Hepatitis A Virus in Colorado
Overview

Hepatitis A virus (HAV) characteristics and vaccination strategy

HAV epidemiology in the US and Colorado

Public health investigation process

2017 Colorado outbreak

Future considerations
# HAV Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Description</th>
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<tbody>
<tr>
<td>Agent</td>
<td>Picornavirus - replicates in liver and excreted in bile</td>
</tr>
<tr>
<td>Transmission</td>
<td>Primarily fecal-oral (foodborne, waterborne, person-to-person, environmental/object contamination); viremia* (as long as 30 days prior to onset to over 1 year after; ~95 days) role in transmission unclear</td>
</tr>
<tr>
<td>Incubation period</td>
<td>15-50 days (~28 days)</td>
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<tr>
<td>Infectious period</td>
<td>14 days before to 7 days after jaundice (or 14 days after if no jaundice)</td>
</tr>
<tr>
<td>Symptoms</td>
<td>Jaundice, dark urine, clay-colored stool, fever, headache, malaise, anorexia, nausea, vomiting, diarrhea, abdominal pain; Children &lt; 5 years often asymptomatic; Severity and mortality greatest &gt; 50 years</td>
</tr>
<tr>
<td>Environmental persistence</td>
<td>Contaminated hands - several hours; Dried feces - days to weeks; Environmental surfaces - several days; Fresh or salt water - up to 1 year; Freezing - indefinitely; Inactivated at 185°F for one minute</td>
</tr>
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</table>

HAV Case Definition

Acute illness with:

• Discrete onset of symptoms consistent with hepatitis A

AND

• Jaundice or elevated serum amino-transferase levels (ALT, AST)

AND

• Hepatitis A IgM+ or person epi-linked to a person who is IgM+

https://wwwn.cdc.gov/nndss/conditions/hepatitis-a-acute/case-definition/2012/
HAV Vaccine

• 1996 - HAV vaccine introduced
• 2006 - ACIP recommended HAV vaccine for all children at age one year
• Three vaccines: Havrix®, Vaqta®, Twinrix® (HAV and HBV)

Recommendations
• All children at one year of age
• Children ages 2-18 years who live in high HAV incidence areas
• International travel to endemic areas
• Men who have sex with men
• People who use injection and non-injection drugs
• Persons with occupational risks (work with primates)
• Persons with chronic liver disease or clotting-factor disorders
• Close contacts of children recently adopted from endemic areas
HAV Incidence (Pre-vaccine Era)

Average Reported Cases of Hepatitis A per 100,000 Population, US, 1987-1997

- Prevaccine era:
  - High rates in Native American and Alaska Native communities, states that border Mexico
  - Prevention through hygienic measures and IG

Source: CDC website
https://www.cdc.gov/hepatitis/hav/historical-usmap.htm
HAV Incidence, US

Rates of Reported Acute Hepatitis A Cases United States, 1966-2015

- 1971: 59,606 cases, Rate = 28.9
- 1996: Vaccine recommended, 31,032 cases, Rate = 11.7
- 2015: 1,390 cases, Rate = 0.4

1996-2011: 95.5% decrease in reported cases

-National Notifiable Diseases Surveillance System (NNDSS); Armstrong GL. Pediatrics 2007;119:e22-9
HAV Incidence, Colorado
Healthy People 2020 Goal: 0.3 cases/100,000; CO has gotten to 0.4 several years

Hepatitis A Rates, Colorado, 1983 - 2016

- 880 cases
- Hepatitis vaccine available
- 21 cases

Year
HAV Geographically, Colorado

Hepatitis A cases
Reported by county, Colorado,
2005 - Nov 2017
(N=481)

No cases
1 case
2-4 cases
5-9 cases
10-19 cases
>=20 cases
HAV Cases by Sex, Colorado

Hepatitis A cases by sex, Colorado, 2005 - Nov 2017 (N=481)

- **Female**
- **Male**

Number of cases by sex and report year:

- 2005: Male 15, Female 22
- 2006: Male 17, Female 20
- 2007: Male 16, Female 21
- 2008: Male 18, Female 23
- 2009: Male 20, Female 24
- 2010: Male 19, Female 21
- 2011: Male 17, Female 20
- 2012: Male 16, Female 19
- 2013: Male 18, Female 22
- 2014: Male 15, Female 18
- 2015: Male 16, Female 17
- 2016: Male 17, Female 16
- 2017: Male 45, Female 25
Public Health Investigation

Reportable condition - 1 working day

Typically followed up on by Communicable Disease*

Markers that prompt and prioritize an investigation into a case
- Meet case definition? (about half of IgM+ reports do not)
- Occupation (food handler, other high risk)
- Living situation/group settings (shared housing, nursing home settings, camp, etc.)
- Source of infection (food, sexual exposure, drug use

Hepatitis A manual:
https://www.colorado.gov/pacific/cdphe/communicable-disease-manual
## Hepatitis A PEP

### Current ACIP/CDC Recommendations

<table>
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<tr>
<th>Group</th>
<th>Recommendation</th>
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<tbody>
<tr>
<td>Children &lt; 12 months, immunocompromised, chronic liver disease, vaccine contraindication</td>
<td>IG</td>
</tr>
<tr>
<td>Healthy persons 12 months - 40 years</td>
<td>Vaccine</td>
</tr>
<tr>
<td>Adults &gt; 40 years</td>
<td>IG; vaccine if IG cannot be obtained</td>
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Recent IG Changes

July 2017: Grifols Therapeutics updated IG dosing instructions for HAV PEP from 0.02 mL/kg to 0.1 mL/kg (5 fold increase)

Decreased HAV IgG potency likely resulting from decreasing prevalence of previous HAV infection among plasma donors (https://www.cdc.gov/mmwr/volumes/66/wr/mm6636a5.htm)

Public health issues:
- Dosage: 100 lb person = 4.5 mL; 200 lb person = 9.0 mL
- Cost: 2.0 mL single dose vial = $100.00; 10.0 mL vial = $400 (vaccine $26-$67)
- Storage: 36-46 degrees F
- Availability: Occasional/historical shortages; 1 manufacturer
- Administration: IM; doses over 10 mL should be divided
- Immunity: Shorter than vaccine
2017 Hepatitis A Outbreak - Colorado

As of December 31, 2017:

- 63 CO cases -- 32 (51%) hospitalized and 1 death
- Primarily counties on the eastern side of Rocky Mountains
- 45 (62% male); 19 - 83 years (median 44 years)
- 7 (11%) Hispanic
- Identified risk factors/exposures: (some cases had multiple)
  - 2 homeless
  - 2 attend same gym (consumed smoothies)
  - 3 IVDU
  - 8 potential secondary cases
  - 9 international travel
  - 20 MSM (some with anonymous partners at adult video stores and meeting through web/phone apps)
Hepatitis A Cases by Month of Illness Onset, Colorado, 2017 (N=62)
2017 Hepatitis A Outbreak - Interventions

- Education campaigns targeting high risk groups (MSM, homeless, PWID)
- Vaccination campaigns targeting high risk groups
- Several press releases, Health Alerts
- Encourage prompt reporting by health care providers to public health, and prompt public health follow-up
- Post-exposure prophylaxis (hepatitis A vaccine or immune globulin) can prevent infection if administered within 14 days of exposure
Las infecciones de la Hepatitis A están aumentando en Colorado
La Hepatitis A es un virus que puede hacerle sentirse muy enfermo. Los síntomas de la Hep A están en las heces (GPIO) de las personas infectadas. Usted puede infectarse tragando pequeñas cantidades del virus. Usted puede obtener Hep A:

- Al tragar alimentos o bebidas contaminadas con el virus.
- Por sexo oral o anal.
- Al tocar personas infectadas con el virus, o cualquier objeto contaminado, luego ponerse sus manos en la boca.
- Al compartir equipo de inyección de drogas.

La Hep A puede ser más severa para las personas que tienen una enfermedad hepática (de por vida) como, cirrosis, hepatitis B o hepatitis C.

Una vacuna segura y eficaz protege contra la Hep A
Protejase y proteja a los demás. Vacúñese en contra de la Hepatitis A. Pregúntele a su médico, o visite vacinedfinder.org para encontrar tiendas que pongan la vacuna de la Hep A. Contácte a su departamento de salud local para vacunas gratuitas o de bajo costo.
Outbreak Genotype Summary

In general, there are 7 hepatitis A genotypes and many strains within genotypes

- Genotype 1A: circulates in South and North America, Europe, Asia
- Genotype 1B: Middle East and Africa

CDC has performed genotyping on 21 Colorado outbreak specimens:

- 2 cases with 1B (homeless cases who spent time in San Diego)
- 2 cases with 1A1(d) (gym/smoothie common exposure)
- 9 cases with 1A1(f) (4 report MSM)
- 4 cases with 1A1(a) (3 report MSM)
- Remainder have unique strains
## Other Recent Outbreaks

<table>
<thead>
<tr>
<th>Year</th>
<th>Location</th>
<th>Source/Affected Population</th>
<th>Case Count</th>
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<tbody>
<tr>
<td>2017-2018</td>
<td>Utah</td>
<td>Homeless, PWID, inmates</td>
<td>278 (2 d, 151 h)</td>
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<tr>
<td>2017-2018</td>
<td>Michigan</td>
<td>Homeless, PWID, inmates</td>
<td>896 (28 d, 720 h)</td>
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<tr>
<td>2017-2018</td>
<td>Indiana</td>
<td>Homeless, PWID, inmates</td>
<td>507 (1 d, 224 h)</td>
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<tr>
<td>2016-2018</td>
<td>California</td>
<td>Homeless, PWID, inmates</td>
<td>587 (20 d, 402 h)</td>
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<tr>
<td>2017-2018</td>
<td>Kentucky</td>
<td>Homeless, PWID</td>
<td>1,851 (14 d, 1,029 h)</td>
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<tr>
<td>2018</td>
<td>West Virginia</td>
<td>Homeless, PWID, inmates</td>
<td>1,395 (3 d, 722 h)</td>
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<tr>
<td>2017-2018</td>
<td>Tennessee</td>
<td></td>
<td>272 (0 d, 152 h)</td>
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<tr>
<td>2018</td>
<td>Missouri</td>
<td>PWID</td>
<td>197 (0 d, 80 h)</td>
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<tr>
<td>2018</td>
<td>Arkansas</td>
<td></td>
<td>150</td>
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<tr>
<td>2018</td>
<td>Ohio</td>
<td></td>
<td>538 (0 d, 333 h)</td>
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<td><strong>TOTALS</strong></td>
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<td><strong>6,164 cases</strong></td>
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<td><strong>3,813 hospitalizations</strong></td>
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<td><strong>68 deaths</strong></td>
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Future Considerations - Comprehensive Service Delivery Model

• Communicable Disease working in tandem with Disease Intervention Specialists, HIV/STI/Viral Hepatitis programs, and LPHAs with priority population experience
• Ensuring EMR prompts for vaccine for priority populations (reported MSM, PWID, persons experiencing homelessness)
• Consider combination vaccine to also include HBV (Twinrix)
• Increase age range for vaccine PEP (several other countries recommend vaccine+IG after exposure)
• Offer counseling/testing services (HIV, HCV, gonorrhea, chlamydia, syphilis)
• Offer HIV PrEP and PEP for priority populations
• Involve contracted agencies and LPHAs in stand-up clinics
  • Shared marketing and outreach
  • Collaborative stand-up clinics
  • Meeting clients/population where they congregate (adult bookstores, Grindr, syringe access programs, LGBT community centers, homeless shelters)
Contact Information

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