# The burden of antimicrobial resistance (AMR) in the Philippines

Executive summary

- Antimicrobial Resistance (AMR) is a major global health threat, over **10,000 lives** have been lost each year since 1990 in the Philippines due to AMR.

- In 2021, there were an estimated **13,000 UI (10,900-15,000)** deaths attributable to AMR and **51,800 UI (44,300-59,300)** 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
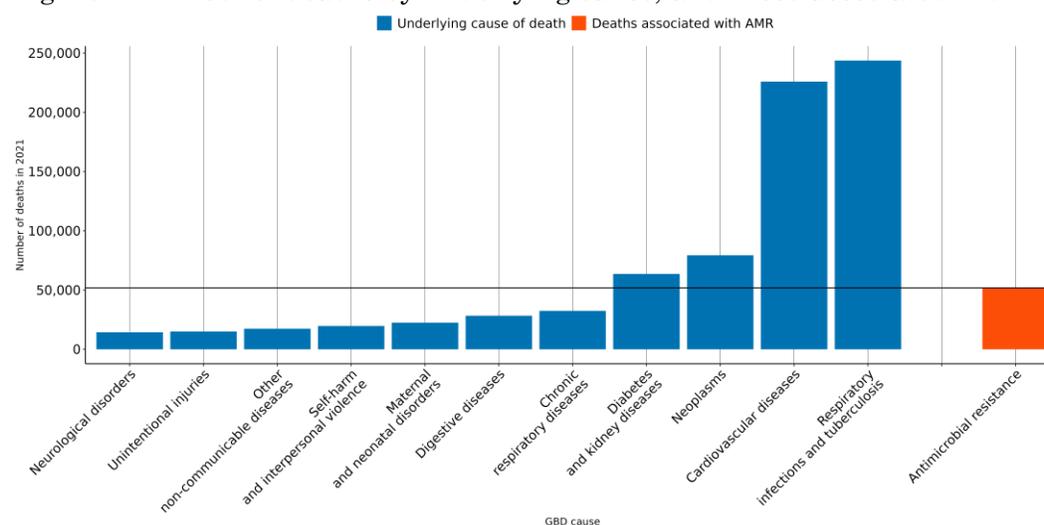

- In 2021, the number of deaths associated with AMR (orange bar in *figure 2*) were high compared to the most relevant underlying causes of death (depicted in blue) in the country. AMR associated deaths occur within multiple Global Burden of Disease (GBD) causes of death and AMR is not an underlying 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 the Philippines, a 10% reduction means to decrease the number of deaths associated with AMR to **50,000**, but currently the trend for this country could reach up to **66,000 UI [52,900-79,200]** AMR-associated deaths in 2030.

AMR in the Philippines

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 the Philippines between 1990 and 2019.
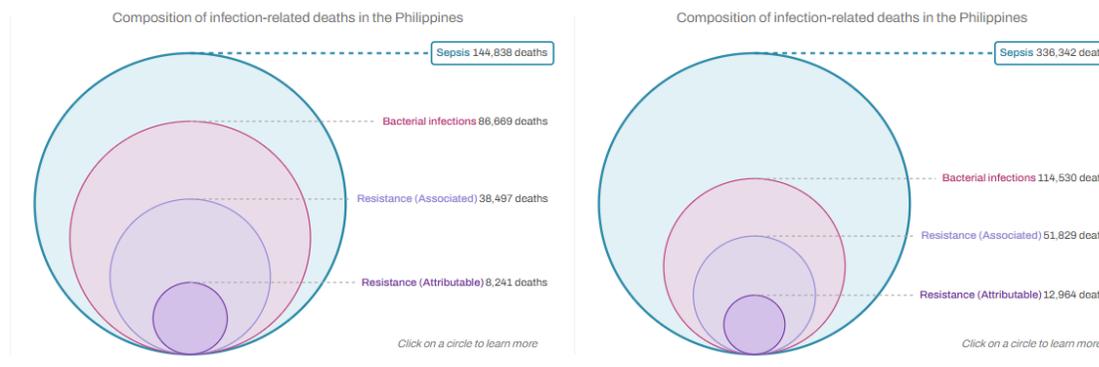
- To look at these and more visualization interactively visit [Measuring Infectious Causes and Resistance Outcomes for Burden Estimation (MICROBE)](#)

- In **the Philippines** in 2021, there were an estimated **13,000 UI (10,900-15,000)** deaths attributable to AMR and **51,800 UI (44,300-59,300)** 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, **the Philippines has the 85th 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)

Overall susceptible and resistant		Associated		Attributable	
Mycobacterium tuberculosis 26,600 UI (21,800-31,300)	↑	Klebsiella pneumoniae 8,450 UI (7,300-9,590)	↑	Acinetobacter baumannii 2,740 UI (2,330-3,140)	↑
Streptococcus pneumoniae 19,300 UI (16,500-22,000)	↓	Staphylococcus aureus 8,010 UI (6,810-9,220)	↑	Staphylococcus aureus 2,380 UI (1,980-2,790)	↑
Staphylococcus aureus 11,900 UI (10,300-13,500)	↑	Escherichia coli 7,610 UI (6,610-8,610)	↑	Klebsiella pneumoniae 2,230 UI (1,890-2,580)	↑
Klebsiella pneumoniae 11,700 UI (10,100-13,200)	↑	Acinetobacter baumannii 6,940 UI (5,950-7,940)	↑	Escherichia coli 1,500 UI (1,220-1,790)	↑
Pseudomonas aeruginosa 9,510 UI (8,240-10,800)	↑	Streptococcus pneumoniae 6,780 UI (5,250-8,310)	↓	Pseudomonas aeruginosa 1,240 UI (946-1,530)	↑
Escherichia coli 8,740 UI (7,590-9,890)	↑	Pseudomonas aeruginosa 4,710 UI (3,910-5,520)	↑	Streptococcus pneumoniae 1,020 UI (700-1,340)	↓
Acinetobacter baumannii 8,270 UI (7,190-9,340)	↑	Mycobacterium tuberculosis 1,680 UI (465-3,850)	↑	Mycobacterium tuberculosis 539 UI (0-1,660)	↑
Group B Streptococcus 2,150 UI (1,860-2,450)	↑	Enterococcus faecium 1,200 UI (1,040-1,370)	↑	Enterobacter spp. 335 UI (285-386)	↑
Enterobacter spp. 2,090 UI (1,820-2,370)	↑	Enterobacter spp. 1,200 UI (1,020-1,370)	↑	Enterococcus faecium 188 UI (128-248)	↑
Haemophilus influenzae 1,890 UI (1,650-2,140)	↑	Proteus spp. 1,180 UI (986-1,370)	↑	Proteus spp. 169 UI (133-205)	↑

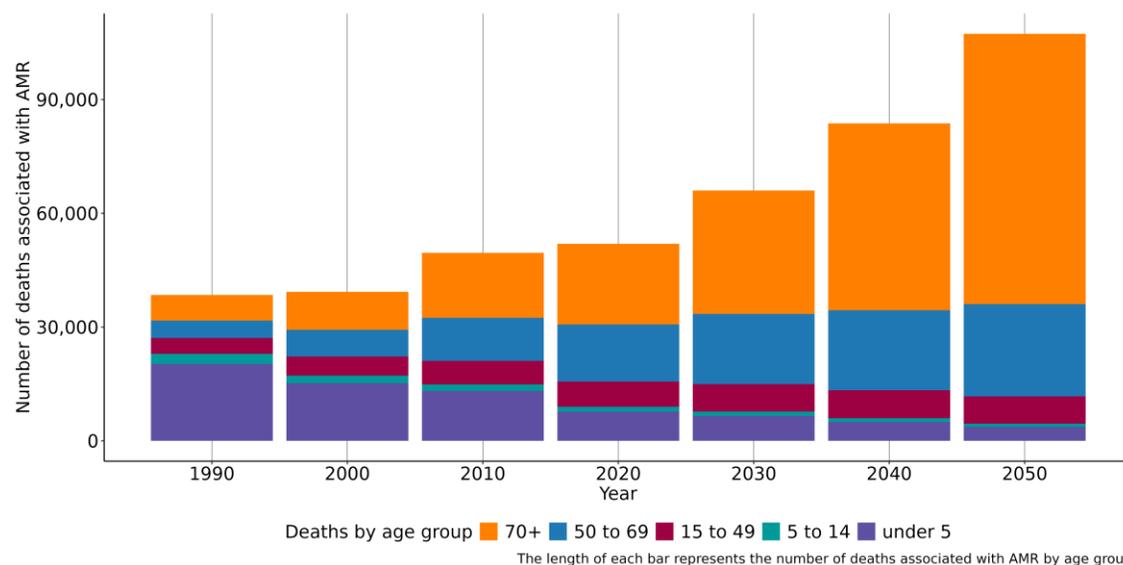Annualized rate of change (1990-2021): <-3%, -3% to -1.5%, -1.5% to 0%, 0% to 1.5%, 1.5% to 3%, 3% to 5%, >5.0%

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

Associated			Attributable		
Escherichia coli Aminopenicillin	7,250 UI (6,250-8,250)	↑	Staphylococcus aureus Methicillin	1,910 UI (1,520-2,290)	↑
Staphylococcus aureus Methicillin	7,060 UI (5,650-8,460)	↑	Acinetobacter baumannii Carbapenems	1,370 UI (1,060-1,670)	↑
Klebsiella pneumoniae TMP-SMX	6,550 UI (5,530-7,560)	↑	Acinetobacter baumannii Fluoroquinolones	678 UI (547-810)	↑
Klebsiella pneumoniae Fluoroquinolones	6,160 UI (5,160-7,160)	↑	Pseudomonas aeruginosa Carbapenems	624 UI (419-829)	↑
Acinetobacter baumannii Carbapenems	6,040 UI (5,040-7,030)	↑	Klebsiella pneumoniae Carbapenems	581 UI (438-725)	↑
Klebsiella pneumoniae Aminoglycosides	5,980 UI (4,930-7,020)	↑	Klebsiella pneumoniae Fluoroquinolones	531 UI (362-700)	↑
Klebsiella pneumoniae 3GC	5,830 UI (4,970-6,690)	↑	Klebsiella pneumoniae Aminoglycosides	459 UI (325-592)	↑
Acinetobacter baumannii Beta-Lactam/Lactamase Inhib.	5,640 UI (4,740-6,540)	↑	Mycobacterium tuberculosis MDR excluding XDR	450 UI (0-1,440)	↑
Acinetobacter baumannii Anti-pseudomonal	5,530 UI (4,610-6,440)	↑	Acinetobacter baumannii Aminoglycosides	374 UI (271-477)	↑
Escherichia coli TMP-SMX	5,510 UI (4,720-6,300)	↑	Streptococcus pneumoniae Carbapenems	336 UI (196-476)	↑

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) (67,700 UI (57,100-78,200)), bloodstream infections (35,700 UI (31,600-39,700)), tuberculosis (26,600 UI (21,800-31,300)), diarrhea (6,960 UI (4,790-9,130)) and urinary tract infections and pyelonephritis (6,720 UI (5,620-7,830)).

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

Deaths by age group ■ 70+ ■ 50 to 69 ■ 15 to 49 ■ 5 to 14 ■ under 5
The length of each bar represents the number of deaths associated with AMR by age group

- In the Philippines, 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 21,300 UI (17,800-24,700), whereas the mortality rate per 100,000 was 588 UI (493-682).

Data sources for the Philippines

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 the Philippines by source type

Source type	Years	Sample size	Sample size units
Antibiotic use	1990-2021	1,804	Study-year datapoints
Microbial or laboratory data without outcome	1990-2021	456,773	Isolates
Literature studies	1990-2021	6,763	Cases/isolates/susceptibility tests
Single drug resistance profile data	1990-2021	644,380	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).

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