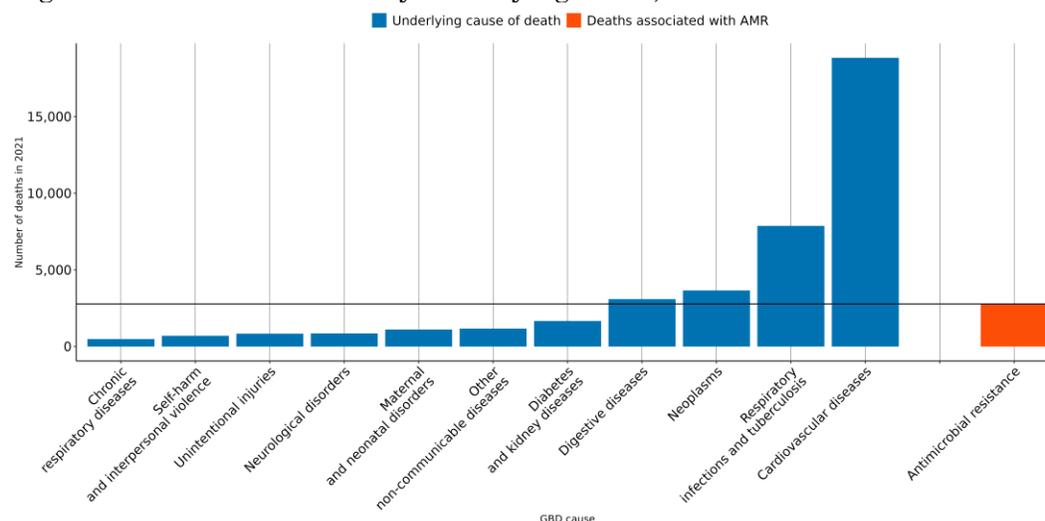


The burden of antimicrobial resistance (AMR) in Turkmenistan

Executive summary

- Antimicrobial Resistance (AMR) is a major global health threat, over **800 lives** have been lost each year since 1990 in Turkmenistan due to AMR.
- In 2021, there were an estimated **690 UI (503-878)** deaths attributable to AMR and **2,780 UI (2,130-3,430)** 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



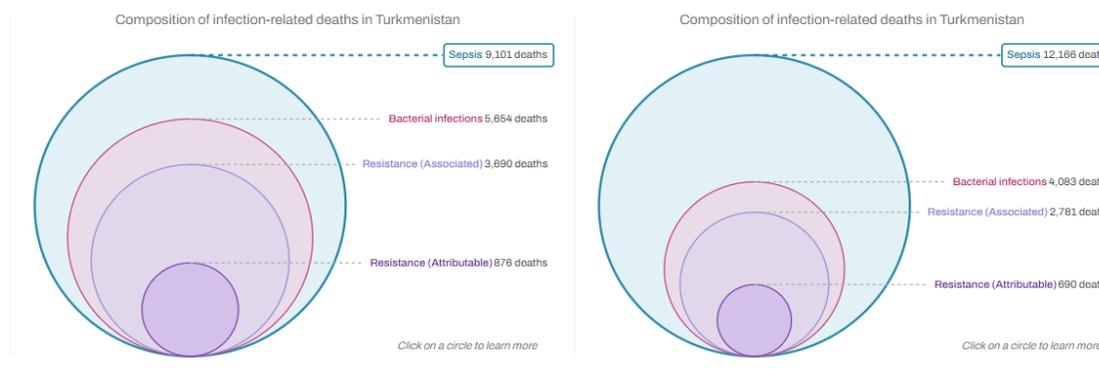
- In 2021, the number of deaths associated with AMR (orange bar in *figure 2*) were high compared to the most relevant underlying causes of death (depicted in blue) in the country. AMR associated deaths occur within multiple Global Burden of Disease (GBD) causes of death and AMR is not an underlying 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 Turkmenistan, a 10% reduction means to decrease the number of deaths associated with AMR to **2,780**, but currently the trend for this country could reach up to **3,160 UI [2,250-4,340]** AMR-associated deaths in 2030.

AMR in Turkmenistan

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 Turkmenistan between 1990 and 2019.



- To look at these and more visualization interactively visit [Measuring Infectious Causes and Resistance Outcomes for Burden Estimation \(MICROBE\)](#)
- In **Turkmenistan** in 2021, there were an estimated **690 UI (503-878)** deaths attributable to AMR and **2,780 UI (2,130-3,430)** 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, **Turkmenistan has the 88th highest** 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)

Burden rank	Overall susceptible and resistant	Associated	Attributable
	Streptococcus pneumoniae 633 UI (536-730) ↓	Streptococcus pneumoniae 458 UI (337-580) ↓	Streptococcus pneumoniae 101 UI (63-138) ↓
	Staphylococcus aureus 588 UI (479-696) ↑	Escherichia coli 442 UI (337-548) ↑	Acinetobacter baumannii 100 UI (82-118) ↑
	Escherichia coli 511 UI (419-602) ↓	Klebsiella pneumoniae 388 UI (317-459) ↓	Klebsiella pneumoniae 97 UI (78-116) ↓
	Klebsiella pneumoniae 469 UI (389-549) ↓	Staphylococcus aureus 349 UI (223-475) ↑	Escherichia coli 94 UI (64-124) ↑
	Pseudomonas aeruginosa 388 UI (320-457) ↓	Pseudomonas aeruginosa 266 UI (204-329) ↓	Staphylococcus aureus 75 UI (37-113) ↑
	Mycobacterium tuberculosis 369 UI (277-462) ↓	Acinetobacter baumannii 250 UI (199-301) ↑	Pseudomonas aeruginosa 67 UI (48-86) ↓
	Acinetobacter baumannii 250 UI (199-301) ↑	Mycobacterium tuberculosis 125 UI (17-232) ↑	Mycobacterium tuberculosis 54 UI (0-134) ↑
	Enterococcus faecalis 131 UI (102-159) ↑	Enterobacter spp. 82 UI (62-102) ↑	Serratia spp. 20 UI (16-25) ↑
	Enterobacter spp. 122 UI (98-146) ↑	Enterococcus faecalis 80 UI (61-100) ↑	Enterobacter spp. 17 UI (13-21) ↓
	Group A Streptococcus 98 UI (82-114) ↓	Serratia spp. 70 UI (56-84) ↑	Enterococcus faecalis 15 UI (9-22) ↑

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

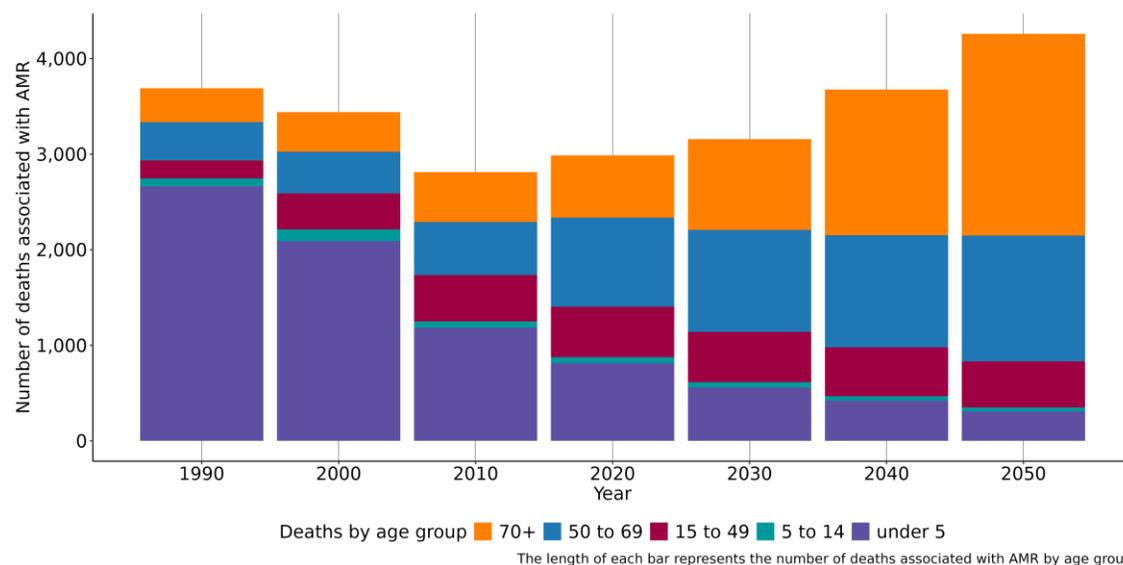
Table 2. Combinations which cause most deaths in 2021 (Number of deaths in parenthesis)

Burden Rank	Associated	Attributable
	Escherichia coli Aminopenicillin 401 UI (231-571) ↑	Streptococcus pneumoniae Carbapenems 52 UI (28-76) ↓
	Klebsiella pneumoniae Aminoglycosides 375 UI (305-444) ↓	Acinetobacter baumannii Carbapenems 49 UI (36-61) ↑
	Streptococcus pneumoniae TMP-SMX 334 UI (208-461) ↓	Staphylococcus aureus Methicillin 42 UI (12-73) ↑
	Escherichia coli TMP-SMX 319 UI (234-404) ↓	Mycobacterium tuberculosis MDR excluding XDR 36 UI (0-95) ↑
	Streptococcus pneumoniae Beta-Lactam/Lactamase Inhib. 307 UI (189-425) ↓	Escherichia coli 3GC 34 UI (22-46) ↑
	Klebsiella pneumoniae TMP-SMX 287 UI (217-357) ↓	Klebsiella pneumoniae Aminoglycosides 32 UI (24-41) ↓
	Escherichia coli 3GC 287 UI (184-389) ↑	Acinetobacter baumannii Fluoroquinolones 27 UI (21-33) ↑
	Klebsiella pneumoniae Fluoroquinolones 267 UI (195-338) ↑	Streptococcus pneumoniae Beta-Lactam/Lactamase Inhib. 23 UI (13-32) ↓
	Staphylococcus aureus Macrolides 251 UI (182-321) ↑	Pseudomonas aeruginosa Carbapenems 22 UI (12-32) ↑
	Acinetobacter baumannii 3GC 250 UI (199-301) ↑	Klebsiella pneumoniae Fluoroquinolones 20 UI (13-27) ↑

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

- 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 (2,210 UI (1,800-2,620)), lower respiratory infection (excl. COVID) (1,840 UI (1,540-2,130)), urinary tract infections and pyelonephritis (453 UI (346-559)), tuberculosis (369 UI (277-462)) and peritoneal and intra-abdominal infections (358 UI (277-439)).

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



- In Turkmenistan, 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 928 UI (654-1,200), whereas the mortality rate per 100,000 was 408 UI (310-507).

Data sources for Turkmenistan

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 Turkmenistan by source type

Source type	Years	Sample size	Sample size units
Antibiotic use	1990-2021	124	Study-year datapoints

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>
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