

TABLE OF CONTENTS

| | |
|--|-----------|
| 1.0 ROUTINE SCHEDULES | 1 |
| 1.1 SCHEDULE A: BASIC IMMUNIZATION WHEN STARTING WITH INFANRIX HEXA™ VACCINE..... | 1 |
| 1.1.1 SCHEDULE A: BASIC IMMUNIZATION WHEN STARTING WITH PEDIACEL® VACCINE..... | 2 |
| 1.1.2 SCHEDULE B: CHILDREN ≥ 1 YEAR BUT LESS THAN 7 YEARS WHEN STARTING IMMUNIZATION | 3 |
| 1.2.1 ALTERNATE SCHEDULE B: CHILDREN ≥ 1 YEAR BUT LESS THAN 7 YEARS WHEN STARTING IMMUNIZATION | 4 |
| 1.3 HIB SCHEDULE WHEN THE BASIC SCHEDULE HAS BEEN DELAYED | 5 |
| 1.4 SCHEDULE C: CHILDREN 7 YEARS TO 17 YEARS (INCLUSIVE) WHEN STARTING IMMUNIZATION | 6 |
| 1.5 SCHEDULE D: UNIMMUNIZED ADULTS AGE 18 AND OLDER WHEN BEGINNING IMMUNIZATION | 7 |
| 1.6 SCHEDULE E: IMMUNIZATION FOR ADULTS WHO HAVE COMPLETED A PRIMARY SERIES OF CHILDHOOD VACCINES | 8 |
| 2.0 GUIDELINES FOR IMMUNIZATION SCHEDULES..... | 9 |
| 3.0 MINIMUM INTERVALS BETWEEN VACCINE DOSES | 11 |
| 3.1 MINIMUM INTERVALS BETWEEN VACCINE DOSES TABLE | 12 |
| 4.0 TIMING AND SPACING OF BIOLOGICAL PRODUCTS..... | 13 |
| 4.1 TIMING AND SPACING OF INACTIVATED VACCINES | 13 |
| 4.2 TIMING AND SPACING OF LIVE ATTENUATED VACCINES..... | 14 |
| 4.3 SPACING OF VACCINES AND ANTIBODY-CONTAINING PRODUCTS..... | 15 |
| 4.4 SPACING OF VACCINES AND BLOOD DONATION | 17 |
| 4.5 TUBERCULIN TESTING | 17 |
| 5.0 REFERENCES | 18 |



1.0 ROUTINE SCHEDULES

1.1 Schedule A: Basic Immunization When Starting With INFANRIX hexa™ Vaccine

| AGE | VACCINE |
|--|--|
| 2 months | Diphtheria/Tetanus/acellular Pertussis/HB/IPV/Hib(INFANRIX hexa™) ❶ Pneumococcal conjugate Meningococcal C conjugate Rotavirus ❷ |
| 4 months | Diphtheria/Tetanus/acellular Pertussis/HB/IPV/Hib (INFANRIX hexa™) Pneumococcal conjugate Meningococcal C conjugate (at-risk infants only) Rotavirus ❷ |
| 6 months | Diphtheria/Tetanus/acellular Pertussis/HB/IPV/Hib (INFANRIX hexa™) Pneumococcal conjugate (at-risk infants only) Influenza ❸ Hepatitis A (Aboriginal infants only) |
| On or after the 1 st birthday | MMR Meningococcal C conjugate Varicella Pneumococcal conjugate Influenza ❸ |
| 18 months | Diphtheria/Tetanus/acellular Pertussis/IPV/Hib (PEDIACEL®) Hepatitis A (Aboriginal Infants only) Influenza ❸ |
| School Entry (4-6 years of age) | Diphtheria/Tetanus/acellular Pertussis/IPV (QUADRACEL®) Varicella MMR (if 2 nd dose not received previously) Hepatitis A (Aboriginal children only) ❹ |
| Grade 6 | Hepatitis B (2 doses; if not previously immunized) Meningococcal C conjugate ❺ HPV (girls only) starting September 2008 Varicella (if susceptible) |
| Grade 9 | Tetanus/Diphtheria/acellular pertussis (Adacel®) ❻ |
| <p>❶ INFANRIX hexa™ for infants starting their primary series on or after February 1, 2009 ❷ First dose of ROTARIX™ vaccine to be given no later than 20 weeks less 1 day of age. Second dose to be administered by 8 months less 1 day of age. ❸ Yearly influenza immunization is recommended for infants 6 – 23 months of age during the influenza season (i.e., two doses in the first year of vaccine receipt and one dose in subsequent years). ❹ Unimmunized Aboriginal children: Two doses of Hepatitis A, given at least 6 months apart. Children previously immunized with 1 dose, provide dose 2 no sooner than 6 months after first dose. ❺ A grade 6 student is considered up-to-date for MCC vaccine if they have a dose of a MCC-containing vaccine on or after their 10th birthday. The interval between MCC doses is a minimum of 8 weeks. ❻ There should be a minimum of 6 months since receipt of a previous booster dose of a tetanus/diphtheria – containing vaccine (applies to the Grade 9 Tdap booster only).</p> | |

1.1.1 Schedule A: Basic Immunization When Starting With PEDIACEL® Vaccine

| AGE | VACCINE |
|--|---|
| 2 months | Diphtheria/Tetanus/acellular Pertussis/IPV/Hib (PEDIACEL®) ❶ Hepatitis B Pneumococcal conjugate Meningococcal C conjugate Rotavirus ❷ |
| 4 months | Diphtheria/Tetanus/acellular Pertussis/IPV/Hib (PEDIACEL®) Hepatitis B Pneumococcal conjugate Meningococcal C conjugate (at-risk infants only) Rotavirus❷ |
| 6 months | Diphtheria/Tetanus/acellular Pertussis/IPV/Hib (PEDIACEL®) Hepatitis B Pneumococcal conjugate (at-risk infants only) Hepatitis A (Aboriginal infants only) Influenza ❸ |
| On or after the 1 st birthday | MMR Meningococcal C conjugate Varicella Pneumococcal conjugate Influenza❸ |
| 18 months | Diphtheria/Tetanus/acellular Pertussis/IPV/Hib (PEDIACEL®) Hepatitis A (Aboriginal children only) Influenza ❸ |
| School Entry (4-6 years of age) | Diphtheria/Tetanus/acellular Pertussis/IPV (QUADRACEL®) MMR (if 2nd dose not received previously) Varicella Hepatitis A (Aboriginal children only) ❹ |
| Grade 6 | Hepatitis B (2 doses; if not previously immunized) Meningococcal C conjugate❸ HPV (girls only) Varicella (if susceptible) |
| Grade 9 | Tetanus/Diphtheria/acellular pertussis (Adacel®)❻ |

- ❶ Use this schedule for infants who have started a series with PEDIACEL® in BC or outside BC.
- ❷ First dose of ROTARIX™ vaccine to be given no later than 20 weeks less 1 day of age. Second dose to be administered by 8 months less 1 day of age.
- ❸ Yearly influenza immunization is recommended for infants 6 – 23 months of age during the influenza season (i.e., two doses in the first year of vaccine receipt and one dose in subsequent years.)
- ❹ Unimmunized Aboriginal children: Two doses of Hepatitis A, given at least 6 months apart. Children previously immunized with 1 dose, provide dose 2 at least 6 months after first dose.
- ❺ A grade 6 student is considered up-to-date for MCC vaccine if they have a dose of a MCC-containing vaccine on or after their 10th birthday. The interval between MCC doses is a minimum of 8 weeks.
- ❻ There should be a minimum of 6 months since receipt of a previous **booster** dose of a tetanus/diphtheria – containing vaccine (applies to the Grade 9 Tdap booster only).



**1.1.2 Schedule B: Children \geq 1 Year But Less Than 7 Years When Starting Immunization
 (Children who will be able to complete a series of INFANRIX hexa™ before 7 years of age)**

| VISIT | VACCINE |
|---|--|
| Initial visit | Diphtheria/ Tetanus/acellular Pertussis/HB/IPV/Hib (INFANRIX hexa™) ❶ MMR Pneumococcal conjugate ❷ Varicella (if susceptible) Meningococcal C conjugate Hepatitis A (Aboriginal children only) Influenza ❸ |
| 4 weeks after 1 st INFANRIX hexa™ | Diphtheria/ Tetanus/acellular Pertussis/HB/IPV/Hib (INFANRIX hexa™) Influenza ❸ |
| 16 weeks after 1 st INFANRIX hexa™ and 8 weeks after 2 nd INFANRIX hexa™ | Diphtheria/ Tetanus/acellular Pertussis/HB/IPV/Hib (INFANRIX hexa™) |
| Six months after 1 st Hepatitis A | Hepatitis A (Aboriginal children only) ❹ |
| Six months after 3 rd INFANRIX hexa™ | Diphtheria/Tetanus/acellular Pertussis/ IPV (QUADRACEL®) OR ❺ Diphtheria/Tetanus/acellular Pertussis (ADACEL®) ❻ and IPV |
| School entry (4-6 years of age) | Diphtheria/Tetanus/acellular Pertussis/ IPV (QUADRACEL®) ❻ MMR (if 2 nd dose not received previously) Varicella Hepatitis A (Aboriginal children only) if not immunized previously |
| Grade 6 | HPV (girls only) Meningococcal C conjugate ❼ |
| Grade 9 | Tetanus/Diphtheria/acellular pertussis (ADACEL®) ❸ |
| <p>❶ INFANRIX hexa™ series must be completed before child is 7 years of age. Use Alternate Schedule B for individuals who are unable to complete a series of INFANRIX hexa™ before 7 years of age.</p> <p>❷ Refer to BC Communicable Disease Manual, Chapter 2, Section VII - Biological Products, Pneumococcal Conjugate Vaccine (Prevnar™) Completing a Pneumococcal Conjugate Vaccine Series.</p> <p>❸ Children 12 – 23 months of age during influenza season (two doses in first year of vaccine receipt and one dose in subsequent years).</p> <p>❹ Unimmunized Aboriginal children: Two doses of Hepatitis A, given at least 6 months apart. Children previously immunized with 1 dose, provide dose 2 at least 6 months after first dose.</p> <p>❺ Administer QUADRACEL® to children presenting for this dose before 7 years of age. If child is \geq 7 years of age, administer ADACEL® for this dose.</p> <p>❻ This dose is not necessary when the fourth dose of a diphtheria/tetanus/pertussis-containing vaccine has been given after the 4th birthday.</p> <p>❼ A grade 6 student is considered up-to-date for MCC vaccine if they have a dose of a MCC – containing vaccine on or after their 10th birthday. The interval between MCC doses is a minimum of 8 weeks.</p> <p>❸ There should be a minimum of 6 months since receipt of a previous booster dose of a tetanus/diphtheria –containing vaccine (applies to the Grade 9 Tdap booster only.)</p> | |



1.2.1 Alternate Schedule B: Children ≥ 1 Year but Less Than 7 Years When Starting Immunization

| VISIT ❶ | VACCINE |
|--|---|
| Initial visit | Diphtheria/ Tetanus/acellular Pertussis/IPV/Hib (PEDIACEL®) ❷ or Diphtheria/ Tetanus/acellular Pertussis/IPV (QUADRACEL®) ❷ MMR Hepatitis B (HB) Pneumococcal conjugate ❸ Varicella (if susceptible) Meningococcal C conjugate Hepatitis A (Aboriginal children only) Influenza ❹ |
| 4 weeks after 1 st DTaP-IPV-Hib | Diphtheria/Tetanus/acellular Pertussis/IPV/Hib (PEDIACEL®) or Diphtheria/ Tetanus/acellular Pertussis/IPV (QUADRACEL®) ❷ Hepatitis B (HB) Influenza ❹ |
| 8 weeks after 1 st DTaP-IPV-Hib | Diphtheria/Tetanus/acellular Pertussis/IPV/Hib ❷ (PEDIACEL®) or Diphtheria/ Tetanus/acellular Pertussis/IPV (QUADRACEL®) |
| 16 weeks after 1 st HB AND 8 weeks after 2 nd HB | Hepatitis B (HB) |
| Six months after 1 st Hepatitis A | Hepatitis A (Aboriginal children only) |
| Six months after 3 rd DTaP-IPV | Diphtheria/Tetanus/acellular Pertussis/ IPV (QUADRACEL®) ❸ or Diphtheria/Tetanus/acellular Pertussis (ADACEL®) ❸ and IPV |
| School entry (4-6 years of age) | Diphtheria/Tetanus/acellular Pertussis/ IPV (QUADRACEL®) ❸ MMR (if 2 nd dose not received previously) Varicella Hepatitis A (Aboriginal children only) if not immunized previously ❷ |
| Grade 6 | HPV (girls only) Meningococcal C conjugate ❸ |
| Grade 9 | Tetanus/Diphtheria/acellular pertussis (ADACEL®) ❹ |
| <p>❶ Use this schedule for children who:</p> <ul style="list-style-type: none"> • Are unable to complete a series of INFANRIX hexa™ before 7 years of age • Were delayed starting immunization and were started on a primary series using PEDIACEL® vaccine • Are starting immunization after 1 year of age but whose parents refuse INFANRIX hexa™ vaccine. <p>❷ See Hib Schedule When Basic Series Has Been Delayed to determine the number of required Hib doses.</p> <p>❸ Refer to BC Communicable Disease Manual, Chapter 2, Section VII - Biological Products, Pneumococcal Conjugate Vaccine (Prevnar™) Completing a Pneumococcal Conjugate Vaccine Series</p> <p>❹ Children 12-23 months of age during influenza season (two doses in first year of vaccine receipt and one dose in subsequent years).</p> <p>❺ Administer QUADRACEL® to children presenting for this dose before 7 years of age. If child is ≥ 7 years of age, administer ADACEL® for this dose.</p> <p>❻ Fifth dose is not necessary if the 4th dose was given after the fourth birthday.</p> <p>❼ Unimmunized Aboriginal children: 2 doses of Hepatitis A, given at least 6 months apart. Children previously immunized with 1 dose, provide dose 2 at least 6 months after first dose.</p> <p>❽ A grade 6 student is considered up-to-date for MCC vaccine if they have a dose of a MCC-containing vaccine on or after their 10th birthday. The interval between MCC doses is a minimum of 8 weeks.</p> <p>❾ There should be a minimum of 6 months since receipt of a previous booster dose of a tetanus/diphtheria-containing vaccine (applies to the Grade 9 Tdap booster only)</p> | |



1.3 HIB Schedule When the Basic Schedule Has Been Delayed

| Age at Presentation ❶ | Primary Series ❷ | Booster |
|-----------------------|---------------------------|-------------|
| 2-6 months ❸ | 3 doses, 2 months apart ❹ | 18 months |
| 7-11 months | 2 doses, 2 months apart | 18 months ❺ |
| 12-14 months | 1 dose | 18 months ❻ |
| 15-59 months | 1 dose | None |

- ❶ If series is interrupted, complete series according to age at which child re-presents.
- ❷ It is preferable to use the same Hib product for all doses of the primary series. Using different Hib products during the primary series is acceptable only when is not possible to continue with the initial product.
- ❸ Initial dose can be given as early as 6 weeks of age.
- ❹ Dose 1 to dose 2 minimum interval is 4 weeks. Dose 2 to dose 3 minimum interval is 4 weeks.
- ❺ The booster recommended at 18 months may be given as early as 15 months provided there is an 8 week interval following the previous dose.
- ❻ At 15 months of age and older, a single dose of any Hib product is all that is required to complete the schedule, even for a previously unimmunized child.



1.4 Schedule C: Children 7 Years To 17 Years (Inclusive) When Starting Immunization

| VISIT | VACCINE |
|---|--|
| Initial visit | Tetanus/Diphtheria/acellular Pertussis (ADACEL®) IPV MMR Varicella (if susceptible) ❶ Hepatitis B ❷ Meningococcal C Conjugate ❸ Hepatitis A (aboriginal children only) |
| One month after initial visit | Tetanus/Diphtheria/acellular Pertussis (ADACEL®) IPV MMR Hepatitis B ❷ |
| 16 weeks after first HB AND 8 weeks after second HB | Hepatitis B ❷ |
| 6 months after 1 st visit | Hepatitis A (aboriginal children only) |
| 6 – 12 months after 2nd visit | Tetanus/Diphtheria/acellular Pertussis (ADACEL®) IPV |
| Grade 6 | Hepatitis B (2 doses; if not previously immunized) ❹ Meningococcal C conjugate ❸ HPV (girls only) Varicella (if susceptible) ❶ |
| Grade 9 | Tetanus/Diphtheria/acellular pertussis(ADACEL®) ❻ |

❶ A susceptible child has a history of chickenpox < 12 months of age, no history of chickenpox disease at >1 year of age, and no previous receipt of varicella vaccine. For susceptible adolescents ≥13 years of age, testing is required to determine varicella status prior to immunizing. An individual ≥13 years of age who is Varicella IgG negative requires two doses of vaccine, given one month apart.

❷ The following children are eligible for a hepatitis B vaccine series when presenting prior to Grade 6: those born on or after January 1, 2001 and those under 12 years of age who are new immigrants (within the past year) to Canada from regions of high hepatitis B prevalence (e.g., Asia and Africa).

❸ Provided to children born on or after July 1, 2002 when presenting prior to grade 6. Provided to adolescents who present after grade 6.

❹ The hepatitis B vaccine two dose schedule (0 and 6 months) is used for students in grade 6, and for individuals from ≥11 to ≤15 years of age.

❺ A grade 6 student is considered up-to-date for MCC vaccine if they have a dose of a MCC-containing vaccine on or after their 10th birthday. The interval between MCC doses is a minimum of 8 weeks.

❻ There should be a minimum of 6 months since receipt of a previous booster dose of a tetanus/diphtheria –containing vaccine (applies to the Grade 9 Tdap booster only.)



1. 5 Schedule D: Unimmunized Adults Age 18 and Older When Beginning Immunization

| VISIT | VACCINE |
|---|--|
| Initial visit | Tetanus/Diphtheria/acellular Pertussis (ADACEL®) IPV (if indicated) ❶ MMR ❷ Assess varicella status ❸ Hepatitis B ❹ Meningococcal C conjugate ❺ Hepatitis A (Aboriginal adults 18 years of age only) |
| 4 weeks after initial visit | MMR ❷ Td or Td/IPV ❶ Varicella ❸ Hepatitis B ❹ |
| 6 weeks after second visit | Varicella ❸ |
| 6 months after initial visit | Hepatitis A (Aboriginal adults 18 years of age only) |
| Six months after 2 nd visit | Td or Td/IPV ❶ Hepatitis B ❹ |
| <p>❶ Routine primary immunization against poliomyelitis of adults living in Canada is not considered necessary. Primary immunization with polio vaccine is recommended only for unimmunized adults who are at higher risk of exposure to wild polioviruses: Refer to BC Communicable Disease Control Manual, Chapter 2, Immunization Program, Section VII, Polio Vaccine</p> <p>❷ Measles protection: two doses of MMR are recommended for all individuals born on or after January 1, 1957 who do not have a history of lab confirmed measles infection, lab evidence of immunity, or documentation of 2 doses of a live measles-containing vaccine at ≥12 months of age and given at least 4 weeks apart. Mumps protection: two doses of MMR are recommended for all individuals born on or after January 1, 1970; one dose is recommended for all individuals born January 1, 1957 to December 31, 1969 who do not have evidence of mumps immunity. Rubella protection: one dose of MMR is recommended for all individuals born on or after January 1, 1957 who have not received at least 1 dose of a rubella-containing vaccine or who do not have serologic evidence of rubella immunity. One dose of MMR for rubella protection is recommended for health care workers regardless of age. One dose is considered evidence of immunity to rubella.</p> <p>❸ Assess varicella susceptibility before providing vaccine (i.e., a history of chickenpox disease < 12 months of age, no history of chickenpox disease at >1 year of age, and no previous receipt of varicella vaccine). A susceptible adult requires testing to determine varicella status. Individuals who are Varicella IgG negative require two doses of vaccine, given 6 weeks apart.</p> <p>❹ Individuals born on or after January 1, 1980 are eligible for hepatitis B vaccine series.</p> <p>❺ Individuals born on or after January 1, 1988 are eligible for one dose of Meningococcal C conjugate vaccine.</p> | |



1.6 Schedule E: Immunization For Adults Who Have Completed A Primary Series Of Childhood Vaccines

NOTE: For all unimmunized adults see Schedule D.

Immunization within the parameters of the provincial immunization policy is provided to any adult upon request and encouraged for adults at risk for reasons of occupation, travel, lifestyle, health status, or age.

| Vaccine | Group | Frequency Of Immunization |
|--|--|---|
| Tetanus -Diphtheria (Td) | Any adult upon request. Adults with a tetanus prone wound. | <ul style="list-style-type: none"> • Every 10 years. • Refer to Tetanus Prophylaxis in Wound Management. |
| Poliomyelitis | Persons at higher risk of exposure to wild polioviruses (i.e., health care workers, travelers to areas of countries where wild polio viruses are circulating, workers in refugee camps in polio endemic areas, laboratory workers handling specimens that may contain polio viruses, military personnel). | <ul style="list-style-type: none"> • A single booster dose, 10 years after the primary series, is recommended if individual completed IPV or OPV vaccine series in childhood and is a member of a group identified as being at higher risk of exposure to wild polioviruses. |
| Measles, Mumps, Rubella (MMR) | All individuals who require protection against measles, mumps, or rubella. | A 2 nd dose is provided free. |
| Influenza Vaccine | <ul style="list-style-type: none"> • All individuals ≥ 65 years of age. • Individuals who are at high risk of influenza and its related complications. • Individuals who are capable of transmitting influenza to those at high risk. • Individuals who provide essential community services. Refer to Section VII Biological Products for complete list of indications for influenza vaccine. | Annual vaccination. |
| Pneumococcal Polysaccharide Vaccine | All individuals ≥ 65 years of age. Individuals with specific medical conditions. See Section VII Biological Products Pneumococcal Polysaccharide Vaccine (Pneumo23™) . | Once only revaccination, 5 years after initial dose, as required for specific medical risk conditions. See Section VII Biological Products Pneumococcal Polysaccharide Vaccine (Pneumo23™) . |

2.0 GUIDELINES FOR IMMUNIZATION SCHEDULES

Optimal response to a vaccine depends on many factors, including the nature of the vaccine and the age and immune status of the recipient.

Recommendations for the age at which vaccines are administered are influenced by age-specific risks for disease, age-specific risks for complications, ability of persons of a certain age to respond to the vaccine, and potential interference with the immune response by passively transferred maternal antibody.

Adhere as closely as possible to recommended vaccine schedules. Recommended ages and intervals between doses of multi-dose antigens provide optimal protection or have the best evidence of efficacy.

Vaccines are recommended for members of the youngest age group at risk for experiencing the disease for whom efficacy and safety have been demonstrated.

All “recommended,” “routine” and “minimum interval” schedules are acceptable and result in protective levels of immunity. The timing for each schedule should be adhered to as closely as possible.

Ideally, primary immunization begins at 2 months (i.e., 8 weeks) of age.

Age relates to actual birth date, not corrected gestational age.

There is no minimum weight for commencing immunization.

Use each client contact as an opportunity to review immunization status and administer all vaccines for which the client is eligible.

Assess for vaccine eligibility by assessing the client's:

- Age
- Health status
- Lifestyle risk factors
- Contact with individuals at risk of vaccine preventable disease.

Client is eligible for all vaccines indicated for his / her birth cohort. If a client was eligible for a vaccine when a program was introduced but did not receive the vaccine, he / she remain eligible for the vaccine. This is often referred to as the “once eligible, always eligible” principle.



The exception to this would be a client who was eligible by birth cohort for a vaccine such as the pneumococcal conjugate vaccine (born on or after July 1, 2003) but presents at an age that is outside the 2-59 months indication for this vaccine.

When an individual starts a vaccine series at one age, and then presents at a later age, complete the series following the schedule for the new age category. There are different vaccines and different dosings for different ages, usually due to licensing restrictions.

For example:

- an infant received all routine vaccines up to 18 months of age, but missed the school entry booster, and presents at age 7: complete the series with one dose of Adacel® and one dose of IPV.
- an individual received one dose only of the two dose hepatitis B vaccine series in grade 6, and presents at age 20: complete the series with two 1.0 ml doses of Recombivax HB® or Engerix® -B.

Immunization status is determined by documentation of immunization or proof of having had the disease (e.g., immunization record or laboratory documentation of immune status). A verbal history of immunization or disease alone may not be reliable. Children lacking written documentation of immunization or proof of having had the disease should be offered immunization according to the basic immunization schedule for children. The exception is varicella. Verbal report of varicella disease history is a highly reliable indicator of immunity.

Dosages of vaccine must not be altered. The recommended dosages of biological products are derived from theoretical considerations, experimental trials, and clinical experience. Administration of amounts smaller than those recommended, such as split doses or intradermal administration (unless specifically recommended), may result in inadequate protection. If a fractional dose has been given it should be considered invalid and a full dose given.

Exceeding the recommended dosage volumes may be hazardous because of excessive local or systemic concentrations of antigens that may result in an increase in adverse events.

Interruption of a recommended series does not require starting the series over again, regardless of the interval elapsed (with the exception of oral typhoid vaccine). Longer than recommended intervals between vaccine doses does not reduce final antibody concentrations, although protection might not be attained until the recommended number of doses has been administered.

By contrast, doses given at less than the **minimum** interval may result in less than optimal antibody response and should not be counted as part of a primary series.

Vaccines should not be administered at less than the minimum intervals or earlier than the minimum age.

Certain vaccines (e.g., Td) produce increased rates of local or systemic reactions in some recipients when administered too frequently. Such reactions may be the result of the formation of antigen-antibody complexes and are not allergic reactions.



3.0 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.

In certain circumstances, it may be necessary to administer doses of a multi-dose vaccine at shorter than the routinely recommended intervals (e.g., person who is behind schedule and needs to be brought up to date as quickly as possible or when international travel is pending). The Minimum Intervals Between Vaccine Doses table reflects both the youngest age at which a vaccine can be given and the minimum time interval between doses.

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 age, return to the routine age-appropriate schedule.**

Refer to [Minimum Intervals between Vaccine Doses Table](#) for information specific to each vaccine.



3.1 Minimum Intervals between Vaccine Doses Table

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 age, return to the routine age-appropriate schedule.**

| Dose 1 (minimum age) | Minimum Spacing Between Doses ^① | | | |
|--|--|---|-----------------------|-----------------------|
| | Dose 1 to Dose 2 | Dose 2 to Dose 3 | Dose 3 to Dose 4 | Dose 4 to Dose 5 |
| DaPT/IPV/Hib (PEDIACEL®) (6 weeks) | 4 weeks | 4 weeks | 6 months ^② | 6 months ^③ |
| DTaP-HB-IPV-Hib (6 weeks) (INFANRIX hexa™) | 4 weeks | 16 weeks after dose 1 AND 8 weeks after dose 2 | | |
| 4 dose Pneumococcal conjugate (6 weeks) ^④ | 4 weeks | 4 weeks | 8 weeks ^⑤ | |
| 3 dose Pneumococcal conjugate (8 weeks) ^④ | 4 weeks | 8 weeks ^⑤ | | |
| Meningococcal C conjugate Neis Vac-C (8 weeks) | 8 weeks ^⑥ | | | |
| MMR (6 months) ^⑦ | 4 weeks | | | |
| Rotavirus (6 weeks) ^⑧ | 4 weeks ^⑧ | | | |
| Varicella (12 months) | 6 weeks ^⑨ | | | |
| Td (7 years) | 4 weeks | 6 months | 10 years | |
| Gardasil™ (9 years) | 4 weeks | 12 weeks | | |
| Hepatitis A (6 months) | 6 months | | | |

^① All intervals ≤ 4 months are calculated in weeks in this table, i.e., 16 weeks is considered equivalent to 4 months.

^② When DaPT/IPV/Hib 4th dose is given before 15 months of age, another dose of Hib is required, at ≥15 months of age.

^③ Minimum age for dose 5 is 4 years.

^④ When a series of pneumococcal conjugate vaccine is delayed or interrupted, refer to [BC Communicable Disease Manual, Chapter 2, Biological Products, Completing a Pneumococcal Conjugate Vaccine Series.](#)

^⑤ The final dose of Pneumococcal conjugate vaccine in a three or four dose series should be given no sooner than 12 months of age, and at least 8 weeks after the previous dose.

^⑥ For healthy infants, administer second dose of Neis Vac-C vaccine on or after 12 months of age and at least eight weeks after the previous dose. High risk infants receive a second dose 8 weeks after dose 1, followed by a dose on or after 12 months of age and at least 8 weeks after the previous dose.

^⑦ If MMR is given before 12 months of age, the child will require two doses of MMR after 12 months of age.

^⑧ The **maximum** age for dose 1 is 20 weeks less 1 day.

The maximum age for the second dose is 8 months less 1 day of age.

^⑨ A second dose of varicella vaccine is provided to children 4 – 6 years of age (school entry.)

A second dose is required for individuals ≥13 years of age.

Note: REFER TO [1.3 HIB Schedule When The Basic Schedule Has Been Delayed](#) for minimum intervals for a three dose primary Hib series.

4.0 TIMING AND SPACING OF BIOLOGICAL PRODUCTS

Administer all vaccine doses for which a client is eligible at the time of each visit.

There are no contraindications to giving multiple vaccines at the same clinic visit, and all opportunities to immunize should be utilized. There is no increase in side effects, reduced vaccine effectiveness, or reduced parental compliance.

Simultaneous (at the same clinic visit) administration of all vaccines for which a person is eligible is critical in increasing the probability that a child will be fully vaccinated, and, therefore, fully protected at the earliest opportunity.

For more information regarding administration of biological products, refer to [BC Communicable Disease Manual, Chapter 2, Administration of Biological Products](#).

4.1 Timing And Spacing Of Inactivated Vaccines

No evidence exists that inactivated vaccines interfere with the immune response to other inactivated vaccines or to live attenuated vaccines.

Inactivated vaccines are **not** affected by the presence of circulating antibody and can, therefore, be administered before, after, or at the same time as a passive immunizing agent.

An inactivated vaccine can be administered concurrently or at any time before or after the administration of another inactivated vaccine or a live vaccine. The exceptions to this are the specific timing considerations between conjugate and polysaccharide presentations of the same antigen (e.g., PCV7 and PPV23 vaccines) and conjugate presentations with the same antigen (e.g., MCC and Meningococcal Quadrivalent Conjugate vaccine).

Inactivated vaccines are not alive and cannot replicate. These vaccines cannot cause disease from infection, even in a person with immunodeficiency.

Inactivated vaccines almost always require multiple doses. The first dose primes the immune system but does not produce protective immunity. A protective immune response develops after the second or third dose (e.g., DTaP containing vaccines).

Immunity from some inactivated vaccines tends to wane over time to below protective immunity levels, necessitating the need for periodic booster doses of the vaccine (e.g., Tetanus / diphtheria vaccine). Pure polysaccharide vaccines such as pneumococcal polysaccharide vaccine elicit a T-cell-independent response. As such, these vaccines are not usually effective in children < 2 years of age and repeat doses do not produce a sustained boost in antibody titers.

4.2 Timing And Spacing Of Live Attenuated Vaccines

Live attenuated vaccine antigen must replicate in order to elicit an immune response. Circulating antibody against injected live vaccine antigen can inhibit its ability to replicate, thereby inhibiting the immune response.

One live parenteral vaccine may interfere with the effectiveness of another if they are not given concurrently.

To minimize this possibility, two or more live injectable vaccines should be administered either on the same day or be separated by an interval of at least four weeks. The exception to this guideline is the administration of varicella vaccine and another live vaccine to high risk/immunocompromised clients. For these clients, varicella vaccine should be administered 4 weeks apart from the administration of another live vaccine. [Refer to BC Communicable Disease Manual, Chapter 2, Section VII Biological Products.](#)

If two live parenteral vaccines are not given on the same day and are given less than four weeks apart, the vaccine that was given second should be repeated 28 days after it was given.

In the first 14 days after the administration of a live attenuated vaccine, interferon (a cytokine) is produced which would interfere with the immune response to another live vaccine when not administered concurrently. The interferon can prevent cells from becoming infected with the vaccine virus by killing the vaccine virus.

Parenteral live vaccines are not believed to have an effect on live vaccines given by the oral route. Live oral vaccines can be given at any time before or after live vaccines administered parenterally.

The live attenuated influenza vaccine (LAIV), given by the intranasal route, may be given at the same time as other inactivated or live vaccines. When LAIV is not administered at the same time as another live parenteral vaccine, at least four weeks should pass before another live parenteral vaccine is administered.

Live attenuated virus vaccines (i.e., MMR and varicella) can usually produce prolonged immunity, even if antibody titers decline over time. Subsequent exposure to infection usually does not lead to viremia but to a rapid anamnestic response.

For live attenuated injected vaccines, the first dose administered at the recommended age usually provides protection. A second dose is given to ensure seroconversion and the majority of persons who fail to respond to the first dose will respond to a second dose.

Table 1: Types of vaccines

| Types of Vaccines | | |
|---|--|--|
| Type of Vaccine | | Examples |
| Replicating Vaccines Live Attenuated | Virus | MMR, Varicella, Rotavirus |
| | Bacteria | Typhoid (oral) |
| Non-Replicating Vaccines Inactivated | Virus | Polio (inj), Hepatitis A, Rabies |
| | Bacteria | Typhoid (inj) |
| | Proteins (subunit) | Acellular pertussis, Influenza |
| | Protein toxoid | Diphtheria, Tetanus |
| | Recombinant (subunit) | Hepatitis B, Human Papillomavirus |
| | Pure Polysaccharide (subunit) | Pneumococcal Polysaccharide, Meningococcal Polysaccharide, Typhoid (inj) |
| | Conjugate Polysaccharide (subunit) | Act-HIB, Meningococcal C Conjugate, Meningococcal Quadrivalent Conjugate, Pneumococcal Conjugate |

4.3 Spacing of Vaccines And Antibody-Containing Products

Antibody containing products include Immune globulin (Ig) and blood products (e.g., whole blood, packed red cells, and plasma).

Ig preparations or blood transfusion will not interfere with the antibody response when given simultaneously with, or at any interval before or after administration of any inactivated vaccine.

Ig preparations and/or blood products can interfere with the immune response to a measles, mumps, rubella or varicella – containing vaccine. For measles (routinely given as MMR) and varicella vaccines, the recommended interval between Ig or blood product administration and subsequent vaccination varies, depending on the specific product and the dose given.



The length of time that interference with live parenteral vaccines occurs after administration of an antibody containing product is directly related to the amount of antigen-specific antibody contained in the product. Live vaccines should be delayed until the antibody containing product has degraded. For recommended intervals between antibody containing products and MMR or Varicella vaccine administration, refer to [BC Communicable Disease Manual, Chapter 2, Section VII Biological Products, Immune Globulin Preparations or Blood: Timing Intervals For Vaccines Containing Live Measles, Mumps, Rubella, or Varicella Virus.](#)

After immunization with live attenuated virus vaccine (i.e., MMR or varicella vaccine), vaccine virus replication and stimulation of immunity occur in about 1 - 2 weeks.

If the Ig preparation of blood product is given >14 days after MMR or varicella vaccine, the immunization does not have to be repeated.

If Ig or a blood product is administered <14 days post immunization with MMR or varicella vaccine, immunization should be repeated at an interval indicated in [BC Communicable Disease Control Manual, Chapter 2, Section VII Biological Products.](#)

There are no data to indicate Ig preparations interfere with the immune response to other live vaccines (e.g., yellow fever and typhoid). This is probably because Ig and blood products available in Canada are unlikely to contain substantial amounts of antibodies to these antigens.

Monoclonal antibody product (e.g., Palivizumab - containing RSV antibody) will not interfere with the immune response to any currently available live or inactivated vaccines.

Rh immune globulin (RhIg) may theoretically interfere with the response to MMR and varicella vaccines. Rubella-susceptible women who receive RhIg postpartum should be vaccinated with rubella-containing vaccine (MMR) at a separate site, tested 2 months later for rubella immunity and revaccinated if the result is negative. Varicella-susceptible women who receive RhIg postpartum should delay immunization with varicella vaccine for 2 months.

4.4 Spacing of Vaccines and Blood Donation

If an individual reports that they are planning to donate blood, inform them of the following intervals between vaccine receipt and blood donation.

| Vaccine | Interval between vaccine receipt and blood donation |
|-----------------------------|---|
| All inactivated vaccines ❶❷ | 2 days |
| Varicella | 3 months |
| Typhoid (oral Vivotif) | 4 weeks |
| Measles | 6 weeks |
| Mumps | 6 weeks |
| Rubella | 12 weeks |
| Yellow fever | 4 weeks |
| Oral polio | 6 weeks |
| Cholera (Mutacol Berna) | 4 weeks |
| BCG | 6 weeks |
| Any immune globulin product | 12 months |

- ❶ Receipt of hepatitis B vaccine (alone or in combination vaccine) requires 4 week deferral of blood donation because of the possibility of a false positive reactivity on the HBsAg donor screening assay.
- ❷ Rabies vaccine received for pre-exposure prophylaxis requires a 2 day deferral. However, if rabies vaccine is received for post-exposure (with or without Rabies Immune Globulin), blood donation must be deferred for 52 weeks.

Information from Canadian Blood Services retrieved November 28, 2011 from <http://www.blood.ca/>

4.5 Tuberculin Testing

Tuberculin skin tests can be given at the same time, or at any time after most vaccines. However, live virus vaccine (e.g., MMR or varicella vaccine) may interfere with the tuberculin test response and produce a false negative response if the vaccine was given in the 4 weeks before the tuberculin skin test.

If possible, delay the tuberculin skin test until at least 4 weeks following date of immunization with a live vaccine. If the test cannot be delayed, it is acceptable to do the test and discuss any negative results with TB Control. The test may have to be repeated or a chest X-Ray completed.

Live virus vaccine will not interfere with the tuberculin test if given on the same day as the test.



No data exist for the potential degree of tuberculin skin test suppression that might be associated with other live vaccines (e.g., yellow fever vaccine) but it would be prudent to follow the guidelines for MMR vaccine.

Past history of a BCG vaccination should not preclude tuberculin skin testing to BCG vaccinees exposed to an individual with active TB. For additional information on tuberculin testing refer to BC Communicable Disease Control Manual, Chapter 4, Tuberculosis Control Manual, available at <http://www.bccdc.ca/dis-cond/comm-manual/default.htm>.

5.0 REFERENCES

Advisory Committee on Immunization Practices. Morbidity and Mortality Weekly Report. Dec 1, 2006/55 (RR15); 1 - 48. Available at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5515a1.htm>

American Academy of Pediatrics. (2006). Red Book: Report of the committee on infectious diseases. (27th ed.). Elk Grove Village, IL: Author.

Centers for Disease Control and Prevention. *Epidemiology and Prevention of Vaccine-Preventable Diseases*. Atkinson W, Hamborsky J, McIntyre L, Wolfe S, eds. 11th ed. Washington DC: Public Health Foundation, May, 2009.

Health and Welfare Canada. (2006). Canadian Immunization Guide (7th ed.). Ottawa, On: Health and Welfare Canada. Available at: <http://www.phac-aspc.gc.ca/naci-ccni/index-eng.php> and <http://www.phac-aspc.gc.ca/naci-ccni/index-eng.php> Guide Errata and Clarifications, March 2008