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Socioeconomic inequality and corruption as determinants of antibiotic access and AMR burden

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Background

Antimicrobial resistance (AMR) is a global health threat that evolves unevenly across countries. Many low- and middle-income countries struggle to implement medical treatment guidelines and antibiotic stewardship programs. We argue that socioeconomic inequality, poor governance and widespread corruption may thwart access to appropriate antibiotics and rational use based on medical need. This may help explain poor national AMR outcomes. We assemble the largest global dataset to date, spanning 204 countries over three decades, to investigate how inequality and corruption affect antibiotic use and AMR-associated mortality.

Methods

Based on UK NHS prescribing guidelines, we quantified country-specific optimal antibiotic use and compiled indicators as potential explanatory and confounders across domains, including economic, governance, environment, health systems, socio-demographic, nutrition and lifestyle risk factors. Principal Component Analysis (PCA) on 19 major diseases' prevalence was used to construct an Antibiotic Usage (ABU) Index (0-100) measuring national adherence to recommended usage in each year from 1990-2021. To study the additional explanatory power of corruption and poor governance on AMR mortality, we used:

Multivariable regressions with relevant covariates,
Propensity score matching (PSM) for a quasi-experimental randomised pairing of corrupt and non-corrupt countries,
Mediation analysis to assess the ABU-index's role in corruption control's impact on AMR mortality.

Results

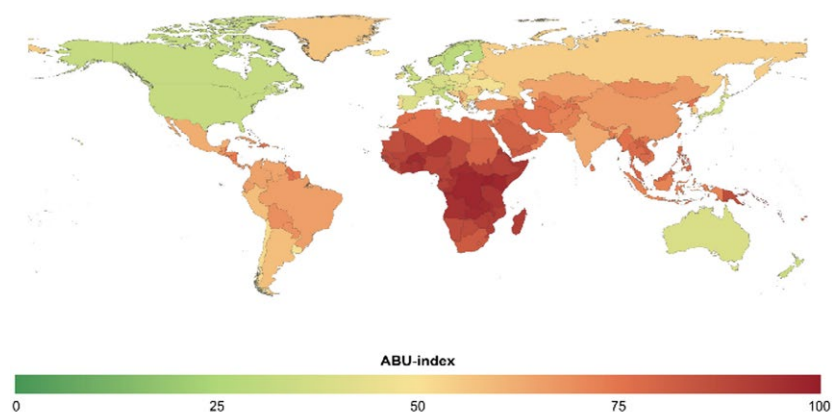
The mean ABU-index declined globally from 70 in 1990 to 62 in 2021 (Figure1). In our regression model, stronger control of corruption was associated with 2 fewer AMR deaths per 100,000 population. PSM showed corrupt countries experienced 16.5 more AMR deaths per 100,000 than matched non-corrupt countries. The ABU-index partially mediated the relationship between corruption control and AMR mortality, accounting for 70.2% of the total effect. The direct effect of corruption control on AMR mortality was -0.13, the indirect effect via the ABU-index -0.30 and the total effect -0.43 (Figure2).

Conclusions

Corruption is a key driver of global AMR mortality, acting both directly, e.g. by increasing the spread of infections, and indirectly by undermining adherence to appropriate antibiotic use. Strengthening governance and improving equitable access to recommended antibiotics could markedly reduce AMR mortality and should be prioritised within international AMR strategies.

Figure 1. The geographical distribution of ABU index in 1990-2021

1990



2021

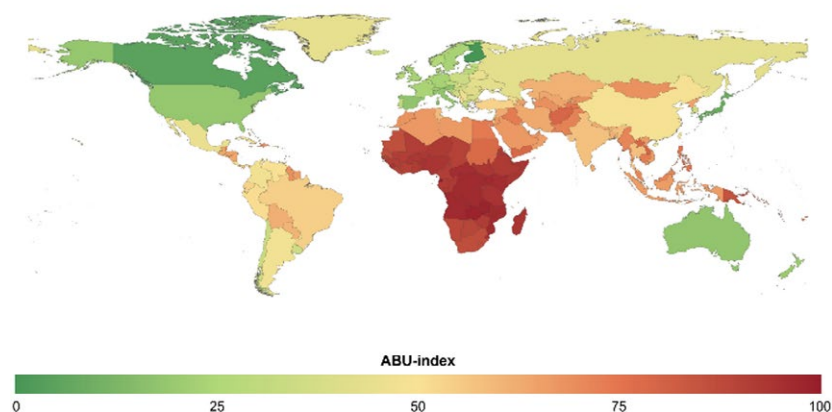
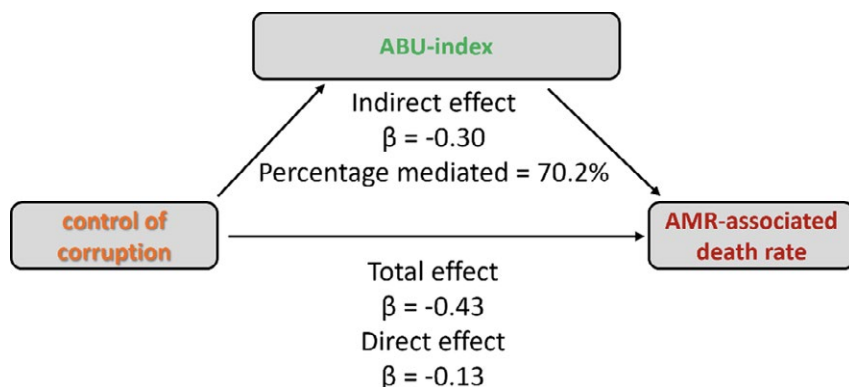


Figure 2. Analysis of the mediating effect of the ABU index on the relationship between the control of corruption and AMR death



References

1. DOI: 10.1016/S0140-6736(24)01867-1 2. DOI: 10.1016/S2542-5196(18)30186-4 3. DOI: 10.1016/S2542-5196(23)00026-8 4. <https://www.transparency.org/en/publications/corruption-perceptions-index-2021>

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In search of innovative 'alter-biotic treatments': non-traditional therapies and the sociotechnical frameworks they require

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Background

Understanding the societal, economic, and policy conditions in which biomedical research unfolds is essential for identifying both the opportunities and the structural constraints shaping innovation. Emerging antimicrobial technologies depend on distinct sociotechnical infrastructures and regulatory arrangements that strongly influence which projects gain traction, investment, and long-term support. Addressing the antimicrobial innovation crisis—marked by decades of declining R&D investment and a shrinking pipeline driven by scientific and market failures—therefore requires more than new therapeutics. It demands substantially reconfigured framework conditions that enable sustainable and needs-driven research and investment. The ERC-StG project ALTERBIOTIC examines the rapidly evolving field of antimicrobial innovation that has emerged in response to this crisis, with a focus on public-private and multilateral initiatives such as CARB-X, GARDP, and the AMR Action Fund. It investigates the visions, strategies, and assumptions these actors advance as they attempt to establish alternative models for antibiotic development.

Methods

The study draws on a multi-method qualitative case-study design, including document analysis, expert interviews, and conference ethnography. ALTERBIOTIC analyses the problematizations, (e)valuation criteria, and expectations underpinning divergent imaginaries of what kinds of innovations are necessary to secure safe and sustainable futures in the context of AMR.

Results

This paper (1) conceptualizes the contours of this emerging field; (2) presents preliminary findings that reveal key challenges, tensions, and contradictions within current efforts to promote non-traditional treatments; and (3) compares the sociotechnical demands associated with different proposed therapeutic approaches.

Conclusions

Current developments challenge widely held assumptions about the feasibility of scaling sustainable alternatives to existing antibiotic modalities. The analysis suggests that without substantial infrastructural investment and targeted policy measures, promising non-traditional treatments are unlikely to reach patients at the scale required to mitigate AMR.