Adjusting for possibly misclassified causes of death in cause-specific survival analysis

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Cause-specific mortality is a common endpoint for clinical trials as well as epidemiologic studies. Careful modeling of cause-specific hazards and the reconstruction of the cumulative incidence of the event under study, can then help guide future policy. Available cause-specific hazards analyses assume all failure types have been accurately recorded or alternatively allow for the fact that some failure type indicators are completely missing [1]. In practice, failure type indicators are commonly subject to misclassification error. This can happen when for convenience a prevalent cause of death is recorded on the death certificate without in depth examination, or in developing countries where the cause of death is often obtained through proxy interviews, a so called 'verbal autopsy' [2].

In [3] is shown how misclassification of cause-of-death can bias effect estimates and substantially reduce the power of a clinical trial. Building on work of Goetghebeur and Ryan [1], we propose new estimators and a modified logrank test, which account for misclassification for given sensitivity and specificity of recorded causes of death, under the assumption of proportional cause-specific hazards. Asymptotic properties of our estimators are assessed analytically, while finite sample properties are verified by simulation. We find that our results compare quite favorably with standard methods. We proceed to perform an analysis of sensitivity of results to modeling assumptions. We analyze data from a clinical trial relying on verbal autopsy information on the cause of death.

References

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