# Influenza Preparedness in the Pediatric Population

## Clinician Outreach and Communication Activity (COCA) Conference Call

## December 14, 2010

Office of Public Health Preparedness and Response
Division of Emergency Operations

# Objectives

**At the conclusion of this hour, each participant should be able to:**

- Understand 2010 -2011 influenza activity
- Describe risk factors for developing serious flu complications in children
- State effective strategies for influenza prevention and treatment in children
- Identify emergency preparedness response tactics for the pediatric populations

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There is no commercial support.

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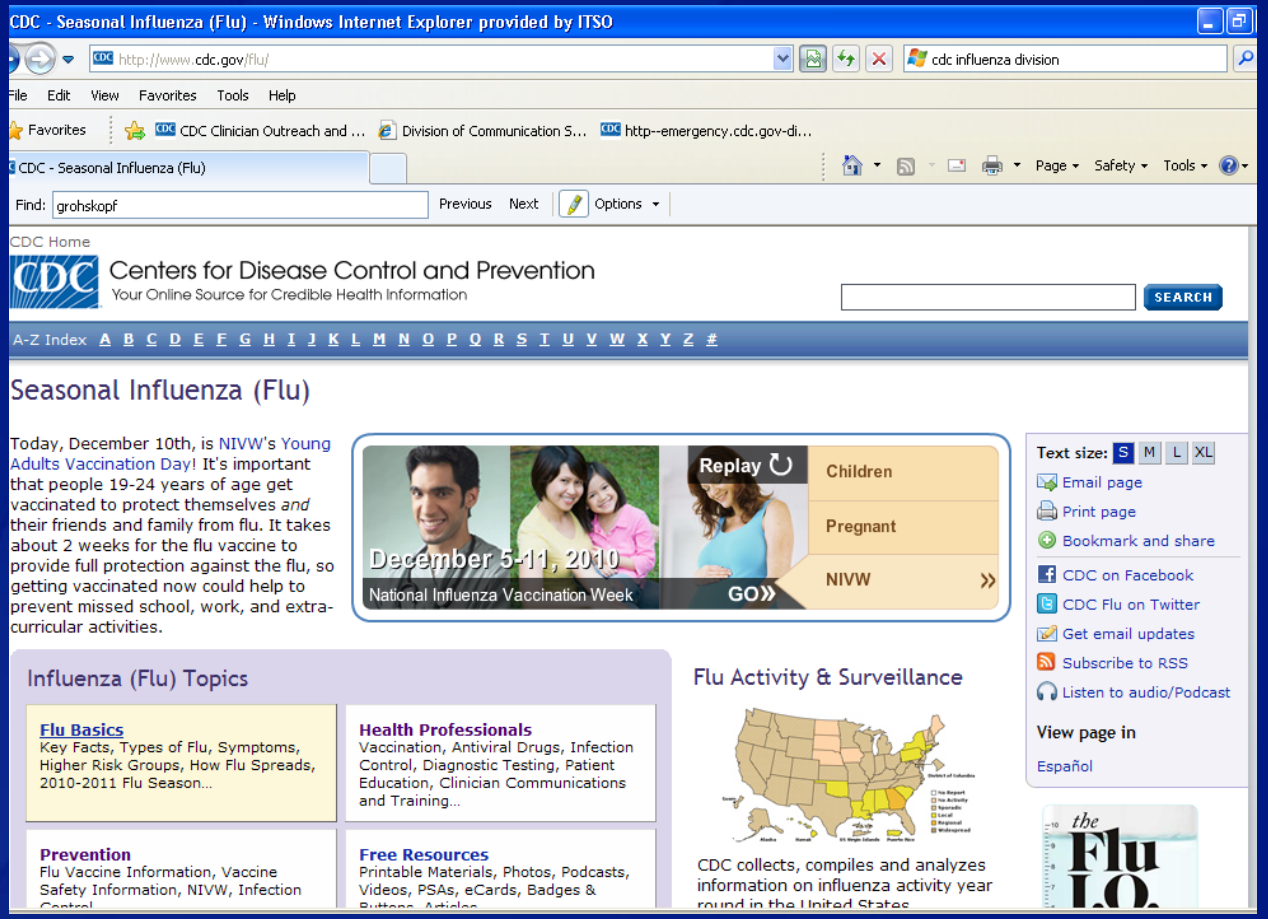
# TODAY'S PRESENTER

**David Schonfeld, MD, FAPP**
**Thelma and Jack Rubenstein Professor of Pediatrics**
**Director, Division of Developmental and Behavioral Pediatrics**
**Director, National Center for School Crisis and Bereavement**
**Cincinnati Children's Hospital Medical Center**

# TODAY'S PRESENTER

**Henry Bernstein, DO, FAAP**
**Professor of Pediatrics**
**Dartmouth Medical School**
**Department of Pediatrics**
**Children's Hospital at Dartmouth**

# TODAY'S PRESENTER




**Lisa Grohskopf, MD, MPH**
**CAPT, U.S. Public Health Service**
**Associate Chief for Policy and Liaison**
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# The Pediatric Healthcare Provider's Role in Preparedness


David J. Schonfeld, MD, FAAP

Member, AAP Disaster Preparedness Advisory Council

**Thelma and Jack Rubinstein Professor**
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www.cincinnatichildrens.org/school-crisis

513-803-2222


**The findings and conclusions in this presentation are those of the author and do not necessarily represent the views of the Centers for Disease Control and Prevention**

# Outline

- Potential roles for pediatricians/pediatric healthcare providers related to disaster
  - Providing direct medical care
  - Providing anticipatory guidance
  - Establishing partnerships in the community to provide pediatric expertise
- Importance of practice and personal/family preparedness

# Providing direct medical care

- Provide direct medical care, often under stressful or austere conditions, to your own patient population
  - Keep updated on evolving public health status and relevant medical information
- Care for additional patients and families (may include adults) or deliver care at different sites (local, regional, or distant)
- Collaborate with hospital, clinic, and practice settings to plan for surge capacity
- Screening protocols for influenza like illnesses
  - See http://www.aap.org/disasters/H1N1.cfm

# Providing anticipatory guidance

- Encourage and facilitate influenza vaccination
  - Universal vaccination, but mechanism for prioritizing if necessary
    - Delivery mechanism
    - Communication strategy
  - Be aware of media messages (planned and spontaneous) and be trusted (and hopefully persuasive) source of accurate medical information

# Establishing partnerships in the community

- Identify yourself and professional organization(s) as resources for health departments and emergency managers for pandemic flu and other disaster/crisis response planning
- Become a trusted collaborator for community-based organizations
  - Schools
  - Child care, Preschool, Head Start
  - Other child congregate facilities (e.g., juvenile justice, youth groups, camps, etc.)

# Providing consultation – Prior to a disaster

- Consult to health departments, emergency managers, etc. on plans
  - Ensure incorporation of medical home
- Consultation to schools, childcare, Head Start, afterschool groups, other congregate care sites
  - Assist with development of plans
  - Identify policies to reconsider
  - Encourage appropriate prevention efforts
  - Develop guidelines and processes for decisions about school closure

# Providing consultation during response

- Assist with development of optimal media messages
  - Understand 2 general purposes of public health messages during a disaster – reassurance or call to action
    - "warning" is not one of them
  - Focus on behaviorally relevant information
  - Avoid fear-based messaging

# Providing supportive services during response and recovery

- Provide supportive services for families and communities under stress within practice setting
- Identify the need for and facilitate referral
- Develop and promote mechanisms for providing services to children in schools and other congregate care sites and community sites
  - Assist with training/professional development
  - Advocate for service capacity

# Importance of practice preparedness

- Make sure your office has a disaster preparedness plan
  - **Disaster Preparedness for Pediatric Practices: An Online Tool:**

    http://practice.aap.org/disasterpreptool.aspx
  - Continuity of Operations plan coupled with appropriate policies regarding worker illness
- Universal influenza vaccination

# Importance of personal/family preparedness

- Make sure your family has a family disaster plan; ensure the same for your staff
  - Alternate plans for childcare and eldercare
  - Options if school closes or primary caretakers become ill
- Recognize the importance of self-care

# AAP Children and Disasters website

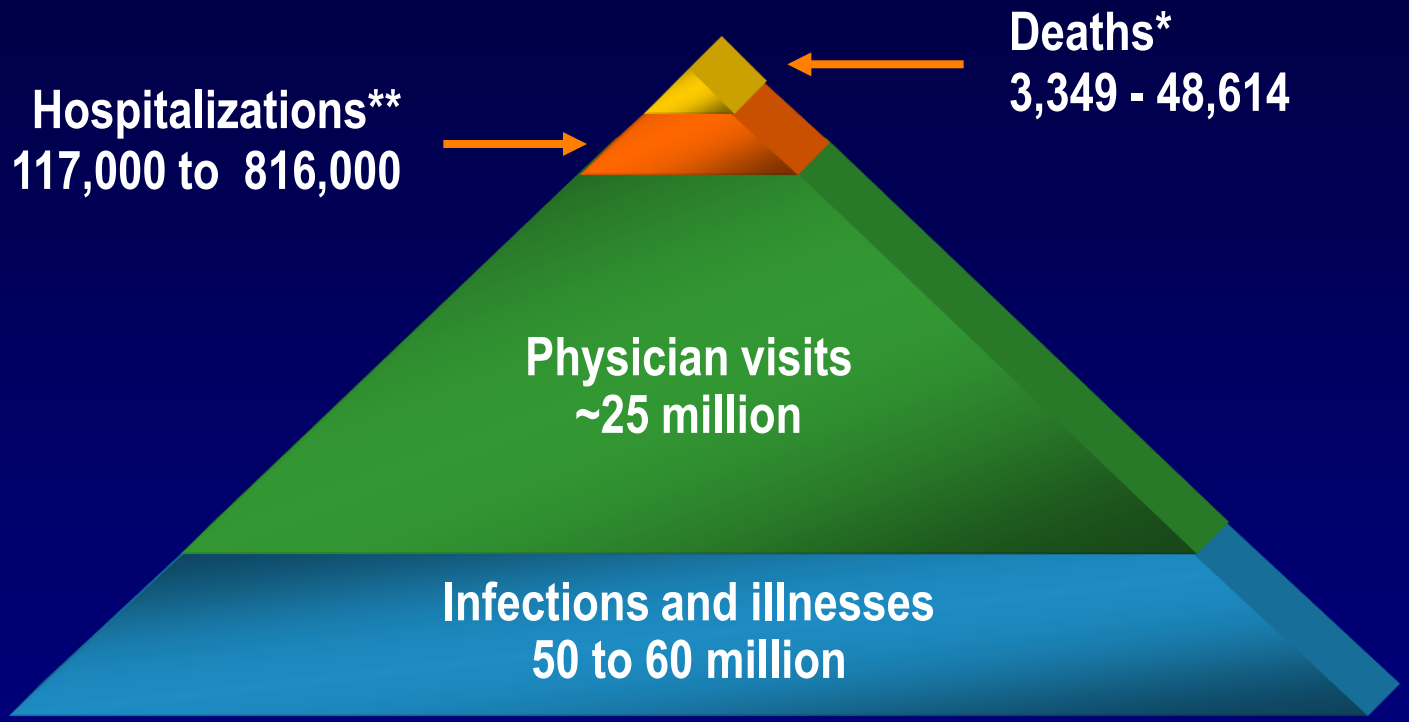
www.aap.org/disasters

# Seasonal Influenza Prevention: AAP Policies for Children and Health Care Personnel in 2010-2011

**Henry (Hank) Bernstein, DO**
**American Academy of Pediatrics**
**Committee on Infectious Diseases**


**The findings and conclusions in this presentation are those of the author and do not necessarily represent the views of the Centers for Disease Control and Prevention**

# Influenza Disease Burden in the U.S. in an Average Year

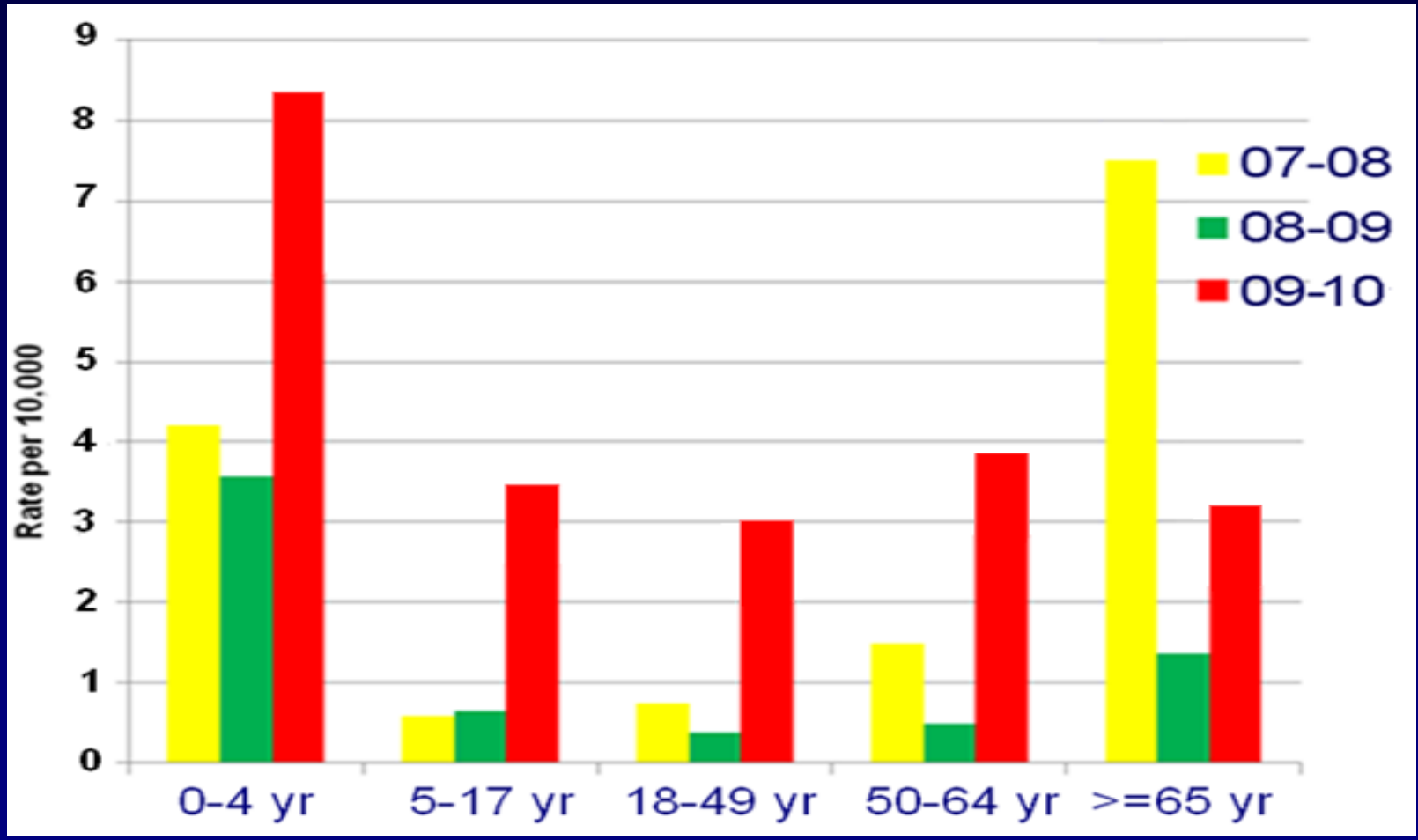



* MMWR. 2010: 59 (22): 1057-62.

**All-cause hospitalization and mortality associated with influenza virus infection.

Thompson WW, et al. *JAMA*. 2003;289:179; Thompson WW, et al. *JAMA*. 2004;292:1333; Couch RB. *Ann Intern Med*. 2000;133:992; Patriarca PA. *JAMA*. 1999;282:75;ACIP. *MMWR*. 2004;53(RR06):1.

# Cumulative rate of laboratory-confirmed influenza-associated hospitalizations per 10,000 by age group during 3 seasons, Emerging Infections Program, 2007-2010




*MMWR* 2010;59:901-908

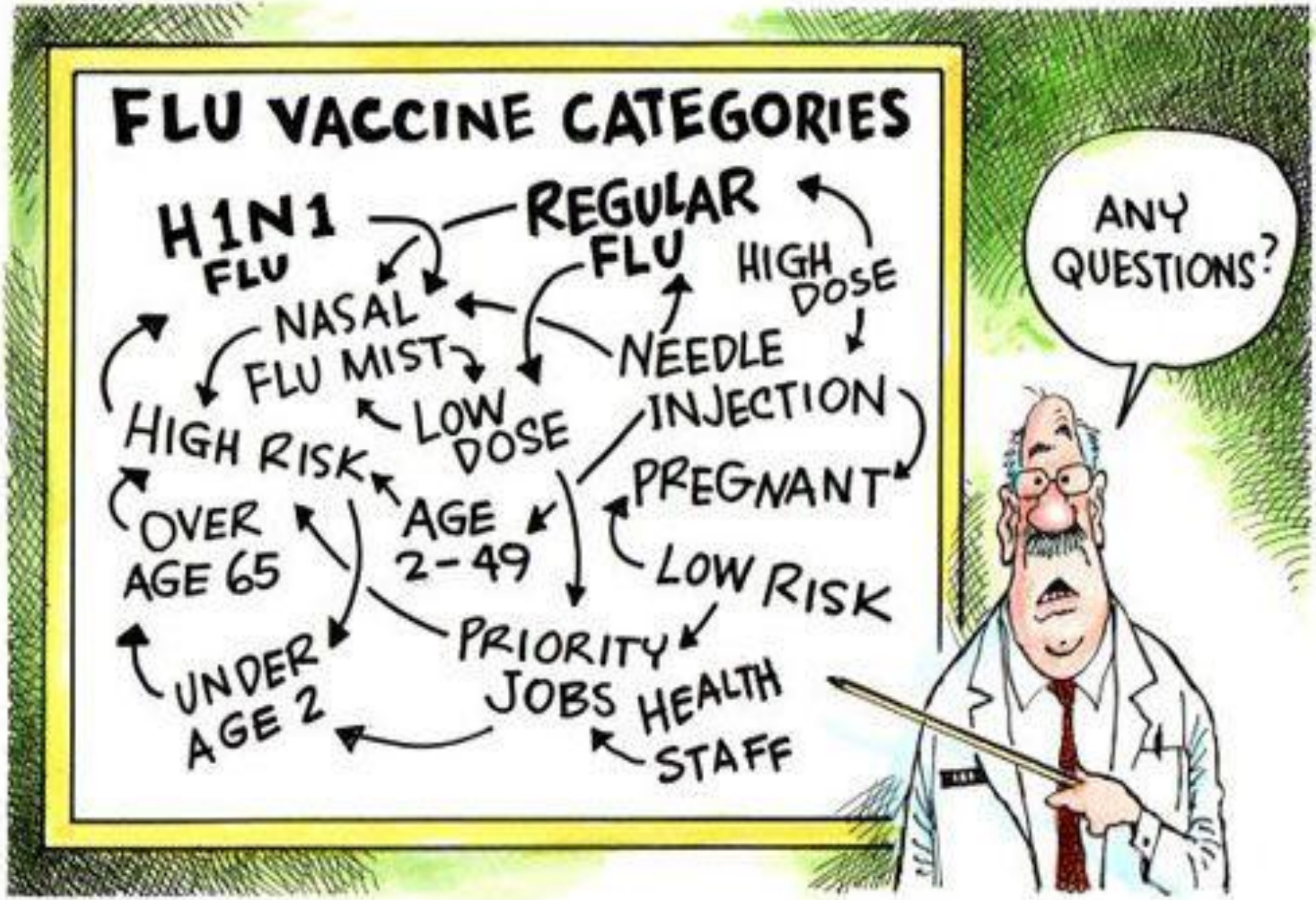
**Table 2. Underlying Medical Conditions among the Patients, According to Age Group.***

| Medical Condition | All Patients (N=272) | Patients <18 yr (N=122) | Patients ≥18 yr (N=150) |
|---|---|---|---|
| | | *number (percent)* | |
| Any one condition | 198 (73) | 73 (60) | 125 (83) |
| Asthma | 76 (28) | 35 (29) | 41 (27) |
| Chronic obstructive pulmonary disease | 22 (8) | 0 | 22 (15) |
| Diabetes | 40 (15) | 3 (2) | 37 (25) |
| Immunosuppression | 40 (15) | 11 (9) | 29 (19) |
| Chronic cardiovascular disease | 35 (13) | 5 (4) | 30 (20) |
| Chronic renal disease | 25 (9) | 7 (6) | 18 (12) |
| Neurocognitive disorder | 20 (7) | 14 (11) | 6 (4) |
| Neuromuscular disorder | 19 (7) | 13 (11) | 6 (4) |
| Pregnancy | 18 (7) | 1 (1) | 17 (11) |
| Seizure disorder | 18 (7) | 13 (11) | 5 (3) |

* Patients who are pregnant, who have immunosuppression (from either medications or immune disorders, including human immunodeficiency virus infection), or who have chronic pulmonary disease (e.g., asthma or chronic obstructive pulmonary disease), cardiovascular disease (excluding hypertension), or renal, hepatic, hematologic, neurologic, or metabolic disease (e.g., diabetes) are considered to be at high risk for influenza-related complications. For additional clinical characteristics of the patients, see Table 1 in the Supplementary Appendix.

Jain S et al. *NEJM* 2009;10.1056

The NEW ENGLAND JOURNAL of MEDICINE



# Trivalent Flu Vaccine Strains, 2010–2011 Northern Hemisphere Influenza Season

- An A/California/7/2009 (H1N1)-like antigen
  - ✓New to seasonal vaccine
  - ✓Replaced influenza A (H1N1) virus that circulated since 1977
- An A/Perth/16/2009 (H3N2)-like antigen
  - ✓New
- A B/Brisbane/60/2008-like virus
  - ✓Unchanged

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Organizational Principles to Guide and Define the Child Health Care System and/or Improve the Health of all Children

# Policy Statement—Recommendations for Prevention and Control of Influenza in Children, 2010–2011

COMMITTEE ON INFECTIOUS DISEASES

**KEY WORDS**

influenza, novel 2009 influenza A (H1N1) virus, pandemic, immunization, live-attenuated influenza vaccine, trivalent inactivated influenza vaccine, vaccine, children, pediatrics

**ABBREVIATIONS**

AAP—American Academy of Pediatrics
HCP—health care personnel
CDC—Centers for Disease Control and Prevention
TIV—trivalent inactivated influenza vaccine
LAIV—live-attenuated influenza vaccine
GBS—Guillain-Barré syndrome



## abstract

The purpose of this statement is to update current recommendations for routine use of trivalent seasonal influenza vaccine and antiviral medications for the prevention and treatment of influenza in children. The 2009 influenza A (H1N1) pandemic virus is expected to circulate, with infants and children at increased risk of severe illness and death. This year's trivalent seasonal influenza vaccine contains A/California/7/2009 (H1N1)-like antigen (derived from the 2009 pandemic influenza A [H1N1] virus); A/Perth/16/2009 (H3N2)-like antigen; and B/Brisbane/60/2008-like antigen. Pediatricians continue to have a leadership role in the prevention of influenza through vaccine use and public education. In addition, pediatricians should promptly identify influenza infections to enable rapid treatment of influenza, when indicated, to reduce childhood morbidity and mortality. *Pediatrics* 2010;126:000

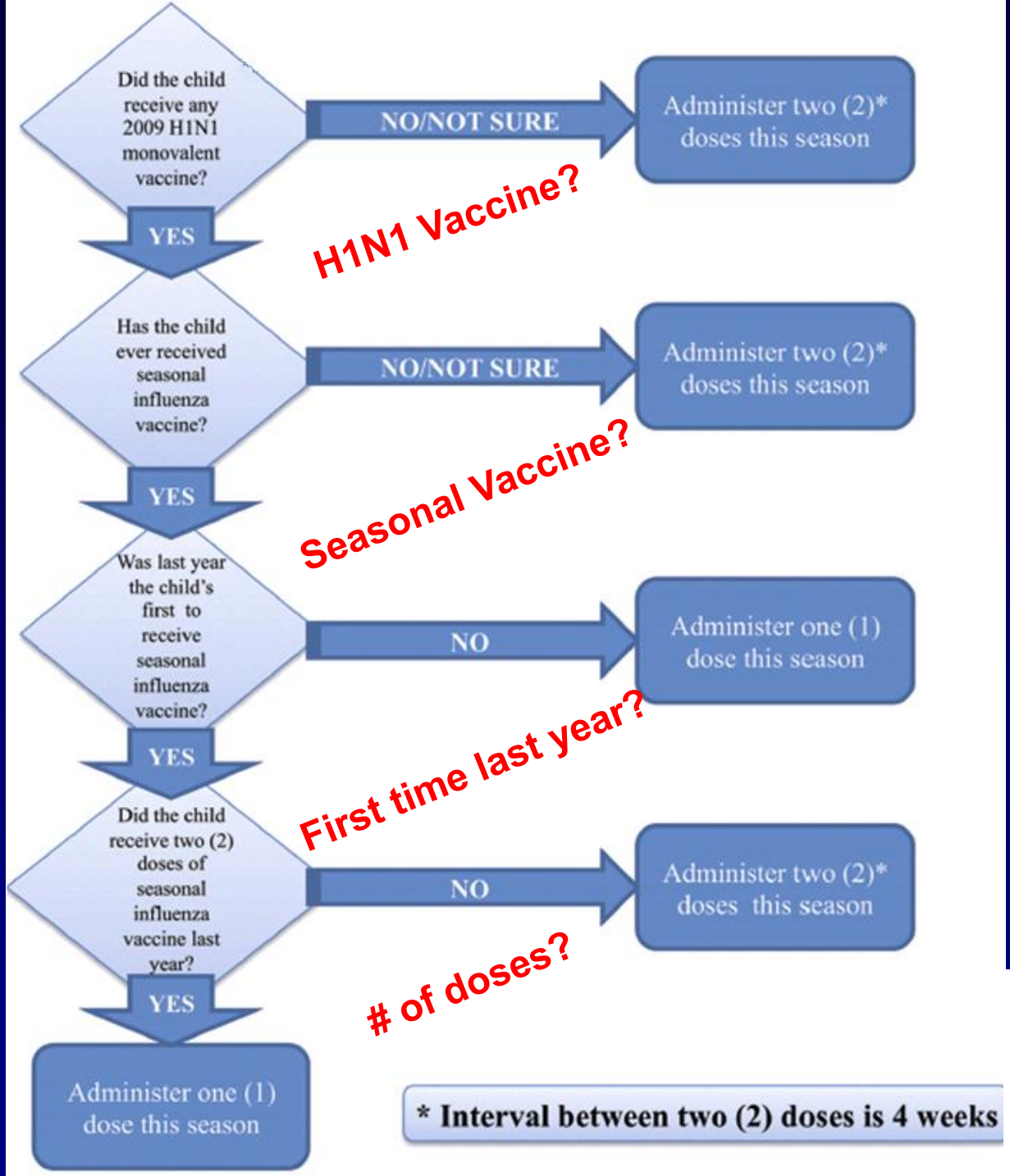
## INTRODUCTION

# Influenza 2010-2011: Key Points

- 2009 influenza A (H1N1) pandemic virus expected to circulate
  - ✓ Infants and children at increased risk
- Vaccine indicated for everyone ≥6 months
  - ✓ Special outreach to children, certain household contacts, pregnant women, and HCP
- Immunize during entire influenza season into April and May

# Number of 2010-2011 Seasonal Influenza Vaccine Doses Recommended For Children

| | |
|---|---|
| Infants under 6 months of age | No influenza vaccine |
| Children 6 months through 8 years of age | Follow algorithm |
| Children 9 years of age and older | One (1) dose |




Childhood Influenza Immunization Coalition
The Power of One Strong Voice

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# Special Outreach

- High risk children with chronic medical conditions (e.g., asthma, diabetes, neurodevelopmental disorders)

- Healthy children younger than 5 years:
  - ✓ If < 24 months, have similar risk of influenza-associated hospitalization as other high-risk groups
  - ✓ If 24-59 months, have increased morbidity, rates of outpatient visits and antimicrobial use

# Cocoon Strategy

- Immunize close contacts of
  - Infants < 6 months (cannot receive vaccine)
  - High risk children with chronic medical conditions
  - Healthy children younger than 5 years

# Use of Antivirals

- **Children with presumed influenza infection**
  - ✓ **Hospitalized**
  - ✓ **At high risk of complication**
  - ✓ **Would benefit from a decrease in duration of symptoms**
- **Best within 48 hours onset of symptoms**
  - ✓ **Severity of symptoms may still be decreased outside of 48 hour window**
- **If clinical judgment indicates treatment…**
  - ✓ **Do not wait for definitive test result**
  - ✓ **RIDT with low sensitivity**

| Expected 2010-11 Seasonal Viruses | Antiviral Medications | | |
|---|---|---|---|
| | Adamantanes (Symmetrel/Flumadine) | Oseltamivir (Tamiflu) | Zanamivir (Relenza) |
| A: 2009 H1N1 | Resistant | Susceptible | Susceptible |
| A: H3N2 | Resistant | Susceptible | Susceptible |
| B | Resistant | Susceptible | Susceptible |

For current recommendations about treatment and chemoprophylaxis of influenza, see www.cdc.gov/flu/professionals/antivirals/index.htm or www.aapredbook.org/flu. Circulating strains in local communities may vary from those found in the vaccine. Antiviral sensitivities of these strains are reported weekly at www.cdc.gov/flu/weekly/fluactivity.htm.

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Organizational Principles to Guide and Define the Child Health Care System and/or Improve the Health of all Children

# Policy Statement—Recommendation for Mandatory Influenza Immunization of All Health Care Personnel

COMMITTEE ON INFECTIOUS DISEASES

**KEY WORDS**
health care personnel, mandatory, influenza, immunization, vaccine, children, pediatrics

**ABBREVIATIONS**
HCP—health care personnel
CDC—Centers for Disease Control and Prevention



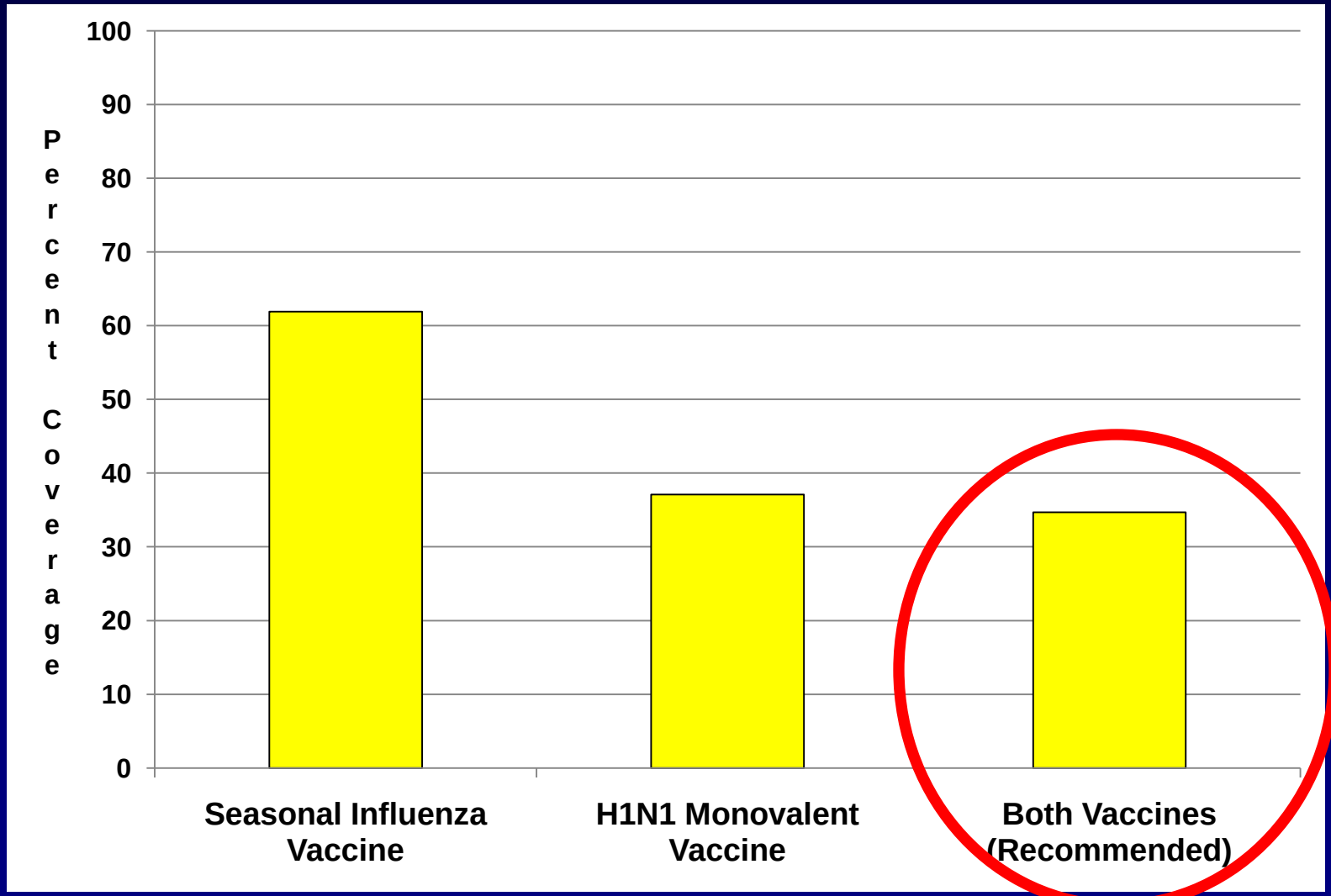
## abstract

FREE

The purpose of this statement is to recommend implementation of a mandatory influenza immunization policy for all health care personnel. Immunization of health care personnel is a critically important step to substantially reduce health care–associated influenza infections. Despite the efforts of many organizations to improve influenza immunization rates with the use of voluntary campaigns, influenza coverage among health care personnel remains unacceptably low. Mandatory influenza immunization for all health care personnel is ethically justified, necessary, and long overdue to ensure patient safety. *Pediatrics* 2010;126:809–815

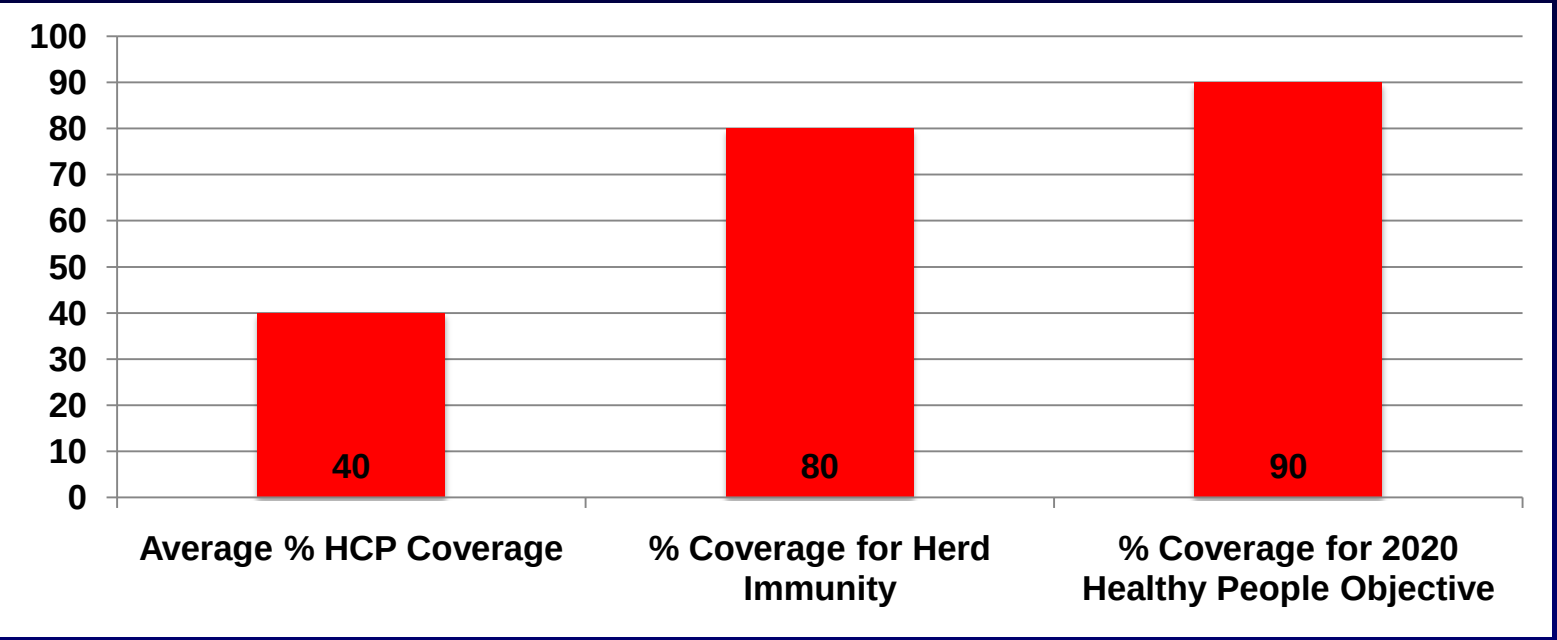
## INTRODUCTION

# Percent of HCP Vaccinated in 2009-2010 Season




*MMWR 2010;59(12):357–362*

# Influenza Immunization for HCP




- HCP immunization rates remain low
- HCP in close contact with high risk populations
  - ✓ Influenza cases in healthy adults reduced by 70-90% when vaccine well-matched to circulating strain[1]

[1] MMWR Recomm Rep. 2009;58(RR-8):1–52

# Reasons Mandatory Requirements Should Be Implemented (1)

- Influenza is a serious threat
- Vaccine is safe and effective in preventing disease
- **Necessary:** less strict strategies have not been enough to prevent spread
- **Ethically justified:** matter of patient safety
- Historically, other mandatory vaccine programs have been **successful** (Tb testing; school immunization requirements)

# Reasons Mandatory Requirements Should Be Implemented (2)

- Mandatory influenza programs cut costs and increase efficiency in healthcare settings
- Concept has widespread support
- Hospitals have already implemented successful mandatory influenza programs

# Features of Successful Mandatory Programs

- Education about influenza and vaccine
- Access to vaccine
- Incentives for participation
- Mandatory Participation either by:
  - ✓ Vaccination
  - ✓ Documented declination of vaccination

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KEYWORDS GO Advanced

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The Report of the Committee on Infectious Diseases

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## Red Book® Table of Contents

Summary of Major Changes
Section 1 | Section 2 | Section 3
Section 4 | Section 5 | Appendices

## Visual Library

## Updates — Updated 12/6/10

## Vaccine Status Table

HTML | PDF — Updated 10/13/10

## Influenza Resource Page, 2010-2011

Main Page | Flu Links — New updates 12/6/10

## 2010 Immunization Schedules

0-6 Years | 7-18 Years | Catch-up Schedule

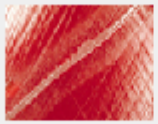
SEARCH [Advanced]

Red Book Online. Developed by the American Academy of Pediatrics (AAP) Committee on Infectious Diseases to provide guidance on the manifestations, etiology, epidemiology, diagnosis, and treatment of more than 200 common childhood conditions.

## Infectious Diseases Quick Lookup

A | B | C | D | E | F | G | H | I | J | K | L | M |
N | O | P | Q | R | S | T | U | V | W | X | Y | Z

## Image of the Week



*Haemophilus influenzae* Infections

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http://aapredbook.aappublications.org/flu/

# Influenza Epidemiology, Vaccine, and Limitations of Rapid Tests

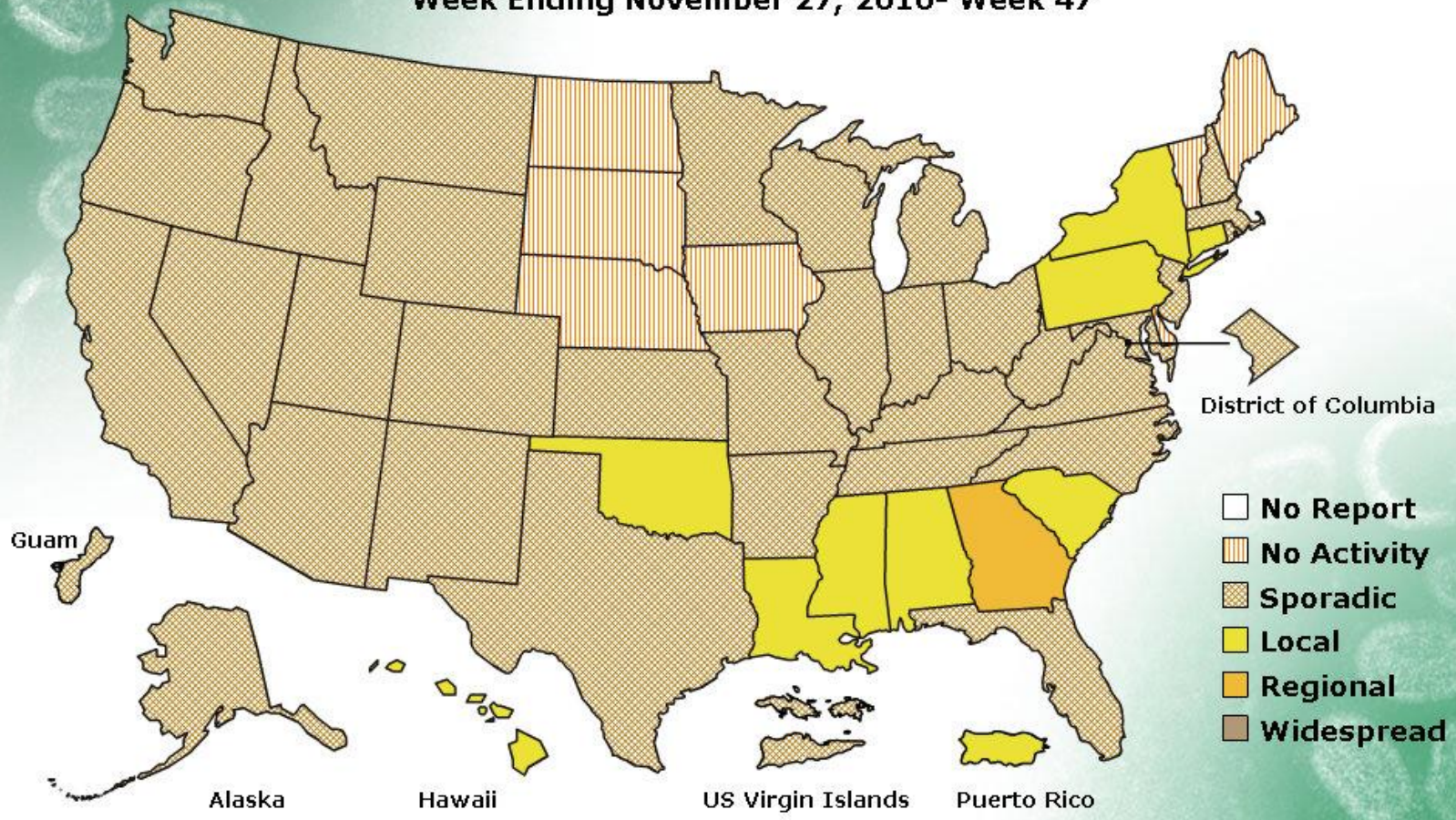
**Lisa A. Grohskopf, MD, MPH**
Medical Officer
Epidemiology and Prevention Branch
Influenza Division

# Influenza Epidemiology Update

# FluView

**A Weekly Influenza Surveillance Report Prepared by the Influenza Division**
**Weekly Influenza Activity Estimates Reported by State and Territorial Epidemiologists***

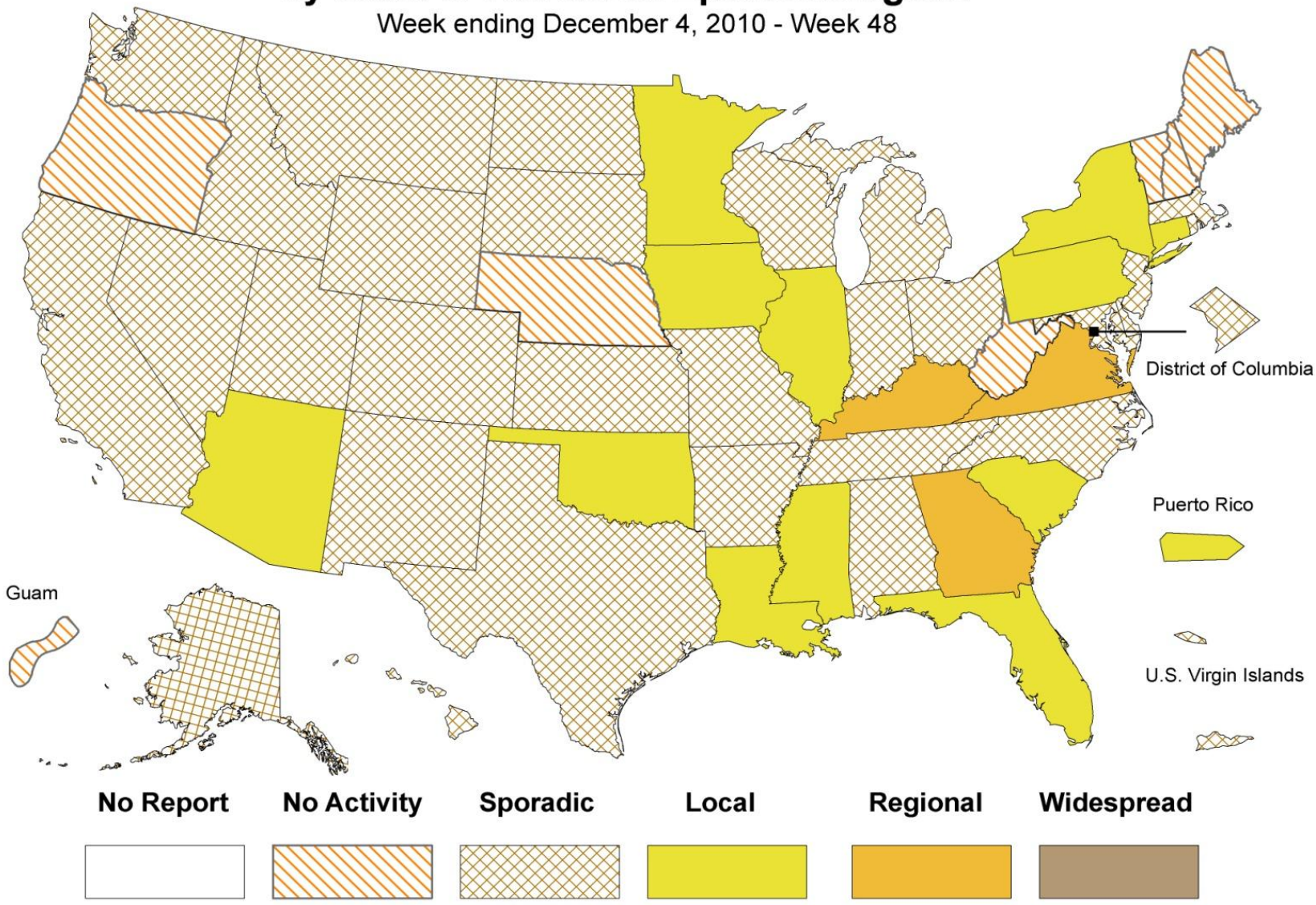
**Week Ending November 27, 2010- Week 47**




*This map indicates geographic spread and does not measure the severity of influenza activity.

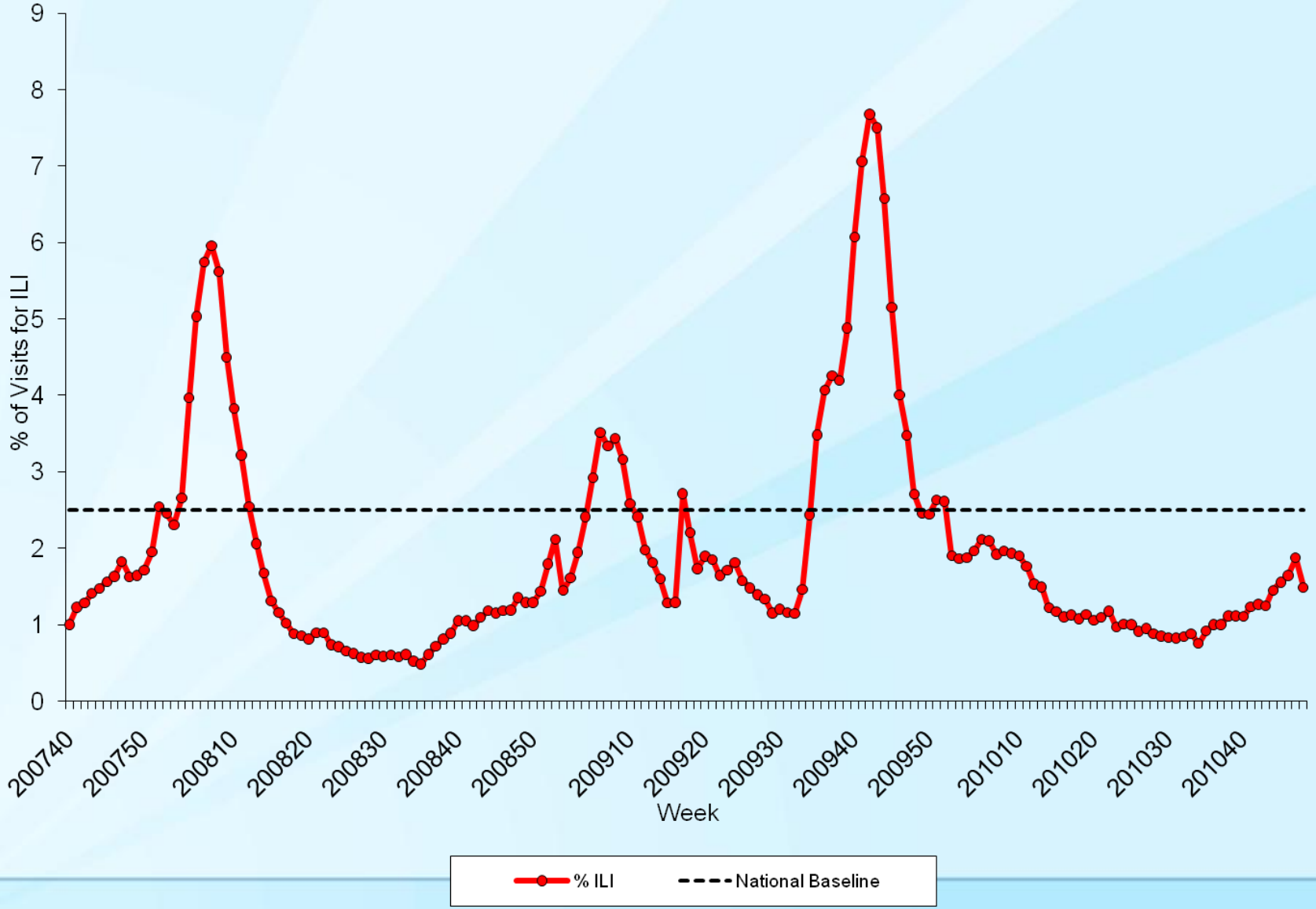
# Weekly Influenza Activity Estimates Reported by State & Territorial Epidemiologists*

Week ending December 4, 2010 - Week 48

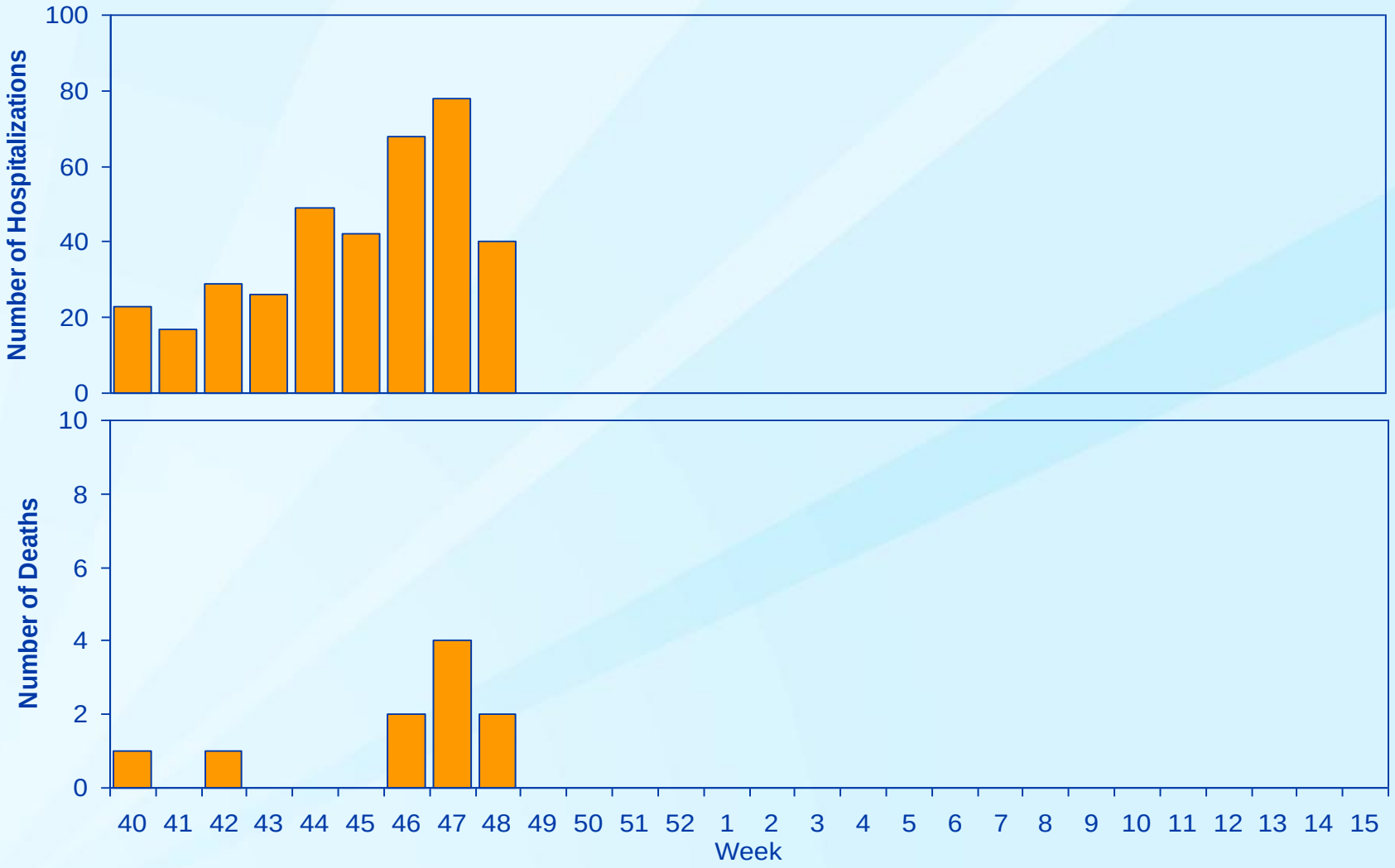



* This map indicates geographic spread & does not measure the severity of influenza activity

# Percentage of Visits for Influenza-like Illness (ILI) Reported by the U.S. Outpatient Influenza-like Illness Surveillance Network (ILINet), Weekly National Summary, September 30, 2007 – December 4, 2010

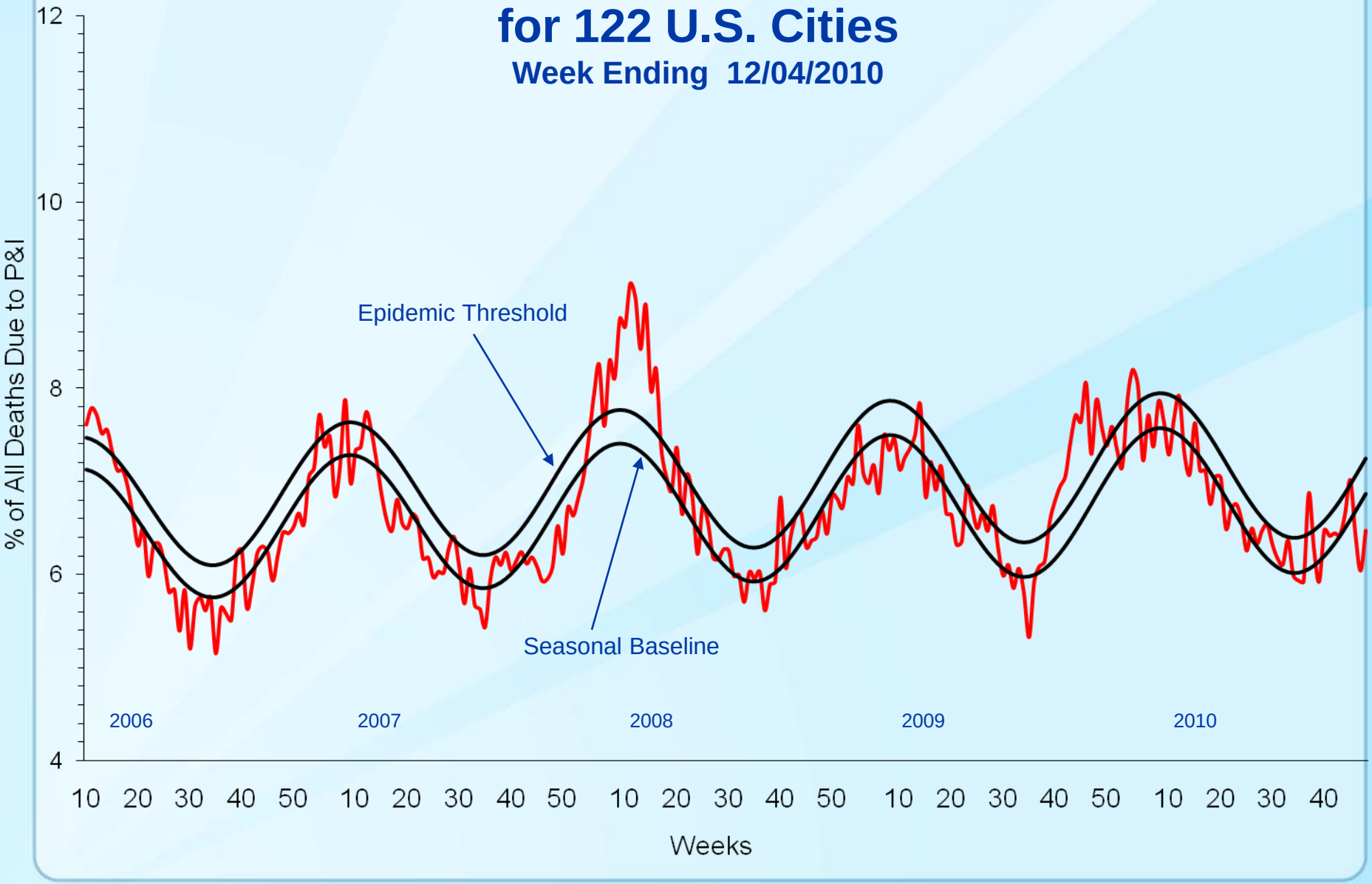


# Weekly Laboratory-Confirmed Influenza-Associated Hospitalizations and Deaths, National Summary, 2010-11 Influenza Season

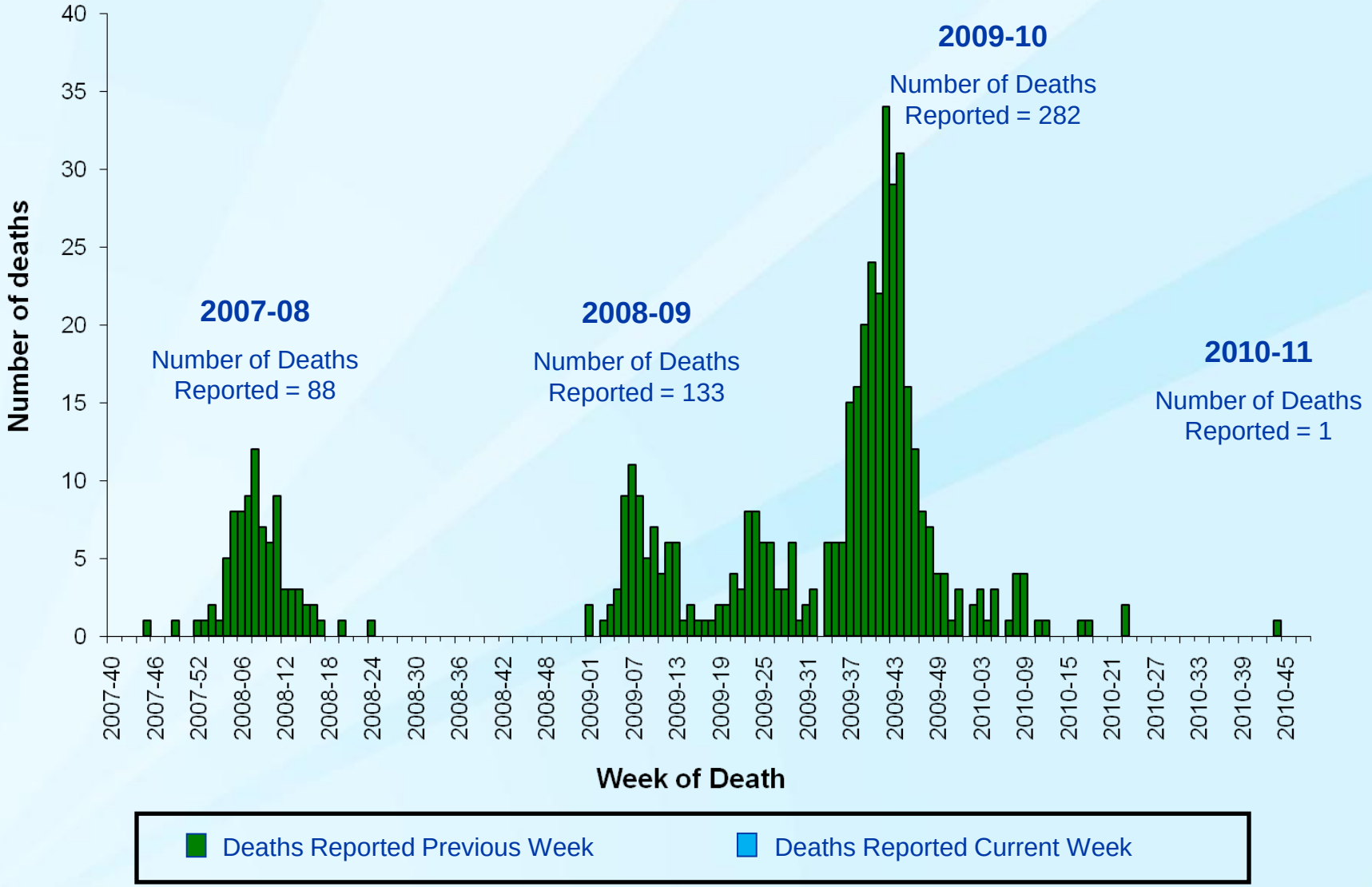


# Pneumonia and Influenza Mortality for 122 U.S. Cities

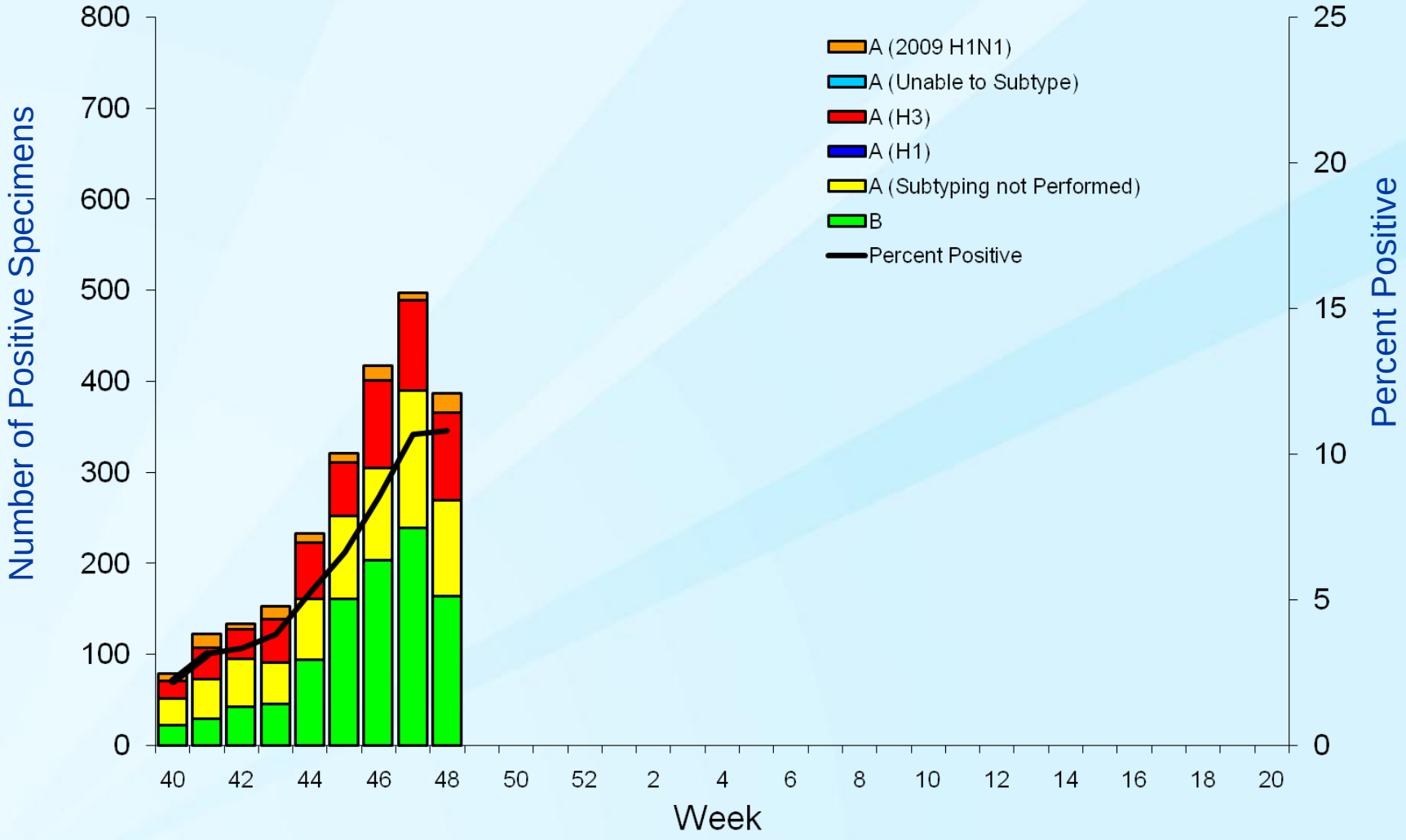
## Week Ending 12/04/2010



# Number of Influenza-Associated Pediatric Deaths by Week of Death: 2007-08 season to present



# Influenza Positive Tests Reported to CDC by U.S. WHO/NREVSS Collaborating Laboratories, National Summary, 2010-11



# Influenza Vaccine

# 2010-11 Trivalent Vaccine Composition

- **Annual vaccination of all persons aged 6 months and older is recommended**
- **Vaccine strains:**
  - A/California/7/2009-like H1N1
    - Same strain as 2009 monovalent vaccine
  - A/Perth/16/2009-like H3N2
    - New H3N2 strain for Northern Hemisphere
  - B/Brisbane/60/2008
    - Was in 2009-10 seasonal vaccine
- **Recently, 2009 H1N1, H3N2, and B virus strains have all been identified in persons in the U.S.**

# Seasonal Influenza Vaccines
# United States, 2010-11 Season

**TABLE. Influenza vaccines recommended by the Advisory Committee on Immunization Practices (ACIP) for different age groups — United States, 2010–11 season**

| Vaccine | Trade name | Manufacturer | Presentation | Mercury content (mcg Hg/0.5 mL dose) | Age group | No. of doses | Route |
|---|---|---|---|---|---|---|---|
| TIV* | Fluzone | sanofi pasteur | 0.25mL prefilled syringe | 0 | 6–35 mos | 1 or 2† | Intramuscular§ |
| | | | 0.5 mL prefilled syringe | 0 | ≥36 mos | 1 or 2† | Intramuscular§ |
| | | | 0.5 mL vial | 0 | ≥36 mos | 1 or 2† | Intramuscular§ |
| | | | 5.0 mL multidose vial | 25.0 | ≥6 mos | 1 or 2† | Intramuscular§ |
| TIV | Fluvirin | Novartis Vaccine | 5.0 mL multidose vial | 25.0 | ≥4 yrs | 1 or 2† | Intramuscular§ |
| | | | 0.5 mL prefilled syringe | <1.0 | | | |
| TIV | Agriflu | Novartis Vaccine | 0.5 mL prefilled syringe | 0 | ≥18 yrs | 1 | Intramuscular§ |
| TIV | Fluarix | GlaxoSmithKline | 0.5 mL prefilled syringe | 0 | ≥3 yrs | 1 or 2† | Intramuscular§ |
| TIV | FluLaval | GlaxoSmithKline | 5.0 mL multidose vial | 25.0 | ≥18 yrs | 1 | Intramuscular§ |
| TIV | Afluria¶ | CSL Biotherapies | 0.5 mL prefilled syringe | 0 | ≥9 yrs | 1 | Intramuscular§ |
| TIV High-Dose** | Fluzone High-Dose | sanofi pasteur | 0.5 mL prefilled syringe | 0 | ≥65 yrs | 1 | Intramuscular§ |
| LAIV†† | FluMist§§ | MedImmune | 0.2 mL sprayer, divided dose | 0 | 2–49 yrs | 1 or 2† | Intranasal |

* Trivalent inactivated vaccine

Expected number of doses for 2010-10: approximately 160 million

# Influenza Vaccine Distribution

- **Doses distributed in the U.S. as of November 26, 2010:**
  - Approximately 162.8 million doses
- **Most doses ever distributed in the U.S. in a single prior season:**
  - Approximately 114 million doses  (2009-2010 season)

# Rapid Testing Issues

# Influenza Diagnostic Tests

| Test Type | Approximate Test Time |
|---|---|
| Viral culture | 3-10 days |
| Direct/Indirect Fluorescent Antibody Staining (DFA/IFA) | 2-4 hours |
| RT-PCR | 2-4 hours |
| Serology (paired specimens) | 2 weeks or more |
| Enzyme Immunoassay (EIA) | 2 hours |
| Rapid Influenza Diagnostic Tests (RIDTs) | 10-15 minutes |

# Challenges in the Use of RIDTs

**Factors that can influence RIDT results:**

- **Timing of specimen collection**
  - Ideally as close to illness onset as possible (<5 days)
  - Viral shedding varies with age, time since illness onset, immune status
- **Source of clinical specimen**
  - Nasopharyngeal swab/aspirate; nasal swab/aspirate; throat swab; combined specimens
- **Specimen collection issues**
  - Acceptable specimen/validated specimen?
  - Some tests include swab to use (e.g. foam swab)
  - Some materials not compatible (e.g., calcium alginate swabs not recommended)
- **Time from specimen collection to testing**
  - Tested quickly or frozen/thawed and tested later?
  - Shipped to an outside laboratory?

# Challenges in the Use of RIDTs

- **Sensitivity (fixed test parameter)**
  - Sub-optimal sensitivity of RIDTs (compared to RT-PCR or viral culture)
  - False negative results occur
  - Sensitivities can vary by influenza virus type (A, B), influenza A subtype, and circulating strains from year-to-year
- **Specificity (fixed test parameter)**
  - High specificity of RIDTs
  - Low frequency of false positive results can occur
- **Prevalence (variable)**
  - Major determinant of predictive values of influenza tests
  - Positive Predictive Value is highest and Negative Predictive Value is lowest during peak influenza activity
  - Negative Predictive Value is highest and Positive Predictive Value is lowest during low influenza activity

# CDC Guidance Regarding RIDTs

- **Listing of available FDA-cleared RIDTs with acceptable types of clinical specimens (e.g. throat, nasal, etc.)**
- **Recommended clinical specimens to collect and optimal period for all influenza tests**
- **Information on proper interpretation of RIDT results**
- **Empiric antiviral treatment can be started without testing or, if testing done, before results available**
- **Low sensitivities of RIDTs result in many false negatives;**
  - therefore empiric treatment without use of RIDTs has been encouraged for clinical practice; do not base decisions on whether to start antiviral treatment on RIDT results
- **Start antiviral treatment as soon as possible when indicated (antivirals are most effective when initiated as early as possible)**
- **If influenza testing is desired, definitive methods (e.g., RT-PCR, viral culture) are recommended**

# Key Messages

- **Clinical decisions regarding whether to prescribe antiviral medications should be guided by clinical and epidemiological factors**
- **If treatment is indicated, it should be initiated promptly**
  - Initiation of antivirals under these circumstances should not be delayed while awaiting results of influenza testing, if testing is done
- **Use rapid tests during influenza season if positive results will change or influence clinical management of patients with suspected influenza**
  - A positive result can be helpful to confirm influenza virus infection
  - A negative result does not necessarily exclude influenza virus infection
- **Viral culture and/or RT-PCR should be done for confirmatory testing of positive RIDT results**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# Thank you for joining!
# Please email us questions at coca@cdc.gov