



2014 - 2015
Seasonal Flu
Wrap up

HPAI
Readiness

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Outline

- I. 2014-2015 Flu season summary: Lessons learned
- II. Influenza Surveillance: What it is and how you can help
- III. Highly Pathogenic Avian Influenza



2014 - 2015
Flu Season
Summary

2014- 15 Flu Season: Lessons Learned

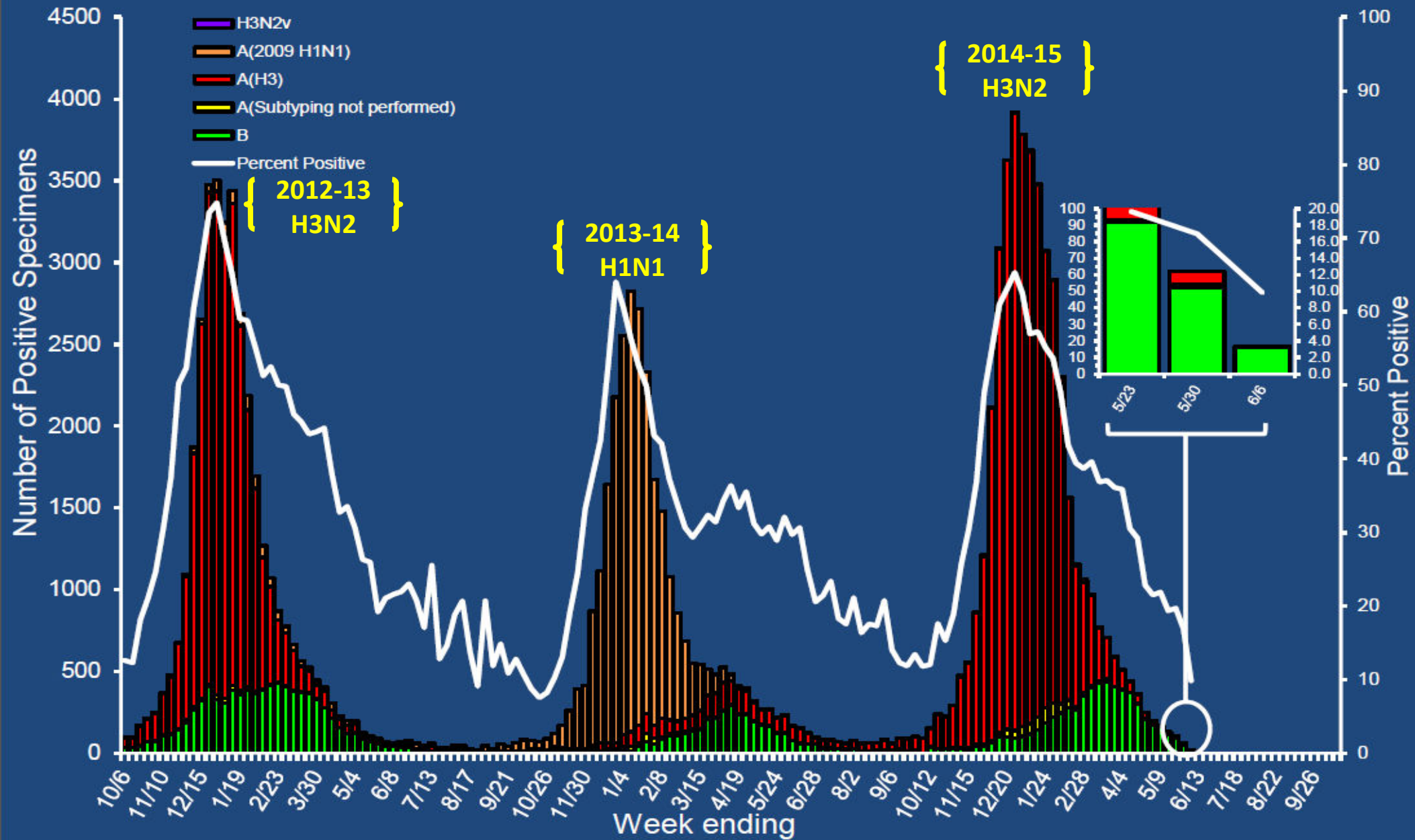
- 2014-15 was a Flu A (H₃N₂) dominant year
 - People 65+ years were hit hardest
 - High number of flu deaths, LTC outbreaks
- The flu vaccine was not a great match
 - Predominant H₃N₂ strain drifted
 - Better effectiveness against other strains
 - Highlight importance of other control measures
- Some unusual presentations of flu

2014- 15 Flu Season: Lessons Learned

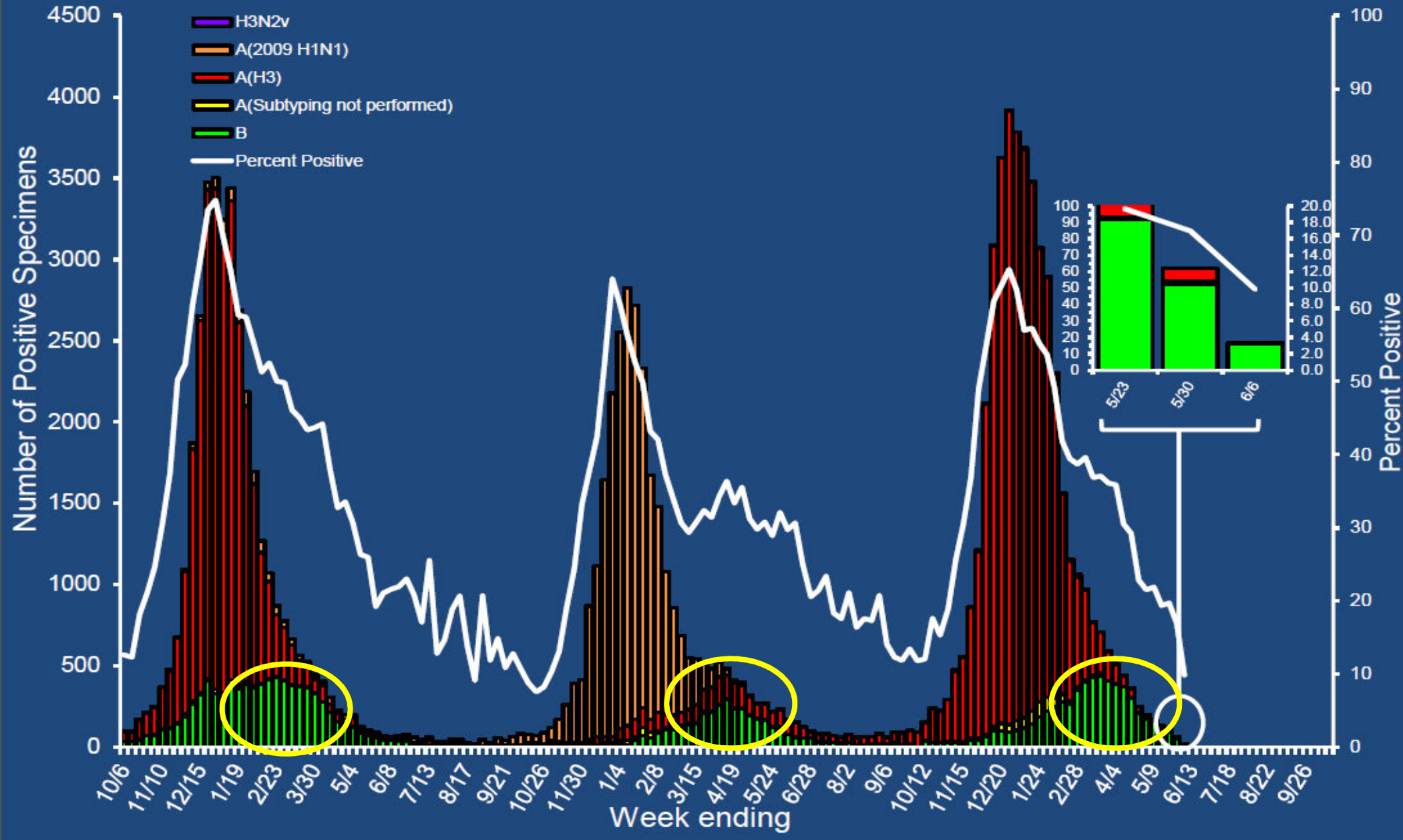
Flu A (H3)

- Moderately severe H₃N₂-predominant season
- Flu season peaked in late December
- Overall there were high levels of flu-associated hospitalizations and deaths, especially for people 65 years and older
- Majority of circulating influenza A (H₃N₂) viruses were different from the influenza A (H₃N₂) component of the 2014–15 Northern Hemisphere seasonal vaccines, resulting in reduced vaccine effectiveness

Public Health Sites - Epidemiology/Surveillance National Summary, 2012-15



Public Health Sites - Epidemiology/Surveillance National Summary, 2012-15



2014- 15 Flu Season: Lessons Learned

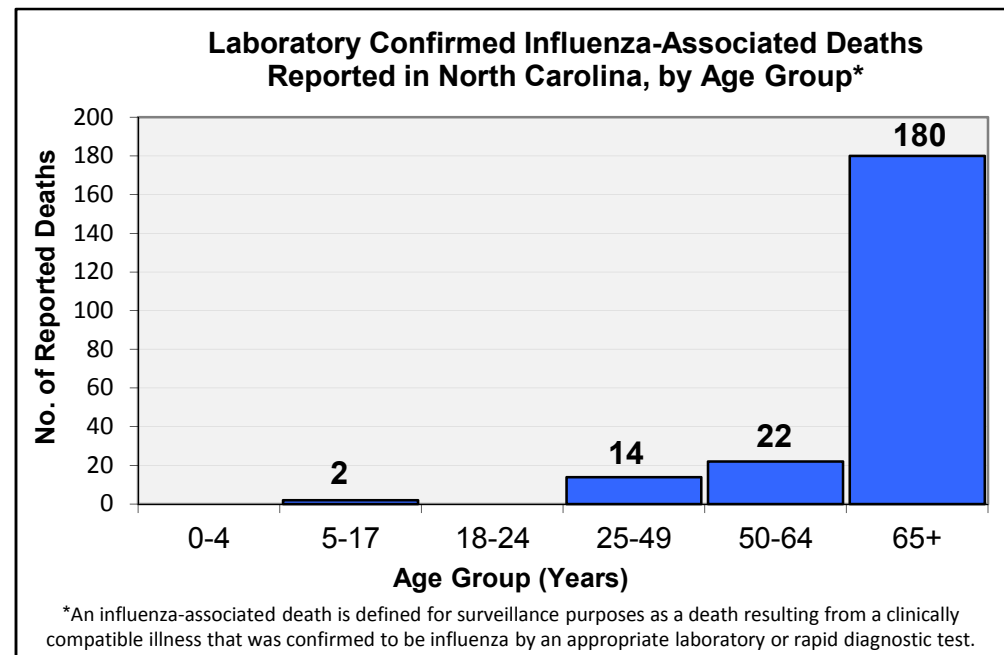
218 Flu- associated deaths

- ✓ 55% Female and 45% Male
- ✓ Vaccination status is known for 170 cases –
 - ✓ 66% were vaccinated and 34% were not vaccinated during the 2014-15 season
- ✓ Antivirals were given to 76% of the cases
- ✓ 97% of flu- associated deaths were Flu type A

107 influenza outbreaks!

CDC Guidance for LTCF:

<http://www.cdc.gov/flu/professionals/infectioncontrol/ltc-facility-guidance.htm>



2014- 15 Flu Season: Lessons Learned

People at high risk for Flu-

- People with asthma, diabetes, heart disease, HIV/AIDS, cancer, pregnant women, adults over 65 years and children less than 5 years are at higher risk for complications from influenza

All Flu-associated deaths are reportable in NC!

Flu Death Reporting in NC

Adult and pediatric flu associated deaths are reportable in NC

An influenza-associated death is defined for surveillance purposes as a death resulting from a clinically compatible illness that was confirmed to be influenza by an appropriate laboratory or rapid diagnostic test. There should be no period of complete recovery between illness and death.

During the 2014-15 season 83% of flu deaths occurred in people over 65 years.

- Gather vaccination history
- Treatment plan- Were antivirals taken?
- Risk history package should include where they resided; if in a nursing home find out about outbreaks
- Specimen available for testing at SLPH

The screenshot displays the North Carolina Electronic Disease Surveillance System (NCEDSS) interface. The main window is titled "Event Summary" and contains a "Basic Information" section with the following details:

Event ID	
Disease	Influenza, adult death (18 years of age or more) (7)
Person	
Type	Interactive
Investigation Status	Closed
Linked Events/Contacts	0 linked event(s)/contact(s) (View)
Attachments	0 attachment(s)
Notifications	

Below the "Basic Information" section are two buttons: "Edit Event Properties" and "Copy Event". At the bottom of the interface, there is a "Question Packages" section with a table that has columns for "Question Package", "Person", "Last Update", and "Updated By".

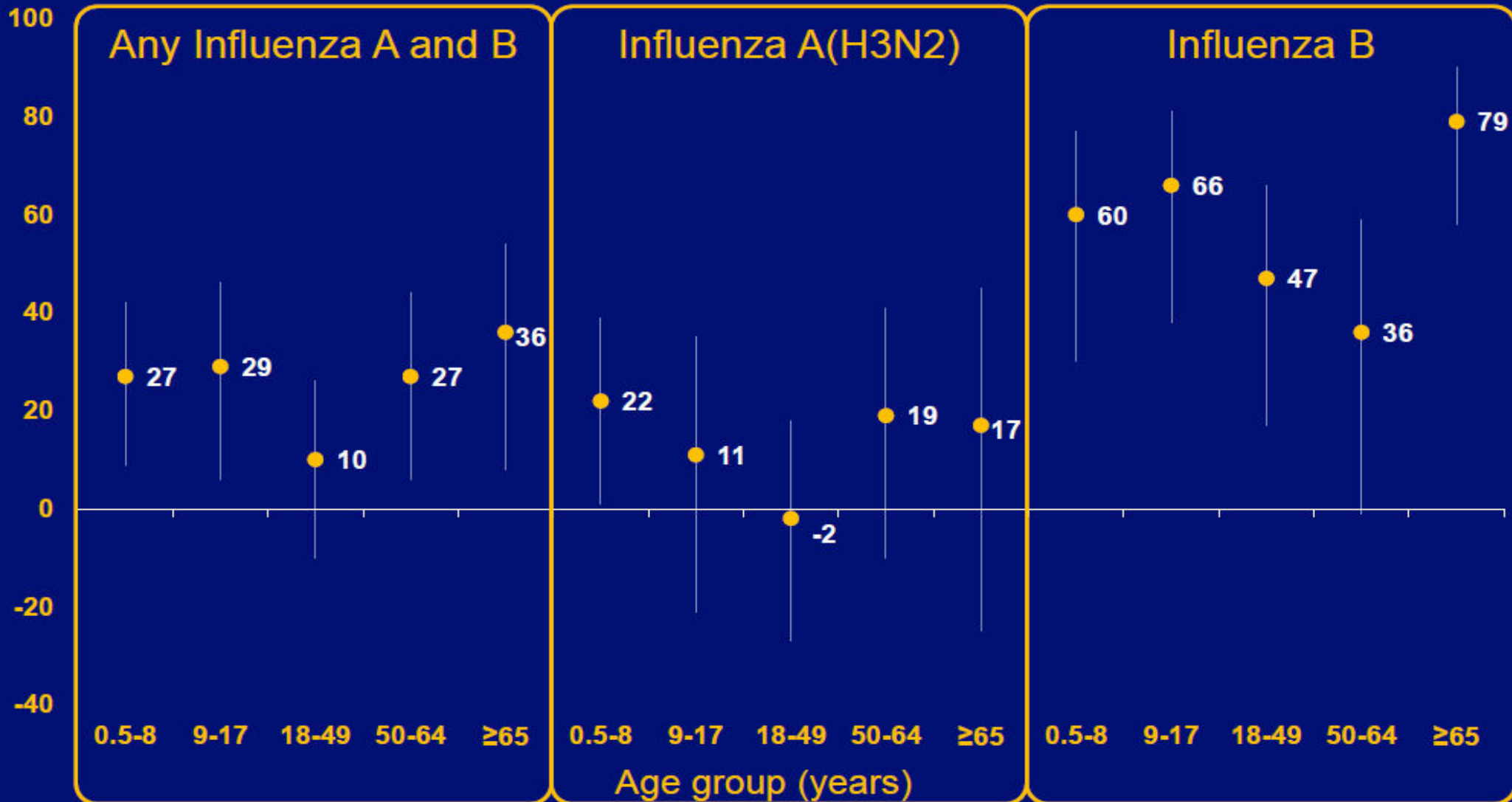
Vaccine Effectiveness

- Vaccine effectiveness estimate against influenza virus was 23% for the 2014-15 season.
 - This means the flu vaccine reduced a person's risk of having to go to the doctor because of flu by 23 percent
- Vaccine effectiveness against influenza A H₃N₂ virus was 18%
- Vaccine effectiveness against influenza B virus was 45%

Table. Adjusted vaccine effectiveness estimates for influenza seasons from 2010-2015

Influenza Season [†]	Reference	Study Site(s)	No. of Patients [‡]	Adjusted Overall VE (%)	95% CI
2010-11	Treanor 2011	WI, MI, NY, TN	4757	60	53, 66
2011-12	Ohmit 2014	WI, MI, PA, TX, WA	4771	47	36, 56
2012-13	McLean 2014	WI, MI, PA, TX, WA	6452	49	43, 55
2013-14	Unpublished	WI, MI, PA, TX, WA	5990	51	43, 58
2014-15	ACIP presentation, Flannery	WI, MI, PA, TX, WA	9329	23	14, 31

VE against any influenza, A(H3N2), and B by age group, US Flu VE Network, 2014-15



Flu Vaccine – Deaths Prevented

- Study of deaths prevented by flu vaccine, August 2005–June 2014
- ~40,127 deaths averted
 - Highest number in 2012–13 (9,398)
 - Fewest in 2009–10 pandemic (222)
 - 88.9% averted deaths in adults ≥ 65
- Estimates do not include indirect effects/ herd immunity

2015 - 16 Vaccine Selection

The trivalent vaccine for use in 2015-16 season (northern hemisphere) will have:

- A/California/7/2009 (H1N1)pdm09-like virus;
- **A/Switzerland/9715293/2013 (H3N2)-like virus;**
- B/Phuket/3073/2013-like virus

The quadrivalent will have the three listed above and an additional

- B/Brisbane/60/2008-like virus

2015-16 Vaccine Recommendations

- No preferential recommendation for LAIV in children 2-8 years of age
 - Lower effectiveness against H₃N₂ in last season
- No preferential recommendation for high-dose vaccine for persons over age 65
 - No increased effectiveness in observational studies

2014-15 Flu Season: Lessons Learned

Antiviral treatment

- Use antiviral medications as an adjunct to vaccination; Primary line of defense is still vaccine
 - With reduced vaccine effectiveness their potential public health benefit is magnified
- Treatment should be initiated within 48 hours of symptom onset
- Do NOT wait for confirmatory influenza laboratory testing to use an antiviral medication
- During peak influenza season, treatment should NOT be withheld due to negative rapid flu test results

Unusual Presentation of Flu

Flu with Parotitis

- Inflammation of the parotid gland is a rare complication of influenza.
- In December 2014, multiple states reported parotitis in lab confirmed influenza cases.
- CDC did a case-control study, most cases experienced painful unilateral swelling 4 days after influenza-like symptoms

Flu with Rash

- Rash is a very rare complication of influenza B
- By March 2015, CDC was notified by multiple states of patients with a maculopapular rash and lab confirmed flu
- Measles test was negative



Influenza Surveillance

Data Sources for Flu Surveillance

A. U.S. Outpatient Influenza-like Illness Surveillance Network (ILINet)

- I. Currently made up of 60 sites that report influenza-like illness weekly at their facility.
- II. Enrollment occurs year round

B. NC DETECT

- I. Emergency department data from across NC

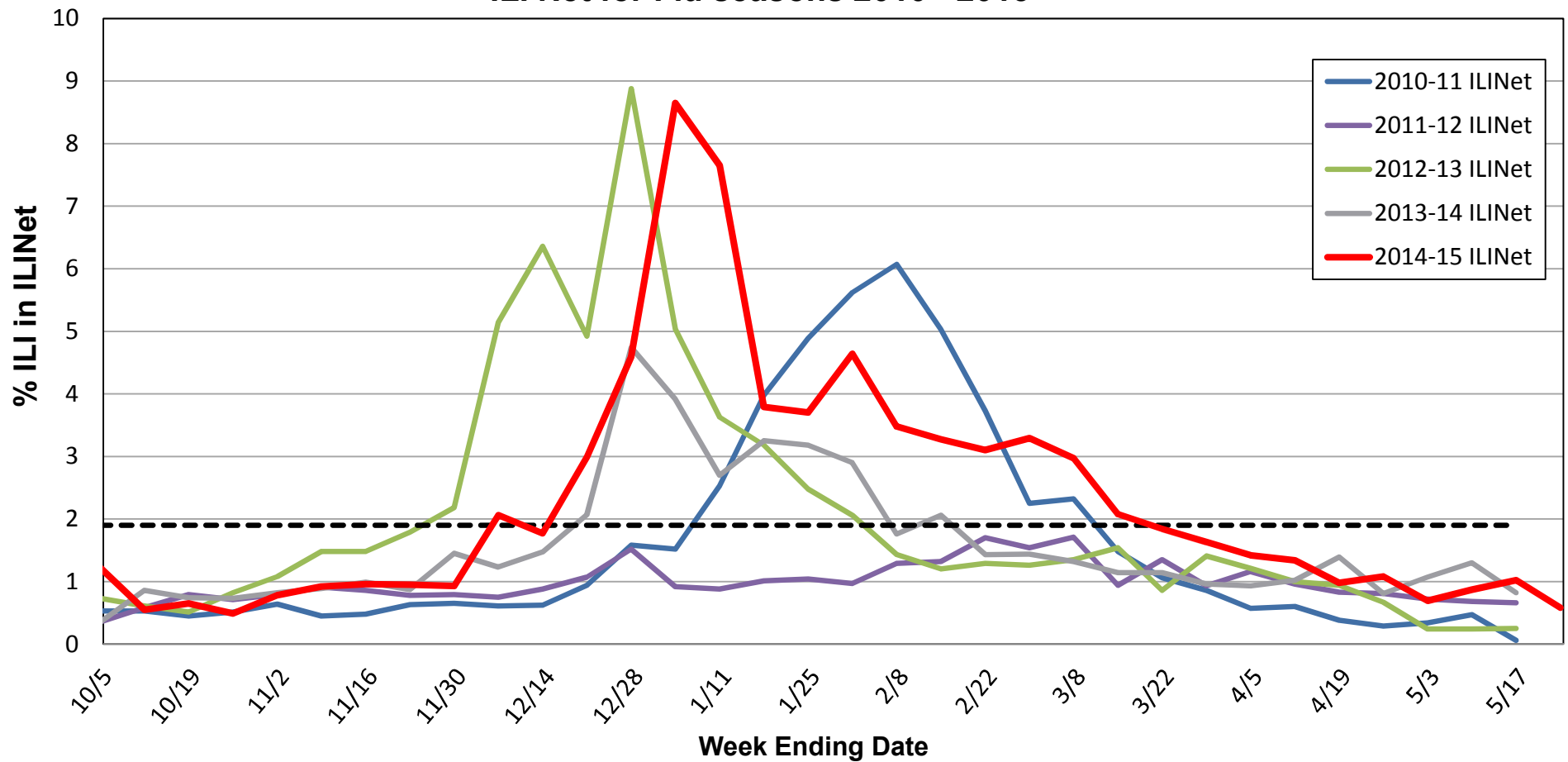
C. Public Health Epidemiology (PHE) Network

- A. Viral respiratory test results
- B. Acute respiratory admissions

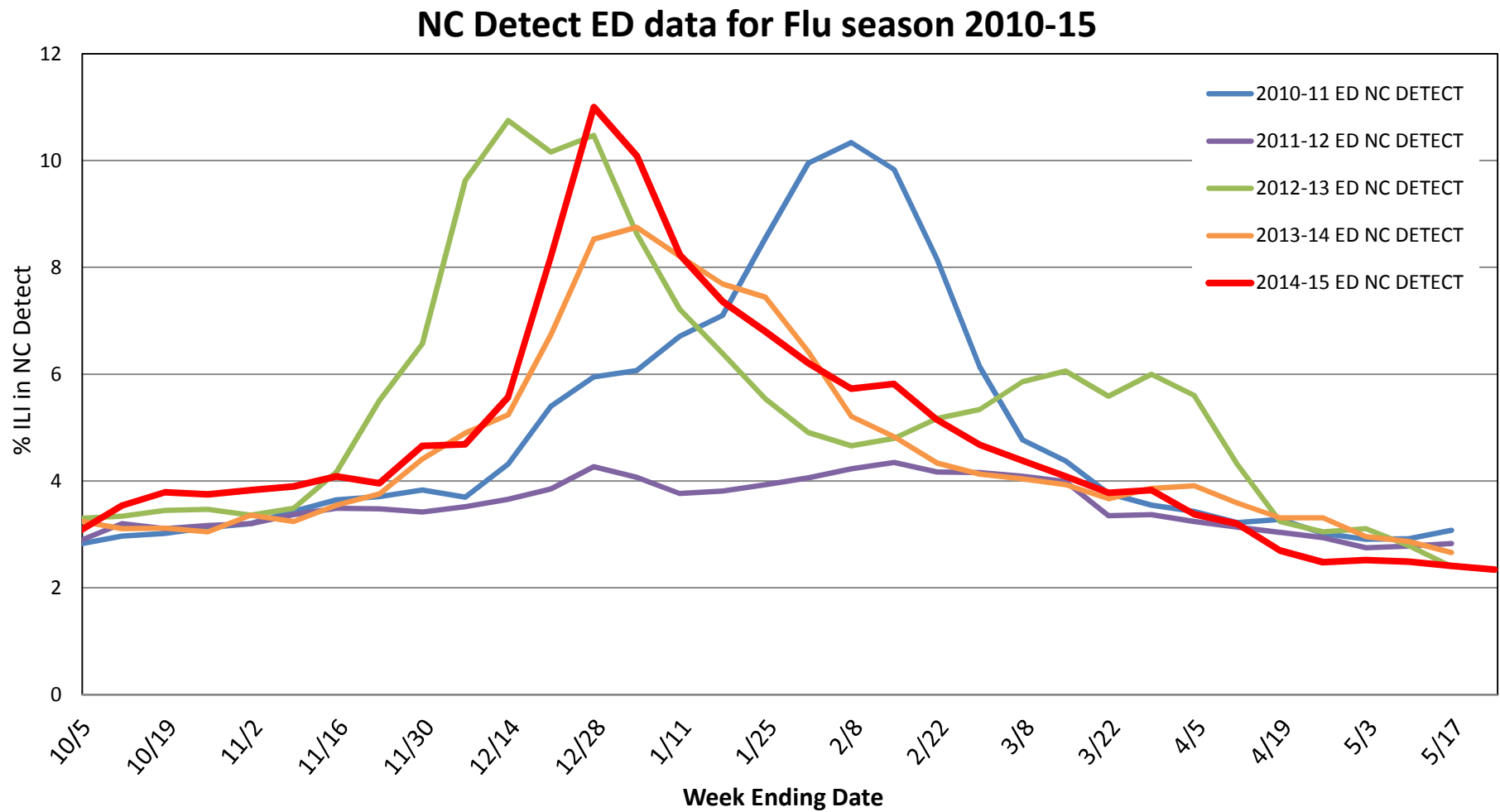
D. State Laboratory of Public Health

ILINet Data for 2010-15

Percentage of visits for Influenza-like illness reported by ILI Net for Flu seasons 2010 - 2015



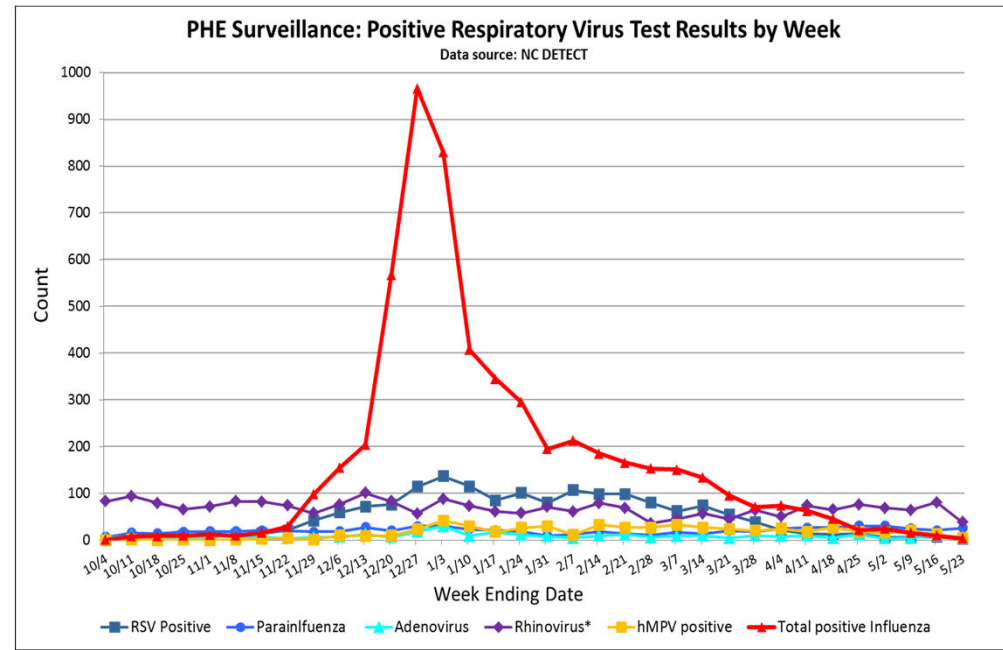
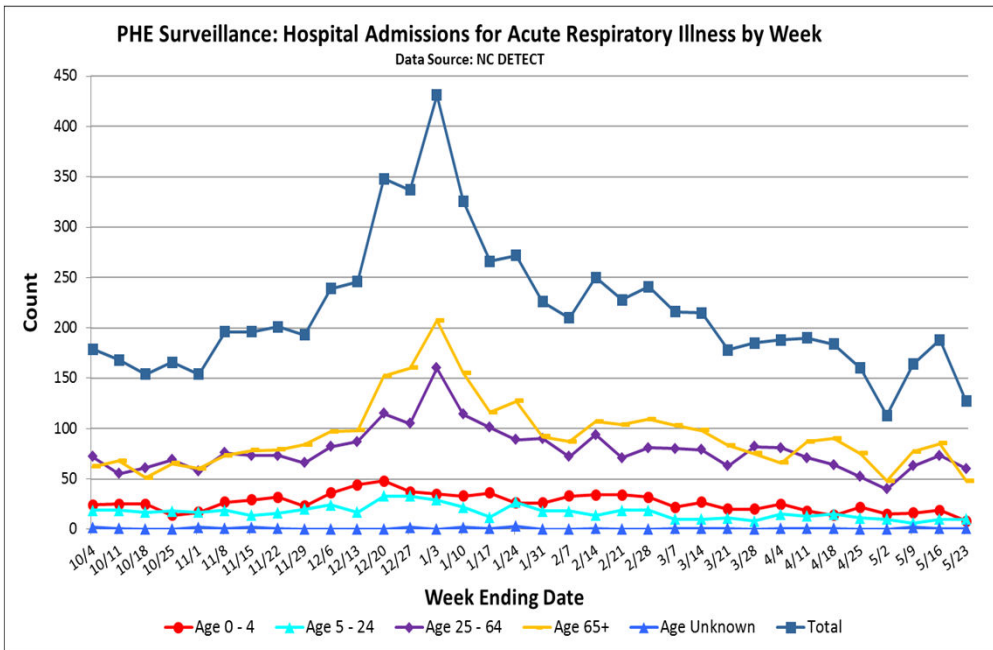
NC DETECT Data for 2010-15



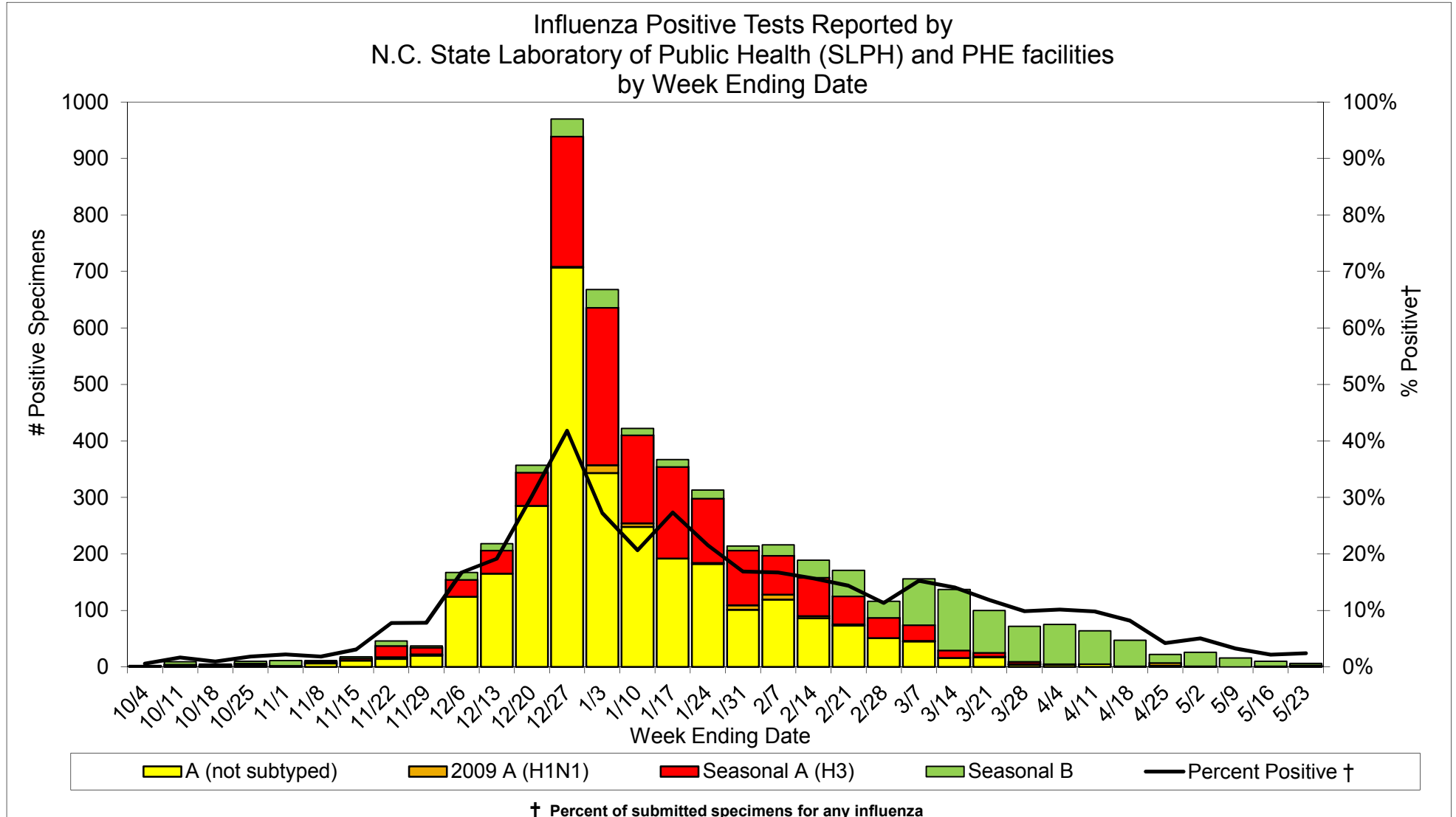
PHE Data

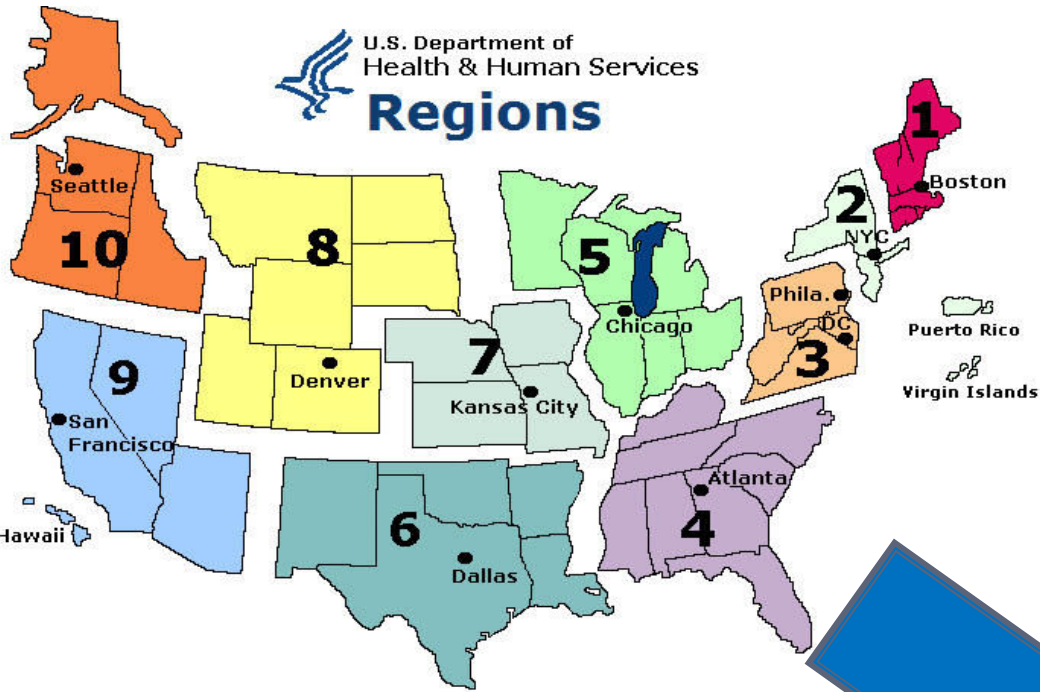
Acute Respiratory Admissions

Viral respiratory test results



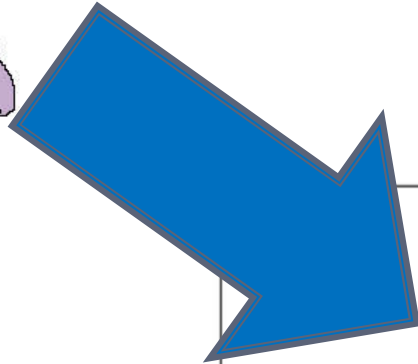
State Lab Of Public Health Data with PHE Data



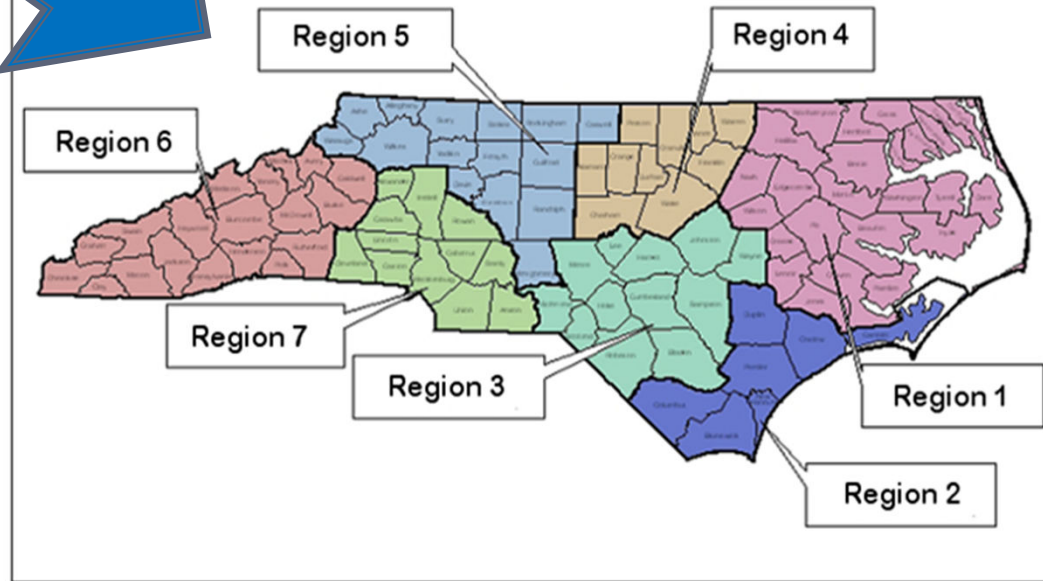


Nationally NC is in Region 4 of the US

NC is divided into 7 regions to monitor flu activity

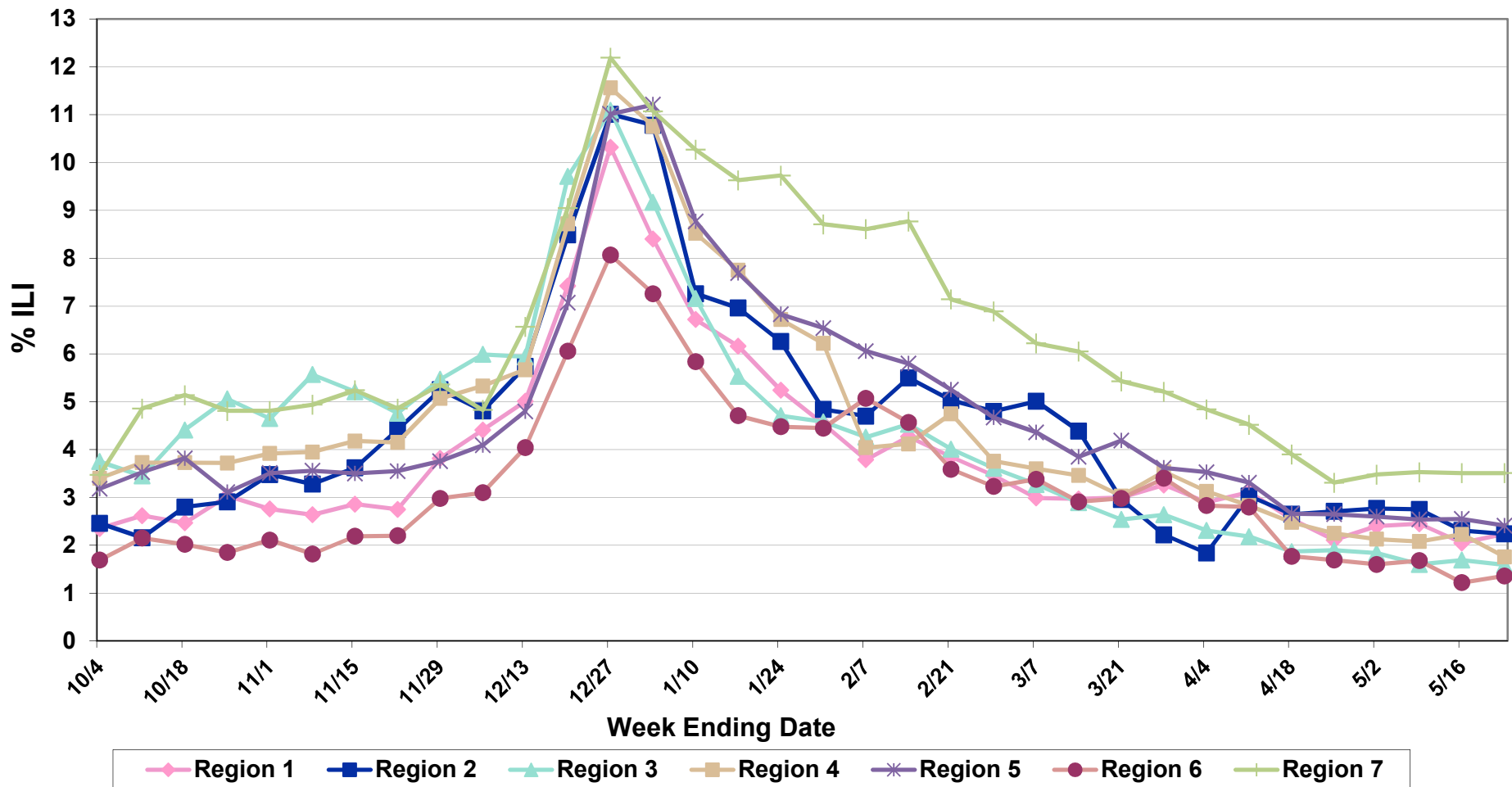


Flu Surveillance Regions



NC Regional data

Percentage of Total Visits by Week, Grouped by Flu Surveillance Regions:
NC DETECT ED Influenza-Like Illness (ILI), 2014-15



Enrollment in the ILINet program

Sites can be (but not limited to)- hospitals, local health departments, student health services, private practices, and urgent care clinics

- ✓ If you know of a site or provider that is interested in being a part of the sentinel program please contact us
- ✓ Some qualities of a good sentinel site:
 - ✓ Timely reporting of weekly influenza numbers (by Tuesday afternoon for Thursday reports)
 - ✓ Submitting at least 1 flu specimen per month to the state lab of public health (SLPH)
- ✓ The PERKS of being a sentinel provider
 - ✓ Free MMWR subscription
 - ✓ Specimen testing at SLPH with flu characterization

What's Next?

- Keep a look out for updated memos on influenza and respiratory illnesses
- If you are part of the sentinel program, thank you for participating we look forward to seeing your data in the upcoming season
- If you want to join or know of a site that would enjoy being part of the sentinel program please contact us
- Continue to promote flu vaccines!
- Thank you for all your during flu seasons!

Highly Pathogenic Avian Influenza (HPAI)



Veterinarians from the federal and state Departments of Agriculture catch birds either infected or exposed to avian flu at a backyard farm in Richland, Wash. Credit Bob Brawdy/The Tri-City Herald, via Associated Press

HPAI: Outline

- I. Avian influenza
 - Background
 - Human risk/ongoing outbreaks
- II. HPAI in the United States
 - History
 - Current situation
- III. Public health guidance
 - Measures to minimize exposures
 - Antiviral chemoprophylaxis (pre- and post-exposure)
 - Post-exposure monitoring
 - Management of illness among exposed persons

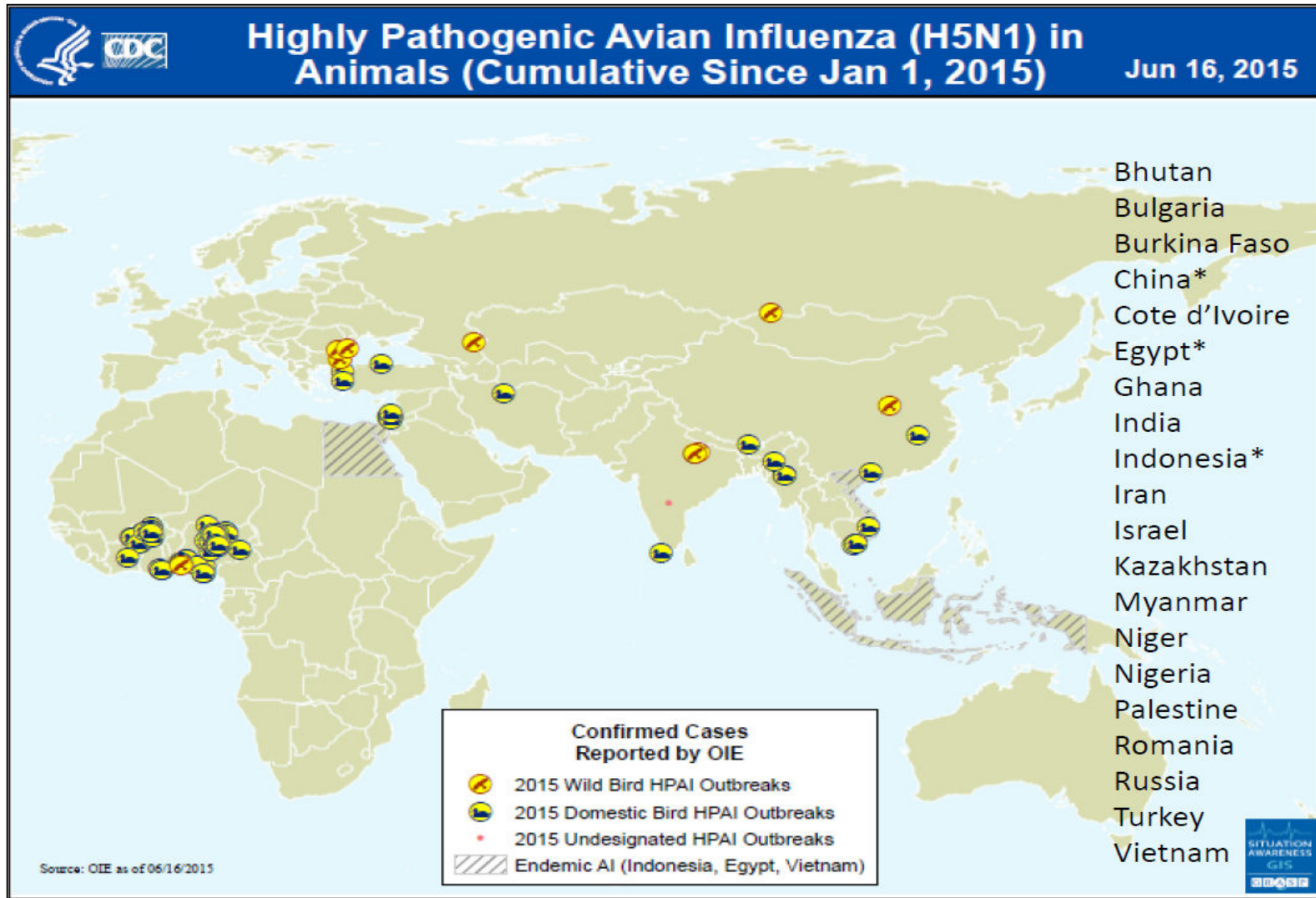
What is Avian Influenza?

- Influenza A viruses carried by wild aquatic birds
 - Usually asymptomatic in reservoir species
 - Shed in saliva, nasal secretions, feces
- Defined as highly pathogenic (HPAI) or low pathogenic (LPAI) based on
 - Mortality in chickens
 - Genetic markers

Avian Influenza: Risk to People

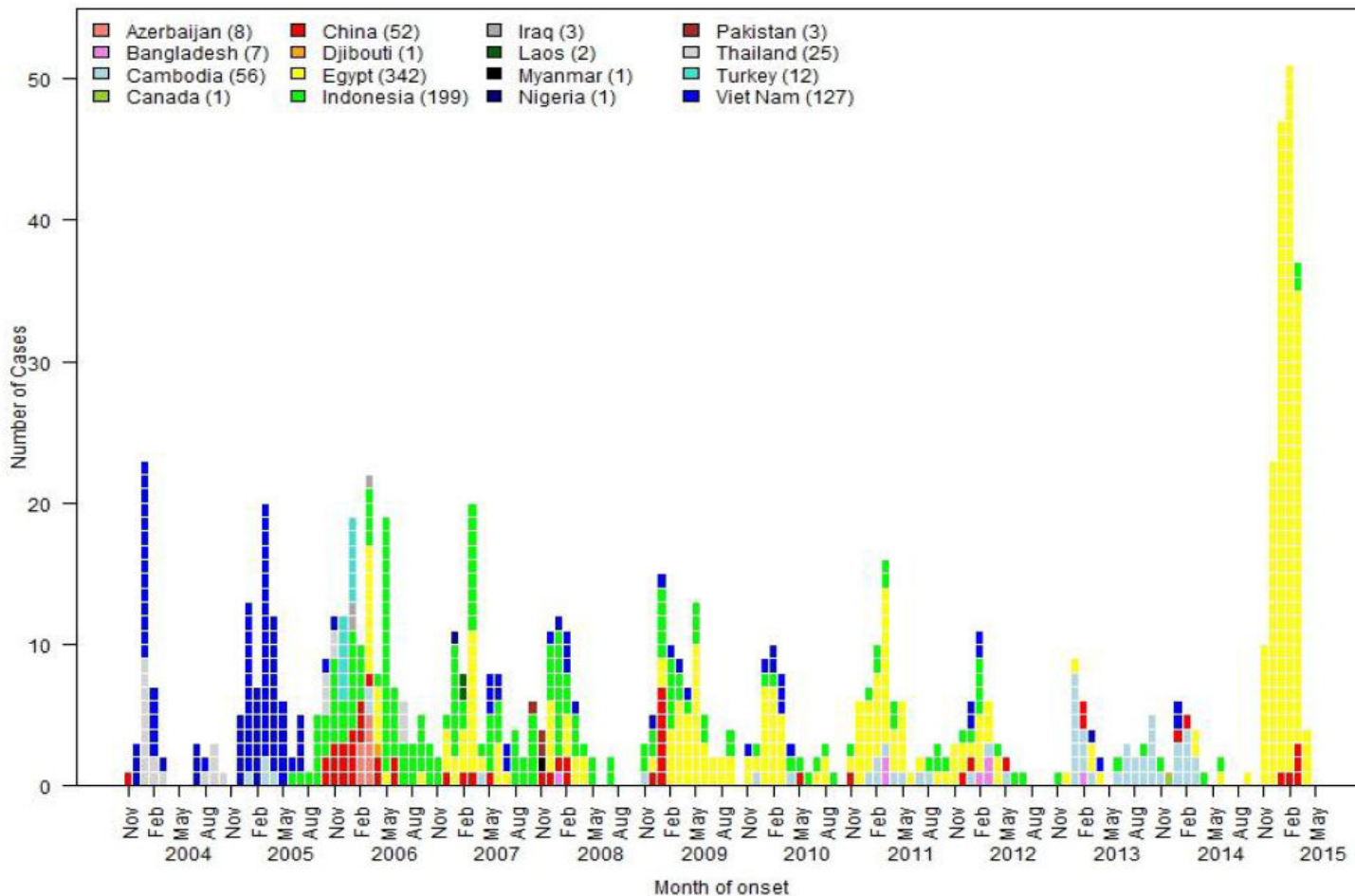
- Human cases have occurred rarely
 - Contact with infected birds
 - Contact with birds' secretions/excretions
- H5 and H7 avian influenza viruses considered higher risk for human infection
- Two ongoing outbreaks of human illness
 - HPAI H5N1 (since 2003)
 - LPAI H7N9 (since 2013)

Current Outbreaks: HPAI H5N1



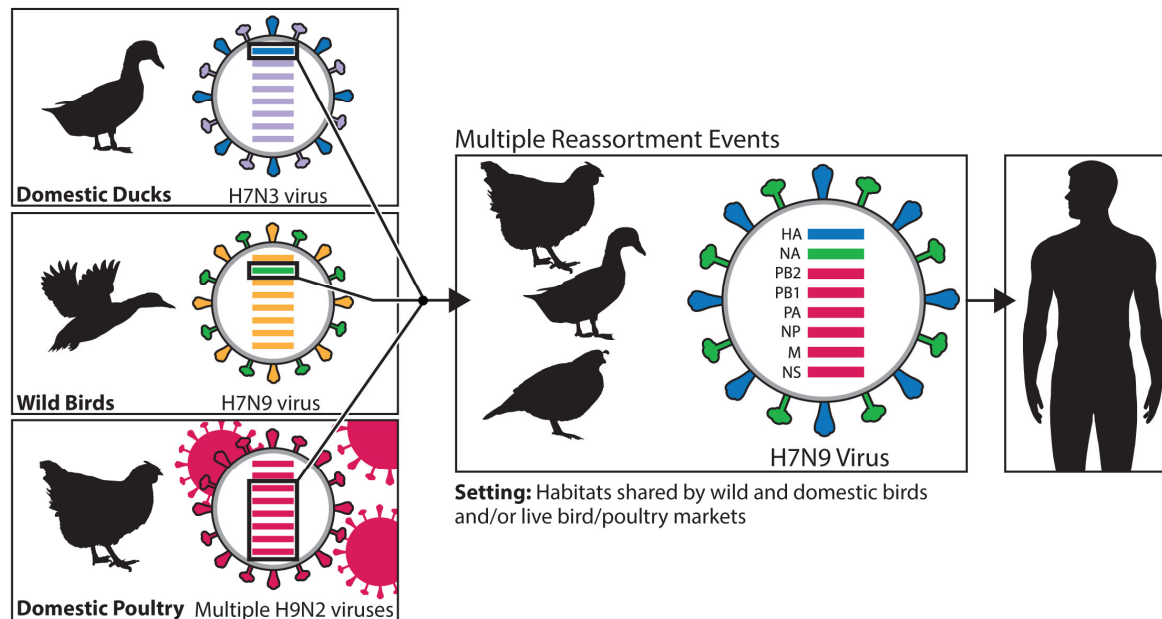
Current Outbreaks: HPAI H5N1

Human Infections of Influenza A (H5N1), 2004-2015



Current Outbreaks: LPAI H7N9

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

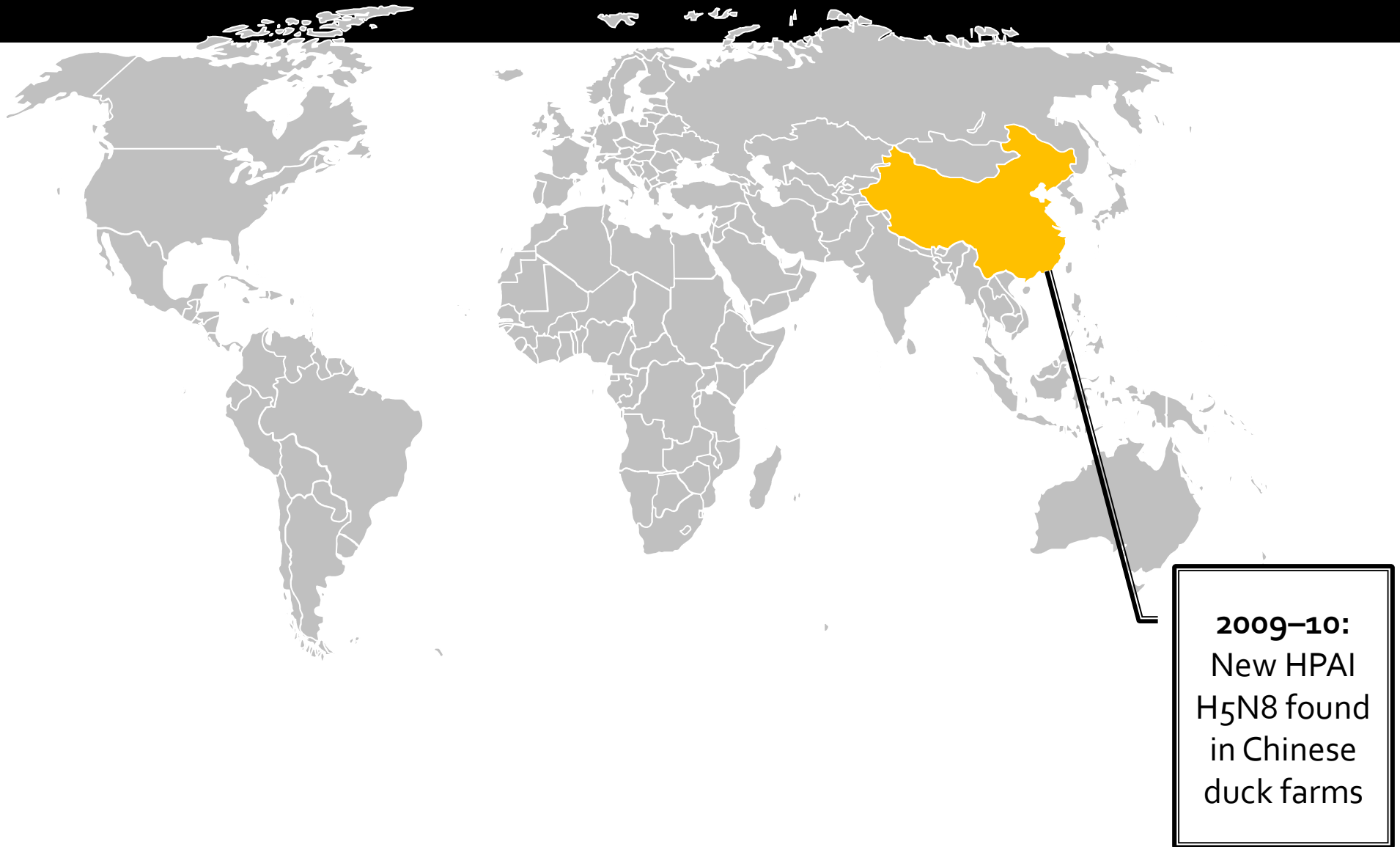
HPAI in Birds: A Brief History

- Rarely detected in wild birds prior to 2014
 - Exception: H5N1 in Asia since 2002
- No historical evidence for HPAI in North American wild birds
 - >400K wild birds tested during 2006–2011
- Only one report of HPAI in US commercial poultry since 1997
 - Texas 2004 (H5N2 virus)

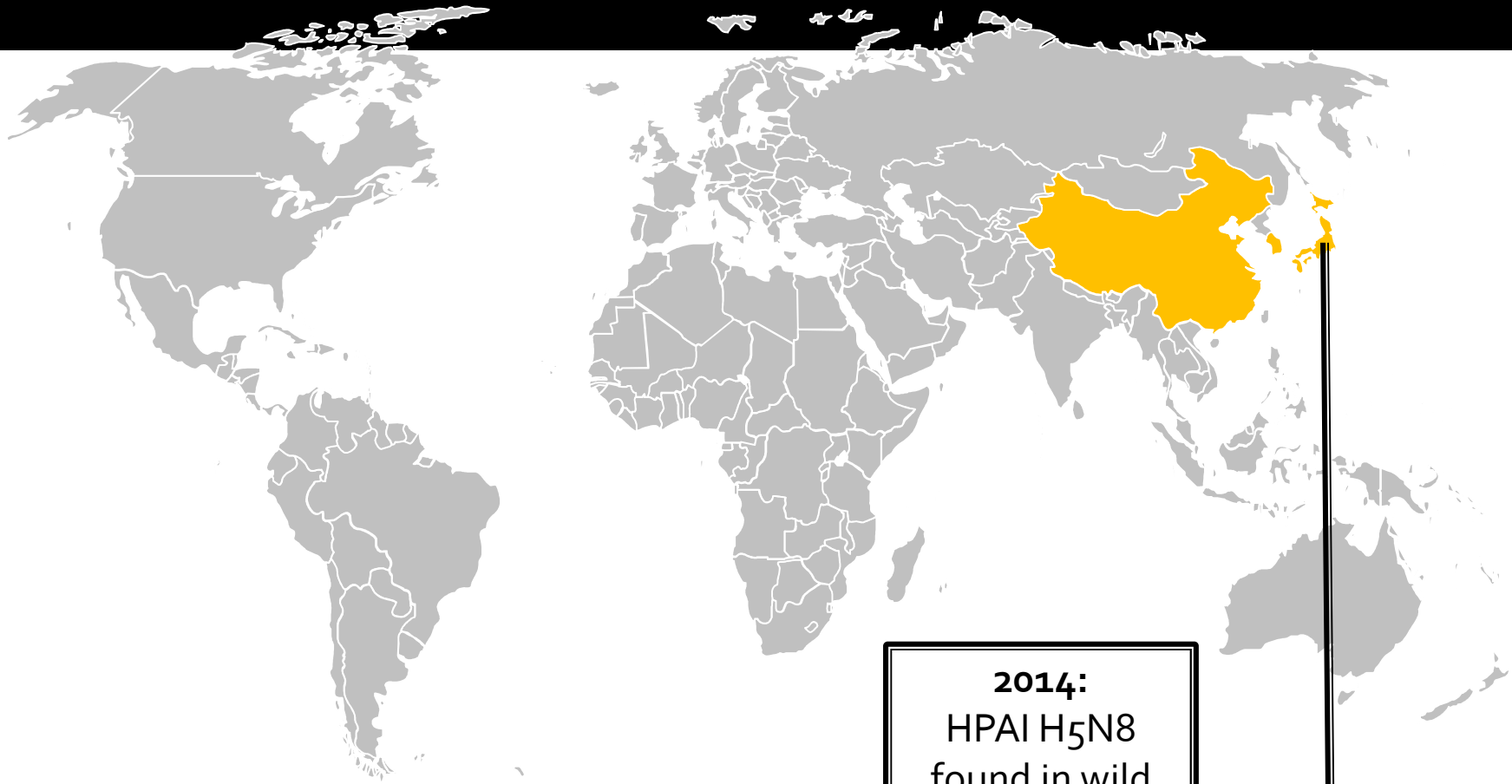
HPAI in Birds: Recent Developments



HPAI in Birds: Recent Developments

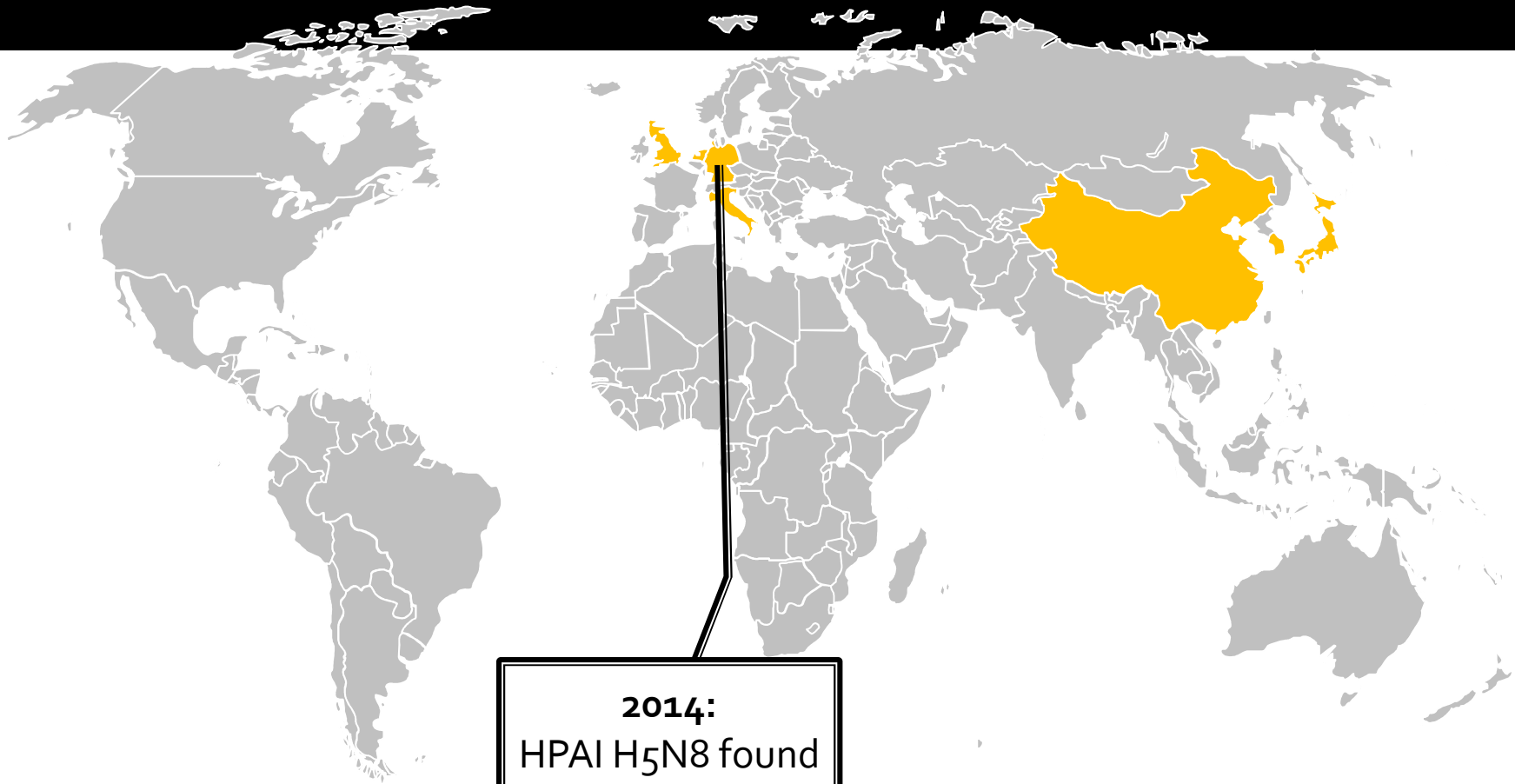


HPAI in Birds: Recent Developments



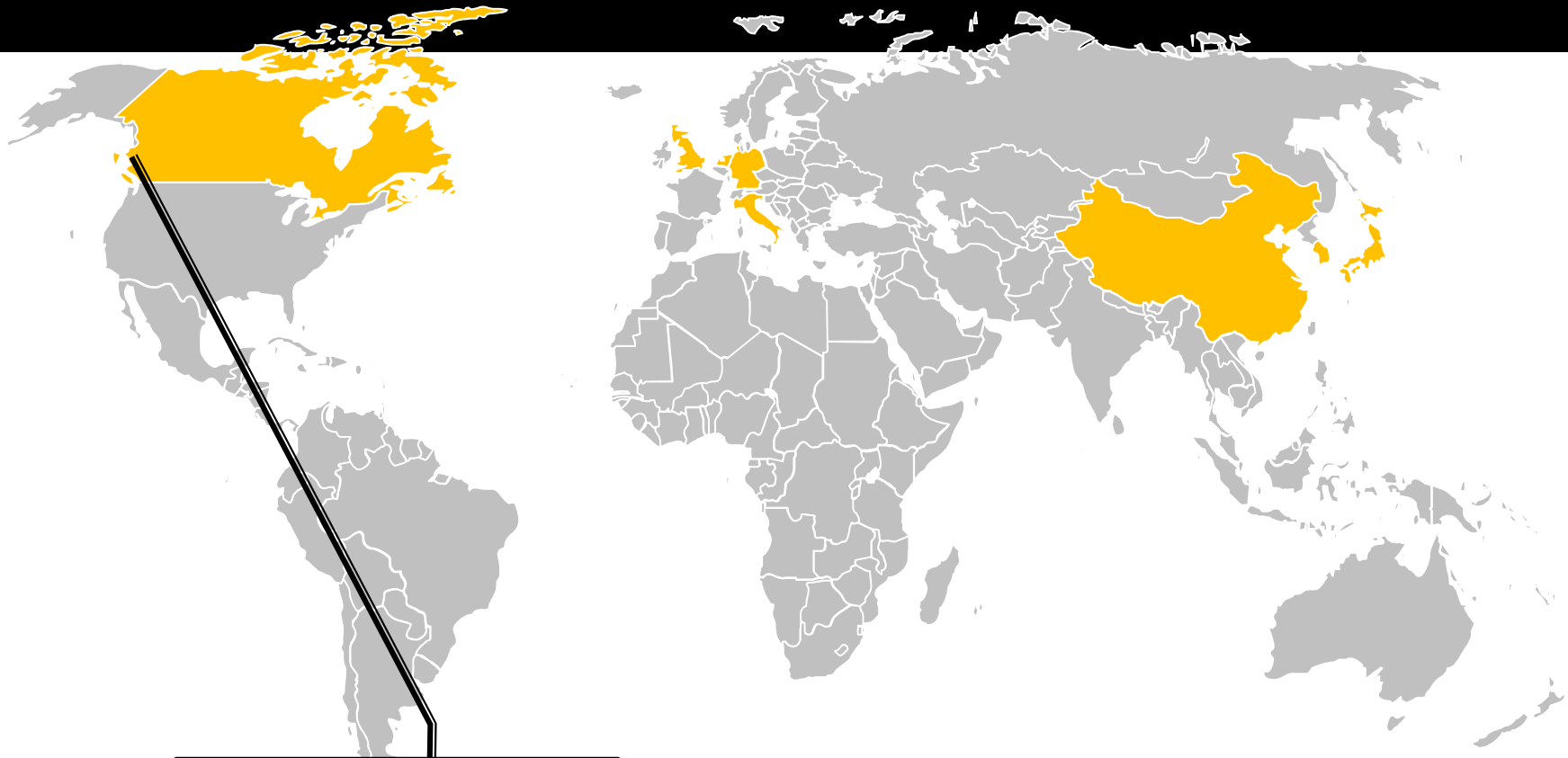
2014:
HPAI H5N8
found in wild
birds and
poultry in
Korea and
Japan

HPAI in Birds: Recent Developments



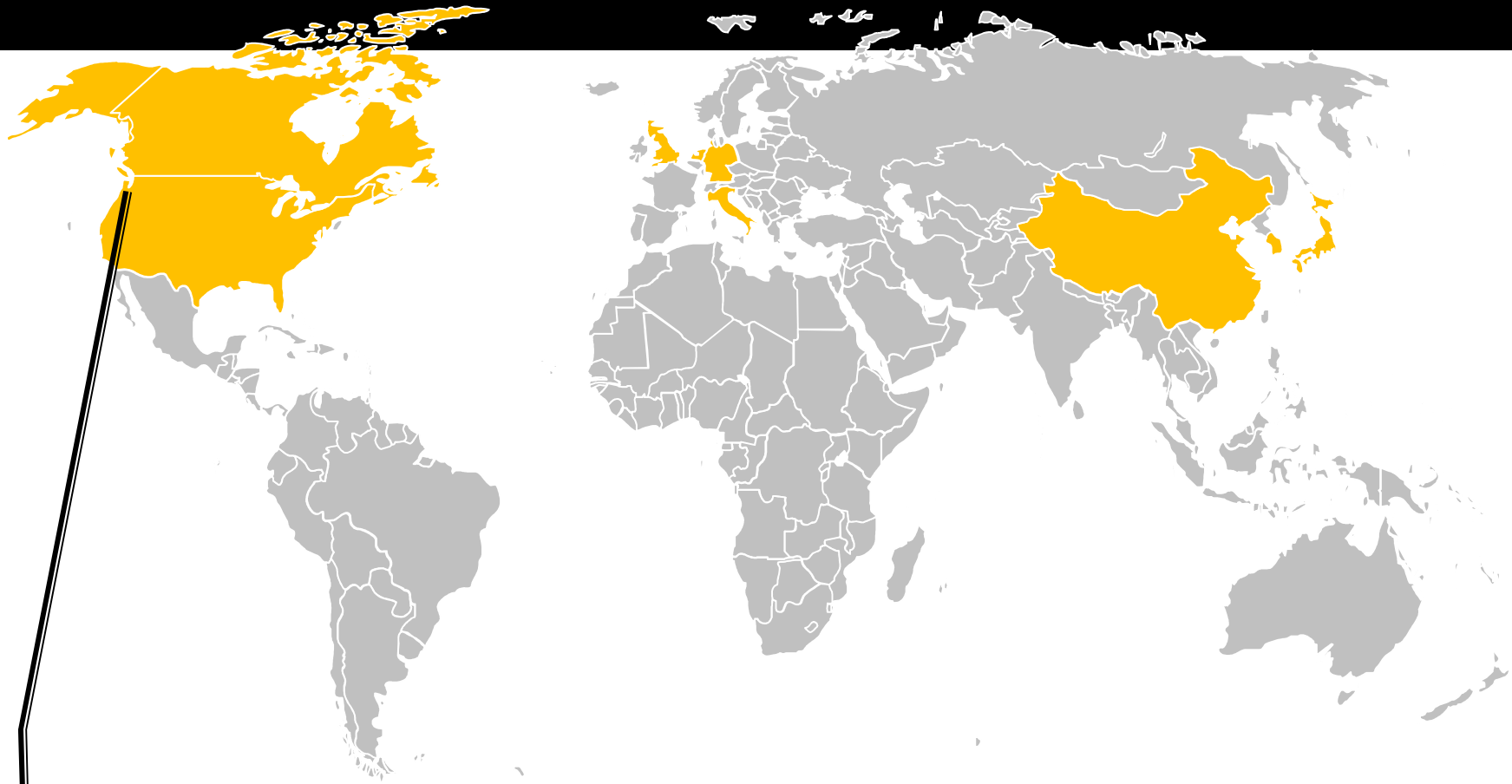
2014:
HPAI H5N8 found
in wild birds in
England,
Netherlands,
Germany, Italy

HPAI in Birds: Recent Developments



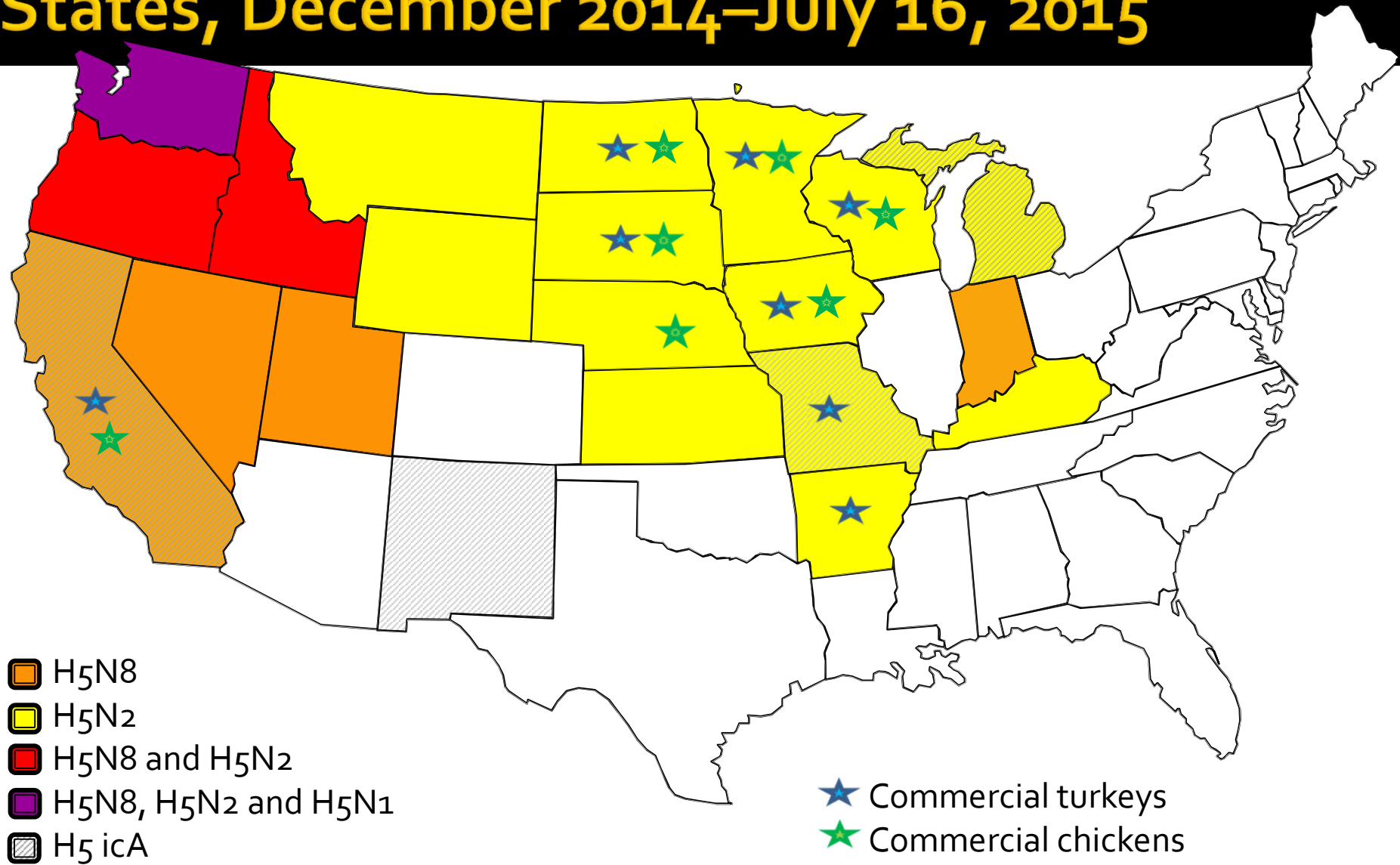
November, 2014:
Similar HPAI H5
(H5N2) in North
American birds

HPAI in Birds: Recent Developments



December, 2014:
Detection of similar
virus (H5N1) in US

HPAI H5 in Domestic and Wild Birds — United States, December 2014–July 16, 2015



Number of HPAI H5 Detections in the US – December 2014–June 9, 2015

Species	H5N2	H5N8	H5N1	H5
Poultry	218	4	-	-
Captive Wild Bird	3	2	-	-
Wild Bird (as of 5/14)	35	22	3	12
Total Detections	256	28	3	12

- >48 million birds affected in 21 states
- Massive economic impact

USDA Response to HPAI

Action	Description
Quarantine	Restricting movement of poultry and poultry-moving equipment
Eradicate	Humanely euthanizing affected flock(s)
Monitor region	Testing wild and domestic birds around quarantine area
Disinfect	Killing the virus in the affected locations
Test	Confirming poultry farm is AI virus-free

Newly Detected Avian HPAI H5: Human Health Risks

- No human infections identified
- Human infections reported with similar viruses
- Animal studies suggest low-moderate virulence, low transmissibility in mammals
- “...newly identified US HPAI viruses should be regarded as having the potential to cause severe disease in humans until shown otherwise.”

http://wwwnc.cdc.gov/eid/article/21/12/15-0904_article
<http://jvi.asm.org/content/early/2015/07/24/JVI.01438-15.abstract>

HPAI Response: State and Local Roles

- State response led by NC Department of Agriculture and Consumer Services
 - NC DPH providing support regarding human health
- Local health department roles could include
 - Risk communication
 - Identification of exposed persons
 - Monitoring of exposed persons
 - Management of illness in exposed persons (testing, treatment, infection control measures)

Minimizing Exposure to HPAI

- General public:
 - Avoid contact with wild birds
 - Avoid contact with domestic birds that appear ill
 - Avoid contact with surfaces contaminated with bird feces
- Workers/responders:
 - Follow all recommended biosecurity measures
 - Use appropriate personal protective equipment
 - Perform thorough hand hygiene before entering and after leaving affected areas

<http://www.cdc.gov/flu/avianflu/h5/worker-protection-ppe.htm>

Identifying Potential Contacts

- Contact with potentially-infected birds
 - Handling, slaughtering, defeathering, butchering, culling, preparation for consumption
- Direct contact with surfaces contaminated with feces or parts of potentially-infected birds
 - Carcasses, internal organs
- Prolonged exposure to potentially-infected birds in a confined space

Monitoring of Exposed Persons

- Monitored all exposed persons for 10 days after last exposure
 - PPE worn at all times → self-monitor
 - PPE NOT worn → active daily monitoring
- Report any illness signs or symptoms, including
 - Fever or feeling feverish
 - Cough
 - Runny nose
 - Sore throat
 - Headache
 - Muscle aches
 - Eye redness
 - Difficulty breathing
 - Diarrhea

HPAI Symptom Monitoring Log

HPAI Symptom		Name: _____		Date of initial exposure: __/__/__		Date monitoring began: __/__/__					
Monitoring Log		NC EDSS Event ID: _____		Date of last exposure: __/__/__		Date monitoring ended: __/__/__ (Day 10 after last exposure)					
Page ___ of ___	Date: _____	DAY _____		DAY _____		DAY _____		DAY _____		DAY _____	
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Time											
If applicable, LHD nurse initials											
Taking fever-reducing medicine? (e.g aspirin, Tylenol (acetaminophen), Aleve (naproxen), Motrin or Advil (ibuprofen))		Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No
Symptoms											
Oral temperature (record)											
Myalgias (muscle pain)											
Rhinorrhea (runny nose)											
Cough											
Sore throat											
Shortness of breath											
Nausea											
Vomiting											
Diarrhea											
Conjunctivitis (itchy, watery, inflamed)											
Rash											
Fatigue (tired)											
Other (describe):											
PPE Use											
Used full PPE*?		Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No
Recognized Break?		Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No
Describe daily PPE use:		Protective clothing, disposable gloves, hair bonnet, fit-tested respirator, eye protection, disposable footwear	Protective clothing, disposable gloves, hair bonnet, fit-tested respirator, eye protection, disposable footwear	Protective clothing, disposable gloves, hair bonnet, fit-tested respirator, eye protection, disposable footwear	Protective clothing, disposable gloves, hair bonnet, fit-tested respirator, eye protection, disposable footwear	Protective clothing, disposable gloves, hair bonnet, fit-tested respirator, eye protection, disposable footwear	Protective clothing, disposable gloves, hair bonnet, fit-tested respirator, eye protection, disposable footwear	Protective clothing, disposable gloves, hair bonnet, fit-tested respirator, eye protection, disposable footwear	Protective clothing, disposable gloves, hair bonnet, fit-tested respirator, eye protection, disposable footwear	Protective clothing, disposable gloves, hair bonnet, fit-tested respirator, eye protection, disposable footwear	Protective clothing, disposable gloves, hair bonnet, fit-tested respirator, eye protection, disposable footwear
Notes:											

Antiviral Chemoprophylaxis

- Oseltamivir or zanamivir
- Can be *considered* for all exposed persons
- Not routinely recommended for personnel who used proper personal protective equipment
- If used, treatment dose recommended
 - Twice normal prophylaxis dose
 - Might reduce potential for resistance

What if They Get Sick?

- If illness occurs within 10 days after exposure, public health will arrange for
 1. Testing for novel influenza A (State Lab)
 2. Immediate antiviral treatment
- Standard, contact, and airborne precautions are recommended
- Encourage social distancing/home isolation

Testing for Novel Influenza A Viruses

- Specimens should be obtained as soon as possible
 - Ideally within 7 days after onset
- Preferred specimens:
 - NP swab, or
 - Nasal aspirate or wash, or
 - Two swabs combined into one viral transport media vial
- Coordinate collection and shipping with CDB and SLPH

Antiviral Treatment

- Empiric treatment with a neuraminidase inhibitor
 - Oral oseltamivir
 - Inhaled zanamivir
 - IV peramivir
- Treatment should NOT be withheld or delayed pending laboratory testing
- Treatment should be initiated as early as possible, even if >48 hours since illness onset

Conclusion

- HPAI is an emerging issue
 - Importation to NC expected with fall migration
- Not currently a public health problem, but potential exists for human infections
- Local health departments will play important role
 - Stay tuned for additional guidance and information

Questions?

- <http://www.cdc.gov/flu/avianflu/>