



PCAST Releases New Report on Combating Antibiotic Resistance

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Summary: Today, the President’s Council of Advisors on Science and Technology (PCAST) released a report, *Combating Antibiotic Resistance*. The report was released simultaneously with a [National Strategy on Combating Antibiotic Resistant Bacteria](#) as well as with a [Presidential Executive Order](#), emphasizing to the Nation the importance of addressing this growing challenge.

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The evolution of antibiotic resistance in bacteria is occurring at an alarming rate and is outpacing the development of new countermeasures. According to the Centers for Disease Control and Prevention (CDC), the annual domestic impact of antibiotic-resistant infections to the U.S. economy has been estimated at \$20 billion in excess direct health care costs, with additional costs to society for lost productivity as high as \$35 billion per year and 8 million additional days in hospitals. The safety of many modern medical procedures – including cancer chemotherapy, complex surgery, dialysis for renal disease, and organ transplantation – relies on effective antibiotics. These interventions become significantly more dangerous as bacterial resistance rises. Indeed, the World Health Organization recently warned that we risk entering a “post-antibiotic” era unless we act now.

Bacteria and other microbes evolve in response to their environment and inevitably develop mechanisms to resist antibiotics. In his 1945 Nobel Prize address, Alexander Fleming (recipient of the Nobel Prize for his discovery of penicillin) warned that the inappropriate use of antibiotics would cause human infections to become resistant to these drugs. As bacteria evolve resistance to widely used antibiotics, it is crucial to stay one step ahead of the problem. PCAST recommends measures to strengthen antibiotic stewardship, boost

surveillance, and facilitate the development of new drugs, diagnostics, and vaccines to combat this growing crisis.

Responsible stewardship of antibiotics requires identifying the microbe responsible for disease (ideally with rapid and inexpensive diagnostics); administering the most effective antibiotic at the appropriate dose, route, and time; and discontinuing antibiotic therapy when it is no longer needed. Optimizing the use of our current antibiotics in human healthcare and animal agriculture will extend the longevity of these life-saving medicines and maximize their benefits.

Increased surveillance for antibiotic-resistant bacteria will enable more effective responses to resistant strains, support earlier identification of outbreaks, and limit the spread of resistant organisms. Improved surveillance will help address fundamental questions of where resistant infections originate, practices that contribute to emergence, and how resistant microbes are being transmitted.

Even with improved stewardship and surveillance, it is critical to develop new antibiotics, diagnostics, vaccines, and other interventions at a rate that outpaces the emergence of resistant microbes. A robust antibiotic pipeline is essential for creating new antibiotics to replace those being steadily lost to antibiotic resistance. Establishing this pipeline and successfully addressing the rise in antibiotic resistant bacteria will require coordination across governmental, academic, health-related, agricultural, and private sectors.

In the fight against microbes, no permanent victory is possible: as new treatments are developed, organisms will evolve new ways to become resistant. This reality underscores how essential it is to embark on a course of action that will ensure an effective and enduring arsenal of antibiotics. Committing to combating antibiotic-resistant microbes will support patient care, economic growth, agriculture, and economic and national security. By taking the recommended steps, the United States and global community will continue to reap the benefits of these essential medicines.

- *Read the full report [here](#).*
- *Read the President's Executive Order [here](#).*
- *Read a White House Fact blog post [here](#).*
- *Read the Administration's National Strategy [here](#).*

Eric Lander and Christopher Chyba are members of PCAST and co-chairs of the PCAST Antibiotic Resistance Working Group.