```
else if s5 in ('FIKCO','FKGCO','FSKCC','MKCCO','MKCMO','MNGMO','MVKCO','MKGMO')
  and b_dep3 eq 'J' then b_ru4='A';
else if s5 in
('FICGC','FRNGO','MFCKO','MFNCO','MICGC','MIGCO','MIKCC','MINCO','MKCKO','MKNCO',
 'MKNCO','MNNGC','MSCGC','MSGGO','MINCC','MKGKO')
 and b_ru4 in ('C','M') and b_dep3 in ('J','H') then do;
 b_ru4='A';b_dep3='A';
end;
else if s4 in ('FIGK','FIKK','FNGG','FNGK','FRKG','FUGG','MNGC','MSKK')
 and b_Tim3 in ('C','O') and b_ru4 in ('C','M') and b_dep3 in ('J','H') then do;
 b_tim3='A';b_ru4='A';b_dep3='A';
end;
else if s4 in ('FRGK','MKGC') and b_Tim3 in ('C','O')
 and b_ru4 in ('C','M') and b_dep3 in ('H') then do;
 b_tim3='A';b_ru4='A';
end;
else if s4 in ('MUKK') and b_Tim3 in ('C','O')
 and b_ru4 in ('C') and b_dep3 in ('H') then do;
 b_tim3='A';
end;
else if s5 in ('FSNCO','FVGCC','MNNCC') and b_ru4 in ('M') and b_dep3 in ('J','H') then
do;
 b_dep3='A';
end;
else if b_s eq 'F' and b_a2 eq 'F' and b_ta3 eq 'K' and b_e2 in ('G','K')
  and b_tim3 in ('O') and b_ru4 in ('C','M') and b_dep3 in ('J','H') then do;
 b_e2='F';b_ru4='A';b_dep3='A';
end;
else if b_s eq 'F' and b_a2 eq 'S' and b_ta3 eq 'G' and b_e2 in ('C','K')
 and b_tim3 in ('O') and b_ru4 in ('M') and b_dep3 in ('J','H') then do;
 b_e2='H';b_dep3='A';
end;
else if b_s eq 'F' and b_a2 eq 'S' and b_ta3 eq 'K' and b_e2 in ('G','K')
 and b_tim3 in ('C','O') and b_ru4 in ('C','M') and b_dep3 in ('J','H') then do;
 b_e2='F';b_tim3='A';b_ru4='A';b_dep3='A';
end;
else if b_s eq 'M' and b_a2 eq 'K' and b_ta3 eq 'K' and b_e2 in ('C','G')
 and b_tim3 in ('O') and b_ru4 in ('C','M') and b_dep3 in ('J') then do;
 b_e2='D';b_ru4='A';b_dep3='A';
end;
else if b_s eq 'M' and b_a2 eq 'U' and b_ta3 eq 'G' and b_e2 in ('G','K')
 and b_tim3 in ('C','O') and b_ru4 in ('C') and b_dep3 in ('J') then do;
 b_e2='F';b_tim3='A';
end;
%end;
run;

%end;

%if %index(&action,B) ne 0 %then %do;
/*Detailed analysis of stratum*/
proc summary data=biascoh&year chartype;
class B_S
 B_A1 B_A2 B_A3 B_A4
 B_TA1 B_TA2 B_TA3 B_TA4
 B_E1 B_E2 B_E3 B_E4
 B_Tim1 B_Tim2 B_Tim3
```

```
 B_RU1 B_RU2 B_RU3 B_RU4
 B_Dep1 B_Dep2 B_Dep3;
var link onlybias;
types B_S
B_S *(B_A1 B_A2 B_A3 B_A4)
B_S *(B_A1 B_A2 B_A3 B_A4) *(B_TA1 B_TA2 B_TA3 B_TA4)
B_S *(B_A1 B_A2 B_A3 B_A4) *(B_E1 B_E2 B_E3 B_E4)
B_S *(B_A1 B_A2 B_A3 B_A4) *(B_Tim1 B_Tim2 B_Tim3)
B_S *(B_A1 B_A2 B_A3 B_A4) *(B_RU1 B_RU2 B_RU3 B_RU4)
B_S *(B_A1 B_A2 B_A3 B_A4) *(B_TA1 B_TA2 B_TA3 B_TA4) *(B_E1 B_E2 B_E3 B_E4)
 *(B_Tim1 B_Tim2 B_Tim3) *(B_RU1 B_RU2 B_RU3 B_RU4) *(B_Dep1 B_Dep2 B_Dep3)
;
output out=sumbiascoh&year
 sum(link onlybias)=SumLink SumOnlyBias;
run;

data sumbiascoh&year;
set sumbiascoh&year;
length C_S C_Age C_TA C_E C_Tim C_RU C_Dep $1;
if sumlink gt 0 and (sumonlybias gt 0 or sumonlybias eq 0) then CB=10;
else if sumlink eq 0 and sumonlybias gt 0 then CB=1;
comb='S:A-:R-:E-:T-:V-:D-';
if substr(_type_,2,1) eq '1' then substr(comb,4,1)='1';
else if substr(_type_,3,1) eq '1' then substr(comb,4,1)='2';
else if substr(_type_,4,1) eq '1' then substr(comb,4,1)='3';
else if substr(_type_,5,1) eq '1' then substr(comb,4,1)='4';
if substr(_type_,6,1) eq '1' then substr(comb,7,1)='1';
else if substr(_type_,7,1) eq '1' then substr(comb,7,1)='2';
else if substr(_type_,8,1) eq '1' then substr(comb,7,1)='3';
else if substr(_type_,9,1) eq '1' then substr(comb,7,1)='4';
if substr(_type_,10,1) eq '1' then substr(comb,10,1)='1';
else if substr(_type_,11,1) eq '1' then substr(comb,10,1)='2';
else if substr(_type_,12,1) eq '1' then substr(comb,10,1)='3';
else if substr(_type_,13,1) eq '1' then substr(comb,10,1)='4';
if substr(_type_,14,1) eq '1' then substr(comb,13,1)='1';
else if substr(_type_,15,1) eq '1' then substr(comb,13,1)='2';
else if substr(_type_,16,1) eq '1' then substr(comb,13,1)='3';
if substr(_type_,17,1) eq '1' then substr(comb,16,1)='1';
else if substr(_type_,18,1) eq '1' then substr(comb,16,1)='2';
else if substr(_type_,19,1) eq '1' then substr(comb,16,1)='3';
else if substr(_type_,20,1) eq '1' then substr(comb,16,1)='4';
if substr(_type_,21,1) eq '1' then substr(comb,19,1)='1';
else if substr(_type_,22,1) eq '1' then substr(comb,19,1)='2';
else if substr(_type_,23,1) eq '1' then substr(comb,19,1)='3';
C_S=substr(comb,1,1);
C_Age=substr(comb,4,1);
C_TA=substr(comb,7,1);
C_E=substr(comb,10,1);
C_Tim=substr(comb,13,1);
C_RU=substr(comb,16,1);
C_Dep=substr(comb,19,1);
run;

proc sort data=sumbiascoh&year;
by _type_ comb cb;
run;
```

```
data sumsum&year(keep=_type_ comb C_S C_Age C_TA C_E C_Tim C_RU C_Dep
  Tot_OnCoh N_OnCoh N_BiaswthCoh Tot_JustBias NumCombJustBias TooFine);
set sumbiasCoh&year;
by _type_ comb cb;
retain Tot_OnCoh N_OnCoh N_BiaswthCoh Tot_JustBias NumCombJustBias;
if first.comb then do;
 Tot_OnCoh=.; N_OnCoh=.; N_BiaswthCoh=.; Tot_JustBias=.;
 NumCombJustBias=0;
end;
if cb eq 10 then do;
 Tot_OnCoh=min(_freq_,Tot_OnCoh); N_OnCoh=min(sumlink,N_OnCoh);
 N_BiaswthCoh=min(sumonlybias,N_BiaswthCoh);
end;
else if cb eq 1 then do;
 Tot_JustBias=min(sumonlybias,Tot_JustBias);
 NumCombJustBias+1;
end;
if last.comb then do;
 if tot_justbias gt 0 then TooFine=1; else TooFine=0;
 output;
end;
run;

proc sort data=sumsum&year;
by toofine numcombjustbias comb;
run;

options pageno=1;

proc printto new file="SumSum&year..lst";run;

title "CT for &year";

proc print data=sumsum&year uniform width=min;
var toofine numcombjustbias comb Tot_OnCoh n_onCoh n_biaswthCoh;
format toofine numcombjustbias 6.0;
run;

proc printto;run;

%end;

%if %index(&action,C) ne 0 %then %do;
/*Quick analysis of stratum*/

title "Bias &year CancerTrends";
proc printto new file="BiasCohTab&year..lst";run;
proc tabulate data=biascoh&year missing noseps out=tabout&year;
class  B_S
 B_A1 B_A2 B_A3 B_A4
 B_TA1 B_TA2 B_TA3 B_TA4
 B_E1 B_E2 B_E3 B_E4
 B_Tim1 B_Tim2 B_Tim3
 B_RU1 B_RU2 B_RU3 B_RU4
 B_Dep1 B_Dep2 B_Dep3;
 var link onlybias;
 table (all B_A1 B_A2 B_A3 B_A4)
```

```
 (all B_A1 /*B_A2 B_A3 B_A4*/)
 *(all B_TA1 B_TA2 B_TA3 B_TA4
 B_E1 B_E2 B_E3 B_E4
 B_Tim1 B_Tim2 B_Tim3
 B_RU1 B_RU2 B_RU3 B_RU4
 B_Dep1 B_Dep2 B_Dep3),
b_s=''*sum=''*(link onlybias)*f=8./rts=58;
run;
proc printto;run;

%end;

%mend;

/*
%makestrat(year=1981);
%makestrat(year=1986);
%makestrat(year=1991);
%makestrat(year=1996);
%makestrat(year=2001);
*/

%makestrat(year=1981,action=AC);
%makestrat(year=1986,action=AC);
%makestrat(year=1991,action=AC);
%makestrat(year=1996,action=AC);
%makestrat(year=2001,action=AC);

/*
%makestrat(year=1981,action=B);
%makestrat(year=1986,action=B);
%makestrat(year=1991,action=B);
%makestrat(year=1996,action=B);
%makestrat(year=2001,action=B);
*/

%macro checkdet(year=,AgeL=2,TAl=3,EthL=3,TimL=3,RUl=4,DepL=3,outd=sumbiascohb);

proc summary data=biascoh&year chartype;
class cenyear B_S  B_A&AgeL B_TA&TAl B_E&EthL b_tim&TimL b_ru&RUl b_dep&DepL linkstat;
var link onlybias;
format B_S  B_A&AgeL B_TA&TAl B_E&EthL b_tim&TimL b_ru&RUl b_dep&DepL;
types cenyear*B_S *B_A&AgeL *B_TA&TAl *B_E&EthL *b_tim&TimL *b_ru&RUl *b_dep&DepL
 cenyear*B_S *B_A&AgeL *B_TA&TAl *B_E&EthL *b_tim&TimL *b_ru&RUl *b_dep&DepL*linkstat
;
output out=&outd&year
 sum(link onlybias)=SumLink SumOnlyBias;
run;

proc sort data=&outd&year;
by cenyear B_S  B_A&AgeL B_TA&TAl B_E&EthL b_tim&TimL b_ru&RUl b_dep&DepL linkstat;
run;

data &outd&year;
set &outd&year;
length comb $19;
comb="S:A&agel:R&tal:E&ethl:T&timl:V&rul:D&depl";
```

```
if trim(linkstat) eq '-' then delete;
if substr(_type_,9,1) eq 'O' then propBias=sumonlybias/_freq_;
else propBias=.;
if propbias gt 0.9 then propstat='***';
else if propbias gt 0.8 then propstat=' **';
else if propbias gt 0.7 then propstat='  *';
else if propbias ne . then propstat='  .';
else propstat='   ';
if substr(_type_,9,1) eq 'O' and sumlink eq 0 then TooFine=11;
else if substr(_type_,9,1) eq 'O' then TooFine=0;
else toofine=.;
if substr(_type_,9,1) eq 'O' then WgtCohort=_freq_/sumlink;
else WgtCohort=.;
run;

%mend;

%checkdet(year=1981,AgeL=2,TAl=3,EthL=3,TimL=3,RUl=4,DepL=3,outd=sumbiascohb);
%checkdet(year=1986,AgeL=2,TAl=3,EthL=3,TimL=3,RUl=4,DepL=3,outd=sumbiascohb);
*%checkdet(year=1991,AgeL=2,TAl=3,EthL=3,TimL=3,RUl=4,DepL=3,outd=sumbiascohb);
*%checkdet(year=1996,AgeL=2,TAl=3,EthL=3,TimL=3,RUl=4,DepL=3,outd=sumbiascohb);
*%checkdet(year=2001,AgeL=2,TAl=3,EthL=3,TimL=3,RUl=4,DepL=3,outd=sumbiascohb);
%checkdet(year=1991,AgeL=2,TAl=3,EthL=2,TimL=3,RUl=4,DepL=3,outd=sumbiascohc);
%checkdet(year=1996,AgeL=2,TAl=3,EthL=2,TimL=3,RUl=4,DepL=3,outd=sumbiascohc);
%checkdet(year=2001,AgeL=2,TAl=3,EthL=2,TimL=3,RUl=4,DepL=3,outd=sumbiascohc);

data lookall;
set sumbiascohb1981 sumbiascohb1986 /*sumbiascohb1991 sumbiascohb1996
 sumbiascohb2001*/
  sumbiascohc1991 sumbiascohc1996 sumbiascohc2001;
where toofine ne .;
run;

proc tabulate data=lookall missing;
class cenyear BCStrata propstat toofine;
table BCStrata*(all propstat toofine),cenyear*n=''*f=9./rts=50;
run;

PROC EXPORT DATA= lookall
  OUTFILE= "\\wsnz02\c_datalab\MAA2006-04 CancerTrends\Checking\
June2\temp\ctlookall.xls"  DBMS=EXCEL2000 REPLACE;
RUN;


/*Create final weight details for each cohort*/

%macro usestrat(year=,AgeL=2,TAl=3,EthL=3,TimL=3,RUl=4,DepL=3,outd=sumbiascohb);

proc sort data=biascoh&year(keep=cenyear id_bias link onlybias
 B_S  B_A&AgeL B_TA&TAl B_E&EthL b_tim&TimL b_ru&RUl b_dep&DepL)
 out=ctbias.BCStrata&year;
by cenyear B_S  B_A&AgeL B_TA&TAl B_E&EthL b_tim&TimL b_ru&RUl b_dep&DepL id_bias;
run;

proc sort data=&outd&year out=merge&year;
where substr(_type_,9,1) eq 'O';
by cenyear B_S  B_A&AgeL B_TA&TAl B_E&EthL b_tim&TimL b_ru&RUl b_dep&DepL;
```

```
run;

data ctbias.BCStrata&year;
merge ctbias.BCStrata&year(in=a) merge&year(in=b keep=cenyear B_S  B_A&AgeL
 B_TA&TAl B_E&EthL b_tim&TimL b_ru&RUl b_dep&DepL WgtCohort propbias);
by cenyear B_S  B_A&AgeL B_TA&TAl B_E&EthL b_tim&TimL b_ru&RUl b_dep&DepL;
length BCStrata $27;
if not (a and b) then put "Check record " id_bias= a= b=;
if not(b) then wgtcohort=.;
BCStrata='S:'||b_s||'/A:'||b_a&AgeL||'/R:'||b_ta&TAl||'/E:'||b_e&EthL||'/T:'||
 b_tim&TimL||'/V:'||b_ru&RUl||'/D:'||b_dep&DepL;
label BCStrata='Strata for Bias to Cohort weights';
run;

title "Final Stata for Weighting Cohort to Bias for &year";

proc tabulate data=ctbias.bcstrata&year noseps missing out=bcstrataTab&year;
class bcstrata;
var link onlybias wgtcohort;
table (all bcstrata),n*f=7. sum=''*(link onlybias)*f=7. mean=''*(wgtcohort)*f=7.4/rts=29;
run;


data fortrans.WgtCohwithBiasID&year(keep=id_bias bcstrata wgtcohort);
set ctbias.BCStrata&year;
where link eq 1;
run;

proc sort data=fortrans.WgtCohwithBiasID&year;
by id_bias;
run;

proc summary data=fortrans.WgtCohwithBiasID&year;
var wgtcohort;
output out=test&year sum=totwgt;
run;

%mend;

%usestrat(year=1981,AgeL=2,TAl=3,EthL=3,TimL=3,RUl=4,DepL=3,outd=sumbiascohb);
%usestrat(year=1986,AgeL=2,TAl=3,EthL=3,TimL=3,RUl=4,DepL=3,outd=sumbiascohb);
%usestrat(year=1991,AgeL=2,TAl=3,EthL=2,TimL=3,RUl=4,DepL=3,outd=sumbiascohc);
%usestrat(year=1996,AgeL=2,TAl=3,EthL=2,TimL=3,RUl=4,DepL=3,outd=sumbiascohc);
%usestrat(year=2001,AgeL=2,TAl=3,EthL=2,TimL=3,RUl=4,DepL=3,outd=sumbiascohc);
```

Appendix 9. SAS Programme to transfer Linkage Weights to Cohort datasets

The following is the SAS programme in the Datalab (called transferIDBiastoCohort.sas last updated 23rd December 2008) that transfers the linkage weights from the Bias datasets to the Cohort datasets.

```
/*Program to take off Bias ID and replace it with Cohort ID for CancerTrends project*/
/*This will transfer the Weights we need to multiply the Cohort data to represent all the
Bias Cancer data*/
/*File called TransferIDBiastoCohort.sas written by June Atkinson for Lilian Morrison to
run 22.12.2008*/
/* (Very similar to file called TransferIDBiastoUnlock.sas written by June Atkinson for
Lilian Morrison to run 1.5.2008)*/

libname trans '\\wsnz02\c_datalab\MAA2006-04 Cancer Trends\Checking\June\Transfer';

libname idsdir '\\Wsnz02\c_datalab\Datalab datasets for checking\Pre 2008_to be
sorted\CancerTrends';

proc sort data=trans.WgtCohwithBiasID1981;  by id_bias;  run;
proc sort data=trans.WgtCohwithBiasID1986;  by id_bias;  run;
proc sort data=trans.WgtCohwithBiasID1991;  by id_bias;  run;
proc sort data=trans.WgtCohwithBiasID1996;  by id_bias;  run;
proc sort data=trans.WgtCohwithBiasID2001;  by id_bias;  run;

proc sort data=idsdir.concord1981_new out=concord81(keep=id_bias id_cohort);
by id_bias;
run;

proc sort data=idsdir.concord1986_new out=concord86(keep=id_bias id_cohort);
by id_bias;
run;

proc sort data=idsdir.concord1991_new out=concord91(keep=id_bias id_cohort);
by id_bias;
run;

proc sort data=idsdir.concord1996_new out=concord96(keep=id_bias id_cohort);
by id_bias;
run;

proc sort data=idsdir.concord2001_new out=concord2001(keep=id_bias id_cohort);
by id_bias;
run;
```

```
data trans.hasCohortID1981(keep=id_cohort bcstrata wgtcohort);
merge trans.WgtCohwithBiasID1981(in=a) concord81(in=b);
by id_bias;
if a;
run;

data trans.hasCohortID1986(keep=id_cohort bcstrata wgtcohort);
merge trans.WgtCohwithBiasID1986(in=a) concord86(in=b);
by id_bias;
if a;
run;

data trans.hasCohortID1991(keep=id_cohort bcstrata wgtcohort);
merge trans.WgtCohwithBiasID1991(in=a) concord91(in=b);
by id_bias;
if a;
run;

data trans.hasCohortID1996(keep=id_cohort bcstrata wgtcohort);
merge trans.WgtCohwithBiasID1996(in=a) concord96(in=b);
by id_bias;
if a;
run;

data trans.hasCohortID2001(keep=id_cohort bcstrata wgtcohort);
merge trans.WgtCohwithBiasID2001(in=a) concord2001(in=b);
by id_bias;
if a;
run;

proc sort data= trans.hasCohortID1981;  by id_cohort;  run;
proc sort data= trans.hasCohortID1986;  by id_cohort;  run;
proc sort data= trans.hasCohortID1991;  by id_cohort;  run;
proc sort data= trans.hasCohortID1996;  by id_cohort;  run;
proc sort data= trans.hasCohortID2001;  by id_cohort;  run;
```

Appendix 10. SAS Programme to make final adjustments to Linkage Weights on Cohort datasets

The following is the SAS programme in the Datalab (called BiasWgtonCohortAdjust.sas last updated 23rd February 2009) that makes the final adjustments to the linkage weights on the Cohort datasets so that everything still represents the census distribution.

```
/*Investigation and putting on of Bias Weights and final adjustment onto Cohort dataset
  BiasWgtonCohortAdjust.sas   11.2.2009 JA*/

/*Based on File CreateBiasWgtforCohortFinal.sas  22.12.2008*/

%include "p:\sasprogs\general\CTmacros.sas";
%persess(action=ABR,censusyr=AllYears);

libname fortrans 'P:\Checking\June\Transfer';
libname impdata 'P:\CTMainDatasets\ImpData';
libname PErsults 'P:\Checked\2008 2O';

options nocenter linesize=105 pageno=1;

%include 'P:\sasprogs\june\UnlkRatioFmts.sas';

%macro Invstrat(year=,AgeL=2,TAl=3,EthL=3,TimL=3,RUl=4,DepL=3);

data InvStrat&year;
set ctbias.bcstrata&year(rename=(B_A&AgeL=B_AFin B_TA&TAl=B_TAFin B_E&EthL=B_EFin
 b_tim&TimL=B_TimFin b_ru&RUl=B_RUFin b_dep&DepL=B_DepFin));
length B_SCode B_ACode B_TACode B_ECode B_TimCode B_RUCode B_DepCode $1;
B_SCode=B_S; B_ACode=B_AFin; B_TACode=B_TAFin; B_ECode=B_EFin; B_TimCode=B_TimFin;
B_RUCode=B_RUFin; B_DepCode=B_DepFin;
run;

proc tabulate data=InvStrat&year missing noseps out=InvStratTab&year;
class cenyear link /*onlybias */
 B_S B_AFin B_TAFin B_EFin B_TimFin B_RUFin B_DepFin
 B_SCode B_ACode B_TACode B_ECode B_TimCode B_RUCode B_DepCode;
var wgtcohort;
table cenyear, B_S*B_SCode B_AFin*B_ACode B_TAFin*B_TACode B_EFin*B_ECode
 B_TimFin*B_TimCode B_RUFin*B_RUCode B_DepFin*B_DepCode,
 (all link /*onlybias*/)*n=''*f=7. wgtcohort*(min mean max)*f=6.4/rts=42;
run;

%mend;
```

```
Proc printto new file='Donotcheck.lst';run;
%Invstrat(year=1981,AgeL=2,TAl=3,EthL=3,TimL=3,RUl=4,DepL=3);
%Invstrat(year=1986,AgeL=2,TAl=3,EthL=3,TimL=3,RUl=4,DepL=3);
%Invstrat(year=1991,AgeL=2,TAl=3,EthL=2,TimL=3,RUl=4,DepL=3);
%Invstrat(year=1996,AgeL=2,TAl=3,EthL=2,TimL=3,RUl=4,DepL=3);
%Invstrat(year=2001,AgeL=2,TAl=3,EthL=2,TimL=3,RUl=4,DepL=3);
proc printto;run;

/*Might want to take out of the datalab some of this info (after RR) - see what else is
needed*/

data peTAall;
set PErsults.peall;
where trim(parameter) eq 'G_TA' and mod eq 2;
length B_TA1 B_TA2 B_TA3 B_TA4 $1;
B_TA1=put(probchisq,ita1l.);
if B_TA1 eq 'N' then do;
 if estimate ge 0 then b_ta1='O'; else b_ta1='P';
end;
else if B_TA1 eq 'K' then do;
 if estimate ge 0 then b_ta1='L'; else b_ta1='M';
end;
else if B_TA1 eq 'G' then do;
 if estimate ge 0 then b_ta1='H'; else b_ta1='I';
end;
b_ta2=input(b_ta1,$ita2L.);
b_ta3=input(b_ta2,$ita3L.);
b_ta4=input(b_ta3,$ita4L.);
G_TA=input(level1,itacode.);
run;

%macro SortWgts(year=);

data fromcoh&year;
set ctro.cohort&year(keep=id_dwell id_cohort CenYear Link Sex
AgeC_Mths   AgeC_yrs    AgeCan1_mth AgeCan2_mth AgeCan3_mth  AgeCan4_mth   AgeDth_mth
 G_DHB   G_RC    G_RHA G_TA  NZDep2001
ICD1Group   ICD2Group   ICD3Group   ICD4Group PerType    UsInd
%if "&year" eq "1981" %then %do;
  EthDet1   EthDet2 EthDet3 G_Rurality01    G_Rurality81
  G_TA81    H_DwgTpG  H_NAbCh   H_NAbTot  H_Type NZDep91
%end;
%else %if "&year" eq "1986" %then %do;
  EthDet1   EthDet2 EthDet3 G_Rurality01    G_Rurality86  H_DwgNat  NZDep91
%end;
%else %if "&year" eq "1991" %then %do;
 EthDet1    EthDet2 EthDet3 G_Rurality01    G_Rurality91 G_RC91 G_TA91    NZDep91
```

```
%end;
%else %if "&year" eq "1996" %then %do;
 EthDet1    EthDet2  EthDet3    G_Rurality01    G_Rurality96
 G_RC96  G_TA96      NZDep96   impform
%end;
%else %if "&year" eq "2001" %then %do;
 EthDet1    EthDet2 EthDet3 EthDet4 EthDet5 EthDet6   G_Rurality   impform
%end;
);
format AgeC_yrs  fage1yr.
       AgeC_Mths AgeCan1_mth AgeCan2_mth AgeCan3_mth AgeCan4_mth AgeDth_mth  fagem5y.;
run;

data cohids&year;
set fromcoh&year(keep=id_dwell id_cohort);
run;

proc sort data=cohids&year;
by id_cohort;
run;

data hascohortid&year;
merge cohids&year(in=a)  fortrans.hascohortid&year(in=b);
by id_cohort;
if b;
run;

proc sort data=hascohortid&year;
by id_dwell id_cohort;
run;

data impinfo&year;
set impdata.nzadults&year._imputejoined(keep=id_dwell id_cohort countmissingfields
   ethcombismallstatus imp1ethcombismall imp2ethcombismall imp3ethcombismall)
 impdata.nzchildren&year._imputejoined(keep=id_dwell id_cohort countmissingfields
   ethcombismallstatus imp1ethcombismall imp2ethcombismall imp3ethcombismall);
run;

proc sort data=impinfo&year;
by id_dwell id_cohort;
run;

proc sort data=fromcoh&year;
by id_dwell id_cohort;
run;

data Coh&year(drop=EthCombiCalc i);
merge fromcoh&year(in=a) hascohortid&year(in=b) impinfo&year(in=c);
```

```
by id_dwell id_cohort;

length ImpEthMaori1 ImpEthMaori2 ImpEthMaori3
 ImpEthPac1 ImpEthPac2 ImpEthPac3
 ImpEthAsian1 ImpEthAsian2 ImpEthAsian3
 ImpEthnonMPA1 ImpEthnonMPA2 ImpEthnonMPA3 3;
length B_S B_AFin B_TAFin B_EFin B_TimFin B_RUFin B_DepFin $1;

array impeth {3} imp1ethcombismall imp2ethcombismall imp3ethcombismall;
array impMaori {3} ImpEthMaori1 ImpEthMaori2 ImpEthMaori3;
array ImpPac {3} ImpEthPac1 ImpEthPac2 ImpEthPac3;
array ImpAsian {3} ImpEthAsian1 ImpEthAsian2 ImpEthAsian3;
array ImpnonMPA {3} ImpEthnonMPA1 ImpEthnonMPA2 ImpEthnonMPA3;

format B_S $fisex. B_AFin $flage. B_TAFin $flta. B_EFin $fleth.
 B_TimFin $fltime. B_RUFin $flrur. B_DepFin $fldepc.;

B_S=substr(BCStrata,3,1);
B_AFin=substr(BCStrata,7,1);
B_TAFin=substr(BCStrata,11,1);
B_EFin=substr(BCStrata,15,1);
B_TimFin=substr(BCStrata,19,1);
B_RUFin=substr(BCStrata,23,1);
B_DepFin=substr(BCStrata,27,1);

if countmissingfields ge 0 then do;
 do i=1 to 3;

 impmaori{i}=0;
 imppac{i}=0;
 impasian{i}=0;
 impnonmpa{i}=0;

 EthCombiCalc = impeth{i};

 IF EthCombiCalc ge 8 THEN DO;
    impasian{i} = 4; EthCombiCalc = EthCombiCalc - 8; END;
 IF EthCombiCalc ge 4 THEN DO;
    imppac{i} = 2; EthCombiCalc = EthCombiCalc - 4; END;
 IF EthCombiCalc ge 2 THEN DO;
    impmaori{i} = 1; EthCombiCalc = EthCombiCalc - 2; END;
 IF EthCombiCalc eq 1 THEN DO;
    impnonmpa{i} = 5; EthCombiCalc = EthCombiCalc - 1; END;

 end; /*end i*/
end;
run;
```

```
%mend;

%sortwgts(year=1981);
%sortwgts(year=1986);
%sortwgts(year=1991);
%sortwgts(year=1996);
%sortwgts(year=2001);

data chketh2001;
set coh2001;
where ethcombismallstatus eq '0';
run;

data chketh2001;
set chketh2001;
NumEths=0;
if imp1ethcombismall eq imp2ethcombismall then numeths=1;
else if imp1ethcombismall ne imp2ethcombismall then numeths=2;
if imp1ethcombismall ne imp2ethcombismall and
 imp1ethcombismall ne imp3ethcombismall and imp2ethcombismall ne imp3ethcombismall
 then numeths=3;
run;

proc freq data=chketh2001;
tables numeths;
run;

proc freq data=chketh2001;
where numeths eq 1;
tables imp1ethcombismall;
run;

proc freq data=chketh2001;
where numeths eq 2;
tables imp1ethcombismall*imp2ethcombismall*imp3ethcombismall/list;
run;

proc freq data=chketh2001;
where numeths eq 3;
tables imp1ethcombismall*imp2ethcombismall*imp3ethcombismall/list;
run;

/*Notes for Assigning Ethnicity written by June 12.2.2009*/
/*From looking at above ethnicity imputed data, majority have just one ethnicity imputed.
  Need to make a Prioritised and a Sole ethnicity, one per person, to be used to want
   only one ethnicity, e.g. in assigning the linkage adjustment weights.
Thought of this option (1)
```

```
  a) If only one ethnicity value from the 3 imputations (this can include value for
multiple ethnicities e.g. M+E), or if there is no imputation, then get prioritised and
sole ethnicities from that value.
  b) If there are two ethnicity values from imputation, then use the most common
ethnicity from imputation to get prioritised and sole values.
  c) If there are three ethnicities from imputation, then use the prioritisation method
to decide ethnicity using all three imputed ethnicities. Same method for deciding Sole
Ethnicity.
but decided on option (2) which is to use all three ethnicities for priorisation or sole.
  Have decided when doing standardised rates for imputed variables (income & education or
ethnicity),  will use the relevant imputed ethnicity value, however if doing other
variables, can use this derived Prioritised or Sole ethnicity*/

%macro calcEth(year=,dropopt=Y);

%let dropopt=%upcase(&dropopt);

data coh&year;
set coh&year
 %if "&dropopt" eq 'Y' %then %do;
 (drop=ImpEthMaori1 ImpEthMaori2 ImpEthMaori3
  ImpEthPac1 ImpEthPac2 ImpEthPac3
  ImpEthAsian1 ImpEthAsian2 ImpEthAsian3
  ImpEthnonMPA1 ImpEthnonMPA2 ImpEthnonMPA3)
 %end;
;
attrib
      TotMaori      LENGTH = 3      FORMAT = fTotEth.   LABEL = 'Total Maori'
      TotPacific    LENGTH = 3      FORMAT = fTotEth.   LABEL = 'Total Pacific'
      TotAsian      LENGTH = 3      FORMAT = fTotEth.   LABEL = 'Total Asian'
      TotnonMPA     LENGTH = 3      FORMAT = fTotEth.   LABEL = 'Total nonMPA'
      EthCenPr4     LENGTH = 3      FORMAT = f4Eth.     LABEL = 'Prioritised Ethnicity'
      EthCenSol4    LENGTH = 3      FORMAT = f4Eth.     LABEL = 'Sole Ethnicity'
;
* 1.2 Derive Total Ethnicity variables ;
* 1.2.1 TotMaori ;
IF EthDet1 IN (2,21) OR EthDet2 IN (2,21) OR EthDet3 IN (2,21)
 %if "&year" eq "2001" %THEN %DO ;
   OR EthDet4 IN (2,21) OR EthDet5 IN (2,21) OR EthDet6 IN (2,21)
 %end;
 THEN TotMaori = 1 ;
 ELSE IF EthDet1 IN (3) OR EthDet2 IN (3) OR EthDet3 IN (3)
      or (30 LE EthDet1 LE 39) OR (30 LE EthDet2 LE 39) OR (30 LE EthDet3 LE 39)
      or EthDet1 IN (4) OR EthDet2 IN (4) OR EthDet3 IN (4)
      or (40 LE EthDet1 LE 49) OR (40 LE EthDet2 LE 49) OR (40 LE EthDet3 LE 49)
      %if "&year" eq "2001" %THEN %DO ;
       OR EthDet4 IN (3) OR EthDet5 IN (3) OR EthDet6 IN (3)
       OR (30 LE EthDet4 LE 39) OR (30 LE EthDet5 LE 39) OR (30 LE EthDet6 LE 39)
```

```
       OR EthDet4 IN (4) OR EthDet5 IN (4) OR EthDet6 IN (4)
       OR (40 LE EthDet4 LE 49) OR (40 LE EthDet5 LE 49) OR (40 LE EthDet6 LE 49)
      %end;
 THEN TotMaori = 11 ;
 ELSE IF EthDet1 IN (.,80,97,98,99) THEN TotMaori = 9 ; /*Will need to use imputed
value*/
 ELSE TotMaori = 5 ;

* 1.2.2 Derive TotPacific - Total Pacific ;
IF EthDet1 IN (3) OR EthDet2 IN (3) OR EthDet3 IN (3)
    or (30 LE EthDet1 LE 39) OR (30 LE EthDet2 LE 39) OR (30 LE EthDet3 LE 39)
 %if "&year" eq "2001" %THEN %DO ;
    OR EthDet4 IN (3) OR EthDet5 IN (3) OR EthDet6 IN (3)
    OR (30 LE EthDet4 LE 39) OR (30 LE EthDet5 LE 39) OR (30 LE EthDet6 LE 39)
 %end;
 THEN TotPacific = 2 ;
 ELSE IF EthDet1 IN (2,21,4) OR EthDet2 IN (2,21,4) OR EthDet3 IN (2,21,4)
      or (40 LE EthDet1 LE 49) OR (40 LE EthDet2 LE 49) OR (40 LE EthDet3 LE 49)
      %if "&year" eq "2001" %THEN %DO ;
       OR EthDet4 IN (2,21,4) OR EthDet5 IN (2,21,4) OR EthDet6 IN (2,21,4)
       OR (40 LE EthDet4 LE 49) OR (40 LE EthDet5 LE 49) OR (40 LE EthDet6 LE 49)
      %end;
 THEN TotPacific = 12 ;
 ELSE IF EthDet1 IN (80,97,98,99) THEN TotPacific = 9 ; /*Will need to use imputed
value*/
 ELSE TotPacific = 5 ;

* 1.2.3 Derive TotAsian - Total Asian ;
IF EthDet1 IN (4) OR EthDet2 IN (4) OR EthDet3 IN (4)
    or (40 LE EthDet1 LE 49) OR (40 LE EthDet2 LE 49) OR (40 LE EthDet3 LE 49)
 %if "&year" eq "2001" %THEN %DO ;
    OR EthDet4 IN (4) OR EthDet5 IN (4) OR EthDet6 IN (4)
    OR (40 LE EthDet4 LE 49) OR (40 LE EthDet5 LE 49) OR (40 LE EthDet6 LE 49)
 %end;
 THEN TotAsian = 4 ;
 ELSE IF EthDet1 IN (2,21,3) OR EthDet2 IN (2,21,3) OR EthDet3 IN (2,21,3)
      or (30 LE EthDet1 LE 39) OR (30 LE EthDet2 LE 39) OR (30 LE EthDet3 LE 39)
      %if "&year" eq "2001" %THEN %DO ;
       OR EthDet4 IN (2,21,3) OR EthDet5 IN (2,21,3) OR EthDet6 IN (2,21,3)
       OR (30 LE EthDet4 LE 39) OR (30 LE EthDet5 LE 39) OR (30 LE EthDet6 LE 39)
      %end;
 THEN TotAsian = 14 ;
 ELSE IF EthDet1 IN (80,97,98,99) THEN TotAsian = 9 ; /*Will need to use imputed value*/
 ELSE TotAsian = 5 ;

* 1.2.4 Derive TotnonMPA - Total nonMPA ;
IF EthDet1 IN (5) OR EthDet2 IN (5) OR EthDet3 IN (5)
    or (50 LE EthDet1 LE 70) OR (50 LE EthDet2 LE 70) OR (50 LE EthDet3 LE 70)
```

```
 %if "&year" eq "2001" %THEN %DO ;
    OR EthDet4 IN (5) OR EthDet5 IN (5) OR EthDet6 IN (5)
    OR (50 LE EthDet4 LE 70) OR (50 LE EthDet5 LE 70) OR (50 LE EthDet6 LE 70)
 %end;
 THEN TotnonMPA = 5 ;
 ELSE IF EthDet1 IN (80,97,98,99) THEN TotnonMPA = 9 ; /*Will need to use imputed value*/
 ELSE TotnonMPA = 0 ;

* 1.2.4 Derive EthCenPr4 - Prioritised Ethnicity  ;
IF TotMaori eq 1 THEN EthCenPr4 = 1 ;
 ELSE IF TotPacific eq 2 THEN EthCenPr4 = 2 ;
 ELSE IF TotAsian eq 4 THEN EthCenPr4 = 4 ;
 ELSE IF TotMaori eq 9 THEN EthCenPr4 = 9 ;
 ELSE EthCenPr4 = 5 ;

IF TotMaori eq 1 and TotPacific eq 12 and TotAsian eq 14 and totnonMPA eq 0 THEN
EthCenSol4 = 1 ;
 ELSE IF TotPacific eq 2 and TotMaori eq 11 and TotAsian eq 14 and totnonMPA eq 0 THEN
EthCenSol4 = 2 ;
 ELSE IF TotAsian eq 4 and TotMaori eq 11 and TotPacific eq 12 and totnonMPA eq 0 THEN
EthCenSol4 = 4 ;
 ELSE IF TotMaori eq 9 THEN EthCenSol4 = 9 ;
 ELSE EthCenSol4 = 5 ;

/*Make adjustment to Prioritised and Sole for imputed ethnicities*/
if totmaori eq 9 then do;
IF imp1ethcombismall in (2,3,6,7,10,11,14,15)
   or imp2ethcombismall in (2,3,6,7,10,11,14,15)
   or imp3ethcombismall in (2,3,6,7,10,11,14,15) THEN EthCenPr4 = 1 ;
 ELSE IF imp1ethcombismall in (4,5,6,7,12,13,14,15)
   or imp2ethcombismall in (4,5,6,7,12,13,14,15)
   or imp3ethcombismall in (4,5,6,7,12,13,14,15) THEN EthCenPr4 = 2 ;
 ELSE IF imp1ethcombismall in (8,9,10,11,12,13,14,15)
    or imp2ethcombismall in (8,9,10,11,12,13,14,15)
    or imp3ethcombismall in (8,9,10,11,12,13,14,15) THEN EthCenPr4 = 4 ;
 else if imp1ethcombismall eq . and imp2ethcombismall eq . and imp3ethcombismall eq .
    then EthCenPr4 = 9;
 ELSE EthCenPr4 = 5 ;

IF imp1ethcombismall in (2) and imp2ethcombismall in (2)
   and imp3ethcombismall in (2) THEN EthCenSol4 = 1 ;
 ELSE IF imp1ethcombismall in (4) and imp2ethcombismall in (4)
   and imp3ethcombismall in (4) THEN EthCenSol4 = 2 ;
 ELSE IF imp1ethcombismall in (8) and imp2ethcombismall in (8)
   and imp3ethcombismall in (8) THEN EthCenSol4 = 4 ;
 else if imp1ethcombismall eq . and imp2ethcombismall eq . and imp3ethcombismall eq .
    then EthCenSol4 = 9;
   ELSE EthCenSol4 = 5 ;
```

```
end;

run;

%mend;

*%calcEth(year=1981,dropopt=Y);
%calcEth(year=1981,dropopt=N);
*%calcEth(year=1986,dropopt=Y);
*%calcEth(year=1991,dropopt=Y);
*%calcEth(year=1996,dropopt=Y);
*%calcEth(year=2001,dropopt=Y);
%calcEth(year=1986,dropopt=N);
%calcEth(year=1991,dropopt=N);
%calcEth(year=1996,dropopt=N);
%calcEth(year=2001,dropopt=N);


data look;
set coh1986(keep=ethdet1 ethdet2 ethdet3 totmaori totpacific totasian totnonmpa
 ethcombismallstatus imp1ethcombismall imp2ethcombismall imp3ethcombismall
 ethcenpr4 ethcensol4);
run;

/*Confirmed from NZCMS that absentees and dummies shouldn't have weights
  (although NZCMS dummies in 1996 had because the absentee flag was still 0,
  whereas in 2001 it had been made 1=absentee, 2=dummy record)*/

proc format;
invalue iageiTc
.=.               0 -< 15=0       15 -< 25=15      25 -< 30=25      30 -< 35=30
35 -< 40=35     40 -< 50=40       50 -< 60=50      60 -< 70=60      70 -< 80=70
80 - 999=80;

invalue iagey5c
.=.              0 -<   5= 0       5 -< 10= 5     10 -< 15=10      15 -< 20=15
20 -< 25=20      25 -< 30=25      30 -< 35=30     35 -< 40=35      40 -< 45=40
45 -< 50=45      50 -< 55=50      55 -< 60=55     60 -< 65=60      65 -< 70=65
70 -< 75=70      75 -< 80=75      80 -< 85=80     85 -< 90=85      90 -< 95=90
95 - 9999=95;

value fagei5c
.='Z'    0='A'    5='B'   10='C'    15='D'   20='E'   25='F'    30='G'   35='H'   40='I'
45='J'  50='K'   55='L'   60='M'    65='N'   70='O'   75='P'    80='Q'   85='R'   90='S'
95='T';

value $fage5c
'Z'='Missing'     'A'=' 0- 4 yrs'   'B'=' 5- 9 yrs'   'C'='10-14 yrs'   'D'='15-19 yrs'
```

```
'E'='20-24 yrs'   'F'='25-29 yrs'   'G'='30-34 yrs'   'H'='35-39 yrs'   'I'='40-44 yrs'
'J'='45-49 yrs'   'K'='50-54 yrs'   'L'='55-59 yrs'   'M'='60-64 yrs'   'N'='65-69 yrs'
'O'='70-74 yrs'   'P'='75-79 yrs'   'Q'='80-84 yrs'   'R'='85-89 yrs'   'S'='90-94 yrs'
'T'='>=95 years'  'U'='>=90 years';

invalue irurgpc
1,2,3=-10               4,5,6,.,9=-70;

value fdecgc
.,-9,1-6='H'            7-10='J';

run;

%macro createStrat(year=,wdep=nzdep2001,wrur=g_rurality01);

data cohstr&year;
set coh&year;
length WgtStrata $24;
* Derive Absentee Indicator ;
%if "&year" eq "1981" %THEN %DO ;
 AbsentFlg = 0 ; * There are no Absentee records in the 1981 Cohort - H_NAbCh & H_NAbTot
indicate the number of Absent adults & children ;
%end;
%else %Do;
 IF PerType IN (1) THEN AbsentFlg = 1 ; * Absentee ;
 %if "&year" eq "2001" or "&year" eq "1996" %THEN %DO ;
  ELSE IF ImpForm NE 0 THEN AbsentFlg = 2 ; * Dummy Record - treated as Absentee (1996 &
2001 Cohorts Only) ;
 %end;
 ELSE AbsentFlg = 0 ; * Non Absentee ;
%end;

length BC_S BC_A BC_E BC_Tim BC_RU BC_Dep $1 BC_TA $2 BC_A5 $1;

format BC_S $fisex. BC_A $fiAge. BC_A5 $fage5c. BC_TA $ftagps. BC_E $fleth.
 BC_Tim $fltime. BC_RU $flrur. BC_Dep $fldepc. g_rur frurgpx.;

BC_S=put(sex,iisex.);
Age10=input(agec_yrs,iageiTc.);
BC_A=put(age10,iiAge.);
Age5=input(agec_yrs,iagey5c.);
BC_A5=put(age5,fagei5c.);
if g_ta in (612864,613888) then g_ta=999;
if g_ta in (99,999,-999,.) then g_ta=99;
BC_TA=put(g_ta,z2.);  /*May be too fine*/
BC_E=put(ethcenpr4,iieth.);
BC_Tim='A';  /*Cannot calculate time since census on Cohort*/
G_Rur=input(&wrur,irurgpc.);
```

```
BC_RU=put(g_rur,iRur1L.);
BC_Dep=put(&wdep,fdecgc.);
if absentflg eq 0 then wgtstrata='S:'||bc_s||'/A:'||bc_a||'/E:'||bc_e||'/V:'||bc_ru||
  '/D:'||bc_dep||'/G:'||bc_ta;
else wgtstrata='none';
run;

proc sort data=petaall out=pet&year;
where cenyear eq &year;
by g_ta;
run;

proc sort data=cohstr&year;
by g_ta;
run;

data cohstr&year;
merge cohstr&year(in=a) pet&year(in=b keep=g_ta B_TA1 B_TA2 B_TA3 B_TA4);
by g_ta;
if a;
length WgtStrataTAG $23;
if g_ta in (99,-99) then b_ta1='Z';
if absentflg eq 0 then  wgtstratatag='S:'||bc_s||'/A:'||bc_a||'/E:'||bc_e||'/V:'||
  bc_ru||'/D:'||bc_dep||'/R:'||B_TA1;
else wgtstratatag='none';
if absentflg eq 0 then wgtstratatagAge='S:'||bc_s||'/A:'||bc_a5||'/E:'||bc_e||'/V:'||
  bc_ru||'/D:'||bc_dep||'/R:'||B_TA1;
else wgtstratatagAge='none';

/*Tweaks for getting the proportions linked/total down*/
%if "&year" eq "1981" %THEN %DO ;
if substr(wgtstratatagage,1,19) in
('S:F/A:H/E:K/V:C/D:H','S:F/A:M/E:C/V:C/D:H','S:F/A:M/E:K/V:C/D:J')
 and substr(wgtstratatagage,23,1) in ('H','I') then
 substr(wgtstratatagage,23,1)='G';

else if substr(wgtstratatagage,1,19) in
('S:F/A:J/E:G/V:M/D:J','S:M/A:N/E:G/V:M/D:J','S:M/A:S/E:C/V:M/D:J')
 and substr(wgtstratatagage,23,1) in ('D','E','F') then
 substr(wgtstratatagage,23,1)='C';

else if substr(wgtstratatagage,1,19) in
('S:F/A:M/E:G/V:M/D:J','S:F/A:O/E:K/V:M/D:H','S:F/A:S/E:C/V:C/D:J')
 and substr(wgtstratatagage,23,1) in ('D','E') then
 substr(wgtstratatagage,23,1)='X';

else if substr(wgtstratatagage,1,19) in ('S:F/A:N/E:Q/V:M/D:H','S:M/A:M/E:Q/V:M/D:H')
 and substr(wgtstratatagage,23,1) in ('O','P') then
```

```
 substr(wgtstratatagage,23,1)='N';

else if substr(wgtstratatagage,1,19) in ('S:F/A:Q/E:K/V:C/D:J')
 and substr(wgtstratatagage,23,1) in ('K','L','M','N','O','P') then
 substr(wgtstratatagage,23,1)='J';

else if substr(wgtstratatagage,1,19) in ('S:M/A:R/E:K/V:C/D:H')
 and substr(wgtstratatagage,23,1) in ('D','E','F','G','H','I') then
 substr(wgtstratatagage,23,1)='B';

else if substr(wgtstratatagage,1,19) in ('S:M/A:S/E:C/V:C/D:J','S:M/A:Q/E:G/V:C/D:H')
  then substr(wgtstratatagage,23,1)='A';

%end;

%else %if "&year" eq "1986" %THEN %DO ;

if substr(wgtstratatagage,1,19) in
('S:F/A:J/E:G/V:M/D:H','S:F/A:N/E:C/V:M/D:J','S:F/A:O/E:G/V:C/D:H'
 ,'S:M/A:Q/E:C/V:C/D:J')
 and substr(wgtstratatagage,23,1) in ('H','I') then
 substr(wgtstratatagage,23,1)='G';

else if substr(wgtstratatagage,1,19) in
('S:F/A:I/E:K/V:M/D:H','S:M/A:P/E:G/V:C/D:J','S:M/A:Q/E:C/V:M/D:H')
 and substr(wgtstratatagage,23,1) in ('D','E','F','G','H','I') then
 substr(wgtstratatagage,23,1)='B';

else if substr(wgtstratatagage,1,19) in
('S:F/A:O/E:G/V:C/D:H','S:M/A:Q/E:K/V:C/D:J','S:M/A:R/E:C/V:C/D:H')
 and substr(wgtstratatagage,23,1) in ('D','E') then
 substr(wgtstratatagage,23,1)='X';

else if substr(wgtstratatagage,1,19) in ('S:F/A:T/E:Q/V:M/D:J')
 and substr(wgtstratatagage,23,1) in ('K','L','M','N','O','P') then
 substr(wgtstratatagage,23,1)='J';

else if substr(wgtstratatagage,1,19) in ('S:M/A:O/E:C/V:C/D:H','S:M/A:P/E:G/V:C/D:H')
 and substr(wgtstratatagage,23,1) in ('O','P') then
 substr(wgtstratatagage,23,1)='N';

else if substr(wgtstratatagage,1,19) in ('S:M/A:O/E:K/V:M/D:H','S:M/A:P/E:G/V:C/D:H'
 ,'S:M/A:Q/E:G/V:C/D:H')
 and substr(wgtstratatagage,23,1) in ('D','E','F') then
 substr(wgtstratatagage,23,1)='C';

else if substr(wgtstratatagage,1,19) in ('S:M/A:Q/E:K/V:C/D:J')
 and substr(wgtstratatagage,23,1) in ('L','M') then
```

```
 substr(wgtstratatagage,23,1)='K';

else if substr(wgtstratatagage,1,19) in ('S:M/A:O/E:G/V:M/D:H')
  then substr(wgtstratatagage,23,1)='A';

else if substr(wgtstratatagage,1,15) in ('S:M/A:P/E:G/V:M') then do;
  substr(wgtstratatagage,19,1)='A';substr(wgtstratatagage,23,1)='A';
end;

%end;

%else %if "&year" eq "1991" %THEN %DO ;

if substr(wgtstratatagage,1,19) in ('S:F/A:G/E:G/V:C/D:H','S:F/A:Q/E:Q/V:C/D:J')
 and substr(wgtstratatagage,23,1) in ('H','I') then
 substr(wgtstratatagage,23,1)='G';

else if substr(wgtstratatagage,1,19) in ('S:F/A:M/E:G/V:M/D:J','S:M/A:S/E:G/V:C/D:J')
 and substr(wgtstratatagage,23,1) in ('D','E','F') then
 substr(wgtstratatagage,23,1)='C';

else if substr(wgtstratatagage,1,19) in ('S:F/A:N/E:C/V:M/D:H')
 and substr(wgtstratatagage,23,1) in ('D','Z') then
 substr(wgtstratatagage,23,1)='W';

else if substr(wgtstratatagage,1,19) in
('S:F/A:Q/E:K/V:C/D:H','S:F/A:T/E:C/V:C/D:J','S:M/A:O/E:G/V:C/D:J')
 and substr(wgtstratatagage,23,1) in ('K','L','M','N','O','P') then
 substr(wgtstratatagage,23,1)='J';

else if substr(wgtstratatagage,1,19) in
('S:F/A:S/E:C/V:C/D:J','S:M/A:O/E:G/V:M/D:H','S:M/A:Q/E:K/V:C/D:J')
 and substr(wgtstratatagage,23,1) in ('D','E','F','G','H','I') then
 substr(wgtstratatagage,23,1)='B';

else if substr(wgtstratatagage,1,19) in
('S:M/A:N/E:G/V:C/D:J','S:M/A:P/E:C/V:M/D:J','S:M/A:R/E:C/V:M/D:H')
 and substr(wgtstratatagage,23,1) in ('D','E') then
 substr(wgtstratatagage,23,1)='X';

else if substr(wgtstratatagage,1,19) in ('S:M/A:P/E:Q/V:M/D:H')
 and substr(wgtstratatagage,23,1) in ('O','P') then
 substr(wgtstratatagage,23,1)='N';

else if substr(wgtstratatagage,1,15) in ('S:F/A:Q/E:K/V:M')
 and substr(wgtstratatagage,23,1) in ('P') then
  substr(wgtstratatagage,19,1)='A';
```

```
else if substr(wgtstratatagage,1,15) in ('S:F/A:T/E:G/V:C')
 and substr(wgtstratatagage,23,1) in ('F') then
  substr(wgtstratatagage,19,1)='A';

else if substr(wgtstratatagage,1,19) in ('S:F/A:S/E:K/V:C/D:J')
  then substr(wgtstratatagage,23,1)='A';

else if substr(wgtstratatagage,1,15) in
('S:M/A:Q/E:G/V:M','S:F/A:N/E:K/V:M','S:F/A:Q/E:G/V:M') then do;
  substr(wgtstratatagage,19,1)='A';substr(wgtstratatagage,23,1)='A';
end;

%end;

%else %if "&year" eq "1996" %THEN %DO ;

if substr(wgtstratatagage,1,19) in
('S:F/A:K/E:K/V:M/D:H','S:F/A:M/E:G/V:M/D:H','S:F/A:Q/E:G/V:C/D:J'
 ,'S:F/A:Q/E:K/V:C/D:J','S:M/A:P/E:G/V:C/D:H','S:M/A:Q/E:K/V:C/D:J')
 and substr(wgtstratatagage,23,1) in ('L','M') then
 substr(wgtstratatagage,23,1)='K';

else if substr(wgtstratatagage,1,19) in
('S:F/A:P/E:G/V:M/D:H','S:M/A:R/E:G/V:C/D:J','S:M/A:S/E:G/V:C/D:H')
 and substr(wgtstratatagage,23,1) in ('D','E','F') then
 substr(wgtstratatagage,23,1)='C';

else if substr(wgtstratatagage,1,19) in ('S:F/A:P/E:G/V:C/D:J','S:M/A:P/E:K/V:C/D:J')
 and substr(wgtstratatagage,23,1) in ('K','L','M','N','O','P') then
 substr(wgtstratatagage,23,1)='J';

else if substr(wgtstratatagage,1,19) in
('S:F/A:Q/E:C/V:M/D:H','S:M/A:Q/E:C/V:C/D:H','S:M/A:Q/E:C/V:C/D:J'
 ,'S:M/A:Q/E:C/V:M/D:H','S:M/A:Q/E:C/V:M/D:J','S:M/A:S/E:Q/V:C/D:H')
 and substr(wgtstratatagage,23,1) in ('O','P') then
 substr(wgtstratatagage,23,1)='N';

else if substr(wgtstratatagage,1,19) in
('S:F/A:Q/E:K/V:C/D:J','S:F/A:S/E:K/V:C/D:H','S:M/A:O/E:G/V:C/D:J'
 ,'S:M/A:P/E:G/V:C/D:H','S:M/A:R/E:C/V:C/D:H')
 and substr(wgtstratatagage,23,1) in ('H','I') then
 substr(wgtstratatagage,23,1)='G';

else if substr(wgtstratatagage,1,19) in
('S:M/A:O/E:G/V:M/D:H','S:M/A:R/E:G/V:C/D:H','S:M/A:S/E:C/V:M/D:J')
 and substr(wgtstratatagage,23,1) in ('D','E','F','G','H','I') then
 substr(wgtstratatagage,23,1)='B';
```

```
else if substr(wgtstratatagage,1,19) in ('S:M/A:T/E:Q/V:M/D:H')
 and substr(wgtstratatagage,23,1) in ('D','E') then
 substr(wgtstratatagage,23,1)='X';

else if substr(wgtstratatagage,1,19) in
('S:F/A:O/E:K/V:M/D:J','S:F/A:P/E:G/V:M/D:J','S:F/A:T/E:C/V:M/D:J'
 ,'S:F/A:O/E:G/V:M/D:J','S:M/A:S/E:K/V:C/D:J')
  then substr(wgtstratatagage,23,1)='A';

else if substr(wgtstratatagage,1,15) in ('S:F/A:Q/E:G/V:M','S:M/A:S/E:C/V:M') then do;
  substr(wgtstratatagage,19,1)='A';substr(wgtstratatagage,23,1)='A';
end;

%end;

%else %if "&year" eq "2001" %THEN %DO ;

if substr(wgtstratatagage,1,19) in
('S:F/A:L/E:K/V:M/D:J','S:F/A:M/E:K/V:M/D:J','S:M/A:P/E:G/V:M/D:J'
 ,'S:M/A:R/E:K/V:C/D:H')
 and substr(wgtstratatagage,23,1) in ('D','E') then
 substr(wgtstratatagage,23,1)='X';

else if substr(wgtstratatagage,1,19) in
('S:F/A:O/E:G/V:C/D:H','S:F/A:O/E:G/V:M/D:H','S:F/A:R/E:K/V:C/D:J'

,'S:M/A:N/E:K/V:M/D:H','S:M/A:R/E:C/V:M/D:H','S:M/A:S/E:K/V:C/D:H','S:M/A:T/E:Q/V:M/D:H')
 and substr(wgtstratatagage,23,1) in ('K','L','M','N','O','P') then
 substr(wgtstratatagage,23,1)='J';

else if substr(wgtstratatagage,1,19) in
('S:F/A:O/E:G/V:M/D:H','S:M/A:O/E:K/V:M/D:H','S:M/A:O/E:K/V:M/D:J')
 and substr(wgtstratatagage,23,1) in ('D','E','F') then
 substr(wgtstratatagage,23,1)='C';

else if substr(wgtstratatagage,1,19) in ('S:M/A:K/E:K/V:M/D:H','S:M/A:P/E:C/V:M/D:H')
 and substr(wgtstratatagage,23,1) in ('O','P') then
 substr(wgtstratatagage,23,1)='N';

else if substr(wgtstratatagage,1,19) in ('S:M/A:Q/E:C/V:M/D:H')
 and substr(wgtstratatagage,23,1) in ('D','E','F','G','H','I') then
 substr(wgtstratatagage,23,1)='B';

%end;

run;

%mend;
```

```
%createStrat(year=1981,wdep=nzdep91,wrur=g_rurality81);
%createStrat(year=1986,wdep=nzdep91,wrur=g_rurality86);
%createStrat(year=1991,wdep=nzdep91,wrur=g_rurality91);
%createStrat(year=1996,wdep=nzdep96,wrur=g_rurality96);
%createStrat(year=2001,wdep=nzdep2001,wrur=g_rurality);

%macro testprop(year=);
ods select none;
proc tabulate data=cohstr&year missing noseps out=check&year;
class wgtstratatagage link;
table wgtstratatagage,(all link)*n=''*f=7./rts=40;
run;
ods select all;

data check&year;
set check&year;
if link eq . and n ne . then link=-99;
else if link eq . and n eq . then link=999;
type2=substr(_type_,1,1);
run;

proc sort data=check&year;
by type2 wgtstratatagage;
run;

proc transpose data=check&year(drop=_type_) prefix=Link_ out=check&year.T;
id link;
var n;
by type2 wgtstratatagage;
run;

data check&year.T;
set check&year.T;
proplink=link_linked/link__99;
run;

title "Proportions for &year 0.5 or over of linked versus total for strata";
proc print data=check&year.T;
var  wgtstratatagage link_linked link_not_linked link__99 proplink;
where proplink ge 0.5;
run;
title;

%mend;

%testprop(year=1981);
%testprop(year=1986);
```

```
%testprop(year=1991);
%testprop(year=1996);
%testprop(year=2001);


%macro propstat(year=);

data Cohstrata&year;
set cohstr&year;
length StrataSAE $11 StrataSAEV $15 StrataSAEVD $19 StrataSAEVDR $23;
StrataSAEVDR=wgtstratatagage;
StrataSAE=substr(StrataSAEVDR,1,11);
StrataSAEV=substr(StrataSAEVDR,1,15);
StrataSAEVD=substr(StrataSAEVDR,1,19);
run;

ods select none;
proc tabulate data=Cohstrata&year missing noseps out=check&year;
class StrataSAE StrataSAEV StrataSAEVD StrataSAEVDR link;
var wgtcohort;
table StrataSAE StrataSAE*StrataSAEV,
 (all link)*n=''*f=7. link*wgtcohort*(mean min max)/rts=40;
table StrataSAE*StrataSAEV,StrataSAEVD,
 (all link)*n=''*f=7. link*wgtcohort*(mean min max)/rts=40;
table StrataSAE*StrataSAEV*StrataSAEVD,StrataSAEVDR,
 (all link)*n=''*f=7. link*wgtcohort*(mean min max)/rts=40;
run;
ods select all;

proc sort data=check&year;
by StrataSAE StrataSAEV StrataSAEVD StrataSAEVDR _type_ link;
run;

data sumstrata&year(keep=StrataSAE TotNSAE TotNotLinkedSAE TotLinkedSAE
      PropLinkedSAE AdjNotLinkedWgtSAE WgtCoh_meanSAE
      StrataSAEV TotNSAEV TotNotLinkedSAEV TotLinkedSAEV
      PropLinkedSAEV AdjNotLinkedWgtSAEV WgtCoh_meanSAEV
      StrataSAEVD TotNSAEVD TotNotLinkedSAEVD TotLinkedSAEVD
      PropLinkedSAEVD AdjNotLinkedWgtSAEVD WgtCoh_meanSAEVD
      StrataSAEVDR TotNSAEVDR TotNotLinkedSAEVDR TotLinkedSAEVDR
      PropLinkedSAEVDR AdjNotLinkedWgtSAEVDR WgtCoh_meanSAEVDR
      LevUse AdjNotLinkedWgtUse)
  needalter(keep=strataSAE sumdiff sumTot minLevuse);
set check&year;
by StrataSAE StrataSAEV StrataSAEVD StrataSAEVDR _type_ link;
length LevUse minLevuse $6;
retain
 TotNSAE TotNotLinkedSAE TotLinkedSAE PropLinkedSAE AdjNotLinkedWgtSAE WgtCoh_meanSAE
```

```
 TotNSAEV TotNotLinkedSAEV TotLinkedSAEV PropLinkedSAEV AdjNotLinkedWgtSAEV
    WgtCoh_meanSAEV
 TotNSAEVD TotNotLinkedSAEVD TotLinkedSAEVD PropLinkedSAEVD AdjNotLinkedWgtSAEVD
    WgtCoh_meanSAEVD
 TotNSAEVDR TotNotLinkedSAEVDR TotLinkedSAEVDR PropLinkedSAEVDR AdjNotLinkedWgtSAEVDR
    WgtCoh_meanSAEVDR
 sumdiff sumTot minLevuse;
if first.StrataSAE then do;
 TotNSAE=0; TotNotLinkedSAE=0; TotLinkedSAE=0;  sumdiff=0; sumTot=0; minLevuse='-';
end;
if first.StrataSAEV then do;
 TotNSAEV=0; TotNotLinkedSAEV=0; TotLinkedSAEV=0;
end;
if first.StrataSAEVD then do;
 TotNSAEVD=0; TotNotLinkedSAEVD=0; TotLinkedSAEVD=0;
end;
if first.StrataSAEVDR then do;
 TotNSAEVDR=0; TotNotLinkedSAEVDR=0; TotLinkedSAEVDR=0;
end;
if _type_ eq '1OOOO' and link eq . then TotNSAE=n;
else if _type_ eq '1OOO1' then do;
 if link eq 0 then TotNotLinkedSAE=n;
 else if link eq 1 then TotLinkedSAE=n;
 if last._type_ then do;
  if totlinkedSAE eq 0 then WgtCoh_meanSAE=0; else WgtCoh_meanSAE=WgtCohort_mean;
  PropLinkedSAE=TotLinkedSAE/TotNSAE;
  AdjNotLinkedWgtSAE=(totNSAE-totlinkedSAE*WgtCoh_meanSAE)/totnotlinkedSAE;
  if AdjNotLinkedWgtSAE eq . then AdjNotLinkedWgtSAE=1;
 end;
end;
if _type_ eq '11OOO' and link eq . then TotNSAEV=n;
else if _type_ eq '11OO1' then do;
 if link eq 0 then TotNotLinkedSAEV=n;
 else if link eq 1 then TotLinkedSAEV=n;
 if last._type_ then do;
  if totlinkedSAEV eq 0 then WgtCoh_meanSAEV=0; else WgtCoh_meanSAEV=WgtCohort_mean;
  PropLinkedSAEV=TotLinkedSAEV/TotNSAEV;
  AdjNotLinkedWgtSAEV=(totNSAEV-totlinkedSAEV*WgtCoh_meanSAEV)/totnotlinkedSAEV;
  if AdjNotLinkedWgtSAEV eq . then AdjNotLinkedWgtSAEV=1;
 end;
end;
if _type_ eq '111OO' and link eq . then TotNSAEVD=n;
else if _type_ eq '111O1' then do;
 if link eq 0 then TotNotLinkedSAEVD=n;
 else if link eq 1 then TotLinkedSAEVD=n;
 if last._type_ then do;
  if totlinkedSAE eq 0 then WgtCoh_meanSAEVD=0; else WgtCoh_meanSAEVD=WgtCohort_mean;
  PropLinkedSAEVD=TotLinkedSAEVD/TotNSAEVD;
```

```
  AdjNotLinkedWgtSAEVD=(totNSAEVD-totlinkedSAEVD*WgtCoh_meanSAEVD)/totnotlinkedSAEVD;
  if AdjNotLinkedWgtSAEVD eq . then AdjNotLinkedWgtSAEVD=1;
 end;
end;
if _type_ eq '1111O' and link eq . then TotNSAEVDR=n;
else if _type_ eq '11111' then do;
 if link eq 0 then TotNotLinkedSAEVDR=n;
 else if link eq 1 then TotLinkedSAEVDR=n;
 if last._type_ then do;
  if totlinkedSAE eq 0 then WgtCoh_meanSAEVDR=0; else WgtCoh_meanSAEVDR=WgtCohort_mean;
  PropLinkedSAEVDR=TotLinkedSAEVDR/TotNSAEVDR;
  AdjNotLinkedWgtSAEVDR=(totNSAEVDR-
totlinkedSAEVDR*WgtCoh_meanSAEVDR)/totnotlinkedSAEVDR;
  if AdjNotLinkedWgtSAEVDR eq . then AdjNotLinkedWgtSAEVDR=1;
  if AdjNotLinkedWgtSAEVDR ge 0.9 then do;
   LevUse='SAEVDR';AdjNotLinkedWgtUse=AdjNotLinkedWgtSAEVDR;
  end;
  else if AdjNotLinkedWgtSAEVD ge 0.9 then do;
   LevUse='SAEVD-';AdjNotLinkedWgtUse=AdjNotLinkedWgtSAEVD;
  end;
  else if AdjNotLinkedWgtSAEV ge 0.9 then do;
   LevUse='SAEV--';AdjNotLinkedWgtUse=AdjNotLinkedWgtSAEV;
  end;
  else if AdjNotLinkedWgtSAE ge 0.9 then do;
   LevUse='SAE---';AdjNotLinkedWgtUse=AdjNotLinkedWgtSAE;
  end;
  else do;
   LevUse='......';AdjNotLinkedWgtUse=AdjNotLinkedWgtSAE;
  end;
  sumtot+1;
  if LevUse ne 'SAEVDR' then do;
   sumdiff+1;
   if sumdiff eq 1 or LevUse lt minlevuse then minLevUse=LevUse;
  end;
  output sumstrata&year;
 end;
end;
if last.StrataSAE and sumdiff gt 0 then output needalter;
run;

data sumstrata&year;
merge needalter(in=a) sumstrata&year;
by stratasae;
if a then do;
 if minLevUse eq 'SAEVD-' then AdjNotLinkedWgtUse=AdjNotLinkedWgtSAEVD;
 else if minLevUse eq 'SAEV--' then AdjNotLinkedWgtUse=AdjNotLinkedWgtSAEV;
 else if minLevUse eq 'SAE---' then AdjNotLinkedWgtUse=AdjNotLinkedWgtSAE;
 LevUse=minLevUse;
```

```
end;
run;

%mend;

%propstat(year=1981);
%propstat(year=1986);
%propstat(year=1991);
%propstat(year=1996);
%propstat(year=2001);

proc univariate data=sumstrata1981;
var AdjNotLinkedWgtUse;
histogram AdjNotLinkedWgtUse;
run;
proc univariate data=sumstrata1986;
var AdjNotLinkedWgtUse;
histogram AdjNotLinkedWgtUse;
run;
proc univariate data=sumstrata1991;
var AdjNotLinkedWgtUse;
histogram AdjNotLinkedWgtUse;
run;
proc univariate data=sumstrata1996;
var AdjNotLinkedWgtUse;
histogram AdjNotLinkedWgtUse;
run;
proc univariate data=sumstrata2001;
var AdjNotLinkedWgtUse;
histogram AdjNotLinkedWgtUse;
run;

%macro finalWgt(year=);

proc sort data=Cohstrata&year;
by StrataSAE StrataSAEV StrataSAEVD StrataSAEVDR;
run;

proc sort data=sumstrata&year;
by StrataSAE StrataSAEV StrataSAEVD StrataSAEVDR;
run;

data ctcohort.CohstrataInfo&year;
merge Cohstrata&year(in=a)
 sumstrata&year(in=b keep=StrataSAE StrataSAEV StrataSAEVD StrataSAEVDR LevUse
    AdjNotLinkedWgtUse);
by StrataSAE StrataSAEV StrataSAEVD StrataSAEVDR;
if not(a) then put 'NOTE: Combination not found on original '
```

```
  StrataSAE= StrataSAEV= StrataSAEVD= StrataSAEVDR=;
if wgtcohort ne . then W_AgEthAdj=wgtcohort;
 else W_AgEthAdj=AdjNotLinkedWgtUse;
run;

%mend;

%finalWgt(year=1981);
%finalWgt(year=1986);
%finalWgt(year=1991);
%finalWgt(year=1996);
%finalWgt(year=2001);

proc printto new file='Not for release\Contents.lst';run;
proc contents data=ctcohort._all_;run;
proc printto;run;

%macro tidydata(year=);

data ctcohort.CohstrataInfo&year(drop=adjnotlinkedwgtuse)
     ctcohort.CohFinalWgts&year(keep=id_cohort id_dwell
      levuse stratasaevdr w_agethadj bcstrata wgtcohort adjnotlinkedwgtuse);
set ctcohort.CohstrataInfo&year(drop=bc_a bc_a5 bc_dep bc_e bc_ru bc_s bc_ta bc_tim
 b_afin b_depfin b_efin b_rufin b_s b_ta1 b_ta2 b_ta3 b_ta4 b_tafin b_timfin
 stratasae stratasaev stratasaevd wgtstrata wgtstratatag wgtstratatagage);
label adjnotlinkedwgtuse='Weight for Not Linked records (majority) adjusting for those
linked [Intermediate Wgt]'
      levuse='Strata level to use for final weights'
      StrataSAEVDR='Strata on cohort for sex(S), age(A), eth(E), rurality(V), dep(D), TA
grouping(R)'
      W_AgEthAdj='Weight to use on Cohort to adjust for Linkage Bias [Final Wgt]'
      WgtCohort='Weight brought over from Bias of linked-not linked [Intermediate Wgt]'
;
run;

%mend;

%tidydata(year=1981);
%tidydata(year=1986);
%tidydata(year=1991);
%tidydata(year=1996);
%tidydata(year=2001);

%macro cohtabs(year=);

ods select none;
proc tabulate data=ctcohort.CohstrataInfo&year missing noseps out=CohTab&year;
class cenyear link absentflg sex age5 ethcenpr4 ethcensol4 g_dhb g_rc g_rha pertype usind
```

```
g_rur totasian totmaori totpacific totnonmpa
%if "&year" eq "1981" %then %do;
 g_rurality01 g_rurality81 g_ta g_ta81 h_dwgtpg h_type nzdep91 nzdep2001
%end;
%else %if "&year" eq "1986" %then %do;
 g_rurality01 g_rurality86 g_ta h_dwgnat nzdep91 nzdep2001
%end;
%else %if "&year" eq "1991" %then %do;
 g_rc91 g_rurality01 g_rurality91 g_ta g_ta91 nzdep91 nzdep2001
%end;
%else %if "&year" eq "1996" %then %do;
 g_rc96 g_rurality01 g_rurality96 g_ta g_ta96 nzdep96 nzdep2001
%end;
%else %if "&year" eq "2001" %then %do;
 g_rurality g_ta nzdep2001
%end;
;
var w_agethadj;
table cenyear*absentflg*(all sex)*(all age5),
ethcenpr4 ethcensol4 g_dhb g_rc g_rha pertype usind
g_rur totasian totmaori totpacific totnonmpa
%if "&year" eq "1981" %then %do;
 g_rurality01 g_rurality81 g_ta g_ta81 h_dwgtpg h_type nzdep91 nzdep2001
%end;
%else %if "&year" eq "1986" %then %do;
 g_rurality01 g_rurality86 g_ta h_dwgnat nzdep91 nzdep2001
%end;
%else %if "&year" eq "1991" %then %do;
 g_rc91 g_rurality01 g_rurality91 g_ta g_ta91 nzdep91 nzdep2001
%end;
%else %if "&year" eq "1996" %then %do;
 g_rc96 g_rurality01 g_rurality96 g_ta g_ta96 nzdep96 nzdep2001
%end;
%else %if "&year" eq "2001" %then %do;
 g_rurality g_ta nzdep2001
%end;
,
(all link)*(n sum*w_agethadj);
run;

ods select all;
%mend;

%cohtabs(year=1981);
%cohtabs(year=1986);
%cohtabs(year=1991);
%cohtabs(year=1996);
%cohtabs(year=2001);
```

```
%rndround(indat=CohTab1981,outdat=fexport.CohTab1981rr,nrnd=2,
 varlist=n w_agethadj_sum,nvarlist=nrr w_agethadj_sumrr,dropvars=n w_agethadj_sum);
%rndround(indat=CohTab1986,outdat=fexport.CohTab1986rr,nrnd=2,
 varlist=n w_agethadj_sum,nvarlist=nrr w_agethadj_sumrr,dropvars=n w_agethadj_sum);
%rndround(indat=CohTab1991,outdat=fexport.CohTab1991rr,nrnd=2,
 varlist=n w_agethadj_sum,nvarlist=nrr w_agethadj_sumrr,dropvars=n w_agethadj_sum);
%rndround(indat=CohTab1996,outdat=fexport.CohTab1996rr,nrnd=2,
 varlist=n w_agethadj_sum,nvarlist=nrr w_agethadj_sumrr,dropvars=n w_agethadj_sum);
%rndround(indat=CohTab2001,outdat=fexport.CohTab2001rr,nrnd=2,
 varlist=n w_agethadj_sum,nvarlist=nrr w_agethadj_sumrr,dropvars=n w_agethadj_sum);

%macro counteth(year=);
ods select none;
proc tabulate data=ctcohort.CohstrataInfo&year missing noseps out=CohEthTab&year;
where totmaori eq 9;
class cenyear ethcenpr4 ethcensol4 imp1ethcombismall imp2ethcombismall imp3ethcombismall
impethmaori1 impethmaori2 impethmaori3 impethPac1 impethPac2 impethPac3
impethasian1 impethasian2 impethasian3 impethnonMPA1 impethnonMPA1 impethnonMPA1;
table cenyear*(all ethcenpr4)*(all ethcensol4 imp1ethcombismall imp2ethcombismall
imp3ethcombismall
impethmaori1 impethmaori2 impethmaori3 impethPac1 impethPac2 impethPac3
impethasian1 impethasian2 impethasian3 impethnonMPA1 impethnonMPA1 impethnonMPA1
 imp1ethcombismall*imp2ethcombismall*imp3ethcombismall),n;
run;
ods select all;

%rndround(indat=CohEthTab&year,outdat=fexport.CohEthTab&year.rr,nrnd=1,
 varlist=n,nvarlist=nrr,dropvars=n);
%mend;
%counteth(year=1981);
%counteth(year=1986);
%counteth(year=1991);
%counteth(year=1996);
%counteth(year=2001);
```

Appendix 11. SAS Formats for Linkage and Unlock Weights Programmes

The following is the SAS programme in the Datalab (called UnlkRatioFmts.sas) that is called in the SAS programmes for producing the Linkage and the Unlock weights (CreateBiasWgtforCohortFinal.sas, BiasWgtonCohortAdjust.sas, UnlockRatiosCreate.sas and UnlockRatiosCreateDoRatio.sas)

```
/*Formats used by programs for creating or using Unlock Ratios, either one per person
  or one per cancer.
  Put into separate file so only need updating once. 23.7.2008
  Filename UnlkRatioFmts.sas  JA 23.7.2008*/

proc format;
invalue itsince
.=-9                -999 - -1=-1             0 -< 7=0              7 -<13=7
13-<19=13             19-<25=19              25-<31=25             31-<37=31
37-<43=37             43-<49=38              49-<55=49             55-<61=55
61- high=61;

value ftsince
-9='Missing'         -1='Dates -ve'          0=' 0- 6 mths'        7=' 7-12 mths'
13='13-18 mths'      19='19-24 mths'        25='25-30 mths'       31='31-36 mths'
37='37-42 mths'      38='43-48 mths'        49='49-54 mths'       55='55-60 mths'
61='61-high mths'    88='55-high mths';

invalue itsiny
.=-9               -999 - 12=0              13-24=13              25-36=25
37-48=37             49-high=49;

value ftsiny
-9='Missing'         -1='Dates incapable (-ve)'        0='-ve, 0-12 mths'
13='13-24 mths'      25='25-36 mths'                  37='37-48 mths'
49='49-high mths';

invalue itsing
.=-999              -999 -< 7=0             7 -<13=-7             13-<19=-13
19-<25=-19            25-<31=-25           31-<37=-31            37-<43=-37
43-high=-43;

value ftsing
-999='Missing'         0='Dates -ve, 0- 6 mths'         -7=' 7-12 mths'
-13='13-18 mths'     -19='19-24 mths'                  -25='25-30 mths'
-31='31-36 mths'     -37='37-42 mths'                  -43='43-high mths';

invalue idecgp
```

```
.,-9=-99     1-4=1     5-6=5      7-8=7     9-10=9;

value fdecgp
-99='Missing'         1,-1='Dep 1-4'        5,-5='Dep 5-6'         7,-7='Dep 7-8'
9,-9='Dep 9-10'       6,-6='Dec 1-6';

invalue irurgp
1=1                   2-3=2                 4,5,6=4                .,-9=-9;

value frurgp
1,-1='Main Urban'     2,-2='Other Urban'    4,-4='Rural'           3,-3='All Urban'
7,-7='NonUrbOrMiss'     -9='Missing';

invalue irurgpx
1=1         2=2         3=3      4,5,6=4      .,-9=-9;

value frurgpx
1,-1='Main Urban'            2,-2='Secondary Urban Area'       3,-3='Minor Urban Area'
4,-4,-40='Rural'           -9,-99='Missing'                     -10='All Urban'
7,-7,-70='NonUrban or Missing';

invalue idecqu
.,-9,-99=-99    1,2=1    3,4=3    5,6=5    7,8=7    9,10=9;

value fdecqu
-99='Missing'          1,-1='Dec 1-2'           3,-3='Dec 3-4'        5,-5='Dec 5-6'
7,-7='Dec 7-8'         9,-9='Dec 9-10'          2,-2='Dec 1-4'        6,-6='Dec 1-6';

value fagei5y  /*Is in CTmacro, just grouping upper ages*/
.='Missing'
 0=' 0- 4 yrs'     5=' 5- 9 yrs'     10='10-14 yrs'     15='15-19 yrs'    20='20-24 yrs'
25='25-29 yrs'    30='30-34 yrs'    35='35-39 yrs'     40='40-44 yrs'    45='45-49 yrs'
50='50-54 yrs'    55='55-59 yrs'    60='60-64 yrs'     65='65-69 yrs'    70='70-74 yrs'
75='75-79 yrs'    80='80-84 yrs'    85='85-89 yrs'     90='90-94 yrs'    95='>=95 years'
98='>=80 years';

invalue iageiTy
 .=.              0,5,10=0          15,20=15            25=25             30=30
35=35             40,45=40          50,55=50         60,65=60          70,75=70
80,85,90,95,98=80;

value fageiTy
.='Missing'        0=' 0-14 yrs'       15='15-24 yrs'       25='25-29 yrs'
30='30-34 yrs'    35='35-39 yrs'       40='40-49 yrs'       50='50-59 yrs'
60='60-69 yrs'    70='70-79 yrs'       80='>=80 years';

value iiAge  /*Age codes Based on fageiTy.*/
```

```
 .='Z'    0='A'   15='B'   25='C'   30='D'   35='E'   40='F'  50='G'   60='H'   70='I'
80='J';

value $fiAge  /*Age Codes Based on fageiTy.*/
'Z' .='Missing'     'A'=' 0-14 yrs'     'B'='15-24 yrs'     'C'='25-29 yrs'
'D'='30-34 yrs'     'E'='35-39 yrs'     'F'='40-49 yrs'     'G'='50-59 yrs'
'H'='60-69 yrs'     'I'='70-79 yrs'     'J'='>=80 years'    'K'='50-69 yrs';

value iiDep  /*NZDep Based on fdecgp.*/
-99='Z'    1,-1='C'    5,-5='D'    7,-7='E'    9,-9='F'    6,-6='G';

value iiMob  /*Area Mobility Based on fdecqu.*/
-99='Z'   1,-1='A'   3,-3='B'   5,-5='D'   7,-7='E'   9,-9='F'   2,-2='C'   6,-6='G';

value $fiQuin  /*NZDep and AU Mobility Quintile Based on fdecgp. and fdecqu.*/
'Z'='Missing'    'A'='Dec 1-2'    'B'='Dec 3-4'    'C'='Dec 1-4'    'D'='Dec 5-6'
'E'='Dec 7-8'    'F'='Dec 9-10'   'G'='Dec 1-6'    'H'='Dec 1-8'    'I'='Dec 5-8'
'J'='Dec 1-10'   'K'='Dec 1-6 & Miss'    'L'='Dec 1-8 & Miss';

value iitime  /*TimeSinceCen Based on ftsing.*/
-999='Z'     0='A'    -7='B'   -13='C'   -19='D'   -25='E'   -31='F'   -37='G'   -43='H';

value $fiTime  /*TimeSinceCen Based on ftsing.*/
'Z'='Missing'      'A'='Dates -ve, 0- 6 mths'     'B'=' 7-12 mths'    'C'='13-18 mths'
'D'='19-24 mths'   'E'='25-30 mths'               'F'='31-36 mths'    'G'='37-42 mths'
'H'='43-high mths'  'I'='Dates -ve, 0-12 mths';

value iiSex
 1='M'         2='F'       3='A'      .='Z'     other='?';

value $fiSex
 'M'='Males'          'F'='Females'        'A'='All Sex'
 'Z'='Miss Sex'       '?'='Not Assigned';

value iieth
0='-'    1,-1='M'    2,-2='P'   4,-4='A'    5,-5='N'    9,-9='Z';


value iiRur
1,-1='M'    2,-2='S'    3,-3='I'      4,-4,-40='R'   -9,-99='Z'   -10='U'   7,-7,-70='N';

value $fiRur
'M'='Main Urban'    'S'='Secondary Urban Area'   'I'='Minor Urban Area'    'R'='Rural'
'Z'='Missing'       'U'='All Urban'              'N'='NonUrban or Missing';

run;

proc format;
```

```
value $ftagps
   '01'='Far North'                  '02'='Whangarei'
   '03'='Kaipara'                    '04'='Rodney'
   '05'='North Shore'                '06'='Waitakere'
   '07'='Auckland'                   '08'='Manukau'
   '09'='Papakura'                   '10'='Franklin'
   '11'='Thames Coromandel'          '12'='Hauraki'
   '13'='Waikato'                    '15'='Matamata-Piako'
   '16'='Hamilton'                   '17'='Waipa'
   '18'='Otorohanga'                 '19'='South Waikato'
   '20'='Waitomo'                    '21'='Taupo'
   '22'='Western Bay of Plenty'      '23'='Tauranga'
   '24'='Rotorua'                    '25'='Whakatane'
   '26'='Kawerau'                    '27'='Opotiki'
   '28'='Gisborne'                   '29'='Wairoa'
   '30'='Hastings'                   '31'='Napier'
   '32'='Central Hawkes Bay'         '33'='New Plymouth'
   '34'='Stratford'                  '35'='South Taranaki'
   '36'='Ruapehu'                    '37'='Wanganui'
   '38'='Rangitikei'                 '39'='Manawatu'
   '40'='Palmerston North'           '41'='Tararua'
   '42'='Horowhenua'                 '43'='Kapiti Coast'
   '44'='Porirua'                    '45'='Upper Hutt'
   '46'='Lower Hutt'                 '47'='Wellington'
   '48'='Masterton'                  '49'='Carterton'
   '50'='South Wairarapa'            '51'='Tasman'
   '52'='Nelson'                     '53'='Marlborough'
   '54'='Kaikoura'                   '55'='Buller'
   '56'='Grey'                       '57'='Westland'
   '58'='Hurunui'                    '59'='Waimakariri'
   '60'='Christchurch'               '61'='Banks Peninsula'
   '62'='Selwyn'                     '63'='Ashburton'
   '64'='Timaru'                     '65'='Mackenzie'
   '66'='Waimate'                    '67'='Chatham Islands'
   '68'='Waitaki'                    '69'='Central Otago'
   '70'='Queenstown-Lakes'           '71'='Dunedin'
   '72'='Clutha'                     '73'='Southland'
   '74'='Gore'                       '75'='Invercargill'
   '90'='0.99 Prob'
   '87'='0.70 Prob'                  '85'='0.50 Prob'
   '83'='0.10 +ve Prob'              '82'='0.10 -ve Prob'
   '81'='0.05 +ve Prob'              '80'='0.05 -ve Prob'
   '79'='0.01 +ve Prob'              '78'='0.01 -ve Prob';

/*These TA values are for Bias Unlock significance. May be different for Bias Cohort*/
invalue i81tag
   33=90   34=90    35=87   36=87     38=90     41=90
   48=90   50=87    54=87   55=90     62=90     64=90
```

```
   65=87    69=90     71=90    74=87      75=90     999=90
    3=85     9=85     11=85    12=85      15=85      20=85
   26=85    29=85     31=85    32=85      37=85      39=85
   43=85    46=85     49=85    51=85      52=85      53=85
   56=85    58=85     59=85    63=85      66=85      67=85
   68=85    70=85     73=85
   21,19,4,44,5,28,42,10,17,8,7,6,1,47,30,2,60=78
   27,22,25,45,23,16,24=80       72=81       61,13,40=82;

invalue i86tag
    1=90    10=90     11=87    12=87     15=90       16=87
   19=87    21=90     26=90    31=87     32=87       36=87
   37=90    38=90     43=87    50=90     51=87       53=90
   56=87    58=87     59=90    62=87     63=87       68=90
   74=90    75=90    999=90
    2=85     3=85      6=85     7=85      9=85       13=85
   20=85    22=85     23=85    24=85     25=85       27=85
   28=85    29=85     34=85    35=85     39=85       40=85
   44=85    45=85     47=85    49=85     52=85       54=85
   55=85    57=85     60=85    64=85     65=85       66=85
   67=85    70=85       71,41,69=79         17,4,8=80
   33,46,48,73,72=81       42,5=82      30,61,18=83;

invalue i91tag
    3=90    12=87     15=87    18=90     27=87      29=87
   32=90    33=90     34=87    36=90     37=90      40=90
   41=90    45=90     46=87    49=87     56=90      58=90
   63=87    64=90     70=90    71=90     72=90      75=90
  999=90
    2=85    16=85     19=85    20=85     21=85      24=85
   26=85    28=85     30=85    31=85     35=85      38=85
   39=85    44=85     47=85    48=85     55=85      57=85
   59=85    60=85     61=85    65=85     66=85      67=85
   74=85     4,51,8,7,53,9,10,23,5,6=78    62,25,22,17,11,13,42,43,1=80
   73,50=81    54,68,52=82    69=83;

invalue i96tag
   12=87    13=87     15=87    16=90     19=87      20=90
   21=90    24=90     25=87    29=90     30=87      31=90
   32=87    33=90     39=90    40=90     45=87      47=87
   49=90    50=90     55=90    59=87     65=87      66=87
   67=90    68=87     69=90    71=90     75=90
    2=85     3=85     10=85    11=85     18=85      27=85
   35=85    36=85     37=85    41=85     44=85      46=85
   48=85    54=85     56=85    57=85     58=85      60=85
   61=85    62=85     63=85    64=85     70=85      72=85
   74=85     4,43,42,8,5=78      51,1,52,9,6,28,7=80
   73,26=81      17,53,22,23=82      38,34=83;
```

```
invalue i01tag
   10=87   11=90    12=87   13=87    15=90     16=87
   19=87   25=90    26=90   32=87    34=87     35=87
   37=90   41=90    44=90   45=87    46=87     47=87
   49=90   56=90    57=90   59=87    60=90     61=87
   63=87   68=87    71=87   73=87    75=90
    3=85    6=85    20=85   23=85    24=85     27=85
   28=85   29=85    30=85   31=85    33=85     38=85
   40=85   42=85    43=85   48=85    50=85     54=85
   62=85   64=85    65=85   66=85    69=85     74=85
   55,1,4,53,5,7=78     67=79   18,36,58,51,17,9,22,2,52,21,8=80
   70,72,39=82;

/*Following at TA significance groupings for Bias Cohort*/
invalue i81tac
1=80    2=80    3=90    4=78    5=87    6=80    7=87
8=90    9=90    10=78   11=78   12=90   13=80   15=83
16=78   17=78   18=90   19=82   20=85   21=78   22=78
23=87   24=78   25=78   26=85   27=85   28=85   29=90
30=82   31=78   32=85   33=85   34=85   35=85   36=78
37=78   38=87   39=85   40=90   41=87   42=90   43=78
44=85   45=82   46=90   47=82   48=82   49=87   50=90
51=85   52=90   53=85   54=85   55=85   56=85   57=85
58=78   59=85   60=85   61=85   62=78   63=85   64=85
65=87   66=90   67=79   68=82   69=90   70=85   71=85
72=85   73=82   74=78   75=90   999=90;

invalue i86tac
1=80    2=85    3=85    4=78    5=87    6=85    7=81
8=79    9=79    10=85   11=87   12=85   13=85   15=79
16=85   17=80   18=85   19=82   20=90   21=85   22=82
23=87   24=80   25=87   26=83   27=85   28=90   29=85
30=85   31=83   32=81   33=87   34=83   35=85   36=90
37=85   38=85   39=85   40=81   41=79   42=90   43=87
44=85   45=85   46=79   47=85   48=80   49=85   50=82
51=81   52=79   53=87   54=85   55=87   56=90   57=83
58=90   59=87   60=83   61=85   62=85   63=85   64=90
65=87   66=85   67=79   68=85   69=83   70=82   71=79
72=79   73=85   74=87   75=90   999=90;

invalue i91tac
1=78    2=80    3=87    4=78    5=82    6=80    7=85
8=85    9=85    10=82   11=78   12=90   13=78   15=85
16=80   17=80   18=87   19=85   20=85   21=80   22=78
23=78   24=85   25=85   26=83   27=85   28=85   29=85
30=85   31=82   32=90   33=85   34=85   35=82   36=85
37=78   38=85   39=78   40=85   41=85   42=80   43=80
```

```
44=90   45=87   46=90   47=85   48=90   49=85   50=87
51=90   52=80   53=78   54=85   55=82   56=82   57=85
58=80   59=78   60=85   61=85   62=78   63=85   64=85
65=85   66=87   67=79   68=87   69=85   70=85   71=85
72=87   73=90   74=85   75=90   999=90;

invalue i96tac
1=80    2=80    3=87    4=78    5=80    6=82    7=85
8=85    9=85    10=82   11=85   12=80   13=78   15=83
16=80   17=78   18=90   19=90   20=85   21=80   22=85
23=85   24=85   25=85   26=85   27=90   28=83   29=79
30=87   31=90   32=85   33=90   34=90   35=87   36=85
37=85   38=81   39=85   40=87   41=87   42=85   43=80
44=85   45=90   46=85   47=85   48=85   49=83   50=81
51=87   52=87   53=85   54=90   55=90   56=90   57=85
58=85   59=80   60=85   61=85   62=87   63=85   64=81
65=85   66=81   67=79   68=90   69=85   70=78   71=87
72=90   73=85   74=87   75=90;

invalue i01tac
1=78    2=78    3=87    4=78    5=78    6=85    7=78
8=85    9=82    10=82   11=90   12=85   13=85   15=85
16=85   17=78   18=78   19=90   20=80   21=78   22=80
23=80   24=85   25=85   26=90   27=85   28=90   29=85
30=90   31=87   32=90   33=80   34=90   35=82   36=87
37=90   38=85   39=80   40=85   41=90   42=85   43=90
44=90   45=90   46=87   47=90   48=87   49=87   50=85
51=85   52=85   53=78   54=85   55=80   56=85   57=90
58=80   59=85   60=90   61=90   62=85   63=90   64=87
65=85   66=85   67=79   68=80   69=87   70=80   71=90
72=85   73=82   74=80   75=90;

run;


/*New version of strata creation, hopefully automated*/

proc format;

value iA1L  /*Age codes Level 1*/
 .='Z'   0='G'  15='H'  25='I'  30='L'  35='M'  40='N'  50='R'  60='S'  70='U'  80='V';

invalue $iA2L /*Age Level 1 grouped into Level 2*/
'A'='A'
 'C'='C'
  'E'='E'
   'F','G','H'='F'
   'I'='I'
```

```
  'J'='J'
   'K','L','M'='K'
   'N'='N'
 'P'='P'
  'Q'='Q'
   'R'='R'
   'S'='S'
  'T'='T'
   'U'='U'
   'V'='V'
 'Z'='Z';

invalue $iA3L /*Age Level 1 or 2 grouped into Level 3*/
'A'='A'
 'C'='C'
  'E','F','G','H','I'='E'
  'J','K','L','M','N'='J'
 'P'='P'
  'Q','R','S'='Q'
  'T','U','V'='T'
 'Z'='Z';

invalue $iA4L /*Age Level 1 or 2 or 3 grouped into Level 4*/
'A'='A'
 'C','E','F','G','H','I','J','K','L','M','N'='C'
 'P','Q','R','S','T','U','V'='P'
 'Z'='Z';

value $flAge  /*Age Codes showing all levels*/
'A'='All Ages'
 'C'=' 0-49 yrs'          /*Level 4*/
  'E'=' 0-29 yrs'          /*Level 3*/
   'F'=' 0-24 yrs'          /*Level 2*/
    'G'=' 0-14 yrs'          /*Level 1*/
    'H'='15-24 yrs'          /*Level 1*/
   'I'='25-29 yrs'          /*Level 1&2*/
  'J'='30-49 yrs'          /*Level 3*/
   'K'='30-39 yrs'          /*Level 2*/
    'L'='30-34 yrs'          /*Level 1*/
    'M'='35-39 yrs'          /*Level 1*/
   'N'='40-49 yrs'          /*Level 1&2*/
 'P'='>=50 years'         /*Level 4*/
  'Q'='50-69 yrs'          /*Level 2&3*/
    'R'='50-59 yrs'          /*Level 1&2*/
    'S'='60-69 yrs'          /*Level 1&2*/
  'T'='>=70 years'         /*Level 2&3*/
    'U'='70-79 yrs'          /*Level 1&2*/
    'V'='>=80 years'         /*Level 1&2*/
```

```
 'Z'='Missing'            /*Level 1&2&3&4*/;

value iTA1L  /*TA groupings into level 1*/
.='D'
low - 0.01='N'
0.01 <- 0.05='K'
0.05 <- 0.10='G'
0.10 <- 0.50='F'
0.50 <- 0.70='E'
0.70 <- high='D';

invalue $ita2L /*TA groupings Level 1 grouped into Level 2*/
'A'='A'
 'B'='B'
  'C'='C'
  'D'='D'
  'E'='E'
  'F'='F'
  'G','H','I'='G'
 'J'='J'
  'K','L','M'='K'
  'N','O','P'='N'
'Z'='Z'
'X'='X';

invalue $ita3L /*TA groupings Level 1 or 2 grouped into Level 3*/
'A'='A'
 'B'='B'
  'C','D','E','F','X'='C'
  'G','H','I'='G'
 'J'='J'
  'K','L','M'='K'
  'N','O','P'='N'
'Z'='Z';

invalue $ita4L /*TA groupings Level 1 or 2 or 3 grouped into Level 4*/
'A'='A'
 'B','C','D','E','F','G','H','I','X'='B'
 'J','K','L','M','N','O','P'='J'
'Z'='Z';

value $flTA  /*TA groupings showing all levels*/
'A'='All TA'
 'B'='N.S. & 0.10'
   'C'='N.S.'
   'D'='0.99 Prob'
   'E'='0.70 Prob'
   'F'='0.50 Prob'
```

```
   'G'='0.10 Prob'
    'H'='0.10 +ve Prob'
    'I'='0.10 -ve Prob'
 'J'='0.01 or 0.05 Prob'
   'K'='0.05 Prob'
    'L'='0.05 +ve Prob'
    'M'='0.05 -ve Prob'
   'N'='0.01 Prob'
    'O'='0.01 +ve Prob'
    'P'='0.01 -ve Prob'
 'Z'='Missing'
 'X'='0.70 & 0.99 Prob' /*Manual grouping*/
 'W'='0.99 Prob & Missing' /*Manual grouping*/;

value iT1L  /*TimeSinceCen codes level 1*/
  0='G'    -7='H'   -13='L'   -19='M'   -25='S'   -31='T'
-37='X'   -43='Y'  -999='Z';

invalue $iT2L /*TimeSinceCen groupings Level 1 grouped into Level 2*/
'A'='A'
 'C'='C'
  'E','G','H'='E'
  'J','L','M'='J'
 'O'='O'
  'Q','S','T'='Q'
  'V','X','Y'='V'
 'Z'='Z';

invalue $iT3L /*TimeSinceCen groupings Level 1 or 2 grouped into Level 3*/
'A'='A'
 'C','E','G','H','J','L','M'='C'
 'O','Q','S','T','V','X','Y'='O'
 'Z'='Z';

value $fLTime  /*TimeSinceCen groupings showing all levels*/
'A'='All Times'
 'C'='Dates -ve, 0-24 mths'
  'E'='Dates -ve, 0-12 mths'
   'G'='Dates -ve, 0- 6 mths'
   'H'=' 7-12 mths'
  'J'='13-24 mths'
   'L'='13-18 mths'
   'M'='19-24 mths'
 'O'='25-high mths'
  'Q'='25-36 mths'
   'S'='25-30 mths'
   'T'='31-36 mths'
  'V'='37-high mths'
```

```
   'X'='37-42 mths'
   'Y'='43-high mths'
 'Z'='Missing';

value iieth
0='-'   1,-1='C'   2,-2='G'   4,-4='K'   5,-5='Q'   9,-9='O';

invalue $iE2L /*Ethnicity groupings Level 1 grouped into Level 2*/
'A'='A'
 'C'='C'
 'E'='E'
  'G'='G'
  'I'='I'
   'K'='K'
   'M','O','Q'='M';

invalue $iE3L /*Ethnicity groupings Level 1 or 2 grouped into Level 3*/
'A'='A'
 'C'='C'
 'E'='E'
  'G'='G'
  'I','K','M','O','Q'='I';

invalue $iE4L /*Ethnicity groupings Level 1 or 2 or 3 grouped into Level 4*/
'A'='A'
 'C'='C'
 'E','G','I','K','M','O','Q'='E';

value $fLEth  /*Ethnicity groupings showing all levels*/
'A'='All Ethnicities'
 'B'='Maori or Pacific or Asian'
 'C'='Maori'
 'D'='Maori or Pacific'
 'H'='Maori or Asian'
 'E'='Non-Maori'
 'F'='Pacific or Asian'
  'G'='Pacific'
  'I'='NonMaoriNonPacific'
   'K'='Asian'
   'M'='NonMaoriNonPacificNonAsian'
    'O'='Missing Ethnicity'
    'Q'='NonMaoriNonPacificNonAsianNonMissing';

value iMob1L  /*Area Mobility codes level 1*/
-99='E'
2,-2='K'
5,-5='M'
6,-6='G'
```

```
7,-7='O'
9,-9='Q';

invalue $iMob2L  /*AU Mobility groupings Level 1 grouped into Level 2*/
'A'='A'
 'C'='C'
  'E'='E'
  'G'='G'
   'I','K','M'='I'
   'O'='O'
 'Q'='Q';

invalue $iMob3L  /*AU Mobility groupings Level 1 or 2 grouped into Level 3*/
'A'='A'
 'C'='C'
  'E'='E'
  'G','I','K','M','O'='G'
 'Q'='Q';

invalue $iMob4L  /*AU Mobility groupings Level 1 or 2 or 3 grouped into Level 4*/
'A'='A'
 'C','E','G','I','K','M','O'='C'
 'Q'='Q';

value $fLMob  /*AU Mobility groupings showing all levels*/
'A'='All AU Mobs'
 'C'='Dec 1-8 & Miss'
  'E'='Missing Mob'
  'G'='Dec 1-8'
   'I'='Dec 1-6'
    'K'='Dec 1-4'
    'M'='Dec 5-6'
   'O'='Dec 7-8'
 'Q'='Dec 9-10';

value iDep1L  /*NZDep codes level 1*/
-99='C'    6,-6='I'    7,-7='K'    9,-9='M';

invalue $iDep2L  /*NZDep groupings Level 1 grouped into Level 2 (for unlock)*/
'A'='A'
 'C'='C'
 'E'='E'
  'G','I','K'='G'
  'M'='M';

invalue $iDep3L  /*NZDep groupings Level 1 or 2 grouped into Level 3 (for unlock)*/
'A'='A'
 'C'='C'
```

```
 'E','G','I','K','M'='E';

value $fLDep  /*NZDep groupings showing all levels (for unlock)*/
'A'='All Deps'
 'C'='Missing Dep'
 'E'='Dec 1-10'
  'G'='Dec 1-8'
   'I'='Dec 1-6'
   'K'='Dec 7-8'
  'M'='Dec 9-10';

invalue $iDep2C  /*NZDep groupings Level 1 grouped into Level 2 (for cohort)*/
'A'='A'
  'C','H','I'='H'
 'J'='J'
  'K'='K'
  'M'='M'
 'E'='E'
 'G'='G';

invalue $iDep3C  /*NZDep groupings Level 1 or 2 grouped into Level 3 (for cohort)*/
'A'='A'
 'C','H','I'='H'
 'J','K','M'='J'
 'E'='E'
 'G'='G';

value $fLDepC  /*NZDep groupings showing all levels (for cohort)*/
'A'='All Deps'
  'H'='Dec 1-6&Miss'
   'I'='Dec 1-6'
   'C'='Missing Dep'
 'J'='Dec 7-10'
  'K'='Dec 7-8'
  'M'='Dec 9-10'
 'E'='Dec 1-10' /*old*/
 'G'='Dec 1-8' /*old*/;

invalue itacode
 'Far North       '=01       'Whangarei       '=02
 'Kaipara         '=03       'Rodney          '=04
 'North Shore     '=05       'Waitakere       '=06
 'Auckland        '=07       'Manukau         '=08
 'Papakura        '=09       'Franklin        '=10
 'Thames Coromande'=11       'Hauraki         '=12
 'Waikato         '=13       'Matamata-Piako  '=15
 'Hamilton        '=16       'Waipa           '=17
 'Otorohanga      '=18       'South Waikato   '=19
```

```
 'Waitomo          '=20       'Taupo            '=21
 'Western Bay of P'=22       'Tauranga         '=23
 'Rotorua          '=24       'Whakatane        '=25
 'Kawerau          '=26       'Opotiki          '=27
 'Gisborne         '=28       'Wairoa           '=29
 'Hastings         '=30       'Napier           '=31
 'Central Hawkes B'=32       'New Plymouth     '=33
 'Stratford        '=34       'South Taranaki   '=35
 'Ruapehu          '=36       'Wanganui         '=37
 'Rangitikei       '=38       'Manawatu         '=39
 'Palmerston North'=40       'Tararua          '=41
 'Horowhenua       '=42       'Kapiti Coast     '=43
 'Porirua          '=44       'Upper Hutt       '=45
 'Lower Hutt       '=46       'Wellington       '=47
 'Masterton        '=48       'Carterton        '=49
 'South Wairarapa  '=50       'Tasman           '=51
 'Nelson           '=52       'Marlborough      '=53
 'Kaikoura         '=54       'Buller           '=55
 'Grey             '=56       'Westland         '=57
 'Hurunui          '=58       'Waimakariri      '=59
 'Christchurch     '=60       'Banks Peninsula  '=61
 'Selwyn           '=62       'Ashburton        '=63
 'Timaru           '=64       'Mackenzie        '=65
 'Waimate          '=66       'Chatham Islands  '=67
 'Waitaki          '=68       'Central Otago    '=69
 'Queenstown-Lakes'=70       'Dunedin          '=71
 'Clutha           '=72       'Southland        '=73
 'Gore             '=74       'Invercargill     '=75
 other=-999;

value iRur1L  /*Rurality codes level 1*/
-10='C'    1,-1='E'    2,-2='I'    3,-3='K'    7,-7,-70='M'   4,-4,-40='O'   -9,-99='Q';

invalue $iRur2L  /*Rurality groupings Level 1 grouped into Level 2*/
'A'='A'
 'C'='C'
  'E'='E'
  'G'='G'
   'I'='I'
   'K'='K'
   'O','Q'='M';

invalue $iRur3L  /*Rurality groupings Level 1 or 2 grouped into Level 3*/
'A'='A'
 'C'='C'
  'E'='E'
  'G','I','K'='G'
  'M','O','Q'='M';
```

```
invalue $iRur4L  /*Rurality groupings Level 1 or 2 or 3 grouped into Level 4*/
'A'='A'
 'C','E','G','I','K'='C'
 'M','O','Q'='M';

value $fLRur  /*Rurality groupings showing all levels*/
'A'='All Rurality'
 'C'='All Urban'
  'E'='Main Urban'
  'G'='Sec&Min Urban'
   'I'='Secondary Urban Area'
   'K'='Minor Urban Area'
  'M'='NonUrban or Missing'
   'O'='Rural'
   'Q'='Missing';

run;

/*Create Ethnicity Variables for census and various Cancer variables*/
/*This group has new formats for 16.7.2008 as indicated below*/
proc format;
value fDetEth
2   ='Maori'                              21  ='Maori'
3   ='Pacific'                            30  ='Pacific (nfd)'
31  ='Samoan'                             32  ='Cook Is Maori'
33  ='Tongan'                             34  ='Nuiean'
35  ='Tokelauan'                          36  ='Fijian (except Fiji Indian/Indo-Fijian)'
37  ='Fijian (nfd)'                       39  ='Other Pacific'
4   ='Asian'                              40  ='Asian (nfd)'
42  ='Chinese'                            43  ='Indian'
49  ='Other Asian'                        5   ='European/Others'
50  ='Others'                             51  ='NZ European'
53  ='European (Caucasian)'               54  ='New Zealander'
58  ='Other European'             70  ='MELAA' /*Middle Eastern/Latin American/African*/
80  ='Mixed Ethnicity'                    96  ='Repeated Value'
97  ='Response Unidentifiable'            98  ='Response Outside Scope'
.,99    ='Missing';

value f4eth
    1='Mäori'               2='Pacific People'      3='NonMäoriNonPac'      4='Asian'
    5='NonMäoriNonPacNonAs' 6='Non-Mäori'           7='Non-Pacific'       .,9='Missing'
    8='Remainder'           0='Not that ethnicity';

value feeth
    1='NZ Mäori'     2='Pacific'               3='nonMP'            4='Asian'
    5='nonMPA'       6='NZ European/Pakeha'    0='Not that ethnicity'    .,9='Missing';
```

```
value ftoteth
  .,9='Missing'                      0='Not Relevant'        1='Total NZ Mäori'
    2='Total Pacific'                3='nonMP'               4='Total Asian'
    5='nonMPA (European/Other)'     11='nonM (but P or A)'  12='nonP (but M or A)'
   14='nonA (but M or P)'           21='non Mäori'          22='non Pacific'
   23='M or P'                      24='non Asian'          25='M or P or A'
   31='non Mäori&Miss'              32='non Pacific&Miss'   33='NonMP&Miss'
   34='non Asian&Miss'              35='nonMPA&Miss'
   46='Tot Euro/Othr' /*46 added 16.7.2008*/
   80='Mixed Ethnicity'              91='Need to Investigate';

invalue iethgp
2,21=1                          3,30,31,32,33,34,35,36,37,39=2          4,40,42,43,49=4
5,50,51,53,54,58,70=5           99=9   80=80   96=96   97=97   98=98;

/*Larger Age groupings required*/
/*Input in Years*/
invalue iageia
.=.      0 -< 25=24    25 -< 45=2544     45 -< 65=4564   65 - high=6599;

invalue iageib
.=.      0 -< 15=14     15 -< 25=1524    25 -< 35=2534    35 -< 45=3544
45 -< 55=4554     55 -< 65=5564     65 -< 75=6574    75 - high=7599;

invalue iageic
.=.     0 -< 60=59    60 -< 75=6074    75 -< 85=7584    85 - high=8599;

/*Input in Months*/
invalue iagema
.=.      0 -< 300=24    300 -< 540=2544    540 -< 780=4564    780 - high=6599;

invalue iagemb
.=.      0 -< 180=14    180 -< 300=1524    300 -< 420=2534    420 -< 540=3544
540 -< 660=4554    660 -< 780=5564    780 -< 900=6574    900 - high=7599;

invalue iagemc
.=.       0 -<  720=59     720 -<  900=6074     900 -< 1020=7584    1020 -  high=8599;

value fagei
   .='Missing'      14=' 0-14 yrs'    24=' 0-24 yrs'     59=' 0-59 yrs'  1524='15-24 yrs'
2544='25-44 yrs'  4564='45-64 yrs'  2534='25-34 yrs'   3544='35-44 yrs'  4554='45-54 yrs'
5564='55-64 yrs'  6574='65-74 yrs'  6074='60-74 yrs'   7584='75-84 yrs'  6599='>=65 yrs'
7599='>=75 yrs'    8599='>=85 yrs';

/*Combining DHBs into Regional Cancer Networks (two versions) 16.7.2008*/
invalue ircna
1,2,3,4=890    5,6,7=892    8,9,10,11,12,13,14,15=894    16,17,18,19,20,21=896   99=898;
```

```
invalue ircnb
1,2,3,4=891    5,6,7,8,9=893   10,11,12,13,14,15=895    16,17,18,19,20,21=897    99=899;

value frcnab
890,891='Northern'         892='Midland a (noT&T)'      893='Midland b (+T&T)'
894='MidCentral a (+T&T)'  895='MidCentral b (noT&T)'   896,897='Southern'
898,899='Area outside Regional Cancer Network';

run;

proc format;
/*  VARIABLE: LinkStat  DESCRIPTION: Linkage Status (Detailed)
     YEAR(S):  1981,1986,1991,1996,2001 */
value $fLkStA
 'MB'='Linked on MB'
 'MBHigh'='Linked on MB, Weight >= Cutoff'
 'MBMedW'='Linked on MB, Weight >= UppLook, <Cutoff'
 'MBLowW'='Linked on MB, Weight < UppLook'
 'AU'='Linked on AU'
 'AUHigh'='Linked on AU, Weight >= Cutoff'
 'AUMedW'='Linked on AU, Weight >= UppLook, <Cutoff'
 'AULowW'='Linked on AU, Weight < UppLook'
 ' '='Missing';

run;
```

Renaming formats in file only required at WSM to put data together, therefore not included here.

Appendix 12. SAS Programme to Create the Unlock Weights

The following is the SAS programme in the Datalab (called CreateUnlockWgtonBiasFinal.sas written 1st May 2008) that produces the Unlock weights on the Bias dataset. These weights are then transferred to the Unlock datasets and the next two SAS programmes (see Appendix 13 and Appendix 14) use these weights to produce the Unlock Ratios.

```
/*Create Unlock weights on Bias datasets for CancerTrends
  CreateUnlockWgtonBias.sas June Atkinson 22.4.2008*/
/*Updated 24.4.2008*/
/*Finalised 1.5.2008*/

%include "p:\sasprogs\general\CTmacros.sas";
%persess(action=ABR,censusyr=AllYears);

libname chked04 'P:\Checked\2008 04';  /*This is the directory with the datasets of
   results from the regressions*/

libname fortrans 'P:\Checking\June\Transfer';

options nocenter linesize=105 pageno=1;

%include 'P:\sasprogs\june\UnlkRatioFmts.sas';

/*Have done some regressions looking at the relationship between timesincecen
  where it is not the same between unlock and bias.
  We assume Unlock is correct therefore we will create a pseudoUnlocktime where
necessary*/

%let year=1981;
data bias&year;
set ctbias.bias&year;
if unlockflag eq 1 then pseudounlockTime=unlocktimesincecen;
else if unlockflag eq 0 then pseudounlockTime=(biastimesincecen+5.8280)/0.9767;
run;
%let year=1986;
data bias&year;
set ctbias.bias&year;
if unlockflag eq 1 then pseudounlockTime=unlocktimesincecen;
else if unlockflag eq 0 then pseudounlockTime=(biastimesincecen+2.6478)/0.9888;
run;
%let year=1991;
data bias&year;
set ctbias.bias&year;
```

```
if unlockflag eq 1 then pseudounlockTime=unlocktimesincecen;
else if unlockflag eq 0 then pseudounlockTime=(biastimesincecen+0.9042)/0.9814;
run;
%let year=1996;
data bias&year;
set ctbias.bias&year;
if unlockflag eq 1 then pseudounlockTime=unlocktimesincecen;
else if unlockflag eq 0 then pseudounlockTime=(biastimesincecen+6.1442)/1.0534;
run;
%let year=2001;
data bias&year;
set ctbias.bias&year;
if unlockflag eq 1 then pseudounlockTime=unlocktimesincecen;
else if unlockflag eq 0 then pseudounlockTime=(biastimesincecen+5.9278)/1.1321;
run;

%macro Option1(year=,action=ABC);

%let action=%upcase(&action);

%if %index(&action,A) ne 0 %then %do;

data bias&year;
set bias&year%if "&year" eq "2001" %then %do;
(rename=(g_rurality=G_Rurality01))
%end;
;
length Age5Yrs 3 ;
format Age5Yrs fagei5y.;
label age5yrs='Age at Census in 5 yearly groups';
age5yrs=input(agec_mths,iagem5y.);
timeSinceCenGp=input(pseudounlockTime,itsing.);
if link eq . then link=-9;
if trim(left(linkstat)) in ('',' ') then linkstat='-';
if trim(left(icd1group)) in ('',' ') then icd1group='-';
if trim(left(icd2group)) in ('',' ') then icd2group='-';
if trim(left(icd3group)) in ('',' ') then icd3group='-';
if trim(left(icd4group)) in ('',' ') then icd4group='-';
if g_rha in (.,9) or g_rha gt 10 then g_rha=-9;
if aumobilitygrp10 eq . then aumobilitygrp10=-9;
if g_rurality01 eq . then g_rurality01=-9;
if nzdep2001 eq . then nzdep2001=-9;
NZDep2001Grp=input(nzdep2001,idecgp.);
if NZDep2001Grp in (-9,-99) then NZDep2001Grp=-99; else NZDep2001Grp=NZDep2001Grp*-1;
G_Rur01Grp=input(g_rurality01,irurgpx.);
if G_Rur01Grp ne -9 then G_Rur01Grp=G_Rur01Grp*-1;
AuMob01Grp=input(aumobilitygrp10,idecqu.);
if AuMob01Grp in (-9,-99) then AuMob01Grp=-99; else AuMob01Grp=AuMob01Grp*-1;
```

```
MBAU=substr(linkstat||' ',1,2);
AsianC1=AsianC1*-1;  MaoriC1=MaoriC1*-1;     PacificC1=PacificC1*-1;  nonMPAC1=nonMPAC1*-
1;
if age5yrs ge 80 then age5yrs=98;
Age10yrs=input(age5yrs,iageity.);
if g_rur01grp in (-3,-2,-1) then g_rur2=-1;
else if g_rur01grp in (-4) then g_rur2=-4;
else g_rur2=-9;
if g_rur2 eq -1 then g_rur1=-1; else g_rur1=-99;
if g_ta in (612864,613888) then g_ta=999;
if g_rc in (612864,613888) then g_rc=99;
if g_dhb in (612864,613888) then g_dhb=99;
if g_ahd in (612864,613888) then g_ahd=99;
if g_ahb in (612864,613888) then g_ahb=99;
if g_ta eq 999 then g_ta=-999;
if g_rc eq 99 then g_rc=-99;
if g_dhb eq 99 then g_dhb=-99;
if g_ahb eq 99 then g_ahb=-99;
if g_ahd eq 99 then g_ahd=-99;
if nzdep2001grp in (-1,-2,-3,-4,-5,-6) then NZDep3=-6; else NZDep3=nzdep2001grp;
if aumob01grp in (-1,-3) then AuMobGrp4=-2; else AuMobGrp4=aumob01grp;
format linkstat ICD1Group ICD2Group ICD3Group  ICD4Group;
format timesincecengp ftsing. NZDep2001Grp NZDep3 fdecgp. G_Rur01Grp frurgpx.
 AuMob01Grp aumobgrp4 fdecqu. age10yrs fageity.;
run;

%end;

%if %index(&action,B) ne 0 %then %do;

title "Freqs for &year";

proc freq data=bias&year;
tables  CenYear            Link               MBAU         Sex
age10yrs TimeSinceCengp
 AsianC1  MaoriC1     PacificC1  nonMPAC1
 /*CtryPresFlag ICD1Group ICD2Group ICD3Group  ICD4Group */
 G_RHA AUMob01Grp G_Rur01Grp NZDep2001Grp;
run;

%end;

%if %index(&action,C) ne 0 %then %do;

options nocenter linesize=135 pageno=1;
proc printto new file="LogRegBias&year..out";run;

title "Using Bias dataset with Unlockflag Regressions no Interactions  for &year";
```

```
    ods output modelinfo         =miA&year;
    ods output convergencestatus =csA&year;
    ods output parameterestimates=peA&year;
    ods output modelfit          =mfA&year;
    ods output type1             =t1A&year;
    ods output type3             =t3A&year;

proc genmod data=bias&year order=internal descending;
class  CenYear     Sex  age10yrs
   MaoriC1     PacificC1 AsianC1  nonMPAC1 aumobgrp4  timesincecengp
    g_ta nzdep3 ;
model unlockflag=CenYear  Sex  age10yrs
   MaoriC1     PacificC1 AsianC1  nonMPAC1  aumobgrp4  timesincecengp
  g_ta nzdep3
/dist=b link=logit type1 type3 wald;
run;

proc printto;run;

options nocenter linesize=105 pageno=1;

title ' ';

%end;

%mend;

%Option1(year=1981);
%Option1(year=1986);
%Option1(year=1991);
%Option1(year=1996);
%Option1(year=2001);

data Type1All;
set t1a1981(in=a) t1a1986(in=b) t1a1991(in=c) t1a1996(in=d) t1a2001(in=e);
Length Cenyear 4 Mod 3;
if a then cenyear=1981;
 else if b then cenyear=1986;
 else if c then cenyear=1991;
 else if d then cenyear=1996;
 else if e then cenyear=2001;
if a or b or c or d or e then Mod=1;
if probchisq eq . then Sig=.;
else if probchisq le 0.01 then Sig=0.01;
else if probchisq le 0.05 then Sig=0.05;
else if probchisq le 0.10 then Sig=0.10;
else if probchisq le 0.50 then Sig=0.50;
```

```
else if probchisq le 0.70 then Sig=0.70;
else if probchisq gt 0.70 then Sig=0.99;
run;

data Type3All;
set t3a1981(in=a) t3a1986(in=b) t3a1991(in=c) t3a1996(in=d) t3a2001(in=e);
Length Cenyear 4 Mod 3;
if a then cenyear=1981;
 else if b then cenyear=1986;
 else if c then cenyear=1991;
 else if d then cenyear=1996;
 else if e then cenyear=2001;
if a or b or c or d or e then Mod=1;
if probchisq eq . then Sig=.;
else if probchisq le 0.01 then Sig=0.01;
else if probchisq le 0.05 then Sig=0.05;
else if probchisq le 0.10 then Sig=0.10;
else if probchisq le 0.50 then Sig=0.50;
else if probchisq le 0.70 then Sig=0.70;
else if probchisq gt 0.70 then Sig=0.99;
run;


data fexport.typeall;
set type1all(in=a) type3all(in=b);
if a then ty='Type1'; else if b then ty='Type3';
run;

data fexport.MFAll;
set mfa1981(in=a) mfa1986(in=b) mfa1991(in=c) mfa1996(in=d) mfa2001(in=e);
Length Cenyear 4 Mod 3;
if a then cenyear=1981;
 else if b then cenyear=1986;
 else if c then cenyear=1991;
 else if d then cenyear=1996;
 else if e then cenyear=2001;
if a or b or c or d or e then Mod=1;
run;

data fexport.PEAll;
set pea1981(in=a) pea1986(in=b) pea1991(in=c) pea1996(in=d) pea2001(in=e);
Length Cenyear 4 Mod 3;
if a then cenyear=1981;
 else if b then cenyear=1986;
 else if c then cenyear=1991;
 else if d then cenyear=1996;
 else if e then cenyear=2001;
if a or b or c or d or e then Mod=1;
```

```
if probchisq eq . then Sig=.;
else if probchisq le 0.01 then Sig=0.01;
else if probchisq le 0.05 then Sig=0.05;
else if probchisq le 0.10 then Sig=0.10;
else if probchisq le 0.50 then Sig=0.50;
else if probchisq le 0.70 then Sig=0.70;
else if probchisq gt 0.70 then Sig=0.99;
run;

data fexport.CSAll;
set csa1981(in=a) csa1986(in=b) csa1991(in=c) csa1996(in=d) csa2001(in=e);
Length Cenyear 4 Mod 3;
if a then cenyear=1981;
 else if b then cenyear=1986;
 else if c then cenyear=1991;
 else if d then cenyear=1996;
 else if e then cenyear=2001;
if a or b or c or d or e then Mod=1;
run;

/*Testing g_dhb, g_rc, G_rur2 and G-rur01grp for each of the years.
Either not sig for type 3 or gave neg hessian*/
/*
%let year=1981;
proc genmod data=bias&year order=internal descending;
class  CenYear     Sex  age10yrs
   MaoriC1     PacificC1 AsianC1  nonMPAC1 aumobgrp4  timesincecengp
    g_ta nzdep3 G_dhb;
model unlockflag=CenYear  Sex  age10yrs
   MaoriC1     PacificC1 AsianC1  nonMPAC1  aumobgrp4  timesincecengp
  g_ta nzdep3 G_dhb
/dist=b link=logit type1 type3 wald;
run;
proc genmod data=bias&year order=internal descending;
class  CenYear     Sex  age10yrs
   MaoriC1     PacificC1 AsianC1  nonMPAC1 aumobgrp4  timesincecengp
    g_ta nzdep3 G_rc;
model unlockflag=CenYear  Sex  age10yrs
   MaoriC1     PacificC1 AsianC1  nonMPAC1  aumobgrp4  timesincecengp
  g_ta nzdep3 G_rc
/dist=b link=logit type1 type3 wald;
run;
proc genmod data=bias&year order=internal descending;
class  CenYear     Sex  age10yrs
   MaoriC1     PacificC1 AsianC1  nonMPAC1 aumobgrp4  timesincecengp
    g_ta nzdep3 G_rur2;
model unlockflag=CenYear  Sex  age10yrs
   MaoriC1     PacificC1 AsianC1  nonMPAC1  aumobgrp4  timesincecengp
```

```
  g_ta nzdep3 G_rur2
/dist=b link=logit type1 type3 wald;
run;
proc genmod data=bias&year order=internal descending;
class  CenYear     Sex  age10yrs
   MaoriC1     PacificC1 AsianC1  nonMPAC1 aumobgrp4  timesincecengp
    g_ta nzdep3 G_rur01grp;
model unlockflag=CenYear  Sex  age10yrs
   MaoriC1     PacificC1 AsianC1  nonMPAC1  aumobgrp4  timesincecengp
  g_ta nzdep3 G_rur01grp
/dist=b link=logit type1 type3 wald;
run;
*/

/*As am running this on a later day 24.4.2008, need to recreate the datasets
  but don't want to run the regressions again*/
%Option1(year=1981,action=A);
%Option1(year=1986,action=A);
%Option1(year=1991,action=A);
%Option1(year=1996,action=A);
%Option1(year=2001,action=A);

/*Create strata strings*/

data peTAall;
set chked04.peall;
where trim(parameter) eq 'G_TA';
run;

proc sort data=petaall;
by cenyear sig estimate;
run;

data petasig;
set petaall;
where sig in (0.01,0.05,0.10);
run;

%macro makestrat(year=);

%let yr=%substr(&year,3,2);

data biasunlk&year;
set bias&year;
length B_S $1 B_A $1 B_E $1 B_AU $1 B_Tim $1 B_TA $2 B_Dep $1;
format B_S $fisex. B_A $fiage. B_Dep B_AU $fiquin.  B_Tim $fitime.
B_TA $ftagps.;
B_S=put(sex,iisex.);
```

```
%if "&year" eq "1981" or "&year" eq "1991" %then %do;
 B_E='-';
%end;
%else %do;
 if maoric1 ne 0 then B_E=put(maoric1,iieth.);
 else if pacificc1 ne 0 then B_E=put(pacificc1,iieth.);
 else if asianc1 ne 0 then B_E=put(asianc1,iieth.);
 else if nonMPAc1 ne 0 then B_E=put(nonMPAc1,iieth.);
 else B_E='?';
%end;
B_A=put(age10yrs,iiage.);
%if "&year" eq "2001" %then %do;
 if B_A in ('G','H') then b_A='K';
%end;
B_Dep=put(nzdep3,iidep.);
%if "&year" eq "1981" %then %do;
 if B_Dep in ('G','Z') then b_dep='K';
%end;
%else %if "&year" eq "1991" %then %do;
 if B_Dep in ('D','E') then b_dep='I';
%end;
%else %if "&year" eq "1986" or "&year" eq "1991" or "&year" eq "2001" %then %do;
 b_dep='-';
%end;
%else %if "&year" eq "1996" %then %do;
 if B_Dep in ('G','E','Z') then b_dep='L';
%end;
B_AU=put(aumobgrp4,iimob.);
%if "&year" eq "1996" %then %do;
 if b_au in ('C','D') then b_au='G';
%end;
B_Tim=put(timesincecengp,iitime.);
%if "&year" eq "1991" %then %do;
 if b_tim in ('A','B') then b_tim='I';
%end;
B_TA=put(input(abs(G_ta),i&yr.tag.),z2.);
MaxStrata='S:'||B_S||'/A:'||B_A||'/E:'||B_E||'/U:'||B_AU||'/T:'||B_Tim
 ||'/R:'||b_ta||'/D:'||B_Dep;
NoEthStrata='S:'||B_S||'/A:'||B_A||'/U:'||B_AU||'/T:'||B_Tim
 ||'/R:'||b_ta||'/D:'||B_Dep;
NoEthDepStrata='S:'||B_S||'/A:'||B_A||'/U:'||B_AU||'/T:'||B_Tim
 ||'/R:'||b_ta;
NoAUStrata='S:'||B_S||'/A:'||B_A||'/E:'||B_E||'/T:'||B_Tim
 ||'/R:'||b_ta||'/D:'||B_Dep;
run;

proc freq data=biasunlk&year order=freq;
tables B_S B_A B_E B_AU B_Tim B_TA B_Dep NoEthDepStrata NoEthStrata MaxStrata;
```

```
run;

%mend;

proc printto new file='Combs.lst';run;
%makestrat(year=1981);
%makestrat(year=1986);
%makestrat(year=1991);
%makestrat(year=1996);
%makestrat(year=2001);
proc printto;run;

%macro lookstart(year=);

proc summary data=biasunlk&year chartype;
class noauStrata unlockflag B_S B_A B_E B_AU B_Tim b_ta B_Dep;
output out=strataSum&year;
run;

data strataSum&year;
set strataSum&year;
where _type_ in ('101111111','111111111');
if unlockflag eq . then unlockflag=99;
run;

proc sort data=strataSum&year;
by noaustrata B_S B_A B_E B_AU B_Tim b_ta B_Dep _type_ unlockflag;
run;

proc transpose data=strataSum&year out=strataSum&year.t;
by noaustrata B_S B_A B_E B_AU B_Tim b_ta B_Dep;
id unlockflag;
var _freq_;
run;

data strataSum&year.t;
set strataSum&year.t;
perunlock=_1/_99*100;
run;

options nodate pageno=1 linesize=103 pagesize=66;
title "Summary strata for &year";

proc tabulate data=strataSum&year.t missing noseps;
class B_S B_A b_ta B_E B_AU B_Tim B_Dep noaustrata;
var _99 _0 _1 perunlock;
table all B_S B_A b_ta B_E B_Tim B_Dep,(_99 _0 _1)*(sum*f=7.) perunlock*(nmiss*f=5.)
 /rts=22;
```

```
run;

proc tabulate data=strataSum&year.t missing noseps;
format B_S $fisex10. B_A $fiage10. B_Dep B_AU $fiquin10.  B_Tim $fitime10.
B_TA $ftagps10.;
class B_S B_A b_ta B_E B_AU B_Tim B_Dep noaustrata;
var _99 _0 _1 perunlock;
table B_S*B_A*b_ta*B_E*B_Tim*B_Dep,(_0 _1)*(sum*f=7.) perunlock*(nmiss*f=5.)
 /rts=72;
run;

%mend;

proc printto new file='strat.lst';
run;

%lookstart(year=1981);
%lookstart(year=1986);
%lookstart(year=1991);
%lookstart(year=1996);
%lookstart(year=2001);

proc printto;run;


/*The following is the final version of the process*/

data peTAall;
set chked04.peall;
where trim(parameter) eq 'G_TA';
length B_TA1 B_TA2 B_TA3 B_TA4 $1;
B_TA1=put(probchisq,ita1l.);
if B_TA1 eq 'N' then do;
 if estimate ge 0 then b_ta1='O'; else b_ta1='P';
end;
else if B_TA1 eq 'K' then do;
 if estimate ge 0 then b_ta1='L'; else b_ta1='M';
end;
else if B_TA1 eq 'G' then do;
 if estimate ge 0 then b_ta1='H'; else b_ta1='I';
end;
b_ta2=input(b_ta1,$ita2L.);
b_ta3=input(b_ta2,$ita3L.);
b_ta4=input(b_ta3,$ita4L.);
G_TA=input(level1,itacode.);
run;
```

```
%macro makestrat(year=);

%let yr=%substr(&year,3,2);

proc sort data=petaall out=pet&year;
where cenyear eq &year;
by g_ta;
run;

proc sort data=bias&year;
by g_ta;
run;

data biasunlk&year;
merge bias&year(in=a) pet&year(in=b keep=g_ta B_TA1 B_TA2 B_TA3 B_TA4);
by g_ta;
if a;
length B_S $1
 B_A1 B_A2 B_A3 B_A4 $1
 B_E1 B_E2 B_E3 B_E4 $1
 B_AU1 B_AU2 B_AU3 B_AU4 $1
 B_Tim1 B_Tim2 B_Tim3 $1
 B_Dep1 B_Dep2 B_Dep3 $1
 OnlyBias 3;
format B_S $fisex.
 B_A1 B_A2 B_A3 B_A4 $flage.
 B_Dep1 B_Dep2 B_Dep3 $fldep.
 B_AU1 B_AU2 B_AU3 B_AU4 $flmob.
 B_Tim1 B_Tim2 B_Tim3 $fltime.
 B_E1 B_E2 B_E3 B_E4 $fleth.
 B_TA1 B_TA2 B_TA3 B_TA4 $flta.;
if unlockflag eq 0 then onlybias=1; else onlybias=0;
B_S=put(sex,iisex.);
%if "&year" eq "1981" or "&year" eq "1991" %then %do;
 B_E1='A';
%end;
%else %do;
 if maoric1 ne 0 then B_E1=put(maoric1,iieth.);
 else if pacificc1 ne 0 then B_E1=put(pacificc1,iieth.);
 else if asianc1 ne 0 then B_E1=put(asianc1,iieth.);
 else if nonMPAc1 ne 0 then B_E1=put(nonMPAc1,iieth.);
 else B_E1='?';
%end;
b_e2=input(b_e1,$iE2L.);
b_e3=input(b_e2,$iE3L.);
b_e4=input(b_e3,$iE4L.);
B_A1=put(age10yrs,ia1l.);
b_a2=input(b_a1,$ia2l.);
```

```
b_a3=input(b_a2,$ia3l.);
b_a4=input(b_a3,$ia4l.);
B_Dep1=put(nzdep3,idep1l.);
B_Dep2=input(B_Dep1,$iDep2L.);
B_Dep3=input(B_Dep2,$iDep3L.);
B_AU1=put(aumobgrp4,imob1l.);
B_AU2=input(b_au1,$iMob2L.);
B_AU3=input(b_au2,$iMob3L.);
B_AU4=input(b_au3,$iMob4L.);
B_Tim1=put(timesincecengp,it1l.);
B_Tim2=input(b_Tim1,$iT2L.);
B_Tim3=input(b_Tim2,$iT3L.);
/*Adjustment to deal with high percentages but giving details elsewhere*/
%if "&year" eq "1986" %then %do;
 if b_s eq 'M' and b_a1 in ('H','I') and b_ta1 in ('D','E','H','I') then do;
  if b_ta1 in ('D','E') then b_ta1='X';
  else if b_a1 eq ('I') and b_ta1 in ('H','I') then b_ta1='G';
  b_ta2=input(b_ta1,$ita2L.);
  b_ta3=input(b_ta2,$ita3L.);
  b_ta4=input(b_ta3,$ita4L.);
 end;
%end;
run;

proc summary data=biasunlk&year chartype;
class B_S
 B_A1 B_A2 B_A3 B_A4
 B_TA1 B_TA2 B_TA3 B_TA4
 B_E1 B_E2 B_E3 B_E4
 B_Tim1 B_Tim2 B_Tim3
 B_AU1 B_AU2 B_AU3 B_AU4
 B_Dep1 B_Dep2 B_Dep3;
var unlockflag onlybias;
types B_S
B_S *(B_A1 B_A2 B_A3 B_A4)
B_S *(B_A1) *(B_TA1 B_TA2 B_TA3 B_TA4)
B_S *(B_A1) *(B_TA1) *(B_E1 B_E2 B_E3 B_E4)
B_S *(B_A1) *(B_TA1) *(B_E1) *(B_Tim1 B_Tim2 B_Tim3)
B_S *(B_A1) *(B_TA1) *(B_E1) *(B_Tim1) *(B_AU1 B_AU2 B_AU3 B_AU4)
B_S *(B_A1 B_A2 B_A3 B_A4) *(B_TA1 B_TA2 B_TA3 B_TA4) *(B_E1 B_E2 B_E3 B_E4)
 *(B_Tim1 B_Tim2 B_Tim3) *(B_AU1 B_AU2 B_AU3 B_AU4) *(B_Dep1 B_Dep2 B_Dep3)
;
output out=sumbiasunlk&year
 sum(unlockflag onlybias)=SumUnlock SumOnlyBias;
run;

data sumbiasunlk&year;
set sumbiasunlk&year;
```

```
if sumunlock gt 0 and (sumonlybias gt 0 or sumonlybias eq 0) then UB=10;
else if sumunlock eq 0 and sumonlybias gt 0 then UB=1;
comb='S:A-:R-:E-:T-:U-:D-';
if substr(_type_,2,1) eq '1' then substr(comb,4,1)='1';
else if substr(_type_,3,1) eq '1' then substr(comb,4,1)='2';
else if substr(_type_,4,1) eq '1' then substr(comb,4,1)='3';
else if substr(_type_,5,1) eq '1' then substr(comb,4,1)='4';
if substr(_type_,6,1) eq '1' then substr(comb,7,1)='1';
else if substr(_type_,7,1) eq '1' then substr(comb,7,1)='2';
else if substr(_type_,8,1) eq '1' then substr(comb,7,1)='3';
else if substr(_type_,9,1) eq '1' then substr(comb,7,1)='4';
if substr(_type_,10,1) eq '1' then substr(comb,10,1)='1';
else if substr(_type_,11,1) eq '1' then substr(comb,10,1)='2';
else if substr(_type_,12,1) eq '1' then substr(comb,10,1)='3';
else if substr(_type_,13,1) eq '1' then substr(comb,10,1)='4';
if substr(_type_,14,1) eq '1' then substr(comb,13,1)='1';
else if substr(_type_,15,1) eq '1' then substr(comb,13,1)='2';
else if substr(_type_,16,1) eq '1' then substr(comb,13,1)='3';
if substr(_type_,17,1) eq '1' then substr(comb,16,1)='1';
else if substr(_type_,18,1) eq '1' then substr(comb,16,1)='2';
else if substr(_type_,19,1) eq '1' then substr(comb,16,1)='3';
else if substr(_type_,20,1) eq '1' then substr(comb,16,1)='4';
if substr(_type_,21,1) eq '1' then substr(comb,19,1)='1';
else if substr(_type_,22,1) eq '1' then substr(comb,19,1)='2';
else if substr(_type_,23,1) eq '1' then substr(comb,19,1)='3';
C_S=substr(comb,1,1);
C_Age=substr(comb,4,1);
C_TA=substr(comb,7,1);
C_E=substr(comb,10,1);
C_Tim=substr(comb,13,1);
C_AU=substr(comb,16,1);
C_Dep=substr(comb,19,1);
run;

proc sort data=sumbiasunlk&year;
by _type_ comb ub;
run;

data sumsum&year(keep=_type_ comb C_S C_Age C_TA C_E C_Tim C_AU C_Dep
  Tot_OnUnlk N_OnUnlk N_BiaswthUnlk Tot_JustBias NumCombJustBias
 TooFine);
set sumbiasunlk&year;
by _type_ comb ub;
retain Tot_OnUnlk N_OnUnlk N_BiaswthUnlk Tot_JustBias NumCombJustBias;
if first.comb then do;
 Tot_OnUnlk=.; N_OnUnlk=.; N_BiaswthUnlk=.; Tot_JustBias=.;
 NumCombJustBias=0;
end;
```

```
if ub eq 10 then do;
 Tot_OnUnlk=min(_freq_,Tot_OnUnlk); N_OnUnlk=min(sumunlock,N_OnUnlk);
 N_BiaswthUnlk=min(sumonlybias,N_BiaswthUnlk);
end;
else if ub eq 1 then do;
 Tot_JustBias=min(sumonlybias,Tot_JustBias);
 NumCombJustBias+1;
end;
if last.comb then do;
 if tot_justbias gt 0 then TooFine=1; else TooFine=0;
 output;
end;
run;

proc sort data=sumsum&year;
by toofine numcombjustbias comb;
run;

options pageno=1;

proc printto new file="SumSum&year..lst";run;

title "CT for &year";

proc print data=sumsum&year uniform width=min;
var toofine numcombjustbias comb Tot_OnUnlk n_onunlk n_biaswthunlk;
format toofine numcombjustbias 6.0;
run;


proc printto;run;

%mend;

%makestrat(year=1981);
%makestrat(year=1986);
%makestrat(year=1991);
%makestrat(year=1996);
%makestrat(year=2001);

/*Deciding on best combinations to use. Have selected possibles from the list,
 now need to look at raw data for possible "twicks"
 After looking at all the tables have decided to use the following groups and will
 then amalgamate where necessary*/


%macro usestrat(year=,AgeL=1,TAl=1,EthL=1,TimL=1,AUl=-,DepL=-,
BTAopt=-,BEopt=-,BTimOpt=-,BAUopt=-,perctLim=75);
```

```
data BUStrata&year;
set biasunlk&year;
length B_A $1 B_TA $1 B_E $1 B_Tim $1 B_AU $1 B_Dep $1 OnlyBias 3
 Comb $19 BTA_Alt BE_Alt BTim_Alt BAU_Alt $1;
format B_S $fisex.  B_A $flage.  B_TA BTA_Alt $flta.  B_E BE_Alt $fleth. B_Tim BTim_Alt
$fltime.
B_AU BAU_Alt $flmob.  B_Dep $fldep.;
%if "&agel" eq "-" %then %do;
 B_A='A';
%end;
%else %do;
 B_A=B_A&agel;
%end;
%if "&ethl" eq "-" %then %do;
 B_E='A';BE_Alt='A';
%end;
%else %do;
 B_E=B_E&ethl;
 %if "&BEopt" eq "-" %then %do;
  BE_Alt='A';
 %end;
 %else %do;
  BE_Alt=B_E&BEopt;
 %end;
%end;
%if "&tal" eq "-" %then %do;
 B_TA='A';BTA_Alt='A';
%end;
%else %do;
 B_TA=B_ta&tal;
 %if "&BTAopt" eq "-" %then %do;
  BTA_Alt='A';
 %end;
 %else %do;
  BTA_Alt=B_TA&BTAopt;
 %end;
%end;
%if "&timl" eq "-" %then %do;
 B_Tim='A';BTim_Alt='A';
%end;
%else %do;
 B_Tim=B_Tim&timl;
 %if "&BTimOpt" eq "-" %then %do;
  BTim_Alt='A';
 %end;
 %else %do;
  BTim_Alt=B_Tim&BTimOpt;
```

```
 %end;
%end;
%if "&depl" eq "-" %then %do;
 B_Dep='A';
%end;
%else %do;
 B_Dep=B_Dep&depl;
%end;
%if "&aul" eq "-" %then %do;
 B_AU='A';BAU_Alt='A';
%end;
%else %do;
 B_AU=B_AU&aul;
 %if "&BAUopt" eq "-" %then %do;
  BAU_Alt='A';
 %end;
 %else %do;
  BAU_Alt=B_AU&BAUopt;
 %end;
%end;
comb="S:A&agel.:R&tal.:E&ethl.:T&timl.:U&aul.:D&depl";
run;

proc summary data=BUStrata&year chartype;
class comb B_S B_A BTA_Alt B_TA BE_Alt B_E BTim_Alt B_Tim BAU_Alt B_AU B_Dep;
types
comb*B_S*B_A*BTA_Alt*B_TA*BE_Alt*b_e*BTim_Alt*B_Tim*BAU_Alt*B_AU*B_Dep
comb*B_S*B_A*BTA_Alt*B_TA*BE_Alt*b_e*BTim_Alt*B_Tim*BAU_Alt*B_Dep
comb*B_S*B_A*BTA_Alt*B_TA*BE_Alt*b_e*BTim_Alt*BAU_Alt*B_Dep
comb*B_S*B_A*BTA_Alt*B_TA*BE_Alt*BTim_Alt*BAU_Alt*B_Dep
comb*B_S*B_A*BTA_Alt*BE_Alt*BTim_Alt*BAU_Alt*B_Dep

;
var unlockflag onlybias;
output out=sumbiasunlk&year
 sum(unlockflag onlybias)=SumUnlock SumOnlyBias
;
run;

data sumbiasunlk&year;
set sumbiasunlk&year;
if sumunlock gt 0 and (sumonlybias gt 0 or sumonlybias eq 0) then UB=10;
else if sumunlock eq 0 and sumonlybias gt 0 then UB=1;
proponlybias=sumonlybias/_freq_*100;
if proponlybias ge &perctLim or ub eq 1 then prob=1; else prob=0;
run;

proc sort data=sumbiasunlk&year;
```

```
by comb B_S B_A BTA_Alt B_TA BE_Alt b_e BTim_Alt b_tim BAU_Alt B_AU B_Dep;
run;

data sumbiasunlk&year;
set sumbiasunlk&year;
by comb B_S B_A BTA_Alt B_TA BE_Alt b_e BTim_Alt b_tim BAU_Alt B_AU B_Dep;
retain BTAaltonlybias BTAaltprop probta BEaltonlybias BEaltprop probbe
 BTimaltonlybias BTimaltprop probbt BAUaltonlybias BAUaltprop probau maxprob;
if first.B_a then do;
 BTAaltonlybias=.;BTAaltprop=.;probTA=.;
 BEaltonlybias=.;BEaltprop=.;probbe=.;BTimaltonlybias=.;BTimaltprop=.;probbt=.;
 BAUaltonlybias=.;BAUaltprop=.;probau=.;maxprob=.;
end;
if first.BTA_Alt then do;
 BTAaltonlybias=sumonlybias;BTAaltprop=proponlybias;probTA=prob;
end;
if first.BE_Alt then do;
 BEaltonlybias=sumonlybias;BEaltprop=proponlybias;probbe=prob;
end;
if first.BTim_Alt then do;
 BTimaltonlybias=sumonlybias;BTimaltprop=proponlybias;probbt=prob;
end;
if first.BAU_Alt then do;
 BAUaltonlybias=sumonlybias;BAUaltprop=proponlybias;probau=prob;
end;
maxprob=max(maxprob,prob);
if _type_ eq '111111111111' then output;
run;

proc sort data=sumbiasunlk&year;
by comb B_S B_A BTA_Alt B_TA BE_Alt b_e BTim_Alt b_tim BAU_Alt B_AU B_Dep;
run;

proc sort data=BUStrata&year;
by comb B_S B_A BTA_Alt B_TA BE_Alt b_e BTim_Alt b_tim BAU_Alt B_AU B_Dep;
run;

data BUStrata&year;
merge BUStrata&year(in=a) sumbiasunlk&year(drop=_type_ _freq_ sumunlock sumonlybias ub
proponlybias prob);
by comb B_S B_A BTA_Alt B_TA BE_Alt b_e BTim_Alt b_tim BAU_Alt B_AU B_Dep;
length BUStrata $27;
if maxprob ne 0 then do;
  B_AU=BAU_Alt; b_tim=BTim_Alt; b_e=BE_Alt; B_TA=BTA_Alt;
end;
BUStrata='S:'||b_s||'/A:'||b_a||'/R:'||b_ta||'/E:'||b_e||'/T:'||b_tim||
   '/U:'||b_au||'/D:'||b_dep;
label BUStrata='Strata for Bias to Unlock weights';
```

```
run;

title "Final Stata for Weighting Unlock to Bias for &year";

proc tabulate data=bustrata&year noseps missing out=bustrataTab&year;
class bustrata;
var unlockflag onlybias;
table (all bustrata),n*f=7. sum=''*(unlockflag onlybias)*f=7./rts=29;
run;

data bustrataTab&year;
set bustrataTab&year;
WgtUnlock=n/unlockflag_sum;
perctBiasOnly=onlybias_sum/n*100;
perctUnlock=unlockflag_sum/n*100;
label wgtUnlock='Weight to be used on Unlock data to represent all Bias dataset'
 perctBiasOnly='Percent of stratum only on Bias dataset'
 perctUnlock='Percent of stratum on Unlock dataset';
run;

proc sort data=BUStrata&year;
by bustrata;
run;

proc sort data=bustrataTab&year;
by bustrata;
run;

data ctbias.BUStrata&year;
merge BUStrata&year(in=a) bustrataTab&year;
by bustrata;
if a;
run;

data ctbias.BUStrata&year;
set ctbias.BUStrata&year;
if unlockflag eq 0 then wgtunlock=0;  /*Need to set the weights to zero of those not on
unlock dataset*/
run;

data fortrans.WgtwithBiasID&year(keep=id_bias bustrata wgtunlock);
set ctbias.BUStrata&year;
where unlockflag eq 1;
run;

proc sort data=fortrans.WgtwithBiasID&year;
by id_bias;
run;
```

```
proc summary data=fortrans.WgtwithBiasID&year;
var wgtunlock;
output out=test&year sum=totwgt;
run;

%mend;

/*The following combinations give everything within limits (i.e. no cells with just bias
or
  bias/total % >= 75%*/
/*
%usestrat(year=1981,AgeL=1,TAl=1,EthL=1,TimL=1,AUl=-,DepL=-,BTAopt=1,BEopt=1,BTimOpt=-
,BAUopt=-,perctLim=75);
%usestrat(year=1986,AgeL=1,TAl=1,EthL=3,TimL=-,AUl=-,DepL=-,BTAopt=1,BEopt=-,BTimOpt=-
,BAUopt=-,perctLim=75);
%usestrat(year=1991,AgeL=1,TAl=1,EthL=1,TimL=1,AUl=4,DepL=-,BTAopt=2,BEopt=1,BTimOpt=-
,BAUopt=-,perctLim=75);
%usestrat(year=1996,AgeL=1,TAl=1,EthL=1,TimL=3,AUl=-,DepL=-,BTAopt=2,BEopt=-,BTimOpt=-
,BAUopt=-,perctLim=75);
%usestrat(year=2001,AgeL=1,TAl=1,EthL=1,TimL=3,AUl=-,DepL=-,BTAopt=4,BEopt=-,BTimOpt=-
,BAUopt=-,perctLim=75);
*/

/*These are the final combinations to use. Percentages all less than 70%, some lower than
that*/
%usestrat(year=1981,AgeL=1,TAl=1,EthL=1,TimL=1,AUl=-,DepL=-,BTAopt=1,BEopt=1,BTimOpt=-
,BAUopt=-,perctLim=70); /*same*/
%usestrat(year=1986,AgeL=1,TAl=1,EthL=3,TimL=-,AUl=-,DepL=-,BTAopt=2,BEopt=-,BTimOpt=-
,BAUopt=-,perctLim=70); /*slightly diff*/
%usestrat(year=1991,AgeL=1,TAl=1,EthL=1,TimL=1,AUl=4,DepL=-,BTAopt=2,BEopt=1,BTimOpt=-
,BAUopt=-,perctLim=70); /*same*/
%usestrat(year=1996,AgeL=1,TAl=1,EthL=1,TimL=3,AUl=-,DepL=-,BTAopt=2,BEopt=-,BTimOpt=-
,BAUopt=-,perctLim=70); /*same*/
%usestrat(year=2001,AgeL=1,TAl=1,EthL=1,TimL=3,AUl=-,DepL=-,BTAopt=4,BEopt=-,BTimOpt=-
,BAUopt=-,perctLim=61); /*same*/
```

Appendix 13. SAS Programme to Create Unlock Ratios

The following is the SAS programme in the Datalab (called UnlkRatiosCreate.sas written 6th May 2008) that produces the Unlock Ratios using the Unlock Weights produced in SAS programme listed in previous appendix. (Last part of the process is listed in next appendix).

```
/*Use Unlock weights which were created on Bias datasets for CancerTrends
  and produce Unlock Ratios
  UnlockRatiosCreate.sas June Atkinson 6.5.2008*/

%include "p:\sasprogs\general\CTmacros.sas";
%persess(action=ABR,censusyr=AllYears);

libname Trans505 'P:\CTTempDatasets\Transfer050508';  /*This is the directory with the
   Unlock Weights from Bias to Unlock datasets*/

options nocenter linesize=105 pageno=1;

%include "p:\sasprogs\june\UnlkRatioFmts.sas";

%let year=1981;
proc sort data=trans505.hasunlockid&year;
by id_unlock;
run;

proc sort data=ctro.unlock&year out=ctunlock.unlock&year;
by id_unlock;
run;

data ctunlock.unlock&year;
merge ctunlock.unlock&year(in=a) trans505.hasunlockid&year(in=b);
by id_unlock;
if not(a and b) then put 'Not on both. ' a= b= id_unlock=;
run;

%let year=1986;
proc sort data=trans505.hasunlockid&year;
by id_unlock;
run;

proc sort data=ctro.unlock&year out=ctunlock.unlock&year;
by id_unlock;
run;

data ctunlock.unlock&year;
merge ctunlock.unlock&year(in=a) trans505.hasunlockid&year(in=b);
```

```
by id_unlock;
if not(a and b) then put 'Not on both. ' a= b= id_unlock=;
run;

%let year=1991;
proc sort data=trans505.hasunlockid&year;
by id_unlock;
run;

proc sort data=ctro.unlock&year out=ctunlock.unlock&year;
by id_unlock;
run;

data ctunlock.unlock&year;
merge ctunlock.unlock&year(in=a) trans505.hasunlockid&year(in=b);
by id_unlock;
if not(a and b) then put 'Not on both. ' a= b= id_unlock=;
run;

%let year=1996;
proc sort data=trans505.hasunlockid&year;
by id_unlock;
run;

proc sort data=ctro.unlock&year out=ctunlock.unlock&year;
by id_unlock;
run;

data ctunlock.unlock&year;
merge ctunlock.unlock&year(in=a) trans505.hasunlockid&year(in=b);
by id_unlock;
if not(a and b) then put 'Not on both. ' a= b= id_unlock=;
run;

%let year=2001;
proc sort data=trans505.hasunlockid&year;
by id_unlock;
run;

proc sort data=ctro.unlock&year out=ctunlock.unlock&year;
by id_unlock;
run;

data ctunlock.unlock&year;
merge ctunlock.unlock&year(in=a) trans505.hasunlockid&year(in=b);
by id_unlock;
if not(a and b) then put 'Not on both. ' a= b= id_unlock=;
run;
```

```
%macro makeunlk(year=);

%let yr=%substr(&year,3,2);
%if "&year" eq "1981" or "&year" eq "1986" %then %let yrx=91;
%else %let yrx=&yr;

data ctunlock.unlock&year(drop=tempeth1 tempeth2 tempeth3 tempeth4 tempeth5 tempeth6);
set ctunlock.unlock&year
%if "&year" eq "2001" %then %do;
(rename=(g_rurality=G_Rurality01))
%end;
;
length Age5Yrs AgeGpA AgeGpB AgeGpC 4 TimeSinceCen 5;
format Age5Yrs fagei5y. AgeGpA AgeGpB AgeGpC fagei.;
label age5yrs='Age at Census in 5 yearly groups'
  agegpa='Age at Census Grouping A'
  agegpb='Age at Census Grouping B'
  agegpc='Age at Census Grouping C'
  TimeSinceCen='Time of First Cancer in Months since census';
age5yrs=input(agec_mths,iagem5y.);
agegpa=input(agec_yrs,iageia.);
agegpb=input(agec_yrs,iageib.);
agegpc=input(agec_yrs,iageic.);
if agec_mths ne 9999 then TimeSinceCen=agecan1_mth-agec_mths;
else TimeSinceCen=agecan1_mth-96*12;
timeSinceCenGp=input(TimeSinceCen,itsince.);
if link eq . then link=-9;
if trim(left(linkstat)) in ('',' ') then linkstat='-';
if trim(left(icd1group)) in ('',' ') then icd1group='-';
if trim(left(icd2group)) in ('',' ') then icd2group='-';
if trim(left(icd3group)) in ('',' ') then icd3group='-';
if trim(left(icd4group)) in ('',' ') then icd4group='-';
if g_rha in (.,9) or g_rha gt 10 then g_rha=-9;
if aumobilitygrp10 eq . then aumobilitygrp10=-9;
if g_rurality01 eq . then g_rurality01=-9;
if nzdep2001 eq . then nzdep2001=-9;
NZDep2001Grp=input(nzdep2001,idecgp.);
if NZDep2001Grp in (-9,-99) then NZDep2001Grp=-99; else NZDep2001Grp=NZDep2001Grp*-1;
G_Rur01Grp=input(g_rurality01,irurgpx.);
if G_Rur01Grp ne -9 then G_Rur01Grp=G_Rur01Grp*-1;
AuMob01Grp=input(aumobilitygrp10,idecqu.);
if AuMob01Grp in (-9,-99) then AuMob01Grp=-99; else AuMob01Grp=AuMob01Grp*-1;
MBAU=substr(linkstat||' ',1,2);
AsianC1=AsianC1*-1;  MaoriC1=MaoriC1*-1;   PacificC1=PacificC1*-1;  nonMPAC1=nonMPAC1*-1;
if age5yrs ge 80 then age5yrs=98;
Age10yrs=input(age5yrs,iageity.);
```

```
if g_rur01grp in (-3,-2,-1) then g_rur2=-10;
else if g_rur01grp in (-4) then g_rur2=-40;
else g_rur2=-99;
if g_rur2 eq -10 then g_rur1=-10; else g_rur1=-70;
if g_ta in (612864,613888) then g_ta=999;
if g_rc in (612864,613888) then g_rc=99;
if g_dhb in (612864,613888) then g_dhb=99;
if g_ahd in (612864,613888) then g_ahd=99;
if g_ahb in (612864,613888) then g_ahb=99;
if g_ta eq 999 then g_ta=-999;
if g_rc eq 99 then g_rc=-99;
if g_dhb eq 99 then g_dhb=-99;
if g_ahb eq 99 then g_ahb=-99;
if g_ahd eq 99 then g_ahd=-99;
if nzdep2001grp in (-1,-2,-3,-4,-5,-6) then NZDep3=-6; else NZDep3=nzdep2001grp;
if aumob01grp in (-1,-3) then AuMobGrp4=-2; else AuMobGrp4=aumob01grp;
format linkstat ICD1Group ICD2Group ICD3Group  ICD4Group;
format timesincecengp ftsince. NZDep2001Grp NZDep3 fdecgp.
 G_Rur01Grp g_rur2 g_rur1 frurgpx.
 AuMob01Grp aumobgrp4 fdecqu. age10yrs fageity. ;

%if "&year" ne "2001" %then %do;
 if g_rurality&yr eq . then g_rurality&yr=-9;
 G_Rur&yr.Grp=input(g_rurality&yr.,irurgpx.);
 if G_Rur&yr.Grp ne -9 then G_Rur&yr.Grp=G_Rur&yr.Grp*-1;
 if g_rur&yr.grp in (-3,-2,-1) then g_rur&yr._2=-10;
 else if g_rur&yr.grp in (-4) then g_rur&yr._2=-40;
 else g_rur&yr._2=-99;
 if g_rur&yr._2 eq -10 then g_rur&yr._1=-10; else g_rur&yr._1=-70;
 if nzdep&yrx eq . then nzdep&yrx=-9;
 NZDep&yrx.Grp=input(nzdep&yrx,idecgp.);
 if NZDep&yrx.Grp in (-9,-99) then NZDep&yrx.Grp=-99;
  else NZDep&yrx.Grp=NZDep&yrx.Grp*-1;
 if nzdep&yrx.grp in (-1,-2,-3,-4,-5,-6) then NZDep&yrx._3=-6;
  else NZDep&yrx._3=nzdep&yrx.grp;
 format NZDep&yrx.Grp NZDep&yrx._3 fdecgp. G_Rur&yr.Grp g_rur&yr._2 g_rur&yr._1 frurgpx.;
%end;

/*Now create all the Ethnicity variables*/
length EthPr4_Cen EthPr3_Cen EthSol4_Cen TotMaori_Cen TotPacific_Cen TotAsian_Cen
 EthIndMaori_Cen EthIndPacific_Cen EthIndAsian_Cen EthIndnonMPA_Cen EthIndnonMP_Cen 3
 EthPr4_CanRC1 EthPr3_CanRC1 EthSol4_CanRC1  EthPr4_CanRAll EthPr3_CanRAll
 EthSol4_CanRAll 3
 nonMPC1 nonMP_CanR 3;

format TotMaori_Cen TotPacific_Cen TotAsian_Cen ftoteth.
 EthIndMaori_Cen EthIndPacific_Cen EthIndAsian_Cen EthIndnonMPA_Cen
   EthIndnonMP_Cen ftoteth.
```

```
 EthPr4_Cen EthPr3_Cen EthSol4_Cen f4eth.
 EthPr4_CanRC1 EthPr3_CanRC1 EthSol4_CanRC1  EthPr4_CanRAll EthPr3_CanRAll
   EthSol4_CanRAll f4eth.
 MaoriC1 PacificC1 AsianC1 nonMPAC1  Maori_CanR Pacific_CanR Asian_CanR
   nonMPA_CanR ftoteth.
 nonMPC1 nonMP_CanR ftoteth.
 TotMaoriC1 TotPacificC1 TotAsianC1 TotMaori_CanR TotPacific_CanR TotAsian_CanR ftoteth.;

label EthPr4_Cen='Census Prioritised Ethnicity (M, P, A, nonMPA, unknown)'
 EthPr3_Cen='Census Prioritised Ethnicity (M, P, nonMP, unknown)'
 EthSol4_Cen='Census Prioritised Ethnicity (M, P, A, remainder)'
 TotMaori_Cen='Census Total Maori Ethnicity (Maori, notM but P or A, nonMPA, unknown)'
 TotPacific_Cen='Census Total Pacific Ethnicity (Pacific, notP but M or A, nonMPA,
unknown)'
 TotAsian_Cen='Census Total Asian Ethnicity (Asian, notA but M or P, nonMPA, unknown)'
 EthIndMaori_Cen='Census Maori Ethnicity Indicator (Maori, nonMaori, unknown)'
 EthIndPacific_Cen='Census Pacific Ethnicity Indicator (Pacific, nonPacific, unknown)'
 EthIndAsian_Cen='Census Asian Ethnicity Indicator (Asian, nonAsian, unknown)'
 EthIndnonMPA_Cen='Census nonMPA Ethnicity Indicator (nonMPA, M or P or A, unknown)'
 EthIndnonMP_Cen='Census nonMP Ethnicity Indicator (nonMP, M or P, unknown)'
 EthPr4_CanRC1='CancerReg Diag 1 Prioritised Ethnicity (M, P, A, nonMPA, unknown)'
 EthPr3_CanRC1='CancerReg Diag 1 Prioritised Ethnicity (M, P, nonMP, unknown)'
 EthSol4_CanRC1='CancerReg Diag 1 Prioritised Ethnicity (M, P, A, remainder)'
 EthPr4_CanRAll='All CancerRegs Prioritised Ethnicity (M, P, A, nonMPA, unknown)'
 EthPr3_CanRAll='All CancerRegs Prioritised Ethnicity (M, P, nonMP, unknown)'
 EthSol4_CanRAll='All CancerRegs Prioritised Ethnicity (M, P, A, remainder)'
 DiffEthC1_CanRAll='Differences between first Cancer Ethnicity and overall'
 nonMPC1='nonMP Ethnicity on Cancer Diag 1'
 nonMP_CanR='nonMP Ethnicity on all Cancer Registry'
 TotMaoriC1='CancerReg Diag 1 Total Maori Ethnicity (Maori, notM but P or A, nonMPA,
unknown)'
 TotPacificC1='CancerReg Diag 1 Total Pacific Ethnicity (Pacific, notP but M or A,
nonMPA, unknown)'
 TotAsianC1='CancerReg Diag 1 Total Asian Ethnicity (Asian, notA but M or P, nonMPA,
unknown)'
 TotMaori_CanR='All CancerRegs Total Maori Ethnicity (Maori, notM but P or A, nonMPA,
unknown)'
 TotPacific_CanR='All CancerRegs Total Pacific Ethnicity (Pacific, notP but M or A,
nonMPA, unknown)'
 TotAsian_CanR='All CancerRegs Total Asian Ethnicity (Asian, notA but M or P, nonMPA,
unknown)' ;
tempeth1=input(ethdet1,iethgp.);
tempeth2=input(ethdet2,iethgp.);
tempeth3=input(ethdet3,iethgp.);
%if "&year" eq "2001" %then %do;
 tempeth4=input(ethdet4,iethgp.);
 tempeth5=input(ethdet5,iethgp.);
 tempeth6=input(ethdet6,iethgp.);
```

```
%end;
%else %do;
 tempeth4=.;
 tempeth5=.;
 tempeth6=.;
%end;
if tempeth1 eq 1 or tempeth2 eq 1 or tempeth3 eq 1 or tempeth4 eq 1 or tempeth5 eq 1
  or tempeth6 eq 1 then TotMaori_Cen=1;
else if tempeth1 in (2,4) or tempeth2 in (2,4) or tempeth3 in (2,4) or tempeth4 in (2,4)
  or tempeth5 in (2,4) or tempeth6 in (2,4) then TotMaori_Cen=11;
else if tempeth1 eq 5 or tempeth2 eq 5 or tempeth3 eq 5 or tempeth4 eq 5 or tempeth5 eq 5
  or tempeth6 eq 5 then TotMaori_Cen=5;
else if tempeth1 in (.,9,80,97,98) then TotMaori_Cen=9;
else TotMaori_Cen=91;

if tempeth1 eq 2 or tempeth2 eq 2 or tempeth3 eq 2 or tempeth4 eq 2 or tempeth5 eq 2 or
  tempeth6 eq 2 then TotPacific_Cen=2;
else if tempeth1 in (1,4) or tempeth2 in (1,4) or tempeth3 in (1,4) or tempeth4 in (1,4)
  or tempeth5 in (1,4) or tempeth6 in (1,4) then TotPacific_Cen=12;
else if tempeth1 eq 5 or tempeth2 eq 5 or tempeth3 eq 5 or tempeth4 eq 5 or tempeth5 eq 5
  or tempeth6 eq 5 then TotPacific_Cen=5;
else if tempeth1 in (.,9,80,97,98) then TotPacific_Cen=9;
else TotPacific_Cen=91;

if tempeth1 eq 4 or tempeth2 eq 4 or tempeth3 eq 4 or tempeth4 eq 4 or tempeth5 eq 4 or
  tempeth6 eq 4 then TotAsian_Cen=4;
else if tempeth1 in (1,2) or tempeth2 in (1,2) or tempeth3 in (1,2) or tempeth4 in (1,2)
  or tempeth5 in (1,2) or tempeth6 in (1,2) then TotAsian_Cen=14;
else if tempeth1 eq 5 or tempeth2 eq 5 or tempeth3 eq 5 or tempeth4 eq 5 or tempeth5 eq 5
  or tempeth6 eq 5 then TotAsian_Cen=5;
else if tempeth1 in (.,9,80,97,98) then TotAsian_Cen=9;
else TotAsian_Cen=91;

if TotMaori_Cen eq 1 then EthPr4_Cen=1;
else if Totpacific_Cen eq 2 then EthPr4_Cen=2;
else if Totasian_Cen eq 4 then EthPr4_Cen=4;
else if totmaori_Cen eq 9 then EthPr4_Cen=9;
else ethpr4_Cen=5;

if EthPr4_Cen in (4,5) then EthPr3_Cen=3; else EthPr3_Cen=EthPr4_Cen;

if TotMaori_Cen in (1,9) then EthIndMaori_Cen=TotMaori_Cen; else EthIndMaori_Cen=21;
if TotPacific_Cen in (2,9) then EthIndPacific_Cen=TotPacific_Cen;
  else EthIndPacific_Cen=22;
if TotAsian_Cen in (4,9) then EthIndAsian_Cen=TotAsian_Cen; else EthIndAsian_Cen=24;
if TotMaori_Cen in (5,9) then EthIndnonMPA_Cen=TotMaori_Cen; else EthIndnonMPA_Cen=25;
if TotMaori_Cen in (9) then EthIndnonMP_Cen=TotMaori_Cen;
 else if TotMaori_Cen in (5) or TotAsian_Cen in (4) then EthIndnonMP_Cen=3;
```

```
  else EthIndnonMP_Cen=23;

if tempeth1 in (1) and tempeth2 in (1,9,.) and tempeth3 in (1,9,.)
  and tempeth4 in (1,9,.) and tempeth5 in (1,9,.) and tempeth6 in (1,9,.)
  then EthSol4_Cen=1;
else if tempeth1 in (2) and tempeth2 in (2,9,.) and tempeth3 in (2,9,.)
  and tempeth4 in (2,9,.) and tempeth5 in (2,9,.) and tempeth6 in (2,9,.)
  then EthSol4_Cen=2;
else if tempeth1 in (4) and tempeth2 in (4,9,.) and tempeth3 in (4,9,.)
  and tempeth4 in (4,9,.) and tempeth5 in (4,9,.) and tempeth6 in (4,9,.)
  then EthSol4_Cen=4;
else EthSol4_Cen=8;

MaoriC1=abs(MaoriC1);
PacificC1=abs(PacificC1);
AsianC1=abs(AsianC1);
nonMPAC1=abs(nonMPAC1);

if maoric1 eq . then maoric1=9;
if pacificc1 eq . then pacificc1=9;
if asianc1 eq . then asianc1=9;
if nonmpac1 eq . then nonmpac1=9;

if MaoriC1 eq 1 then EthPr4_CanRC1=1;
else if PacificC1 eq 2 then EthPr4_CanRC1=2;
else if AsianC1 eq 4 then EthPr4_CanRC1=4;
else if MaoriC1 in (.,9) then EthPr4_CanRC1=9;
else if nonMPAC1 eq 5 then EthPr4_CanRC1=5;
else EthPr4_CanRC1=91;

if EthPr4_CanRC1 in (4,5) then EthPr3_CanRC1=3; else EthPr3_CanRC1=EthPr4_CanRC1;

if maoric1 in (1) and pacificc1 ne 2 and asianc1 ne 4
 and nonmpac1 ne 5 then EthSol4_CanRC1=1;
else if maoric1 ne 1 and pacificc1 in (2) and asianc1 ne 4
 and nonmpac1 ne 5 then EthSol4_CanRC1=2;
else if maoric1 ne 1 and pacificc1 ne 2 and asianc1 in (4)
 and nonmpac1 ne 5 then EthSol4_CanRC1=4;
else EthSol4_CanRC1=8;

Maori_CanR=abs(Maori_CanR);
Pacific_CanR=abs(Pacific_CanR);
Asian_CanR=abs(Asian_CanR);
nonMPA_CanR=abs(nonMPA_CanR);

if maori_CanR eq . then maori_CanR=9;
if pacific_CanR eq . then pacific_CanR=9;
if asian_CanR eq . then asian_CanR=9;
```

```
if nonmpa_CanR eq . then nonmpa_CanR=9;

if Maori_CanR eq 1 then EthPr4_CanRAll=1;
else if Pacific_CanR eq 2 then EthPr4_CanRAll=2;
else if Asian_CanR eq 4 then EthPr4_CanRAll=4;
else if Maori_CanR in (.,9) then EthPr4_CanRAll=9;
else if nonMPA_CanR eq 5 then EthPr4_CanRAll=5;
else EthPr4_CanRAll=91;

if EthPr4_CanRAll in (4,5) then EthPr3_CanRAll=3; else EthPr3_CanRAll=EthPr4_CanRAll;

if maori_CanR in (1) and pacific_CanR ne 2 and asian_CanR ne 4
 and nonmpa_CanR ne 5 then EthSol4_CanRAll=1;
else if maori_CanR ne 1 and pacific_CanR in (2) and asian_CanR ne 4
 and nonmpa_CanR ne 5 then EthSol4_CanRAll=2;
else if maori_CanR ne 1 and pacific_CanR ne 2 and asian_CanR in (4)
 and nonmpa_CanR ne 5 then EthSol4_CanRAll=4;
else EthSol4_CanRAll=8;

if MaoriC1 ne Maori_canr or pacificc1 ne pacific_canr
 or asianc1 ne asian_canr or nonmpac1 ne nonmpa_canr then DiffEthC1_CanRAll=1;
 else DiffEthC1_CanRAll=0;

if maoric1 eq 0 then maoric1=21;
if pacificc1 eq 0 then pacificc1=22;
if asianc1 eq 0 then asianc1=24;
if nonmpac1 eq 0 then nonmpac1=25;

if maori_CanR eq 0 then maori_CanR=21;
if pacific_CanR eq 0 then pacific_CanR=22;
if asian_CanR eq 0 then asian_CanR=24;
if nonmpa_CanR eq 0 then nonmpa_CanR=25;

if nonmpac1 eq 9 then nonMPc1=nonmpac1;
else if nonmpac1 eq 5 or asianc1 eq 4 then nonMPc1=3;
else nonmpc1=nonmpac1;

if nonmpa_CanR eq 9 then nonMP_CanR=nonmpa_CanR;
else if nonmpa_CanR eq 5 or asian_CanR eq 4 then nonMP_CanR=3;
else nonmp_CanR=nonmpa_CanR;

if maoric1 in (1,9) then TotMaoriC1=maoric1;
 else if pacificc1 eq 2 or asianc1 eq 4 then TotMaoriC1=11;
 else TotMaoriC1=5;
if pacificc1 in (2,9) then TotPacificC1=pacificc1;
 else if maoric1 eq 1 or asianc1 eq 4 then TotPacificC1=12;
 else TotPacificC1=5;
if asianc1 in (4,9) then TotAsianC1=asianc1;
```

```
 else if maoric1 eq 1 or pacificc1 eq 2 then TotAsianC1=14;
 else TotAsianC1=5;

if TotMaoriC1 eq . then TotMaoriC1=9;
if TotPacificC1 eq . then TotPacificC1=9;
if TotAsianC1 eq . then TotAsianC1=9;

if maori_CanR in (1,9) then TotMaori_CanR=maori_CanR;
 else if pacific_CanR eq 2 or asian_CanR eq 4 then TotMaori_CanR=11;
 else TotMaori_CanR=5;
if pacific_CanR in (2,9) then TotPacific_CanR=pacific_CanR;
 else if maori_CanR eq 1 or asian_CanR eq 4 then TotPacific_CanR=12;
 else TotPacific_CanR=5;
if asian_CanR in (4,9) then TotAsian_CanR=asian_CanR;
 else if maori_CanR eq 1 or pacific_CanR eq 2 then TotAsian_CanR=14;
 else TotAsian_CanR=5;

if TotMaori_CanR eq . then TotMaori_CanR=9;
if TotPacific_CanR eq . then TotPacific_CanR=9;
if TotAsian_CanR eq . then TotAsian_CanR=9;

if numdifficd eq . then numdifficd=0;
if numkidcancers eq . then numkidcancers=0;
if numythcancers eq . then numythcancers=0;

run;

%mend;

%makeunlk(year=1981);
%makeunlk(year=1986);
%makeunlk(year=1991);
%makeunlk(year=1996);
%makeunlk(year=2001);
```

See UnlockRatiosCreateDoRatio.sas for remainder of process.

Appendix 14. SAS Programme to use the Unlock Ratio Weights to Produce the Unlock Ratios

The following is the SAS programme in the Datalab (called UnlkRatiosCreateDoRatio last updated 16th July 2008) that uses the Unlock Weights to produce the Unlock Ratios.

```
/*Use Unlock weights which were created on Bias datasets for CancerTrends
  and produce Unlock Ratios
  Orig prog UnlockRatiosCreate.sas June Atkinson 6.5.2008
   The orig prog had formats (same as this prog), then it put on unlockflag flag and
   made the actual unlock ratios, then made tables of these ratios for exporting
   back to WSM.
This prog UnlockRatiosCreateDoRatio.sas 26.5.2008
  has the same formats as the orig prog at the start, then it goes straight into
  %maketabu macro (this macro same as in orig prog). This is where the two progs change.
  This prog then uses the unrounded output from those tables to generate unrounded Unlock
  Ratios.
  Code to make datasets and make the actual ratios was developed back at WSM but to be
  used here.
These unlock ratios are one per record. Separate program (CTUnlockCancSpecific.sas) will
  generate ratios for Cancer Specific records (i.e. multiple per person).

This program updated 16.7.2008 to get three more ethnicity variables (nonMP+Miss;
  nonMPA+Miss; Tot Euro/Other (actual total, can have M or P or A as well)) and two
  geographic variables (Regional Cancer grouping A and grouping B (diff splitting of
  Taranaki and Tairawhiti)) and some tables of counts for reports.

Put all the formats into a separate file so consistent with one per person and one per
cancer ratios 23.7.2008
*/

%include "p:\sasprogs\general\CTmacros.sas";
%persess(action=ABR,censusyr=AllYears);

libname Trans505 'P:\CTTempDatasets\Transfer050508';  /*This is the directory with the
   Unlock Weights from Bias to Unlock datasets*/

%include "p:\sasprogs\june\UnlkRatioFmts.sas";

options nocenter linesize=105 pageno=1;

/*Make extra ethnicity variables and Regional Cancer Variables*/
%macro xeth(year=);

data ctunlock.unlock&year(drop=tempeth1 tempeth2 tempeth3 tempeth4 tempeth5 tempeth6);
set ctunlock.unlock&year;
```

```
length TotMPAMiss_Cen TotMPAMiss_C1 TotMPAMiss_CanR
       TotMPMiss_Cen TotMPMiss_C1 TotMPMiss_CanR
       TotEurOth_Cen TotEurOth_C1 TotEurOth_CanR RegCanA RegCanB 3;
format TotMPAMiss_Cen TotMPAMiss_C1 TotMPAMiss_CanR
       TotMPMiss_Cen TotMPMiss_C1 TotMPMiss_CanR
       TotEurOth_Cen TotEurOth_C1 TotEurOth_CanR ftoteth. RegCanA RegCanB frcnab.;
label  TotMPAMiss_Cen='Census nonMPA+Missing (nonMPA+Miss, M or P or A)'
       TotMPAMiss_C1='CancerReg Diag 1 nonMPA+Missing (nonMPA+Miss, M or P or A)'
       TotMPAMiss_CanR='All CancerRegs nonMPA+Missing (nonMPA+Miss, M or P or A)'
       TotMPMiss_Cen='Census nonMP+Missing (nonMP+Miss, M or P)'
       TotMPMiss_C1='CancerReg Diag 1 nonMP+Missing (nonMP+Miss, M or P)'
       TotMPMiss_CanR='All CancerRegs nonMP+Missing (nonMP+Miss, M or P)'
       TotEurOth_Cen='Census Total European/Other Ethnicity (Euro/Othr, notRelevant,
unknown)'
       TotEurOth_C1='CancerReg Diag 1 Total European/Other Ethnicity (Euro/Othr,
notRelevant, unknown)'
       TotEurOth_CanR='All CancerRegs Total European/Other Ethnicity (Euro/Othr,
notRelevant, unknown)'
       RegCanA='Regional Cancer Network A'
       RegCanB='Regional Cancer Network B'
       ;
if totmaori_cen in (5,9,.) then TotMPAMiss_Cen=35; else TotMPAMiss_Cen=25;
if totmaoric1 in (5,9,.) then TotMPAMiss_C1=35; else TotMPAMiss_C1=25;
if totmaori_canr in (5,9,.) then TotMPAMiss_Canr=35; else TotMPAMiss_Canr=25;

if totasian_cen in (5,9,.,4) then TotMPMiss_Cen=33; else TotMPMiss_Cen=23;
if totasianc1 in (5,9,.,4) then TotMPMiss_C1=33; else TotMPMiss_C1=23;
if totasian_canr in (5,9,.,4) then TotMPMiss_Canr=33; else TotMPMiss_Canr=23;

tempeth1=input(ethdet1,iethgp.);
tempeth2=input(ethdet2,iethgp.);
tempeth3=input(ethdet3,iethgp.);
%if "&year" eq "2001" %then %do;
 tempeth4=input(ethdet4,iethgp.);
 tempeth5=input(ethdet5,iethgp.);
 tempeth6=input(ethdet6,iethgp.);
%end;
%else %do;
 tempeth4=.;
 tempeth5=.;
 tempeth6=.;
%end;
if tempeth1 eq 5 or tempeth2 eq 5 or tempeth3 eq 5 or tempeth4 eq 5 or tempeth5 eq 5 or
  tempeth6 eq 5 then TotEurOth_Cen=46;
else if tempeth1 in (.,9,80,97,98) then TotEurOth_Cen=9;
else TotEurOth_Cen=25;
if nonmp_Canr eq 25 then nonmp_canr=23;
if nonmpc1 eq 25 then nonmpc1=23;
```

```
if nonmpac1 eq 5 then TotEurOth_C1=46; else TotEurOth_C1=nonmpac1;
if nonmpa_canr eq 5 then TotEurOth_Canr=46; else TotEurOth_Canr=nonmpa_canr;
regcana=input(g_dhb,ircna.);
regcanb=input(g_dhb,ircnb.);
run;

%mend;

%xeth(year=1981);
%xeth(year=1986);
%xeth(year=1991);
%xeth(year=1996);
%xeth(year=2001);

/*Producing summaries for "one rec per person"*/

%macro makeTabU(year=);

%let yr=%substr(&year,3,2);
%if "&year" eq "1981" or "&year" eq "1986" %then %let yrx=91;
%else %let yrx=&yr;

proc summary data=ctunlock.unlock&year chartype missing;
class  CenYear   EthIndMaori_Cen    MaoriC1           Maori_CanR
                 EthIndPacific_Cen  PacificC1         Pacific_CanR
                 EthIndAsian_Cen    AsianC1           Asian_CanR
                 EthIndnonMPA_Cen   nonMPAC1          nonMPA_CanR
                 EthIndnonMP_Cen    nonMPC1           nonMP_CanR
                 TotMaori_Cen       TotMaoriC1        TotMaori_CanR
                 TotPacific_Cen     TotPacificC1      TotPacific_CanR
                 TotAsian_Cen       TotAsianC1        TotAsian_CanR
                 EthPr3_Cen         EthPr3_CanRAll    EthPr3_CanRC1
                 EthPr4_Cen         EthPr4_CanRAll    EthPr4_CanRC1
                 EthSol4_Cen        EthSol4_CanRAll   EthSol4_CanRC1
                 TotMPAMiss_Cen     TotMPAMiss_C1     TotMPAMiss_CanR
                 TotMPMiss_Cen      TotMPMiss_C1      TotMPMiss_CanR
                 TotEurOth_Cen      TotEurOth_C1      TotEurOth_CanR
 sex             Age10yrs       Age5Yrs           AgeGpA         AgeGpB         AgeGpC
 AuMob01Grp      AuMobGrp4      AuMobilityGrp10          changedAU01
 CtryBrth        CtryPresFlag   DiffEthC1_CanRAll
 G_TA            G_RHA          G_DHB             G_RC           G_AHB          G_AHD
 G_Rur01Grp      G_Rurality01   g_rur1            g_rur2
 LinkStat        MBAU           NZDep3            NZDep2001      NZDep2001Grp
 NumDiffICD      NumKidCancers  NumYthCancers     timeSinceCenGp
%if "&year" ne "2001" %then %do;
 G_Rur&yr.Grp    G_Rurality&yr  g_rur&yr._1       g_rur&yr._2
 NZDep&yrx._3    NZDep&yrx      NZDep&yrx.Grp
%end;
```

```
%if "&year" eq "1996" %then %do;
 changedau96
%end;
RegCanA RegCanB;

var link WgtUnlock;
types CenYear
 EthIndMaori_Cen    MaoriC1             Maori_CanR
 EthIndPacific_Cen  PacificC1           Pacific_CanR
 EthIndAsian_Cen    AsianC1             Asian_CanR
 EthIndnonMPA_Cen   nonMPAC1            nonMPA_CanR
 EthIndnonMP_Cen    nonMPC1             nonMP_CanR
 TotMaori_Cen       TotMaoriC1          TotMaori_CanR
 TotPacific_Cen     TotPacificC1        TotPacific_CanR
 TotAsian_Cen       TotAsianC1          TotAsian_CanR
 EthPr3_Cen         EthPr3_CanRAll      EthPr3_CanRC1
 EthPr4_Cen         EthPr4_CanRAll      EthPr4_CanRC1
 EthSol4_Cen        EthSol4_CanRAll     EthSol4_CanRC1
 TotMPAMiss_Cen     TotMPAMiss_C1       TotMPAMiss_CanR
 TotMPMiss_Cen      TotMPMiss_C1        TotMPMiss_CanR
 TotEurOth_Cen      TotEurOth_C1        TotEurOth_CanR
 sex                Age10yrs            Age5Yrs
 AgeGpA             AgeGpB              AgeGpC
 AuMob01Grp         AuMobGrp4           AuMobilityGrp10      changedAU01
 CtryBrth           CtryPresFlag        DiffEthC1_CanRAll
 G_TA    G_RHA      G_DHB    G_RC       G_AHB    G_AHD
 G_Rur01Grp         G_Rurality01        g_rur1   g_rur2
 LinkStat     MBAU   NZDep3  NZDep2001  NZDep2001Grp
 NumDiffICD   NumKidCancers  NumYthCancers  timeSinceCenGp
%if "&year" ne "2001" %then %do;
 G_Rur&yr.Grp   G_Rurality&yr     g_rur&yr._1    g_rur&yr._2
 NZDep&yrx._3   NZDep&yrx         NZDep&yrx.Grp
%end;
%if "&year" eq "1996" %then %do;
 changedau96
%end;
RegCanA RegCanB

(EthIndMaori_Cen MaoriC1 Maori_CanR)*(sex Age10yrs Age5Yrs AgeGpA AgeGpB AgeGpC)
(EthIndPacific_Cen PacificC1 Pacific_CanR)*(sex Age10yrs Age5Yrs AgeGpA AgeGpB AgeGpC)
(EthIndAsian_Cen AsianC1 Asian_CanR)*(sex Age10yrs Age5Yrs AgeGpA AgeGpB AgeGpC)
(EthIndnonMPA_Cen nonMPAC1 nonMPA_CanR)*(sex Age10yrs Age5Yrs AgeGpA AgeGpB AgeGpC)
(EthIndnonMP_Cen nonMPC1 nonMP_CanR)*(sex Age10yrs Age5Yrs AgeGpA AgeGpB AgeGpC)
(TotMaori_Cen TotMaoriC1 TotMaori_CanR)*(sex Age10yrs Age5Yrs AgeGpA AgeGpB AgeGpC)
(TotPacific_Cen TotPacificC1 TotPacific_CanR)*(sex Age10yrs Age5Yrs AgeGpA AgeGpB AgeGpC)
(TotAsian_Cen TotAsianC1 TotAsian_CanR)*(sex Age10yrs Age5Yrs AgeGpA AgeGpB AgeGpC)
(EthPr3_Cen EthPr3_CanRAll EthPr3_CanRC1)*(sex Age10yrs Age5Yrs AgeGpA AgeGpB AgeGpC)
(EthPr4_Cen EthPr4_CanRAll EthPr4_CanRC1)*(sex Age10yrs Age5Yrs AgeGpA AgeGpB AgeGpC)
```

```
(EthSol4_Cen EthSol4_CanRAll EthSol4_CanRC1)*(sex Age1Oyrs Age5Yrs AgeGpA AgeGpB AgeGpC)
(TotMPAMiss_Cen TotMPAMiss_C1 TotMPAMiss_CanR)*(sex Age1Oyrs Age5Yrs AgeGpA AgeGpB
     AgeGpC)
(TotMPMiss_Cen TotMPMiss_C1 TotMPMiss_CanR)*(sex Age1Oyrs Age5Yrs AgeGpA AgeGpB AgeGpC)
(TotEurOth_Cen TotEurOth_C1 TotEurOth_CanR)*(sex Age1Oyrs Age5Yrs AgeGpA AgeGpB AgeGpC)

EthPr3_Cen*(EthPr3_CanRAll EthPr3_CanRC1)*(sex Age1Oyrs Age5Yrs AgeGpA AgeGpB AgeGpC)
EthPr4_Cen*(EthPr4_CanRAll EthPr4_CanRC1)*(sex Age1Oyrs Age5Yrs AgeGpA AgeGpB AgeGpC)
EthSol4_Cen*(EthSol4_CanRAll EthSol4_CanRC1)*(sex Age1Oyrs Age5Yrs AgeGpA AgeGpB AgeGpC)

(EthIndMaori_Cen MaoriC1 Maori_CanR)*sex*(Age1Oyrs Age5Yrs AgeGpA AgeGpB AgeGpC)
(EthIndPacific_Cen PacificC1 Pacific_CanR)*sex*(Age1Oyrs Age5Yrs AgeGpA AgeGpB AgeGpC)
(EthIndAsian_Cen AsianC1 Asian_CanR)*sex*(Age1Oyrs Age5Yrs AgeGpA AgeGpB AgeGpC)
(EthIndnonMPA_Cen nonMPAC1 nonMPA_CanR)*sex*(Age1Oyrs Age5Yrs AgeGpA AgeGpB AgeGpC)
(EthIndnonMP_Cen nonMPC1 nonMP_CanR)*sex*(Age1Oyrs Age5Yrs AgeGpA AgeGpB AgeGpC)
(TotMaori_Cen TotMaoriC1 TotMaori_CanR)*sex*(Age1Oyrs Age5Yrs AgeGpA AgeGpB AgeGpC)
(TotPacific_Cen TotPacificC1 TotPacific_CanR)*sex*(Age1Oyrs Age5Yrs AgeGpA AgeGpB AgeGpC)
(TotAsian_Cen TotAsianC1 TotAsian_CanR)*sex*(Age1Oyrs Age5Yrs AgeGpA AgeGpB AgeGpC)
(EthPr3_Cen EthPr3_CanRAll EthPr3_CanRC1)*sex*(Age1Oyrs Age5Yrs AgeGpA AgeGpB AgeGpC)
(EthPr4_Cen EthPr4_CanRAll EthPr4_CanRC1)*sex*(Age1Oyrs Age5Yrs AgeGpA AgeGpB AgeGpC)
(EthSol4_Cen EthSol4_CanRAll EthSol4_CanRC1)*sex*(Age1Oyrs Age5Yrs AgeGpA AgeGpB AgeGpC)
(TotMPAMiss_Cen TotMPAMiss_C1 TotMPAMiss_CanR)*sex*(Age1Oyrs Age5Yrs AgeGpA AgeGpB
     AgeGpC)
(TotMPMiss_Cen TotMPMiss_C1 TotMPMiss_CanR)*sex*(Age1Oyrs Age5Yrs AgeGpA AgeGpB AgeGpC)
(TotEurOth_Cen TotEurOth_C1 TotEurOth_CanR)*sex*(Age1Oyrs Age5Yrs AgeGpA AgeGpB AgeGpC)

EthPr3_Cen*(EthPr3_CanRAll EthPr3_CanRC1)*sex*(Age1Oyrs Age5Yrs AgeGpA AgeGpB AgeGpC)
EthPr4_Cen*(EthPr4_CanRAll EthPr4_CanRC1)*sex*(Age1Oyrs Age5Yrs AgeGpA AgeGpB AgeGpC)
EthSol4_Cen*(EthSol4_CanRAll EthSol4_CanRC1)*sex*(Age1Oyrs Age5Yrs AgeGpA AgeGpB AgeGpC)


(EthIndMaori_Cen MaoriC1 Maori_CanR)*(CenYear sex Age1Oyrs Age5Yrs AgeGpA AgeGpB AgeGpC)
*( AuMobO1Grp     AuMobGrp4      AuMobilityGrp1O   changedAUO1
   CtryBrth       CtryPresFlag   DiffEthC1_CanRAll
   G_TA    G_RHA   G_DHB    G_RC     G_AHB    G_AHD
   G_RurO1Grp     G_RuralityO1    g_rur1    g_rur2
   LinkStat       MBAU      NZDep3    NZDep2OO1     NZDep2OO1Grp
   NumDiffICD     NumKidCancers  NumYthCancers  timeSinceCenGp
   %if "&year" ne "2OO1" %then %do;
    G_Rur&yr.Grp    G_Rurality&yr     g_rur&yr._1    g_rur&yr._2
    NZDep&yrx._3    NZDep&yrx         NZDep&yrx.Grp
   %end;
   %if "&year" eq "1996" %then %do;
    changedau96
   %end;
   RegCanA RegCanB
)
```

```
(EthIndPacific_Cen PacificC1 Pacific_CanR)*(CenYear sex Age1Oyrs Age5Yrs AgeGpA AgeGpB
    AgeGpC)
*(AuMobO1Grp     AuMobGrp4      AuMobilityGrp1O   changedAUO1
 CtryBrth        CtryPresFlag   DiffEthC1_CanRAll
 G_TA    G_RHA   G_DHB    G_RC     G_AHB    G_AHD
 G_RurO1Grp      G_RuralityO1   g_rur1    g_rur2
 LinkStat     MBAU   NZDep3   NZDep2OO1    NZDep2OO1Grp
 NumDiffICD     NumKidCancers  NumYthCancers   timeSinceCenGp
%if "&year" ne "2OO1" %then %do;
 G_Rur&yr.Grp    G_Rurality&yr     g_rur&yr._1    g_rur&yr._2
 NZDep&yrx._3    NZDep&yrx         NZDep&yrx.Grp
%end;
%if "&year" eq "1996" %then %do;
 changedau96
%end;
RegCanA RegCanB)

(EthIndAsian_Cen AsianC1 Asian_CanR)*(CenYear sex Age1Oyrs Age5Yrs AgeGpA AgeGpB AgeGpC)
*(AuMobO1Grp     AuMobGrp4      AuMobilityGrp1O   changedAUO1
  CtryBrth       CtryPresFlag   DiffEthC1_CanRAll
  G_TA    G_RHA   G_DHB    G_RC     G_AHB    G_AHD
  G_RurO1Grp      G_RuralityO1   g_rur1    g_rur2
  LinkStat     MBAU   NZDep3 NZDep2OO1  NZDep2OO1Grp
  NumDiffICD     NumKidCancers  NumYthCancers   timeSinceCenGp
  %if "&year" ne "2OO1" %then %do;
   G_Rur&yr.Grp    G_Rurality&yr     g_rur&yr._1    g_rur&yr._2
   NZDep&yrx._3    NZDep&yrx         NZDep&yrx.Grp
  %end;
  %if "&year" eq "1996" %then %do;
   changedau96
  %end;
  RegCanA RegCanB)

(EthIndnonMPA_Cen nonMPAC1 nonMPA_CanR)*(CenYear sex Age1Oyrs Age5Yrs AgeGpA AgeGpB
    AgeGpC)
*(AuMobO1Grp      AuMobGrp4      AuMobilityGrp1O   changedAUO1
  CtryBrth        CtryPresFlag   DiffEthC1_CanRAll
  G_TA    G_RHA   G_DHB    G_RC     G_AHB    G_AHD
  G_RurO1Grp      G_RuralityO1   g_rur1    g_rur2
  LinkStat     MBAU   NZDep3 NZDep2OO1  NZDep2OO1Grp
  NumDiffICD     NumKidCancers  NumYthCancers  timeSinceCenGp
  %if "&year" ne "2OO1" %then %do;
   G_Rur&yr.Grp    G_Rurality&yr     g_rur&yr._1    g_rur&yr._2
   NZDep&yrx._3    NZDep&yrx         NZDep&yrx.Grp
  %end;
  %if "&year" eq "1996" %then %do;
   changedau96
  %end;
```

```
RegCanA RegCanB)

(EthIndnonMP_Cen nonMPC1 nonMP_CanR)*(CenYear sex Age1Oyrs Age5Yrs AgeGpA AgeGpB AgeGpC)
*(AuMobO1Grp     AuMobGrp4      AuMobilityGrp1O   changedAUO1
  CtryBrth       CtryPresFlag   DiffEthC1_CanRAll
  G_TA    G_RHA   G_DHB    G_RC     G_AHB    G_AHD
  G_RurO1Grp    G_RuralityO1   g_rur1    g_rur2
  LinkStat     MBAU   NZDep3   NZDep2OO1  NZDep2OO1Grp
  NumDiffICD     NumKidCancers  NumYthCancers  timeSinceCenGp
  %if "&year" ne "2OO1" %then %do;
   G_Rur&yr.Grp G_Rurality&yr     g_rur&yr._1    g_rur&yr._2
   NZDep&yrx._3    NZDep&yrx  NZDep&yrx.Grp
  %end;
  %if "&year" eq "1996" %then %do;
   changedau96
  %end;
  RegCanA RegCanB)

(TotMaori_Cen TotMaoriC1 TotMaori_CanR)*(CenYear sex Age1Oyrs Age5Yrs AgeGpA AgeGpB
    AgeGpC)
*(AuMobO1Grp     AuMobGrp4      AuMobilityGrp1O   changedAUO1
  CtryBrth       CtryPresFlag   DiffEthC1_CanRAll
  G_TA    G_RHA   G_DHB    G_RC     G_AHB    G_AHD
  G_RurO1Grp      G_RuralityO1 g_rur1    g_rur2
  LinkStat       MBAU   NZDep3 NZDep2OO1  NZDep2OO1Grp
  NumDiffICD     NumKidCancers  NumYthCancers  timeSinceCenGp
  %if "&year" ne "2OO1" %then %do;
   G_Rur&yr.Grp    G_Rurality&yr     g_rur&yr._1    g_rur&yr._2
   NZDep&yrx._3    NZDep&yrx         NZDep&yrx.Grp
  %end;
  %if "&year" eq "1996" %then %do;
   changedau96
  %end;
  RegCanA RegCanB)

(TotPacific_Cen TotPacificC1 TotPacific_CanR)*(CenYear sex Age1Oyrs Age5Yrs AgeGpA AgeGpB
    AgeGpC)
*(AuMobO1Grp     AuMobGrp4      AuMobilityGrp1O   changedAUO1
  CtryBrth       CtryPresFlag   DiffEthC1_CanRAll
  G_TA    G_RHA   G_DHB    G_RC     G_AHB    G_AHD
  G_RurO1Grp      G_RuralityO1 g_rur1    g_rur2
  LinkStat       MBAU   NZDep3   NZDep2OO1  NZDep2OO1Grp
  NumDiffICD     NumKidCancers   NumYthCancers  timeSinceCenGp
  %if "&year" ne "2OO1" %then %do;
   G_Rur&yr.Grp    G_Rurality&yr     g_rur&yr._1    g_rur&yr._2
   NZDep&yrx._3    NZDep&yrx         NZDep&yrx.Grp
  %end;
  %if "&year" eq "1996" %then %do;
```

```
   changedau96
  %end;
  RegCanA RegCanB)

(TotAsian_Cen TotAsianC1 TotAsian_CanR)*(CenYear sex Age1Oyrs Age5Yrs AgeGpA AgeGpB
    AgeGpC)
*(AuMobO1Grp     AuMobGrp4      AuMobilityGrp1O   changedAUO1
  CtryBrth       CtryPresFlag   DiffEthC1_CanRAll
  G_TA    G_RHA   G_DHB    G_RC     G_AHB    G_AHD
  G_RurO1Grp     G_Rurality01 g_rur1    g_rur2
  LinkStat       MBAU   NZDep3   NZDep2OO1  NZDep2OO1Grp
  NumDiffICD     NumKidCancers   NumYthCancers  timeSinceCenGp
  %if "&year" ne "2OO1" %then %do;
   G_Rur&yr.Grp    G_Rurality&yr     g_rur&yr._1    g_rur&yr._2
   NZDep&yrx._3    NZDep&yrx         NZDep&yrx.Grp
  %end;
  %if "&year" eq "1996" %then %do;
   changedau96
  %end;
  RegCanA RegCanB)

(EthPr3_Cen EthPr3_CanRAll EthPr3_CanRC1)*(CenYear sex Age1Oyrs Age5Yrs AgeGpA AgeGpB
    AgeGpC)
*(AuMobO1Grp     AuMobGrp4      AuMobilityGrp1O   changedAUO1
  CtryBrth       CtryPresFlag   DiffEthC1_CanRAll
  G_TA    G_RHA   G_DHB    G_RC     G_AHB    G_AHD
  G_RurO1Grp     G_Rurality01 g_rur1    g_rur2
  LinkStat       MBAU   NZDep3  NZDep2OO1  NZDep2OO1Grp
  NumDiffICD     NumKidCancers  NumYthCancers   timeSinceCenGp
  %if "&year" ne "2OO1" %then %do;
   G_Rur&yr.Grp    G_Rurality&yr     g_rur&yr._1    g_rur&yr._2
   NZDep&yrx._3    NZDep&yrx         NZDep&yrx.Grp
  %end;
  %if "&year" eq "1996" %then %do;
   changedau96
  %end;
  RegCanA RegCanB)

(TotMPAMiss_Cen TotMPAMiss_C1 TotMPAMiss_CanR)*(CenYear sex Age1Oyrs Age5Yrs AgeGpA
    AgeGpB AgeGpC)
*(AuMobO1Grp     AuMobGrp4      AuMobilityGrp1O   changedAUO1
  CtryBrth       CtryPresFlag   DiffEthC1_CanRAll
  G_TA    G_RHA   G_DHB    G_RC     G_AHB    G_AHD
  G_RurO1Grp    G_RuralityO1  g_rur1     g_rur2
  LinkStat      MBAU   NZDep3 NZDep2OO1  NZDep2OO1Grp
  NumDiffICD     NumKidCancers  NumYthCancers  timeSinceCenGp
  %if "&year" ne "2OO1" %then %do;
   G_Rur&yr.Grp    G_Rurality&yr     g_rur&yr._1    g_rur&yr._2
```

```
   NZDep&yrx._3    NZDep&yrx  NZDep&yrx.Grp
  %end;
  %if "&year" eq "1996" %then %do;
   changedau96
  %end;
  RegCanA RegCanB)

(TotMPMiss_Cen TotMPMiss_C1 TotMPMiss_CanR)*(CenYear sex Age1Oyrs Age5Yrs AgeGpA AgeGpB
    AgeGpC)
*(AuMobO1Grp     AuMobGrp4      AuMobilityGrp1O   changedAUO1
  CtryBrth       CtryPresFlag   DiffEthC1_CanRAll
  G_TA    G_RHA   G_DHB    G_RC     G_AHB    G_AHD
  G_RurO1Grp    G_RuralityO1 g_rur1    g_rur2
  LinkStat      MBAU   NZDep3  NZDep2OO1  NZDep2OO1Grp
  NumDiffICD    NumKidCancers  NumYthCancers  timeSinceCenGp
  %if "&year" ne "2OO1" %then %do;
   G_Rur&yr.Grp    G_Rurality&yr     g_rur&yr._1    g_rur&yr._2
   NZDep&yrx._3    NZDep&yrx         NZDep&yrx.Grp
  %end;
  %if "&year" eq "1996" %then %do;
   changedau96
  %end;
  RegCanA RegCanB)

(TotEurOth_Cen TotEurOth_C1 TotEurOth_CanR)*(CenYear sex Age1Oyrs Age5Yrs AgeGpA AgeGpB
    AgeGpC)
*(AuMobO1Grp     AuMobGrp4      AuMobilityGrp1O   changedAUO1
  CtryBrth       CtryPresFlag   DiffEthC1_CanRAll
  G_TA    G_RHA   G_DHB    G_RC     G_AHB    G_AHD
  G_RurO1Grp     G_RuralityO1 g_rur1    g_rur2
  LinkStat       MBAU   NZDep3  NZDep2OO1  NZDep2OO1Grp
  NumDiffICD     NumKidCancers  NumYthCancers  timeSinceCenGp
  %if "&year" ne "2OO1" %then %do;
   G_Rur&yr.Grp    G_Rurality&yr     g_rur&yr._1    g_rur&yr._2
   NZDep&yrx._3    NZDep&yrx  NZDep&yrx.Grp
  %end;
  %if "&year" eq "1996" %then %do;
   changedau96
  %end;
  RegCanA RegCanB)

EthPr3_Cen*(EthPr3_CanRAll EthPr3_CanRC1)*(CenYear sex Age1Oyrs Age5Yrs AgeGpA AgeGpB
   AgeGpC)
*(AuMobO1Grp     AuMobGrp4      AuMobilityGrp1O   changedAUO1
  CtryBrth       CtryPresFlag   DiffEthC1_CanRAll
  G_TA    G_RHA   G_DHB    G_RC     G_AHB    G_AHD
  G_RurO1Grp      G_RuralityO1 g_rur1    g_rur2
  LinkStat     MBAU   NZDep3 NZDep2OO1  NZDep2OO1Grp
```

```
   NumDiffICD     NumKidCancers  NumYthCancers  timeSinceCenGp
  %if "&year" ne "2001" %then %do;
   G_Rur&yr.Grp    G_Rurality&yr     g_rur&yr._1    g_rur&yr._2
   NZDep&yrx._3    NZDep&yrx         NZDep&yrx.Grp
  %end;
  %if "&year" eq "1996" %then %do;
   changedau96
  %end;
  RegCanA RegCanB)

(EthPr4_Cen EthPr4_CanRAll EthPr4_CanRC1)*(CenYear sex Age10yrs Age5Yrs AgeGpA AgeGpB
    AgeGpC)
*(AuMob01Grp     AuMobGrp4      AuMobilityGrp10   changedAU01
  CtryBrth       CtryPresFlag   DiffEthC1_CanRAll
  G_TA    G_RHA   G_DHB    G_RC     G_AHB    G_AHD
  G_Rur01Grp     G_Rurality01  g_rur1    g_rur2
  LinkStat       MBAU   NZDep3 NZDep2001  NZDep2001Grp
  NumDiffICD     NumKidCancers  NumYthCancers  timeSinceCenGp
  %if "&year" ne "2001" %then %do;
   G_Rur&yr.Grp    G_Rurality&yr     g_rur&yr._1    g_rur&yr._2
   NZDep&yrx._3    NZDep&yrx         NZDep&yrx.Grp
  %end;
  %if "&year" eq "1996" %then %do;
   changedau96
  %end;
  RegCanA RegCanB)

EthPr4_Cen*(EthPr4_CanRAll EthPr4_CanRC1)*(CenYear sex Age10yrs Age5Yrs AgeGpA AgeGpB
   AgeGpC)
*(AuMob01Grp     AuMobGrp4      AuMobilityGrp10   changedAU01
  CtryBrth       CtryPresFlag   DiffEthC1_CanRAll
  G_TA    G_RHA   G_DHB    G_RC     G_AHB    G_AHD
  G_Rur01Grp    G_Rurality01 g_rur1    g_rur2
  LinkStat      MBAU   NZDep3   NZDep2001  NZDep2001Grp
  NumDiffICD     NumKidCancers  NumYthCancers  timeSinceCenGp
  %if "&year" ne "2001" %then %do;
   G_Rur&yr.Grp    G_Rurality&yr     g_rur&yr._1    g_rur&yr._2
   NZDep&yrx._3    NZDep&yrx         NZDep&yrx.Grp
  %end;
  %if "&year" eq "1996" %then %do;
   changedau96
  %end;
  RegCanA RegCanB)

(EthSol4_Cen EthSol4_CanRAll EthSol4_CanRC1)*(CenYear sex Age10yrs Age5Yrs AgeGpA AgeGpB
    AgeGpC)
*(AuMob01Grp     AuMobGrp4      AuMobilityGrp10   changedAU01
  CtryBrth       CtryPresFlag   DiffEthC1_CanRAll
```

```
  G_TA    G_RHA   G_DHB    G_RC     G_AHB    G_AHD
  G_Rur01Grp    G_Rurality01 g_rur1    g_rur2
  LinkStat       MBAU   NZDep3  NZDep2001  NZDep2001Grp
  NumDiffICD     NumKidCancers  NumYthCancers  timeSinceCenGp
  %if "&year" ne "2001" %then %do;
   G_Rur&yr.Grp    G_Rurality&yr     g_rur&yr._1    g_rur&yr._2
   NZDep&yrx._3    NZDep&yrx         NZDep&yrx.Grp
  %end;
  %if "&year" eq "1996" %then %do;
   changedau96
  %end;
  RegCanA RegCanB)

EthSol4_Cen*(EthSol4_CanRAll EthSol4_CanRC1)*(CenYear sex Age10yrs Age5Yrs AgeGpA AgeGpB
   AgeGpC)
*(AuMob01Grp     AuMobGrp4      AuMobilityGrp10   changedAU01
  CtryBrth       CtryPresFlag   DiffEthC1_CanRAll
  G_TA    G_RHA   G_DHB    G_RC     G_AHB    G_AHD
  G_Rur01Grp     G_Rurality01   g_rur1    g_rur2
  LinkStat       MBAU   NZDep3  NZDep2001  NZDep2001Grp
  NumDiffICD     NumKidCancers  NumYthCancers  timeSinceCenGp
  %if "&year" ne "2001" %then %do;
   G_Rur&yr.Grp    G_Rurality&yr     g_rur&yr._1    g_rur&yr._2
   NZDep&yrx._3    NZDep&yrx         NZDep&yrx.Grp
  %end;
  %if "&year" eq "1996" %then %do;
   changedau96
  %end;
  RegCanA RegCanB)
;
output out=texport.sumunlocktab&year sum=sumLink SumWgted;
run;

data texport.sumunlocktab&year(drop=i);
set texport.sumunlocktab&year(drop=_freq_);
format sumlink;
numcomb=0;
do i=1 to length(_type_);
 if substr(_type_,i,1) eq '1' then numcomb=numcomb+1;
end;
sumwgted=round(sumwgted);
run;

%mend;

%makeTabU(year=1981);
%makeTabU(year=1986);
%makeTabU(year=1991);
```

```
%makeTabU(year=1996);
%makeTabU(year=2001);

/*Now sort out the datasets and generate the ratios (as per WSM prog)
  CTUnlockRatios.23.5.2008*/

%macro getdat(year=);

%let yr=%substr(&year,3,2);
%if "&year" eq "1981" or "&year" eq "1986" %then %let yrx=91;
%else %let yrx=&yr;

data sumunlocktab&year;
set texport.sumunlocktab&year;
format linkstat mbau $fLkStA.;
if nonMPC1 eq 25 then nonMPC1=23;
if nonMP_CanR eq 25 then nonMP_Canr=23;
if ethIndnonMP_Cen eq 25 then ethindnonMP_Cen=23;
if EthIndPacific_Cen eq 9 or PacificC1 eq 9 or Pacific_CanR eq 9 then delete;
if EthIndAsian_Cen eq 9 or AsianC1 eq 9 or Asian_CanR eq 9 then delete;
if EthIndnonMPA_Cen eq 9 or nonMPAC1 eq 9 or nonMPA_CanR eq 9 then delete;
if EthIndnonMP_Cen eq 9 or nonMPC1 eq 9 or nonMP_CanR eq 9 then delete;
if TotMaori_Cen eq 11 or TotMaoriC1 eq 11 or TotMaori_CanR eq 11 then delete;
if TotPacific_Cen in (5,9,12) or TotPacificC1 in (5,9,12) or
  TotPacific_CanR in (5,9,12) then delete;
if TotAsian_Cen in (5,9,14) or TotAsianC1 in (5,9,14) or
  TotAsian_CanR in (5,9,14) then delete;
if TotMPAMiss_Cen in (25) or TotMPAMiss_C1 in (25) or
  TotMPAMiss_CanR in (25) then delete;     /*Added 16.7.2008*/
if TotMPMiss_Cen in (23) or TotMPMiss_C1 in (23) or
  TotMPMiss_CanR in (23) then delete;      /*Added 16.7.2008*/
if regcanb in (891,897) then delete;       /*Added 16.7.2008*/
run;

data unlocktab&year
(keep=cenyear sex agegroup EthType CenCode Cen_sumlink Cen_sumWgted
 C1Code C1_sumlink C1_sumWgted CanRCode CanR_sumlink CanR_sumWgted
 Var_1 Val_1 numcomb sumlink sumwgted HasEth);
set sumunlocktab&year;
length allvarstrg $1000 tempname $20
 Var_1 Val_1  AgeGroup EthType  CenCode Cen_sumlink Cen_sumWgted
 C1Code C1_sumlink C1_sumWgted CanRCode CanR_sumlink CanR_sumWgted 8;
array Varith {*} Var_1;
array Valith {*} Val_1;
array alllist {*} CenYear EthIndMaori_Cen MaoriC1 Maori_CanR EthIndPacific_Cen
 PacificC1 Pacific_CanR EthIndAsian_Cen AsianC1 Asian_CanR EthIndnonMPA_Cen
 nonMPAC1 nonMPA_CanR EthIndnonMP_Cen nonMPC1 nonMP_CanR TotMaori_Cen
 TotMaoriC1 TotMaori_CanR TotPacific_Cen TotPacificC1 TotPacific_CanR
```

```
 TotAsian_Cen TotAsianC1 TotAsian_CanR EthPr3_Cen EthPr3_CanRAll EthPr3_CanRC1
 EthPr4_Cen EthPr4_CanRAll EthPr4_CanRC1 EthSol4_Cen
 EthSol4_CanRAll EthSol4_CanRC1
 TotMPAMiss_Cen TotMPAMiss_C1 TotMPAMiss_CanR
 TotMPMiss_Cen TotMPMiss_C1 TotMPMiss_CanR
 TotEurOth_Cen TotEurOth_C1 TotEurOth_CanR
 sex Age1Oyrs Age5Yrs AgeGpA AgeGpB AgeGpC
 AuMobO1Grp AuMobGrp4 AuMobilityGrp1O changedAUO1
 CtryBrth CtryPresFlag DiffEthC1_CanRAll
 G_TA G_RHA G_DHB G_RC G_AHB G_AHD G_RurO1Grp G_RuralityO1 g_rur1 g_rur2
 tempLinkStat tempMBAU NZDep3 NZDep2OO1 NZDep2OO1Grp
 NumDiffICD NumKidCancers NumYthCancers timeSinceCenGp
%if "&year" ne "2OO1" %then %do;
 G_Rur&yr.Grp G_Rurality&yr g_rur&yr._1 g_rur&yr._2
 NZDep&yrx._3 NZDep&yrx NZDep&yrx.Grp
%end;
%if "&year" eq "1996" %then %do;
 changedau96
%end;
RegCanA RegCanB
;
format Var_1  fvara. Val_1  AgeGroup fvalcomb.;
format CenCode C1Code CanRCode  fvalcomb.;
allvarstrg="CenYear EthIndMaori_Cen MaoriC1 Maori_CanR EthIndPacific_Cen
 PacificC1 Pacific_CanR EthIndAsian_Cen AsianC1 Asian_CanR EthIndnonMPA_Cen"
 ||" nonMPAC1 nonMPA_CanR EthIndnonMP_Cen nonMPC1 nonMP_CanR TotMaori_Cen
 TotMaoriC1 TotMaori_CanR TotPacific_Cen TotPacificC1 TotPacific_CanR"
 ||" TotAsian_Cen TotAsianC1 TotAsian_CanR EthPr3_Cen EthPr3_CanRAll EthPr3_CanRC1
 EthPr4_Cen EthPr4_CanRAll EthPr4_CanRC1 EthSol4_Cen"
 ||" EthSol4_CanRAll EthSol4_CanRC1
 TotMPAMiss_Cen TotMPAMiss_C1 TotMPAMiss_CanR"
 ||" TotMPMiss_Cen TotMPMiss_C1 TotMPMiss_CanR
 TotEurOth_Cen TotEurOth_C1 TotEurOth_CanR"
 ||" sex Age1Oyrs Age5Yrs AgeGpA AgeGpB AgeGpC"
 ||" AuMobO1Grp AuMobGrp4 AuMobilityGrp1O changedAUO1
 CtryBrth CtryPresFlag DiffEthC1_CanRAll"
 ||" G_TA G_RHA G_DHB G_RC G_AHB G_AHD G_RurO1Grp G_RuralityO1 g_rur1 g_rur2
 LinkStat MBAU NZDep3 NZDep2OO1 NZDep2OO1Grp"
 ||" NumDiffICD NumKidCancers NumYthCancers timeSinceCenGp"
%if "&year" ne "2OO1" %then %do;
 ||" G_Rur&yr.Grp G_Rurality&yr g_rur&yr._1 g_rur&yr._2
 NZDep&yrx._3 NZDep&yrx NZDep&yrx.Grp"
%end;
%if "&year" eq "1996" %then %do;
 ||" changedau96"
%end;
 ||" RegCanA RegCanB"
;
```

```
allvarstrg=upcase(allvarstrg);
if cenyear eq . then cenyear=&year;
if sex eq . then sex=0;
AgeGroup=318;
EthType=.;
CenCode=.; Cen_sumlink=.; Cen_sumWgted=.;
C1Code=.; C1_sumlink=.; C1_sumWgted=.;
CanRCode=.; CanR_sumlink=.; CanR_sumWgted=.;
ith=0;Var_1=-99;
Val_1=9999;
do i=1 to length(_type_);
 if substr(_type_,i,1) eq '1' then do;
  tempname=scan(allvarstrg,i);
   if trim(tempname) in ('AGE5YRS','AGE10YRS','AGEGPA',
      'AGEGPB','AGEGPC') then do;
    if age5yrs ne . then AgeGroup=input(age5yrs,ifai5y.);
    else if age10yrs ne . then AgeGroup=input(age10yrs,ifaity.);
    else if agegpa ne . then AgeGroup=input(agegpa,ifagei.);
    else if agegpb ne . then AgeGroup=input(agegpb,ifagei.);
    else if agegpc ne . then AgeGroup=input(agegpc,ifagei.);
   end;
   else if trim(tempname) in ('ETHINDMAORI_CEN' ,'ETHINDPACIFIC_CEN',
    'ETHINDASIAN_CEN','ETHINDNONMPA_CEN','ETHINDNONMP_CEN','TOTMAORI_CEN',
    'TOTPACIFIC_CEN','TOTASIAN_CEN','TOTMPAMISS_CEN','TOTMPMISS_CEN','TOTEUROTH_CEN')
then do;
      EthType=input(input(trim(tempname),ivara.),ivarg.);
      CenCode=input(alllist{i},ifteth.);
      Cen_sumlink=sumlink;Cen_sumWgted=sumWgted;
   end;
   else if trim(tempname) in ('ETHPR3_CEN','ETHPR4_CEN','ETHSOL4_CEN') then do;
      EthType=input(input(trim(tempname),ivara.),ivarg.);
      CenCode=input(alllist{i},if4eth.);
      Cen_sumlink=sumlink;Cen_sumWgted=sumWgted;
   end;
   else if trim(tempname) in ('MAORIC1','PACIFICC1','ASIANC1','NONMPAC1',
    'NONMPC1','TOTMAORIC1','TOTPACIFICC1','TOTASIANC1',
    'TOTMPAMISS_C1','TOTMPMISS_C1','TOTEUROTH_C1') then do;
      EthType=input(input(trim(tempname),ivara.),ivarg.);
      C1Code=input(alllist{i},ifteth.);
      C1_sumlink=sumlink;C1_sumWgted=sumWgted;
   end;
   else if trim(tempname) in ('ETHPR3_CANRC1','ETHPR4_CANRC1',
    'ETHSOL4_CANRC1') then do;
      EthType=input(input(trim(tempname),ivara.),ivarg.);
      C1Code=input(alllist{i},if4eth.);
      C1_sumlink=sumlink;C1_sumWgted=sumWgted;
   end;
   else if trim(tempname) in ('MAORI_CANR','PACIFIC_CANR','ASIAN_CANR',
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 'NONMPA_CANR','NONMP_CANR','TOTMAORI_CANR','TOTPACIFIC_CANR',
 'TOTASIAN_CANR','TOTMPAMISS_CANR','TOTMPMISS_CANR','TOTEUROTH_CANR') then do;
   EthType=input(input(trim(tempname),ivara.),ivarg.);
   CanRCode=input(alllist{i},ifteth.);
   CanR_sumlink=sumlink;CanR_sumWgted=sumWgted;
end;
else if trim(tempname) in ('ETHPR3_CANRALL','ETHPR4_CANRALL',
 'ETHSOL4_CANRALL') then do;
   EthType=input(input(trim(tempname),ivara.),ivarg.);
   CanRCode=input(alllist{i},if4eth.);
   CanR_sumlink=sumlink;CanR_sumWgted=sumWgted;
end;
else if trim(tempname) not in ('CENYEAR','SEX') then do;
 ith+1;varith{ith #31}=input(trim(tempname),ivara.);
 if trim(tempname) in ('LINKSTAT') then valith{ith #31}=input(linkstat,iflka.);
 else if trim(tempname) in ('REGCANA') then valith{ith #31}=regcana;
 else if trim(tempname) in ('REGCANB') then valith{ith #31}=regcanb;
 else if trim(tempname) in ('MBAU') then valith{ith #31}=input(mbau,iflka.);
 else if varith{ith #31} ge 178 and varith{ith #31} le 202 then
   valith{ith #31}=input(alllist{i},if4eth.);
 else if varith{ith #31} ge 90 and varith{ith #31} le 172 then
   valith{ith #31}=input(alllist{i},ifteth.);
 else if varith{ith #31} ge 398 and varith{ith #31} le 410 then
   valith{ith #31}=input(alllist{i},ifdecq.);
 else if varith{ith #31} eq 420 then do;
   if alllist{i} eq -9 then valith{ith #31}=400;
    else valith{ith #31}=alllist{i}+417;
 end;
 else if varith{ith #31} eq 430 then valith{ith #31}=input(alllist{i},ifcob.);
 else if varith{ith #31} in (460,470,500,700,800)
  then valith{ith #31}=alllist{i}+varith{ith #31};
 else if varith{ith #31} eq 600 then do;
   if alllist{i} eq 999 then valith{ith #31}=699;
   else if alllist{i} eq 888 then valith{ith #31}=697;
   else if alllist{i} ge 901 and alllist{i} le 998 then valith{ith #31}=698;
   else valith{ith #31}=alllist{i}+varith{ith #31};
 end;
 else if varith{ith #31} eq 810 then do;
   if alllist{i} eq 88 then valith{ith #31}=828;
   else if alllist{i} eq 99 then valith{ith #31}=829;
   else valith{ith #31}=alllist{i}+varith{ith #31};
 end;
 else if varith{ith #31} eq 860 then do;
   if alllist{i} eq 99 then valith{ith #31}=889;
   else valith{ith #31}=alllist{i}+varith{ith #31};
 end;
 else if (varith{ith #31} ge 898 and varith{ith #31} le 940) or
  (varith{ith #31} ge 1000 and varith{ith #31} le 1090) then
```

```
      valith{ith #31}=input(alllist{i},ifrgpx.);
    else if varith{ith #31} ge 950 and varith{ith #31} le 990 then
      valith{ith #31}=alllist{i}+950;
    else if varith{ith #31} eq 1120 then do;
      if alllist{i} eq -99 then valith{ith #31}=1120;
      else valith{ith #31}=abs(alllist{i})+1120;
    end;
    else if varith{ith #31} ge 1130 and varith{ith #31} le 1170 then do;
      if alllist{i} eq -9 then valith{ith #31}=1130;
      else valith{ith #31}=abs(alllist{i})+1130;
    end;
    else if varith{ith #31} ge 1190 and varith{ith #31} le 1230 then do;
      if abs(alllist{i}) eq 99 then valith{ith #31}=1190;
      else valith{ith #31}=abs(alllist{i})+1190;
    end;
    else if varith{ith #31} ge 1300 and varith{ith #31} le 1320 then do;
      if abs(alllist{i}) gt 8 then valith{ith #31}=8+varith{ith #31};
      else valith{ith #31}=alllist{i}+varith{ith #31};
    end;
    else if varith{ith #31} ge 1330 and varith{ith #31} le 1340 then
      valith{ith #31}=alllist{i}+1330;
    else if (varith{ith #31} eq 1350) then
      valith{ith #31}=input(alllist{i},iftsin.);
   end;
 end;
end;
if ethtype in (90,148) and
 (CenCode in (124,118) or C1Code in (124,118) or  CanRCode in (124,118))
 and tempname not in ('ETHINDMAORI_CEN','MAORIC1','MAORI_CANR','TOTMAORI_CEN',
  'TOTMAORIC1','TOTMAORI_CANR') then Deleth=1; else DelEth=0;
if CenCode ne . or C1Code ne . or CanRCode ne . then HasEth=1; else HasEth=0;
run;


proc sort data=unlocktab&year;
by cenyear sex agegroup Var_1 Val_1 HasEth ethtype CenCode C1Code CanRCode;
run;

data hasCenEth&year(keep=cenyear sex agegroup EthType Var_1 Val_1 numcomb HasEth
 CenCode Cen_sumlink Cen_sumWgted EthVar)
hasC1Eth&year(keep=cenyear sex agegroup EthType Var_1 Val_1 numcomb HasEth
 C1Code C1_sumlink C1_sumWgted EthVar)
hasCanrEth&year(keep=cenyear sex agegroup EthType Var_1 Val_1 numcomb HasEth
 CanRCode CanR_sumlink CanR_sumWgted EthVar)
noeth&year(keep=cenyear sex agegroup EthType Var_1 Val_1 numcomb HasEth
  sumlink sumwgted EthVar)
hasmultEth&year(keep=cenyear sex agegroup EthType Var_1 Val_1 numcomb HasEth
 CenCode Cen_sumlink Cen_sumWgted C1Code C1_sumlink C1_sumWgted
```

```
 CanRCode CanR_sumlink CanR_sumWgted)
needchecking&year
;
set unlocktab&year;
EthVar=max(CenCode,C1Code,CanRCode);
format EthVar fvalcomb.;
if haseth eq 0 then output noeth&year;
else if cencode ne . and (c1code ne . or CanRcode ne .) then output hasmultEth&year;
else if cencode ne . and c1code eq . and CanRcode eq . then output hasCenEth&year;
else if cencode eq . and c1code ne . and CanRcode eq . then output hasC1Eth&year;
else if cencode eq . and c1code eq . and CanRcode ne . then output hasCanrEth&year;
else output needchecking&year;
run;

proc sort data=hasCenEth&year;
by cenyear sex agegroup EthType Var_1 Val_1 numcomb HasEth EthVar
 CenCode;
run;
proc sort data=hasC1Eth&year;
by cenyear sex agegroup EthType Var_1 Val_1 numcomb HasEth EthVar
 C1Code;
run;
proc sort data=hasCanrEth&year;
by cenyear sex agegroup EthType Var_1 Val_1 numcomb HasEth EthVar
 CanRCode;
run;
proc sort data=noeth&year;
by cenyear sex agegroup EthType Var_1 Val_1 numcomb HasEth EthVar;
run;
proc sort data=hasmultEth&year;
by cenyear sex agegroup EthType Var_1 Val_1 numcomb HasEth
 CenCode C1Code CanRCode;
run;
proc sort data=needchecking&year;
by cenyear sex agegroup EthType Var_1 Val_1 numcomb HasEth EthVar
 CenCode C1Code CanRCode;
run;

data combethsUnlockTab&year;
merge hasCenEth&year hasC1Eth&year hasCanrEth&year noeth&year;
by cenyear sex agegroup EthType Var_1 Val_1 numcomb HasEth EthVar;
run;

data texport.combethsUnlockTab&year;
set combethsUnlockTab&year(drop=sumlink sumwgted);
where haseth eq 1;
label Cen_C1WgtLink='Census to 1st CanR Eth Wgted Ratio (Nonrr)'
 Cen_CanWgtLink='Census to All CanR Eth Wgted Ratio (Nonrr)';
```

```
Cen_C1WgtLink=Cen_sumWgted / C1_sumWgted;
Cen_CanWgtLink=Cen_sumWgted / CanR_sumWgted;
run;
%mend;

%getdat(year=1981);
%getdat(year=1986);
%getdat(year=1991);
%getdat(year=1996);
%getdat(year=2001);

%macro FinRats(year=);
data fexport.combethsUnlockTab&year;
set texport.combethsUnlockTab&year(drop=cen_sumlink cen_sumwgted
  c1_sumlink c1_sumwgted canr_sumlink canr_sumwgted
 rename=(Cen_C1WgtLink=Cen_C1WgtRatio Cen_CanWgtLink=Cen_CanWgtRatio));
Cen_C1WgtRatio=round(Cen_C1WgtRatio,0.01);
Cen_CanWgtRatio=round(Cen_CanWgtRatio,0.01);
if cen_c1wgtratio ne . or cen_canwgtratio ne .;
run;
%mend;
%FinRats(year=1981);
%FinRats(year=1986);
%FinRats(year=1991);
%FinRats(year=1996);
%FinRats(year=2001);

/*Will not bring out all the results again, only the new ratios and counts from
16.7.2008*/

%macro getinf(year=);

data sumunlkextra&year;
set texport.sumunlocktab&year;
where TotMPAMiss_Cen ne . or  TotMPAMiss_C1 ne . or TotMPAMiss_CanR ne . or
 TotMPMiss_Cen ne . or TotMPMiss_C1 ne . or TotMPMiss_CanR ne . or
 TotEurOth_Cen ne . or TotEurOth_C1 ne . or TotEurOth_CanR ne . or
 RegCanA ne . or RegCanB ne . or totmaori_cen ne . or totmaoric1 ne . or
 totmaori_canr ne .;
run;

%rndround(n=3,minval=6,indat=sumunlkextra&year,outdat=fexport.sumunlkextra&year.rr,
 nrnd=2,varlist=sumLink SumWgted,nvarlist=sumLinkrr SumWgtedrr,
 dropvars=sumLink SumWgted,xcelfile=none,sortNDup=Y,samenum=Y)

data fexport.combethsUnlockTabextra&year;
set texport.combethsUnlockTab&year(drop=cen_sumlink cen_sumwgted
  c1_sumlink c1_sumwgted canr_sumlink canr_sumwgted
```

```
 rename=(Cen_C1WgtLink=Cen_C1WgtRatio Cen_CanWgtLink=Cen_CanWgtRatio));
where ethtype in (209,219,229) or var_1 in (1360,1362);
Cen_C1WgtRatio=round(Cen_C1WgtRatio,0.01);
Cen_CanWgtRatio=round(Cen_CanWgtRatio,0.01);
if cen_c1wgtratio ne . or cen_canwgtratio ne .;
run;
%mend;
%getinf(year=1981);
%getinf(year=1986);
%getinf(year=1991);
%getinf(year=1996);
%getinf(year=2001);

/*Counts of strata used*/
%macro cntstr(year=);

proc summary data=ctunlock.unlock&year missing nway chartype;
class cenyear bustrata;
var link wgtunlock;
output out=stratInfo&year sum=sumlink sumwgtunlk;
format link wgtunlock;
run;

proc summary data=stratInfo&year(rename=(_freq_=StratFreq) drop=_type_) nway chartype;
class cenyear;
var sumlink sumwgtunlk;
output out=stratInfo&year median=Mednlink mednWgtUnlk
 mean=meanlink meanwgtunlk  min=minlink minwgtunlk
 max=maxlink maxunlk n=nlink nwgtunlk sum=TotinUnlk TotinBias;
run;

%mend;

%cntstr(year=1981);
%cntstr(year=1986);
%cntstr(year=1991);
%cntstr(year=1996);
%cntstr(year=2001);

data allstratinfo;
set stratInfo1981 stratInfo1986 stratInfo1991 stratInfo1996 stratInfo2001;
run;

%rndround(n=3,minval=6,indat=allstratinfo,outdat=fexport.allstratinforr,
 nrnd=2,varlist=TotinUnlk TotinBias,nvarlist=TotinUnlkrr TotinBiasrr,
 dropvars=TotinUnlk TotinBias,xcelfile=none,sortNDup=Y,samenum=Y)
```