Rationale for update:
- Incorporated recommendations for Shingrix® provided by Alberta infectious disease and Solid Organ Transplant Physicians.

**Note:** This guide is meant to supplement existing recommendations for routine immunization as outlined in the current Alberta Immunization Policy. See Principles of Immunization in Hematopoietic Stem Cell Transplant Recipients and Solid Organ Transplant Recipients.

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. Consult with an attending physician before providing live vaccines.1

### 1. Routine Immunizations – Before Transplant

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Series</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Td or dTap</strong></td>
<td>3 doses</td>
<td>If an adult requires completion of a primary series of Td, the first dose in the series should be replaced with dTap. Adults who have not previously received a dose of acellular pertussis in adulthood should receive a one-time booster dose of dTap. Subsequent boosters should be Td. <strong>Note:</strong> If both dTap and polio are indicated, dTap-IPV may be used.</td>
</tr>
</tbody>
</table>
| **Polio IPV**         | 3 doses| Primary immunization with inactivated polio vaccine is recommended for all previously unimmunized SOT candidates and recipients.1 Notes:  
  • Booster doses of IPV are not necessary for adults living in Canada except for adults at high risk of exposure. Those at higher risk (e.g., health care workers and laboratory workers) may receive a single lifetime booster dose.1  
  • If available, TdP may be used when both Td and IPV vaccines are indicated.  
  Immunity screening after immunization is not recommended. |
| **Pneumococcal**      | Pneu-C13 followed by Pneumo-P at least eight weeks later. | There should be at least eight weeks between Pneu-C13 and Pneumo-P.1,2  
  Adults who have already received Pneumo-P should receive Pneu-C13. Pneu-C13 should be administered at least one year after any previously administered dose of Pneumo-P.2,3  
  Immunity screening after immunization is not recommended. |
| **Hib**               | 1 dose | One dose is recommended for candidates/ recipients of SOT five years of age and older regardless of previous Hib immunization (at least one year after any previous dose).1  
  Immunity screening after immunization is not recommended. |
<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Series</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MenC-ACYW</strong>&lt;br&gt;(18 years to 24 years of age inclusive and those 25 years of age and older at higher risk)</td>
<td>18 – 24 years of age*: One dose (unless received as an adolescent at 12 years of age or older.)¹&lt;br&gt;*Booster doses are not indicated.&lt;br&gt;<strong>Increased risk: 18 years of age and older.</strong>&lt;br&gt;(Under lying medical condition)&lt;br&gt;Two doses eight weeks apart&lt;br&gt;**Booster dose every five years if risk continues.²&lt;br&gt;**Increased risk of exposure (laboratory workers):</td>
<td>Recommended for individuals:&lt;br&gt;• 18 – 24 years of age inclusive&lt;br&gt;• Increased risk - 18 years of age and older as listed¹:&lt;br&gt;  ➢ Anatomical or functional asplenia including sickle cell disease&lt;br&gt;  ➢ HIV infection&lt;br&gt;  ➢ Congenital complement, properdin, factor D or primary antibody deficiencies.&lt;br&gt;  ➢ Acquired complement deficiency e.g. those receiving eculizumab (Soliris™).&lt;br&gt;  ➢ Laboratory workers routinely exposed to Neisseria meningitides.&lt;br&gt;Note: Provincially funded vaccine is not provided for international travellers. Refer individuals to local travel clinics.&lt;br&gt;Immunity screening after immunization is not recommended.</td>
</tr>
<tr>
<td><strong>Hepatitis B</strong>&lt;br&gt;HBVD¹</td>
<td>Follow the dosage and schedule for hypo-responsive individuals for Hepatitis B Vaccine.&lt;br&gt;Repeat series if response is less than 10 IU/mL after series completion.¹</td>
<td>Follow the dosage and schedule for hypo-responsive individuals for Hepatitis B Vaccine.&lt;br&gt;&lt;br&gt;<strong>Laboratory Recommendations</strong>&lt;br&gt;Screen for anti-HBs within 1 – 6 months after the series is completed. If antibody levels are less than 10 IU/L, repeat the series once and retest for anti-Hbs within 1 – 6 months after the repeat series.¹&lt;br&gt;Periodic screening as recommended by the transplant physician taking into account the severity of the immunocompromised state and whether or not the risk of hepatitis B is still present.¹&lt;br&gt;• Ordering serology and interpretation of the results is the responsibility of the transplant physician.</td>
</tr>
<tr>
<td><strong>Hepatitis A</strong>&lt;br&gt;HAV</td>
<td>Two doses: Second dose 6 – 12 months after the first dose.</td>
<td>Only for those considered at high risk:&lt;br&gt;• Lifestyle risks of infection, including people engaging in illicit drug use (injectable and non-injectable) and men having sex with men&lt;br&gt;• Chronic liver disease and liver transplantation&lt;br&gt;• Individuals receiving repeated replacement of plasma-derived clotting factors.&lt;br&gt;• Workers involved in hepatitis A virus research or production of hepatitis A vaccine who may be exposed to hepatitis A virus.&lt;br&gt;• Zoo-keepers, veterinarians and researchers who handle non-human primates.&lt;br&gt;• Household /close contacts of children adopted from hepatitis A endemic countries.&lt;br&gt;• Populations/communities at risk of hepatitis A outbreaks or in which hepatitis A is highly endemic.&lt;br&gt;Note: Provincially funded vaccine is not provided for travellers – refer individuals to local travel clinics.&lt;br&gt;Immunity screening after HAV immunization is not routinely recommended.¹</td>
</tr>
<tr>
<td>Vaccine</td>
<td>Series</td>
<td>Comments</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Human Papillomavirus Vaccine</strong>&lt;br&gt;HPV (18 – 26 years of age inclusive)</td>
<td>Three doses administered at 0, 2 and 6 months&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Immunity screening after immunization is not recommended.</td>
</tr>
<tr>
<td><strong>INFLUENZA</strong> (inactivated)</td>
<td>Annually</td>
<td>Administer a dose of inactivated influenza vaccine annually. Influenza vaccine can be administered as early as three months post-transplant.</td>
</tr>
</tbody>
</table>
| **MMR (only susceptible adults* pre-transplant)**<sup>1</sup> | One or two doses. If a second dose is indicated the interval between doses should be at least four weeks.<sup>1</sup> (See Laboratory Recommendations) | MMR must be administered at least four weeks prior to transplant.<sup>1</sup>  
**Not recommended post-transplant**  
*Evidence of Measles Immunity:*  
- Individuals born in 1970 or later  
  - with a documented history of two doses of measles-containing vaccine OR  
  - history of laboratory confirmed measles disease OR  
  - laboratory evidence of measles immunity.  
- Individuals born prior to 1970 are generally considered to be immune. Serology may be recommended by the transplant physician.  
**Laboratory Recommendations:**  
- Screen for measles and rubella immunity (IgG) one month after the first dose of vaccine.  
- If non-immune and a second dose can be administered, provide a second dose (after consult with the transplant physician) and repeat screening in one month.  
- If seroconversion for measles, or rubella has been demonstrated following a dose of MMR, a second dose is not required. However, it is recommended to provide age appropriate MMR if time allows pre-transplant.<sup>4</sup>  
- Annual screening for immunity is not recommended. Ordering serology and interpretation of the results is the responsibility of the transplant physician.  
| **Varicella (chickenpox)** | 1 or 2 doses                                                           | *Evidence of Immunity:*  
- history of two doses of varicella vaccine after 12 months of age OR  
- laboratory evidence of immunity  
Varicella must be administered at least four weeks prior to transplantation.<sup>2,4</sup>  
**Not recommended post-transplant**  
**Laboratory Recommendations**  
- Routine screen pre-transplant includes varicella IgG testing to confirm disease history.  
| **VZ (only susceptible adults* pre-transplant)** | 1 or 2 doses                                                           |  

<sup>1</sup> Evidence of Immunity:  
- history of two doses of varicella vaccine after 12 months of age OR  
- laboratory evidence of immunity  

<sup>2</sup> Varicella must be administered at least four weeks prior to transplantation.  

<sup>3</sup> Evidence of Varicella Immunity:  
- history of two doses of varicella vaccine after 12 months of age OR  
- laboratory evidence of immunity  

<sup>4</sup> Annual screening for immunity is not recommended. Ordering serology and interpretation of the results is the responsibility of the transplant physician.
<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Series</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Varicella-Zoster Vaccine</strong></td>
<td>Adults 50 years of age and older&lt;sup&gt;2&lt;/sup&gt;</td>
<td>- <strong>Zostavax®</strong> may be considered pre-transplant for individuals who are varicella positive (i.e., have had chickenpox or shingles or are varicella seropositive with no history of previous varicella vaccine doses)&lt;sup&gt;2&lt;/sup&gt;; with no contraindications to the use of live vaccines or ZOSTAVAX® and if the vaccine can be administered four weeks or more prior to the transplant. Individuals should discuss the vaccine with their transplant physician. Zostavax® is not available through the provincially funded immunization program. It is available by prescription and may be purchased and administered at local pharmacies. <strong>Zostavax® is contraindicated post-transplant.</strong> Immunity screening after immunization is not recommended.</td>
</tr>
<tr>
<td>(Shingles)</td>
<td>Adults 18 years of age and older&lt;sup&gt;4&lt;/sup&gt;</td>
<td>- <strong>Shingrix®</strong> is recommended for adult SOT by transplant physicians for those 18 years of age and older.&lt;sup&gt;1,4&lt;/sup&gt; Vaccine should be provided at least 2 weeks prior to transplant as with other inactivated vaccines.&lt;sup&gt;4&lt;/sup&gt; Post transplant immunization may resume once the individual is on baseline immunosuppression, usually 6 to 12 months after transplant, and as determined appropriate by the individual’s attending transplant physician.&lt;sup&gt;1,4&lt;/sup&gt; Immunity screening after immunization is not recommended. <strong>Shingrix® is not available through the provincially funded immunization program. It is available by prescription and may be purchased at pharmacies and administered by physicians or pharmacists.</strong> Note: Pharmacists can administer a product off-license once they are satisfied that the off label use is appropriate.</td>
</tr>
</tbody>
</table>
1. Non-routine Immunizations – Before and/or After Transplant

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Series (if needed)</th>
<th>Comments</th>
</tr>
</thead>
</table>
| **Hepatitis A (HAV)** | Two doses: Second dose 6 – 12 months after the first dose.                           | Only for those considered at high risk:  
  - Lifestyle risks of infection, including people engaging in illicit drug use (injectable and non-injectable) and men having sex with men  
  - Chronic liver disease, liver transplantation; chronic liver GVHD following HSCT  
  - Individuals receiving repeated replacement of plasma-derived clotting factors.  
  - Workers involved in hepatitis A virus research or production of hepatitis A vaccine who may be exposed to hepatitis A virus.  
  - Zoo-keepers, veterinarians and researchers who handle non-human primates.  
  - Household /close contacts of children adopted from hepatitis A endemic countries.  
  - Populations/communities at risk of hepatitis A outbreaks or in which hepatitis A is highly endemic.  
  Note: Provincially funded vaccine is not provided for travellers – refer individuals to local travel clinics. Immunity screening after HAV immunization is not routinely recommended. |
| **Rabies (RAB)**      | **Pre-exposure:** days 0, 7, 21 or 28  
  Pre-exposure: Rabies Immune Globulin and vaccine on day 0, and vaccine only on days 3, 7, 14 and 28.  
  Post-exposure: Rabies prophylaxis can be administered intramuscularly at any time before or after transplantation if indicated.  
  Laboratory Recommendations  
  Pre-exposure: Immunity screening is recommended 7 – 14 days after last dose of the series.  
  Post-exposure: Immunity screening is recommended 7 – 14 days after the completion of the vaccine series.  
  If an acceptable antibody response is not obtained, revaccination with a second rabies vaccine series is recommended, followed by further serologic testing.  
  Ordering serology and interpretation of the results is the responsibility of the transplant physician. |  
  Pre-exposure: Should be administered intramuscularly only to those considered high risk (e.g. veterinary health technicians).  
  Should be administered pre-transplant if possible, and completed at least 14 days before starting immunosuppressants.  
  Post-exposure: Rabies prophylaxis can be administered intramuscularly at any time before or after transplantation if indicated.  
  Laboratory Recommendations  
  Pre-exposure: Immunity screening is recommended 7 – 14 days after last dose of the series.  
  Post-exposure: Immunity screening is recommended 7 – 14 days after the completion of the vaccine series.  
  If an acceptable antibody response is not obtained, revaccination with a second rabies vaccine series is recommended, followed by further serologic testing.  
  Ordering serology and interpretation of the results is the responsibility of the transplant physician. |
| **Typhoid Fever (TYVI)** (inactivated) | 1 dose  
  Booster every three years if at continued high risk. |  
  *Only for those considered high risk. Individuals at high risk include household and/or intimate contacts of a typhoid carrier and laboratory workers who manipulate Salmonella typhi.  
  Immunity screening after immunization is not recommended. |

2. Ongoing Recommendations after Transplant

**Note:** Immunization may resume once the individual is on baseline immunosuppression, usually 6 to 12 months after transplant,¹ and as determined appropriate by the individual’s attending transplant physician. If immunizations were not completed prior to transplant, complete the series for inactivated vaccines as previously indicated.

**Live vaccines, are contraindicated after transplant.**
References


