Immunizations (Guideline Intervals Using “The Rule of Six” for Vaccines Birth to Six Years)

Guideline developed by Shelly Baldwin, MD, in collaboration with the ANGELS Team. Last reviewed by Shelly Baldwin, MD, April 10, 2017.

Key Points

- Vaccines are necessary for prevention of and protection from several diseases.
- Administering vaccines in a consistent manner and schedule is critical to reduce provider error, maximize vaccine effect, and protect populations from vaccine preventable diseases.
- Regarding the standard immunization schedule for vaccines given from birth to 6 years of age, the “Rule of Six” can be used to ensure consistency and preservation of vaccine timing intervals – which are generally multiples of the number 6.
- The “Rule of Six” does not apply to catch-up vaccination schedules.
- Following the recommendations from the Centers for Disease Control and Prevention (CDC), the Advisory Committee on Immunization Practices (ACIP), and the American Academy of Pediatrics (AAP) is of utmost importance when administering vaccines.
Definition and Assessment

Definition

“The Rule of Six,” which is a method used to ensure consistency and preservation of vaccine timing intervals is based on multiples of the number 6. These intervals pertain only to the standard immunization schedule and not to catch-up schedules.

- Be familiar with recommendations from the Center for Disease Control (CDC), the Advisory Committee on Immunization Practices (ACIP), and the American Academy of Pediatrics (AAP).
- Consistency in vaccine administration and schedules is of utmost importance to reduce provider error and simplify the administration regimen.
- Timing intervals for vaccinations are often divisible by or are multiples of the **number 6**, particularly as related to vaccines given from birth through 4-6 years of age. For example:
  - The earliest time that the first set (i.e., 2 month set) of vaccines can be given is at 6 weeks of age.\(^1\)
  - The optimal timing interval between the primary series (i.e., the 2 month, 4 month, and 6 month sets of vaccines) is **6 weeks**. However, for a catch up schedule or during an epidemic, the vaccine-timing interval can be as short as 4 weeks.\(^1\)
  - There are 3 vaccine timing periods or ages at which a child must have reached a minimum absolute age in order to receive necessary vaccines. These timing periods or ages are **6 months, 12 months, and 48 months — all multiples of 6.**\(^1\)

Assessment

Vaccines are necessary for disease prevention; however, vaccination schedules have become increasingly complex secondary to the addition of new vaccine recommendations and new vaccine combinations.\(^2\)

**Table 1. Recommended Ideal Vaccine Schedule for Children Ages 0-6 Years**

To view a larger image on your device, please click or touch the image.

<table>
<thead>
<tr>
<th>Birth</th>
<th>2 Months</th>
<th>4 Months</th>
<th>6 Months</th>
<th>9 Months</th>
<th>12 Months</th>
<th>15 Months</th>
<th>18 Months</th>
<th>24 Months</th>
<th>48-72 Months</th>
<th>4-6 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hep B</td>
<td>DTaP</td>
<td>DTaP</td>
<td>DTaP</td>
<td>MMR</td>
<td>DTaP</td>
<td>Hep A#2</td>
<td>Hep A#2</td>
<td>DTaP</td>
<td>DTaP</td>
<td>Varicella</td>
</tr>
<tr>
<td>IPV</td>
<td>IPV</td>
<td>IPV</td>
<td>Hib*</td>
<td>Varicella</td>
<td>Hib</td>
<td>(Hep A#1</td>
<td>(Hep A#2</td>
<td>IPV</td>
<td>IPV</td>
<td>Hib</td>
</tr>
<tr>
<td>Hib*</td>
<td>Hib*</td>
<td>PCV</td>
<td>PCV</td>
<td>Hep A</td>
<td>PCV</td>
<td>(if declined</td>
<td>(if Hep A</td>
<td>PCV</td>
<td>PCV</td>
<td>Hib</td>
</tr>
<tr>
<td>PCV</td>
<td>PCV</td>
<td>RV*</td>
<td>RV*</td>
<td>PCV</td>
<td>Hep B</td>
<td>@ 12 Months)</td>
<td>#1 was given</td>
<td></td>
<td>RV*</td>
<td></td>
</tr>
<tr>
<td>Hep B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>18 Months)</td>
<td></td>
<td></td>
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<tr>
<td>RV*</td>
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</tr>
</tbody>
</table>

\(^*\) The number of Hib doses and RV doses (2 or 3) before the first birthday may be manufacturer-dependent.

Management of Vaccines and Timing Intervals

**Hep B (Hepatitis B vaccine)**

- If a mother is Hepatitis B surface antigen positive (HBsAg+), the infant should receive both
Hepatitis B vaccine and Hepatitis B Immunoglobulin (HBIG) within 12 hours of birth preferably.

- The final dose of Hepatitis B vaccine should be administered no earlier than age 24 weeks or 6 months of age. To reiterate, a child must be a minimum of 6 months of age in order to receive the final dose of Hepatitis B vaccine.¹

**DTaP (Diphtheria and tetanus toxoids and acellular pertussis vaccine)**

- The minimum age that the first DTaP vaccine can be given is 6 weeks of age.
- An appropriate timing interval among the primary series (i.e., 2 month, 4 month, and 6 month sets) is 6 weeks.
- Six (6) months must elapse between the third and fourth doses of DTaP. While the fourth dose may be administered as early as 12 months of age, 6 months must have elapsed since the third dose.
- The final dose of DTaP should be administered between 48 and 72 months, or 4-6 years of age. A child must be a minimum of 6 months of age in order to receive the final dose of Hepatitis B vaccine.

**IPV (Inactivated poliovirus vaccine)**

- The minimum age that the first IPV vaccine can be given is 6 weeks of age.
- The final dose in the IPV vaccine series should be given on or after 48 months of age and at least 6 months after the previous dose. While 4 doses of IPV vaccine are preferred, 3 doses will suffice as long as the third dose is given on or after 48 months of age.¹

**Hib (Haemophilus influenza type b conjugate vaccine)**

- The minimum age that the first Hib vaccine can be given is 6 weeks of age.
- All children should receive one Hib vaccine on or after 12 months of age;
  - A child >60 months of age is ineligible for a Hib vaccine.
  - Hib vaccine is not routinely recommended for children older than 60 months.
  - However, 1 dose of Hib vaccine should be given to unvaccinated or partially vaccinated children ≥ 60 months who have leukemia, HIV infection, asplenia (functional or anatomic), or other immune deficiency.¹

**PCV (Pneumococcal conjugate vaccine)**

- The minimum age that the first PCV vaccine can be given is 6 weeks of age.
- PCV is recommended for all children <60 months of age.
- For children who are incompletely vaccinated for their age, 1 dose of PCV may be given for children ≥24 months but <60 months.¹

**Hep A (Hepatitis A)**

- The minimum age that the first Hep A vaccine can be given is 12 months of age.
- Six (6) months must elapse between the first and second doses of Hepatitis A vaccine.¹

**MMR (Measles, Mumps, and Rubella vaccine)**

- The minimum age at which MMR vaccine may be given is 12 months of age.
- The second dose of MMR vaccine should be given between the ages of 48 months and 72
months of age.
- However, the second dose may be given earlier as long as 30 days have elapsed since the first dose.
- Twenty-eight (28) days is actually acceptable; however, 30 days follows nicely for the purpose of the “Rule of Six.”

Varicella vaccine

- The minimum age at which the first Varicella vaccine can be given is 12 months of age.
- The second dose of Varicella vaccine is routinely given between 48 months and 72 months of age. However, the second dose may be administered as early as 30 days after the first and be considered valid, but preferentially the second dose of varicella vaccine should be given 3 months after the first dose if the second dose is given before 48 months of age.
- Ideally, MMR and Varicella vaccines should be given concurrently no earlier than 12 months of age. However, if given on different dates, 30 days minimum must elapse between vaccines.

Influenza vaccine (seasonal)

- A child must be a minimum age of 6 months to receive inactivated influenza vaccine. Two (2) doses separated by a minimum of 30 days are required for children younger than 9 years of age who are receiving influenza vaccine for the first time or who were vaccinated for the first time during the previous influenza season but only received 1 vaccine dose.
- Live attenuated influenza vaccine administered intranasally should not be given to children <24 months (2 years) of age. Additionally, the intranasal preparation should not be given to those patients who are immunocompromised or who have asthma or to those children 24 – 48 months of age who have had wheezing in the previous 12 months.

Conclusion

In conclusion, there are many options for vaccine administration; however, being conscientious about appropriate timing intervals for vaccine administration and being consistent in the practice approach facilitate adherence to the recommended vaccine schedule with reduction in provider error.

This guideline was developed to improve health care access in Arkansas and to aid health care providers in making decisions about appropriate patient care. The needs of the individual patient, resources available, and limitations unique to the institution or type of practice may warrant variations.

References

References


Additional Selected Reference

Centers for Disease Control and Prevention. Recommended immunization schedules for persons