Royal Society of Canada

H5N1: Evolving Situation, Evolving Research

June 19, 2023, Canadian Museum of Nature, Ottawa, Ontario

Proceedings

Executive Summary

In June 2023, an inter-sectoral meeting was convened by the Royal Society of Canada in partnership with the Public Health Agency of Canada, the Canadian Food Inspection Agency, the National Research Council and the Canadian Institutes of Health Research at the Canadian Museum of Nature in Ottawa. This meeting was opened by Dr. Theresa Tam, Canada's Chief Public Health Officer, and closed by Dr. Mary-Jane Ireland, Chief Veterinary Officer of Canada. Over the course of the day, participants aimed to:

1. Consolidate the current state of science, knowledge, and action related to the response to highly pathogenic avian influenza A (HPAI) H5Nx virus in avian, wildlife, and domestic animal populations, and implications for prevention and preparedness for human health;
2. Discuss and identify science and research knowledge gaps and priorities for HPAI which can be addressed across disciplines and sectors;
3. Fully integrate and operationalize a One Health perspective into research planning for an emerging health threat.

An opening panel presentation addressed key questions on lessons from past spillover events from previous influenza virus pandemics and the key research challenges and gaps in science, risk reduction, and to enable the greatest connectivity across surveillance, science, policy, and practice. This was followed by group discussions to identify knowledge, capacity, and implementation gaps for research, and describe how to integrate One Health in the prevention and response to HPAI. Topic areas included:

- Diagnostics, surveillance, disease control and population health
- Assessing the risks related to H5Nx reassortants
- Pharmaceutical interventions
- Health intelligence and social sciences

A thematic analysis based on proceedings' notes was also done and in conjunction with the proceedings, the following key themes emerged:

1. <u>Research knowledge gaps</u>

Participants acknowledged that current research structures do not support, far less incentivize, multidisciplinary approaches, leading to weakened efforts to build a robust One Health framework to tackle HPAI, including effective scientific collaboration and coordination among various agencies and academics, and communication and data sharing strategies. Persistent gaps include lack of Canada's preparedness and capacity, particularly around containment level 3 (CL3) capabilities for HPAI work in Canada.

2. <u>Surveillance</u>

Participants discussed current surveillance programs and expressed the need for capacity building and tools to ensure robust surveillance. Participants provided background and context about Canada's efforts to improve avian and mammalian wildlife surveillance. Capabilities have waxed and waned as a function

of fiscal and technical (e.g. diagnostic) limitations. While surveillance programs have been considered a priority for wild birds, a formal surveillance program for wild and domestic mammals is lacking. Participants underscored the need to link resources and data sharing across disciplines and sectors to consider both domestic and wild species as well as humans.

3. Interspecies transmission

Participants were keen to understand factors operating at the human-animal interface and which promote interspecies transmission. These questions draw attention to the considerable complexity of interspecies transmission while focusing on potential intervention points in human-animal systems. Potential interventions necessitate effective communication and coordination between partners in human health, wildlife and agricultural sectors in a sustainable fashion.

4. Collaboration

Cross-disciplinary collaboration was seen as critical to integrating One Health approaches into HPAI decision making. While the importance of the federal, provincial, and territorial agencies was acknowledged, connections with rural and Indigenous communities must be sought in a more meaningful way towards prevention, preparedness and response to public health emergencies. The benefits of collaborations between intra- and extramural scientists was also underscored. These collaborations would help build the trust that is currently lacking in terms of key communication, scientific collaboration, and data sharing strategies.

5. One Health

Integrating One Health principles and research in combating HPAI challenges was a prominent theme at the workshop, and second only to research gaps. Participants observed governance, policy, and decision making, and fiscal constraints as fundamental issues hindering implementation. A key takeaway point was the need to strengthen inter-sectoral and multi-disciplinary approaches that include resources and knowledge brokering between government agencies and academics as well as a bi-directional partnerships with Indigenous communities.

6. Countermeasures

Both medical countermeasures such as antivirals and vaccines and public health measures for prevention were underscored throughout the meeting. Stockpiling and gaps in biomanufacturing of materials was discussed. Gaps in capacity around research and development for countermeasures, partially driven by limited access to CL3 facilities, and limited understanding of the underlying biology of host-virus interactions and immunity were noted.

In summary

Overall, there was consensus that a One Health approach is integral to addressing gaps in prevention, risk reduction, and science around HPAI. Robust cross-sectoral connectivity is essential for health intelligence,

policy, and research. Cohesive efforts to dismantle barriers to capacity-building, enhance inter-sectoral communication and data sharing, and build research collaborations are warranted.