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%put NOTE:
=====;
%put NOTE: Covance Study Number : 000000106324;
%put NOTE: Client Protocol ID   : ZRHR-REXC-03-EU;
%put NOTE: Program Name        : m_cyp.sas;
%put NOTE: Purpose              : create biomarker data for ADBX;
%put NOTE: ;
%put NOTE: Input Data           : STDLIB.ADBX SDTM.LB SDTM.SUPPLB
ADAM.ADSL;
%put NOTE: Output                : ;
%put NOTE: Macros Called        : _MPRINTTO _MTOTPER _MPERALL _SCRAMBLE
CYP2A6 COUGH COHB UVOL;
%put NOTE: ;
%put NOTE: Programmed by        : cvn_kbooth;
%put NOTE: Creation Date        : 2014-05-02;
%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: 13May2014  KB        1) Amended NEQ calculation;
%put NOTE: 13May2014  KB        2) Amended NEQ creatinine derivation;
%put NOTE: 13May2014  KB        3) Amended ATPTNs;
%put NOTE: 13May2014  KB        4) Amended BLQs for biomarker and risk
marker conversion;
%put NOTE: 14May2014  KB        5) Removed a variable for the
uninitialized message in log;
%put NOTE: 14May2014  KB        6) Divided NEQ by 1000 to get correct
units;
%put NOTE: 14May2014  KB        7) Amended BLQs for CYP2A6 data;
%put NOTE: 15May2014  KB        8) Amended NEQ PARAM;
%put NOTE: 15May2014  KB        9) Amended dp of PCHGC;
%put NOTE: 15May2014  KB        10) Amended BASETYPE;
%put NOTE: 15May2014  KB        11) Amended dp of SBMA24U SBMACRE
TXB2CRE;
%put NOTE: 15May2014  KB        12) Amended BLQs for CYP1A2;
%put NOTE: 15May2014  KB        13) Added BASETYPE;
%put NOTE: 01Jun2014  KB        14) Added flag for derived parameters
if original is BLQ;
%put NOTE: 01Jun2014  KB        15) Only pulled in data that has LBSTAT
not equal to NOT DONE;
%put NOTE: 02Jun2014  KB        16) Added new windows for the biomarker
and urine volume data;
%put NOTE: 05Jun2014  KB        17) Amended CRIT1 and CRIT1FL to only
populate for visit 1 onwards;
%put NOTE: 05Jun2014  KB        18) Amended CYP data as if components
are BLQ then they are not calculated;

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%put NOTE: 05Jun2014	KB	19) Amended AWHI for CO data;
%put NOTE: 06Jun2014	KB	20) Amended rounding for adjusted biomarker data;
%put NOTE: 09Jun2014	KB	21) Added in deviations for biomarkers and ANL01FL;
%put NOTE: 09Jun2014	KB	22) Amended CRIT1;
%put NOTE: 09Jun2014	KB	23) Amended primary biomarkers for urine and creatinine;
%put NOTE: 09Jun2014	KB	24) Amended rounding issue ;
%put NOTE: 21Jun2014	KB	25) Amended secondary biomarkers for urine and creatinine;
%put NOTE: 21Jun2014	KB	26) Amended warning creation to ignore day 6;
%put NOTE: 21Jun2014	KB	27) Amended pull out of parameters from LB due to change in SDTM;
%put NOTE: 21Jun2014	KB	28) Amended LBTESTCDs for biomarkers due to change in SDTM;
%put NOTE: 21Jun2014	KB	29) Amended LBSTRESU length for setting with rest of derived data;
%put NOTE: 22Jun2014	KB	30) Amended CYP2A6 and CYP1A2 for BLQ values;
%put NOTE: 22Jun2014	KB	31) Added AMES urine 24 h results;
%put NOTE: 22Jun2014	KB	32) AMended baseline for subject 55 MHBMA;
%put NOTE: 23Jun2014	KB	33) Amended data for client comments;
%put NOTE: 23Jun2014	KB	34) Removed rounding issue in update 24;
%put NOTE: 24Jun2014	KB	35) Amended rounding;
%put NOTE: 31Jul2014	KB	36) Amended enrolled not rand subjects for CO;
%put NOTE: 01Aug2014	KB	37) Amended ANL01FL for urine;
%put NOTE: 11Sep2014	KB	38) AMended ABLFL;
%put NOTE: 11Sep2014	KB	39) Amended DEVN & DEVWC;
%put NOTE: 15Sep2014	KB	40) Amended baselines for CYP1A2 data;
%put NOTE: 15Sep2014	KB	41) Amended baselines by adding a flag;
%put NOTE: 15Oct2014	KB	42) Amended AVALC issues;
%put NOTE: 15Oct2014	KB	43) Amended CHGC & PCHGC issues;
%put NOTE: 07Sep2015	JM	44) Updated ames mutagenicity test calculation;
%put NOTE: 08Sep2015	JM	45) Updated to include urine biomarker parameter 3-hydroxybenzo(a)pyrene (BAP);
%put NOTE: 10Sep2015	SM	46) Corrected ANL01FL for missing collection end times in macro biom;
%put NOTE:		=====;

%macro cyp2a6;

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/* 7) START KB 14May2014 */
/*proc sort data=sdm.lb(where=(lbcatt='ENZYME ACTIVITY' and lbtestcd
in('TRANS3H' 'COTININE')) keep= studyid usubjid visitnum visit lbdtc
lbcatt lbscatt lbtestcd lbstresn lbtp) out=lb_cyp;*/
/* by studyid usubjid visitnum visit lbdtc lbtestcd;*/
/*run;*/

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DATA LB_CYP;
    SET SDTM.LB (WHERE=(LBCAT='ENZYME ACTIVITY' AND LBTESTCD IN('TRANS3H'
'COTININE') AND LBSTAT NE 'NOT DONE')); /* 15) KB 01Jun2014 */

    IF INDEX(LBSTRESC,'<') THEN DO; /* 14) KB 01Jun2014 */
        LBSTRESN=INPUT(TRANWRD(SCAN(LBSTRESC,2,'(',')',''),BEST.)/2;
        LBSTRES2=STRIP(PUT(LBSTRESN,BEST.))||" "||STRIP("(Y)"); /* 14) KB
01Jun2014 */
    END; /* 14) KB 01Jun2014 */
    ELSE LBSTRES2=STRIP(PUT(LBSTRESN,BEST.)); /* 14) KB 01Jun2014 */

    KEEP STUDYID USUBJID VISITNUM VISIT LBDTC LBCAT LBSCAT LBTESTCD
LBSTRESN LBTPT LBSTRES2; /* 14) KB 01Jun2014 */
RUN;

PROC SORT DATA=LB_CYP;
    BY STUDYID USUBJID VISITNUM VISIT LBDTC LBTPT LBCAT LBSCAT;
RUN;
/* 7) END KB 14May2014 */

proc transpose data=lb_cyp out=tlb_cyp;
    by studyid usubjid visitnum visit lbdtc lbtpt lbcate lbscate;
    var /*lbstresn*/LBSTRES2; /* 14) KB 01Jun2014 */
    id lbtestcd;
run;

/* 18) START KB 05Jun2014 */
DATA TLB_CYP2;
    SET TLB_CYP;

/* IF INDEX(COTININE,'(Y)') OR INDEX(TRANS3H,'(Y)') THEN DELETE;*/ /*
30) KB 22Jun2014 */
RUN;
/* 18) END KB 05Jun2014 */

data cyp1;
    set /*tlb_cyp*/TLB_CYP2(drop=_name_ /*_label_*/); /* 14) KB
01Jun2014 */ /* 18) KB 05Jun2014 */
    FORMAT CYP2A6 HCOT COT BEST32.; /* 35) KB 24Jun2014 */

    COTFLG=TRANWRD(SCAN(COTININE,2,'(',')',''),BEST32.); /* 14) KB 01Jun2014 */
    HCOTFLG=TRANWRD(SCAN(TRANS3H,2,'(',')',''),BEST32.); /* 14) KB 01Jun2014 */
    IF COTFLG='Y' OR HCOTFLG='Y' THEN CYP2FLG='Y'; /* 14) KB 01Jun2014 */

    cyp2a6=ROUND(((INPUT(SCAN(trans3h,1,'(',')',BEST32.)*5.202)/(INPUT(SCA
N(cotinine,1,'(',')',BEST32.)*5.675))*100,0.0000000000000001); /* 14) KB
01Jun2014 */ /* 35) KB 24Jun2014 */
    /*cyp2a6c=left(trim(put(/*round(/*cyp2a6/*/*,0.01)/*/*,/*/*8.2*
/*BEST32.)))); /* 35) KB 24Jun2014 */

CYP2A6C=LEFT(TRIM(PUT(ROUND(((INPUT(SCAN(TRANS3H,1,'(',')',BEST32.)*5.202)/(
INPUT(SCAN(COTININE,1,'(',')',BEST32.)*5.675))*100,0.0000000000000001),BEST3
2.)))); /* 42) KB 15Oct2014 */

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hcot=ROUND(INPUT(SCAN(trans3h,1,' '),BEST32.)*5.202,0.0000000000000001);
/* 14) KB 01Jun2014 */ /* 35) KB 24Jun2014 */
/*
hcotc=left(trim(put(*//*round(*//*hcot*//*0.001)*//*,*//*8.3*//*BEST32.)
)); /* 35) KB 24Jun2014 */

HCOTC=LEFT(TRIM(PUT(ROUND(INPUT(SCAN(TRANS3H,1,' '),BEST32.)*5.202,0.0000
000000000001),BEST32.))); /* 42) KB 15Oct2014 */

cot=ROUND(INPUT(SCAN(cotinine,1,' '),BEST32.)*5.675,0.0000000000000001);
/* 14) KB 01Jun2014 */ /* 35) KB 24Jun2014 */

/*cotc=left(trim(put(*//*round(*//*cot*//*0.001)*//*,*//*8.3*//*BEST32.)
)); /* 35) KB 24Jun2014 */

COTC=LEFT(TRIM(PUT(ROUND(INPUT(SCAN(COTININE,1,' '),BEST32.)*5.675,0.0000
000000000001),BEST32.))); /* 42) KB 15Oct2014 */

/* 14) START KB 01Jun2014 */
IF COTFLG='Y' THEN COTC=STRIP(COTC)||" "||STRIP(COTFLG);
IF HCOTFLG='Y' THEN HCOTC=STRIP(HCOTC)||" "||STRIP(HCOTFLG);
IF CYP2FLG='Y' THEN CYP2A6C=STRIP(CYP2A6C)||" "||STRIP(CYP2FLG);
/* 14) END KB 01Jun2014 */

run;

proc transpose data=cyp1 out=cyp1a(rename=(_name_=lbtestcd coll=aval));
by studyid usubjid visitnum visit lbdtc lbtpt lbcat lbscat;
var cyp2a6 hcot cot;
run;

proc transpose data=cyp1 out=cyp1b(rename=(_name_=lbtestcd coll=avalc));
by studyid usubjid visitnum visit lbdtc lbtpt lbcat lbscat;
var cyp2a6c hcotc cotc;
run;

data cyp1c;
set cyp1b;

lbtestcd=tranwrd(lbtestcd,'CYP2A6C','CYP2A6');
lbtestcd=tranwrd(lbtestcd,'HCOTC','HCOT');
lbtestcd=tranwrd(lbtestcd,'COTC','COT');

/* 14) START KB 01Jun2014 */
IF INDEX(AVALC," Y") THEN DO;
BLQFLG="Y";
AVALC=SCAN(AVALC,1," Y");
END;
/* 14) END KB 01Jun2014 */
run;

proc sort data=cyp1a;

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    by studyid usubjid visitnum visit lbdtc lbtpt lbcat lbcat lbtestcd;
run;

proc sort data=cyp1c;
    by studyid usubjid visitnum visit lbdtc lbtpt lbcat lbcat lbtestcd;
run;

data cyp2;
    merge cyp1a cyp1c;
    by studyid usubjid visitnum visit lbdtc lbtpt lbcat lbcat lbtestcd;
run;

data cyp2a;
    set cyp2;
    format lbstresn /*best.*/BEST32. lbstresc $200. lbtestcd $8. lbtest
$40. lbseq 8. paramtyp $20. dtype $10.; /* 35) KB 24Jun2014 */

    IF LBTESTCD='CYP2A6' AND BLQFLG='Y' THEN DELETE; /* 30) KB 22Jun2014
*/

    if usubjid ne '' then do;
        if lbtestcd='CYP2A6' then do;
            lbstresn=aval;
            lbstresc=avalc;
            lbtest='CYP2A6 Activity';
            lbseq=.;
            paramtyp='DERIVED';
            dtype='RATIO';
        end;
        else if lbtestcd='COT' then do;
            lbstresn=aval;
            lbstresc=avalc;
            lbtest='Cotinine';
            lbseq=.;
            paramtyp='DERIVED';
            dtype='FUNCTION';
        end;
        else if lbtestcd='HCOT' then do;
            lbstresn=aval;
            lbstresc=avalc;
            lbtest="Trans-3'hydroxycotinine";
            lbseq=.;
            paramtyp='DERIVED';
            dtype='FUNCTION';
        end;
    end;
    else delete;

    keep studyid usubjid visitnum visit lbdtc lbtpt lbtest lbtestcd
lbcat lbcat lbstresn lbstresc paramtyp dtype BLQFLG; /* 14) KB
01Jun2014 */
run;

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%mend cyp2a6;

/* Biomarkers of Exposure */
%macro cough;

proc sort data=sdtm.lb(where=(lbcat='BIOMARKERS' and lbtestcd in('CO')
AND LBSTAT NE 'NOT DONE')) out=lb_co; /* 15) KB 01Jun2014 */
    by usubjid visitnum visit lbdtc lbtestcd;
run;

data lb_co2;
    set lb_co;
    format subjidn 8.;

    subjidn=input(scan(usubjid,6,'-'),best.);
run;

data doses;
    set adam.addx(in = a drop=avalu) adam.adex(in = b drop=avalu)
adam.adsv(in = c);
    format astm time5.;
    if trta = 'SA' and (1 le astday le 5) then astm = '10:00't; * no
product smoked so 10am at latest ;
    else if astday = 6 then astm = '06:30't; * no product
recorded after day 5 so prior to start of day;
    else astm = timepart(astdt);
    if missing(astm) then delete;
    keep subjidn astday astm astdt AVISIT; /* 36) KB 31Jul2014 */
run;

proc sort data=doses;
    by subjidn AVISIT astday astm; /* 36) KB 31Jul2014 */
run;

data doses2;
    set doses;
    by subjidn AVISIT astday; /* 36) KB 31Jul2014 */
    format tr01sdtm datetime13. visitnum 8.;
    if first.AVISIT/*astday*/; /* 36) KB 31Jul2014 */

    tr01sdtm=dhms(astdt, hour(astm), minute(astm), 0);
    visitnum=astday+100;

/* 36) START KB 31Jul2014 */
    IF VISITNUM=. THEN DO;
        IF AVISIT='Day -2' THEN VISITNUM=98;
        ELSE IF AVISIT='Day -1' THEN VISITNUM=99;
        ELSE IF AVISIT='Day 0' THEN VISITNUM=100;
    END;
/* 36) END KB 31Jul2014 */
    drop astdt astm astday AVISIT; /* 36) KB 31Jul2014 */
run;

proc sort data=lb_co2;

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        by subjidn visitnum;
run;

proc sort data=doses2;
    by subjidn visitnum;
run;

data lb_co2a;
    merge lb_co2(in=a) doses2;
    by subjidn visitnum;
    if a;
run;

data lb_co2b;
    merge lb_co2a(in=a) adam.adsl(keep=subjidn trt01a);
    by subjidn;
    if a;
run;

data lb_co3;
    set lb_co2b;
    format awlo awhi /*adtmtest*/ datetime13. awrange $80. adt date9.
    atpt $40. atptn 8.; /* 5) KB 14May2014 */

    adt=input(scan(lbdtc,1,'T'),yymmdd10.);

    if trt01a ne 'SA' then do;
        if index(lbtpt,'WITHIN 15') then do;
            awlo=tr01sdtm-dhms(0,0,15,0);
            awhi=tr01sdtm;
        end;
        else if index(lbtpt,'12:00 - 14:00') then do;
            awlo=dhms(adt,12,00,00);
            awhi=dhms(adt,14,00,00);
        end;
        else if index(lbtpt,'16:00 - 18:00') then do;
            awlo=dhms(adt,16,00,00);
            awhi=dhms(adt,18,00,00);
        end;
        else if index(lbtpt,'20:00 - 22:00') then do;
            awlo=dhms(adt,20,00,00);
            awhi=dhms(adt,22,00,00);
        end;
    end;
else if trt01a eq 'SA' then do;
    if index(lbtpt,'WITHIN 15') then do;
        awlo=tr01sdtm-dhms(0,0,15,0);
        awhi=tr01sdtm;
    end;
    else if index(lbtpt,'08:00 - 10:00') then do;
        awlo=dhms(adt,8,0,0);
        awhi=dhms(adt,10,00,00);
    end;
    else if index(lbtpt,'12:00 - 14:00') then do;

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        awlo=dhms(adl,12,00,00);
        awhi=dhms(adl,14,00,00);
    end;
    else if index(lbtpt,'16:00 - 18:00') then do;
        awlo=dhms(adl,16,00,00);
        awhi=dhms(adl,/*17*/18,/*30*/0,00); /* 19) KB 05Jun2014 */
    end;
    else if index(lbtpt,'20:00 - 22:00') then do;
        awlo=dhms(adl,20,00,00);
        awhi=dhms(adl,22,00,00);
    end;
end;

if not missing(awlo) and not missing(awhi) then do;
    awrange=put(awlo,datetime13.) || '-' || put(awhi,datetime13.);
end;

if index(lbtpt,'WITHIN 15') then do;
    atpt='15 min < T0';
    atptn=0;
end;
else if index(lbtpt,'08:00') then do;
    atpt='08:00-10:00 AM';
    atptn=/*11*/12; /* 3) KB 13May2014 */
end;
else if index(lbtpt,'12:00') then do;
    atpt='12:00-02:00 PM';
    atptn=/*13*/14; /* 3) KB 13May2014 */
end;
else if index(lbtpt,'16:00') then do;
    atpt='04:00-06:00 PM';
    atptn=/*15*/20; /* 3) KB 13May2014 */
end;
else if index(lbtpt,'20:00') then do;
    atpt='08:00-10:00 PM';
    atptn=/*21*/22; /* 3) KB 13May2014 */
end;
else if length(lbtpt)>6 AND INDEX(VISIT,'DAY 6')=0 then put "WARN"
"ING: Check LBTPts for missing ATPTs " lbtpt=; /* 26) KB 21Jun2014 */

/* 18) START KB 05Jun2014 */
    ATPTN2=ATPTN;
    IF TRT01A='SA' AND ATPTN=12 THEN ATPTN2=0;
/* 18) END KB 05Jun2014 */
run;

/* 38) START KB 11Sep2014 */
DATA SV;
    SET SDTM.SV(WHERE=(VISIT=('DAY 1')));
    FORMAT DAY DATE9.;

    DAY=INPUT(SCAN(SVSTDTC,1,'T'),YYMMDD10.);
    KEEP USUBJID DAY;
RUN;

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DATA ABLFL;
    SET LB_CO3(WHERE=(VISIT IN ('SCREENING' 'DAY -2' 'DAY -1' 'DAY 0')
AND LBSTAT NE 'NOT DONE'));
    FORMAT ADTM DATETIME13.;

ADTM=DHMS(INPUT(SCAN(LBDC,1,'T'),YYMMDD10.),HOUR(INPUT(SCAN(LBDC,2,'T')
,TIME5.)),MINUTE(INPUT(SCAN(LBDC,2,'T'),TIME5.)),0);

    KEEP USUBJID VISIT VISITNUM ATPTN2 ADTM ATPT;
RUN;

PROC SORT DATA=ABLFL;
    BY USUBJID;
RUN;

DATA ABLFL2;
    MERGE ABLFL(IN=A) SV;
    BY USUBJID;
    IF A;
RUN;

DATA ADSLTM;
    SET ADAM.ADSL;
    WHERE TRT01A IN ('CC' 'THS 2.2' 'SA');

    KEEP USUBJID TRTSDTM TRT01A;
RUN;

DATA ABLFL2A;
    MERGE ABLFL2(IN=A) ADSLTM;
    BY USUBJID;
    IF A;
RUN;

PROC SORT DATA=ABLFL2A;
    BY USUBJID ATPTN2 ADTM;
RUN;

DATA ABLFL3;
    SET ABLFL2A;

    IF TRT01A='SA' THEN DO;
        IF DAY NE . THEN DO;
            IF ADTM<DHMS(DAY,06,30,0) AND
INDEX(UPCASE(VISIT),'UNSCHED')=0 AND INDEX(UPCASE(ATPT),'UNSCHED')=0 THEN
ABLFL2='Y';
            END;
        ELSE IF DAY EQ . THEN DO;
            IF INDEX(UPCASE(VISIT),'UNSCHED')=0 AND
INDEX(UPCASE(ATPT),'UNSCHED')=0 THEN ABLFL2='Y';
            END;
        END;
END;

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        ELSE IF TRT01A IN ('CC' 'THS 2.2') THEN DO;
            IF ADTM<TRTSDTM AND INDEX(UPCASE(VISIT),'UNSCHED')=0 AND
INDEX(UPCASE(ATPT),'UNSCHED')=0 THEN ABLFL2='Y';
            END;
        ELSE IF MISSING(TRT01A) THEN DO;
            IF INDEX(UPCASE(VISIT),'UNSCHED')=0 AND
INDEX(UPCASE(ATPT),'UNSCHED')=0 THEN ABLFL2='Y';
            END;
RUN;

PROC SORT DATA=ABLFL3(WHERE=(ABLFL2='Y')) OUT=ABLFL4;
    BY USUBJID ATPTN2 VISITNUM ADTM;
RUN;

DATA ABLFL5(WHERE=(ABLFL='Y'));
    SET ABLFL4;
    BY USUBJID ATPTN2 VISITNUM ADTM;
    FORMAT ABLFL $2.;

    IF LAST.ATPTN2 AND NOT MISSING(ATPTN2) THEN ABLFL='Y';

    KEEP USUBJID VISIT ATPTN2 ABLFL;
RUN;

PROC SORT DATA=ABLFL5;
    BY USUBJID VISIT ATPTN2;
RUN;

PROC SORT DATA=LB_CO3;
    BY USUBJID VISIT ATPTN2;
RUN;

DATA ABLFL6;
    MERGE ABLFL5 LB_CO3;
    BY USUBJID VISIT ATPTN2;
RUN;
/* 38) END KB 11Sep2014 */

data base;
    set /*lb_co3*/ABLFL6(where=(/*index(lbtpt,'DAY 0')*/ABLFL='Y')); /*
38) KB 11Sep2014 */
    format base /*best.*/BEST32. basetype $40.; /* 35) KB 24Jun2014 */

    base=lbstresn;
/*    basetype='TIME MATCHED DAY 0';*/
    BASETYPE='TIME MATCHED ' || STRIP(VISIT); /* 38) KB 11Sep2014 */

    if atpt='15 min < T0' then basetype=strip(basetype)|| ' (1)';
    else if atpt='12:00-02:00 PM' then basetype=strip(basetype)|| ' (2)';
    else if atpt='04:00-06:00 PM' then basetype=strip(basetype)|| ' (3)';
    else if atpt='08:00-10:00 PM' then basetype=strip(basetype)|| ' (4)';

    BLFL=1; /* 41) KB 15Sep2014 */

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    ATPTN2=ATPTN; /* 18) KB 05Jun2014 */

    keep subjidn lbtestcd base basetype atpt atptn ATPTN2 BLFL; /* 18) KB
05Jun2014 */ /* 41) KB 15Sep2014 */
run;

proc sort data=/*lb_co3*/ABLFL6; /* 38) KB 11Sep2014 */
    by subjidn /*atptn atpt*/ ATPTN2; /* 18) KB 05Jun2014 */
run;

proc sort data=base;
    by subjidn /*atptn atpt*/ ATPTN2; /* 18) KB 05Jun2014 */
run;

data lb_co4;
    merge /*lb_co3*/ABLFL6 base; /* 38) KB 11Sep2014 */
    by subjidn /*atptn atpt*/ ATPTN2; /* 18) KB 05Jun2014 */
    DROP ATPTN2; /* 18) KB 05Jun2014 */

    IF BLFL=. THEN BLFL=1; /* 41) KB 15Sep2014 */
run;

proc sort data=lb_co4;
    by subjidn visitnum atptn;
run;

data lb_co5;
    set lb_co4;
    format /*ablfl $2.*/ ampmfl ablamfl ablpml $2.; /* 38) KB 11Sep2014
*/

/* 10) START KB 15May2014 */
/*    if index(lbtpt,'DAY -1') then do;*/
/*        base=.;*/
/*        basetype='';*/
/*    end;*/
/* 10) END KB 15May2014 */

/*    if index(lbtpt,'DAY 0') then ablfl='Y';*/ /* 38) KB 11Sep2014 */

    if index(atpt,'15 min < T0') or index(atpt,'08:00-10:00 AM') then
ampmfl='AM';
    else if index(atpt,'12:00-02:00 PM') or index(atpt,'04:00-06:00 PM')
or index(atpt,'08:00-10:00 PM') then ampmfl='PM';

    if visit='DAY 0' and index(atpt,'12:00-02:00 PM') then ablpml='Y';
    if visit='DAY 0' and (index(atpt,'15 min < T0') or index(atpt,'08:00-
10:00 AM')) then ablamfl='Y';

run;

proc sort data=lb_co5(where=(ampmfl='AM')) out=lb_am;
    by subjidn visitnum atptn ampmfl;
run;

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data lb_am2;
  set lb_am;
  by subjidn visitnum atptn ampmfl;
  format aeoeamfl $2.;

  if last.subjidn and last.visitnum and last.atptn and last.ampmfl then
aeoeamfl='Y';

  keep subjidn visitnum atptn aeoeamfl;
run;

proc sort data=lb_co5(where=(ampmfl='PM')) out=lb_pm;
  by subjidn visitnum atptn ampmfl;
run;

data lb_pm2;
  set lb_pm;
  by subjidn visitnum atptn ampmfl;
  format aeoeamfl $2.;

  if last.subjidn and last.visitnum and last.atptn and last.ampmfl then
aeoeamfl='Y';

  keep subjidn visitnum atptn aeoeamfl;
run;

data lb_flags;
  merge lb_am2 lb_pm2;
  by subjidn visitnum atptn;
run;

data lb_co6;
  merge lb_co5 lb_flags;
  by subjidn visitnum atptn;
run;

data lb_co7;
  set lb_co6;
  format chg pchg /*best.*/BEST32. chgc pchgc $20. crit1 $200. crit1fl
$2.; /* 35) KB 24Jun2014 */

  if index(lbtpt,'DAY -1')=0 and index(lbtpt,'DAY 0')=0 then do;
    chg=lbstresn-base; /* 35) KB 24Jun2014 */
    /* chgc=strip(put(chg,/*best.*/BEST32.)); */ /* 35) KB
24Jun2014 */
    CHGC=STRIP(PUT(ROUND(LBSTRESN-BASE,0.0000000000000001),BEST32.));
/* 43) KB 15Oct2014 */
    if base eq 0 then do;
      /*pchg=(chg/1)*100;*/ /* 35) KB 24Jun2014 */

PCHGC=STRIP(PUT(ROUND((CHG/1)*100,0.0000000000000001),BEST32.)); /* 43)
KB 15Oct2014 */

```

```

        end;
        else do;
            pchg=(chg/base)*100; /* 35) KB 24Jun2014 */

PCHGC=STRIP(PUT(ROUND((CHG/BASE)*100,0.000000000000000001),BEST32.)); /*
43) KB 15Oct2014 */
            end;
            /* pchgc=strip(put(pchg,*/,best.*/,8.1*/,BEST32.)); */, 9) KB
15May2014 */ /* 35) KB 24Jun2014 */
            end;

            if trt01a='SA' and lbstresn>10 AND VISIT NOT IN ('DAY -2' 'DAY -1'
'DAY 0' 'DAY 1') then do; /* 17) KB 05Jun2014 */ /* 22) KB 09Jun2014 */
                crit1fl='Y';
                crit1='Possible non-compliance to study restrictions on SA arm';
            end;

            drop subjidn trt01a adt tr01sdtm;
run;

data comp;
    set lb_co7(where=(crit1fl='Y'));

    crit2=crit1;
    crit2fl=crit1fl;

    keep usubjid visit crit2fl crit2;
run;

proc sort data=comp nodupkey;
    by usubjid visit;
run;

proc sort data=lb_co7;
    by usubjid visit;
run;

data lb_co8;
    merge lb_co7 comp;
    by usubjid visit;

    if crit2 ne '' then crit1=crit2;
    if crit2fl ne '' then crit1fl=crit2fl;

    drop crit2 crit2fl;
run;

%mend cough;

%macro cohb;

proc sort data=sdtm.lb(where=(lbcats='BIOMARKERS' and lbtestcd
in('CARBXHGB') AND LBSTAT NE 'NOT DONE')) out=lb_cohb; /* 15) KB
01Jun2014 */

```

```

        by usubjid visitnum visit lbdtc lbtestcd;
run;

data lb_cohb2;
    set lb_cohb;
    format subjidn 8.;

    subjidn=input(scan(usubjid,6,'-'),best.);
run;

data doses;
    set adam.addx(in = a drop=avalu) adam.adex(in = b drop=avalu)
adam.adsv(in = c);
    format astm time5.;
    if trta = 'SA' and (1 le astday le 5) then astm = '10:00't;  * no
product smoked so 10am at latest ;
    else if astday = 6 then astm = '06:30't;                  * no product
recorded after day 5 so prior to start of day;
    else astm = timepart(astdtm);
    if missing(astm) then delete;
    keep subjidn astday astm astdt;
run;

proc sort data=doses;
    by subjidn astday astm;
run;

data doses2;
    set doses;
    by subjidn astday;
    format tr01sdtm datetime13. visitnum 8.;
    if first.astday;

    tr01sdtm=dhms(astdt,hour(astm),minute(astm),0);
    visitnum=astday+100;

    drop astdt astm astday;
run;

proc sort data=lb_cohb2;
    by subjidn visitnum;
run;

proc sort data=doses2;
    by subjidn visitnum;
run;

data lb_cohb2a;
    merge lb_cohb2(in=a) doses2;
    by subjidn visitnum;
    if a;
run;

data lb_cohb2b;

```

```

merge lb_cohb2a(in=a) adam.adsl(keep=subjidn trt01a);
by subjidn;
if a;
run;

data lb_cohb3;
set lb_cohb2b;
format awlo awhi datetime13. awrange $80. adt date9. atpt $40. atptn
8.;

adt=input(scan(lbdtc,1,'T'),yymmdd10.);

if trt01a ne 'SA' then do;
    if lbtpt in ('DAY -1' 'DAY 0' 'DAY 1' 'DAY 2' 'DAY 3' 'DAY 4')
then do;
        awlo=dhms(adl,20,0,0);
        awhi=dhms(adl,23,00,0);
    end;
    else if index(lbtpt,'WITHIN 15') then do;
        awlo=tr01sdtm-dhms(0,0,15,0);
        awhi=tr01sdtm;
    end;
    else if index(lbtpt,'12:00 - 14:00') then do;
        awlo=dhms(adl,12,00,00);
        awhi=dhms(adl,14,00,00);
    end;
    else if index(lbtpt,'16:00 - 18:00') then do;
        awlo=dhms(adl,16,00,00);
        awhi=dhms(adl,18,00,00);
    end;
    else if index(lbtpt,'20:00 - 22:00') then do;
        awlo=dhms(adl,20,00,00);
        awhi=dhms(adl,22,00,00);
    end;
end;
else if trt01a eq 'SA' then do;
    if lbtpt in ('DAY -1' 'DAY 0' 'DAY 1' 'DAY 2' 'DAY 3' 'DAY 4')
then do;
        awlo=dhms(adl,20,0,0);
        awhi=dhms(adl,23,00,0);
    end;
    if index(lbtpt,'08:00 - 10:00') then do;
        awlo=dhms(adl,8,0,0);
        awhi=dhms(adl,10,00,0);
    end;
    else if index(lbtpt,'12:00 - 14:00') then do;
        awlo=dhms(adl,12,00,00);
        awhi=dhms(adl,14,00,00);
    end;
    else if index(lbtpt,'16:00 - 18:00') then do;
        awlo=dhms(adl,16,00,00);
        awhi=dhms(adl,18,00,00);
    end;
    else if index(lbtpt,'20:00 - 22:00') then do;

```

```

        awlo=dhms(adl,20,00,00);
        awhi=dhms(adl,22,00,00);
    end;
end;

if not missing(awlo) and not missing(awhi) then do;
    awrange=put(awlo,datetime13.) || '-' || put(awhi,datetime13.);
end;

if index(lbtpt,'WITHIN 15') then do;
    atpt='15 min < T0';
    atptn=0;
end;
else if index(lbtpt,'08:00') then do;
    atpt='08:00-10:00 AM';
    atptn=/*11*/12; /* 3) KB 13May2014 */
end;
else if index(lbtpt,'12:00') then do;
    atpt='12:00-02:00 PM';
    atptn=/*13*/14; /* 3) KB 13May2014 */
end;
else if index(lbtpt,'16:00') then do;
    atpt='04:00-06:00 PM';
    atptn=/*15*/20; /* 3) KB 13May2014 */
end;
else if index(lbtpt,'20:00') then do;
    atpt='08:00-10:00 PM';
    atptn=/*21*/22; /* 3) KB 13May2014 */
end;
else if length(lbtpt)>6 then put "WARN" "ING: Check LBTPTs for
missing ATPTs " lbtpt=;
run;

/* 38) START KB 11Sep2014 */
DATA SV;
    SET SDTM.SV(WHERE=(VISIT=('DAY 1')));
    FORMAT DAY DATE9.;

    DAY=INPUT(SCAN(SVSTDTC,1,'T'),YYMMDD10.);
    KEEP USUBJID DAY;
RUN;

DATA ABLFLCB;
    SET LB_COHB3(WHERE=(VISIT IN ('SCREENING' 'DAY -2' 'DAY -1' 'DAY 0'
'DAY 1') AND LBSTAT NE 'NOT DONE')));
    FORMAT ADTM DATETIME13.;

ADTM=DHMS(INPUT(SCAN(LBDTC,1,'T'),YYMMDD10.),HOUR(INPUT(SCAN(LBDTC,2,'T')
,TIME5.)),MINUTE(INPUT(SCAN(LBDTC,2,'T'),TIME5.)),0);

    KEEP USUBJID VISIT VISITNUM ATPTN ADTM ATPT;
RUN;

```



```

PROC SORT DATA=ABLFLCB;
  BY USUBJID;
RUN;

DATA ABLFLCB2;
  MERGE ABLFLCB(IN=A) SV;
  BY USUBJID;
  IF A;
RUN;

DATA ADSLTM;
  SET ADAM.ADSL;
  WHERE TRT01A IN ('CC' 'THS 2.2' 'SA');

  KEEP USUBJID TRTSDTM TRT01A;
RUN;

DATA ABLFLCB2A;
  MERGE ABLFLCB2(IN=A) ADSLTM;
  BY USUBJID;
  IF A;
RUN;

PROC SORT DATA=ABLFLCB2A;
  BY USUBJID ATPTN ADTM;
RUN;

DATA ABLFLCB3;
  SET ABLFLCB2A;

  IF TRT01A='SA' THEN DO;
    IF DAY NE . THEN DO;
      IF ADTM<DHMS(DAY,6,30,0) AND INDEX(UPCASE(VISIT),'UNSCHED')=0
AND INDEX(UPCASE(ATPT),'UNSCHED')=0 THEN ABLFL2='Y';
    END;
    ELSE IF DAY EQ . THEN DO;
      IF INDEX(UPCASE(VISIT),'UNSCHED')=0 AND
INDEX(UPCASE(ATPT),'UNSCHED')=0 THEN ABLFL2='Y';
    END;
  END;
  ELSE IF TRT01A IN ('CC' 'THS 2.2') THEN DO;
    IF ADTM<TRTSDTM AND INDEX(UPCASE(VISIT),'UNSCHED')=0 AND
INDEX(UPCASE(ATPT),'UNSCHED')=0 THEN ABLFL2='Y';
  END;
  ELSE IF MISSING(TRT01A) THEN DO;
    IF INDEX(UPCASE(VISIT),'UNSCHED')=0 AND
INDEX(UPCASE(ATPT),'UNSCHED')=0 THEN ABLFL2='Y';
  END;
RUN;

PROC SORT DATA=ABLFLCB3(WHERE=(ABLFL2='Y')) OUT=ABLFLCB4;
  BY USUBJID ADTM VISITNUM ;
RUN;

```

```

DATA ABLFLCB5 (WHERE=(ABLFL='Y')) ;
    SET ABLFLCB4;
    BY USUBJID ADTM VISITNUM ;
    FORMAT ABLFL $2.;

    IF LAST.USUBJID AND NOT MISSING(ADTM) THEN ABLFL='Y';

    KEEP USUBJID VISIT ABLFL;
RUN;

PROC SORT DATA=ABLFLCB5;
    BY USUBJID VISIT;
RUN;

PROC SORT DATA=LB_COHB3;
    BY USUBJID VISIT;
RUN;

DATA ABLFLCB6;
    MERGE ABLFLCB5 LB_COHB3;
    BY USUBJID VISIT ;
RUN;
/* 38) END KB 11Sep2014 */

data base;
    set /*lb_cohb3*/ABLFLCB6(where=(/*index(lbtpt,'DAY 0'*/ABLFL='Y')));
/* 38) KB 11Sep2014 */
    format base /*best.*/BEST32. basetype $40.; /* 35) KB 24Jun2014 */

    base=lbstresn;
    basetype=/*'DAY 0'*/STRIP(VISIT); /* 38) KB 11Sep2014 */

    BLFL=1; /* 41) KB 15Sep2014 */

    keep subjidn lbtestcd base basetype BLFL; /* 41) KB 15Sep2014 */
run;

proc sort data=/*lb_cohb3*/ABLFLCB6; /* 38) KB 11Sep2014 */
    by subjidn;
run;

proc sort data=base;
    by subjidn;
run;

data lb_cohb4;
    merge /*lb_cohb3*/ABLFLCB6 base; /* 38) KB 11Sep2014 */
    by subjidn;
run;

proc sort data=lb_cohb4;
    by subjidn visitnum atptn;
run;

```

```

data lb_cohb5;
  set lb_cohb4;
  format /*ablfl $2.*/ ampmfl ablamfl ablpml $2.; /* 38) KB 11Sep2014
*/

/*    if index(lbtpt,'DAY 0') then ablfl='Y';*/ /* 38) KB 11Sep2014 */

  if index(atpt,'15 min < T0') or index(atpt,'08:00-10:00 AM') then
    ampmfl='AM';
  else ampmfl='PM';

  if visit='DAY 5' and index(atpt,'12:00-02:00 PM') then ablpml='Y';
  if visit='DAY 5' and (index(atpt,'15 min < T0') or index(atpt,'08:00-
10:00 AM')) then ablamfl='Y';

run;

proc sort data=lb_cohb5(where=(ampmfl='AM')) out=lb_am;
  by subjdn visitnum atptn ampmfl;
run;

data lb_am2;
  set lb_am;
  by subjdn visitnum atptn ampmfl;
  format aeoeamfl $2.;

  if last.subjdn and last.visitnum and last.ampmfl then aeoeamfl='Y';

  keep subjdn visitnum atptn aeoeamfl;
run;

proc sort data=lb_cohb5(where=(ampmfl='PM')) out=lb_pm;
  by subjdn visitnum atptn ampmfl;
run;

data lb_pm2;
  set lb_pm;
  by subjdn visitnum atptn ampmfl;
  format aeopmlfl $2.;

  if last.subjdn and last.visitnum and last.ampmfl then aeopmlfl='Y';

  keep subjdn visitnum atptn aeopmlfl;
run;

data lb_flags;
  merge lb_am2 lb_pm2;
  by subjdn visitnum atptn;
run;

data lb_cohb6;
  merge lb_cohb5 lb_flags;
  by subjdn visitnum atptn;
run;

```

```

data lb_cohb7;
  set lb_cohb6;
  format chg pchg /*best.*/BEST32. chgc pchgc $20.; /* 35) KB 24Jun2014
*/

  if index(lbtpt,'DAY -1')=0 and index(lbtpt,'DAY 0')=0 then do;
    chg=lbstresn-base; /* 35) KB 24Jun2014 */
    /* chgc=strip(put(chg,/*/*best.*//*BEST32.)); *//* 35) KB
24Jun2014 */
    CHGC=STRIP(PUT(ROUND(LBSTRESN-BASE,0.0000000000000001),BEST32.));
/* 43) KB 15Oct2014 */
    if base eq 0 then do;
      pchg=(chg/1)*100; /* 35) KB 24Jun2014 */

PCHGC=STRIP(PUT(ROUND((CHG/1)*100,0.0000000000000001),BEST32.)); /* 43)
KB 15Oct2014 */
      end;
      else do;
        pchg=(chg/base)*100; /* 35) KB 24Jun2014 */

PCHGC=STRIP(PUT(ROUND((CHG/BASE)*100,0.0000000000000001),BEST32.)); /*
43) KB 15Oct2014 */
        end;
        /* pchgc=strip(put(pchg,/*/*best.*//*8.1*//*BEST32.)); *//* 9) KB
15May2014 */ /* 35) KB 24Jun2014 */
        end;

    drop subjidn trt01a adt tr01sdtm;
run;

%mend cohb;

/* Urine Volume */
%macro uvol;

proc sort data=sdtm.lb(where=(lbcatt='BIOMARKERS' and lbtestcd
in(/*'UVOL'*/'VOLUME') AND LBSTAT NE 'NOT DONE')) out=lb_uvol; /* 15) KB
01Jun2014 */ /* 28) KB 21Jun2014 */
  by usubjid visitnum visit lbdtc lbtestcd;
run;

data lb_uvol2;
  set lb_uvol;
  format subjidn 8.;

  subjidn=input(scan(usubjid,6,'-'),best.);
run;

data doses;
  set adam.addx(in = a drop=avalu) adam.adex(in = b drop=avalu)
adam.adsv(in = c);

```

```

        format astm time5.;
        if trta = 'SA' and (1 le astday le 5) then astm = '10:00't;  * no
product smoked so 10am at latest ;
        else if astday = 6 then astm = '06:30't;                  * no product
recorded after day 5 so prior to start of day;
        else astm = timepart(astdtm);
        if missing(astm) then delete;
        keep subjidn astday astm astdt;
run;

proc sort data=doses;
    by subjidn astday astm;
run;

data doses2;
    set doses;
    by subjidn astday;
    format tr01sdtm datetime13. visitnum 8.;
    if first.astday;

    tr01sdtm=dhms(astdt,hour(astm),minute(astm),0);
    visitnum=astday+100;

    drop astdt astm astday;
run;

proc sort data=lb_uvol2;
    by subjidn visitnum;
run;

proc sort data=doses2;
    by subjidn visitnum;
run;

data lb_uvol2a;
    merge lb_uvol2(in=a) doses2;
    by subjidn visitnum;
    if a;
run;

data lb_uvol2b;
    merge lb_uvol2a(in=a) adam.adsl(keep=subjidn trt01a);
    by subjidn;
    if a;
run;

data lb_uvol3;
    set lb_uvol2b;
    format awlo awhi AWLOUS AWLOUE AWHIUS AWHIUE datetime13. awrange $80.
adtl adt2 date9. ANL01FL $2. DEVWC $10. DEVN 8.; /* 16) KB 02Jun2014 */
/* 21) KB 09Jun2014 */
    FORMAT ADT3 ADT4 DATETIME13.; /* 21) KB 09Jun2014 */

    adtl=input(scan(lbdtc,1,'T'),yymmdd10.);

```

```

    adt2=input(scan(lbendtc,1,'T'),yymmdd10.);

ADT3=DHMS(ADT1,HOUR(INPUT(SCAN(LBDTC,2,'T'),TIME5.)),MINUTE(INPUT(SCAN(LB
DTC,2,'T'),TIME5.)),0); /* 21) KB 09Jun2014 */

ADT4=DHMS(ADT2,HOUR(INPUT(SCAN(LBENDTC,2,'T'),TIME5.)),MINUTE(INPUT(SCAN(
LBENDTC,2,'T'),TIME5.)),0); /* 21) KB 09Jun2014 */
/* 16) START KB 02Jun2014 */
    AWLOUS=DHMS(ADT1,6,0,0);
    AWLOUE=DHMS(ADT1,7,0,0);
    AWHIUS=DHMS(ADT2,5,59,0);
    AWHIUE=DHMS(ADT2,6,59,0);
/* 16) END KB 02Jun2014 */
    awlo=/*dhms(adt1,6,30,0)*/AWLOUS; /* 16) KB 02Jun2014 */
    awhi=/*dhms(adt2,6,29,0)*/AWHIUE; /* 16) KB 02Jun2014 */

    if not missing(awlo) and not missing(awhi) then do;
        awrange=put(awlo,datetime13.) || '-' || put(awhi,datetime13.);
    end;

/* 21) START KB 09Jun2014 */
    IF (AWLO <= ADT3 AND ADT4<=AWHI) THEN ANL01FL='Y';
    IF MISSING(ADT4) THEN ANL01FL=''; /* 37) KB 01Aug2014 */

        IF ADT3<AWLO THEN DO;
            DEVN=FLOOR((ADT3-AWLO)/60);
            DEVWC=COMPRESS(PUT(FLOOR((ADT3-AWLO)/60),BEST.));
        END;
    ELSE IF ADT4>AWHI THEN DO;
/*            DEVN=CEIL((ADT4-AWHI)/60);*/
/*            DEVWC=COMPRESS(PUT(CEIL((ADT4-AWHI)/60),BEST.));*/
        DEVN=CEIL(((ADT4+59)-AWHI)/60); /* 39) KB 11Sep2014 */
        DEVWC=COMPRESS(PUT(CEIL(((ADT4+59)-AWHI)/60),BEST.)); /* 39)
KB 11Sep2014 */
        END;

        IF NOT MISSING(DEVWC) THEN DO;
            IF INDEX(DEVWC,'-')=0 THEN DEVWC=CATS(CATS('+',DEVWC),' min');
            ELSE IF INDEX(DEVWC,'-') THEN DEVWC=CATS(DEVWC,' min');
        END;

/*    DROP ADT1 ADT2 ADT3 ADT4;*/
/* 21) END KB 09Jun2014 */
run;

/* 38) START KB 11Sep2014 */
DATA SV;
    SET SDTM.SV(WHERE=(VISIT=('DAY 1')));
    FORMAT DAY DATE9.;
    DAY=INPUT(SCAN(SVSTDTC,1,'T'),YMMDD10.);
    KEEP USUBJID DAY;
RUN;

```

```

DATA ABLFLUV;
    SET LB_UVOL3(WHERE=(VISIT IN ('SCREENING' 'DAY -2' 'DAY -1' 'DAY 0'
'DAY 1')));

    KEEP USUBJID VISIT VISITNUM ADT4;
RUN;

PROC SORT DATA=ABLFLUV;
    BY USUBJID;
RUN;

DATA ABLFLUV2;
    MERGE ABLFLUV(IN=A) SV;
    BY USUBJID;
    IF A;
RUN;
DATA ADSLTM;
    SET ADAM.ADSL;
    WHERE TRT01A IN ('CC' 'THS 2.2' 'SA');

    KEEP USUBJID TRTSDTM TRT01A;
RUN;

DATA ABLFLUV2A;
    MERGE ABLFLUV2(IN=A) ADSLTM;
    BY USUBJID;
    IF A;
RUN;

PROC SORT DATA=ABLFLUV2A;
    BY USUBJID ADT4;
RUN;

DATA ABLFLUV3;
    SET ABLFLUV2A;

    IF TRT01A='SA' THEN DO;
        IF DAY NE . THEN DO;
            IF ADT4<DHMS(DAY,6,30,0) AND INDEX(UPCASE(VISIT),'UNSCHED')=0
THEN ABLFL2='Y';
            END;
        ELSE IF DAY EQ . THEN DO;
            IF INDEX(UPCASE(VISIT),'UNSCHED')=0 THEN ABLFL2='Y';
            END;
        END;
    ELSE IF TRT01A IN ('CC' 'THS 2.2') THEN DO;
        IF ADT4<TRTSDTM AND INDEX(UPCASE(VISIT),'UNSCHED')=0 THEN
ABLFL2='Y';
        END;
    ELSE IF MISSING(TRT01A) THEN DO;
        IF INDEX(UPCASE(VISIT),'UNSCHED')=0 THEN ABLFL2='Y';
        END;
RUN;

```

```
PROC SORT DATA=ABLFLUV3 (WHERE=(ABLFL2='Y')) OUT=ABLFLUV4;
  BY USUBJID ADT4 VISITNUM ;
RUN;
```

```
DATA ABLFLUV5 (WHERE=(ABLFL='Y')) ;
  SET ABLFLUV4;
  BY USUBJID ADT4 VISITNUM ;
  FORMAT ABLFL $2.;
```

```
  IF LAST.USUBJID AND NOT MISSING(ADT4) THEN ABLFL='Y';

  KEEP USUBJID VISIT ABLFL;
RUN;
```

```
PROC SORT DATA=ABLFLUV5;
  BY USUBJID VISIT;
RUN;
```

```
PROC SORT DATA=LB_UVOL3;
  BY USUBJID VISIT;
RUN;
```

```
DATA ABLFLUV6;
  MERGE ABLFLUV5 LB_UVOL3;
  BY USUBJID VISIT ;
RUN;
/* 38) END KB 11Sep2014 */
```

```
data base;
  set /*lb_uvol3*/ABLFLUV6 (where=(/*index(lbtpt, 'DAY 0')*/ABLFL='Y'));
/* 38) KB 11Sep2014 */
  format base /*best.*/BEST32. basetype $40.; /* 35) KB 24Jun2014 */

  base=lbstresn;
  basetype=/*'DAY 0'*/STRIP(VISIT); /* 38) KB 11Sep2014 */

  BLFL=1; /* 41) KB 15Sep2014 */

  keep subjidn lbtestcd base basetype BLFL; /* 41) KB 15Sep2014 */
run;
```

```
proc sort data=/*lb_uvol3*/ABLFLUV6; /* 38) KB 11Sep2014 */
  by subjidn;
run;
```

```
proc sort data=base;
  by subjidn;
run;
```

```
data lb_uvol4;
  merge /*lb_uvol3*/ABLFLUV6 base; /* 38) KB 11Sep2014 */
  by subjidn;
run;
```



```

proc sort data=lb_uvol4;
    by subjidn visitnum;
run;

data lb_uvol5;
    set lb_uvol4;
    format /*ablfl $2.*/ chg pchg /*best.*/BEST32. chgc pchgc $20.; /*
35) KB 24Jun2014 */ /* 38) KB 11Sep2014 */

/*      if index(lbtpt,'DAY 0') then ablfl='Y';*/ /* 38) KB 11Sep2014 */

    if index(lbtpt,'DAY -1')=0 and index(lbtpt,'DAY 0')=0 then do;
        chg=lbstresn-base;
/*      chgc=strip(put(chg,BEST32.)); */
        CHGC=STRIP(PUT(ROUND(LBSTRESN-BASE,0.000000000000000001),BEST32.));
/* 43) KB 15Oct2014 */
        if base eq 0 then do;
            pchg=(chg/1)*100;

PCHGC=STRIP(PUT(ROUND((CHG/1)*100,0.000000000000000001),BEST32.)); /* 43)
KB 15Oct2014 */
            end;
        else do;
            pchg=(chg/base)*100;

PCHGC=STRIP(PUT(ROUND((CHG/BASE)*100,0.000000000000000001),BEST32.)); /*
43) KB 15Oct2014 */
            end;
/*pchg=strip(put(pchg,/*best.*/BEST32.));*/ /* 9) KB
15May2014 */
            end;

        drop subjidn trt01a /*adt1 adt2*/ tr01sdtm; /* 21) KB 09Jun2014 */
run;

%mend uvol;

/* CYP1A2 */

%macro cyp1a2;

/* 12) START KB 15May2014 */
/*proc sort data=sdtm.lb(where=(lbcatt='ENZYM ACTIVITY' and lbtestcd
in('CAFFEINE' 'PX')) keep=studyid usubjid visitnum visit lbdtc lbcatt
lbstat lbtestcd lbstresn lbtpt) out=lb_cypdata;*/
/*      by studyid usubjid visitnum visit lbdtc lbtestcd;*/
/*run;*/

DATA LB_CYPDATA;
    SET SDTM.LB(WHERE=(LBCAT='ENZYM ACTIVITY' AND LBTESTCD IN('CAFFEINE'
'PX') AND LBSTAT NE 'NOT DONE')); /* 15) KB 01Jun2014 */

    IF INDEX(LBSTRESC,'<') THEN DO; /* 14) KB 01Jun2014 */

```

```

        LBSTRESN=INPUT(TRANWRD(SCAN(LBSTRESC,2,'(',')',''),BEST.)/2;
        LBSTRES2=STRIP(PUT(LBSTRESN,BEST.))||" "||STRIP("(Y)"); /* 14) KB
01Jun2014 */
        END; /* 14) KB 01Jun2014 */
        ELSE LBSTRES2=STRIP(PUT(LBSTRESN,BEST.)); /* 14) KB 01Jun2014 */
        KEEP STUDYID USUBJID VISITNUM VISIT LBDTC LBCAT LBSCAT LBTESTCD
LBSTRESN LBTPT LBSTRES2; /* 14) KB 01Jun2014 */
RUN;

PROC SORT DATA=LB_CYPDATA;
    BY STUDYID USUBJID VISITNUM VISIT LBDTC LBTPT LBCAT LBSCAT;
RUN;
/* 12) ENBD KB 15May2014 */

proc transpose data=lb_cypdata out=tlb_cypdata;
    by studyid usubjid visitnum visit lbdtc lbtpt lbcate lbscate;
    var /*lbstresn*/LBSTRES2; /* 14) KB 01Jun2014 */
    id lbtestcd;
run;

/* 18) START KB 05Jun2014 */
DATA TLB_CYPDATA2;
    SET TLB_CYPDATA;

/*      IF INDEX(CAFFEINE,'(Y)') OR INDEX(PX,'(Y)') THEN DELETE;*/ /* 30)
KB 22Jun2014 */
RUN;
/* 18) END KB 05Jun2014 */

data cypdata1;
    set /*tlb_cypdata*/TLB_CYPDATA2(drop=_name_ /*_label_*/); /* 14) KB
01Jun2014 */ /* 18) KB 05Jun2014 */
    FORMAT CYP1A2 PXC CAF BEST32.; /* 35) KB 24Jun2014 */

    CAFFLG=TRANWRD(SCAN(CAFFEINE,2,'(',')',''), /* 14) KB 01Jun2014 */
PXFLG=TRANWRD(SCAN(PX,2,'(',')',''), /* 14) KB 01Jun2014 */
IF CAFFLG='Y' OR PXFLG='Y' THEN CYP1FLG='Y'; /* 14) KB 01Jun2014 */

    cypla2=ROUND(((INPUT(SCAN(px,1,'(',')',BEST32.)*5.550)/(INPUT(SCAN(cafeine,1,'(',')',BEST32.)*5.150))*100,0.0000000000000001); /* 14) KB
01Jun2014 */ /* 35) KB 24Jun2014 */
/*
    cypla2c=left(trim(put(/**round(/**cypla2/**,0.01)/**,/**8.2/**
*BEST32.)))); /* 35) KB 24Jun2014 */
    CYP1A2C=LEFT(TRIM(PUT(ROUND(((INPUT(SCAN(PX,1,'(',')',BEST32.)*5.550)/(
INPUT(SCAN(CAFFEINE,1,'(',')',BEST32.)*5.150))*100,0.0000000000000001),BEST
32.)))); /* 42) KB 15Oct2014 */

    pxc=ROUND(INPUT(SCAN(px,1,'(',')',BEST32.)*5.550,0.0000000000000001); /*
14) KB 01Jun2014 */ /* 35) KB 24Jun2014 */

/*pxcc=left(trim(put(/**round(/**pxc/**,0.001)/**,/**8.3/**BEST32.
)); /* 35) KB 24Jun2014 */

```

```
PXCC=LEFT(TRIM(PUT(round(input(scan(px,1,' '),best32.)*5.550,0.0000000000
000001),BEST32.))); /* 42) KB 15Oct2014 */
```

```
caf=ROUND(INPUT(SCAN(caffeine,1,' '),BEST32.)*5.150,0.0000000000000001);
/* 14) KB 01Jun2014 */ /* 35) KB 24Jun2014 */
/*
```

```
cafc=left(trim(put(*/*round(*/*caf*/*,0.001)*/*,*/*8.3*/*BEST32.)))
;*/ /* 35) KB 24Jun2014 */
```

```
CAFC=LEFT(TRIM(PUT(ROUND(INPUT(SCAN(CAFFEINE,1,' '),BEST32.)*5.150,0.0000
000000000001),BEST32.))); /* 42) KB 15Oct2014 */
```

```
/* 14) START KB 01Jun2014 */
IF CAFFLG='Y' THEN CAFC=STRIP(CAFC)||" "||STRIP(CAFFLG);
IF PXFLG='Y' THEN PXCC=STRIP(PXCC)||" "||STRIP(PXFLG);
IF CYP1FLG='Y' THEN CYP1A2C=STRIP(CYP1A2C)||" "||STRIP(CYP1FLG);
/* 14) END KB 01Jun2014 */
run;
```

```
proc transpose data=cypdata1 out=cypdata1a(rename=(_name_=lbtestcd
coll=aval));
by studyid usubjid visitnum visit lbdtc lbtpt lbcat lbcat;
var cypla2 pxc caf;
run;
```

```
proc transpose data=cypdata1 out=cypdata1b(rename=(_name_=lbtestcd
coll=avalc));
by studyid usubjid visitnum visit lbdtc lbtpt lbcat lbcat;
var cypla2c pxcc cafc;
run;
```

```
data cypdata1aa;
set cypdata1a;

lbtestcd=upcase(lbtestcd);
run;
```

```
data cypdata1c;
set cypdata1b;

lbtestcd=upcase(lbtestcd);

lbtestcd=tranwrd(lbtestcd,'CYP1A2C','CYP1A2');
lbtestcd=tranwrd(lbtestcd,'PXCC','PXC');
lbtestcd=tranwrd(lbtestcd,'CAFC','CAF');
```

```
/* 14) START KB 01Jun2014 */
IF INDEX(AVALC," Y") THEN DO;
BLQFLG="Y";
AVALC=SCAN(AVALC,1," Y");
END;
/* 14) END KB 01Jun2014 */
```

```

run;

proc sort data=cypdata1aa;
  by studyid usubjid visitnum visit lbdtc lbtpt lbcac lbscat lbtestcd;
run;

proc sort data=cypdata1c;
  by studyid usubjid visitnum visit lbdtc lbtpt lbcac lbscat lbtestcd;
run;

data cypdata2;
  merge cypdata1aa cypdata1c;
  by studyid usubjid visitnum visit lbdtc lbtpt lbcac lbscat lbtestcd;
run;

data cypdata2a;
  set cypdata2;
  format lbstresn /*best.*/BEST32. lbstresc $200. lbtestcd $8. lbtest
$40. lbseq 8. paramtyp $20. dtype $10.; /* 35) KB 24Jun2014 */

  IF LBTESTCD='CYP1A2' AND BLQFLG='Y' THEN DELETE; /* 30) KB 22Jun2014
*/

  if usubjid ne '' then do;
    if lbtestcd='CYP1A2' then do;
      lbstresn=aval;
      lbstresc=avalc;
      lbtest='CYP1A2 Activity';
      lbseq=.;
      paramtyp='DERIVED';
      dtype='RATIO';
    end;
    else if lbtestcd='CAF' then do;
      lbstresn=aval;
      lbstresc=avalc;
      lbtest='Caffeine';
      lbseq=.;
      paramtyp='DERIVED';
      dtype='FUNCTION';
    end;
    else if lbtestcd='PXC' then do;
      lbstresn=aval;
      lbstresc=avalc;
      lbtest="Paraxanthine";
      lbseq=.;
      paramtyp='DERIVED';
      dtype='FUNCTION';
    end;
  end;
  else delete;
  keep studyid usubjid visitnum visit lbdtc lbtpt lbtest lbtestcd lbcac
lbscat lbstresn lbstresc paramtyp dtype BLQFLG; /* 14) KB 01Jun2014 */
run;

```

```

/* 38) START KB 11Sep2014 */
DATA SV;
  SET SDTM.SV(WHERE=(VISIT=('DAY 1')));
  FORMAT DAY DATE9.;

  DAY=INPUT(SCAN(SVSTDTC,1,'T'),YYMMDD10.);
  KEEP USUBJID DAY;
RUN;

DATA ABLFLCY;
  SET CYPDATA2A(WHERE=(VISIT IN ('SCREENING' 'DAY -2' 'DAY -1' 'DAY 0'
'DAY 1')));
  FORMAT ADTM DATETIME13.;

ADTM=DHMS(INPUT(SCAN(LBDTC,1,'T'),YYMMDD10.),HOUR(INPUT(SCAN(LBDTC,2,'T')
,TIME5.)),MINUTE(INPUT(SCAN(LBDTC,2,'T'),TIME5.)),0);

  KEEP USUBJID VISIT VISITNUM ADTM LBTESTCD; /* 40) KB 15Sep2014 */
RUN;

PROC SORT DATA=ABLFLCY;
  BY USUBJID;
RUN;

DATA ABLFLCY2;
  MERGE ABLFLCY(IN=A) SV;
  BY USUBJID;
  IF A;
RUN;

DATA ADSLTM;
  SET ADAM.ADSL;
  WHERE TRT01A IN ('CC' 'THS 2.2' 'SA');

  KEEP USUBJID TRTSDTM TRT01A;
RUN;

DATA ABLFLCY2A;
  MERGE ABLFLCY2(IN=A) ADSLTM;
  BY USUBJID;
  IF A;
RUN;

PROC SORT DATA=ABLFLCY2A;
  BY USUBJID ADTM;
RUN;

DATA ABLFLCY3;
  SET ABLFLCY2A;

  IF TRT01A='SA' THEN DO;
    IF DAY NE . THEN DO;

```

```

        IF ADTM<DHMS(DAY,6,30,0) AND INDEX(UPCASE(VISIT),'UNSCHED')=0
THEN ABLFL2='Y';
        END;
        ELSE IF DAY EQ . THEN DO;
            IF INDEX(UPCASE(VISIT),'UNSCHED')=0 THEN ABLFL2='Y';
        END;
    END;
    ELSE IF TRT01A IN ('CC' 'THS 2.2') THEN DO;
        IF ADTM<TRTSDTM AND INDEX(UPCASE(VISIT),'UNSCHED')=0 THEN
ABLFL2='Y';
        END;
        ELSE IF MISSING(TRT01A) THEN DO;
            IF INDEX(UPCASE(VISIT),'UNSCHED')=0 THEN ABLFL2='Y';
        END;
    END;
RUN;

PROC SORT DATA=ABLFLCY3(WHERE=(ABLFL2='Y')) OUT=ABLFLCY4;
    BY USUBJID ADTM VISITNUM LBTESTCD; /* 40) KB 15Sep2014 */
RUN;

DATA ABLFLCY5(WHERE=(ABLFL='Y'));
    SET ABLFLCY4;
    BY USUBJID ADTM VISITNUM LBTESTCD; /* 40) KB 15Sep2014 */
    FORMAT ABLFL $2.;

    IF LAST.LBTESTCD/*USUBJID*/ AND NOT MISSING(ADTM) THEN ABLFL='Y'; /*
40) KB 15Sep2014 */

    KEEP USUBJID VISIT ABLFL LBTESTCD; /* 40) KB 15Sep2014 */
RUN;

PROC SORT DATA=ABLFLCY5;
    BY USUBJID VISIT LBTESTCD; /* 40) KB 15Sep2014 */
RUN;

PROC SORT DATA=CYPDATA2A;
    BY USUBJID VISIT LBTESTCD; /* 40) KB 15Sep2014 */
RUN;

DATA ABLFLCY6;
    MERGE ABLFLCY5 CYPDATA2A;
    BY USUBJID VISIT LBTESTCD; /* 40) KB 15Sep2014 */
RUN;
/* 38) END KB 11Sep2014 */

data cypdatabases;
    set /*cypdata2a*/ABLFLCY6(where=(/*visit='DAY 0'*/ABLFL='Y')); /* 38)
KB 11Sep2014 */
    format base /*best.*/BEST32. BASETYPE $40.; /* 13) KB 15May2014 */ /*
35) KB 24Jun2014 */

    base=lbstresn;
    BASETYPE=/*'DAY 0'*/STRIP(VISIT); /* 13) KB 15May2014 */ /* 38) KB
11Sep2014 */

```

```

        BLFL=1; /* 41) KB 15Sep2014 */
        keep usubjid lbtestcd base BASETYPE BLFL; /* 13) KB 15May2014 */ /*
41) KB 15Sep2014 */
run;

proc sort data=/*cypdata2a*/ABLFLCY6; /* 38) KB 11Sep2014 */
    by usubjid lbtestcd;
run;

data cypdata3;
    merge /*cypdata2a*/ABLFLCY6 cypdatabases; /* 38) KB 11Sep2014 */
    by usubjid lbtestcd;
    format chg pchg /*best.*/BEST32. chgc pchgc $20.; /* 35) KB 24Jun2014
*/

        if visit ne 'DAY 0' then do;
            chg=lbstresn-base; /* 35) KB 24Jun2014 */
/*            chgc=strip(put(chg,BEST32.)); */
            CHGC=STRIP(PUT(ROUND(LBSTRESN-BASE,0.0000000000000001),BEST32.));
/* 43) KB 15Oct2014 */
            if base eq 0 then do;
                pchg=(chg/1)*100; /* 35) KB 24Jun2014 */

PCHGC=STRIP(PUT(ROUND((CHG/1)*100,0.0000000000000001),BEST32.)); /* 43)
KB 15Oct2014 */
                end;
            else do;
                pchg=(chg/base)*100; /* 35) KB 24Jun2014 */

PCHGC=STRIP(PUT(ROUND((CHG/BASE)*100,0.0000000000000001),BEST32.)); /*
43) KB 15Oct2014 */
                end;
            /* pchgc=strip(put(pchg,/*best.*//*8.1*//*BEST32.)); *//* 9) KB
15May2014 */ /* 35) KB 24Jun2014 */
            end;
run;

%mend cypla2;

%macro neq;

data neq;
    set sdtm.lb(where=(lbtestcd in ('FNIC' 'NICG' 'FCOT' 'COTG'
'FTRANSHY' 'TRANSHYG' /*'UVOL'*/'VOLUME') or (lbcat='BIOMARKERS' and
lbtestcd='CREAT') AND LBSTAT NE 'NOT DONE'))); /* 15) KB 01Jun2014 */ /*
28) KB 21Jun2014 */
        IF INDEX(LBSTRESC,'<') THEN DO; /* 14) KB 01Jun2014 */
            LBSTRESN=INPUT(TRANWRD(SCAN(LBSTRESC,2,'(',')',' '),BEST.)/2; /*
4) KB 13May2014 */
            LBSTRES2=STRIP(PUT(LBSTRESN,BEST.))||" "||STRIP("(Y)"); /* 14) KB
01Jun2014 */
            END; /* 14) KB 01Jun2014 */
            ELSE LBSTRES2=STRIP(PUT(LBSTRESN,BEST.)); /* 14) KB 01Jun2014 */

```

```

        keep studyid usubjid visitnum visit lbdtc LBENDTC lbcac lbcat lbcat
lbtestcd lbstresn lbtp LBSTRES2; /* 14) KB 01Jun2014 */ /* 16) KB
02Jun2014 */
run;

proc sort data=neq;
    by studyid usubjid visitnum visit lbdtc LBENDTC lbtp lbcat lbcat;
/* 16) KB 02Jun2014 */
run;

proc transpose data=neq out=neq2 (WHERE=(FNIC NE '' AND NICG NE '' AND
FCOT NE '' AND COTG NE '' AND FTRANSHY NE '' AND TRANSHYG NE '')); /* 15)
KB 01Jun2014 */
    by studyid usubjid visitnum visit lbdtc LBENDTC lbtp lbcat lbcat;
/* 16) KB 02Jun2014 */
    var /*lbstresn*/LBSTRES2; /* 14) KB 01Jun2014 */
    id lbtestcd;
run;

data neq3;
    set neq2(drop=_name_ /*_label_*/); /* 14) KB 01Jun2014 */
    FORMAT FNICC NICGC FCOTC COTGC FTRANSC TRANSHC NEQ24U NEQCRE BEST32.;
/* 35) KB 24Jun2014 */

/* 14) START KB 01Jun2014 */
    FNICFLG=TRANWRD(SCAN(FNIC,2,'(',')',' '),' ');
    NICGFLG=TRANWRD(SCAN(NICG,2,'(',')',' '),' ');
    FCOTFLG=TRANWRD(SCAN(FCOT,2,'(',')',' '),' ');
    COTGFLG=TRANWRD(SCAN(COTG,2,'(',')',' '),' ');
    FTRANFLG=TRANWRD(SCAN(FTRANSHY,2,'(',')',' '),' ');
    TRANSFLG=TRANWRD(SCAN(TRANSHYG,2,'(',')',' '),' ');
    IF FNICFLG='Y' OR NICGFLG='Y' OR FCOTFLG='Y' OR COTGFLG='Y' OR
FTRANFLG='Y' OR TRANSFLG='Y' THEN DO;
        NEQ24FLG='Y';
        NEQCRFLG='Y';
    END;
/* 14) END KB 01Jun2014 */

/* 42) START KB 15Oct2014 */
/*    fnicc=fnic*6.164*1000;*/
/*    FNICC=(INPUT(SCAN(FNIC,1,'(',')',BEST32.)*6.164)/1000; *//* 1) KB
13May2014 */
/*
fnicc2=left(trim(put(*/*round(*/*fnicc*/*,0.001)*//*,*//*8.3*//*BEST32
.)))); */ /* 35) KB 24Jun2014 */
/*    nicgc=nicg*2.955*1000;*/
/*    NICGC=(INPUT(SCAN(NICG,1,'(',')',BEST32.)*2.955)/1000; */ /* 1) KB
13May2014 */
/*
nicgc2=left(trim(put(*/*round(*/*nicgc*/*,0.001)*//*,*//*8.3*//*BEST32
.)))); *//* 35) KB 24Jun2014 */
/*    fcotc=fcot*5.675*1000;*/
/*    FCOTC=(INPUT(SCAN(FCOT,1,'(',')',BEST32.)*5.675)/1000; *//* 1) KB
13May2014 */

```



```

/*fcotc2=left(trim(put(*//*round(*//*fcotc*//*0.001)*//*,*//*8.3*//*BEST
32.)));*/ /* 35) KB 24Jun2014 */
/*      cotgc=cotg*2.838*1000;*/
/*      COTGC=(INPUT(SCAN(COTG,1,' '),BEST32.)*2.838)/1000; *//* 1) KB
13May2014 */
/*
cotgc2=left(trim(put(*//*round(*//*cotgc*//*0.001)*//*,*//*8.3*//*BEST32
.)));*/ /* 35) KB 24Jun2014 */
/*      ftransc=ftranshy*5.202*1000;*/
/*      FTRANSC=(INPUT(SCAN(FTRANSHY,1,' '),BEST32.)*5.202)/1000;*/ /* 1)
KB 13May2014 */
/*
ftransc2=left(trim(put(*//*round(*//*ftransc*//*0.001)*//*,*//*8.3*//*BE
ST32.)));*/ /* 35) KB 24Jun2014 */
/*      transhc=transhyg*2.715*1000;*/
/*      TRANSHC=(INPUT(SCAN(TRANSHYG,1,' '),BEST32.)*2.715)/1000;*/ /* 1)
KB 13May2014 */
/*
transhc2=left(trim(put(*//*round(*//*transhc*//*0.001)*//*,*//*8.3*//*BE
ST32.))); *//* 35) KB 24Jun2014 */

```

```

FNICC=ROUND(ROUND((ROUND(INPUT(SCAN(FNIC,1,' '),BEST32.),0.000000000000000
01)*6.164),0.00000000000000001)/1000,0.00000000000000001);
FNICC4=ROUND(FNICC*1000000,0.00000000000000001);

```

```

FNICC2=LEFT(TRIM(PUT(ROUND((ROUND(INPUT(SCAN(FNIC,1,' '),BEST32.),0.00000
000000000001)*6.164)/1000,0.00000000000000001),BEST32.)));

```

```

NICGC=ROUND(ROUND((ROUND(INPUT(SCAN(NICG,1,' '),BEST32.),0.000000000000000
01)*2.955),0.00000000000000001)/1000,0.00000000000000001);
NICGC4=ROUND(NICGC*1000000,0.00000000000000001);

```

```

NICGC2=LEFT(TRIM(PUT(ROUND((ROUND(INPUT(SCAN(NICG,1,' '),BEST32.),0.00000
000000000001)*2.955)/1000,0.00000000000000001),BEST32.)));

```

```

FCOTC=ROUND(ROUND((ROUND(INPUT(SCAN(FCOT,1,' '),BEST32.),0.000000000000000
01)*5.675),0.00000000000000001)/1000,0.00000000000000001);
FCOTC4=ROUND(FCOTC*1000000,0.00000000000000001);

```

```

FCOTC2=LEFT(TRIM(PUT(ROUND((ROUND(INPUT(SCAN(FCOT,1,' '),BEST32.),0.00000
000000000001)*5.675)/1000,0.00000000000000001),BEST32.)));

```

```

COTGC=ROUND(ROUND((ROUND(INPUT(SCAN(COTG,1,' '),BEST32.),0.000000000000000
01)*2.838),0.00000000000000001)/1000,0.00000000000000001);
COTGC4=ROUND(COTGC*1000000,0.00000000000000001);

```

```

COTGC2=LEFT(TRIM(PUT(ROUND((ROUND(INPUT(SCAN(COTG,1,' '),BEST32.),0.00000
000000000001)*2.838)/1000,0.00000000000000001),BEST32.)));

```

```

FTRANSC=ROUND(ROUND((ROUND(INPUT(SCAN(FTRANSHY,1,' '),BEST32.),0.00000000
00000001)*5.202),0.00000000000000001)/1000,0.00000000000000001);
FTRANSC4=ROUND(FTRANSC*1000000,0.00000000000000001);

```

```
FTRANSC2=LEFT (TRIM(PUT (ROUND ( (ROUND (INPUT (SCAN (FTRANSHY,1,' ( ' ),BEST32. ),0
.000000000000000001)*5.202)/1000,0.000000000000000001),BEST32.)));
```

```
TRANSHC=ROUND (ROUND ( (ROUND (INPUT (SCAN (TRANSHYG,1,' ( ' ),BEST32. ),0.00000000
000000001)*2.715),0.000000000000000001)/1000,0.000000000000000001);
TRANSHC4=ROUND (TRANSHC*1000000,0.000000000000000001);
```

```
TRANSHC2=LEFT (TRIM(PUT (ROUND ( (ROUND (INPUT (SCAN (TRANSHYG,1,' ( ' ),BEST32. ),0
.000000000000000001)*2.715)/1000,0.000000000000000001),BEST32.)));
/* 42) END KB 15Oct2014 */
```

```
/* 42) START KB 15Oct2014 */
/*
neq24u=(fnicc+nicgc+fcotc+cotgc+ftransc+transhc)*162.2*(uvol/1000);*/
/*
NEQ24U=ROUND (((FNICC+NICGC+FCOTC+COTGC+FTRANSC+TRANSHC)*162.2*(U*VOL*
/VOLUME)/1000))/1000,0.000000000000000001); *//* 6) KB 14May2014 */ /* 28)
KB 21Jun2014 */ /* 35) KB 24Jun2014 */
```

```
/*neq24u2=left(trim(put(*//*round(*//*neq24u*//* ,0.01)*//* ,*//*8.2*//*BES
T32.))); *//* 35) KB 24Jun2014 */
/*VOLUME2=VOLUME/100; *//* 33) KB 23Jun2014 */
```

```
/*neqcre=*//*neq*//*ROUND((NEQ24U/(creat*VOLUME2))*1000,0.00000000000000000
1); *//* 2) KB 13May2014 */ /* 33) KB 23Jun2014 */ /* 35) KB 24Jun2014
*/
```

```
/*neqadj=left(trim(put(*//*round(*//*neqcre*//* ,0.01)*//* ,*//*8.2*//*BEST
32.))); *//* 35) KB 24Jun2014 */
```

```
NEQ24U=ROUND (((COTGC4+FCOTC4+FNICC4+FTRANSC4+NICGC4+TRANSHC4)/1000000)*1
62.2*(VOLUME/1000))/1000,0.000000000000000001);
NEQ24U2=LEFT (TRIM(PUT ((NEQ24U),BEST32.)));
VOLUME2=VOLUME/100;
```

```
NEQCRE=ROUND ((NEQ24U/ROUND ((CREAT*VOLUME2),0.000000000000000001))*1000,0.00
0000000000000001);
```

```
NEQADJ=LEFT (TRIM(PUT (ROUND ((NEQ24U/(CREAT*VOLUME2))*1000,0.000000000000000
01),BEST32.)));
/* 42) END KB 15Oct2014 */
```

```
/* 42) START KB 15Oct2014 */
/* 35) START KB 24Jun2014 */
/* FNICC3=ROUND (FNICC,0.000000000000000001); */
/* NICGC3=ROUND (NICGC,0.000000000000000001); */
/* FCOTC3=ROUND (FCOTC,0.000000000000000001); */
/* COTGC3=ROUND (COTGC,0.000000000000000001); */
/* FTRANSC3=ROUND (FTRANSC,0.000000000000000001); */
/* TRANSHC3=ROUND (TRANSHC,0.000000000000000001); */
/* 35) END KB 24Jun2014 */
/* 42) END KB 15Oct2014 */
```

```

/* 14) START KB 01Jun2014 */
  IF FNICFLG='Y' THEN FNICC2=STRIP(FNICC2)||" "||STRIP(FNICFLG);
  IF NICGFLG='Y' THEN NICGC2=STRIP(NICGC2)||" "||STRIP(NICGFLG);
  IF FCOTFLG='Y' THEN FCOTC2=STRIP(FCOTC2)||" "||STRIP(FCOTFLG);
  IF COTGFLG='Y' THEN COTGC2=STRIP(COTGC2)||" "||STRIP(COTGFLG);
  IF FTRANFLG='Y' THEN FTRANSC2=STRIP(FTRANSC2)||" "||STRIP(FTRANFLG);
  IF TRANSHC2=STRIP(TRANSHC2)||" "||STRIP(TRANSHC2);
  IF NEQ24FLG='Y' THEN NEQ24U2=STRIP(NEQ24U2)||" "||STRIP(NEQ24FLG);
  IF NEQCRFLG='Y' THEN NEQADJ=STRIP(NEQADJ)||" "||STRIP(NEQCRFLG);
/* 14) END KB 01Jun2014 */

  DROP VOLUME2 /*FNICC NICGC FCOTC COTGC FTRANSC TRANSHC*/ ; /* 33) KB
23Jun2014 */ /* 42) KB 15Oct2014 */
  /*RENAME FNICC3=FNICC NICGC3=NICGC FCOTC3=FCOTC COTGC3=COTGC
FTRANSC3=FTRANSC TRANSHC3=TRANSHC;*/ /* 35) KB 24Jun2014 */ /* 42) KB
15Oct2014 */
run;

proc transpose data=neq3 out=neq3a(rename=(_name_=lbtestcd coll=aval));
  by studyid usubjid visitnum visit lbdtc LBENDTC lbtpt lbcats lbcat lbscat;
/* 16) KB 02Jun2014 */
  var fnicc nicgc fcotc cotgc ftransc transhc neq24u neqcre;
run;

proc transpose data=neq3 out=neq3b(rename=(_name_=lbtestcd coll=avalc));
  by studyid usubjid visitnum visit lbdtc LBENDTC lbtpt lbcats lbcat lbscat;
/* 16) KB 02Jun2014 */
  var fnicc2 nicgc2 fcotc2 cotgc2 ftransc2 transhc2 neq24u2 neqadj;
run;

data neq3aa;
  set neq3a;
  lbtestcd=upcase(lbtestcd);
run;

data neq3c;
  set neq3b;

  lbtestcd=upcase(lbtestcd);

  lbtestcd=tranwrd(lbtestcd,'FNICC2','FNICC');
  lbtestcd=tranwrd(lbtestcd,'NICGC2','NICGC');
  lbtestcd=tranwrd(lbtestcd,'FCOTC2','FCOTC');
  lbtestcd=tranwrd(lbtestcd,'COTGC2','COTGC');
  lbtestcd=tranwrd(lbtestcd,'FTRANSC2','FTRANSC');
  lbtestcd=tranwrd(lbtestcd,'TRANSHC2','TRANSHC');
  lbtestcd=tranwrd(lbtestcd,'NEQ24U2','NEQ24U');
  lbtestcd=tranwrd(lbtestcd,'NEQADJ','NEQCRE');

/* 14) START KB 01Jun2014 */
  IF INDEX(AVALC," Y") THEN DO;
    BLQFLG="Y";
    AVALC=SCAN(AVALC,1," Y");

```

```

        END;
/* 14) END KB 01Jun2014 */

run;
proc sort data=neq3aa;
    by studyid usubjid visitnum visit lbdtc LBENDTC lbtpt lbcat lbscat
lbtestcd; /* 16) KB 02Jun2014 */
run;

proc sort data=neq3c;
    by studyid usubjid visitnum visit lbdtc LBENDTC lbtpt lbcat lbscat
lbtestcd; /* 16) KB 02Jun2014 */
run;

data neq4;
    merge neq3aa neq3c;
    by studyid usubjid visitnum visit lbdtc LBENDTC lbtpt lbcat lbscat
lbtestcd; /* 16) KB 02Jun2014 */
run;

data neq4a;
    set neq4;
    format lbstresn /*best.*/BEST32. lbstresc $200. lbtestcd $8. lbtest
$40. lbseq 8. paramtyp $20. dtype $10.;
    length lbstresu /*$200*/$7; /* 29) KB 21Jun2014 */

    if usubjid ne '' then do;
        if lbtestcd='COTGC' then do;
            lbstresn=aval;
            lbstresc=avalc;
            lbtest='Cotinine-Glucuronide';
            lbseq=.;
            paramtyp='DERIVED';
            dtype='FUNCTION';
            lbstresu=strip('umol/L');
        end;
        else if lbtestcd='FCOTC' then do;
            lbstresn=aval;
            lbstresc=avalc;
            lbtest='Free Cotinine';
            lbseq=.;
            paramtyp='DERIVED';
            dtype='FUNCTION';
            lbstresu=strip('umol/L');
        end;
        else if lbtestcd='FNICC' then do;
            lbstresn=aval;
            lbstresc=avalc;
            lbtest='Free Nicotine';
            lbseq=.;
            paramtyp='DERIVED';
            dtype='FUNCTION';
            lbstresu=strip('umol/L');
        end;
    end;
end;

```

```

else if lbtestcd='FTRANSC' then do;
    lbstresn=aval;
    lbstresc=avalc;
    lbtest="Free Trans-3'-Hydroxycotinine";
    lbseq=.;
    paramtyp='DERIVED';
    dtype='FUNCTION';
    lbstresu=strip('umol/L');
end;
else if lbtestcd='NEQ24U' then do;
    lbstresn=aval;
    lbstresc=avalc;
    lbtest='Nicotine Equivalents';
    lbseq=.;
    paramtyp='DERIVED';
    dtype='FUNCTION';
/*      lbstresu=strip('g');*/
    LBSTRESU=STRIP('mg'); /* 6) KB 14May2014 */
end;
else if lbtestcd='NEQCRE' then do;
    lbstresn=aval;
    lbstresc=avalc;
/*      lbtest='Nicotine Equivalents Corrected';*/
    LBTEST='Nicotine Equivalents'; /* 8) KB 15May2014 */
    lbseq=.;
    paramtyp='DERIVED';
    dtype='FUNCTION';
/*      lbstresu=strip('g / mg/dL creat');*/
    LBSTRESU=STRIP(/*'mg / mg/dL creat'*/'mg / mg'); /* 6) KB
14May2014 */ /* 29) KB 21Jun2014 */
end;
else if lbtestcd='NICGC' then do;
    lbstresn=aval;
    lbstresc=avalc;
    lbtest='Nicotine-Glucuronide';
    lbseq=.;
    paramtyp='DERIVED';
    dtype='FUNCTION';
    lbstresu=strip('umol/L');
end;
else if lbtestcd='TRANSHC' then do;
    lbstresn=aval;
    lbstresc=avalc;
    lbtest="Trans-3'-Hydroxycotinineglucuronide";
    lbseq=.;
    paramtyp='DERIVED';
    dtype='FUNCTION';
    lbstresu=strip('umol/L');
end;
end;
else delete;

```

```

        keep studyid usubjid visitnum visit lbdtc LBENDTC lbtpt lbtest
lbtestcd lbcatt lbstresn lbstresc paramtyp dtype lbstresu BLQFLG;
/* 14) KB 01Jun2014 */ /* 16) KB 02Jun2014 */
run;

/* 38) START KB 11Sep2014 */
DATA SV;
    SET SDTM.SV(WHERE=(VISIT=('DAY 1')));
    FORMAT DAY DATE9.;

    DAY=INPUT(SCAN(SVSTDTC,1,'T'),YYMMDD10.);
    KEEP USUBJID DAY;
RUN;

DATA ABLFLNE;
    SET NEQ4A(WHERE=(VISIT IN ('SCREENING' 'DAY -2' 'DAY -1' 'DAY 0' 'DAY
1')));
    FORMAT ADTM DATETIME13.;

ADTM=DHMS(INPUT(SCAN(LBENDTC,1,'T'),YYMMDD10.),HOUR(INPUT(SCAN(LBENDTC,2,
'T'),TIME5.)),MINUTE(INPUT(SCAN(LBENDTC,2,'T'),TIME5.)),0);

    KEEP USUBJID VISIT VISITNUM ADTM LBTESTCD;
RUN;

PROC SORT DATA=ABLFLNE;
    BY USUBJID;
RUN;

DATA ABLFLNE2;
    MERGE ABLFLNE(IN=A) SV;
    BY USUBJID;
    IF A;
RUN;

DATA ADSLTM;
    SET ADAM.ADSL;
    WHERE TRT01A IN ('CC' 'THS 2.2' 'SA');

    KEEP USUBJID TRTSDTM TRT01A;
RUN;

DATA ABLFLNE2A;
    MERGE ABLFLNE2(IN=A) ADSLTM;
    BY USUBJID;
    IF A;
RUN;

PROC SORT DATA=ABLFLNE2A;
    BY USUBJID ADTM;
RUN;

DATA ABLFLNE3;

```

```

SET ABLFLNE2A;

IF TRT01A='SA' THEN DO;
    IF DAY NE . THEN DO;
        IF ADTM<DHMS(DAY,6,30,0) AND INDEX(UPCASE(VISIT),'UNSCHED')=0
THEN ABLFL2='Y';
        END;
        ELSE IF DAY EQ . THEN DO;
            IF INDEX(UPCASE(VISIT),'UNSCHED')=0 THEN ABLFL2='Y';
            END;
        END;
    ELSE IF TRT01A IN ('CC' 'THS 2.2') THEN DO;
        IF ADTM<TRTSDTM AND INDEX(UPCASE(VISIT),'UNSCHED')=0 THEN
ABLFL2='Y';
        END;
        ELSE IF MISSING(TRT01A) THEN DO;
            IF INDEX(UPCASE(VISIT),'UNSCHED')=0 THEN ABLFL2='Y';
            END;
        END;
RUN;

PROC SORT DATA=ABLFLNE3(WHERE=(ABLFL2='Y')) OUT=ABLFLNE4;
    BY USUBJID LBTESTCD ADTM VISITNUM ;
RUN;

DATA ABLFLNE5(WHERE=(ABLFL='Y'));
    SET ABLFLNE4;
    BY USUBJID LBTESTCD ADTM VISITNUM ;
    FORMAT ABLFL $2.;

    IF LAST.LBTESTCD AND NOT MISSING(ADTM) THEN ABLFL='Y';

    KEEP USUBJID VISIT ABLFL LBTESTCD;
RUN;

PROC SORT DATA=ABLFLNE5;
    BY USUBJID LBTESTCD VISIT;
RUN;

PROC SORT DATA=NEQ4A;
    BY USUBJID LBTESTCD VISIT;
RUN;

DATA ABLFLNE6;
    MERGE ABLFLNE5 NEQ4A;
    BY USUBJID LBTESTCD VISIT ;
RUN;
/* 38) END KB 11Sep2014 */

data neq4abases;
    set /*neq4a*/ABLFLNE6(where=(/*visit='DAY 0'*/ABLFL='Y')); /* 38) KB
11Sep2014 */
    format base /*best.*/BEST32. BASETYPE $40.; /* 13) KB 15May2014 */ /*
35) KB 24Jun2014 */

```

```

        base=lbstresn;
        BASETYPE=/'DAY 0'*/STRIP(VISIT); /* 13) KB 15May2014 */ /* 38) KB
11Sep2014 */

        BLFL=1; /* 41) KB 15Sep2014 */

        keep usubjid lbtestcd base BASETYPE BLFL; /* 13) KB 15May2014 */ /*
41) KB 15Sep2014 */
run;

proc sort data=/'neq4a'*/ABLFLNE6; /* 38) KB 11Sep2014 */
    by usubjid lbtestcd;
run;

data neq5;
    merge /*neq4a*/ABLFLNE6 neq4abases; /* 38) KB 11Sep2014 */
    by usubjid lbtestcd;
    format chg pchg /*best.*/BEST32. chgc pchgc $20.; /* 35) KB 24Jun2014
*/

    if visit not in ('DAY -1' 'DAY 0') then do;
        chg=lbstresn-base; /* 35) KB 24Jun2014 */
/*
        chgc=strip(put(chg,BEST32.));*/
        CHGC=STRIP(PUT(ROUND(LBSTRESN-BASE,0.000000000000000001),BEST32.));
/* 43) KB 15Oct2014 */
        if base eq 0 then do;
            pchg=(chg/1)*100; /* 35) KB 24Jun2014 */

PCHGC=STRIP(PUT(ROUND((CHG/1)*100,0.000000000000000001),BEST32.)); /* 43)
KB 15Oct2014 */
            end;
            else do;
                pchg=(chg/base)*100; /* 35) KB 24Jun2014 */

PCHGC=STRIP(PUT(ROUND((CHG/BASE)*100,0.000000000000000001),BEST32.)); /*
43) KB 15Oct2014 */
            end;
            /* pchgc=strip(put(pchg,/*best.*//*8.1*//*BEST32.)); *//* 9) KB
15May2014 */ /* 35) KB 24Jun2014 */
            end;
run;

/* 16) START KB 02Jun2014 */
DATA NEQ6;
    SET NEQ5;
    FORMAT AWLO AWHI AWLOUS AWLOUE AWHIUS AWHIUE DATETIME13. AWRANGE $80.
ADT1 ADT2 DATE9. ANL01FL $2. DEVCW $10. DEVN 8.; /* 21) KB 09Jun2014 */

    ADT1=INPUT(SCAN(LBDTC,1,'T'),YMMDD10.);
    ADT2=INPUT(SCAN(LBENDTC,1,'T'),YMMDD10.);

```



```
ADT3=DHMS (ADT1,HOUR (INPUT (SCAN (LBDTC,2,'T'),TIME5.)),MINUTE (INPUT (SCAN (LB
DTC,2,'T'),TIME5.)),0); /* 21) KB 09Jun2014 */
```

```
ADT4=DHMS (ADT2,HOUR (INPUT (SCAN (LBENDTC,2,'T'),TIME5.)),MINUTE (INPUT (SCAN (
LBENDTC,2,'T'),TIME5.)),0); /* 21) KB 09Jun2014 */
```

```
AWLOUS=DHMS (ADT1,6,0,0);
AWLOUE=DHMS (ADT1,7,0,0);
AWHIUS=DHMS (ADT2,5,59,0);
AWHIUE=DHMS (ADT2,6,59,0);
```

```
AWLO=AWLOUS;
AWHI=AWHIUE;
```

```
IF NOT MISSING(AWLO) AND NOT MISSING(AWHI) THEN DO;
    AWRANGE=PUT(AWLO,DATETIME13.) || '-' || PUT(AWHI,DATETIME13.);
END;
```

```
/* 21) START KB 09Jun2014 */
IF (AWLO <= ADT3 AND ADT4<=AWHI) THEN ANL01FL='Y';
```

```
    IF ADT3<AWLO THEN DO;
        DEVN=FLOOR((ADT3-AWLO)/60);
        DEVWC=COMPRESS(PUT(FLOOR((ADT3-AWLO)/60),BEST.));
    END;
    ELSE IF ADT4>AWHI THEN DO;
/*        DEVN=CEIL((ADT4-AWHI)/60);*/
/*        DEVWC=COMPRESS(PUT(CEIL((ADT4-AWHI)/60),BEST.));*/
        DEVN=CEIL(((ADT4+59)-AWHI)/60); /* 39) KB 11Sep2014 */
        DEVWC=COMPRESS(PUT(CEIL(((ADT4+59)-AWHI)/60),BEST.)); /* 39)
KB 11Sep2014 */
    END;
```

```
    IF NOT MISSING(DEVWC) THEN DO;
        IF INDEX(DEVWC,'-')=0 THEN DEVWC=CATS(CATS('+',DEVWC),' min');
        ELSE IF INDEX(DEVWC,'-') THEN DEVWC=CATS(DEVWC,' min');
    END;
```

```
/* 21) END KB 09Jun2014 */
```

```
DROP ADT1 ADT2 ADT3 ADT4; /* 21) KB 09Jun2014 */
```

```
RUN;
```

```
/* 16) END KB 02Jun2014 */
```

```
%mend neq;
```

```
%macro biom;
```

```
data biom;
```

```
/*    set sdtm.lb(where=(lbtestcd in ('1-NA' '1-OHP' '2-NA' '3-HPMA' '4-
ABP' 'CEMA' 'HEMA' 'HMPMA' 'MHBMA' 'NNN' 'NNAL' 'O-TOL' 'S-BMA' 'S-PMA')
AND LBSTAT NE 'NOT DONE'));*/ /* 15) KB 01Jun2014 */
```

```
    SET SDTM.LB(WHERE=(LBTESTCD IN ('_1_NA' '_1_OHP' '_2_NA' '_3_HPMA'
'_4_ABP' 'CEMA' 'HEMA' 'HMPMA' 'MHBMA' 'NNN' 'NNAL' 'O_TOL' 'S_BMA'
```

```

'S_PMA' ' _BAP') AND LBSTAT NE 'NOT DONE'))); /* 28) KB 21Jun2014 */ /*45)
JM 08SEP2015*/
    IF INDEX(LBSTRESC,'<') THEN DO;
        LBSTRESN=INPUT(TRANWRD(SCAN(LBSTRESC,2,'(',')',''),BEST.)/2; /*
4) KB 13May2014 */
        LBSTRES2=STRIP(PUT(LBSTRESN,BEST.))||" "||STRIP("(Y)"); /* 14) KB
01Jun2014 */
        END; /* 14) KB 01Jun2014 */
        ELSE LBSTRES2=STRIP(PUT(LBSTRESN,BEST.)); /* 14) KB 01Jun2014 */

        rename lbstresn=biomkr;
        keep studyid usubjid visitnum visit lbtestcd lbdtc LBENDTC lbtpt
lbtest lbcat lbcat lbstresn LBSTRES2; /* 12) KB 15May2014 */ /* 14) KB
01Jun2014 */
run;

data uvoladj;
    set sdtm.lb(where=(lbtestcd=/'UVOL'/'VOLUME')); /* 28) KB 21Jun2014
*/

    rename lbstresn=uvol;

    keep studyid usubjid visitnum visit lbdtc LBENDTC lbtpt lbcat lbcat
lbstresn; /* 12) KB 15May2014 */
run;

proc sort data=biom;
    by usubjid visit;
run;

proc sort data=uvoladj;
    by usubjid visit;
run;

data biom2;
    merge biom(in=a) uvoladj;
    by usubjid visit;
    if a;

/* 33) START KB 23Jun2014 */
    IF LBTESTCD IN ('MHBMA' 'S_BMA' 'HEMA' 'S_PMA') THEN DO;
        BIOMKR=BIOMKR*1000;
    END;
/* 33) END KB 23Jun2014 */
run;

data biom3;
    set biom2;
    format lbstresn /*best.*/BEST32. lbstresc $200. lbtstcd2 $8. lbseq
8. paramtyp $20. dtype $10.; /* 35) KB 24Jun2014 */
    paramtyp='DERIVED';
    dtype='FUNCTION';
    lbtstcd2=strip(compress(lbtestcd,/'-'/'_'))||strip('24U'); /* 28)
KB 21Jun2014 */

```

```

lbseq=.;
if lbtstcd2 in ('3HPMA24U' 'BAP24U') then do; /* 45) JM 08SEP205 */

lbstresn=/*round(*/ROUND((biomkr*uvol/*,1.)*/)/1000,0.0000000000000001);
/* 20) KB 06Jun2014 */ /* 23) KB 09Jun2014 */ /* 35) KB 24Jun2014 */
/*lbstresc=left(trim(put(lbstresn,*//*8.*//*BEST32.)));*/ /* 35)
KB 24Jun2014 */

LBSTRESC=LEFT(TRIM(PUT(ROUND((BIOMKR*UVOL)/1000,0.0000000000000001),BEST3
2.))); /* 42) KB 15Oct2014 */
end;
else if lbtstcd2 in ('1NA24U' '1OHP24U' 'CEMA24U' 'HMPMA24U'
'NNAL24U' 'OTOL24U' /*'SBMA24U'*/) then do; /* 11) KB 15May2014 */

lbstresn=/*round(*/ROUND((biomkr*uvol)/*,0.1)*/)/1000,0.0000000000000001);
/* 20) KB 06Jun2014 */ /* 25) KB 21Jun2014 */ /* 35) KB 24Jun2014 */
/*lbstresc=left(trim(put(lbstresn,*//*8.1*//*BEST32.)));*/ /* 35)
KB 24Jun2014 */

LBSTRESC=LEFT(TRIM(PUT(ROUND((BIOMKR*UVOL)/1000,0.0000000000000001),BEST3
2.))); /* 42) KB 15Oct2014 */
end;
else if lbtstcd2 in ('2NA24U' '4ABP24U' 'NNN24U') then do;

lbstresn=/*round(*/ROUND((biomkr*uvol)/*,0.01)*/)/1000,0.0000000000000001)
; /* 20) KB 06Jun2014 */ /* 25) KB 21Jun2014 */ /* 35) KB 24Jun2014 */
/* lbstresc=left(trim(put(lbstresn,*//*8.2*//*BEST32.)));*/ /* 35)
KB 24Jun2014 */

LBSTRESC=LEFT(TRIM(PUT(ROUND((BIOMKR*UVOL)/1000,0.0000000000000001),BEST3
2.))); /* 42) KB 15Oct2014 */
end;
else if lbtstcd2 in ('HEMA24U' /*'MHBMA24U'*/ 'SBMA24U') then do; /*
11) KB 15May2014 */ /* 23) KB 09Jun2014 */

lbstresn=/*round(*/ROUND((biomkr*uvol)/*,0.001*/)/1000,0.0000000000000001)
; /* 20) KB 06Jun2014 */ /* 25) KB 21Jun2014 */ /* 35) KB 24Jun2014 */
/*lbstresc=left(trim(put(lbstresn,*//*8.3*//*BEST32.)));*/ /* 35)
KB 24Jun2014 */

LBSTRESC=LEFT(TRIM(PUT(ROUND((BIOMKR*UVOL)/1000,0.0000000000000001),BEST3
2.))); /* 42) KB 15Oct2014 */
end;
/* 23) START KB 09Jun2014 */
ELSE IF LBTSTCD2 IN ('MHBMA24U') THEN DO;
LBSTRESN=ROUND((BIOMKR*UVOL)/1000,0.0000000000000001); /* 35) KB
24Jun2014 */
/*LBSTRESC=LEFT(TRIM(PUT(LBSTRESN,*//*8.3*//*BEST32.)));*/ /* 35)
KB 24Jun2014 */

LBSTRESC=LEFT(TRIM(PUT(ROUND((BIOMKR*UVOL)/1000,0.0000000000000001),BEST3
2.))); /* 42) KB 15Oct2014 */
END;
/* 23) END KB 09Jun2014 */

```

```

        else if lbtstcd2 in ('SPMA24U') then do;

lbstresn=/*round(*/ROUND((biomkr*uvol/*,0.0001)*/)/1000,0.0000000000000000
1); /* 20) KB 06Jun2014 */ /* 23) KB 09Jun2014 */ /* 35) KB 24Jun2014
*/
        /*lbstresc=left(trim(put(lbstresn,*//*8.4*//*BEST32.))); *//* 35)
KB 24Jun2014 */

LBSTRESC=LEFT(TRIM(PUT(ROUND((BIOMKR*UVOL)/1000,0.00000000000000001),BEST3
2.))); /* 42) KB 15Oct2014 */
        end;

        IF INDEX(LBSTRES2,"Y") THEN BLQFLG="Y"; /* 14) KB 01Jun2014 */

        drop lbtestcd;
        rename lbtstcd2=lbtestcd;
        keep studyid usubjid visitnum visit lbdtc LBENDTC lbtpt lbtest
lbstcd2 lbcat lbscat lbstresn lbstresc paramtyp dtype BLQFLG; /* 12) KB
15May2014 */ /* 14) KB 01Jun2014 */
run;

data creatadj;
        set sdtm.lb(where=(lbtestcd='CREAT' and lbcat='BIOMARKERS'));

        rename lbstresn=creat;

        keep studyid usubjid visitnum visit lbdtc LBENDTC lbtpt lbcat lbscat
lbstresn; /* 12) KB 15May2014 */
run;

proc sort data=biom;
        by usubjid visit;
run;

proc sort data=creatadj;
        by usubjid visit;
run;

data biomc2;
        merge biom(in=a) creatadj;
        by usubjid visit;
        if a;

/* 33) START KB 23Jun2014 */
        IF LBTESTCD IN ('MHBMA' 'S_BMA' 'HEMA' 'S_PMA') THEN DO;
                BIOMKR=BIOMKR*1000;
        END;
/* 33) END KB 23Jun2014 */
run;

data biomc3;
        set biomc2;
        format lbstresn /*best.*/BEST32. lbstresc $200. lbtstcd2 $8. lbseq 8.
paramtyp $20. dtype $10.; /* 35) KB 24Jun2014 */

```

```

        paramtyp='DERIVED';
        dtype='FUNCTION';
        lbtstcd2=strip(compress(lbtestcd,/*'-'/'_')||strip('CRE'); /* 28)
KB 21Jun2014 */
        lbseq=.;
        if lbtstcd2 in ('3HPMACRE' 'BAPCRE') then do; /* 45) JM 08SEP205 */

lbstresn=/*round(*/ROUND((biomkr/creat/*,1.)*/*100,0.00000000000000001);
/* 20) KB 06Jun2014 */ /* 23) KB 09Jun2014 */ /* 35) KB 24Jun2014 */
        /*lbstresc=left(trim(put(lbstresn,*//*8.*//*BEST32.))); *//* 35)
KB 24Jun2014 */

LBSTRESC=LEFT(TRIM(PUT(ROUND((BIOMKR/CREAT)*100,0.00000000000000001),BEST3
2.))); /* 42) KB 15Oct2014 */
        end;
        else if lbtstcd2 in ('1NACRE' '1OHPCRE' 'CEMACRE' 'HMPMACRE'
'NNALCRE' 'OTOLCRE' /*'SBMACRE'*/) then do; /* 11) KB 15May2014 */

lbstresn=/*round(*/ROUND((biomkr/creat)/*,0.1)*/*100,0.00000000000000001);
/* 20) KB 06Jun2014 */ /* 25) KB 21Jun2014 */ /* 35) KB 24Jun2014 */
        /*lbstresc=left(trim(put(lbstresn,*//*8.1*//*BEST32.))); *//* 35)
KB 24Jun2014 */

LBSTRESC=LEFT(TRIM(PUT(ROUND((BIOMKR/CREAT)*100,0.00000000000000001),BEST3
2.))); /* 42) KB 15Oct2014 */
        end;
        else if lbtstcd2 in ('2NACRE' '4ABPCRE' 'NNNCRE') then do;

lbstresn=/*round(*/ROUND((biomkr/creat)/*,0.01)*/*100,0.00000000000000001)
; /* 20) KB 06Jun2014 */ /* 25) KB 21Jun2014 */ /* 35) KB 24Jun2014 */
        /* lbstresc=left(trim(put(lbstresn,*//*8.2*//*BEST32.))); *//* 35)
KB 24Jun2014 */

LBSTRESC=LEFT(TRIM(PUT(ROUND((BIOMKR/CREAT)*100,0.00000000000000001),BEST3
2.))); /* 42) KB 15Oct2014 */
        end;
        else if lbtstcd2 in ('HEMACRE' /*'MHBMACRE'*/ 'SBMACRE') then do; /*
11) KB 15May2014 */ /* 23) KB 09Jun2014 */

lbstresn=/*round(*/ROUND((biomkr/creat)/*,0.001)*/*100,0.00000000000000001)
); /* 20) KB 06Jun2014 */ /* 25) KB 21Jun2014 */ /* 35) KB 24Jun2014 */
        /*lbstresc=left(trim(put(lbstresn,*//*8.3*//*BEST32.))); *//* 35)
KB 24Jun2014 */

LBSTRESC=LEFT(TRIM(PUT(ROUND((BIOMKR/CREAT)*100,0.00000000000000001),BEST3
2.))); /* 42) KB 15Oct2014 */
        end;
        /* 23) START KB 09Jun2014 */
        ELSE IF LBTSTCD2 IN ('MHBMACRE') then do;
                LBSTRESN=ROUND((BIOMKR/CREAT)*100,0.00000000000000001); /* 35) KB
24Jun2014 */
                /* LBSTRESC=LEFT(TRIM(PUT(LBSTRESN,*//*8.3*//*BEST32.))); *//* 35)
KB 24Jun2014 */

```

```

LBSTRESC=LEFT(TRIM(PUT(ROUND((BIOMKR/CREAT)*100,0.0000000000000001),BEST3
2.))); /* 42) KB 15Oct2014 */
END;
/* 23) END KB 09Jun2014 */
else if lbtstcd2 in ('SPMACRE') then do;

lbstresn=/*round(*/ROUND((biomkr/creat/*,0.0001)*/) *100,0.0000000000000000
1); /* 20) KB 06Jun2014 */ /* 23) KB 09Jun2014 */ /* 35) KB 24Jun2014
*/
/*lbstresc=left(trim(put(lbstresn,*//*8.4*//*BEST32.))); *//* 35)
KB 24Jun2014 */

LBSTRESC=LEFT(TRIM(PUT(ROUND((BIOMKR/CREAT)*100,0.0000000000000001),BEST3
2.))); /* 42) KB 15Oct2014 */
end;

IF INDEX(LBSTRES2,"Y") THEN BLQFLG="Y"; /* 14) KB 01Jun2014 */

drop lbtestcd;
rename lbtstcd2=lbtestcd;
keep studyid usubjid visitnum visit lbdtc LBENDTC lbtpt lbtest
lbtstcd2 lbcatt lbcat lbstresn lbstresc paramtyp dtype BLQFLG; /* 12) KB
15May2014 */ /* 14) KB 01Jun2014 */
run;

data bioall;
set biom3 biomc3;
run;

proc sort data=bioall;
by usubjid lbtestcd visit;
run;

/* 38) START KB 11Sep2014 */
DATA SV;
SET SDTM.SV(WHERE=(VISIT=('DAY 1')));
FORMAT DAY DATE9.;

DAY=INPUT(SCAN(SVSTDTC,1,'T'),YYMMDD10.);
KEEP USUBJID DAY;
RUN;

DATA ABLFLBI;
SET BIOALL(WHERE=(VISIT IN ('SCREENING' 'DAY -2' 'DAY -1' 'DAY 0'
'DAY 1')));
FORMAT ADTM DATETIME13.;

ADTM=DHMS(INPUT(SCAN(LBENDTC,1,'T'),YYMMDD10.),HOUR(INPUT(SCAN(LBENDTC,2,
'T'),TIME5.)),MINUTE(INPUT(SCAN(LBENDTC,2,'T'),TIME5.)),0);

KEEP USUBJID VISIT VISITNUM ADTM LBTESTCD;
RUN;

```

```

PROC SORT DATA=ABLFLBI;
  BY USUBJID;
RUN;

DATA ABLFLBI2;
  MERGE ABLFLBI (IN=A) SV;
  BY USUBJID;
  IF A;
RUN;

DATA ADSLTM;
  SET ADAM.ADSL;
  WHERE TRT01A IN ('CC' 'THS 2.2' 'SA');

  KEEP USUBJID TRTSDTM TRT01A;
RUN;

DATA ABLFLBI2A;
  MERGE ABLFLBI2 (IN=A) ADSLTM;
  BY USUBJID;
  IF A;
RUN;

PROC SORT DATA=ABLFLBI2A;
  BY USUBJID ADTM;
RUN;

DATA ABLFLBI3;
  SET ABLFLBI2A;

  IF TRT01A='SA' THEN DO;
    IF DAY NE . THEN DO;
      IF ADTM<DHMS(DAY,6,30,0) AND INDEX(UPCASE(VISIT),'UNSCHED')=0
THEN ABLFL2='Y';
      END;
    ELSE IF DAY EQ . THEN DO;
      IF INDEX(UPCASE(VISIT),'UNSCHED')=0 THEN ABLFL2='Y';
      END;
    END;
  ELSE IF TRT01A IN ('CC' 'THS 2.2') THEN DO;
    IF ADTM<TRTSDTM AND INDEX(UPCASE(VISIT),'UNSCHED')=0 THEN
ABLFL2='Y';
    END;
  ELSE IF MISSING(TRT01A) THEN DO;
    IF INDEX(UPCASE(VISIT),'UNSCHED')=0 THEN ABLFL2='Y';
    END;
RUN;

PROC SORT DATA=ABLFLBI3 (WHERE=(ABLFL2='Y')) OUT=ABLFLBI4;
  BY USUBJID LBTESTCD ADTM VISITNUM ;
RUN;

DATA ABLFLBI5 (WHERE=(ABLFL='Y')) ;

```

```

    SET ABLFLBI4;
    BY USUBJID LBTESTCD ADTM VISITNUM ;
    FORMAT ABLFL $2.;

    IF LAST.LBTESTCD AND NOT MISSING(ADTM) THEN ABLFL='Y';

    KEEP USUBJID VISIT ABLFL LBTESTCD;
RUN;

PROC SORT DATA=ABLFLBI5;
    BY USUBJID LBTESTCD VISIT;
RUN;

PROC SORT DATA=BIOALL;
    BY USUBJID LBTESTCD VISIT;
RUN;

DATA ABLFLBI6;
    MERGE ABLFLBI5 BIOALL;
    BY USUBJID LBTESTCD VISIT ;
RUN;
/* 38) END KB 11Sep2014 */

data bioallbases;
    set /*bioall*/ABLFLBI6(where=(/*visit='DAY 0' OR (LBTESTCD IN
('MHBMACRE' 'MHBMA24U') AND USUBJID='ZRHR-REXC-03-EU-BIO-0055' AND
VISIT='DAY -1')*/ABLFL='Y'))); /* 32) KB 22Jun2014 */ /* 38) KB 11Sep2014
*/
    format base /*best.*/BEST32. BASETYPE $40.; /* 13) KB 15May2014 */ /*
35) KB 24Jun2014 */

    base=lbstresn;
    /*IF USUBJID='ZRHR-REXC-03-EU-BIO-0055' AND VISIT='DAY -1' AND
LBTESTCD IN('MHBMACRE' 'MHBMA24U') THEN BASETYPE='DAY -1'; *//* 32) KB
22Jun2014 */
    /*ELSE BASETYPE='DAY 0'; *//* 13) KB 15May2014 */ /* 32) KB 22Jun2014
*/
    BASETYPE=STRIP(VISIT); /* 38) KB 11Sep2014 */

    BLFL=1; /* 41) KB 15Sep2014 */

    keep usubjid lbtestcd base BASETYPE BLFL; /* 13) KB 15May2014 */ /*
41) KB 15Sep2014 */
run;

proc sort data=/*bioall*/ABLFLBI6; /* 38) KB 11Sep2014 */
    by usubjid lbtestcd;
run;

data bioall2;
    merge /*bioall*/ABLFLBI6 bioallbases; /* 38) KB 11Sep2014 */
    by usubjid lbtestcd;
    format chg pchg /*best.*/BEST32. chgc pchgc $20.; /* 35) KB 24Jun2014
*/

```



```

/* ISSUES WITH CHG FOR A SUBJECT COMING OUT EXTREMELY SMALL, WE HAD
MADE THE UPDATE BELOW BUT REMOVED DUE TO IMPACT OF THIS CHANGE ON DATA*/
/*IF BASE NE LBSTRESN THEN BASE=ROUND(BASE,0.000000000001);*/ /* 24)
KB 09Jun2014 */ /* 34) KB 23Jun2014 */
    if visit not in ('DAY -1' 'DAY 0') then do;
        chg=lbstresn-base; /* 35) KB 24Jun2014 */
/*        chgc=strip(put(chg,BEST32.));*/
        CHGC=STRIP(PUT(ROUND(LBSTRESN-BASE,0.000000000000000001),BEST32.));
/* 43) KB 15Oct2014 */
        if base eq 0 then do;
            pchg=(chg/1)*100; /* 35) KB 24Jun2014 */

PCHGC=STRIP(PUT(ROUND((CHG/1)*100,0.000000000000000001),BEST32.)); /* 43)
KB 15Oct2014 */
            end;
            else do;
                pchg=(chg/base)*100; /* 35) KB 24Jun2014 */

PCHGC=STRIP(PUT(ROUND((CHG/BASE)*100,0.000000000000000001),BEST32.)); /*
43) KB 15Oct2014 */
                end;
                /*pchg=strip(put(pchg,/*/*best./*/*8.1/*/*BEST32.)); /*/* 9) KB
15May2014 */ /* 35) KB 24Jun2014 */
                end;
run;

/* 12) START KB 15May2014 */
DATA BIOALL3;
    SET BIOALL2;
    FORMAT AWLO AWHI AWLOUS AWLOUE AWHIUS AWHIUE DATETIME13. AWRANGE $80.
ADT1 ADT2 DATE9. ANL01FL $2. DEVWC $10. DEVN 8.; /* 16) KB 02Jun2014 */
/* 21) KB 09Jun2014 */

    ADT1=INPUT(SCAN(LBDTC,1,'T'),YYMMDD10.);
    ADT2=INPUT(SCAN(LBENDTC,1,'T'),YYMMDD10.);

ADT3=DHMS(ADT1,HOUR(INPUT(SCAN(LBDTC,2,'T'),TIME5.)),MINUTE(INPUT(SCAN(LB
DTC,2,'T'),TIME5.)),0); /* 21) KB 09Jun2014 */

ADT4=DHMS(ADT2,HOUR(INPUT(SCAN(LBENDTC,2,'T'),TIME5.)),MINUTE(INPUT(SCAN(
LBENDTC,2,'T'),TIME5.)),0); /* 21) KB 09Jun2014 */

/* 16) START KB 02Jun2014 */
    AWLOUS=DHMS(ADT1,6,0,0);
    AWLOUE=DHMS(ADT1,7,0,0);
    AWHIUS=DHMS(ADT2,5,59,0);
    AWHIUE=DHMS(ADT2,6,59,0);
/* 16) END KB 02Jun2014 */

    AWLO=/*DHMS(ADT1,6,30,0)*/AWLOUS; /* 16) KB 02Jun2014 */
    AWHI=/*DHMS(ADT2,6,29,0)*/AWHIUE; /* 16) KB 02Jun2014 */

```

```

    IF NOT MISSING(AWLO) AND NOT MISSING(AWHI) THEN DO;
        AWRANGE=PUT(AWLO,DATETIME13.) || '-' || PUT(AWHI,DATETIME13.);
    END;

/* 21) START KB 09Jun2014 */
    IF (AWLO <= ADT3 AND ADT4<=AWHI) THEN ANL01FL='Y';
    IF NOT MISSING(LBENDTC) AND INDEX(LBENDTC,'T')=0 THEN CALL
MISSING(ANL01FL); /* 46) SM 10Sep2015 */

        IF ADT3<AWLO THEN DO;
            DEVN=FLOOR((ADT3-AWLO)/60);
            DEVWC=COMPRESS(PUT(FLOOR((ADT3-AWLO)/60),BEST.));
        END;
    ELSE IF ADT4>AWHI THEN DO;
/*          DEVN=CEIL((ADT4-AWHI)/60); */
/*          DEVWC=COMPRESS(PUT(CEIL((ADT4-AWHI)/60),BEST.)); */
        DEVN=CEIL(((ADT4+59)-AWHI)/60); /* 39) KB 11Sep2014 */
        DEVWC=COMPRESS(PUT(CEIL(((ADT4+59)-AWHI)/60),BEST.)); /* 39)
KB 11Sep2014 */
    END;

    IF NOT MISSING(DEVWC) THEN DO;
        IF INDEX(DEVWC,'-')=0 THEN DEVWC=CATS(CATS('+',DEVWC),' min');
        ELSE IF INDEX(DEVWC,'-') THEN DEVWC=CATS(DEVWC,' min');
    END;
/* 21) END KB 09Jun2014 */

    DROP ADT1 ADT2 ADT3 ADT4; /* 21) KB 09Jun2014 */

RUN;
/* 12) END KB 15May2014 */
%mend biom;

%macro risk;

data risk;
    set sdtm.lb(where=(lbtestcd in ('PGF2A' 'TXB2_D11') AND LBSTAT NE
'NOT DONE')); /* 15) KB 01Jun2014 */

        IF INDEX(LBSTRESC,'<') THEN DO; /* 14) KB 01Jun2014 */
            LBSTRESN=INPUT(TRANWRD(SCAN(LBSTRESC,2,'(',')',' '),BEST.)/2; /*
4) KB 13May2014 */
            LBSTRES2=STRIP(PUT(LBSTRESN,BEST.))||" "||STRIP("(Y)"); /* 14) KB
01Jun2014 */
        END; /* 14) KB 01Jun2014 */
        ELSE LBSTRES2=STRIP(PUT(LBSTRESN,BEST.)); /* 14) KB 01Jun2014 */

        rename lbstresn=biomkr;

        keep studyid usubjid visitnum visit lbtestcd lbdtc LBENDTC lbtpt
lbtest lbcat lbcat lbstresn LBSTRES2; /* 14) KB 01Jun2014 */ /* 16) KB
02Jun2014 */
run;

```

```

data uvoladj;
    set sdtm.lb(where=(lbtestcd=/'UVOL'/'VOLUME')); /* 28) KB 21Jun2014
*/

    rename lbstresn=uvol;

    keep studyid usubjid visitnum visit lbdtc LBENDTC lbtpt lbcat lbcat
lbstresn; /* 16) KB 02Jun2014 */
run;

proc sort data=risk;
    by usubjid visit;
run;

proc sort data=uvoladj;
    by usubjid visit;
run;

data risk2;
    merge risk(in=a) uvoladj;
    by usubjid visit;
    if a;
run;

data risk3;
    set risk2;
    format lbstresn /*best.*/BEST32. lbstresc $200. lbtstcd2 $8. lbseq 8.
paramtyp $20. dtype $10.; /* 35) KB 24Jun2014 */

    paramtyp='DERIVED';
    dtype='FUNCTION';
    if lbtestcd='TXB2_D11' then do;
        lbtstcd2=strip('TXB2')||strip('24U');
    end;
    else if lbtestcd='PGF2A' then do;
        lbtstcd2=strip('PGF2')||strip('24U');
    end;
    lbseq=.;
    if lbtstcd2='TXB224U' then do;

lbstresn=/*round(*/ROUND((biomkr*uvol)/*,*//*0.001*//*0.1)*/1000,0.00000
000000000001); /* 11) KB 15May2014 */ /* 20) KB 06Jun2014 */ /* 25) KB
21Jun2014 */ /* 35) KB 24Jun2014 */
        /* lbstresc=left(trim(put(lbstresn,*//*8.3*//*8.1*//*BEST32.)));
*//* 11) KB 15May2014 */ /* 35) KB 24Jun2014 */

LBSTRESC=LEFT(TRIM(PUT(ROUND((BIOMKR*UVOL)/1000,0.000000000000000001),BEST3
2.))); /* 42) KB 15Oct2014 */
        end;
        else if lbtstcd2='PGF224U' then do;

lbstresn=/*round(*/ROUND((biomkr*uvol)/*,0.1)*/1000,0.000000000000000001);
/* 20) KB 06Jun2014 */ /* 25) KB 21Jun2014 */ /* 35) KB 24Jun2014 */

```

```
        /* lbstresc=left(trim(put(lbstresn,*/,8.1*/,BEST32.))); */, 35)
KB 24Jun2014 */
```

```
LBSTRESC=LEFT(TRIM(PUT(ROUND((BIOMKR*UVOL)/1000,0.0000000000000001),BEST3
2.))); /* 42) KB 15Oct2014 */
end;
```

```
IF INDEX(LBSTRES2,"Y") THEN BLQFLG="Y"; /* 14) KB 01Jun2014 */
```

```
drop lbtestcd;
rename lbtstcd2=lbtestcd;
keep studyid usubjid visitnum visit lbdtc LBENDTC lbtpt lbtest
lbtstcd2 lbcacat lbscat lbstresn lbstresc paramtyp dtype BLQFLG; /* 14) KB
01Jun2014 */ /* 16) KB 02Jun2014 */
run;
```

```
data creatadj;
set sdtm.lb(where=(lbtestcd='CREAT' and lbcacat='BIOMARKERS'));
```

```
rename lbstresn=creat;
```

```
keep studyid usubjid visitnum visit lbdtc LBENDTC lbtpt lbcacat lbscat
lbstresn; /* 16) KB 02Jun2014 */
run;
```

```
proc sort data=risk;
by usubjid visit;
run;
```

```
proc sort data=creatadj;
by usubjid visit;
run;
```

```
data riskc2;
merge risk(in=a) creatadj;
by usubjid visit;
if a;
run;
```

```
data riskc3;
set riskc2;
format lbstresn /*best.*/best32. lbstresc $200. lbtstcd2 $8. lbseq 8.
paramtyp $20. dtype $10.; /* 35) KB 24Jun2014 */
```

```
paramtyp='DERIVED';
dtype='FUNCTION';
if lbtestcd='TXB2_D11' then do;
lbtstcd2=strip('TXB2')||strip('CRE');
end;
else if lbtestcd='PGF2A' then do;
lbtstcd2=strip('PGF2')||strip('CRE');
end;
lbseq=.;
if lbtstcd2='TXB2CRE' then do;
```

```

lbstresn=/*round(*/*ROUND((biomkr/creat)/*/*/*0.001*/*/*0.1)*/*100,0.00000
000000000001); /* 11) KB 15May2014 */ /* 20) KB 06Jun2014 */ /* 25) KB
21Jun2014 */ /* 35) KB 24Jun2014 */
/* lbstresc=left(trim(put(lbstresn,*/*8.3*/*8.1*/*BEST32.)))*/*
/* 11) KB 15May2014 */ /* 35) KB 24Jun2014 */

LBSTRESC=LEFT(TRIM(PUT(ROUND((BIOMKR/CREAT)*100,0.000000000000000001),BEST3
2.))); /* 42) KB 15Oct2014 */
end;
else if lbtstcd2='PGF2CRE' then do;

lbstresn=/*round(*/*ROUND((biomkr/creat)/*/*0.1)*/*100,0.000000000000000001);
/* 20) KB 06Jun2014 */ /* 25) KB 21Jun2014 */ /* 35) KB 24Jun2014 */
/*lbstresc=left(trim(put(lbstresn,*/*8.1*/*BEST32.)))*/* 35)
KB 24Jun2014 */

LBSTRESC=LEFT(TRIM(PUT(ROUND((BIOMKR/CREAT)*100,0.000000000000000001),BEST3
2.))); /* 42) KB 15Oct2014 */
end;

IF INDEX(LBSTRES2,"Y") THEN BLQFLG="Y"; /* 14) KB 01Jun2014 */

drop lbtestcd;
rename lbtstcd2=lbtestcd;
keep studyid usubjid visitnum visit lbdtc LBENDTC lbtpt lbtest
lbtstcd2 lbcatt lbcat lbstresn lbstresc paramtyp dtype BLQFLG; /* 14) KB
01Jun2014 */ /* 16) KB 02Jun2014 */
run;

data riskall;
set risk3 riskc3;
run;

proc sort data=riskall;
by usubjid lbtestcd visit;
run;

/* 38) START KB 11Sep2014 */
DATA SV;
SET SDTM.SV(WHERE=(VISIT=('DAY 1')));
FORMAT DAY DATE9.;

DAY=INPUT(SCAN(SVSTDTC,1,'T'),YYMMDD10.);
KEEP USUBJID DAY;
RUN;

DATA ABLFLRI;
SET RISKALL(WHERE=(VISIT IN ('SCREENING' 'DAY -2' 'DAY -1' 'DAY 0'
'DAY 1')));
FORMAT ADTM DATETIME13.;

```

```
ADTM=DHMS (INPUT (SCAN (LBENDTC,1,'T'),YYMMDD10.),HOUR (INPUT (SCAN (LBENDTC,2,
'T'),TIME5.)),MINUTE (INPUT (SCAN (LBENDTC,2,'T'),TIME5.)),0);
```

```
KEEP USUBJID VISIT VISITNUM ADTM LBTESTCD;
RUN;
```

```
PROC SORT DATA=ABLFLRI;
BY USUBJID;
RUN;
```

```
DATA ABLFLRI2;
MERGE ABLFLRI (IN=A) SV;
BY USUBJID;
IF A;
RUN;
```

```
DATA ADSLTM;
SET ADAM.ADSL;
WHERE TRT01A IN ('CC' 'THS 2.2' 'SA');

KEEP USUBJID TRTSDTM TRT01A;
RUN;
```

```
DATA ABLFLRI2A;
MERGE ABLFLRI2 (IN=A) ADSLTM;
BY USUBJID;
IF A;
RUN;
```

```
PROC SORT DATA=ABLFLRI2A;
BY USUBJID ADTM;
RUN;
```

```
DATA ABLFLRI3;
SET ABLFLRI2A;

IF TRT01A='SA' THEN DO;
IF DAY NE . THEN DO;
IF ADTM<DHMS (DAY,6,30,0) AND INDEX (UPCASE (VISIT), 'UNSCHED')=0
THEN ABLFL2='Y';
END;
ELSE IF DAY EQ . THEN DO;
IF INDEX (UPCASE (VISIT), 'UNSCHED')=0 THEN ABLFL2='Y';
END;
END;
ELSE IF TRT01A IN ('CC' 'THS 2.2') THEN DO;
IF ADTM<TRTSDTM AND INDEX (UPCASE (VISIT), 'UNSCHED')=0 THEN
ABLFL2='Y';
END;
ELSE IF MISSING (TRT01A) THEN DO;
IF INDEX (UPCASE (VISIT), 'UNSCHED')=0 THEN ABLFL2='Y';
END;
RUN;
```

```

PROC SORT DATA=ABLFLRI3 (WHERE=(ABLFL2='Y')) OUT=ABLFLRI4;
  BY USUBJID LBTESTCD ADTM VISITNUM ;
RUN;

DATA ABLFLRI5 (WHERE=(ABLFL='Y')) ;
  SET ABLFLRI4;
  BY USUBJID LBTESTCD ADTM VISITNUM ;
  FORMAT ABLFL $2.;

  IF LAST.LBTESTCD AND NOT MISSING(ADTM) THEN ABLFL='Y';

  KEEP USUBJID VISIT ABLFL LBTESTCD;
RUN;

PROC SORT DATA=ABLFLRI5;
  BY USUBJID LBTESTCD VISIT;
RUN;

PROC SORT DATA=RISKALL;
  BY USUBJID LBTESTCD VISIT;
RUN;

DATA ABLFLRI6;
  MERGE ABLFLRI5 RISKALL;
  BY USUBJID LBTESTCD VISIT ;
RUN;
/* 38) END KB 11Sep2014 */

data riskallbases;
  set /*riskall*/ABLFLRI6(where=(/*visit='DAY 0'*/ABLFL='Y')); /* 38)
KB 11Sep2014 */
  format base /*best.*/BEST32. BASETYPE $40.; /* 13) KB 15May2014 */ /*
35) KB 24Jun2014 */

  base=lbstresn;
  BASETYPE=/*'DAY 0'*/STRIP(VISIT); /* 13) KB 15May2014 */ /* 38) KB
11Sep2014 */

  BLFL=1; /* 41) KB 15Sep2014 */

  keep usubjid lbtestcd base BASETYPE BLFL; /* 13) KB 15May2014 */ /*
41) KB 15Sep2014 */
run;

proc sort data=/*riskall*/ABLFLRI6; /* 38) KB 11Sep2014 */
  by usubjid lbtestcd;
run;

data riskall2;
  merge /*riskall*/ABLFLRI6 riskallbases; /* 38) KB 11Sep2014 */
  by usubjid lbtestcd;
  format chg pchg /*best.*/BEST32. chgc pchgc $20.; /* 35) KB 24Jun2014
*/

```

```

        if visit not in ('DAY -1' 'DAY 0') then do;
            chg=lbstresn-base; /* 35) KB 24Jun2014 */
/*      chgc=strip(put(chg,BEST32.));*/
        CHGC=STRIP(PUT(ROUND(LBSTRESN-BASE,0.0000000000000001),BEST32.));
/* 43) KB 15Oct2014 */
        if base eq 0 then do;
            pchg=(chg/1)*100; /* 35) KB 24Jun2014 */

PCHGC=STRIP(PUT(ROUND((CHG/1)*100,0.0000000000000001),BEST32.)); /* 43)
KB 15Oct2014 */
            end;
        else do;
            pchg=(chg/base)*100; /* 35) KB 24Jun2014 */

PCHGC=STRIP(PUT(ROUND((CHG/BASE)*100,0.0000000000000001),BEST32.)); /*
43) KB 15Oct2014 */
            end;
        /* pchgc=strip(put(pchg,/*best.*//*8.1*//*BEST32.));*/ /* 9) KB
15May2014 */ /* 35) KB 24Jun2014 */
        end;
run;

/* 16) START KB 02Jun2014 */
DATA RISKALL3;
    SET RISKALL2;
    FORMAT AWLO AWHI AWLOUS AWLOUE AWHIUS AWHIUE DATETIME13. AWRANGE $80.
ADT1 ADT2 DATE9. ANL01FL $2. DEVCW $10. DEVCN 8.; /* 21) KB 09Jun2014 */

    ADT1=INPUT(SCAN(LBDTC,1,'T'),YYMMDD10.);
    ADT2=INPUT(SCAN(LBENDTC,1,'T'),YYMMDD10.);

ADT3=DHMS(ADT1,HOUR(INPUT(SCAN(LBDTC,2,'T'),TIME5.)),MINUTE(INPUT(SCAN(LB
DTC,2,'T'),TIME5.)),0); /* 21) KB 09Jun2014 */

ADT4=DHMS(ADT2,HOUR(INPUT(SCAN(LBENDTC,2,'T'),TIME5.)),MINUTE(INPUT(SCAN(
LBENDTC,2,'T'),TIME5.)),0); /* 21) KB 09Jun2014 */

    AWLOUS=DHMS(ADT1,6,0,0);
    AWLOUE=DHMS(ADT1,7,0,0);
    AWHIUS=DHMS(ADT2,5,59,0);
    AWHIUE=DHMS(ADT2,6,59,0);

    AWLO=AWLOUS;
    AWHI=AWHIUE;

    IF NOT MISSING(AWLO) AND NOT MISSING(AWHI) THEN DO;
        AWRANGE=PUT(AWLO,DATETIME13.) || '-' || PUT(AWHI,DATETIME13.);
    END;

/* 21) START KB 09Jun2014 */
    IF (AWLO <= ADT3 AND ADT4<=AWHI) THEN ANL01FL='Y';

```



```

        IF ADT3<AWLO THEN DO;
            DEVN=FLOOR((ADT3-AWLO)/60);
            DEVWC=COMPRESS(PUT(FLOOR((ADT3-AWLO)/60),BEST.));
        END;
        ELSE IF ADT4>AWHI THEN DO;
/*            DEVN=CEIL((ADT4-AWHI)/60); */
/*            DEVWC=COMPRESS(PUT(CEIL((ADT4-AWHI)/60),BEST.)); */
            DEVN=CEIL(((ADT4+59)-AWHI)/60); /* 39) KB 11Sep2014 */
            DEVWC=COMPRESS(PUT(CEIL(((ADT4+59)-AWHI)/60),BEST.)); /* 39)
KB 11Sep2014 */
        END;

```

```

        IF NOT MISSING(DEVWC) THEN DO;
            IF INDEX(DEVWC,'-')=0 THEN DEVWC=CATS(CATS('+',DEVWC),' min');
            ELSE IF INDEX(DEVWC,'-') THEN DEVWC=CATS(DEVWC,' min');
        END;
/* 21) END KB 09Jun2014 */

```

```

        DROP ADT1 ADT2 ADT3 ADT4; /* 21) KB 09Jun2014 */

```

```

RUN;
/* 16) END KB 02Jun2014 */

```

```

%mend risk;

```

```

/* 31) START KB 22Jun2014 */
%MACRO AMES;

```

```

DATA AMES;
    SET SDTM.LB(WHERE=(LBTESTCD IN ('AMES') AND LBSTAT NE 'NOT DONE'));

```

```

    IF INDEX(LBSTRESC,'<') THEN DO;
        LBSTRESN=INPUT(TRANWRD(SCAN(LBSTRESC,2,'(',')',' '),BEST.)/2;
        LBSTRES2=STRIP(PUT(LBSTRESN,BEST.))||" "||STRIP("(Y)");
    END;
    ELSE LBSTRES2=STRIP(PUT(LBSTRESN,BEST.));

```

```

    RENAME LBSTRESN=BIOMKR;

```

```

    KEEP STUDYID USUBJID VISITNUM VISIT LBTESTCD LBDTC LBENDTC LBTPT
LBTEST LBCAT LBSCAT LBSTRESN LBSTRES2;
RUN;

```

```

DATA UVOLADJA;
    SET SDTM.LB(WHERE=(LBTESTCD='VOLUME'));

```

```

    RENAME LBSTRESN=UVOL;

```

```

    KEEP STUDYID USUBJID VISITNUM VISIT LBDTC LBENDTC LBTPT LBCAT LBSCAT
LBSTRESN;
RUN;

```

```

PROC SORT DATA=AMES;

```

```

        BY USUBJID VISIT;
RUN;

PROC SORT DATA=UVOLADJA;
        BY USUBJID VISIT;
RUN;

DATA AMES2;
        MERGE AMES(IN=A) UVOLADJA;
        BY USUBJID VISIT;
        IF A;
RUN;

DATA AMES3;
        SET AMES2;
        FORMAT LBSTRESN /*BEST.*/BEST32. LBSTRESC $200. LBTSTCD2 $8. LBSEQ
8. PARAMTYP $20. DTYPE $10.; /* 35) KB 24Jun2014 */
        PARAMTYP='DERIVED';
        DTYPE='FUNCTION';
        LBTSTCD2=STRIP(COMPRESS(LBTESTCD,'_'))||STRIP('24U');
        LBSEQ=.;
        IF LBTSTCD2 IN ('AMES24U') THEN DO;
                LBSTRESN=ROUND((BIOMKR*UVOL)/1000/,0.0000000000000001); /* 35)
KB 24Jun2014 */ /*44) JM 06SEP2015*/
                /* LBSTRESC=LEFT(TRIM(PUT(LBSTRESN,/*8.1*//*BEST32.))); /*/* 35)
KB 24Jun2014 */

LBSTRESC=LEFT(TRIM(PUT(ROUND((BIOMKR*UVOL)/1000/,0.0000000000000001),B
EST32.))); /* 42) KB 15Oct2014 */ /*44) JM 06SEP2015*/
        END;
        IF INDEX(LBSTRES2,"Y") THEN BLQFLG="Y";

        DROP LBTESTCD;
        RENAME LBTSTCD2=LBTESTCD;
        KEEP STUDYID USUBJID VISITNUM VISIT LBDTC LBENDTC LBTPT LBTEST
LBTSTCD2 LBCAT LBSCAT LBSTRESN LBSTRESC PARAMTYP DTYPE BLQFLG;
RUN;

DATA AMESALL;
        SET AMES3;
RUN;

PROC SORT DATA=AMESALL;
        BY USUBJID LBTESTCD VISIT;
RUN;

/* 38) START KB 11Sep2014 */
DATA SV;
        SET SDTM.SV(WHERE=(VISIT=('DAY 1')));
        FORMAT DAY DATE9.;

        DAY=INPUT(SCAN(SVSTDTC,1,'T'),YYMMDD10.);
        KEEP USUBJID DAY;
RUN;

```

```

DATA ABLFLAM;
    SET AMESALL(WHERE=(VISIT IN ('SCREENING' 'DAY -2' 'DAY -1' 'DAY 0'
'DAY 1')));
    FORMAT ADTM DATETIME13.;

ADTM=DHMS(INPUT(SCAN(LBENDTC,1,'T'),YYMMDD10.),HOUR(INPUT(SCAN(LBENDTC,2,
'T'),TIME5.)),MINUTE(INPUT(SCAN(LBENDTC,2,'T'),TIME5.)),0);

    KEEP USUBJID VISIT VISITNUM ADTM LBTESTCD;
RUN;

PROC SORT DATA=ABLFLAM;
    BY USUBJID;
RUN;

DATA ABLFLAM2;
    MERGE ABLFLAM(IN=A) SV;
    BY USUBJID;
    IF A;
RUN;

DATA ADSLTM;
    SET ADAM.ADSL;
    WHERE TRT01A IN ('CC' 'THS 2.2' 'SA');

    KEEP USUBJID TRTSDTM TRT01A;
RUN;

DATA ABLFLAM2A;
    MERGE ABLFLAM2(IN=A) ADSLTM;
    BY USUBJID;
    IF A;
RUN;

PROC SORT DATA=ABLFLAM2A;
    BY USUBJID ADTM;
RUN;

DATA ABLFLAM3;
    SET ABLFLAM2A;

    IF TRT01A='SA' THEN DO;
        IF DAY NE . THEN DO;
            IF ADTM<DHMS(DAY,6,30,0) AND INDEX(UPCASE(VISIT),'UNSCHED')=0
THEN ABLFL2='Y';
            END;
        ELSE IF DAY EQ . THEN DO;
            IF INDEX(UPCASE(VISIT),'UNSCHED')=0 THEN ABLFL2='Y';
            END;
        END;
    ELSE IF TRT01A IN ('CC' 'THS 2.2') THEN DO;

```

```

        IF ADTM<TRTSDTM AND INDEX(UPCASE(VISIT),'UNSCHED')=0 THEN
ABLFL2='Y';
        END;
        ELSE IF MISSING(TRT01A) THEN DO;
            IF INDEX(UPCASE(VISIT),'UNSCHED')=0 THEN ABLFL2='Y';
        END;
RUN;

PROC SORT DATA=ABLFLAM3 (WHERE=(ABLFL2='Y')) OUT=ABLFLAM4;
    BY USUBJID LBTESTCD ADTM VISITNUM ;
RUN;

DATA ABLFLAM5 (WHERE=(ABLFL='Y')) ;
    SET ABLFLAM4;
    BY USUBJID LBTESTCD ADTM VISITNUM ;
    FORMAT ABLFL $2.;

    IF LAST.LBTESTCD AND NOT MISSING(ADTM) THEN ABLFL='Y';

    KEEP USUBJID VISIT ABLFL LBTESTCD;
RUN;

PROC SORT DATA=ABLFLAM5;
    BY USUBJID LBTESTCD VISIT;
RUN;

PROC SORT DATA=AMESALL;
    BY USUBJID LBTESTCD VISIT;
RUN;

DATA ABLFLAM6;
    MERGE ABLFLAM5 AMESALL;
    BY USUBJID LBTESTCD VISIT ;
RUN;
/* 38) END KB 11Sep2014 */

DATA AMESALLBASES;
    SET /*AMESALL*/ABLFLAM6 (WHERE=(/*VISIT='DAY 0'*/ABLFL='Y')); /* 38)
KB 11Sep2014 */
    FORMAT BASE /*BEST.*/BEST32. BASETYPE $40.; /* 35) KB 24Jun2014 */

    BASE=LBSTRESN;
    BASETYPE=/*'DAY 0'*/STRIP(VISIT); /* 38) KB 11Sep2014 */

    BLFL=1; /* 41) KB 15Sep2014 */
    KEEP USUBJID LBTESTCD BASE BASETYPE BLFL;
RUN;

PROC SORT DATA=/*AMESALL*/ABLFLAM6; /* 38) KB 11Sep2014 */
    BY USUBJID LBTESTCD;
RUN;

DATA AMESALL2;
    MERGE /*AMESALL*/ABLFLAM6 AMESALLBASES; /* 38) KB 11Sep2014 */

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```

BY USUBJID LBTESTCD;
FORMAT CHG PCHG /*BEST.*/BEST32. CHGC PCHGC $20.; /* 35) KB 24Jun2014
*/

IF VISIT NOT IN ('DAY -1' 'DAY 0') THEN DO;
    CHG=LBSTRESN-BASE; /* 35) KB 24Jun2014 */
/*    CHGC=STRIP(PUT(CHG,BEST32.)); */
    CHGC=STRIP(PUT(ROUND(LBSTRESN-BASE,0.0000000000000001),BEST32.));
/* 43) KB 15Oct2014 */
    IF BASE EQ 0 THEN DO;
        PCHG=(CHG/1)*100; /* 35) KB 24Jun2014 */

PCHGC=STRIP(PUT(ROUND((CHG/1)*100,0.0000000000000001),BEST32.)); /* 43)
KB 15Oct2014 */
        END;
        ELSE DO;
            PCHG=(CHG/BASE)*100; /* 35) KB 24Jun2014 */

PCHGC=STRIP(PUT(ROUND((CHG/BASE)*100,0.0000000000000001),BEST32.)); /*
43) KB 15Oct2014 */
            END;
            /*PCHGC=STRIP(PUT(PCHG,/*/*8.1*/*/*BEST32.)); *//* 35) KB
24Jun2014 */
            END;
RUN;

DATA AMESALL3;
    SET AMESALL2;
    FORMAT AWLO AWHI AWLOUS AWLOUE AWHIUS AWHIUE DATETIME13. AWRANGE $80.
ADT1 ADT2 DATE9. ANL01FL $2. DEVC $10. DEVCN 8.;

    ADT1=INPUT(SCAN(LBDTC,1,'T'),YYMMDD10.);
    ADT2=INPUT(SCAN(LBENDTC,1,'T'),YYMMDD10.);

ADT3=DHMS(ADT1,HOUR(INPUT(SCAN(LBDTC,2,'T'),TIME5.)),MINUTE(INPUT(SCAN(LB
DTC,2,'T'),TIME5.)),0);

ADT4=DHMS(ADT2,HOUR(INPUT(SCAN(LBENDTC,2,'T'),TIME5.)),MINUTE(INPUT(SCAN(
LBENDTC,2,'T'),TIME5.)),0);

    AWLOUS=DHMS(ADT1,6,0,0);
    AWLOUE=DHMS(ADT1,7,0,0);
    AWHIUS=DHMS(ADT2,5,59,0);
    AWHIUE=DHMS(ADT2,6,59,0);

    AWLO=AWLOUS;
    AWHI=AWHIUE;

IF NOT MISSING(AWLO) AND NOT MISSING(AWHI) THEN DO;
    AWRANGE=PUT(AWLO,DATETIME13.) || '-' || PUT(AWHI,DATETIME13.);
END;

IF (AWLO <= ADT3 AND ADT4<=AWHI) THEN ANL01FL='Y';

```

```

        IF ADT3<AWLO THEN DO;
            DEVN=FLOOR((ADT3-AWLO)/60);
            DEVWC=COMPRESS( PUT (FLOOR((ADT3-AWLO)/60),BEST.));
        END;
        ELSE IF ADT4>AWHI THEN DO;
/*            DEVN=CEIL((ADT4-AWHI)/60);*/
/*            DEVWC=COMPRESS( PUT (CEIL((ADT4-AWHI)/60),BEST.));*/
            DEVN=CEIL(( (ADT4+59)-AWHI)/60); /* 39) KB 11Sep2014 */
            DEVWC=COMPRESS( PUT (CEIL(( (ADT4+59)-AWHI)/60),BEST.)); /* 39)
KB 11Sep2014 */
        END;

        IF NOT MISSING(DEVWC) THEN DO;
            IF INDEX(DEVWC,'-')=0 THEN DEVWC=CATS(CATS('+',DEVWC),' min');
            ELSE IF INDEX(DEVWC,'-') THEN DEVWC=CATS(DEVWC,' min');
        END;

        DROP ADT1 ADT2 ADT3 ADT4;

RUN;
%MEND AMES;
/* 31) END KB 22Jun2014 */

```