Standard for Recommended Immunization Schedules

Alberta Health Services
Communicable Disease Control

Section 3	Immunization General Principles	**Standard # 03.110**	
Created and approved by	Provincial Immunization Program		
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Preamble

Primary Care Alberta (PCA) Provincial Immunization Program, Public Health, CDC & Screening provides Public Health and other partners who administer provincially funded vaccines with ongoing and timely information relating to provincial immunization program standards and quality. These standards are based on currently available evidence-based information, Primary and Preventative Health Services (PPHS) policy, and provincial and national guidelines. Immunizers must be knowledgeable about the specific vaccines they administer.

Background

General Scheduling Information:

The routine schedule in Alberta is determined by PPHS and provided to PCA as Alberta Immunization Policy. Routine immunization schedules are designed to achieve optimal levels of immunity to vaccine-preventable diseases and to increase client compliance considering factors such as epidemiology of disease, vaccine effectiveness, and the ability of an individual to respond to the specific vaccine. Routine schedules outlining optimal spacing should be followed as best practice whenever possible. However, in certain circumstances minimum intervals may be considered, for example, client is delayed in routine immunization, rapid protection is needed for travel, outbreak or client is identified as a contact of a vaccine-preventable disease. The risks and benefits of recommended versus minimal spacing and its effect on achieving optimal vaccine immunogenicity should be discussed with the client/parent/guardian. Consult MOH/MOH designate if questions arise. See Section 5: Minimum Intervals Between Vaccine Doses.

If a vaccine schedule becomes interrupted, it should not be restarted, regardless of time lapse since the previous dose. In most circumstances, intervals between doses can be extended without compromising the immune response, remembering that optimal protection may not be achieved until the series is completed. This delay in achieving optimal protection may have significant consequences when administering post exposure prophylaxis vaccines such as rabies vaccine.

The vaccine/biological pages contain information for specific timing or scheduling recommendations. It is the immunizing nurse's professional responsibility to ensure the vaccines/biologicals being provided are indicated and necessary.

Disease does not always confer immunity. Refer to vaccine specific biological pages to determine need to continue with immunization and the minimum interval between disease and vaccine if applicable.

All immunization encounters provide an opportunity to review the child's/client's immunization history and ensure all age-appropriate vaccines have been offered. When assessing historical immunization records, vaccine doses are considered valid provided the minimum intervals for the specific vaccine and the specific doses are respected. Refer to Standard For Immunization Record Assessment.

Premature infants (defined as infants born before 37 weeks of gestational age) in stable clinical condition, regardless of birth weight, should be immunized with age-appropriate doses of vaccine at the same chronological age and according to the same schedule as full-term infants. Healthy premature infants weighing 1,500 grams or more at birth generally tolerate immunizations well, with rates of adverse events similar to the low rates of full-term infants. See Contraindications and Precautions Related to Immunization and Section 5: Minimum Age and Minimum Intervals Between Vaccine Doses for additional assessment guidance.

Purpose

This standard is intended to provide the principles and guidelines for routine recommended schedules and to provide direction when there are deviations from the routine schedule. This standard includes:

Section 1: Routine Childhood Immunization Schedule for Children who are ON SCHEDULE

Section 2: Delayed Immunization Schedule for Children/Adolescents up to and including 17 years of age – BEGINNING Immunization BEFORE their 7th birthday

Section 3: Delayed Immunization Schedule for Children/Adolescents up to and including 17 years of age – BEGINNING Immunization ON/AFTER their 7th birthday

Section 4: Adult Immunization Schedule – For 18 Years of Age and Older Beginning or Completing an Immunization Series

Section 5: Minimum Age and Minimum Intervals Between Vaccine Doses

Section 6: Guidelines for Spacing of Non-live and Live Vaccines

Section 7: Guidelines for Intervals Between Immunoglobulins / Blood Products and Vaccines

7.1 Intervals Between Immunoglobulins/Blood Products and Live Vaccines

7.2 Intervals Between Vaccines and Blood Donation

Section 8: Immunization Following Vaccine Administration Errors

Section 9: Alternate Schedules Used to Assess Completeness of Previous Immunization Received

Section 10: Guideline for Converting a Combined Hepatitis A and B Vaccine Series to a Single Antigen Series

This standard is not intended to stand alone. It should be used in conjunction with:

- Vaccine Biological Pages - for detailed information about each vaccine. The vaccine biological pages should be consulted for all detailed information including, but not limited to, age considerations, scheduling, and reinforcing doses.
- Standard for the Administration of Immunizations
- Standard on the Contraindications and Precautions Related to Immunization
- Standard on the Immunization of Individuals with Chronic Health Conditions and/or Immunosuppression
- Standard for Immunization Record Assessment

Applicability

This standard applies to all immunizers providing provincially funded vaccines.

Competency

The Public Health Agency of Canada published the Immunization Competencies for Health Professionals with the goal of promoting safe and competent practices for immunization providers. The competencies outlined in that document are applicable throughout this standard.

Definitions

Routine schedule
All vaccines that are part of a primary series and reinforcing/booster dose as set out by the Alberta Immunization Policy.

Primary series
An initial series of immunizations designed to give a primary antibody response. The series may be followed by an additional booster dose(s) to give a secondary immune response.

Reinforcing/booster dose
A reinforcing/booster dose is an extra administration of a vaccine after an earlier dose/series resulting in re-exposure to the immunizing antigen. This “boosting” aims to restore immunity back to protective levels after it has waned over a specific period of time.

Null dose
A null dose is a dose of live vaccine given before one year of age that is considered invalid. The antigen(s) do not count in the vaccine series (for example, a dose of measles-containing vaccine given prior to 12 months of age).

Routine childhood immunization
Routine childhood immunization is a schedule based on the child's age in calendar months. For example, when booking a child for their 2-month immunization appointment the child should be 2 calendar months of age.

Delayed childhood immunization
Children are considered delayed for immunization when they fall behind the routine schedule by one calendar month or more. When the child presents to clinic or when reviewing historical immunization records, the following definitions for intervals may be used:

- **1 month:** Equal to 4 weeks or 28 days.
- **2 months**: Equal to 8 weeks or 56 days.
- **Calendar month:** Used for calculating intervals greater than 2 months. Exceptions to this may occur where intervals are calculated using weeks or days.

Grace Period
Grace period refers to an allowable period prior to dose eligibility within which an administered dose can still be considered valid.

Simultaneous/concurrent administration means biological products and/or vaccines given on the same clinic day. If a client receives a biological product/vaccine in the morning and then another that same afternoon, it would be considered simultaneous administration.

- Vaccines used for routine immunization may be given simultaneously using different needles, syringes and injection sites.
- There is no evidence that simultaneous administration of most vaccines either reduces vaccine effectiveness or increases the risk of adverse events.
- Simultaneous administration increases the probability that the individual will be immunized fully by the appropriate age.

Section 1: Routine Childhood Immunization Schedule for Children who are ON SCHEDULE – 2 Months up to and Including 17 Years of Age

In Alberta, routine childhood immunization begins ideally at two **calendar months** of age. Recommendations for the age at which vaccines are administered are influenced by age-specific risks for disease, age-specific risks for complications, ability to respond to the vaccine, and potential interference with the immune response by passively transferred maternal antibody. Each vaccine manufacturer indicates the minimum age for initiating the vaccine series.

This section should be used for all children who are presenting **on time for immunization**. For children who fall behind the routine immunization schedule by **one month or more** refer to Section 2: Delayed Immunization Schedule for Children/Adolescents up to and Including 17 Years of Age - BEGINNING Immunization BEFORE Their 7th Birthday *and* Section 3: Delayed Immunization Schedule for Children/Adolescents up to and Including 17 Years of Age - BEGINNING Immunization ON/AFTER Their 7th Birthday. Once they are up to date for age, return to this section to complete the routine age-appropriate schedule.

This section is to be used as a summary of the **routine immunization schedule** only. Alternate schedules and/or additional vaccines may be necessary for individuals who are at greater risk for vaccine preventable diseases (e.g., HSCT recipients, children whose family have emigrated from hepatitis B endemic countries, children with chronic health conditions, children who previously lived in a TB endemic country). Children should be assessed at each immunization visit to determine need for vaccines outside of the routine immunization schedule based on risk factors. For detailed schedule information, refer to vaccine biological pages and immunization standards for high-risk individuals.

Age at Presentation	Vaccine
2 months	DTaP-IPV-Hib-HB MenC-ACYW (high risk) PNEU-C15 or PNEU-C20 (high risk) Rot
4 months	DTaP-IPV-Hib-HB MenconC or MenC-ACYW (high risk) PNEU-C15 or PNEU-C20 (high risk) Rot
6 months	DTaP-IPV-Hib-HB PNEU-C20 (high risk) MenC-ACYW (high risk) Rot
6 months of age and older	Annual Influenza COVID-19
12 months	MMR-Var MenconC or MenC-ACYW (high risk) PNEU-C15 or PNEU-C20 (high risk)
18 months	DTaP-IPV-Hib[1] MMR-Var
4 years of age	Tdap-IPV
Grade 6	HBV (two doses) HPV (two or three doses)
Grade 9	Tdap MenC-ACYW
Birth up to and including 17 years of age	Tuberculin Purified Protein Derivative (PPD)[2] • Foreign born who have originated from a country with high TB incidence and have arrived within the past 5 years. • Refugees and evacuees originating from countries with high TB incidence AND have arrived in Canada within the past 2 years.

[1] To provide complete protection, 1 dose of Hib-containing vaccine is required at 15 months of age up to 59 months of age, regardless of the number of doses received prior to 15 months of age.
[2] This is not a universal routine immunization but applies to some individuals. See Tuberculin Purified Protein Derivative Biological Page for eligibility criteria and appropriate scheduling.

Section 2: Delayed Immunization Schedule for Children/Adolescents up to and Including 17 Years of Age – BEGINNING Immunization BEFORE their 7th Birthday

This section is a general guideline to use for children up to and including 17 years of age who **begin immunization BEFORE** their 7th birthday and **fall behind the routine immunization schedule by one month or more**. When assessing the delayed immunization schedule, immunizers must consider previous documented immunizations received. Once the individual is up to date for age, return to Section 1: Routine Childhood Immunization Schedule to complete the routine age-appropriate schedule.

Due to the complexity of determining delayed immunization schedules, this summary **must be used in conjunction with the vaccine specific biological pages and Section 5: Minimum Age and Minimum Intervals Between Vaccine Doses**. Consult with the MOH/MOH designate as required.

Schedule	Vaccine
First visit	DTaP-IPV-Hib[1] or DTaP-IPV-Hib-HB[1] MenconC[2] or MenC-ACYW[3] (high risk) PNEU-C15[4,5] or PNEU-C20[5] (high risk) MMR-Var[6] or MMR[6] and VZ[6] (12 months of age and older) Rot HBV[1]
Second visit	DTaP-IPV-Hib[1], DTaP-IPV-Hib-HB[1] or Tdap-IPV[1] MenC-ACYW[3] (high risk) PNEU-C15[4,5] or PNEU-C20[5] (high risk) Rot HBV[1]
Third visit	DTaP-IPV-Hib[1], DTaP-IPV-Hib-HB[1], Tdap-IPV[1] or Tdap[1] PNEU-C20[5] (high risk) Rot
Fourth visit	DTaP-IPV-Hib[1,7], Tdap-IPV[1,7] or Tdap[1,7] MenconC[2] or MenC-ACYW[3] (high risk) PNEU-C15[4,5] or PNEU-C20[5] (high risk) MMR-Var[6] or MMR[6] and VZ[6] HBV[1]
Fifth visit	Tdap-IPV[1,7] or Tdap[1,7]
Other Routine Recommended Immunizations	
Annual Influenza	1 or 2 doses during the influenza season
COVID-19	See the applicable biological pages for eligibility and scheduling information
Grade 6	HBV (two doses) HPV (two or three doses)
Grade 9	Tdap MenC-ACYW
Birth up to and including 17 years of age	Tuberculin Purified Protein Derivative (PPD)[8] • Foreign born who have originated from a country with high TB incidence and have arrived within the past 5 years. • Refugees and evacuees originating from countries with high TB incidence AND have arrived in Canada within the past 2 years.

[1] Children beginning immunization up to and including 6 years of age should receive a minimum of 4 doses of tetanus/diphtheria/pertussis+/-polio +/-Hib containing vaccine. Refer to vaccine specific biological pages for detailed indication and schedule information.

- For children 2 months up to and including 23 months of age, give DTaP-IPV-Hib-HB vaccine.

- For children 24 months up to and including 6 years of age give DTaP-IPV-Hib vaccine.
- Children who have received a dose of Hib containing vaccine at 15 months of age or older should still receive DTaP-IPV-Hib or Tdap-IPV depending on their age. **Note:** To provide complete protection, 1 dose of Hib-containing vaccine is required at 15 months of age up to 59 months of age, regardless of the number of doses received prior to 15 months of age.
- Booster dose (4th dose) of polio containing vaccine is recommended for children 4 to 6 years of age usually as a combined vaccine (Tdap-IPV or DTaP-IPV-Hib). This reinforcing dose of polio is not required if the third dose was given on or after 4 years of age.
    - In order to have a complete series for polio vaccine the individual must have received a minimum of 2 doses 4 weeks apart with a third dose a minimum of 6 months from the previous dose. Additional doses may have been given for convenience when using combined vaccine. Regardless of how many polio vaccine doses received, the interval between the last two doses must be 6 months.
- Children 7 years of age and older should receive Tdap-IPV to complete their routine immunization series. The reinforcing dose of polio is not required if the third dose was given on or after 4 years of age.
- Hepatitis B given as a 3-dose or 2-dose series dependent on age. Children 11 years of age and older may require only 2 doses. See Hepatitis B Biological Page for eligibility criteria and appropriate scheduling.

[2] For children up to and including 4 years of age and presenting for immunization at 4 months of age or older. Depending on age when immunization is received, fewer doses may be required. Refer to the Meningococcal Conjugate (Group C) Vaccine Biological Page.
[3] Number of doses of MenC-ACYW will depend on the age of the individual and their medical conditions when they start immunization. See Meningococcal Conjugate Groups A, C, Y, W-135 Biological Page for details.
[4] For children up to and including 59 months of age. Depending on age when immunization is received fewer doses may be required and the interval between doses may differ. Refer to the Pneumococcal 15-valent Conjugate Vaccine Biological Page.
[5] Children with high-risk conditions require up to 4 doses of Pneumococcal 20-valent Conjugate vaccine depending on the age at which they receive immunization. Refer to the Pneumococcal 20-valent Conjugate Vaccine Biological Page.
[6] Children presenting for the first visit should have this dose administered on or after 12 months of age.
[7] When the fourth dose is administered after the fourth birthday the fifth dose is not necessary.
[8] This is not a universal routine immunization but applies to some individuals. See Tuberculin Purified Protein Derivative Biological Page for eligibility criteria and appropriate scheduling.

Section 3: Delayed Immunization Schedule for Children/Adolescents up to and Including 17 Years of Age – BEGINNING Immunization ON/AFTER their 7th Birthday

This section is a general guideline to use for children up to and including 17 years of age who **begin immunization ON/AFTER their 7th birthday** and **fall behind the routine immunization schedule by one month or more**. Once they are up to date for age, return to Section 1: Routine Childhood Immunization Schedule to complete the routine age-appropriate schedule.

Due to the complexity of determining delayed immunization schedules, this summary must be used in conjunction with the vaccine specific biological pages. Consult with the MOH/MOH designate as required.

Schedule	Vaccine
First Visit	Tdap-IPV PNEU-C20 (high risk) MMR-Var (7 years up to and including 12 years of age) OR MMR and Varicella (13 years up to and including 17 years of age)
Second Visit Minimum 4 weeks, 6 weeks or 3 months after 1st visit[1,2]	Tdap-IPV MMR-Var (7 years up to and including 12 years of age) OR MMR and Varicella (13 years up to and including 17 years of age)
Third Visit Minimum 6 months after 2nd visit	Tdap-IPV
Other Routine Recommended Immunizations	
Annual Influenza	1 or 2 doses during the influenza season
COVID-19	See the applicable biological pages for eligibility and scheduling information
Grade 6	HBV (two doses) HPV (two or three doses)
Grade 9	Tdap MenC-ACYW
Birth up to and including 17 years of age	Tuberculin Purified Protein Derivative (PPD)[3] • Foreign born who have originated from a country with high TB incidence and have arrived within the past 5 years. • Refugees and evacuees originating from countries with high TB incidence AND have arrived in Canada within the past 2 years.

[1] In order to ensure adequate protection as soon as possible for each vaccine, this visit may need to be divided into more than one appointment.

[2] Depending on which live vaccine is used and the age at which the vaccine is being given, the eligibility for vaccine and the interval will change. Refer to specific vaccine biological pages for detailed information on vaccine indications and scheduling.

[3] This is not a universal routine immunization but applies to some individuals. See Tuberculin Purified Protein Derivative Biological Page for eligibility criteria and appropriate scheduling.

Section 4: Adult Immunization Schedule – For 18 Years of Age and Older Beginning or Completing an Immunization Series

This section is a general guideline to use for routine adult immunization. For information related to vaccine recommended for adults with high-risk conditions or adults requiring assessment of immunization status for occupational purposes refer to the vaccine specific biological pages.

Schedule	Antigen
First Visit	Tdap[1], Tdap-IPV[1], or IPV[1] MMR[2] VZ[4] Influenza COVID-19 PNEU-C20 (high risk)[4] HBV[4] HPV[4] RSV[4]
Second Visit Minimum 4 weeks or 6 weeks after 1st visit[3]	Tdap[1], Tdap-IPV[1], or IPV[1] MMR[2] VZ[4] HBV[4] HPV[4]
Third Visit Minimum 6 months after 2nd visit	Tdap[1], Tdap-IPV[1], or IPV[1] HBV[4] HPV[4]
Every 10 years	Tdap[1]
Pregnant Persons with every pregnancy	Tdap[1]
Individuals less than 65 years of age	Tuberculin Purified Protein Derivative (PPD)[5] • Foreign born who have originated from a country with high TB incidence and have arrived within the past 5 years. • Refugees and evacuees originating from countries with high TB incidence AND have arrived in Canada within the past 2 years.

[1] Adults should receive a total of 3 doses of tetanus and diphtheria containing vaccines. Previous doses of Td may be counted in the series even if they are +/-pertussis and polio. Primary immunization for polio is recommended for those who have not completed a series. Reinforcing dose of polio is recommended for specific groups. Adults require at least one dose of pertussis containing vaccine.
[2] When reviewing records, any doses of Killed Measles Vaccine (KMV) should be considered invalid. A dose of live attenuated measles containing vaccine should be offered at least 4 months following the killed measles vaccine to be considered a valid dose.
[3] In order to ensure adequate protection as soon as possible for each vaccine, this visit may need to be divided into more than one appointment.
[4] Refer to vaccine specific biological pages for eligibility criteria.
[5] This is not a universal routine immunization but applies to some individuals. See Tuberculin Purified Protein Derivative Biological Page for eligibility criteria and appropriate scheduling.

Section 5: Minimum Age and Minimum Intervals Between Vaccine Doses

This section should not be used to assess eligibility for vaccine. Once it is determined an individual is eligible for vaccine, minimum intervals can be used for those who start an immunization series outside the routine schedule, those who fall behind the routine immunization schedule by one month or more or those for whom rapid protection is required, except in some specific situations. Use this table in conjunction with the vaccine biological pages. **Once the individual is on schedule (up to date for age) use the recommended spacing rather than the minimum intervals.**

Individuals who are at greater risk for vaccine preventable diseases (for example, HSCT recipients, SOT candidates and recipients, children whose family have emigrated from hepatitis B endemic areas, children with chronic health conditions) have very specific immunization schedule recommendations. For those individuals follow the recommendations outlined in the vaccine biological pages. Consult with the MOH/MOH designate as required.

Vaccine	Minimum Age for First Dose	Minimum Interval Between Dose			
		Dose 1 to Dose 2	Dose 2 to Dose 3	Dose 3 to Dose 4	Dose 4 to Dose 5
DTaP-IPV-Hib[1,2,3]	6 weeks	4 weeks	4 weeks	6 months[1,2,3]	6 months[2,3,4]
DTaP-IPV	8 weeks	4 weeks	4 weeks	6 months[2,3]	6 months[2,3,4]
HAV	6 calendar months	6 months			
HABV	1 year	4 weeks	5 calendar months		
IPV[2,3]	6 weeks	4 weeks	6 months[2,3]	6 months[2,3]	
Influenza	6 calendar months	4 weeks			
MMR[5,6]	1 year	4 weeks			
MMR-Var[5,6]	1 year	4 weeks[7]			
Men-B	8 weeks	Refer to biological page	Refer to biological page	Refer to biological page	
MenconC[8]	8 weeks	4 weeks	4 weeks		
MenC-ACYW[8]	8 weeks	4 weeks	4 weeks	8 weeks	3 years / 5 years
PNEU-C15[9] (3 doses)	6 weeks	4 weeks	8 weeks[9]		
PNEU-C20[9] (high risk) (4 doses)	6 weeks	4 weeks	4 weeks	8 weeks[9]	
PNEU-C13[9] (3 doses)	6 weeks	4 weeks	8 weeks		
PNEU-C13[9] (4 doses)	6 weeks	4 weeks	4 weeks	8 weeks	
PNEUMO-P	2 years	5 years	5 years		
RAB (pre-exposure)	Birth	7 days	14 to 21 days		
RAB (post-exposure)	Birth	3 days[10]	4 days[10]	7 days[10]	14 days[10]
Rot	6 weeks	4 weeks	4 weeks		
Td[11]	7 years	4 weeks	6 months		
Tdap[11]	4 years	4 weeks	6 months		
Tdap-IPV[2,3,11]	4 years	4 weeks	6 months		
TYVI injectable	2 years	3 years			
VZ[5,6,7]	1 year	4 weeks[5,6,7]			
Vaccine	**Minimum Age for First Dose**	**Minimum Interval Between Dose**			
		Dose 1 to Dose 2	**Dose 2 to Dose 3**	**Dose 1 to Dose 3**	**Dose 3 to Dose 4**
DTaP-IPV-Hib-HB	6 weeks	4 weeks	8 weeks[12,13]	16 weeks[12,13]	6 months[14]
HBV (3 dose schedule)	birth	4 weeks	8 weeks	4 months[12] (112 days)	
HBV (2 dose schedule)	11 years	6 months (24 weeks)	NA	NA	
HBV (4 dose schedule)[15]	birth	4 weeks	4 weeks	NA	4 months[15] (112 days)
HPV (3 dose schedule)	9 years	4 weeks	12 weeks	6 months (24 weeks)	
HPV (2 dose schedule)	9 years	6 months (24 weeks)	NA	NA	

[1] To determine which tetanus-diphtheria containing vaccine to use, see tetanus-containing vaccine biological pages. **Note**: if 4th dose of DTaP-IPV-Hib is given before 15 months of age, a reinforcing dose of Hib vaccine should be offered at 15 months of age or older with a minimum spacing of 8 weeks after the last Hib dose.
[2] A complete series for polio vaccine is a minimum of 3 doses AND the final dose needs to have a minimum of 6 months from the previous dose. Additional doses may have been given for convenience when using combined vaccines. Regardless of how many polio vaccine doses received, the interval between the last two doses must be 6 months.
[3] Must have at least one dose of polio containing vaccine at 4 years of age or older.
[4] Minimum age for 5th dose is 4 years of age; if 4th dose is given on or after 4 years of age and a minimum of 6 months from the previous dose, the 5th dose is not required.
[5] For historical immunization record assessment, or if rapid protection is required a minimum of 4 weeks must separate between live vaccines (MMR, MMR-Var and VZ) for healthy individuals.
[6] MMR may be given as early as 6 calendar months if indicated:

- A dose of MMR vaccine given prior to 12 months of age is considered null/invalid.
- Vaccine should be repeated on or after the first birthday (12 months of age) with a minimum interval of 4 weeks from the previous null dose.
- The repeat valid dose at 12 months of age can be given as MMR or MMR-Var.

[7] Individuals who have at least one of the following conditions: HIV, asplenia/hyposplenia and chronic renal disease require a minimum spacing of 3 months between varicella doses. See Varicella Vaccine Biological Page.
[8] At least one dose must be given in the second year of life. When assessing previous immunization records for MenconC or MenC-ACYW, a dose given any time in the first year of life respecting the minimum age would be considered valid and further doses under 12 months are not required.
[9] At least one dose of Pneu-C13, Pneu-C15 or Pneu-C20 must be given in the second year of life.
[10] If a dose in the routine rabies post exposure prophylaxis schedule is missed, consult with the MOH. Series should be resumed as soon as possible respecting the minimum intervals.
[11] Previous doses of Td may be counted in the tetanus-containing vaccine series. Adults require at least one dose of pertussis containing vaccine.
[12] The minimum age for the third dose is 6 months (24 weeks, 168 days) of age and all minimum intervals for the three doses must be met.
[13] If minimal spacing is not met refer to Section 8: Immunization Following Vaccine Administration Errors.
[14] If a 4th dose of DTaP-IPV-Hib-HB is required, minimal spacing is 6 months from the previous dose.
[15] Individuals requiring a 4-dose HBV schedule:

- Infants whose birth weight is less than 2,000 grams born to a birth parent who is HBsAg positive may receive 4 doses single antigen hepatitis B vaccine. The minimum age for the fourth dose is 6 months (24 weeks, 168 days) of age and all minimum intervals for the four doses must be met.
- Hyporesponsive individuals (16 years of age and older) who receive Engerix-B vaccines require a 4-dose schedule. All minimum intervals for the four doses must be met.
- For assessment of historical single antigen 4-dose Hepatitis B schedules given outside of Alberta, see guidance in Standard for Immunization Record Assessment.

Section 6: Guidelines for Spacing of Non-live and Live Vaccines

Vaccines are safe and effective when administered simultaneously. All vaccines due should be given at the same clinic visit when possible. Concurrent administration of all vaccines for which the individual is eligible increases the probability that they will be fully immunized at the appropriate age.

- Two or more vaccines can be administered on the same day, provided there are no contraindications.
- Live vaccines must be given on the same day or separated by the interval as outlined in the vaccine biological page for the vaccine being provided. Refer to vaccine specific biological pages for more information.

Vaccine	Recommended Interval Between Doses
2 or more non-live vaccines	None; can be administered simultaneously or at any interval between doses
Non-live plus any live vaccine	None; can be administered simultaneously or at any interval between doses
2 or more live vaccines	Use intervals as outlined in the specific vaccine biological pages. • Live oral vaccines (for example, oral typhoid, oral poliovirus and oral rotavirus vaccines) can be administered simultaneously or at any interval before or after injectable vaccines (non-live or live). • Intranasal live vaccine (for example, FluMist vaccine) may be administered any time before or after the administration of other live attenuated or non-live vaccines. ○ Specialists recommending alternate spacing for specific high-risk individuals may be accommodated on a case-by-case basis. • With non-provincially funded live vaccines, refer to the product monograph for spacing recommendations.

Section 7: Guidelines for Intervals Between Immunoglobulins/Blood Products and Vaccines

7.1 Intervals Between Vaccines and Immunoglobulins/Blood Products

Immunoglobulins and other blood products can interfere with the immune response to **live** vaccines.

The immune response to some live vaccines may be diminished when given less than 2 weeks before, or in the following specified timeframes below after receipt of immunoglobulins or other blood products. Administration of immunoglobulins or blood products does not interfere with antibody responses to yellow fever vaccine, oral vaccines (typhoid, polio, rotavirus) or Bacille Calmette-Guérin (BCG) and is not expected to affect response to live-attenuated influenza vaccine.

Immunoglobulin preparations and **non-live** vaccines for post exposure prophylaxis may be given on the same day (concurrently) and **must** be administered in different limbs. Concurrent administration does not impair the effectiveness of the vaccines. Immediate protection is provided from the immunoglobulin preparation(s) and long-term immunity is achieved from the vaccine(s).

Multiple immunoglobulin preparations may be administered at the same visit or separated by any interval if both are required, for example RIG and TIG. These should be administered in different limbs.

Immunoglobulin or Blood Product	Dose	Interval between receipt of Ig or blood product and subsequent administration of MMR, MMR-Var or VZ vaccine (months)
Standard Immunoglobulin (human)		
IG (Immunoglobulin)	0.02 to 0.06 mL/kg	3
	0.1 mL/kg	3 **Note:** PPHS has indicated when IMIG has been administered for Hepatitis A post exposure utilizing a dosage of 0.1 mL/kg of body weight, the recommended interval between IMIG and live vaccines is 3 months.
	0.25 mL/kg	5
	0.5 mL/kg	6
IVIg (Intravenous Immunoglobulin) **or** SCIg (Subcutaneous Immunoglobulin[1])	300 to 400 mg/kg	8
	1000 mg/kg	10
	2000 mg/kg	11
Specific Immunoglobulin (human)		
Cytomegalovirus immunoglobulin (CMVIg)	150 mg/kg IV	6
Hepatitis B immunoglobulin (HBIG)	0.06 mL/kg	3
Rh immunoglobulin (RhIg)	300 mcg	3 **Note:** If MMR or varicella containing vaccine is given to susceptible individuals less than 3 months from receipt of RhIg, serological testing should be done 3 months after the vaccine dose to assess the immune response.
Rabies Immunoglobulin (RIG)	20 IU/kg	4
Tetanus Immunoglobulin (TIG)	250 units	3
Varicella Zoster Immunoglobulin (VZIG)	12.5 units/kg	5
Specific Immunoglobulin (humanized monoclonal antibody)		
Palivizumab (Synagis)	15 mg/kg/4 weeks	No wait
Nirsevimab (Beyfortus)	Single dose	No wait

Blood Products	Interval (months)
Packed Red Blood Cells (RBCs)	5
Plasma or Platelets	7
Reconstituted RBCs	3
Washed RBCs	No wait
Whole Blood	6
Albumin	No wait
Plasma-derived clotting factors	7 **Note:** High and intermediate-purity plasma-derived clotting factor concentrates will likely contain some immunoglobulins but much smaller amounts than immunoglobulin products. If a shorter interval is required, consult with MOH/MOH designate before proceeding with immunization.
Recombinant clotting factor concentrates	No wait (free of immunoglobulins)

[1] Ig can also be administered subcutaneously (SCIg). SCIg is primarily indicated as life-long replacement therapy in patients with primary antibody deficiencies for whom immunization with live vaccines is contraindicated. However, potential alternative indications for SCIg therapy may result in temporary use and discontinuation of therapy. Because pharmacokinetic properties of IgG following SCIg administration have been shown to resemble those following IVIg administration, the recommended interval between the administration of SCIg and MMR, MMR-Var or univalent varicella vaccines should be considered equivalent to the recommended interval after the corresponding IVIg monthly dosing.

7.2 Intervals Between Vaccines and Blood Donation

If an individual reports that they are planning to donate blood, they may be informed that Canadian Blood Services (CBS) may recommend an interval between immunization and blood donation.

Information on deferral periods between immunization and blood donation can be found at Canadian Blood Services. Clients concern about donating blood following receipt of vaccines should be referred to the Canadian Blood Services website www.blood.ca or to call 1-888-236-6283 for the most up to date information.

Section 8: Immunization Following Vaccine Administration Errors and Deviations

The following are general guidelines related to vaccine administration errors or when assessing historical records. This section is not meant to replace the recommended schedules in each vaccine biological page. For errors or deviations that are not listed here, consultation with the MOH/MOH designate is required to determine how best to proceed.

Non-live Vaccine Given at Less than the Minimum Interval

- When reviewing **non-live** immunizations, a '4-day grace period' allows for circumstances in which a vaccine dose was inadvertently given within 4 days of the minimum age or interval, with the exception of rabies and accelerated HABV (Twinrix) vaccine series.
    - If a non-live vaccine dose is administered 5 or more days earlier than the minimum interval between doses, it will be considered invalid, and the vaccine dose will need to be repeated.
    - If a non-live vaccine dose is administered 4 days or less than the minimum interval between doses, the dose can be considered valid.
    - This '4-day grace period' can only be used once in a non-live vaccine series. Consult with MOH/MOH designate if questions arise.
    - The repeat dose must be spaced after the invalid dose by the recommended minimum interval for the specific dose of that vaccine. Refer to Section 5: Minimum Intervals Between Vaccine Doses.
    - The '4-day grace period' cannot be used in the prospective scheduling of future immunizations.
- **HABV** (Twinrix): If the accelerated schedule is used, the '4-day grace period' cannot be applied. See Section 9: Alternate Schedules Used to Assess Completeness of Previous Immunization Received.
- **Rabies**: The '4-day grace period' cannot be used for rabies vaccine series. If any doses in the rabies vaccine series are less than the minimum interval, consult MOH/MOH designate.
- **Additional guidance:**
    - **DTaP-IPV-Hib-HB**: If a dose has been administered earlier than the minimum intervals outlined on the vaccine biological page, as long as there are 28 days between the first three doses, all components of the vaccines can be considered valid. A dose of DTaP-IPV-Hib-HB vaccine will be required at the routine 18-month appointment in order to complete the hepatitis B series.
    - **Pneumococcal** vaccines:
        - For individuals 24 months up to and including 17 years of age, if Pneu-C20 was given less than 1 year after a dose of pneumococcal polysaccharide vaccine, the Pneu-C20 vaccine is considered ineffective. Another dose of Pneu-C20 is recommended at least 1 year after the pneumococcal polysaccharide vaccine and at least 8 weeks after the ineffective pneumococcal conjugate vaccine.
        - For individuals 18 years of age and older, if Pneu-C20 was given less than the recommended 1-year interval but at least 8 weeks after the previous dose of pneumococcal polysaccharide vaccine then the dose of Pneu-C20 may be considered valid and does not need to be repeated.
        - If historical pneumococcal polysaccharide vaccine was given earlier than the minimum 5-year interval from the previous dose, consider all administered doses of pneumococcal polysaccharide vaccine valid regardless of the interval between doses.
    - Adult **Tdap**:
        - If a dose has been administered earlier than the minimum intervals outlined on the vaccine biological page, as long as there are 28 days between Tdap doses, all components of the vaccine can be considered valid. Additional doses of Tdap may be required to complete the series.

Live Injectable/Oral/Intranasal Vaccines Given at Less than the Minimum Interval

- If two live injectable vaccines are not given on the same day and are given less than 28 days apart, consider the vaccine that was given second to be invalid.
    - Repeat the vaccine that was given second using the minimum interval after the invalid dose. Refer to Section 5: Minimum Intervals Between Vaccine Doses.
- If two live oral vaccines of the same antigen series are given 4 days or less than the minimum interval, consider both doses as valid.
    - Oral poliomyelitis vaccine (OPV) is not available in Canada, however, if historical records indicate rotavirus vaccine and OPV are given at less than 2 weeks apart, consider both vaccines as valid doses.
- Intranasal live vaccine (for example, FluMist vaccine) may be administered any time before or after the administration of other live attenuated or non-live vaccines.

Note: Specialists recommending alternate spacing for specific high-risk individuals may be accommodated on a case-by-case basis.

Vaccine Given at Less than the Minimum Age

Live vaccines:

- If a live vaccine dose is given at less than the minimum age it will be considered invalid, and the vaccine dose will need to be repeated. Repeat the dose when the individual reaches the minimum age and at least the minimum interval from the dose that was given too early. Refer to Section 5: Minimum Intervals Between Vaccine Doses.

Non-live vaccines:

- If non-live vaccine is administered 5 or more days earlier than the minimum age it will be considered invalid, and the vaccine dose will need to be repeated. Repeat the dose when the individual reaches the minimum age and at least the minimum interval from the dose that was given too early.
- If a non-live vaccine dose is administered 4 days or less than the minimum age, the dose can be considered valid.
- When assessing historical doses of HABV administered to children 6 months of age up to and including 11 months of age, both the HBV and HAV components are considered valid.

Vaccine Given at Greater than the Recommended Age

- MMR-Var: This vaccine is not licensed for use in individuals 13 years of age and older. Limited data is available on the efficacy of the vaccine in this age group. Based on consultation with PPHS Chief Medical Officer of Health, the following is recommended if the vaccine is inadvertently administered to an individual 13 years of age and older:
    - Both the MMR and Varicella components of the combined vaccine can be considered valid and does not need to be repeated.
    - Subsequent doses of MMR and/or Varicella vaccine, if needed, should be given as separate vaccines and according to intervals outlined in the vaccine biological pages.
- DTaP-IPV-Hib-HB vaccine: Doses that have been administered to children 24 months to less than 7 years of age will be considered valid doses.
- DTaP-IPV-Hib vaccine: If inadvertently administered to healthy individuals at 7 years of age or older when Tdap-IPV was indicated, these doses may count in the vaccine series. The dose is considered valid and does not have to be repeated.
- DTaP vaccine: If given when Tdap was indicated, the dose can be considered valid and does not have to be repeated.
- Rotavirus vaccine: For infants who receive the first dose of rotavirus vaccine after the maximum age for the specific product, the rotavirus vaccine series can be completed ensuring a minimum of 4 weeks between doses, and all doses must be administered before 8 months of age.
- Consult MOH/MOH designate for all other vaccines given at greater than recommended age.

Vaccine Containing Lesser Amount of diphtheria/pertussis Component

- If any dose of Tdap containing vaccine has been given to a child under 4 years of age, the dose should be considered invalid and repeated as soon as feasible.
- If Tdap containing vaccine has been given to a child over 4 but under 7 years of age:
  - If given as dose 1, 2 or 3, the dose should be considered invalid and repeated as soon as feasible.
  - If given as dose 4, the dose can be considered valid and does not have to be repeated.

Immunization When Less than the Recommended Dose is Given

The recommended dosage for each vaccine is based on information from clinical trials from the manufacturer and clinical experience of post-licensure use of the vaccines. Vaccine doses should not be altered from the recommendations outlined in the vaccine biological pages as this may result in less than optimal protection or excessive local or systemic reactions, with the exception of clients undergoing allergy testing.

- If the volume of vaccine administered is known (for example, a pediatric dose was administered instead of an adult dose):
  - Offer the remainder of the dose on the same day.
  - If the error is not noticed on the same day, repeat the entire dose as soon as possible.
- If the volume of the vaccine given is not known (for example, leakage from the syringe, child pulls away from the needle before the entire dose can be administered):
  - Repeat the entire dose immediately, if possible.

Immunization When Greater than the Recommended Dose is Given

- If an individual is given a vaccine dose that is greater than recommended volume or strength, the dose may be considered valid. If further doses in a vaccine series are required, the remaining doses should be given using the appropriate vaccine volume or strength.

Omission of One Component of a Non-live Combined Vaccine

- If a component of a combined vaccine (for example, DTaP-IPV-Hib) was omitted/not mixed prior to administration:
  - Offer single antigen vaccine for the omitted component if the vaccine is available (for example, Hib) as soon as possible.
  - Repeat the entire dose as soon as possible if single antigen vaccine for the omitted component is NOT available.
  - Consult MOH/MOH designate as needed.

Expired Vaccine

If an expired product is given inadvertently, consult the MOH/MOH designate for recommendations. If the MOH/MOH designate determines the dose needs to be repeated, use the following guidelines for spacing:

- If it is a live vaccine, give on the same day as the expired vaccine was given. If the error is discovered after that, repeat the dose of live vaccine using the minimum intervals from the expired dose. Refer to Section 5: Minimum Intervals Between Vaccine Doses.
- If it is a non-live vaccine, give the repeat dose as soon as possible.

Vaccine Given by Incorrect Route

- If a vaccine recommended to be given subcutaneously (SC) is inadvertently given by the intramuscular (IM) route, the dose can be considered valid and does not need to be repeated.
- If a vaccine recommended to be given IM is inadvertently given subcutaneously (SC) or intradermally (ID), the dose should be considered invalid and repeated as soon as feasible.
  - Gluteal muscle groups (for example, dorsogluteal and ventrogluteal) should not be used for vaccine administration. If a vaccine recommended to be given IM is inadvertently given in a gluteal muscle, consider ALL vaccines given in any gluteal muscle to be invalid and recommend repeating the dose as soon as feasible.

Errors Involving Varicella & Herpes Zoster (Shingrix) Vaccines

The following is recommended if inadvertent administration of incorrect product occurs:

- If varicella vaccine is indicated and Shingrix vaccine was given inadvertently, there is no waiting period and live varicella vaccine can be given as soon as possible. Shingrix cannot be used to prevent primary varicella infection, and the dose should be considered invalid.
- If Shingrix is indicated and a dose of live varicella vaccine was given inadvertently, then Shingrix may be given with a minimum interval of 8 weeks from the varicella vaccine. The dose of varicella vaccine is considered valid.

Section 9: Alternate Schedules Used to Assess Completeness of Previous Immunization Received

Alternate Immunization Schedule for Vaccines

When an individual presents with an immunization record from out of province or out of country, it can be difficult to determine if they are considered up to date for age. Vaccine schedules for various antigens may be different in other provinces/territories or in other countries. The intervals may not align with PPHS immunization recommendations and individual assessment should occur for each record to determine validity. Consideration should be made to age, intervals and the health status of the individual. Refer to Section 5: Minimum Intervals Between Vaccine Doses as well as the Standard for Immunization Record Assessment when assessing alternate immunization schedules. Consult MOH/MOH designate if clarification is required.

Alternate Immunization Schedule for Hepatitis B and Combined Hepatitis A and Hepatitis B Vaccine

These schedules may have been used for hepatitis B or hepatitis A/B combined vaccine (for example, for the purpose of travelling, or schedules used for programs in other provinces/territories). Individuals immunized under these schedules will be considered appropriately immunized for age.

Vaccine		Dose 1	Dose 2
Recombivax Hepatitis B For use in children 11 to 15 years of age	1 mL dose	Day 0	4-6 months after dose 1
Engerix Hepatitis B For use in children 11 to 15 years of age	1 mL dose	Day 0	6 months after dose 1
Twinrix Hepatitis A and B For use in children 1 to 15 years of age*	1 mL dose	Day 0	6-12 months after dose 1

*When assessing historical doses of HABV administered to children 6 months of age up to and including 11 months of age, both the HBV and HAV components are considered valid.

Rapid Immunization Schedule for Hepatitis B and Combined Hepatitis A and Hepatitis B Vaccine

These schedules may have been used for hepatitis B or hepatitis A/B combined vaccine (for example, for the purpose of travelling, or schedules used for programs in other provinces/territories). Individuals immunized under these schedules using the correct dose for age will be considered appropriately immunized. These are **absolute minimum intervals**; the 4-day rule cannot be applied to rapid immunization schedules for hepatitis B and combined hepatitis A and B vaccines.

Vaccine	Dose 1	Dose 2	Dose 3	Dose 4
Engerix Hepatitis B Rapid For use in individuals 20 years of age and older	Day 0	Day 7	Day 21	12 months after dose 1
Engerix Hepatitis B Accelerated For all ages	Day 0	1 month after dose 1	2 months after dose 1	12 months after dose 1
Recombivax Hepatitis B Accelerated For all ages	Day 0	1 month after dose 1	4 months after dose 1	-
Twinrix Combined Hepatitis A and B For individuals 19 years of age and older	Day 0	Day 7	Day 21	12 months after dose 1

Section 10: Guideline for Converting a Combined Hepatitis A and B Vaccine Series to a Single Antigen Series

The following table provides guidelines for completing an immunization series started with combined hepatitis A and B vaccine (HABV) and completing with single antigen vaccines.

Initially Immunized with HABV	To complete with single antigen Hepatitis A vaccine	To complete with single antigen Hepatitis B vaccine
One dose[1]	Give dose at time of presentation (minimum 4 weeks after dose of HABV) followed by another dose 6 months later	Complete using the HBV schedule[1]
Two doses[2]	Give dose at least 6 months after the last dose of HABV[2]	Complete using the HBV schedule[2]

[1] If the first dose of HABV was a 1 mL dose **AND** was given between 11-15 years of age, then the Hepatitis B series may be completed using 1 mL Hepatitis B vaccine with a minimum of 6 months after first HABV, as long as the individual is currently between 11-15 yrs of age. If the first dose of HABV was a 1 mL dose and was given at less than 11 years of age, this dose does not count towards the HBV series; offer age-appropriate HBV vaccine.

[2] If **BOTH** HABV doses were 1 mL **AND** given between 1-15 years of age with a minimum of 6 months apart, see Section 9: "Alternate Immunization Schedule for Hepatitis B and Combined Hepatitis A and Hepatitis B Vaccine".

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