

Decentralizing predictive epidemiology: From local practice to global foresight

The future of epidemic prediction will not be built from the top down. As threats grow more complex—driven by climate change, pathogen evolution, and political instability—centralized systems are proving brittle. A better model comes from biology: we do not have a central immune system. We rely on distributed sensing and response, with local action, feedback, and adaptation.

Recent work in West Africa shows how this logic can shape public health. By linking clinics, labs, and health agencies through real-time diagnostics, genomic surveillance, and shared data platforms, it is possible to detect weak signals early and respond before outbreaks escalate.

Over time, predictive epidemiology will become less about rare-event forecasting and more about enabling everyday foresight. That shift will require more than new tools, and in fact will demand new system architectures. These lessons are not limited to health. As we explore with fellow panelists, resilience in complex systems may depend not on central control, but on connected, responsive parts.