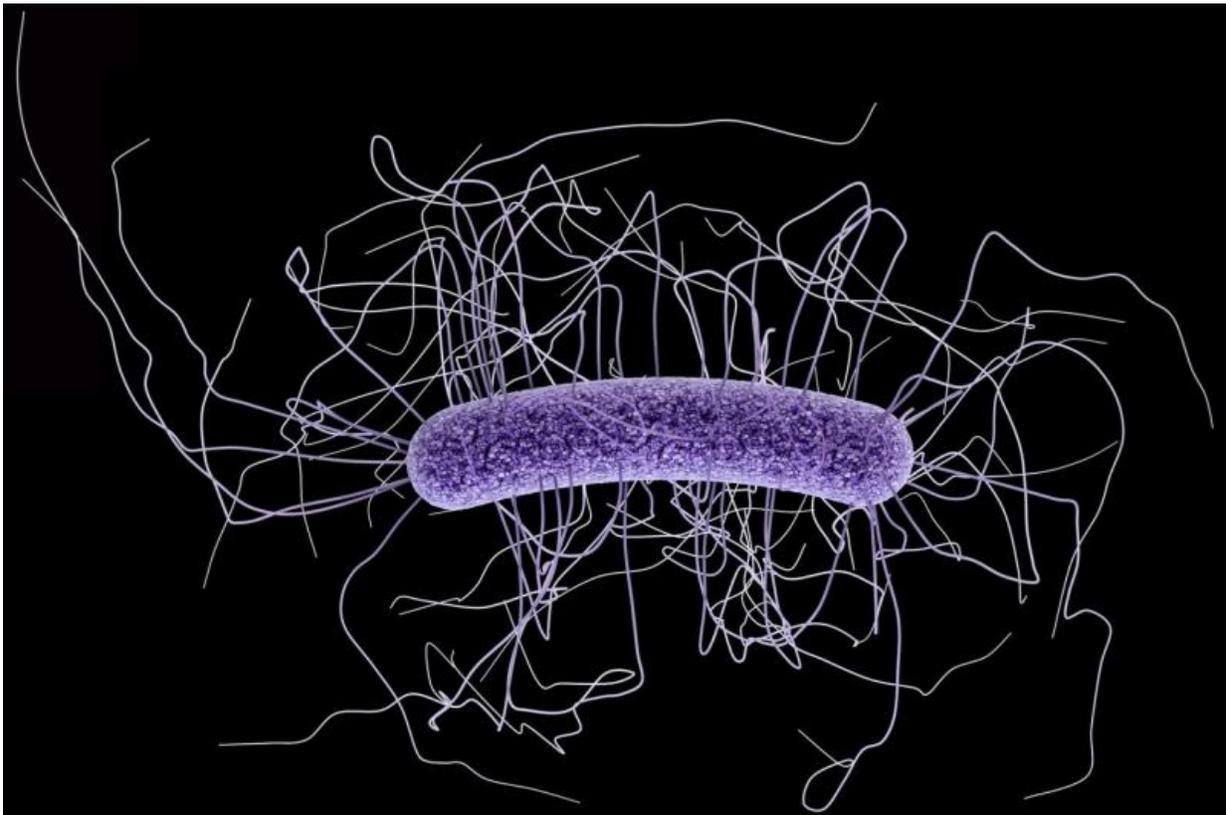


Acid-reducing medications sharply raise risk of *C. diff.* bacteria infection in kids

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A medical illustration of *Clostridium difficile*. Credit: Centers for Disease Control and Prevention

Infants and children who are given prescription acid-reducing medications face a substantially higher risk of developing *Clostridium*

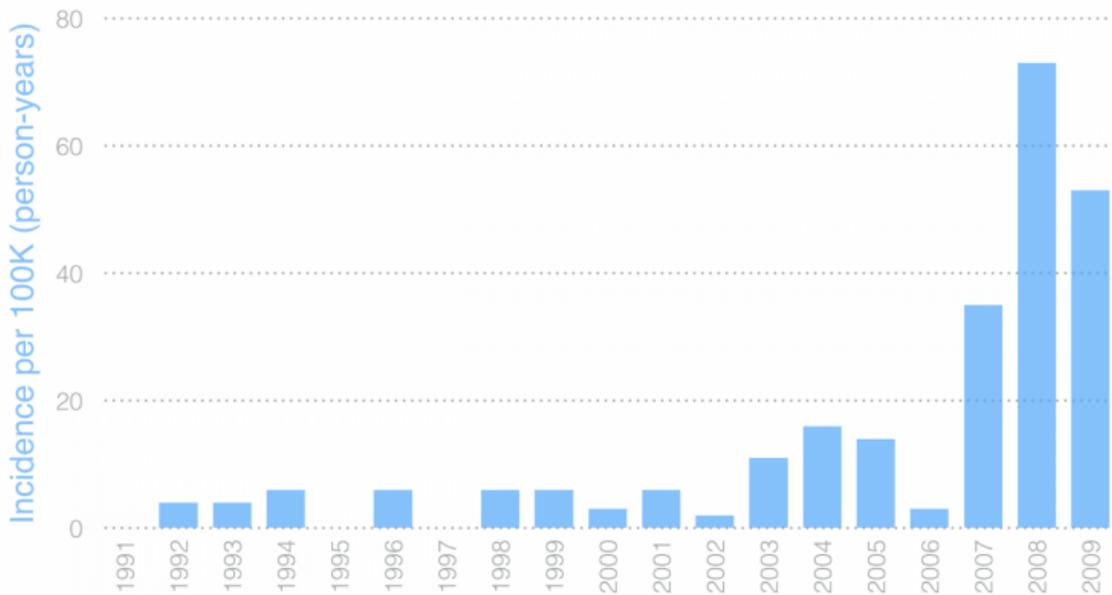
difficile infection, a potentially severe colonic disorder. The findings, reported by Columbia University Medical Center (CUMC) researchers, suggest that pediatricians may do more harm than good by prescribing these drugs for children who have non-specific gastrointestinal symptoms such as occasional vomiting. The study was published recently in the online edition of *Clinical Infectious Diseases*.

"There's no question that acid-reducing medications alleviate heartburn in adults, but there's little evidence of benefit in healthy infants and younger children," said lead author Daniel E. Freedberg, MD, MS, assistant professor of medicine at CUMC. "Given our findings about the risk involved, pediatricians may hesitate before prescribing these drugs unless there is evidence of acid-related disease."

The rate of *Clostridium difficile*, often called *C. diff.*, infection in children is increasing, with a ten-fold rise from 1991 to 2009. For unknown reasons, the infection has recently emerged as a problem in relatively healthy children lacking traditional risk factors.

C. diff. is a bacterium that can cause severe, even fatal, colonic inflammation. The most important risk factor for *C. diff.* infection is exposure to antibiotics. Antibiotics are thought to disturb the healthy balance of microbes in the intestinal tract, allowing *C. diff.* to flourish. Other risk factors for infection are inflammatory bowel disease, immune system compromise, advanced age, and hospitalization (since the bacterium is common in health-care settings).

C. diff. infection in children, 1991–2009



Columbia University Medical Center

Data: Pardi et al. (2013), Clinical Infectious Diseases

The rate of *C. diff.* infection in children is increasing, with a ten-fold rise from 1991 to 2009. Chart adapted with data from Pardi et al. (2013). Credit: Columbia University Medical Center

Studies have shown that use of medications called proton pump inhibitors (PPIs) may contribute to *C. diff.* infection in adults. "The use of PPIs in the pediatric population is rising rapidly, which is why we felt it was important to find out if these medications are associated with an increased risk of *C. diff.* in children," said senior author Julian A. Abrams, MD, MS, Florence Irving Assistant Professor of Medicine at CUMC.

The study examined whether use of PPIs and another type of common acid-reducing medication—histamine-2 receptor antagonists

(H2RAs)—might be contributing to the increased incidence of *C. diff* infection in children who have no known [risk factors](#). "Previous studies have looked at the effects of these drugs on children with chronic illnesses that make them prone to *C. diff*. Less attention has been paid to relatively healthy children, including 'happy spitters' or infants who occasionally regurgitate but probably don't have anything truly wrong with them," said Dr. Freedberg.

The researchers examined the health records of children in The Health Improvement Network, a database of electronic [medical](#) records maintained by general practitioners throughout the United Kingdom, using data collected from 1995 to 2014. (Children with chronic conditions that might be associated with *C. diff* infection were excluded.) The study identified 650 outpatients who had been diagnosed with *C. diff* infection. Each patient's recent use of PPIs/H2RAs was compared with that of five age- and sex-matched controls who did not have *C. diff* infection.

The study found that 2.6% (17 of 650) of the children diagnosed with *C. diff* infection had used PPIs/H2RAs within 90 days, compared with just 0.3% (8 of 3,200) of the controls. In other words, use of acid-reducing drugs resulted in a seven-fold increase in risk for infection with *C. diff*. The effect was stronger for PPIs, which are more powerful than H2RAs.

The researchers suspect that, like antibiotics, acid reducing medications may increase the risk of *C. diff* infection by altering the gastrointestinal microbiome.

"The microbiome in [children](#) is highly mutable up until age four or five," said Dr. Freedberg. "It is unknown whether changes during that formative period, due to antibiotics or PPIs, could alter the microbiome's ultimate trajectory."

Provided by Columbia University Medical Center

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