Massachusetts Department of Public Health
Bureau of Infectious Disease and Laboratory Sciences

Surveillance, Reporting and Control of Vaccine-Preventable Diseases
A Partnership

Adult Immunization Conference

"Building Networks to Vaccinate the Village"

April 25, 2017

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Presenter Disclosure Information

We, Joyce Cohen and Marija PopStefanija, have been asked to disclose any significant relationships with commercial entities that are either providing financial support for this program or whose products or services are mentioned during our presentations.

We have no relationships to disclose.

We will discuss the use of vaccines in a manner not approved by the U.S. Food and Drug Administration.

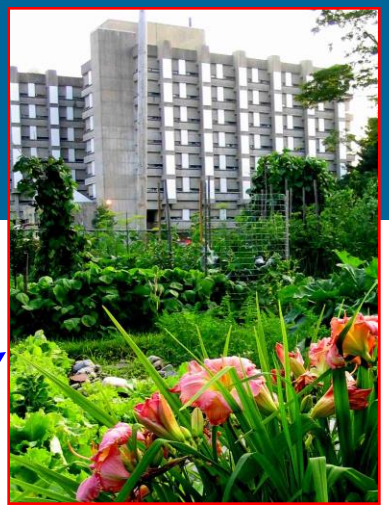
But in accordance with ACIP recommendations.

Today's Topics

- **Vaccine-preventable disease (VPD) epidemiology in Massachusetts**
  - **Overall trends**
  - **Influenza**
  - **Congenital rubella syndrome (CRS)**
  - **Invasive meningococcal disease**
  - **Mumps**
- **One village's experience – Mumps 2016**

COLLABORATIONS IN DISEASE SURVEILLANCE AND CONTROL

Healthcare Provider



MDPH

School

LBOH 2

Sports Team

Vaccine-Preventable Diseases in Massachusetts*, 2007-2016

Disease	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Measles	1	2	2	3	24	0	1	8	0	1
Mumps	6	7	15	9	4	6	71	5	6	253
Rubella	1	1	1	0	1	1	0	0	0	0
CRS	0	0	0	0	0	0	0	0	0	0
Meningococcal Disease	21	22	14	8	14	6	11	11	12	11
Pertussis	1198	762	362	294	273	651	348	298	252	193
Hib < 5	3	2	1	1	0	2	1	1	0	1
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	89	83	81	72	40	51	24	27	20	31
Varicella	2094	1585	1415	769	606	626	476	469	356	289

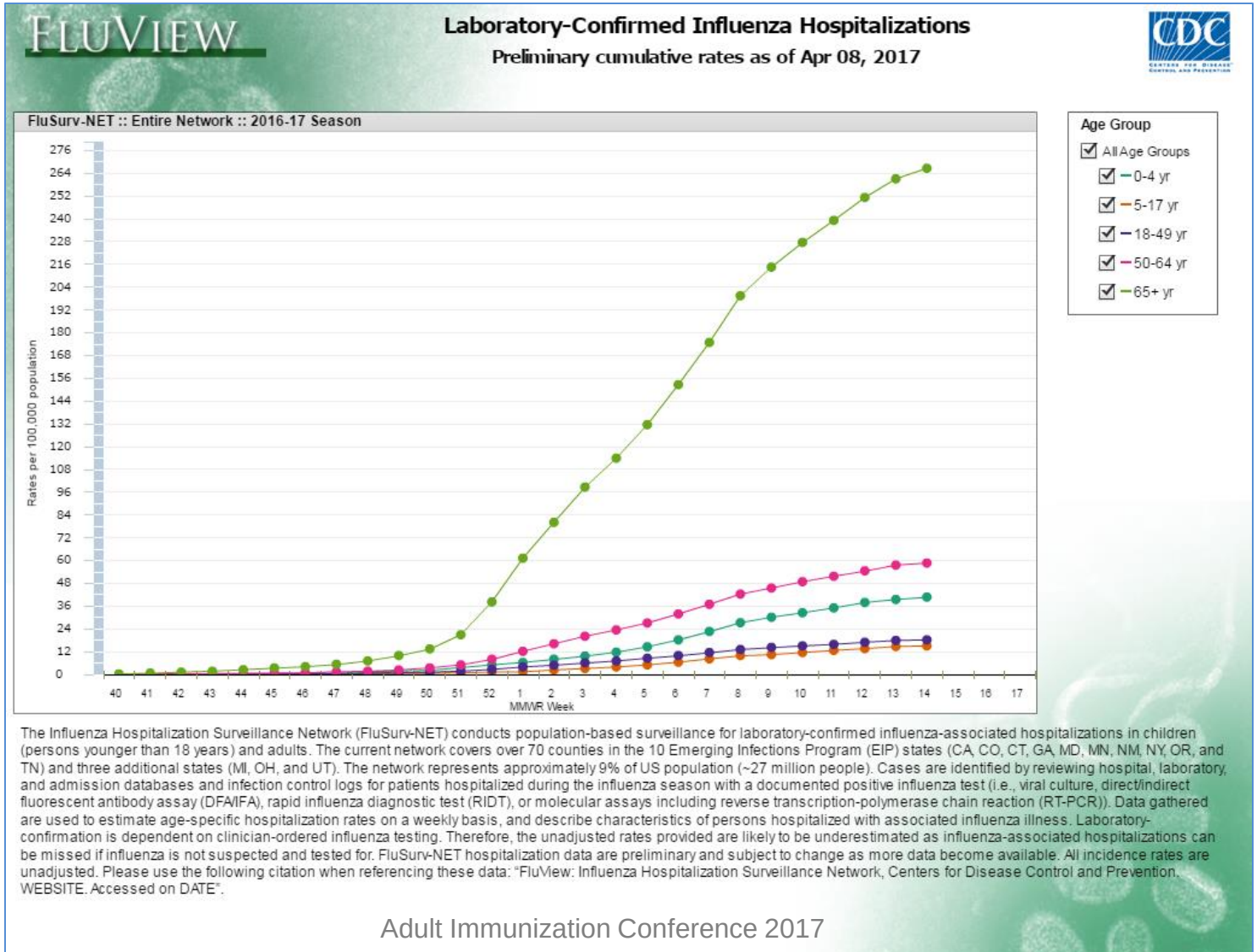
Data are current as of 4/7/2017 and are subject to change.

*Both confirmed and probable cases are reported for measles, mumps, rubella, and varicella to better reflect the true burden of disease. All other diseases include confirmed cases only.

2016-2017 Influenza Season

- Moderate season – Influenza A (H3N2) predominated this season.
- Circulating strains were a good match with the vaccine. Overall vaccine effectiveness (VE) against influenza A and influenza B virus infection associated with medically attended acute respiratory illness (ARI) was 48%.
- Influenza activity in Massachusetts peaked in February.

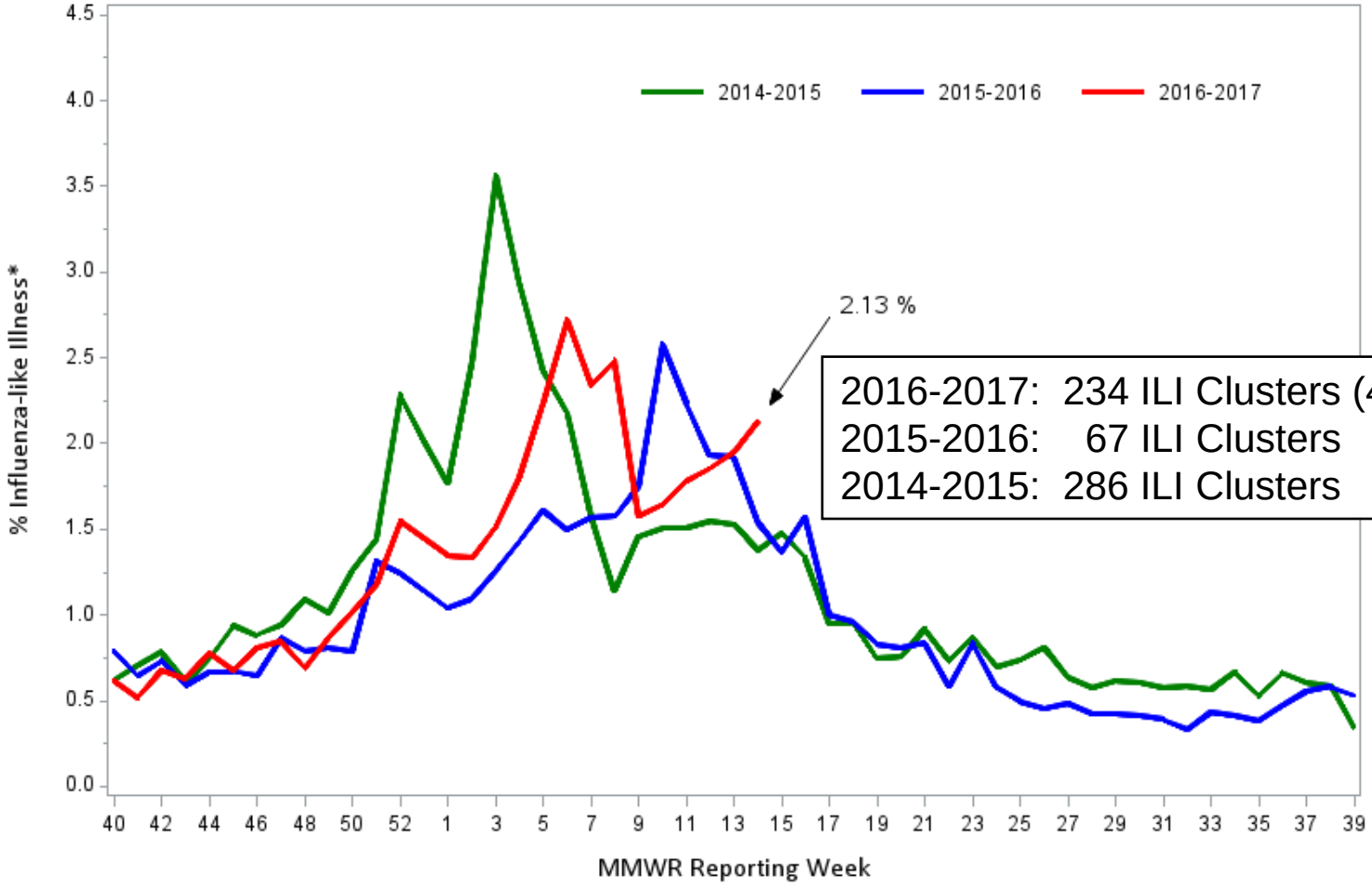
Influenza Hospitalizations in the United States



Source: CDC

Massachusetts Influenza-like Illness (ILI) as of 4/8/2017

Figure 1: Percentage of ILI visits reported by sentinel provider sites



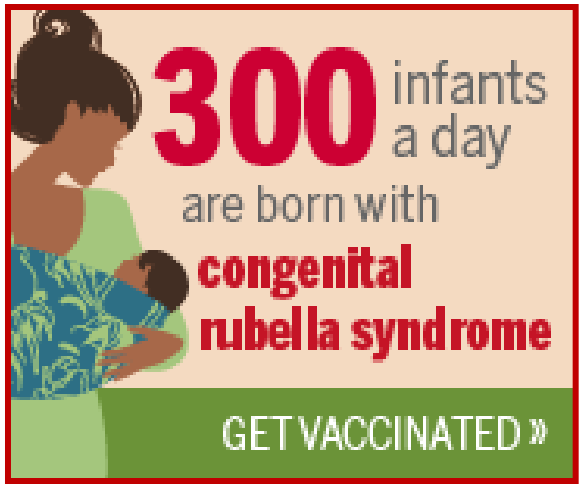
*Influenza-like illness (ILI, defined by fever >100F and cough and/or sore throat),as reported by Massachusetts sentinel surveillance sites

Congenital Rubella Syndrome (CRS)

- Maternal rubella infection, especially during the first trimester can cause multiple serious birth defects in the fetus. Baby can remain infectious for one year or longer.
- Rare in the US.
- **2017: First Massachusetts case in over 20 years.**
  - Born in February in an outlying hospital.
  - Mother from Africa: one US prenatal visit prior to delivery.
  - Came to MA for delivery.
  - Was tested for rubella immunity and had a very high positive IgG. Mostly likely had rubella in first trimester.

CRS In the US and Worldwide

- More than **100,000** children are born every year with CRS, mainly in Africa, South-East Asia, and the Western Pacific.
- There were 41 cases of CRS reported in the US from 1998 – 2016 (18 year period). 88% of mothers were born outside the US.

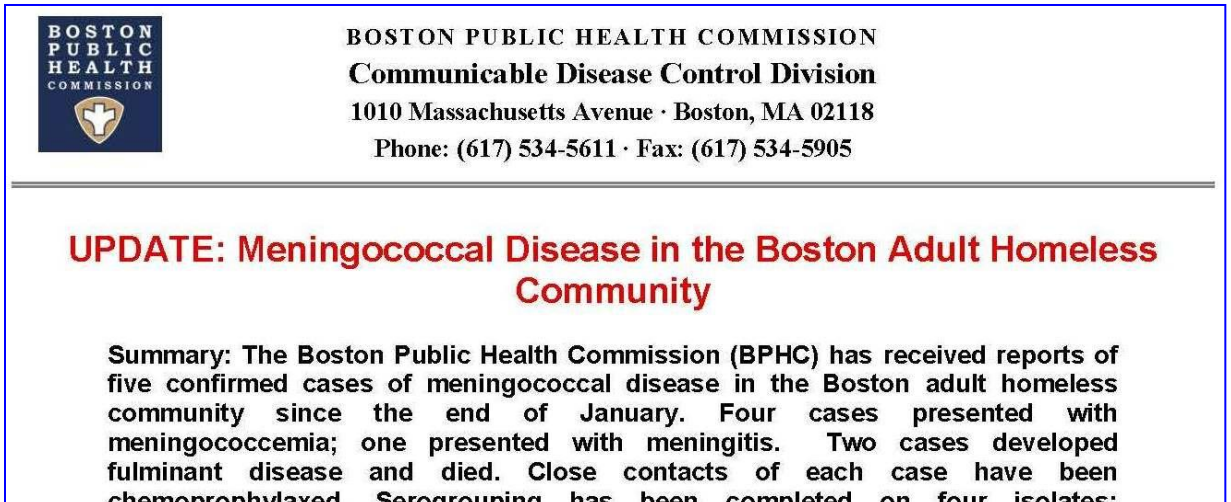


Recommendations

- Immunity to rubella should be documented in **all** pregnant women.
  - Particularly in recent U.S. arrivals and foreign-born
- If not immune, or in doubt, vaccinate.
  - Before pregnancy
  - Or before discharge after delivery
  - Or at the first post-partum visit
- High index of suspicion with recent arrivals to US who were born outside of US.
  - Ask about rash illness and exposure to rash illness during pregnancy
- Consider CRS in infants with symptoms consistent with CRS, especially in foreign-born or recently-arrived mothers, and place on contact precautions.
- **Infection Control is Critical: Infants can shed the virus for prolonged periods (up to 1 year of age or longer)**

Invasive Meningococcal Disease

- Five cases in two months starting in late January 2016 among people experiencing homelessness in greater Boston
- Very cold winter
- A sixth case was retrospectively linked to the outbreak
- 4 males/2 females
- Two deaths
- Three serogroup C; three serogroup Y (matching molecular profiles) – serogroups are included in the quadrivalent meningococcal vaccine
- Very unusual outbreak



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UPDATE: Meningococcal Disease in the Boston Adult Homeless Community

Summary: The Boston Public Health Commission (BPHC) has received reports of five confirmed cases of meningococcal disease in the Boston adult homeless community since the end of January. Four cases presented with meningococcemia; one presented with meningitis. Two cases developed fulminant disease and died. Close contacts of each case have been chemoprophylaxed. Serogrouping has been completed on four isolates:

Invasive Meningococcal Disease

- Antibiotic post-exposure prophylaxis to close contacts (**280 individuals**)
- Large vaccination campaigns – approx. **4800 doses of meningococcal vaccine were administered, the majority by the Boston Health Care for the Homeless Program**
- CDC-led case-control interviews to determine risk factors:
  - History of any immunosuppressive condition was significantly associated with IMD
  - While not statistically significant, a higher proportion of cases than controls were black, newly homeless, had higher education level, slept in rooms with ≥50 persons, shared beverages and food, and engaged in high risk activities such as having >1 kissing or sexual partner.

(Source: Otshudiema, John O., M.D., M.P.H. , CDC)


Menu Metro Breaking: US adds just 98,000 jobs in March

CDC in Boston to investigate illness striking homeless

By Felice J. Freyer | GLOBE STAFF MARCH 16, 2016

Disease-trackers from the Centers for Disease Control and
to study the spread of a deadly bacterial infection among

Vaccine rushed to Boston's homeless after a death

By Felice J. Freyer | GLOBE STAFF FEBRUARY 20, 2016

Top 10 Trending Articles

Most Viewed Most Commented Most

Silent protest by Bill Belichick at NF
owners meetings?

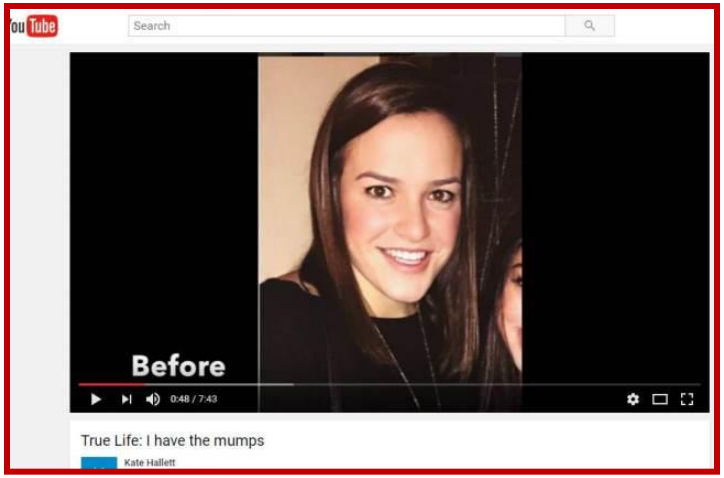
HubSpot book is unflattering portra

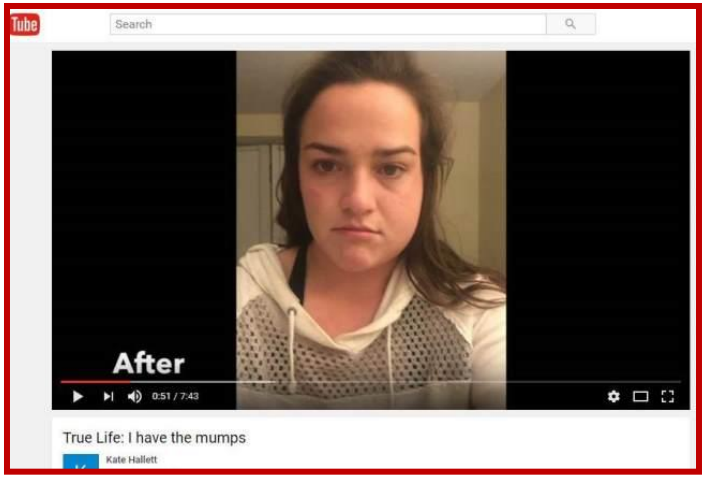
BOSTON HEALTH CARE *for the* HOMELESS PROGRAM

UMASS Amherst Vaccination Clinic Exercise

Emergency Dispensing Site Exercise

Mumps



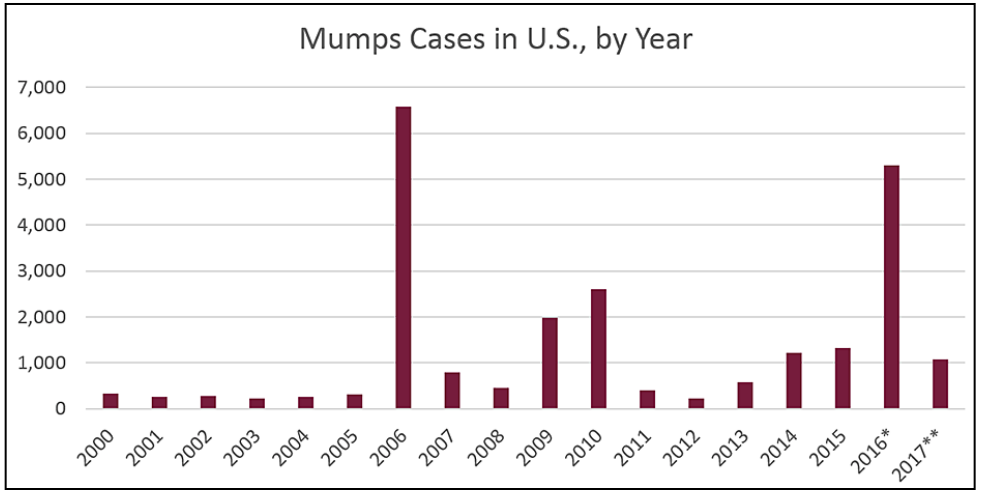


A systemic disease characterized by:

- Non-specific prodrome consisting of myalgia, loss of appetite, malaise, headache, low-grade fever
- Swelling of one or more salivary glands, usually the parotid glands, often tender or painful, with orchitis commonly reported in males after puberty
- **1/3 of infections may be asymptomatic or manifest as respiratory illness**
- Rare complications include arthritis, encephalitis, thyroiditis, mastitis, ataxia, oophoritis, hearing loss, and others
- Two doses 88% effective (at best) in preventing mumps

Confirmed and probable mumps cases in MA and in the US

Year	Cases in U.S.	Cases in MA
2006	6,584	10
2007	800	6
2008	454	7
2009	1,991	15
2010	2,612	9
2011	370	4
2012	229	6
2013	584	71
2014	1,223	5
2015	1,057*	6
2016	5,311**	253***

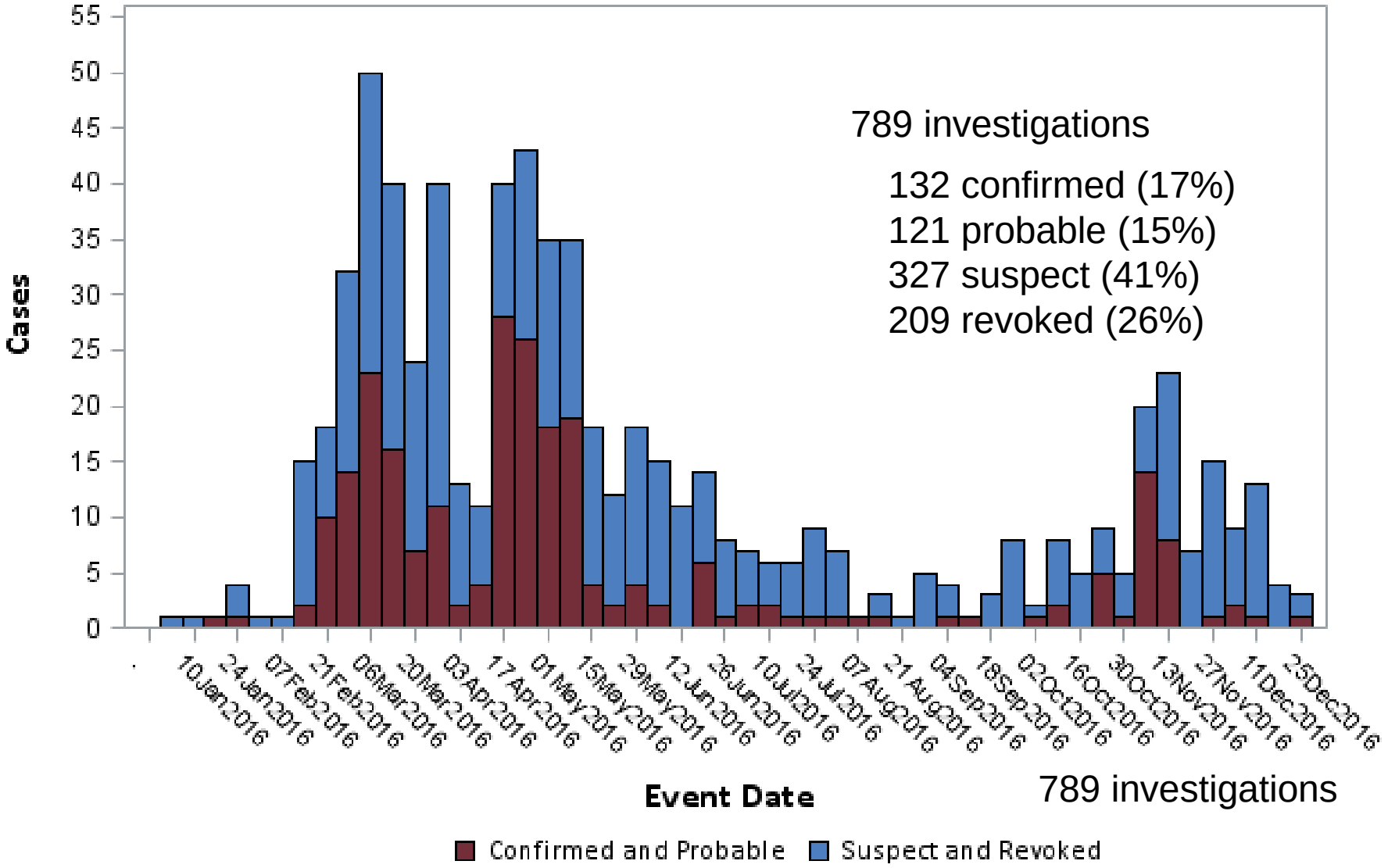


Source: CDC

*Cases as of January 2, 2016. Case count is preliminary and subject to change.
**Cases as of April 4, 2017. Case count is preliminary and subject to change.
Source: Morbidity and Mortality Weekly Report (MMWR), Notifiable Diseases and Mortality Tables
*** Cases as of December 31. 2016. Preliminary and subject to change.

Event Date of All Investigated Mumps Events by Week

January 1 2016 – December 31 2016

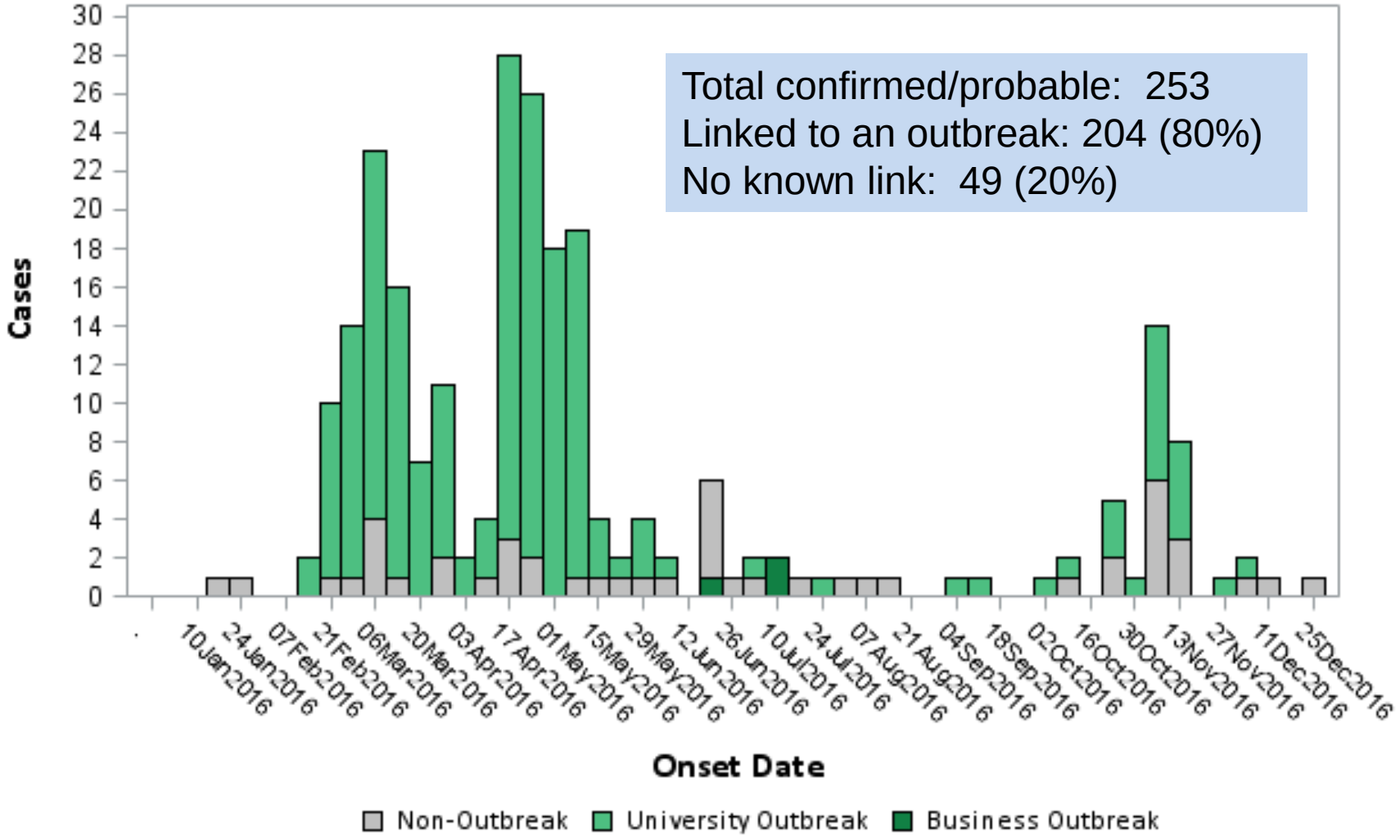


Data are prelimary and subject to change. (MDPH 2016)

Onset of Parotitis among Confirmed and Probable Mumps Cases by Week

Outbreak Related vs Not Outbreak Related

January 1 – December 31, 2016



Total confirmed/probable: 253
Linked to an outbreak: 204 (80%)
No known link: 49 (20%)

Data are prelimary and subject to change. (MDPH 2016)

Mumps in MA 2016

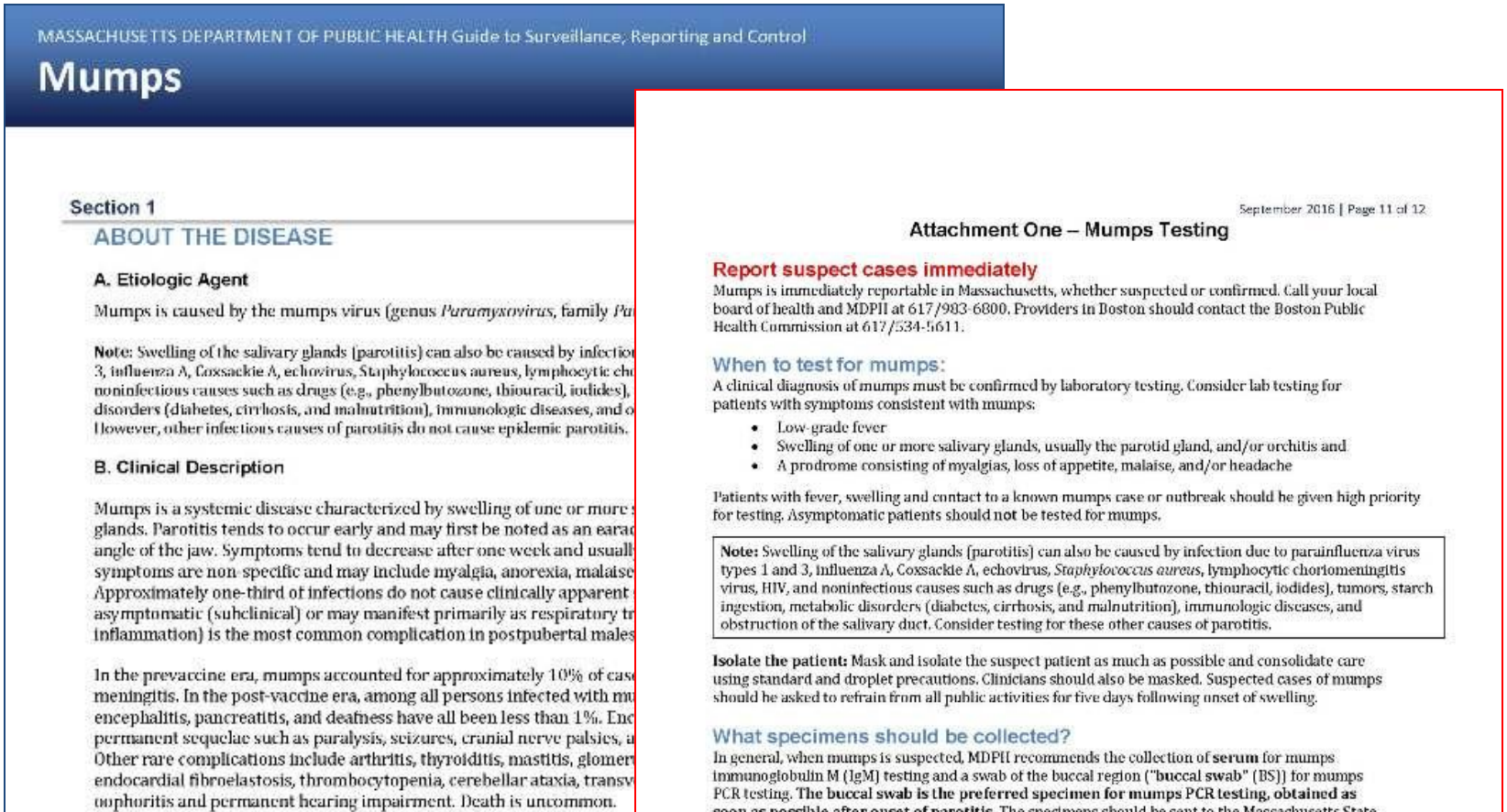
- Largest mumps outbreak in MA in 30+ years
  - **789** total investigations from January – December 2016
- Largely contained within university settings, with little spread into surrounding communities
- Transmission interrupted due to:
  - Enforcement of existing school requirements for immunization
  - Implementation of control measures, including social distancing
  - End of school year and school vacations

Challenges

- Many causes of parotitis
- Mumps testing shortcomings
- Asymptomatic people may transmit mumps
- Vaccination not 100% effective
- Educating providers and LBOHs
- Isolation for five days, especially with negative test results
- Social distancing/college students

Updated Mumps Chapter

- Mass.gov/dph/epi – click on "Reportable Communicable Diseases"



MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH Guide to Surveillance, Reporting and Control

Mumps

Section 1

ABOUT THE DISEASE

A. Etiologic Agent

Mumps is caused by the mumps virus (genus *Paramyxovirus*, family *Pa*

Note: Swelling of the salivary glands (parotitis) can also be caused by infectio
3, influenza A, Coxsackie A, echovirus, Staphylococcus aureus, lymphocytic ch
noninfectious causes such as drugs (e.g., phenylbutozone, thiouracil, iodides),
disorders (diabetes, cirrhosis, and malnutrition), immunologic diseases, and o
However, other infectious causes of parotitis do not cause epidemic parotitis.

B. Clinical Description

Mumps is a systemic disease characterized by swelling of one or more
glands. Parotitis tends to occur early and may first be noted as an earac
angle of the jaw. Symptoms tend to decrease after one week and usuall
symptoms are non-specific and may include myalgia, anorexia, malaise
Approximately one-third of infections do not cause clinically apparent
asymptomatic (subclinical) or may manifest primarily as respiratory tr
inflammation) is the most common complication in postpubertal males

In the prevaccine era, mumps accounted for approximately 10% of cas
meningitis. In the post-vaccine era, among all persons infected with mu
encephalitis, pancreatitis, and deafness have all been less than 1%. Enc
permanent sequelae such as paralysis, seizures, cranial nerve palsies, a
Other rare complications include arthritis, thyroiditis, mastitis, glomer
endocardial fibroelastosis, thrombocytopenia, cerebellar ataxia, transv
oophoritis and permanent hearing impairment. Death is uncommon.

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Attachment One – Mumps Testing

Report suspect cases immediately

Mumps is immediately reportable in Massachusetts, whether suspected or confirmed. Call your local board of health and MDPH at 617/983-6800. Providers in Boston should contact the Boston Public Health Commission at 617/534-5611.

When to test for mumps:

A clinical diagnosis of mumps must be confirmed by laboratory testing. Consider lab testing for patients with symptoms consistent with mumps:

- Low-grade fever
- Swelling of one or more salivary glands, usually the parotid gland, and/or orchitis and
- A prodrome consisting of myalgias, loss of appetite, malaise, and/or headache

Patients with fever, swelling and contact to a known mumps case or outbreak should be given high priority for testing. Asymptomatic patients should not be tested for mumps.

Note: Swelling of the salivary glands (parotitis) can also be caused by infection due to parainfluenza virus types 1 and 3, influenza A, Coxsackie A, echovirus, *Staphylococcus aureus*, lymphocytic choriomeningitis virus, HIV, and noninfectious causes such as drugs (e.g., phenylbutozone, thiouracil, iodides), tumors, starch ingestion, metabolic disorders (diabetes, cirrhosis, and malnutrition), immunologic diseases, and obstruction of the salivary duct. Consider testing for these other causes of parotitis.

Isolate the patient: Mask and isolate the suspect patient as much as possible and consolidate care using standard and droplet precautions. Clinicians should also be masked. Suspected cases of mumps should be asked to refrain from all public activities for five days following onset of swelling.

What specimens should be collected?

In general, when mumps is suspected, MDPH recommends the collection of **serum** for mumps immunoglobulin M (IgM) testing and a swab of the buccal region ("**buccal swab**" (BS)) for mumps PCR testing. **The buccal swab is the preferred specimen for mumps PCR testing, obtained as**