

POSTGRADUATE COURSE IN
Evaluation and Comparison of Methods of Measurements
DAY 3, EXERCISES

Exercise 6

Return to “exercise 2a long” (coagulation time – 2 methods:A/B – 2 repeated measurements with each method). Use only observations with time>220 (the patient group). In the following we will analyse the logarithm to the time.

Ignore for a moment the measurement errors generated by each method. Assume that the two methods are linked by a linear relationship: $A = \alpha + \beta \cdot B + q$, $q \sim N(0, \sigma_q^2)$. In the following we will test the hypothesis: $\beta = 1$.

Note: Method A: deviceType=1 and Method B: deviceType=2.

1. Fit the mixed model with a linear relationship between the two methods and with unequal measurement errors (DAY 3, p. 18).
2. Fit the mixed model with $\beta = 1$ and make the likelihood ratio test for this hypothesis.
3. Check the model in question 2.
4. Assume $\beta = 1$. Fit a mixed model with equal measurement errors for the two methods and make the likelihood ratio test for this hypothesis.
5. Return to the model in question 2. Use the estimate of σ_q to calculate the limits of agreement between the two methods (as if the methods generated no measurement errors). These limits represent the lower limits of agreement even if you make a large number of repeated measurements with each method and compare the averages.