THIS CHAPTER MEETS THE FOLLOWING IMMUNIZATION COMPETENCIES FOR HEALTH PROFESSIONAL (PHAC, 2008): http://www.phac-aspc.gc.ca/im/pdf/ichp-cips-eng.pdf

#11: Populations Requiring Special Considerations

- **Competency**: Recognizes and responds to the unique immunization needs of certain population groups.

1.0 INDIVIDUALS AT HIGH RISK FOR VACCINE PREVENTABLE DISEASES

Individuals who have certain chronic medical conditions or who are immunocompromised related to disease or medical treatments are unable to mount adequate immune responses to vaccines. The cause of the altered immunocompetent state can be primary (congenital) or secondary (acquired), and it can be temporary or permanent. In these individuals, even a less-than-optimal immune response to a vaccine may provide protective benefits to reduce their high risk of morbidity and mortality from vaccine-preventable diseases.

Chronic medical condition examples:

- Cochlear implant candidate or recipient*
- Congenital or acquired or functional asplenia*
- Liver disease (including hepatitis B and C)
- Malignancies /cancer
- Renal disease

Immunocompromised condition examples:

- Acquired complement deficiency* or congenital immunodeficiency* involving any part of the immune system, including B-lymphocyte (humoral) immunity, T-lymphocyte (cell- mediated) immunity, complement system (properdin, or factor D deficiencies), or phagocytic functions
- Human immunodeficiency virus (HIV)*
- Immunosuppressive treatments (e.g., corticosteroids, chemotherapy, radiation therapy, post-organ-transplant therapy*, certain anti-rheumatic drugs, and drugs used for the management of inflammatory bowel disease)
- Transplant candidate or recipient - islet cell, solid organ* or tissue
- Transplant recipient - haematopoietic stem cell transplantation (HSCT)*

* These individuals have a very high risk of infection from encapsulated bacteria such as *Streptococcus pneumonia, Neisseria meningitidis,* and *Haemophilus influenzae* type b.

1.1 Household Members of an Immunocompromised Person

Immunization of household contacts provides important protection against transmission of disease in the household.

- Assess the immunization status of household contacts. Ensure routine immunizations are up-to-date.
- Ensure that opportunities to immunize are not missed for household contacts.
- Offer yearly influenza vaccine to all household contacts of immunocompromised individuals, regardless of whether or not the individual at high risk has been immunized.
- There are no general contraindications to immunization of household or close contacts of immunosuppressed individuals. Household and close contacts of immunocompromised individuals can be immunized with MMR, varicella, and rotavirus vaccines as the vaccine viruses are rarely transmitted to contacts.
- Wash hands well to prevent possible rotavirus transmission after changing a diaper, etc.
- No special precautions need to be taken post MMR immunization, regardless of whether or not a post-vaccine rash occurs.
- After varicella immunization, no special precautions need to be taken unless the vaccine recipient develops a post - varicella vaccination rash within 42 days of vaccine receipt.
- Vaccine recipients should keep the rash covered. If this is not possible, they should minimize contact with susceptible immunocompromised individuals for the duration of the rash.

1.2 General Principles for Immunization of the Immunocompromised

Maximize benefit while minimizing harm.

- There is potential for serious illness and death in the under-immunization of immunocompromised people and every effort should be made to ensure adequate protection through immunization.

Make no assumptions about susceptibility or protection.

- A history of childhood disease or previous vaccination may be irrelevant.

Immunize at the time when maximum immune response can be anticipated.

- Vaccines may be less effective when administered during the period of altered immunocompetence. Individuals who are fully immunized may remain at risk for vaccine-preventable diseases.
- Immunize early when immunologic decline is predictable.
- Delay immunization if the immunodeficiency is transient (if this can be done safely).
- Primary health care provider may decide to stop or reduce immunosuppressive therapy to permit better vaccine response (if this is appropriate).

Consider the vaccination environment broadly.

- Immunize household contacts (family and caregivers) when individuals need protection (e.g. against influenza).

Avoid live vaccines unless:

- Data are available to support their use.
- The risk of natural infection is greater than the risk of immunization.

Administer routine reinforcements (*booster doses*) as indicated.

- The degree and duration of vaccine-induced immunity are often reduced in immune compromised individuals.

Consider the use of passive immunizing agents. These include:

- Immune globulin (Ig);
- Intravenous immune globulin (IVIg); and
- Pathogen-specific immune globulin preparations (e.g., tetanus immune globulin).

1.3 Immunization with Inactivated Vaccines

There are no general contraindications to immunizing immunocompromised individuals with inactivated vaccines. Specific vaccine formulations (e.g., 40 mcg HB vaccine for individuals with chronic renal disease) and/or specific immunization schedules may be recommended for particular conditions.

1.4 Immunization with Live Vaccines

The administration of live vaccines can cause serious adverse events in immunocompromised individuals because of the uncontrollable replication of the virus or bacterium. The decision to immunize an immunocompromised individual with a live vaccine can only be made following consultation with the physician most knowledgeable about the client's current health status, their immunosuppressive disease, and the vaccine. This includes either the primary care physician most familiar with the client's current medical status or a medical specialist.

Determine with the client which physician would be most familiar with their current health status. If the client is uncertain, consult the client's specialist. Consult the most appropriate physician and obtain a written referral regarding live vaccine administration to any individual whose immune system is compromised as the result of disease or therapy. Physician to physician (e.g., specialist and MHO) discussion and referral may occur, and documentation of recommendations should occur to communicate to public health staff. Refer to Appendix 7.2: *Varicella Immunization Referral Form* and Appendix 7.3: *MMR Immunization Referral Form*.

Many individuals with immunosuppressing conditions are immune to varicella because of earlier immunization or disease. Assess all immune suppressed clients 12 months of age and older for varicella susceptibility prior to immunization. Varicella susceptibility is defined as not having previously received a cohort-based varicella vaccine series; no documented serological evidence of immunity to the varicella zoster virus; or no lab-confirmed documentation of disease (e.g., culture from a pox viral swab).

1.4.1 Consideration for MMR and Varicella Immunization of Immunocompromised Individuals

Consult the most appropriate physician, as described in section 1.4 *Immunization with Live Vaccines* and obtain a written referral regarding live vaccine administration to any individual whose immune system is compromised as the result of disease or therapy. **MMRV is contraindicated**.

Haematopoietic Stem Cell Transplant (HSCT) recipient:

- MMR and varicella vaccines may be considered if the client is two or more years post-transplant and there is no graft versus host disease and no immunosuppressive treatment.

High Doses of Oral Corticosteroid Therapy of More than 14 days Duration: (≥ 2 mg/kg per day or ≥ 20 mg of prednisone daily):

- Depending on immunization history, age, and susceptibility, MMR and varicella vaccines may be considered if the client is able to discontinue therapy for one month prior to immunization.

HIV Infection:

- Depending on immunization history, age, and susceptibility, upon consultation, the client's specialist may approve MMR vaccine if no evidence of significant immune system compromise is present.
- Upon consultation, the client's specialist may approve varicella vaccine for susceptible individuals 12 months and older with asymptomatic or mildly symptomatic HIV infection (CDC clinical category N, A or B and immunologic category 1 or 2) and with age–specific CD4 percentages of ≥ 15%.
- Varicella and MMR vaccines may be administered at the same visit provided adequate anatomical spacing is used.
- MMRV vaccine is not indicated for use in HIV infected individuals at this time.

Immunosuppressive medical treatments (e.g., chemotherapy, radiation therapy, certain antirheumatic drugs, and drugs used for the management of inflammatory bowel disease):

- Live vaccines are contraindicated during therapy but may be considered if only low doses of immunosuppressive drugs are required and there is significant risk of wild-type infection.
- Depending on immunization history, age, and susceptibility, MMR and varicella vaccines may be considered if three or more months have elapsed since immunosuppressive therapy was discontinued.

Congenital Immunodeficiency

- A family history of congenital immunodeficiency may not be evident in infants less than 12 months of age but may be documented as an overwhelming infection following a natural infection or receipt of a live vaccine in an older sibling or a sibling who may be deceased.
- Assess family history of these types of events prior to administering a live vaccine to an infant less than 12 months of age (e.g., MMR vaccine for an infant travelling to a measles endemic region). If such a history is present, live vaccines are contraindicated.

Isolated Immunodeficiencies or acquired complement deficiency:

- MMR and varicella immunization forms in SIM Chapter 7 must be completed by the patient's specialist.

Malignancies:

- MMR and varicella vaccines are generally contraindicated.

Renal Disease and Dialysis Clients:

- MMR and varicella vaccines are recommended depending on the client's immunization history, age, and susceptibility given the possibility of receiving a kidney transplant in the future.

SOT or HSCT Transplant Candidate or Recipient

- Refer to MMR and Varicella recommendations for the appropriate transplant patient type in SIM Chapter 7 Appendices 7.6, 7.9 and 7.10.

2.0 CHRONIC MEDICAL CONDITIONS

2.1 Bleeding Disorders

- Individuals with bleeding disorders (e.g., haemophilia, thrombocytopenia) and those receiving anticoagulant therapy have an increased risk of bleeding (e.g., haematoma) after IM injections.
- Individuals who receive low doses of acetylsalicylic acid therapy or long-term anticoagulation (e.g., coumadin, heparin) are not considered to have a high risk of bleeding. However, manufacturers of varicella-containing vaccines (Var, MMRV) recommend that recipients should avoid using salicylates for 6 weeks after receiving a varicella-containing vaccine because of the association between Reye's syndrome, natural varicella infection, and salicylates. **Those 18 years or younger on salicylate therapy must be able to discontinue it for 6 weeks post-vaccination and require a consultation with a medical specialist before receiving a varicella-containing vaccine.**
- Always consult with the child's physician/specialist prior to MMR/MMRV immunization if they have had an episode of idiopathic thrombocytopenia that occurred within 6 weeks of a previous MMR/MMRV vaccine.
- MMR-associated ITP is rare, self-limiting and non-life threatening, and susceptible individuals with ITP should be immunized with MMR/MMRV at the recommended ages, after discussion with their physician/specialist. MMR/MMRV vaccination of unimmunized patients with ITP and re-vaccination of patients with previous non-vaccine or vaccine associated ITP, did not lead to recurrence of the thrombocytopenia. Those with either non-vaccine or vaccine-related ITP who have already received one dose of MMR/MMRV vaccine, vaccine titres may be checked to see if a second dose is required.
- If there is concern that the injection may stimulate bleeding, schedule it shortly after the administration of anti-haemophilia therapy. It is advisable to administer the vaccine approximately 3-4 hours after the anti-haemophilia therapy that decreases the risk of bleeding and haematoma. If bleeding does not stop after administering the vaccine, contact the MHO for further assistance (more anti-haemophilia therapy may be needed). Refer to SIM, Chapter 5, Section 3.5.1, Immune Globulin Preparations or Blood: Timing Intervals for Vaccines Containing Live Measles, Mumps, Rubella, or Varicella Virus for further information.
- If vaccine efficacy is known to be the same for a vaccine whether it is administered SC or IM, administer the vaccine using the SC route.
- A fine gauge needle (23, 25, or 27 G) should be used. Z-track technique may be used to prevent bleeding. Use the rapid injection technique without aspiration. Apply direct pressure (without rubbing) to the injection site for two minutes or longer following immunization (CIG).
- Although currently available plasma-derived products are routinely tested for viral contamination prior to administration, any patient with a bleeding disorder should still be considered at higher risk of contracting hepatitis A or B and should be offered these vaccines. Even when recombinant therapeutic products are being used, immunization for hepatitis A and/or B is still recommended in case the recombinant supply is unavailable and patients are required to switch to plasma-derived products at short notice.

2.1A: Publicly Funded Vaccines[1] - Bleeding Disorders

All routine vaccines	• Immunize according to routine schedule for age • Live attenuated influenza vaccine (LAIV) is contraindicated for children 2 to 17 years of age currently receiving aspirin or aspirin-containing therapy
HA	Non-immune individuals with bleeding disorders and others who receive repeated infusions of blood or blood products or plasma-derived replacement clotting factors.
HB	Non-immune individuals with bleeding disorders and others who receive repeated infusions of blood or blood products or plasma-derived replacement clotting factors.

[1] For specific vaccine information, refer to SIM, Chapter 10, *Biological Products*.

2.2 Cardiac Disease

Individuals with the **specific cardiac diseases/conditions** (**excluding** hypertension, dysrhythmias) **noted in SIM Appendix 7.1** are at higher risk of pneumococcal infection and potential exacerbation of their underlying disease.

2.2A: Publicly Funded Vaccines[1] - Cardiac Disease

All routine vaccines **except Pneu-C-15 for children**	
Pneu-C-20	**Only for those younger than 65 years old**. Refer to directives in *Pneu-C-20 Immunization Schedules for Individuals Who Have Qualifying Medical/Lifestyle Risk Factors*.

[1] For specific vaccine information, refer to SIM, Chapter 10, *Biological Products*.

2.3 Cochlear Implant

Cochlear implant recipients are at increased risk of developing bacterial meningitis, most commonly caused by *Streptococcus pneumoniae* bacteria. Cochlear implant candidates should be immunized at least 2 weeks prior to the cochlear implant.

2.3A: Publicly Funded Vaccines[1] - Cochlear Implant

All routine vaccines **except Pneu-C-15 for children**	
Pneu-C-20	**Only for those younger than 65 years old**. Refer to directives in *Pneu-C-20 Immunization Schedules for Individuals Who Have Qualifying Medical/Lifestyle Risk Factors*.
Men-C- ACYW-135	• Complete an age-appropriate primary series.
Hib	• Immunization with an age-appropriate primary series should be completed for children less than 5 years. • 1 dose Hib for people 5 years and older regardless of Hib immunization or Hib disease history. Provide at least 1 year after a previous Hib dose.

[1] For specific vaccine information, refer to SIM, Chapter 10, *Biological Products*.

2.4 Asplenia – Congenital, Acquired or Functional

Several conditions may lead to functional asplenia (e.g., sickle cell disease, thalassemia major, celiac disease, inflammatory bowel disease, rheumatoid arthritis and other anemias and hemoglobinopathies). Individuals with any of these conditions need further investigation to determine whether their pre-existing condition is compromising their spleen function.

Asplenics are at increased risk for infection from pathogens, particularly those caused by encapsulated bacteria (e.g., pneumococcal, meningococcal, and Hib). For example, children who have sickle cell disease or have had a splenectomy are at increased risk for fulminant pneumococcal sepsis associated with high mortality rates. This risk continues throughout their lifespan.

Unimmunized individuals who have had a splenectomy in the past or who have functional hyposplenism should be immunized as soon as their condition is identified. Individuals undergoing an elective splenectomy should receive immunizations at least 2 weeks prior to surgery. In the case of an emergency splenectomy, administer all the necessary vaccines two weeks after the splenectomy. If the individual is discharged earlier and there is a concern that he/she might not return, vaccination should be given before discharge.

2.4A: Publicly Funded Vaccines [1] - Asplenia – Congenital, Acquired, or Functional

• All routine vaccines **except Pneu-C-15 for children**	
Pneu-C-20	**Only for those younger than 65 years old**. Refer to directives in *Pneu-C-20 Immunization Schedules for Individuals Who Have Qualifying Medical/Lifestyle Risk Factors*.
Pneu-C-21	**Only for those 65 years and older.** Refer to directives in *Pneu-C-21 Immunization Schedules for Individuals 65 Years and Older.*
Men-C-ACYW-135	• Complete an age-appropriate primary series. • Eligible for 1 reinforcement dose every 5 years (after the last dose in the primary series).
Hib	• Immunization with an age-appropriate primary series should be completed for children less than 5 years old. • 1 dose Hib for people 5 years and older regardless of Hib immunization or Hib disease history. Provide at least 1 year after a previous Hib dose
Men-B4C	• Complete an age-appropriate primary series.

[1] For specific vaccine information, refer to SIM, Chapter 10, *Biological Products*.

2.5 Cerebrospinal Fluid Disorders

These individuals (usually from a congenital malformation, skull fracture or neurologic procedure) are at increased risk of invasive infections.

2.5A: Publicly Funded Vaccines[1] - Cerebrospinal Fluid Disorders

All routine vaccines **except Pneu-C-15 for children**	
Pneu-C-20	• **Only for those younger than 65 years old**. Refer to directives in *Pneu-C-20 Immunization Schedules for Individuals Who Have Qualifying Medical/Lifestyle Risk Factors*.
Men-C-ACYW-135	• Complete an age-appropriate primary series.

[1] For specific vaccine information, refer to SIM, Chapter 10, *Biological Products*.

2.6 Cystic Fibrosis

Abnormal mucous is produced in the lungs of individuals with CF. It interferes with their breathing and they are more prone to serious lower respiratory tract and lung infections.

2.6A: Publicly Funded Vaccines [1] - Cystic Fibrosis

All routine vaccines **except Pneu-C-15 for children**	
Pneu-C-20	**Only for those younger than 65 years old**. Refer to directives in *Pneu-C-20 Immunization Schedules for Individuals Who Have Qualifying Medical/Lifestyle Risk Factors*.

[1] For specific vaccine information, refer to SIM, Chapter 10, *Biological Products*.

2.7 Diabetes Mellitus

Individuals with diabetes mellitus type 1 or 2 are at high risk of influenza related complications, including pneumonia. In addition, individuals with longstanding diabetes mellitus often have complications such as cardiovascular, renal, and other organ dysfunction.

2.7A: Publicly Funded Vaccines - Diabetes Mellitus [1]

All routine vaccines **except Pneu-C-15 for children**	
Pneu-C-20	**Only for those younger than 65 years old**. Refer to directives in *Pneu-C-20 Immunization Schedules for Individuals Who Have Qualifying Medical/Lifestyle Risk Factors*.

[1] For specific vaccine information, refer to SIM, Chapter 10, *Biological Products*.

2.8 Liver Disease

Individuals with liver disease (including alcoholism, cirrhosis, hepatitis B, hepatitis C) are at increased risk for fulminant hepatitis A or more severe acute hepatitis B infection should infection occur. Chronic hepatitis C (HCV) infection develops in 70% - 80% of those infected. Chronic HCV may progress to cirrhosis, end-stage liver disease, and hepatocellular carcinoma. Individuals with chronic liver disease are at increased risk of developing pneumococcal infection and severe pneumococcal disease and its complications. Immunization should be done early in the course of disease, as the immune response may be suboptimal in advanced liver disease.

2.8A: Publicly Funded Vaccines[1] - Liver Disease

All routine vaccines **except Pneu-C-15 for children**	
Pneu-C-20	**Only for those younger than 65 years old**. Refer to directives in *Pneu-C-20 Immunization Schedules for Individuals Who Have Qualifying Medical/Lifestyle Risk Factors*.
HA	Individuals who are non-immune to HA
HB	Individuals who are non-immune to HB

[1] For specific vaccine information, refer to SIM, Chapter 10, *Biological Products*.

2.9 Lung Disease

Individuals with lung disease (excluding asthma unless on high dose oral corticosteroid therapy) are at higher risk of influenza related complications and hospitalization, including pneumococcal infection and potentially the exacerbation of their underlying disease.

2.9A: Publicly Funded Vaccines[1] - Lung Disease

All routine vaccines **except Pneu-C-15 for children**	
Pneu-C-20	**Only for those younger than 65 years old**. Refer to directives in *Pneu-C-20 Immunization Schedules for Individuals Who Have Qualifying Medical/Lifestyle Risk Factors*.

[1] For specific vaccine information, refer to SIM, Chapter 10, *Biological Products*.

2.10 Malignancies / Cancer (must have an active diagnosis, and not in remission)

These individuals are at increased risk of vaccine-preventable diseases because of their underlying condition and medical treatment (e.g., chemotherapy, radiation therapy). There is a broad spectrum in the potential immunologic impact of cancer depending on cancer type and treatment used. Specific malignancies (e.g., Hodgkin and non-Hodgkin lymphomas) are associated with significant deficits in cell-mediated immunity, which can persist even after cure. Other malignancies such as multiple myeloma and B-cell chronic lymphocytic leukemia are associated with deficiencies in humoral immunity and susceptibility, particularly to infection with encapsulated bacteria. For most cancers, the main period of immune suppression is during or immediately following chemotherapy and/or radiation therapy when neutropenia and mucosal injury may be present. Refer to Section 3.7 *Medical Treatment* for immunization recommendations for the individual who is currently undergoing treatment.

2.10A: Publicly Funded Vaccines[1] – Malignancies / Cancer (must have an active diagnosis)

Administer rotavirus vaccine and all routine **inactivated** vaccines **except Pneu-C-15 for children**	
Pneu-C-20	**Only for those younger than 65 years old**. Refer to directives in *Pneu-C-20 Immunization Schedules for Individuals Who Have Qualifying Medical/Lifestyle Risk Factors*.
Pneu-C-21	**Only for those 65 years and older.** Refer to directives in *Pneu-C-21 Immunization Schedules for Individuals 65 Years and Older.*
Hib	• Immunization with an age-appropriate primary series should be completed for children less than 5 years old • 1 dose Hib for people 5 years and older regardless of Hib immunization or Hib disease history. Provide at least 1 year after a previous Hib dose.
Var	**Specialist consultation required.** Refer to Appendix 7.2: *Varicella Immunization Referral Form.*
MMR	**Specialist consultation required.** Refer to Appendix 7.3 *MMR Immunization Referral Form.*

[1] For specific vaccine information, refer to SIM, Chapter 10, *Biological Products.*

2.11 Neurological Conditions that Impede the Clearance of Respiratory/Oral Secretions

Individuals with neurological conditions that impair the clearance of respiratory/oral secretions may be at higher risk of morbidity and mortality from bacterial and viral respiratory diseases and their sequalae. Those with neurologic disorders may be divided into two categories: those with a pre-existing neurologic condition prior to immunization, and those who developed symptoms of a new neurologic condition following immunization. Disorders that usually begin in infancy (e.g., cerebral palsy, spina bifida, seizure disorders, neuromuscular diseases and inborn errors of metabolism) may have symptoms identified before administration of the routine infant vaccines. Other disorders often appear later in childhood or adulthood (e.g., autism spectrum disorders, acute demyelinating encephalomyelitis, transverse myelitis, multiple sclerosis) and may appear coincidentally before or after administration of vaccines. There has been no causal relationship identified between any routine immunizations and autism spectrum disorders (MMR vaccine) or demyelinating disorders such as multiple sclerosis (hepatitis B vaccine).

2.11.A: Publicly Funded Vaccines[1] - Those with Neurological Conditions that Impede the Clearance of Respiratory/Oral Secretions

All routine vaccines **except Pneu-C-15 for children**	
Pneu-C-20	**Only for those younger than 65 years old**. Refer to directives in *Pneu-C-20 Immunization Schedules for Individuals Who Have Qualifying Medical/Lifestyle Risk Factors*.

[1] For specific vaccine information, refer to SIM, Chapter 10, *Biological Products*.

2.11.1 Development of a New Neurological Condition at Any time After Immunization

Neurologic events that occur in the 8-12 weeks following immunization are temporally associated with immunization. Temporal association alone is not evidence that the vaccine caused the neurologic condition. Children who experience hypotonic-hyporesponsive events or prolonged crying after receiving a vaccine(s) may receive the next dose of vaccine according to schedule.

Individuals who develop encephalopathy or encephalitis within 7 days following immunization should be investigated. Continue to immunize according to routine schedule those individuals whose condition is found to have a different etiology and those who recover fully by the next scheduled immunization. Individuals with encephalopathy that persists and who have no alternative etiology should be referred to a specialist for further consultation. Continue with routine immunization schedule if their condition is stable and found not to relate to immunization.

2.11.2 Guillain-Barré Syndrome

A MHO should be consulted before immunizing an individual who has a history of Guillain-Barré syndrome (GBS) related or unrelated to immunization. Influenza and tetanus toxoid-containing vaccines are contraindicated for individuals who developed GBS within 6 weeks of a dose of these vaccines without any other cause being identified. Individuals who have developed GBS outside this interval or who have a different etiology confirmed may receive subsequent doses of tetanus and/or influenza vaccines upon consultation with the regional MHO.

2.12 Renal Disease

Renal disease includes predialysis, hemodialysis or peritoneal dialysis clients, those with nephrotic syndrome, and candidates for or recipients of a kidney transplant. Formulate immunization strategies early in the course of progressive kidney disease, particularly if transplantation and/or long-term immunosuppressive therapy are being considered. All predialysis, hemodialysis, and peritoneal dialysis clients in hospital, community, home or self-care settings are eligible for this program. Vaccine administration should occur at the dialysis facility; however, in small communities the local health unit may arrange it.

Viral and bacterial infections are a major cause of morbidity and mortality in those who have chronic kidney disease or who are undergoing dialysis. Several issues put these individuals at increased risk of vaccine-preventable diseases:

- Vascular access catheters.
- Long-term peritoneal dialysis catheters.
- Immunosuppression prior to transplantation.
- Immune system compromise due to uremic state.
- Lower seroconversion rates to vaccines.
- Lower peak antibody titres following immunization.
- More rapid decline of antibody levels following immunization.

2.12A: Publicly Funded Vaccines [1] - Renal Disease

All routine vaccines **except Pneu-C-15 for children**	
Pneu-C-20	**Only for those younger than 65 years old**. Refer to directives in *Pneu-C-20 Immunization Schedules for Individuals Who Have Qualifying Medical/Lifestyle Risk Factors*.
Pneu-C-21	**Only for those 65 years and older.** Refer to directives in *Pneu-C-21 Immunization Schedules for Individuals 65 Years and Older*.
HB	Refer to Appendix 7.4 *High Dose Hepatitis B Immunization Algorithm*

[1] For specific vaccine information, refer to SIM, Chapter 10, *Biological Products*.

2.13 Sickle Cell Disease

Sickle cell disease may lead to functional asplenia. They are at increased risk for infection from pathogens, particularly those caused by encapsulated bacteria (e.g., pneumococcal, meningococcal, and Hib). Those who have sickle cell disease are at increased risk for fulminant pneumococcal sepsis associated with high mortality rates. This risk continues throughout their lifespan.

If they receive blood/blood products for disease management or treatment, ensure the client's risk factors are updated in Panorama (e.g., Chronic Medical Condition – Bleeding Disorders) and appropriate HB vaccine series is provided.

2.13A: Publicly Funded Vaccines[1] – Sickle Cell Disease

All routine vaccines **except Pneu-C-15 for children**	
Pneu-C-20	**Only for those younger than 65 years old**. Refer to directives in *Pneu-C-20 Immunization Schedules for Individuals Who Have Qualifying Medical/Lifestyle Risk Factors*.
Pneu-C-21	**Only for those 65 years and older.** Refer to directives in *Pneu-C-21 Immunization Schedules for Individuals 65 Years and Older*.
Men-C-ACYW-135	• Complete an age-appropriate primary series. • Eligible for 1 reinforcement dose every 5 years (after the last dose in the primary series).
Hib	• Immunization with an age-appropriate primary series should be completed for children less than 5 years old. • 1 dose Hib for people 5 years and older regardless of Hib immunization or Hib disease history. Provide at least 1 year after a previous Hib dose.
Men-B4C	• Complete an age-appropriate primary series.

[1] For specific vaccine information, refer to SIM, Chapter 10, *Biological Products*.

3.0 IMMUNOCOMPROMISED CONDITIONS

3.1 Congenital Immunodeficiency

Immunization of those with suspected or significant immunodeficiency should be performed only in consultation with medical experts. Congenital immunodeficiencies affecting innate, humoral, and T cell-mediated immunity, disorders of B-lymphocyte (humoral) immunity, T-lymphocyte (cell) mediated immunity, complement component deficiency (C_5-C_9, properdin, factor H, factor D), or phagocytic functions.

3.2 Acquired Complement Deficiency

Acquired complement immunodeficiency includes treatment with the terminal complement inhibitors. Upon medical specialist consultation, inactivated and component vaccines may be safely administered to individuals with all of these conditions, keeping in mind that many of the vaccine recipients will not develop an adequate immune response. Consider use of IVIg or pathogen-specific Ig if individual is exposed to vaccine-preventable disease. Live bacterial vaccines (e.g., oral typhoid vaccine, BCG) are contraindicated.

3.1A: Publicly Funded Vaccines[1] - Congenital Immunodeficiency and 3.2A: Publicly Funded Vaccines[1] - Acquired Complement Deficiency

All routine **inactivated** vaccines **except Pneu-C-15 for children**	
HB (only Congenital Immunodeficiency)	• Refer to Appendix 7.4 *High Dose Hepatitis B Immunization Algorithm*
Hib	• Immunization with an age-appropriate primary series should be completed for children less than 5 years old. • 1 dose Hib for people 5 years and older regardless of Hib immunization or Hib disease history. Provide at least 1 year after a previous Hib dose.
HPV-9	• **3-dose schedule**: 0.5 mL IM at 0, 2, and 6 months for females and males aged 9 up to and including 26 years of age with the following risk factors (ineligible at 27th birthday): ○ Immunocompromised – Acquired complement deficiency ○ Immunocompromised – Congenital immunodeficiency ○ Immunocompromised – HIV ○ Immunocompromised – Related to Disease ○ Immunocompromised – Treatment – Specify
Men-C-ACYW-135	• Complete an age-appropriate primary series. • Eligible for 1 reinforcement dose every 5 years (after the last dose in the primary series).
Men-B4C	Complete an age-appropriate primary series.
Pneu-C-20	**Only for those younger than 65 years old**. Refer to directives in *Pneu-C-20 Immunization Schedules for Individuals Who Have Qualifying Medical/Lifestyle Risk Factors.*
Pneu-C-21	**Only for those 65 years and older.** Refer to directives in *Pneu-C-21 Immunization Schedules for Individuals 65 Years and Older.*
Rotavirus	**Contraindicated.**
Var	**Specialist consultation required**. Refer to Appendix 7.2: *Varicella Immunization Referral Form.*
MMR	**Specialist consultation required**. Refer to Appendix 7.3: *MMR Immunization Referral Form.*

[1] For specific vaccine information, refer to SIM, Chapter 10, *Biological Products.*

3.3 Human Immunodeficiency Virus

The ability of these individuals to respond to vaccine antigens is related to the degree of immunosuppression at the time of immunization and may be inadequate. Immune response may be positively affected by the antiretroviral therapy an individual with HIV is receiving. These persons could be susceptible to vaccine-preventable diseases, even after appropriate immunization, unless a recent serological test demonstrates adequate antibody concentrations. **It is recommended to consult with the regional Medical Health Officer or an Infectious Disease (ID) specialist before administering live vaccines**. Refer to Appendix 7.2: *Varicella Immunization Referral Form* and Appendix 7.3: *MMR Immunization Referral Form*.

HIV Immunodeficiency is defined as follows:

1. Severely immunocompromised: This includes persons with a current CD4 count of less than 200, those with a history of AIDS defining illness, or persons with clinical manifestations of symptomatic HIV.
2. Limited immune deficits: Asymptomatic HIV infection, persons with CD4 counts between 200 -500.
3. **Not considered immunocompromised**: Persons with HIV with a current CD4 count greater than 500.

NOTE: Always confirm the client's state of immunosuppression with their specialist before proceeding with immunization.

Inactivated Vaccines

- There are no contraindications to the use of inactivated vaccines in these symptomatic and asymptomatic individuals at any time. However, the immune response to inactivated vaccines is suboptimal (depending on level of immunodeficiency). Incidence and severity of adverse reaction are not increased in these individuals.
- Post-immunization titres should be done one month after completing a primary hepatitis B or rabies series. Should the person not have mounted protective levels, further doses should be administered. The optimal timing of reinforcement (booster) doses for immunocompromised individuals who are at continued risk of HBV exposure and have mounted an initial response is not known. Periodic monitoring of anti-HBs may be considered, and booster doses provided if needed.

Live Attenuated Viral or Bacterial Vaccines

- As the client's illness progresses, the immune system weakens and the effectiveness of immunization decreases while the risk associated with administering live vaccines increases.
- Rotavirus vaccine may be administered on schedule to infants regardless of their CD4 counts unless another contraindication exists.
- Those with HIV infection are at increased risk for complications from varicella and herpes zoster. Monovalent varicella vaccine should be considered for certain asymptomatic and mildly symptomatic HIV infected children 12 months of age and older. **Consult with an Infectious Disease (ID) specialist before administering varicella vaccine to HIV infected individuals**. Refer to Appendix 7.2: *Varicella Immunization Referral Form.*
- Persons with HIV infection are at increased risk for severe complications from measles. MMR vaccine is recommended for those 12 months of age and older who are not considered severely immunocompromised. **Consult an Infectious Disease (ID) specialist before administering MMR vaccine to HIV infected individuals**. Refer to Appendix 7.3: *MMR Immunization Referral Form*.
- For those who received regular doses of intravenous immunoglobulin (IVIg), receipt of MMR and varicella vaccines should be considered approximately 14 days prior to the next scheduled dose of IGIV. Refer to SIM, Chapter 5, Section 3.5.1, *Immune Globulin Preparations or Blood: Timing Intervals for Vaccines Containing Live Measles, Mumps, Rubella, or Varicella Virus.*

3.3A: Publicly Funded Vaccines and Immune Globulins [1]– Human Immunodeficiency Virus

Administer rotavirus vaccine **and** all routine **inactivated** vaccines **except Pneu-C-15 for children**	
Pneu-C-20	**Only for those younger than 65 years old**. Refer to directives in *Pneu-C-20 Immunization Schedules for Individuals Who Have Qualifying Medical/Lifestyle Risk Factors*.
Pneu-C-21	**Only for those 65 years and older.** Refer to directives in *Pneu-C-21 Immunization Schedules for Individuals 65 Years and Older.*
HPV-9 **3-dose schedule**	For females and males aged 9 up to and including 26 years of age with the following risk factors (ineligible at 27th birthday): ○ Immunocompromised – Acquired complement deficiency ○ Immunocompromised – Congenital immunodeficiency ○ Immunocompromised – HIV ○ Immunocompromised – Related to Disease ○ Immunocompromised – Treatment – Specify
Men-B4C **Adults 18 years and older ineligible.**	Complete an age-appropriate series for children up to and including 17 years of age only.
Men-C-ACYW-135 **Adults 18 years and older ineligible for 2-dose primary series**	• Complete an age-appropriate series for children up to and including 17 years of age only. • Eligible for 1 reinforcement dose every 5 years (after the last dose in the primary childhood series). [*Reminder that this dose only applies to those who started the series before 18 years old*].
Hib	• Immunization with an age-appropriate primary series should be completed for children less than 5 years old. • 1 dose Hib for people 5 years and older regardless of Hib immunization or Hib disease history. Provide at least 1 year after a previous Hib dose.
HB	Refer to SIM Appendix 7.4: *High Dose Hepatitis B Immunization Algorithm.*
Var	**Specialist consultation required for age-based assessment**. Refer to Appendix 7.2: *Varicella Immunization Referral Form.*
MMR	**Specialist consultation required for age-based assessment**. Refer to Appendix 7.3: *MMR Immunization Referral Form.*
MMRV	**Contraindicated**
LAIV	**Contraindicated**

[1] For specific vaccine information, refer to SIM, Chapter 10, *Biological Products*.

3.4 Transplant Candidate or Recipient – Islet Cell

- Refer to Appendix 7.9: Publicly Funded Immunization Schedule for Adult Solid Organ Pre-Transplant Candidates and Appendix 7.10: Publicly Funded Immunization Schedule for Adult Solid Organ Post-Transplant Recipients.
- For adult and pediatric patients who receive their transplant outside of SK, consult with the jurisdictional transplant program coordinating things for the patient and to follow whatever schedule is requested even if their recommendations differ from Saskatchewan guidelines. The type of transplant, medical history, current medical condition, and immunosuppressive drugs are important factors when determining immunization regimens for post-transplant patients.

3.5 Transplant Candidate or Recipient – Solid Organ/Tissue

- Refer to Appendix 7.9: Publicly Funded Immunization Schedule for Adult Solid Organ Pre-Transplant Candidates and Appendix 7.10: Publicly Funded Immunization Schedule for Adult Solid Organ Post-Transplant Recipients.
- For adult and pediatric patients who receive their transplant outside of SK, consult with the jurisdictional transplant program coordinating things for the patient and to follow whatever schedule is requested even if their recommendations differ from Saskatchewan guidelines. The type of transplant, medical history, current medical condition, and immunosuppressive drugs are important factors when determining immunization regimens for post-transplant patients.

3.6 Transplant Recipient – Haematopoietic Stem Cell Transplant (HSCT)

- **Consult with the jurisdictional haematology/blood & bone marrow transplant program transplant physician for recommended immunizations. The type of transplant, medical history, current medical condition and immunosuppressive agents are important factors when determining immunization requirements for HSCT clients.**
- Decisions about which vaccines to give will be made by the transplant team and the vaccines provided by the Ministry of Health. **Public Health must administer the assigned immunization schedule provided by the transplant agency**.
- Refer to Appendix 7.6: *Publicly Funded Immunization Schedule for Adult Post-Hematopoietic Stem Cell Transplant Recipients* (all types) for recommended schedule for adults who receive their transplant in SK.
- For adult and pediatric patients who receive their transplant outside of SK, consult with the jurisdictional transplant program coordinating things for the patient and to follow that schedule.

Hematopoietic stem cell transplantation (HSCT) results in immunosuppression from:

- Hematopoietic ablative therapy preceding transplant;
- Medications used to prevent or treat graft – versus – host disease (GVHD); and
- In some cases, the disease process necessitating the transplantation.

HSCT generally involves the ablation of the bone marrow followed by reimplantation of the person's own stem cells (autologous HSCT) or stem cells from a donor (allogeneic HSCT). Recipients of allogeneic grafts from donors who are not closely matched siblings are at substantially greater risk for GVHD, suboptimal graft function, and delayed capability for immune system memory.

Depending on the pre-ablation immune status of the client in autologous HSCT or on the immune status of the donor in allogeneic HSCT, there may be some immunity to vaccine-preventable diseases following transplantation. However, antibody levels to vaccine preventable diseases decline 1 - 4 years after HSCT if the recipient is not re-immunized, regardless of whether the transplant was autologous or allogeneic. In the case of allogeneic HSCT, if possible, complete all appropriate vaccines and reinforcement doses for the donor at least 14 days before the procedure.

All clients registered with a provincial HSCT programs should be provided with a letter recommending both the vaccines and schedule of administration required. HSCT transplant recipients should receive all indicated vaccines regardless of immunization history because ablation of stem cells prior to the procedure will affect client's post-transplant immunity. Immunization with inactivated vaccines is generally started 6 - 12 months post HSCT, except inactivated influenza vaccine, which can be administered 4-6 months post HSCT.

Live vaccines must not be administered until 24 months post HSCT. Specialist consultation is required prior to immunization with live vaccines. Refer to Appendix 7.2: *Varicella Immunization Referral Form* and Appendix 7.3: *MMR Immunization Referral Form*. Live bacterial vaccines (e.g., oral typhoid vaccine, BCG) are contraindicated.

3.7 Medical Treatment

Immunosuppression may result from or be implemented before the following (non-exhaustive) medical treatments

- Long-term/high dose corticosteroids
- Cancer chemotherapies
- Radiation therapies
- Immunosuppressants (immunologic modulators, anti-rheumatic drugs (including tumour necrosis factor blockers), monoclonal antibody medications)
- Post-transplant – solid organ, islet cell or hematopoietic stem cell. For more information on transplant candidates and recipients refer to SIM Chapter 7.

Individuals immunized appropriately before receiving chemotherapy or radiation therapy are thought to retain immune memory after treatment and re-immunization is not necessary.

Inactivated Vaccines

Although inactivated vaccines can be safely administered any time before, during or after immunosuppression, inactivated vaccines should be administered at least 14 days before initiation of immunosuppressive therapy to optimize immunogenicity. If immunization cannot be completed prior to initiation of immunosuppressive therapy, generally a period of at least 3 months should elapse between therapy cessation and the administration of inactivated vaccines. If the therapy cannot be stopped, inactivated vaccines should be given when the therapy is at its lowest.

Except for inactivated influenza vaccine, immunization during chemotherapy or radiation therapy should be avoided if possible because antibody response might be suboptimal. Patients vaccinated within 14 days before starting immunosuppressive therapy or while receiving immunosuppressive therapy should be considered unimmunized and should be revaccinated at least 3 months after their therapy is discontinued providing their immune competence has been restored (CDC (2011), https://www.cdc.gov/mmwr/preview/mmwrhtml/rr6002a1.htm). A MHO referral is not required to re-immunize a client with inactivated vaccines according to above statement only.

Infants whose mothers took monoclonal antibody medications while pregnant are to be immunized with an age-appropriate series of Pneu-C-15 (i.e., 2 months, 4 months, 12 months).

Live Vaccines

Live vaccines are generally contraindicated during immunosuppressive therapy. Live vaccines should be administered at least 4 weeks before immunosuppressive therapy is started to reduce the risk of disease caused by the vaccine strain. An analysis of immunization risk versus benefit may be necessary if only low doses of therapy are required and there is significant risk of developing wild-type infection. In this case, consult with the individual's specialist before immunization. If this cannot be done safely, delay immunization for at least 3 months after immunosuppressive therapy has stopped.

Refer to SIM Appendix 8.2 Potentially Immunosuppressive Biologic Agents for live vaccine contraindications for infants whose mothers took monoclonal antibody medications during pregnancy.

3.7A: Publicly Funded Vaccines [1] - Medical Treatment

Administer all routine **inactivated** vaccines **except Pneu-C-15 for children**	
HPV-9	• **3-dose schedule**: 0.5 mL IM at 0, 2, and 6 months for females and males aged 9 up to and including 26 years of age with the following risk factors (ineligible at 27th birthday): ○ Immunocompromised – Acquired complement deficiency ○ Immunocompromised – Congenital immunodeficiency ○ Immunocompromised – HIV ○ Immunocompromised – Related to Disease ○ Immunocompromised – Treatment – Specify
Pneu-C-20	**Only for those younger than 65 years old**. Refer to directives in *Pneu-C-20 Immunization Schedules for Individuals Who Have Qualifying Medical/Lifestyle Risk Factors*.
Pneu-C-21	**Only for those 65 years and older.** Refer to directives in *Pneu-C-21 Immunization Schedules for Individuals 65 Years and Older*.
Hib	• Immunization with an age-appropriate primary series should be completed for children less than 5 years old. • 1 dose Hib for people 5 years and older regardless of Hib immunization or Hib disease history. Provide at least 1 year after a previous Hib dose.
Rotavirus	**Consult with infant's specialist.** [3]
Varicella	**Specialist consultation required.** Refer to Appendix 7.2: *Varicella Immunization Referral Form.*
MMR	**Specialist consultation required.** Refer to Appendix 7.3: *MMR Immunization Referral Form.*

[1] For specific vaccine information, refer SIM, Chapter 10, *Biological Products*.

[2] The third dose of pneumococcal conjugate vaccine that forecasts at 6 months of age is unnecessary for infants whose mothers took monoclonal antibody medications while pregnant.

[3] Refer to SIM Chapter 8, Appendix 8.2: *Potentially Immunosuppressive Biologic Agents.*

3.7.1 High Dose Corticosteroid Therapy

Only oral high dose systemic steroids interfere with vaccine induced immune responses (e.g., consider persons receiving prednisone equivalent of ≥ 2 mg/kg/day or 20 mg/day if weight > 10 kg, for ≥ 14 days to be immune suppressed). At least 1-3 months should elapse between high dose corticosteroid therapy administered for more than 2 weeks and administration of both inactivated vaccine (to ensure immunogenicity) and live vaccine (to reduce the risk of dissemination).

The following types of corticosteroid therapy will not cause immunosuppression and live vaccines can be administered to persons receiving such therapy:

- Oral prednisone equivalent of less than 2 mg/kg/day or less than 20 mg/day if weight > 10 kg;
- less than 14 days;
- prescribed as alternate day treatment or rapidly tapering with short-acting preparations;
- administered topically (skin, eyes, respiratory) or by intra-articular, intraocular, bursal, aerosol, rectal or tendon injection; or
- Children with adrenogenital syndrome and those receiving physiologic replacement doses (< 2 mg/kg of prednisone per day) of glucocorticoids should receive all routine immunizations on schedule.

4.0 POST-EXPOSURE

4.1 Infant Born to HBsAg Positive Mother or High Risk for HB ≥ 2000g

4.2 Infant Born to HBsAg Positive Mother or High Risk for HB < 2000g

Infants born to mothers who are HBsAg positive during pregnancy have a risk of contracting HB infection. Infants who contract HB infection have a 90-95% risk of developing chronic HB infection potentially leading to cirrhosis and hepatocellular carcinoma. All women should be screened for the presence of HBsAg during every pregnancy. If she is HBsAg is positive **or** has an unknown status but she is considered to be at high risk for HB infection (e.g. intravenous drug use, sex trade worker), protocols are in place to ensure that the infant is immunized with HBIg and HB vaccine as soon as possible after delivery.

When HBIg and HB vaccine is provided within 12 hours after birth, the risk of HB infection in the infant is reduced by 90% (CIG). Ideally, HBIg should be given immediately after birth, along with one dose of HB vaccine. Give HB vaccine and HBIg at the same time using separate syringes and separate limbs. The HB vaccine series for these infants should be completed at 6 months of age (refer to chart below). It is recommended that these infants be tested for HBsAg and anti-HBs when they are at least 9 months old, and at least 1 month but no more than 4 months after their HB series is complete (CIG).
Prior to discharge, Appendix 7.5: *Prophylactic Record Referral Form for Infants at High Risk of Hepatitis B* should be completed and referred to the appropriate health care practitioners.

4.2.1 Hepatitis B Infant Immunoprophylaxis Protocol [1, 2] (Whose Mothers are HBsAg positive or are at High Risk of HB Infection and Their Status is Unknown and STAT Order Testing Cannot be Obtained Within 12 Hours After Delivery).

Birth weight	Give < 12 hours after birth	Give at 1 month of age	Give at 2 months of age	Give at 6 months of age [3]
≥ 2000g	• **HBIg** 0.5 mL IM • **1st** HB vaccine 0.5 mL IM • Give at different sites	**2nd** HB vaccine 0.5 mL IM	**N/A**	**3rd** HB vaccine 0.5 mL IM
< 2000g	• **HBIg** 0.5 mL IM • **1st** HB vaccine 0.5 mL IM • Give at different sites	**2nd** HB vaccine 0.5 mL IM	**3rd** HB vaccine 0.5 mL IM	**4th** HB vaccine 0.5 mL IM

[1] For specific vaccine information, refer to SIM, Chapter 10, *Biological Products*.

[2] Refer to SIM, Chapter 5, Section 2.1, *Minimum Intervals for Specific Vaccine Series* for more information.

[3] Child must be 24 weeks of age or older to receive this dose.

5.0 SPECIAL POPULATION

5.1 Men who have Sex with Men

HA[1]	2 doses given 6 -12 months apart
HB[1]	Age-appropriate series
SMV[1]	Refer to SIM, *Chapter 10, Biological Products*.

[1] For specific vaccine information, refer to SIM, *Chapter 10, Biological Products*.

5.2 Pregnancy

"Benefits of vaccinating pregnant women usually outweigh potential risks when the likelihood of disease exposure is high, when infection would pose a risk to the mother or fetus, and when the vaccine is unlikely to cause harm". (Plotkin, Orenstein, & Offit, 2008, p. 99).

5.2.1 Pregnancy

Pregnancy is a time when a healthy woman may have more contact with the medical system than at any other time. All pregnant women should be evaluated for immunity to rubella and varicella and be tested for the presence of HBsAg at the first prenatal visit. It is an opportune time to assess her immunization status and administer any appropriate vaccines that will provide protection for both her and her child against vaccine-preventable diseases. There are no data to indicate that any of the currently approved vaccines are teratogenic or embryotoxic, result in specific adverse pregnancy outcomes, or result in inadequate antibody responses when given to pregnant women.

5.2.1.1 Inactivated Vaccines

- Inactivated influenza vaccine and COVID-19 vaccines are recommended.
- There are no data to indicate that currently approved inactivate vaccines are teratogenic or embryotoxic or have resulted in specific adverse pregnancy outcomes. However, a risk/benefit discussion with the client is encouraged and their potential for exposure should be considered (e.g., travel to high-risk country for polio, exposure to meningitis, or their partner is an IV drug user (HB)).

5.2.1.2 Live Vaccines

MMR, Var, and LAIV vaccines are indicated only for pre-conception and post-partum (including breastfeeding) women. Live, attenuated viral and live bacterial vaccines pose a theoretical risk to the developing fetus and are generally contraindicated during pregnancy. There are occasions when administration of a live vaccine during pregnancy may be considered (e.g., travel to a yellow fever endemic region), when the risk of disease outweighs any risk from receiving the vaccine**.**

Suggested guidelines before immunizing females of childbearing age with live vaccines include:

- Asking women if they are pregnant or might become pregnant in the next 1 month.
- Defer immunizing women who state they are pregnant or are planning a pregnancy in the next month.
- Explaining the theoretical risk to the fetus if live vaccines are given during pregnancy.
- Advise women to avoid becoming pregnant for 1 month after receiving a live vaccine.
- If a woman is pregnant and inadvertently immunized or becomes pregnant within 1 month of receiving a live vaccine, she should be counselled about the theoretical risk to the fetus.
- Live vaccine manufacturers monitor such incidents and can be contact as follows:
  - GlaxoSmithKline (Varilrix, Priorix) medical information line: 1-800-387-7374.
  - Merck Frosst (Varivax III, MMR II) medical services line: 1-800-567-2594.
- Immunization with live vaccines during pregnancy should not be a reason to terminate a pregnancy.

5.2.A: Publicly Funded Vaccines [1] - Pregnancy

Tdap *Refer to Appendix 7.7: Tdap Immunization Decision Chart for Pregnant Women*	• Offered Tdap at or after 27 weeks gestation. • If Tdap is administered to a pregnant individual **before** 27 weeks gestation, **they do not need another Tdap after 27 weeks gestation or post-delivery.** • A Tdap vaccine should be routinely offered in every pregnancy, irrespective of their immunization history. One dose of Tdap vaccine should ideally be provided between 27 and 32 weeks of gestation. Earlier immunization between 13 and 26 weeks of gestation may also be considered in some situations (e.g., in case of an increased risk of preterm delivery or travel) to allow for longer placental exposure to higher antibody levels and maximization of antibody transfer. While it is preferable that immunization is administered at least 4 weeks before birth to allow optimal transfer of antibodies and direct protection of the infant against pertussis, it should be considered until the end of pregnancy as it has the potential to provide partial protection. • Individuals who did not receive Tdap during their current pregnancy do not require Tdap post-delivery, unless they require a routine dose.
All **inactivated** routine vaccines.	• Inactivated influenza vaccine and COVID-19 vaccines are recommended. • There are no data to indicate that currently approved inactivated vaccines are teratogenic or embryotoxic or have resulted in specific adverse pregnancy outcomes. **However, a risk/benefit discussion with the client is encouraged and their current medical risk factors and potential for disease exposure should be considered (e.g., travel to high-risk country for polio, exposure to meningitis, or their partner is an IV drug user (HB)).**
LAIV	**Contraindicated during pregnancy.**
MMR [2]	**Contraindicated during pregnancy.**
Var [3]	**Contraindicated during pregnancy.**

[1] For specific vaccine information, refer to SIM, Chapter 10, *Biological Products.*

[2] MMR vaccine is recommended post-partum or preconception for susceptible women. Refer to Appendix 5.2: *Publicly Funded MMR Vaccine Eligibility.*

- Advise individuals to avoid pregnancy for one month following immunization.

[3] Refer to Appendix 5.4 *Publicly Funded Varicella Immunization Eligibility and Panorama Directives.* Women of childbearing age who do not have ANY of the following are considered susceptible to:

- Serological evidence of VZV IgG antibodies; or
- Documented evidence of immunization with two doses of a varicella-containing vaccine.
- Advise individuals to avoid pregnancy for one month following immunization.

5.2.1.3 Passive Immunizing Agents and Blood Products during Pregnancy

Pregnant women may receive immune globulin preparations (e.g., RabIg, VarIg) and blood products when indicated. No known risk exists for the fetus from passive immunization of pregnant women with any immunoglobulin preparations.

Susceptible women that are eligible to receive MMR or Var vaccines should be immunized as soon as possible post-partum. If they have received any immunoglobulin or blood products during pregnancy or the post-partum period, specific time intervals must be adhered to before administering live viral vaccines. Refer to SIM, Chapter 5, Section 3.5.1, *Immune Globulin Preparations or Blood: Timing Intervals for Vaccines Containing Live Measles, Mumps, Rubella, or Varicella Virus* for further information on recommended timing of vaccines and biological and immunoglobulin products. If an immune globulin is given more than 14 days after MMR or varicella vaccine, neither vaccine needs to be repeated.

5.2.2 Breastfeeding

- Breastfeeding mothers should receive all recommended immunizations according to schedule.
- Inactivated and live vaccines administered to breastfeeding women do not affect the safety of breastfeeding for women and infants, or maternal immune responses.
    - Exception:
        - Yellow fever (YF) vaccine should be avoided in breastfeeding women because of a risk of transmission of the virus in breastmilk. If travel to an endemic area is required, then immunizing breastfeeding women with YF vaccine is a lesser risk than that of acquiring the disease.

6.0 OCCUPATION

Best Practice Guidelines

The following guidelines constitute advice on best practices to facilitate/ensure consistent procedures and policies regarding employee immunizations. It is the responsibility of every employer to:

1. Assess the immunization/immunity status of each worker at the time of initial employment as per Section 6.5 as a guideline.
2. Obtain an immunization history, including documentation of the vaccines and doses received, and dates of administration.
3. Offer or refer for immunizations at the earliest opportunity to employees who do not have documented evidence of immunization or adequate immunity.
4. Maintain records of all immunizations provided, serologic, and tuberculin skin test results. The employee should also be provided with a copy of these records.
5. Institute an immunization recall system to ensure immunization series are completed.

Healthcare Worker Information

HCWs have the potential for exposure to patients and/or to infectious materials (e.g., body substances, contaminated medical supplies and equipment, contaminated environmental surfaces and air). HCWs are at risk of exposure to communicable diseases (diagnosed or undiagnosed) because of their contact with patients or material from infectious patients. The level of exposure risk and/ or transmission of pathogens and diseases should be considered in conjunction with the specific vaccines recommended, as exposure circumstances may vary in facilities. A HCW may have varying levels of risk if they change positions or work environments, therefore assessment of their potential risk should be ongoing. Should a HCW become exposed, infected, or knowingly have an increased risk of exposure (e.g. needle stick incident) their immunization schedule would be determined by the circumstances involved. Maintenance of HCW immunity against vaccine-preventable diseases is an integral part of a health care facility's occupational health program. Optimal usage of immunizations among HCWs will not only safeguard the health of staff members but may also protect patients from becoming infected by HCWs.

HCWs for which immunizations are contraindicated should have a medical exemption issued by their treating medical physician or nurse practitioner and reviewed by the facility Occupational Health and Safety Consultant and/or regional Medical Health Officer for validation of true contraindications. Such exemptions should be reviewed as appropriate (e.g., during influenza disease outbreaks).

6.1 Child Care

Maintenance of an up-to-date immunization status is vital to protect the health of both childcare workers and the children in their care. Persons who will be providing direct childcare should have written proof of vaccinations previously received. Employers are responsible to ensure that their employees are fully immunized. Refer to SIM, Chapter 5, *Immunization Schedules* for further information.

6.2 Health Care Worker – Eligibility for Publicly Funded Vaccines

The Saskatchewan Ministry of Health defines a AHA/SHA/SCA/CC/FNJ HCW as a clinical and/or non-clinical individual employed (paid) by AHA/SHA/SCA/CC/FNJ **and their respective affiliates**, and includes individuals who have been appointed as Practitioner Staff (e.g., midwives). This includes special care and long-term care facilities.

An HCW who is not employed by AHA/SHA/SCA/CC/FNJ and their respective affiliates is eligible for routine adult vaccines as noted in Chapter 5, *Immunization Schedules*.

6.2.1 Students of Health Care Professions – Eligibility for Publicly Funded Vaccines

Post-secondary students of health care professions are eligible to receive the same vaccines as noted in section 6.2; refer to section 6.3 Health Care Worker – Eligible for Publicly Funded Vaccines

Publicly funded HB vaccine is free only for the listed unimmunized, under-immunized or non-immune students of health care professions who:

- Are studying in and/or out-of-province; and
- Have a reasonable anticipated risk of HB exposure via blood and body fluids, and/or sharps injuries during training.

1. Undergraduate students in Medicine, Nursing, Dentistry, Pharmacy, Midwifery, Naturopathy, and Health Science Students (e.g., University Departments of Anatomy who may work with cadavers).
2. Students training to be:
    - Acupuncturists
    - Addiction counsellors
    - Biomedical Engineers
    - Blood Perfusion Technologists
    - Chiropractors
    - Cytologists & Cytogeneticists
    - Dental Aides/Assistants
    - Dental Hygienists
    - Dental Technicians
    - Dental Therapists
    - Detoxification Facility Workers
    - Electrophysiologists (human)
    - Embalmers, Morticians & Funeral Directors
    - Emergency Medical Technicians
    - Licensed Practical Nurses
    - Long Term Care Attendants
    - Massage Therapists
    - Medical Laboratory Assistants & Technicians
    - Medical Devise Reprocessing Technicians & Sterile Supply Workers
    - Medical Office Assistants
    - Medical Radiology Technicians
    - Nurse Aides
    - Nurse Practitioners
    - Occupational Therapists
    - Paramedics
    - Personal & Continuing Care Assistants
    - Pharmacy Technicians
    - Phlebotomists
    - Physical Therapists
    - Physician Assistants
    - Podiatrists
    - Psychiatric Nurses
    - Rehabilitation Medicine Specialists
    - Respiratory Therapists
    - Residential Care Aides

6.3 Health Care Worker – Eligible for Publicly Funded Vaccines

Refer to Chapter 10, *Biological Products* for specific vaccine information.

Vaccine	Immunity Criteria	Comments
Tdap	• Documentation of a 3-4 dose tetanus primary series, with last dose given < 10 years ago.	• Tdap given every 10 years after primary series **and it is not recommended to administer it sooner regardless of employer or educational institution.**
IPV	• Documentation of a 3-dose primary series given by any route with at least one dose received at 4 years of age or older.	• Reinforcement (booster) doses are not publicly funded or recommended after a primary series for HCWs.
HB	• Documentation of an age-appropriate 2 or 3 dose HB series **and** adequate serologic antibodies at least 4 weeks post immunization; **or** • Serological evidence of previous HB infection (anti-HBs+ & anti-HBc+; **or** HBsAg+ & Anti HBc IgM).	• Refer to SIM Chapter 10 HB Recommendations for Healthcare Workers & Students.
Influenza	• None	• Annual immunization.
COVID-19	• None	• Annual immunization.
Varicella	• Documentation of two doses of a varicella -containing vaccine; or • Serological evidence of VZV IgG antibodies.	• Contraindicated during pregnancy. Counsel women to avoid pregnancy for 1-month post-immunization.
Measles	• Documentation of two doses of a measles-containing vaccine; **or** • Serological evidence of measles IgG antibodies.	• MMR vaccine is publicly funded for HCWs. Refer to Chapter 5, *Appendix 5.2: Publicly Funded MMR Vaccine Eligibility* to assess MMR dose eligibility. • Contraindicated during pregnancy. Counsel women to avoid pregnancy for 1-month post-immunization
Mumps	• Documentation of two doses of a mumps-containing vaccine; **or** • Serological evidence of mumps IgG antibodies.	• MMR vaccine is publicly funded for HCWs. Refer to Chapter 5, Appendix 5.2: *Publicly Funded MMR Vaccine Eligibility* to assess MMR dose eligibility. • Contraindicated during pregnancy. Counsel women to avoid pregnancy for 1-month post-immunization.
Rubella	• Documentation of **one** dose of a rubella-containing vaccine (NOTE: Although a second dose of rubella is not considered necessary for immunity, it is not harmful and may benefit the 1% to 5% of people who do not respond to primary immunization (CIG)); **or** • Serological evidence of rubella IgG antibodies.	• MMR vaccine is publicly funded for HCWs. Refer to Chapter 5, *Appendix 5.2: Publicly Funded MMR Vaccine Eligibility* to assess MMR dose eligibility. • Contraindicated during pregnancy. Counsel women to avoid pregnancy for 1-month post-immunization.

7.0 OTHER POPULATIONS

7.1 Premature Birth

A premature infant whose health is assesses by their physician to be clinically satisfactory should be immunized at the same chronological age as full-term infants, according to the routine immunization schedule. Antibody response to immunization is generally a function of chronological age rather than maturity and vaccine efficacy is high in premature infants. Low rates of adverse events are similar to those of full-term infants.

Premature infants have lower maternal antibodies titres and shorter duration of maternal antibody protection. The severity of vaccine preventable illnesses may be greater in preterm and low birth weight infants. Preterm birth is associated with increased risk of complications and death from pertussis in infancy. Preterm infants are at greater risk of developing complications from influenza. All preterm infants 6 months of age and older and their household contacts should be immunized yearly with (publicly funded) influenza vaccine.

Premature infants and other children at risk of contracting respiratory syncytial virus (RSV) may be eligible to receive an RSV-specific monoclonal antibody (i.e., palivizumab or nirsevimab). These do not interfere with the immune response of vaccines (refer to SIM, Chapter 5, *Immunization Schedules*, Section 3.5, *Spacing of Live Vaccines, Blood Products and Immune Globulin Preparations*. A provincial RSV program exists to coordinate this service outside of public health https://momsandkidssask.saskhealthauthority.ca/infant-child-health/specialty-care/respiratory-syncytial-virus-program.

Publicly Funded Vaccines [1] – Premature Birth

All routine vaccines	Immunize according to routine schedule as appropriate for age

[1] For specific vaccine information, refer to SIM, Chapter 10, *Biological Products*.

7.2 Individuals Recently New to Canada

Immunization of children and adults, including foreign students, who have newly arrived in Canada is challenging because:

- Documented Immunization records may not exist or be suspect.
- Refer to Appendix 7.8 *Publicly Funded Immigrant and Refugee Immunization and Serology Recommendations* when assessing individuals recently new to Canada.
- For specific vaccine eligibility information, refer to SIM, Chapter 5 *Immunization Schedules*. All immunization recommendations in chapter 5 are for routine immunizations. Individuals may be eligible for additional vaccines based on health conditions or other risk factors.
- For specific vaccine information, refer to SIM Chapter 10 *Biological Products.*
- Records that do exist may be difficult to interpret because of language barriers. Refer to Appendix 14.4 *Immigrant Immunization Resources* for translation aids.
- Immunization schedules and products may differ from those used in Canada.
- Translation of foreign terms for immunization products can be found at https://www.cdc.gov/vaccines/pubs/pinkbook/appendix/appdx-b.html
- Information on vaccination schedules in other countries can be found at the WHO Immunization Data https://immunizationdata.who.int/global?topic=Vaccination-schedule&location=

Only written documentation of immunizations should be considered valid evidence of prior immunization history. The potency of vaccines administered in other countries can be generally assumed adequate. Immunizations received outside Canada can be considered valid if the written documentation indicates the vaccine antigen types, administration dates, number of doses, intervals between doses, and the age of the client at time of immunization are comparable with the current Saskatchewan recommendations. Re-immunize any child immunized outside of Canada, if any question exists about whether vaccines were administered or were immunogenic. In some situations, use of serologic testing may be useful in determining which vaccines are needed. If a child experiences a significant local reaction after one dose of tetanus and diphtheria-containing vaccine, consider serologic testing for antibodies to diphtheria and tetanus toxoids.

Internationally adopted children from orphanages may differ from refugee children in terms of their access to medical care and treatment before arrival in Canada. Immunization records for certain children, especially children from orphanages, may not be accurate (e.g., MMR may be recorded but the actual product administered may be missing one of the antigens). Refugee children may have resided in refugee processing camps for months before resettlement in Canada and may have had access to medical care and immunization in the camp. The following vaccines are in limited use in the developing world and, therefore, individuals from such areas are unlikely to have received them.

- Meningococcal conjugate
- Pneumococcal conjugate
- Hib
- HPV
- Hepatitis B
- Varicella
- Mumps and rubella (measles vaccine alone is often given)

The epidemiology of different diseases varies in other countries:

- Compared with temperate climates, in the tropics a higher proportion of varicella disease occurs in adults, meaning that children, adolescents and young adults from those areas are more likely to be susceptible to varicella.
- Hepatitis A immunity is more common in individuals from endemic countries and regions.
- Individuals born in developing countries are more likely to be hepatitis B carriers, necessitating the need for assessment and immunization of their sexual and household contacts.

Ask the following questions when assessing the immunization status of an individual who is new to Canada:

- What country has the individual come from or lastly resided in?
- Were they in an orphanage or refugee camp?
- When did they arrive in Canada?
- Which immunizations were given prior to arrival and when?
- Were the immunizations comparable to Canadian recommendations, particularly:
  - Vaccine type;
  - Dates of administration;
  - Numbers of doses;
  - Intervals between doses; and
  - Age of client at time of immunization.

- What diseases were endemic in the country of previous residence?
  - If a client assessment is done, the following tests are particularly relevant in determining the need for some vaccines or contraindications to vaccination:
- Hepatitis B surface antigen (HBsAg), hepatitis B surface antibody (anti-HBs), and hepatitis B core antibody (anti-HBc): To identify current or chronic infection, past resolved infection, or evidence of immunization. Should any member of the family test positive for HBsAg, assess and immunize all susceptible sexual and household contacts. Refer to Appendix 7.8.
- Hepatitis C antibody: If anti-HCV is positive in children < 18 months (may be due to circulating maternal antibodies), order hepatitis C PCR. Offer hepatitis A and B vaccines to individuals with hepatitis C infection. Refer to Appendix 7.8.
- Human immunodeficiency virus (HIV): If individual is from a country with high rates of HIV and HIV status is unknown, testing should be encouraged. Routine HIV testing is done during the immigration medical examination for everyone > 15 years of age and certain children (those who received blood products, those whose mother was known to be HIV positive). If anti-HIV is positive in children 18 months or younger (may be due to circulating maternal antibodies), order HIV PCR.
- In the context of a complete clinical assessment in which no signs or symptoms consistent with advanced HIV/AIDS are identified, immunization with live vaccines may proceed when HIV tests are not yet available. Live vaccines are contraindicated for individuals with advanced HIV infection. Refer to Chapter 7, Section 1.0, *Immunocompromised Individuals*.
- Families new to Canada may return to their country of origin to visit friends and relatives or may receive visitors from their country of origin. Encourage such families to visit a travel health professional for consultation and immunization with appropriate vaccines, particularly HA and HB vaccines. Refer to SIM Chapter 10, *Hepatitis B Vaccine – Immigrant Populations Ineligibility List* which applies to children and adults.

7.3 Unknown or Uncertain Immunization Status/Inadequate Immunization Records

Refer to Chapter 5, *Section 4.1 Unknown or Uncertain Immunization Status* for Canadians, foreign-born adult, and child **immunization directives.**

7.4 Travelers

Generally, vaccines for travellers are not publicly funded but there are some exceptions. Refer to SIM Chapter 5 Appendix 5.2 *Publicly Funded MMR Vaccine Eligibility* for parameters. Tetanus-containing vaccines for reinforcement are also publicly funded. Booster doses of IPV are not publicly funded.

Advise individuals considering international travel to make an appointment for a full consultation with a travel health provider. Refer clients to the following websites for travel health information:

- *Canadian Immunization Guide*, Immunization of Travellers section, available at: http://www.phac-aspc.gc.ca/publicat/cig-gci/p03-10-eng.php
- Public Health Agency of Canada - Travel Health section of the web site: available at http://www.travelhealth.gc.ca
- U.S. Centers for Disease Control and Prevention - Traveler's Health, available at: http://wwwn.cdc.gov/travel/default.aspx
- World Health Organization - International Travel and Health, available at: http://www.who.int/ith/en

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9.0 APPENDICES

Appendix 7.1: Publicly Funded Vaccine Recommendations for Specific Populations by Panorama Risk Factor Category

- Risk factors names are exactly worded from Panorama Immunization Module. Not all agents forecast and/or validate for all risk factors in Panorama.
- Refer to the specific immune-suppressing conditions in SIM Chapter 7, *Special Populations* and specific vaccines in SIM Chapter 10, *Biological Products*.

CHRONIC MEDICAL CONDITION (non-exhaustive examples)	Hib	HA	HB	MMR	Men-C-ACYW-135	Men-B4C	Pneu-C	Var
Asplenia (**congenital, acquired, functional**) - congenital asplenia/hyposplenia; heterotaxy syndrome with asplenia / polysplenia; surgical splenectomy because of trauma, tumour, or as treatment for disease (e.g., idiopathic thrombocytopenic purpura, thalassemia major, spherocytosis); polysplenia; hemoglobinopathies	•[8]				•[1, 10]	•	•[2]	
Bleeding disorders - haemophilia; thrombocytopenia; von Willebrand's disease; Individuals who receive repeated infusions of blood or blood products or plasma-derived replacement clotting factors		•	•					
Cardiac disease [must be chronic conditions] – coronary or peripheral artery disease; cardiomyopathies; heart failure; complications from pericarditis or myocarditis; valvular disease; cerebrovascular disease; congenital heart disease; heart murmurs **in infants. Consult MHO for other cardiac conditions.**							•[2]	
CSF disorder - hydrocephalus; impaired cerebrospinal fluid disorder; lymphatic transport; surgical shunts					•[1]		•[2]	
Cochlear implant – candidate or recipient	•[8]				•[1]		•[2]	
Cystic fibrosis - aka mucoviscidosis							•[2]	
Diabetes mellitus - type 1 (IDDM); type 2 (NIDDM)							•[2]	
Liver disease – alcoholism; alcoholic liver disease; fatty liver disease; cirrhosis; primary biliary cirrhosis; Budd–Chiari syndrome; primary sclerosing cholangitis; Hemochromatosis; Wilson's disease; transthyretin-related hereditary amyloidosis; Gilbert's syndrome; Biliary atresia; Alpha-1 antitrypsin deficiency; Alagille syndrome; progressive familial intrahepatic cholestasis		•	•				•[2]	
Liver disease – HB (infection)		•					•[2]	
Liver disease – HC (infection)		•	•				•[2]	
Lung disease - asthma ONLY if on high dose oral corticosteroid therapy; bronchopulmonary dysplasia; cystic fibrosis; chronic obstructive pulmonary disorder; pleural mesothelioma; pulmonary tuberculosis; pulmonary arterial hypertension; pulmonary edema; pulmonary hematoma; congenital cystic adenomatoid malformation; restrictive lung disease							•[2]	
Malignancies / Cancer – **current** cancer of any organ/body system	•[8]			C[6]			•[2]	C[6]
Neurological conditions that impede the clearance of respiratory/oral secretions -transient ischemic attacks; cerebrovascular accidents; cerebral palsy; spina bifida; seizure disorders; acute demyelinating encephalomyelitis; transverse myelitis; Guillain-Barre syndrome; multiple sclerosis							•[2]	
Renal disease - nephrotic syndrome; predialysis; peritoneal dialysis; hemodialysis			•[3]				•[2]	
Sickle cell disease	•[8]				•[1, 10]	•	•[2]	

IMMUNOCOMPROMISED (non-exhaustive examples)	Hib	HA	HB	HPV-9	Men-C-ACYW-135	Men-B4C	Pneu-C	MMR	Var	Rota
Acquired Complement Deficiency -treatment with Solaris® (e.g., terminal complement inhibitor eculizumab)	•[8]			•[5]	•[1, 10]	•	•[2]	C[6]	C[6]	C
Congenital Immunodeficiency - B cell deficiency; T-cell defects; complement component deficiency (C5-C9, properdin, factor H, factor D); phagocytic and neutrophil disorders	•[8]		•[3]	•[5]	•[1, 10]	•	•[2]	C[6]	C[6]	C
HIV	•[8]		•[3]	•[5]	•[1, 4, 10]	•[4]	•[2]	C[6]	C[6]	•[14]
Related to Disease – myelodysplasia; collagen vascular disease	•[8]			•[5]			•[2]	C[6]	C[6]	
Treatment - Additional info - chemotherapy and radiation therapies; currently taking immunosuppressants (e.g., for inflammatory bowel disease; systemic lupus erythematosis; rheumatoid arthritis (e.g., immune modulators such as anti-rheumatics drugs); long-term corticosteroids; infant's mother took monoclonal antibodies during pregnancy	•[8]			•[5]			•[2]	C[6]	C[6]	C
Transplant Candidate or Recipient - Islet Cell	Refer to SIM Ch. 7 Sections 3.4, 3.5 and 3.7. Administer transplant agency recommended vaccines as scheduled. [6, 7] Contact the transplant agency directly if client vaccine eligibility concerns arise.									
Transplant Candidate or Recipient - Solid Organ/Tissue - all solid organ/tissue transplant candidates and recipients										
Transplant Recipient - HSCT										

POST-EXPOSURE (Refer to the *Saskatchewan Communicable Disease and Control Manual for all cases)*	HB	HBIg	Rab	RabIg	TIg	T	VarIg
Blood and Body Fluids - percutaneous or mucosal exposure to blood or body fluid (e.g., needle stick injury, human bite); or to HBsAg positive source; sexual assault	•	•					
Infant Born to HBsAg+ Mom or High Risk for HB	•	•					
Rabies - individual with animal bite/exposure with risk of rabies (with MHO approval)			•	•			
Tetanus-prone wound - TIg required - contraindication to a tetanus toxoid-containing vaccine; significant immune deficiency state; unimmunized individual with a tetanus-prone wound. Refer to Ch. 5 Section 3.7 *Tetanus Prophylaxis in Wound Management.*					•[9]		
Tetanus - Refer to Ch. 5 Section 3.7 *Tetanus Prophylaxis in Wound Management*						•[11]	
Varicella –susceptible individuals at increased risk of severe varicella disease							•

TREATMENT	BAT	BabyBIg	DAT
Botulism - Greater than or equal to one year of age	•		
Botulism - Less than one year of age	•	•	
Diphtheria			•

SPECIAL POPULATION	HA	HB	HBIg	Pneu-C	MMR	Var	Tdap	SMV
Children of Immigrants – HB - children of immigrants from regions of intermediate or high HB prevalence. This includes all children born before the family's arrival in Canada and all children born after the family's arrival in Canada.		•						
Hepatitis A Program - Targeted Community - People born since January 1, 1982, who: live in any SK First Nations community; live in the Athabasca Health Authority; or live in a non-First Nations community in Northern SK (former Mamawetan Churchill River and Keewatin Yatthé health regions excluding Creighton, Air Ronge and La Ronge).	•							
Homeless				• [2]				
Household member of an immunocompromised person	Refer to SIM Chapter 5 Section 1.0 *Routine Schedules*							
LTC facility - **resident** - adults and children				• [2]				
Personal care home resident - adults and children				• [2]				
Non-responder - HB - non-responder to a **second** valid series of hepatitis B vaccine (i.e., a non-responder after 2 complete series)			•					
Non-responder - Additional information - specify disease after valid appropriate series complete e.g., varicella, measles, mumps, rubella, HA, **first** HB series, etc.	Specify disease							
Substance Use – Illicit non-injection drug use - use by ingestion, snorting, smoking, inhalation etc., excluding injection. **Cannabis products excluded.**	•	•		• [2]				
Substance Use – Injection drug use - use by injection	•	•		• [2]				
Potential Exposure – HA - sexual partners and household contacts of individuals who use illicit drugs	•							
Potential Exposure – HB - males and females with multiple sexual partners; sexual partners and household contacts of individuals who use illicit drugs		•						
Pregnancy – every pregnancy							•	
Resident – Group Home - adult and child residents of institutions for persons with cognitive or developmental disabilities; and Saskatchewan Hospital North Battleford.		•		• [2]				
Resident – Provincial Correctional Facility		•						
Sexual Behaviour - MSM	•	•						•
Varicella - Woman Childbearing Age						•		

OCCUPATION	HB	MMR	Var	IPV
Child Care - Child care employees; post-secondary childcare students	Refer to SIM Ch. 5			
Health Care Worker – eligible for publicly funded vaccines	Refer to SIM Ch. 7			

TRAVEL	MMR
Publicly funded - **Pre-exposure** - Refer to SIM *Chapter 5 Appendix 5.2*	•
Sales Program	N/A

CONTACT **(Refer to the *Saskatchewan Communicable Disease and Control Manual for all cases)***	HA	Ig	HB	HBIg	Men-C-ACYW-135	Men-B4C	MMR	ap/aP
HA - contact to an acute lab confirmed HA case	•	•						
HB - sexual contact of an acute or chronic HB case; household and close contacts of an acute or chronic HB case			•	•				
IMD Serogroup A, C, Y, or W-135 - contact to a lab confirmed case of invasive meningococcal disease serogroup A, C, Y, or W-135 when immunoprophylaxis is recommended					•			
IMD Serogroup B - contact to a lab confirmed case of invasive meningococcal disease serogroup B when immunoprophylaxis is recommended						•		
Measles - contact to lab confirmed case of measles when immunoprophylaxis with measles-containing-vaccine or Ig/IVIg is recommended		•					•	
Pertussis outbreak: Defined community - use only for an outbreak declared in a defined community by the MHO, and as directed by the Ministry of Health. This does not apply to individual cases.								•

C – Consultation required as may be contraindicated.

[1] A high-risk child who is 1 year old should receive Men-C-ACYW-135. If younger, give Men-C-ACYW-135 as per infant schedules; don't wait/delay giving the series until the person is 1 year old.

[2] Refer to these SIM CH. 10 immunization directives for guidance and eligibility parameters: *Pneu-C-20 Immunization Schedules for Individuals Who Have Qualifying Medical/Lifestyle Risk Factors* **OR** *Pneu-C-21 Immunization Schedules for Individuals 65 Years and Older*.

[3] Refer to Appendix 7.4*: High Dose Hepatitis B Immunization Algorithm* appropriate dosages and products appropriate for client's age.

[4] Children up to and including 17 years of age only.

[5] 3-dose series; must receive first public funded dose before age 27 to continue publicly funded series.

[6] Medical consultations are required. Refer to Appendix 7.2: *Varicella Immunization Referral Form* and Appendix 7.3 *MMR Immunization Referral Form*.

[7] Transplant agency determines immunizations.

[8] People 5 years and older with medical conditions noted in SIM Chapter 10*, Biological Products* regardless of Hib immunization or Hib disease history.

[9] If received less than 3 tetanus vaccine doses in the past.

[10] Lifetime Men-C-ACYW-135 boosters every 5 years as noted in SIM Chapter 10*, Biological Products*.

[11] Use appropriate tetanus vaccine formulations based on age and antigen requirements.

[12] Only for residents of institutions for the developmentally challenged.

[13] Rotavirus vaccines can be given to HIV+ infants regardless of CD4 counts unless another contraindication exists.

[14] Infants whose mothers took monoclonal antibodies during pregnancy are ineligible for Pneu-C-20. Document an exemption as per SIM CH. 5 Appendix 4.2.

Appendix 7.2: Varicella Immunization Referral Form (Ages 1+ years)

Immunization of immunocompromised adults and children with live attenuated varicella vaccine requires approval from the medical specialist, primary care physician or nurse practitioner most familiar with the client's current medical status.

Patient name: _____

DOB: _____yyyy/mm/dd_____ **Gender** _____ **HSN** _____

Check the appropriate condition below:

☐ **HIV infection**[1] – **only individuals who are not severely immunosuppressed** as indicated according to criteria based on age for immunization:

Age 1 through 5 years old	Age ≥ 6 years old
CD4+ T-lymphocyte counts ($x10^6$/L) for ≥ 6 months: **≥ 500**	CD4+ T-lymphocyte counts ($x10^6$/L) for ≥ 6 months: **≥ 200**
Total lymphocytes: **≥ 15%**	Total lymphocytes: **≥15%**

☐ **Isolated immune deficiency**[2]
- ☐ Humoral (Ig) deficiency diseases
- ☐ Neutrophil deficiency diseases
- ☐ Complement deficiency diseases

☐ **Transplant recipient** ☐ Kidney ☐ Liver ☐ HSCT ☐ Other (specify)_____

☐ **Long-term immunosuppressive therapy**[3]

☐ **Other condition** (specify): _____
_____

☐ **Comments:** _____
_____

Section A OR B must be completed by a physician or a nurse practitioner and sent to the Public Health Centre

Section A

1) I verify on _____yyyy/mm/d_____ that this patient **currently has a medical contraindication** to receiving varicella vaccine and cannot be immunized.

Section B

1) *If applicable:* VZV IgG result: _____ Date of titre: _____yyyy/mm/dd_____

2) I verify on _____yyyy/mm/dd_____ that this patient has no medical contraindications to receiving varicella vaccine.

3) I understand that this patient may require up to 2 doses given at least 3 months apart and verify that this client's condition is sufficiently stable to receive up to 2 doses within an 8-month period from when this referral has been received at Public Health.

Signature: _____ ❑**MD** ❑**NP** **Clinic**: _____

Phone #: _____ **Fax #:** _____ **Email**: _____

Section C to be completed by Public Health Nurse and faxed back to physician or nurse practitioner:

Dose 1 date given: _____yyyy/mm/dd_____ Lot #: _____

Dose 2 date given: _____yyyy/mm/dd_____ Lot #: _____

Public Health Nurse's name (print): _____

Phone #: _____ **Fax**: _____ **Email:** _____

[1] Varicella and MMR **may be** administered on same day. **MMRV vaccine contraindicated.**

[2] Min. 4-week intervals **are required** between all Varicella and MMR vaccine doses. **MMRV vaccine contraindicated.**

[3] **Live vaccines are contraindicated during immunosuppressive therapy.** However, the patient's clinical status, net state of immune suppression (including immunosuppressive medications and presence of opportunistic infections), and an in-depth immunologic evaluation are important consideration when deciding about risk versus benefit for live virus immunization.

Appendix 7.3: MMR Immunization Referral Form (Ages 1+ years)

Immunization of immunocompromised adults and children with live attenuated measles-mumps-rubella vaccine requires approval from the medical specialist, primary care physician or nurse practitioner most familiar with the client's current medical status.

Patient's name: _____

Patient's DOB: _____ yyyy/mm/dd **Gender** _____ **HSN #:** _____

Check the appropriate condition below:

☐ **HIV infection**[1] – **only individuals who are not severely immunosuppressed** as indicated according to criteria base on age for immunization:

Age 1 through 5 years old	Age ≥ 6 years old
CD4+ T-lymphocyte counts ($x10^6$/L) for ≥ 6 months: **≥ 500**	CD4+ T-lymphocyte counts ($x10^6$/L) for ≥ 6 months: **≥ 200**
Total lymphocytes: **≥ 15%**	Total lymphocytes: **≥15%**

☐ **Isolated immune deficiency**[2]
- ☐ Humoral (Ig) deficiency diseases
- ☐ Neutrophil deficiency diseases
- ☐ Complement deficiency diseases

☐ **Transplant recipient** ☐ Heart ☐ Liver ☐ HSCT ☐ Other (specify)_____

☐ **Long-term immunosuppressive therapy**[3]

☐ **Other condition** (specify): _____

_____

☐ **Comments:** _____

_____

Section A OR B must be completed by a physician or a nurse practitioner and sent to the Public Health Centre

Section A

1) I verify on _____ yyyy/mm/d that this patient **currently has a medical contraindication** to receiving MMR vaccine and cannot be immunized.

Section B

1) I verify on _____ yyyy/mm/d that this patient **has no medical contraindications** to receiving MMR vaccine.

2) I understand that they may require up to 2 doses given at least 3 months apart and verify that this client's condition is sufficiently stable to receive up to 2 doses within an 8-month period from when this referral has been received at Public Health.

Signature: _____ ❑ **MD** ❑ **NP** **Clinic:** _____

Phone #: _____ **Fax #:** _____ **Email:** _____

Section C to be completed by Public Health Nurse and faxed back to physician or nurse practitioner:

Dose 1 date given: _____ yyyy/mm/dd Lot #: _____

Dose 2 date given: _____ yyyy/mm/dd Lot #: _____

Public Health Nurse's name (print): _____

Phone #: _____ **Fax:** _____ **Email:** _____

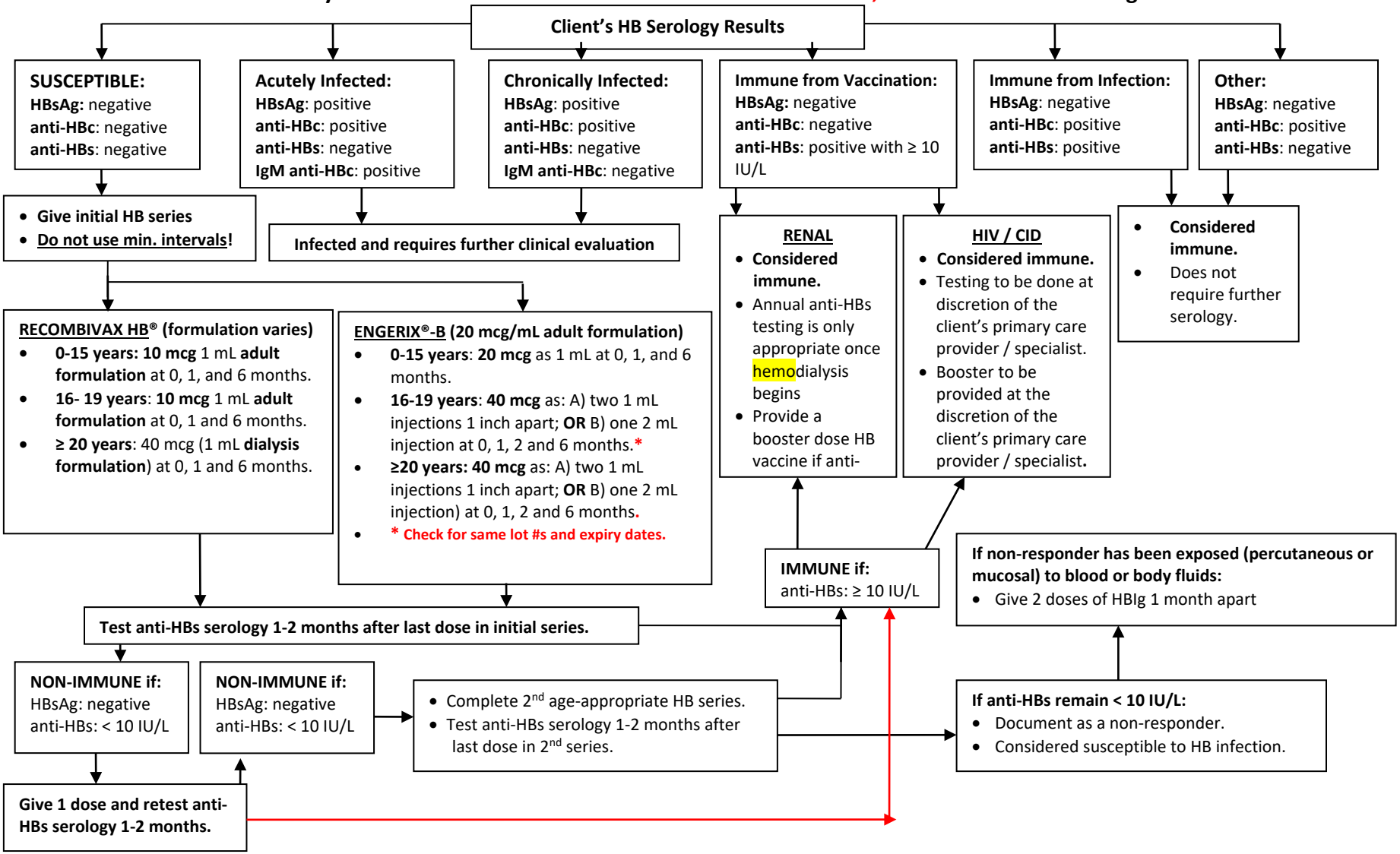
[1] Varicella and MMR **may be** administered on same day. **MMRV vaccine contraindicated.**

[2] Min. 4-week intervals **are required** between all Varicella and MMR vaccine doses. **MMRV vaccine contraindicated.**

[3] **Live vaccines are contraindicated during immunosuppressive therapy.** However, the patient's clinical status, net state of immune suppression (including immunosuppressive medications and presence of opportunistic infections), and an in-depth immunologic evaluation are important consideration when deciding about risk versus benefit for live virus immunization.

Appendix 7.4: High Dose Hepatitis B Immunization Algorithm - Renal, HIV, Congenital Immunodeficiency Deficiency [CID] Clients

***NOTE: If any dose in a series for those 16 and older is ENGERIX®-B, a 4-dose series must be given.**



Appendix 7.5: Infant Hepatitis B Prophylaxis Record Referral Form

Note to physician/midwife/nursing staff delivering infant:

After giving the first injection of HB vaccine, please complete and return this form to the Regional Public Health or First Nations Inuit Health office of the parent/guardian's region of residence. Regional health authority contact information is available http://www.saskatchewan.ca/residents/health/accessing-health-care-services/immunization-services#immunization-forms-and-fact-sheets

INFANT INFORMATION

Name _____ _____ _____
Last Name First Health Services Number

Date of Birth _____ Sex _____ Birth Weight_____ grams
yyyy/mm/dd

HOSPITAL/SITE OF DELIVERY _____

Physician/midwife Name _____

Address _____

BIRTH MOTHER INFORMATION

Name _____ _____ _____
Last Name First Middle

Date of Birth _____ PHN _____
yyyy/mm/dd

Address _____ Postal Code _____

Phone _____

Immunization	Date (YY/MM/DD)	Lot Number	Panorama entered?
HBIg 0.5 mL IM			
#1 HB 0.5 mL IM			

Infant's Family Physician or Pediatrician:

Name _____

Address _____

Postal Code _____ Phone _____

If placed for Adoption:

Parent(s) Name(s) _____ Phone _____

Address _____

OR

Child and Family Services Social Worker:

Name _____

Address _____ Phone _____

NOTES: _____

Appendix 7.6: Publicly Funded Immunization Schedule for Adult Post-Hematopoietic Stem Cell Transplant Recipients (autologous and allogeneic)

NOTE: The SCA endorses that this schedule is to be strictly followed by healthcare providers at determined intervals. When questions or concerns arise that are related to the SCA's HSCT immunization schedule, direct them to SCA.

	Months post-transplant											
Vaccines [18]	**≥ 4**	**5**	**6**	**7**	**8**	**10**	**12**	**14**	**18**	**20**	**≥ 24**	**26**
COVID-19 mRNA	●¥	●¥		●¥		●						
HA [2]							●				●	
HB (high dose) [2, 11, 12]							●	●			●	
Hib [2, 16]							●	●			●	
HPV-9 [2, 13]							●	●			●	
Influenza [1] **(inactivated only)**	●											
IPV [2, 16]							●	●			●	
MMR [5, 6, 7, 8, 9, 9, 10]											●	●
Men B [2]							●	●				
Men-C-ACYW-135 [2, 15]							●	●				
Pneu-C-20 [3]			●	●	●				● [4]			
Pneu-C-21 (+65 years only) [4]			**Refer to footnote 4 for directives**									
Tdap [2, 16]							●	●			●	
Varicella [5, 6, 7, 8, 9, 10, 17]											●	●
RZV [14, 17]			**Refer to footnote 14 for directives**									

¥ - All previously immunized or unimmunized patients should receive 3 mRNA vaccine doses (0, 4 weeks, 8 weeks) as a primary series starting at 4 months post transplant (3 months post autologous transplant who are going onto maintenance therapy). If indicated, an additional dose should be given 3 months later. HSCT recipients with previous COVID-19 disease should defer vaccination 3 months post-infection.

[1] Inactivated influenza vaccine annually

[2] Vaccination should be at least 2 months after last dose of IVIg.

[3] Individuals with incomplete Pneu-C-13 series: complete series with Pneu-C-20. **Refer to footnote #4 for those +65 years old**. Individuals 18-64 years old who completed a Pneu-C-13 series **and/or** received Pneu-P-23 dose(s) **can receive** 1 Pneu-C-20 dose when it has been ≥1 year after last documented Pneu-P-23 **AND** ≥ 8 weeks from last documented Pneu-C-13 dose (if applicable).

[4] **For +65 years ONLY:**

Has completed a 4-dose Pneu-C-13/20 series before or after 65 years	Provide one Pneu-C-21 dose when it has been ≥ 6 months after last Pneu-C-13/20 dose **AND** ≥1 year after last documented Pneu-P-23 (if applicable)
Has not completed a 4-dose Pneu-C-13/20 series before or after 65 years	a. Complete 3-dose primary series with Pneu-C-20 (max. 3 doses), **then** b. Provide 1 dose Pneu-C-21 when it has been ≥ 6 months after third Pneu-C 13/20 dose **AND** ≥1 year after last documented Pneu-P-23 (if applicable)

[5] No immunosuppressant therapy in preceding 1 year (cyclosporine, tacrolimus, prednisone, methylprednisone, ruxolitinib).

[6] No rituximab therapy preceding 6 months.

[7] No chemotherapy preceding 3 months.

[8] Patients receiving lenalidmoide or velcade maintenance therapy may receive MMR and varicella vaccines.

[9] Refer to Chapter 7, *Immunization of Special Populations,* for Var and MMR referral forms.

[10] Vaccination should be at least 8 months after last dose of IVIG.

[11] Refer to SIM Appendix 7.4 *High Dose Hepatitis B Immunization Algorithm - Renal, HIV, Congenital Immunodeficiency Client*.

[12] Post-vaccination antibody testing required 1-2 months after 3rd dose. For patients who do not respond to primary vaccine series a second 3 dose series should be administered. Other post vaccination antibody testing not required due to lack of evidence regarding revaccination.

[13] **Publicly funded** for patients aged 18-26 years old. **NOT publicly funded** for older patients.

[14] **Refer to the SIM Ch. 10 *Herpes zoster* (SHINGRIX) vaccine page for autologous AND allogeneic HSCT transplant recipient immunization parameters.**

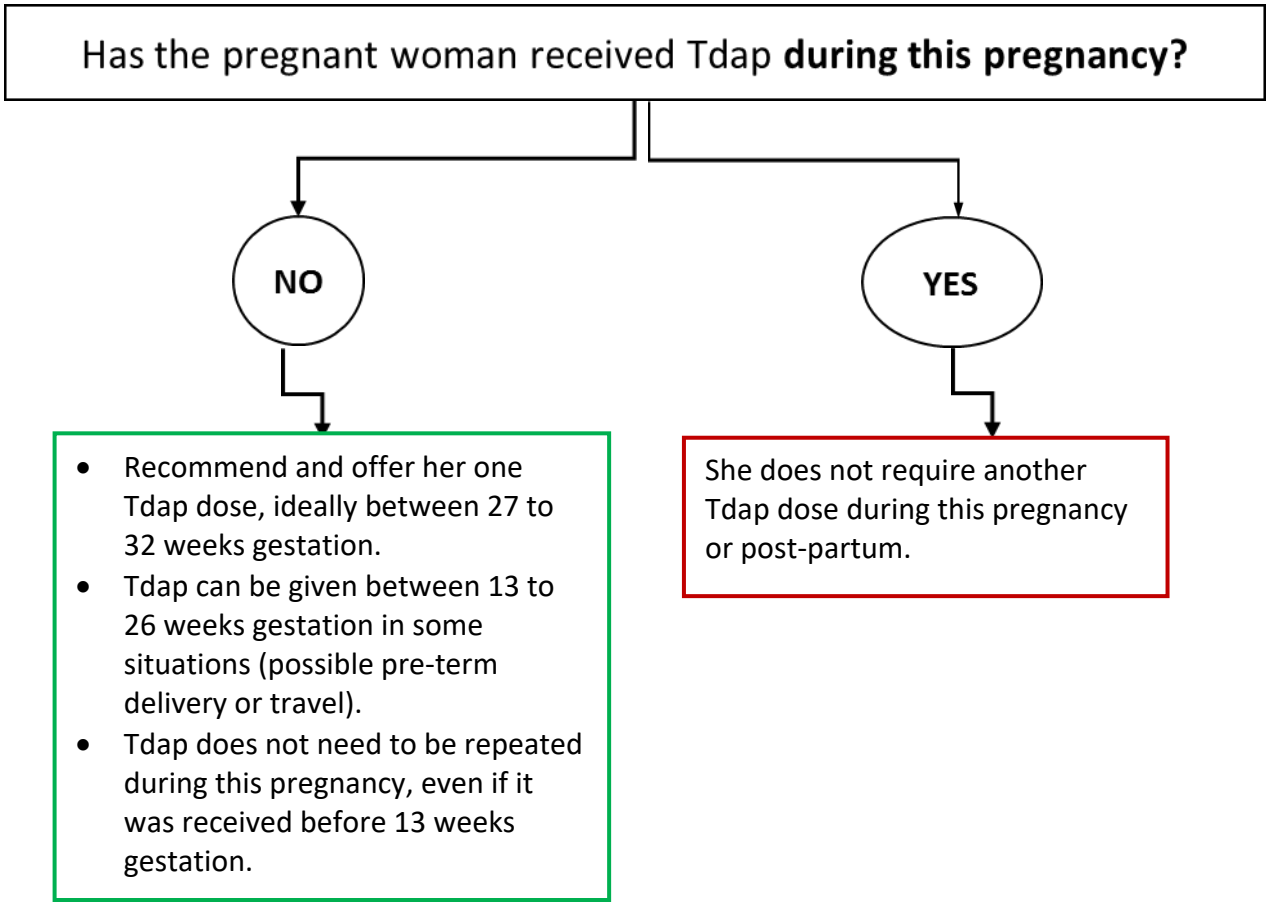
[15] Booster every 5 years.

[16] DTaP-IPV-Hib may be administered off label to all HSCT recipients (whose age is beyond the vaccine's licensed age range) to reduce the number of injections they require to meet the antigen requirements as noted in this schedule.

[17] Confirmation of VZV seropositivity post-Var series is recommended before providing RZV series min 8 weeks later.

[18] The following vaccines are not publicly funded at this time, even though they may be recommended by the transplant program: HPV-9 and Pneu-C-21 for those ineligible for publicly funded program criteria ● Pneu-C-15 ● RSV vaccines

Appendix 7.7: Tdap Immunization Decision Chart for Pregnant Women



Appendix 7.8: Publicly Funded Immigrant and Refugee Immunization and Serology Recommendations[1]

- Refer to Chapter 5, *Immunization* Schedules for routine vaccine schedules.
- Refer to Chapter 7, *Immunization* of Special Populations for risk factors.
- Refer to Chapter 10, *Biological Products* for specific vaccine indications and information.

Antigen	Serology	0-17 years of age	≥ 18 years of age
HA	Not recommended	Refer to Publicly Funded HA Vaccine Indications	Refer to Publicly Funded HA Vaccine Indications
HB	Recommended [2] 1. HBsAg 2. HBsAb (Anti HBs) 3. Hep B Total Core Ab (Anti HBc total)	Refer to Publicly Funded HB Vaccine Indications	Refer to Publicly Funded HB Vaccine Indications
HC	Recommended [3] Anti-Hep C	Not applicable	Not applicable
Varicella	Refer to Appendix 5.4 *Publicly Funded Varicella Immunization Eligibility*	Refer to Appendix 5.4 *Publicly Funded Varicella Immunization Eligibility*	Refer to Appendix 5.4 *Publicly Funded Varicella Immunization Eligibility*
Measles Mumps Rubella	Not generally recommended	●	Refer to Appendix 5.2: *Publicly Funded MMR Vaccine Eligibility*
Tetanus Diphtheria Pertussis	Not generally recommended	●	●
Polio	Not recommended	●	●
Hib	No standard assay available	●	●
HPV	No standard assay available	●	●
Men-B4C	No standard assay available	●	●
Men-C-ACYW-135	No standard assay available	●	●
Pneu-C-15, 20 or 21	No standard assay available	●	●
Rotavirus	No standard assay available	●	

[1] Individuals who do not have documented immunization records should be referred to Public Health for immunization.

[2A] Screen adults and children from countries where the seroprevalence of chronic HB infection is ≥2% for all 3 markers (Pottie et al., 2011).

[2B] HB vaccination can occur prior to specified serology being completed. There should be a minimum of 1 month between a HB vaccine and HBsAg test to avoid false positive result. Complete the HB immunization series if serology results are received during the series **unless** the HBsAg or Anti HBc total come back positive. Once the HB vaccine series is completed, HBsAb can be drawn 1 month after the last dose.

[3] Recommended if HC prevalence in country of origin is >3%. If HC positive then, automatic testing for HA & HB immunity is done at RRPL. Refer to the CDA Foundation. Hepatitis C – [Country name]. Lafayette, CO: CDA Foundation, 2025. Available from https://cdafound.org/polaris/database-query/ (Accessed July 7, 2025).

Appendix 7.9: Publicly Funded Immunization Schedule for Adult Solid Organ Pre-Transplant Candidates

- Solid organ transplants include: heart, lung, kidney, liver, pancreas, small bowel, uterus and islet cells. These guidelines do not apply to skin, bone and cornea transplants since these are tissue transplants and do not require immunosuppression.
- Immunize adults pre-SOT as per SIM chapter 5 Sections 1.6, 1.7 and 2.1, **except that HB-D must replace standard dose HB series**. If immunization status of pre-transplant client is unknown or incomplete, **offer all eligible vaccines using minimum intervals** as required. Completed series are not to be re-offered.
- When possible, ensure required vaccine series are completed pre-SOT (2 weeks for inactivated and mRNA COVID-19 vaccines; 4 weeks prior to immunosuppression and 4 weeks prior to transplant for live vaccines).
- Avoid inactive vaccines for at least 6 months and live vaccines at least 12 months after completion of treatment with biological agents such as Rituximab.
- Post-immunization titres not recommended unless noted.

Vaccine [15]	Dose 1 date	Dose 2 date	Dose 3 date
COVID-19 mRNA ¥			
HA [1]			N/A
HB high dose for all [2]			
Hib [3, 13]		N/A	N/A
HPV-9 [4]			
Influenza [5]		N/A	N/A
IPV [6, 13]			
MMR [7, 8A, 8B]			N/A
Men B [9]			N/A
Men-C-ACYW-135 [9, 10]			N/A
Pneu-C-20 [11]		N/A	N/A
RZV [12]	Refer to footnote 12 for directives		N/A
Tdap [6, 13]			
Var [7, 8A, 8B, 14]			N/A

¥ **Unvaccinated** pre-transplant SOT candidates should receive 3 doses (0-4 weeks-8 weeks) of mRNA vaccine as a primary series, with the final dose given 1-2 weeks prior to transplantation when possible. If indicated, an additional dose should be given 3 months later.

[1] Liver transplant only or if other publicly funded HA vaccine risk factors apply.

[2] Refer to schedule in Appendix 7.4 *High Dose Hepatitis B Immunization Algorithm - Renal, HIV, Congenital Immunodeficiency Client*.

[3] 1 dose regardless of Hib immunization history or disease, and at least 1 year after any previous Hib dose**.**

[4] Publicly funded up to 26 years old. Not publicly funded if starting series after 27 years old.

[5] Inactivated influenza vaccine annually.

[6] Min. 4 weeks between doses 1 and 2. Min interval 24 weeks between doses 2 and 3.

[7] MMR and Varicella immunization referral forms are NOT required prior to immunization.

[8A] Provide series if no evidence of immunity. Give dose #1 ≥ 10 weeks pre-SOT and dose #2 4 weeks later and a minimum 4 weeks pre-SOT. If VZ IgG is negative 4-6 weeks after the second dose, a third dose may be provided at the request of the transplant physician.

[8B] Immunity serology done pre-SOT as per requesting physician prior to vaccine administration and 4 weeks post-series administration. If VZ IgG is negative 4-6 weeks after the second dose, a third dose may be provided at the request of the transplant physician.

[9] Min. 8 weeks between doses 1 and 2.

[10] Some may have received dose 1 as an adolescent and just require 1 additional dose.

[11] Individuals who received a prior Pneu-C-13 dose and/or Pneu-P-23 dose(s) **should receive 1 Pneu-C-20 dose pre-transplant** when: it has been ≥1 year after last documented Pneu-P-23 **AND** ≥ 8 weeks from last documented Pneu-C-13 dose, as applicable. **Ineligible for Pneu-C-20 if they previously received Pneu-C-15 AND Pneu-P-23**.

[12] **Refer to the SIM Ch. 10 *Herpes zoster* (SHINGRIX) vaccine page for SOT candidate immunization parameters.**

[13] DTaP-IPV-Hib may be administered off label to all transplant candidates (whose age is beyond the vaccine's licensed age range) to reduce the number of injections they require to meet the antigen requirements as noted in this schedule.

[14] Confirmation of VZV seropositivity post-Var series is recommended before providing RZV series.

[15] The following vaccines are not publicly funded at this time, even though they may be recommended by the transplant program: HPV-9 and Pneu-C-21 for those ineligible for publicly funded program criteria ● Pneu-C-15 ● RSV vaccines

Appendix 7.10: Publicly Funded Immunization Schedule for Adult Solid Organ Post-Transplant Recipients

- Solid organ transplants include: heart, lung, kidney, liver, pancreas, small bowel, uterus and islet cells. These guidelines do not apply to skin, bone and cornea transplants since these are tissue transplants and do not require immunosuppression.
- Immunize adults post-SOT as stated in SIM chapter 5 Sections 1.6, and 1.7, and 2.1. exceptions:
  - **HB-D must replace standard dose HB series**.
  - **ALL live vaccines are contraindicated for post-SOT recipients.**
- Immunization may resume once the individual is on baseline immunosuppression, usually 6 to 12 months post-transplant. If immunizations were not completed prior to transplant, complete the series for inactivated vaccines, including COVID-19 immunization, as previously indicated. **Clearance letters are NOT required for SOT immunization post-transplant**.
  - Avoid inactive vaccination for at least 6 months after completion of treatment with biological agents such as Rituximab (**3 months for COVID-19 mRNA vaccine)** or anti-thymocyte treatments such as anti-thymocyte thymoglobulins.
- Post-immunization HB titres are recommended as per SIM Appendix 7.4: *High Dose Hepatitis B Immunization Algorithm - Renal, HIV, Congenital Immunodeficiency Deficiency [CID] Clients*.
- Refer to the Communicable Disease Control Manual for disease specific post-exposure recommendations.

	Months post-SOT							
Vaccine [13]	**1**	**2**	**≥ 3**	**≥ 6**	**7**	**8**	**12**	**13**
COVID-19 mRNA ¥	●	●	●	●			●	
HA [1]				●			●	
HB high dose for all [2]				●	●		●	
Hib [3, 10]				●				
HPV-9 [4]				●		●	●	
Influenza [5]			●					
IPV [6, 10]				●	●			●
Men B [7]				●	●			
Men-C-ACYW-135 [8, 11]				●	●			
Pneu-C-20 [9]				●				
RZV [12]	Refer to footnote 12 for directives							
Tdap[10]				●	●			●

¥ - **Unvaccinated** pre-transplant SOT recipients should receive 3 doses (0-4 weeks-8 weeks) of mRNA vaccine as a primary series. If indicated, an additional dose should be given 3 months later. **Vaccinated** SOT recipients should receive an additional dose 3 months after their previous vaccine dose. All SOT recipients should wait at least 1-month post-transplant to continue vaccine series, regardless of induction therapy. SOT recipients undergoing active treatment for acute rejection should defer vaccination for 1 month. SOT recipients with previous COVID-19 infection should defer vaccination for 3 months post-infection.

[1] Liver transplant only or if other publicly funded HA vaccine risk factors apply.

[2] Refer to schedule in Appendix 7.4 *High Dose Hepatitis B Immunization Algorithm - Renal, HIV, Congenital Immunodeficiency Clients*.

[3] 1 dose regardless of Hib immunization history or disease, and at least 1 year after any previous Hib dose**.**

[4] Publicly funded up to 26 years old. Not publicly funded if starting series after 27 years old.

[5] Inactivated influenza vaccine annually.

[6] Min. 4 weeks between doses 1 and 2. Min interval 24 weeks between doses 2 and 3.

[7] Min. 4 weeks between doses 1 and 2.

[8] Some may have received dose 1 as an adolescent and just require 1 additional dose.

[9] Individuals who received a prior Pneu-C-13 dose and/or a Pneu-P-23 dose should receive 1 Pneu-C-20 post-transplant **(if not received pre-transplant)** dose when it has been ≥1 year after last documented Pneu-P-23; **AND** ≥ 8 weeks from last documented Pneu-C-13 dose, as applicable. **Ineligible for Pneu-C-20 if they previously received Pneu-C-15 AND Pneu-P-23**.

[10] DTaP-IPV-Hib may be administered off-label to all transplant recipients.

[11] Booster every 5 years.

[12] **Refer to the SIM Ch. 10 *Herpes zoster* (SHINGRIX) vaccine page for SOT recipient immunization parameters.** VZV titre may be recommended before providing RZV series.

[13] The following vaccines are not publicly funded at this time, even though they may be recommended by the transplant program: HPV-9 and Pneu-C-21 for those ineligible for publicly funded program criteria ● Pneu-C-15 ● RSV vaccines