

Unseen infections harming world's children, research reveals

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University of Virginia School of Medicine researchers Liz Rogawski McQuade (from left), James Platts-Mills and Eric Houpt were part of an international team that revealed that childhood infections were a far greater threat than previously realized. Credit: Dan Addison | University of Virginia Communications

Children around the world are suffering from unnoticed infections that

are stunting their growth and mental development, new research from an international coalition of scientists reveals.

Up to 30 percent of children in low-resource countries suffer from stunted growth. Inadequate nutrition and [diarrhea](#) have long been blamed, but scientists have, until now, been unable to explain a large percentage of stunting cases. Two new studies, however, show that a tremendous number of children with no signs of diarrhea are carrying harmful infections. These infections ultimately prevent them from reaching their full potential and perpetuate a vicious cycle of poverty.

"If we're just targeting diarrhea, that may not be enough. We need to be addressing these asymptomatic exposures as well," said researcher Liz Rogawski McQuade, Ph.D., of the University of Virginia School of Medicine. "If we could have interventions against just four pathogens, we would expect an improvement in growth that's similar to what has been seen for nutritional interventions in similar settings. This puts pathogen exposure, in terms of importance, on the same level as nutrition, which in the past has been considered the main reason for poor growth."

Childhood Infections

The researchers examined more than 44,000 stool samples from children in eight countries: Pakistan, India, Nepal, Bangladesh, Tanzania, South Africa, Peru and Brazil. They analyzed the samples using highly sensitive molecular testing—testing much more sensitive than that available in the past—to determine whether the children were carrying harmful infections. They found that four main pathogens were widely present in asymptomatic children: Shigella bacteria, Campylobacter bacteria, enteroaggregative E. coli bacteria and the giardia parasite. More than 95 percent of the children tested positive for at least one pathogen.

"It was surprising that these infections without diarrhea were so common, and that they seemed to explain a large amount of the stunting," said researcher Eric R. Houpt, MD, of UVA's Division of Infectious Diseases and International Health. "The challenge now will be to see if we can reduce these four."

The dangers of *Shigella* are well known, as it is associated with bloody diarrhea. But the new research suggests that it may be an even greater threat than expected. The researchers examined [stool samples](#) from children with diarrhea, and they found that *Shigella* was common even among children with diarrhea that was not bloody. It was especially common in the second year of life.

"Existing international guidelines recommend that only bloody diarrhea needs to be treated with antibiotics in children in these settings, a recommendation that is designed to target the treatment of shigellosis" said researcher James A. Platts-Mills, MD, of UVA's Department of Medicine. "The frequent detection of *Shigella* from non-[bloody diarrhea](#), as well as the strong association between *Shigella* [infection](#) and poor growth, suggest that those guidelines need to be revisited."

Asymptomatic Infections

Houpt noted that childhood infections have lasting effects. "Stunting means children aren't growing and means that they get sick more easily," he said. "They don't do as well in school, and this can trap them in poverty."

Finding ways to address these infections among the world's [children](#) could have tremendous benefits. Vaccines, for example, are being developed for both *Shigella* and *Campylobacter*, noted McQuade, of UVA's Department of Public Health Sciences and UVA's Division of Infectious Diseases and International Health.

"We've made huge gains in diarrhea around the world, and the mortality rate has decreased very rapidly. Both are wonderful, but there is still a lot of room for improvement, and we really need to target these subclinical infections," she said. "We think that these early-life experiences are extremely important for child cognitive development, which is essential for their future earning potential and ... paramount to health."

UVA is now conducting a clinical trial in Tanzania to determine if treating these asymptomatic infections will reduce stunting without significantly increasing antibiotic resistance.

The researchers have published their findings in a pair of papers in the scientific journal *The Lancet Global Health*.

More information: Elizabeth T Rogawski et al, Use of quantitative molecular diagnostic methods to investigate the effect of enteropathogen infections on linear growth in children in low-resource settings: longitudinal analysis of results from the MAL-ED cohort study, *The Lancet Global Health* (2018). [DOI: 10.1016/S2214-109X\(18\)30351-6](https://doi.org/10.1016/S2214-109X(18)30351-6)

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