



## SURVEILLANCE, REPORTING AND CONTROL OF VACCINE-PREVENTABLE DISEASES: WORKING TOGETHER TO CONTROL THE SPREAD

Adult Immunization Conference April 10, 2018

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# **Presenter Disclosure Information**

We, Nancy Harrington 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

- The 10-Year Table
- Collaboration
- Scenarios 1-4
  - Influenza
  - Pertussis
  - Mumps
  - Hepatitis B

### Flu season is breaking records, CDC says

by Maggie Fox / Feb.09.2018 / 1:27 PM ET / Updated Feb.12.2018 / 7:58 AM ET



### Smith College student contracted same meningitis strain as 2017 UMass outbreak

Updated Mar 2, 6:29 PM; Posted Mar 2, 6:29 PM



#### By Lucas Ropek

NORTHAMPTON -- The Smith College student diagnosed with meningitis last weekend was infected by the same bacterial strain that

# Puzzling mumps outbreak strikes Latino community





By Felice J. Freyer | GLOBE STAFF JUNE 02, 2017

State health officials are investigating a puzzling outbreak of mumps in Latino communities in Boston, Chelsea, and Revere, and have advised health care providers to be alert for additional cases.

The state Department of Public Health has recorded 12 mumps cases since the end of March.

Previously in Massachusetts, mumps has been found chiefly among vaccinated college students and others connected to colleges and universities. But the dozen new cases involve people aged 20 to 41 with no known links to higher education.

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#### Massachusetts Department of Public Health

Bureau of Infectious Disease and Laboratory Sciences - Division of Epidemiology and Immunization

### Vaccine-Preventable Diseases in Massachusetts\*, 2008-2018 to date



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Disease	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018 YTD
Measles	2	2	3	24	0	1	8	0	1	0	0
Mumps	7	15	9	4	6	71	5	6	258	191	8
Rubella	1	1	0	0	1	0	0	0	0	1	0
Meningococcal Disease	22	14	8	14	6	11	11	12	11	11	2
Pertussis	761	362	296	280	653	348	298	253	198	374	16
Hepatitis B (acute)	63	93	87	77	76	69	33	27	35	47	10
Hib < 5	2	1	1	0	2	1	1	0	1	2	0
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	6
Varicella	1584	1415	770	606	628	475	469	356	288	385	34

#### Data are current as of 3/6/2018 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. Adult Immunization Conference 2018 Massachusetts Department of Public Health Bureau of Infectious Disease and Laboratory Sciences - Division of Epidemiology and Immunization



### Vaccine-Preventable Disease Confirmed Cases vs. Investigations Massachusetts\*, 2008-2017

Disease	Investigated	Confirmed*
Measles	732	41
Mumps	2552	572
Rubella	260	4
Meningococcal Disease	540	120
Pertussis	5130	3823
Hib < 5	1488 (HI of any age)	11
Tetanus	10	0
Diphtheria	77	0
Polio	180	0

#### Data are current as of 3/6/2018 and are subject to change.

\*Both confirmed and probable cases are reported for measles, mumps, rubella 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?



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# PATIENT #1 CALLS YOUR OFFICE

It is the end of flu season. An unvaccinated 20-something patient (who works in a long-term care facility) has arrived at your office carrying a letter from her employer recommending that she consider a prophylactic course of Tamiflu because there have been recent flu cases in the long-term care facility. The patient is also slated to attend a wedding in two days.

- 1. Could this scenario actually occur? Yes, it is consistent with MDPH recommendations.
- Mass.gov/flu. 2. Where are MDPH flu recommendations and resources located?
- 3. Should flu vaccine still be recommended to the patient late in the season? Yes!
- 4. Bonus points: If the patient has fever and cough during flu season, but tests negative for flu using a rapid assay in your office, could she still have the flu?

Yes! Because of sub-optimal test sensitivity, false negative results are common, especially when influenza activity is high (CDC).



tices (ACIP) recommends vaccination with either the inactivated influenza vaccine rea vaccine (RIV). Vaccination should not be delayed to procure a specific vaccine on. Begin offering flu vaccine as soon as it is available. There is no prefe priate inactivated flu formulation over another. Choice of which influenza vaccine formulation

raccine. Only 60% of healthcare workers in Adult Day Health prog , 82% of acute care facilities in Massachusetts achieved vaccine of ios implement processes to maximize vaccination coverage. All healthcare facilities should strive to reac ving 90% of healthcare personnel vaccinated annually against influenza in order to best protect

ike illness in your facility? See <u>page seven</u> for guidance on reporting cluster like illness, prophylaxis of those exposed, and other control measures.

#### What's New for the 2017-2018 Sr

- Afluria, Alluria (Trivalent) and Alluria Quadrivalent inactivated influenza vaccines by (Segirus) ca both be used in persons 5 years of age and older
- Flublok. Flublok Quadrivalent, a recombinant influenza vac licensed for use in those 18 years and older in October 2016.
- FluLaval, FluLaval has been approved as a 0.5 mL dose for everyone 6 months of age and older
- Pregnant women may receive any licensed, age appropriate, recommended influenza vaccine An updated list of all flu vaccine products available in the USA is available at
- http://www.immunize.org/catg.d/p4072.pdf

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# Influenza Season 2017 - 2018



- Severe season
- A lot of media attention
- Started building early but did not peak early (mid-February)
- Influenza A/H3N2 predominated (more flu B later in season)
- A/H3N2 tends to impact older adults disproportionately
- Record year for hospitalizations nationally
- Resources taxed and stressed (hospital beds, EDs, provider offices, vaccines, antivirals, IV bags, rapid tests)



# Influenza Season 2017 - 2018



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- Moderate to low vaccine effectiveness based on interim estimates:
  - 36% overall
  - 25% against H3N2
    - 51% against H3N2 among children 6 months 8 years old
  - 67% against H1N1
  - 42% against B strains
- Better performance than initially expected

By ASHLEY WELCH | CBS NEWS | December 5, 2017, 12:33 PM

### This year's flu vaccine may only be 10% effective, experts warn

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Health officials say there are a number of signs pointing to a **potentially rough flu season**. According to the Centers for Disease Control and Prevention, more than 7,000 cases of influenza have been confirmed in the U.S. so far, which is more than double the number this time last year.

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# Flu vaccine works better than feared, but it's still not great

Children ages 8 and under are well protected against the most common strain, CDC finds

y Maggie Fox / Feb.16.2018 / 1:24 PM ET



# PATIENT #2





A 20-something patient wakes up with swelling under her jaw. She is a student at a local college where there have been cases of mumps. She had flu-like illness for a couple of days before the onset of swelling. She has plans to attend a wedding in two days.

### Should your patient attend this wedding?

- She has two documented doses of MMR.
- She has not recently traveled out of the country.
- She promises to keep a low profile at the event.
- 1. Should she attend the wedding? No. Not unless another cause of the parotitis is found.
- 2. What testing can be done? PCR at MA SPHL. IgM serology also a possibility. Consider testing for other causes of parotitis.
- 3. Will the mumps test results influence isolation requirements? No. Patient should remain isolated even with a negative PCR result.
- 4. Should she get a third dose of MMR?

In consultation with Public Health, if she is part of an ongoing outbreak, a 3<sup>rd</sup> dose may be recommended. – New!

## MA Outbreak Summary 2016-2017

### 2016

Largest mumps outbreak in MA in 30+ years

- **787** total investigations
- <u>258 confirmed and probable cases</u>
- 80% associated with colleges/universities
- Part of a national trend

### 2017

- 713 total investigations
- <u>191 confirmed and probable cases</u>
- 131/191 (69%) associated with outbreaks
  - 90/191 (47%) identified among members of Latino communities in Greater Boston. Smaller clusters included students who traveled to DC area (8); college students on North Shore (4); college students attending a party (5) and athletes at a MA college/university (24)

Puzzling mumps outbreak strikes Latino community By Felee J. Freyer | GLOBE STAFF JUNE 02, 2017

State health officials are investigating a puzzling outbreak of mumps in Latino communities in Boston, Chelsea, and Revere, and have advised health care providers to be alert for additional cases.

The state Department of Public Health has recorded 12 mumps cases since the end of March.

Previously in Massachusetts, mumps has been found chiefly among vaccinated college students and others connected to colleges and universities. But the dozen new cases involve people aged 20 to 41 with no known links to higher education.

### Transmission interrupted due to:

- Enforcement of existing school requirements for immunization
- Implementation of control measures, including isolation of suspected cases, quarantine of susceptible contacts and social distancing
- End of school year and school vacations



### Officials have asked the students to "self-isolate" for five days.

of mumps at Harvard University

There are now 6 confirmed cases





# Mumps in Massachusetts 2016 - 2017



## **Challenges with Mumps Control**

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- Two doses of MMR approximately 88% effective (range 31-95%)
- Asymptomatic people may transmit mumps
- Resistance to isolation for five days, especially with negative test results. <u>A negative mumps PCR does not rule out mumps</u> infection due to specimen collection factors/intermittent shedding
- Cultures of socializing/sharing items/sustained close contact
- Lack of access to healthcare/trust of authorities/language barriers
- Lack of MMR vaccination in adults who are not US-born
   On the bright side: college/university outbreaks with central organization and communication are extremely helpful with mumps prevention and control activities!

MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH Guide to Surveillance, Reporting and Control Mumps	mass.gov/dph/epi		
September 2016   Page 1 of 12	September 2016   Page 11 of 12		
Section 1	Adactiment one - multips reading		
ABOUT THE DISEASE	Report suspect cases immediately Mumps is immediately reportable in Massachusetts, whether suspected or confirmed. Call your local board of health and MDPII at 617/933-6800. Providers in Boston should contact the Boston Public		
A. Etiologic Agent			
Mumps is caused by the mumps virus (genus Paramysovirus, family Paramysoviridae).	Health Commission at 61/7534-5611.		
Note: Swelling of the salivary glands (parotitis) can also be caused by infection due to parainfluenza virus types 1 and	When to test for mumps: Addit infinunization Conference 2016		

# 3<sup>rd</sup> dose of MMR Considerations



Persons previously vaccinated with 2 doses of a mumps virus– containing vaccine who are identified by public health authorities as being part of a group or population at increased risk for acquiring mumps in certain outbreak settings should receive a 3<sup>rd</sup> dose of a mumps virus–containing vaccine to improve an individual's protection against an risk mumps disease and related complications.

### Factors to be considered:

- Size of target population
- Mumps incidence/number of cases
- MMR3 vaccine coverage needed to impact the outbreak
- Timing of MMR3 vaccination
- Social networks
- Intensity and duration of close contact
- Note: This is not a routine recommendation for a third dose, and it does not apply retroactively to past outbreaks!

Call MDPH Division of Epidemiology and Immunization at 617-983-6800 for consultation.

# Mumps in Massachusetts 2018

## As of 3/26/18\*

- 158 investigations
  - 118 suspect
  - 28 revoked
  - 3 probable
  - 9 confirmed
- Of 12 confirmed/probable cases:
  - 10 in Boston or neighboring cities
  - Age range 15-53, median 24, mean 28
  - 8 females 4 males

National

### **Delaware officials confirm 9** cases of mumps

#### By Associated Press March 28 at 1:47 PM

DOVER, Del. - Delaware health officials have confirmed nine cases of mumps as part of an ongoing investigation of an outbreak among people who attended two dance festivals.

The Delaware Division of Public Health said Wednesday that seven of the nine cases either attended the Baile Mejicano event in Wilmington on Feb. 10 or lived with people who attended. An eighth person was working at another Baile Mejicano dance, held at the same location on March 3. Health officials are still investigating the source of another person's

### \*data are preliminary and subject to change

# PATIENT #3



You have recently learned that a patient you evaluated has tested <u>PCR positive</u> for pertussis. The patient had classic pertussis symptoms including paroxysmal cough, with a cough onset two weeks before the evaluation. You are vaccinated with a dose of Tdap. You were not wearing a mask during the evaluation. Should <u>you</u> cancel your plans to attend a friend's wedding?



- 1. Was the patient infectious during the evaluation? Yes.
- 2. Could you have been exposed? Yes.
- 3. Could you get pertussis? Yes. (Incubation period is 7 to 10 days, with a range of 4-21 days.)
- 4. Is post-exposure chemoprophylaxis recommended? Yes.
- 5. Can you attend the wedding? Yes, if you do not have a cough.

Which groups are the priority targets of Public Health investigations and control measures for pertussis ?

- Infants
- Pregnant women
- Immunocompromised people
- Healthcare workers





# Confirmed Pertussis in MA 2000-2017



# by Month of Onset

- Range: 7 to 441 cases per month
- Average: 63 cases



# Pertussis Cases by Age Group





# Pertussis Incidence by Age Group





# Acceptable Pertussis Diagnostic Tests



- 1. Culture at MA SPHL or any commercial lab
- 2. PCR from any commercial lab (risk of false positives\*)
- 3. Serology performed at MA SPHL
  - Must be drawn >3 years after a pertussis containing vaccine

	DIAGNOSTIC METHOD			
DURATION OF COUGH	CHILDREN (<11 yrs)	ADULTS ( <u>&gt;</u> 11 yrs)		
< 14 DAYS		<b>NP Swab(s)</b> (for Culture & PCR Testing)		
14-28 DAYS	<b>NP Swab(s)</b> (for Culture & PCR Testing)	Serology at MA SPHL -OR- Serology at MA SPHL & Consider NP Swab(s) (for Culture & PCR Testing)		
29-56 DAYS		Serology at MA SPHL		

\*Because of the possibility of false positive PCR results, and the need to avoid antibiotic overuse, and the need for caution when using isolation and quarantine regulations, MDPH only makes formal control measures when patients who are PCR-positive have symptoms which are consistent with the pertussis clinical case definition:  $\geq$  2 weeks of cough and either post-tussive vomiting, the whoop, paroxysmal cough, or apnea (infants <1).

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A 30-something patient presents with one week of fatigue, nausea, fever, and dark urine. She attended a wedding three months ago and had unprotected sex with another guest.

She's since heard from mutual friends that this individual was diagnosed with hepatitis, which he was exposed to via injection drug use (IDU).

What type(s) of hepatitis might you be concerned about?

• Hepatitis C

IDU is a risk for hepatitis C infection. However hepatitis C is not typically transmitted sexually.

• Hepatitis A

There have been recent hepatitis A outbreaks associated with drug use and homelessness in California, Michigan, and Utah. However, the incubation period for hepatitis A is 2-6 weeks, so she would have had symptoms earlier.

Hepatitis B

Yes! People who inject drugs (PWID) are also at risk for hepatitis B infection, and hepatitis B is transmitted sexually. (Incubation period up to 6 months.)







### Reported Number of Acute Hepatitis B Cases – United States, 2000-2015



National Notifiable Diseases Reporting System

Surveillance for Viral Hepatitis – United States, 2015 (www.cdc.gov/hepatitis/statistics/2015surveillance)



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### Incidence of Acute Hepatitis B by Age Group – United States, 2000-2015



National Notifiable Diseases Reporting System Surveillance for Viral Hepatitis – United States, 2015 (www.cdc.gov/hepatitis/statistics/2015surveillance





# Hepatitis B Outbreak in MA

- 2017: 78% increase in acute hepatitis
   B cases in Bristol County
- Geographic cluster within county with high rate of IDU
  - More males than females
  - Median age 38.5
  - Where known, mostly white non-Hispanic
  - Many diagnosed in emergency department
  - High rate of hospitalization
  - Many with lab evidence of hepatitis C exposure
- Vaccination efforts during March 2018 resulted in >50 doses being given during the first two weeks, and testing for HBV infection





# Hepatitis B and IDU

- Several states have reported a recent increase in acute hepatitis B cases among PWID
- ACIP recommends that PWID are vaccinated against hepatitis A and hepatitis B
- CDC also recommends testing for hepatitis B and hepatitis C infection in anyone who has injected drugs



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Bureau 30	Department of Public Health of Infectious Disease and Labora 5 South Street, Jamaica Plain, M Tet 617-624-6000 www.mass.gov/dph	tory Sciences A 02130
CHARLES D. BAKER Gesenser KARYN E. POLITO Lindensel Desenser	Clinical Advisory March 27, 2018	MARYLOU SUDDERS Servicey MONICA SHAREL, ND, NPH
Hepatitis B Outbre	ak in Bristol County Associated wi	th Injection Drug Use
The Massachusetts Departme hepatitis B transmission assoc ongoing epidemic of substance	nt of Public Health (MDPH) is aderting heal iated with injection drug use in Southeaster e use.	thcare providers about increased n Massachusetts related to the
The MDPH has observed an inc in people who inject drugs, inclu- vaccination against hepatitis B a	rease in the number of cases of acute hepatitis ading an outbreak in Bristol County. Many po as children and are at risk for infection.	B virus (BBV) infection reported ple who inject did not receive
MDPH asks healthcare provider recent injection drug use. With	is to increase vigilance for acute HBV infection respect to these extients, we remind you to:	n in patients who report current or
<ol> <li>Give hepatitis B vaccin injection drug use. Test able to complete the ful of hepatitis B vaccine p</li> </ol>	c to susceptible individuals (not previously infing for immunity prior to immunization is not a series should not prevent the administration errorides some screprotection.	ected or immunized) reporting necessary. Concern about being f a first dose. Even a partial series
<ol> <li>Remain alert to the pote to symptomatic patients</li> </ol>	ntial for acute HBV infection in people who in r,	ject drugs and offer HEIV testing
3. Refer patients who use injectable substances to substance use disorder treatment and harm reduction services in your community; and		
<ol> <li>Report all cases of susp clinical, and demograph</li> </ol>	octed acute HBV infection to MDPH promptly tic data as you can obtain.	with as much risk history,
Background: With improved ch Massachusetts, with an annual a acute cases reported from Brish cases were in individuals known Most of the individuals are in th	iblhood vaccination, acute HBV infection has inverage member of cases for 2010-2016 of 132 of County, a 78% increase over the County's a to inject drugs and/or that testud positive for 1 seir 30s and 40s and were likely not to have be	become loss frequent in statowide. In 2017, there were 32 must average. Twenty-two of the hepatitis C visus (HCV) infection. on vaccinated as children.
The potential for HBV transmis- renewed concern due to the cur- transmission related to ongoing leads to more frequent injection	sion among people who inject drugs has alway rent opioid epidemic. There is also risk for hep- sharing of injecting equipment. The introducti , amplifying the risk.	s been a concern. There is now atitis C virus (BCV) and HIV on of fentany! into the drug supply
CDC's clinical guidance related found at: https://www.edc.pov/l	to HBV infection and its prevention through I separitis like vaccadults htm	epatitis II vaccination can be
For current listings of substance http://www.mass.gov/colibs/gov services.html	use disorder treatment programs. departments deb programs substance abuse p	nn iden indistance abuse:
For a current listing of syringe a http://www.mass.gov/coldin.gov	nd needle exchange programs : departments dob programs id hiv-aids;	
For questions, or to report a c 617-983-6800.	ase of acute HBV infection to the MDPH, ca	dl the Epidemiology Program at

# Persons Recommended to Receive Hepatitis B Vaccine – 20 Groups in Brief



- All infants
- Unvaccinated children <19</li>
- Persons at risk by sexual exposure
- Sex partners of hepatitis B surface antigen-positive persons
- Sexually active persons not in a long-term monogamous relationship
- Persons seeking evaluation or treatment for an STI
- Men who have sex with men
- Persons at risk for infection by percutaneous or mucosal exposure to blood
- Current or recent infection-drug users
- Household contact of HBsAg-positive persons
- Residents and staff of facilities for developmentally disabled persons
- Healthcare and public safety personnel with anticipated risk for blood exposure
- Hemodialysis patients
- Persons with diabetes aged 19-59 years (and ≥60 at discretion of provider)
- International travelers to countries with high or intermediate endemnicity
- Persons with HCV infection
- Persons with chronic liver disease
- Persons with HIV infection
- Incarcerated persons
- All others seeking protection from HBV infection
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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: <u>http://dx.doi.org/10.15585/mmwr.rr6701a1</u>

## **Resource for Interpretation of Hepatitis B Serologic**



HBsAg anti-HBc anti-HBs	negative negative negative	Susceptible
HBsAg anti-HBc anti-HBs	negative positive positive	Immune due to natural infection
HBsAg anti-HBc anti-HBs	negative negative positive	Immune due to hepatitis B vaccination
HBsAg anti-HBc IgM anti-HBc anti-HBs	positive positive positive negative	Acutely infected
HBsAg anti-HBc IgM anti-HBc anti-HBs	positive positive negative negative	Chronically infected
HBsAg anti-HBc anti-HBs	negative positive negative	Interpretation unclear; four possibilities: 1. Resolved infection (most common) 2. False-positive anti-HBc, thus susceptible 3. "Low level" chronic infection 4. Resolving acute infection

**Resources:** 

CDC's Hepatitis B Facts for Health Professionals: <u>https://www.cdc.gov/hepatitis/hbv/hbvfaq.htm</u>

Hepatitis B Vaccination, Screening, and Linkage to Care: Best Practice Advice From the American College of Physicians and the Centers for Disease Control and Prevention (Annals of Internal Medicine, 12/2017) <u>http://annals.org/aim/fullarticle/2664089/hepatitis</u> -b-vaccination-screening-linkage-care-bestpractice-advice-from

Prevention of Hepatitis B Virus Infection in the United States: Recommendations of the Advisory Committee on Immunization Practices (January 2018):

https://www.cdc.gov/mmwr/volumes/67/rr/pdfs/rr670 1-H.PDF

### **CDC Viral Hepatitis Serology Training:**

https://www.cdc.gov/hepatitis/resources/professiona ls/training/serology/training.htm

Adapted from: A Comprehensive Immunization Strategy to Eliminate Transmission of Hepatitis B Virus Infection in the United States: Recommendations of the Advisory Committee on Immunization Practices. Part I: Immunization of Infants, Children, and Adolescents. MMWR 2005;54(No. RR-16).

Chart available at: https://www.cdc.gov/hepatitis/hbv/pdfs/serologicchartv8.pdf



# **Questions?**

# Division of Epidemiology and Immunization, 24/7 telephone line: 617-983-6800.