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The Long-Term Indirect Impacts of Early Childhood Deworming

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2009-2010

Sample Size
20,000 children

Research Implemented by IPA
Yes

The Long-Term Indirect Impacts of Early Childhood Deworming

Abstract

Intestinal worm infections are among the world's most widespread diseases, with roughly one in four people infected worldwide. Research has shown that when children are treated with deworming medication, worm infections become less prevalent not only for children who received the medication, but for those who live in the same environment as treated children. This evaluation tested whether a mass deworming campaign conducted among primary school pupils in western Kenya had long-term effects on young children who were in contact with treated children. It found large cognitive effects—equivalent to half a year of schooling—for children who were less than one year old when their communities received mass deworming treatment. For children with siblings in school at the time, improvements were twice as large.

Policy Issue

Intestinal worm infections – including hookworm, whipworm, roundworm and schistosomiasis – are among the world's most widespread diseases, with roughly one in four people infected worldwide. School-age children have the highest infection prevalence of any group, and while mild worm infections are often asymptomatic, more serious infections can lead to lethargy, anemia, and growth stunting. There is a growing body of evidence that suggests that school-based deworming can generate immediate improvements in child appetite, growth, and overall health, and subsequent improvements in school attendance. However, no evidence to date has shown whether deworming during early childhood can have lasting benefits. This

research attempts to help fill this gap, providing the first evidence on the long-term effects of reducing helminth infection in early childhood.

Context of the Evaluation

Between 1998 and 2001, researchers Edward Miguel and Michael Kremer carried out the Primary School Deworming Project (PSDP) in which they randomly phased in deworming drugs to a group of 75 primary schools in western Kenya. Children in this region suffered from high rates of worm infection before the study; 92 percent of children had at least one type of worm infection. The PSDP led to reduced infections, reduced anemia, and increased school attendance. While only schoolchildren were dewormed, the study found large "spillover" effects within the community. In terms of school attendance, for example, children in dewormed areas who were not actually given medication still received nearly 60 percent of the benefits of direct deworming.

This research took place in the same area as the PSDP, a densely populated farming region in Samia and Bunyala districts, along the shores of Lake Victoria.

Details of the Intervention

This study utilized the positive, indirect effects of the mass school-based deworming project, the Primary School Deworming Project,[1] to estimate the long-term impact on young children whose communities were dewormed years earlier, but who did not receive medication directly.

The researcher utilized information from the original deworming project to divide the children into groups based on their age at the time deworming occurred in their communities. Because the project was implemented in phases from 1998 to 2001, children who were the same age in 2009 were different ages when deworming project took place. The researcher was therefore able to compare children whose communities were dewormed by the time they reached age 1 to those who were two years old or older (the comparison group) at the time the deworming project took place in their communities.

In 2009 and 2010, an IPA field team in Kenya collected height, weight, and migration data from more than 20,000 children at all of the deworming project schools in Samia and Bunyala districts of Kenya's Western Province who were between the ages of 8-14 in 2009. For a subset of approximately 2,400 children, the team also conducted detailed cognitive assessments, which tested memory, reasoning, verbal fluency and receptive vocabulary.

Results and Policy Lessons

Overall, the indirect effects of deworming in early childhood (starting by age 1) yielded substantial improvements in cognitive performance, providing evidence that an inexpensive intervention can reap immense benefits for children in early childhood.

Cognitive function: Early community deworming treatment resulted in an improvement of varying magnitudes on several standardized cognitive outcomes, including a 0.22-standard-deviation increase in nonverbal reasoning ability specifically, and an 0.2-standard-deviation increase in an index combining all cognitive measures more broadly, equivalent to half a year of schooling. The effect was similar for children whose communities were dewormed the year they were born and for those that were dewormed two years before their birth.

The cognitive effects were twice as large for children with an older sibling likely to have received deworming medication directly.

These improvements are well beyond the cognitive benefits of direct deworming later in childhood, indicating that early childhood deworming is particularly useful and policy relevant; deworming early in life may serve as not only an effective investment in future cognitive ability, but an extremely cost-effective one. (Deworming costs around $0.59 per pupil per year,[2] and indirect positive impacts obviously carry no additional cost.)

Height and stunting: Early childhood deworming did not have any long-term effects on stunting or height, suggesting that extreme caloric deprivation was neither a central issue for this population, nor is it a condition deworming chiefly addresses.

Sources

1. Miguel, E., and M. Kremer (2004): “Worms: Identifying Impacts on Education and Health in the Presence of Treatment Externalities,” Econometrica, 72(1), 159–217.

2. Baird, Sarah, Joan Hamory Hicks, Michael Kremer, and Edward Miguel. "Worms at Work: Public finance implications of a child health investment."*University of California at Berkeley,-mimeo* (2014).

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