```
libname raw '/home/u58485303/raw';
libname output '/home/u58485303/output';
libname base '/home/u58485303/base';

options validvarname=upcase;

/* lbch raw data */
/* created variables  STUDYID DOMAIN     USUBJID       LBSPID LBTESTCD
       LBTEST LBCAT LBORRES LBORRESU LBORNRLO LBORNRHI
       LBSTRESC LBSTRESU LBSTRESN LBSTNRLO LBSTNRHI LBNRIND LBSTAT
LBREASND VISITNUM VISIT EPOCH LBDTC;*/

data lb1;
set raw.lbch (rename=(LBTEST= LBTEST1 LBORRES= LBORRES1 LBORRESU=
LBORRESU1));
length USUBJID $40 LBTESTCD $10 LBTEST LBCAT LBORRES LBORRESU LBSTAT
LBREASND $200;

STUDYID= 'ACP-103-020';
DOMAIN= 'LB';
SUBJID= strip(substr(SUBJECT, 4,3));
SITEID= strip(substr(SITE, 5,3));
USUBJID= compress(STUDYID || '-' || SITEID|| '-' || SUBJID);

/* VISIT VISITNUM */

if find(vstdt, 'Screening', 'i') then do; visit= 'Screening';
visitnum= 10; end;
else if find(vstdt, 'Day 1 - Baseline', 'i') then do; visit= 'Day 1';
visitnum= 15; end;
else if find(vstdt, 'Day 15', 'i') then do; visit= 'Day 15'; visitnum=
25; end;
else if find(vstdt, 'Day 29', 'i') then do; visit= 'Day 29'; visitnum=
35; end;
else if find(vstdt, 'Day 43', 'i') then do; visit= 'Day 43'; visitnum=
45; end;
else if find(vstdt, 'Follow-Up', 'i') then do; visit= 'Follow-Up';
visitnum= 55; end;

/* EPOCH */

if  visitnum = 10 then EPOCH ='SCREENING';
else if 15 <= visitnum <= 45  then EPOCH ='TREATMENT';
else if visitnum =55 then EPOCH ='FOLLOW-UP';
else EPOCH='';
```

```
/* LBDTC */
LBDTC= put(input(VISITDT,??DATE11.),??IS8601DA.);

/* LBSPID */
if SAMPNUM ne ' ' then LBSPID=compress(SAMPNUM);

/* LBTESTCD LBTEST */
if LBTEST1= 'ALT, SGPT' then do; LBTESTCD= 'ALT'; LBTEST= 'Alanine
Aminotransferase'; end;
if LBTEST1= 'AST, SGOT' then do; LBTESTCD= 'AST'; LBTEST= 'Aspartate
Aminotransferase'; end;
if LBTEST1= 'Albumin' then do; LBTESTCD= 'ALB'; LBTEST= 'Albumin';
end;
if LBTEST1= 'Alkaline Phosphatase' then do; LBTESTCD= 'ALP'; LBTEST=
'Alkaline Phosphatase'; end;
if LBTEST1= 'BUN' then do; LBTESTCD= 'BUN'; LBTEST= 'Blood Urea
Nitrogen'; end;
if LBTEST1= 'Calcium' then do; LBTESTCD= 'CAL'; LBTEST= 'Calcium';
end;
if LBTEST1= 'Carbon Dioxide' then do; LBTESTCD= 'CO2'; LBTEST= 'Carbon
Dioxide'; end;
if LBTEST1= 'Chloride' then do; LBTESTCD= 'CL'; LBTEST= 'Chloride';
end;
if LBTEST1= 'Creatinine' then do; LBTESTCD= 'CREAT'; LBTEST=
'Creatinine'; end;
if LBTEST1= 'Creatinine Kinase (CK)/ Creatinine Phosphokinase (CPK)'
then do; LBTESTCD= 'CK'; LBTEST= 'Creatine Kinase'; end;
if LBTEST1= 'GGT' then do; LBTESTCD= 'GGT'; LBTEST= 'Gamma Glutamyl
Transferase'; end;
if LBTEST1= 'Glucose' THEN do; LBTESTCD= 'GUL'; LBTEST= 'Glucose';
end;
if LBTEST1= 'LDH' then do; LBTESTCD= 'LDH'; LBTEST= 'Lactate
Dehydrogenase'; end;
if LBTEST1= 'Phosphorus' then do; LBTESTCD= 'PHOS'; LBTEST=
'Phosphate'; end;
if LBTEST1= 'Potassium' then do; LBTESTCD= 'K'; LBTEST= 'Potassium';
end;
if LBTEST1= 'Sodium' then do; LBTESTCD= 'Sodium'; LBTEST= 'Sodium';
end;
if LBTEST1= 'Total Bilirubin' then do; LBTESTCD= 'BILI'; LBTEST=
'Bilirubin'; end;
if LBTEST1= 'Total Protein' then do; LBTESTCD= 'PROT'; LBTEST= 'Total
Protein'; end;
if LBTEST1= 'Uric Acid' then do; LBTESTCD= 'URATE'; LBTEST= 'Urate';
end;
```

```
/* LBCAT LBORRES LBORRESU LBORNRLO LBORNRHI LBSTRESC LBSTRESU LBSTRESN
LBSTNRLO LBSTNRHI LBSTAT LBREASND */
LBCAT= 'CHEMISTRY';

if LBORRES1 ne ' ' then LBORRES= LBORRES1;
if LBORRESU1 ne ' ' then LBORRESU= LBORRESU1;

LBORNRLO= '';
LBORNRHI= '';

LBSTRESC= LBORRES;
LBSTRESU= LBORRESU;
LBSTRESN= input(LBORRES,??best.);
LBSTNRLO= .;
LBSTNRHI= .;

if LBSTRESC ne ' ' then do;
if LBABN= 1 then LBNRIND= 'Abnormal';
else LBNRIND= 'Normal';
end;

if LBORRES = ' ' then do; LBSTAT = 'NOT DONE'; LBREASND= 'SPECIMEN
LOST'; end;

keep STUDYID DOMAIN  USUBJID       LBSPID LBTESTCD      LBTEST LBCAT
LBORRES LBORRESU LBORNRLO LBORNRHI LBSTRESC LBSTRESU
       LBSTRESN LBSTNRLO LBSTNRHI LBNRIND LBSTAT LBREASND VISITNUM
       VISIT EPOCH   LBDTC;
run;

/* lbhe raw data */
/* created variables  STUDYID DOMAIN USUBJID LBSPID LBTESTCD LBTEST
LBCAT LBORRES LBORRESU LBORNRLO LBORNRHI
       LBSTRESC LBSTRESU LBSTRESN LBSTNRLO LBSTNRHI LBNRIND LBSTAT
LBREASND VISITNUM VISIT EPOCH LBDTC;*/

data lb2;
set raw.lbhe (rename=(LBTEST= LBTEST1 LBORRES= LBORRES1 LBORRESU=
LBORRESU1));
length USUBJID $40 LBTESTCD $10 LBTEST LBCAT LBORRES LBORRESU LBSTAT
LBREASND $200;

STUDYID= 'ACP-103-020';
DOMAIN= 'LB';
SUBJID= strip(substr(SUBJECT, 4,3));
SITEID= strip(substr(SITE, 5,3));
```

```
USUBJID= compress(STUDYID || '-' || SITEID|| '-' || SUBJID);

/* VISIT VISITNUM */

if find(vstdt, 'Screening', 'i') then do; visit= 'Screening';
visitnum= 10; end;
else if find(vstdt, 'Day 1 - Baseline', 'i') then do; visit= 'Day 1';
visitnum= 15; end;
else if find(vstdt, 'Day 15', 'i') then do; visit= 'Day 15'; visitnum=
25; end;
else if find(vstdt, 'Day 29', 'i') then do; visit= 'Day 29'; visitnum=
35; end;
else if find(vstdt, 'Day 43', 'i') then do; visit= 'Day 43'; visitnum=
45; end;
else if find(vstdt, 'Follow-Up', 'i') then do; visit= 'Follow-Up';
visitnum= 55; end;

/* EPOCH */

if  visitnum = 10 then EPOCH ='SCREENING';
else if 15 <= visitnum <= 45  then EPOCH ='TREATMENT';
else if visitnum =55 then EPOCH ='FOLLOW-UP';
else EPOCH='';

/* LBDTC */
LBDTC= put(input(VISITDT,??DATE11.),??IS8601DA.);

/* LBSPID */
if SAMPNUM ne ' ' then LBSPID=compress(SAMPNUM);

/* LBTESTCD LBTEST */
if LBTEST1= 'Absolute Basophil Count' then do; LBTESTCD= 'ABSBASO';
LBTEST= 'Absolute Basophil Count'; end;
if LBTEST1= 'Absolute Eosinophil Count' then do; LBTESTCD= 'ABSEOS';
LBTEST= 'Absolute Eosinophil Count'; end;
if LBTEST1= 'Absolute Lymphocyte Count' then do; LBTESTCD= 'ABSLYM';
LBTEST= 'Absolute Lymphocyte Count'; end;
if LBTEST1= 'Absolute Monocyte Count' then do; LBTESTCD= 'ABSMONO';
LBTEST= 'Absolute Monocyte Count'; end;
if LBTEST1= 'Absolute Neutrophil Count' then do; LBTESTCD= 'ABSNEUT';
LBTEST= 'Absolute Neutrophil Count'; end;
if LBTEST1= 'Bands' then do; LBTESTCD= 'BAND'; LBTEST= 'Bands'; end;
if LBTEST1= 'Basophils' then do; LBTESTCD= 'BASO'; LBTEST=
'Basophils'; end;
if LBTEST1= 'Eosinophils' then do; LBTESTCD= 'EOS'; LBTEST=
'Eosinophils'; end;
```

```
if LBTEST1= 'Hematocrit' then do; LBTESTCD= 'HCT'; LBTEST=
'Hematocrit'; end;
if LBTEST1= 'Hemoglobin' then do; LBTESTCD= 'HGB'; LBTEST=
'Hemoglobin'; end;
if LBTEST1= 'Lymphocytes' then do; LBTESTCD= 'LYM'; LBTEST=
'Lymphocytes'; end;
if LBTEST1= 'Monocytes' THEN do; LBTESTCD= 'MONO'; LBTEST=
'Monocytes'; end;
if LBTEST1= 'Neutrophils' then do; LBTESTCD= 'NEUT'; LBTEST=
'Neutrophils'; end;
if LBTEST1= 'Platelet Count' then do; LBTESTCD= 'PLAT'; LBTEST=
'Platelets'; end;
if LBTEST1= 'RBC' then do; LBTESTCD= 'RBC'; LBTEST= 'Erythrocytes';
end;
if LBTEST1= 'Reticulocyte Count' then do; LBTESTCD= 'RETI'; LBTEST=
'Reticulocytes'; end;
if LBTEST1= 'Serum Pregnancy' then do; LBTESTCD= 'HCG'; LBTEST=
'Choriogonadotropin Beta'; end;
if LBTEST1= 'WBC' then do; LBTESTCD= 'WBC'; LBTEST= 'Leukocytes'; end;

/* LBCAT LBORRES LBORRESU LBORNRLO LBORNRHI LBSTRESC LBSTRESU LBSTRESN
LBSTNRLO LBSTNRHI LBSTAT LBREASND */
LBCAT= 'HEMATOLOGY';

if LBORRES1 ne ' ' then LBORRES= LBORRES1;
if LBORRESU1 ne ' ' then LBORRESU= LBORRESU1;

LBORNRLO= '';
LBORNRHI= '';

LBSTRESC= LBORRES;
LBSTRESU= LBORRESU;
LBSTRESN= input(LBORRES,??best.);
LBSTNRLO= .;
LBSTNRHI= .;

if LBSTRESC ne ' ' then do;
if LBABN= 1 then LBNRIND= 'Abnormal';
else LBNRIND= 'Normal';
end;

if LBORRES = ' ' then do; LBSTAT = 'NOT DONE'; LBREASND= 'SPECIMEN
LOST'; end;

keep STUDYID DOMAIN  USUBJID       LBSPID LBTESTCD      LBTEST LBCAT
LBORRES LBORRESU LBORNRLO LBORNRHI LBSTRESC LBSTRESU
```

```
       LBSTRESN LBSTNRLO LBSTNRHI LBNRIND LBSTAT LBREASND VISITNUM
       VISIT EPOCH   LBDTC;
run;

/* lbur raw data */
/* created variables  STUDYID DOMAIN USUBJID LBSPID LBTESTCD LBTEST
LBCAT LBORRES LBORRESU LBORNRLO LBORNRHI
       LBSTRESC LBSTRESU LBSTRESN LBSTNRLO LBSTNRHI LBNRIND LBSTAT
LBREASND VISITNUM VISIT EPOCH LBDTC;*/

data lb3;
set raw.lbur (rename=(LBTEST= LBTEST1 LBORRES= LBORRES1 LBORRESU=
LBORRESU1));
length USUBJID $40 LBTESTCD $10 LBTEST LBCAT LBORRES LBORRESU LBSTAT
LBREASND $200;

STUDYID= 'ACP-103-020';
DOMAIN= 'LB';
SUBJID= strip(substr(SUBJECT, 4,3));
SITEID= strip(substr(SITE, 5,3));
USUBJID= compress(STUDYID || '-' || SITEID|| '-' || SUBJID);

/* VISIT VISITNUM */

if find(vstdt, 'Screening', 'i') then do; visit= 'Screening';
visitnum= 10; end;
else if find(vstdt, 'Day 1 - Baseline', 'i') then do; visit= 'Day 1';
visitnum= 15; end;
else if find(vstdt, 'Day 15', 'i') then do; visit= 'Day 15'; visitnum=
25; end;
else if find(vstdt, 'Day 29', 'i') then do; visit= 'Day 29'; visitnum=
35; end;
else if find(vstdt, 'Day 43', 'i') then do; visit= 'Day 43'; visitnum=
45; end;
else if find(vstdt, 'Follow-Up', 'i') then do; visit= 'Follow-Up';
visitnum= 55; end;

/* EPOCH */

if  visitnum = 10 then EPOCH ='SCREENING';
else if 15 <= visitnum <= 45  then EPOCH ='TREATMENT';
else if visitnum =55 then EPOCH ='FOLLOW-UP';
else EPOCH='';

/* LBDTC */
LBDTC= put(input(VISITDT,??DATE11.),??IS8601DA.);
```

```
/* LBSPID */
if SAMPNUM ne ' ' then LBSPID=compress(SAMPNUM);

/* LBTESTCD LBTEST */
if LBTEST1= 'Blood' then do; LBTESTCD= 'BLOOD'; LBTEST= 'Blood'; end;
if LBTEST1= 'Glucose' then do; LBTESTCD= 'GLUC'; LBTEST= 'Glucose';
end;
if LBTEST1= 'Ketones' then do; LBTESTCD= 'KETONES'; LBTEST= 'Ketones';
end;
if LBTEST1= 'Protein' then do; LBTESTCD= 'PROT'; LBTEST= 'Protein';
end;
if LBTEST1= 'RBC' then do; LBTESTCD= 'RBC'; LBTEST= 'Erythrocytes';
end;
if LBTEST1= 'Specific Gravity' then do; LBTESTCD= 'SPGRAV'; LBTEST=
'Specific Gravity'; end;
if LBTEST1= 'WBC' then do; LBTESTCD= 'WBC'; LBTEST= 'Leukocytes'; end;
if LBTEST1= 'pH' then do; LBTESTCD= 'pH'; LBTEST= 'pH'; end;

/* LBCAT LBORRES LBORRESU LBORNRLO LBORNRHI LBSTRESC LBSTRESU LBSTRESN
LBSTNRLO LBSTNRHI LBSTAT LBREASND */
LBCAT= 'URINALYSIS';

if LBORRES1 ne ' ' then LBORRES= LBORRES1;
if LBORRESU1 ne ' ' then LBORRESU= LBORRESU1;

LBORNRLO= '';
LBORNRHI= '';

LBSTRESC= LBORRES;
LBSTRESU= LBORRESU;
LBSTRESN= input(LBORRES,??best.);
LBSTNRLO= .;
LBSTNRHI= .;

if LBSTRESC ne ' ' then do;
if LBABN= 1 then LBNRIND= 'Abnormal';
else LBNRIND= 'Normal';
end;

if LBORRES = ' ' then do; LBSTAT = 'NOT DONE'; LBREASND= 'SPECIMEN
LOST'; end;

keep STUDYID DOMAIN  USUBJID       LBSPID LBTESTCD      LBTEST LBCAT
LBORRES LBORRESU LBORNRLO LBORNRHI LBSTRESC LBSTRESU
       LBSTRESN LBSTNRLO LBSTNRHI LBNRIND LBSTAT LBREASND VISITNUM
```

```
       VISIT EPOCH   LBDTC;
run;

/* concatenating lb1 lb2 lb3 datasets */

data lb_all;
set lb1 lb2 lb3;
run;

/* created variables LBDY */

options mprint;

%macro stdy_dy (domain=, input=);

proc sort data= output.dm out= dmx (keep= usubjid rfstdtc);
by usubjid;
run;

proc sort data= &input. out= &input.x;
by usubjid;
run;

data &input._dm;
merge dmx (in= a) &input.x (in= b);
if a and b;
by usubjid;
&domain.dt= input(&domain.dtc,??is8601da.);
rfstdt= input(rfstdtc,??is8601da.);

if &domain.dt ge rfstdt then &domain.dy= (&domain.dt- rfstdt) + 1;
else &domain.dy= &domain.dt- rfstdt;

run;

%mend stdy_dy;

%stdy_dy(domain=lb, input=lb_all);

/* created variable VSBLFL */

data blfl noblfl;
set lb_all_dm;
if lbdt ne . and rfstdt ne . and lbdt lt rfstdt then output blfl;
else output noblfl;
run;
```

```
proc sort data=blfl;
by usubjid lbtestcd lbdt;
run;

data blfld;
set blfl;
by usubjid lbtestcd lbdt;
if last.lbtestcd then LBBLFL= 'Y';
else LBBLFL= '';
run;

data blfl_noblfl;
set blfld noblfl;
run;

/* created LBSEQ */

%let key= STUDYID USUBJID LBCAT LBTESTCD LBDTC;

proc sort data= blfl_noblfl out= blfl_noblfl1;
by &key;
run;

data all;
set blfl_noblfl1;
by &key;

if first.usubjid then lbseq= 1;
else lbseq +1;
format _all_;
informat _all_;
run;

/* proc contents data= ; */
/* run; */

/* assigned attributes and created final lb dataset */

%let keepvar= STUDYID DOMAIN USUBJID LBSEQ LBSPID LBTESTCD LBTEST
LBCAT LBORRES LBORRESU LBORNRLO LBORNRHI
       LBSTRESC LBSTRESU LBSTRESN LBSTNRLO       LBSTNRHI LBNRIND
LBSTAT LBREASND LBBLFL      VISITNUM VISIT EPOCH LBDTC LBDY;

data output.lb (label= 'Laboratory Test Results');
retain &keepvar;
```

```
attrib STUDYID label= 'Study Identifier' length= $20
              DOMAIN label= 'Domain Abbreviation' length= $2
              USUBJID label= 'Unique Subject Identifier' length= $40
              LBSEQ label= 'Sequence Number' length= 8.
              LBSPID label= 'Sponsor-Defined Identifier' length= $10
              LBTESTCD label= 'Lab Test or Examination Short Name'
length= $10
              LBTEST label= 'Lab Test or Examination Name' length= $200
              LBCAT label= 'Category for Lab Test' length= $200
              LBORRES label= 'Result or Finding in Original Units'
length= $200
              LBORRESU label= 'Original Units' length= $200
              LBORNRLO label= 'Reference Range Lower Limit in Orig
Unit' length= $20
              LBORNRHI label= 'Reference Range Upper Limit in Orig
Unit' length= $20
              LBSTRESC label= 'Character Result/Finding in Std Format'
length= $200
              LBSTRESU label= 'Standard Units' length= $200
              LBSTRESN label= 'Numeric Result/Finding in Standard
Units' length= 8.
              LBSTNRLO label= 'Reference Range Lower Limit-Std Units'
length= 8.
              LBSTNRHI label= 'Reference Range Upper Limit-Std Units'
length= 8.
              LBNRIND label= 'Reference Range Indicator' length= $20
              LBSTAT label= 'Completion Status' length= $200
              LBREASND label= 'Reason Test Not Done' length= $200
              LBBLFL label= 'Baseline Flag' length= $2
              VISITNUM label= 'Visit Number' length= 8.
              VISIT label= 'Visit Name' length= $50
              EPOCH label= 'Epoch' length= $20
              LBDTC label= 'Date/Time of Specimen Collection' length=
$20
              LBDY label= 'Study Day of Specimen Collection' length=
8.;

set all;

keep &keepvar;
run;

proc compare base=base.lb comp=output.lb outcompare outbase outnoequal
outdiff method=exact out=difference;
/* ods listing file= '/home/u58485303/output/lb.lst'; */
run;
```