Hepatitis A Outbreak in Lexington-Fayette Co.,KY

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Helping Lexington be well.

I have nothing to disclose.



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Hepatitis A



- Vaccine preventable, communicable disease of the liver
- Caused by hepatitis A virus (HAV)
- Fecal-oral transmission
- No chronic infection
- Usually resolves within 2 months of infection
- Children often asymptomatic.

Signs and Symptoms*



Discrete onset of:

- Fatigue/Malaise
- Decreased appetite
- Nausea/Vomiting
- Abdominal Pain
- Jaundice
- Dark urine
- Pale stools
- Fever



*May have several symptoms or none.

Infectious Period



- Average incubation is 28 days (range:15-50 days)
- Infected individuals can transmit the virus to others for up to two weeks <u>before</u> their own symptoms appear
- Cases remain contagious until 7 days after illness onset
- Rare cases can excrete virus for months



Diagnosing Hepatitis A



- Case definition:
 - Signs or symptoms consistent with acute viral hepatitis (e.g., fever, headache, malaise, anorexia, nausea, vomiting, diarrhea, and abdominal pain), and either: a) jaundice; or b) elevated serum alanine aminotransferase (ALT) or aspartate aminotransferase (AST) levels
 - AND Laboratory evidence: Immunoglobulin M (IgM) antibody to hepatitis A virus (anti-HAV)or positive hepatitis RNA

Hepatitis A Outbreak in Kentucky



- 10-year average of hepatitis A in KY: 20 cases/year; almost 5,000 in the current outbreak
- Hepatitis A cluster investigation in October 2017
- Statewide outbreak declared November 2017
 - 27 outbreak-associated cases
 - 2 cases with molecular evidence of outbreak strain occurring in CA and UT
- Risk factors of cases matched that of CA, UT, MI outbreaks (i.e., homelessness and illicit drug use)
- No contaminated food source was identified

A new type of hepatitis A outbreak



- Change in mechanism of transmission: shift in hepatitis A epidemiology from pointsource outbreaks associated with contaminated food to large community outbreaks with person-to-person transmission.
- Why here, why now? Outbreak occurring in environment of increased illicit drug use.

Foster, M. et al., Hepatitis A Virus Outbreaks Associated with Drug Use and Homelessness--- California, Kentucky, Michigan and Utah, MMWR, 2018, 67(43): 1208-1210.

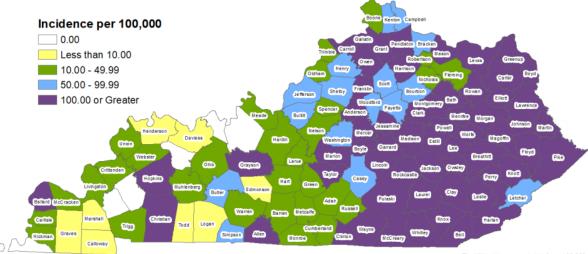
Statewide Outbreak Data



- Kentucky case count: 4,943 of as of 9/28/19
 - Hospitalizations:
 2,381 (48%)
 - Deaths: 61 (1.2%)

- Fayette County case count: 207 as of 10/14/2019
 - Hospitalizations: <u>135</u>
 (<u>65%</u>)
 - Deaths: 2 (<1%)

KY17-089 Incidence of Outbreak-Associated Acute Hepatitis A Cases by County, August 1, 2017 - September 28, 2019



The KY incidence rate is 111.0 per 100,00



Risk Factor Profile

Kentucky

KY17-089 Risk Factors of Outbreak-Associated Acute Hepatitis A Cases, August 1, 2017 – September 28, 2019#^

Risk Factor	Number of Cases Reporting Risk Factor (n=3967)*
Homelessness + No/Unk Illicit Drug Use	57 (1.4%)
Illicit Drug Use + No/Unk Homelessness	2851 (72%)
Homelessness + Illicit drug use	304 (7.7%)
No Outbreak-Related Risk Factors	755 (19%)

^{*} Risk factor information is unavailable for 976 (19.7%) of all outbreak-associated cases.

Fayette County

KY17-089 Risk Factors of Fayette County Outbreak-Associated Acute Hepatitis A Cases, August 1, 2017- September 28, 2019

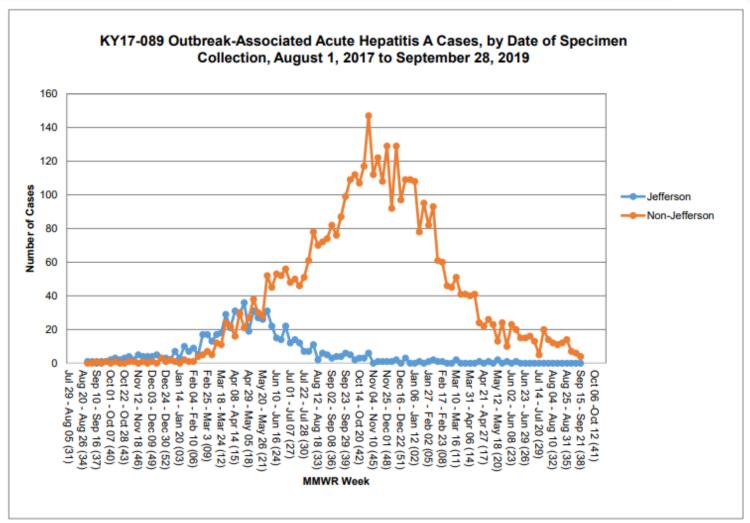
Risk Factor	Number of Cases (n=207)
Homelessness (alone)	5 (2%)
Drug use (alone)	129 (62%)
Homeless and drug use	13 (6%)
Contact with homeless	2 (1%)
None	29 (14%)
Unknown	20 (10%)
Contact of a case	9 (4%)

[#] The percentages in the table may add up to greater than 100 percent due to rounding.

[^] 38 MSM cases have been reported. Of those, 12 have reported no other risk factors. MSM is not considered an outbreak-related risk factor.

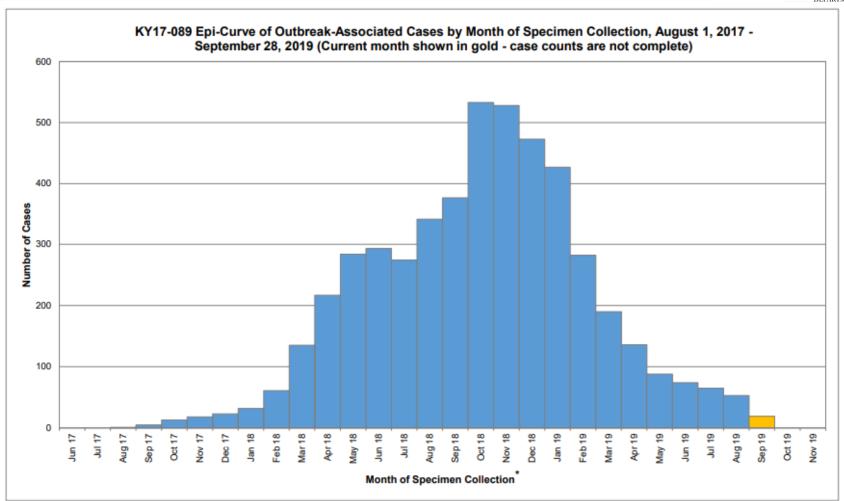
Louisville as an Early Target





Kentucky Hepatitis A Cases by Month of Onset

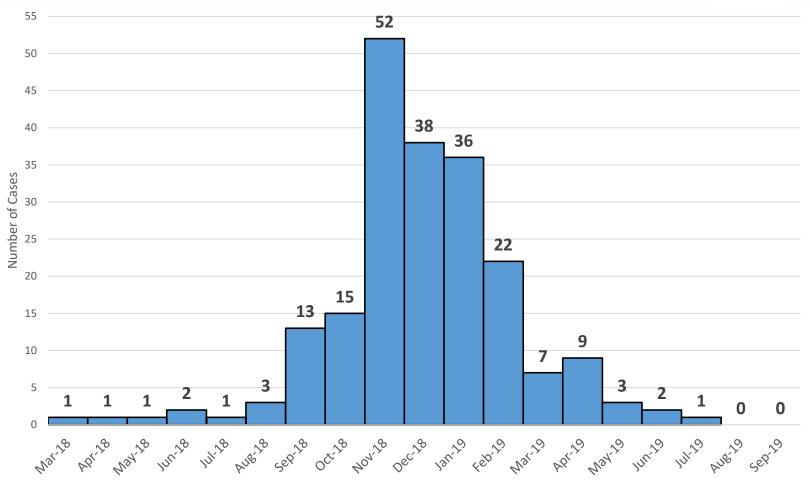




^{*}Note: As of the report ending July 6, 2019, this figure will be based on date of specimen collection rather than date of onset to be consistent with other figures.

Lexington Hepatitis A Cases by Month* of Diagnosis (n= 207)



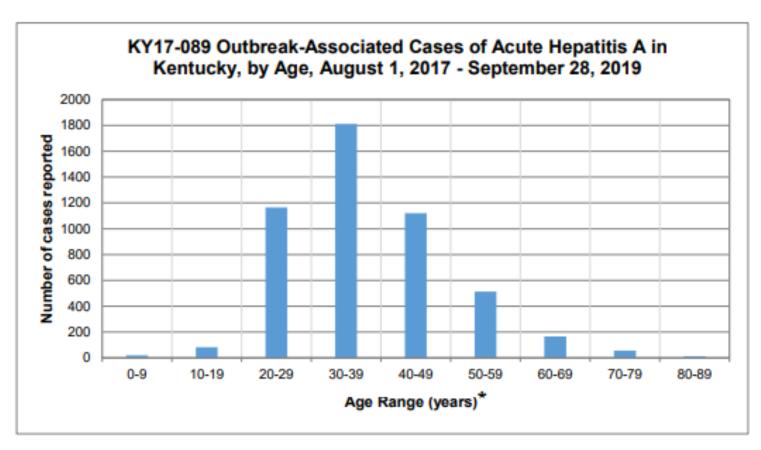


Month of Diagnosis (month-year)

*Current month accurate through 9/28/2019

Statewide Age Distribution





^{*}The mean age of cases is 37.6 years, and the median age is 36.0 years.

Genotyping



- 885 specimens submitted statewide (as of 9/28/19)
- 824 (93%) positive for genotype 1B
 - Predominant genotype in other outbreaks with same risk factors
 - California
 - Utah
 - Michigan
 - West Virginia
 - Ohio

Prevention



- Vaccinate! Vaccinate! Vaccinate!
- Thorough handwashing (after using the bathroom or diapering an incontinent person, and before eating or preparing food). Alcohol based hand sanitizers not very effective.
- Avoid waters that may be contaminated with sewage.
- Avoid raw or undercooked oysters or shellfish.
- Practice safe sex.



Single antigen hepatitis A vaccines

- 2-dose series
- 90% effectiveness after first dose
- Covered by most insurance plans
- Havrix®
- 12 mo-18 yrs: 0.5 ml; initial and at least 6 months later
- 19 yrs and older: 1.0 ml; initial and at least 6 months later

- Vaqta[®]
- 12 mo-18 yrs: 0.5 ml; initial and at least 6 months later
- 19 yrs and older: 1.0 ml; initial and at least 6 months later

Combo hepatitis A & B vaccine



- Twinrix®
- 18 years and older; 1.0 ml, 3 or 4 doses
- Schedule:
 - ≽initial, 1mo, and 6 mo later

-OR-

initial, 7 days, and 21-30 days, followed by a dose at 12 mo

Consider using in people who inject drugs or other populations who are also at high risk for hepatitis B

New school vaccination requirements: 2018-19 school year



As of July 1, 2018, in order for students to attend schools or licensed day care facilities:

- 2-dose series of hepatitis A vaccine for ages
 12 months through 18 years
- Quadrivalent meningococcal vaccine (MenACWY) booster dose for 16 years and above

Vaccination Strategies: Which is best?



- Ring vaccination
- Targeted vaccination
- Universal vaccination
- On September 11, 2018, the Lexington-Fayette County Health Department recommended that all susceptible residents of Fayette County be vaccinated. Why? Evidence of spread beyond those with traditional risk factors.

Outreach to high risk populations



- Needle exchange program
- Shelters and day centers for the homeless
- Recovery centers
- Detention centers, jails, and prisons
- Emergency departments
- Street outreach?

Logistics of Universal Vaccination



Goal: blanket the community with hepatitis A vaccinations

- Health department focused on high risk populations.
- Physicians offices vaccinated both high and low risk.
- Pharmacies were relied upon to vaccinate much of the low-risk population.

R₀ for hepatitis A



- In general, what is R_0 (the basic reproduction number)?
 - Average number of secondary infections caused by a single case in a fully susceptible population
- Specifically, what is R₀ for hepatitis A?
 - Good question:
 - 1.6-2.2, according to Gay, N.J. et al., Age-Specific Antibody Prevalence to Hepatitis A in England: Implications for disease control. *Epidemiol. Infect.*, 1994. 113, 113-120.
 - 1.7-3.3, according to Regan, D.G., et al., Estimating the Critical Immunity Threshold for Preventing Hepatitis A Outbreaks in Men Who Have Sex with Men. Epidemiol. Infect., 2016. 144, 1528-37.
 - 2.1-2.8, according to Zheng, X. and Lo Iacono, G. Estimating Human-to-Human Transmissibility of Hepatitis A Virus in an Outbreak at an Elementary School in China, 2011. PLOS One, 2018. 13: e0204201.

Contact Investigations



- Close contacts to confirmed or probable cases include household members, sexual contacts, and contacts at child care centers or at schools, when child is not likely to have good hand hygiene.
- Recommended post-exposure prophylaxis for susceptible close contacts, to be given within 14 days of exposure:
 - Single antigen hepatitis A vaccination for healthy people 12 months through 40 years old
 - IGIM for others; hepatitis A vaccination can be substituted for IGIM for those over 40 years, if IGIM is unavailable

Controversy: Should vaccination be mandated for food service workers?



- About 5% or less of outbreak related cases of hepatitis A have been food service workers.
- No known transmission from a food service worker has occurred in this outbreak, but it's theoretically possible.
- Food service workers are recommended to be vaccinated along with the rest of the public.
- The health department continues to educate restaurants as part of all routine inspections.

Controversy: Should vaccination be mandated for food service workers?



• Pros:

- Cases in food service workers are high-profile
- Cases in food service workers can potentially expose more people and those people are often impossible to identify

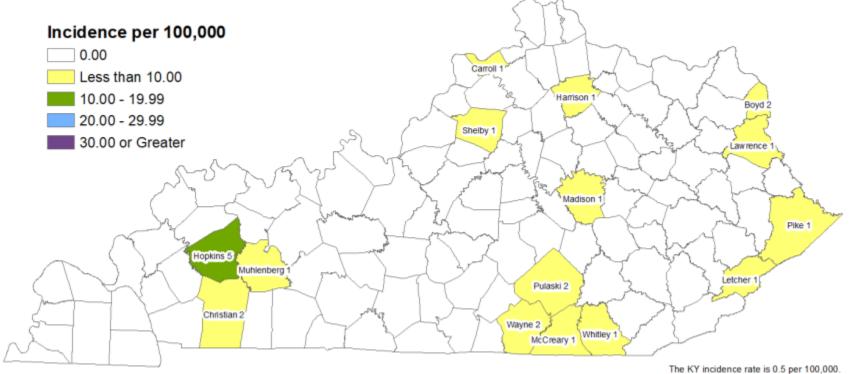
Cons:

- Food service workers are not at greater risk of contracting hepatitis A because of their work
- Employee turnover can be high in this industry, making it difficult--- and costly---to ensure vaccination.
- Following good food safety practices, such as excellent hand hygiene, should minimize risk to patrons.

Outbreak Cases in Last 30 Days



KY17-089 Incidence of Outbreak-Associated Acute Hepatitis A Cases by County*, August 29 - September 28, 2019



Note: Rates calculated from numerators less than 20 may not be reliably used to determine trends.

^{*}Case count for the last 30 days is displayed beside county name. Statewide outbreak-associated case count over the last 30 days is 23.

When will the outbreak be over?



- When more people become immune
- Declaring the end of an outbreak:
 - Number of cases returns to what is usually expected
 - -OR-
 - Two incubation periods without cases, if there are normally no cases.

Estimating the cost of the outbreak



- Cost to the community is a complex issue:
 - Expense of diagnosing and treating cases
 - Expense of cases missing work
 - Expense of caregivers missing work
 - Expense of health professionals' and pharmacists' time and expertise
 - Expense of vaccine and vaccine supplies
 - Expense of contact investigations

How you can help



- Get vaccinated, if you are susceptible.
- If you are a healthcare provider, recommend and administer hepatitis A vaccination to all people 12 months of age and older, if they are non-immune.
- Emphasize good handwashing, especially before meals and after diapering or going to the bathroom.

Questions?

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