/\*\*dummy coding variables to use in MI\*/

**data** analysis ;

set analysis\_20200817 ;

if raceredcap\_d = **1** then white\_d = **1** ;

else if raceredcap\_d in (**2**, **3**, **4**, **5**, **6**, **7**) then white\_d = **0** ;

if raceredcap\_d = **2** then black\_d = **1** ;

else if raceredcap\_d in (**1**, **3**, **4**, **5**, **6**, **7**) then black\_d = **0**;

if raceredcap\_d = **3** then asian\_d = **1** ;

else if raceredcap\_d in (**1**, **2**, **4**, **5**, **6**, **7**) then asian\_d = **0** ;

if raceredcap\_d = **4** then hisp\_d = **1** ;

else if raceredcap\_d in (**1**, **2**, **3**, **5**, **6**, **7**) then hisp\_d = **0** ;

if raceredcap\_d = **5** then multi\_d = **1** ;

else if raceredcap\_d in (**1**, **2**, **3**, **4**, **6**, **7**) then multi\_d = **0** ;

if raceredcap\_d = **6** then otherra\_d = **1** ;

else if raceredcap\_d in (**1**, **2**, **3**, **4**, **5**, **7**) then otherra\_d = **0** ;

if raceredcap\_d = **7** then unknown\_d = **1** ;

else if raceredcap\_d in (**1**, **2**, **3**, **4**, **5**, **6**) then unknown\_d = **0** ;

if educat\_d = **1** then less\_col = **1** ;

else if educat\_d in (**2**, **3**) then less\_col = **0**;

if educat\_d in (**2**, **3**) then col\_more = **1** ;

else if educat\_d = **1** then col\_more = **0**;

if part\_cat = **1** then married\_d = **1** ;

else if part\_cat in (**2** ,**3**) then married\_d = **0** ;

if part\_cat = **2** then living\_d = **1** ;

else if part\_cat in (**1**, **3**) then living\_d = **0** ;

if part\_cat = **3** then other\_d = **1** ;

else if part\_cat in (**1**, **2**) then other\_d = **0** ;

if ins\_status = **1** then private\_d = **1** ;

else if ins\_status in (**2**, **3**) then private\_d = **0** ;

if ins\_status in (**2**, **3**) then pub\_self\_d = **1** ;

else if ins\_status = **1** then pub\_self\_d = **0** ;

if income\_cat = **1** then less100\_d = **1** ;

else if income\_cat = **2** then less100\_d = **0** ;

else less100\_d = **.** ;

if income\_cat = **2** then more100\_d = **1** ;

else if income\_cat = **1** then more100\_d = **0** ;

else more100\_d = **.** ;

if bmicat\_d = **1** then normal\_d = **1** ;

else if bmicat\_d in (**2**, **3**) then normal\_d = **0** ;

else normal\_d = **.** ;

if bmicat\_d = **2** then over\_d = **1** ;

else if bmicat\_d in (**1**, **3**) then over\_d = **0** ;

else over\_d = **.** ;

if bmicat\_d = **3** then obese\_d = **1** ;

else if bmicat\_d in (**1**, **2**) then obese\_d = **0** ;

else obese\_d = **.** ;

if smoke\_d = **1** then current\_d = **1** ;

else if smoke\_d in (**2**, **3**) then current\_d = **0** ;

else current\_d = **.** ;

if smoke\_d = **2** then past\_d = **1** ;

else if smoke\_d in (**1**, **3**) then past\_d = **0** ;

else past\_d = **.** ;

if smoke\_d = **3** then never\_d = **1** ;

else if smoke\_d in (**1**, **2**) then never\_d = **0** ;

else never\_d = **.** ;

if histcat\_d = **1** then hxnull\_d = **1** ;

else if histcat\_d in (**2**, **3**) then hxnull\_d = **0** ;

else hxnull\_d = **.** ;

if histcat\_d = **2** then hxptb\_d = **1** ;

else if histcat\_d in (**1**, **3**) then hxptb\_d = **0** ;

else hxptb\_d = **.** ;

if histcat\_d = **3** then hxterm\_d = **1** ;

else if histcat\_d in (**1**, **2**) then hxterm\_d = **0** ;

else hxterm\_d = **.** ;

if when\_resil\_comp = **1** then first\_d = **1** ;

else if when\_resil\_comp in (**2**, **3**, **4**) then first\_d = **0** ;

else first\_d = **.** ;

if when\_resil\_comp = **2** then second\_d = **1** ;

else if when\_resil\_comp in (**1**, **3**, **4**) then second\_d = **0** ;

else second\_d = **.** ;

if when\_resil\_comp = **3** then third\_d = **1** ;

else if when\_resil\_comp in (**1**, **2**, **4**) then third\_d = **0** ;

else third\_d = **.** ;

if when\_resil\_comp = **4** then post\_d = **1** ;

else if when\_resil\_comp in (**1**, **2**, **3**) then post\_d = **0** ;

else post\_d = **.** ;

if res\_t1\_all\_d = **1** then res\_tert\_all\_d = **1** ;

else if res\_t2\_all\_d = **1** then res\_tert\_all\_d = **2** ;

else if res\_t3\_all\_d = **1** then res\_tert\_all\_d = **3** ;

if res\_tert\_all\_d in (**1**, **2**) then res\_t3\_yn = **0** ;

else if res\_tert\_all\_d = **3** then res\_t3\_yn = **1** ;

**run** ;

**proc** **sort** data=analysis ; by mrn date\_delivery ; **run** ;

**data** analysis\_0;

set analysis;

by mrn;

if first.mrn then delivery\_number = **1**;

else delivery\_number+**1**;

**run**;

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\* MULTIPLE IMPUTATION \*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*;

\*STEP 1: REDUCE DATASET TO ALL VARIABLES THAT WILL BE INCLUDED IN ANALYSIS AND STRONG PREDICTORS OF

MISSING DATA;

\*reduce dataset to necessary variables;

**data** analysis1 ;

set analysis\_0 ;

keep study\_id mrn date\_delivery delivery\_number when\_resil\_comp status\_cr delivered\_mr fetus raceredcap\_d

ptb\_yn\_d res\_t1\_all\_d res\_t2\_all\_d res\_t3\_all\_d resil\_total

white\_d black\_d asian\_d hisp\_d multi\_d otherra\_d unknown\_d

less\_col col\_more married\_d living\_d other\_d private\_d pub\_self\_d less100\_d more100\_d

normal\_d over\_d obese\_d current\_d past\_d never\_d hxnull\_d hxptb\_d hxterm\_d age\_edd

;

**run** ;

\*LOOK AT NUMBER OF MISSING OBSERVATIONS FOR EACH VARIABLE AND CALCULATE PROPORTION OF MISSINGNESS

CAN'T IMPUTE DATA FOR VARIABLES MISSING MORE THAN 50% OF DATA;

**proc** **means** data=analysis1 N NMISS;

var white\_d black\_d asian\_d hisp\_d multi\_d otherra\_d unknown\_d

less\_col col\_more married\_d living\_d other\_d private\_d pub\_self\_d less100\_d more100\_d

normal\_d over\_d obese\_d current\_d past\_d never\_d hxnull\_d hxptb\_d hxterm\_d age\_edd ;

;

**run**;

\*LOOK AT DISTRIBUTION OF ALL CONTINOUS VARIABLES. VARAIBLES THAT AREN'T PERFECTLY NORMALLY DISTRIBUTED

NEED TO BE LOG TRANSFORMED DURING IMPUTATION;

\*check for normality to identify variables that need to be transformed during MI;

**proc** **univariate** data=analysis1 PLOT NORMAL;

var age\_edd ;

**run**;

\*IMPUTATION;

**proc** **mi** data=analysis1 seed=**17655417** nimpute=**10** out=imputed;

em maxiter=**600** converge=**0.01**;

mcmc impute=full initial=em(maxiter=**600** converge=**0.01**);

\*log transform non-normally distributed continous variables and ordinal variables. proc mi will transform them back;

/\* transform log(age\_edd /c=1);\*/

var white\_d black\_d asian\_d hisp\_d multi\_d otherra\_d unknown\_d

less\_col col\_more married\_d living\_d other\_d private\_d pub\_self\_d less100\_d more100\_d

normal\_d over\_d obese\_d current\_d past\_d never\_d hxnull\_d hxptb\_d hxterm\_d age\_edd ;

**run**;

\*STEP 2: POST-MI CLEANING;

**data** imputed\_clean;

set imputed;

\*\*rounds binary 0/1-variables based on random number generator. Variables with low prevalence can be over

estimated using this code. If that is the case just round values >=0.5 to 1 and those <0.5 to 0;

array binary{\*} white\_d black\_d asian\_d hisp\_d multi\_d other\_d unknown\_d

less\_col col\_more married\_d living\_d other\_d private\_d pub\_self\_d less100\_d more100\_d

normal\_d over\_d obese\_d current\_d past\_d never\_d hxnull\_d hxptb\_d hxterm\_d ;

X=ranuni(-**1**); \*random number to round dummy variables\*;

do i=**1** to dim(binary);

\*will overwrite the original variable with a rounded value \*;

if X<binary{i} then binary{i}=**1**;

else binary{i}=**0**;

end;

**run** ;

\*restricting to women who have completed the study;

**data** imputed\_clean1 ;

set imputed\_clean ;

where status\_cr not in (**0**, **3**, **4**, **5**) ;

**run** ;

**data** imputed\_clean2 ;

set imputed\_clean1 ;

where delivered\_mr = **1** ;

**run** ;

\*restricting to women with expsoure;

**data** imputed\_clean3 ;

set imputed\_clean2 ;

where resil\_total ne **.** ;

**run** ;

\*resricting to singletons only;

**data** imputed\_clean4 ;

set imputed\_clean3 ;

where fetus = **1** ;

**run** ;

\*restricting to black and white women only and outputting permanent multiple imputation sas dataset;

**data** sptb.imputed\_clean ;

set imputed\_clean4 ;

where raceredcap\_d in (**1** ,**2**);

**run** ;

**proc** **contents** data=sptb.imputed\_clean ; **run** ;

/\*outputting dataset for first delivery in SPEC sensitivity analysis\*/

**data** sptb.imputed\_for\_1stdel ;

set sptb.imputed\_clean ;

where delivery\_number = **1** ;

**run** ;

/\*outputting dataset for no zero women sensitivity analysis\*/

**data** sptb.imputed\_for\_no0 ;

set sptb.imputed\_clean ;

where resil\_total ne **0** ;

**run** ;

/\*outputting dataset for CD-RISC completion prior to delivery\*/

**data** sptb.imputed\_for\_riscPD ;

set sptb.imputed\_clean ;

where when\_resil\_comp in (**1**, **2**, **3**) ;

**run** ;

/\*Cleaning imputed variables\*/

**data** imputed\_clean ;

set sptb.imputed\_clean ;

if age\_edd ne **.** and age\_edd lt **30** then agecat\_edd\_mi = **1** ;

else if age\_edd ge **30** and age\_edd lt **35** then agecat\_edd\_mi = **2** ;

else if age\_edd ge **35** then agecat\_edd\_mi = **3** ;

else agecat\_edd\_mi = **.** ;

if less\_col = **1** then edu\_cat\_mi = **1** ; \*less than college degree;

else if col\_more = **1** then edu\_cat\_mi = **2** ; \*college degree or more;

if married\_d = **1** then part\_cat\_mi = **1** ; \*married;

else if living\_d = **1** then part\_cat\_mi = **2** ; \*not married, living together;

else if other\_d = **1** then part\_cat\_mi = **3** ; \*other partner status;

if private\_d = **1** then ins\_cat\_mi = **1** ; \*private insurance;

else if pub\_self\_d = **1** then ins\_cat\_mi = **2** ; \*public/self-pay/other insurance ;

if less100\_d = **1** then income\_cat\_mi = **1** ; \*less than $100k/year ;

else if less100\_d = **0** then income\_cat\_mi = **2** ; \*more than $100k/year ;

if normal\_d = **1** then bmi\_cat\_mi = **1** ; \*normal weight ;

else if over\_d = **1** then bmi\_cat\_mi = **2** ; \*overweight ;

else if obese\_d = **1** then bmi\_cat\_mi = **3** ; \*obese ;

if current\_d = **1** then smoke\_cat\_mi = **1** ; \*current smoker;

else if past\_d = **1** then smoke\_cat\_mi = **2** ; \*past smoker ;

else if never\_d = **1** then smoke\_cat\_mi = **3** ; \*never smoker ;

resilXblack = resil\_total\*black\_d ;

\*Resil Score dichotomized at the median from proc univariate;

if resil\_total ge **77** then high\_res\_all\_d = **1** ;

else if resil\_total lt **77** and resil\_total ne **.** then high\_res\_all\_d = **0** ;

else high\_res\_all\_d = **.** ;

\*Resil score categorized in quartiles from proc univariate ;

if resil\_total ge **87** then resil\_q4\_all\_d = **1** ;

else if resil\_total lt **87** and resil\_total ne **.** then resil\_q4\_all\_d = **0** ;

else resil\_q4\_all\_d = **.** ;

if resil\_total ne **.** and resil\_total lt **87** and resil\_total ge **77** then resil\_q3\_all\_d = **1** ;

else if resil\_total ne **.** and (resil\_total lt **77** or resil\_total ge **87**) then resil\_q3\_all\_d = **0** ;

else resil\_q3\_all\_d = **.** ;

if resil\_total ne **.** and resil\_total ge **68** and resil\_total lt **77** then resil\_q2\_all\_d = **1** ;

else if resil\_total ne **.** and resil\_total lt **68** or resil\_total ge **77** then resil\_q2\_all\_d = **0** ;

else resil\_q2\_all\_d = **.** ;

if resil\_total ne **.** and resil\_total lt **68** then resil\_q1\_all\_d = **1** ;

else if resil\_total ge **68** then resil\_q1\_all\_d = **0** ;

else resil\_q1\_all\_d = **.** ;

**run** ;

/\*Table 1- freq and percent missing data\*/

**proc** **freq** data=imputed\_clean ;

tables agecat\_edd\_mi ;

tables edu\_cat\_mi;

tables part\_cat\_mi ;

tables ins\_cat\_mi ;

tables income\_cat\_mi ;

tables bmi\_cat\_mi ;

tables hxnull\_d ;

tables smoke\_cat\_mi ;

**run** ;

/\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*/

/\*MODELING\*/

/\*confounding test\*/

**PROC** **GENMOD** descending data=imputed\_clean;

CLASS mrn /param=ref;

MODEL ptb\_yn\_d= black\_d less\_col less100\_d /DIST=Poisson LINK=LOG COVB;

REPEATED SUBJECT=mrn / PRINTMLE MODELSE ECOVB MCOVB;

ESTIMATE 'Black' black\_d **1**/EXP;

ESTIMATE 'Less than College' less\_col **1**/EXP;

ESTIMATE 'Less than 100k' less100\_d **1**/EXP; by \_Imputation\_;

ods output

/\*the indices of the parameters\*/

ParmInfo=parminfo

/\*the empirical(ROBUST) estimates from a repeated model\*/

GEEEmpPEst=emp\_est

/\*the empirical(ROBUST) covariance from a repeated model\*/

GEERCov= emp\_covb

;

**RUN**;

/\*Analyzing empirical(ROBUST) results\*/

**PROC** **MIANALYZE** parms = emp\_est covb = emp\_covb parminfo=parminfo;

modeleffects Intercept black\_d less\_col less100\_d ;

**run**;

**PROC** **GENMOD** descending data=imputed\_clean; \*;

CLASS mrn /param=ref;

MODEL ptb\_yn\_d= black\_d resil\_total less\_col less100\_d /DIST=Poisson LINK=LOG COVB;

REPEATED SUBJECT=mrn / PRINTMLE MODELSE ECOVB MCOVB;

ESTIMATE 'Black' black\_d **1**/EXP;

ESTIMATE 'Resil score' resil\_total **1**/EXP;

ESTIMATE 'Less than College' less\_col **1**/EXP;

ESTIMATE 'Less than 100k' less100\_d **1**/EXP; by \_Imputation\_;

ods output

/\*the indices of the parameters\*/

ParmInfo=parminfo

/\*the empirical(ROBUST) estimates from a repeated model\*/

GEEEmpPEst=emp\_est

/\*the empirical(ROBUST) covariance from a repeated model\*/

GEERCov= emp\_covb

;

**RUN**;

/\*Analyzing empirical(ROBUST) results\*/

**PROC** **MIANALYZE** parms = emp\_est covb = emp\_covb parminfo=parminfo;

modeleffects Intercept black\_d resil\_total less\_col less100\_d ;

**run**;

/\*interaction\*/

**PROC** **GENMOD** descending data=imputed\_clean; \*;

CLASS mrn /param=ref;

MODEL ptb\_yn\_d= resil\_total black\_d resilXblack /DIST=Poisson LINK=LOG COVB;

REPEATED SUBJECT=mrn / PRINTMLE MODELSE ECOVB MCOVB;

ESTIMATE 'Resil score' resil\_total **1**/EXP;

ESTIMATE 'Black' black\_d **1**/EXP;

ESTIMATE 'Interaction' resilXblack **1**/EXP;

by \_Imputation\_;

ods output

/\*the indices of the parameters\*/

ParmInfo=parminfo

/\*the empirical(ROBUST) estimates from a repeated model\*/

GEEEmpPEst=emp\_est

/\*the empirical(ROBUST) covariance from a repeated model\*/

GEERCov= emp\_covb

;

**RUN**;

/\*Analyzing empirical(ROBUST) results\*/

**PROC** **MIANALYZE** parms = emp\_est covb = emp\_covb parminfo=parminfo;

modeleffects Intercept resil\_total black\_d resilXblack ;

**run**;

**PROC** **GENMOD** descending data=imputed\_clean; \*;

CLASS mrn /param=ref;

MODEL ptb\_yn\_d= resil\_total black\_d resilXblack less\_col less100\_d /DIST=Poisson LINK=LOG COVB;

REPEATED SUBJECT=mrn / PRINTMLE MODELSE ECOVB MCOVB;

ESTIMATE 'Resil score' resil\_total **1**/EXP;

ESTIMATE 'Black' black\_d **1**/EXP;

ESTIMATE 'Interaction' resilXblack **1**/EXP;

ESTIMATE 'Less than College' less\_col **1**/EXP;

ESTIMATE 'Less than 100k' less100\_d **1**/EXP;

by \_Imputation\_;

ods output

/\*the indices of the parameters\*/

ParmInfo=parminfo

/\*the empirical(ROBUST) estimates from a repeated model\*/

GEEEmpPEst=emp\_est

/\*the empirical(ROBUST) covariance from a repeated model\*/

GEERCov= emp\_covb

;

**RUN**;

/\*Analyzing empirical(ROBUST) results\*/

**PROC** **MIANALYZE** parms = emp\_est covb = emp\_covb parminfo=parminfo;

modeleffects Intercept resil\_total black\_d resilXblack less\_col less100\_d;

**run**;

/\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*/

/\*MODELING- Table 3 (table updated 8/17/2020)\*/

\*All;

**PROC** **GENMOD** descending data=sptb.imputed\_clean;

CLASS mrn /param=ref;

MODEL ptb\_yn\_d=black\_d /DIST=Poisson LINK=LOG COVB;

REPEATED SUBJECT=mrn / PRINTMLE MODELSE ECOVB MCOVB;

ESTIMATE 'Black Women' black\_d **1**/EXP;

by \_Imputation\_;

ods output

/\*the indices of the parameters\*/

ParmInfo=parminfo

/\*the empirical(ROBUST) estimates from a repeated model\*/

GEEEmpPEst=emp\_est

/\*the empirical(ROBUST) covariance from a repeated model\*/

GEERCov= emp\_covb

;

**RUN**;

/\*Analyzing empirical(ROBUST) results\*/

**PROC** **MIANALYZE** parms = emp\_est covb = emp\_covb parminfo=parminfo;

modeleffects Intercept black\_d ;

**run**;

\*Adjusted;

**PROC** **GENMOD** descending data=sptb.imputed\_clean;

CLASS mrn /param=ref;

MODEL ptb\_yn\_d=black\_d less\_col less100\_d /DIST=Poisson LINK=LOG COVB;

REPEATED SUBJECT=mrn / PRINTMLE MODELSE ECOVB MCOVB;

ESTIMATE 'Black Women' black\_d **1**/EXP;

ESTIMATE 'Less than College' less\_col **1**/EXP;

ESTIMATE 'Less than 100k' less100\_d **1**/EXP;

by \_Imputation\_;

ods output

/\*the indices of the parameters\*/

ParmInfo=parminfo

/\*the empirical(ROBUST) estimates from a repeated model\*/

GEEEmpPEst=emp\_est

/\*the empirical(ROBUST) covariance from a repeated model\*/

GEERCov= emp\_covb

;

**RUN**;

/\*Analyzing empirical(ROBUST) results\*/

**PROC** **MIANALYZE** parms = emp\_est covb = emp\_covb parminfo=parminfo;

modeleffects Intercept black\_d less\_col less100\_d ;

**run**;

/\*T1\*/

\*Unadjusted;

**PROC** **GENMOD** descending data=sptb.imputed\_clean;

where res\_t1\_all\_d = **1**;

CLASS mrn /param=ref;

MODEL ptb\_yn\_d=black\_d /DIST=Poisson LINK=LOG COVB;

REPEATED SUBJECT=mrn / PRINTMLE MODELSE ECOVB MCOVB;

ESTIMATE 'Black Women' black\_d **1**/EXP;

by \_Imputation\_;

ods output

/\*the indices of the parameters\*/

ParmInfo=parminfo

/\*the empirical(ROBUST) estimates from a repeated model\*/

GEEEmpPEst=emp\_est

/\*the empirical(ROBUST) covariance from a repeated model\*/

GEERCov= emp\_covb

;

**RUN**;

/\*Analyzing empirical(ROBUST) results\*/

**PROC** **MIANALYZE** parms = emp\_est covb = emp\_covb parminfo=parminfo;

modeleffects Intercept black\_d ;

**run**;

**PROC** **GENMOD** descending data=sptb.imputed\_clean;

where res\_t1\_all\_d = **1**;

CLASS mrn /param=ref;

MODEL ptb\_yn\_d=black\_d less\_col less100\_d /DIST=Poisson LINK=LOG COVB;

REPEATED SUBJECT=mrn / PRINTMLE MODELSE ECOVB MCOVB;

ESTIMATE 'Black Women' black\_d **1**/EXP;

ESTIMATE 'Less than College' less\_col **1**/EXP;

ESTIMATE 'Less than 100k' less100\_d **1**/EXP;

by \_Imputation\_;

ods output

/\*the indices of the parameters\*/

ParmInfo=parminfo

/\*the empirical(ROBUST) estimates from a repeated model\*/

GEEEmpPEst=emp\_est

/\*the empirical(ROBUST) covariance from a repeated model\*/

GEERCov= emp\_covb

;

**RUN**;

/\*Analyzing empirical(ROBUST) results\*/

**PROC** **MIANALYZE** parms = emp\_est covb = emp\_covb parminfo=parminfo;

modeleffects Intercept black\_d less\_col less100\_d ;

**run**;

/\*T2\*/

**PROC** **GENMOD** descending data=sptb.imputed\_clean;

where res\_t2\_all\_d = **1**;

CLASS mrn /param=ref;

MODEL ptb\_yn\_d=black\_d /DIST=Poisson LINK=LOG COVB;

REPEATED SUBJECT=mrn / PRINTMLE MODELSE ECOVB MCOVB;

ESTIMATE 'Black Women' black\_d **1**/EXP;

by \_Imputation\_;

ods output

/\*the indices of the parameters\*/

ParmInfo=parminfo

/\*the empirical(ROBUST) estimates from a repeated model\*/

GEEEmpPEst=emp\_est

/\*the empirical(ROBUST) covariance from a repeated model\*/

GEERCov= emp\_covb

;

**RUN**;

/\*Analyzing empirical(ROBUST) results\*/

**PROC** **MIANALYZE** parms = emp\_est covb = emp\_covb parminfo=parminfo;

modeleffects Intercept black\_d ;

**run**;

\*Adjusted ;

**PROC** **GENMOD** descending data=sptb.imputed\_clean;

where res\_t2\_all\_d = **1**;

CLASS mrn /param=ref;

MODEL ptb\_yn\_d=black\_d less\_col less100\_d /DIST=Poisson LINK=LOG COVB;

REPEATED SUBJECT=mrn / PRINTMLE MODELSE ECOVB MCOVB;

ESTIMATE 'Black Women' black\_d **1**/EXP;

ESTIMATE 'Less than College' less\_col **1**/EXP;

ESTIMATE 'Less than 100k' less100\_d **1**/EXP;

by \_Imputation\_;

ods output

/\*the indices of the parameters\*/

ParmInfo=parminfo

/\*the empirical(ROBUST) estimates from a repeated model\*/

GEEEmpPEst=emp\_est

/\*the empirical(ROBUST) covariance from a repeated model\*/

GEERCov= emp\_covb

;

**RUN**;

/\*Analyzing empirical(ROBUST) results\*/

**PROC** **MIANALYZE** parms = emp\_est covb = emp\_covb parminfo=parminfo;

modeleffects Intercept black\_d less\_col less100\_d ;

**run**;

/\*T3\*/

**PROC** **GENMOD** descending data=sptb.imputed\_clean;

where res\_t3\_all\_d = **1**;

CLASS mrn /param=ref;

MODEL ptb\_yn\_d=black\_d /DIST=Poisson LINK=LOG COVB;

REPEATED SUBJECT=mrn / PRINTMLE MODELSE ECOVB MCOVB;

ESTIMATE 'Black Women' black\_d **1**/EXP;

by \_Imputation\_;

ods output

/\*the indices of the parameters\*/

ParmInfo=parminfo

/\*the empirical(ROBUST) estimates from a repeated model\*/

GEEEmpPEst=emp\_est

/\*the empirical(ROBUST) covariance from a repeated model\*/

GEERCov= emp\_covb

;

**RUN**;

/\*Analyzing empirical(ROBUST) results\*/

**PROC** **MIANALYZE** parms = emp\_est covb = emp\_covb parminfo=parminfo;

modeleffects Intercept black\_d ;

**run**;

\*Adjusted ;

**PROC** **GENMOD** descending data=sptb.imputed\_clean;

where res\_t3\_all\_d = **1**;

CLASS mrn /param=ref;

MODEL ptb\_yn\_d=black\_d less\_col less100\_d /DIST=Poisson LINK=LOG COVB;

REPEATED SUBJECT=mrn / PRINTMLE MODELSE ECOVB MCOVB;

ESTIMATE 'Black Women' black\_d **1**/EXP;

ESTIMATE 'Less than College' less\_col **1**/EXP;

ESTIMATE 'Less than 100k' less100\_d **1**/EXP;

by \_Imputation\_;

ods output

/\*the indices of the parameters\*/

ParmInfo=parminfo

/\*the empirical(ROBUST) estimates from a repeated model\*/

GEEEmpPEst=emp\_est

/\*the empirical(ROBUST) covariance from a repeated model\*/

GEERCov= emp\_covb

;

**RUN**;

/\*Analyzing empirical(ROBUST) results\*/

**PROC** **MIANALYZE** parms = emp\_est covb = emp\_covb parminfo=parminfo;

modeleffects Intercept black\_d less\_col less100\_d ;

**run**;