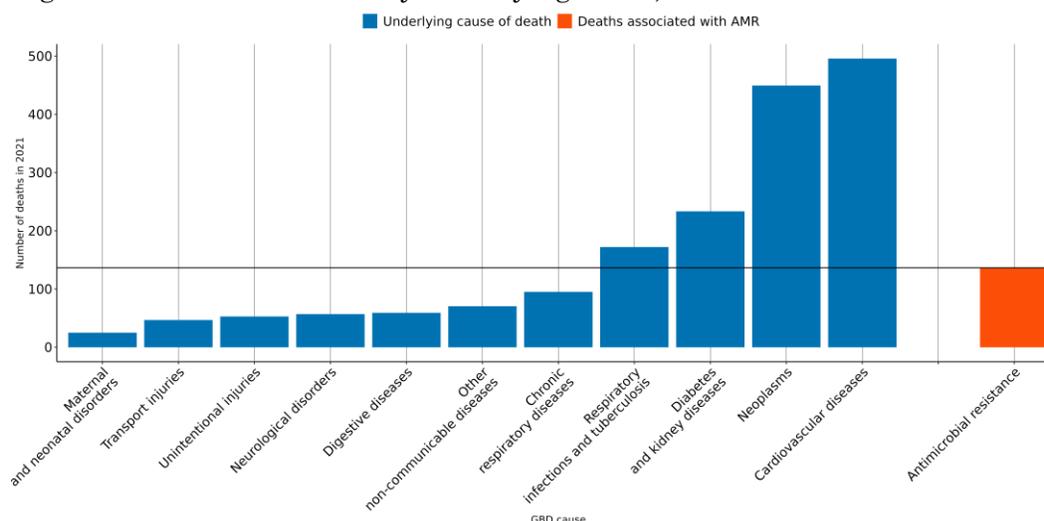


The burden of antimicrobial resistance (AMR) in Brunei Darussalam

Executive summary

- Antimicrobial Resistance (AMR) is a major global health threat, over **30 lives** have been lost each year since 1990 in Brunei Darussalam due to AMR.
- In 2021, there were an estimated **34 UI (27-42)** deaths attributable to AMR and **136 UI (111-162)** 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 *Acinetobacter baumannii* resistant to carbapenems, *Acinetobacter baumannii* resistant to fluoroquinolones and *Streptococcus pneumoniae* resistant to carbapenems.

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



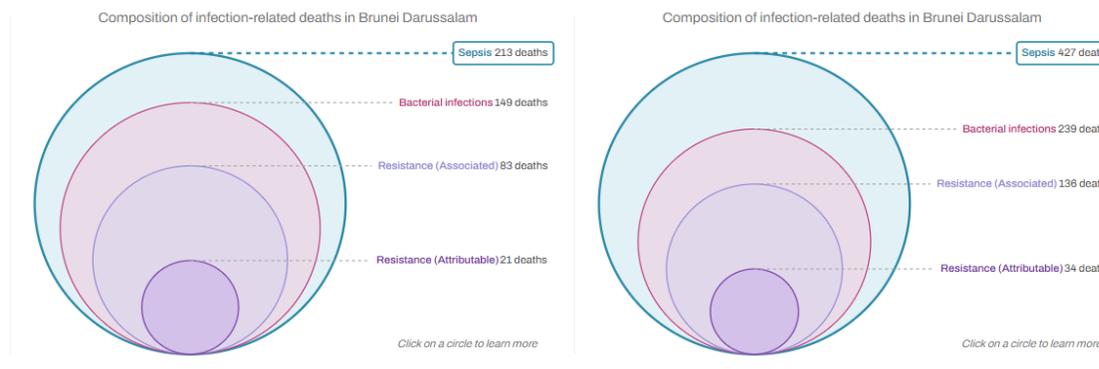
- In 2021, the number of deaths associated with AMR (orange bar in *figure 2*) were high compared to the most relevant underlying causes of death (depicted in blue) in the country. AMR associated deaths occur within multiple Global Burden of Disease (GBD) causes of death and AMR is not an underlying 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 Brunei Darussalam, a 10% reduction means to decrease the number of deaths associated with AMR to **128**, but currently the trend for this country could reach up to **224 UI [175-295]** AMR-associated deaths in 2030.

AMR in Brunei Darussalam

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 Brunei Darussalam between 1990 and 2019.



- To look at these and more visualization interactively visit [Measuring Infectious Causes and Resistance Outcomes for Burden Estimation \(MICROBE\)](#)
- In **Brunei Darussalam** in 2021, there were an estimated **34 UI (27-42)** deaths attributable to AMR and **136 UI (111-162)** 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, **Brunei Darussalam has the 95th 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)

	Overall susceptible and resistant	Associated	Attributable
Burden rank	Staphylococcus aureus 43 UI (38-48) ↑	Acinetobacter baumannii 25 UI (22-28) ↑	Acinetobacter baumannii 10 UI (9-12) ↑
	Streptococcus pneumoniae 36 UI (32-40) ↑	Streptococcus pneumoniae 22 UI (16-28) ↓	Streptococcus pneumoniae 6 UI (4-8) ↑
	Acinetobacter baumannii 28 UI (25-31) ↑	Staphylococcus aureus 21 UI (16-27) ↑	Staphylococcus aureus 4 UI (2-5) ↑
	Escherichia coli 24 UI (21-27) ↑	Escherichia coli 18 UI (15-20) ↑	Pseudomonas aeruginosa 3 UI (3-4) ↑
	Klebsiella pneumoniae 23 UI (21-26) ↑	Pseudomonas aeruginosa 14 UI (12-17) ↑	Escherichia coli 3 UI (3-4) ↑
	Pseudomonas aeruginosa 23 UI (20-25) ↑	Klebsiella pneumoniae 13 UI (10-15) ↑	Klebsiella pneumoniae 3 UI (2-4) ↑
	Mycobacterium tuberculosis 16 UI (13-18) ↓	Enterobacter spp. 5 UI (4-6) ↑	Enterobacter spp. 1 UI (1-2) ↑
	Enterococcus faecalis 7 UI (6-8) ↑	Enterococcus faecalis 4 UI (3-5) ↑	Enterococcus faecium 1 UI (1-1) ↑
	Enterobacter spp. 7 UI (6-8) ↑	Enterococcus faecium 4 UI (3-4) ↑	Enterococcus faecalis 1 UI (0-1) ↑
	Enterococcus faecium 5 UI (4-6) ↑	Proteus spp. 3 UI (2-4) ↑	Serratia spp. 1 UI (0-1) ↑

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%

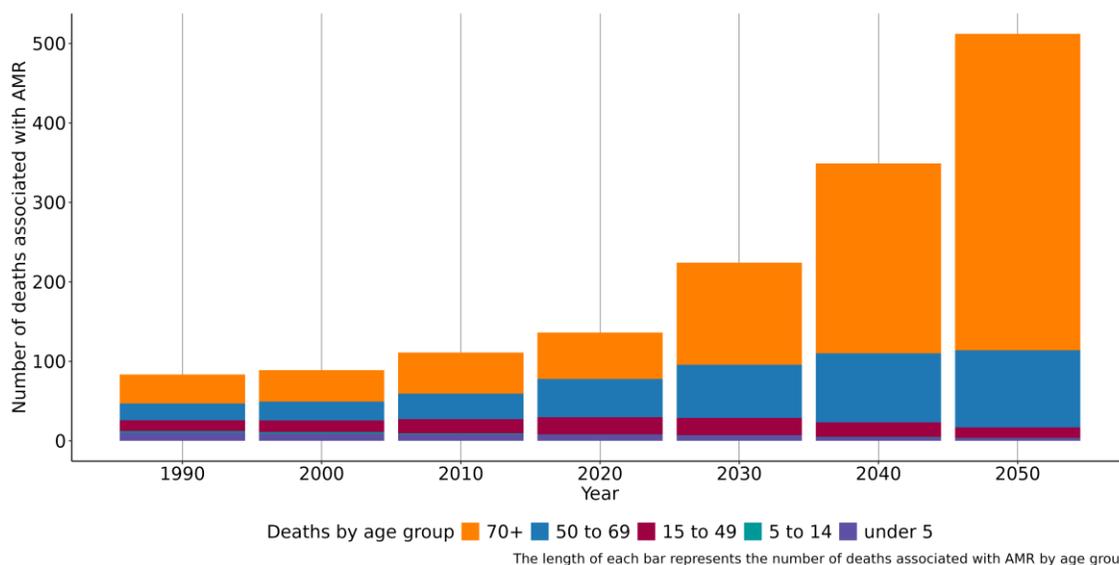
Table 2. Combinations which cause most deaths in 2021 (Number of deaths in parenthesis)

	Associated	Attributable
Burden Rank	Acinetobacter baumannii Carbapenems 24 UI (21-28) ↑	Acinetobacter baumannii Carbapenems 6 UI (5-7) ↑
	Acinetobacter baumannii Fluoroquinolones 24 UI (21-27) ↑	Streptococcus pneumoniae Carbapenems 4 UI (3-6) ↑
	Acinetobacter baumannii 4GC 24 UI (20-27) ↑	Acinetobacter baumannii Fluoroquinolones 3 UI (3-4) ↑
	Acinetobacter baumannii Anti-pseudomonal 23 UI (20-26) ↑	Staphylococcus aureus Methicillin 2 UI (1-3) ↑
	Acinetobacter baumannii Beta-Lactam/Lactamase Inhib. 20 UI (16-23) ↑	Klebsiella pneumoniae Aminoglycosides 1 UI (1-2) ↑
	Acinetobacter baumannii 3GC 18 UI (13-23) ↑	Pseudomonas aeruginosa Fluoroquinolones 1 UI (1-2) ↑
	Escherichia coli Aminopenicillin 16 UI (13-19) ↑	Pseudomonas aeruginosa Carbapenems 1 UI (1-1) ↑
	Staphylococcus aureus Macrolides 16 UI (12-19) ↑	Acinetobacter baumannii Aminoglycosides 1 UI (1-1) ↓
	Streptococcus pneumoniae Carbapenems 15 UI (10-20) ↑	Staphylococcus aureus Fluoroquinolones 1 UI (0-1) ↑
	Streptococcus pneumoniae TMP-SMX 13 UI (7-20) ↑	Escherichia coli 3GC 1 UI (0-1) ↑

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) (111 UI (97-125)), bloodstream infections (110 UI (98-122)), urinary tract infections and pyelonephritis (25 UI (20-30)), peritoneal and intra-abdominal infections (24 UI (21-27)) and tuberculosis (16 UI (13-18)).

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



- In Brunei Darussalam, 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 60 UI (49-72), whereas the mortality rate per 100,000 was 443 UI (358-529).

Data sources for Brunei Darussalam

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 Brunei Darussalam by source type

Source type	Years	Sample size	Sample size units
Single drug resistance profile data	1990-2021	3,326	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:

- 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>