HEALTH AND HEALTHCARE

Antimicrobial resistance: Avoiding antibiotic overconsumption with the right data

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- **Antimicrobial resistance, rendering antibiotics ineffective, is incredibly harmful, associated with 4.95 million deaths in 2019.**
- **A significant cause of antimicrobial resistance is over-prescribing antibiotics and inadequate diagnostics for the right therapeutic solution.**
- **Adequate data collection along the health value chain is important for valuable insights to inform prescriptions properly.**

Often described as a "silent epidemic," antimicrobial resistance is one of the most dangerous threats to global health.

Antimicrobial resistance is a natural process in which bacteria, parasites, fungi and viruses evolve to overpower available treatments, rendering them ineffective. Sub-optimal antibiotic prescribing in humans and overuse in agriculture and animal husbandry, along with poor sanitation and environmental contaminants, actively contribute to it, further aggravating an already complex situation.

Numerous studies and publications have explored the harmful effects of antimicrobial resistance, particularly for antibiotics, currently associated with 4.95 million deaths in 2019. If not addressed urgently, antimicrobial resistance could claim the lives of up to 10 million and reduce the global gross domestic product between 1.1% and 3.8% by 2050. Antimicrobial resistance is a healthcare challenge in every geography, although it disproportionally impacts low- and middle-income countries, particularly sub-Saharan Africa, South Asia and the Americas.

Navigating a multidimensional challenge

Understanding and adequately tackling antimicrobial resistance has become a multidimensional challenge for governments and other national and international health stakeholders that requires integrating institutional, clinical, policy, financing, research and development and partnership-related factors into a comprehensive framework of action.

Separate interventions in these areas have yielded useful insights, but only a coherent and systematic approach that connects the dots across the entire healthcare ecosystem can support all-encompassing and sustainable solutions. In this regard, data-driven insights will be required to advance innovation, inform current and future decisions and build a detailed and accurate picture of an issue that demands but currently lacks a quantified definition.

Clinically, overprescribing and the inappropriate use of antibiotics have led to the emergence of increasingly resistant pathogens. The absence of rapid diagnostics at the point of care increases the risk of inaccurately identifying a given cause of infection, and the lack of data to inform prescribing practices usually results in sub-optimal therapeutic choices, typically administered without microbiology results or properly processed cultures.

These impacts are compounded by issues around access to medicine, limiting options or encouraging counterfeits and driving uncompleted treatment courses. An IQVIA study shows that four broad-spectrum drugs, prone to creating resistance, represented 67% of antibiotic consumption across the 14 countries covered. This study found 48 antibiotics circulating across these markets that were neither included in national essential medicine lists nor recommended by WHO.

As illustrated in Figure 1, antibiotic consumption is significantly increasing across many countries, particularly during and after the COVID-19 pandemic, raising concern about the potential impact of this trend on antimicrobial resistance. Figures 2 and 3 list the relative highest consumers of antibiotics and the relative increase in consumption across the top 10 countries between 2012 and 2022. And while the human

consumption of antibiotics shows different dynamics to antivirals and antifungals, the effects of resistant pathogenic fungi are equally problematic.

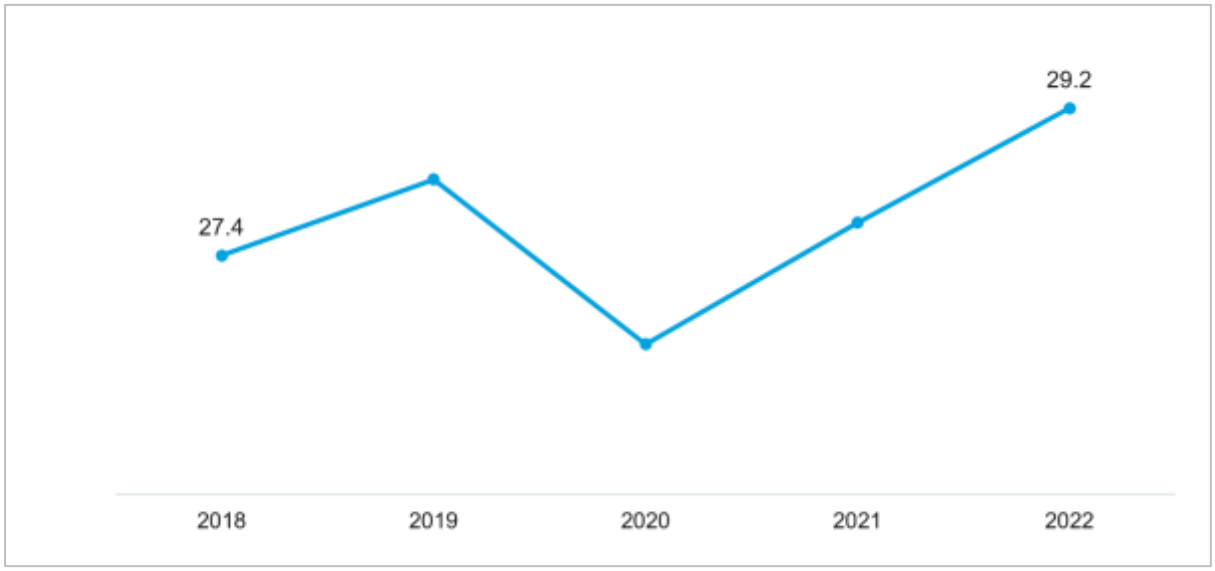

Figure 1: Change in antibiotic consumption across IQVIA MIDAS geographies (2018-2022) (defined daily dose in billions). Image: IQVIA EMEA Thought Leadership, IQVIA MIDAS

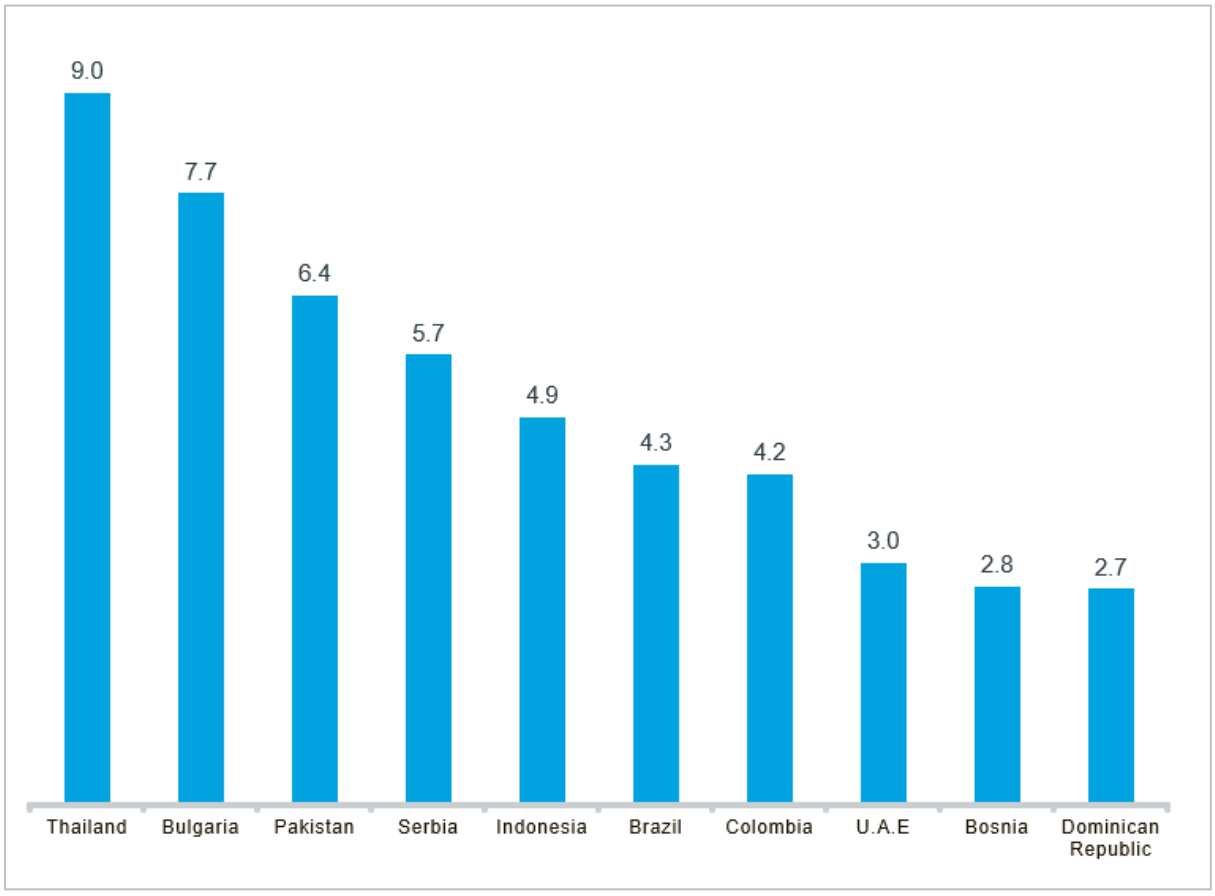

Figure 2: Relative change in antibacterial consumption across top 10 countries based on IQVIA data (2012-2022) (defined daily dose 1,000 inhabitants per day). Image: IQVIA EMEA Thought Leadership, IQVIA MIDAS and World Bank WDI

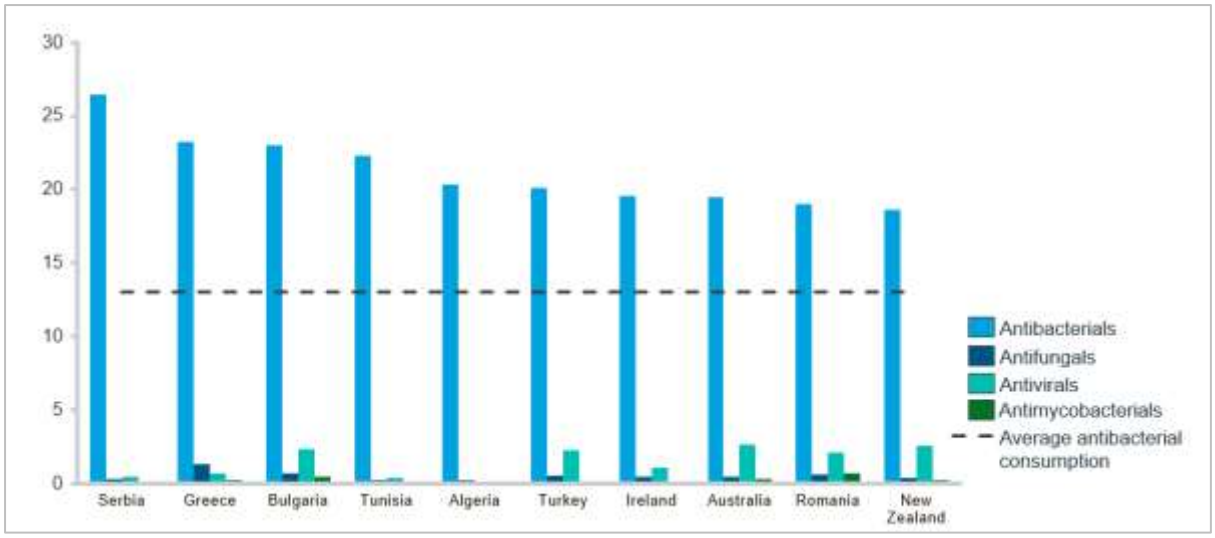

Figure 3: Anti-infective consumption across top 10 antibiotic countries across IQVIA MIDAS geographies (2022). Image: IQVIA EMEA Thought Leadership, IQVIA MIDAS and World Bank WDI

The world is also running out of solutions to address new pathogens. Insufficient commercial return on investment and partially effective policies to incentivize development have led to a drought in novel therapies. Between 2017 and 2021, only 12 new antibiotics were introduced to the market, most of which show negligible sales value and share of the global medicines market compared to the 1990s and early 2000s. Studies have calculated that an average of $1.2 billion in funding needs to be provided each year to support a viable pipeline of antibiotic innovation.

In light of this dire context, there is a clear need for policy incentives and innovative financing mechanisms to discover, develop and supply novel antibiotics. Incentives may include, among others, fixed annual payments or minimum revenues, reward payments for drug development and launch, patent extensions or vouchers for the accelerated assessment and approval of antibiotics.

In the financing realm, blended capital funds and pooled loans that combine philanthropic, public and private investments are gaining traction as feasible alternatives to stimulate production. Yet, against the backdrop of these discussions, the dilemma between access and excess remains for novel antibiotics: the market needs to guarantee their availability while limiting their use.

In response to limited innovation, stewardship protocols to maximize the effectiveness of presently available agents are critical. Standards set by the World Health Organization (WHO), for example, classify 285 access, watch and reserve antibiotics, advising extensively on their use. However, successful stewardship demands institutional capacities within healthcare systems that provide strong diagnostics, surveillance and evidence-based clinical guidelines to monitor and regulate prescribing and pathogen evolution.

Surveillance-generated data is fundamental for tracking antimicrobial resistance and antibiotic consumption trends, rationalizing prescribing and enabling early warning systems for other issues, including potential pandemic threats. These efforts should

incorporate a One Health approach, seeking a sustainable balance and optimization between human and animal health and the environment.

Partnership-focused value ecosystem for innovation

Advancing a truly integrated response to tackle antimicrobial resistance means forming partnerships across governments, multilateral actors, policymakers, academia and the private sector guided by reliable data assets. To be truly effective, data to understand antimicrobial resistance and antibiotic consumption must be comprehensive, timely and standardized across countries, which is usually not the case. In some parts of Africa, 50% of antimicrobial consumption information is captured manually and datasets linking antimicrobial use and diagnosis are unavailable. Beyond Africa, many developed countries often face similar gaps, although less acutely.

An ecosystem to manage antimicrobial resistance requires concertation across different stakeholders to capture and process data on the patient journey, correct diagnosis and prescribing, and reach a successful outcome of care, with insights continuously informing systematic adjustments and enhancing the health value chain.

Collective investments in data innovation and systems, primarily in surveillance and diagnostics as a starting point, could create a virtuous cycle with multiple benefits – from more robust laboratory capacity on the ground and effective national and regional early warning systems to more efficient, targeted and economic health interventions. Collaborative approaches to innovation can also capitalize on the potential of new digital technologies and artificial intelligence to automate microbiology workflows and accelerate test results. At the clinical level, digital tools incorporating real-world data could also support antimicrobial prescribing and, at more advanced stages, monitoring of treatment adherence.

Moreover, dealing with antimicrobial resistance adequately requires establishing data networks, closer collaboration across relevant organizations, enhanced data access and management and One Health-driven surveillance, factoring in other critical environmental variables, particularly climate change. Truly impactful public-private partnerships to address antimicrobial resistance should then be grounded on three key factors:

- A comprehensive landscape analysis of successes, challenges, risks and opportunities, mapping key players and stakeholders with capabilities and complementarities.
- A timely, comprehensive and standardized collection of data on antibiotic consumption across a broader range of countries that complement the WHO's Global Antimicrobial Resistance and Use Surveillance System.

- The coordinated promotion of better use of existing antibiotics across countries and ecosystem actors, better surveillance techniques, and conservation of novel therapeutic options for appropriate use.

We can successfully move the needle on the optimal management and reduction of antimicrobial resistance only through truly collaborative and concerted action. Public-private partnerships will continue to be a major catalyst for innovation and a key platform for greater accountability, coordination, and cross-sectoral engagement – a message that should remain front and centre in the coming multilateral deliberations in 2024.

More importantly, it is necessary to emphasize that no sustainable solution can be generated without the use of data and data-driven innovation, as they set the foundations of a stronger response across all One Health actors and curbing the existential threat of antimicrobial resistance.

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