# The burden of antimicrobial resistance (AMR) in Chile

Executive summary

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

- In 2021, there were an estimated **2,080 UI (1,750-2,410)** deaths attributable to AMR and **8,780 UI (7,700-9,860)** 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 *Streptococcus pneumoniae* resistant to carbapenems.

Figure 1 Number of deaths by underlying cause, and those associated with AMR in 2021
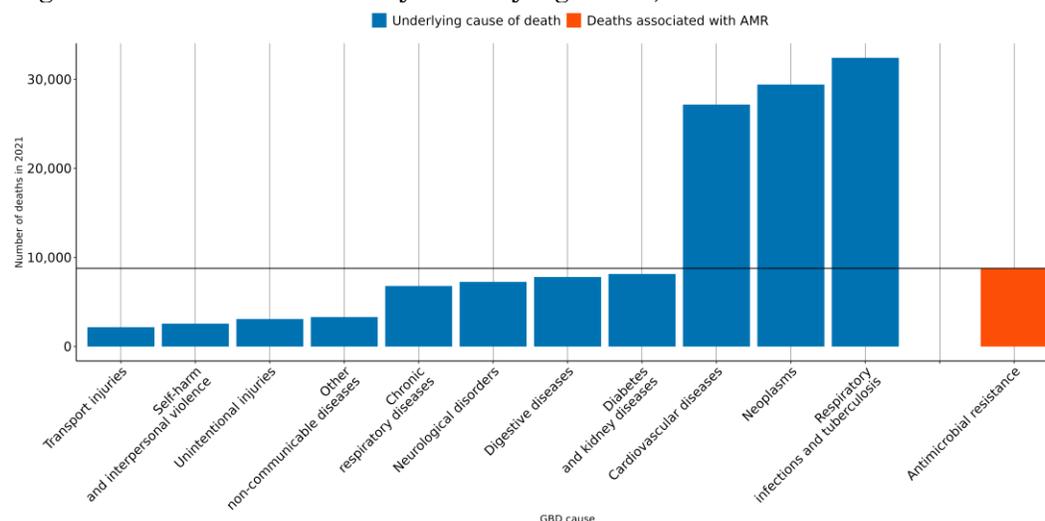
- In 2021, the number of deaths associated with AMR (orange bar in *figure 2*) were high compared to the most relevant underlying causes of death (depicted in blue) in the country. AMR associated deaths occur within multiple Global Burden of Disease (GBD) causes of death and AMR is not an underlying 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 Chile, a 10% reduction means to decrease the number of deaths associated with AMR to **8,650**, but currently the trend for this country could reach up to **12,000 UI [10,000-14,100]** AMR-associated deaths in 2030.

AMR in Chile

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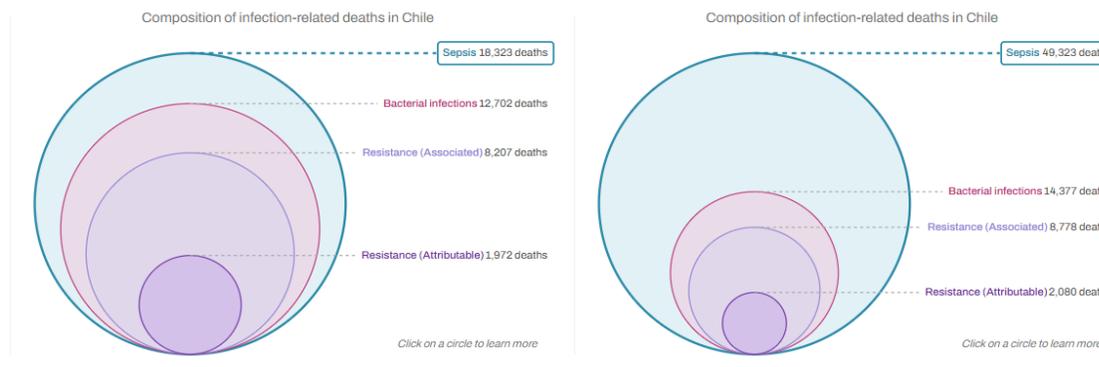
- To look at these and more visualization interactively visit [Measuring Infectious Causes and Resistance Outcomes for Burden Estimation (MICROBE)](#)

- In **Chile** in 2021, there were an estimated **2,080 UI (1,750-2,410)** deaths attributable to AMR and **8,780 UI (7,700-9,860)** 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, **Chile has the 51st 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
Staphylococcus aureus 3,280 UI (3,010-3,550) ↑	Staphylococcus aureus 1,950 UI (1,530-2,360) ↑	Staphylococcus aureus 506 UI (347-666) ↑
Escherichia coli 2,250 UI (2,040-2,450) ↑	Escherichia coli 1,640 UI (1,450-1,820) ↑	Escherichia coli 298 UI (245-351) ↑
Pseudomonas aeruginosa 1,490 UI (1,370-1,610) ↑	Pseudomonas aeruginosa 1,120 UI (998-1,230) ↑	Pseudomonas aeruginosa 298 UI (246-350) ↑
Streptococcus pneumoniae 1,480 UI (1,360-1,610) ↓	Klebsiella pneumoniae 1,110 UI (986-1,220) ↑	Klebsiella pneumoniae 293 UI (252-333) ↑
Klebsiella pneumoniae 1,370 UI (1,250-1,480) ↑	Streptococcus pneumoniae 1,050 UI (894-1,200) ↓	Streptococcus pneumoniae 204 UI (159-249) ↓
Group A Streptococcus 552 UI (494-609) ↑	Enterococcus faecium 377 UI (347-407) ↑	Acinetobacter baumannii 137 UI (112-161) ↓
Acinetobacter baumannii 533 UI (492-574) ↓	Acinetobacter baumannii 363 UI (298-427) ↓	Enterococcus faecium 118 UI (104-131) ↑
Enterococcus faecalis 488 UI (446-530) ↑	Proteus spp. 265 UI (206-324) ↑	Enterobacter spp. 61 UI (54-68) ↓
Proteus spp. 459 UI (414-503) ↑	Enterobacter spp. 227 UI (200-255) ↓	Proteus spp. 39 UI (28-51) ↑
Mycobacterium tuberculosis 443 UI (402-484) ↓	Enterococcus faecalis 181 UI (162-199) ↑	Enterococcus faecalis 36 UI (26-46) ↑

Burden rank

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

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

Associated		Attributable	
Staphylococcus aureus Methicillin	1,470 UI (852-2,080) ↑	Staphylococcus aureus Methicillin	362 UI (220-504) ↑
Escherichia coli Aminopenicillin	1,430 UI (1,170-1,690) ↑	Pseudomonas aeruginosa Carbapenems	165 UI (120-209) ↑
Staphylococcus aureus Macrolides	1,350 UI (1,130-1,560) ↑	Streptococcus pneumoniae Carbapenems	139 UI (99-179) ↓
Staphylococcus aureus Fluoroquinolones	1,010 UI (796-1,230) ↑	Enterococcus faecium Vancomycin	90 UI (77-103) ↑
Klebsiella pneumoniae Fluoroquinolones	989 UI (875-1,100) ↑	Klebsiella pneumoniae Fluoroquinolones	86 UI (61-111) ↑
Escherichia coli Fluoroquinolones	960 UI (771-1,150) ↑	Escherichia coli Fluoroquinolones	70 UI (42-98) ↑
Escherichia coli TMP-SMX	908 UI (676-1,140) ↑	Klebsiella pneumoniae Carbapenems	68 UI (51-85) ↑
Pseudomonas aeruginosa Carbapenems	898 UI (790-1,010) ↑	Pseudomonas aeruginosa Fluoroquinolones	66 UI (46-86) ↓
Klebsiella pneumoniae TMP-SMX	865 UI (742-987) ↓	Staphylococcus aureus Fluoroquinolones	65 UI (27-103) ↑
Klebsiella pneumoniae Aminoglycosides	806 UI (681-932) ↑	Staphylococcus aureus Macrolides	56 UI (38-75) ↑

Burden Rank

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

- 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) (6,900 UI (6,210-7,600)), bloodstream infections (6,030 UI (5,560-6,500)), urinary tract infections and pyelonephritis (2,520 UI (2,240-2,810)), peritoneal and intra-abdominal infections (2,250 UI (2,040-2,470)) and infections of the skin and subcutaneous systems (1,180 UI (1,050-1,320)).

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
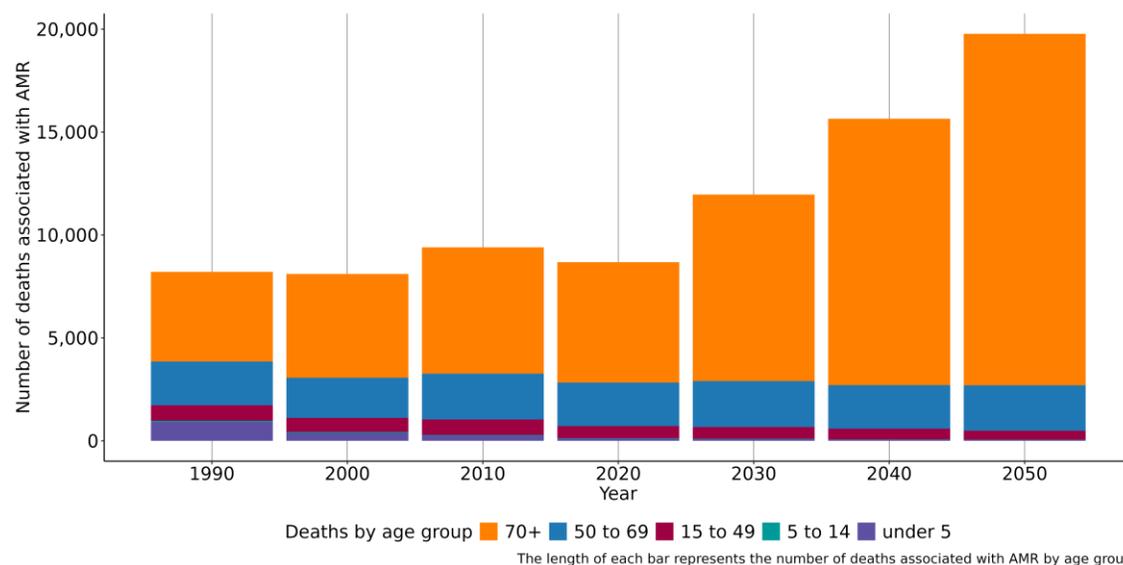
- In Chile, people aged 70+ saw the largest number of deaths associated with AMR both in 1990 and 2021, which indicates that 70+ continues to be particularly vulnerable to infections which are resistant to antibiotics. In 2021, the number of deaths associated with AMR among the 70+ was 5,920 UI (5,070-6,760), whereas the mortality rate per 100,000 was 380 UI (326-434).

Data sources for Chile

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 Chile by source type

Source type	Years	Sample size	Sample size units
Microbial or laboratory data without outcome	1990-2021	546,485	Isolates
Literature studies	1990-2021	3,939	Cases/isolates/susceptibility tests
Single drug resistance profile data	1990-2021	137,372	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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