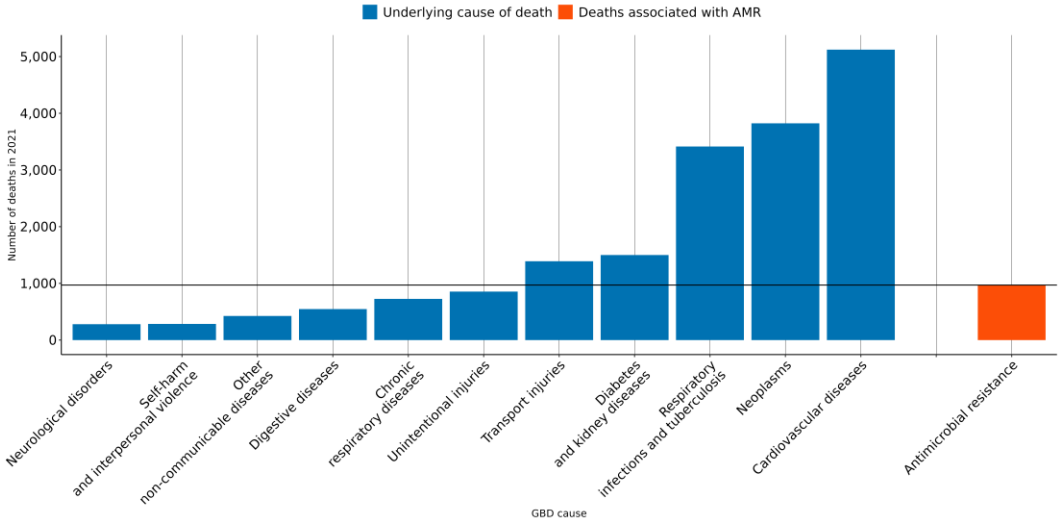
The burden of antimicrobial resistance (AMR) in the United Arab Emirates

Executive summary

- Antimicrobial Resistance (AMR) is a major global health threat, over **200 lives** have been lost each year since 1990 in the United Arab Emirates due to AMR.
- In 2021, there were an estimated **236 UI (184-288)** deaths attributable to AMR and **970 UI (770-1,170)** 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, *Pseudomonas aeruginosa* resistant to carbapenems and *Acinetobacter baumannii* resistant to carbapenems.

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



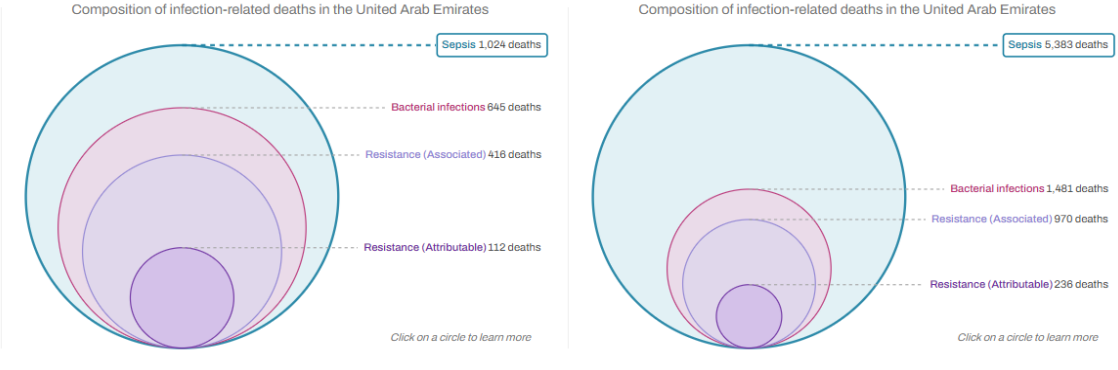
- In 2021, the number of deaths associated with AMR (orange bar in *figure 2*) were high compared to the most relevant underlying causes of death (depicted in blue) in the country. AMR associated deaths occur within multiple Global Burden of Disease (GBD) causes of death and AMR is not an underlying 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 the UAE, a 10% reduction means to decrease the number of deaths associated with AMR to **1,020**, but currently the trend for this country could reach up to **3,120 UI [2,400-4,010]** AMR-associated deaths in 2030.

AMR in the United Arab Emirates

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 United Arab Emirates 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 United Arab Emirates** in 2021, there were an estimated **236 UI (184-288)** deaths attributable to AMR and **970 UI (770-1,170)** 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 United Arab Emirates has the 85th 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 299 UI (243-355) ↑	Staphylococcus aureus 185 UI (136-233) ↑	Acinetobacter baumannii 48 UI (39-56) ↑
2	Pseudomonas aeruginosa 173 UI (140-206) ↑	Escherichia coli 138 UI (111-165) ↑	Staphylococcus aureus 45 UI (30-59) ↑
3	Escherichia coli 173 UI (141-205) ↑	Klebsiella pneumoniae 125 UI (99-151) ↑	Klebsiella pneumoniae 33 UI (26-40) ↑
4	Klebsiella pneumoniae 166 UI (134-197) ↑	Acinetobacter baumannii 119 UI (96-142) ↑	Pseudomonas aeruginosa 30 UI (22-39) ↑
5	Streptococcus pneumoniae 157 UI (128-186) ↓	Pseudomonas aeruginosa 114 UI (89-139) ↑	Escherichia coli 27 UI (21-34) ↑
6	Acinetobacter baumannii 125 UI (100-150) ↑	Streptococcus pneumoniae 106 UI (87-125) ↓	Streptococcus pneumoniae 19 UI (14-25) ↓
7	Group A Streptococcus 46 UI (38-54) ↑	Enterococcus faecium 29 UI (23-36) ↑	Enterobacter spp. 6 UI (5-8) ↑
8	Enterococcus faecium 42 UI (34-51) ↑	Enterococcus faecalis 26 UI (21-32) ↑	Enterococcus faecium 6 UI (5-8) ↑
9	Enterococcus faecalis 41 UI (33-49) ↑	Proteus spp. 25 UI (19-32) ↑	Enterococcus faecalis 4 UI (3-6) ↑
10	Enterobacter spp. 38 UI (31-45) ↑	Enterobacter spp. 24 UI (19-29) ↑	Serratia spp. 4 UI (3-5) ↑

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%

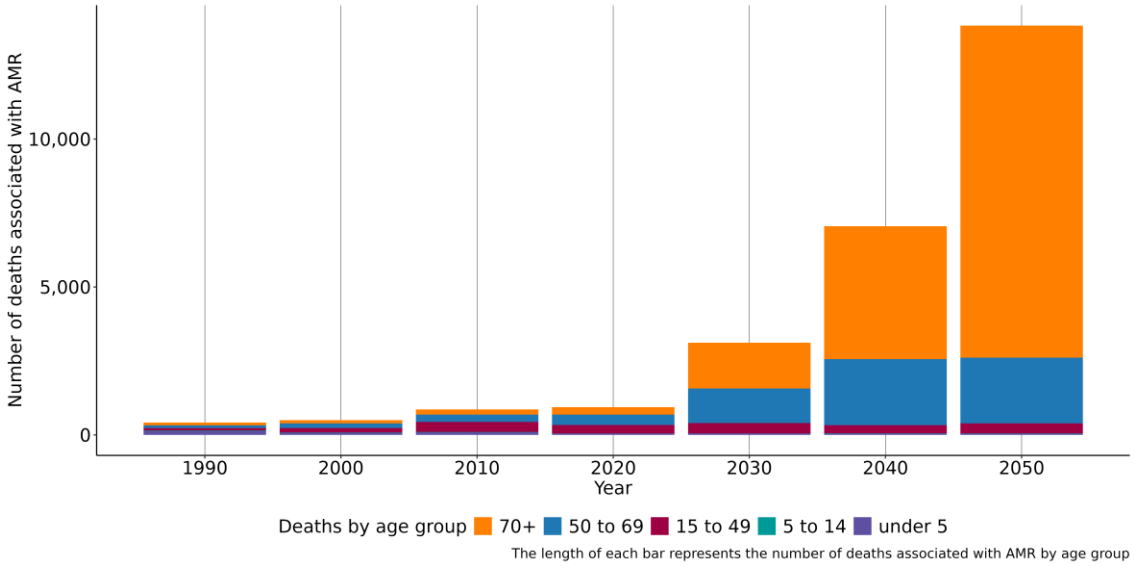
Table 2. Combinations which cause most deaths in 2021 (Number of deaths in parenthesis)

Burden Rank	Associated		Attributable	
1	Staphylococcus aureus Macrolides	147 UI (110-184) ↑	Staphylococcus aureus Methicillin	31 UI (20-43) ↑
2	Staphylococcus aureus Methicillin	128 UI (76-179) ↑	Acinetobacter baumannii Carbapenems	26 UI (20-32) ↑
3	Escherichia coli Aminopenicillin	119 UI (82-156) ↑	Pseudomonas aeruginosa Carbapenems	16 UI (10-22) ↑
4	Acinetobacter baumannii Beta-Lactam/Lactamase Inhib.	113 UI (91-135) ↑	Acinetobacter baumannii Fluoroquinolones	12 UI (9-14) ↑
5	Klebsiella pneumoniae Aminoglycosides	112 UI (89-136) ↑	Streptococcus pneumoniae Carbapenems	11 UI (6-16) ↓
6	Acinetobacter baumannii Carbapenems	110 UI (89-132) ↑	Klebsiella pneumoniae Aminoglycosides	10 UI (7-13) ↑
7	Acinetobacter baumannii 3GC	107 UI (86-129) ↑	Escherichia coli 3GC	8 UI (5-11) ↑
8	Acinetobacter baumannii 4GC	105 UI (83-126) ↑	Klebsiella pneumoniae Carbapenems	7 UI (5-9) ↑
9	Klebsiella pneumoniae Beta-Lactam/Lactamase Inhib.	102 UI (75-129) ↑	Staphylococcus aureus Macrolides	6 UI (4-9) ↑
10	Acinetobacter baumannii Anti-pseudomonal	98 UI (78-118) ↑	Escherichia coli Fluoroquinolones	6 UI (3-9) ↑

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 (918 UI (746-1,090)), lower respiratory infection (excl. COVID) (729 UI (584-874)), peritoneal and intra-abdominal infections (196 UI (154-237)), infections of the skin and subcutaneous systems (90 UI (69-111)) and urinary tract infections and pyelonephritis (80 UI (62-97)).

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



- In the United Arab Emirates, 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 392 UI (297-488), whereas the mortality rate per 100,000 was 544 UI (446-641).

Data sources for the United Arab Emirates

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 United Arab Emirates by source type

Source type	Years	Sample size	Sample size units
Microbial or laboratory data with outcome	2010-2021	18	Isolates
Literature studies	1990-2021	119,064	Cases/isolates/susceptibility tests
Single drug resistance profile data	2010-2021	579,877	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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