

EARLY CHILDHOOD ENGAGEMENT FOR LIFELONG LEARNING


Early childhood stimulation programs implemented at home with parents can contribute to children's cognitive and socio-emotional development, ultimately enabling them to improve on a number of future life outcomes, including academic achievement, employment, and earnings. Such programs can be implemented cost-effectively and at scale.



DEVELOPMENT MEDIA INTERNATIONAL

KEY RESULTS:

- Weekly home visits promoting psychosocial stimulation changed the way parents interacted with their children and shaped their home environments.
- Children exhibited, on average, immediate and sustained heightened cognitive ability.
- In Jamaica (where researchers have conducted longer-term follow-ups), children in the stimulation group improved their reading abilities, were half as likely to drop out, and ultimately attended more years of school.
- As they entered into full-time jobs, 22-year-old stimulation group members in Jamaica earned around 25 percent more than those in the comparison group.
- Psychosocial stimulation may result in less depression and social inhibition up to 20 years later in participants' lives.
- In general, early childhood stimulation had little effect on children's physical development.

A young child with dark hair, wearing a light-colored straw hat with a colorful band and a light-colored long-sleeved shirt, is shown in profile. The child is holding a blue and white soccer ball with both hands. The background is a blurred outdoor setting with green grass and brown earth.

From conception to five years of age, early childhood is an extremely important period for cognitive and psychosocial development. Children’s high levels of brain plasticity and neurogenesis make them especially receptive to external stimuli. Young children’s minds are still learning how to learn, and simple play activities that stimulate the brain through all the senses can help improve their ability to think, communicate, and connect with others. Research from around the world suggests that guaranteeing such early childhood stimulation is critical.

Children in developing countries may have the most to gain from policy interventions that promote early childhood stimulation. Poverty can limit parents’ ability to spend time and money to play with, feed, and educate their children, resulting in a less stimulating home environment. Children in poor households may thus start life at a disadvantage and can fall further behind their more advantaged peers throughout life. Millions of children under the age of five are at risk of not reaching their full developmental potential, with most living in extreme poverty.

Policymakers know this; UNICEF estimates that approximately seventy countries have implemented early childhood development programs. However, these interventions vary substantially in design, effectiveness, cost, and scalability. To support parents in providing children with more stimulating home environments as well as to address the related risk factors of poverty and poor nutrition, policymakers are increasingly demanding integrated and scalable early childhood development programs.

A growing body of randomized evaluations has rigorously evaluated stimulation and nutrition interventions, and tested their separate and combined impacts. Two studies, in particular, provide actionable lessons for early childhood stimulation programs. Longer-term findings from a small and carefully designed intervention in Jamaica provided a proof of concept for a more recent cost-effective program in Colombia implemented at scale.

EVALUATIONS

CONTEXT

This bulletin reviews studies of two randomized early childhood psychosocial stimulation interventions. While the first took place in Jamaica in the mid-1980s and the second in Colombia nearly 25 years later, the intentionally similar design of the two interventions makes their findings generally comparable. In low-income neighborhoods in Kingston, Jamaica, researchers conducted a house-to-house census and recruited all identified stunted children. Stunting is an easily observed valid indicator of chronic malnutrition, which is strongly associated with large and persistent cognitive, socioemotional, and behavioral issues. In total, 129 stunted children aged 9–24 months were randomly assigned as program participants. In Colombia, researchers capitalized on a pre-existing government-run conditional cash transfer program to randomly assign 1,420 children aged 12–24 months from towns across Colombia. Rather than selecting on nutrition-related measures, this program targeted very low-income households. At the time of the study, 14 percent of all selected children were stunted and 45 percent were anemic.

INTERVENTIONS

Since researchers designed the Colombia intervention to be in line with the Jamaica study, the two programs are nearly identical. In both countries, households received weekly one-hour home visits by trained health aides (Jamaica) or community leaders (Colombia). During these visits, community leaders and health aides conducted play demonstrations with low-cost or homemade toys and books. These visitors interacted directly with both mothers and children, delivering positive feedback to mothers throughout their sessions. To encourage mothers to engage with their children between visits, home visitors also left toys and books behind, exchanging them weekly with new ones. In Jamaica, the intervention lasted two years. In Colombia, the program concluded after 18 months.

In both countries, participants were randomly assigned to one of four groups:

- Stimulation intervention offer
- Nutrition intervention offer
- Combined offer of stimulation and nutrition interventions
- Comparison (no intervention offer)

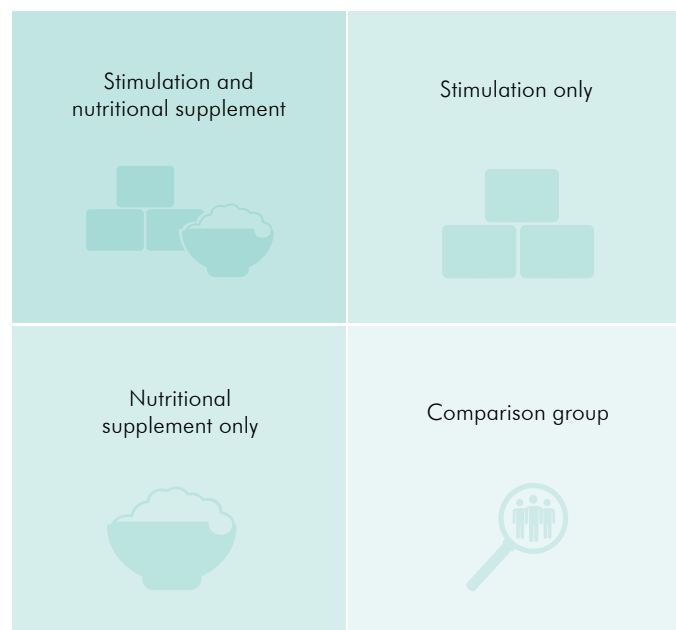
This design allowed researchers to understand the relative and combined effects of nutritional supplements on early childhood development. In Jamaica, households that received the nutrition intervention were given one kilogram of baby formula per week. In Colombia, nutrition intervention households were given micronutrient sprinkles to add to their children's food that included vitamins and minerals such as iron and zinc.



SUSAN CHANG

In Jamaica and Colombia, home visitors conducted play demonstrations with low-cost or homemade toys and books. The items pictured above were used in the Jamaica intervention and were constructed from readily available materials.

FIGURE 1. THERE WERE FOUR GROUPS IN BOTH STUDIES



EVALUATIONS



DEVELOPMENT MEDIA INTERNATIONAL

To measure each intervention’s impact on child development, researchers adapted internationally-recognized measurement techniques to reflect local contexts (see “Assessing Ability”). In Colombia, researchers conducted one endline survey immediately following the intervention, when the average age of participating children was three years old. In Jamaica, the research team followed participants through their lives, conducting surveys at the time children were initially enrolled in the study, at the end of the intervention (ages 33–48 months) and follow-up rounds at average sample ages of 7, 11, 17, and 22 years. In these follow-up studies, researchers measured additional outcomes such as academic achievement and labor force participation (Figure 3). A sample of non-stunted children identified in the initial house-to-house-census was also included in the Jamaica study to measure whether stunted children in the intervention “caught up” to their non-stunted counterparts. For additional details of each intervention, see Table 1.

ASSESSING ABILITY

Assessing a child’s development level can be difficult. To measure children’s abilities at different stages of their lives, researchers rely on a variety of tests. In Colombia, researchers employed the internationally-recognized Bayley-III test to evaluate the developmental functioning of infants and toddlers. This assessment includes sub-components to parse out specific measurements of cognition, language comprehension, expressive language, and motor skills. To ensure both universal reliability and local applicability, the Bayley-III was translated into Spanish and administered by testers with psychology degrees and six weeks’ training.

In Jamaica, researchers relied on the Griffiths Mental Development Scales to test child development every six months during the two-year intervention period. The locally-adapted test uses observable measures such as running ability and block pattern recognition to evaluate locomotor, sensory, coordination, and performance development. In later years, researchers employed the Wechsler Adult Intelligence Scale (WAIS) to assess cognitive ability of the older participants at ages 17 and 22. The WAIS assesses verbal comprehension, non-verbal reasoning, working memory, and processing speed, and is composed of both spoken responses and tasks that participants must perform. There are no IQ tests standardized for Jamaican adults, but this test’s correlation with grades attained, reading levels, math scores, and general knowledge indicates that the WAIS is a valid measurement tool for cognitive ability.

EVALUATIONS

TABLE 1. INTERVENTION AND RESEARCH DETAILS

	Jamaica	Colombia
Location	Low-income, disadvantaged neighborhoods of Kingston	Small towns across Colombia
Implementing organization	Jamaican government community health aides with additional training	Trained female community leaders
Sample	129 stunted children aged 9-24 months	1,420 children aged 12-24 months in households participating in government-run welfare program
Intervention years	1986-1989	2010-2011
Program duration per participant	24 months	18 months
Intervention frequency	Weekly one-hour play sessions at home	
Stimulation intervention	<p>Play demonstrations with low cost or homemade toys</p> <p>Language learning with books and songs</p> <p>Emphasis on positive feedback</p> <p>Toys and books left behind (and exchanged weekly) to encourage mother-child interaction and to assist mothers in learning activities</p>	
Nutrition intervention	Baby formula	Micronutrient supplementation, including iron, zinc, and other vitamins and minerals
Average age at follow-up surveys (in years)	3, 7, 11, 17, 22	3

RESULTS

Early childhood stimulation had large and, in the case of Jamaica, lasting impacts on the cognitive ability and socioemotional development of children, and ultimately contributed to improved academic and employment outcomes.¹ The longer run effects in Colombia are yet to be assessed.

STIMULATION INTERVENTION

HOME ENVIRONMENT EFFECTS

At the end of the intervention period, weekly home visits changed the way parents interacted with their children and shaped their home environments.

To determine whether home visits increased childhood stimulation beyond the weekly one-hour sessions, researchers assessed child-parent interactions and home environment changes. Following the two-year Jamaica intervention, surveyors revisited households to observe parents' interactions with their children, as well as specific aspects of the homes (see Figure 2 for examples). On average, stimulation group households received an 18.5 out of 38 on this home inventory index, 16 percent higher than the comparison group's 16.0 rating. However, these differences appear to have faded over time, with no observed home differences four and eight years later.

In Colombia, where researchers have currently conducted just one follow-up after the 18-month intervention (see "Ongoing Research"), treatment group households had more types of toys, books, and art supplies, collectively, than those in the comparison group. Likewise, parents in the stimulation intervention group also engaged in a greater diversity of activities with their children, such as telling stories, going for a walk, and spending time naming things.

COGNITIVE EFFECTS

Children in the psychosocial stimulation group exhibited, on average, immediate and sustained heightened cognitive ability in both Jamaica and Colombia.

From infancy to adulthood, early childhood stimulation improved participants' cognition. To measure infant and toddler development, researchers in Colombia used the internationally-recognized Bayley-III scales (see "Assessing Ability"). At the conclusion of the 18-month intervention, children in the treatment group scored an average 0.26 standard deviations higher on the Bayley cognition subscale than those in the comparison group. While follow-up surveys will allow researchers to observe the direct impacts of



Original photograph of community health aides in Jamaica preparing for their weekly home visits.

these gains, similar US survey data show that an improvement of this size is associated with a 7.5 percent increase in income at age 30—equivalent to the average earnings gains associated with one additional year of schooling. Over the course of the intervention, trainers provided instruction for just 8 percent of the hours a typical student spends in a classroom in one school year, yet achieved similar cognitive gains. However, a key aspect of the intervention was to train mothers to engage with their children outside of training periods, so actual total instruction hours by either the trainer or mother could be considerably higher. A cost-effectiveness analysis (see "Cost-effectiveness in Colombia") would also need to account for this intervention's relatively lower child-trainer ratio, as compared to student-teacher ratios.

In Jamaica, the research team evaluated participants' cognition at the end of the intervention, as well as at ages 7, 11, 17, and 22 years. An initial post-program evaluation found that stimulation had substantial benefits to children's cognitive language and motor development, as measured by the Griffiths Mental Development Scales (see "Assessing Ability"). Cognitive improvements persisted over time, as children in the stimulation group continued to outperform children from the comparison group on IQ tests when evaluated at 11, 17, and 22 years of age. In the most recent follow-up, the average IQ among these now young adults was 0.6 standard deviations higher than that of their comparison group counterparts.

¹ Since nutritional supplements had no long-term effects on children, when evaluating academic and employment outcomes at age 22 researchers grouped participants who only received supplements with the original comparison group members to form a new comparison group. Likewise, all participants who received psychosocial stimulation (regardless of whether they also received nutrition) were evaluated as treatment group members for the same analysis.

RESULTS

SCHOOLING EFFECTS

In Jamaica, children in the stimulation group improved their reading abilities, were half as likely to drop out, and ultimately attended more years of school.

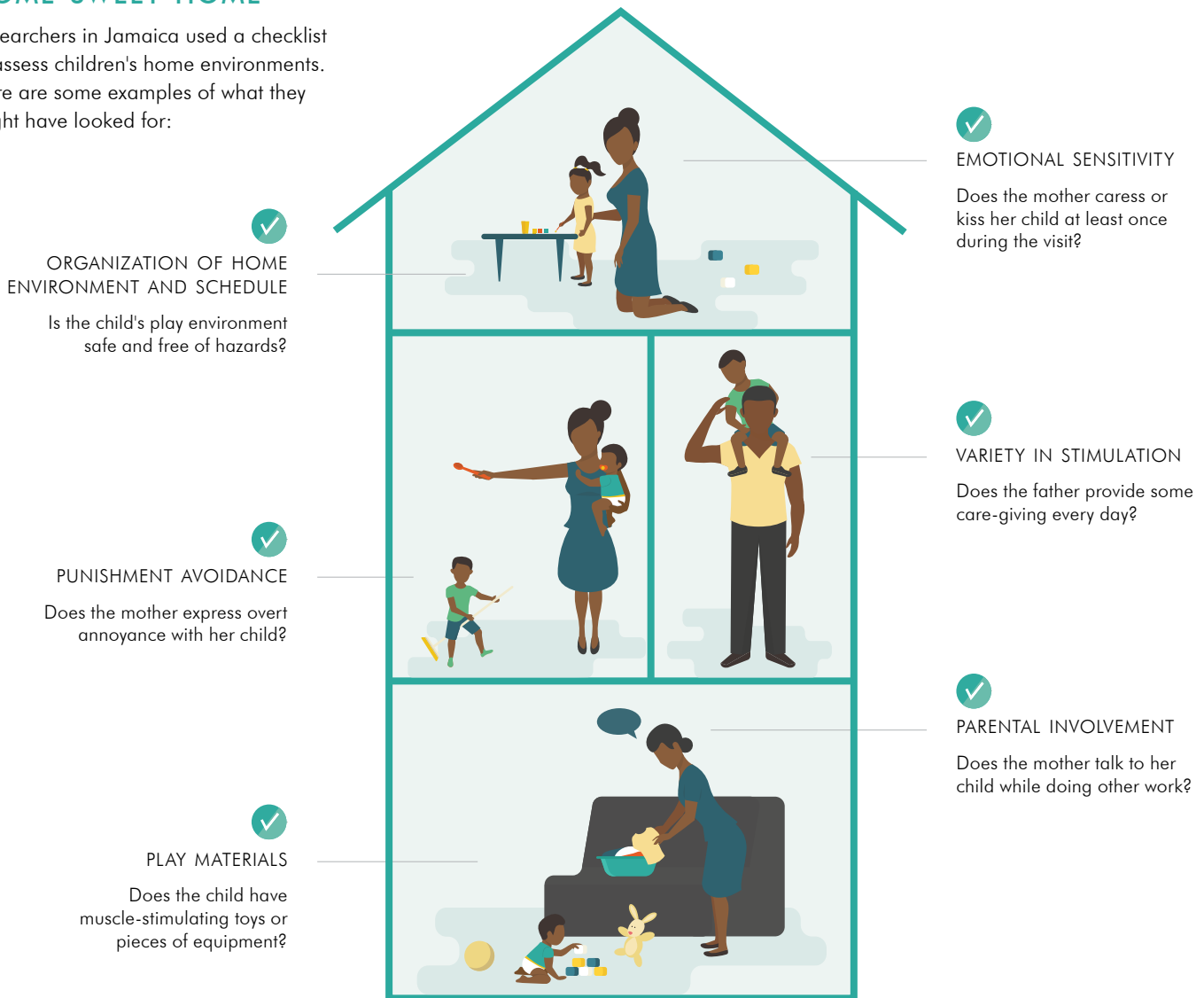
To understand the real-world implications of early childhood stimulation, researchers in Jamaica evaluated the participating children's school performance. At age 17, 29 percent of those in the comparison group had dropped out of school, compared to only 15 percent among stimulation group members. To evaluate whether this program helped children "catch up" to non-stunted children, researchers also followed non-stunted children from the same neighborhoods and found an average 14 percent drop-out rate. This indicates that early childhood stimulation effectively eliminated the higher drop-out rates associated with stunting.

By age 22, the treatment group had attained an average 0.6 more years of schooling, and the proportion of stimulation group members still enrolled in school full-time (22 percent) was more than five times that of the comparison group. Since more treatment group members were still in school at this time, it is likely that the schooling gap between treatment and comparison group members has since continued to grow. Not only did treated children stay in school longer, but they also performed better: young adults in the treatment group scored, on average, around 25 percent higher than the non-stimulated group on standardized math and reading tests. Evidence from US studies suggests that such increases are highly correlated with other positive outcomes such as college attendance and home ownership.

FIGURE 2.

HOME SWEET HOME

Researchers in Jamaica used a checklist to assess children's home environments. Here are some examples of what they might have looked for:



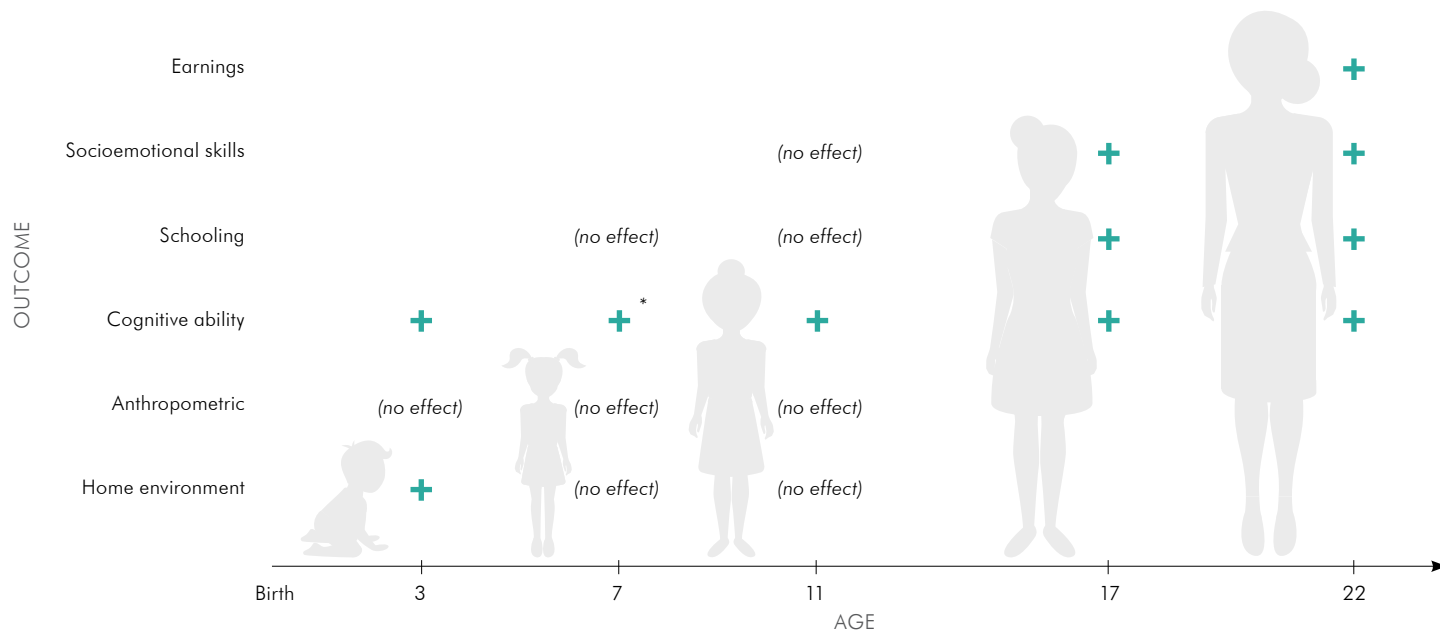
Source: Adapted version of the Infant-Toddler HOME Inventory; this measurement tool was originally developed by Bettye Caldwell, please see "References" for full citation.



RESULTS

FIGURE 3. RESEARCHERS SURVEYED JAMAICAN PARTICIPANTS SEVERAL TIMES FROM INFANCY TO ADULTHOOD, MEASURING AGE-APPROPRIATE OUTCOMES

Policies often address a specific population at a specific stage in life. The public sector invests in human capital across a person’s lifetime, from birth at a public hospital to free primary education to job market training to assistance during retirement. Ensuring that these investments result in long-term economic and social benefits for both individuals and society is of paramount importance to effective policymaking. The research team evaluating the Jamaica study understood this, and measured appropriate outcomes of this stimulation intervention across time. Here is what they measured, and when:



* Perceptual motor skills, a measure of activities involving both movement and perception

Note: Plus signs represent statistically significant positive differences in outcomes between the treatment and comparison groups at the 95 percent confidence level or higher.

JOB MARKET EFFECTS

As they entered into full-time jobs, 22-year-old stimulation group members in Jamaica earned around 25 percent more than those in the comparison group.

In the most recent Jamaica follow-up, researchers compared labor market outcomes among these now working-age adults. For those with full-time jobs, average earnings were 25 percent higher among those in the treatment group. Similar to their academic achievements, this increase equates to “catching up” with non-stunted counterparts.

Treatment group families in Jamaica were also more likely to emigrate. While 12 percent of comparison group households had moved away by age 22, just over 20 percent of treatment families had relocated to another country. Emigration can affect job market opportunities, but it is unclear from this research whether treatment group children’s improved skills were the motivating factor for the move. Researchers also collected information on criminal activity. They found that stimulation group participants were less likely to be involved in violent crime, although there were no differences in arrest or conviction rates.

SOCIOEMOTIONAL EFFECTS

Psychosocial stimulation may result in less depression and social inhibition up to 20 years later in participants’ lives.

In Jamaica, the most recent follow-up of 22-year-olds found that early childhood stimulation may have had some positive socioemotional impact. In general, adults in the stimulation program reported less depression and social inhibition, but similar anxiety levels as those in the comparison group. In Colombia, where participants were around three years old at evaluation, researchers chose to instead focus their analysis on depression levels of participants’ mothers. Immediately following the 18-month program, mothers in treatment and comparison groups expressed similar depression levels.

RESULTS



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PHYSICAL EFFECTS

In general, early childhood stimulation had little effect on the physical development of participating children.

Prior to the Jamaica study, evidence was mixed on whether stimulation may increase physical growth. In both Jamaica and Colombia, stimulation had no effect on children's anthropometric measures such as height or weight by the end of each respective intervention. In Jamaica, stimulated children's locomotor skills were stronger immediately following the intervention, but these effects were not reevaluated in later years. In Colombia, treated children's motor skills were no different than those in the comparison group.

NUTRITION SUPPLEMENTATION

Researchers found no evidence that the specific nutritional supplements offered in these programs had additional interactive effects on any measured outcome.

In Colombia, researchers did not observe any differences between children who received micronutrient supplementation and those in the comparison group. In Jamaica, children given baby formula as a supplement were generally heavier and taller after six months than those who did not receive formula. Researchers also found that children in Jamaica who received both baby formula and psychosocial stimulation improved on physical development measures more than those who received only stimulation. However, these effects faded over time, and researchers did not observe any long-term improvements linked to nutrition supplementation. Additionally, when researchers in both countries evaluated the combined effect of psychosocial stimulation and nutrition, they found no complementary effects in either country.

COST-EFFECTIVENESS IN COLOMBIA

With limited resources, policymakers must evaluate programs not only for their effectiveness, but also for their cost-effectiveness. The researchers designed and implemented the Colombia intervention with cost as a primary consideration. The study findings suggest that child stimulation programs can be delivered at scale and at a relatively low cost. By linking itself to an existing government-run conditional cash transfer program, the intervention benefited from an established administrative capacity, a pre-identified population, and a pre-mobilized local community network. Ultimately, researchers estimated costs at US\$500 per child per year, with potential for further reductions at scale. That amounts to just over one-third of the costs that the Colombian government has budgeted for other child development programs, such as the construction of large centers catering to children aged between 6 and 60 months.

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POLICY LESSONS

Psychosocial stimulation is an effective approach to help children achieve their full developmental potential. The studies featured in this bulletin provide a compelling evidence base for the positive impacts of early childhood stimulation. Around 100 hours or less of community leader home visits with parents and children increased stimulation and improved children’s cognitive abilities. Longer-term evidence from the Jamaica study demonstrates that these effects can persist and convert into improved outcomes later in life, including in school, employment, and earnings.

Interventions promoting early childhood stimulation can be cost-effective and scalable, particularly when incorporated into existing programs. In Colombia, researchers took a light-touch approach by capitalizing on the pre-existing structure of a government-run conditional cash transfer program that already had community-elected leaders and enrolled households. This infrastructure allowed researchers to evaluate an early childhood program that mimicked the Jamaica intervention, while simultaneously testing the model at scale. Similarly positive results to those in Jamaica indicate that such interventions can cost-effectively achieve strong positive impacts on child well-being.

ONGOING RESEARCH

In Jamaica and Colombia, researchers will continue to follow up with participants to examine longer-term outcomes. In India, which has a higher number of stunted and/or impoverished children than any other country, researchers are currently evaluating an early childhood stimulation program adapted for the local context from the Jamaica and Colombia model. They are also testing a “play group” approach that promotes interaction among mothers and encourages sharing of child development practices, an approach that may also prove to be more cost-effective than current program models. Additionally, researchers’ analyses will allow them to evaluate the mechanisms through which the program works, such as the amount of time mothers spent playing with their children.

OPEN QUESTIONS

These programmatic extensions and adaptations will help advance knowledge on how to optimally design early childhood stimulation programs, but there are still many important questions for researchers, policymakers, and program implementers to consider. Here are a few:

- What is the most effective age to enroll a child in an early childhood stimulation program?
- What is the minimal and optimal duration for early childhood stimulation required to achieve sustained benefits?
- What is the optimal delivery model, and how can this approach be integrated into the larger suite of maternal and child health programs?
- How does this intervention affect parents and the larger community?

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