

Splenectomy vaccination and Antimicrobial Prophylaxis (Adult asplenic and hyposplenic patients) Clinical Guideline

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Disclaimer

This statewide guideline has been prepared to promote and facilitate standardisation and consistency of practice, using a multidisciplinary approach. The guideline is based on a review of published evidence and expert opinion. Health practitioners in the South Australian public health sector are expected to review specific details of each patient and professionally assess the applicability of the relevant guideline to that clinical situation. If for good clinical reasons, a decision is made to depart from the guideline, the responsible clinician must document in the patient's medical record, the decision made, by whom and detailed reasons for the departure from the guideline.

This statewide guideline does not address all the elements of clinical practice and assumes that the individual clinicians are responsible for:

- Discussing care with consumers in an environment that is culturally appropriate and which enables respectful confidential discussion. This includes the use of interpreter services where necessary;
- Advising consumers of their choice and ensure informed consent is obtained;
- Providing care within scope of practice, meeting all legislative requirements and maintaining standards of professional conduct; and
- Documenting all care in accordance with mandatory and local requirements.

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Splenectomy Vaccination & Antibiotic Prophylaxis (adult) Clinical Guideline

1. Introduction

Patients with an absent or dysfunctional spleen are at a life-long increased risk of bacterial infection due to *Streptococcus pneumoniae*, *Neisseria meningitidis* (meningococcus) and *Haemophilus influenzae*, as well as infection acquired from animal bites or overseas travel (e.g. malaria). This guideline provides recommendations on appropriate vaccination and antibiotic prophylaxis schedules for adult patients who have undergone a splenectomy (removal of the spleen), or who are in a clinically hyposplenic (reduced function of the spleen) state.

2. Background

This guideline has been developed by the SA expert Advisory Group on Antimicrobial Resistance (SAAGAR) to provide a consistent and evidence-based guideline available for clinicians concerning the care of asplenic or hyposplenic patients in order to best protect them from overwhelming post-splenectomy infection (OPSI). The guideline aims to be as consistent as possible with national treatment guidelines presented by Spleen Australia (<https://spleen.org.au>), the [Australian Immunisation Handbook](#), and the [Therapeutic Guidelines](#) [1-3].

The spleen is the largest lymphatic organ in the body and plays an important role in fighting infection. It works to remove micro-organisms and their products circulating within the bloodstream, and to produce antibodies to enhance the immuneresponse.

Asplenia can be surgical, functional or congenital. Splenectomy is the most common cause of asplenia. In patients on the Victorian Spleen Registry, the most frequent reasons for surgical removal of the spleen are: trauma (40%), haematological disorders and malignancies (35%), and incidental trauma at the time of intra-abdominal surgery (24%) [4]. Less commonly, an asplenic state may occur in medical conditions such as coeliac disease or sickle cell anaemia. Congenital asplenia is rare; screening of family members is recommended in affected patients.

Prevention of Overwhelming Post-Splenectomy Infection (OPSI)

Consensus guidelines appropriate to the Australian setting were published in 2008 [5] and updated in 2017 [6]. Recommended strategies to prevent OPSI include vaccination, the use of preventive and emergency antibiotics, and the education of patients and their families. There is evidence that these strategies reduce the incidence of OPSI in asplenic and hyposplenic patients. In one series, asplenic patients with a better knowledge of the infectious risks, those who received pneumococcal vaccine, and those who had taken post-splenectomy antibiotics had a lower incidence of OPSI [7]. However, despite the availability of best practice guidelines, preventive strategies are not always implemented and preventable cases of severe post-splenectomy sepsis continue to occur [8].

Immunocompromised patients and children are at the highest risk of OPSI. The most common pathogens are the encapsulated bacteria, especially *Streptococcus pneumoniae*, *Neisseria meningitidis* and *Haemophilus influenzae*. Other bacteria (including those associated with animal bites) and parasites (including malaria) can also cause OPSI [9, 10].

3. Definitions / acronyms

AGEP	Acute generalised exanthemous pustulosis
Asplenic / asplenia	Having no functional spleen
DRESS	Drug reaction with eosinophilia and systemic symptoms
HSCT	Haematopoietic stem cell transplant
Hyposplenism	Reduced function of the spleen
IBW	Patient's ideal body weight
SAAGAR	South Australian expert Advisory Group on Antimicrobial Resistance
SJS / TEN	Stevens-Johnson syndrome / toxic epidermal necrosis
SOT	Solid organ transplant
TDM	Therapeutic drug monitoring

4. Principles of the standards

Standard 3 aims to prevent patients from acquiring preventable healthcare associated infections and effectively manage infections when they occur by using evidence-based strategies that are based on the risk to both patients and staff.

Standard 4 aims to ensure competent clinicians safely prescribe, dispense and administer appropriate medicines to informed patients and carers.

5. General

Part 1: Vaccination guidelines

Note: This guideline is applicable for patients 18 years of age and over.

Vaccination schedule for asplenic or hyposplenic patients

The vaccination guidelines below are consistent with the recommendations of Spleen Australia. Refer to the following [link](#) for the Spleen Australia vaccination flowcharts (alternatively access via <https://spleen.org.au>). All patients undergoing splenectomy, or those who are asplenic or hyposplenic, should receive the initial and follow-up vaccinations specified in table 1 and 2 below.

All immunisations given should be logged on the [Australian Immunisation Register \(AIR\)](#).

Initial vaccines to be given to all patients

- > **Elective splenectomy:** Give vaccines at least 2 weeks before procedure.
- > **Urgent / emergency splenectomy:** Give vaccines at least 7 days postoperatively or on day of discharge, whichever comes first. The optimal time is when the patient has recovered from surgery (7 days postoperatively if this is possible). However it may be more convenient and appropriate (especially where patient compliance is an issue) that all the initial vaccines are administered prior to discharge from hospital as soon as the patient is clinically stable.
- > It is safe to give all the initial vaccinations at the same time using different administration sites.

Table 1. Initial vaccines to be administered

Type of vaccine	Vaccine brand name
13 valent pneumococcal <i>conjugate</i> vaccine (13vPCV)	Prevenar 13 [®]
Quadrivalent (ACWY) meningococcal <i>conjugate</i> vaccine (4vMenCV)	Menveo [®] / Nimenrix [®]
Meningococcal B <i>recombinant</i> vaccine (4CMenB)	Bexsero [®] #
<i>Haemophilus influenzae</i> type b <i>conjugate</i> vaccine (Hib) Single dose only	Hiberix [®] / Act-HIB

[# Trumenba (MenB-fHBP) is another brand of meningococcal B recombinant vaccine available in Australia, but is not on formulary in SA public hospitals. Bexsero is directed at the predominant clones in SA and is the preferred option. Trumenba is not interchangeable with Bexsero and requires 3 doses – refer to [Australian Immunisation Handbook](#) for dosing]

Follow-up vaccines to be given at least 8 weeks after the initial set

- > If the patient has previously received different initial vaccinations from those specified above, then follow this [link](#) to view the separate flowchart on page 2 of the Spleen Australia recommendations, titled 'Vaccines recommended for adults (>18 years) with asplenia/hyposplenism who have previously been vaccinated'.
- > The initial pneumococcal conjugate vaccine (13vPCV) is different to the follow-up pneumococcal polysaccharide vaccine (23vPPV).
- > Medical staff should ensure there is a plan in place to facilitate administration of the follow-up vaccinations at least 8 weeks after the initial set and this must be communicated to the patient prior to discharge.

Table 2. Follow-up vaccines to be administered

Type of vaccine	Vaccine brand name
23 valent pneumococcal <i>polysaccharide</i> vaccine (23vPPV)	Pneumovax 23 [®]
Quadrivalent (ACWY) meningococcal <i>conjugate</i> vaccine (4vMenCV)	Menveo [®] / Nimenrix [®]
Meningococcal B <i>recombinant</i> vaccine (4CMenB)	Bexsero [®] #

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Ongoing follow-up and recommendations

- > Annual influenza vaccination is recommended as the prevention of influenza may reduce the risk of secondary bacterial infection. Two doses of influenza vaccine are required in the first year influenza vaccine is given post haematopoietic stem cell transplant or solid organ transplant [2], however use of two doses of influenza vaccine in the first season may be recommended in other immunocompromised individuals on a case by case basis.
- > A second dose of Pneumovax 23[®] (23vPPV) should be repeated at 5 years and then a third dose is recommended at the age of 65 years (50 years for Indigenous adults), or a minimum of 5 years after the second dose, whichever is later [11]. There is a maximum of 3 doses of Pneumovax 23[®] (23vPPV) during adulthood. If asplenia is diagnosed ≥ 65 years (age ≥ 50 years for Indigenous adults), only a single revaccination dose of Pneumovax 23[®] (23vPPV) is recommended (i.e. the third

pneumococcal vaccine dose is omitted).

- > Quadrivalent (ACWY) meningococcal *conjugate* vaccine (4vMenCV) should be repeated at 5 yearly intervals.

Part 2: Antibiotic prophylaxis

The risk of overwhelming infection post-splenectomy remains life-long and is highest in immunocompromised patients. The duration of antimicrobial prophylaxis should be assessed for each individual patient, particularly those at highest risk of invasive pneumococcal infection. The recommendations below are taken from the Australian [Therapeutic Guidelines](#) [3].

Minimum recommendations for duration of antibiotic prophylaxis:

- > Prophylaxis for at least three years following splenectomy
- > At least 6 months following an episode of severe sepsis

Consider lifelong prophylaxis for:

- > Asplenic patients who are severely immunosuppressed
- > Patients who have had a splenectomy for haematological malignancy, particularly for those with ongoing immunosuppression or patients with graft-versus-host disease (GVHD)
- > Patients who have survived an episode of severe sepsis, particularly after a second episode

Recommended antibiotic prophylaxis:

- > **Amoxicillin 250mg** orally once daily

OR If the patient reports a history of a previous reaction to penicillins:

- > Explore the validity of the reported penicillin allergy.
- > In patients with documented severe penicillin/cephalosporin allergy (e.g. immediate anaphylaxis, extensive urticarial, compromised airway, angioedema, hypotension or collapse or DRESS, SJS/TEN, AGEP), then use: **roxithromycin 150mg** orally once daily

Due to the increasing prevalence of macrolide resistance in *S. pneumoniae*, penicillins are the preferred prophylaxis.

Part 3: Self-care – Emergency supply of antimicrobials

Adherence to prophylactic therapy is often a problem. Patients should be given clear instructions to seek prompt medical attention if a fever develops. All patients should also have an emergency supply of antibiotics to take before medical review in the event of a sudden onset of unexplained fever. For adults, suggested regimens include:

NO PENICILLIN / CEPHALOSPORIN ALLERGY	MODERATE RISK PENICILLIN ALLERGY (Delayed rash which is not urticarial or DRESS/SJS/TEN/AGEP)	HIGH RISK PENICILLIN / CEPHALOSPORIN ALLERGY (History suggestive of high risk, e.g. anaphylaxis, urticaria, angioedema, bronchospasm, DRESS/SJS/TEN/AGEP)
Amoxicillin 3g orally for the first dose, then 1g 8-hourly until medical review	Cefuroxime 500mg orally every 12 hours until medical review	Roxithromycin 300mg orally once daily until medical review

Taking antibiotics is not a substitute for medical review, which should occur as soon as possible and ideally on the same day that the fever is noted.

Patients should be advised to store the antibiotics at room temperature away from direct sunlight and moisture. The expiry date of all antibiotics should be checked regularly.

Part 4: Patient information and education

Education of the patient, their family members, and their general practitioner about the increased lifelong risk of bacterial infections and prevention strategies is crucial [12]. Patients and their families should be given verbal and written information concerning these recommendations. [The SA Health Post-Splenectomy Consumer Information leaflet](#) has been developed for this purpose. Please utilise this sheet to guide the education you provide. With the consent of the patient, his/her general practitioner should be informed and given written information. Up-to-date recommendations should be readily accessible to all general practitioners.

Travel

People with asplenia or hyposplenism are at increased risk of severe malaria, so expert travel advice for malaria prevention when travelling to a malaria endemic region should be encouraged [13]. This advice includes vector avoidance (e.g. wearing long sleeved clothing, using insect repellent), anti-malarial medications, and early medical attention in the setting of symptoms.

Animal handling

There is an increased risk of severe OPSI (e.g. due to *Capnocytophaga canimorsus*) following dog, cat or other animal bites. Tick bites are also a concern. Early medical attention is recommended.









Alerts and follow-up

The patient should be encouraged to wear or carry a Medic Alert medallion/bracelet or wallet card and an up-to-date vaccination card at all times. . The patient's electronic medical record / case notes and Alerts sheet should record that the patient has had a splenectomy. It is the Home Team's responsibility to organise follow-up vaccinations and ongoing antimicrobial therapy.

6. Safety, quality and risk management

The following National Safety and Quality Health Service Standard standards apply:

National Safety and Quality Health Service Standards

 National Standard 1 Clinical Governance	 National Standard 2 Partnering with Consumers	 National Standard 3 Preventing & Controlling Healthcare Associated Infection	 National Standard 4 Medication Safety	 National Standard 5 Comprehensive Care	 National Standard 6 Communicating for Safety	 National Standard 7 Blood Management	 National Standard 8 Recognising & Responding to Acute Deterioration
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Standard 3 – Preventing & Controlling Healthcare Associated Infections

- > Criterion 3.15 (b) – The health service organisation has an antimicrobial stewardship program that provides access to, and promotes the use of, current evidence-based Australian therapeutic

- guidelines and resources on antimicrobial prescribing;
- > Criterion 3.16 (d) – The antimicrobial stewardship program will report to clinicians and the governing body regarding appropriateness of prescribing and compliance with current evidence-based Australian therapeutic guidelines or resources on antimicrobial prescribing
- > **Standard 4 – Medication Safety**
- > Criterion 4.13 – The health service organisation ensures that information and decision support tools for medicines are available to clinicians

7. Appendices

Appendix 1: Checklist for healthcare providers

Appendix 2: Consumer info Post-splenectomy

8. References

1. Spleen Australia, *Spleen Australia Recommendations for the prevention of infection in asplenic (splenectomy) or hyposplenic patients over 18 years of age* (v35). 2019 [Available at: https://spleen.org.au/VSR/Files/RECOMMENDATIONS_Spleen_Registry.pdf] Accessed Feb 2019.
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11. Therapeutic Goods Administration, *Pneumovax 23 - updated revaccination recommendations* 2011: [Available at: <https://www.tga.gov.au/alert/pneumovax-23-updated-revaccination-recommendations>].

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9. Document Ownership & History

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29/05/17	V1.1	Safety and Quality Strategic Governance Committee	Title change and minor amendments
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Checklist for healthcare providers:

- Organise vaccinations for at least 2 weeks prior to elective splenectomy. If emergency splenectomy, vaccinate within 7 days of surgery (or before discharge)
- Provide patient with SA Health *Post-splenectomy treatment consumer information leaflet*. Write the date each vaccination was given on the leaflet.
- Provide handover and/or written information to patient's GP.
- Organise the date for the second set of vaccines (at least 2 months after the initial set of vaccines)
- Educate patient about increased life-long risk of bacterial infections and prevention strategies
- Provide patient with antibiotic prophylaxis, with instructions regarding the duration of prophylaxis
- Provide patient with an emergency supply of antibiotics. Using the consumer information leaflet, instruct the patient on the appropriate use of emergency antibiotics in case of illness
- Instruct patient to not travel overseas without seeing a doctor first
- Instruct patient to seek medical attention in the event of an animal scratch

INT

Post-splenectomy treatment in adults

You have had a splenectomy to remove your spleen due to damage or disease.

What is the spleen?

The spleen is a small organ that sits underneath your ribs on the left side.

The spleen has several functions. The main function is to help the body fight infections.

What can happen if I don't have a spleen?

If your spleen is removed (or not functioning properly), you have a higher risk of life-threatening infections. You will have this risk for the rest of your life.

Although these infections do not happen very often, it's important to take the following precautions to prevent them:

1. Get vaccinated

You will be given vaccinations against some of the bacteria that can cause serious infections. These include vaccinations for pneumococcal disease, meningococcal disease, and for *Haemophilus influenzae type B*. A yearly influenza (flu) vaccination is also recommended.

Your vaccination schedule is outlined on the second and third pages of this information sheet.

2. Take preventative antibiotics

Antibiotics are often prescribed to be taken daily for the first three years after you have your spleen removed. This is when you are most at risk of infection. Some people may need to take an antibiotic every day for the rest of their life. Your doctor will discuss this with you.

The antibiotic we recommend is **amoxicillin 250mg once each day**, however if you have had a reaction to penicillins, your doctor may recommend an alternative antibiotic.

3. Have emergency antibiotics and know when to use them

As well as the daily preventative antibiotics, you will be provided with an emergency supply of antibiotics to take immediately when required. It is important for you to **know when to take your emergency antibiotics:**

- > You should have 6 amoxicillin capsules (500mg) on hand at all times.
- > If you feel unwell or have an unexplained fever then take all 6 capsules of amoxicillin 500mg together at once **and** see your doctor immediately.
- > If you are allergic to amoxicillin, then you will be provided either cefuroxime 500mg **or** roxithromycin 300mg which you should take at once **and** immediately see your doctor
- > You should also see a doctor straight away if you get an animal bite that breaks the skin



All antibiotics should be stored at room temperature away from direct sunlight and moisture. You should check the expiry date of all antibiotics regularly.

4. Take good care of yourself

- > **Be careful when travelling.** See your doctor if you are planning on travelling overseas. You may need additional vaccines.
- > **Wear a Medic-Alert® (or similar) bracelet or necklace.** Having a bracelet or necklace that has important information about your condition or a number to call for more information may help healthcare professionals assist you if you are severely injured or unwell. Application forms for a Medic-Alert® bracelet or necklace can be downloaded at <http://www.medicalert.org.au>.
- > **Inform healthcare providers.** Make sure you tell your doctor, dentist and other healthcare professionals that you do not have a spleen.

YOUR VACCINATION SCHEDULE

Date of splenectomy:

Insert the date of the surgery when your spleen was removed.

First set of vaccines

If your surgery to remove your spleen was planned, you should be vaccinated with the first set of vaccines at least 2 weeks before the surgery. If you had unplanned emergency surgery to remove your spleen, you will be vaccinated with the first set of vaccines while you are in hospital.

Type of vaccine	Vaccine brand name	Date given
Pneumococcal <i>conjugate</i> vaccine (13vPCV)	Prevenar 13®	
Meningococcal <i>conjugate</i> vaccine (4vMenCV)	Menveo or Nimenrix®	
Meningococcal B <i>recombinant</i> vaccine (4CMenB)	Bexsero®#	
<i>Haemophilus influenzae</i> type b <i>conjugate</i> vaccine (Hib)	Hiberix® or Act-HIB	

Second set of vaccines (follow-up vaccines)

Should be given at **least 2 months** after the first set of vaccines.

Type of vaccine	Vaccine brand name	Date given
Pneumococcal <i>polysaccharide</i> vaccine (23vPPV)	Pneumovax 23®	
Meningococcal <i>conjugate</i> vaccine (4vMenCV)	Menveo® or Nimenrix®	
Meningococcal B <i>recombinant</i> vaccine (4CMenB)	Bexsero®#	

Another brand of meningococcal B recombinant vaccine is Trumenba®, however Trumenba® requires a different dosing schedule to Bexsero®. Your doctor should advise you if you are given a brand other than Bexsero® and will advise you when doses should be given.

It is very important that you visit your local doctor for the second set (follow-up) vaccines if you are discharged from hospital before they are given to you. You should take this information sheet with you to appointments and record all dates that vaccines were given to you.

Re-vaccination

You will need ongoing vaccines as follows:

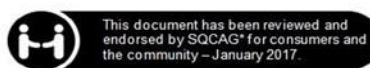
Type of vaccine	Vaccine brand name	Instructions	Date(s) given
Influenza vaccine (Flu vaccine)	Multiple	> A yearly flu vaccination is recommended.	
Pneumococcal polysaccharide vaccine (23vPPV)	Pneumovax 23[®]	> A second dose of Pneumovax 23 [®] (23vPPV) should be repeated 5 years after the second set of vaccines above. > A third dose is recommended at the age of 65 years (50 years for Indigenous adults) OR a minimum of 5 years after the second dose, whichever is later. > You can have a maximum of 3 doses of Pneumovax 23 [®] (23vPPV) as an adult (> 18 years). If you have your spleen removed after 65 years of age (or ≥ 50 years for Indigenous adults), only a single booster dose is recommended (i.e. the third and final dose is not given).	
Meningococcal conjugate vaccine (4vMenCV)	Menveo[®] or Nimenrix[®]	> Menveo[®] or Nimenrix[®] should be repeated every 5 years	

My antibiotics

I am takingdaily (amoxicillin/roxithromycin)

IF I am unwell, my emergency antibiotic treatment is to take
and see a doctor as soon as possible (on the same day). (amoxicillin/cefuroxime/roxithromycin)

The information contained within this leaflet is for general information only. Ask your doctor if you have any questions about the leaflet or about your medical care.



*SA Health Safety and Quality Community Advisory Group



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Infection Control Service
Communicable Disease Control
Branch www.sahealth.sa.gov.au/antimicrobials

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