Immunization of Specific Populations
(Immunosuppressed and Chronic Health Conditions)

Revision Date: June 1, 2015

Immunocompromised Individuals

General information

- The safety and effectiveness of vaccines in immunocompromised individuals are determined by the type of immunodeficiency and the degree of immunosuppression. The relative degree of immunodeficiency is variable depending on the underlying condition and can vary over time in many individuals.
- Case-by-case medical consultation with the individual’s attending physician is recommended in order to determine the individual’s degree of immunosuppression or immunodeficiency and whether or not immunization is appropriate for the individual. In complex cases, referral to a physician with expertise in immunization and/or immunodeficiency is advised.
- The decision to recommend for or against any particular vaccine will depend upon a careful analysis of the risks and benefits. There is potential for serious illness and death if immunocompromised individuals are under-immunized and every effort should be made to ensure adequate protection through immunization; however, the inappropriate use of live vaccines can cause serious adverse events in some immunocompromised individuals as a result of the uncontrolled replication of the vaccine virus or bacterium.
- Recommendations for immunization may vary according to the severity of disease and the interval since the last treatment.
- If possible, administer immunization at least two weeks (inactivated vaccines) or four weeks (live vaccines) before planned immunosuppression due to treatment or medications.
- Inactivated vaccines may be administered to immunocompromised individuals if indicated; however, the magnitude and duration of the vaccine-induced immunity are often reduced.
- Live vaccines are not generally recommended due to the risk of disease caused by the vaccine strains. However, in some less severely immunocompromised individuals, the benefits of live vaccines may outweigh the risks. Approval from the individual’s attending physician must be obtained before proceeding with live vaccines.
  - Children with a known or suspected family history of congenital or hereditary immunodeficiency that is a contraindication to immunization with live vaccines should not receive a live vaccine until their immune competence has been established. If the child has other than first-degree relatives with congenital immunodeficiency conditions or if multiple neonatal or infant deaths occurred within the child’s immediate family, the provider should seek a medical consultation before proceeding with the administration of a live vaccine.
- The immune response to vaccines may be suboptimal and the individual may remain susceptible despite appropriate immunization.
- If serologic testing is available and there is a clear antibody correlate of protection, post-immunization antibody titres to determine the immune response and guide re-immunization and post-exposure management should be considered. See Biologicals for specific vaccine recommendations.
- Household contacts of immunocompromised individuals should receive all routine immunization, including measles, mumps, rubella and varicella vaccines, if susceptible. If a rash develops post–varicella vaccine, the rash should be covered and the vaccine recipient should avoid direct contact with the immunocompromised person for the duration of the rash. Household and family contacts should also receive annual influenza immunization.
General principles

- Maximize benefit while minimizing harm.
- Susceptibility or degree of protection vary according to the degree of immune suppression. There may not be complete protection even when there is a history of childhood infection or previous immunization.
- Immunize at the time when maximum immune response can be anticipated.
  - Immunize early, before immunodeficiency begins, if possible.
  - Delay immunization if the immunodeficiency is transient (if this can be done safely).
  - Stop or reduce immunosuppression to permit better vaccine response, if appropriate.
- Consider the immunization environment broadly.
  - Immunize household contacts when appropriate.
  - Strongly encourage up-to-date immunization, including annual influenza vaccine, for all health care workers (HCW) providing care to immunocompromised individuals.
- Avoid live vaccines unless:
  - Immunosuppression is mild and data are available to support their use.
  - The risk of natural infection is greater than the risk of immunization.
- Monitor vaccines carefully and boost aggressively. The magnitude and duration of vaccine-induced immunity are often reduced in immunocompromised individuals.
  
  **Note:** The following corticosteroid therapies do not generally result in immunosuppression (unless there is clinical or laboratory evidence of immunosuppression) that would contraindicate immunization:
  - Short-term therapy (less than 14 days)
  - Low to moderate dose (less than 2 mg/kg/day for a child or less than 20 mg/day of prednisone or its equivalent per day for an adult).
  - Long-term, alternate-day treatment with short-acting preparations.
  - Maintenance physiologic replacement therapy.
  - Administered topically, inhaled, or locally injected (e.g., joint injection).

Table 1 Vaccines for Immunocompromised Individuals and Individuals with Other Chronic Health Conditions follows. This table provides an overview of vaccines to consider when assessing individuals with chronic health conditions including those who are immunocompromised. Detailed information about the specific health conditions is presented in the pages following Table 1.

**Note:** Medical consultation is recommended before proceeding with any immunization. Age-appropriate routine schedules for inactivated vaccines should be followed except for HSCT patients.
### Table 1: Vaccines for Populations at Risk due to Chronic Health Conditions:

<table>
<thead>
<tr>
<th>Health Condition</th>
<th>DTaP-IPV-Hib</th>
<th>HAV</th>
<th>HBV</th>
<th>Hib</th>
<th>HPV</th>
<th>Men-B</th>
<th>MenC-ACYW</th>
<th>PNEU-C13</th>
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\(^1\) DTaP-IPV-Hib: Diphtheria and tetanus toxoids and acellular pertussis vaccines, inactivated poliovirus vaccine, and Haemophilus influenzae type b conjugate vaccine

\(^2\) HBV: Hepatitis B vaccine

\(^3\) Hib: Haemophilus influenzae type b conjugate vaccine

\(^4\) Men-B: Meningoococcal B conjugate vaccine

\(^5\) MenC: Meningoococcal C conjugate vaccine

\(^6\) ACYW: Meningoococcal A, C, Y, W-135 conjugate vaccine

\(^7\) PNEU-P: Pneumococcal polysaccharide vaccine

\(^8\) MMR: Measles, mumps, and rubella vaccine

\(^9\) VZ: Varicella vaccine

\(^10\) SOT: Solid organ transplant

\(^11\) Asplenia/hyposplenia

\(^12\) Chronic cardiac disease

\(^13\) Chronic liver disease

\(^14\) Chronic pulmonary disease

\(^15\) Chronic renal Disease

\(^16\) Cochlear Implants

\(^17\) Diabetes

\(^18\) Chronic cerebrospinal fluid leaks

\(^19\) Neurologic conditions impairing

\(^20\) Non-malignant Hematologic disorders

\(^21\) Bleeding disorders
1 Individuals seven years of age and older who have received Hematopoietic Stem Cell Transplantation (HSCT). See [Immunization for Child HSCT Recipients](#) and [Immunization for Adult HSCT Recipients](#) for immunization details and timing of doses.

2 Follow routine immunization schedules generally, contraindicated if on immunosuppressive therapy.

3 Only recommended for individuals with complement, properdin, factor D or primary antibody deficiencies.

4 Contraindicated for individuals with T-cell, natural killer T-cell and mixed cellular or primary antibody deficiencies.

5 May be considered for X-linked agammaglobulinemia, common variable immunodeficiency, known intact T cell immunity, Ig A deficiency, complement deficiency, phagocytic and neutrophil disorders.

6 Usually recommended only if within acceptable clinical and immunologic categories.

7 See [Principles of Immunization in HSCT Recipients and SOT Recipients](#), [Immunization for Child HSCT Recipients](#) and [Immunization for Adult HSCT Recipients](#) for immunization details, timing and restrictions.

8 If chronic liver graft versus host disease (GVHD) is present. See [Immunization for Child HSCT Recipients](#) and [Immunization for Adult HSCT Recipients](#) for more information.

9 If Hib has not been included with combined vaccine for DTaP-IPV. See [Immunization for Child HSCT Recipients](#) and [Immunization for Adult HSCT Recipients](#).

10 Individuals may be considered for MMR and/or VZ at 24 months post-HSCT with some restrictions. See [Immunization for Child HSCT Recipients](#) and [Immunization for Adult HSCT Recipients](#).

11 See [Principles of Immunization in HSCT Recipients and SOT Recipients](#), [Immunization for Children Expecting SOT before 18 Months of Age (Accelerated)](#), [Immunization for Children Expecting SOT after 18 Months of Age (Catch-up and Ongoing)](#) and [Immunization for Adult SOT Candidates and Recipients](#).

12 Individuals who have received a liver transplant. See [Immunization for Children Expecting SOT before 18 Months of Age (Accelerated)](#), [Immunization for Children Expecting SOT after 18 Months of Age (Catch-up and Ongoing)](#) and [Immunization for Adult SOT Candidates and Recipients](#).

13 Individuals 9 years up to and including 26 years of age. See [Immunization for Children Expecting SOT after 18 Months of Age (Catch-up and Ongoing)](#) and [Immunization for Adult SOT Candidates and Recipients](#).

14 MMR and VZ are only considered for SOT candidates. They are contraindicated for SOT recipients. See [Immunization for Children Expecting SOT before 18 Months of Age (Accelerated)](#), [Immunization for Children Expecting SOT after 18 Months of Age (Catch-up and Ongoing)](#) and [Immunization for Adult SOT Candidates and Recipients](#).

15 If receiving repeated blood transfusions or blood products.

16 May be contraindicated for some individuals depending on cause of asplenia/hyposplenia.

17 Children (younger than 18 years of age).

18 Individuals with hemophilia A or B receiving plasma-derived clotting factors.
Immunocompromising Conditions

➢ Acquired complement deficiency
  • Individuals receiving terminal complement inhibitor (e.g. eculizumab [Soliris®]) should receive inactivated and live vaccines following routine immunization schedules as well as meningococcal vaccines (meningococcal conjugate ACYW and meningococcal B), pneumococcal vaccines (conjugate and polysaccharide) and haemophilus influenza type B vaccine. See Biological Products – specific vaccines.

  Note: Medical consultation is recommended before proceeding with any vaccine.

➢ Congenital immunodeficiency states
  • General Information:
    o Medical consultation is recommended before proceeding with immunization.
    o Generally inherited and include defects in antibody production (e.g., agammaglobulinemia, isotype and IgG subclass deficiencies, and common variable immunodeficiency), complement deficiencies, defects in one or more aspects of cell-mediated immunity, and mixed deficits. Individuals with defects in antibody and complement are highly susceptible to encapsulated bacteria such as Streptococcus pneumoniae, Haemophilus influenza type b, and Neisseria meningitidis. Individuals with mixed and T cell defects are particularly susceptible to virtually all viruses and some bacteria.
    o Replacement immune globulin (IG) or pathogen-specific IG preparations may be used for individuals with antibody defects to provide protection from many vaccine-preventable infections but immunization is still recommended, when possible, and not contraindicated. IG may interfere with the immune response to measles or varicella-containing vaccines.
    o Inactivated vaccines should be administered according to routine schedules. Additionally, hepatitis B, Hib and pneumococcal (conjugate and polysaccharide) vaccines are recommended. Individuals with complement, properdin, factor D or primary antibody deficiencies should also receive meningococcal vaccines (MenC-ACYW and Men-B). See Biologicals for specific vaccines.
    o Generally, live vaccines are contraindicated (particularly for individuals with T cell, natural killer T cell and mixed cellular and antibody defects (e.g., Severe Combined Immune Deficiency [SCID]), although some exceptions exist as indicated below:
      ♦ X-linked agammaglobulinemia and Common Variable Immunodeficiency (and known intact T cell immunity).
        ▶ MMR and univalent varicella vaccines may be considered although regular immune globulin replacement therapy may affect the efficacy of the vaccines.
        ▶ All other live vaccines (e.g., rotavirus, BCG, live attenuated influenza vaccine and oral typhoid) are contraindicated.
      ♦ IgA deficiency with no concomitant defects in T cell function can receive most live vaccines.
        ▶ Live mucosal vaccines are likely safe though there may be a lack of mucosal response. Some experts may prefer to use inactivated vaccines if available (e.g., inactivated influenza vaccine, parenteral typhoid vaccine).
        ▶ Individuals with IgG subclass deficiencies can receive live vaccines although the response may be suboptimal. In addition, regular IG replacement therapy may diminish the vaccine response.
      ♦ Individuals with complement deficiency (e.g., properdin or factor D deficiency) may receive any live vaccine if indicated.

➢ HIV infection
  • Medical consultation is recommended before proceeding with any immunization.
  • Screening for HIV infection is not necessary prior to immunization. When possible, vaccines should be administered early in the course of HIV infection. Although there is no contraindication to the use of inactivated vaccines at any time.
• The degree of immune suppression varies widely among HIV-infected individuals, reflecting disease stage and response to antiretroviral therapy. Immune suppression is approximately predicted by a recent CD4 count and CD4 percentage. Elevated viral loads may diminish the effectiveness of some vaccines although this is not a reason to delay vaccination.

• HIV positive individuals may be considered for routine age-appropriate immunization with inactivated vaccines as well as pneumococcal (conjugate followed by polysaccharide), meningococcal (meningococcal conjugate ACYW and meningococcal B), *Haemophilus influenzae* type b and hepatitis B vaccine. Hepatitis A and other inactivated vaccines may also be recommended based on risk factors. See Biological Products for vaccine-specific information.

• There are no contraindications to the use of some live vaccines (MMR, VZ, rotavirus) early in the course of the illness. BCG, small pox, and oral live typhoid vaccines are contraindicated and LAIV is not recommended. As the disease progresses, the risk of using live vaccines increases and consensus "cut-offs" based on clinical and immunologic categories have been determined for the use of MMR and univalent varicella vaccines as follows:

  o Measles-mumps-rubella vaccine (MMR): HIV-infected children 12 months of age and older, and with Centers for Disease Control and Prevention (CDC) clinical category N, A or B and immunologic category 1 or 2 (i.e., CD4 counts ≥15%) may receive two doses of MMR vaccine 3 - 6 months apart. Immunization with two doses of MMR vaccine administered three months apart may be considered for susceptible HIV-infected adolescents and adults with CD4 cell count ≥200 x 10^6/L and CD4 percentage ≥15%. MMR vaccine is contraindicated in persons with advanced HIV/AIDS.

  o Univalent varicella vaccine: HIV-infected children 12 months of age and older, and with CDC clinical category N, A or B and immunologic category 1 or 2 (i.e., CD4 percentage ≥15%) may receive two doses of univalent varicella vaccine 3 - 6 months apart. There are no published data on the use of varicella vaccine in susceptible HIV-infected adolescents and adults. HIV-infected adolescents and adults should be asked for a history of varicella disease or vaccination, and if negative for both, serology should be requested to confirm susceptibility. Based on expert opinion, immunization with two doses of univalent varicella vaccine administered three months apart may be considered for susceptible HIV-infected adolescents and adults with CD4 cell count ≥200 x 10^6/L and CD4 percentage ≥15%. Varicella vaccine is contraindicated in persons with advanced HIV/AIDS.

  o Children with symptomatic HIV infection should receive immune globulin if exposed to measles, even if they have received MMR vaccine. Children who have received immune globulin intravenously within two weeks of exposure to measles do not require additional passive immunization. Unimmunized children who receive immune globulin for measles exposure should not receive measles immunization for six months following the administration of immune globulin.

• Hematopoietic Stem Cell Transplantation (HSCT)

  o Individuals who are recipients of HSCT require special consideration. See Principles of Immunization in HSCT Recipients and SOT Recipients, Immunization for Child HSCT Recipients and Immunization for Adult HSCT Recipients.

  o Regardless of the pre-transplant immunization status, the recipient’s immunity to vaccine – preventable diseases is decreased post-transplant. Therefore; immunization schedules need to be started anew using the recommendations outlined in Immunization for Child HSCT Recipients and Immunization for Adult HSCT Recipients.
Immunosuppressive therapy

- Medical consultation with the individual’s physician(s) is recommended regarding the appropriateness of immunization for individuals whose immune status may be suppressed by immunosuppressive therapy (e.g., long-term steroids, cancer chemotherapy, radiation therapy, total body irradiation, azathioprine, cyclosporine, cyclophosphamide and infliximab) within the past three months.¹

- Long-term immunosuppressive therapy is used for organ transplantation and a range of chronic infections and inflammatory conditions (e.g., inflammatory bowel disease, psoriasis, systemic lupus erythematosus).¹ These therapies have their greatest impact on cell-mediated immunity, although T-cell dependent antibody production can also be adversely affected.¹

- Immunization status should be reviewed prior to the initiation of immunosuppressive therapy and any age-appropriate vaccines recommended should be administered prior to the initiation of immunosuppressive therapy so that optimal immunity is achieved.¹

- Inactivated vaccines:
  - Inactivated vaccines should be administered at least 14 days before the initiation of immunosuppressive therapy, when possible, to optimize immunogenicity or delayed until at least three months after immunosuppressive medications have stopped. Although they can be administered safely at any time before, during or after immunosuppression every effort should be made to time immunization so that optimal immunogenicity will be achieved.¹ Immunization should be delayed until at least three months after immunosuppressive drugs have been stopped or until such therapy is at the lowest possible level.
  - Active verification of immune status and aggressive re-immunization may be important for some individuals.
  - Routine immunization is recommended as well as pneumococcal (conjugate and polysaccharide) vaccines.

- Live vaccines should be administered at least four weeks before immunosuppressive therapy begins to reduce the risk of disease caused by the vaccine strain.¹ Live vaccines are generally contraindicated during and for at least three months after the immunosuppressive drugs have been discontinued.¹ However, vaccines may be administered four weeks after discontinuation of high-dose systemic steroids.¹
  - Generally only high-dose systemic steroids (e.g., 2 mg/kg or more per day for a child or 20 mg or more of prednisone or its equivalent per day for an adult) can interfere with vaccine-induced immune responses.¹
  - Do not give inactivated or live vaccines for at least one month after stopping high-dose steroids unless needed for post-exposure or outbreak management.¹ Medical consultation should be sought before proceeding with immunization.

- Some chronic cancer therapies are hormonal (tamoxifen, gonadotropin release inhibitors) and have no significant immunologic effects. Some therapies for inflammatory conditions (such as hydroxychloroquine, sulfasalazine, or auranofin) are not considered immunosuppressive.¹

- Monoclonal antibodies:
  - Are laboratory-produced substances that can bind to B cells (such as rituximab) or tumor necrosis factor and are called TNF inhibitors (such as infliximab and adalimumab) to induce a therapeutic immunosuppression.¹
  - As with other immunosuppressive therapy, immunization should be administered prior to beginning the therapy or delayed until at least 3 months after the therapy has ended.¹
  - Monoclonal antibodies taken during pregnancy will be transferred to the fetus and their effects may persist after birth.¹ For example, rituximab taken during pregnancy is associated with B cell depletion in both mother and fetus. Infants, who have been exposed to rituximab, either during pregnancy or from breastfeeding, should have B-cell enumeration prior to immunization. Consultation with an immunologist is advised.¹
Malignant hematological disorders (e.g., leukemia, lymphomas, or other malignant neoplasms affecting the bone marrow or lymphatic systems)

- Medical consultation is recommended before proceeding with immunization.
- During active chemotherapy and shortly thereafter, antibody responses are impaired; therefore, ensure that at least three months have passed since the completion of chemotherapy before immunizing. Inactivated vaccine doses administered during cancer chemotherapy should not be considered valid doses unless there is documentation of a protective antibody response.²
- In addition to routine inactivated vaccines, pneumococcal (conjugate and polysaccharide) and Hib vaccines are also recommended.¹ If asplenic, meningococcal vaccines (meningococcal conjugate ACYW and meningococcal B) are recommended. See Biological Products specific vaccines for more information.
- Live vaccines are contraindicated for individuals with severe immunodeficiency due to blood dyscrasias, lymphomas, leukemias of any type or other malignant neoplasms affecting the bone marrow or lymphatic systems and those undergoing immunosuppressive treatment for malignancy.¹ Children with Acute Lymphocytic Leukemia (ALL) in remission for at least 12 months may be considered for MMR vaccine with or without varicella vaccine providing that certain criteria are met. See Biological Products – Specific vaccines for more information.

Malignant solid tumours

- Inactivated vaccines according to routine immunization schedules should be administered. Pneumococcal vaccines (conjugate and polysaccharide) are recommended before individuals begin immunosuppressive therapies.¹ See Biological Vaccines – Pneumococcal vaccines.

Solid organ transplants (SOT)

- Ideally, all non-immune solid organ transplantation candidates should be immunized prior to transplantation and as early in the course of disease as possible because vaccine response may be reduced in people with organ failure pre-transplant.¹ In addition, vaccines are generally more immunogenic if given before transplantation because the immunosuppressive medications given after transplant to prevent and treat rejection of the transplanted organ may diminish the vaccine response.¹
- Inactivated vaccines should be given at least 2 weeks before transplantation and live attenuated vaccines should be given at least 4 weeks prior to transplantation.¹
- See Principles of Immunization in HSCT Recipients and SOT Recipients, Immunization for Children Expecting SOT before 18 Months of Age (Accelerated), Immunization for Children Expecting SOT after 18 Months of Age (Catch-up and Ongoing) and Immunization for Adult SOT Candidates and Recipients, for immunization recommendations before and after solid organ transplantation.

Other Chronic Health Conditions:

Asplenia or hyposplenia

- Asplenia or hyposplenism may be congenital, surgical or functional. A number of conditions can lead to functional asplenia (e.g., sickle-cell anemia, thalassemia major).¹
- Individuals with asplenia/hyposplenism are at increased risk of fulminant bacterial infection which is associated with a high mortality rate. When emergency splenectomies are performed, vaccines are best administered two weeks following surgery for optimal response. Particular attention should be paid to ensuring optimal protection against encapsulated bacteria (Neisseria meningitidis, Streptococcus pneumoniae, Haemophilus influenzae type b) to which these individuals are highly susceptible.¹
- Immunization status review is critical when an elective surgical splenectomy is planned so that all the necessary vaccines can be administered at least two weeks prior to surgery.¹
• Individuals who are asplenic/hyposplenic should receive all routine immunization. Two doses of varicella vaccine if needed should be administered with an interval of at least three months between doses instead of six weeks apart as routinely recommended for adolescents and adults. In addition, it is important that they receive Hib, meningococcal (meningococcal conjugate ACYW and meningococcal B) and pneumococcal (conjugate followed by polysaccharide) vaccines according to recommended schedules. See Biological Products for information on the specific vaccines. Some individuals receiving repeated blood transfusions should receive hepatitis B vaccine. See Biological products: Hepatitis B vaccine.

• Parents should be aware that all febrile illnesses potentially are serious in children with asplenia and that they should seek immediate medical attention for all febrile events.

- **Chronic cardiac disease**
  • Individuals with chronic heart disease should receive pneumococcal vaccine (conjugate followed polysaccharide for children and polysaccharide for adults) as well as routinely recommended vaccines.

- **Chronic inflammatory diseases**
  • Includes individuals with inflammatory arthropathies (e.g. systemic lupus erythematosus [SLE], rheumatoid of juvenile arthritis etc.) inflammatory dermatological conditions and inflammatory bowel disease (Crohn’s disease, ulcerative colitis).
  • Individuals not treated with immunosuppressive drugs are not considered significantly immunocompromised and can receive all recommended routine immunization. Monoclonal antibodies (MAB) may be used for treatment of these conditions. Prior to treatment immunization history should be reviewed to ensure all routine immunization is up-to-date and pneumococcal polysaccharide vaccine should be administered. It is prudent to avoid live vaccines during MAB treatment.
  • MAB taken during pregnancy will be transferred to the fetus and their effects may persist after birth.
  • If immunosuppressive therapy, should ensure routine immunizations are up-to date and receive pneumococcal vaccine (conjugate and polysaccharide vaccines) prior to immunosuppressive therapy, if possible.

- **Chronic liver disease**
  • Individuals with chronic liver disease, including hepatitis B carriers, anti-HCV positive individuals and those with chronic liver graft versus host disease, should receive hepatitis A vaccine, hepatitis B vaccine and pneumococcal vaccine (conjugate and polysaccharide vaccines for children and polysaccharide for adults). See Biological Products – Hepatitis Vaccines and Pneumococcal Vaccines.

- **Chronic pulmonary disease**
  • Individuals with chronic lung diseases such as asthma, chronic obstructive pulmonary diseases (COPD) or cystic fibrosis are at increased risk of complications from influenza and invasive pneumococcal disease. As well as routine immunizations, these individuals should receive pneumococcal vaccines (conjugate followed by polysaccharide vaccines for children and polysaccharide for adults). See Biological Products: Pneumococcal Vaccines.
  • Individuals with cystic fibrosis are at increased risk of complications from varicella infection.

- **Chronic renal disease**
  • Bacterial and viral infections are a major cause of morbidity and mortality in individuals with renal disease and those undergoing chronic dialysis (hemodialysis or peritoneal dialysis).
  • In addition to routine immunization, hepatitis B (higher dose), and pneumococcal (children should receive conjugate followed by polysaccharide and adults polysaccharide) vaccines are recommended. See Biological Products for vaccine specifics.
  • Susceptible individuals 12 months and older should receive two doses of univalent varicella vaccine with an interval of at least three months between doses rather than the routine interval of six weeks between doses for individuals 3 years of age and older.
Cochlear implant candidates and recipients
- Individuals approved for cochlear implant surgery as well as past implant recipients should be considered at risk for bacterial meningitis. They should receive all routine immunizations and Hib and pneumococcal vaccines (conjugate followed by polysaccharide). See Biologicals for specific vaccine recommendations.

Endocrine and metabolic diseases
- Individuals with diabetes should receive pneumococcal vaccine (conjugate followed by polysaccharide vaccine for children and polysaccharide for adults).

Neurologic disorders
- Individuals with pre-existing neurological disorders should receive all routinely recommended immunizations with the exception of repeat doses of a vaccine administered within six weeks of the onset of GBS.
- Individuals with chronic cerebrospinal fluid (CSF) leak should receive all routine immunizations and pneumococcal vaccines (conjugate and polysaccharide). Those with neurologic conditions that may impair clearance of oral secretions should receive all routine immunizations and pneumococcal vaccines (conjugate followed by polysaccharide vaccine for children and polysaccharide for adults).
- Pre-existing Neurologic Conditions:
  - Individuals with pre-existing neurological disorders should receive all routinely recommended immunization with the exception of repeat doses of vaccine administered within six weeks of the onset of Guillain-Barré syndrome (GBS).
  - Immunization should be deferred for 24 hours following significant head injury to avoid confusion between head trauma symptoms and AEFI.
- Neurologic events following immunization:
  - Ensure any adverse events following immunization are reported and the recommendations arising from these reports are followed.

Refer to Adverse Events Following Immunization (AEFI), Policy for Alberta Immunization Providers.

Non-malignant hematologic disorders
- Individuals with anemias and hemoglobinopathies should receive all routine vaccines, pneumococcal (conjugate and polysaccharide) vaccines and if repeated blood transfusions are needed, should receive hepatitis B vaccine. See Biologic Products: Pneumococcal Vaccines and Hepatitis B Vaccines.

Note: Anemia due to sickle cell disease see Asplenia/hyposplenia.

- Bleeding disorders: individuals with bleeding disorders should be optimally controlled (e.g., hemophiliacs may receive clotting factor concentrates) prior to immunization to minimize the risk of bleeding. In addition to routine immunization, they should receive hepatitis A and hepatitis B vaccines. See Biological Products: Hepatitis A and Hepatitis B Vaccines. Intramuscular vaccines should be administered with a small gauge needle (23 gauge or smaller) with firm pressure applied to the injection site for 5 – 10 minutes following the injection.

Note: Individuals receiving long-term anticoagulation therapy with warfarin or heparin are not considered to be at higher risk of bleeding complications following immunization.

References