

Advanced longitudinal analysis of repeated blood marker measurements in a population-based setting

Objective: Comparison and development of methods to longitudinally analyze blood marker concentrations (hsCRP, insulin, glucose, HbA1c) taking measurement error, loss to follow-up and medication intake into account.

Data description: The project will be based on data from the population-based KORA (Cooperative Health Research in the Region of Augsburg) study. Several blood marker concentrations (high-sensitive C-reactive protein (hsCRP), insulin, glucose, glycosylated haemoglobin (HbA1c)) were measured at the baseline survey (1999-2001, N=4,261, participants aged 25-74 years), first follow-up (2006-08, N=3080) and second follow-up (2013-14, N=2,279).

Though the measurements were conducted in a standardized way, several devices or techniques had to be used due to the long study period. For example, fasting insulin was measured with a different assay at baseline than at the two follow-ups and only in the sup-group of participants aged 55-74 years. The measured concentrations are higher and spread larger above the 3rd quartile compared to the follow-ups (see figure below).

Default longitudinal analysis approaches are not appropriate as in addition to the usage of different measurement techniques several important aspects need to be taken into account: age structure of the participants, selection bias due to study drop outs and intake of medication affecting the blood markers. Therefore, this project shall compare and develop methods which can account for the different aspects. Additional information on socio-demographic, lifestyle and clinical characteristics is available for all participants and time points and will be provided.

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Figure: Logarithmized fasting insulin concentrations of participants aged 55-74 years taking no insulin-related medication at baseline (1), first (2) and second (3) follow-up.

