Statistical methods for frailty models: studies on old-age mortality and recurrent events
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Stellingen behorend bij het proefschrift getiteld
"Statistical Methods for Frailty Models:
Studies on Old-Age Mortality and Recurrent Events"

1. The standard formula for the Akaike information criterion provides a biased estimator of the Akaike information in the gamma-Gompertz model. *(this thesis)*

2. The likelihood ratio test for a zero frailty variance in the gamma-Gompertz model has low power to detect mortality deceleration if samples are of relatively small size or left-truncated at high ages. Extending the age range covered by a sample may result in higher power than having a sample of larger size in the given age range. *(this thesis)*

3. Model selection based on a focused information criterion outperforms alternative approaches in detecting mortality deceleration in the gamma-Gompertz model. *(this thesis)*

4. Taking into account the selection effects on the frailty distribution is essential for obtaining unbiased estimates in the joint frailty model for recurrent events and death if there is left truncation. *(this thesis)*

5. Statistical methods for time-to-event analysis can be adjusted to different observational settings of censoring and truncation. Still the study design needs to consider that these adjustments cannot compensate for the loss of information resulting from such incomplete observations.

6. When studying recurrent events in the presence of a terminal event, one needs to carefully reflect the implications of the different modeling approaches as regards, for example, the interpretation of covariate effects and insights into marginal features. (Based on Cook and Lawless, *The Statistical Analysis of Recurrent Events*, 2007, Section 6.6)

7. An estimate of the smooth mixing distribution of mixed recurrent-event rates could be obtained by representing the problem as a penalized composite link model (as developed by Eilers, 2007, *Statistical Modelling* 7, 239-254; as an extension of the composite link model introduced by Thompson and Baker, 1981, *J. R. Stat. Soc. C (Appl Stat)* 30, 125-131).

8. Being a good statistician requires analytical and mathematical skills, but also skills in statistical programming and effective communication.

9. Advances in the field of computer science have played an important role in shaping the field of modern statistics.

10. The rapid development of COVID-19 vaccines has exemplified the importance of investments in both applied and basic research.