



Cost and Effectiveness

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Breastfeeding, while a natural maternal behavior, is most beneficial when practiced optimally to save infant lives, protect against childhood illness, foster child growth and development, and contribute to child spacing. LINKAGES has shown in four countries how breastfeeding promotion can effectively increase optimal breastfeeding behaviors. But at what cost?

This issue of *Experience LINKAGES* describes the process LINKAGES undertook with Abt Associates, Inc., in its Madagascar program to link the costs of its interventions with the resultant changes in infant feeding behaviors. The study set out to answer the following questions:

- ◆ How do costs and outcomes compare across districts?
- ◆ What are the determinants of costs and cost-effectiveness across districts?
- ◆ How can LINKAGES improve cost-effectiveness?
- ◆ What would it cost to replicate LINKAGES activities, and would it be cost effective?

The methodology used to answer these questions in Madagascar was also applied to LINKAGES' programs in Ghana, Jordan, and Zambia; similarities and differences among these applications are discussed as well.

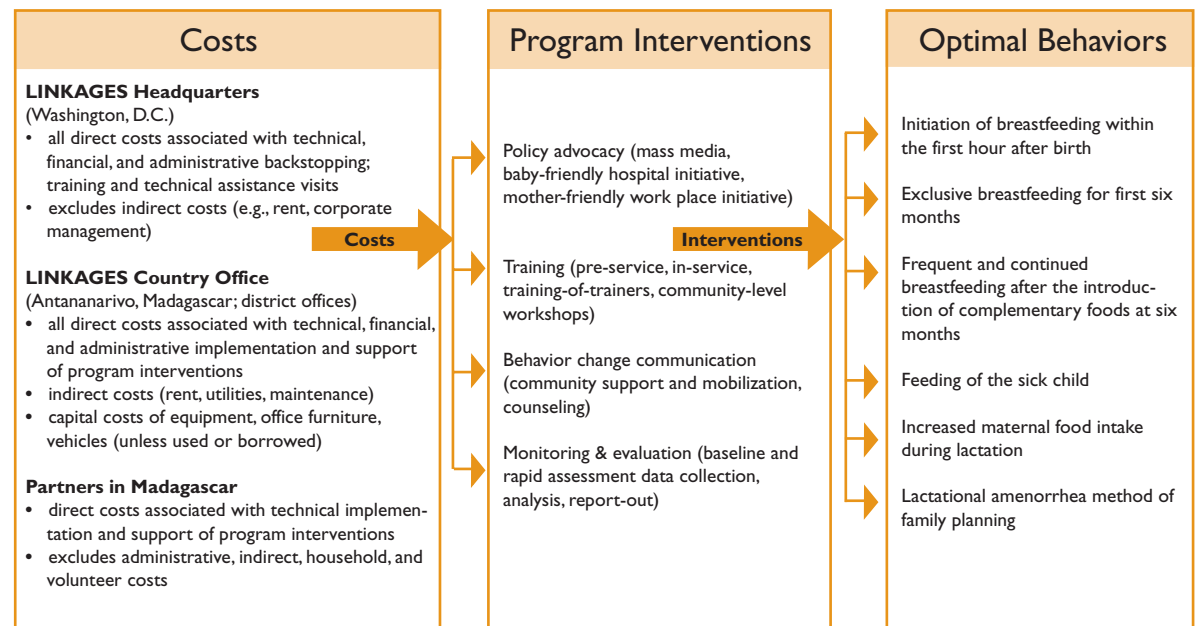
Experience LINKAGES is a series of publications on the strategies, tools, and materials used by the LINKAGES Project to achieve results.

Methodology

Our methodology compares certain costs associated with breastfeeding promotion interventions of LINKAGES and its partners with specific behavior changes in different locations, as shown in Figure 1. *The results are measured against the alternative of no breastfeeding promotion interventions by LINKAGES.* The methodology:

- ◆ Links costs to results, i.e., all costs are attributed to activities, which are then allocated to a behavior change indicator
- ◆ Includes both LINKAGES and partner costs
- ◆ Bases analysis on actual retrospective data
- ◆ Uses all actual financial costs: programmatic, administrative support, and external technical assistance
- ◆ Limits costs and outcomes to a defined study period
- ◆ Reports cost by new behavior acceptor, targeted audience (infant or young child), and beneficiary

Figure 1. Costs associated with interventions linked to behaviors



In Madagascar data were collected retrospectively covering interventions in two program areas, from January 2000 (when a baseline survey was conducted) through October 2001 (following a second rapid assessment of program impact). The process for allocating costs by intervention, location, and behavior is outlined in Box 1.

Cost Ratios

Findings from analyses of the data were reported for the following rates:

- ◆ **Cost per beneficiary** (where “beneficiary” is *any* person living in the program area)
- ◆ **Cost per targeted audience** (where “targeted audience” is all mothers of infants or young children of a certain age living in the program area)
- ◆ **Cost per new acceptor** of an optimal behavior

This methodology was also used to estimate the total financial costs of LINKAGES and its partners to promote exclusive breastfeeding at the community level. Findings include:

- ◆ LINKAGES and its partners spent about 42 percent of its total project funds on the promotion of exclusive breastfeeding.
- ◆ LINKAGES spent 12 times the funds expended by its partners.
- ◆ LINKAGES and its partners spent 59 percent of their funds on training, 18 percent on behavior change communication (BCC), 16 percent on policy advocacy, and 4 percent on monitoring and evaluation.

Costs and behavior changes in communities in one region (Antananarivo) were compared with those in communities of another region (Fianarantsoa). The costs associated in promoting each behavior were calculated and used to determine the cost per beneficiary and cost per targeted child. In Antananarivo the cost to promote exclusive breastfeeding by LINKAGES and its partners was \$0.24 per beneficiary and \$4.07 per mother of an infant younger than 6 months. Promotion was more expensive in Fianarantsoa: \$0.40 per beneficiary and \$6.68 per mother of an infant younger than 6 months (Table 1). Analyses showed a direct relationship between the cost incurred per beneficiary and the behavior change outcomes (i.e., higher costs per beneficiary are associated with greater changes in the target behavior).

Box 1. Steps to allocate costs

1. Calculate LINKAGES’ full cost (direct and indirect) for each and all interventions
2. Identify specific interventions which contribute to each outcome or behavior change to be studied
3. Compile LINKAGES’ full cost for specific interventions by each geographic area (in Madagascar, districts were chosen)
4. Compile the direct costs only of partners involved in specific interventions by geographic area
5. Associate all compiled costs to each of the studied outcomes or behavior changes based on the content and purpose of each of the specific interventions, by geographic area

Measures of Cost-Effectiveness

Understanding costs helps program managers assess the affordability of an intervention, but another measure is needed to determine how costs are associated with changes in behaviors. Typically, health outcomes such as reduced illness and death are used when measuring cost-effectiveness. Since LINKAGES collects data on individual behavior change but does not collect data on health outcomes, cost per new acceptor was used as a measure of cost-effectiveness. LINKAGES also uses disability-adjusted life years as a measure of cost-effectiveness. These measures were used to estimate the cost and effectiveness of a new program and replication of an existing program.

Table 1. Cost to promote exclusive breastfeeding (EBF) in two program areas in Madagascar

	Antananarivo	Fianarantsoa	Total
Cost of activities to promote EBF	\$214,971	\$177,541	\$392,512
Total population in program area	886,291	448,906	1,335,197
Cost per beneficiary	\$0.24	\$0.40	\$0.29
Target audience (mothers of infants < 6 months)	52,859	26,594	79,453
Cost per target audience	\$4.07	\$6.68	\$4.94
“Initial” EBF rate in January 2000	44%	50%	46%
“End” EBF rate in October 2001	82%	86%	83%
Difference in rates	+ 38%	+ 36%	+ 37%
Cost per new acceptor of EBF	\$10.70	\$18.54	\$13.35

Box 2. Cost per new exclusive breastfeeding acceptor in Madagascar

When applied to the formula shown below, information from Table 1 (previous page) yields the cost per new acceptor of exclusive breastfeeding (EBF) in Madagascar.

$$\frac{\text{[cost of activities to promote exclusive breastfeeding]}}{\text{[target audience] x [end rate - initial rate of optimal behavior]}} = \frac{\text{[\$392.512]}}{\text{[79,453 x (83\% - 46\%)]}} = \text{\$13.35} \left[\frac{\text{cost}}{\text{new acceptor of EBF}} \right]$$

Cost per acceptor

As shown in Box 2, the denominator represents the number of new exclusive breastfeeding acceptors or mothers whose behavior has changed as a result of the breastfeeding promotion interventions. The cost of activities to promote exclusive breastfeeding is divided by the estimated number of new acceptors, which gives the cost per new acceptor to achieve behavior change. This represents the incremental average cost (compared with the alternative of no intervention) to achieve behavior change during the same period. The cost per new acceptor of exclusive breastfeeding was \$18.54 in Fianarantsoa and \$10.17 in Antananarivo (Table 1). The formula was also applied to measure the cost-effectiveness of promoting the project’s other optimal infant feeding behaviors.

When comparing costs per new acceptor of the two program sites, the larger population in Antananarivo may have resulted in economies of scale that increased the cost-effectiveness. But an analysis showed that expenditures for training and mass media were significantly higher in Fianarantsoa: training costs per beneficiary were 36 percent higher than in Antananarivo, and mass media represented a higher percentage of total costs (14 percent) compared to Antananarivo (9 percent).

Replication costs exclude program start-up costs (development costs for training modules, IEC materials, and mass media messages) and M&E costs. By excluding these costs, the cost per new acceptor of breastfeeding was reduced from \$10.70 to \$8.12 in Antananarivo, from \$18.54 to \$14.22 in Fianarantsoa, and overall from \$13.35 to \$10.09.

Disability-adjusted life years (DALY)

Improvements in the rate of exclusive breastfeeding over a 21-month period in program areas in two regions of Madagascar averted an estimated 420 deaths at a cost of \$30.77 per disability-adjusted life years. DALY as a measurement of cost-effectiveness allows for standardized comparison of the effectiveness of different interventions to reduce the disease burden due to a particular illness or condition. At a cost of \$30.77, LINKAGES’

program to promote exclusive breastfeeding compares favorably with other health interventions and is well below the benchmark of \$100 per DALY, which is considered the upper limit for cost-effective health investments in low-income countries. For other health interventions, the DALY values are \$14.50 for immunization programs, \$25.00 for family planning programs, and \$40.00 for integrated management of childhood illness (IMCI).¹

Cost and Effectiveness Methodology Applied to Other Countries

The cost and effectiveness methodology used in Madagascar was also applied in Ghana, Jordan, and Zambia. These cost studies provide context-specific results; therefore, the results cannot necessarily be generalized to another country. Cost and effectiveness varied by country and were influenced by the number and type of target behaviors, the geographic scale and size of the population, the scope of the program, and local partner experience and level of participation in program implementation.

Findings from the four country studies suggest that increases in both the size of the target population (scale) and the number and variety of behaviors targeted (scope) positively affect cost-effectiveness. LINKAGES or a similar program may be able to improve its cost-effectiveness by:

- ◆ Selecting areas with larger target populations (i.e., the greater the population, the lower the cost per new acceptor)
- ◆ Selecting areas with lower initial rates of the recommended feeding practices (i.e., the lower the baseline rate, the lower the cost per new acceptor)
- ◆ Collaborating with partners who are ready and able to implement relatively intensive community-level activities, including integration of interventions into pre-existing comprehensive government health programs
- ◆ Expanding the range and scope of community health activities to include other child survival interventions

¹ The World Bank. *Health, Nutrition, and Population Sector Strategy Paper*. Washington: The World Bank, 1997.

Use of the Cost and Effectiveness Data

The data collected through cost and effectiveness studies can be used in various ways. Stakeholders can determine the financial implications of introducing, replicating, scaling up, phasing out, and/or sustaining breastfeeding promotion. While LINKAGES may not be able to and perhaps should not select program interventions to maximize cost-effectiveness, the data can help in setting goals and anticipating the cost effectiveness of the program prior to implementation. With this information, LINKAGES and its partners can assess ways of using existing resources more efficiently and modify their budgets, staff, and programs accordingly. Cost-effectiveness data can also be used for advocacy. The estimated cost per DALY serves as a common unit of measurement in the economic evaluation of health interventions.

Lessons Learned

The following lessons have been learned through LINKAGES' cost and effectiveness studies:

- ◆ **Resources required for cost and effectiveness studies should not be underestimated.** Resources needed include expertise not found in most projects, complete and accurate financial and M&E data, and significant headquarter and country program staff time to identify and gather the data.
- ◆ **Various sources of data should be used for planning and decision-making.** Data on costs are as important for planning and decision-making as data on behavioral changes and other outcomes. Changing policies, priorities, and funding are also important factors in program planning.
- ◆ **Cost and effectiveness analyses are better conducted prospectively than retrospectively.** They should be incorporated into project designs, financial management plans, and evaluation designs. This will provide more accurate and systematic estimates of costs, reduce the time and expenditure for data collection, and make more timely the use of data for project decision-making. However, both a prospective and a retrospective study run the risk of selecting a time period that may not reflect implementation of all program interventions needed to be costed.

- ◆ **Competency in cost and effectiveness analyses can be built within a project.** External technical assistance, multiple studies, and active participation by project staff, coupled with the willingness of a project to invest in developing its own cost and effectiveness expertise, can build this competency within M&E and financial units, as was the case with LINKAGES.
- ◆ **A shared methodology is needed.** Multiple methodologies currently used for cost-effectiveness analysis reduce the value of the data for the donor agency. For cost and effectiveness studies to be more readily compared across countries and projects, a common methodology is needed. LINKAGES is working with other projects to adopt a shared methodology.

Resources

For the specific findings and a detailed description of methodologies used in LINKAGES' Madagascar, Ghana, Jordan, and Zambia projects, please refer to the documents listed below.

- ◆ Methodology for Analyzing Cost and Effectiveness of LINKAGES' Interventions (Abt Associates Inc., 2003)
- ◆ Cost and Effectiveness Analysis of LINKAGES' Breastfeeding Interventions in Ghana (Abt Associates Inc., 2002)
- ◆ Cost and Effectiveness Analysis of LINKAGES' Infant and Young Feeding Program in Madagascar (Abt Associates Inc., 2004)
- ◆ Cost and Effectiveness Analysis of LINKAGES' LAM Promotion Interventions in Jordan (LINKAGES, 2005)
- ◆ Cost and Effectiveness Analysis of the Ndola Demonstration Project in Zambia (Abt Associates Inc., forthcoming)
- ◆ Cost and Effectiveness Analysis of the Zambia Integrated PMTCT Program (LINKAGES, forthcoming)



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