

Under the influence

Highly pathogenic avian influenza Equine influenza in dogs

WVMA Winter meeting
Casper Dec 2 2005

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Wyovet

Wyoming Animal Health and Disease Information Network

Disease updates and alerts

Other sources:

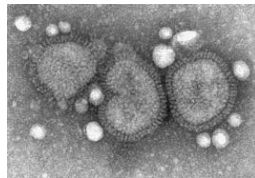
- CDC
- USDA
- National Wildlife Health Center
- Southeastern Cooperative Wildlife Disease Study
- OIE
- WHO

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Influenza viruses

- Influenza – ‘*influence*’ ‘*visitation*’
- Orthomyxovirus types:
 - A – viruses of veterinary importance
 - B – mostly human
 - C – mostly human



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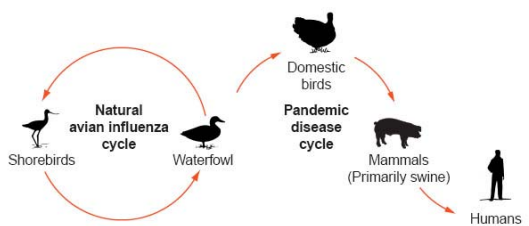
Type A influenza viruses

- Domestic chickens and turkeys
- Waterfowl and shore birds
- Horses
- Pigs
- Ferrets
- Whales
- Seals

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Natural and pandemic cycles of avian influenza virus



Field Manual of Wildlife Diseases: Birds

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Properties of virus

- Enveloped = wimpy
- Inactivation:
 - 56°C for 3 H, 60°C for 30 min, 70°C for 1 min
 - Soap
 - Alcohol, bleach, formalin, iodine compounds.
 - Recommended: **5% bleach solution**
- Recovery = good immunity TO THAT STRAIN

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A confusion of NAMES

1. By hemagglutinin (H) and neuraminidase (N) variance
E.g., Equine influenza in dogs = H3N8
Highly pathogenic avian influenza = H5 and H7
2. By type/host/location/ref number/year
E.g., A/chicken/Hong Kong/258/97 (H5N1)

High pathogenic vs. low pathogenic strains
HPAI vs LPAI
But LPAI → HPAI

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A confusion of RNA

Influenza viruses readily undergo genetic change

- Segmented genome – reassortment with other influenza strains
- RNA virus – much more likely to undergo mutation

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Conditions for 1918-type pandemic

- ✓ Naïve human population
- ✓ Ability to infect people with resultant high mortality
- ✗ Person → person

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Avian influenza in poultry, waterfowl and pet birds

Subtypes H5 and H7

- Free-ranging waterfowl and shorebirds: typically minimally pathogenic
- Domestic poultry (turkeys and chickens): wide spectrum of clinical disease
- Pet birds: depends on strain
- Some replicate in pigs - generally no disease

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HPAI in USA

- 1924-1925
- 1929
- 1983-1984 - \$70M
- 2004

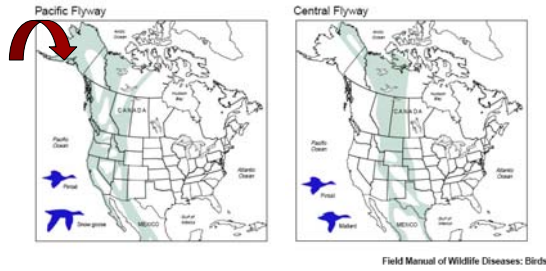
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How might it get here?



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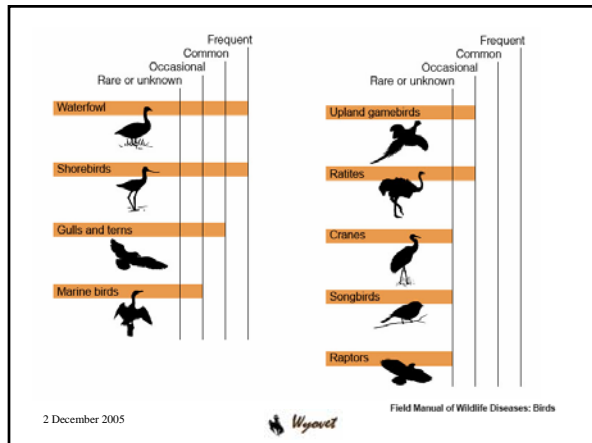


If asked to handle SICK domestic or wild birds and you suspect HPAI

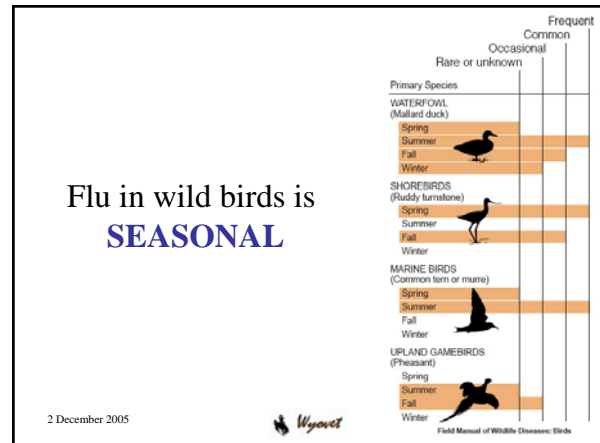
PROTECT YOURSELF

- Coveralls, rubber boots, latex or rubber gloves that can be disinfected or disposed
- Protective eyewear (goggles)
- Particulate surgical mask (NIOSH N95 respirator/mask preferable)

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Suspect avian influenza when

- Large, unexpected mortality
- Swollen combs and wattles
- Hemorrhages in skin of hocks
- Usual nondescript signs that occurs in all birds regardless of disease:
 - Respiratory distress
 - Ruffled feathers, listlessness, egg drop, etc etc ect

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Lesions at necropsy

- Hemorrhages in multiple organs
- Multifocal necrosis in liver, lungs, spleen and kidneys
- Some strains transmissible to people – PROTECT yourself

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Distinctive features of recent avian isolates including current Asian H5N1

- Pathogenic for:
 - People* (bird → person, but not person → person)
 - Unusually wide spectrum among shore birds/waterfowl
 - Domestic and large cats
- Unpredictable geographic spread

* Mortality rate in confirmed human cases: 51% (62/121 cases – WHO 24th Oct 2005)

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Avian influenza in people

1997	Hong Kong	H5N1	18 infected; 6 died
1999	Hong Kong	H9N2	2 infected; no deaths
2003	Hong Kong	H5N1	2 infected; ?1 death
2003	Holland	H7N7	83 infected; 1 death
2003	Hong Kong	H9N2	1 infected; no deaths
2003	SE Asia	H5N1	121 infected; 62 deaths
2004	BC	H7N7	5 infected; no deaths

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Avian flu in people

- Mild form: conjunctivitis with recovery
- Severe form: PNEUMONIA (ARDS), fever, diarrhea, death
- Incubation period: 3 days
- Mean age: 13.7 years (5 – 24 years)
- Mortality rate: >50%
- Antivirals: oseltamivir and zanamivir
- Inactivated trivalent human influenza vaccine provides little or no protection against H5 and H7 avian influenza strains

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If there is an outbreak in birds

- Regulated
- Quarantine of premises
- Investigation by FADD
 - Laboratory testing of carcasses and swabs
- IF POSITIVE: depopulation and disinfection
- Surveillance zone
- Strategic reserves of vaccine: 20M of H5 and of H7

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Diagnosis

- rt-PCR – high volume testing done by approved laboratory in NAHLN laboratory under BSL-2 conditions (class IIa biological safety cabinet)
- WSVL is a NAHLN lab and we are seeking approval to test for HPAI
- Other:
 - Serology
 - Direct virus isolation (BSL-3+ conditions)
 - Antigen detection

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Control

- REPORT TO AVIC and/or Dr Oldham
- Trade restrictions with affected countries
- Quarantine and test imported birds
- Ongoing surveillance program
 - 1M tests a year of domestic poultry
 - ~3,000 birds in Alaska/Pacific flyway/Aleutian islands
- Biosecurity by commercial industry
- USDA vaccine bank: 20 M doses each of H5 and H7
 - Effective for current H5 strains



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Routing questions from public

- Human health issue: MCP or WDH
- Poultry illness:
 - AVIC or WLSB
 - WSVL
- Importation issues
 - AVIC or WLSB
- Wildlife die off
 - WGFD – Dr. Cynthia Tate at WSVL
- Food safety
 - Dean Finkenbinder in WDA

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Diagnosis of H5N1 in birds

- SUSPECT if massive die-off of chickens and/or poultry seen
- BEST SAMPLE:
 - Cloacal swab
 - Tracheal swab
 - CARCASS
- LABORATORY CONFIRMATION:
 - PCR
 - Growth in susceptible cell lines, or in eggs

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Influenza in dogs



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Equine influenza in dogs

- Jan 2004 – 8/22 dogs die (36%) in FL
 - Hemorrhagic pneumonia
 - Viral-type pneumonia histologically
 - Equine influenza-like virus isolated
 - A/canine/Florida/43/2004 (canine/FL/04)
 - 8 - 10 amino acid change in hemagglutinin
 - Seroconversion of in-contact and recovered dogs

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Clinical signs

- Kennel cough – but with a FEVER
- Kennel cough – but with DEATH (1- 10%)
- Rule outs:
 - KC
 - CD
 - Staphylococcal pneumonia with TSS, esp. greyhounds
- Many dogs subclinically affected

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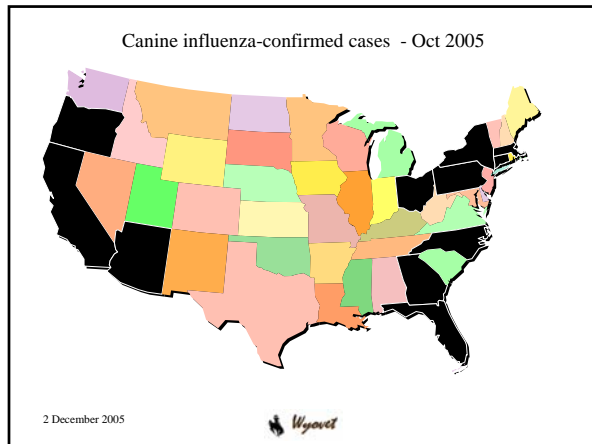


If you think you have a case of canine influenza

- LIVE dog:
 - Sample at time of presentation and 7 – 10 days later
 - Paired serum samples
 - Also test for rule outs: CDV and KC
- DEAD dog:
 - Tissue samples, esp. **LUNG**
 - Virus isolation; rt-PCR; IHC

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Current statistics
Source: Cornell VDL 17 Nov 2005

State	Tested	Positive
FL	348	107
NYC	134	48
CA	269	15
MT	3	0
CO	15	1
WY	4	0

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Wyonet

- What canine influenza is NOT
- Transmissible to people
 - The same as HPAI
 - Transmissible to poultry
 - In Wyoming that we know of
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- Wyonet

- LAB and UW NEWS
- Still trying to hire 3rd pathologist
 - ? Potential hire in July 2006
 - ?Temp hire Feb - end-June 2006
 - Virologist - Dr. Ana Bratanich
 - Epidemiologist - Dr. Kenji Sato
 - 2006 Legislative session
 - University president search
 - NAHLN membership
 - Laboratory full re-accreditation 2006 - 2010
- 2 December 2005
- Wyonet