DONATION OPPORTUNITY

Vision and Eye Health

Caviver Congenital Cataract Surgeries

CENTRO DE APERFEIÇOAMENTO VISUAL VER A ESPERANÇA RENASCER

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DONATION OPPORTUNITY

Cause: Vision and Eye Health

Organization: *Caviver* - Visual Improvement Center Ver a Esperança Nascer [Seeing Hope Being Born]

Intervention: Congenital Cataract Surgeries

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Executive Summary

Doebem's work culminates in identifying and recommending the most cost-effective donation opportunities. The World Health Organization considers congenital cataract surgeries one of the most cost-effective healthcare interventions. In Brazil, specifically in Ceará, *Caviver* performs this procedure as part of its Childhood Blindness Prevention Program for children experiencing high social vulnerability.

The surgeries involve removing the clouded lens from the affected eye(s), almost immediately restoring the patient's vision. This interrupts the vision loss process and generates lifelong benefits for children and their families.

Evaluation Highlights:

→ Congenital cataract surgery is highly cost-effective because it prevents childhood blindness in the early years of life, yielding short and long-term benefits for children and families.

→ *Caviver* and its leadership enjoy significant legitimacy and are recognized as a leading reference in childhood blindness prevention in Brazil, particularly in Ceará.

→ The organization serves extremely vulnerable children and families throughout Ceará and from neighboring states, promoting equity, as comparable treatment is only available privately to more affluent families.

→ *Caviver* demonstrated a commitment to addressing the points of improvement identified in ***doebem***'s evaluation. Specifically, enhancing data collection and systematization processes for children pre- and post-operatively will improve *Caviver*'s management and decision-making, enabling more precise cost-effectiveness calculations in future ***doebem*** evaluations.

Problem Statement

Congenital cataracts are a leading cause of childhood blindness in Brazil. This condition is estimated to account for approximately 7% to 19% of childhood blindness cases[1]. Causes can range from hereditary factors to complications during pregnancy. It is characterized by the clouding of the eye's lens, which is naturally responsible for focusing light onto the retina.

While congenital cataracts are treatable, and vision loss can be reversed through surgery, successful treatment depends on intervention within the first few months of life. The absence of timely intervention leads to progressive vision impairment, potentially resulting in complete and irreversible blindness. This not only affects a child's cognitive, motor, and sensory development but also, due to societal biases against disability, severely limits their life opportunities.

Poverty exacerbates this problem, as access to healthcare services that enable early diagnosis and appropriate treatment is significantly unequal, both geographically and, more importantly, concerning families' socioeconomic conditions.

Although the *Sistema Único de Saúde (SUS)* (Brazilian Unified Health System) offers cataract surgeries, long waiting lists often make timely treatment within the critical period impossible. The costs, exceeding R$5,000 (USD 892.8) per eye and reaching tens of thousands of reais, make private treatment inaccessible for the most vulnerable families. Consequently, many children face the lifelong consequences of blindness, which impacts their quality of life and contributes to the intergenerational cycle of poverty.

The exchange rate of 1 USD = 5.6 BRL is used as an estimate for reference, based on the average value over the past 5 years. For a more precise estimate, we suggest performing the conversion at the reading time due to the significant volatility of the BRL-USD exchange rate.

[1] https://agencia.fiocruz.br/diagnostico-precoce-pode-evitar-cegueira-em-criancas

The Organization

The Visual Improvement Center *Ver a Esperança Nascer* (Seeing Hope Being Born) (*Caviver*) is a Civil Society Organization that has worked since 2006 to promote vision health for socially vulnerable children living with conditions that could lead to blindness. With a multidisciplinary and highly qualified team, *Caviver* offers comprehensive and free services, including intake, diagnosis, treatment (clinical and surgical), visual rehabilitation, and psychosocial support. This contributes to reversing preventable blindness cases and improving the quality of life for children and their families.

Dr. Mariana Caliope performing a refraction exam on a 7-year-old child. Source: *Caviver* archives.

Doebem's institutional strength assessment of *Caviver* highlighted the following points, organized by evaluation criteria:

Legitimacy

Caviver is a leading reference in vision health in Ceará and neighboring municipalities. Healthcare facilities throughout the region refer children at risk of vision loss to the institution for surgery. The organization's founder and leader, Dr. Islane Verçosa, is a university professor, a researcher in childhood blindness prevention, and highly respected by her peers.

Technical Capacity of the Team

The organization's medical staff is highly qualified. The surgeons work in regional hospitals and have volunteered at *Caviver* for years.

Promoting Equity

By offering comprehensive free treatment and preventing blindness in vulnerable children, *Caviver* promotes equity, as these families would not be able to afford private treatment. Additionally, *Caviver* partners with other organizations to enable families from distant municipalities to stay for the necessary treatment duration without incurring logistical or accommodation costs.

Dr. Paloma Verçosa performing a refraction exam on a 2-year-old child with Down syndrome. Source: *Caviver* archives.

Dr. Islane Verçosa performing a red reflex test and funduscopy on a 3-month-old baby. Source: *Caviver* archives.

***CAVIVER* OFFERS COMPREHENSIVE AND FREE SERVICES, INCLUDING INTAKE, DIAGNOSIS, TREATMENT (CLINICAL AND SURGICAL), VISUAL REHABILITATION, AND PSYCHOSOCIAL SUPPORT**

Caviver has partnered with ***doebem*** since 2017, when it underwent an initial evaluation and was selected for our portfolio. Over the years, it has been an excellent partner, always available and responsive to ***doebem***'s requests. In 2024, the organization was re-evaluated and fully satisfied the vast majority of the criteria.

Regarding areas for improvement, the first relates to the organization's data collection and analysis strategies. While currently underdeveloped, these strategies hold significant potential for generating evidence to not only enhance the organization's work but also contribute to knowledge generation in the sector. Improving monitoring practices has become a requirement for maintaining a medium-term partnership with ***doebem***. *Caviver*, already aware of this weakness, has committed to developing strategies for improvement in this area.

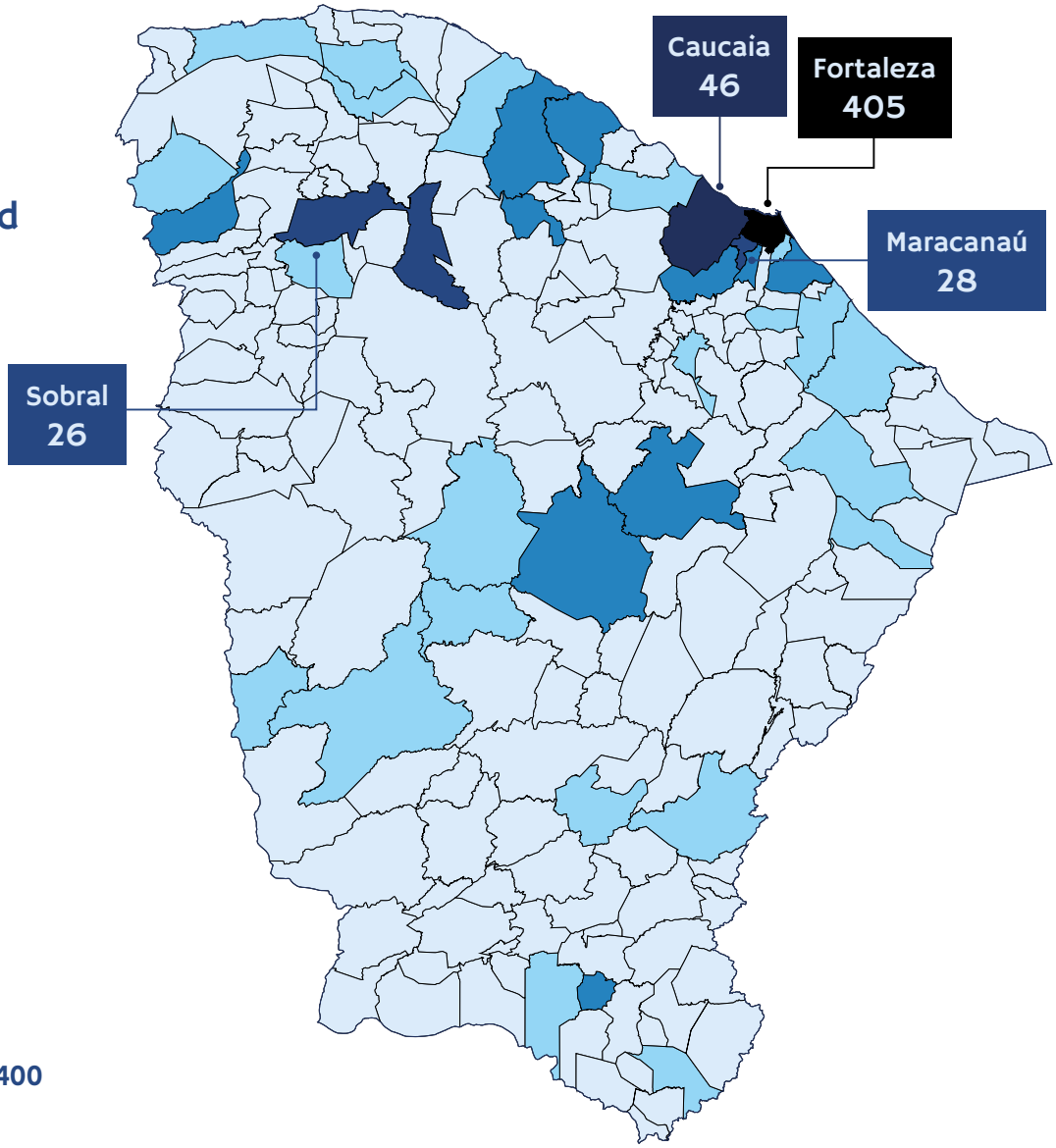
Another aspect that raised concerns was institutional communication, specifically the use of certain terms that, while common in the medical field, are not the most appropriate from an inclusivity perspective. *Caviver* has been receptive to and engaged with this analysis, fostering collaboration between its social assistance and communication departments.

Geographic Reach

Caviver is based in Fortaleza, Ceará, but serves children and families from across the state, as well as from municipalities in neighboring states. These families are referred by local health units to receive comprehensive treatment at the organization.

1,063

children served
(jan. 19 – jan. 25)



Caviver's Area of Operation (2025). Source: Institutional Website.

Dr. Jean Hipolito conducting a visual rehabilitation session. In the image, the child is working with cone-shaped objects, stimulating the development of hand-eye coordination. Source: *Caviver* archives.

Ceará has the third-highest poverty rate in Brazil, with nearly half (48.7%) of its population living on less than R$665 (USD 118.75) per month[2].

It also has the third-highest percentage of its population living on less than R$209 (USD 37.3) per month[3], with 9.4% experiencing extreme poverty.

[2] US$6.85 PPP per day is the World Bank's parameter for categorizing extreme poverty

[3] US$6.85 PPP per day is the World Bank's parameter for categorizing extreme poverty

The Intervention

Congenital cataract removal surgery is part of *Caviver*'s Childhood Blindness Prevention Program[4], which provides comprehensive care to children and adolescents aged 0 to 15. In addition to the surgical procedure, the program offers clinical care, social services, visual rehabilitation, and psychosocial support.

The surgery involves removing the clouded lens from the affected eye(s) and results in the almost immediate restoration of vision[5]. It is considered one of the most cost-effective healthcare interventions by the World Health Organization (WHO)[6]. In some cases, an artificial intraocular lens is implanted in place of the natural lens. In others, vision correction is achieved through contact lenses.

Cataract removal surgery costs *Caviver* R$4,084 (USD 729.3) per eye, including materials, medications, equipment, and personnel costs for staff like anesthesiologists and nurses. The ophthalmologists are *Caviver* volunteers and perform the surgeries at no cost to the organization.

While the surgery completely removes the cataract, its long-term effectiveness regarding visual acuity is highly correlated with post-operative care and rehabilitation practices. Therefore, *Caviver* provides guidance and treatment before and after surgery.

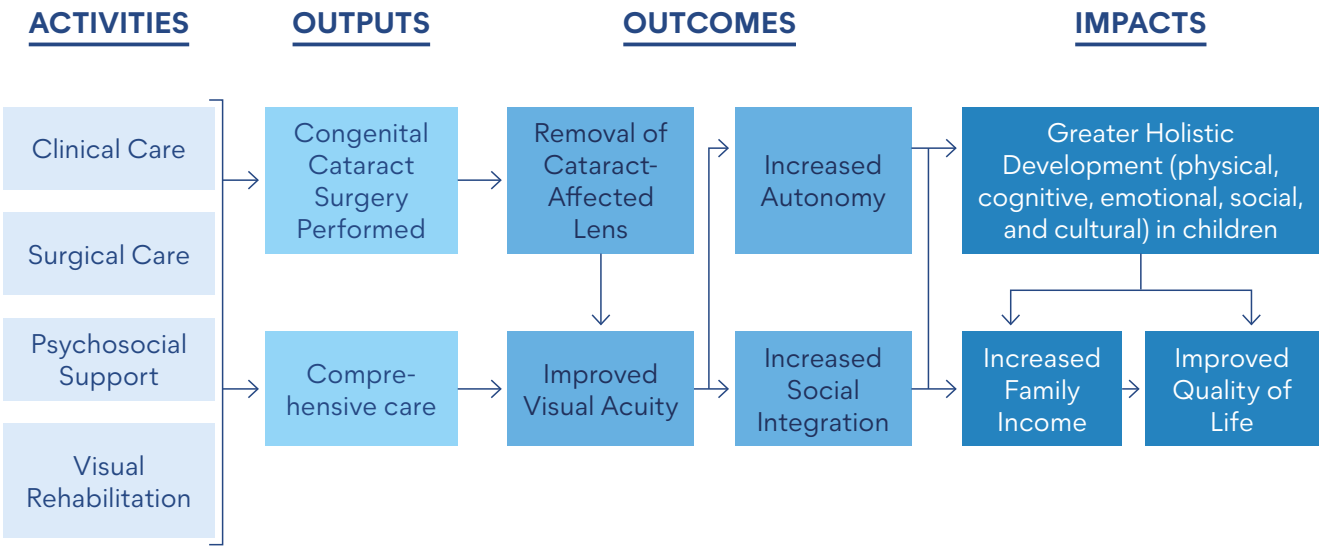
4 *Caviver*'s Childhood Blindness Prevention Program also includes comprehensive treatment for congenital glaucoma and retinopathy of prematurity.

5 Eye Health Conditions in Brazil 2019 - Brazilian Council of Ophthalmology.

6 https://www.who.int/news-room/fact-sheets/detail/blindness-and-visual-impairment

CAVIVER'S CHILDHOOD BLINDNESS PREVENTION PROGRAM PROVIDES COMPREHENSIVE CARE TO CHILDREN AND ADOLESCENTS AGED 0 TO 15

Improved visual acuity is associated with increased autonomy and social integration for the child, contributing to their holistic development in the short term and facilitating their family members' integration into the workforce, along with the child's future integration. These effects have both economic and social consequences for the child and their family.



Summarized Theory of Change for the *Caviver* Intervention

Evidence of Impact

Studies demonstrate that early diagnosis and surgery within the first few weeks of life are crucial for reversing blindness and other negative long-term consequences for children's vision[7][8].

Despite the consensus on the importance of early diagnosis and treatment for improving visual acuity in infants and children with congenital cataracts, evidence regarding the magnitude of this impact and the risk of long-term visual complications is less consistent. These outcomes depend on several factors, ranging from surgical techniques to post-operative care. Therefore, ***doebem***'s continued recommendation of Caviver is contingent on more rigorous, long-term monitoring and recording of visual acuity metrics for the children served by the organization.

Furthermore, the literature lacks methodologically rigorous studies measuring the causal relationship between surgery and relevant socioeconomic variables. Most studies are observational or randomized controlled trials with small sample sizes. Nevertheless, it is reasonable to assume that by preventing childhood blindness, the surgery mitigates the negative impacts of visual impairment—caused by a social structure ill-equipped for inclusivity—on these children's quality of life throughout their lives.

[7] SIMÃO, Ana Leticia Corvisier Sad et al. Catarata congênita: aspectos diagnósticos, clínicos e cirúrgicos: uma revisão da literatura. Congenital cataract: diagnostic, clinical, and surgical aspects: a literature review. RICS - Revista Interdisciplinar das Ciências da Saúde, v. 1, n. 1, p. 1-23, 2024.

[8] LENHART, Phoebe D.; LAMBERT, Scott R. Current management of infantile cataracts. Survey of Ophthalmology, v. 67, n. 5, p. 1476-1505, 2022.

Cost-Effectiveness

Doebem uses a cost-effectiveness analysis to calculate the relationship between an intervention's impact and its associated costs. This involves considering variables such as the intervention's characteristics, the organization's institutional strength, the health and socioeconomic conditions of the beneficiary communities, and reference studies that have estimated the impact of similar interventions using robust methodological strategies.

The impacts of the surgeries were estimated by considering their effects on reducing morbidity and mortality caused by cataract-related blindness, increasing educational attainment, and improving future earnings for these children.

A hypothetical donation of R$100,000 (USD 17,857.1) is sufficient to perform 24 surgeries for R$4,084 (USD 729.3) each. According to *Caviver*'s historical data, 27% of children undergoing surgery at the organization had cataracts in only one eye. Considering this percentage, the 24 surgeries represent 16 children cured of cataracts. The information provided by *Caviver* indicates a 100% success rate in terms of improved visual acuity. Due to the lack of an official parameter or a more rigorously constructed database from the organization, a 20% discount factor was added to account for potential negative consequences of surgery due to inadequate post-operative care or lack of rehabilitation[9]. Therefore, the aforementioned donation amount prevents childhood blindness in 9 children who, in the counterfactual scenario (i.e., without surgery), would experience lifelong blindness.

[9] It is worth noting that this 20% can be considered a high discount, following a conservative approach, given *Caviver*'s meticulous work to minimize risks that could compromise the surgeries' effectiveness.

Applying disability weights published by the Institute for Health Metrics and Evaluation (IHME) for cataract-related blindness to the above result, the R$100,000 (USD 17,857.1) donation averts 45.2 YLDs[10]. Additionally, the impact on future earnings was estimated using the difference in average labor income between the poorest individuals with and without visual impairment in Ceará[11]. Considering the time until these children reach working age and their productive years until retirement, the surgery represents again, in present value terms, R$ 2,700 (USD 482.1) per child, or R$ 34,000 (USD 6,071.4) in total. Applying Moral Weights[12] to convert income gains into DALYs, the R$100,000 (USD 17,857.1) donation averts 4.8 DALYs. Finally, impacts on educational attainment and mortality reduction were also estimated, but in both cases, the estimated impact is negligible.

Thus, it is estimated that R$ 100,000 (USD 17,857.1) would avert a total of 49.9 DALYs.This means a donation of R$2,000 (USD 357.1) would provide one year of healthy

[10] YLDs (Years Lived with Disability) is a metric related to disease-induced morbidity and is a component of DALY (Disability-Adjusted Life Year). DALY is the sum of YLDs and YLLs (Years of Life Lost due to premature mortality). One DALY represents the loss of one year of healthy life due to illness, injury, or health conditions.

[11] Data from the 2022 PNAD-c indicates that the average monthly income of individuals in the 1st and 2nd income quartiles in Ceará with visual impairment was R$162, while the average for those in the same quartiles without visual impairment was R$274. The definition of a person with visual impairment followed the reference document: https://agenciadenoticias.ibge.gov.br/media/com_mediaibge/arquivos/oagafaedo4d7983of73a16136dba23b9.pdf

[12] Conversion was performed using moral weights, which are correspondence factors based on ethical values or personal preferences that individuals or societies hold to compare impacts of different natures.

life for an individual who would have suffered the consequences of childhood blindness throughout their life had they not received the congenital cataract surgery and treatment offered by *Caviver*. This result is the second-best among recent donation opportunities evaluated by ***doebem***.

It's important to emphasize that despite some uncertainty in this exercise, stemming from the lack of impact evaluations establishing causal relationships between the surgery and the most relevant dimensions for the final result, ***doebem***'s perception, based on academic literature, is that the result is more likely underestimated than overestimated. This is because evidence links visual impairment to mental health impacts[13] and impacts on family members' labor market indicators[14], which were not included in the calculation[15].

[13] CHAK, Melanie; RAHI, Jugnoo Sangeeta. The health-related quality of life of children with congenital cataract: findings of the British Congenital Cataract Study. British Journal of Ophthalmology, v. 91, n. 7, p. 922-926, 2007.

[14] BARROS, Leticia Baptista de Paula et al. Gasto Catastrófico em crianças com deficiência visual: estudo transversal com cuidadores no Rio de Janeiro, Brasil. Cadernos de Saúde Pública, v. 40, 2024. e00167723.

[15] The decision not to include these other dimensions was based on a preference not to add further layers of uncertainty to the calculation, as no highly rigorous experimental or quasi-experimental studies measuring these relationships were found.

Funding Opportunities

Caviver can perform approximately 20 congenital cataract surgeries per month. While this doesn't fully meet the territorial demand, it ensures the waiting list doesn't exceed two months, a mark considered excellent by international standards.

Caviver lacks a consistent, recurring donor to finance these surgeries, making the number of monthly procedures directly dependent on the success of fundraising efforts in the preceding month. This not only compromises the surgeries' effectiveness (given the strong evidence linking timely intervention to positive outcomes) but also negatively impacts the organization's efficiency, as some of the personnel hired for these procedures end up underutilized.

Securing funding for the year's surgeries, totaling R$980,000 (USD 175,000) equivalent to R$81,700 (USD 14,589.3) per month, would increase predictability, enhance organizational efficiency, reduce waiting lists, and maximize the surgeries' positive impact.

***CAVIVER* CAN PERFORM APPROXIMATELY 20 CONGENITAL CATARACT SURGERIES PER MONTH**

Dr. Islane performing a tonometry exam to check eye pressure on an 8-year-old child. Source: *Caviver* archives.

Highlights

→ **Long-term Gains:** congenital cataracts are a leading cause of childhood blindness globally, but they can be effectively treated through surgical interventions like those offered by *Caviver*. When performed in the early years of life, these surgeries not only restore vision but also promote significant, lasting gains in children's development and quality of life throughout their lives.

→ **Equity:** by offering free, comprehensive treatment to children from socially vulnerable families, *Caviver* promotes equity by providing access to care typically only available to more affluent families. Furthermore, recognizing the ableist and exclusionary nature of society, preventing childhood blindness helps break the cycle of poverty perpetuation that would disproportionately affect these families.

→ **Institutional Legitimacy:** *Caviver* and its leadership are references in childhood blindness prevention throughout Ceará and neighboring municipalities, serving as an inspiration for other organizations nationwide.

Key Considerations/ Uncertainties

→ **Lack of Robust Evidence in the Scientific Literature:** part of *Caviver*'s cost-effectiveness calculation relied on assumptions based on the organization's historical data and academic literature featuring studies employing methods other than experimental or quasi-experimental designs. While these assumptions are reasonable, the methodology used is not ***doebem***'s preferred approach. Therefore, a medium-term partnership with *Caviver* is contingent on generating more robust evidence, specifically through a more rigorous data collection and analysis process for children served. To learn more about our methodology, visit: https://bit.ly/3yv1sog

→ **Non-Inclusive Language in Institutional Communication:** *Caviver*'s institutional communication still uses medical terminology considered inappropriate from a social inclusion perspective for people with disabilities. The organization acknowledges this issue and is committed to revising its communication (both formal and informal). ***Doebem*** will monitor this process.

Questions and Answers

WHY MEASURE IMPACT IN DALYS?

DALYs are a commonly used metric for evaluating and comparing interventions from a cost-effectiveness perspective, as they incorporate both mortality and morbidity aspects into a single measure.

WHY IS THE INVESTMENT NEEDED TO GENERATE 1 DALY DIFFERENT FROM THE UNIT COST OF SURGERY?

Doebem's cost-effectiveness analysis uses DALYs to compare different donation opportunities because it goes beyond the direct cost of surgery and measures the actual benefits and transformations in the lives of beneficiaries. The cost of surgery only reflects the investment needed to deliver the service. The cost per DALY reflects the investment required to genuinely promote positive change in beneficiaries' lives. In short, it's a rigorous method for more accurately measuring the real impact of donations.

HOW CAN I BE SURE MY DONATION WILL BE USED FOR CATARACT SURGERIES?

Doebem monitors donations to partner organizations to ensure funds are used effectively. We analyze financial statements and activity reports periodically to maintain our partnership standards. Additionally, we update the donation opportunity assessment every two years, on average.

Acknowledgments

We thank volunteer Felipe Amorim for his support in collecting data and evidence for these calculations. We also thank Conceição Santana and Dr. Islane Verçosa, on behalf of the entire *Caviver* team, for their conversations, information sharing, and availability throughout the evaluation process. Finally, we thank Luis Enrique Urtubey De Cesaris and Mariana Hungria for translating this document into English.

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Donate to the **Effective Fund** and support this intervention.

If you prefer, donate directly via wire transfer to **contato@doebem.org.br**

R$ 81 (USD 14.5): → Covers the cost of pre-operative medications to dilate a patient's pupil.

R$ 880 (USD 157.1) → Covers the cost of anesthesia for a patient.

R$ 2,000 (USD 357.1) → Prevents the loss of one year of healthy life due to premature death or disability caused by congenital cataracts.

R$ 4,000 (USD 714.3) → Covers the cost of one congenital cataract surgery.