

POLICY BRIEF

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# Urging health collaboration to combat antimicrobial resistance between China and B&R countries

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## Background

Antimicrobial resistance (AMR) was regarded as one of the top ten global public health problems by the World Health Organization (WHO). While the complexity of AMR poses threats to humans, animals, and the environment, to combat AMR necessitates a multi-sector approach. In March 2022, world leaders and experts called on all countries to reduce antimicrobial pollution to protect the environment, and WHO published the strategic framework for collaboration on AMR in May, emphasizing significant global threat of AMR and calling for multisectoral coordination based on One Health approach [1, 2].

In 2013, China proposed the construction of the Silk Road Economic Belt and the 21st Century Maritime Silk Road (the Belt and Road, B&R). As of July 2022, 149 countries and 32 international organizations participated in the Belt and Road Initiative (BRI) [3]. BRI attached considerable priority to health, and the Boao Forum for Asia in 2021 focused on new forms of health cooperation for “Healthy Silk Road” initiative [4]. However, AMR-related aspects have not been involved in B&R health cooperation projects. As the proponent of B&R, China need to enhance AMR-related health collaboration. This report is to recommend detailed strategies or plans for

further enhancing the AMR governance capabilities in B&R, based on a comprehensive assessment of the current AMR status according to the Global One Health Index for AMR (GOHI-AMR) [5].

## Current AMR status of B&R countries

With the GOHI-AMR platform, which is the first One Health-based systemic tool to conduct a global assessment of AMR, we would be able to assess the AMR status and provide specific recommendations for the B&R's continued health implementation strategies or plans.

There were 149 countries in B&R, of which 113 countries were included in the GOHI-AMR database including China [5]. They were geographically grouped into 6 primary regions based on World Bank classification standards: 16 countries in East Asia and the Pacific (EAP, average scores: 43.44), 33 countries in Europe and Central Asia (ECA, 42.30), 12 countries in Latin America and Caribbean (LAC, 34.21), 14 countries in Middle East and North Africa (MENA, 37.31), 5 countries in South Asia (SA, 32.23), and 33 countries in Sub-Saharan Africa (SSA, 29.99). It could be seen Sub-Saharan Africa's scores were lower and there were significant discrepancies across B&R countries (Additional file 1: Fig. S1A). As shown in Additional file 1: Fig. S1B, comparing the GOHI-AMR sub-scores between the six groups (detailed data in Additional file 2: Fig. S2), the most significant metric difference was NTC indicator, showing a huge gap in the establishment of the national reference laboratory system on AMR. And most of the disparity indicators were related to SSA, which reflected in SSA high antimicrobial consumption in animal, incomplete action plan and

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national laws. Surprisingly, there was high prevalence of AMR for Aminoglycosides in ECA.

### Recommendations

Given the large AMR discrepancies between B&R countries indicated by GOHI-AMR data, the future health cooperation plan in B&R should prioritize the most critical AMR concerns. Due to the close relationship between AMR and the human living environment, we focused on the One Health approach and propose the following recommendations for the current primary situation:

- i. Increasing One Health-based funds and talent: This may necessitate a greater emphasis on the cultivation and exchange plans of talent in One Health-related fields by subsidizing education funds and the recruitment of more pharmaceutical companies to increase capital investment.
- ii. Establishing a monitoring network of antimicrobial consumption: Linking countries to build a surveillance platform of antimicrobial consumption and use, especially on antimicrobial abuse, comprehensively monitoring and regularly reporting the overall consumption of humans, animals and pesticides, urging high-consuming countries to rationally optimize the management of antibiotic usage.
- iii. Establishing collaborative laboratories to monitor AMR: Utilizing the joint laboratory platform, standardize AMR surveillance plan, facilitate reciprocal exchanges on AMR management, organize regular professional technical training, invite countries with relatively complete AMR management to share their experiences, and improve the national action plan for AMR surveillance.
- iv. Establishing a cross-border AMR surveillance online database in B&R: It is essential to establish online AMR surveillance data based on the joint laboratory. Thus, nations can stay aware of the emerging AMR trends and bridge the gap between them.
- v. Strengthening ecological governance continuously: Combined with the Belt and Road Ecological and Environmental Cooperation Plan, adhering to the concept of One Health, promote implementation of the 2030 Agenda for Sustainable Development, which must prioritize monitoring AMR in the environment and in animals. Continually boost investment in AMR-related ecological prevention research, including vaccine, probiotics, lactic acid bacteria, and enzymiotics (Additional file 2).

### Conclusions

AMR has remained a global public health concern, and its effects vary considerably in B&R countries. Countries should adopt the One Health strategy, pay great attention to AMR issues, provide financial and human resource assistance, utilize joint laboratories and a cross-border AMR monitoring database to promote health cooperation, and prioritize ecological governance in accordance with other B&R cooperation plans. This report's suggestions serve as a guide for future B&R public health cooperation and policy development.

### Abbreviations

AMR: Antimicrobial resistance; BRI: The Belt and Road Initiative; B&R: The Belt and Road; GOHI-AMR: Global One Health index for Antimicrobial Resistance; EAP: East Asia and the Pacific; ECA: Europe and Central Asia; LAC: Latin America and Caribbean; NTC: National AMR capacity; SA: South Asia; SSA: Sub-Saharan Africa.

### Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s40249-022-01033-4>.

**Additional file 1.** Fig.S1.

**Additional file 2.** Fig.S2.

### Acknowledgements

Not applicable.

### Author contributions

YZZ and ML conceived and designed the article. ZLC and NZ performed the whole data integration and analysis, and wrote the first draft manuscript. XXZ and CL collected AMR datasets from different databases. XKG revised the paper. All authors approved the submitted version. All authors read and approved the final manuscript.

### Funding

This study was supported by the National Natural Science Foundation of China (Grant No. 32170141).

### Availability of data and materials

All the data came from the reference [5].

### Declarations

#### Ethics approval and consent to participate

Not applicable.

#### Consent for publication

Not applicable.

#### Competing interests

The authors have no other competing interests to disclose.

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Received: 13 July 2022 Accepted: 28 September 2022

Published online: 17 October 2022

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