4. Secondary prevention of acute rheumatic fever

Secondary prevention of further episodes of ARF is a priority. Secondary prophylaxis with regular benzathine penicillin G (BPG) is the only RHD control strategy shown to be effective and cost-effective at both community and population levels.

This quick reference guide is derived from the *Australian guideline for prevention, diagnosis and management of acute rheumatic fever and rheumatic heart disease* (2nd edn).

What is acute rheumatic fever?

Acute rheumatic fever (ARF) is an illness caused by a reaction to a bacterial infection with group A streptococcus (GAS). It causes an acute, generalised inflammatory response and an illness that targets specific parts of the body, including the heart, joints, brain and skin. Individuals with ARF are often unwell, have significant joint pain and require hospitalisation. Despite the dramatic nature of the acute episode, ARF typically leaves no lasting damage to the brain, joints or skin, but can cause persisting heart damage, termed 'rheumatic heart disease' (RHD). People who have had ARF previously are much more likely than the wider community to have subsequent episodes. Recurrences of ARF may cause further cardiac valve damage. Hence, RHD steadily worsens in people who have multiple episodes of ARF.

Who gets ARF?

Although ARF is relatively rare in industrialised countries, in Australia it is a significant illness among Aboriginal people and Torres Strait Islanders, particularly across central and northern Australia. Pacific Islanders, and migrants from countries with a high prevalence of RHD, are also known to be at high risk.

Secondary prevention

Secondary prevention of further episodes of ARF is a priority. Secondary prophylaxis with regular benzathine penicillin G (BPG) is the only RHD control strategy shown to be effective and cost-effective at both community and population levels.

The appropriate duration of secondary prophylaxis is determined by age, time since the last episode of ARF and potential harm from recurrent ARF, but is likely to be 10 years or more.

While secondary prophylaxis is a proven strategy for controlling RHD, and is also simple, cheap and cost-effective, it must be adequately implemented. Persistent high rates of recurrent ARF in high-risk populations highlight the continued barriers to secondary prevention.

The effectiveness of secondary prophylaxis is impaired by factors that contribute to poor adherence to antibiotic regimens and increased incidence rates of ARF. These factors relate to overcrowded housing, poor access to health services, limited educational opportunities and poor environmental conditions. Communities with the highest rates of ARF and RHD are often the least equipped to deal with the problem.

Secondary prevention should include:

- strategies aimed at improving the delivery of secondary prophylaxis and patient care
- the provision of education
- coordination of available health services
- advocacy for necessary and appropriate resources.

Antibiotic regimens for secondary prophylaxis

Antibiotic	Dose	Route	Frequency
First line			
BPG	900 mg (1,200,000 U) ≥20 kg 450 mg (600,000 U) < 20 kg	Deep im injection	4 weekly, or 3 weekly for selected groups*
Second line (If im route is not possible or refused, adherence should be carefully monitored)			
Phenoxymethylpenicillin (Penicillin V)	250 mg	Oral	Twice daily
Following documented penicillin allergy			
Erythromycin	250 mg	Oral	Twice daily

*Three-weekly BPG may be considered for patients with moderate or severe carditis or a history of valve surgery, who demonstrate good adherence to less frequent injections, and for those who have confirmed breakthrough ARF, despite full adherence to 4-weekly BPG.

BPG, benzathine penicillin G; im, intramuscular.

Measures that may reduce the pain of BPG injections

- Use a 21-gauge needle
- Warm syringe to room temperature before using
- Allow alcohol from swab to dry before inserting needle
- Apply pressure with thumb for 10 sec before inserting needle
- Deliver injection very slowly (preferably over at least 2–3 mins)
- Distract patient during injection (e.g. with conversation)
- (The addition of 0.5–1.0 mL of 1% lignocaine is used elsewhere, but is not recommended with preloaded syringes currently available in Australia)

Factors that affect the duration of secondary prophylaxis

Factor	Implication
Age	ARF recurrence is less common between 25–40 years of age, and rare >40 years
Presence and severity of RHD	ARF recurrence could be life-threatening in people with moderate or severe RHD, or in those with a history of valve surgery
Presence of carditis during initial episode	Increases the likelihood of further cardiac damage, should a recurrence occur
Time elapsed since last episode of ARF	ARF recurrences are less common >5 years since last episode
Socioeconomic circumstances	ARF recurrences are more common in lower socioeconomic groups (particularly related to overcrowded housing)
Background risk of GAS infection and ARF within the community	ARF recurrences are more common in higher-incidence communities or settings
Adherence to treatment	Optimised adherence for a few years after the initial episode may provide greater protection from recurrences than offered by poor adherence for many years
Assessment at time of cessation of secondary prophylaxis	Evidence of moderate or greater RHD may warrant prolonged prophylaxis

Duration of secondary prophylaxis

Category	Definition of category	Duration
All persons with ARF or RHD†		Minimum 10 years after most recent episode of ARF or until age 21 years (whichever is longer).
Status after initial period elapsed:		
No RHD	No pathological mitral or aortic regurgitation, but may have minor morphological changes to mitral or aortic valves on echocardiography	Discontinue at that time#
Mild RHD	Mild mitral or aortic regurgitation clinically and on echocardiography, with no clinical evidence of heart failure, and no evidence of cardiac chamber enlargement on echocardiography	Discontinue at that time
Moderate RHD	• Any valve lesion of moderate severity clinically (e.g. mild–moderate cardiomegaly and/or mild–moderate heart failure) or on echocardiography • Mild mitral regurgitation, together with mild aortic regurgitation clinically or on echocardiography • Mild or moderate mitral or aortic stenosis • Any pulmonary or tricuspid valve lesion co-existing with a left-sided valve lesion	Continue until 35 years of age
Severe RHD	• Any severe valve lesion clinically (e.g. moderate to severe cardiomegaly or heart failure) or on echocardiography • Any impending or previous cardiac valve surgery for RHD	Continue until age 40 years, or longer*

† Patients >25 years of age who are diagnosed with RHD, without any documented history of prior ARF, should receive prophylaxis until the age of 35 years. At this time, they should be reassessed to determine whether prophylaxis should be continued. # Decisions to cease secondary prophylaxis should be based on clinical and echocardiographic assessment. * Risk of recurrence is extremely low in people aged >40 years. In some cases, for example, when the patient decides that they want to reduce even a minimal risk of recurrence, prophylaxis may be continued beyond the age of 40 years, or even for life.

Improving adherence to secondary prophylaxis

A variety of factors, mainly sociological, combine to limit the efficacy of secondary prophylaxis. A major reason for poor adherence in remote Aboriginal and Torres Strait Islander communities is the availability and acceptability of health services, rather than personal factors, such as injection refusal, pain of injections or a lack of knowledge or understanding of ARF and RHD.

Adherence is improved when patients feel a sense of personalised care and 'belonging' to the clinic, and when recall systems extend beyond the boundaries of the community.

Organisational approaches to secondary prophylaxis (including the use of registers) are outlined in the information sheet *RHD control programs*.

Strategies to promote continuing adherence include:

- routine review and care planning (see below)
- recall and reminder systems
- having local staff members dedicated to secondary prophylaxis and coordinating routine care
- supporting and utilising the expertise, experience, community knowledge and language skills of Aboriginal health workers
- improving staff awareness of the diagnosis and management of ARF and RHD
- taking measures to minimise staff turnover
- implementing measures to reduce the pain of injections.

Procedures requiring endocarditis prophylaxis for patients with RHD

Infective endocarditis is a dangerous complication of RHD including those with prosthetic valves. People with prosthetic valves or established RHD, should receive antibiotic prophylaxis prior to procedures expected to produce bacteraemia (see below).

Dental, oral and respiratory tract procedures	
Dental extractions	Endodontic surgery and instrumentation
Periodontal procedures	Placement of orthodontic bands
Dental implant placement	Intraligamentary local anaesthetic injections
Gingival surgery	Tonsillectomy/adenoidectomy
Initial placement of orthodontic appliances	Rigid bronchoscopy
Surgical drainage of dental abscess	Surgery involving the bronchial mucosa
Maxillary or mandibular osteotomies	Sclerotherapy of oesophageal varices
Surgical repair or fixation of a fractured jaw	Dilatation of oesophageal stricture

Antibiotic	Dose
For patients on long-term penicillin therapy, hypersensitive to penicillin or who have taken penicillin or a related beta-lactam antibiotic more than once in the last month:	
Clindamycin	(Child: 15 mg/kg, up to 600 mg) 600 mg orally as 1 dose 1 hour before procedure
If unable to take orally	
Clindamycin	(Child: 15 mg/kg, up to 600 mg) 600 mg iv, over at least 20 mins just before procedure
Or vancomycin	(Child less than 12 years: 30 mg/kg up to 1.5 g) 1.5 g iv by slow infusion, over at least 1 hour just prior to procedure
Or lincomycin	(Child: 15 mg/kg, up to 600 mg) 600 mg iv, over 1 hour before procedure
Or teicoplanin	(Child: 10 mg/kg, up to 400 mg) 400 mg iv, just before the procedure or im 30 mins before procedure
For patients not on long-term penicillin therapy, not hypersensitive to penicillin and who have not taken penicillin or a related beta-lactam antibiotic more than once in the last month:	
Amoxycillin	(Child: 50 mg/kg up to 2 g) 2 g orally as 1 dose 1 hour prior to the procedure
Or amoxycillin/ ampicillin	(Child: 50 mg/kg up to 2 g) 2 g iv just prior to procedure or im 30 min prior to procedure

im, intramuscular; iv, intravenous.

Genitourinary and gastrointestinal procedures

- Surgery of the intestinal mucosa or biliary tract (except for endoscopy, biopsy and percutaneous endoscopic gastrostomy)
- Endoscopic retrograde cholangiography
- Prostate surgery
- Cystoscopy and urethral dilatation
- Vaginal delivery in the presence of infection, or prolonged labour or prolonged rupture of membranes
- Surgical procedures of the genitourinary tract in the presence of infection (e.g. urethral catheterisation, uterine dilatation and curettage, abortion, sterilisation and placement or removal of intrauterine contraceptive devices)

Antibiotic	Dose
Vancomycin	(Child <12 years: 30 mg/kg, up to 1.5 g) 1.5g iv by slow infusion, over at least 1 hour just prior to procedure
Or teicoplanin	(Child: 10 mg/kg up to 400 mg) 400 mg iv just prior to procedure

iv, intravenous.

Recommended routine review and management plan for ARF and RHD

Classification	Criteria*	Review and management plan	Frequency†
Priority 1 (severe)¥	Severe valvular disease **or** moderate/severe valvular lesion with symptoms **or** mechanical prosthetic valves, tissue prosthetic valves and valve repairs, including balloon valvuloplasty	Secondary prophylaxis (BPG)	3–4 weekly
		Doctor review	3–6 monthly
		Cardiologist/physician/paediatrician review	3–6 monthly
		Influenza vaccination	Yearly
		Echocardiography	3–6 monthly
		Dental review	Within 3 months of diagnosis, then 6 monthly thereafter
		Pneumococcal vaccination	Refer to *Immunisation handbook*
		Endocarditis prophylaxis	As required Refer to *Therapeutic Guidelines: Antibiotics 2010*
Priority 2 (moderate)	Any moderate valve lesion in the absence of symptoms, and with normal left ventricular function	Secondary prophylaxis (BPG)	4-weekly
		Doctor review	6-monthly
		Influenza vaccination	Yearly
		ECG (optional)	Yearly
		Cardiologist/physician/paediatrician review	Yearly
		Echocardiography	Yearly
		Dental review	Within 3 months of diagnosis, then 6 monthly
		Pneumococcal vaccination	Refer to *Immunisation handbook*
		Endocarditis prophylaxis	As required Refer to *Therapeutic Guidelines: Antibiotics 2010*
Priority 3 (mild)	ARF with no evidence of RHD **or** trivial to mild valvular disease	Secondary prophylaxis (BPG)	4 weekly
		Doctor review	Yearly
		Echocardiography	Children: 2 yearly‡ Adults: 2–3 yearly‡
		Dental review	Yearly

Classification	Criteria*	Review and management plan	Frequency†
		Endocarditis prophylaxis	As required Refer to *Therapeutic Guidelines: Antibiotics 2010*
Priority 4 (inactive)	Patients with a history of ARF (no RHD) for whom secondary prophylaxis has been ceased	Medical review	Yearly
		Dental review	Yearly
		Cardiologist/physician/paediatrician review	As referred with new symptoms
Additional considerations	Following valve surgery	Medical assessment ECG Chest radiograph Echocardiography Full blood count Urea, creatinine, electrolytes INR, if indicated	3–4 weeks' post-discharge
	Missed doses of BPG	Patient should be contacted if they have not presented within 3 days of due injection	
	Patient travelling to another community when injection due	Consideration should be given to bringing forward the date of injection to 2–3 weeks, or arrangements made with other service providers in advance	

*Serial echocardiographic assessments are required in the long-term management of RHD as an essential tool in determining the progress of cardiac damage and the optimal timing of surgery. Therefore, risk stratification should be based on clinical and echocardiographic findings (Grade D). †Review frequency should be determined according to individual needs and local capacity. Most critically, the frequency of review should become more frequent in the event of symptom onset, symptomatic deterioration or a change in clinical findings. ¥Any patient with severe valvular disease or moderate to severe valvular disease with symptoms should be referred for cardiological and surgical assessment as soon as possible. ‡In patients with no evidence of valvular disease on echocardiography, who have no documented ARF recurrences, good adherence to secondary prophylaxis and no cardiac murmurs on examination at follow up appointments, echocardiography may not be needed as frequently.

BPG, benzathine penicillin G; ECG, electrocardiogram; INR, international normalised ratio.

RHD Australia

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Quick reference guides include:

- Primary prevention of ARF
- Diagnosis of ARF
- Management of ARF
- Secondary prevention of ARF
- Management of RHD
- RHD in pregnancy
- RHD control programs

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