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/*=====
| Covance Study Number   : COV- 106343
| Program Name           : d_2ad1b.sas
| Purpose                 : create ADLB
| Input Data             : ADAM.ADSL,SDTM.LB
| Output Data            : ADAM.ADLB
|
| Macros Called          :
|
| Originally Performed by : Serona Zheng
| Date/Time billed       : 13Apr2015
|
+=====
|
| Modification History   :
|
| Programmer             : Serona Zheng
| Date                   : 15Apr2015
| Reason for Change      : 1. add condition if safbfl ^= 'Y and safaf1 ^= 'Y' then anl01f1 ='Y' |
|                        2. keep base,bnrind,btoxgr1,btoxgrh for all records |
|
| Programmer             : Serona Zheng
| Date                   : 28May2015
| Reason for Change      : 1. Use locf for parameter BASO,EOS,MONO,NEUT,LYM
|                        2. Set parcat3 to 'Risk maskers' for BASO,EOS,MONO,NEUT,LYM|
|
| Programmer             : Serona Zheng
| Date                   : 30Jun2015
| Reason for Change      : remove 'CS' or 'NCS' after 'NORMAL' in shift1 values
|
| Programmer             : Serona Zheng
| Date                   : 10Jul2015
| Reason for Change      : Include unscheduled visit for LOCF
|
| Programmer             : Serona Zheng
| Date                   : 03Aug2015
| Reason for Change      : Add new variable TMSNQUIT based on new SPEC
+=====*/

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libname sdtm "/cvn/projects/prj/data/000000106343/datasets/sdtm/sdtmx";
***Create log file;
proc printto new
log="/cvn/projects/prj/development/000000106343/dev/adam/log/d_2ad1b.log" ;
run;

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```
proc format;
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```
value paracd
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```

1='ALT'
2='AST'
3='BILI'
4='BILDIR'
5='ALP'
6='GGT'
7='LDH'
8='GLUC'
9='CREAT'
10='PROT'
11='BUN'
12='TRIG'
13='CHOL'
14='ALB'
15='SODIUM'
16='K'
20='CRP'
21='HBA1C'
22='HDL'
23='LDL'
24='HOMOCY'
25='FIBRINO'
26='ICAM1'
74='OALB'
75='OSODIUM'
76='OK'
99='CLBALL'
101='RBC'
102='HGB'
103='HCT'
104='WBC'

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105='NEUT'  
106='NEUTLE'  
107='LYM'  
108='LYMLE'  
109='MONO'  
110='MONOLE'  
111='EOS'  
112='EOSLE'  
113='BASO'  
114='BASOLE'  
115='PLAT'  
116='MCH'  
117='MCHC'  
118='MCV'  
119='MYCY'  
161='ORBC'  
164='OWBC'  
165='ONEUT'  
167='OLYM'  
169='OMONO'  
171='OEOS'  
173='OBASO'  
175='OPLAT'  
177='OMCHC'  
199='HLBALL'  
201='PH'  
202='SPGRAV'  
203='UBILI'  
204='UGLUC'  
205='NITRITE'  
206='URBC'  
207='UPROT'  
208='BACT'  
209='CASTS'  
210='CRYSTALS'  
211='CYCAOXA'  
212='DENSITY'  
213='EPIROCE'  
214='EPISQCE'  
215='MUCUS'  
216='UWBC'  
217='YEAST'  
218='OCCBLD'  
299='ULBALL'  
301='HBSAG'  
302='HCAB'  
303='HIV12ABI'  
304='HBSAGC'  
305='HCABC'  
306='HIV12ABQ'  
310='AMPHET'  
311='BARB'  
312='BNZDZPN'  
313='CANNAB'  
314='COCAINE'  
315='OPIATE'  
320='COTININE'  
330='ETHANOL'  
340='PREGTEST'  
399='SLBALL';

value param  
1='Alanine Aminotransferase (IU/L)'  
2='Aspartate Aminotransferase (IU/L)'  
3='Bilirubin (mg/dL)'  
4='Direct Bilirubin (mg/dL)'  
5='Alkaline Phosphatase (IU/L)'  
6='Gamma Glutamyl Transferase (IU/L)'  
7='Lactate Dehydrogenase (IU/L)'  
8='Glucose (mg/dL)'  
9='Creatinine (mg/dL)'  
10='Protein (g/dL)'  
11='Blood Urea Nitrogen (mg/dL)'  
12='Triglycerides (mg/dL)'  
13='Cholesterol (mg/dL)'  
14='Albumin (g/L)'  
15='Sodium (mmol/L)'  
16='Potassium (mmol/L)'

20='C Reactive Protein (mg/L)'  
 21='Hemoglobin A1C (%)'  
 22='HDL Cholesterol (mg/dL)'  
 23='LDL Cholesterol (mg/dL)'  
 24='Homocysteine (umol/L)'  
 25='Fibrinogen (mg/dL)'  
 26='Intercellular Adhesion Molecule 1 (ng/mL)'  
 74='Albumin (g/dL)'  
 75='Sodium (mEq/L)'  
 76='Potassium (mEq/L)'  
 99='All laboratory tests (Clinical Chemistry)'  
 101='Erythrocytes (T/L)'  
 102='Hemoglobin (g/dL)'  
 103='Hematocrit (%)'  
 104='Leukocytes (GI/L)'  
 105='Neutrophils (GI/L)'  
 106='Neutrophils/Leukocytes (%)'  
 107='Lymphocytes (GI/L)'  
 108='Lymphocytes/Leukocytes (%)'  
 109='Monocytes (GI/L)'  
 110='Monocytes/Leukocytes (%)'  
 111='Eosinophils (GI/L)'  
 112='Eosinophils/Leukocytes (%)'  
 113='Basophils (GI/L)'  
 114='Basophils/Leukocytes (%)'  
 115='Platelets (GI/L)'  
 116='Ery. Mean Corpuscular Hemoglobin (pg)'  
 117='Ery. Mean Corpuscular HGB Concentration (g/dL)'  
 118='Ery. Mean Corpuscular Volume (fL)'  
 119='Myelocytes (GI/L)'  
 161='Erythrocytes (10<sup>4</sup>/uL)'  
 164='Leukocytes (/uL)'  
 165='Neutrophils (/uL)'  
 167='Lymphocytes (/uL)'  
 169='Monocytes (/uL)'  
 171='Eosinophils (/uL)'  
 173='Basophils (/uL)'  
 175='Platelets (10<sup>4</sup>/uL)'  
 177='Ery. Mean Corpuscular HGB Concentration (%)'  
 199='All laboratory tests (Hematology)'  
 201='pH'  
 202='Specific Gravity'  
 203='Bilirubin (Urine)'  
 204='Glucose (Urine)'  
 205='Nitrite'  
 206='Erythrocytes (Urine)'  
 207='Protein (Urine)'  
 208='Bacteria'  
 209='Casts'  
 210='Crystals'  
 211='Calcium Oxalate Crystals'  
 212='Density'  
 213='Round Epithelial Cells'  
 214='Squamous Epithelial Cells'  
 215='Mucus'  
 216='Leukocytes (Urine)'  
 217='Yeast'  
 218='Occult Blood'  
 299='All laboratory tests (Urinalysis)'  
 301='Hepatitis B Virus Surface Antigen'  
 302='Hepatitis C Antibody Measurement (S/CO RATIO)'  
 303='HIV-1/2 Antibody Index Value'  
 304='Hepatitis B Virus Surface Antigen (no units)'  
 305='Hepatitis C Antibody Measurement (no units)'  
 306='HIV-1/2 Antibody Qual'  
 310='Amphetamine'  
 311='Barbiturates'  
 312='Benzodiazepine'  
 313='Cannabinoids'  
 314='Cocaine'  
 315='Opiate'  
 320='Cotinine'  
 330='Ethanol'  
 340='Pregnancy Test'  
 399='All laboratory tests (Safety Laboratory Entry Criteria)';

value unit  
 1='IU/L'

2='IU/L'  
3='mg/dL'  
4='mg/dL'  
5='IU/L'  
6='IU/L'  
7='IU/L'  
8='mg/dL'  
9='mg/dL'  
10='g/dL'  
11='mg/dL'  
12='mg/dL'  
13='mg/dL'  
14='g/L'  
15='mmol/L'  
16='mmol/L'  
20='mg/L'  
21='%'  
22='mg/dL'  
23='mg/dL'  
24='umol/L'  
25='mg/dL'  
26='ng/mL'  
74='g/dL'  
75='mEq/L'  
76='mEq/L'  
99=' '  
101='T/L'  
102='g/dL'  
103='%'  
104='GI/L'  
105='GI/L'  
106='%'  
107='GI/L'  
108='%'  
109='GI/L'  
110='%'  
111='GI/L'  
112='%'  
113='GI/L'  
114='%'  
115='GI/L'  
116='pg'  
117='g/dL'  
118='fL'  
119='GI/L'  
161='10^4/uL'  
164=' /uL'  
165=' /uL'  
167=' /uL'  
169=' /uL'  
171=' /uL'  
173=' /uL'  
175='10^4/uL'  
177='%'  
199=' '  
201=' '  
202=' '  
203=' '  
204=' '  
205=' '  
206=' '  
207=' '  
208=' '  
209=' '  
210=' '  
211=' '  
212=' '  
213=' '  
214=' '  
215=' '  
216=' '  
217=' '  
218=' '  
299=' '  
301=' '  
302='S/CO RATIO'  
303=' '  
304=' '

305=' '  
306=' '  
310=' '  
311=' '  
312=' '  
313=' '  
314=' '  
315=' '  
320=' '  
330=' '  
340=' '  
399=' '  
;

value cat1c

1='Clinical Chemistry'  
2='Clinical Chemistry'  
3='Clinical Chemistry'  
4='Clinical Chemistry'  
5='Clinical Chemistry'  
6='Clinical Chemistry'  
7='Clinical Chemistry'  
8='Clinical Chemistry'  
9='Clinical Chemistry'  
10='Clinical Chemistry'  
11='Clinical Chemistry'  
12='Clinical Chemistry'  
13='Clinical Chemistry'  
14='Clinical Chemistry'  
15='Clinical Chemistry'  
16='Clinical Chemistry'  
20='Clinical Chemistry'  
21='Clinical Chemistry'  
22='Clinical Chemistry'  
23='Clinical Chemistry'  
24='Clinical Chemistry'  
25='Clinical Chemistry'  
26='Clinical Chemistry'  
74='Clinical Chemistry'  
75='Clinical Chemistry'  
76='Clinical Chemistry'  
99='Clinical Chemistry'  
101='Hematology'  
102='Hematology'  
103='Hematology'  
104='Hematology'  
105='Hematology'  
106='Hematology'  
107='Hematology'  
108='Hematology'  
109='Hematology'  
110='Hematology'  
111='Hematology'  
112='Hematology'  
113='Hematology'  
114='Hematology'  
115='Hematology'  
116='Hematology'  
117='Hematology'  
118='Hematology'  
119='Hematology'  
161='Hematology'  
164='Hematology'  
165='Hematology'  
167='Hematology'  
169='Hematology'  
171='Hematology'  
173='Hematology'  
175='Hematology'  
177='Hematology'  
199='Hematology'  
201='Urinalysis'  
202='Urinalysis'  
203='Urinalysis'  
204='Urinalysis'  
205='Urinalysis'  
206='Urinalysis'  
207='Urinalysis'

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208='Urinalysis'
209='Urinalysis'
210='Urinalysis'
211='Urinalysis'
212='Urinalysis'
213='Urinalysis'
214='Urinalysis'
215='Urinalysis'
216='Urinalysis'
217='Urinalysis'
218='Urinalysis'
299='Urinalysis'
301='Safety Laboratory Entry Criteria'
302='Safety Laboratory Entry Criteria'
303='Safety Laboratory Entry Criteria'
304='Safety Laboratory Entry Criteria'
305='Safety Laboratory Entry Criteria'
306='Safety Laboratory Entry Criteria'
310='Safety Laboratory Entry Criteria'
311='Safety Laboratory Entry Criteria'
312='Safety Laboratory Entry Criteria'
313='Safety Laboratory Entry Criteria'
314='Safety Laboratory Entry Criteria'
315='Safety Laboratory Entry Criteria'
320='Safety Laboratory Entry Criteria'
330='Safety Laboratory Entry Criteria'
340='Safety Laboratory Entry Criteria'
399='Safety Laboratory Entry Criteria';

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value cat3c
8='Risk Markers'
12='Risk Markers'
13='Risk Markers'
20='Risk Markers'
21='Risk Markers'
22='Risk Markers'
23='Risk Markers'
24='Risk Markers'
25='Risk Markers'
26='Risk Markers'
104='Risk Markers'
105='Risk Markers'
107='Risk Markers'
109='Risk Markers'
111='Risk Markers'
113='Risk Markers'
115='Risk Markers'
;

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value cat4c
1='Single-directional (High) CTC grade parameter'
2='Single-directional (High) CTC grade parameter'
3='Single-directional (High) CTC grade parameter'
5='Single-directional (High) CTC grade parameter'
6='Single-directional (High) CTC grade parameter'
8='Bi-directional CTC grade parameter'
9='Single-directional (High) CTC grade parameter'
10='Single-directional (Low) CTC grade parameter'
11='Single-directional (High) CTC grade parameter'
12='Single-directional (High) CTC grade parameter'
13='Single-directional (High) CTC grade parameter'
14='Single-directional (Low) CTC grade parameter'
15='Bi-directional CTC grade parameter'
16='Bi-directional CTC grade parameter'
102='Bi-directional CTC grade parameter'
104='Bi-directional CTC grade parameter'
105='Single-directional (Low) CTC grade parameter'
107='Bi-directional CTC grade parameter'
111='Single-directional (High) CTC grade parameter'
115='Single-directional (Low) CTC grade parameter'
204='Single-directional (High) CTC grade parameter'
207='Single-directional (High) CTC grade parameter'
;

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run;
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```
***Get data from ADAL;
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proc sort data=adam.adsl out=adsl;by usubjid;run;

proc sort data=adsl out=sv_1(keep=usubjid lvisdt);by usubjid;run;
***Get data from LBo;
data lb;
  length avalc $200 avalu $20 afastfl $1 bloqfl aulqfl aqlfl $2 atpt $78;
  set sdtm.lb;
  if lbstresn ne . then aval1 = lbstresn;
  else if lbstresn eq . and lbstresc ne '' then do;
    if index(lbstresc, '(') then aval1 = input(scan(scan(lbstresc,2,"(",1,""),best.)/2;
    else if index(lbstresc, '<') and lbstresc ne "Negative <200 ng/ml" then aval1 = input(scan(lbstresc,1,'<'),best.)/2;
    else if index(lbstresc, '>') then aval1 = input(compress(lbstresc, 'AP'),best.);
    aqlfl = 'Y';
  end;
  atpt = lbtpt;
  atptn = lbtpnum;

  if aval1 = . then aqlfl = '';

  avalc = lbstresc;
  avalu = lbstresu;
  afastfl = lbfast;
  if index(lbstresc, '<') then bloqfl = 'Y';
  if index(lbstresc, '>') then aulqfl = 'Y';

  if avalc = "Negative <200 ng/ml" and aval = . then do;
    aval = 100;
    aqlfl = 'Y';
  end;
run;

***Get supp data of LB;
proc sort data=sdtm.supplb out=supplb;by usubjid;run;
data lbcl prim pact anri;
  set supplb;
  by usubjid;
  lbseq = input(idvarval,best.);
  if qnam = "LBCLSIG" then output lbcl;
  else if qnam = "PRIMTUB" then output prim;
  else if qnam = "BACTUB" then output pact;
  else if qnam = "LB_FLG" and qval in ('LOW' 'NORMAL' 'ABNORMAL' 'HIGH') then output anri;
  keep lbseq qnam qval usubjid;
run;
proc sort data=lbcl;by usubjid lbseq;run;
proc sort data=prim;by usubjid lbseq;run;
proc sort data=pact;by usubjid lbseq;run;
proc sort data=anri;by usubjid lbseq;run;

***merge LB and SUPPLB;
proc sort data=lb out=lb;by usubjid lbseq;run;
data lb;
  length primtub $200 lbclsig $200 aclsig $200 anrind $6 bactub $200 anrhi anrlo $50;
  merge lb(in=a) lbcl(rename=(qval=lbcl) drop=qnam) prim(rename=(qval=prim) drop=qnam) pact(rename=(qval=pact) drop=qnam) anri(renam
e=(qval=anri) drop=qnam);
  by usubjid lbseq;
  if a;
  primtub = prim;
  lbclsig = lbcl;

  if upcase(lbnrind) = 'NORMAL' then lbclsig = ''; ***Remove CS or SCS for normal value;

  if lbclsig ne '' then aclsig = lbclsig;
  anrind = LBNRIND;
  if anri ne '' then anrind = anri;

  if lbstnrlo ne . then anrlo = strip(put(lbstnrlo, best.));
  if lbstnrhi ne . then anrhi = strip(put(lbstnrhi, best.));

  bactub = pact;

  if LBCAT in ('OXYSTEROLS') and lbtestcd in ("CHOL") then delete;

run;

***Create parameter;
data lb1;

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length param $60 paramcd $8;
set lb;
if upcase(lbtestcd) = "ALP" then do;
paramn = 5;
paramcd = strip(lbtestcd);
param = 'Alkaline Phosphatase';
end;

else if upcase(lbtestcd) = "ALT" then do;
paramn = 1;
paramcd = strip(lbtestcd);
param = 'Alanine Aminotransferase';

end;

else if upcase(lbtestcd) = "AMPHET" then do;
paramn = 310;
paramcd = strip(lbtestcd);
param = 'Amphetamine';

end;

else if upcase(lbtestcd) = "AST" then do;
paramn = 2;
paramcd = strip(lbtestcd);
param = 'Aspartate Aminotransferase';
end;

else if upcase(lbtestcd) = "BACT" then do;
paramn = 208;
paramcd = strip(lbtestcd);
param = 'Bacteria';
end;

else if upcase(lbtestcd) = "BARB" then do;
paramn = 311;
paramcd = strip(lbtestcd);
param = 'Barbiturates';
end;

else if upcase(lbtestcd) = "BASOLE" then do;
paramn = 114;
paramcd = strip(lbtestcd);
param = 'Basophils';
end;

else if upcase(lbtestcd) = "BNZDZPN" then do;
paramn = 312;
paramcd = strip(lbtestcd);
param = 'Benzodiazepine';
end;

else if upcase(lbtestcd) = "BILDIR" then do;
paramn = 4;
paramcd = strip(lbtestcd);
param = 'Direct Bilirubin';
end;

else if upcase(lbcat) = "CLINICAL CHEMISTRY" and upcase(lbtestcd) = "BILI" then do;
paramn = 3;
paramcd = strip(lbtestcd);
param = 'Bilirubin';
end;

else if upcase(lbtestcd) = "BUN" then do;
paramn = 11;
paramcd = strip(lbtestcd);
param = 'Blood Urea Nitrogen';
end;

else if upcase(lbtestcd) = "CANNAB" then do;
paramn = 313;
paramcd = strip(lbtestcd);
param = 'Cannabinoids';
end;

else if upcase(lbtestcd) = "CASTS" then do;
paramn = 209;
paramcd = strip(lbtestcd);
param = 'Casts';
end;
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else if upcase(lbtestcd) = "CHOL" then do;
paramn = 13;
paramcd = strip(lbtestcd);
param = 'Cholesterol';
end;
else if upcase(lbtestcd) = "COCAINE" then do;
paramn = 314;
paramcd = strip(lbtestcd);
param = 'Cocaine';
end;
else if upcase(lbtestcd) = "COTININE" and upcase(lbcat) = "COTININE SCREENING" then do;
paramn = 320;
paramcd = strip(lbtestcd);
param = 'Cotinine';
end;
else if upcase(lbtestcd) = "CREAT" and upcase(lbcat) = "CLINICAL CHEMISTRY" then do;
paramn = 9;
paramcd = strip(lbtestcd);
param = 'Creatinine';
end;
else if upcase(lbtestcd) = "CRYSTALS" then do;
paramn = 210;
paramcd = strip(lbtestcd);
param = 'Crystals';
end;
else if upcase(lbtestcd) = "CYCAOXA" then do;
paramn = 211;
paramcd = strip(lbtestcd);
param = 'Calcium Oxalate Crystals';
end;

else if upcase(lbtestcd) = "DENSITY" then do;
paramn = 212;
paramcd = strip(lbtestcd);
param = 'Density';
end;
else if upcase(lbtestcd) = "EOSLE" then do;
paramn = 112;
paramcd = strip(lbtestcd);
param = 'Eosinophils/Leukocytes';
end;

else if upcase(lbtestcd) = "EPIROCE" then do;
paramn = 213;
paramcd = strip(lbtestcd);
param = 'Round Epithelial Cells';
end;

else if upcase(lbtestcd) = "EPISQCE" then do;
paramn = 214;
paramcd = strip(lbtestcd);
param = 'Squamous Epithelial Cells';
end;

else if upcase(lbtestcd) = "ETHANOL" then do;
paramn = 330;
paramcd = strip(lbtestcd);
param = 'Ethanol';
end;

else if upcase(lbtestcd) = "GGT" then do;
paramn = 6;
paramcd = strip(lbtestcd);
param = 'Gamma Glutamyl Transferase';
end;

else if upcase(lbtestcd) = "GLUC" and upcase(lbcat) = "CLINICAL CHEMISTRY" then do;
paramn = 8;
paramcd = strip(lbtestcd);
param = 'Glucose';
end;

else if upcase(lbtestcd) = "HBSAG" then do;
paramn = 301;
paramcd = strip(lbtestcd);
param = 'Hepatitis B Virus Surface Antigen';
end;

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else if upcase(lbtestcd) = "HCAB" then do;
paramn = 302;
paramcd = strip(lbtestcd);
param = 'Hepatitis C Antibody Measurement';
end;

else if upcase(lbtestcd) = "HCABC" then do;
paramn = 305;
paramcd = strip(lbtestcd);
param = 'Hepatitis C Antibody Measurement (no units)';
end;

else if upcase(lbtestcd) = "HBSAGC" then do;
paramn = 304;
paramcd = strip(lbtestcd);
param = 'Hepatitis B Virus Surface Antigen (no units)';
end;

else if upcase(lbtestcd) = "HCT" then do;
paramn = 103;
paramcd = strip(lbtestcd);
param = 'Hematocrit';
end;

else if upcase(lbtestcd) = "HGB" then do;
paramn = 102;
paramcd = strip(lbtestcd);
param = 'Hemoglobin';
end;

else if upcase(lbtestcd) = "HIV12ABI" then do;
paramn = 303;
paramcd = strip(lbtestcd);
param = 'HIV-1/2 Antibody Index Value';
end;

else if upcase(lbtestcd) = "HIV12ABQ" then do;
paramn = 306;
paramcd = strip(lbtestcd);
param = 'HIV-1/2 Antibody Qual';
end;

else if upcase(lbtestcd) = "LBALL" then do;
if upcase(lbcat) = "CLINICAL CHEMISTRY" then do;
paramn = 99;
paramcd = "C"||strip(lbtestcd);
end;
else if upcase(lbcat) = "HAEMATOLOGY" then do;
paramn = 199;
paramcd = "H"||strip(lbtestcd);
end;
else if lbscat = '' and upcase(lbcat) = "URINALYSIS" then do;
paramn = 299;
paramcd = "U"||strip(lbtestcd);
end;
else if upcase(lbcat) = "PREGNANCY" then do;
paramn = 399;
paramcd = "S"||strip(lbtestcd);
end;
param = 'All laboratory tests';
end;

else if upcase(lbtestcd) = "LDH" then do;
paramn = 7;
paramcd = strip(lbtestcd);
param = 'Lactate Dehydrogenase';
end;

else if upcase(lbtestcd) = "LYMLE" then do;
paramn = 108;
paramcd = strip(lbtestcd);
param = 'Lymphocytes/Leukocytes';
end;

else if upcase(lbtestcd) = "MCH" then do;
paramn = 116;
paramcd = strip(lbtestcd);
param = 'Ery. Mean Corpuscular Hemoglobin';

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end;

else if upcase(lbtestcd) = "MCV" then do;
paramn = 118;
paramcd = strip(lbtestcd);
param = 'Ery. Mean Corpuscular Volume';
end;

else if upcase(lbtestcd) = "MONOLE" then do;
paramn = 110;
paramcd = strip(lbtestcd);
param = 'Monocytes/Leukocytes';
end;

else if upcase(lbtestcd) = "MUCUS" then do;
paramn = 215;
paramcd = strip(lbtestcd);
param = 'Mucus';
end;

else if upcase(lbtestcd) = "MYCY" then do;
paramn = 119;
paramcd = strip(lbtestcd);
param = 'Myelocytes';
end;

else if upcase(lbtestcd) = "NEUTLE" then do;
paramn = 106;
paramcd = strip(lbtestcd);
param = 'Neutrophils/Leukocytes';
end;

else if upcase(lbtestcd) = "NITRITE" then do;
paramn = 205;
paramcd = strip(lbtestcd);
param = 'Nitrite';
end;

else if upcase(lbtestcd) = "OPIATE" then do;
paramn = 315;
paramcd = strip(lbtestcd);
param = 'Opiate';
end;

else if upcase(lbtestcd) = "PH" then do;
paramn = 201;
paramcd = strip(lbtestcd);
param = 'pH';
end;

else if upcase(lbtestcd) = "PREGTEST" then do;
paramn = 340;
paramcd = strip(lbtestcd);
param = 'Pregnancy Test';
end;

else if upcase(lbtestcd) = "PROT" and upcase(lbcat) = "CLINICAL CHEMISTRY" then do;
paramn = 10;
paramcd = strip(lbtestcd);
param = 'Protein';
end;

/* else if upcase(lbtestcd) = "RBCMORPH" then paramn = 120;*/
else if upcase(lbtestcd) = "SPGRAV" then do;
paramn = 202;
paramcd = strip(lbtestcd);
param = 'Specific Gravity';
end;

else if upcase(lbtestcd) = "TRIG" then do;
paramn = 12;
paramcd = strip(lbtestcd);
param = 'Triglycerides';
end;

else if upcase(lbtestcd) = "BILI" and upcase(lbcat) = "URINALYSIS" then do;
paramn = 203;
paramcd = "UBILI";

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param = 'Bilirubin (Urine)';
end;
else if upcase(lbtestcd) = "GLUC" and upcase(lbcate) = "URINALYSIS" then do;
paramn = 204;
paramcd = "UGLUC";
param = 'Bilirubin (Urine)';
end;
else if upcase(lbtestcd) = "PROT" and upcase(lbcate) = "URINALYSIS" then do;
paramn = 207;
paramcd = "UPROT";
param = 'Protein (Urine)';
end;
else if upcase(lbtestcd) = "RBC" and upcase(lbcate) = "URINALYSIS" then do;
paramn = 206;
paramcd = "URBC";
param = 'Erythrocytes (Urine)';
end;
else if upcase(lbtestcd) = "WBC" and upcase(lbcate) = "URINALYSIS" then do;
paramn = 216;
paramcd = "UWBC";
param = 'Leukocytes (Urine)';
end;
else if upcase(lbtestcd) = "YEAST" then do;
paramn = 217;
paramcd = strip(lbtestcd);
param = 'Yeast';
end;

else if upcase(lbtestcd) = "OCCBLD" then do;
paramn = 218;
paramcd = strip(lbtestcd);
param = 'Occult Blood';
end;

else if upcase(lbtestcd) = "CRP" then do;
paramn = 20;
paramcd = strip(lbtestcd);
param = 'C Reactive Protein';
end;

else if upcase(lbtestcd) = "HBA1C" then do;
paramn = 21;
paramcd = strip(lbtestcd);
param = 'Hemoglobin A1C';
end;

else if upcase(lbtestcd) = "HDL" then do;
paramn = 22;
paramcd = strip(lbtestcd);
param = 'HDL Cholesterol';
end;

else if upcase(lbtestcd) = "LDL" then do;
paramn = 23;
paramcd = strip(lbtestcd);
param = 'LDL Cholesterol';
end;

else if upcase(lbtestcd) = "HOMOCY" then do;
paramn = 24;
paramcd = strip(lbtestcd);
param = 'Homocysteine';
end;

else if upcase(lbtestcd) = "FIBRINO" then do;
paramn = 25;
paramcd = strip(lbtestcd);
param = 'Fibrinogen';
end;

else if upcase(lbtestcd) = "ICAM1" then do;
paramn = 26;
paramcd = strip(lbtestcd);
param = 'Soluble Intercellular Adhesion Mol 1';
end;

else if upcase(lbtestcd) = "ALB" then do;
paramn = 14;

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paramcd = strip(lbtestcd);
param = 'Albumin';
end;

else if upcase(lbtestcd) = "BASO" then do;
paramn = 113;
paramcd = strip(lbtestcd);
param = 'Basophils';
end;

else if upcase(lbtestcd) = "K" then do;
paramn = 16;
paramcd = strip(lbtestcd);
param = 'Potassium';
end;

else if upcase(lbtestcd) = "MCHC" then do;
paramn = 117;
paramcd = strip(lbtestcd);
param = 'Ery. Mean Corpuscular HGB Concentration';
end;

else if upcase(lbtestcd) = "PLAT" then do;
paramn = 115;
paramcd = strip(lbtestcd);
param = 'Platelets';
end;

else if upcase(lbtestcd) = "SODIUM" then do;
paramn = 15;
paramcd = strip(lbtestcd);
param = 'Sodium';
end;

else if upcase(lbtestcd) = "MONO" then do;
paramn = 109;
paramcd = strip(lbtestcd);
param = 'Monocytes';
end;

else if upcase(lbtestcd) = "WBC" and upcase(LBCAT)='HAEMATOLOGY' then do;
paramn = 104;
paramcd = strip(lbtestcd);
param = 'Leukocytes';
end;

else if upcase(lbtestcd) = "NEUT" then do;
paramn = 105;
paramcd = strip(lbtestcd);
param = 'Neutrophils';
end;

else if upcase(lbtestcd) = "RBC" and upcase(LBCAT)='HAEMATOLOGY' then do;
paramn = 101;
paramcd = strip(lbtestcd);
param = 'Erythrocytes';
end;

else if upcase(lbtestcd) = "LYM" and upcase(LBCAT)='HAEMATOLOGY' then do;
paramn = 107;
paramcd = strip(lbtestcd);
param = 'Lymphocytes';
end;

else if upcase(lbtestcd) = "EOS" and upcase(LBCAT)='HAEMATOLOGY' then do;
paramn = 111;
paramcd = strip(lbtestcd);
param = 'Eosinophils';
end;
run;

data lb1;
length parcat1 $40;
set lb1;

if LBTESTCD='ALB' and LBSTRESU='g/dL' then do;
paramcd = lbtestcd;
if aval1 ne . then aval = aval1*10;

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else if aval1 = . then aval = .;
valu = 'g/L';avalc = strip(put(aval,best.));
anrlo = strip(put(lbstnrlo*10,best.));anrhi = strip(put(lbstnrhi*10,best.));paramn = 14;parcat1n = 1;
paramtyp = "DERIVED";
dtype = "FUNCTION";
/* output;*/
end;
if LBTESTCD='BASO' and LBSTRESU='/uL' then do;
paramcd = lbtestcd;
if aval1 ne . then aval = aval1/1000;
else if aval1 eq . then aval = .;
valu = 'G/L';
if aval ne . then avalc = strip(put(aval,best.));
else if aval eq . then avalc = '';
if lbstnrlo ne . then anrlo = strip(put(lbstnrlo/1000,best.));
if lbstnrhi ne . then anrhi = strip(put(lbstnrhi/1000,best.));paramn = 113;parcat1n = 2;
paramtyp = "DERIVED";
dtype = "FUNCTION";
/* output;*/
end;
if LBTESTCD='EOS' and LBSTRESU='/uL' then do;
paramcd = lbtestcd;aval = aval1;valu = 'G/L';avalc = lbstresc;
anrlo = strip(put(lbstnrlo,best.));anrhi = strip(put(lbstnrhi,best.));paramn = 111;parcat1n = 2;
paramtyp = "DERIVED";
dtype = "FUNCTION";
/* output;*/
end;
if LBTESTCD='K' and LBSTRESU='mEq/L' then do;
paramcd = lbtestcd;aval = aval1;valu = 'mmol/L';avalc = strip(put(aval,best.));
anrlo = strip(put(lbstnrlo,best.));anrhi = strip(put(lbstnrhi,best.));paramn = 16;parcat1n = 1;
paramtyp = "DERIVED";
dtype = "FUNCTION";
/* output;*/
end;

if LBTESTCD='MCHC' and LBSTRESU='%' then do;
paramcd = lbtestcd;aval = aval1;valu = 'g/dL';avalc = lbstresc;
anrlo = strip(put(lbstnrlo,best.));anrhi = strip(put(lbstnrhi,best.));paramn = 117;parcat1n = 2;
/* paramtyp = "DERIVED";*/
dtype = "FUNCTION";
/* output;*/
end;

if LBTESTCD='PLAT' and LBSTRESU='10^4/uL' then do;
paramcd = lbtestcd;
if aval1 ne . then aval = aval1*10;
else if aval1 eq . then aval = .;
valu = 'GI/L';if aval ne . then avalc = strip(put(aval,best.));
if aval = . then avalc = lborres;
anrlo = strip(put(lbstnrlo*10,best.));anrhi = strip(put(lbstnrhi*10,best.));paramn = 115;parcat1n = 2;
paramtyp = "DERIVED";
dtype = "FUNCTION";
/* output;*/
end;

if LBTESTCD='SODIUM' and LBSTRESU='mEq/L' then do;
paramcd = lbtestcd;aval = aval1;valu = 'mmol/L';avalc = strip(put(aval,best.));
anrlo = strip(put(lbstnrlo,best.));anrhi = strip(put(lbstnrhi,best.));paramn = 15;parcat1n = 1;
paramtyp = "DERIVED";
dtype = "FUNCTION";
/* output;*/
end;
if LBTESTCD='MONO' and LBSTRESU='/uL' then do;
paramcd = lbtestcd;aval = aval1;valu = 'G/L';avalc = lbstresc;
anrlo = strip(put(lbstnrlo,best.));anrhi = strip(put(lbstnrhi,best.));paramn = 109;parcat1n = 2;
paramtyp = "DERIVED";
dtype = "FUNCTION";
/* output;*/
end;

if LBCAT='HAEMATOLOGY' and LBTESTCD='WBC' and LBSTRESU='/uL' then do;
paramcd = lbtestcd;
if aval1 ne . then aval = aval1/1000;
else if aval1 eq . then aval = .;
valu = 'G/L';avalc = strip(put(aval,best.));
anrlo = strip(put(lbstnrlo/1000,best.));anrhi = strip(put(lbstnrhi/1000,best.));paramn = 104;parcat1n = 2;
paramtyp = "DERIVED";

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    dtype = "FUNCTION";
/*  output;*/
end;
if LBTESTCD='NEUT' and LBSTRESU='/uL' then do;
    paramcd = lbtestcd;aval = aval1;avalu = 'G/L';avalc = lbstresc;
    anrlo = strip(put(lbstnrlo,best.));anrhi = strip(put(lbstnrhi,best.));paramn = 105;parcat1n = 2;
    paramtyp = "DERIVED";
    dtype = "FUNCTION";
/*  output;*/
end;
if LBCAT='HAEMATOLOGY' and LBTESTCD='RBC' and LBSTRESU='10^4/uL' then do;
    paramcd = lbtestcd;
    if aval1 ne . then aval = aval1/100;
    else if aval1 eq . then aval = .;
    avalu = 'T/L';avalc = strip(put(aval,best.));
    anrlo = strip(put(lbstnrlo/100,best.));anrhi = strip(put(lbstnrhi/100,best.));paramn = 101;parcat1n = 2;
    paramtyp = "DERIVED";
    dtype = "FUNCTION";
/*  output;*/
end;
if LBTESTCD='LYM' and LBSTRESU='/uL' then do;
    paramcd = lbtestcd;aval = aval1;avalu = 'G/L';avalc = lbstresc;
    anrlo = strip(put(lbstnrlo,best.));anrhi = strip(put(lbstnrhi,best.));paramn = 107;parcat1n = 2;
    paramtyp = "DERIVED";
    dtype = "FUNCTION";
/*  output;*/
end;

if 0 < paramn < 100 then do;
    PARCAT1 = 'Clinical Chemistry';
    parcat1n = 1;
end;
else if 100 <= PARAMN < 200 then do;
    PARCAT1='Hematology';
    parcat1n = 2;
end;
else if 200 <= PARAMN <300 then do;
    PARCAT1='Urinalysis';
    parcat1n = 3;
end;
else if 300 <= PARAMN <400 then do;
    PARCAT1 = 'Safety Laboratory Entry Criteria';
    parcat1n = 4;
end;

run;

data lb2;
length dtype $20 paramtyp $20;
set lb1;
output;
if upcase(lbtestcd) = "ALB" and upcase(lborresu) = "G/DL" then do;
    paramcd = strip("0"||strip(lbtestcd));
    aval = input(lborres,best.);
    avalu = lborres;
    avalu = lborresu;
    paramn = 74;
    parcat1n = 1;
    param= 'Albumin';
    parcat1 = "Clinical Chemistry";
    paramtyp = '';
    dtype = '';
    anrlo = lbornrlo;
    anrhi = lbornrhi;
output;
end;
if upcase(lbtestcd) = "BASO" and upcase(lborresu) = "/UL" then do;
    paramcd = strip("0"||strip(lbtestcd));
    aval = input(lborres,best.);
    avalu = lborres;
    avalu = lborresu;
    paramn = 173;
    parcat1n = 2;
    param = 'Basophils';
    parcat1 = "Hematology";
    paramtyp = '';
    dtype = '';
    anrlo = lbornrlo;

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    anrhi = lbornrhi;
output;
end;
if upcase(lbtestcd) = "EOS" and upcase(lborresu) = "/UL" then do;
    paramcd = strip("0"||strip(lbtestcd));
    aval = input(lborres,best.);
    avalc = lborres;
    avalu = lborresu;
    paramn = 171;
    parcat1n = 2;
    parcat1 = "Hematology";
    param = 'Eosinophils';
    paramtyp = '';
    dtype = '';
    anrlo = lbornrlo;
    anrhi = lbornrhi;
output;
end;
if upcase(lbtestcd) = "K" and upcase(lborresu) = "MEQ/L" then do;
    paramcd = strip("0"||strip(lbtestcd));
    aval = input(lborres,best.);
    avalc = lborres;
    avalu = lborresu;
    paramn = 76;
    parcat1n = 1;
    param = 'Potassium';
    parcat1 = "Clinical Chemistry";
    paramtyp = '';
    dtype = '';
    anrlo = lbornrlo;
    anrhi = lbornrhi;
output;
end;
if upcase(lbtestcd) = "LYM" and upcase(lborresu) = "/UL" then do;
    paramcd = strip("0"||strip(lbtestcd));
    aval = input(lborres,best.);
    avalc = lborres;
    avalu = lborresu;
    paramn = 167;
    parcat1n = 2;
    param = 'Lymphocytes';
    parcat1 = "Hematology";
    paramtyp = '';
    dtype = '';
    anrlo = lbornrlo;
    anrhi = lbornrhi;
output;
end;
if upcase(lbtestcd) = "MCHC" and upcase(lborresu) = "%" then do;
    paramcd = strip("0"||strip(lbtestcd));
    aval = input(lborres,best.);
    avalc = lborres;
    avalu = lborresu;
    paramn = 177;
    parcat1n = 2;
    param = 'Ery. Mean Corpuscular HGB Concentration';
    parcat1 = "Hematology";
    paramtyp = '';
    dtype = '';
    anrlo = lbornrlo;
    anrhi = lbornrhi;
output;
end;
if upcase(lbtestcd) = "MONO" and upcase(lborresu) = "/UL" then do;
    paramcd = strip("0"||strip(lbtestcd));
    aval = input(lborres,best.);
    avalc = lborres;
    avalu = lborresu;
    paramn = 169;
    parcat1n = 2;
    param = 'Monocytes';
    parcat1 = "Hematology";
    paramtyp = '';
    dtype = '';
    anrlo = lbornrlo;
    anrhi = lbornrhi;
output;
end;

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if upcase(lbtestcd) = "NEUT" and upcase(lborresu) = "/UL" then do;
    paramcd = strip("0"||strip(lbtestcd));
    aval = input(lborres,best.);
    avalc = lborres;
    avalu = lborresu;
    paramn = 165;
    parcat1n = 2;
    param = 'Neutrophils';
    parcat1 = "Hematology";
    paramtyp = '';
    dtype = '';
        anrlo = lbornrlo;
    anrhi = lbornrhi;
    output;
end;

if upcase(lbtestcd) = "PLAT" and upcase(lborresu) = "10^4/UL" then do;
    paramcd = strip("0"||strip(lbtestcd));
    if strip(upcase(lborres)) ne "CANNOT BE TESTED" then aval = input(lborres,best.);
    avalc = lborres;
    avalu = lborresu;
    paramn = 175;
    parcat1n = 2;
    param = 'Platelets';
    parcat1 = "Hematology";
    paramtyp = '';
    dtype = '';
        anrlo = lbornrlo;
    anrhi = lbornrhi;
    output;
end;

if upcase(lbtestcd) = "RBC" and upcase(lbcat) = "HAEMATOLOGY" and upcase(lborresu) = "10^4/UL" then do;
    paramcd = strip("0"||strip(lbtestcd));
    aval = input(lborres,best.);
    avalc = lborres;
    avalu = lborresu;
    paramn = 161;
    parcat1n = 2;
    param = 'Erythrocytes';
    parcat1 = "Hematology";
    paramtyp = '';
    dtype = '';
        anrlo = lbornrlo;
    anrhi = lbornrhi;
    output;
end;

if upcase(lbtestcd) = "SODIUM" and upcase(lborresu) = "MEQ/L" then do;
    paramcd = strip("0"||strip(lbtestcd));
    aval = input(lborres,best.);
    avalc = lborres;
    avalu = lborresu;
    paramn = 75;
    parcat1n = 1;
    param = 'Sodium';
    parcat1 = "Clinical Chemistry";
    paramtyp = '';
    dtype = '';
        anrlo = lbornrlo;
    anrhi = lbornrhi;
    output;
end;

if upcase(lbtestcd) = "WBC" and upcase(lbcat) = "HAEMATOLOGY" and upcase(lborresu) = "/UL" then do;
    paramcd = strip("0"||strip(lbtestcd));
    aval = input(lborres,best.);
    avalc = lborres;
    avalu = lborresu;
    paramn = 164;
    parcat1n = 2;
    param = 'Leukocytes';
    parcat1 = "Hematology";
    paramtyp = '';
    dtype = '';
        anrlo = lbornrlo;
    anrhi = lbornrhi;
    output;
end;

run;

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data lb3;
  length parcat3 parcat4 $40;
  set lb2;

  if avalu ne '' then param = strip(param)||" ("||strip(avalu)||")";
  else param =param;

  if paramn = . then do;
    paramcd = strip("0"||strip(paramcd));
    anrlo = lbornrlo;
    anrhi = lbornrhi;
  end;
  if aval = . and aval1 ne . then aval = aval1;
  ***Create parcat3;

  if paramcd in ('CHOL', 'CRP', 'FIBRINO', 'GLUC', 'HBA1C', 'HDL', 'HOMOCY', 'LDL', 'ICAM1', 'TRIG', 'WBC', 'PLAT', 'BASO', 'EOS', 'MON
0', 'NEUT', 'LYM') then do;
    parcat3 = "Risk Markers";
    parcat3n = 1;
  end;
  else do;
    parcat3 = '';
    parcat3n = .;
  end;
  ***Create parcat34;
  if paramcd in ('ALP', 'ALT', 'AST', 'BILI', 'BUN', 'CHOL', 'CREAT', 'EOS', 'GGT', 'TRIG', 'UPROT', 'UGLUC') then do;
    parcat4 = "Single-directional (High) CTC grade parameter";
    parcat4n = 1;
  end;
  else if paramcd in ('ALB', 'NEUT', 'PLAT', 'PROT') then do;
    parcat4 = "Single-directional (Low) CTC grade parameter";
    parcat4n = 2;
  end;
  else if paramcd in ('GLUC', 'HGB', 'K', 'LYM', 'SODIUM', 'WBC') then do;
    parcat4 = "Bi-directional CTC grade parameter";
    parcat4n = 3;
  end;
  else do;
    parcat4 = '';
    parcat4n = .;
  end;
  ***Assign adt,atm,adtm;
  adt = input(scan(lbdtc,1,"T"),ymmdd10.);
  atm = input(scan(lbdtc,2,"T"),time8.);
  if atm ne . then adtm = dhms(adt,0,0,atm);
  if paramn ne .;
  format atm time5. adt date9. adtm datetime13.;
run;

proc sort data=lb3;by usubjid;run;

***Get discontinued subjects;
proc sort data=sdtm.ds out=ds_dis(keep=usubjid) nodupkey; where dscat = "DISPOSITION EVENT" and dsdecod not in ("SCREEN FAILURE" "CO
MPLETED");by usubjid;run;

***Calculate aday and assign Avisit;
data lb4;
  length avisit $40;
  merge lb3(in=a) adsl(keep=usubjid trtsdt fasfl);
  by usubjid;
  if a;
  if nmiss(adt,trtsdt)=0 then aday = adt - trtsdt + 1;
  avisit = visit;
  avisitn = visitnum;
run;

data lb4;
  merge lb4(in=a) ds_dis(in=b);
  by usubjid;
  if b then do;
    if visit = "DAY 91/DISCHARGE AMBULATORY" and paramcd ne "HBA1C" then do;
      if 7 <= aday <= 31 then do;
        avisit = "DAY 30";
        avisitn = 130;
        atpt = 'DAY 30';
        atptn = 8;
      end;
    else if 32 <= aday <= 61 then do;

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    avisit = "DAY 60";
    avisitn =160;
    atpt = 'DAY 60';
    atptn = 10;
end;
else avisit = visit;
end;
else avisit = visit;
end;
run;

***Calculate base;
%macro base(b_dsin=,b_conf=,b_by1=,b_by2=,b_dsout=);
***Get Base dataset;
proc sort data=&b_dsin;by usubjid;run;
data &b_dsin;
    merge &b_dsin(in=a) adsl(in=b keep=usubjid trtsdtm);
    by usubjid;
    if a;
run;

proc sort data=&b_dsin out=base;
    where &b_conf and trtsdt ne .;
by &b_by1;
run;
***Create Base variable;
data base1;
    length basec $20;
    set base;
    by &b_by1;
    if last.paramn;
    base = aval;
    basec = avalc;
    bnrind = anrind;
    keep usubjid paramn base bnrind basec;
run;
proc sort data=&b_dsin;by usubjid paramn;run;
data temp;
    merge &b_dsin(in=a) base1;
    by usubjid paramn;
    if a;
run;
***Assign base flag;
data base_f;
    set base;
    by &b_by1;
    if last.paramn and trtsdt ne .;
    ablfl = 'Y';
    keep &b_by2 ablfl;
run;
proc sort data=temp;by &b_by2;run;
proc sort data=base_f;by &b_by2;run;
data &b_dsout;
    merge temp(in=a) base_f;
    by &b_by2;
    if a;
/* if &b_conf then do;*/
/* base = .;*/
/* basec = '';*/
/* bnrind = "";*/
/* end;*/
run;
%mend;
%base(b_dsin=lb4,
    b_conf=%str(((.<atm<TRTSDTM and avisitn < 101) or ((trtsdtm=. or ATM=.) and .<adt<trtsdt) or avisitn<101)),
    b_by1=usubjid paramn avisitn adt atm lbseq,
    b_by2=usubjid paramn avisitn adt atm lbseq,
    b_dsout=lb5);
***Calculate chg and pchg;
data lb5;
    length atoxgrh atoxgrl $20 lbtoxh lbtoxl $200 parcat2 $40 ;
    set lb5;
    if base ne . then do;
/* basec = strip(put(base,best.));*/
    if aval ne . then chg = aval - base;
    if base ne 0 and aval ne . then pchg = (aval-base)*100/base;
    if base = 0 and aval ne . then pchg = (aval-base)*100/1;

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end;
/* if basec = '' and base_c ne '' then basec=base_c;*/
parcat2 = lbscat;
parcat2n = .;

if anrlo ne '' then anrlo1 = input(anrlo,best.);
if anrhi ne '' and index(anrhi,'<') = 0 then anrhi1 = input(anrhi,best.);

if parcat4n = 1 then atoxgrh = lbtoxgr;
else if parcat4n = 3 and lbtoxgr ne '' then do;
  if paramcd not in ('WBC' 'LYM') and aval > anrhi1 then atoxgrh = lbtoxgr;
  if paramcd in ('WBC' 'LYM') and aval >= anrlo1 then atoxgrh = lbtoxgr;
  if aval < anrlo1 then atoxgrh = '0';
  if anrlo1 <= aval <= anrhi1 then put "User warning:" usubjid "has lbtoxgr value.";
end;
if parcat4n in (1 3) and paramcd in ('UPROT' 'UGLUC') and avalc ne '' and atoxgrh eq '' then atoxgrh = '0';
else if parcat4n in (1 3) and paramcd not in ('UPROT' 'UGLUC') and aval ne . and atoxgrh eq '' then atoxgrh = '0';

if parcat4n = 2 then atoxgr1 = lbtoxgr;
else if parcat4n = 3 and lbtoxgr ne '' then do;
/* if aval < anrlo1 or chg < 0 then atoxgr1 = lbtoxgr;*/
/* if aval > anrhi1 then atoxgr1 = '';*/

  if paramcd ^= "HGB" and aval < anrlo1 then atoxgr1 = lbtoxgr;
/* if aval > anrhi1 then atoxgr1 = '';*/
  if paramcd = "HGB" and aval <= anrhi1 then atoxgr1=lbtoxgr;

  if anrlo1 <= aval <= anrhi1 then put "User warning:" usubjid "has lbtoxgr value.";
end;
if parcat4n in (2 3) and aval ne . and atoxgr1 eq '' then atoxgr1 = '0';

if paramcd = 'SODIUM' and atoxgrh ne '' then lbtoxh = 'Hypernatremia';
else if PARAMCD = 'K' and atoxgrh ne '' then lbtoxh = 'Hyperkalemia';
else if PARAMCD = 'GLUC' and atoxgrh ne '' then lbtoxh = 'Hyperglycemia';
else if PARAMCD = 'BUN' and atoxgrh ne '' then lbtoxh = 'Blood Urea Nitrogen';
else if PARAMCD = 'CREAT' and atoxgrh ne '' then lbtoxh = 'Creatinine increased';
else if PARAMCD = 'ALP' and atoxgrh ne '' then lbtoxh = 'Alkaline phosphatase increased';
else if PARAMCD = 'ALT' and atoxgrh ne '' then lbtoxh = 'ALT increased';
else if PARAMCD = 'AST' and atoxgrh ne '' then lbtoxh = 'AST increased';
else if PARAMCD = 'GGT' and atoxgrh ne '' then lbtoxh = 'GGT increased';
else if PARAMCD = 'BILI' and atoxgrh ne '' then lbtoxh = 'Blood bilirubin increased';
else if PARAMCD = 'CHOL' and atoxgrh ne '' then lbtoxh = 'Cholesterol high';
else if PARAMCD = 'TRIG' and atoxgrh ne '' then lbtoxh = 'Hypertriglyceridemia';
else if PARAMCD = 'HGB' and atoxgrh ne '' then lbtoxh = 'Hemoglobin increase';
else if PARAMCD = 'WBC' and atoxgrh ne '' then lbtoxh = 'WBC Increase';
else if PARAMCD = 'LYM' and atoxgrh ne '' then lbtoxh = 'Lymphocytes Increase';
else if PARAMCD = 'EOS' and atoxgrh ne '' then lbtoxh = 'Eosinophils';
else if PARAMCD = 'UPROT' and atoxgrh ne '' then lbtoxh = 'U.Protein increase';
else if PARAMCD = 'UGLUC' and atoxgrh ne '' then lbtoxh = 'U.Glucose increase';

if paramcd = "SODIUM" and atoxgr1 ne '' then lbtox1 = "Hyponatremia";
else if paramcd = 'K' and atoxgr1 ne '' then lbtox1 = "Hypokalemia";
else if paramcd = 'GLUC' and atoxgr1 ne '' then lbtox1 = "Hypoglycemia";
else if paramcd = 'ALB' and atoxgr1 ne '' then lbtox1 = "Hypoalbuminemia";
else if paramcd = 'PROT' and atoxgr1 ne '' then lbtox1 = "Hypoproteinemia";
else if paramcd = 'HGB' and atoxgr1 ne '' then lbtox1 = "Hemoglobin decreased";
else if paramcd = 'WBC' and atoxgr1 ne '' then lbtox1 = "WBC Decrease";
else if paramcd = 'LYM' and atoxgr1 ne '' then lbtox1 = "Lymphocytes Decrease";
else if paramcd = 'NEUT' and atoxgr1 ne '' then lbtox1 = "Neutrophils Decrease";
else if paramcd = 'PLAT' and atoxgr1 ne '' then lbtox1 = "Platelets Decrease";

run;

***Create Base variable;
data base2;
  length btoxgrh btoxgr1$20;
  set lb5;
  if ab1f1 = 'Y';
  btoxgrh = atoxgrh;
  btoxgr1 = atoxgr1;
  bc1sig = lb1sig;
  keep usubjid paramn btoxgrh btoxgr1 bc1sig ;
run;
proc sort data=lb5;by usubjid paramn;run;
data lb6;
  merge lb5(in=a) base2;
  by usubjid paramn;
  if a;

```

```

run;

proc sort data=lb6;by usubjid;run;
***Get end of study flag;
data lb6;
  merge lb6(in=a) sv_1;
  by usubjid;
  if a;
run;

proc sort data=lb6 out=lb6_a;where (lbstat ^= "NOT DONE" and lborres not in ("CANNOT BE TESTED")) and nmiss(adt,lvisdt)=0 and adt <=
lvisdt; by usubjid paramn adt;run;
data lb6_a;
  length aeosfl $2;
  set lb6_a;
  by usubjid paramn adt lbseq;
  if last.paramn then aeosfl = 'Y';
run;

data lb6;
  length shift1 shift2 shift3 $50;
  set lb6_a lb6(where=(lbstat = "NOT DONE" or lborres = "CANNOT BE TESTED" or adt > lvisdt));

  if bnrind ne '' and anrind ne '' then do;
    if lbclsig eq '' and bcclsig eq '' then shift1 = strip(propcase(bnrind))||' to '||strip(propcase(anrind));
    else if lbclsig eq '' and bcclsig ne '' then shift1 = strip(propcase(bnrind))||', '||strip(bcclsig)||' to '||strip(propcase(anrind))
;
    else if lbclsig ne '' and bcclsig eq '' then shift1 = strip(propcase(bnrind))||' to '||strip(propcase(anrind))||', '||strip(lbclsig
);
    else if lbclsig ne '' and bcclsig ne '' then shift1 = strip(propcase(bnrind))||', '||strip(bcclsig)||' to '||strip(propcase(anrind)
)||', '||strip(lbclsig);
  end;

  if btoxgrh ne '' and atoxgrh ne '' then shift2 = strip(btoxgrh)||' to '||strip(atoxgrh);
  if btoxgrl ne '' and atoxgrl ne '' then shift3 = strip(btoxgrl)||' to '||strip(atoxgrl);

  if lbstnrl = . and lbstnrhi = . and lbstnrc ne "" then do;
    if lbstnrc in ("NEGATIVE" "NORMAL" "NON REACTIVE" ) then do; anrlo = lbstnrc; anrhi = ""; end;
    else if lbstnrc = "<1.00" then do; anrlo = ""; anrhi = lbstnrc; end;
    else if lbstnrc in ("NEGATIVE TO TRACE" "NEGATIVE/TRACE") then do; anrlo = "NEGATIVE"; anrhi = "TRACE"; end;
/*    else if lbstnrc = "NON REACTIVE" then do; anrlo = lbstnrc; anrhi = ""; end;*/
    else if lbstnrc = "1+" then do; anrlo = lbstnrc; anrhi = ""; end;
    else if lbstnrc = "0-2" then do; anrlo = "0"; anrhi = "2"; end;
    else if lbstnrc = "0-5" then do; anrlo = "0"; anrhi = "5"; end;
    else put "WAR" "NING: Unexpected value " lbstnrc;
  end;
run;

data lb6;
  set lb6;
  if (.<adm<TRTSDTM or ((trtsdtm=. or ATM=.) and .<adt<trtsdt) or avisitn<101) then do;
    shift1 = '';
    shift2 = '';
    shift3 = '';
    chg = .;
    pchg = .;
  end;
run;

***get EOS;
data eos;
  set lb6_a;
  if aeosfl = 'Y';
  eos = aval;
  keep usubjid paramn eos;
run;

proc sort data=lb6;by usubjid paramn;run;
data lb6;
  merge lb6(in=a) eos;
  by usubjid paramn;
  if a;
run;

***Create LOCF parameter;
%macro locf(l_dsin=,l_conf1=,l_conf2=,l_dsout=,l_conf3=,l_conf4=);
%***Get raw data;
proc sql;

```

```

create table usubjid as
select distinct usubjid, paramn
from &l_dsin
where &l_conf1;

create table visit as
select distinct avisit, avisitn,atpt,atptn
from &l_dsin
where &l_conf1 &l_conf2 &l_conf3;

create table template
as select a.*, b.*
from usubjid a, visit b
order by usubjid,paramn,avisitn,avisit,atptn,atpt;
quit;

proc sql;
create table rawdata as
select *
from &l_dsin
where &l_conf1 /*&l_conf2*/ &l_conf4 and fasfl = 'Y'
order by usubjid, paramn, avisitn, avisit,atptn,atpt;
quit;

/*data rawdata;*/
/* set rawdata;*/
/* by usubjid paramn avisitn avisit lbseq;*/
/* if last.avisitn;*/
/*run;*/

data &l_dsout;
length _avalc $200 _avalu $20 _basec $20 _bnrind $6 _btoxgrh _btoxgrl $20 _aqlfl $2 _lbgrpid $21 _lbrefid $14 _anrind $6
      _lbdtc $16 /*_atpt $87*/ _bloqfl $2 _lbfast _afastfl $1 _anrhi _anrlo $50 _lbclsig _aclsig $200 _shift1 $50;
merge template(in=ok1) rawdata(in=ok2);
by usubjid paramn avisitn avisit atptn atpt;

retain _avalc _avalu _aval _chg _pchg _base _basec _bnrind _btoxgrh _btoxgrl _aqlfl _lbseq _lbgrpid _lbrefid _anrind _anrlo _anrhi
      _lbfast _afastfl _bloqfl _lbclsig _aclsig _lbdtc _lbdy _adt _atm _adtm _aday /*_atpt _atptn */ _shift1;
if first.usubjid then
call missing( _avalc, _avalu, _aval, _base, _basec, _chg, _pchg, _bnrind, _btoxgrh, _btoxgrl, _aqlfl, _lbseq, _lbgrpid, _lbrefid, _anrind,
      _shift1,
      _anrlo, _anrhi, _lbfast, _afastfl, _bloqfl, _lbclsig, _aclsig, _lbdtc, _lbdy, _adt, _atm, _adtm, _aday /*, _atpt, _atptn*/);
if not missing(AVAL) then do;
  _avalc=avalc;
  _avalu=avalu;
  _aval=aval;
  _base=base;
  _basec=basec;
  _chg = chg;
  _pchg = pchg;
  _bnrind = bnrind;
  _btoxgrh=btoxgrh;
  _btoxgrl=btoxgrl;
  _aqlfl=aqlfl;
  _lbseq=lbseq;
  _lbgrpid=lbgrpid;
  _lbrefid=lbrefid;
  _anrind=anrind;
  _anrlo=anrlo;
  _anrhi=anrhi;
  _lbfast=lbfast;
  _afastfl=afastfl;
  _bloqfl=bloqfl;
  _lbclsig=lbclsig;
  _aclsig=aclsig;
  _lbdtc=lbdtc;
  _lbdy=lbdy;
  _adt=adt;
  _atm=atm;
  _adtm=adtm;
  _aday=aday;
/*  _atpt=atpt;*/
/*  _atptn=atptn;*/
  _shift1=shift1;
end;

if missing(AVAL) and not missing(_AVAL) then do;
  avalc=_avalc;

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```

    avalu=_avalu;
    aval=_aval;
    basec=_basec;
    base=_base;
    chg=_chg;
    pchg=_pchg;
    bnrind=_bnrind;
    btoxgrh=_btoxgrh;
    btoxgrl=_btoxgrl;
    aqlfl=_aqlfl;
    dtype='LOCF';
    lbseq=_lbseq;
    lbgrpid=_lbgrpid;
    lbrefid=_lbrefid;
    anrind=_anrind;
    anrlo=_anrlo;
    anrhi=_anrhi;
    lbfast=_lbfast;
    afastfl=_afastfl;
    bloqfl=_bloqfl;
    lbclsig=_lbclsig;
    aclsig=_aclsig;
    lbdtc=_lbdtc;
    lbdy=_lbdy;
    adt=_adt;
    atm=_atm;
    adtm=_adtm;
    aday=_aday;
/*   atpt=_atpt;*/
/*   atptn=_atptn;*/
    shift1=_shift1;
end;

if DTYPE='LOCF' &l_conf3;

keep usubjid avisit avisitn paramn avalc avalu btoxgrh btoxgrl aval base basec chg pchg dtype bnrind aqlfl
    lbseq lbgrpid lbrefid anrind anrlo anrhi lbfast afastfl bloqfl
    lbclsig aclsig lbdtc lbdy adt atm adtm aday atpt atptn shift1;
run;

%mend;

%locf( l_dsin=lb6,
    l_conf1=%str(paramcd = 'CRP'),
    l_conf2=%str(and visitnum >= 1 and index(visit,'UNS') =0),
    l_conf4=%str(and visitnum >= 1 ),
    l_conf3=%str(and visit ne "DAY 6/DISCHARGE CONFINEMENT"),
    l_dsout=crp
);

%locf( l_dsin=lb6,
    l_conf1=%str(paramcd = 'HOMOCY'),
    l_conf2=%str(and visitnum >= 1 and index(visit,'UNS') =0),
    l_conf4=%str(and visitnum > 1),
    l_conf3=%str(and visit ne "DAY 6/DISCHARGE CONFINEMENT"),
    l_dsout=HOMOCY
);

%locf( l_dsin=lb6,
    l_conf1=%str(paramn = 8),
    l_conf2=%str(and visitnum >= 1 and index(visit,'UNS') =0),
    l_conf3=%str(and visit ne "DAY 6/DISCHARGE CONFINEMENT"),
    l_conf4=%str(and visitnum > 1),
    l_dsout=GLUC
);

%locf( l_dsin=lb6,
    l_conf1=%str(paramcd = 'LDL'),
    l_conf2=%str(and visitnum >= 1 and index(visit,'UNS') =0),
    l_conf3=%str(and visit ne "DAY 6/DISCHARGE CONFINEMENT"),
    l_conf4=%str(and visitnum > 1),
    l_dsout=LDL
);

%locf( l_dsin=lb6,
    l_conf1=%str(paramcd = 'HDL'),
    l_conf2=%str(and visitnum >= 1 and index(visit,'UNS') =0),

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    l_conf3=%str(and visit ne "DAY 6/DISCHARGE CONFINEMENT"),
    l_conf4=%str(and visitnum > 1),
    l_dsout=HDL
);

%locf( l_dsin=lb6,
    l_conf1=%str(paramcd = 'TRIG'),
    l_conf2=%str(and visitnum >= 1 and index(visit,'UNS') =0),
    l_conf3=%str(and visit ne "DAY 6/DISCHARGE CONFINEMENT"),
    l_conf4=%str(and visitnum > 1),
    l_dsout=TRIG
);

%locf( l_dsin=lb6,
    l_conf1=%str(paramcd = 'CHOL'),
    l_conf2=%str(and visitnum >= 1 and index(visit,'UNS') =0),
    l_conf3=%str(and visit ne "DAY 6/DISCHARGE CONFINEMENT"),
    l_conf4=%str(and visitnum > 1),
    l_dsout=CHOL
);

%locf( l_dsin=lb6,
    l_conf1=%str(paramcd = 'FIBRINO'),
    l_conf2=%str(and visitnum >= 1 and index(visit,'UNS') =0),
    l_conf3=%str(and visit ne "DAY 6/DISCHARGE CONFINEMENT"),
    l_conf4=%str(and visitnum > 1),
    l_dsout=FIBRINO
);

%locf( l_dsin=lb6,
    l_conf1=%str(paramcd in ('HBA1C')),
    l_conf2=%str(and visitnum >= 1 and index(visit,'UNS') =0),
    l_conf3=%str(and visit ne "DAY 6/DISCHARGE CONFINEMENT"),
    l_conf4=%str(and visitnum > 1),
    l_dsout=HBA1C
);

%locf( l_dsin=lb6,
    l_conf1=%str(paramcd in ('ICAM1')),
    l_conf2=%str(and visitnum >= 1 and index(visit,'UNS') =0 ),
    l_conf4=%str(and visitnum > 1),
    l_dsout=ICAM1
);

%locf( l_dsin=lb6,
    l_conf1=%str(paramn = 104),
    l_conf2=%str(and visitnum >= 1 and index(visit,'UNS') =0 ),
    l_conf4=%str(and visitnum > 1),
    l_dsout=WBC
);

%locf( l_dsin=lb6,
    l_conf1=%str(paramcd in ('PLAT')),
    l_conf2=%str(and visitnum >= 1 and index(visit,'UNS') =0 ),
    l_conf4=%str(and visitnum > 1),
    l_dsout=PLAT
);

%locf( l_dsin=lb6,
    l_conf1=%str(paramcd in ('BASO')),
    l_conf2=%str(and visitnum > 1 and index(visit,'UNS') =0 ),
    l_conf4=%str(and visitnum > 1),
    l_dsout=baso
);

%locf( l_dsin=lb6,
    l_conf1=%str(paramcd in ('EOS')),
    l_conf2=%str(and visitnum > 1 and index(visit,'UNS') =0 ),
    l_conf4=%str(and visitnum > 1),
    l_dsout=eos
);

%locf( l_dsin=lb6,
    l_conf1=%str(paramcd in ('MONO')),
    l_conf2=%str(and visitnum > 1 and index(visit,'UNS') =0 ),
    l_conf4=%str(and visitnum > 1),
    l_dsout=mono
);

```



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%locf( l_dsin=lb6,
  l_conf1=%str(paramcd in ('NEUT')),
  l_conf2=%str(and visitnum > 1 and index(visit,'UNS') =0 ),
  l_conf4=%str(and visitnum > 1),
  l_dsout=neut
);

%locf( l_dsin=lb6,
  l_conf1=%str(paramcd in ('LYM')),
  l_conf2=%str(and visitnum > 1 and index(visit,'UNS') =0 ),
  l_conf4=%str(and visitnum > 1),
  l_dsout=lym
);

data locf;
  set plat wbc icam1 HBA1C CRP HOMOCY GLUC LDL HDL TRIG CHOL FIBRINO baso eos mono neut lym;
  drop base;
run;

proc sort data=locf;by usubjid paramn;run;
proc sort data=base1;by usubjid paramn;run;
data locf(drop=bclsig);
  merge locf(in=a drop=bnrind basec btoxgrh btoxgrl) base1(in=b ) base2(in=c /*drop=bclsig*/);
  by usubjid paramn;
  if a;
  if aval ne . and base ne . then chg = aval - base;
  if base > 0 and aval ne . then pchg = (aval-base)*100/base;
  if base = 0 and aval ne . then pchg = (aval-base)*100/1;
  if bnrind ne '' and anrind ne '' then do;
    if lbclsig eq '' and bclsig eq '' then shift1 = strip(propcase(bnrind))||' to '||strip(propcase(anrind));
    else if lbclsig eq '' and bclsig ne '' then shift1 = strip(propcase(bnrind))||', '||strip(bclsig)||' to '||strip(propcase(anrind))
  ;
  else if lbclsig ne '' and bclsig eq '' then shift1 = strip(propcase(bnrind))||' to '||strip(propcase(anrind))||', '||strip(lbclsig)
);
  else if lbclsig ne '' and bclsig ne '' then shift1 = strip(propcase(bnrind))||', '||strip(bclsig)||' to '||strip(propcase(anrind)
)||', '||strip(lbclsig);
  end;

run;

data lb8;
  set lb6 locf;
run;

***Assign anl01f1;
proc sort data=lb8 out=lb8_a;
where paramcd not in ('OK' 'OALB' 'OSODIUM' 'OMCHC' 'OWBC' 'OBASO' 'OEOS' 'OLYM' 'OMONO' 'ONEUT' 'ORBC')
  and index(avisit,"UNS") = 0 /*avisitn in (1 98 100 106 130 160 190 191)* / ;
by usubjid paramn avisitn dtype lbseq;
run;

data lb8_a;
  set lb8_a;
  by usubjid paramn avisitn dtype lbseq;
  if last.avisitn then anl01f1 = 'Y';
run;

data lb9;
  length aperiod $10 asperc $40 apuperc $10;
  set lb8_a lb8(where=(paramcd in ('OK' 'OALB' 'OSODIUM' 'OMCHC' 'OWBC' 'OBASO' 'OEOS' 'OLYM' 'OMONO' 'ONEUT' 'ORBC') or
    (paramcd not in ('OK' 'OALB' 'OSODIUM' 'OMCHC' 'OWBC' 'OBASO' 'OEOS' 'OLYM' 'OMONO' 'ONEUT' 'ORBC') and index(avisit,"UNS") > 0
  )));
  aperiod = 1;
  aperiodc = "Period 1";

  if AVISITN < 101 then do;
    asper = 1;
    asperc = "Pre-Randomization Period";
  end;
  else if 101<=AVISITN<=106 then do;
    asper = 2;
    asperc = "Confinement Period";
  end;
  else if 106<AVISITN<=191 then do;
    asper = 3;
    asperc = "Ambulatory Period";
  end;
end;

```

```

else if AVISITN>191 then do;
  asper = 4;
  asperc = "Safety Follow-up Period";
end;

if 101 <= avisitn <=106 then do;
  apuper = 1;
  apuperc = "Period 1";
end;
else if 106 < avisitn <= 131 then do;
  apuper = 2;
  apuperc = "Period 2";
end;
else if 131 < avisitn <= 161 then do;
  apuper = 3;
  apuperc = "Period 3";
end;
else if 161 < avisitn <= 191 then do;
  apuper = 4;
  apuperc = "Period 4";
end;

run;

proc sort data=lb9;by usubjid;run;
proc sort data=adsl;by usubjid;run;
data adlb;
  length trtp trta $40 parcat2 $40 ;
  merge lb9(in=a drop=studyid trtsdt fasfl trtsdtm lvisdt param paramcd avalu parcat1 parcat3 parcat4) adsl;
  by usubjid;
  if a;
  trtp = trt01p;
  trtpn = trt01pn;
  trta = trt01a;
  trtan = trt01an;
  parcat2 = lbscat;
  parcat2n = .;
  avisit = propcase(avisit);
  atpt = upcase(atpt);
  param = strip(put(paramn,param.));
  paramcd = strip(put(paramn,paramcd.));
  avalu = strip(put(paramn,unit.));
  parcat1 = strip(put(paramn,cat1c.));
  parcat3 = strip(put(paramn,cat3c.));
  parcat4 = strip(put(paramn,cat4c.));

  if parcat3 = "Risk Markers" then parcat3n = 1;

  if parcat4 = "Single-directional (High) CTC grade parameter" then parcat4n = 1;
  else if parcat4 = "Single-directional (Low) CTC grade parameter" then parcat4n =2;
  else if parcat4 = "Bi-directional CTC grade parameter" then parcat4n =3;

  if parcat3n = . then parcat3 = '';
  if parcat4n = . then parcat4 = '';
  if avalu = "" then avalu = '';

  if PARCAT1 = 'Clinical Chemistry' then parcat1n = 1;
  else if PARCAT1='Hematology' then parcat1n = 2;
  else if PARCAT1='Urinalysis' then parcat1n = 3;
  else if PARCAT1 ='Safety Laboratory Entry Criteria' then parcat1n = 4;

  if (SAFBFL^='Y' and SAF AFL^='Y') then do;
    anl01f1 = '';
    anl01fn = .;
  end;

  if trtpn in (97 98) then do;
    asperc = 'Pre-Randomization Period';
    asper = 1;
    apuper = .;
    apuperc = '';
  end;

  if avalc = 'CANNOT BE TESTED' or lbstat = 'NOT DONE' then do;
    anl01f1 = '';
    anl01fn = .;
  end;
run;

```

```

***Add new variable TMSNQUIT based on new SPEC on 03Aug2015;
***Step1, get visit day from sv domain;
data sv;
  set sdtm.sv;
  keep usubjid visitnum visit svstdy;
  if visitnum in (130 160 190);
/* if visitnum = 191 then visitnum = 190;*/
run;
proc sort data=sv;by usubjid visitnum svstdy;run;
data sv;
  set sv;
  by usubjid visitnum;
  if first.visitnum;
run;
proc transpose data=sv out=sv1 prefix=v;
var svstdy;
by usubjid;
id visitnum;
run;

data sv1;
  set sv1;
  rename v130=day30vis v160=day60vis v190=day90vis;
  drop _name_ _label_;
run;
proc sort data=sv1;by usubjid;run;

data adlb;
  merge adlb(in=a) sv1(in=b);
  by usubjid;
  if a;
  if day30vis = . then day30vis = 30;
  if day60vis = . then day60vis = 60;
  if day90vis = . then day90vis = 90;

  if avisit='Day 30' and . < qtsmkdy < day30vis then tmsnquit = 30;
  if avisit='Day 60' and . < qtsmkdy < day30vis then tmsnquit = 60;
  if avisit in ('Day 90' 'Day 91/Discharge Ambulatory' ) and . < qtsmkdy < day30vis then tmsnquit = 90;
  if avisit = 'Day 60' and (day30vis ne . and day60vis ne . and day30vis <= qtsmkdy < day60vis) then tmsnquit = 30;
  if avisit in ('Day 90' 'Day 91/Discharge Ambulatory' ) and (day30vis <= qtsmkdy < day60vis) then tmsnquit = 60;
  if avisit in ('Day 90' 'Day 91/Discharge Ambulatory' ) and (day60vis <= qtsmkdy < day90vis) then tmsnquit = 30;
run;

proc sort data=adlb;by USUBJID AVISITN ATPTN PARAMCD lbseq;
run;
***Add variable attribute;
%m_attrb_adam(dset=ADLB);

*** Output dataset;
data adam.adlb(label = "Laboratory Analysis Dataset" );
  set adlb;
run;

***Deletes all SAS files in the WORK library that are available for processing;
/*proc datasets library=work kill;*/
/*run;*/

proc printto ;
run;

***check the log, if there is any findings, please make sure to resolve;
%m_chklog(TFL_part=dev,pgm_type=adam,pgm_name=d_2adlb,serv=dev,covstudyid=000000106343);

```