The National Heart, Lung, and Blood Institute
Value Function: Measure for Measure

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This issue focuses on a topic of considerable interest and some controversy: the "value function" used by the National Heart, Lung, and Blood Institute (NHLBI) as an aid in making funding decisions on research project grant applications. This innovative approach arose at the behest of the 101st US Congress. In its fiscal year 1991 report covering appropriations for the National Institutes of Health (NIH), the US House of Representatives directed the NIH "...to provide necessary cost control on the research grant system...by specific cost management strategies or by factoring cost into the grant selection process or both." Emphatic support for the House directive was included in the corresponding Senate report.

In response to the congressional directives, the NHLBI developed a measure for research project grant applications that addresses both the quality and the cost of proposed research. The NHLBI value function approach, which was first presented to the National Heart, Lung, and Blood Advisory Council (NHLBAC) in October 1990, is based on widely accepted methodology for establishing preferences among alternatives with multiple attributes. It rank orders research grant applications according to a function that takes one measure, the percentile score obtained from peer review, and adjusts it by another measure, one that reflects the cost of the proposed research, to derive a third measure, the one used to guide funding decisions.

The function is a product of the percentile score and some power of the total cost. Although it may appear to be arbitrary, the value function actually provides a reasonable representation of the cost-effectiveness of proposed research. It is a product rather than a ratio because NIH percentiles, which would ordinarily constitute the denominator in a cost-effectiveness ratio, are assigned so that lower values reflect higher quality. The cost multiplier used is the fourth root of the total cost; this is done so that the predominant aspect of the measure is the quality of the proposed research.

The value function has some highly desirable properties. Its response to cost increases is more pronounced at less favorable (ie, higher) percentile scores than at more favorable scores, and its response to percentile score increases is more pronounced for higher-cost applications than for lower-cost applications. In addition, it does not automatically exclude high-cost applications from funding consideration.

The value function was first used to guide NHLBI funding decisions following the May 1991 meeting of the NHLBAC. Prior to that meeting, the NHLBI deviated only slightly from the rank ordering established by percentile scores, that is, applications were sorted in order of increasing percentile scores and generally were awarded in that order up to the limit of available resources. Introduction of the value function has placed emphasis on the essential arbitrariness of the earlier approach. There is, after all, no inherent reason why two applications that make markedly different demands on the limited resources available to the institute should be treated identically just because they have the same percentile score.

It is certainly possible that other methodologies might provide as good a guide for funding decisions as this approach. However, we believe that our experience with the value function approach justifies its continued use. The value function introduces only modest changes from orderings based solely on percentile scores, so it clearly maintains a primary emphasis on research quality. The few changes it has led us to make have been exchanges between limited numbers of expensive applications in the upper part of the fundable range and less costly applications that otherwise would have been just outside the fundable range. By emphasizing the existence of such trade-offs, the value function approach assists in efforts to ensure the highest standards of care in the management of public funds.

The US House of Representatives apparently shares our belief in the validity of this measured approach. In its fiscal year 1993 report covering the NIH, the House Committee on Appropriations included the following: "The Committee heard...a detailed description of the Institute's policy of selecting grants which are less expensive but of similar quality as a method of controlling the average cost of grants...The Committee supports this procedure and believes it may serve as a model for other institutes."

We hope that our colleagues in the cardiovascular research community will come to share this assessment of the new measure.
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