



Bacterial and fungal skin infections

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Introduction

The skin is the largest organ of the body and provides an effective barrier against infection.^{1,2} Although many bacteria come in contact with or reside on the skin, they are normally unable to establish an infection. When bacterial skin infections do occur, they can range from mild to potentially

life-threatening.² Mild infections may be treatable with over-the-counter (OTC) medications and home remedies, whereas more serious infections may require referral to the doctor.¹

Bacterial skin infections

Bacterial skin infections occur when bacteria enter the body through a break in the skin, such as a cut or a scratch. However, this does not necessarily mean that a skin infection will develop. The risk is greater in a person with a weakened immune system.¹

Bacteria may cause different types of skin infections. Common skin infections include impetigo, folliculitis and minor skin abscesses³⁻⁵ (Table I). The length of treatment will differ depending on the type and severity of the infection.⁴

Table I. Different types of bacterial skin infections

	Description	Signs and symptoms	OTC treatment	Prevention
Bacterial skin infections				
Impetigo	A contagious skin infection commonly caused by <i>Staphylococcus aureus</i> . ^{3,4} Less commonly, infection may be caused by <i>Streptococcus pyogenes</i> or both bacteria. ⁵ Usually affects children aged 2 to 5 years, but may affect older children and adults. ³⁻⁵ Infection is more likely in warm, humid conditions and easily spreads through direct contact with another person who has the infection. ^{4,5} It can affect different parts of the body such as the face, arms, or legs. ^{3,4} It may also affect moist parts of the body, such as the armpits, neck folds, and diaper areas. ⁴ The blisters that may form (bullous impetigo) vary in size and can last for days to weeks. ³	<ul style="list-style-type: none"> • Red bumps on the skin, usually of the face, arms or legs.⁵ • These bumps eventually form blisters that may rupture and form honey-coloured crusts.³⁻⁵ • The blisters may become painful sores.⁵ • Itching.^{3,4} • Tenderness.^{3,4} 	Topical mupirocine or retapamulin. ^{5,7} Apply to the infected parts of the skin. ⁵	To prevent the spread of the infection to other parts of the body, avoid scratching the blisters or sores. ⁴ Cut the fingernails and cover affected areas of the body with bandages or gauze. ⁴ Do not share items such as blankets, linens, toys, or clothing. ⁴ Wash the hands with soap and water or use an alcohol-based hand rub after having contact with anyone who has the infection. ⁵
Bacterial folliculitis	An infection of one or many hair follicles commonly caused by <i>Staphylococcus aureus</i> . ^{4,6} May be present on any part of the body with hair, such as the face, scalp, thighs, underarms, and groin area. This includes areas that are bearded or shaved. ⁴	<ul style="list-style-type: none"> • A tiny red or white pimple at the base of the hair.^{4,6} • Redness, tenderness, or swelling of the affected area.^{4,6} • Each infected follicle is usually itchy or slightly painful. 	Mild folliculitis may be treated with antibacterial cleansers (such as benzoyl peroxide or chlorhexidine) and topical antibiotics, such as mupirocin. ^{4,6,7,8}	Good skin hygiene and proper shaving techniques have been shown to prevent folliculitis. ⁸ The doctor may recommend monthly treatments with mupirocin ointment in cases of recurring folliculitis. ⁴

Minor skin abscesses: Furuncles (boils)	Furuncles are tender, smaller, more superficial abscesses that by definition involve a hair follicle and the surrounding tissue. Furuncles are common on the neck, breasts, face, and buttocks. ⁶	<ul style="list-style-type: none"> • A red lump with a white or yellow centre.^{4,6} • Discomfort.⁶ • Pain.⁶ • If not treated, abscesses often come to a head and rupture, discharging a creamy white or pink fluid.⁶ 	Apply a warm compress on the boil several times a day. ⁶ The patient should be referred to the doctor for more severe infections, such as larger boils and carbuncles. These may require a surgical cut and drainage of the affected area. ^{4,6} If needed, the doctor may prescribe oral antibiotics. ⁴	People who have recurrent skin abscesses may wash their skin with liquid soap that contains special antiseptics and take prescribed antibiotics for 1 to 2 months if needed. ⁶ Wash hands regularly. ^{4,6}
Carbuncles	Carbuncles are multiple boils that are connected to one another below the skin surface. ⁶			

Fungal skin infections

Fungal infections of the skin are common and include athlete's foot, jock itch, ringworm, and yeast infections⁹ (Table II).

Table II. Different types of fungal infections

	Description	Signs and symptoms	OTC treatment	Prevention
Fungal skin infections				
Athletes foot (tinea pedis)	A common fungal infection of the foot. ^{9,10} The most common fungus associated with causing athlete's foot is <i>Trichophyton rubrum</i> . ⁹ The fungus lives on dead tissue of the hair, toenails, and outer skin layers. ⁹ The fungus grows best in a warm, moist environment such as socks, shoes, swimming pools, locker rooms, and the floors of public showers. ⁸ It is most common in the summer and in warm, humid climates. ⁹ It occurs more often in people who wear tight shoes and who use community baths and pools. ⁹	<ul style="list-style-type: none"> • Cracking, peeling and scaling of the feet (often between the toes).^{9,10} • Tenderness.¹⁰ • Burning.^{9,10} • Redness.^{9,10} • Itching.^{9,10} • Blisters and sores.^{9,10} 	Topical antifungals such as terbinafine, miconazole and clotrimazole. ¹¹ Treatment should generally be continued for at least one week after all the skin symptoms have cleared. ¹¹ Mild superficial tinea infections may respond well to zinc undecenoate or tolnaftate. ⁷ In severe cases, refer the patient to the doctor. ⁹	Wear sandals in public showering areas. ⁹ Wear open shoes that allow the feet to breathe. ^{9,10} Wash the feet with soap and water. ⁹ Dry the feet thoroughly and use antifungal foot powders, both on the feet and in the shoes. ^{9,10}
Jock itch (tinea cruris)	A common skin infection. ⁹ The fungus thrives in warm, moist areas of the body and as a result, infection can affect the genitals, inner thighs, and buttocks. ^{9,10} It is mildly contagious. ⁹ More common in men than women. ⁹ Infections occur more frequently in the summer or in warm, wet climates. ⁹	<ul style="list-style-type: none"> • Burning, itching or chafing in the groin or thigh.^{9,10} • Redness in the groin or thigh.⁹ • A circular, raised rash with elevated edges. • Peeling, flaking, or cracking skin.⁹ 	Apply the antifungal cream e.g. clotrimazole, for one to two weeks. Powders and sprays are also available. ^{9,10}	Wash and dry the affected area with a clean towel. ⁹ Change clothes, especially underwear, every day. ¹⁰
Ringworm (tinea corporis)	Not caused by a worm, but by a fungus. ^{9,10} Spread by direct contact with infected people or animals. It may also be spread on clothing or furniture. Heat and humidity may help to spread the infection. ⁹ Ringworm may spread from one body part (such as the feet) to another (such as the hand or groin). ¹⁰ Ringworm can be unsightly, but it is usually not a serious condition. ⁹	<ul style="list-style-type: none"> • Appears as a red, ring-shaped, flat sore that is sometimes accompanied by itchy, scaly skin.^{9,10} • There may be more than one patch of ringworm on the skin, and patches or red rings of rash may overlap.⁹ • The outer part of the sore can be raised while the skin in the middle appears normal.⁹ 	Antifungal medications that are applied to the skin for at least 2 weeks e.g. clotrimazole, terbinafine and miconazole. ^{7,10} Prescription topical or oral drugs may be prescribed for more severe cases of ringworm. ⁹	Do not share clothing, sports equipment, or towels with other people. ¹⁰ Take the pet to the vet if it has patches of missing hair or a rash. That could be a sign of a tinea infection. ¹⁰ If someone in the family has symptoms of ringworm, make sure she/he is treated immediately. Otherwise, the infection may spread. ¹⁰ Wash thoroughly with soap and shampoo after any sport involving skin-to-skin contact. ¹⁰

Yeast infections (cutaneous candidiasis)	Caused by yeast-like fungi called <i>Candida</i> . ⁹ Not contagious. ⁹ May affect nearly any skin surface on the body, but are most likely to occur in warm, moist, creased areas including the armpits and the groin. ⁹ <i>Candida</i> infection is especially common among people who are obese or who have diabetes. People taking antibiotics are also at risk. ⁹ <i>Candida</i> may cause diaper rash in infants. ⁹	<i>Signs of yeast infection in skin folds include</i> ⁹ : • Pimple-like bumps. • Scaling, red rash. • Patches that ooze clear fluid. • Burning or itching.	Antifungal creams such as nystatin and terbinafine may reduce the spread of infection. ^{7,12} Some antiseptic, disinfectant and cleansing agents e.g. povidone iodine have antifungal activity and may be useful adjuncts for treating superficial infections of the skin. ⁷	The affected area should be kept clean and dry and protected from chafing. ¹²
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Conclusion

Many infections of the skin are usually mild and the involved skin clears completely with OTC treatment. However, some cases may be severe and lead to generalised infection. Thus, it is important to seek medical care promptly if the skin infection is associated with fever, rapid worsening of skin changes, other signs of progression, or if there are other medical conditions present.

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