Hepatitis A Case Investigation and Outbreak Response

Terrie Whitfield LPN
Public Health Representative
Training Objectives

- Provide an overview of HAV epidemiology
- Present reporting criteria and HAV case definition
- Ascertain the source
- Implement appropriate control measures
Hepatitis (HAV)

- Nationally reportable
- Most disease occurs in community-wide outbreaks
- Children and young adults account for 50 – 60 % of reported cases
- No risk factor identified for 40%-50% of reported cases
Populations at Risk

- Travel to countries with high or intermediate endemicity of infection
- MSM
- Illicit drug users
- Persons with occupational risk
- Chronic liver disease
HAV

- A highly contagious viral disease
- Self limiting infection of the liver
- Acute disease or asymptomatic infection
- No chronic infection
  - Protective antibodies develop in response to infection conferring lifelong immunity
Hepatitis A Immunology

HAV Total Antibodies

HAV IgG
Previous illness
Immunity due to vaccination

HAV IgM
Acute illness (within 6 months)
Recent HAV vaccination (rarely)
HAV Pathogen

- RNA Picornavirus
  - Single serotype worldwide
  - Resistant to heat, solvents, and acid
  - Grows slowly in living cells

- Major site of replication is the liver, excreted in bile, and shed in the stool
HAV Transmission

- Person – to - person fecal oral route transmission
  - Close personal contact
    - Household contacts, extended families, sexual partners
    - Young children are often the source of infection
      - Asymptomatic illness
      - Lower standards of hygiene
  - Foodborne and waterborne contamination
    - ready to eat or uncooked foods prepared by an infected foodhandler with poor hygiene
    - consuming raw shellfish harvested from sewage contaminated water, drinking contaminated water or ice
HAV in New Jersey

- NJAC 8:57
- Immediately reportable
- 2012 cases reported = 403
  - Confirmed cases = 62
  - Not A Case = 324
HAV Case Definition

**Confirmed:**

**Clinical criteria**

An acute illness with:
- discrete onset of symptoms (e.g. fatigue, abdominal pain, loss of appetite, intermittent nausea, vomiting), **and**
- jaundice or elevated serum aminotransferase levels

**Laboratory criteria**

- IgM antibody to hepatitis A virus (anti-HAV) positive
- OR
- a case that meets the clinical case definition and occurs in a person who has an epidemiologic link with a person who has laboratory-confirmed hepatitis A (i.e., household or sexual contact with an infected person during the 15-50 days before the onset of symptoms)
NJDHSS HAV
Case Definition

<table>
<thead>
<tr>
<th>Probable:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clinical Criteria</strong></td>
</tr>
<tr>
<td>➢ None</td>
</tr>
<tr>
<td><strong>Laboratory Criteria</strong></td>
</tr>
<tr>
<td>➢ IgM antibody to hepatitis A virus (anti-HAV) positive</td>
</tr>
</tbody>
</table>

**AND**

<table>
<thead>
<tr>
<th><strong>Other Criteria</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>➢ The patient is epidemiologically linked to a confirmed case of acute hepatitis A. An epidemiological link is defined as a household or sexual contact, or sharing the same exposure as that which is thought to be the cause of a common source hepatitis A outbreak (e.g. dining at a restaurant where an infected food handler was working).</td>
</tr>
</tbody>
</table>
ABRUPT Onset of Symptoms

- Fever
- Malaise
- Anorexia
- Nausea
- Abdominal pain

- Diarrhea
- Dark urine
- Clay colored stools
- Jaundice- yellow skin
  - Icteric- yellow sclera

Those infected may have all, some or none of these symptoms. A lab test is required to diagnose HAV.
HAV Symptom Severity

- Symptoms severity increases with age
- Typical course of illness is < 2 months
- Prolonged/relapsing illness in 10 – 15% of the cases
## HAV Clinical Features

- **Incubation period:** Range 15 - 50 days  
  Average 28 - 30 days

- **Jaundice by age group:**  
  - <6 yrs: <10%  
  - 6-14 yrs: 40%-50%  
  - >14 yrs: 70%-80%

- **Rare complications:**  
  - Relapsing hepatitis  
  - Fulminant hepatitis  
  - Cholestatic hepatitis

- **Chronic sequelae:** None
HAV Liver Studies

- Jaundice: Elevated Bilirubin, Total

- Elevated Liver Enzymes:
  - Alanine Transaminase ALT (SGPT) – range 9-50 U/L
  - Aspartate Transaminase AST (SGOT) – range 14-36 U/L
Period of Communicability

- Most infectious 2 weeks prior onset of jaundice or elevated liver enzymes through one week after jaundice

- Viral shedding in stool is greatest during two week period prior to jaundice

- **Identifying jaundice or elevated liver enzymes onset date is the most crucial piece of the case investigation**
<table>
<thead>
<tr>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
<th>Sunday</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td>MD VISIT</td>
<td>19</td>
<td>20</td>
<td>21</td>
<td>Jaundice</td>
<td>22</td>
<td>LAB RESULTS</td>
</tr>
<tr>
<td>25</td>
<td>26</td>
<td>27</td>
<td>28</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Calculating Period of Infectivity

Jaundice Onset Date or Elevated Liver Enzyme Date: 02/21/13

Infectious Period: 02/07/13 to 02/28/13

Two weeks prior to jaundice / ↑ liver enzymes

One week after jaundice / ↑ liver enzymes
Post Exposure Prophylaxis

- Vaccination with the full, two-dose series of HAV vaccine is the best.
  - HAV vaccine licensed in the US for persons 12 months of age and older.

- Persons not vaccinated should receive single dose of single-antigen vaccine or IG (0.02 mL/kg) as soon as possible, within 2 weeks after exposure.
Post Exposure Prophylaxis

- IG is preferred for persons aged 40 years and older.
  - If IG cannot be obtained, vaccine can be used.
- IG should be used for children aged less than 12 months, persons with chronic liver disease and immunocompromised persons.
The Outbreak

HAV Associated with Pomegranate Seeds
Steps of an Outbreak Investigation

- Establish the existence of an outbreak
- Verify the diagnosis
- Define and Identify cases
- Describe and orient the data in terms of time, place and person
Steps of an Outbreak Investigation

- Develop Hypotheses
- Evaluate Hypotheses
- Refine Hypotheses
- Implement control and prevention measures
- Communicate findings
Establish Existence of Outbreak

- High incidence of Hepatitis A cases in Colorado and New Mexico
- Through Epi-X State officials made aware to look for cases with recent travel to identified states
- First illness linked to the outbreak began on March 31, 2013
Verify the Diagnosis

- Immunoglobulin M (IgM) antibodies
- Elevated Liver Enzymes (ALT/AST)
- Clinical Signs and Symptoms
Develop Hypothesis

- What was the common source that each case could have been exposed to?
- Transmission is fecal/oral
  - Contaminated food?
  - Contaminated water?
- Travel to endemic area 2 – 7 wks ago?
- Gathering 2 – 7 wks ago?
Data Collection

- Identify Risk Factor Exposure

- Review laboratory results and validate additional testing

- Determine public health risk. Is the case a source of infection for others?
Describe and Orient the Data in Terms of Time, Place and Person
Epidemiology

- 162 people were confirmed
- Ten states identified cases
- Ages ranged from 1 – 84 years
- 55% ill people were women
- Onset dates ranged from 3/31 – 7/26/2013
- 71 (44%) were hospitalized
Current Epi Curve

Hepatitis A Virus Infection Associated with Consumption of Frozen Berry and Pomegranate Mix: Epidemic Curve by Date of Symptom Onset as of 9/19/2013

- 154 Confirmed Cases with Known Symptom Onset

Number of Cases

Week of Symptom Onset

- 2 additional confirmed cases have unknown symptom onset date and are not represented in the epidemic curve
- 6 confirmed secondary cases are not included in the epidemic curve
Epidemiology

- Six of the confirmed cases were household contacts of confirmed cases (secondary cases).
- No Deaths reported
The major outbreak strain of hepatitis A virus, belonged to genotype 1B

Found in clinical specimens of 117 people in nine states: AZ, CA, CO, HI, NH, NJ, NM, NV, and WI.

This genotype is rarely seen in the Americas but circulates in North Africa and the Middle East.
Regulatory Investigation

- Vehicle was a shipment of pomegranate seeds from a company in Turkey.
- Pomegranate seeds were used by Townsend Farms to make Organic Antioxidant Blends & by Scenic Fruit Company to make the Woodstock Frozen Organic Pomegranate Kernels.
- June 28, Townsend Farms expanded its voluntary limited lot recall of Organic Antioxidant Blend.
162 people were confirmed to have become ill from HAV after eating ‘Townsend Farms Organic Antioxidant Blend’

All ill people reported eating this product purchased it from Costco markets;

The product was also sold at Harris Teeter stores. No ill people were identified that bought the product at Harris Teeter.
Refine Hypothesis

- The cases reported from Wisconsin were exposed to the product in California.
- The cases reported from New Hampshire reported fruit exposure during travel to Nevada.
- The case reported in New Jersey was a household contact of a confirmed case in Colorado.
Communicate Findings

- States updated on a regular basis through Epi-X
- Information added to CDC and FDA websites regarding outbreak
Epi-X

CDC officials, state and local health departments, and other public health professionals shared preliminary health surveillance information posted nationally for case findings.
The Notification

- 74 yr. old, NJ resident with recent travel history to Colorado
- Went to MD after returning to NJ
- Initial Hep.A IgM drawn on 7/4 negative, liver enzymes normal, asymptomatic
- APN called NJ patient on 7/11 to repeat testing for HAV
The Notification

- Case developed symptoms on 7/12
- Evaluated at ER and admitted to local hospital on 7/14
- LHD calls to report a 74 yr. old with a Positive HAV IgM
- Elevated Liver Enzymes, Symptomatic
- Admitted with Acute HAV
Case Investigation

- Review laboratory results and validate additional testing
- Enter case into CDRSS
- Conduct interviews to determine clinical features
- Identify Infectious Period
- Identify Risk Factor Exposure
- Determine public health risk
- Identify contacts
- Facilitate Immune Globulin (IG)/Hep.A vaccine post exposure prophylaxis to contacts
- Provided Education
Epidemiology

- NJ Resident with recent travel to Colorado
  - Case did not consume contaminated product
  - Secondary case -- Household Contact
  - Case not contacted by Colorado Health Department
Epidemiology

- Post Exposure Prophylaxis provided to household contact
- Transferred to University of Pennsylvania for liver transplant
- Case contacted by CDC for Epidemiological Study
  - Major outbreak strain of HAV, belonging to genotype 1B found in NJ case
“BE CONSISTENT”
Questions

HAV is mainly spread by:

- a. Injection drug use
- b. Prison tattooing
- c. Person-to-person transmission through the fecal-oral route
- d. Close personal contact with an infected household member or sexual partner
- **e. C & D only**
The incubation period for HAV ranges from 15-50 days with an average of 28-30 days. Why is this important to know?

- a. To identify the infectious period
- b. To calculate when others might have been exposed
- c. To determine when it is acceptable to share a meal with this person
- d. A & B
- e. B & C
Questions

How would I calculate the infectious period during my public health investigation?

- a. Determine the onset of jaundice or elevated liver enzymes
- b. Calculate two weeks before and one week after the onset of jaundice/elevated liver enzymes
- c. Calculate one week before and after the onset of jaundice/elevated liver enzymes
- d. Ask person when they started to feel ill and note that date
Which of the following statement(s) are true about Hepatitis A?

- a. Persons can become reinfected with the hepatitis A virus after recovering from a prior infection
- b. Best to treat hepatitis A early so it does not become chronic
- c. The average incubation period for hepatitis A is 28 days
- d. A & B
- e. B & C
Questions

Why are we concerned if a food-handler or day care worker test positive for HAV?

- a. Children less than 1 year are not vaccinated
- b. These individuals often travel and may bring it home
- c. Infected foodhandlers may be infectious and contaminate food
- d. A & B
- e. A & C
Questions

The current CDC post-exposure prophylaxis guidelines recommend:

- a. An injection of immune globulin (IG) is the only recommended way to protect people after they have been exposed to the hepatitis A virus
- b. Vaccine can be used if IG cannot be obtained
- c. Persons who have recently been exposed to HAV and who have not been vaccinated previously should be administered a single dose of single-antigen Hepatitis A vaccine or IG as soon as possible, within 2 weeks after exposure
- d. A & B
- e. B & C
Securing and administering post-exposure prophylaxis to exposed individuals is the role of:

- a. The state health department
- b. The local health department where the contact resides.
- c. The Centers for Disease Control & Prevention
- d. The contact’s primary care physician
NJDOH Contact Information

NJDHSS  Communicable Disease Service
(609) 826-5964
Request to speak with clinical staff regarding Hepatitis A
After hours (609) 392-2020

Terrie Whitfield LPN , Public Health Rep
terrie.whitfield@doh.state.nj.us

Food and Drug Safety Program - (609) 588-3123