# The burden of antimicrobial resistance (AMR) in Chad

Executive summary

- Antimicrobial Resistance (AMR) is a major global health threat, over **5,000 lives** have been lost each year since 1990 in Chad due to AMR.

- In 2021, there were an estimated **6,390 UI (4,610-8,170)** deaths attributable to AMR and **29,600 UI (22,200-37,000)** 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 third-generation cephalosporins, *Streptococcus pneumoniae* resistant to fluoroquinolones and *Streptococcus pneumoniae* resistant to third-generation cephalosporins.

Figure 1 Number of deaths by underlying cause, and those associated with AMR in 2021
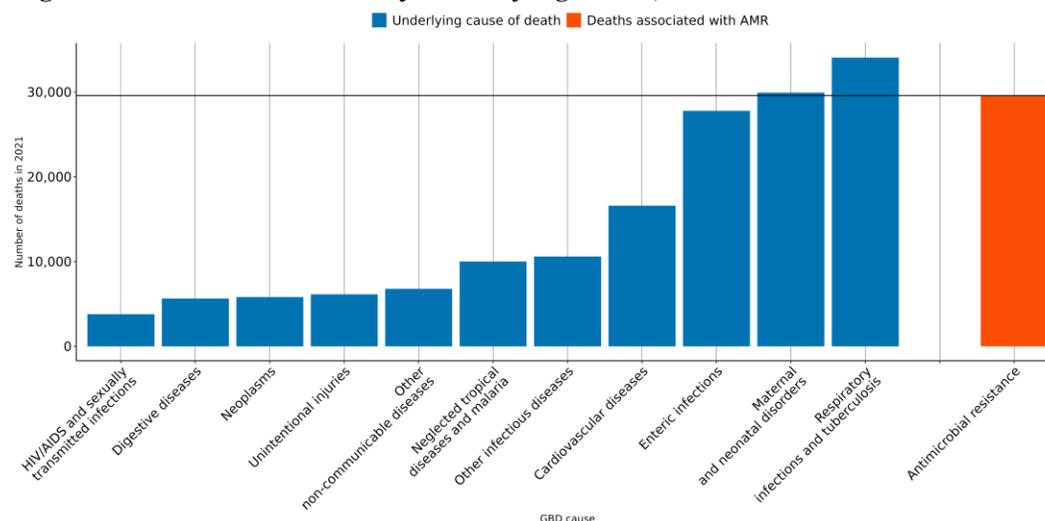
- In 2021, the number of deaths associated with AMR (orange bar in *figure 2*) were high compared to the most relevant underlying causes of death (depicted in blue) in the country. AMR associated deaths occur within multiple Global Burden of Disease (GBD) causes of death and AMR is not an underlying 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 Chad, a 10% reduction means to decrease the number of deaths associated with AMR to **27,200**, but currently the trend for this country could reach up to **35,000 UI [24,000-48,200]** AMR-associated deaths in 2030.

AMR in Chad

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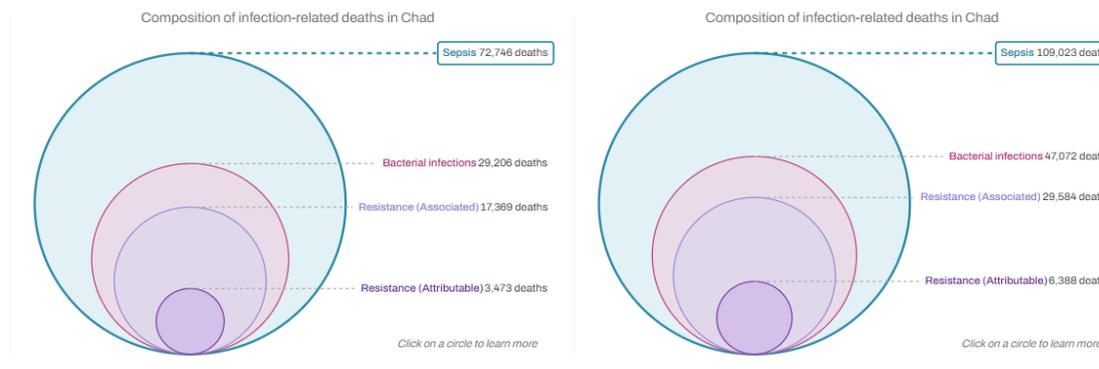
- To look at these and more visualization interactively visit [Measuring Infectious Causes and Resistance Outcomes for Burden Estimation (MICROBE)](#)

- In **Chad** in 2021, there were an estimated **6,390 UI (4,610-8,170)** deaths attributable to AMR and **29,600 UI (22,200-37,000)** 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, **Chad 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	Streptococcus pneumoniae 9,940 UI (7,620-12,300)	↑	Streptococcus pneumoniae 8,020 UI (5,810-10,200)	↑	Streptococcus pneumoniae 1,420 UI (932-1,920)	↑
	Mycobacterium tuberculosis 6,360 UI (4,420-8,310)	↑	Escherichia coli 5,900 UI (3,490-8,320)	↑	Escherichia coli 1,200 UI (581-1,820)	↑
	Escherichia coli 6,190 UI (3,700-8,690)	↑	Klebsiella pneumoniae 4,340 UI (3,300-5,380)	↑	Klebsiella pneumoniae 990 UI (706-1,270)	↑
	Klebsiella pneumoniae 4,860 UI (3,720-6,000)	↑	Acinetobacter baumannii 2,530 UI (1,880-3,180)	↑	Acinetobacter baumannii 917 UI (716-1,120)	↑
	Shigella spp. 3,640 UI (1,320-5,960)	↑	Pseudomonas aeruginosa 1,890 UI (1,370-2,420)	↑	Pseudomonas aeruginosa 463 UI (315-611)	↑
	Acinetobacter baumannii 2,940 UI (2,220-3,650)	↑	Staphylococcus aureus 1,750 UI (1,180-2,320)	↑	Staphylococcus aureus 412 UI (240-584)	↑
	Pseudomonas aeruginosa 2,800 UI (2,160-3,430)	↑	Shigella spp. 1,110 UI (12-2,210)	↑	Enterobacter spp. 168 UI (125-211)	↑
	Staphylococcus aureus 2,340 UI (1,800-2,880)	↑	Haemophilus influenzae 636 UI (310-962)	↑	Haemophilus influenzae 150 UI (67-234)	↑
	Non-typhoidal Salmonella 1,820 UI (727-2,900)	↑	Enterobacter spp. 582 UI (431-733)	↑	Serratia spp. 150 UI (99-201)	↑
	Group B Streptococcus 1,310 UI (944-1,670)	↑	Serratia spp. 579 UI (394-765)	↑	Shigella spp. 117 UI (0-288)	↑

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	
Burden Rank	Streptococcus pneumoniae TMP-SMX	6,460 UI (4,310-8,610) ↑	Streptococcus pneumoniae 3GC	413 UI (265-561) ↑
	Escherichia coli Aminopenicillin	5,490 UI (3,070-7,910) ↑	Escherichia coli 3GC	301 UI (2-601) ↑
	Escherichia coli TMP-SMX	4,790 UI (2,910-6,670) ↑	Streptococcus pneumoniae Fluoroquinolones	299 UI (115-483) ↑
	Streptococcus pneumoniae Macrolides	4,630 UI (3,100-6,170) ↑	Escherichia coli Fluoroquinolones	291 UI (126-456) ↑
	Escherichia coli Beta-Lactam/Lactamase Inhib.	4,600 UI (2,710-6,490) ↑	Acinetobacter baumannii Anti-pseudomonal	239 UI (186-292) ↑
	Escherichia coli Fluoroquinolones	4,500 UI (2,340-6,660) ↑	Escherichia coli TMP-SMX	239 UI (152-326) ↑
	Klebsiella pneumoniae Beta-Lactam/Lactamase Inhib.	4,130 UI (3,110-5,150) ↑	Klebsiella pneumoniae Beta-Lactam/Lactamase Inhib.	239 UI (96-381) ↑
	Escherichia coli 3GC	3,870 UI (2,030-5,710) ↑	Klebsiella pneumoniae Fluoroquinolones	227 UI (143-312) ↑
	Klebsiella pneumoniae TMP-SMX	3,780 UI (2,840-4,710) ↑	Staphylococcus aureus Methicillin	205 UI (79-330) ↑
	Streptococcus pneumoniae Penicillin	3,380 UI (1,720-5,050) ↑	Streptococcus pneumoniae Penicillin	200 UI (106-293) ↓

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) diarrhea (26,500 UI (15,900-37,100)), lower respiratory infection (excl. COVID) (20,900 UI (16,100-25,700)), bloodstream infections (18,100 UI (13,100-23,200)), tuberculosis (6,360 UI (4,420-8,310)) and meningitis (3,830 UI (2,550-5,110)).

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
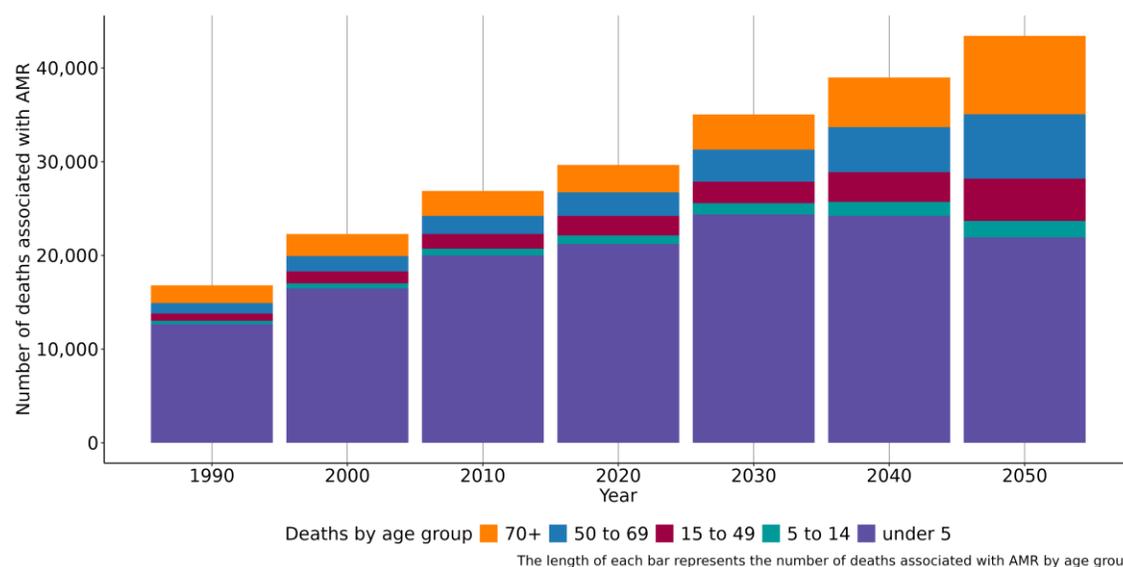
- In Chad, people aged under 5 saw the largest number of deaths associated with AMR both in 1990 and 2021, which indicates that under 5 continues to be particularly vulnerable to infections which are resistant to antibiotics. In 2021, the number of deaths associated with AMR among the under 5 was 21,100 UI (15,600-26,600), whereas the mortality rate per 100,000 was 1,200 UI (942-1,470).

Data sources for Chad

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 Chad by source type

Source type	Years	Sample size	Sample size units
Antibiotic use	2010-2021	2,056	Study-year datapoints
Literature studies	2010-2021	6,433	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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