ONE HEALTH ATLAS

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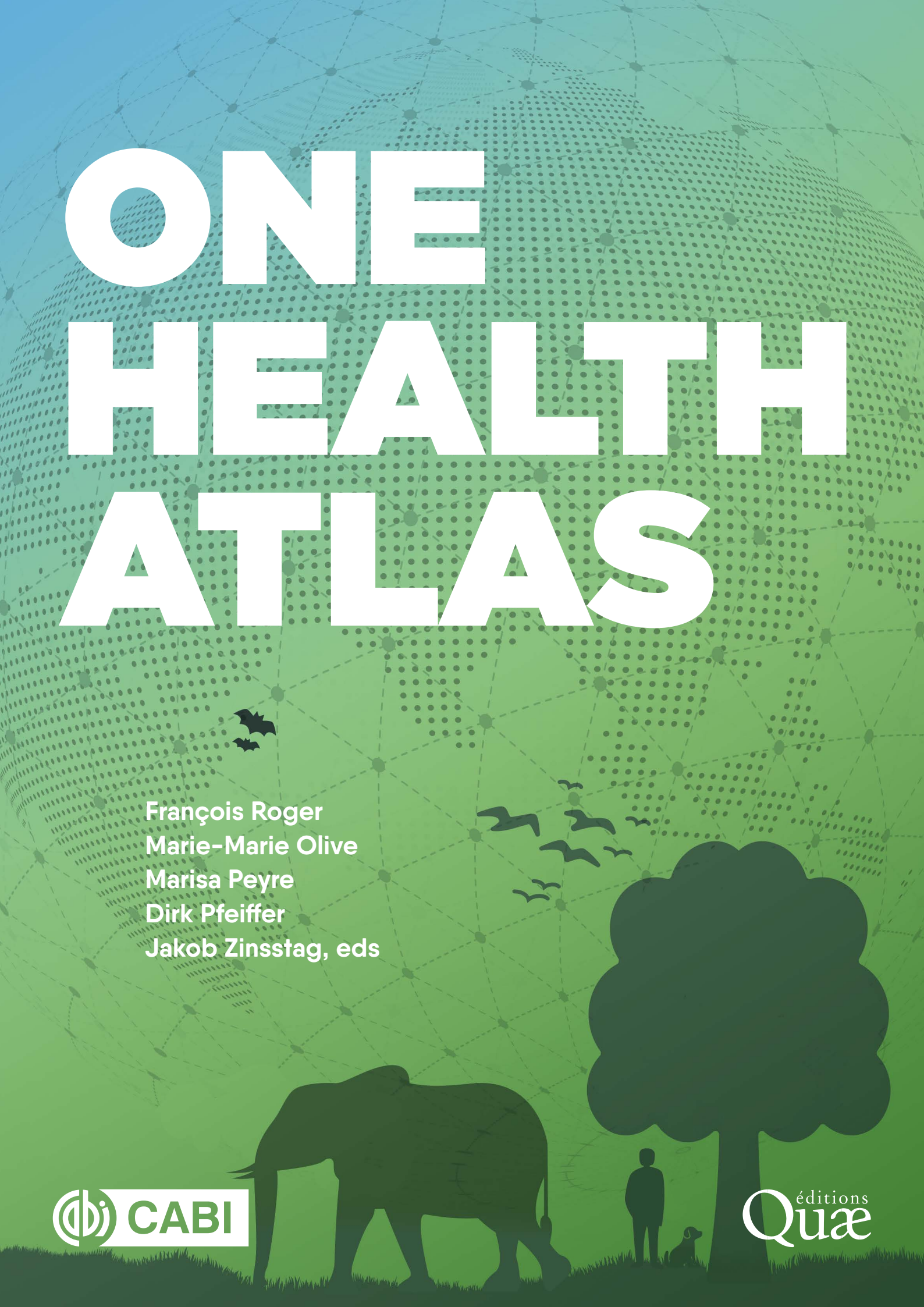

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Unveiling filovirus reservoirs in Africa and Asia: the necessary role of One Health

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Filoviruses, which include the Ebola and Marburg viruses, represent significant global public health challenges due to their high case fatality rates and potential to cause epidemics. Despite extensive research, their natural history remains poorly understood. Natural reservoirs for these viruses are elusive, although fruit bats are the primary suspects for virus maintenance. The ecological, socio-economic and environmental factors that drive spillover events—when these viruses are transmitted to humans—are still generally unclear (Figure 1).

Identifying the natural reservoirs of filoviruses is a multidimensional challenge. Suspected reservoirs like bats often harbour asymptomatic infections, complicating detection and understanding of viral maintenance mechanisms. While the Marburg virus has been isolated from *Rousettus aegyptiacus,* only fragments of Ebola virus genomes have been found in fruit bats, despite the analysis of hundreds of thousands of wildlife samples across Africa. Furthermore, African tropical rainforests, where these viruses are believed to circulate, host exceptional biodiversity, with many species potentially acting as reservoirs or vectors. Filoviruses likely circulate among multiple reservoirs and intermediary hosts, including bats, non-human primates and other terrestrial mammals. The genetic diversity of filoviruses also suggests that strains vary geographically, requiring context-specific surveillance in both Africa and Asia.

Spillover events are rare and intermittent, often occurring in remote areas with limited access to healthcare and research infrastructure, which hinders detailed investigations. These transmission dynamics are further exacerbated by socioecological factors such as habitat destruction and hunting, which amplify the risk of zoonotic transmission.

Identifying filovirus reservoirs remains critical for preventing and controlling these deadly diseases (Figure 2). The One Health approach offers an integrated and effective framework to address these challenges. This strategy emphasizes integrated surveillance, interdisciplinary collaboration among virologists, ecologists, epidemiologists and anthropologists, and community engagement to strengthen disease reporting and prevention. Advanced molecular research, including next-generation sequencing and artificial intelligence, can further aid in identifying reservoirs and intermediary hosts.

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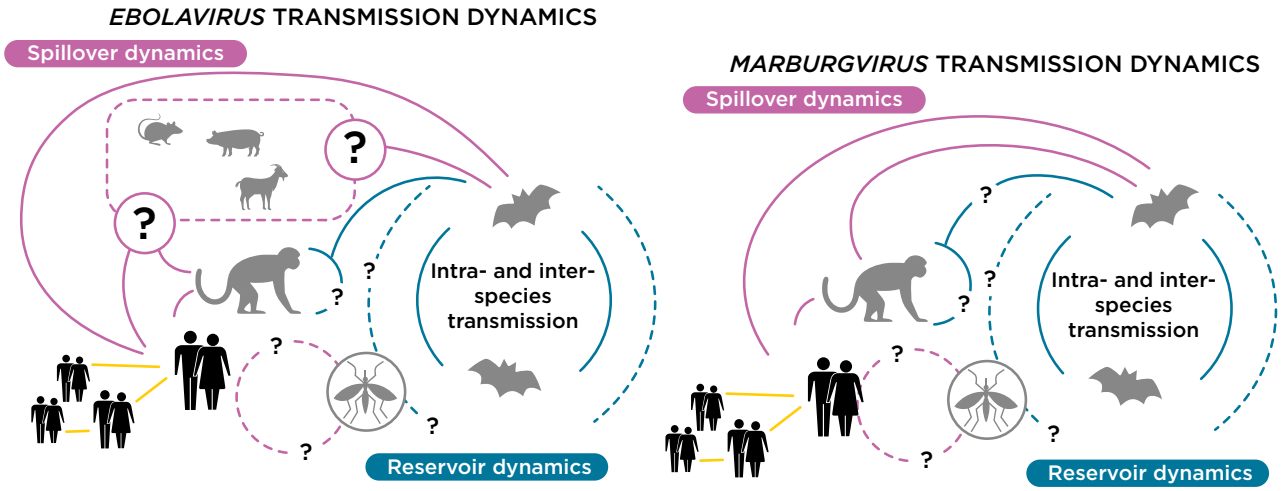

Figure 1. Diagrams depicting the hypothesized transmission cycle involving suspected reservoirs (e.g. fruit bats), incidental hosts (e.g. non-human primates), and humans. Source: Olivial and Hayman 2024.

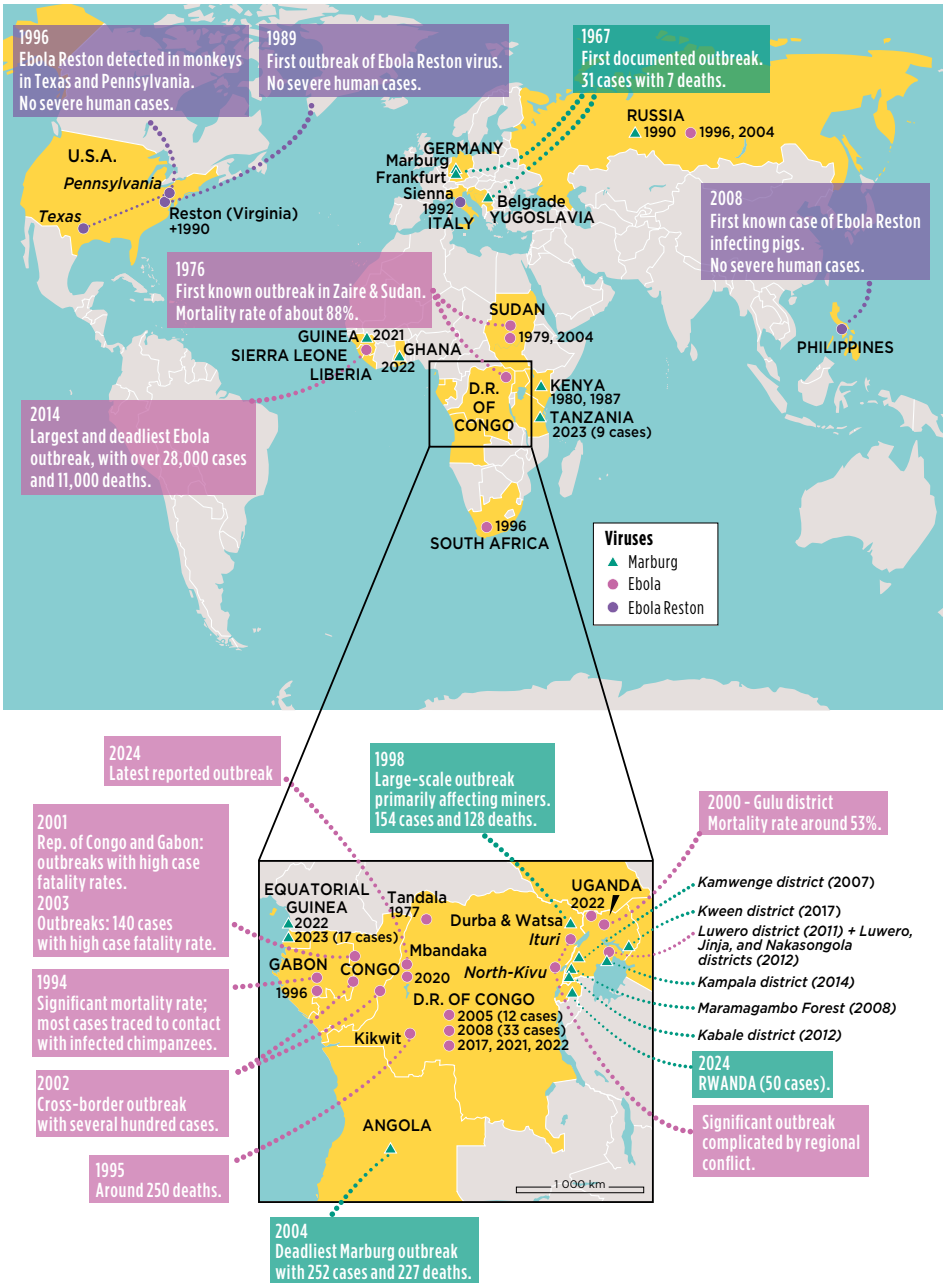

Figure 2. Geographical distribution of filovirus outbreaks and epidemics. Sources: CDC (https://www.cdc.gov/ebola/outbreaks/index.html) and WHO (https://www.who.int/emergencies/disease-outbreak-news).