

# Avian Influenza

## The Human Health Aspect

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An Office of the  
Department of Health and Human Services

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Maine Center for Disease Control and Prevention



maine.gov/idepi  
800-821-5821

# Back to Basics – Influenza 101

- Influenza is a contagious respiratory illness caused by influenza viruses
  - Can cause mild to severe illness
  - Can result in hospitalization or death



# Individuals at High Risk for Complications

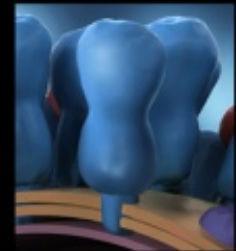
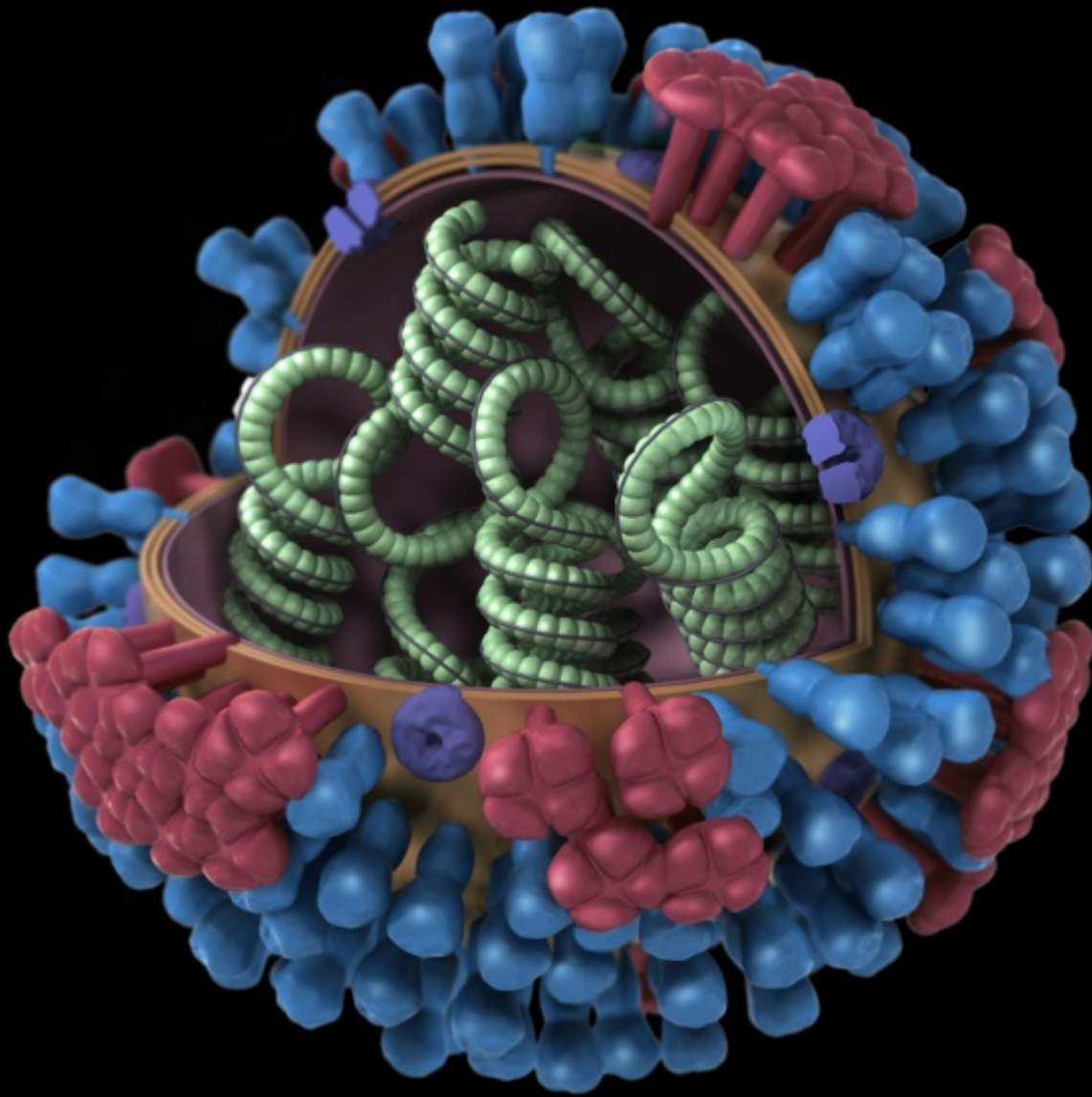
- Children younger than 5, especially children younger than 2
- Adults 65 years and older
- Pregnant women
- Residents of long term care facilities
- American Indians and Alaska Natives
- Individuals with underlying medical conditions
  - Asthma, heart disease, lung disease, metabolic disorder, morbid obesity etc.

# Influenza viruses

- RNA virus (Orthomyxoviridae family)
- Two main types of influenza viruses
  - Influenza A
    - Broken down into subtypes
    - H1 and H3 are most common seasonal strains
  - Influenza B
    - Broken down into lineages
      - Victoria or Yamagata

# Influenza A viruses

- 18 different H antigens
  - H1 – H18
- 11 different N antigens
  - N1 – N11
- Each subtype can have multiple strains with different pathogenic profiles
- Some subtypes are pathogenic to one species but not others
  - All known subtypes of influenza A viruses have been found among birds except subtype H17N10 and H18N11 which have only been found in bats



Hemagglutinin



Neuraminidase



M2 Ion Channel

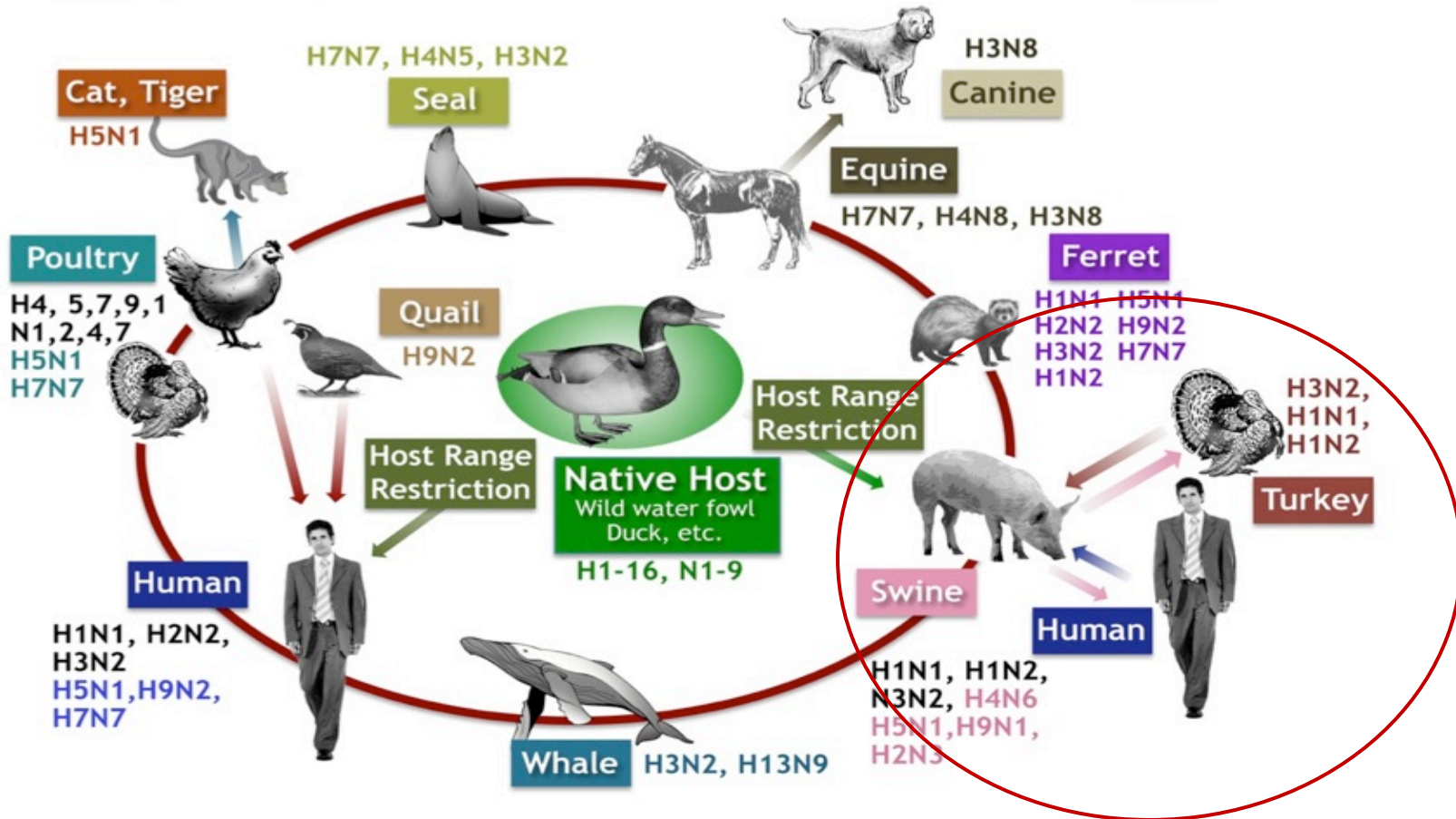


RNP

# Non-human species that are known to get influenza



# It all starts with wild water fowl:



Adapted from : <http://www.medicalecology.org/diseases/influenza/influenza.htm#sec3>

## Safeguarding Animal Health

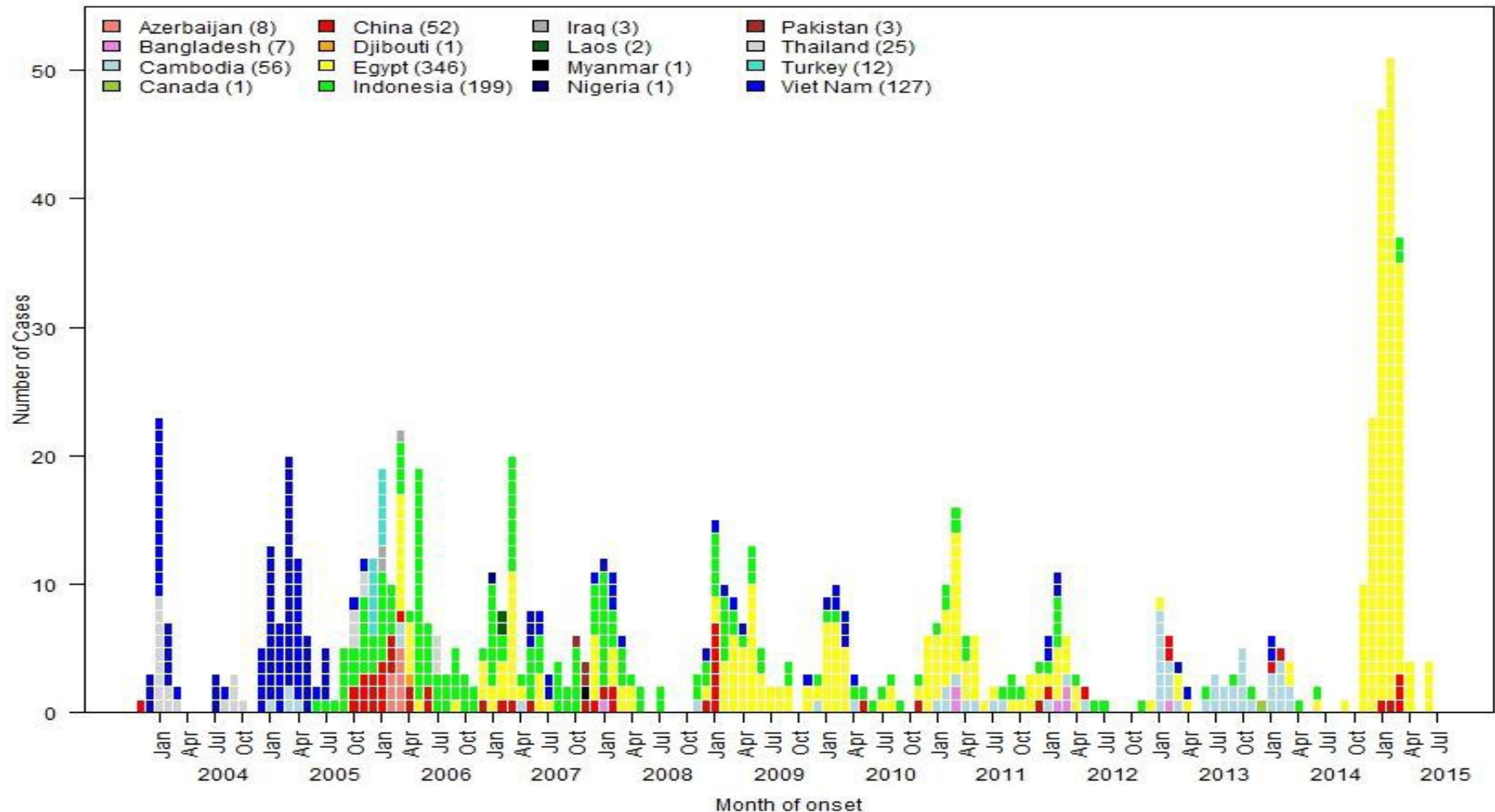


# Avian influenza in humans

- Most avian influenza viruses do not cause disease in humans
  - No human cases associated with the 2014-2015 HPAI outbreak in the United States
- Most well known example of zoonotic avian influenza is H5N1 which has caused human disease and deaths since 1997
  - Since 2003 there have been 844 laboratory confirmed cases from 16 countries with 449 deaths (53% fatality rate)

# Epi curve of avian influenza A(H5N1) cases in humans by reporting country and month of onset

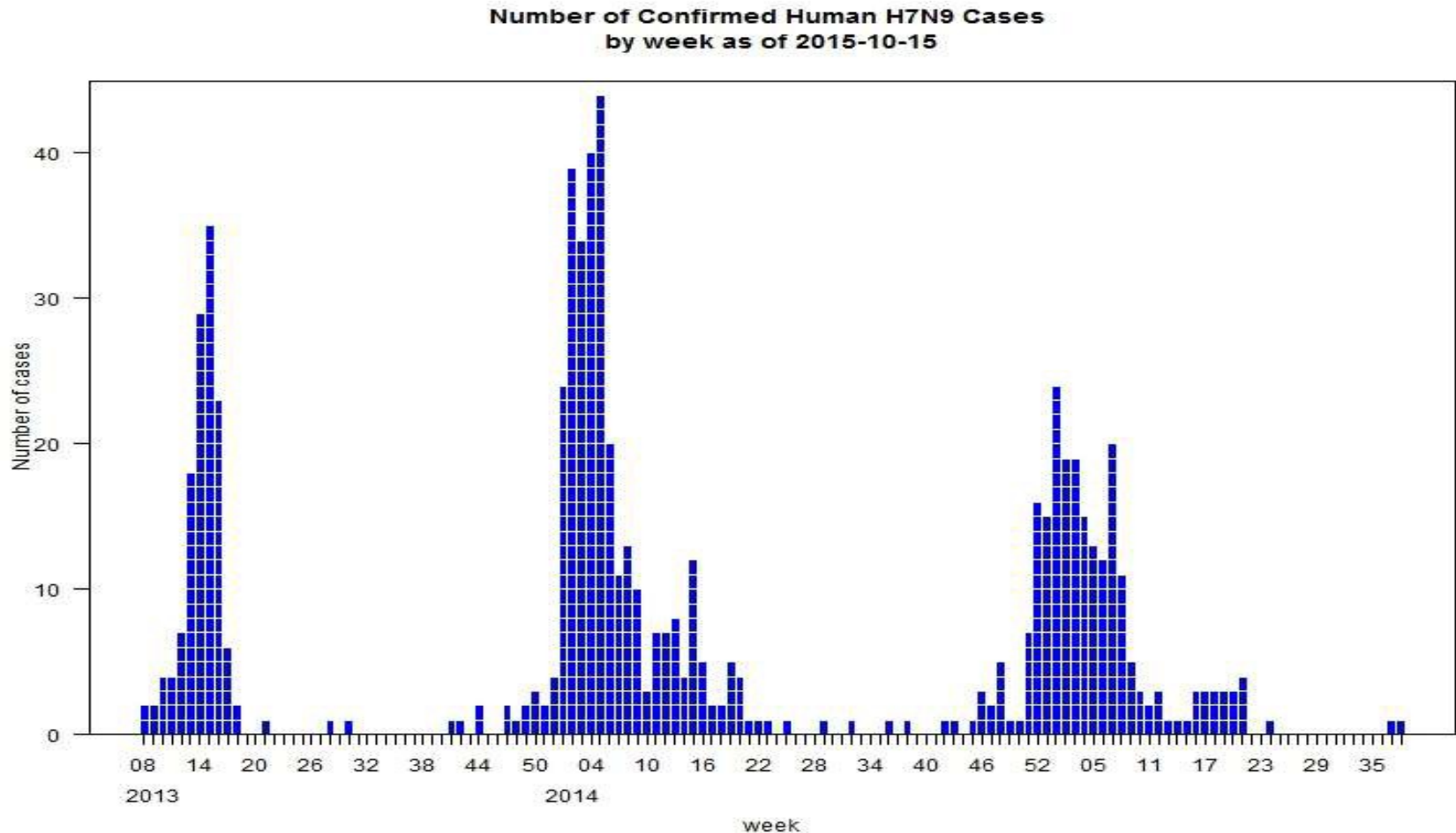
Number of Confirmed Human H5N1 Cases by month of onset as of 2015-07-06



# Recent avian influenza

- Influenza A(H5N6) detected in China
  - 4 cases since 2014
- Influenza A(H7N9)
  - Since 2013 there have been 679 laboratory-confirmed cases with at least 275 deaths (41% fatality rate)
  - All cases have a connection to China

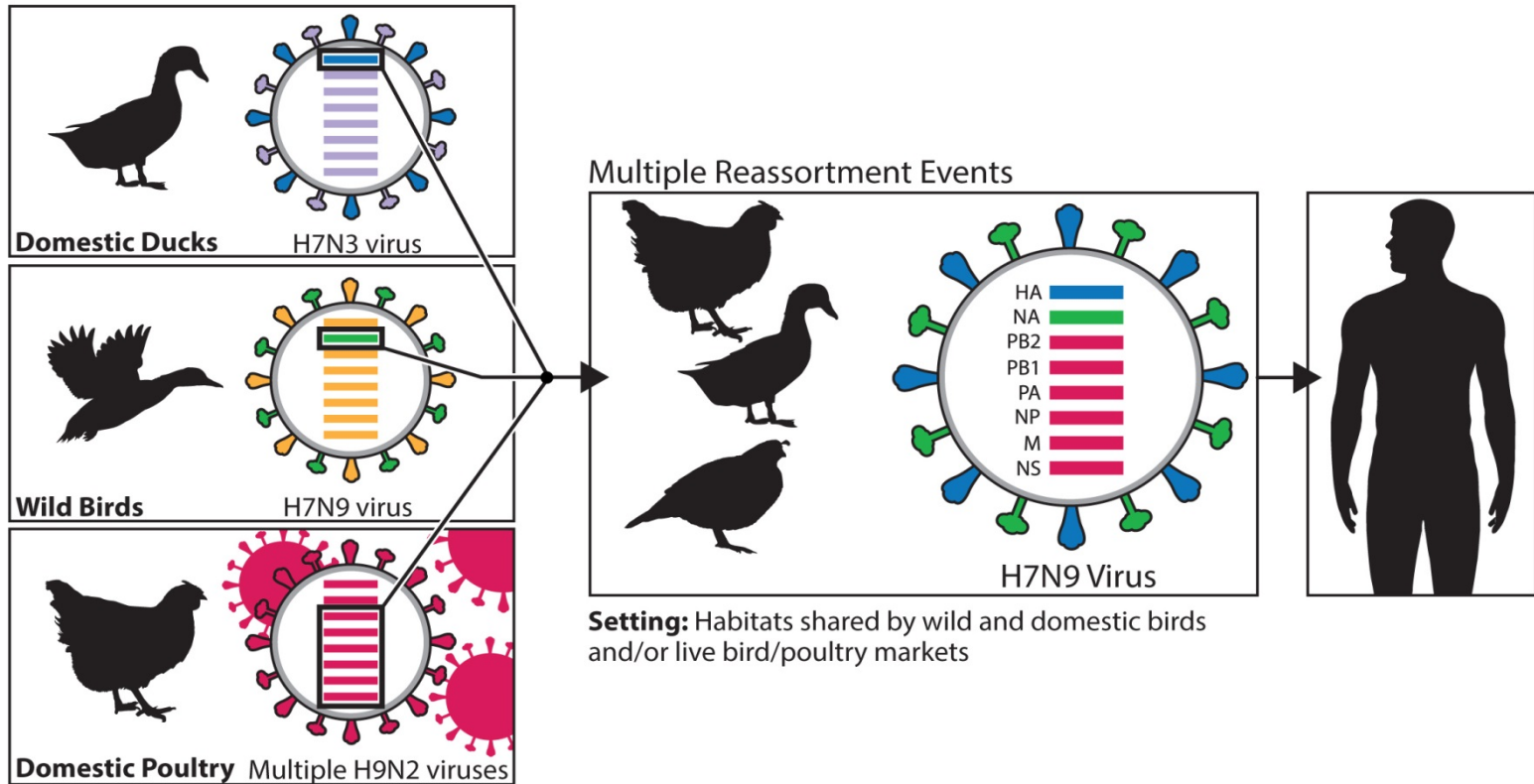
# Epi curve of avian influenza A(H7N9) cases in humans by week of onset



# So.....

- If there are no known cases from the US outbreak why do we care?
- Influenza has high mutation rates and frequent genetic reassortment
  - The only predictable thing about influenza is its unpredictability
- Other avian strains not associated with the outbreak may be found in humans

# Genetic Evolution of H7N9 Virus in China, 2013



The eight genes of the H7N9 virus are closely related to avian influenza viruses found in domestic ducks, wild birds and domestic poultry in Asia. The virus likely emerged from “reassortment,” a process in which two or more influenza viruses co-infect a single host and exchange genes. This can result in the creation of a new influenza virus. Experts think multiple reassortment events led to the creation of the H7N9 virus. These events may have occurred in habitats shared by wild and domestic birds and/or in live bird/poultry markets, where different species of birds are bought and sold for food. As the above diagram shows, the H7N9 virus likely obtained its HA (hemagglutinin) gene from domestic ducks, its NA (neuraminidase) gene from wild birds, and its six remaining genes from multiple related H9N2 influenza viruses in domestic poultry.



**Centers for Disease  
Control and Prevention**  
National Center for Immunization  
and Respiratory Diseases

# Humans symptoms of avian influenza

## Typical symptoms

- Influenza-like illness
  - Fever greater than 100°F plus cough or sore throat
- Rhinorrhea
- Fatigue
- Myalgia
- Arthralgia
- Headache
- Difficulty breathing

## Atypical symptoms

- No fever
  - More common in patients under 5 or over 65 years old or with immune-suppression
- Nausea
- Vomiting
- Diarrhea
- Conjunctivitis



# What is Maine CDC's role in avian influenza outbreaks?

Maine Center for Disease Control and Prevention



# Responder Monitoring

- CDC recommends that all persons exposed to potentially-infected birds be monitored for illness during their response activities and for 10 days after their last exposure
- Purpose is to facilitate timely identification of possible human infections with HPAI H5 viruses in order to ensure prompt medical evaluation and treatment and to prevent secondary spread

# Responder Monitoring

## **During mobilization/exposure**

- USDA/APHIS Safety Officers, Contract Safety Officers, and Facility Safety Officers are responsible for evaluation and monitoring
- Will coordinate with state if testing is needed during response

## **After mobilization/exposure**

- State health department is responsible for evaluation and monitoring



# State Led Monitoring

- USDA and contractors generate a daily report of demobilizing responders and provide to federal CDC
  - Federal CDC will notify Maine CDC for any Maine residents demobilizing via Epi-X
- If the exposure occurred in Maine, Maine CDC would collaborate with DACF, IF&W, and USDA to determine who requires monitoring
- Maine CDC initiates post-exposure monitoring

# Post Exposure Monitoring

- Day 1: Establish phone contact, determine level of exposure, and provide instructions on what to do if illness manifests
  - Low: No exposure to potentially-infected birds and/or their environment (e.g., administrative duties)
  - Medium: Exposure to potentially-infected birds and/or their environment while wearing recommended PPE
  - High: Exposure to potentially-infected birds and/or their environment while not wearing recommended PPE (e.g., exposure prior to donning PPE or a document breach in PPE)

# Chemoprophylaxis

- Not routinely recommended for personnel with low or medium exposures
- Decision to initiate antiviral chemoprophylaxis should be based on clinical judgement with consideration given to type of exposure and whether the person is at high risk for complications for influenza
  - If chemoprophylaxis is initiated treatment dosing is recommended instead of prophylaxis dosing (twice a day instead of once a day)

# Post Exposure Monitoring

- Day 2 through Day 9: Employ self-observation
  - Notify Maine CDC if signs or symptoms of influenza develop
- Day 10: Establish phone contact to verify illness status and let responders know their monitoring period has concluded

# If individual has symptoms

- Notify Maine CDC immediately before seeking care
  - Except in emergency situations
- Maine CDC will coordinate with the selected care location to make sure appropriate precautions are taken
- Maine CDC will coordinate influenza testing
- Maine CDC will recommend initiating Tamiflu
  - SNS may be used if needed

# Novel influenza testing

- Maine's Health and Environmental Testing Laboratory (HETL) is the only lab in the state that can determine if an influenza virus is a novel strain
  - HETL can test for 4 H strains (H1, H3, H5, H7)
  - HETL can detect swine components of influenza viruses
- Confirmation of a human case of avian influenza is performed by federal CDC



# Human avian influenza case

- Ensure individual is receiving appropriate care
- Complete case report form (federal CDC and WHO notification)
- Monitor, test, and provide prophylaxis for close contacts as necessary
- Coordinate with animal health for monitoring and testing

# Only you can stop bird flu!



**Only you can stop bird flu!**



Wash hands thoroughly with soap and water immediately after handling birds.

Bird Flu Hotline **020 201 90 90**

Issued by National Task Force on Avian Influenza




**Only you can stop bird flu!**



Immediately report sickness or death among birds to the nearest Agriculture or Veterinary Office or Call 020 201 90 90.

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**Only you can stop bird flu!**



Confine your birds in an enclosed area, away from other animals or wild birds.

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**Only you can stop bird flu!**

## 10 TIPS TO KEEP BIRD FLU OFF YOUR FARM

- Do not buy, sell or accept any animals, eggs or manure from other farms.
- Wash hands thoroughly with soap and water immediately after handling birds.
- Confine your birds in an enclosed area, away from other animals or wild birds.
- Clean farm and poultry equipment daily.
- Burn or bury feathers and waste away from the farmhouse. Dig deep to bury waste and add lime so that scavengers do not dig it up.
- Keep nose and mouth covered with a clean cloth, mask, or noseguard when cleaning, defeathering or slaughtering birds.
- Clean your shoes, clothing, equipment and the wheels of any vehicle when coming back from farms or poultry markets.
- Cover your hands with gloves or plastic when handling sick or dead birds.
- Always change clothes after working on the farm.
- Do not transport live or dead poultry from one place to another.

Call the bird flu hotline if you find any sick or dead birds. **020 201 90 90**

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**020 201 90 90**



**Only you can stop bird flu!**

- Immediately report sickness or death among birds to the nearest Agriculture or Veterinary Office or Call 0202019090.
- Wash hands thoroughly with soap and water immediately after handling birds.
- Confine your birds in an enclosed area, away from other animals or wild birds.
- Chicken is safe to eat if it is well cooked.
- Do not buy, sell or accept dead or sick birds.

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# Questions?

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Department of Health  
and Human Services

*Maine People Living  
Safe, Healthy and Productive Lives*

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