A COMPLETELY DIFFERENT APPROACH TO SAMPLE SIZE PLANNING

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We propose and justify a new approach for choosing sample size based oncost efficiency, the ratio of a study's scientific and/or practical value to its total cost. Because a study's projected value exhibits diminishing marginal returns as a function of increasing sample size for a wide variety of definitions of study value, choosing the sample size that minimizes cost per subject never falls short of the most cost-efficient sample size. An alternative method, choosing sample size to minimize total cost divided by the square root of sample size, never falls short for innovative studies and also appears to perform well and has some justification in other cases. Notably, if projected study value is proportional to power at a given alternative and total cost is a linear function of sample size, then this choice is more cost efficient than the sample size producing 90% power. In many situations, these methods are easier to implement, based on more reliable inputs, and better justified than current conventional approaches.