LETTERS

Randomization in Clinical Trials

Gina Bari Kolata (News and Comment, 16 Dec. 1977, p. 1127) repeats the often stated belief that "The randomization [in controlled clinical trials] is designed to average out possible pertinent differences among the trial participants, such as age, sex, and general state of health. The treatment and control groups, then, should be medically equivalent." In fact, randomization never completely eliminates between-group differences; with small group sizes such differences may still be quite appreciable after randomization. It is questionable whether such groups could be considered medically equivalent.

The real rationale of randomization lies in the statistical theory of errors that distinguishes between systematic (biasing) errors and random (variable) errors. Even if the trial subjects were selected by identified criteria (age, sex, and so forth), there is no assurance that some attributes affecting the result may not be more (or less) predominant in one group than in the other. Since these factors are hidden, they cannot be measured, and the result cannot be corrected for the bias they introduce. Allocating by chance (randomizing) the subjects to the treatment and control groups does not make the groups medically equivalent, but it distributes the biasing factors to the groups also according to chance, that is, the biasing errors become random errors. Their magnitude can be calculated as the standard deviation and be allowed for in arriving at the result by tests of significance and confidence limits. Without randomization, such tests lack the appropriate logical foundation. That randomization also makes the subject groups more uniform is a by-product, welcome but not essential, of its primary function.

HERBERT A. WENDEL
Department of Pharmacology, Health Sciences Center, University of Oregon Medical School, Portland 97201

OTEC: Feasibility and Costs

The article "Ocean thermal energy: The biggest gamble in solar power" by William D. Metz (Research News, 14 Oct. 1977, p. 178) inspired a vigorous discussion in the Letters section (9 Dec. 1977, p. 989), some of which related to statements made by me and to results obtained by my research group. This dis-