How to implement collaborative wildlife surveillance

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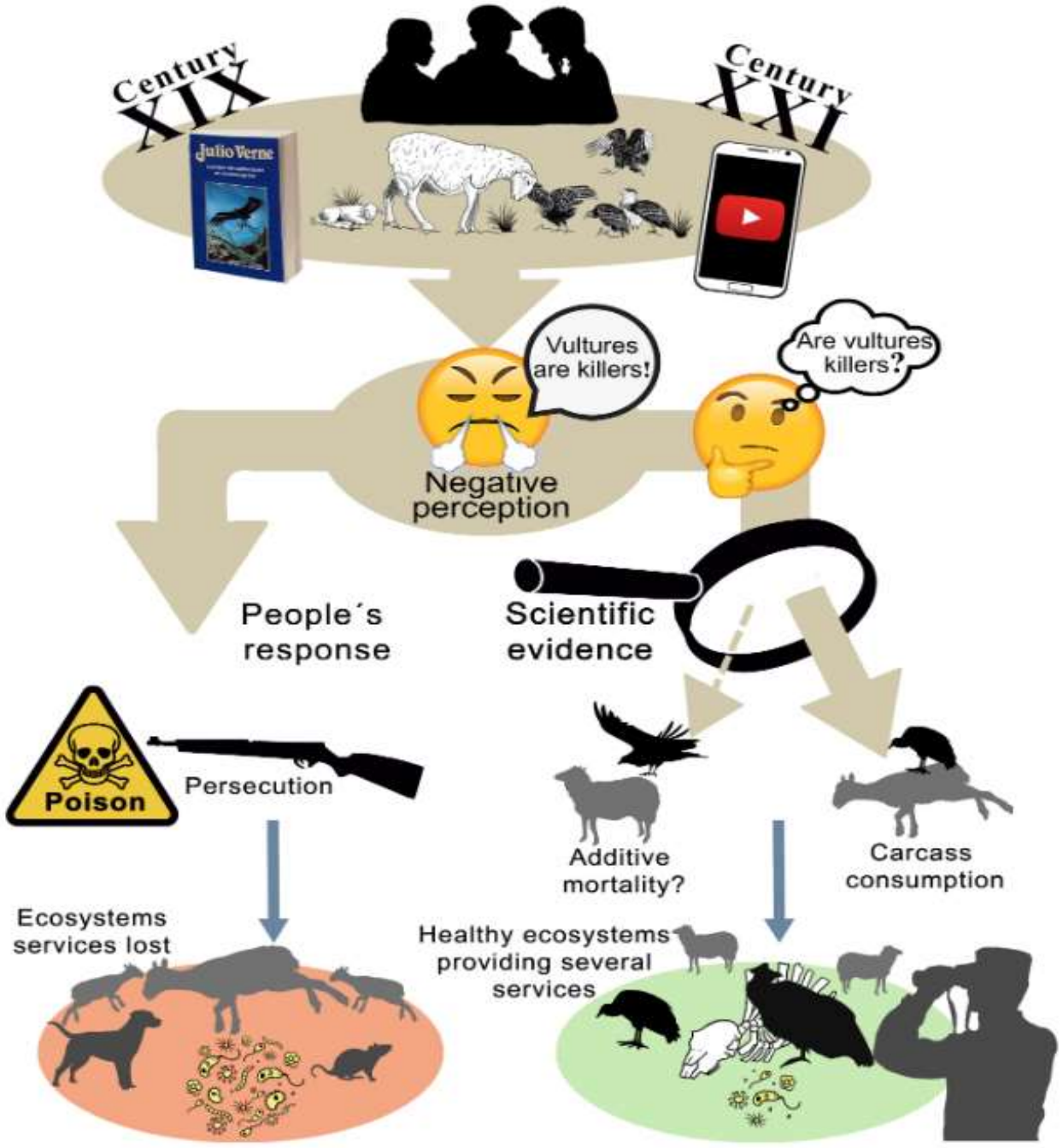
Wildlife health

- Wildlife health is important for conservation, healthy ecosystems, sustainable development and biosecurity

- Wildlife health programs
  - can help countries meet international agreements and obligations
  - are an essential defense against biodiversity loss and trade restrictions

Stephen, Sleeman, et al. 2018. Proposed attributes of national wildlife health programmes. Rev. Sci. Tech. Off. Int. Epiz., 37 (3), 925-936.



Acknowledging the value of wildlife

Wild birds

- ecosystem services: pollination, seed dispersal, fertilizer, pest control, scavenging, disease reduction
- direct monetary value: tourism, bird watching, hunting; fertilizer; regulated and sustainable trade

Lambertucci, et al. Presumed killers? Vultures, stakeholders, misperceptions, and fake news. *Conservation Science and Practice*. 2021; 3:e415. https://doi.org/10.1111/csp2.415

Public and domestic animal health implications of wildlife loss

- Asia declines 97% vulture populations
  - increase in feral dog population of at least 5.5 million.
  - resulted in over 38.5 million additional dog bites and more than 47,300 extra human deaths from rabies.
  - increased number of rabies victims cost the Indian economy $34 billion.

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OIE WILDLIFE HEALTH FRAMEWORK
'PROTECTING WILDLIFE HEALTH TO ACHIEVE ONE HEALTH'

- Objectives:
  - to manage the risk of disease emergence at the human-animal-ecosystems interface,
  - to protect wildlife health.
- In the context of disease emergence, **wildlife** is often seen as a threat, but it **is a vital resource, providing essential ecosystems services and a source of biodiversity.**
- Wildlife is also at risk from disease emergence. **Managing the risk of disease emergence and protecting wildlife health should be complementary**.

Why enhance surveillance efforts

- Data gaps
  - inconsistent sampling across space and time (often only during crisis)
- Cost effectiveness
- Situational awareness
- Decisions on income generating activities such as hunting, ecotourism, etc.
- Potential mitigation interventions
- Baseline to assess efficacy of interventions
- Assessment of impact on wildlife populations

Collaborative wildlife disease surveillance

- Wildlife surveillance requires collaboration
  - Collaboration is built on joint expert capacities and trust
  - Operating under enabling and safe conditions
- Wildlife Health Australia model
  - WHA is a public-private partnership built on One Health principles, to assist as a “trusted broker”*

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Guidelines for Wildlife Disease Surveillance: An Overview[1]

*Woods, R.; et al. The Importance of Wildlife Disease Monitoring as Part of Global Surveillance for Zoonotic Diseases: The Role of Australia. Trop. Med. Infect. Dis. 2019, 4, 29. https://doi.org/10.3390/tropicalmed4010029

One Health surveillance scheme

Private sector

- Academia
  - Diagnostics, outbreak investigation, species identification, strain characterization, innovation, technological advance, expert advise (e.g. surveillance sites, methods)
- NGO and civil society orgs
  - Detection, sample collection, species identification, species movement/flyways, impact assessment, expert advise (e.g. surveillance sites, public outreach)
- Public
  - Detection, risk mitigation (if informed)

Public sector

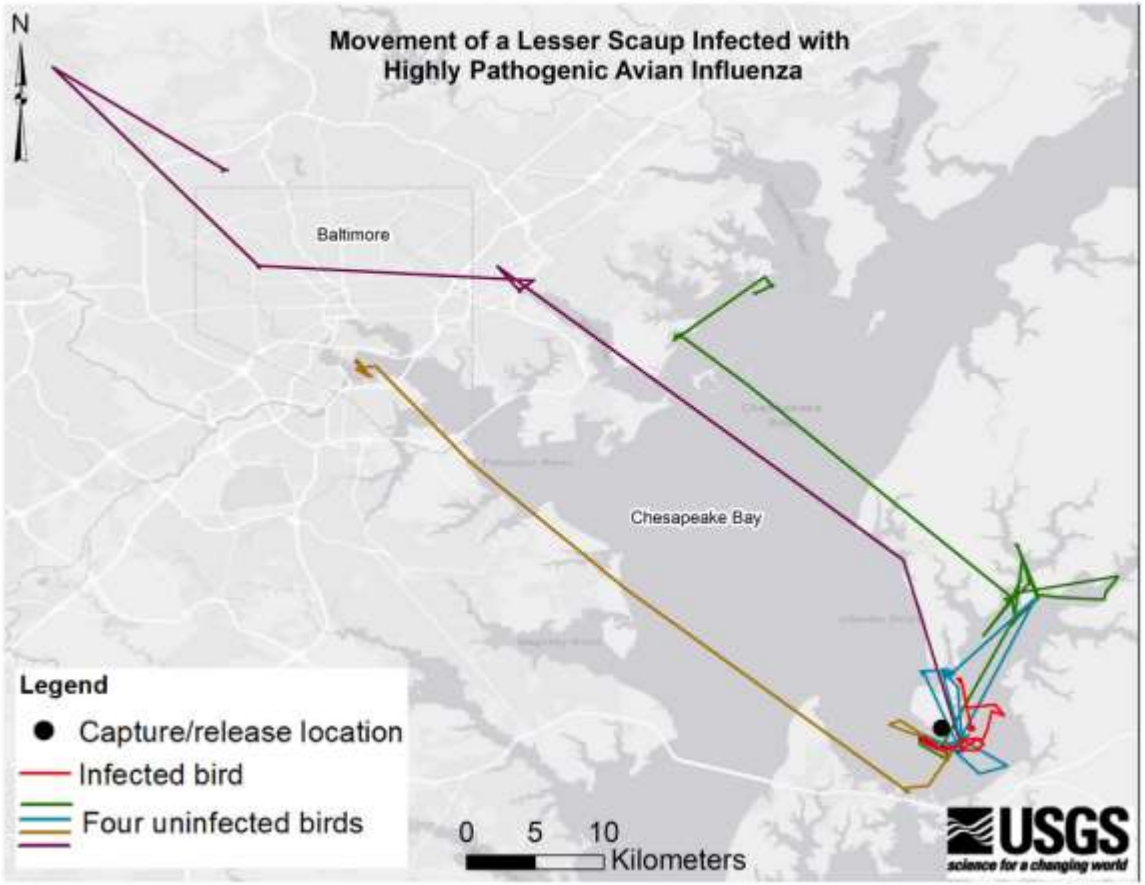
- Animal health services
  - Diagnostics, risk assessment and mitigation, outbreak control, policy, data repository
- Public health services
  - Diagnostics, human case follow up, risk assessment mutations, data repository
- Wildlife/environment/parks services
  - Surveillance and early detection, sample collection, species identification, risk reduction, public outreach
- Government research agencies
  - Surveillance, sample collection, diagnostic development, diagnostics, data management systems, technological advances, innovation

Value of HPAI H5N1 surveillance in Wildlife

- Early detection of disease
- Early detection of movement and spread
- Understanding disease ecology and epidemiology: species involved in transmission and spread, viral evolution, species affected
- All above needed for risk management and adapting mitigation and control actions to new characteristics of disease
- Understanding pathogenesis: clinical signs, pathological effects, case definition
- Directs diagnostic sample collection and improves testing efficiency and efficacy
- Characterization of strains
- Early detection of mutations – especially adaptation to mammals/humans
- Inform global public health risk
- Share and communicate data, nationally and internationally in a timely manner

Movement of a Lesser Scaup Infected with Highly Pathogenic Avian Influenza

By Communications and Publishing JANUARY 26, 2022



Received: 6 April 2022 | Revised: 27 May 2022 | Accepted: 2 June 2022

DOI: 10.1111/tbed.14614

Transboundary and Emerging Diseases WILEY

ORIGINAL ARTICLE

A lesser scaup (*Aythya affinis*) naturally infected with Eurasian 2.3.4.4 highly pathogenic H5N1 avian influenza virus: Movement ecology and host factors

Diann J. Prosser[1] | Hannah L. Schley[2] | Nathan Simmons[3] | Jeffery D. Sullivan[1] | Josh Homyack[3] | Matthew Weegman[4] | Glenn H. Olsen[1] | Alicia M. Berlin[1] | Rebecca L. Poulson[5] | David E. Stallknecht[5] | Christopher K. Williams[2]

https://www.usgs.gov/news/national-news-release/first-study-track-wild-bird-known-have-highly-pathogenic-avian-0

pathogens

MDPI

Article

Environmental Samples Test Negative for Avian Influenza Virus H5N1 Four Months after Mass Mortality at A Seabird Colony

Robert W. Furness [1,2,*], Sheila C. Gear [3], Kees C. J. Camphuysen [4], Glen Tyler [5], Dilhani de Silva [6], Caroline J. Warren [6], Joe James [6], Scott M. Reid [6] and Ashley C. Banyard [6,*]

Cold Spring Harbor Laboratory

bioRxiv

THE PREPRINT SERVER FOR BIOLOGY

Intercontinental Movement of Highly Pathogenic Avian Influenza A(H5N1) Clade 2.3.4.4 Virus to the United States, 2021

Sarah N. Bevins,[1] Susan A. Shriner,[1] James C. Cumbee Jr, Krista E. Dilione, Kelly E. Douglass, Jeremy W. Ellis, Mary Lea Killian, Mia K. Torchetti, Julianna B. Lenoch

New Results

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Highly pathogenic avian influenza A (H5N1) in marine mammals and seabirds in Peru

Mariana Leguia, Alejandra Garcia-Glaessner, Breno Muñoz-Saavedra, Diana Juarez, Patricia Barrera, Carlos Calvo-Mac, Javier Jara, Walter Silva, Karl Ploog, Lady Amaro, Paulo Colchao-Claux, Marcela M. Uhart, Martha I. Nelson, Jesus Lescano

doi: https://doi.org/10.1101/2023.03.03.531008

RAPID COMMUNICATION

Highly pathogenic avian influenza A(H5N1) virus infection in farmed minks, Spain, October 2022

Montserrat Agüero[1,*], Isabella Monne[2,*] O, Azucena Sánchez[1], Bianca Zecchin[2], Alice Fusaro[2], María José Ruano[1], Manuel del Valle Arrojo[3], Ricardo Fernández-Antonio[4], Antonio Manuel Souto[5], Pedro Tordable[5], Julio Cañás[5], Francesco Bonfante[2], Edoardo Giussani[2], Calogero Terregino[2], Jesús Javier Orejas[6]

Relevant details for HPAI H5N1 wildlife surveillance

- Paradigm changing virus
- Case definition
- Sample target – animals (when, species, numbers)
- Environmental sampling
- Sampling sites – risk based, hotspots
- Species identification & age (photodocumentation)
- Sample type –animals (e.g. CNS for current virus)
- Safe sample collection live animals – e.g. animal handling/human euthanasia clinical cases
- Safe sample collection – e.g. lysis buffer to inactivate virus
- Cold chain
- Safe & proper carcass disposal –e.g. burial at site
- PPE
- Standardization


THANK YOU