

Global antibiotic consumption rates have increased by 46 percent since 2000

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Antibiotic consumption rates grew by 46 percent after 2000, according to findings which also suggest lack of treatment access in some areas.

Global antibiotic [consumption](#) rates increased by 46 percent in the last two decades, according to the first study to provide longitudinal

estimates for human antibiotic consumption covering 204 countries from 2000 to 2018, published in *Lancet Planetary Health* on Thursday by the Global Research on Antimicrobial Resistance (GRAM) Project.

The excess and inappropriate use of [antibiotics](#) is an important driver of drug resistant infections, yet data on antibiotic consumption are scarce. GRAM, which includes researchers from the University of Oxford, the Mahidol Oxford Tropical Medicine Research Unit (MORU), and the Institute for Health Metric and Evaluation (IHME), used a novel approach that deployed statistical modeling techniques, and incorporated multiple data sources and types, such as large-scale household surveys in low-and middle-income countries, pharmaceutical sales data, and antibiotic consumption data from the World Health Organisation (WHO) and the European Centre for Disease Prevention and Control (ECDC).

The study provides a comparative analysis of total antibiotic consumption rates in humans globally, expressed in the WHO metric of defined daily doses (DDD) per 1000 population per day. This equates to the proportion of people receiving antibiotics on a single day (on each single day in that year) in a given country.

"Understanding the patterns of global antibiotic consumption can help us address a number of public health challenges, from combating drug resistant infections to providing access to basic treatment," said Dr. Annie Browne, data scientist, GRAM geospatial modeler, and the study's first author.

The key findings:

- High rates of antibiotic consumption were seen in North America, Europe and the Middle East, which were contrasted by very low rates of consumption in sub-Saharan Africa and parts of Southeast Asia.

- Total antibiotic consumption rates showed a nearly ten-fold variation between countries, ranging from as low as 5.0 DDD to 45.9 DDD per 1000 population per day.
- Between 2000 and 2018, global antibiotic consumption rates increased by 46% (from 9.8 to 14.3 DDD per 1000 population per day).
- In high-income countries, consumption rates remained stable between 2000 and 2018
- In low- and [middle-income countries](#), there was a 76% increase observed between 2000 and 2018 (from 7.4 to 13.1 DDD per 1000 per day).
- The largest increases in antibiotic consumption rates were seen in the North Africa and Middle East region (111% increase) and South Asia (116%).
- Large variations in the proportion of antibiotics classes used in different geographic contexts.
- The highest rates of broad-spectrum penicillin consumption were observed in the High-Income super-region and the lowest in South Asia.
- In South Asia, consumption rates for fluoroquinolones increased 1.8 fold and for third-generation cephalosporin 37 fold during the study period.

These findings reveal the huge task ahead, implementing and delivering the WHO Global Action Plan on Antimicrobial Resistance, which relies on optimizing antibiotic use and reducing the incidence of infections," said Professor Christiane Dolecek, the study's lead author and GRAM scientific lead based in Oxford University's Centre for Tropical Medicine and Global Health and the Mahidol Oxford Tropical Medicine Research Unit (MORU).

"It is imperative to curb the unnecessary demand for antibiotics and combat antimicrobial resistance by improving drinking water and

sanitation, vaccine coverage and the availability of rapid diagnostic testing, whilst also increasing access and stewardship of antibiotics when and where they are needed. We hope that this seminal platform and first global country-level benchmarking of [antibiotic consumption](#) and usage over a 19-year period up to the pre-COVID-19 era can help inform future interventions to optimize antibiotic use and consumption."

More information: Annie J Browne et al, Global antibiotic consumption and usage in humans, 2000–18: a spatial modelling study, *The Lancet Planetary Health* (2021). [DOI: 10.1016/S2542-5196\(21\)00280-1](#)

Provided by University of Oxford

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