One Health, "Disease X" and the Challenge of "Unknown" Unknowns

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Potential Set of Pathogen X is Not Limitless

• ~25 families of viruses can potentially infect human beings
• Estimated 1.67 million unknown viruses
• Estimated 631,000 to 827,000 unknown viruses have the capacity to infect human beings

Likely Origin of Pathogen X is Zoonotic

• Between 1940 and 2004, 335 pathogens have emerged, with 60 per cent having a zoonotic source, of which 71 per cent originate from wildlife¹

• Pathogen X likely to emerge in tropical, LMIC settings, with high biodiversity, and experiencing anthropogenic land-use changes²

Which pathogens will spillover?

One Health as a Surveillance Approach

Cycle of surveillance, risk assessment and response

Surveillance Systems Should Leverage Multiple Sources of Information and Data

Adaptive Responses for Infectious Disease Outbreaks

Prevent Epidemics: https://preventepidemics.org/covid19/resources/playbook/
Strategic Action Areas for Responding to Disease X

- Regional and global cooperation/governance mechanisms
- One Health Preparedness for Disease X events
- Adaptive healthcare systems to respond to Disease X events
- Measure risks and predict occurrence of Disease X events
- Communication and countering misinformation
- Invest in priority R&D
- Predict the impacts of Disease X events
- Equity, Evidence-based, Ethics, Collaboration, Community-centered
Challenges and Opportunities

- Operationalizing and institutionalizing One Health
- Laboratory Capacity
- Identifying case clusters
- "Embedded" surveillance systems building on existing programs
- Data sharing – within and between countries
- Agile and responsive health systems

- Institutionalization of the Quadripartite
- Emergence of cheaper technological solutions for diagnostics
- Innovative surveillance mechanisms: Crowdsourcing, Digital tools, AI, NLP
- Increased visibility and acceptance of One Health for policymakers
- Linkages with existing programs
In Summary…

• The “unknown” set of pathogens from which Disease X can emerge is large, but limited
• The likely origin of Pathogen X is zoonotic
• Surveillance is key to monitor the emergence of Pathogen X at the human-animal-environment interfaces
• Strengthen global governance mechanisms to ensure adoption of preparedness plans based on the One Health approach
• Utilize ”inside the box” innovation, build on existing infrastructure and programs