contra002.sas: Clinical trial of contracepting women
Table 14.4: Marginal model, Unstructured Odds ratios, GEE

The GENMOD Procedure

Model Information		
Data Set	WORK.A	
Distribution	Binomial	
Link Function	Logit	
Dependent Variable	y	Amenorrhea Status (0=no, 1=yes)

Number of Observations Read	4053
Number of Observations Used	3616
Number of Events	1231
Number of Trials	3616
Missing Values	437

Class Level Information		
Class	**Levels**	**Values**
id	1151	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 ...
timefactor	4	1 2 3 4

Response Profile		
Ordered Value	**y**	**Total Frequency**
1	1	1231
2	0	2385

PROC GENMOD is modeling the probability that y='1'.

Parameter Information	
Parameter	**Effect**
Prm1	Intercept
Prm2	time
Prm3	time2
Prm4	dt
Prm5	dt2

Algorithm converged.

The GENMOD Procedure

GEE Model Information	
Log Odds Ratio Structure	Fully Parameterized Clusters
Within-Subject Effect	timefactor (4 levels)
Subject Effect	id (1151 levels)
Number of Clusters	1151
Clusters With Missing Values	437
Correlation Matrix Dimension	4
Maximum Cluster Size	4
Minimum Cluster Size	1

Log Odds Ratio Parameter Information	
Parameter	**Group**
Alpha1	(1, 2)
Alpha2	(1, 3)
Alpha3	(1, 4)
Alpha4	(2, 3)
Alpha5	(2, 4)
Alpha6	(3, 4)

Algorithm converged.

GEE Fit Criteria	
QIC	4384.3523
QICu	4382.4909

Analysis Of GEE Parameter Estimates						
Empirical Standard Error Estimates						
Parameter	**Estimate**	**Standard Error**	**95% Confidence Limits**		**Z**	**Pr > |Z|**
Intercept	-2.2461	0.1765	-2.5921	-1.9001	-12.72	<.0001
time	0.7030	0.1581	0.3931	1.0129	4.45	<.0001
time2	-0.0323	0.0318	-0.0946	0.0299	-1.02	0.3089
dt	0.3380	0.1097	0.1230	0.5529	3.08	0.0021
dt2	-0.0683	0.0284	-0.1239	-0.0126	-2.40	0.0162
Alpha1	1.8475	0.1810	1.4928	2.2021	10.21	<.0001

Table 14.4: Marginal model, Unstructured Odds ratios, GEE

The GENMOD Procedure

Analysis Of GEE Parameter Estimates						
Empirical Standard Error Estimates						
Parameter	Estimate	Standard Error	95% Confidence Limits		Z	Pr > |Z|
Alpha2	1.4851	0.1985	1.0960	1.8742	7.48	<.0001
Alpha3	1.7605	0.2482	1.2740	2.2471	7.09	<.0001
Alpha4	2.1610	0.1761	1.8159	2.5060	12.27	<.0001
Alpha5	2.0665	0.2034	1.6679	2.4651	10.16	<.0001
Alpha6	2.2783	0.1827	1.9202	2.6364	12.47	<.0001

The NLMIXED Procedure

Specifications	
Data Set	WORK.A
Dependent Variable	y
Distribution for Dependent Variable	Binary
Random Effects	u
Distribution for Random Effects	Normal
Subject Variable	id
Optimization Technique	Dual Quasi-Newton
Integration Method	Adaptive Gaussian Quadrature

Dimensions	
Observations Used	3616
Observations Not Used	437
Total Observations	4053
Subjects	1151
Max Obs per Subject	4
Parameters	6
Quadrature Points	50

Parameters						
int	**time_**	**time2_**	**dt_**	**dt2_**	**sigmasq**	**NegLogLike**
-2.2	0.7	-0.032	0.34	-0.068	4	1983.2275

Iteration History						
Iter		**Calls**	**NegLogLike**	**Diff**	**MaxGrad**	**Slope**
1		6	1979.74946	3.478043	94.49105	-2645.06
2		10	1955.30328	24.44618	202.1438	-279.999
3		13	1945.57531	9.727974	37.85248	-817.144
4		17	1939.69798	5.877326	61.16151	-4.64382
5		21	1937.46423	2.233755	20.77391	-2.19888
6		23	1934.89571	2.568513	25.62831	-0.84485
7		26	1934.78602	0.109697	15.13482	-0.10919
8		30	1934.4717	0.314318	11.47178	-0.07603
9		33	1934.46499	0.006705	0.063899	-0.01154
10		36	1934.46498	0.000012	0.022195	-0.00002
11		39	1934.46498	2.322E-8	0.000659	-4.46E-8

The NLMIXED Procedure

NOTE: GCONV convergence criterion satisfied.

Fit Statistics	
-2 Log Likelihood	3868.9
AIC (smaller is better)	3880.9
AICC (smaller is better)	3881.0
BIC (smaller is better)	3911.2

Parameter Estimates

Parameter	Estimate	Standard Error	DF	t Value	Pr > |t|	Alpha	Lower	Upper	Gradient
int	-3.8057	0.3050	1150	-12.48	<.0001	0.05	-4.4040	-3.2073	0.00004
time_	1.1332	0.2682	1150	4.22	<.0001	0.05	0.6069	1.6595	0.000156
time2_	-0.04192	0.05481	1150	-0.76	0.4445	0.05	-0.1495	0.06562	0.000659
dt_	0.5644	0.1922	1150	2.94	0.0034	0.05	0.1873	0.9416	-0.00004
dt2_	-0.1096	0.04961	1150	-2.21	0.0274	0.05	-0.2069	-0.01222	-0.00016
sigmasq	5.0646	0.5840	1150	8.67	<.0001	0.05	3.9187	6.2104	-3.95E-6

The NLMIXED Procedure

Specifications	
Data Set	WORK.A
Dependent Variable	y
Distribution for Dependent Variable	Binary
Random Effects	u
Distribution for Random Effects	Normal
Subject Variable	id
Optimization Technique	Dual Quasi-Newton
Integration Method	Adaptive Gaussian Quadrature

Dimensions	
Observations Used	3616
Observations Not Used	437
Total Observations	4053
Subjects	1151
Max Obs per Subject	4
Parameters	6
Quadrature Points	50

Parameters						
int	**time_**	**time2_**	**dt_**	**dt2_**	**logsigma**	**NegLogLike**
-3.8057	1.1332	-0.04192	0.5644	-0.1096	0.81113	1934.465

Iteration History						
Iter		**Calls**	**NegLogLike**	**Diff**	**MaxGrad**	**Slope**
1		9	1934.46499	0.000011	0.106415	-5.11475
2		15	1934.46498	3.03E-6	0.005876	-0.23396
3		20	1934.46498	7.731E-8	0.001618	-0.00073
4		24	1934.46498	1.161E-8	0.000972	-0.00005
5		28	1934.46498	2.386E-9	0.000922	-9.39E-7

NOTE: GCONV convergence criterion satisfied.

The NLMIXED Procedure

Fit Statistics	
-2 Log Likelihood	3868.9
AIC (smaller is better)	3880.9
AICC (smaller is better)	3881.0
BIC (smaller is better)	3911.2

Parameter Estimates

Parameter	Estimate	Standard Error	DF	t Value	Pr > |t|	Alpha	Lower	Upper	Gradient
int	-3.8057	0.3050	1150	-12.48	<.0001	0.05	-4.4041	-3.2073	0.000377
time_	1.1332	0.2682	1150	4.22	<.0001	0.05	0.6070	1.6595	0.000628
time2_	-0.04193	0.05481	1150	-0.76	0.4445	0.05	-0.1495	0.06561	-0.00019
dt_	0.5644	0.1922	1150	2.94	0.0034	0.05	0.1873	0.9416	0.000487
dt2_	-0.1096	0.04961	1150	-2.21	0.0274	0.05	-0.2069	-0.01222	-0.00014
logsigma	0.8111	0.05766	1150	14.07	<.0001	0.05	0.6980	0.9243	-0.00092