

### The LOGISTIC Procedure

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

Number of Observations Read	5755
Number of Observations Used	5755

Response Profile		
Ordered Value	is_referred	Total Frequency
1	0	2784
2	1	2971

Probability modeled is is\_referred='0'.

### Backward Elimination Procedure

Class Level Information											
Class	Value	Design Variables									
incjr	2006	0	0	0	0	0	0	0	0	0	0
	2007	1	0	0	0	0	0	0	0	0	0
	2008	0	1	0	0	0	0	0	0	0	0
	2009	0	0	1	0	0	0	0	0	0	0
	2010	0	0	0	1	0	0	0	0	0	0
	2011	0	0	0	0	1	0	0	0	0	0
gesl	2012	0	0	0	0	0	1	0	0	0	0
	2013	0	0	0	0	0	0	1	0	0	0
	2014	0	0	0	0	0	0	0	1	0	0
	2015	0	0	0	0	0	0	0	0	0	1
	female	0									
	male	1									
morf	Follicular	1	0	0	0	0					
	Hurthe cell	0	1	0	0	0					
	Medullary	0	0	1	0	0					
	Other/Malignant	0	0	0	1	0					
	Papillary	0	0	0	0	0					
	Papillary-Follicular mixed	0	0	0	0	1					

## The LOGISTIC Procedure

Class Level Information											
Class	Value	Design Variables									
diffgr	1	1	0	0	0						
	2	0	1	0	0						
	3	0	0	1	0						
	4	0	0	0	1						
	9	0	0	0	0						
ct	0	1	0	0	0	0					
	1	0	0	0	0	0					
	2	0	1	0	0	0					
	3	0	0	1	0	0					
	4	0	0	0	1	0					
	Unknown	0	0	0	0	1					
cn	0	0	0	0	0						
	1	1	0	0	0						
	1A	0	1	0	0						
	1B	0	0	1	0						
	X	0	0	0	1						
cm	0	0	0								
	1	1	0								
	X	0	1								
stadiumc	1	0	0	0	0						
	2	1	0	0	0						
	3	0	1	0	0						
	4	0	0	1	0						
	Unknown	0	0	0	1						
post1	1	1	0	0	0	0	0	0	0		
	2	0	1	0	0	0	0	0	0		
	3	0	0	0	0	0	0	0	0		
	4	0	0	1	0	0	0	0	0		
	5	0	0	0	1	0	0	0	0		
	6	0	0	0	0	1	0	0	0		
	7	0	0	0	0	0	1	0	0		
	8	0	0	0	0	0	0	1	0		
	9	0	0	0	0	0	0	0	1		
type_hospital1	academic	1	0								

### The LOGISTIC Procedure

Class Level Information										
Class	Value	Design Variables								
	educational	0	0							
	not_educational	0	1							

**Step 0. The following effects were entered:**

Intercept Intercept score incjr gesl morf diffgr ct cn cm stadiumc type\_hospital1 post1 leeft

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

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	7974.047	7097.541
SC	7980.705	7410.459
-2 Log L	7972.047	7003.541

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	968.5054	46	<.0001
Score	900.7145	46	<.0001
Wald	778.5856	46	<.0001

**Note:** Intercept was removed because of its redundancy.

**Step 1. Effect cm is removed:**

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

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	7974.047	7093.548
SC	7980.705	7393.150
-2 Log L	7972.047	7003.548

### The LOGISTIC Procedure

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	968.4985	44	<.0001
Score	900.6971	44	<.0001
Wald	778.5733	44	<.0001

Residual Chi-Square Test		
Chi-Square	DF	Pr > ChiSq
0.0069	2	0.9965

#### Step 2. Effect diffgr is removed:

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

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	7974.047	7086.291
SC	7980.705	7359.262
-2 Log L	7972.047	7004.291

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	967.7553	40	<.0001
Score	900.0354	40	<.0001
Wald	778.0712	40	<.0001

Residual Chi-Square Test		
Chi-Square	DF	Pr > ChiSq
0.7508	6	0.9933

#### Step 3. Effect score is removed:

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

### The LOGISTIC Procedure

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	7974.047	7084.425
SC	7980.705	7350.738
-2 Log L	7972.047	7004.425

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	967.6218	39	<.0001
Score	899.9363	39	<.0001
Wald	778.0273	39	<.0001

Residual Chi-Square Test		
Chi-Square	DF	Pr > ChiSq
0.8840	7	0.9965

#### Step 4. Effect incjr is removed:

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

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	7974.047	7076.410
SC	7980.705	7282.802
-2 Log L	7972.047	7014.410

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	957.6368	30	<.0001
Score	891.5275	30	<.0001
Wald	772.2221	30	<.0001

Residual Chi-Square Test		
Chi-Square	DF	Pr > ChiSq
10.8622	16	0.8179

### The LOGISTIC Procedure

**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	cm	2	11	0.0069	0.9965
2	diffgr	4	10	0.7427	0.9460
3	score	1	9	0.1335	0.7149
4	incjr	9	8	9.9649	0.3533

Type 3 Analysis of Effects			
Effect	DF	Wald Chi-Square	Pr > ChiSq
gesl	1	5.6880	0.0171
morf	5	16.2880	0.0061
ct	5	44.7995	<.0001
cn	4	62.9590	<.0001
stadiumc	4	12.7223	0.0127
type_hospital1	2	618.7139	<.0001
post1	8	37.3978	<.0001
leef	1	22.5922	<.0001

Analysis of Maximum Likelihood Estimates							
Parameter		DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq	Exp(Est)
Intercept		1	-0.1291	0.1420	0.8262	0.3634	0.879
gesl	male	1	-0.1552	0.0651	5.6880	0.0171	0.856
morf	Follicular	1	-0.0547	0.0897	0.3719	0.5420	0.947
morf	Hurthe cell	1	0.2141	0.1720	1.5488	0.2133	1.239
morf	Medullary	1	-0.2529	0.1370	3.4091	0.0648	0.777
morf	Other/Malignant	1	0.4576	0.1633	7.8571	0.0051	1.580
morf	Papillary-Follicular mixed	1	-0.1180	0.0823	2.0527	0.1519	0.889
ct	0	1	0.8826	0.1795	24.1727	<.0001	2.417
ct	2	1	-0.2884	0.1042	7.6509	0.0057	0.749
ct	3	1	-0.2546	0.1181	4.6515	0.0310	0.775
ct	4	1	-0.1547	0.1673	0.8550	0.3552	0.857
ct	Unknown	1	0.0147	0.1036	0.0202	0.8869	1.015
cn	1	1	-0.6540	0.1404	21.6989	<.0001	0.520
cn	1A	1	-1.0407	0.1874	30.8239	<.0001	0.353
cn	1B	1	-0.5452	0.1152	22.3911	<.0001	0.580

## The LOGISTIC Procedure

Analysis of Maximum Likelihood Estimates							
Parameter		DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq	Exp(Est)
cn	X	1	0.0884	0.0905	0.9555	0.3283	1.092
stadiumc	2	1	-0.0539	0.1234	0.1907	0.6623	0.948
stadiumc	3	1	-0.2681	0.1427	3.5270	0.0604	0.765
stadiumc	4	1	-0.4500	0.1403	10.2906	0.0013	0.638
stadiumc	Unknown	1	-0.0169	0.1264	0.0179	0.8935	0.983
type_hospital1	academic	1	1.2295	0.0771	253.9916	<.0001	3.420
type_hospital1	not_educational	1	-0.9437	0.0687	188.5428	<.0001	0.389
post1	1	1	-0.3550	0.1011	12.3275	0.0004	0.701
post1	2	1	-0.2221	0.1009	4.8450	0.0277	0.801
post1	4	1	0.1562	0.1237	1.5950	0.2066	1.169
post1	5	1	0.00878	0.1023	0.0074	0.9316	1.009
post1	6	1	-0.1296	0.1094	1.4036	0.2361	0.878
post1	7	1	-0.3879	0.1189	10.6436	0.0011	0.678
post1	8	1	-0.1856	0.1440	1.6609	0.1975	0.831
post1	9	1	-0.4353	0.1382	9.9146	0.0016	0.647
leef		1	0.0113	0.00237	22.5922	<.0001	1.011

Odds Ratio Estimates				
Effect			Point Estimate	95% Wald Confidence Limits
gesl	male vs female		0.856	0.754 0.973
morf	Follicular	vs Papillary	0.947	0.794 1.129
morf	Hurthe cell	vs Papillary	1.239	0.884 1.735
morf	Medullary	vs Papillary	0.777	0.594 1.016
morf	Other/Malignant	vs Papillary	1.580	1.148 2.176
morf	Papillary-Follicular mixed vs Papillary		0.889	0.756 1.044
ct	0	vs 1	2.417	1.700 3.436
ct	2	vs 1	0.749	0.611 0.919
ct	3	vs 1	0.775	0.615 0.977
ct	4	vs 1	0.857	0.617 1.189
ct	Unknown vs 1		1.015	0.828 1.243
cn	1	vs 0	0.520	0.395 0.685
cn	1A	vs 0	0.353	0.245 0.510
cn	1B	vs 0	0.580	0.463 0.727
cn	X	vs 0	1.092	0.915 1.304
stadiumc	2	vs 1	0.948	0.744 1.207

## The LOGISTIC Procedure

Odds Ratio Estimates				
Effect		Point Estimate	95% Wald Confidence Limits	
stadiumc	3 vs 1	0.765	0.578	1.012
stadiumc	4 vs 1	0.638	0.484	0.839
stadiumc	Unknown vs 1	0.983	0.767	1.260
type_hospital1	academic vs educational	3.420	2.940	3.978
type_hospital1	not_educational vs educational	0.389	0.340	0.445
post1	1 vs 3	0.701	0.575	0.855
post1	2 vs 3	0.801	0.657	0.976
post1	4 vs 3	1.169	0.917	1.490
post1	5 vs 3	1.009	0.825	1.233
post1	6 vs 3	0.878	0.709	1.089
post1	7 vs 3	0.678	0.537	0.857
post1	8 vs 3	0.831	0.626	1.101
post1	9 vs 3	0.647	0.493	0.848
leeft		1.011	1.007	1.016

Association of Predicted Probabilities and Observed Responses			
Percent Concordant	73.0	Somers' D	0.461
Percent Discordant	26.9	Gamma	0.461
Percent Tied	0.0	Tau-a	0.230
Pairs	8271264	c	0.730