Introduction to Acute Hepatitis C Investigations

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Agenda

- Background of hepatitis C
- Interpreting lab results for hepatitis C
- Hepatitis C case interviews
- Case report form (required variables in MAVEN)
- Resources (syringe service programs, testing locations, clinics for treatment)

Hepatitis C

- Liver infection caused by the hepatitis C virus (HCV).
- Spread through contact with blood from a person with hepatitis C infection.
- Most common way it is spread is by sharing needles or equipment used to prepare and inject drugs.
- For more than half of people who become infected with HCV, it becomes chronic.
- Chronic HCV can result in serious health problems like cirrhosis, liver cancer, and ultimately death.
- There is a treatment for hepatitis C that can cure people in 8-12 weeks.

Transmission

- As stated previously, the most common way is through injection drug use (sharing drug injection equipment)
  - Sharing syringes, cookers, cottons, rinse water, etc.
- Prior to 1992, many people also exposed through blood transfusions/clotting factors/organ transplants
  - Before blood supply screened for hepatitis C
- Sexual transmission – inefficient but does occur
- Blood exposures in healthcare settings
- Vertical transmission – 5-6% of births to infected mothers (20% in HIV/HCV co-infected)
- Sharing personal/household items with blood
- Intranasal drug use
- Tattoo/body piercing non-sterile practices

Isolation and Quarantine?

- When diagnosed for hepatitis C a person does not need to isolate.
  - They should avoid behavior that would put others at risk (sharing injection drug equipment, making sure to use protection during intimacy, etc.)
- If people believe they may have been exposed to HCV, they should contact their provider and seek testing (baseline and if baseline is negative 3-6 weeks after potential exposure).
- There is treatment for hepatitis C.

Acute Hepatitis C: Symptoms

- 70-85% asymptomatic
- Jaundice
- Anorexia
- GI issues (upset stomach, vomiting, stomach pain)
- Dark urine
- Light-colored stool
- Joint pain
- Malaise

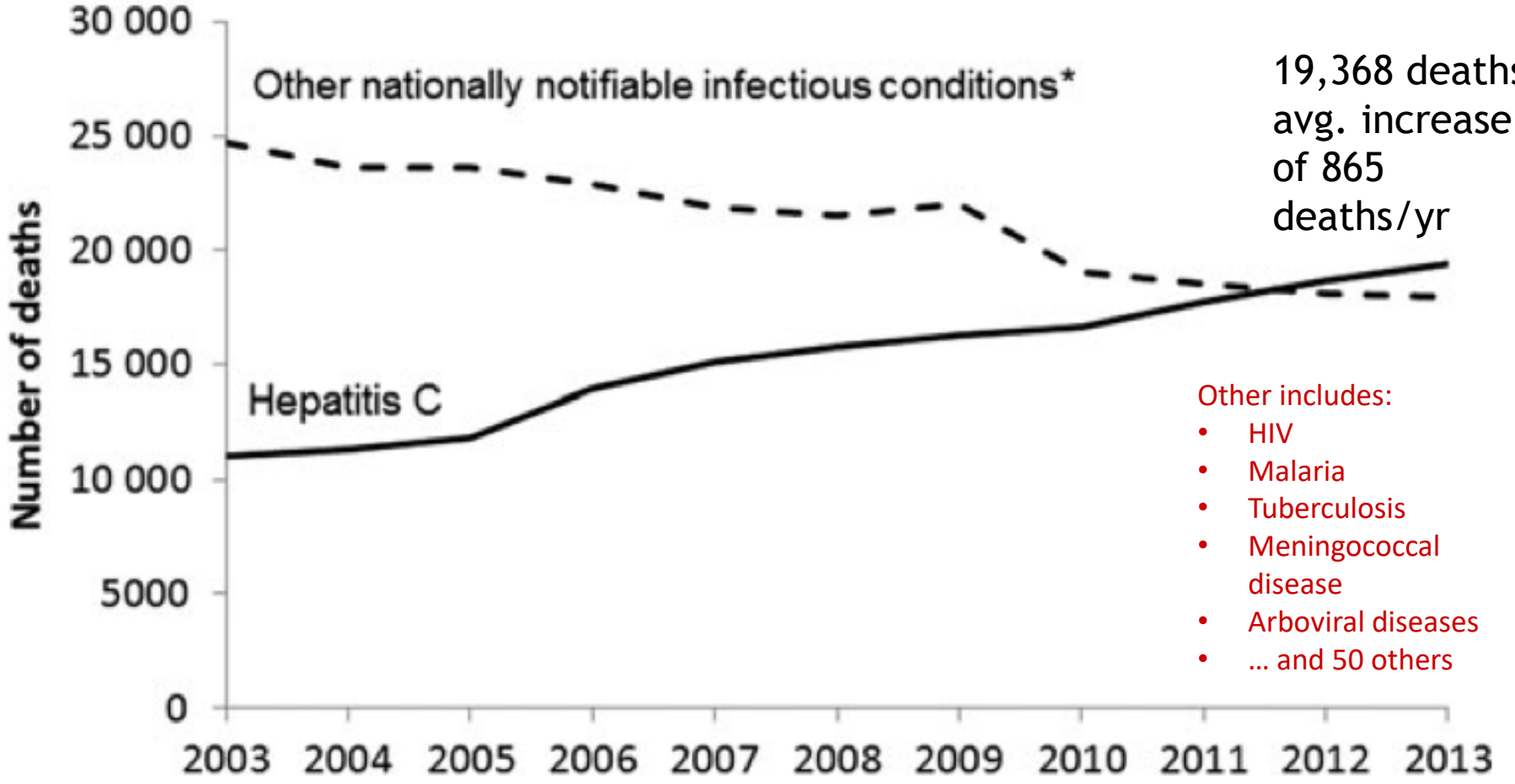
Opioid Epidemic: A driver of hepatitis C cases

- Hepatitis C infections in the United States declined in the 90s and then experienced a sharp increase in the early 2000s (largely attributable to the opioid epidemic)
- Average lifetime medical costs are estimated to exceed $200,000 per patient.
- CDC estimates that nearly 2.5 million people are living with hepatitis C.
- The opioid crisis has led to a significant shift in incident hepatitis C infections to younger populations.
- In 2019, The rate of acute hepatitis C remained the highest among persons aged 20–39 years, similar to age groups at highest risk for fatal overdose in the United States and age at initiation of injection drug use among certain US populations.

Reference: Powell D, Alpert A, Pacula RL. A Transitioning Epidemic: How The Opioid Crisis Is Driving The Rise In Hepatitis C. Health Aff (Millwood). 2019 Feb;38(2):287-294. doi: 10.1377/hlthaff.2018.05232. PMID: 30715966.

NP Report 2025 Goal: Reduce HCV Rate among PWID | CDC

Rising hepatitis C mortality in the US



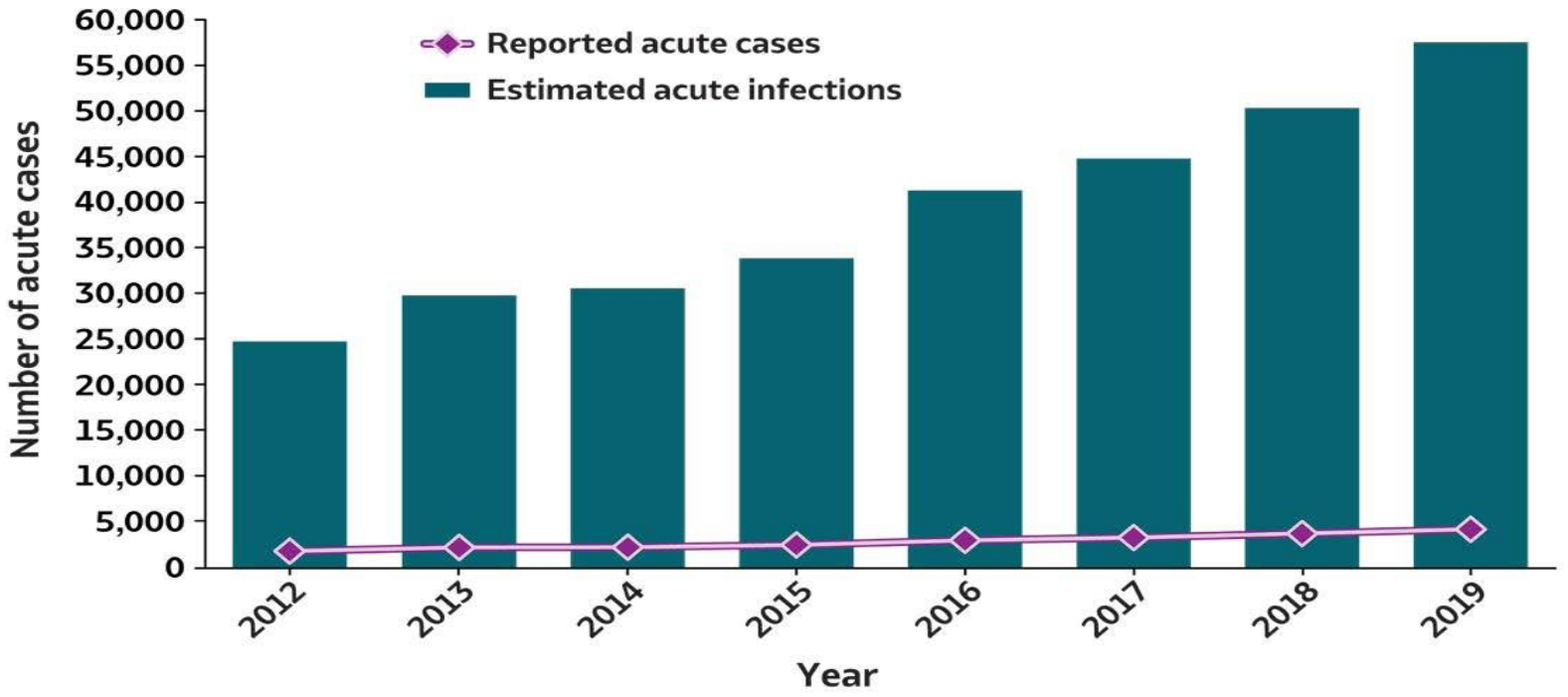
19,368 deaths
avg. increase of 865 deaths/yr

Other includes:

- HIV
- Malaria
- Tuberculosis
- Meningococcal disease
- Arboviral diseases
- … and 50 others

Ly KN, Hughes EM, Jiles RB, Holmberg SD. Rising Mortality Associated With Hepatitis C Virus in the United States, 2003-2013. *Clinical Infectious Diseases*. 2016:1287–1288.

Figure 3.1. Number of reported acute hepatitis C virus infection cases and estimated infections* — United States, 2012–2019

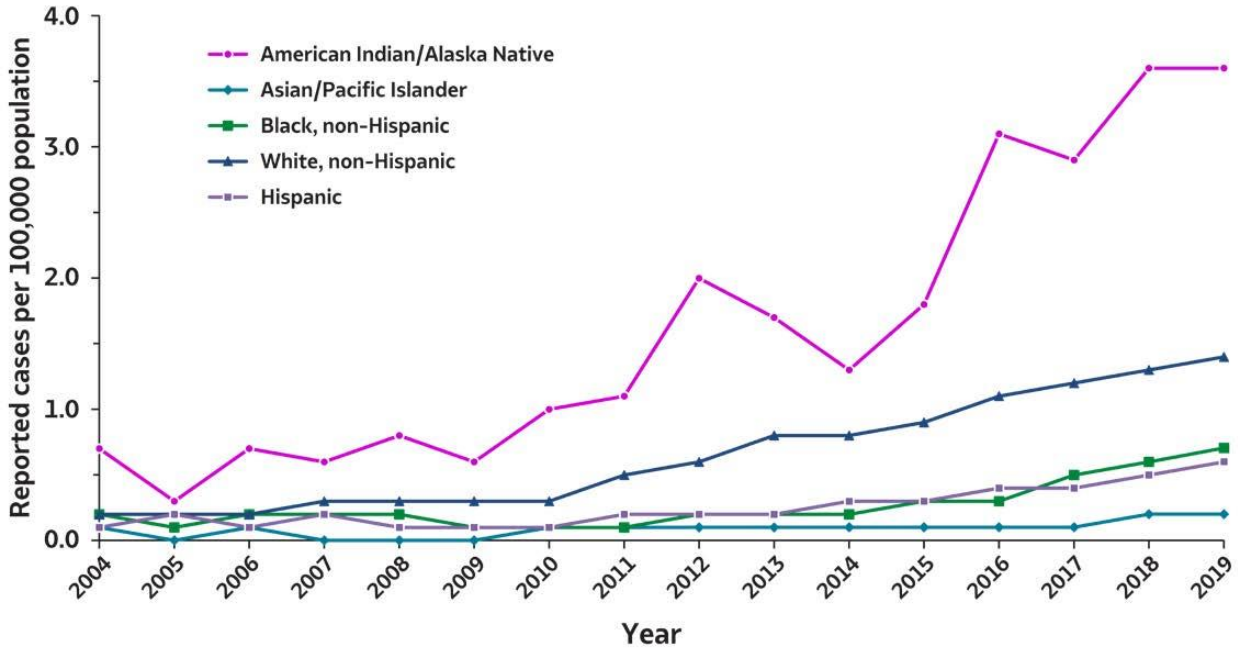


Acute Hepatitis C	2012	2013	2014	2015	2016	2017	2018	2019
Reported acute cases	1,778	2,138	2,194	2,436	2,967	3,216	3,621	4,136
Estimated acute infections	24,700	29,700	30,500	33,900	41,200	44,700	50,300	57,500

Source: CDC, National Notifiable Diseases Surveillance System.

*The number of estimated viral hepatitis infections was determined by multiplying the number of reported cases that met the classification criteria for a confirmed case by a factor that adjusted for underascertainment and underreporting. The 95% bootstrap confidence intervals for the estimated number of infections are displayed in the Appendix.

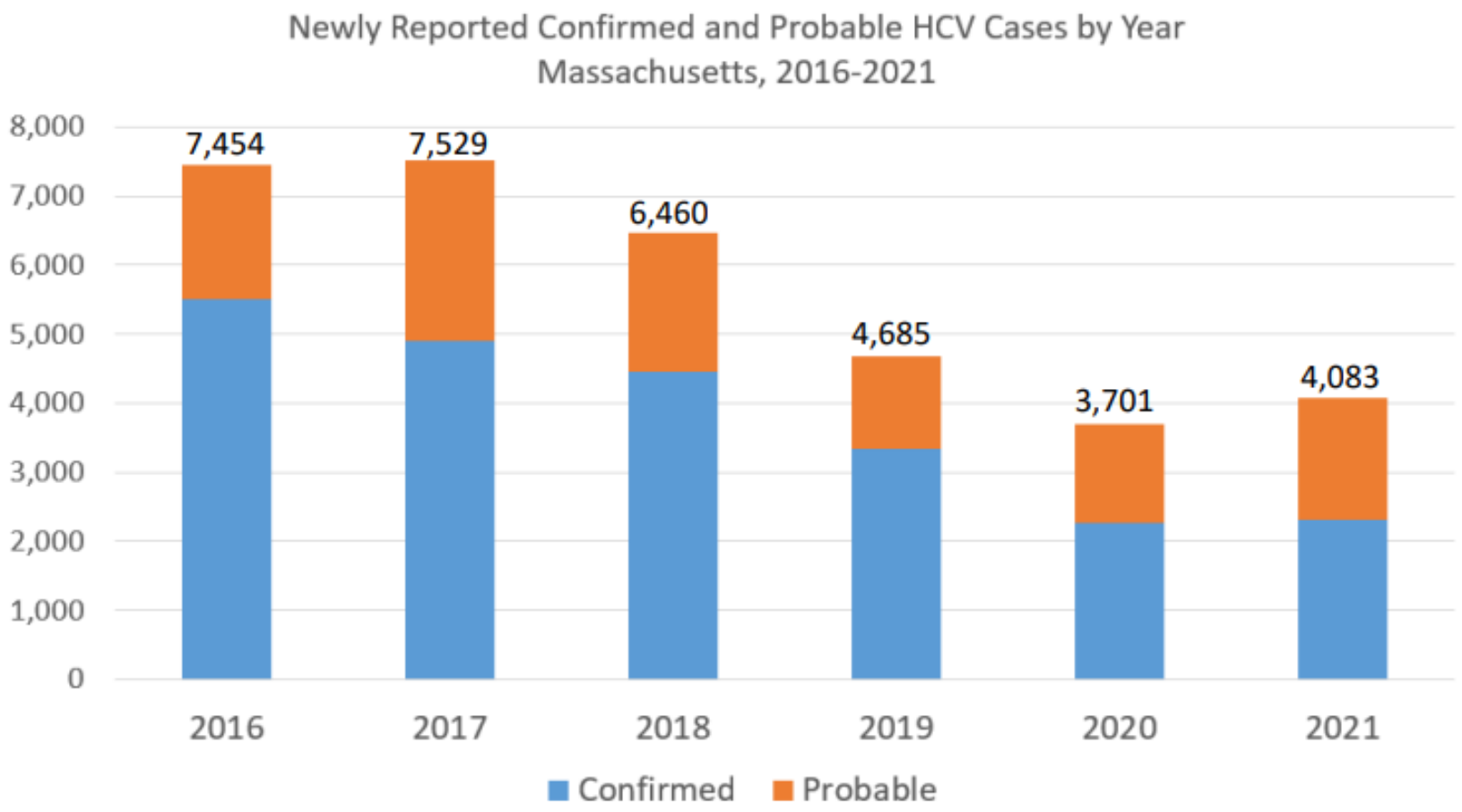
Figure 3.6. Rates of reported acute hepatitis C virus infection, by race/ethnicity — United States, 2004–2019



Race/Ethnicity	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
American Indian/ Alaska Native	0.7	0.3	0.7	0.6	0.8	0.6	1.0	1.1	2.0	1.7	1.3	1.8	3.1	2.9	3.6	3.6
Asian/ Pacific Islander	0.1	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2
Black, non-Hispanic	0.2	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.5	0.6	0.7
White, non-Hispanic	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.5	0.6	0.8	0.8	0.9	1.1	1.2	1.3	1.4
Hispanic	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.5	0.6

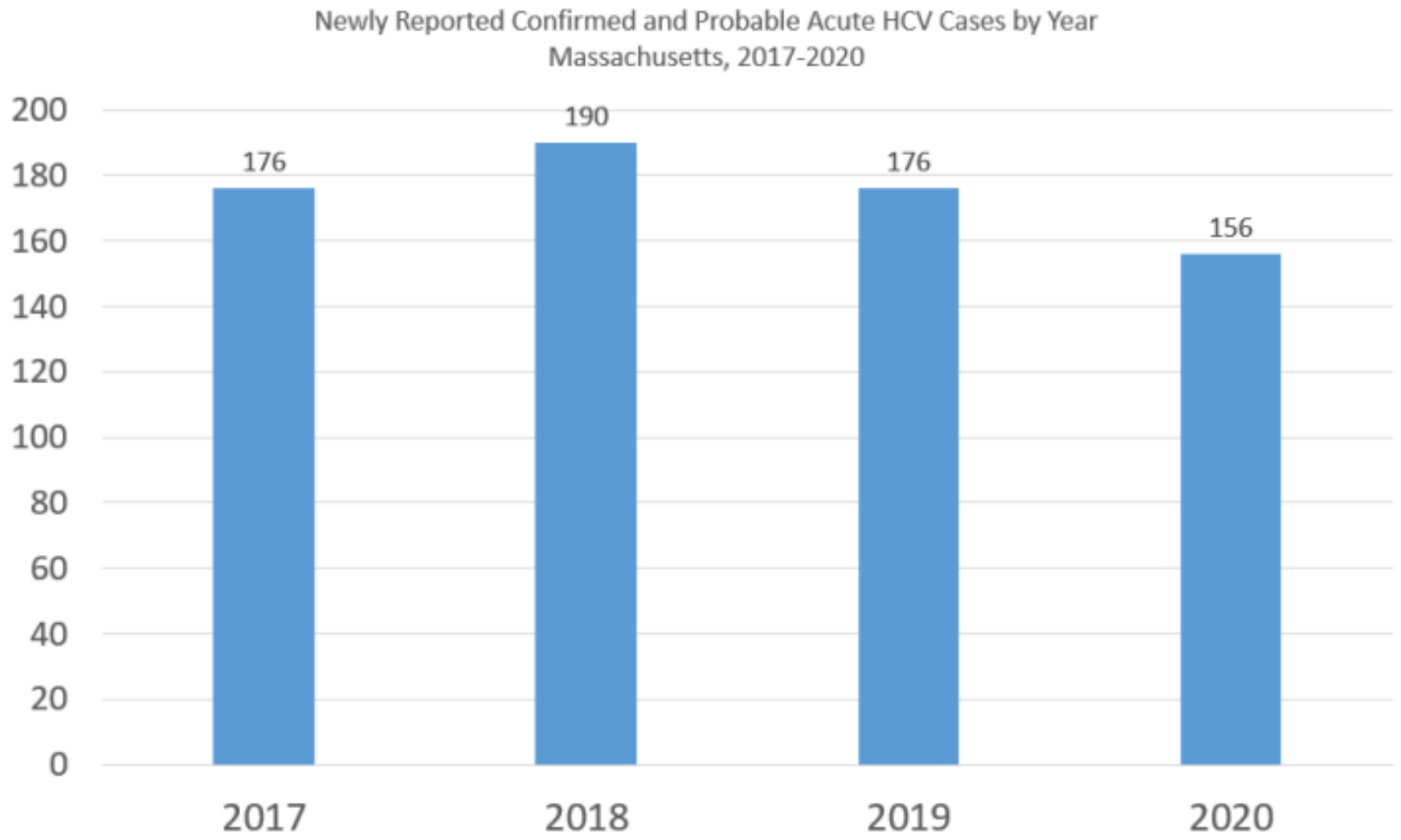
Source: CDC, National Notifiable Diseases Surveillance System.

Reported cases

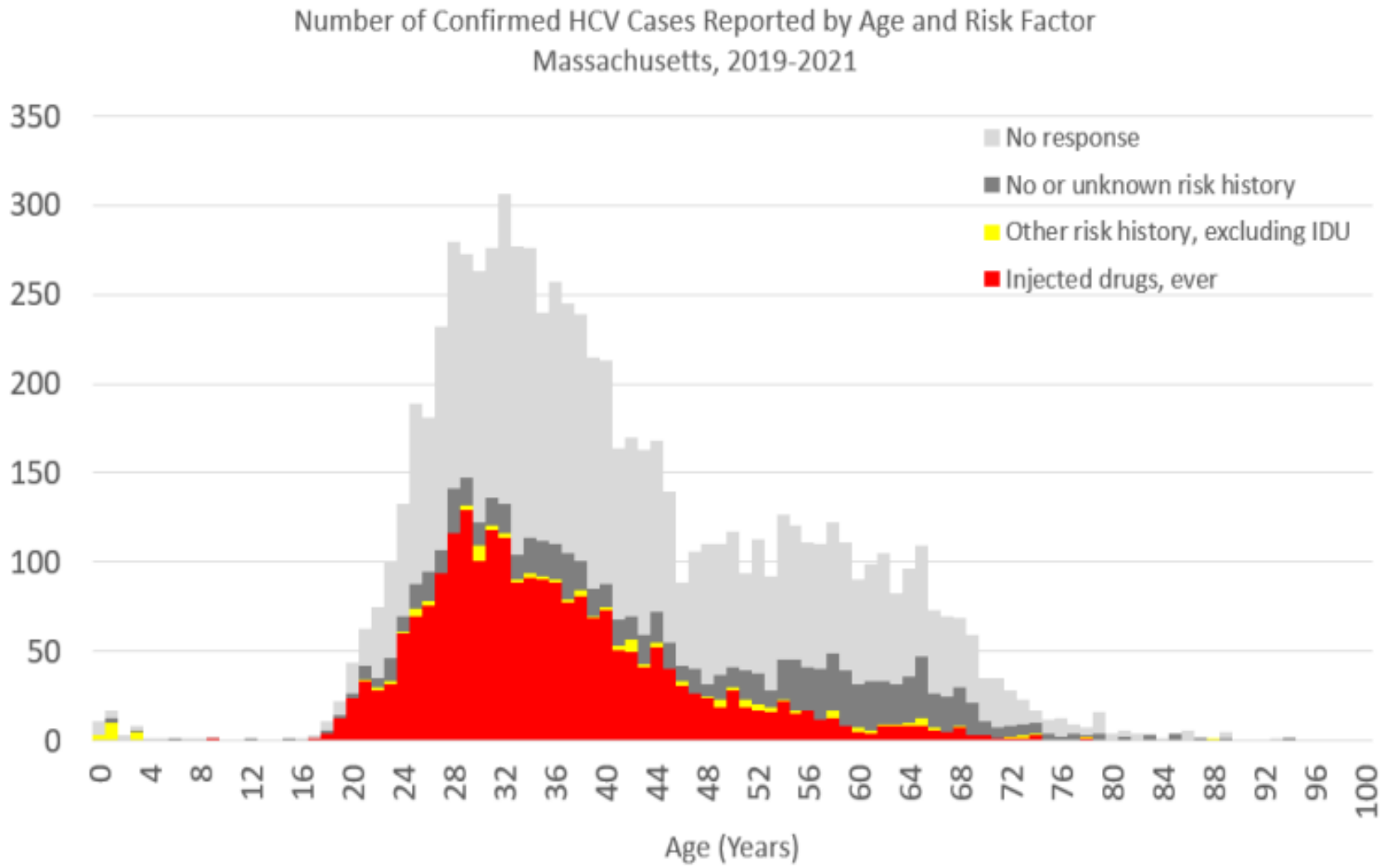


- Decreases:
  - 14% from 2017 to 2018
  - 27% from 2018 to 2019
  - 21% from 2019 to 2020
- 57% of cases were confirmed in 2021, down from a high of 74% in 2016

Reported acute cases

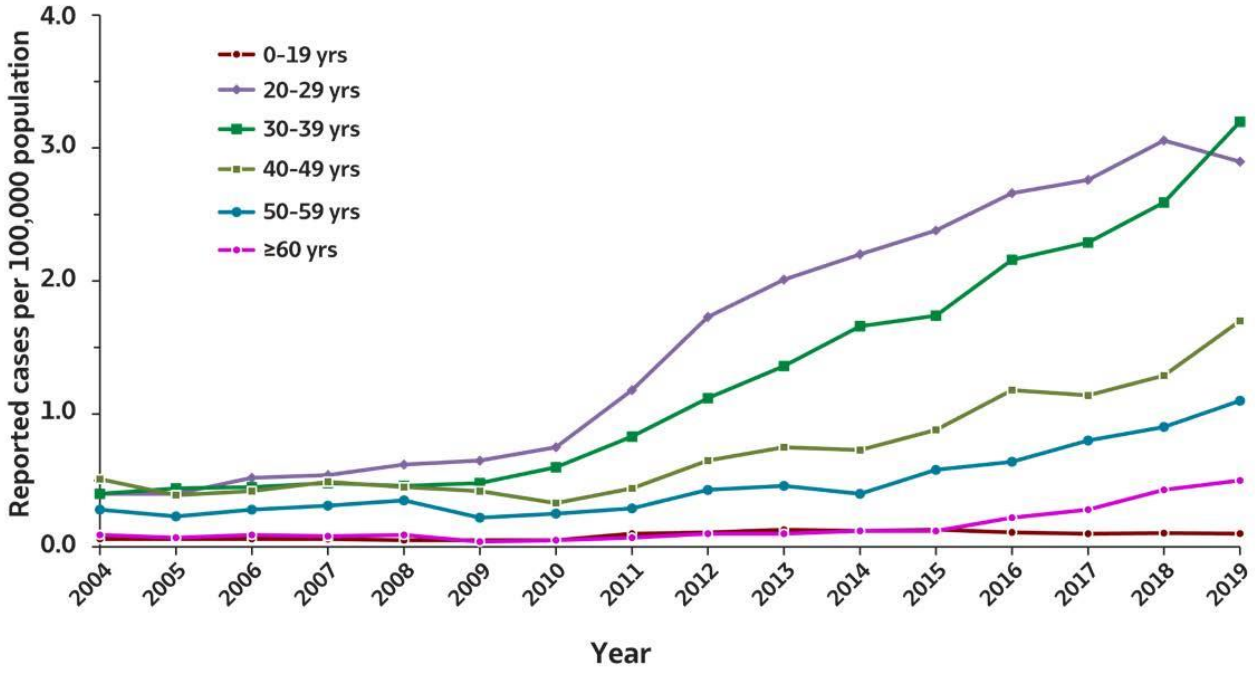


Data are current as of 6/28/2022 and subject to change.



Data are current as of 6/28/2022 and subject to change.

Figure 3.4. Rates of reported acute hepatitis C virus infection, by age group — United States, 2004–2019



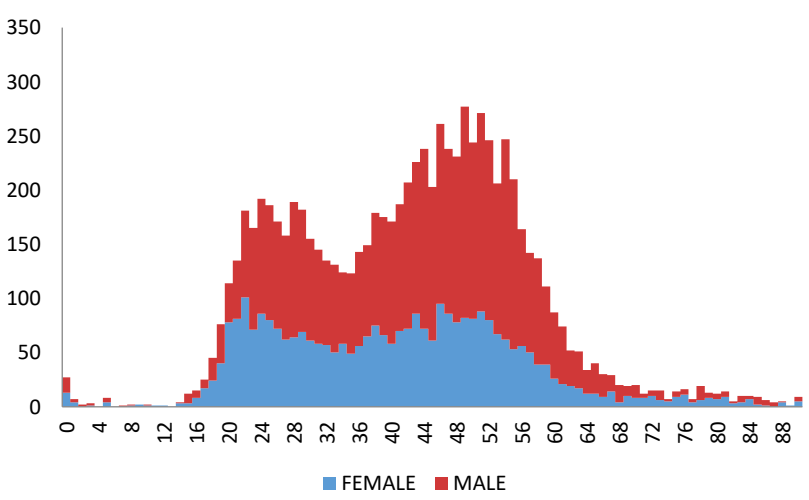
Age (years)	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
0–19	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
20–29	0.4	0.4	0.5	0.5	0.7	0.7	0.7	1.2	1.7	2.0	2.2	2.4	2.7	2.7	3.0	2.9
30–39	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.8	1.1	1.4	1.7	1.7	2.2	2.3	2.6	3.2
40–49	0.5	0.4	0.4	0.5	0.5	0.4	0.3	0.4	0.6	0.7	0.7	0.9	1.2	1.1	1.3	1.7
50–59	0.3	0.2	0.3	0.3	0.4	0.2	0.3	0.3	0.4	0.5	0.4	0.6	0.6	0.8	0.9	1.1
≥60	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.4	0.5

Source: CDC, National Notifiable Diseases Surveillance System.

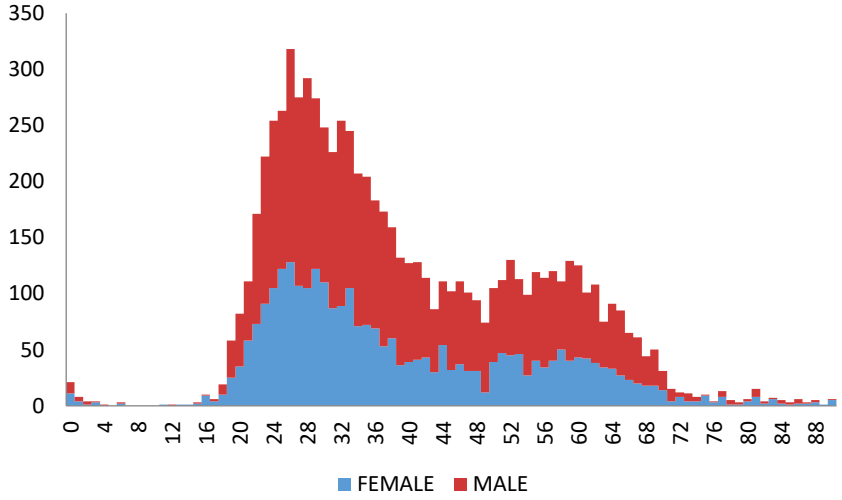
Age Distribution of New HCV Infections, 2007-2016, Massachusetts

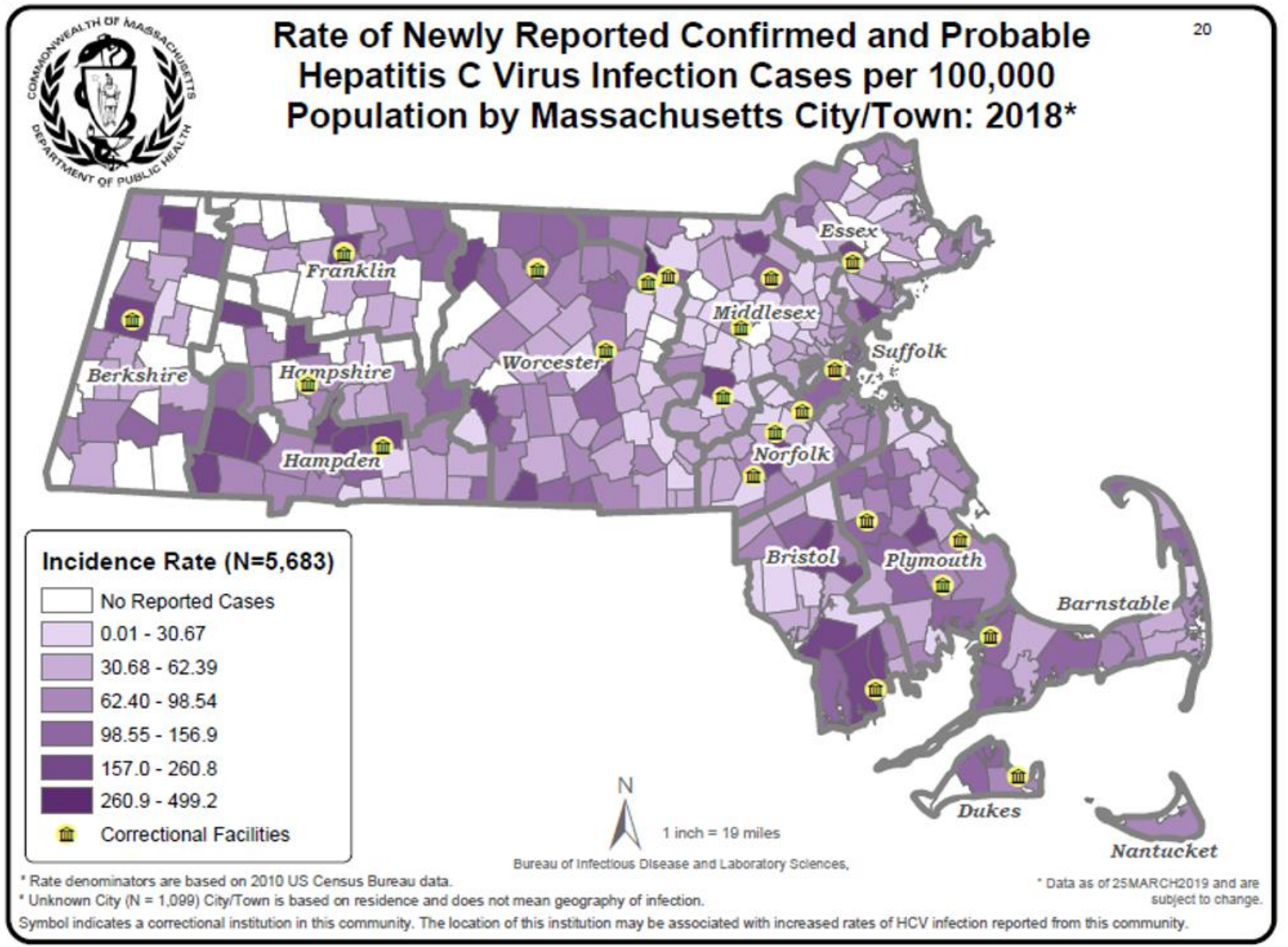
The age distribution of HCV infection has shifted in the last decade, now reflecting a population predominantly under the age of 40

Age distribution of HCV in Massachusetts, 2007
N=8,241 (875 missing age or gender excluded)



Age distribution of HCV in Massachusetts, 2016
N=7,612 (217 missing age or gender excluded)




Rate of Newly Reported Confirmed and Probable Hepatitis C Virus Infection Cases per 100,000 Population by Massachusetts City/Town: 2018*
20
COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC HEALTH
Essex
Franklin
Middlesex
Suffolk
Berkshire
Hampshire
Worcester
Norfolk
Hampden
Bristol
Plymouth
Barnstable
Dukes
Nantucket
Incidence Rate (N=5,683)
No Reported Cases
0.01 - 30.67
30.68 - 62.39
62.40 - 98.54
98.55 - 156.9
157.0 - 260.8
260.9 - 499.2
Correctional Facilities
N
1 inch = 19 miles
Bureau of Infectious Disease and Laboratory Sciences,
* Rate denominators are based on 2010 US Census Bureau data.
* Unknown City (N = 1,099) City/Town is based on residence and does not mean geography of infection.
* Data as of 25MARCH2019 and are subject to change.
Symbol indicates a correctional institution in this community. The location of this institution may be associated with increased rates of HCV infection reported from this community.

Hepatitis C, Acute 2020 Case Definition

- *All hepatitis C Virus cases in each classification category should be > 36 months of age, unless known to have been exposed non-perinatally.*

Clinical Criteria (one or more of the following):

- Jaundice, **OR**
- Peak elevated total bilirubin levels > 3.0 mg/dL, **OR**
- Peak elevated serum alanine aminotransferase (ALT) levels > 200 IU/L

AND

The absence of a more likely diagnosis (pre-existing HCV infection, alcohol exposure, other viral hepatitis, hemochromatosis, etc.)

Hepatitis C, Acute 2020 Case Definition (continued)

Laboratory Criteria:

- Positive hepatitis C virus detection test: Nucleic acid test (NAT) for HCV RNA positive (including qualitative, quantitative or genotype testing) **OR**
- A positive test indicating presence of hepatitis C viral antigen(s) (HCV antigen)

Presumptive laboratory evidence:

- A positive test for antibodies to hepatitis C virus (anti-HCV)

HCV Lab Tests Explained- Screening

HCV Antibody

- Initial screening for hepatitis C. The sensitivity is generally 99%. HCV antibody does not indicate whether the infection is acute, chronic or resolved. A positive antibody result should be followed up with an HCV RNA test to confirm.

*After a person is treated, the antibody will remain detectable but RNA will be undetectable.

Recommended training: Hepatitis C: CDC Viral Hepatitis Serology Training - YouTube

HCV Lab Tests Explained - Confirmatory

HCV RNA Qualitative/Quantitative/Genotype

- Qualitative can detect vey low levels virus and is more sensitive than quantitative.
- The quantitative HCV RNA tests measures the amount of hepatitis C virus in the blood. The result will be an exact number (‘1,215,422 IU/L’). This may also be called the viral load.
- Quantitative tests are often taken to serve as a proxy to how well treatment works.
- If a test result is “< 15 IU/L” it means that the quantitative test cannot measure the hepatitis C virus. It may mean that there is no HCV RNA at all, but it also could mean that viral load is too low for detection.
- There are six genotypes of HCV. In the United States the three most common are: 1,2 and 3. Genotypes are used to help guide providers with treatments (which tx and how long).

HCV Lab Tests Explained- Bilirubin, ALT, AST

- Bilirubin is made during the process of breaking down red blood cells.
- Bilirubin is found in the bile, which helps digests food. A healthy liver will move most of the bilirubin from your body, but if the liver is damaged it can leak into your blood (causing health problems and often jaundice).
- ALT (alanine aminotransferase) converts alanine (an amino acid found in proteins), into pyruvate, an important intermediate in cellular energy production. When the liver is damaged, ALT is released into the blood (usually before jaundice). ALT tests serve as an early indicator of liver damage.
- AST (aspartate transferase) is an enzyme found in your liver, heart, pancreas, muscles and other tissues. This is a type of protein in the cell that acts as a catalyst and allows certain bodily processes to happen. When liver cells get damaged, AST can leak into your bloodstream.
- Elevated bilirubin, ALT or AST may be indicative of acute liver damage and suggests a recent infection.

Why investigate acute HCV infections?

- Obtain accurate and meaningful data to inform resource allocation and policies
- Prevent additional cases
- Improve outcomes
- Identify clusters

How Epis Assign LBOH Cases (Criteria):

- A positive hepatitis C lab (HCV antibody or HCV NAT) in an individual over the age of 36 months

AND

  - Evidence of seroconversion in the last year **OR**
  - Jaundice **OR**
  - Being tested due to acute hepatitis signs or symptoms **OR**
  - Peak elevated total bilirubin levels > 3.0 mg/dL, **OR**
  - Peak elevated serum alanine aminotransferase (ALT) levels > 200 IU/L
  - Cases that aren't identified as suspect acute cases will go into the "LBOH Notification but no follow-up required workflow" whereas cases identified as suspect acute cases will enter the "LBOH Notification for Routine disease workflow."

Prepare/Conduct Hepatitis C Case Interviews

Understand why we're asking what we're asking.

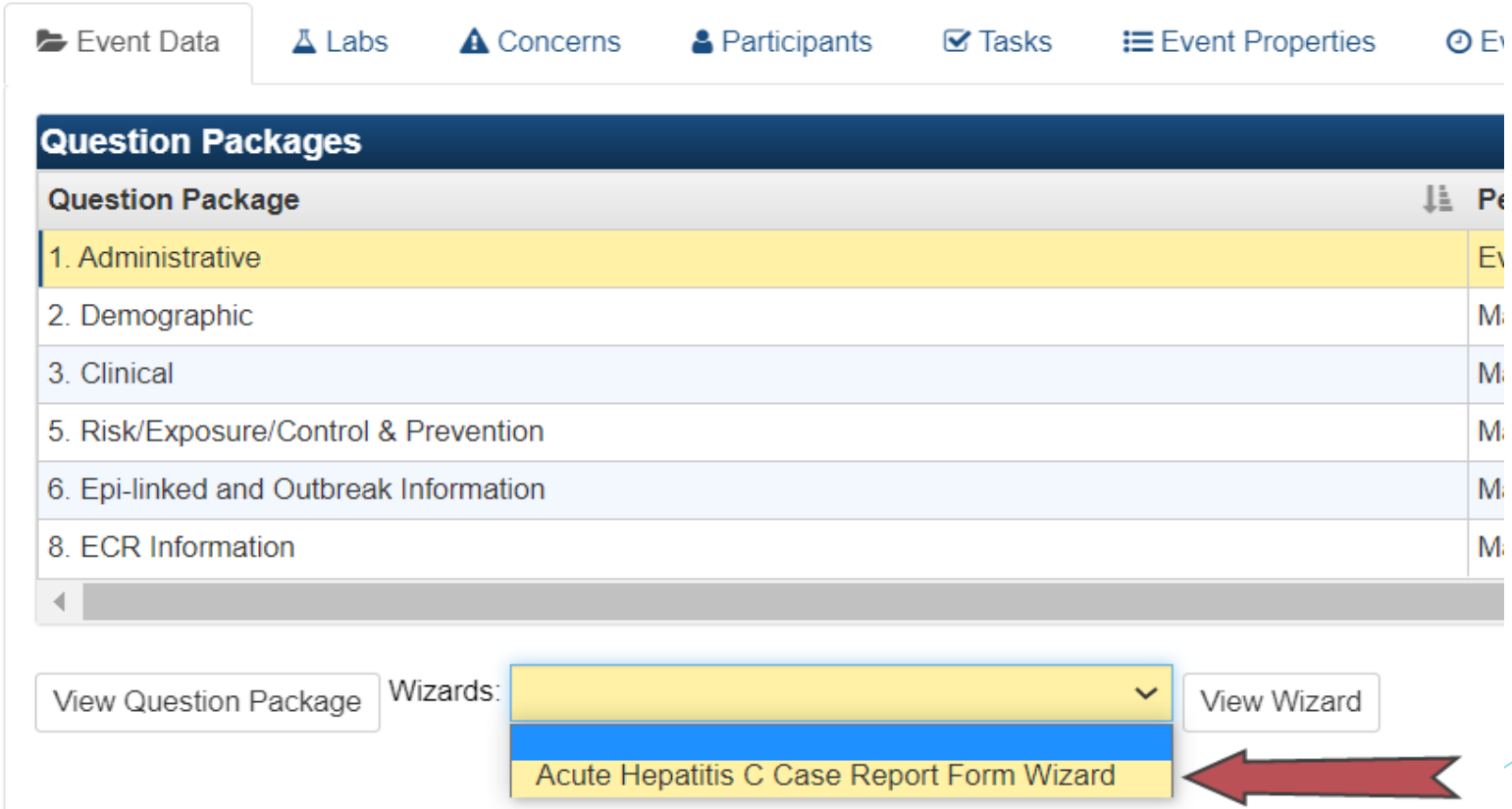
- Risk factors associated with HCV (IDU, sexual, tattoos, hemodialysis, etc.)
- Hospital related infections (need to be reported to Epi)
- Demographic (race/ethnicity, employment, gender identity, transgender experience, sexual orientation)
- Clinical information (hospitalization, symptoms, year first diagnosed)

Don't make assumptions.

- Everyone has biases.
- Ask the questions in a non-judgmental way.
- Ask open ended questions

Helpful Tips!

- Wizards: “Acute Hepatitis C Case Report Form Wizard”



Example Questions:

Some Medical Risk Factors

- Has case received blood transfusion, tissue products or organ transplants?
- During the incubation period did the case undergo hemodialysis?
- Did the case have surgery during the incubation period?
- During the incubation period, did the case have an accidental stick/puncture with a needle or other object contaminated with blood?
- During the incubation period, did the case receive any IV transfusions and/or injections in an outpatient setting?

Other

- During the incubation period, did the case inject drugs not prescribed by a doctor?
- During the incubation period, did the case use any drugs (not injection or intranasal) not prescribed by a doctor?
- During the incubation period, did the case use drugs not prescribed by a doctor intranasally?
- During the incubation period, did the case receive any body piercings?

Prepare/Conduct Hepatitis C Case Interviews

1. Contact ordering provider(s) to verify diagnosis and confirm that the case is aware of diagnosis.
2. Go through labs with provider to ensure all labs have been received.
3. Complete Clinical Question Package with provider and risk history.
4. If you are missing risk history contact the case directly.
5. You should try at least three times (different times of day) and if that is unsuccessful, complete the question Packages in MAVEN with as much info as you have gathered and indicate that the case is lost to follow-up (Admin QP).
    - If case is not answering phone, try sending a text message.
6. When investigation is complete, in Admin QP, mark “Acute-HCV Investigation Status” as “Complete.”

Prepare/Conduct Hepatitis C Case Interviews

If injection drug use (IDU) is listed as risk factor (already obtained through medical records/teleform):

- If local board of health capacity allow, you can consider collecting outstanding information in the QP and directing individual to local treatment and support services.
- Complete “Local Health and Investigation Steps (1-5)” in the Admin QP and change “Acute HCV Investigation Status” from “Pending” to “Complete.”

Syringe Service Programs:

Treatment and Support Services

- Syringe Service Programs: The Massachusetts Department of Public Health supports programs where persons who inject drugs can access sterile needles and syringes through syringe services programs (SSPs). Through these programs you can get sterile needles and syringes free of cost, dispose of used needles and syringes, and get connected to other services such as testing for hepatitis C, HIV and other sexually transmitted infections, overdose education, and Narcan (naloxone).
- Note: There are very safe and effective treatments with minimal side effects, and that MassHealth covers the cost completely (and will cover again if someone gets reinfected)

Treatment and Support Services (Continued)

HIV/AIDS Services and Resource Guide

- This Service and Resource Guide includes listings for syringe service programs/needle exchange, overdose education and naloxone distribution, and integrated HIV, STI, and viral hepatitis prevention and screening services funded through the Massachusetts Department of Public Health (MDPH).
- Please encourage cases to get hep A and hep B vaccinations!

Data Best Practices: MDPH Surveillance Reports
Data Request

Questions?

Contact: Julie.coco@mass.gov