Community Dent Oral Epidemiol 2005; 33: 237

Community Dentistry and Oral Epidemiology

Response

Response from Lewsey and Thomson to Letter from Kibria

Received 28 October 2004

We welcome the suggestion to use formal goodness-of-fit tests following ZIP/ZINB modelling. For illustration purposes, we thought the informal graphical approach showed best the superiority of ZINB over ZIP for our data sets.

The references suggested are wholly appropriate. We felt that the references provided in our paper were best suited for the readership of *Community Dentistry and Oral Epidemiology*. One was published in *Statistics in Medicine* and provided a good overview of the methods (1), and the other illustrated the ZIP approach for the DMFT index (2) .

The only error in our model formulation was that we stated $\mu = x\beta$; this should have been $\mu = \exp(x\beta)$. We thank the author for pointing out this oversight. In the paper, the correct formulation was applied in the text (p. 186) illustrating how some of the model results of Table 1 are interpreted.

Kibria states that for $y = 0$ the model formulation should be given by:

$$P(y|x) = \pi + (1 - \pi)e^{-\mu}$$

We would like to point out that this is equivalent to our formulation:

$$P(y|x) = \pi + (1 - \pi)\frac{e^{-\mu}\mu^{y}}{y!}$$

because $\mu^0 = 1$ and $0! = 1$. We did not simplify the formula in the paper because we wanted to make it clear that individuals with $y = 0$ consist of two groups: the first not part of the Poisson process and the second part of a Poisson distribution but only taking zero values. This point may have been lost if we had just used $e^{-\mu}$ to represent the Poisson distribution.

Kibria's response has some minor errors. In the above formulae, μ is used instead of π to represent the probability of being an extra zero.

References

1. Cheung YB. Zero-inflated models for regression analysis of count data: a study of growth and development. Statist Med 2002;21:1461–9.
2. Böhning D, Dietz E, Schlattmann P, Mendonca L, Kirchner U. The zero-inflated Poisson model and the decayed, missing and filled teeth index in dental epidemiology. J R Statist Soc 1999;162:195–209.

W. M. Thomson
Department of Oral Sciences
School of Dentistry
Dunedin, New Zealand