

# Hepatitis A

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## Epidemiology

Hepatitis A virus (HAV) is a single strand RNA non-enveloped virus classified as a member of the picornavirus (enterovirus) group.

The proportion of people ever infected (prevalence of infection) is estimated at 31% for the early 2000's. A prevalence of 25% was found in young adults tested at OPH laboratory. It is estimated that there were around 1,500 to 2,000 new infections occurring in Louisiana in the early 2000's, of which approximately 700 to 900 are acute cases. Approximately 100 cases are reported every year.

HAV is mostly spread by the fecal-oral route.

- HAV replicates in the liver, is excreted in bile and is shed in the stool.
- The most common mode of transmission is person to person, resulting from fecal contamination and oral ingestion, the fecal-oral route. Fecal-oral spread from asymptomatic infections, particularly young children, likely accounts for most of these cases of unknown source. Viral titers in the stools may reach 100 million viral particles /ml.
- The virus is not present in the saliva and therefore drinking after someone else poses no risk.
- Viremia occurs soon after infection and persists through the period of liver enzyme elevation. During this short viremia, transmission may occur by transfusion of blood, through injecting drug use, or from mother to newborn infant (vertical transmission). These cases are rare.
- HAV has recently been recognized as a sexually transmitted disease (STD) for those who practice anal sex. Transmission may be due to fecal-oral route through contaminated hands or sexual contacts.
- Ingestion of contaminated food or water is responsible for common source outbreaks. These are rare.

Humans are the usual hosts, although HAV can infect some monkeys.

The incubation period for HAV is 15 to 50 days, with an average of 25 to 30 days.

Infectivity period: The virus is present in the stool approximately one week before onset and during the first week of overt disease. By the third week, only 30% of patients continue to excrete viruses. There is no evidence of chronic excretors.

## Clinical Description

Symptomatic hepatitis occurs in fewer than 20% of infected children younger than six years of age, 40% to 50% of those from six to fourteen years, and 70% to 80% of those older than fourteen years.

The illness caused by HAV infection typically has an abrupt onset of symptoms that can include fever, malaise, anorexia, nausea, abdominal discomfort, dark urine and jaundice. Signs and symptoms usually

last less than two months, although 10% to 15% of symptomatic persons have prolonged or relapsing disease lasting up to six months.

Fulminant hepatitis is rare (2 per 1,000 among children less than five years of age and 25 per 1,000 cases among adults older than 40 years). Chronic infection does not occur.

The treatment is supportive.

## Surveillance

**Acute Hepatitis A is a reportable condition.** Past infection, asymptomatic infection and presence of anti HAV IgG only antibodies are not reportable.

## Case Definition

Clinical case definition: An acute illness with a) discrete onset of symptoms ,and b) jaundice or elevated serum aminotransferase levels

Laboratory criteria for diagnosis: immunoglobulin M (IgM) antibody to hepatitis A virus (antiHAV) positive

## Case Classification

Confirmed: a case that meets the clinical case definition and is laboratory confirmed or, for hepatitis A, 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 to 50 days before the onset of symptoms).

## Laboratory Tests

Hepatitis A cannot be differentiated from other types of viral hepatitis on the basis of clinical or epidemiologic features alone.

Serologic tests for HAV-specific IgG and IgM are available commercially. **Serum IgM** is present at the onset of illness and usually disappears within four months, thus usually indicating current or recent infection, but may persist for six months or longer. Measurement of the HAV IgM antibody is the preferred diagnostic test for acute infection. A positive IgM anti-HAV test result in a person without symptoms of hepatitis A might indicate:

- Asymptomatic acute HAV infection
- Previous hepatitis A infection with prolonged presence of IgM anti-HAV
- False positive test result

A minority of patients have detectable IgM anti-HAV for as long as 30 months after onset of illness. False positive results are more likely to occur when patients are tested who do not have symptoms of acute hepatitis. False positive results also are more likely to be female and older. A false positive result is likely if a patient has a positive IgM anti-HAV and a negative total (IgG and IgM) anti-HAV result.

**Test only when needed:** Test results indicating acute HAV infection among people who do not have clinical or epidemiologic features consistent with hepatitis A are a concern for state and local health departments because of the need to assess whether contacts need post-exposure immunoprophylaxis.

**Test ONLY people with signs or symptoms of hepatitis  
or close contacts of confirmed acute cases of hepatitis A**

**Anti-HAV IgG** is detectable shortly after the appearance of the IgM-specific titer. The presence of IgG anti-HAV antibodies without virus-specific IgM indicates past infection.

The interpretation of antibody results is as follows:

- IgM positive - indicates a present infection; consistent with a diagnosis of acute hepatitis A
- IgG positive - indicates past infection (unless specimens obtained late in the course of illness); the patient is presently immune and has hepatitis of other etiology.
- IgM/IgG negative - indicates no prior exposure; the patient is presently susceptible and has hepatitis of other etiology.
- Commercial diagnostic tests detecting total (IgM and IgG) anti-HAV in serum are not useful to differentiate between new and old infection.

Hepatitis A vaccination can induce IgM anti-HAV that is detectable by standard assays, particularly if the test is conducted soon after vaccination. IgM anti-HAV has been detected two to three weeks after administration of one dose of vaccine in eight to twenty percent of adults. However, when tested one month after vaccination, only one percent of 311 adults had detectable IgM anti-HAV.

Nucleic acid tests may detect HAV RNA in the blood and stool of most persons during the acute phase of infection. However, these methods, available in only a limited number of research laboratories, generally are not used for diagnostic purposes.

### **Case Investigation**

- Upon receipt of a report of hepatitis A, complete the Viral Hepatitis Case Record (CDC 53.1). This may be done by phone if the case is reported by a physician, hospital, or other source, or at the time of the health unit visit by family members for post-exposure prophylaxis (PEP).
- Confirm the diagnosis with lab test: Contact the health care provider to obtain lab test results. The lab tests results are indispensable for case confirmation. The state laboratory will not routinely test specimens for hepatitis A. If there are special circumstances, contact the Infectious Disease Epidemiology Section for further information.
- Ensure that household contacts are given post-exposure-prophylaxis (see Household contacts)
- Ask about child care attendance and food handling (see following sections)
- Ask about additional cases (outbreaks?)

### **Household contacts:**

All household and sexual contacts of HAV cases should receive post-exposure prophylaxis as soon as possible after exposure. Serologic testing of contacts is not recommended because it adds unnecessary cost and may delay the administration of PEP. The use of PEP more than two weeks after the last exposure is not indicated.

Consideration should also be given to providing PEP to persons with other types of ongoing, close personal contact (e.g., regular babysitting).

### **Cases Associated with Child Care Centers:**

If a case of Hepatitis A is associated with a child care center, notify the Infectious Disease Epidemiology Section immediately and discuss recommendations.

-Exclusion of cases: Cases should be excluded for the first 14 days following onset of symptoms, or for seven days following onset of jaundice. If symptoms appear in any child or employee, they should be excluded and referred to their health care provider for evaluation.

-Active surveillance: Prepare a list of children and adults attending the center and set up an active surveillance to identify additional cases. Contact the owner/director of day care center to notify him/her of the case and to determine if any other cases have occurred. There may be cases of hepatitis in non-household relatives of children in child care centers that can be linked to the center.

-PEP: should be administered to all previously unvaccinated staff and attendees of day care centers or homes if

- one or more cases of hepatitis A are recognized in children or employees or
- cases are recognized in two or more households of center attendees.

In centers that do not provide care to children who wear diapers, PEP need be given only to classroom contacts of an index case-patient.

When an outbreak occurs (i.e., hepatitis cases in three or more families), PEP also should be considered for members of households that have children (center attendees) in diapers.

Inspection of child care facilities may be warranted in the event of an outbreak. Educate child care center staff on hygienic practices, proper disposal of diapers, and emphasize appropriate and proper handwashing practices.

### **Cases involving a Food Handler or Food Establishment**

If a case is a food handler, ascertain to what degree the person handles food, i.e., cook, server and take additional preventive measures.

Exclusion from food handling: Notify the manager of the food establishment and indicate that the case should not engage in handling food for the first seven days following onset of symptoms. The employee may work in a nonfood handling capacity during this time if compliance is reasonably assured.

#### Other food workers

- should be interviewed about their health status and if symptomatic, should be excluded and referred to their health care provider.
- If the other employees ate food prepared by the case that are not then cooked, they are to be referred to their private physician for PEP.

Inspection of facility: Since the incubation of hepatitis A can be as long as 50 days, a quick and thorough assessment of the case's role and hygiene practices performed in the food establishment must be done. Determine if food on the premises should be discarded based on the hygienic practices that are observed, foods handled and method of preparation. Be specific as to when food was last handled and dates on which it was handled for the entire time the food worker was symptomatic while working.

Educate staff on hygienic practices and emphasize appropriate and proper handwashing practices.

Search actively for additional cases.

Patrons: Because common-source transmission to patrons is unlikely, PEP administration to patrons is usually not recommended but can be considered if

- during the time when the food handler was likely to be infectious, the food handler both directly handled uncooked foods, or foods after cooking and had diarrhea, or poor hygienic practices; also
- patrons can be identified and treated within two weeks after the exposure.
- In settings where repeated exposures to HAV might have occurred (e.g., institutional cafeterias), stronger consideration of PEP use might be warranted.

In the event of a common-source outbreak, PEP should not be administered to exposed persons after cases have begun to occur because the two week period during which IG is effective will have been exceeded.

## **Newborn Infants of HAV-infected Mothers**

Perinatal transmission of HAV is rare in this circumstance. Consideration should be given to administering Immune Globulin (0.02 mL/kg) to the infant if the mother's symptoms began between two weeks before and one week after delivery. Efficacy, however, in this circumstance has not been established. Severe disease in healthy infants appears to be rare.

## **Schools, Other Work Settings**

Schoolroom exposure generally does not pose an appreciable risk of infection, and **PEP administration is not indicated**. However, PEP could be used if transmission within the school setting is documented. Alternatively, vaccine should be considered as a means of prophylaxis especially when a longer duration of protection is advisable.

PEP is not routinely indicated when a single case occurs in an office, or in other work settings.

## **Institutions and Hospitals**

In institutions for custodial care with an outbreak of HAV Infection, residents and staff in close personal contact with infected patients should receive PEP. Administration of PEP to hospital personnel caring for patients is not indicated routinely, unless an outbreak is occurring.

Contact precautions are recommended for diapered and/or incontinent patients, ie, young children, for one week after the onset of symptoms.

## **Other Occupational Groups**

Sewage workers: Recently, two serologic surveys were conducted in the United States comparing the prevalence of anti-HAV among sewage workers to that among other municipal workers. Neither survey found a substantial increase in prevalence among sewage workers. No work-related instances of HAV transmission have been reported among sewage workers in the United States.

## **Immune Globulin (IG)**

IG is a sterile preparation of concentrated antibodies (immunoglobulins) made from pooled human plasma processed by cold ethanol fractionation. In the United States, only plasma that has tested negative for a) hepatitis B surface antigen (HBsAg), b) antibody to human immunodeficiency virus (HIV), and c) antibody to hepatitis C virus (HCV) is used to produce IG. IG provides protection against hepatitis A through passive transfer of antibody.

When used for pre-exposure prophylaxis, a dose of 0.02 mL/kg of IG administered intramuscularly (IM) confers protection for less than three months. When administered within two weeks following an exposure to HAV, IG is greater than 85% effective in preventing hepatitis A. Efficacy is greatest when IG is administered early in the incubation period; when administered later in the incubation period, IG often only attenuates the clinical expression of HAV infection.

Administer Immune Globulin (IG) at a dose of (0.02 mL/kg) of body weight IM. IG must be administered within 14 days of exposure in order to be effective. For administration of IGIM, an appropriate muscle mass (i.e., the deltoid or gluteal muscle) should be chosen into which a large volume can be injected by using a needle length appropriate for the person's age and size.

Parents should be informed that immunization with a live vaccine (MMR, Varicella) should be deferred (three months for MMR and five months for varicella) after injection as IG may interfere with the response to the immunization. If IG becomes necessary after a live virus vaccine has been administered and the interval between administration of the vaccine (MMR), and subsequent administration of IG is less

than 14 days, vaccination should be repeated at least three months after the IG was given. However, OPV(oral poliovirus vaccine), DTP (diphtheria, tetanus toxoids and pertussis vaccine), and other killed vaccines may be given and do not have to be repeated.

There is a consent form at the end of this section that is being utilized when administering IG to the day-care centers. Copies can be made and pertinent data typed on form.

Serious adverse events from IG are rare. Anaphylaxis has been reported after repeated administration to persons who have known immunoglobulin A (IgA) deficiency; thus, IG should not be administered to these persons. Pregnancy or lactation is not a contraindication to IG administration. When administration of IG is indicated for infants or pregnant women, preparations that do not contain thimerosal should be used.

**Sources of Immune Globulin for Intramuscular Administration (IMIG) 24-Hour Telephone Numbers:**

Amerisource ASD: 1-800-837-5403  
Bayer Biologics: 1-800-243-4153  
Biomed Plus: 1-800-809-2308  
FFF Enterprises: 1-800-843-7477  
NSS Cardinal: 1-800-879-5569  
Blood Diagnostics, Inc.: 1-800-948-9834

**Immunization**

Hepatitis A vaccine was licensed in 1995 for children older than 24 months. In 1996, the Advisory Committee on Immunization Practices (ACIP) recommended vaccination of children older than 24 months in populations with the highest incidence of hepatitis A. Since then, the indications were expanded incrementally. In August 2005, hepatitis A vaccine was licensed by the Food and Drug Administration for use in younger children (aged  $\geq 12$  months). In 2006, ACIP recommended routine vaccination of all children aged greater than or equal to 12 months regardless of risk category or geographic location.

There are two inactivated (killed) vaccines available in the U.S. for the prevention of HAV. They are available in several formulations and the formulations differ according to the person's age. Therefore, consult the package insert for doses.

The vaccine should be administered intramuscularly into the deltoid muscle.

Estimates indicate that protective levels of anti-HAV could be present for greater than or equal to 20 years. Simultaneous administration of hepatitis A vaccine with diphtheria, poliovirus (oral and inactivated), tetanus, typhoid (both oral and IM), cholera, Japanese encephalitis, rabies, or yellow fever vaccines does not decrease the immune response to either vaccine or increase the frequency of reported adverse events.

No serious adverse events were attributed definitively to hepatitis A vaccine. Among adults, the most frequently reported side effects occurring within three days were soreness at the injection site, headache and malaise. The safety of hepatitis A vaccination during pregnancy has not been determined; however, because hepatitis A vaccine is produced from inactivated HAV, the theoretical risk to the developing fetus is expected to be low. The risk associated with vaccination should be weighed against the risk for hepatitis A in women who might be at high risk for exposure to HAV. Because hepatitis A vaccine is inactivated, no special precautions need to be taken when vaccinating immunocompromised persons.

Indications for the pre-exposure vaccination are:

- Children living in areas where rates of hepatitis A are at least twice the national average should be routinely vaccinated. This is not the case in Louisiana where rates are at, or below the national average.

• **Persons traveling to or working in countries that have high or intermediate endemicity of infection.** All susceptible persons traveling to or working in countries that have high or intermediate HAV endemicity should be vaccinated or receive IG before departure. Hepatitis A vaccination at the age-appropriate dose is preferred. Travelers to Canada, western Europe, Japan, Australia, or New Zealand are at no greater risk for infection than in the United States.

Travelers who are administered vaccine can be assumed to be protected by four weeks after receiving the first vaccine dose. According to both vaccines' licensure information, the first dose can be given at least two weeks before departure, although this may not give adequate early protection. A second vaccine dose administered according to the recommended schedule is necessary for long-term protection.

Travelers who are allergic to a vaccine component or who elect not to receive vaccine should receive a single dose of IG (0.02 mL/kg), which provides effective protection against hepatitis A for up to three months. Travelers whose travel period exceeds two months should be administered IG at 0.06 mL/kg; administration must be repeated if the travel period exceeds five months.

- **Men who have sex with men.** Sexually active men who have sex with men (both adolescents and adults) should be vaccinated.
- **Illegal-drug users.** Vaccination is recommended for users of injecting and non-injecting illegal drugs.
- **Persons who have occupational risk for infection.** Persons who work with HAV-infected primates, or with HAV in a research laboratory setting should be vaccinated.
- **Persons who have clotting-factor disorders.** Susceptible persons who are administered clotting-factor concentrates, especially solvent-detergent-treated preparations, should be administered hepatitis A vaccine.
- **Vaccination of Persons Who Have Chronic Liver Disease**  
Susceptible persons who have chronic liver disease should be vaccinated. Available data do not indicate a need for routine vaccination of persons with chronic hepatitis B virus or hepatitis C virus infections without evidence of chronic liver disease. Susceptible persons who either are awaiting or have received liver transplants also should be vaccinated.

**There is no recommendation for HAV vaccine for people working with sewage** for the following reasons:

1- The risk is extremely small. The reported rate of HAV is only 2 per 100,000 population. Assuming that only 5% are reported, one could estimate that there is at most 40 cases per 100,000 population per year. Since the virus is in the stools for only two weeks, the number of excretors per 100,000 population is  $40 / 26$  (26 two-week periods per year) = 1.5 excretors per 100,000 population.

2-The workers should take precautions to avoid contact with sewage.

3-If a worker was to have an accident and come in contact with a large amount of sewage (example-falling in), then it would not be too late to start post-exposure immunization.

### **Post exposure prophylaxis.**

In June 2007, the Advisory Committee on Immunization Practices (ACIP) revised the previous resolution to incorporate the post-exposure use of hepatitis A vaccine.

“Persons who recently have been exposed to hepatitis A virus and who previously have not received hepatitis A vaccine should be administered a single dose of single antigen vaccine or immune globulin (IG) (0.02 mL/kg) as soon as possible”. Information about the relative efficacy of vaccine compared to IG post-exposure is limited; no data is available on persons with underlying medical conditions. Therefore,

decisions to use vaccine or IG should take into account patient characteristics associated with more severe manifestations of hepatitis A, including age and chronic liver disease.

IG should be used in healthy persons younger than 12 months of age, immunocompromised persons, persons who have been diagnosed with chronic liver disease and persons for whom vaccine is contraindicated.

For healthy persons aged 12 months and over, hepatitis A vaccine at the age appropriate dose is preferred to IG because of vaccine's advantages, including long term protection and ease of administration.

Persons administered IG for whom hepatitis A vaccine is also recommended should receive a dose of vaccine simultaneously with IG. For persons who receive vaccine, the second dose should be administered according to the licensed schedule to complete the series.

The efficacy of IG or vaccine when administered more than two weeks after exposure has not been established.

The following conditions are contraindications to administration of Hepatitis A vaccine:

1. Allergy to vaccine components: Anaphylactic reaction to the vaccine or a constituent of the vaccine.
2. Acute, moderate or severe illness with, or without, fever

The safety of hepatitis A vaccination during pregnancy has not been determined; however, because hepatitis A vaccine is produced from inactivated HAV, the theoretical risk to the developing fetus is expected to be low. The risk associated with vaccination should be weighed against the risk for hepatitis A in women who may be at high risk for exposure to HAV.

### **Environmental Persistence, Disinfection**

Depending on conditions, HAV can be stable in the environment for months. Heating foods at temperatures greater than 185°F (85°C) for one minute or disinfecting surfaces with a 1:100 dilution of sodium hypochlorite (i.e., household bleach) in tap water is necessary to inactivate HAV.

### **Sample Letter**

The following page is a form letter for day care centers:

Dear Parent,

We were informed that Hepatitis A case(s) have been associated with our Child Care Center and has recommended that each child attending the Child Care Center receive an injection of Hepatitis A vaccine to prevent further spread of the hepatitis virus, unless your child is properly immunized against hepatitis A by a previous vaccination.

Hepatitis A virus is excreted in the feces of infected children. It is easily transmitted among young children, especially those in diapers whose personal hygiene habits are not yet developed. Young children usually do not show signs and symptoms of the disease, but nevertheless become infected and can transmit the virus to other persons such as household members. Older persons are more likely to develop symptoms which can be serious.

The Health Department is offering the Hepatitis A vaccine free of charge for all of the children at the child care center which will be administered by a Public Health nurse on \_\_\_\_\_. It will be necessary for your child to receive an injection of Hepatitis A vaccine in order to continue attending the child care center. If you choose to go to your family doctor for the injection, please bring a statement from the doctor indicating that the Hepatitis A vaccine has been given. Please indicate your choice by completing the form below and return it to the child care center by \_\_\_\_\_.

Injection of Hepatitis A vaccine given within one to two weeks of exposure to hepatitis A prevents illness in 80% to 90% of those exposed. Adverse reactions to the injections are extremely rare. Some discomfort at the site of injection may occur.

It is possible that some household members may have already been exposed as a result of an asymptomatic child. The Health Department is not providing IG for household contacts of children not known to be infected, but has suggested that you consult your own physician and follow her/his recommendations.

If you have any questions please call \_\_\_\_\_.

I give permission for my child \_\_\_\_\_ to receive the injection of Hepatitis A vaccine to be administered by a Public Health nurse at the \_\_\_\_\_ Child Care Center for prophylaxis against the spread of hepatitis A virus.

Child's age \_\_\_\_\_

Date \_\_\_\_\_ Parent's Signature \_\_\_\_\_

Additional Information required by the Office of Public Health:

Number of persons in household? \_\_\_\_\_

Has anyone in the household, family or close friends, been diagnosed with hepatitis during the last six (6) months? Yes \_\_\_\_ No \_\_\_\_.

If yes, please give the following information:

Name \_\_\_\_\_

Age \_\_\_\_\_

Date of illness \_\_\_\_\_

Relationship to child \_\_\_\_\_