# Immunization for Children Expecting Solid Organ Transplant before 18 Months of Age (Accelerated)

**Revision Date: March 14, 2018**

Rationale for update: Updated dosing and scheduling for hepatitis B vaccine for hypo-responsive individuals under 16 years of age.

These guidelines are intended as a supplement to 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.[1] Consult with an attending physician before providing live vaccines.

## 1. Routine Immunizations – Before Transplant

| Age | Vaccine | Comments |
|---|---|---|
| **2 months** | **DTaP-IPV-Hib** | **DTaP-IPV-Hib:**<br>• DTaP-IPV-Hib can be administered as early as six weeks of age.[1]<br>• Four weeks is the minimum interval between subsequent doses of DTaP-IPV-Hib.[1,2,3]<br>Note: **INFANRIX hexa**® should not be administered as INFANRIX hexa® contains single dose (10 µg) of Engerix® Hepatitis B vaccine. |
| | **PNEU-C13** | **PNEU-C13 :**<br>• Pneu-C13 can be administered as early as six weeks of age.[1]<br>• Four weeks is the minimum interval between subsequent doses of Pneu-C13. [2,3] |
| | **HBV** | **HBV:**<br>• HBV can be administered at birth.<br>• Follow the dosage and schedule for hypo-responsive individuals for Hepatitis B Vaccine. |
| | **MenC-ACYW (MENVEO™)[1,4]** | **MenC-ACYW (MENVEO™):**<br>• MenC-ACYW should not be administered before eight weeks of age. |
| | **Rotavirus** | **Rotavirus Vaccine:**<br>• Rotavirus vaccine must be administered at least four weeks prior to transplant.[4]<br>• Rotavirus vaccine can be administered as early as 6 weeks of age.<br>• Minimum interval between doses is four weeks.<br>• First dose must be administered before 15 weeks of age with series completed before 8 calendar months of age. |
| | **Laboratory Recommendations:**<br>Immunity screening after immunization is not recommended for diphtheria, tetanus, pertussis, polio, haemophilus influenzae, pneumococcal, meningococcal and rotavirus. | |
| **3 months** | **DTaP-IPV-Hib** | |
| | **PNEU-C13** | |
| | **HBV** | **HBV:**<br>• Follow the dosage and schedule for hypo-responsive individuals for Hepatitis B Vaccine. |
| | **Rotavirus** | **Rotavirus Vaccine:**<br>• Series must be administered before 8 calendar months of age.<br>• Minimum interval between doses is four weeks. |

| Age | Vaccine | Comments |
|---|---|---|
| 4 months | DTaP-IPV-Hib | |
| | PNEU-C13 | |
| | MenC-ACYW (MENVEO™)[1,4] | |
| | Rotavirus | **Rotavirus Vaccine:**<br>• First dose must be administered before 15 weeks of age with series completed before 8 calendar months of age. |
| 6 months | MMR<br>VZ[4,5] | **MMR and VZ:**<br>• Must be administered at least four weeks prior to transplant.[1,5]<br>• Off-license use of VZ for children younger than 12 months of age.<br>**Laboratory Recommendations**<br>• MMR and VZ: Check for seroconversion (measles, mumps, rubella and varicella) six weeks after the vaccines are administered.[4] |
| | HBV | **HBV**:<br>• Follow the dosage and schedule for hypo-responsive individuals for Hepatitis B Vaccine.<br>**Laboratory Recommendations**<br>HBV: Screen for anti-HBs at 1 – 6 months after the initial series. If antibody levels are suboptimal, repeat the series once and retest anti-HBs at 1 – 6 months after the repeat series. Be aware that a positive antibody result for children younger than 12 months can be due to passive immunity from maternal antibodies. Periodic screening as recommended by the attending transplant physician taking into account the severity of the immunocompromised state and whether or not the risk of hepatitis B is still present.[1] |
| | INFLUENZA (Inactivated) | **INFLUENZA**:<br>• 2 doses with a minimal interval of four weeks between doses. |
| | HAV | **HAV**:<br>• Only for those considered high risk (chronic liver disease; liver transplantation, individuals receiving repeated plasma–derived clotting factors; household or close contacts of children adopted from hepatitis A endemic countries; populations or communities at risk of hepatitis A outbreaks or in which hepatitis A is highly endemic.[1]<br>• Off-license use of HAV for children younger than 12 months of age<br>**Laboratory Recommendations**<br>HAV: Immunity screening after HAV immunization is not routinely recommended.[1] Ordering serology and interpretation of the results is the responsibility of the transplant physician. |
| 9 months | MMR-Var[4] | **MMR-Var**:<br>• Must be administered at least four weeks prior to transplant.[1,5]<br>• Children younger than 12 months of age should receive PRIORIX-TETRA®.<br>**Laboratory Recommendations**<br>Check for seroconversion (measles, mumps, rubella and varicella) six weeks after the vaccine is administered.<br>Ordering serology and interpretation of the result is the responsibility of the transplant physician. |

 

| Age | Vaccine | Comments |
|---|---|---|
| **12 months** | **DTaP-IPV-Hib**[1] | **DTaP-IPV-Hib:**<br>• 12 months of age or older and at least six months after third dose.[1] |
| | **PNEU-C13**[1] | **PNEU-C13:**<br>• 12 months of age or older and at least eight weeks after the third dose.[1] |
| | **MenC-ACYW (Menveo™)**[1,4] | **MenC-ACYW (MENVEO™):**<br>• This dose must be administered in second year of life (12 to 23 months of age).[1] |
| | **MMR-Var**[4]***** | **MMR-Var:**<br>• Must be administered at least four weeks prior to the transplant.[1,5]<br><br>**Laboratory Recommendations**<br>MMR and Varicella*<br>If true seroconversion for measles, mumps, rubella, or varicella (i.e., a negative then a positive) is demonstrated following the dose at nine months, this dose is not required. Separate vaccines (VZ or MMR) may be indicated depending on the seroconversion results.<br>If MMR-Var, MMR or VZ are administered, screen for the appropriate antigen (measles, rubella or varicella) six weeks later. Further doses of these vaccines should only be administered if seroconversion is not demonstrated.<br>Annual screening of immunity for measles, rubella and varicella is not recommended.<br>Ordering serology and interpretation of the results is the responsibility of the transplant physician. |
| | **HAV** | **HAV**:<br>• Only for those considered high risk (chronic liver disease; liver transplantation, individuals receiving repeated plasma–derived clotting factors; household or close contacts of children adopted from hepatitis A endemic countries; populations or communities at risk of hepatitis A outbreaks or in which hepatitis A is highly endemic.[1] |
| **14 months** | **MMR** | Administer second dose of MMR only if seroconversion is not demonstrated after the 12 month dose. The second dose of MMR (if indicated) must be at least six weeks after the MMR-Var dose at 12 months of age.<br>**Note**: If both MMR and VZ are needed based on serology results, MMR-Var may be administered.<br>**Laboratory Recommendations**<br>The transplant physician needs to be consulted before proceeding with second dose of MMR-containing vaccine even if serology is negative. This will allow assessment as to whether or not the patient can be on hold for the transplant for another four weeks. |
| **15 months** | **VZ** | Administer a second dose of varicella-containing vaccine only if seroconversion is not demonstrated after the MMR-Var dose administered at 12 months of age.<br>It is preferred that the second dose of varicella-containing vaccine be at least three months after the first dose of varicella-containing vaccine. However, the interval between doses may be shortened to four[1] to six[7] weeks if rapid complete protection is required.<br>**Laboratory Recommendations**<br>The transplant physician needs to be consulted before proceeding with second dose of VZ-containing vaccine even if serology is negative. This will allow assessment as to whether or not the patient can be on hold for the transplant for another four weeks. |

 

## 2. Ongoing Recommendations after transplantation for children younger than 18 months of age

**Note**: Immunization may resume once the child is on baseline immunosuppression, usually 6 to 12 months after transplant[1] and as determined appropriate by the child'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.**

**Refer to Immunization for Children Expecting Solid Organ Transplant (SOT) after 18 Months of Age (Catch-up and Ongoing Schedule) for children 18 months of age and older for ongoing immunization recommendations.**

***References***

[1] National Advisory Committee on Immunization. (2016). *Canadian Immunization Guide* (Evergreen ed.). Ottawa, ON: Public Health Agency of Canada. www.canada.ca/en/public-health/services/canadian-immunization-guide.html

[2] T. M. Wyeth, Pfizer Canada Inc. (2015, December 22). Prevnar® 13: Pneumococcal 13-valent conjugate vaccine (diphtheria CRM197 protein). *Product Monograph*.

[3] Atkinson, W. Wolfe, S. Hamborsky, J. (2015). Pneumococcal disease In *Epidemiology and Prevention of Vaccine-preventable Diseases* [Chap 17] (13th ed.). Retrieved November 6, 2017, from www.cdc.gov/vaccines/pubs/pinkbook/pneumo.html

[4] Expert opinion of AB transplant physicians (2013, 2015, and 2017).

[5] Rubin, L. G., et all. (2013, December 4). 2013 IDSA clinical practice guidelines for vaccination of the immunocompromised host. *Clinical Infectious Diseases*, *Advanced Access*

[6] National Advisory Committee on Immunization. (2013). Update on the use of quadrivalent conjugate meningococcal vaccines. *Canada Communicable Disease Report* 39(ACS-1).

[7] GlasxoSmithKline Inc. (2017, August 11). Varilrix®: Varicella virus vaccine. *Product Monograph*.

 