# The burden of antimicrobial resistance (AMR) in Azerbaijan

Executive summary

- Antimicrobial Resistance (AMR) is a major global health threat, over **1,000 lives** have been lost each year since 1990 in Azerbaijan due to AMR.

- In 2021, there were an estimated **990 UI (747-1,230)** deaths attributable to AMR and **3,970 UI (3,230-4,720)** deaths associated with AMR in this location.

- The largest number of deaths associated with AMR in 2021 occurred among those aged **50 to 69** in the country.

- Among the most deadly pathogen-drug combinations in 2021 were *Staphylococcus aureus* resistant to methicillin, *Acinetobacter baumannii* resistant to carbapenems and *Streptococcus pneumoniae* resistant to carbapenems.

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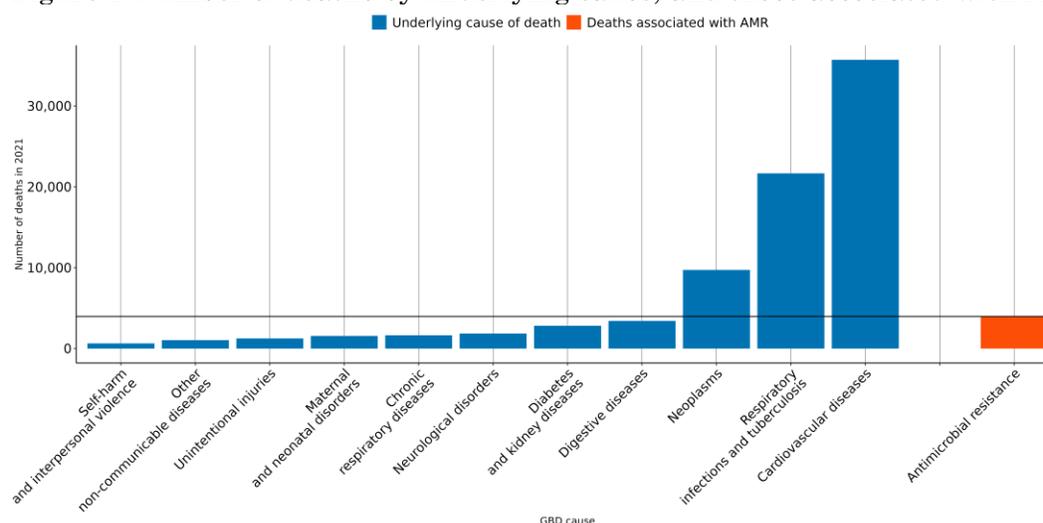

- In 2021, the number of deaths associated with AMR (orange bar in *figure 2*) were high compared to the most relevant underlying causes of death (depicted in blue) in the country. AMR associated deaths occur within multiple Global Burden of Disease (GBD) causes of death and AMR is not an underlying 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 Azerbaijan, a 10% reduction means to decrease the number of deaths associated with AMR to **4,120**, but currently the trend for this country could reach up to **4,920 UI [3,740-6,330]** AMR-associated deaths in 2030.

AMR in Azerbaijan

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 Azerbaijan between 1990 and 2019.
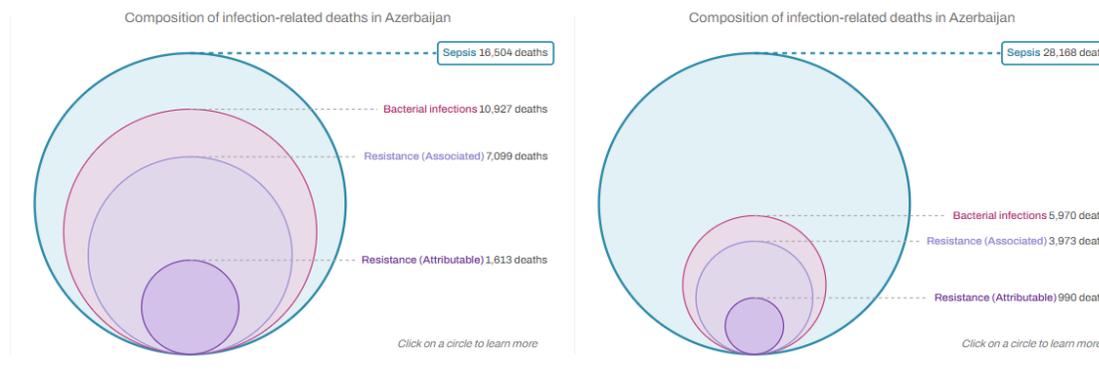
- To look at these and more visualization interactively visit [Measuring Infectious Causes and Resistance Outcomes for Burden Estimation (MICROBE)](#)

- In **Azerbaijan** in 2021, there were an estimated **990 UI (747-1,230)** deaths attributable to AMR and **3,970 UI (3,230-4,720)** 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, **Azerbaijan has the 78th 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 993 UI (882-1,100)	↑	Streptococcus pneumoniae 687 UI (533-841)	↓	Klebsiella pneumoniae 153 UI (127-180)	↓
	Streptococcus pneumoniae 925 UI (820-1,030)	↓	Klebsiella pneumoniae 594 UI (512-676)	↓	Streptococcus pneumoniae 135 UI (87-183)	↓
	Klebsiella pneumoniae 701 UI (621-780)	↓	Escherichia coli 569 UI (443-696)	↓	Acinetobacter baumannii 134 UI (117-151)	↓
	Escherichia coli 663 UI (583-743)	↓	Staphylococcus aureus 476 UI (316-636)	↓	Escherichia coli 123 UI (87-159)	↓
	Pseudomonas aeruginosa 655 UI (581-729)	↓	Pseudomonas aeruginosa 470 UI (393-548)	↓	Pseudomonas aeruginosa 121 UI (93-150)	↓
	Mycobacterium tuberculosis 436 UI (285-588)	↓	Acinetobacter baumannii 337 UI (297-378)	↓	Staphylococcus aureus 104 UI (50-159)	↑
	Acinetobacter baumannii 337 UI (297-378)	↓	Mycobacterium tuberculosis 163 UI (22-305)	↑	Mycobacterium tuberculosis 79 UI (0-204)	↑
	Enterobacter spp. 162 UI (143-182)	↓	Enterobacter spp. 130 UI (112-147)	↓	Enterobacter spp. 40 UI (31-49)	↓
	Enterococcus faecalis 162 UI (139-185)	↑	Enterococcus faecalis 113 UI (96-131)	↑	Serratia spp. 22 UI (18-26)	↓
	Haemophilus influenzae 140 UI (123-157)	↓	Enterococcus faecium 97 UI (82-112)	↑	Enterococcus faecalis 20 UI (12-28)	↑

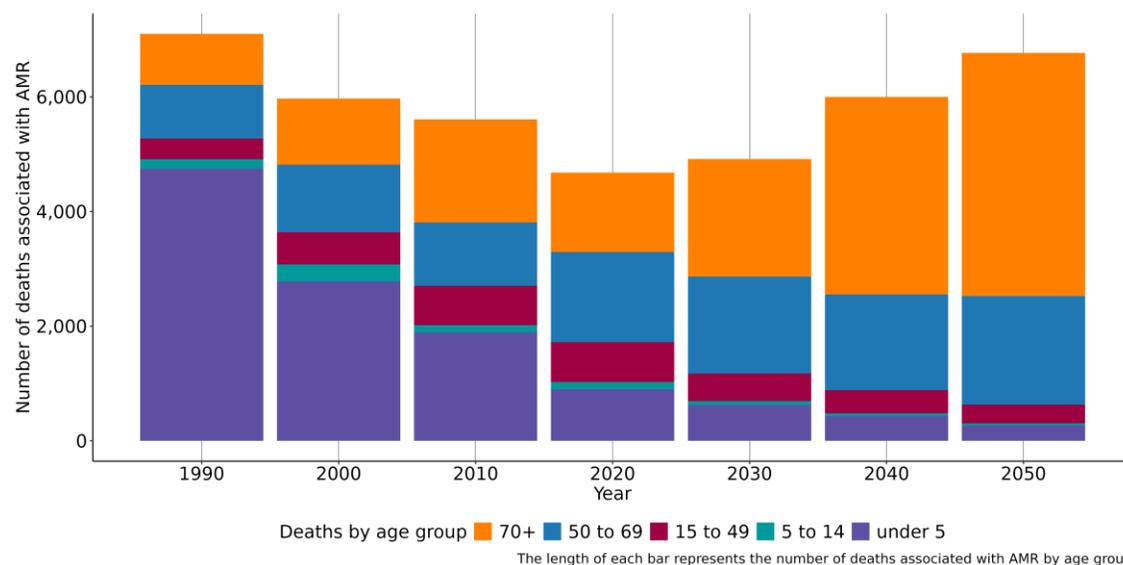Annualized rate of change (1990-2021): <-3% | -3% to -1.5% | -1.5% to 0% | 0% to 1.5% | 1.5% to 3% | 3% to 5% | >5.0%

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

	Associated			Attributable		
Burden Rank	Klebsiella pneumoniae TMP-SMX	551 UI (467-635)	↓	Streptococcus pneumoniae Carbapenems	61 UI (32-90)	↓
	Streptococcus pneumoniae TMP-SMX	541 UI (369-712)	↓	Acinetobacter baumannii Carbapenems	59 UI (44-74)	↓
	Escherichia coli Aminopenicillin	515 UI (295-734)	↓	Staphylococcus aureus Methicillin	56 UI (15-98)	↑
	Klebsiella pneumoniae Fluoroquinolones	470 UI (376-563)	↓	Mycobacterium tuberculosis MDR excluding XDR	54 UI (0-145)	↑
	Klebsiella pneumoniae Aminoglycosides	458 UI (378-539)	↓	Pseudomonas aeruginosa Carbapenems	49 UI (30-68)	↓
	Klebsiella pneumoniae Beta-Lactam/Lactamase Inhib.	412 UI (297-526)	↓	Escherichia coli 3GC	43 UI (29-57)	↑
	Klebsiella pneumoniae 3GC	408 UI (341-475)	↓	Acinetobacter baumannii Fluoroquinolones	39 UI (32-46)	↓
	Streptococcus pneumoniae Beta-Lactam/Lactamase Inhib.	389 UI (233-544)	↓	Pseudomonas aeruginosa Fluoroquinolones	38 UI (26-50)	↓
	Escherichia coli 3GC	381 UI (254-507)	↑	Klebsiella pneumoniae Fluoroquinolones	37 UI (25-50)	↑
	Pseudomonas aeruginosa Fluoroquinolones	380 UI (315-444)	↓	Klebsiella pneumoniae Carbapenems	34 UI (24-44)	↑

Annualized rate of change (1990-2021): <-3% | -3% to -1.5% | -1.5% to 0% | 0% to 1.5% | 1.5% to 3% | 3% to 5% | >5.0%

 - Independently of antimicrobial resistance, the infectious syndromes accounting for the most deaths in 2021 were as follows (estimated thousands of deaths in parenthesis) lower respiratory infection (excl. COVID) (3,320 UI (2,900-3,740)), bloodstream infections (3,080 UI (2,710-3,460)), peritoneal and intra-abdominal infections (540 UI (437-642)), urinary tract infections and pyelonephritis (521 UI (407-635)) and tuberculosis (436 UI (285-588)).

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

Deaths by age group ■ 70+ ■ 50 to 69 ■ 15 to 49 ■ 5 to 14 ■ under 5
The length of each bar represents the number of deaths associated with AMR by age group

- In Azerbaijan, people aged under 5 experienced the largest number of deaths associated with AMR in 1990 but this changed by 2021 as the largest number of deaths occurred among the 50 to 69. This indicates that prevention of infections among the under 5 has contributed to the reduction in the number of AMR associated deaths. In 2021, the number of deaths associated with AMR among the 50 to 69 was 1,460 UI (1,160-1,770), whereas the mortality rate per 100,000 was 335 UI (268-402).

Data sources for Azerbaijan

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 Azerbaijan by source type

Source type	Years	Sample size	Sample size units
Antibiotic use	1990-2009	204	Study-year datapoints
Microbial or laboratory data without outcome	2010-2021	198	Isolates

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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