AARHUS UNIVERSITY
Department of Biostatistics

September 18th 2016

Bo Martin Bibby

PhD-course in ANOVA and Repeated Measurements, Fall 2016

Exercises day 3

Exercise 8

We return to the C-reactive protein data in exercise 5 and 6. The data are in `crp.dta` and `crp.xls`.

1. Make a plot of the mean curves in each group and add the best straight line (for each group).
2. Analyze the data using the random coefficient model.
3. Repeat this for the log-transformed data.
4. Write a short summary of the statistical methods used in the analysis and the findings. How do these findings compare to what we saw in exercise 6?

Exercise 9

In an experiment with smoke in doses similar to what people with domestic wood burning stoves are in contact with, 12 individuals were subjected to 3 different doses of smoke (1: 0 $\mu g/m^3$, 2: 200 $\mu g/m^3$, 3: 400 $\mu g/m^3$) on 3 different days with 14 days in between. The individuals were placed in climate chambers with the given dose of smoke administered for 1 hour, and the forced expiratory volume in 1 second (FEV_1 in liters) was measured 5 times each day: 0 (baseline), 1 (30 minutes), 2 (2 hours), 3 (4 hours), and 4 (6 hours). The data can be found in `smoke.dta` and `smoke.xls`.

	Day 1						Day 2						Day 3					
Subj.	Dose	0	1	2	3	4	Dose	0	1	2	3	4	Dose	0	1	2	3	4
1	1	4.68	4.87	5.16	5.24	4.78	2	3.97	2.14	3.16	4.28	4.31	3	3.69	1.99	2.72	3.26	4.04
2	1	3.83	5.42	5.15	4.31	4.64	2	4.13	4.38	3.21	4.29	4.86	3	5.10	2.10	2.71	3.41	2.58
3	1	3.49	4.09	3.92	3.79	4.41	3	5.09	1.77	2.11	3.68	2.82	2	4.10	2.03	4.15	3.42	2.95
4	1	4.95	3.82	4.74	3.65	4.38	3	4.25	1.12	2.70	3.84	3.31	2	4.72	2.08	2.40	4.10	4.25
5	2	4.16	3.07	2.95	3.97	4.50	1	4.11	4.35	3.87	3.84	4.51	3	5.00	3.22	3.53	4.49	4.52
6	2	2.13	0.97	2.38	2.96	3.01	1	3.18	3.42	2.43	3.16	2.79	3	2.09	1.16	1.07	2.03	0.85
7	2	4.96	3.23	3.58	3.17	5.01	3	4.29	2.01	1.74	4.28	3.47	1	4.26	4.11	3.67	4.47	4.37
8	2	5.21	2.25	3.20	4.15	3.98	3	4.61	1.84	2.87	3.78	3.46	1	4.08	3.51	4.52	3.70	3.94
9	3	4.39	2.05	2.67	3.49	4.47	1	4.40	5.00	2.99	3.56	3.33	2	4.63	2.94	2.80	5.11	4.23
10	3	4.43	2.22	2.00	3.15	3.74	1	4.32	3.71	3.31	3.76	3.59	2	3.30	2.18	2.30	3.65	4.98
11	3	3.44	2.68	2.03	3.36	2.98	2	4.03	2.35	2.71	3.61	3.70	1	4.85	3.29	4.60	4.10	3.90
12	3	6.29	3.02	3.43	4.30	4.56	2	4.64	4.31	3.28	3.62	5.19	1	3.35	4.86	4.96	3.90	5.05

1. Plot the individual and the mean curves.
2. Consider the decrease in FEV_1 from baseline to 2 hours as a summary statistic. What is the effect of dose on this difference in FEV_1?
3. Make an analysis of all the data.
4. Is the FEV_1-level back to normal after 6 hours?