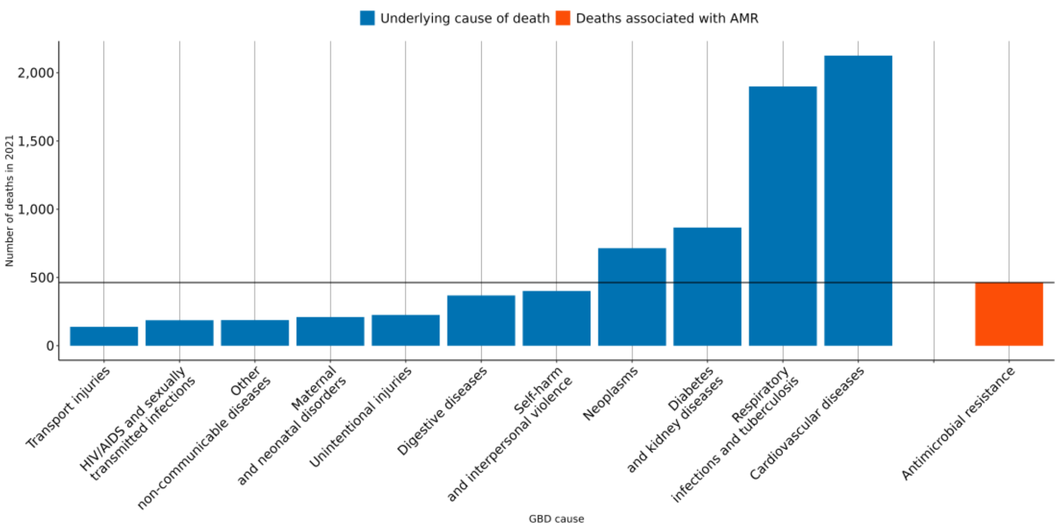
The burden of antimicrobial resistance (AMR) in Guyana

Executive summary

- Antimicrobial Resistance (AMR) is a major global health threat, over **100 lives** have been lost each year since 1990 in Guyana due to AMR.
- In 2021, there were an estimated **115 UI (79-150)** deaths attributable to AMR and **463 UI (329-597)** 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



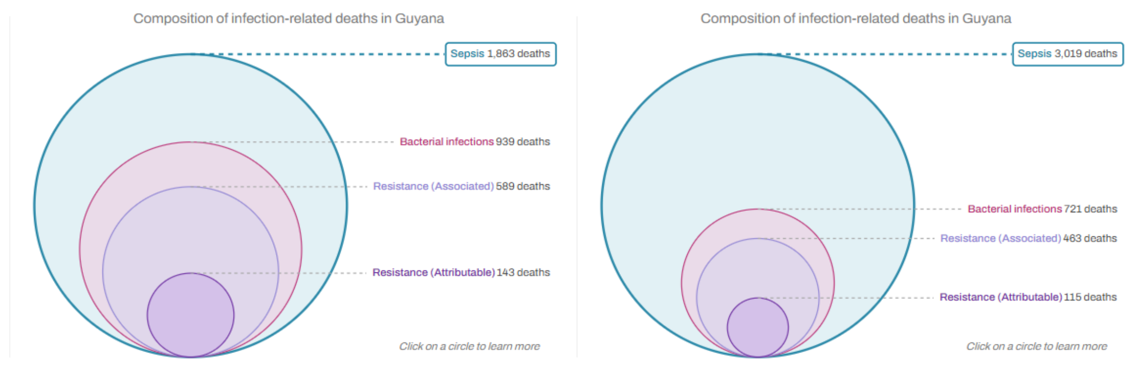
- In 2021, the number of deaths associated with AMR (orange bar in *figure 2*) were high compared to the most relevant underlying causes of death (depicted in blue) in the country. AMR associated deaths occur within multiple Global Burden of Disease (GBD) causes of death and AMR is not an underlying 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 Guyana, a 10% reduction means to decrease the number of deaths associated with AMR to **459**, but currently the trend for this country could reach up to **440 UI [308-650]** AMR-associated deaths in 2030.

AMR in Guyana

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 Guyana between 1990 and 2019.



- To look at these and more visualization interactively visit [Measuring Infectious Causes and Resistance Outcomes for Burden Estimation (MICROBE)]
- In **Guyana** in 2021, there were an estimated **115 UI (79-150)** deaths attributable to AMR and **463 UI (329-597)** 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, **Guyana has the 76th 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	Klebsiella pneumoniae 107 UI (80-133) ↓	Klebsiella pneumoniae 84 UI (61-107) ↓	Acinetobacter baumannii 23 UI (18-28) ↓
2	Staphylococcus aureus 98 UI (74-122) ↑	Escherichia coli 73 UI (53-93) ↑	Klebsiella pneumoniae 19 UI (13-25) ↓
3	Pseudomonas aeruginosa 83 UI (63-104) ↑	Staphylococcus aureus 66 UI (43-88) ↑	Staphylococcus aureus 18 UI (10-25) ↑
4	Streptococcus pneumoniae 81 UI (62-101) ↓	Acinetobacter baumannii 57 UI (42-71) ↓	Escherichia coli 15 UI (10-20) ↑
5	Escherichia coli 80 UI (60-99) ↑	Pseudomonas aeruginosa 51 UI (35-66) ↓	Pseudomonas aeruginosa 13 UI (8-17) ↑
6	Acinetobacter baumannii 61 UI (46-76) ↓	Streptococcus pneumoniae 49 UI (31-67) ↓	Streptococcus pneumoniae 11 UI (6-16) ↓
7	Mycobacterium tuberculosis 49 UI (36-62) ↓	Enterobacter spp. 15 UI (11-19) ↓	Enterobacter spp. 4 UI (3-6) ↓
8	Group B Streptococcus 21 UI (15-26) ↓	Proteus spp. 11 UI (8-15) ↑	Serratia spp. 3 UI (2-4) ↓
9	Serratia spp. 20 UI (15-25) ↓	Serratia spp. 11 UI (8-14) ↓	Enterococcus faecium 2 UI (2-3) ↑
10	Enterobacter spp. 19 UI (14-24) ↓	Enterococcus faecalis 10 UI (8-13) ↑	Enterococcus faecalis 2 UI (1-2) ↑

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%

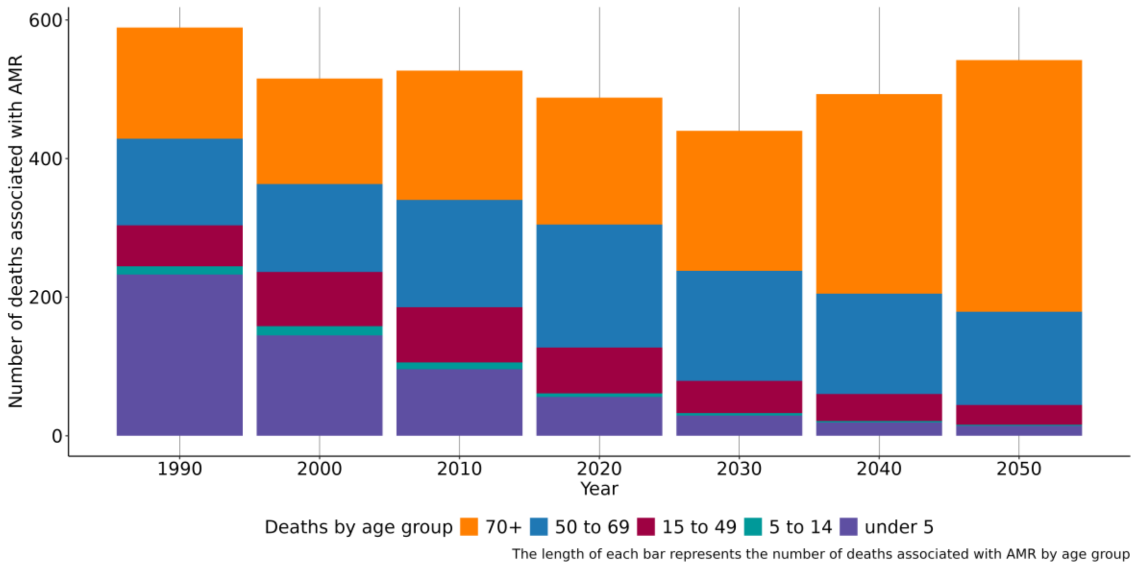
Table 2. Combinations which cause most deaths in 2021 (Number of deaths in parenthesis)

Burden Rank	Associated		Attributable	
1	Klebsiella pneumoniae Fluoroquinolones	75 UI (54-96) ↑	Acinetobacter baumannii Carbapenems	13 UI (9-16) ↓
2	Klebsiella pneumoniae Aminoglycosides	70 UI (51-90) ↓	Staphylococcus aureus Methicillin	12 UI (6-18) ↑
3	Escherichia coli Fluoroquinolones	67 UI (47-88) ↑	Streptococcus pneumoniae Carbapenems	8 UI (5-12) ↓
4	Escherichia coli Aminopenicillin	62 UI (33-91) ↑	Klebsiella pneumoniae Fluoroquinolones	6 UI (4-8) ↑
5	Klebsiella pneumoniae TMP-SMX	60 UI (42-79) ↓	Acinetobacter baumannii Fluoroquinolones	6 UI (5-8) ↓
6	Klebsiella pneumoniae Beta-Lactam/Lactamase Inhib.	59 UI (38-81) ↓	Klebsiella pneumoniae Aminoglycosides	5 UI (3-7) ↓
7	Acinetobacter baumannii Carbapenems	54 UI (40-69) ↓	Pseudomonas aeruginosa Carbapenems	5 UI (2-7) ↑
8	Acinetobacter baumannii 4GC	52 UI (38-66) ↓	Escherichia coli Fluoroquinolones	5 UI (3-7) ↑
9	Acinetobacter baumannii 3GC	52 UI (38-66) ↓	Escherichia coli 3GC	4 UI (2-6) ↑
10	Staphylococcus aureus Methicillin	51 UI (22-80) ↑	Pseudomonas aeruginosa Fluoroquinolones	4 UI (2-5) ↓

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 (395 UI (296-495)), lower respiratory infection (excl. COVID) (381 UI (291-471)), urinary tract infections and pyelonephritis (69 UI (52-87)), peritoneal and intra-abdominal infections (67 UI (49-85)) and diarrhea (54 UI (40-68)).

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



- In Guyana, 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 174 UI (119-229), whereas the mortality rate per 100,000 was 593 UI (445-741).

Data sources for Guyana

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 Guyana by source type

Source type	Years	Sample size	Sample size units
Antibiotic use	1990-2021	370	Study-year datapoints
Literature studies	1990-2009	70	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:

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