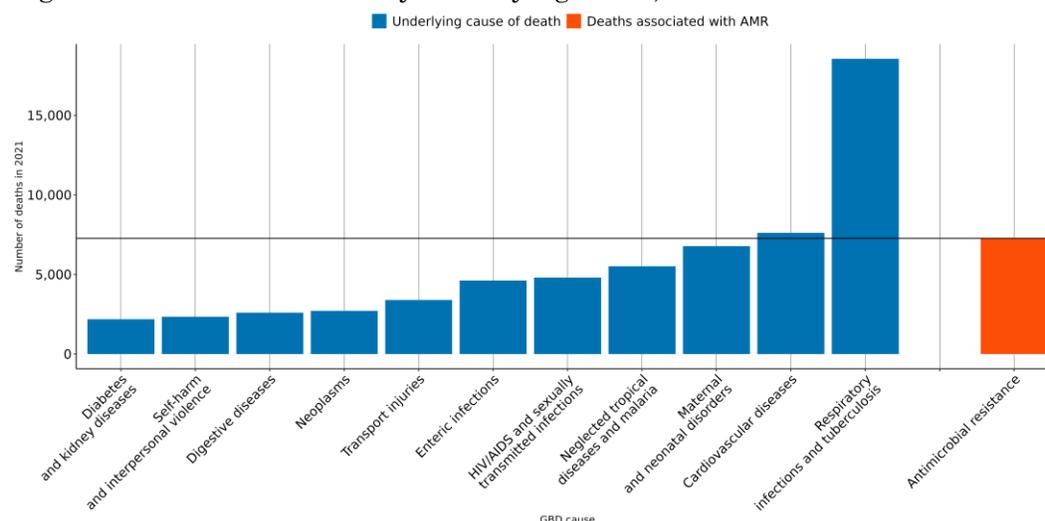


The burden of antimicrobial resistance (AMR) in the Central African Republic

Executive summary

- Antimicrobial Resistance (AMR) is a major global health threat, over **2,000 lives** have been lost each year since 1990 in the Central African Republic due to AMR.
- In 2021, there were an estimated **1,890 UI (1,340-2,440)** deaths attributable to AMR and **7,270 UI (5,320-9,230)** 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 *Escherichia coli* resistant to carbapenems, *Klebsiella pneumoniae* resistant to carbapenems and *Streptococcus pneumoniae* resistant to carbapenems.

Figure 1 Number of deaths by underlying cause, and those associated with AMR in 2021



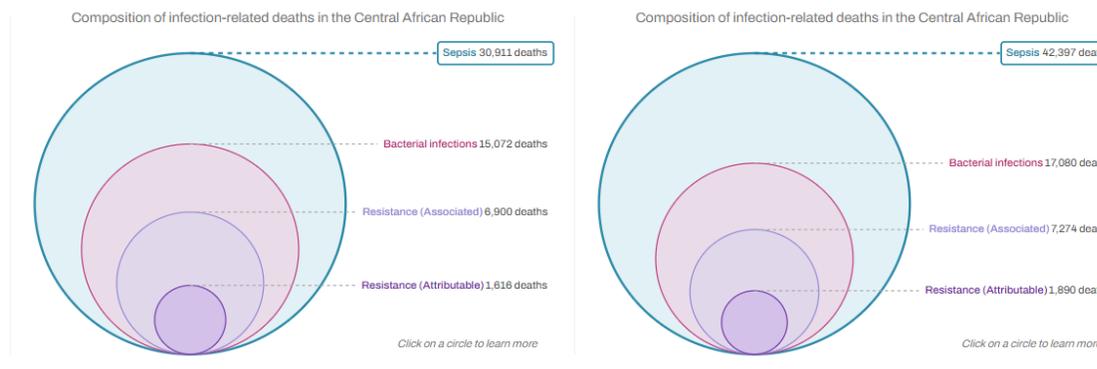
- In 2021, the number of deaths associated with AMR (orange bar in *figure 2*) were high compared to the most relevant underlying causes of death (depicted in blue) in the country. AMR associated deaths occur within multiple Global Burden of Disease (GBD) causes of death and AMR is not an underlying 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 the CAR, a 10% reduction means to decrease the number of deaths associated with AMR to **6,980**, but currently the trend for this country could reach up to **6,880 UI [4,460-10,100]** AMR-associated deaths in 2030.

AMR in the Central African Republic

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 the Central African Republic between 1990 and 2019.



- To look at these and more visualization interactively visit [Measuring Infectious Causes and Resistance Outcomes for Burden Estimation \(MICROBE\)](#)
- In the **Central African Republic** in 2021, there were an estimated **1,890 UI (1,340-2,440)** deaths attributable to AMR and **7,270 UI (5,320-9,230)** 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, **the Central African Republic 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)

Burden rank	Overall susceptible and resistant			Associated			Attributable		
	Bacteria	UI (range)	Change	Bacteria	UI (range)	Change	Bacteria	UI (range)	Change
	Mycobacterium tuberculosis	7,740 UI (5,130-10,400)	↑	Streptococcus pneumoniae	1,810 UI (1,350-2,270)	↓	Streptococcus pneumoniae	440 UI (311-570)	↓
	Streptococcus pneumoniae	1,970 UI (1,480-2,460)	↓	Klebsiella pneumoniae	1,330 UI (1,020-1,650)	↑	Klebsiella pneumoniae	393 UI (301-485)	↑
	Klebsiella pneumoniae	1,510 UI (1,160-1,860)	↑	Escherichia coli	775 UI (513-1,040)	↑	Escherichia coli	245 UI (163-327)	↑
	Pseudomonas aeruginosa	830 UI (642-1,020)	↑	Acinetobacter baumannii	573 UI (432-714)	↑	Acinetobacter baumannii	211 UI (164-258)	↑
	Escherichia coli	825 UI (552-1,100)	↑	Pseudomonas aeruginosa	568 UI (409-726)	↑	Staphylococcus aureus	140 UI (102-178)	↑
	Shigella spp.	782 UI (228-1,340)	↓	Staphylococcus aureus	548 UI (410-687)	↑	Pseudomonas aeruginosa	137 UI (91-183)	↑
	Acinetobacter baumannii	684 UI (527-840)	↑	Shigella spp.	274 UI (10-538)	↓	Mycobacterium tuberculosis	88 UI (0-318)	↑
	Staphylococcus aureus	609 UI (469-750)	↑	Mycobacterium tuberculosis	245 UI (44-697)	↑	Serratia spp.	53 UI (38-68)	↑
	Non-typhoidal Salmonella	394 UI (125-662)	↑	Serratia spp.	194 UI (140-248)	↑	Enterobacter spp.	37 UI (21-54)	↑
	Group B Streptococcus	388 UI (280-497)	↑	Non-typhoidal Salmonella	189 UI (56-322)	↑	Shigella spp.	29 UI (0-68)	↓

Annualized rate of change (1990-2021): <-3% (dark blue), -3% to -1.5% (medium blue), -1.5% to 0% (light blue), 0% to 1.5% (pink), 1.5% to 3% (red), 3% to 5% (dark red), >5.0% (black)

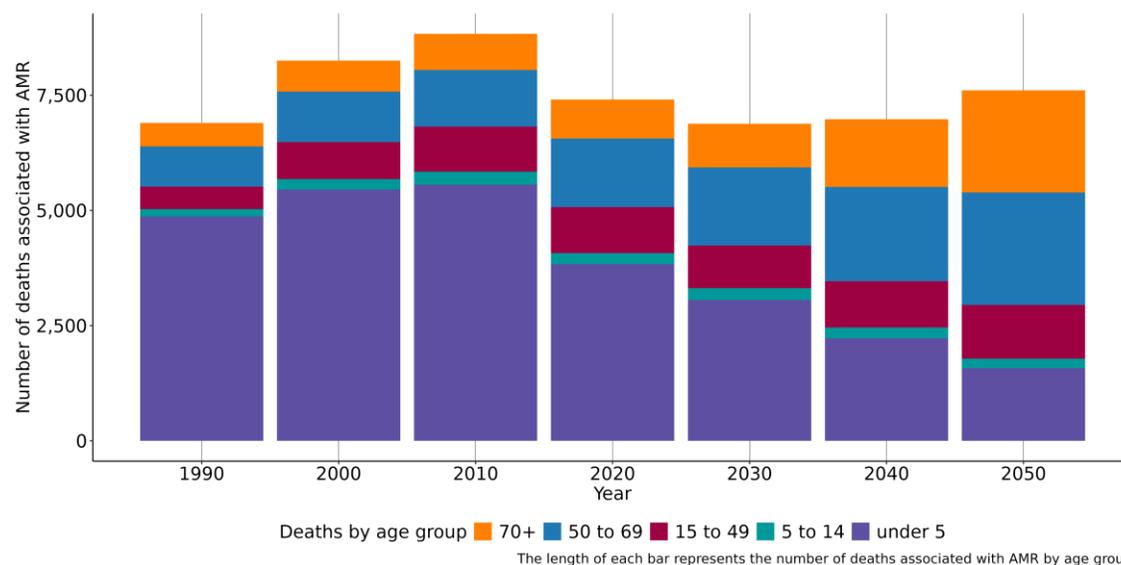
Table 2. Combinations which cause most deaths in 2021 (Number of deaths in parenthesis)

Burden Rank	Associated			Attributable		
	Combination	UI (range)	Change	Combination	UI (range)	Change
	Streptococcus pneumoniae TMP-SMX	1,610 UI (1,160-2,060)	↓	Streptococcus pneumoniae Carbapenems	158 UI (85-231)	↓
	Streptococcus pneumoniae Beta-Lactam/Lactamase Inhib.	1,480 UI (1,070-1,880)	↓	Escherichia coli Carbapenems	149 UI (94-205)	↑
	Klebsiella pneumoniae TMP-SMX	1,230 UI (930-1,540)	↑	Klebsiella pneumoniae Carbapenems	140 UI (100-181)	↑
	Klebsiella pneumoniae Aminoglycosides	1,110 UI (834-1,390)	↑	Mycobacterium tuberculosis MDR excluding XDR	86 UI (0-314)	↑
	Streptococcus pneumoniae Macrolides	1,060 UI (759-1,360)	↑	Streptococcus pneumoniae 3GC	85 UI (55-115)	↑
	Streptococcus pneumoniae 3GC	1,020 UI (708-1,340)	↑	Klebsiella pneumoniae Aminoglycosides	84 UI (58-110)	↑
	Klebsiella pneumoniae 3GC	1,010 UI (754-1,260)	↑	Klebsiella pneumoniae Fluoroquinolones	72 UI (44-99)	↑
	Streptococcus pneumoniae Penicillin	980 UI (612-1,350)	↓	Staphylococcus aureus Methicillin	72 UI (48-95)	↑
	Klebsiella pneumoniae Beta-Lactam/Lactamase Inhib.	976 UI (678-1,270)	↑	Acinetobacter baumannii Carbapenems	70 UI (41-99)	↑
	Klebsiella pneumoniae Fluoroquinolones	942 UI (679-1,200)	↑	Streptococcus pneumoniae Beta-Lactam/Lactamase Inhib.	65 UI (32-99)	↓

Annualized rate of change (1990-2021): <-3% (dark blue), -3% to -1.5% (medium blue), -1.5% to 0% (light blue), 0% to 1.5% (pink), 1.5% to 3% (red), 3% to 5% (dark red), >5.0% (black)

- Independently of antimicrobial resistance, the infectious syndromes accounting for the most deaths in 2021 were as follows (estimated thousands of deaths in parenthesis) tuberculosis (7,740 UI (5,130-10,400)), lower respiratory infection (excl. COVID) (5,720 UI (4,360-7,080)), bloodstream infections (4,950 UI (3,630-6,260)), diarrhea (4,380 UI (2,350-6,410)) and meningitis (942 UI (580-1,300)).

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



- In the Central African Republic, 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 3,650 UI (2,490-4,810), whereas the mortality rate per 100,000 was 1,270 UI (1,020-1,520).

Data sources for the Central African Republic

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 the Central African Republic by source type

Source type	Years	Sample size	Sample size units
Antibiotic use	1990-2021	2,030	Study-year datapoints
Microbial or laboratory data without outcome	2010-2021	6,012	Isolates
Literature studies	1990-2009	628	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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