do;
            call symput('_FSRTITL', trim(left(_firtitl)));
            end;
        drop _firtitl ;
    run;

proc template;
    define statgraph temp;
        begingraph /;
            /* we can change the alignment of text using halign=, text
attributes can also be set */
/*            entrytitle halign=left "&_FSRTITL." /*;*/
/*            entrytitle " " ;*/ /* 8) APH 15SEP2014 */
            /* textattrs options include size, color, font, weight and
style */
            /* the default text attributes are picked up from the default
rtf styles template */
            /* this can be changed using style= in the ods rtf statement
*/

            entrytitle halign=left "Variable: &var" /*;
                layout overlay /
XAXISOPTS=(label="Timepoint" LINEAROPTS=(TICKVALUEFITPOLICY=rotate
viewmin=99 viewmax=105.5 tickvaluelist=(99.5 101 102 103 104 105)) )
                YAXISOPTS=(label="Least Square Mean
Difference");
            scatterplot x=avisitn y=estimate / group=colord
yerrorlower=lower yerrorupper=upper markerattrs=(color=black) ;
            seriesplot x=avisitn y=series / group=colord
name="series" primary=true display=(markers) markerattrs=(color=black)
lineattrs=(color=black) ;
            referenceline y=0 / lineattrs=(pattern=2);
            discretelegend "series";
        endlayout;
        /* 8) APH 15SEP2014 */
/*            footnotes work using the same option as the entrytitle
statement */ /* 5) AMH 01Aug2014 */
/*            ENTRYFOOTNOTE HALIGN=LEFT "Note: CC = Conventional
cigarettes; THS = Tobacco Heating System."; */
/*            *entryfootnote halign=left "Note: Adjusted least squares (LS)
means and confidence intervals (CIs) from an ANOVA model with study arm,
sex and CC consumption reported at screening as fixed effect factors." /
;*/
/*            entryfootnote halign=left "Note: Adjusted least squares (LS)
means and confidence intervals (CIs) from an ANCOVA model with study arm,
sex, CC consumption reported at screening, day and study arm*day fitted
as fixed effect factors with baseline fitted as a covariate. Day fitted
as a repeated factor." / ;*/
/*            entryfootnote halign=left "Note: CC = Conventional cigarettes;
THS = Tobacco Heating System.";*/

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/* 8) APH 15SEP2014 */

        endgraph;
    end;
run;

/* 8) APH 15SEP2014 */
ods select all;

ods escapechar='^';
/* 8) APH 15SEP2014 */
ODS RTF PREPAGE="^S={outputwidth=100% just=1 font_size=12pt
font_weight=bold background=white foreground=black
font_face=arial}^R/RTF'\QL' Figure 15.1.2.38 MCEQ Subscales Change from
Baseline Least Squares Mean Differences and 95% CI - FAS";

        proc sgrender data=plot template=temp objectlabel=''; /* applies the
above template to the specified data */
        format avisitn tpoint. colord col.;
run;
/* 8) APH 15SEP2014 */
ODS RTF TEXT="^S={outputwidth=100% just=1 font_size=9pt background=white
foreground=black font_face=arial}^R/RTF'\QL' Note: CC = Conventional
cigarettes; THS = Tobacco Heating System.";
ODS RTF TEXT="^S={outputwidth=100% just=1 font_size=9pt background=white
foreground=black font_face=arial}^R/RTF'\QL' Note: Adjusted least squares
(LS) means and confidence intervals (CIs) from an ANCOVA model with study
arm, sex, CC consumption reported at screening, day and study arm*day
fitted as fixed effect factors with baseline fitted as a covariate. Day
fitted as a repeated factor.";
ODS RTF TEXT="^S={outputwidth=100% just=1 font_size=9pt background=white
foreground=black font_face=arial}^R/RTF'\QL' Note: MCEQ subscales
reported on a 7-point scale (1-7). Higher scores indicate greater
intensity on that scale.";
ODS RTF TEXT="^S={outputwidth=100% just=1 font_size=9pt background=white
foreground=black font_face=arial}^R/RTF'\QL' &ref.";
ODS RTF TEXT="^S={outputwidth=100% just=1 font_size=9pt background=white
foreground=black font_face=arial}^R/RTF'\QL' Path: &TFLpath.
(Page &i of &tpage)";
ODS RTF TEXT="^S={outputwidth=100% just=1 font_size=9pt background=white
foreground=black font_face=arial}^R/RTF'\QL' Program Run: &sysdate
&sysuserid   Program Status: &status";

/* 8) APH 15SEP2014 */

%end;
ods markup close;
/*ods rtf close; */
ods path reset;

%mend graph;
%graph;

ods exclude all;

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```
ods _all_ close;
```

```
proc printto ; run;
```

```
*=====;
```

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

```
*=====;
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