Update on the 2013-2014 season

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Influenza Surveillance and Outbreak Response Team

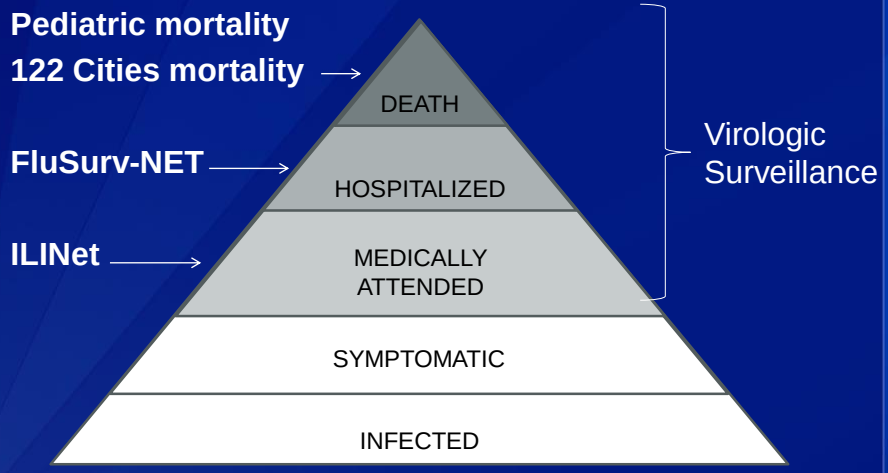
Epidemiology and Prevention Branch

Influenza Division

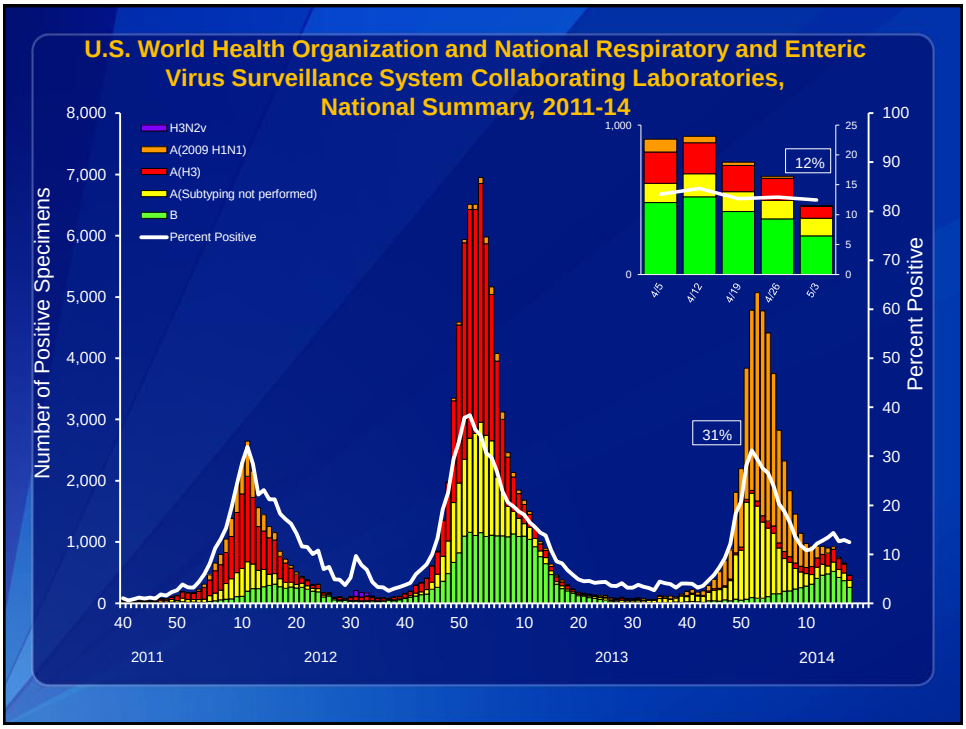
NAIIS

May 15, 2014

Domestic Surveillance Systems for Influenza



VIROLOGIC SURVEILLANCE



Antigenic Characterization
October 1, 2013 – May 3, 2014

- Influenza A
  - 2009 H1N1
    - 1,926/1,929 (99.8%) characterized A/California/7/2009-like, the H1N1 component of the 2013-14 N. Hemisphere vaccine
  - H3N2
    - 406/421 (96%) characterized as A/Texas/50/2012-like, the H3N2 component of the 2013-14 N. Hemisphere vaccine
- Influenza B
  - Yamagata lineage
    - 206/294 (70%) are from the Yamagata lineage and 205 (99.5%) are characterized as B/Massachusetts/2/2012-like, an influenza B component of the 2013-14 N. Hemisphere vaccine
  - Victoria lineage
    - 88/294 (30%) tested have been from the B/Brisbane/60/2008-like, an influenza B component of the 2013-14 N. Hemisphere vaccine

Antiviral Resistance
October 1, 2013 – February 15, 2014

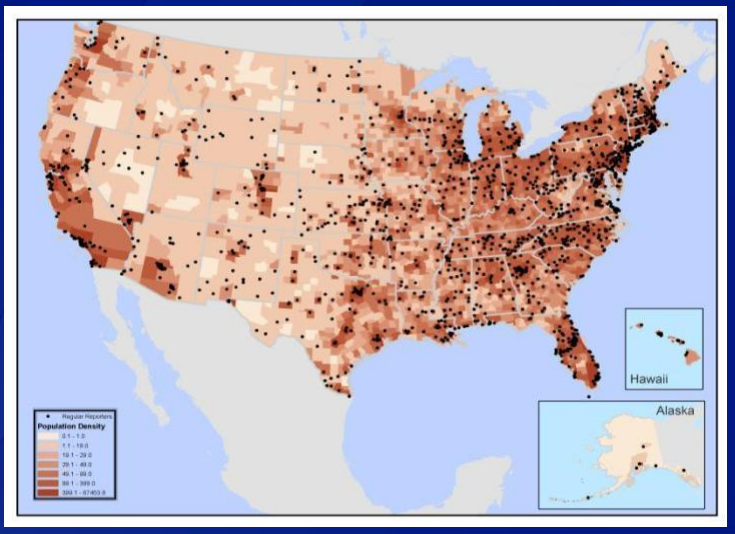
Neuraminidase Inhibitor Resistance Testing Results Samples Collected Since October 1, 2013

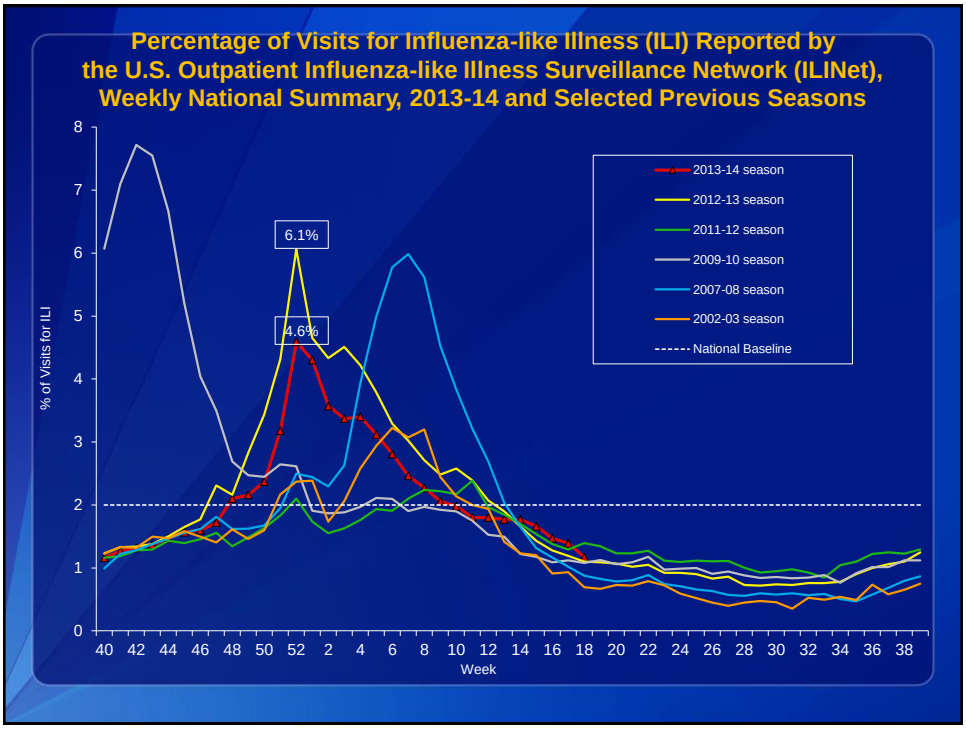
	Oseltamivir		Zanamivir	
	Virus Samples tested (n)	Resistant Viruses, Number (%)	Virus Samples tested (n)	Resistant Viruses, Number (%)
Influenza A (H3N2)	554	0 (0.0)	554	0 (0.0)
Influenza B	409	0 (0.0)	409	0 (0.0)
2009 H1N1	5,071	59 (1.2)	1,867	0 (0.0)

- High levels of resistance to the adamantanes (amantadine and rimantadine) persist among pH1N1 and influenza A (H3N2) viruses currently circulating globally.

ILI SYNDROMIC SURVEILLANCE

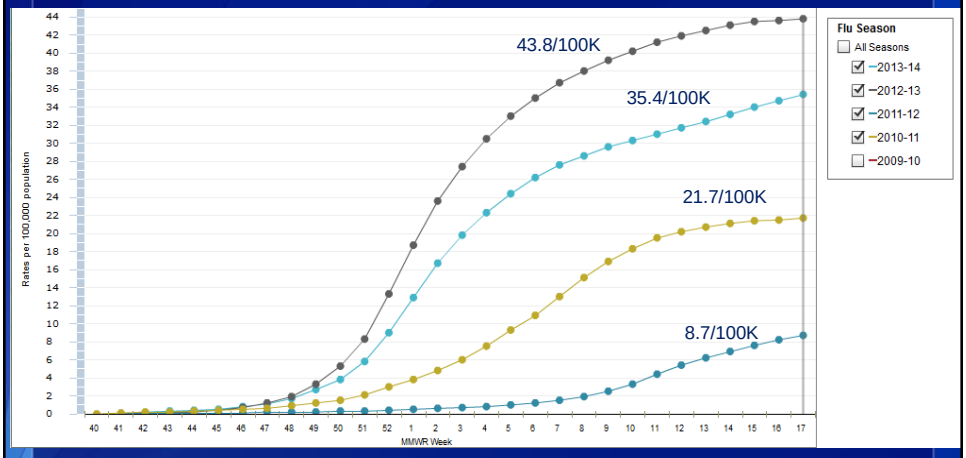
Outpatient Influenza-Like Illness Surveillance Network (ILINet) - Coverage





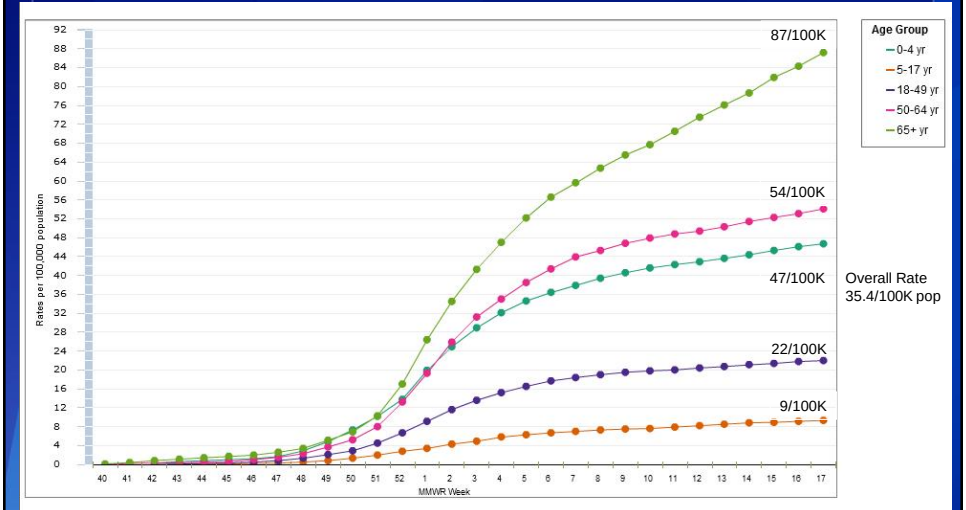
HOSPITALIZATION SURVEILLANCE

Rates of Lab-Confirmed Influenza Hospitalization FluSurvNet*, October 1, 2013 – April 30, 2014

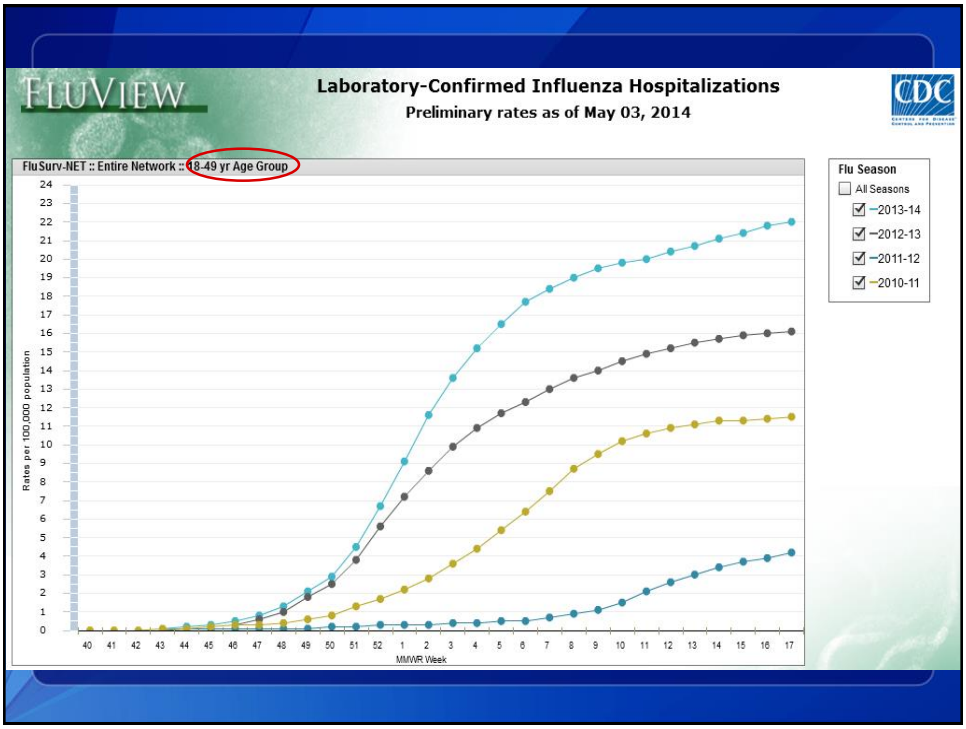


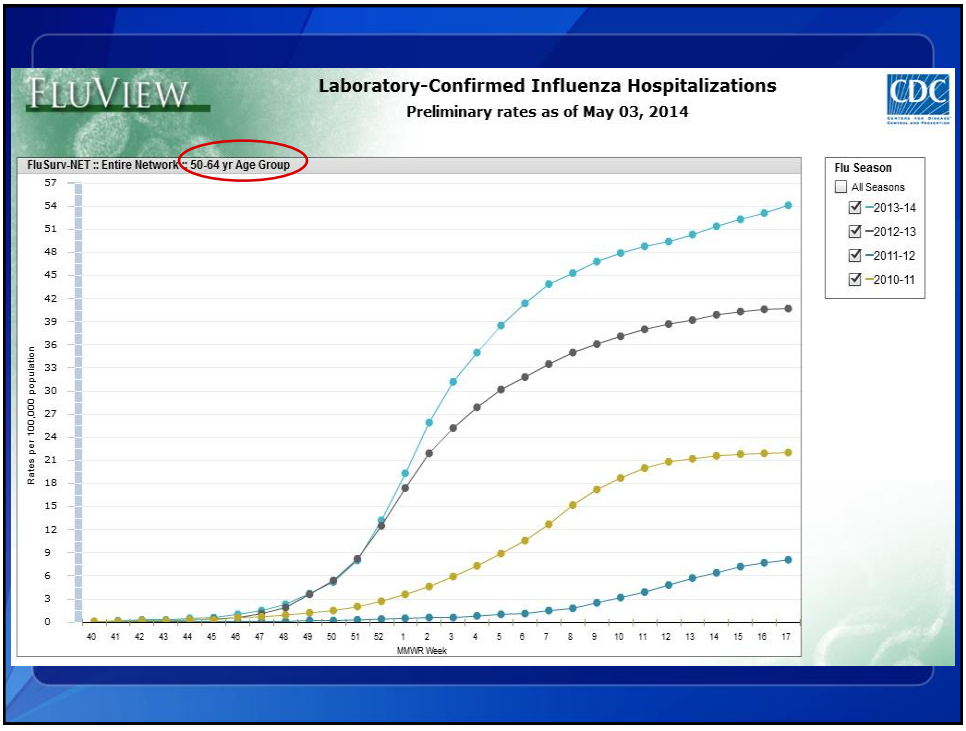
* FluSurv-NET: Influenza Hospitalization Surveillance Network

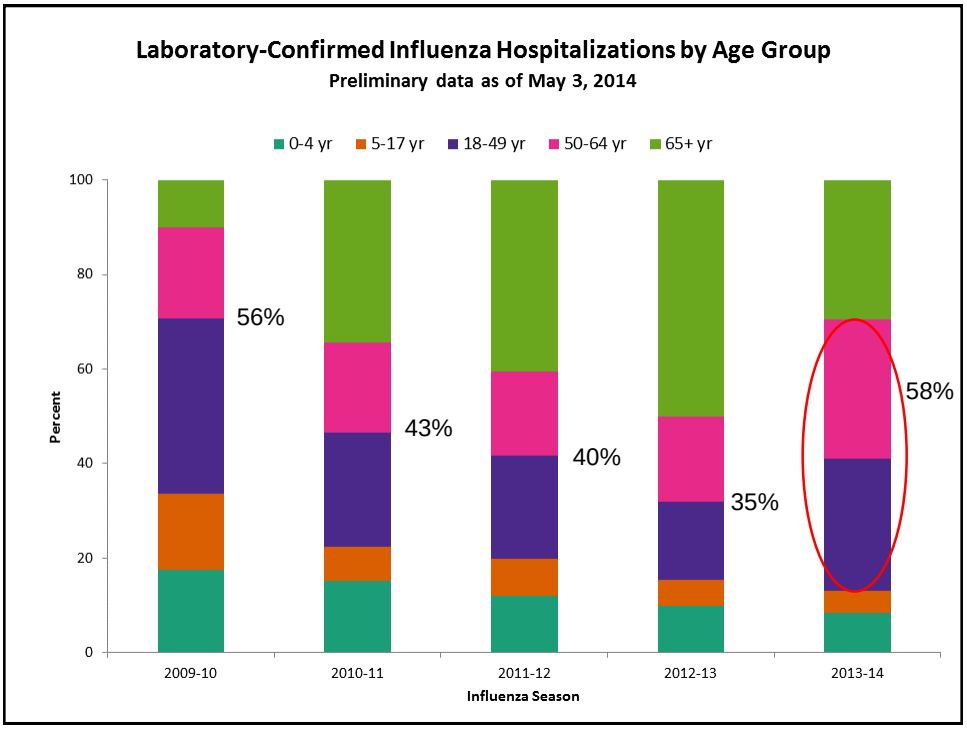
Rates of Lab-Confirmed Influenza Hospitalization FluSurvNet, October 1, 2013 – April 30, 2014



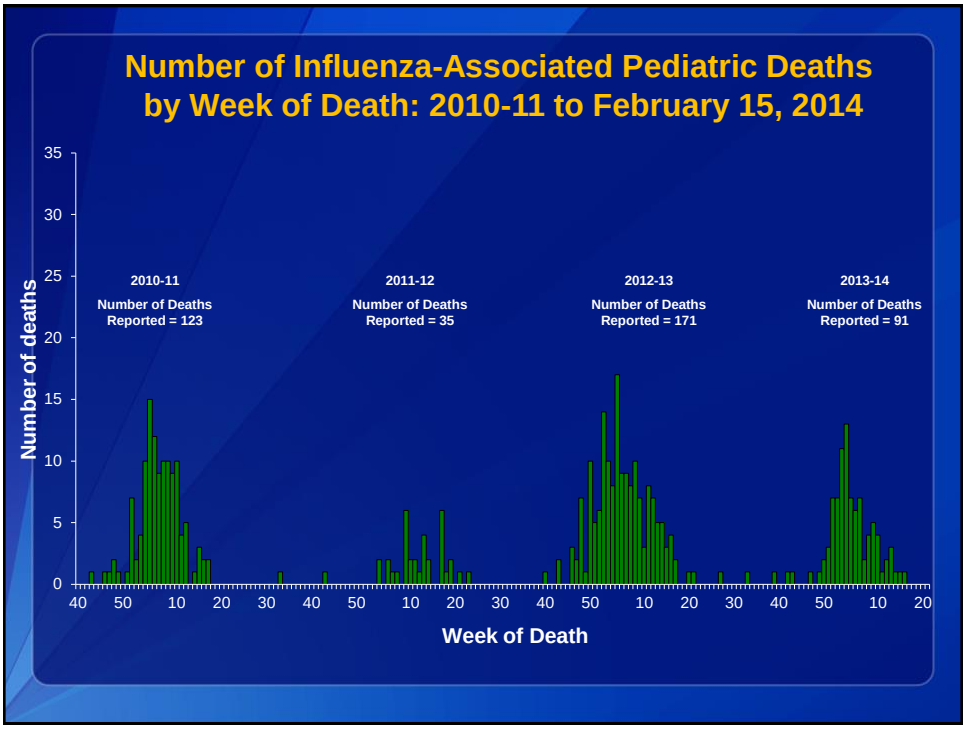
Overall Rate 35.4/100K pop

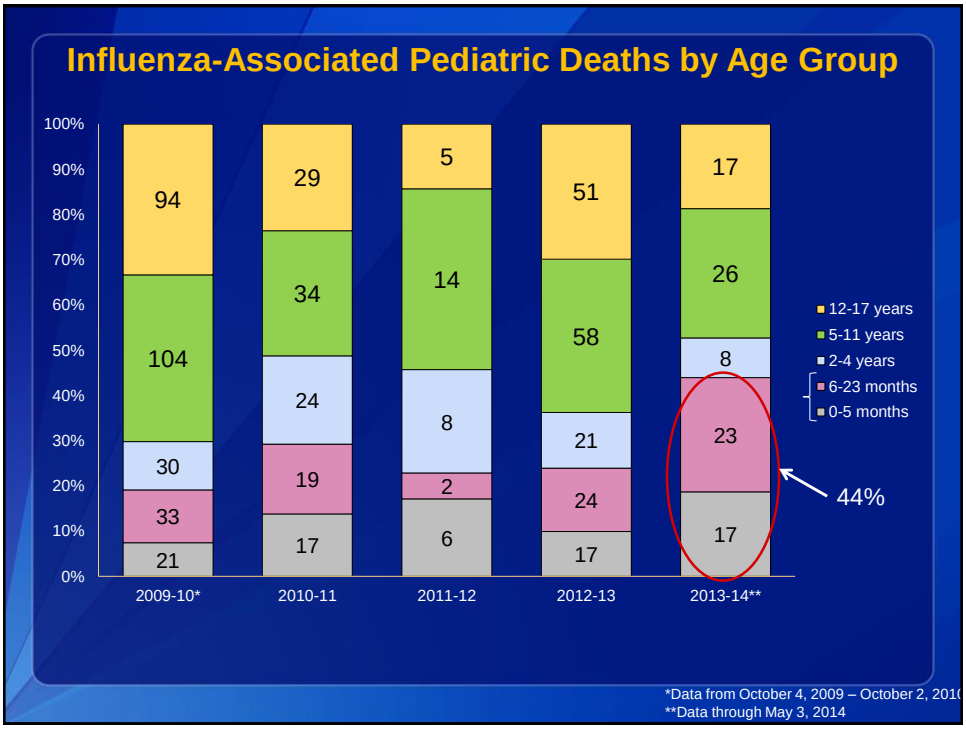

FLUVIEW
Laboratory-Confirmed Influenza Hospitalizations
Preliminary rates as of May 03, 2014
CDC
FluSurv-NET :: Entire Network :: 18-49 yr Age Group
Rates per 100,000 population
MMWR Week
Flu Season
All Seasons
2013-14
2012-13
2011-12
2010-11

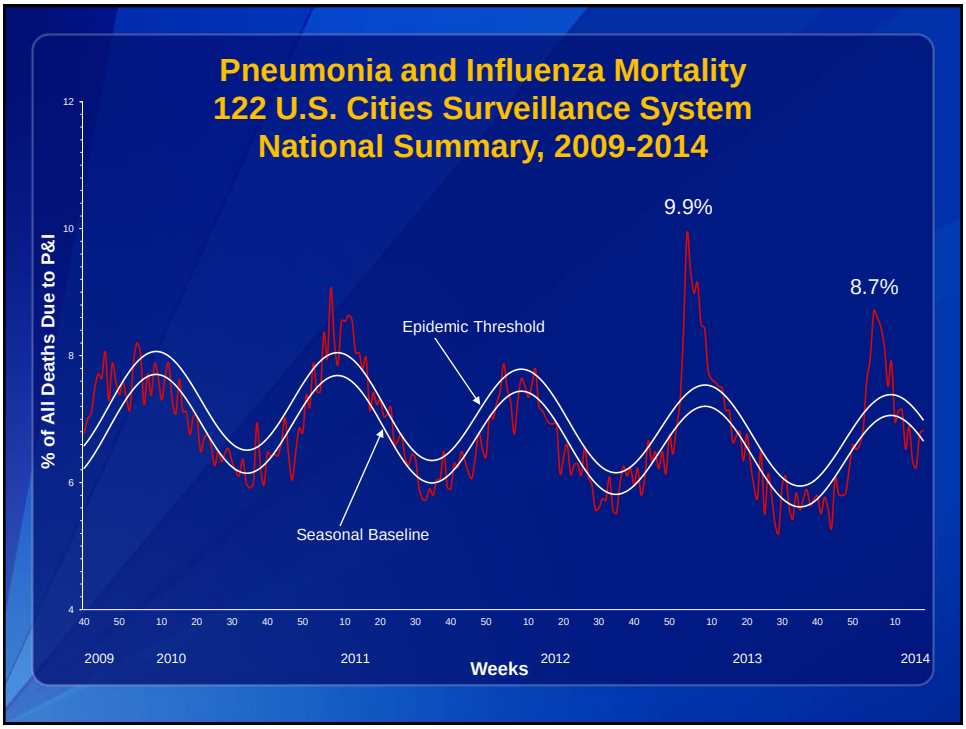

FLUVIEW
Laboratory-Confirmed Influenza Hospitalizations
Preliminary rates as of May 03, 2014
CDC
FluSurv-NET :: Entire Network :: 50-64 yr Age Group
Rates per 100,000 population
MMWR Week
Flu Season
All Seasons
2013-14
2012-13
2011-12
2010-11

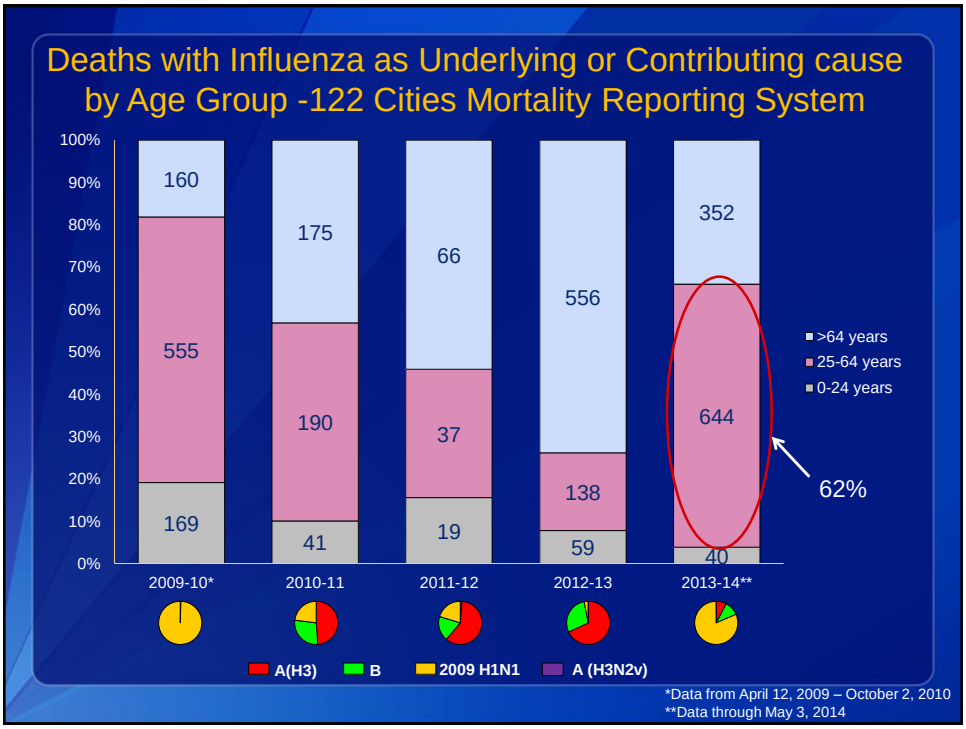


MORTALITY SURVEILLANCE


Number of Influenza-Associated Pediatric Deaths by Week of Death: 2010-11 to February 15, 2014
Number of deaths
35
30
25
20
15
10
5
0
2010-11
Number of Deaths Reported = 123
2011-12
Number of Deaths Reported = 35
2012-13
Number of Deaths Reported = 171
2013-14
Number of Deaths Reported = 91
40 50 10 20 30 40 50 10 20 30 40 50 10 20 30 40 50 10 20
Week of Death


Influenza-Associated Pediatric Deaths by Age Group
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
94
104
30
33
21
29
34
24
19
17
5
14
8
2
6
51
58
21
24
17
17
26
8
23
17
44%
2009-10*
2010-11
2011-12
2012-13
2013-14**
12-17 years
5-11 years
2-4 years
6-23 months
0-5 months
*Data from October 4, 2009 – October 2, 201
**Data through May 3, 2014


Pneumonia and Influenza Mortality
122 U.S. Cities Surveillance System
National Summary, 2009-2014
% of All Deaths Due to P&I
12
10
8
6
4
9.9%
8.7%
Epidemic Threshold
Seasonal Baseline
40 50 10 20 30 40 50 10 20 30 40 50 10 20 30 40 50 10 20 30 40 50 10
2009
2010
2011
2012
2013
2014
Weeks


Deaths with Influenza as Underlying or Contributing cause
by Age Group -122 Cities Mortality Reporting System
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
160
555
169
175
190
41
66
37
19
556
138
59
352
644
40
62%
>64 years
25-64 years
0-24 years
2009-10*
2010-11
2011-12
2012-13
2013-14**
A(H3)
B
2009 H1N1
A (H3N2v)
*Data from April 12, 2009 – October 2, 2010
**Data through May 3, 2014

Influenza Activity Summary

- Influenza activity in the US during the 2013–14 season began approximately 4 weeks earlier than usual, and occurred at moderate levels of intensity
  - Activity peaked in late December/early January
  - 2009 H1N1 viruses predominated through the peak of the season
  - A late season increase in influenza B activity occurred
- This is the first season since the 2009 pandemic where 2009 H1N1 predominated

Cont.

- The high rate of influenza-associated hospitalizations and deaths among the young adult population is not often seen in most seasons
  - This age group had lower attack rates during the 2009H1N1 pandemic (compared to their younger counterparts) and may have less cross protective immunity
  - Vaccination coverage estimates for this and past seasons indicate this age group has the lowest vaccination coverage (compared to other younger and older age groups)
- Hospitalization rates were still the highest among those ≥65 years
  - Despite some partial protection from previous exposures to similar viruses
  - This group is at increased risk of influenza-related complications due to frailty, immunosenescence and high prevalence of underlying chronic medical conditions

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Thank you

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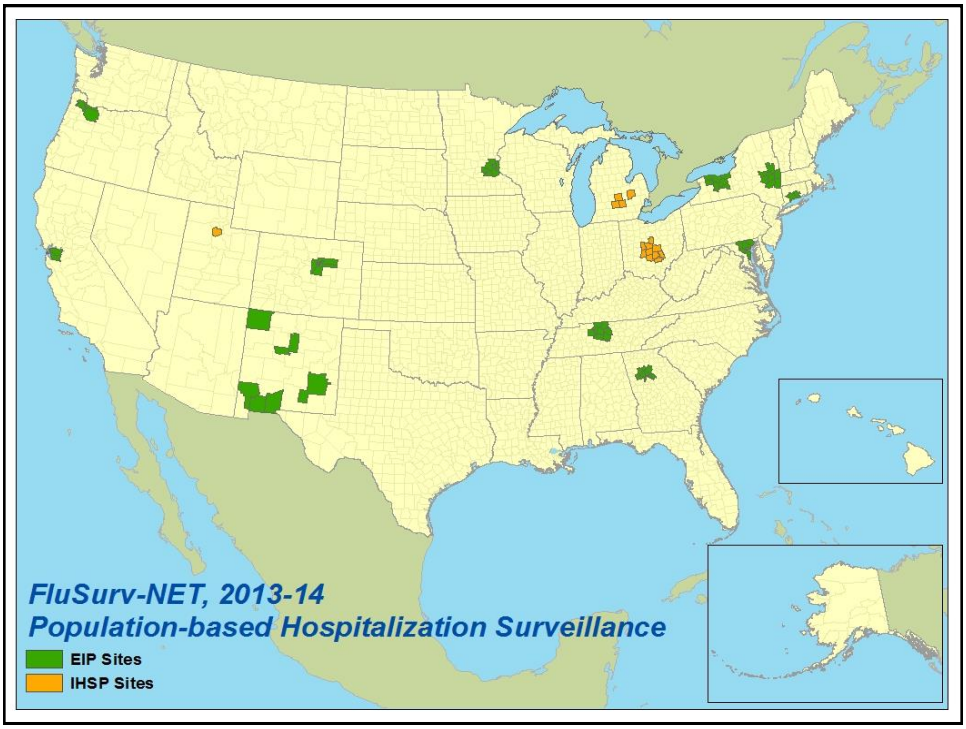
www.cdc.gov/flu

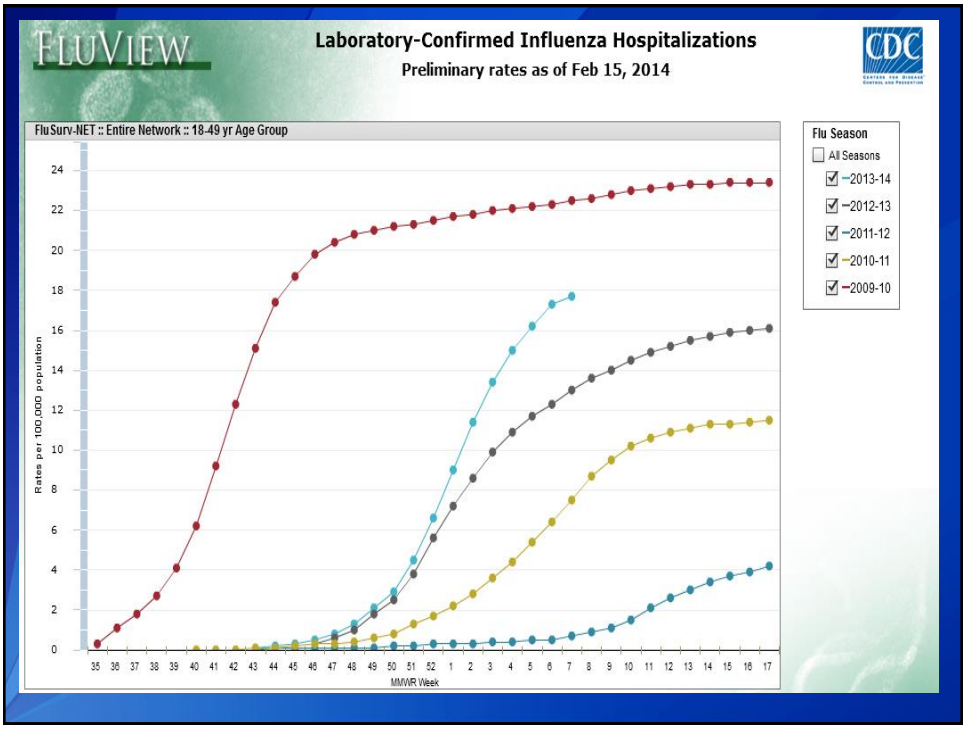
http://www.cdc.gov/flu/weekly/fluviewinteractive.htm

EXTRA SLIDES

Influenza Hospitalization Surveillance Network (FluSurv-Net)

- Population-based surveillance system
  - Collected pediatric data from 2003—04 season and adult data from 2005—06 season
- Currently covers ~ 27 million persons, 8.5% of the US population
- Surveillance relies on laboratory-confirmed diagnostic testing
- Testing is ordered at the discretion of the treating clinician


FluSurv-NET, 2013-14
Population-based Hospitalization Surveillance
EIP Sites
IHSP Sites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Preliminary rates as of Feb 15, 2014
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MMWR Week
Flu Season
All Seasons
2013-14
2012-13
2011-12
2010-11
2009-10

High Risk Medical Conditions Among Influenza-Associated Pediatric Deaths

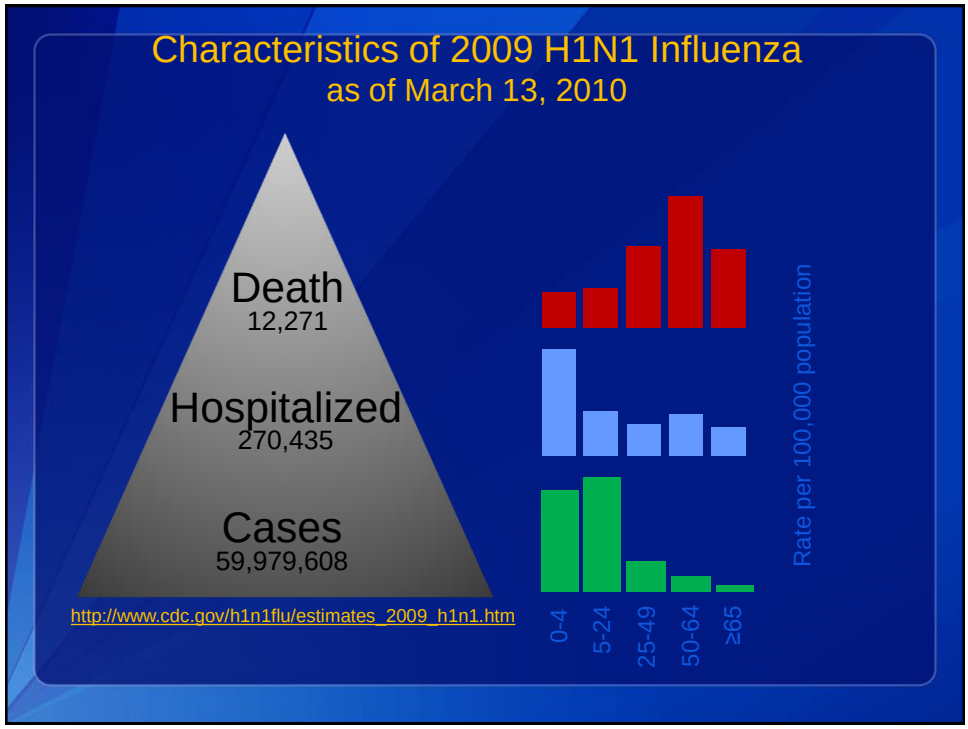
- 46 (53%) of 86 children who died with a known medical history had at least one underlying medical condition
  - Neurologic disorder: 28 (32.6%)
  - Pulmonary disorder: 15 (17.4%)
  - Chromosomal abnormality/genetic syndrome: 10 (11.6%)
  - Cardiac disease: 8 (9.3%)
  - Immune suppression: 4 (4.7%)
  - Endocrine disorder: 2 (2.3%)

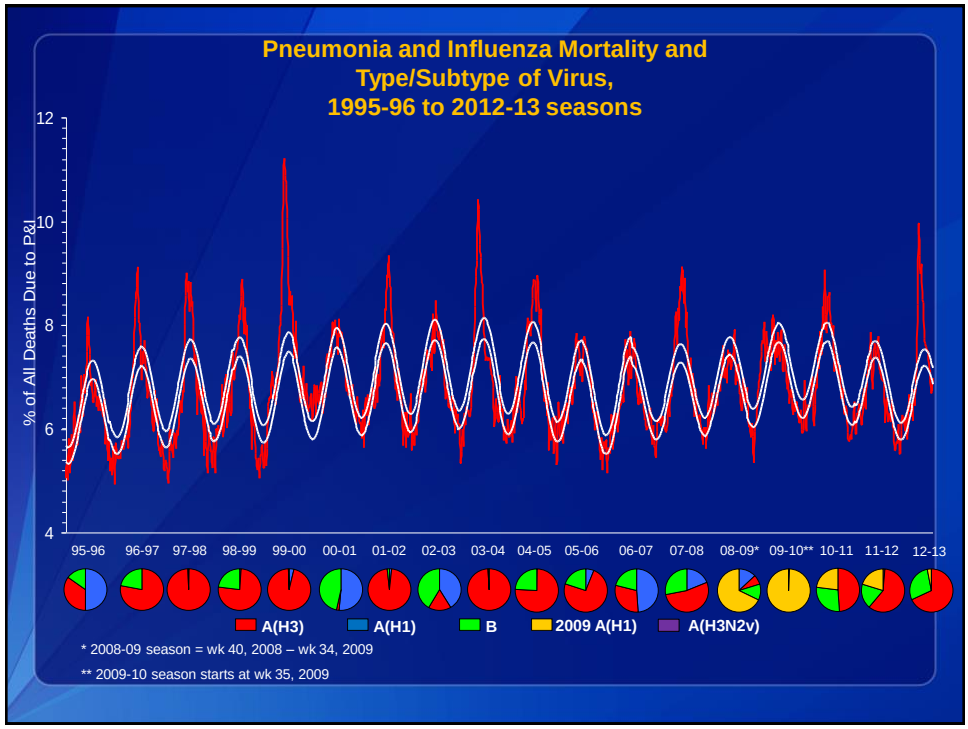
Medical condition groupings:
Neurologic disorder (including moderate to severe developmental delay, seizure disorder, cerebral palsy, and neuromuscular disorder);
Pulmonary disease (including asthma/reactive airway disease, cystic fibrosis, or other chronic pulmonary disease);
Cardiac disease (including congenital heart disease);
Immunosuppressive condition (including a cancer diagnosis or treatment in the previous 12 months);
Endocrine disorder (including diabetes mellitus);
Mitochondrial disorder;
Renal disease;
Pregnancy;
Other medical conditions (including blood disorders, obesity, skin or soft tissue infections, and hepatic diseases).

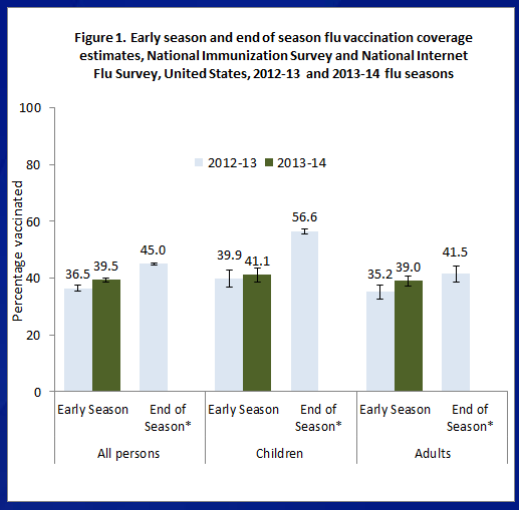
Vaccination Status Among Influenza Associated Pediatric Deaths

- **Vaccination Status of Children in 2013-14 (N=91)**
  - 11 (17%) of 66 children eligible for vaccination and with known vaccination history were fully vaccinated* during the 2013-14 season.
    - 7 of 11 (64%) had a high risk medical condition
  - 17 children were ineligible for vaccination based on age
  - 8 children had unknown vaccination status

*Fully vaccinated: received one or two doses (depending on age and prior vaccination history) of influenza vaccine in the current season at least two weeks prior to illness onset.


Characteristics of 2009 H1N1 Influenza
as of March 13, 2010
Death
12,271
Hospitalized
270,435
Cases
59,979,608
http://www.cdc.gov/h1n1flu/estimates_2009_h1n1.htm
Rate per 100,000 population
0-4
5-24
25-49
50-64
≥65


Pneumonia and Influenza Mortality and
Type/Subtype of Virus,
1995-96 to 2012-13 seasons
% of All Deaths Due to P&I
12
10
8
6
4
95-96
96-97
97-98
98-99
99-00
00-01
01-02
02-03
03-04
04-05
05-06
06-07
07-08
08-09*
09-10**
10-11
11-12
12-13
A(H3)
A(H1)
B
2009 A(H1)
A(H3N2v)
* 2008-09 season = wk 40, 2008 – wk 34, 2009
** 2009-10 season starts at wk 35, 2009



* End-of-season estimates are from the National Immunization Survey for children and the Behavioral Risk Factor Surveillance System for adults (Flu Vaccination Coverage, United States, 2012-13 Influenza Season). The 2013-14 end-of-season estimates will not be available until September 2014.

† All percentages in the table are weighted to the U.S. population.

Seasonal Influenza Vaccination Coverage by Age Group 2012-13 Season

Age Group	Proportion vaccinated
6-23 mos	76.9%
2-4 years	65.8%
5-12 years	58.6%
13-17 years	42.5%
18-49 years	31.1%
50-64 years	45.1%
65+ years	66.2%

Data Sources and Methods

http://www.cdc.gov/flu/fluvaxview/coverage-1213estimates.htm#data

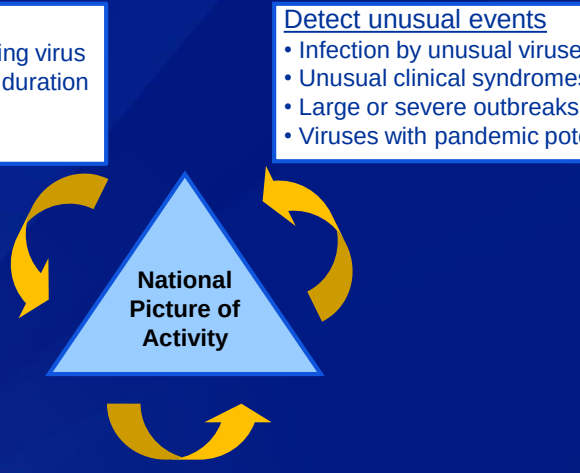
CDC analyzed NIS data collected October 2012 through June 2013 and BRFSS data collected September 2012 through June 2013 from all 50 states and the District of Columbia to estimate national and state level flu vaccination coverage from July 2012 through May 2013 for the 2012–13 flu season.

Early November Estimated Seasonal Influenza Vaccination Coverage by Age Group 2013-14 Season

Age Group	Proportion vaccinated
6 mos -17 years	41.1%
18-49 years	31.4%
50-64 years	39.1%
65+ years	61.8%

Data Sources and Methods
http://www.cdc.gov/flu/fluvaxview/nifs-estimates-nov2013.htm
The 2013-14 season estimates in this report are based on two different data sources. Estimates for children are based on data from NIS, while estimates for adults are based on data from the National Internet Flu Survey (NIFS).

Influenza Surveillance Goals



Domestic Surveillance Systems for Influenza

- **Seasonal and novel influenza viruses (WHO/NREVSS)**
- **Outpatient influenza-like illness (ILINet)**
- **Influenza-associated hospitalizations**
- **Influenza-associated pediatric mortality**
- **Mortality from pneumonia and influenza syndrome**
- **Geographic distribution of influenza activity**

ILI Syndromic Surveillance ILINet

- ~3,000 physicians/clinics enrolled for the 2013-14 season with denominator of more than 35 million patient visits
- Weekly reports
  - Total # of patient visits
  - # visits for influenza-like illness (ILI) by age group
    - ILI = fever ≥ 100 °F (38 °C) and cough or sore throat, in absence of a known cause
  - Data weighted by state population for analysis
- Subset of specimens submitted for culture