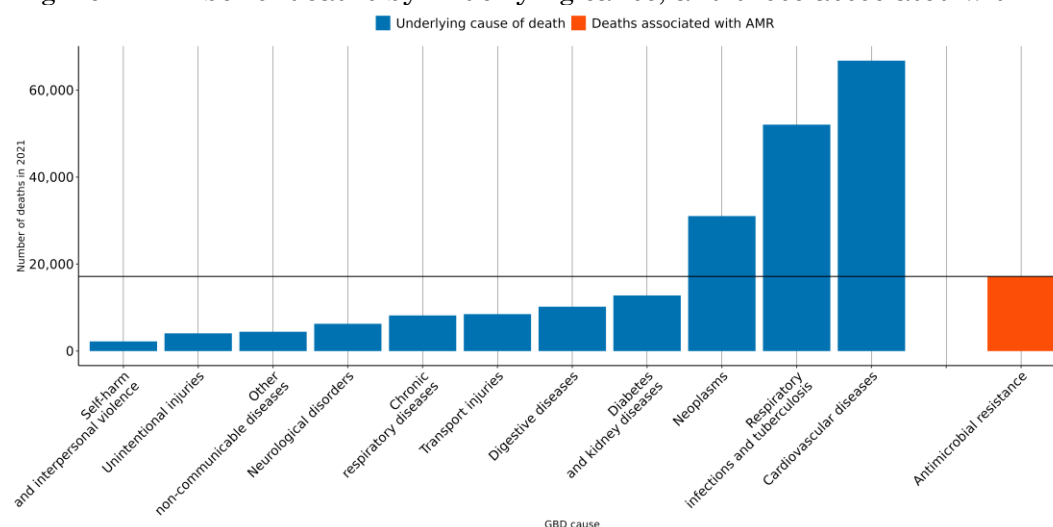


The burden of antimicrobial resistance (AMR) in Malaysia

Executive summary

- Antimicrobial Resistance (AMR) is a major global health threat, over **3,000 lives** have been lost each year since 1990 in Malaysia due to AMR.
- In 2021, there were an estimated **4,020 UI (3,470-4,580)** deaths attributable to AMR and **17,200 UI (15,500-18,800)** 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



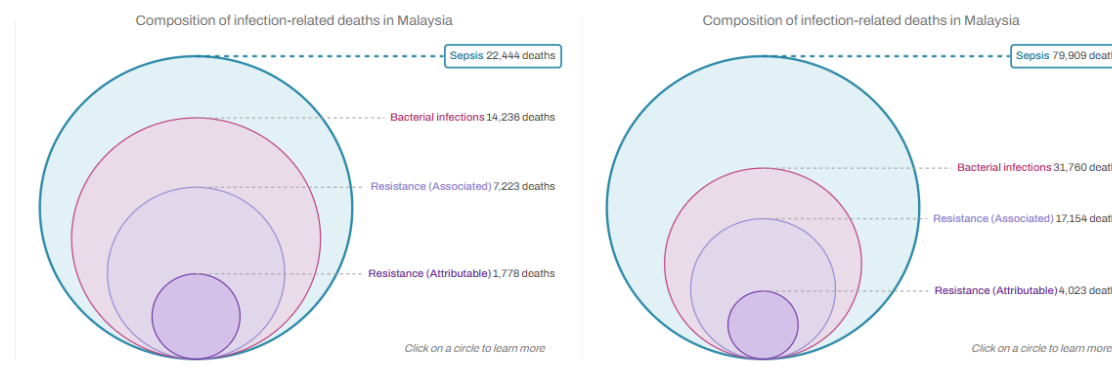
- In 2021, the number of deaths associated with AMR (orange bar in *figure 2*) were high compared to the most relevant underlying causes of death (depicted in blue) in the country. AMR associated deaths occur within multiple Global Burden of Disease (GBD) causes of death and AMR is not an underlying 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 Malaysia, a 10% reduction means to decrease the number of deaths associated with AMR to **15,400**, but currently the trend for this country could reach up to **21,800 UI [18,100-25,700]** AMR-associated deaths in 2030.

AMR in Malaysia

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 Malaysia between 1990 and 2019.



- To look at these and more visualization interactively visit [Measuring Infectious Causes and Resistance Outcomes for Burden Estimation \(MICROBE\)](#)
- In **Malaysia** in 2021, there were an estimated **4,020 UI (3,470-4,580)** deaths attributable to AMR and **17,200 UI (15,500-18,800)** 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, **Malaysia has the 84th 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)

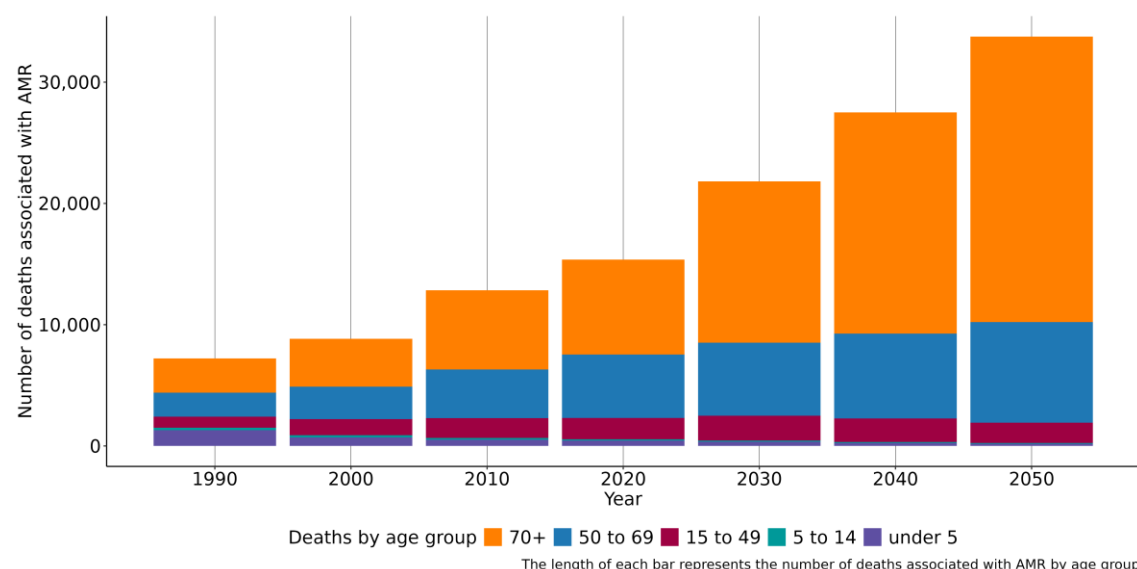
Burden rank	Overall susceptible and resistant		Associated		Attributable	
	Streptococcus pneumoniae 6,240 UI (5,620-6,850)	↑	Streptococcus pneumoniae 4,040 UI (3,560-4,520)	↑	Acinetobacter baumannii 977 UI (873-1,080)	↑
	Staphylococcus aureus 5,890 UI (5,400-6,370)	↑	Staphylococcus aureus 2,910 UI (2,620-3,190)	↑	Staphylococcus aureus 751 UI (639-864)	↑
	Klebsiella pneumoniae 3,270 UI (3,020-3,520)	↑	Acinetobacter baumannii 2,470 UI (2,270-2,660)	↑	Streptococcus pneumoniae 693 UI (503-883)	↑
	Pseudomonas aeruginosa 3,060 UI (2,840-3,280)	↑	Escherichia coli 2,220 UI (2,030-2,410)	↑	Klebsiella pneumoniae 431 UI (372-489)	↑
	Escherichia coli 2,800 UI (2,590-3,020)	↑	Klebsiella pneumoniae 1,730 UI (1,540-1,920)	↑	Escherichia coli 407 UI (351-462)	↑
	Acinetobacter baumannii 2,750 UI (2,580-2,930)	↑	Pseudomonas aeruginosa 1,320 UI (1,100-1,540)	↑	Pseudomonas aeruginosa 343 UI (265-422)	↑
	Mycobacterium tuberculosis 2,020 UI (1,700-2,330)	↓	Enterococcus faecium 460 UI (427-493)	↑	Enterobacter spp. 91 UI (77-104)	↑
	Group A Streptococcus 818 UI (734-902)	↑	Proteus spp. 449 UI (386-512)	↑	Enterococcus faecium 76 UI (56-96)	↑
	Enterobacter spp. 767 UI (718-815)	↑	Enterobacter spp. 347 UI (286-408)	↑	Proteus spp. 70 UI (55-84)	↑
	Enterococcus faecalis 656 UI (607-704)	↑	Enterococcus faecalis 202 UI (167-237)	↑	Enterococcus faecalis 36 UI (23-50)	↑
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	
	Streptococcus pneumoniae Macrolides	3,160 UI (2,680-3,640) ↑	Acinetobacter baumannii Carbapenems	519 UI (426-613) ↑
	Acinetobacter baumannii Beta-Lactam/Lactamase Inhib.	2,220 UI (2,010-2,430) ↑	Staphylococcus aureus Methicillin	497 UI (394-600) ↑
	Streptococcus pneumoniae TMP-SMX	2,210 UI (1,890-2,530) ↑	Streptococcus pneumoniae Carbapenems	380 UI (236-523) ↑
	Acinetobacter baumannii Carbapenems	2,190 UI (1,960-2,420) ↑	Acinetobacter baumannii Fluoroquinolones	213 UI (172-254) ↑
	Acinetobacter baumannii Anti-pseudomonal	2,140 UI (1,930-2,340) ↑	Pseudomonas aeruginosa Carbapenems	167 UI (114-220) ↑
	Escherichia coli Aminopenicillin	2,100 UI (1,890-2,300) ↑	Streptococcus pneumoniae Macrolides	134 UI (80-189) ↑
	Staphylococcus aureus Methicillin	2,070 UI (1,650-2,490) ↑	Staphylococcus aureus Fluoroquinolones	130 UI (48-212) ↑
	Acinetobacter baumannii 4GC	2,030 UI (1,770-2,290) ↑	Acinetobacter baumannii Aminoglycosides	127 UI (100-155) ↑
	Acinetobacter baumannii 3GC	2,000 UI (1,740-2,270) ↑	Klebsiella pneumoniae Fluoroquinolones	109 UI (76-141) ↑
	Staphylococcus aureus Fluoroquinolones	1,910 UI (1,560-2,250) ↑	Escherichia coli Aminopenicillin	99 UI (75-124) ↑
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) (23,100 UI (20,500-25,700)), bloodstream infections (9,430 UI (8,830-10,000)), peritoneal and intra-abdominal infections (2,590 UI (2,290-2,900)), infections of the skin and subcutaneous systems (2,480 UI (2,180-2,780)) and tuberculosis (2,020 UI (1,700-2,330)).

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



- In Malaysia, 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 9,300 UI (8,180-10,400), whereas the mortality rate per 100,000 was 657 UI (579-736).

Data sources for Malaysia

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 Malaysia by source type

Source type	Years	Sample size	Sample size units
Microbial or laboratory data without outcome	1990-2021	221,347	Isolates
Microbial or laboratory data with outcome	1990-2021	2,472	Isolates
Literature studies	1990-2021	4,402	Cases/isolates/susceptibility tests
Single drug resistance profile data	1990-2021	46,553,887	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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