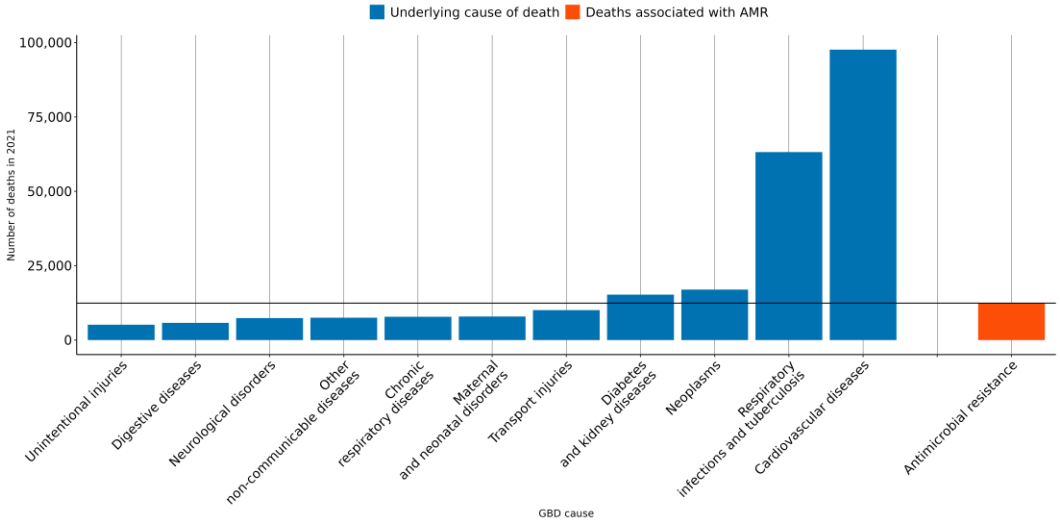
The burden of antimicrobial resistance (AMR) in Algeria

Executive summary

- Antimicrobial Resistance (AMR) is a major global health threat, over **3,000 lives** have been lost each year since 1990 in Algeria due to AMR.
- In 2021, there were an estimated **3,130 UI (2,360-3,910)** deaths attributable to AMR and **12,400 UI (9,700-15,100)** 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



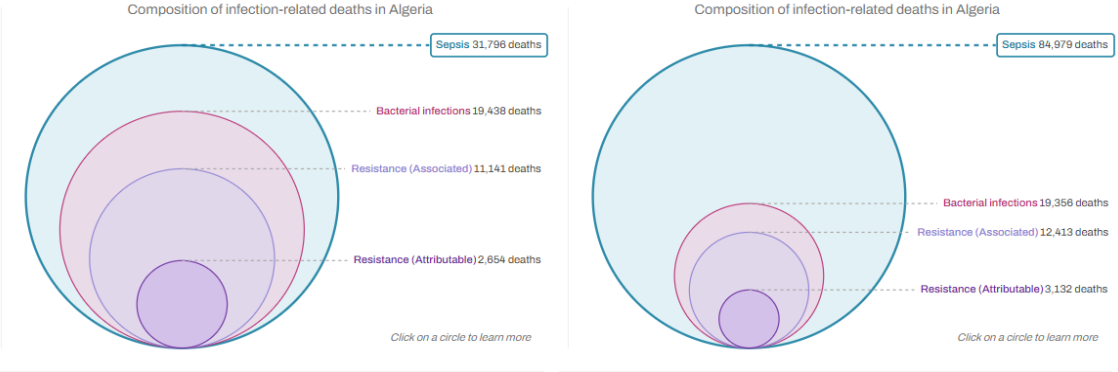
- In 2021, the number of deaths associated with AMR (orange bar in *figure 2*) were high compared to the most relevant underlying causes of death (depicted in blue) in the country. AMR associated deaths occur within multiple Global Burden of Disease (GBD) causes of death and AMR is not an underlying 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 Algeria, a 10% reduction means to decrease the number of deaths associated with AMR to **11,700**, but currently the trend for this country could reach up to **15,700 UI [11,700-20,800]** AMR-associated deaths in 2030.

AMR in Algeria

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 Algeria between 1990 and 2019.



- To look at these and more visualization interactively visit Measuring Infectious Causes and Resistance Outcomes for Burden Estimation (MICROBE)
- In **Algeria** in 2021, there were an estimated **3,130 UI (2,360-3,910)** deaths attributable to AMR and **12,400 UI (9,700-15,100)** 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, **Algeria has the 73rd 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 3,760 UI (3,190-4,330) ↑	Staphylococcus aureus 2,480 UI (1,760-3,210) ↑	Staphylococcus aureus 725 UI (484-967) ↑
2	Streptococcus pneumoniae 2,490 UI (2,120-2,860) ↓	Streptococcus pneumoniae 1,930 UI (1,500-2,350) ↓	Streptococcus pneumoniae 498 UI (355-642) ↓
3	Escherichia coli 2,210 UI (1,880-2,530) ↑	Escherichia coli 1,910 UI (1,500-2,330) ↑	Acinetobacter baumannii 455 UI (386-524) ↓
4	Pseudomonas aeruginosa 2,000 UI (1,690-2,300) ↑	Klebsiella pneumoniae 1,510 UI (1,210-1,810) ↓	Escherichia coli 375 UI (265-484) ↑
5	Klebsiella pneumoniae 1,970 UI (1,670-2,260) ↓	Pseudomonas aeruginosa 1,270 UI (964-1,570) ↑	Klebsiella pneumoniae 357 UI (270-444) ↓
6	Mycobacterium tuberculosis 1,550 UI (1,040-2,060) ↓	Acinetobacter baumannii 1,130 UI (950-1,300) ↓	Pseudomonas aeruginosa 332 UI (231-432) ↑
7	Acinetobacter baumannii 1,140 UI (965-1,320) ↓	Enterococcus faecalis 372 UI (307-438) ↑	Enterobacter spp. 68 UI (51-84) ↓
8	Enterococcus faecalis 540 UI (451-629) ↑	Enterobacter spp. 336 UI (268-405) ↑	Enterococcus faecalis 64 UI (39-89) ↑
9	Enterobacter spp. 532 UI (448-615) ↑	Proteus spp. 291 UI (217-364) ↑	Serratia spp. 55 UI (40-70) ↓
10	Group A Streptococcus 530 UI (441-619) ↑	Enterococcus faecium 280 UI (227-333) ↑	Enterococcus faecium 55 UI (39-70) ↑

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%

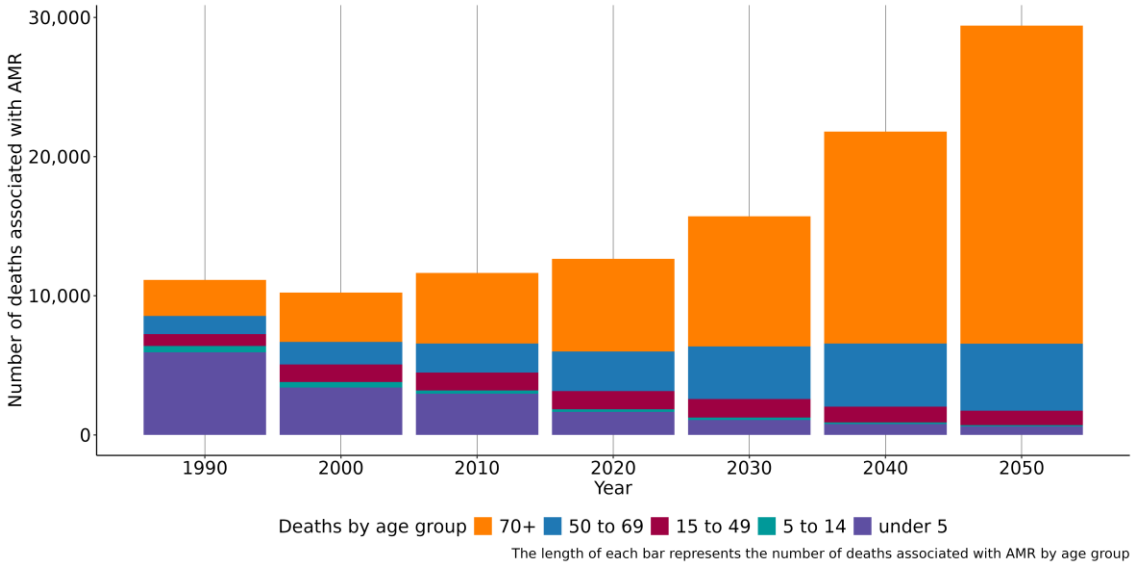
Table 2. Combinations which cause most deaths in 2021 (Number of deaths in parenthesis)

Burden Rank	Associated		Attributable	
1	Staphylococcus aureus Methicillin	2,210 UI (1,340-3,070) ↑	Staphylococcus aureus Methicillin	573 UI (367-779) ↑
2	Escherichia coli Aminopenicillin	1,800 UI (1,130-2,470) ↑	Streptococcus pneumoniae Carbapenems	319 UI (203-436) ↓
3	Staphylococcus aureus Macrolides	1,530 UI (1,130-1,930) ↑	Acinetobacter baumannii Carbapenems	257 UI (204-311) ↑
4	Streptococcus pneumoniae Penicillin	1,340 UI (948-1,730) ↓	Pseudomonas aeruginosa Carbapenems	162 UI (101-223) ↑
5	Klebsiella pneumoniae Aminoglycosides	1,320 UI (1,060-1,570) ↓	Acinetobacter baumannii Fluoroquinolones	109 UI (86-132) ↑
6	Escherichia coli TMP-SMX	1,270 UI (930-1,610) ↑	Klebsiella pneumoniae Aminoglycosides	103 UI (74-132) ↓
7	Klebsiella pneumoniae Beta-Lactam/Lactamase Inhib.	1,220 UI (876-1,560) ↓	Escherichia coli 3GC	95 UI (55-135) ↑
8	Streptococcus pneumoniae Macrolides	1,190 UI (851-1,540) ↑	Klebsiella pneumoniae Fluoroquinolones	81 UI (52-110) ↑
9	Escherichia coli Fluoroquinolones	1,170 UI (771-1,570) ↑	Streptococcus pneumoniae Penicillin	79 UI (64-94) ↓
10	Streptococcus pneumoniae Carbapenems	1,160 UI (782-1,540) ↓	Escherichia coli Fluoroquinolones	76 UI (32-120) ↑

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 (10,700 UI (9,150-12,200)), lower respiratory infection (excl. COVID) (9,290 UI (7,670-10,900)), peritoneal and intra-abdominal infections (1,660 UI (1,310-2,010)), tuberculosis (1,550 UI (1,040-2,060)) and urinary tract infections and pyelonephritis (1,290 UI (1,020-1,560)).

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



- In Algeria, 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 6,570 UI (5,110-8,040), whereas the mortality rate per 100,000 was 380 UI (295-464).

Data sources for Algeria

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 Algeria by source type

Source type	Years	Sample size	Sample size units
Antibiotic use	1990-2021	1,161	Study-year datapoints
Literature studies	1990-2021	5,308	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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