ONE-STAGE PARAMETRIC META-ANALYSIS OF TIME-TO-EVENT OUTCOMES USING INDIVIDUAL PATIENTS DATA

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The aim of this work is to investigate how different studies with time-to-event individual patient data can be pooled together for meta-analysis, when the data are not assumed to be of the classical proportional hazards structure. In this situation the log-hazard ratio is no longer suitable for measuring the treatment effect. We then introduce the ratio of the k^{th}-percentiles (q_k) of survival probabilities of the treatment groups of interest as a new measure of treatment effect within the meta-analysis framework. If we consider each study separately, then the parametric distributions that fit the data best can be expressed as functions of q_k, through appropriate re-parameterization of the location parameters. It can be easily shown that for accelerated failure time models, q_k remains constant over k, providing a single measure of treatment effect. In the context of a meta-analysis, even if different distributions are fit to the data of each individual study, parameter q_k remains common across distributions, with a useful interpretation for the meta-analysis process to focus on. Therefore, by assuming that q_k is the same across studies, a maximum likelihood estimate $\hat{q}_k$ can be obtained as a measure of the pooled treatment effect. Additionally, this modeling approach provides a useful framework for exploring heterogeneity. The validity of such an approach is assessed through a simulation study.