From Audit to Action:
Strengthening ARF and RHD Diagnosis in Aboriginal Health

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Professor Anna Ralph

AH&MRC
Aboriginal Health & Medical Research Council of NSW

Acknowledgement of Country

We acknowledge the many Aboriginal lands from which we join this meeting.

We acknowledge Aboriginal and Torres Strait Islander peoples as traditional owners of these lands and recognise their ongoing connection to country.

We pay respect to our Elders past, present and emerging and extend that respect to other First Nations People joining us today

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Learning Objectives:

1. Increased awareness of potential ARF/RHD in your area

2. Increased knowledge in the management of streptococcal associated throat and skin infections (primary prevention)

3. Increased confidence in using ARF/RHD app to assist in diagnosis and management of ARF

To begin with the end in mind

May decide to do an audit of your area for ARF/RHD

Ensure you are prescribing and treating streptococcal infections appropriately

You will have downloaded and used the ARF/RHD app

Acute Rheumatic Fever (ARF)

Abnormal autoimmune response to a Group A streptococcal infection

Acute generalized inflammatory illness that targets

Skin

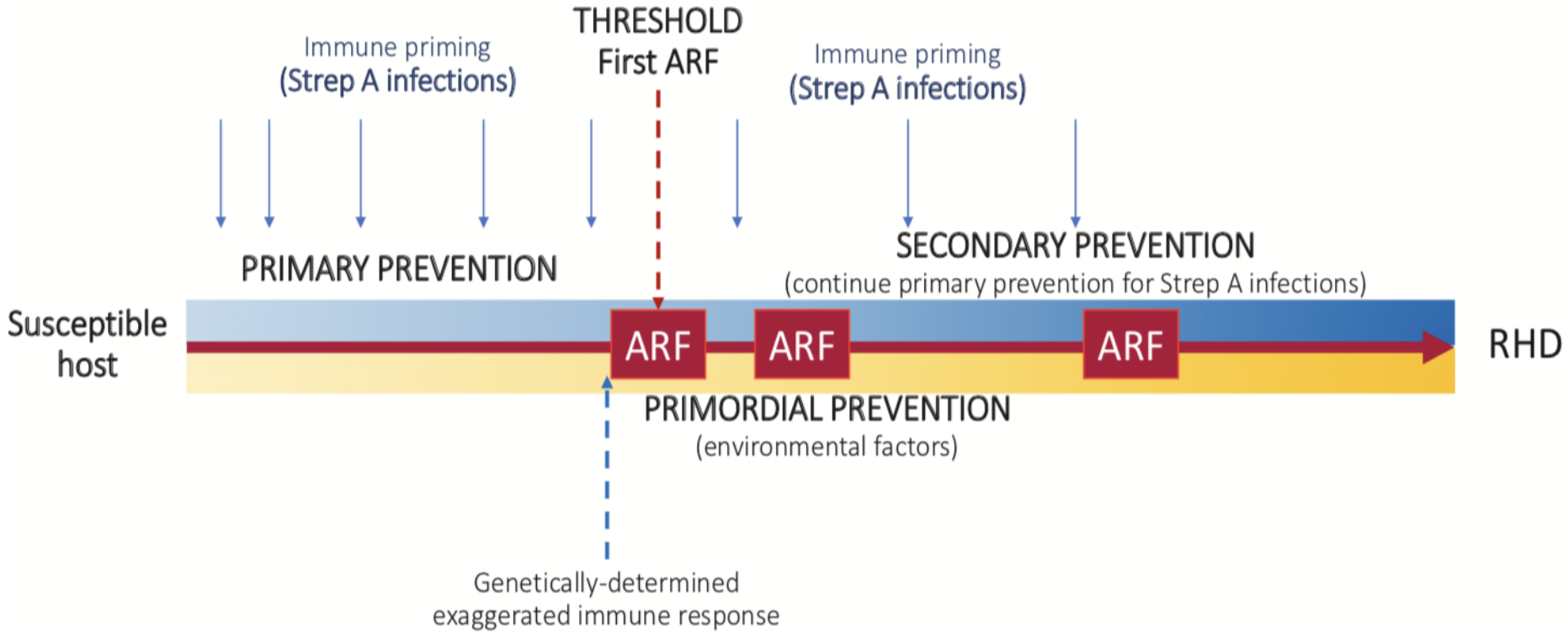
Joints

Brain

Heart

Typically leaves no damage to the skin joints or brain, but if heart affected, one or more heart valves may remain damaged. This is **Rheumatic Heart disease**

Figure 5.1. Pathway for ARF and RHD with immune priming

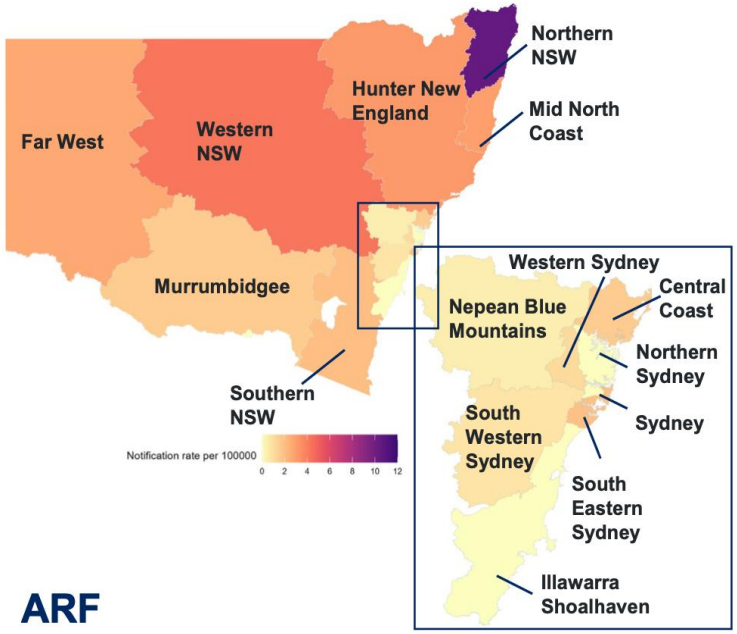


ARF and RHD

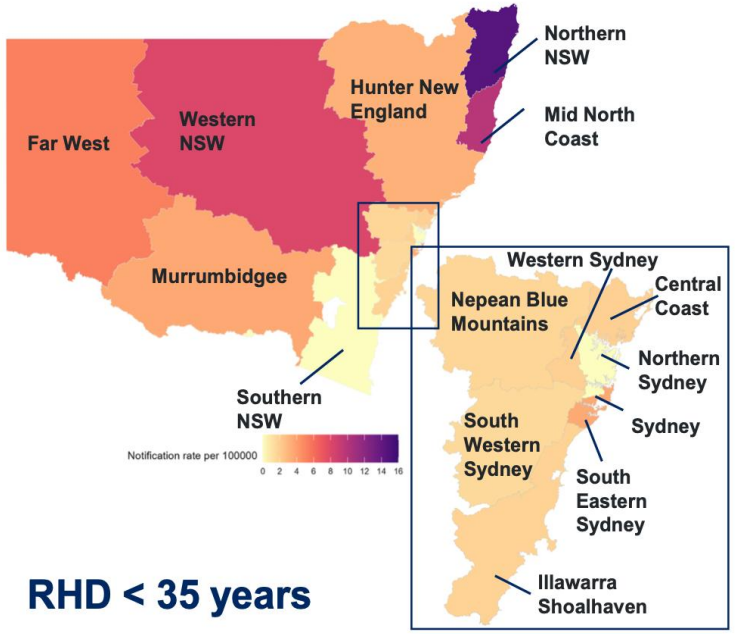
Basic epidemiology

- Used to be common in all populations: related to living conditions, crowding, hygiene, access to health care
- In Australia mostly (but not completely) in First Nations, Maori and Pacific Island people
- More common in First Nations people living rural and remote areas
- Northern NSW has highest rates of ARF in Aboriginal people in NSW….because we did the audit…what about you!

Notification rate of Aboriginal and Torres Strait Islander people with ARF and RHD, 2016 – 2024*, by LHD



ARF



RHD < 35 years

* 2024 data collection incomplete

Data source: Notifiable Conditions Information Management System

How much ARF/RHD is in your area and are you missing cases!

A Northern Rivers Experience

What tipped us off

What we did

Audit Tool

Email AH&MRC: publichealth@ahmrc.org.au or kkeenan@ahmrc.org.au

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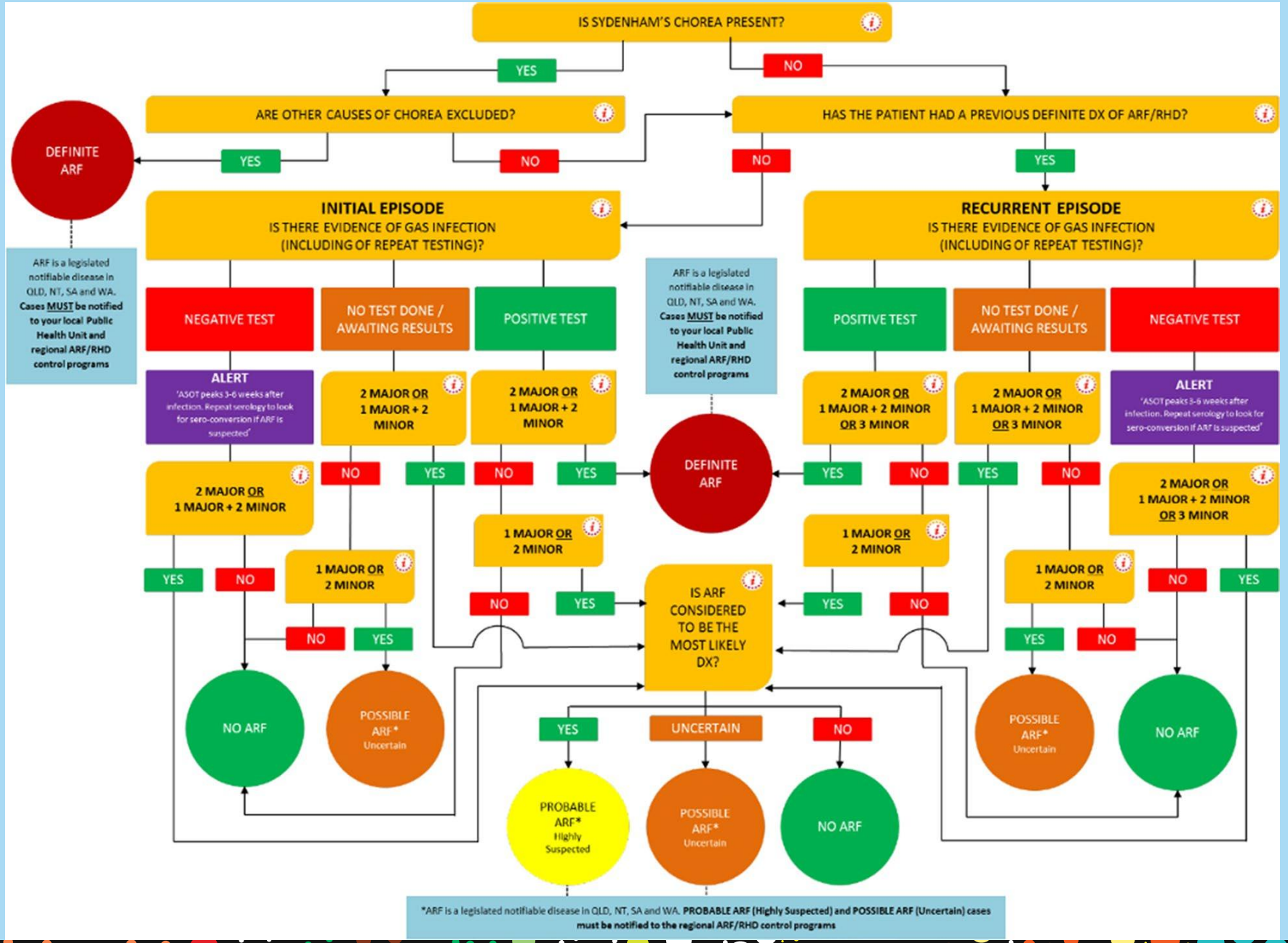
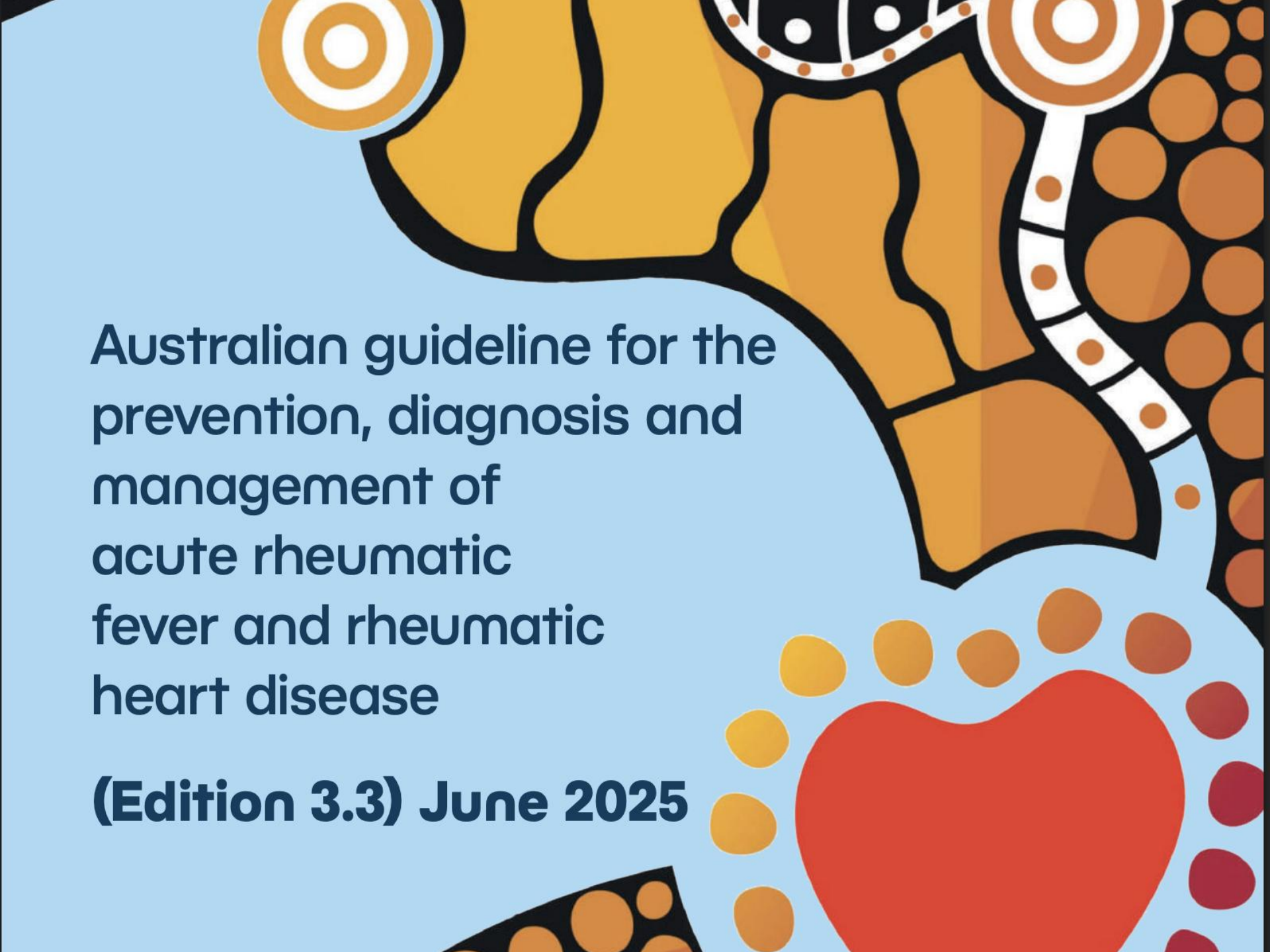
Fig. 1 Algorithm for diagnosing acute rheumatic fever as available in 2016, illustrating the complexity of a paper-based algorithmic approach. Modified from Remond 2014 [6]





Australian guideline for the prevention, diagnosis and management of acute rheumatic fever and rheumatic heart disease

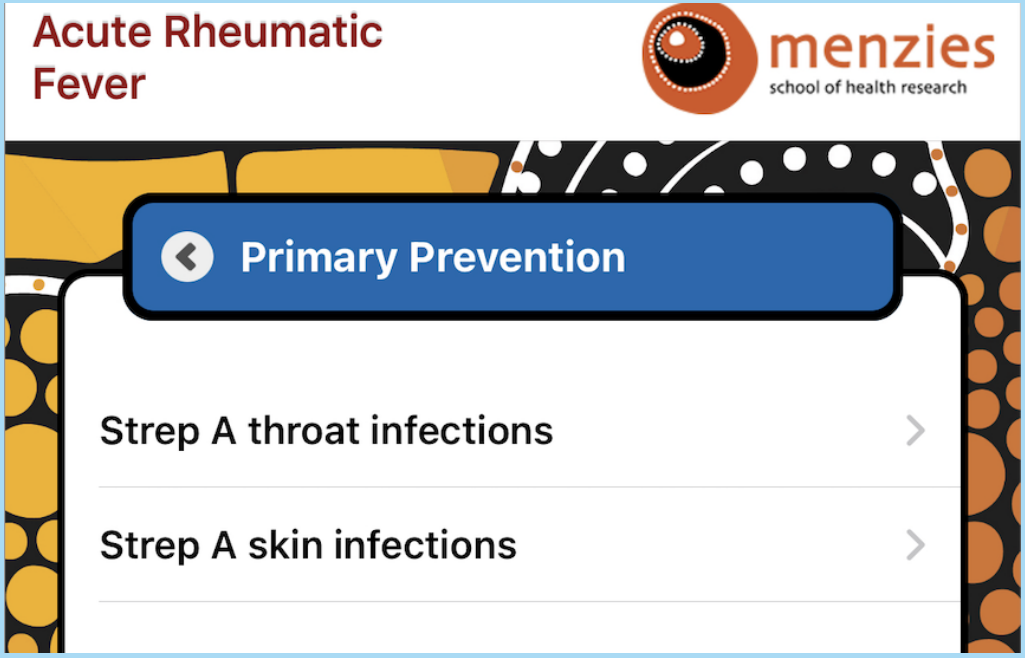
(Edition 3.3) June 2025

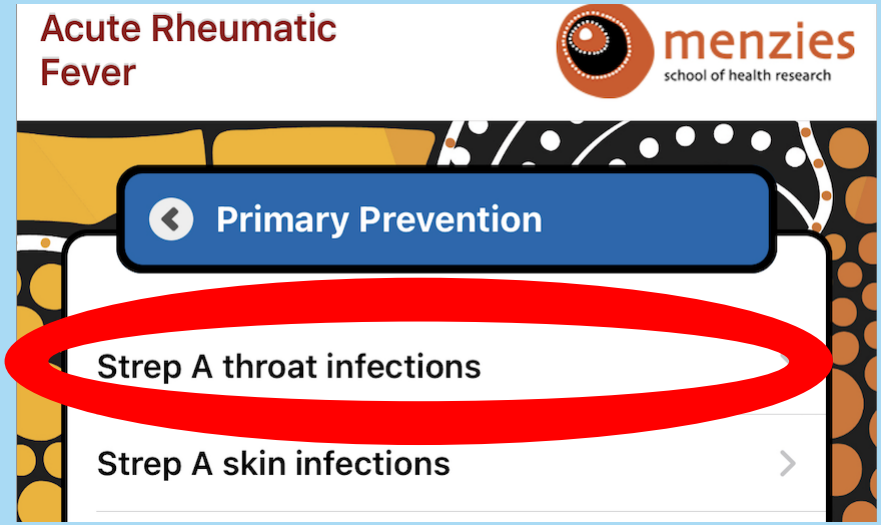
Android

iOS


Acute Rheumatic Fever
RHD Australia
What is ARF?
Diagnosis
Management of ARF
Secondary Prevention
Primary Prevention
Resources
ARF Diagnosis Calculator
Language
ARF
RHD

Primary Prevention





DRUG	DOSE		ROUTE	DURATION
All cases				
Benzathine benzylpenicillin G (BPG)[‡]	Weight (kg) Child: <10 10 to <20 ≥20 Adult: ≥20	Dose in units (mL)[§] 450,000 units (0.9 mL) 600,000 units (1.2 mL) 1,200,000 units (2.3 mL) 1,200,000 units (2.3 mL)	Deep intramuscular injection	Once
If IM injection not possible, use one of the following four oral options depending on circumstances, availability and potential drug intolerances:				
Phenoxymethylpenicillin	Child: 15 mg/kg up to 500 mg, twice daily Adult: 500 mg, twice daily		Oral	For 10 days
Azithromycin	Child: 12 mg/kg up to 500 mg, once daily Adult: 500 mg once daily		Oral	For 5 days
Cefalexin	Child: 25 mg/kg up to 1 g, twice daily Adult: 1 g, twice daily		Oral	For 10 days
Amoxicillin	Child: 25 mg/kg up to 1 g, once daily Adult: 1 g, once daily		Oral	For 10 days

Sore Throats

- Swab all sore and throats and code “sore throat”
- Use a low threshold to prescribe penicillin.
- Ab choice – look at the App!
- Offer IMI or Oral based on family choice + adherence
- What do you do if already have RHD an on penicillin regular injections?

Skin Infections

Swab all skin infections including:

- **insect bites, tinea, scabies, head lice and minor skin trauma**
- **Treat all skin infections as presumed Strep A**
- **Ab choice – look at the App!**
- **Why Bactrim?**
- **What to do if sulfur allergy**
- **What do you do if already have RHD an on penicillin regular injections?**

Acute Rheumatic Fever

menzies school of health research

Primary Prevention

- Strep A throat infections
- Strep A skin infections

Recommended antibiotic treatment for Strep A skin sores†

DRUG	WEIGHT RANGE	DOSE			ROUTE	DURATION
	For ≥1 purulent or crusted sore(s)					
Cotrimoxazole (trimethoprim / sulfamethoxazole) 4 mg/kg/dose trimethoprim component	**Weight range**	**Syrup dose (40 mg/5 mL)** §	**Tablet dose SS (80/400 mg)** ‡	**Tablet dose DS (160/800 mg)** ‡	Oral	Morning and night for 3 days
	3–<6 kg	12 mg (1.5 mL)	N/A	N/A		
	6–<8 kg	24 mg (3 mL)	¼ tablet			
	8–<10 kg	32 mg (4 mL)	½ tablet			
	10–<12 kg	40 mg (5 mL)				
	12–<16 kg	48 mg (6 mL)	¾ tablet			
	16–<20 kg	64 mg (8 mL)				
	20–<25 kg	80 mg (10 mL)	1 tablet	½ tablet		
	25–<32 kg	100 mg (12.5 mL)	1½ tablets	¾ tablet		
	32–<40 kg	128 mg (16 mL)				
	≥40kg	160 mg (20 mL)	2 tablets	1 tablet		
Benzathine benzylpenicillin G (BPG)	Weight Child: <10 kg 10 to <20 kg ≥20 kg Adult: ≥20 kg			Dose in units (mL)§ 450,000 units (0.9 mL) 600,000 units (1.2 mL) 1,200,000 units (2.3 mL) 1,200,000 units (2.3 mL)	Deep IM injection	Once

† Antibiotic treatment is indicated for all people with one or more lesions with pus or crust.

‡ Cotrimoxazole comes as syrup (40 mg trimethoprim/5 mL) and tablets. The tablets are single strength (SS) (80/400 mg trimethoprim/ sulfamethoxazole) or double strength (DS) (160/800 mg trimethoprim/ sulfamethoxazole). When syrup is unavailable, tablets may be crushed and dissolved in water for small children as per the table above.

§ mL is only relevant for the premix product. Volumes of powdered BPG may vary.

People already receiving secondary antibiotic prophylaxis for ARF still need active treatment of subsequent Strep A infections if the last penicillin injection was more than 7 days ago.

Diagnosis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ARF
RHD

Criteria for ARF diagnosis

Table 6.3. Australian criteria for ARF diagnosis

	HIGH-RISK GROUPS†	LOW-RISK GROUPS
Definite initial episode of ARF	2 major manifestations + evidence of preceding Strep A infection, or 1 major + 2 minor manifestations + evidence of preceding Strep A infection‡	
Definite recurrent§ episode of ARF in a patient with a documented history of ARF or RHD	2 major manifestations + evidence of preceding Strep A infection, or 1 major + 2 minor manifestations + evidence of preceding Strep A infection‡, or 3 minor manifestations + evidence of a preceding Strep A infection‡	
Probable or possible ARF (first episode or recurrence§)	A clinical presentation in which ARF is considered a likely diagnosis but falls short in meeting the criteria by either: • one major or one minor manifestation, or • no evidence of preceding Strep A infection (streptococcal titres within normal limits or titres not measured) Such cases should be further categorised according to the level of confidence with which the diagnosis is made: • Probable ARF (previously termed 'probable: highly suspected') • Possible ARF (previously termed 'probable: uncertain')	

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	HIGH-RISK GROUPS†	LOW-RISK GROUPS
Major manifestations	Carditis (including subclinical evidence of rheumatic valvulitis on echocardiogram) Polyarthritis¶ or aseptic monoarthritis or polyarthralgia Sydenham chorea†† Erythema marginatum‡‡ Subcutaneous nodules	Carditis (including subclinical evidence of rheumatic valvulitis on echocardiogram) Polyarthritis¶ Sydenham chorea†† Erythema marginatum‡‡ Subcutaneous nodules
Minor Manifestations	Fever ≥38°C§§ Monoarthralgia¶¶ ESR ≥30 mm/h or CRP ≥30 mg/L Prolonged P–R interval or advanced conduction abnormalities on ECG††† ‡‡‡	Fever ≥38.5°C Polyarthralgia or aseptic monoarthritis¶¶ ESR ≥60 mm/h or CRP ≥30 mg/L Prolonged P–R interval or advanced conduction abnormalities on ECG††† ‡‡‡

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Major Manifestations

Carditis

Who is going to provide echocardiogram?

Paediatric
and
Adult

- Within 72 hours

- Significant murmur
- Cardiac enlargement
- Cardiac decompensation
- Pericardial friction rub or effusion
- Subclinical carditis; rheumatic valvulitis seen on echocardiogram

Joint Pain

Polyarthritis,

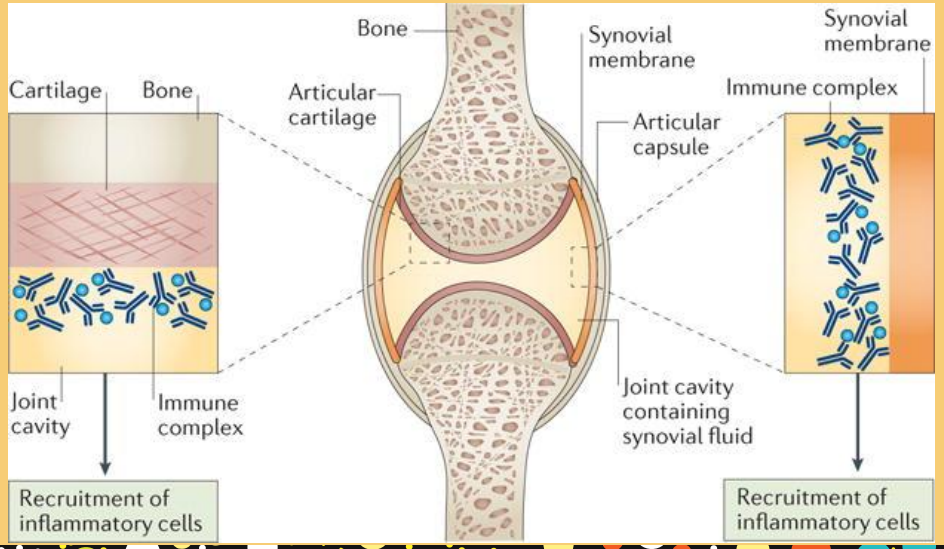
polyarthralgia,

aseptic monoarthritis,

monoarthralgia

Most common presenting symptom:

- **Mostly large joints (esp knees/ ankles/ elbows)**
- **Joint involvement usually few days- few weeks**
- **Often the first symptom**



Sydenhams chorea

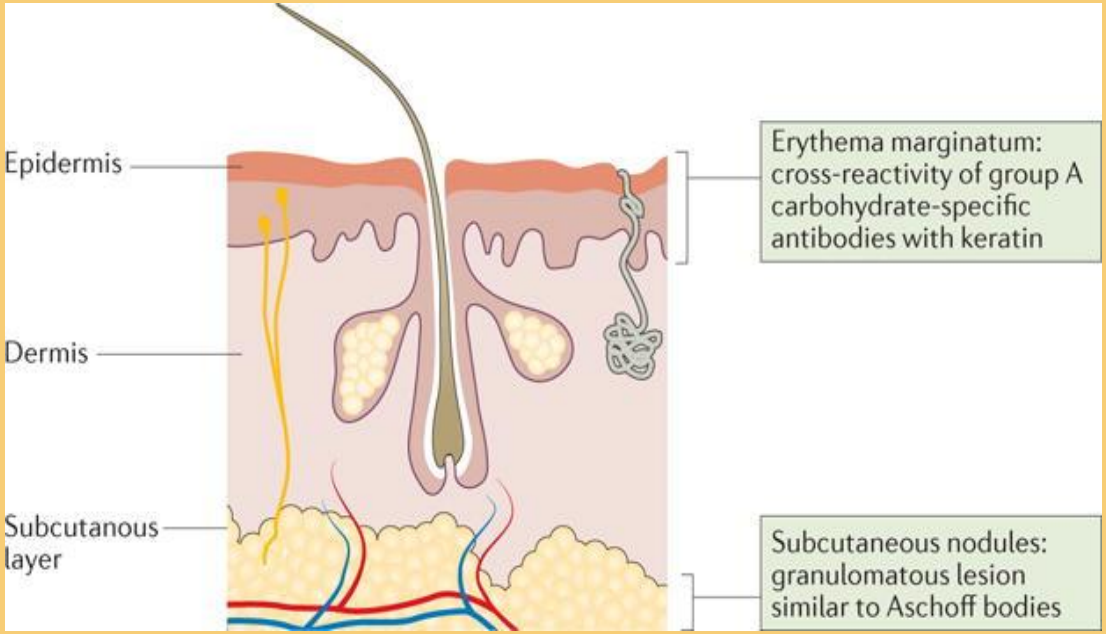
- **Involuntary non rhythmic purposeless movements of the trunk and limbs and face**
- **Affects between 12-28% Aboriginal and Torres Strait Islanders with ARF.**
- **More likely to affect teenage girls.**

Some videos:

- Sydenham chorea - whole body – YouTube
- Sydenham chorea - milkmaid grip – YouTube
- Sydenham chorea - spooning – YouTube
- Pronator sign: Sydenham's chorea - YouTube

Skin Manifestations

- Erythema Marginatum
- Subcutaneous Nodules
- Occur in < 10 percent of patients.



Minor Manifestations

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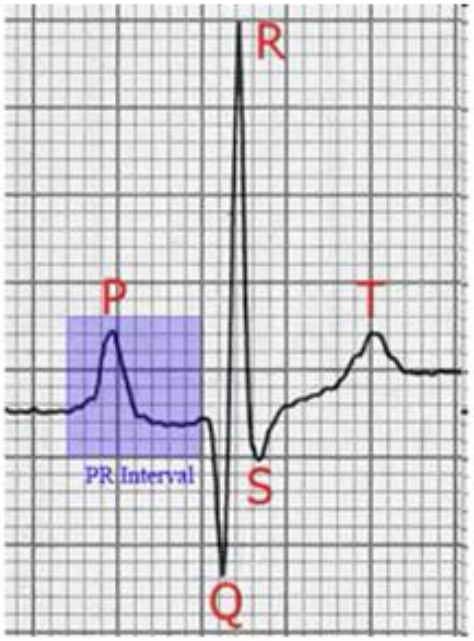
Fever
History of fever >38°C

Polyarthralgia

Raised inflammatory markers
Raised ESR (>30mm/hr)
OR
Raised CRP (>30mg/L)

Prolonged PR interval
→ ECG



3-12yrs 0.16sec
12-16yrs 0.18sec
17+yrs 0.20sec

AMS LHD Pathway

Use the ARF RHD app diagnosis calculator (QR code)

ARF presents 2-8 weeks post Grp A Strep (GAS) infection

Preceding GAS infection: recent strep throat, impetigo, raised ASOT or anti-DNase B

Major manifestations	Minor manifestations
Carditis (absence of murmur does not exclude carditis/valvulitis: need an echo)	Fever ≥ 38°C or reliable history of fever
Polyarthritis or aseptic monoarthritis or polyarthralgia	Monoarthralgia
Sydenham's chorea	ESR≥30 or CRP≥30
Erythema marginatum	ECG Prolonged PR >0.20 in adults **> 0.16 in 3-11 yrs , > 0.18 in 12-16 yrs**
Subcutaneous nodules – painless	Refer app for descriptions of all manifestations

Do ECG+ Bloods (ESR, CRP, ASOT, Anti-DNase B) **Use ARF Diagnosis calculator**

DIAGNOSIS

1. **Definite initial episode ARF**: Evidence of preceding GAS infection AND 2 major manifestations OR 1 major + 2 minor manifestations
2. **Definite recurrent episode ARF**: as for initial episode OR preceding GAS infection + 3 minor manifestations
3. **Possible /Probable ARF**: As for initial or recurrent episode but without evidence of preceding GAS infection OR preceding GAS infection + 1 major and 1 minor manifestat

All cases need immediate discussion with a Specialist

(Gen Med/Cardiology or Paeds) and

Echocardiogram ideally within 72 hrs

NSW Health CONFIDENTIAL

Acute Rheumatic Fever / Rheumatic Heart Disease Notification Form

NSW GOVERNMENT

NSW HEALTH USE ONLY
Date received: __ __ / __ __ / __ __ __ __ PHU: _____ Record No: _____

PATIENT DETAILS

Last Name: .....
First Name: .....
Alias: .....
Parent / Guardian's Name: .....
Parent / Guardian's Name: .....
Address: *(permanent)* .....
State: ..... Postcode: .....
Address: *(temporary)* .....
State: ..... Postcode: .....
Phone 1: ..... Phone 2: .....
Date of Birth: __ __ / __ __ / __ __ __ __ Age: .....
Gender: ☐ Male ☐ Female ☐ Other

NOTIFYING DOCTOR

Name: .....
Patient's Hospital / Clinic Number: .....
Hospital/Clinic: .....
Address: .....
State: ..... Postcode: .....
Phone: ..... Fax: .....

Patient's Usual Health Service Provider

Patient's Hospital / Clinic Number: .....
Address: .....
State: ..... Postcode: .....
Phone: ..... Fax: .....
Language spoken at home: .....

Country of birth: ☐ Australia ☐ Other ..... ☐ Unknown

Indigenous status: ☐ Aboriginal ☐ Torres Strait Islander ☐ Unknown
☐ Both Aboriginal and Torres Strait Islander ☐ None of the above

Ancestry: ☐ Maori ☐ Pacific Islander .....
☐ Other ..... ☐ Unknown

ACUTE RHEUMATIC FEVER (ARF)

Current episode: ☐ Initial ☐ Recurrent ☐ Unknown

Date of onset (current episode): __ __ / __ __ / __ __ __ __ Date of onset (first episode): __ __ / __ __ / __ __ __ __

Manifestations (tick all that apply)

☐ Carditis ☐ Chorea ☐ Erythema marginatum ☐ Fever ≥ 38°C
☐ Mono-arthralgia (aseptic) ☐ Mono-arthritis (aseptic) ☐ Polyarthralgia ☐ Polyarthritis
☐ Prolonged P-R interval on ECG ☐ Elevated ESR (≥ 30 mm/hr): _____ mm/hr __ __ / __ __ / __ __ __ __
☐ Subcutaneous nodules ☐ Elevated CRP (≥ 30 mg/L): _____ mg/L __ __ / __ __ / __ __ __ __

Case 1
4 year old boy

(before audit and teaching)

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Day 1: Presents with a 2 days sore throat and fever

Urine MCS and Viral Resp swab

Day 2: Presents to local ED as not improving

Blood in urine, intermittent fevers, intermittent discomfort L ankle and wrist and intermittent abdo pain. Mild tonsillar erythema.
Bloods and Stat Viral Respiratory swab
Discharged home to follow up with GP at AMS.

Social history:

Lives with Mum, grandparents and 6 other children

Investigations

FBC : N except Lymphocytes low 1.8

ESR 32, CRP 94;

Day 5: GP review

Unfortunately no investigation results or discharge summary from hospital yet.

Negative viral resp swab

Currently looking well, acting at close to baseline levels of activity

Good PO intake, good UO

No evidence of bowel issues, bowel habits good

No complaints of headache / dysuria / rash

Active in room (no comment about arthralgia)

Examination

Vitals: HR 113 (Normal for age), BP 94/61, sats 100%RA, afebrile

Well; alert + interactive with age-appropriate behaviour; no respiratory distress,

HSDNM

Lungs clear

Abdo SNT

No cervical lymphadenopathy

Throat: mild inflammation, no pus nor spots

Moist tongue, Ears clear

Day 7, (2 days later): represents to ED

- **Recurrence of abdo pain and joint pain + fevers.**

- **Repeat bloods;**
  - CRP 94 ->104
  - ESR 32 -> 101;

- **Discussion with Paediatrics- to t/f to Lismore for further investigation/ workup.**

- **2 ½ week admission**
  - Carditis (heart murmur)
  - Erythema Marginatum
  - Develops Sydenham's Chorea
  - Prolonged PR

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A full diagnostic work-up determines

definite

probable

possible

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Secondary Prophylaxis

The duration of secondary prophylaxis varies dramatically from

- **12 months** (possible ARF) to
- **5 or 10 years or until the age of 21 years** (probable or definite ARF) or
- **Until age of 40** (if established RHD with valvular replacement)

IM Bicillin injections monthly are painful for everyone but especially small children

Use lignocaine, ice packs, buzzy bees, VR goggles, ipads, anything

Progress:

Now:

Receiving regular (every 28 days) doses IM Benzylpenicillin

(to continue until age 21 years at minimum);

No further cases of probable or definite ARF to date.

Case 2

Lived experience

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At age 6yo - single episode of ARF with severe carditis.

Diagnosed with mitral regurgitiation and started monthly bicillin

At age of 20 - AV and MV Tisuue Replacement

At age 26 – AV and MV Tissue Replacement redone

At age 34– Further deterioration needing surgery

…..opted for mechanical valves; adds on warfarin + continuing bicillin and

Becomes high antenatal risk if wants children

Summing up

RHD is in Northern NSW and maybe in your community too – do an audit

Do all Mandatory Notifications for all old patients and your new ones too

What we do as GPs will be critical – primary prevention matters

Use the app!