

# Statistics to assess patient satisfaction with primary care called into question

## TO THE EDITOR:

I believe wholeheartedly in the value of patient-centered interaction, but I am not confident that the cross-sectional observational study by Flocke and colleagues<sup>1</sup> provides much evidence to support my belief. The 9-item visit rating form from the Medical Outcomes Study<sup>2</sup> that was used in Flocke's study is an ordinal scale. Although each of the succeeding levels of satisfaction (poor, fair, good, very good, and excellent) denotes "more satisfaction" than the preceding level, they do not necessarily do so by any uniform interval. "Excellent" is better than "very good," but we don't know if "good" is better than "fair" by the same increment. Attaching the numbers 1 to 5 to the ordered response categories does not change this fact.

With numbers attached, means can be calculated to many decimal places, as they are in Tables 3 and 4 of Flocke's article, but they have no substantive meaning, and indeed can be deceptive. I believe the appropriate measure of central tendency for an ordinal scale is the median. I would not be surprised if the differences seen in Tables 3 and 4 disappeared, and all the numbers evolved into "4s," if the medians of the variables were used, along with an appropriate statistical test.

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## DR FLOCKE RESPONDS:

I thank Dr Ryan for his comments regarding the choice of analyses for the data in our article.<sup>1</sup> He is correct that the outcome variables represent the sum of ordinal variables and use of a nonparametric statistical test such as the Kruskal-Wallis test that utilizes rankings would be appropriate. Univariate analyses of these data using a Kruskal-Wallis test resulted in medians and *P* values that were similar to means and *P* values generated using analysis of variance.

Our choice of analysis was driven by the nested structure of the data. In our case, multiple patient observations are represented per physician; our dependent variable is a patient level score; and our independent variable is measured at the physician level. The appropriate analysis to avoid bias given this structure of data is multilevel modeling. Multilevel modeling can take into account the effect of patients being nested within physician and correctly model the data without inflating (ignoring the physician level and analyzing data as if 2760 patients) or deflating the sample size (aggregating patient data to the physician level as if the sample were 138 physicians). However, no nonparametric equivalent exists for multilevel modeling as there is for analysis of variance. Therefore, we needed to decide which analysis option was the least biased. Our decision was to use the multilevel modeling because this strategy also allows inclusion of

covariates at the patient and physician levels to rule out alternative explanations for the observed associations.

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## REFERENCES

1. Flocke SA, Miller WL, Crabtree BF. Relationships between physician practice style, patient satisfaction, and attributes of primary care. *J Fam Pract* 2002; 51:835-40.
2. Rubin HR, Gandek B, Rogers WH, Kosinski M, McHorney CA, Ware JE Jr. Patients' ratings of outpatient visits in different practice settings. Results from the Medical Outcomes Study. *JAMA* 1993; 270:835-40.