Due for review: 26/7/2029

Healthy Skin Program

Contents

Applicability

This guideline applies to:

- NT Health Hospitals and Primary Care Services

Guideline statement

Objectives:

- to provide a guideline for the community control of scabies, skin sores and tinea infection in remote communities
- to reduce the prevalence of scabies, tinea, streptococcal skin sores and associated post streptococcal illness in the Northern Territory (NT).

Policy suite

This guideline forms part of the following policy suite:

- Public Health management of crusted scabies in the Northern Territory
- Simple, Complicated and Crusted Scabies NT Health Guideline
- Crusted Scabies Management LBC RDPH Guideline
- Scabies Management Protocol for Sexual Health and Blood Borne Virus Unit.
- National Healthy Skin Guideline
- Scabies fact sheet
- Visual fact sheet for contacts of crusted scabies
- ~~Crusted scabies and hospital story~~ (One Disease)
- NT CDC – Public health and notifiable diseases resource page
- Guidelines for the control of leprosy in the Northern Territory

Summary of changes from previous edition

- Section 1 –Background information:
  - addition of Section 1.3 - Social determinants of health and primordial prevention of skin infections
- Section 2 – Definitions and clinical presentation:
  - clinical images added
  - appendices (fact sheets) updated
  - addition of Section 2.5 (other skin conditions).
- Section 3 – Skin checks, treatment and follow-up:
  - section 3.1 (skin checks)
    - updated to align with skin check recommendations in current Central Australian Rural practitioners Association (CARPA) Standard Treatment Manual (8th edition)
  - section 3.2.1 (scabies treatment)
    - updated to align with the Simple, Complicated and Crusted Scabies NT Health Guideline
    - Ivermectin added as a first-line treatment option for scabies infection
    - Ivermectin listed as acceptable while breastfeeding

  - section 3.2.3 (impetigo treatment)
    - oral trimethoprim-sulfamethoxazole listed as a first line treatment option
    - topical 2% mupirocin ointment added as a treatment option for limited impetigo (≤2 sores)
  - section 3.2.4 (tinea treatment)
    - terbinafine 1% cream added as an alternative to topical miconazole
    - oral terbinafine and griseofulvin listed as first-line treatment for tinea capitis
    - practice points and precautions updated
  - weight based dosing tables for oral ivermectin, trimethoprim-sulfamethoxazole, terbinafine and griseofulvin added as an Appendix (adapted from National Healthy Skin Guideline[1])
- Section 4 – Diagnosis and management of crusted scabies:
  - updated to align with the Simple, Complicated and Crusted Scabies NT Health Guideline
  - link to scabies skin scraping video added
- Section 5 – Active surveillance and whole-of-community treatment
  - appendices (flowcharts and equipment list) updated to include oral ivermectin and trimethoprim-sulfamethoxazole.

Guideline details

Section 1: Background information

1.1 Objectives:

- to provide a guideline for the community control of scabies, skin sores and tinea infection in remote communities
- to reduce the prevalence of scabies, tinea, streptococcal skin sores and associated post streptococcal illness in the Northern Territory (NT).

1.2 Rationale

Scabies is endemic in many remote Aboriginal communities, and underlies a large proportion of streptococcal skin infections[1-4]. Control of scabies is therefore critical in controlling streptococcal skin infections and their sequelae[5-7]. Outbreaks of acute post streptococcal glomerulonephritis (APSGN) have been documented in the NT with large periodic outbreaks involving numerous communities[8]. APSGN occurs following streptococcal skin infection and is characterised by oedema (most noticeably of the face), haematuria and hypertension. NT studies have shown that children who have had APSGN are 6 times more likely to develop chronic kidney disease (CKD) as adults[9-10]. For more information see the Northern Territory Guidelines for Acute Post-Streptococcal Glomerulonephritis.

The incidence of acute rheumatic fever (ARF) and prevalence of rheumatic heart disease (RHD) in Top End communities are among the highest in the world[11-14]. Low incidence of streptococcal pharyngitis and high incidence of streptococcal skin infections and ARF in Indigenous communities have led to the hypothesis that ARF can occur as a complication of streptococcal skin infection. For further information see the Australian Guideline for Prevention, Diagnosis and Management of Acute Rheumatic Fever and Rheumatic Heart Disease (3rd edition).

The high rate of streptococcal infection is therefore likely to be a significant contributing factor to the high prevalence of CKD and RHD in the NT. Control of scabies is essential for prevention of streptococcal skin infection.

1.3 Social determinants of health and primordial prevention of skin infections

From Chapter 3 of the National Healthy Skin Guideline[1].

Skin infections are prevalent in Aboriginal and Torres Strait Islander communities in Australia, the consequences of ongoing colonisation, systemic racism, dispossession, inadequate housing, socioeconomic disadvantage, and consequent poverty. Improvements in health service delivery, housing, and overall socioeconomic and environmental conditions, are likely to result in improved skin health. Until this occurs, strategies to prevent skin infections are important and fall into one of four categories: primordial, primary, secondary, or tertiary. Primary prevention is the most developed strategy for management of skin infections, and this guideline has this as a major focus.

Primordial prevention is the prevention of risk factors, and generally addresses the social determinants of health to reduce the risk of skin infections. Social determinants are defined as 'the circumstances in which people grow, live, work, and age, and the systems put in place to deal with illness. The conditions in which people live and die are, in turn, shaped by political, social, and economic forces[15]. Improvements in living conditions have been widely credited for the decreasing burden of acute rheumatic fever (ARF) and rheumatic heart disease (RHD) in most developed countries, including Australia.

Strategies to improve environmental health are likely to have an impact on skin infections. The nine 'Healthy Living Practices'[16] have been widely adopted as a framework for addressing the links between housing and health for Aboriginal and Torres Strait Islander peoples. They have been adopted for communities and governments to consider the environmental determinants of health and help guide priorities for action (Table 1).

Table 1. Nine Healthy Living practices and how they relate to skin infections. Adapted from Health Habitat[16].

Healthy Living Practice	Explanation Relevant to Skin Infections
1. Washing people	Washing hands and bodies is directly associated with skin health. Studies overseas have confirmed hand washing with soap and water decreases impetigo rates[17]. Therefore, people who do not have access to: functional and regularly maintained hardware (taps, sinks and water); consumables (soap and towels); and information about the importance of washing hands and bodies to reduce the spread of disease, may experience poorer skin health.
2. Washing clothes and bedding	Washing clothing and bedding is an important way to reduce skin infections. A functional laundry tub and washing machine helps enable the washing of clothes and bedding. While rare, scabies mites may spread though clothes or bedding used by someone who has scabies. Scabies transmission through bedding and clothing is more likely from people with crusted scabies and very high mite burden. Fleas, lice and fungal infections may also spread through clothes or bedding and cause skin disruption which can lead to skin infections. Bacterial infections also pass from person to person via contact with household linen. Therefore, ensuring that people have facilities to wash clothes and bedding to kill bacteria, scabies mites and lice, may reduce the rates of skin infections.

Healthy Living Practice	Explanation Relevant to Skin Infections
3. Removing wastewater safely	Removing wastewater safely is important to reduce the risk of many infectious diseases. It is important that toilets and drains are functional, and that wastewater is treated and managed safely, away from the living environment. Wastewater is not a major contributor to the spread of skin infections but is an overall aspect of healthy living.
4. Improving nutrition through the ability to store, prepare and cook food	Access to potable water for drinking, cooking, and cleaning, is essential for overall health and wellbeing. Functional sinks, taps and stoves also aid the preparation of food in the home environment, which can contribute to good nutrition. Access to fresh fruits and vegetables, and the ability to find and consume traditional foods has also been linked to improved overall health.
5. Reducing the negative impacts of overcrowding	It is important that health hardware, e.g. hot water and wastewater systems, can cope with the number of people living in a house. Overcrowding increases the pressure on the health hardware which in turn can increase the risk of skin infections, and other infectious diseases. The risk of impetigo, ARF, and RHD in crowded households has been shown to be up to 1.7–2.8 times higher compared to uncrowded households. However, defining and measuring crowding can be complex, and identifying risk to individuals is difficult.[18] Efforts to reduce household overcrowding, or reduce the risk of overcrowded living circumstances, by building and maintaining appropriate health hardware for the number of occupants are important for overall health and wellbeing.
6. Reducing the negative effects of animals, vermin or insects	An individual's health can be negatively affected by contact with insects, animals, and vermin in the living environment. For example, contact with animals, insects and scabies mites can cause skin damage which increase the risk of secondary bacterial infection. Protection from insect bites (e.g. flyscreens on windows, removal of containers where water can pool for mosquito breeding) and animal bites (e.g. dog control programs) can reduce the rate of skin infection.
7. Reducing the health impacts of dust	Dust can be caused by unsealed roads and arid lands, making dust common in remote communities. Similarly, dust can contribute to poor health in urban environments where building sites are nearby. Dust can cause direct health problems by irritating the skin. For example, fungal spores contained in dust may lead to tinea.
8. Controlling the temperature of the living environment	Living environments that are too cool or too hot can cause illness. However, controlling the temperature of the environment may also have negative impacts. For example, air conditioning to cool very hot environments may lead to increased spread of infectious disease between people due to a closed environment with limited fresh air exchange enables bacteria to transmit from person to person.
9. Reducing hazards that cause trauma	Living in a house which is poorly maintained and contains rubbish and debris may increase the risk of minor skin damage from cuts, injuries and abrasions.

Section 2: Definitions and clinical presentation

2.1 Scabies

Scabies is a parasitic infestation of the skin caused by a mite, **Sarcoptes scabiei** (see scabies fact sheet, Appendix A)[19]. Penetration of the skin leads to papules, vesicles and/or tiny linear burrows that contain the mites and their eggs. Scabies papules and scratch marks are commonly found in the web spaces between fingers and toes (Figures 1 and 2), and on the anterior surfaces of the wrists and elbows. Other common sites include axillary folds, belt line, thighs, abdomen and buttocks. Burrows may not be seen. Infants may have widespread lesions involving the head, neck, palms and soles. Itching is generally intense and often more severe at night. Mites are transferred by direct contact with skin and can burrow into the skin within 2.5 minutes. Transmission from undergarments and bedclothes occurs only if these have been contaminated immediately prior to contact. The scabies mite that affects dogs does not cause human infestation. Symptoms develop 2-6 weeks after exposure if there has been no previous episode of scabies infection. The incubation period is 1-4 days in individuals who have previously been exposed.

Figure 1: Scabies of the hand.

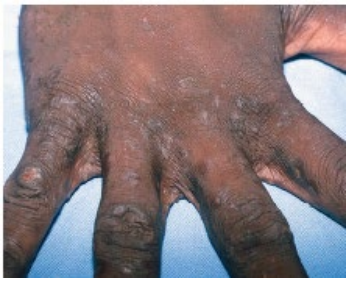


Figure 2: Complicated scabies (non-crusted).

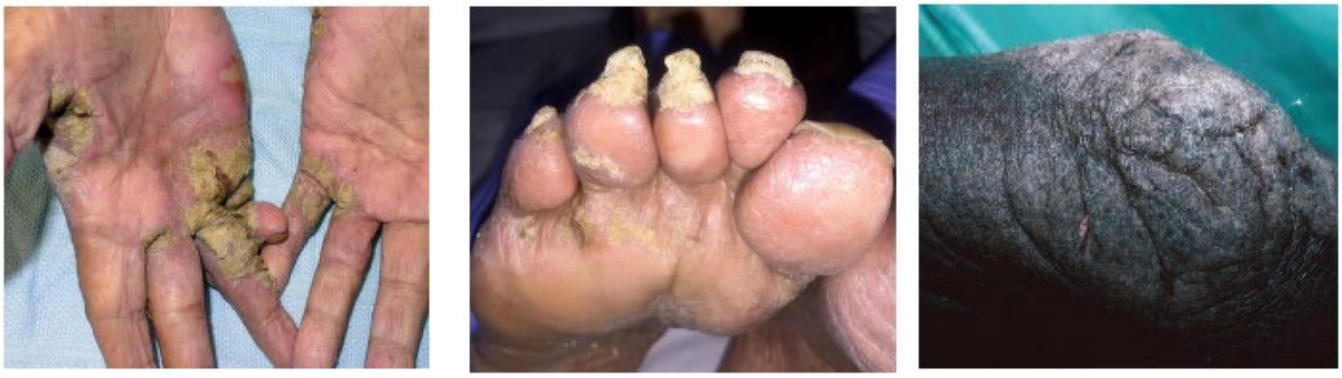
Source: Bart Currie, Tropical Health Orientation Manual

2.2 Crusted scabies

Crusted scabies is due to the same scabies mite. It occurs when the immune system fails to control the infestation, and there is hyperproliferation of mites. In Central Australia, crusted scabies has been associated with human T-cell lymphotropic virus 1 (HTLV–1) infection[20]. A large proportion of cases in the Top End have no identifiable immunological defect[21-23]. People with crusted scabies often have no itch and the rash manifests as scaling and crusting of skin, often on buttocks, elbows and arms. Palms and soles of feet may be fissured (Figure 3). Cases can range from mild with only a few patches, to severe infestation covering the entire body. It may be misdiagnosed as other conditions such as psoriasis or fungal infection. Microscopic examination of skin scrapings to detect the presence of mites and/or their eggs is required to make the diagnosis.

Individuals with crusted scabies are highly infectious to other people (see Appendix B - visual fact sheet for contacts). They are also at high risk of reinfection after initial successful treatment[23-24]. Crusted scabies is associated with high morbidity, and secondary skin sepsis may result in life threatening bacteraemia. Undiagnosed cases of crusted scabies can lead to recurrent infection of treated household members.

Figure 3: Crusted scabies, demonstrating fissuring and nail involvement.



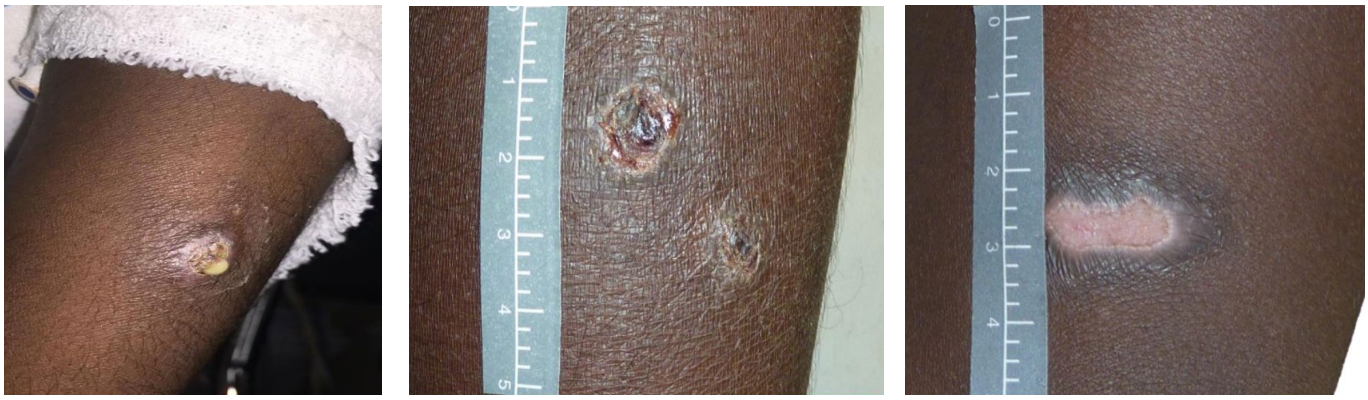
Source: Bart Currie, Tropical Health Orientation Manual

2.3 Skin sores (impetigo)

Skin sores are almost always due to Group A Streptococcus (GAS) but Staphylococcus aureus can also be isolated. The lesions start as pustules which subsequently break down and form crusts (Figure 4). Skin sores often occur as a complication of scabies, and even though there is a crust, this should not be referred to as crusted scabies.

Eradication of GAS is important to prevent post streptococcal disease including APSGN and ARF (see GAS fact sheet, Appendix C). GAS is usually the primary pathogen so antibiotic treatment to cover S. aureus is usually not required for initial empirical therapy.

Figure 4: Impetigo (purulent, crusted and healing skin sores)



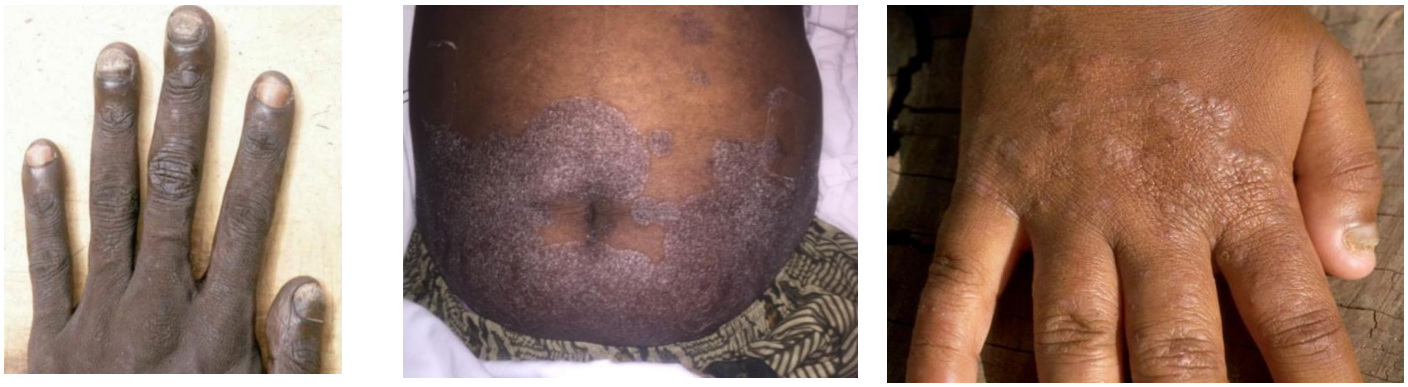
Source: National Healthy Skin Guideline (Recognising & Treating Skin Infections: A visual clinical handbook)

2.4 Tinea

Tinea is a fungal infection that is caused by the dermatophytes *Trichophyton*, *Epidermophyton* and *Microsporum*. It is usually spread between humans, but some tinea species have primary animal hosts and therefore can be acquired from animals such as cats and dogs. In the Top End, the majority of tinea infection is caused by a granular variant of Trichophyton rubrum, which is only spread from person to person, has no animal reservoir and often causes extensive and severe tinea of the body and nails[25]. There are a number of names given to tinea disease, depending on the part of the body involved. Tinea can involve the body (tinea corporis, ringworm), feet (tinea pedis, athlete's foot), scalp (tinea capitis), groin folds (tinea cruris, jock itch) and nails (tinea unguium, onychomycosis) (Figure 5).

Tinea of the body starts as an itchy, scaly patch that spreads outwards with central clearing, forming ring-shaped lesions. These can join together to form very large lesions. Tinea of the feet presents as itchy, red fissures and erosions between the toes, but can progress to an extensive scaly rash involving the rest of the foot. Tinea of the nails presents with white-yellow discolouration, thickening and irregularity of the nails, with or without accumulation of flaky debris between the nail and the nail bed. All forms of tinea can cause discomfort, there may be skin breakdown as a result of scratching, and lesions may become secondarily infected with streptococci and staphylococci.

Figure 5: Tinea, demonstrating nail, body and hand/thumbnail involvement



Source: National Healthy Skin Guideline (Recognising & Treating Skin Infections: A visual clinical handbook)

2.5 Other skin conditions

The National Healthy Skin Guideline also provides information on the diagnosis, treatment and prevention of:

- **atopic dermatitis (eczema)**
- **head lice**
- **molluscum contagiosum**.

These conditions are recognised for their high burden in Australian Aboriginal and Torres Strait Islander people, and are important causes of morbidity and antecedent substantial mortality from invasive bacterial infection and autoimmune sequelae.

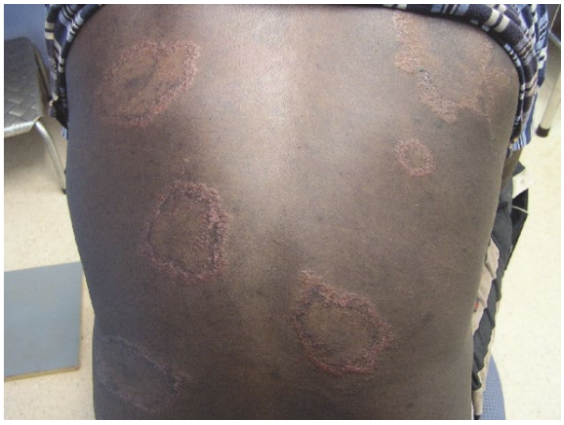
Leprosy is now a rare diagnosis in the NT. However, new cases have been identified in remote Aboriginal and Torres Strait Islander communities as recently as 2024 and ongoing vigilance is required.

Skin changes of leprosy can include:

- discoloured patches of skin, usually flat, that may be **anaesthetic** and **depigmented** (lighter than the surrounding skin) (figure 6)
- nodules on the skin
- thick, stiff or dry skin
- painless ulcers on the soles of feet
- painless swelling or lumps on the face or earlobes
- loss of eyebrows or eyelashes[26].

Further detail can be found in the Guidelines for control of leprosy in the Northern Territory.

Figure 6: Characteristic lesions of tuberculoid leprosy



Source: NT CDC collection

Section 3: Skin checks, treatment and follow up

Effective diagnosis and treatment of scabies, skin sores and tinea requires a proactive approach. The skin can be examined opportunistically when a patient presents for other reasons, and as part of routine health checks. When scabies, skin sores and/or tinea are identified, it important to take time to explain the correct method of application of cream and/or administration of the antibiotic course, to encourage and facilitate completion of the treatment course, and to review the patient to ensure there has been a clinical response[27-29]. Adequate treatment of the household is also important. When there are recurrent episodes of scabies within a household, a case management approach is recommended.

3.1 Skin checks

A skin check is included in child health assessments at 8 weeks, 4, 6, 9, 12 and 18 months, and at 2, 3, 4 and 5 years of age (CARPA)[21]. This age group has the highest prevalence of scabies and skin sores[30-32]. Check the entire skin including the scalp.

Many communities will also have school-age health screening programs. A skin check should be included as part of this. In this age group, check the hands, arms, legs, feet and waist. Only check the rest of the skin if scabies or sores are noted, or if itching is present on other parts of the body.

An adult health check is recommended every year from age 18 (CARPA)[21]. A skin examination should be included as part of this.

3.2 Treatment

3.2.1 Scabies

Oral ivermectin and topical permethrin and are the first-line treatments for scabies in children and adults. They appear to have similar efficacy. The oral dosing of ivermectin may improve adherence over topical permethrin, although this has not been specifically studied.

Oral ivermectin is not approved in children who weigh less than 15kg or during pregnancy (permethrin 5% cream is recommended).

First-line treatment options:

1. Ivermectin (adult and child ≥ 15kg) 200 micrograms/kg orally with fatty food as a single dose. Round up to the nearest 3mg (see Appendix D for weight band dosing table)

OR

2. Permethrin 5% cream (adults and children aged 6 months or older)
    - Apply permethrin 5% cream late in the afternoon or evening, leave on for a minimum of 8 hours, usually overnight, then wash off. Apply topically, including face and scalp, paying particular attention to hands and genitalia. Apply under the nails using a nailbrush or toothbrush. If hands washed during the 8-12 hour period, reapply to hands. Topical therapy may be left on for 24 hours if there is a history of treatment failure.

Repeat scabies treatments after 7 days, as initial treatment will not have treated eggs yet to be hatched.

Topical steroids may be required for itch and/or reactive dermatitis. Apply 2-3 times a day. After an effective course of scabies treatment, the itch associated with scabies can take 3 weeks or longer to resolve. Refer to the Therapeutic Guidelines[33] or other local guidelines for dosing options.

Special categories

- Pregnancy:
    - permethrin 5% cream (apply as above)
- Breastfeeding:
    - Ivermectin or permethrin 5% cream may be used[33-34]
- Infants less than 6 months:
    - permethrin 5% cream, applied to the entire body including the scalp, but avoiding eyes and mouth. Cover hands to avoid child sucking the medication. Leave on for 8 hours.

  Note: Permethrin is the recommended treatment, despite currently not being approved for use in children less than 6 months. The risk must be balanced against the serious morbidity of untreated scabies.
- Permethrin allergy (adults and children):

  Note: Increased itch with treatment usually represents increased mite activity and should NOT be routinely considered allergy unless other features of allergy present.
    - Child less than 2 months: sulphur 5% in white soft paraffin topically, once daily for 3 days OR crotamiton 10% cream topically, once daily for 3 days.
    - Child 2-6 months: sulphur 10% in white soft paraffin topically, once daily for 3 days OR crotamiton 10% cream topically, once daily for 3 days.

  - Child 6 months-2 years: benzyl benzoate 25% emulsion diluted with 3 parts water.
  - Child 2-12 years: benzyl benzoate 25% emulsion diluted with equal parts water.
  - Adults with significant skin irritation from benzyl benzoate may also benefit from dilution as per children above.
- If medication shortages occur, these guidelines may be adjusted to balance the risk of serious morbidity from untreated scabies.

Complicated scabies

- Consider inpatient admission and/or consultation with paediatrics or infectious diseases teams if severe, extensive, or a neonate.
- Commence empiric antibiotics (po/im/iv) if secondary bacterial infection suspected:
  - Impetigo/skin sores: see section 3.2.3 for treatment guidelines
  - If causative organism identified, switch to directed antibiotic therapy as per Therapeutic Guidelines[33]
  - Cellulitis or concurrent sepsis: refer to therapeutic guidelines and/or local sepsis guidelines.
- If extensive, open or weeping, application of permethrin 5% may be delayed until lesions dry and starting to heal.
- Affected children should also bathe twice daily with antiseptic wash.

Environmental management

- All clothing worn prior to completion of scabies treatment should be laundered in soapy water at a minimum temperature of 50°c for at least 10 minutes. Consider also subjecting to heat from a hot iron or clothes dryer, particularly if unable to reach required temperatures during wash.
- If above laundering options are not available or suitable, bagging and storing clothes in a sealed plastic bag for 8 days will also kill scabies mites.[35] Mites, including those subsequently hatching from eggs, are unlikely to survive longer than 7 days away from a host.
- Freezing below -10°c for at least 5 hours is another safe option for killing mites and eggs[35].
- Waste is regarded as general waste.
- Follow local environmental cleaning protocols relevant to healthcare settings.

Precautions

- Patients can be deemed non-infectious within 24 hours of commencing scabies treatment, regardless of any ongoing symptoms.
- Children with scabies can return to childcare or school once the first treatment dose of topical permethrin (must be supervised and documented) or oral ivermectin has commenced.
- Children with concurrent impetigo can return to childcare or school once appropriate antibiotic treatment has started. Cover sores on exposed skin with a watertight dressing. Dispose of dressings appropriately.

Management of contacts

- Treat caregivers of affected children and ensure all household members are examined with a low threshold for treatment.
- Residential settings (e.g. aged care facilities) should be contacted and recommended to:
  - Treat all residents and staff who have had contact with residents.

  - Investigate for a source patient in the setting of an outbreak, as they may have crusted scabies.
- School-aged children:
  - parents should notify the school
  - no need to treat other children at the school unless symptomatic.
- An outbreak of scabies in residential or healthcare facilities, where one or more linked cases of scabies (crusted or non-crusted) occurs, requires a comprehensive outbreak investigation and response. Refer to Section 3.4.2 of the Australian Guidelines for the Prevention and Control of Infection in Healthcare for management principles and steps. Infection Prevention and Management Units in the inpatient setting, and the Centre for Disease Control outside the hospital setting, should be closely involved in the management of any outbreaks.

Recurrent scabies (non-crusted) or treatment failure

Management

If itch persists after 3 weeks, consider:

- inadequate contact tracing or environmental management (see below), looking for an unidentified source of ongoing re-infestation
- adequacy of, and adherence to, treatment
- alternate or concurrent diagnoses.

Consider re-treatment, ensuring adequate application, adherence, and environmental management as above. Consider using an alternate agent to that used in the initial treatment regimen, e.g. oral ivermectin if topical permethrin was previously used.

Recurrent infection after initial resolution on treatment should trigger closer investigation of close contacts and the home environment.

Further considerations

Where there are recurrent episodes of scabies in a household, a case management approach is recommended. This is outlined in detail in the Managing Households with Recurrent Scabies, 2017 Edition guide developed by One Disease[36]. In summary, this approach includes a home visit assessment for causes of scabies recurrence such as inadequate application of cream/lotion, broken health hardware and exclusion of a crusted scabies contact. A treatment approach should be planned in consultation with the family and may include a 'Mini-Skin Day' which involves treatment of multiple closely related households. If the family agrees, help to facilitate a clean-up of the house, and consider the use of an insecticide bomb for each bedroom. The aim should be to create a 'scabies-free zone' in the home, breaking the cycle of recurrent scabies.

Also see Section 4.3 Treatment of house for crusted scabies cases.

3.2.2 Crusted scabies

Management of crusted scabies is discussed in Section 4.

3.2.3 Impetigo/skin sores

First line treatment:

A single dose of IM benzathine benzylpenicillin (BPG):

- adult: 1.2 million units (2.3ml)

- child less than 10kg: 0.45 million units (0.9ml)
- child 10kg to less than 20kg: 0.6 million units (1.2ml)
- child 20kg or more: 1.2 million units (2.3ml).

OR

Trimethoprim + sulfamethoxazole 160+800 mg (adults and children 1 month or older):

- 4+20 mg/kg up to 160+800 mg) orally, twice daily for 3 days[37] (see Appendix D for weight band dosing table)

  OR

- 8+40mg/kg/dose (up to 320+1600mg) orally, once daily for 5 days.

Note:

- Topical 2% mupirocin ointment can be applied directly to the sores for **two or less sores**, twice a day for 2 days.
- Alternative oral option for patients with sulfonamide antibiotic allergy: cefalexin 1 g (child: 25 mg/kg up to 1 g) orally, 12-hourly for 7 days. Stop therapy earlier if lesions have resolved.
- Oral penicillin g is not recommended for the treatment of impetigo.
- If there is concurrent scabies infection, permethrin 5% cream can be applied at the time antibiotic treatment is given, including to the skin sores. However, if extensive, open or weeping, application of permethrin 5% may be delayed until lesions dry and starting to heal.
- Children with skin sores should be excluded from childcare or school until appropriate antibiotic treatment has been taken for at least 24 hours.
- Any sores on exposed skin should be covered with a watertight dressing. Dispose of dressings such that they cannot be accessed by children.
- Do not touch sores directly. Wash hands before and after changing dressings, or if there is inadvertent contact with the sore.

3.2.4 Tinea

- Tinea of the body:
  - Collect skin scrapings from the scaly edge of the area of tinea for fungal culture. Collect skin scrapings by running a surgical blade held perpendicular to the skin across the affected area using light pressure. Skin flakes should be collected in a sterile container (yellow topped urine jar is suitable) and stored in the refrigerator. Be careful not to break the skin.
  - **Oral treatment (for widespread rash):**
    - oral terbinafine as per dosing below, daily for 2 weeks. See below regarding terbinafine precautions and dosing
  - **Topical treatment (for small patches of ringworm only, not for more widespread tinea as commonly seen)**:
    - Miconazole 2% cream twice a day for 4-6 weeks (including for 2 weeks after the rash has resolved) OR
    - Terbinafine 1% cream twice a day for 2 weeks or until resolved completely.
  - Alternative topical and oral options are outlined in the Therapeutic Guidelines[33].
- Tinea of the scalp (tinea capitis):

- collect skin scrapings and pull some broken hairs for fungal culture.
- For empiric therapy while waiting for culture results, or for tinea capitis caused by Trichophyton species or mixed infection**:**
  - Oral terbinafine as per dosing below, daily for 4 weeks (or until clinically resolved, i.e. no scale, no inflammation, evidence of hair regrowth). See below regarding terbinafine precautions and dosing.
- If Microsporum species identified:
  - Oral griseofulvin 20mg/kg (up to 500mg), daily for 6 to 8 weeks (or until clinically resolved, i.e. no scale, no inflammation, evidence of hair regrowth) – see Appendix D for dosing table.
- Alternative oral treatment options are outlined in the Therapeutic Guidelines[33].
- Ketoconazole and selenium sulphide shampoos reduce spore shedding. They are ineffective when used alone, but can be used as an adjunct to therapy.

- Tinea of the nails (onychomycosis):
  - Collect clippings and collect material from under nail for fungal culture.
  - If the person is high risk (e.g. recurrent cellulitis, diabetes) or there is concern about appearance, give terbinafine oral daily for 6 weeks for fingernails or 12 weeks for toenails. See below regarding terbinafine precautions and dosing.
- Precautions with oral terbinafine:
  - ALL oral anti-fungal agents have potential drug interactions and a thorough drug interaction screen should be performed prior to their prescription.
  - Rare but serious side effects may develop, usually after 4 weeks of treatment, including liver toxicity, blood abnormalities such as severe neutropenia and skin rash.
  - Check liver function tests & full blood count before treatment and at 2 and 4 weeks; discuss results with a medical officer if these are abnormal. Therapy and monitoring can continue if there is only mild liver function abnormality, but therapy must be stopped immediately if neutropenia develops.
  - In patients with renal insufficiency, the dose of terbinafine may need adjusting down and specialist advice should be sought.
  - Wait until after pregnancy and breastfeeding before treating.
- Terbinafine dosing (also provided as a weight-based table in Appendix D):
  - 10-20kg, age 1-6 years, 62.5mg daily (¼ tablet)
  - 21-40kg, age 7-12 years, 125mg daily (½ tablet)
  - >40kg, age >12 years, 250mg daily (1 tablet)
- **Note:** splitting tablets worsens the bitter taste of terbinafine for children. This may be masked with chocolate flavourings e.g. Nutella or chocolate syrup[1].
- Check household or community pets for features of dermatophyte infection and seek treatment as needed.
- Clinical assessment of household contacts is recommended as they may also have tinea which leads to reinfection.

3.3 Follow-up

It is important to ensure that treatment of scabies, skin sores and tinea has led to cure. A clinic recall 4 weeks after treatment for scabies treatment is recommended. If there is treatment failure or reinfection, treatment of the case and household should be repeated. See above regarding management of recurrent scabies.

Section 4: Diagnosis and management of crusted scabies

4.1 Medical assessment and diagnosis

Crusted scabies is characterised by thickened, scaly, hyperkeratotic patches which are often not itchy. Confusingly, skin sores often have a crust; this is not crusted scabies. Common sites for crusted scabies include the buttocks, hands, feet, elbows and armpits. Wear gloves while examining patients with possible crusted scabies. Consultation with an infectious diseases physician or dermatologist (within 24 hours, either in person or by photo/video) is required to confirm the diagnosis of crusted scabies in the NT.

4.1.1 Diagnosis

Diagnosis is made up of two components:

1. **Clinical diagnosis**: All suspected crusted scabies should be reviewed by an infectious diseases or dermatology consultant. For patients from remote communities, this may be done via photo or teleconference.

And

2. **Laboratory diagnosis:** Obtain skin scrapings (see Section 4.1.3 below for collection advice) and add the location from where scrapings were taken on pathology forms. Label pathology form as 'suspected crusted scabies' so that microscopy is prioritised. If high clinical suspicion and scrapings negative, repeat scrapings may be required by a clinician experienced with collecting scrapings. If scrapings not possible, skin flakes can sometimes be collected from bedsheets or other areas exposed to the patient.

Early notification to the NT CDC, even before confirmation, is vital to ensure adequate response prior to discharge of the patient.

Further guidance, including a detailed pathway for diagnosis and investigation, can be found in the Simple, Complicated and Crusted Scabies NT Health Guideline.

Managing Crusted Scabies in Remote Aboriginal Communities[38] provides pictorial information.

4.1.2 Crusted scabies grading scale

Crusted scabies is divided into 3 grades, taking into account distribution, severity of crusting, past episodes, and overall skin condition[23]. Grading should be determined prior to choosing a treatment regimen.

Category	Description	Score
A. Distribution and extent of crusting	Wrists, web spaces, feet only AND <10% total body surface area (TBSA)	1
	As above + forearms, lower legs, buttocks, trunk OR 10-30% TBSA	2
	As above + scalp OR >30% TBSA	3
B. Crusting/shedding	Mild crusting (<5mm deep); minimal skin shedding	1
	Moderate crusting (5-10mm); moderate skin shedding	2

Category	Description			Score
	Severe crusting (>10mm); profuse skin shedding			3
C. **Past episodes of crusted scabies**	Never had it before			1
	1-3 prior hospitalisations for crusted scabies OR depigmentation of elbows and/or knees			2
	≥4 prior hospitalisations for crusted scabies OR depigmentation as above PLUS depigmentation of legs/back or residual skin thickening/ichthyosis			3
D. **Skin condition**	No cracking or pyoderma			1
	Any of: multiple pustules, weeping sores, superficial skin cracking			2
	Deep skin cracking with bleeding, widespread pus			3
Scoring	**Grade 1 = 4-6**	**Grade 2 = 7-9**	**Grade 3 = 10-12**	**Total**

4.1.3 Investigations

For each episode:

- skin scrapings (for scabies microscopy and fungal culture)
- full blood count, c-reactive protein, liver function tests, urea/electrolytes/creatinine
- bacterial swab of any infected lesions
- blood cultures prior to antibiotics
- pregnancy test for females prior to ivermectin
- nail clippings for fungal culture (if applicable).

Collect skin scrapings by running a surgical blade held perpendicular to the skin across the affected area using light pressure. Skin flakes should be collected in a sterile container (yellow topped urine jar is suitable) and stored in the refrigerator. Be careful not to break the skin. The Managing Crusted Scabies in Remote Communities video (by One Disease) demonstrates how to collect skin scrapings for crusted scabies.

Once crusted scabies is confirmed, add:

- HIV, HTLV-1 serology
- HbA1C
- ANA, C3, C4
- CH50 (children only)
- Immunoglobulins/IgE
- T-cell subsets
- Vitamin B12, folate, iron studies, thyroid function tests.

Assess clinically for underlying conditions such as systemic lupus erythematosus, lymphoma, Hansen's disease or underlying nutritional deficiencies and perform further tests accordingly. Any abnormalities in these tests may require further discussion with the Infectious Diseases or alternative specialist team.

Consider the Jones criteria for ARF and whether RHD is a potential concern for all patients with suspected superimposed bacterial infection. If indicated, an electrocardiogram (ECG) and a transthoracic echocardiogram should be performed to investigate for ARF/RHD (see and download the ARF Diagnostic

Calculator). ECG abnormalities may include a prolonged PR interval, transient first-degree heart block or other conduction abnormalities.

4.2 Treatment of crusted scabies cases and their contacts

4.2.1 Treatment of cases

Patients with crusted scabies are typically admitted and treated in hospital. If the initial presentation is in an outpatient clinic setting, the patient should be discussed with a medical officer who can assist with the preferred management pathway. An Infectious Diseases team should be involved in the management of all inpatients with crusted scabies, either in person or remotely. Admission to a hospital with an inpatient infectious diseases service is preferable, particularly for Grade 2 or 3, or for recurrent disease. On some occasions, Grade 1 crusted scabies may be managed in remote communities, provided there is ongoing specialist involvement remotely, and where the community healthcare staff are experienced and trained in crusted scabies management and can supervise and document all therapy.

Treatment involves a combination of oral ivermectin and topical treatments, as well as thorough decontamination of the hospital and home environments. Further management detail can be found in the Simple, Complicated and Crusted Scabies NT Health Guideline.

Oral medication:

- Ivermectin (adult and child ≥ 5 years and ≥ 15kg) 200 micrograms/kg orally with fatty food. Round up to the nearest 3mg.

  Grade 1: 3 doses: Days 0, 1, 7

  Grade 2: 5 doses: Days 0, 1, 7, 8, 14

  Grade 3: 7 doses: Days 0, 1, 7, 8, 14, 21, 28

  Boosted Grade 3[#]: 10 doses: Days 0, 1, 2, 3, 4, 7, 8, 14, 21, 28.

Note: Ivermectin should not be given to pregnant women or children who weigh less than 15kg. Seek expert advice. [#]Consider the 10-dose Boosted Grade 3 regimen for those patients presenting with more than one episode in 12 months or more than three total episodes.

Topical agents (all grades):

- Scabicidal agent:
  - Benzyl benzoate 25% lotion with added tea tree oil 5%. Apply to the whole body second daily after bathing for the 1st week, then 2-3 times weekly until cured.
  - Apply from head-to-toe, ensuring the whole body is covered but avoiding the eyes and mouth. Make sure that the lotion covers between the fingers and toes, soles of feet, under nails, behind ears, the groin, bottom and genitalia. Wear gloves while applying the lotion to others. Do not apply on same day as Calmurid.
  - Use permethrin 5% cream if benzyl benzoate is not available.
- Keratolytic agent:
  - DermaDrate® or Calmurid® cream (both of which contain urea and lactic acid). This softens skin crusts and facilitates shedding, thereby allowing better penetration of scabies lotion or cream.
  - Apply after bathing on the days not applying the topical scabicide
  - DermaDrate® or Calmurid® only needs to be applied to crusted or thickened skin areas

- Note: the nail beds can serve as a reservoir for mites. Trim nails adequately, and if concerned about concurrent tinea infection of nails, send clippings for fungal culture and consider treatment (see **Section 3.2.4** Tinea).

4.2.2 Treatment of contacts of crusted scabies cases

- Notify the NT CDC for early initiation of contact tracing and management of contacts in conjunction with primary health teams. The CDC will help to coordinate a public health response, including:
  - Provision of scabies education and fact sheets for all household contacts
  - Advice on completing skin checks on household contacts
  - Advice on provision of treatment to all contacts, and full scabies treatment for those with scabies
  - Provision of education regarding household cleaning and management of clothing/linen
- Even if no evidence of scabies is found, treat all household members and close contacts with a single dose of permethrin 5% cream, ivermectin or alternative agent (see Section 3.2.1 Scabies and **Appendix B** – visual fact sheet for contacts)
- All contacts who themselves have clinical scabies should complete a full treatment course as described in Section 3.2.1 Scabies
- Household contacts should be treated either the day of or the day prior to the house being treated.

4.3 Treatment of house for crusted scabies cases

Scabies mites can only survive off the human host for around 3 days, but potentially for up to 8 days if attached to shed skin in dark, moist environments[35].The homes of patients with crusted scabies should therefore be treated once the patient begins treatment or is admitted to hospital. With support, the patient's family can take responsibility for household treatment. Clinic staff will need to liaise with the family to explain what needs to be done to help ensure that their home is free of scabies mites.

Machine wash any clothes, bedding and towels used by the patient during the preceding 3 days on a hot water cycle (50-60°C). If a hot machine wash is not available, items should be washed then dried in the sun. Items that cannot be washed can be decontaminated by removing from any contact for ideally 8 days[35].

The house should be thoroughly vacuumed or swept then mopped to remove dust and skin particles which could harbor mites. The vacuum bag or sweepings should be disposed of in an outside rubbish bin. Mattresses and soft furnishings such as lounges should also be vacuumed or swept. If possible they should also be left in full sun for at least several hours to help kill any remaining mites. Pyrethroid-based insecticide sprays (available at community stores) can be used to decontaminate mattresses and soft furnishings. A small amount of spray should be evenly applied across the surface of the item. The directions on the label should be followed.

Fumigation of the house is not necessary if the house is thoroughly cleaned and clothes and bedding are washed in hot water. However, in severe cases and where the family wishes, insecticide bombs containing pyrethroids can be used to help kill any scabies mites remaining in the house. Insecticide bombs can be purchased by the family at the community store. In order for the insecticide bomb to be effective all the windows in the house must be closed. Where windows or louvres are missing, cardboard or plastic sheeting can be used to seal the house. The following safety precautions need to be followed:

- read the label and follow directions carefully
- remove all children, pets, and toys from the house prior to treatment

- cover or remove food and utensils from the house prior to treatment
- leave the house immediately once the insecticide bombs have been released. stay out of the house until the time indicated on the label has passed, usually 2 to 4 hours
- upon returning open all windows and doors to air out the house
- keep any unused product away from children, for example, in a locked cupboard or shed.

4.4 Follow-up

Regular follow-up of individuals with crusted scabies is recommended to ensure a durable response to treatment[39]. A suggested plan is outlined on page 20 of Managing Crusted Scabies in Remote Aboriginal Communities[38], prepared by One Disease. This includes regular skin examinations (fortnightly or monthly) and regular application of Calmurid and moisturiser. If there have been multiple previous episodes of crusted scabies, consider initial fortnightly prophylactic benzyl benzoate, with subsequent review to determine longer intervals between prophylactic benzyl benzoate. If recurrences occur, consider possible causes such as inadequate treatment of contacts or lotion/cream not applied adequately. Consider repeating household treatment.

Section 5: Active surveillance and whole-of-community treatment

Since the 1990s, some NT communities have implemented Healthy Skin Programs which involve community education, active surveillance for scabies and skin sores, and whole-of-community treatment for scabies[1, 40-44]. Local and international data suggest that this approach can lead to a significant decrease in the prevalence of scabies and skin sores[45]. However, maintenance where there is a lower level of prevalence is challenging. The degree of movement between communities is high, making reintroduction of scabies a major factor in scabies recrudescence and therefore regional coordination is recommended. A committed approach with regular surveillance and repeat treatment of households or whole community if required is important. The ability to carry out surveillance and whole-of-community treatment will depend on clinic resources and other support. Some communities may choose to undertake this only if scabies reaches particularly high prevalence, in order to reduce scabies to a more manageable level.

A Healthy Skin Program can be divided into the following 5 phases:

- planning
- community involvement and education
- baseline screening and whole-of-community treatment
- maintenance
- evaluation.

5.1 Planning

People to involve in the initial planning will vary from community to community but may include health staff, council workers, women's centre staff, school teachers and visiting health staff such as environmental health officers and health promotion officers.

See Appendix E for a list of educational resources.

5.1.1 Initial community screening and treatment

A realistic timeframe for initial community screening and treatment is required. This may need up to 3 months of planning to allow for community awareness and education activities to take place. Small communities may only require one day to screen and treat everyone, but larger communities may need to

allow up to a week of screening and treatment. Other community events should be taken into consideration when deciding on the dates.

5.1.2 Resources required

- community population list
- extra supplies of scabies and skin sore treatments
- extra health staff and community members (if required) for baseline screening and treatment.

5.1.3 Education requirements of health staff

Plan an education session for health staff to ensure everyone understands the issues and will be delivering the same health message to the community. A discussion on the diagnosis of scabies, crusted scabies and skin sores and appropriate treatment should be included.

5.1.4 Ongoing program

Ways of ensuring the sustainability of the program should be discussed. This should include community education on how the lowered scabies rates will be maintained rather than just focusing on the initial screening and treatment.

5.2 Community involvement and education

This phase may take up to 2 months depending on the size of the community, other community events and available resources.

5.2.1 Community participation

Talk with different community organisations to identify community members who will support the program and take the message to the community. They will include community leaders, elders, council members, education staff, health boards, arts centre staff, women's centre members, outstation resource centres and others specific to your community. These people should be involved in planning, the community treatment day and the ongoing maintenance program.

5.2.2 Community education

Plan to provide school and community education sessions and decide on the messages you want to convey to the community. Schools may run a competition for children to develop posters about scabies and skin sores. Local organisations often donate prizes, and the posters can be used for community education. Communities can develop their own video story and show this locally.

Key messages for community education include:

- the relationship between scabies, skin sores and kidney and heart disease
- the success of the program in other communities
- the importance of treating everyone, whether they have scabies or not
- how to apply scabies creams and lotions
- an ongoing program to keep scabies rates low
- the importance of washing children to reduce skin infection
- health hardware to enable washing of children.

5.3 Baseline screening and community treatment

5.3.1 Reasons for screening

- to establish the baseline scabies and skin sore prevalence in the community
- to identify individuals with infected sores requiring treatment
- to identify individuals with scabies requiring further application(s) of cream/lotion to complete a full treatment course.

5.3.2 Who to screen

Children 0-3 years of age are an appropriate group for selective screening. These children have the highest rates of scabies and skin sores and are an easy group to access[29]. Smaller communities may decide to include children up to 5 years of age or even children up to age 15; this could be as part of a school age health screening program.

It is not essential to screen adults; however, all adults should be encouraged to be treated for scabies.

5.3.3 How and where to screen

A designated screening centre will need to be organised and well-advertised prior to the treatment day. An appropriate centre may be the school, health clinic or women's centre.

In larger communities, health workers may decide to divide into teams to conduct mobile screening while another team works at a screening centre. Refer people with other skin problems (for example, tinea) to the clinic for treatment.

See Appendix F for a checklist of equipment required for screening and treatment.

5.3.4 Documentation

Accurate documentation is important as this will assist in follow up of cases and contacts. Clinic staff should decide on the most appropriate record-keeping method for the community (for example, Primary Care Information System, Communicare) taking into account the need for follow up of scabies, crusted scabies and household reinfections.

Infected sores should also be documented; these will be moist and have pus or a yellow/brown crust. Do not record non-infected cuts, scratches or insect bites.

See Appendix G and Appendix H for a spreadsheet example for baseline screening and flow chart.

5.3.5 Whole-of-community treatment

Scabies whole-of-community treatment (Mass Drug Administration [MDA]) should be discussed and where appropriate offered at the time of screening, with treatments as outlined in Section 3 above. Where the prevalence of scabies is assessed as 10% or higher consider an ivermectin-based MDA program[21,46]. Successful whole-of-community treatments have included using only topical permethrin for all[42-43,47] or oral ivermectin for older children and adults and topical permethrin for younger children and women who may be pregnant[45,48]. Health staff should demonstrate the correct way to apply the cream. When present, skin sores will also need to be treated.

5.4 Maintenance program

An ongoing maintenance program is essential to ensure community scabies prevalence rates are maintained at the lowered level. A return to previous high prevalence rates has been seen in communities where a maintenance program has not been implemented. A maintenance program involves:

- promotion of washing and maintenance of health hardware
- promotion of early presentation of scabies cases
- ensuring treatment of new cases and household contacts
- regular surveillance of young children to monitor prevalence.

See Appendix I and Appendix J for spread sheet example for follow-up screening and treatment, and flowchart.

5.4.1 Follow-up and surveillance screening

All cases of scabies identified during the initial screening should receive a full treatment course and be followed up as described in Section 3.2 and 3.3. Management of crusted scabies is discussed in Section 4.

Community surveillance should be regular if possible and focused on identifying treatment failure or reinfection. Surveillance following the community treatment day should be done approximately 6 weeks later, and subsequently 2-4 times per year if resources allow. An appropriate population for surveillance includes children 0-3 years of age. Smaller communities may have capacity to include older children. It is important to document which children have had scabies, skin sores and treatment such that households with frequent recurrences are identified. For management of recurrent scabies, see Section 3.2.1 and Managing Households with Recurrent Scabies[36].

5.5 Evaluation

After each survey:

- use graphs and pictures to present scabies rates to community decision-makers such as councils, women's centres, community elders and teachers
- write a short report on how the program is going and discuss it with the relevant health service managers and program staff, environmental health officers and relevant stakeholders.

Definitions

Term	Definition
APSGN	Acute Post-Streptococcal Glomerulonephritis
ARF	Acute Rheumatic Fever
CARPA	Central Australian Rural practitioners Association
CDC	Centre for Disease Control
CKD	Chronic Kidney Disease
Complicated scabies	Scabies infestation complicated by secondary bacterial infection and/or immunological sequelae of infection such as acute post-streptococcal glomerulonephritis (APSGN) or acute rheumatic fever (ARF) leading to rheumatic heart disease (RHD).

Term	Definition
Crusted scabies (previously known as Norwegian Scabies)	A hyperinfestation with scabies mites, usually occurring in the setting of immunological deficiency, resulting in hyperkeratotic scaling and/or crusting with extreme mite burden.
ECG	Electrocardiogram
GAS	Group A Streptococcus
Guideline	Establishes the key principles and provisions that govern the decision –making process. Guidelines include advisory and explanatory statements offering detail, context or recommendations for good practice and decision making which support policies and procedures. **In a clinical context these are usually mandatory. Any deviation from the guideline must be approved and documented.** (NT Health Policy Development Procedure)
HTLV–1	Human T-cell lymphotropic virus 1
Impetigo	A skin infection caused by one or both of the following bacteria: Group A streptococcus and Staphylococcus aureus.
MDA	Mass Drug Administration
NT	Northern Territory
Policy suite	A collection of documents on a specific subject matter that is corporate or clinical in nature, in order of hierarchy as per the document pyramid in the Policy Governance Framework Model. A policy suite would usually consist of a parent policy and be supported by a procedure and/or guideline (NT Health Policy Development Procedure).
RHD	Rheumatic Heart Disease
Simple scabies	Scabies infestation without superimposed bacterial infection or crusting.
Tinea	Infection of the skin with a dermatophyte (ringworm) fungus.

Appendices

Appendix A: Scabies

What is scabies

Scabies is a skin condition which is caused by an infestation of a parasitic mite (Sarcoptes scabiei) which burrows underneath and lives in the skin. The itch results from the inflammatory response to mite excreta and other components. Itching and scratching can cause skin sores, which may become infected with bacteria and lead to kidney and heart problems.

Scabies is endemic in many Indigenous communities in northern Australia. The burden of disease has been reported to affect as much as 25% of community members in some areas, with an even higher prevalence in young children (as high as 35%).

Symptoms

The first time someone is infected with scabies, it may take up to 6 weeks for the onset of itch to occur after mite infestation. If someone has been infected previously, the onset of itch may occur after only a few days.

Look for scratches, small bumps, a red lumpy rash or skin sores. Burrows (often slightly raised, linear lesions approximately 1cm long which can radiate out from bumps) can sometimes be seen.

In **adults** the rash commonly appears around any of the following areas:

- between the fingers and toes (particularly the web-spaces of fingers)
- wrists, elbows
- armpits
- knees, ankles.

Babies and young children frequently have a more generalised rash across their body and lesions may occur from head to toe, consider a more thorough examination and be sure to also check:

- buttocks
- genitals, groin
- palms of hands, soles of feet (blisters and early pustules often develop here).

Elderly adults may present with an uncharacteristic rash in non-exposed sites, consider a more thorough examination and be sure to check:

- back
- abdomen.

The rash is very itchy – often more so at night – and scratching the affected area may cause secondary bacterial infections. However, note that the rash associated with crusted scabies is often not itchy (see further information below).

Complications

Scratching of the affected area often causes secondary infection with Streptococcus and Staphylococcus bacteria.

Streptococcal infections can be associated with:

- inflammation of the kidneys (post-streptococcal glomerulonephritis) which increases the risk of kidney failure later in life,
- inflammation of the heart (following on from acute rheumatic fever) which can lead to rheumatic heart disease and heart failure,
- bacterial septicaemia, which can lead to potentially life-threatening complications from an overwhelming response from the immune system.

Early treatment for streptococcal infections is therefore important.

How it is spread

The scabies mite is spread from person to person after direct physical contact from an infected person. To transmit scabies, direct skin-to-skin contact must be prolonged – a quick handshake or hug will not spread it.

Scabies infection may also be spread from direct contact with clothes and bed linen from an infected person, if used immediately beforehand. The scabies mite can survive away from the human body for up to 2-3 days.

Importantly, people affected by crusted scabies can act as 'core transmitters' of scabies within a community and act as mite reservoirs, with an infestation of thousands or millions of mites.

Scabies will continue to be spread until all mites and eggs are destroyed, which is why it is so important to complete two treatment doses for both cream and tablets (7-14 days apart).

A similar condition occurs in dogs, however the mite that causes dog scabies is different from that which causes human scabies.

Who is most at risk

Scabies occurs across the world, however it is a disease of poverty and is formally recognised as a Neglected Tropical Disease with the World Health Organisation.

It predominantly affects people living in crowded conditions with poor hygiene and malnutrition.

Treatment

For the individual

Can use either oral (ivermectin tablets) or topical (5% permethrin cream) for first-line treatment.

Tablets available for the treatment of scabies include:

- For **children 5 years and over** and more than 15kgs, and **adults**: take 1 oral dose of ivermectin (Stromectol ®) tablet with food, then repeat with another dose 7 – 14 days later. Oral dose depends on weight.
    - DO NOT give ivermectin to children under 5 years, or less than 15 kgs, and do not give to women who are or could be pregnant (should do a urine pregnancy test to confirm) or who are breastfeeding.

Creams available for the treatment of scabies include:

- For babies less than 6 months old: apply 5% Permethrin (Lyclear®) to entire body except hands, leave on for 6-8 hours (ideally overnight underneath bed clothes) then wash off and repeat treatment 1 week later.
- For children older than 6 months old and adults: apply 5% Permethrin (Lyclear®) to entire body, leave on for at least 8 hours (ideally overnight underneath bed clothes) then wash off and repeat treatment 1 week later.

It is essential that the topical 5% permethrin cream is properly applied:

- Ideally, the cream should be applied at night before bed to clean and dry skin, underneath bed clothes.
- Apply to the whole body including the scalp, face and behind the ears (but avoid the eyes, lips and mouth).
- For thick hair, or a bad infestation affecting the scalp; it may be necessary to consider shaving the scalp with permission.

Cream should be reapplied to hands after washing, with special consideration to ensure good coverage of joint and body creases, as well as between the fingers and toes, and underneath the soles of the feet.

After overnight treatment, the cream should be washed off and clean clothing should be applied after treatment. Treatment should be repeated again in 7 days. Patients should be reminded that itching may continue for up to 6 weeks after treatment, which does not mean that the treatment has not worked.

For others in the house

For the treatment to be successful, all household contacts, close family members and any close contacts should all be treated at the same time as the infected person. Contacts may be incubating scabies at the time of treatment and may not show any symptoms.

For the household

In most cases of scabies, it is rare for mites to remain on soft furnishings, clothing or in the household as scabies mites can only live on human hosts. However, it may be helpful to wash recently used clothing, bedding or towels in a hot wash cycle (at least 50°C).

If a hot water washing machine is not available, these items can be sealed in a plastic bag for 8 days, as this will kill any mites and eggs living in them. This process should be repeated each time the scabies treatment (with either topical cream or oral tablet) is undertaken.

Household cleaning is not required to break cycles of scabies transmission (household contact treatment with scabies treatment does this) however, it may be helpful to vacuum floors and soft furnishings, particularly in cases of suspected or confirmed crusted scabies.

Prevention

Early diagnosis and prompt treatment helps to prevent the spread of scabies.

Healthy Skin Programs are conducted in some communities, for further information about this contact your nearest health centre.

Crusted (Norwegian) scabies

While most people with simple scabies are infected with about 10 to 15 mites, in crusted scabies, there is infestation with thousands of mites. Sometimes this happens because a person's immune system is not working well due to other illness.

However, in many cases in the NT there are no clear underlying immune problems. Crusted scabies does not look like scabies. Look for thickened, scaly skin patches and crusting of the skin, which may occur in 1 of 2 areas or may cover the whole body with a thick and flaky crust. Scale may have a distinctive creamy colour and may look like other skin conditions. The rash may not be itchy, and often appears on the buttocks, feet, hands, elbows and arms.

Mild cases of crusted scabies may be treated in the community with creams and oral ivermectin. Moderate and severe cases will require admission to hospital, with support from the infectious diseases specialist consultant and Centre for Disease Control (CDC) team.

Other resources

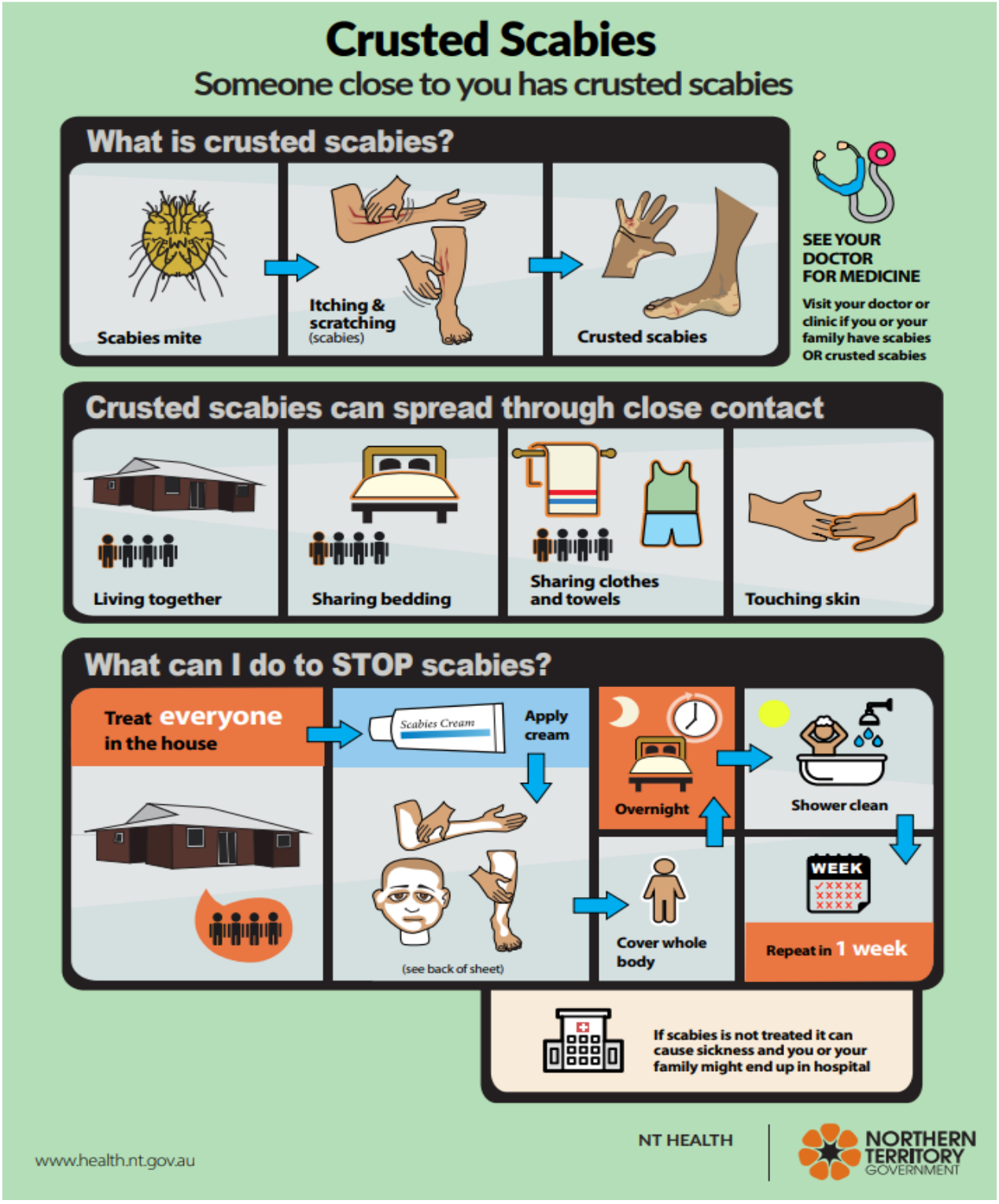
For more information about management of recurrent or crusted scabies go to the PHU - Disease Control publications and resources for scabies, the One Disease website or read 'Managing crusted scabies in remote Aboriginal communities: 2017 edition' on the Australian Indigenous HealthInfoNet website.

Contact

For more information contact the Centre for Disease Control.

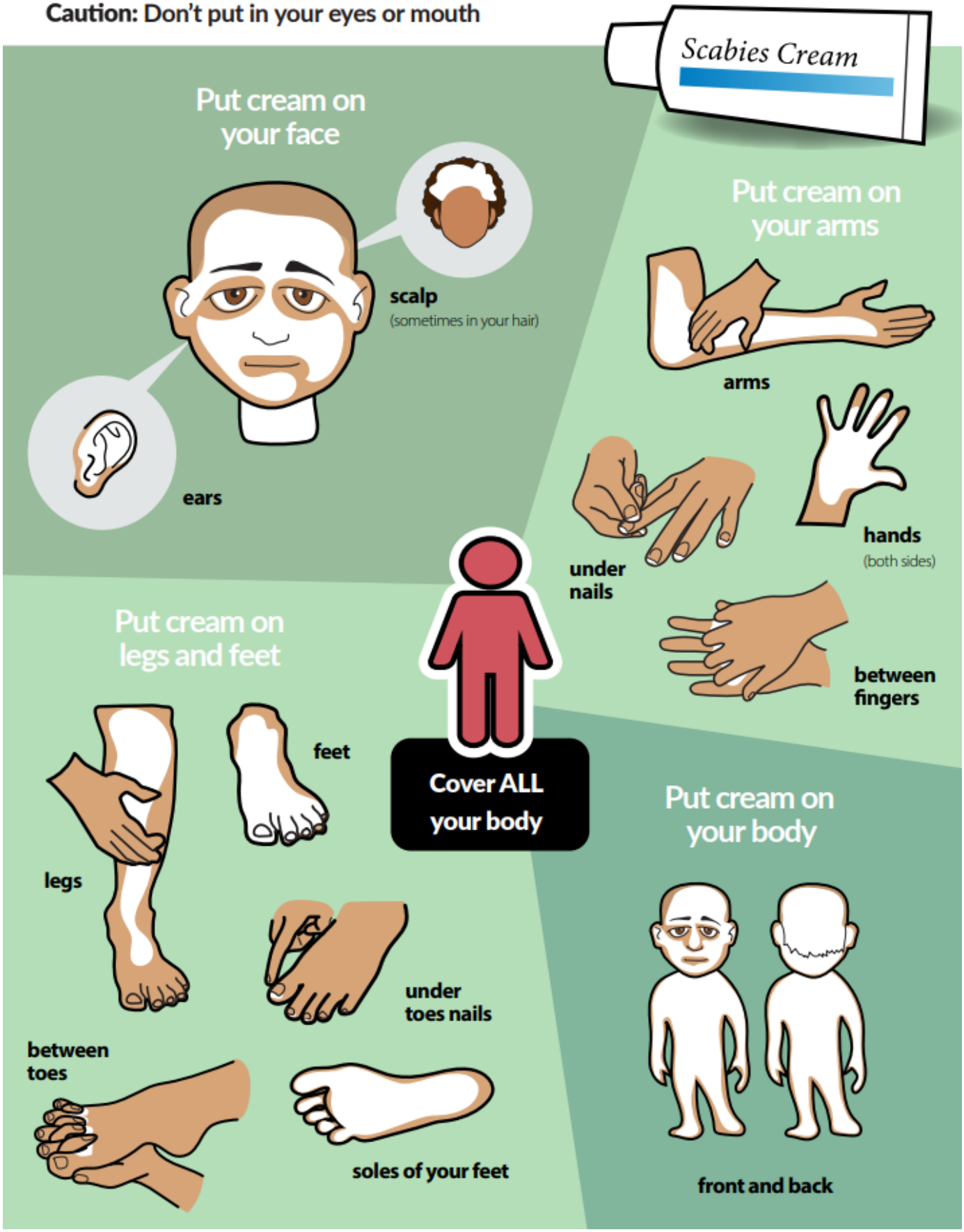
Location	Phone
Darwin (Top End Region)	(08) 8922 8044 1800 008 002
Katherine (Big Rivers Region)	(08) 8973 9049
Tennant Creek (Central Australia Region)	(08) 8962 4259
Alice Springs (Central Australia Region)	(08) 8951 7540
Nhulunbuy (East Arnhem Region)	(08) 8987 0357

Appendix B: Visual fact sheet for contacts



How to use the scabies cream

Caution: Don't put in your eyes or mouth



Appendix C: Group A streptococcus

What is Group A streptococcus?

Group A streptococcus (GAS) is a bacterium that often lives in people's throats or on their skin. Most of the time this germ does not make people sick.

Illnesses most commonly caused by GAS are sore throats ('strep throat') or skin infections (sometimes referred to as 'school sores').

Some people who have GAS infections go on to develop complications such as acute rheumatic fever and post-streptococcal glomerulonephritis (heart and kidney diseases) but these are uncommon.

Occasionally, it does cause other severe and even life-threatening sickness referred to as invasive GAS or iGAS (see below).

How is it spread?

GAS spreads among infected people via skin contact and actions such as sneezing and kissing.

Invasive GAS disease

Severe, sometimes life-threatening, disease can occur when GAS invades parts of the body such as blood, muscles or lungs. These infections are called invasive GAS disease (iGAS). Two of the most severe forms are necrotising fasciitis and streptococcal toxic shock syndrome.

Necrotising fasciitis destroys muscles, fat and skin tissue.

Streptococcal toxic shock syndrome causes a rapid drop in blood pressure which causes organ failure (e.g. failure of the kidneys, liver, lungs).

For what to do when someone close to you has an iGAS infection look at the invasive group A streptococcus infection poster.

Why invasive GAS disease happens

When GAS bacteria gain 'entrance' and overwhelm the body's defences, iGAS diseases can occur. This may happen when the person's skin defence is broken with a sore or cut and the bacteria invade.

People with chronic illnesses or illnesses that affect the immune system maybe more vulnerable to iGAS. Rarely, people with no known risk factors have developed iGAS disease.

Who is at risk?

Most people who come in contact with GAS will not develop invasive GAS disease. Some will have a throat or skin infection but most will have no symptoms at all.

Although healthy people can get iGAS disease those most at risk are:

- children <5 years of age, especially infants
- people aged >65 years
- Indigenous people
- people living in crowded conditions or where good hygiene is hard to maintain

- people with chronic illnesses (eg. cancer, diabetes, chronic lung, heart, liver and kidney diseases) and those with heavy alcohol consumption (consume over 20 standard drinks a week or binge drinking)
- people with skin and soft tissue infections such as cellulitis
- people who use medications such as steroids for a long time
- children with a recent (2 weeks) history of chickenpox.

Risk and advice for contacts of people with iGAS disease

The risk of secondary cases of iGAS occurring in contacts is not entirely clear but is considered low. The Centre for Disease Control (CDC) will follow up people diagnosed with iGAS disease to consider management of their recent and close contacts. In some circumstances the CDC will recommend close contacts receive antibiotics to kill the GAS.

Any contacts with signs of a sore throat or an infected wound, especially if fever occurs, should seek medical care and inform the care giver that they are a potential contact of an iGAS case.

Prevention

Good hygiene is the mainstay of preventing all forms of GAS disease.

To reduce the spread of bacteria wash your hands, especially after coughing and sneezing and before preparing, eating or serving foods.

People with 'strep throats' should stay at home for 24 hours after taking an effective antibiotic.

Treatment

Prompt antibiotic therapy is required and most people need admission to hospital for medicine and monitoring.

People with necrotising fasciitis may require surgery to remove damaged tissue.

Contact

For more information contact the Public Health Unit's Centre for Disease Control in your region.

The full list of contacts of contacts can be found at NT Health.

Location	Address	Phone	Fax	Email
Darwin	Ground Floor, Building 4 Royal Darwin Hospital Rocklands Drive Tiwi NT 0810	(08) 8922 8044 1800 008 002	(08) 8922 8310	CDCSurveillance.DARWIN@nt.gov.au
Katherine	O'Keef House Katherine Hospital Gorge Road Katherine NT 0850	(08) 8973 9049	(08) 8973 9048	CDC.Katherine@nt.gov.au
Tennant Creek	Schmidt Street Tennant Creek NT 0860	(08) 8962 4259	(08) 8962 4420	CDC.Barkly@nt.gov.au
Alice Springs	Disease Control Unit Lower Ground Floor Eurilpa House, 25 Todd Street Alice Springs NT 0870	(08) 8951 7540	(08) 8951 7900	CDC.alicesprings@nt.gov.au

Location	Address	Phone	Fax	Email
Nhulunbuy	Corner Mathew Flinders Way and Chesterfield Court Nhulunbuy NT 0880	(08) 8987 0357	(08) 8987 0500	CDCGove.DoH@nt.gov.au

Appendix D: Weight band dosing tables

Weight band dosing for oral ivermectin (~200 µg/kg)

Weight band	Dose
15-24 kg	3 mg (1 tablet)
25-35 kg	6 mg (2 tablets)
36-55 kg	9 mg (3 tablets)
56-65 kg	12 mg (4 tablets)
66-79 kg	15 mg (5 tablets)
>80 kg	18 mg (6 tablets) or 200 µg/kg (rounded up to the nearest 3 mg)

Note: oral ivermectin is not approved for children weighing less than 15 kg, or for pregnant individuals.

Source: adapted from National Healthy Skin Guideline 2nd edition

Weight band dosing for oral trimethoprim-sulfamethoxazole

(4mg/kg/dose of trimethoprim component) twice daily for 3 days:

Weight band	Syrup dose (Give morning and night) Trimethoprim-sulfamethoxazole is 40mg trimethoprim/5mL	Tablet dose
3 - <6 kg	1.5 mL (12 mg trimethoprim BD)	N/A
6 - <8 kg	3 mL (24 mg BD)	N/A
8 - <10 kg	4 mL (32 mg BD)	N/A
10- <12 kg	5 mL (40 mg BD)	N/A
12 - <16 kg	6 mL (48 mg BD)	N/A
16 - <20 kg	8 mL (64 mg BD)	N/A
20 - <25 kg	10 mL (80 mg BD)	½ tablet (80 mg trimethoprim BD)
25 - <32 kg	12.5 mL (100 mg BD)	¾ tablet (120 mg BD)
32 - <40 kg	16 mL (128 mg BD)	¾ tablet (120 mg BD)
≥40 kg	20 mL (160 mg BD)	1 tablet (160 mg BD)

Source: adapted from National Healthy Skin Guideline 2nd edition

Weight band dosing for oral terbinafine (for tinea)

Weight band	Dose
10-20 kg	62.5mg daily (¼ tablet)
21-40 kg	125mg daily (½ tablet)
>40 kg	250mg daily (1 tablet)

Note:

- If possible, wait until after pregnancy and breastfeeding before treating.
- Splitting tablets worsens the bitter taste of terbinafine for children. This may be masked with chocolate flavourings e.g. Nutella or chocolate syrup.

Source: adapted from National Healthy Skin Guideline 2nd edition

Dosing for oral griseofulvin (for tinea)

Age group	Dose
Children 1 month to 12 years	**10-20 mg/kg (to a maximum of 500mg)** once daily. If using the higher dose, reduce dose when clinical improvement occurs.
>12 years to 18 years	**500 mg daily**. Up to 1 gram daily can be used for severe infections; reduce dose once response occurs.
Adults	**500 mg daily**. Up to 1 gram daily can be used for severe infections; reduce dose once response occurs.

Note:

- Griseofulvin should be administered with a high fat meal or milk to increase absorption and reduce stomach upset.
- Oral griseofulvin can be compounded as a liquid (250mg/mL) for patients who do not tolerate tablet formulation.

Source: adapted from National Healthy Skin Guideline 2nd edition

Appendix E: Educational resource list

Title	What	Source
National Healthy Skin Guideline 2nd edition (including health promotion resource list - Chapter 13)	eBook	Telethon Kids Institute / Wesfarmers Centre of Vaccines & Infectious Diseases
Managing households with recurrent scabies (2017 edition)	eBook	One Disease
Managing crusted scabies in remote Aboriginal communities (2017 edition)	eBook	One Disease
Crusted scabies storytelling tool, hospital story and other resources	Website / videos	One Disease
CARPA Standard Treatment Manual	Book / eBook	Centre for Remote Health
Healthy Skin Story Scabies	Flipchart	Menzies School of Health Research
Recognising and Treating Skin Infections: A Visual Clinical Handbook (2018 edition)	Flipchart	Lowitja Institute / Menzies School of Health Research / Telethon Kids Institute
Keeping Skin Healthy: A Handbook for Community Care Workers in the Pilbara	eBook	Lowitja Institute / Menzies School of Health Research / Telethon Kids Institute
Scabies	Fact sheet	NT Health
Visual fact sheet for contacts of crusted scabies	Fact sheet	NT Health
Group A streptococcal infection	Fact sheet	NT Health
Public health management of crusted scabies	Guideline	NT Health
Simple, Complicated and Crusted Scabies	Guideline	NT Health
Managing Scabies and Crusted Scabies	eLearning Module	Remote Area Health Corps (requires registration for access)

Appendix F: Equipment list for community screening and treatment

General

- community population list
- screening spreadsheet
- pens/paper
- sharps container
- alcohol swabs
- needles and syringes
- gloves
- hand wash
- scales.

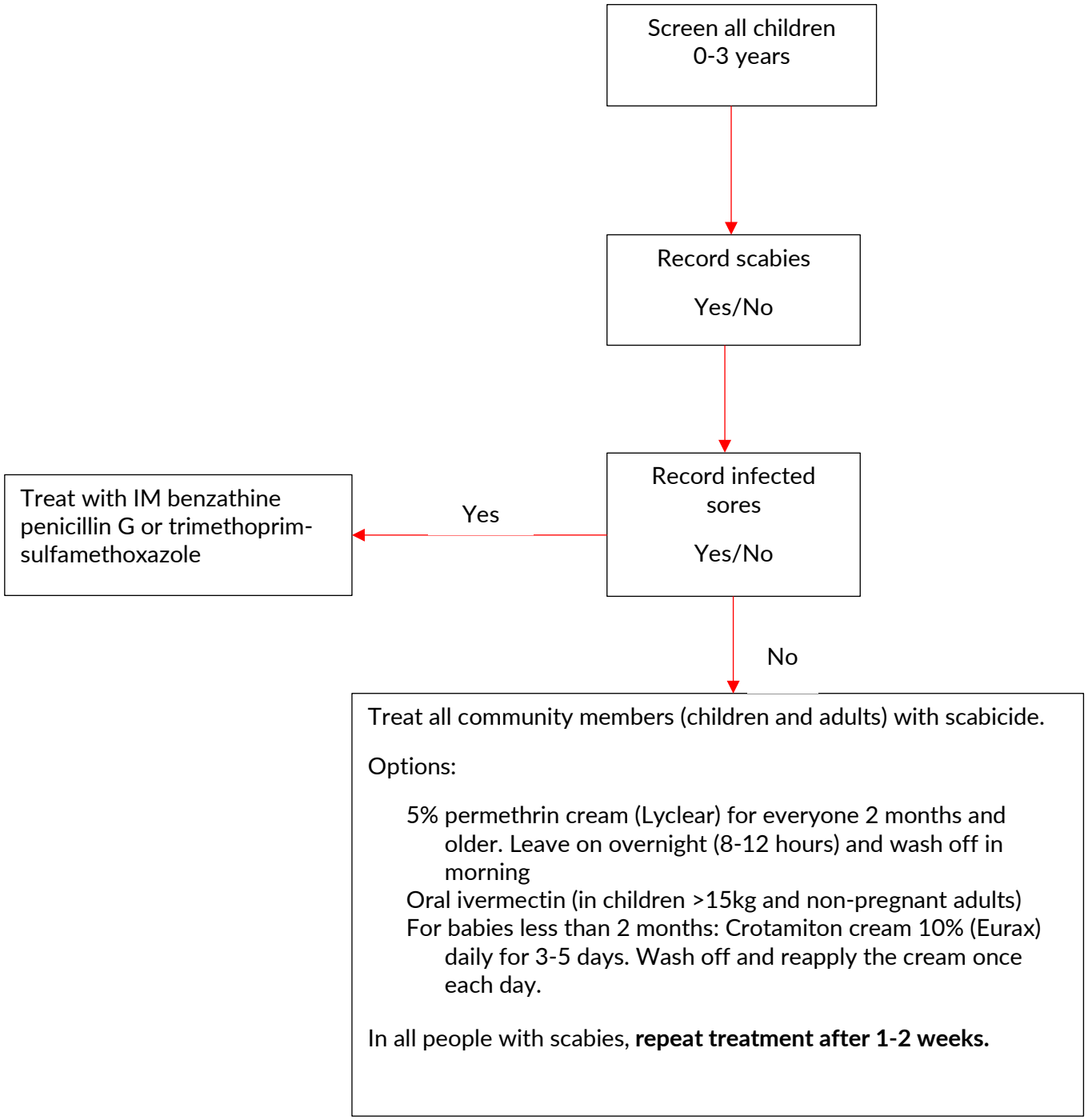
Scabies and skin sores treatment:

- permethrin cream (Lyclear)
    - ~ 1 tube for 2 adults
    - ~ 1 tube for 4 children
    - ~ 1 tube for 8 babies
- ivermectin tablets (for use in children >15 kg and non-pregnant adults)
- crotamiton cream (eurax)
- benzathine penicillin g (2.3ml) – store in esky to maintain temperature between 2–8^{o}c
- trimethoprim + sulfamethoxazole syrup / tablets.

Appendix G: Example spreadsheet for baseline screening

Name	DOB	Date checked	Scabies Yes/No	Infected skin sores Yes/No	Treatment given Yes (specify)/No	Follow up required Yes/No

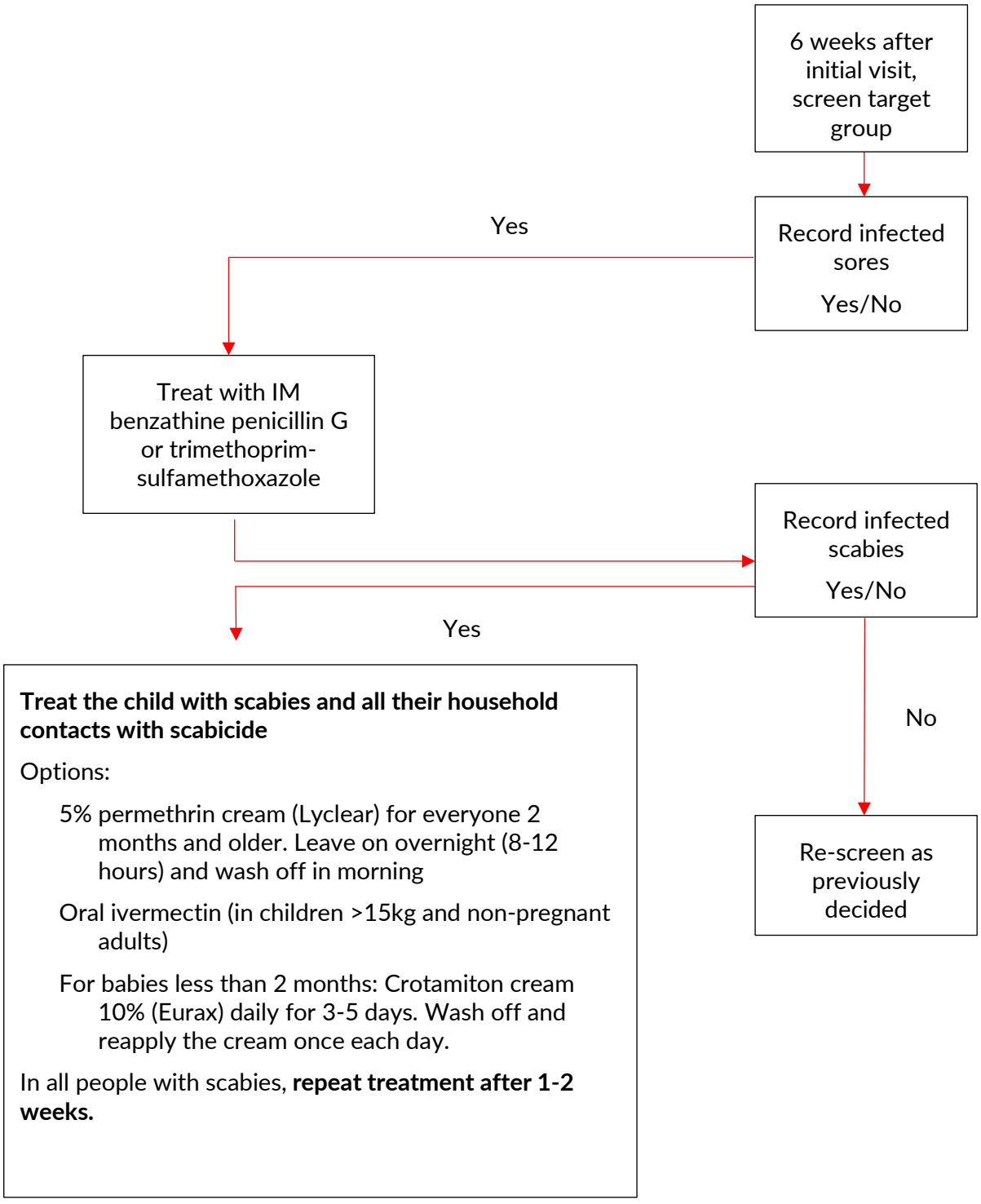
Appendix H: Baseline screening and community treatment flowchart



Appendix I: Example spreadsheet for ongoing surveillance

Name	DOB	3 month follow up date:		6 month follow up date:		9 month follow up date:		12 month follow up date:	
		Skin sores Yes/No	Scabies Yes/No	Skin sores Yes/No	Scabies Yes/No	Skin sores Yes/No	Scabies Yes/No	Skin sores Yes/No	Scabies Yes/No

Appendix J: Maintenance program flowchart



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Appendix L: Related information

- Australian Guidelines for the Prevention and Control of Infection in Healthcare
- Managing Households with Recurrent Scabies, 2017 Edition guide
- Managing Crusted Scabies in Remote Aboriginal Communities
- Managing Crusted Scabies in Remote Communities, 2017 - Video
- ARF Diagnostic Calculator
- Lowitja Institute / Menzies School of Health Research / Telethon Kids Institute

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National Safety and Quality Health Service standards

National Safety and Quality Health Service standards							
Clinical Governance	Partnering with Consumers	Preventing and Controlling Healthcare Associated Infection	Medication Safety	Comprehensive Care	Communicating for Safety	Blood Management	Recognising & Responding to Acute Deterioration
☒	☒	☐	☒	☒	☐	☐	☐