IWK Health Centre

Transplantation (Hematopoietic Stem Cell Transplantation (HSCT) Immunization Recommendations

***** Immunizations for the HSCT population should only commence after consultation with the hematopoietic stem cell transplantation physician. ******

It is known that differences are present between children who undergo allogeneic versus autologous HSCT in regards to immunization responses, but not enough evidence is available to recommend different vaccination schedules. For the purposes of simplicity APPHON (in accordance with the American Society for Blood and Marrow Transplantation guideline 2009) is recommending the same schedule for both allogeneic and autologous HSCT patients.

Pre-Transplantation:

- If possible, all appropriate vaccines should be administered 10-14 days prior to implementation of ablative or immunosuppressive therapy if this can be achieved without delaying therapy. In allogeneic HSCT, consider administration of appropriate vaccines to the donor (at least) 10-14 days before bone marrow harvesting.

- All household and other close contacts should also be immunized if not previously immunized or immune with influenza, meningococcal, pneumococcal, MMR, varicella, pertussis.

Post-transplantation:

- The influenza and pneumococococcal conjugate (Prevnar) vaccines may be given as early as 6 months after HSCT unless patient is on active chemotherapy including antibody directed therapy.
- All other vaccines should start no earlier than 12 months post HSCT or at 3 months after stopping all chronic GVHD therapy, if greater than 1 year post transplant including high dose steroids (equivalent to 2 mg/kg/day prednisone or 20 mg prednisone/day for 2 weeks or longer).

- All household and other close contacts should also be immunized if not immunized prior to transplant

This guidance document is an APPHON consensus document that included experts from Infectious Disease, Immunology and Oncology.

This document follows the recommendations put forth by the National Advisory Committee for Immunization in Canada. Refer to the *Canadian Immunization Guide* www.phac-aspc.gc.ca/publicat/cig-gci/p01-10-eng.php

This document does not replace good clinical care.

Routine Immunizations

	6 months after HSCT	7 months after HSCT	8 months after HSCT	12 months after HSCT	14 months after HSCT	16 months after HSCT	24 months after HSCT	27 months after HSCT	36 months after HSCT
Influenza (Inactivated)	X		Live influenza vaccine is contraindicated for HSCT patients less than 24 months post-HSCT and until deemed immunocompetent by the transplant physician.						
Pneu-C 13[1,2,3]	X	X	X						
DTaP-IPV-Hib				X	X	X**(for children less than 7 years of age)**	X		STAT serology If low, give a booster dose
MenC-ACYW				X					
(For asplenia) MenC-ACYW + Men B				X		X			
Hepatitis B				X	X		X		Serology for anti-HBs
HPV				X	X		X		
Pneumo-P					X			X	
MMRV (combined vaccine)							X	X At least 3 months after 1st dose	IgG for measles and rubella

See detailed recommendations on following pages.

INFLUENZA (Inactivated)								
	6 months after HSCT	7 months after HSCT	8 months after HSCT	12 months after HSCT	14 months after HSCT	24 months after HSCT	27 months after HSCT	36 months after HSCT
Influenza (Inactivated)	X[(a)]	Live influenza vaccine is contraindicated for HSCT patients less than 24 months post-HSCT and until deemed immunocompetent by the transplant physician.						

INFLUENZA

Annual seasonal administration starting before HSCT. Inactivated influenza vaccine must be administered at least two weeks prior to transplant conditioning or mobilization chemotherapy.

(a) Inactivated Influenza vaccine may be administered as early as four months post-transplant in outbreak situations with approval of oncologist. If administered less than six months post-transplant (i.e., 4 – 6 months), a 2nd dose may be administered four weeks later if there is ongoing circulation of virus in the community.

Children younger than nine years of age receiving influenza vaccine for the first time post-transplantation require two doses administered at least four weeks apart.

Annual influenza vaccine is strongly recommended for close contacts of pre- and post-transplant recipients (e.g., family members, household contacts, etc.). Either inactivated or live influenza vaccines may be administered to close contacts.

Note: Individuals who have received FluMist® should avoid close association with individuals with severe immunocompromising conditions (e.g., bone marrow transplants recipients requiring protective isolation) for at least two weeks following immunization.

Immunity screening after immunization is not recommended.

PNEUMOCOCCAL								
	6 months after HSCT	7 months after HSCT	8 months after HSCT	12 months after HSCT	14 months after HSCT	24 months after HSCT	27 months after HSCT	36 months after HSCT
Pneu-C 13	X	X	X					
Pneumo-P					X		X	

PNEUMOCOCCAL

The minimum interval between Pneu-C13 doses is four weeks and the minimum interval between the Pneu-C13 and the Pneumo-P is six months. The minimum interval between Pneumo-P doses is six months.

A booster dose of Pneumo-P recommended one year after the first dose.

Children must be 24 months of age or older to receive Pneumo-P.

Immunity screening after immunization is not recommended at this time.

DTaP-IPV-HIB									
	6 months after HSCT	7 months after HSCT	8 months after HSCT	12 months after HSCT	14 months after HSCT	16 months after HSCT	24 months after HSCT	27 months after HSCT	36 months after HSCT
DTaP-IPV-Hib				X	X	X[(a)]	X		TAT serology. If low, give a booster dose[(b)]

DTaP-IPV-HIB

(a) Children younger than seven years of age should receive a 3rd dose 4 – 8 weeks following the 2nd dose and a 4th dose at 24 months after HSCT. The minimum interval between each of the first three doses is four weeks and between the 3rd and 4th dose is six months.

Screen for tetanus antitoxin (TAT) after immunization at three years post-transplant. If the patient is on intravenous immune globulin (IVIG), serology should be delayed until three months after the completion of IVIG therapy.

(b) If TAT results indicate not immune for tetanus, administer a booster dose of DTaP-IPV/Hib. Immunity

screening for diphtheria, pertussis, polio and Hib is not recommended.

Ordering serology and booster (if needed) should be done in consultation with the immunologist.

Notes:

- Off-license use of DTaP-IPV/Hib – The higher dose of Diphtheria and Pertusis recommended by APPHON as immunity with lower doses in this population deemed suboptimal.

The immunization recommendations for the general population should be followed long term (i.e., after the TAT assessment and recommendations at three years).

MENINGOCOCCAL								
	6 months after HSCT	7 months after HSCT	8 months after HSCT	12 months after HSCT	14 months after HSCT	24 months after HSCT	27 months after HSCT	36 months after HSCT
MenC-ACYW				X				

MENINGOCOCCAL

All children should receive a dose of Men-C-ACYW after HSCT.

Children younger than two years of age should receive Menveo® (not Menactra® or Nimenrix®) vaccine.

Immunity screening after immunization is not recommended.

MENINGOCOCCAL (For Asplenia and Hyposplenia ONLY)								
	6 months after HSCT	7 months after HSCT	8 months after HSCT	12 months after HSCT	16 months after HSCT	24 months after HSCT	27 months after HSCT	36 months after HSCT
MenC-ACYW (+ Men B)				X	(X)			

MENINGOCOCCAL

Children with asplenia or hyposplenia should receive 2 doses of Men-C-ACYW and 2 doses of Men B vaccine at least 8 weeks apart.

Children younger than two years of age should receive Menveo® (not Menactra® or Nimenrix®) vaccine and if Men B vaccine is indicated, Bexsero® should be used (not Trumenba®)

Immunity screening after immunization is not recommended.

Hepatitis B (HBVD)								
	6 months after HSCT	**7 months after HSCT**	**8 months after HSCT**	**12 months after HSCT**	**14 months after HSCT**	**24 months after HSCT**	**27 months after HSCT**	**36 months after HSCT**
Hepatitis B				**X**	**X**	**X**		Serology for anti-HBs[(a)]

HEPATITIS B
Administer higher dose levels of vaccine:

(a) If patient is on IVIG, serology should be delayed until 4 to 6 months after the completion of IVIG therapy.

*If antibody levels are suboptimal, a repeat HBV series is indicated. Ordering serology and recommending the 2nd series is the responsibility of the immunologist.

HPV								
	6 months after HSCT	**7 months after HSCT**	**8 months after HSCT**	**12 months after HSCT**	**14 months after HSCT**	**24 months after HSCT**	**27 months after HSCT**	**36 months after HSCT**
HPV				**X**	**X**	**X**		

HUMAN PAPILLOMAVIRUS – Girls and Boys 12 to 17 years of age (regardless of previous immunization)

The minimum interval between dose 1 and dose 2 is four weeks and between dose 2 and dose 3 is twelve weeks.

Immunity screening after immunization is not recommended.

MEASLES, MUMPS, RUBELLA, VARICELLA								
	6 months after HSCT	**7 months after HSCT**	**8 months after HSCT**	**12 months after HSCT**	**14 months after HSCT**	**24 months after HSCT**	**27 months after HSCT**	**36 months after HSCT**
MMR-V Combined vaccine						**X[(a)]**	**X[(a)]** At least 3 months after 1st dose[1]	IgG for measles and rubella after 2nd dose

MEASLES, MUMPS, RUBELLA and Varicella (MMR-V combined vaccine)
(a) If active chronic GVHD, live vaccines are contraindicated. A live vaccine may be administered after all immunosuppressive drugs have been discontinued for at least three months and the child is deemed immunocompetent by the immunologist for allogeneic patients and oncologist for autologous. Children on maintenance chemotherapy or immunomodulator therapy should not receive live vaccines.

IVIG: Interval between IVIG and a live vaccine is dependent upon the dose of IVIG used and ranges between eight and eleven months. Refer to the *Canadian Immunization Guide* https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-1-key-immunization-information.html?page=11 per discretion of the immunologist/oncologist.

Measles and rubella IgG level at 36 months (in case of delayed immunization with live vaccines, IgG level should be determined at least one month after the 2nd MMR).

- If after two doses of MMR vaccine, measles IgG is negative or indeterminate consider non- immune to measles – no further doses of vaccine should be administered. If patient is exposed to measles in the future, prophylactic IG within six days of exposure should be provided.

Ordering serology and booster dose (if needed) is the responsibility of the immunologist.

Even if the patient has previously developed shingles or chickenpox (pre or post-transplant), varicella vaccine should be administered.

All individuals with HSCT who have not received varicella vaccination post-transplant should be considered susceptible in case of exposure to VZV and should be offered VZIG.

Antiviral medications should be discontinued at least 24 hours before receipt of varicella-containing vaccines and should not be restarted until at least 14 days after vaccination.

The combined measles mumps rubella and varicella vaccine (MMR-V) may be used in place of the single vaccines.