Antibiotic use by travelers may add to global spread of superbugs

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Taking antibiotics for diarrhea may put travelers visiting developing parts of the world at higher risk for contracting superbugs and spreading these daunting drug-resistant bacteria to their home countries, according to a new study published in *Clinical Infectious Diseases* and now available online. The study authors call for greater caution in using antibiotics for travelers' diarrhea, except in severe cases, as part of broader efforts to fight the growing public health crisis of antibiotic resistance and the spread of highly resistant bacteria worldwide.

"The great majority of all cases of travelers' diarrhea are mild and resolve on their own," said lead study author Anu Kantele, MD, PhD, associate professor in infectious diseases at Helsinki University Hospital in Finland.

In the study, researchers collected stool samples for testing from 430 Finns before and after they travelled outside of Scandinavia. The goal: Determine if their guts became colonized by a resistant type of bacteria from the Enterobacteriaceae family that produces a key enzyme, extended-spectrum beta-lactamase (ESBL), which confers resistance to many commonly used antibiotics. The researchers looked for risk factors in the travelers' behavior that may have facilitated colonization by these resistant bacteria. The U.S. Centers for Disease Control and Prevention has called ESBL-producing bacteria a serious concern and a significant threat to public health. The bacteria can cause severe infections that are harder and more expensive to treat and more likely to be fatal.

The Finnish travelers completed surveys about their trips, including questions about diarrhea and antibiotic use, which can disrupt the gut's balanced ecosystem, sometimes allowing resistant bacteria to become incorporated into the intestinal ecosystem.

Overall, 21 percent of the travelers to tropical and subtropical areas in the study had unknowingly contracted ESBL-producing bacteria during their trips. Significant risk factors for colonization were travelers' diarrhea and treating it with antibiotics while abroad. Among those who took antibiotics for diarrhea, 37 percent were colonized. Those travelling to South Asia faced the highest risk of contracting the resistant bacteria: 80 percent of travelers who took antibiotics for diarrhea while visiting the region were colonized with ESBL bacteria. Southeast Asia, East Asia, and North Africa together with the Middle East, in order, were next highest in risk.

Even if colonized travellers do not develop infections themselves, they may, after returning home, unknowingly spread the superbugs to their own developed countries, where today these bacteria are less prevalent. A laboratory survey showed that none of the 90 colonized travelers in the study developed infections caused by the resistant bacteria during the next year. Had the number of colonized travelers been slightly larger, Dr. Kantele noted, symptomatic infections would probably have been detected.

"More than 300 million people visit these high-risk regions every year," Dr. Kantele said. "If approximately 20 percent of them are colonized with the bugs, these are really huge numbers. This is a serious thing. The only positive thing is that the colonization is usually transient, lasting for around half a year."

Greater attention should be aimed at educating international travelers to take a more cautious attitude toward antibiotics, the study authors wrote.

In general, Dr. Kantele said, travelers with diarrhea should drink plenty of fluids to avoid dehydration, use non-antibiotic antidiarrheal drugs available over the counter to help relieve symptoms if needed, and seek medical attention for severe cases, such as those with high fever, bloody stools, or serious dehydration.

In a related editorial, Bradley A. Connor, MD, of Weill Cornell Medical College, and Jay S. Keystone, MD, of Toronto General Hospital, noted that the study provides compelling evidence that antibiotic use increases a traveler's risk of colonization by ESBL-producing bacteria. Additional research is needed on what criteria should guide travelers' use of antibiotics for severe diarrhea, the effect of travel on the gut microbiome, and new preventive measures travelers can use to avoid diarrhea, the editorial authors noted.

Fast Facts

- Researchers found that taking antibiotics for travelers' diarrhea increased the risk of becoming colonized by extended-spectrum beta-lactamase (ESBL)-producing Enterobacteriaceae, a concerning type of drug-resistant superbug that is a serious threat to public health.
- Travelers who return home with ESBL-producing bacteria in their gut may unknowingly spread these superbugs to their own home countries, even if they do not develop infections themselves.
- Developing regions posed the highest risk, led by South Asia, where 80 percent of the travelers who took antibiotics for diarrhea while visiting the region were colonized with ESBL-producing bacteria.
- Travelers' diarrhea is the single most common cause of illness during international travel. Most cases resolve on their own, without treatment.

- More information on travelers' diarrhea, including tips for prevention, is available from the U.S. Centers for Disease Control and Prevention: http://wwwnc.cdc.gov/travel/page/travelers-diarrhea

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