

# AVIAN INFLUENZA

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# Introduction

- Infectious respiratory disease of poultry especially turkeys.
- Family – Orthomyxoviridae, Type A influenza
- Subtyped according to Hemagglutinin (H) antigens and Neuraminidase (N) projections on virus surface

# Introduction - continued

- There have been 15H and 9N types identified
- All HPAI have been H5 and H7 subtypes

# AI Pathogenicity

- Pathogenicity correlated to ability of trypsin to cleave H molecule into 2 subunits
- H5 and H7 have several amino acid residues at cleavage site
- Trypsin sensitivity and amino acid sequencing can be used diagnostically to determine whether or not an isolated virus is potentially pathogenic

# History of HPAI

- 1959 Scotland H5N1
- 1961 South Africa
- 1963 England H7N3
- 1966 Canada H5N9
- 1976 Australia H7N7
- 1979 Germany, England H7N7
- 1983 USA H5N2
- 1983 Ireland H5N8
- 1985 Australia H7N7
- 1991 England H5N1
- 1992 Australia H7N3
- 1994-95 Pakistan H7N3
- 1994-95 Mexico H5N2
- 1995 Australia H7N3
- 1997 Hong Kong H5N1
- Australia H7N4
- Italy H5N2 Ch.
- 1999 Italy H5N2 T
- 2001 Hong Kong H5N1
- Chile H7N3
- 2003 Netherlands H7N7
- Germany
- Belgium

# Epidemiology

- Ubiquitous in wild waterfowl
- Most outbreaks start with direct or indirect contact of domestic poultry with wild waterfowl
- Most strains in wild birds are nonpathogenic or mildly pathogenic for poultry
- Virulent strains emerge by genetic mutation or reassortment of less virulent strains

# Transmission

- Once established in domestic poultry, the virus is easily spread
- Virus multiplies in the respiratory, intestinal and reproductive tracts
- Virus is excreted in huge quantities in the feces and in nasal and ocular discharges
- Virus is then transmitted from farm to farm by movement of infected birds, contaminated equipment, feed trucks and service crews

# Vaccination

- Inactivated oil emulsion vaccines effective in preventing the disease and decreasing mortality
- The killed vaccine is not effective in preventing new infections in some individual birds which go on to shed virus
- Killed vaccines are expensive

# Vaccination -continued

- Cheaper vaccines can be made from naturally avirulent or attenuated strains but there is the danger of reassortment between vaccine and wild type strains
- Basic drawback to any vaccine approach for control of HPAI is the large number of Hemagglutinin subtypes
- There is no cross-protection among subtypes so multivalent vaccines will be needed

# Laboratory Diagnosis

- Rapid testing methods: Serology via Directigen/RT PCR and AGP
- Virus isolation for confirmation
- Serotyping H and N types
- Pathogenicity index tests

# Recent History of AI

- 2003 South Korea H5N1
- 2004 Vietnam H5N1
- 2004 Japan H5N1
- 2004 Thailand H5N1
- 2004 China H5N1
- 2004 US-MD H7N2
- 2004 US-DE H7N2
- 2004 US-PA
- 2004 US-TX H5N2
- 2004 Canada –BC H7N3

# Public Health Significance of H5N1

- Recent cases in Asia caused mortality in humans
- Hong Kong 1997 –18 sick, 6 dead
- 2004 Asian cases – 34 human cases, 23 deaths
- H5N1 mutates rapidly and has a greater ability to acquire genes from other species
- Spread of infection in birds increase opportunities for human infection
- Mixing of avian and human influenza types in humans may lead to pandemic in man





















































