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Could Giving Kids A 50-Cent Pill Massively Boost Their Income Years Later?

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A teacher gives a deworming tablet to a student during National Deworming Day at a high school in Hyderabad, India, in 2017.

Noah Seelam/AFP via Getty Images

It's one of the cheapest ways to help kids in extremely poor countries: Twice a year, give them a 50-cent pill to kill off nasty intestinal parasites. Now, a landmark study finds the benefits carry over long into adulthood — and the impact is massive. But dig deeper and the issue quickly becomes more complicated — and controversial.

To understand why, it helps to start at the beginning, when newly minted economist — and future Nobel prize winner — Michael Kremer says he stumbled into this study by lucky happenstance.

It was the mid-1990s and Kremer was visiting Kenya. "I mean I was on vacation. I wasn't there for a research trip or something," he recalls.

Kremer, who had spent a year after college teaching at a school in Kenya, decided to look up a friend from that project. And at their get-together, the friend mentioned to Kremer that he was about to start a new aid program to help elementary school children — including by giving them deworming pills.

The parasites aren't just bad for kids' health. They can make a child too listless to pay proper attention in school or so sick she misses many school days.

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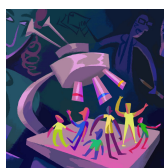
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Kremer, who had recently gotten his doctorate in economics, says he was struck by an idea: "I suggested that if he chose twice as many schools and then they initially started working in half of them and then later expanded [the deworming to the other half], I could measure the impact of what they were doing."

In other words, by comparing what happened to the kids who started being treated with pills first versus those who didn't start to get them until about three years later, Kremer could see whether the pills made a difference on all sorts of measures, including the children's health and school attendance.

This kind of experiment is called a randomized controlled trial. And it has long been the way that scientists like, say, biologists, determine whether a new medication works. But at the time, randomized controlled trials were just starting to gain ground as a tool for economists to check whether programs to alleviate poverty worked.



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"This was the first one I was involved in," says Kremer. And, he adds with a chuckle, "this changed the nature of my research a lot."

Not just Kremer's research. His Kenya experiment helped pave the way for an explosion in these kinds of randomized controlled trials. Last year, Kremer shared the Nobel Memorial Prize in economics for pioneering this approach.

The experiment, which involved about 32,000 children, also turned deworming into a popular form of aid. That's because the first set of results, released in 2004 by Kremer and a collaborator, Edward Miguel of University of California, Berkeley, showed that giving the kids the pills reduced absenteeism and dropping out of elementary school by a fourth — from 28% to 21%.

Kenya's government was so impressed that officials soon extended deworming to all elementary schools in areas where parasites are common. The World Bank provided funding for that effort, and Kremer helped found a nongovernmental organization to provide logistical support.

Various state governments in India also followed suit. Today, Kremer estimates that about 150 million children per year are given deworming pills as a result of the initiatives in Kenya and India alone.

But it didn't end there. Kremer and a growing list of collaborators continued to follow about 7,500 children in the original experiment as they grew up, entered the workforce and reached their late 20s to early 30s. "We have data 20 years out," notes Kremer.

Now they've released those results: Giving out deworming pills to the subjects when they were kids has boosted their household income as adults by 13%. Household spending, which economists consider a more precise measure of standard of living, went up by a similar amount.

"I thought there'd be some impact," marvels Kremer. "But I had no idea there'd be an impact of this magnitude."

A large reason deworming increased incomes, adds Kremer, is that it increased the likelihood that recipients would work in nonagricultural jobs by 9%. These jobs generally pay more than farm work.

"What this shows is that if people are given a chance to be healthy and to get education, then they can benefit from that," says Kremer.

Chris Udry, an economist at Northwestern University who specializes in rural economic activity in sub-Saharan Africa, says he finds the study both rigorous and persuasive.

"It's pretty convincing evidence that deworming is having these long-term effects on people's living standards," says Udry. "It doesn't make someone who is poor rich. But it's a meaningful change. It really does help change their lives." (Udry is working with Kremer's collaborator Miguel on another research project that is unrelated to deworming).

There are, however, some significant caveats to these findings. One is that the income boost was limited to the men in the study. This was all the more notable given that as children, the women saw the biggest education gains from the deworming. For instance, among boys, deworming did not increase the likelihood of going on to high school. But among girls, deworming increased the share who attended high school from 33% to 42%.

"That's a really big effect," says Miguel. In Kenya, he adds, students generally begin high school at age 16 and attend boarding schools. "So it's not too different from what going to college represents in the United States. It can be a transforming experience and gives people very different life chances than if they stay in a village."

An early sign that this would not ultimately translate into economic benefits for the women actually came at the 10-year mark, when the women were in their late teens to early 20s and the researchers first found no clear effects from deworming on women's incomes. At the time, says Kremer, "we thought, 'Well, maybe that's just a temporary effect because some of the women are still in school and also the women were in prime childbearing years at that point.' " Now, he says, the fact that 20 years on the women still haven't seen an economic benefit, suggests it is due to even more insidious "barriers that women are facing in the labor market."

Seema Jayachandran, an economist at Northwestern University who specializes in the economic impact of gender differences and who was not involved in the study, says it's notable that deworming didn't just fail to increase the women's individual income, it had no effect on their household income. This is surprising, says Jayachandran, because based on other social science research, one might expect that these women's greater education would have at least led them to marry men who also had more education and therefore higher incomes — boosting the women's household incomes above that of the women who did not get the deworming pills in the first wave.

Jayachandran says her best explanation is that a large share of the women in the study may actually be single or divorced mothers. Indeed, adds Jayachandran, this would also explain why in each of the two groups — deworming early and deworming late — the women's household incomes are lower than that of the men in their same group.



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If it's true that many of the women are raising families on their own, says Jayachandran, this would be significant because "it makes women poorer overall and also means they don't benefit as much from the improved health and education from the deworming treatment."

Miguel agrees Jayachandran's theory is intriguing. And he says it's one that he and the other authors of the Kenya study hope to delve into once they can resume follow-up data collection that is currently frozen because of the coronavirus pandemic.

Another lingering issue is how to weigh a reanalysis of the experiment's initial findings that was published in 2015 by a team from the London School of Hygiene and Tropical Medicine (LSHTM). Essentially, the LSHTM team sliced and diced the original data using statistical approaches that were different from the ones Kremer and his collaborators had used.

Alexander Aiken, an epidemiologist and member of the LSHTM reanalysis team, says he came away unconvinced that deworming actually caused school attendance to go up. The reanalysis "raised major question marks over many of the findings," he says.

The methods that Aiken and his co-authors favored were so hotly contested by many economists, academics waggishly dubbed the contretemps the "worm wars."

But for Aiken, the upshot is that because he doesn't think the original research proves that the deworming caused kids to spend more time in school, he doesn't see how it could have led them to earn higher incomes so many years later. "I'm not sure I really believe it," says Aiken.

So should funders back deworming programs?

"Figuring out the impact of deworming is really hard," says economist David Roodman, who has served as a fellow or senior adviser to several prominent foundations over the years. "Then figuring out what to do with the research results once you get them is also really hard."

Three years ago, Roodman was tasked with doing just that when he was asked to do an exhaustive analysis of the research on deworming by GiveWell, a nonprofit that helps would-be funders decide which forms of aid are most effective. GiveWell has been a major backer of deworming programs, helping to funnel millions of donor dollars to the cause over the years and funding the 20-years-on round of the Kenya study.

Unlike Aiken, Roodman believes that the original results from the Kenya experiment hold up. "I spent a lot of time trying to decide whether this experiment was flawed in some way," he says. "And I found no flaws." But he notes that this is just one study. And he points to two other studies that, while not as relevant as the Kenya version, according to Roodman's analysis don't seem to suggest a long-term economic impact to deworming.

Roodman is also troubled by a limitation of the Kenya study that Kremer and his co-authors have acknowledged: The deworming program took place during a period when, because of climatic conditions, the rate of parasitic infections was particularly high in that part of Kenya.

"I worry that most places where deworming is done today don't have as bad a worm problem," says Roodman. "And that therefore there should be less benefits."

GiveWell's co-founder Elie Hassenfeld says he, too, has his doubts about deworming. For instance, though he is convinced that the Kenya experiment showed an educational benefit from the deworming, it doesn't strike him as

large enough to explain the enormous impact on recipients' incomes all those years later.

"This should lead us to wonder whether or not this effect is real," says Hassenfeld — sounding notably like Aiken. Hassenfeld says his conclusion is that "there's a very strong possibility that we're *not* having a significant impact with deworming." GiveWell has even taken the trouble to calculate the odds. "We give it a 10% chance that this effect is a real thing," says Hassenfeld.

So why does GiveWell continue to back deworming programs so enthusiastically?

Hassenfeld says it comes down to the extraordinarily low cost of the pills. Because they are so cheap, in the event the long-term benefits are real, they would represent an incredible return on investment for deworming programs — 37%, according to Kramer and his collaborators' latest study.

And so, says Hassenfeld, even if the actual benefits are much, much smaller, "it's a very good bet to take." When it comes down to it, he says, "a low probability of a really positive effect is a good giving opportunity."

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