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Estimations of the joint distribution of failure time and failure type with dependent truncation. (English) [Zbl 1436.62524](#)

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Summary: In biomedical studies involving survival data, the observation of failure times is sometimes accompanied by a variable which describes the type of failure event [*J. D. Kalbfleisch* and *R. L. Prentice*, *The statistical analysis of failure time data*. 2nd ed. Chichester: Wiley (2002; [Zbl 1012.62104](#))]. This paper considers two specific challenges which are encountered in the joint analysis of failure time and failure type. First, because the observation of failure times is subject to left truncation, the sampling bias extends to the failure type which is associated with the failure time. An analytical challenge is to deal with such sampling bias. Second, in case that the joint distribution of failure time and failure type is allowed to have a temporal trend, it is of interest to estimate the joint distribution of failure time and failure type nonparametrically. This paper develops statistical approaches to address these two analytical challenges on the basis of prevalent survival data. The proposed approaches are examined through simulation studies and illustrated by using a real data set.

MSC:

[62P10](#) Applications of statistics to biology and medical sciences; meta analysis

[62N05](#) Reliability and life testing

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[competing risks](#); [cumulative incidence function](#); [dependent truncation](#); [prevalent sampling](#)

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