

```
/*=====
=====*
```

```
| Covance Study Number   : 000000106343          |
| Program Name           : f_forest_rm.sas        |
| Purpose                 : To create Figure 15.1.2.2      |
| Input Data              : tflds.t_15_02_04_25_01_f      |
| Output Data             : F_15_01_02_02            |
| Macros Called           :                          |
| Originally Performed by :Jyothsna Reddy            |
| Date                    : 28APR2015                |
|                          |                          |
```

```
|=====
=====|
```

```
| Modification History          |
|-----|
```

```
| Modified by                  :                      |
```

```
| Modification Date            :                      |
```

```
| Modification Description     :                      |
```

```
+=====
=====*/
```

```
options notes source source2 nofullstimer validvarname=upcase missing=' ';
```

```
ods _all_ close;
```

```
ods listing;
```

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

```

* START OF PROGRAM CODE                                ;

*=====;

%m_printto;

%let tflno=F_15_01_02_02;

/* 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 &tflpath;

options notes source source2 nofullstimer validvarname=upcase

nonumber nodate orientation=portrait missing=' ';

ods graphics on; /* As we are effectively using ODS graphics we need to ensure that it is turned on */

ods graphics / height=12cm width=16cm noborder; /* Removes border around the image */

ods path reset;

/* please include styles template */

```

```
%include "/cvn/projects/prj/development/000000106343/dev/figures/figtmplt.sas";
```

```
ods rtf toc_data file="/cvn/projects/prj/data/000000106343/TFL/dev/Tables/&tflno..rtf"  
style=t106343_g2 startpage=yes headery=1440 footery=1440 ;
```

```
ods exclude all;
```

```
proc sort data=tflds.t_15_02_04_25_01_f out=forest;
```

```
by paramn avisitn;
```

```
where paramcd ne " ";
```

```
run;
```

```
data forest1;
```

```
set forest ;
```

```
if DIFFTYP="THSm2.2vs.mCC" then difftyp="THSm2.2 vs. mCC";
```

```
else difftyp="THSm2.2 vs. SA";
```

```
if difftyp="THSm2.2 vs. mCC" then do;
```

```
if avisitn=105 then par=1;
```

```
else if avisitn=106 then par=1;
```

```
else if avisitn=130 then par=2;
```

```
else if avisitn=160 then par=3;
```

```
else if avisitn=190 then par=4;
```

```
else if avisitn=191 then par=4;
```

```
end;
```

```
else do;

  if avisitn=105 then par=5;

  else if avisitn=106 then par=5;

  else if avisitn=130 then par=6;

  else if avisitn=160 then par=7;

  else if avisitn=190 then par=8;

  else if avisitn=191 then par=8;

end;

run;
```

```
proc sort data=forest1;

  by par PARAMN;

run;
```

```
PROC SQL;

CREATE TABLE forest1_xls AS

SELECT PARAM, DIFFTYP, AVISIT, DIFF, LCLM, UCLM

FROM forest1;

QUIT;

/**/

PROC EXPORT DATA=forest1_xls DBMS=XLSX

OUTFILE="/cvn/projects/prj/data/000000106343/TFL/dev/Tables/&tflno..xlsx" REPLACE;

SHEET=Sheet1;

proc summary data=forest1;

  by par;
```

```

var uclm;

output out =axis1 max=max1;

run;

proc summary data=forest1;

    by par;

    var lclm;

    output out =axis2(drop=_type_ _freq_) min=min1;

run;

```

```

data maxaxis1;

    merge axis1 axis2;

    by par;

    max2=(ceil(max1));

    min2=(floor(min1));

    /*Use mod 2 to ensure axis limit is an even number so the increment can be 2*/

    if mod(max2,2)=0 then max3=max2;

    else if mod(max2,2)=1 then max3=max2+1;

    if max3<100 then max3=150;

    if min2>0 then do;

        if mod(min2,2)=0 then min3=min2;

        else if mod(min2,2)=1 then min3=min2-1;

        end;

        else min3=0;

        min=put(min3,best.);

```

```
max=put(max3,best.);  
keep par max min;  
run;
```

```
data forest_;  
merge forest1 maxaxis1;  
by par;  
run;
```

```
data forest_;  
set forest_end=last;  
page = 1;  
par1=put(par,best.);  
if last then call symput("maxpage", par1);  
run;  
%put &maxpage;
```

```
data dforest1_;  
format lcl3 Ucl3 LSMEAN comma6.2 ;  
length trtname $20;  
set forest_;  
col1="^ "; col2="^ ";  
col3="^ "; col4="^ ";  
  
lcl3=lclm;
```

ucl3=uclm;

lsmean=diff;

trt=difftyp;

if paramn=1001 then newword=1;

if paramn=1002 then newword=2;

if paramn=1015 then newword=3;

if paramn=1026 then newword=4;

if paramn=2012 then newword=5;

if paramn=2013 then newword=6;

if paramn=2021 then newword=7;

if paramn=2022 then newword=8;

if paramn=2023 then newword=9;

if paramn=2027 then newword=10;

if paramn=2028 then newword=11;

if paramn=2104 then newword=12;

if paramn=2105 then newword=13;

if paramn=2107 then newword=14;

if paramn=2109 then newword=15;

if paramn=2111 then newword=16;

if paramn=2113 then newword=17;

if paramn=2008 then newword=18;

if paramn=2020 then newword=19;

if paramn=2024 then newword=20;

if paramn=2025 then newword=21;

if paramn=2026 then newword=22;

if paramn=2115 then newword=23;

if paramn=3073 then newword=24;

if paramn=3076 then newword=25;

if difftyp="THSm2.2 vs. mCC" and lsmean gt 150 then newpar="*" | strip(param);

else if difftyp ne "THSm2.2 vs. mCC" and lsmean gt 200 then newpar="*" | strip(param);

else newpar=strip(param);

drop param;

rename newpar=param;

if avisitn in (105 106) then avisit="Day 5";

if avisitn in (190 191) then avisit="Day 90";

if difftyp="THSm2.2 vs. mCC" then subord=0.1;

else subord=0.2;

if difftyp="THSm2.2 vs. mCC" then trtfl=1;

else trtfl=2;

if logf=0 then do;

if difftyp="THSm2.2 vs. mCC" then trtname="THSm2.2-mCC";

else trtname="THSm2.2-SA";

end;

else do;

if difftyp="THSm2.2 vs. mCC" then trtname="THSm2.2/mCC(%)";


```
else trtname="THSm2.2/SA(%)";
```

```
end;
```

```
neword2=neword+subord;
```

```
run;
```

```
proc sort data=dforest1_;
```

```
  by neword descending trt;
```

```
  where avisitn ne . ;
```

```
run;
```

```
proc sort data=dforest1_ out=pg nodupkey;;
```

```
  by neword descending trt;
```

```
  where avisitn ne . ;
```

```
run;
```

```
data pg1(keep= trt neword pg);
```

```
  set pg;
```

```
  pg=put(_n_,6.);
```

```
run;
```

```
data dforest1_;
```

```
  merge dforest1_ pg1;
```

```
  by neword descending trt;
```

```
run;
```

```
proc sort data=dforest1_;
```

```
  by newword2 PARAMN avisitn trt;
```

```
  where avisitn ne . ;
```

```
run;
```

```
%macro graph;
```

```
%do i=1 %to 25;
```

```
%do j=1 %to 2;
```

```
proc sort data=dforest1_ out=dforest1;
```

```
  by newword2 PARAMN avisitn trt logf ;
```

```
  where newword=&i and trtfl=&j;
```

```
run;
```

```
data dforest1;
```

```
  set dforest1;
```

```
  order=_n_;
```

```
  paramn=order;
```

```
  test=0;
```

```
  if difftyp="THSm2.2 vs. mCC" and ucl3 gt 150 then newpar="*" | strip(avisit);
```

```
  else if difftyp ne "THSm2.2 vs. mCC" and lsmean gt 150 then newpar="*" | strip(avisit);
```

```
  Param1=compbl(param);
```

```
call symput("pg",pg);
```

```
call symput("label1",trtname);
```

```
call symput("label2",avisit);
```

```
call symput("label3",param1);
```

```
logf1=put(logf,8.);
```

```
call symput("logf",logf1);
```

```
mrange=strip(put(lsmear,6.2)||' ('||put(lcl3,6.2)||', '||put(uc13,6.2)||')');
```

```
order1=put(order,8.);
```

```
run;
```

```
data _null_;
```

```
set dforest1 end=last;
```

```
if _n_=1 then call execute("proc format; value fmtcat_");
```

```
call execute(compress(put(order,8.))||'='||strip(avisit)||'');
```

```
if last then call execute("; run;");
```

```
if last then call symput("ymax",order1);
```

```
run;
```

```
proc summary data=dforest1;
```

```
by trtfl;
```

```
var uclm;
```

```
output out =axis1 max=max1;
```

```
run;
```

```
proc summary data=dforest1;
```

```
by trtfl;
```

```
var lclm;
```

```
output out =axis2(drop=_type__freq_) min=min1;
```

```
run;
```

```
data maxaxis1;
```

```
merge axis1 axis2;
```

```
by trtfl;
```

```
max2=(ceil(max1));
```

```
min2=(floor(min1));
```

```
/*Use mod 2 to ensure axis limit is an even number so the increment can be 2*/
```

```
if mod(max2,2)=0 then max3=max2;
```

```
else if mod(max2,2)=1 then max3=max2+1;
```

```
if min2>0 then do;
```

```
if mod(min2,2)=0 then min3=min2;
```

```
else if mod(min2,2)=1 then min3=min2-1;
```

```
end;
```

```
else min3=min2;
```

```
minval=min3;
```

```
maxval=max3;
```

```
incr=max(abs(minval),abs(maxval));
```

```
if minval lt 0 then min=-1*incr;
```

```
else min=maxval-2*incr;
```

```
if maxval lt 0 then max=-1*incr;
```

```
else max=incr;
```

```
if -1.5 le minval le 1.5 or -1.5 le maxval le 1.5 then do;
```

```
    max=1; min=-1; incr=1;
```

```
end;
```

```
%if ( &i=2) %then %do;
```

```
    max=10; min=-10; incr=10;
```

```
%end;
```

```
%if &i=12 or &i=3 %then %do;
```

```
    max=3; min=-3; incr=3;
```

```
%end;
```

```
%if &i=4 %then %do;
```

```
    max=24; min=-24; incr=24;
```

```
%end;
```

```
%if &i=5 %then %do;
```

```
    max=56; min=-56; incr=56;
```

```
%end;
```

```
%if &i=6 %then %do;  
    max=22; min=-22; incr=22;  
%end;
```

```
%if ( &i=13) %then %do;  
    max=2; min=-2; incr=2;  
%end;
```

```
%if &i=15 %then %do;  
    max=0.2; min=-0.2; incr=0.2;  
%end;
```

```
%if &i=16 %then %do;  
    max=0.1; min=-0.1; incr=0.1;  
%end;
```

```
%if &i=17 %then %do;  
    max=0.05; min=-0.05; incr=0.05;  
%end;
```

```
%if &i=18 %then %do;  
    max=120; min=80; incr=20;  
%end;
```

```
%if &i=1 or &i=8 %then %do;
```

```
    max=8; min=-8; incr=8;
```

```
%end;
```

```
%if &i=19 %then %do;
```

```
    max=225; min=-25; incr=125;
```

```
%end;
```

```
%if &i=21 or &i=22 or &i=23 or &i=24 %then %do;
```

```
    max=120; min=80; incr=20;
```

```
%end;
```

```
%if &i=20 %then %do;
```

```
    max=125; min=75; incr=25;
```

```
%end;
```

```
%if &i=24 %then %do;
```

```
    max=130; min=70; incr=30;
```

```
%end;
```

```
%if &i=9 %then %do;
```

```
    max=20; min=-20; incr=20;
```

```
%end;
```

```
%if &i=25 %then %do;
```

```
    max=240; min=-40; incr=140;
```

```
%end;
```

```
%if &i=10 %then %do;  
    max=20; min=-20; incr=20;  
%end;
```

```
    %if &i=11 %then %do;  
        max=15; min=-15; incr=15;  
    %end;
```

```
incr1=put(incr,best.);  
max1_=put(max,best.);  
min1_=put(min,best.);
```

```
    keep max1_ min1_ incr1;  
run;
```

```
data _null_;  
set maxaxis1;  
call symput("min",strip(min1_));  
call symput("max",strip(max1_));  
call symput("incr",strip(incr1));  
run;
```

```
proc template;  
    define statgraph Forest11;  
        begingraph;
```



```
layout lattice / columns=3 columnweights=(0.15 0.35 0.5) ;
```

```
drawline x1=0 y1=9.8 y2=9.8 x2=120/lineattrs=(thickness=1) x1space=layoutpercent  
y1space=layoutpercent
```

```
x2space=layoutpercent y2space=layoutpercent ;
```

```
drawline x1=0 y1=90 y2=90 x2=120 /lineattrs=(thickness=1) x1space=layoutpercent  
y1space=layoutpercent
```

```
x2space=layoutpercent y2space=layoutpercent;
```

```
/*--Column headers--*/
```

```
sidebar / align=top;
```

```
layout lattice / columns=3 columnweights=(0.15 0.35 0.5) ;
```

```
entry textattrs=(size=9 weight=bold) halign=center "Visit";
```

```
    %if &i lt 16 %then %do;
```

```
        entry textattrs=(size=9 weight=bold) halign=center "LS Mean Difference (95% CI)";
```

```
    %end;
```

```
    %else %do;
```

```
        entry textattrs=(size=9 weight=bold) halign=center "Geometric LS Mean Ratio (95%  
CI)";
```

```
    %end;
```

```
entry textattrs=(size=9 weight=bold) halign=center "&label3.";
```

```
endlayout;
```

```
endsidebar;
```

```
/*--Second & third column showing Count and percent--*/
```

```

layout overlay / walldisplay=none

    xaxisopts=(display=none offsetmin=0 offsetmax=0 )

    y2axisopts=(reverse=true display=(tickvalues) type=linear offsetmin=0.06 offsetmax=0.06

    linearopts=(tickvalueformat=fmtcat_ tickvaluesequence=(start=1 end=&ymax increment=1))
tickvalueattrs=(size=9)) ;

scatterplot y=order x=col1 / yaxis=y2 markerattrs=(size=0) ;

;

endlayout;

```

/*--Second column showing Count and percent--*/

```

layout overlay / walldisplay=none

    xaxisopts=(display=(tickvalues) tickvalueattrs=(size=9) )

    y2axisopts=(reverse=true display=none type=linear offsetmin=0.07 offsetmax=0.07) ;

scatterplot y=order x=col1 / markercharacter=mrangle yaxis=y2 datalabelattrs=(size=9)

    markercharacterattrs=graphvaluetext(size=9);

endlayout;

```

/*--Forth column showing hazard ratio graph--*/

```

layout overlay / walldisplay=none

    xaxisopts=( display=(ticks tickvalues)

%if &logf=0 %then %do;

    linearopts=(tickvaluesequence=(start=&min end=&max increment=&incr) tickdisplaylist=("&min"
"0" "&max") viewmin=&min viewmax=&max )

%end;

%else %do;

```

```
linearopts=(tickvaluesequence=(start=&min end=&max increment=&incr) tickdisplaylist("&min"  
"100" "&max")) viewmin=&min viewmax=&max)
```

```
%end;
```

```
tickstyle=inside tickvalueattrs=(size=9) )
```

```
yaxisopts=(reverse=true display=none offsetmin=0.08 offsetmax=0.08) ;
```

```
%if &logf=0 %then %do;
```

```
referenceline x=0 / lineattrs=(pattern=solid);
```

```
%end;
```

```
%else %do;
```

```
referenceline x=100 / lineattrs=(pattern=solid);
```

```
%end;
```

```
%if &j=1 %then %do;
```

```
highlowplot y=order low=lcl3 high=Ucl3/name="hlp" lineattrs=(color=red);
```

```
entry halign=left " "
```

```
halign=center textattrs=(size=8 weight=bold) "&label1." / location=outside valign=bottom ;
```

```
entry halign=left " "
```

```
halign=center " " / location=outside valign=top ;
```

```
scatterplot y=order x=LSMEAN / name="pred" markerattrs=(size=9 symbol=squarefilled  
color=red);
```

```
%end;
```

```

%else %do;

    highlowplot y=order low=lcl3 high=Ucl3/name="hlp" lineattrs=(color=green);

    entry halign=left " "

        halign=center textattrs=(size=8 weight=bold) "&label1." / location=outside valign=bottom ;

    entry halign=left " "

        halign=center " " / location=outside valign=top ;

        scatterplot y=order x=LSMEAN / name="pred" markerattrs=(size=9 symbol=trianglefilled
color=green);

%end;

endlayout;

endlayout;

endgraph;

end;

run;

ods select all;

ods rtf style=t106343_g2;

ods escapechar='^';

ODS RTF PREPAGE="^S={outputwidth=100% just=l font_size=12pt font_weight=bold background=white
foreground=black font_face=arial}^R/RTF'\QL' Figure 15.1.2.2 Forest Plot of Statistical Analysis of Risk
Markers - PP Set";

proc sort data=dforest1;

    by avisitn logf paramn ;

```

```
run;
```

```
** proc template for the appearance of the plot **;
```

```
proc sgrender data=dforest1 template=Forest11;
```

```
run;
```

```
%if &i=25 and &j=2 %then %do;
```

```
ODS RTF TEXT="{outputwidth=100% just=l font_size=9pt background=white foreground=black  
font_face=arial}^R/RTF'\QL' Ratio is displayed for C Reactive Protein (mg/L), Fibrinogen (mg/dL), Glucose  
(mg/dL), Homocysteine";
```

```
ODS RTF TEXT="{outputwidth=100% just=l font_size=9pt background=white foreground=black  
font_face=arial}^R/RTF'\QL' (umol/L), Intercellular Adhesion Molecule 1 (ng/mL), Platelets (GI/L),  
Prostaglandin F2 Alpha (pg/mg creat)";
```

```
ODS RTF TEXT="{outputwidth=100% just=l font_size=9pt background=white foreground=black  
font_face=arial}^R/RTF'\QL' and 11-Dehydro-Thromboxane B2 (pg/mg creat). All other risk markers are  
presented using difference.";
```

```
ODS RTF TEXT="{outputwidth=100% just=l font_size=9pt background=white foreground=black  
font_face=arial}^R/RTF'\QL'";
```

```
%end;
```

```
ODS RTF TEXT="{outputwidth=100% just=l font_size=9pt background=white foreground=black  
font_face=arial}^R/RTF'\QL' Note: mCC = Menthol conventional cigarettes; SA = Smoking abstinence;  
THSm2.2 = Tobacco Heating System 2.2 Menthol.";
```

```
ODS RTF TEXT="{outputwidth=100% just=l font_size=9pt background=white foreground=black  
font_face=arial}^R/RTF'\QL' ";
```

```
ODS RTF TEXT="{outputwidth=100% just=l font_size=9pt background=white foreground=black  
font_face=arial}^R/RTF'\QL' Appendix 15.2.4.25.1";
```

```
%let pg=&pg;
```

```
ODS RTF TEXT="^S={outputwidth=100% just=l font_size=9pt background=white foreground=black  
font_face=arial}^R/RTF\QL' Study ID:ZRHM-REXA-08-US Program: f_forest_rm.sas &sysdate Status:  
&status. (Page &pg of 50)";
```

```
ods markup close;
```

```
ods path reset;
```

```
%end;
```

```
%end;
```

```
%mend;
```

```
%graph;
```

```
%m_logchk;
```

```
ods exclude all;
```

```
ods _all_ close;
```