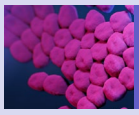
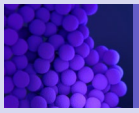
ANTIMICROBIAL RESISTANCE THREATS in the United States, 2021-2022

CDC used new data[1] to analyze the U.S. burden of the following antimicrobial-resistant pathogens typically found in healthcare settings:


Carbapenem-resistant Enterobacterales (CRE)


Carbapenem-resistant *Acinetobacter*


Candida auris (*C. auris*)


Methicillin-resistant *Staphylococcus aureus* (MRSA)


Vancomycin-resistant Enterococcus (VRE)


Extended-spectrum beta-lactamase (ESBL)-producing Enterobacterales


Multidrug-resistant (MDR) *Pseudomonas aeruginosa*

CDC previously reported that the burden of these pathogens increased in the United States in 2020 in the COVID-19 Impact Report. The information below describes the burden in the two following years, 2021 and 2022, and compares against 2019 data.

Key Findings

20% Bacterial antimicrobial-resistant hospital-onset infections caused by the pathogens listed above increased by a combined 20% during the COVID-19 pandemic compared to the pre-pandemic period, peaking in 2021. In 2022, rates for all but one of these pathogens (MRSA) remained above pre-pandemic levels.

5x The number of reported clinical cases of *C. auris* increased nearly five-fold from 2019 to 2022. Clinical cases are identified when specimens collected from patients during routine clinical care test positive for *C. auris*.

Impact of COVID-19 on AR

The increases in antimicrobial resistance (AR) burden seen in 2020 and 2021 are likely due in part to the impact of COVID-19, which pushed healthcare facilities, health departments, and communities near their breaking points. This resulted in longer hospital stays for hospitalized patients (including those diagnosed with COVID-19), challenged the implementation of infection prevention and control practices, and increased inappropriate antibiotic use.

As the pandemic continued, healthcare providers and public health professionals took aggressive action to prevent infections and protect lives, helping to reduce the burden of AR from its 2021 peak. CDC supported many of these efforts through American Rescue Plan Act funding to health-department Healthcare-Associated Infections and Antimicrobial Resistance (HAI/AR) Programs, Antibiotic Stewardship Programs, and CDC's Antimicrobial Resistance Laboratory Network (AR Lab Network) in all U.S. states, as well as some large cities and territories.

Actions Against AR

Supported by American Rescue Plan Act funding, health departments invested in proven strategies and initiatives including:


More than **9,000** prevention-based infection control assessments in healthcare facilities.[2]


More than **50,000** outbreak responses to novel multidrug-resistant germs.[2]


More than **90,000** healthcare workers trained in infection prevention and control.[2]


In 2021 and 2022, CDC's AR Lab Network received more than 230,000 patient samples for detection and characterization of resistant organisms. This testing helped inform efforts to stop spread and protect patients.

[1] Databases used for bacterial pathogens analyzed were the PINC-AI Healthcare Database and the BD Insights Research Database. CDC is working on a future publication that will include more detailed data analysis for bacterial pathogens discussed in this fact sheet. *C. auris* data was obtained by monthly reporting through jurisdiction public health departments.
[2] Data shown reflect activities from the first year of American Rescue Plan supplements, October 2021-August 2022.

Additional Action is Critical

We can and must do more to combat antimicrobial resistance by investing in the prevention-focused public health actions that we know work, including:

- Appropriate antibiotic and antifungal use
- Accurate laboratory detection
- Rapid response
- Effective infection prevention and control
- Innovative prevention strategies

AR Threats

	Threat	Change in Rates or Number of Infections***			
		2020 vs. 2019	2021 vs. 2020	2022 vs. 2021	2022 vs. 2019
URGENT*	Hospital-onset CRE	▲ Increase	▲ Increase	— Stable	▲ Increase
URGENT*	Hospital-onset Carbapenem-resistant *Acinetobacter*	— Stable	— Stable	— Stable	▲ Increase**
URGENT*	Clinical Cases of *C. auris*	▲ Increase	▲ Increase	▲ Increase	▲ Increase
SERIOUS*	Hospital-onset MRSA	▲ Increase	— Stable	▼ Decrease	— Stable
SERIOUS*	Hospital-onset VRE	▲ Increase	▲ Increase	— Stable	▲ Increase
SERIOUS*	Hospital-onset ESBL-producing Enterobacterales	▲ Increase	— Stable	— Stable	▲ Increase
SERIOUS*	Hospital-onset MDR *Pseudomonas aeruginosa*	▲ Increase	▲ Increase	— Stable	▲ Increase

* Threat level for each pathogen, as categorized in CDC's Antibiotic Resistance Threats in the United States, 2019.
** There was no statistically significant difference in rate of hospital-onset carbapenem-resistant *Acinetobacter* in 2020, 2021, and 2022 when compared to the previous year. However, there was a statistically significant increase in rate of hospital-onset carbapenem-resistant *Acinetobacter* in 2022 when compared to 2019.
*** Hospital-onset rates were described using multivariable models for all threats except *C. auris*. Please note that in above table, stable indicates there was no statistically significant increase or decrease, decrease indicates a statistically significant decrease where $p<0.05$, and increase indicates a statistically significant increase where $p<0.05$, for all threats except for *C. auris*. Increases or decreases in *C. auris* were indicated by changes in the number of clinical cases reported nationally without hypothesis testing.

The Future of CDC AR Threats Reporting

- CDC's previous AR Threats Reports, published in 2013 and 2019, were important resources to guide U.S. policy for and investments in combating antimicrobial resistance.
- Starting in 2025, CDC will release estimates for at least 19 AR threats and an update on the U.S. burden of antimicrobial resistance, by pathogen, in a new electronic format.
- Going forward, CDC will release new estimates for the burden of these threats at least every two years.
- Data are critical to guide efforts to combat AR, and CDC is committed to providing the high-quality data required to steer this important work.

For More Information on Antimicrobial Resistance:
https://www.bit.ly/ARThreats2022

U.S. CENTERS FOR DISEASE CONTROL AND PREVENTION

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