Birth Weight Part 3

```
/* bweightread.sas: Just read the data */
options linesize=79 pagesize=500 noovp formdlim='-';
/* Watch out for huge page size if there are plots */
title 'Low Birth Weight Data';

proc format; /* Value labels used in data step below  */
     value lowfmt  0 = '2500 g +'  1 = 'Under 2500 g';
     value racefmt 1 = 'White'
                   2 = 'Black'
                   3 = 'Other';
     value ynfmt   0 = 'No'  1 = 'Yes';

data bigbaby;
     infile 'bweight.data' firstobs=2; /* Skip the first line that R uses */
     input id low age lwt race smoke ptl ht ui ftv bwt;
     if race = 2 then r2 = 1; else r2=0;
     if race = 3 then r3 = 1; else r3=0;
     label id    =  'Identification Code'
           low   =  'Low Birth Weight'
           lwt   =  'Weight at Last Period'
           smoke =  'Smoke during Pregnancy'
           ptl   =  'History of Premature Labour (# of times)'
           ht    =  'History of Hypertension'
           ui    =  'Presence of Uterine Irritability'
           ftv   =  'Visits to Doctor During 1st trimester'
           bwt   =  'Birth Weight in Grams'
           r2    =  'Black vs White'
           r3    =  'Other vs White';
/******  Value labels defined above in proc format  ******/
format low lowfmt.;
format race racefmt.;
format ht ui smoke ynfmt.;



/* bweight3.sas */
%include 'bweightread.sas';

proc logistic;
     title3 'Full model';
     model low (event='Under 2500 g')  = age lwt smoke ptl ht ui ftv r2 r3;
     /* Can also say event=last or event=first */
     race: test r2=r3=0;
     Black_vs_Other: test r2=r3;
     Weak3: test age=0, ptl=0, ftv=0;

proc logistic;
     title3 'Let SAS make the dummy variables';
     class race;
     model low (event=last) = age lwt smoke ptl ht ui ftv race;
     race: test raceBlack=0, raceOther=0;

proc logistic;
     title3 'Indicator dummy variable coding with the class statement';
     class race /  param = ref; /* Default is last, and it's aphabetical */
     /* class race / order=internal param=ref ref=first; Does the same  */
     model low (event=last) = age lwt smoke ptl ht ui ftv race;
     race: test raceBlack=0, raceOther=0;
```

```
proc logistic;
     title3 'Automatic Variable Selection: Forward';
     /* Smallest score p-value with p < slentry=0.05 */
     class race /  param = ref;
     model low (event='Under 2500 g') = age lwt smoke ptl ht ui ftv race
           / selection=forward;

proc logistic;
     title3 'Automatic Variable Selection: Forward with full details';
     class race /  param = ref;
     model low (event='Under 2500 g') = age lwt smoke ptl ht ui ftv race
           / selection=forward details;

proc logistic;
     title3 'Automatic Variable Selection: Backward';
     /* Biggest Wald p-value with p > slstay=0.05 */
     class race /  param = ref;
     model low (event='Under 2500 g') = age lwt smoke ptl ht ui ftv race
           / selection=backward details;

proc logistic;
     title3 'Automatic Variable Selection: Forward with Possible Removal';
     /* Add based on smallest score p-value  with p < slentry=0.05
        Remove based on biggest Wald p-value with p > slstay=0.05 */
     class race /  param = ref;
     model low (event='Under 2500 g') = age lwt smoke ptl ht ui ftv race
           / selection=stepwise details;

proc logistic;
     title3 'Automatic Variable Selection: Backward with Possible Re-entry';
     /* Add based on smallest score p-value  with p < slentry=0.05
        Remove based on biggest Wald p-value with p > slstay=0.05 */
     class race /  param = ref;
     model low (event='Under 2500 g') = age lwt smoke ptl ht ui ftv race
           / selection=stepwise start = 8 details;
```

Full model

The LOGISTIC Procedure

Model Information

Data Set	WORK.BIGBABY	
Response Variable	low	Low Birth Weight
Number of Response Levels	2	
Model	binary logit	
Optimization Technique	Fisher's scoring	

Number of Observations Read	189
Number of Observations Used	189

Response Profile

Ordered Value	low	Total Frequency
1	2500 g +	130
2	Under 2500 g	59

Probability modeled is low='Under 2500 g'.

Model Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	236.672	221.285
SC	239.914	253.702
-2 Log L	234.672	201.285

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	33.3872	9	0.0001
Score	30.9586	9	0.0003
Wald	25.7025	9	0.0023

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	0.4806	1.1969	0.1612	0.6880
age	1	-0.0295	0.0370	0.6367	0.4249
lwt	1	-0.0154	0.00692	4.9691	0.0258
smoke	1	0.9388	0.4022	5.4501	0.0196
ptl	1	0.5433	0.3454	2.4745	0.1157
ht	1	1.8633	0.6975	7.1356	0.0076
ui	1	0.7676	0.4593	2.7931	0.0947
ftv	1	0.0653	0.1724	0.1435	0.7048
r2	1	1.2723	0.5274	5.8201	0.0158
r3	1	0.8805	0.4408	3.9902	0.0458

Odds Ratio Estimates

Effect	Point Estimate	95% Wald Confidence Limits	
age	0.971	0.903	1.044
lwt	0.985	0.971	0.998
smoke	2.557	1.163	5.624
ptl	1.722	0.875	3.388
ht	6.445	1.642	25.291
ui	2.155	0.876	5.301
ftv	1.067	0.761	1.497
r2	3.569	1.270	10.033
r3	2.412	1.017	5.723

Association of Predicted Probabilities and Observed Responses

Percent Concordant	74.4	Somers' D	0.492
Percent Discordant	25.3	Gamma	0.493
Percent Tied	0.3	Tau-a	0.212
Pairs	7670	c	0.746

Linear Hypotheses Testing Results

Label	Wald Chi-Square	DF	Pr > ChiSq
race	7.1158	2	0.0285
Black_vs_Other	0.5310	1	0.4662
Weak3	2.8519	3	0.4150

Let SAS make the dummy variables

The LOGISTIC Procedure

Model Information

Data Set	WORK.BIGBABY	
Response Variable	low	Low Birth Weight
Number of Response Levels	2	
Model	binary logit	
Optimization Technique	Fisher's scoring	

Number of Observations Read	189
Number of Observations Used	189

Response Profile

Ordered Value	low	Total Frequency
1	2500 g +	130
2	Under 2500 g	59

Probability modeled is low='Under 2500 g'.

Class Level Information

Class	Value	Design Variables	
race	Black	1	0
	Other	0	1
	White	-1	-1

Model Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	236.672	221.285
SC	239.914	253.702
-2 Log L	234.672	201.285

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	33.3872	9	0.0001
Score	30.9586	9	0.0003
Wald	25.7025	9	0.0023

Type 3 Analysis of Effects

Effect	DF	Wald Chi-Square	Pr > ChiSq
age	1	0.6367	0.4249
lwt	1	4.9691	0.0258
smoke	1	5.4501	0.0196
ptl	1	2.4745	0.1157
ht	1	7.1356	0.0076
ui	1	2.7931	0.0947
ftv	1	0.1435	0.7048
race	2	7.1158	0.0285

Analysis of Maximum Likelihood Estimates

Parameter		DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept		1	1.1982	1.1509	1.0839	0.2978
age		1	-0.0295	0.0370	0.6367	0.4249
lwt		1	-0.0154	0.00692	4.9691	0.0258
smoke		1	0.9388	0.4022	5.4501	0.0196
ptl		1	0.5433	0.3454	2.4745	0.1157
ht		1	1.8633	0.6975	7.1356	0.0076
ui		1	0.7676	0.4593	2.7931	0.0947
ftv		1	0.0653	0.1724	0.1435	0.7048
race	Black	1	0.5547	0.3232	2.9458	0.0861
race	Other	1	0.1629	0.2766	0.3469	0.5559

Odds Ratio Estimates

Effect		Point Estimate	95% Wald Confidence Limits	
age		0.971	0.903	1.044
lwt		0.985	0.971	0.998
smoke		2.557	1.163	5.624
ptl		1.722	0.875	3.388
ht		6.445	1.642	25.291
ui		2.155	0.876	5.301
ftv		1.067	0.761	1.497
race	Black vs White	3.569	1.270	10.033
race	Other vs White	2.412	1.017	5.723

Association of Predicted Probabilities and Observed Responses

Percent Concordant	74.4	Somers' D	0.492
Percent Discordant	25.3	Gamma	0.493
Percent Tied	0.3	Tau-a	0.212
Pairs	7670	c	0.746

Linear Hypotheses Testing Results

Label	Wald Chi-Square	DF	Pr > ChiSq
race	7.1158	2	0.0285

Indicator dummy variable coding with the class statement

The LOGISTIC Procedure

Model Information

Data Set	WORK.BIGBABY	
Response Variable	low	Low Birth Weight
Number of Response Levels	2	
Model	binary logit	
Optimization Technique	Fisher's scoring	

Number of Observations Read	189
Number of Observations Used	189

Response Profile

Ordered Value	low	Total Frequency
1	Under 2500 g	59
2	2500 g +	130

Probability modeled is low='Under 2500 g'.

Class Level Information

Class	Value	Design Variables	
race	Black	1	0
	Other	0	1
	White	0	0

Model Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	236.672	221.285
SC	239.914	253.702
-2 Log L	234.672	201.285

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	33.3872	9	0.0001
Score	30.9586	9	0.0003
Wald	25.7025	9	0.0023

Type 3 Analysis of Effects

Effect	DF	Wald Chi-Square	Pr > ChiSq
age	1	0.6367	0.4249
lwt	1	4.9691	0.0258
smoke	1	5.4501	0.0196
ptl	1	2.4745	0.1157
ht	1	7.1356	0.0076
ui	1	2.7931	0.0947
ftv	1	0.1435	0.7048
race	2	7.1158	0.0285

Analysis of Maximum Likelihood Estimates

Parameter		DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept		1	0.4806	1.1969	0.1612	0.6880
age		1	-0.0295	0.0370	0.6367	0.4249
lwt		1	-0.0154	0.00692	4.9691	0.0258
smoke		1	0.9388	0.4022	5.4501	0.0196
ptl		1	0.5433	0.3454	2.4745	0.1157
ht		1	1.8633	0.6975	7.1356	0.0076
ui		1	0.7676	0.4593	2.7931	0.0947
ftv		1	0.0653	0.1724	0.1435	0.7048
race	Black	1	1.2723	0.5274	5.8201	0.0158
race	Other	1	0.8805	0.4408	3.9902	0.0458

Odds Ratio Estimates

Effect		Point Estimate	95% Wald Confidence Limits	
age		0.971	0.903	1.044
lwt		0.985	0.971	0.998
smoke		2.557	1.163	5.624
ptl		1.722	0.875	3.388
ht		6.445	1.642	25.291
ui		2.155	0.876	5.301
ftv		1.067	0.761	1.497
race	Black vs White	3.569	1.270	10.033
race	Other vs White	2.412	1.017	5.723

Association of Predicted Probabilities and Observed Responses

Percent Concordant	74.4	Somers' D	0.492
Percent Discordant	25.3	Gamma	0.493
Percent Tied	0.3	Tau-a	0.212
Pairs	7670	c	0.746

Linear Hypotheses Testing Results

Label	Wald Chi-Square	DF	Pr > ChiSq
race	7.1158	2	0.0285

Automatic Variable Selection: Forward

The LOGISTIC Procedure

Model Information

Data Set	WORK.BIGBABY	
Response Variable	low	Low Birth Weight
Number of Response Levels	2	
Model	binary logit	
Optimization Technique	Fisher's scoring	

Number of Observations Read	189
Number of Observations Used	189

Response Profile

Ordered Value	low	Total Frequency
1	2500 g +	130
2	Under 2500 g	59

Probability modeled is low='Under 2500 g'.

Forward Selection Procedure

Class Level Information

Class	Value	Design Variables	
race	Black	1	0
	Other	0	1
	White	0	0

Step 0. Intercept entered:

Model Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

-2 Log L = 234.672

Residual Chi-Square Test

Chi-Square	DF	Pr > ChiSq
30.9586	9	0.0003

Step 1. Effect ptl entered:

Model Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	236.672	231.893
SC	239.914	238.376
-2 Log L	234.672	227.893

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	6.7794	1	0.0092
Score	7.2671	1	0.0070
Wald	6.3914	1	0.0115

Residual Chi-Square Test

Chi-Square	DF	Pr > ChiSq
24.7720	8	0.0017

Step 2. Effect ht entered:

Model Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	236.672	229.583
SC	239.914	239.309
-2 Log L	234.672	223.583

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	11.0887	2	0.0039
Score	11.8318	2	0.0027
Wald	10.4409	2	0.0054

Residual Chi-Square Test

Chi-Square	DF	Pr > ChiSq
20.6585	7	0.0043

Step 3. Effect lwt entered:

Model Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	236.672	223.964
SC	239.914	236.931
-2 Log L	234.672	215.964

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	18.7082	3	0.0003
Score	18.3434	3	0.0004
Wald	15.3112	3	0.0016

Residual Chi-Square Test

Chi-Square	DF	Pr > ChiSq
14.3948	6	0.0255

NOTE: No (additional) effects met the 0.05 significance level for entry into the model.

Summary of Forward Selection

Step	Effect Entered	DF	Number In	Score Chi-Square	Pr > ChiSq
1	ptl	1	1	7.2671	0.0070
2	ht	1	2	4.7218	0.0298
3	lwt	1	3	6.8999	0.0086

Summary of Forward Selection

Step	Variable Label
1	History of Premature Labour (# of times)
2	History of Hypertension
3	Weight at Last Period

Type 3 Analysis of Effects

Effect	DF	Wald Chi-Square	Pr > ChiSq
lwt	1	6.5552	0.0105
ptl	1	4.8957	0.0269
ht	1	6.9329	0.0085

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	1.0928	0.8415	1.6865	0.1941
lwt	1	-0.0171	0.00667	6.5552	0.0105
ptl	1	0.7256	0.3279	4.8957	0.0269
ht	1	1.8560	0.7049	6.9329	0.0085

Odds Ratio Estimates

Effect	Point Estimate	95% Wald Confidence Limits	
lwt	0.983	0.970	0.996
ptl	2.066	1.086	3.929
ht	6.398	1.607	25.471

Association of Predicted Probabilities and Observed Responses

Percent Concordant	71.1	Somers' D	0.439
Percent Discordant	27.3	Gamma	0.446
Percent Tied	1.6	Tau-a	0.189
Pairs	7670	c	0.719

Automatic Variable Selection: Forward with full details

The LOGISTIC Procedure

Model Information

Data Set	WORK.BIGBABY	
Response Variable	low	Low Birth Weight
Number of Response Levels	2	
Model	binary logit	
Optimization Technique	Fisher's scoring	

Number of Observations Read	189
Number of Observations Used	189

Response Profile

Ordered Value	low	Total Frequency
1	2500 g +	130
2	Under 2500 g	59

Probability modeled is low='Under 2500 g'.

Forward Selection Procedure

Class Level Information

Class	Value	Design Variables	
race	Black	1	0
	Other	0	1
	White	0	0

Step 0. Intercept entered:

Model Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

-2 Log L = 234.672

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-0.7900	0.1570	25.3270	<.0001

Residual Chi-Square Test

Chi-Square	DF	Pr > ChiSq
30.9586	9	0.0003

Analysis of Effects Eligible for Entry

Effect	DF	Score Chi-Square	Pr > ChiSq
age	1	2.6737	0.1020
lwt	1	5.4382	0.0197
smoke	1	4.9237	0.0265
ptl	1	7.2671	0.0070
ht	1	4.3880	0.0362
ui	1	5.4008	0.0201
ftv	1	0.7492	0.3867
race	2	5.0048	0.0819

Step 1. Effect ptl entered:

Model Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	236.672	231.893
SC	239.914	238.376
-2 Log L	234.672	227.893

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	6.7794	1	0.0092
Score	7.2671	1	0.0070
Wald	6.3914	1	0.0115

Type 3 Analysis of Effects

Effect	DF	Wald Chi-Square	Pr > ChiSq
ptl	1	6.3914	0.0115

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-0.9642	0.1750	30.3699	<.0001
ptl	1	0.8018	0.3172	6.3914	0.0115

Odds Ratio Estimates

Effect	Point Estimate	95% Wald Confidence Limits	
ptl	2.230	1.197	4.151

Association of Predicted Probabilities and Observed Responses

Percent Concordant	27.9	Somers' D	0.206
Percent Discordant	7.3	Gamma	0.586
Percent Tied	64.8	Tau-a	0.089
Pairs	7670	c	0.603

Residual Chi-Square Test

Chi-Square	DF	Pr > ChiSq
24.7720	8	0.0017

Analysis of Effects Eligible for Entry

Effect	DF	Score Chi-Square	Pr > ChiSq
age	1	3.4783	0.0622
lwt	1	4.1126	0.0426
smoke	1	3.1640	0.0753
ht	1	4.7218	0.0298
ui	1	3.1612	0.0754
ftv	1	0.5769	0.4475
race	2	5.3590	0.0686

Step 2. Effect ht entered:

Model Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	236.672	229.583
SC	239.914	239.309
-2 Log L	234.672	223.583

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	11.0887	2	0.0039
Score	11.8318	2	0.0027
Wald	10.4409	2	0.0054

Type 3 Analysis of Effects

Effect	DF	Wald Chi-Square	Pr > ChiSq
ptl	1	6.6833	0.0097
ht	1	4.2701	0.0388

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-1.0616	0.1842	33.2244	<.0001
ptl	1	0.8230	0.3184	6.6833	0.0097
ht	1	1.2723	0.6157	4.2701	0.0388

Odds Ratio Estimates

Effect	Point Estimate	95% Wald Confidence Limits	
ptl	2.277	1.220	4.250
ht	3.569	1.068	11.930

Association of Predicted Probabilities and Observed Responses

Percent Concordant	35.2	Somers' D	0.252
Percent Discordant	9.9	Gamma	0.559
Percent Tied	54.9	Tau-a	0.109
Pairs	7670	c	0.626

Residual Chi-Square Test

Chi-Square	DF	Pr > ChiSq
20.6585	7	0.0043

Analysis of Effects Eligible for Entry

Effect	DF	Score Chi-Square	Pr > ChiSq
age	1	3.4477	0.0633
lwt	1	6.8999	0.0086
smoke	1	3.1166	0.0775
ui	1	4.2246	0.0398
ftv	1	0.3697	0.5431
race	2	4.8822	0.0871

Step 3. Effect lwt entered:

Model Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	236.672	223.964
SC	239.914	236.931
-2 Log L	234.672	215.964

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	18.7082	3	0.0003
Score	18.3434	3	0.0004
Wald	15.3112	3	0.0016

Type 3 Analysis of Effects

Effect	DF	Wald Chi-Square	Pr > ChiSq
lwt	1	6.5552	0.0105
ptl	1	4.8957	0.0269
ht	1	6.9329	0.0085

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	1.0928	0.8415	1.6865	0.1941
lwt	1	-0.0171	0.00667	6.5552	0.0105
ptl	1	0.7256	0.3279	4.8957	0.0269
ht	1	1.8560	0.7049	6.9329	0.0085

Odds Ratio Estimates

Effect	Point Estimate	95% Wald Confidence Limits	
lwt	0.983	0.970	0.996
ptl	2.066	1.086	3.929
ht	6.398	1.607	25.471

Association of Predicted Probabilities and Observed Responses

Percent Concordant	71.1	Somers' D	0.439
Percent Discordant	27.3	Gamma	0.446
Percent Tied	1.6	Tau-a	0.189
Pairs	7670	c	0.719

Residual Chi-Square Test

Chi-Square	DF	Pr > ChiSq
14.3948	6	0.0255

Analysis of Effects Eligible for Entry

Effect	DF	Score Chi-Square	Pr > ChiSq
age	1	1.8954	0.1686
smoke	1	2.8571	0.0910
ui	1	3.0810	0.0792
ftv	1	0.1175	0.7317
race	2	5.2658	0.0719

NOTE: No (additional) effects met the 0.05 significance level for entry into the model.

Summary of Forward Selection

Step	Effect Entered	DF	Number In	Score Chi-Square	Pr > ChiSq
1	ptl	1	1	7.2671	0.0070
2	ht	1	2	4.7218	0.0298
3	lwt	1	3	6.8999	0.0086

Summary of Forward Selection

Step	Variable Label
1	History of Premature Labour (# of times)
2	History of Hypertension
3	Weight at Last Period

Low Birth Weight Data 6

Automatic Variable Selection: Backward

The LOGISTIC Procedure

Skipping ...

Step 0. The following effects were entered:

Intercept age lwt smoke ptl ht ui ftv race

Model Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	236.672	221.285
SC	239.914	253.702
-2 Log L	234.672	201.285

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	33.3872	9	0.0001
Score	30.9586	9	0.0003
Wald	25.7025	9	0.0023

Skipping ...

Analysis of Maximum Likelihood Estimates

Skipping ...

Odds Ratio Estimates

Skipping ...

Association of Predicted Probabilities and Observed Responses

Skipping ...

Analysis of Effects Eligible for Removal

Effect	DF	Wald Chi-Square	Pr > ChiSq
age	1	0.6367	0.4249
lwt	1	4.9691	0.0258
smoke	1	5.4501	0.0196
ptl	1	2.4745	0.1157
ht	1	7.1356	0.0076
ui	1	2.7931	0.0947
ftv	1	0.1435	0.7048
race	2	7.1158	0.0285

Step 1. Effect ftv is removed:

Model Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Skipping ...

Testing Global Null Hypothesis: BETA=0

Skipping ...

Type 3 Analysis of Effects

Skipping ...

Analysis of Maximum Likelihood Estimates

Standard Wald

Skipping ...

Odds Ratio Estimates

Skipping ...

Association of Predicted Probabilities and Observed Responses

Skipping ...

Residual Chi-Square Test

Chi-Square	DF	Pr > ChiSq
0.1437	1	0.7047

Analysis of Effects Eligible for Removal

Effect	DF	Wald Chi-Square	Pr > ChiSq
age	1	0.5515	0.4577
lwt	1	4.8027	0.0284
smoke	1	5.3058	0.0213
ptl	1	2.4479	0.1177
ht	1	7.0264	0.0080
ui	1	2.7268	0.0987
race	2	7.0057	0.0301

Step 2. Effect age is removed:

Skipping quite a lot …

Residual Chi-Square Test

Chi-Square	DF	Pr > ChiSq
0.6961	2	0.7061

Analysis of Effects Eligible for Removal

Effect	DF	Wald Chi-Square	Pr > ChiSq
lwt	1	5.3831	0.0203
smoke	1	5.5430	0.0186
ptl	1	2.1747	0.1403
ht	1	7.1217	0.0076
ui	1	2.9630	0.0852
race	2	7.8855	0.0194

Step 3. Effect ptl is removed:

Skipping …

Residual Chi-Square Test

Chi-Square	DF	Pr > ChiSq
2.9371	3	0.4014

Analysis of Effects Eligible for Removal

Effect	DF	Wald Chi-Square	Pr > ChiSq
lwt	1	6.0487	0.0139
smoke	1	6.9625	0.0083
ht	1	7.3368	0.0068
ui	1	4.0887	0.0432
race	2	8.1165	0.0173

NOTE: No (additional) effects met the 0.05 significance level for removal from the model.

Summary of Backward Elimination

Step	Effect Removed	DF	Number In	Wald Chi-Square	Pr > ChiSq
1	ftv	1	7	0.1435	0.7048
2	age	1	6	0.5515	0.4577
3	ptl	1	5	2.1747	0.1403

Summary of Backward Elimination

Step	Variable Label
1	Visits to Doctor During 1st trimester
2	
3	History of Premature Labour (# of times)

Automatic Variable Selection: Forward with Possible Removal

Skipping ...

Step 0. Intercept entered:

Skipping ...

Analysis of Effects Eligible for Entry

Effect	DF	Score Chi-Square	Pr > ChiSq
age	1	2.6737	0.1020
lwt	1	5.4382	0.0197
smoke	1	4.9237	0.0265
ptl	1	7.2671	0.0070
ht	1	4.3880	0.0362
ui	1	5.4008	0.0201
ftv	1	0.7492	0.3867
race	2	5.0048	0.0819

Step 1. Effect ptl entered:

Skipping ...

Residual Chi-Square Test

Chi-Square	DF	Pr > ChiSq
24.7720	8	0.0017

Analysis of Effects Eligible for Removal

Effect	DF	Wald Chi-Square	Pr > ChiSq
ptl	1	6.3914	0.0115

NOTE: No effects for the model in Step 1 are removed.

Analysis of Effects Eligible for Entry

Effect	DF	Score Chi-Square	Pr > ChiSq
age	1	3.4783	0.0622
lwt	1	4.1126	0.0426
smoke	1	3.1640	0.0753
ht	1	4.7218	0.0298
ui	1	3.1612	0.0754
ftv	1	0.5769	0.4475
race	2	5.3590	0.0686

Step 2. Effect ht entered:

Skipping …

Residual Chi-Square Test

Chi-Square	DF	Pr > ChiSq
20.6585	7	0.0043

Analysis of Effects Eligible for Removal

Effect	DF	Wald Chi-Square	Pr > ChiSq
ptl	1	6.6833	0.0097
ht	1	4.2701	0.0388

NOTE: No effects for the model in Step 2 are removed.

Analysis of Effects Eligible for Entry

Effect	DF	Score Chi-Square	Pr > ChiSq
age	1	3.4477	0.0633
lwt	1	6.8999	0.0086
smoke	1	3.1166	0.0775
ui	1	4.2246	0.0398
ftv	1	0.3697	0.5431
race	2	4.8822	0.0871

Step 3. Effect lwt entered:

Skipping …

Residual Chi-Square Test

Chi-Square	DF	Pr > ChiSq
14.3948	6	0.0255

Analysis of Effects Eligible for Removal

Effect	DF	Wald Chi-Square	Pr > ChiSq
lwt	1	6.5552	0.0105
ptl	1	4.8957	0.0269
ht	1	6.9329	0.0085

NOTE: No effects for the model in Step 3 are removed.

Analysis of Effects Eligible for Entry

Effect	DF	Score Chi-Square	Pr > ChiSq
age	1	1.8954	0.1686
smoke	1	2.8571	0.0910
ui	1	3.0810	0.0792
ftv	1	0.1175	0.7317
race	2	5.2658	0.0719

NOTE: No (additional) effects met the 0.05 significance level for entry into the model.

Summary of Stepwise Selection

Step	Effect Entered	Effect Removed	DF	Number In	Score Chi-Square	Wald Chi-Square	Pr > ChiSq
1	ptl		1	1	7.2671		0.0070
2	ht		1	2	4.7218		0.0298
3	lwt		1	3	6.8999		0.0086

Summary of Stepwise Selection

Step	Variable Label
1	History of Premature Labour (# of times)
2	History of Hypertension
3	Weight at Last Period

Automatic Variable Selection: Backward with Possible Re-entry

Skipping ...

Step 0. The following effects were entered:

Intercept age lwt smoke ptl ht ui ftv race

Skipping ...

Analysis of Effects Eligible for Removal

Effect	DF	Wald Chi-Square	Pr > ChiSq
age	1	0.6367	0.4249
lwt	1	4.9691	0.0258
smoke	1	5.4501	0.0196
ptl	1	2.4745	0.1157
ht	1	7.1356	0.0076
ui	1	2.7931	0.0947
ftv	1	0.1435	0.7048
race	2	7.1158	0.0285

Step 1. Effect ftv is removed:

Skipping ...

Residual Chi-Square Test

Chi-Square	DF	Pr > ChiSq
0.1437	1	0.7047

Analysis of Effects Eligible for Removal

Effect	DF	Wald Chi-Square	Pr > ChiSq
age	1	0.5515	0.4577
lwt	1	4.8027	0.0284
smoke	1	5.3058	0.0213
ptl	1	2.4479	0.1177
ht	1	7.0264	0.0080
ui	1	2.7268	0.0987
race	2	7.0057	0.0301

Step 2. Effect age is removed:

Model Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Skipping ...

Testing Global Null Hypothesis: BETA=0

Skipping ...

Type 3 Analysis of Effects

Skipping ...

Analysis of Maximum Likelihood Estimates

Skipping ...

Odds Ratio Estimates

Skipping ...

Association of Predicted Probabilities and Observed Responses

Skipping ...

Residual Chi-Square Test

Chi-Square	DF	Pr > ChiSq
0.6961	2	0.7061

Analysis of Effects Eligible for Removal

Effect	DF	Wald Chi-Square	Pr > ChiSq
lwt	1	5.3831	0.0203
smoke	1	5.5430	0.0186
ptl	1	2.1747	0.1403
ht	1	7.1217	0.0076
ui	1	2.9630	0.0852
race	2	7.8855	0.0194

Step 3. Effect ptl is removed:

Skipping ...

Residual Chi-Square Test

Chi-Square	DF	Pr > ChiSq
2.9371	3	0.4014

Analysis of Effects Eligible for Removal

Effect	DF	Wald Chi-Square	Pr > ChiSq
lwt	1	6.0487	0.0139
smoke	1	6.9625	0.0083
ht	1	7.3368	0.0068
ui	1	4.0887	0.0432
race	2	8.1165	0.0173

NOTE: No effects for the model in Step 3 are removed.

Analysis of Effects Eligible for Entry

Effect	DF	Score Chi-Square	Pr > ChiSq
age	1	0.2670	0.6054
ptl	1	2.2389	0.1346
ftv	1	0.0584	0.8091

NOTE: No (additional) effects met the 0.05 significance level for entry into the model.

Summary of Stepwise Selection

Step	Effect Entered	Effect Removed	DF	Number In	Score Chi-Square	Wald Chi-Square	Pr > ChiSq
1		ftv	1	7		0.1435	0.7048
2		age	1	6		0.5515	0.4577
3		ptl	1	5		2.1747	0.1403

Summary of Stepwise Selection

Step	Variable Label
1	Visits to Doctor During 1st trimester
2	
3	History of Premature Labour (# of times)