Editorial

Operational research to strengthen evidence-based interventions to tackle antimicrobial resistance in the Region of the Americas

Yamile Celis[1], German Esparza[1], Rony Zachariah[2], and Freddy Pérez[3,4]

Antimicrobial resistance (AMR) is known to be among the most substantial threats to public health around the world. Mainly associated with the over- and misuse of antimicrobials in human and veterinary medicine and agriculture, AMR was exacerbated during the COVID-19 pandemic (1). Limiting the emergence and spread of AMR pathogens is critical to preserving the ability to treat diseases in humans, animals, and plants; to enhancing food safety; and to protecting the environment (2).

In 2019, an estimated 4.95 million human deaths worldwide were associated with antibiotic resistant bacterial infections, including 1.27 million deaths directly attributable to antibiotic resistant infections. In Latin America and the Caribbean, 338 000 deaths were associated with bacterial AMR and 84 300 deaths were attributable to bacterial AMR (3). Because AMR has multiple drivers and needs to be confronted on many fronts (2), it requires global, regional, and multisectoral collaboration to ensure that all sectors and stakeholders communicate and work effectively together. This has prompted the World Health Organization, the World Organization for Animal Health, the United Nations (UN) Environment Program, and the UN Food and Agriculture Organization to join forces to propose comprehensive actions to contain AMR through a *One Health* approach (4).

The importance of urgently addressing AMR has been recognized since 2015. With the Pan American Health Organization support, all of the countries of the Region of the Americas endorsed a Regional Action Plan on AMR (5) that is aligned with the WHO Global Action Plan. The pillars of this action plan include five strategic areas to confront AMR, namely to: improve awareness and understanding of AMR; strengthen the knowledge and evidence base through AMR surveillance and research; reduce the incidence of infection through infection prevention and control measures; optimize the use of antimicrobial medicines in animal and human health; and increase investment in new medicines, diagnostic tools, vaccines, and other interventions (5). To date, all 35 Member States have developed national action plans steered by their respective One Health intersectoral committees. Nevertheless, there is a need to learn from existing policies and programs in the Region and to strengthen the scientific evidence base on AMR interventions; moreover, this evidence should be integrated into the AMR response to achieve more effective and sustainable solutions (6).

An understanding of the burden of AMR, the main pathogens causing AMR infections, and the antibiotics involved is crucial for political decision-making based on the epidemiologic context of each country. This understanding will inform 'where to act and how to act'. Most countries in the Region have well established national surveillance systems and participate in Regional and global surveillance networks, such as ReLAVRA+ (Latin American and Caribbean Network for Antimicrobial Resistance Surveillance) and GLASS (Global Antimicrobial Resistance Surveillance System). However, in too many situations, data are poorly documented; thus, there is a dire need to strengthen data collection systems so that the current understanding of this important threat can be improved (3).

The need to support low- and middle-income countries in conducting operational research around their own priorities gave rise to the Structured Operations Research and Training Initiative (SORT IT) (7). This is a global operational research partnership that is coordinated by the WHO Special Program for Research and Training in Tropical Diseases (TDR). The TDR aims to develop sustainable operational research capacity within each country and assists with evidence-based decision-making to improve program performance, to publish research, and to influence policies and/or practices (8).

1 Pan American Health Organization, Bogota, Colombia
2 Special Programme for Research and Training in Tropical Diseases-World Health Organization, Geneva, Switzerland
3 Pan American Health Organization, Washington, DC, United States of America. ✉ Freddy Pérez, perezf@paho.org
4 Federal University of Health Sciences of Porto Alegre, Porto Alegre, Brazil

Since 2019, with funding from the Department of Health and Social Welfare of the United Kingdom and Northern Ireland, SORT IT has supported operational research training for health professionals focused on tackling AMR. This program seeks to promote the use of AMR-related evidence to guide strategies for controlling this urgent public health threat. It also strengthens health care systems and improves policies and/or programs for preventing AMR emergence and spread. In Latin America, the operational research program was initiated in Colombia and Ecuador in 2020 (9).

The SORT IT duration is 12 months and covers four modules: module 1, protocol development; module 2, data capture and analysis; module 3, research paper writing and publication; and module 4, effective communication for research uptake. All modules have clear milestones and measurable targets. Research priorities are tailored to the national context and local needs and are aligned with the strategic pillars of the Global and National Action Plans on AMR of each country.

From July 2021 to September 2022, professionals in 12 national surveillance and research institutes in Colombia and Ecuador completed the four modules through the SORT IT virtual platform. Twelve operational research protocols were developed to address national program priorities and cover topics related to the five pillars of the national action plans in human, animal, and environmental health. The research studies covered a broad range of topics, including improvements to the quality of antibiotic consumption and AMR data; strengthening of the infection prevention control and AMR surveillance programs in health facilities; optimization of antimicrobials use; improving surveillance systems for AMR; understanding AMR patterns in human, animals, feed, and environment; and adhering to guidelines on antibiotics use in respiratory infections. The information collected will help to understand the AMR situation in the respective countries and inform the strategic pillars of action to tackle AMR from a One Health perspective.

Operational research studies, such as these conducted under SORT IT, provide a unique opportunity to close evidence gaps and incorporate scientific evidence into the AMR response at the local, national, and regional levels, while building capacity for the future with ownership of data collection, results, and actions. By training professionals embedded in the national programs and bridging the gap with decision makers, AMR-SORT IT intends to continue strengthening the AMR response across the Region and sharing lessons learned with other parts of the world (e.g., Africa and Asia) that are also implementing the AMR-SORT IT initiative.

This special issue of the *Pan American Journal of Public Health* is dedicated to operational research initiatives to strengthen evidence-based interventions to tackle AMR in the Region of the Americas. This is a joint effort among PAHO and the WHO TDR program and various SORT IT partners. This issue presents a select number of scientific studies conducted in Colombia and Ecuador and seeks to generate scientific evidence on relevant aspects of One Health. The findings of these studies have generated evidence that will strengthen AMR action plans in Colombia and Ecuador.

Disclaimer. Authors hold sole responsibility for the views expressed in the manuscript, which may not necessarily reflect the opinion or policy of the RPSP/PAJPH and/or the Pan American Health Organization (PAHO).

REFERENCES

1. Romero TG, Corso A, Pasterán F, Shal J, Sosa A, Pillonetto M, et al. Increased detection of carbapenemase-producing enterobacterales bacteria in Latin America and the Caribbean during the COVID-19 pandemic. Emerg Infect Dis. 2022;28(11):E1–8. doi: 10.3201/eid2811.220415.

2. World Health Organization, Food and Agriculture Organization, World Organization for Animal Health, UN Environment Program. Strategic framework for collaboration on antimicrobial resistance: together for One Health [Internet]. Geneva; 2022. [cited 2023 Mar 31]. Available from: https://www.who.int/publications/i/item/9789240045408

3. Antimicrobial Resistance Collaborators. Global burden of bacterial antimicrobial resistance in 2019: a systematic analysis [published correction appears in Lancet. 2022;400(10358):1102]. Lancet. 2022;399(10325):629-655. doi:10.1016/S0140-6736(21)02724-0.

4. World Health Organization, Food and Agriculture Organization, World Organization for Animal Health, United Nations Environment Program. One Health Joint Plan of Action (2022-2026). Working together for the humans, animals, plants and the environment [Internet]. WHO; 2022. [cited 2023 Mar 31] Available from: https://apps.who.int/iris/handle/10665/363518

5. World Health Organization. Global Action Plan on AMR [Internet]. WHO; 2016. [cited 2020 Oct 21]. Available from: http://www.who.int/antimicrobial-resistance/global-action-plan/en/

6. Van Katwyk SR, Hoffman SJ, Mendelson M, Taljaard M, Grimshaw JM. Strengthening the science of addressing antimicrobial resistance: a framework for planning, conducting and disseminating antimicrobial resistance intervention research Health Res Policy Syst. 2020;18(1):60. doi:10.1186/s12961-020-00549-1

7. United Nations Children's Fund, the United Nations Development Program, the World Bank, World Health Organization. Special Program for Research and Training in Tropical Diseases. SORT IT operational research and training [Internet]. 2021 [cited 2023 Mar 28]. Available from: https://tdr.who.int/activities/sort-it-operational-research-and-training

8. Zachariah R, Rust S, Dar Berger S, Guillerm N, Bissell K, Delaunois P, et al. Building global capacity for conducting operational research using the SORT IT model: where and who? PLoS ONE 11(8): e0160837. https://doi.org/10.1371/journal.pone.01608379.

9. World Health Organization/ Special Programme for Research and Training in Tropical Diseases. The Structured Operational Research and Training Initiative on tackling antimicrobial resistance in Africa, Asia and Latin America progress, achievements, challenges [Internet]. 2022. [cited 2023 Mar 31] Available from: https://tdr.who.int/publications/m/item/amr-sort-it-2022-annual-report