# The burden of antimicrobial resistance (AMR) in the United Republic of Tanzania

Executive summary

- Antimicrobial Resistance (AMR) is a major global health threat, over **10,000 lives** have been lost each year since 1990 in the United Republic of Tanzania due to AMR.

- In 2021, there were an estimated **9,230 UI (7,170-11,300)** deaths attributable to AMR and **42,200 UI (33,200-51,200)** 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 *Acinetobacter baumannii* resistant to carbapenems, *Streptococcus pneumoniae* resistant to beta lactam / beta-lactamase inhibitors and *Streptococcus pneumoniae* resistant to carbapenems.

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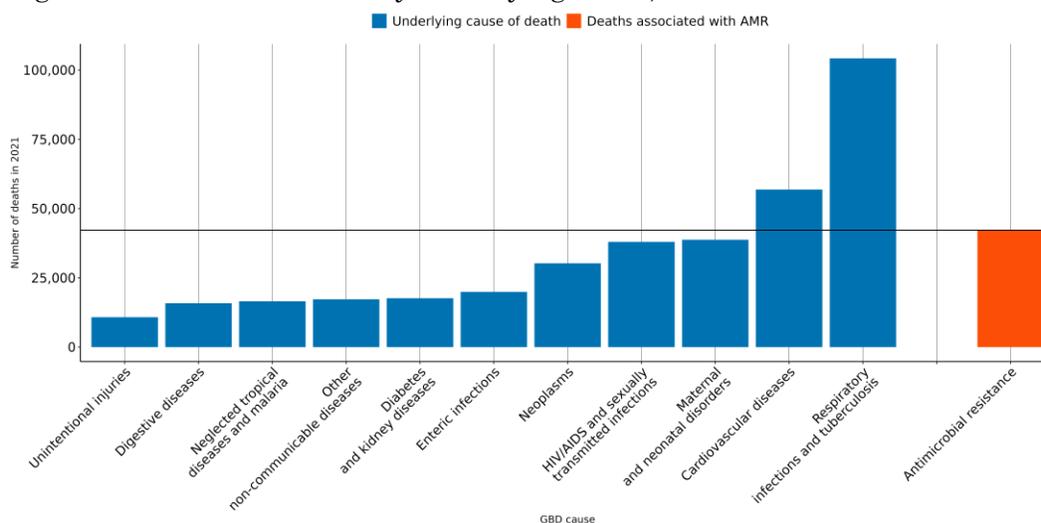

- In 2021, the number of deaths associated with AMR (orange bar in *figure 2*) were high compared to the most relevant underlying causes of death (depicted in blue) in the country. AMR associated deaths occur within multiple Global Burden of Disease (GBD) causes of death and AMR is not an underlying 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 the Tanzania, a 10% reduction means to decrease the number of deaths associated with AMR to **41,700**, but currently the trend for this country could reach up to **44,600 UI [32,100-59,100]** AMR-associated deaths in 2030.

AMR in the United Republic of Tanzania

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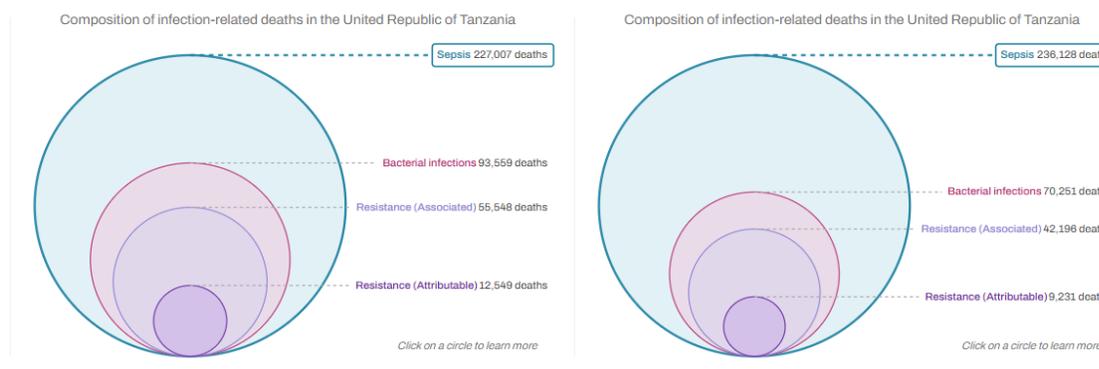
- To look at these and more visualization interactively visit [Measuring Infectious Causes and Resistance Outcomes for Burden Estimation (MICROBE)](#)

- In **the United Republic of Tanzania** in 2021, there were an estimated **9,230 UI (7,170-11,300)** deaths attributable to AMR and **42,200 UI (33,200-51,200)** 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, **the United Republic of Tanzania has the 32nd 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	
	Mycobacterium tuberculosis 15,000 UI (10,100-19,800)	↓	Escherichia coli 7,220 UI (5,740-8,710)	↓	Streptococcus pneumoniae 1,830 UI (1,360-2,300)	↓
	Klebsiella pneumoniae 8,210 UI (6,640-9,780)	↓	Streptococcus pneumoniae 7,080 UI (5,580-8,580)	↓	Klebsiella pneumoniae 1,510 UI (1,100-1,910)	↑
	Escherichia coli 7,770 UI (6,190-9,360)	↓	Klebsiella pneumoniae 7,020 UI (5,530-8,500)	↑	Escherichia coli 1,450 UI (1,090-1,800)	↓
	Streptococcus pneumoniae 7,690 UI (6,150-9,220)	↓	Staphylococcus aureus 4,290 UI (2,940-5,650)	↑	Acinetobacter baumannii 1,230 UI (1,000-1,460)	↓
	Staphylococcus aureus 5,770 UI (4,680-6,860)	↑	Pseudomonas aeruginosa 4,200 UI (3,210-5,180)	↑	Pseudomonas aeruginosa 939 UI (666-1,210)	↑
	Pseudomonas aeruginosa 5,580 UI (4,510-6,650)	↑	Acinetobacter baumannii 3,110 UI (2,480-3,750)	↓	Staphylococcus aureus 621 UI (399-844)	↑
	Acinetobacter baumannii 3,200 UI (2,550-3,850)	↓	Salmonella Typhi 1,140 UI (272-2,010)	↑	Serratia spp. 293 UI (221-365)	↓
	Group B Streptococcus 2,560 UI (1,900-3,210)	↑	Serratia spp. 1,090 UI (821-1,360)	↓	Mycobacterium tuberculosis 264 UI (0-874)	↑
	Shigella spp. 2,360 UI (1,330-3,390)	↓	Shigella spp. 999 UI (298-1,700)	↓	Enterobacter spp. 256 UI (168-344)	↑
	Salmonella Typhi 1,900 UI (631-3,170)	↓	Enterobacter spp. 959 UI (754-1,160)	↑	Salmonella Typhi 120 UI (0-246)	↑

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		
	Escherichia coli TMP-SMX	6,760 UI (5,360-8,160)	↓	Streptococcus pneumoniae Carbapenems	819 UI (475-1,160)	↓
	Klebsiella pneumoniae TMP-SMX	6,640 UI (5,220-8,050)	↓	Acinetobacter baumannii Carbapenems	602 UI (433-771)	↑
	Streptococcus pneumoniae Beta-Lactam/Lactamase Inhib.	6,480 UI (5,000-7,960)	↓	Streptococcus pneumoniae Beta-Lactam/Lactamase Inhib.	411 UI (240-582)	↓
	Streptococcus pneumoniae TMP-SMX	6,060 UI (4,490-7,620)	↓	Escherichia coli TMP-SMX	391 UI (259-523)	↓
	Escherichia coli Aminopenicillin	5,910 UI (3,980-7,840)	↓	Escherichia coli 3GC	368 UI (109-628)	↑
	Klebsiella pneumoniae Beta-Lactam/Lactamase Inhib.	5,800 UI (4,260-7,350)	↑	Staphylococcus aureus TMP-SMX	358 UI (207-510)	↑
	Escherichia coli Beta-Lactam/Lactamase Inhib.	4,640 UI (3,600-5,670)	↑	Klebsiella pneumoniae TMP-SMX	354 UI (177-531)	↓
	Escherichia coli 3GC	4,200 UI (2,960-5,430)	↑	Pseudomonas aeruginosa Aminoglycosides	346 UI (239-453)	↑
	Streptococcus pneumoniae 3GC	3,800 UI (2,710-4,900)	↓	Streptococcus pneumoniae 3GC	324 UI (224-425)	↓
	Pseudomonas aeruginosa Aminoglycosides	3,650 UI (2,720-4,580)	↑	Acinetobacter baumannii Fluoroquinolones	297 UI (230-365)	↑

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) (31,600 UI (25,500-37,600)), bloodstream infections (30,600 UI (23,800-37,400)), diarrhea (18,400 UI (11,200-25,500)), tuberculosis (15,000 UI (10,100-19,800)) and meningitis (4,520 UI (2,890-6,160)).

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
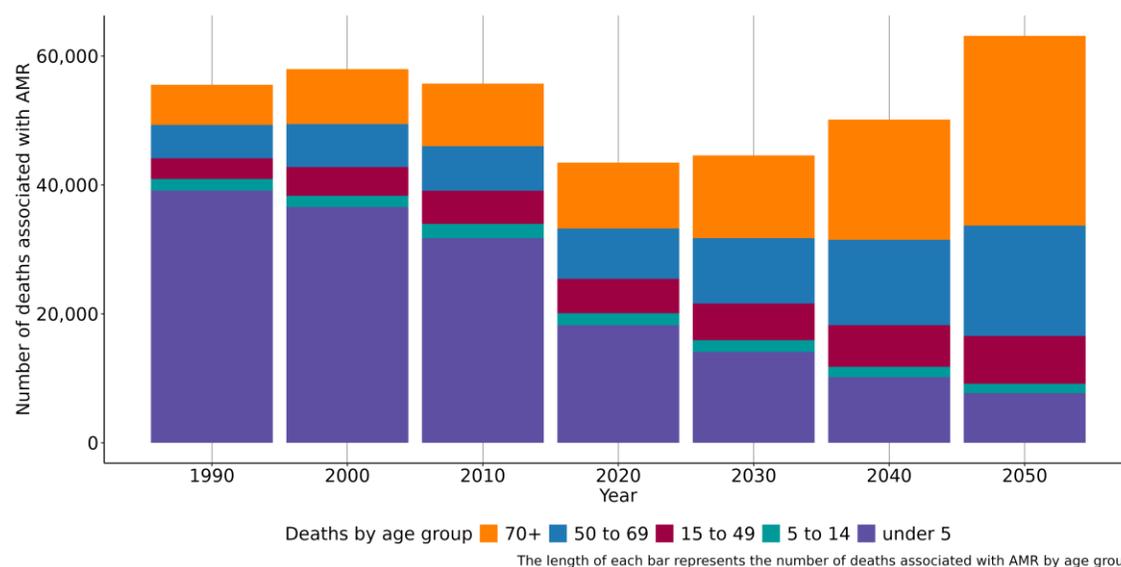
- In the United Republic of Tanzania, people aged under 5 saw the largest number of deaths associated with AMR both in 1990 and 2021, which indicates that under 5 continues to be particularly vulnerable to infections which are resistant to antibiotics. In 2021, the number of deaths associated with AMR among the under 5 was 17,000 UI (11,800-22,100), whereas the mortality rate per 100,000 was 914 UI (724-1,100).

Data sources for the United Republic of Tanzania

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 the United Republic of Tanzania by source type

Source type	Years	Sample size	Sample size units
Antibiotic use	1990-2021	3,171	Study-year datapoints
Microbial or laboratory data without outcome	1990-2021	471	Isolates
Literature studies	1990-2021	11,291	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