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For twin time-to-event data we consider different concordance probabilities, such as the casewise concordance that are routinely computed as a measure of the lifetime dependence/correlation for specific diseases. The concordance probability here is the probability that both twins have experienced the event of interest. Under the assumption that both twins are censored at the same time, we show how to estimate this probability in the presence of right-censoring and as a consequence we can then estimate the casewise twin concordance. In addition we can model the magnitude of within pair dependence over time and covariates may be further influential on the marginal risk and dependence structure. We establish the estimators large sample properties and suggest various tests, e.g., for inferring familial influence.

The method is demonstrated and motivated by specific twin data on cancer events with the competing risk death. We thus aim to quantify the degree of dependence through the casewise concordance function, and show a significant genetic component.