

```
setwd("C:\\Users\\Aasthaa\\Documents\\RA_Hutch\\2009_11_13_fromDaryl")
source("rocreg.R")
source("hidden.R")
```

### ### Documentation examples

```
nnhs2 <- read.csv("http://labs.fhcrc.org/pepe/book/data/nnhs2.csv",header = TRUE, sep = ",")
```

```
> rocreg(dataset="nnhs2", d="d", markers="y1", cluster="id", noccsamp=T, nsamp=5000)
ROC regression for markers: y1
```

Percentile value calculation  
method: empirical  
tie correction: no

GLM fit  
link function: probit - binormal ROC  
number of points: 10  
on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling  
w/o respect to case/control status

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: y1

ROC-GLM model

Bootstrap results

Number of strata = 1                      Number of obs = 5058  
Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	0.452	0.0979	0.267 0.648
alpha_1	0.9	0.073	0.78 1.07

```
> rocreg(dataset="nnhs2", d="d", markers="y1", adjcov="gender", regcov="gender", cluster="id",  
noccsamp=T, level=90, nsamp=5000)
```

ROC regression for markers: y1

Model intercept term covariates: gender

Percentile value calculation

method: empirical

tie correction: no

Covariate adjustment

method: stratified

covariates: gender

# of case-containing strata: 2

Stratum d=0 d=1 Total

1 2170 64 2234

2 2739 85 2824

Total 4909 149 5058

GLM fit

link function: probit - binormal ROC

number of points: 10

on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling

w/o respect to case/control status

and from within covariate strata

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: y1

ROC-GLM model

Bootstrap results

Number of strata = 2                      Number of obs = 5058

Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[90% Conf. Interval]
alpha_0	0.495	0.323	-0.0587 1.02
alpha_1	0.914	0.0718	0.81 1.05
gender	-0.0285	0.195	-0.336 0.306

```
> rocreg(dataset="nnhs2", d="d", markers="y1", adjcov="gender", regcov="gender",  
pvcmeth="normal", cluster="id", noccsamp=T, nsamp=5000)
```

ROC regression for markers: y1

Model intercept term covariates: gender

Percentile value calculation

method: normal

Covariate adjustment

method: stratified

covariates: gender

# of case-containing strata: 2

Stratum d=0 d=1 Total

1 2170 64 2234

2 2739 85 2824

Total 4909 149 5058

GLM fit

link function: probit - binormal ROC

number of points: 10

on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling  
w/o respect to case/control status  
and from within covariate strata

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: y1

ROC-GLM model

Bootstrap results

Number of strata = 2                      Number of obs = 5058

Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	0.48	0.32	-0.129 1.12
alpha_1	1.04	0.0826	0.893 1.22
gender	-0.00853	0.192	-0.386 0.371

```
> rocreg(dataset="nnhs2", d="d", markers=c("y1","y2"), adjcov=c("currence","gender"),  
adjmodel="linear", regcov="currence", cluster="id", noccsamp=T, nsamp=5000)
```

ROC regression for markers: y1, y2

Model intercept term covariates: currence

Percentile value calculation

method: empirical

tie correction: no

Covariate adjustment

method: linear model

covariates: currence, gender

GLM fit

link function: probit - binormal ROC

number of points: 10

on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling  
w/o respect to case/control status

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: y1

Covariate adjustment - linear model, controls only

Call:

```
glm(formula = as.formula(formulaStr), data = ctrlData)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-27.356	-5.132	1.104	4.804	48.274

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	-1.48666	1.28861	-1.154	0.249
currence	-0.20325	0.03239	-6.275	3.8e-10 ***
gender	0.24717	0.22291	1.109	0.268

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for gaussian family taken to be 60.08613)

Null deviance: 297081 on 4906 degrees of freedom  
Residual deviance: 294662 on 4904 degrees of freedom

AIC: 34028

Number of Fisher Scoring iterations: 2

\*\*\*\*\*

ROC-GLM model

Bootstrap results

Number of strata = 1                  Number of obs = 5056  
Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	-1.27	1.16	-3.61 0.968
alpha_1	0.937	0.0747	0.809 1.11
currage	0.0448	0.0302	-0.0139 0.106

\*\*\*\*\*

Model results for marker: y2

Covariate adjustment - linear model, controls only

Call:

glm(formula = as.formula(formulaStr), data = ctrlsData)

Deviance Residuals:

Min	1Q	Median	3Q	Max
-24.8469	-4.4290	-0.1300	4.2539	35.4476

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	-6.3488	1.1617	-5.465	4.86e-08 ***
currage	-0.1694	0.0292	-5.802	6.98e-09 ***
gender	0.7014	0.2010	3.490	0.000487 ***

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for gaussian family taken to be 48.83636)

Null deviance: 241680 on 4906 degrees of freedom  
Residual deviance: 239494 on 4904 degrees of freedom  
AIC: 33011

Number of Fisher Scoring iterations: 2

\*\*\*\*\*

ROC-GLM model

Bootstrap results

Number of strata = 1                  Number of obs = 5056

Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	-1.52	1.06	-3.59 0.61
alpha_1	0.915	0.072	0.778 1.06
currage	0.0483	0.0276	-0.0064 0.102

```
> rocreg(dataset="nnhs2", d="d", markers="y1", adjcov="gender", regcov="gender",
sregcov="gender", link="logit", cluster="id", noccsamp=T, nsamp=5000)
```

ROC regression for markers: y1

Model intercept term covariates: gender

Model slope term covariates: gender

Percentile value calculation

method: empirical

tie correction: no

Covariate adjustment

method: stratified

covariates: gender

# of case-containing strata: 2

Stratum d=0 d=1 Total

1 2170 64 2234

2 2739 85 2824

Total 4909 149 5058

GLM fit

link function: logit - bilogistic ROC

number of points: 10

on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling

w/o respect to case/control status

and from within covariate strata

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: y1

ROC-GLM model

Bootstrap results

Number of strata = 2                      Number of obs = 5058

Replications = 5000

Observed Coef. Bootstrap Std. Err. [95% Conf. Interval]

alpha\_0 0.793      0.552      -0.315    1.87

alpha\_1 0.841      0.243      0.367    1.33

gender -0.0258      0.337      -0.663   0.668

s\_gender 0.0436      0.156      -0.235   0.374

>

>

```

> ### Covariate adjustment
> dis <- nnhs2$d
> m1 <- nnhs2$y1
> m2 <- nnhs2$y2
> m3 <- nnhs2$y3
>
> # One marker
> test <-
rocreg(d="dis",markers="m1",adjcov=c("nnhs2$gender"),adjmodel="stratified",pvcmeth="empirical",
nsamp=5000)
ROC regression for markers: m1

```

Percentile value calculation  
method: empirical  
tie correction: no

Covariate adjustment  
method: stratified  
covariates: gender  
# of case-containing strata: 2

Stratum	dis=0	dis=1	Total
1	2170	64	2234
2	2739	85	2824
Total	4909	149	5058

GLM fit  
link function: probit - binormal ROC  
number of points: 10  
on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling  
separately from cases and controls  
and from within covariate strata

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: m1

ROC-GLM model

Bootstrap results  
Number of strata = 2                      Number of obs = 5058  
Replications = 5000

Observed Coef. Bootstrap Std. Err. [95% Conf. Interval]



alpha_0	0.451	0.0916	0.28	0.635
alpha_1	0.914	0.0693	0.791	1.06

> test

\$rocreg\_m1

\$rocreg\_m1\$fit

Call: glm(formula = as.formula(formulaStr), family = binomial(probit), data = reg)

Coefficients:

(Intercept)	x
0.4507	0.9139

Degrees of Freedom: 1489 Total (i.e. Null); 1488 Residual

Null Deviance: 1948

Residual Deviance: 1580 AIC: 1584

\$rocreg\_m1\$V

	alpha_0	alpha_1
alpha_0	0.008389374	NA
alpha_1	0.001073310	0.004806276

\$GLMparam

	alpha_0	alpha_1
m1	0.451	0.914

```
> rocreg(d="dis",markers="m1",adjcov="nnhs2$gender",adjmodel="stratified",pvcmeth="normal",
nsamp=5000)
```

ROC regression for markers: m1

Percentile value calculation

method: normal

Covariate adjustment

method: stratified

covariates: gender

# of case-containing strata: 2

Stratum dis=0 dis=1 Total

1	2170	64	2234
---	------	----	------

2	2739	85	2824
---	------	----	------

Total	4909	149	5058
-------	------	-----	------

GLM fit

link function: probit - binormal ROC

number of points: 10

on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling

separately from cases and controls

and from within covariate strata

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: m1

ROC-GLM model

Bootstrap results

Number of strata = 2                      Number of obs = 5058

Replications = 5000

Observed Coef. Bootstrap Std. Err. [95% Conf. Interval]

alpha_0	0.467	0.0944	0.293	0.657
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alpha_1	1.04	0.0814	0.889	1.21
---------	------	--------	-------	------

```
> rocreg(d="dis",markers="m1",adjcov="nnhs2$y2",adjmodel="linear",pvcmeth="normal",
nsamp=5000)
```

ROC regression for markers: m1

Percentile value calculation

method: normal

Covariate adjustment

method: linear model

covariates: y2

GLM fit

link function: probit - binormal ROC

number of points: 10

on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling  
separately from cases and controls

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: m1

Covariate adjustment - linear model, controls only

Call:

```
glm(formula = as.formula(formulaStr), data = ctrlsData)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-22.6108	-4.3916	0.5024	4.2454	43.6259

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	-2.20880	0.18605	-11.87	<2e-16 ***
y2	0.56972	0.01357	41.98	<2e-16 ***

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for gaussian family taken to be 44.55492)

Null deviance: 297140 on 4908 degrees of freedom  
Residual deviance: 218631 on 4907 degrees of freedom  
AIC: 32573

Number of Fisher Scoring iterations: 2

\*\*\*\*\*

ROC-GLM model

Bootstrap results

Number of strata = 1                      Number of obs = 5058

Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	0.285	0.0867	0.122 0.462
alpha_1	1.36	0.0907	1.2 1.55

```
> rocreg(d="dis",markers="m1",adjcov="nnhs2$y2",adjmodel="linear",pvcmeth="empirical",  
nsamp=5000)
```

ROC regression for markers: m1

Percentile value calculation

method: empirical

tie correction: no

Covariate adjustment

method: linear model

covariates: y2

GLM fit

link function: probit - binormal ROC

number of points: 10

on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling  
separately from cases and controls

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: m1

Covariate adjustment - linear model, controls only

Call:  
glm(formula = as.formula(formulaStr), data = ctrlData)

Deviance Residuals:

Min	1Q	Median	3Q	Max
-22.6108	-4.3916	0.5024	4.2454	43.6259

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	-2.20880	0.18605	-11.87	<2e-16 ***
y2	0.56972	0.01357	41.98	<2e-16 ***

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for gaussian family taken to be 44.55492)

Null deviance: 297140 on 4908 degrees of freedom  
Residual deviance: 218631 on 4907 degrees of freedom  
AIC: 32573

Number of Fisher Scoring iterations: 2

\*\*\*\*\*

ROC-GLM model

Bootstrap results

Number of strata = 1                      Number of obs = 5058  
Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	0.274	0.0865	0.111 0.447
alpha_1	1.11	0.0738	0.97 1.26

>

```
> # Multiple markers
> test <- rocreg(d="dis", markers=c("nnhs2$y1","nnhs2$y2"),
adjcov="nnhs2$gender",adjmodel="stratified",pvcmeth="empirical",nsamp=5000)
ROC regression for markers: y1, y2
```

Percentile value calculation  
method: empirical  
tie correction: no

Covariate adjustment  
method: stratified  
covariates: gender  
# of case-containing strata: 2

```
Stratum dis=0 dis=1 Total
1 2170 64 2234
2 2739 85 2824
Total 4909 149 5058
```

GLM fit  
link function: probit - binormal ROC  
number of points: 10  
on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling  
separately from cases and controls  
and from within covariate strata

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: y1

ROC-GLM model

Bootstrap results  
Number of strata = 2                      Number of obs = 5058  
   Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	0.451	0.0916	0.28 0.635
alpha_1	0.914	0.0693	0.791 1.06

\*\*\*\*\*

Model results for marker: y2

## ROC-GLM model

### Bootstrap results

Number of strata = 2                      Number of obs = 5058  
Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	0.329	0.0888	0.157 0.506
alpha_1	0.891	0.0681	0.772 1.04

**> test**

\$rocreg\_m1  
\$rocreg\_m1\$fit

Call: glm(formula = as.formula(formulaStr), family = binomial(probit), data = reg)

Coefficients:

(Intercept)        x  
0.4507    0.9139

Degrees of Freedom: 1489 Total (i.e. Null); 1488 Residual

Null Deviance: 1948

Residual Deviance: 1580      AIC: 1584

\$rocreg\_m1\$V

	alpha_0	alpha_1
alpha_0	0.008389374	NA
alpha_1	0.001073310	0.004806276

\$rocreg\_m2

\$rocreg\_m2\$fit

Call: glm(formula = as.formula(formulaStr), family = binomial(probit), data = reg)

Coefficients:

(Intercept)        x  
0.3286    0.8914

Degrees of Freedom: 1489 Total (i.e. Null); 1488 Residual

Null Deviance: 2001

Residual Deviance: 1637      AIC: 1641

\$rocreg\_m2\$V

	alpha_0	alpha_1
alpha_0	0.0078904804	NA
alpha_1	0.0005808754	0.004642187

```
$GLMparm
  alpha_0 alpha_1
y1  0.451  0.914
y2  0.329  0.891
```

```
> rocreg(d="dis", markers=c("nnhs2$y1","nnhs2$y2"),
adjcov="nnhs2$gender",adjmodel="stratified",pvcmeth="normal",nsamp=5000)
ROC regression for markers: y1, y2
```

Percentile value calculation  
method: normal

Covariate adjustment  
method: stratified  
covariates: gender  
# of case-containing strata: 2

Stratum	dis=0	dis=1	Total
1	2170	64	2234
2	2739	85	2824
Total	4909	149	5058

GLM fit  
link function: probit - binormal ROC  
number of points: 10  
on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling  
separately from cases and controls  
and from within covariate strata

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: y1

ROC-GLM model

Bootstrap results  
Number of strata = 2                      Number of obs = 5058  
Replications = 5000



	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	0.467	0.0944	0.293 0.657
alpha_1	1.04	0.0814	0.889 1.21

\*\*\*\*\*

Model results for marker: y2

ROC-GLM model

Bootstrap results

Number of strata = 2                      Number of obs = 5058  
    Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	0.309	0.088	0.145 0.494
alpha_1	0.961	0.0724	0.832 1.12

```
> rocreg(d="dis", markers=c("nnhs2$y1","nnhs2$y2"),
adjcov="m3",adjmodel="linear",pvcmeth="empirical",nsamp=5000)
ROC regression for markers: y1, y2
```

Percentile value calculation

method:     empirical  
 tie correction: no

Covariate adjustment

method:    linear model  
 covariates: m3

GLM fit

link function:    probit - binormal ROC  
 number of points: 10  
 on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling  
 separately from cases and controls

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: y1

Covariate adjustment - linear model, controls only

Call:  
glm(formula = as.formula(formulaStr), data = ctrlData)

Deviance Residuals:

Min	1Q	Median	3Q	Max
-28.588	-5.099	1.110	4.861	46.663

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	-7.41363	0.27780	-26.69	< 2e-16 ***
m3	0.38715	0.06562	5.90	3.88e-09 ***

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for gaussian family taken to be 60.12773)

Null deviance: 297140 on 4908 degrees of freedom  
Residual deviance: 295047 on 4907 degrees of freedom  
AIC: 34045

Number of Fisher Scoring iterations: 2

\*\*\*\*\*

ROC-GLM model

Bootstrap results

Number of strata = 1                      Number of obs = 5058  
Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	0.43	0.0886	0.257 0.604
alpha_1	0.902	0.0702	0.784 1.06

\*\*\*\*\*

Model results for marker: y2

Covariate adjustment - linear model, controls only

Call:  
glm(formula = as.formula(formulaStr), data = ctrlData)

Deviance Residuals:

Min	1Q	Median	3Q	Max
-25.47259	-4.45726	-0.09874	4.37939	34.03224

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	-10.7817	0.2510	-42.946	< 2e-16 ***
m3	0.2557	0.0593	4.312	1.65e-05 ***

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for gaussian family taken to be 49.10665)

Null deviance: 241879 on 4908 degrees of freedom  
Residual deviance: 240966 on 4907 degrees of freedom  
AIC: 33051

Number of Fisher Scoring iterations: 2

\*\*\*\*\*

ROC-GLM model

Bootstrap results

Number of strata = 1                      Number of obs = 5058  
Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	0.33	0.0862	0.162 0.495
alpha_1	0.87	0.0683	0.753 1.02

```
> rocreg(d="dis", markers=c("nnhs2$y1", "nnhs2$y2"),  
adjcov="m3", adjmodel="linear", pvcmeth="normal", nsamp=5000)  
ROC regression for markers: y1, y2
```

Percentile value calculation  
method: normal

Covariate adjustment  
method: linear model  
covariates: m3

GLM fit  
link function: probit - binormal ROC  
number of points: 10  
on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling  
separately from cases and controls

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: y1

Covariate adjustment - linear model, controls only

Call:

glm(formula = as.formula(formulaStr), data = ctrlData)

Deviance Residuals:

Min	1Q	Median	3Q	Max
-28.588	-5.099	1.110	4.861	46.663

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	-7.41363	0.27780	-26.69	< 2e-16 ***
m3	0.38715	0.06562	5.90	3.88e-09 ***

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for gaussian family taken to be 60.12773)

Null deviance: 297140 on 4908 degrees of freedom  
Residual deviance: 295047 on 4907 degrees of freedom  
AIC: 34045

Number of Fisher Scoring iterations: 2

\*\*\*\*\*

ROC-GLM model

Bootstrap results

Number of strata = 1                      Number of obs = 5058  
Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	0.45	0.0911	0.283 0.635
alpha_1	1.02	0.0806	0.879 1.19

\*\*\*\*\*

Model results for marker: y2

Covariate adjustment - linear model, controls only

Call:

```
glm(formula = as.formula(formulaStr), data = ctrlData)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-25.47259	-4.45726	-0.09874	4.37939	34.03224

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	-10.7817	0.2510	-42.946	< 2e-16 ***
m3	0.2557	0.0593	4.312	1.65e-05 ***

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for gaussian family taken to be 49.10665)

Null deviance: 241879 on 4908 degrees of freedom  
Residual deviance: 240966 on 4907 degrees of freedom  
AIC: 33051

Number of Fisher Scoring iterations: 2

\*\*\*\*\*

ROC-GLM model

Bootstrap results

Number of strata = 1                      Number of obs = 5058  
Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	0.309	0.0858	0.14 0.473
alpha_1	0.969	0.071	0.839 1.12

>

```
> # Multiple adjcov variables
> test <- rocreg(dataset="nnhs2", d="d", markers=c("y1"),
adjcov=c("sitenum", "gender"), adjmodel="stratified", pvcmeth="empirical", nsamp=5000)
ROC regression for markers: y1
```

Percentile value calculation  
method: empirical  
tie correction: no

Covariate adjustment  
method: stratified  
covariates: sitenum, gender  
# of case-containing strata: 12

	Stratum	d=0	d=1	Total
1	575	9	584	
2	101	4	105	
3	98	7	105	
4	876	26	902	
5	313	7	320	
6	207	11	218	
7	768	11	779	
8	164	4	168	
9	117	5	122	
10	942	40	982	
11	478	21	499	
12	270	4	274	
Total	4909	149	5058	

GLM fit  
link function: probit - binormal ROC  
number of points: 10  
on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling  
separately from cases and controls  
and from within covariate strata

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: y1

ROC-GLM model

Bootstrap results  
Number of strata = 12                      Number of obs = 5058

Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	0.446	0.0845	0.279 0.618
alpha_1	0.941	0.0696	0.802 1.07

**> test**

\$rocreg\_m1

\$rocreg\_m1\$fit

Call: glm(formula = as.formula(formulaStr), family = binomial(probit), data = reg)

Coefficients:

(Intercept)	x
0.4460	0.9405

Degrees of Freedom: 1489 Total (i.e. Null); 1488 Residual

Null Deviance: 1952

Residual Deviance: 1566 AIC: 1570

\$rocreg\_m1\$V

	alpha_0	alpha_1
alpha_0	0.007142125	NA
alpha_1	0.001165083	0.004848634

\$GLMparm

	alpha_0	alpha_1
y1	0.446	0.941

```
> rocreg(dataset="nnhs2", d="d", markers=c("y1"),
adjcov=c("sitenum","gender"),adjmodel="stratified",pvcmeth="normal",nsamp=5000)
ROC regression for markers: y1
```

Percentile value calculation  
method: normal

Covariate adjustment  
method: stratified  
covariates: sitenum, gender  
# of case-containing strata: 12

Stratum	d=0	d=1	Total
1	575	9	584
2	101	4	105
3	98	7	105
4	876	26	902
5	313	7	320
6	207	11	218
7	768	11	779
8	164	4	168
9	117	5	122
10	942	40	982
11	478	21	499
12	270	4	274
Total	4909	149	5058

GLM fit  
link function: probit - binormal ROC  
number of points: 10  
on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling  
separately from cases and controls  
and from within covariate strata

bootstrap samples: 5000  
\*\*\*\*\*

Model results for marker: y1  
ROC-GLM model

Bootstrap results  
Number of strata = 12                      Number of obs = 5058  
Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	0.463	0.0873	0.299 0.644
alpha_1	1.02	0.0791	0.872 1.18



```
> rocreg(dataset="nnhs2", d="d", markers=c("y1"),
adjcov=c("currence","y3"),adjmodel="linear",pvcmeth="normal",nsamp=5000)
ROC regression for markers: y1
```

Percentile value calculation  
method: normal

Covariate adjustment  
method: linear model  
covariates: currence, y3

GLM fit  
link function: probit - binormal ROC  
number of points: 10  
on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling  
separately from cases and controls

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: y1

Covariate adjustment - linear model, controls only

Call:  
glm(formula = as.formula(formulaStr), data = ctrlData)

Deviance Residuals:  
Min 1Q Median 3Q Max  
-27.665 -5.085 1.100 4.749 48.281

Coefficients:  
Estimate Std. Error t value Pr(>|t|)  
(Intercept) 0.39416 1.27232 0.310 0.757  
currence -0.20302 0.03227 -6.292 3.41e-10 \*\*\*  
y3 0.38749 0.06543 5.922 3.39e-09 \*\*\*  
---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for gaussian family taken to be 59.67438)

Null deviance: 297081 on 4906 degrees of freedom  
Residual deviance: 292643 on 4904 degrees of freedom  
AIC: 33995

Number of Fisher Scoring iterations: 2

\*\*\*\*\*

ROC-GLM model

Bootstrap results

Number of strata = 1                      Number of obs = 5056  
Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	0.443	0.0894	0.275 0.624
alpha_1	1.05	0.0775	0.913 1.22

```
> rocreg(dataset="nnhs2", d="d", markers=c("y1"),  
adjcov=c("currage","y3"),adjmodel="linear",pvcmeth="empirical",nsamp=5000)  
ROC regression for markers: y1
```

Percentile value calculation

method: empirical  
tie correction: no

Covariate adjustment

method: linear model  
covariates: currage, y3

GLM fit

link function: probit - binormal ROC  
number of points: 10  
on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling  
separately from cases and controls

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: y1

Covariate adjustment - linear model, controls only

Call:

```
glm(formula = as.formula(formulaStr), data = ctrlsData)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-27.665	-5.085	1.100	4.749	48.281

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	0.39416	1.27232	0.310	0.757
currage	-0.20302	0.03227	-6.292	3.41e-10 ***
y3	0.38749	0.06543	5.922	3.39e-09 ***

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for gaussian family taken to be 59.67438)

Null deviance: 297081 on 4906 degrees of freedom  
Residual deviance: 292643 on 4904 degrees of freedom  
AIC: 33995

Number of Fisher Scoring iterations: 2

\*\*\*\*\*

ROC-GLM model

Bootstrap results

Number of strata = 1                      Number of obs = 5056  
Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	0.447	0.0877	0.267 0.611
alpha_1	0.951	0.0686	0.822 1.09

>

```
> #nostsamp
> rocreg(dataset="nnhs2", d="d", markers=c("y1"),
adjcov=c("sitenum", "gender"), adjmodel="stratified", pvcmeth="empirical", nsamp=5000, nostsamp=T)
ROC regression for markers: y1
```

Percentile value calculation

method: empirical

tie correction: no

Covariate adjustment

method: stratified

covariates: sitenum, gender

# of case-containing strata: 12

Stratum d=0 d=1 Total

1	575	9	584
2	101	4	105
3	98	7	105
4	876	26	902
5	313	7	320
6	207	11	218
7	768	11	779
8	164	4	168
9	117	5	122
10	942	40	982
11	478	21	499
12	270	4	274
Total	4909	149	5058

GLM fit

link function: probit - binormal ROC

number of points: 10

on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling  
separately from cases and controls  
and from within covariate strata

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: y1

ROC-GLM model

Bootstrap results

Number of strata = 12

Number of obs = 5058

Replications = 5000

	Observed	Coef.	Bootstrap	Std. Err.	[95% Conf. Interval]
alpha_0	0.446	0.0889	0.276	0.624	
alpha_1	0.941	0.0713	0.8	1.08	

```
> rocreg(dataset="nnhs2", d="d", markers=c("y1"),
adjcov=c("sitenum", "gender"), adjmodel="stratified", pvcmeth="normal", nsamp=5000, nostsamp=T)
ROC regression for markers: y1
```

Percentile value calculation  
method: normal

Covariate adjustment  
method: stratified  
covariates: sitenum, gender  
# of case-containing strata: 12

Stratum	d=0	d=1	Total
1	575	9	584
2	101	4	105
3	98	7	105
4	876	26	902
5	313	7	320
6	207	11	218
7	768	11	779
8	164	4	168
9	117	5	122
10	942	40	982
11	478	21	499
12	270	4	274
Total	4909	149	5058

GLM fit  
link function: probit - binormal ROC  
number of points: 10  
on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling  
separately from cases and controls  
and from within covariate strata

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: y1

ROC-GLM model

Bootstrap results

Number of strata = 12                      Number of obs = 5058  
Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	0.463	0.0914	0.296 0.653
alpha_1	1.02	0.0804	0.871 1.18

>  
>  
>

> ### regcov, sregcov with covariate adjustment

> # One marker

>

**rocreg(d="dis",markers="m1",adjcov="nnhs2\$gender",adjmodel="stratified",regcov="nnhs2\$currage",pvcmeth="normal", nsamp=5000)**

ROC regression for markers: m1

Model intercept term covariates: currage

Percentile value calculation

method: normal

Covariate adjustment

method: stratified

covariates: gender

# of case-containing strata: 2

Stratum dis=0 dis=1 Total

1 2168 64 2232

2 2739 85 2824

Total 4907 149 5056

GLM fit

link function: probit - binormal ROC

number of points: 10

on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling  
separately from cases and controls  
and from within covariate strata

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: m1

ROC-GLM model

Bootstrap results

Number of strata = 2                      Number of obs = 5056

Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	4.14	1.04	-1.55 2.51
alpha_1	1.09	0.0824	0.889 1.22
currage	-0.0947	0.0268	-0.0524 0.0524

>

**rocreg(d="dis",markers="m1",adjcov="nnhs2\$y2",adjmodel="linear",regcov="nnhs2\$y3",pvcmeth="normal", nsamp=5000)**

ROC regression for markers: m1

Model intercept term covariates: y3

Percentile value calculation

method: normal

Covariate adjustment

method: linear model

covariates: y2

GLM fit

link function: probit - binormal ROC

number of points: 10

on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling  
separately from cases and controls

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: m1

Covariate adjustment - linear model, controls only

Call:

glm(formula = as.formula(formulaStr), data = ctrlData)

Deviance Residuals:

Min	1Q	Median	3Q	Max
-22.6108	-4.3916	0.5024	4.2454	43.6259

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	-2.20880	0.18605	-11.87	<2e-16 ***
y2	0.56972	0.01357	41.98	<2e-16 ***

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for gaussian family taken to be 44.55492)

Null deviance: 297140 on 4908 degrees of freedom  
Residual deviance: 218631 on 4907 degrees of freedom  
AIC: 32573

Number of Fisher Scoring iterations: 2

\*\*\*\*\*

ROC-GLM model

Bootstrap results

Number of strata = 1                  Number of obs = 5058  
Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	0.365	0.198	0.00707 0.773
alpha_1	1.36	0.0906	1.2 1.55
y3	0.0243	0.0524	-0.0686 0.137

>

**rocreg(d="dis",markers="m1",adjcov="nnhs2\$y2",adjmodel="linear",regcov="nnhs2\$y3",pvcmeth="empirical", nsamp=5000)**

ROC regression for markers: m1

Model intercept term covariates: y3

Percentile value calculation

method: empirical

tie correction: no

Covariate adjustment

method: linear model

covariates: y2



GLM fit

link function: probit - binormal ROC

number of points: 10

on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling  
separately from cases and controls

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: m1

Covariate adjustment - linear model, controls only

Call:

glm(formula = as.formula(formulaStr), data = ctrlData)

Deviance Residuals:

Min	1Q	Median	3Q	Max
-22.6108	-4.3916	0.5024	4.2454	43.6259

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	-2.20880	0.18605	-11.87	<2e-16 ***
y2	0.56972	0.01357	41.98	<2e-16 ***

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for gaussian family taken to be 44.55492)

Null deviance: 297140 on 4908 degrees of freedom  
Residual deviance: 218631 on 4907 degrees of freedom  
AIC: 32573

Number of Fisher Scoring iterations: 2

\*\*\*\*\*

ROC-GLM model

Bootstrap results

Number of strata = 1                      Number of obs = 5058  
Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	0.329	0.202	-0.0472 0.733
alpha_1	1.11	0.0744	0.972 1.27
y3	0.0169	0.0548	-0.0809 0.133

>

```
rocreg(d="dis",markers="m1",adjcov="nnhs2$gender",adjmodel="stratified",regcov="nnhs2$currage",sregcov="nnhs2$currage",pvcmeth="normal", nsamp=5000)
```

ROC regression for markers: m1

Model intercept term covariates: currage

Model slope term covariates: currage

Percentile value calculation

method: normal

Covariate adjustment

method: stratified

covariates: gender

# of case-containing strata: 2

Stratum dis=0 dis=1 Total

1	2168	64	2232
---	------	----	------

2	2739	85	2824
---	------	----	------

Total	4907	149	5056
-------	------	-----	------

GLM fit

link function: probit - binormal ROC

number of points: 10

on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling  
separately from cases and controls  
and from within covariate strata

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: m1

ROC-GLM model

Bootstrap results

Number of strata = 2                      Number of obs = 5056

Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	4.09	1.09	-1.69 2.58
alpha_1	0.699	0.939	-0.854 2.84
currage	-0.0934	0.0282	-0.0543 0.0555
s_currage	0.0101	0.0243	-0.0459 0.0499

>

```
rocreg(d="dis",markers="m1",adjcov="nnhs2$y2",adjmodel="linear",regcov="nnhs2$y3",sregcov="nnhs2$y3",pvcmeth="normal", nsamp=5000)
```

ROC regression for markers: m1

Model intercept term covariates: y3

Model slope term covariates: y3

Percentile value calculation

method: normal

Covariate adjustment

method: linear model

covariates: y2

GLM fit

link function: probit - binormal ROC

number of points: 10

on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling  
separately from cases and controls

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: m1

Covariate adjustment - linear model, controls only

Call:

```
glm(formula = as.formula(formulaStr), data = ctrlsData)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-22.6108	-4.3916	0.5024	4.2454	43.6259

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	-2.20880	0.18605	-11.87	<2e-16 ***
y2	0.56972	0.01357	41.98	<2e-16 ***

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for gaussian family taken to be 44.55492)

Null deviance: 297140 on 4908 degrees of freedom  
Residual deviance: 218631 on 4907 degrees of freedom  
AIC: 32573

Number of Fisher Scoring iterations: 2

\*\*\*\*\*

ROC-GLM model

Bootstrap results

Number of strata = 1            Number of obs = 5058  
Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	0.323	0.189	-0.0294 0.706
alpha_1	1.1	0.172	0.744 1.43
y3	0.0118	0.0527	-0.0832 0.125
s_y3	-0.0849	0.0483	-0.197 -0.00876

>

**rocreg(d="dis",markers="m1",adjcov="nnhs2\$y2",adjmodel="linear",regcov="nnhs2\$y3",sregcov="nnhs2\$y3",pvcmeth="empirical", nsamp=5000)**

ROC regression for markers: m1

Model intercept term covariates: y3

Model slope term covariates: y3

Percentile value calculation

method: empirical

tie correction: no

Covariate adjustment

method: linear model

covariates: y2

GLM fit

link function: probit - binormal ROC

number of points: 10

on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling  
separately from cases and controls

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: m1

Covariate adjustment - linear model, controls only

Call:

```
glm(formula = as.formula(formulaStr), data = ctrlData)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-22.6108	-4.3916	0.5024	4.2454	43.6259

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	-2.20880	0.18605	-11.87	<2e-16 ***
y2	0.56972	0.01357	41.98	<2e-16 ***

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for gaussian family taken to be 44.55492)

Null deviance: 297140 on 4908 degrees of freedom  
Residual deviance: 218631 on 4907 degrees of freedom  
AIC: 32573

Number of Fisher Scoring iterations: 2

\*\*\*\*\*

ROC-GLM model

Bootstrap results

Number of strata = 1                      Number of obs = 5058  
Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	0.313	0.193	-0.0575 0.696
alpha_1	1.02	0.159	0.641 1.27
y3	0.0121	0.0529	-0.0836 0.124
s_y3	-0.0297	0.046	-0.15 0.0303

>  
>

```
> # Multiple regcov, sregcov markers
```

```
> test <-
```

```
rocreg(d="dis",markers="m1",adjcov="nnhs2$gender",adjmodel="stratified",regcov=c("nnhs2$currage",  
"nnhs2$y3"),pvcmeth="normal", nsamp=5000)
```

```
ROC regression for markers: m1
```

```
Model intercept term covariates: currage, y3
```

```
Percentile value calculation
```

```
method: normal
```

```
Covariate adjustment
```

```
method: stratified
```

```
covariates: gender
```

```
# of case-containing strata: 2
```

```
Stratum dis=0 dis=1 Total
```

```
1 2168 64 2232
```

```
2 2739 85 2824
```

```
Total 4907 149 5056
```

```
GLM fit
```

```
link function: probit - binormal ROC
```

```
number of points: 10
```

```
on FPR interval: (0,1)
```

```
model coefficient bootstrap se's and CI's based on sampling
```

```
separately from cases and controls
```

```
and from within covariate strata
```

```
bootstrap samples: 5000
```

```
*****
```

```
Model results for marker: m1
```

```
ROC-GLM model
```

```
Bootstrap results
```

```
Number of strata = 2          Number of obs = 5056
```

```
Replications = 5000
```

```
Observed Coef. Bootstrap Std. Err. [95% Conf. Interval]
```

```
alpha_0 3.58      1.12      -1.65   2.65
```

```
alpha_1 1.1       0.083     0.892   1.22
```

```
currage -0.0864   0.0275    -0.0542 0.0535
```

```
y3 -0.0749   0.0528    -0.107  0.103
```

```
> test
```

```
$rocreg_m1
```

```
$rocreg_m1$fit
```

```
Call: glm(formula = as.formula(formulaStr), family = binomial(probit), data = reg)
```

```
Coefficients:
```

```
(Intercept)      x  currage      y3  
  3.58152    1.10051  -0.08637  -0.07494
```

```
Degrees of Freedom: 1489 Total (i.e. Null); 1486 Residual
```

```
Null Deviance: 1949
```

```
Residual Deviance: 1420 AIC: 1428
```

```
$rocreg_m1$V
```

```
      alpha_0  alpha_1  currage      y3  
alpha_0 1.246879669      NA      NA      NA  
alpha_1 0.002122125 6.883378e-03      NA      NA  
currage -0.030282371 2.010008e-05 0.0007577230      NA  
y3      0.020899144 -4.809414e-05 -0.0003067867 0.002788267
```

```
$GLMparam
```

```
      alpha_0 alpha_1 currage      y3  
m1  3.58    1.1 -0.0864 -0.0749
```

```
>
```

```
rocreg(d="dis",markers="m1",adjcov="nnhs2$y2",adjmodel="linear",regcov=c("nnhs2$currage","nnhs2$y3"),pvcmeth="normal", nsamp=5000)
```

```
ROC regression for markers: m1
```

```
Model intercept term covariates: currage, y3
```

```
Percentile value calculation
```

```
method: normal
```

```
Covariate adjustment
```

```
method: linear model
```

```
covariates: y2
```

```
GLM fit
```

```
link function: probit - binormal ROC
```

```
number of points: 10
```

```
on FPR interval: (0,1)
```

```
model coefficient bootstrap se's and CI's based on sampling  
separately from cases and controls
```

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: m1

Covariate adjustment - linear model, controls only

Call:

glm(formula = as.formula(formulaStr), data = ctrlsData)

Deviance Residuals:

Min	1Q	Median	3Q	Max
-22.6035	-4.3898	0.5011	4.2453	43.6253

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	-2.20417	0.18604	-11.85	<2e-16 ***
y2	0.57032	0.01358	42.01	<2e-16 ***

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for gaussian family taken to be 44.54037)

Null deviance: 297081 on 4906 degrees of freedom  
Residual deviance: 218471 on 4905 degrees of freedom  
AIC: 32558

Number of Fisher Scoring iterations: 2

\*\*\*\*\*

ROC-GLM model

Bootstrap results

Number of strata = 1                      Number of obs = 5056  
Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	0.364	1.06	-1.65 2.52
alpha_1	1.36	0.0898	1.21 1.57
currage	2.42e-05	0.0264	-0.0542 0.0502
y3	0.0243	0.0533	-0.0694 0.139



```
rocreg(d="dis",markers="m1",adjcov="nnhs2$y2",adjmodel="linear",regcov=c("nnhs2$currage","nnhs2$y3"),pvcmeth="empirical", nsamp=5000)
```

ROC regression for markers: m1

Model intercept term covariates: currage, y3

Percentile value calculation

method: empirical

tie correction: no

Covariate adjustment

method: linear model

covariates: y2

GLM fit

link function: probit - binormal ROC

number of points: 10

on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling  
separately from cases and controls

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: m1

Covariate adjustment - linear model, controls only

Call:

```
glm(formula = as.formula(formulaStr), data = ctrlsData)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-22.6035	-4.3898	0.5011	4.2453	43.6253

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	-2.20417	0.18604	-11.85	<2e-16 ***
y2	0.57032	0.01358	42.01	<2e-16 ***

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for gaussian family taken to be 44.54037)

Null deviance: 297081 on 4906 degrees of freedom  
Residual deviance: 218471 on 4905 degrees of freedom  
AIC: 32558

Number of Fisher Scoring iterations: 2

\*\*\*\*\*

ROC-GLM model

Bootstrap results

Number of strata = 1                  Number of obs = 5056  
Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	0.087	1.06	-1.9 2.24
alpha_1	1.11	0.074	0.983 1.27
currage	0.00607	0.0262	-0.0466 0.0547
y3	0.0145	0.0557	-0.0841 0.135

>

> test <-

**rocreg(d="dis",markers="m1",adjcov="nnhs2\$gender",adjmodel="stratified",regcov=c("nnhs2\$currage","nnhs2\$y3"),sregcov=c("nnhs2\$currage","nnhs2\$y3"),pvcmeth="normal", nsamp=5000)**

ROC regression for markers: m1

Model intercept term covariates: currage, y3

Model slope term covariates: currage, y3

Percentile value calculation

method: normal

Covariate adjustment

method: stratified

covariates: gender

# of case-containing strata: 2

Stratum dis=0 dis=1 Total

1 2168 64 2232

2 2739 85 2824

Total 4907 149 5056

GLM fit

link function: probit - binormal ROC

number of points: 10

on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling

separately from cases and controls  
and from within covariate strata

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: m1

ROC-GLM model

Bootstrap results

Number of strata = 2                      Number of obs = 5056  
Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	3.48	1.17	-1.82 2.75
alpha_1	0.484	1.01	-1.02 3.01
currage	-0.0843	0.029	-0.056 0.0578
y3	-0.0822	0.0561	-0.115 0.105
s_currage	0.0135	0.025	-0.0473 0.0521
s_y3	-0.0293	0.0492	-0.108 0.0875

>

**rocreg(d="dis",markers="m1",adjcov="nnhs2\$y2",adjmodel="linear",regcov=c("nnhs2\$currage","nnhs2\$y3"),sregcov=c("nnhs2\$currage","nnhs2\$y3"),pvcmeth="normal", nsamp=5000)**

ROC regression for markers: m1

Model intercept term covariates: currage, y3

Model slope term covariates: currage, y3

Percentile value calculation

method: normal

Covariate adjustment

method: linear model

covariates: y2

GLM fit

link function: probit - binormal ROC

number of points: 10

on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling  
separately from cases and controls

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: m1

Covariate adjustment - linear model, controls only

Call:

```
glm(formula = as.formula(formulaStr), data = ctrlData)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-22.6035	-4.3898	0.5011	4.2453	43.6253

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	-2.20417	0.18604	-11.85	<2e-16 ***
y2	0.57032	0.01358	42.01	<2e-16 ***

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for gaussian family taken to be 44.54037)

Null deviance: 297081 on 4906 degrees of freedom  
Residual deviance: 218471 on 4905 degrees of freedom  
AIC: 32558

Number of Fisher Scoring iterations: 2

\*\*\*\*\*

ROC-GLM model

Bootstrap results

Number of strata = 1                      Number of obs = 5056  
Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	0.422	1.06	-1.58 2.55
alpha_1	1.81	1.1	-0.333 4.05
currage	-0.00245	0.0262	-0.0562 0.0468
y3	0.0131	0.0537	-0.0824 0.129
s_currage	-0.0176	0.0271	-0.0712 0.0361
s_y3	-0.0767	0.0509	-0.192 0.00643

>

```
rocreg(d="dis",markers="m1",adjcov="nnhs2$y2",adjmodel="linear",regcov=c("nnhs2$currage","nnhs2$y3"),sregcov=c("nnhs2$currage","nnhs2$y3"),pvcmeth="empirical", nsamp=5000)
```

ROC regression for markers: m1

Model intercept term covariates: currage, y3

Model slope term covariates: currage, y3

Percentile value calculation

method: empirical

tie correction: no

Covariate adjustment

method: linear model

covariates: y2

GLM fit

link function: probit - binormal ROC

number of points: 10

on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling  
separately from cases and controls

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: m1

Covariate adjustment - linear model, controls only

Call:

```
glm(formula = as.formula(formulaStr), data = ctrlData)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-22.6035	-4.3898	0.5011	4.2453	43.6253

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	-2.20417	0.18604	-11.85	<2e-16 ***
y2	0.57032	0.01358	42.01	<2e-16 ***

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for gaussian family taken to be 44.54037)

Null deviance: 297081 on 4906 degrees of freedom  
Residual deviance: 218471 on 4905 degrees of freedom

AIC: 32558

Number of Fisher Scoring iterations: 2

\*\*\*\*\*

ROC-GLM model

Bootstrap results

Number of strata = 1            Number of obs = 5056  
Replications = 5000

	Observed	Coef.	Bootstrap	Std. Err.	[95% Conf. Interval]
alpha_0	0.231	1.05	-1.77	2.32	
alpha_1	2.24	0.909	0.303	3.87	
currage	0.00211	0.026	-0.0499	0.0513	
y3	0.0115	0.0539	-0.087	0.127	
s_currage	-0.0303	0.0222	-0.0704	0.0167	
s_y3	-0.0167	0.0479	-0.142	0.0459	

>  
>

> # Multiple adjcov variables

```
> rocreg(dataset="nnhs2", d="d", markers=c("y1"),  
adjcov=c("sitenum","gender"),adjmodel="stratified",regcov=c("nnhs2$currage","nnhs2$gender"),sre  
gcov=c("nnhs2$currage","nnhs2$gender"),pvcmeth="empirical",nsamp=5000)
```

Error in data.frame(..., check.names = FALSE) :

arguments imply differing number of rows: 5058, 0

```
> rocreg(dataset="nnhs2", d="d", markers=c("y1"),  
adjcov=c("sitenum","gender"),adjmodel="stratified",regcov=c("nnhs2$currage","nnhs2$gender"),sre  
gcov=c("nnhs2$currage","nnhs2$gender"),pvcmeth="normal",nsamp=5000)
```

Error in data.frame(..., check.names = FALSE) :

arguments imply differing number of rows: 5058, 0

```
> rocreg(dataset="nnhs2", d="d", markers=c("y1"),  
adjcov=c("currage","y3"),adjmodel="linear",regcov=c("nnhs2$currage","nnhs2$gender"),sregcov=c("  
nnhs2$currage","nnhs2$gender"),pvcmeth="normal",nsamp=5000)
```

Error in data.frame(..., check.names = FALSE) :

arguments imply differing number of rows: 5058, 0

```
> rocreg(dataset="nnhs2", d="d", markers=c("y1"),  
adjcov=c("currage","y3"),adjmodel="linear",regcov=c("nnhs2$currage","nnhs2$gender"),sregcov=c("  
nnhs2$currage","nnhs2$gender"),pvcmeth="empirical",nsamp=5000)
```

Error in data.frame(..., check.names = FALSE) :

arguments imply differing number of rows: 5058, 0

```
> #nostsamp
> rocreg(dataset="nnhs2", d="d", markers=c("y1"),
adjcov=c("sitenum","gender"),adjmodel="stratified",regcov="currage",sregcov="currage",pvcmeth="
empirical",nsamp=5000,nostsamp=T)
```

ROC regression for markers: y1

Model intercept term covariates: currage

Model slope term covariates: currage

Percentile value calculation

method: empirical

tie correction: no

Covariate adjustment

method: stratified

covariates: sitenum, gender

# of case-containing strata: 12

Stratum d=0 d=1 Total

1	575	9	584
2	99	4	103
3	98	7	105
4	876	26	902
5	313	7	320
6	207	11	218
7	768	11	779
8	164	4	168
9	117	5	122
10	942	40	982
11	478	21	499
12	270	4	274
Total	4907	149	5056

GLM fit

link function: probit - binormal ROC

number of points: 10

on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling  
separately from cases and controls  
and from within covariate strata

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: y1

ROC-GLM model

## Bootstrap results

Number of strata = 12                  Number of obs = 5056  
Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	0.0398	1.06	-1.99 2.19
alpha_1	1.96	0.863	0.24 3.63
currage	0.0105	0.0273	-0.0454 0.0632
s_currage	-0.0262	0.0221	-0.0692 0.0187

```
> rocreg(dataset="nnhs2", d="d", markers=c("y1"),  
adjcov=c("sitenum", "gender"), adjmodel="stratified", regcov="currage", sregcov="currage", pvcmeth="  
normal", nsamp=5000, nostsamp=T)  
ROC regression for markers: y1  
Model intercept term covariates: currage  
Model slope term covariates: currage
```

Percentile value calculation  
method: normal

Covariate adjustment  
method: stratified  
covariates: sitenum, gender  
# of case-containing strata: 12

Stratum	d=0	d=1	Total
1	575	9	584
2	99	4	103
3	98	7	105
4	876	26	902
5	313	7	320
6	207	11	218
7	768	11	779
8	164	4	168
9	117	5	122
10	942	40	982
11	478	21	499
12	270	4	274
Total	4907	149	5056

GLM fit  
link function: probit - binormal ROC  
number of points: 10  
on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling



separately from cases and controls  
and from within covariate strata

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: y1

ROC-GLM model

Bootstrap results

Number of strata = 12                      Number of obs = 5056  
Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	-0.493	1.15	-1.94 2.58
alpha_1	2.23	0.989	-0.359 3.48
currage	0.0247	0.0296	-0.0543 0.0628
s_currage	-0.0313	0.0254	-0.0629 0.0366

>  
>  
>  
>  
>  
>  
>  
>

> ### Pancreatic cancer data set, more options

> panCan <- read.csv("http://www.fhcrc.org/science/labs/pepe/book/data/wiedat2b.csv", header = TRUE, sep = ",")

> rocreg(dataset="panCan",d="d",markers="y1", nsamp=5000, tiecorr=T)

ROC regression for markers: y1

Percentile value calculation

method: empirical

tie correction: yes

GLM fit

link function: probit - binormal ROC

number of points: 10

on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling  
separately from cases and controls

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: y1

ROC-GLM model

Bootstrap results

Number of strata = 1            Number of obs = 141  
Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	1.19	0.175	0.901 1.58
alpha_1	0.478	0.114	0.289 0.732

**> rocreg(dataset="panCan",d="d",markers="y1", regcov="y2", nsamp=5000)**

ROC regression for markers: y1

Model intercept term covariates: y2

Percentile value calculation

method: empirical

tie correction: no

GLM fit

link function: probit - binormal ROC

number of points: 10

on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling  
separately from cases and controls

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: y1

ROC-GLM model

Bootstrap results

Number of strata = 1            Number of obs = 141  
Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	1.14	0.188	0.788 1.52
alpha_1	0.48	0.115	0.289 0.736
y2	0.00128	0.00266	-0.00312 0.00811

There were 50 or more warnings (use warnings() to see the first 50)

```
> rocreg(dataset="panCan",d="d",markers="y1", regcov="y2", sregcov="y2", nsamp=5000)
```

ROC regression for markers: y1

Model intercept term covariates: y2

Model slope term covariates: y2

Percentile value calculation

method: empirical

tie correction: no

GLM fit

link function: probit - binormal ROC

number of points: 10

on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling  
separately from cases and controls

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: y1

ROC-GLM model

Bootstrap results

Number of strata = 1                      Number of obs = 141

Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	1.14	0.191	0.768 1.52
alpha_1	0.49	0.123	0.259 0.734
y2	0.00118	0.00396	-0.00289 0.0115
s_y2	-0.000263	0.00268	-0.00264 0.0068

There were 50 or more warnings (use warnings() to see the first 50)

```
> rocreg(dataset="panCan", d="d", markers="y1", pvcmeth="normal", nsamp=5000)
ROC regression for markers: y1
```

Percentile value calculation  
method: normal

GLM fit  
link function: probit - binormal ROC  
number of points: 10  
on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling  
separately from cases and controls

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: y1

ROC-GLM model

Bootstrap results

Number of strata = 1                  Number of obs = 141  
Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	1.14	0.148	0.864 1.45
alpha_1	0.607	0.0747	0.43 0.724

>

**> #Link function and interval**

```
> rocreg(dataset="panCan", d="d", markers="y1", interval=c(0, 0.1, 10), link="probit", nsamp=5000)
ROC regression for markers: y1
```

Percentile value calculation  
method: empirical  
tie correction: no

GLM fit  
link function: probit - binormal ROC  
number of points: 10  
on FPR interval: (0,0.1)

model coefficient bootstrap se's and CI's based on sampling  
separately from cases and controls

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: y1

ROC-GLM model

Bootstrap results

Number of strata = 1            Number of obs = 141  
Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	1.13	0.369	0.311 1.76
alpha_1	0.404	0.169	0.0344 0.673

**> rocreg(dataset="panCan", d="d", markers="y1", link="logit", nsamp=5000)**

ROC regression for markers: y1

Percentile value calculation

method: empirical

tie correction: no

GLM fit

link function: logit - bilogistic ROC

number of points: 10

on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling  
separately from cases and controls

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: y1

ROC-GLM model

Bootstrap results

Number of strata = 1            Number of obs = 141  
Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	2.05	0.34	1.5 2.83
alpha_1	0.522	0.127	0.313 0.808

```
> rocreg(dataset="panCan", d="d", markers="y1", interval=c(0, 0.1, 10), link="logit", nsamp=5000)
ROC regression for markers: y1
```

Percentile value calculation  
method: empirical  
tie correction: no

GLM fit  
link function: logit - bilogistic ROC  
number of points: 10  
on FPR interval: (0,0.1)

model coefficient bootstrap se's and CI's based on sampling  
separately from cases and controls

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: y1

ROC-GLM model

Bootstrap results  
Number of strata = 1                  Number of obs = 141  
Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	1.57	0.525	0.464 2.51
alpha_1	0.279	0.119	0.0237 0.476

>

> #Bootstrap options

```
> rocreg(dataset="panCan", d="d", markers="y1", noccsamp=T, nsamp=5000)
ROC regression for markers: y1
```

Percentile value calculation  
method: empirical  
tie correction: no

GLM fit  
link function: probit - binormal ROC  
number of points: 10  
on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling

w/o respect to case/control status

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: y1

ROC-GLM model

Bootstrap results

Number of strata = 1              Number of obs = 141  
Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	1.19	0.175	0.901 1.57
alpha_1	0.478	0.113	0.286 0.727

>

```
> #resfile
> dis <- panCan$d
> panCan <- cbind(panCan, dis)
> panCan <- panCan[,-which(names(panCan)=="d")]
> #1 marker - create file
> rocreg(dataset="panCan",d="dis",markers="y1", nsamp=5000, resfile="testResfileRocreg")
Error in rocreg(dataset = "panCan", d = "dis", markers = "y1", nsamp = 5000, :
  file specified by resfile already exists, use 'replace' option to replace existing file

> #1 marker - Try to overwrite existing file
> rocreg(dataset="panCan",d="dis",markers="y2", nsamp=5000, resfile="testResfileRocreg")
Error in rocreg(dataset = "panCan", d = "dis", markers = "y2", nsamp = 5000, :
  file specified by resfile already exists, use 'replace' option to replace existing file
```

```
> #Multiple markers
> rocreg(dataset="panCan",d="dis",markers=c("y1","y2"), nsamp=5000, resfile="testResfileRocreg",
replace=T)
```

ROC regression for markers: y1, y2

Percentile value calculation

method: empirical

tie correction: no

GLM fit

link function: probit - binormal ROC

number of points: 10

on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling  
separately from cases and controls

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: y1

ROC-GLM model

Bootstrap results

Number of strata = 1                      Number of obs = 141

Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	1.19	0.174	0.896 1.57
alpha_1	0.478	0.113	0.288 0.729

\*\*\*\*\*

Model results for marker: y2

ROC-GLM model

Bootstrap results

Number of strata = 1                      Number of obs = 141

Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	0.789	0.2	0.401 1.19
alpha_1	1	0.194	0.695 1.47



> **#Multiple markers - Try to overwrite existing file**

> **rocreg(dataset="panCan",d="dis",markers=c("y1","y2"), nsamp=5000, resfile="testResfileRocreg")**

Error in rocreg(dataset = "panCan", d = "dis", markers = c("y1", "y2"), :

file specified by resfile already exists, use 'replace' option to replace existing file

>

> **#Test replace option**

> **rocreg(dataset="panCan",d="dis",markers="y1", nsamp=5000, resfile="testResfileRocreg",  
replace=T)**

ROC regression for markers: y1

Percentile value calculation

method: empirical

tie correction: no

GLM fit

link function: probit - binormal ROC

number of points: 10

on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling  
separately from cases and controls

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: y1

ROC-GLM model

Bootstrap results

Number of strata = 1                      Number of obs = 141

Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	1.19	0.174	0.896 1.57
alpha_1	0.478	0.113	0.288 0.729

```
> rocreg(dataset="panCan",d="dis",markers="y1", regcov="y2", nsamp=5000,  
resfile="testResfileRocreg", replace=T)
```

ROC regression for markers: y1

Model intercept term covariates: y2

Percentile value calculation

method: empirical

tie correction: no

GLM fit

link function: probit - binormal ROC

number of points: 10

on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling  
separately from cases and controls

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: y1

ROC-GLM model

Bootstrap results

Number of strata = 1                      Number of obs = 141

Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	1.14	0.188	0.788 1.52
alpha_1	0.48	0.115	0.289 0.736
y2	0.00128	0.00266	-0.00312 0.00811

There were 50 or more warnings (use warnings() to see the first 50)

```
> rocreg(dataset="panCan",d="dis",markers="y1", regcov="y2", sregcov="y2", nsamp=5000,  
resfile="testResfileRocreg", replace=T)
```

ROC regression for markers: y1

Model intercept term covariates: y2

Model slope term covariates: y2

Percentile value calculation

method: empirical

tie correction: no

GLM fit

link function: probit - binormal ROC

number of points: 10

on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling  
separately from cases and controls

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: y1

ROC-GLM model

Bootstrap results

Number of strata = 1                      Number of obs = 141

Replications = 5000

Observed Coef. Bootstrap Std. Err. [95% Conf. Interval]

alpha\_0 1.14      0.191      0.768    1.52

alpha\_1 0.49      0.123      0.259    0.734

y2    0.00118    0.00396    -0.00289 0.0115

s\_y2 -0.000263    0.00268    -0.00264 0.0068

There were 50 or more warnings (use warnings() to see the first 50)

```
> rocreg(dataset="panCan",d="dis",markers=c("y1","y2"), nsamp=5000, resfile="testResfileRocreg",
replace=T)
```

ROC regression for markers: y1, y2

Percentile value calculation

method: empirical

tie correction: no

GLM fit

link function: probit - binormal ROC

number of points: 10

on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling  
separately from cases and controls

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: y1

ROC-GLM model

Bootstrap results

Number of strata = 1                  Number of obs = 141  
Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	1.19	0.174	0.896 1.57
alpha_1	0.478	0.113	0.288 0.729

\*\*\*\*\*

Model results for marker: y2

ROC-GLM model

Bootstrap results

Number of strata = 1                  Number of obs = 141  
Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	0.789	0.2	0.401 1.19
alpha_1	1	0.194	0.695 1.47

>

>

>

```
> ### Ovarian Cancer dataset
> ovCan <- read.csv("http://www.fhcrc.org/science/labs/pepe/book/data/ocdata_b.csv", header =
TRUE, sep = ",")
> rocreg(dataset="ovCan", d="d", markers=c("y1","y2"), nsamp=5000)
ROC regression for markers: y1, y2
```

Percentile value calculation  
method: empirical  
tie correction: no

GLM fit  
link function: probit - binormal ROC  
number of points: 10  
on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling  
separately from cases and controls

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: y1

ROC-GLM model

Bootstrap results

Number of strata = 1                  Number of obs = 1200  
Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]	
alpha_0	1.02	0.0986	0.842	1.23
alpha_1	0.953	0.0807	0.816	1.14

\*\*\*\*\*

Model results for marker: y2

ROC-GLM model

Bootstrap results

Number of strata = 1                  Number of obs = 1200  
Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]	
alpha_0	2.17	0.185	1.92	2.64
alpha_1	1.19	0.149	0.987	1.57

```
> rocreg(dataset="ovCan", d="d", markers="y1", tiecorr=T, pvcmeth="empirical", nsamp=5000)
ROC regression for markers: y1
```

Percentile value calculation  
method: empirical  
tie correction: yes

GLM fit  
link function: probit - binormal ROC  
number of points: 10  
on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling  
separately from cases and controls

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: y1

ROC-GLM model

Bootstrap results  
Number of strata = 1                  Number of obs = 1200  
Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	1.02	0.0986	0.842 1.23
alpha_1	0.953	0.0807	0.816 1.14

```
> rocreg(dataset="ovCan", d="d", markers="y1", link="logit", nsamp=5000)
ROC regression for markers: y1
```

Percentile value calculation  
method: empirical  
tie correction: no

GLM fit  
link function: logit - bilogistic ROC  
number of points: 10  
on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling  
separately from cases and controls  
bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: y1

ROC-GLM model

Bootstrap results

Number of strata = 1              Number of obs = 1200  
Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	1.78	0.185	1.45 2.17
alpha_1	1.01	0.0883	0.859 1.2

> ### Daryl error - CIs don't contain estimate

> adjCovDat <- read.csv("http://labs.fhcrc.org/pepe/dabs/sj\_ms2\_fig1\_scen1b.csv", header = TRUE,  
sep = ",")

> rocreg(dataset="adjCovDat", d="d", markers="y", level=95, nsamp=5000)

ROC regression for markers: y

Percentile value calculation

method: empirical

tie correction: no

GLM fit

link function: probit - binormal ROC

number of points: 10

on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling  
separately from cases and controls

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: y

ROC-GLM model

Bootstrap results

Number of strata = 1              Number of obs = 20000  
Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	1.55	0.0196	1.51 1.59
alpha_1	0.9	0.0167	0.866 0.932

```
> rocreg(dataset="adjCovDat", d="d", markers="y", level=95, nsamp=5000, adjcov = "z", adjmodel = "stratified")
```

ROC regression for markers: y

Percentile value calculation

method: empirical

tie correction: no

Covariate adjustment

method: stratified

covariates: z

# of case-containing strata: 2

Stratum	d=0	d=1	Total
1	8991	5096	14087
2	1009	4904	5913
Total	10000	10000	20000

GLM fit

link function: probit - binormal ROC

number of points: 10

on FPR interval: (0,1)

model coefficient bootstrap se's and CI's based on sampling  
separately from cases and controls  
and from within covariate strata

bootstrap samples: 5000

\*\*\*\*\*

Model results for marker: y

ROC-GLM model

Bootstrap results

Number of strata = 2                      Number of obs = 20000  
Replications = 5000

	Observed Coef.	Bootstrap Std. Err.	[95% Conf. Interval]
alpha_0	1.31	0.0227	1.27 1.36
alpha_1	0.99	0.0207	0.949 1.03

>  
>