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# Ringworm (tinea)

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## Key facts

- Ringworm is a common fungal infection of the skin caused by dermatophyte fungi that have adapted to live on keratin, the hard fibrous protein found in skin and hair.
- Ringworm accounts for roughly half of the estimated 650 million fungal skin infections globally (1).
- In some countries, more than 25% of pupils under the age of 10 years have ringworm scalp infections (2).
- Ringworm can affect people and animals.
- Symptoms include itching, redness, and a ring-shaped rash.
- It is typically treated with antifungal medications.

## Overview

Ringworm, also known as tinea, is a common fungal infection of the skin. It can affect both humans and animals. The infection is caused by fungi, known as dermatophytes, that thrive on the skin, hair, and nails. Symptoms of ringworm include itching, redness, and a characteristic ring-shaped rash. While not life threatening, ringworm can be uncomfortable, embarrassing and easily spread. It is typically treated with antifungal medications applied directly to the skin, but oral medications may be necessary for severe or widespread infections. There is a spreading outbreak of extensive and drug-resistant ringworm in many countries.

# Scope of the problem

Tinea is one of the commonest dermatological conditions, accounting for a substantial proportion of skin disease in developing countries. Globally, fungal skin infections are estimated to affect more than 650 million people at any time and of these, ringworm accounts for over half the cases (1).

Ringworm is found in every country but some forms are common in resource-poor tropical settings. Prevalence of scalp infection among children in these areas may reach more than 25 % of school children under 10 (2). Cases are sporadic in some high-income countries but may lead to outbreaks in schools. Tinea pedis infections are often endemic in heavy industries and can result in loss of work and complications due to secondary infection.

There is a growing worldwide problem of ringworm or tinea extensively affecting the body, tinea corporis. First reported in India, it has spread widely in communities in South-East Asia and is now increasingly reported in the Middle East, Europe, Africa and the Americas. Many of these cases are resistant to the common antifungal medications, posing an increasing public health problem.

## Symptoms

Ringworm can affect various parts of the body, and the symptoms may vary depending on the location of the infection.

- **Tinea capitis (scalp ringworm) affects the scalp and can cause itching, redness and hair loss. It is mainly seen in children.**
- **Tinea corporis (body ringworm) appears on the skin as a ring-shaped rash with raised borders. It can be itchy and may spread to other parts of the body. It may also be very widespread covering large areas of the body.**
- **Tinea cruris (groin ringworm or jock itch) affects the groin and upper thighs. It is more common in adolescent and adult males and is often associated with activities leading to sweating and tight clothing.**
- **Tinea pedis (foot ringworm or athlete's foot) occurs on the feet, particularly between the toes. Symptoms include itching, burning and scaling of the skin. It can spread in workplace or public changing rooms and can be an occupational problem in some industries, e.g. mining, petroleum.**
- **Tinea unguium (nail ringworm or onychomycosis) affects the nails, causing them to become thick, discoloured and brittle. It can impair mobility in the elderly.**

## Transmission

Ringworm is contagious and can be spread through:

- **direct contact with an infected person or animal**
- **indirect contact with contaminated objects or surfaces, such as clothing, wet floors, towels and sports equipment**
- **environmental contact with fungi in soil.**

## Risk factors

Several factors can increase the risk of developing ringworm.

- **Ringworm can affect people of all ages.**
- **Spread of scalp infections in school children is very common (in some countries, more than 25% of pupils under the age of 10 years).**
- **A newly described ringworm species has spread widely and is now common in countries of South-East Asia. It has also spread beyond this to Africa, the Middle East, Europe and the Americas. It is also often resistant to treatment with antifungal medicines.**
- **Close contact with an infected person or animal increases the risk of transmission.**
- **People with weakened immune systems are more susceptible to tinea infections which may have an atypical appearance.**
- **Athletes, especially those involved in contact sports, as well as industrial workers, are at higher risk due to shared equipment, changing rooms and close contact.**
- **Fungi thrive in warm, moist environments, such as showers, locker rooms and swimming pools.**
- **Sharing clothing, towels and other personal items such as combs or hairbrushes can increase the risk of transmission.**

## Diagnosis

Ringworm is usually diagnosed based on its characteristic appearance and symptoms. A health-care provider may also take a skin scraping or nail clipping to confirm the diagnosis. This sample is then examined under a microscope or sent to a laboratory for fungal culture or molecular diagnosis.

## Treatment

Ringworm is typically treated with antifungal medications. The type of medication and duration of treatment will depend on the location and severity of the infection.

- **Topical antifungal medications are applied directly to the skin and are effective for most cases of ringworm. Common topical medications include clotrimazole, miconazole, econazole, ciclopirox and terbinafine.**
- **Oral antifungal medications may be prescribed for severe or widespread infections, or when topical treatments are ineffective. Oral medications include griseofulvin, terbinafine and itraconazole.**

In addition to medication, keeping the affected area clean and dry can help promote healing and prevent the spread of infection.

## Prevention

Preventing ringworm involves reducing the risk of exposure and transmission.

- **Practice good hygiene: keep skin clean and dry, especially in areas prone to sweating.**
- **Avoid close contact: avoid touching or coming into close contact with people or animals known to have ringworm.**
- **Don't share personal items: do not share clothing, towels, hairbrushes or other personal items.**
- **Wear appropriate footwear: wear shoes or sandals in public showers, locker rooms and pool areas.**
- **Clean and disinfect: regularly clean and disinfect surfaces and objects that may be contaminated.**
- **Keep pets healthy: if you have pets, have them checked and treated for ringworm by a veterinarian if necessary.**

## Complications

While ringworm is usually not serious, it can lead to complications if left untreated or if the infection is severe.

- **Secondary bacterial infection: the broken skin caused by ringworm can become infected with bacteria, leading to cellulitis or impetigo. Secondary bacterial infection of the feet can be very painful and disabling.**
- **Severe inflammation: in some cases, ringworm can cause severe inflammation, resulting in blisters, boils or kerions (painful, raised lesions).**
- **Hair loss: ringworm of the scalp can cause hair loss, which may be permanent if not treated promptly.**
- **Nail deformities: ringworm of the nails can cause them to become thickened, discoloured or deformed. This may interfere with mobility in the elderly**
- **Spread of infection: ringworm can easily spread to other parts of the body or to other people if not treated.**

## WHO response

The World Health Organization (WHO), through the initiative to address neglected tropical diseases of the skin (skin NTDs), recognizes a growing problem of fungal infections of the skin and the emergence of antifungal resistance. [The resolution on skin diseases as a global public health priority](https://www.who.int/news-room/fact-sheets/detail/ringworm-(tinea)) that was adopted during the May 2025 World Health Assembly is expected to help advance work on fungal diseases including ringworm.

## References

1. Institute for Health Metrics and Evaluation (IHME). GBD 2024 Cause and Risk Summary: Fungal Skin Infections Accessed (28/03/2025). Seattle, USA: IHME, University of Washington, 2024.
2. Coulibaly O, L'Ollivier C, Piarroux R, Ranque S Epidemiology of human dermatophytosis in Africa Medical Mycology, 2018: 56, 145–161.