

```

data coronary;
  input sex ecg age ca @@;
  datalines;
0 0 28 0 1 0 42 1 0 1 46 0 1 1 45 0 0 0 34 0 1 0 44 1 0 1 48 1 1 1 45 1
0 0 38 0 1 0 45 0 0 1 49 0 1 1 45 1 0 0 41 1 1 0 46 0 0 1 49 0 1 1 46 1
0 0 44 0 1 0 48 0 0 1 52 0 1 1 48 1 0 0 45 1 1 0 50 0 0 1 53 1 1 1 57 1
0 0 46 0 1 0 52 1 0 1 54 1 1 1 57 1 0 0 47 0 1 0 52 1 0 1 55 0 1 1 59 1
0 0 50 0 1 0 54 0 0 1 57 1 1 1 60 1 0 0 51 0 1 0 55 0 0 2 46 1 1 1 63 1
0 0 51 0 1 0 59 1 0 2 48 0 1 2 35 0 0 0 53 0 1 0 59 1 0 2 57 1 1 2 37 1
0 0 55 1 1 1 32 0 0 2 60 1 1 2 43 1 0 0 59 0 1 1 37 0 1 0 30 0 1 2 47 1
0 0 60 1 1 1 38 1 1 0 34 0 1 2 48 1 0 1 32 1 1 1 38 1 1 0 36 1 1 2 49 0
0 1 33 0 1 1 42 1 1 0 38 1 1 2 58 1 0 1 35 0 1 1 43 0 1 0 39 0 1 2 59 1
0 1 39 0 1 1 43 1 1 0 42 0 1 2 60 1 0 1 40 0 1 1 44 1
;
proc logistic descending;
  model ca=sex ecg age / lackfit;
  output out=new resdev=resids p=p;
run;

```

The LOGISTIC Procedure

Model Information

Data Set	WORK.CORONARY
Response Variable	ca
Number of Response Levels	2
Model	binary logit
Optimization Technique	Fisher's scoring

Number of Observations Read	78
Number of Observations Used	78

Response Profile

Ordered Value	ca	Total Frequency
1	1	41
2	0	37

Probability modeled is ca=1.

Model Convergence Status

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

Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	109.926	94.811
SC	112.282	104.238
-2 Log L	107.926	86.811

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	21.1145	3	<.0001
Score	18.5624	3	0.0003
Wald	14.4410	3	0.0024

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Chi-Square	Pr > ChiSq
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Intercept	1	-5.6418	1.8061	9.7572	0.0018
sex	1	1.3564	0.5464	6.1616	0.0131
ecg	1	0.8732	0.3843	5.1619	0.0231
age	1	0.0929	0.0351	7.0003	0.0081

Odds Ratio Estimates

Effect	Point	95% Wald	
	Estimate	Confidence Limits	
sex	3.882	1.330	11.330
ecg	2.395	1.127	5.086
age	1.097	1.024	1.175

Association of Predicted Probabilities and Observed Responses

Percent Concordant	78.2	Somers' D	0.568
Percent Discordant	21.5	Gamma	0.569
Percent Tied	0.3	Tau-a	0.287
Pairs	1517	c	0.784

Partition for the Hosmer and Lemeshow Test

Group	Total	ca = 1		ca = 0	
		Observed	Expected	Observed	Expected
1	8	2	1.02	6	6.98
2	8	1	1.80	7	6.20
3	8	3	2.59	5	5.41
4	8	3	3.42	5	4.58
5	8	4	4.07	4	3.93
6	9	6	5.38	3	3.62
7	9	4	5.97	5	3.03
8	8	7	5.99	1	2.01
9	8	7	6.98	1	1.02
10	4	4	3.77	0	0.23

Hosmer and Lemeshow Goodness-of-Fit Test

Chi-Square	DF	Pr > ChiSq
4.7766	8	0.7812

```
data new; set new; drop _LEVEL_;
  pp=0; if p ge 0.5 then pp=1;
proc freq; tables ca*pp/norow nocol; run;
proc print noobs; run;
```

The FREQ Procedure

Table of ca by pp

ca	pp			
Frequency,				
Percent	0,	1,		Total
0	25	12		37
	32.05	15.38		47.44
1	10	31		41
	12.82	39.74		52.56
Total	35	43		78
	44.87	55.13		100.00

sex	ecg	age	ca	p	resids	pp
0	0	28	0	0.04557	-0.30542	0
1	0	42	1	0.40479	1.34491	0
0	1	46	0	0.37816	-0.97475	0
1	1	45	0	0.68270	-1.51519	1
0	0	34	0	0.07693	-0.40013	0
1	0	44	1	0.45020	1.26337	0
0	1	48	1	0.42271	1.31231	0
1	1	45	1	0.68270	0.87373	1
0	0	38	0	0.10780	-0.47764	0
1	0	45	0	0.47328	-1.13232	0
0	1	49	0	0.44551	-1.08601	0
1	1	45	1	0.68270	0.87373	1
0	0	41	1	0.13766	1.99145	0
1	0	46	0	0.49646	-1.17141	0
0	1	49	0	0.44551	-1.08601	0
1	1	46	1	0.70246	0.84043	1
0	0	44	0	0.17418	-0.61868	0
1	0	48	0	0.54279	-1.25108	1
0	1	52	0	0.51493	-1.20288	1
1	1	48	1	0.73977	0.77643	1
0	0	45	1	0.18794	1.82845	0
1	0	50	0	0.58838	-1.33240	1
0	1	53	1	0.53807	1.11334	1
1	1	57	1	0.86766	0.53283	1
0	0	46	0	0.20253	-0.67277	0
1	0	52	1	0.63250	0.95715	1
0	1	54	1	0.56106	1.07512	1
1	1	57	1	0.86766	0.53283	1
0	0	47	0	0.21794	-0.70117	0
1	0	52	1	0.63250	0.95715	1
0	1	55	0	0.58378	-1.32403	1
1	1	59	1	0.88757	0.48841	1
0	0	50	0	0.26911	-0.79182	0
1	0	54	0	0.67451	-1.49829	1
0	1	57	1	0.62808	0.96445	1
1	1	60	1	0.89651	0.46744	1
0	0	51	0	0.28776	-0.82381	0
1	0	55	0	0.69456	-1.54013	1
0	2	46	1	0.59287	1.02253	1
1	1	63	1	0.91965	0.40931	1
0	0	51	0	0.28776	-0.82381	0
1	0	59	1	0.76726	0.72791	1
0	2	48	0	0.63681	-1.42325	1
1	2	35	0	0.67060	-1.49028	1
0	0	53	0	0.32726	-0.89039	0
1	0	59	1	0.76726	0.72791	1
0	2	57	1	0.80174	0.66479	1
1	2	37	1	0.71025	0.82721	1
0	0	55	1	0.36937	1.41134	0
1	1	32	0	0.39153	-0.99681	0
0	2	60	1	0.84234	0.58578	1
1	2	43	1	0.81057	0.64811	1
0	0	59	0	0.45922	-1.10882	0
1	1	37	0	0.50585	-1.18736	1
1	0	30	0	0.18246	-0.63475	0
1	2	47	1	0.86118	0.54673	1
0	0	60	1	0.48235	1.20755	0
1	1	38	1	0.52903	1.12846	1
1	0	34	0	0.24446	-0.74877	0
1	2	48	1	0.87191	0.52358	1

0	1	32	1	0.14218	1.97518	0
1	1	38	1	0.52903	1.12846	1
1	0	36	1	0.28036	1.59479	0
1	2	49	0	0.88193	-2.06710	1
0	1	33	0	0.15389	-0.57810	0
1	1	42	1	0.61955	0.97853	1
1	0	38	1	0.31931	1.51103	0
1	2	58	1	0.94514	0.33594	1
0	1	35	0	0.17965	-0.62932	0
1	1	43	0	0.64118	-1.43174	1
1	0	39	0	0.33982	-0.91131	0
1	2	59	1	0.94976	0.32109	1
0	1	39	0	0.24098	-0.74259	0
1	1	43	1	0.64118	0.94281	1
1	0	42	0	0.40479	-1.01866	0
1	2	60	1	0.95401	0.30687	1
0	1	40	0	0.25837	-0.77317	0
1	1	44	1	0.66225	0.90786	1