# The burden of antimicrobial resistance (AMR) in Belgium

Executive summary

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

- In 2021, there were an estimated **1,330 UI (1,150-1,510)** deaths attributable to AMR and **6,150 UI (5,320-6,980)** 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, *Escherichia coli* resistant to aminopenicillin and *Pseudomonas aeruginosa* resistant to carbapenems.

Figure 1 Number of deaths by underlying cause, and those associated with AMR in 2021
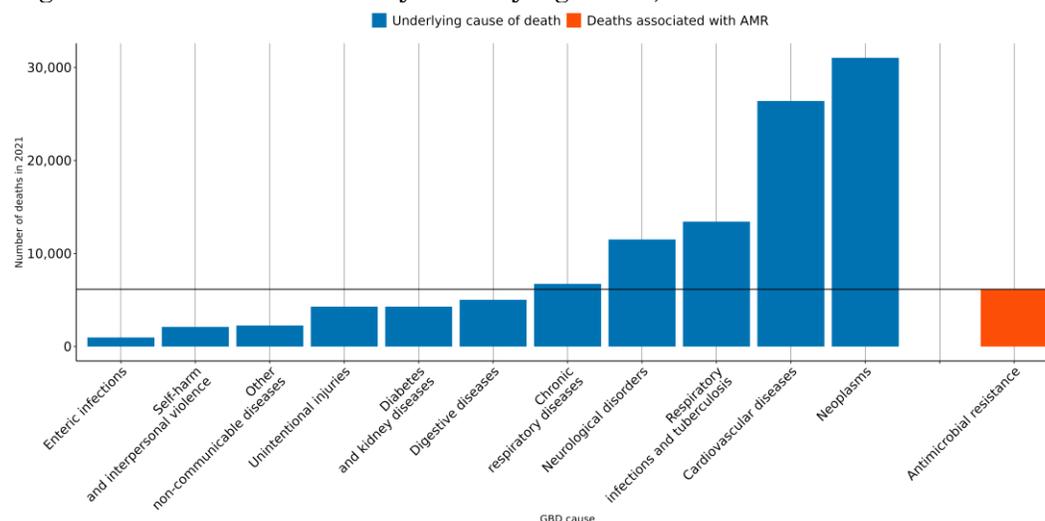
- In 2021, the number of deaths associated with AMR (orange bar in *figure 2*) were high compared to the most relevant underlying causes of death (depicted in blue) in the country. AMR associated deaths occur within multiple Global Burden of Disease (GBD) causes of death and AMR is not an underlying 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 Belgium, a 10% reduction means to decrease the number of deaths associated with AMR to **6,320**, but currently the trend for this country could reach up to **7,490 UI [5,810-8,940]** AMR-associated deaths in 2030.

AMR in Belgium

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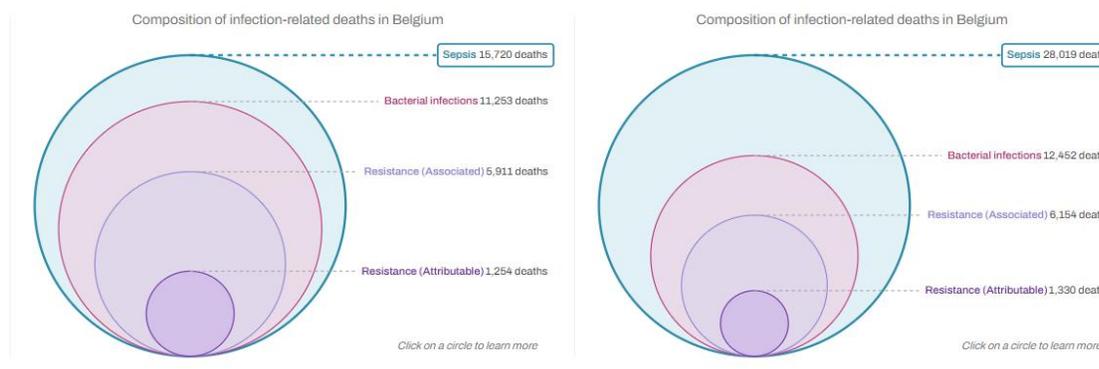
- To look at these and more visualization interactively visit [Measuring Infectious Causes and Resistance Outcomes for Burden Estimation (MICROBE)](#)

- In **Belgium** in 2021, there were an estimated **1,330 UI (1,150-1,510)** deaths attributable to AMR and **6,150 UI (5,320-6,980)** 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, **Belgium has the 24th 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 3,660 UI (3,180-4,150)	↑	Staphylococcus aureus 1,870 UI (1,610-2,140)	↑	Staphylococcus aureus 493 UI (394-591)	↑
Escherichia coli 2,280 UI (1,980-2,580)	↑	Escherichia coli 1,540 UI (1,320-1,760)	↑	Escherichia coli 271 UI (213-329)	↑
Pseudomonas aeruginosa 1,200 UI (1,040-1,350)	↑	Pseudomonas aeruginosa 554 UI (462-646)	↓	Pseudomonas aeruginosa 142 UI (111-173)	↓
Streptococcus pneumoniae 975 UI (844-1,110)	↓	Klebsiella pneumoniae 479 UI (396-563)	↓	Klebsiella pneumoniae 108 UI (86-129)	↓
Klebsiella pneumoniae 933 UI (809-1,060)	↑	Streptococcus pneumoniae 385 UI (306-464)	↓	Acinetobacter baumannii 75 UI (60-90)	↓
Group A Streptococcus 541 UI (459-624)	↑	Enterococcus faecium 319 UI (277-361)	↑	Streptococcus pneumoniae 62 UI (44-80)	↓
Enterococcus faecalis 390 UI (342-438)	↓	Proteus spp. 216 UI (169-264)	↑	Enterococcus faecium 45 UI (29-60)	↑
Proteus spp. 378 UI (324-432)	↑	Acinetobacter baumannii 195 UI (154-235)	↓	Enterobacter spp. 34 UI (28-39)	↓
Enterococcus faecium 351 UI (306-395)	↑	Enterobacter spp. 136 UI (112-160)	↓	Proteus spp. 29 UI (22-37)	↑
Enterobacter spp. 328 UI (286-369)	↓	Enterococcus faecalis 82 UI (70-94)	↓	Citrobacter spp. 17 UI (12-22)	↓

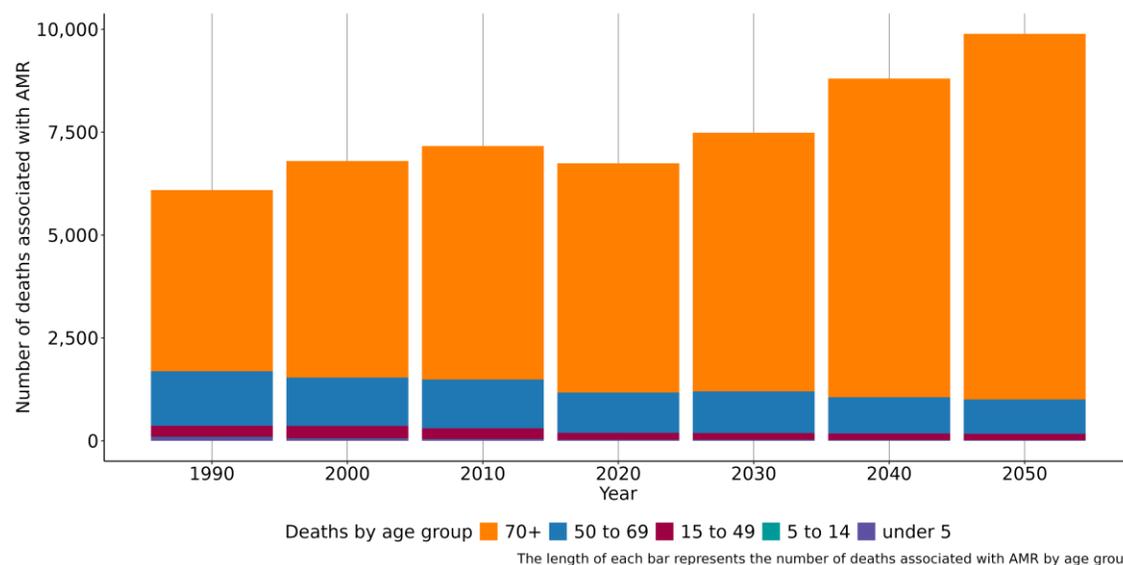Annualized rate of change (1990-2021): <-3%, -3% to -1.5%, -1.5% to 0%, 0% to 1.5%, 1.5% to 3%, 3% to 5%, >5.0%

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

Associated			Attributable		
Escherichia coli Aminopenicillin	1,450 UI (1,220-1,680)	↑	Staphylococcus aureus Methicillin	365 UI (251-479)	↑
Staphylococcus aureus Methicillin	1,430 UI (1,020-1,830)	↑	Escherichia coli Aminopenicillin	65 UI (44-85)	↑
Staphylococcus aureus Macrolides	1,220 UI (984-1,460)	↑	Pseudomonas aeruginosa Carbapenems	64 UI (43-85)	↓
Escherichia coli Beta-Lactam/Lactamase Inhib.	783 UI (646-920)	↑	Escherichia coli Beta-Lactam/Lactamase Inhib.	61 UI (18-105)	↑
Escherichia coli TMP-SMX	748 UI (589-908)	↑	Staphylococcus aureus Macrolides	54 UI (35-72)	↑
Staphylococcus aureus Fluoroquinolones	714 UI (549-879)	↓	Staphylococcus aureus Fluoroquinolones	46 UI (17-76)	↓
Escherichia coli Fluoroquinolones	655 UI (503-807)	↑	Escherichia coli Fluoroquinolones	44 UI (24-64)	↑
Pseudomonas aeruginosa Fluoroquinolones	350 UI (283-417)	↓	Escherichia coli TMP-SMX	40 UI (22-58)	↑
Pseudomonas aeruginosa Carbapenems	333 UI (269-397)	↓	Pseudomonas aeruginosa Fluoroquinolones	37 UI (24-50)	↓
Pseudomonas aeruginosa Anti-pseudomonal	324 UI (258-391)	↓	Streptococcus pneumoniae Carbapenems	36 UI (23-49)	↓

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) (6,740 UI (5,710-7,760)), bloodstream infections (5,450 UI (4,820-6,070)), peritoneal and intra-abdominal infections (2,180 UI (1,900-2,460)), urinary tract infections and pyelonephritis (1,480 UI (1,220-1,740)) and diarrhea (1,010 UI (826-1,200)).

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 Belgium, 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 4,910 UI (4,130-5,690), whereas the mortality rate per 100,000 was 306 UI (257-354).

Data sources for Belgium

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 Belgium by source type

Source type	Years	Sample size	Sample size units
Microbial or laboratory data without outcome	1990-2021	1,992,837	Isolates
Microbial or laboratory data with outcome	1990-2021	60,284	Isolates
Literature studies	1990-2009	2,093	Cases/isolates/susceptibility tests
Single drug resistance profile data	1990-2021	58,645	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).

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