Dividing the FEV$_1$ into its component parts

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TO THE EDITOR: Sorkness et al. (1) show that the forced expiratory volume in 1 s (FEV$_1$) expressed as percent predicted can be broken down into its two components, forced vital capacity (FVC) and FEV$_1$/FVC, also expressed as percent predicted. They claim that “this is a novel approach [for partitioning the FEV$_1$] in a quantitative manner”. In fact, this quantitative novelty was introduced 12 years ago by Gibbons et al. (2) for exactly the same reason that Sorkness et al. (1) use it: to detect asthmatic subjects with severe disease. Sorkness et al. suggest that severe asthmatic subjects may be fundamentally different from nonsevere asthmatic subjects in that they have airway closure, causing gas trapping, and this can be detected by a lower FVC in the severe group. If so, the frequency distribution of fall in FVC at the dose of agonist producing a 20% decline in FEV$_1$ (PC$_{20}$) should be bimodal. However, Gibbons et al. (2) found that in 146 asthmatic subjects, this distribution was unimodal and normally distributed. It could be claimed that the numbers were insufficient to demonstrate bimodality, but 64 of the 146 patients had a fall in FVC $\geq 15\%$, accounting for 75% or more of the fall in FEV$_1$.

Curiously, in a control group of only 20 healthy subjects receiving high-dose methacholine challenge, there was clear evidence of bimodality: 16 subjects had a fall in FVC ranging from 0 to 15% and there were none between 15 and 19.9% but 4 between 20 and 55%. Could it be that these four subjects were at risk for developing asthma?

Sorkness et al. (1) did not report the fall in FVC at the PC$_{20}$, and their subjects were preselected as either severe or nonsevere asthma. This selection would prevent detection of bimodality; an unselected group of patients like those studied by Gibbons et al. (2) would be required. Sorkness et al. (1) claim that their study “is the first... to show the predilection of severe asthma for air trapping over the entire range of airflow limitation,” but the asthmatic subjects studied by Gibbons et al. had a mean baseline value of FVC and FEV$_1$ of 105.7% and 98.9% predicted, respectively, with lower 95% confidence limits of 76.9% and 70.1% predicted, respectively, so the claim of Sorkness et al. to originality can be challenged. Finally, Gibbons et al. found no correlation between PC$_{20}$ and percent fall in FVC at the PC$_{20}$, proving that sensitivity to methacholine and response to the agonist are unrelated phenomena.

REFERENCES
