

Consultation document

August 2019

Diagnostic testing for fungal infections of skin, hair, and nails at Labtests and Northland Pathology Laboratory

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1. Introduction

Fungal infections of the skin, hair, and nails are a common problem in primary care. Dermatophytes (in particular *Trichophyton rubrum*) are the most common pathogens identified overall. They account, for instance, for over 90% of fungi associated with toenail onychomycosis. Other common organisms include *Malassezia* yeasts associated with pityriasis versicolor, which are seen frequently in skin specimens, and *Candida* species, which can cause infection in intertriginous areas and fingernail onychomycosis. Uncommonly, non-dermatophyte moulds (eg *Scytalidium*, *Fusarium*, *Aspergillus*, *Scopulariopsis*) can cause toenail onychomycosis, but many of these species are also frequently present as contaminants in laboratory cultures.

2. Current service

At present all skin, hair, and nail specimens submitted to the laboratory for investigation of fungal infection undergo microscopic examination as well as fungal culture. Microscopy results are typically available within 24-48 hours. Fungal results take several weeks due to slow growth of the organisms; a positive fungal culture result typically take 2-3 weeks, whereas a negative result is reported after 3-4 weeks.

3. Rationale for change

Laboratory diagnosis of fungal skin, hair, and nail infection may be useful to confirm fungal aetiology and direct appropriate treatment in circumstances where a diagnosis is not clinically obvious or where suspected infections fail to respond to initial treatment. Labtests has recently reviewed our processes and evaluated the performance of fungal microscopy and culture. Our current process of providing both microscopy and (delayed) fungal culture results appears unnecessary for the majority of patient samples submitted to the laboratory.

Microscopic examination for hyphae is known to be much faster and much more sensitive than fungal culture for detecting dermatophyte infections. At Labtests the sensitivity of fungal culture on toenail clippings and non-intertriginous skin scrapings is only half that of microscopy and > 95% of the time a negative microscopy result indicates a subsequent negative dermatophyte culture. Microscopy is considered sufficiently specific to support a diagnosis of onychomycosis, whereas positive culture results from microscopy negative cases may be misleading because of culture contamination by environmental moulds that may lead to unnecessary or inappropriate treatment. Where a laboratory diagnosis is desirable, a positive or negative microscopy result, in combination with clinical features, allows a clinician to confidently make treatment decisions for most fungal infections.

The majority of the time a culture result i.e. the genus and species of a dermatophyte, has no bearing on the recommended treatment for fungal infections, which is largely based on the clinical features and site of infection. There are some exceptions which we will take into account with our proposed changes. Provision of an isolate for susceptibility testing is rarely necessary.

Fungal infections of toenails are almost exclusively caused by dermatophytes. The first line recommended treatment for dermatophyte onychomycosis is terbinafine, which also has activity

against the most common non-dermatophyte mould infections. Itraconazole is a second line treatment for patients who cannot tolerate, or fail to respond to terbinafine, and requires specialist approval.

Similarly, fungal infections of trunk, limbs, interdigital spaces, or the face (non-intertriginous skin sites) are largely caused by dermatophytes or *Malassezia* yeasts associated with pityriasis versicolor. Topical antifungals are the recommended first-line treatment. The microscopic appearance of *Malassezia*, which cannot be cultured by routine methods, is characteristic.

In contrast, fungal infections of intertriginous skin sites (groin, perineum, axilla, breast folds, abdominal apron) or fingernails are often caused by *Candida*, for which microscopy has a poor negative predictive value. Fungal culture of specimens from these sites may have a diagnostic role in order to determine appropriate treatment.

4. Proposed new service

Labtests and Northland Pathology Laboratory are proposing to limit routine fungal culture of toenail specimens and skin scrapings from non-intertriginous sites, except under certain circumstances. Samples for fingernails and intertriginous areas will continue to be cultured. As always, the inclusion of relevant clinical details allows the laboratory to optimise diagnostic testing. The on-call clinical microbiologist is available to discuss any severe or atypical cases of suspected fungal infection, as well as in assisting in result interpretation.

a. Proposed processing of nail specimens

- Microscopy will be performed on all nail specimens.
- Culture will not be routinely performed on toenail specimens.
- Culture will still be performed if clinical details indicate they are fingernail specimens, microscopy is suggestive of a non-dermatophytic mould, or the patient has failed therapy with oral terbinafine or itraconazole.

b. Proposed processing of skin scrapings

- Microscopy will be performed on all skin scrapings.
- Culture will not be routinely performed on skin scrapings from the trunk, limbs, interdigital spaces, or the face.
- Culture will still be routinely performed if clinical details indicate it is from a scalp lesion or an intertriginous area (groin, perineum, axilla, breast folds, abdominal apron) or if clinical details indicate patient has failed therapy with oral terbinafine or itraconazole.

c. Table: summary of proposed service

Sample type	Microscopy	Culture (Yes/No)
Toenails	Positive	No, unless microscopy suggestive of a non-dermatophyte mould or treatment failure with systemic terbinafine/itraconazole
	Negative	No, unless treatment failure with systemic terbinafine/itraconazole
Fingernails	Positive	Yes
	Negative	Yes
Intertriginous skin and scalp	Positive	Yes
	Negative	Yes
Non-intertriginous skin	Positive	No, unless treatment failure with systemic terbinafine/itraconazole
	Negative	No, unless treatment failure with systemic terbinafine/itraconazole

5. Implications of proposed new service

Routine diagnosis and treatment of fungal infections of the toenails and non-intertriginous skin will be based on clinical assessment and microscopy results. Fungal culture will be limited to situations where results may assist with diagnosis and treatment decisions.

6. Consultation process

a. What are we consulting on

Limiting routine culture for fungal infections of the skin, hair, and nails

b. Who is being consulted

- Healthcare providers on the Labtests/NPL communication database
- PHOs in the Auckland and Northland regions
- The four Auckland and Northland DHBs via the Chief Medical Officers
- The Auckland and Northland Pathways groups

c. Consultation timeline

- Consultation document release 19/8/19
- Feedback deadline 2/9/19
- Decision announcement 9/9/19

7. How to give feedback

Please send feedback on proposed changes to:

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