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Repeated measures with zeros. (English) Zbl 1121.62574
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Summary: Illinois State University, Normal, USA and PA Lachenbruch FDA Center for Biologics Research and Review, Rockville, MD, USA, kberkatilstu.edu Consider repeated measures data with many zeros. For the case with one grouping factor and one repeated measure, we examine several models, assuming that the nonzero data are roughly lognormal. One of the simplest approaches is to model the zeros as left-censored observations from the lognormal distribution. A random effect is assumed for subjects. The censored model makes a strong assumption about the relationship between the zeros and the nonzero values. To check on this, you can instead assume that some of the zeros are 'true' zeros and model them as Bernoulli. Then the other values are modeled with a censored lognormal. A logistic model is used for the Bernoulli p , the probability of a true nonzero. The fit of the pure left-censored lognormal can be assessed by testing the hypothesis that p is 1, as described by Moulton and Halsey.¹ The model can also be simplified by omitting the censoring, leaving a logistic model for the zeros and a lognormal model for the nonzero values. This is approximately equivalent to modeling the zero and nonzero values separately, a two-part model. In contrast to the censored model, this model assumes only a slight relationship (a covariance component) between the occurrence of zeros and the size of the nonzero values. The models are compared in terms of an example with data from children's private speech.

MSC:

62P10 Applications of statistics to biology and medical sciences; meta analysis

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