

Update on Pandemic Potential of H5N1

Professor John Oxford

*Professor of Virology, Queen Mary's University of
London, United Kingdom*



Previous Pandemics

Three major influenza pandemics in the twentieth century:

- 1918 - 1919 Spanish influenza pandemic (H1N1)
 - in excess of 30 million deaths
 - evidence of gene mixing with avian viruses
- 1957 - 1958 Asian influenza pandemic (H2N2)
 - one million deaths
- 1968 - 1969 Hong Kong influenza pandemic (H3N2)
 - 800,000 deaths

The current H5N1 virus circulating is avian in nature, similar to the 1918 virus.

Name
(Old catalogue 4004)

Age

Sex

M.S.W.

Occupation

Hon. Med. Off.

Nature of Specimen Lung showing acute influenzal pneumonia and anthracosis

Object of Examination Histology

Clinical Notes by Old catalogue

Date recd. 15.1.19

The patient contracted influenza during the epidemic of 1919.

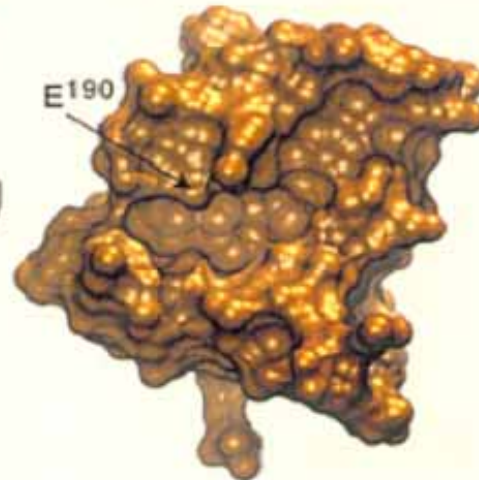
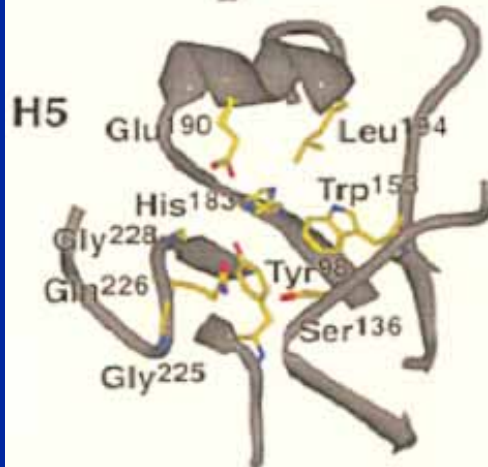
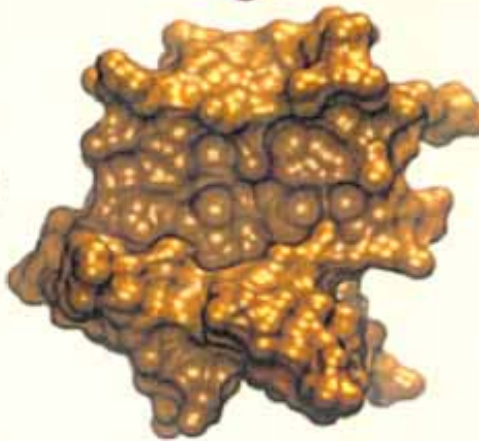
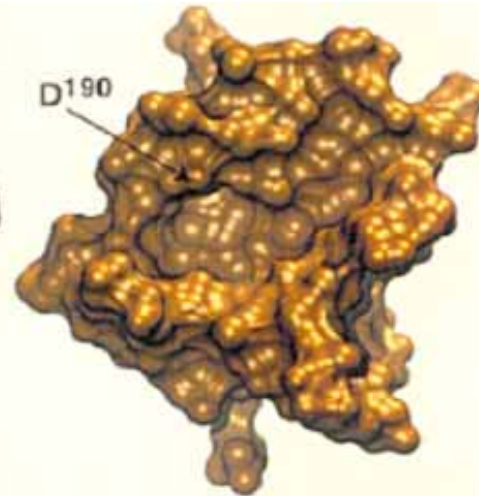
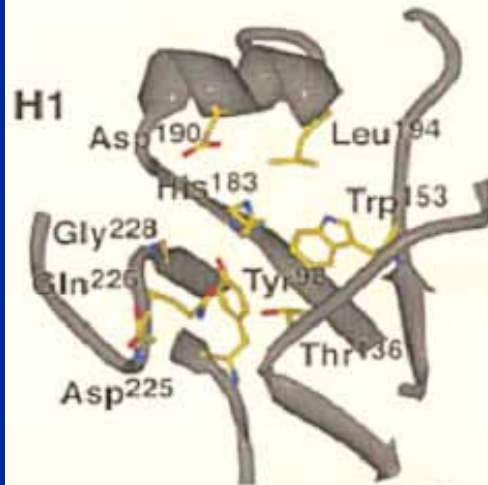
Report by

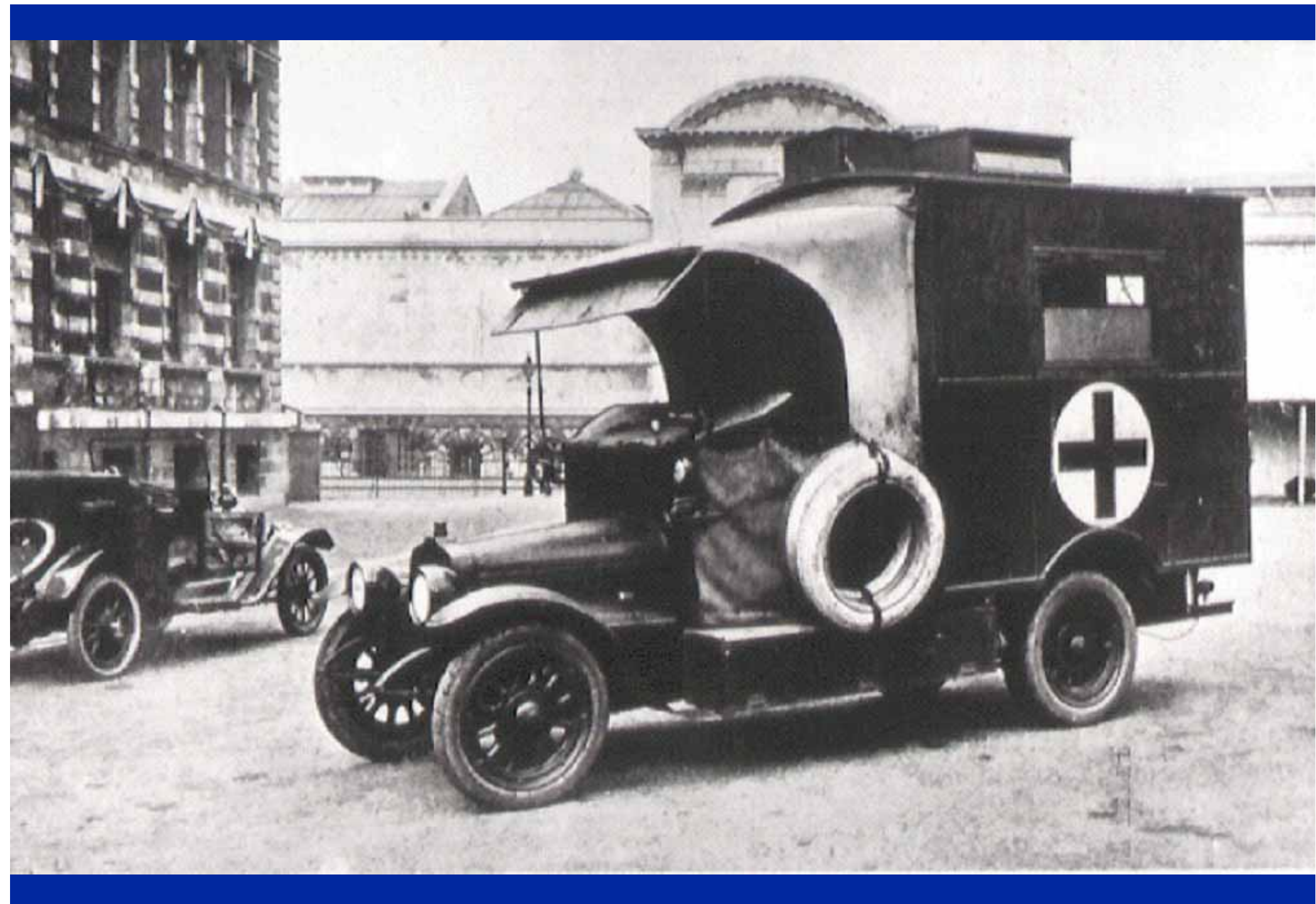
Date

MACROSCOPIC. The lung showed consolidation, but this is not as uniform as in ordinary lobar pneumonia; the carbon pigment is especially conspicuous by the distribution of the subpleural lymphatic vessels. Anthracosis preceded the pneumonia and was quite independent of it.

MICROSCOPIC. Acute inflammation of bronchioles and inflammatory oedema of the pulmonary tissue are striking features. The consolidation process is at an early stage.

Glenn Howden
Curator Museum of Pathology
University of Sydney
Sydney N.S.W. 2006.
Australia

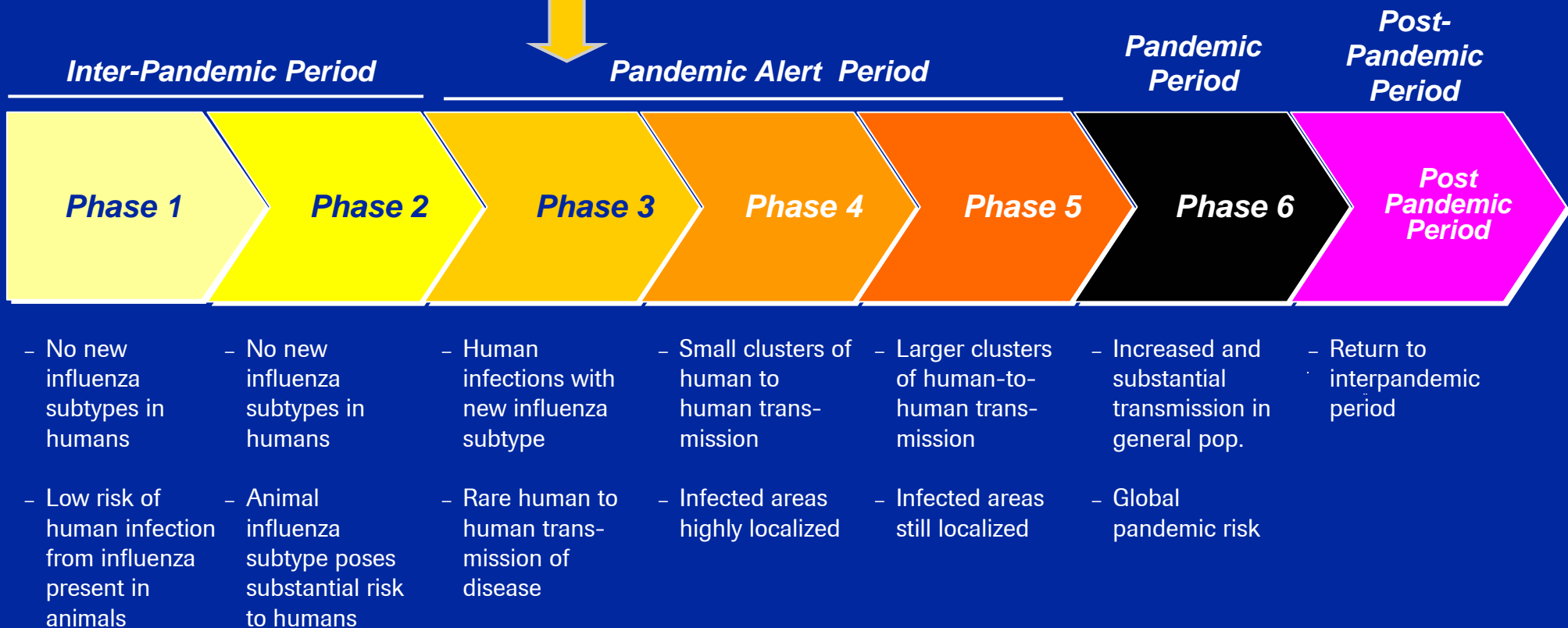


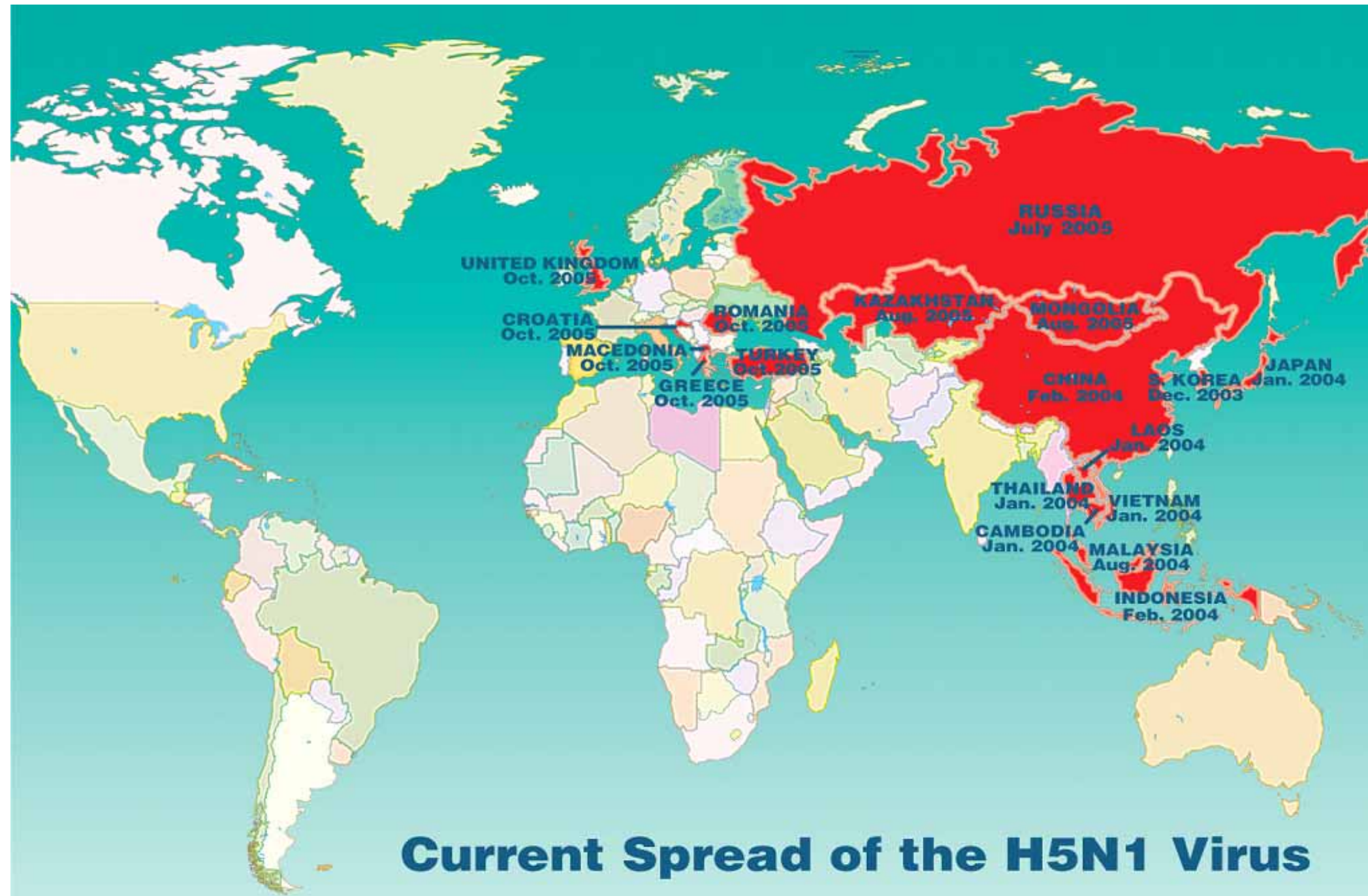


The Phases of a Pandemic

The avian flu is in phase 3 of the WHO's monitoring system and shows signs of progression towards what has the potential of becoming a pandemic.

Estimated Current Phase of the Pandemic





Current Spread of the H5N1 Virus

A Patient's Journey with Suspected Avian Flu in Vietnam



Resistance and Ongoing Surveillance

- As with any antiviral, a theoretical potential exists for an influenza virus to emerge with decreased sensitivity to a drug
- Mechanisms have been set up both internally and externally (Neuraminidase Inhibitor Susceptibility Network, NISN) to monitor emerging resistance to the drug
- Data from ~ 4000 patients treated with Tamiflu demonstrate an overall incidence of resistant virus of 0.4% in adults and 4 % in children aged one to 12
- Surveillance during recent Japanese epidemic confirmed low rate of resistance (0.4%)
- This resistant virus was found to be less virulent than the wild type virus and did not affect the course of the illness

H5N1 resistance

- One H5N1 isolate (A/Hanoi/30408/05) reported reduced susceptibility to oseltamivir. Patient had received 4 days prophylactic treatment with oseltamivir then 7 days of treatment with oseltamivir*
- The patient recovered and was discharged from hospital
- Resistant virus was recovered on last day of prophylaxis
- Patient showed clinical symptoms of influenza 2-3 days prior to starting oseltamivir prophylaxis
- Under dosing probably led to resistance

* Nature 437 20th October 2005

Summary

- It's not "if" a pandemic is coming, but "when"
- Medical intervention is the most important part of a pandemic plan
- Vaccines manufacturers will need time to produce an effective vaccine
- Antivirals are the initial line of defence
 - Treatment should be started early
 - The approved treatment dose and duration of oseltamivir must be followed

