

# Efficacy Trials & Cost-Effectiveness

CBCSE IES Methods Training in Economic Evaluation Methods Brief

By: Brooks Bowden, University of Pennsylvania

This methods brief is intended to provide basic guidance for researchers proposing an efficacy or follow-up field trial that includes a cost component. The guidance here is framed by the FY 21 RFA from the Institute of Education Sciences (IES).

In an efficacy proposal, a cost study is guided by the concept of costs as including all resources allocated regardless of how ingredients were financed. The trial intends to measure the effects of an intervention and the cost component should be designed to reflect the resources delivered to produce effects. The goal of the cost component is to improve what is known about the production of the effect, to better inform replication efforts, and to guide policy. The last of these goals, supporting education resource decisions, is addressed during design by preparing to compute a cost-effectiveness ratio as a metric to reflect the cost to achieve the effect. For all of these goals, the ingredients or resources described and the estimated costs must correspond to the production of the effect by reflecting implementation. Here are three important points that stress the goal of successful replication that are highlighted by the IES RFA:

**Costs ≠ \$0.** Even if a program is offered free of charge to a school, some level of resource input is required for implementation. For example, if computers are used, they cannot be used for any other purpose during that time and the computers are a necessary input in producing the effect.

**Costs ≠ List Price.** A list price is insufficient as a stand in for a cost study. If a list price is available, it should be combined with all other costs, such as personnel time or training, to implement.

**Costs to produce effect(s).** The cost estimate reflects the value of the inputs delivered during implementation that produced the effect(s). Therefore, all resources that were provided or changed through the intervention should be included regardless if they were donated or reallocated.

Proposals for efficacy trials typically include sections justifying the significance of the work and problem being addressed, outlining the research plan, a timeline, and personnel. It is best if the cost or efficiency aspect of the work is threaded throughout these sections.

**Justification:** Align statements about resource scarcity, inequitable outcomes, need for skills improvement, labor market outcomes with the plan to include research on resources and their costs.

**Research Plan:** Include a cost research question, specify method guiding the cost research, plan to collect data on ingredients during implementation considering treatment contrast, clarify sample for ingredients data collection, outline plan to estimate the cost value of ingredients with national average prices, plan for sensitivity tests, and compare to extant cost research if possible. Include these activities in the timeline.

## Research Question Examples to Get Started:

1. What is the cost of [intervention] to produce changes in [Y]?
2. How were the costs of [intervention] financed? What portion of costs are borne by the school and what portion are contributed by volunteers?
3. How do costs vary among sites?
4. How does the cost-effectiveness of [intervention] compare to alternative interventions that effect equivalent outcomes?

**Tell a cohesive story by connecting all aspects of the proposal together in a well conceived and planned study that will contribute important new knowledge.**

## Stay tuned for IES methods training sessions in summer 2021!

Treatment contrast is critical, not just for costs but for the evaluation overall. An effect size, a cost estimate, and a cost-effectiveness ratio are all related to the production of the impact, which is defined by implementation and treatment contrast during the trial. To interpret the results and to replicate the intervention successfully, efficacy and replication trials must plan to specify the achieved relative strength in terms of the differences in resources used in the treatment compared to the control.

**Guiding Ingredients Data Collection:** When designing a data collection plan, set out ingredients and potential sources for data on each. At the design phase, this does not need to be complete, but determining the source for data on ingredients is a necessary step when moving from designing to conducting the study.

**Efficiency tip:** integrate data collection on ingredients with the implementation study observations, surveys, interviews, time logs.

**Alignment tip:** If you anticipate effect heterogeneity or implementation variation, consider the data needed to examine this from a resource perspective.

**Worksheets:** A hallmark of the ingredients method is the organization of data in simple worksheets. A basic template to guide study planning is available as an accompanying resource. Your study may require a larger statistical software package to manage data across many sites. In that instance, the worksheet can organize the ingredients list, the data sources, and price list, similar to a codebook.

**Cost financing:** After estimating the total cost to produce an effect, plan to provide estimates of how the costs would be incurred across sources (% borne by the school, parents, volunteers, AmeriCorps, or other partners).

**Personnel:** Clearly identify who will oversee the cost component and who will be involved in data collection and estimation of costs. Reference training and any relevant experience. If needed, provide a plan to obtain additional training or support.

### Resources:

Ingredients method textbook:

Levin, H.M., McEwan, P., Belfield, C., Bowden, A.B., Shand, R. (2018). *Economic Evaluation in Education: Cost-Effectiveness and Benefit Cost Analysis, 3rd Edition*. Sage Publications.

Broad recommendations for evaluation:

Belfield, C. & Bowden, A.B. (2019). Using Resource and Cost Considerations to Support Educational Evaluation: Six Domains. *Educational Researcher*, 48(2), 120-127

Considering induced changes to services or supports broader than the intervention:

Bowden, A.B., Shand, R., Belfield, C.R., Wang, A., & Levin, H.M. (2017). Evaluating Educational Interventions that Induce Service Receipt: A Case Study Application of City Connects. *American Journal of Evaluation*, 38(3), 405-419.

Complexity of Comparing Cost-effectiveness Ratios:

Levin, H.M. & Belfield, C. (2015). Guiding the Development and Use of Cost-Effectiveness Analysis in Education. *Journal of Research on Educational Effectiveness*, 8(3), 400-418.

Example of published study with effects, implementation, and costs:

Jacob, R., Armstrong, C., Bowden, A.B., Pan, Y. (2016). Leveraging Volunteers: An Experimental Evaluation of a Tutoring Program for Struggling Readers. *Journal of Research on Educational Effectiveness*, 9 (Sup1), p.67-92.

*The research reported here was supported by the Institute of Education Sciences, U.S. Department of Education, through Grant R305B200034 to the University of Pennsylvania. The opinions expressed are those of the author and do not represent the views of the Institute or the U.S. Department of Education.*