

Biobanks and Biological Collections: driving One Health by strengthening global networks, capacity, and research equity

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ABSTRACT

Biological collections, preserved in biobanks, are critical assets for advancing innovation, preparedness, and translation in both One Health and Global Health. These collections—which may include organisms, tissues, vectors, and other biological materials—serve as powerful sources of scientific data. They underpin the identification and monitoring of pathogens, characterization of hosts, vectors and reservoirs, and tracking of diseases that impact human, animal, and environmental health. As the interconnection between these health domains becomes increasingly evident, biobanks emerge as essential tools for applied research and the development of evidence-based policies. They support early outbreak detection, monitor antimicrobial resistance, uncover epidemiological patterns, and offer insights into the ecological dynamics shaping public health. In this context, biobanks are not merely repositories—they are strategic instruments for health surveillance, resilience, and security through a One Health lens.

Despite their value, low- and middle-income countries (LMICs)—where the burden of infectious diseases is highest—often face major barriers in biobank development. Challenges include limited infrastructure, insufficient regulation, and a shortage of trained personnel. These constraints underscore the pressing need for knowledge exchange, capacity building, and equitable partnerships in biobanking. Collaborative networks, particularly those linking lusophone countries, offer a powerful model. By fostering the exchange of biological materials, harmonizing protocols, and enabling trans-biobank research, these alliances strengthen local scientific ecosystems. They also support fair benefit sharing in accordance with national ethical and legal frameworks

Ultimately, these efforts advance scientific equity, promote sustainable research capacity, and drive global progress in tackling tropical and emerging health threats—laying the groundwork for a more interconnected, collaborative, and prepared global health community.

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