

**North Carolina  
State Laboratory of Public Health:  
Influenza Surveillance & Testing**

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Director**

# North Carolina State Laboratory of Public Health...

...provides services to benefit the general population of North Carolina by enhancing both human and environmental health along with effective disease control and prevention efforts.



# North Carolina State Laboratory of Public Health

- **Laboratory Testing**
  - 125 clinical analyses
  - 65 environmental analyses
- **Training/Consultation**
  - LHDs
  - Hospitals
  - Laboratories
  - Healthcare professionals
- **Certification**
  - Certifies drinking water laboratories (North Carolina Drinking Water Act)
  - Certifies milk (Grade A Pasteurized Milk Ordinance).
- **Non-profit distributor of pharmaceutical products and medical/laboratory**



# Purpose of Surveillance

- Determine when/where flu activity is occurring
- Track flu-related illness
- Determine what flu viruses are circulating
- Detect changes in flu viruses
- Measure the impact flu is having on hospitalizations/deaths
- Determine the best vaccine design for the next flu season



World Health  
Organization

# WHO-Global Influenza Surveillance and Response System (GISRS)

# WHO Global Influenza Surveillance and Response System

28 November



**National Influenza Centre**

**WHO Collaborating Centre for Reference and Research on Influenza**

**WHO Collaborating Centre for the Surveillance, Epidemiology and Control of Influenza**

**WHO Collaborating Centre for Studies on the Ecology of Influenza in Animals**

**WHO Essential Regulatory Laboratory**

**WHO H5 Reference Laboratory**

**Not applicable**

0 875 1,750 3,500 Kilometers

The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

Data Source: Global Influenza Surveillance and Response System (GISRS), WHO  
Map Production: WHO GISRS Team  
World Health Organization



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# The National Influenza Network

- Approximately 85 U.S. **World Health Organization (WHO) Collaborating Laboratories** (All state public health laboratories participate as U.S. WHO collaborating laboratories along with some city and county public health laboratories and some large tertiary care or academic medical centers.)
- 185 **National Respiratory and Enteric Virus Surveillance System (NREVSS) laboratories** located throughout the United States participate in virologic surveillance for influenza.

# The NC Influenza Sentinel System

- Hospitals-large and small
- Universities-both State and private
- Private doctor's offices
- County local health departments
- Military bases
- Urgent care/minute clinics

*Provide samples and/or epidemiological data.*

# Other influenza samples received

- Travel history (foreign & ILI associated illness)
- Outbreaks from long-term care facilities
- Contact with known infected birds (HPAI)
- Deaths (OCME and hospitals)

# What happens at the NCSLPH ?

- Each year the official season for flu in the Northern hemisphere runs from October 1-May 31.
- Prior to the season, NC DHHS Epidemiology Section approves established & recruits new sentinel sites.
- NCSLPH prepares/ships free flu collection kits for the NC sentinel sites (1-2 kits are shipped in late Sept.).
- Return shipment from submitters (State Courier system or UPS/FedEx) are funded by State/federal resources.

# NCSLPH Flu Kit 2015-16



- Instruction form
- Flocked swabs
- Viral transport (x4)
- Blue ice (x2)
- Submission form
- Labels for shipping
- Insulated box

# Specimen tests and handling

**Real-Time RT-PCR:** NCSLPH tests all influenza sample requests using FDA-approved kits provided by CDC and puts most positive samples by PCR into culture. Positive A and B samples are subtyped and genotyped.

**Cultures** are analyzed for CPE (7-14 days) and confirmed using DFA or IFA. Some reagents are purchased and others are provided by WHO.

**Laboratory Reports** are issued daily (M-F) both electronically and hardcopy via State Courier/USPS.

# NCSLPH Influenza PCR tests:

SCREEN +A



A subtypes:

A(H1)

A(H3)

A(H1N1)pdm09

A(H5)\*

A/H7 (Eurasian lineage)\*

*for emergency use only*

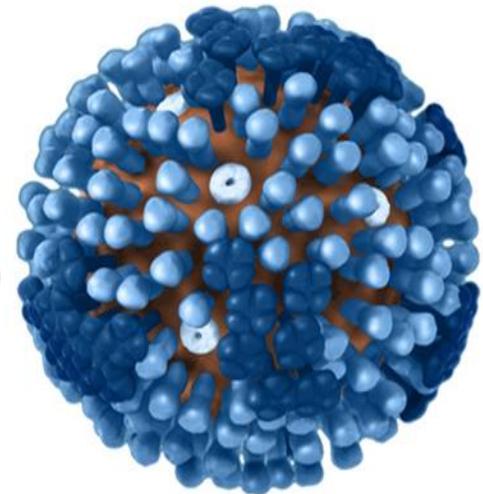
+B



B genotypes:

B-Victoria

B-Yamagata



*\* Must be confirmed by CDC*

# Sending samples to CDC

- **Start of flu season:** ALL early positive samples.
- **During flu season:**
  - 5 positive samples and their isolated viruses every other week for characterization.
  - In addition, 5 additional positive samples are sent every other week to a designated CDC lab for antiviral analysis (NYDOH).
  - ALL pediatric influenza death samples and other influenza death samples of good quality.
  - ALL untyped A viruses
- **Off season:** All samples that are positive during the off-season months.

# Surveillance for Novel Influenza A viruses

- In 2007, human infection with a novel influenza A virus became a nationally notifiable condition.
- Novel influenza A virus infections include all human infections with influenza A viruses that are different from currently circulating human seasonal influenza H1 and H3 viruses.
- For any Influenza A viruses that cannot be subtyped using PCR subtyping targets, NCSLPH immediately repeats the PCR assay. If unable to subtype, specimen is sent immediately to CDC for further characterization.

# Antiviral Diagnostic Testing

- CDC accepts samples where the patient is not responding to antiviral treatment (hospitalized) for diagnostic purposes.
- These samples can be sent directly to the CDC or through the NCSLPH.

# Avian flu testing

- **TRAVEL HISTORY**: Symptomatic individuals that have traveled and have had significant contact in countries where human avian flu has been detected are referred to NC DHHS Communicable Disease Branch. When CDC criteria are met, NCSLPH performs testing on an emergency basis for Flu A and A subtypes (including A/H5 and A/H7 targets). These samples are NOT cultured.
- **EXPOSURE VIA BIRD CULLING IN US**: Workers exposed to HPAI are assessed by NC DHHS Communicable Disease Branch. If ILI symptoms occur during the quarantine period, NCSLPH performs emergency testing for Flu A and A subtypes (including A/H5 and A/H7 targets). These samples are NOT cultured.

# CDC “Right-sized Roadmap”

This CDC/APHL-developed tool assists Public Health Departments/Labs to statistically determine the quantity of specimens necessary to detect a novel influenza isolate.

**Even though last year was a particularly severe season, the NCSLPH saw decreased numbers of sample submissions!!**

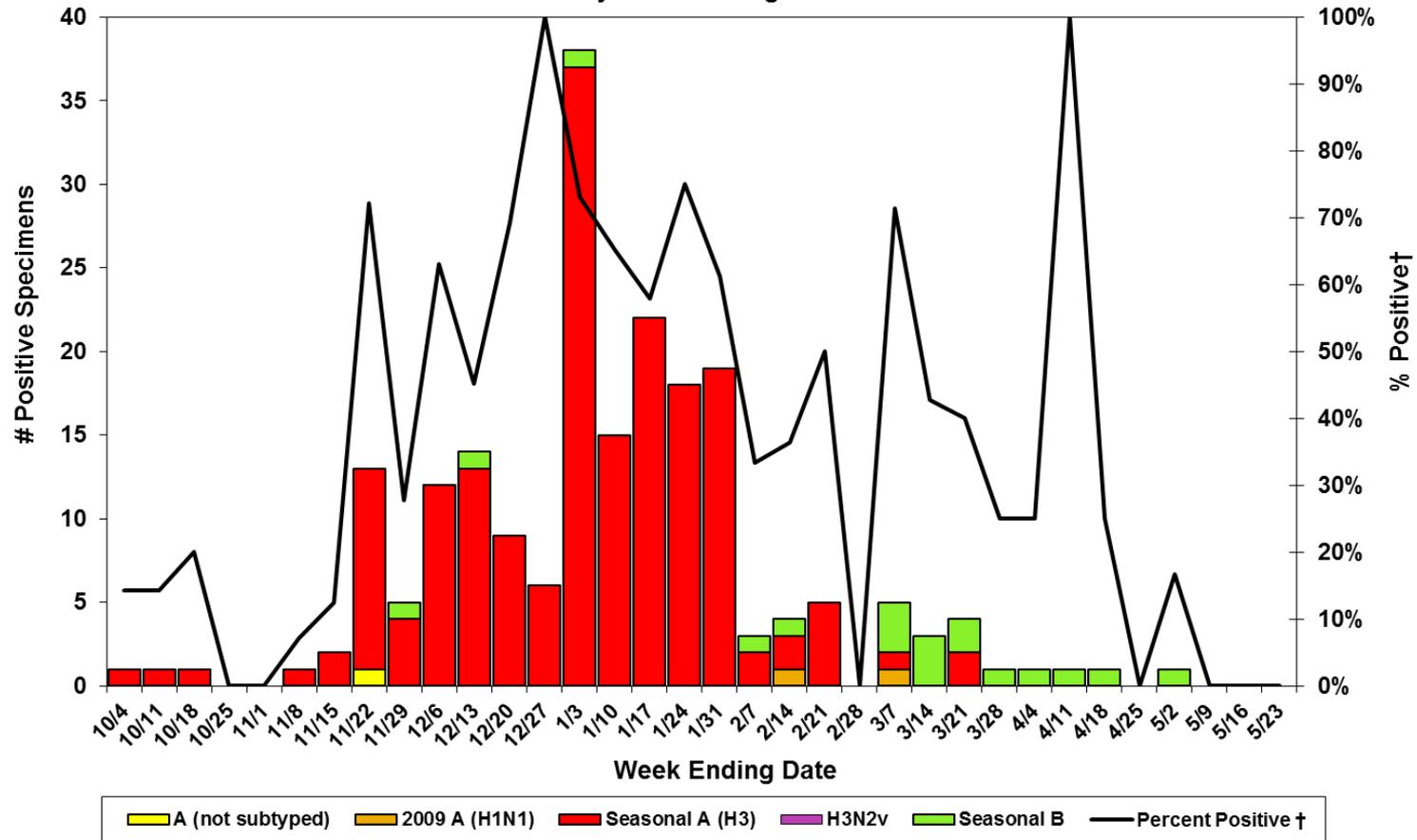
# Important Samples-Hospitals

## Important samples

- Early season influenza samples
- Late season influenza samples
- Unsubtypable influenza A viruses
- Deaths, especially pediatric deaths
- Patients with foreign travel history

# Final Summary 2014-15

Influenza Positive Tests Reported by the N.C. State Laboratory of Public Health (SLPH)  
by Week Ending Date



† Percent of submitted specimens for any influenza

# Surveillance websites



**WHO** produces *FluNet* a global tool for viral surveillance from remotely entered data provided by National Influenza Centers. Charts and summaries of virus detection globally [http://www.who.int/influenza/gisrs\\_laboratory/flunet/en/](http://www.who.int/influenza/gisrs_laboratory/flunet/en/)



**CDC** produces *FluView* a weekly reporting of activity in the US and territories. <http://www.cdc.gov/flu/weekly/>

# Thank you...

