



# HEALTH MAINTENANCE

Julio, age 14,  
4-year Burkitt's Lymphoma survivor

*It's not the years in your life that count.  
It's the life in your years.*

ABRAHAM LINCOLN

## Health Maintenance

**T**HIS SECTION IS DEVOTED TO HEALTH MAINTENANCE after completion of chemotherapy or after bone marrow/stem cell transplantation (BMT/SCT).

- All patients should re-establish contact with their primary care physician once their treatment is finished
- A visit to the primary doctor should be scheduled within 1-3 months following completion of treatment
- The Off-Therapy summary together with recommendations for immunizations should be sent to the primary care physician from the oncology treatment center

### Immunization Titers:

It is recommended that immunization titers be obtained on all patients once 3–6 months off all chemotherapy and/or immunosuppressive therapy following bone marrow/stem cell transplant.

Immunization Titers			
Disease	Titers	Positive/Negative	Date Obtained
Diphtheria			
Haemophilus Influenzae			
Hepatitis A			
Hepatitis B			
Measles			
Mumps			
Pertussis			
Pneumococcus			
Polio			
Rubella			
Tetanus			
Varicella (chickenpox)			

### **Re-immunization:**

- Children are immunosuppressed after completion of standard dose chemotherapy and after bone marrow/stem cell transplantation (BMT/SCT)
- BMT/SCT recipients are profoundly immunosuppressed for months, even years after transplantation
- Both groups are at increased risk of infections, including vaccine preventable infections
- Therefore, re-immunization is very important

### **After completion of standard chemotherapy:**

- No killed vaccines for six months
- No live vaccines for one year
- Flu vaccine annually every fall
- Patients who have maintained normal antibody titers should receive one dose of each childhood vaccine (booster) as per the CDC Catch-up Immunization schedule (or the schedule of the country of residence). See chart on following page
- Infants and older patients who either never received immunizations or lost immunity following treatment should follow the normal immunization schedule

### **Following BMT/SCT (Autologous, Allogeneic, Cord blood):**

- Almost all BMT/SCT patients lose their pre-transplant acquired natural and vaccine acquired immunity
- Re-immunization should commence in BMT/SCT patients at 12 months, provided:
  - They are off all immunosuppressive therapy
  - There is no graft-versus-host disease (GVHD)
  - They have not had immunoglobulin in the last three months
- No killed vaccines for one year post transplant
- No live vaccines for two years post transplant
- Flu vaccine annually every fall
- BMT/SCT patients need the full schedule of childhood vaccines (2-3 doses) as per the CDC Immunization schedule for BMT/SCT patients (or the schedule of the country of residence)

### Catch-up Schedule for Persons Aged 4 Months–6 Years

Vaccine	Minimum Age for Dose 1	Minimum Interval Between Doses				
		Dose 1 to Dose 2	Dose 2 to Dose 3	Dose 3 to Dose 4	Dose 4 to Dose 5	
Hepatitis B	Birth	4 weeks	8 weeks (and 16 weeks after first dose)			
Rotavirus	6 wks	4 weeks	4 weeks			
Diphtheria, Tetanus, Pertussis	6 wks	4 weeks	4 weeks	6 months	6 months	
Haemophilus influenzae type b	6 wks	4 weeks if current age is younger than 12 months of age 8 weeks (as final dose) if first dose administered at age 12-14 months No further doses needed if first dose administered at 15 months of age or older	4 weeks if current age is younger than 12 months of age 8 weeks (as final dose) if current age is 12 months or older and second dose administered at younger than 15 months of age No further doses needed if previous dose administered at age 15 months or older	8 weeks (as final dose) This dose only necessary for children aged 12 months–5 years who received 3 doses before age 12 months		
Pneumococcal	6 wks	4 weeks if current age is younger than 12 months of age 8 weeks (as final dose) if first dose administered at age 12 months or older or current age 24–59 months No further doses needed for healthy children if first dose administered at age 24 months or older	4 weeks if current age is younger than 12 months of age 8 weeks (as final dose) if current age is 12 months or older No further doses needed for healthy children if previous dose administered at age 24 months or older	8 weeks (as final dose) This dose only necessary for children aged 12 months–5 years who received 3 doses before age 12 months		
Inactivated Poliovirus	6 wks	4 weeks	4 weeks	4 weeks		
Measles, Mumps, Rubella	12 mos	4 weeks				
Varicella	12 mos	3 months				
Hepatitis A	12 mos	6 months				

### Catch-up Schedule for Persons Aged 7–18 Years

Vaccine	Minimum Age for Dose 1	Minimum Interval Between Doses				
		Dose 1 to Dose 2	Dose 2 to Dose 3	Dose 3 to Dose 4	Dose 4 to Dose 5	
Tetanus, Diphtheria/ Tetanus, Diphtheria, Pertussis	7 yrs	4 weeks	4 weeks if first dose administered at younger than 12 months of age 3 months if first dose administered at age 12 months or older	6 months if first dose administered at younger than 12 months of age		
Human Papillomavirus	9 yrs	4 weeks	12 weeks (and 24 weeks after first dose)			
Hepatitis A	12 mos	6 months				
Hepatitis B	Birth	4 weeks	8 weeks (and 16 weeks after first dose)			
Inactivated Poliovirus	6 wks	4 weeks	4 weeks	4 weeks		
Measles, Mumps, Rubella	12 mos	4 weeks				
Varicella	12 mos	4 weeks if first dose administered at age 13 years or older 3 months if first dose administered at younger than 13 years of age				

Source: Center for Disease Control and Prevention (2008)

“Catch-up Immunization Schedule For Persons Aged 4 Months–18 Years Who Start Late or Who Are More Than 1 Month Behind.”  
Please refer to [www.cdc.gov](http://www.cdc.gov) for more detailed information and specific recommendations.

## Recommended Vaccinations for Bone Marrow/Stem Cell Transplant (BMT/SCT) Recipients, Including both, Allogeneic and Autologous Recipients

For these guidelines, BMT/SCT recipients are presumed immunocompetent at 2 years or later after BMT/SCT if they are not on immunosuppressive therapy and do not have graft-versus-host disease (GVHD).

Immunization Schedule after Bone Marrow/Stem Cell Transplantation (BMT/SCT)						
Date of Transplant:						
Vaccine/Toxoid	Time After BMT/SCT					
	12 months	Date Given	14 months	Date Given	24 months	Date Given
Inactivated	Diphtheria, Tetanus, Pertussis for Children aged <7yrs	DTaP or DT		DTaP or DT		DTaP or DT
	Diphtheria, Tetanus, Pertussis for Children aged ≥7yrs	Td		Td		Td
	Haemophilus Influenzae (Type B)	Hib Conjugate		Hib Conjugate		Hib Conjugate
	Hepatitis B	HepB		HepB		HepB
	Pneumococcal (PPV23)	PPV23		—————		PPV23
	Hepatitis A	Routine Administration Not Indicated				
	Influenza	Lifelong, Seasonal Administration (starting before HSCT Transplant and resuming 6 months afterwards)				
	Meningococcal	Routine Administration Not Indicated				
	Polio (IPV)	IPV		IPV		IPV
	Rabies	Routine Administration Not Indicated				
Lyme Disease	Routine Administration Not Indicated					
Live-Attenuated	Measles, Mumps, Rubella (MMR)	—————			MMR	
	Varicella	Contraindicated for BMT/SCT Recipients				
	Rotavirus	Not Recommended for Patients in the United States				

Source: Center for Disease Control (2000) – “Guidelines for preventing opportunistic infections among hematopoietic stem cell transplant recipients.” Recommendations of CDC, the Infectious Disease Society of America, and the American Society of Blood and Marrow Transplantation. MMWR, 49 (RR10): 1-128. Adapted with permission.

## Immunizations for health care workers, close contacts and family of BMT/SCT recipients

- Vaccination coverage of health care workers, including those caring for transplant patients is often sub-optimal.
- The CDC has made recommendations for appropriate immunization of caretakers of BMT/SCT recipients.

## Vaccinations for Family, Close Contacts, and Health Care Workers (HCW), Bone Marrow/Stem Cell Transplantation Recipients (BMT/SCT)

Vaccines	Recommendations for Use
Hepatitis A	Routine vaccination is recommended for persons at increased risk for hepatitis A or its adverse consequences (e.g., persons with chronic liver disease or persons traveling to hepatitis A-endemic countries) and for children aged $\geq 24$ months living in areas with consistently elevated hepatitis A incidence.
Influenza	Household contacts—Vaccination is strongly recommended during each influenza season (i.e., October-May) beginning in the season before the transplant and continuing to $\geq 24$ months after BMT/SCT. All household contacts of immunocompromised BMT/SCT recipients should be vaccinated annually as long as these conditions persist. HCWs and home caregivers—Annual vaccination is strongly recommended during each influenza season.
Polio	Vaccination is not routinely recommended for adults but should be administered when polio vaccination is indicated according to published Advisory Committee on Immunization Practices guidelines; when polio vaccine is administered, inactivated polio vaccine should be used.
Measles, Mumps, Rubella (MMR)	Vaccination is recommended for all persons who are aged $\geq 12$ months and who are not pregnant or immunocompromised.
Rotavirus	Contraindicated because intussusception has been reported among infants during the first 1-2 weeks after rotavirus vaccination with substantially increased frequency.
Varicella	Vaccination should be administered to all susceptible HCWs, household contacts, and family members who are aged $\geq 12$ months and who are not pregnant or immunocompromised. When varicella vaccination is administered to persons aged $\geq 13$ years, 2 doses are required, administered 4-8 weeks apart.

Source: Center for Disease Control (2000) – “Guidelines for preventing opportunistic infections among hematopoietic stem cell transplant recipients.” Recommendations of CDC, the Infectious Disease Society of America, and the American Society of Blood and Marrow Transplantation. MMWR, 49 (RR10); 1-128. Adapted with permission.