Logistic Regression Results

The LOGISTIC Procedure

Model Information	
Data Set	WORK.SORTTEMPTABLESORTED
Response Variable	Censoring
Number of Response Levels	2
Model	binary logit
Optimization Technique	Fisher's scoring

Number of Observations Read	418
Number of Observations Used	276

Response Profile		
Ordered Value	Censoring	Total Frequency
1	0	165
2	1	111

Probability modeled is Censoring='1'.

Note: 142 observations were deleted due to missing values for the response or explanatory variables.

Backward Elimination Procedure

Step 0. The following effects were entered:

Intercept Treatment Age Gender Ascites Hepatomegaly Spiders Edema1 Edema0.5 Bilirubin Cholesterol Albumin Urine copper Alkaline phosphatase SGOT Triglycerides Platelet count Prothrombin time Histologicstage4 Histologicstage3 Histologicstage2

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

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	373.984	277.116
SC	377.604	353.145

Generated by the SAS System ('Local', W32_7PRO) on November 23, 2015 at 5:10:11 PM

Logistic Regression Results

The LOGISTIC Procedure

Intercept Treatment Age Gender Ascites Hepatomegaly Spiders Edema1 Edema0.5 Bilirubin Cholesterol Albumin Urine copper Alkaline phosphatase SGOT Triglycerides Platelet count Prothrombin time Histologicstage4 Histologicstage3 Histologicstage2

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
-2 Log L	371.984	235.116

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	136.8671	20	<.0001
Score	108.2980	20	<.0001
Wald	64.5753	20	<.0001

Step 1. Effect Platelet count is removed:

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

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	373.984	275.117
SC	377.604	347.525
-2 Log L	371.984	235.117

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	136.8669	19	<.0001
Score	108.2888	19	<.0001
Wald	64.5728	19	<.0001

Residual Chi-Square Test		
Chi-Square	DF	Pr > ChiSq
0.0002	1	0.9880

Logistic Regression Results

The LOGISTIC Procedure

Step 2. Effect Edema0.5 is removed:

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

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	373.984	273.130
SC	377.604	341.918
-2 Log L	371.984	235.130

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	136.8531	18	<.0001
Score	108.1191	18	<.0001
Wald	64.6278	18	<.0001

Residual Chi-Square Test		
Chi-Square	DF	Pr > ChiSq
0.0140	2	0.9930

Step 3. Effect Albumin is removed:

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

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	373.984	271.211
SC	377.604	336.378
-2 Log L	371.984	235.211

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	136.7730	17	<.0001
Score	108.0062	17	<.0001
Wald	64.6404	17	<.0001

Logistic Regression Results

The LOGISTIC Procedure

Step 3. Effect Albumin is removed:

Residual Chi-Square Test		
Chi-Square	DF	Pr > ChiSq
0.0939	3	0.9926

Step 4. Effect Hepatomegaly is removed:

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

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	373.984	269.323
SC	377.604	330.870
-2 Log L	371.984	235.323

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	136.6605	16	<.0001
Score	107.5967	16	<.0001
Wald	64.2928	16	<.0001

Residual Chi-Square Test		
Chi-Square	DF	Pr > ChiSq
0.2066	4	0.9950

Step 5. Effect Cholesterol is removed:

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

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	373.984	267.533
SC	377.604	325.459
-2 Log L	371.984	235.533

Logistic Regression Results

The LOGISTIC Procedure

Step 5. Effect Cholesterol is removed:

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	136.4507	15	<.0001
Score	106.8073	15	<.0001
Wald	63.7827	15	<.0001

Residual Chi-Square Test		
Chi-Square	DF	Pr > ChiSq
0.4143	5	0.9949

Step 6. Effect Edema1 is removed:

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

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	373.984	265.830
SC	377.604	320.136
-2 Log L	371.984	235.830

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	136.1539	14	<.0001
Score	106.7655	14	<.0001
Wald	64.4469	14	<.0001

Residual Chi-Square Test		
Chi-Square	DF	Pr > ChiSq
0.7114	6	0.9942

Step 7. Effect Triglycerides is removed:

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

Logistic Regression Results

The LOGISTIC Procedure

Step 7. Effect Triglycerides is removed:

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	373.984	264.303
SC	377.604	314.988
-2 Log L	371.984	236.303

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	135.6807	13	<.0001
Score	106.7058	13	<.0001
Wald	63.8603	13	<.0001

Residual Chi-Square Test		
Chi-Square	DF	Pr > ChiSq
1.1896	7	0.9912

Step 8. Effect Treatment is removed:

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

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	373.984	263.018
SC	377.604	310.083
-2 Log L	371.984	237.018

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	134.9660	12	<.0001
Score	106.2245	12	<.0001
Wald	63.8609	12	<.0001

Residual Chi-Square Test		
Chi-Square	DF	Pr > ChiSq
1.8901	8	0.9842

Logistic Regression Results

The LOGISTIC Procedure

Step 9. Effect Spiders is removed:

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

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	373.984	262.245
SC	377.604	305.690
-2 Log L	371.984	238.245

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	133.7385	11	<.0001
Score	105.0293	11	<.0001
Wald	62.4849	11	<.0001

Residual Chi-Square Test		
Chi-Square	DF	Pr > ChiSq
3.1416	9	0.9584

Step 10. Effect Gender is removed:

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

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	373.984	261.455
SC	377.604	301.279
-2 Log L	371.984	239.455

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	132.5289	10	<.0001
Score	103.6917	10	<.0001
Wald	61.9081	10	<.0001

Logistic Regression Results

The LOGISTIC Procedure

Step 10. Effect Gender is removed:

Residual Chi-Square Test		
Chi-Square	DF	Pr > ChiSq
4.3920	10	0.9279

Step 11. Effect Ascites is removed:

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

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	373.984	261.547
SC	377.604	297.751
-2 Log L	371.984	241.547

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	130.4369	9	<.0001
Score	103.4529	9	<.0001
Wald	63.1221	9	<.0001

Residual Chi-Square Test		
Chi-Square	DF	Pr > ChiSq
6.1964	11	0.8599

Step 12. Effect SGOT is removed:

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

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	373.984	262.653
SC	377.604	295.236
-2 Log L	371.984	244.653

Logistic Regression Results

The LOGISTIC Procedure

Step 12. Effect SGOT is removed:

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	127.3309	8	<.0001
Score	101.4491	8	<.0001
Wald	61.9803	8	<.0001

Residual Chi-Square Test		
Chi-Square	DF	Pr > ChiSq
9.6342	12	0.6480

Step 13. Effect Histologicstage2 is removed:

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

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	373.984	265.364
SC	377.604	294.327
-2 Log L	371.984	249.364

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	122.6200	7	<.0001
Score	100.1151	7	<.0001
Wald	63.1836	7	<.0001

Residual Chi-Square Test		
Chi-Square	DF	Pr > ChiSq
13.1915	13	0.4331

Step 14. Effect Histologicstage3 is removed:

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

Logistic Regression Results

The LOGISTIC Procedure

Step 14. Effect Histologicstage3 is removed:

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	373.984	265.047
SC	377.604	290.390
-2 Log L	371.984	251.047

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	120.9363	6	<.0001
Score	98.6163	6	<.0001
Wald	62.8578	6	<.0001

Residual Chi-Square Test		
Chi-Square	DF	Pr > ChiSq
14.2684	14	0.4299

Step 15. Effect Histologicstage4 is removed:

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

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	373.984	263.959
SC	377.604	285.681
-2 Log L	371.984	251.959

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	120.0249	5	<.0001
Score	97.0675	5	<.0001
Wald	61.5528	5	<.0001

Residual Chi-Square Test		
Chi-Square	DF	Pr > ChiSq
15.0681	15	0.4465

Logistic Regression Results

The LOGISTIC Procedure

Step 16. Effect Urine copper is removed:

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

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	373.984	267.076
SC	377.604	285.178
-2 Log L	371.984	257.076

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	114.9073	4	<.0001
Score	91.5863	4	<.0001
Wald	59.3958	4	<.0001

Residual Chi-Square Test		
Chi-Square	DF	Pr > ChiSq
20.3747	16	0.2038

Note: No (additional) effects met the 0.01 significance level for removal from the model.

Summary of Backward Elimination					
Step	Effect Removed	DF	Number In	Wald Chi-Square	Pr > ChiSq
1	Platelet count	1	19	0.0002	0.9880
2	Edema0.5	1	18	0.0138	0.9066
3	Albumin	1	17	0.0799	0.7774
4	Hepatomegaly	1	16	0.1128	0.7370
5	Cholesterol	1	15	0.2076	0.6487
6	Edema1	1	14	0.2889	0.5910
7	Triglycerides	1	13	0.4702	0.4929
8	Treatment	1	12	0.7123	0.3987
9	Spiders	1	11	1.2359	0.2663
10	Gender	1	10	1.2104	0.2713
11	Ascites	1	9	1.6442	0.1997
12	SGOT	1	8	3.1323	0.0768

Logistic Regression Results

The LOGISTIC Procedure

Note: No (additional) effects met the 0.01 significance level for removal from the model.

Summary of Backward Elimination

Step	Effect Removed	DF	Number In	Wald Chi-Square	Pr > ChiSq
13	Histologicstage2	1	7	3.2622	0.0709
14	Histologicstage3	1	6	1.6383	0.2006
15	Histologicstage4	1	5	0.9235	0.3366
16	Urine copper	1	4	5.0072	0.0252

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-11.4540	2.0490	31.2482	<.0001
Age	1	0.0535	0.0155	11.8562	0.0006
Bilirubin	1	0.3110	0.0666	21.8110	<.0001
Alkaline phosphatase	1	0.000297	0.000081	13.3287	0.0003
Prothrombin time	1	0.6405	0.1854	11.9377	0.0006

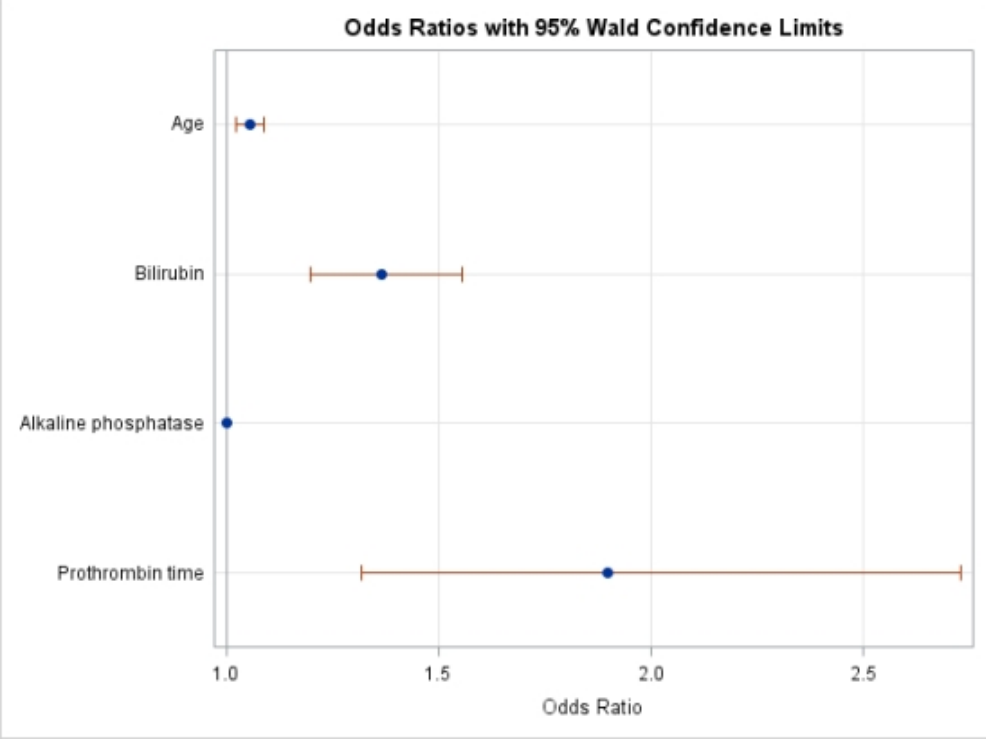
Odds Ratio Estimates

Effect	Point Estimate	95% Wald Confidence Limits	
Age	1.055	1.023	1.088
Bilirubin	1.365	1.198	1.555
Alkaline phosphatase	1.000	1.000	1.000
Prothrombin time	1.898	1.319	2.729

Logistic Regression Results

The LOGISTIC Procedure

Note: No (additional) effects met the 0.01 significance level for removal from the model.



Association of Predicted Probabilities and Observed Responses			
Percent Concordant	86.2	**Somers' D**	0.724
Percent Discordant	13.8	**Gamma**	0.724
Percent Tied	0.0	**Tau-a**	0.349
Pairs	18315	**c**	0.862

Logistic Regression Results

The LOGISTIC Procedure

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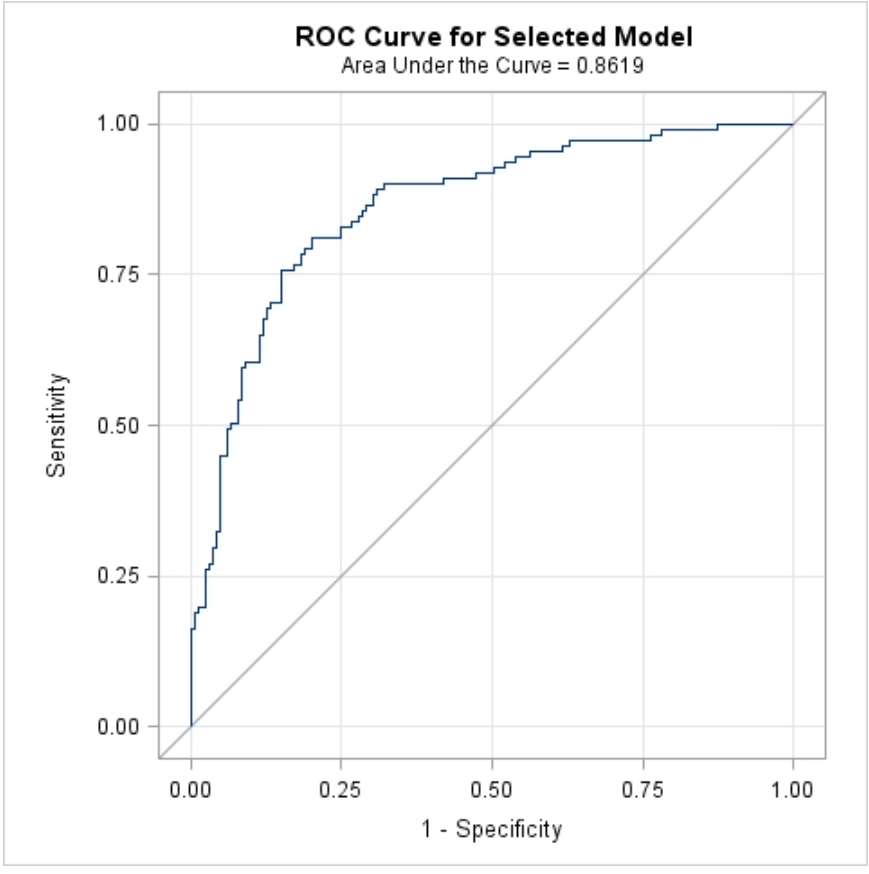

Logistic Regression Results

The LOGISTIC Procedure

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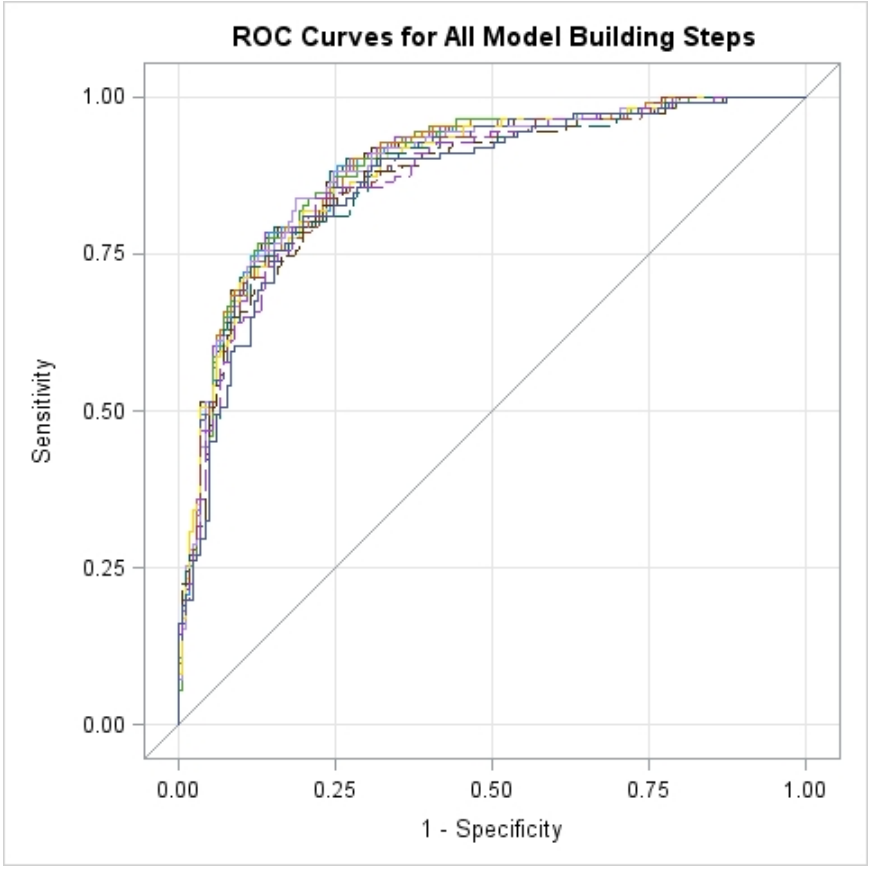

Logistic Regression Results

The LOGISTIC Procedure

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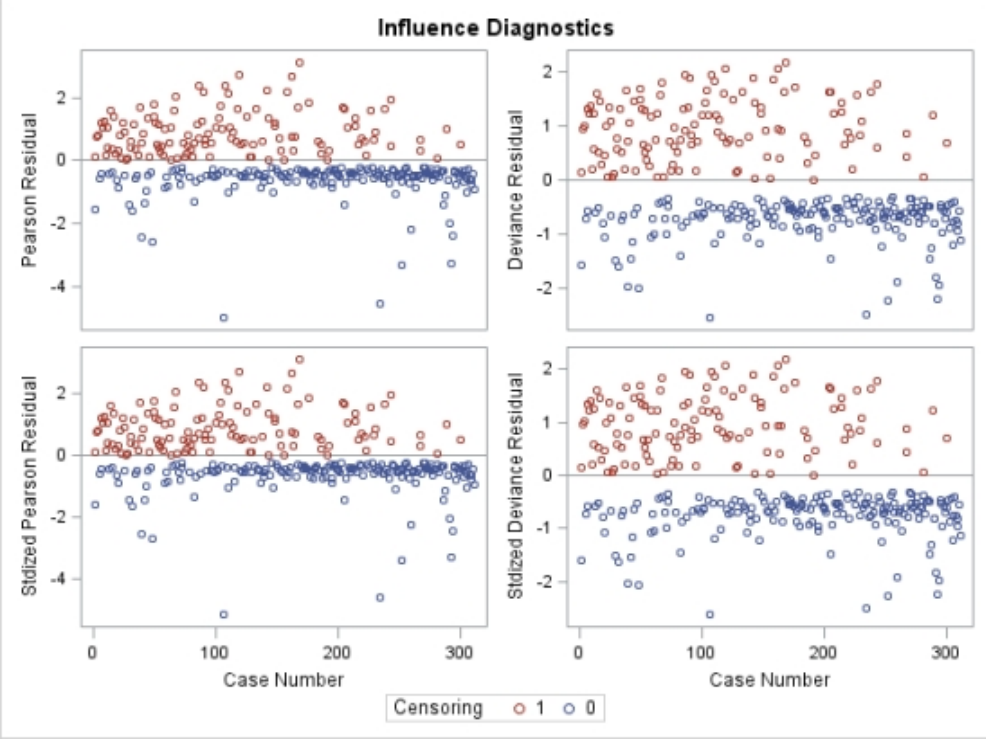

Logistic Regression Results

The LOGISTIC Procedure

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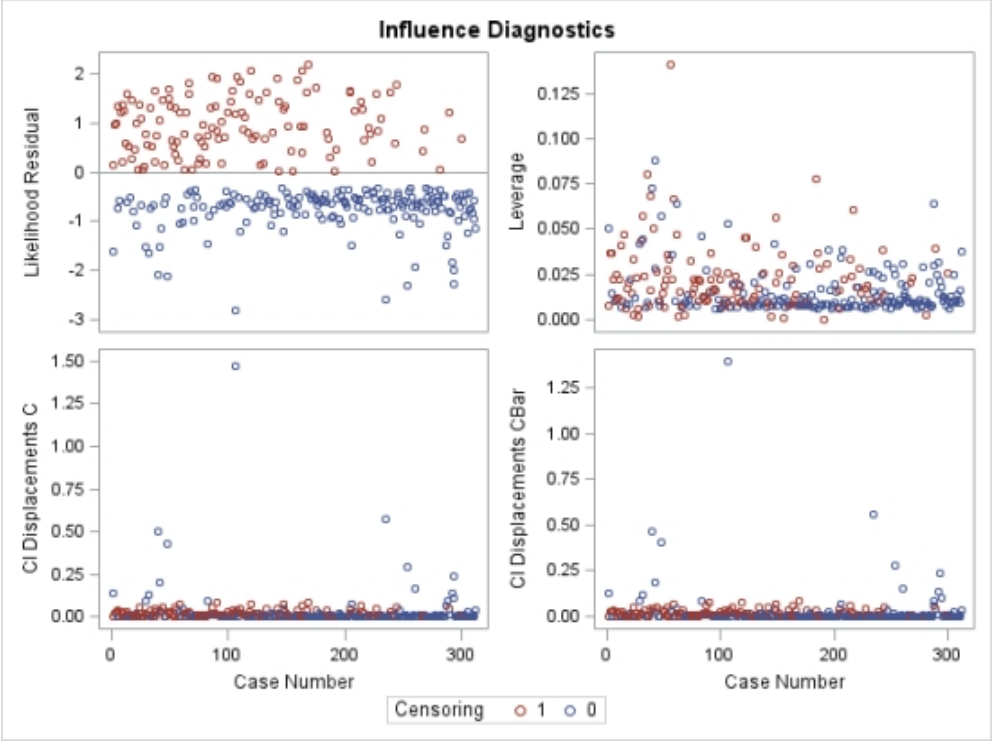

Logistic Regression Results

The LOGISTIC Procedure

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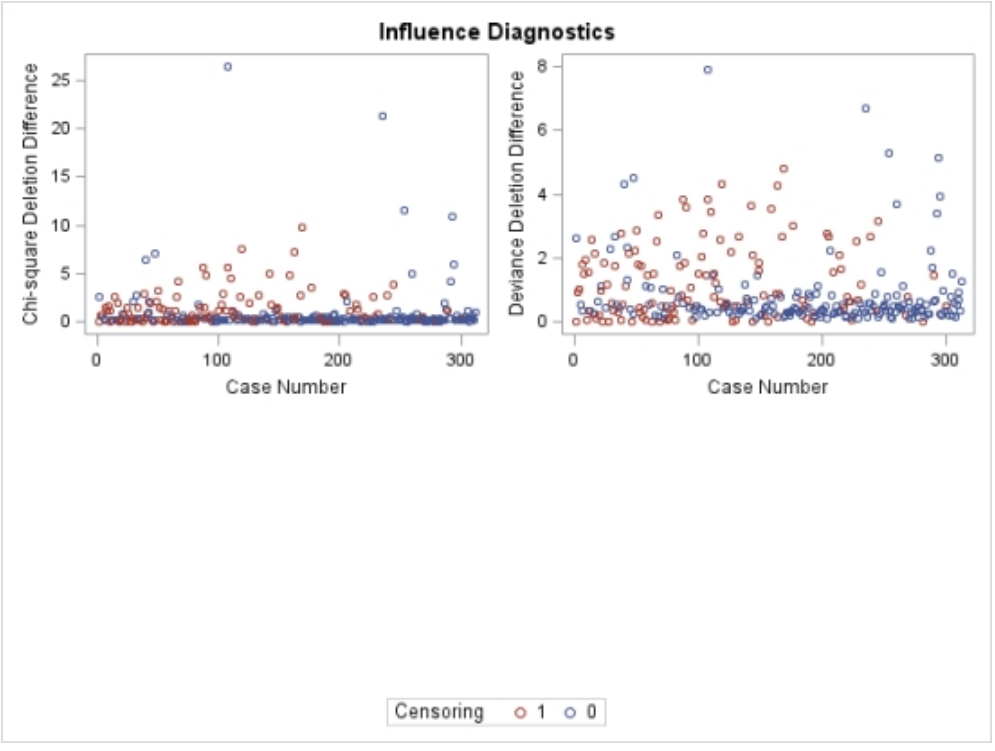

Logistic Regression Results

The LOGISTIC Procedure

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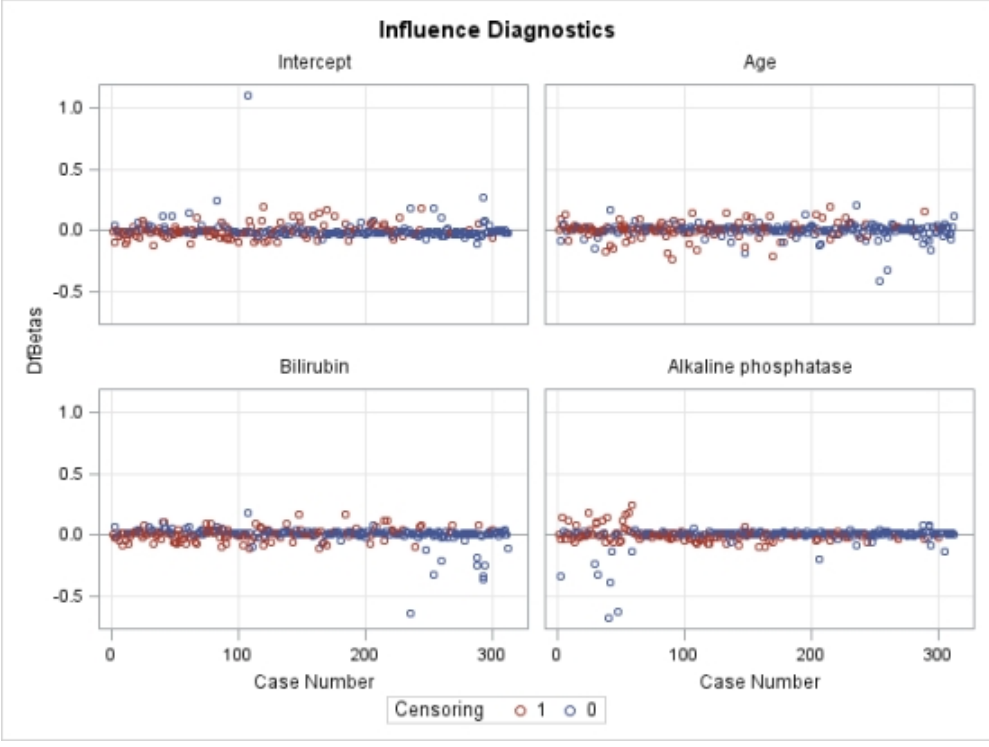

Logistic Regression Results

The LOGISTIC Procedure

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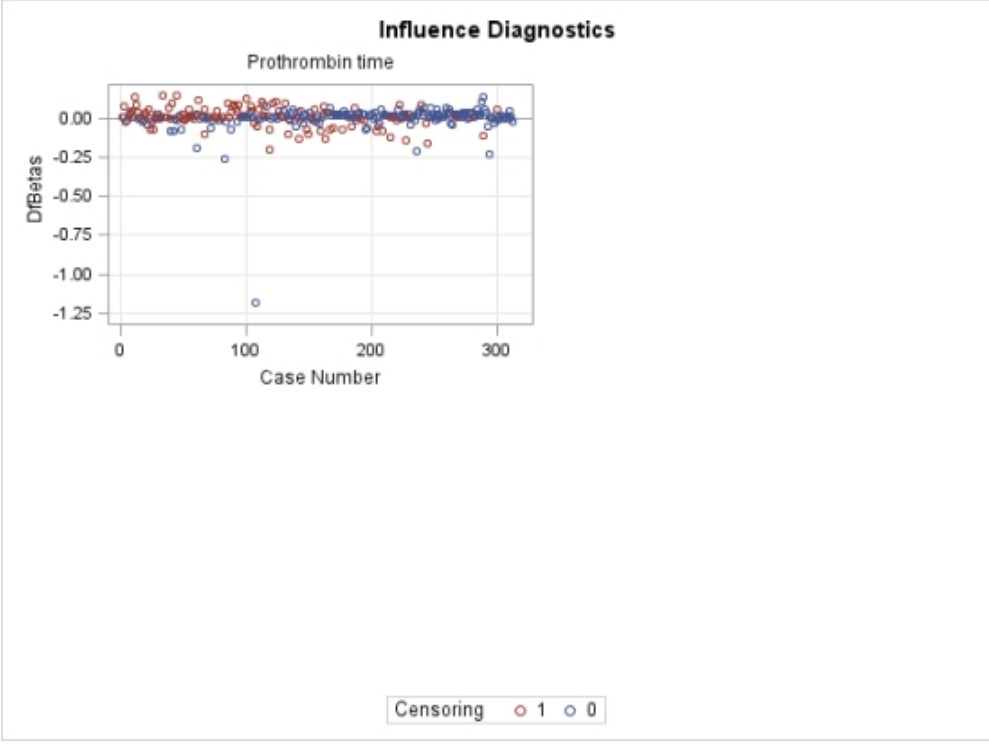

Logistic Regression Results

The LOGISTIC Procedure

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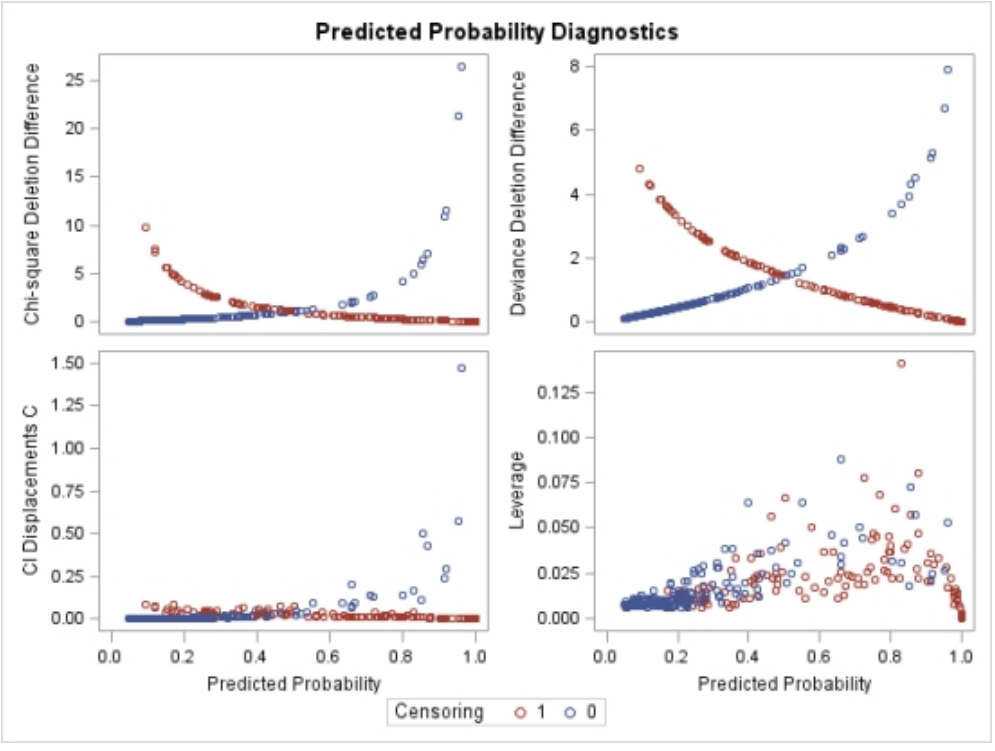

Logistic Regression Results

The LOGISTIC Procedure

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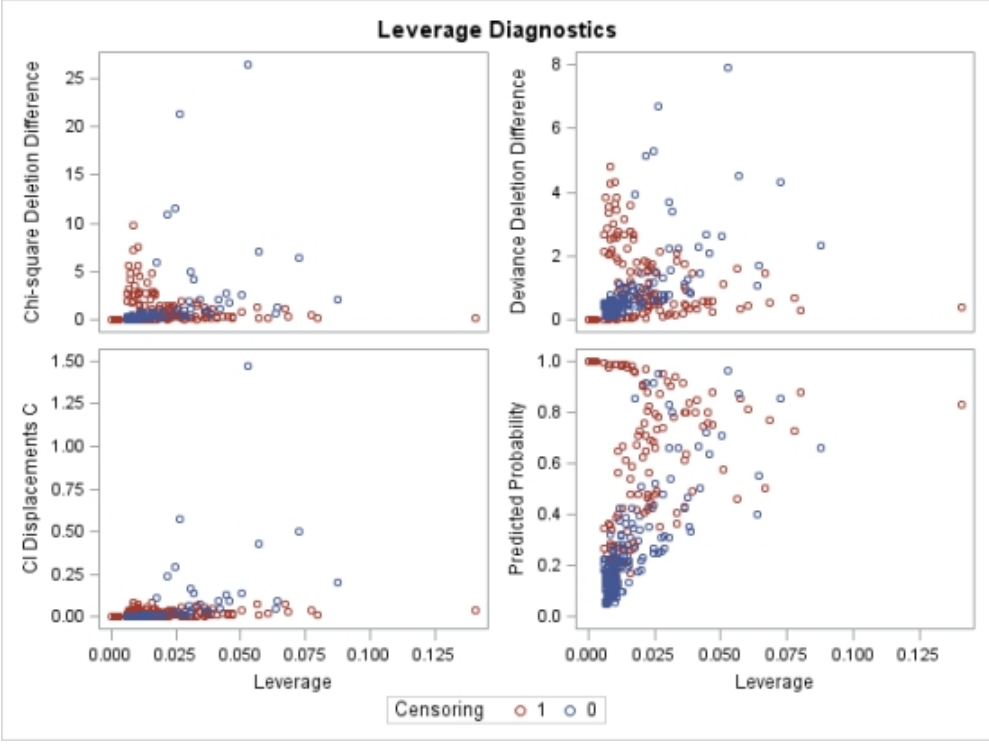
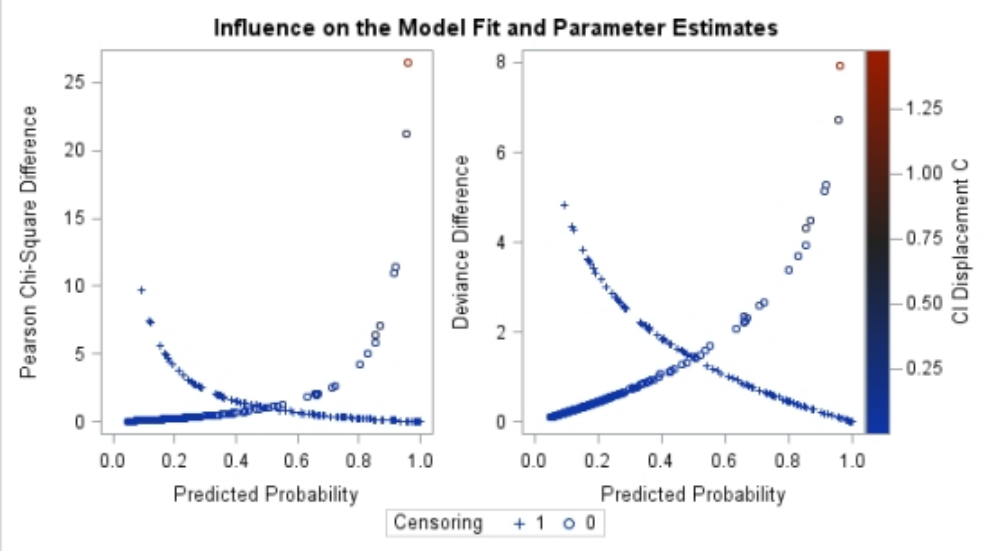


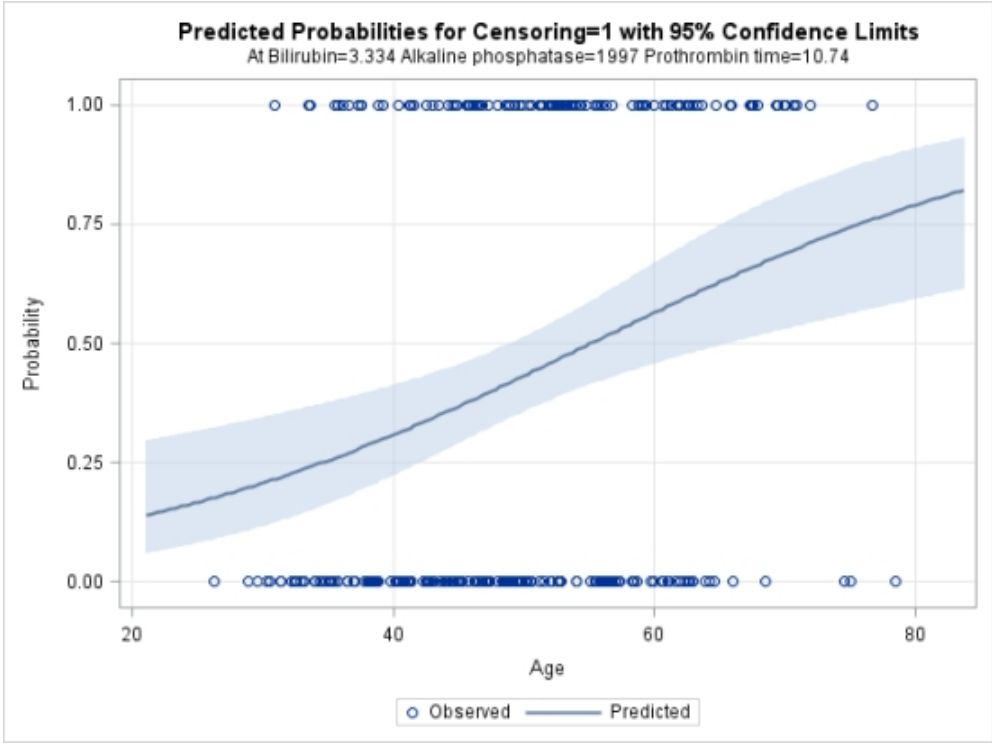
Logistic Regression Results

The LOGISTIC Procedure

Note: No (additional) effects met the 0.01 significance level for removal from the model.



Logistic Regression Results

The LOGISTIC Procedure

Note: No (additional) effects met the 0.01 significance level for removal from the model.