SURVEILLANCE, REPORTING AND CONTROL OF VACCINE-PREVENTABLE DISEASES

Adult Immunization Conference
April 2, 2019

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Presenter Disclosure Information

We, Nancy Harrington and Lindsay Bouton, 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.

Immunize MA

150 YEARS OF ADVANCING PUBLIC HEALTH

Today's Topics

Vaccine-preventable Disease (VPD) Epidemiology in Massachusetts

- The 10-Year Table
- Collaboration
- Measles
- Invasive meningococcal disease
  - College students
  - People experiencing homelessness
- Influenza
- Mumps
- Acute flaccid myelitis (AFM)
- Hepatitis A & B

Vaccine-Preventable Diseases in Massachusetts*, 2008-2018

Disease	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Measles	2	2	3	24	0	1	8	0	1	0	2
Mumps	7	15	9	4	6	71	5	6	258	191	46
Rubella	1	1	0	0	1	0	0	0	0	1	0
Meningococcal Disease	22	14	8	14	6	11	11	12	11	11	21
Pertussis	761	362	296	280	653	348	298	253	198	383	250
Hepatitis A	58	70	50	40	43	46	43	35	64	53	367
Hep B (acute)	63	93	87	77	76	69	33	27	35	52	46
Hib < 5	2	1	1	0	2	1	1	0	1	2	1
Tetanus	0	0	0	0	0	0	0	0	0	0	0
Diphtheria	0	0	0	0	0	0	0	0	0	0	0
Polio	0	0	0	0	0	0	0	0	0	0	0
Pneumococcal Disease < 5	83	81	72	40	51	24	27	20	31	21	26
Varicella	1584	1415	770	606	628	475	469	356	289	383	291

Data are current as of 2/11/2019 and are subject to change.

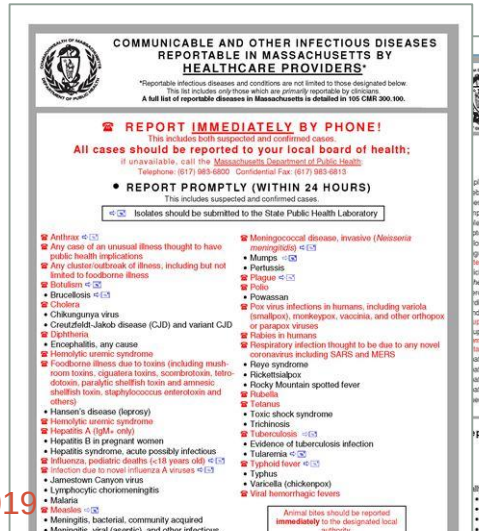
*Both confirmed and probable cases are reported for measles, mumps, rubella, and varicella to better reflect the true burden of disease. All other diseases include confirmed cases only.

Healthcare Provider Role

- **Vaccinate! Get vaccinated!**
- **Report suspected and confirmed cases of VPDs!**
- Notify patient of diagnosis/suspected diagnosis
- Provide key information to the LBOH to complete the official “Case Report” per 105 CMR 300.000

Control measures:

- Isolate patient if still infectious
- Educate patient about protecting their family and close contacts – Inform patient that the LBOH may be calling
- Assist with notification and PEP
- Exclude susceptible staff?



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

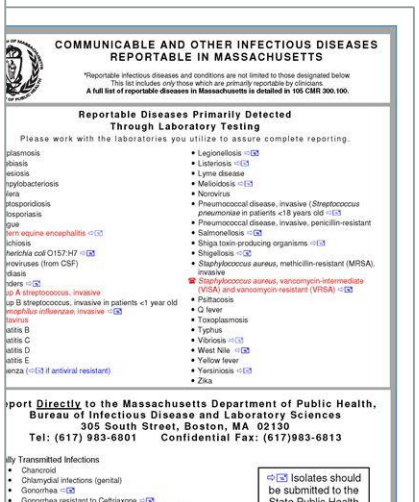
*Reportable infectious diseases and conditions are not limited to those designated below. This list includes only those which are primarily reportable by clinicians.
A full list of reportable diseases in Massachusetts is detailed in 105 CMR 300.100.

REPORT IMMEDIATELY BY PHONE!
This includes both suspected 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 24 HOURS)
This includes suspected and confirmed cases.
Isolates should be submitted to the State Public Health Laboratory

- Anthrax
- Any case of an unusual illness thought to have public health implications
- Any cluster/outbreak of illness, including but not limited to foodborne illness
- Botulism
- Brucellosis
- Cholera
- Chikungunya virus
- Creutzfeldt-Jakob disease (CJD) and variant CJD
- Diphtheria
- Encephalitis, any cause
- Hemolytic uremic syndrome
- Foodborne illness due to toxins (including mushroom toxins, ciguatera toxins, scombrotoxin, tetrodotoxin, paralytic shellfish toxin and amnesic shellfish toxin, staphylococcus enterotoxin and others)
- Hansen’s disease (leprosy)
- Hemolytic uremic syndrome
- Hepatitis A (IgM+ only)
- Hepatitis B in pregnant women
- Hepatitis syndrome, acute possibly infectious
- Influenza, pediatric deaths (<18 years old)
- Infection due to novel influenza A viruses
- Jamestown Canyon virus
- Lymphocytic choriomeningitis
- Malaria
- Measles
- Meningitis, bacterial, community acquired
- Meningococcal disease, invasive (*Neisseria meningitidis*)
- Mumps
- Pertussis
- Plague
- Polio
- Powassan
- Pox virus infections in humans, including variola (smallpox), monkeypox, vaccinia, and other orthopox or parapox viruses
- Rabies in humans
- Respiratory infection thought to be due to any novel coronavirus including SARS and MERS
- Reye syndrome
- Rickettsialpox
- Rocky Mountain spotted fever
- Rubella
- Tetanus
- Toxic shock syndrome
- Trichinosis
- Tuberculosis
- Evidence of tuberculosis infection
- Tularemia
- Typhoid fever
- Typhus
- Varicella (chickenpox)
- Viral hemorrhagic fevers

Animal bites should be reported **immediately** to the designated local



COMMUNICABLE AND OTHER INFECTIOUS DISEASES REPORTABLE IN MASSACHUSETTS

*Reportable infectious diseases and conditions are not limited to those designated below. This list includes only those which are primarily reportable by clinicians.
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Reportable Diseases Primarily Detected Through Laboratory Testing

Please work with the laboratories you utilize to assure complete reporting.

- Legionellosis
- Listeriosis
- Lyme disease
- Melioidosis
- Norovirus
- Pneumococcal disease, invasive (*Streptococcus pneumoniae* in patients <18 years old
- Pneumococcal disease, invasive, penicillin-resistant
- Salmonellosis
- Shiga toxin-producing organisms
- Shigellosis
- *Staphylococcus aureus*, methicillin-resistant (MRSA), invasive
- *Staphylococcus aureus*, vancomycin-intermediate (VISA) and vancomycin-resistant (VRSA)
- Psittacosis
- Q fever
- Toxoplasmosis
- Typhus
- Vibriosis
- West Nile
- Yellow fever
- Yersiniosis
- Zika

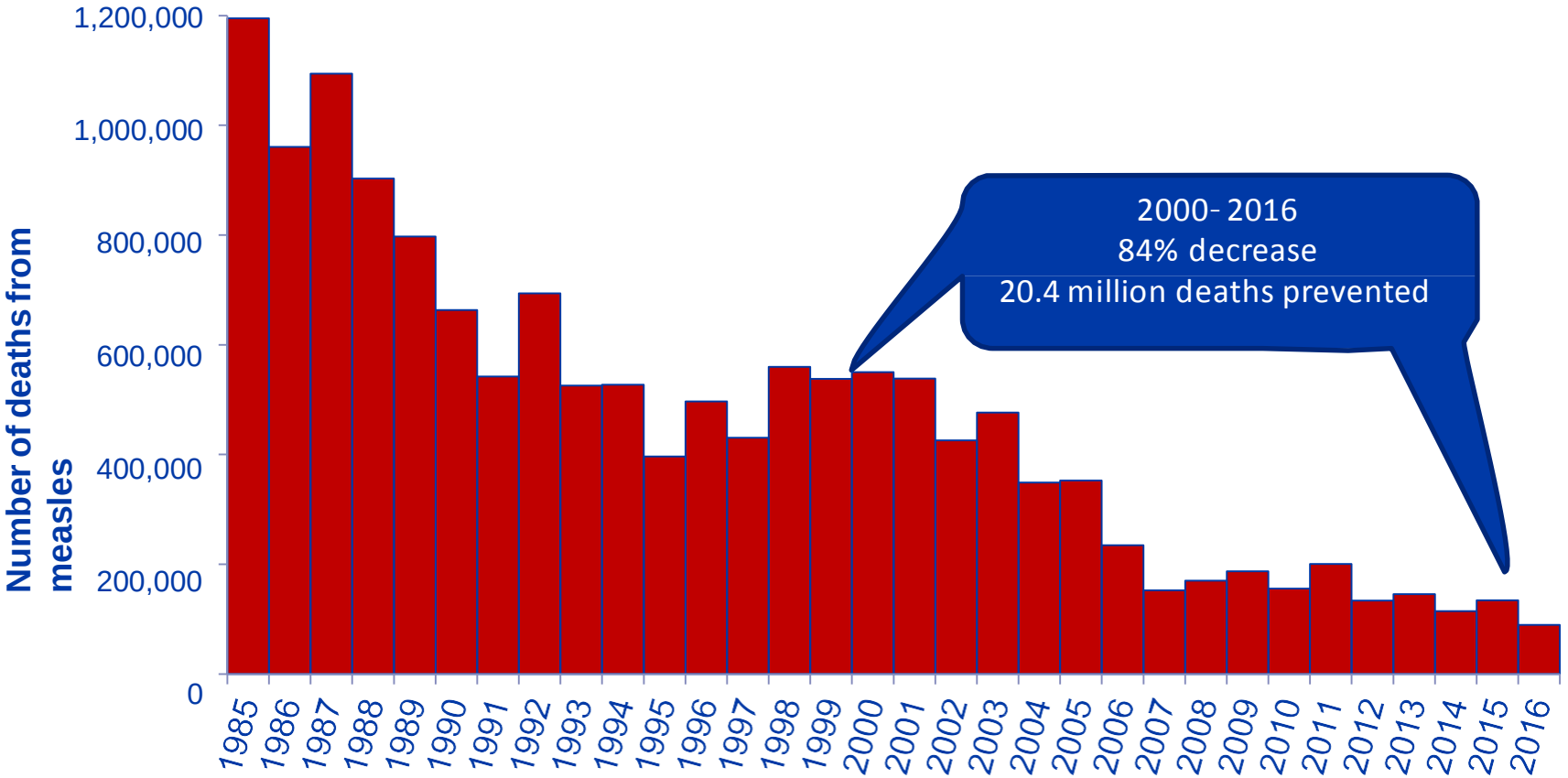
…port Directly to the Massachusetts Department of Public Health, Bureau of Infectious Disease and Laboratory Sciences
305 South Street, Boston, MA 02130
Tel: (617) 983-6801 Confidential Fax: (617)983-6813

…lly Transmitted Infections
- Chancroid
- Chlamydial infections (genital)
- Gonorrhea

Isolates should be submitted to the

Measles

Reduction in Deaths Due to Measles Vaccine Globally



Source: MMWR: Oct 27, 2017 / Vol. 66 / No. 42

Measles Internationally

Israel measles outbreak 2018: More than 3,000 cases

by NEWS DESK

February 5, 2019 | Middle East | No Comments

Start Dow

In a follow-up on the measles outbreak in Israe

According
a result of
and visitor
3150 indiv

The Minis
into 2019.

Measles is
Symptoms
a rash that
takes 8 to
symptom,
after the fe
coughing,
measles. P

Article by Don Ward Hackett

Measles Migrating From Venezuela

Venezuela contributed 68% of the measles cases reported in the Americas during 2018

January 31st, 2019 – The return of measles in Vene
the World Health Organization (WHO) as a substan
countries.

According to a new report published by the US Cent
Prevention (CDC) on January 30, 2019, Venezuela h

Health

Measles cases in Europe tripled last year, WHO says

7 February 2019 | 134 | Share

Measles cases in Europe tripled between 2017 and 2018 to 82,596 - the highest number recorded this decade, data from the World Health Organization shows.

While vaccination rates are improving, the WHO says coverage is not high enough to prevent circulation of the virus in many countries.

Sources of photos: http://outbreaknewstoday.com/israel-measles-outbreak-2018-3000-cases-10845/

https://www.bbc.com/news/health-47157020

https://www.precisionvaccinations.com/venezuela-contributed-68-measles-cases-reported-americas-during-2018

Don’t miss vaccination opportunities!

Ann Intern Med. 2017 Jul 18;167(2):77-84. doi: 10.7326/M16-2249. Epub 2017 May 16.

Missed Opportunities for Measles, Mumps, Rubella Vaccination Among Departing U.S. Adult Travelers Receiving Pretravel Health Consultations.

Hyle EP[1], Rao SR[1], Jentes ES[1], Parker Fiebelkorn A[1], Hagmann SHF[1], Taylor Walker A[1], Walensky RP[1], Ryan ET[1], LaRocque RC[1].

⊕ Author information

Abstract

BACKGROUND: Measles outbreaks continue to occur in the United States and are mostly due to infections in returning travelers.

OBJECTIVE: To describe how providers assessed the measles immunity status of departing U.S. adult travelers seeking pretravel consultation and to assess reasons given for nonvaccination among those considered eligible to receive the measles, mumps, rubella (MMR) vaccine.

DESIGN: Observational study in U.S. pretravel clinics.

SETTING: 24 sites associated with Global TravEpiNet (GTEN), a Centers for Disease Control and Prevention-funded consortium.

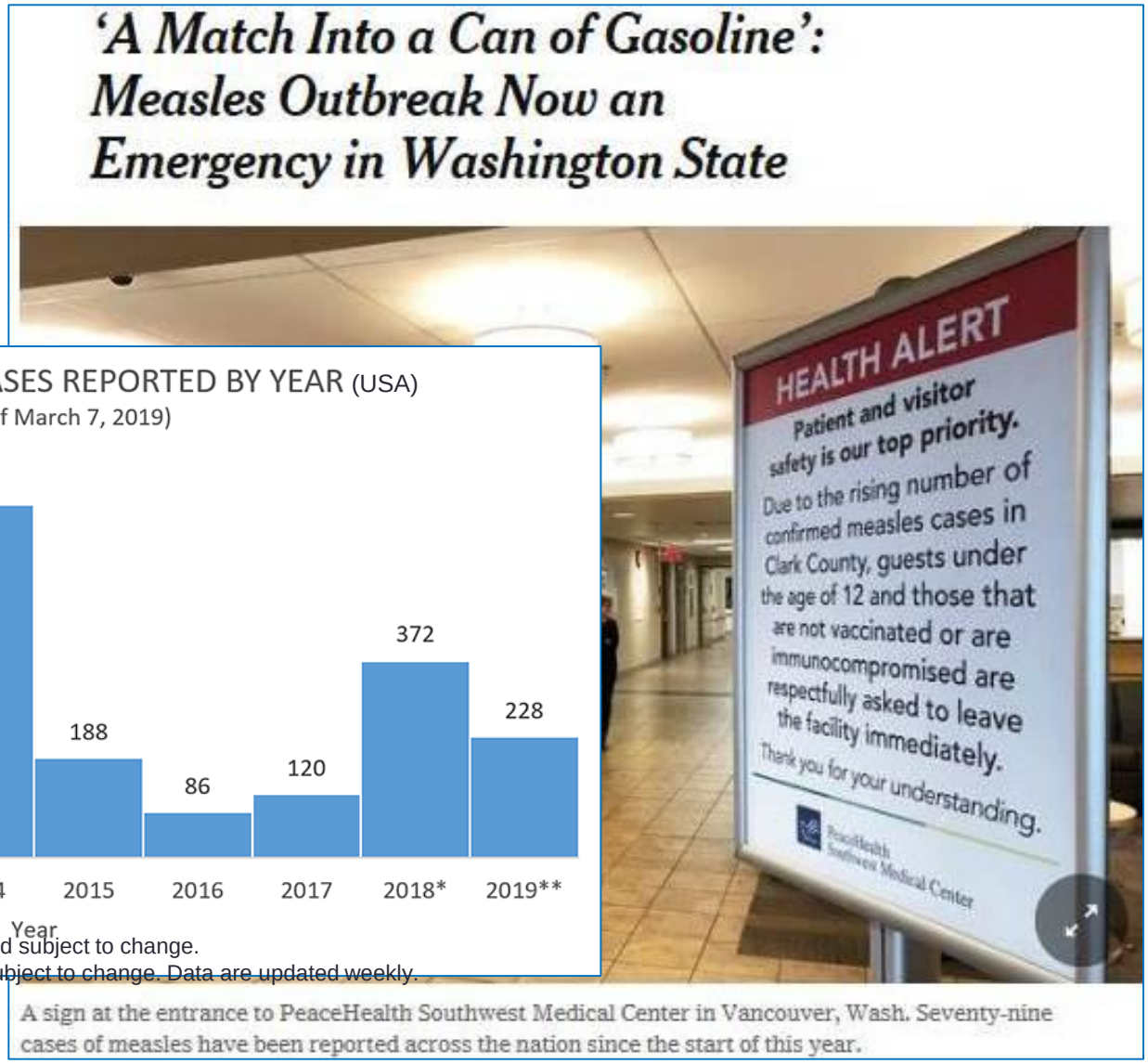
PATIENTS: Adults (born in or after 1957) attending pretravel consultations at GTEN sites (2009 to 2014).

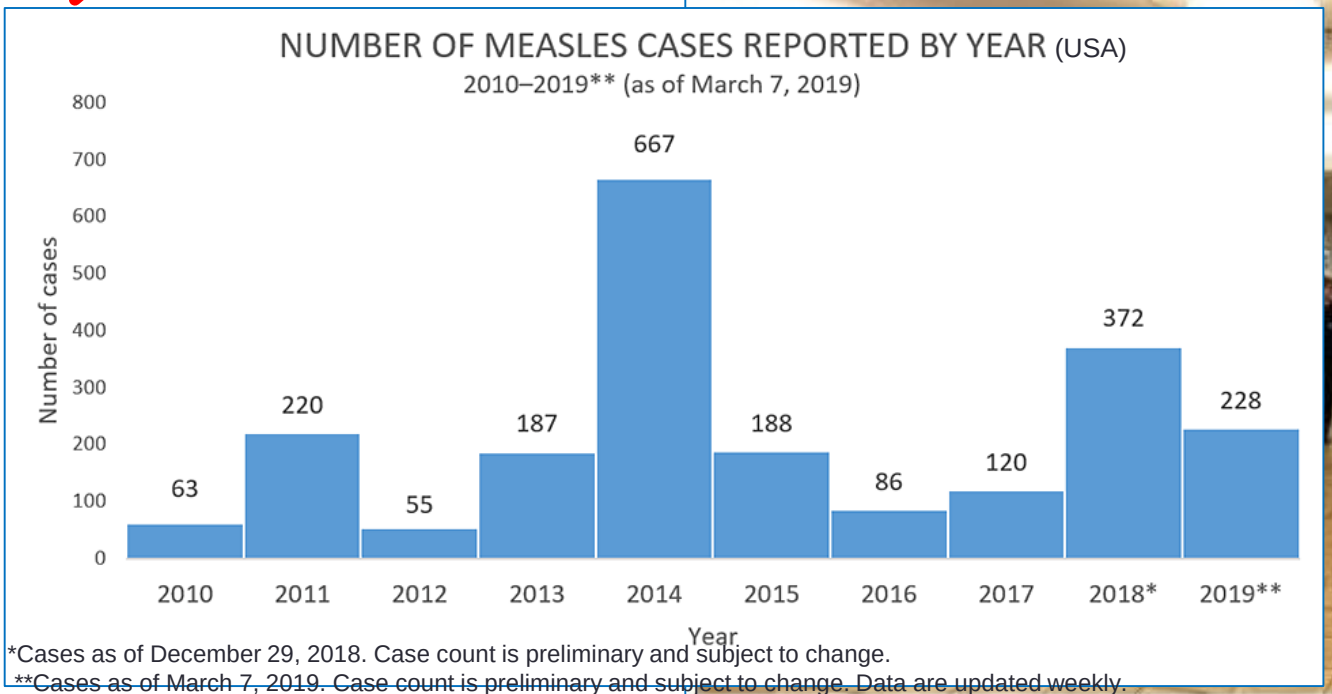
MEASUREMENTS: Structured questionnaire completed by traveler and provider during pretravel consultation.

RESULTS: 40 810 adult travelers were included; providers considered 6612 (16%) to be eligible for MMR vaccine at the time of pretravel consultation. Of the MMR-eligible, 3477 (53%) were not vaccinated at the visit; of these, 1689 (48%) were not vaccinated because of traveler refusal, 966 (28%) because of provider decision, and 822 (24%) because of health systems barriers. Most MMR-eligible travelers who were not vaccinated were evaluated in the South

Measles in the USA

Please vaccinate!





*Cases as of December 29, 2018. Case count is preliminary and subject to change.
**Cases as of March 7, 2019. Case count is preliminary and subject to change. Data are updated weekly.

Source: New York Times, 2/6/2019, and CDC https://www.cdc.gov/measles/cases-outbreaks.html

Measles in Mass 2018

- Two confirmed cases
- Both with recent travel
- **Hundreds of people exposed** in medical and other settings
- Enormous post-exposure efforts to identify susceptibles and vaccinate (or refer for immune globulin)
- Dozens of people quarantined

UPDATED: Person with measles visited Lexington Town Pool, library

On Thursday, Aug. 23, town of Lexington staff, members of th
Board of Health and Office of Public Health staff were notifie
potential measles exposure due to a resident who was infectio
according to an announcement posted on the town's website.

The resident made brief stops:

- Thursday, Aug, 16, late afternoon, Lexington High Sch
- Saturday, Aug. 18, between about 1:00 and 1:30 p.m., C
- Sunday, Aug. 19 around noon, the Town Pool
- Monday, Aug, 20 around 11:45 a.m., Lahey Lexington

Measles is a highly contagious disease that starts off with cold
during these dates and specific times and have symptoms, the

Symptoms may develop up until Sept. 9, the town's announce
after a person is exposed. Symptoms appear like a cold at first

Home › Breaking News › Story

Warning about measles in Lowell after infected patient identified

The Lowell Sun

UPDATED: 11/10/2018 03:33:04 PM EST

Sun Staff Report

LOWELL -- The Lowell Community Health Center is warning the public about measles after a pediatric patient was diagnosed with the contagious respiratory infection on Thursday.

The patient, who is recovering at home, was immediately isolated at the health center, according to officials.

However, anyone who was in the health center's main lobby, pediatric waiting room, pharmacy or lab between 12:53 p.m. and 5:22 p.m. on Thursday might have been exposed to measles.

The True Cost of Measles Outbreaks in the Post-elimination Era

*The effect of measles outbreaks is generally estimated through case counts and geographic spread. Given the high infectivity and potential for severe post-infection complications associated with measles, simple case counts are not capable of reflecting the true cost of measles outbreaks. When evaluating the true cost of measles epidemics during the post-elimination era, policy makers must account for the long-term immunologic sequelae that result from infection, the monetary effects of a response to the outbreak, and the resulting strain on the health care infrastructure…**During the measles post-elimination era, vaccine hesitancy and refusal have become a threat to the health of the public.***

- **Immunologic costs.** Measles causes post-infection immunosuppression, increasing chances of secondary viral and bacterial infections. In addition to temporary post-infection immunosuppression, measles infection is associated with increased all-cause mortality extending 2 to 3 years post-infection, perhaps due to post-measles immunologic amnesia.
- **Financial costs.** The cost of responding to a single case may be as high as $142,000. U.S. estimated costs ranged from 2.7 to 5.3 million in 2011.
- **Strain on healthcare system.** Diverting human resources disrupts routine healthcare and healthcare systems.

Sundaram ME, Guterman LB, Omer SB. The True Cost of Measles Outbreaks During the Postelimination Era. *JAMA.* Published online March 07, 2019. doi:10.1001/jama.2019.1506

PATIENT #1 CALLS YOUR OFFICE

She is a 40-something who is heading on a Mediterranean cruise in a couple of months. She is wondering if she needs any vaccines prior to travel.

1. **Could this scenario actually occur?** Yes!

2. **Where can you find information about travel vaccine recommendations?** https://wwwnc.cdc.gov/travel.

3. **Should she get one or two doses of MMR?**

Before any international travel—

- Infants 6 months through 11 months of age should receive one dose of MMR vaccine.†
- Children 12 months of age and older should receive two doses of MMR vaccine separated by at least 28 days.
- **Teenagers and adults who do not have evidence of immunity* against measles should get two doses of MMR vaccine separated by at least 28 days.**

† Infants who get one dose of MMR vaccine before their first birthday should get two more doses (one dose at 12 through 15 months of age and another dose at least 28 days later).

*** Acceptable presumptive evidence of immunity against measles includes at least one of the following: written documentation of adequate vaccination, laboratory evidence of immunity, laboratory confirmation of measles, or birth in the United States before 1957.**

BONUS QUESTION: Does MMR vaccine cause autism?

Annals of Internal Medicine

ORIGINAL RESEARCH

Measles, Mumps, Rubella Vaccination and Autism

A Nationwide Cohort Study

Anders Hviid, DrMedSci; Jørgen Vinsløv Hansen, PhD; Morten Frisch, DrMedSci; and Mads Melbye, DrMedSci

Background: The hypothesized link between the measles, mumps, rubella (MMR) vaccine and autism continues to cause concern and challenge vaccine uptake.

Objective: To evaluate whether the MMR vaccine increases the risk for autism in children, subgroups of children, or time periods after vaccination.

Design: Nationwide cohort study.

Setting: Denmark.

Participants: 657 461 children born in Denmark from 1999 through 31 December 2010, with follow up from 1 year of age and through 31 August 2013.

Measurements: Danish population registries were used to link information on MMR vaccination, autism diagnoses, other childhood vaccines, sibling history of autism, and autism risk factors to children in the cohort. Survival analysis of the time to autism diagnosis with Cox proportional hazards regression was used to estimate hazard ratios of autism according to MMR vaccination status, with adjustment for age, birth year, sex, other childhood vaccines, sibling history of autism, and autism risk factors (based on a disease risk score).

Results: During 5 025 754 person-years of follow-up, 6517 children were diagnosed with autism (incidence rate, 129.7 per 100 000 person-years). Comparing MMR-vaccinated with MMR-unvaccinated children yielded a fully adjusted autism hazard ratio of 0.93 (95% CI, 0.85 to 1.02). Similarly, no increased risk for autism after MMR vaccination was consistently observed in subgroups of children defined according to sibling history of autism, autism risk factors (based on a disease risk score) or other childhood vaccinations, or during specified time periods after vaccination.

Limitation: No individual medical charts were reviewed.

Conclusion: The study strongly supports that MMR vaccination does not increase the risk for autism, does not trigger autism in susceptible children, and is not associated with clustering of autism cases after vaccination. It adds to previous studies through significant additional statistical power and by addressing hypotheses of susceptible subgroups and clustering of cases.

Primary Funding Source: Novo Nordisk Foundation and Danish Ministry of Health.

Ann Intern Med. doi:10.7326/M18-2101 Annals.org

For author affiliations, see end of text.

This article was published at Annals.org on 5 March 2019.

The hypothesized link between the measles, mumps, rubella (MMR) vaccine and autism continues to cause concern and challenge vaccine acceptance almost 2 decades after the controversial and later retracted *Lancet* paper from 1998 (1), even though observational studies have not been able to identify an increased risk for autism after MMR vaccination. In a 2014 meta analysis, 10 observational studies on childhood vaccines were identified: 5 cohort studies and 5 case–control studies (2). Of these, 2 cohort studies and 4 case–control studies specifically addressed MMR and autism, all reporting no association. This is consistent with more recent studies of note (3, 4).

We previously addressed this issue in a nationwide cohort study of 537 303 Danish children with 1838 cases of autism spectrum disorders (5). In our cohort, MMR vaccination was not associated with autistic disorder (rate ratio, 0.92 [95% CI, 0.68 to 1.24]) or other autism spectrum disorders (rate ratio, 0.83 [CI, 0.65 to 1.07]).

In this study, we aimed to evaluate the association again in a more recent and nonoverlapping cohort of Danish children that has greater statistical power owing to more children, more cases, and longer follow-up. A criticism of our and other previous observational studies has been that these did not address the concern that MMR vaccination could trigger autism in specific groups of presumably susceptible children, in contrast to all children (6); the current study addresses this concern in detail. We evaluate the risk for autism after MMR vaccination in subgroups of children defined according to environmental and familial autism risk factors. Another criticism has been that MMR is associated with a regressive form of autism, leading to a clustering of cases with onset shortly after MMR vaccination (7). We evaluate the risk for autism after MMR vaccination in specific periods in detail.

METHODS

Ethical approval is not needed for register-based research in Denmark. The Danish Data Protection Agency approved the study.

Cohort

We conducted a nationwide cohort study of all children born in Denmark of Danish-born mothers from 1 January 1999 through 31 December 2010. We sourced the study cohort from the Danish Civil Registration System, which assigns a unique personal identification number to all people living in Denmark and keeps track of basic demographic information for each individual (8). This unique identifier is used in all other national registries and allows for individual-level linkage of health-related information, including vaccinations and autism diagnoses.

See also:

Editorial comment 1

Summary for Patients 2

Web-Only
Supplement

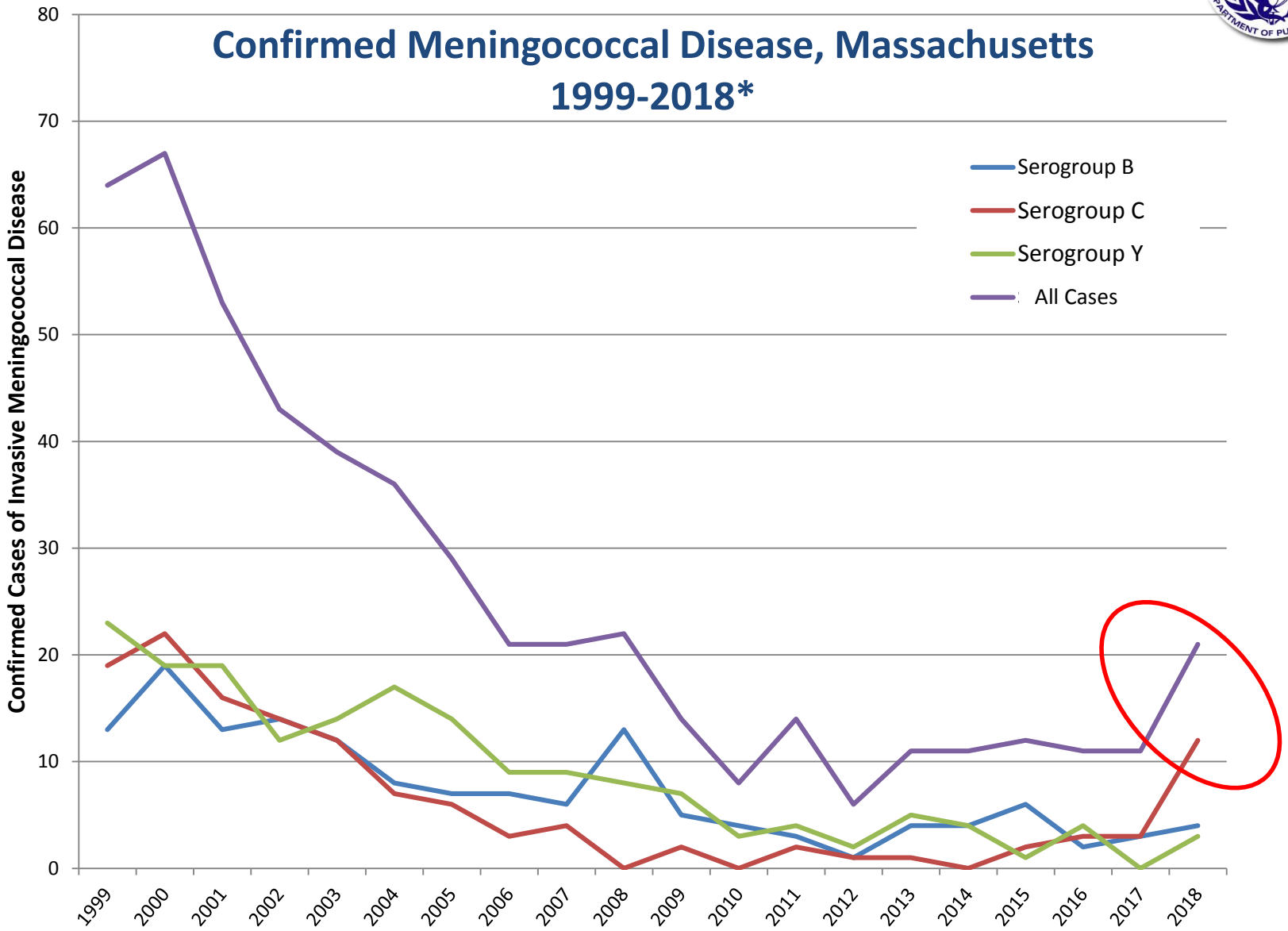
NO!

"Measles, Mumps, Rubella Vaccination and Autism: A Nationwide Cohort Study" – Annals of Internal Medicine, 3/4/2019.

The study of 657,461 children born in Denmark between 1999 and 2010 strongly supports that MMR "**does not increase the risk for autism, does not trigger autism in susceptible children, and is not associated with clustering of autism cases after vaccination**."

Meningococcal Disease

Source of photo: https://www.meningitisnow.org/support-us/news-centre/meningitis-stories/?tag=meningococcal



*2018 data are preliminary and subject to change

Two Outbreaks of Invasive Meningococcal Disease in MA

Location of Outbreak	Population Impacted	Initial Onsets	Recent Onsets	Total cases to date	Serogroup	Deaths	Control Measures
Five College Consortium, Greater Amherst	Students	2 cases Oct/Nov 2017 at UMass Amherst	1 case February 2018 at Smith College	**3**	B	No deaths	PEP for close contacts (>160) and huge vaccination efforts (>10,200 doses at UMass, >2200 Smith College).
Greater Boston Homeless Communities	People experiencing homelessness	Winter 2016*	Winter 2019	**15****	C (12) Y (3)	Two deaths (group Y)	PEP for close contacts and huge vaccination efforts >5000 doses in Boston, Cambridge, Lynn, Quincy, Haverhill, Worcester

No new cases in >1 year!

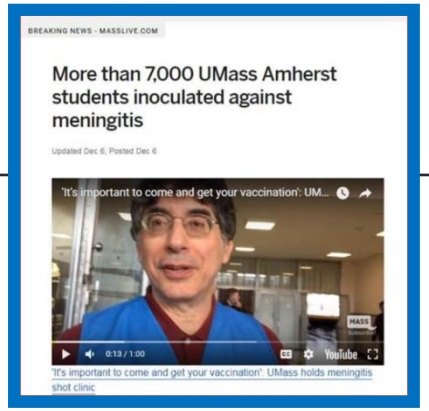
Menu | Metro | Breaking: US adds just 98,000 jobs in March

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 Prevention arrived in Boston Wednesday to study the spread of a deadly bacterial infection among homeless people.

Dr. Anita Barry, director of the Infectious Disease Bureau at the Boston Public Health Commission, said the CDC is interested in the city's experience because the federal agency is updating guidelines for handling clusters of meningococcal disease, the infection that killed two homeless people in Boston and sickened three others.



BREAKING NEWS - MASSLIVE.COM

More than 7,000 UMass Amherst students inoculated against meningitis

Updated Dec 6; Posted Dec 6

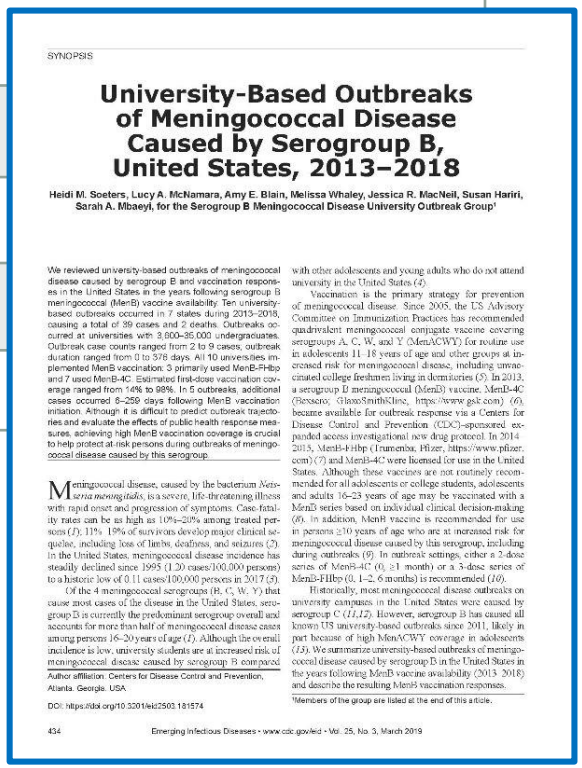
'It's important to come and get your vaccination': UMass holds meningitis shot clinic

*retrospectively, a case was identified from 2015

**includes 2 cases with connection to homeless communities in stable housing

Groups at Increased Risk for *N. meningitidis*

MenACWY	MenB
Complement deficiency, or taking eculizumab (Soliris)	Complement deficiency, or taking eculizumab (Soliris)
Anatomic/Functional asplenia	Anatomic/Functional asplenia
Outbreak setting	Outbreak setting
Microbiologist	Microbiologist
HIV Infection	
Traveler to hyperendemic area	
First year college student	
Military Recruit	



SYNOPSIS

University-Based Outbreaks of Meningococcal Disease Caused by Serogroup B, United States, 2013–2018

Heidi M. Soeters, Lucy A. McNamara, Amy E. Blain, Melissa Whaley, Jessica R. MacNeil, Susan Hariri, Sarah A. Mbaeyi, for the Serogroup B Meningococcal Disease University Outbreak Group[1]

We reviewed university-based outbreaks of meningococcal disease caused by serogroup B and vaccination responses in the United States in the years following serogroup B meningococcal (MenB) vaccine availability. Ten university-based outbreaks occurred in 7 states during 2013–2018, causing a total of 39 cases and 2 deaths. Outbreaks occurred at universities with 3,000–35,000 undergraduates. Outbreak case counts ranged from 2 to 9 cases; outbreak duration ranged from 0 to 378 days. All 10 universities implemented MenB vaccination: 3 primarily used MenB-FHbp and 7 used MenB-4C. Estimated first-dose vaccination coverage ranged from 14% to 98%. In 5 outbreaks, additional cases occurred 8–259 days following MenB vaccination initiation. Although it is difficult to predict outbreak trajectories and evaluate the effects of public health response measures, achieving high MenB vaccination coverage is crucial to help protect at-risk persons during outbreaks of meningococcal disease caused by this serogroup.

Meningococcal disease, caused by the bacterium *Neisseria meningitidis*, is a severe, life-threatening illness with rapid onset and progression of symptoms. Case-fatality rates can be as high as 10%–20% among treated persons (*1*); 11%–19% of survivors develop major clinical sequelae, including loss of limbs, deafness, and seizures (*2*). In the United States, meningococcal disease incidence has steadily declined since 1995 (1.20 cases/100,000 persons) to a historic low of 0.11 cases/100,000 persons in 2017 (*3*).

Of the 4 meningococcal serogroups (B, C, W, Y) that cause most cases of the disease in the United States, serogroup B is currently the predominant serogroup overall and accounts for more than half of meningococcal disease cases among persons 16–20 years of age (*1*). Although the overall incidence is low, university students are at increased risk of meningococcal disease caused by serogroup B compared with other adolescents and young adults who do not attend university in the United States (*4*).

Vaccination is the primary strategy for prevention of meningococcal disease. Since 2005, the US Advisory Committee on Immunization Practices has recommended quadrivalent meningococcal conjugate vaccine covering serogroups A, C, W, and Y (MenACWY) for routine use in adolescents 11–18 years of age and other groups at increased risk for meningococcal disease, including unvaccinated college freshmen living in dormitories (*5*). In 2013, a serogroup B meningococcal (MenB) vaccine, MenB-4C (Bexsero; GlaxoSmithKline, https://www.gsk.com) (*6*), became available for outbreak response via a Centers for Disease Control and Prevention (CDC)–sponsored expanded access investigational new drug protocol. In 2014-2015, MenB-FHbp (Trumenba; Pfizer, https://www.pfizer.com) (*7*) and MenB-4C were licensed for use in the United States. Although these vaccines are not routinely recommended for all adolescents or college students, adolescents and adults 16–23 years of age may be vaccinated with a MenB series based on individual clinical decision-making (*6*). In addition, MenB vaccine is recommended for use in persons ≥10 years of age who are at increased risk for meningococcal disease caused by this serogroup, including during outbreaks (*9*). In outbreak settings, either a 2-dose series of MenB-4C (0, ≥1 month) or a 3-dose series of MenB-FHbp (0, 1–2, 6 months) is recommended (*10*).

Historically, most meningococcal disease outbreaks on university campuses in the United States were caused by serogroup C (*11*,*12*). However, serogroup B has caused all known US university-based outbreaks since 2011, likely in part because of high MenACWY coverage in adolescents (*13*). We summarize university-based outbreaks of meningococcal disease caused by serogroup B in the United States in the years following MenB vaccine availability (2013–2018) and describe the resulting MenB vaccination responses.

Author affiliation: Centers for Disease Control and Prevention, Atlanta, Georgia, USA

[1]Members of the group are listed at the end of this article.

DOI: https://doi.org/10.3201/eid2503.181574

434 Emerging Infectious Diseases • www.cdc.gov/eid • Vol. 25, No. 3, March 2019

Soeters HM, McNamara LA, Blain AE, Whaley M, MacNeil JR, Hariri S, et al. University-Based Outbreaks of Meningococcal Disease Caused by Serogroup B, United States, 2013–2018. Emerg Infect Dis. 2019;25(3):434-440. https://dx.doi.org/10.3201/eid2503.181574

(Category B) MMWR October 23, 2015/64(41);1171-1176. MMWR May 19, 2017/66(19);509-513.

Influenza

CDC estimates that, from **October 1, 2018,** through **March 2, 2019**, there have been:

22.8 million to 26.3 million
flu **illnesses**

10.6 million to 12.4 million
flu **medical visits**

289,000 to 347,000
flu **hospitalizations**

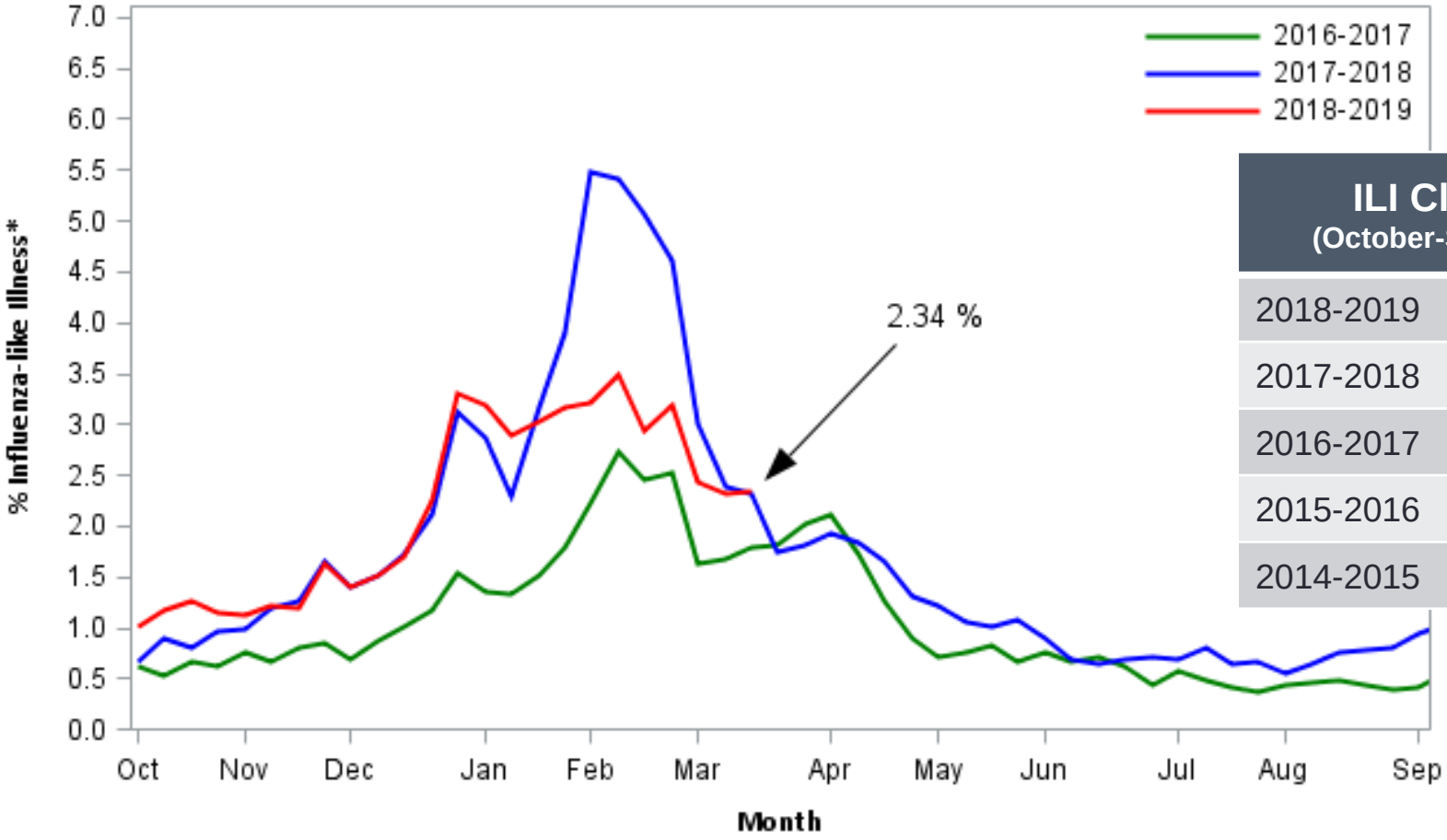
18,900 to 31,200
flu **deaths**

Source: https://www.cdc.gov/flu/index.htm
4/2/2019

Massachusetts Influenza-like Illness

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

September 30, 2018 – March 16, 2019



ILI Clusters (October-September)	
2018-2019	270*
2017-2018	406
2016-2017	261
2015-2016	67
2014-2015	286

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

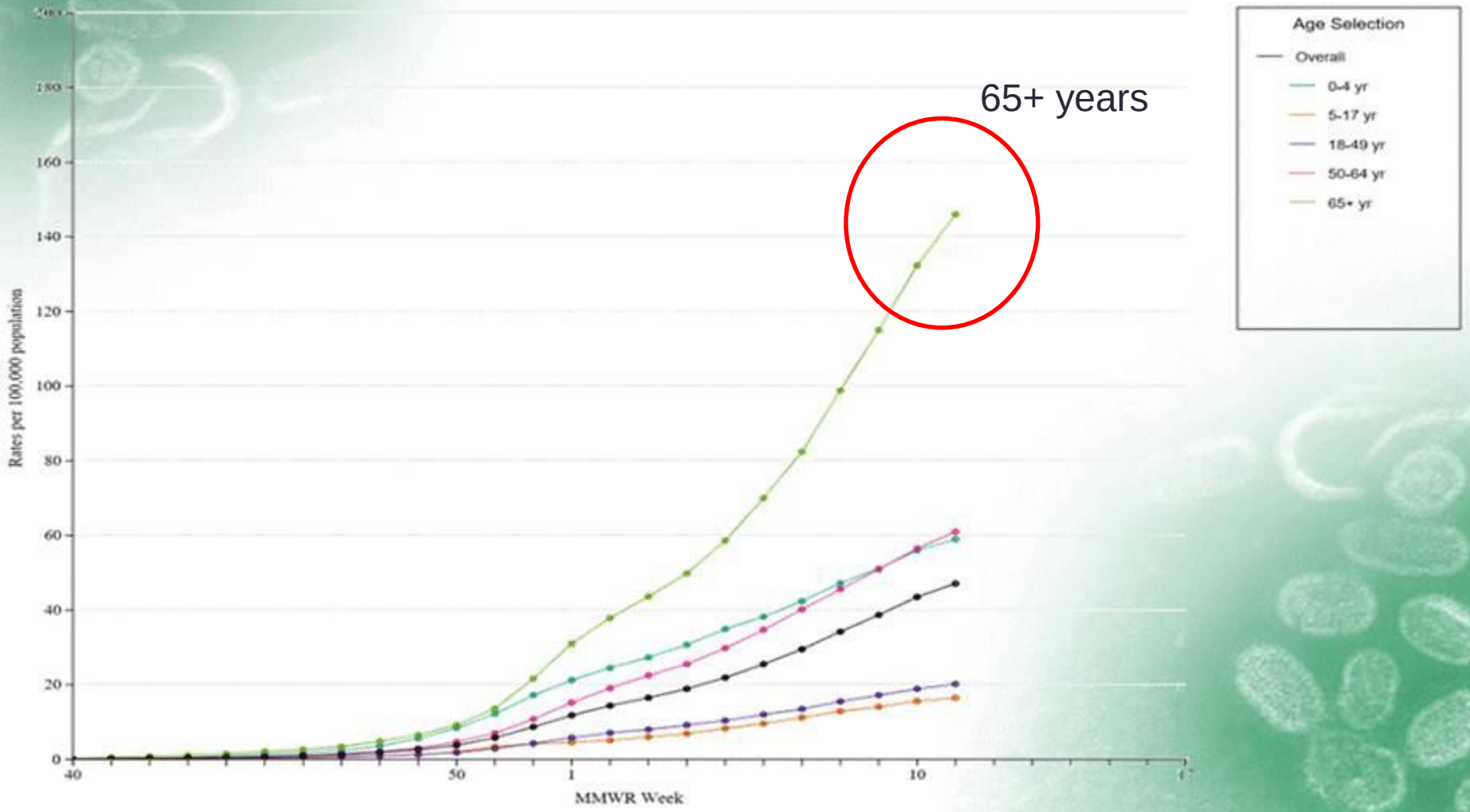
*as of March 22, 2019

FLUVIEW

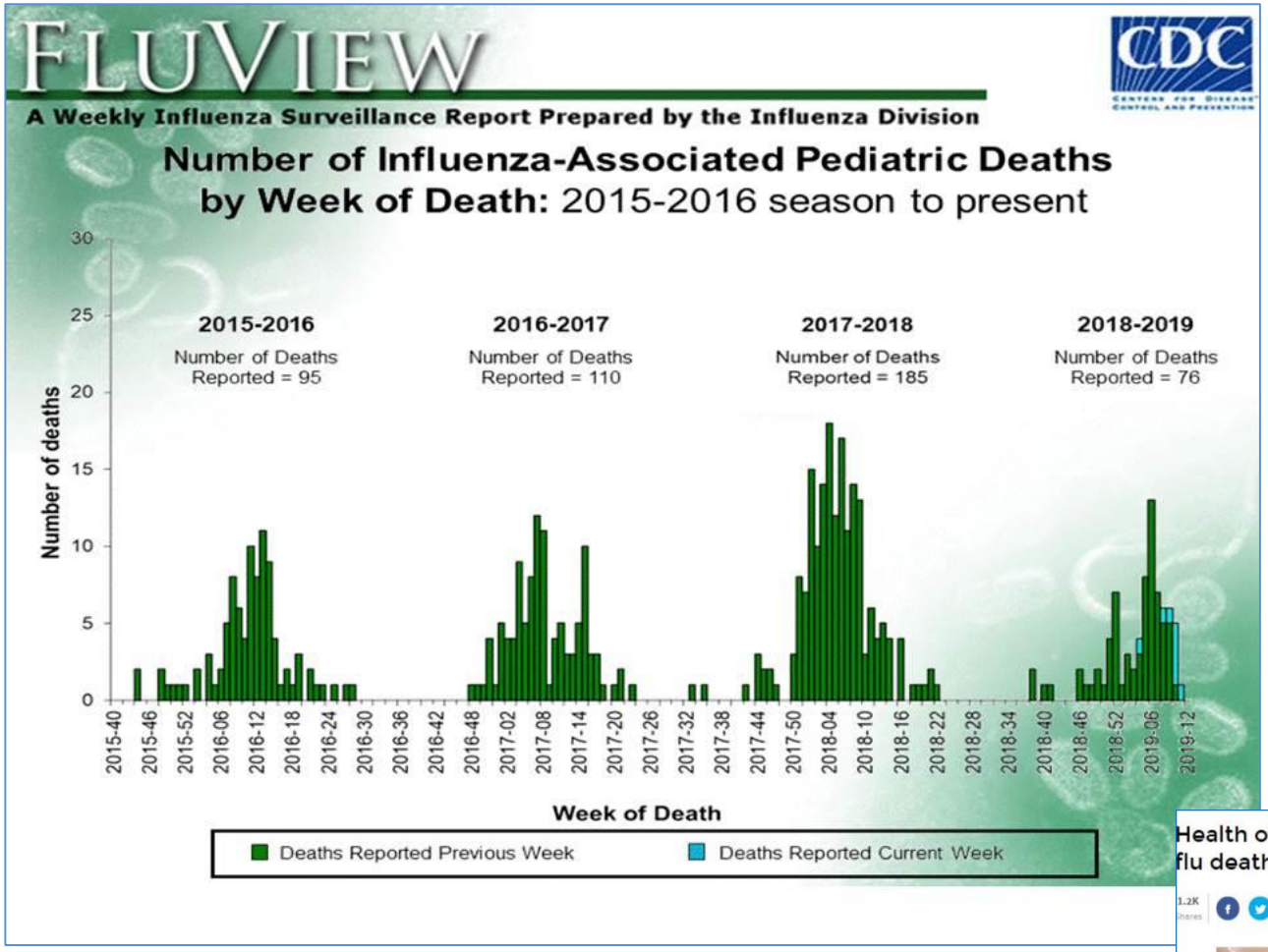
A Weekly Influenza Surveillance Report Prepared by the Influenza Division

Laboratory-Confirmed Influenza Hospitalizations

Preliminary cumulative rates as of Mar 16, 2019



Pediatric Influenza-related Deaths: US and MA



Pediatric Influenza-related Deaths in MA by Season	
2018-2019	3 to date
2017-2018	1
2016-2017	2
2015-2016	2
2014-2015	1
2013-2014	2

CDC 2019 data as of 3/16/2019; MA data as of 3/22/19, preliminary, subject to change

https://www.wcvb.com/article/massachusetts-health-officials-confirm-third-pediatric-flu-death-of-season/26415746

Interim Estimates of 2018–19 Seasonal Influenza Vaccine Effectiveness Overall

Influenza A & B	Influenza A (H1N1)pdm09	Influenza A (H3N2)
47% CI (34 -57)	46% CI (30 to 58)	44 CI (13 to 64)

Overall adjusted vaccine effectiveness against all influenza virus infection associated with medically attended ARI was 47% (95% confidence interval [CI] = 34%–57%). Flu vaccination reduced the risk of medically attended flu illness by about half overall among people who got vaccinated. This is within the range (40-60%) of what has been seen during recent seasons when the recommended vaccine viruses are well-matched to the circulating viruses.

During the 2017–18 influenza season, in which influenza A(H3N2) predominated, vaccination was estimated to prevent **7.1 million illnesses, 3.7 million medical visits, 109,000 hospitalizations, and 8,000 deaths.** Vaccination can also reduce the severity of influenza-associated illness.

https://www.cdc.gov/mmwr/volumes/68/wr/mm6806a2.htm?s_cid=mm6806a2_e

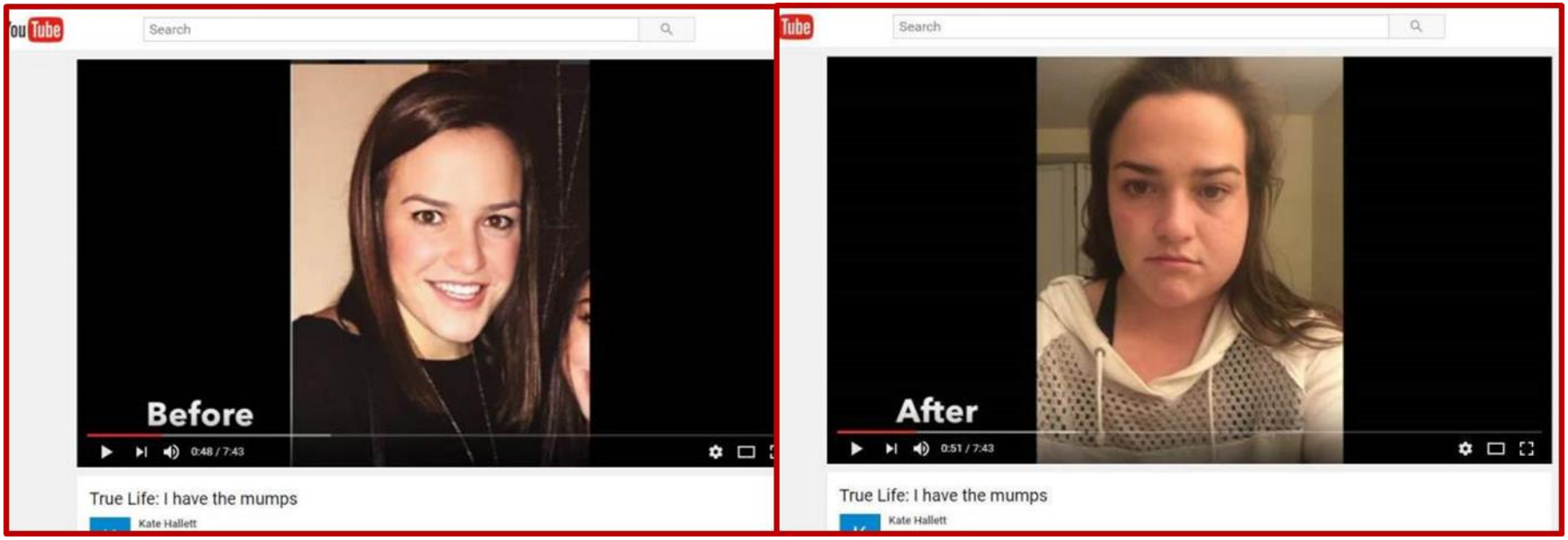
PATIENT #2

A patient calls your office with a question about flu vaccine. The patient had laboratory-confirmed influenza two weeks ago. Should they still get the vaccine?

1. **Should the patient get flu vaccine?** **Yes, flu vaccine is recommended throughout the season, and protects against multiple strains of the flu.**
2. **Is there still flu in MA?** **Yes, flu is seen throughout the year in MA, although it peaks during the winter and early spring, usually.**
3. **Is influenza a risk to healthy young people?**

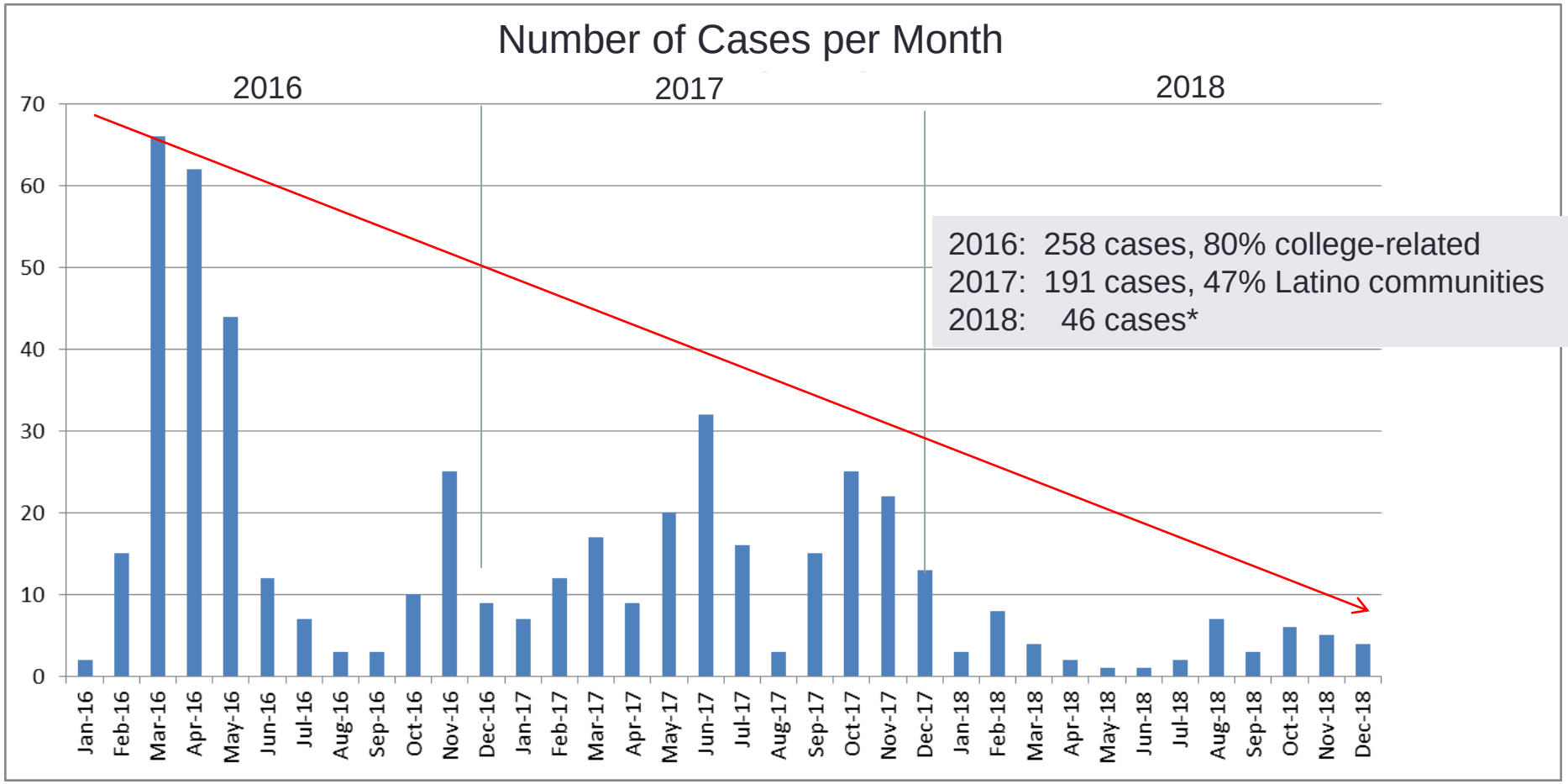
   Yes. Although people with pre-existing health conditions may be more likely to develop severe disease, every year there are pediatric flu-related deaths among otherwise healthy, usually unvaccinated, young people.

Mumps



https://www.wcvb.com/article/massachusetts-health-officials-confirm-third-pediatric-flu-death-of-season/26415746

Mumps in MA 2016 – 2018*



*2018 data are preliminary and subject to change. Includes confirmed and probable to better reflect the burden of disease.

Control measures: required vaccination, isolation and quarantine, social distancing, school breaks, vaccination clinics, paying attention to recommended vaccinations for adults.

PATIENT #3

A college student with parotitis comes in for an evaluation. You know that the big mumps outbreak of 2016 among college students is over.

1. **Should the patient be isolated for five days after onset?**
   Yes, if you suspect mumps, please ask the patient to isolate for 5 days after onset.
2. **Are there other causes of parotitis?**
   There are many causes of parotitis, including other viruses and bacterial infections.
3. **How effective are two doses of MMR in preventing mumps?**
   Two doses are 88% (range 31-95%) protective; protection may wane after 12+ years.
4. **What is the most important clinical specimen to collect?**
   A swab of the buccal region for mumps PCR testing.

Acute Flaccid Myelitis (AFM)

AAFP

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CDC Focused on Unraveling Acute Flaccid Myelitis Mystery

November 19, 2018 04:22 pm News Staff – The CDC published a *Morbidity and Mortality Weekly Report (MMWR)* (www.cdc.gov) Early Release online on Nov. 13 that shines some light on this year's spike in acute flaccid myelitis (AFM), which continues to plague young patients, especially, across the country.

AFM is a rare but serious condition that affects the nervous system, causing rapid-onset weakness in one or more arms and legs and spinal cord gray matter lesions. The condition has been associated in some instances with long-term disability.

Report Explained

From Jan. 1 to Nov. 2, of 106 patients with acute flaccid limb weakness, 80 cases from 25 states were confirmed as AFM, according to the *MMWR*, with another six classified as probable. That's three times the number of confirmed cases seen during the same period in 2017, the CDC said.

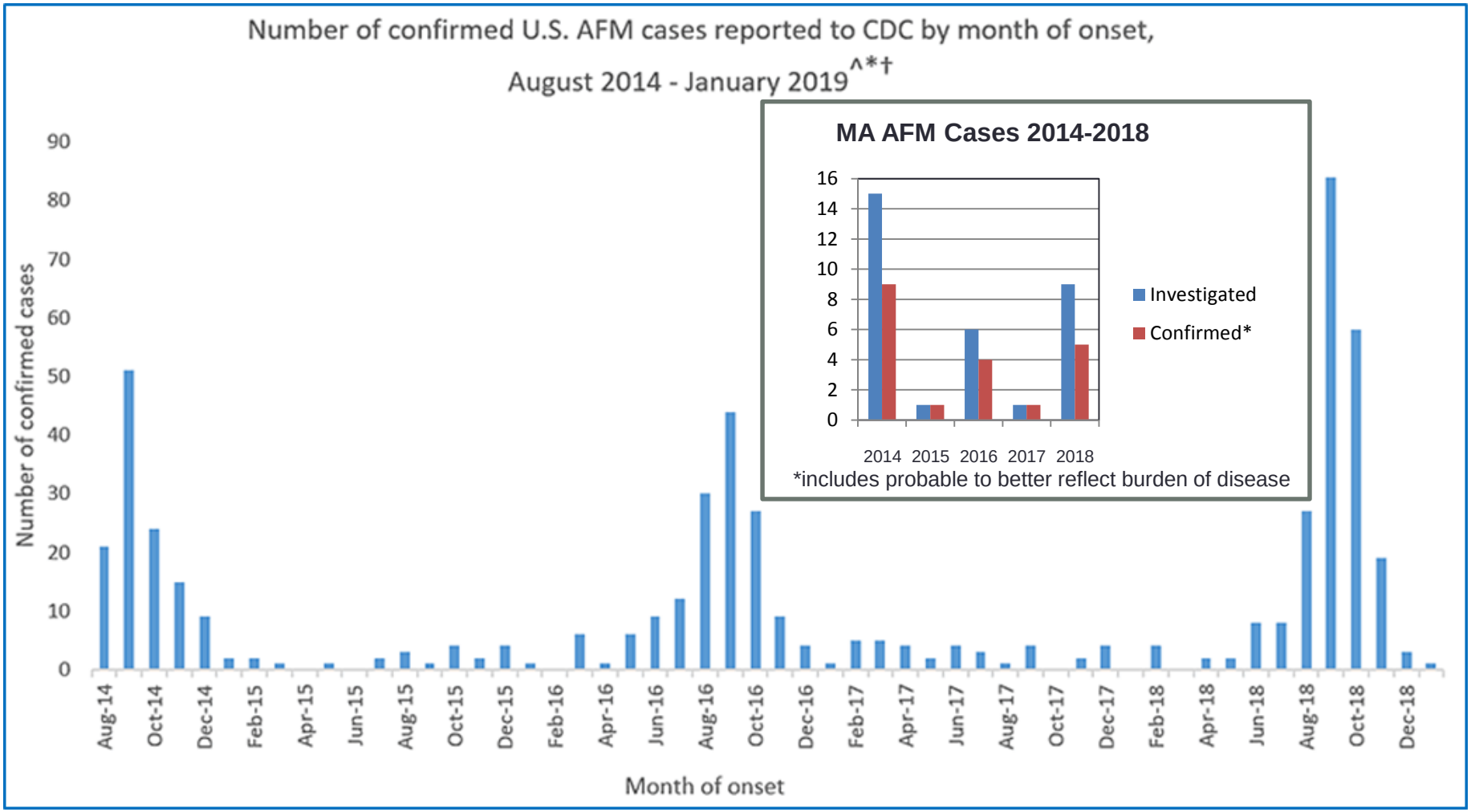
During a Nov. 13 press briefing, (www.cdc.gov) Nancy Messonnier, M.D., director of the CDC's National Center for Immunization and Respiratory Diseases, updated participants on the agency's findings, boosting that case count to 90 confirmed cases of AFM in 27 states from among 252 case reports under investigation. Most AFM cases were identified in children between ages 2 and 8, sh noted, and about half were among males, almost all of whom had fever and/or respiratory illness in the three to 10

AFM in MA 2018:**
4 confirmed
1 probable
4 suspect
5 revoked

**2018 data are preliminary and subject to change

Sources: https://www.aafp.org/news/health-of-the-public/20181119mmwr-afm.html; CDC

Acute Flaccid Myelitis (AFM)

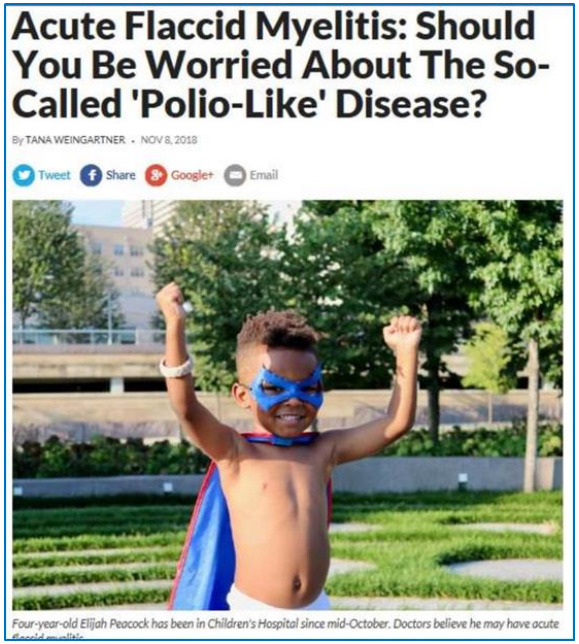


https://www.cdc.gov/acute-flaccid-myelitis/afm-surveillance.html

**2018/2019 data are preliminary and subject to change

AFM: What is Known to Date?

- **Respiratory illness:** Most of the patients with AFM (more than 90%) had a mild respiratory illness or fever consistent with a viral infection before they developed AFM.
- **Stool testing and polio:** These AFM cases are <u>not</u> caused by poliovirus; all the stool specimens from AFM patients that we received tested negative for poliovirus**.**
- **CSF testing**: CDC detected coxsackievirus A16, EV-A71, and EV-D68 in the spinal fluid of only **four** of **537** confirmed cases of AFM since 2014, which points to the cause of their AFM. **For all other patients (>99%), no pathogen has been detected in their spinal fluid to confirm a cause.**
- **Seasonality:** Most patients had onset of AFM between August and October, with increases in AFM cases every two years since 2014. At this same time of year, many viruses commonly circulate, including enteroviruses, and will be temporally associated with AFM.
- **Age impacted:** Most AFM cases are children (over 90%).



If you suspect AFM, please call MDPH epidemiologists at 617/983-6800.

Hepatitis A Outbreak In Persons Experiencing Homelessness and Substance Use Disorder

Lindsay Bouton
Epidemiologist

April 2, 2019

Hepatitis A background

- Liver disease caused by hepatitis A virus (HAV)
- Symptoms may include fever, fatigue, loss of appetite, stomach pain, nausea, diarrhea and jaundice
  - Ranges from mild to severe disease; more severe in individuals with pre-existing liver disease
- Acute infection only
- Spread via fecal-oral route
- Average incubation period is 28 days (range 15-50 days)

Hepatitis A vaccine

- Two single-antigen and one combination vaccine (all inactivated) currently licensed in US
- Advisory Committee on Immunization Practices (ACIP) recommends vaccine for:
  - All children at age 1 year,
  - Persons who are at increased risk for infection,
  - Persons who are at increased risk for complications from hepatitis A, and
  - Any person wishing to obtain immunity (protection).
- Single-antigen vaccine (and IG) also used for post-exposure prophylaxis (PEP), within two weeks of exposure

Recommendations for routine preexposure use of hepatitis A vaccine

- All children at age 12–23 months.
- Persons traveling to or working in countries that have high or intermediate HAV endemicity.
- Persons who anticipate close contact with an international adoptee from a country of high or intermediate endemicity during the first 60 days following arrival of the adoptee in the United States.
- Men who have sex with men.
- Users of injection and noninjection drugs.
- Persons with chronic liver disease.
- Persons with clotting factor disorders.
- Persons who work with HAV-infected primates or with HAV in a research laboratory setting.
- Persons experiencing homelessness.
- Anyone wishing to obtain immunity.

Doshani M, Weng M, Moore KL, Romero JR, Nelson NP. Recommendations of the Advisory Committee on Immunization Practices for Use of Hepatitis A Vaccine for Persons Experiencing Homelessness. MMWR Morb Mortal Wkly Rep 2019;68:153–156. DOI: http://dx.doi.org/10.15585/mmwr.mm6806a6

Hepatitis A in Massachusetts

- Each case investigated by local board of health (LBOH) and MDPH
  - Demographic, clinical, and risk data collected
  - Vaccination recommended for close contacts
- Typically about 50 confirmed reported cases per year
  - At least 25% associated with international travel
- Males and females affected equally
- 50% hospitalization rate

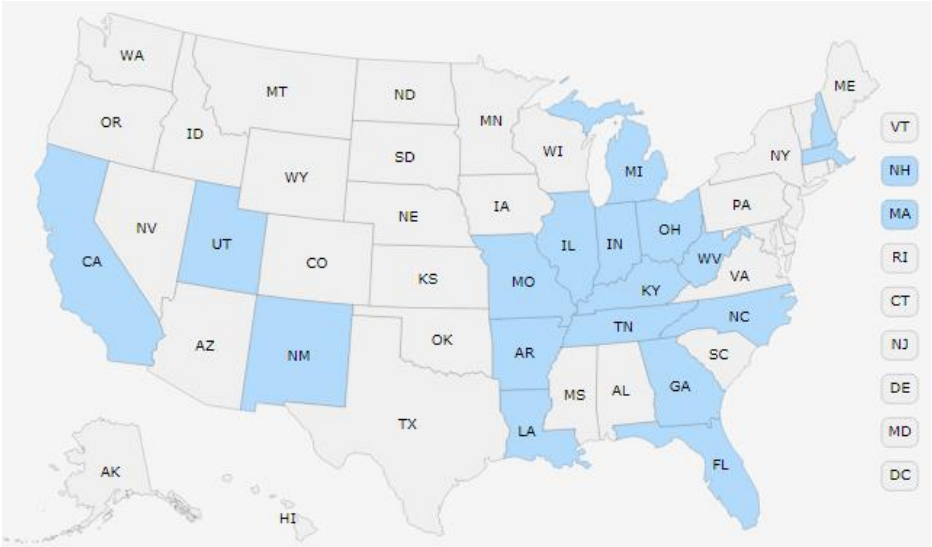
Homelessness in US and Massachusetts

- On a single night in 2018, roughly 553,000 people were experiencing homelessness in the US
  - 65% in sheltered locations, 35% unsheltered
- 20,068 people experienced homelessness in 2018 in Massachusetts (29 people per 10,000)
  - 4.9% unsheltered
- Massachusetts has one of the largest increases in homelessness in the country
  - 32.7% increase from 2007 to 2018

US Department of Housing and Urban Development . The 2018 Annual Homeless Assessment Report (AHAR) to Congress. Part 1: Point-In-Time Estimates of Homelessness. December 2018. https://www.hudexchange.info/resources/documents/2018-AHAR-Part-1.pdf

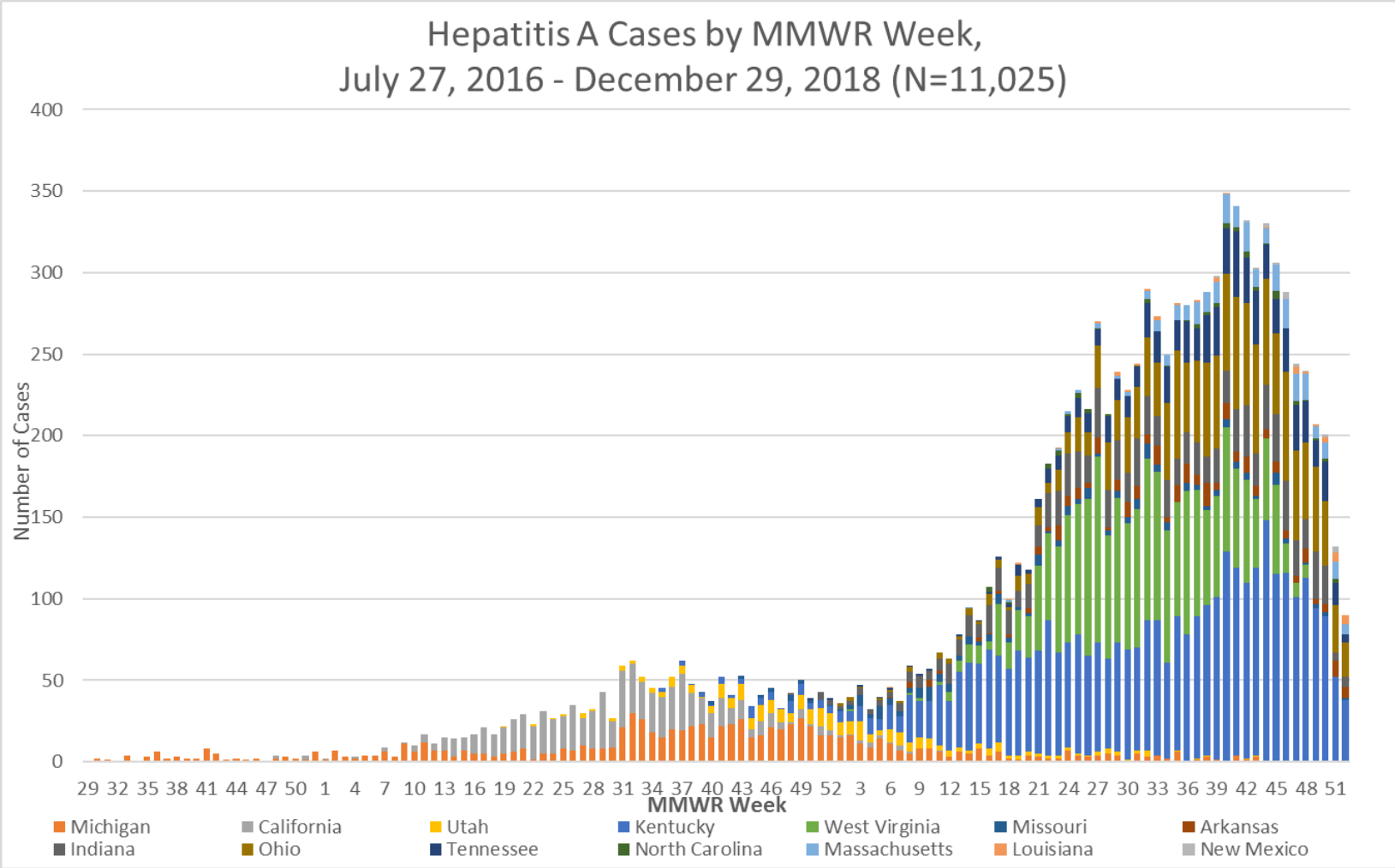
Recent outbreaks

- Since 2017, CDC has been tracking multiple outbreaks of HAV infection in other states
  - Affecting people who use drugs and/or people who are homeless
  - Person-to-person spread
  - Certain states with case counts >4000



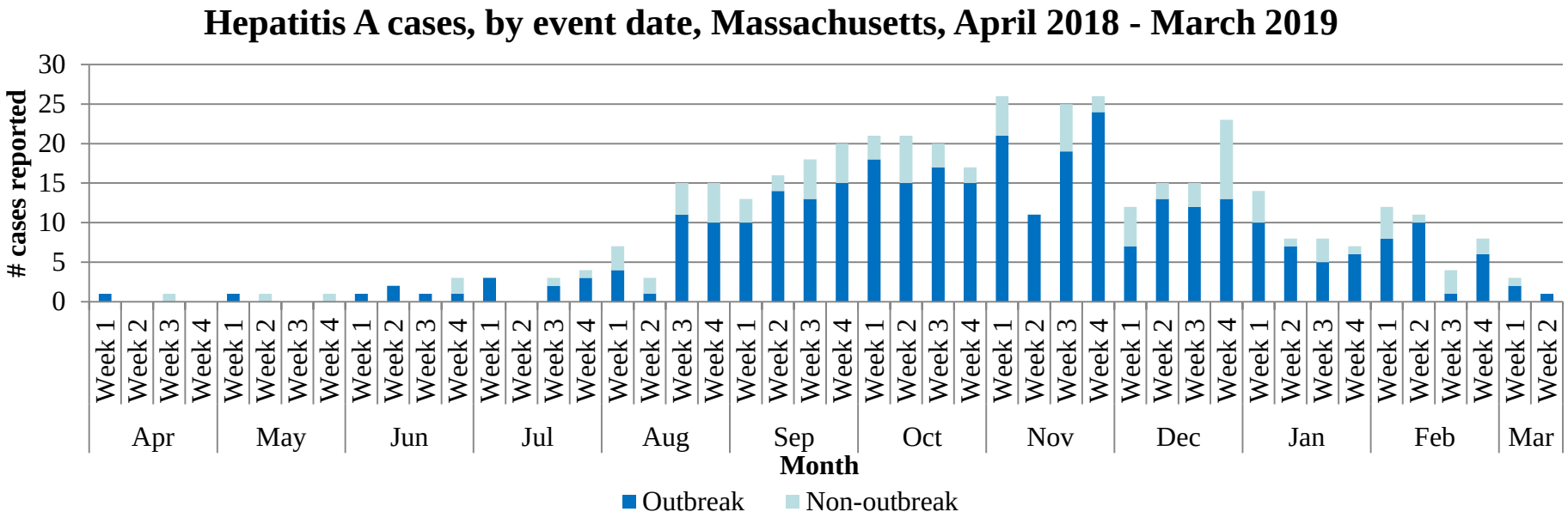
https://www.cdc.gov/hepatitis/outbreaks/2017March-HepatitisA.htm

National outbreak



Outbreak in Massachusetts

- Since April 2018, 335 cases reported to MDPH in individuals experiencing homelessness and/or substance use disorder



Cases occurring after Week 2 in March excluded. Data for more recent weeks may be incomplete due to diagnosis and reporting delays. Data source: MDPH Bureau of Infectious Disease and Laboratory Sciences. Data as of 3/22/2019 and subject to change.

Outbreak cases (N= 335)

- Complications
  - Hospitalization rate: 83%
  - Mortality rate: 1%
- Demographics
  - Gender: 60% male
  - Age: Range 21-78, Median 34
  - Race/ethnicity: predominantly white non-Hispanic

Data as of 3/22/2019 and subject to change.

Outbreak cases (N= 335)

- Risks:
  - Homelessness/unstable housing: 50%
  - Injection drug use: 76%
  - Any illicit drug use: 90%
  - Current or recent incarceration: 10%

Data as of 3/22/2019 and subject to change.

Outbreak cases (N= 335)

- Affected counties
  - Barnstable: 2%
  - Berkshire: <1%
  - Bristol: 6%
  - Essex: 14%
  - Hampden: 3%
  - Hampshire: 1%
  - Middlesex: 12%
  - Norfolk: 5%
  - Plymouth: 9%
  - Suffolk: 24%
  - Worcester: 25%

Data as of 3/22/2019 and subject to change.

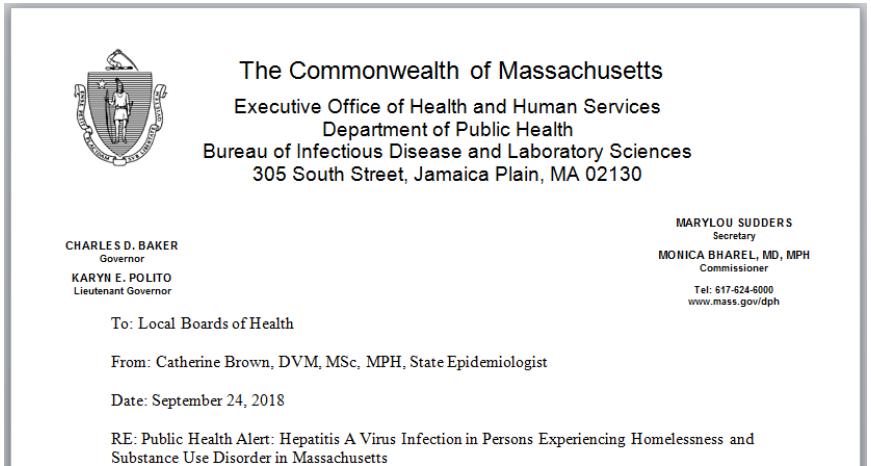
Outbreak cases (N= 335)

- Coinfections
  - Confirmed chronic hepatitis C infection: 52%
  - HIV infection: 4%
- Genotyping/sequencing analysis (CDC and MA State Public Health Lab) to date:
  - Predominantly genotype IIIA

Data as of 3/22/2019 and subject to change.

MDPH response

- Communications recommending vaccination of at-risk population and other prevention measures:
  - Clinical advisory August 2 (with Boston Public Health Commission)
  - Clinical advisory August 22
  - Public health alert September 24



The Commonwealth of Massachusetts

Executive Office of Health and Human Services
Department of Public Health
Bureau of Infectious Disease and Laboratory Sciences
305 South Street, Jamaica Plain, MA 02130

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MARYLOU SUDDERS
Secretary
MONICA BHAREL, MD, MPH
Commissioner
Tel: 617-624-6000
www.mass.gov/dph

To: Local Boards of Health

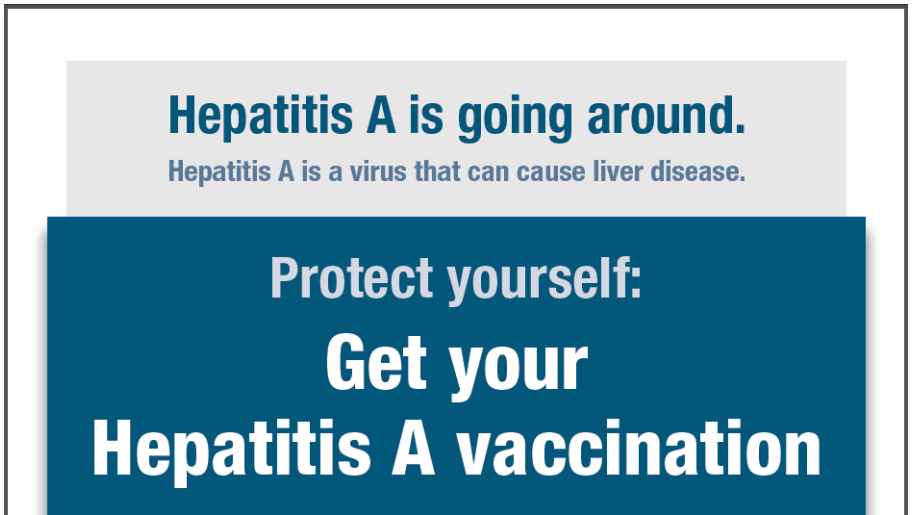
From: Catherine Brown, DVM, MSc, MPH, State Epidemiologist

Date: September 24, 2018

RE: Public Health Alert: Hepatitis A Virus Infection in Persons Experiencing Homelessness and Substance Use Disorder in Massachusetts

MDPH response

- Outreach to LBOHs, homeless shelters, syringe services programs, community health centers, jails, emergency departments, detox facilities, and other agencies serving at-risk populations
- Provision of state & CDC supplied HAV vaccine
- Development of communications materials



Control recommendations

- Vaccination of those at high risk
- Handwashing
- Environmental cleaning
- Education about prevention
- Early recognition of cases
- Reporting of new cases

Vaccination recommendations

- Vaccinate all persons at high risk:
  - Persons experiencing homelessness
  - Persons who use injection or non-injection drugs and/or have chronic liver disease (including chronic hepatitis B or C infection or chronic alcohol use)
  - Persons recently or currently incarcerated
  - Men who have sex with men
- Single dose of monovalent hepatitis A vaccine

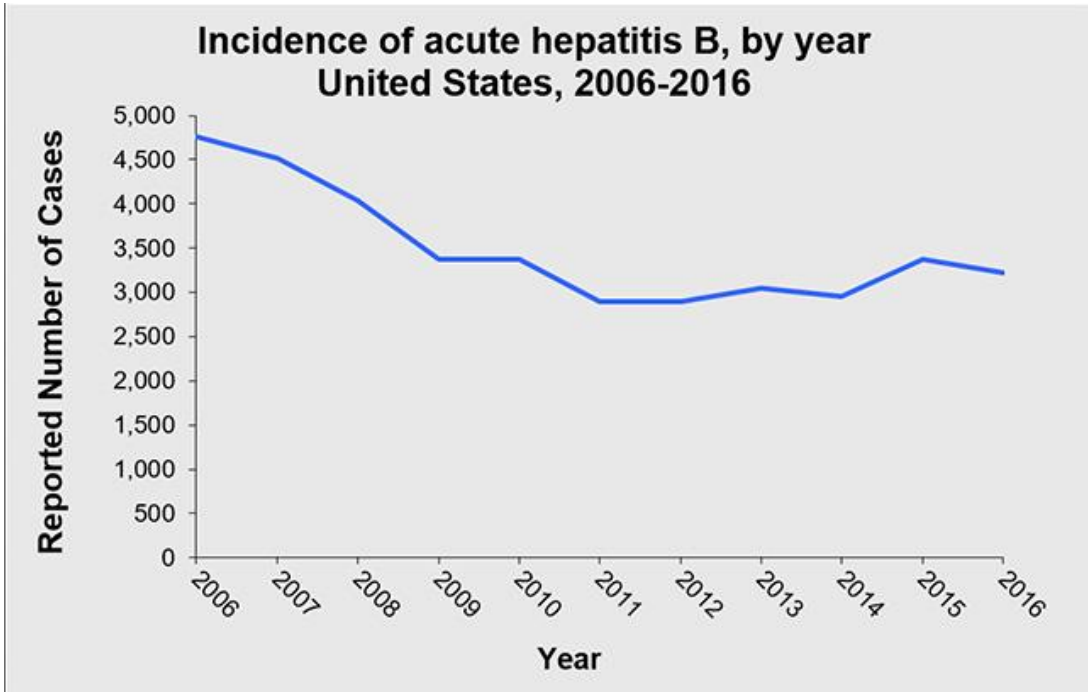
Other hepatitis A guidelines

- Vaccine and IG recommendations for:
  - Post-exposure
  - Pre-exposure for travel

Nelson NP, Link-Gelles R, Hofmeister MG, et al. Update: Recommendations of the Advisory Committee on Immunization Practices for Use of Hepatitis A Vaccine for Postexposure Prophylaxis and for Preexposure Prophylaxis for International Travel. MMWR Morb Mortal Wkly Rep 2018;67:1216–1220. DOI: http://dx.doi.org/10.15585/mmwr.mm6743a5

And don’t forget hepatitis B!

- Increase in national rate of new HBV infections since 2014—likely due to increasing injection drug use



https://www.cdc.gov/hepatitis/hbv/hbvfaq.htm#overview

- Outbreak among persons who inject drugs in Bristol County in 2017-2018

Persons recommended to receive hepatitis B vaccine

- All infants
- Unvaccinated children aged <19 years
- Persons at risk for infection by sexual exposure
- Sex partners of hepatitis B surface antigen (HBsAg)–positive persons
- Sexually active persons who are not in a long-term, mutually monogamous relationship (e.g., persons with more than one sex partner during the previous 6 months)
- Persons seeking evaluation or treatment for a sexually transmitted infection
- Men who have sex with men
  - Persons at risk for infection by percutaneous or mucosal exposure to blood
- Current or recent injection-drug users
- Household contacts of HBsAg-positive persons
- Residents and staff of facilities for developmentally disabled persons
- Health care and public safety personnel with reasonably anticipated risk for exposure to blood or blood-contaminated body fluids
- Hemodialysis patients and predialysis, peritoneal dialysis, and home dialysis patients
- Persons with diabetes aged 19–59 years; persons with diabetes aged ≥60 years at the discretion of the treating clinician
  - Others
- International travelers to countries with high or intermediate levels of endemic hepatitis B virus (HBV) infection (HBsAg prevalence of ≥2%)
- Persons with hepatitis C virus infection
- Persons with chronic liver disease (including, but not limited to, persons with cirrhosis, fatty liver disease, alcoholic liver disease, autoimmune hepatitis, and an alanine aminotransferase [ALT] or aspartate aminotransferase [AST] level greater than twice the upper limit of normal)
- Persons with HIV infection
- Incarcerated persons
- All other persons seeking protection from HBV infection

Schillie S, Vellozzi C, Reingold A, et al. Prevention of Hepatitis B Virus Infection in the United States: Recommendations of the Advisory Committee on Immunization Practices. MMWR Recomm Rep 2018;67(No. RR-1):1–31.
DOI: http://dx.doi.org/10.15585/mmwr.rr6701a1

What vaccines do you recommend (if any)?

Brian is 47, and has recently found a home after living on the street and struggling with mental health and substance use issues. He acknowledges that his stability feels fragile. He has been diagnosed with HCV infection in the past. What vaccinations should he get before he leaves your office?

1. MMR
2. MenACWY
3. HAV
4. HBV
5. Influenza
6. All of the above

Questions?

- Email me: Lindsay.bouton@state.ma.us
- MDPH Epidemiology Division: 617-983-6800
  - Questions about HAV cases, transmission, prevention, and HAV educational materials
- MDPH Vaccine Unit: 617-983-6828
  - Calls about ordering HAV vaccine for target populations
- Hepatitis A outbreak web page: https://www.mass.gov/info-details/current-hepatitis-a-outbreak