

AVIAN AND SWINE INFLUENZA: WHAT'S THE LATEST?



Wade A. Northington, DVM, MPA
 Director, Associate Professor
 Breathitt Veterinary Center
 Murray State University

INFLUENZA VIRUSES



Birds



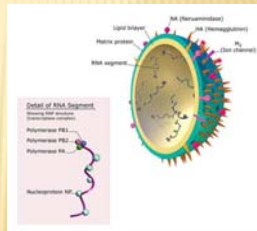
Pigs



Humans

CLASSIFICATION SYSTEM

- ✘ Surface glycoproteins: H & N
 - + Hemagglutinins-16
 - + Neuraminidases-9
- ✘ Humans
 - + H1
 - + H3
- ✘ Birds
 - + H5
 - + H7
 - + H9
- ✘ Swine
 - + H1
 - + H3
- ✘ Horses & Dogs
 - + H3



ANTIGENIC DRIFT

Immune pressure

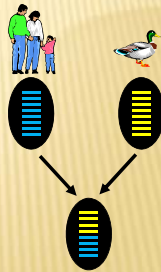


Courtesy: USDA-APHIS

ANTIGENIC SHIFT

Gene Reassortment

- ✗ Two or more virus strains infect the same cell and exchange genetic material
- ✗ Emergence of a new Strains
 - + Genetic reassortment (human and animal viruses)
 - + Direct animal (avian) to human transmission



Courtesy: USDA-APHIS

AVIAN INFLUENZA H5N1 THE NEXT PANDEMIC?



AVIAN INFLUENZA: H5N1

- ✗ Timeline
 - + China 1996
 - + Hong Kong 2002
 - + Korea, Japan 2002-2003
 - + Russia, Eastern Europe 2003-2004
 - + Europe, Middle East, Africa 2005-2006
 - + Vietnam 2007
 - + North America??



Spread dependent on migratory bird flyways

AVIAN INFLUENZA: H5N1



AVIAN INFLUENZA: H5N1 WHAT DO WE KNOW?

- ✗ Bird to Human Transmission (WHO)
 - + 442 Cases worldwide 2003-2009
 - + 262 Human deaths
 - + 59% Mortality Rate!
- ✗ Low morbidity
- ✗ High mortality
- ✗ *Just as likely to have a new strain emerge as for H5N1 to become pandemic.*

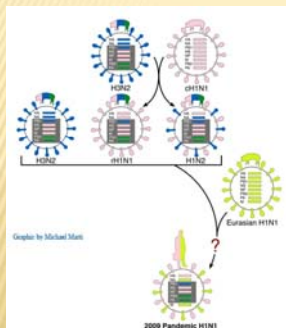


SWINE INFLUENZA: H1N1

- ✗ First recognized in swine in 1930
- ✗ Descendant of 1918 pandemic virus
- ✗ Pigs
 - + Seasonal
 - + High morbidity, low mortality
 - + Fever, respiratory symptoms
 - + Self-limiting



NOVEL H1N1 INFLUENZA



- ✗ 1990's Classical Swine Flu mixed with other avian and human strains and created H3N2.
- ✗ 2000 Reassorted into rH1N1 and H1N2
- ✗ 2008 Mixed with Eurasian H1N1
- ✗ 2009 Pandemic H1N1

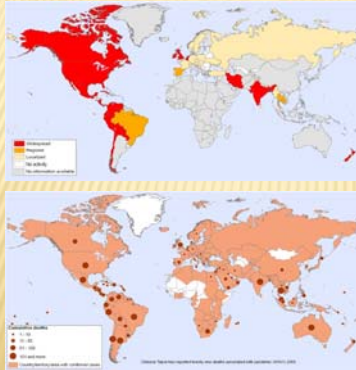
NOVEL H1N1 INFLUENZA

- ✗ First recognized in USA in March, 2009
- ✗ Cases in California linked to influenza cases in Mexico
- ✗ Identified by CDC as a new variant in April, 2009
- ✗ By June, 2009, all 50 states, Puerto Rico, and the Virgin Islands



Air Travel Density: USA & Mexico
Human to Human Spread

SWINE INFLUENZA: NOVEL H1N1

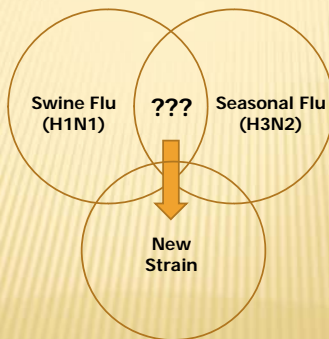


- ✘ 583,587 Human Cases
 - ✘ 7225 Deaths
 - ✘ 1% Mortality Rate
 - ✘ High morbidity
 - ✘ Low mortality
- WHO Statistics

SWINE INFLUENZA: NOVEL H1N1

- ✘ North American confirmed pig cases:
 - + Canada—linked to worker from Mexico
 - + Minnesota—linked to students visiting state fair
 - + Indiana
 - + Mexico?
- ✘ Mild or no illness in pigs: *a human disease*
- ✘ Does not transmit to humans in pork products
 - + *Consumer confidence*
- ✘ Illustrates the need to use HN nomenclature, not names such as Avian Flu and Swine Flu

WHAT'S NEXT?



BREATHITT VETERINARY CENTER INFLUENZA SURVEILLANCE

- ✘ USDA National Animal Health Laboratory Network (NAHLN)
- ✘ Influenza Surveillance
 - + Avian Influenza
 - ✘ 30,000 tests/year
 - + Swine Influenza
 - ✘ 500-1000 tests/year



PANDEMIC INFLUENZA



With acknowledgements to USDA, CDC, and WHO for information and graphic illustrations

