Disclaimer:
Treatment of skin diseases, common in developing countries, is often based on the use of simple management schemes which are easy to apply and cheap.

The protocols here were devised to provide examples of recognition and treatment schedules which meet these criteria. It is important to recognise that these are seldom supported by a strong evidence base as many of the treatments were devised and assessed many years ago. However we hope that they provide useful examples of treatment protocols that can be applied in different countries using medications that are commonly available. They are broadly based on the evidence presented in the Disease Control Priorities project (www.dcp2.org).

Management of Tinea Pedis

What is tinea pedis?
1. A fungal infection of the feet, most frequently affecting the spaces between toes (interdigital spaces).
2. It is transmitted by human to human contact in warm humid environments, for example through shared towels and on wet floors in swimming pools, changing rooms and gymnasia.

Which population is at risk?
1. Adults almost exclusively, with men being more often affected than women.
2. It is particularly prevalent in hot, tropical, urban environments.
3. Most likely to be seen in those who wear shoes. Heavy industrial or military footwear is particularly associated with this infection.
4. It is common in industry where workers share common shower and changing areas.

What are the clinical symptoms?
1. Interdigital
   - Most common form of tinea pedis;
   - Scaling, fissured skin in the interdigital spaces, usually the 4th and 5th space;
   - There may be some inflammation;
   - Itch is commonly present;

2. Vesicular patterns
   - Usually due to T. interdigitale;
   - Causes vesicles between the toes, on the sides and tops of the feet. These may become larger and form blisters. When the lesions burst they leave scales;
   - It is usually extremely itchy.
3. Dry scaly, hyperkeratotic patterns

- Cover the soles of the feet and extend up around the sides to produce a well demarcated line (moccasin pattern);
- Small circles of scaling are common;
- Usually due to *T. rubrum*;
- Associated nail disease is very common;

**How is diagnosis confirmed?**

1. Diagnosis is confirmed by skin scraping which is then viewed under a microscope in potassium hydroxide, followed by culture.

2. Generally a clinical diagnosis is sufficient to warrant starting treatment, providing it is recognised that there are other causes of interdigital infection.

**What might it be confused with?**

1. Interdigital fungal infection: Gram negative bacterial infection (presence of maceration, erosion of the skin, green discolouration and pain rather than itch are all pointers); interdigital maceration (often present in lymphoedema); soft corns; interdigital erythrasma or *Candida* infection. *Scytalidium* infection - this fungus is common in the tropics, mimics tinea pedis of interdigital and dry scaly types and seldom responds to antifungals.

2. Vesicular pattern: plantar pustular psoriasis or eczema.

3. Hyperkeratotic pattern: psoriasis; eczema, *Scytalidium* infection (see above).

**What preventive measures should be taken?**

1. Preventive approaches are ideal. Patients should be advised:
   - To wash their feet carefully, at least daily, and dry meticulously between the toes.
   - Avoid having sweaty feet by wearing open toed shoes (sandals or flip flops).

**Which treatments are most effective?**

1. A number of topical antifungals will be effective if used correctly for the right amount of time. These include azoles (e.g. ketoconazole, amorolfine and miconazole nitrate), allylamines (e.g. terbinafine) and undecenoic acid.

2. All three broad categories of drug are efficacious.

3. Whilst allylamines are slightly more efficacious at resolving infections than azoles they are more expensive.

4. Whitfield’s ointment, comprising benzoic acid and salicylic acid in a white soft paraffin base, is a cheap alternative to the branded antifungal preparations. Treatment is longer (up to 1 month).

5. It is particularly helpful on dry tinea pedis.

6. If nails are involved or there is extensive plantar scaling oral therapy with terbinafine or itraconazole is preferred. Griseofulvin can be used but is less effective.
How should the treatments be used?

Exact instructions for use will vary depending on the specific product. In general the following guidelines should be followed:

- Creams/ointments should always be applied to clean, well dried skin;
- Enough should be used to cover the area comfortably;
- The cream/ointment should be rubbed in gently but completely (no white appearance left on the skin);
- Creams/ointments should be applied for up to two weeks after the symptoms have cleared to reduce the likelihood of a relapse.

What are the common concurrent problems?

1. Interdigital bacterial infection caused by Gram negative bacteria. Described previously can follow tinea pedis. Treatment of one can result in recurrence of the other.

2. Erythrasma due to Cornyebacterium minutissimum. Early lesions present as asymptomatic areas of interdigital scaling or maceration. Treatment with topical azole antifungals or oral erythromycin is required; Whitfield’s ointment may also help to resolve these infections. Risk factors are the same as for tinea pedis. It can be differentially diagnosed using a Woods light which will cause bright pink fluorescence.

3. Interdigital cracks of whatever cause create entry lesions for other bacterial infections which can lead to cellulitis/erysipelas and “acute febrile attacks” particularly in people with lymphoedema.

What are the uncommon concurrent problems?

- Multiple itchy vesicles sometimes develop most commonly on sides of fingers, palms and soles, worse closer to the primary infection. This is known as an ‘id’ reaction probably an immunological reaction to the dermatophyte. Treatment should be continued.

What are the commonly held misconceptions about the disease?

- That all interdigital lesions on the feet are always fungal. Both Gram positive and Gram negative bacterial infections may also present with web lesions; likewise Candida and Scytalidium as well as dermatophyte fungi may all cause web infections.