IMPACT AUDIT

Living Goods
Community Health Worker (C.H.W.) program

ImpactMatters
FINDINGS

Community Health Workers (C.H.W.) Program

MISSION
To empower community health workers with the digital tools and supervision to address basic health challenges.

PROBLEM
Residents of poor countries die too often from easily preventable and treatable diseases and infections.

INTERVENTION
Living Goods trains women from local communities in Uganda to diagnose and treat malnutrition, infection and many common and life-threatening illnesses.

ENGAGEMENT
Community health workers trained, managed and supported.

OUTCOME
Reduced mortality among children under 5 years of age.

IMPACT AND COST
1 child death averted per $5,000 spent

CONFIDENCE IN ESTIMATE

IMPACT AND COST CALCULATION
Taking account of the Living Goods’ marginal costs alone, the program has a cost-effectiveness of about $4,000 per death averted. When we consider the additional costs borne by the beneficiaries who incur additional health expenses than they otherwise would have, the program has a cost-effectiveness of around $5,000 per death averted.

CONFIDENCE IN ESTIMATE
The evidence for the impact comes from a high quality randomized controlled trial of the C.H.W. program conducted by researchers affiliated with the Abdul Latif Jameel Poverty Action Lab (J-PAL) and Innovations for Poverty Action (I.P.A.). The study surveyed households in 217 Ugandan villages to evaluate the effect of the C.H.W.s on mortality of children under 5 years old, children under one year and newborns. The study has a minor risk of bias due to apparent crossover effects, whereby C.H.W.s inadvertently provided health services and products to households in control villages. However, these crossover effects are likely to produce underestimates of impact, not overestimates. Confidence is further reduced as the authors rely on retrospective recall information may have influenced the results.
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Feedback

We welcome your feedback at www.impactm.org/feedback.
ImpactMatters conducted an impact audit of Living Goods, a nonprofit that saves and improves lives by training Community Health Workers (C.H.W.s) to educate, diagnose and treat basic health challenges faced by their neighbors. The audit considers the impacts and costs borne by all stakeholders associated with implementing the Living Goods C.H.W. program in Uganda between 2014 and 2016.¹

Mission

For the purpose of this audit, ImpactMatters assesses the impact of Living Goods against the following mission: to save and improve lives by empowering community health workers with the digital tools and supervision to address basic health challenges.

Intervention

Residents in resource-constrained countries face increased mortality from easily preventable and treatable diseases and infections. According to Living Goods, two factors contribute to this problem: a shortage of doctors and nurses in poor countries as well as the additional challenges faced by residents in reaching the formal health systems that do exist. In response to this problem, Living Goods recruits Community Health Workers (C.H.W.s) from existing government pools and local communities in Uganda and provides them with digital tools, financial incentives, supervision and ongoing re-training. C.H.W.s provide education to support prenatal and postnatal care, as well as diagnose, treat and refer children under 5 for issues including malaria, pneumonia and diarrhea. The C.H.W.s sell medications and other health-related products for a small margin.

¹ Living Goods also operates in Kenya, Myanmar and Zambia. For the purpose of this audit, we focus only on the Living Goods program in Uganda.
Outcome

For the purposes of the impact audit, we measure the success of Living Goods by the extent to which its services reduce mortality among children under 5 years of age. ii, iii

Note that Living Goods also saves and improves the lives of individuals who are not young children. In particular, C.H.W.s focus on supporting mothers through prenatal and postnatal care. However, in the impact audit we estimate impact using only the under-5 mortality outcome.

iii Living Goods also measures its impact with other indicators including the number of under-1 and under-5 sick child assessment and treatments, the percentage of on-time newborn visits, and the number of referral follow-ups.

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ii Note that Living Goods also saves and improves the lives of individuals who are not young children. In particular, C.H.W.s focus on supporting mothers through prenatal and postnatal care. However, in the impact audit we estimate impact using only the under-5 mortality outcome.
IMPACT AND COST

Findings

The impact of Living Goods is defined as the reduction in mortality of participating children under 5, beyond changes in mortality that would have occurred in the absence of Living Goods’ intervention. Impacts and costs are estimated from the perspective of all stakeholders. Put another way, estimates take account of all costs regardless of who bears them (patients, funders, government) and all benefits generated by the Living Goods intervention, whether accrued by participants or others.

ImpactMatters estimate: Living Goods averts the death of one child under 5 at a cost of about $5,000. This estimate is based on data from a randomized controlled trial (R.C.T.) conducted by researchers affiliated with the Abdul Latif Jameel Poverty Action Lab (J-PAL) and Innovations for Poverty Action (I.P.A.) on the Living Goods program from 2011 to 2013.

<table>
<thead>
<tr>
<th>Specification</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMPACT (UNDER-5 DEATHS AVERTED)</td>
<td>1,445</td>
</tr>
<tr>
<td>TOTAL COSTS TO SOCIETY</td>
<td>$7,511,730</td>
</tr>
<tr>
<td>COST-EFFECTIVENESS (COST PER DEATH AVERTED)</td>
<td>$5,199</td>
</tr>
</tbody>
</table>

STRATEGY FOR ESTIMATING IMPACT

GUIDING QUESTION

The analysis answers the following question: how much does the Living Goods Community Health Worker program spend to reduce deaths of young children (under age 5) by one?

The impact is measured net of counterfactual outcomes (reduction in deaths of children had they not, in fact, been reached by the C.H.W. program).
We consider all marginal costs associated with implementing the program during the period of analysis, 2014 to 2016. This means we only consider the costs that rise and fall as the number of beneficiaries rise and fall. Because our analysis takes the perspective of society as a whole, we take account of all costs borne by all stakeholders to deliver the program.

STRATEGY FOR ESTIMATING IMPACT

To estimate the impact of the Living Goods intervention on deaths of children under 5, we borrow the findings of a randomized controlled trial (R.C.T.) conducted by J-PAL and Innovations for Policy Action (I.P.A.) that assessed the impacts of Living Goods' C.H.W. program in Uganda.¹ First, we estimate the mortality rate present in the areas that were not exposed to Living Goods’ intervention for the relevant period. We consider this estimate to be counterfactual mortality rate. We estimate the deaths averted by multiplying the number of children under 5 in areas served by Living Goods by both the expected (counterfactual) mortality rate and by the reduction rate estimated by the R.C.T. We then divide the number of C.H.W.s active during the study by the deaths averted to estimate the impact of an average C.H.W. on child mortality. We multiply this figure by the number of C.H.W.s active in Uganda during the period of analysis (2014-2016) to estimate the total number of child deaths averted because of the program.

DETAILED CALCULATIONS

Step 1. Estimate the mortality rate for children under 5 in the absence of the Living Goods C.H.W. program:

\[
\frac{194 \text{ deaths of children under 5 years in areas without Living Goods program}^*}{5,399 \text{ children under 5 years old in areas without Living Goods program}^*} \times 1,000 \text{ (mortality rates are expressed as “deaths per thousand”)} = 36 \text{ deaths of children under 5 years old per thousand}
\]

Step 2. Estimate how many fewer children died in the presence of the Living Goods C.H.W. program:

\[
\frac{8,306 \text{ children under 5 years old in areas with the Living Goods program}^*}{36 \text{ deaths of children under 5 per 1,000 children (from Step 1 above)}} = 1,000 \text{ (mortality rates are expressed as “deaths per thousand”)}
\]
$31\%$ mortality rate of children under 5 in areas served by Living Goods relative to the in areas without Living Goods’ C.H.W. program$^{iv}$

93.6 deaths averted of children under 5

Step 3. Divide the number of deaths averted by the number of active C.H.W.s to estimate the impact of each C.H.W.: 

\[
s = \frac{93.6 \text{ deaths of children under 5 years old averted (from step 2 above)}}{79 \text{ C.H.W.s active during the randomized evaluation}^*} \div \frac{1}{3 \text{ program years}^*} = 0.39 \text{ deaths of children under 5 averted per C.H.W. per year}
\]

Step 4. Multiply the number of C.H.W.s active in Uganda during 2014–16 by the number of deaths averted per C.H.W.

\[
1,269 \text{ deaths of children under 5 years old averted in Uganda (2014–2016)}
\]

Source:

*Data from the J-PAL/I.P.A. randomized trial of Living Goods’ C.H.W. program$^1$

The following calculations illustrate the steps described above.

First, calculate the mortality rate in areas not served by Living Goods C.H.W.s (this is the counterfactual mortality rate). To do this, divide the number of children under 5 years old that died during the study period by the number of children under 5 living in the areas at the start of the evaluation (Step 1). Multiply this number by 1000 (mortality rates are reported as “deaths per thousand”).

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$^{iv}$ The J-PAL/I.P.A. randomized trial of Living Goods’ C.H.W. program also estimated the impact of BRAC, another N.G.O. involved in the C.H.W. program. In the impact and cost model we use the results from the Living Goods subsample.

Next, multiply the number of children in areas served by the Living Goods C.H.W. program by the counterfactual mortality rate. This is the number of children that would have been expected to die without the C.H.W. program. Multiply this number by the reduction in mortality program caused by the Living Goods program. The result is the number of deaths averted during the evaluation period, 2011 to 2013, as a result of the C.H.W. program (Step 2).

Then, divide the number of deaths averted by the number of C.H.W.s that were active during the randomized evaluation. Divide this figure by the number of years over which the evaluation took place to estimate the number of deaths averted by each individual C.H.W. (Step 3). Note that this calculation relies on the assumption that the relationship between C.H.W.s and child mortality is linear: a doubling in the number of C.H.W.s yields a doubling of deaths averted.

Finally, multiply the number of deaths averted by each individual C.H.W. by the by the number of C.H.W.s that were active in Uganda during the audit analysis period: 2014 to 2016 (Step 4).

This is the number of deaths averted by the Living Goods C.H.W. program between 2014 and 2016, net of the counterfactual.

After applying a social discount rate (at a 5 percent discount rate, the rate used by the World Bank), we estimate the C.H.W. program saved the lives of 1,445 children under 5 years old between 2014 and 2016, net of the counterfactual.²

We combine this impact estimate with the costs incurred to implement the program to estimate the program’s cost-effectiveness, where C-E = \frac{\text{Cost}}{\text{Impact}}.

We estimate the cost-effectiveness from the perspective of all stakeholders, taking account of all costs and savings no matter who bears them.

First, we calculate the cost to Living Goods of supporting its beneficiaries over the period of analysis, 2014–2016: $6,179,069.⁶ This figure reflects Living Goods marginal costs over the period of analysis, and subtracts out its revenues from the sale of goods to the C.H.W.s. We then add the all of the costs to the average beneficiary of participating in the program. We find that Living Goods’ beneficiaries paid $1,332,661 for the health products and services purchased from the C.H.W.s between 2014 and 2016. No other entities aside from Living Goods and its beneficiaries incurred costs in pursuit of impact. Adding together all societal costs gives a numerator of $7,511,730. When we divide costs by the

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² All costs are adjusted for inflation and discounted using a 5% social discount rate, the rate used by the World Bank.
benefits, we find that Living Goods averts the death of one child under 5 years of age for about $5,000 spent on the C.H.W. program.

From the perspective of the nonprofit alone — therefore excluding beneficiary costs — we estimate that the program averts the death of one child under 5 years of age for about $4,000.

See the attached spreadsheet for additional details.

It is possible that the program produces lasting benefits, as Living Goods has a long-term commitment to field C.H.W.s in the communities currently covered.

BENCHMARKING THE COST-EFFECTIVENESS ESTIMATE

Living Goods averts the death of one child under 5 years old for about $5,000. For reference, we present the cost-effectiveness of three interventions with comparable outcomes below.

Development Media International's child survival program

Development Media International's (D.M.I.) child survival program reduces newborn and early-childhood deaths by running media campaigns that encourage behaviors believed to lower child mortality. For example, D.M.I. broadcasted short radio advertisements that discussed when and how parents should seek treatment for children showing symptoms of malaria. D.M.I. runs these campaigns in countries with high rates of child mortality and measures success by the number of child lives saved.

D.M.I. and the London School of Hygiene and Tropical Medicine conducted a randomized controlled trial (R.C.T.) to directly measure the campaign's impact on child mortality in Burkina Faso in 2012-14. In the treatment group of the study, visits to health clinics for sick children rose by anywhere from 16 to 35 percent more than in the control zone. Clinics also reported that uptake of antenatal care and births at facilities increased by 6 to 9 percent.

We use the impact and cost figures reported by the authors and D.M.I. to calculate the benefit-cost ratio of its child survival program.

During D.M.I.’s 2015-2017 nationwide campaign, it costs an average of $1,700 to save the life of a child. This figure includes costs borne by D.M.I. and patients. Patients pay for about three quarters of the cost per life saved, mostly through drug purchases.
The Against Malaria Foundation’s bednet program

The Against Malaria Foundation (A.M.F.) delivers insecticide-treated bednets in countries with high incidences of malaria and measures success by the number of deaths averted for children under 5 years of age.

A systematic review of 22 studies published by the Cochrane Collaboration evaluated the effects of bednets on mortality. Lengeler concludes that 5.5 child deaths are averted for every 1,000 children than are protected by insecticide-treated bednets in high-prevalence areas.4

We report the cost-effectiveness analysis estimated by GiveWell, a nonprofit that rigorously estimates the cost-effectiveness of highly effective nonprofits. GiveWell estimates that A.M.F. averts the death of one child under 5 years old for around $4,500 spent on its bednet program.

Preventative Tuberculosis Treatment

In countries with high rates of tuberculosis infections, it is common to treat latent tuberculosis — tuberculosis that is dormant and asymptomatic in an infected person — with the drug, isoniazid.

A Cochrane meta-analysis on the effectiveness of isoniazid against latent tuberculosis. The Cochrane review found that isoniazid treatment lasting six to 12 months reduced the risk of developing active tuberculosis by 60 percent.5

A cost-effectiveness analysis published in the American Journal of Preventative Medicine finds that it costs about $35,000 to avert one death through preventative treatment of tuberculosis with isoniazid.6
Third-Party and Other Effects

This section of findings addresses possible impacts — positive or negative — of the Living Goods program on nonparticipants. Any such “third-party” effects, also known as externalities, are not captured in the calculations outlined above. Our calculations only capture effects on mission driven outcomes for participants.

Benefits of Other Products Sold by Community Health Works

**EFFECT: POSITIVE; UNKNOWN MAGNITUDE**

In addition to educating families and supplying tools for preventing, diagnosing and treating the most common illnesses that afflict children, C.H.W.s also sell various products like clean stoves, water filters and solar lights, that deliver additional benefits. These benefits are not captured by the impact and cost model above.

For example, the clean stoves sold by C.H.W.s use less fuel, cook faster than traditional stoves and reduce harmful smoke. This provides a range of benefits: financial savings on fuel, additional time for other household work, and a decreased risk of respiratory infection.

Likewise, solar lights can also save families money as an alternative to kerosene-fueled lamps. Moreover, solar lamps are safer than kerosene lamps because they eliminate the risk of burns or fire. In addition, solar lights might expand the educational and economic
opportunities for families, as they can help children study hours after the sun sets and allow artisans to work additional hours at night.

Boosted Financial Resources for Community Health Workers

**EFFECT: LIKELY POSITIVE; LIKELY SMALL**

This impact and cost model does not account for the financial resources earned by C.H.W.s as part of the program. C.H.W.s are trained by the Living Goods staff to diagnose and treat various medical conditions. It is plausible that they earn more financial resources as a result of the program than they would have otherwise.\(^vii\)

It is also possible that the effects are neutral or even negative. Some C.H.W.s may decide to work less hours at their “day job” in order to spend more time fulfilling their C.H.W. responsibilities.\(^viii\) Therefore, they might earn less than they would have in the absence of Living Goods’ program. Similarly, C.H.W.s may risk losing money if they do not sell the health goods that they have acquired through Living Goods.

It seems likely that C.H.W.s experience a combination of these effects; some earning more money than they would have otherwise, others less. We are uncertain about which of these effects is likely to dominate but expect that C.H.W.s do see small to moderate boosts to their financial earnings on average.

\(^{vii}\) Many Living Goods C.H.W.s are recruited from existing government pools of Village Health Technicians (V.H.T.s). V.H.T.s do similar work to C.H.W.s, but they are volunteers (and thus do not receive any compensation).

\(^{viii}\) C.H.W.s are expected to spend about two hours each day supporting their neighbors, though many spend more time than this.
CONFIDENCE IN ESTIMATE

Rating
★★★★★

How confident should we be in the estimates of impact and cost outlined above? Based on the quality of the available randomized controlled trial (R.C.T.) and other data that undergirds the impact audit’s estimates, ImpactMatters concludes that the audit’s finding warrants high confidence. ImpactMatters assigns five stars (of a maximum of five stars) to our confidence in the impact estimates presented.\textsuperscript{iX}

In particular, the impact audit’s calculations rely on data from a well-designed R.C.T. of Living Goods’ Community Health Worker (C.H.W.) program in Uganda conducted by researchers affiliated with the Abdul Latif Jameel Poverty Action Lab (J-PAL) and Innovations for Poverty Action (I.P.A.). The study found effects on child mortality rates over a three-year period. See below for details.

Review

The study was a cluster-randomized trial, whereby 217 villages in 10 Ugandan districts were randomly assigned to either treatment or control groups.\textsuperscript{1} C.H.W.s trained by Living Goods served households in villages assigned to the treatment group. Three years after the C.H.W.s were initially trained, a sample of 8,119 households in the treatment and control villages were surveyed to evaluate the effect of the C.H.W.s on mortality of children under 5 years, children under one year and newborns. The authors found statistically significant effects on all three age groups. The study’s primary outcome,

\textsuperscript{iX} ImpactMatters scores our confidence in estimate on a scale of one to five stars. A cost-effectiveness estimate based on very poor evidence will lead us to have very low confidence in our findings (one star). A ratio that uses poor evidence will lead us to have low confidence (two stars). A ratio that uses middling evidence will lead us to have moderate confidence (three stars). A ratio that uses strong evidence – such as a strong quasi-experimental design – will lead us to have high confidence (four stars). A ratio that uses exceptionally strong evidence — such as evidence from a randomized control trial — will lead us to have very high confidence (five stars).
under-5 mortality, fell by 27 percent in communities with Living Goods C.H.W.s relative to mortality in otherwise identical communities without C.H.W.s.

The R.C.T. suffers from a minor risk of bias due to possible crossover effects, whereby C.H.W.s inadvertently provided health services and products to households in control villages.¹ Although this crossover effect could only lead to an underestimation of impact – not a overestimation – it nevertheless weakens our confidence in the accuracy of our estimate (though not enough to reduce our rating).

The authors took measures to eliminate other factors that would heighten the risk of bias. For example, C.H.W.s were not told which households were to be surveyed, which kept them from devoting special attention to only those households. Also, the R.C.T. accounted for the outcomes of all households in treatment villages, not just those households that had contact with a C.H.W.

Similarly, several features of the study findings boost confidence in the estimate. The authors found similar results on all three age groups. The confidence interval surrounding the effect sizes was relatively narrow, suggesting that the impact estimates are reasonably precise. The distance from the C.H.W. households was associated with the outcomes: households that lived far away from the C.H.W.s experienced a smaller decrease in child mortality rates. This dose-response observation further supports the conclusion that the intervention resulted in the findings.

Overall, because of the study's strong design and analysis, we have a high level of confidence in the impacts of the C.H.W. program on child mortality rates.
NONPROFIT COMMENT

Living Goods is enormously proud that the audit conducted by ImpactMatters reinforces our understanding of the positive role our organization is having on transforming community health programs in Uganda and beyond. As an organization dedicated to data-driven performance management, adaptive learning, transparency, and strengthening community health efforts worldwide, we are delighted to have external audits such as this and the GiveWell assessment, which enable broad groups of stakeholders to understand and apply relevant insights based on our evidence and experiences.

In the time since this Impact Audit began, Living Goods has grown substantially and deepened the support we provide to communities through robust community health programs. Our 2018-2021 strategic plan outlines three pillars focused on scaling the footprint of our current operations in Uganda and Kenya, and in new countries, deepening and optimizing the basket of services CHWs provide within communities, and playing an increasingly visible role in influencing local governments through advocacy and technical assistance to build and lead their own effective community health cadres.

Although the Impact Audit focuses on a specific subset of Ugandan communities assessed through our Randomized Control Trial, our current footprint is much larger. By the end of Q2 2018, Living Goods was supporting 1,513 CHWs in Kenya, 2,755 in Uganda, and another 3,953 in Uganda through our partnership with the world’s largest NGO, BRAC. In total, we are currently serving a total of 6,576,800 people. We have also worked to support other leading NGOs including CARE and PSI to respectively strengthen community health programs in Zambia and Myanmar, which draw upon aspects of our approach.

With the support of the Audacious Project, a philanthropic initiative housed at TED, we have an ambitious partnership with Last Mile Health to collectively provide community health care to 34 million people in 6 African countries by 2021 that will deploy cadres of 50,000 digitally-empowered community health workers. In partnership with Gavi, the Vaccine Initiative, we also recently added immunization counseling and referrals to the existing focus on malaria, pneumonia, diarrhea, and robust maternal and newborn health services. Meanwhile, we have deepened our focus on innovation that drives impact, and have experimented with scaling up family planning programming, including the injectable Sayana Press, and innovations that leverage technology to both better target communities in need and close the loop to ensure a continuum of care for patients. At the
same time, we are supporting governments through a wide range of technical assistance efforts, including providing guidance on developing investment cases for community health, developing national and local-level community health strategies, and pioneering a community health framework for Results-Based Financing in Uganda.

For Living Goods, the value of studies such as Randomized Controlled Trials is not about getting positive numbers that look good, but about robustly evaluating the impact of our work, and driving continual improvement and learning. We use data in myriad ways to continually tweak how we work at both micro and macro levels, to manage targets and performance, to identify gaps in service, to optimize how CHWs and their supervisors go about their invaluable work, and so much more.

We are grateful to ImpactMatters for the insights provided through this impact audit. And we thank our research, government, funding and operational partners, and most importantly the many thousand community health workers working tirelessly to deliver essential care to their communities.


5. Smieja M, Marchetti C, Cook D, Smaill FM. Isoniazid is effective in helping to prevent tuberculosis in people not infected with HIV. In: Cochrane Database of Systematic Reviews [Internet]. 1999. Available from: http://doi.wiley.com/10.1002/14651858.CD001363

ImpactMatters, a 501(c)(3), conducts “impact audits” of nonprofits to rigorously estimate their philanthropic impact, enabling them and their funders to make evidence-based decisions.

Learn more at www.impactm.org.