

# Sugira Muryango: Cost Analysis

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## Introduction

There is general agreement on the importance of pregnancy and the early years of a child's life in shaping their development (Shonkoff et al, 2012). The period, characterised by rapid development, including rapid neurological development, is sensitive to environmental influences. This sensitivity means that early experiences, good or bad, can have lifelong, and possibly irreversible, consequences (Britto et al, 2017). Interventions which promote the good and protect against the bad, therefore, have similar potential to generate returns over the life-course.

While the importance of the first few years of a child's life is well established, how best to intervene during this time is still debated. A number of interventions, typically delivered through the health system, have proven effective during pregnancy. How best to support families post-delivery, to provide the holistic care a child needs, remains unclear.

A combination of a lack of understanding among policy makers of the importance of early intervention, and a failure to provide clear direction on how best to intervene early, combine to produce a focus on centre based services for slightly older children – a phenomenon referred to in the Lancet special series on ECD as aging up (Richter et al, 2017). While no doubt these interventions have the potential to generate significant returns, the returns are unlikely to be as high as interventions targeted earlier.

The need for greater clarity on early intervention has led to a number of possibilities being tested. Among these, home visiting has emerged as one of the most promising. Such interventions provide a means to deliver a range of support, including information and have been linked to long-term benefits (Walker et al, 2005; Yousafzai et al, 2018). These interventions, however, differ in intensity, and associated cost. The higher intensity, higher cost interventions may not be affordable everywhere, while the lower intensity, lower cost interventions may not be sufficient, particularly in challenging contexts. There remains, therefore, a need to identify designs for home-visiting interventions which are both effective and affordable, in specific contexts, particularly those characterised by the combination of high risk and significant resource constraints .

The evaluation of Sugira Muryango (SM) speaks to this need in Rwanda (Betancourt et al, 2018). SM is a home-visiting programme that seeks to improve child development outcomes by promoting positive parent-child relationships. It builds on the success of the the Family Strengthening Intervention (FSI) model, which was developed with the Rwandan context in mind, to improve communication and parenting in HIV/AIDS-affected families with school-age children.

The Randomised Control Trial (RCT) of SM will provide data on the effectiveness of the intervention. This report addresses the question of how much the intervention costs. Once the results of the trial are finalised, the cost and outcome data will be combined to examine the cost effectiveness, and the possibility of modelling long-term outcomes examined.

The cost analysis aims to answer three questions:

1. What did the SM intervention, in the context of the trial, cost to implement?

2. How much would it cost to implement SM to a larger population as a programme?
3. What would it cost to replicate SM within the government system?

The actual cost of implementation (question/scenario 1), is an estimate of the resources used, in the context of the trial, to deliver the intervention. It is essentially the total cost of the project, minus costs associated with research activities.

The cost of SM as a programme (question/scenario 2) examines the possibility of economies of scale, i.e. the lower unit cost associated with ongoing delivery. Providing the intervention in the context of a trial is expensive as the start-up costs are not spread out over a long period, or over many people. Training costs, for example, are divided only over the number of families receiving the intervention during the trial. If SM were run on an ongoing basis, the same trained delivery staff could provide services to many more families, without additional training, and associated costs, thereby reducing the cost per family.

The end goal of the SM evaluation is to support the Rwandan Government with evidence of a model which could be implemented within the government's own systems. It is, therefore, important to examine what the model might cost if implemented in this way (question/scenario 3). This involves a number of adjustments, including changes in salaries and in the management structure. The preliminary results for question 3 are provided, but they are likely to be revised based on ongoing engagement with government officials.

This report provides a summary of the methods used, and of the results. These results are then discussed.

## Methods

All costs are estimated from a provider perspective. That is, they consider the cost of delivery. They do not include the cost carried by families to access these services. As this is a home visiting programme, these costs are not likely to be significant. Moreover, as the end goal is to support government led implementation, the potential budget impact is of primary interest.

Programme data from the trial on the number of families recruited, sessions conducted and staffing levels, were used to calculate the ratio of families/sessions to coaches (implementation staff), and implementation staff to supervisory staff and supervisory staff to management.

The ratios refer to the number of full-time equivalent staff required to deliver the intervention. This is not necessarily the same as the number of staff employed, as some staff spent part of their time on research activities. The distribution of staff time between intervention implementation and research was based on a review of their responsibilities. This process allowed the grouping of staff into three categories: intervention only, research only and staff who worked on both activities. Staff who were involved only in research were not included in the analysis. To estimate the number of full-time equivalent staff needed, the time of staff who were involved in both research and implementation was divided between the two activities. This was done by the project manager, allocating a percentage to each

activity for each month of the project. The monthly allocations allowed for greater precision, as certain months were clearly all implementation and others clearly all research.

The calculation of these ratios provides the skeleton of all three costings. Arguably, from a costing perspective, this is the SM model. As a human resource intensive model, as opposed to say a pharmaceutical based intervention, the ratio of beneficiaries and associated sessions to staff of different levels is the critical feature of the model.

The difference between the cost of staff at the different levels is the driver of the difference in costs between the three scenarios. It is important to note that the cost of staff referred to here is the full cost. That is, the salary cost, the cost of transport and communication required for that staff member to do their work, training costs and the cost of any other resources which vary by number of staff. The three scenarios are, therefore, based on different staff costs, with these differences being shaped by differences in salary, transport, communication, training etc.

The full staff costs for scenario 1, the actual cost of implementation, are based on a review of project expenditure. An initial review of expenditures was undertaken by a member of the project staff, who provided a description of each item and indicated if it was implementation only, research only or mixed. The project manager reviewed the descriptions and allocations, and adjusted as deemed appropriate, and proposed how to divide mixed costs between research and implementation. Finally the analyst reviewed, allocated each expenditure to the appropriate level of staff (coaches, supervisors or management) and made the final assessment on the division between research and implementation costs. Salaries and consumables were fully allocated in the time period in which they occurred. For scenario 2, capital costs were also fully allocated in the period in which they occurred, unless they were likely to have value at the end of the project (e.g. vehicles). A summary of the assumptions made is provided in the annex.

The expenditure review provided an estimate of the full cost of each staff level, broken down into the following categories: training, salary, materials, transport, communications, office and cost of employment. It also provides an estimate of indirect administrative costs, which could not be allocated by staff category, and are included as an overhead.

To estimate of the cost of actual implementation, the full cost of each staffing category was multiplied by the number of staff required in each category and indirect cost were added. This cost was then divided by the number of families covered and the number of sessions provided. This allows us to report the more meaningful (than total cost) estimates of the cost per family covered and the cost per session – which allow for comparisons to be made to similar programmes which have been costed.

The staffing ratios and the expenditure data was used to inform scenarios 2 and 3. A number of assumptions were required, to adjust these data to reflect potential changes associated with programme and government delivery. The assumptions are summarised in Table 1.

**Table 1: Assumptions for scenarios 2 and 3**

Scenario 2: Assumptions for programme implementation	Scenario 3: Preliminary assumptions for government delivery
<ul style="list-style-type: none"> <li>• Capital costs allocated over their useful life</li> <li>• 3 years until coaches require re-training</li> <li>• 25% improvement in efficiency of coaches with time/experience</li> </ul>	<ul style="list-style-type: none"> <li>• Capital costs allocated over their useful life</li> <li>• 3 years until coaches require re-training</li> <li>• 25% improvement in efficiency of coaches with time/experience</li> <li>• Expenditure on travel and subsistence from head office to implementation site during start-up phase excluded</li> <li>• 70% of transport costs included (i.e. assume 30% for travel to site)</li> <li>• International salaries for management staff adjusted to local rates</li> <li>• Increased rates of supervision</li> <li>• Decreased involvement of senior management</li> </ul>

## Results

The ratios of staff of various levels to beneficiaries are provided in Table 2. The first column of ratios reports the full time equivalent number of staff, by level, based on the current model of implementation. The second and third columns report the adjusted ratios for the other scenarios.

**Table 2: Staff ratios, by scenario**

	Scenario 1	Scenario 2	Scenario 3 (preliminary)
Families per coach (per cohort)	5.3*	6.6**	6.6**
Coaches per supervisor	10	10	10
Supervisors per manager	15	15	8
Managers per director	0.5	0.5	2

\*Equivalent to coaches visiting 4 households per week

\*\*Equivalent to coaches visiting 5 households per week

The ratio of families to coaches is based on programme data for scenario 1. For scenario's 2 and 3 it includes the assumed 25% improvement in efficiency. As the programme was implemented in the context of the trial, the project director played a major part in

implementation, allocating more time than the manager. This structure is maintained in scenario 2. However, to provide more realistic estimates for scenario 3, the ratio is changed to 2 (i.e. one director for every two managers). This is still a low ratio, something which may be required to maintain quality. To balance this change, the ratio of supervisors to managers was shifted down from 15 to 8. This was done to allow the assumption, required later when we compare costs to outcomes, that quality can be maintained despite lower levels of involvement from high-level management.

The costs per family covered and per session are summarised in Table 3, for each of the 3 scenarios.

**Table 3: Cost per family and per session, by scenario**

	As implemented (scenario 1)	As an INGO programme (scenario 2)	Within government system (scenario 3 preliminary)
Cost per family	\$456	\$262	\$199
Cost per session	\$38	\$22	\$17

The breakdown of costs by expenditure category is provided in Table 4.

**Table 4: Proportion of costs by expenditure category**

	As implemented (scenario 1)	As an INGO programme (scenario 2)	Within government system (scenario 3 preliminary)
Salaries	0.52	0.64	0.59
Training	0.24	0.04	0.05
Communication	0.02	0.03	0.04
Transport	0.16	0.21	0.22
Office costs	0.02	0.04	0.06
Overhead	0.04	0.04	0.04

## Discussion

The costs of the SM home-visiting intervention are within the range reported in the literature. Costs per family range from USD70 for basic programmes (Cardenas et al, 2017) to USD520 for more comprehensive interventions (Attanasio et al, 2014). Scenario 1 is at the upper end of this range. The higher costs stemming from the allocation of start-up costs to a few families and international salaries. The cost per family is substantially reduced if SM were to be run as a programme. This is because start-up costs, including training and capital expenditures, are spread out over more families, and because we assume some improvement in efficiency associated with learning and denser coverage (meaning households are closer together). The preliminary results for scenario 3 suggest that incorporating SM into Government systems would be associated with a further drop in the cost per family. This is a result lower management costs associated with the shift from international to local management.

As expected for an intervention of this kind, the largest expenditure category is for salaries. This is a human resource intensive intervention. Transport costs are also significant in all three scenarios. Training is a significant cost in scenario 1. As discussed, this is because the training costs are not spread out over many families.

The results for scenario 3 are preliminary. More discussion is required with officials working within Government to determine how best to structure such an intervention. The costs per family may increase or decrease as a result of changes in assumptions based on these discussions. It is important to note here that the current estimate for scenario 3 includes a payment to the coaches. This is not the norm in Rwanda. Removing this payment drops the cost by \$20 per family. However, it may be difficult to argue that the quality of the intervention will be maintained if the coaches are not paid.

The results of scenarios 2 and 3 are sensitive to some of the assumptions made. Notably, they are sensitive to the assumed improvement in efficiency. If this assumption is not made, the costs per family increase by approximately \$40 in both scenarios.

The costs here are based on a programme delivered in rural areas. It is likely that there will be substantial cost savings in urban settings where households are closer together, allowing coaches to conduct more sessions in a week and lowering transport costs. Assuming coaches could visit 10 families a week in urban settings lower the cost per family by close to \$100 in scenarios 2 and 3.

## References

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### Annex: Assumptions applied to expenditure data

Average useful life of recorders provided to CBVs: 2 years

Average useful life of laptops used for reporting: 2 years

Average useful life of sim-cards and modems: 2 years

Managers use of transport relative to supervisors: 0.5

Project director use of transport relative to supervisors: 0.5

Per diem and car hire use of manager and directors to supervisors: 0

Allocation of hosting NGO overheads allocated to implementation: 0.5

Discount rate: 3%

Exchange rate to USD: 900 RWF