Quick reference guide

- Many nail problems can look like fungal infections, eg psoriasis or injury. Always send samples before starting long-term treatment, as only 45% of dermatology samples received are positive for fungal infections.\(^ {1B} \)
- Microscopy detects 91% of positives, and provides the most rapid diagnosis.\(^ {1B} \)
- Culture distinguishes dermatophyte from non-dermatophyte moulds, which is important as this may alter treatment.

### WHEN SHOULD I TAKE DERMATOLOGICAL SAMPLES FOR FUNGI?

- Samples are not needed for:
  - uncomplicated Athlete’s foot (tinea pedis)
  - mild infections of the groin; if samples are not taken, treat as suspected Candida or Erythrasma with topical imidazole\(^ {5A} \)
  - mild skin ringworm
- Take samples for fungi:
  - when oral treatment is being considered (scalp ringworm or nail disease)
  - in severe or extensive skin fungal infections, eg moccasin-type Athlete’s foot
  - skin infections refractory to initial treatment, as occasionally gram negative bacterial infections cause interdigital cracking that looks like tinea pedis\(^ {6B} + \)
  - when the diagnosis is uncertain
- Ensure clinical details are stated, including treatment, animal contact, and overseas travel.

### HOW SHOULD I TAKE SAMPLES FOR FUNGAL INVESTIGATION?

- Swabs are of little value for dermatophytes, unless there is insufficient material obtained by scraping.
- Wipe off any treatment creams before sampling.
- Keep any samples at room temperature. Do not refrigerate as dermatophytes are inhibited at low temperatures, and humidity facilitates the growth of contaminants.\(^ {8C} \)
- Samples should be collected into folded dark paper squares. Secure dark paper squares with a paper clip and place in a plastic bag, or use commercially available fungal packets, eg Mycotrans; Dermapak.\(^ {9D} \)
- Skin scrapings:
  - scrape skin from the advancing edge of lesion; use a blunt scalpel blade or similar
  - 5mm\(^ 2 \) of skin flakes are needed for microscopy and culture
- Nail samples (better taken by clinicians):\(^ {3D} \)
  - most viable fungi are usually found in the most proximal part of diseased nail; sample with chiropody scissors
  - include full thickness clippings of the diseased nail
  - sample as far back from nail tip as possible, as this is where fungi are usually found; also sample debris from under the diseased part of the nail
  - in superficial infections, scrape surface of diseased nail plate with scalpel blade
- Hair samples:\(^ {2A} +, 21A \)
  - take scalp scrapings, as this often pulls out infected hair stumps, which are critical for successful culture and microscopy; hair plucking does not produce the best samples.
  - a soft toothbrush can be used if scrapings are not possible.\(^ {21A} \)
INTERPRETING THE LABORATORY REPORT

- When to treat:
  - a positive microscopy (fungal elements seen) is sufficient to start antifungals
  - a positive dermatophyte culture with negative microscopy is still significant
  - a negative microscopy or culture does not rule out fungal infection, particularly with kerion and nail infections; if clinical appearance very suggestive of fungal infection, repeat sample and start treatment.

- Significant fungi isolated and reported:
  - the most common dermatophytes from foot or trunk infections are *T. rubrum* (80%) and *T. interdigitale* (15%)
  - *Epidermophyton floccosum* and *Microsporum* species are also encountered
  - *T. tonsurans* and *T. violaceum* cause 80% of scalp infections in the UK
  - *Scytalidium* spp. are the most common non-dermatophyte moulds that can cause both skin and nail infections
  - true nail infections with the yeasts *C. albicans* and *C. parapsilosis* are rare and are more likely to affect the finger nail or finger nail folds; other Candida spp. may very rarely cause paronychia

- Fungi of uncertain clinical significance:
  - non-dermatophyte moulds (e.g., *Aspergillus* spp., *Scopulariopsis* spp., *Acremonium* spp.) are very rare causes of nail infection, usually following nail trauma, immunosuppression, or underlying dermatophyte infection; discuss management with a local microbiologist or dermatologist
  - such a diagnosis requires positive direct microscopy, isolation of the organism in pure culture, and ideally, on repeated occasions
  - repeat sample usually requested to confirm significance of non-dermatophyte moulds

- Antifungal susceptibilities:
  - susceptibility testing of dermatophytes is not required, as antifungal resistance is rare, and there is no known correlation between antifungal susceptibilities and outcome

TREATING FUNGAL SKIN AND NAIL INFECTIONS

- For non-dermatophyte moulds other than Candida spp. seek the advice of a microbiologist or dermatologist.
  - Dermatophyte and candida infection of the fingernail or toenail:
    - treat only if infection confirmed by laboratory; only use topical treatment if superficial infection of the top surface of nail plate; 5% amorolfine nail lacquer; 1-2 times weekly; 6 months on fingers; 12 months on toes
    - for infections with dermatophytes use oral terbinafine; 250mg OD; 6-12 weeks on fingers; 3-6 months on toes; or itraconazole; 200mg BD; 2 courses of 7 days a month for fingers; 3 courses of 7 days a month for toes
    - for infections with candida or non-dermatophyte moulds use oral itraconazole
    - idiosyncratic liver and other severe reactions occur very rarely with terbinafine and itraconazole
    - for children, seek specialist advice

- Dermatophyte infection of the skin:
  - take skin scrapings for culture
  - as terbinafine is fungicidal, one week is as effective as 4 weeks azole which is fungistatic; topical 1% terbinafine; 1-2 times daily; 1 week