VPD Epidemiology Massachusetts

January 10, 2025

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Agenda

- Pertussis Update
- MMR
  - Measles Case Investigations
  - Mumps Case Investigations
  - Rubella
- Questions

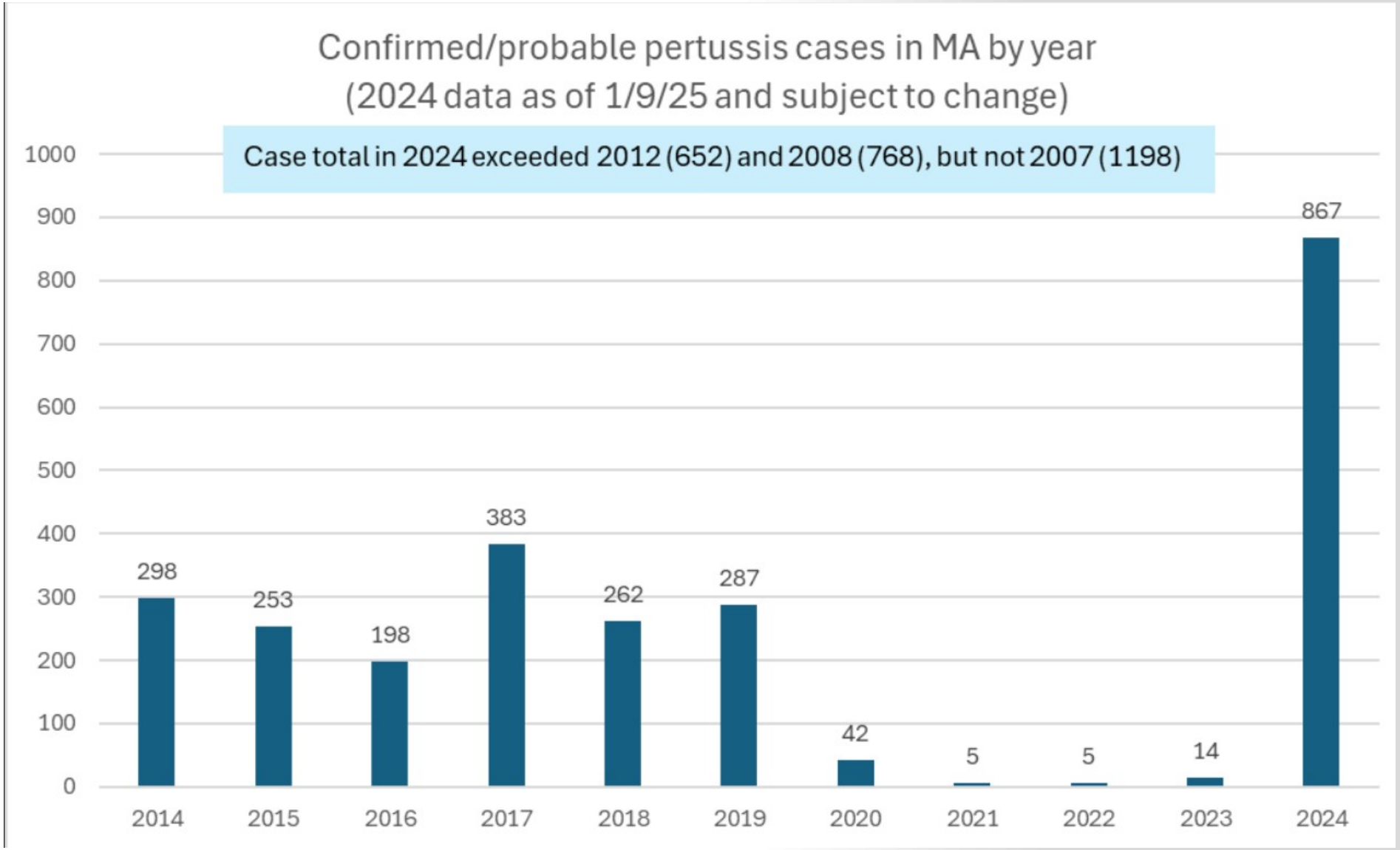
Summary of Pertussis in Massachusetts 2024 as of 1/9/25

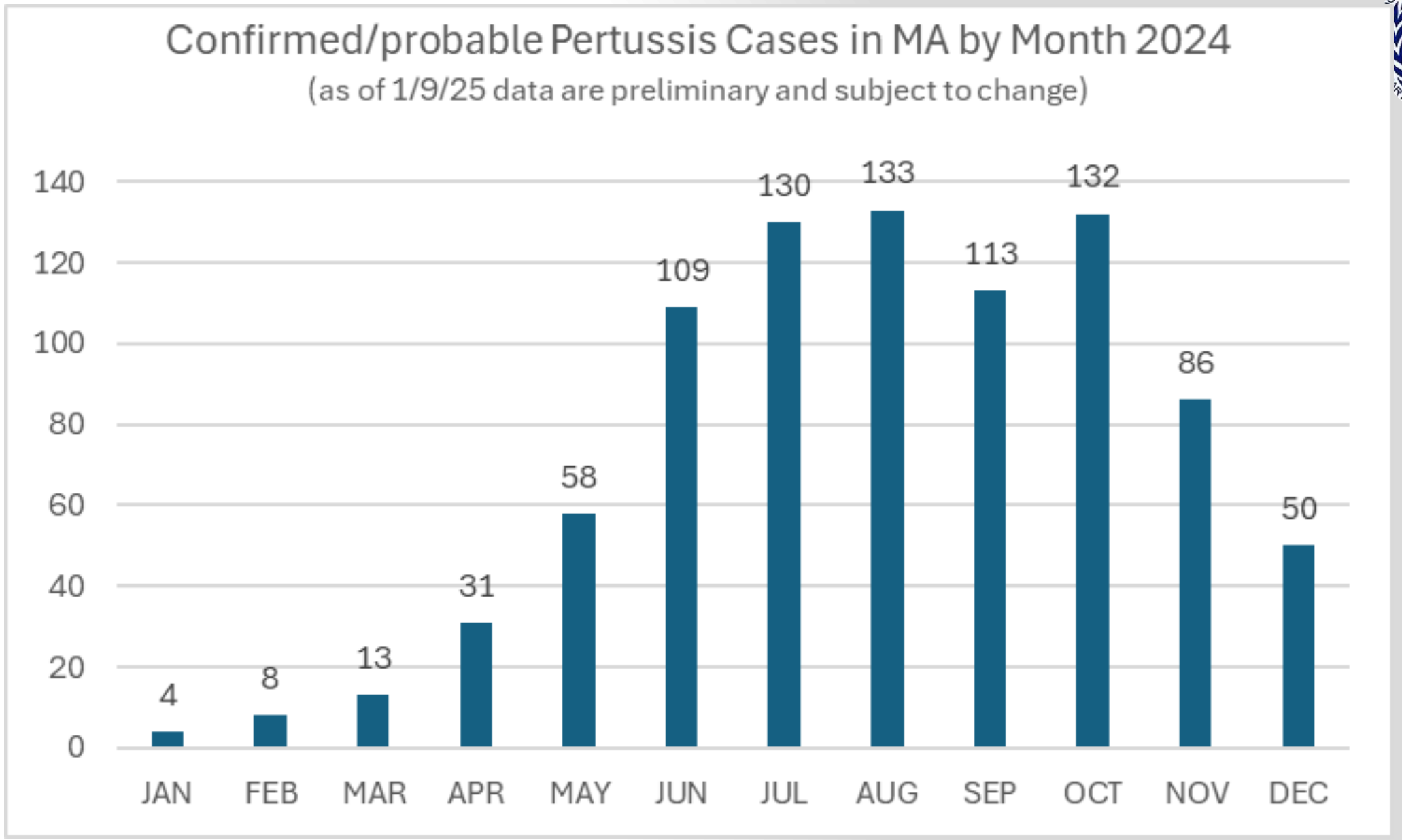
(2024 data are preliminary and subject to change)

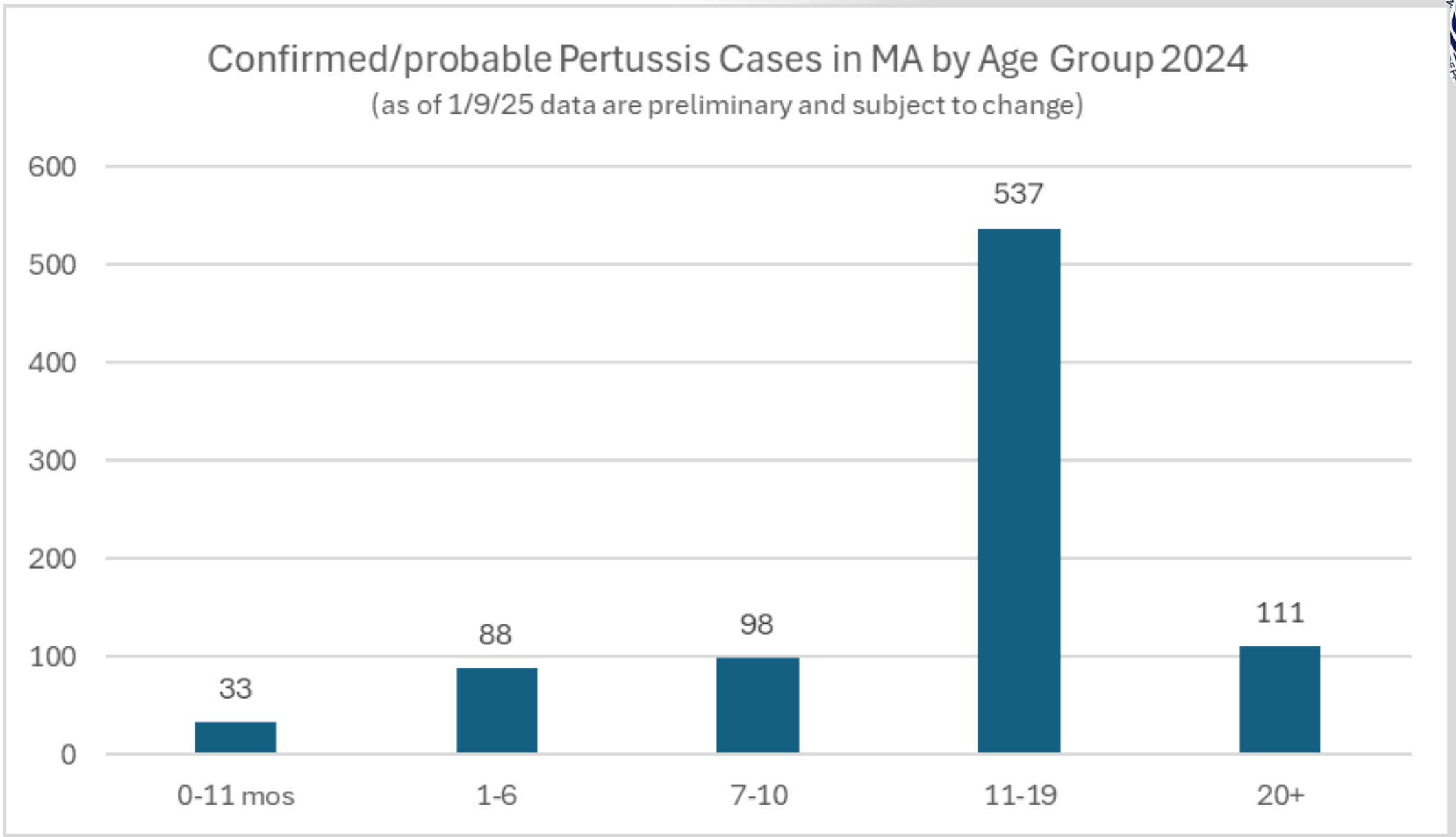
- 980 investigations (including all species of Bordetella)
- 960 had a species identified
- 926/960 were identified as B. pertussis (96%)
  - Other species identified included B. bronchiseptica (2%) and B. parapertussis (1.25%)

- Of the 926 events identified as B. pertussis, 862 were classified as confirmed and 5 as probable (867 confirmed/probable = 94% of reported B. pertussis events)
  - 41 were revoked – 18 remained suspect

- **Of the 867 confirmed and probable B. pertussis events:**
  - 53% female and 47% male
  - Mean age = 16.667
  - Median age = 15.939
  - Although we have some issues with completeness of symptom variable reporting in MAVEN, for those with complete reporting, over 40% of cases reported paroxysmal cough, over 30% reported post-tussive vomiting and over 24% reported the “whoop” sound.
  - 27 hospitalizations reported with vast majority (800/867) reporting no hospitalization
  - Similarly, “recovered” was indicated for 98% of patients reporting an outcome.
  - There were no deaths reported.

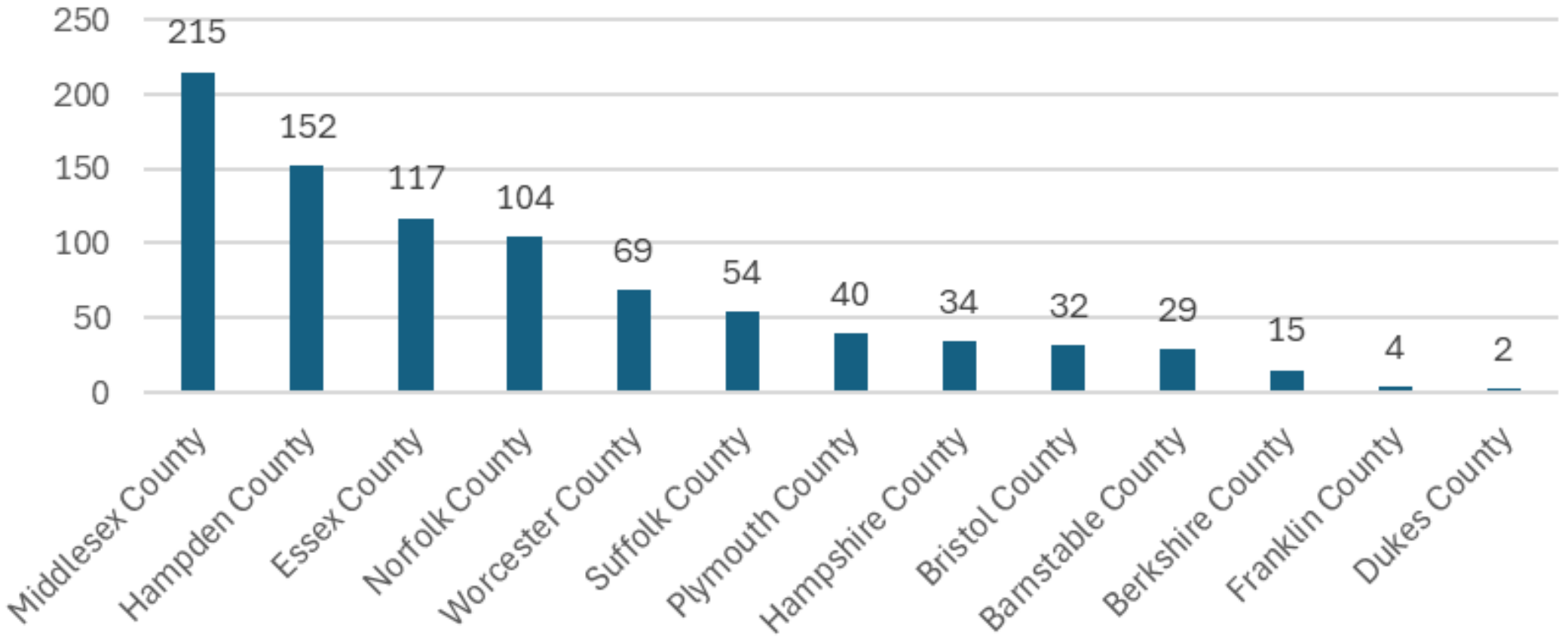

Confirmed/probable pertussis cases in MA by year
(2024 data as of 1/9/25 and subject to change)
Case total in 2024 exceeded 2012 (652) and 2008 (768), but not 2007 (1198)
1000
900
800
700
600
500
400
300
200
100
0
298
253
198
383
262
287
42
5
5
14
867
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024


Confirmed/probable Pertussis Cases in MA by Month 2024
(as of 1/9/25 data are preliminary and subject to change)
140
120
100
80
60
40
20
0
4
8
13
31
58
109
130
133
113
132
86
50
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC


Confirmed/probable Pertussis Cases in MA by Age Group 2024
(as of 1/9/25 data are preliminary and subject to change)
600
500
400
300
200
100
0
33
88
98
537
111
0-11 mos
1-6
7-10
11-19
20+

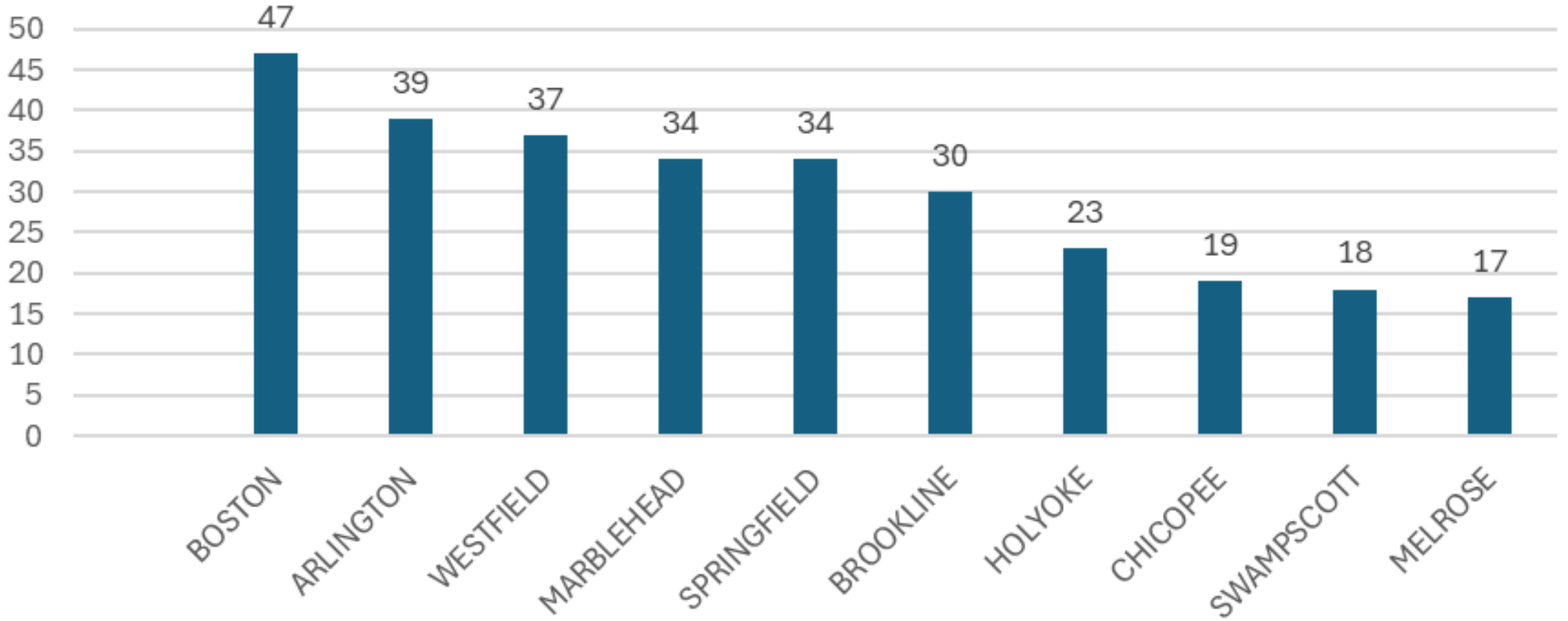
Frequency of Confirmed/probable Pertussis Cases in MA by County (2024)

(as of 1/9/25 data are preliminary and subject to change)



Frequency of Confirmed/probable Pertussis Cases by Top Ten MA Municipality, 2024

(as of 1/9/25 data are preliminary and subject to change)



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Department of Public Health
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305 South Street, Jamaica Plain, MA 02130

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Clinical Advisory August 20, 202

Pertussis is spreading in Massachusetts, particularly
A high index of suspicion for pertussis is recommended in patie
cough, regardless of vaccination sta

Increasing Pertussis Cases in Massachusetts

Pertussis, also known as "whooping cough," is a highly contagiou
caused by the bacteria *Bordetella pertussis*. Following a significa
pandemic, cases of pertussis in Massachusetts are increasing to
particularly among adolescents. Cases to date in 2024 have beer
males and females. 75% of cases have been in adolescents (age
seventeen. Cases have included several outbreaks among high s
percent of cases have been in children under six years of age.

Respiratory Illness Alert: Increase in Mycoplasma Pneumonia and Pertussis Cases in Massachusetts

November 8, 2024

Dear Colleagues,

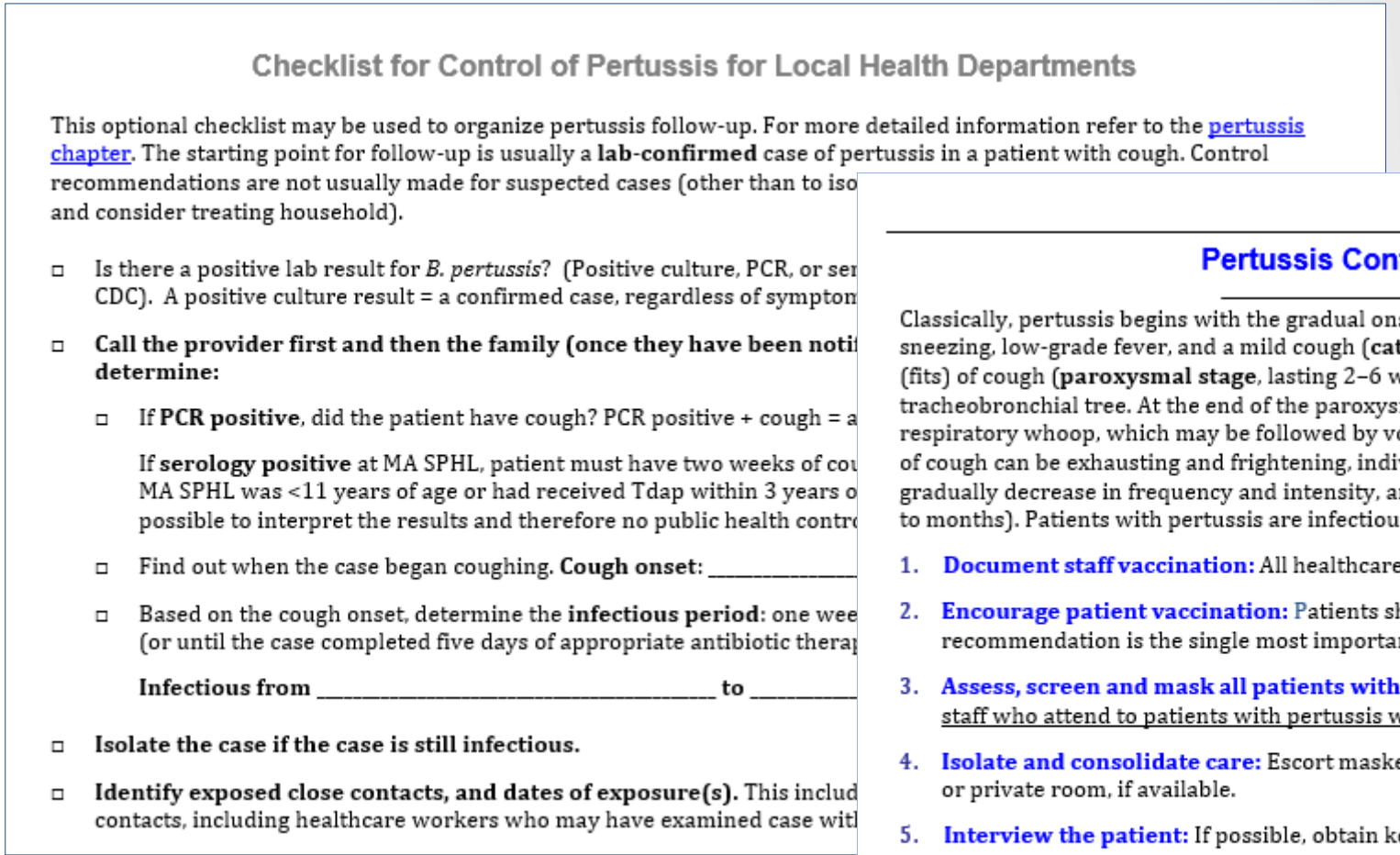
The Massachusetts Department of Public Health (MDPH) has observed a significant rise in cases of the respiratory illnesses caused by ***Mycoplasma pneumoniae*** and ***Bordetella pertussis*** across the Commonwealth in recent weeks. Please see below for reminders for managing and preventing spread of these respiratory infections.

Mycoplasma Pneumonia

Key Details: *M. pneumoniae* is a common cause of community-acquired pneumonia, especially in children, and can cause community outbreaks. Symptoms of mycoplasma pneumonia often include persistent cough, fever, and fatigue, though symptoms are often mild and patients do not require hospitalization.

Resources

- Pertussis Chapter https://www.mass.gov/handbook/guide-to-surveillance-reporting-and-control



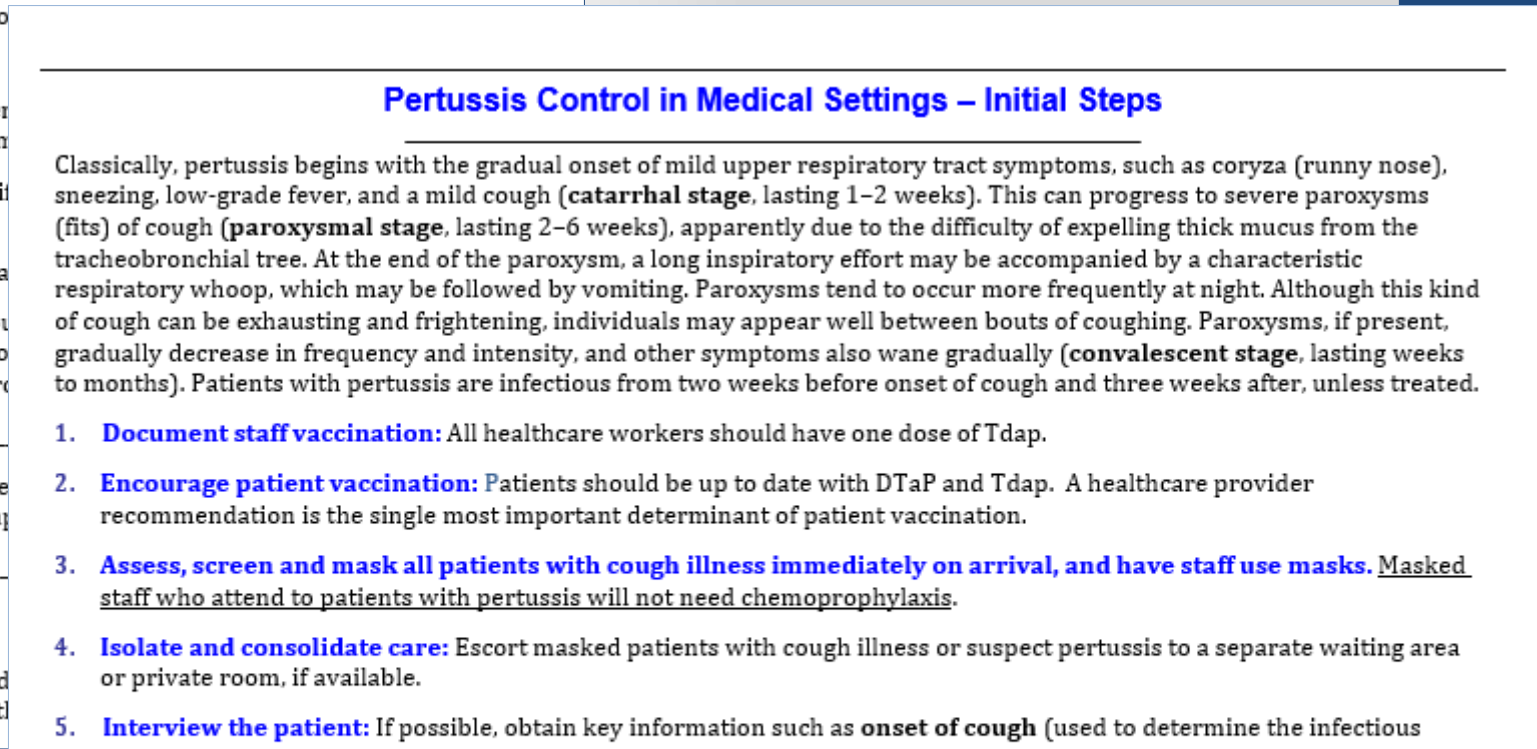
Checklist for Control of Pertussis for Local Health Departments

This optional checklist may be used to organize pertussis follow-up. For more detailed information refer to the pertussis chapter. The starting point for follow-up is usually a **lab-confirmed** case of pertussis in a patient with cough. Control recommendations are not usually made for suspected cases (other than to iso
and consider treating household).

- ☐ Is there a positive lab result for *B. pertussis*? (Positive culture, PCR, or ser
  CDC). A positive culture result = a confirmed case, regardless of sympton
- ☐ **Call the provider first and then the family (once they have been noti
  determine:**
  - ☐ If **PCR positive**, did the patient have cough? PCR positive + cough = a

    If **serology positive** at MA SPHL, patient must have two weeks of cou
    MA SPHL was <11 years of age or had received Tdap within 3 years o
    possible to interpret the results and therefore no public health contr
  - ☐ Find out when the case began coughing. **Cough onset**: _____
  - ☐ Based on the cough onset, determine the **infectious period**: one wee
    (or until the case completed five days of appropriate therap

    Infectious from _____ **to** _____
- ☐ **Isolate the case if the case is still infectious.**
- ☐ **Identify exposed close contacts, and dates of exposure(s).** This includ
  contacts, including healthcare workers who may have examined case wit



Pertussis Control in Medical Settings – Initial Steps

Classically, pertussis begins with the gradual onset of mild upper respiratory tract symptoms, such as coryza (runny nose), sneezing, low-grade fever, and a mild cough (**catarrhal stage**, lasting 1–2 weeks). This can progress to severe paroxysms (fits) of cough (**paroxysmal stage**, lasting 2–6 weeks), apparently due to the difficulty of expelling thick mucus from the tracheobronchial tree. At the end of the paroxysm, a long inspiratory effort may be accompanied by a characteristic respiratory whoop, which may be followed by vomiting. Paroxysms tend to occur more frequently at night. Although this kind of cough can be exhausting and frightening, individuals may appear well between bouts of coughing. Paroxysms, if present, gradually decrease in frequency and intensity, and other symptoms also wane gradually (**convalescent stage**, lasting weeks to months). Patients with pertussis are infectious from two weeks before onset of cough and three weeks after, unless treated.

1. **Document staff vaccination:** All healthcare workers should have one dose of Tdap.
2. **Encourage patient vaccination:** Patients should be up to date with DTaP and Tdap. A healthcare provider recommendation is the single most important determinant of patient vaccination.
3. **Assess, screen and mask all patients with cough illness immediately on arrival, and have staff use masks.** Masked staff who attend to patients with pertussis will not need chemoprophylaxis.
4. **Isolate and consolidate care:** Escort masked patients with cough illness or suspect pertussis to a separate waiting area or private room, if available.
5. **Interview the patient:** If possible, obtain key information such as **onset of cough** (used to determine the infectious

Group Question!

- What are you noticing with pertussis investigations?
- What questions do you have?

Measles, Mumps, and Rubella (MMR) Vaccination

- **There are now TWO MMR vaccines available for use in US!**
  - **KEY UPDATE:** Both vaccines are fully interchangeable for all indications for which MMR vaccination is recommended:
    - **M-M-R II** manufactured by Merck (Previous only US option available since 1978)
    - **PRIORIX** manufactured by GSK (Licensed June 2022)

CDC MMWR: MMR Vaccine (PRIORIX) ACIP Recommendations Nov. 18, 2022.

- **MMRV Combination Vaccine:** Children may also get MMRV (measles, mumps, rubella, & varicella) licensed for use 12 months through 12 years of age.
  - **ProQuad** manufactured by Merck (MMRV licensed 2005)

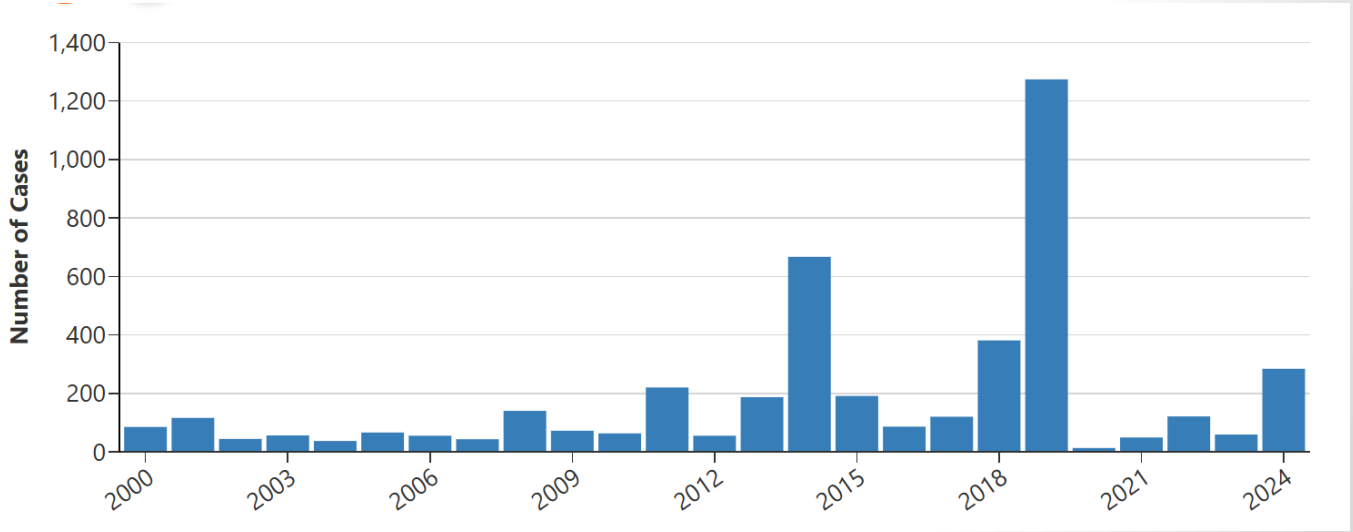
MMR Vaccine – Protection While You Travel!

- **Children ages 6–11 Months can receive one dose of MMR vaccine prior to travel for temporary increased protection from measles!**
  - ACIP recommends that children who travel or live abroad should be vaccinated at an earlier age than that recommended for children who reside in the United States. The risk for measles exposure can be high in high-, middle- and low-income countries.
  - A measles-containing vaccine administered more than 4 days before the first birthday should NOT be counted as part of the US Immunization Schedule series.
    - The MMR dose should be repeated when the child is age 12 through 15 months (12 months if the child remains in an area where disease risk is high). The second dose should be administered at least 28 days after the first dose

Measles Outbreaks in the U.S.

- In any given year, more measles cases can occur for any of the following reasons:
  - an **increase in the number of travelers who get measles abroad** and bring it into the U.S., and/or
  - further spread of measles in U.S. **communities with pockets of unvaccinated people**.

Number of US Measles Cases Reported by Year 2000-2024* (as of December 20, 2024)



https://www.cdc.gov/measles/cases-outbreaks.html

Measles in Massachusetts

Total Confirmed Measles Cases and Measles Investigations*

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024*
CONFIRMED MEASLES	8	0	1	0	2	3	1	0	0	0	1
Total Investigations	111	119	62	55	74	196	24	16	17	38	84

*Data as of 12/31/2024

Note: Imported cases (AKA travelers who may visit MA while infectious) do not reside in MA and therefore are not included in the table above.

- As you can see, most suspect cases for measles are eventually ruled out, however even one case can lead to several hundred exposures and extensive follow-up.

Group Question!

- What measles situations have you seen (suspect cases, revoked, confirmed)?
- How did you interact with Division of Epidemiology?
- What was your role?
- What are your questions?

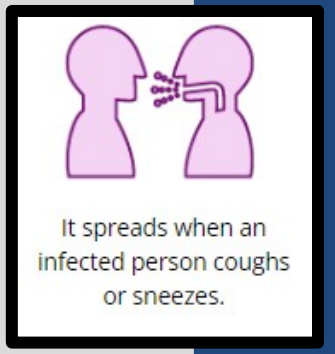
Measles: Symptoms

- Viral disease characterized by **fever, cough, runny nose (coryza), conjunctivitis, erythematous maculopapular rash**, and characteristic **mouth lesions** (Koplik spots)
  - **Fever** typically increases in stepwise fashion, peaking as high as 103° - 105° F
  - **Rash** classically begins at the hairline, then involves the face and upper neck.
  - Gradually proceeds downward over the next few days, reaching the hands and feet.
    - The rash fades in the same order that it appears, from head to the extremities (usually lasts 5–6 days).

Rash begins approx. 14 days after exposure.
- Maculopapular
- Head to toe progression

Measles: Transmission

- **A Respiratory Virus:** Measles is a highly contagious virus that lives in the nose and throat mucus of an infected person. It can spread to others through coughing and sneezing.
  - If other people **breathe the contaminated air or touch the infected surface**, then touch their eyes, noses, or mouths, they can become infected.
  - Animals do not get or spread measles.
- **Measles is one of the most contagious diseases!**
  - Measles is so contagious that if one person has it, up to 90% of the people close to that person who are not immune will also become infected.
  - Measles virus can **live for up to two hours in an airspace after an infected person leaves an area.**
- **Infectious Period:** Infected people can **spread measles to others from four days before through four days after the rash appears**.



https://www.cdc.gov/measles/transmission.html

A True Measles Story!

Measles virus can travel in shared air spaces!

MDPH Investigated a measles case in a child <1 yr of age to determine the source of infection. Conclusion: while on vacation in the Caribbean, the MA family had stayed at a hotel on an island. In the next room, travelers from France were also staying as guests. One of the French travelers became sick with measles while staying at the hotel – and infected the child next door without ever interacting directly!

Evidence of Immunity for Measles

1. **VACCINE RECORD:** Documentation of 2 appropriately timed doses of measles containing vaccine; or
2. **LAB TEST:** Serologic evidence of immunity or laboratory evidence of disease; or
3. **AGE:** Birth in the US before 1957 (unless a healthcare worker)
   - Past history of disease is NOT acceptable evidence of immunity without a lab test.
   - Foreign-born individuals (including those born before 1957) should have documentation of immunization or serologic evidence of immunity. Those who are born before 1957 can be assigned a lower priority for follow up.

Quarantine for Susceptible Contacts: Day 5 through Day 21 Following Exposure. (Exposure = Day 0)

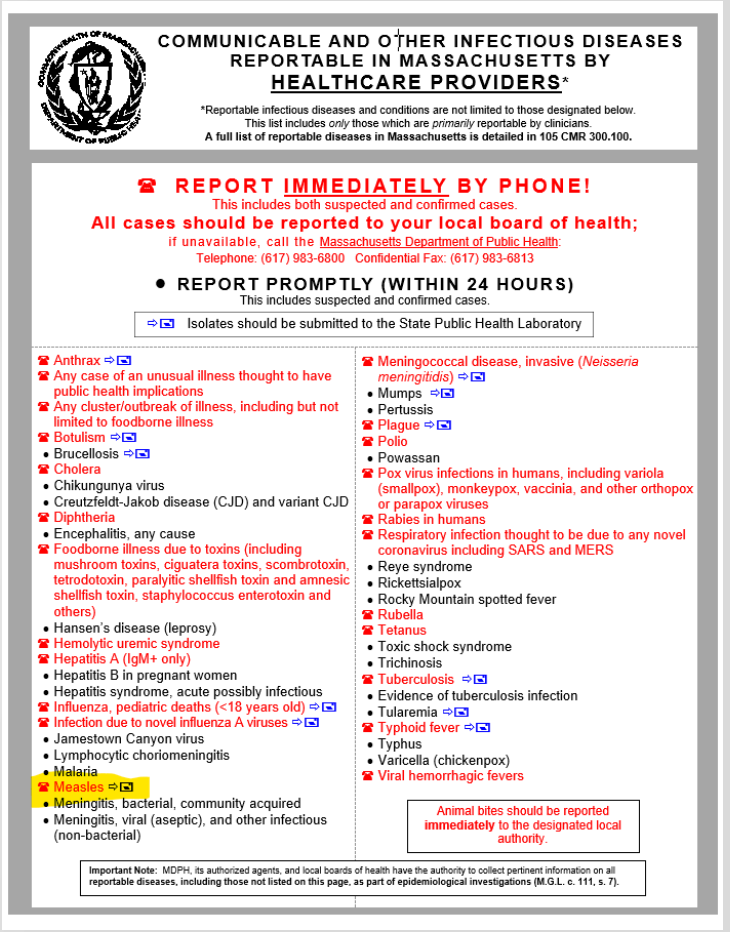
Not sure if someone was previously vaccinated? There is no harm in giving MMR vaccine to a person who may already be immune to one or more of the vaccine viruses.

Measles Testing: Notes for LBOH

- **Measles is an Immediate Disease.** All suspected measles cases should be reported to MDPH by the provider wishing to test to ensure the proper specimens are collected and public health is ready to implement appropriate control measures and follow-up as soon as possible.

- Most **MAVEN Events for Measles** will be created by an MDPH Epi as Suspect Events while the test results are pending. Test results are typically available within 24-48 hours, but follow-up activities may be initiated sooner in highly suspect situations.

- **Partner with MDPH.** Be sure to be in communication with the assigned epi to receive the results and to ensure appropriate and timely local response as needed.



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

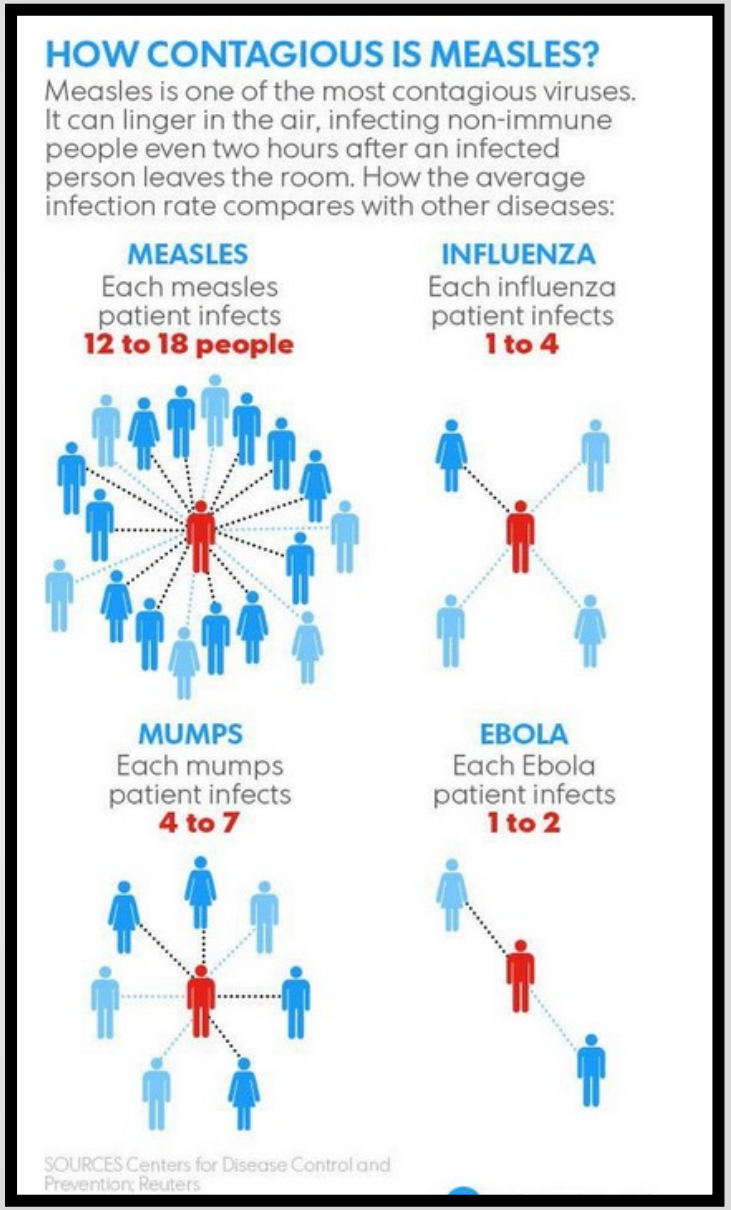
☎ Anthrax ⇨
☎ Any case of an unusual illness thought to have public health implications
☎ Any cluster/outbreak of illness, including but not limited to foodborne illness
☎ Botulism ⇨
• Brucellosis ⇨
☎ Cholera
• Chikungunya virus
• Creutzfeldt-Jakob disease (CJD) and variant CJD
☎ Diphtheria
• Encephalitis, any cause
☎ Foodborne illness due to toxins (including mushroom toxins, ciguatera toxins, scombrotoxin, tetrodotoxin, paralyitic 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
• Meningitis, viral (aseptic), and other infectious (non-bacterial)
☎ 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 authority.

Important Note: MDPH, its authorized agents, and local boards of health have the authority to collect pertinent information on all reportable diseases, including those not listed on this page, as part of epidemiological investigations (M.G.L. c. 111, s. 7).

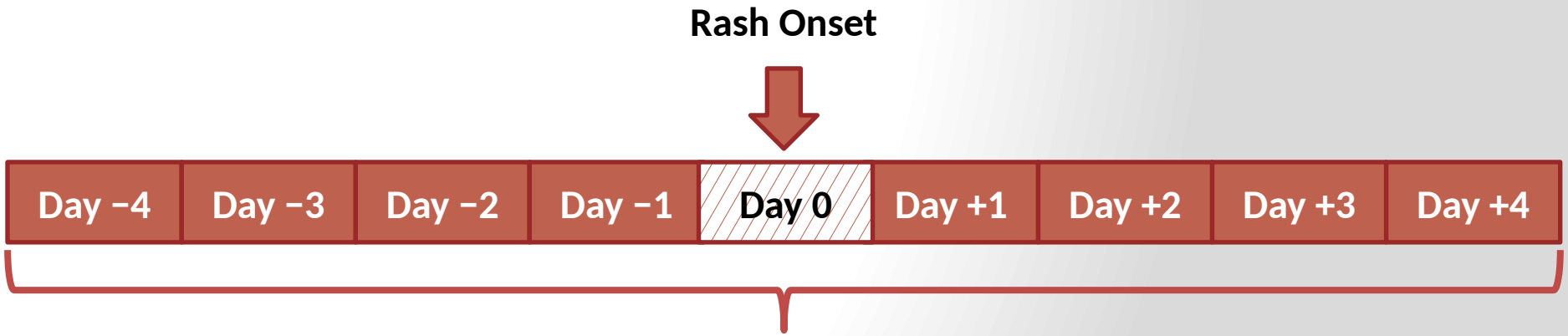
Measles Control Measures

- Isolate & Interview Cases
- Identify Contacts
- Are Contacts Immune or Susceptible?
- Is Post-Exposure Prophylaxis Recommended?
- Quarantine Contacts



Isolate All Suspect Cases

- **Infectious Period: 4** days before rash through 4 days after rash onset.
- Isolate case through 4 days after rash onset.
  - Onset of Rash= Day 0
  - If in a health care facility, the patient should be kept on airborne precautions.
    - Remember, shared air space up to 2 hours after a case was present can lead to exposure.



Thoroughly Interview Case (or Family of Child)

Key Questions to ask the Patient

- **Symptom History** (Review the symptoms experienced, rash onset date is critical) (QP #3)
- **MMR Vaccination History** (if not already known from ordering provider)? (QP #4)
- **Occupation/school** (if so, where and did they work/attend school while infectious)? (QP #2)
- **Race/Hispanic Status** (if not known by provider)?

- **Risk History**
  - **Contact with another case of measles, or someone with similar symptoms?** (QP #5)
  - **Travel History** (including where and dates), **or recent out of town visitors** (from where and dates)? (QP #5)
    - Flights while infectious? Obtain Flight Info.
  - **Transmission setting** (childcare, school, healthcare setting)? (QP #5)

Risk History Time Period is generally 3 weeks (up to 21 days) prior to onset so we can hopefully determine where they may have been exposed to measles (risk history).

Identify Close Contacts

Those individuals present at the same time as the case in a shared airspace, as well as in the determined airspace for 2 hours after the case left:

- Household
- Close friends
- School or daycare (students and staff)
- Medical facility (patients and staff)
- Workplace
- Religious/social groups
- Sports teams or other extracurricular activity groups
- Buses/Carpools/Taxis/Ubers, etc.
- Travel (companions and drivers)
- Persons exposed at social events or retail establishments

The most common locations of exposure include **household** and **medical facility settings** (from when the patient sought care prior to diagnosis).

Don't forget to ask how the patient got to and from various locations while infectious.

Contact Notification

- Identify and notify all exposed contacts of the case while the case was infectious.
  - Phone calls
  - Letters
  - Public advisories
- Prioritize high-risk contacts and refer them to their healthcare providers immediately for possible use of IG.
  - Pregnant women
  - Immunosuppressed individuals
  - Infants <12 months of age
- Ensure that companions of known exposed contacts, who have also been exposed, are identified.
  - Examples: a medical office might have a list of patients that were in the waiting room, but family/companions that accompanied the patients would not be on their list.

Identifying Close Contacts - Challenges

- **Some exposures may occur in locations where individual contact identification is not possible:**
  - **Examples:** Retail Establishments, Public Transportation, Public Spaces.
  - Sometimes there are clear groups that can be targeted (like staff that worked during a particular timeframe or a list of patients that were in a waiting room).
  - Other times we may have to rely on broader outreach so that potentially exposed individuals can self-identify.
- You may need to work with an establishment to post a **General Notice** or **Advisory** with recommendations for next steps if someone believes they may have been at a particular location during a designated time period.
  - **Remember to add 2 hours** on to the timeframe in question to ensure comprehensive outreach.
    - For example, if a case reported shopping in **Target from 2:00-2:15 pm**, you would want to provide a general advisory for anyone who may have been in the facility from **approximately 2:00-4:15 pm**.
    - MDPH Epi will help with these advisories and verifying timeframes/dates.

Are Contacts Immune or Susceptible?

Exposed individuals should immediately be assessed for immunity.

- **VACCINE RECORDS:** Finding historical vaccination records may be challenging for some contacts, particularly those who may have been vaccinated prior to electronic medical records and/or electronic immunization registries.
  - **Tips** for finding records include:
    - Calling PCPs, parents, school/college health offices, old baby books/records, recently visited travel clinics (where MMR status might have been assessed?), etc. Check MIIS or other state registry.

Official Evidence of Immunity

1. **VACCINE RECORD:** Documentation of 2 appropriately timed doses of measles containing vaccine; or
2. **LAB TEST:** Serologic evidence of immunity or laboratory evidence of disease; or
3. **AGE:** Birth in the US before 1957 (unless a healthcare worker)

Are Contacts Immune or Susceptible?

Exposed individuals should immediately be assessed for immunity.

- **LAB TESTS:** Obtaining a titer to assess immunity may be an option for individuals who lack vaccination records but are fairly confident they are immune.
  - Things to consider include:
    - Not all serologic titers may be covered by insurance.
    - Timing following exposure (ensuring the titer is reflective of previous status and not acute illness). Sooner is better!
      - Is the contact currently symptomatic?
    - Titers following exposure may not eliminate the need to quarantine.
- **Getting a dose of MMR at the same visit is often advised.**

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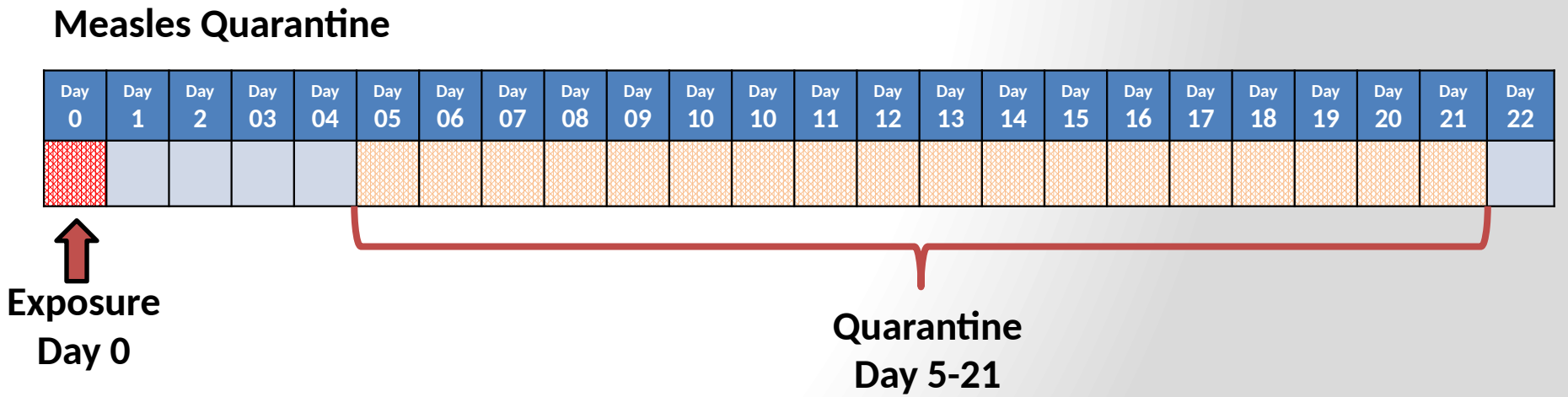
Post-Exposure Vaccine & Immune Globulin

- **Identify close contacts who do not have evidence of immunity and recommend MMR or immune globulin (IG).**
  - **Vaccination:** Measles vaccine given within 72 hours of exposure may prevent disease.
    - Beyond 72 hours, vaccine is still recommended to provide protection against exposure to future cases of measles.
    - MDPH can help coordinate MMR vaccine supply for certain outbreak situations.
  - **Immune Globulin:** IG may prevent or modify measles in persons who are nonimmune, if given within 6 days of exposure.
    - This is typically recommended for individuals who are at risk for severe disease and complications from measles (e.g., infants <12 months of age, pregnant women without evidence of measles immunity, and severely immunocompromised persons regardless of vaccination status because they might not be protected by the vaccine)

Quarantine Contacts

- Exclude susceptible close contacts unable to be vaccinated, or not vaccinated quickly enough, from **day 5 through day 21 after exposure**
  - In most low-risk settings, susceptible close contacts may be readmitted immediately after they receive a dose of MMR, even when given >5 days post exposure. (local discretion)
  - Susceptible close contacts who receive IG (instead of vaccine) should quarantined.



Notes on Exposure Follow-up: If Symptoms Develop

- **No Asymptomatic Testing.** Contacts without symptoms should NOT be tested for measles. Only symptomatic contacts need to seek testing.
- **Testing for Measles?** Avoid additional exposures at the medical office by calling ahead to arrange testing.
  - Symptomatic contacts should be masked when seen.
  - Attending providers should all have evidence of immunity and wear appropriate PPE.
  - Pre-arrange a time when exposing other staff/patients can be minimized (before opening/after closing).
  - Meet the patient at the door and immediately mask them to prevent the generation of droplets.
  - Escort the patient through a separate entrance to a private waiting area or exam room, preferably a negative pressure room.
  - Be creative. Consider collecting a specimen outside/through car window.

True Story: Healthcare Exposures!

MA Medical Practice saw a patient with a rash, suspected measles and sent a lab specimen to a commercial lab (no notification to MDPH) and the results returned positive for measles.

Multiple providers were exposed, and the office had **NO IDEA if their staff had evidence of immunity,** requiring titers on all staff and closing the office for a day while awaiting results.
(1 Day Revenue Loss)

Fortunately, all came back immune but remember to have **vaccination documentation or laboratory evidence readily available**!

Health care workers, regardless of year of birth, who are not appropriately immunized or do not have laboratory evidence of immunity, will be excluded from work from the 5th day after their first exposure through the 21st day after their last exposure. These restrictions for health care workers and inpatients remain even if the contact received IG or was vaccinated post-exposure.

Measles Investigations for LBOH

Measles Events (Low or High Suspect?)

- **Due to high vaccination rates in MA and the US at large, measles is still relatively rare.**
- **SUSPECT** measles cases reported to MDPH will be assessed as Low or High Suspect based upon:
  - clinical presentation, vaccination status of the patient, and additional known risk factors (typically travel or known exposures).

High Suspect Measles	Low Suspect Measles
• International traveler • Recent travel to an area with known confirmed cases • Sick contacts • Unvaccinated or vaccinated abroad • Classic symptom presentation	• US born • No known risk (no travel, no sick contacts) • Fully vaccinated in the US • Alternative diagnosis in differential • Doesn't meet clinical case definition

- **Public Health Actions** while awaiting test results will be based upon how high the likelihood is the test results will be positive.

Case Study: High Suspect MAVEN Event

- **On Feb 13, provider at Community Health Center calls MDPH to report a suspect case of Measles:**
  - Case is a 34-year-old male from Town Z.
  - The patient presented on 2/13 with a maculopapular rash that developed earlier in the day (onset 2/13)
    - The rash began on the face and has spread to the torso & extremities
    - Significant respiratory issues (cough, runny nose, high fever ~103^0 and rising.)
    - Returned from 2-week trip and family wedding in France 2/10
    - No vaccine on record, has lived in US for 10 years (not US born)
- MDPH advises the facility to collect an NP swab and serum to be sent to MA State Public Health Laboratory (SPHL).

Classic High Suspect situation based upon recent travel, classic symptoms, no vaccine hx.

Case Study: High Suspect MAVEN Event

MDPH:

- Coordinates specimens being sent to State Lab.
- Advises provider office to immediately assess potential staff and patient exposures. Can make lists while awaiting test results.
  - Are staff records immediately accessible? (They should be!)
- Creates suspect "Measles" event in MAVEN and enters data.
- Notifies LBOH in Town Z.

LBOH Interviews the Patient (or Patient Designee):

- Obtains Patient Information
  - May need to coordinate through infection control if patient is admitted.
  - May need to interview a spouse or emergency contact.
  - Confirms symptoms and onsets (Infectious Period: 2/9-2/17).
  - Goes over timeline and starts to make a detailed list of places visited/potential exposures.
  - Traveled While Infectious: Collects flight information for potential notification to quarantine station pending results.
- Follows Up With Household
  - LBOH checks MMR status of household and provides recommendations.
- Documents notes in MAVEN event and maintains communication with assigned MDPH EPI. Discusses plan of action and alerts public health staff as needed.

High Risk Scenarios/Case Study

Next Day:

- Lab reports that the patient is PCR positive for measles. MDPH Epi changes case classification to "Confirmed"
- MDPH notifies the Community Health Center & LBOH of results.

MDPH and LBOH:

- Go over timeline and locations of exposures and discuss coordination of healthcare and other exposures.
  - Additional LBOH jurisdictions are notified as applicable.
- Plans for each exposure location and list of contacts is determined.
- Line lists of contacts from various locations should be collected and follow-up outlined.
- MDPH creates Measles MAVEN Cluster Event to track exposures and upload contact roster lists.

Follow-up Continues as New Information is Obtained (as always):

- New suspect cases should be isolated and tested as needed.
- Vaccination Recommendations and Guidance for contacts.
- LBOH and MDPH update MAVEN Notes and finalize Admin QP Variables to sign off on individual cases and contacts as applicable.

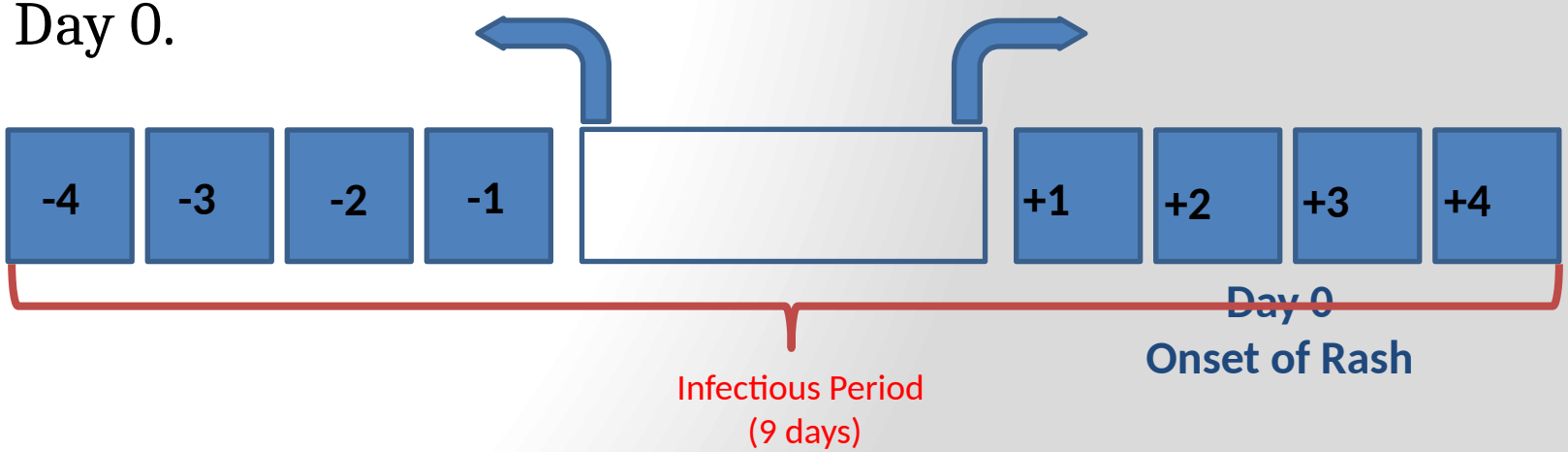
Questions to Think About for LBOH

- **Do YOU have evidence of your immunity to measles?**
  - Your Staff?
  - Could you quickly stand up an MMR vaccine clinic for exposed residents?

- **Is it clear who would provide emergency weekend response if you did have a large exposure requiring immediate follow-up?**

Measles In Review – The Case

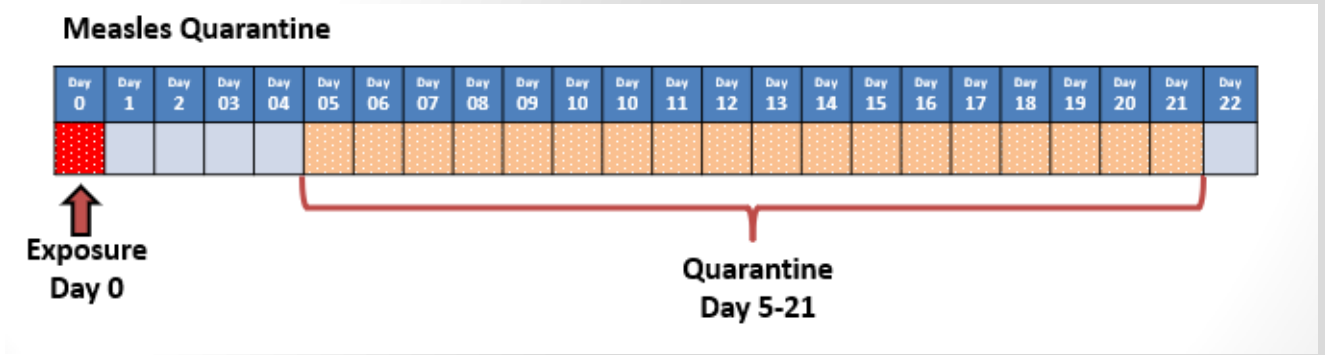
- **Cause:** Measles Virus
- **Transmission:** respiratory/airborne transmission
- **Symptoms: Primary Symptom is a rash**
  - **Prodromal Symptoms:** high fever, cough, coryza, and conjunctivitis (the Three "C"s)
- **Incubation period:** Incubation period is usually 10–12 days (average 14 days to onset of rash)
- **Infectious Period: 4** days before rash through 4 days after rash onset. Onset of Rash is Day 0.



Measles In Review – Exposed Contacts

- **Contacts with Evidence of Immunity do not need to quarantine:**
  - 2 doses of MMR Vaccine
  - Lab test showing immunity or Lab evidence of previous disease.
  - Birth before 1957 (non-HCWs)

- **Quarantine for Susceptible Contacts:** Day 5 through 21 following exposure. Exposure = Day 0.
  - **Vaccine:** Post Exposure MMR within 72 hours may prevent disease (and quarantine requirements).
  - **Immune Globulin:** IG may prevent or modify measles in persons who are nonimmune, if given within 6 days of exposure

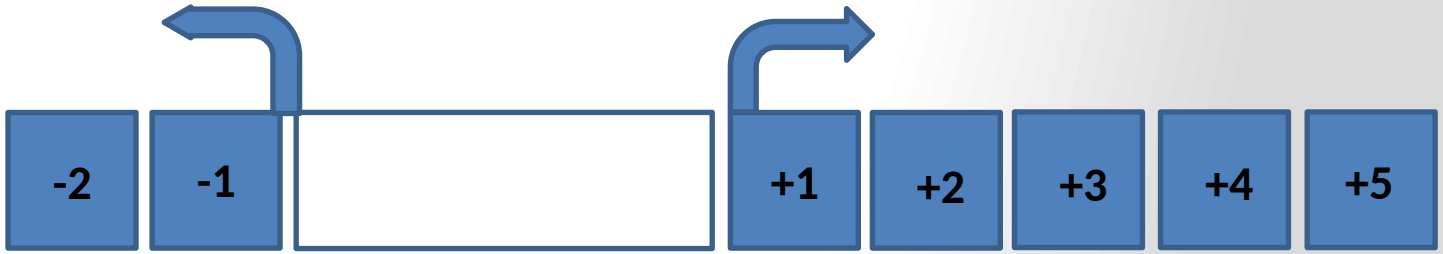


Resources

- **Measles-Specific Resources**
  - **The Epidemiology and Prevention of Vaccine-Preventable Diseases, a.k.a. the "Pink Book," Chapter on Measles**
  - **CDC Measles Chapter**
  - **Measles for Healthcare Providers**
  - **WHO Information on Measles**
- **MDPH Division of Epidemiology and Immunization: 617-983-6800**
  - Questions/Guidance for follow-up
  - Sample Letters/Alerts
  - Reporting
- **MAVEN Help Desk: 617-983-6801**
- **MDPH Reference Materials**
  - **MDPH Guide to Surveillance, Reporting, and Control: Disease-Specific Chapters**
  - **The Massachusetts Immunization Information System (MIIS) Onboarding and Resources:**
  - **105 CMR 300.00: Reportable diseases, surveillance, and isolation and quarantine requirements**

What is Mumps?

- **Cause:** paramyxovirus (Mumps Virus)
- **Transmission:** droplet transmission
- **Symptoms: Primary Symptom is swollen salivary glands (parotitis)**
  - **Prodromal Symptoms:** fever, headache, fatigue ,myalgia, anorexia, earache, sore throat, nasal congestion, stiff neck
  - **Asymptomatic!** (20% unvaccinated)
- **Incubation period:** 16-18 d post- exposure (range 12-25 d)
- **Infectious Period:** 2 days before swelling onset through 5 days after onset.



- **Recovery:** about 2 weeks

https://www.cdc.gov/mumps/about/signs-symptoms.html

Mumps in Massachusetts

MA Confirmed and Probable Mumps Cases

Disease	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024*
Mumps[2]	5	6	258	192	44	64	19	2	9	7	14

Data as of 12/31/2024

2016: Largest Mumps outbreak in MA in 30+ years: out of 789 total investigations 258 confirmed and probable.

2021: Lowest number of mumps cases in MA in over a decade.

* 2024 data is preliminary (12/30/24).

Challenges of Mumps Testing

Negative Mumps Test ≠ No Mumps

Reasons

- Mumps virus sheds intermittently, so PCR testing may miss it
- Very difficult for a person who has been vaccinated (MMR vaccine) to mount an IgM response

Recommendation

- Recommend cases stay in isolation through their potential infectious period <u>even if their results are negative.</u>

Exception

- The only time a mumps case will be revoked is if an alternate diagnosis is given by the provider, or if the case does not meet clinical case definition (i.e. did not have at least 48 hours of swelling)

Measles, Mumps, and Rubella (MMR) Vaccination

- **There are now TWO MMR vaccines available for use in US!**
  - **KEY UPDATE:** Both vaccines are fully interchangeable for all indications for which MMR vaccination is recommended:
    - **M-M-R II** manufactured by Merck (Previous only US option available since 1978)
    - **PRIORIX** manufactured by GSK (Licensed June 2022)

CDC MMWR: MMR Vaccine (PRIORIX) ACIP Recommendations Nov. 18, 2022.

- **MMRV Combination Vaccine:** Children may also get MMRV (measles, mumps, rubella, & varicella) licensed for use 12 months through 12 years of age.
  - **ProQuad** manufactured by Merck (MMRV licensed 2005)

Mumps Control Measures

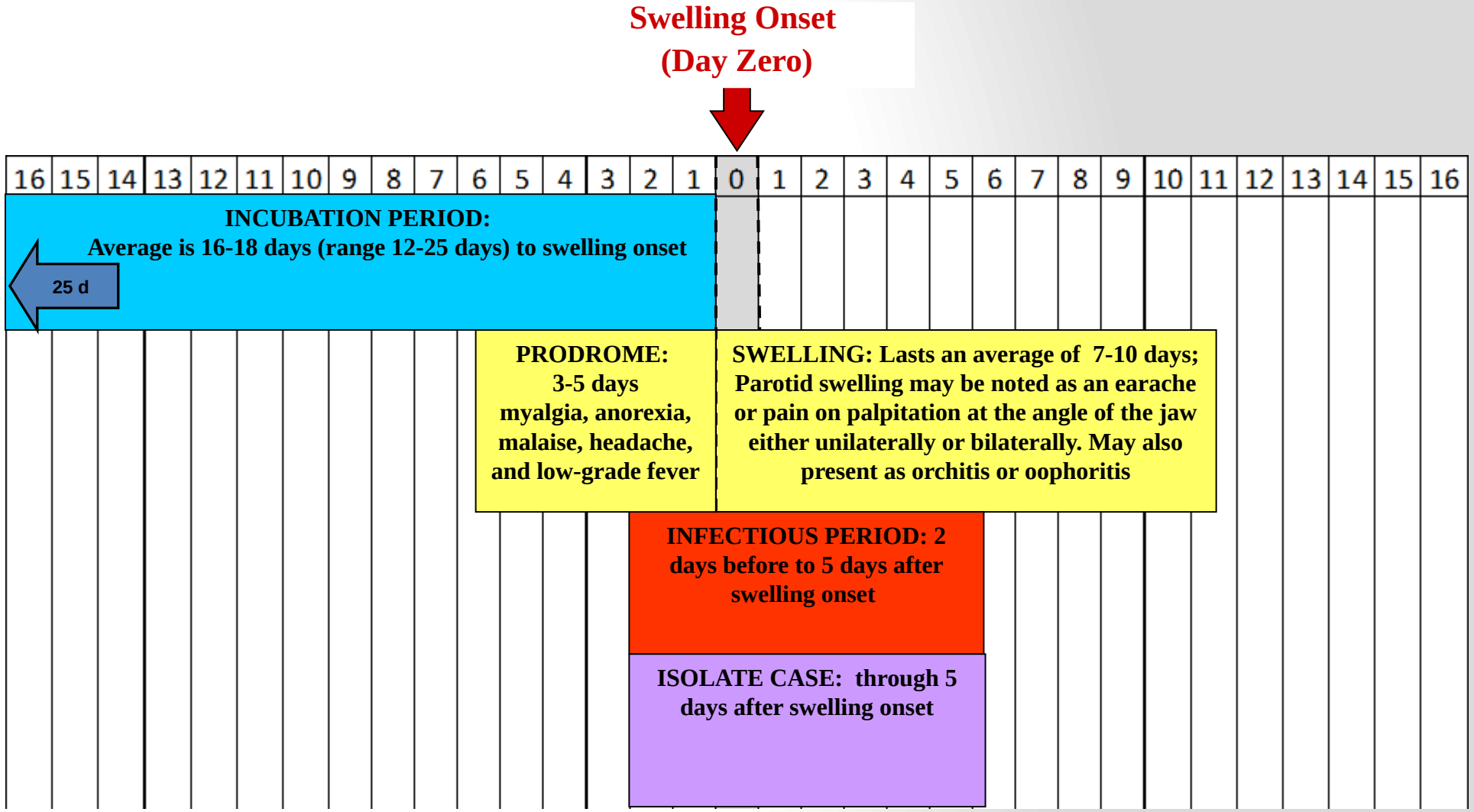
Control Measures

- Control measures are the responsibility of LBOHs.
- **Confirmed and probable cases of mumps require control measures.**
  - If a suspect case is NOT lab confirmed, there are **no** formal control measures for contacts from public health, **however,**
    - Providers can use clinical judgment for household contacts, etc.
    - It is always a good time to get Up-to-Date with MMR Vaccine if needed! Patients should remain in isolation

Control Measures

- Key Prevention: Isolation and physical distancing (esp. dense setting).
- Remember **"Negative Mumps Test ≠ No Mumps,"** therefore even if patients with clinical symptoms have negative results, they should still be **isolated.**
- MMR Vaccination (88% effective preventing mumps): Ensure all contacts are up to date with their MMRs.
- Exposed unvaccinated individuals should be excluded (Day 12-25 following exposure Day 0)

Mumps Infection Timeline



LBOH Main Responsibilities During Mumps Investigations

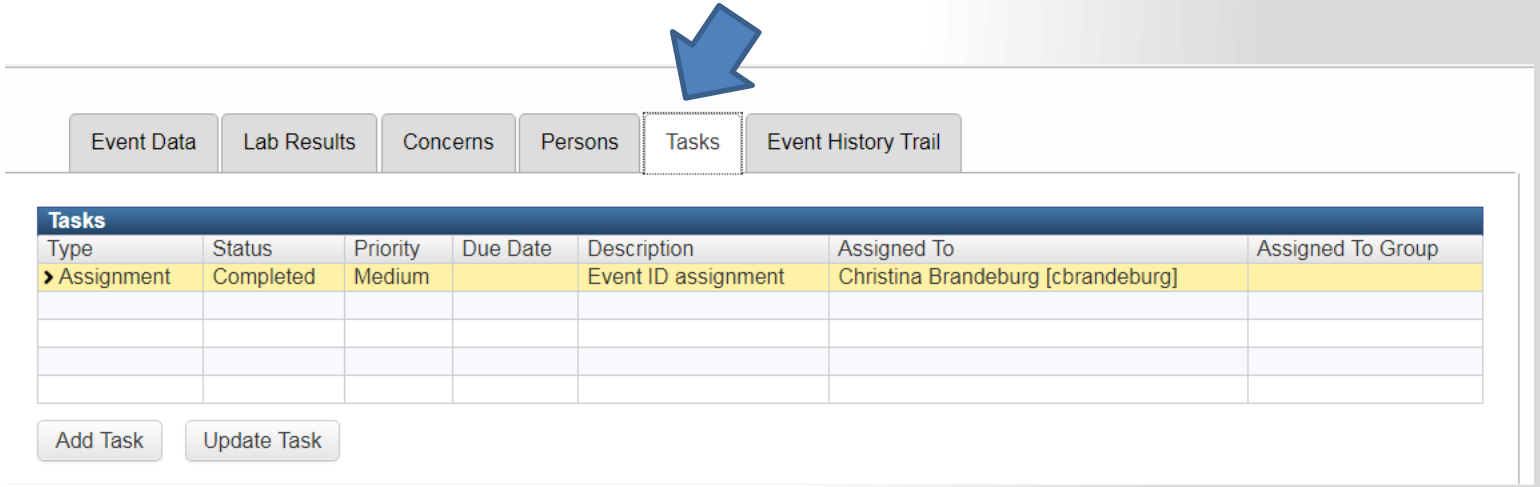
- **PART 1: Investigating the Case (completing question packages in MAVEN)**
  - Interviewing Patient (while waiting for test results).
  - Gathering Contact Information (getting ready for additional control measures)

- **PART 2: Instituting Control Measures**
  - Making sure patient is isolated.
  - Planning next steps for contacts.

Step 1: Review and acknowledge event in MAVEN.

- Typically, a suspect mumps event will be entered into MAVEN by an Epi at MDPH after receiving a phone call from a provider.

- To see which MDPH Epi is assigned to the case, open the Tasks Tab and look under “Assigned To”.



Step 2: Call case to collect important information for Case Report Form.

2023 Case Definition Change: Swelling of **any duration**

Questions to ask the Patient

- **Symptom History** (Review the symptoms experienced, swelling onset date is critical) (QP #3)
- **MMR Vaccination History** (if not already known from ordering provider)? (QP #4)
- **Occupation/school** (if so, where and did they work/attend school while infectious)? (QP #2)
- **Race/ethnicity** (if not known by provider)?
- **Risk History**
  - **Contact with another case of mumps, or someone with similar symptoms?** (QP #5)
  - **Travel History** (including where and dates), **or recent out of town visitors** (from where and dates)? (QP #5)
  - **Any recent dental work?** (No QP, but put in Notes)
  - **Transmission setting** (childcare, school, healthcare setting)? (QP #5)

Risk History Time Period is generally one month (up to 25 days) prior to onset so we can hopefully determine where they may have been exposed to mumps (risk history).

Step 3: Identify all contacts who have been exposed.

- Think about people in the following groups who were in close contact (within 6- feet) with the case during their infectious period or had direct contact with case's respiratory secretions:
  - Household members
  - School/daycare
  - Co-workers
  - Staff and patients at medical facility where case was seen
  - Religious/social groups
  - Sports teams/other extra-curricular groups
  - Bus/carpool mates
  - Close friends

Exposure: Close Proximity for prolonged period of time and/or exposure to respiratory secretions.

Step 4: Identify Susceptibles

- Susceptible to Mumps: People who do not have evidence of immunity, including those with vaccine exemptions.

- Sufficient Evidence of Immunity to Mumps:
  - Birth in the US before 1957 (unless a healthcare worker)
  - Documentation of 2 doses of mumps containing vaccine
  - Serologic evidence of immunity or laboratory evidence of disease

Verbal past history of disease is NOT acceptable evidence of immunity.

Step 4: Identify Susceptibles

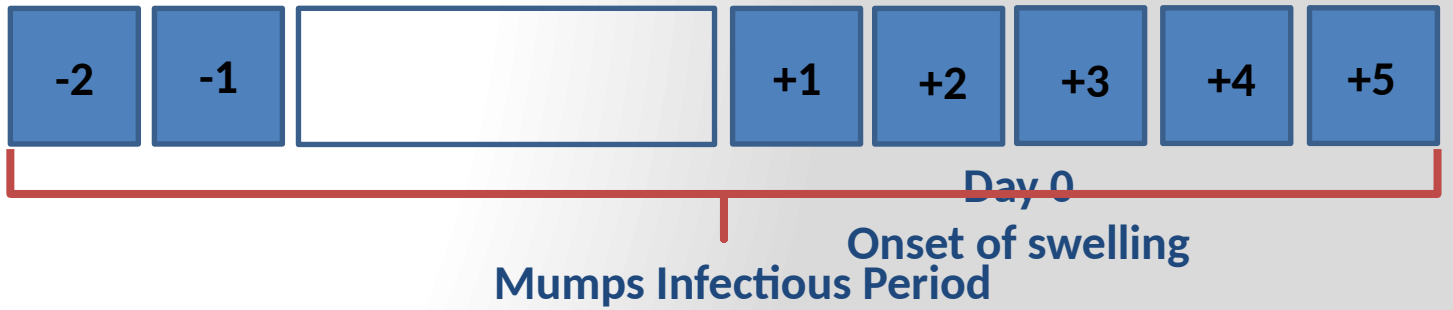
- Prioritize unvaccinated High-Risk Contacts and refer to healthcare providers.
  - Pregnant women
  - Immunosuppressed individuals
  - Infants <12 months of age

Step 5: Recommend immunization for all susceptibles >12 months of age for which MMR is not contraindicated

- Vaccinating an exposed individual who may be incubating mumps is not harmful
  - The same applies to an individual who MAY have been vaccinated in the past but does not have a record of that vaccination.
- Reminder: As a LBOH, you can give MMR to exposed contacts (MDPH vaccine unit has doses of MMR available to LBOHs)

Step 6: Discuss isolation dates and notifying contacts with case.

- Calculate infectious period with case and discuss how long they need to stay out of public activities.
  - **Infectious Period= 2 Days before Onset through 5 Days After.**
    - **Swelling Onset = Day 0**



- Develop a plan of action for household & other contacts
  - You can work in tandem with them to notify exposed contacts as applicable.

Step 7: Follow up with school/workplaces and/or additional contacts if applicable.

- Mumps letter/advisory templates are available.
- Contact MDPH epidemiologists for assistance. Epi Program: 617-983-6800

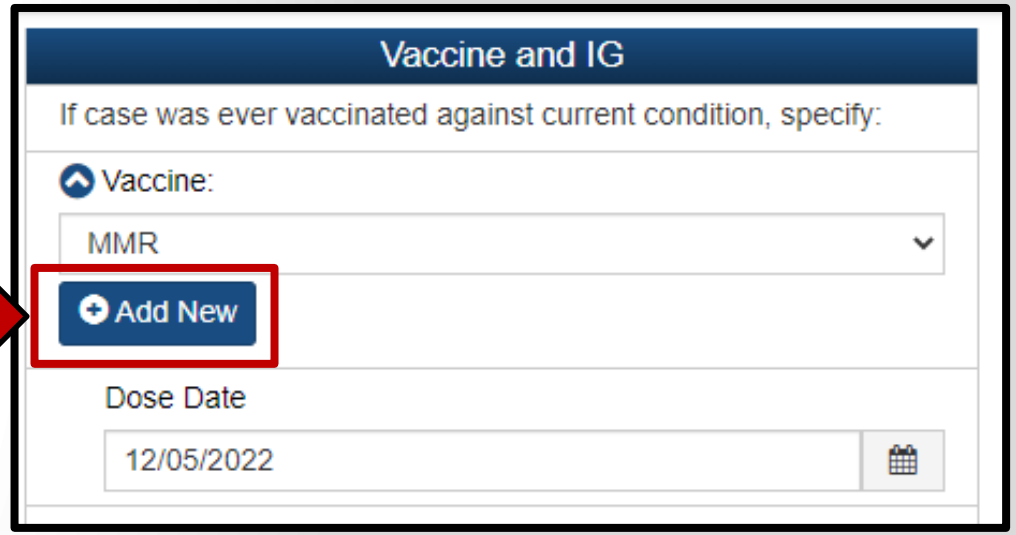
Step 8: Final Control Measures

- **Case:** Exclude through 5 days after onset of swelling
  - Swelling onset is Day 0

- **Contacts:** Individuals without evidence of immunity should be excluded from Day 12-Day 25 after exposure.
  - Exposure = Day 0.
  - Post-exposure vaccination is not expected to prevent illness or development of disease in someone recently exposed to mumps. Rather, exposed individuals should be vaccinated to protect against subsequent exposures.
  - ***In most <u>low-risk</u> settings, asymptomatic contacts can typically avoid exclusion if they receive a dose of MMR.***

Step 9: Update all notes and fields in MAVEN

- **Most important variables to complete are:**
  - Race/Hispanic Status (QP #2)
  - Onset of swelling (QP#3)
  - Duration of swelling (QP #3)
  - Vaccination history (QP #4)
    - Remember to ADD NEW for adding a second dose of vaccine.



Step 10: Sign off in Admin Question Package (QP)

- Once investigation is concluded and all data has been entered in the question packages, complete Steps 4 and 5 in the Administrative Question Package to sign off on the MAVEN event.
  - Case Report Form = Complete for both confirmed and ruled out mumps cases if LBOH is able to enter required variables.
  - Lost to Follow-up should only be utilized if no contact was made with the case.
- This signals for MDPH Epi that the case is ready for final review.

Are we still thinking mumps?

Epidemiological Indicators of Highly Suspect Mumps	Epidemiological Indicators of Low Suspect Mumps
• Known contact with a confirmed Mumps Case • Recent travel • Sick contacts • College student or active contact with the college community • Dense communal living (dorm environment) • Unvaccinated community • Age range (late teens – 20s) where we see most cases. • Classic symptoms (swelling ≥ 48 hours)	• No known risk (no travel, no sick contacts) • Fully vaccinated • Alternative diagnosis in differential • Recent dental work/facial injury • Young vaccinated child/older adult (not typical risk group) • No contact with college students

Resources

- **MDPH Division of Epidemiology and Immunization: 617-983-6800**
  - Questions/Guidance for follow-up
  - Sample Letters/Alerts
  - Reporting
- **MAVEN Help Desk: 617-983-6801**
- **MDPH Reference Materials**
  - **MDPH Guide to Surveillance, Reporting, and Control: Disease-Specific Chapters:**
    - https://www.mass.gov/handbook/guide-to-surveillance-reporting-and-control
  - **The Massachusetts Immunization Information System (MIIS) Onboarding and Resources:**
    - https://www.miisresourcecenter.com/
  - **105 CMR 300.00: Reportable diseases, surveillance, and isolation and quarantine requirements:**
    - https://www.mass.gov/regulations/105-CMR-30000-reportable-diseases-surveillance-and-isolation-and-quarantine-requirements

Your Questions?

Rubella

- Rubella is no longer endemic in the United States but can be brought into the United States by people who get infected in other countries.
- Rubella is usually mild but can cause:
  - Low-grade fever
  - Sore throat
  - A rash (starts on the face and then goes to other parts of the body)
  - Arthritis (70% of women)
- Rubella can cause miscarriage or serious birth defects.
- One dose of MMR vaccine is 97% effective against rubella.

Rubella

- The most common reason for “reports” of rubella are when providers accidentally order IgM for immunity screening purposes.
- The Epidemiologist of the Day at the state will follow-up with the ordering providers and/or employee health to see if rubella was truly suspected.
- If testing was conducted for immunity screening only, or was not ordered intentionally, and the patient is not pregnant and does not have symptoms of rubella, the case will be revoked.
- If rubella is suspected and/or positive result is from a pregnancy screen the state epi will work on obtaining information and working with local board of health.
- True suspect/cases of rubella are extremely rare.

That was a lot of information!

- So, what are your questions?