

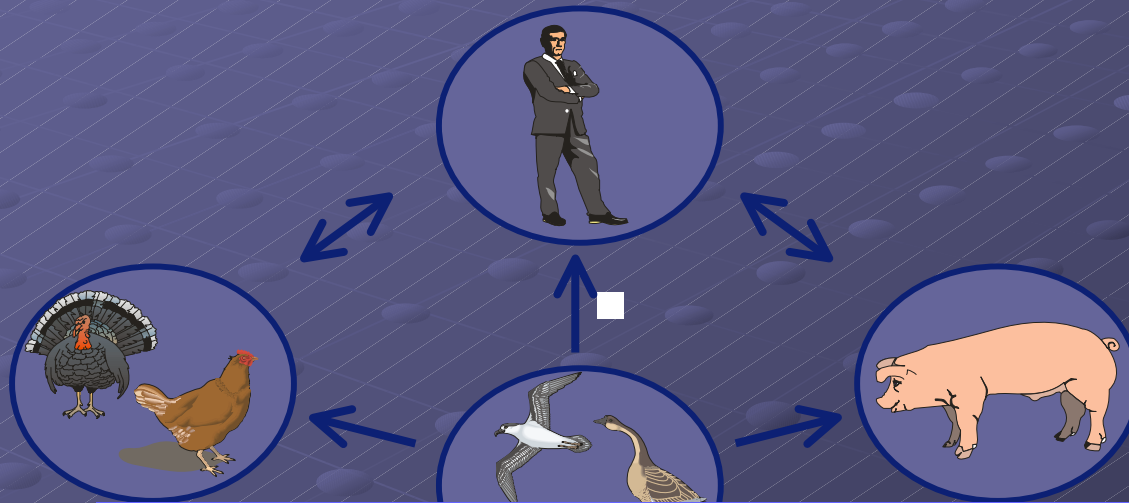
ONE WORLD . ONE HEALTH  
Rockefeller University  
New York – 29 September 2004

# "History of zoonotic avian influenza"

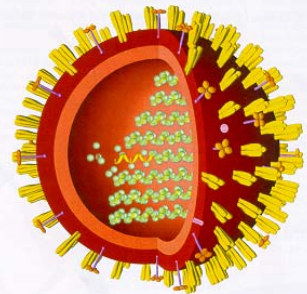
■  
By F.X. Meslin

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of Zoonoses, Foodborne Diseases and  
Kinetoplastidae  
World Health Organization  
WHO, Geneva

# Influenza A viruses: common to man and animals



Wild birds: wild ducks,  
shorebirds e.g. terns,  
shearwaters and gulls  
All HA and NA



# Avian influenza viruses causing human disease

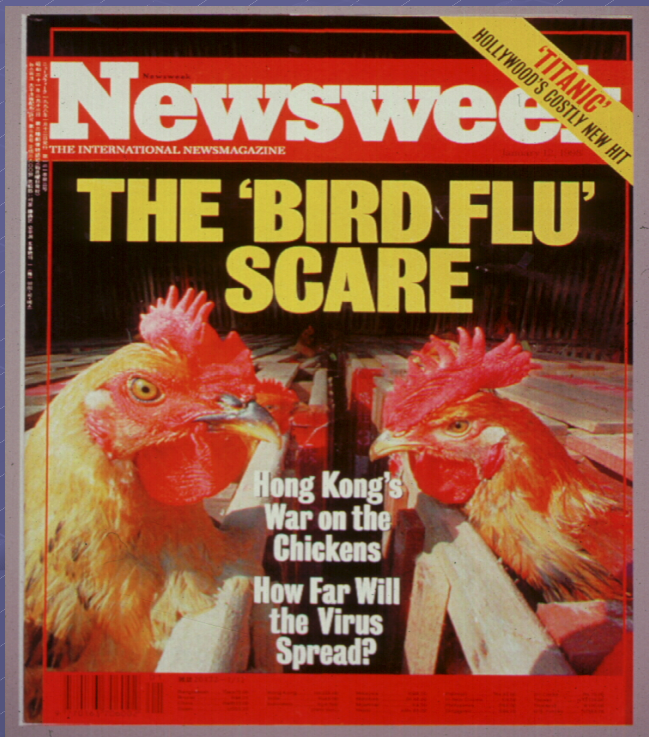
- Pre-1997: sporadic conjunctivitis – H7N7
- 1997: H5N1 (Hong Kong): 18 patients; 6 deaths
- 1998, 1999 and 2003: H9N2 (Hong Kong; Guangdong)
- 2003: H5N1: Fujian / Hong Kong: 2 patients, 1 death
- 2003: H7N7 (Holland) - 78 conjunctivitis, 7 with flu-like illness, 4 other, 1 death
- 2004 –H5N1 Asian outbreak (human cases in Vietnam & Thailand);

# Previous outbreaks of highly pathogenic avian influenza worldwide

Year	Country/area	Domestic birds affected	Strain
1959	Scotland	chicken	H5N1
1963	England	turkey	H7N3
1966	Ontario (Canada)	turkey	H5N9
1976	Victoria (Australia)	chicken	H7N7
1979	Germany	chicken	H7N7
1979	England	turkey	H7N7
1983–1985	Pennsylvania (USA)*	chicken, turkey	H5N2
1983	Ireland	turkey	H5N8
1985	Victoria (Australia)	chicken ■	H7N7
1991	England	turkey	H5N1
1992	Victoria (Australia)	chicken	H7N3
1994	Queensland (Australia)	chicken	H7N3
1994–1995	Mexico*	chicken	H5N2
1994	Pakistan*	chicken	H7N3
1997	New South Wales (Australia)	chicken	H7N4
1997	Hong Kong (China)*	chicken	H5N1
1997	Italy	chicken	H5N2
1999–2000	Italy*	turkey	H7N1
2002	Hong Kong (China)	chicken	H5N1
2002	Chile	chicken	H7N3
2003	Netherlands	*chicken	H7N7

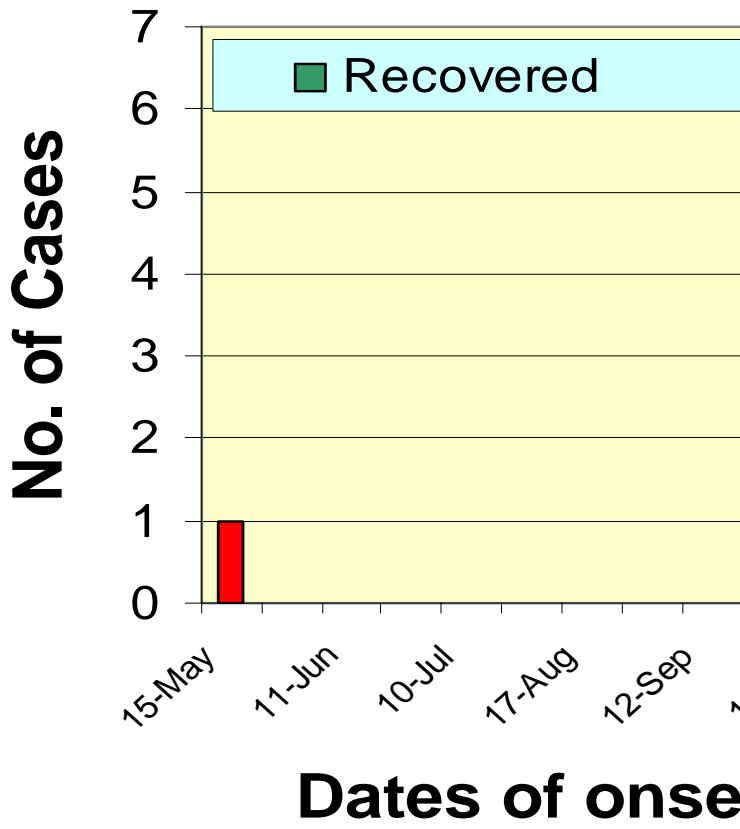


# The H5N1 "incident" of 1997



- Outbreaks of avian flu in chicken farms in Hong Kong in March / April 1997
- May 1997: Child with flu like illness, died of complications
- Virus was H5N1

# Epidemic Curve of Influenza A (H5N1) Cases in HKSAR May - Dec 1997



# Mild human flu-like disease associated with avian H9N2 virus in Hong Kong

1999

- Two children with mild self limited “flu like” illness in Hong Kong in 1999 caused by H9N2
- Low prevalence of neutralizing antibody in general population and Health care workers. Up to 30% seroprevalence in poultry workers.

2003

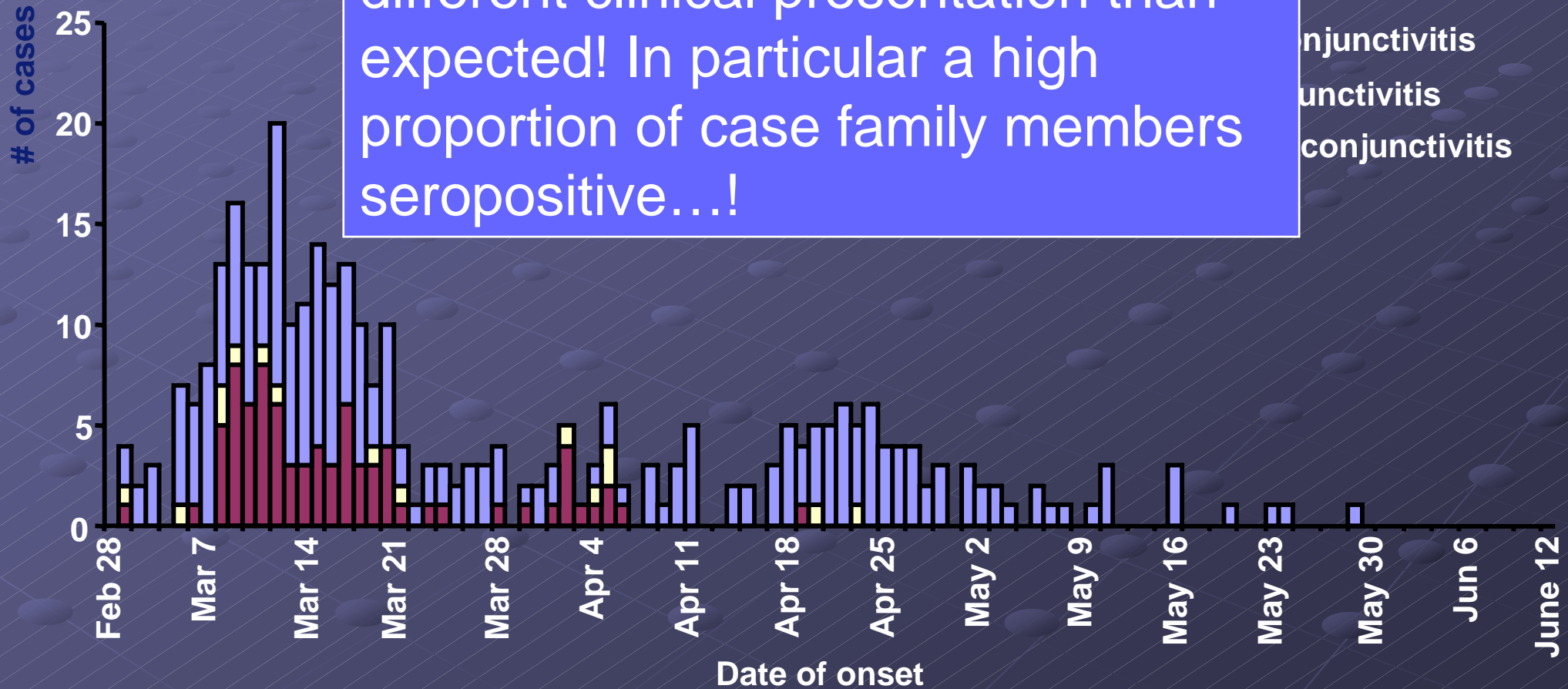
- 1 child with H9N2 disease - *unpublished*



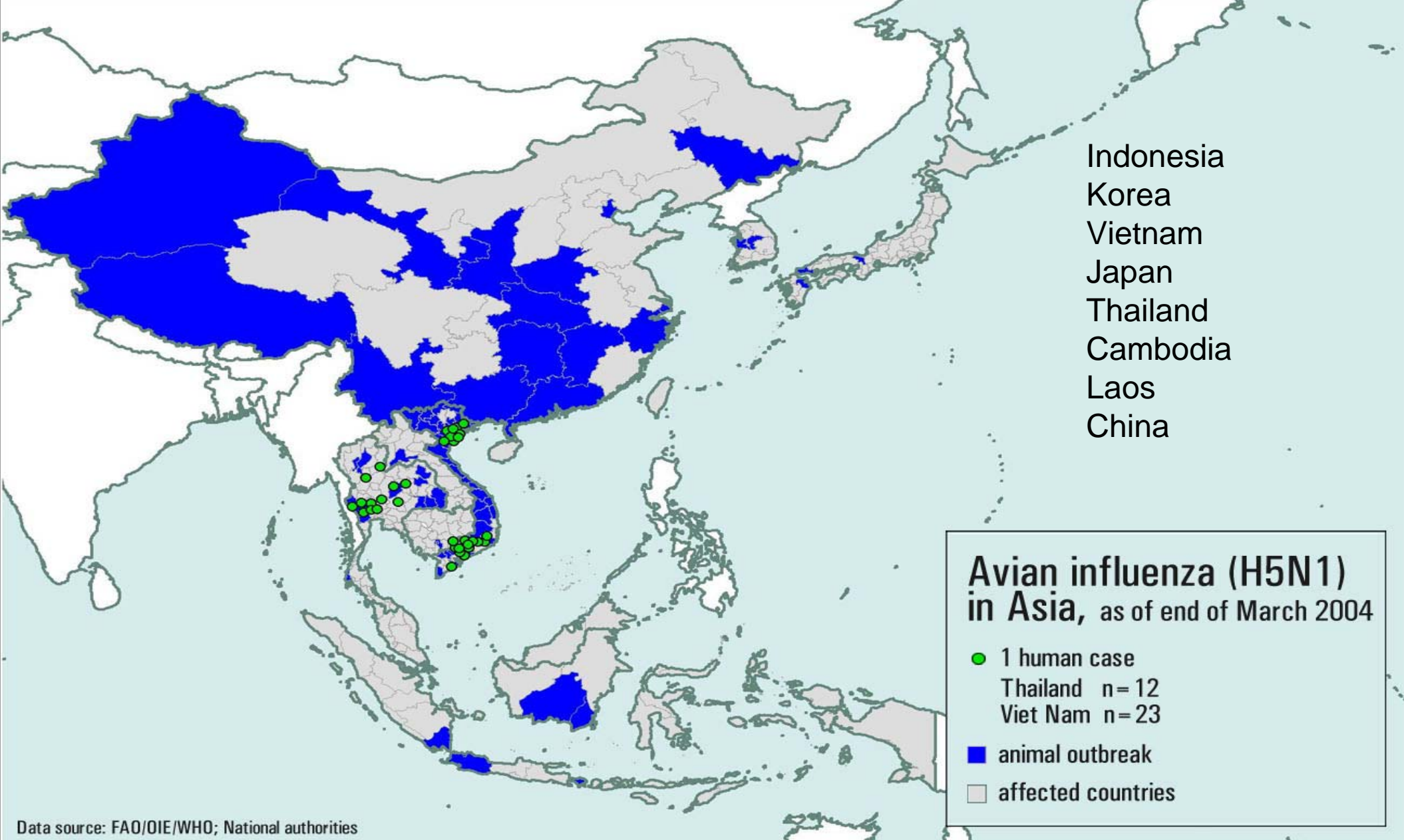
# H7N7 outbreak in Holland, 2003

- Reports of conjunctivitis by date of onset of symptoms -

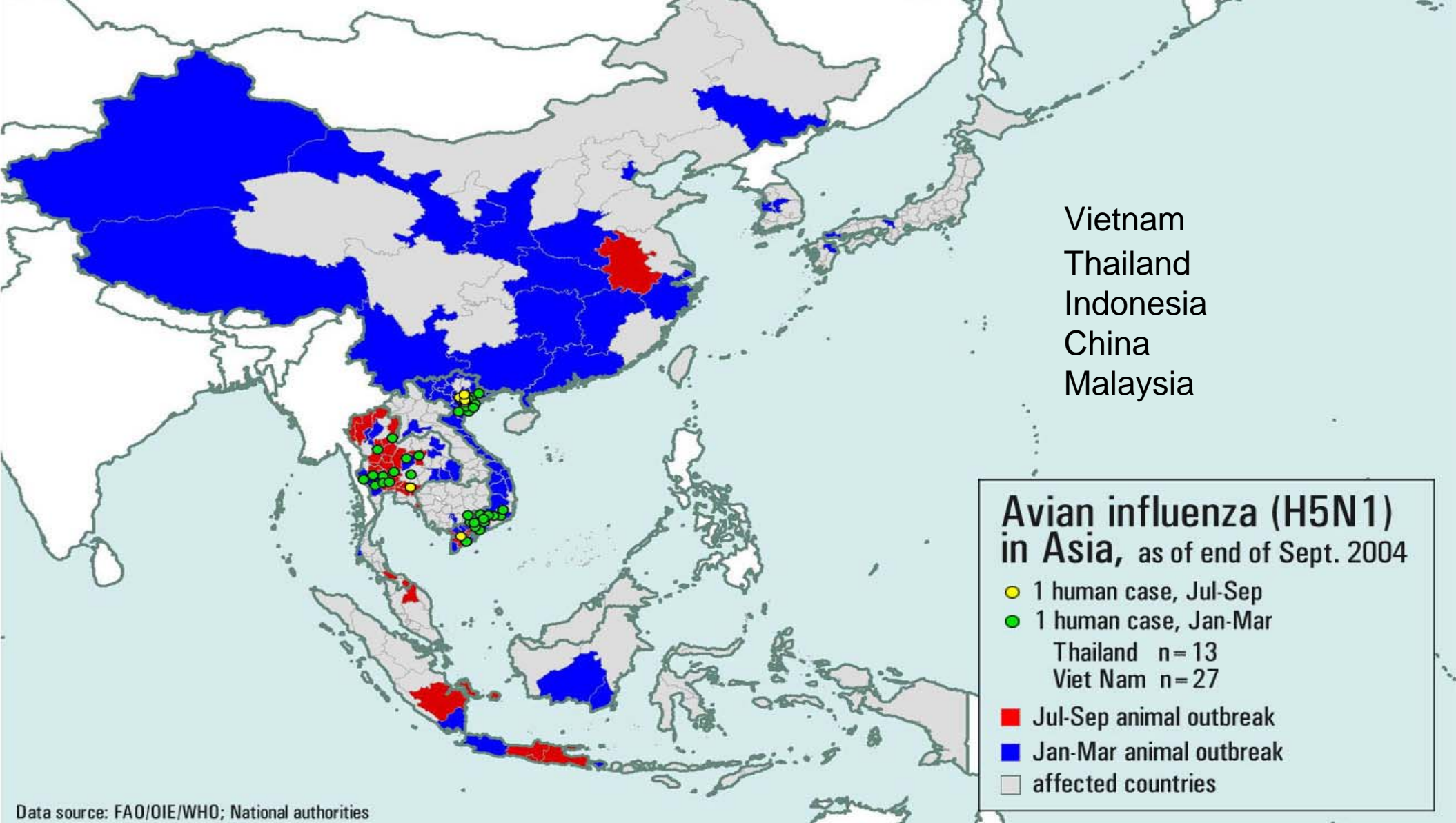
More infection, more disease, and different clinical presentation than expected! In particular a high proportion of case family members seropositive...!







Data source: FAO/OIE/WHO; National authorities



Vietnam  
Thailand  
Indonesia  
China  
Malaysia

**Avian influenza (H5N1)  
in Asia, as of end of Sept. 2004**

- 1 human case, Jul-Sep
- 1 human case, Jan-Mar
- Thailand n=13
- Viet Nam n=27
- Jul-Sep animal outbreak
- Jan-Mar animal outbreak
- affected countries

Data source: FAO/OIE/WHO; National authorities

# Confirmed human cases of avian influenza A(H5N1) as of 27 September 2004

	<b>Cases</b>	<b>Deaths</b>
<b>Thailand</b>	<b>15</b>	<b>10</b>
<b>Viet Nam</b>	<b>27</b>	<b>20</b>
<b>Total</b>	<b>42</b>	<b>30</b>

Tip of the Iceberg?

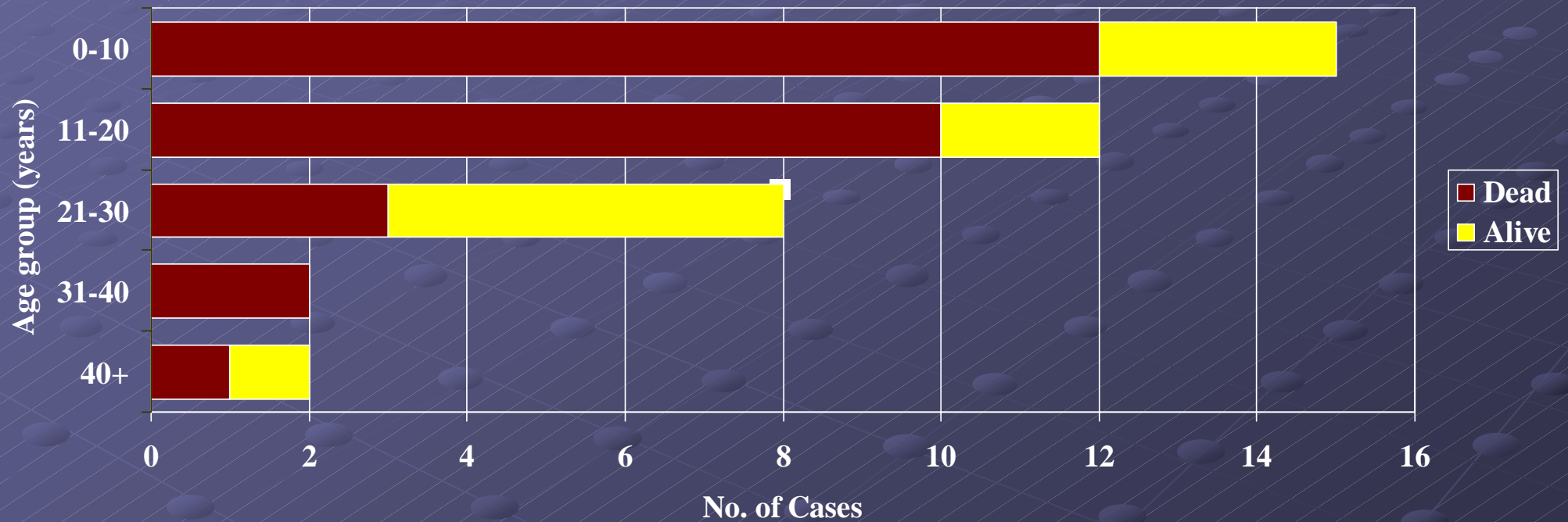


# Brief descriptive analyses

- Sex (n=23)
  - 10 (43%) female
- Age (n=23)
  - Mean 16 years, median 13 years
  - Range 4 to 58 years
- Interval between onsets of symptoms and death
  - Mean 13 days, median 13.5 days
  - Range 5 to 31 days



# Status of H5N1 Cases by Age group Thailand and Viet Nam (N= 40)



# Clinical features influenza A(H5N1)

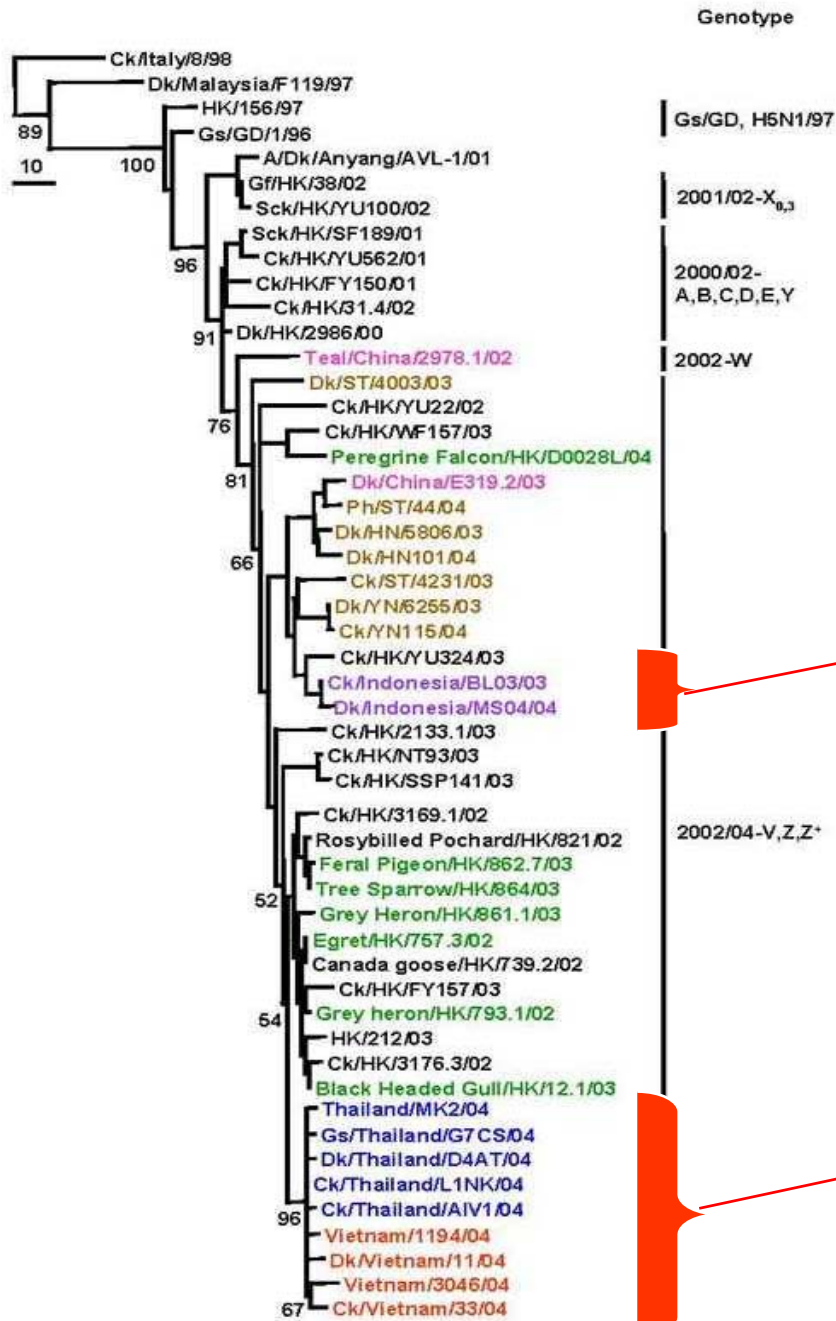
(Based on preliminary reports from Thailand and Viet Nam)

- Exposure history to ill or dead chickens
- No disease among cullers
- Main presenting features
  - Sustained fever ( $> 38^{\circ}\text{C}$ )
  - Shortness of breath
  - Dry, non-productive cough
- Rapid progression of severe respiratory distress
  - Chest X-ray changes
  - Mechanical ventilation
- Decreased WBC count with lymphocytopenia



# Characterization of H5N1 viruses

*Li et al Nature July 8, 2004*



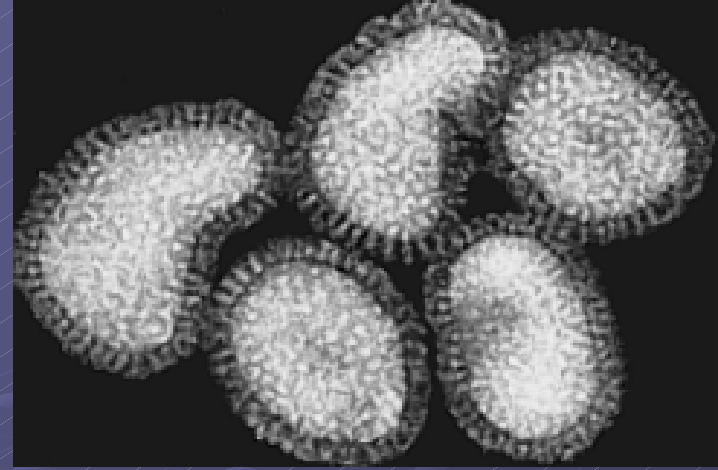
Indonesian viruses are distinct

Human and avian viruses of Vietnam and Thailand cluster closely together

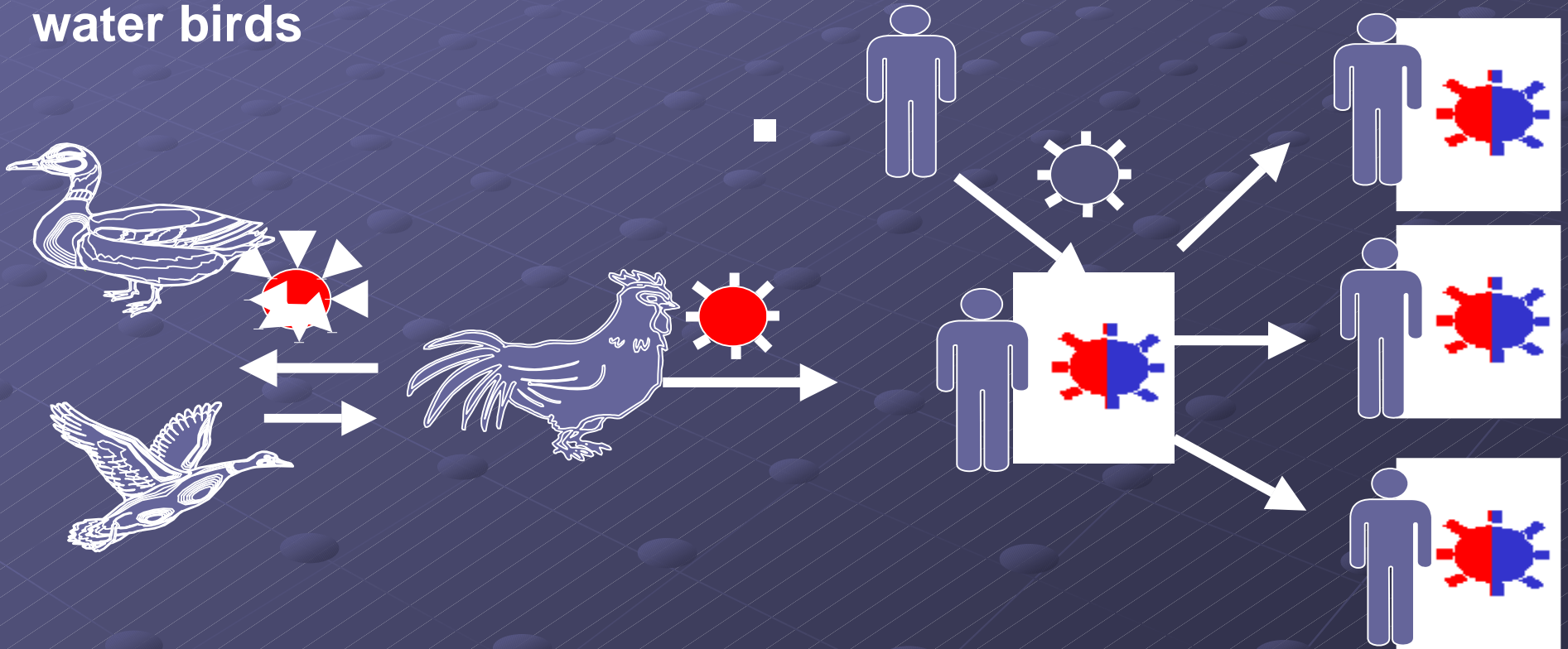
# Why is WHO concerned?

- Increasing number of human avian influenza cases
- H5N1 virus circulation in animals is not under control and will last as infected countries not yet equipped to cope
- Co-circulating of human & avian influenza viruses will also continue (and increase as the cold season arrives)
- Risk of genetic reassortment increase
  - Emergence of pandemic strain
  - Majority of human population would lack immunity
- Reports of H5N1 viruses isolated from pigs
- Reports of HP H5N1 healthy carrier state in domestic ducks
- Reported family cluster with possible human to human transmission

# Reassortment (in Human)

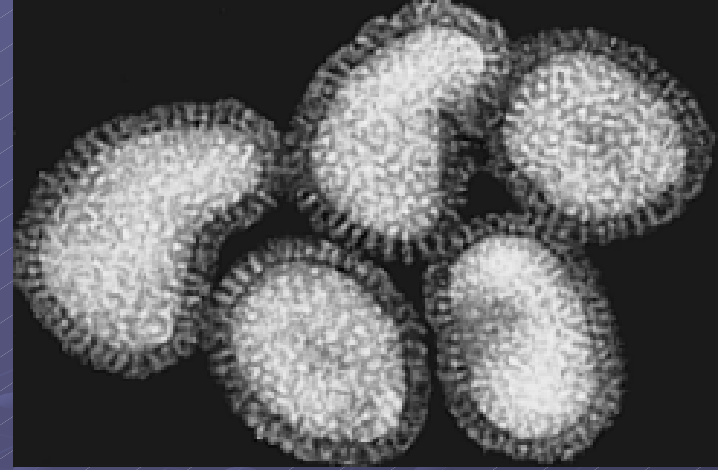


Migratory water birds

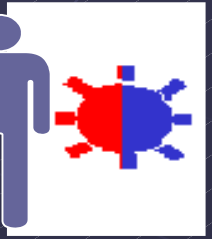
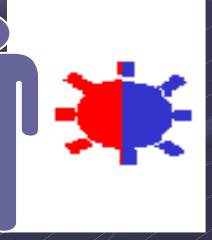
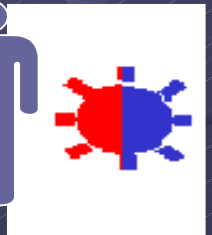
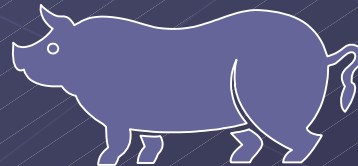
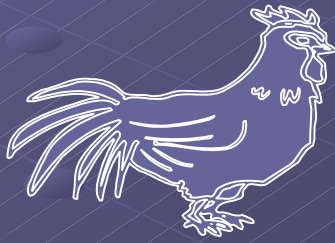
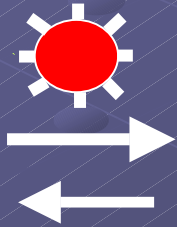




# Reassortment (in Pigs)



Migratory water birds



# Influenza Pandemics 20th Century

Pandemic are major epidemics characterised by the rapid spread of a novel type of virus to all areas of the world resulting in an unusually high number of illnesses and deaths in most age groups for approximately 2 to 3 years.



Credit: US National Museum of Medicine



Next pandemic is "overdue"

1918:

“Spanish Flu”

20 - 40 million deaths

A(H1N1)

1957:

“Asian Flu”

1 - 4 million deaths

A(H2N2)

1968:

“Hong Kong Flu”

1 - 4 million deaths

A(H3N2)

# control and prevention strategy: inter-agency responsibility

- Risk reduction (avoid emergence of a new virus)
  - Reduction of human exposure through disease control and elimination in the domestic animal reservoir (FAO, OIE and others)
    - Culling, movement control, immunization
  - Protection, immunization and monitoring of at-risk individuals (WHO)
    - Cullers, health care personnel
- 
- Strengthen surveillance & ensure timely reporting and response
  - Domestic and wild Animals (FAO, OIE and others with WHO through rumours investigation: GLEWS)
  - Humans and animals: improved diagnostic tests, national detection, global reporting (WHO/FAO/OIE and other partners)
- Improve pandemic preparedness (WHO)
  - Ensure (H5N1) vaccine development, fair distribution and administration
  - Increase production and access to antiviral drugs for prophylaxis or therapy
  - Prepare for case isolation, contact confinement, border screening, travel advisories, travel restrictions (if appropriate)



# Conclusions

- WHO is extremely concerned by the current situation
- WHO is in pandemic preparedness mode
- WHO needs to cooperate very effectively with other Organizations as major interventions to effectively reduce and detect human exposure to HPAI viruses are with the agricultural sector not the public health sector

● Thank you for your attention

