2-min tidal volume method, chosen to fulfill the following criteria: (1) response to the second last concentration between 15 and 19% (inclusive) FEV \(_1\) fall; and (2) response to the last concentration ≥20% FEV \(_1\) fall.

There were 45 men and 55 women, mean age 29.5 ± 15.03 years (range 15 to 79 years), baseline FEV \(_1\) 3.26 ± 0.85 L, FEV \(_1\) 90.2 ± 15.26% predicted. We calculated the conventional PC\(_{20}\) using the linear interpolation formula from the last two data points. We then assumed that the last (≥20%) concentration had not been administered and estimated the PC\(_{20}\) by two methods. The first was to extrapolate, using the same formula, from the previous last two data points. The second was to extrapolate from the last (15 to 19% FEV \(_1\) fall) data point using the following formula:

\[20 \times \text{Concentration } \div \text{FEV}_1 \text{ fall (linear extrapolation through } 0)\]

The two log-transformed PC\(_{20}\) estimates were compared with the conventional PC\(_{20}\) using the intraclass correlation coefficient (ICC). Although there were no significant differences in the PC\(_{20}\) values calculated using the three different methods (analysis of variance [ANOVA] F = 3.03, p = 0.43), the last point formula more closely approximated the conventional PC\(_{20}\) (ICC = 0.97) than did the two-point extrapolation (ICC = 0.74), as demonstrated in Figure 1.

The need to accurately estimate PC\(_{20}\) when the fall in FEV \(_1\) does not reach 20% may be exclusive to research trials, when reliability in calculating and interpreting the data is important. Estimation of PC\(_{20}\) eliminates decreasing FEV \(_1\) to a level that could cause subjective discomfort, and therefore, subsequent administration of bronchodilators can be avoided. Avoidance of bronchodilators may be an important aspect of some research protocols. This issue is not relevant when interpreting a clinical or diagnostic test, when the PC\(_{20}\) is usually approximated to the nearest (doubling) concentration. In addition, the differences between the conventional PC\(_{20}\) and the PC\(_{20}\) estimated by the two methods of linear extrapolation are small (0.17 and 0.13 doubling concentrations in this study, respectively), and thus not of clinical significance.

A plausible explanation for a weaker correlation between the conventional PC\(_{20}\) and the PC\(_{20}\) calculated by two-point extrapolation is that the two-point formula uses the slope of the line between two points. A small absolute difference in the first FEV \(_1\) particularly when the percent change FEV \(_1\) is small, can produce a relatively large change in the slope. Such a large change in the slope can have a marked effect on the estimated PC\(_{20}\) in either direction but will be particularly important if the slope is shallow. This may lead to a marked overestimate of the PC\(_{20}\) (Fig 1). A simple mathematical formula for single point linear extrapolation provides an accurate approximation of the conventional PC\(_{20}\) and can reliably be used in the interpretation of bronchial challenge tests.

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**The Third Dimension**

To the Editor:

I have always been fascinated by sculpture. Recently I had the opportunity to visit the Longstreet Memorial on Seminary Ridge in Gettysburg. The statue is a tribute to “Old Pete,” Lieutenant General James Longstreet, the South’s controversial hero. In bronze detail, the artist, Gary Casteel, has captured the strength and integrity of a dedicated individual. As the evening sun set beyond South Mountain, its rays delicately outlined the broad shoulders of horse and rider. In this twilight gallery, the appeal of sculpture became apparent. Sculpture is three-dimensional, its beauty highlighted by its multilateral individuality. No two perspectives are alike.

The practice of medicine is in many ways like sculpture. Both are hands-on, labor-intensive art forms that require sensitivity, originality, and attention to detail. Medicine, like sculpture, is three-dimensional. It requires consideration of disease, treatment, and patient. It’s not just the bug and the drug. Like sculpture, no two patients are alike. Human beings are multidimensional. Social, psychological, and physiologic factors unique to each patient sculpt health-care needs. Meeting individual needs in the context of crisis is the art of medicine.

Unfortunately, health-care administrators, review organizations, and insurance companies no longer think in three dimensions. Medical management is now an industrialized, two-dimensional process of debits and credits. With cold efficiency, the health maintenance organization chisels its way to a fat bottom line at the expense of individuality. Medical mass production has evolved, complete with its own vocabulary, ethics, and accounting systems. Computer programs using statistical scoring systems are now available to determine medical necessity and covered expenses. Gone is the art of medicine, replaced by the assembly-line mentality of managed care.

I do not relish the thought of a computer program determining my health-care needs by binary analysis. I want my treatment plan determined by a physician I know and trust, molded to my individual needs by the doctor-patient relationship, not determined for profit by a faceless and distant medical director. I do not want to become lost in the vast sea of HMO sameness, my care cast in stone by predetermined criteria. I am a human being, and I expect to be treated as an individual. Most Americans would agree.

Medicine and sculpture have been a part of civilization since its beginnings. The art of medicine now faces extinction.

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**References**


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