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*****;
* Project          : ZRHM-REXA-07-JP
*
* Program name     : T150204450201_ZRHM-REXA-07_V1.sas
*
* Author          : L. Yan
*
* Date created     : 05/20/2015
*
* Purpose         : Table T150204450201
*
* Revision History :
*
* Date           Author      Ref      Revision (Date in YYYYMMDD format)
*
*****;

%let prgname=T150204450201_ZRHM_REXA_07_JP_V1;
options mprint;

options sasautos=("W:\pmp07\macros" sasautos) notes;
%init(delivery=9);

%titlecsv(prgname=&prgname., version=5);

%put &title1;
%put &title2;
%put &APPENDIX;
%put &endpoint;
%put &outname.;
%put &repversion.;

options missing="";

%macro cal_sumary_pvalue(wher=, outnum=, method=, used=, var=, in=, pflg=, paramcd=, avisit=);
title2 h=10pt j=1 "&used";

proc sort data=&in. out=anadt_&outnum.;
by usubjid;
where &wher. ;
run;

proc sort data=anadt_&outnum.;
by trtcd;
run;

%if &method = 1 %then %do;
title3 h=10pt j=1 "Paramcd: &paramcd, &avisit. Model: Mixed, Method: Log";

proc means data = anadt_&outnum. noprint;
by trtcd;
var &var.;
output out=xlab_&outnum. n=n mean=mean median=med std=sd min=min max=max q1=q1 q3=q3 lclm=lclm uclm=uclm;
run;
%end;

%if &method = 2 %then %do;
title3 h=10pt j=1 "Paramcd: &paramcd, &avisit. Model: Mixed, Method: Normal";

proc means data = anadt_&outnum. noprint;
by trtcd;
var aval;
output out=xlab_&outnum. n=n mean=mean median=med std=sd min=min max=max q1=q1 q3=q3 lclm=lclm uclm=uclm;
run;
%end;

data xlab_&outnum.;
set xlab_&outnum.;
n1 = trim(left(compress(put(n, 8.))));
if sd > . then mean1 = (trim(left(compress(put(mean, 8.1))))||' ( '||trim(left(compress(put(ceil(sd*100)/100, 8.2))))||')');
else mean1 = (trim(left(compress(put(mean, 8.1))))||' (NA)');
ci1=trim(left(compress(put(floor(lclm*100)/100, 8.2))))||', '||trim(left(compress(put(ceil(uclm*100)/100, 8.2)))));
median1 = trim(left(compress(put(med, 8.1)))));
q1q3 = trim(left(compress(put(q1, 8.2))))||', '||trim(left(compress(put(q3, 8.2)))));
min1 = trim(left(compress(put(min, 8.))))||', '||trim(left(compress(put(max, 8.0)))));

run;

/*
proc mixed data=anadt_&outnum.;

Class trtcd sex UCPDGR1;

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Model logaval = logbase sex UCPDGR1 trtcd / outp=pred;

lsmeans trtcd / pdiff =control('mCC') alpha=0.05 cl;

ods output lsmeans=lsmeans_&outnum. (keep=trtcd lower upper estimate); *each arm;

ods output diffs=LSMeanDiffCL&outnum. (keep=trtcd lower upper probt estimate); * lsmean and C.I. for ratios;

ods output covparms=ROOTMSE&outnum.(rename=(estimate=mse)); *MSE;

run;
*/

proc mixed data=anadt_&outnum.;
class trtp sex UCPDGR1;

%if &method = 1 %then %do;
model logaval = logbase sex UCPDGR1 trtp/ outp=pred;
%end;
%if &method = 2 %then %do;
model aval = base sex UCPDGR1 trtp/ outp=pred;
%end;
lsmeans trtp / pdiff =control('mCC') alpha=0.05 cl;
lsmeans trtp / pdiff =control('SA') alpha=0.05 cl;
ods output lsmeans=lsmeans_&outnum. (keep=trtp lower upper estimate); *each arm;
ods output diffs=LSMeanDiffCL&outnum. (keep=_trtp trtp lower upper probt estimate where=(TRTP="THSm2.2")); * lsmean and
C.I. for ratios;
ods output covparms=estimate&outnum.(rename=(estimate=rootmse)); *MSE;
run;
ods output close;

data pval&outnum.;
set LSMeanDiffCL&outnum.;
ProbtDiff=probt;
keep trtp ProbtDiff;
run;

data lsmeans_&outnum.;
set lsmeans_&outnum.;
lowercl=lower;
uppercl=upper;
lsmean=estimate;
keep trtp lowercl uppercl lsmean;
run;

data LSMeanDiffCL&outnum.;
set LSMeanDiffCL&outnum.;
lowercl=lower;
uppercl=upper;
difference=estimate;
keep trtp _trtp lowercl uppercl difference;
run;

data lsmeans_&outnum.;
set lsmeans_&outnum.;
if TRTP="THSm2.2" then trtcd=1;
else if TRTP="mCC" then trtcd=2;
else if TRTP="SA" then trtcd=3;

%if &method = 1 %then %do;
Estimate1 = exp(lsmean); /* Ratio of geometric mean */
LowerCL = exp(lowercl); /* 95% CI lower bound */
UpperCL = exp(uppercl); /* 95% CI upper bound */
%end;
%if &method = 2 %then %do;
Estimate1 = lsmean; /* Ratio of geometric mean */
LowerCL = lowercl; /* 95% CI lower bound */
UpperCL = uppercl; /* 95% CI upper bound */
%end;

run;

data ROOTMSE&outnum.;
set estimate&outnum.;
*CVperc=100*sqrt(exp(rootmse**2)-1);
cvperc=100*sqrt(exp(rootmse)-1);
run;

proc sort data=lsmeans_&outnum. nodupkey;
by trtcd;
run;

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data lsmeans_&outnum.;
length geomean geoci $100;
set lsmeans_&outnum.;
geomean=strip(put(ESTIMATE1, 8.2));
geoci=strip(put(floor(LowerCL*100)/100, 8.2)||", "||strip(put(ceil(UpperCL*100)/100, 8.2)));

keep trtcd geomean geoci;
run;

proc sort data=LSMeanDiffCL&outnum. nodup;
by TRTP _TRTP;
run;

data LSMeanDiffCL&outnum.;
set LSMeanDiffCL&outnum.;
myord=1;
run;

data ROOTMSE&outnum.;
set ROOTMSE&outnum.;
myord=1;
run;

data LSMeanDiffCL&outnum.;
merge LSMeanDiffCL&outnum. ROOTMSE&outnum.;
by myord;
run;

data LSMeanDiffCL&outnum.;
length geomean geoci $100;
set LSMeanDiffCL&outnum.;
if _TRTP eq "mCC" then trtcd=4;
if _TRTP eq "SA" then trtcd=5;

%if &method = 1 %then %do;

    difference = 100*exp(difference); /* Ratio of geometric mean */
    lowercl = 100*exp(lowercl); /* 95% CI lower bound */
    uppercl = 100*exp(uppercl); /* 95% CI upper bound */
%end;

%if &method = 2 %then %do;

    difference =difference; /* Ratio of geometric mean */
    lowercl = lowercl; /* 95% CI lower bound */
    uppercl = uppercl; /* 95% CI upper bound */
%end;

%if &method = 1 %then %do;
geomean=strip(put(round(difference, 0.01), 8.2))||" ("||strip(put(ceil(CVperc*100)/100, 8.2)) ||")";
%end;
%if &method = 2 %then %do;
geomean=strip(put(round(difference, 0.01), 8.2))/"|" ("||strip(put(CVperc, 8.1)) ||")"/";
%end;

geoci=strip(put(floor(lowercl*100)/100, 8.2))||", "||strip(put(ceil(uppercl*100)/100, 8.2)));
keep trtcd geomean geoci difference;
run;

data pval&outnum.;
set pval&outnum.;
if _n_=1;
trtcd=4;
keep trtcd ProbtDiff;
format ProbtDiff PVALUE6.3;
run;

proc sort data=LSMeanDiffCL&outnum.;
by trtcd;
run;

data LSMeanDiffCL&outnum.;
merge LSMeanDiffCL&outnum. pval&outnum.;
by trtcd;
run;

data LSMeanDiffCL&outnum.;
set LSMeanDiffCL&outnum.;
%if &method = 1 %then %do;
if (difference < 100) then ProbtDiff=ProbtDiff/2;
else ProbtDiff=1-ProbtDiff/2;
%end;
%if &method = 2 %then %do;
if (difference < 0) then ProbtDiff=ProbtDiff/2;
else ProbtDiff=1-ProbtDiff/2;
%end;
run;

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data mrep_&outnum.;
set lsmeans_&outnum. LSMeanDiffCL&outnum.;
run;

proc sort data=mrep_&outnum.;
by trtcd;
run;

proc sort data=xlab_&outnum.;
by trtcd;
run;

data xlab_&outnum.;
merge xlab_&outnum.(in=a) mrep_&outnum.;
by trtcd;
run;

data xlab_&outnum.;
set xlab_&outnum.;
if geoci ne "";
run;

proc transpose data = xlab_&outnum. out=xlab_1_&outnum.;
id trtcd;
var n1 geomean geoci ProbtDiff;
run;

data rep_&outnum.;
length _name_ _1 _2 _3 ord1 $100;
set xlab_1_&outnum.;
ord1=&outnum.;
ordnum=input(ord1, best.);
if upcase(_name_)="N1" then do; _name_="n"; sord=0; end;
%if &method = 1 %then %do;
if upcase(_name_)="GEOMEAN" then do; _name_="Geometric LS Mean (CV%)"; sord=1; end;
if upcase(_name_)="GEOCI" then do; _name_="95% CI of Geometric Mean"; sord=2; end;
if upcase(_name_)="CI1" then do; _name_="95% CI of Mean"; sord=4; end;
%end;
%if &method = 2 %then %do;
if upcase(_name_)="GEOMEAN" then do; _name_="LS Mean"; sord=1; end;
if upcase(_name_)="GEOCI" then do; _name_="95% CI"; sord=2; end;
if upcase(_name_)="CI1" then do; _name_="95% CI"; sord=4; end;
%end;

if upcase(_name_)="MEAN1" then do; _name_="Mean (SD)"; sord=3; end;
if upcase(_name_)="MEDIAN1" then do; _name_="Median"; sord=5; end;
if upcase(_name_)="Q1Q3" then do; _name_="Q25, Q75"; sord=6; end;
if upcase(_name_)="MIN1" then do; _name_="Min, Max"; sord=7; end;
if upcase(_name_)="PROBTDIFF" then do; _name_="p-value (one-sided)"; sord=9; end;
run;

data rep;
set rep rep_&outnum.;
run;

%mend;

%macro mainloop(where1=, outn=, where=);

proc sort data=adam.adsl out=trt;
by usubjid;
where fasfl="Y";
run;

data trt;
set trt;
if TRT01A="THSm2.2" then trtcd=1;
else if TRT01A="mCC" then trtcd=2;
else if TRT01A="SA" then trtcd=3;
run;

/*
"ADQSSU.PARAMCD in ("QSUFAC1", "QSUFAC2", "QSUFAC3", "QSUFAC4", "QSUFAC5", "QSUFAC6", "QSUFAC7", "QSUFAC8", "QSUFAC9", "QSUFAC10", "QSUFAC11", "QSUFAC12", "QSUFAC13", "QSUFAC14", "QSUFAC15", "QSUFAC16", "QSUFAC17", "QSUFAC18", "QSUFAC19", "QSUFAC20", "QSUFAC21", "QSUFAC22", "QSUFAC23", "QSUFAC24", "QSUFAC25", "QSUFAC26", "QSUFAC27", "QSUFAC28", "QSUFAC29", "QSUFAC30", "QSUFAC31", "QSUFAC32", "QSUFAC33", "QSUFAC34", "QSUFAC35", "QSUFAC36", "QSUFAC37", "QSUFAC38", "QSUFAC39", "QSUFAC40", "QSUFAC41", "QSUFAC42", "QSUFAC43", "QSUFAC44", "QSUFAC45", "QSUFAC46", "QSUFAC47", "QSUFAC48", "QSUFAC49", "QSUFAC50", "QSUFAC51", "QSUFAC52", "QSUFAC53", "QSUFAC54", "QSUFAC55", "QSUFAC56", "QSUFAC57", "QSUFAC58", "QSUFAC59", "QSUFAC60", "QSUFAC61", "QSUFAC62", "QSUFAC63", "QSUFAC64", "QSUFAC65", "QSUFAC66", "QSUFAC67", "QSUFAC68", "QSUFAC69", "QSUFAC70", "QSUFAC71", "QSUFAC72", "QSUFAC73", "QSUFAC74", "QSUFAC75", "QSUFAC76", "QSUFAC77", "QSUFAC78", "QSUFAC79", "QSUFAC80", "QSUFAC81", "QSUFAC82", "QSUFAC83", "QSUFAC84", "QSUFAC85", "QSUFAC86", "QSUFAC87", "QSUFAC88", "QSUFAC89", "QSUFAC90", "QSUFAC91", "QSUFAC92", "QSUFAC93", "QSUFAC94", "QSUFAC95", "QSUFAC96", "QSUFAC97", "QSUFAC98", "QSUFAC99", "QSUFAC100");
- AVISITN > 100
- PPROTxFL eq "Y" depending on different analysis periods"
*/

data indata1;
length group $4;
set adam.ADBX;
group="A";
paramn=paramn+100;
used="The where clause used on the dataset adam.ADBX: FASFL=Y and ANL02FL=Y and anl03fl=Y";

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if PARAMCD in ("CYP2A6") and avisitn in (106, 190) and ANL02FL="Y" and fasfl="Y" and anl03fl="Y";
drop DTYPE ATPT;
run;

data anldata1;
set indata1;
if paramcd in ("CYP2A6") then method=1;
if aval>0 then logaval=log(aval);
if base>0 then logbase=log(base);
run;

proc sort data=anldata1 out=fmt(keep=paramn param) nodupkey;
by paramn param;
run;

proc sort data=anldata1 out=check(keep=method paramcd) nodupkey;
by method paramcd;
run;

data anldata1;
set anldata1;
if &where.;
run;

proc sort data=anldata1 out=check(keep=paramn avisitn avisit method used param paramcd) nodupkey;
by paramn avisitn avisit method;
where &where1.;
run;

data trt_1;
set trt;
run;

data anldata1;
set anldata1;
if TRTP="THSm2.2" then trtcd=1;
else if TRTP="mCC" then trtcd=2;
else if TRTP="SA" then trtcd=3;
run;

data check;
set check;
ord=_n_;
run;

%*cal_summary_pvalue(where=1, outnum=1, var=aval, in=anldata1, pflg=1);

data rep;
run;

data _null_;
set check;
call execute ('%cal_summary_pvalue(where=%str(avisitn='||avisitn||' and paramn='||paramn||' ), outnum='||ord||', met
hod='||method||', used='||used||', var=logaval, in=anldata1, paramcd='||paramcd||', avisit='||avisit||');');
run;

data frep;
set rep;
ord=ORDNUM;
run;

data frep;
merge frep(in=a) check;
by ord;
if a;
if avisitn>.;
run;

proc sort data=trt_1 nodupkey;
by trtcd usubjid;
run;

proc freq data = trt_1 noprint;
tables trtcd/ out= denom;
run;

data _null_;
set denom end=eof;

retain total 0;

total = total+count;

if trtcd= 1 then do;
call symput('trt1', trim(left(put(count,8)))));

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end;
if trtcd= 2 then do;
  call symput('trt2', trim(left(put(count,8)))));
end;
if trtcd= 3 then do;
  call symput('trt3', trim(left(put(count,8)))));
end;
run;

%put trt1=&trt1 trt2=&trt2 trt3=&trt3;

%macro cal_part_main();

data frep;
set frep;
avisit=propcase(avisit);

if AVISIT="Day 0" then avisit="Baseline";

  %do i = 1 %to 100;
    if (&i-1)*3<ordnum<=&i*3 then pagen=&i;
  %end;

run;

%mend;

%cal_part_main();
data frep&outn.;
set frep;
if avisit="Day 6/Discharge Confinement" then avisit="Day 5";
space="";
*if _name_="p-value (one-sided)" then delete;
run;

%mend;

%trtrtfg(pgmname=&loutname., pgmid=1, new=0, style=, bookmark=%lowcase(&outname.));

title1 bold j=1 "&title1 &title2";
*footnote1 j=1 h=9pt "Study ID:ZRHM-REXA-07-JP          Program: &fprgname..sas          Status: &repversion./&fdate.";

%mainloop(where1=%str(method=1), outn=2, where=%str((avisitn<=106 and fasfl="Y") or
(avisitn=130 and fasfl="Y") or (avisitn=160 and fasfl="Y") or (avisitn in (190, 191) and fasfl="Y") ));

ods listing;
ods rtf close;

%*mainloop(flg=fasfl, outn=2, where=%str(avisitn=130 and APUPER=2));
%*mainloop(flg=fasfl, outn=3, where=%str(avisitn=160 and APUPER=3));
%*mainloop(flg=fasfl, outn=4, where=%str(avisitn in (190, 191) and APUPER=4));

data odata.&prgname.;
set frep2 (in=b) /*frep3 (in=c) frep4 (in=d)*/;
*if a then group="fasfl";
*if b then group="fasfl";
*if c then group="fasfl";
*if d then group="fasfl";
run;

data pvalueday5;
set frep2;
if avisit="Day 5" and _name_="p-value (one-sided)";
keep paramcd _4;
run;

data pvalueday5;
set pvalueday5;
pvlueday5 =input(compress(_4), best.);
drop _4;
run;

data frep2;
merge frep2(in=a) pvalueday5;
by paramcd;
if a;
run;

data frep2;
set frep2;

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if avisit ne "Day 5" and pvlueday5>0.05 and _name_="p-value (one-sided)" then delete;
run;
/*
proc sort data=anldata1 out=fmt(keep=paramn param) nodupkey;
by paramn param;
run;
*/

data fmt;
set fmt;
fmtname="grp";
start=paramn;
label="Parameter: "||strip(param);
run;

proc format cntlin=fmt;
run;

%global totalpage2;
data _null_;
set frep2 end=eof;

if eof then do;
call symput('totalpage2', trim(left(put(pagen,8)))));
end;

run;

%put totalpage2=&totalpage2;

%*title(prgname1=&prgname.);

%trtrtfg(pgmname=&outname., pgmid=1, new=0, style=, bookmark=%lowcase(&outname.));

/*****
title1 j=1 h=9pt "Study ID: ZRHM-REXA-07-JP" j=r "Page ^{thispage} of ^{lastpage}";
title2 " ";
title3 bold j=1 "&title1 &title2";

title5 "^R/RTF'\brdrb\brdrs ' ";

footnote1 "^R/RTF'\brdrb\brdrs ' ";
footnote2 j=1 h=9pt "Note: mCC = Menthol conventional cigarettes; SA = Smoking abstinence; THSm2.2 = Tobacco Heating Sys
tem 2.2 Menthol .";
footnote3 j=1 h=9pt "Note: Adjusted geometric least squares (LS) means and confidence intervals (CIs) from an ANCOVA mod
el conducted with baseline value, study arm, ";
footnote4 j=1 h=9pt "sex and mCC consumption reported at screening as fixed effect factors. ";
footnote5 j=1 h=9pt " ";
footnote6 j=1 h=9pt "Program: &fprgname." j=c "Status: Draft/&fdate." j=r "&APPENDIX.";
/*****/

%macro reppart;
%do i = 1 %to &totalpage2;

proc report data=frep2 headskip headline spacing=4 nowd split='-' style=[outputwidth=100%] style(header column)=[protec
tspecialchars=off];
where pagen=&i;
column pagen paramn avisitn avisit sord _name_ _1 space _2 space _3 space _4 space _5;
define pagen /order order=internal noprint;
define paramn /order order=internal noprint;
define avisitn /order order=internal noprint;
define avisit /order "Time point" flow style(column)=[cellwidth=7% just=1];
define sord /order order=internal noprint;

define _name_ /display "Statistic" flow style(column)=[cellwidth=15% just=1];
define _1 /display "THSm2.2" flow style(column)=[cellwidth=10% just=c];
define space /display " " flow style(column)=[cellwidth=0.5% just=c];

define _2 /display "mCC" flow style(column)=[cellwidth=10% just=c];
define space /display " " flow style(column)=[cellwidth=0.5% just=c];

define _3 /display "SA" flow style(column)=[cellwidth=10% just=c];
define space /display " " flow style(column)=[cellwidth=0.2% just=c];

define _4 /display "THSm2.2 : mCC Ratio (%)" flow style(column)=[cellwidth=10% just=c];
define space /display " " flow style(column)=[cellwidth=0.2% just=c];

define _5 /display "THSm2.2 : SA Ratio (%)" flow style(column)=[cellwidth=10% just=c];
/*
COMPUTE before paramn ;
LINE @1 paramn grp.;
ENDCOMP;

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*/
COMPUTE after avisitn ;
LINE @1 "";
ENDCOMP;

break after pagen/page;
compute before pagen;
line @1 "";
endcomp;

compute before _page_ /style=[fontweight=bold fontsize=3.75];
line @1 "&title1 &title2";
line @1 " ";
LINE @1 paramn grp.;

line @1 "^R/RTF'\brdrb\brdrs\brdrw30\brsp20\b ' ";
endcomp;

compute after _page_/style=[fontsize=1.75];
line @1 "Note: mCC = Menthol conventional cigarettes; SA = Smoking abstinence; THSm2.2 = Tobacco Heating System 2.2 Ment
hol.";
line @1 "Note: Adjusted geometric least squares (LS) means and confidence intervals (CIs) from an mixed model conducted
on log-transformed values with";
line @1 "log-transformed baseline value, study arm, sex and mCC consumption reported at screening as fixed effect factor
s. Geometrical CV% of the ratio";
line @1 "is estimated from the residual mean squares.";
line @1 "Note: p-value for one-sided test for comparison between products.";
line @1 "&APPENDIX.";
line @1 "Study ID:ZRHM-REXA-07-JP          Program: &fprgname..sas          Status: &repversion./&fdate.          Page: &i.
of &totalpage2";
endcomp;

run;
%end;

%mend;
%reppart;

ods listing;
ods rtf close;

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