Avian influenza

Allen Cheng
Professor of Infectious Diseases, Monash University
Program Director, Medical Specialties, Monash Health

Monash Health


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Global situation

- H5N1 widespread since 1997
  - Hong Kong outbreak – 18 human cases, 6 deaths
  - Since 2003, 1000 cases, 47% mortality

- Clade 2.3.4.4b current strain of interest
  - Wild birds, poultry, mammals (incl marine mammals)
  - US dairy herds – 15 states, >500 herds affected

Avian influenza in Australia

- First detection in migratory seabirds in June 2026
- Likely from sub-Antarctic islands
- Widespread detections of 2.3.4.4b in Australia
  - 6 jurisdictions
  - N>500 positive events
  - One confirmed mass mortality event but several others likely
  - Cases in marine mammals reported
  - No known involvement of poultry

Avian influenza in humans

- United States - 71 human cases in US
  - 41 cattle exposure
  - 24 poultry exposure
  - 3 other animal exposure
  - 3 no known source
  - Severe cases associated with D1.1 clade (vs more common B3.13 clade)

- Australia
  - Single case of H5N1 2.3.2.1a (child in ICU; acquired in India)
  - No reported cases of 2.3.4.4b cases
  - Animal cases in Australia B3.2 clade (South America/Antarctic)

Epidemiological characteristics

- **Route of transmission** - inhalation, environmental contact (exposure to contaminated milking equipment), ingestion (uncooked poultry products, raw milk)
- **Incubation period** longer than seasonal influenza A - 5 days (range 1-10 days); one outlier at 17 days
- **Infectious period** - difficult to know as not very transmissible. Detectable virus up to 2-3 weeks, longest 27 days

ORIGINAL ARTICLE

Highly Pathogenic Avian Influenza A(H5N1) Virus Infections in Humans

Authors: Shikha Garg, M.D., Katie Reinhart, Ph.D., Alexia Couture, M.P.H., Krista Kniss, M.P.H., C. Todd Davis, Ph.D., Marie K. Kirby, Ph.D., Erin L. Murray, Ph.D., +26 , and Sonja J. Olsen, Ph.D. Author Info & Affiliations

Published December 31, 2024 | N Engl J Med 2025;392:843-854 | DOI: 10.1056/NEJMoa2414610

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- N=46 – 20 exposed to poultry, 25 to dairy cows
- All had mild illness
  - Conjunctivitis 93% (with resp Sx 31%)
  - Fever 46%
  - Respiratory symptoms 36%
  - Myalgia 42%

Clinical profile

- North America
  - Most B3.13
  - D1.1 clade (n=4, single event, poultry) – severe cases reported. May be better adapted to human respiratory tract

- South American-Australian clade
  - B3.2 – currently, no features of mammalian adaptation

Diagnosis

- *In silico* studies – primers for influenza PCR should detect HPAI
- Eye, upper, lower respiratory tract
- Principles
  - Negative flu PCR excludes avian influenza.
  - If positive PCR and avian flu suspected, call LPHU to authorise further typing
  - Samples in high risk contacts will be managed in consultation with LPHU. Repeat swab if high clinical suspicion

Clinical approach

- Many guidelines written in context of H5N1, rather than 2.3.4.4b specifically
- Antiviral PEP?
  - Severely immunosuppressed
  - High risk, esp if limited access to care
- Antiviral treatment?
  - Within 48 hours of onset
  - Recommend against for critically ill patients

- Mental health and other impact

Public health response

- Australian CDC priorities
  - Public health advice, risk assessment, comms;
  - Support OneHealth response,
  - Maintain preparedness, guidelines

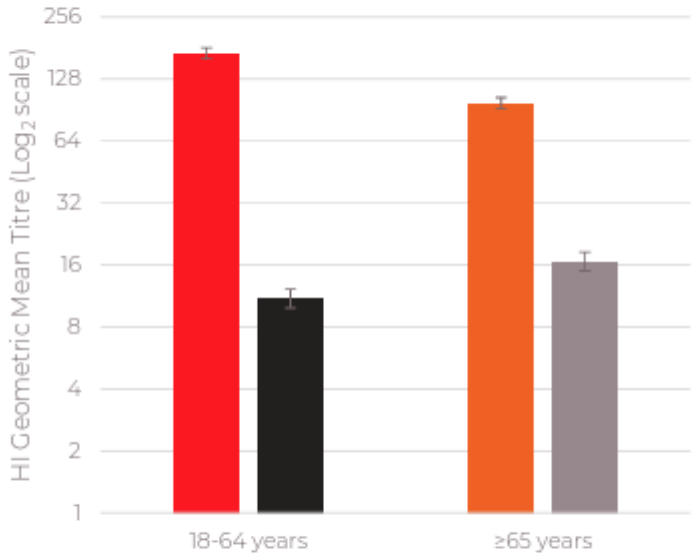
- Activities
  - Surveillance, incl wastewater surveillance
  - Lab readiness
  - Risk assessment, stakeholder engagement.
  - Public health guidelines and comms - SoNG under review. AHMPPI scoping.

Vaccines

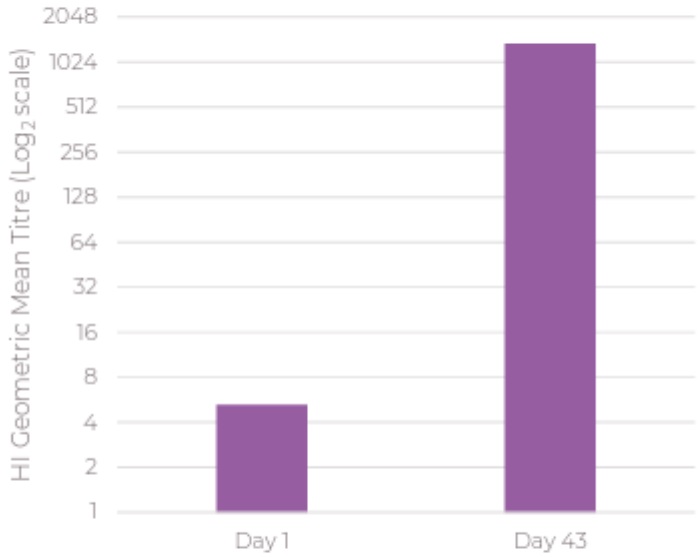
- TGA regulatory status Pandemic vs pre-pandemic vaccines
- Types
  - Cell based (eg Seqirus – adjuvanted Celldemic/Audenz)
  - *mRNA pandemic vaccine (eg Moderna mRNA-1018)*
  - *Pandemic LAIV (AstraZeneca)*
- Strains
  - Various older strains – turkey/Turkey, A/Vietnam/1194/2004
  - 2.3.4.4b – Astrakhan, American Wigeon
  - CVVs maintained for other AI strains
- Clinical experience limited – adjuvanted in Finland

aH5N1c is immunogenic in adults, older adults and children ≥6 months of age[1-3]

HI GMT Day 43: ≥18 years old



HI GMT: 6 months to 17 years old



Haemagglutination Inhibition Results	18-64 years Vaccine	18-64 years Placebo	≥65 years Vaccine	≥65 years Placebo	6 mo - 17 years Vaccine
Day 43/ Day 1 GMR [95%CI]	**12.7** [11.94, 13.51]	**0.82** [0.73, 0.91]	**4.9** [4.61, 5.2]	**0.83** [0.75,0.92]	**262** [190, 361]
Day 43 Seroconversion, % [95% CI]	**79.9** [77.4, 82.3]	**0.3** [0, 1.6]	**54** [51, 57]	**1.7** [0.6, 3.7]	**96** [93, 98]
Day 43 HI ≥1:40, %	**95**	**8.5**	**85.7**	**20.8**	**96**

aH5N1c, adjuvanted A/H5N1 cell culture-derived influenza vaccine; CBER, Center for Biologics Evaluation and Research; CHMP, Committee for Medicinal Products for Human Use; CI, confidence interval; GMR, geometric mean ratio; HI, hemagglutination inhibition.

1. Versage E, et al. Vaccines (Basel). 2021;9:1468.. 2. Chanthavanich, P. et al. Pediatr Infect Dis J 38, 757–764 (2019). 3. Peterson, J. *et al.* Nato Adv Sci Inst Se 10, 497 (2022).

CSL Seqirus

Slide courtesy of Jules Bayliss, Seqirus

Summary

- H5N1 historically associated with high severity but 2.3.4.4b mostly mild
- Widespread detections in Australia
- Different clinical profile to seasonal influenza – esp conjunctivitis
- Oseltamivir prophylaxis and treatment should be effective (but recommend against use in late/severe infection)
- Pandemic vaccines exist but not yet being deployed
- Public health guidelines being updated