# The burden of antimicrobial resistance (AMR) in Ecuador

Executive summary

- Antimicrobial Resistance (AMR) is a major global health threat, over **2,000 lives** have been lost each year since 1990 in Ecuador due to AMR.

- In 2021, there were an estimated **1,700 UI (1,400-2,010)** deaths attributable to AMR and **7,200 UI (5,820-8,580)** 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, *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
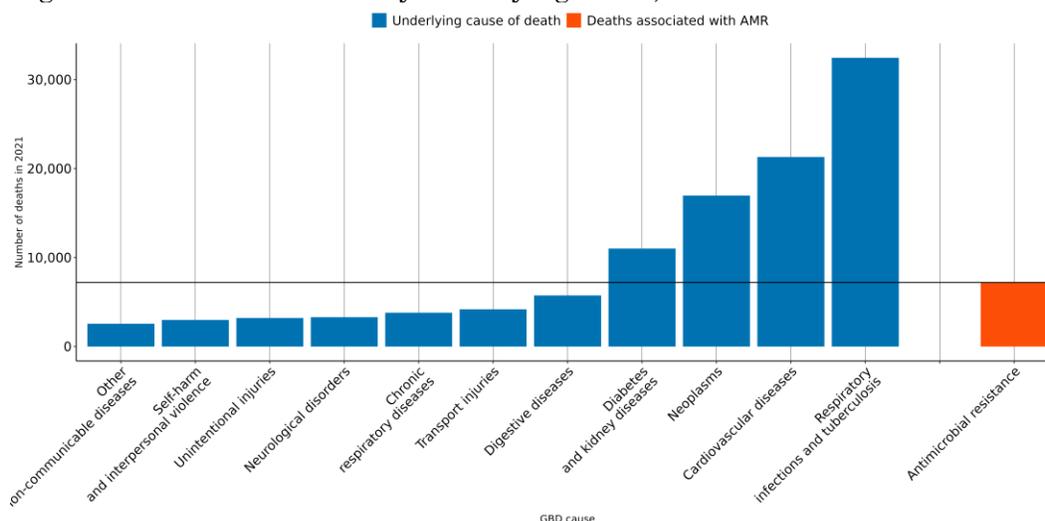

- In 2021, the number of deaths associated with AMR (orange bar in *figure 2*) were high compared to the most relevant underlying causes of death (depicted in blue) in the country. AMR associated deaths occur within multiple Global Burden of Disease (GBD) causes of death and AMR is not an underlying 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 Ecuador, a 10% reduction means to decrease the number of deaths associated with AMR to **7,280**, but currently the trend for this country could reach up to **9,920 UI [7,540-12,700]** AMR-associated deaths in 2030.

AMR in Ecuador

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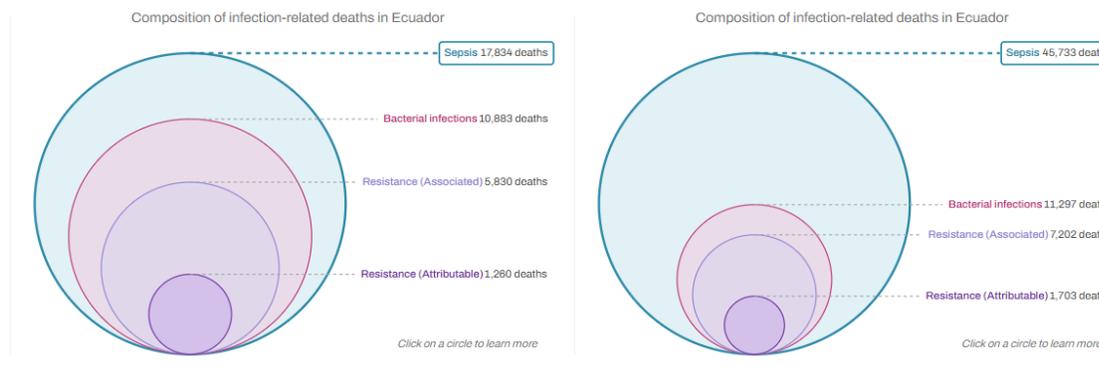
- To look at these and more visualization interactively visit Measuring Infectious Causes and Resistance Outcomes for Burden Estimation (MICROBE)

- In **Ecuador** in 2021, there were an estimated **1,700 UI (1,400-2,010)** deaths attributable to AMR and **7,200 UI (5,820-8,580)** 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, **Ecuador has the 81st 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)

	Overall susceptible and resistant		Associated		Attributable	
Burden rank	Staphylococcus aureus 2,060 UI (1,680-2,450)	↑	Staphylococcus aureus 1,220 UI (980-1,460)	↑	Staphylococcus aureus 309 UI (227-392)	↑
	Streptococcus pneumoniae 1,530 UI (1,270-1,800)	↓	Escherichia coli 1,180 UI (949-1,410)	↑	Klebsiella pneumoniae 300 UI (242-358)	↑
	Klebsiella pneumoniae 1,380 UI (1,130-1,640)	↑	Streptococcus pneumoniae 1,080 UI (837-1,330)	↓	Acinetobacter baumannii 246 UI (205-287)	↑
	Escherichia coli 1,370 UI (1,110-1,620)	↑	Klebsiella pneumoniae 1,070 UI (853-1,280)	↑	Escherichia coli 229 UI (175-282)	↑
	Pseudomonas aeruginosa 1,320 UI (1,070-1,560)	↑	Pseudomonas aeruginosa 804 UI (639-969)	↑	Pseudomonas aeruginosa 207 UI (155-259)	↑
	Acinetobacter baumannii 673 UI (541-805)	↓	Acinetobacter baumannii 611 UI (492-731)	↑	Streptococcus pneumoniae 182 UI (119-244)	↓
	Mycobacterium tuberculosis 458 UI (363-552)	↓	Enterococcus faecium 205 UI (163-247)	↑	Enterococcus faecium 42 UI (30-55)	↑
	Enterobacter spp. 301 UI (243-360)	↑	Proteus spp. 192 UI (140-243)	↑	Enterobacter spp. 40 UI (32-48)	↓
	Enterococcus faecalis 292 UI (232-351)	↑	Enterobacter spp. 171 UI (134-207)	↑	Serratia spp. 38 UI (29-46)	↓
	Group A Streptococcus 284 UI (234-334)	↑	Serratia spp. 166 UI (128-203)	↓	Proteus spp. 29 UI (19-39)	↑

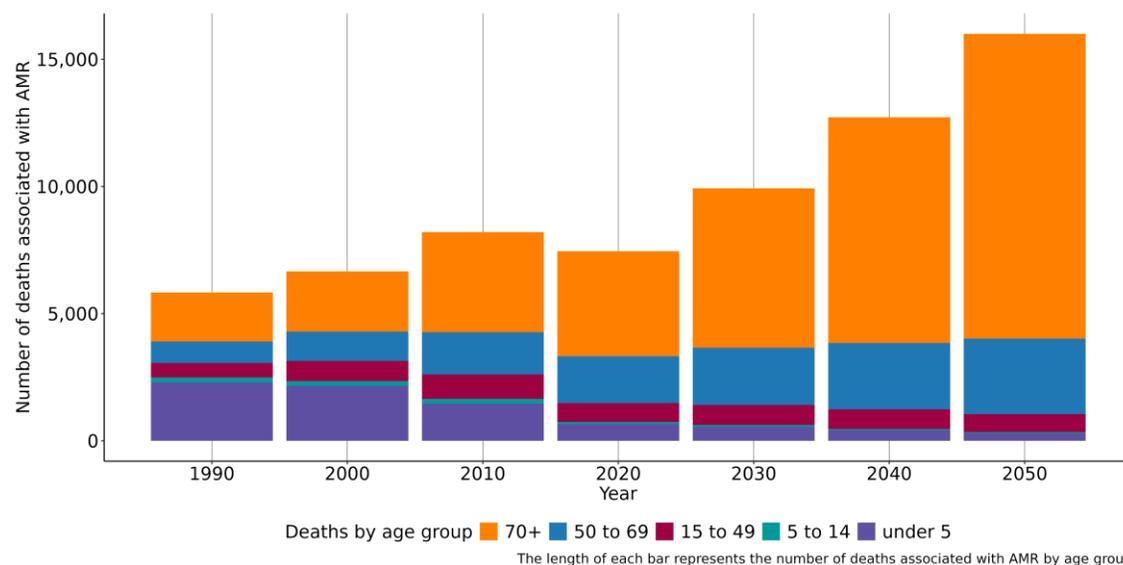Annualized rate of change (1990-2021): <-3% | -3% to -1.5% | -1.5% to 0% | 0% to 1.5% | 1.5% to 3% | 3% to 5% | >5.0%

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

	Associated			Attributable		
Burden Rank	Escherichia coli Aminopenicillin	1,060 UI (749-1,380)	↑	Staphylococcus aureus Methicillin	217 UI (134-300)	↑
	Klebsiella pneumoniae Aminoglycosides	906 UI (713-1,100)	↑	Acinetobacter baumannii Carbapenems	139 UI (108-169)	↑
	Klebsiella pneumoniae Fluoroquinolones	879 UI (688-1,070)	↑	Pseudomonas aeruginosa Carbapenems	93 UI (57-129)	↑
	Staphylococcus aureus Methicillin	874 UI (562-1,190)	↑	Klebsiella pneumoniae Carbapenems	87 UI (65-110)	↑
	Escherichia coli Fluoroquinolones	838 UI (660-1,020)	↑	Klebsiella pneumoniae Fluoroquinolones	76 UI (51-100)	↑
	Staphylococcus aureus Macrolides	835 UI (632-1,040)	↑	Klebsiella pneumoniae Aminoglycosides	72 UI (52-92)	↑
	Escherichia coli TMP-SMX	830 UI (628-1,030)	↑	Streptococcus pneumoniae Carbapenems	70 UI (38-101)	↑
	Streptococcus pneumoniae TMP-SMX	752 UI (512-991)	↓	Acinetobacter baumannii Fluoroquinolones	66 UI (52-79)	↑
	Streptococcus pneumoniae Macrolides	752 UI (578-925)	↑	Pseudomonas aeruginosa Fluoroquinolones	56 UI (36-76)	↑
	Klebsiella pneumoniae Beta-Lactam/Lactamase Inhib.	743 UI (523-962)	↓	Escherichia coli Fluoroquinolones	55 UI (30-81)	↑

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) (7,180 UI (5,870-8,490)), bloodstream infections (5,300 UI (4,340-6,250)), peritoneal and intra-abdominal infections (1,410 UI (1,100-1,710)), urinary tract infections and pyelonephritis (1,140 UI (883-1,400)) and infections of the skin and subcutaneous systems (563 UI (440-686)).

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 Ecuador, 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 3,990 UI (3,250-4,720), whereas the mortality rate per 100,000 was 426 UI (348-505).

Data sources for Ecuador

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 Ecuador by source type

Source type	Years	Sample size	Sample size units
Microbial or laboratory data without outcome	2010-2021	14,022	Isolates
Microbial or laboratory data with outcome	2010-2021	4,339	Isolates
Literature studies	1990-2009	84	Cases/isolates/susceptibility tests
Single drug resistance profile data	1990-2021	179,595	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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