



## Complete Summary

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### GUIDELINE TITLE

Prevention and control of infections with hepatitis viruses in correctional settings.

### BIBLIOGRAPHIC SOURCE(S)

Weinbaum C, Lyerla R, Margolis HS. Prevention and control of infections with hepatitis viruses in correctional settings. [published errata in MMWR Morb Mortal Wkly Rep 52(10):205]. MMWR Recomm Rep 2003 Jan 24;52(RR-1):1-36. [22 references] [PubMed](#)

### GUIDELINE STATUS

This is the current release of the guideline.

## COMPLETE SUMMARY CONTENT

SCOPE  
METHODOLOGY - including Rating Scheme and Cost Analysis  
RECOMMENDATIONS  
EVIDENCE SUPPORTING THE RECOMMENDATIONS  
BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS  
QUALIFYING STATEMENTS  
IMPLEMENTATION OF THE GUIDELINE  
INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT  
CATEGORIES  
IDENTIFYING INFORMATION AND AVAILABILITY  
DISCLAIMER

## SCOPE

### DISEASE/CONDITION(S)

- Hepatitis A
- Hepatitis B
- Hepatitis C

### GUIDELINE CATEGORY

Diagnosis  
Prevention  
Treatment

### CLINICAL SPECIALTY

Infectious Diseases  
Internal Medicine  
Preventive Medicine  
Psychology

## **INTENDED USERS**

Advanced Practice Nurses  
Nurses  
Physician Assistants  
Physicians  
Public Health Departments

## **GUIDELINE OBJECTIVE(S)**

To reduce transmission of hepatitis virus infections both during and after incarceration

## **TARGET POPULATION**

- Individuals (adolescents and adults) incarcerated in correctional systems
- Staff working in correctional facilities
- Persons in close personal contact with incarcerated individuals with hepatitis A, hepatitis B, or hepatitis C virus infections
- Infants of incarcerated pregnant women infected with hepatitis B virus

## **INTERVENTIONS AND PRACTICES CONSIDERED**

### **Diagnosis**

1. Serologic and nucleic acid testing for hepatitis viruses
  - Immunoglobulin M (IgM) antibody to hepatitis A virus (IgM anti-HAV)
  - IgM antibody to hepatitis B core antigen (IgM anti-HBc)
  - Hepatitis B surface antigen (HBsAg) and antibody to HBsAg (anti-HBs) testing
  - Antibody to hepatitis C virus (anti-HCV) by screening immunoassay, and confirmed by a more specific assay (e.g., recombinant immunoblot assay [RIBA®] for anti-HCV or nucleic acid testing for HCV RNA)
2. Serum alanine aminotransferase (ALT) levels

### **Prevention**

1. Immunization (preexposure immunization and postexposure prophylaxis) (i.e., hepatitis A vaccine [Havrix®, VAQTA®, and Twinrix®]; hepatitis B vaccine [Recombivax®, Engerix-B®, and Twinrix®]; and hepatitis A and hepatitis B immune globulins)
2. Behavioral interventions
  - Counseling
  - Health education
3. Contact tracing and vaccination
4. Comprehensive release planning

## **Treatment**

### *Acute Hepatitis B*

Rest, hydration and symptomatic relief

### *Chronic Hepatitis B*

1. Alpha interferon
2. Lamivudine
3. Adefovir dipivoxil

### *Hepatitis C Virus*

1. Alpha interferon
2. Pegylated interferon
3. Alpha or pegylated interferon in combination with ribavirin

## **MAJOR OUTCOMES CONSIDERED**

- Prevalence and incidence of hepatitis A, hepatitis B, and hepatitis C
- Risk of infection for hepatitis A, B, or C
- Antibody response to vaccination

## **METHODOLOGY**

### **METHODS USED TO COLLECT/SELECT EVIDENCE**

Searches of Electronic Databases

### **DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE**

Not stated

### **NUMBER OF SOURCE DOCUMENTS**

Not stated

### **METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE**

Weighting According to a Rating Scheme (Scheme Given)

### **RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE**

**Strongly recommended** (on the basis of >2 consistent, well-conceived, well-executed studies with control groups or longitudinal measurements).

**Recommended** (on the basis of >1 well-conceived, well-executed, controlled, or time-series study; or >3 studies with more limited execution).

**Indicated** (on the basis of previous scientific observation and theoretic rationale, but case-controlled or prospective studies do not exist).

**Not recommended** (on the basis of published literature recommending against a practice).

## **METHODS USED TO ANALYZE THE EVIDENCE**

Review

## **DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE**

Not stated

## **METHODS USED TO FORMULATE THE RECOMMENDATIONS**

Not stated

## **RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS**

Not applicable

## **COST ANALYSIS**

The guideline developer reviewed published cost analyses and their own unpublished data. They reported that vaccinating inmates in prison for hepatitis B has been demonstrated feasible and cost-saving from both prison and outside community perspectives. The developer recommends prevaccination serologic testing should be considered for adult incarcerated populations and notes that it is likely to be cost-effective when the prevalence of immunity from prior infection and vaccination exceeds 25%-30%.

The guideline developers provide the following formula for determining the cost-effectiveness of prevaccination screening for hepatitis B vaccination (HBV):

The breakeven point for the cost of prevaccination serologic testing, when first vaccine dose is administered at the time of blood draw, is

$$T = P1 \times [P2 + P2(P3)] \times v$$

where

T = cost of serologic test (anti-HBc or anti-HBs);

P1 = prevalence of past infection/immunization;

P2 = percentage of recipients of first dose who actually receive a second dose;

P3 = percentage of recipients of doses 1 and 2 who receive dose 3;

[P2 + P2(P3)] = average number of doses for a person starting the series; and

v = cost per dose of vaccine, including administrative costs.

Using this formula for hepatitis A vaccination assumes no vaccination is administered at the time of the blood draw. For hepatitis A vaccination, T = cost

of serologic test for anti-hepatitis A virus (HAV); T = P1 x v. For more prevaccination information regarding hepatitis A, see the Appendix in the original guideline document.

## **METHOD OF GUIDELINE VALIDATION**

Peer Review

## **DESCRIPTION OF METHOD OF GUIDELINE VALIDATION**

Not stated

# **RECOMMENDATIONS**

## **MAJOR RECOMMENDATIONS**

Recommendations are followed by a strength of evidence rating (Strongly Recommended, Recommended, Indicated, Not Recommended), which are defined at the end of the "Major Recommendations" field.

### **Recommendations for Juvenile Correctional Facilities -- Hepatitis A Virus Infection**

- Hepatitis A vaccination should be administered to all juveniles in those states where routine vaccination is recommended (Refer to Box 1 in the original guideline document). Strongly recommended.
- In all other states, hepatitis A vaccination of all juveniles should be considered because of the high prevalence of risk factors for hepatitis A virus (HAV) infection among this population. Indicated.
- Vaccination should be administered to those juveniles with risk factors for HAV infection (see Box 1 in the original guideline document) or for those at risk for severe adverse outcomes of infection (e.g., persons with chronic liver disease). Strongly recommended.
- Vaccination should be initiated as soon as possible after entry into incarceration or detention using the appropriate dosage and schedule (standard practice) (Refer to Table 3 in the original guideline document).
- Tracking systems to ensure completion of vaccine series within the correctional system should be established, and systems should be established to facilitate completion of the vaccine series in the community (standard practice).
- Vaccination information, including date of administration, dose, and manufacturer should be included in the medical record, and an immunization record should be given to juvenile, or their parents or guardians, upon release (standard practice).
- Routine screening or prevaccination testing of juveniles for markers of HAV infection should not be conducted. Not recommended.
- Prevaccination testing should be considered for older adolescents (e.g., >15 years) in certain population groups (i.e., American Indians, Alaska Natives, and Hispanics) because of higher prevalence of infection or previous infection. Indicated.

- Juveniles with signs or symptoms indicative of acute hepatitis should have appropriate diagnostic testing to differentiate acute hepatitis A, hepatitis B, or hepatitis C and to determine if the patients have chronic hepatitis B virus (HBV) or hepatitis C virus (HCV) infection (standard practice).
  - Cases of acute hepatitis A should be reported to the appropriate public health jurisdiction (e.g., county or state health department) (standard practice).
  - Identification of a case of hepatitis A in a correctional facility should prompt an epidemiologic investigation by correctional officials, in collaboration with the appropriate health authorities, to identify the source of infection and contacts who might have been exposed (standard practice).
  - Unvaccinated close contacts of a confirmed case of hepatitis A should be administered postexposure prophylaxis with 1 dose of immune globulin (IG) (0.02 mL/kg body weight, intramuscular) as soon as possible, but not > 2 weeks after the last exposure. If the contact has indications for hepatitis A vaccination, vaccine should be administered either at the same or a later time (Box 3 in the original guideline document). Strongly recommended.

### **Recommendations for Juvenile Correctional Facilities -- Hepatitis B Virus Infection**

#### **Preventing Perinatal HBV Infection**

- All pregnant incarcerated juveniles should be tested for hepatitis B surface antigen (HBsAg) after their pregnancy is recognized, even if previously vaccinated or tested. Because of the high risk of HBV infection among this population, testing should be performed even if the female was tested before incarceration. The HBsAg status of incarcerated pregnant juveniles should be reported to the hospital where the juvenile will deliver her infant, along with other prenatal medical information. HBsAg-positive females should also be reported to the appropriate public health authority. Strongly recommended.
- Infants born to HBsAg-positive mothers should receive hepatitis B immune globulin (HBIG) (0.5 mL) and the first dose of hepatitis B vaccine  $\leq$  12 hours of birth. Strongly recommended.
- Females admitted for delivery without HBsAg test results should have blood drawn for testing. While test results are pending, the infant should receive hepatitis B vaccine without HBIG within 12 hours of birth (Refer to Table 4 in the original guideline document for recommended dosages of licensed hepatitis B vaccines.) (standard practice).
  - If the mother is later determined to be HBsAg-positive, her infant should receive HBIG as soon as possible, but  $\leq$  7 days after birth. If the infant does not receive HBIG, the second dose of vaccine should be administered at 1 month of age. The final dose should be administered at age 6 months. Strongly recommended.
  - If the mother is determined to be HBsAg-negative, her infant should continue to receive hepatitis B vaccine as part of the routine vaccination schedule. Strongly recommended.
  - If the mother is never tested to determine her HBsAg status, the infant should continue to receive hepatitis B vaccine as part of the routine vaccination schedule. Strongly recommended.

- Case management should be established to ensure appropriate postexposure prophylaxis and follow-up for children born to incarcerated or recently released HBsAg-positive mothers, including completion of the vaccine series at age 6 months and postvaccination testing during ages 9-15 months. Recommended.
- Infants born to HBsAg-negative mothers should receive the first dose of hepatitis B vaccine before release from the hospital. Strongly recommended.
- Previously unvaccinated HBsAg-negative pregnant juveniles should be vaccinated; pregnancy is not a contraindication to vaccination. Strongly recommended.
- Discharge planning for pregnant HBsAg-positive juveniles should include transfer of appropriate medical records to the hospital where the juvenile plans to deliver her infant, along with other prenatal medical information. Test results should also be provided to the patient and her parent or guardian (standard practice).

## **Hepatitis B Vaccination**

### **Preexposure**

- All juveniles who receive a medical evaluation in a correctional facility should be administered hepatitis B vaccine, unless they have proof of completion of the vaccine series or serologic evidence of immunity to infection. The vaccine series should be started for those juveniles who have never been vaccinated, irrespective of their length of stay, and the series should be completed for those incompletely immunized. Strongly recommended.
  - For juveniles who do not receive medical evaluation upon entry into correctional custody, vaccination should be considered for those who lack proof of previous vaccination (standard practice).
  - Catch-up vaccination of previously unvaccinated, already incarcerated juveniles should be considered in facilities in which routine hepatitis B vaccination of entering inmates is established (standard practice).
- An appropriate vaccination dose and schedule should be selected to facilitate completion of the vaccine series while the juvenile is in custody. For previously unvaccinated juveniles held in a correctional facility for <6 months, the vaccine series should be initiated and completed by using a 4-month schedule (0, 1-2, and 4 months). Recommended.
- Vaccination information, including date of administration, dose, and manufacturer should be included in the medical record, and an immunization record should be given to juveniles, or to their parents or guardians, upon release (standard practice).
- Discharge planning should include transfer of immunization records to the person's medical home to ensure completion of the vaccine series for those juveniles not fully vaccinated while in the correctional facility, and for all fully vaccinated persons as well (standard practice).

### **Prevaccination and Postvaccination Testing**

- Prevaccination serologic testing is not indicated. Indicated.
  - As hepatitis B vaccination coverage among adolescents increases, validation of immunization records or serologic testing might become a cost-effective means to minimize overvaccination. Indicated.

- Knowledge of state middle school hepatitis B vaccination requirements and performance of periodic vaccine coverage serologic surveys to determine the proportion of vaccinated or immune adolescents entering juvenile facilities should be used to define prevaccination screening policies (e.g., history or serologic testing) and the need for hepatitis B immunization among specific age groups (standard practice).
- Postvaccination testing should not be conducted for healthy juveniles. Not recommended.
- For juveniles with special conditions (e.g., immunocompromised or HIV-infected), postvaccination testing for antibody to hepatitis B surface antigen (anti-HBs) should be conducted 1-2 months after completion of the vaccine series. Nonresponders in this category should be revaccinated. Strongly recommended.

### **Postexposure Prophylaxis**

- After any percutaneous exposure (e.g., sharing injection-drug equipment or human bite) or mucosal exposure (e.g., sexual) to blood, unvaccinated juveniles should begin the vaccine series, and the exposure incident should be evaluated to determine if additional postexposure prophylaxis (i.e., HBIG) is required (Refer to the erratum, "Errata: Vol.52, No. RR-1"). Strongly recommended.
  - The first dose of hepatitis B vaccine should be administered immediately, and the remaining doses, 1 and 6 months later (standard practice).
  - For an exposed juvenile who has begun but not completed the vaccine series, subsequent vaccine doses should be administered as scheduled (standard practice).
  - The person who was the source of the exposure should be tested for HBsAg, even if this person was previously vaccinated. If the source person is HBsAg-positive, HBIG should be administered to the exposed person as soon as possible and  $\leq 7$  days after the exposure (standard practice).
  - Postexposure prophylaxis is not necessary for a fully vaccinated juvenile after exposure to HBV. Not recommended.

### **Serologic Testing for Hepatitis B Virus Infection**

- Routine testing of juveniles for markers of HBV infection (e.g., HBsAg, anti-HBs, antibody to hepatitis B core antigen [anti-HBc]) is not recommended. Not recommended.
- Juveniles with signs or symptoms indicative of viral hepatitis should have appropriate diagnostic testing to differentiate acute hepatitis A, hepatitis B, or hepatitis C and to determine if the patient has chronic HBV or HCV infection (standard practice).
  - Cases of acute hepatitis B should be reported to the appropriate public health authority (standard practice).
  - Cases of chronic HBV infection should be reported in those states that require reporting (standard practice).
- Identification of a case of acute hepatitis B should prompt an epidemiologic investigation by correctional officials, in collaboration with the appropriate

health authorities, to identify the source of infection and provide appropriate postexposure prophylaxis (Refer to the erratum, "Errata: Vol.52, No. RR-1" and Box 6 in the original guideline document) to nonimmunized contacts at risk for infection (standard practice).

### **Chronic Hepatitis B Treatment**

- Juveniles identified as having, or who are known to have chronic HBV infection during routine medical screening should be evaluated to determine the presence and extent of chronic liver disease and candidacy for antiviral therapy. Recommended.
  - Lamivudine can be used to treat patients aged >2 years.
  - The safety and efficacy of interferon and adefovir in pediatric patients has not been established.
  - Treatment of patients with chronic hepatitis B should be conducted in consultation with a pediatric specialist experienced with these treatment regimens.
- All long-term correctional facilities should establish criteria for identification of inmates who might benefit from treatment, on the basis of the latest treatment guidelines (standard practice).
- Discharge planning for persons with chronic HBV infection should include referral to medical care, risk-reduction programs, and social services necessary to maintain behavior changes; vaccination of contacts should also be arranged before patient discharge (standard practice).

### **Recommendations for Juvenile Correctional Facilities -- Hepatitis C Virus Infection**

#### **Testing for Hepatitis C Virus Infection**

- A history of risk factors for HCV infection should be obtained from juveniles undergoing medical evaluations, and those with risk factors should be tested for anti-HCV (see Box 7 in the original guideline document). Routine testing of all juveniles for anti-HCV should not be conducted. Not recommended.
- Juveniles with signs or symptoms indicative of viral hepatitis should have appropriate diagnostic testing to differentiate acute hepatitis A, hepatitis B, or hepatitis C and to determine if the patient has chronic HBV or HCV infection (see Box 2 in the original guideline document) (standard practice).
- Cases of acute hepatitis C should be reported to the appropriate public health authority (standard practice).
- Anti-HCV-positive persons should be reported if required by state laws or regulations (standard practice).
- Identification of juveniles with acute hepatitis C, including those incarcerated for >6 months, should prompt an epidemiologic investigation by correctional officials, in collaboration with the appropriate health authorities, to identify the source of the infection. Depending on the results of the investigation, testing of contacts might be indicated (see Box 7 in the original guideline document) (standard practice).
- Juveniles who are anti-HCV-positive should receive further medical evaluation to determine if they are chronically infected (Box 2 of the original guideline document) (standard practice).

## **Postexposure Management for HCV**

- After a percutaneous or permucosal exposure to blood, the source person should be tested for anti-HCV. If the source person is anti-HCV-positive, the exposed person should be tested for anti-HCV and ALT activity at baseline and 4-6 months later. For earlier diagnosis, testing for HCV ribonucleic acid (RNA) can be performed in 4-6 weeks. Recommended.
- IG and antiviral agents are not recommended for postexposure prophylaxis of hepatitis C. Not recommended.

## **Chronic Hepatitis C Treatment**

- Juveniles identified as having chronic HCV infection should be evaluated to determine the presence and extent of chronic liver disease. Food and Drug Administration (FDA)-approved antiviral agents for treatment of hepatitis C are not indicated for persons aged <18 years, although participation in clinical trials might be possible. Although HCV infection in juveniles can result in less severe disease, infected juveniles should be monitored by a specialist familiar with this disease. Discharge planning should also include drug and alcohol abuse treatment, risk-reduction programs, and social services necessary to maintain behavior changes (standard practice).
- Juveniles with chronic hepatitis C should receive hepatitis B vaccination and hepatitis A vaccination if not previously immunized or known to be susceptible to infection. Recommended.

## **Juvenile Health Education and Release Planning**

- Prevention of HAV, HBV, and HCV infections should be incorporated into health education programs (e.g., programs for preventing HIV/AIDS) and include information concerning modes of disease transmission and means for prevention, including risk-reduction and immunization (see Box 8 in the original guideline document). Indicated.
- An integrated health education and risk reduction program should be established in each facility and include a written plan of health instruction completed by each inmate (standard practice).
- Such instruction should address a range of issues relevant to the diverse developmental and cultural composition of correctional populations, and should include basic skill development, literacy, and home economics, as well as tools needed to avoid behaviors that result in acquisition of HIV, hepatitis, and other bloodborne and sexually transmitted infections (standard practice).
- Teachers should be trained professionals or inmate peers with specific training to teach comprehensive life-skills programs, including health education (standard practice).
- A system for periodic evaluation, updating and improvement should exist (standard practice).
- Documentation of hepatitis A or hepatitis B vaccination should be included in the medical record retained within the correctional system, as well as in any medical record provided to other health-care providers. In addition, vaccinated persons or their parents or guardians should be provided a personal immunization record (standard practice).
- Juvenile correctional health facilities should establish links with community and public health facilities, and where available, with immunization registries,

to ensure tracking and completion of hepatitis A and hepatitis B vaccine series (standard practice).

- Juveniles with chronic HBV or HCV infection should be:
  - counseled, along with their parent or guardian, regarding preventing transmission to household, sexual, and drug-use contacts
  - provided referral for hepatitis B vaccination of contacts
  - counseled regarding ways to reduce further liver damage, including limiting alcohol and drug use, and afforded substance-abuse treatment when appropriate
  - provided aftercare that includes medical follow-up (standard practices)

### **Recommendations for Adult Correctional Facilities -- Hepatitis A Virus Infection**

- Hepatitis A vaccination should be administered to adults in groups at risk for HAV infection (e.g., men who have sex with men [MSM] or drug users) or who are likely to experience severe adverse outcomes of infection (e.g., persons with chronic liver disease) (Refer to Box 1 in the original guideline document for other groups for whom vaccination is recommended.) Strongly recommended.
- For persons at risk, the vaccination series should be initiated as soon as possible after incarceration using the appropriate dosage and schedule (see Table 3 in the original guideline document). Tracking systems to ensure completion of the vaccine series within the correctional system should be established, and systems should be developed to facilitate completion of the second vaccine dose for those inmates who return to the community. Strongly recommended.
- Prevacination serologic testing to identify susceptible persons should be considered if determined to be cost-effective (see Box 5 of the original guideline document for method to determine cost-effectiveness), and it does not compromise initiation of vaccination. Inmates aged >40 years and those from regions of high endemicity should be considered for prevaccination testing because of the high prevalence of past HAV infection among these groups. Indicated.
- Routine screening of adults for anti-HAV should not be conducted, except when used to identify susceptible persons for vaccination. Not recommended.
- Vaccination information, including date of administration, dose, and manufacturer should be included in the medical record, and an immunization record should be given to the inmate upon release (standard practice).
- Adults with signs or symptoms indicative of acute hepatitis should have appropriate diagnostic testing to differentiate acute hepatitis A, hepatitis B, or hepatitis C, and to determine if the patient has chronic HBV or HCV infection (see Box 2 of the original guideline document for specific diagnostic tests to be performed) (standard practice).
  - Cases of hepatitis A should be reported to the appropriate public health authority (standard practice).
  - Identification of a case of hepatitis A in a correctional facility should prompt an epidemiologic investigation by correctional officials, in collaboration with the appropriate health authorities, to identify the source of infection and contacts that might have been exposed (standard practice).

- Unvaccinated or known susceptible close contacts of a confirmed case of hepatitis A should be administered postexposure prophylaxis with a single dose of IG (0.02 mL/kg body weight, intramuscular) as soon as possible, but not >2 weeks after the last exposure (see Box 3 of the original guideline document for additional guidelines on postexposure prophylaxis). Strongly recommended.

## **Recommendations for Adult Correctional Facilities -- Hepatitis B Virus Infection**

### **Preventing Perinatal HBV Infection**

- All pregnant women should be tested for HBsAg after their pregnancy is recognized, even if previously vaccinated or tested. Because of the high risk for HBV infection among this incarcerated population, testing should be performed even if the woman was tested before incarceration. The HBsAg status of a pregnant woman should be reported to the hospital where she will deliver her infant, along with other prenatal medical information. HBsAg-positive women should also be reported to the appropriate public health authority. Strongly recommended.
- Infants born to HBsAg-positive mothers should receive HBIG (0.5 mL) and the first dose of hepatitis B vaccine  $\leq 12$  hours after birth (see Table 4 of the original guideline document for recommended dosages of hepatitis B vaccines). Strongly recommended.
- Females admitted for delivery without HBsAg test results should have blood drawn for testing. While test results are pending, the infant should receive hepatitis B vaccine without HBIG within 12 hours of birth (standard practice).
  - If the mother is later determined to be HBsAg-positive, her infant should receive HBIG as soon as possible, but  $\leq 7$  days after birth. If the infant does not receive HBIG, the second dose of vaccine should be administered at 1 month of age. The final dose should be given at age 6 months. Strongly recommended.
  - If the mother is determined to be HBsAg-negative, her infant should continue to receive hepatitis B vaccine as part of the routine vaccination schedule. Strongly recommended.
  - If the mother is never tested to determine her HBsAg status, the infant should continue to receive hepatitis B vaccine as part of the routine vaccination schedule. Strongly recommended.
- Case management should be established to ensure appropriate postexposure prophylaxis and follow-up for children born to incarcerated or recently released HBsAg-positive mothers, including completion of the vaccine series at age 6 months and postvaccination testing during ages 9-15 months. Recommended.
- Infants born to HBsAg-negative mothers should receive the first dose of hepatitis B vaccine before release from the hospital. Strongly recommended.
- Previously unvaccinated HBsAg-negative pregnant women should be vaccinated; pregnancy is not a contraindication to vaccination. Strongly recommended.
- Discharge planning for pregnant HBsAg-positive women should include transfer of appropriate medical records to the hospital where the woman plans to deliver her infant, along with other prenatal medical information. Test results should also be provided to the patient (standard practice).

## **Hepatitis B Vaccination**

### **Preexposure**

- All adults who receive a medical evaluation in a correctional facility should be administered hepatitis B vaccine, unless they have proof of completion of the vaccine series or serologic evidence of immunity to infection. The vaccine series should be started for those who have never been vaccinated, irrespective of the length of their stay, and the series should be completed for those incompletely immunized. Strongly recommended.
  - For persons who did not receive medical evaluation upon entry into correctional custody, vaccination should be considered for those who lack proof of previous vaccination or immunity. Recommended.
  - Catch-up vaccination of already incarcerated, previously unvaccinated persons, or persons known to be susceptible to infection, should be considered in facilities in which routine hepatitis B vaccination of entering inmates is being established. Priority should be given to vaccination of contacts of known HBsAg-positive persons (e.g., cellmates or persons living in the same cell block or dormitory). Recommended.
- An appropriate vaccination dose and schedule should be selected to facilitate completion of the vaccine series while the person is in custody. For previously unvaccinated persons held in a correctional facility for <6 months, the vaccine series should be initiated and completed by using a 4-month schedule (0, 1-2, and 4 months) (Refer to Table 4 in the original guideline document). Recommended.
- Vaccination information, including date of administration, dose, and manufacturer should be included in the medical record, and an immunization record should be given to the incarcerated person upon release (standard practice).
- Discharge planning should include transfer of immunization records to the person's medical home to ensure completion of the vaccine series for persons not fully vaccinated while in the correctional facility, and for all fully vaccinated persons as well (standard practice).

### **Prevaccination and Postvaccination Testing**

- Prevaccination serologic testing should be considered for adult incarcerated populations and is likely to be cost-effective when the prevalence of immunity from prior infection and vaccination exceeds 25%-30%. Indicated.
  - To assist correctional facilities in determining whether to conduct prevaccination testing, periodic serologic surveys of incoming inmates can be used to determine the prevalence of markers of immunity to HBV infection (standard practice).
  - Testing for anti-HBs provides the best measure of immunity to HBV infection, because it detects infection or vaccine-induced immunity (standard practice).
  - When prevaccination testing is done, the first dose of vaccine should be administered at the same time the blood sample is obtained to ensure optimal vaccination coverage (see Box 5 of the original guideline document). Recommended.
- Postvaccination testing is not indicated for healthy adults. Not recommended.

- For persons with special conditions (e.g., immunodeficiency, HIV infection, or chronic hemodialysis), or who are likely to be exposed to HBV (e.g., sex partner of HBsAg-positive person or health-care worker), postvaccination testing for anti-HBs is recommended 1-2 months after completion of the vaccination series. Nonresponders in this category should be revaccinated. Strongly recommended.

### **Postexposure Prophylaxis**

- After any percutaneous (e.g., sharing injection-drug equipment or human bite) or mucosal (e.g., sexual) exposure to blood, an unvaccinated person should begin the vaccine series, and the exposure incident should be evaluated to determine if additional postexposure prophylaxis (i.e., HBIG) is required (see Table 5 in the erratum, "Errata: Vol.52, No. RR-1"). Strongly recommended.
  - The first dose of hepatitis B vaccine should be administered immediately, and the remaining doses 1 and 6 months later (refer to Table 4 in the original guideline document for additional dosage information) (standard practice).
  - For an exposed person who has begun but not completed the vaccine series, subsequent vaccine doses should be administered as scheduled (standard practice).
  - The person who was the source of the exposure should be tested for HBsAg, even if that person was previously vaccinated. If the source person is HBsAg-positive, HBIG (0.06 mL/kg body weight intramuscular) should be administered to the exposed person as soon as possible and  $\leq 7$  days after the exposure (standard practice).
  - Postexposure prophylaxis is not necessary for a fully vaccinated person after exposure to HBV. Not recommended.

### **Serologic Testing for Hepatitis B Virus Infection**

- Correctional facilities should consider routine testing of long-term inmates for chronic HBV infection (see Box 2 and Table 2 in the original guideline document), to facilitate rapid vaccination of contacts, direct counseling for preventing secondary transmission, and ensure medical evaluation of infected persons. If routine testing is not performed, testing should be considered for inmates in groups with risk factors for chronic HBV infection (e.g., injection-drug use, men who have sex with men or foreign-born persons from countries with high rate of infection). Indicated.
- Residents of any facility with signs or symptoms indicative of viral hepatitis should have appropriate diagnostic testing to differentiate acute hepatitis A, hepatitis B, and hepatitis C and to determine if the patient has chronic HBV or HCV infection (see Box 2 in the original guideline document) (standard practice).
  - Cases of acute hepatitis B should be reported to the appropriate public health authority (standard practice).
  - If an inmate is identified as having chronic HBV infection, the case should be reported in those states where reporting is required (standard practice).
  - Identification of acute hepatitis B should prompt an epidemiologic investigation by correctional officials, in collaboration with the

appropriate health authorities, to identify the source of infection and provide appropriate postexposure prophylaxis to nonimmunized contacts at risk for infection (standard practice).

- Persons diagnosed with acute hepatitis B should be observed for progressive liver dysfunction and evidence of acute liver failure (standard practice).

### **Chronic Hepatitis B Treatment**

- Inmates identified as having chronic HBV infection during medical screening should be evaluated to determine the presence and extent of chronic liver disease and the potential benefit of antiviral therapy. Therapies for treatment of hepatitis B include interferon, alpha, lamivudine, and adefovir. Treatment of patients with chronic hepatitis B should be conducted in consultation with a specialist experienced with these treatment regimens (standard practice).
- All long-term correctional facilities should establish criteria for identifying prisoners who might benefit from treatment, on the basis of the latest treatment guidelines (standard practice).
- Discharge planning for persons with chronic HBV infection should include referral to medical care, risk-reduction programs, and social services necessary to maintain behavior changes; vaccination of contacts should also be arranged before patient discharge (standard practice).

### **Recommendations for Adult Correctional Facilities -- Hepatitis C Virus Infection**

#### **Testing for Hepatitis C Virus Infection**

- All inmates should be asked questions regarding risk factors for HCV infection during their entry medical evaluations, and all inmates reporting risk factors for HCV infection should be tested for anti-HCV (see Box 7 for list of persons for whom routine hepatitis C virus testing is recommended) Recommended.
- The sensitivity of risk factor-based screening should be periodically determined by seroprevalence surveys, in combination with ascertainment of demographic and risk-factor information. Serologic testing of expanded groups of inmates or all inmates is recommended when:
  - self-reported history of risk factors alone identifies <75% of anti-HCV positive inmates
  - the prevalence of risk factors for HCV infection, including injection-drug use, is known to be high (>75%), and a high prevalence exists (>20%) of HCV infection among inmates who deny risk factors (standard practices)
- Anti-HCV-positive persons should be reported if required by state regulations (standard practice).
- Adults with signs or symptoms indicative of viral hepatitis should have appropriate diagnostic testing to differentiate acute hepatitis A, hepatitis B, or hepatitis C and to determine if the patient has chronic HBV or HCV infection (see Box 2 of the original guideline document) (standard practice).
  - Cases of acute hepatitis C should be reported to the appropriate public health authority (standard practice).
  - Identification of an inmate with acute hepatitis C, including ones who have been incarcerated for >6 months, should prompt an

epidemiologic investigation by correctional officials, in collaboration with the appropriate health authorities, to identify the source of the infection. Depending on the results of the investigation, testing of contacts might be indicated (see Box 7 of the original guideline document) (standard practice).

- Adults who test positive for anti-HCV should receive further medical evaluation to determine chronic infection and liver disease (standard practice).

### **Postexposure Management for HCV**

- After a percutaneous or permucosal exposure to blood, the source person should be tested for anti-HCV. If the source person is anti-HCV-positive, the exposed person should be tested for anti-HCV and ALT activity at baseline and 4-6 months later. For earlier diagnosis, testing for HCV ribonucleic acid can be performed at 4-6 weeks. Recommended.
- IG and antiviral agents are not recommended for postexposure prophylaxis of hepatitis C. Not recommended.

### **Chronic Hepatitis C Treatment**

- All anti-HCV-positive inmates should be evaluated for evidence of chronic HCV infection, including the presence and extent of chronic liver disease and candidacy for antiviral therapy. Treatment of patients with chronic hepatitis C should be conducted in consultation with a specialist familiar with these treatment regimens (standard practice).
- Inmates with chronic hepatitis C should receive hepatitis B vaccination and hepatitis A vaccination if not previously immunized or known to be susceptible to infection. Recommended.
- Correctional facilities or systems should establish criteria based on the latest treatment guidelines for the identification of prisoners who might benefit from antiviral treatment. For HCV-infected patients who are actively abusing substances (e.g., drugs or alcohol), appropriate substance-abuse treatment should be initiated to limit disease transmission, reinfection, and liver disease progression. Recommended.

### **Adult Health Education and Release Planning**

- Prevention of HAV, HBV, and HCV infection should be incorporated into health education programs (e.g., programs for preventing HIV/AIDS) and include information concerning modes of disease transmission, methods for prevention, including risk reduction and immunization, disease outcomes, and options for treatment (see Box 8 for elements of a viral hepatitis health education program). Indicated.
- An integrated health education and risk reduction program should be established in each facility and include a written plan of health instruction completed by each inmate (standard practice).
- Such instruction should address a range of issues relevant to the diverse developmental and cultural composition of correctional populations, and should include basic skill development, literacy, and home economics, as well as tools needed to avoid behaviors that result in acquisition of HIV, hepatitis, and other bloodborne and sexually transmitted infections (standard practice).

- Teachers should be trained professionals or inmate peers with specific training to teach comprehensive life-skills programs, including health education (standard practice).
- A system for periodic evaluation, updating and improvement should exist (standard practice).
- Documentation of hepatitis A or hepatitis B vaccination should be included in the medical record retained within the correctional system, as well as in any medical record provided to other health-care providers. In addition, the vaccinated person should be provided a personal immunization record (standard practice).
- Correctional health facilities should establish links with community and public health facilities, and where available, with immunization registries, to ensure tracking and completion of hepatitis A and hepatitis B vaccine series (standard practice).
- Persons with chronic HBV or HCV infection should be
  - counseled regarding preventing transmission to household, sexual, and drug-use contacts, including risk reduction and condom use
  - provided referral for hepatitis B vaccination of contacts
  - counseled regarding ways to reduce further liver damage, including limiting alcohol and drug use, and afforded substance-abuse treatment when appropriate
  - provided aftercare that includes medical follow-up (standard practices)

### **Preventing and Controlling Hepatitis Virus Infections Among Correctional Staff**

#### **Hepatitis A Virus Infection**

- Hepatitis A is not occupationally acquired in the health-care or correctional setting, and neither routine screening nor routine vaccination of staff should be administered. Not recommended.

#### **Infection Control Plan for HBV and HCV Prevention**

- Measures to prevent occupational exposure to HBV and HCV among correctional workers should be integrated into each facility's bloodborne pathogen and infection control plan according to the requirements of the Occupational Safety and Health Administration (OSHA) or the respective state Occupational Safety and Health Administration. Elements of this plan should be coordinated with the infection control plan for correctional workers for all other infectious agents (e.g., HIV and *Mycobacterium tuberculosis*) (standard practice).
- The plan should cover all employees (including inmates who are assigned work duties at a correctional facility) who could be reasonably anticipated, as the result of job duties, to be exposed to blood, bodily fluids, or other materials that might contain HBV or HCV (standard practice).
- The plan should identify tasks, procedures, and job classifications in which occupational exposure to potentially infectious material occurs--without regard to personal protective clothing and equipment. The plan must be accessible to employees and employee representatives. The employer should review and update the plan at least annually--more often if necessary to

- accommodate changes or recommendations from appropriate agencies (standard practice).
- The plan should mandate standard (i.e., universal) precautions for all contact with blood or body fluids. This should include procedures used to prevent needle sticks, including use of safer needle devices, to minimize splashing and spraying of potentially infectious material, and to ensure appropriate disinfection and decontamination of potentially contaminated surfaces and equipment, and appropriate disinfection and disposal of infectious material and contaminated clothing. As a part of the plan, correctional facilities should require employees to use appropriate personal protective equipment (e.g., gloves, gowns, masks, mouthpieces, and resuscitation bags) that are provided by the employer (standard practice).
  - The plan should ensure that all workers are familiar with all aspects of infection control, including bloodborne pathogens and their transmission, the written exposure control plan, engineering and work practice controls, personal protective equipment, hepatitis B vaccine, response to emergencies involving blood, how to handle exposure incidents, the postexposure evaluation and follow-up program, and signs/labels/color-coding to alert persons to potentially infectious material (standard practice).
  - Plan administrators should consider strategies to overcome the unique barriers to an effective infection control plan in a correctional environment. For example, potential inaccessibility of sharps disposal containers might necessitate using specific safe-needle devices and other strategies to minimize needle-stick injuries in correctional health-care settings (standard practice).
  - A work practices program should be established that includes standard operating procedures for all activities having exposure potential. No worker should engage in such tasks or activities before receiving training pertaining to the procedures, work practices, and protective equipment required for that task (standard practice).

### **Preexposure Hepatitis B Vaccination and Postexposure Management for HBV and HCV**

- Hepatitis B vaccination should be administered to all previously unvaccinated persons (e.g., correctional and medical staff) whose work duties involve exposure to blood or other potentially infectious body fluids. Strongly recommended.
- Prevacination serologic screening is not indicated for persons being vaccinated because of occupational risk, unless the hospital or health-care organization considers screening cost-effective. Indicated.
- Staff with continued contact with patients or blood and who are at ongoing risk for percutaneous injuries should be tested for anti-HBs 1-2 months after completion of the 3-dose vaccination series. Staff who do not respond to a primary vaccine series should complete a second 3-dose vaccine series or be evaluated to determine if they are HBsAg-positive (standard practice).
- For correctional workers who have no contact with inmates and no routine exposure to blood and body fluids in the correctional setting, timely postexposure prophylaxis should be provided if an exposure occurs, rather than routine vaccination (standard practice).

- Evaluation for appropriate postexposure prophylaxis for an employee who has had an exposure incident should be performed in a timely fashion according to recommendations for HBV and HCV. Strongly recommended.
- When an exposure to potentially infectious blood or body fluid has occurred, a blood sample from the source person should be tested for HBsAg and anti-HCV. If the source person cannot be identified or tested, the respective postexposure protocol (i.e., HBV or HCV) should be followed to evaluate the need for postexposure prophylaxis or follow-up (standard practice).
- Appropriate postexposure prophylaxis and follow-up for HBV infection after exposure is dependent on the HBsAg status of the source person, as well as the immunization status of the exposed person (Tables 2 and 4 in the original guideline document) (see Recommendations for Adult Inmates) (standard practice).
- If the source person is anti-HCV positive, Centers for Disease Control and Prevention (CDC) guidelines for postexposure follow-up should be followed (see Recommendations for Adult Inmates) (standard practice).

### **HBV or HCV Serologic Testing**

- Routine testing for HBV or HCV infection is not necessary for correctional workers, except as described for hepatitis B vaccination or postexposure management. Not recommended.

### **Definitions:**

Note: The recommendations are rated, where applicable, on the basis of the strength of evidence indicating changes in outcomes attributable to the interventions. Where formal recommendations previously have been published, they are cited as supporting evidence and can be referred to for the original studies. Ratings have been assigned by using a modification of criteria published by the Guide to Community Preventive Services. No rating was assigned to a recommendation considered standard practice (i.e., a medical or administrative practice conducted routinely by qualified persons experienced in their fields).

**Strongly recommended** (on the basis of >2 consistent, well-conceived, well-executed studies with control groups or longitudinal measurements).

**Recommended** (on the basis of >1 well-conceived, well-executed, controlled, or time-series study; or >3 studies with more limited execution).

**Indicated** (on the basis of previous scientific observation and theoretic rationale, but case-controlled or prospective studies do not exist).

**Not recommended** (on the basis of published literature recommending against a practice).

### **CLINICAL ALGORITHM(S)**

None provided

## EVIDENCE SUPPORTING THE RECOMMENDATIONS

### TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The recommendations are rated, where applicable, on the basis of the strength of evidence indicating changes in outcomes attributable to the interventions (see "Major Recommendations"). Where formal recommendations previously have been published, they are cited in the original guideline as supporting evidence and can be referred to for the original studies. Ratings have been assigned by using a modification of criteria published by the Guide to Community Preventive Services. No rating was assigned to a recommendation considered standard practice (i.e., a medical or administrative practice conducted routinely by qualified persons experienced in their fields).

## BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

### POTENTIAL BENEFITS

In general, implementation of these recommendations can 1) reduce transmission of hepatitis A virus (HAV) infection in the community by immunizing incarcerated persons at highest risk for infection; 2) eliminate transmission of hepatitis B virus (HBV) infection among the inmate population through immunization; 3) reduce the number of new hepatitis C virus (HCV) infections by testing, harm- and risk-reduction counseling, and substance-abuse treatment and prevention; 4) reduce the burden of viral hepatitis-related chronic liver disease through appropriate medical management; and 5) prevent HBV and HCV infections among correctional employees.

#### Subgroups Most Likely to Benefit:

Persons with chronic liver disease of any etiology

### POTENTIAL HARMS

- Alpha interferon, pegylated interferon, and alpha or pegylated interferon in combination with ribavirin have side effects, certain of which can be serious.
- Hepatitis A Vaccine: The most frequently reported adverse reactions occurring  $\leq 3$  days after vaccination are soreness at the injection site (53%-56%), headache (14-16%), and malaise (7%).
- Adverse reactions associated with hepatitis B vaccine include pain at the injection site (3%-29%) and a temperature  $\geq 37.7$  degrees C (1%-6%), although these effects are reported no more frequently among vaccine recipients than among placebo recipients in controlled trials. Anaphylaxis has been reported in 1/600,000 vaccine recipients; however, no deaths have been attributed to vaccination. A number of case reports and case series have claimed an association between hepatitis B vaccination and serious adverse health events (e.g., multiple sclerosis); however, these have not been proven by other epidemiologic studies

#### Subgroups Most Likely to be Harmed:

Hepatitis A vaccine should not be administered to persons with a history of hypersensitivity reactions to alum, or for Havrix or Twinrix, to the preservative 2-phenoxyethanol. The safety of hepatitis A vaccination during pregnancy has not been determined. However, because this is an inactivated vaccine, the theoretical risk to the developing fetus is low. The risk associated with vaccination should be weighed against the risk for hepatitis A among women who might be at high risk for exposure to hepatitis A virus (HAV) infection. No special precautions are needed when vaccinating immunocompromised persons.

## QUALIFYING STATEMENTS

### QUALIFYING STATEMENTS

- Use of trade names and commercial sources is for identification only and does not imply endorsement by the United States Department of Health and Human Services.
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## IMPLEMENTATION OF THE GUIDELINE

### DESCRIPTION OF IMPLEMENTATION STRATEGY

The unique nature of correctional institution populations necessitates close collaboration with public health personnel at state and local levels for effective implementation of the recommendations in this report. Preventing and controlling viral hepatitis among incarcerated and released persons, and among persons in the communities to which they return, requires defining specific roles for each agency.

- Correctional staff should review these recommendations and develop written policies for their implementation. Policies should include implementation by contractors where correctional health care is provided by the private sector. Correctional staff should also monitor the 1) proportion of inmates (both adults and juveniles) who begin and complete the hepatitis B vaccine series; 2) prevalence of immunity to hepatitis B virus (HBV) infection among incoming inmates; 3) vaccine-series--completion rates for released prisoners; 4) proportion of inmates tested for hepatitis C virus (HCV) infection and reasons that inmates decline testing; and 5) prevalence of HCV infection among incoming inmates.
- Correctional systems should establish close working relationships with state and local health departments to ensure awareness of viral hepatitis prevention and control activities. Written agreements can better ensure all agencies participate in 1) reporting and investigating acute cases of viral hepatitis among inmates; 2) reporting inmates with chronic HBV and HCV infection in states where this is a requirement; 3) vaccination of contacts of

- inmates with chronic HBV infection; and 4) follow-up of inmates released before completing the hepatitis A or hepatitis B vaccine series, or before completing treatment for chronic HBV or HCV infection. Correctional staff should also collaborate with health department staff to provide hepatitis education and counseling to inmates and correctional employees.
- Public health departments should work closely with correctional systems to develop community-based strategies for preventing and controlling viral hepatitis. Integration of correctional health care into such strategies can be facilitated through designation of health department personnel to provide epidemiologic and programmatic assistance to correctional facilities. Other activities might include 1) development of record-keeping systems that facilitate hepatitis B vaccination; 2) case management of persons on antiviral therapy for chronic hepatitis C or hepatitis B; 3) substance-abuse treatment where appropriate; and 4) development of training courses for correctional facility staff.
  - Public health departments should be considered resources for consultation on all aspects of viral hepatitis prevention and control, including quality assurance of laboratory testing services. Training and educational programs for correctional staff should include topics such as diagnosis of viral hepatitis and interpretation of laboratory test results, vaccination delivery and assessment of vaccination programs, disease reporting, and health education. Health department officials should provide educational information to senior-level prison and jail officials and to county and other elected officials.
  - Public health departments should develop mechanisms that encourage reporting of viral hepatitis cases identified in correctional facilities. In addition, mechanisms should be established to provide epidemiologic consultation for investigations of acute disease in the complex setting of the correctional facility. Other areas for which mechanisms should be established include follow-up of persons with chronic HBV and HCV infection for vaccination of contacts (HBV), and appropriate counseling and referral for medical follow-up and treatment.

## **INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES**

### **IOM CARE NEED**

Getting Better  
Living with Illness  
Staying Healthy

### **IOM DOMAIN**

Effectiveness  
Patient-centeredness  
Safety

## **IDENTIFYING INFORMATION AND AVAILABILITY**

### **BIBLIOGRAPHIC SOURCE(S)**

Weinbaum C, Lyerla R, Margolis HS. Prevention and control of infections with hepatitis viruses in correctional settings. [published errata in MMWR Morb Mortal Wkly Rep 52(10):205]. MMWR Recomm Rep 2003 Jan 24;52(RR-1):1-36. [22 references] [PubMed](#)

#### **ADAPTATION**

Not applicable: The guideline was not adapted from another source.

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#### **GUIDELINE DEVELOPER(S)**

Centers for Disease Control and Prevention - Federal Government Agency [U.S.]

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#### **GUIDELINE COMMITTEE**

Not stated

#### **COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE**

*Report Prepared by:* Cindy Weinbaum, MD; Rob Lyerla, PhD; Harold S. Margolis, MD (Division of Viral Hepatitis, National Center for Infectious Diseases)

#### **FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST**

The preparers of this report have signed a conflict of interest disclosure form that verifies no conflict of interest.

#### **GUIDELINE STATUS**

This is the current release of the guideline.

#### **GUIDELINE AVAILABILITY**

Electronic copies: Available in HTML format from the [Centers for Disease Control and Prevention \(CDC\) Web site](#)

Print copies: Available from the Centers for Disease Control and Prevention, MMWR, Atlanta, GA 30333. Additional copies can be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402-9325; (202) 783-3238.

#### **AVAILABILITY OF COMPANION DOCUMENTS**

None available

## **PATIENT RESOURCES**

None available

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