

# Hepatitis A

## 1. DISEASE REPORTING

### A. Purpose of Reporting and Surveillance

1. To identify outbreaks and potential sources of ongoing transmission, in order to forestall further transmission.
2. To identify exposed persons and assure timely administration of vaccine or immune globulin or other preventive measures, thus helping to prevent or ameliorate disease and further transmission.
3. To educate cases and their contacts about the importance of good personal hygiene.
4. To educate potentially exposed persons about signs and symptoms of disease, thereby facilitating early diagnosis.

### B. Laboratory and Physician Reporting Requirements

Physicians are required to report confirmed or suspected cases within one working day. Labs must report positive IgM anti-HAV tests within one working day. In addition to reporting positive IgM anti-HAV tests, labs must submit all anti-HAV IgM positive specimens to OSPHL.

### C. Local Health Authority Reporting and Follow-Up Responsibilities

1. Report all confirmed and presumptive (but not suspect) cases (see definitions below) to the state health department as soon as possible, and not later than within one working day of initial physician/lab report.
2. Begin follow-up investigation within one working day. Use the Hepatitis A case investigation form; download a current copy from the Internet. Send a copy of the completed form to the ACDP within seven days of initial report.
3. As indicated, complete summary forms for waterborne or foodborne disease outbreaks (available on the ACDP web site) when investigation is complete.

## 2. THE DISEASE AND ITS EPIDEMIOLOGY

### A. Etiologic Agent:

Hepatitis A virus (HAV), a picornavirus.

### B. Description of Illness

Onset is usually abrupt with fever, malaise, anorexia, nausea, and abdominal discomfort, followed within a few days by jaundice. Urine may become unusually dark, and stools quite pale. Infections vary from completely asymptomatic to a disabling illness lasting weeks to several months. Fulminant hepatitis is rare, but can be fatal. As with hepatitis B, the likelihood of being symptomatic increases with age. Children under the age of three are rarely symptomatic, while >80-90% of adults will become sick if infected. Hepatitis A cannot be clinically distinguished from other viral hepatitises with any reliability. There is no chronic carrier state.

Paradoxically, in countries where sanitation is poor, hepatitis A is not a significant health problem for natives. Essentially everyone is infected early in life and has an asymptomatic course followed by lifelong immunity. In countries with good sewage disposal and safe drinking water, exposure is relatively infre-

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quent, so the people who do get infected tend to be older and thus suffer illness. Even in the United States, however, significant numbers of adults (10–40%) are seropositive, indicating past exposure.

### C. Serological Markers

Serological markers for hepatitis A come in only two flavors: IgM and “Total.” Acute illness can be reliably diagnosed in persons with the onset of clinical illness compatible with hepatitis A and hepatitis A IgM antibody (IgM anti-HAV) in a single serum specimen. IgM antibody usually becomes detectable before onset of clinical symptoms, and persists for approximately 4–6 months in most persons—up to 32 months in some individuals. (Approximately 3% of HAV infected persons will be IgM negative if blood is drawn on or before the day of onset of jaundice. Suspicious cases with negative IgM results on such early specimens should be retested in 4–7 days to rule out the diagnosis.) IgM antibodies are detectable in persons with asymptomatic (inapparent, subclinical) as well as symptomatic (apparent, clinical) infections. “Total” Ig (anti-HAV) may contain one or more of the IgA, IgG, or IgM class antibodies. IgG antibodies (e.g., IgG anti-HAV) are markers of ever having been infected; they typically persist for life after infection. Although useful for identifying persons who are currently immune to HAV infection, they are not specific indicators of recent infection.

### D. Reservoirs

Acutely infected humans (symptomatic or not).

### E. Modes of Transmission

Transmission is almost entirely fecal-oral, and may occur through fecal contamination of food by poor food handling practices; fecal contamination and inadequate treatment of drinking water; and ingestion of fecal material transferred by direct personal contact, including sexual contact. Special risk situations include food service facilities with poor sanitation and day-care facilities serving diapered children.

Parenteral transmission (needlestick, blood transfusion) is rare, because viremia is brief and the concentration of virus in blood is low. Almost all recognized blood-borne outbreaks have occurred among transfused neonates. Cases among injection drug users are common, but presumably are usually due to coincident poor hygiene rather than needle sharing per se.

Saliva has not been shown to be a source of infection. Virus can remain infectious for at least one month at room temperature on environmental surfaces, and transfer on fomites is probably important in some settings (e.g., on toys in a day-care facility).

### F. Incubation Period

15–50 days; usually around 28–30 days.

### G. Period of Communicability

HAV is shed in the feces from about two weeks before onset of prodromal symptoms to the time of peak liver enzyme (ALT/SGPT, AST/SGOT) elevations. The concentration of virus in stool (and therefore infectivity) varies over the course of infection; it is highest before onset of symptoms. Practically speaking, one can assume that communicability ends two weeks after onset of prodromal symptoms or one week after onset of jaundice, whichever comes first.

### H. Treatment

No specific therapy is available. Supportive care.

## 3. DEFINITIONS AND LABORATORY SERVICES

### A. Confirmed Case Definition

An individual with: 1) discrete onset of symptoms (i.e., nausea, vomiting, abdominal discomfort, pale stools, dark urine) and 2) jaundice or elevated serum ALT or AST levels and 3) anti-HAV IgM antibody.

### B. Presumptive Case Definition

An individual with: 1) discrete onset of symptoms and 2) jaundice or elevated serum ALT or AST levels and 3) an epidemiologic link with a person who has confirmed hepatitis A (i.e., household or sexual contact with an infected person during the 15-50 days before the onset of symptoms).

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### C. Suspect Case Definition (*not reportable*)

Anyone with a compatible illness or elevated liver enzymes of unknown etiology and with no epidemiologic association with confirmed cases. Serologic testing for IgM anti-HAV antibodies is indicated. Anyone with a positive IgM anti-HAV antibody titer without compatible illness or elevated ALT or AST levels.

### D. Services Available at the Oregon State Public Health Laboratory

The OSPHL typically does IgM anti-HAV testing two times a week. STAT testing may be available at other times after consultation with Epi and OSPHL staff. IgG (or total) anti-HAV tests are not generally useful for routine epi follow-up. Under special circumstances, such testing might be worthwhile. Consult with ACDP epidemiologists. For example, tests on certain food handlers might be worth doing if knowledge of the results might:

#### 1. Avoid Restaurant Closure

If knowledge of the immune status of key employees exposed to a case of hepatitis A would avoid restaurant closure, testing these employees for IgG anti-HAV might be appropriate

#### 2. Prevent Serial Testing of Food Handlers

If serial testing of high-risk food handlers for IgM anti-HAV is planned, assessing current immunity would obviate the need for further testing among those immune to HAV infection.

#### 3. Result in Specific Food Handling Assignments

If knowledge of immune status of employees will determine assignment of tasks to exposed food handlers, such testing may be indicated.

## 4. ROUTINE CASE INVESTIGATION

Interview the case and others who may be able to provide pertinent information.

### A. Determine the Source of Infection

Determining the source of infection may permit identification of other cases, and interruption of transmission from them. Information regarding exposures during the period between 15 and 50 days before onset of illness should be sought. This should include:

1. name, diagnosis, and telephone number or address of any acquaintance, household member, or sexual contact with an illness compatible with hepatitis A. (Anyone meeting the presumptive case definition should be reported and investigated in the same manner as a confirmed case.);
2. name, date, and location of restaurants where the case has eaten;
3. date, location, and sponsor of social gatherings where case has eaten;
4. association of the case or a household member of the case with a day-care center or other care setting for preschool children as a staff member or attending child;
5. sources of drinking water at home and work and during recreational trips;
6. sources and dates of consumption of any raw or partially cooked shellfish (restaurant or retail outlets);
7. travel outside the United States;
8. illicit drug use;
9. sexual contacts (heterosexual/homosexual);
10. recreational water exposure

### B. Identify Potentially Exposed Persons

Persons with significant opportunity for fecal-oral exposure during the period of communicability should be identified, including:

1. household and sexual contacts;
2. persons who have eaten food prepared or handled by the case;
3. day-care contacts (see §7).

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4. The case's potential for exposing others at work should be assessed. (Occupations of particular concern are food handlers, day-care center employees, and health care workers such as dentists, physicians, nurses, and nurse's aides. Assess their personal hygiene—a judgment call. Consult with ACDP epidemiologists as necessary.)

### C. Environmental Evaluation

#### 1. Water Supply

Although uncommon in this country, drinking water systems are potential sources of HAV if there is opportunity for fecal contamination due to, for example, cross-connections, leaching from septic systems into well water, or broken water pipes. If indicated, an evaluation may include review of water treatment procedures and bacteriologic quality as well as full sanitary inspection and testing of the system.

#### 2. Sewage Disposal

Determine whether the case's home is served by a failing sewage system, or whether neighboring homes have failing systems.

#### 3. Food Service Facility (see §6)

#### 4. Day Care Facility (see §7)

## 5. CONTROLLING FURTHER SPREAD

### A. Education

Instruct patient and family members on measures to prevent fecal-oral transmission. Place special emphasis on thorough hand washing after defecation and diaper changing, and before food handling. Contacts should be knowledgeable of signs and symptoms of hepatitis A in children and adults and understand that persons may be infected and infectious to others without any associated illness.

### B. Isolation and Work or Day Care Restrictions

#### 1. Rules

Hepatitis A cases should be excluded from schools, day-care, and work in sensitive occupations until they are no longer communicable—typically until two weeks after onset of prodromal symptoms or one week after onset of jaundice, whichever comes first. Restrictions can be modified or lifted at the discretion of the local health department.

#### 2. Recommendations

During the period of communicability, cases should be placed under standard precautions or similar measures to assure that other persons, including health facility employees and patients, are not exposed to fecal material

### C. Follow-up of Cases

None is required, except for work and day-care restrictions as described (§5 B, supra).

### D. Protection of Contacts

For decades, immune globulin (IG) has been recommended for prophylaxis after exposure to HAV: when administered within 2 weeks of last exposure, IG is 80%-90% effective in preventing clinical hepatitis A. Despite limited evidence suggesting that hepatitis A vaccine might be efficacious when administered after exposure, the ACIP continued to recommend IG as the preferred mode of prophylaxis, although vaccine could be given in addition to IG in situations where the exposed person had continuing risk factors for HAV. The results of a recent trial directly comparing vaccine with IG and the recent experiences of other countries where vaccine has been recommended for prophylaxis for more than 5 years has swayed the ACIP to recommend HAV vaccine as the preferred agent for post-exposure prophylaxis in certain groups.

#### 1. Prophylaxis of contacts

**a. General recommendations:** The trial was conducted among otherwise healthy individuals aged 2-40, so the new recommendation only applies to healthy individuals aged 12 months to 40 years, who have recently been exposed to HAV and who have not previously received hepatitis A vaccine. These persons should receive a single dose of single-antigen vaccine or IG (0.02 mL/kg) as soon as possible after exposure. For persons who do not meet these criteria, who typically have a higher risk of developing fulminant

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hepatitis A, IG should be administered as soon as possible. These groups include persons over the age of 40, immunocompromised persons, and persons who have been diagnosed with chronic liver disease. Additionally, since vaccine is not licensed for use in persons less than 12 months of age, IG should be given to children under one year of age as well as persons for whom vaccine is contraindicated.

**b. Close contacts:** Absent evidence of pre-existing immunity, all household and sexual contacts of hepatitis A cases should receive IG or vaccine (depending on which group they fall into above). Persons who have shared illicit drugs with a confirmed HAV case should receive hepatitis A vaccine, or IG and hepatitis A vaccine simultaneously. Other persons with significant opportunity for fecal-oral exposure to the case should also receive vaccine or IG. These include primarily persons who have repeatedly eaten food that has not been cooked after handling by the case. The case's level of hygiene and practices in food preparation should be considered in determining who should receive vaccine or IG. (If the case is a food handler, see §6.)

**c. Child care centers:** When one or more cases are found in employees or children or cases are found in two or more households of attendees, hepatitis A vaccine or IG should be given to all previously unvaccinated staff members and attendees of child care centers or homes. When an outbreak occurs, consider administering vaccine or IG to household members of children (in diapers) in the center.

### 2. Prophylaxis options

IG is a preparation of pooled antibodies that, given soon after exposure, provides protection against illness and infection. The efficacy of IG prophylaxis declines rapidly within days after exposure, however, and is of no use when given more than two weeks later. (In other words, IG given 5 days after exposure is much more effective than IG given 12 days after exposure—do not delay!) Make every effort to give IG, when indicated, within 48 hours.

**NOTE:** In general, IG does not interfere with the response to inactivated vaccines, or to oral polio or yellow fever. It can, however, diminish the response to other live, attenuated vaccines (e.g., measles, mumps, rubella, varicella) when administered either individually or in combination vaccines (e.g., MMR). Administration of MMR should be delayed for >3 months, and varicella vaccine for >5 months after giving IG for hepatitis A prophylaxis. IG should not be administered within 2 weeks after giving MMR or 3 weeks after varicella vaccine unless the benefits of IG more than outweigh the impairment of the other vaccinations. It is prudent to assume that the patient's response to those earlier vaccines will be aborted or attenuated to an undesirably degree by the IG. Wait 3 months to repeat the MMR; 5 months for the varicella.

Two highly effective vaccines against hepatitis A have been licensed since 1995 for use by persons >1 year old: Havrix (SmithKline Beecham) and VAQTA (Merck). Both have the same volume dose and schedule:

- children 1–18 years old: 2 doses, at least 6 months apart, each 0.5 ml IM.
- persons >19 years old: 2 doses, at least 6 months apart, each 1.0 ml IM.

Always check the package insert for any updates. Ideally, the second dose should be of the same vaccine formulation as the first, but in a pinch, it is ok to switch horses in mid-stream. Even a single dose of vaccine provides protection for several years in most individuals within 4 weeks of inoculation. For longer protection, a second dose 6 or more months after the first is recommended. Because of the historically high rates of hepatitis A in Oregon, immunization is recommended for everyone after their first birthday. These vaccines are expensive, however, and some insurance plans do not cover all comers. The efficacy of vaccine when administered >2 weeks after exposure has not been established, so make every effort to vaccinate contacts as soon as possible.

## E. Environmental Measures

### 1. Water Supply

If a contaminated public or private water supply is implicated as the source of infection, contact local or state environmental health personnel for assistance.

### 2. Sewage Disposal

If the case's home is served by a failing sewage system, contact local or state environmental health personnel for assistance in preventing exposure of others to the sewage effluent.

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3. Food Service Facility (see §6, When the Case is a Food Handler)
4. Day-care Facility (see §7, Managing other Special Situations)

### 6. WHEN THE CASE IS A FOOD HANDLER

#### A. Background

Food handlers are not, in general, at higher risk of getting hepatitis A than any other segment of the population. Roughly 7–8% of the working population work as food handlers, and about the same proportion show up as hepatitis A cases. Commercial food handlers do have the unique potential to amplify their hygienic lapses into large outbreaks with surprisingly little effort, which accounts for all the attention this problem gets. Still, keep in mind that restaurant-associated outbreaks have been quite rare in Oregon, with only two or three very small clusters (<8 cases each) identified in the period 1990–2007. Let's keep it that way! And let's not be too complacent; the long incubation period makes such outbreaks difficult to identify.

Vaccine or IG should be administered to other food handlers at the same establishment. When an outbreak occurs, be cognizant of the 2-week window after exposure during which IG and vaccine is known to be effective. Administration of vaccine or IG is not effective after this 2-week period has been exceeded. Since transmission to restaurant patrons is unlikely, hepatitis A vaccine or IG administration is not typically indicated but should be considered if 1) the food handler, while infectious, both directly handled cooked or uncooked foods and had diarrhea or poor hygiene practices and 2) patrons can be identified and treated  $\leq 2$  weeks after exposure.

The following guidelines are intended to help make a decision about notification of potentially exposed patrons through the news media. They can also be used to inform food handlers and food service facility operators about the decision-making process. These guidelines cannot anticipate every situation. ACDP epidemiologists are always available for consultation.

There are two main reasons to go public:

- to provide vaccine or IG to potentially exposed individuals, in order to prevent further cases;
- to warn persons who may be already incubating the infections (and their physicians) about their exposure, educating them about the signs and symptoms of hepatitis, in order to facilitate rapid diagnosis and prevent a subsequent generation of cases. (This is why public announcements can be worthwhile even if it is too late to offer IG to exposed individuals.)

Certain public health measures have proven to be effective in limiting the spread of disease when food handlers are identified with a disease that can be transmitted through poor hygienic practices. The measures include removing infected persons from the food handling setting, evaluating and correcting inappropriate food handling procedures and, in certain situations, investigating the health of those who ate food prepared by ill food handlers. Public health follow-up with consumers is appropriate under some circumstances to determine whether the disease has spread, to advise consumers to take precautionary measures such as receiving prophylaxis and treatment and to monitor medical status and educate consumers about activities that may place others at risk.

These measures can be readily applied in a setting with an easily located clientele, such as a school, senior center, day-care center or private home. Identification and follow-up of consumers aren't as easy in other food service settings such as restaurants and convenience stores. In these situations, it sometimes becomes necessary to notify those at risk via the news media.

Both food service facility operators and public health authorities should recognize their responsibility to protect the public's health. We recommend the following guidelines to LHDs for deciding whether to notify potentially exposed patrons through the news media when an infected food handler is found to have hepatitis A in a facility with patrons who cannot be readily notified by any other means.

In applying these criteria and judging the risk of further spread of infection, LHD personnel should:

- Make every possible effort to obtain accurate information;
- Exercise considerable judgment about the accuracy of information received, especially the consistency of hygiene information received from different sources;
- Consider the record of the facility's sanitation inspections while under its current management;

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- Determine whether the manager has had food service sanitation training and applies it through employee training, supervision and sanitation control systems at the facility (see below).

ACDP epidemiologists are always available to discuss the need for public notification. The local health administrator must make the final decision, however, because local public health personnel, having conducted interviews, inspections, and evaluations, are in the best position to make the necessary judgments when the situation is ambiguous.

### B. Definitions

#### 1. Approved Food Service Sanitation Training

During the last three years, the manager or responsible operator has received agency-approved training that includes—at a minimum—information about foodborne diseases, food protection, food handler hygiene, sanitary environmental design and cleaning, and managing a safe food service.

#### 2. Approved Sanitation Control System

An approved program for food protection and foodborne disease prevention includes, but is not limited to, the following elements:

- a. food handlers have attended a minimum course in food service sanitation offered by the LHD, the management, or an educational institution;
- b. management supervises and inspects food protection and food handling practices of all shifts on a routine basis;
- c. training addresses personal hygiene and supervision of food handler hand washing practices;
- d. management has established a routine means of evaluating employee performance such as watching that all food handlers wash their hands upon entering a food preparation area in addition to restroom hand washing;
- e. hand washing facilities are checked frequently each day for adequate supplies and operation;
- f. high risk food handling tasks are designed so that direct handling of food and cross-contamination are minimized;
- g. an effective management policy is in place for encouraging employees not to work with symptoms, that could indicate a communicable disease (e.g., diarrhea or vomiting), thereby encouraging employees to report illnesses to management.

#### 3. High Risk Food

Food that is handled and not subsequently cooked before consumption (e.g., salad fixings, cake icing, sliced fruit).

### C. General Principles for Decision-Making

Generally, infected food handler situations fall into one of three categories. The decision-making process is unique for each of them. In all cases, other food handlers at the establishment in question should be evaluated to determine whether any have, or recently have had, hepatitis A. If other food handlers are found to be infected, the risk to patrons should be reevaluated. Health officials and food service managers should monitor other food handlers at risk for hepatitis A for one incubation period (50 days) after their last exposure to the index case.

1. Food handler has not handled any high risk food.

Notification of potentially exposed patrons is rarely necessary.

2. Food handler handles high risk foods, but facility manager has received approved food service sanitation training and uses an approved sanitation control system.

If the case always uses gloves or utensils appropriately, then public notification generally is not necessary. Glove use per se is no panacea, however, and at worst can create a false sense of security. The potential for breaks in proper practices should be carefully evaluated.

If the food handler has handled high risk foods with bare hands, but the facility manager can document receipt of approved training and implementation of an approved sanitation control system, public notification is usually not indicated—if the following conditions are met:

- a. No transmission within the facility to co-workers or to patrons has been documented.

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- b. The record of inspections of the facility under present management indicates that both personal hygiene of food handlers and the facilities for food handlers to wash hands have met inspection standards.
  - c. Inspection of the facility after identification of the case reveals that hand washing facilities for employees are adequate.
  - d. Information obtained from the infected food handler, supervisor, and other reliable sources indicates that the infected food handler followed optimum hand washing practices.
  - e. The infected employee, while potentially infectious, did not handle high risk foods on days when experiencing diarrhea.
3. The food handler handles high risk food, and the manager has not received approved training or does not have an approved sanitation control system.

If the food handler has handled high risk foods and the facility manager has not received approved training within the last three years or does not use an approved sanitation control system, notification of potentially exposed patrons through the news media should be considered. We recommend going public given one or more of the following criteria:

- a. transmission within the facility to coworkers or to patrons has already been documented;
- b. inspection of the facility after identification of the case reveals that hand washing facilities for employees in the food preparation area or the employees' restroom are inadequate (e.g., no soap, no towels, no warm running water);
- c. one or more food handlers are not conforming to good hygienic practices (e.g., not washing their hands on arrival at work or after using the restroom);
- d. the record of inspections of the facility under the present management indicates that personal hygiene of food handlers or facilities for food handlers to wash their hands have been a problem two or more times during the previous two years;
- e. the infected employee, while potentially infectious, handled high risk foods on days when experiencing diarrhea;
- f. information obtained from the infected food handler, supervisor, or other reliable source indicates that the infected food handler did not follow good hand washing practices or failed to use gloves or utensils appropriately (e.g., didn't change gloves when food preparation was interrupted for a non-food preparation task, such as mopping floors or going to the toilet);
- g. the infected food handler in the facility handled high risk foods with bare hands (e.g., failed to use gloves or utensils).

### D. Going Public: How to Do It

Consult with ACDP staff before going public. They will help you draft your press release and can assist with contacting media representatives who are outside your local area (e.g., Portland TV stations, the Oregonian), as well as public health officials in other counties and neighboring states. A model press release is included at the end of this chapter. Keep in mind the different deadlines for local newspapers, TV, and radio stations.

## 7. MANAGING OTHER SPECIAL SITUATIONS

### A. Day Care Association

Because most HAV infections in young children are asymptomatic, illness among adult staff members or household contacts is often the first (and only) indication of childcare facility outbreaks.

1. Case attends or works at a day-care facility that serves diapered children

IG or vaccine should be administered to staff and classmates if a) any cases are identified among children or staff or b) cases are recognized in at least 2 households of kids attending childcare. Except under exceptional circumstances, it is not worth testing for susceptibility; give IG or vaccine to everyone without a history of previous infection or immunization. In centers that do not provide care to diapered kids, IG or vaccine should go only to same-classroom contacts. When an outbreak occurs (i.e., cases in >2 households), IG or vaccine should also be considered for all household members of diapered kids and possibly household

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members of other children, depending on an epidemiological risk assessment. Vaccine can be given at the same time as IG but in a different anatomic site to persons >1 year old.

In order to identify new infections quickly, the LHD should institute surveillance for hepatitis-like illness among households connected to the facility for 50 days after onset of the last case. All such households should be provided with basic information about hepatitis A, and instructed to contact the health department immediately should suspicious symptoms develop.

The critical role of good personal hygiene (especially handwashing) should be reviewed with day-care staff.

Affected facilities should be discouraged from accepting new children for 50 days after onset of the last case, unless IG is given prior to admission or the child has been vaccinated. Transferring children to other facilities should be discouraged during this period.

### 2. Case is a household contact of a childcare attendee

We recommend that any childcare attendees in such households be tested for IgM anti-HAV, in order to rule out asymptomatic infections. Positive test results obviously put you in the situation described above. Discreet interviews with childcare operators can also be conducted to identify any suspect cases among staff or attendees, and it is a good opportunity to review relevant operations at the facility. Institute surveillance for suspect cases among staff and attendees for a period of 50 days. Absent plausible alternative hypotheses, two or more cases reported from different households linked to the same facility constitute prima facie evidence of day-care-associated transmission, and should be investigated as such.

## B. Other Potentially Foodborne or Waterborne Outbreaks

Consult with ACDP epidemiologists. The Shellfish Program experts in the Oregon Department of Agriculture's Food Safety Division will assist when shellfish is implicated.

## 8. GLOSSARY OF TERMS

**ALT/AST:** these are both liver enzymes classified as serum aminotransferases or transaminases and are useful indicators of liver damage. Alanine aminotransferase is usually abbreviated as ALT (or SGOT) and is particularly sensitive for assessing liver damage secondary to HCV. Aspartate aminotransferase is referred to as AST (or SGPT). In acute hepatitis A or B, an elevation in either one is required to meet the case definition, while the hepatitis C case definition requires an elevation in the ALT to over 400 IU/L.

**Anti-HCV EIA:** enzyme immunoassay to measure HCV antibody. Indicates presence of antibody only and cannot be used to distinguish between recent and past infection. Additional testing is required to determine if the individual is chronically infected.

**HBsAg:** hepatitis B surface antigen, a marker of replicating virus. It occurs as part of acute infection and persists in chronic infection. Its presence indicates that the patient is considered to be infectious.

**HBeAg:** hepatitis B e antigen, a core protein exported from infected liver cells and a marker of high levels of infectivity. Similar to HBsAg, it occurs (albeit transiently) as part of acute infection and may persist in the chronic carrier state.

**HBe Ab:** hepatitis B e antibody is produced by the immune system temporarily during acute HBV infection and may persist in chronic infections. Spontaneous conversion from e antigen to e antibody (a change known as seroconversion) is a predictor of long-term clearance of HBV in patients undergoing antiviral therapy and indicates lower levels of HBV. Chronic hepatitis B surface antigen carriers can be positive for either HBeAg or anti-HBe, but are less infectious when anti-HBe is present.

**HBV DNA:** signifies active replication of the virus and indicates that the patient is infectious. It is usually measured to test for chronic infection, and the viral load may be used to decide whether treatment is warranted.

**HCV genotype:** HCV can be divided into at least 6 different genotypes. Genotype 1 is the most common in the US, accounting for 70%-75% of infections.

**IgM anti-HAV:** IgM antibody to HAV. Indicates acute infection with HAV.

**IgM Anti-HBc:** IgM antibody to hepatitis B core antigen, indicative of recent infection with HBV. Antibody to core antigen only occurs following infection, not immunization.

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**RIBA:** recombinant immunoblot assay, a more specific test for anti-HCV antibody (in other words, it's good for ruling out false positives). It is not as sensitive as the anti-HCV EIA and should not be used as an initial screening test, but it is useful for ruling out false-positive EIA tests.

**PCR:** polymerase chain reaction, used to measure HCV RNA and indicates active replication of the virus (e.g., the chronic carrier state). The qualitative PCR is more sensitive than the quantitative assay and is preferred for the initial test. The quantitative PCR is often used to guide initial treatment decisions and to follow the progress of individuals undergoing treatment.

**Signal-cutoff ratio:** can be used to help determine the likelihood that a positive anti-HCV EIA represents a true positive. Each assay has a cut-off value that is considered a "positive" result; the signal-cutoff ratio can be calculated by dividing the optical density (OD) value of the sample being tested (e.g., the client's test result) by that particular assay's cut-off value. As seen in the Table, each test kit or assay has a signal-cutoff ratio above which the client has a 95% probability of being HCV-positive. If a client's signal-cutoff ratio is equal or above the ratios listed in Table 1 (Hepatitis C guidelines), they can be counseled that they have antibodies to HCV. However, they would still need a PCR test to determine if they are chronically infected. For surveillance purposes, a patient reported with low signal-cutoff ratio (i.e., their Abbott HCV EIA 2.0 test result is above the threshold for a positive test, but the signal-cutoff ratio is below 3.8) would not be considered a case (and thus does not have to be reported).

### APPENDIX: SAMPLE PRESS RELEASE AND COMMENTS

To minimize phone calls, imagine you ate at the restaurant and are reading the press account. Are all the obvious questions answered?

#### COMMENTS

Target the announcement as specifically as possible. Itemize implicated foods, dates and times served, etc. Keep in mind that foods prepared by a certain worker are not necessarily served during the same shift hours. You may decide that there is no reason to run your own IG clinic. Find out if the restaurant plans to pay for IG up front. It's their call— but if they are, say so in your announcement.

Alert people who are too late for IG to signs and symptoms of hepatitis. Encourage them to seek medical attention promptly should illness develop.

This kind of alert is NOT a hepatitis outbreak. It is the health department taking action to PREVENT one! Make sure the difference is clear. Provide "boilerplate" background information about hepatitis A last.

July 4, 1776 — For Immediate Release

#### Madison County Announces Hepatitis A Alert

The Madison County Health Department announced today that recent patrons of the "Hands On" Restaurant, 1234 Main St, Anytown, may have been exposed to hepatitis A. "On July 3, a case of hepatitis A in a restaurant worker was reported to the Health Department," said Frank Teeterboro, Madison County Health Department Administrator.

To prevent further illness, persons who ate at the salad bar or had any sandwich with lettuce between 11 a.m. and 4 p.m. on June 24, 26, 29, 30, or July 1 should get an injection of immune globulin as soon as possible, but not more than two weeks after their exposure, said Teeterboro. Immune globulin is available from most physicians, emergency rooms, and urgent care clinics, but you should call ahead to ensure availability. Immune globulin shots will also be given at the Madison County Health Department, 506 Poe St. in downtown Anytown, on Wednesday and Thursday, July 5 and 6, from 3-7 PM. No appointment is necessary. A donation of \$8 is requested, but no one will be refused immunization because of inability to pay.

Persons who ate such food on June 19 or 20 may also have been exposed, but it would be too late for immune globulin to prevent illness. If you ate at the restaurant and develop symptoms of hepatitis A (see below), contact your physician.

The purpose of this alert is preventive; no cases resulting from exposure at the restaurant have been reported. The restaurant has been inspected and is believed to be safe at the present time. This alert concerns the Anytown restaurant only—not other restaurants in the Hands On chain. "This recommendation is not applicable to persons who only ate at the restaurant on other days, or who only ate other items not named above," Teeterboro added.

Hepatitis A is a viral disease of the liver. It is spread from person to person by the "fecal-oral" route, often by inadequate handwashing after using the toilet or changing diapers. Typical symptoms of hepatitis A include fatigue, fever, malaise, loss of appetite, abdominal pain, nausea, vomiting, and jaundice (yellowing of the skin or eyes). Symptoms usually develop 3-5 weeks after exposure. Some infections may be very mild or even asymptomatic.

## Hepatitis A

### UPDATE LOG

Updated May 2007: Updated case definition to reflect current CDC/CSTE case definition. Confirmed cases must have discrete onset of symptoms; elevated LFTs or jaundice; IgM anti-HAV positive. Eliminated asymptomatic case definition.

Updated March 2008: Updated prophylaxis recommendations to reflect current ACIP recommendations. Vaccine is preferred for healthy persons aged 1 – 40. Persons >40 should receive vaccine and IG, unless vaccine is contraindicated by health status. Immunocompromised persons should also receive IG