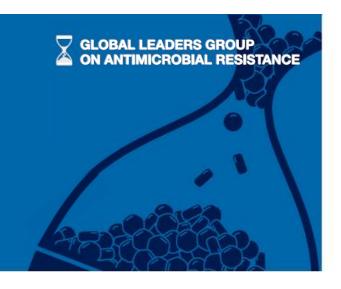# Summary Note
Global Leaders Group on AMR Information Session on AMR and the International Pathogen Surveillance Network (IPSN)

The Global Leaders Group on Antimicrobial Resistance hosted an information session with GLG members for cross-sectoral information exchange on enhancing genomic sequencing and analytics for One Health-based Integrated AMR surveillance.

30 August 2023

GLOBAL LEADERS GROUP ON ANTIMICROBIAL RESISTANCE

Background

Pathogen genomic surveillance is the monitoring and analysis of the genetic material (genome) of pathogens such as viruses, bacteria, fungi, and parasites. It involves the collection, sequencing, and analysis of genomic information of pathogens to understand their genetic makeup, evolution, and spread. Pathogen genomic surveillance became increasingly relevant during the COVID-19 pandemic to track and predict the evolution of the SARS-CoV-2 virus but can be used across diseases to prepare for future pandemics and inform public health outcomes. Genomic sequencing technology has evolved rapidly in recent years, allowing for lower cost and higher volume pathogen analysis. In 2022, WHO released a 10-year genomic surveillance strategy for pathogens with pandemic and epidemic potential that aims to strengthen this component of national and global surveillance systems.

As part of the work of the Global Leaders Group (GLG) Task Force on Integrated Surveillance facilitated by GLG member Prof Lothar Wieler, the GLG is engaging with stakeholders to discuss ways of applying genomic sequencing and analytics to One Health, integrated AMR surveillance and ensuring sustainable investment and technical support for cross-sectoral genomic surveillance of AMR - especially in low- and middle-income countries (LMICs) - including for the implementation of national AMR action plans. These discussions will inform future GLG engagement and advocacy in advance of the United Nations General Assembly high-level meeting on AMR in 2024.

This GLG information session aimed to provide cross-sectoral information exchange on enhancing genomic sequencing and analytics for One Health-integrated AMR surveillance. The 90-minute session was chaired by GLG member and Facilitator of the GLG Task Force on Integrated Surveillance Professor Lothar Wieler and attracted nearly 50 participants, comprising GLG members and their technical advisers and staff of the Quadripartite organizations.

Presentations

Dr Chinyere Okoro, on behalf of the Quadripartite Core Team on Integrated Surveillance, presented an overview of the Quadripartite organizations' work on AMR genomic surveillance across sectors. In the food and agriculture sectors, work under Objective 2 on surveillance in FAO's Action Plan on AMR 2021-2025 is progressively expanding to include genomic surveillance and analysis, including through support provided by the network of FAO Reference Centres on AMR. While surveillance of antimicrobial resistance and use in the environment sector is not fully developed, UNEP is currently developing its own AMR strategy based on its recent report *Bracing for Superbugs*, and its priority actions are in place, with the work on surveillance considered key, including the use of new technologies such as genomics. In the human health sector, WHO has developed guidance on whole-genome sequencing for surveillance of AMR that sets out the benefits and limitations of current technology for AMR surveillance, presents an analysis of the application of whole-genome sequencing to single bacterial pathogens for AMR surveillance, and outlines the requirements for building or upgrading laboratories at different levels of complexity. WHO has also developed a basic protocol on integrated and multisectoral global surveillance of ESBL E.*Coli* using a One Health approach (the "tricycle protocol"), and whole-genome sequencing is a component of WHO methodological principles of national AMR prevalence surveys. In the animal health sector, WOAH is working to incorporate genomics in its standards and manuals related to diagnostic testing and surveillance in terrestrial and aquatic animals and in the work of some WOAH Collaborating Centres. The four organizations are also jointly addressing the potential for incremental implementation of genomic surveillance as part of the recommendations that will be included in the Quadripartite Guide on Integrated Surveillance being developed by the Quadripartite Technical Group on Integrated Surveillance.

Dr Okoro described several common challenges across sectors in the adoption of genomic sequencing and analytics for One Health integrated surveillance, including data management and volume, data privacy and sharing, the need for specialized bioinformatics expertise and capacity, and cost and accessibility, especially in LMICs. Common opportunities presented by genomic surveillance across sectors include earlier detection and prevention of AMR emergence, the ability to track and source the spread of AMR within and between sectors, and more informed decision-making and policy decisions.

Dr Sara Hersey, Director of Collaborative Intelligence in the WHO Hub for Pandemic and Epidemic Intelligence, provided an overview of the International Pathogen Surveillance Network (IPSN). The IPSN evolved from the G7 call for a "pandemic radar" in the wake of COVID-19 and was established in 2021 to provide a collaboration platform for pathogen genomic actors - including government, academia, donors, the private sector and other organizations - to accelerate progress in pathogen genomics and improve public health decision-making. IPSN members share a commitment to international cooperation and equity in this field and have deep expertise in genomics data and technologies or scale-up of surveillance systems. By strengthening the pathogen genomic surveillance ecosystem, the IPSN aims to enable faster detection of new pathogens and enhanced tracking of the spread and evolution of diseases.

Dr Hersey noted that despite a surge in financing for and innovation in pathogen genomics, the technology is yet to be optimally deployed globally, country capacity in this area remains uneven and there are significant data-sharing challenges. The IPSN vision is for every country to have equitable access to sustained capacity for genomic sequencing as part of its public health surveillance system. The network provides communities of practice to solve common challenges (in areas such as data sharing, and environmental and vector surveillance) and a country scale-up accelerator to align efforts and enable South-South exchange. From 2023, it will provide around 10 small grants annually to support member projects. It is also developing global goods in the form of a country capacity framework, a global investment case and specific use cases for pathogen genomic surveillance.

Professor Jeremy Farrar, Chief Scientist at WHO, noted that as a result of increased attention during the COVID-19 pandemic, the world has a critical but possibly narrow window of opportunity to build less fragmented and more sustainable approaches to surveillance, including through the use of genomic sequencing technology. At the same time, traditional microbiology should continue to play an important role in surveillance. Above all, he emphasized the importance of linking surveillance to action through national and international public health organizations and to the daily work of disease prevention and response.

In his remarks, **Professor Lothar Wieler** also highlighted the critical importance of linking surveillance to action. He noted that because drug resistance is an issue that cuts across pathogens and sectors, AMR surveillance represents a key opportunity to address past fragmentation and overcome barriers between sectors and to develop more integrated, harmonized and "horizontal" surveillance approaches based on comparable types of data. However, he strongly emphasized that, even with advances in genomic sequencing, traditional diagnostics will continue to play a key role in surveillance and these approaches must be seen as complementary. He also noted that efforts to implement new surveillance technologies must be accompanied by a broad commitment to strengthening national public and veterinary health institutions and to fostering their scientific independence.

Conclusion

Participants agreed that genomics methods for AMR offer a unifying approach to address the fragmentation of surveillance data across sectors. Therefore, the GLG should advocate for the scale-up of genomic sequencing technology and highlight the important opportunities that it presents for more harmonized and integrated approaches to AMR surveillance across sectors. The costs of implementing new technologies in LMICs was also noted and requires utmost attention, as was the need to consider resource and other challenges specific to animal health and food systems. As the next steps, joint technical consultations with the Quadripartite and Collaborative Intelligence technical teams will follow to explore and leverage opportunities for capacity enhancement in genomic surveillance of AMR within and across sectors.