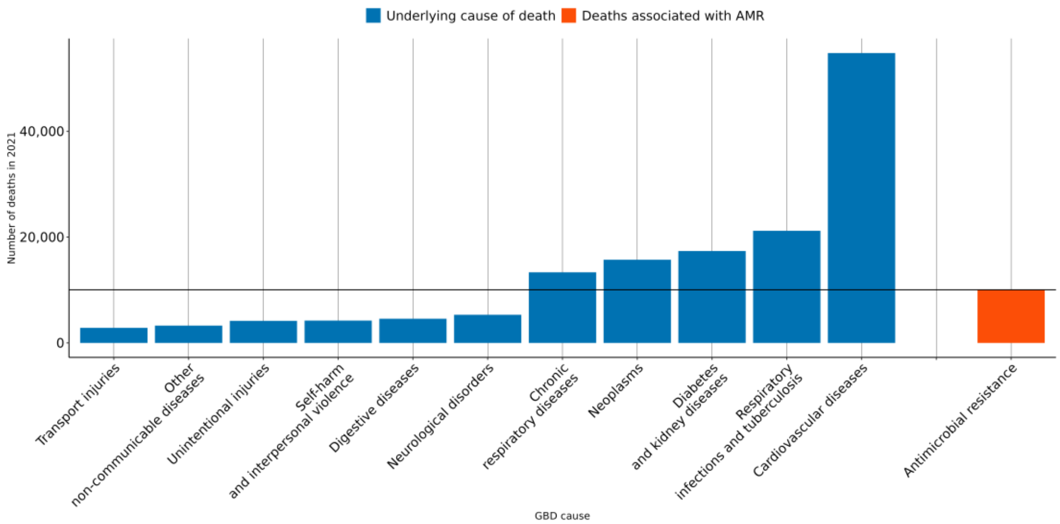
The burden of antimicrobial resistance (AMR) in Sri Lanka

Executive summary

- Antimicrobial Resistance (AMR) is a major global health threat, over **2,000 lives** have been lost each year since 1990 in Sri Lanka due to AMR.
- In 2021, there were an estimated **2,610 UI (1,750-3,460)** deaths attributable to AMR and **10,000 UI (6,610-13,500)** 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 *Acinetobacter baumannii* resistant to fluoroquinolones.

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



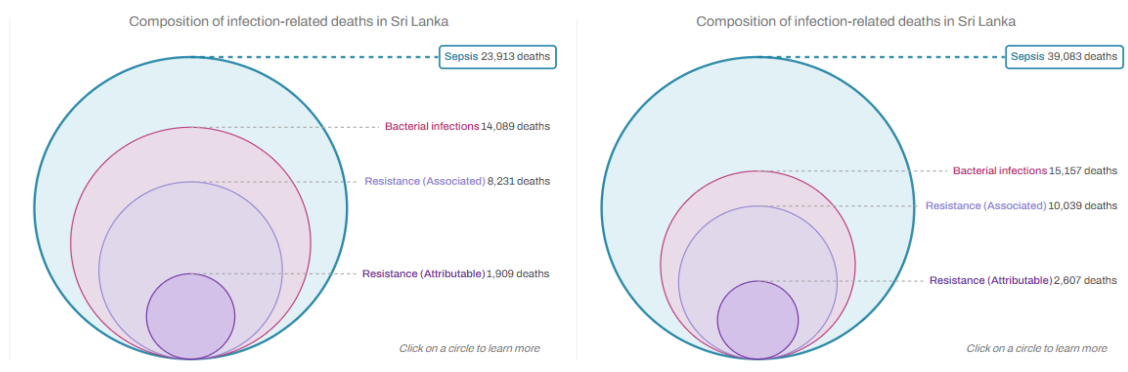
- In 2021, the number of deaths associated with AMR (orange bar in *figure 2*) were high compared to the most relevant underlying causes of death (depicted in blue) in the country. AMR associated deaths occur within multiple Global Burden of Disease (GBD) causes of death and AMR is not an underlying 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 Sri Lanka, a 10% reduction means to decrease the number of deaths associated with AMR to **9,370**, but currently the trend for this country could reach up to **14,100 UI [9,230-21,300]** AMR-associated deaths in 2030.

AMR in Sri Lanka

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 Sri Lanka between 1990 and 2019.



- To look at these and more visualization interactively visit [Measuring Infectious Causes and Resistance Outcomes for Burden Estimation (MICROBE)]
- In **Sri Lanka** in 2021, there were an estimated **2,610 UI (1,750-3,460)** deaths attributable to AMR and **10,000 UI (6,610-13,500)** 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, **Sri Lanka has the 69th 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)

Burden rank	Overall susceptible and resistant		Associated		Attributable	
1	Staphylococcus aureus 2,810 UI (1,940-3,680)	↑	Staphylococcus aureus 1,910 UI (1,250-2,570)	↑	Acinetobacter baumannii 649 UI (472-826)	↑
2	Escherichia coli 1,940 UI (1,340-2,540)	↑	Escherichia coli 1,680 UI (1,100-2,270)	↑	Staphylococcus aureus 569 UI (385-752)	↑
3	Streptococcus pneumoniae 1,890 UI (1,310-2,460)	↓	Acinetobacter baumannii 1,600 UI (1,090-2,100)	↑	Escherichia coli 344 UI (213-474)	↑
4	Acinetobacter baumannii 1,640 UI (1,120-2,160)	↑	Streptococcus pneumoniae 1,290 UI (793-1,790)	↓	Klebsiella pneumoniae 262 UI (178-347)	↑
5	Pseudomonas aeruginosa 1,310 UI (898-1,730)	↑	Klebsiella pneumoniae 951 UI (631-1,270)	↑	Streptococcus pneumoniae 236 UI (124-349)	↓
6	Klebsiella pneumoniae 1,290 UI (884-1,700)	↓	Pseudomonas aeruginosa 835 UI (515-1,150)	↑	Pseudomonas aeruginosa 205 UI (114-297)	↑
7	Mycobacterium tuberculosis 983 UI (619-1,350)	↓	Enterobacter spp. 350 UI (234-466)	↑	Enterobacter spp. 109 UI (68-150)	↑
8	Enterococcus faecalis 518 UI (352-683)	↑	Enterococcus faecalis 349 UI (236-463)	↑	Enterococcus faecalis 57 UI (32-82)	↑
9	Enterobacter spp. 455 UI (309-601)	↑	Proteus spp. 246 UI (160-332)	↑	Proteus spp. 38 UI (22-54)	↑
10	Group A Streptococcus 384 UI (253-515)	↑	Enterococcus faecium 207 UI (137-277)	↑	Enterococcus faecium 33 UI (17-48)	↑

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	Staphylococcus aureus Methicillin	1,750 UI (1,120-2,370)	↑	Staphylococcus aureus Methicillin	462 UI (313-611)	↑
2	Acinetobacter baumannii Carbapenems	1,570 UI (1,070-2,070)	↑	Acinetobacter baumannii Carbapenems	372 UI (252-492)	↑
3	Acinetobacter baumannii 4GC	1,570 UI (1,070-2,070)	↑	Acinetobacter baumannii Fluoroquinolones	173 UI (130-215)	↑
4	Escherichia coli Aminopenicillin	1,530 UI (753-2,310)	↑	Streptococcus pneumoniae Carbapenems	139 UI (60-218)	↑
5	Acinetobacter baumannii 3GC	1,520 UI (1,030-2,010)	↑	Escherichia coli 3GC	112 UI (59-164)	↑
6	Acinetobacter baumannii Anti-pseudomonal	1,440 UI (976-1,900)	↑	Acinetobacter baumannii Aminoglycosides	92 UI (55-130)	↑
7	Acinetobacter baumannii Beta-Lactam/Lactamase Inhib.	1,420 UI (963-1,880)	↑	Klebsiella pneumoniae Fluoroquinolones	84 UI (52-116)	↑
8	Acinetobacter baumannii Fluoroquinolones	1,400 UI (945-1,850)	↑	Escherichia coli Fluoroquinolones	76 UI (37-115)	↑
9	Acinetobacter baumannii Aminoglycosides	1,230 UI (795-1,660)	↑	Klebsiella pneumoniae Carbapenems	66 UI (41-90)	↑
10	Escherichia coli Fluoroquinolones	1,130 UI (716-1,550)	↑	Pseudomonas aeruginosa Carbapenems	62 UI (23-100)	↑

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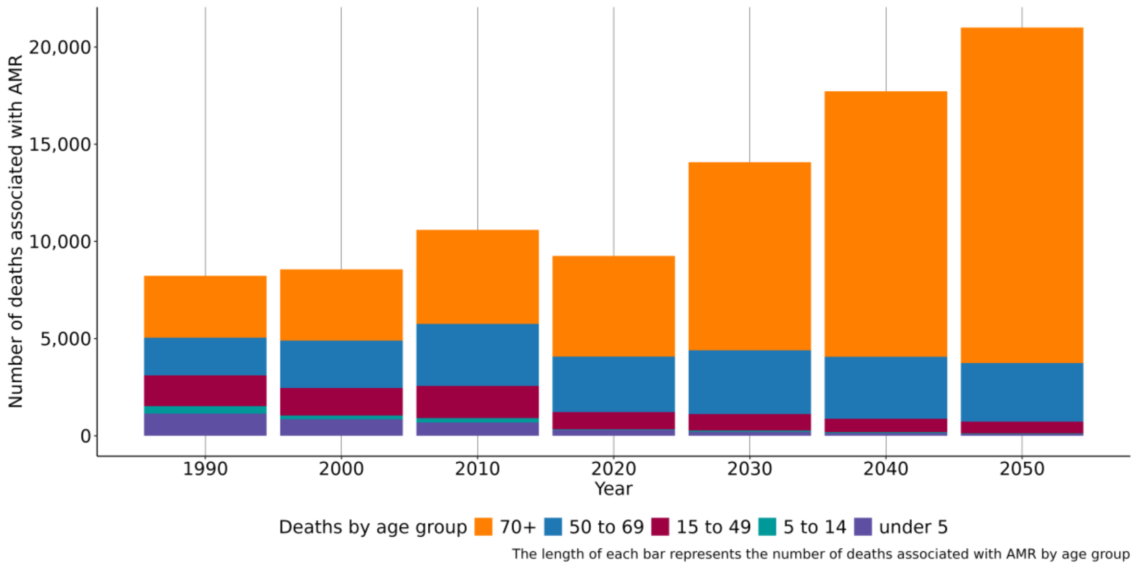
- Independently of antimicrobial resistance, the infectious syndromes accounting for the most deaths in 2021 were as follows (estimated thousands of deaths in parenthesis) bloodstream infections (7,630 UI (5,300-9,960)), lower respiratory infection (excl. COVID) (6,450 UI (4,420-8,480)), urinary tract infections and pyelonephritis (1,120 UI (707-1,540)), peritoneal and intra-abdominal infections (1,100 UI (709-1,490)) and tuberculosis (983 UI (619-1,350)).

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



- In Sri Lanka, people aged 70+ saw the largest number of deaths associated with AMR both in 1990 and 2021, which indicates that 70+ continues to be particularly vulnerable to infections which are resistant to antibiotics. In 2021, the number of deaths associated with AMR among the 70+ was 5,810 UI (3,950-7,660), whereas the mortality rate per 100,000 was 382 UI (260-504).

Data sources for Sri Lanka

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 Sri Lanka by source type

Source type	Years	Sample size	Sample size units
Antibiotic use	1990-2021	535	Study-year datapoints
Microbial or laboratory data without outcome	2010-2021	17	Isolates
Microbial or laboratory data with outcome	2010-2021	43	Isolates
Literature studies	1990-2021	943	Cases/isolates/susceptibility tests
Single drug resistance profile data	1990-2021	16,744	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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