
Costs, Outcomes, and Cost-Effectiveness of OVC Interventions

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Boston University

January 2010

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The USAID | Project SEARCH, Orphans and Vulnerable Children Comprehensive Action Research (OVC-CARE) Task Order, is funded by the U.S. Agency for International Development under Contract No. GHH-I-00-07-00023-00, beginning August 1, 2008. OVC-CARE Task Order is implemented by Boston University. The opinions expressed herein are those of the authors and do not necessarily reflect the views of the funding agency.



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Executive Summary

Background

More than 1 out of every 10 children in sub-Saharan Africa and 1 out of 15 in Asia are orphans. A significant proportion of these children in sub-Saharan Africa were orphaned because one or both parents died from AIDS. Large numbers of other children are vulnerable to becoming orphans because one or both parents are HIV-infected.

In response to the needs to children who are orphaned or made more vulnerable because of HIV/AIDS, the U.S. government through the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) spent about \$1 billion during 2006-2008 on activities to improve the wellbeing of orphans and vulnerable children (OVC). Through the Reauthorization Act of 2008 [1], significant sums will continue to be allocated to OVC programs between 2009 and 2013.

Given the past and continuing magnitude of the U.S. public's investment in PEPFAR-funded OVC programs, combined with several years of implementation experience, this report reviews existing literature addressing the costs, the impacts/outcomes, and cost-effectiveness of OVC programs/interventions.

Key Findings, Main Messages, and Policy implications

In sum, decades into the AIDS pandemic and after five years of PEPFAR funding, relatively little information exists to:

1. Document the costs of OVC program implementation;
2. Identify the specific outcomes the programs are designed to improve upon (measures or indicators of child wellbeing); and
3. Measure the impacts of the programs in terms of outcomes achieved by delivering the OVC program services.

While information on the number of OVC reached by programs and by core program areas are included in global PEPFAR reporting requirements, such information is not adequate for evaluating costs of program service delivery to OVC. The current PEPFAR global reporting requirements also do not identify adequate outcome measures (item 2 above) or requirements for measuring impacts (item 3).

Substantially more and better information is needed on program activities, number and characteristics of OVC served, program costs, intended program outcomes, and estimated impacts. The Reauthorization Act of 2008 specifically calls for such analysis as part of *impact evaluation research, operations research, and program monitoring* (see precise definition in [1], Section 3, Paragraphs (7), (8), and (11)). Given that OVC programs are multiple-input, multiple-output activities, evaluation of such programs should focus on reporting costs and

program impacts across multiple dimensions (cost-outcomes analysis). In the absence of one aggregate OVC outcome indicator, cost-effectiveness analysis of OVC programs is not possible.

Recommendations

To continue to develop the evidence base for OVC program implementation concludes with three recommendations for program monitoring and operations research and two recommendations for impact evaluation research.

Program Monitoring and Operations Research

1. OVC programs need to document better the baseline characteristics of the OVC population attempting to be served by the program.
2. As part of program monitoring to determine “how well a program is carried out” (quote directly from [1], Section 3, Paragraph (11)), standard *program evaluation* activities should be incorporated into program monitoring to determine if the program is being implemented as intended and if adjustments in implementation strategies are needed.¹ The Child Status Index, developed by MEASURE Evaluation, provides a useful tool to be integrated into these program evaluation activities. A key component of these program evaluation activities should be publicly available documents reporting on the results of these evaluation activities.
3. OVC programs should report regularly on program implementation costs and services provided to OVC (total, per beneficiary, and per beneficiary per service component, quantity and valuation of donated goods and services to the program such as volunteer time, food, etc.). No new methods are required to develop cost estimate of service delivery for actual OVC programs.

Impact Evaluation Research

4. Impact evaluation research of OVC programs, and any attempt to evaluate outcomes across programs, requires at least a core set of well defined outcome indicators. The lack of well defined, consistently used, outcome indicators for OVC program evaluation remains problematic. Given the central role of PEPFAR in the definition of OVC programs receiving PEPFAR funding and the six core program areas of OVC support, OGAC should propose a minimum set of outcome indicators for PEPFAR-funded OVC programs. Many standard outcome indicators already exist for certain core program areas. While the Child Status Index is clearly useful for program monitoring activities, as noted in (2) above, as of September 2009 it is too early to tell if individual components of the Child Status Index provide adequate outcome indicators for solid impact evaluation research.

¹ With program evaluation, “the emphasis is on practical, ongoing evaluation strategies that involve all program stakeholders, not just evaluation experts. Understanding and applying the elements of this framework can be a driving force for planning effective public health strategies, improving existing programs, and demonstrating the results of resource investments” (quoted from the summary of the [Framework for Program Evaluation in Public Health](#), MMWR, 9/17/1999 / 48(RR11); 1-46).

5. The impacts on child well being of OVC programs, both immediate and sustained impacts over time, remain poorly understood. OVC impact evaluation research needs to expand the evidence base on OVC program impacts using standard statistical methods for impact evaluation within social and poverty alleviation programs. Impact evaluation research requires well defined outcome measures (item 4 above), flexibility in evaluation methods depending on the program, locations, data, sample sizes, and outcomes, and adequate amounts of time for obtaining ethics approvals from multiple institutional review boards and primary data collection.

I. Introduction

Over 12 percent of children in sub-Saharan Africa and 7 percent of children in Asia are orphans—about 130 million children total [2]. In response to the diverse problems and needs of orphans and more generally vulnerable children (OVC) in low-income countries, a range of programs have evolved overtime to attempt to improve their daily lives and future prospects. In South Africa alone, for example, over 1400 registered non-profit organizations were estimated to be providing home-based care to orphans in 2004 (and vulnerable children and sick adults) [3].

The U.S. government through the U.S. President’s Emergency Plan for AIDS Relief (PEPFAR) spent \$312 million on OVC activities in 2008 [4], which was about 10% of total PEPFAR funding. Between 2006 and 2008 over \$1 billion was spent on OVC programs.² As part of The Reauthorization Act of 2008 [1], significant sums will continue to be allocated to OVC programs between 2009 and 2013.

Given the past and continuing magnitude of the U.S. public’s investment in PEPFAR-funded OVC programs, combined with several years of implementation experience, this report reviews existing literature to discuss what is currently known about the costs, the impacts/outcomes, and cost-effectiveness of OVC programs/interventions. We proceed in three steps. Section II reviews briefly what is required for the evaluation of OVC program costs and impacts. A multi-output production function framework is used to distinguish between the services provided to OVC (the inputs) and what is achieved with these services (the outputs or the impacts). This framework also highlights what should and should not be expected from quantitative evaluations of OVC program costs and impacts.

Section III then reviews the existing literature attempting to investigate costs, impacts, and cost-effectiveness of actual OVC programs. In short, substantially more **program monitoring, operations research, and impact evaluation research** as defined in the Reauthorization Act of 2008 [1] remains needed to document the costs of OVC programs and the impacts achieved. While information on the numbers of OVC reached by programs are reported as part of global PEPFAR reporting requirements, such information does not identify the impacts—what was achieved by delivering program services to OVC and their caregivers. Fortunately, a few excellent examples, discussed in Section III, provide clear guidance on what is needed in the future for further expansion of the evidence base on the costs, impacts, and cost-effectiveness of OVC programs. In the absence of such information, the impacts of OVC programs will continue to be poorly defined and unknown.

Section IV concludes with recommendations for future program monitoring and impact evaluation research activities needed to expand the evidence base on the costs and outcomes of individual OVC programs and eventually cost-outcomes results for sub-sets of OVC programs.

² Source: THE U.S. PRESIDENT’S EMERGENCY PLAN FOR AIDS RELIEF (PEPFAR) FISCAL YEAR 2008: PEPFAR OPERATIONAL PLAN June 2008, <http://www.pepfar.gov/documents/organization/107838.pdf>, accessed 11 September 2009.

II. Evaluating Multidimensional OVC programs

The multidimensionality of OVC programs

Orphans and vulnerable children affected by HIV/AIDS are a heterogeneous group, both in terms of their development needs, their pasts, and their living conditions. Stages of development are recognized by the Office of the Global Aids Coordinator (OGAC), which recommends the following categories [5]:

- infants (under 2 years);
- early childhood (2-4 years);
- middle childhood (5-11 years); and
- late childhood (12-17 years).

The needs of infants differ from the needs of those in late childhood. Orphans in primary school who live with extended family members have different needs than orphans who live in group homes. OGAC recognizes such differences, and concludes that:

“The exact mix of care provided and the beneficiaries served will differ by location, according to existing community resources and the types and extent of a child’s vulnerabilities” (p.7 in [5]).

Regarding the mix of care, OGAC also identifies seven areas of core support that can be included in OVC programs receiving PEPFAR funding:

- food/nutrition;
- shelter and care;
- protection;
- health care
- psychosocial support
- education; and
- economic strengthening.

In sum, OVC programs are diverse across at least three dimensions:

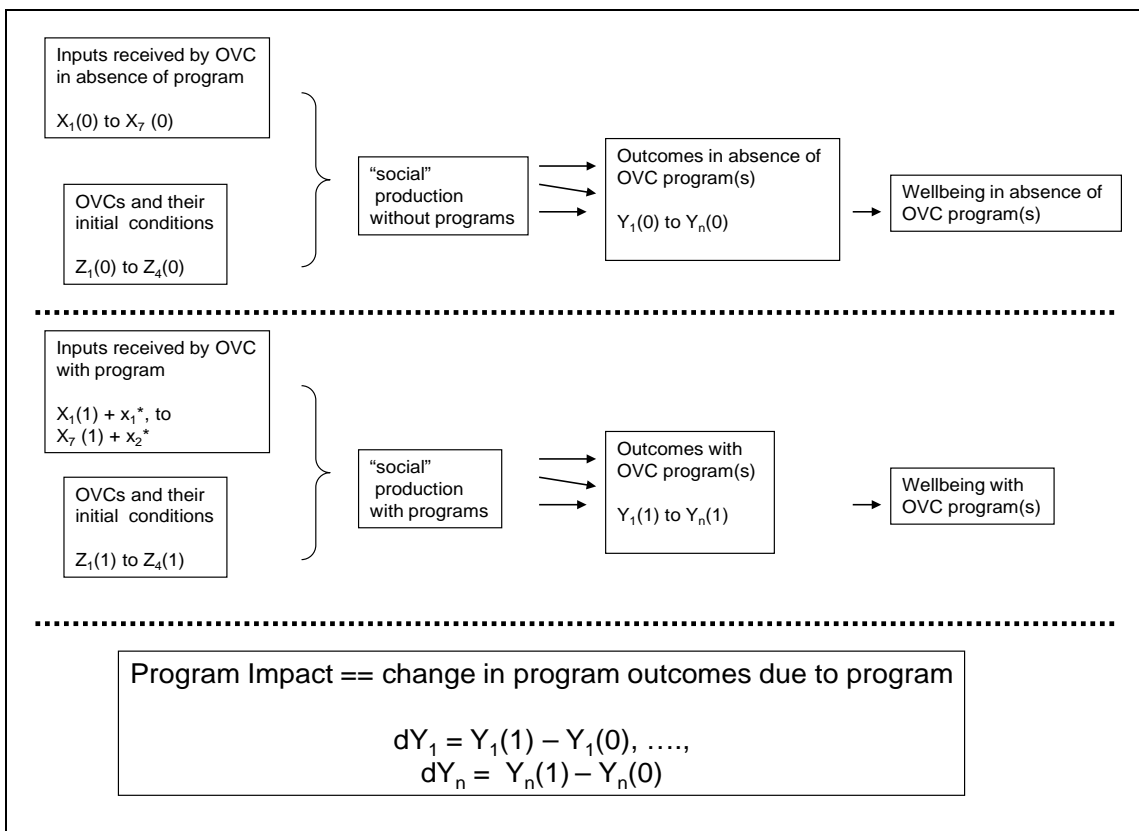
1. the specific sub-groups of OVC included in the programs, both their ages and situations;
2. the type and intensity of support across some or all of the seven areas of support; and
3. the outcomes the programs are trying to achieve that lead to improvements in child well being.

OVC programs within a multiple-input, multiple-output production framework

Given the multidimensionality of OVC programs, the simple multiple-input, multiple-output production function framework outlined in Figure 1 helps to highlight several issues.

In Figure 1, the care and services provided to OVC are ‘inputs’, denoted as $X_1(0)$ to $X_7(0)$ in the top panel. For discussion, these inputs are aggregated into the services included in seven program areas outlined by OGAC. The “0” notation is used with the X ’s to show that these are inputs that would be provided to a child in the absence of an OVC program (this will change to 1 in the presence of a program). These inputs are combined with the OVC themselves, denoted as four basic groups Z_1 to Z_4 based on the four age categories outlined by OGAC (and their care givers, and others) to attempt to generate improvements along different domains of welfare, denoted as $Y_1(0)$ to $Y_n(0)$ in the top panel of Figure 1.³

Figure 1. OVC programs combine multiple services to produce multiple outcomes



The production technology (the ‘black box’ labeled social production in the top panel of Figure 1) shows the transformation between inputs and outputs. This framework emphasizes that there is not a one-for-one correspondence between an input category and an output category (i.e., $X_1(0)$ does not only affect the level of

³ Multiple output production technologies are typically formulated as $G(X_1, \dots, X_7, Y_1, \dots, Y_n) = 0$.

$Y_1(0)$). The level of $X_1(0)$ can jointly influence multiple outcomes, and the impact of $X_1(0)$ on the several outcomes also depends on the other input levels (X_2 through X_7) as well as the types of OVC (Z_1 to Z_4) served by the program.⁴

While the top panel in Figure 1 describes the situation that would occur for some OVC population in the absence of the program, the middle panel in Figure 1 describes the situation if a program provided services to these OVC. With the program, they would now receive possibly different levels of inputs, denoted as $X_1(1) + x_1^*$ to $X_7(1) + x_7^*$, where x_1^* and x_7^* denote the services provided by the program and $X_1(1)$ and $X_7(1)$ are the levels provided by other sources with the program. This notation acknowledges the possible slippage or substitution that occurs if other sources (e.g. family members) adjust their services provided to an OVC because of services provided by the program.

Program impacts, outcomes, and/or effectiveness

The bottom panel of Figure 1 highlights the definition of impact, outcome, or effectiveness of a program. In the absence of the program, the outcomes $Y_1(0)$ to $Y_n(0)$ would be obtained. With the program, outcomes $Y_1(1)$ to $Y_n(1)$ are obtained. The impact of the program, therefore, is the change in the outcomes due to the program: $dY_1 = Y_1(1) - Y_1(0)$, ..., $dY_n = Y_n(1) - Y_n(0)$.

OVC programs may generate impacts because they alter quality and quantity of inputs received by the recipients and because they alter the social production technology.⁵

OVC programs are similar to other types of social programs supported by governments and donor organizations. The issues and potential problems associated with identifying the impacts of OVC programs are no different than identifying impacts of other social and development programs (e.g. conditional cash transfer programs, unconditional cash transfers, micro-credit, family planning, infrastructure improvements, water and sanitation projects, and so on). Identifying impacts requires appropriate study designs, definitions of outcomes, data, and statistical methods. We return to such matters as part of the literature review in Section III.

Program costs

OVC program costs are essentially all financial payments made to supply the inputs x_1^* to x_7^* . This simple notion of cost can change based on the perspective from which the project is viewed, so more perspective on 'costs' will be provided later in this section. In general, certain costs can be directly attributed to specific inputs (denoted as $c_1x_1^*$ to $c_7x_7^*$), and certain costs cannot be directly attributed to specific inputs (denoted simply as C). Such joint costs might include project offices, vehicles, support staff, and overhead. These costs could also include staff completing home based visits where multiple activities across input categories are completed. For

⁴ By type of OVC, we simply mean their existing condition or situation. For example, orphaned HIV-infected children of primary school age already living in a group home are different than young children who lost parents to AIDS but are being fostered by another family member.

⁵ For example, consider a program that allows an OVC to remain within a community with a relative's family instead of being moved to an informal residential care facility in another community.

example, a home-based visit could include HIV awareness activities, the transfer of funds for school fees or delivery of school supplies, and delivery of seeds for home gardens. Thus, the same visit provides services jointly across these input categories. Various rules of thumb exist to apportion costs C to various input categories (i.e. proportion p_1 to category 1 and so on), so that $p_1C + c_1x_1^*$ could be estimated as the programs costs for providing services of type 1 to the program's OVC target population (e.g. food/nutrition support).⁶ Most importantly, the methods required for costing OVC programs are no different than standard costing methods already used for costing of other programs and projects.

Cost-effectiveness analysis of OVC programs

To begin any cost-effectiveness, an 'accounting stance' is needed that defines the perspective from which a program is being evaluated. In relation to OVC programs, the accounting stance could be a local NGO delivering OVC services, an international NGO providing resources used by the local NGO, varying levels of government within a country, a bi-lateral funding agency, and so on. This accounting stance provides guidance on how to evaluate costs (defined as opportunity costs of inputs used to implement program), and when actual expenditures on program inputs are correct measures of costs and when they are not. In short, whenever a market is distorted for any reason (a VAT is a type of market distortion) or some inputs are donated to the program, prices actually paid by programs do not adequately reflect opportunity costs from a more social perspective.⁷

Given an accounting stance, the total cost of an OVC program is simply the sum of all allocable and non-allocated costs, $C^T = C + c_1x_1 + \dots + c_7x_7$, where C, c_1, \dots, c_7 , follow from the accounting stance.⁸

Cost-effectiveness analysis is a sub-category of benefit-cost analysis that is useful for evaluating programs designed to produce one outcome. When evaluating one program with total costs C^T and one outcome, dY , simply knowing the costs and outcome of the program is called cost-outcome analysis. Average costs, C/dY , are also typically computed in cost-outcome analysis, which shows simply on average how much one unit of the outcome costs the program to produce.

⁶ The World Bank's OVC toolkit website at <http://info.worldbank.org/etools/docs/library/164047/howdo/costing.htm> for more background information program costing.

⁷ In short, a distortion exists whenever an actual market outcome differs from a competitive equilibrium. While a full discussion of how to estimate opportunity costs is far beyond the scope of this paper, a simple example highlights a few issues. Suppose an NGO buys a blanket at a store for \$5. The \$5 price includes the 20% VAT (\$4 to the shop for the blanket and \$1 to the government for the tax payment). From the NGO's perspective, their cost is \$5 and any costing analysis from their perspective would include \$5 as the cost of the blanket. If a more social perspective was considered, because the \$1 is transferred within the economy but not lost, \$4 would be the correct opportunity cost for the blanket. If a local family instead bought a blanket for \$5 but donated it to the NGO, the NGO's costs would be \$0, an evaluation based at the local level would include \$5 as the cost, and a social evaluation would consider \$4 as the cost. If two NGO's worked in the same location but one was able to obtain a VAT exemption and the other was not, they would pay different prices for the same goods even if the opportunity costs from the government's perspective remained the same. If the local market for blankets was controlled by a monopolist, the pre-VAT market price of \$4 would also include excess profits to the monopolist (again a transfer in the economy), so the opportunity cost would be below \$4.

⁸ Depending on the situation, these costs could be expressed as the present discounted value of costs over a specific planning period or the annualized equivalent of such costs.

In some circumstances, if C/dY looks “reasonable”, or not too high, the program is called ‘cost effective’. What is really being concluded is that the benefits of providing dY are high enough to justify paying the costs C (implicitly just a benefit-cost analysis).

When comparing multiple programs with the same outcome (say dY), cost-outcome analysis for each individual program provides the basic information for cost-effectiveness analysis. For example, consider two projects, A and B that achieve the same outcome, dY . If C^a and C^b denote their costs, cost-effectiveness analysis would conclude that project A is preferred to project B if $C^a < C^b$, which is identical to saying that $C^a/dY < C^b/dY$ since both projects achieve the same dY .

Applied cost-effectiveness analysis has evolved over time to consider two or more projects that provide different levels of the same outcome. For example, with two projects, when costs and the outcome attained are less for one project (say project A), average costs C^a/dY^a and C^b/dY^b are compared.⁹ Incremental costs ($[C^b - C^a]/[dY^b - dY^a]$) are also sometimes calculated to show how much extra it costs to obtain the extra impacts provided by project B.

The above three paragraphs emphasize that cost-effectiveness analysis can be used to evaluate programs that generate one outcome. OVC programs, on the other hand, are multidimensional; that is, they are designed to generate multiple outcomes (see Figure 1). When programs generate multiple outcomes (or attempt to), cost-outcomes analysis is always possible for each program.

In a multiple outcome world, cost-outcomes analysis simply requires documenting/estimating program costs, C^T based on an accounting stance, and documenting program impacts, dY_1 to dY_n . Additional breakdowns of total costs into input categories such as c_1x_1 , costs C not directly associated with specific input categories (program areas), and estimates of their apportionment across categories (e.g. p_1C) provides additional context for understanding costs.

In certain limited circumstances, multiple outcomes are sometimes combined into one aggregate outcome (the notion of disability-adjusted life years is one example), in which case cost-effectiveness analysis for the program could be completed. It should be recognized that these aggregation procedures are just a way to avoid the monetary valuation for outcomes. Whether the aggregation procedures are somehow better or more arbitrary cannot be objectively determined. To date, a simple aggregate measure of child wellbeing that is accepted as the way to aggregate the multiple outcomes produced by OVC programs does not exist. Such a measure is unlikely to exist in the near future.

For example, The Child Status Index (CSI) developed by MEASURE Evaluation identifies 10 outcomes along six PEPFAR OVC core program areas (e.g., see the Measure Evaluation factsheet, “Providing tools to reliably measure the well being of vulnerable children”, available at: www.cpc.unc.edu/measure/publications/pdf/fs-07-17.pdf). The tool was designed to be used by ‘people living in the same community as the affected children.’ While the purpose of the CSI toolkit differs from typical tools used for the evaluation of interventions, the fact

⁹ Projects with higher costs or lower outcomes than another project are clearly not preferred (i.e. dominated by another project).

remains that the CSI includes 10 outcomes that cannot be obviously aggregated into one number for cost-effectiveness analysis. For example, is a change from 1 to 2 in the food security outcome equivalent to a change from 3 to 4 in social behavior?

In the absence of one aggregate outcome, OVC programs should report information on multiple outcomes dY_1, \dots, dY_n , total costs C^T , specific program input categories, $c_1x_1^*$ to $c_7x_7^*$, costs not allocated C , and possibly apportioned costs to program areas (p_1 to p_7).

If costs are apportioned to one input category for a project (e.g. $p_1C + c_1x_1^*$ for area one—food and nutrition—defined by PEPFAR), and if just one outcome, dY_1 , could be defined as “the” food and nutrition outcome, it is tempting to compute $(p_1C + c_1x_1^*)/dY_1$ as the ‘cost-effectiveness’ ratio or measure for this project. While this could be possible for perspective *on this program*, the information could not really be used outside of this project because some of the outcome dY_1 was jointly provided by other program areas and conditioned by the types of OVC included in this program.

As is typically the case, inputs provided in one program area may create impacts of relevance to the program. Such cross input/output impacts are routinely investigated in health and poverty alleviation programs. For example, Miguel and Kremer investigate the impacts of de-worming programs (a health intervention) on educational outcomes [6], and Weiser et al. investigate food insecurity and sexual risk behaviors [7]. A large literature assesses the ability of conditional cash transfers to achieve child and health educational goals (see, e.g., the World Bank “Conditional Cash Transfer” page at <http://go.worldbank.org/BWUC1CMXM0> for more information). Additional work on cash transfers with less conditionality also show positive impacts across several domains of child well being (more information on the experience with such programs in Malawi are available at <http://www.childresearchpolicy.org>).

III. A review of literature on OVC program costs, outcomes, and cost-effectiveness

Given the discussion provided in Section II, we now turn to a review of literature on costs, outcomes, and cost-effectiveness of OVC programs. The following online databases were searched to identify relevant studies: Ovid/Medline, PubMed, Web of Science, Popline/One Source, and Google Scholar. Organizational websites were also searched. References of all relevant sources were also manually searched. Our search paired the terms *cost*, *cost-effectiveness*, *cost-outcome*, *economic*, *OVC*, *orphan*, *child*, *vulnerable children*, *HIV*, *outcome*, *evaluation*, *intervention*, *program*, and *model*.

Costing without effectiveness

Costing of OVC programs requires the application of standard costing methods in program evaluation; nothing new is needed. Nonetheless, information and tools have been developed to provide guidance to OVC program managers on how to estimate costs of their programs based on standard methods (see, e.g. [8]).¹⁰

Desmond, Gow, and co-authors provides a good example of estimating costs of services provided by six specific organizations providing services to OVC in South Africa [9, 10]. The appendix in the unpublished version of their report [9] provides a good example of how to document costs. They reviewed program budgets to identify actual program expenses, including placement and supervision costs, as well as services provided at no cost (volunteer time). For volunteer time, they used wages actually paid by the program for others doing similar activities. They obtained information from each organization on the number of OVC served (although this information was not reported for all programs), and then computed the program cost per child per month. Monthly costs per child (as of 1999) ranged from \$86 for home-based care and support to \$501 for formal residential care (not including HIV-related treatment costs). Two programs included in their analysis did not meet 'minimum material standards', so program costs for such programs were not reported. The fact that this analysis was done prior to PEPFAR shows that the basic methods for costing of OVC program services are already available.

While costs varied, the programs and children served also varied. For example, the institutional care program essentially covered the full cost of caring for the child, and the program evaluated focused on seriously-ill, orphaned, children. Not surprisingly, this program involved the highest monthly cost per child. The home-based care program, however, was essentially a program designed to find foster-case placement (not the full cost of caring for the child) for children whose parents are already terminally ill.

Desmond et al. [10] do not identify specific outcome measures or obtain data on such outcomes, so any discussion of cost-effectiveness is not feasible. They do follow a useful approach to assess if an OVC program typically provides a "minimum of care" based on five essential categories: survival, security, socialization, self-actualization, and palliative care. While this minimum standard of care provides a useful reference point for discussing program quality, it does not address whether OVC welfare is improved by a program (even one that does not meet a minimum standard). For example, the program called "community-based support structures"

¹⁰ See the OVC toolkit at <http://info.worldbank.org/etools/docs/library/164047/howdo/costing.htm> for useful guidance on costing methods for OVC programs.

focused on attempting to increase income generation for poor, female pensioners who were also caring for one or more OVC (typically their grandchildren). Perhaps not surprisingly, OVC being cared for by the program participants did not receive the minimum material standard of care as defined by the authors (children were poorly clothed, many were not in school, food was in short supply). Nonetheless, the OVC were arguably better off with their grandmother caregivers than the relevant alternative (no caregiver and on the street). The real issue is that the income generation project did not generate enough income increase to lift the children out of poverty.

Naidu et al. [3] focus on costs and simple performance indicators of service delivery as part of nine home and community based care (HCBC) programs in South Africa. For costs, only the financial costs directly attributed to each home visit were included in the analysis (supplies plus the wages and transportation costs of community care givers). Each of these programs was fairly small, with 28-192 children per program visited at home (22-106 homes). The intensity of the programs varied widely, from only 7 visits annual per OVC on average for one program to 110 annual visits for another. They organize their information as cost per contact hour and cost per OVC visit. The direct costs per contact hour per OVC ranged from under \$1 to about \$6 (about \$1 per ZAR during the 2004-2005 data collection period), while the annual cost per OVC included in the program ranged from about \$9 to about \$110. Rural programs tended to cost more per contact hour than urban programs because of travel time and costs to visit rural households. Annual costs per OVC varied in large part due to the intensity of the program, so that some rural programs incurred lower costs per OVC simply because they did not visit as often.

Naidu et al. [3] also discuss performance measures to assess the quality of service delivery based on five “proxies for quality”: annual number of HCBC visits received by an OVC; annual number of visits made by each community caregiver working in the HCBC program; the average number of OVC per community caregiver in the program; the average length of a community caregiver visit with an OVC; and the proportion of community caregivers with formal OVC training. Quality ratings for each program based on these 5 performance- or quality-of-service delivery indicators were used to rate program quality of service as low, acceptable, and high.¹¹ This simple approach to rate quality of service delivery for HCBC visits provides useful information to document inputs and costs of the programs, but again the outcomes achieved from these services, even if considered high quality, remain unknown.

Prywes et al. [11] also provides information on the costs of six OVC projects in Eritrea and Benin addressing varying types of children and issues, including orphanages, groups homes, reintegration of child with families separated by conflict, adoption, and labor exploitation. They focus on annual ‘economic’ cost per child of service delivery and apply standard methods to calculate costs, where the difference between financial and economic was mainly related to the value of donated and subsidized goods and services received by the project. A review of program financial records combined with interviews of program personnel were used to develop cost information. Costs per child per year of service obviously vary because of the number of children included in the program (scale issues), the types of children included in the projects, and the services provided. A reintegration project could work with a child for only one day or up to 8 months. An orphanage might accept a child at 5 years of age and then be the home for this child until her or she is 16 years old. Clearly the potential

¹¹ Naidu et al. (2008) also reference 5 other unpublished reports related to the costs of OVC care not included in this review. These reports also consider costing without effectiveness measures.

magnitude of the outcomes varies widely. Data on quality of service delivery or outcomes achieved were not collected by the programs, Prywes et al. provides a good example of a costing analysis.

As a side topic, Stover et al. [12] estimate that about US\$1.7 billion would be required annually by 2010 to provide a package of essential support services to all orphans and vulnerable children “in need of public support” in sub-Saharan Africa. To create such estimates, they interviewed staff of numerous programs in the region to obtain information on the costs of specific services provided in their programs. They then used median values for unit costs (cost per year of a list of specific inputs) and then multiplied this information by different numbers of OVC to discuss aggregate budget implications depending on the numbers of OVC reached and the package of services provided. The estimated median cost per child per year for the package of services as of 2004 was \$480 for 0-4 year olds, \$690 for 5-9 year olds, and \$830 for 10-17 year olds. While useful for aggregate budget discussions and a consideration of likely services that might be included within OVC program areas, such information is not relevant for the evaluation of actual OVC programs. On the other hand, more information on the actual program costs and impacts can provide needed information for additional budgeting exercises in the future. Other examples of aggregate budget projections are discussed in Shepard et al. [13].

Moving in the right direction with cost-outcomes analysis

A recent report by Hutchinson and Thurman (2009) provides four excellent examples from programs in Kenya and Tanzania of how to proceed for cost-outcome analysis of OVC programs—document the program; calculate/estimate costs; identify and measure outcome variables; and estimate program impact [14].¹²

Again, as mentioned earlier in this paper and emphasized in Hutchinson and Thurman (2009), costing methods for OVC programs are no different than costing for other types of programs with multiple activities. The basic framework is to calculate the opportunity costs of the inputs used to implement the program and provide program services.¹³

Because of the diversity of program activities, one general indicator of child well being does not exist at this time, and is unlikely to exist at anytime in the near future. As a result, Hutchinson and Thurman (2009) include a range of outcomes for their evaluation of the four programs. Four general categories were defined based on program activities: physical health outcomes, psychological health and social outcomes; educational outcomes, HIV knowledge level outcomes, and food security outcomes. Nineteen specific outcomes within these four categories were further defined, and a range of existing survey instruments (e.g. the Self-Esteem Questionnaire; WHO Quality of Life, McMaster’s Family Assessment Device) were used to obtain information on most of these outcomes. Other outcomes related to educational levels (is the child in school, is the child less than two years above the appropriate age for grade) were chosen as logical and relatively easy to measure. Some measures were created as part of the study (community stigma).

¹² Other MEASURE Evaluation documents related to these interventions are available at <http://www.cpc.unc.edu/measure/publications>.

¹³ Whether or not to include opportunity costs of donated inputs (e.g. donated food, volunteer time) should depend on the purpose of the evaluation, as discussed in Section II. If an organization wanted to evaluate its own costs of providing a program, volunteer time would not be included into costs. If an organization wanted to evaluate what it might need to replicate the same program in a different region, and it was not sure it could access needed volunteers, it would include additional labor costs into the analysis.

Once outcome variables are chosen, identifying (and estimating) OVC program impact as defined in Figure 1 remains the most challenging step in cost-outcomes analysis of OVC programs. This is not unexpected. A large literature exists on methods for measuring impacts with non random assignment to the intervention or non-intervention group. In general, methods appropriate for quasi-experimental study designs are required, as noted in Hutchinson and Thurman (2009). Ravallion (2001) provides a good overview of such these topics [15]. Numerous methods exist for estimating impacts in such settings, including propensity score matching, nearest neighbor matching, several types of difference-in-difference approaches, instrumental variable methods, and so on, depending on the situation and types of data available for analysis. The diversity of methods available, depending on outcome measures (binary, categorical, ordered categories, continuous, truncated, and so on) and data available (cross sectional, repeated cross sections, longitudinal, etc.), sets a fairly high bar for statistical analyses of acceptable standards across multiple the disciplines involved in OVC activities. Nonetheless, such methods and associated data needs are regularly included in program implementation and evaluation activities related to poverty alleviation, social programs, and health programs. Given the magnitude of the investment in OVC programs, room clearly exists for expanded evaluations of OVC program impacts.

Because each of the programs included in Hutchinson and Thurman (2009) did not obtain baseline information on their chosen outcomes, their analysis relied on a post-intervention design with information for two groups (the children included in the OVC program; and other children who provided a comparison group). For three programs, the comparison group was based on OVC households not yet included in the programs (but expecting to be part of the program in the future). For the other program, self-reported exposure to program services separated households into intervention and comparison groups. Given that the communities involved were of limited geographic size, a one-time cross sectional interview to collect needed information involved significant but a manageable level of effort and resources. While the number of households included in the studies is not reported, the number of children 8-14 years old included in the survey ranged from 564 to 3423 (and guardians ranged from 488 to 2487).

Table 3 in Hutchinson and Thurman (2009, p. 19) highlights two obvious issues:

- evaluation results might show no impact of program areas; and
- outcomes chosen may be difficult to interpret by organizations implementing and funding OVC programs.

Regarding the lack of program impact, the educational support activities included in two projects were estimated to have no impact on child educational outcomes (based on appropriate age-for-grade, enrollment, or absenteeism). While it is entirely possible that the wrong outcomes were chosen and/or the methods or data were not adequate to identify impact, the fundamental issue is that the correct answer is not known.¹⁴ Until efforts are expanded to document impact, positive program impacts cannot be assumed.

¹⁴ For example, the instrumental variable method employed by Hutchinson and Thurman (2009) to identify program impact relies on strong assumptions and at least one 'instrumental variable' that logically predicts program participation but does not directly after the program outcome conditional on participation. Hutchinson and Thurman (2009) to not report which variable(s) is (are) used for their analysis or the quality of the first stage participation regression.

When positive impacts of programs were identified, the question of interpretation remains. For example, the Allamano program in Tanzania included in the Hutchinson and Thurman (2009) analysis was estimated to have a 0.305 increase in “self esteem” as defined by the Family sub-scale of the Self-Esteem Questionnaire. What a 0.305 change means in practical terms is unclear. Another outcome reported for the same program is a 0.132 improvement in “social isolation” as defined by KIDSCREEN Social Acceptance Scale. Again, what a 0.132 improvement in social isolation means is unclear.

While the analysis in Hutchinson and Thurman (2009) provide good guidance on how to proceed with cost-outcomes analysis of OVC programs, their results show why attempting to interpret results in a cost-effectiveness framework does not provide additional useful information and may provide information that is easy to misinterpret.

For example, consider The Salvation Army project in Tanzania. The home visit activities were estimated to have a cost of \$398 for a one unit change in ‘self-esteem’ for children and \$78 per unit change in ‘community stigma’ perceptions related to guardians. Whether it is better to spend \$398 for self esteem or \$78 for community stigma is unclear. A funding or program implementation organization that did not understand the analysis could erroneously conclude that home visits targeting guardians is better (more cost-effective) than home visits targeting children.

Schenk (2008 and 2009) recently completed a review of evaluation information on “community interventions” for OVC, where community interventions are those attempting to address the needs of OVC that remain in their own community [16, 17]. Such interventions typically include household visits by program staff, who are typically local volunteers. Evaluation information related to 21 programs was reviewed. Consistent with the above discussion, Schenk (2008) concludes that “this review draws attention to the lack of standardization in outcome measures”[16]. Schenk (2009) concludes that: “considering the widespread experience in implementing OVC programs represented by spending to date, the evidence base guiding resource allocation is disappointingly limited” (p. 935 in [17])

IV. Conclusions and recommendations

Millions of children with diverse situations and needs have been orphaned or made more vulnerable because of HIV/AIDS. In response, OVC-targeted interventions in seven core program areas have been and continue to be implemented by numerous organizations with funding from PEPFAR. Substantially more and better information remains needed on program activities, OVC served, program costs, and intended program outcomes and impacts. Given that OVC programs are multiple-input, multiple-output activities, evaluation of such programs should focus on reporting costs and program impacts across multiple dimensions (cost-outcomes analysis). In the absence of one aggregate OVC outcome indicator, cost-effectiveness analysis of OVC programs is not possible.

To continue to develop the evidence base for OVC program implementation and evaluation, this brief review of the literature highlights five areas needed further development.

1. As part of regular OVC program implementation and reporting activities, OVC programs need to document better the baseline characteristics of the OVC population attempting to be served by the program.

This information remains necessary for understanding the situation of program participants prior to intervention and helps to identify comparison groups for impact evaluation activities.

2. Also as part of regular program implementation, program evaluation activities should be included to monitor quality control, if the program is being implemented as intended, and if adjustments are needed based on new information.

A key component of these process evaluation activities should be reporting on the results of these evaluation activities. The Child Status Index record form provides information that could usefully and easily be collected as part of such process evaluations.

The importance of program evaluation activities for program implementation and eventual impact evaluation should not be undervalued. If the evaluation of a program designed to improve a certain outcome indicator shows no impact, the question remains as to why no impact was obtained. It is possible that the program was implemented poorly, in which case implementation, not the basic logic of the program, may have led to the finding of no impact.

3. As part of regular program implantation activities, OVC programs should report regularly program implementation costs (total, per beneficiary, and per beneficiary per service component, quantity and if possible valuation of donated goods and services to the program (such as volunteer time, food, etc.).

Building basic information systems into OVC programs provides the foundation for efficient analysis related to the costs of program implementation. Nothing conceptually new is needed to create and maintain such information. Accounting for volunteer time and other donations is clearly needed to develop a full picture of program costs.

4. Impact evaluation of OVC programs, and any attempt to evaluate outcomes across programs, requires at least a core set of well-defined outcome indicators. PEPFAR should propose a minimum set of outcome indicators for PEPFAR-funded OVC programs.

The lack of well-defined, consistently used, outcome indicators for OVC program evaluation remains problematic. Developing a short list of relevant outcomes for each OVC age category, and logically associated with each core program area, does not seem particularly difficult. The PEPFAR document titled “Next Generation Indicators Reference Guide” (Version 1.1) continues to identify input indicators for OVC programs. The only “outcome” identified is “quality of life”, which is to be investigated through national surveys. The usefulness of this outcome is not clear at best.

If one began with the Millennium Development Goals, several specific indicators used to monitor progress towards the MDG targets could easily be considered as core outcome variables OVC programs serving children 0-4 years of age. For example, logical indicators are:

- is the child living? (Goal 4 for mortality risks)
- is a child underweight? (from Goal 1 for malnutrition)
- is a child immunized against measles? (Goal 4)
- does the child sleep under an insecticide treated bed net?
- if the child had a fever, did the child receive appropriate treatment for malaria?

In a similar fashion, other indicators for targets related to education and health targets are relevant to older children. While the MDGs do not provide obvious indicators for all the key dimensions of OVC well being, it seems logical to consider, at least as a starting point, the relevant targets that are included in the MDGs or other major development-related programs.

5. The impacts on child well being of OVC programs, both immediate and sustained impacts over time, remain poorly understood. OVC evaluation activities need to expand the evidence base on OVC program impacts through targeted evaluations of program impacts using standard methods for impact evaluation within social and poverty alleviation programs.

A natural tension occurs in all projects between implementation and impact evaluation. Nonetheless, modern methods of impact evaluation to document program impacts are widely used to evaluate program impacts across a range of social programs throughout the world. A range of evaluation designs are possible, with differing needs for data and statistical methods.

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