

Letter to the editor

Statistical evaluation of nondetectable concentrations of IgE

In the statistical treatment of data from analyses of cord-blood IgE, it has been common to use methods which, as far as I can see, give a false impression of accuracy and are improper. The article by Bergmann et al. in the January issue of this journal (*Allergy* 1995; 50: 65–71) once more brings up the problem of how to treat data when the limits of the laboratory method do not allow detection in a substantial number of the specimens. According to that article, 74.5% of the samples had values below the detection limit of 0.35 kU/l. This did not prevent the authors from calculating a geometric mean of 0.106 kU/l by assigning all values below 0.35 kU/l a value of 0.01 kU/l. Furthermore, they compared this improper geometric mean with, for example, the results of Hide et al. (*Clin Exp Allergy* 1991; 21: 739–43), who had a detection limit of 0.2 kU/l and an assigned value of 0.1 kU/l for samples with undetectable concentrations, and with those of Halonen et al. (*Clin Exp Allergy* 1991; 21: 235–41), who had a detection limit of 0.1 kU/l with 45.2% of the samples below the detection limit. Furthermore, Bergmann et al. gave a median value of 0.198 kU/l although still having a detection limit of 0.35 kU/l – a calculation which is still more astonishing.

To the credit of the authors, I must emphasize that they did not use their fabricated, imaginary statistical values when relating the laboratory data to the clinical findings, and to that part of the article I have no objections.

As far as I can see, this way of treating data is a misuse of statistics which not only entails unnecessary work but also gives a false and misleading impression of accuracy. For instance, I have seen in an abstract the use of geometric mean plus 1 SD = 0.65 kU/l in a situation where the detection limit was 0.9 kU/l. As I am not a statistician myself, I should appreciate responses from an experienced professional statistician to the following questions:

- Can a geometric mean be calculated when most or a substantial number of the samples have concentrations below the laboratory detection limit?
- Is it meaningful to do such a calculation?
- Can a median value be calculated when most of the samples have concentrations below the laboratory detection limit?
- Is the use of percentiles the proper way of treating such data, i.e., in the situation of Bergmann et al., to give the percentiles from the start of the 75th percentile?

To me, the last-named suggestion seems meaningful, is easy to understand, and does not use non-existent data.

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