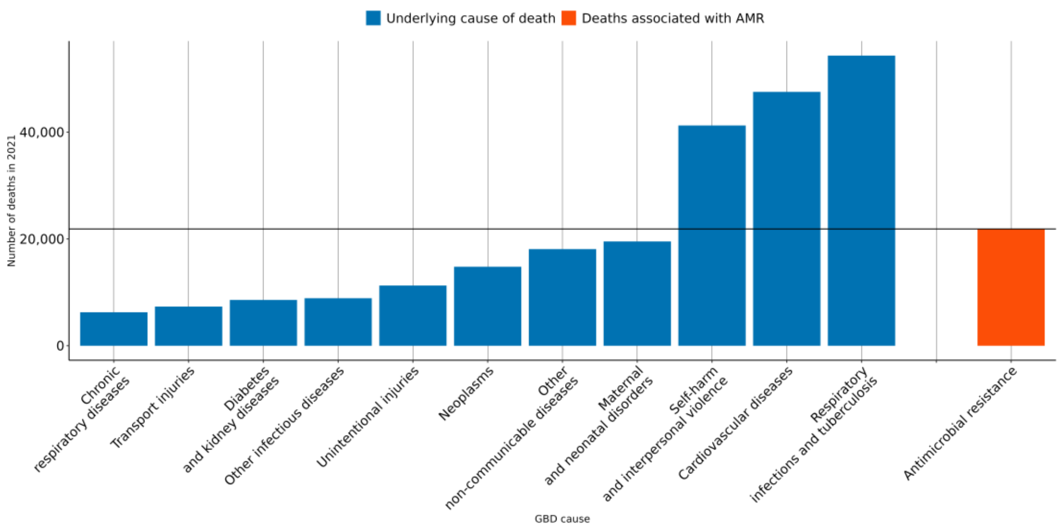
The burden of antimicrobial resistance (AMR) in Afghanistan

Executive summary

- Antimicrobial Resistance (AMR) is a major global health threat, over **6,000 lives** have been lost each year since 1990 in Afghanistan due to AMR.
- In 2021, there were an estimated **5,690 UI (4,270-7,120)** deaths attributable to AMR and **21,900 UI (17,300-26,500)** deaths associated with AMR in this location.
- The largest number of deaths associated with AMR in 2021 occurred among those aged **under 5** in the country.
- Among the most deadly pathogen-drug combinations in 2021 were *Staphylococcus aureus* resistant to methicillin, *Pseudomonas aeruginosa* resistant to carbapenems and *Streptococcus pneumoniae* resistant to carbapenems.

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



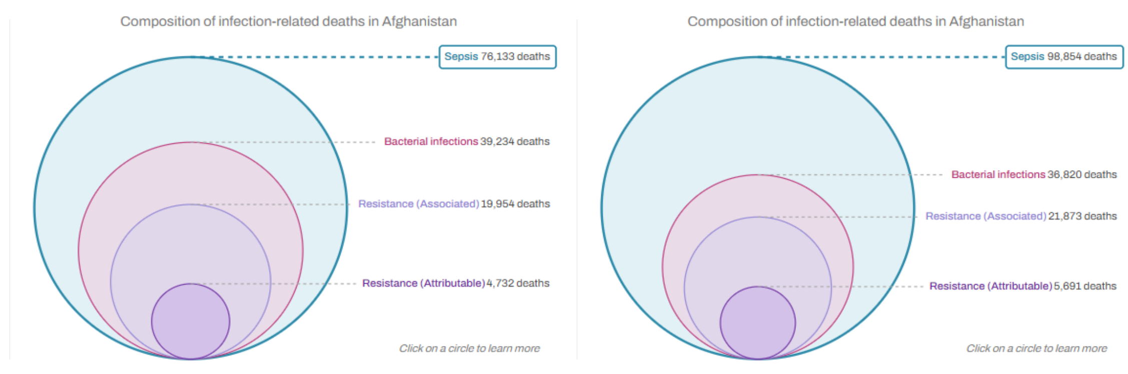
- In 2021, the number of deaths associated with AMR (orange bar in *figure 2*) were high compared to the most relevant underlying causes of death (depicted in blue) in the country. AMR associated deaths occur within multiple Global Burden of Disease (GBD) causes of death and AMR is not an underlying 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 Afghanistan, a 10% reduction means to decrease the number of deaths associated with AMR to **21,300**, but currently the trend for this country could reach up to **22,600 UI [14,300-34,700]** AMR-associated deaths in 2030.

AMR in Afghanistan

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 Afghanistan between 1990 and 2019.



- To look at these and more visualization interactively visit [Measuring Infectious Causes and Resistance Outcomes for Burden Estimation (MICROBE)]
- In **Afghanistan** in 2021, there were an estimated **5,690 UI (4,270-7,120)** deaths attributable to AMR and **21,900 UI (17,300-26,500)** 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, **Afghanistan has the 28th 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	
1	Mycobacterium tuberculosis 8,730 UI (5,260-12,200)	↓	Streptococcus pneumoniae 4,060 UI (2,940-5,180)	↓	Klebsiella pneumoniae 1,050 UI (809-1,300)	↑
2	Streptococcus pneumoniae 5,300 UI (4,350-6,250)	↓	Klebsiella pneumoniae 3,920 UI (3,160-4,690)	↑	Streptococcus pneumoniae 977 UI (613-1,340)	↓
3	Klebsiella pneumoniae 4,660 UI (3,890-5,440)	↑	Escherichia coli 2,620 UI (2,160-3,080)	↑	Pseudomonas aeruginosa 721 UI (521-921)	↑
4	Pseudomonas aeruginosa 3,140 UI (2,630-3,650)	↑	Pseudomonas aeruginosa 2,620 UI (2,150-3,090)	↑	Acinetobacter baumannii 685 UI (564-806)	↑
5	Staphylococcus aureus 2,960 UI (2,490-3,420)	↑	Staphylococcus aureus 2,090 UI (1,460-2,710)	↑	Staphylococcus aureus 625 UI (437-814)	↑
6	Escherichia coli 2,760 UI (2,280-3,240)	↑	Acinetobacter baumannii 1,710 UI (1,410-2,010)	↑	Escherichia coli 576 UI (440-712)	↑
7	Acinetobacter baumannii 1,730 UI (1,430-2,030)	↑	Mycobacterium tuberculosis 765 UI (144-2,140)	↑	Mycobacterium tuberculosis 271 UI (0-873)	↑
8	Group B Streptococcus 1,280 UI (976-1,580)	↑	Serratia spp. 661 UI (505-817)	↑	Serratia spp. 170 UI (128-213)	↑
9	Haemophilus influenzae 914 UI (747-1,080)	↓	Group B Streptococcus 630 UI (433-826)	↑	Enterobacter spp. 168 UI (134-202)	↑
10	Serratia spp. 886 UI (703-1,070)	↑	Enterobacter spp. 538 UI (437-640)	↑	Group B Streptococcus 78 UI (38-118)	↑

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%

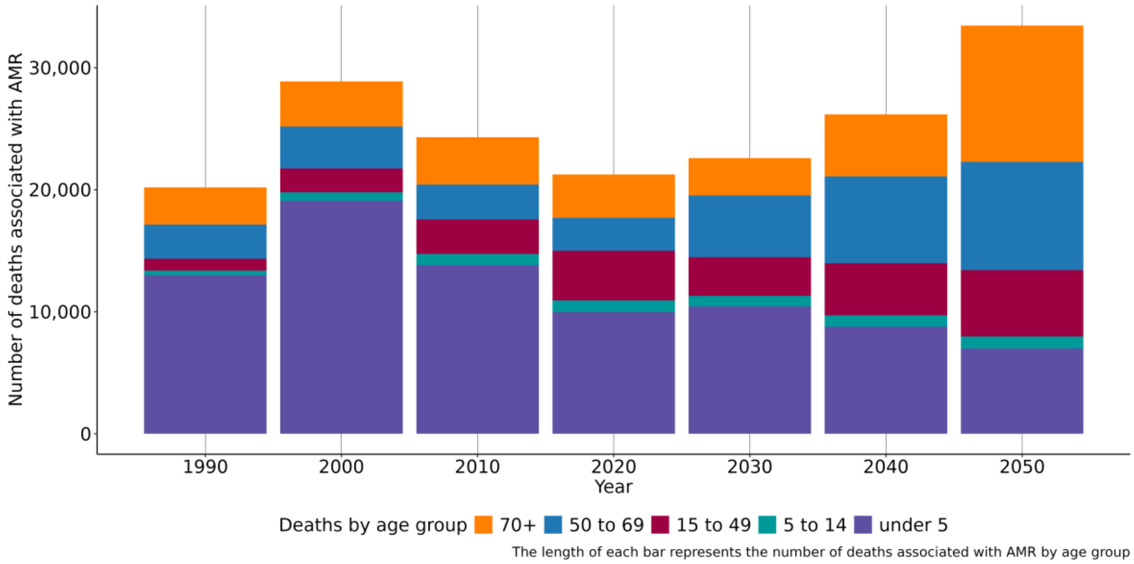
Table 2. Combinations which cause most deaths in 2021 (Number of deaths in parenthesis)

Burden Rank	Associated			Attributable		
1	Klebsiella pneumoniae Beta-Lactam/Lactamase Inhib.	3,290 UI (2,450-4,130)	↑	Streptococcus pneumoniae Carbapenems	617 UI (357-878)	↓
2	Streptococcus pneumoniae TMP-SMX	3,260 UI (2,140-4,380)	↓	Pseudomonas aeruginosa Carbapenems	509 UI (348-670)	↑
3	Klebsiella pneumoniae Aminoglycosides	3,130 UI (2,460-3,800)	↓	Staphylococcus aureus Methicillin	442 UI (302-583)	↑
4	Klebsiella pneumoniae TMP-SMX	3,120 UI (2,390-3,850)	↓	Acinetobacter baumannii Carbapenems	328 UI (239-417)	↑
5	Klebsiella pneumoniae Fluoroquinolones	2,830 UI (2,090-3,570)	↑	Klebsiella pneumoniae Carbapenems	289 UI (200-377)	↑
6	Pseudomonas aeruginosa Carbapenems	2,590 UI (2,130-3,050)	↑	Mycobacterium tuberculosis MDR excluding XDR	243 UI (0-804)	↑
7	Escherichia coli Aminopenicillin	2,360 UI (1,640-3,080)	↑	Klebsiella pneumoniae Aminoglycosides	234 UI (164-303)	↑
8	Streptococcus pneumoniae Penicillin	2,270 UI (1,250-3,300)	↓	Escherichia coli 3GC	223 UI (138-307)	↑
9	Streptococcus pneumoniae Carbapenems	2,260 UI (1,400-3,120)	↓	Klebsiella pneumoniae Fluoroquinolones	217 UI (141-294)	↑
10	Escherichia coli 3GC	2,190 UI (1,770-2,620)	↑	Acinetobacter baumannii Fluoroquinolones	196 UI (156-235)	↑

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) bloodstream infections (18,600 UI (15,100-22,200)), lower respiratory infection (excl. COVID) (17,000 UI (13,800-20,100)), tuberculosis (8,730 UI (5,260-12,200)), diarrhea (4,400 UI (2,570-6,240)) and meningitis (2,230 UI (1,410-3,050)).

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



- In Afghanistan, people aged under 5 saw the largest number of deaths associated with AMR both in 1990 and 2021, which indicates that under 5 continues to be particularly vulnerable to infections which are resistant to antibiotics. In 2021, the number of deaths associated with AMR among the under 5 was 9,140 UI (6,390-11,900), whereas the mortality rate per 100,000 was 844 UI (675-1,010).

Data sources for Afghanistan

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 Afghanistan by source type

Source type	Years	Sample size	Sample size units
Antibiotic use	2010-2021	14,398	Study-year datapoints
Microbial or laboratory data without outcome	1990-2021	49	Isolates
Literature studies	2010-2021	3,072	Cases/isolates/susceptibility tests
Single drug resistance profile data	2010-2021	371	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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