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In Reply:—While it is true that the earlier report by Cherala and Ovassapian described the passage of a bronchoscope through the Murphy eye of an endotracheal tube, in none of the three cases was there any mention of difficulty in advancing of the tube/scope combination into the trachea as was the case in our report. Instead, they reported an inability to withdraw the bronchoscope once successful intubation had been accomplished. As was stated in our letter, our concern was that repeated or forceful attempts to advance the endotracheal tube in a situation where the bronchoscope has exited through the Murphy eye may result in traumatic injury to the glottic structures. We retain this concern and feel that our letter serves as an important reminder that difficult passage of an endotracheal tube over a bronchoscope may be due to more than a narrow nasal passage or failure to adequately lubricate the bronchoscope.

With regard to their comments that the bronchoscope should be advanced after the endotracheal tube has been positioned in the pos-

terior pharynx, we feel that this is a matter of personal preference and that successful intubations may be achieved either in this manner or by first positioning the bronchoscope and then advancing the endotracheal tube.

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A Statistic for Inferences Based upon Negative Results

To the Editor:—The letter by Benefiel¹ *et al.* calls attention to an important concept of probability related to the strength of a clinical inference based upon the nonoccurrence of a disease in a series of patients. However, the equation for such is incorrect, as printed. Hence, I would like to derive the correct formula while presenting the simple underlying concepts.

If R is the rate of occurrence or incidence of the condition in a general population, (1 - R) is the fraction of the population free of the condition and represents the probability that observation of a single patient will be negative. Then, the probability P of a negative observation in n consecutive patients is (1 - R)ⁿ, or

$$(1 - R)^n = P \quad (1)$$

The P in equation 1 is indeed our familiar P value, usually taken at 0.05 or 5%, representing the probability that the observed result occurred by chance alone. The corresponding level of confidence, 1 - P, is 0.95 or 95%.

Depending upon the question asked, equation 1 may be rearranged into several useful forms, as shown below.

$$(1 - R)^n = P \quad (1)$$

Taking the nth root on both sides of the equality yields:

$$1 - R = P^{1/n} \quad (2)$$

Solving for R:

$$R = 1 - P^{1/n} \quad (3)$$

or

$$R = 1 - \sqrt[n]{P} \quad (4)$$

which is the correct equation for the letter of Benefiel *et al.* using his notation for the nth root of P. The form of equation 3 or 4 is useful for calculating, in the general population, a condition's expected rate of occurrence corresponding to a desired P value and the number n of consecutive negative observations made.

Another useful form of equation 1 is obtained as follows:

$$(1 - R)^n = P \quad (1)$$

Taking the logarithm on both sides of the equality

$$n \cdot \log(1 - R) = \log P$$

Solving for n

$$n = \frac{\log P}{\log(1 - R)} \quad (5)$$

The form of equation 5 enables calculation of the number of consecutive negative observations (*i.e.*, condition absent) needed to confirm a known or assumed rate of occurrence R at a chosen P value.

To one who has not used these relationships quantitatively, it is surprising to learn the number of consecutive negative observations needed to confirm or infer a low rate of occurrence in the population of a condition under scrutiny. To familiarize the reader with the relation between the rate of occurrence (R) and the number (n) of consecutive negative observations, table 1 presents several milestone values of R and the corresponding values of n for the commonly-used P = 0.05 (confidence level 0.95).

For example, if we adopt a new procedure or administer a drug, and we wish to show that the rate of untoward effects is not greater than 10%, we need to observe 28 consecutive cases where the undesirable side effects have not occurred. Observation of 13 consecutive cases without an occurrence only permits the inference of a maximum rate of 20% in the general population of patients. And, as Benefiel *et*

TABLE 1

P = 0.05	
R	n
0.20 or 20%	13
0.15 or 15%	18
0.10 or 10%	28
0.05 or 5%	59