The spread of highly pathogenic avian influenza in wild birds

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Is this a **new era** for bird flu?

Yes, this is the biggest wildlife outbreak to date!
Increasing size & frequency of H5 outbreaks

Ramey et al., 2022. *J. Wildl Management*
Why did H5N1 spread to North America only recently?

Epicenter of the virus expanded
Epicenter expanded from Asia into Europe

~10 years in the making!

Xie et al., *Pre-print*. “The Episodic Resurgence of HPAI H5 Virus.”
Europe: jumping-off point for trans-Atlantic spread

First cases in Canada: Nov 2021

Gass et al. 2023, Molecular Ecology
Wild bird infections across all US states

First cases in US: Jan 2022

APHIS USDA, 2023
Do wild birds contribute to spread differently?

Yes!
Ducks

...this strain is well-adapted to spread in waterfowl
Steady host range expansion in US wild birds

Over 150 of ~1,000 bird species in US have been infected with HPAI H5N1

Monthly cumulative totals (pink bars) indicate rapid host range expansion

APHIS USDA, 2022-2023. Wild bird detections
What is the risk of spillover to wild mammals?

Species that eat or swim with birds are at highest risk
Mammals that eat birds: linked to infections

Foxes account for half of mammalian infections

Primary producers
- phytoplankton
- aquatic plants
- land plants

Primary consumers
- fish

Secondary consumers
- gulls, terns

Tertiary consumers
- seals, dolphins
- osprey
- eagles, hawks
- foxes, coyotes

APHIS USDA, 2022-2023. Mammal detections
Mammals that swim with birds: linked to infections

seal, dolphin & sea lion die-offs likely due to water-borne transmission

Puryear et al., 2023, *Emerging Infectious Diseases*
Thanks for tuning in!