Immunisation Schedule for Autologous and Allogeneic Blood and Marrow Transplant Recipients

Following transplantation, the immunisation of blood and marrow transplant (BMT) recipients, for vaccine preventable diseases, is recommended in accordance with joint guidelines recommended by: The European Group of Blood and Marrow Transplantation (EBMT), the Centres for Disease Control (CDC), the Infectious Diseases Society of America (IDSA), and the American Society for Blood and Marrow Transplantation (ASBMT).\(^1\)

The Oxford BMT Programme recommends that patients following autologous or allogeneic transplant are vaccinated in line with the UK childhood vaccinations schedule. Note however, that the decision to enter the vaccination program should be taken by a consultant in cases where patients are to continue on post-transplant maintenance chemotherapy.

**Live vaccines should not be given to:**

- Autologous transplant recipients
- Allogeneic transplant recipients who remain immunosuppressed and not until 2 years post transplantation.

**Primary Series –Table 1**

1. **Influenza A & B (Flu) inactivated seasonal vaccine:** surgery seasonal choice. Vaccination should ideally be given before the influenza season (October to March) but no earlier than 3 months post-transplant.  
   *Schedule*: 1 dose annually, life long, before the influenza season begins.  
   Antibody testing post vaccination is not indicated.

   **NB:** The live attenuated influenza vaccine (Fluenz Tetra®) must NOT be given to transplant recipients. Household members should also receive an inactivated influenza vaccine as there is theoretical potential for transmission of live attenuated influenza virus in Fluenz Tetra® to immunocompromised contacts for one to two weeks following the vaccination.

2. **Diphtheria/Tetanus/Pertussis/Inactivated Polio/Haemophilus Influenzae type b/Hepatitis B (DTaP/IPV/Hib/HepB) hexavalent vaccine:** usual choice for childhood vaccination schedule  
   *Schedule*: Starting at 6 months post-transplant, 3 doses at 1 month intervals.
   Antibody testing post vaccination is not required.

3. **Meningococcal Group B (Men B)** multicomponent protein vaccine: usual choice for childhood vaccination schedule  
   *Schedule*: Starting 6 months post-transplant, 2 doses, 2 months apart
   Antibody testing post vaccination is not indicated.

4. **Meningococcal Groups A, C, W & Y (MenACWY)** quadrivalent conjugate vaccine: usual choice for childhood vaccination schedule  
   *Schedule*: Starting 6 months post-transplant, one single dose.
   Antibody testing post vaccination is not indicated.

5. **Pneumococcal** (Streptococcus pneumoniae) **Prevenar 13®, 13 valent conjugate vaccine (PCV13) and for the subsequent dose** **Pneumovax II®, 23-valent, polysaccharide vaccine (PPSV23)**  
   **Primary schedule**: Starting 6 months post-transplant, 3 doses at 2- month intervals.
   A single dose of PPSV23 should be given 2 months after the primary series of PCV13.
   Antibody testing should be carried out 2 months after the complete course i.e. after 4 doses, and should be repeated every 2 years, in patients’ with chronic graft versus host disease (GVHD).
PCV13 is used for the primary series because the immunological response to conjugate vaccines is generally more immunogenic than polysaccharide vaccines but, the spectrum of protection is narrower and therefore the subsequent dose of PPSV23 is given to broaden the immune response.3

Common enquiry from GP surgery Practice Nurses:
Q “I have given the patient Pneumovax® II for the primary series rather than Prevenar 13® what should I do?”
A “Wait 6 months and then give the primary series of Prevenar13® as above but no need to give the subsequent dose of Pneumovax® II ”

6. Measles/Mumps/Rubella (MMR) live-attenuated vaccine should not be given to autologous transplant recipients. For allogeneic recipients it is contraindicated until 24 months post-transplant and remains contraindicated in patients with chronic GVHD or on-going immunosuppression4.

Schedule: Starting 24 months post-transplant, 2 doses 1 month apart.
Antibody testing post vaccination is not indicated

Please note that where the start of the immunisation schedule is deferred due to active Graft versus Host Disease (GVHD) or acutely unwell, the MMR schedule should also be deferred and commence 1 year after the start of the primary series.

Table 1 - Summary of Adult Immunisation Schedule for all BMT Recipients

<table>
<thead>
<tr>
<th>Months post BMT</th>
<th>Protects against</th>
<th>Vaccine Choice</th>
<th>Doses</th>
<th>Months Between doses</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Influenza A &amp; B</td>
<td>Any Inactivated Seasonal vaccine</td>
<td>1 12 Seasonal</td>
<td>Differs from UK childhood vaccination schedule</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Diptheria/Tetanus/ Pertussis/Polio/ Haemophilus Influenza type b/ Hepatitis B (DTaP/IPV/Hib/HepB)</td>
<td>Usual choice for UK childhood vaccination schedule</td>
<td>3 1</td>
<td>Refer to Table 2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Meningococcal A,C,W&amp;Y (Men ACWY)</td>
<td>Usual choice for UK childhood vaccination schedule</td>
<td>1</td>
<td>No booster required</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Meningococcal B (Men B)</td>
<td>Usual choice for UK childhood vaccination schedule</td>
<td>2 2</td>
<td>No booster required</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Pneumococcal (Streptococcus pneumoniae)</td>
<td>Prevenar 13® Pneumovax II®</td>
<td>3 1 2</td>
<td>Differs from UK childhood vaccination schedule</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Measles/Mumps/Rubella</td>
<td>Usual choice for UK childhood vaccination schedule</td>
<td>2 1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Send to Immunology Department, Churchill Hospital, Oxford or a local hospital that supports this testing. GP practice to carry out antibody testing and inform the patient’s BMT consultant if the response is found to be suboptimal. A level of >20U/ml is considered to be an acceptable level. Revaccination may be considered for patients with low immunity but please discuss with consultant virologist on a case by case basis.
Clinicians can seek further advice from Public Health England (PHE) Thames Valley Health Protection Team (TVHPT): Email: TVHPTimms@phe.gov.uk or Tel: 03442253861, option 4 then option 1. Out of hours: 08449670083.

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Should not be given to autologous transplant recipients and contraindicated in allogeneic transplant recipients with chronic GVHD, or on-going immunosuppression.

**Table 2 - Reinforcing immunisation (Booster)**

<table>
<thead>
<tr>
<th>Vaccine/Toxoid</th>
<th>Interval after completion of primary series</th>
<th>Number of doses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetanus diphtheria</td>
<td>5 years and 10 years</td>
<td>1</td>
</tr>
<tr>
<td>Inactivated Polio Vaccine</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>(Td/IPV)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Foreign travel**

Additional vaccinations may be indicated post BMT if the recipient is residing in or visiting an area where other vaccine preventable diseases are endemic.

Healthcare professionals and patients can get advice from [www.nathnac.org](http://www.nathnac.org)

Patients can also get advice from their GP or Practice Nurse

**References**


Joint guidelines based on recommendations by: the European Group of Blood and Marrow Transplantation (EBMT), the Centres for Disease Control (CDC), the Infectious Diseases Society of America (IDSA), and the American Society for Blood and Marrow Transplantation (ASBMT).

Department of Health


Centre for Disease Control and Prevention - General Recommendations on Immunization: Recommendations of the Advisory Committee on Immunization Practices (ACIP). 2011

IDSA Clinical Practice Guideline for Vaccination of the Immunocompromised Host. Clinical Infectious Diseases 2013

Audit
These processes are subject to the OxBMT audit programme

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Circulation
NSSG Haematology Website

<table>
<thead>
<tr>
<th>Name</th>
<th>Revision</th>
<th>Date</th>
<th>Version</th>
<th>Review date</th>
</tr>
</thead>
</table>
| Denise Wareham, BMT Coordinator
  Katie Jeffery, Consultant Virologist | Revision of start date for some vaccines
  Change of DTaP vaccine brand, addition of subsequent PPSV dose | Dec 2014 | 5.0     | Dec 2016    |
| Denise Wareham, BMT Coordinator
  Katie Jeffery, Consultant Virologist | Minor amendments, change of contact details, vaccine choice & reference to Off-label | Mar 2015 | 6.0     | Mar 2017    |
| Dr Jon Willan, Haematology SPR
  Dr Andy Peniket, BMT programme Director | Inclusion of Autograft patient group | Mar 2016 | 7.0     | Mar 2018    |
| Denise Wareham, BMT Nurse Coordinator | No live vaccines for autologous recipients, addition of Td/IPV booster | Feb 2017 | 8.0     | Feb 2019    |
| Denise Wareham, BMT Coordinator | Revised to come in line with national childhood immunisation schedule
  Antibody test post MMR removed | Feb 2018 | 9.0     | Feb 2020    |