Bacterial infections
Bacterial infection

Staphylococcus
- Impetigo
- Scaled skin syndrome
- Carbuncle
- Furunculosis

Streptococcus
- Cellulitis
- Erysipelas
The primary pathogens in SSTI are
Streptococcus
Staphylococcus
staphylococcal infections

It is not part of the resident flora.

Carried in nostrils, perineum or armpits.

Multiply on areas of diseased skin such as eczema.

Can Cause:

1. Impetigo.
2. Furunculosis (boils).
3. Carbuncle.
4. Scalded skin syndrome.
Impetigo

- **Erosions** in the stratum corneum
- It's a **Superficial** bacterial skin infection maybe caused by:
  1. **Staphylococci** (bullous type)
  2. **Streptococci** (crusted ulcerated)
  3. Both
- Both are highly contagious
- Most common skin infection of children.
- General risk factors seem to be a moist environment, poor hygiene, or chronic nasopharyngeal carriage of staphylococci or streptococci. Tropical or subtropical regions, or during summer.
- If the toxin is localized this produces the blisters of bullous impetigo.
- If generalized leads to more widespread blistering as in the staphylococcal scalded skin syndrome.
- Primary impetigo mainly affects exposed areas such as the face and hands, but may also affect trunk, perineum and other body sites.
- Impetigo and ecthyma cause mild pain or discomfort. Pruritus is common; scratching may spread infection, inoculating adjacent and nonadjacent skin.
- **Ecthyma** is an ulcerative form of impetigo (deep impetigo)
Types: bullous and non bullous

Non bullous

- The **crusted ulcerated type** usually caused by β-haemolytic strains of *streptococci*.
- Multiple coalescing lesions on the face and extremities
- The initial lesions are clusters of small vesicles or pustules that rupture and become a honey-colored crust.
- Mild regional lymphadenopathy is commonly present
- Painless
Bullous

- **the bullous type is usually caused by** *Staphylococcus aureus*
  - It produces exfoliative toxins which cleave the cell adhesion molecule desmoglein 1
  - If the toxin is localized this produces the blisters of bullous impetigo
  - If generalized leads to more widespread blistering as in the staphylococcal scalded skin syndrome

- Large thin-walled flaccid bulla containing clear yellow fluid.
- It often ruptures leaving a complete or partially denuded area with a ring or arc of remaining bulla
- Tends to affect the face, extremities, axillae, trunk, and perianal region
- More in neonates
Impetigo: Subtypes

- Non-bullous Impetigo
- Bullous Impetigo
- Ecthyma

- Macules and Papules
- VESICLES
- Superficial Erosions

- Macules and Papules
- BULLAE
- Superficial Erosions

- Macules and Papules
- Vesicles and Bullae
- ULCERS
Course
It tends to clear even without treatment.

Complications
Streptococcal impetigo can trigger an acute glomerulonephritis.

Differential diagnosis
- Herpes simplex
- Eczema.
- Recurrent impetigo of the head and neck, for example, should prompt a search for scalp lice.

Investigation
The diagnosis is usually made on clinical grounds.
Gram stains can be done or swabs can be taken for culture, "but treatment must not be held up until the results are available."

Treatment
- It tends to clear even without treatment
- **Minor cases:**
  - Removal of crusts by compressing them
  - Application of a **topical antibiotic** such as neomycin, fusidic acid, mupirocin or bacitracin
- **Severe cases:**
  **Systemic antibiotics** (such as flucloxacillin, erythromycin or cefalexin) or if anephritogenic strain of streptococcus is suspected (penicillin V).
scalded skin syndrome

- Staphylococcal scalded skin syndrome (SSSS) is a serious skin infection caused by the bacterium *Staphylococcus aureus*. This bacterium produces an exfoliative toxin that causes the outer layers of skin to blister and peel.

- **Pathophysiology:**
  - **Exfoliative toxins** by staphylococcal infection, that cleave the superficial skin adhesion molecule desmoglein (acantholysis).

- **Signs and symptoms**
  - Fever and Loosening of large areas of overlying epidermis, cause: Erythema.
  - Tenderness.
  - Nikolsky sign is positive.
Early signs of SSSS usually begin with the hallmark symptoms of an infection:
- fever
- irritability
- fatigue
- chills
- weakness
- lack of appetite
- conjunctivitis (an inflammation or infection of the clear lining that covers the white portion of the eyeball)
- Sepsis, cellulitis, and pneumonia may develop.
Affects *children* (mostly younger than 5 years, particularly neonates, due to lack of specific immunity to the toxins and an immature renal clearance system) by a toxin produced by *staphylococcal infection* elsewhere (e.g. impetigo or conjunctivitis) and patients with renal failure.

Most adults have antibodies to the toxin.

**DDx:** toxic epidermal necrolysis

**Investigation:** skin biopsy (to exclude toxic epidermal necrolysis)

In adults with widespread exfoliation, consider toxic epidermal necrolysis, which is usually drug-induced.

The damage to the epidermis in toxic epidermal necrolysis is full thickness, and a skin biopsy will distinguish it from the scalded skin syndrome.
Treatment

*inpatient*, as systemic intravenous *antibiotics* are generally necessary to eradicate the staphylococcal infection.

- Oral antibiotics can be substituted within several days.
- Monitoring and maintaining fluid and electrolyte intake.
- Paracetamol when necessary for fever and pain.
Folliculitis

- Inflammation of the hair follicle.
- The result is a tender red spot, often with a surface pustule.
- Folliculitis may be superficial or deep, and can affect any hair-bearing area of skin.
- Treatment: appropriate self hygiene, topical antibiotics.
Furunculosis (boils)

- Furuncles (boils) are skin abscesses caused by staphylococcal infection, which involve a hair follicle and surrounding tissue.
- Furuncles are common on the neck, breasts, face, and buttocks. They are uncomfortable and may be painful when closely attached to underlying structures (e.g., on the nose, ear, or fingers).
- Infection spreads to the deep dermis, where small abscesses may form.
- Adolescent boys are especially susceptible to them.
- A tender red nodule enlarges, and later may discharge pus and its central ‘core’ before healing to leave a scar.
- Fever and enlarged draining nodes are rare.
- Most patients have one or two boils only, and then clear.
The sudden appearance of many furuncles suggests a virulent staphlococcus including strains of community-acquired MRSA, or staphylococci expressing Panton–Valentine leucocidin toxin.

A few unfortunate persons suffer from a tiresome sequence of boils (chronic furunculosis), often due to susceptibility of follicles or colonization of nares or groins with pathogenic bacteria.

Immunodeficiency is rarely the problem.

Complications

- Cavernous sinus thrombosis is an unusual complication of boils on the central face.
- Septicaemia may occur but is rare.

Investigations in chronic furunculosis

- General examination: look for underlying skin disease (e.g. scabies, pediculosis, eczema).
- Test the urine for sugar.
- Full blood count.
- Culture swabs from lesions and carrier sites (nostrils, perineum) of the patient and immediate family. Test both to identify the organism and to evaluate sensitivity to various antibiotics.
- Immunological evaluation only if the patient has recurrent or unusual internal infections too.
Treatment:

- **Acute episodes:**
  - incision & drainage.
  - **Systemic antibiotics** (fever or immuno-suppressed).

- **Chronic furunculosis**
  - **topical** antiseptic or antibiotic:
    - (treat carrier sites such as the nose twice daily for the first 5 days of each month) e.g. mupirocin cream or fusidic acid ointment to try to eliminate staphylococcal carriage.
  - A 10-day course of rifampicin may also help eradicate carriage
  - Treat family carriers in the same way.

- **Stubborn cases**
  - antibiotic (for 6 weeks) sequential topical and systemic antibiotics chosen to cover organism's proven sensitivities will be needed
  - Daily bath using an antiseptic soap.
  - Improve hygiene and nutritional state, if faulty
Carbuncle

Carbuncles are clusters of furuncles connected subcutaneously (into a single inflammatory mass), causing deeper suppuration (with purulent drainage from multiple follicles) and scarring.

The pain and systemic upset are greater than those of a boil.

Carbuncles are most likely on the back, the thighs, or the back of the neck.

They affect males more frequently than females, and especially older men with poor health or a weakened immune system.

Diabetes must be excluded

**Treatment**
- needs both topical and systemic antibiotics.
- Incision and drainage has been shown to speed up healing

**DDX:** fungal kerion in unresponsive carbuncles.
Erysipelas.

Cellulitis.

Risk factors

- Toe web intertrigo and lymphoedema are risk factors for the development of both erysipelas and cellulitis, which in turn predispose patients to persistent lymphoedema.
- It is important to treat these underlying factors as well as the bacterial infection to reduce the risks of recurrence.
Erysipelas

- Erysipelas is an acute infection of the dermis or hypodermis.
- Erysipelas is characterized clinically by shiny, raised, indurated, and tender plaques with distinct margins. High fever, chills, and malaise frequently accompany erysipelas. There is also a bullous form of erysipelas.
- After a few hours the affected area of skin becomes red, and the eruption spreads with a well-defined advancing edge.
- Blisters may develop on the red plaques.
- Erysipelas may be recurrent and may result in chronic lymphedema. Complications of erysipelas commonly include thrombophlebitis, abscesses, and gangrene.
- Usually : Between the toes and Under an ear lobe

Treatment:

- Untreated, the condition can even be fatal, but it responds rapidly to systemic penicillin, sometimes given intravenously.
- Oral or parenteral penicillin (depend on the severity of the infection)
- Recurrent bouts (in up to 20% of patients) may need low dosage long-term prophylactic oral penicillin V.
- Untreated, the condition can even be fatal
Cellulitis

Cellulitis is acute bacterial infection of the skin and subcutaneous tissue most often caused by streptococci or staphylococci.

- This inflammation of the skin occurs at a deeper level than erysipelas; the area is more raised and swollen, and the erythema less margined than in erysipelas and systemic symptoms.

- Often starts with a break in skin from trauma or another infection.

- The major findings are local erythema and tenderness and, in more severe infections, often lymphangitis and regional lymphadenopathy. The skin is hot, red, and edematous, often with surface appearance resembling the skin of an orange (peau d’orange).

- The most common causes of cellulitis are
  - Streptococcus pyogenes
  - Staphylococcus aureus

**Risk factors:**
Toe web intertrigo and lymphoedema are risk factors.

**Treatment** is elevation, rest. The edge of the involved area of swelling should be marked to monitor progression/regression of the infection and systemic antibiotics (A combination of a macrolide with a streptogramin may be more effective than penicillin).
Thank you