

GiveWell & Open Philanthropy

Evaluating the Long-Run Returns to Early Child Education in Africa

Research Proposal

Submitted by:

The International Initiative for Impact Evaluation (3ie) 1111 19th Street, NW, Suite 700 Washington, DC 20036 United States of America 3ieus@3ieimpact.org Tel: +1 202 629 3939 www.3ieimpact.org

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The International Initiative for Impact Evaluation (3ie) Will Ridlehoover Deputy Director Program Delivery and Business Development Date of submission: 6th November, 2024





Executive summary (less than 250 words)

The earliest years of life are pivotal in forming the foundations for healthy development and providing children and their societies the opportunity to reach their full potential. Early childhood development (ECD) programs are particularly critical in Africa, where children face myriad risks of disease, malnutrition, orphan hood and low-quality education. We propose the first long-term experimental evaluation of preschool in a low-income country setting. In 2008, rural communities in Mozambique's Gaza Province were randomly assigned to receive preschools for children ages 3 to 5. The intervention aimed to improve children's cognitive, social and emotional development, and facilitate transition to primary school. A baseline study of two thousand children and their families was conducted in 2008, with follow-up surveys in 2010 and 2014. Short term effects included gains in cognitive development, problem solving abilities, communication and receptive vocabulary and socioemotional skills. Children in treatment communities were more likely to enroll and flourish in primary school. By 2026, at the time of the proposed long-term re-contact, the study cohort will be 21 to 23 years old, allowing us to observe impacts into young adulthood. Long-term outcomes of interest include educational attainment, labor market participation and income, health status and risky behaviors. We will also study effects on marriage and fertility and inter-generational transmission of human capital to the next generation of children. As the first evaluation of its kind, this study represents a unique opportunity to shed light on the long-term returns to investment in ECD in a low-income country setting.

1. Research team

This research will be co-led by principal investigators (PIs) Dr. Pedro Carneiro, Dr. Sebastian Martinez, and Dr. Vitor Pereira, all of whom have held substantive roles in earlier phases of the study. Dr. Martinez and Dr. Pereira designed and co-led the initial study (2007-2010), while Dr. Carneiro served as PI on the midline evaluation (2014). All three co-PIs have extensive experience successfully implementing large scale impact evaluations, including long-run follow up studies (see Appendix for sample publications and resumes). Their combined expertise will be supported by a team of skilled field coordinators, research assistants, evaluation specialists and financial and managerial support staff from the International Initiative for Impact Evaluation (3ie).

Dr. Pedro Carneiro is a professor of economics at the University College London. He is also a research economist at the Centre for Microdata Methods and Practice, and a research fellow at the Institute for Fiscal Studies. He is a Fellow of the Econometric Society and the International Association for Applied Econometrics. His research interests include labor economics and education in developed and developing countries. He has published extensively on the role of early childhood education on human capital formation and has led experimental (large scale) impact evaluations in early childhood and education interventions in Brazil, Chile, Ecuador, the Gambia, Macedonia, Nigeria, Senegal and Serbia. He received his PhD in economics from The University of Chicago.

Dr. Sebastian Martinez is the Director of Evaluation at 3ie. He has over 20 years of experience in producing and using rigorous evidence to inform decision-making for more effective economic development. Through his work at the World Bank, Inter-American Development Bank and 3ie, he has led more than 50 impact evaluations, including large-scale randomized control trials (RCTs) of ECD interventions in Mozambique, Bolivia and Panama, and a long-term (9 year follow-up) study of youth in Uganda. He holds a PhD in Economics from the University of California at Berkeley.

Dr. Vitor Pereira is a professor at the National School of Public Administration (ENAP). He has worked as director of evaluation at the Brazilian Ministry of Social Development (MDS), and has led several impact evaluations in the fields of education and social protection, spanning topics such as early childhood development, anti-dropout strategies for youth, cash transfers and rural graduation programs. He holds a PhD in Economics from PUC-Rio (split-site at Stanford University).

We propose implementing this research project over three years (2025-2027). **Year one** (2025) would focus on developing the subject tracking protocols, study pre-registry, institutional review board clearance, government approvals and data sharing agreements (the Ministry of Education would have a historical registry of students), contracting research assistants and team members, and procurement of data collection. In **year two** (2026) we would conduct fieldwork, first by analyzing existing administrative datasets on children's school enrollment (which will give a fist assessment of where children could have migrated to inside Mozambique)



To manage fieldwork in Mozambique, two locally based field coordinators, fluent in Changana and Portuguese, will be hired to assist with local research requirements, including coordination with local authorities, developing tracking protocols and supervising data collection activities. Two additional research support staff (senior/research associate and research assistant) will assist the PIs with the development of survey instruments, data entry programs, data processing and analysis at different stages of the project. 3ie staff will provide support for adherence to transparency, computational reproducibility and ethical evidence standards, project management, communications and publications, contracting, travel and finance. We will contract a qualified data collection firm in Mozambigue and experienced enumerators in destination countries with high concentration of migrants (including potentially South Africa and Portugal) to conduct tracking and interviews in destination countries. Additionally, the evaluation team will include expert survey methodologists from Sistemas Integrales to assist with survey and tracking protocols, data quality assurance, training, supervision and technical support during the preparation and implementation of data collection.

2. Intervention (if relevant to your study):

analysis, report writing and publication and dissemination activities.

The original preschool intervention was implemented by Save the Children between 2008 and 2010 in 30 rural communities in Gaza province, Mozambique. The community-based preschool program focused on early stimulation, emergent literacy and numeracy instruction and psychosocial support, with the objective of improving children's cognitive, social, emotional, and physical development, and facilitating transition to primary school. Preschools were led by teams of community volunteers, including two teachers per classroom who were trained through experiential learning techniques to facilitate children's learning at the centers, with a curriculum focused on cognitive stimulation through games, art and music, as well as elementary math and reading. They also introduced children to Portuguese, in preparation for elementary school. In addition, the project organized monthly parent group meetings to strengthen positive parenting practices at home. Meetings were facilitated by the community development agents with the aid of the pre-school teachers and a parent of the day, who was chosen by the community. Some of the topics discussed at parent meetings included breastfeeding, de-worming, nutrition, child development, pre-math and pre-literacy, playing with children, attendance and demand driven components defined by the community. Additional details of the preschool model are discussed in Martinez et al 2017.

Preschools have the potential to change the lives of young children and their families. For children that spend part of their waking hours in a daycare environment, centers can provide the building blocks for cognitive development, vocabulary, nutrition, gross and fine motor skills, socialization, and other foundations of child development (Behrman et al., 2004¹; Bennhoff et al, 2024²; Bernal and Ramirez, 2019³; Veramendi and Urzua, 2011⁴). They also allow guardians to work by freeing them from daycare responsibilities, which leads to an increase in household resources. Early childhood interventions have led to sustained long-term benefits and have the potential to break the inter-generational transmission of poverty (Burchinal et. Al., 2010⁵; Shonkoff and Phillips, 2000⁶; Gertler et al., 2014⁷; Gertler et al, 2021⁸, Campbell et al., 2002⁹, 2014¹⁰; Currie, 2001¹¹;

⁷ Gertler, Paul et al. 2014. "Labor market returns to an early childhood stimulation intervention in Jamaica". Science 344(6187): 998–1001

¹ Jere R. Behrman, Yingmei Cheng, Petra E. Todd; Evaluating Preschool Programs When Length of Exposure to the Program Varies: A Nonparametric Approach. The Review of Economics and Statistics 2004; 86 (1): 108-132. doi: https://doi.org/10.1162/0034 ² Bennhoff, Frederik H., Jorge Luis García, e Duncan Ermini Leaf. 2024. "The Dynastic Benefits of Early-Childhood Education: Participant Benefits and Family

Spillovers". Journal of Human Capital 18(1): 44-73. Bernal, Raquel, e Sara María Ramírez. 2019. "Improving the quality of early childhood care at scale: The effects of 'From Zero to Forever'". World Development 118:

^{91–105.} ⁴ Veramendi, Gregory; Urzua, Sergio (2011) : The Impact of Out-of-Home Childcare Centers on Early Childhood Development, IDB Working Paper Series, No. IDB-WP-

^{240,} InterAmerican Development Bank (IDB), Washington, DC

⁵ Burchinal, Margaret, Nathan Vandergrift, Robert Pianta, e Andrew Mashburn. 2010. "Threshold analysis of association between child care quality and child outcomes for low-income children in pre-kindergarten programs". Early Childhood Research Quarterly 25(2): 166–76. http://dx.doi.org/10.1016/j.ecresq.2009.10.004 ⁶ Shonkoff, J. P., & Phillips, D. A. (Eds.). (2000). From neurons to neighborhoods: The science of early childhood development. National Academy Press. 2009.10.004

⁵ Effect of the Jamaica Early Childhood Stimulation Intervention on Labor Market Outcomes at Age 31 Paul Gertler, James J. Heckman, Rodrigo Pinto, Susan M. Chang, Sally Grantham-McGregor, Christel Vermeersch, Susan Walker, and Amika Wright NBER Working Paper No. 29292 September 2021 JEL No. C31, I21, J13 ⁹ Campbell, F. A., Ramey, C. T., Pungello, E., Sparling, J., & Miller-Johnson, S. (2002). Early Childhood Education: Young Adult Outcomes From the Abecedarian Project. Applied Developmental Science, 6(1), 42–57. https://doi.org/10.1207/S1532480XADS0601_05

¹⁰ Campbell F, Conti G, Heckman JJ, Moon SH, Pinto R, Pungello E, Pan Y. Early childhood investments substantially boost adult health. Science. 2014 Mar 28;343(6178):1478-85. doi: 10.1126/science.1248429. PMID: 24675955; PMCID: PMC4028126. ¹¹ Currie, Janet. 2001. "Early Childhood Education Programs." *Journal of Economic Perspectives*, 15 (2): 213–238.



Garcia et al, 2023¹²). The key question we will address is whether these impacts can be achieved through large-scale interventions in very poor settings. Evidence from the US shows that short run cognitive gains from well implemented ECD programs can fade out in the medium term (Heckman et al, 2010, 2013¹³, Puma et al, 2012¹⁴), and this will be especially true in contexts of low quality of primary school education (Cunha and Heckman, 2007¹⁵). Changes in personality skills caused by ECD programs, however, can translate into better labor market outcomes and health behavior during adulthood (Heckman et al,2013¹⁶). Attanasio et al (2024¹⁷) and Attanasio et al (2021¹⁸) also show that ECD programs can lead to large nutritional gains in children. There is however also evidence from high-income settings that full time daycare can have negative impacts on child cognition and behaviors, although this applies to daycare for younger children (0-2 years old) from more affluent backgrounds who would have experienced increased and higher quality interactions at home (Fort et al, 2021¹⁹).

As part of the original study, the cost of the Mozambique preschool intervention was estimated at approximately \$3 USD per student per-month, placing this intervention within highly cost-effective education alternatives for Africa (Martinez et al 2017). A recent (independent and yet to be published) cost-benefit analysis conducted by a team at J-PAL led by Professor Nathaniel Hendren estimated the cost of this same project at \$5.55 per student per month (adjusted to 2020 prices), with a Marginal Value of Public Funds (MVPF) of 1.72, indicating a return of \$1.72 in benefits per \$1 spent. This MVPF exceeds the average of 1.5 in comparable early childhood programs, underscoring the Mozambique preschool intervention as a high-impact investment. Nevertheless, these recent cost-benefit estimates rely on strong assumptions about the long-term effectiveness of ECD programs. The research proposed here will provide the empirical basis for updated cost-benefit analysis based on actual, rather than assumed, long-term impacts, considering a richer set of variables beyond wages, such as income from farm activities, consumption, government transfers and payment of taxes.

3. Research design

Identification of long-term impacts will leverage random variation in preschool exposure from a cluster randomized control trial (RCT) implemented in 76 rural communities in Gaza Province, Mozambigue. Due to resource constraints for project implementation, 30 communities were randomly assigned to treatment, with the remaining 46 making up the control group. A baseline survey was collected before the start of the program in 2008. To establish a representative sample of households and children, a census was conducted in each of the 76 communities to identify households with at least one child in the preschool eligible age range of 36 to 59 months. Then, a random sample of 23 households with eligible children per community was drawn. In addition, in each of the 4 largest treatment communities where oversubscription to the program was likely, an additional 63 households were selected, yielding a total sample of 2000 households. The baseline data contains information on child development outcomes of preschool aged children and characteristics of household members such as age and date of birth, educational background, work, wages, and health and anthropometrics of the caregivers. Baseline analysis showed robust balance in pre-intervention characteristics between treatment and control groups (Martinez et al, 2017).

We aim to track the original evaluation sample of two thousand children who were preschool-aged in our 2008 baseline survey. The primary research questions will address long-term impacts and cost-benefit of exposure to preschool on health, income and related outcomes at ages 21 to 23. Primary outcomes of interest include:

outcomes". American Economic Review 103(6): 2052–86. ¹⁷Public Childcare, Labor Market Outcomes of Caregivers, and Child Development: Experimental Evidence from Brazil Orazio Attanasio, Ricardo Paes de Barros,

¹² The Lasting Effects of Early-Childhood Education on Promoting the Skills and Social Mobility of Disadvantaged African Americans and Their Children Jorge Luis García, James J. Heckman, and Victor Ronda_Journal of Politica Economy 2023 131:6, 1477-1506 ¹³ Heckman, James, Rodrigo Pinto, e Peter Savelyev. 2013. "Understanding the mechanisms through which an influential early childhood program boosted adult

outcomes". American Economic Review 103(6): 2052–86. ¹⁴ Mike Puma, Stephen Bell, Ronna Cook, Camilla Heid, Pam Broene, Frank Jenkins, Andrew Mashburn, and Jason Downer (2012). Third Grade Follow-up to the Head

Start Impact Study Final Report, OPRE Report # 2012-45, Washington, DC: Office of Planning, Research and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services. ¹⁵ Cunha, Flavio, and James Heckman. 2007. "The Technology of Skill Formation." American Economic Review, 97 (2): 31–47. ¹⁶ Heckman, James, Rodrigo Pinto, e Peter Savelyev. 2013. "Understanding the mechanisms through which an influential early childhood program boosted adult

Pedro Carneiro, David K. Evans, Lycia Lima, Pedro Olinto, and Norbert Schady NBER Working Paper No. 30653 November 2022, revised June 2024 JEL No

 ¹³ L30,131,138
¹⁸ Early Stimulation and Nutrition: The Impacts of a Scalable Intervention Orazio Attanasio, Helen Baker-Henningham, Raquel Bernal, Costas Meghir, Diana Pineda,
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¹⁸ Early Stimulation and Nutrition: The Impacts of a Scalable Intervention Orazio Attanasio, Helen Baker-Henningham, Raquel Bernal, Costas Meghir, Diana Pineda,

Cognitive and Noncognitive Costs of Day Care at Age 0-2 for Children in Advantaged Families, Margherita Fort, Andrea Ichino, and Giulio Zanella; Journal of Political Economy 2020 128:1, 158-205



Outcome Category	Indicative Measurements/ Metrics and Tools
Education attainment	Primary school completion, high school attendance and graduation, college attendance and graduation, years of education
Employment and income	Employment status, labor income, profits from business or farm activities, age at first job, job tenure, out-migration
Health	Self-reported outcomes: fitness condition (Activity of daily living), being sick in the last year, being in treatment in last year, hospitalization in last year, had malaria in the last year, HIV and tuberculosis status, and anthropometric measurements (weight and height, BMI, underweight, and overweight or obese)
Health seeking behavior	Physical activity, healthy diet, medicines taken in the last year, frequency of check-ups, last time of HIV testing
Risky behavior	Ever taken to police station, felonies, arrests, involvement in fights, carrying knives and guns, reckless driving, accidents, using helmet when driving motorcycle, gambling, sex frequency, unprotected sex, number of partners, knowledge about HIV transmission, knowledge about anticonception methods, ever tried alcohol, tobacco and other drugs, frequency of drinking and smoking, number of cigarettes per day.
Impulsive behavior	Impulsiveness and sensation seeking behavior (impulsive behavior short scale– 8 (I-8))
Cognitive ability	Cognitive scores, executive function and vocabulary
Socio- emotional, psychosocial skills and Mental wellbeing	Personality traits, including openness, conscientiousness, and resilience, will be evaluated using standardized inventories such as the 10-Item Personality Inventory.
	Symptoms of depression, anxiety, and social inhibition will be measured using tools like the CES-D Scale, the Rosenberg Self-Esteem Scale, or the Beck Anxiety Inventory. Self-reported measures of life satisfaction and outlook for the future.
Intergenerational Transmission	We will track health, cognitive, and educational outcomes of study participants' children, capturing early developmental indicators (e.g., birthweight, APGAR scores, and preschool enrollment)

We will pilot test the survey instruments and develop field protocols to minimize respondent fatigue, for example by conducting the interview over multiple sessions or days. We also aim to link our survey data with administrative records from the National Ministry of Education of Mozambique on primary and high-school enrolment, repetition, dropout, grade attainment and test scores. This can help in locating subjects, as we will know if they moved to Xai Xai (the capital of Gaza Province), to Maputo or other localities in order to study. By matching administrative data with preschool enrolment records from Save the Children we can also expand our analysis sample to all preschool age children_in treatment and control communities and validate educational impacts on an expanded sample.

Power calculations: We calculate the chances of finding a statistically significant impact if it exists, the power of the tests, on select outcomes. In order to obtain the means, standard deviation and intra cluster correlation (ICC) of variables, we rely on our own data from previous surveys, as we collected data for all family members including parents, siblings and caregivers. We restrict the analysis sub-sample to individuals aged 19-25 and conduct power calculations for primary outcomes including the probability of being employed, labor wages, years of education, and probability of being underweight. We calculate power using 76 clusters, considering a correlation of 20% between baseline covariates and our outcomes of interest, and we let the number of subjects vary inside each cluster. We also let the effect size vary between 0.15 of standard deviation (sd) and 0.4 sd.

Power estimates are presented in Appendix Table A.1. Estimates suggest that modest effects of 0.2 standard deviations will be detectable for most outcomes with our existing sample, and effects of 0.25 standard



deviations are detectable even under high attrition rates surpassing 60%. Graphical representations of power curves are presented in Appendix section 3.

Tracking of respondents

Rigorous tracking and re-contact protocols will be employed to minimize attrition. We will aim to re-survey all two thousand children from the baseline sample. In each of the 3 previous waves of data collection, we collected the GPS location of the child's household and phone numbers from caregivers, relatives and neighbours. We will attempt to gather up-to-date information on the subject's current location and contact information (including phone number, e-mail, social media, etc) by calling available phone numbers and visiting their childhood residence. If the subject is not located, we will inquire about their current contact information with family members, neighbours and community leaders. We will also pilot test tracking protocols for subjects that may have migrated to other parts of Mozambique or internationally, using updated contact information obtained in the initial re-contact attempts.

The most recent Demographic and Health Survey from Mozambique (2022/23) indicates that 83% of the population ages 19 to 25 years old lives in the same community since their birth, and 85% live in the same place as 20 years ago. Among those who moved from their original communities in Gaza in the last 20 years to somewhere else in Mozambique, 89% are still in Gaza Province, 5.4% moved to Maputo province and 5.1% to Maputo city. These recent data lead us to believe that tracking of subjects outside of Gaza province will be required for approximately 15% of subjects, and that a majority of those will be located in neighbouring Maputo province and city. However, if high returns to education lead to disproportionately high migration rates for jobs or higher education, we may be required to track more individuals to cities such as Maputo, Johannesburg and Lisbon. For budgeting purposes, we have conservatively estimated that up to 30% of the sample may need to be tracked outside of the Gaza province.

Between existing survey rounds from 2008, 2010 and 2014, we experienced about 1% attrition of the sample per year. If we extrapolate these numbers to 2026, we obtain an attrition rate of approximately 18%, or a final analytical sample for the long-term survey of approximately 1640 subjects. We are optimistic about keeping attrition to 18% or less given that we have GPS coordinates of the child's original dwelling and contact information from relatives and neighbours. Furthermore, communities are small, with 204 households on average, so there is a high probability that family, neighbours or community members will have information on the current location of the subject. And as mentioned above, migration rates out of Gaza are relatively low and most migration is domestic, either to another community in Gaza or to Maputo Province or City, allowing us to concentrate re-contact efforts in these areas. We will also attempt to track migrants internationally, including South Africa, Malawi and Portugal. In cases where face-to-face surveys are prohibitively expensive due to the location of the subject, we will consider remote-surveys through telephone or video-conference using common messaging applications such as Whatsapp.

The high prevalence of HIV in the Gaza region of Mozambique might also raise concerns about attrition due to deaths of participants. A recent study in Mozambique (Macicame et al, 2023²⁰) found that mortality rates are 18 per 1000 lives from ages 5 to 14 and 26 per 1000 from age 15 to 24 years old, suggesting that approximately 88 subjects (4.4%) may have died since baseline. In case our pilot tracking exercise suggests that attrition within our original study sample is much higher than anticipated, we will develop contingency plans, for example exploring replacement strategies using siblings or other community members who were preschool-aged and resided in treatment or comparison communities during the experimental period.

Expected effect size

Appendix Table A.2 presents the effect sizes from table 1 translated in "real" terms. An effect size of 0.2 SD, for example, means an increase of 8.8 percentage points on the probability of working, while a 0.25 SD increase on log wages means an increase of 17% in wages and a 0.3 SD increase in years of education means an increase of 1.026 year of education.

²⁰ Macicame I, Kante AM, Wilson E, Gilbert B, Koffi A, Nhachungue S, Monjane C, Duce P, Adriano A, Chicumbe S, Jani I, Kalter HD, Datta A, Zeger S, Black RE, Gudo ES, Amouzou A; COMSA-Mozambique study team. Countrywide Mortality Surveillance for Action in Mozambique: Results from a National Sample-Based Vital Statistics System for Mortality and Cause of Death. Am J Trop Med Hyg. 2023 Apr 10;108(5_Suppl):5-16. doi: 10.4269/ajtmh.22-0367. PMID: 37037442; PMCID: PMC10160865.

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We benchmark these results with estimates from ECD programs that followed participants in the long run, such as Perry Preschool (PPP, Heckman et al, 2010²¹; Conti et al, 2016²²), ABC/CARE (ABC, Conti et al, 2016; Garcia et al, 2023a) and the Jamaica Home Visit program (Jam HV, Gertler et al, 2014²³; Gertler et al, 2021²⁴; Walker et al, 2022²⁵). Despite relatively small sample sizes, these studies have found significant increases of 26 pp on the probability that males are working (ABC at age 30), 30% on wages at age 22 (Jam HV), 0.46 Jam HV at age 30) to 1.41 years (ABC, females at age 30) of completed years of education, and 57% on the probability of finishing high school. On health-related outcomes, these studies have found reductions of 12 pp to 21 pp on the probability of smoking and 11 pp on the probability of drinking, and an increase of 4 points in BMI. All of these effect sizes are well within detection given the power of our sample.

Given the age of our study cohort at re-contact, one potential challenge could be estimating impact on wages for those who are still studying, for example at the university level. We anticipate that higher education rates will be low, given that in Mozambique 23.8% of adults aged 20-24 completed high school, and 3.8% completed college education (INE, 2023), with 4.3% completion rate in urban areas and 0.5% in rural areas. Given the high dropout rate in the region and lack of tertiary education in rural areas, we expect to find a relatively small number of subjects (below 5%) enrolled in university at ages 21-23. If we do observe significant differential rates of current university enrolment between treatment and control populations, we can estimate the probability of studying at ages 21 to 23, and reweight the sample by using inverse probability weighting (IPW) or augmented inverse probability weighting (AIPW), which improves the standard IPW by using covariates to forecast wages and estimate the probability of studying and not working. We can also impute wages of workers with college education using data from the Mozambican National Institute of Statistics, data such as the Census of 2017 or the Survey of Family Budget of 2022²⁶ (Inquérito sobre Orçamento Familiar).

Potential spillover effects

We have been measuring spillover effects for siblings and caregivers since the first follow up. Indeed, we find significant impacts on school enrolment and time allocation of older siblings (ineligible to attend preschool), who spent less time taking care of younger siblings and more time studying. We also found positive spillovers for caregivers, who had a higher probability of working (Martinez et al, 2017). Spillovers could occur through several channels. Increased caregiver work could increase household income, providing better nutrition to siblings. By freeing time taking care of children, siblings can spend more time studying. Behaviour changes from preschool could influence other children if they see preschool children as a role model. Finally, changes in parenting practices could improve hygiene, heath and cognitive and non-cognitive stimulation for the siblings.

We will aim to capture spillover effects on siblings by linking our data to administrative data from the Ministry of Education by school and grade, allowing us to calculate dropout rates and highest grade completed. We can also match these datasets with the preschool enrolment dataset from Save the Children and identify spillover effects on those who did not attend preschool but lived in the same communities. Furthermore, during our follow up survey, we will ask subjects about their sibling's educational attainment, current employment status and fertility. Finally, as mentioned above, spillovers may occur through the inter-generational transmission of human capital. We will explore this hypothesis by measuring educational and health outcomes of children of our study subjects.

4. Impact of research

The proposed research aims to fill a critical gap in long-term evidence for the impacts of early childhood development (ECD) programs in LMICs, addressing an area of high interest for GiveWell and Open Philanthropy (OP). The current evidence base, largely based on short-term studies, shows ECD programs can effectively mitigate developmental delays due to malnutrition and stunting. However, these benefits often

 ²¹ Heckman JJ, Moon SH, Pinto R, Savelyev PA, Yavitz A. The Rate of Return to the High/Scope Perry Preschool Program. J Public Econ. 2010 Feb 1;94(1-2):114-128.
doi: 10.1016/j.jpubeco.2009.11.001. PMID: 21804653; PMCID: PMC3145373.
²² Conti G, Heckman J, Pinto R. The Effects of Two Influential Early Childhood Interventions on Health and Healthy Behaviour. Econ J (London). 2016
²³ Conti G, Heckman J, Pinto R. The Effects of Two Influencial Early Childhood Interventions on Health and Healthy Behaviour. Econ J (London). 2016

Oct; 126(596):F28-F65. doi: 10.1111/ecoj.12420. Epub 2016 Dec 7. PMID: 28260805; PMCID: PMC5331750. ²³ Gertler, Paul et al. 2014. "Labor market returns to an early childhood stimulation intervention in Jamaica". Science 344(6187): 998–1001

²⁴ Effect of the Jamaica Early Childhood Stimulation Intervention on Labor Market Outcomes at Age 31 Paul Gertler, James J. Heckman, Rodrigo Pinto, Susan M. Chang, Sally Grantham-McGregor, Christel Vermeersch, Susan Walker, and Amika Wright NBER Working Paper No. 29292 September 2021 JEL No. C31,I21,J13 ²⁵ Walker, Susan P. et al. 2022. "Cognitive, psychosocial, and behaviour gains at age 31 years from the Jamaica early childhood stimulation trial". Journal of Child Psychology and Psychiatry and Allied Disciplines 63(6): 626-35.

²⁵ National Institute of Statistics, releases data from the Household Budget Survey (IOF-2022)

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diminish over time, particularly in regions with limited primary education quality. By providing new, detailed insights into the effectiveness of preschool interventions over time, our study can inform future ECD investment decisions from governments and donors.

Full time center-based care is a favored policy option of many high and middle income countries because of its dual role of providing education and nutrition to young children and allowing care givers to work. It has the potential to contribute substantially to child development not only directly, but also indirectly through an improvement in household resources (and even in local economies). Yet center-based care can be an expensive policy, and its long-term impacts are not known in low-income countries. There are several reasons why impacts may be different in low and high-income countries. For example, both the quality of the preschools and of the alternative home environments children would be exposed to in the absence of preschools are likely to be quite different in rich and poor countries. In addition, the health and nutrition benefits of preschools in very low resource environments may be especially important in poorer contexts. The proposed research is a unique opportunity to learn about the long-term impacts of exposure to preschool in a very poor country

Our research aligns with GiveWell and OP's focus on high-impact, cost-effective interventions. While longterm outcomes for cognitive and health gains from ECD have been well documented in U.S.-based programs like the Perry Preschool Program and Abecedarian Program, similar studies in LMICs remain scarce. This study, which extends beyond early childhood to assess long-term effects on health, behavior, and labor market outcomes, will be the first long-term preschool-related study, and only the second long-term, experimental evaluation among broader ECD interventions in LMICs, following the Jamaican Home Visit Program (Gertler et al, 2014;.Gertler et al, 2021; Walker et al, 2022). By focusing on regions with unique needs, such as high HIV prevalence in Mozambique, we also aim to capture additional effects related to reductions in risky behavior, which can significantly impact life expectancy and quality in this context.

The Mozambican community-based preschool model, evaluated here, was inspired by promising short-term outcomes. Based in part on evidence from the initial evaluation (Martinez et al 2017), the model was scaled by the Mozambican government to 350 communities. This approach to center-based care offers a realistic model that can be adopted by other NGOs and governments in LMICs. Our findings will contribute valuable data to determine cost-effectiveness and rates of return, enabling governments, NGOs, and donors to make evidence-based decisions on preschool investments. This study holds the potential to establish a new area of giving within GiveWell and OP's portfolios by highlighting a scalable intervention that addresses critical developmental gaps in LMICs, guiding future ECD funding and policy.

5. Human subjects research

The original study obtained the necessary ethical approvals from Mozambican authorities, including clearance from the Bioethics Committee of Mozambique, in 2008. These approvals remain valid for subsequent data collection and analysis rounds. For the upcoming long-term follow-up, we will update and renew all required IRB and official approvals to ensure continued compliance with ethical standards, and we will request further IRB approval from University College London's ethics committee.

At 3ie, we register evaluations with The Registry for International Development Impact Evaluations (RIDIE), which aligns with best practice in open science. Given the experimental nature of the impact evaluation, we will also register the study on the AEA Social Science Registry. These registries allow researchers to record evaluation designs before analysis and update findings throughout the study's lifecycle.

3ie adheres to strict ethical standards and processes in data management and data collection and expects our collaborators to follow 'do no harm' principles in all contexts. Investigators re required to have updated humansubjects protection certificates and to obtain ethical clearance with appropriate institutions prior to conducting the study. Additionally, 3ie follows the <u>Transparent</u>, <u>Reproducible</u>, and <u>Ethical Evidence (TREE)</u> framework, ensuring research is ethically conducted and transparent. TREE integrates principles of respect, beneficence, and justice. By committing to these practices, we aim to promote research transparency, enhance the evidence base, and contribute to impactful academic and policy discussions. 3ie is fully dedicated to making research results publicly and safely accessible.



6. Budget

The proposed budget outlines the costs associated with the implementation of the proposed evaluation. Please note that it does not include costs related to implementation. Find attached the budget template along with the technical document and appendix for your review.

7. Alternate funding sources

We have not submitted this proposal to other funders. In the event that our current proposal is not selected or is partially funded, we are prepared to actively seek additional funding opportunities. This would include exploring potential partnerships with other donors who share our mission or, if appropriate, seeking guidance from GiveWell and Open Philanthropy on connecting with like-minded funders. By remaining adaptable and open to collaboration, we aim to secure the necessary resources to support this landmark study.

8. If we have asked additional questions by email, please include your answers to these as well.

Please see Appendix section 4 for responses to questions received by email.