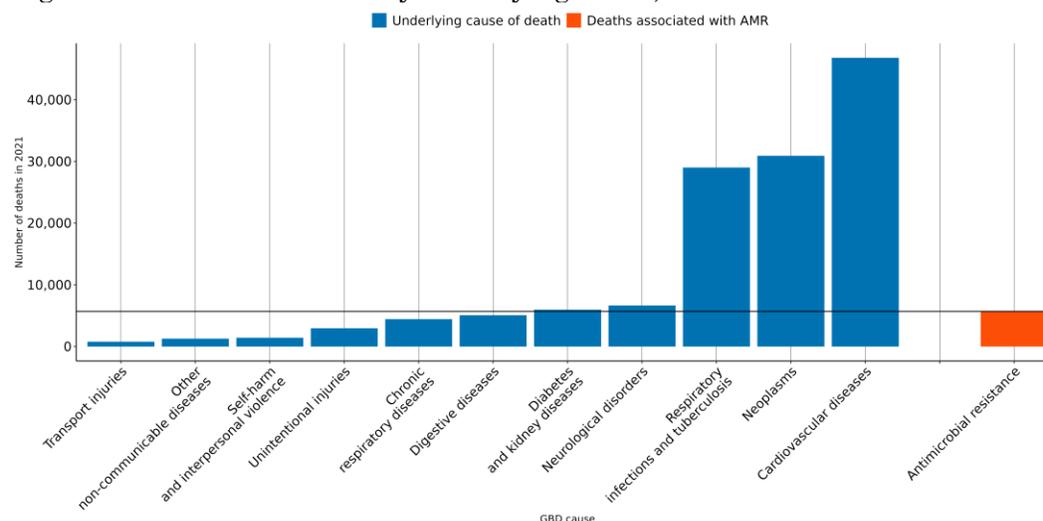


The burden of antimicrobial resistance (AMR) in Czechia

Executive summary

- Antimicrobial Resistance (AMR) is a major global health threat, over **1,000 lives** have been lost each year since 1990 in Czechia due to AMR.
- In 2021, there were an estimated **1,160 UI (987-1,340)** deaths attributable to AMR and **5,700 UI (4,860-6,540)** deaths associated with AMR in this location.
- The largest number of deaths associated with AMR in 2021 occurred among those aged **70+** in the country.
- Among the most deadly pathogen-drug combinations in 2021 were *Staphylococcus aureus* resistant to fluoroquinolones, *Staphylococcus aureus* resistant to methicillin and *Pseudomonas aeruginosa* resistant to carbapenems.

Figure 1 Number of deaths by underlying cause, and those associated with AMR in 2021



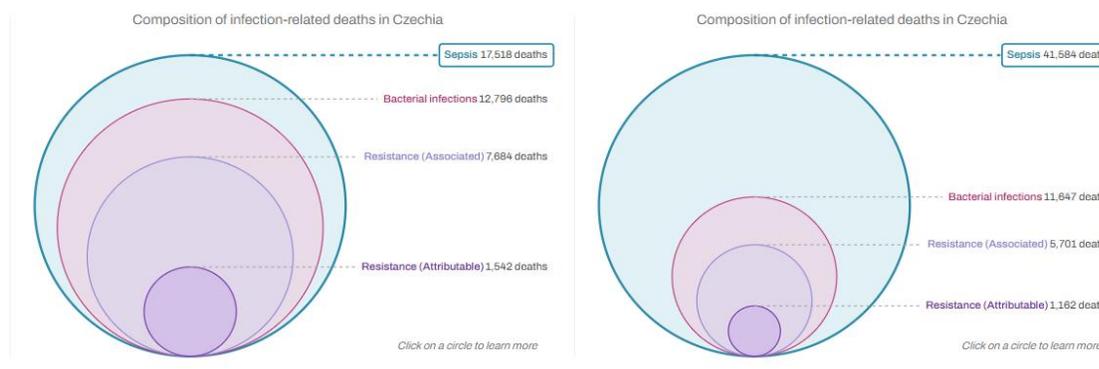
- In 2021, the number of deaths associated with AMR (orange bar in *figure 2*) were high compared to the most relevant underlying causes of death (depicted in blue) in the country. AMR associated deaths occur within multiple Global Burden of Disease (GBD) causes of death and AMR is not an underlying cause of death by itself.
- At the [2024 United Nations General Assembly high level meeting on antimicrobial resistance](#), country members agreed to aim for a **10% reduction** compared to 2019 baseline (**from 4.95 to 4.45 million**) in the global number of deaths associated with AMR by 2030. But [our forecast](#) indicates that in absence of concerted action, deaths associated with AMR could reach **5.5 million** (UI 4.8 - 6.2) if current trends continue. For Czechia, a 10% reduction means to decrease the number of deaths associated with AMR to **5,400**, but currently the trend for this country could reach up to **6,690 UI [5,500-7,970]** AMR-associated deaths in 2030.

AMR in Czechia

Key takeaways

- Antimicrobial Resistance (AMR) is a major global health threat, over *a million lives* have been lost each year since 1990.
- Globally, 4.71 (95% Uncertainty Interval (UI) 4.2-5.2) million deaths were associated with bacterial drug-resistant infections in 2021.
- And 1.14 (UI 1 - 1.3) million deaths were attributable to bacterial drug-resistant infection in the same year.
- *39 (UI 33 - 46) million deaths* directly attributable to bacterial AMR are projected to occur between 2025-2050 unless concerted action is taken. This equates to three deaths every minute.

Figure 2 Comparing 30 years of infection related deaths, and those associated with and attributable to AMR in Czechia between 1990 and 2019.



- To look at these and more visualization interactively visit [Measuring Infectious Causes and Resistance Outcomes for Burden Estimation \(MICROBE\)](#)
- In **Czechia** in 2021, there were an estimated **1,160 UI (987-1,340)** deaths attributable to AMR and **5,700 UI (4,860-6,540)** deaths associated with AMR. Here “*attributable deaths*” are considered to be those that would have been prevented had the drug-resistant bacteria causing the infections not been drug-resistant. “*Associated deaths*” are considered to be those that would not have occurred had the infections been prevented entirely.
- Across 204 countries, **Czechia has the 31st lowest** age-standardized mortality rate associated with AMR in 2021.
- *Table 1* shows the bacteria which caused most deaths in 2021 (↑ indicates an increasing estimated annual rate between 1990-2021, ↓ indicates a decreasing annual trend), and *table 2* shows the pathogen-drug combinations which caused most deaths in 2021.

Table 1. Bacteria which cause most deaths in 2021 (Number of deaths in parenthesis)

	Overall susceptible and resistant	Associated	Attributable
Burden rank	Staphylococcus aureus 3,130 UI (2,780-3,480) ↑	Staphylococcus aureus 1,350 UI (1,130-1,580) ↓	Staphylococcus aureus 262 UI (219-306) ↑
	Escherichia coli 1,910 UI (1,690-2,130) ↑	Escherichia coli 1,240 UI (1,090-1,390) ↓	Escherichia coli 223 UI (178-268) ↑
	Streptococcus pneumoniae 1,470 UI (1,310-1,640) ↓	Klebsiella pneumoniae 632 UI (534-729) ↓	Pseudomonas aeruginosa 150 UI (122-179) ↓
	Pseudomonas aeruginosa 1,030 UI (912-1,150) ↓	Pseudomonas aeruginosa 589 UI (510-667) ↓	Klebsiella pneumoniae 139 UI (110-168) ↓
	Klebsiella pneumoniae 868 UI (767-969) ↓	Streptococcus pneumoniae 429 UI (339-520) ↓	Acinetobacter baumannii 119 UI (95-143) ↓
	Enterococcus faecalis 517 UI (455-578) ↓	Acinetobacter baumannii 323 UI (251-396) ↓	Streptococcus pneumoniae 76 UI (58-94) ↓
	Acinetobacter baumannii 501 UI (440-562) ↓	Enterococcus faecium 277 UI (243-311) ↑	Enterococcus faecium 53 UI (40-65) ↑
	Enterobacter spp. 387 UI (341-432) ↓	Enterococcus faecalis 176 UI (150-202) ↓	Enterobacter spp. 37 UI (30-43) ↓
	Group A Streptococcus 364 UI (312-415) ↑	Proteus spp. 175 UI (138-211) ↓	Enterococcus faecalis 30 UI (21-39) ↓
	Enterococcus faecium 291 UI (255-326) ↓	Enterobacter spp. 165 UI (131-199) ↓	Proteus spp. 24 UI (17-31) ↓

Annualized rate of change (1990-2021): <-3% (dark blue), -3% to -1.5% (medium blue), -1.5% to 0% (light blue), 0% to 1.5% (pink), 1.5% to 3% (red), 3% to 5% (dark red), >5.0% (orange)

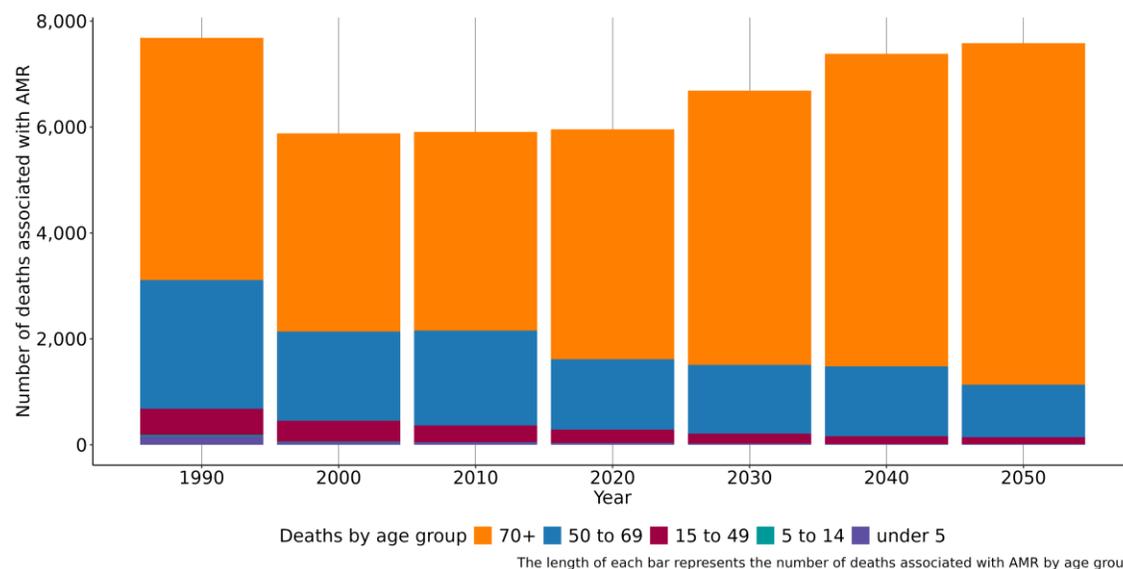
Table 2. Combinations which cause most deaths in 2021 (Number of deaths in parenthesis)

	Associated	Attributable
Burden Rank	Escherichia coli Aminopenicillin 1,120 UI (949-1,290) ↑	Staphylococcus aureus Methicillin 135 UI (96-175) ↑
	Staphylococcus aureus Macrolides 942 UI (727-1,160) ↓	Pseudomonas aeruginosa Carbapenems 77 UI (54-100) ↓
	Staphylococcus aureus Fluoroquinolones 809 UI (638-980) ↑	Staphylococcus aureus Fluoroquinolones 58 UI (16-99) ↑
	Escherichia coli TMP-SMX 670 UI (509-830) ↓	Escherichia coli Aminopenicillin 47 UI (30-65) ↑
	Escherichia coli Beta-Lactam/Lactamase Inhib. 601 UI (486-716) ↓	Escherichia coli Beta-Lactam/Lactamase Inhib. 44 UI (12-76) ↓
	Staphylococcus aureus Methicillin 589 UI (434-745) ↑	Staphylococcus aureus Macrolides 42 UI (28-57) ↓
	Escherichia coli Fluoroquinolones 509 UI (406-612) ↑	Pseudomonas aeruginosa Fluoroquinolones 42 UI (28-55) ↓
	Klebsiella pneumoniae Aminoglycosides 488 UI (414-562) ↓	Escherichia coli TMP-SMX 38 UI (20-55) ↓
	Klebsiella pneumoniae TMP-SMX 462 UI (372-551) ↓	Klebsiella pneumoniae Aminoglycosides 37 UI (27-46) ↓
	Klebsiella pneumoniae Beta-Lactam/Lactamase Inhib. 459 UI (346-572) ↓	Acinetobacter baumannii Carbapenems 35 UI (23-48) ↓

Annualized rate of change (1990-2021): <-3% (dark blue), -3% to -1.5% (medium blue), -1.5% to 0% (light blue), 0% to 1.5% (pink), 1.5% to 3% (red), 3% to 5% (dark red), >5.0% (orange)

- Independently of antimicrobial resistance, the infectious syndromes accounting for the most deaths in 2021 were as follows (estimated thousands of deaths in parenthesis) bloodstream infections (5,900 UI (5,200-6,600)), lower respiratory infection (excl. COVID) (5,320 UI (4,680-5,950)), peritoneal and intra-abdominal infections (1,830 UI (1,580-2,070)), urinary tract infections and pyelonephritis (1,010 UI (832-1,180)) and infections of the skin and subcutaneous systems (711 UI (595-827)).

Figure 3. Number of deaths associated with AMR by age group between 1990-2020 and 2050 projection



- In Czechia, people aged 70+ saw the largest number of deaths associated with AMR both in 1990 and 2021, which indicates that 70+ continues to be particularly vulnerable to infections which are resistant to antibiotics. In 2021, the number of deaths associated with AMR among the 70+ was 4,090 UI (3,470-4,700), whereas the mortality rate per 100,000 was 265 UI (225-304).

Data sources for Czechia

In total, 520 million individual records or isolates covering 19,513 study-location-years were used as input data to our estimation process. The subset of input data for this country is shown below.

Table 3. Data inputs for Czechia by source type

Source type	Years	Sample size	Sample size units
Microbial or laboratory data without outcome	1990-2021	1,359,621	Isolates
Microbial or laboratory data with outcome	1990-2021	34,164	Isolates
Literature studies	1990-2021	818	Cases/isolates/susceptibility tests
Single drug resistance profile data	2010-2021	102,388	Antibiotic susceptibility test

More information

About GRAM:

The purpose of the Global Research on AntiMicrobial resistance (GRAM) project is to **generate accurate and timely estimates of the magnitude and trends in antimicrobial resistance (AMR) burden** across the world, which can be used to inform treatment guidelines and agendas for decision-making and research, detect emerging problems and monitor trends to inform global strategies, as well as facilitate the assessment of interventions over time.

GRAM is the flagship project of the University of Oxford–IHME Strategic Partnership. GRAM was launched with support from the United Kingdom Department of Health and Social Care’s Fleming Fund, and the Wellcome Trust.

All resources:

For all resources on AMR analysis at IHME, visit <https://www.healthdata.org/antimicrobial-resistance>.

To look at these and more visualization interactively visit [Measuring Infectious Causes and Resistance Outcomes for Burden Estimation \(MICROBE\)](#).

Data sources:

To download the list of data input sources by country, and AMR results by region, visit the [Global Health Data Exchange \(GHDx\)](#).

Contact us:

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