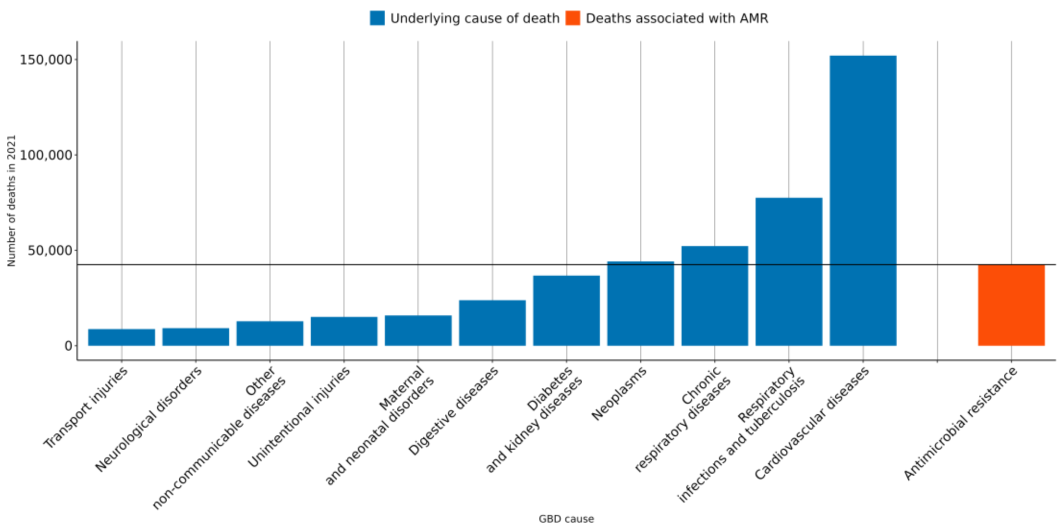
The burden of antimicrobial resistance (AMR) in Myanmar

Executive summary

- Antimicrobial Resistance (AMR) is a major global health threat, over **10,000 lives** have been lost each year since 1990 in Myanmar due to AMR.
- In 2021, there were an estimated **11,100 UI (8,470-13,700)** deaths attributable to AMR and **42,500 UI (33,400-51,600)** deaths associated with AMR in this location.
- The largest number of deaths associated with AMR in 2021 occurred among those aged **70+** 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



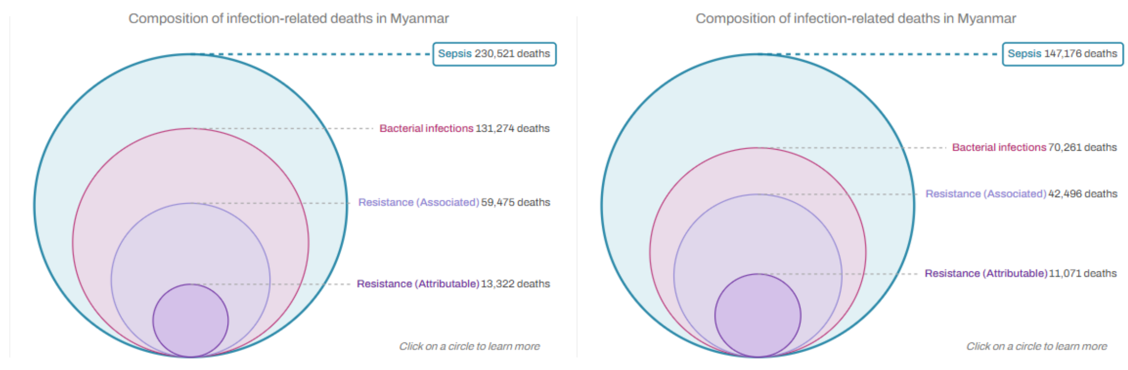
- In 2021, the number of deaths associated with AMR (orange bar in *figure 2*) were high compared to the most relevant underlying causes of death (depicted in blue) in the country. AMR associated deaths occur within multiple Global Burden of Disease (GBD) causes of death and AMR is not an underlying 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 Myanmar, a 10% reduction means to decrease the number of deaths associated with AMR to **40,100**, but currently the trend for this country could reach up to **50,800 UI [38,500-68,000]** AMR-associated deaths in 2030.

AMR in Myanmar

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 Myanmar between 1990 and 2019.



- To look at these and more visualization interactively visit [Measuring Infectious Causes and Resistance Outcomes for Burden Estimation (MICROBE)]
- In **Myanmar** in 2021, there were an estimated **11,100 UI (8,470-13,700)** deaths attributable to AMR and **42,500 UI (33,400-51,600)** 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, **Myanmar has the 56th 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 16,000 UI (11,300-20,800) ↓	Streptococcus pneumoniae 7,640 UI (5,520-9,770) ↓	Acinetobacter baumannii 2,120 UI (1,710-2,520) ↓
2	Streptococcus pneumoniae 10,400 UI (8,680-12,100) ↓	Klebsiella pneumoniae 6,140 UI (4,980-7,300) ↓	Klebsiella pneumoniae 1,720 UI (1,360-2,070) ↓
3	Klebsiella pneumoniae 7,480 UI (6,180-8,770) ↓	Acinetobacter baumannii 5,340 UI (4,300-6,390) ↓	Staphylococcus aureus 1,550 UI (1,240-1,860) ↑
4	Staphylococcus aureus 6,880 UI (5,680-8,090) ↑	Staphylococcus aureus 5,230 UI (4,090-6,370) ↑	Streptococcus pneumoniae 1,350 UI (762-1,940) ↓
5	Pseudomonas aeruginosa 6,010 UI (4,960-7,070) ↓	Escherichia coli 5,230 UI (4,280-6,180) ↓	Escherichia coli 1,350 UI (1,090-1,610) ↓
6	Acinetobacter baumannii 5,660 UI (4,620-6,700) ↓	Pseudomonas aeruginosa 3,820 UI (2,800-4,850) ↓	Pseudomonas aeruginosa 950 UI (625-1,270) ↓
7	Escherichia coli 5,410 UI (4,440-6,390) ↓	Mycobacterium tuberculosis 2,020 UI (632-4,390) ↑	Mycobacterium tuberculosis 681 UI (0-1,950) ↑
8	Enterobacter spp. 1,430 UI (1,170-1,700) ↑	Enterobacter spp. 1,130 UI (908-1,360) ↓	Enterobacter spp. 349 UI (274-424) ↓
9	Group B Streptococcus 1,380 UI (1,110-1,640) ↓	Enterococcus faecalis 859 UI (673-1,050) ↑	Serratia spp. 244 UI (194-295) ↓
10	Haemophilus influenzae 1,280 UI (1,050-1,500) ↓	Serratia spp. 857 UI (685-1,030) ↓	Enterococcus faecalis 144 UI (89-199) ↓

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%

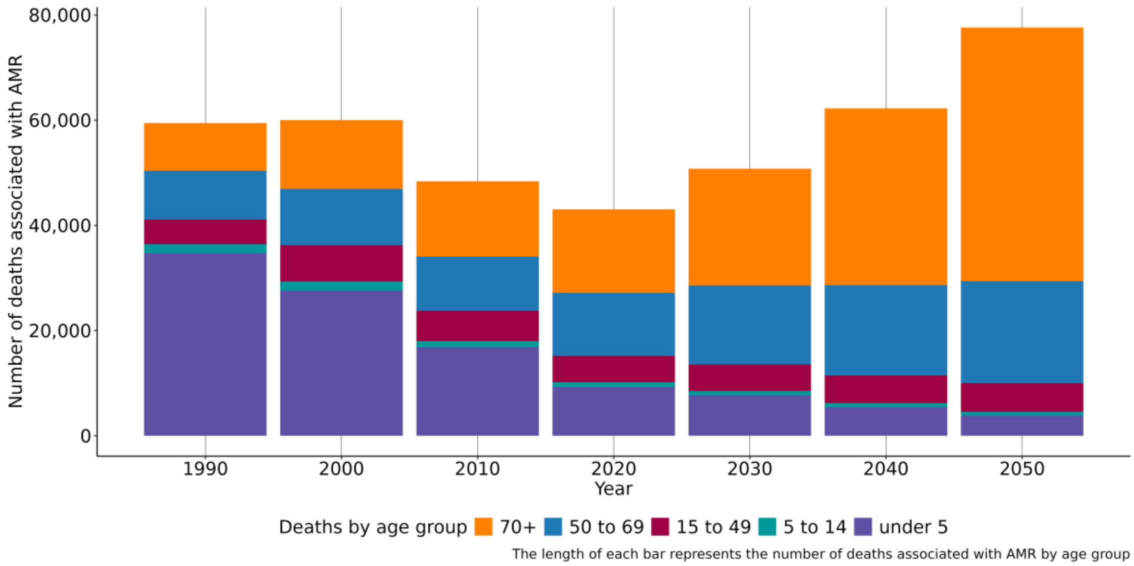
Table 2. Combinations which cause most deaths in 2021 (Number of deaths in parenthesis)

Burden Rank	Associated		Attributable	
1	Streptococcus pneumoniae TMP-SMX	6,090 UI (3,890-8,300) ↓	Staphylococcus aureus Methicillin	1,160 UI (913-1,400) ↑
2	Klebsiella pneumoniae Fluoroquinolones	5,900 UI (4,750-7,050) ↓	Acinetobacter baumannii Carbapenems	1,000 UI (700-1,300) ↑
3	Acinetobacter baumannii 4GC	5,180 UI (4,130-6,230) ↓	Streptococcus pneumoniae Carbapenems	744 UI (361-1,130) ↓
4	Escherichia coli Aminopenicillin	5,090 UI (4,120-6,050) ↓	Acinetobacter baumannii Fluoroquinolones	555 UI (439-671) ↑
5	Klebsiella pneumoniae 3GC	5,070 UI (4,050-6,080) ↓	Mycobacterium tuberculosis MDR excluding XDR	550 UI (0-1,640) ↑
6	Acinetobacter baumannii 3GC	4,970 UI (3,880-6,050) ↓	Klebsiella pneumoniae Fluoroquinolones	543 UI (376-710) ↑
7	Acinetobacter baumannii Anti-pseudomonal	4,850 UI (3,860-5,840) ↑	Klebsiella pneumoniae Carbapenems	449 UI (313-585) ↑
8	Streptococcus pneumoniae Macrolides	4,780 UI (3,220-6,350) ↑	Escherichia coli Carbapenems	375 UI (258-491) ↓
9	Staphylococcus aureus Methicillin	4,700 UI (3,660-5,730) ↑	Pseudomonas aeruginosa Carbapenems	341 UI (174-508) ↑
10	Acinetobacter baumannii Carbapenems	4,620 UI (3,490-5,740) ↑	Acinetobacter baumannii Aminoglycosides	331 UI (228-434) ↓

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) (34,000 UI (28,000-40,000)), bloodstream infections (27,700 UI (22,800-32,600)), tuberculosis (16,000 UI (11,300-20,800)), diarrhea (5,410 UI (3,540-7,280)) and urinary tract infections and pyelonephritis (3,840 UI (2,880-4,810)).

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



- In Myanmar, 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 70+. 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 70+ was 15,900 UI (12,500-19,300), whereas the mortality rate per 100,000 was 710 UI (558-863).

Data sources for Myanmar

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 Myanmar by source type

Source type	Years	Sample size	Sample size units
Antibiotic use	2010-2021	339	Study-year datapoints
Microbial or laboratory data without outcome	2010-2021	207	Isolates
Literature studies	1990-2021	345	Cases/isolates/susceptibility tests
Single drug resistance profile data	2010-2021	25,695	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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