# The burden of antimicrobial resistance (AMR) in Kyrgyzstan

Executive summary

- Antimicrobial Resistance (AMR) is a major global health threat, over **800 lives** have been lost each year since 1990 in Kyrgyzstan due to AMR.

- In 2021, there were an estimated **546 UI (405-688)** deaths attributable to AMR and **2,170 UI (1,750-2,600)** 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 multi-drug resistant *Mycobacterium tuberculosis* (excluding extensive drug-resistance), *Staphylococcus aureus* resistant to methicillin and *Streptococcus pneumoniae* resistant to carbapenems.

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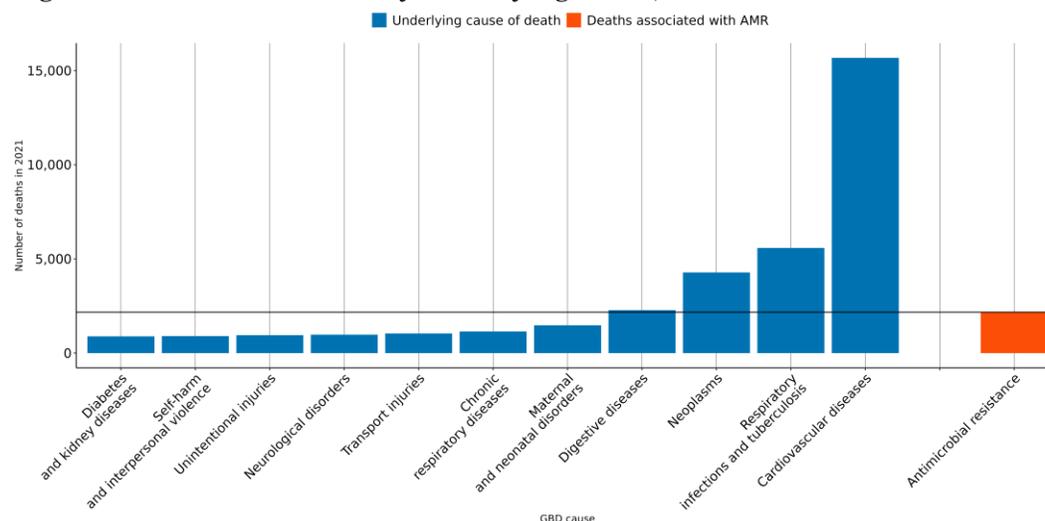

- In 2021, the number of deaths associated with AMR (orange bar in *figure 2*) were high compared to the most relevant underlying causes of death (depicted in blue) in the country. AMR associated deaths occur within multiple Global Burden of Disease (GBD) causes of death and AMR is not an underlying 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 Kyrgyzstan, a 10% reduction means to decrease the number of deaths associated with AMR to **2,070**, but currently the trend for this country could reach up to **2,700 UI [2,000-3,430]** AMR-associated deaths in 2030.

AMR in Kyrgyzstan

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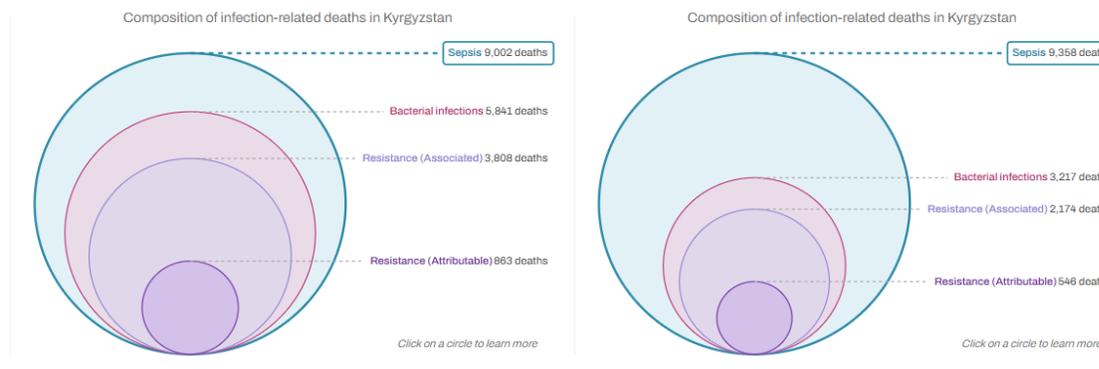
- To look at these and more visualization interactively visit [Measuring Infectious Causes and Resistance Outcomes for Burden Estimation (MICROBE)](#)

- In **Kyrgyzstan** in 2021, there were an estimated **546 UI (405-688)** deaths attributable to AMR and **2,170 UI (1,750-2,600)** 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, **Kyrgyzstan has the 71st 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	
Staphylococcus aureus 550 UI (478-622)	↑	Staphylococcus aureus 372 UI (272-473)	↑	Klebsiella pneumoniae 79 UI (66-93)	↓
Streptococcus pneumoniae 391 UI (345-438)	↓	Escherichia coli 329 UI (259-399)	↓	Staphylococcus aureus 76 UI (43-109)	↑
Escherichia coli 390 UI (341-440)	↓	Klebsiella pneumoniae 299 UI (256-342)	↓	Mycobacterium tuberculosis 70 UI (0-171)	↑
Klebsiella pneumoniae 356 UI (312-401)	↓	Streptococcus pneumoniae 273 UI (203-343)	↓	Escherichia coli 67 UI (47-86)	↓
Mycobacterium tuberculosis 339 UI (274-404)	↓	Pseudomonas aeruginosa 221 UI (178-265)	↓	Streptococcus pneumoniae 65 UI (44-87)	↓
Pseudomonas aeruginosa 326 UI (284-369)	↓	Mycobacterium tuberculosis 153 UI (44-263)	↑	Pseudomonas aeruginosa 56 UI (42-71)	↓
Acinetobacter baumannii 130 UI (111-149)	↓	Acinetobacter baumannii 126 UI (108-144)	↓	Acinetobacter baumannii 50 UI (43-57)	↓
Enterococcus faecalis 100 UI (85-115)	↑	Enterobacter spp. 72 UI (60-83)	↓	Enterobacter spp. 19 UI (12-26)	↓
Enterobacter spp. 95 UI (82-108)	↓	Enterococcus faecalis 70 UI (58-81)	↑	Serratia spp. 16 UI (14-18)	↓
Group A Streptococcus 81 UI (72-90)	↓	Serratia spp. 58 UI (49-66)	↓	Enterococcus faecalis 13 UI (7-18)	↓

Burden rank

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

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

Associated			Attributable		
Escherichia coli Aminopenicillin	300 UI (174-426)	↓	Mycobacterium tuberculosis MDR excluding XDR	47 UI (0-122)	↑
Klebsiella pneumoniae Aminoglycosides	266 UI (225-306)	↓	Staphylococcus aureus Methicillin	36 UI (11-61)	↑
Staphylococcus aureus Macrolides	243 UI (187-300)	↑	Streptococcus pneumoniae Carbapenems	34 UI (20-49)	↓
Klebsiella pneumoniae TMP-SMX	243 UI (198-288)	↓	Acinetobacter baumannii Carbapenems	25 UI (19-30)	↓
Escherichia coli TMP-SMX	236 UI (180-291)	↓	Mycobacterium tuberculosis XDR	23 UI (0-52)	↑
Klebsiella pneumoniae Beta-Lactam/Lactamase Inhib.	226 UI (170-282)	↓	Klebsiella pneumoniae Aminoglycosides	22 UI (17-28)	↓
Staphylococcus aureus Fluoroquinolones	207 UI (154-260)	↑	Klebsiella pneumoniae Carbapenems	22 UI (16-27)	↑
Streptococcus pneumoniae Beta-Lactam/Lactamase Inhib.	203 UI (133-272)	↓	Pseudomonas aeruginosa Carbapenems	21 UI (13-30)	↓
Streptococcus pneumoniae TMP-SMX	196 UI (122-270)	↓	Escherichia coli 3GC	20 UI (13-27)	↓
Escherichia coli Beta-Lactam/Lactamase Inhib.	191 UI (155-227)	↓	Pseudomonas aeruginosa Fluoroquinolones	17 UI (12-23)	↓

Burden Rank

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

 - 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 (2,000 UI (1,760-2,250)), lower respiratory infection (excl. COVID) (1,290 UI (1,110-1,470)), peritoneal and intra-abdominal infections (341 UI (279-403)), tuberculosis (339 UI (274-404)) and urinary tract infections and pyelonephritis (212 UI (175-249)).

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
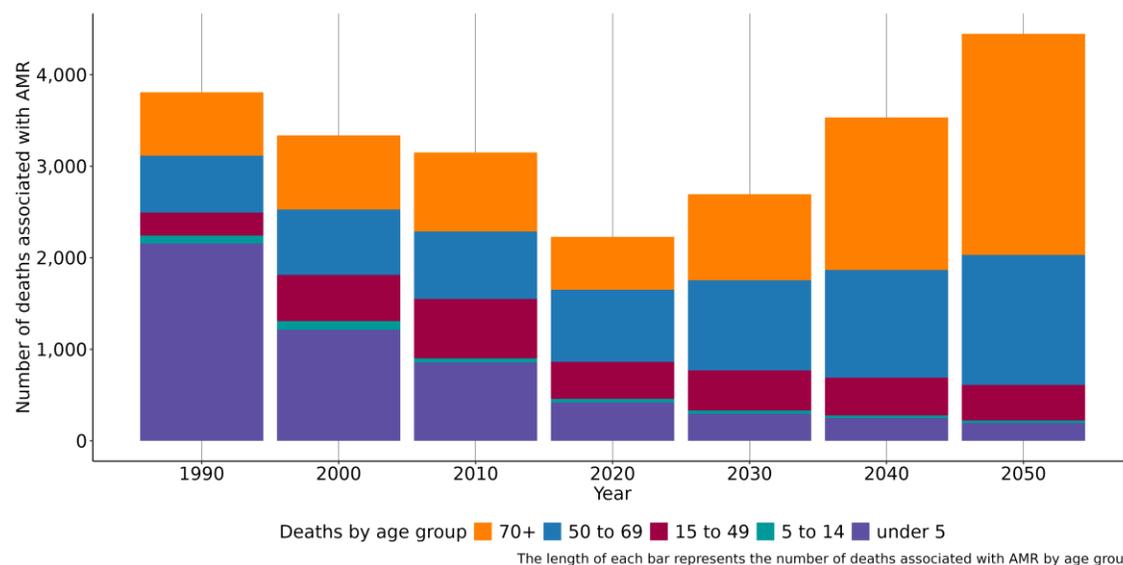
- In Kyrgyzstan, people aged under 5 experienced the largest number of deaths associated with AMR in 1990 but this changed by 2021 as the largest number of deaths occurred among the 50 to 69. This indicates that prevention of infections among the under 5 has contributed to the reduction in the number of AMR associated deaths. In 2021, the number of deaths associated with AMR among the 50 to 69 was 794 UI (620-969), whereas the mortality rate per 100,000 was 292 UI (230-354).

Data sources for Kyrgyzstan

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 Kyrgyzstan by source type

Source type	Years	Sample size	Sample size units
Antibiotic use	1990-2021	928	Study-year datapoints
Literature studies	1990-2009	120	Cases/isolates/susceptibility tests

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:

- For inquiries about the analysis and questions from government officials, health departments, or research institutions: engage@healthdata.org

- For media-related inquiries: media@healthdata.org

- **Bluesky**: @ihmeuw.bsky.social

- **Twitter**: @IHME_UW

- **Facebook**: https://www.facebook.com/IHMEUW

- **LinkedIn**: https://www.linkedin.com/company/institute-for-health-metrics-and-evaluation