FIGURE 2. Catch-up immunization schedule for persons aged 4 months through 18 years who start late or who are more than 1 month behind—United States, 2016.

The figure below provides catch-up schedules and minimum intervals between doses for children whose vaccinations have been delayed. A vaccine series does not need to be restarted, regardless of the time that has elapsed between doses. Use the section appropriate for the child's age. Always use this table in conjunction with Figure 1 and the footnotes that follow.

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Minimum Age for Dose 1</th>
<th>Minimum Interval Between Doses</th>
<th>Dose 3 to Dose 4</th>
<th>Dose 4 to Dose 5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8 weeks and at least 16 weeks after first dose. Minimum age for the final dose is 24 weeks.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hepatitis B&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Birth</td>
<td>4 weeks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rotavirus&lt;sup&gt;2&lt;/sup&gt;</td>
<td>6 weeks</td>
<td>4 weeks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diphtheria, tetanus, and acellular pertussis&lt;sup&gt;3&lt;/sup&gt;</td>
<td>6 weeks</td>
<td>4 weeks</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8 weeks and 12 through 59 months as final dose&lt;sup&gt;4&lt;/sup&gt; - if current age is younger than 12 months and first dose was administered at age 7 through 11 months (wait until at least 12 months old); OR if current age is 12 through 59 months and first dose was administered before the 1st birthday, and second dose administered at younger than 15 months; OR if both doses were PRP-OMP (ActHIB, Pentacel) and were administered before the 1st birthday (wait until at least 12 months old).</td>
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<tr>
<td>Haemophilus influenzae type b&lt;sup&gt;5&lt;/sup&gt;</td>
<td>6 weeks</td>
<td>8 weeks (as final dose) - if first dose was administered at age 12 through 14 months; No further doses needed if first dose was administered at age 15 months or older.</td>
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</tr>
<tr>
<td>Pneumococcal&lt;sup&gt;6&lt;/sup&gt;</td>
<td>6 weeks</td>
<td>4 weeks (as final dose) - if first dose was administered before the 1st birthday.</td>
<td></td>
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<tr>
<td></td>
<td>6 weeks</td>
<td>4 weeks (as final dose) - if first dose was administered at age 12 through 14 months; No further doses needed if first dose was administered at age 15 months or older.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inactivated poliovirus&lt;sup&gt;7&lt;/sup&gt;</td>
<td>6 weeks</td>
<td>4 weeks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measles, mumps, rubella&lt;sup&gt;8&lt;/sup&gt;</td>
<td>6 weeks</td>
<td>4 weeks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Varicella&lt;sup&gt;9&lt;/sup&gt;</td>
<td>12 months</td>
<td>3 months</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hepatitis A&lt;sup&gt;10&lt;/sup&gt;</td>
<td>12 months</td>
<td>6 months</td>
<td></td>
<td></td>
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<tr>
<td>Meningococcal&lt;sup&gt;11&lt;/sup&gt;</td>
<td>6 weeks</td>
<td>8 weeks&lt;sup&gt;12&lt;/sup&gt; - See footnote 11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Children and adolescents age 7 through 18 years</td>
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<td></td>
</tr>
<tr>
<td>Meningococcal&lt;sup&gt;11&lt;/sup&gt;</td>
<td>Not Applicable (N/A)</td>
<td>8 weeks&lt;sup&gt;12&lt;/sup&gt; - Routine dosing intervals are recommended&lt;sup&gt;13&lt;/sup&gt;</td>
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<td></td>
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<tr>
<td>Tetanus, diphtheria; tetanus, diphtheria, and acellular pertussis&lt;sup&gt;14&lt;/sup&gt;</td>
<td>7 years&lt;sup&gt;15&lt;/sup&gt;</td>
<td>4 weeks - if first dose of DTaP/DT was administered before the 1st birthday.</td>
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<tr>
<td></td>
<td>6 months (as final dose) - if first dose of DTaP/DT or Td was administered at or after the 1st birthday.</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Human papillomavirus&lt;sup&gt;16&lt;/sup&gt;</td>
<td>9 years</td>
<td>4 weeks</td>
<td></td>
<td></td>
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<tr>
<td>Hepatitis A&lt;sup&gt;10&lt;/sup&gt;</td>
<td>N/A</td>
<td>6 months</td>
<td></td>
<td></td>
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<tr>
<td>Hepatitis B&lt;sup&gt;17&lt;/sup&gt;</td>
<td>N/A</td>
<td>3 weeks and at least 16 weeks after first dose.</td>
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<td></td>
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<tr>
<td>Inactivated poliovirus&lt;sup&gt;18&lt;/sup&gt;</td>
<td>N/A</td>
<td>4 weeks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measles, mumps, rubella&lt;sup&gt;9&lt;/sup&gt;</td>
<td>N/A</td>
<td>4 weeks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Varicella&lt;sup&gt;9&lt;/sup&gt;</td>
<td>N/A</td>
<td>3 months if younger than age 13 years. 4 weeks if age 13 years or older.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE: The above recommendations must be read along with the footnotes of this schedule.
Footnotes — Recommended immunization schedule for persons aged 0 through 18 years—United States, 2016

For further guidance on the use of the vaccines mentioned below, see: http://www.cdc.gov/vaccines/hcp/acip-recs/index.html.

For vaccine recommendations for persons 19 years of age and older, see the Adult Immunization Schedule.

Additional information

- For contraindications and precautions to use of a vaccine and for additional information regarding that vaccine, vaccination providers should consult the relevant ACIP statement available online at http://www.cdc.gov/vaccines/hcp/acip-recs/index.html.
- For purposes of calculating intervals between doses, 4 weeks = 28 days. Intervals of 4 months or greater are determined by calendar months.
- Vaccine doses administered 4 days or less before the minimum interval are considered valid. Doses of any vaccine administered ≥5 days earlier than the minimum interval or minimum age should not be counted as valid. A dose should be repeated as age-appropriate. The repeat dose should be administered at the minimum interval. For further details, see MMWR, General Recommendations on Immunization and Reports / Vol. 60 / No. 2; Table 1. Recommended and minimum ages and intervals between vaccine doses available online at: http://www.cdc.gov/mmwr/pdf/rr/rr6002.pdf.

1. Hepatitis B (HepB) vaccine. (Minimum age: birth)

Routine vaccination:

At birth:
- Administer monovalent HepB vaccine to all newborns before hospital discharge.
- For infants born to hepatitis B surface antigen (HBsAg)-positive mothers, administer HepB vaccine and 0.5 mL of hepatitis B immune globulin (HBIg) within 12 hours of birth. These infants should be tested for HBsAg and antibody to HBsAg (anti-HBs) at age 9 through 18 months (preferably at the next well-child visit) or 1 to 2 months after completion of the HepB series if the series was delayed; CDC recently recommended testing occur at age 9 through 12 months; see: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6349a6.htm.
- If mother's HBsAg status is unknown, within 12 hours of birth administer HepB vaccine regardless of birth weight. For infants weighing less than 2,000 grams, administer HBIG in addition to HepB vaccine within 12 hours of birth. Determine mother's HBsAg status as soon as possible and, if mother is HBsAg-positive, also administer HBIG for infants weighing 2,000 grams or more as soon as possible, but no later than age 7 days.

Doses following the birth dose:

- The second dose should be administered at age 1 or 2 months. Monovalent HepB vaccine should be used for doses administered before age 6 weeks.
- Infants who did not receive a birth dose should receive 3 doses of a HepB-containing vaccine on a schedule of 0, 1 to 2 months, and 6 months starting as soon as feasible. See Figure 2.
- Administer the second dose 1 to 2 months after the first dose (minimum interval of 4 weeks), administer the third dose at least 8 weeks after the second dose and at least 16 weeks after the first dose. The final (third or fourth) dose in the HepB vaccine series should be administered no earlier than age 24 weeks.
- Administration of a total of 4 doses of HepB vaccine is permitted when a combination vaccine containing HepB is administered after the birth dose.

Catch-up vaccination:

- Unvaccinated persons should complete a 3-dose series.
- A 2-dose series (doses separated by at least 4 months) of adult formulation Recombivax HB is licensed for use in children aged 11 through 15 years.
- For other catch-up guidance, see Figure 2.

2. Rotavirus (RV) vaccines. (Minimum age: 6 weeks for both RV1 [Rotarix] and RVS [RotaTeq])

Routine vaccination:

Administer a series of RV vaccine to all infants as follows:
1. If Rotarix is used, administer a 2-dose series at 2 and 4 months of age.
2. If RotaTeq is used, administer a 3-dose series at ages 2, 4, and 6 months.
3. If any dose in the series was Rotarix or vaccine product is unknown for any dose in the series, a total of 3 doses of RV vaccine should be administered.

Catch-up vaccination:

- The maximum age for the first dose in the series is 14 weeks, 6 days; vaccination should not be initiated for infants aged 15 weeks, 0 days or older.
- The maximum age for the final dose in the series is 8 months, 0 days.
- For other catch-up guidance, see Figure 2.

3. Diphtheria and tetanus toxoids and acellular pertussis (DTaP) vaccine. (Minimum age: 6 weeks. Exception: DTaP-IPV [Kinrix, Quadracel]: 4 years)

Routine vaccination:

Administer a 5-dose series of DTaP vaccine at ages 2, 4, 6, 15 through 18 months, and 4 through 6 years.

The fourth dose may be administered as early as age 12 months, provided at least 6 months have elapsed since the third dose.
- Inadvertent administration of 4th DTaP dose early: If the fourth dose of DTaP was administered at least 4 months, but less than 6 months, after the third dose of DTaP, it need not be repeated.
- The fifth dose of DTaP vaccine is not necessary if the fourth dose was administered at age 4 years or older.
- For other catch-up guidance, see Figure 2.

4. Haemophilus influenzae type b (Hib) conjugate vaccine. (Minimum age: 6 weeks for PRP-T [AC-HIB, DTaP-IPV/Hib (Pentacel) and Hib-MenCY (MenHibrix)]; PRP-OMP [PedvaxHIB or COMVAX], 12 months for PRP-T [Hiberix])

Routine vaccination:

- Administer a 2- or 3-dose Hib primary series and a booster dose (dose 3 or 4 depending on vaccine used in primary series) at age 12 through 15 months to complete a full Hib vaccine series.
- The primary series with Act-HIB, MenHibrix, or Pentacel consists of 3 doses and should be administered at 2, 4, and 6 months of age. The primary series with PedvaxHIB or COMVAX consists of 2 doses and should be administered at 2 and 4 months of age; a dose at age 6 months is not indicated.
- One booster dose (dose 3 or 4 depending on vaccine used in primary series) of any Hib vaccine should be administered at age 12 through 15 months. An exception is Hibrix vaccine. Hibrix should only be used for the booster (final) dose in children aged 12 months through 4 years who have received at least 1 prior dose of Hib-containing vaccine.
- For recommendations on the use of MenHibrix in patients at increased risk for meningococcal disease, please refer to the meningococcal vaccine footnotes and also to MMWR February 28, 2014 / 63(RR01);1-13, available at: http://www.cdc.gov/mmwr/pdf/rr/rr6301.pdf.

Catch-up vaccination:

- If dose 1 was administered at ages 12 through 14 months, administer a second (final) dose at least 8 weeks after dose 1, regardless of Hib vaccine used in the primary series.
- If both doses were PRP-OMP (PedvaxHIB or COMVAX), and were administered before the first birthday, the third (and final) dose should be administered at age 12 through 59 months and at least 8 weeks after the second dose.
- If the first dose was administered before the first birthday and second dose administered at younger than 15 months, a third (and final) dose should be administered 8 weeks after dose 2.
- If unvaccinated children aged 15 months or older, administer only dose.
- For other catch-up guidance, see Figure 2. For catch-up guidance related to MenHibrix, please see the meningococcal vaccine footnotes and also MMWR February 28, 2014 / 63(RR01);1-13, available at: http://www.cdc.gov/mmwr/pdf/rr/rr6301.pdf.

Vaccination of persons with high-risk conditions:

- Children aged 12 through 59 months who are at increased risk for Hib disease, including chemotherapy recipients and those with anatomic or functional asplenia (including splenic cell disease), human immunodeficiency virus (HIV) infection, immunoglobulin deficiency, or early component complement deficiency, who have received either no doses or only 1 dose of Hib vaccine before 12 months of age, should receive 2 additional doses of Hib vaccine 8 weeks apart; children who received 2 or more doses of Hib vaccine before 12 months of age should receive 1 additional dose.
- For patients younger than 5 years of age undergoing chemotherapy or radiation treatment who received a Hib vaccine dose(s) within 14 days of starting therapy or during therapy, repeat the dose(s) at least 3 months following therapy completion.
- Recipients of hematopoietic stem cell transplant (HSCT) should be revaccinated with a 3-dose regimen of Hib vaccine starting at 6 to 12 months after successful transplant, regardless of vaccination history; doses should be administered at least 4 weeks apart.
- A single dose of any Hib-containing vaccine should be administered to unimmunized* children and adolescents 15 months of age and older undergoing an elective splenectomy; if possible, vaccine should be administered at least 14 days before procedure.
4. Haemophilus influenzae type b (Hib) conjugate vaccine (cont'd)
   - Hib vaccine is not routinely recommended for patients 5 years or older. However, 1 dose of Hib vaccine should be administered to unimmunized* persons aged 5 years or older who have anatomic or functional asplenia (including sickle cell disease) and uncomplicated persons 5 through 18 years of age with HIV infection.
   - *Patients who have not received a primary series and booster dose or at least 1 dose of Hib vaccine after 14 months of age are considered unimmunized.

5. Pneumococcal vaccines. (Minimum age: 6 weeks for PCV13, 2 years for PPSV23)
   - Routine vaccination with PCV13:
     - Administer a 4-dose series of PCV13 vaccine at ages 2, 4, and 6 months and at age 12 through 15 months.
     - For children aged 14 through 59 months who have received an age-appropriate series of 7-valent PCV (PCV7), administer a single supplemental dose of 13-valent PCV (PCV13).
   - Catch-up vaccination with PCV13:
     - Administer 1 dose of PCV13 to all healthy children aged 24 through 59 months who are not completely vaccinated for their age.
   - For other catch-up guidance, see Figure 2.

6. Inactivated poliovirus vaccine (IPV). (Minimum age: 6 weeks) (cont'd)
   - If both OPV and IPV were administered as part of a series, a total of 4 doses should be administered, regardless of the child's current age. If only OPV was administered and all doses were given prior to 4 years of age, one dose of IPV should be given at 4 years or older, at least 4 weeks after the last OPV dose.
   - IPV is not routinely recommended for U.S. residents aged 18 years or older.
   - For other catch-up guidance, see Figure 2.

7. Influenza vaccines. (Minimum age: 6 months for inactivated influenza vaccine [IIV]; 2 years for live, attenuated influenza vaccine [LAIV])
   - Routine vaccination:
     - Administer influenza vaccine annually to all children beginning at age 6 months. For most healthy, nonpregnant persons aged 2 through 49 years, either LAIV or IIV may be used. However, LAIV should not be administered to some persons, including 1) persons who have experienced severe allergic reactions to LAIV, any of its components, or to a previous dose of any other influenza vaccine; 2) children 2 through 17 years receiving inhaled or oral corticosteroids or other immunosuppressive products; 3) persons who are allergic to eggs; 4) pregnant women; 5) immunosuppressed persons; 6) children 2 through 4 years of age with asthma or who had wheezing in the past 12 months; or 7) persons who have taken influenza antiviral medications in the previous 48 hours. For all other contraindications and precautions to the use of LAIV, see MMWR August 7, 2015 / 64(30):818-25 available at http://www.cdc.gov/mmwr/pdf/wk/mm6430.pdf.
   - For children aged 6 months through 8 years:
     - For the 2015-16 season, administer 2 doses separated by at least 4 weeks to children who are receiving influenza vaccine for the first time. Some children in this age group who have been vaccinated previously will also need 2 doses. For additional guidance, follow dosing guidelines in the 2015-16 ACP influenza vaccine recommendations, MMWR August 7, 2015 / 64(30):818-25, available at http://www.cdc.gov/mmwr/pdf/wk/mm6430.pdf.
     - For the 2016-17 season, follow dosing guidelines in the 2016 ACP influenza vaccine recommendations.
   - For persons aged 9 years and older:
     - Administer 1 dose.

8. Measles, mumps, and rubella (MMR) vaccine. (Minimum age: 12 months for routine vaccination)
   - Routine vaccination:
     - Administer a 2-dose series of MMR vaccine at ages 12 through 15 months and 4 through 6 years. The second dose may be administered before age 4 years, provided at least 4 weeks have elapsed since the first dose.
     - Administer 1 dose of MMR vaccine to infants aged 6 through 11 months before departure from the United States for international travel. These children should be revaccinated with 2 doses of MMR vaccine, the first at age 12 through 17 months (12 months if the child remains in an area where disease risk is high), and the second dose at least 4 weeks later.
     - Administer 2 doses of MMR vaccine to children aged 12 months and older before departure from the United States for international travel. The first dose should be administered on or after age 12 months and the second dose at least 4 weeks later.
   - Catch-up vaccination:
     - Ensure that all school-aged children and adolescents have had 2 doses of MMR vaccine; the minimum interval between the 2 doses is 4 weeks.

9. Varicella (VAR) vaccine. (Minimum age: 12 months)
   - Routine vaccination:
     - Administer a 2-dose series of VAR vaccine at ages 12 through 15 months and 4 through 6 years. The second dose may be administered before age 4 years, provided at least 3 months have elapsed since the first dose. If the second dose was administered at least 4 weeks after the first dose, it can be accepted as valid.
   - Catch-up vaccination:
     - Ensure that all persons aged 7 through 18 years without evidence of immunity (see MMWR 2007 / 56[No. RR-4], available at http://www.cdc.gov/mmwr/pdf/mm6604.pdf) have 2 doses of varicella vaccine. For children aged 7 through 12 years, the recommended minimum interval between doses is 3 months (if the second dose was administered at least 4 weeks after the first dose, it can be accepted as valid); for persons aged 13 through 18 years, the minimum interval between doses is 4 weeks.

10. Hepatitis A (HepA) vaccine. (Minimum age: 12 months)
    - Routine vaccination:
      - Initiate the 2-dose HepA vaccine series at 12 through 23 months; separate the 2 doses by 6 to 18 months. Children who have received 1 dose of HepA vaccine before age 24 months should receive a second dose 6 to 18 months after the first dose.
      - For any person aged 2 years and older who has not already received the HepA vaccine series, 2 doses of HepA vaccine separated by 6 to 18 months may be administered if immunity against hepatitis A virus infection is desired.
    - Catch-up vaccination:
      - The minimum interval between the 2 doses is 6 months.
10. Hepatitis A (HepA) vaccine (cont’d)
Special populations:
- Administer 2 doses of HepA vaccine at least 6 months apart to previously unvaccinated persons who live in areas where vaccination programs target older children, or who are at increased risk for infection. This includes persons traveling to or working in countries that have high or intermediate endemicity of infection; men having sex with men; users of injection and non-injection illicit drugs; persons who work with HAV-infected primates or with HAV in a research laboratory; persons with clotting-factor disorders; persons with chronic liver disease; and persons who anticipate close personal contact (e.g., household or regular babysitting) with an international adoptee during the first 60 days after arrival in the United States from a country with high or intermediate endemicity. The first dose should be administered as soon as the adoption is planned, ideally 2 or more weeks before the arrival of the adoptee.

11. Meningococcal vaccines. (Minimum age: 6 weeks for Hib-MenCY [MenBrix], 9 months for MenACWY-D [Menactra], 2 months for MenACWY-CRM [Menevo], 10 years for serogroup B meningococcal [MenB] vaccines: MenB-4C [Bexsero] and MenB-FHbp [Trumenba])
Routine vaccination:
- Administer a single dose of Menactra or Menevo vaccine at age 11 through 12 years, with a booster dose at age 16 years.
- Adolescents aged 11 through 18 years with human immunodeficiency virus (HIV) infection should receive a 2-dose primary series of Menactra or Menevo vaccine with at least 8 weeks between doses.
- For children aged 2 months through 18 years with high-risk conditions, see below.

Catch-up vaccination:
- Administer Menactra or Menevo vaccine at age 13 through 18 years if not previously vaccinated.
- If the first dose is administered at age 13 through 15 years, a booster dose should be administered at age 16 through 18 years with a minimum interval of at least 8 weeks between doses.
- If the first dose is administered at age 16 years or older, a booster dose is not needed.
- For other catch-up guidance, see Figure 2.

Clinical discretion:
- Young adults aged 16 through 23 years (preferred age range is 16 through 18 years) may be vaccinated with either a 2-dose series of Bexsero or a 3-dose series of Trumenba vaccine to provide short-term protection against most strains of serogroup B meningococcal disease. The two MenB vaccines are not interchangeable; the same vaccine product must be used for all doses.

Vaccination of persons with high-risk conditions and other persons at increased risk of disease:
- Children with anatomic or functional asplenia (including sickle cell disease): Meningococcal conjugate ACWY vaccines:
  1. Menevo
     a. Children who initiate vaccination at 8 weeks: Administer doses at 2, 4, 6, and 12 months of age.
     b. Unvaccinated children who initiate vaccination at 2 through 23 months: Administer 2 doses, with the second dose at least 12 weeks after the first dose AND after the first birthday.
     c. Children 24 months and older who have not received a complete series: Administer 2 primary doses at least 8 weeks apart.
  2. MenBrix
     a. Children who initiate vaccination at 6 weeks: Administer doses at 2, 4, 6, and 12 through 15 months of age.
     b. If the first dose of MenBrix is given at or after 12 months of age, a total of 2 doses should be given at least 8 weeks apart to ensure protection against serogroups C and Y meningococcal disease.

Meningococcal B vaccines:
- Bexsero or Trumenba
  a. Persons 10 years or older who have not received a complete series. Administer a 2-dose series of Bexsero, at least 1 month apart. Or a 3-dose series of Trumenba, with the second dose at least 2 months after the first and the third dose at least 6 months after the first. The two MenB vaccines are not interchangeable; the same vaccine product must be used for all doses.
  b. Children with persistent complement component deficiency (including persons with inherited or chronic deficiencies in C3, C5-9, properdin, factor D, factor H, or taking eculizumab [Soliris®]): Meningococcal conjugate ACWY vaccines:
    1. Menevo
       a. Children who initiate vaccination at 8 weeks: Administer doses at 2, 4, 6, and 12 months of age.
       b. Unvaccinated children who initiate vaccination at 7 through 23 months: Administer 2 doses, with the second dose at least 12 weeks after the first dose AND after the first birthday.
       c. Children 24 months and older who have not received a complete series: Administer 2 primary doses at least 8 weeks apart.
    2. MenBrix
       a. Children who initiate vaccination 6 weeks: Administer doses at 2, 4, 6, and 12 through 15 months of age.
       b. If the first dose of MenBrix is given at or after 12 months of age, a total of 2 doses should be given at least 8 weeks apart to ensure protection against serogroups C and Y meningococcal disease.