



Wisconsin State
Laboratory of Hygiene

UNIVERSITY OF WISCONSIN-MADISON

WE'RE MOVING!





Important Update!



The WSLH Communicable Disease Division will be moving to the Sta Agriculture Drive, Madison, effective Monday, **October, 10, 2016**.

On and after October 10, 2016, please send clinical specimens as follows:

WSLH Unit	Address
<ul style="list-style-type: none">• Communicable Diseases (surveillance, emergency response, outbreak, etc.)• Rabies• Cytology	<p>2601 Agriculture Drive, P.O. Box 7904 Madison, WI 53718</p> <p>(For directions, see map below. Please deliver to loading dock off Vondron Road.)</p>



WSLH Contact Information

- Email addresses will remain the same.
- CDD Customer Service #
 - ❑ 800-862-1013
- Phone & FAX numbers are changing



WSLH will communicate new key contact phone #'s when they become available



Influenza and other Respiratory Viruses Update-- 2016

Pete Shult, PhD

CDD Director & Emergency Laboratory Response

and

Erik Reisdorf, MPH, M(ASCP)^{CM}

Surveillance and Virology Lab-Team Lead



Learning Objectives

- Moving Day!
- Review of the 2015-2016 influenza season.
- Vaccine strain selection and efficacy.
- Influenza “variant” virus update.
- Non-influenza respiratory pathogens.
- Technology update.
- Discuss surveillance strategy for 2016-2017



Influenza

The latest information

www.cdc.gov/flu/index.htm

CDC Centers for Disease Control and Prevention
CDC 24/7: Saving Lives. Protecting People™

SEARCH

CDC A-Z INDEX

Influenza (Flu)

Language: English

Note: For the 2016-2017 season, CDC recommends use of the flu shot (inactivated influenza vaccine or IIV) and the recombinant influenza vaccine (RIV). The nasal spray flu vaccine (live attenuated influenza vaccine or LAIV) should not be used during 2016-2017. The [2016-2017 influenza vaccination recommendations](#) are now available.

While current U.S. [flu activity](#) is low overall, in the past 2 weeks CDC has received reports of a small number of localized influenza outbreaks. This is not unusual for September. It is not possible to make any predictions about the timing or severity of the upcoming influenza season based on these outbreaks.

CDC recommends a [yearly flu vaccine](#) for everyone 6 months and older. You should try to get your flu vaccine anytime between now and the end of October, if possible. Flu vaccination can reduce flu illnesses and prevent flu-related hospitalizations. Flu vaccines have been updated for the [2016-2017 season](#). More than 60 million doses of seasonal influenza vaccine have been [distributed](#) at this time.

FLUVIEW Interactive
Influenza Surveillance Data the Way You Want It

FluView Interactive: Surveillance Data the Way You Want It!

FLU BASICS
Symptoms, How Flu Spreads, Higher Risk Groups, Past and Current Flu Season

HEALTH PROFESSIONALS
Vaccination, Antiviral Drugs, Infection Control, Diagnostic Testing, and Training

Flu Vaccine Finder
Find flu clinics near you. Everyone six months of age and older needs a flu vaccine. Enter Zip Code. [GO](#) powered by HealthMap. [Visit CDC/Flu](#) [Embed](#)

PREVENTION - FLU VACCINE
Vaccine Safety, Vaccination Coverage, Influenza VIS, NIVW, Infection Control

FREE RESOURCES
Printable Materials, Photos, Podcasts, Videos, PSAs, eCards, Badges & Buttons, Articles

TREATMENTS
Drugs to Treat Flu Virus, Stay Home When Sick, Caring for Someone Sick With Flu

INFORMATION FOR PARTNERS
Campaign Highlights, Partner Activity, Media Briefings, Promotional/Educational Tools

SUPPLY AND DISTRIBUTION
Approved U.S. Flu Vaccines, Total Doses Distributed

QUESTIONS & ANSWERS
Answers to Flu-Related Questions

NEWS & HIGHLIGHTS
Flu Spotlights, Press Releases...

PUBLIC HEALTH IMAGE LIBRARY
Photographs, Illustrations, and Multimedia Files

Flu Activity & Surveillance
Influenza-Like Illness (ILI) Activity Level Indicator Determined by Data Reported to AHSN
2015-16 Influenza Season Week 38 ending May 31, 2016

Check where flu is active near you. [More >](#)

What We've Been Dealing With: 2016



- Zika virus
- Dengue fever
- Chikungunya
- Elizabethkingia spp.
- Measles, mumps, pertussis
- Food-borne illnesses

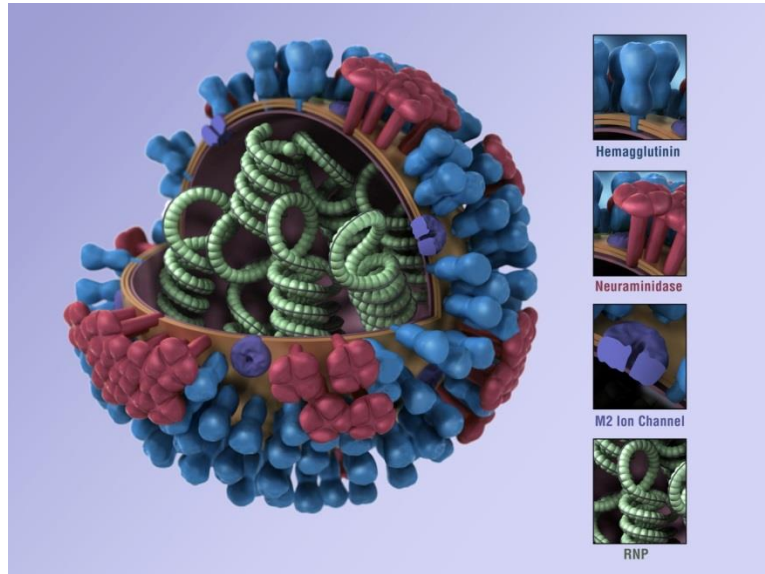
... So what's the big deal with influenza?



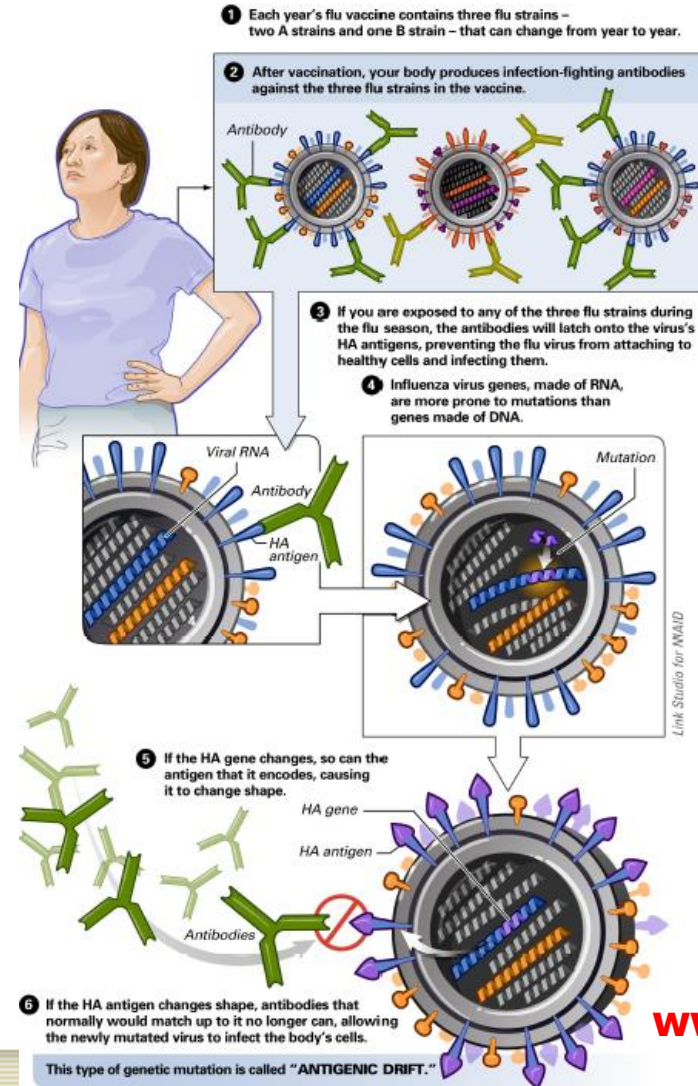


The Changeability of Influenza

Antigenic Drift → *Seasonal Influenza*



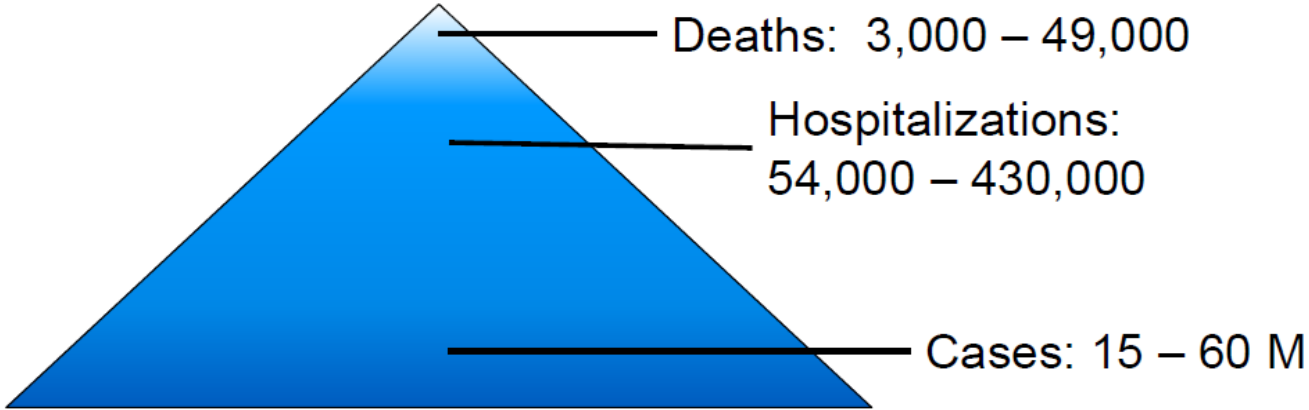
Antigenic Drift
Manifests in HA and NA as a result of continuous and gradual accumulation of point mutations in the HA and NA genes



www.flu.gov



Estimated Annual Burden of Seasonal Influenza in the United States



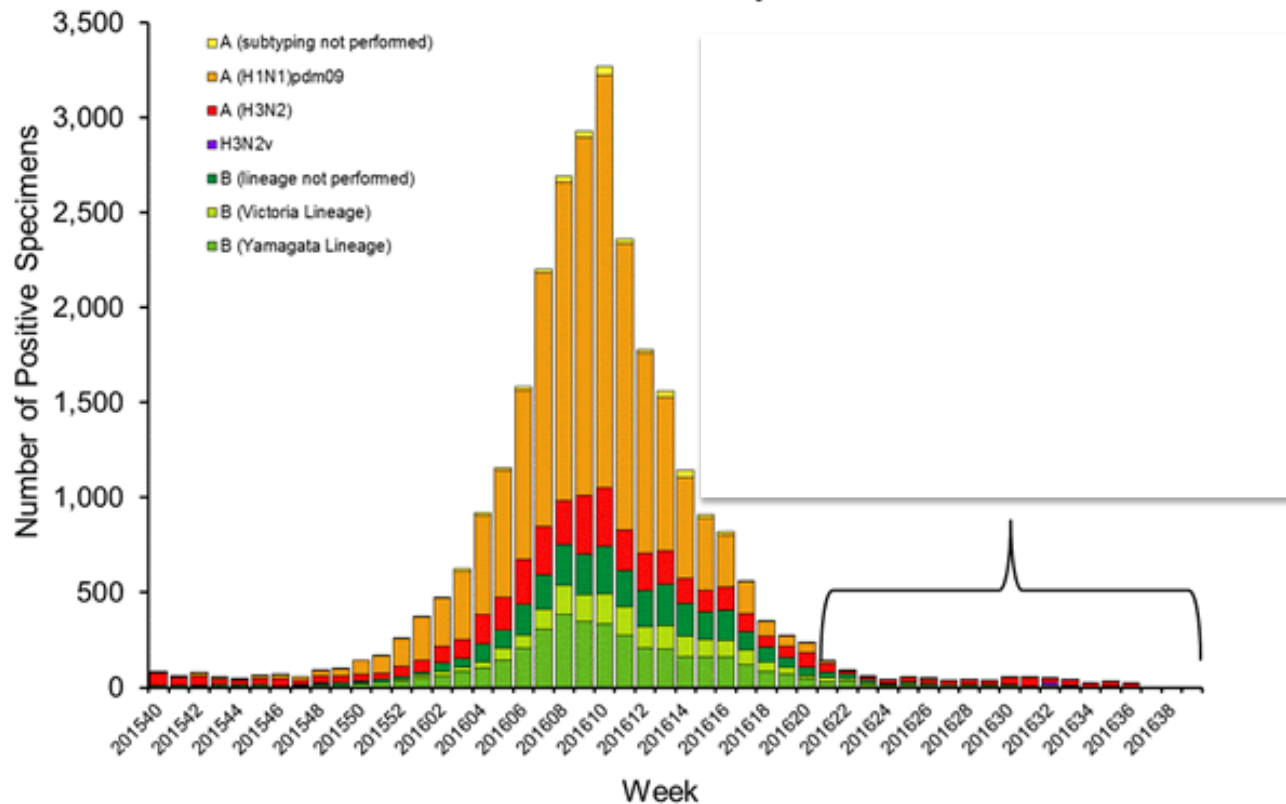
Direct medical costs: \$10.4 billion





Influenza in the U.S. 2015-16

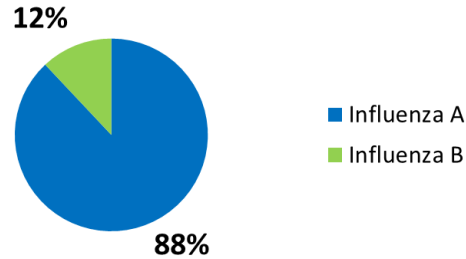
Influenza Positive Tests Reported to CDC by U.S. Public Health Laboratories, National Summary, 2015-2016 Season



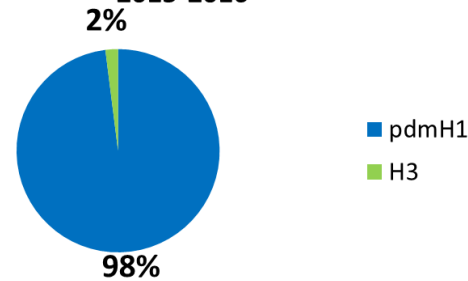


Influenza in WI, 2015-2016

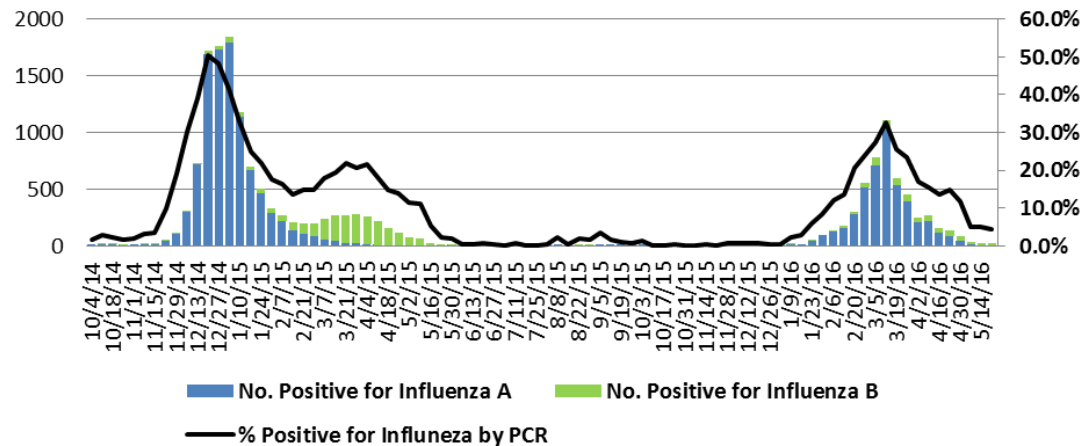
Influenza Type (%) in Wisconsin,
2015-2016



Influenza Subtype (%) in Wisconsin,
2015-2016



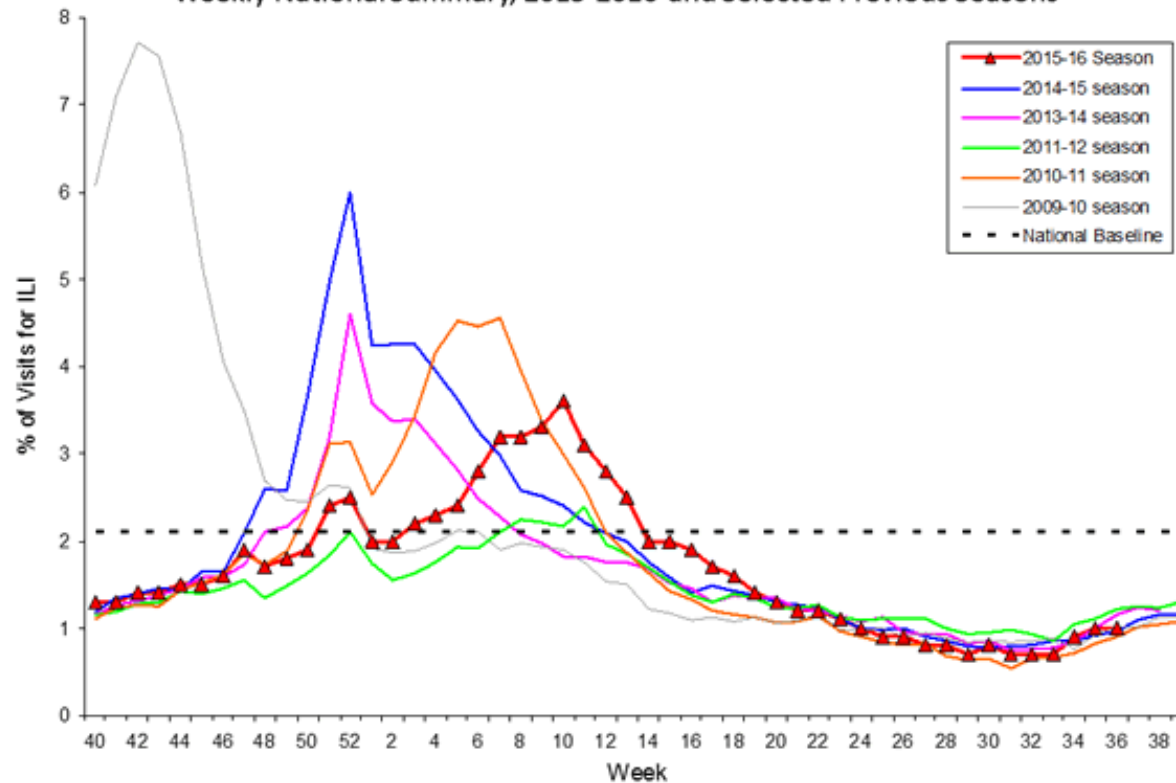
% Positive for Influenza by PCR (Wisconsin),
Week Ending 5/14/16





Influenza in the U.S. 2015-16

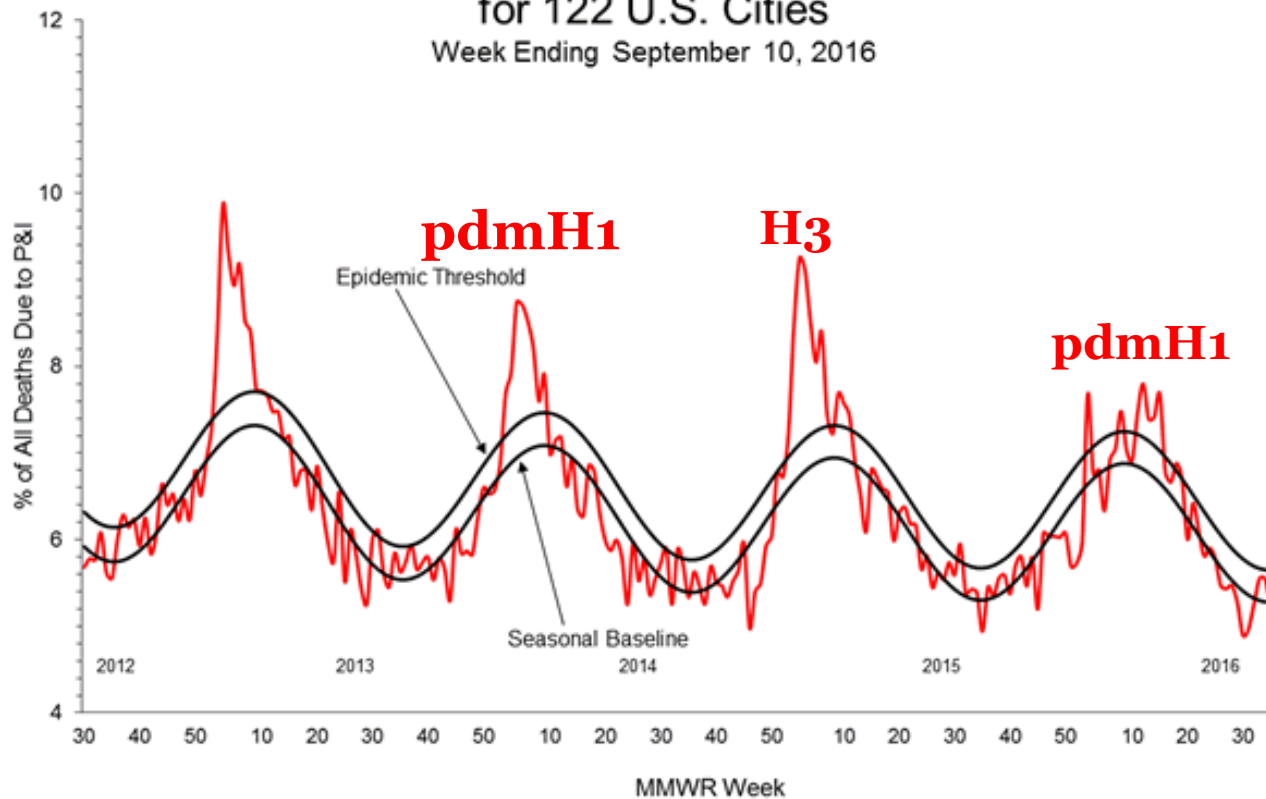
Percentage of Visits for Influenza-like Illness (ILI) Reported by the U.S. Outpatient Influenza-like Illness Surveillance Network (ILINet), Weekly National Summary, 2015-2016 and Selected Previous Seasons





Influenza in the U.S. 2015-16

Pneumonia and Influenza Mortality
for 122 U.S. Cities
Week Ending September 10, 2016

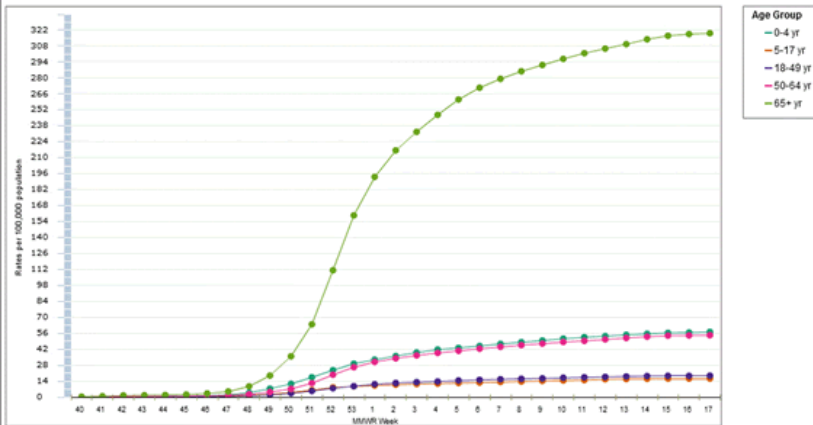




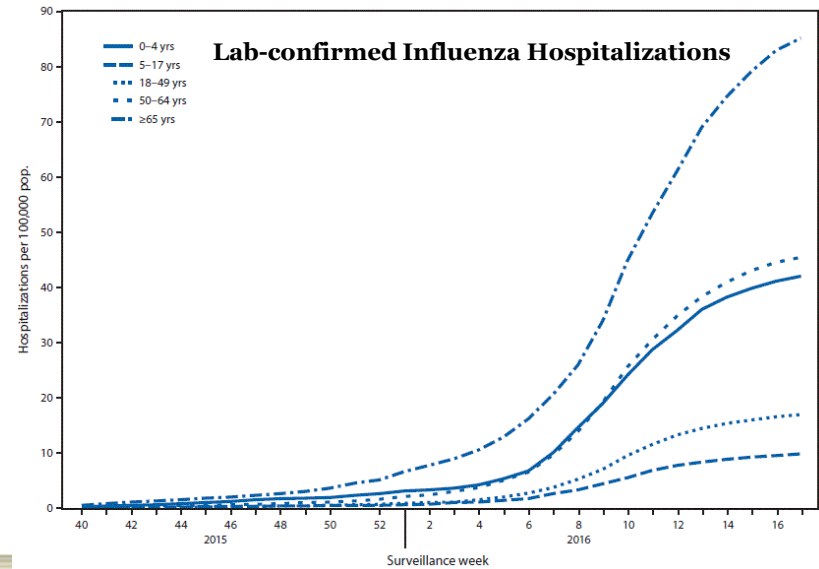
Influenza Hospitalizations

2014-15

Laboratory-Confirmed Influenza Hospitalizations
Preliminary rates as of May 02, 2015



In contrast, 2015-16





Influenza 2015-16

What was expected...

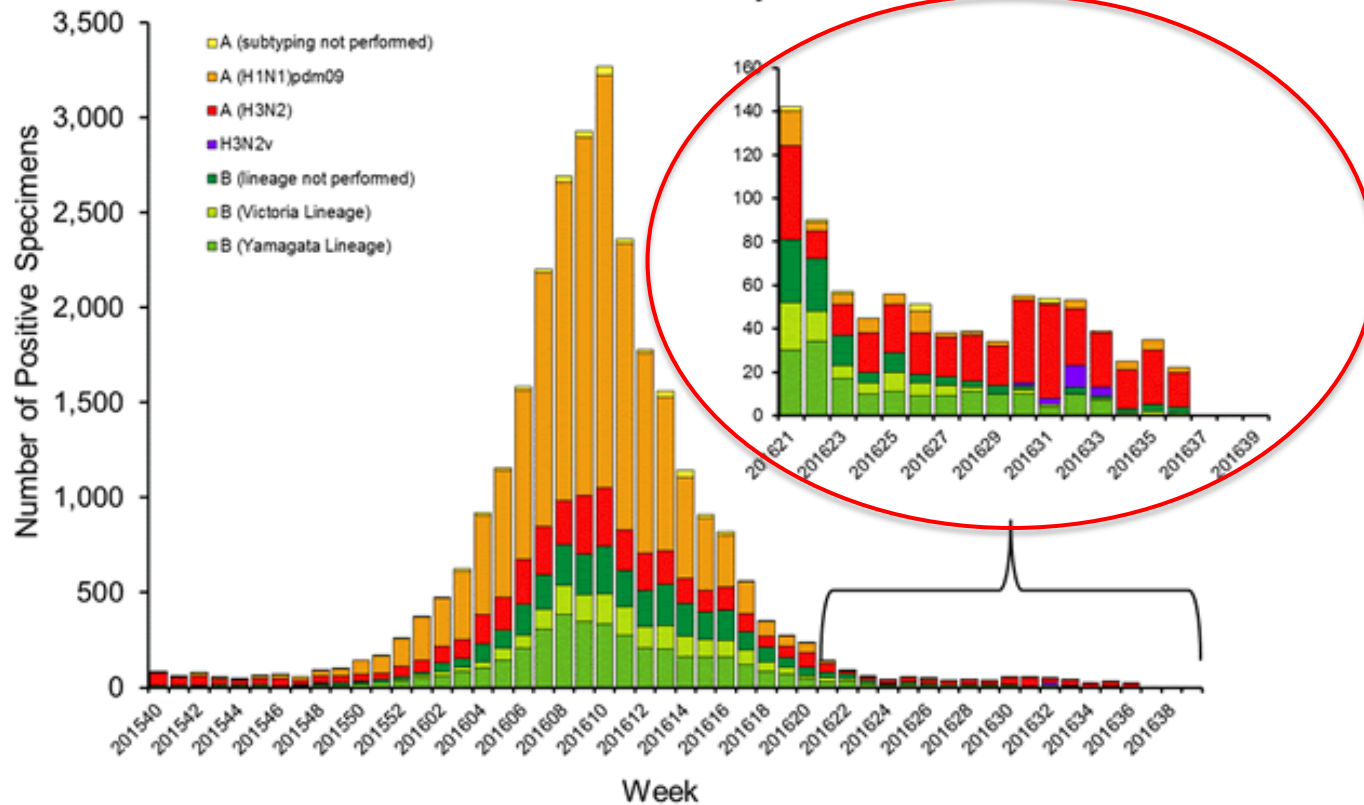
- A/Switzerland/9715293/2013(H3N2)
- A/California/7/2009
- B/Phuket/3073/2013 (B/Yamagata-lineage)
- B/Brisbane/60/2008 (B/Victoria-lineage)

... and that's what we got 😊



Influenza in the U.S. Early in 2016-17

Influenza Positive Tests Reported to CDC by U.S. Public Health Laboratories, National Summary, 2015-2016 Season





Early 2016-2017 Season....



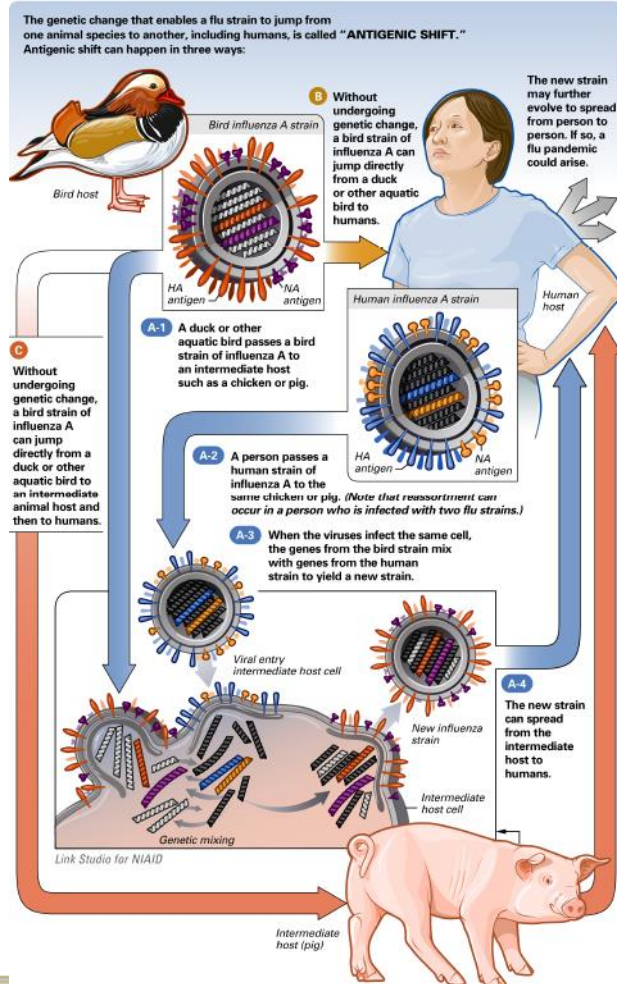
PH Region	Date Received	Influenza type
?	7/14/2016	Flu A (H3)
?	7/28/2016	Flu A (H3)
Travel (AK)	8/10/2016	Flu A (H3)
Travel (India)	8/30/2016	Flu A (H3), FluB
?	9/15/2016	Flu A (H3)
?	9/21/2016	Flu A (H3)
Monroe Co.	June 2016	Flu A H1N2v



The Changeability of Influenza

Antigenic Shift

www.flu.gov

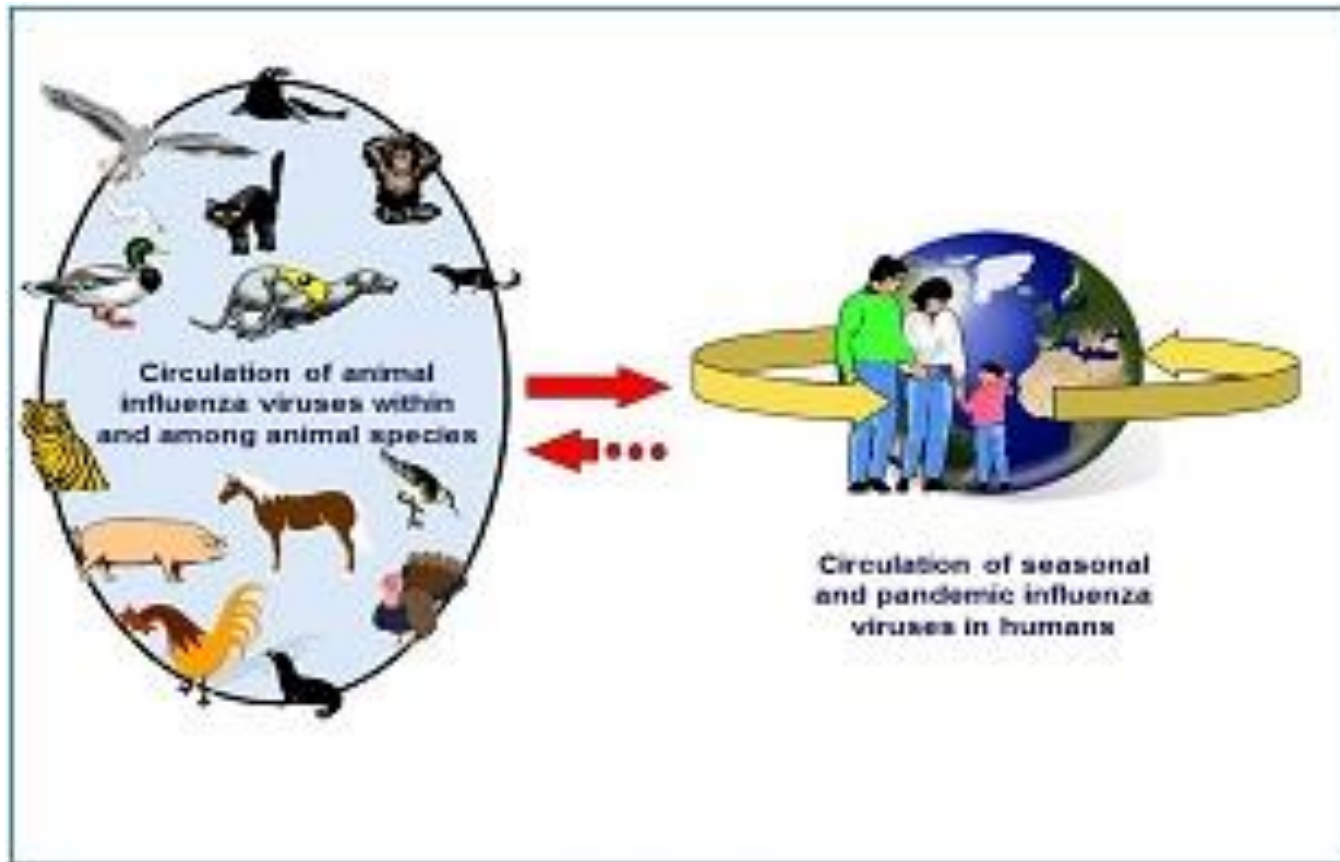


Antigenic Shift
When a new subtype (a novel HA and/or NA) of influenza A emerges in the host (humans)



Infectious Diseases at the Human-Animal Interface

Influenza as an Example

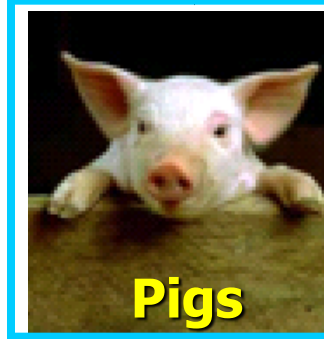




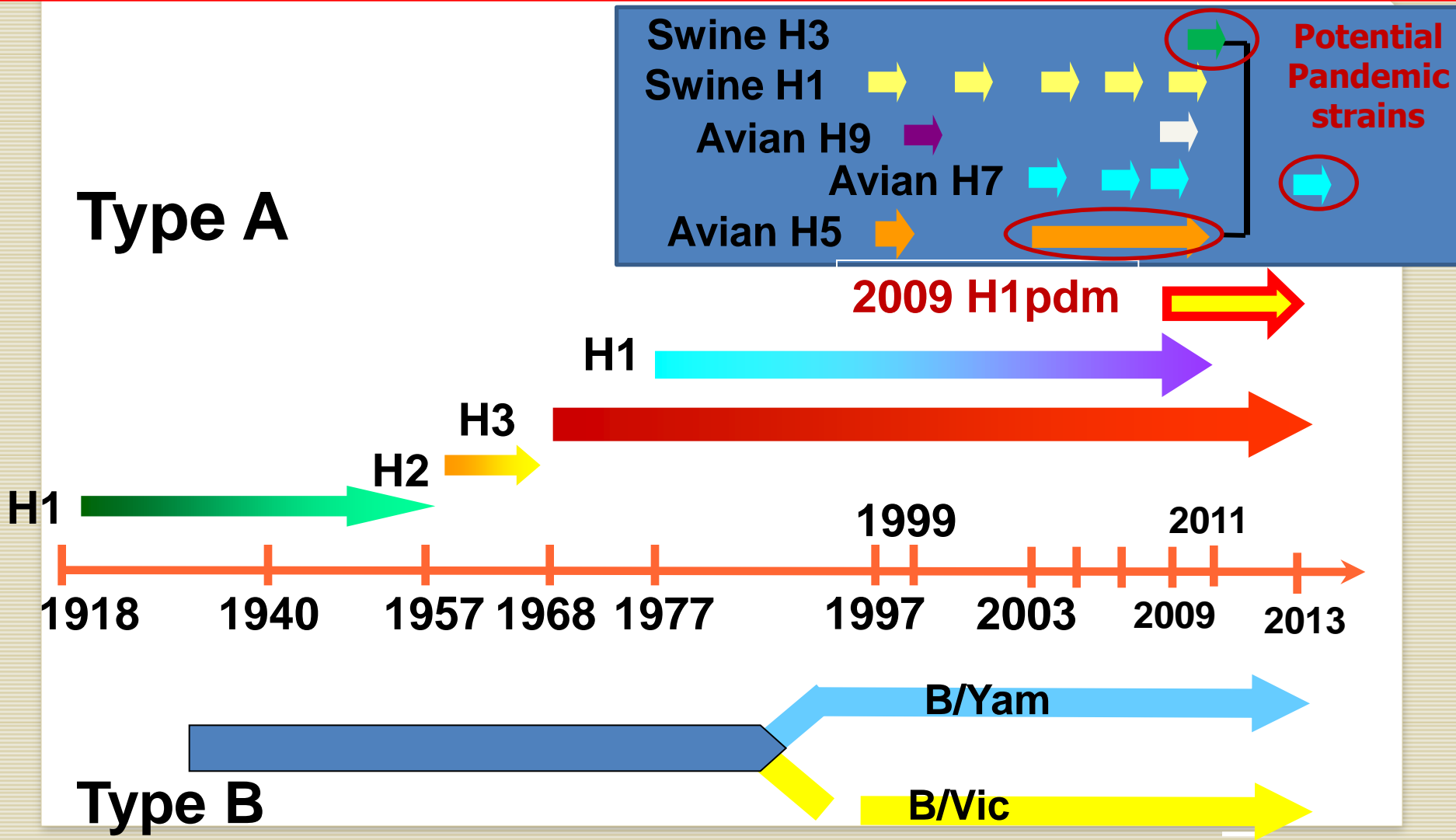
Influenza at the Human-Animal Interface

Influenza A

- H1 - H17
- N1 - N10



Timeline of Influenza Viruses in Humans

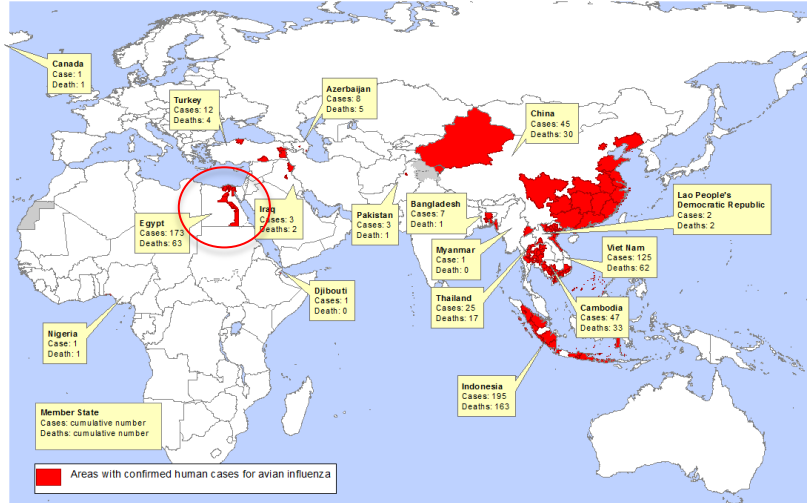




Global Influenza Concerns: A(H5N1) and A(H7N9)

http://www.who.int/csr/disease/avian_influenza/en/

Areas with confirmed human cases for avian influenza A(H5N1) reported to WHO, 2003-2013*

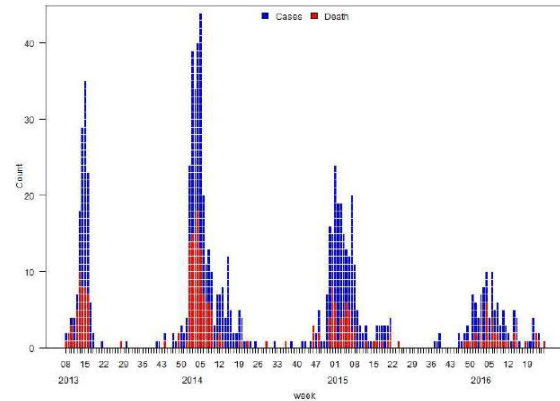


*All dates refer to onset of illness
Data as of 24 January 2014
Source: WHO/GIP

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Number of Confirmed Human H7N9 Cases and Deaths by week as of 2016-7-14



Areas reporting confirmed human cases for influenza A(H7N9) to WHO from 2013-06-01 *

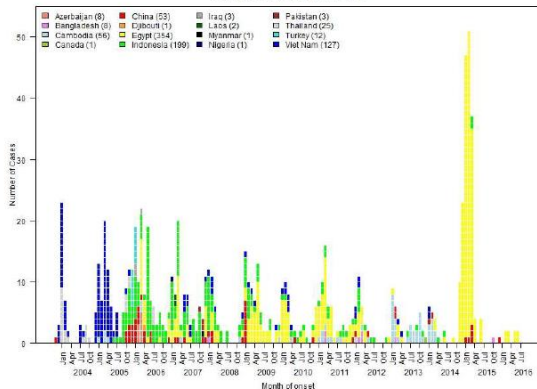


*All dates refer to onset of illness
Data as of 14/02/2014
Source: WHO

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Number of Confirmed Human H5N1 Cases by month of onset as of 2016-07-21



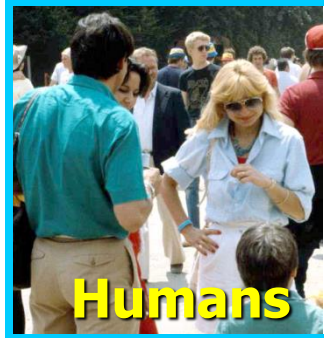
Influenza: Emergence of Novel Flu A Subtypes

Chickens and turkeys take center stage
in 2015



Influenza A

- H1 - H17
- N1 - N10





Emergence of Avian Flu (H5Nx) in U.S.

Figure 2-1: Asian Migratory Bird Flyways

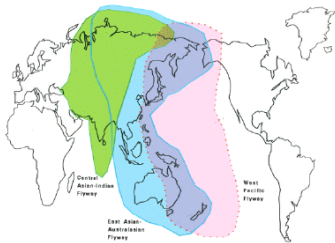
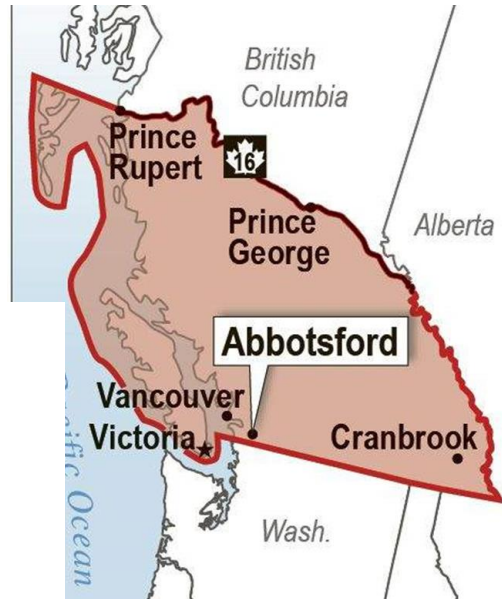
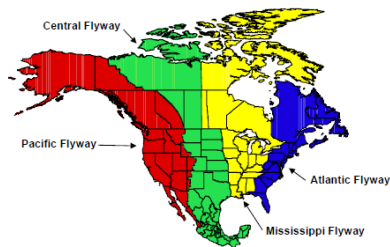


Figure 2-2: North American Migratory Bird Flyways

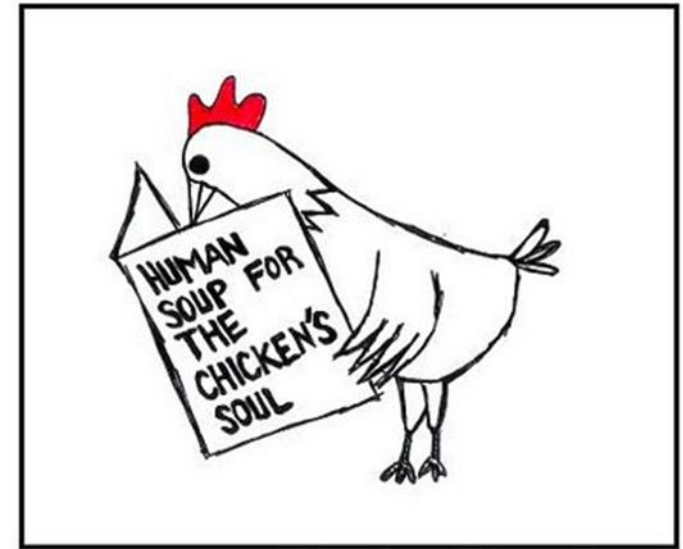


- Avian Influenza (H5Nx) emerged in North America (November 2014).
- Many flocks in the area were infected by December including those in the US.



Avian Influenza Terminology

- Highly Pathogenic Avian Influenza
- Bird flu
- Pathogenicity refers to avian NOT human
- **H5N1**, **H5N2** and **H5N8** are collectively referred to as **H5Nx**
- **H5N2** and **H5N8** have both been detected in the US in 2015.



dcfeliciano.blogspot.com



The question going into the 2015-16 influenza season?



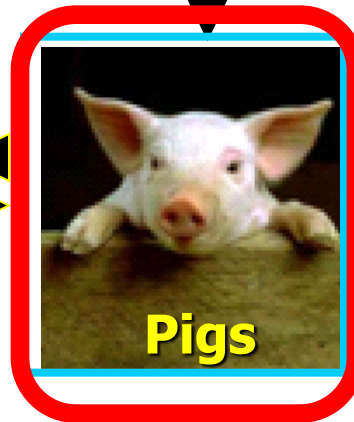
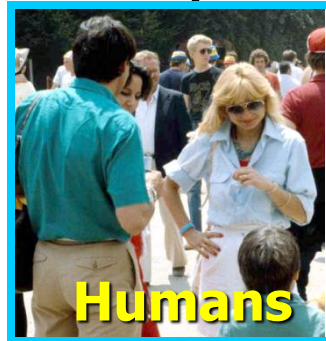
Influenza: Emergence of Novel Flu A Subtypes

Don't forget about the little piggies



Influenza A

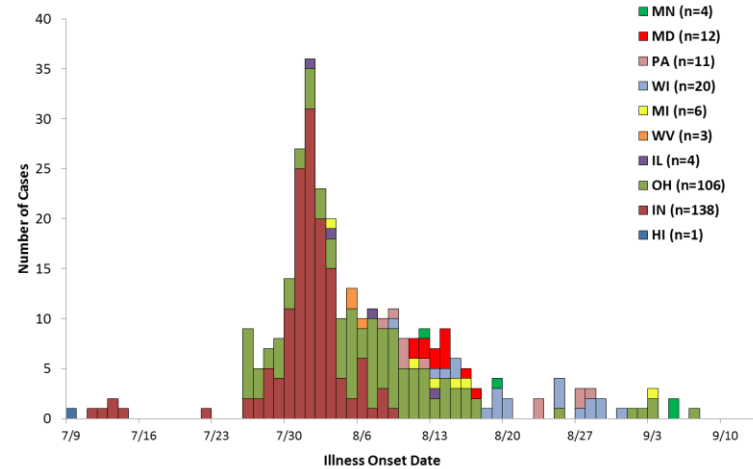
- H1 - H17
- N1 - N10





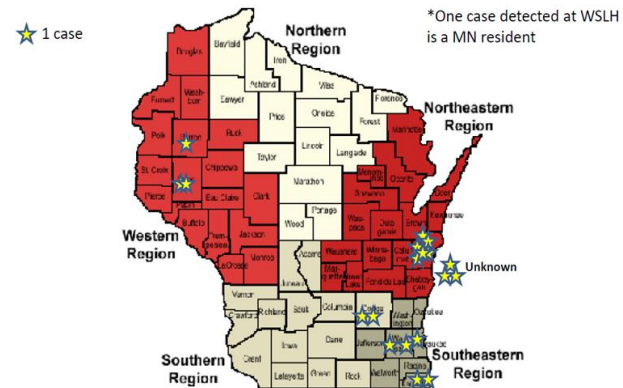
Influenza A H3N2v: July-Sept, 2012

Novel Flu A events happen in the U.S. too!

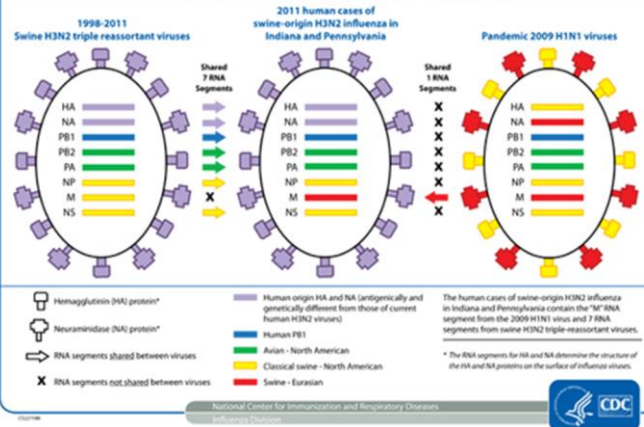


These slides contain unpublished data, please DO NOT distribute or reproduce.

H3N2v Cases –September 14, 2012 (n=20*)

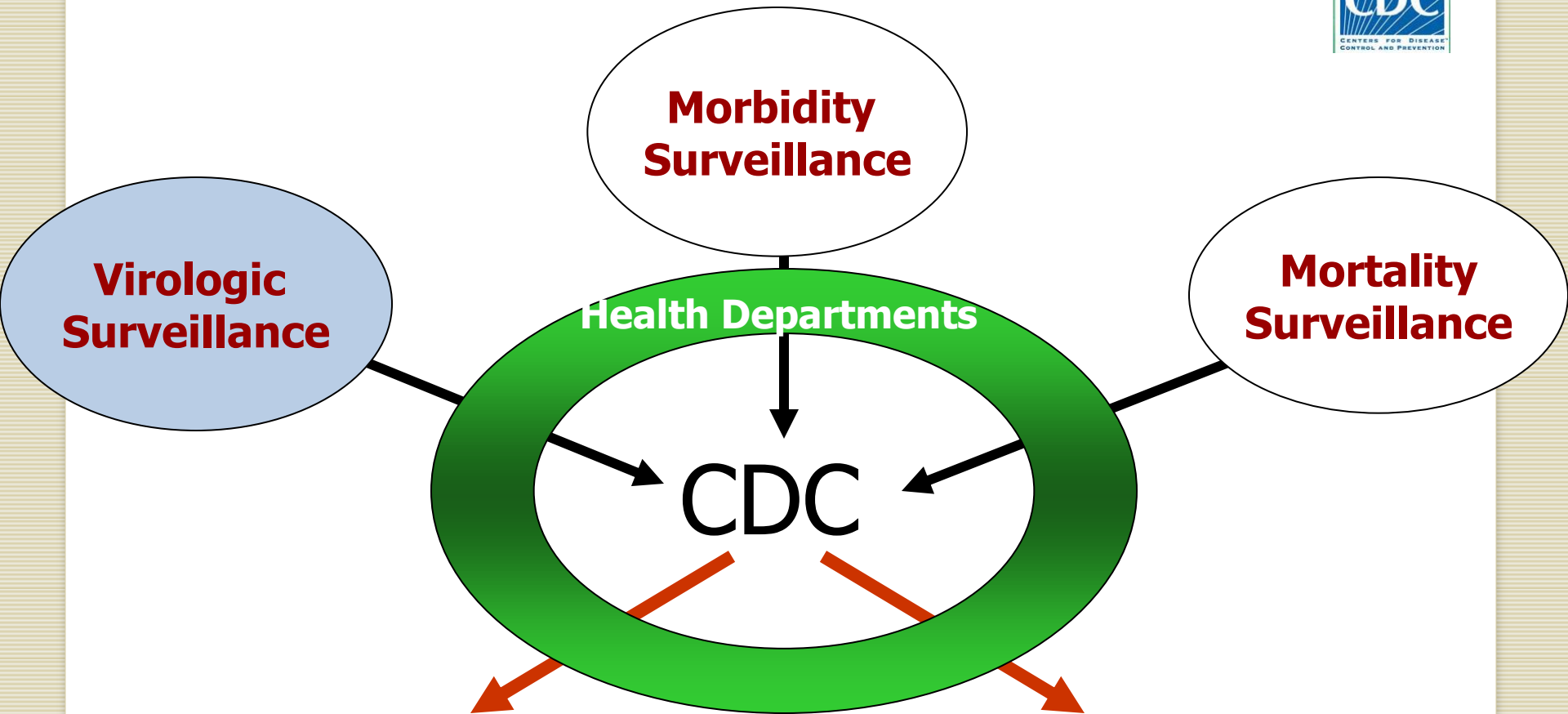


The human cases of swine-origin H3N2 influenza in Indiana and Pennsylvania resulted from existing influenza viruses exchanging genetic material through a process called "reassortment" (Influenza A viruses have 8 RNA segments: HA, NA, PB1, PB2, PA, NP, M, NS)



U.S. Influenza Surveillance

www.cdc.gov/flu/weekly



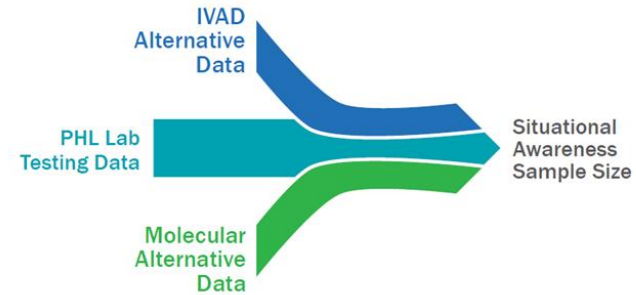
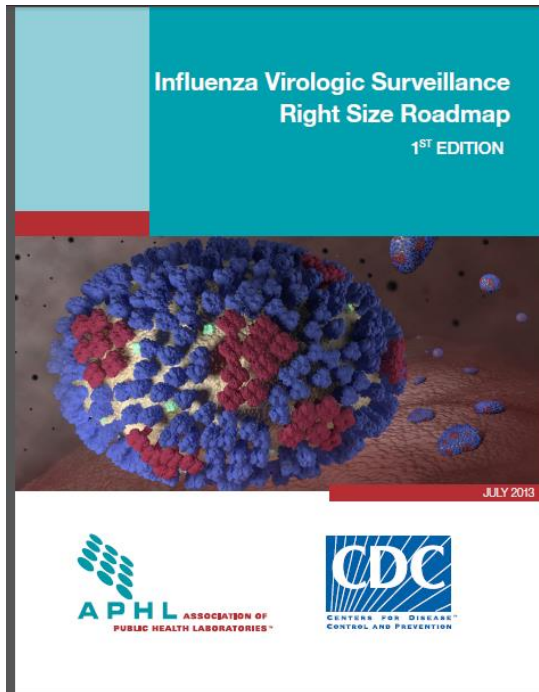
FLUVIEW
A Weekly Influenza Surveillance Report Prepared by the Influenza Division

State-level data to state surveillance coordinators



“Right-Sizing” Influenza Virologic Surveillance

The Importance of “Alternative Data”



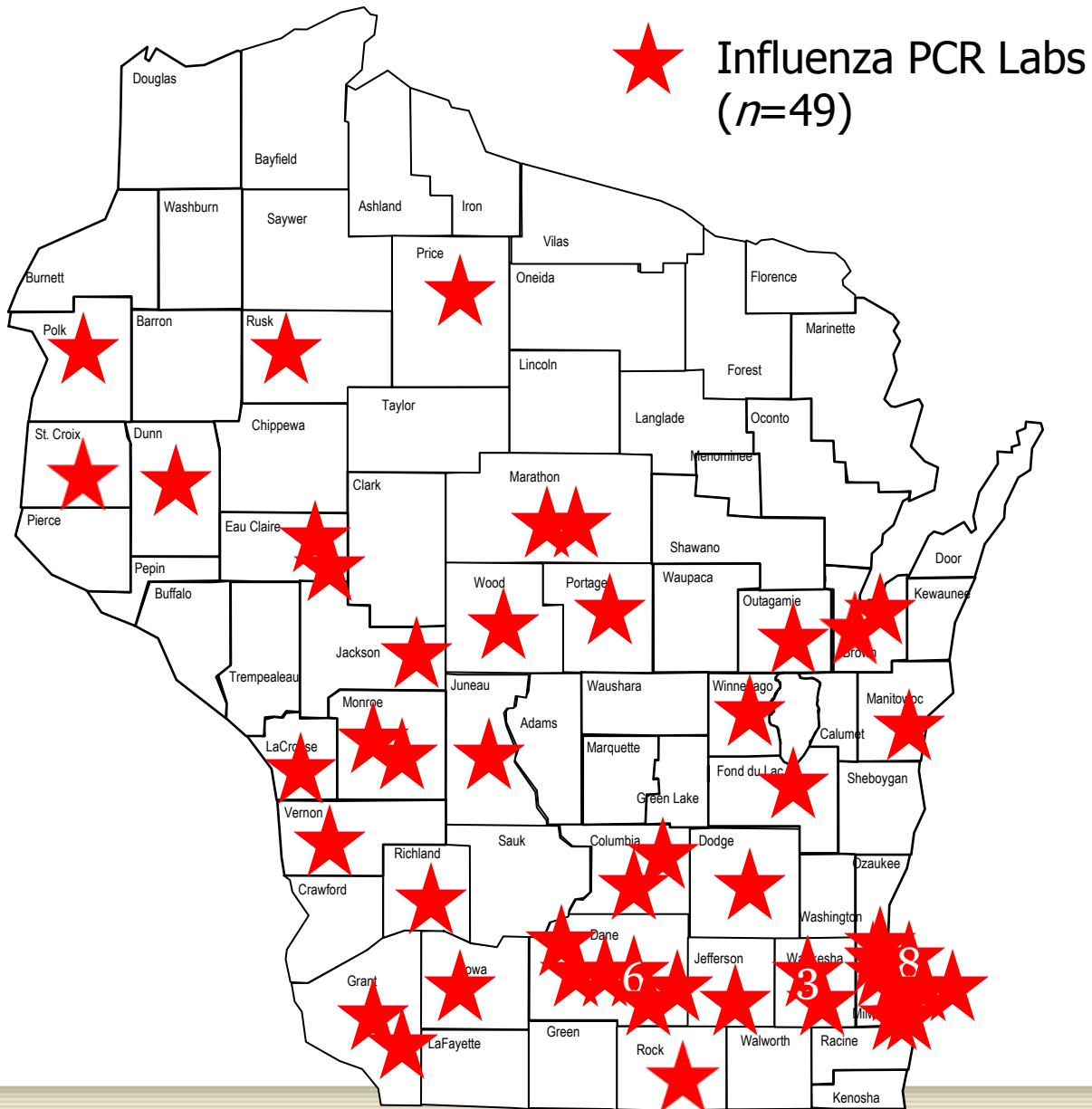
Alternative data is existing virologic data from non-PHL sources that can be used to supplement PHL data for improved situational awareness

Right Size Roadmap

<http://www.aphl.org/aphlprograms/infectious/influenza/Pages/Influenza-Virologic-Surveillance-Right-Size-Roadmap.aspx>



Wisconsin Labs with Flu PCR Capacity, September 2016





Influenza Virologic Surveillance

Increasing Role for the Clinical Lab

- Provide situational awareness
 - **Clinical lab testing data** $\xrightarrow{\text{Via WSLH or directly}}$ **CDC**
- { Detect novel or reassortant viruses
- { Inform vaccine strain selection
- { Detect and monitor antiviral resistance
 - **Specimens/isolates from clinical labs** \rightarrow **WSLH** \rightarrow **CDC**

Influenza – Prevention and Treatment

<http://www.cdc.gov/flu/professionals/index.htm>



CDC A-Z INDEX

Influenza (Flu)

Seasonal Influenza (Flu)

2014-2015 Flu Season

Influenza - Flu Basics

Prevention - Flu Vaccine

Treatment - Antiviral Drugs

Specific Groups

Questions & Answers

Health Professionals

ACIP Recommendations

Vaccination

Antiviral Drugs

Infection Control

Clinical Description & Lab Diagnosis

International Influenza

Training

References & Resources

Communications to Health Care Providers

Toolkit for Long-Term Care Employers

Resources for Flu Prevention Partners

Flu Activity & Surveillance

FluVaxView Influenza Vaccination Coverage

National Influenza Vaccination Week (NIVW)

Vaccination Pledge

What's New & Updated!

Free Resources


Information for Health Professionals

Language: English

The pages listed below offer public health and healthcare professionals key information about vaccination, infection control, prevention, treatment, and diagnosis of seasonal influenza.

Toolkit for Long-Term Care Employers

This Long-Term Care Employers toolkit is being launched in collaboration with the HHS National Vaccine Program Office, as a guide to increasing flu vaccination among healthcare personnel in long-term care settings. It includes a number of resources intended to help long-term care facility owners and administrators provide access to influenza vaccination for their workforce, and to help anyone working in long-term care understand the importance of influenza vaccination for their employees.



More >

Topics

- Clinical Information**
Transmission, clinical signs and symptoms of illness, complications of influenza
- Diagnostic Tests**
Information on influenza diagnostic testing
- Antiviral Drugs**
Guidance on the use of antiviral agents for treatment and chemoprophylaxis
- Vaccine Recommendations (ACIP)**
Recommendations from the Advisory Committee on Immunization Practices
- Institutional Outbreaks and Infection Control**
Guidelines for various settings, respiratory hygiene/cough etiquette
- Influenza Activity and Surveillance**
Overview and map of current influenza activity in the United States
- Vaccination**
Dosing & administration, supply, storage, VIS, effectiveness & safety
- Vaccination Coverage**
Current available coverage data and past trends
- Patient Education**
Influenza materials for health professionals to provide to patients
- Training**
Webcasts and online courses
- Long-term Care Facilities**
Consolidated guidance on influenza outbreak management and prevention.

Other Resources

- Medical Office Telephone Evaluation of Patients with Possible Influenza
- 2014-15 Flu Vaccination Communication Plans & Strategies #P
- Communications to Health Care Providers
- How Effective Is the Flu Vaccine? #P
- CDC Medscape Expert Commentary
- Guidance for H1N1
- Archived guidance documents for 2009 H1N1 issued during the pandemic
- Toolkit for Long-Term Care Employers
- Flu Activity and Surveillance
- Current & past flu activity
- National Influenza Vaccination Week (NIVW)
- Designed to raise awareness of the importance of continuing flu vaccination
- Vaccines and Immunizations
- Provider Resources for Vaccine Conversations with Parents

Influenza Types

Seasonal

Avian

Swine

Variant

Pandemic

Other

Get Email Updates

To receive email updates



Seasonal Influenza Vaccines

How effective in 2015-16?

<http://www.cdc.gov/flu/professionals/vaccination/effectivenessqa.htm>

<http://www.cdc.gov/flu/professionals/vaccination/>

Table. Adjusted vaccine effectiveness estimates for influenza seasons from 2005-2016

Influenza Season ^a	Reference	Study Site(s)	No. of Patients ^a	Adjusted Overall VE (%)	95% CI
2004-05	Belongia 2009	WI	762	10	-36, 40
2005-06	Belongia 2009	WI	346	21	-52, 59
2006-07	Belongia 2009	WI	871	52	22, 70
2007-08	Belongia 2011	WI	1914	37	22, 49
2009-10	Griffin 2011	WI, MI, NY, TN	6757	56	23, 75
2010-11	Tresnor 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
2015-16*	ACIP presentation, Flannery	WI, MI, PA, TX, WA	563	47*	39, 53*

*Estimate from Nov 2, 2015–April 15, 2016.



Vaccine usage and effectiveness 2015-16

All is not sunshine and roses

ACIP: Don't Use LAIV During 2016-17 Flu Season

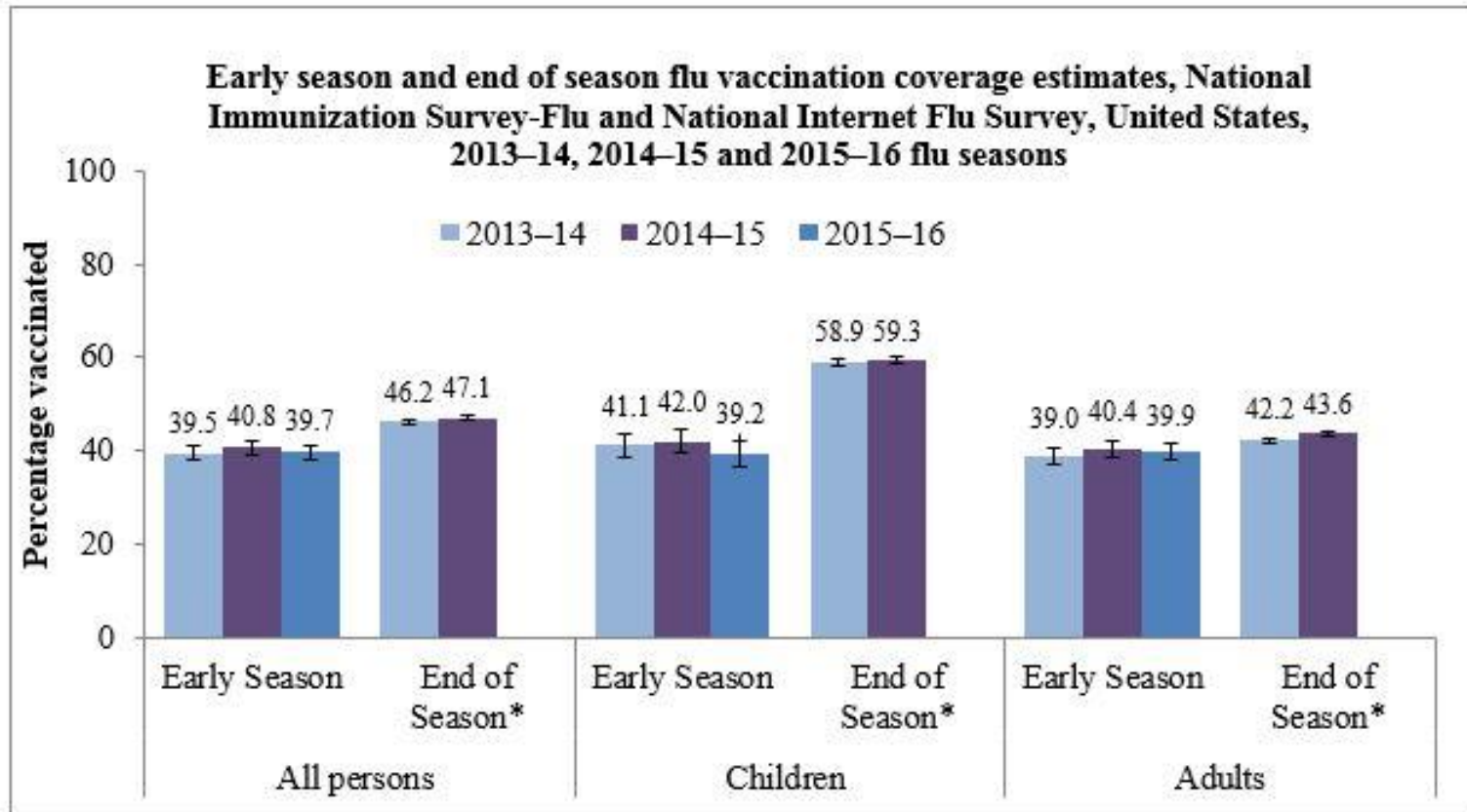
-AAFP News, June 23, 2016-



Vaccination Rates---2013-14, 2014-15, 2015-16

General Population

<http://www.cdc.gov/flu/professionals/vaccination/>





Influenza Surveillance in Wisconsin

Multi-element approach

1. Rapid Influenza Diagnostic Testing (RIDT) Sites
 - >50% of Influenza testing in WI.
 - Confirmatory testing during periods of low prevalence!

WSLH can provide confirmatory testing for out-of-season positives and the first two positive influenza A and influenza B specimens.

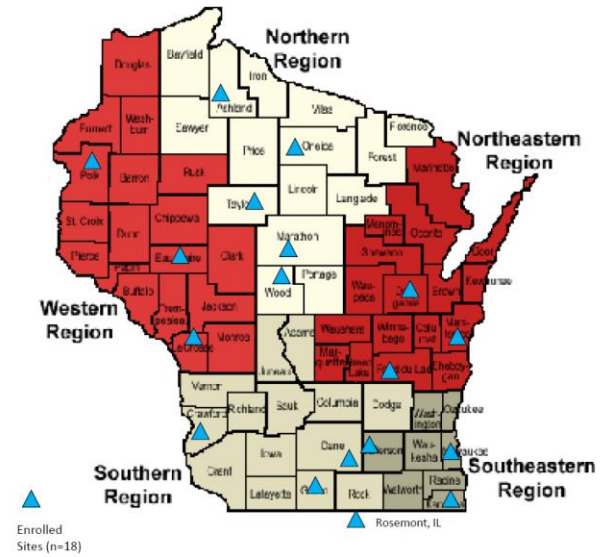


Influenza Surveillance in Wisconsin

Multi-element approach

2. Enrolled Surveillance Sites

- 17 labs in 5 public health regions.
- Provide randomized specimens weekly.




Request to continue to submit the first 3 specimens per week with influenza test requests to WSLH.



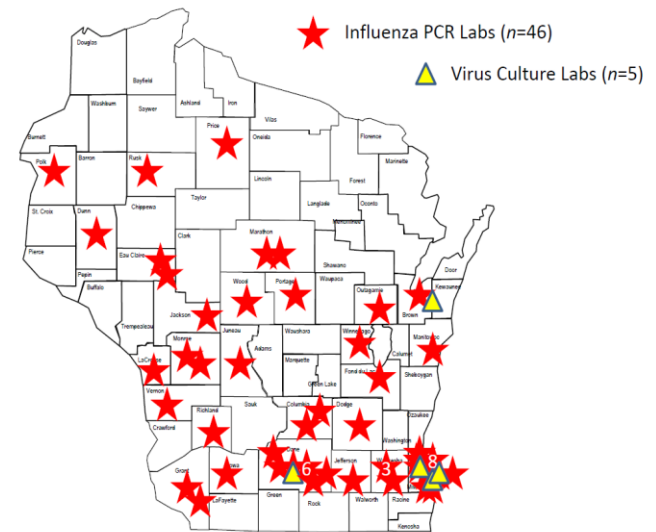
Influenza Surveillance in Wisconsin

Multi-element approach

3. PCR Labs

- “Gold Standard” testing.
- Provide weekly testing data summary reports.
- 48 WI PCR labs! 

Wisconsin Labs with Flu PCR & Virus Culture Capacity, September 2014



Request to report both the number positive and the number tested weekly.

**Send Flu A unsubtypable specimens when subtyping for both 2009 H1N1 and seasonal H3 were attempted (Ct<35).



Laboratory-based Surveillance

All Clinical Laboratories performing influenza diagnostic testing

All Labs:

- Send those with international travel histories
- Sampling of influenza-related hospitalizations
- Unusual presentations/results
- Contact with swine/ sick or dead poultry
- Antiviral treatment failure



Other Pathogens of Public Health Importance to Report

- *B. pertussis/ parapertussis*
- RSV
- Non-influenza respiratory viruses
- Grp A Strep
- VZV
- Rotavirus

NEW! Gastropathogen PCR

Gastrointestinal Pathogens PCR Testing

Please report the number of specimens tested and the number positive.

	Number Tested	Number Positive
Aeromonas	<input type="text"/>	<input type="text"/>
Campylobacter	<input type="text"/>	<input type="text"/>
Clostridium difficile (Toxin A/B)	<input type="text"/>	<input type="text"/>
E. coli O157	<input type="text"/>	<input type="text"/>
Enteroaggregative E. coli (EAEC)	<input type="text"/>	<input type="text"/>
Enteropathogenic E. coli (EPEC)	<input type="text"/>	<input type="text"/>
Enterotoxigenic E. coli (ETEC)	<input type="text"/>	<input type="text"/>
Plesiomonas shigelloides	<input type="text"/>	<input type="text"/>
Salmonella	<input type="text"/>	<input type="text"/>
Shiga-like toxin-producing E. coli (STEC)	<input type="text"/>	<input type="text"/>
Shigella	<input type="text"/>	<input type="text"/>
Shigella/Enteroinvasive E. coli (EIEC)	<input type="text"/>	<input type="text"/>
Vibrio	<input type="text"/>	<input type="text"/>
Vibrio cholerae	<input type="text"/>	<input type="text"/>
Yersinia enterocolitica	<input type="text"/>	<input type="text"/>
Adenovirus 40/41	<input type="text"/>	<input type="text"/>
Astrovirus	<input type="text"/>	<input type="text"/>
Norovirus GI/GII	<input type="text"/>	<input type="text"/>
Rotavirus A	<input type="text"/>	<input type="text"/>
Sapovirus	<input type="text"/>	<input type="text"/>
Cryptosporidium	<input type="text"/>	<input type="text"/>
Cyclospora cayetanensis	<input type="text"/>	<input type="text"/>
Entamoeba histolytica	<input type="text"/>	<input type="text"/>
Giardia lamblia	<input type="text"/>	<input type="text"/>



Reporting Lab Results

There are two options.....

1. Web-based reporting



Select the method below to enter data; you must also select "Next".

- Antigen Detection
- PCR
- Culture

75%

2. FAX reporting

Please FAX by noon Wednesday of each week to:
Erik Reisdorf or Mary Wedig, Wisconsin State Laboratory of Hygiene at 608-265-9091
 Contact Mary Wedig (608-890-0353) or Erik Reisdorf (608-262-1021) with questions.
 Please report the number of specimens tested and the number of specimens positive for each Sunday through Saturday week throughout the year even if no specimens were tested.

WISCONSIN TESTING FAX REPORT

Identification Number: Your Institution's Name, Address & Telephone Number:

Change of Institution Address:

Report For Week (Sunday through Saturday) Ending: _____

Rapid Testing - Virus / Bacteria	Number Tested	Number Positive					
		Influenza			RSV	Rota	Strep
		A	B	A & B			
Influenza A and B (Differentiated) <i>Testing provides 2 results – 1 result for A & 1 result for B</i>							
Influenza (Type Not Known) <i>Testing provides 1 result: could be A or B</i>				Unknown			
RSV							
Rotavirus							
Rapid Strep (Streptococcus Group A)							



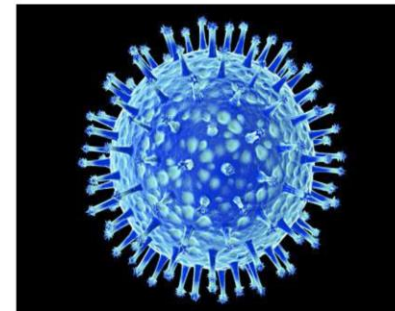


What is the WSLH able to provide to support participating labs?

- Specimen collection supplies.
- Specimen shippers & packaging supplies.
- NO cost specimen transport.
- Influenza confirmatory testing.
- Influenza PCR validation specimen panel.
- Weekly updated surveillance data (*B. pertussis*, *Influenza*, *RSV* & others).
- Laboratory Surveillance Reports



Laboratory-Based Surveillance
Plan 2015-2016



Information, Forms and
Instructions



Influenza Surveillance Strategy

WSLH Surveillance Coordinators

1. Erik Reisdorf

Virology Lab-Team Lead

erik.reisdorf@slh.wisc.edu

2. Mary Wedig

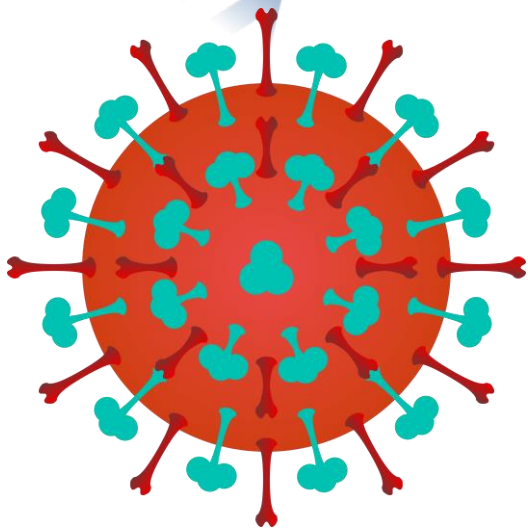
Electronic Reporting Coordinator

mary.wedig@slh.wisc.edu



Other Respiratory Pathogens of Public Health Importance.....

RSV Metapneumovirus



**Rhinovirus/
Enterovirus**

ADENOVIRUS



New viral pathogens discovered since **2001**

- Human metapneumovirus (2001)
- SARS-coronavirus (2003)
- Coronavirus NL63 (2004)
- Coronavirus HKU1 (2005)
- Human bocavirus (2005)
- MERS- coronavirus (2012)

Other “not so new” ones impacting public health.....

- Enterovirus D68 (2014)



Rapid Molecular Platforms



[▶ Play Video](#)

GAS
Flu A/B
Flu A/B & RSV



Flu A/B
GAS



Coming Soon!



GAS



Benefits of NIRV Testing

- Establishes situational awareness
- Establishes etiology when influenza is not detected
- NIRV have similar clinical presentations
- Antibiotic stewardship
- Broaden capacity for outbreak investigations
- Define etiologies with severe acute respiratory illness (SARI)
- Understand burden of co-infections, emerging pathogens



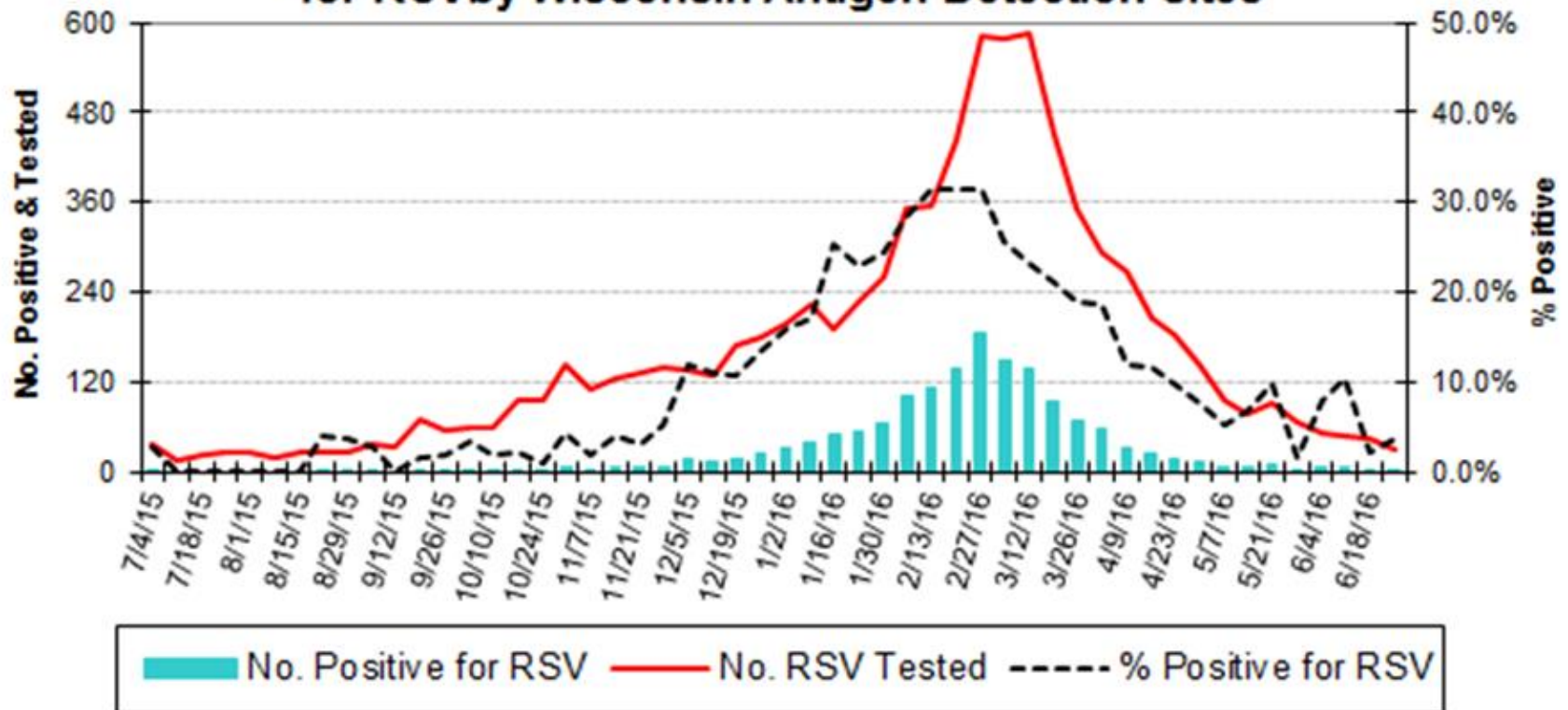
The Major Players- RSV

- Types A and B
- Leading cause of severe disease in infants and young children
- Bronchiolitis, hospitalizations (1-2% infants)
- Burden on elderly
- Seasonality varies with geography
- Infections occur throughout life
- Prophylaxis for vulnerable population--\$\$
- Vaccines in development



RSV Seasonality- Wisconsin

Number of Specimens Tested, Positive and Percent Positive for RSV by Wisconsin Antigen Detection Sites



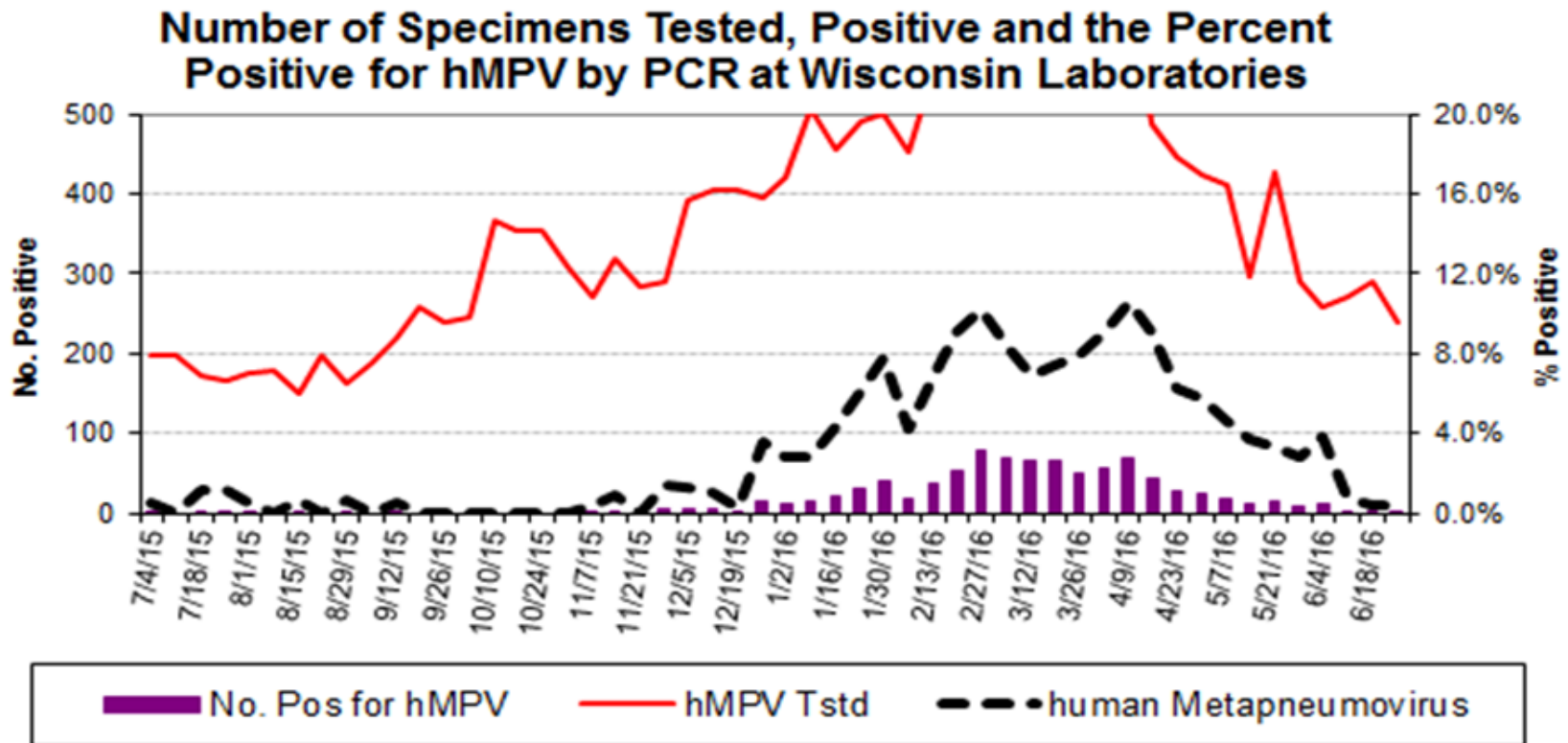


The Major Players- **Metapneumovirus**

- Burden primarily on children, elderly immunocompromised, COPD
- Occurs every year
- Symptoms indistinguishable with RSV
- No antivirals, treatments, or vaccines
- 51% hMPV patients prescribed antibiotics (Williams J et al. J Infect Dis 2006, 193: 387-95)



Human Metapneumovirus-Seasonality



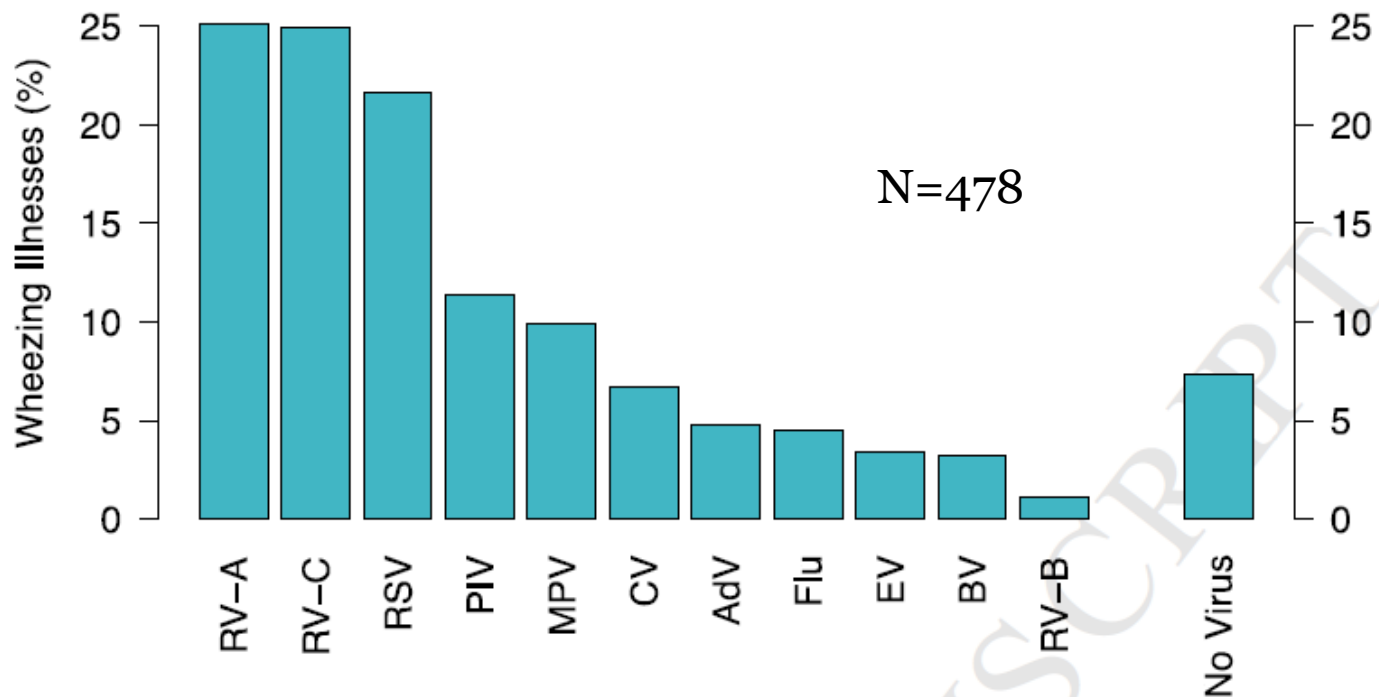


The Major Players- Rhino/Enterovirus

- “Common cold”, URI sinusitis but.....LRI
- Exacerbations of asthma, wheezing
- Occurs every year, year-round
- Re-infections common
- Many types co-circulate, diversity
- Some types associated with more severe disease (e.g. paralysis, myocarditis, encephalitis); Others are mild



Rhinovirus and Wheezing

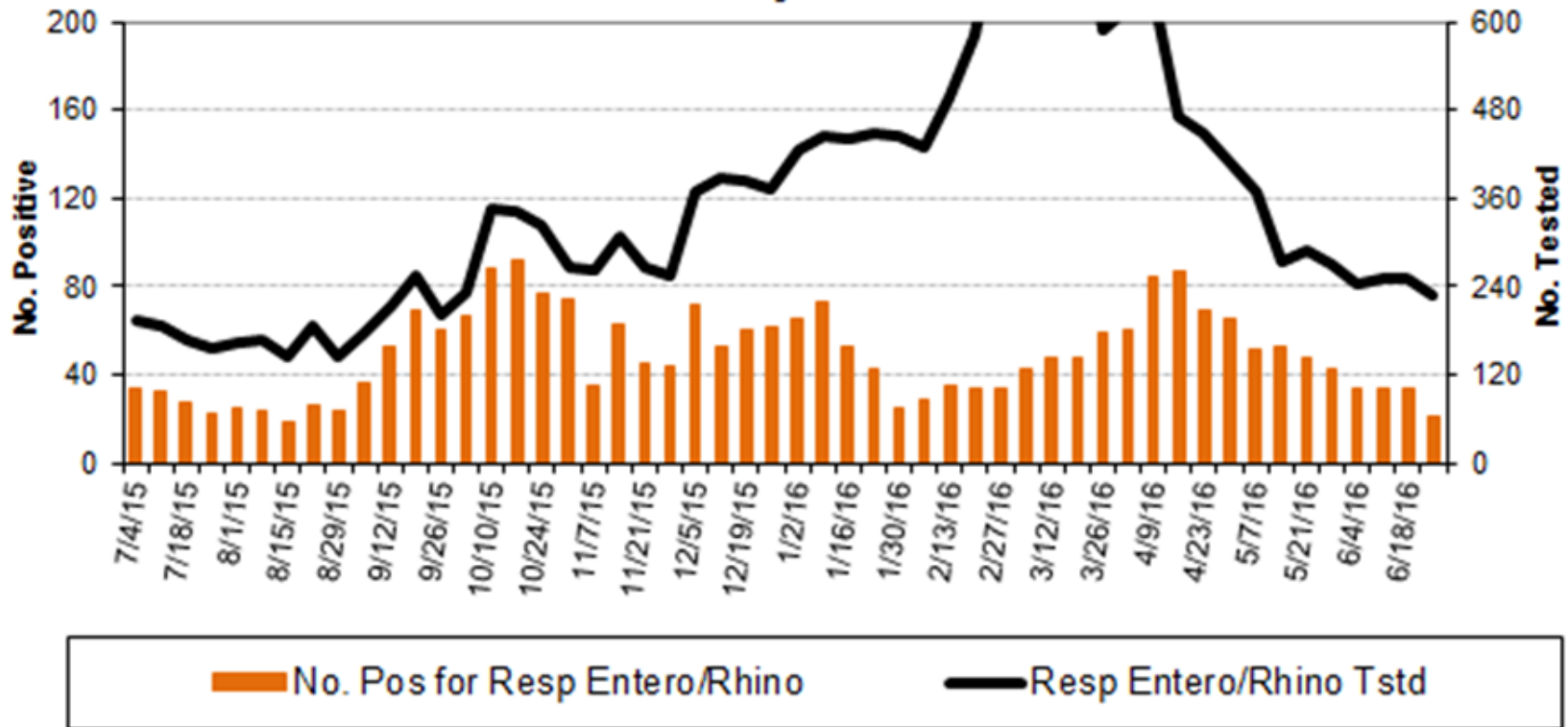


Anderson H, et al., (2016) Assessment of Wheezing Frequency and Viral Etiology on Child and Adolescent Asthma Risk. *J Allergy and Clin Immunol* 26 July 2016



Rhinovirus/enterovirus-Seasonality

Number of Specimens Tested and Positive for Enterovirus/Rhinovirus by PCR at Wisconsin Laboratories





WI Pediatric SARI Patients (2016)

	Infants (n=51)	Toddlers (n=47)	School-Aged Children (n=37)
Bacterial growth	4 (8%)	3 (6%)	3 (8%)
Coinfection	11 (22%)	11 (23%)	5 (14%)
Virus Detected	45 (88%)	42 (89%)	27 (73%)
RSV	25 (62%)	6 (14%)	2 (7%)
Influenza	2 (4%)	1 (2%)	5 (19%)
Coronavirus	4 (9%)	4 (10%)	5 (19%)
Adenovirus	5 (11%)	7 (17%)	3 (11%)
Bocavirus	3 (7%)	3 (7%)	1 (4%)
Metapneumovirus	1 (2%)	5 (12%)	0 (0%)
Rhinovirus	14 (31%)	19 (45%)	10 (37%)
Parinfluenza	1 (2%)	3 (7%)	2 (7%)

Preliminary data courtesy of Lina Elbadawi, MD (CDC) and the WI Div. of Public Health (unpublished)



Thank you!



Your participation in the Wisconsin surveillance system is **vital** to monitor for emerging novel strains with pandemic potential and other pathogens that impact community health.