**Warner Binary Model**

**data** Warner;

seed=**23**;

pi=**0.8**; p=**0.85**; n=**500**;

/\* run 10000 simulations\*/

do outer = **1** to **10000**;

x=**0**; y=**0**; z=**0**; s=**0**; sumz1=**0**;

/\* Generate 500 subjects\*/

do inner = **1** to n;

x = ranbin(seed,**1**,pi);

s = ranbin(seed,**1**,p);

if x=s then z= 1;

else z = 0;

sumz1 = sumz1 + z;

end;

/\* calculate the estimator\*/

pihat1=sumz1/n;

pihat = (pihat1-(1-p))/(2\*p-1);

output;

end;

**proc** **means** data= Warner n mean var;

var pihat;

**run**;

**quit**;

**Greenberg Binary Model**

**data** Greenberg;

seed=**23**;

pi=**0.4**; p=**0.80**; n=**500**; piy=**30**/**365**;

/\* run 10000 simulations\*/

do outer = **1** to **10000**;

x=**0**; y=**0**; z=**0**; s=**0**; sumz1=**0**;

/\* generate 500 subjects\*/

do inner = **1** to n;

x = ranbin(seed,**1**,pi);

y = ranbin(seed,**1**,p);

s = ranbin(seed,**1**, piy);

if y = **1** then z= x;

else z = s;

sumz1 = sumz1 + z;

end;

/\* calculate the estimator\*/

pihat1=sumz1/n;

pihat = (pihat1-(1-p)\*piy)/p;

output;

end;

**proc** **means** data= Greenberg n mean var;

var pihat;

**run**;

**quit**;

**Warner Quantitative Model**

**data** Warner;

seed=**23**;

MuX = 4; MuY = 2; p=**0.85**; n=**500**;

/\* run 10000 simulations\*/

do outer = **1** to **10000**;

x=**0**; y=**0**; z=**0**; s=**0**; sumz=**0**;

/\* Generate 500 subjects\*/

do inner = **1** to n;

x=ranpoi (seed,muX);

y=ranpoi (seed,muY);

z = x + y;

sumz=sumz+z;

end;

/\* calculate the estimator\*/

zbar=sumz/n;

MuXhat = zbar-MuY;

output;

end;

**proc** **means** data= Warner n mean var;

var MuXhat;

**run**;

**quit**;

**Greenberg Quantitative Model**

data GreenbergQuantitative;

seed=23;

muX=4; muY=2; p1=0.8; n1=500;

do outer = 1 to 10000;

z1sum=0;

do j=1 to n1;

x=ranpoi(seed,muX);

u=ranbin(seed,1, p1);

y=ranpoi(seed,muY);

if u=1 then z=x;

else z=y;

z1sum=z1sum+z;

end;

z1bar=z1sum/n1;

MuXhat=z1bar-(1-p1)\*MuY;

MuXhat=MuXhat/p1;

output;

end;

proc means data=GreenbergQuantitative n mean var;

var MuXhat;

run;

quit;