CAPTURING COST DATA

This note provides process guidance on how to collect data to measure the cost of interventions.

Financial data that comes from budgets or spending reports can provide much of the data needed to cost interventions. However, this data must be **disaggregated** and **intervention-specific**.

Cost estimates must include the comprehensive set of inputs for program delivery, so **non-financial information** may also be part of cost data capture. This can come from monitoring and evaluation data, interviews with program implementers, and exercises like time- & effort-tracking.

Ideally cost data is **captured in real-time** during program implementation. Collecting the data at project close may result in inaccurate or missing data.

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Policymakers and implementing agencies constantly face budget constraints. Only by knowing the effectiveness and costs of an intervention can they make informed decisions about allocating scarce resources. Cost metrics, even in the absence of estimates of impact, can also help link government funding and transfers to actual need, identify opportunities to save money, and predict budgets required to scale up interventions. However, despite consensus on the utility of cost estimates, it is rare to see cost data publicly available, whether in peer-reviewed research publications, project completion reports, or process evaluations.[1]

What explains this absence? The obstacle is not analytical, as there is ample methodological guidance on cost analysis once cost data has been collected.[2,3] The major challenge is the limited accessible guidance on cost capture - the collection of sufficiently detailed financial and programmatic data to use in a costing analysis.[4] While "cost capture" may conjure up images of an accounting exercise with expenditure data that happens after a project closes, it typically requires an investigation that also involves monitoring data, interviews, and observations throughout the entire project cycle. The goal is data that are (i) disaggregated and (ii) intervention-specific and (iii) captured in real time over the course of an intervention.

Cost data should be disaggregated, intervention-specific, and captured in real-time.

1. Knust, Renata Erthal, et al., "Estimated Costs of Advanced Lung Cancer Care in a Public Reference Hospital," Revista De Saúde Pública 51, (2017); and Araujo, M.C., et al., "Overview of early childhood development services in Latin America and the Caribbean," Inter-American Development Bank, (2013).

2. Dhaliwal, Iqbal, et al., "Comparative Cost-Effectiveness Analysis to Inform Policy in Developing Countries," Abdul Latif Jameel Poverty Action Lab (J-PAL), MIT, (2012).

3. Levin., Henry M., McEwan, Patrick J., *Economic Evaluation in Education: Cost-Effectiveness and Benefit-Cost Analysis*, SAGE Publications, Inc; Third edition, July 2017.

4. Some exceptions are USAID's "Cost Reporting Guidance for Educational Programs" and the Global Health Cost Consortium's "Reference Case for Estimating the Costs of Global Health Services and Interventions."

The first question many people ask is "Why isn't a budget, or other raw financial data, sufficient to cost this program?" To answer this question, it's useful to think of the difference between a shopping list and a recipe. A budget is similar to a monthly shopping list. It might include clothes, food, and any items that are needed for daily life. However, a cost model is more similar to a recipe for a specific dish and includes more than what would be on a shopping list, like cooking time and temperature, quantities of ingredients for specific dishes, or the number of people the recipe is meant to serve.

Similarly, costing an intervention is not an accounting exercise for an organization or funding stream. Rather it is a detailed (disaggregated) listing and valuing of all resources and efforts required to make a specific thing - the intervention - happen.

So what does disaggregated data and intervention-specific data look like?

1. Disaggregated data

Often project budgets and expenditure reports provide only aggregated summaries of spending per cost category. Take for instance an early childhood education project that has both classroom-based and home-centered components (the practice of funding multiple interventions through the same funding source is very common). Let's say we want to cost only the home-based components.

Consider the aggregate budget data in Table 1 that you might find on the project. This data provides no detailed information on quantities of the specific inputs that drove these totals, nor their unit prices. For example, the first line item, "Salaries," only provides a total cost of all salaries funded under the larger project funding stream, not the cost of individual personnel salaries based on units and unit costs. We also cannot determine how much is spent on key items like supervision costs, procurement of learning materials, nor can we determine when costs occurred. The absence of these variables will limit both data accuracy and the extent to which the cost data can be used to estimate the costs of scaling up the intervention or implementing it in different areas.

Table 1. Aggregate category totals provide little information that can be used to cost an intervention.

Salaries	$10,843,630
Procurement	$2,345,486
Contractors	$5,541,020
Other expenses	$163,300
TOTAL	$18,893,436

The structure of the financial data should instead resemble what is presented in Table 2. Disaggregated data includes both more specific inputs and the prices and number of units used to value those inputs. For example, the first input in table 2, "home based care agent salaries," describes the specific personnel that conduct home based care visits, as well as the quantity of days these personnel have billed and the unit cost of a day of their work.

Table 2. Disaggregated financial data should be input-specific and include unit price and quantity data.

Input	Nature of unit cost	Number of units (Aug 2016-Jul 2017)	Nominal unit price (Aug 2016-Jul 2017)	Nominal estimated cost (Aug 2016-Jul 2017)
Home based care agent salaries	Days billed	61,546	$30	$1,846,380
Fuel costs	Miles billed	2,602,431	$0.20	$520,486
Contract vehicles	Vehicles days	20,432	$60	$1,225,920
Reading specialist	Days billed	478	$450	$215,100
Travel: child care agents training	Number of agents	220	$15	$3,300
Lodging: child care agents training	Total agent training days	2200	$60	$132,000
Training location	Days billed	10	$1600	$16,000
Trainer salaries	Months employed	12	$1200	$14,400
Teachers' salaries: preprimary classrooms	Salary months	10,232	$650	$6,650,800
Classrooms constructed	Number of new classrooms	100	$41,000	$4,100,000
Classroom reading materials	Number of packages	10,000	$100	$1,000,000
District Early Childhood Education Officers	Number of officers	110	10,550	$1,160,500
Health Agents	Days billed	23,431	$50	$1,171,550
Learning materials	Number of packages	15,000	$55.00	$825,000
TOTAL				**$18,881,436**

2. Intervention-specific

The home-based care intervention is one major component of this early childhood education program. It consists of a series of visits by trained facilitators to meet families in their homes and spend time with parents and their young children, demonstrating best practices to promote child development. The program has nearly a $19 million budget, but not all $19 million supports the home care intervention. Some inputs funded by this grant are shared across all interventions, and others are specific to one of the inverventions. Through interviews with grant and program managers, let's say we collected information about which items support the home-based program (Table 3).

Table 3. Program delivery teams must provide insight as to which budget items support which project components.

How much to attribute to home care intervention?		
Salaries	Home based care agents	100%
	Teachers: preprimary classrooms	0%
	Trainers	100%
	District officers	33%
	Health agents	0%
Procurement	Fuel costs	50%
	Classroom reading materials	0%
	Learning materials	50%
Contractors	Contract vehicles	50%
	Reading specialist	33%
	Classrooms constructed	0%
Other expenses	Travel: child agents training	100%
	Training location	100%
	Lodging: child agents training	100%

The data in Table 3 shows that it is necessary to determine how much of each line item is devoted to the intervention in question and to determine if there are other inputs to the program not found in available financial documents. To do this, it is necessary to draw from multiple data sources, not just financial data. For example, in the context of the early childhood education program, staff from the federal government may be responsible for quality assurance and monitoring. Thus, a portion of the federal staff's salaries should be included in estimating the cost of the home-based care intervention. Further, the travel budget for these federal early childhood education officers was also paid for by a different source. Determining which program inputs must be pulled from other source data often requires interviews with managers involved in the project.

This is particularly true for capturing the "level of effort," or the fraction of a full-time-equivalent worker devoted to your intervention of interest. Perhaps after interviewing the senior officer managing the program, you find the federal early childhood education workers roughly split their time equally between three programs -home based care, preprimary classes, and health checkups- and that time and effort on trips made to the field are also split across these programs equally (Table 4).

Table 4. A comprehensive list of program inputs often requires data from multiple sources, particularly when a program benefits from multiple funding streams.

Input	Unit label	Number of units	Unit price	Level of effort
Federal officers	Salary months	20	16,432	33%
Travel costs	Miles billed	1000	50	33%

TIPS FOR IMPROVING QUALITY OF LEVEL OF EFFORT DATA FOR PERSONNEL

1. **Asking for estimates of time spent on an activity**, rather than population served or time spent in a certain geographic area, is generally easier for staff to assess.

2. **Monthly or quarterly estimates of how staff spend time** will generate relatively precise data about how shared resources are used across activities. Asking staff to capture data at higher frequency can pose a significant burden with little increase in data quality.

3. **In order to estimate how a resource is shared across activities, staff need training and practice in allocating shared costs**. Clarifying to program staff what program activities are/aren't part of treatment is key for accurate allocations.

Table 5 shows how the data from the hypothetical home based care program might change after making expenditures intervention-specific, using the information in Tables 3 and 4. Some inputs of the larger early childhood education program like health agents, teachers' salaries, and classrooms constructed have been deleted, as they deal with classroom-based interventions, not home-based care. Some new inputs like the salaries of federal early childhood education officiers were not in the original budget and had to be added.

Table 5. Building an intervention-specific budget may require adding, deleting, and revising information.

Input	Nature of unit cost	Level of effort (LOE)	Number of units (Aug 2016-Jul 2017)	Nominal unit price (Aug 2016-Jul 2017)	Nominal estimated cost (Aug 2016-Jul 2017)
Home based care agent salaries	Days billed	100%	61,546	$30	$1,846,380
Fuel costs	Miles billed	50%	2,602,431	$0.17	$221,207
Contract vehicles	Vehicles days	50%	15,432	$60	$462,960
Reading specialist	Days billed	33%	478	$450	$70,983
Travel: child care agents training	Number of agents	100%	220	$15	$3,300
Lodging: child care agents training	Total agent training days	100%	2200	$60	$132,000
Training location	Days billed	100%	10	$1600	$16,000
Trainer salaries	Months employed	100%	12	$1200	$14,400
District program officers	Number of officers	33%	90	11,321	$336,234
Federal officers	Number of officers	33%	20	16,432	108,451
Travel costs	Days / daily rate	33%	1000	50	16,500
Learning materials	Number of packages	50%	15,000	$55.00	$412,500
TOTAL					**$3,640,915**

Notice that the home based care intervention only makes up $3,652,915 of the overall program budget of $18,893,436. Without going through this exercise, we would not have been able to pinpoint the costs of the home based care program if we had just used the original program budget.

3. Captured in real time

In order to get cost data that is sufficiently disaggregated and project-specific, it should be collected in real time – that is, throughout project implementation, not after the intervention is completed. To capture cost data in real time, you will need to finalize your data collection plan before the intervention starts. Some steps for doing this are listed in the graphic below.

What will this get us?

Costing a potential scale-up of the intervention, identifying potential savings, and determining optimal funding for a program will require further cost analysis, which sometimes may not be a straightforward task. None of this would be possible, however, without capturing disaggregated and intervention-specific data that permit an accurate estimation of how much an intervention implemented in a particular way costs. To capture these essential cost data, we may need to modify the way we collect monitoring and financial data throughout the project and start thinking about this before a project starts. The benefits of doing this, however, include accurate costs of program implementation (rather than back-of-the envelope estimates) and information required to estimate the costs of implementing the program at a larger scale or in another context.

STEP 1: TAKE STOCK OF PROJECT BUDGETS AND ACTIVITIES

Get budgets for all financing streams

Define what activities are part of intervention to be costed

Identify who on project team knows about scope and use of each budget line

STEP 2: CALCULATE PRE-INTERVENTION COST ESTIMATE

Determine how often, in what quantities, and at what prices items are purchased

Decide appropriate time frame for costing the intervention

Decide whether to organize costs by geographic/beneficiary groups, or just by activities

Determine whether there are costs borne by families or communities

Do a complete pre-intervention cost estimate to identify what cost data is available or missing before the intervention starts

STEP 3: DEVELOP A DATA COLLECTION PLAN

Set up protocols to capture missing costs identified in Step 2. Pay particular attention to labor of staff and management

Monitoring and evaluation data collection may be necessary to understand cost data structure, such as frequency and dosage of certain activities/inputs

STEP 4: CAPTURE DATA DURING IMPLEMENTATION

Ensure data is collected throughout course of program implementation

STEP 5: FINALIZE COST ESTIMATE

Replicate Step 2 with actual expenditures

Adjust costs with data on allocations of time, monitoring and evaluation data, and family / community costs

Calculate total cost for intervention

Divide cost by outputs as measured in monitoring and evaluation data to get a cost-efficiency metric

If costs are matched to outcomes, use impact data to calculate cost-effectiveness

Publish estimate of cost