# The burden of antimicrobial resistance (AMR) in Eritrea

## Executive summary

- Antimicrobial Resistance (AMR) is a major global health threat, over **1,000 lives** have been lost each year since 1990 in Eritrea due to AMR.

- In 2021, there were an estimated **1,340 UI (922-1,760)** deaths attributable to AMR and **5,910 UI (4,220-7,590)** deaths associated with AMR in this location.

- The largest number of deaths associated with AMR in 2021 occurred among those aged **under 5** in the country.

- Among the most deadly pathogen-drug combinations in 2021 were multi-drug resistant *Mycobacterium tuberculosis* (excluding extensive drug-resistance), *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
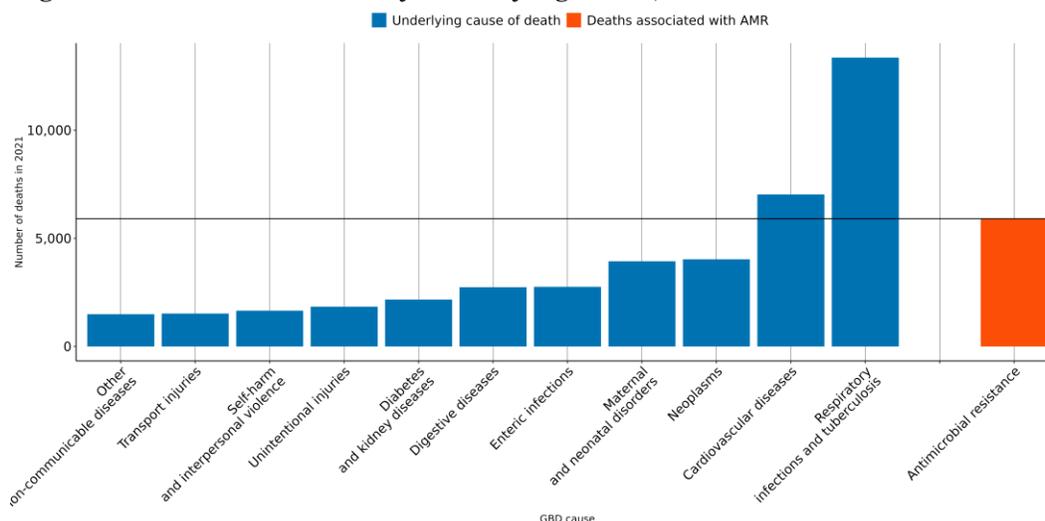


- In 2021, the number of deaths associated with AMR (orange bar in *figure 2*) were high compared to the most relevant underlying causes of death (depicted in blue) in the country. AMR associated deaths occur within multiple Global Burden of Disease (GBD) causes of death and AMR is not an underlying 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 Eritrea, a 10% reduction means to decrease the number of deaths associated with AMR to **5,530**, but currently the trend for this country could reach up to **6,150 UI [3,720-9,570]** AMR-associated deaths in 2030.

# AMR in Eritrea

## 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 Eritrea between 1990 and 2019.
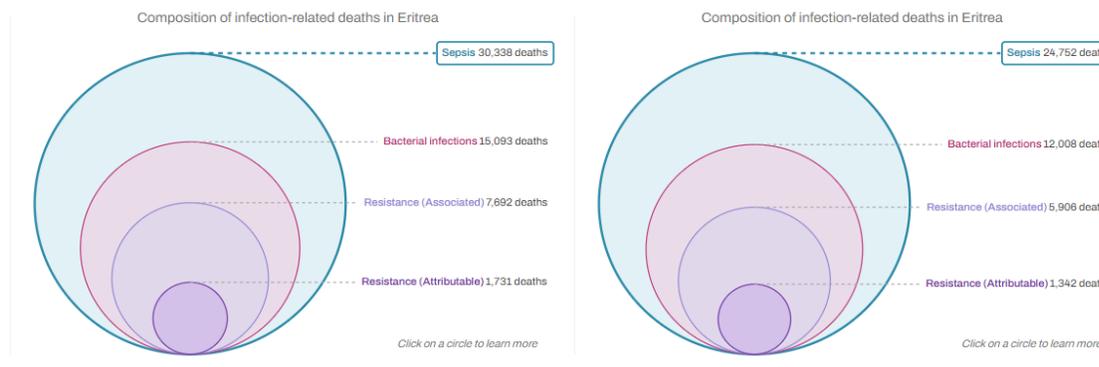


- To look at these and more visualization interactively visit [Measuring Infectious Causes and Resistance Outcomes for Burden Estimation (MICROBE)](link)

- In **Eritrea** in 2021, there were an estimated **1,340 UI (922-1,760)** deaths attributable to AMR and **5,910 UI (4,220-7,590)** 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, **Eritrea was among the highest 10 countries in** 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 | Mycobacterium tuberculosis 4,600 UI (2,550-6,640) ↑ | Klebsiella pneumoniae 1,120 UI (801-1,440) ↓ | Klebsiella pneumoniae 258 UI (175-341) ↓ |
| | Streptococcus pneumoniae 1,300 UI (829-1,760) ↓ | Streptococcus pneumoniae 949 UI (564-1,340) ↓ | Acinetobacter baumannii 193 UI (152-234) ↓ |
| | Klebsiella pneumoniae 1,240 UI (886-1,580) ↓ | Escherichia coli 879 UI (626-1,130) ↓ | Escherichia coli 183 UI (120-246) ↓ |
| | Escherichia coli 910 UI (652-1,170) ↓ | Staphylococcus aureus 586 UI (388-784) ↑ | Streptococcus pneumoniae 173 UI (88-258) ↓ |
| | Pseudomonas aeruginosa 780 UI (566-995) ↑ | Pseudomonas aeruginosa 522 UI (356-688) ↑ | Pseudomonas aeruginosa 123 UI (79-167) ↓ |
| | Staphylococcus aureus 743 UI (534-952) ↑ | Acinetobacter baumannii 493 UI (369-618) ↓ | Mycobacterium tuberculosis 116 UI (0-365) ↑ |
| | Acinetobacter baumannii 522 UI (391-654) ↓ | Mycobacterium tuberculosis 390 UI (80-1,010) ↑ | Staphylococcus aureus 102 UI (61-143) ↑ |
| | Group B Streptococcus 307 UI (213-400) ↑ | Serratia spp. 183 UI (134-231) ↑ | Serratia spp. 54 UI (39-68) ↑ |
| | Shigella spp. 253 UI (82-424) ↓ | Enterobacter spp. 129 UI (97-162) ↓ | Enterobacter spp. 39 UI (28-50) ↓ |
| | Serratia spp. 196 UI (144-248) ↑ | Haemophilus influenzae 115 UI (60-171) ↓ | Haemophilus influenzae 22 UI (9-36) ↓ |

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 | Klebsiella pneumoniae Beta-Lactam/Lactamase Inhib. | 1,050 UI (740-1,350) ↓ | Mycobacterium tuberculosis MDR excluding XDR 114 UI (0-360) | ↑ |
| | Klebsiella pneumoniae TMP-SMX | 1,020 UI (731-1,320) ↓ | Acinetobacter baumannii Carbapenems 90 UI (63-118) | ↑ |
| | Escherichia coli Aminopenicillin | 855 UI (594-1,120) ↓ | Streptococcus pneumoniae Carbapenems 79 UI (36-121) | ↓ |
| | Streptococcus pneumoniae TMP-SMX | 830 UI (477-1,180) ↓ | Klebsiella pneumoniae Beta-Lactam/Lactamase Inhib. 58 UI (20-96) | ↓ |
| | Klebsiella pneumoniae Fluoroquinolones | 774 UI (528-1,020) ↑ | Klebsiella pneumoniae Fluoroquinolones 55 UI (33-77) | ↑ |
| | Escherichia coli TMP-SMX | 758 UI (545-971) ↓ | Escherichia coli 3GC 47 UI (20-75) | ↑ |
| | Klebsiella pneumoniae Aminoglycosides | 624 UI (423-825) ↓ | Staphylococcus aureus TMP-SMX 47 UI (28-66) | ↑ |
| | Escherichia coli Beta-Lactam/Lactamase Inhib. | 609 UI (432-787) ↓ | Klebsiella pneumoniae TMP-SMX 44 UI (22-66) | ↓ |
| | Escherichia coli Fluoroquinolones | 548 UI (300-796) ↑ | Streptococcus pneumoniae Fluoroquinolones 42 UI (14-69) | ↓ |
| | Escherichia coli 3GC | 519 UI (310-729) ↑ | Klebsiella pneumoniae Aminoglycosides 39 UI (23-55) | ↓ |

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- 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) (5,000 UI (2,940-7,060)), tuberculosis (4,600 UI (2,550-6,640)), bloodstream infections (3,650 UI (2,670-4,630)), diarrhea (2,640 UI (818-4,460)) and meningitis (776 UI (516-1,040)).

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



The length of each bar represents the number of deaths associated with AMR by age group
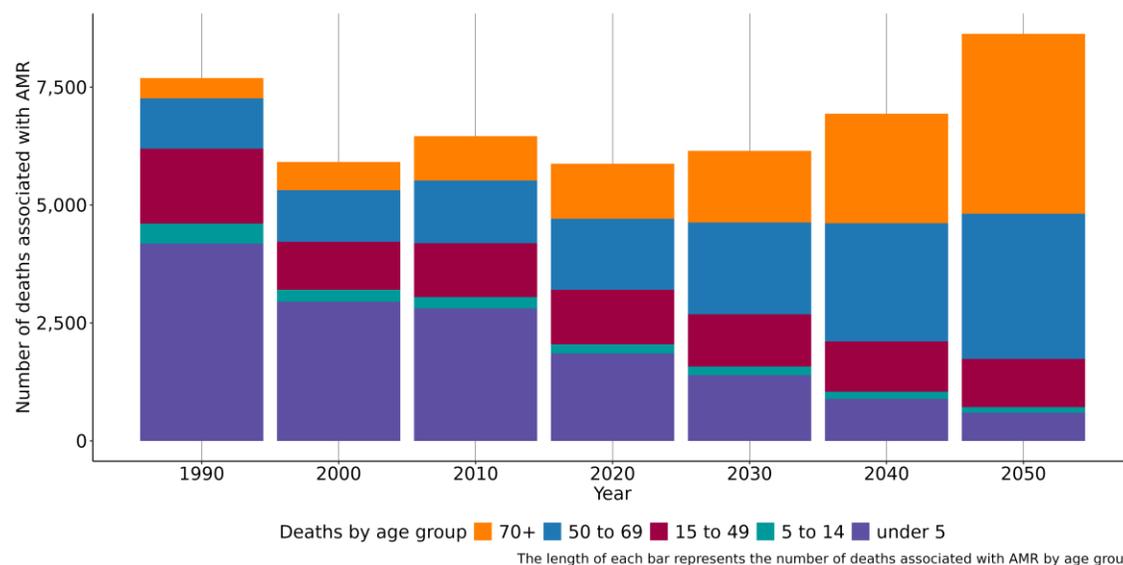
- In Eritrea, people aged under 5 saw the largest number of deaths associated with AMR both in 1990 and 2021, which indicates that under 5 continues to be particularly vulnerable to infections which are resistant to antibiotics. In 2021, the number of deaths associated with AMR among the under 5 was 1,800 UI (1,210-2,380), whereas the mortality rate per 100,000 was 1,290 UI (996-1,590).

**Data sources for Eritrea**

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 Eritrea by source type

| Source type | Years | Sample size | Sample size units |
|---|---|---|---|
| Microbial or laboratory data without outcome | 2010-2021 | 1 | Isolates |
| Literature studies | 1990-2021 | 1,015 | 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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