

Second most common infection in the US proving harder to treat with current antibiotics

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Certain types of bacteria responsible for causing urinary tract infections (UTIs), the second-most-common infection in the United States, are becoming more difficult to treat with current antibiotics, according to new research from Extending the Cure (ETC), a project of the Center for Disease Dynamics, Economics & Policy. ETC released the research via its online ResistanceMap, an online tool created to track changes in antibiotic drug use and resistance. This year, ResistanceMap features analysis using ETC's Drug Resistance Index, a way for non-experts to track changes in antibiotic effectiveness.

Using an index that tracks antibiotic resistance over time, researchers found that the available arsenal of drugs used to treat UTIs are losing their overall effectiveness, with the overall share of resistant bacteria increasing by over 30% between 1999 and 2010. There are currently about five drug classes used to treat UTIs. The analysis combined the extent of their use with data on their ability to treat organisms that cause urinary infections. This research was funded in part by the Robert Wood Johnson Foundation.

[Urinary tract infections](#) are the second most common type of infection, accounting for about 8.6 million visits to health care providers each year, according to the Centers for Disease Control and Prevention. More than half of U.S. women will get a UTI in their lifetime.

"Without proper antibiotic treatment, UTIs can turn into bloodstream infections, which are much more serious and can be life-threatening," said Ramanan Laxminarayan, director of Extending the Cure (ETC). "These findings are especially disturbing because there are few new [antibiotics](#) to replace the ones that are becoming less effective. New drug development needs to target the types of drug-resistant bacteria that cause these infections," he said.

In addition to their overall findings about UTI drug resistance, researchers found worrisome trends that suggest high levels of antibiotic overuse in the Southeastern region of the U.S. between 1999 and 2010. Unnecessary use makes antibiotics less effective in fighting off infections as microbes become more adept at surviving treatment when exposed to them over time.

Trends in UTI Infections and Antibiotic Overuse

Extending the Cure found that the burden of antibiotic resistance for urinary tract infections was highest in the Southeast, specifically in the East South Central and South Atlantic states. In contrast, states in New England and the Pacific regions of the country had lower levels of resistance. Prior work by ETC has shown that these regions are among the most intensive users of antibiotics, which likely speeds up the development of resistant strains of the bacteria causing these and other more serious infections.

Researchers also found significant regional variation and alarming regional trends in the use of antibiotics between 1999 and 2010:

- Since 1999, the percentage of antibiotic prescriptions filled nationwide has dropped by 17%. However, high-consumption states are lagging in this positive trend and are seeing the smallest

decrease in prescriptions, resulting in a widening use gap.

Researchers found staggering geographic variation—residents of Appalachian and Gulf Coast states, where antibiotic use rates are highest, take about twice as many antibiotics per capita as people living in Western states.

- In 2010, the five states with the highest rates of antibiotic use in the nation were Kentucky, West Virginia, Tennessee, Mississippi, and Louisiana. The maps show higher-than-average use of antibiotics in other regions of the country, as well.
- In 2010, the five states with the lowest antibiotic use in the nation were Alaska, Hawaii, California, Oregon, and Washington. Other Western and New England states also showed lower-than-average use.

"While nationally, people are starting to use antibiotics more judiciously, the new findings also show the message might not be reaching everyone. People continue to consume antibiotics at much higher rates in certain parts of the country, and the problem appears to be getting worse," said Laxminarayan. "We're hoping public health officials and health care leaders will be able to use ResistanceMap and the Drug Resistance Index to better target their education efforts to reduce inappropriate use."

High antibiotic use rates could reflect cultural norms in certain regions where consumers demand antibiotics – and physicians prescribe them – even when they aren't needed. Patients in remote areas may desire antibiotics for a cold or the flu, viruses which can't be treated with an antibiotic, because they have infrequent access to their doctor and want to make sure they get a "cure" on their visit. However, additional research must be done to better understand the driving factors behind antibiotic use.

Other National Findings

Other noteworthy findings from ResistanceMap included:

- In contrast to the difficulty in treating UTIs, our ability to treat skin infections, another common reason for outpatient visits, has improved since the peak of drug-resistant infections caused by methicillin-resistant *Staphylococcus aureus* (MRSA) in the mid 2000s. At its height, MRSA caused 19,000 deaths a year, but infection rates have declined due to increased awareness and research efforts directed at new therapies and interventions. The new findings underscore the need to refocus the attention of drug developers and policymakers on certain species of drug-resistant organisms, such as the ones analyzed in the study, called Gram-negative bacteria.
- National use of fluoroquinolones – an antibiotic class commonly used to treat respiratory infections such as pneumonia – increased between 2000 to 2007, but fell by 24 percent from 2007 to 2010. This significant decrease could be due to a black box warning the Food and Drug Administration placed on levaquin, a type of fluoroquinolone which had serious side effects, *Extending the Cure* suggests. Despite their safe reputation, antibiotic side effects account for over 140,000 ER visits annually, according to a 2008 CDC study.

To conduct their analysis of drug resistance, ETC used its [Drug Resistance](#) Index—a tool developed last year—which aggregates information about resistance trends and antibiotic use into a single measure. They populated the index with data from The Surveillance Network, a database containing samples of millions of bacterial cultures pulled from laboratories nationwide. To evaluate antibiotic use, researchers analyzed the number of prescriptions filled in U.S. retail pharmacies using data from IMS Health.

Next year, Extending the Cure plans to release a policy recommendation report, followed by new findings on the socioeconomic and health factors underlying regional disparities in antibiotic use.

Provided by Burness Communications

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