EXTENDED SPECTRUM β-LACTAMASE (ESBL)- PRODUCING ENTEROBACTERIACEAE
CDC’s 2013 AR Threats Report

Estimated minimum number of illnesses and deaths caused annually by antibiotic resistance*:

At least

- **2,049,442** illnesses
- **23,000** deaths

*bacteria and fungus included in this report*
2013 Data Recalculated for 2019 Report

Estimated minimum number of illnesses and deaths caused annually by antibiotic resistance*:

At least

- **2,049,442** illnesses
- **23,000** deaths
- **44,000**

* bacteria and fungus included in this report
The Threat of Antibiotic Resistance in the United States

The New National Estimate states that:

- Each year, antibiotic-resistant bacteria and fungi cause at least an estimated 2,868,700 infections and 35,900 deaths.

The national burden reflects de-duplicated infection and death estimates.

- Clostridioides difficile is related to antibiotic use and antibiotic resistance. It caused 223,900 cases and 12,800 deaths in 2017.

The New Antibiotic Resistance Threats List includes:

- Updated urgent, serious, and concerning threats, totaling 18 threats.
- 5 urgent threats, 2 new threats, and a new watch list with 3 threats.

Antibiotic resistance remains a significant One Health problem, affecting humans, animals, and the environment. Data show infection prevention and control is saving lives, especially in hospitals, but threats may undermine this progress without continued aggressive action now.

Learn more at www.cdc.gov/DrugResistance/Biggest-Threats.
Infection Prevention in Hospitals is Working

CDC’s 2019 AR Threats Report: PREVENTION WORKS.

- 18% fewer deaths from antibiotic resistance overall since 2013 report
- 28% fewer deaths from antibiotic resistance in hospitals since 2013 report

And decreases in infections caused by:

- Vancomycin-resistant Enterococcus: 41%
- Multidrug-resistant Pseudomonas aeruginosa: 29%
- Methicillin-resistant Staphylococcus aureus (MRSA): 21%
- Carbapenem-resistant Acinetobacter: 33%
- Drug-resistant Candida: 25%
- Carbapenem-resistant Enterobacteriaceae (CRE) & drug-resistant tuberculosis (TB disease cases): STABLE
Despite these gains, CDC’s 2019 AR Threats Report shows additional actions are needed to protect people.

- 2.8M+ antibiotic-resistant infections each year
- 35k+ deaths from antibiotic resistance each year
- Plus: 223,900 cases and 12,800 deaths from Clostridioides difficile

Increases in infections caused by:

- Erythromycin-resistant invasive group A strep: ↑315%
- Drug-resistant Neisseria gonorrhoeae: ↑124%
- ESBL-producing Enterobacteriaceae: ↑50%

More Work Needed Beyond Hospitals
Current Antibiotic Resistance Threats in the U.S.

**Urgent Threats**
- Carbapenem-resistant *Acinetobacter*
- *Candida auris*
- *C. difficile*
- Carbapenem-resistant *Enterobacteriaceae*
- Drug-resistant *Neisseria gonorrhoeae* (*N. gonorrhoeae*)

**Serious Threats**
- Drug-resistant *Campylobacter*
- Drug-resistant *Candida*
- ESBL-producing *Enterobacteriaceae*
- Vancomycin-resistant *Enterococci*
- Multidrug-resistant *Pseudomonas aeruginosa*
- Drug-resistant nontyphoidal *Salmonella*
- Drug-resistant *Salmonella* serotype Typhi
- Drug-resistant *Shigella*
- Methicillin-resistant *Staphylococcus aureus*
- Drug-resistant *Streptococcus pneumoniae*
- Drug-resistant Tuberculosis

**Concerning Threats**
- Erythromycin-resistant Group A *Streptococcus*
- Clindamycin-resistant Group B *Streptococcus*
Since 2013, Ranking of Three Germs Shifted

- **C. auris**
  - Not listed in 2013. Listed as Urgent in 2019.

- Carbapenem-resistant *Acinetobacter*
  - Listed as Serious (as Multidrug-resistant *Acinetobacter*) in 2013. Listed as Urgent in 2019.

- Vancomycin-resistant *Staphylococcus aureus* (VRSA)
CDC’s 2019 Watch List

- Infrequently found in the United States or not well understood
- CDC and public health experts are closely monitoring

AZOLE-RESISTANT *A. FUMIGATUS*  
DRUG-RESISTANT *M. GENITALIUM*  
DRUG-RESISTANT *B. PERTUSSIS*
A One Health Challenge: The Interconnected Threat of Antibiotic Resistance

- Resistance happens when germs such as bacteria and fungi defeat the drugs designed to kill them. Any antibiotic use, including in people, animals, or crops, can lead to resistance.
- Resistant germs are a One Health problem. They can spread between people, animals, and the environment. For example, water and soil.
- The following are 3 examples of how antibiotic resistance affects humans, animals, and the environment.
  - People. Some types of antibiotic-resistant germs can spread person to person. “Nightmare bacteria” carbapenem-resistant Enterobacteriaceae (CRE) can also survive and grow in sink drains at healthcare facilities and spread to patients and to the environment through the wastewater.
  - Animals. Resistant germs can spread between animals and people through food or contact with animals. For example, Salmonella Heidelberg bacteria can make both cattle and people sick.
  - Environment. Antibiotic-resistant germs can spread in the environment. Aspergillus fumigatus, a common mold, can make people with weak immune systems sick. In 2018, resistant Aspergillus fumigatus was reported in three patients. It was also found in U.S. crop fields treated with fungicides that are similar to antifungals used in human medicine.
A Complex Web: Everything Is Connected
Using Plain Language to Convey Complex Ideas

A COMPLEX WEB: EVERYTHING IS CONNECTED

Healthcare Facilities

Antibiotic-resistant germs, including new and emerging resistance, can spread within and between healthcare facilities. These germs can cause infections in patients, called healthcare-associated infections (HAIs), and can spread to the community or environment (soil, water).

Community & the Environment

Germs, including antibiotic-resistant germs, live and spread within our community and sometimes make people sick. Human activity can introduce antibiotics and antibiotic-resistant germs into the environment (soil, water), but it remains unclear how spread in the environment impacts human and animal health.

Human waste can carry traces of previously consumed antibiotics and antibiotic-resistant germs. Waste goes to treatment plants and is released as treated waste water. This can contribute to antibiotic resistance in the environment, including contaminating lakes and streams.

Food, Farms, & Animals

Animals, like people, carry germs in their gut, including antibiotic-resistant germs. The U.S. food supply is among the safest in the world, but these germs can get into the food supply and people can get sick.

Antibiotics save lives. However, any time antibiotics are used, the drugs can cause side effects and contribute to the development of antibiotic resistance.
Antibiotic Resistance Spreads Easily Across the Globe

Resistant bacteria and fungi can spread across the countries and continents with people, animals, and goods.

One billion people cross through international borders each year. This includes 350 million travelers arriving in the United States through more than 300 points of entry.
The Road Ahead on Antibiotic Resistance

**Domestic Gaps**
- Greater implementation of programs for infection prevention, antibiotic stewardship across the One Health spectrum.
- Increased collaboration between public health and healthcare to prevent the spread of germs and improve antibiotic use.
- Leverage use and resistance data to drive change in communities, states, and the nation.

**Global Gaps**
- Improved detection of known and emerging AR threats worldwide.
- Robust infection prevention everywhere to stop spread.
- Improved use of and access to antibiotics worldwide.
- Improved access to vaccines and safe water/sanitation.

**Innovation Gaps**
- New antibiotics, vaccines, diagnostics, and therapeutics to identify, prevent or treat.
- Better strategies for preventing spread of AR pathogens; Better strategies to improve antibiotic use wherever antibiotics are used.
- Understand AR in the environment and impact on human and animal health.
- Understand how the microbiome can be leveraged to prevent and treat infection.