AARHUS UNIVERSITY
Department of Biostatistics

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PhD-course in ANOVA and Repeated Measurements, Fall 2016

Exercises day 4

Exercise 10

In the table below we have the capillary density (capillaries per mm^2) in each foot of 16 ulcerated patients and 18 healthy controls. Data from **Bland (2000)** and it can be found in `capillary.dta` and `capillary.xlsx`.

Controls			Ulcerated patients		
Person	Right	Left	Patient	Worse	Better
1	19	16	1	15	10
2	25	30	2	16	21
3	25	29	3	18	18
4	26	33	4	18	18
5	26	28	5	19	26
6	30	28	6	20	20
7	33	36	7	20	33
8	33	29	8	20	26
9	34	37	9	21	15
10	34	33	10	22	23
11	34	37	11	23	23
12	35	38	12	25	30
13	36	40	13	26	31
14	39	41	14	27	26
15	40	39	15	35	23
16	41	39	16	47	42
17	41	39			
18	56	48			

1. Make a scatter plot of the data in each group and connect density measurements corresponding to the same subject.
2. Consider the healthy controls. Is there any systematic difference between the capillary density corresponding to the right and left foot? What about the worse and the better foot for the ulcerated patients?
3. Test whether there is any systematic difference between the patients and the controls. Find estimates and 95%-confidence intervals for the capillary density in each group and for the difference.
4. Estimate the variation between feet and the variation between subjects. Which source of variation explains most of the variation in the measurements (how much)?
5. Observations corresponding to the same person are now positively correlated. What is (according to the model) the estimated correlation between measurements from the same person?
6. Write a short summary of statistical methods used in the analysis and the findings.

Exercise 11

A total of 102 people with stress were randomized to either 3 months of a stress handling intervention or a waiting list followed by the same intervention. The data consists of the Perceived Stress Score (PSS) on a scale from 0 to 40 measured before randomization and after 3, 6 and 9 (for the waiting list group) months after randomization. The data are from **Willert et al. (2009)** and can be found in `pss.dta` or `pss.xlsx`.

1. Analyze the data with special focus on the effectiveness of the intervention.
2. Is there the same effect of the intervention even though it is postponed by three months?
3. Write a short summary of statistical methods used in the analysis and the findings.