

# MDPH Tuesday Infectious Disease Webinar Series

## Part 2: Introduction to Infectious Disease Epidemiology for Local Health (Beyond COVID-19)

**May 10, 2022**

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Senior Epidemiologist – MAVEN User Management & Data Visualization Lead

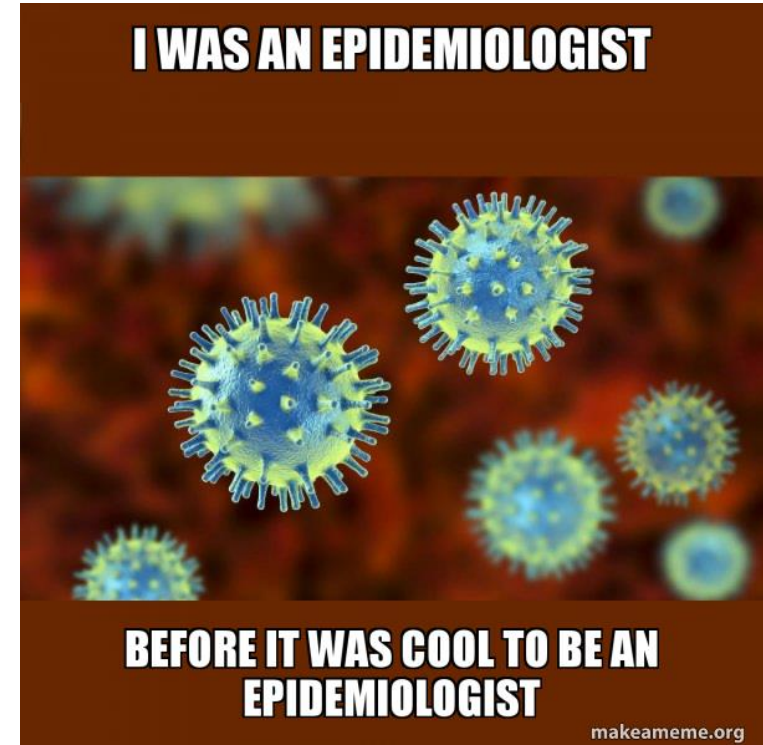
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# Topics Today

- **Introduction**
- **Infectious Disease Basics**
  - Key Words and Terms for Infectious Disease Epidemiology
- **Defining Epidemiology**
  - A Public Health Approach
  - Descriptive and Analytic Epidemiology
- **Infectious Disease Data**
  - Case Numbers
  - Rates
  - Baselines
  - Epidemic Curves
- **Applying Your Findings**
  - Using Surveillance Data
  - Examples
- **Outbreak Investigations**
  - Each Outbreak is Different: The Disease Determines the Response
  - Immediate Response Scenarios
  - Controlling Further Spread
  - Beginning an Investigation
- **Resources for Local health**



# Learning Objectives

- Review Investigation Priorities
- Define Epidemiology
- Describe Key Terminology and Concepts of Infectious Disease Epidemiology
- Describe a public health problem in terms of time, place, and person
- Identify Ways to Visualize and Compare Your Data, Including Rates and Epidemic Curves
- Identify Resources for Assisting Your Investigations

# Introduction to Infectious Disease Epidemiology for Local Health (Beyond COVID-19) Parts 1 & 2

- Welcome to Part 2 of our two-part introductory series on the core components of infectious disease epidemiology in Massachusetts!
- **Topics Include:**
  - Reporting Requirements,
  - Surveillance,
  - Case Investigation Resources, and
  - The importance of Shoe-Leather Epidemiology in identifying and investigating cases and outbreaks in your local community.
- This Training will lay the foundation for additional disease-specific trainings this spring!

## Registration:

- [Part 1: Infectious Disease Epidemiology for Local Health \(Beyond COVID-19\)](#)
  - Tuesday, April 26, 2022, 11:00-12:30 pm
- [Part 2: Infectious Disease Epidemiology for Local Health \(Beyond COVID-19\)](#)
  - Tuesday, May 10, 2022, 11:00-12:30 pm



- This training will be appropriate for new and existing local health staff and board members wishing to understand the core components of our work in MA as we respond to additional reportable infectious diseases (beyond COVID-19).
- These sessions will be recorded and posted for future use.

# Where We Left Off Last Time:

## A Day in the Life of Local Health...

- Epi wants more info about a Salmonella case
- Dead bird disposal
- MRSA skin infection cluster
- Elected official – West Nile Virus stats
- Long-Term Care Facility: Influenza-Like Illness numbers
- Restaurant – a worker is out sick
- Measles – teen at summer camp
- Bat in bedroom has rabies
- Report of Fifth Disease
- 20/60 patrons have diarrhea/vomiting after event

What are your top  
three priorities?

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What are your top three priorities?

# How Do You Prioritize in Local Health?

**The Question: What are the consequences if/when follow-up does not occur?**

- **Morbidity:** refers to an illness or disease.
  - The rate of disease in a population.
- **Mortality:** refers to death.
  - The rate of death in a population.



# Are you...

- ...currently **responsible for** responding to these kinds of questions, concerns and events?
- ...currently **comfortable and capable** of prioritizing and responding to these kinds of questions, concerns and events?
- ...**familiar with** specific **resources** which can assist with these questions and challenges?

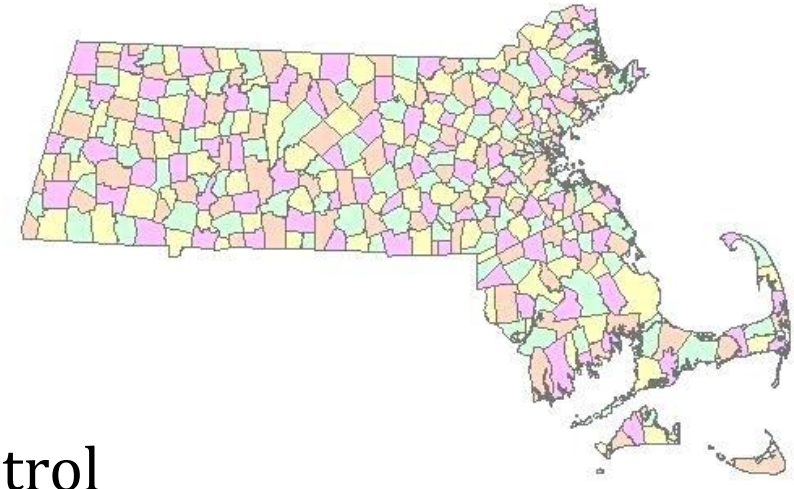
## A Day in the Life of Local Health...

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What are your top three priorities?




# Local Health's Role



- Report cases to and coordinate follow up with MDPH.
- Conduct case investigation and implement disease control measures.
- Submit Case Report Forms through MAVEN.
- Communicate reports for cases from other communities to that LBOH or MDPH.
- Establish relationships with healthcare providers and surrounding boards of health.
- Health Education.
- And Everything Else!

# What is reportable by whom?

- Disease surveillance, reporting, and control are required by law under M.G.L. c.111 and c.111D.
- 105 CMR 300.000: Reportable Diseases, Surveillance, and Isolation Quarantine Requirements



**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

<ul style="list-style-type: none"> <li>☒ Anthrax ☞</li> <li>☒ Any case of an unusual illness thought to have public health implications</li> <li>☒ Any cluster/outbreak of illness, including but not limited to foodborne illness</li> <li>☒ Botulism ☞</li> <li>• Brucellosis ☞</li> <li>☒ Cholera</li> <li>• Chikungunya virus</li> <li>• Creutzfeldt-Jakob disease (CJD) and variant CJD</li> <li>☒ Diphtheria</li> <li>• Encephalitis, any cause</li> </ul>	<ul style="list-style-type: none"> <li>☒ Meningococcal disease, invasive (<i>Neisseria meningitidis</i>) ☞</li> <li>• Mumps ☞</li> <li>• Pertussis</li> <li>☒ Plague ☞</li> <li>☒ Polio</li> <li>• Powassan</li> <li>☒ Pox virus infections in humans, including variola (smallpox), monkeypox, vaccinia, and other orthopox or parapox viruses</li> <li>• Rabies in humans</li> <li>☒ Respiratory infection thought to be due to any novel</li> </ul>
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**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. A full list of reportable diseases in Massachusetts is detailed in 105 CMR 300.100.

**Reportable Diseases Primarily Detected Through Laboratory Testing**  
Please work with the laboratories you utilize to assure complete reporting.

<ul style="list-style-type: none"> <li>• Anaplasmosis</li> <li>• Amebiasis</li> <li>• Babesiosis</li> <li>• Campylobacteriosis</li> <li>• Cholera</li> <li>• Cryptosporidiosis</li> <li>• Cyclosporiasis</li> <li>• Dengue</li> <li>☒ Eastern equine encephalitis ☞</li> <li>• Ehrlichiosis</li> <li>• <i>Escherichia coli</i> O157:H7 ☞</li> <li>• Enteroviruses (from CSF)</li> <li>• Giardiasis</li> <li>• Glanders ☞</li> <li>☒ Group A streptococcus, invasive</li> <li>• Group B streptococcus, invasive in patients &lt;1 year old</li> <li>☒ <i>Haemophilus influenzae</i>, invasive ☞</li> <li>☒ Hantavirus</li> <li>• Hepatitis B</li> <li>• Hepatitis C</li> <li>• Hepatitis D</li> </ul>	<ul style="list-style-type: none"> <li>• Legionellosis ☞</li> <li>• Listeriosis ☞</li> <li>• Lyme disease</li> <li>• Melioidosis ☞</li> <li>• Norovirus</li> <li>• Pneumococcal disease, invasive (<i>Streptococcus pneumoniae</i>) in patients &lt;18 years old ☞</li> <li>• Pneumococcal disease, invasive, penicillin-resistant</li> <li>• Salmonellosis ☞</li> <li>• Shiga toxin-producing organisms ☞</li> <li>• Shigellosis ☞</li> <li>• <i>Staphylococcus aureus</i>, methicillin-resistant (MRSA), invasive</li> <li>☒ <i>Staphylococcus aureus</i>, vancomycin-intermediate (VISA) and vancomycin-resistant (VRSA) ☞</li> <li>• Psittacosis</li> <li>• Q fever</li> <li>• Toxoplasmosis</li> <li>• Typhus</li> <li>• Vibriosis ☞</li> <li>• West Nile ☞</li> </ul>
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# The Basics

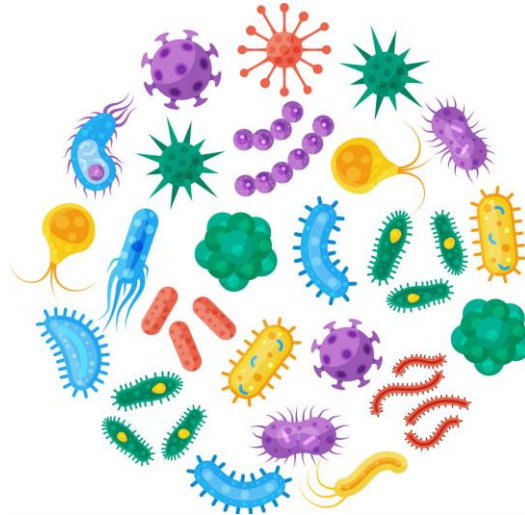


## Infectious Diseases

# Infectious Disease Basics

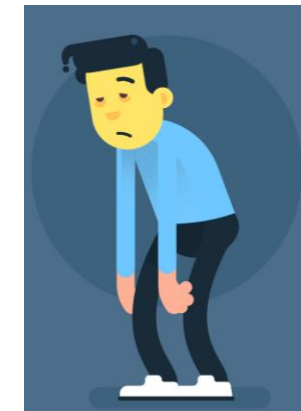


- **What is an infectious disease?**
- **Disease:** Illness. An abnormal condition, a consequence of infection. Impaired physiological functioning.
  - An illness caused by microbes such as bacteria, viruses, fungi or parasites.



# Key Infectious Disease Concepts:

- Infectious diseases cause a variety of signs and symptoms:
  - Respiratory illness
  - Rash illness
  - Gastrointestinal (GI) illness
  - Fever
  - Jaundice
- A change in the body or its functioning, whether perceived by the patient or observed by HCPs.

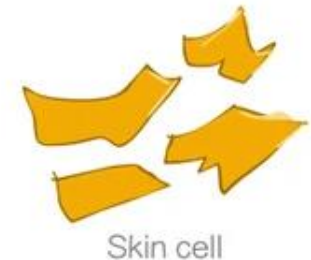
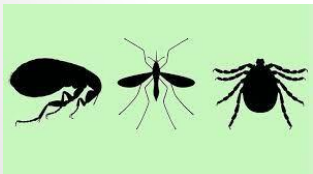
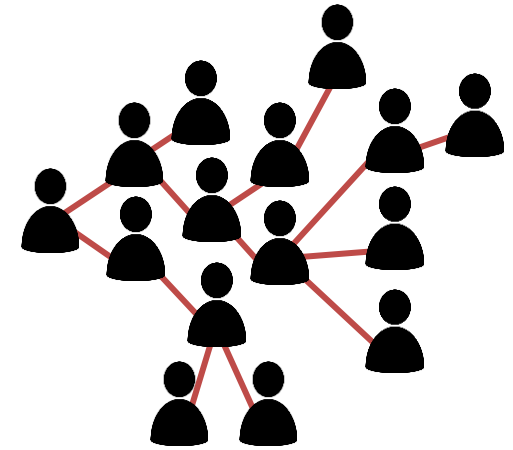




# Key Infectious Disease Concepts:



- Infectious diseases transmitted in a variety of ways.
  - Some spread person-to-person by droplets coughed or sneezed
  - Some spread through food or water
  - Some spread through insects or animals
  - Some spread sexually
  - Some by direct contact
  - Some by contact with an object
  - Needle sharing
  - Blood, organ transplants



# Important Disease Terms

- **Arbovirus Disease:** General term used to describe infections caused by a group of viruses transmitted by the bite of infected arthropods (insects) such as mosquitoes and ticks.
- **Enteric Disease:** caused by micro-organisms such as viruses, bacteria and parasites that cause intestinal illness.
- **Zoonotic Disease:** an infectious disease that is transmitted between species from animals to humans (or from humans to animals).
- **Reservoir:** An animal, plant or environment in which a disease can subsist for extended periods of time.
- **Vector:** A living creature that passes a disease to another living creature.

# Key Words:

- **Exposure:** An encounter with a potentially pathogenic organism, which may or may not result in infection.
- **Index Case:** The first person infected with a pathogen in a referenced disease transmission chain.
- **Infection:** Occurs when a pathogenic micro-organism (e.g., bacteria or virus) invades the body or a part of the body, usually causing injury to tissue or pathology (disease).
- **Incubation Period:** The time interval between invasion by infectious agent & first appearance of disease. Varies from 2-4 hours for staphylococcal food poisoning to a month for hepatitis A virus to potentially several years for some diseases like rabies.
- **Communicable Period or Infectious Period:** is the interval during which an infectious agent may be transferred directly or indirectly from an infected person to another person
- **Isolation:** Separates sick people with a contagious disease from people who are not sick.
- **Post-Exposure Prophylaxis (PEP):** Medication or treatment given post-exposure to prevent infection.
- **Quarantine:** Separates and restricts the movement of people who were exposed to a contagious disease to see if they become sick.



# Key Words:

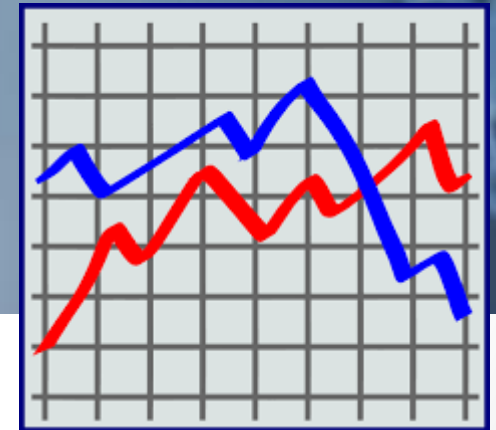
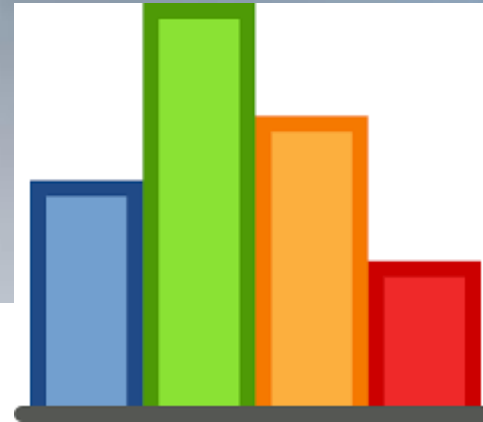
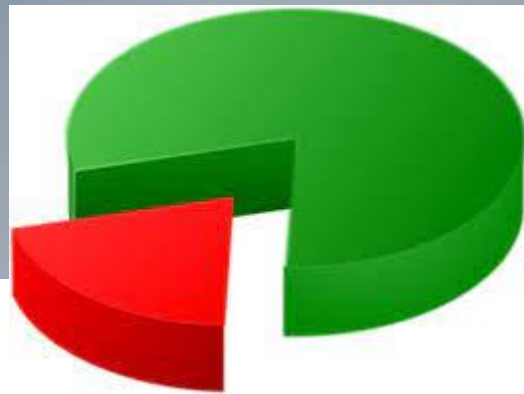
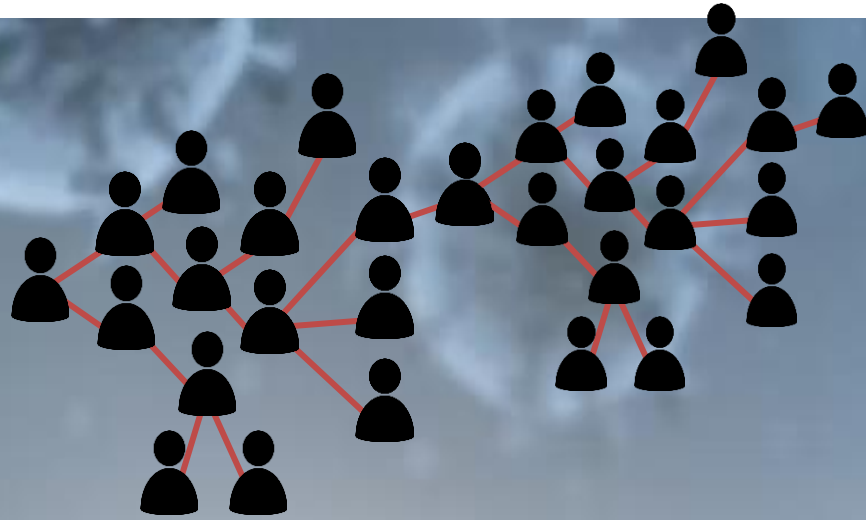
- **Cluster:** Refers to an aggregation of cases grouped in place and time that are suspected to be greater than the number expected, even though the expected number may not be known.
- **Epidemic:** A widespread occurrence of an infectious disease in a community at a particular time.
- **Outbreak:** An outbreak is a cluster with a clear association between cases, with or without a recognized common source or known disease agent.
- **Pandemic:** An epidemic spanning many countries, regions or continents. The parameters of this definition are a bit amorphous and largely depend on the opinions of scientists and health officials using the term.

# Key Distinctions Across Diseases

- For each disease, similar concepts, different features:
  - Symptoms
  - Symptom onset
  - Incubation period, infectious period
  - Mode of transmission
  - Prevention
  - Appropriate Testing
    - Not all lab tests are equal, and some diseases require additional follow-up testing for confirmation.



# What is Epidemiology?

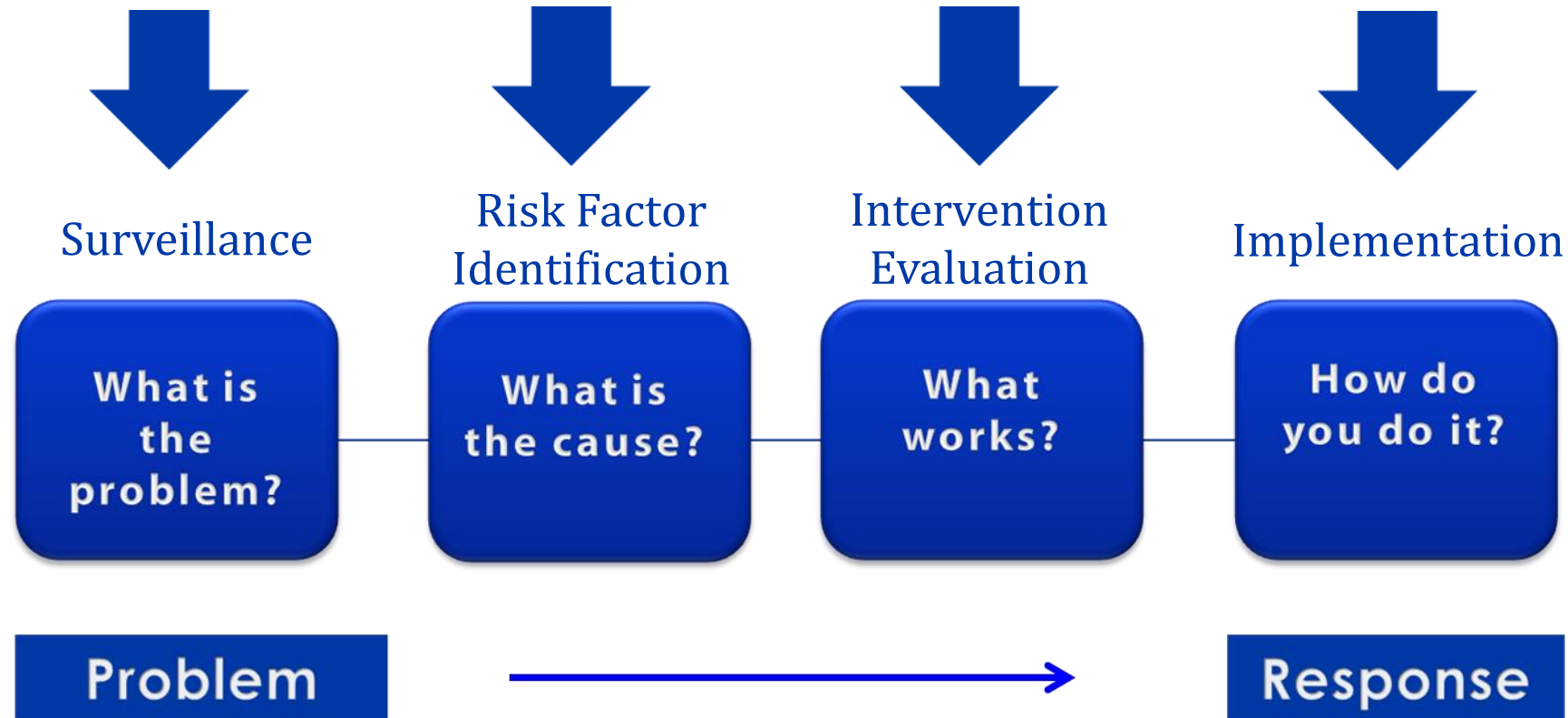


# Infectious Disease Epidemiology - Defined

- **Infectious Disease Epidemiology:**
  - The study of the distribution and determinants of infectious diseases among specified populations, and the application of that study to the control of infectious disease.
- **Epidemiology** enables us to determine where diseases originate, how or why they move through populations, and how we can prevent them.

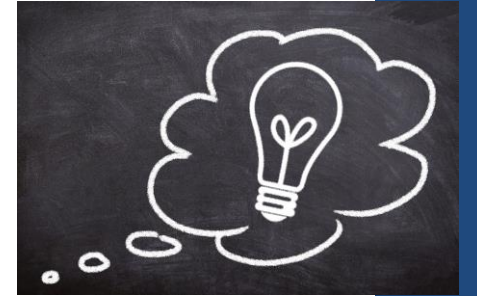


# A Public Health Approach



# The Purpose of Epidemiology in Public Health Practice

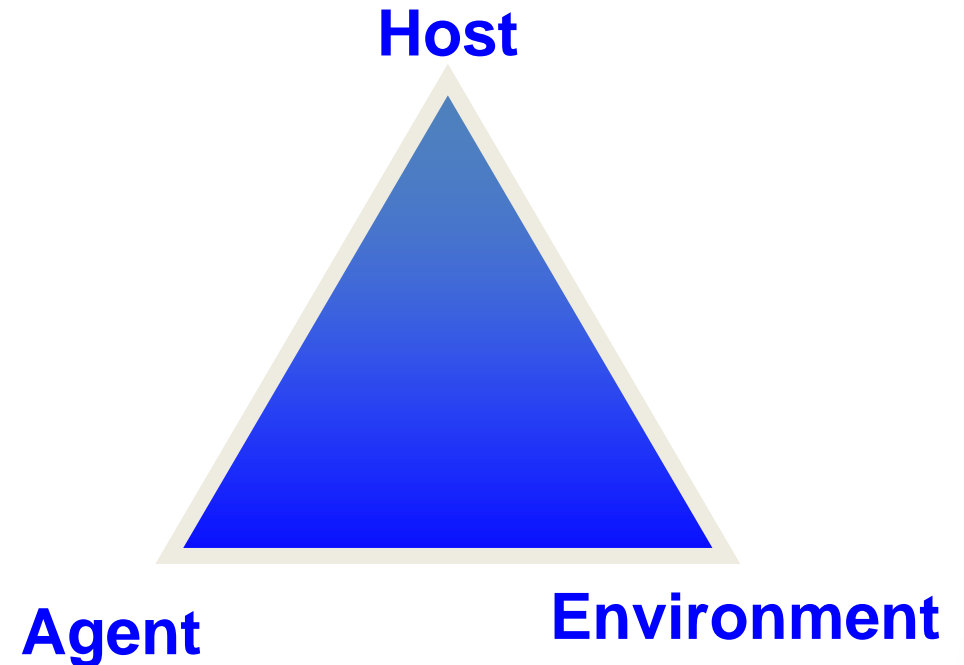
- **Discover** the agent, host, and environmental factors that affect health
- **Determine** the relative importance of causes of illness, disability, and death
- **Identify** those segments of the population that have the greatest risk from specific causes of ill health
- **Evaluate** the effectiveness of health programs and services in improving population health



# Disease Transmission

- The triad consists of an external **agent**, a susceptible **host**, and an **environment** that brings the host and agent together.
- In this model, disease results from the interaction between the agent and the susceptible host in an environment that supports transmission of the agent from a source to that host.

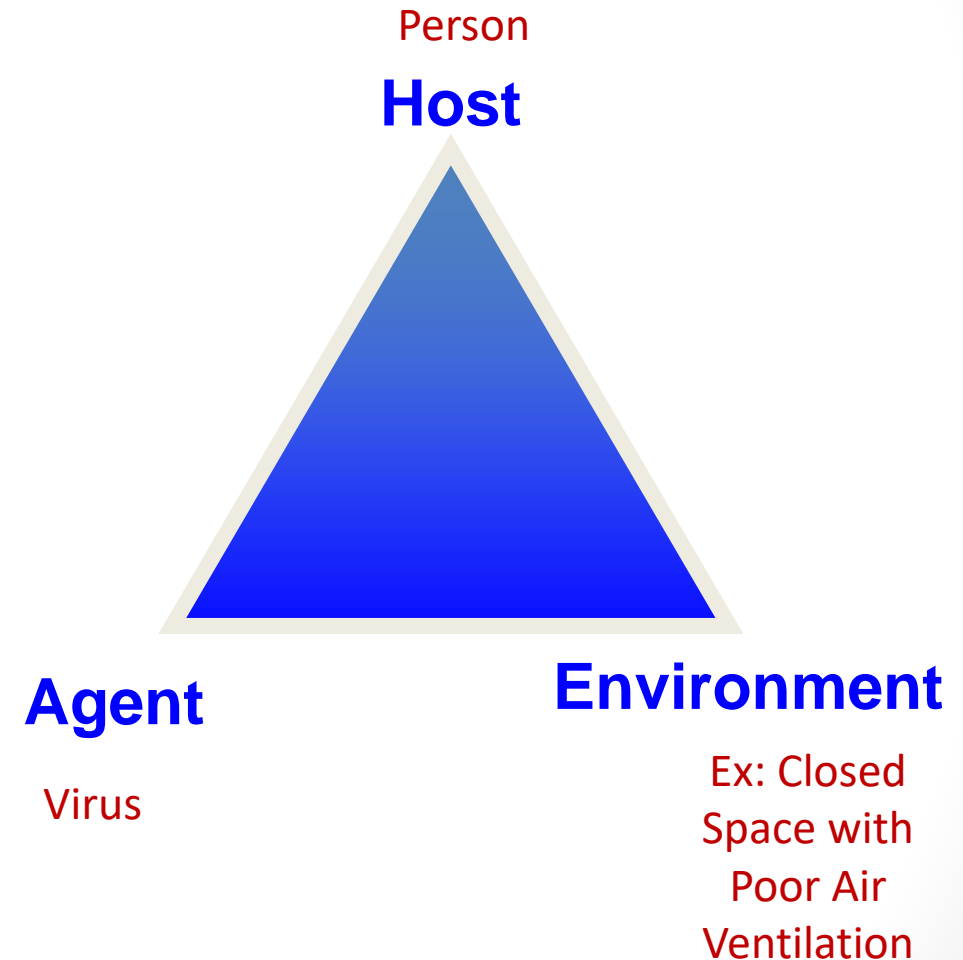
The “Epidemiologic Triad.”



# Disease Transmission

- **Agent** originally referred to an infectious microorganism or pathogen: a virus, bacterium, parasite, or other microbe.
- **Host** refers to the human who can get the disease. A variety of factors intrinsic to the host, sometimes called risk factors, can influence an individual's exposure, susceptibility, or response to a causative agent.
- **Environment** refers to extrinsic factors that affect the agent and the opportunity for exposure. Can include:
  - Physical factors such as geology and climate, biologic factors such as insects that transmit the agent, and socioeconomic factors such as crowding, sanitation, and the availability of health services.

## The “Epidemiologic Triad.”





# Observational Epidemiology

- There are many different types of epidemiology studies, but the use of surveillance data generally lends itself to observational studies, where the epidemiologist does not control the circumstances.
- **Descriptive Epidemiology** is fundamental to what epidemiologists do. In a descriptive study, the epidemiologist collects information that characterizes and summarizes the health event or problem.
- **Analytic Epidemiology** comes next. In an analytic study, the epidemiologist relies on comparisons between different groups to determine the role of different causative conditions or risk factors.
- Time, place, and person is the mantra of the epidemiologist.

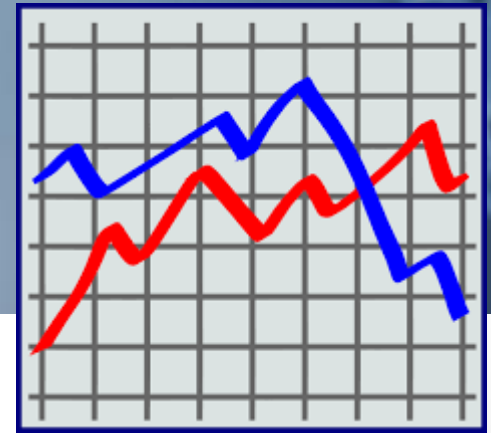
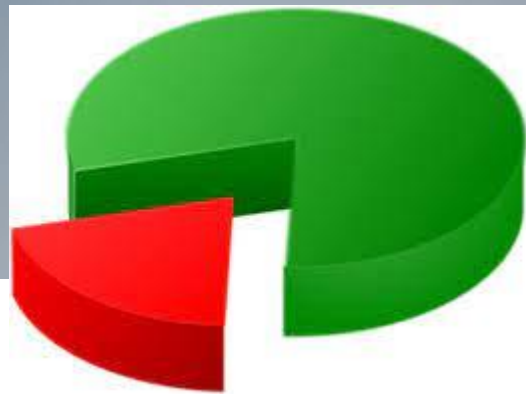
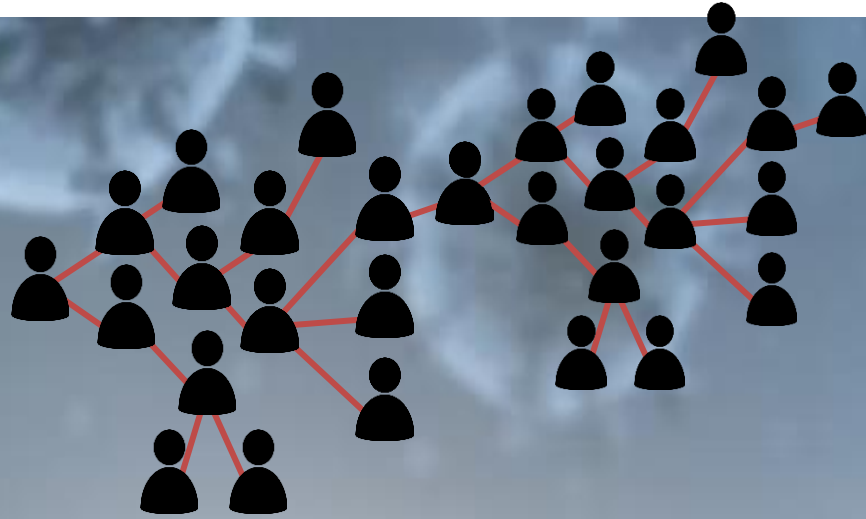
# Descriptive and Analytic Epidemiology

- During the descriptive process, we are concerned with:
  - when the population was affected,
  - where they were affected, and
  - who specifically was affected.

Descriptive Epidemiology	Analytic Epidemiology
When was the population affected?	How was the population affected?
Where was the population affected?	Why was the population affected?
Who was affected?	

- From the observations gathered during the descriptive process, a hypothesis is generated about the causes of observed patterns and the factors that increase risk for disease.
- To test a hypothesis, epidemiologists must use an analytic epidemiology process in which they ask how and why the population was affected.

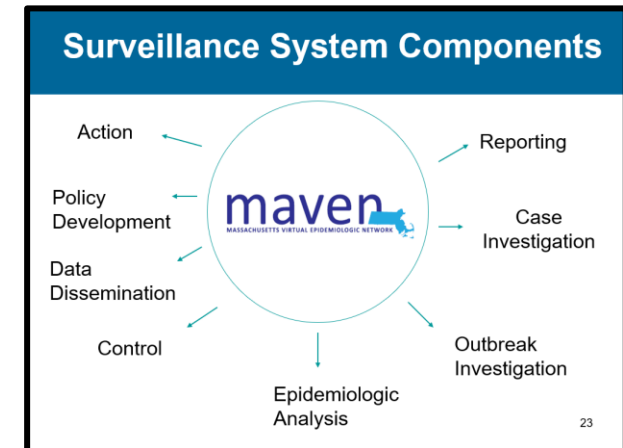
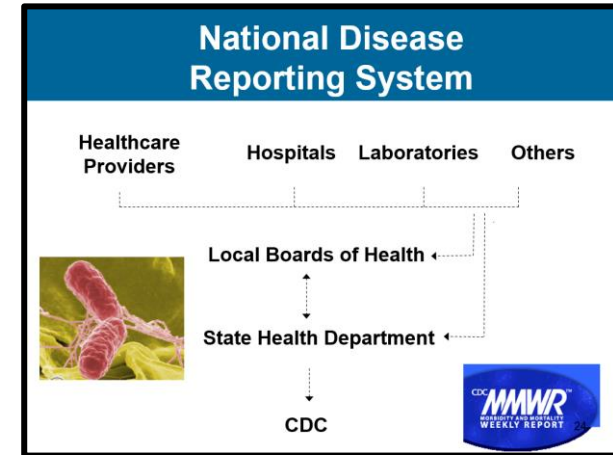
# Infectious Disease Data



# Looking at Your Data

- Last session we spoke about data sources and the importance of thorough investigations to ensure data completion.
- As you start to look more analytically at your disease data in your community, a question you should ask is:

**“What is normal for our jurisdiction?”**



# Case Numbers

- If a community reports 10 cases of an infectious disease, is it an emergency? What about 20 cases?
- The answer is – we don't know without more information. Is this 10 cases in a community of 20 people? Or is it 10 cases in a community of 50,000 people? Was it 10 cases reported YESTERDAY, or 10 cases over the last year?
- As epidemiologists, we know there is more to a situation than just straight case numbers. Remember, we want to know TIME, PLACE, and PERSON.

# Rates: Comparing Population Characteristics

- **Rates** help us compare health problems among different populations that include two or more groups who differ by a selected characteristic.
  - For example, we might compare persons who had not eaten at a particular restaurant for a particular meal with persons who had eaten at that restaurant for that meal and look for cases of foodborne illness.
- By comparing population characteristics, we can observe more clearly what factors might be associated with a health event, such as what might be making persons ill. We can then determine what actions to take, such as facilitating programs and activities that support health or prevent more persons from becoming ill.
- Rates also help us determine unusual activity by comparing a **baseline** rate of disease or condition with a current event, such as whether a spike or decline in influenza reports are greater than or less than what is typically expected.

# Rate Formula

- To calculate a rate, we first need to determine the frequency of disease, which includes
  - **the number of cases** of the illness or condition
  - the size of the **population at risk**
  - **the period** during which we are calculating the rate

$$\text{Rate (\%)} = \frac{\text{number of cases}}{\text{population at risk}} \times 100$$

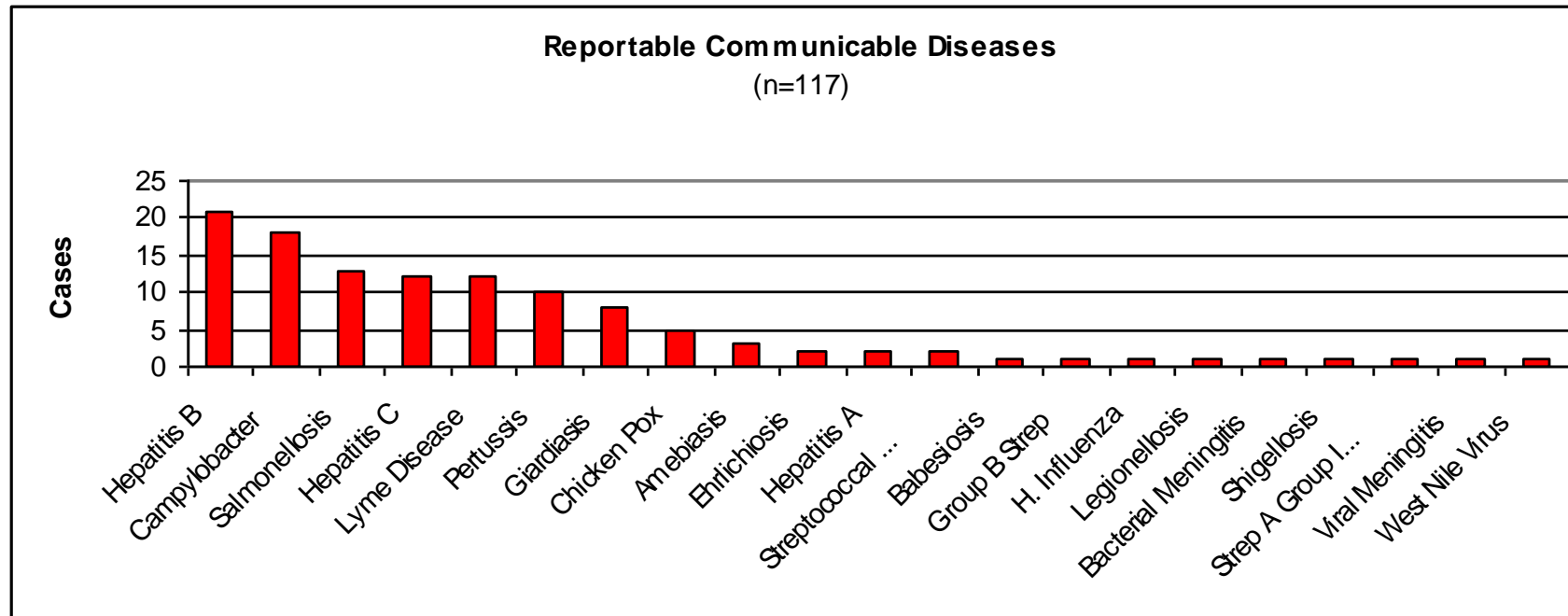
## Legionnaires' Disease Rate

Hotel A Residents  
Time: July 21–24, 1976

	Frequency	Unit	Rate
Age (yrs)	Sick	Total	Percentage
≥39	3	44	6.8
40–49	9	160	5.6
50–59	27	320	8.4
60–69	12	108	11.1
≥70	11	54	20.4
Unknown	0	2	0

Be sure to note your population at risk correctly to ensure accurate calculations.

# Know What is Normal (Baseline) for Your Community



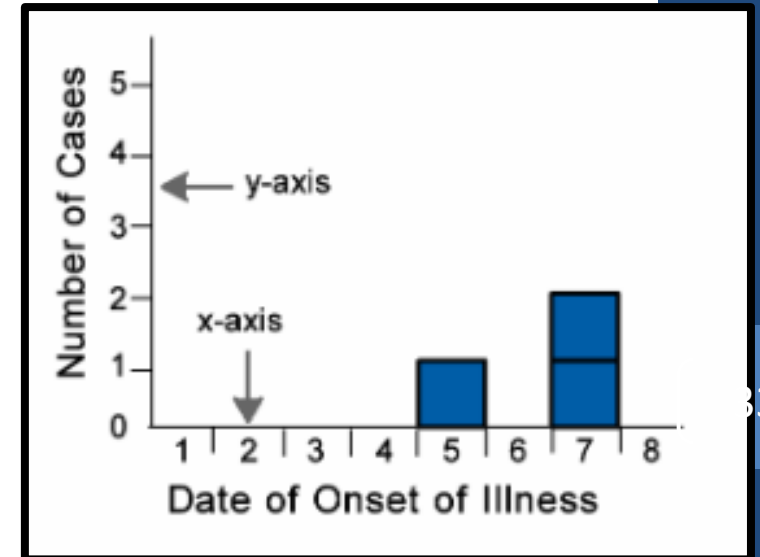
Example



# Epidemic Curve (Epi Curve)

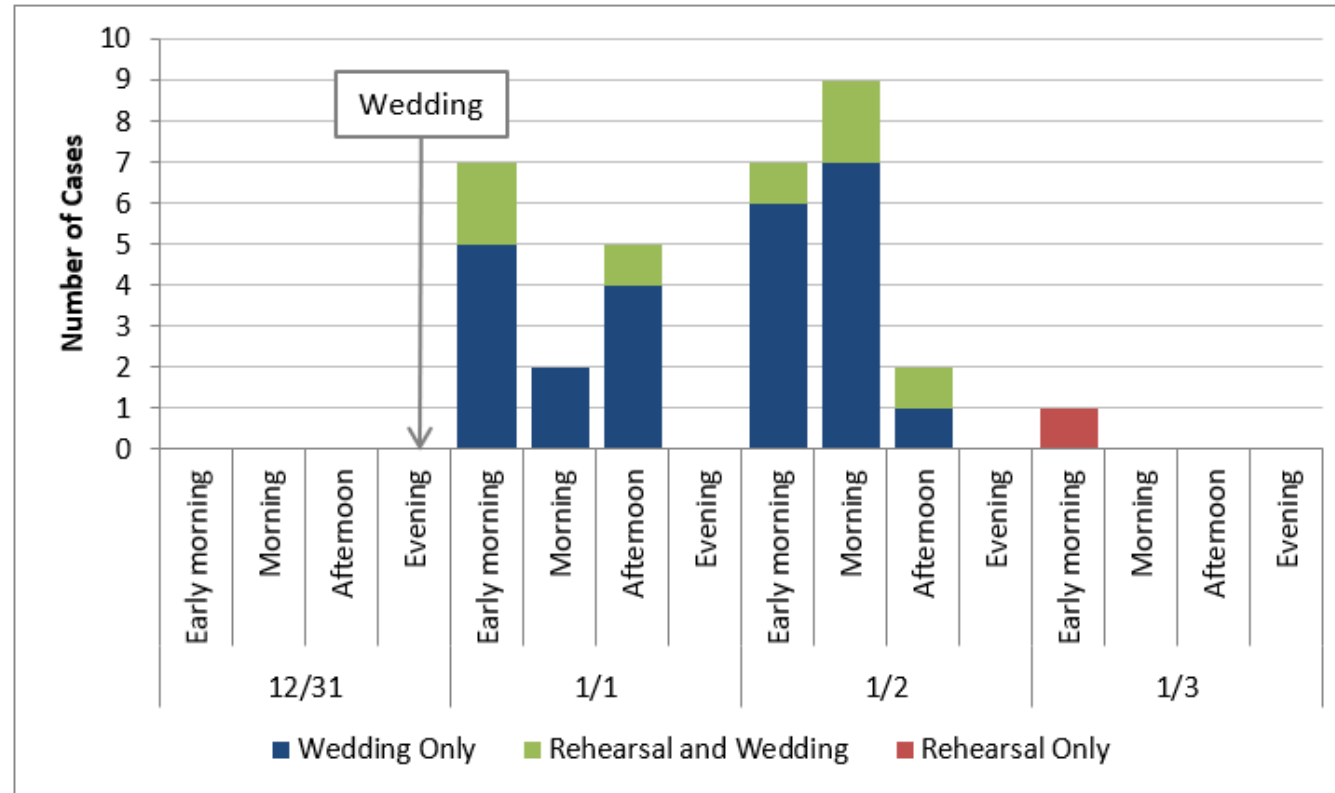
- An **epi curve** is a visual display of the onset of illness among cases associated with an outbreak.
- You can learn a lot about an outbreak from an epi curve, such as
  - The outbreak's time trend: the distribution of cases over time
  - Outliers: cases that stand apart from the overall pattern
  - General sense of the outbreak's magnitude
  - Inferences about the outbreak's pattern of spread
  - The most likely time period of exposure

[CDC Quick Lesson on Creating Epi Curves](#)



# Example Epi Curves

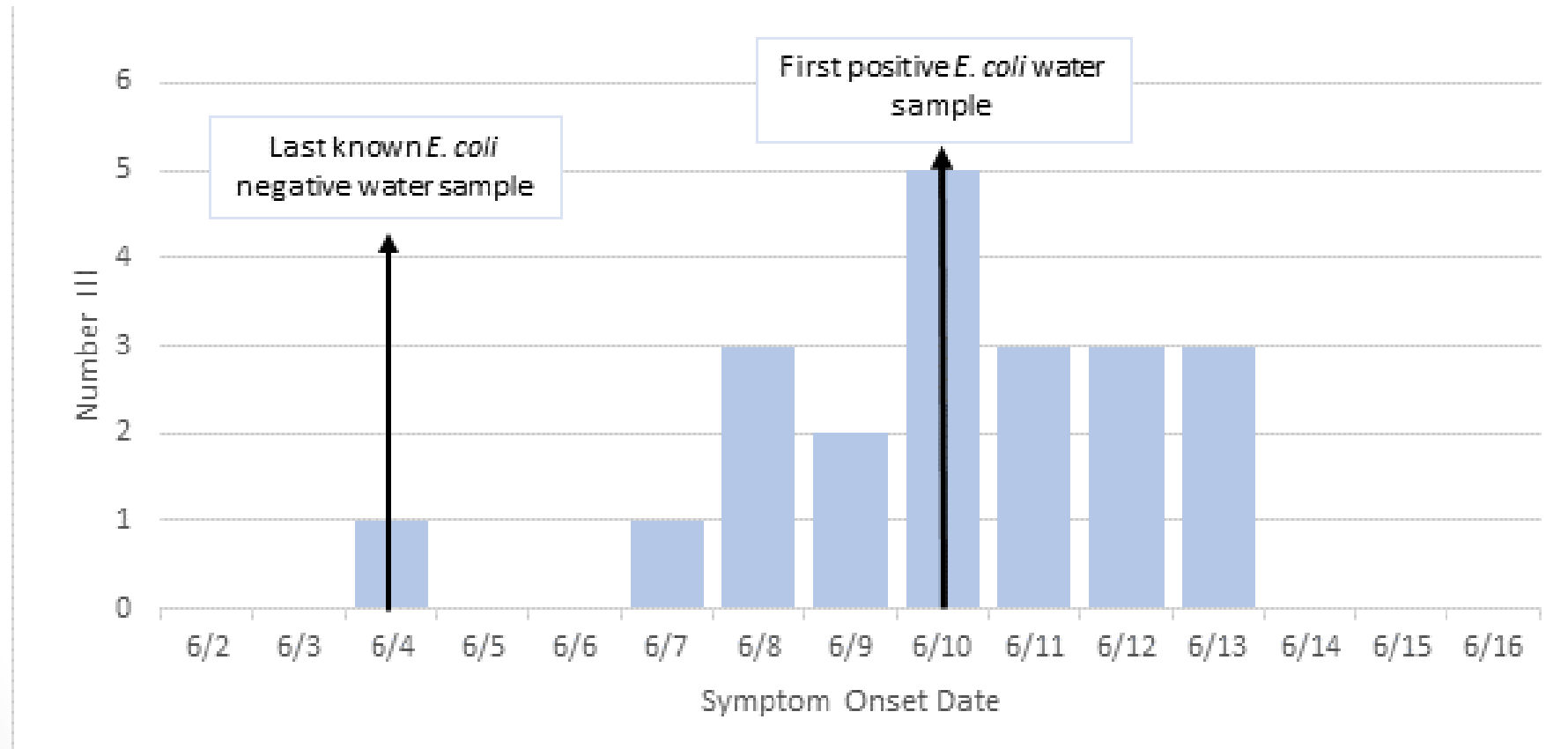
Figure 1. Epidemic curve of illness onset among wedding attendees responding to the survey, by wedding event attendance<sup>a</sup> (n=33)



<sup>a</sup> Wedding attendance was determined by completion of one or more wedding food exposure questions.

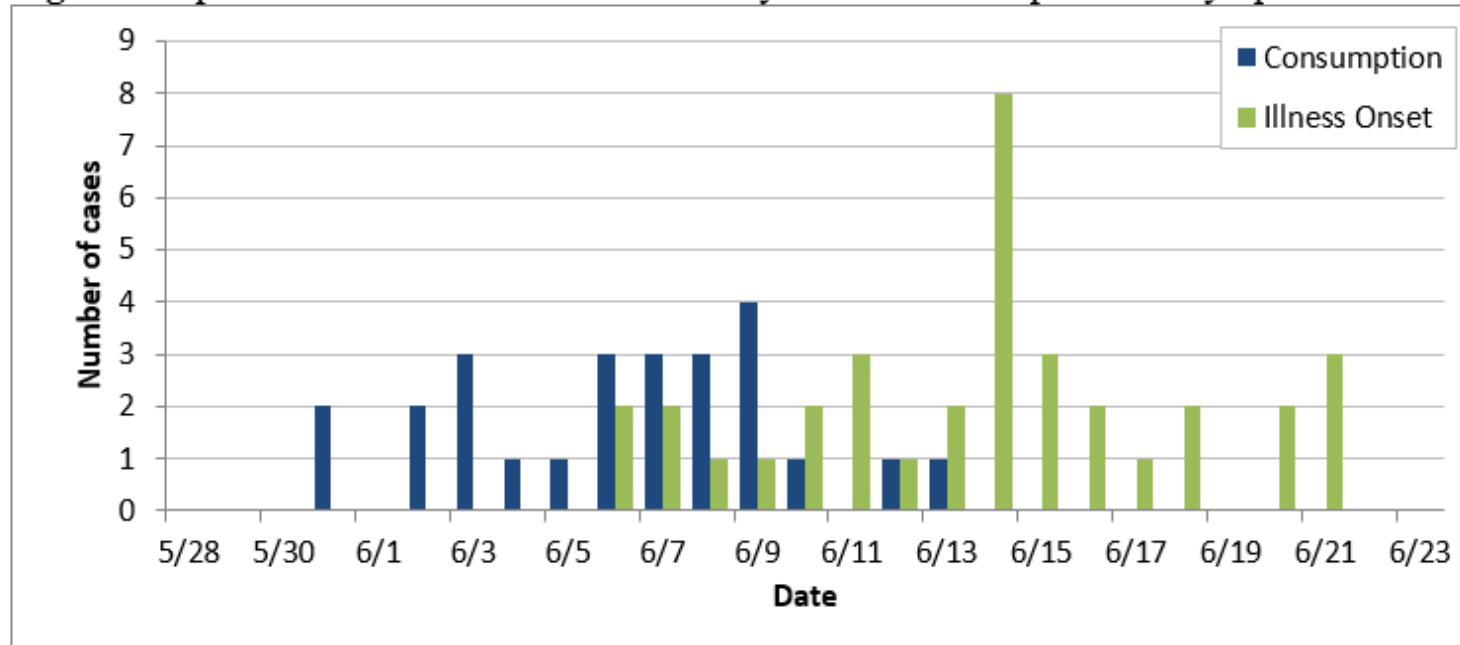
# Example Epi Curves

Epidemic curve of symptom onset among residents  
reporting gastrointestinal illness



# Example Epi Curves

**Figure 1.** Epidemic curve of confirmed cases by date of consumption and symptom onset<sup>a</sup>



a. Date of consumption available for 27 cases. Two cases reported dining at restaurant more than once during their incubation period.

# Thinking About Your Data

- Remember your data is only as good as the information you collect.
  - If you want to examine a variable like **occupation** or **race**, you are dependent on your team collecting that information accurately and completely.
    - If you have questions on how to collect certain variables, discuss with the Epi Program to determine strategies or identify trainings that focus on skills building during the interview process.
    - Remember, not all questions require an interview of the patient. Some information can be collected by contacting the Ordering Provider (provider who ordered the test) or by the patient's PCP.

# Thinking About Your Data

- Denominators are an important component when determining rates, so be sure to utilize your appropriate census data for different years.
- **Rates per 100,000 population** is a common tool for comparison (across towns or within your own town across time). For example:
  - **Big City** (population 600,000) has 50 cases this year.
    - $50/600,000 = 0.000083333$   
$$\begin{array}{r} \text{X } 100,000 \\ 8.33 \end{array}$$
  - **Middle City** (population 450,000) has 50 cases this year.
    - $50/450,000 = 0.00011111$   
$$\begin{array}{r} \text{X } 100,000 \\ 11.11 \end{array}$$
- There are different resources for census data, so be sure to note the census numbers/resource you are utilizing.

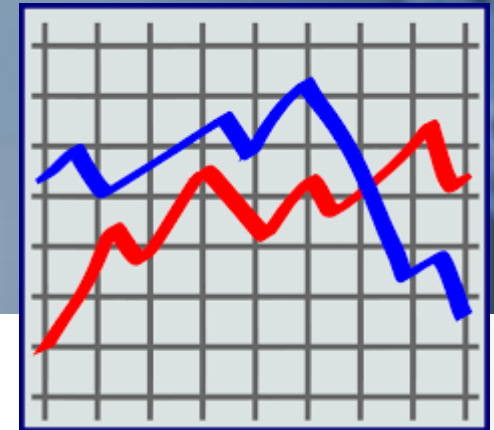
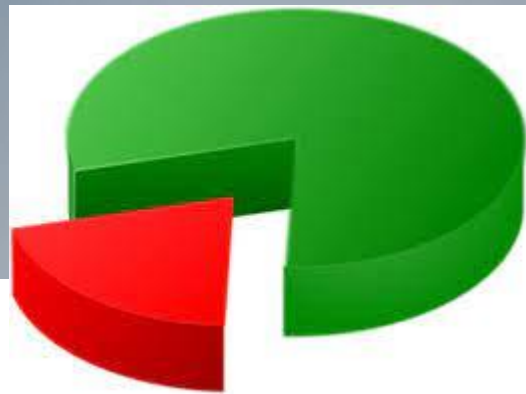
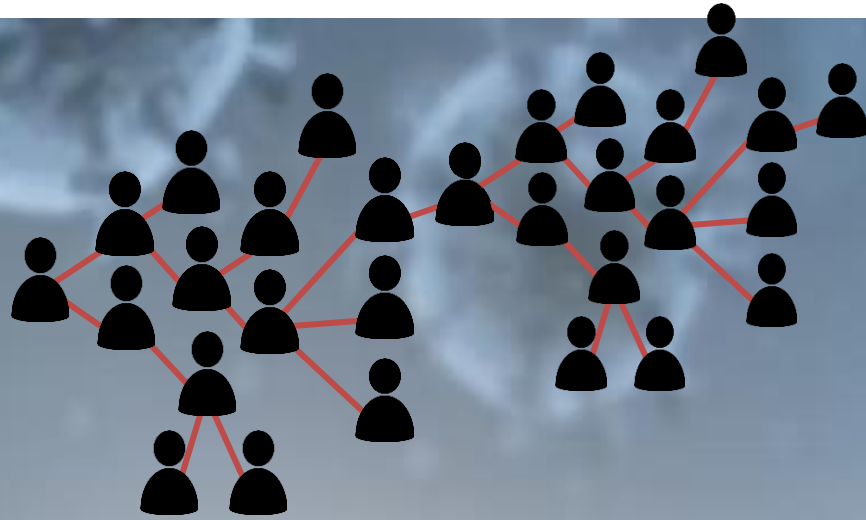
Big City has a disease rate of  
**8.33 cases per 100,000 residents.**

Middle City has a disease rate of  
**11.11 cases per 100,000 residents.**

# What are the Limitations of Surveillance Data Collected by MPDHD?

- **Under-reporting:** Most surveillance systems are passive and rely on active participation of busy healthcare providers and other reporters; therefore, under-reporting is inevitable.
- **Incomplete data:** Case's lack of cooperation, inability to contact the case, or an inability of the case to recall activities or potential exposures.
- **Reporting bias:** More likely to get reports when case is symptomatic vs. asymptomatic; with media coverage; with more severe or rare conditions; and with new diagnostic technology.
- **Changing reporting criteria:** Updated every couple of years.
- **Changing laboratory tests:** Some more useful than others.

# Applying Your Findings





# How Should Your Surveillance Data Be Used?

- Our Goals in Public Health Surveillance:
  - Establish baseline disease data
  - Monitor disease trends over time
  - Rapidly detect increases in disease occurrence
  - Identify high-risk groups
  - Implement and evaluate control measures
  - Allocate resources and guide public health policy/action
- Think about “Person, Place, and Time” and how your data can help to stop the chains of infection, preventing morbidity and mortality.

Let's take a look at some examples of using your data...

# COVID-19 & Increases in Hockey Clusters & Cases

- In 2020, we saw numerous sports-related COVID-19 clusters.
- Notably, we saw a large increase in Hockey-associated cases in Fall 2020
  - This was not the only time we saw this increase
- Began seeing transmission both within AND between teams
  - Documented in MAVEN by linking clusters to one another and detailing exposure information
- Data request from Leadership: Discussed what we were seeing in terms of transmission and the challenges of obtaining information from teams/organization
  - Leadership supported our recommendation of quarantining all individuals on the ice since there was evidence of within team **AND** between team transmission



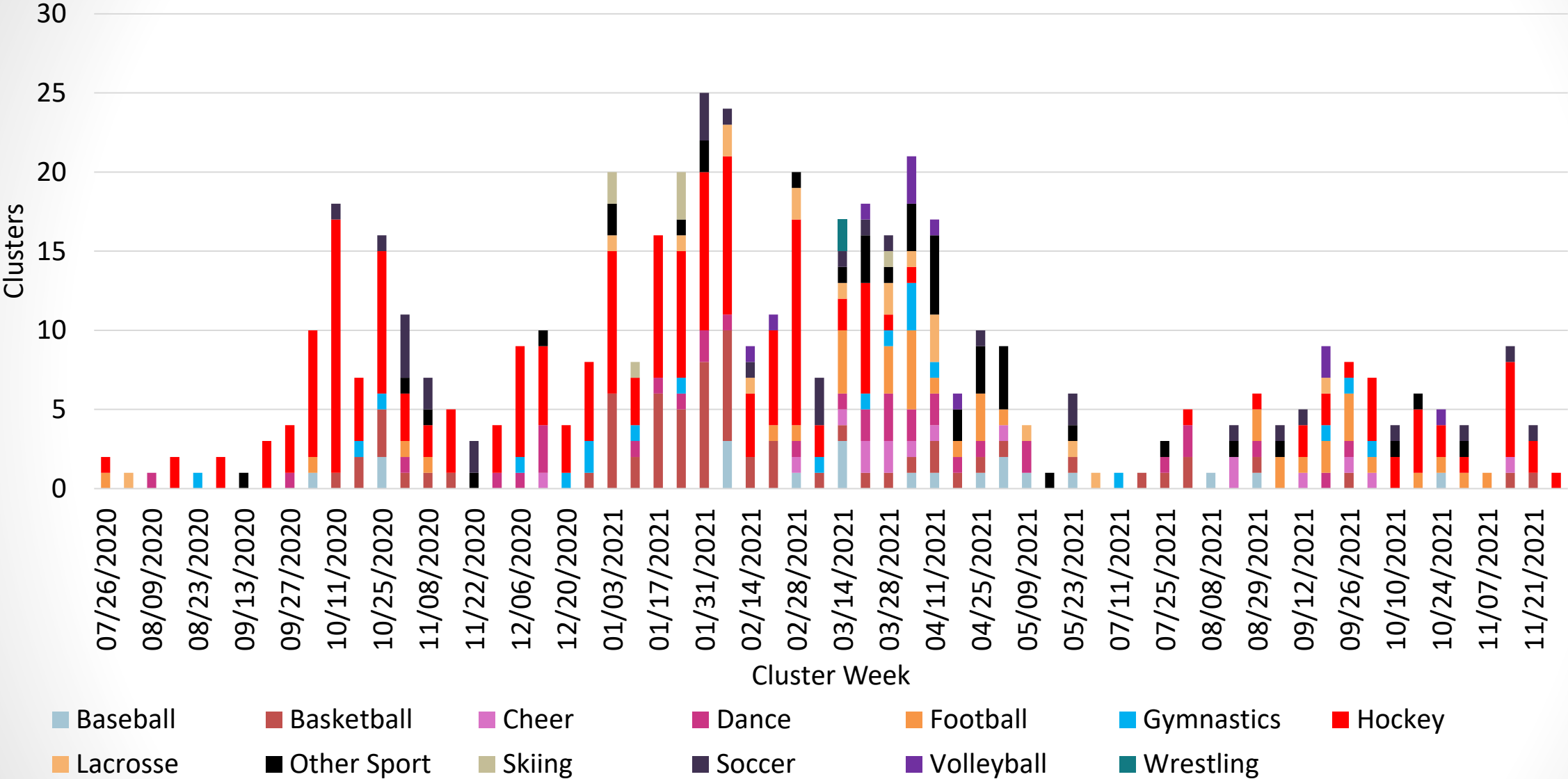
## Sports Clusters Documented in MAVEN\*

	N	Cases (Confirmed & Probable)	Contacts	Risk Level <sup>1</sup>
Hockey	194	842	1775	High
Basketball	68	246	336	High
All Others	41	190	135	Varies
Football	38	227	377	High
Dance	35	193	139	Moderate
Soccer	31	112	154	Moderate
Baseball	20	104	228	Moderate
Gymnastics	20	99	163	Low
Lacrosse	19	138	185	Moderate (F); High (M)
Cheer	16	138	206	High
Volleyball	11	53	86	Moderate
Skiing	7	46	9	Low
Wrestling	2	49	44	High

\*This table represents total clusters, confirmed & probable cases, and contacts among ALL sports related clusters with linked cases as of 11/29/2021

<sup>1</sup>Risk levels were designated by the EEA. All EEA guidance was rescinded as of 5/29/2021

Sports Clusters by Cluster Week



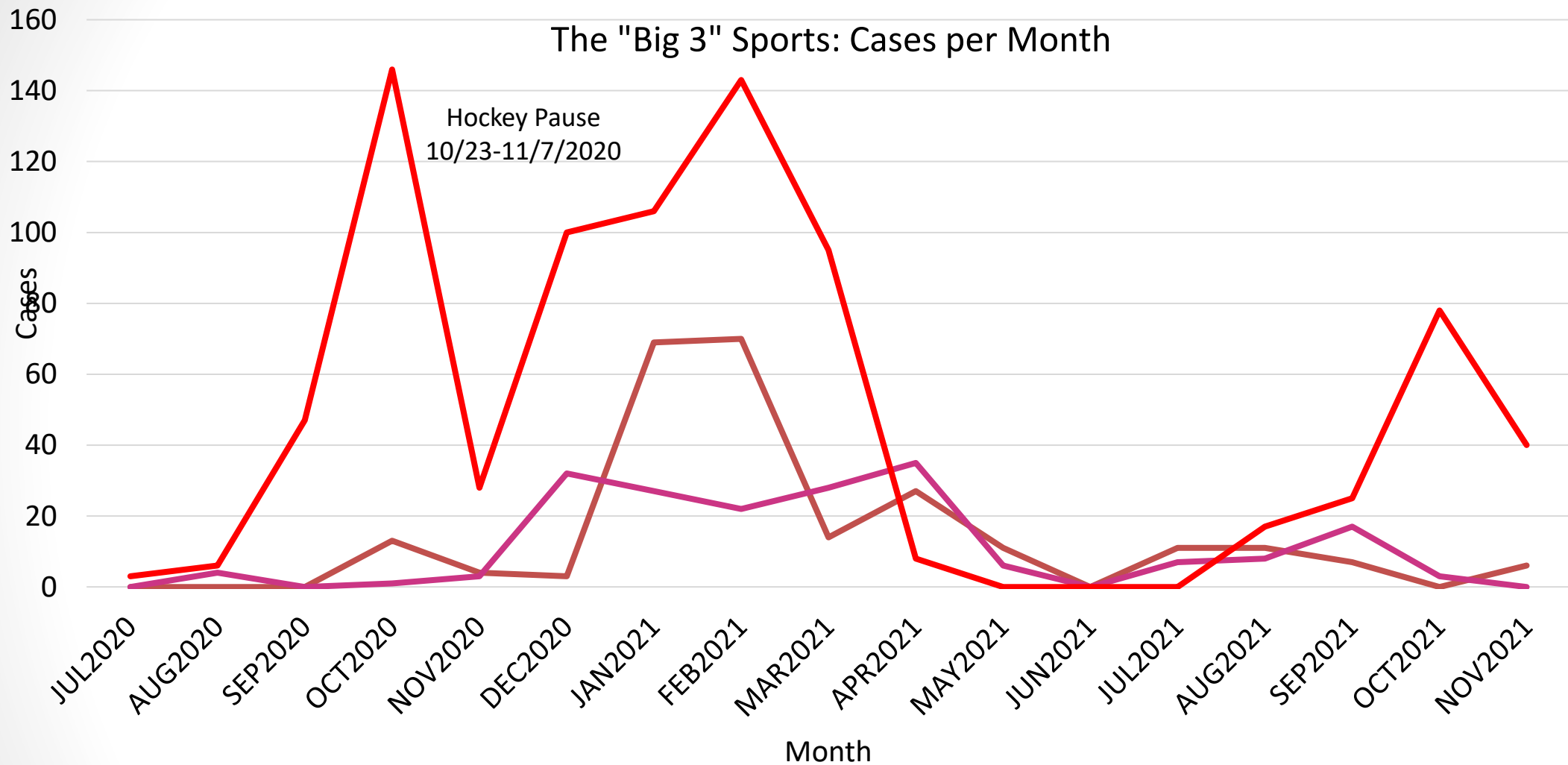
Data are through 11/29/2021

# The Hockey Pause: 10/23/2020-11/7/2020

Looking at the high-risk activity and setting, the [challenges](#) with compliance, and resulting data, a temporary pause on Hockey activities was implemented.

- “Massachusetts to temporarily pause all indoor ice rink and ice skating facilities operations for two weeks” – [DPH press release 10/22/2020](#)
- “Massachusetts Shuts Down Ice Rinks To Combat Coronavirus Spread Among Hockey Leagues” – [WBUR 10/23/2020](#)
- “New England States Ban Interstate Travel For Youth Hockey” – [WBUR 11/12/2020](#)



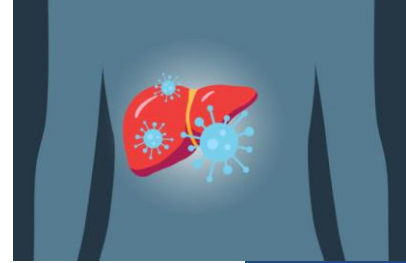


Data are through 11/29/2021

— Basketball — Dance — Ice Hockey

# Hepatitis A Outbreak in Massachusetts

Liver disease caused by hepatitis A virus (HAV), spread by the fecal-oral route.  
Average incubation period is 28 days (range 15- 50 days)

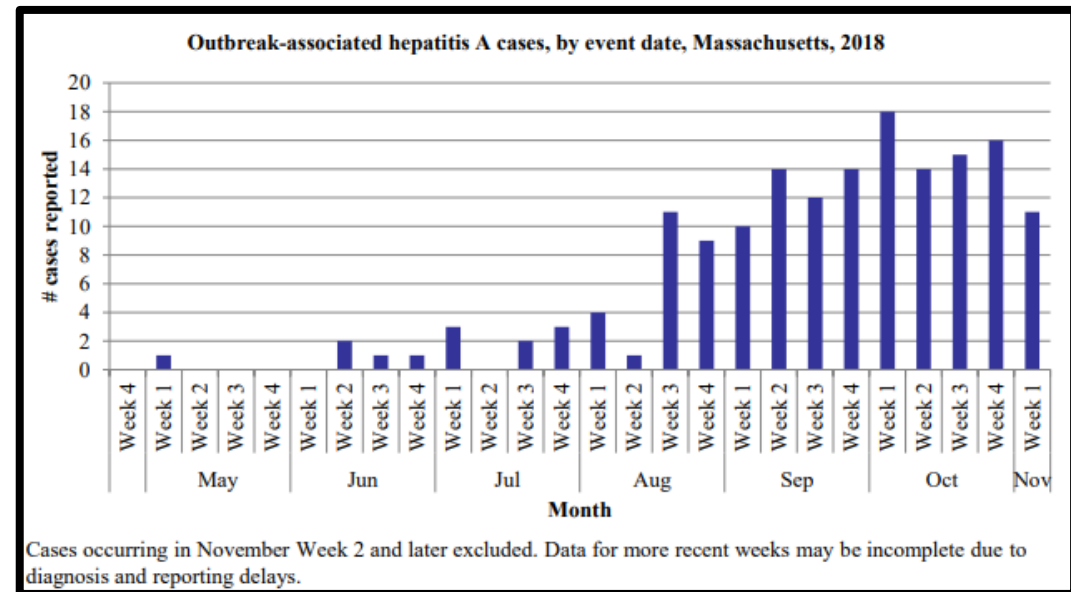


## Typical Hepatitis A in MA

- 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

## April – Nov 2018

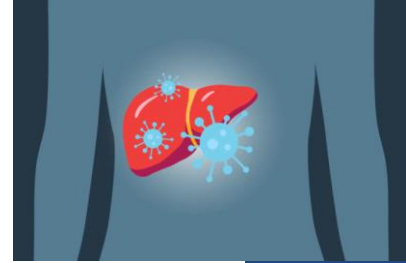
- **168 cases** reported to MDPH in individuals experiencing homelessness and/or substance use disorder





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## April – Nov 2018

- **168 cases** reported to MDPH in individuals experiencing homelessness and/or substance use disorder
- Complications:
  - **Hospitalization rate: 84%**
  - Mortality rate: 2%
- Demographics
  - **Gender: 58% male**
  - Age: Range 21-78, Median 32
  - Race/ethnicity: predominantly white non-Hispanic
- **Risks:**
  - Homelessness/unstable housing: 55%
  - Injection drug use: 70%
  - Any illicit drug use: 85%
  - Current or recent incarceration: 9%

# Hepatitis A Outbreak in Massachusetts

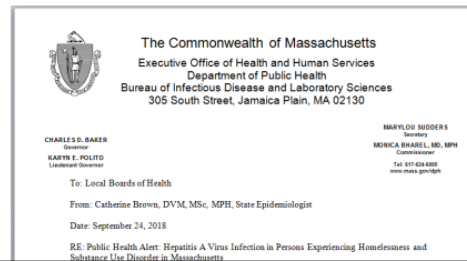
## MDPH response

- Case investigations!
  - Infectious period is 2 weeks prior to onset through 1 week after symptom onset
  - PEP recommended for close contacts
    - Household members
    - Sexual contacts
    - Anyone sharing food, beverages, or eating utensils
    - Special considerations for settings such as shelters, drug treatment facilities, and homeless shelters
- 9 cases in foodhandlers since state health department investigation began

Using the Data to Target a Multi-Phased Response

## MDPH response

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



## MDPH response

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

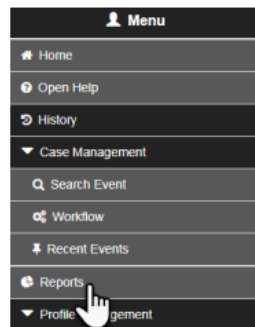
**Hepatitis A is going around.**  
Hepatitis A is a virus that can cause liver disease.

**Protect yourself:  
Get your  
Hepatitis A vaccination**

# Access MAVEN Data through Reports

- A MAVEN report [Tip Sheet](#) is available for reference on MAVEN Help.
- The tip sheet will walk you through how to run a report and some of the reports available to LBOH.

## LBOH Reports



### To run MAVEN Reports

**Step 1:** Navigate to the MAVEN Dashboard and click on **Reports** from the Menu options.

**Step 2:** A few reports you can use to manage your COVID cases/contacts are listed below -- select your report option for your town/city from Select Report dropdown.

**Step 3:** Enter **Start Date & End Date**

**Step 4:** Enter the Town/City you are running the report for. Some reports the user needs to manually enter the **Official City** field. You need to enter in all caps, for example – “Lowell” needs to be entered as “LOWELL”. Some reports you have to search first for your city/town and then select prior to running the report. **Step 5:** Click **Run Report** button.

**Report output options:** HTML (view on your screen/browser) and CSV (comma separate values).

[Additional information around reports is located in the FAQ folder.](#)

## LBOH Reports

- 4) **COVID-19 LBOH Contact line list Report** - This report will show you all the Contact events of COVID-19 you have. Leave the Step 4 as blank and it will pull all contact events. If you only want to see contact events where you have answered Admin Step 4 with a Yes or No then choose those options.

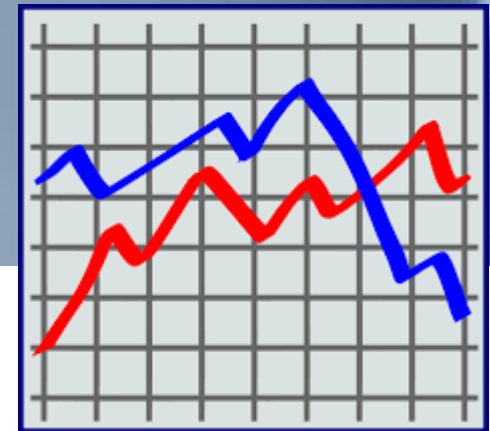
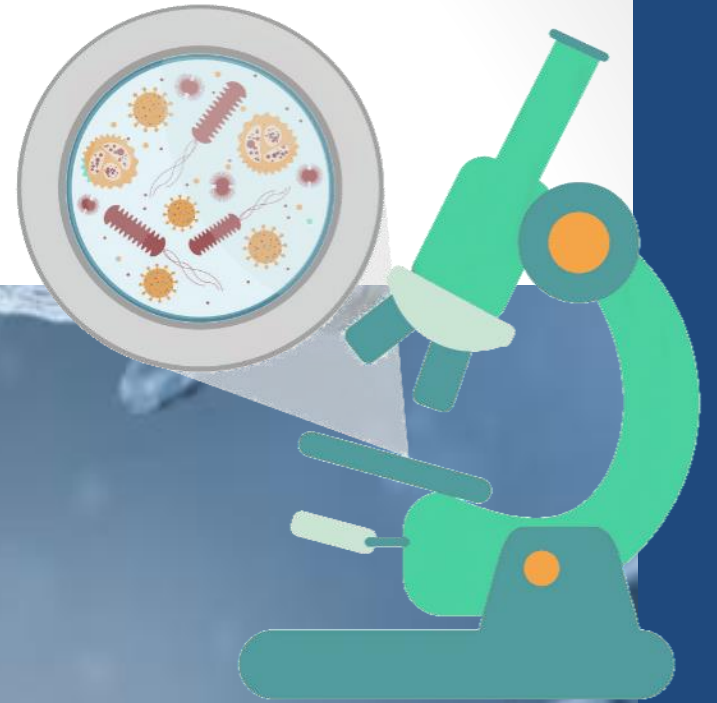
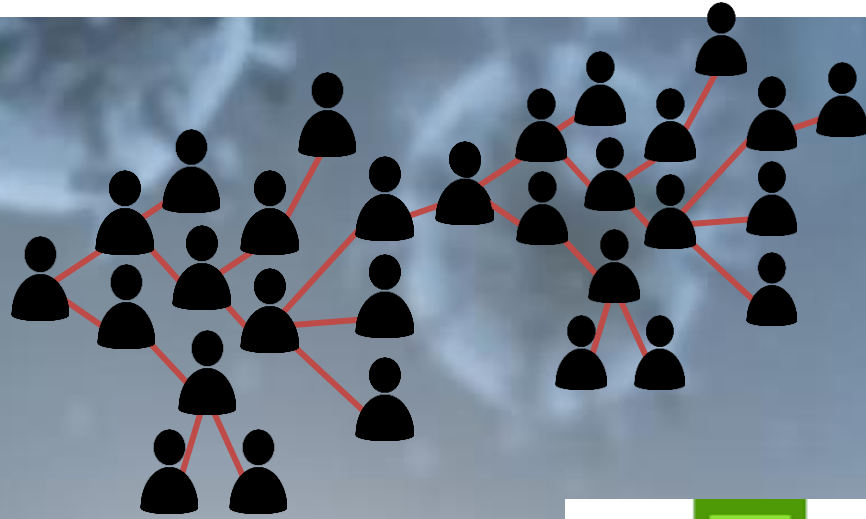
A screenshot of the MAVEN Reporting interface. The 'Category' is set to 'Custom Reports'. The 'Select Report' dropdown is set to 'COVID-19 LBOH Contact line list Report'. The 'Description' field contains the text 'Your city/town name must be in all CAPS'. The 'Report Period' section shows 'Date Range' selected with 'Start Date' as 01/01/2020 and 'End Date' as 04/05/2020. The 'Official City' field is set to 'HOLYOKE'. The 'Step 4 - Case Report Form Completed' section has 'Yes' selected. The 'Output Type' is set to 'HTML'.

- 5) **Cluster/Outbreak Line List** – report will give you a line list report of all associated linked events to a specific single cluster/outbreak event in MAVEN that you have jurisdictional access to.

A screenshot of the MAVEN Reporting interface. The 'Category' is set to 'Custom Reports'. The 'Select Report' dropdown is set to 'Cluster/Outbreak Line List'. The 'Description' field contains the text 'This report produces a cluster/outbreak linelist selectable by event ID'. The 'CaseID\*' field is set to '103'. The 'Disease\*' dropdown is set to 'Mumps'. A red box highlights the 'CaseID\*' and 'Disease\*' fields with the text 'Cluster event ID goes here'.

\*Please reach out to [mavenhelp@mass.gov](mailto:mavenhelp@mass.gov) with any questions on reports

# Outbreak Investigations



# Investigations

- We use the term “investigation” to mean a wide variety of actions related to a disease event in MAVEN.
- Gathering & updating additional information not in the original electronic or phone report (either from interviews or calling the reporting provider).
  - This is “**Completing the Case Report Form (CRF)**”
  - A completed CRF allows for an official review and final case classification. This is needed to CONFIRM a case, OR to Revoke one.
- **Ensuring proper control measures**, including isolation of the case and quarantine of contacts when applicable.
- Occasionally, follow-up expands beyond routine data collection to encompass an **outbreak investigation which includes rapid time-sensitive response**.

# Each Outbreak is Different

## Hepatitis A in a Food Handler

If the food handler worked during their infectious period, public health recommendations include:

- All close contacts of an identified case should receive PEP within two weeks of their exposure.
- **For other food handlers at the facility or other close contacts who are food handlers**
  - All food handlers with symptoms consistent with HAV infection must be excluded and tested for HAV unless they can provide documented proof of immunity (documentation of prior HAV infection or vaccination against HAV).
  - All asymptomatic food handlers in the facility must receive IG or vaccine within 14 days of exposure to the case during their infectious period, unless proof of immunity can be provided.

## Group A Strep (GAS) in a Healthcare Facility

Multiple cases of GAS in a healthcare facility within a 6-month time frame and are genomically related

- Public Health Recommendations Include:
  - Perform throat and skin lesion (if present) cultures on all exposed residents and staff (with or without symptoms).
  - Treat residents and staff with positive test results.
  - Recommend that any non-exposed symptomatic staff and residents of the facility be tested for GAS and treated, if positive.



# Each Outbreak is Different

## Pertussis (Whooping Cough) in a Middle School

Pertussis has a very long infectious period (up to 5 weeks!) and there may be many close contacts exposed.

- All close contacts of an identified case should receive PEP immediately if still within the three weeks following their exposure.
  - Sports teams are often all considered contacts if a teammate is a confirmed case. Notices to the team need to be sent, PEP recommendations established, and any symptomatic contacts isolated and appropriate testing and treatment pursued.
  - Vaccination campaigns may be applicable in populations with low vaccination coverage.

## Varicella (Chickenpox) in a Daycare

Daycares often need assistance in identifying exposed individuals and appropriate follow-up.

- All close contacts of an identified case need to be reviewed for susceptibility (vaccination status).
  - Quarantine for susceptible contacts is Day 8-21 after exposure.
  - Post-exposure vaccination for those eligible within 3 days of exposure may be up to 90% effective in preventing disease
  - Some high risk susceptible contacts may be eligible for VARIZIG or IVIG if identified quickly.
  - Daycares often need help with letters to parents, etc.

# Immediate Workflow Diseases

- Clusters of illness
- Diseases that require prompt administration of agents to protect or prevent spread
  - (ex: rabies, hepatitis A, measles)
- Diseases with high mortality rates
  - (ex: invasive meningococcal disease, EEE)
- Potential bioterrorism agents
  - (ex: anthrax, smallpox)
- Unusual disease in a demographic group or geographic region



# Thorough Investigations and Complete Reporting




- Document, document, document!
- Collect information and enter into MAVEN (complete the Case Report Forms (CRFs)) as completely and accurately as possible (check spellings and dates).
  - Interview the patient and/or the family when applicable.
  - Contact a Medical Provider (Infection Preventionist, PCP, Urgent Care, Ordering Provider, School Nurse, etc.).
  - Check additional resources like the Massachusetts Immunization Information System (MIIS) for vaccine records.
  - Check additional online resources when applicable (social media accounts, Google, etc.).




# Epidemic Intelligence Service (EIS) and Shoe-Leather Epidemiology

[CDC Museum](#)

- **Alexander Langmuir** has been called "the father of shoe leather epidemiology."
- He established the Epidemic Intelligence Service (EIS) at the Centers for Disease Control.
- His efforts contributed to the virtual elimination of polio in the United States and to a better understanding of other infectious disease dilemmas of the last 50 years.



**EIS**  
Epidemic Intelligence Service



**1951**  
First EIS class  
23 officers  
22 physicians  
1 sanitary engineer

The two simple leather soles exemplify the phrase "shoe-leather epidemiology," a term Alex Langmuir used frequently. The term was defined as the practice of personally investigating disease outbreaks at the local population level, and not relying on the reports of others.

Because Alex Langmuir stressed shoe leather epidemiology, the term became closely associated with the Epidemic Intelligence Service. During the first year, one of the officers created a logo featuring the sole of a shoe with a prominent hole worn through the bottom, superimposed over the Earth. This logo has continued to be the symbol of the EIS.



GLOBAL HEALTH ODYSSEY MUSEUM

# Outbreak Investigations

- **Some investigations in MAVEN will require simple data collection and follow-up such as checking in on the family of a case and making sure the rest of the household is up to date on relevant vaccines and no one else is symptomatic.**
  - Additional control measures may be needed for exposure settings like schools, daycares, workplaces, sports teams, or close associates.
    - Identifying locations of concern will come from your investigation interviews and follow-up.
    - These situations often focus on stopping chains of infection and preventing prospective spread.
- **Other investigations will require intensive retrospective investigations to identify a source of the outbreak.**
  - Examples include clusters of diarrheal illness or clusters of pneumonia with an unknown cause.
    - What exposures do the cases have in common? Is there a common restaurant or food item? Have they visited a healthcare facility where they had similar medical procedures or a different location where they overlapped in time or activity?
    - These situations often focus on identifying the source of an outbreak so that it can be removed to prevent further spread.

# Let's Revisit Our Initial Question...

What are your top three priorities?

## A Day in the Life of Local Health...

- Epi wants more info about a Salmonella case
- Dead bird disposal
- MRSA skin infection cluster
- Elected official – West Nile Virus stats
- Long-Term Care Facility: Influenza-Like Illness numbers
- Restaurant – a worker is out sick
- Measles – teen at summer camp
- Bat in bedroom has rabies
- Report of Fifth Disease
- 20/60 patrons have diarrhea/vomiting after event

What are your top three priorities?

## What are the consequences if follow-up does not occur?

While all of these are potentially important, we look at immediate risks to morbidity and mortality and the needs for immediate investigation and intervention.

**Measles (Immediate Disease):** High Transmissibility. Potential for a large number of exposures requiring extensive follow-up. Severe risks to morbidity and mortality in susceptible individuals. Confirmed Measles is an all- hands-on-deck situation.

**Rabies (Immediate Disease):** High Mortality Rate if not prevented through post-exposure prophylaxis (PEP). Immediate action is needed to identify and treat anyone exposed.

**GI Illness Outbreak:** Potential for additional illnesses via an infectious food handler and/or improper food preparation practices (e.g., cross-contamination, undercooked food). Outbreak should be immediately reported to DPH epidemiologists and Food Protection Program to coordinate collection of additional event details, stool testing, etc..

# Control Further Spread

- During and after case investigation, you must implement and enforce control measures—to prevent further spread of disease to others.
- You may need to identify others with illness, known exposure, or risk factors.
- Protect contacts of a case (or others exposed to pathogen) with other appropriate measures:
  - Vaccinate or provide IG or antibiotic
- Manage special situations (daycare, school, LTCF)
- Apply preventive measures
  - Remove food item from an establishment
  - Environmental measures (e.g., sterilize surfaces or toys)
  - Educate! (fact sheets; letters to parents; press release)
- If an outbreak is suspected, call: 617-983-6800.





# Beginning an Investigation: A Provider Calls with a Suspected Case

- **Some disease events in MAVEN will be created by an Epi at MDPH if a provider calls MDPH with an ill patient they suspect has a particular disease.**
  - Part of the investigation will be ensuring the correct tests are collected to rule in or rule out the disease.
    - Ex: Measles, Rubella, Invasive Meningococcal Disease
    - Before a disease event has been confirmed, it will likely be created as a SUSPECT disease event.



# Beginning an Investigation: A Provider Calls with a Suspected Case

- Depending on how highly suspected the disease is, follow-up actions may vary.
  - **Look to the notes.** The Epi creating the event will typically provide status instructions regarding how to proceed or to hold off pending further information.
    - Ex: A doctor calls with a suspect measles in a clinically compatible unvaccinated child who just returned from international travel to a location with a known measles outbreak.
      - Time to get ready for response...
    - Ex: A doctor calls with a suspect measles case in a 4yo with a measles-like rash who recently had their second MMR vaccine, has not traveled or had any recent sick contacts.
      - Likely “stand by” for pending test results prior to further action.

# Beginning an Investigation: A Provider Calls with a Suspected Case

- Occasionally providers will call local health departments directly based upon local agreements and established protocols.
- If you have questions in this scenario on what to do, please call the MDPH Epi Program at 617-983-6800 and speak to the On Call Epidemiologist.



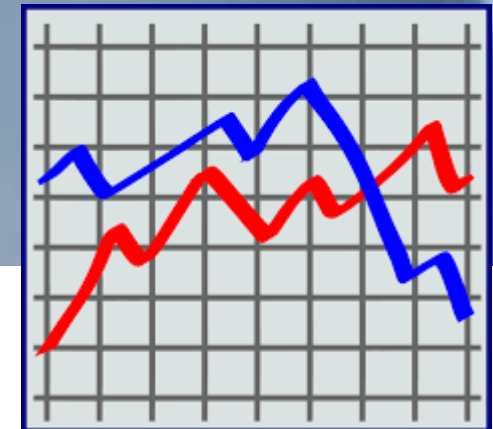
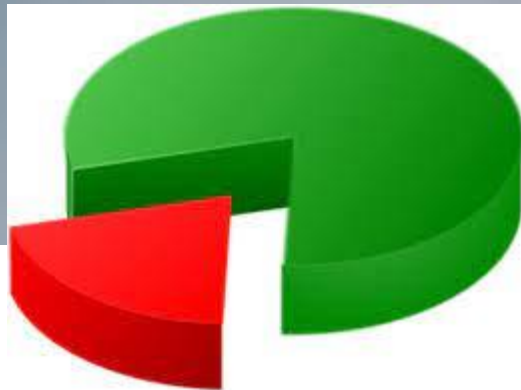
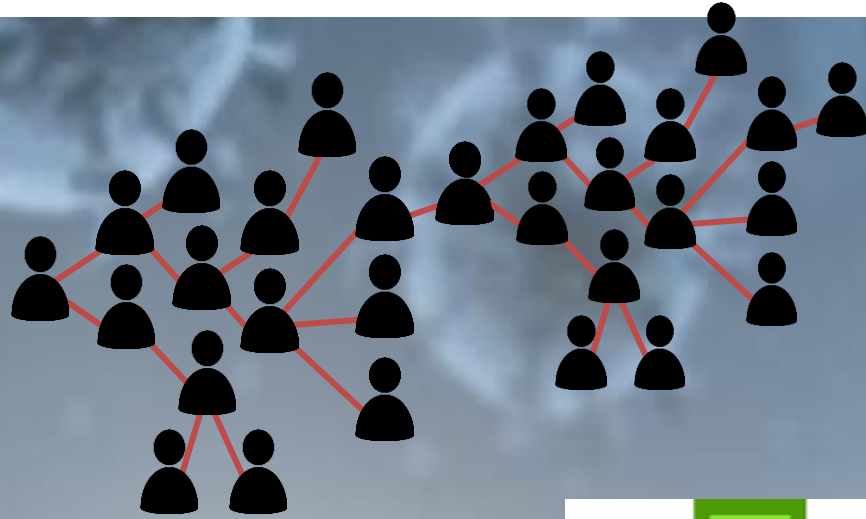


# Beginning an Investigation: A Positive Lab Creates a MAVEN Event

- **Most disease events are created AFTER a positive lab test result is sent electronically to MDPH (and uploaded to MAVEN).**
  - Ex: Hepatitis A, COVID-19, Vibrio
- A positive lab (as opposed to a provider call prior to test results) will more definitively give the case a classification based upon the disease and which combination of positive labs are reported (See the [Case Classification Manual](#) for a particular disease).
- Next steps in the investigation are typically data collection and vary by disease.
  - See the disease-specific chapter of the *MDPH Guide to Surveillance, Reporting and Control* for a quick resource:
    - <https://www.mass.gov/handbook/guide-to-surveillance-reporting-and-control>



# Resources for Local Health



# MDPH Guide to Surveillance, Reporting and Control

- The *Guide to Surveillance and Reporting* was developed to assist local boards of health with specific surveillance, response, and reporting responsibilities for infectious diseases reportable to the Massachusetts Department of Public Health. Each chapter is disease specific and contains general information about the disease, as well as control recommendations and reporting requirements.

<https://www.mass.gov/handbook/guide-to-surveillance-reporting-and-control>

HANDBOOK

Guide to Surveillance, Reporting and Control

The Guide to Surveillance and Reporting assists local boards of health with specific surveillance, response, and reporting responsibilities for infectious diseases reportable to the Massachusetts Department of Public Health.



ORGANIZATION:

Bureau of Infectious Disease and Laboratory Sciences  
Department of Public Health

DATE PUBLISHED:

October 26, 2018

RELATED

Bureau of Infectious Disease and Laboratory Sciences →

About this guide

Infectious diseases are a continuing threat to the public's health. They cause illness, suffering, and death, and they place an enormous financial burden on society. Although some infectious diseases have been controlled by modern advances, diseases are constantly emerging or re-emerging. State public health officials rely on local boards of health (LBOH), health care providers, laboratories, and other public health personnel to report the occurrence of reportable diseases. Without such data, trends cannot be accurately monitored, unusual occurrences of diseases (such as outbreaks) cannot be detected and appropriately addressed, and the effectiveness of control and prevention activities cannot be easily evaluated.

The *Guide to Surveillance and Reporting* was developed to assist local boards of health with specific surveillance, response, and reporting responsibilities for infectious diseases reportable to the Massachusetts Department of Public Health. Each chapter is disease specific and contains general information about the disease, as well as control recommendations and reporting requirements. We appreciate the critical importance of the efforts of local boards of health to investigate and control diseases in their communities and strive to provide the most up to date materials to assist in that process.

Downloads

 Amebiasis (2016) (RTF 228.38 KB)

 Botulism (2018) (RTF 226.3 KB)

 Campylobacter Enteritis (2016) (RTF 205.21 KB)

 Chickenpox and Shingles (2016) (DOC 287.5 KB)

 Cryptosporidiosis (2016) (DOCX 50.99 KB)

 Cyclosporiasis (2016) (RTF 195.83 KB)

 Giardiasis (2016) (RTF 206.19 KB)

 Group A Streptococcus (Invasive) (2011) (DOCX 54.42 KB)

 Hansen's Disease (2016) (RTF 197.46 KB)

 Hepatitis A (2016) (RTF 224.66 KB)

# MAVEN Help

















- MAVEN Help has Guidance Documents, the Case Classification Manual, and Previous Webinars:
  - <http://www.maven-help.maventrainingsite.com/toc.html>
- You do not have to be logged into MAVEN to access these materials. Just bookmark the web address above.
- Additional Webinars and Disease-Specific trainings for Local Health will be recorded and available here.

How to Contact the Maven help desk in DSAI.  
We are available M-F (9-5p.m.)

- *DSAI Help Desk 617-983-6801*
- *DSAI Fax Number 617-983-6813*
- [mavenhelp@mass.gov](mailto:mavenhelp@mass.gov)  
(do not email names or identifying information - use the MAVEN Event ID)
- *Epi-of-the-Day and Epidemiologist on Call 617-983-6800*

## MAVEN Online Help

 [Expand all](#)  [Collapse all](#)

-  [Tools for Local Health Webinars](#) 
-  [COVID-19 Materials/Training](#)
-  [General Information](#)
-  [Frequently Asked Questions\(FAQs\)](#)
-  [Division of Global Populations\(DGP\)](#)
-  [ePostcards/Webinars](#)
-  [Foodborne Illness Complaint Resources](#)
-  [Infection Preventionist Resources](#) 
-  [Antibiogram](#)
-  [Case Classification Manual](#) 
-  [Case Report Forms](#)
-  [HIPAA Documents](#)
-  [Technical Support](#)

# MDPH Conducts Infectious Disease Tools for LBOH Webinars Every Other Week

## Upcoming Topics!

26-Apr-22	Introduction to Infectious Disease Epidemiology for Local Health (Beyond COVID-19) Part 1: Surveillance
10-May-22	Introduction to Infectious Disease Epidemiology for Local Health (Beyond COVID-19) Part 2: Epidemiology
24-May-22	Foodborne Disease: General Enterics
7-Jun-22	Tickborne Diseases
21-Jun-22	Foodborne Disease: Vibrio & Cyclosporiasis
19-Jul-22	Hepatitis A
16-Aug-22	Acute Hepatitis C
Fall 2022	Vaccine-Preventable Diseases

MAVEN Help has Guidance Documents and Previous Webinars:  
<http://www.maven-help.maventrainingsite.com/toc.html>

**Webinar Schedule Update:  
Every Other Tuesday @ 11am**

- **MDPH presents Every Other Week on Tuesdays 11:00-12:15**
  - Updates in Guidance.
  - Troubleshooting MAVEN.
  - How to conduct case investigations and contact tracing in different settings.
  - Target Audience: Health Agents, Contact Tracers, and Public Health Nurses doing this work.

**MDPH Epi Program:** 617-983-6800

**MDPH MAVEN Help Desk:** [MavenHelp@mass.gov](mailto:MavenHelp@mass.gov)

**MAVEN Onboarding:** [MavenTraining@mass.gov](mailto:MavenTraining@mass.gov)

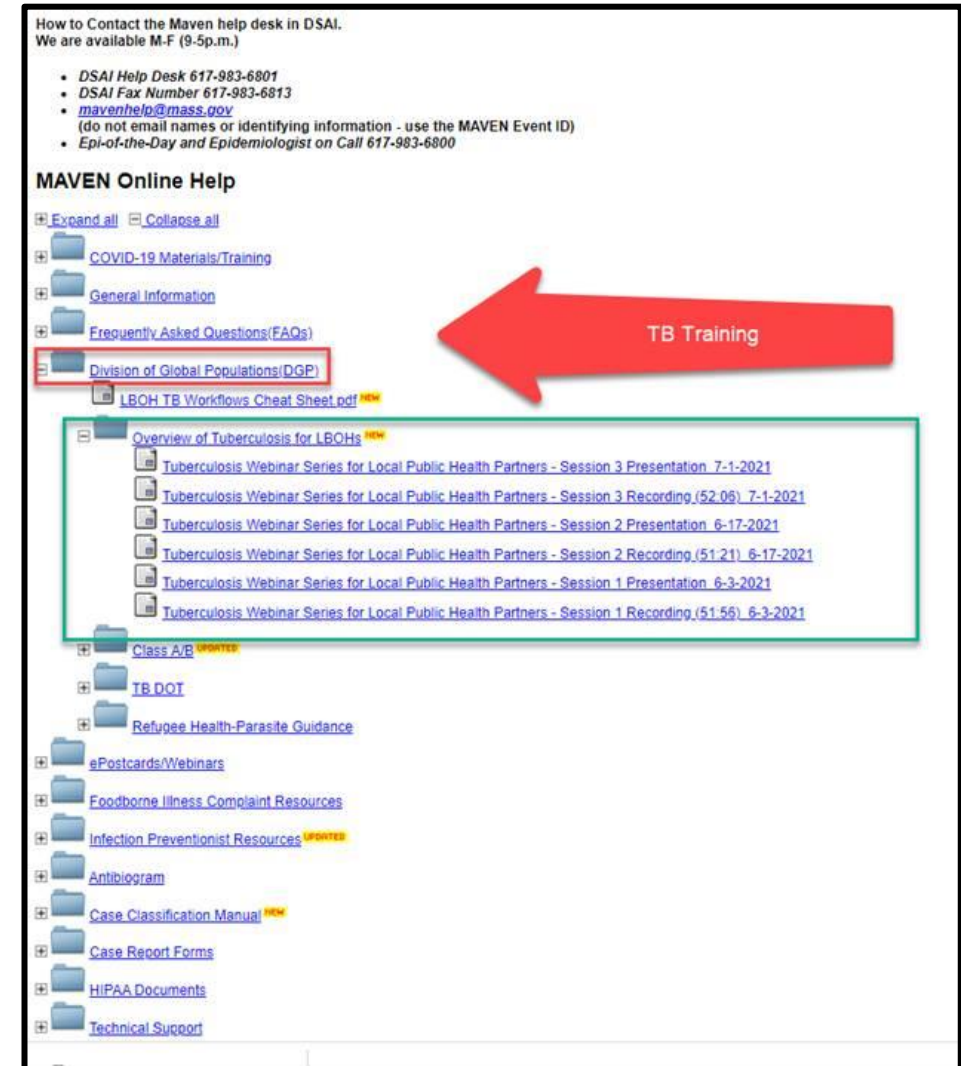
**MDPH MAVEN Help Desk:** 617-983-6801

**MDPH MAVEN Fax:** 617-983-6813



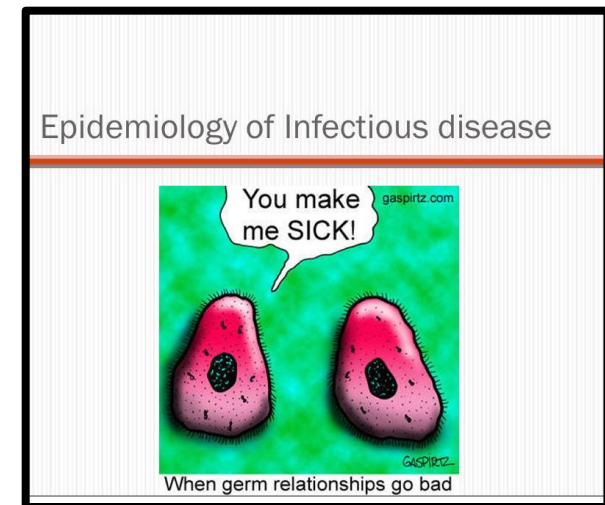
# Tuberculosis Webinars & Training Materials Available on MAVEN Help

- **Tuberculosis and Refugee Health** fall under the Division of Global Populations (DGP). You can find their materials there.
- **UPCOMING TRAINING:**
  - **Revisiting DOT: Best Practices in Direct Observation Therapy and Community Engagement for Tuberculosis**
    - Date: Thursday May 12, 2022
    - Time: 12:00 PM - 1:00 PM
    - Register [HERE](#)



# Learning Objectives – A Review

- Review Investigation Priorities
- Define Epidemiology
- Describe Key Terminology and Concepts of Infectious Disease Epidemiology
- Describe a public health problem in terms of time, place, and person
- Identify Ways to Visualize and Compare Your Data, Including Rates and Epidemic Curves
- Identify Resources for Assisting Your Investigations



# Communication Events Track Your Town's Users and Contact Information

- Communication Events [Tip Sheet](#)
- Communication Events [Instructional Video](#)

The screenshot displays the 'Search Case' interface. On the left is a 'Menu' with options: Home, Open Help, History, Case Management (expanded), Create Event, Search Event (highlighted with a red box and a hand cursor), Workflow, Import Roster, Create Cluster/Outbreak /Aggregate Event, Recent Events, Reports, and Profile Management. The main area is titled 'Search Case' and contains 'Search Criteria' and 'Search Options' sections. The 'Search Criteria' section has fields for Type (Normal), Event ID, Last Name, First Name, Alias, Maiden/Other Name, Birth Date (Range), Street, City (Brookline), State, Event (Communication), From Date, and To Date. The 'Search Options' section has buttons for Search, Clear, and Create New. On the right, the 'Search Results' section shows a table with columns: Event ID, Name, Birth Date, Status, Event, and Create Date. A single result is shown: ID 101492018, Name Communication Brookline, Status Open, Event Communication, and Create Date 06/27/2013. A red box highlights this result, and a hand cursor points to the 'Name' column. Below the table are buttons for Select, Create Record for Person, Cancel, and Help.

Event ID	Name	Birth Date	Status	Event	Create Date
101492018	Communication Brookline		Open	Communication	06/27/2013

Once you select Communication event and enter a town/city name click on the Search button to see the Communication event for your own town/city or another one you need to contact

- **Reminders:**

- Please check your communication event frequently and note any necessary updates to coverage
- To add or remove users, email [maventraining@mass.gov](mailto:maventraining@mass.gov)



# MDPH Resources for You

- **MDPH Division of Epidemiology:** 617-983-6800
- **MDPH Division of Surveillance, Analytics, and Informatics (DSAI):**
  - **MAVEN Help Desk:** [MavenHelp@mass.gov](mailto:MavenHelp@mass.gov)
  - **MAVEN Onboarding:** [MavenTraining@mass.gov](mailto:MavenTraining@mass.gov)
  - **MDPH MAVEN Help Desk:** 617-983-6801
  - **MDPH MAVEN Fax:** 617-983-6813
- **MAVEN Help** has Guidance Documents, the Case Classification Manual, and Previous Webinars:
  - <http://www.maven-help.maventrainingsite.com/toc.html>
- **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/>

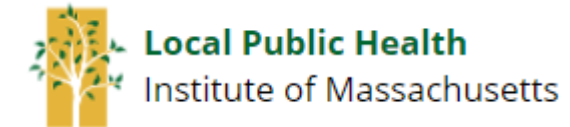
# Additional Resources to Learn More:

- [CDC's Public Health 101](#): An Introduction to public health and the sciences essential to public health practice.



- [CDC Quick Lesson on Creating Epi Curves](#)

- [The Local Public Health Institute of Massachusetts](#) is a comprehensive, convenient resource for public health trainings that help build and maintain a skilled local public health workforce.



- See [MAVEN Help](#) for some additional data tools!
  - Excel Document “Tools for Epidemiology and Biostatistics”
    - - Wayne W. LaMorte, MD, PhD, MPH

This is a screenshot of an Excel spreadsheet titled "Tools for Epidemiology and Biostatistics". The spreadsheet is organized into a grid with columns labeled A through F and rows numbered 1 through 10. It contains a "Main Menu" section with various links to statistical tools and resources, categorized into Measurement Variables, Probability, Analysis of Measurements, Confounding, Rare Outcomes, Data Sets, Categorical Variables, Analysis of Frequencies, Other Tools, Examples, Other Videos, Analysis Videos, and Graphics Videos. The spreadsheet is attributed to Wayne W. LaMorte, MD, PhD, MPH, and is dated Copyright 2006; modified March 20, 2021.