## Module 6
### Immunization Schedules

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1. Competency
Demonstrates an understanding of immunization schedules.

2. Learning Objectives
By the end of this module you will be able to:

- Describe the guidelines for immunization schedules
- Name the N.S. resource that is used to guide immunization schedules and decision making
- Locate the current N.S. immunization schedules
- Explain how the guidelines for immunization schedules accommodate factors that affect the immune response to vaccines
- Illustrate in a tabular format the vaccine, age, dose, route, site, contraindication, precaution, side effects, for each vaccine
- Describe the unique immunization needs of individuals who are off course for recommended immunizations

3. Introduction
Following a standard immunization schedule ensures that the desired disease protection is achieved. Schedules may be modified for many different reasons such as: history of disease or previous immunization, risk factors, medical conditions, and age at presentation.

4. Immunization Schedule Guidelines

4.1 Immunization Schedule Guidelines
An immunization schedule is the recommended number of vaccine doses, vaccine dosage, and intervals between vaccine doses to create an immune response.

- Number of vaccine doses
  Vaccines undergo clinical trials to identify the number of doses needed to create the desired antibody response. The numbers of doses in a series are not repeated or the schedule restarted regardless of prolonged time since a previous dose.

- Vaccine dosages
  The recommended dosage will lead to the desired protection. Vaccine dosage amounts must not be altered.

4.2 Intervals between Vaccine Doses
- Intervals between vaccine doses:
  Timing between vaccine doses that will lead to desired protection
• Minimum intervals between vaccine doses:
  – A minimum interval is the shortest time between two doses of a vaccine in a multi-dose series in which a protective response to the subsequent dose can be expected.
  – Doses given at less than the minimum interval may result in less than optimal antibody response and should not be counted as part of an initial series.
  – Use "minimum intervals" when a child or adolescent starts an immunization series at a later date, or falls behind the routine immunization schedule by one month or more.
  – When the client is up-to-date for their age, return to the routine age-appropriate schedule.

5. Key Definitions

5.1 Definitions

• Initial Series
  The number of vaccine doses given to prime and build immunity to the disease. The number of vaccine doses is dependent upon the kind of vaccine. The following are examples of a initial series:
  – The initial series for DaPTP-Hib vaccine is three doses at 2, 4, and 6 months of age
  – The initial series for Varicella is one dose at 12 months of age

• Reinforcement/Booster Dose
  A dose given following an initial series boosts the initial response and provides long term protection. An 18 month dose of DaPTP-Hib vaccine is an example of a reinforcement/booster dose.

6. Schedules

There are different types of schedules which need to be followed depending on circumstances.

6.1 Routine Schedules
  Publicly funded immunizations are offered to infants and adults based upon routine age-related immunization schedules.

• Infants
  – Initial immunization starts at 2 months.
  – Age relates to actual birth date, not corrected gestational age.
  – No minimum weight for starting immunizations.

• Adults
  Immunization is provided to previously un-immunized or partly immunized adults. Immunization is encouraged for adults at risk for reasons of occupation, lifestyle, health status, or age. The following are examples of reinforcing immunization of previously immunized adults:
- Tetanus/Diphtheria (Td): Booster dose should be offered every ten years.
- Measles/Mumps/Rubella (MMR): Women of childbearing age who are susceptible to rubella.

- Updated immunization schedules are found on the NSDHW website: http://www.gov.ns.ca/hpp/cdpc/info-for-professionals.asp


- NS School Age Immunization Schedule http://www.gov.ns.ca/hpp/publications/13153_SchoolImmunizationSchedule_En.pdf

- Immunization for Adults who have completed a Primary series of Childhood vaccines http://www.gov.ns.ca/hpp/publications/13155_AdultImmunizationSchedule_En.pdf

6.2 Special Situations

Follow-up for individuals who may have been exposed to Hepatitis B or Tetanus will be based upon immunization history.

- Hepatitis B
  - Infants at risk for Hepatitis B
    Babies born to Hepatitis B chronic carrier mothers (HBsAg positive), are at risk of infection with hepatitis B virus. If a mother is HBsAg positive, her baby will require a dose of Hepatitis B Immune Globulin (HBIG), and first dose of hepatitis B vaccine at birth. This will decrease the risk the baby will develop Hepatitis B infection. Premature infants weighing less than 2000 grams who receive at birth a dose of Hepatitis B vaccine will require 4 vaccine doses.

- Tetanus
  - Tetanus Prophylaxis in Wound Management. See the following: http://www.gov.ns.ca/hpp/publications/13101_TetanusPoster_En.pdf

7. Timing of Vaccines

Routine and modified schedules take into consideration the possible interactions between vaccine products which may lead to a less than effective immune response.

7.1 Timing of two or more vaccines

<table>
<thead>
<tr>
<th>Table 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timing of Two or more vaccines</td>
</tr>
</tbody>
</table>
### 7.2 Timing of conjugate and polysaccharide vaccines

Although there are specific timing considerations for giving conjugate and polysaccharide vaccines presentations of the same antigen.

<table>
<thead>
<tr>
<th>Vaccines</th>
<th>Timing</th>
<th>Figure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inactivated</td>
<td>No time consideration</td>
<td>2</td>
</tr>
<tr>
<td>Inactivated &amp; Live injectable/oral</td>
<td>No time consideration</td>
<td>2</td>
</tr>
<tr>
<td>Live oral &amp; Live injectable</td>
<td>No time consideration</td>
<td>3</td>
</tr>
<tr>
<td>Live injectable</td>
<td>Same day or 4 weeks apart</td>
<td>3</td>
</tr>
</tbody>
</table>

![Figure 2: Timing of Vaccines](image)

![Figure 3: Timing of two live vaccines](image)
• Timing of Pneumococcal Conjugate and Polysaccharide Vaccines
(See Figure 4)

A pneumococcal conjugate vaccine and a pneumococcal polysaccharide vaccine are given a minimum of 8 weeks apart. Give the conjugate first.

![Figure 4](image1)

• Timing of Meningococcal Conjugate and Polysaccharide Vaccines
(See Figure 5)

Give meningococcal conjugate vaccine first followed by meningococcal polysaccharide minimum of 2 weeks later. If meningococcal polysaccharide is given first, the meningococcal conjugate is given 6 months later.

![Figure 5](image2)

• Timing of Meningococcal Monovalent and Quadrivalent Vaccines
(See Figure 6)

A monovalent meningococcal conjugate and a quadrivalent meningococcal conjugate vaccine should be separated by 4 weeks.

![Figure 6](image3)
7.3 Timing of live injectable vaccines and immune globulin (Ig) preparations

Ig preparations and/or blood products can interfere with the immune response to live vaccines. If the interval between administration of MMR or varicella vaccine and subsequent administration of an Ig preparation or blood product is:
- <14 days, immunization should be repeated;
- >14 days, immunization does not need to be repeated.

8. Summary
Immunization carried out as recommended will provide good protection for children and adults against vaccine preventable diseases.

9. Required Reading

10. References

11. Quiz

Question #1
When a vaccine series is interrupted by more than one year, the series should be started over to ensure an adequate response to the vaccine?

A. True
B. False

Question #2
An 11 month old child received DaPTP-Hib and Pneumococcal conjugate vaccines at 2 months of age and is in your office to receive their second vaccinations. Which one of the following schedules should be used?

A. Minimum Intervals between Vaccine Doses
B. Vaccines Recommended for High Risk Clients
C. Schedule G: Children > 6 months but < 5 years when starting immunization
D. Schedule A: Basic Immunization

Question #3
Which one of the following would be offered to an individual with a dirty, major wound and who has a documented tetanus immunization 6 years ago?

A. Tetanus immune globulin  
B. Tetanus immune globulin and tetanus/diphtheria (Td) vaccine  
C. Tetanus/diphtheria (Td) vaccine  
D. No immunization or immune globulin necessary

**Question #4**  
Premature infants should be vaccinated according to their corrected age, not their chronological age?  

A. True  
B. False

**Question #5**  
When does an infant start routine immunizations?  

A. After birth at the hospital  
B. 6 weeks of age  
C. 2 months of age  
D. 4 months of age

**Question #6**  
A Meningococcal conjugate and a Meningococcal polysaccharide vaccine can be given on the same day?  

A. True  
B. False

**Question #7**  
Varicella vaccine and MMR cannot be given simultaneously?  

A. True  
B. False
Question #8

If a Meningococcal conjugate vaccine and a Hepatitis B vaccine are not administered on the same day then they must be administered 4 weeks apart.

A. True

B. False
12. Quiz Answers

**Question #1**
Answer: False
The numbers of doses in a series are not repeated or the schedule restarted regardless of the prolonged time since a previous dose.

**Question #2**
Answer: A
Use “Minimum Intervals between Vaccine Doses” when a child falls behind the routine immunization schedule by one month or more.

**Question #3**
Answer: C
A dirty wound may be highly contaminated with Tetanus spores and therefore a Td immunization is required if there is no documentation of a booster within the last 5 years.

For further information:

**Question #4**
Answer: False
Age relates to actual birth date, not corrected gestational age

**Question #5**
Answer: C
Routine immunizations start at 2 months of age.

**Question #6**
Answer: False
Give meningococcal conjugate first followed by meningococcal polysaccharide minimum of 2 weeks later. If meningococcal polysaccharide given first, give meningococcal conjugate 6 months later

**Question #7**
Answer: False
Two live attenuated vaccines can be given on the same day or 4 weeks apart

**Question #8**
Answer: False
There are no timing considerations between two inactivated vaccines