

Surveillance, Reporting and Control of Influenza and Pertussis

B. SURVEILLANCE, REPORTING AND CONTROL OF INFLUENZA

AND PERTUSSIS 2013 (AM & PM)

How do epidemiologists track and respond to infectious diseases? What happens when a disease or condition is reported to the state or to a local board of health? In this interactive workshop, presenters will provide an overview of infectious disease surveillance, reporting, and control. With a special emphasis on pertussis and influenza, we'll strategize about reducing the spread of these diseases in our workplaces, schools, and communities.

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Epidemiologists
Immunization Program, MDPH

18TH ANNUAL MASSACHUSETTS
ADULT IMMUNIZATION CONFERENCE
TUESDAY, MAY 21, 2013



Disclosures

- The speaker has no financial interest or conflict with the manufacturer of any product named in this presentation
- The speaker will discuss the use of vaccines in a manner not approved by the U.S. Food and Drug Administration, but in accordance with ACIP recommendations

Agenda

- Vaccine-preventable disease (VPD) epidemiology in Massachusetts
 - Who we are and what we do
 - Overall trends
 - Influenza update
 - Pertussis update and scenario

Who are you?

Stand up/Sit down

- ...if you have talked to a patient who is apprehensive about getting vaccine
- ...if you know someone who has had a vaccine-preventable disease even though they've been appropriately vaccinated
- ...if you have heard that some communicable diseases and conditions are reportable in Massachusetts
- ...if you know someone who is skeptical about the potential severity of influenza
- ...if you know someone who has ever been exposed to a communicable disease on the job

VPD Epidemiologists – Our Role

Hinton State Laboratory Institute (HSLI)



**Surveillance,
reporting and
control of
vaccine-
preventable
diseases, to
reduce
associated
morbidity and
mortality**



**Massachusetts
Department of
Public Health**

Division of Epidemiology and Immunization - Epi On Call

617-983-6800



MDPH Immunization Epidemiologists

- For suspect cases, we
 - Partner with local health departments
 - Ensure appropriate treatment
 - Help determine if the case needs to be excluded from work or school and for how long
 - Help identify “close contacts”
 - Make recommendations for contacts including immunization, prophylaxis, treatment, and/or exclusion from work/school as needed

Healthcare Provider Role

- Notify patient of diagnosis
- Notify the LBOH or MDPH of an infectious reportable disease
- Inform patient that the LBOH may be calling
- Educate patient about protecting their family and close contacts
- Collaborate with the LBOH to complete the official Case Report Form

What is reportable by whom?

- 105 CMR 300.000
- Reportable Diseases Lists:
 1. Healthcare providers
 2. Clinical laboratories
 3. Local Boards of Health



Diseases in red are “immediate” diseases.

- Diseases in black are reportable within 1-2 business days.

Effective July 2008

 **COMMUNICABLE AND OTHER INFECTIOUS DISEASES
REPORTABLE IN MASSACHUSETTS BY
HEALTHCARE PROVIDERS***

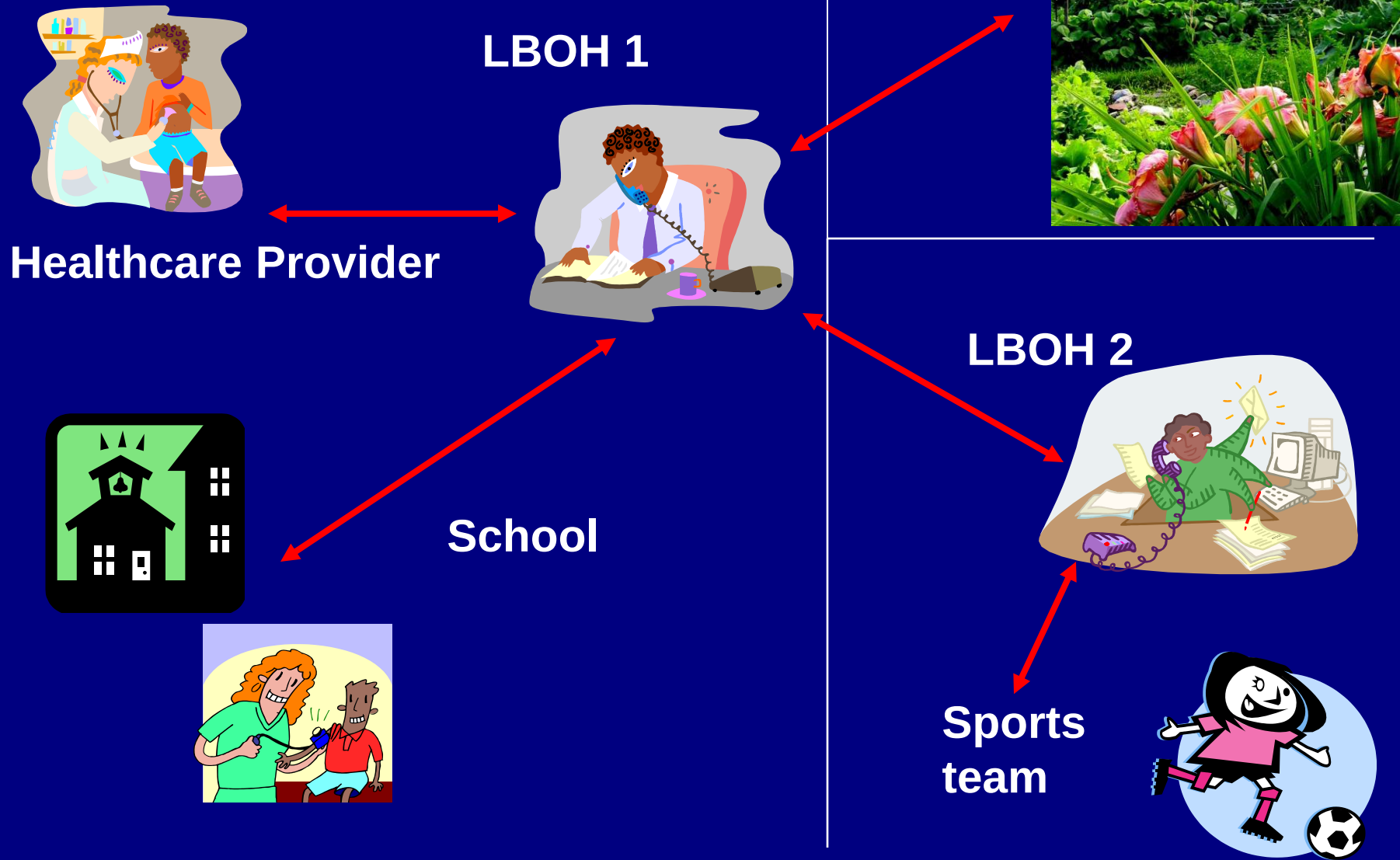
*The list of reportable diseases is not limited to those designated below and includes *only* those which are *primarily* reportable by clinical providers.
A full list of reportable diseases in Massachusetts is detailed in 105 CMR 300.100.

☎REPORT IMMEDIATELY BY PHONE!
This includes both suspect and confirmed cases.
All cases should be reported to your local board of health;
if unavailable, call the Massachusetts Department of Public Health:
Telephone: (617) 983-6800 Confidential Fax: (617) 983-6813

• **REPORT PROMPTLY (WITHIN 1-2 BUSINESS DAYS).**
This includes both suspect and confirmed cases.
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• Anaplasmosis	• Leptospirosis
☎ Anthrax ☐	• Lyme disease
☎ Any case of an unusual illness thought to have public health implications	☎ Measles
☎ Any cluster/outbreak of illness, including but not limited to foodborne illness	• Molluscum ☐
☎ Botulism ☐	☎ Meningitis, bacterial, community acquired
	• Meningitis, viral (aseptic), and other infectious (non-bacterial)

Collaborations in Disease Surveillance and Control





Avian Influenza A (H7N9) Virus

- Bird influenza that has caused serious respiratory illness and death in humans in China.
- As of May 8, 2013, 131 cases with 32 deaths, most with severe illness, most among middle aged and older men. *Increase in case count has dropped from what it was in April, due to containment measures, changing seasons, or a combination.*
- Many cases had direct contact with live poultry; most were hospitalized
- Monitoring and testing of >2000 contacts has detected few infections
- No sustained human-to-human transmission reported to date; a few small clusters where it cannot be ruled out
- Virus has not been found in people or birds in US

This is an official
CDC HEALTH ADVISORY

Distributed via the CDC Health Alert Network
April 05, 2013, 10:00 a.m. ET
CDC/HA-00344

Human Infections with Novel Influenza A (H7N9) Viruses

Summary and Background
As of April 4, 2013, Chinese public health officials have reported 14 cases of human infection with a novel avian influenza A (H7N9) virus from four different provinces in China. All patients were hospitalized with severe respiratory illness, and six persons have died. These are the first human infections identified with an avian influenza A (H7N9) virus infection. Six cases are from Shanghai, one is from Anhui Province, four are from Jiangsu Province, and three are from Zhejiang Province. Thirteen cases are in adults aged 27 through 67 years, and one case is in a child aged 4 years; all cases had illness onset from February 19 through March 31, 2013. No person-to-person transmission or epidemiologic link between any of the cases has been identified. We are aware of reports of possible sources of infection but these have not been confirmed. We are investigating and will provide that information when it is available. Preliminary functional data of the isolated viruses from the first 3 cases suggest that they are likely susceptible to neuraminidase inhibitors. Investigations by Chinese public health officials are ongoing.

These cases are a reminder that novel A influenza viruses can infect and cause severe respiratory illness in humans. Novel influenza A viruses are influenza viruses that are different from currently circulating human influenza A virus subtypes and include influenza viruses from predominantly avian and swine origin. In recent years, human infections with highly pathogenic avian influenza A (H5N1) virus in several Asian countries and Egypt, highly pathogenic avian influenza A (H7N3) virus in Mexico, and variant influenza A (H3N2)v viruses in the United States have been reported (<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6113a4.htm>, http://www.who.int/influenza/human_animal_interface/HN_20130412CumulativeNumberH5N1cases.pdf, <http://emergency.cdc.gov/HAN/H7N90326.asp>). The clinical presentation of human infection with avian influenza A viruses varies considerably—from mild illness, including conjunctivitis, fever, and cough, to severe illness, including fulminant pneumonia leading to death in cases of H5N1 and in these recent

Suspected Avian Influenza A (H7N9) in Humans

- **If you suspect avian influenza in a patient with respiratory illness and appropriate travel and/or exposure history, please notify your local board of health and MDPH immediately. An MDPH Immunization Epidemiologist is available 24/7 at 617-983-6800 for assistance with specimen collection and infection control.**

Suspect Avian Influenza A (H7N9) Cases Investigated

MDPH, Spring 2013

- NH man lives and works most of the year in China; visits affected provinces and lives in one. Developed ILI prior to travel to US. Still feeling ill when arrived in NH. Sought care, fearing avian flu.
- ME family visits relatives in China every year. Following long flight into Boston, all felt fluish. Family hosting those returning from China suddenly very concerned about avian flu.
- MA resident returns from China. Prior to departure from Shanghai, develops fever, cough, myalgias. Hospitalized upon return to US, on standard, droplet and airborne precautions.

Your patient has influenza-like illness

- Is it possible to have flu at this time of the year?
- Can a rapid flu test detect avian influenza A (H7N9)?
- Do you routinely ask about travel and sick contacts?
- Are you familiar with the H7N9 *Interim Guidance for Infection Control within Healthcare Settings* (CDC 2013)?

Suspect Cases of Immediate VPDs: Initial Steps

- Notify your **local board of health** and MDPH at **617-983-6800** when an immediately reportable VPD is first suspected – an epidemiologist can walk you through what to do.
- This includes:
 - Specimen collection and testing at the State Lab
 - Control recommendations for patient, exposed staff

Avian Influenza A (H7N9) Resources

- [U.S. Centers for Disease Control and Prevention Avian Influenza A \(H7N9\) Home Page](#)
- [Emergency of Avian Influenza A\(H7N9\) Virus Causing Severe Human Illness](#) (Morbidity and Mortality Weekly Report, May 2013)
- [Interim Guidance for Infection Control Within Healthcare Settings](#) When Caring for Patients with Confirmed, Probable, or Cases Under Investigation of Avian Influenza A(H7N9) Virus Infection, CDC
- [Interim Guidance on the Use of Antiviral Agents for Treatment of Human Infections with Avian Influenza A](#) (H7N9), CDC
- [Diagnostics for Detecting H7N9 Using rRT-PCR](#) (CDC)
- [Interim Guidance on Case Definitions to be Used for Novel Influenza A \(H7N9\) Case Investigations in the United States](#) (CDC)
- World Health Organization [Influenza at the Human-Animal Interface \(HAI\)](#)

Vaccine-Preventable Diseases in Massachusetts

Vaccine-Preventable Diseases in Massachusetts 2003-2012

Disease	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012*
Measles	0	2	0	19	1	2	2	3	24	0
Mumps	1	3	8	7	5	7	14	9	5	2
Rubella	1	0	1	2	1	1	1	0	1	1
CRS	0	0	0	0	0	0	0	0	0	0
Pertussis	1668	1713	1180	1199	1198	768	379	296	273	653
Hib < 5	1	1	0	0	3	2	1	1	0	2
Tetanus	0	0	0	0	0	0	0	0	0	0
Diphtheria	0	0	0	0	0	0	0	0	0	0
Polio	0	0	0	0	0	0	0	0	0	0
Pneumococcal Disease < 5	67	69	57	85	90	82	81	69	38	45
Varicella ²	2011	2648	2248	1998	2256	1759	1783	1751	1702	1237

* Preliminary 2012 data as of April 30, 2013

MUMPS IS NOT JUST FOR KIDS ANYMORE

WHAT EXACTLY IS MUMPS?

Mumps is a highly contagious viral illness that can have serious complications in young adults. Mumps spreads easily and if you get it you will have to spend 9 days in isolation.

HOW DO YOU KNOW YOU HAVE MUMPS?

You might think you have the flu. You may have a fever, a headache, muscle aches and pains, feel tired and lose your appetite. These symptoms may be followed by painful swelling of one or both of the glands located within your cheek near your jaw line. It may just start as an earache or tenderness along your jaw. Symptoms usually last for 9 days. Call your health care provider if you have any or all of these symptoms.

HOW DO YOU GET MUMPS?

Mumps is spread through:

- coughing,
- sneezing,
- kissing, or
- sharing food or drinks.

Even touching a surface contaminated by mumps and then touching your nose or mouth can give you the virus.

University and college campuses are the perfect places for mumps to spread, as students live and play in close proximity to each other. This is why if you get mumps you will have to spend 9 days in isolation.

MUMPS COMPLICATIONS IN YOUNG ADULTS ARE SERIOUS

MUMPS CAN CAUSE:

- meningitis or swelling of the brain and spinal cord,
- painful swelling of one or both testicles,
- painful swelling of ovaries and breasts,
- pancreatitis,
- permanent deafness, or
- spontaneous abortions if you get it in the first trimester of pregnancy.

MUMPS IS NO FUN

If you get mumps you will have to spend 9 days in isolation. This is the only way to prevent the spread of this highly contagious virus.

PROTECT YOURSELF. GET THE MUMPS CATCH-UP VACCINATION

If you have never had mumps and you are a young adult, you should get the mumps catch-up vaccination. Call your local health care provider. Vaccinations are available at your doctor's office, walk-in clinics, local public health units and some university and college campuses.

FOR MORE INFORMATION VISIT
ONTARIO.CA/MUMPS
OR CALL 1-866-559-4598

FREE MUMPS VACCINATION CLINIC

QUEEN'S UNIVERSITY
WEDNESDAY, MARCH 4, 2009
11 a.m. to 2 p.m.

JOHN DEUTSCH UNIVERSITY CENTRE—JOHN ORR ROOM

DON'T SPEND 9 DAYS IN ISOLATION. GET THE MUMPS CATCH-UP VACCINATION.

Mumps in Massachusetts - 2013

- Outbreaks at Holy Cross and Boston College, April-May 2013
 - Holy Cross: 6 confirmed; 4 probable (as of 5/17/13)
 - Boston College: 8 confirmed; 2+ probable (as of 5/17/13)
- 95% of student body with two MMRs
- Related to outbreaks at mid-Atlantic colleges and universities and spring break activities
- Control measures focus on education, vaccination and early recognition of illness, isolation of suspect cases, quarantine of exposed susceptibles
- Two doses of MMR are 88% effective in prevention mumps disease (CDC, 2012)

Influenza

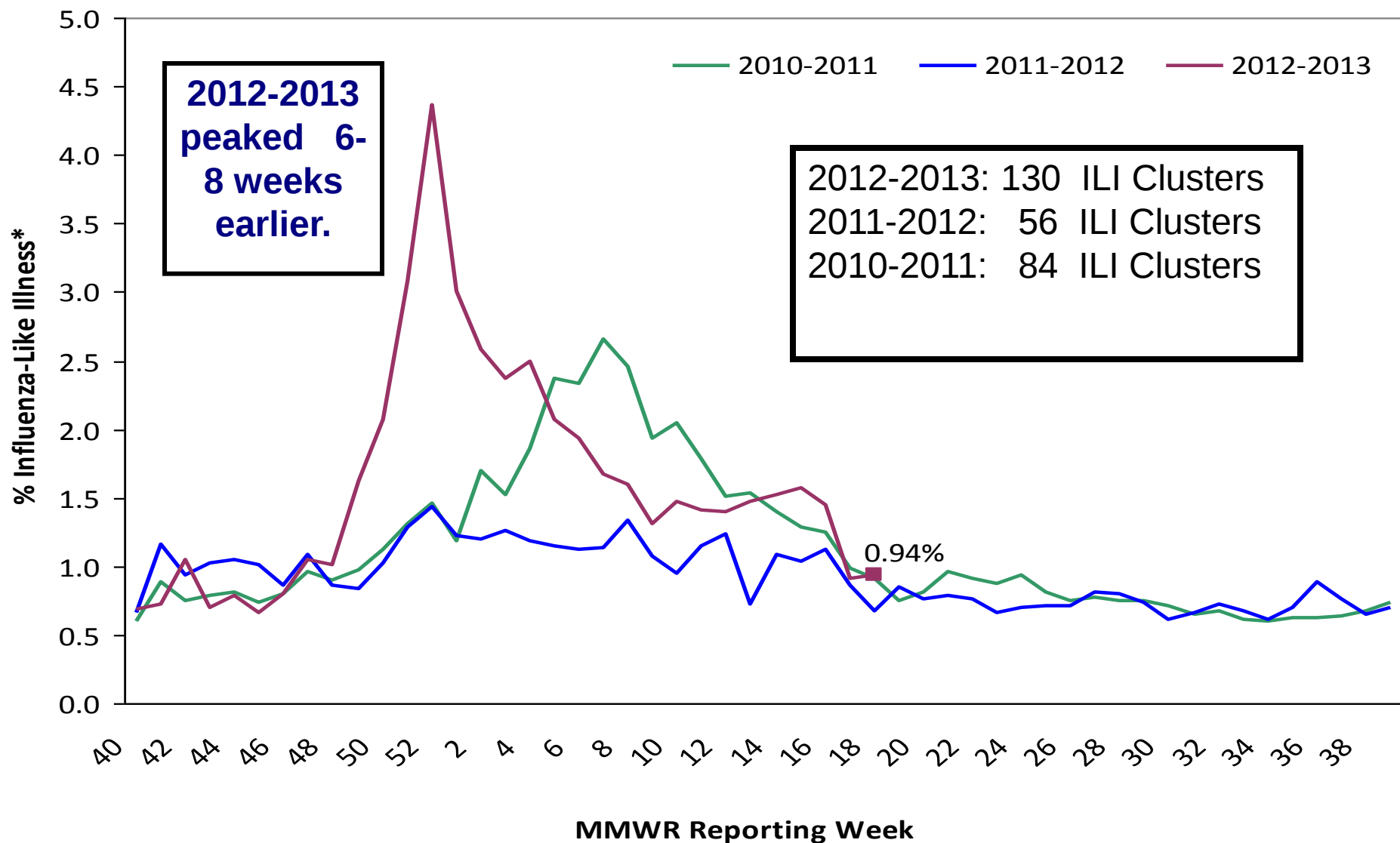
CDC's Three-pronged Approach to Influenza

1. Annual Vaccination
2. Appropriate Use of Influenza Antiviral Drugs
 - Including early presumptive treatment and prophylaxis of contacts
3. Everyday Prevention
 - Staying home when sick
 - Covering coughs and sneezes
 - Proper hand washing

National Influenza Activity Summary, 2012-2013

- Influenza activity in the US during the 2012–13 season began approximately 4 weeks earlier than usual, and occurred at moderately high levels
 - Activity increased in late November and peaked in late December
 - Activity continues in much of the country, but is decreased in all areas
- Influenza A (H3N2) viruses have predominated overall (55%), but influenza B viruses have also circulated (34%, as of 5/11/13)
- This influenza season has been moderately severe with high rates of influenza hospitalization in the elderly and a large proportion of deaths attributed to pneumonia and influenza
- Over 90% of the viruses antigenically characterized to date are well matched to vaccine
- CDC continues to monitor vaccine effectiveness – overall was moderately effective

Massachusetts Influenza-Like Illness (ILI) as of 5/04/2013



Flu Hospitalizations, US 2012-2013

FLUVIEW



A Weekly Influenza Surveillance Report Prepared by the Influenza Division

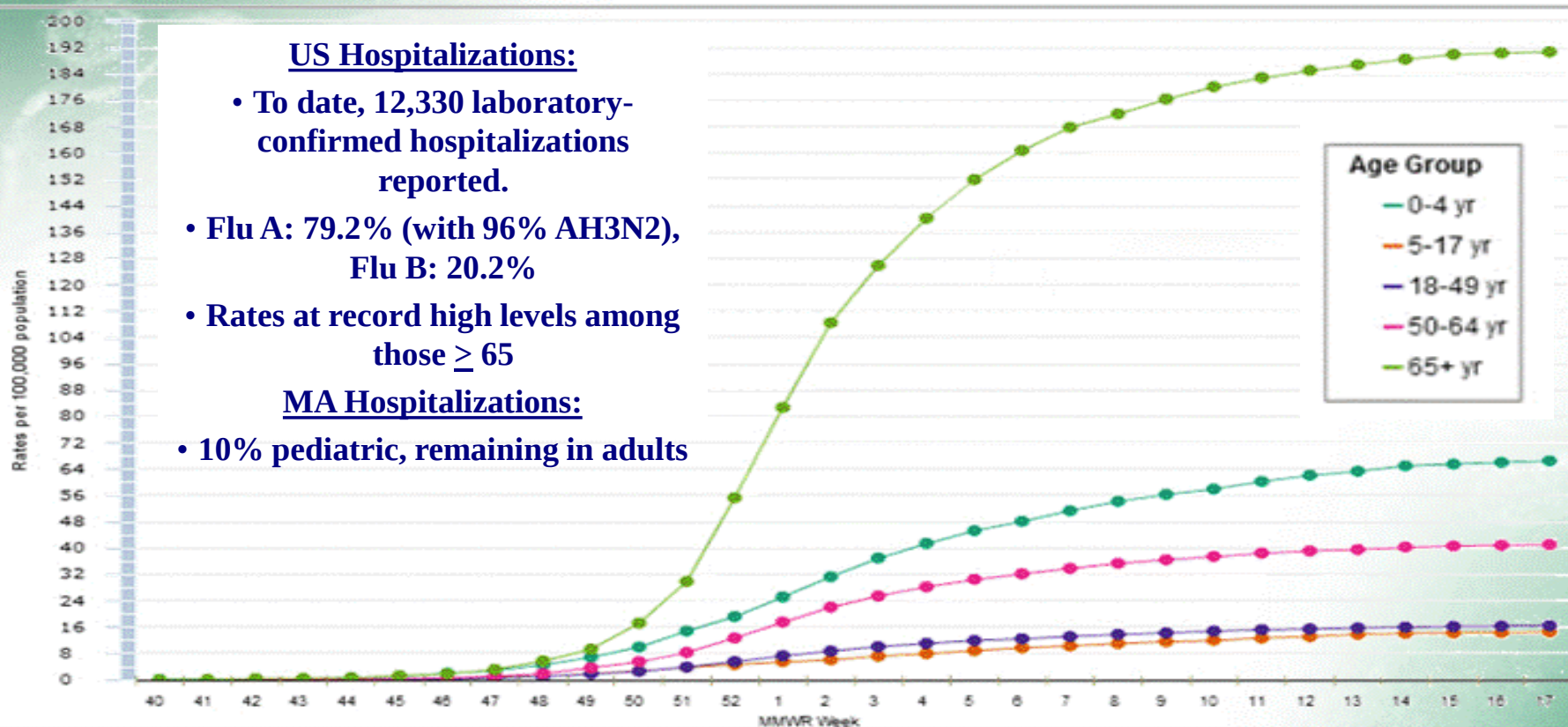
Laboratory-Confirmed Influenza Hospitalizations Preliminary rates as of May 04, 2013

US Hospitalizations:

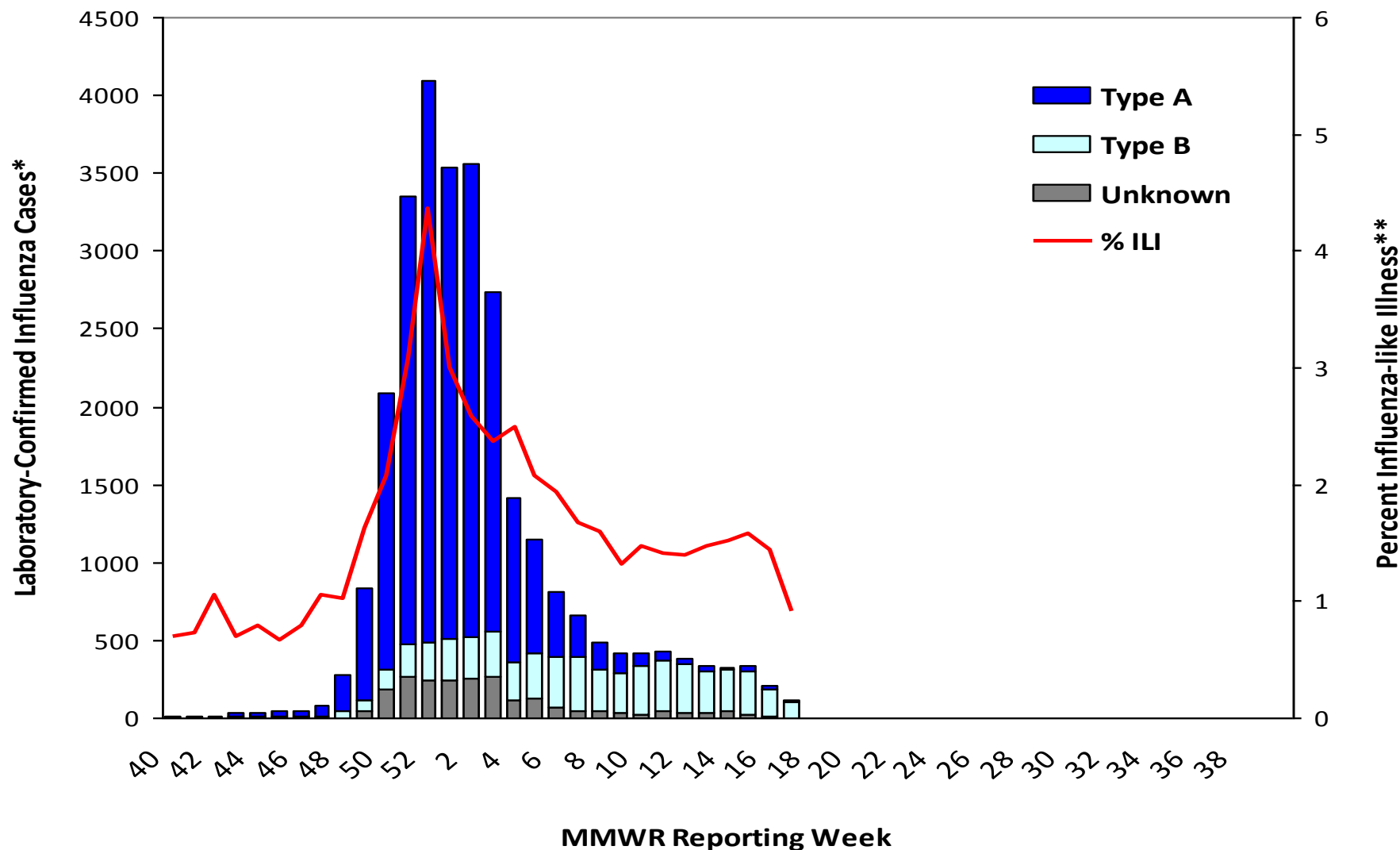
- To date, 12,330 laboratory-confirmed hospitalizations reported.
- Flu A: 79.2% (with 96% AH3N2), Flu B: 20.2%
- Rates at record high levels among those ≥ 65

MA Hospitalizations:

- 10% pediatric, remaining in adults



Flu Activity and Positive Laboratory Tests, MA 2012-2013



Influenza Questions

- Looking back over the past flu season, (and forward to the coming season) which of CDC's three strategies for influenza prevention works best?
- Which of the three strategies could use improvement?

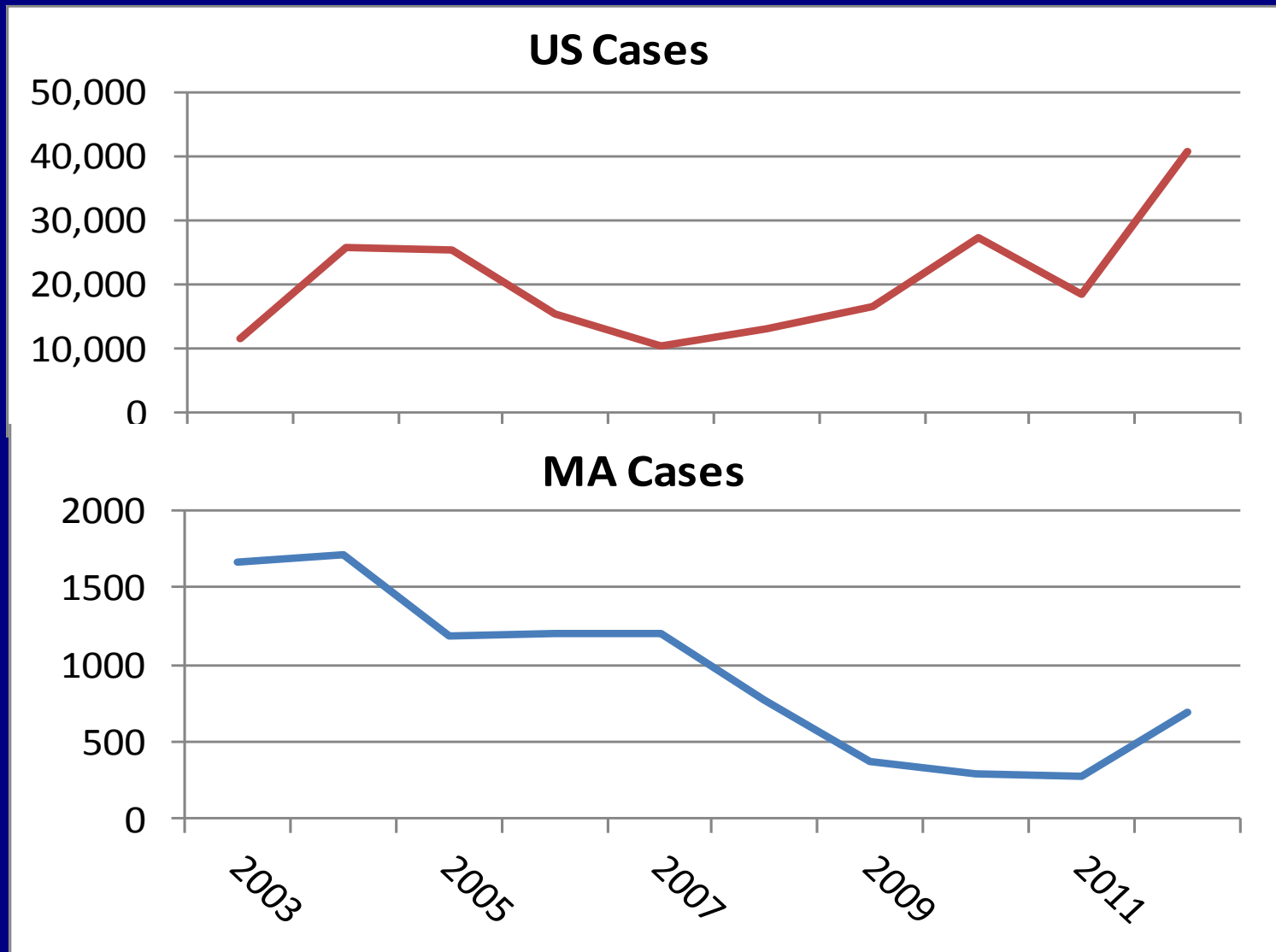
1. **Annual Vaccination**
2. **Appropriate Use of Influenza Antiviral Drugs**
(including early presumptive treatment and prophylaxis of contacts)
3. **Everyday Prevention**
Staying home when sick
Covering coughs and sneezes
Proper hand washing

Pertussis in 2012



What is the infectious period for pertussis?

Pertussis Cases, US and MA 2003-2012

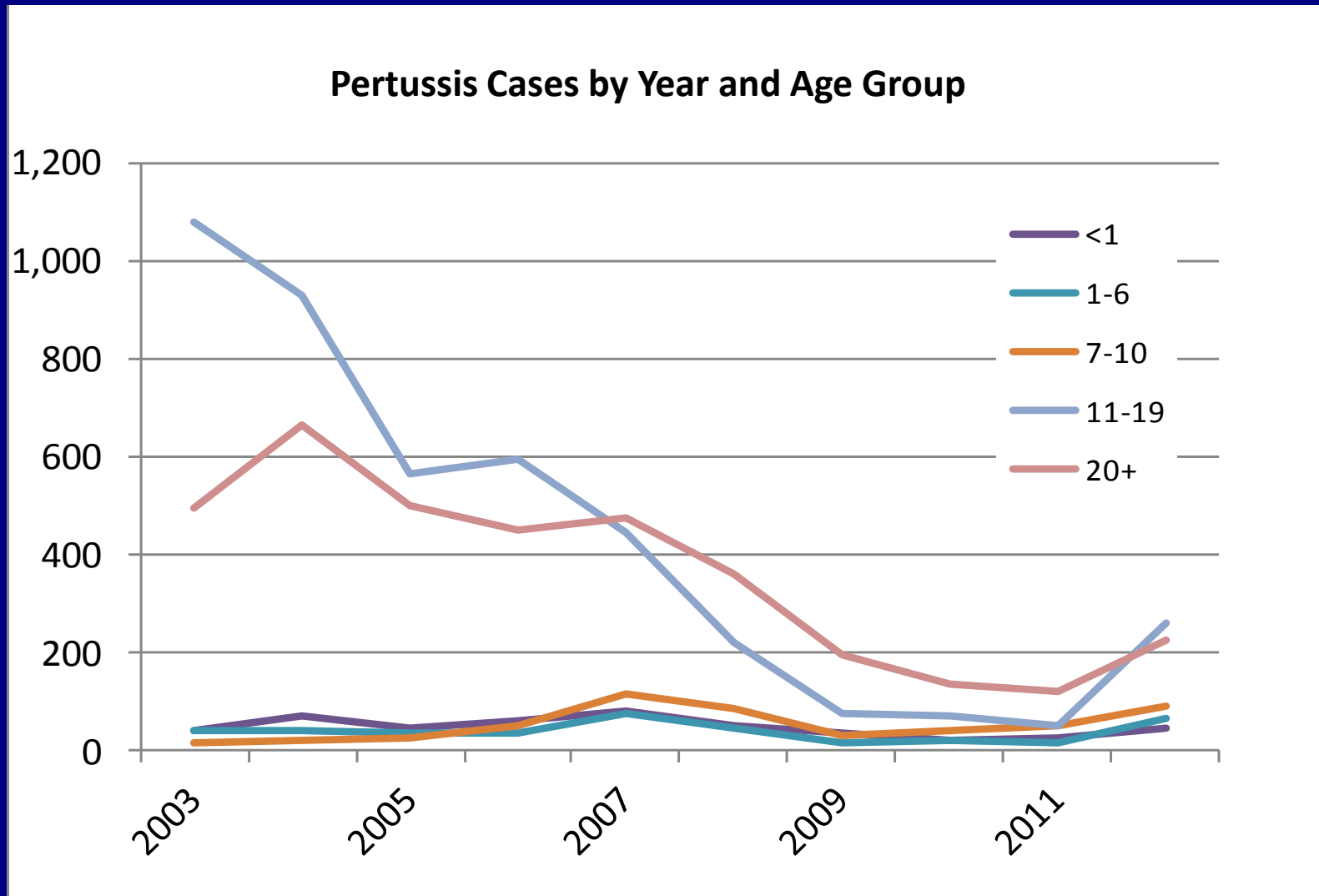


National Pertussis Outbreaks in 2012

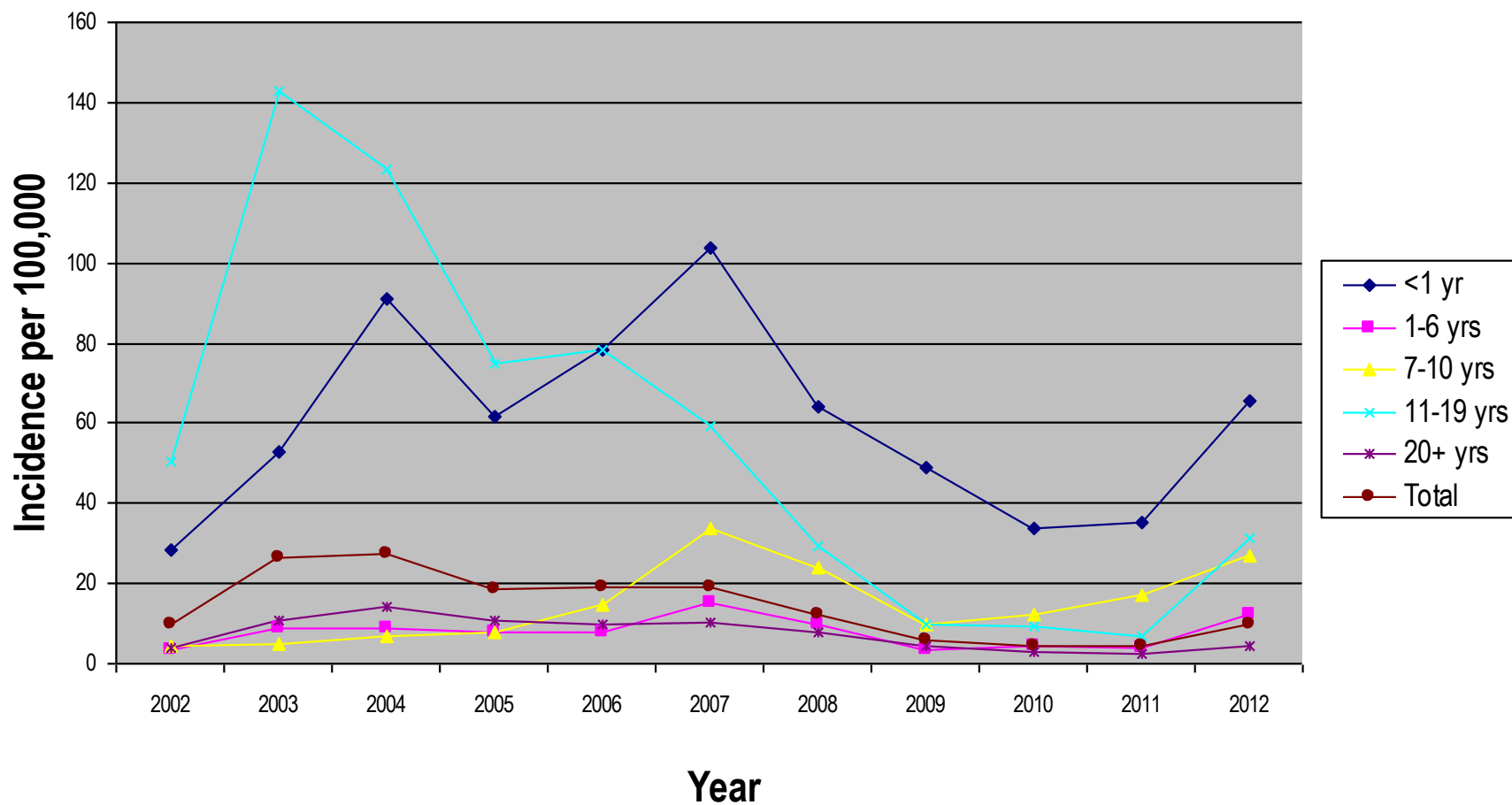
- As of January 10, 2013, **49** states and Washington, D.C. reported increases in disease in 2012 compared with 2011.
- 41,880 cases of pertussis were reported to CDC during 2012.
- 17 pertussis-related pediatric deaths nationally in 2012.
 - First infant death in MA in 10 years.

Year	Reported Cases
2000	7,867
2001	7,580
2002	9,771
2003	11,647
2004	25,827
2005	25,616
2006	15,632
2007	10,454
2008	13,278
2009	16,858
2010	27,550
2011	18,719
2012	41,880

Pertussis Cases by Age Group, MA 2003-2012



Pertussis Incidence by Age Group (MA), 2002 - 2012



Contributing Factors to Rise in Pertussis

- Low Tdap vaccination rates
- Pertussis vaccine itself is not 100 percent effective in preventing disease (estimates of efficacy range from 80 to 85 percent)
- Immunity wanes following pertussis infection and vaccination
- Immunity wanes more quickly after acellular vaccines (DTaP and Tdap) and is changing pertussis epidemiology
- Providers are more aware of pertussis and improved diagnostics

Pertussis Among Adolescents and Adults

- **Wide spectrum of presentation**
 - Disease often milder than in infants and children
 - May be asymptomatic
 - Can be quite severe and with classic presentation
- **Clinically difficult to distinguish from other causes of cough illness**
- **Persons with mild disease can transmit infection**

Diagnosis and Control of Pertussis

- Appropriate test depends on age, cough duration and Tdap vaccination status.
 - Clinical diagnosis not enough
 - Lab testing required for implementing control measures and reducing spread
- Acceptable diagnostic tests include:
 - Culture from any lab
 - Serology performed at HSLI
 - PCR from commercial lab
- Note: Serologies from commercial labs are not acceptable due to inability to interpret results

Pertussis Testing

(by Age and Symptom Duration)

	Diagnostic Method	
DURATION OF COUGH	CHILDREN (<11yrs)	ADULTS (≥11yrs)
<14 DAYS	NP Swab(s) (for Culture & PCR Testing)	NP Swab(s) (for Culture & PCR Testing)
14-28 DAYS		Serology* at HSLI -OR- Serology* at HSLI & Consider NP Swab(s) (for Culture & PCR Testing)
29-56 DAYS		Serology* at HSLI

***Serology results are not valid if less than 3 years since Tdap.**

Pertussis Treatment

- **When to treat**

- Adults, adolescents, children
 - Antimicrobials may modify course if given early (reduce duration and severity of symptoms and lessen communicability)
 - Treatment >3 weeks after cough onset limited benefit
- Infants and pregnant women near term
 - Treatment up to 6 weeks after cough onset should be considered

- **Recommended treatment**

- Macrolide / azolide antimicrobial
 - 5 day course azithromycin
 - 7 day course clarithromycin
 - 14 day course erythromycin
- Alternative agent:
 - 14 day course trimethoprim-sulfamethoxazole (Bactrim)

Postexposure Chemoprophylaxis (PEP)

- Focus on highest risk contacts
 - Lack of evidence supporting broad-scale PEP
- PEP recommended for:
 - All household contacts of a pertussis case
 - Persons exposed to pertussis who are at high risk or who will have close contact with a person at high risk
 - Infants and women in their third trimester
 - Those with pre-existing health conditions that may be exacerbated by a pertussis infection
 - All contacts in high risk settings that include infants aged <12 months or women in the third trimester of pregnancy
 - All exposed HCW, regardless of Tdap history

Tdap Reminder

- Single dose for ALL adults not previously vaccinated
 - Including everyone 65+
 - Pregnant women, with every pregnancy*
- Give regardless of interval since last Td**

***Off label recommendation. MMWR 2013 62(07);131-135**

****Off label recommendation. MMWR 2011 60(01);13-15**

Pertussis Reminders

- Clinical diagnosis not enough for public health response.
- Lab testing required for implementing control measures and reducing spread.
- Providers should have a high index of suspicion for pertussis, including in vaccinated patients.
- Specific information concerning cough onset, symptoms (whoop, paroxysms, post-tussive vomiting), occupation and household can be very helpful to public health.



Contact Us!

- MDPH & your LBOH are here to help and should be contacted immediately if you suspect an immediate vaccine-preventable disease.
 - Call 617-983-6800 for 24 hr/day epi assistance.

	2012 Confirmed Cases	2012 Suspect Cases Investigated
Diphtheria	0	10
Measles	0	64
Mumps	2	111
Polio	0	11
Rubella	1	30
Pertussis	653	867

Questions - Comments

- 617/983-6800

Immunization Epidemiologists

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- Ed Corkren
- Steve Fleming
- Nancy Harrington
- Rosa Hernandez
- Hillary Johnson
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