

/\*=====\*

Covance Study Number	: COV- 106343	
Program Name	: d_2adex.sas	
Purpose	: create ADEX	
Input Data	: ADAM.ADSL,SDTM.EX,SDTM.DX,SDTM.SU	
Output Data	: ADAM.ADEX	
Macros Called	:	
Originally Performed by	: Serona Zheng	
Date/Time billed	: 10Apr2015	

+=====+

Modification History	:	
Programmer	: Serona Zheng	
Date	: 21May2015	
Reason for Change	: Change -dose to -dostxt for -9 or -1 values	
Programmer	: Serona Zheng	
Date	: 05Jun2015	
Reason for Change	: Change svstdtc to svendtc based on John's email on 05Jun2015	
Programmer	: Serona Zheng	

| Date : 30Jun2015 |

| Reason for Change : Fix the typo in param 'Daily Electronic Cigarette' |

+=====\*/

```
libname adam "&base2/datasets/adam/cleaned_adam";
```

```
libname sdtm "/cvn/projects/prj/data/000000106343/datasets/sdtm/sdtmx";
```

```
/*libname sdtm "/cvn/projects/prj/data/000000106343/datasets/sdtm"; */
```

```
%m_printto(route=YES);
```

```
***Create macro to assign apuper;
```

```
%macro apuper(dsin1=,dsout1=);
```

```
data &dsout1;
```

```
merge &dsin1(in=a) ds sv1;
```

```
by usubjid;
```

```
if a;
```

```
if . < astdt <=randdt then apuper = 0;
```

```
else if nmiss(randdt,astdt) = 0 and randdt < astdt and index(parcat2,"PRODUCT USE DIARY")=0  
and avisitn < 130 then apuper = 1;
```

```
else if index(parcat2,"PRODUCT USE DIARY") and ((v30 ne . and . < astdt <= v30) or (v30 = . and  
/*6<=*/astday <=31)) then apuper = 2;
```

```
else if index(parcat2,"PRODUCT USE DIARY") and ((v60 ne . and v30 < astdt <= v60) or (v30 ne .  
and v60 = . and 31 < astday <=61) or (v30 eq . and v60 = . and 31 < astday <=61)) then apuper = 3;
```

```
else if index(parcat2,"PRODUCT USE DIARY") and ((v60 > . and astdt > v60) or (v60 eq . and  
astday > 61)) then apuper = 4;
```

```
        if nmiss(astdt,v91) eq 0 and astdt > v91 then put "User warning: " usubjid " take drug date is  
        greate than study end date";
```

```
run;
```

```
%mend;
```

```
%macro cal_1(dsin2=,dsout2=,apuper=);
```

```
proc sql;
```

```
    create table temp as
```

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

```
            select usubjid,paramn,apuper,parcat1, sum(aval) as aval1
```

```
            from &dsin2
```

```
            where apuper >=2
```

```
            group by usubjid,paramn,apuper,parcat1;
```

```
        %end;
```

```
        %else %do;
```

```
            select usubjid,paramn,parcat1,sum(aval) as aval1
```

```
            from &dsin2
```

```
            where apuper >=2
```

```
            group by usubjid,paramn,parcat1;
```

```
        %end;
```

```
quit;
```

```
data &dsout2;
```

```
    merge temp(in=a) sv_d(keep=usubjid d_2 d_3 d_4 d_dis);
```

```
    by usubjid;
```

```

if a;

%if &apuper = 1 %then %do;

    if apuper = 2 and nmiss(aval1,d_2) = 0 and d_2 > 0 then aval = aval1/d_2;

    else if apuper = 3 and nmiss(aval1,d_3) = 0 and d_3 > 0 then aval = aval1/d_3;

    else if apuper = 4 and nmiss(aval1,d_4) = 0 and d_4 > 0 then aval = aval1/d_4;

%end;

%else %do;

    if nmiss(aval1,d_dis) = 0 and d_dis > 0 then aval = aval1/d_dis;

%end;

run;

%mend;

***Get data from adsl;

proc sort data=adam.adsl out=adsl;by usubjid;run;

***Get randdt from ds;

data ds;

    set adsl(keep=usubjid randdt where=(randdt ne .));

run;

***Get visit date from SV;

data sv;

    set sdtm.sv;

    svdt = input(svendtc, is8601da.);

    format svdt date9.;

```

```
run;
```

```
proc transpose data=sv(where=(visitnum in (130 /*131 161*/ 160 190 191 106)))
```

```
                                out=sv1(drop=_name_ rename=(v130=v30 /*v131=v31 v161=v61*/  
v160=v60 v190=v90 v191=v91 v106=v6)) prefix=v;
```

```
    by usubjid;
```

```
    var svdt;
```

```
    id visitnum;
```

```
run;
```

```
***Get last visit;
```

```
data sv_l1;
```

```
    set adsl;
```

```
    lastdt =lvisdt;
```

```
    keep usubjid lastdt;
```

```
    format lastdt date9.;
```

```
run;
```

```
data sv_d;
```

```
    merge sv1(in=a) sv_l1;
```

```
    by usubjid;
```

```
    if a;
```

```
    if v30 ne . then d_2=v30-v6+1;
```

```
    if v30 = . and v91 ne . then d_2 = v91-v6;
```

```
    if v30 = . and v91 eq . then d_2 = lastdt-v6;
```

```

if v60 = . and v30 ne . then do;
    if v91 ne . then d_3 = v91-1-v30;
    else if v91 eq . then d_3 = lastdt-1-v30;
end;

if v60 ne . and v30 = . then do;
    d_3 = v60-(v6+24);
end;

if v60 ne . and v30 ne . then d_3 = v60-v30;

if nmiss(v91,v60) = 0 then d_4 = v91-v60-1;
else if v91 = . and v60 ne . then d_4 = lastdt-v60 -1;
else if v91 ne . and v60 = . then d_4 = v91-1-(v6+54);
else if v91 = . and v60 = . then d_4 = lastdt-1-(v6+54);

if nmiss(v6,v91) eq 0 then d_dis = v91-v6;
if v6 ne . and v91 = . then d_dis=lastdt-v6;

run;

*****
*****Step1: Get data and create parameter from DX *****
*****

```

\*\*\*Get data from DX;

data dx;

length srcdom \$2 desc reasnd \$200 parcat1 parcat2 \$100 avalu status \$20 lot \$7 astdtc aendtc  
\$16 epoch \$25 avisit \$40;

set sdtm.dx(rename=(epoch=epoch1));

if dxcat = "TOBACCO HEATING SYSTEM MENTHOL";

srcdom = 'DX';

srcseq = dxseq;

desc = dxtrt;

parcat1 = dxcat;

parcat2 = dxscat;

if dxdostxt = '-9' then aval = 0;

else if dxdostxt = '-1' then aval = .;

else aval = dxdose;

avalu = dxdosu;

status = dxstat;

reasnd = dxreasnd;

lot = dxlot;

avisitn = visitnum;

avisit = visit;

astdte = dxstdte;

aendte = dxendte;

astdy = dxstdy;

aendy = dxendy;

epoch = epoch1;

```

if ASTDTC^=" then astdt = input(scan(ASTDTC,1,"T"),yymmdd10.);
if index(ASTDTC,"T") then do;
    if length(scan(ASTDTC,2,"T")) = 5 then do;
        astdtm = dhms(astdt,0,0,input(scan(ASTDTC,2,"T"),time5.)+0);
    end;
    else if length(scan(ASTDTC,2,"T")) = 8 then astdtm =
dhms(astdt,0,0,input(scan(ASTDTC,2,"T"),time8.));
    else put "WAR" "NING: Unexpected time format " ASTDTC=;
end;
/* else astdtm = dhms(astdt,0, 0, 0);*/
if AENDTC^=" then aendt = input(scan(AENDTC,1,"T"),yymmdd10.);
if index(AENDTC,"T") then do;
    if length(scan(AENDTC,2,"T")) = 5 then do;
        aendtm = dhms(aendt,0,0,input(scan(AENDTC,2,"T"),time5.)+0);
    end;
    else if length(scan(AENDTC,2,"T")) = 8 then aendtm =
dhms(aendt,0,0,input(scan(AENDTC,2,"T"),time8.));
    ELSE IF LENGTH(SCAN(AENDTC,2,"T")) = 2 THEN AENDTM = .;
    else put "WAR" "NING: Unexpected time format " AENDTC=;
end;

    format astdtm aendtm datetime13. astdt aendt date9.;
run;

***Calculate astday;

```



```

proc sort data=dx;by usubjid;run;

data dx;

    merge dx(in=a) adsl(keep=usubjid trtsdt);

    by usubjid;

    if a;

    if nmiss(astdt,trtsdt) = 0 then astday = astdt-trtsdt + 1;

```

```
run;
```

```
***Assign apuper;
```

```
%apuper(dsin1=dx,dsout1=dx)
```

```
***Derive param,paramcd,paramn from dx;
```

```
***create parameter 0;
```

```
data dx_p0;
```

```
    length param $100 paramcd $8;
```

```
    set dx;
```

```
    if index(dxscat,"PRODUCT USE DIARY")=0;
```

```
        paramn = 0;
```

```
        paramcd = "THS2_2";
```

```
        param = "THS 2.2";
```

```
run;
```

```
***create parameter 1;
```

```
data dx_1;
```

```
    set dx;
```

```
    if index(dxscat,"PRODUCT USE DIARY")=0 and avisitn not in (130 160 190);
```

```
keep usubjid astdtc astdt aendtc aendt astdy aendy dxdose apuper avisitn avisit parcat1 parcat2  
astday epoch;
```

```
run;
```

```
proc sql;
```

```
create table dx_1_ as
```

```
select usubjid,astdt, sum(dxdose) as aval
```

```
from dx_1
```

```
group by usubjid,astdt;
```

```
quit;
```

```
proc sort data=dx_1(drop=dxdose) nodupkey;by usubjid astdt astdtc aendtc aendt astdy aendy apuper  
epoch;run;
```

```
data dx_1;
```

```
set dx_1;
```

```
by usubjid astdt;
```

```
if last.astdt;
```

```
astdtc = scan(astdtc,1,'T');
```

```
aendtc = scan(aendtc,1,'T');
```

```
run;
```

```
data dx_p1;
```

```
length dtype $20;
```

```
merge dx_1(in=a) dx_1_;
```

```
by usubjid astdt;
```

```

if a;

dtype = "SUM";

run;

data dx_p1;

    length param $100 paramcd $8 parcat3 $100 dtype avalu $20;

    set dx(where=(index(dxscat,"PRODUCT USE DIARY"))) dx_p1;

    param = "Daily THS 2.2 Administration";

    paramcd = "DTHS2_2";

    paramn = 1;

    avalu = "STICKS/DAY";

    parcat3 = "DAILY PRODUCT USE";

    parcat3n = 1;

run;

```

```

***create parameter 2;

%cal_1(dsin2=dx_p1,dsout2=dx_p2,apuper=1)

```

```

data dx_p2;

    length param $100 paramcd $8 parcat3 $100 paramtyp $10 avalu $20;

    set dx_p2;

    param = "Average Daily THS 2.2 by Period";

    paramcd = "PDTHS2_2";

    paramn = 2;

```

```

parcat3 = "AVERAGE DAILY PRODUCT USE BY PERIOD";

parcat3n = 2;

paramtyp = "DERIVED";

avalu = "STICKS/DAY";

dtype = "AVERAGE";

keep usubjid aval apuper param paramcd paramn parcat3 parcat3n paramtyp avalu dtype
parcat1 ;

run;

***create parameter 3;

%cal_1(dsin2=dx_p1,dsout2=dx_p3,apuper=)

data dx_p3;

    length param $100 paramcd $8 parcat3 $100 paramtyp $10 avalu dtype $20;

    set dx_p3;

    param = "Average Daily THS 2.2 in Ambulatory";

    paramcd = "ADTHS2_2";

    paramn = 3;

    parcat3 = "AVERAGE DAILY PRODUCT USE IN AMBULATORY";

    parcat3n = 3;

    paramtyp = "DERIVED";

    avalu = "STICKS/DAY";

    dtype = "AVERAGE";

    keep usubjid aval param paramcd paramn parcat3 parcat3n paramtyp avalu dtype parcat1 ;

run;

***Combine all parameter together;

```

```
data dx_p;
```

```
    set dx_p0 dx_p1 dx_p2 dx_p3;
```

```
run;
```

```
*****,
```

```
*****Step2: Get data and create parameter from EX *****;
```

```
*****,
```

```
***Get data from EX;
```

```
data ex;
```

```
    length srcdom $2 desc reasnd $200 parcat1 parcat2 $100 avalu status $20 lot $7 asstdtc aendtc  
$16 epoch $25 avisit $40;
```

```
    set sdtm.ex(rename=(epoch=epoch1));
```

```
    if excat = "MENTHOL CONVENTIONAL CIGARETTES";
```

```
    srcdom = 'EX';
```

```
    srcseq = exseq;
```

```
    desc = extrt;
```

```
    parcat1 = excat;
```

```
    parcat2 = exscat;
```

```
    if exdostxt = '-9' then aval = 0;
```

```
    else if exdostxt = '-1' then aval = .;
```

```
    else aval = exdose;
```

```
    avalu = exdosu;
```

```
    status = exstat;
```

```
    reasnd = exreasnd;
```

```
lot = "";
avisitn = visitnum;
avisit = visit;
astdtc = exstdtc;
aendtc = exendtc;
astdy = exstdy;
aendy = exendy;
epoch = epoch1;
```

```
if ASTDTC^=" then astdt = input(scan(ASTDTC,1,"T"),yymmdd10.);
if index(ASTDTC,"T") then do;
    if length(scan(ASTDTC,2,"T")) = 5 then do;
        astdtm = dhms(astdt,0,0,input(scan(ASTDTC,2,"T"),time5.))+0);
    end;
    else if length(scan(ASTDTC,2,"T")) = 8 then astdtm =
dhms(astdt,0,0,input(scan(ASTDTC,2,"T"),time8.));
    else put "WAR" "NING: Unexpected time format " ASTDTC=;
end;
if AENDTC^=" then aendt = input(scan(AENDTC,1,"T"),yymmdd10.);
if index(AENDTC,"T") then do;
    if length(scan(AENDTC,2,"T")) = 5 then do;
        aendtm = dhms(aendt,0,0,input(scan(AENDTC,2,"T"),time5.))+0);
    end;
    else if length(scan(AENDTC,2,"T")) = 8 then aendtm =
dhms(aendt,0,0,input(scan(AENDTC,2,"T"),time8.));
    ELSE IF LENGTH(SCAN(AENDTC,2,"T")) = 2 THEN AENDTM = .;
```

```

else put "WAR" "NING: Unexpected time format " AENDTC=;

end;

format astdtm aendtm datetime13. astdt aendt date9.;

run;

***Calculate astday;

data ex;

    merge ex(in=a) adsl(keep=usubjid trtsdt);

    by usubjid;

    if a;

    if nmiss(astdt,trtsdt) = 0 then astday = astdt-trtsdt + 1;

run;

***Assign apuper;

%apuper(dsin1=ex,dsout1=ex)

***Create parameter from EX;

***Create parameter 10;

data ex_p0;

    length param $100 paramcd $8;

    set ex;

    if index(exscat,"PRODUCT USE DIARY")=0;

        paramn = 10;

        paramcd = "MCC";

```

```

        param = "mCC";

run;

***Create parameter 11;

data ex_1;

    set ex;

    if index(exscat,"PRODUCT USE DIARY")=0 and avisitn not in (130 160 190);

    astdtc = put(astdt,yymmdd10.);

    aendtc = put(aendt,yymmdd10.);

    keep usubjid astdtc astdt aendtc aendt astdy aendy exdose apuper avisit avisitn parcat1 parcat2
astday epoch;

run;

proc sql;

    create table ex_1_ as

        select usubjid,astdt, sum(exdose) as aval

            from ex_1

            group by usubjid,astdt;

quit;

proc sort data=ex_1(drop=exdose) nodupkey;by usubjid apuper parcat1 parcat2 astdt astdtc aendt
aendtc astdy aendy epoch;run;

data ex_1;

    set ex_1;

    by usubjid apuper parcat1 parcat2 astdt astdtc aendt aendtc astdy aendy epoch;

    if last.astdt;

```



```
run;
```

```
data ex_p1;
```

```
length dtype $20;
```

```
merge ex_1(in=a) ex_1_;
```

```
by usubjid astdt;
```

```
if a;
```

```
dtype = "SUM";
```

```
run;
```

```
data ex_p1;
```

```
length param $100 paramcd $8 parcat3 $100 avalu $20;
```

```
set ex(where=(index(exscat,"PRODUCT USE DIARY"))) ex_p1;
```

```
param = "Daily mCC Administration";
```

```
paramcd = "DMCC";
```

```
paramn = 11;
```

```
avalu = "CIGARETTES/DAY";
```

```
parcat3 = "DAILY PRODUCT USE";
```

```
parcat3n = 1;
```

```
run;
```

```
***Create parameter 12;
```

```
%cal_1(dsin2=ex_p1,dsout2=ex_p2,apuper=1)
```

```
data ex_p2;
```

```
length param $100 paramcd $8 parcat3 $100 paramtyp $10 avalu $20;
```

```
set ex_p2;
```

```

param = "Average Daily mCC by Period";

paramcd = "PDMCC";

paramn = 12;

parcat3 = "AVERAGE DAILY PRODUCT USE BY PERIOD";

parcat3n = 2;

paramtyp = "DERIVED";

valu = "CIGARETTES/DAY";

dtype = "AVERAGE";

keep usubjid aval apuper param paramcd paramn parcat3 parcat3n paramtyp valu dtype
parcat1 ;

run;

***create parameter 13;

%cal_1(dsin2=ex_p1,dsout2=ex_p3,apuper=)

data ex_p3;

length param $100 paramcd $8 parcat3 $100 paramtyp $10 valu dtype $20;

set ex_p3;

param = "Average Daily mCC in Ambulatory";

paramcd = "ADMCC";

paramn = 13;

parcat3 = "AVERAGE DAILY PRODUCT USE IN AMBULATORY";

parcat3n = 3;

paramtyp = "DERIVED";

valu = "CIGARETTES/DAY";

dtype = "AVERAGE";

keep usubjid aval param paramcd paramn parcat3 parcat3n paramtyp valu dtype parcat1 ;

```

```
run;
```

```
***Combine all parameter together;
```

```
data ex_p;
```

```
    set ex_p0 ex_p1 ex_p2 ex_p3;
```

```
run;
```

```
*****.
,
```

```
*****Step3: Get data and create parameter from SU *****.
,
```

```
*****.
,
```

```
***Get data from SU;
```

```
data su;
```

```
    length srcdom $2 desc reasnd $200 parcat1 parcat2 $100 avalu status $20 lot $7 astdtc aendtc  
$16 epoch $25 avisit $40;
```

```
    set sdtm.su(rename=(epoch=epoch1));
```

```
    if sucat in ('NRT_USE' 'TOB_USE');
```

```
    srcdom = 'SU';
```

```
    srcseq = suseq;
```

```
    desc = sutrt;
```

```
    parcat1 = sucat;
```

```
    parcat2 = suscat;
```

```
    if sudostxt = '-9' then aval = 0;
```

```
    else if sudostxt = '-1' then aval = .;
```

```

else aval = sudose;

valu = sudosu;

status = "";

reasnd = "";

lot = "";

avisitn = visitnum;

avisit = visit;

astdtc = sustdtc;

aendtc = "";

astdy = sustdy;

aendy = .;

epoch = epoch1;

if ASTDTC^=" then astdt = input(scan(ASTDTC,1,"T"),yymmdd10.);
if index(ASTDTC,"T") then do;
    if length(scan(ASTDTC,2,"T")) = 5 then do;
        astdtm = dhms(astdt,0,0,input(scan(ASTDTC,2,"T"),time5.))+0);
    end;
    else if length(scan(ASTDTC,2,"T")) = 8 then astdtm =
dhms(astdt,0,0,input(scan(ASTDTC,2,"T"),time8.));
    else put "WAR" "NING: Unexpected time format " ASTDTC=;
end;

format astdtm datetime13. astdt date9.;

run;

```

```
***Calculate astday;  
  
data su;  
  
    merge su(in=a) adsl(keep=usubjid trtsdt);  
  
    by usubjid;  
  
    if a;  
  
    if nmiss(astdt,trtsdt) = 0 then astday = astdt-trtsdt + 1;  
  
run;
```

```
***Assign apuper;  
  
%apuper(dsin1=su,dsout1=su)
```

```
data su_p1;  
  
    length param $100 paramcd $8 parcat3 $100;  
  
    set su;  
  
  
    parcat3 = "DAILY PRODUCT USE";  
  
    parcat3n = 1;  
  
  
    if upcase(sutrt) = "INHALER" then do;  
  
        param = "Daily Inhaler";  
  
        paramcd = "DINHALER";  
  
        paramn = 20;  
  
    end;  
  
    else if upcase(sutrt) = "NASPRAY" then do;  
  
        param = "Daily Nasal Spray";
```

```
        paramcd = "DNASPRAY";

        paramn = 21;

end;

else if upcase(sutrt) = "GUMS" then do;

        param = "Daily Gums";

        paramcd = "DGUMS";

        paramn = 22;

end;

else if upcase(sutrt) = "LOZENGES" then do;

        param = "Daily Lozenges";

        paramcd = "DLOZENGE";

        paramn = 23;

end;

else if upcase(sutrt) = "PATCHES" then do;

        param = "Daily Patches";

        paramcd = "DPATCHES";

        paramn = 24;

end;

else if upcase(sutrt) = "OTHNRT" then do;

        param = "Daily Other NRT Products";

        paramcd = "DOTHNRT";

        paramn = 25;

end;

else if upcase(sutrt) = "CHWSMKLS" then do;

        param = "Daily Chewable/Smokeless Tobacco";
```

```
        paramcd = "DCHWMKL";

        paramn = 26;

    end;

    else if upcase(sutrt) = "CIGARS" then do;

        param = "Daily Cigars/Cigarillos";

        paramcd = "DCIGARS";

        paramn = 27;

    end;

    else if upcase(sutrt) = "PIPE" then do;

        param = "Daily Pipes";

        paramcd = "DPIPE";

        paramn = 28;

    end;

    else if upcase(sutrt) = "OTHTOB" then do;

        param = "Daily Tobacco Not Listed Previously";

        paramcd = "DOTHTOB";

        paramn = 29;

    end;

    else if upcase(sutrt) = "E_CIG" then do;

        param = "Daily Electronic Cigarette";

        paramcd = "DE_CIG";

        paramn = 30;

    end;

run;
```

```
%cal_1(dsln2=su_p1,dsout2=su_p2,apuper=1)
```

```
data su_p2;
```

```
length param $100 paramcd $8 parcat3 $100 paramtyp $10;
```

```
set su_p2(rename=(paramn=paramn1));
```

```
if paramn1 = 20 then do;
```

```
    param = "Average Daily Inhaler by Period";
```

```
    paramcd = "PDINHAL";
```

```
    paramn = 50;
```

```
end;
```

```
if paramn1 = 21 then do;
```

```
    param = "Average Daily Nasal Spray by Period";
```

```
    paramcd = "PDNASPR";
```

```
    paramn = 51;
```

```
end;
```

```
if paramn1 = 22 then do;
```

```
    param = "Average Daily Gums by Period";
```

```
    paramcd = "PDGUMS";
```

```
    paramn = 52;
```

```
end;
```

```
if paramn1 = 23 then do;
```

```
    param = "Average Daily Lozenges by Period";
```

```
    paramcd = "PDLOZENG";
```

```
    paramn = 53;
```



```
end;

if paramn1 = 24 then do;

    param = "Average Daily Patches by Period";

    paramcd = "PDPATCHE";

    paramn = 54;

end;

if paramn1 = 25 then do;

    param = "Average Daily Other NRT by Period";

    paramcd = "PDOTHNRT";

    paramn = 55;

end;

if paramn1 = 26 then do;

    param = "Ave. Daily Chew/Smokeless Tob. by Period";

    paramcd = "PDCHWMKL";

    paramn = 56;

end;

if paramn1 = 27 then do;

    param = "Average Daily Cigar/Cigarillo by Period";

    paramcd = "PDCIGARS";

    paramn = 57;

end;

if paramn1 = 28 then do;

    param = "Average Daily Pipes by Period";

    paramcd = "PDPIPE";

    paramn = 58;
```

```

end;

if paramn1 = 29 then do;

    param = "Average Daily Tob. Not Listed by Period";

    paramcd = "PDOTHTOB";

    paramn = 59;

end;

if paramn1 = 30 then do;

    param = "Average Daily E-Cigarette by Period";

    paramcd = "PDE_CIG";

    paramn = 60;

end;

parcat3 = "AVERAGE DAILY PRODUCT USE BY PERIOD";

parcat3n = 2;

paramtyp = "DERIVED";

dtype = "AVERAGE";

keep usubjid aval apuper param paramcd paramn parcat3 parcat3n paramtyp dtype parcat1 ;

run;

```

```

%cal_1(dsin2=su_p1,dsout2=su_p3,apuper=)

```

```

data su_p3;

    length param $100 paramcd $8 parcat3 $100 paramtyp $10;

    set su_p3(rename=(paramn=paramn1));

    if paramn1 = 20 then do;

        param = "Average Daily Inhaler in Ambulatory";
    end;
end;

```

```
        paramcd = "ADINHAL";

        paramn = 70;

end;

if paramn1 = 21 then do;

        param = "Average Daily Nasal Spray in Ambulatory";

        paramcd = "ADNASPR";

        paramn = 71;

end;

if paramn1 = 22 then do;

        param = "Average Daily Gums in Ambulatory";

        paramcd = "ADGUMS";

        paramn = 72;

end;

if paramn1 = 23 then do;

        param = "Average Daily Lozenges in Ambulatory";

        paramcd = "ADLOZENG";

        paramn = 73;

end;

if paramn1 = 24 then do;

        param = "Average Daily Patches in Ambulatory";

        paramcd = "ADPATCHE";

        paramn = 74;

end;

if paramn1 = 25 then do;

        param = "Average Daily Other NRT in Ambulatory";
```

```
        paramcd = "ADOTHNRT";

        paramn = 75;

end;

if paramn1 = 26 then do;

        param = "Ave. Daily Chew/Smokeless Tob. in Ambulatory";

        paramcd = "ADCHWMKL";

        paramn = 76;

end;

if paramn1 = 27 then do;

        param = "Average Daily Cigar/Cigarillo in Ambulatory";

        paramcd = "ADCIGARS";

        paramn = 77;

end;

if paramn1 = 28 then do;

        param = "Average Daily Pipes in Ambulatory";

        paramcd = "ADPIPE";

        paramn = 78;

end;

if paramn1 = 29 then do;

        param = "Average Daily Tob. Not Listed in Ambulatory";

        paramcd = "ADOTHTOB";

        paramn = 79;

end;

if paramn1 = 30 then do;

        param = "Average Daily E-Cigarette in Ambulatory";
```

```

        paramcd = "ADE_CIG";

        paramn = 80;

    end;

    parcat3 = "AVERAGE DAILY PRODUCT USE IN AMBULATORY";

    parcat3n = 3;

    paramtyp = "DERIVED";

    dtype = "AVERAGE";

    keep usubjid aval param paramcd paramn parcat3 parcat3n paramtyp dtype parcat1 ;

run;

***Combine all parameter together;

data su_p;

    set su_p1 su_p2 su_p3;

run;

data su_p;

    length visit $27;

    set su_p(rename=(visit=visit1));

    visit = visit1;

run;

*****
*****Step4: Prepare and output dataset *****;

```

\*\*\*\*\*.

\*\*\*Combine all data together;

data adex1;

length aperiodc \$10 apuperc \$40;

set dx\_p ex\_p su\_p;

if upcase(parcat1) = "TOBACCO HEATING SYSTEM MENTHOL" then parcat1n = 1;

else if upcase(parcat1) = "MENTHOL CONVENTIONAL CIGARETTES" then parcat1n = 2;

else if upcase(parcat1) = "NRT\_USE" then parcat1n = 3;

else if upcase(parcat1) = "TOB\_USE" then parcat1n = 4;

if upcase(parcat2) = "PRODUCT USE CONFINEMENT" then parcat2n = 1;

else if upcase(parcat2) = "PRODUCT USE DIARY - ELECTRONIC" then parcat2n = 2;

else if upcase(parcat2) = "PRODUCT USE DIARY - PAPER" then parcat2n = 3;

aperiod = 1;

aperiodc = "Period 1";

if apuper = 0 then apuperc = "Pre-Randomization Period";

else if apuper = 1 then apuperc = "Period 1";

else if apuper = 2 then apuperc = "Period 2";

else if apuper = 3 then apuperc = "Period 3";

else if apuper = 4 then apuperc = "Period 4";

```
run;
```

```
***Assign analysis flag - anl01fl;
```

```
proc sort data=adex1 out=adex1_p;where APUPER >=2 and PARCAT3 = "DAILY PRODUCT USE" and avisit  
= "; by usubjid paramcd apuper descending aval srcseq;run;
```

```
data adex1_p;
```

```
    set adex1_p;
```

```
    by usubjid paramcd apuper descending aval srcseq;
```

```
    if first.apuper then anl01fl = 'Y';
```

```
run;
```

```
***Assign analysis flag - anl02fl;
```

```
proc sort data=adex1_p;by usubjid paramcd descending aval srcseq;run;
```

```
data adex1_p;
```

```
    set adex1_p;
```

```
    by usubjid paramcd descending aval srcseq;
```

```
    if first.paramcd then anl02fl = 'Y';
```

```
run;
```

```
data adex2;
```

```
    set adex1(where=(apuper < 2 or (apuper >=2 and ((parcat3 ne "DAILY PRODUCT USE") or  
(parcat3 = 'DAILY PRODUCT USE' and avisit ne ")))))) adex1_p;
```

```
run;
```

```
***Get data from suppdx and suppex domain;
```

```
data suppdx;
```

```
length other_dx $20;

set sdtm.suppdx(where=(qnam = "DXOTH"));

other_dx = qval;

dxseq = input(idvarval,best.);

keep usubjid other_dx dxseq;

run;
```

```
data suppex;

length other_ex $20;

set sdtm.suppex(where=(qnam="OTHER"));

other_ex = qval;

exseq = input(idvarval,best.);

keep usubjid other_ex exseq;

run;
```

```
proc sort data=suppdx;by usubjid dxseq;run;

proc sort data=adex2;by usubjid dxseq;run;

data adex2;

merge adex2(in=a) suppdx;

by usubjid dxseq;

if a;

run;
```

```
proc sort data=suppex;by usubjid exseq;run;

proc sort data=adex2;by usubjid exseq;run;

data adex2;
```



```
merge adex2(in=a) supsex;  
by usubjid exseq;  
if a;  
run;
```

```
data adex2;  
length other $20;  
set adex2;  
if other_dx ne "" then other = other_dx;  
if other_ex ne "" then other = other_ex;  
run;
```

```
proc sort data=adex2;by usubjid;run;
```

```
proc sort data=adsl;by usubjid;run;
```

```
data adex;  
length trtp trta $40;  
merge adex2(in=a drop=studyid randdt trtsdt) adsl(in=b);  
by usubjid;  
if a;  
trtp = trt01p;  
trtpn = trt01pn;  
trta = trt01a;  
trtan = trt01an;  
avisit = propcase(avisit);  
if trtpn in (97 98) then do;
```

```
        apuper = .;
        apuperc = "";
    end;
run;

***Add variable attribute;

%m_attrib_adam(dset=adex);

proc sort data=adex;
by USUBJID AVISITN PARAMCD APUPER ASTDTC AENDTC SRCDOM SRCSEQ ;
run;

*** Output dataset;

data adam.adex(label = "Exposure Analysis Dataset" );
    set adex;
run;

proc printto ;
run;

%m_logchk;
```

