Errata
(11/14/2018)

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Erratum Date: 11/14/2018
Page 303, https://redbook.solutions.aap.org/chapter.aspx?sectionid=189640074&bookid=2205: In the first paragraph of the Treatment section of the Cryptococcus neoformans and Cryptococcus gatti Infections (Cryptococcosis) chapter, the dosing recommendation for fluconazole should be changed from "(6 mg/kg [maximum dose, 400 mg] daily) for a minimum of 8 weeks" to "(12 mg/kg [maximum dose, 800 mg] daily) for a minimum of 8 weeks."

Erratum Date: 07/02/2018
Page 394-399, https://redbook.solutions.ions.aap.org/chapter.aspx?sectionid=189640103&bookid=2205: In the Isolation of the Hospitalized Patient and Control Measures section of the Hepatitis A chapter, the IGIM dose used as pre- or post-exposure prophylaxis for hepatitis A has been changed from 0.02 mL/kg and 0.06 mL/kg (depending on duration of protection required) to 0.1 mL/kg and 0.2 mL/kg (depending on duration of protection required).

Erratum Date: 07/02/2018
Page 937, https://redbook.solutions.aap.org/chapter.aspx?sectionid=189640242&bookid=2205: In the Table 4.5 entry for Prepubertal vaginitis (STI related), the Treatment of Infants and Children <45 kg recommendation for Bacterial vaginosis should be changed from "Metronidazole, 45 mg/kg per day, orally, in 3 divided doses (maximum 2 g/day) for 7 days" to "Metronidazole, 15-25 mg/kg per day, orally, in 3 divided doses (maximum 2 g/day) for 7 days".
Erratum Date: 11/14/2018
Page 947, https://redbook.solutions.aap.org/chapter.aspx?sectionid=189640248&bookid=2205: In the Table 4.8 entry for fluconazole in the "Dose (per day)" column, the first sentence of the "Cryptococcal meningitis (children)" paragraph should be changed from "Following induction therapy with amphotericin B plus flucytosine for 2-6 wk, initiate consolidation therapy with fluconazole 12 mg/kg in 2 divided doses (maximum 800 mg) once daily." to "Following induction therapy with amphotericin B plus flucytosine, fluconazole 12 mg/kg (maximum 800 mg) once daily." Additionally, the first two sentences of the "Cryptococcal meningitis (adults)" paragraph should be changed from "400 mg on the first day, followed by 200 mg once daily. A dosage of 400 mg once daily may be used, based on medical judgment of the patient's response to therapy." to "Following induction therapy with amphotericin B plus flucytosine, fluconazole 400 mg once daily."
can be biopsied for fungal staining and culture.

**TREATMENT:** The Infectious Diseases Society of America, the Pediatric Infectious Diseases Society, the American Academy of Pediatrics, the National Institutes of Health, and the Centers for Disease Control and Prevention have published practice management guidelines for cryptococcal disease.\(^1\)\(^2\) No trials dedicated to children have been performed, so optimal dosing and duration of therapy for children with cryptococcal infection have not been precisely determined. Amphotericin B deoxycholate, 1 mg/kg/day (see Antifungal Drugs for Systemic Fungal Infections, p 938), in combination with oral flucytosine, 25 mg/kg/dose, 4 times/day, is indicated as induction therapy for patients with meningitis and other serious cryptococcal infections. Monitoring of blood counts and/or serum peak flucytosine concentrations (with a target of 40 to 60 μg/mL 2 hours after the dose) is recommended to prevent neutropenia. Patients with meningitis should receive induction combination therapy for at least 2 weeks and until a repeat CSF culture is negative, followed by consolidation therapy with fluconazole (12 mg/kg [maximum dose, 800 mg] daily) for a minimum of 8 weeks. Liposomal amphotericin B (3–6 mg/kg/day) or amphotericin B lipid complex (5 mg/kg/day) can be used in children with renal impairment or those intolerant to amphotericin B deoxycholate. If flucytosine cannot be administered, amphotericin B alone has been successfully used in pediatric cryptococcosis. A lumbar puncture should be performed after 2 weeks of therapy to document microbiologic clearance. The 20% to 40% of patients in whom culture is positive after 2 weeks of therapy will require a more prolonged induction treatment course. For any relapse, induction antifungal therapy should be restarted for 4 to 10 weeks, CSF cultures should be repeated every 2 weeks until sterile, and antifungal susceptibility of the relapse isolate should be determined. Monitoring of serum cryptococcal antigen is not useful to monitor response to therapy in patients with cryptococcal meningitis.

Increased intracranial pressure occurs frequently despite microbiologic response and often is associated with clinical deterioration. Significant elevation of intracranial pressure is a major source of morbidity and should be managed with frequent repeated lumbar punctures or placement of a lumbar drain. Immune reconstitution inflammatory syndrome (IRIS) is described, and although there are no guidelines for specific management of IRIS in children, a patient should be closely monitored for signs and symptoms associated with IRIS.

Children with HIV infection who have completed initial therapy for cryptococcosis should receive long-term suppressive therapy with fluconazole (6 mg/kg daily; maximum dose 400 mg). Oral itraconazole daily (oral solution preferred over capsule because of better bioavailability and no need to take with food) or amphotericin B deoxycholate, 1 to 3 times weekly, are less effective alternatives. Discontinuing chronic suppressive therapy for cryptococcosis (after 1 year or longer of secondary prophylaxis) can be considered in asymptomatic children 6 years or older who are receiving antiretroviral therapy, have sustained (≥6 months) increases in CD4+ T-lymphocyte counts to ≥100 cells/mm\(^3\), and

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hepatitis A vaccine (HepA) or Immune Globulin (IG) for postexposure prophylaxis within 14 days of last exposure.

**Schools, Child Care, and Work.** Children and adults with acute HAV infection who work as food handlers or attend or work in child care settings should be excluded for 1 week after onset of the illness.

**Immune Globulin.** Immune Globulin Intramuscular (IGIM), when administered within 2 weeks after exposure to HAV, is more than 85% effective in preventing symptomatic infection. When administered for preexposure prophylaxis, 1 dose of 0.1 mL/kg confers protection against hepatitis A for up to 1 month, and a dose of 0.2 mL/kg protects for up to 2 months. Recommended preexposure and postexposure IGIM doses and duration of protection are provided in Tables 3.16 and 3.17. HAV vaccine is preferred for preexposure protection in all populations (age ≥1 year) unless contraindicated and should be administered at least 2 weeks before expected exposure. Vaccine may be used for postexposure prophylaxis for most people 1 through 40 years of age (see Postexposure Prophylaxis, p 399).

**Hepatitis A Vaccine.** Two inactivated hepatitis A (HepA) vaccines, Havrix (GlaxoSmithKline, Research Triangle Park, NC) and Vaqta (Merck & Co Inc, Whitehouse Station, NJ), are available in the United States. The vaccines are prepared from cell culture-adapted HAV, which is propagated in human fibroblasts, purified from cell lysates, formalin inactivated, and adsorbed to an aluminum hydroxide adjuvant. Vaqta contains no preservative. Havrix contains 0.5% 2-phenoxyethanol as a preservative.

### Table 3.16. Recommendations for Preexposure Immunoprophylaxis of Hepatitis A Virus (HAV) for Travelers to Countries With High or Intermediate Hepatitis A Endemicity

<table>
<thead>
<tr>
<th>Age</th>
<th>Recommended Prophylaxis</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Younger than 12 mo</td>
<td>IGIM</td>
<td>0.1 mL/kg (^b) protects for up to 1 mo; 0.2 mL/kg (^b) protects for up to 2 mo. For trips of 2 mo or longer, 0.2 mL/kg (^b) should be administered at departure and every 2 mo if exposure to HAV continues.</td>
</tr>
<tr>
<td>12 mo through 40 y</td>
<td>HepA vaccine(^c)</td>
<td>If departure is in less than 2 wk, older adults, immunocompromised people, and people with chronic liver disease or other chronic medical conditions can receive IGIM with the initial dose of HepA vaccine to ensure optimal protection.</td>
</tr>
<tr>
<td>41 y or older</td>
<td>HepA vaccine, with or without IGIM(^c)</td>
<td></td>
</tr>
</tbody>
</table>

IGIM indicates Immune Globulin Intramuscular; HepA, hepatitis A vaccine.

*All people 12 months of age or older at high risk of HAV disease should be immunized routinely (see People at Increased Risk, p 397).

*IGIM should be administered deep into a large muscle mass. Ordinarily, no more than 5 mL should be administered in one site in an adult or large child; lesser amounts (maximum 3 mL in one site) should be administered to small children and infants.

*People who have a contraindication to HepA vaccine should receive IGIM.
Table 3.17. Recommendations for Postexposure Immunoprophylaxis of Hepatitis A Virus (HAV)

<table>
<thead>
<tr>
<th>Time Since Exposure</th>
<th>Age of Patient</th>
<th>Recommended Prophylaxis</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 wk or less</td>
<td>Younger than 12 mo</td>
<td>IGIM, 0.1 mL/kg&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>12 mo through 40 y</td>
<td>HepA vaccine&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>41 y or older</td>
<td>IGIM, 0.1 mL/kg&lt;sup&gt;a&lt;/sup&gt;, but HepA vaccine&lt;sup&gt;b&lt;/sup&gt; can be used if IGIM is unavailable&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>People of any age who are immunocompromised, have chronic liver disease, or contraindication to vaccination</td>
<td>IGIM, 0.1 mL/kg&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>More than 2 wk</td>
<td>Younger than 12 mo</td>
<td>No prophylaxis</td>
</tr>
<tr>
<td></td>
<td>12 mo or older</td>
<td>No prophylaxis, but HepA vaccine may be indicated for ongoing exposure&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

IGIM indicates Immune Globulin Intramuscular; HepA, hepatitis A vaccine.<br><sup>a</sup>IGIM should be administered deep into a large muscle mass. Ordinarily, no more than 5 mL should be administered in one site in an adult or large child; lesser amounts (maximum 3 mL in one site) should be administered to small children and infants.<br><sup>b</sup>Dosage and schedule of hepatitis A vaccine as recommended according to age in Table 3.18. Only monovalent hepatitis A vaccine (Havrix or Vaqta) should be used for postexposure prophylaxis.

Table 3.18. Recommended Doses and Schedules for Inactivated Hepatitis A Virus (HepA) Vaccines<sup>a</sup>

<table>
<thead>
<tr>
<th>Age</th>
<th>Vaccine</th>
<th>Hepatitis A Antigen Dose</th>
<th>Volume per Dose, mL</th>
<th>No. of Doses</th>
<th>Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 mo through 18 y</td>
<td>Havrix</td>
<td>720 ELU</td>
<td>0.5</td>
<td>2</td>
<td>Initial and 6–12 mo later</td>
</tr>
<tr>
<td>12 mo through 18 y</td>
<td>Vaqta</td>
<td>25 U&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.5</td>
<td>2</td>
<td>Initial and 6–18 mo later</td>
</tr>
<tr>
<td>19 y or older</td>
<td>Havrix</td>
<td>1440 ELU</td>
<td>1.0</td>
<td>2</td>
<td>Initial and 6–12 mo later</td>
</tr>
<tr>
<td>19 y or older</td>
<td>Vaqta</td>
<td>50 U&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1.0</td>
<td>2</td>
<td>Initial and 6–18 mo later</td>
</tr>
<tr>
<td>18 y or older</td>
<td>Twinrix&lt;sup&gt;c&lt;/sup&gt;</td>
<td>720 ELU</td>
<td>1.0</td>
<td>3 or 4</td>
<td>Initial, 1 mo, and 6 mo later</td>
</tr>
</tbody>
</table>

OR

Initial, 7 days, and 21–30 days, followed by a dose at 12 mo

ELU indicates enzyme-linked immunosorbent assay units.<br><sup>a</sup>Havrix and Twinrix are manufactured by GlaxoSmithKline Biologicals (Research Triangle Park, NC); Vaqta is manufactured and distributed by Merck & Co Inc (Whitehouse Station, NJ).<br><sup>b</sup>Antigen units (each unit is equivalent to approximately 1 μg of viral protein).<br><sup>c</sup>A combination of hepatitis B (Engerix-B, 20 μg) and hepatitis A (Havrix, 720 ELU) vaccine (Twinrix) is licensed for use in people 18 years and older in 3-dose and 4-dose schedules.
liver disease or other chronic medical conditions who are traveling to an area with endemic infection in 2 weeks or less should receive the initial dose of vaccine and simultaneously can receive IGIM (0.1 mL/kg for up to 1 month of travel; 0.2 mL/kg for up to 2 months of travel) at a separate anatomic site. The vaccine series then should be completed according to the licensed schedule.

- Travelers who elect not to receive vaccine, are younger than 12 months, or are allergic to a vaccine component should receive a single dose of IGIM (see Table 3.16, p 394).

- **Close contacts of newly arriving international adoptees.**\(^{1,2}\) Data from a study conducted at 3 adoption clinics in the United States indicate that 1% to 6% of newly arrived international adoptees have acute HAV infection. The risk of HAV infection among close personal contacts of international adoptees is estimated at 106 (range, 90–819) per 100 000 household contacts of international adoptees within the first 60 days of their arrival in the United States. Therefore, HepA vaccine should be administered to all previously unvaccinated people who anticipate close personal contact (eg, household contact or regular babysitting) with an international adoptee from a country with high or intermediate endemicity during the first 60 days following arrival of the adoptee in the United States. The first dose of the 2-dose HepA vaccine series should be administered as soon as adoption is planned, ideally 2 or more weeks before the arrival of the adoptee.

- **Men who have sex with men.** Cyclic outbreaks of hepatitis A among men who have sex with men have been reported often, including in urban areas in the United States, Canada, and Australia. Therefore, men (adolescents and adults) who have sex with men should be immunized. Preimmunization serologic testing may be cost-effective for older people in this group.

- **Users of injection and noninjection drugs.** Periodic outbreaks among injection and noninjection drug users have been reported in many parts of the United States and in Europe. Adolescents and adults who use illegal drugs should be immunized. Preimmunization serologic testing may be cost-effective for older people in this group.

- **Patients with clotting-factor disorders.** Reported outbreaks of hepatitis A in patients with hemophilia receiving solvent-detergent–treated factor VIII and factor IX concentrates were identified during the 1990s, primarily in Europe, although 1 case was reported in the United States. Therefore, susceptible patients with chronic clotting disorders who receive clotting-factor concentrates should be immunized. Preimmunization testing for anti-HAV may be cost-effective for older people in this group.

- **People at risk of occupational exposure (eg, handlers of nonhuman primates and people working with HAV in a research laboratory setting).** Outbreaks of hepatitis A have been reported among people working with nonhuman primates. These infected primates were born in the wild and were not primates that had been born and raised in captivity. People working with HAV-infected primates or with HAV in a research laboratory setting should be immunized.

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\(^{1}\) Centers for Disease Control and Prevention. Updated recommendations from the Advisory Committee on Immunization Practices (ACIP) for use of hepatitis A vaccine in close contacts of newly arriving international adoptees. MMWR Morb Mortal Wkly Rep. 2009;58(36):1006–1007

• **People with chronic liver disease.** Because people with chronic liver disease are at increased risk of fulminant hepatitis A, susceptible patients with chronic liver disease should be immunized. Susceptible people who are awaiting or have received liver transplants should be immunized.

**Postexposure Prophylaxis (see Table 3.17, p 395).** A randomized clinical trial conducted among people 2 through 40 years of age comparing postexposure efficacy of IGIM and HepA vaccine found that the efficacy of a single dose of HepA vaccine was similar to that of IGIM in preventing symptomatic infection when administered within 14 days after exposure.

People who have been exposed to HAV and previously have not received HepA vaccine should receive a single dose of single-antigen HepA vaccine or IGIM as soon as possible (see Table 3.17, p 395, for prophylaxis guidance and dosages). The efficacy of IGIM or vaccine for postexposure prophylaxis when administered more than 2 weeks after exposure has not been established. No data are available for people older than 40 years or people with underlying medical conditions.

- For **healthy people 12 months through 40 years of age**, HepA vaccine at the age-appropriate dose is preferred to IGIM because of vaccine advantages, including long-term protection and ease of administration.
- For **people older than 40 years**, IGIM is preferred because of the absence of data regarding vaccine performance in this age group and the increased risk of severe manifestations of hepatitis A with increasing age. However, HepA vaccine can be used if IGIM is unavailable.
- IGIM should be used for **children younger than 12 months**, immunocompromised people, people with chronic liver disease, and people for whom HepA vaccine is contraindicated.
- People who are receiving IGIM and for whom HepA vaccine also is recommended for other reasons should receive a dose of vaccine simultaneously with IGIM at a different site. For people who receive HepA vaccine, the second dose should be administered according to the licensed schedule to complete the series.

**Household and sexual contacts.** All previously unimmunized people with close personal contact with a person with serologically confirmed HAV infection, such as household and sexual contacts, should receive HepA vaccine or IGIM within 2 weeks after the most recent exposure (Table 3.17, p 395). Serologic testing of contacts is not recommended, because testing adds unnecessary cost and may delay administration of postexposure prophylaxis.

- **Newborn infants of HAV-infected mothers.** Perinatal transmission of HAV is rare. Some experts advise giving IGIM (0.1 mL/kg) to an infant if the mother’s symptoms began between 2 weeks before and 1 week after delivery. Efficacy in this circumstance has not been established. Severe disease in healthy infants is rare.
- **Child care center staff, employees, and children and their household contacts.** Outbreaks of HAV infection at child care centers have been recognized since the 1970s, but their frequency has decreased as HAV immunization rates in
### Table 4.5. Guidelines for Treatment of Sexually Transmitted Infections in Infants and Children <45 kg According to Syndrome, continued

<table>
<thead>
<tr>
<th>Syndrome</th>
<th>Organisms/ Diagnoses</th>
<th>Treatment of Infants and Children &lt;45 kg&lt;sup&gt;a,b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacterial vaginosis</td>
<td>Metronidazole, 15–25 mg/kg per day, orally, in 3 divided doses (maximum 2 g/day) for 7 days</td>
<td></td>
</tr>
<tr>
<td><strong>Genital ulcer disease</strong></td>
<td><em>T. pallidum</em> (primary syphilis)*</td>
<td>Benzathine penicillin G, 50 000 U/kg IM, up to the adult dose of 2.4 million U in a single dose</td>
</tr>
</tbody>
</table>
| HSV—1<sup>a</sup> clinical episode | Acyclovir, 80 mg/kg per day, orally, in 4 divided doses (maximum 3.2 g/day) for 7–10 days  
**OR**  
Valacyclovir, 40 mg/kg per day (maximum 2 g/day), orally, in 2 divided doses for 7–10 days |
| *Haemophilus ducreyi* (chancroid) | Ceftriaxone, 50 mg/kg, IM, in a single dose (maximum 250 mg<sup>c</sup>)  
**OR**  
Azithromycin, 20 mg/kg, orally, in a single dose (maximum 1 g) |

**Anogenital warts**  
Human papillomavirus  
Same as for adolescents. See Table 4.4.

<sup>a</sup>IM indicates intramuscularly; STI, sexually transmitted infection.  
<sup>b</sup>For additional information and recommendations, see Centers for Disease Control and Prevention. Sexually transmitted diseases treatment guidelines, 2015. *MMWR Morb Mortal Wkly Rep.* 2015;64(RR-3):1–137. Available at: [www.cdc.gov/std/treatment](http://www.cdc.gov/std/treatment)  
<sup>c</sup>Infants and children aged ≥1 month with a sexually transmitted infection should be evaluated for sexual abuse (eg, through consultation with child-protection services).  
<sup>d</sup>If ceftriaxone is not feasible, may substitute cefixime, 8 mg/kg, up to 400 mg, orally, in a single dose, for a child weighing <45 kg, or 4 mg/kg x 2 doses, every 12 hours, up to 400 mg. Providers treating patients with a severe cephalosporin allergy should consult an infectious disease specialist.  
<sup>e</sup>Data are limited on the effectiveness and optimal dose of azithromycin for the treatment of chlamydial infection in infants and children who weigh <45 kg.  
<sup>f</sup>Infants and children >1 mo of age who receive a diagnosis of syphilis should have birth and maternal medical records reviewed to assess whether they have congenital or acquired syphilis. Infants and children ≥1 mo of age with primary syphilis should be managed by a pediatric infectious disease specialist.
**Table 4.8. Recommended Doses of Parenteral and Oral Antifungal Drugs, continued**

<table>
<thead>
<tr>
<th>Drug</th>
<th>Route</th>
<th>Dose (per day)</th>
<th>Adverse Reactions&lt;sup&gt;a,b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluconazole&lt;sup&gt;f&lt;/sup&gt;</td>
<td>IV, PO</td>
<td>Oropharyngeal candidiasis: 6 mg/kg (adult dose: 200 mg) on the first day, followed by 3–6 mg/kg (adult dose: 100 mg) once daily. Treatment should be given for at least 2 wk to decrease the likelihood of relapse. Esophageal candidiasis: 6 mg/kg (adult dose: 200 mg) on the first day, followed by 6 mg/kg (adult dose: 100 mg) once daily. Doses up to 12 mg/kg/day may be used, based on medical judgment of the patient’s response to therapy. Treatment for a minimum of 3 wk and for at least 2 wk following the resolution of symptoms. Systemic Candida infections: 12 mg/kg/day. Cryptococcal meningitis (children): Following induction therapy with amphotericin B plus flucytosine, fluconazole 12 mg/kg (maximum 800 mg) once daily. Duration of fluconazole consolidation treatment is a minimum of 8 wk after the CSF becomes culture negative; for suppression of relapse in children with AIDS, use 6 mg/kg once daily. Cryptococcal meningitis (adults): Following induction therapy with amphotericin B plus flucytosine, fluconazole 400 mg once daily. The recommended duration of fluconazole consolidation treatment is a minimum of 8 wk after the CSF fluid becomes culture negative; 200 mg once daily is used for suppression of relapse of cryptococcal meningitis in patients with AIDS. Prophylaxis in patients undergoing bone marrow transplantation: 400 mg, once daily.</td>
<td>Rash, gastrointestinal tract symptoms, hepatotoxicity, Stevens-Johnson syndrome, anaphylaxis.</td>
</tr>
</tbody>
</table>