

Researchers find correlation between hookworm infection, extreme poverty and poor sanitation in rural Alabama

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Hookworm infection is commonly seen in resource-limited areas of Latin America, China and Africa, but problems with poor sanitation linked to extreme poverty also have resulted in a recurrence or persistence of the infection in rural areas of Alabama and likely other parts of the Southern United States.

The infection, which is caused by a worm parasite and results in iron deficiency, cognitive delays, stunted growth in children and anemia in all ages, occurs in impoverished areas of poor sewage and sanitation due to fecal contamination. In a new study published in the *American Journal of Tropical Medicine & Hygiene*, experts at the National School of Tropical Medicine at Baylor College of Medicine show the relationship to [poor sanitation](#) linked to extreme [poverty](#) and endemic prevalence of hookworm infections in Lowndes County, Ala.

Historically, hookworm infection has long-been present in rural Alabama; low levels of the infection persisted up until the 1950s. However, no extensive testing has been conducted in the area since then.

An op-ed by Dr. Peter Hotez, dean of the National School of Tropical Medicine at Baylor, on the topic of poverty and neglected diseases in poor areas of the Gulf Coast, Texas and the Southern United States, inspired Catherine Flowers of the Alabama Center for Rural Enterprise to approach Hotez's team about readdressing this concern. Flowers'

organization focuses on addressing poverty and economic development in Lowndes County, one of the poorest areas in the nation. Her main concern was to work to eliminate the sewage problem in the area.

Dr. Rojelio Mejia, assistant professor of pediatrics at the National School of Tropical Medicine at Baylor and director of the Laboratory of Clinical Parasitology and Diagnostics at the Texas Children's Hospital Center for Vaccine Development, worked with Flowers' organization to conduct house-to-house enrollment for the study, and they were able to collect 55 stool samples, which they brought back to the labs in Houston. Among 24 households, 42.4 percent reported exposure to [raw sewage](#) within their home. A surprising 34.5 percent tested positive for *Necator americanus*, a species of hookworm.

"It's shocking that we continue to have these infections of poverty in the United States," Mejia said.

"The depth and breadth of poverty and disease in Texas, the Gulf Coast and the Southern United States has been consistently underestimated. However, my estimates indicate that up to 12 million or more Americans now live with a neglected tropical disease. The new findings of persistent hookworm infection among the poor living in the American South help to confirm my many concerns about neglected tropical diseases in the U.S. We still need to account for all of the enabling factors responsible for tropical diseases in the U.S. – clearly [extreme poverty](#) is an important factor, but we also need to look at the effects of climate change and other modern 21st century forces," said Hotez.

Mejia's team notified the families that tested positive for the [infection](#). While it is treatable with medication, fixing the sewage problem is likely the only way to end the worm's life cycle.

"The problem is they are just going to get re-infected because they are

getting re-exposed to the same environment. The fix is to solve the issue by putting in sewage systems," Mejia said.

However, because these are areas of poverty, families cannot afford septic systems and tend to discard their waste in the backyard. Mejia hopes that his next study will focus on having sewage lines or septic systems or developing low-cost alternatives built in these areas.

"The irony is that this study illustrates how environmental justice, poverty and climate change have intersected to produce inequality along the famous Selma to Montgomery March trail. We are thankful to the National School of Tropical Medicine at Baylor College of Medicine for validating our long held belief that raw [sewage](#) within the United States is currently yielding tropical illnesses. Now the nation can no longer look away," Flowers said.

More information: Megan L. McKenna et al. Human Intestinal Parasite Burden and Poor Sanitation in Rural Alabama, *The American Journal of Tropical Medicine and Hygiene* (2017). [DOI: 10.4269/ajtmh.17-0396](#)

Provided by Baylor College of Medicine

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