# Immunization of Pediatric (those under 18 years of age) Oncology Clients who have Completed Treatment, Including Autologous HSCT [A]

For information pertaining to vaccination of pediatric clients who have had an allogeneic HSCT, see Hematopoietic Stem Cell Transplantation (HSCT) and the associated *Table 2: Worksheet for Immunization of Pediatric Allogeneic Hematopoietic Stem Cell Transplant (HSCT) Recipients (those under 18 years of age).*

## Introduction and General Principles

Immunization of pediatric oncology clients is suspended at treatment initiation. The decision to commence immunization post-treatment is generally made by the oncologist supervising the care of the child; however the Approval for Immunization of Pediatric (those under 18 years of age) Oncology and HSCT Clients who have Completed Treatment may be signed by the oncologist or nurse practitioner at the oncology clinic.

The following recommendations are based on expert opinion (see references) and are aimed at boosting existing immunity in this population. Routine immunization with inactivated vaccines can be initiated 6 months post-treatment, (influenza vaccine may be given earlier, see below), with approval from the oncologist. Use of live vaccines in this population is deferred until at least 12 months post-treatment, with approval from the oncologist.

Children who are up-to-date for age for all immunizations at the commencement of treatment should be provided a dose of the vaccines listed below.

Those who had not completed their primary immunization series for one or more antigens prior to commencing treatment should be brought up-to-date for age for those antigens. Children should be immunized according to the schedule appropriate for their age.

Children receiving these vaccines post-treatment who are eligible for an age-scheduled dose of that antigen within a year should be vaccinated when they present and will not require the age-scheduled dose. The exception to this is if the post-treatment dose was given prior to the minimum age (e.g., school entry booster dose of Tdap-IPV administered prior to 4 years of age).

To plan immunizations use the Personalized Schedule Worksheet for Immunization of Pediatric (those under 18 years of age) Oncology Clients who have Completed Treatment, Including Autologous HSCT and the Approval for Immunization of Pediatric (those under 18 years of age) Oncology and HSCT Clients who have Completed Treatment.

[A] In certain situations, individuals over 18 years of age may be receiving treatment at the Oncology, Hematology and BMT Clinic at BC Children's Hospital. If a client 18 years of age or older presents with a referral letter from this clinic, they should be immunized as per the pediatric oncology schedule.

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## Inactivated Vaccines

### 3-4 weeks after discontinuation of therapy with approval from the oncologist:

Inactivated Influenza Vaccine

If seasonally appropriate, inactivated influenza vaccine should be given 3-4 weeks after chemotherapy is discontinued and preferably when peripheral granulocyte and lymphocyte counts are > $1x10^9$/L.

### 6 months after discontinuation of treatment with approval from the oncologist:

DTaP-HB-IPV-Hib vaccine

If vaccine history is incomplete, the client should be brought up-to-date for age. Clients should receive an extra dose of DTaP-HB-IPV-Hib vaccine if they were 'complete for age' prior to commencing treatment regimen. These antigens should be given as INFANRIX hexa® regardless of the client's age to provide polio, Hib and hepatitis B protection. The use of pediatric formulation combination vaccines (higher potency vaccines) in those 7 years of age and older is based on expert opinion. Pediatric oncology clients who have undergone treatment, including autologous stem cell transplant, **do not** require the hepatitis B vaccine higher dose schedule. This is in contrast to pediatric oncology patients who have had an allogeneic stem cell transplant and require the Hepatitis B Vaccine Higher Dose Schedule.

Meningococcal C vaccine and PCV13

If vaccine history is incomplete, the client should be brought up-to-date for age. Clients should receive an extra dose of meningococcal C conjugate and PCV13 if they were 'complete for age' prior to commencing treatment regimen. Clients 5 to 18 years of age (inclusive) should also receive a dose of PCV13.

HPV and hepatitis A vaccine

If vaccine history is incomplete, the client should be brought up-to-date for age. Clients should receive an extra dose of each of these vaccines if they were 'complete for age' prior to commencing treatment regimen, if applicable for age/sex and risk group.

PPV23 and meningococcal quadrivalent conjugate vaccines

Children whose treatment (e.g., radiation to the left kidney) has also affected splenic function may be recommended by their oncologist to receive broader coverage against encapsulated bacterial infections with pneumococcal polysaccharide 23 vaccine (6 months after the last dose of PCV13) and meningococcal quadrivalent conjugate vaccine (at least 4 weeks after the last dose of meningococcal C vaccine). The oncologist will indicate the need for these vaccines on the form Approval for Immunization of Pediatric (those under 18 years of age) Oncology and HSCT Clients who have Completed Treatment.

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## Live Vaccines

### 12 months after discontinuation of therapy with approval from the oncologist:

MMR and varicella

May be given 12 months after completion of therapy with approval from the oncologist (use Referral Form for Varicella Vaccination and Referral Form for MMR Vaccination). If vaccine history for these antigens is incomplete, the client should be brought up-to-date for age. Children who completed a series of MMR and/or varicella vaccine prior to undergoing treatment should receive a single dose of each vaccine given 4 weeks apart. The MMR and varicella vaccines should NOT be administered on the same day. MMRV is contraindicated in this patient population. Children with a history of varicella or herpes zoster after 12 months of age do not need to receive varicella vaccine provided the disease occurred prior to 2004 or it was lab confirmed.

Live Attenuated Influenza Vaccine

LAIV may be considered 12 months after completion of therapy for pediatric oncology clients, including autologous HSCT with approval from the oncologist (use Referral Form for Live Attenuated Influenza Vaccination).

## Post-vaccination Serology

Titers are not routinely recommended after vaccination for any vaccine in this patient group, including varicella and hepatitis B, although many patients may be screened by the oncologist for immunity to inform clinical management of exposures.

## Vaccine Administration

Children presenting at the public health unit or at their primary care provider should be immunized according to the principles outlined on the previous pages. The oncologist will indicate approval to commence vaccination by completing Approval for Immunization of Pediatric (those under 18 years of age) Oncology and HSCT Clients who have Completed Treatment. This form is used to provide approval for the date that vaccination can commence for influenza, all other inactivated and live vaccines. The Personalized Schedule Worksheet for Immunization of Pediatric (those under 18 years of age) Oncology Clients who have Completed Treatment, Including Autologous HSCT can be used to plan immunizations for these clients once approval is received.

## Pain Management

In keeping with general principles, immunizers should provide all vaccines for which a client is due. Depending on the number and volume of vaccines to be given, it may be appropriate to use the vastus lateralis as a secondary site. However, it is important to consider that children who have undergone repeated invasive treatments for childhood cancers may be at risk of development of needle fears. These children and their families may request an altered schedule to help alleviate fears and provide the child with some control. When taking into account preferences for altering the schedule, nurses should use their

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clinical judgement when undertaking a thorough assessment with regard to the risk of exposure to each antigen, including personal risk factors and local disease epidemiology. Additionally, use of topical anesthetic patches or creams (e.g., EMLA patch, Maxilene cream, Ametop gel) should be discussed as these parents and children are often familiar with their application.

Where possible, it is recommended that the nurse call the family prior to the first set of immunizations to discuss scheduling options, site selection and the use of topical anesthetic product. This will allow the parent to prepare the child, to apply the topical anesthetic product to the chosen injection sites, and to bring appropriate clothing to access the sites in a discreet manner, especially if the vastus lateralis is chosen.

## After Completion of Immunizations

For clients receiving treatment at BC Children's Hospital, after each set of vaccines, a record of immunizations should be sent by fax to the attention of the Long Term Care Follow-Up Nurse at the Oncology, Hematology and BMT Clinic at BC Children's Hospital, fax: 604-875-3414.

## References

Hilgendorf I, Freund M, Jilg W, Einsele H, Gea-Banaloche J, Greinix H, et al. Vaccination of allogeneic haematopoietic stem cell transplant recipients: Report from the International Consensus Conference on Clinical Practice in chronic GVHD. Vaccine 2011 Apr;29(16):2825-33.

Australian Technical Advisory Group on Immunization. Australian Immunization Handbook-Oncology patients. Canberra; 2013.

Chrisholm J. Reimmunization after therapy for childhood cancer. Clin Infect Dis. 2007 Mar;44:643-5.

Bate J, Patel S, et al. Immunisation practices of paediatric oncology and shared care oncology consultants: a United Kingdom survey. Pediatr Blood Cancer. 2010 Jul;54(7):941-6.

# Personalized Schedule Worksheet for Immunization of Pediatric (those under 18 years of age) Oncology Clients who have Completed Treatment, Including Autologous HSCT

| | | | |
|---|---|---|---|
| | | Date: | |
| | | | *YYYY/MM/DD* |

| **CLIENT INFORMATION** | | | |
|---|---|---|---|
| Name: | | | |
| | *Last* | *First* | |
| DOB: | | PHN: | |
| | *YYYY/MM/DD* | | |

| | |
|---|---|
| Treatment Completion Date: | |
| Inactivated Influenza Vaccine | Effective Date *(YYYY/MM/DD)*: |
| All Other Inactivated Vaccines | Effective Date *(YYYY/MM/DD)*: |
| Live Vaccines | Please Complete the LAIV, MMR and Varicella Referral Forms |
| Oncologist recommendation for PPV23 and Men ACYW-135 conjugate vaccine? | Yes ❑ No ❑ |

| | **1st visit** | **2nd visit** | **3rd visit** | **4th visit** | **5th visit** |
|---|---|---|---|---|---|
| **Date:** ***YYYY/MM/DD*** | | | | | |
| Influenza | | | | | |
| DTaP-HB-IPV-Hib | | | | | |
| PCV13 | | | | | |
| Men C | | | | | |
| Hep A | | | | | |
| Men ACYW-135 Conjugate | | | | | |
| HPV | | | | | |
| PPV23 | | | | | |
| MMR | | | | | |
| Varicella | | | | | |