Public Health Scotland

Scottish haematology Society

Revaccination of patients following haematopoietic stem cell transplant or CAR-T treatment

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Version 1.2

Version history

Version	Date	Summary of changes
1.2	20 September 2024	The following changes have been made to version 1.1 of the schedule: • Minor revisions following annual clinical review. • Addition of MenQuadfi to list of MenACWY vaccines.

Contents

Background

Following receipt of a haematopoietic stem cell transplant (HSCT), recipients rapidly experience a decline in protection from vaccines received pre-transplant. This patient cohort should be considered “never vaccinated”. As such, this patient cohort should be considered a priority cohort for re-vaccination, once clinically appropriate.

This statement provides clinicians in Scotland with a template revaccination schedule for post-HSCT patients. Recommendations are also valid for those patients undergoing treatment with cellular immunotherapies, such as CAR-T cell therapy.

It remains the responsibility of the transplant or cellular therapies teams to determine the most appropriate time to start re-vaccination and refer accordingly. It is expected that transplant teams and/or clinicians providing follow up or on-going clinical care post-transplant will support immunisation teams to ensure the vaccination schedule is appropriately delivered.

Please note that the administration of live attenuated vaccines such as MMR may be appropriate for selected patients, but they are not currently part of routine post-transplant vaccination schedules. As there are several clinical criteria to consider prior to the administration of a live vaccine in this patient cohort, live vaccines are not included in this template schedule and patients will be referred separately if they require this type of vaccine. Similarly, travel vaccines are also not included. Where live and travel vaccines are indicated, teams should refer to the Joint consensus statement on the vaccination of adult and paediatric haematopoietic stem cell transplant recipients, the Green Book and relevant summary of product characteristics. Accordingly, this revaccination schedule will not reference live vaccines.

Table 1 provides a schedule for revaccination of patients following receipt of HSCT in Scotland. This is based on the 2023 **Joint consensus statement on the vaccination of adult and paediatric haematopoietic stem cell transplant recipients**: Prepared on behalf of the British society of blood and marrow transplantation and cellular therapy (BSBMTCT), the Children's cancer and

Leukaemia Group (CCLG), and British Infection Association (BIA), with additional clinical advice from the Scottish Haematology Society clinical leads. All clinicians involved in the revaccination of HSCT patients should be familiar with this Consensus statement, the relevant Green Book Chapters and other relevant advice.

In this vulnerable cohort, minimum recommended intervals between vaccine doses should be maintained, with vaccination courses continued to completion. However, it is acknowledged that it may be necessary to delay the start of revaccination and sometimes the schedule will be paused as a result of intercurrent clinical illness. In this latter case, it is not necessary to restart the whole schedule nor the course of any specific vaccine. A patient-centric approach should be taken where alterations to the schedule are required, balancing the needs of the patient with the risk of infection post-transplant. Robust communication between transplant centres and vaccination teams are essential to coordinate this process.

Where the re-vaccination schedule is interrupted by disease relapse and the patient receives a subsequent second autologous or allogeneic HSCT, the patient should again be considered “never vaccinated” and the schedule re-started at the appropriate time after the second HSCT, rather than resumed. This will be communicated by the transplant teams to vaccination colleagues. Transplant teams will re-refer for revaccination, as appropriate.

1. Recommended schedule for re-vaccination of patients following receipt of HSCT with non-live vaccines

Individual non-live vaccine recommendations for post-HSCT recipients are described below. Clinicians are advised to refer to the relevant **Green book** chapter or to seek advice if there is any uncertainty.

1.1. Diphtheria, tetanus, pertussis, polio, Haemophilus influenzae b, Hepatitis B vaccine

Adult and paediatric recipients of autologous and allogeneic HSCT should receive 3 doses of a DTaP/IPV/Hib/HepB vaccine (Infanrix Hexa or Vaxelis) one month (four weeks) apart, from 6 months post-transplant.

In the absence of evidence to guide administration of booster doses in the HSCT population, it is reasonable to offer adult and paediatric recipients of autologous and allogeneic HSCT a DTaP/IPV booster vaccine (Repevax or Boostrix-IPV) at 3 years post-HSCT, and to offer a Td/IPV booster vaccine (Revaxis) at 14 years post-HSCT to align with the NHS routine vaccination schedule.

1.2. Meningitis vaccines (Neisseria meningitidis, Meningococcus, meningococcal disease)

1.2.1. Men B vaccine

Adult and paediatric recipients of autologous and allogeneic HSCT should receive 2 primary doses of a MenB vaccine (Bexsero) at a 2-month (8 week) interval from 6 months post-HSCT. A booster dose should be administered at 18 months post-HSCT (or 1 year after primary dose 1).

1.2.2. MenACWY vaccine

Adult and paediatric recipients of autologous and allogeneic HSCT should receive 2 doses of a MenACWY vaccine (MenQuadfi, Nimenrix or Menveo), the first dose from 8 months post-HSCT and the second dose at 18 months post-HSCT (or 10 months after the first dose).

Please note: If paediatric patients complete their revaccination schedule before turning 10 years of age, then they should be invited to align with the NHS routine vaccination schedule. If the revaccination schedule is completed after a patient turns 10 years of age, then no further meningococcal vaccination is required.

1.3. Streptococcus pneumoniae (Pneumococcus, Invasive pneumococcal disease)

Adult and paediatric recipients of autologous and allogeneic HSCT should receive 3 primary doses of pneumococcal conjugate vaccine (PCV13 (Prevenar 13)) at a one-month (4 week) intervals from 6 months post-HSCT. Consideration can be given to commencing vaccination from 3 months.

A booster dose should be given at 18 months post-HSCT (10 months after last primary dose) with pneumococcal polysaccharide vaccine (PPV23 (Pneumovax 23)).

Please note: The advice for the booster dose reflects clinical advice from the Scottish Haematology Society.

1.4. Human papillomavirus (HPV)

All HSCT recipients aged 12 and over should be offered a primary course of 3 doses of HPV vaccine (Gardasil 9) at 0,1- and 6-month intervals starting at 6 months post-HSCT.

Please note: Offering all patients doses at 6,7 and 12 months post-HSCT is based on clinical advice from the Scottish Haematology Society.

1.5. Seasonal inactivated influenza vaccine (SIIV)

Due to the risk of influenza related clinical complications, adult and paediatric recipients of autologous and allogeneic HSCT should receive one dose of the SIIV annually from 3 months post-HSCT. Please refer to the latest Chief Medical Officer letter for details on the currently recommended inactivated influenza vaccine.

Paediatric patients aged 6 months to under 9 years receiving influenza vaccine for the first time should be offered a second dose of vaccine, at least four weeks later. This is in line with the Green Book advice for vaccine-naïve patients.

1.6. COVID-19 (SARS-CoV-2)

Adult and paediatric recipients of autologous and allogeneic HSCT should be considered for vaccination for SARS-CoV-2 from 3 months post-HSCT, regardless of the time of year. The recommended interval between the two primary doses is eight weeks.

Vaccination teams should refer to Chapter 14a of the Green Book for current advice, with specific reference to recommended subsequent doses for patients who receive HSCTs and many individuals who receive CAR-T therapy. HSCT recipients who are severely immunosuppressed may require additional vaccine doses – this should be discussed and agreed with the clinical teams.

1.7. Varicella zoster virus (VZV; for prevention of shingles)

Adult recipients of autologous and allogeneic HSCT aged 18 years or more should receive 2 doses of Shingrix at least 2 months apart, commencing at 6 months following HSCT.

Table 1: Re-vaccination schedule (and recommended minimum intervals between doses) of non-live vaccines for human stem cell transplant (HSCT) (including CAR-T) recipients who are designated as appropriate by the treating transplant team.

Time interval from HSCT/CAR-T procedure	Vaccination components	Brands recommended for use in Scotland
3 months	Age 6 months upwards: Age-appropriate quadrivalent inactivated influenza vaccine Age-appropriate COVID-19 (SARS-CoV-2) vaccine	Please refer to current programme for appropriate brand(s) of inactivated influenza and COVID-19 preparations
4 months	Age 6 months to under 9 years: Age-appropriate quadrivalent inactivated flu vaccine	Please refer to current programme for appropriate brand(s) of inactivated influenza preparations
5 months	Age 6 months upwards: Age-appropriate COVID-19 (SARS-CoV-2) vaccine	Please refer to current programme for appropriate brand COVID 19 preparations
6 months:	DTaP/IPV/HiB/HepB Men B PCV13 Age 12 upwards: Human Papillomavirus 9-Valent vaccine Age 18 and over: Herpes zoster vaccine	Infanrix Hexa® or Vaxelis® Bexsero® Prevenar 13® Gardasil 9® Shingrix®
7 months:	DTaP/IPV/HiB/HepB PCV13 Age 12 upwards: Human Papillomavirus 9-Valent vaccine	Infanrix Hexa® or Vaxelis® Prevenar 13® Gardasil 9®

Time interval from HSCT/CAR-T procedure	Vaccination components	Brands recommended for use in Scotland
8 months:	DTaP/IPV/HiB/HepB Men B Men ACWY PCV13 Age 18 and over: Herpes zoster vaccine	Infanrix Hexa® or Vaxelis® Bexsero® Nimenrix® or Menveo® Prevenar 13® Shingrix®
12 months:	Age 12 upwards: Human Papillomavirus 9-Valent vaccine	Gardasil 9®
18 months:	Men ACWY Men B PPV23	MenQuadfi®, Nimenrix® or Menveo® Bexsero® Pneumovax 23®
36 months:	DTaP/IPV	Repevax® or Boostrix-IPV®
168 months (14 years):	Td/IPV	Revaxis®

Version history

Version	Date	Summary of changes
1.0	26 January 2024	Document co-developed by the Scottish Haematology Society and Public Health Scotland.
1.1	15 March 2024	The following changes have been made to version 1.0 of the schedule: • Following clinical advice, the time from procedure and the interval for seasonal influenza and COVID-19 (SARS-CoV-2) has been amended.
1.2	20 September 2024	The following changes have been made to version 1.1 of the schedule: • Minor revisions following annual clinical review. • Addition of MenQuadfi to list of MenACWY vaccines.