

Advisory Committee on Immunization Practices: Influenza Session

Anthony Fiore, MD, MPH
Influenza Division, NCIRD, CDC

Kathy Neuzil, MD, MPH
Chair, Influenza Vaccines Workgroup

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Presentation Overview

- 2008-2009 influenza season surveillance
- Influenza vaccine coverage and effectiveness update – infants and toddlers
- Plans for monitoring antiviral resistance and vaccine effectiveness
- Adult vaccination recommendations (Kathy Neuzil)
- Vaccination effectiveness among the elderly (Kathy Neuzil)

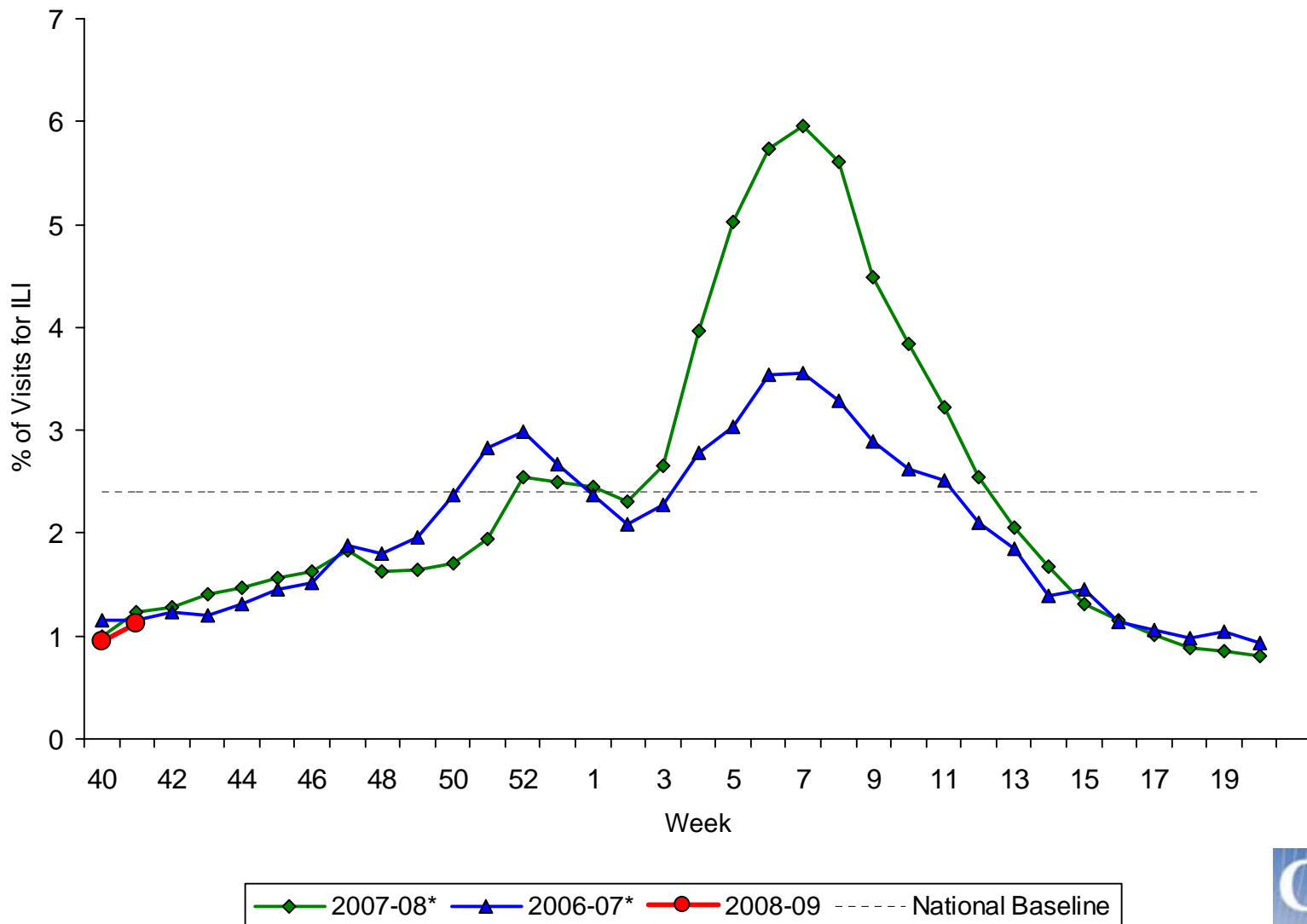
2008-2009 influenza season surveillance

Thanks: L Blanton, L Finelli, A Klimov.

Surveillance Team, Influenza Division, NCIRD, CDC



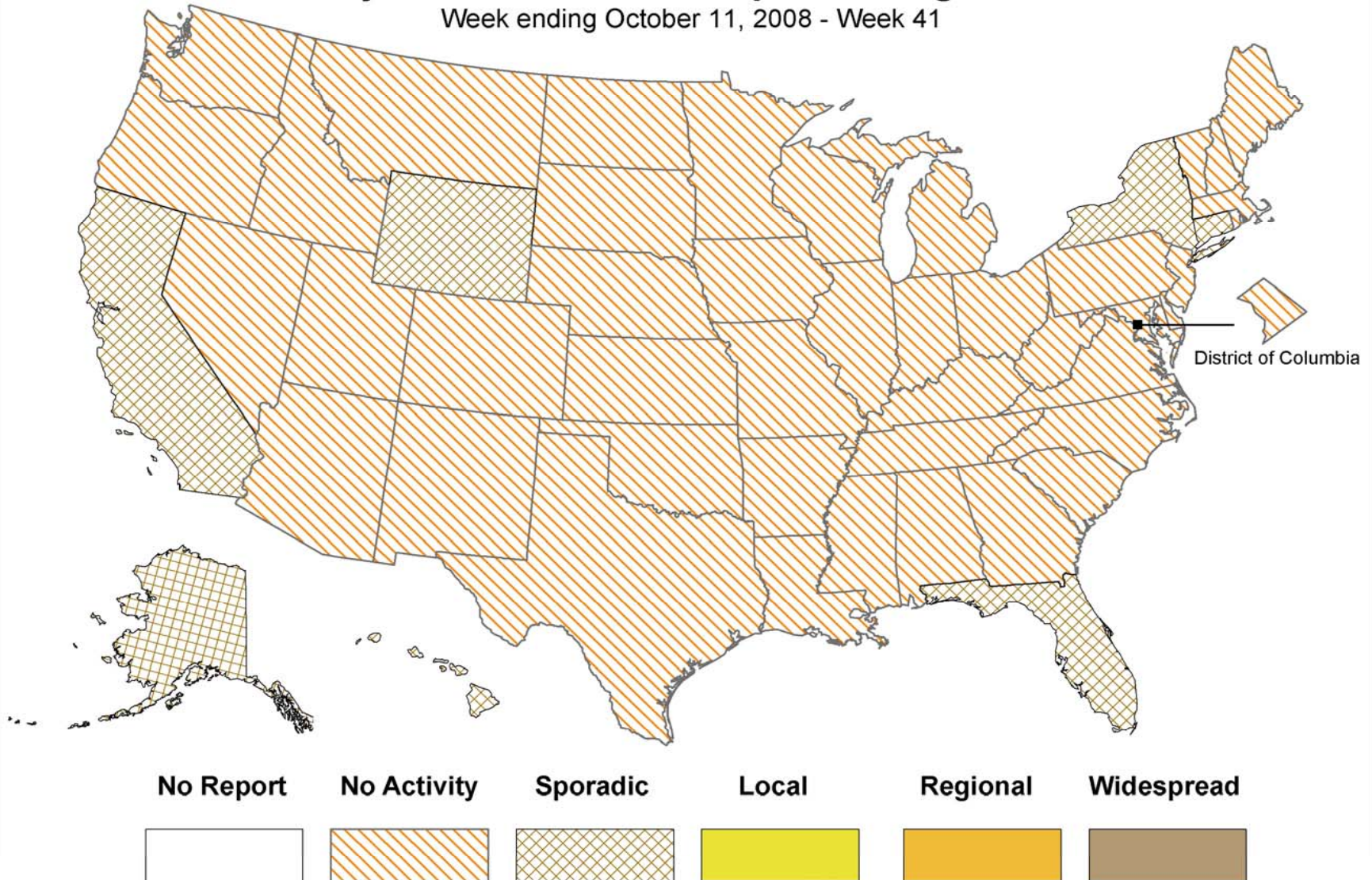
Percentage of Visits for Influenza-like Illness (ILI) Reported by the US Outpatient Influenza-like Illness Surveillance Network (ILINet), National Summary 2008-09 and Previous Two Seasons



*There was no week 53 during the 2006-07 and 2007-08 seasons, therefore the week 53 data point for those seasons is an average of weeks 52 and 1.

Weekly Influenza Activity Estimates Reported by State & Territorial Epidemiologists*

Week ending October 11, 2008 - Week 41



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

Strain Characterization, May 18- September 19, 2008

CDC has characterized 108 viruses since May 18, 2008*

Influenza A(H1N1) [n=55]:

- 53 (96%) similar to A/Brisbane/59/2007 (selected 2008-09 vaccine strain)

Influenza A(H3N2) [n=15]

- 15 (100%) similar to A/Brisbane/10/2007 (selected 2008-09 vaccine strain)

Influenza B [n=28]

- 23 (82%) in B/Yamagata lineage and similar to B/Florida/04/2006 (selected 2008-09 vaccine strain)
- 5 (18%) in B/Victoria lineage

*as of September 19, 2008

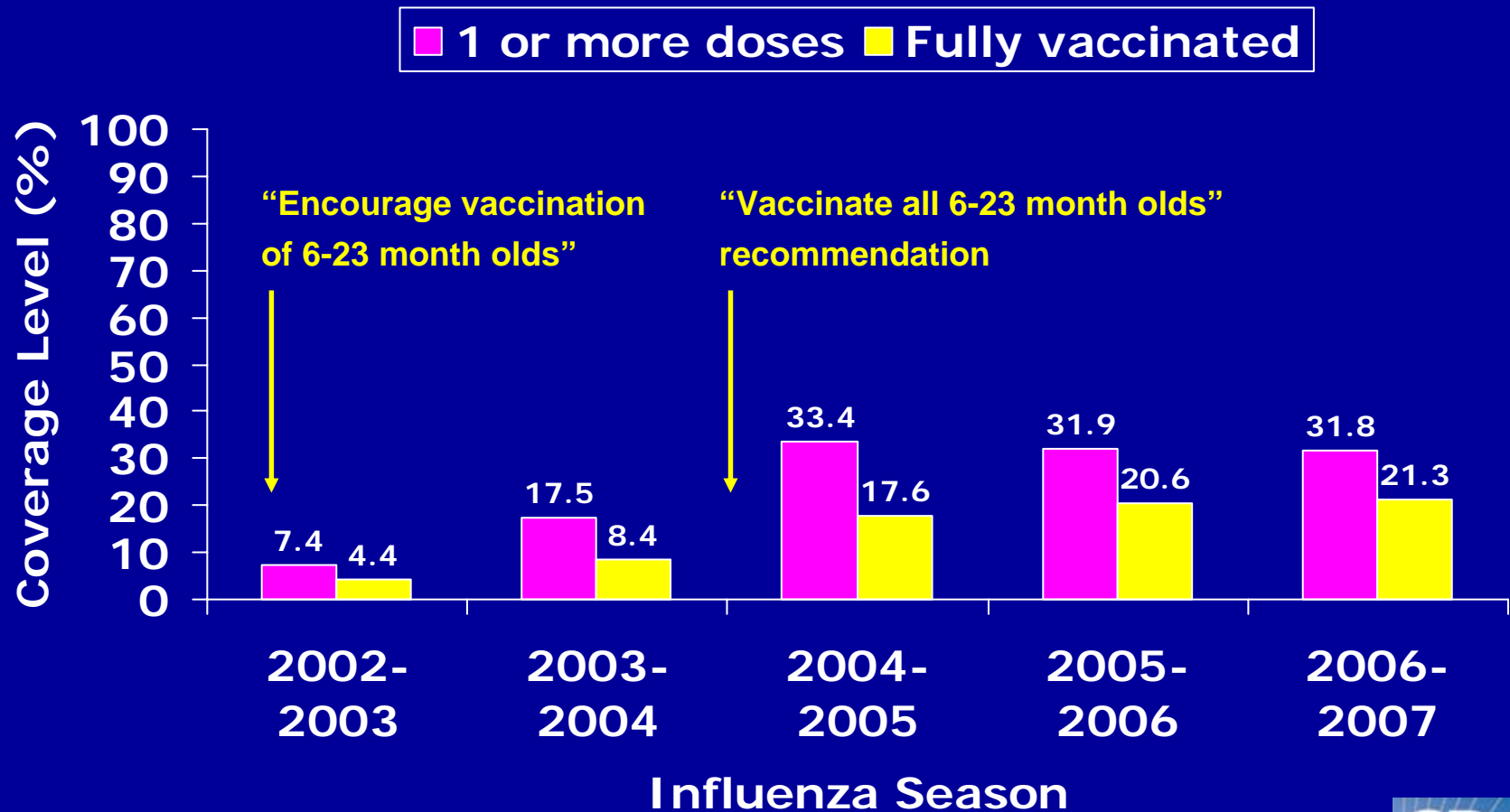


Influenza vaccine coverage and effectiveness update – infants and toddlers

**Thanks: T Santibanez (Immunization Services Division, NCIRD, CDC)
M Steinhoff (Bloomberg School of Public Health, Baltimore MD)**



Influenza Vaccination Coverage among Children 6-23 Months of Age, National Immunization Survey, 2002-03 through 2006-07



Source: CDC. MMWR Sep 2008



Effectiveness of Maternal Influenza Immunization in Mothers and Infants*

- Study participants and design
 - Bangladesh, 2004-05
 - Randomized controlled trial
 - 340 pregnant women received either influenza vaccine or pneumococcal polysaccharide vaccine (control) during 3rd trimester
 - Follow-up through pregnancy and first 6 months after birth
- Outcomes
 - Febrile respiratory illness among infants
 - Lab-confirmed influenza among infants
 - Febrile respiratory illness among mothers

* **K Zaman et al. N Engl J Med 2008**

Cumulative Cases of Lab-Confirmed Influenza among Infants, by Receipt of Influenza Vaccine, Bangladesh, 2004-05

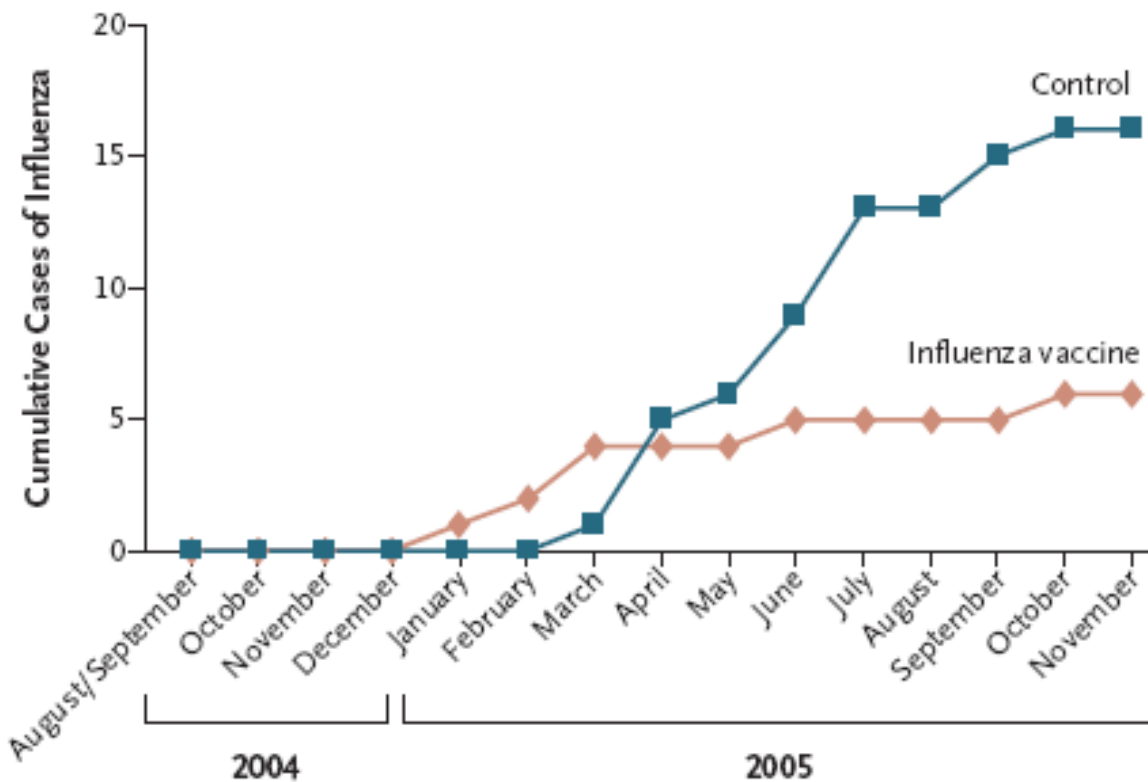


Figure 2. Cumulative Cases of Laboratory-Proven Influenza in Infants Whose Mothers Received Influenza Vaccine, as Compared with Control Subjects.

Testing for influenza antigen was performed from December 2004 to November 2005.

* K Zaman et al.
N Engl J Med 2008

Cumulative Cases of Lab-Confirmed Influenza among Infants, by Receipt of Influenza vaccine, Zaman et al, Bangladesh, 2004-05

Table 2. Clinical Effectiveness of Influenza Vaccine in Infants and Mothers.*

Variable	Episodes		Clinical Effectiveness (95% CI) [†]	Risk Difference (95% CI) [‡]
	Control	Influenza Vaccine <i>no.</i>	%	
Infants				
Person-months	870	881		
Respiratory illness with fever				
Any fever	153	110	28.9 (6.9 to 45.7)	-28.1 (-48.2 to -8.0) [§]
Temperature >38°C	77	56	28.1 (-4.6 to 50.6)	-13.7 (-28.0 to 0.5)
Diarrheal disease	138	137	1.9 (-30.0 to 26.0)	-1.6 (-22.1 to 18.9)
Clinic visit	92	54	42.0 (18.2 to 58.8)	-24.5 (-39.5 to -9.5) [§]
Influenza test ordered	79	41	48.7 (25.4 to 64.7)	-24.4 (-38.0 to -10.8) [§]
Influenza test positive	16	6	62.8 (5.0 to 85.4)	-6.4 (-12.2 to -0.5) [§]
Mothers				
Person-months	1076	1089		
Respiratory illness with fever				
Any fever	77	50	35.8 (3.7 to 57.2)	-14.2 (-25.5 to -2.9) [§]
Temperature >38°C	33	19	43.1 (-9.0 to 70.3)	-7.3 (-14.5 to -0.1) [§]
Diarrheal disease	60	49	19.3 (-24.6 to 47.8)	-5.9 (-16.4 to 4.5)
Clinic visit	25	19	24.9 (-43.9 to 60.8)	-3.2 (-9.8 to 3.4)

Plans for monitoring antiviral resistance and vaccine effectiveness

Thanks: D Shay, A Fry, L Finelli, N Dharan,
L Gubareva, A Klimov, J Bresee, Influenza Division, NCIRD, CDC



Emergence of Oseltamivir Resistance among Influenza A(H1N1) Viruses: 2007-2008 Influenza Season

- Season characterized by predominance of influenza caused by A(H3N2) and B viruses in most U.S. communities
- United States, end of 2007-08 season*
 - 123 (11.9%) of 1,026 influenza A (H1N1)
 - 4 (0.7%) of 588 in 2006-07
 - Adjusting for subtype prevalence, an estimated 2.1% of influenza A and B viruses in circulation in the United States were resistant to oseltamivir
- Worldwide, end of 2007-08 Northern hemisphere season**
 - 1,203 (16%) of 7,535 influenza A(H1N1) viruses tested were resistant to oseltamivir



Antiviral Resistance, United States, Current Status

- Neuraminidase inhibitor resistance in influenza A(H1N1) viruses only
 - No neuraminidase inhibitor resistance among influenza A(H3N2) and influenza B viruses
- All influenza viruses tested are sensitive to zanamivir
- Oseltamivir-resistant influenza A(H1N1) viruses tested are sensitive to adamantanes (rimantadine and amantadine)
 - ~10% of oseltamivir-sensitive influenza A(H1N1) viruses were resistant to adamantanes in U.S. last season
- Adamantane resistance among other influenza viruses is very high
 - >99% of influenza A H3N2 viruses tested
 - Influenza B viruses are not sensitive to adamantanes

Key Considerations at Start of 2008-09 Influenza Season

- Oseltamivir-resistant influenza A(H1N1) viruses are likely to circulate in the United States
- Overall prevalence of oseltamivir resistance in the United States during 2008-09 season is difficult to predict but will depend on
 - Prevalence of resistance among H1N1 viruses
 - Prevalence of H1N1 among circulating influenza viruses
- Virulence of oseltamivir-resistant H1N1 viruses does not appear to be different
 - Preliminary data from U.S.* and EU**

*N Dharan et al IDSA 2008

**ECDC 2008



Antiviral Resistance Issues: Start of 2008-09 Season

- Encourage vaccination – should be effective against the currently circulating oseltamivir-resistant influenza A(H1N1) viruses
- Continue current treatment and chemoprophylaxis recommendations
 - Use oseltamivir or zanamivir
 - Don't use adamantanes
- Improve representativeness of surveillance for antiviral resistance
- Increase laboratory testing capabilities for antiviral resistance
- Follow viral surveillance data
 - Will be provided throughout the season and discussed in ACIP influenza vaccine workgroup
 - Additional treatment or chemoprophylaxis guidance could be considered

Plans for Annual Influenza Vaccine Effectiveness (VE) Assessments

- 4 U.S. sites funded for 3 years to estimate VE for lab-confirmed medically attended outcomes
 - Includes all groups recommended for vaccination by ACIP
 - Powered to permit age-specific VE estimates for outpatient visits for influenza
 - Plan to produce one within-season estimate and final estimate each influenza season
 - 2 sites funded for separate project to assess humoral and cell-mediated immunologic responses to inactivated vaccine (TIV) in persons aged 50+



Influenza Vaccine Working Group Members

Kathy Neuzil, Chair

- Jan Englund
- Lance Chilton
- Nana Bennett (NAACHO)
- Hank Bernstein (AAP)
- Douglas Campos-Outcalt (AAFP)
- Jeff Duchin (NAACHO)
- Stanley Gall (ACOG)
- Elyse Olshen Kharbanda (SAM)
- Susan Lett (CSTE)
- Tamara Lewis (AHIP)
- William Schaffner (NFID)
- Rob Schechter (AIM)
- Danuta Skowronski (NACI)
- Patsy Stinchfield (NAPNAP)
- LJ Tan (AMA)
- Joe Bresee (CDC)
- Carolyn Bridges (CDC)
- Karen Broder (CDC)
- Nancy Cox (CDC)
- Therese Cvetkovich (FDA)
- David Delozier (CDC)
- Scott Epperson (CDC)
- Wayne Hachey (DoD)
- John Iskander (CDC)
- Gina Mootrey (CDC)
- Kristln Nichol (VA)
- Jeanne Santoli (CDC)
- Ben Schwartz (CDC)
- David Shay (CDC)
- Jean Clare Smith (CDC)
- Ray Strikas (NVPO)
- Rosemary Tiernan (FDA)
- Greg Wallace (CDC)
- Mary Vernon-Smiley (CDC)