A Multi-Sectoral One Health Approach to Biosurveillance and Epidemic Preparedness: a Singapore case study

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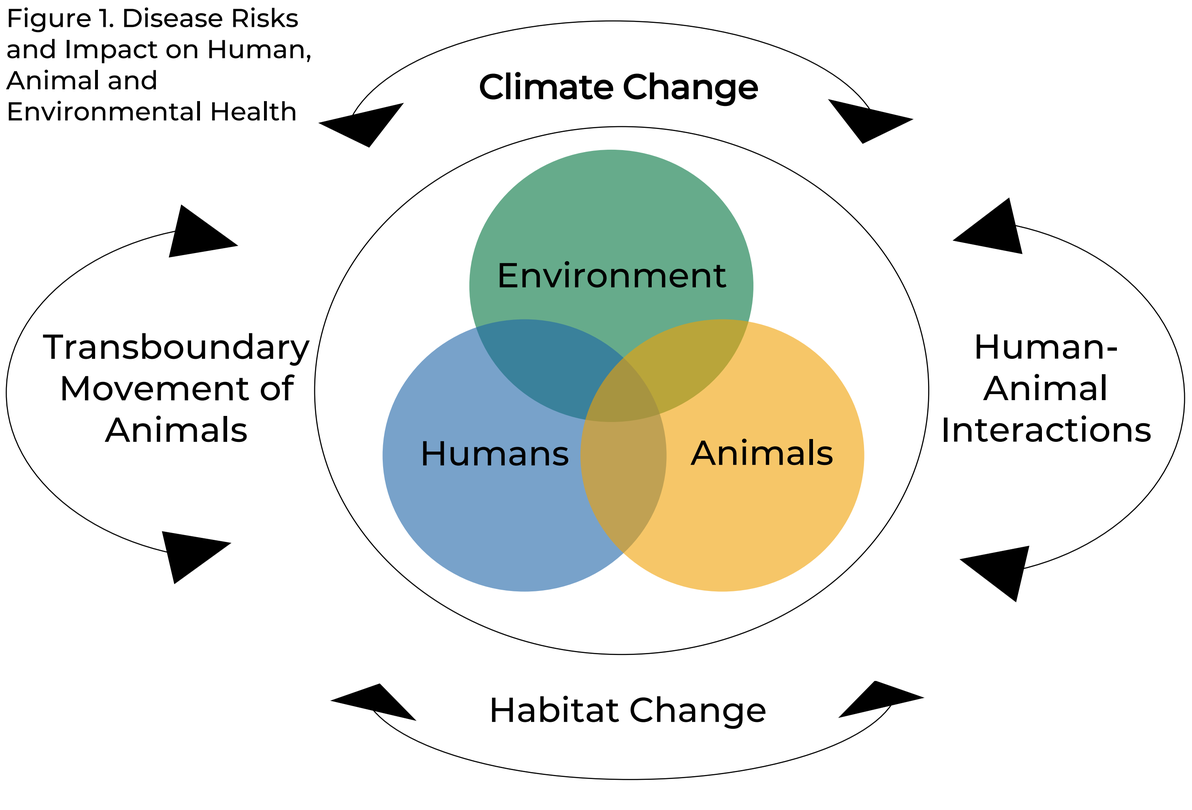
A Whole-of-Government (WOG) Biosurveillance Strategic Framework that encompasses public, animal/wildlife, environmental health, and food safety to address climate-sensitive disease threats.

Shared Disease Risks

Climate change has been identified as a major risk factor in accelerating disease emergence and spread, with impacts across human, animal, and environmental health.

Figure 1. Disease Risks and Impact on Human, Animal and Environmental Health



One Health Framework Singapore

Established in 2012, the One Health Framework serves as an important platform for multisectoral collaborative efforts to threats at the human-animal-environment interface. It has yielded positive outcomes since, including coordinated training for capability building, coordinated efforts to combat antimicrobial resistance, and development of joint protocols for zoonotic and foodborne disease outbreaks.

Opportunities for Singapore

Singapore's efforts above would benefit from a coordinated WOG framework to address remaining gaps and leverage on the following opportunities:

- Strengthen integration of One Health biosurveillance for cross-sectoral assessment of disease threats
- Galvanise scientific contributions and capabilities across academic, industry, and citizenry for biosurveillance
- Plug Singapore into regional and international networks for biosurveillance and forward defence

There is a need for integrated risk assessment using intelligence on climate and disease indicators from multiple sources for surveillance of climate-sensitive infectious diseases.

Strategic Thrusts of the WOG Biosurveillance Framework and Ongoing Collaborative Work

Scanning & Early Detection

Create a climate-informed early warning system for zoonotic and vector-borne disease threats

- Established the One Health Intelligence Team (OHIT) that will issue a quarterly joint horizon scanning and risk assessment report that will tackle globally emerging public health threats with a human-animal-environment interface and assess its impact to Singapore

Host & Vector Management

Strengthen vector control and disease management plans as part of climate adaptation

- Pathogen-vector ecology studies on vectors and diseases to improve knowledge and understanding of interactions between pathogens, vectors, hosts and the environment e.g. In a collaborative study on African Horse Sickness (AHS), more than 20 species of *Culicoides* were detected for the first time

Interagency Information Integration

Establish an integrated monitoring disease system through critical data system enhancements

- Development of a One Health data platform and process for joint risk assessments and analyses

Science & Technology

Increase the scale and quality of laboratory output

- Implementation of a holistic sampling approach (incl. developing genomics and environmental based sampling technology)

With a One Health approach to biosurveillance and epidemic preparedness, the framework will guide ecologically informed interventions for the natural and urban environment, to mitigate public health impact from risk hotspots in conjunction with climatic and social risk factors.

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