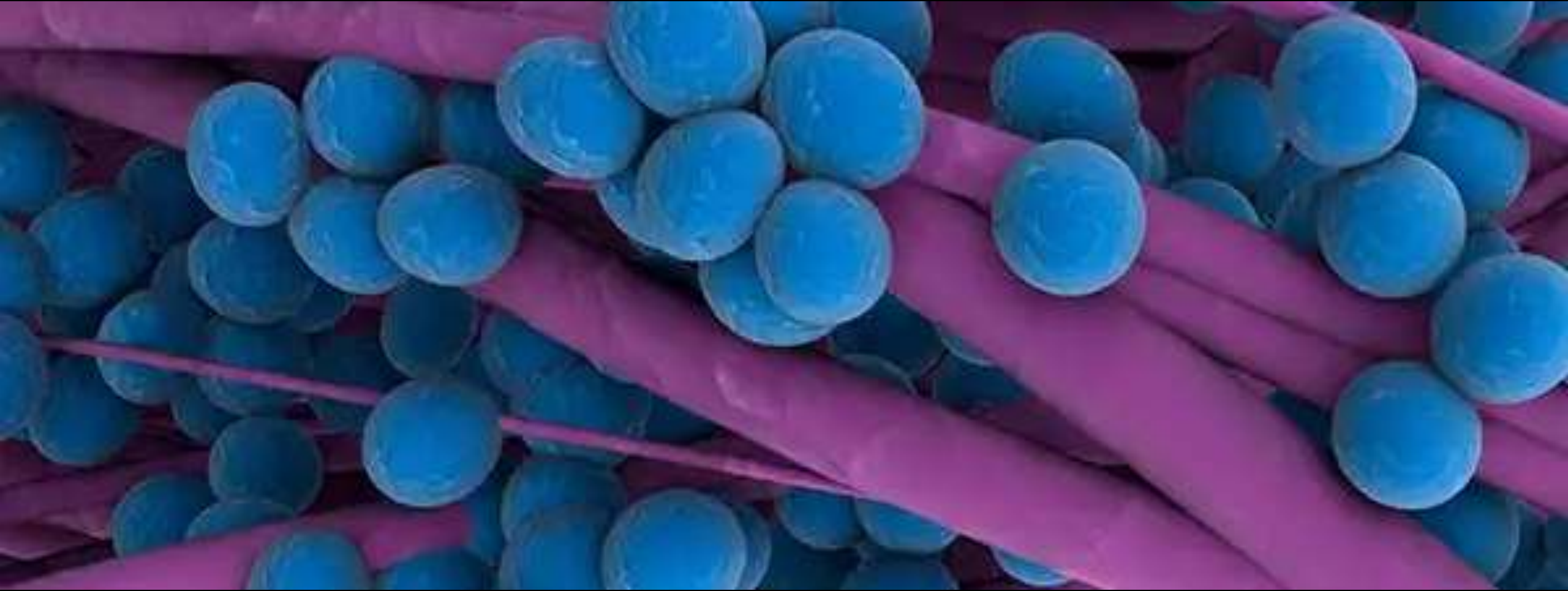




Skin and soft tissue infections

Kirill Lobastov, MD, PhD,
Associated professor

Abbreviations

- SSTI – Skin and soft tissue infection
- ABSSSI - Acute bacterial skin and skin structure infection
- I&D - Incision and drainage
- MSSA - Methicillin-sensitive *Staphylococcus aureus*
- MRSA - Methicillin-resistant *Staphylococcus aureus*
- CAMRSA - Community-associated methicillin resistant *Staphylococcus aureus*
- HAMRSA - Health care-associated methicillin resistant *Staphylococcus aureus*
- TMP/SMX - trimethoprim/sulfamethoxazole

Classification

- SSTI:

- Purulent infection:

- Folliculitis
 - Furuncles
 - Carbuncles
 - Abscesses
 - Phlegmon (purulent cellulitis)
 - Hidradenitis

- Nonpurulent infections:

- Erysipelas
 - Cellulitis
 - Necrotizing fasciitis

- SSTI:

- Mild (local without SIRS)

- Moderate (SIRS)

- Severe:

- SIRS and/or
 - immunocompromising conditions and/or
 - clinical signs of deeper infection and/or
 - infection that fails to improve with
 - incision and drainage (I&D) plus oral antibiotics

Criteria of SIRS

Fever of more than 38°C (100.4°F) or less than 36°C (96.8°F)

Heart rate of more than 90 beats per minute

Respiratory rate of more than 20 breaths per minute or arterial carbon dioxide tension (PaCO₂) of less than 32 mm Hg

Abnormal white blood cell count (>12,000/μL or < 4,000/μL or >10% immature [band] forms)

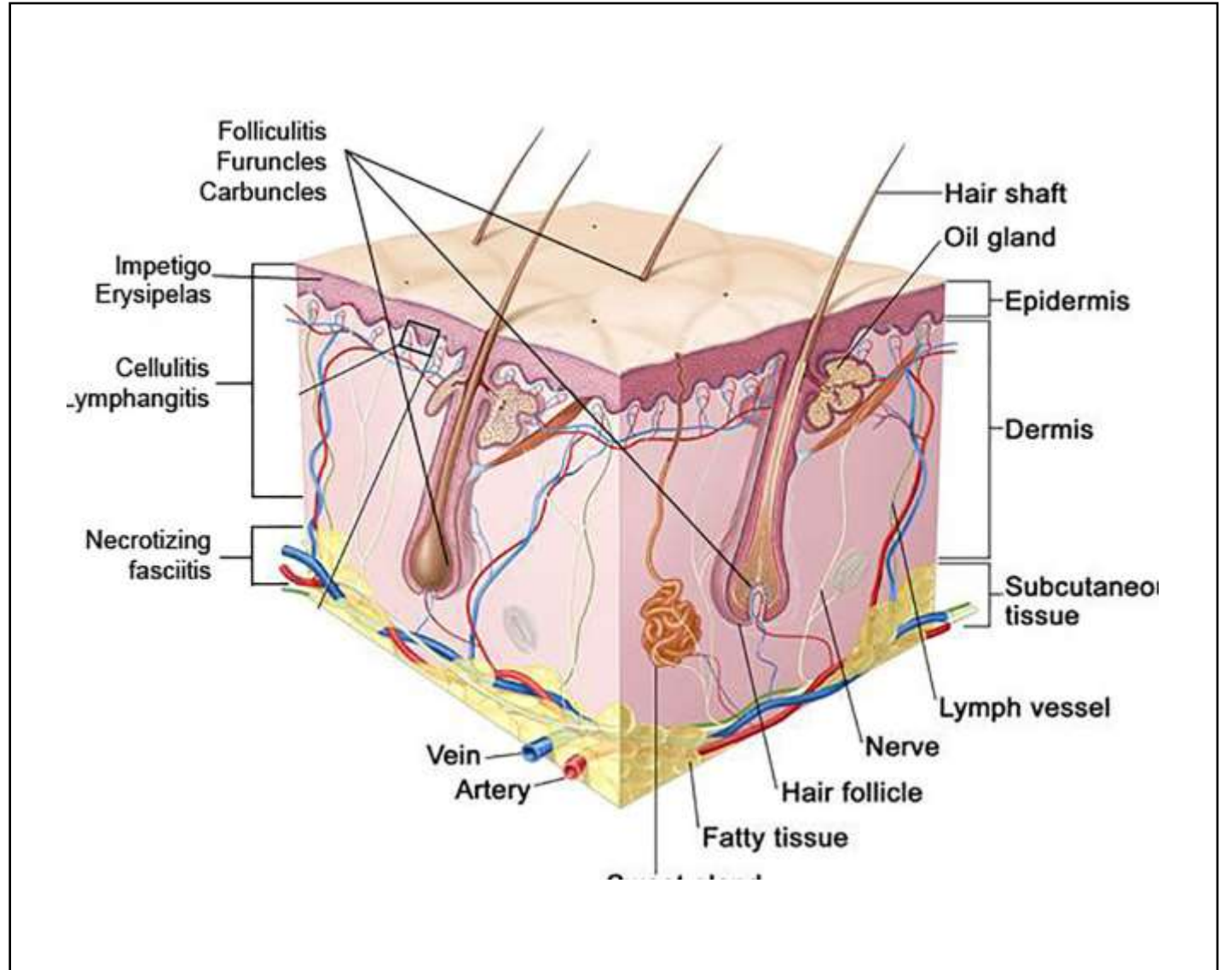
**≥2 criteria
= SIRS**

Epidemiology

- Not established clearly
- In US SSTIs accounted for 3.4 million emergency department visits, or 2.6% of all emergency department visits, with 13.9% of visits resulting in hospitalization
- In US SSTIs accounted for 500,000 hospital discharges, or 1.4% of total discharges, with a mean length of stay of 3.7 days and a mean charge of \$18,299 per case

Pathophysiology

- **Primary** SSTIs occur when microorganisms invade otherwise healthy skin
- **Secondary** SSTIs occur when, because of underlying disease or trauma, microorganisms infect already damaged skin.



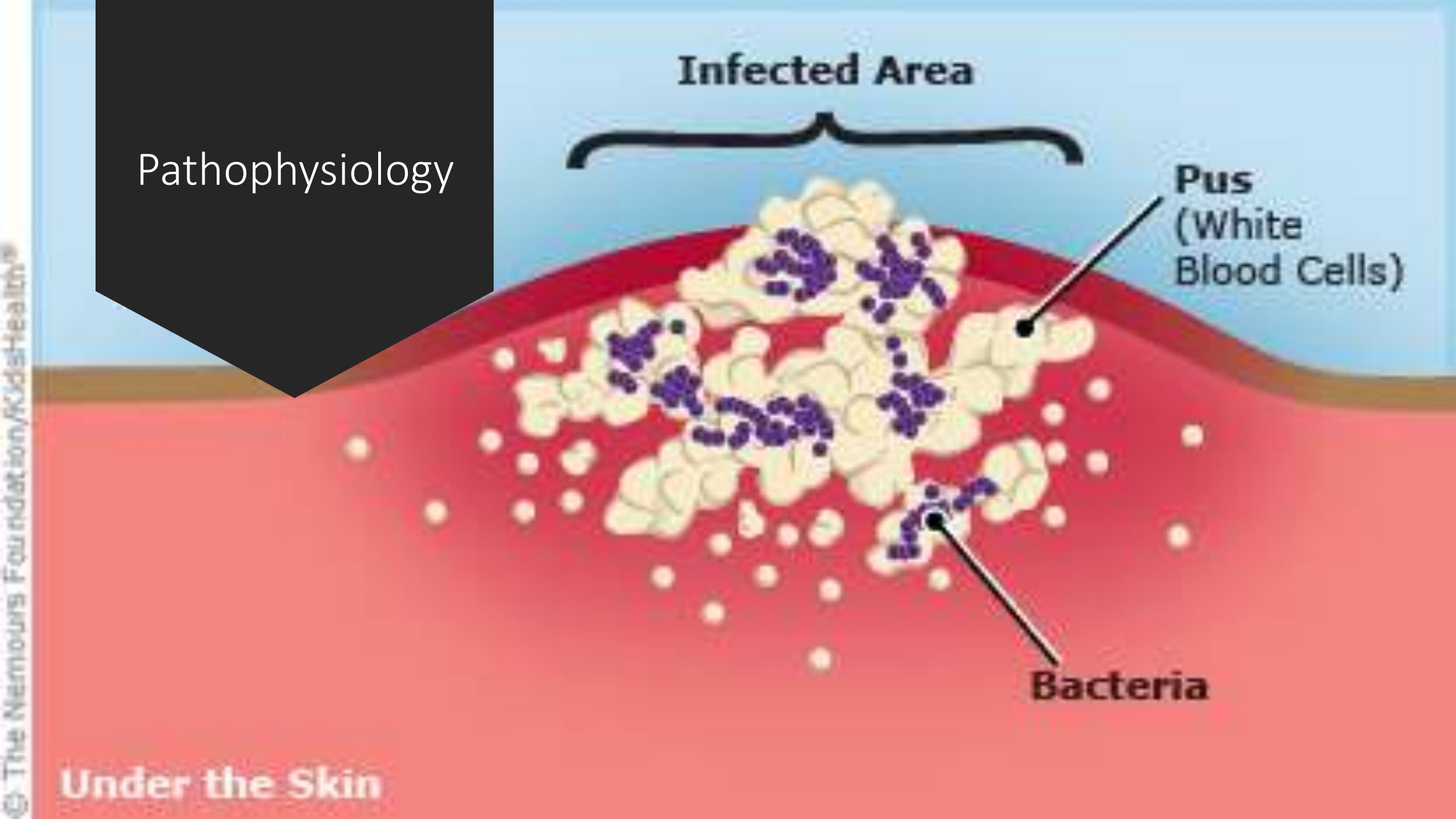
Pathophysiology

Infected Area

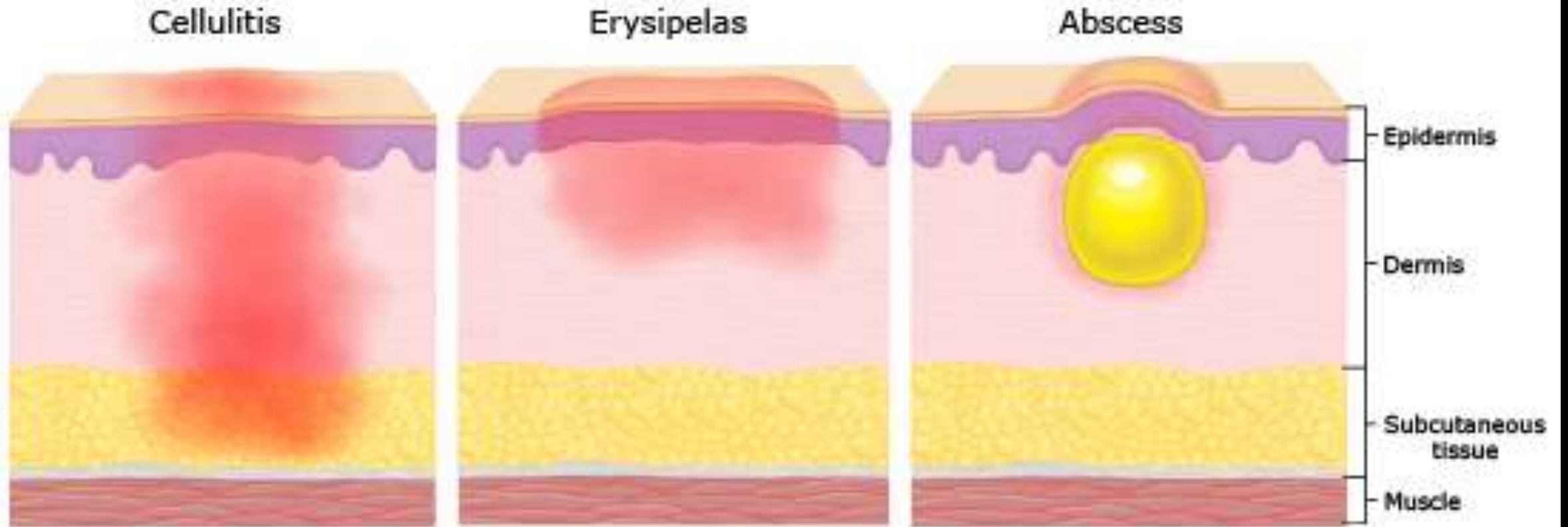
Pus
(White
Blood Cells)

Bacteria

Under the Skin



Depth of SSTI



Risk factors for SSTI

- high bacterial load on the skin,
 - the availability of bacterial nutrients,
 - excessive skin wet,
 - inadequate blood supply,
 - immunosuppression,
 - damage to the corneal layer
- Furuncles, carbuncles, and impetigo:
 - poor hygiene,
 - sharing of personal items,
 - physical contact,
 - crowded living conditions
 - Erysipelas, cellulitis:
 - pre-existing skin disease
 - peripheral vascular disease
 - Diabetic foot infection
 - poorly controlled diabetes
 - Skin infections and abscesses:
 - traumatic events such as cuts and bites and injection drug use result in wounds

Causative Organisms

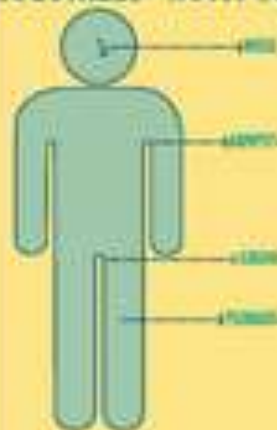
- **S. aureus** is the most common cause of furuncles, carbuncles, cutaneous abscesses, and impetigo.
- **S. pyogenes** is the most common cause of erysipelas, lymphangitis, and cellulitis in patients without penetrating trauma, evidence of MRSA infection elsewhere, nasal colonization with MRSA, injection drug use, or systemic inflammatory-response syndrome
- **Gram-negative rods** and **anaerobic bacteria** can also cause ABSSSIs, particularly in patients with deep long-standing ulcers, immunocompromising conditions, or recent antibiotic exposure
- **Pasteurella spp.** is the most common etiology of dog and cat bite infections, and many infections are caused by both aerobic and anaerobic microorganisms.
- Necrotizing SSTIs
 - Monomicrobial infections are often caused by hypervirulent strains of **S. pyogenes** and to a lesser extent by **S. aureus**, **Clostridium perfringens**, **Vibrio vulnificus**, or **Aeromonas hydrophila**.
 - Polymicrobial infections are caused by a variety of organisms, with Streptococcus spp. and Staphylococcus spp. as the most common Grampositive cocci; Enterobacteriaceae as the most common gram-negative rods; and Bacteroides spp., Clostridium spp., and Peptostreptococcus spp. as the most common anaerobic organisms

THE

UNKNOWN KILLER

Methicillin-resistant *Staphylococcus aureus* (MRSA) is a type of staph bacteria that does not respond to some antibiotics that are commonly used to treat staph infections.

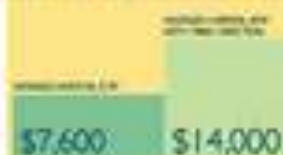
COLONIZED HOTSPOTS



*Colonies to which a person carries the organism have the potential to cause a staph infection.

20,000-40,000
DEATHS PER YEAR

MRSA
IS THE LEADING
CAUSE OF
HOSPITAL
ACQUIRED
INFECTIONS



HOW IS MRSA MOST COMMONLY TRANSMITTED?



TOP 5 SPOTS TO FIND MRSA



HOSPITAL ACQUIRED MRSA (HA-MRSA)

most commonly
transmitted items



COMMUNITY ACQUIRED MRSA (CA-MRSA)

most commonly
transmitted items



WHAT IS MRSA RESISTANT TO?

DRUG NAME	STILL WORKS FOR
PENICILLIN	EAR INFECTIONS
METHICILLIN	CERTAIN STAPH INFECTIONS
DICLOXACILLIN	ACUTE BACTERIAL SINUS INFECTIONS
NAVICLIN	BACTERIAL BLOOD INFECTIONS
OXACILLIN	BACTERIAL BLOOD INFECTIONS
APMOXICLIN	STREP THROAT
CEPHALOSPORIN	URINARY TRACT INFECTIONS
VANCOMYCIN	BACTERIAL INTESTINAL INFECTIONS



1/3 OF THE POPULATION
CARRIES MRSA ON THEIR SKIN

MRSA

- MRSA – methicillin resistant *S. aureus*
- Resistant to antibiotics and antiseptics
- Mortality in MRSA related infections: 12-65%
- CAMRSA typically remain susceptible to trimethoprim/sulfamethoxazole, clindamycin, and tetracycline
- HAMRSA resistant to older, non- β -lactam antibiotics



MRSA bacteria under a microscope

Risk factors for MRSA colonization

- Health care-associated risk factors include:
 - Recent hospitalization
 - Residence in a long-term care facility
 - Recent surgery
 - Hemodialysis
- Additional risk factors for MRSA infection include:
 - Human immunodeficiency virus (HIV) infection
 - Injection drug use
 - Prior antibiotic use
- Factors associated with MRSA outbreaks include:
 - Incarceration
 - Military service
 - Sharing sports equipment
 - Sharing needles, razors, or other sharp objects

Treatment

- eradicate the causative organism(s),
 - alleviate signs and symptoms,
 - avoid complications
 - prevent recurrences
- Purulent SSTI:
 - Mild – I&D only
 - Moderate and – I&D plus oral antibiotics
 - Severe - I&D plus IV followed by oral antibiotics
 - Non-purulent SSTI:
 - Mild – oral antibiotics
 - Moderate – IV followed by oral antibiotics
 - Severe – IV antibiotics plus surgical debridement

I&D

Conditions in Which Antibiotic Therapy is Recommended After Incision and Drainage

- Abscess in area difficult to drain completely
- Associated comorbidities or immunosuppression
- Associated septic phlebitis
- Extremes of age
- Lack of response to incision and drainage alone
- Severe or extensive disease
- Signs and symptoms of systemic illness



Folliculitis

- Folliculitis is an infection of one or more hair follicles that may affect any area of the body (excepting the palms and soles, where there is no hair).
- It presents as a red dot that ultimately becomes a white tip, and it may be associated with rash or pruritus.



Folliculitis Treatment

- Topical agents:
 - Bacitracin/neomycin/polymyxin B (Neosporin)
 - Bacitracin zinc/polymyxin B sulfate (Betadine Brand)
 - acne preparations
 - benzoyl peroxide (Benzac, OTC)
 - clindamycin/benzoyl peroxide (Benzacilin)
 - mupirocin (Bactroban, Centany) – **save for MRSA**

Furuncles

- Total purulent inflammation of hair follicle and neighbored tissue
- Well-circumscribed, painful, suppurative inflammatory nodule involving hair follicles that usually arises from preexisting folliculitis
- Can occur at any site that contains hair follicles, especially in regions that are subject to friction and maceration (eg, face, neck, axillae, groin, thighs, and buttocks)
- Lesion may extend into the dermis and subcutaneous tissues and often serves as a nidus for cellulitis and skin abscess.



Recurrent Furunculosis

- Defined as 3 or more attacks within 12 months
- May spread to other family members – concomitant treatment as well
- Several adjacent furuncles may coalesce into a larger nodule termed a carbuncle
- Systemic antibiotic, decolonization, decontamination
- Decolonization:
 - mupirocin (Bactroban) 0.5 mg each nostril bid x 5d
 - 0.2% chlorhexidine solution – oral rinse 3 times daily x 5d
 - Body wash daily with 4% chlorhexidine soap
- Decontamination –wash clothes and bedding at highest allowed temperature – disinfect commonly used surfaces

Carbuncles

- coalescence of several inflamed follicles into a single inflammatory mass with purulent drainage from multiple follicles
- looks like a honeycomb



Skin abscess

- collection of pus within the dermis and deeper skin tissues
- artificial cavity with accumulation of pus due to tissue lysis
- manifest as painful, tender, fluctuant, and erythematous nodules, frequently surmounted by a pustule and surrounded by a rim of erythematous swelling



Evaluation for abscess

- Clinical examination of inflammation zone with determining for softening, drainage and/or and fluctuation
- Additional ultrasound:
 - Abscess without drainage or fluctuation
 - Abscess inside cellulitis
 - Multiple connected abscesses
 - Identifying of abnormalities (eg, adjacent vessels or atypical findings suggesting an alternative diagnosis)

I&D: anesthesia

- Local anesthesia is sufficient for most simple abscesses in adolescents and adults.
- Local infiltration is less effective than a regional block due to the lower pH of infected tissue, which reduces the proportion of anesthetic in the more active uncharged form.
- Prefer regional block, If possible.

I&D: incision

- After adequate analgesia is achieved, incise the skin with a number 11 scalpel blade.
- Make a simple linear incision through the total length of the abscess with the incision conforming to the natural folds of the skin.
- Avoid cruciate or elliptical incisions because they can cause unsightly scars. If the abscess is in a cosmetic area or an area of skin tension, a stab incision may be used to limit tissue injury and scarring.
- Wound cultures are not necessary in healthy patients who will not receive antibiotics after abscess drainage.

I&D: wound culture

- Severe, local infection (eg, extensive cellulitis, pilonidal cyst)
- Systemic signs of infection (eg, fever or hemodynamic instability)
- History of recurrent or multiple abscesses
- Failure of initial antibiotic treatment
- Extremes of age (young infants or the elderly)
- Immunocompromise

I&D: probe and irrigation

- After incision, probe the abscess cavity with a hemostat to break up loculations, identify foreign bodies, and ensure proper drainage.
- Do not probe with a gloved finger or scalpel. A gloved finger may be injured by a sharp foreign body, and a scalpel may cause tissue damage or create a false passage or fistula.
- Probing of the wound is painful and may require additional anesthesia.
- Irrigate the abscess cavity copiously with isotonic saline solution until all visible pus is removed

I&D: closing

- After incision, drainage, probing, and irrigation abscesses should be left open to heal by secondary intention (secondary closure).
- In previously healthy adults without significant surrounding erythema >5 cm wide or signs of systemic infection, primary closure using nonabsorbable sutures and vertical mattress technique is an option.
- If sutures are placed, close wound follow-up must be assured to evaluate for reaccumulation of pus.
- Also, primary closure should be avoided in patients with the following conditions:
 - Immunocompromise (eg, diabetes mellitus, chronic immunosuppressive therapy, or human immunodeficiency virus infection)
 - Signs of systemic infection (eg, fever, chills, hypotension)
 - Significant cellulitis (>5 cm of surrounding erythema)

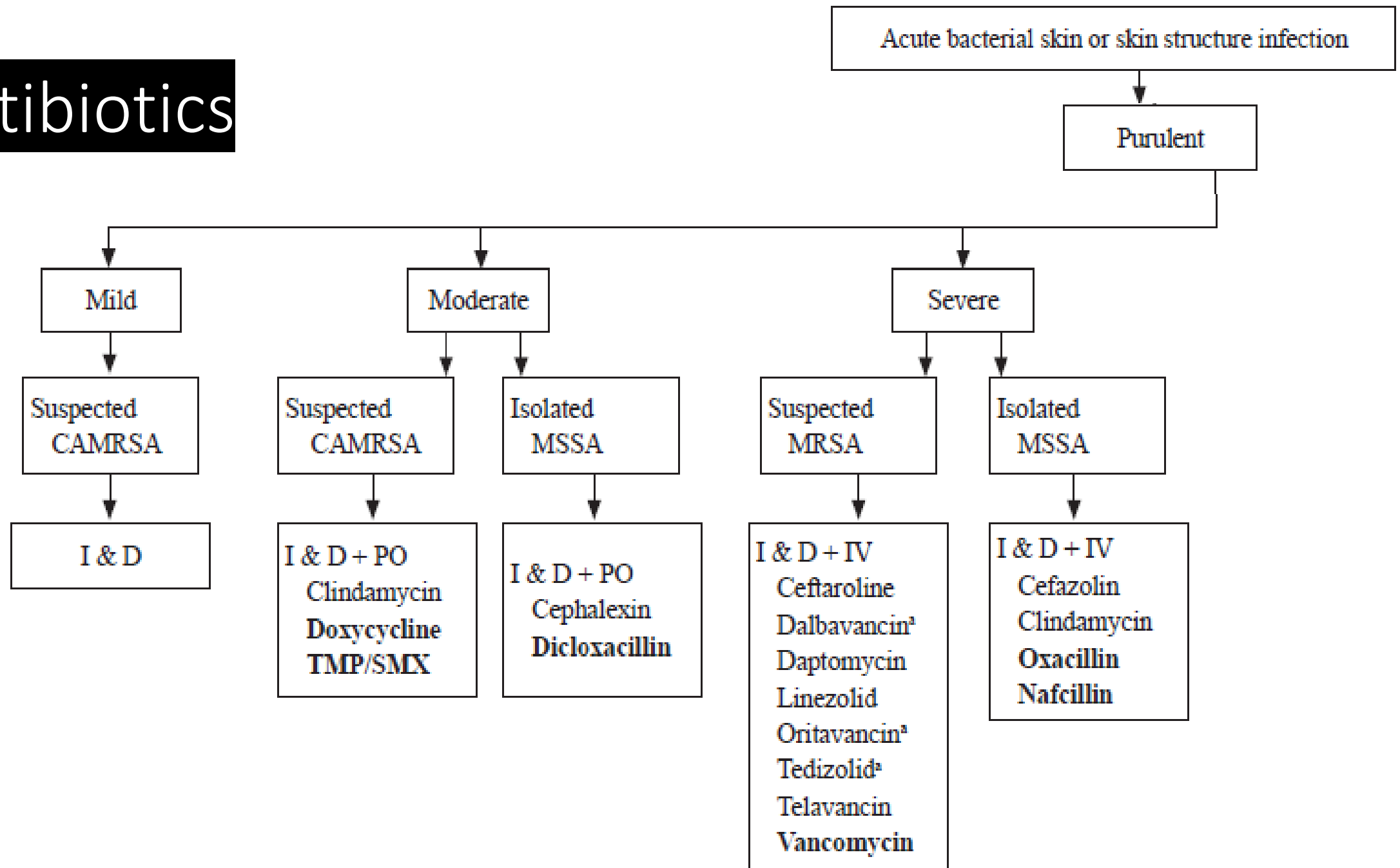
I&D: packing

- Abscess >5 cm in diameter
- Pilonidal abscess
- Abscess in an immunocompromised or diabetic patient
- packing of wounds <5 cm wide does not appear to prevent the need for further drainage procedures and may be more painful in some patients
- After probing and irrigation, pack the cavity to prevent closure of the wound margins.
- Avoid packing the cavity too tightly, since excessive pressure may cause tissue necrosis
- Sterile gauze, iodoform gauze, or silver-containing hydrofiber (eg, Aquacel Ag) packing strips may be used to fill the abscess cavity.
- A tail of about 1 cm of packing can serve as a wick for drainage and facilitate subsequent removal of the packing material
- The wound is left open and an absorbent dressing is placed over it.

The following abscesses have a high rate of complication or require anatomical expertise :

- Perirectal abscesses.
- Anterior and lateral neck abscesses potentially arising from congenital cysts (eg, thyroglossal duct cyst, branchial cyst, cystic hygroma).
- Hand abscesses (excluding paronychias and felons).
- Abscesses adjacent to vital nerves or blood vessels (eg, facial nerve, carotid artery, femoral artery).
- Abscesses in the central triangle of the face formed by the corners of the mouth and the nasal bridge. These lesions pose a risk of septic phlebitis and intracranial extension through the cavernous sinus. They are treated with warm compresses, broad spectrum antibiotic therapy, and close follow-up with otolaryngology.
- Breast abscesses, particularly those near the areola and nipple.

Antibiotics



Impetigo

- Impetigo occurs mostly in children and is characterized by multiple erythematous, vesicular, and pruritic lesions on the face and the extremities.
- Nonbullous impetigo presents with small fluid-filled vesicles that soon develop into pustules that rupture, leaving golden-yellow crusts.



Impetigo

- Bullous impetigo presents with vesicles that develop into yellow fluid-filled bullae that rupture, leaving brown crusts.
- Rarely, streptococcal impetigo leads to complications such as acute rheumatic fever and glomerulonephritis.
- Diagnosis of impetigo is based on clinical presentation.



Impetigo

- Gram stain and culture of the pus or exudates are recommended to identify whether *S. pyogenes* or *S. aureus* is the cause, but treatment without those studies is reasonable in typical cases
- The mainstay of therapy for both nonbullous and bullous impetigo is topical mupirocin or retapamulin twice daily for 5 days.
- Oral antibiotics directed against MSSA (e.g. dicloxacillin or cephalexin for 7 days) are recommended for patients with many lesions and in the setting of an outbreak.

Erysipelas

- The vast majority of erysipelas cases are caused by beta-hemolytic streptococci
- Erysipelas is characterized by a bright red erythematous lesion of the superficial layers of the skin
- The lesion has a raised border and a well-demarcated margin
- Erysipelas is often preceded by flu-like symptoms and is associated with burning pain



Bullous Erysipelas

- Typically caused by group A B-hemolytic streptococci
- Legs and face are primary sites
- Lymphangitis, fever, chills
- Bullous involvement complicates erysipelas in 5% of cases and there is an increased rate of MRSA infection
- Rupture of bullae, debridement, compression stockings
- Recurrence of 30% within 3 years due to lymphatic obstruction



Cellulitis

- The most common microbiologic cause of cellulitis is beta-hemolytic streptococci (groups A, B, C, G, and F), most commonly group A *Streptococcus* or *Streptococcus pyogenes*; *Staphylococcus aureus* (including methicillin-resistant strains) is a notable but less common cause.
- Cellulitis is an acute inflammation of the epidermis, dermis, and sometimes the superficial fascia, and it can be purulent or nonpurulent.
- The lesion is characterized by erythema and edema of the skin and has nonelevated and poorly defined margins.



Cellulitis

- Cellulitis is considered a serious infection because of the propensity of the microorganism(s) to invade lymphatic tissue and blood.
- If left untreated, cellulitis can progress to adjacent tissue and cause an abscess, septic arthritis, or osteomyelitis.
- Diagnosis is based on clinical presentation, and cultures of blood or cutaneous aspirates, biopsies, or swabs are not routinely recommended, except in patients with immersion injuries or in those who with immunocompromising conditions

Cellulitis

Cellulitis Clinical Scoring System	
Clinical presentation	Score
Largest lesion > 5 cm at longest diameter	1
> 3 affected areas	1
Concurrent ulcers or abscesses	1
Fever > 38.0 °C or 101.4 °F	1
Leukocytosis (men > 12,000; women > 11,000) <u>OR</u> leukopenia WBC < 4000	1
Hypotension (SBP < 90 or decreased by 20 mm Hg)	1

mild 0-1, moderate 2-3, severe 4-6

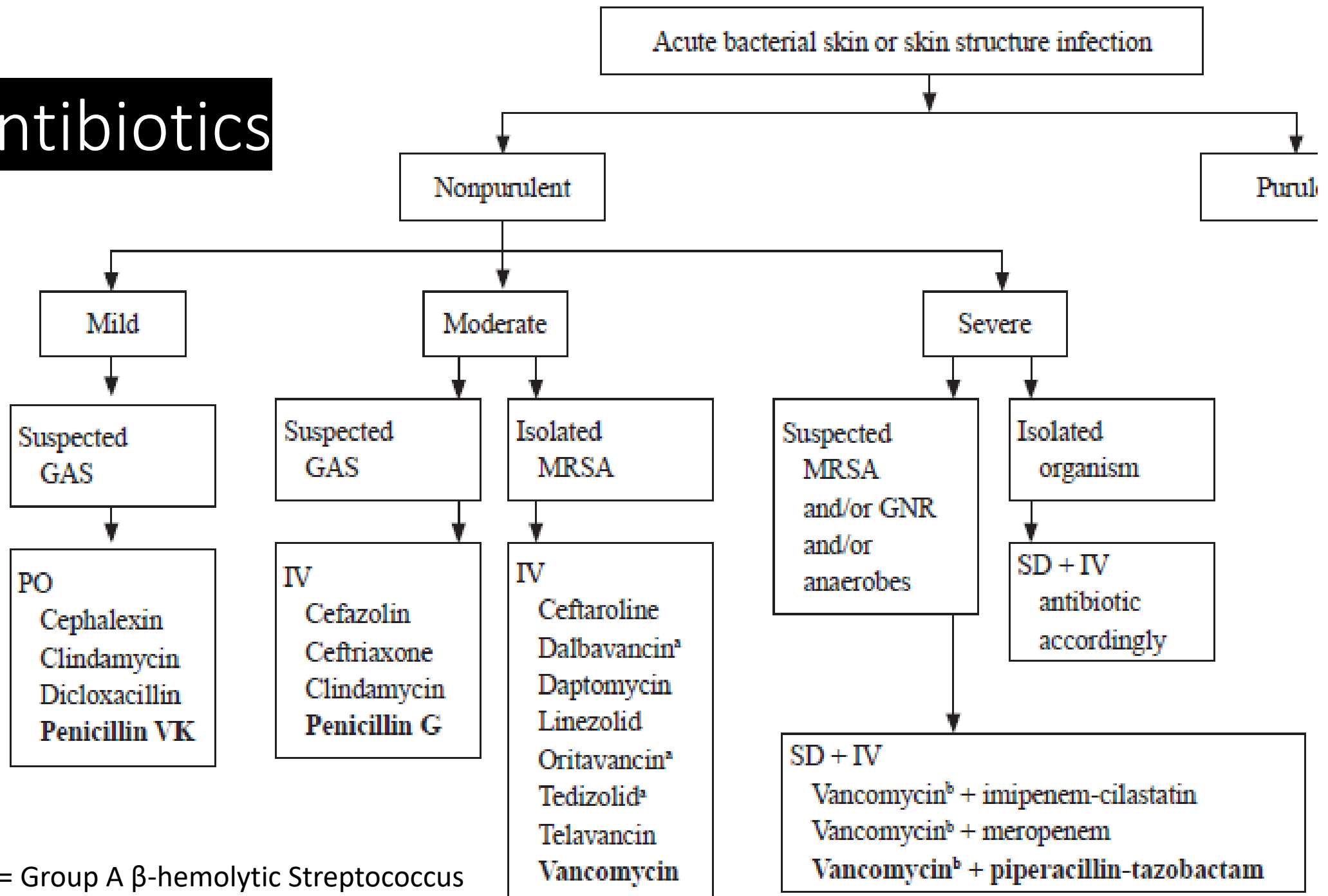
Cellulitis and Erysipelas treatment

- Patients with nonpurulent infection (ie, cellulitis or erysipelas in the absence of abscess or purulent drainage) should be managed with empiric antibiotic therapy
- Patients with purulent cellulitis (ie, cellulitis associated with purulent drainage in the absence of drainable abscess) should be managed with antibiotic therapy
- Patients with drainable abscess should undergo incision and drainage with Gram stain, culture, and susceptibility testing of debrided material. In addition, antibiotic therapy is warranted if moderate or severe SSTI

Cellulitis and Erysipelas treatment

- Mild and typical cases with no focus of purulence are treated in the outpatient setting with oral antibiotics directed primarily against streptococci (e.g., penicillin VK) but could also include coverage against MSSA (e.g., dicloxacillin, cephalexin, or clindamycin).
- The recommended duration of therapy is 5 days, but treatment should be extended if the infection has not improved.
- Moderate cases with systemic signs of infection (e.g., fever, leukocytosis, extensive lesions) require a short hospitalization for administration of intravenous penicillin G, cefazolin, ceftriaxone, or clindamycin, with a switch to oral agents upon clinical response.
- For patients whose cellulitis is associated with penetrating trauma, evidence of MRSA infection elsewhere, nasal colonization with MRSA, injection drug use, or systemic inflammatory-response syndrome, intravenous vancomycin or another antibiotic effective against both MRSA and streptococci is recommended.

Antibiotics



GAS = Group A β -hemolytic Streptococcus

Additional treatment

- Immobilization and elevation of the affected extremity facilitate drainage.
- Treating fissuring, scaling, and maceration in the interdigital toe spaces reduces the incidence of recurrent lower-leg infections.
- Treating predisposing conditions such as obesity, edema, venous insufficiency, and eczema reduces the risk of recurrent infections.
- Lastly, prophylactic administration of penicillin VK or erythromycin orally twice daily or benzathine penicillin intramuscularly every 2 to 4 weeks should be considered in patients who have three or four episodes of cellulitis per year despite attempts to treat predisposing factors

Necrotizing fasciitis

- **Type I** necrotizing fasciitis is a **mixed infection** caused by aerobic and anaerobic bacteria. Risk factors include diabetes, peripheral vascular disease (PVD), immune compromise, and recent surgery, including minor procedures such as circumcision in newborn infants. Patients with diabetes and/or PVD frequently have lower extremity involvement. Neonates usually have abdominal or perineal involvement.
- **Type II** necrotizing fasciitis due to **group A Streptococcus** (GAS) or other beta-hemolytic streptococci, either alone or in combination with other species, most commonly *S. aureus*. It can occur among healthy individuals with no past medical history, in any age group.



Necrotizing fasciitis

- Patients with necrotizing fasciitis present initially with erythema, tenderness, warmth, swelling, and pain out of proportion to physical findings. As the infection progresses, blistering, skin crepitus, skin discoloration, and necrosis occur.
- Polymicrobial necrotizing fasciitis presents with relatively intact skin and spreads in 3–5 days.
- Streptococcal necrotizing fasciitis (what the lay press terms flesh-eating bacteria) can progress quickly within 1–2 days.
- Clostridial gas gangrene is characterized by gas production and muscle necrosis.
- Diagnosis is based on clinical presentation, recent history of penetrating or blunt trauma, laboratory abnormalities, and surgical exploration.
- Cultures should be obtained from tissue samples and blood.
- Once the diagnosis is established, necrotizing fasciitis is considered a medical emergency

Differential diagnosis of necrotizing myositis and fasciitis

Clinical finding	Type I	Type II	Gas gangrene	Pyomyositis	Myositis viral/parasitic
Fever	++	++++	+++	++	++
Diffuse pain	+	+	+	+	++++ [¶]
Local pain	++	++++	++++	++	++
Systemic toxicity	++	++++	++++	+	+
Gas in tissue	++	—	++++	—	—
Obvious portal of entry	++++	± [◇]	++++ [§]	—	—
Diabetes mellitus	++++	±	—	—	—

(Laboratory Risk Indicator for Necrotizing Fasciitis) A tool for distinguishing necrotizing fasciitis from other soft tissue infections

Item	Value	Score
C-reactive protein	<150	0
	>150	4
WBC count	<15	0
	15-25	1
	>25	2
Hemoglobin	>13.5	0
	11-13.5	1
	<11	2
Sodium level	≥ 135	0
	<135	2
Creatinine level	≤ 1.6	0
	>1.6	2
Glucose level	≤ 180	0
	>180	1

Risk	Score	Probability
Low	≤ 5	<50%
Intermediate	6-7	50-75%
High	≥ 8	>75%

Necrotizing fasciitis

- Immediate and aggressive surgical debridement is essential in the management of necrotizing fasciitis.
- Polymicrobial infections must be empirically treated with broad-spectrum antibiotics such as vancomycin, linezolid, or daptomycin plus piperacillin-tazobactam or a carbapenem or ceftriaxone plus metronidazole that are directed against gram-positive cocci, Enterobacteriaceae, and anaerobes.
- Group A streptococcal and clostridial infections are treated with parenteral aqueous penicillin G plus clindamycin.





Hidradenitis
suppurativa
(acne inversa)

Hidradenitis suppurativa

- Hidradenitis suppurativa (HS, from the Greek hidros = sweat and aden = glands) is a chronic inflammatory skin condition that is also known as acne inversa (AI), and historically, as Verneuil's disease
- The primary sites of involvement for HS/AI are the intertriginous skin areas of the axillary, groin, perianal, perineal, and inframammary regions, though HS/AI can occur in any skin area that contains FPSUs.
- The clinical manifestations vary, ranging from recurrent inflamed nodules and abscesses to draining sinus tracts and bands of severe scar formation.
- The associated pain, malodor, drainage, and disfigurement that accompany HS/AI contribute to a profound psychosocial impact of the disease on many patients.

Inflammatory nodules

- Most frequently, the first lesion is a solitary, painful, deep-seated inflamed nodule (0.5 to 2 cm in diameter), often in an intertriginous area.
- Onset can be insidious, with occasional solitary, painful nodules that can last for several days to months.
- Recurrent episodes of nodule formation may occur in the exact same location or in the same general area.
- After a variable period of time, the nodule often progresses to form an abscess that may open to the skin surface spontaneously (or as a result of manipulation by the patient), yielding purulent or serosanguineous drainage



Sinus tracts

- The development of multiple recurrent nodules within a limited area may predispose to the formation of intercommunicating sinuses.
- Patients with sinus tracts often experience intermittent release of seropurulent, and at times infected and malodorous, bloody discharge.



Comedones

- Open comedones often appear in long-standing HS/AI, commonly as double-headed or multi-headed open comedones.
- These structures are often described as "tombstone comedones" because they reflect end stage damage to the folliculopilosebaceous unit with associated loss of the sebaceous gland and hair



Scars

- The appearance of healed areas ranges from individual pitted acneiform scars after resolution of small nodules to dense fibrotic bands or indurated, thick, scarred plaques affecting the whole axillary or groin area.
- Scars may also be atrophic (particularly on the trunk) or keloidal, and scarring on the buttocks sometimes manifests as multiple pitted scars.
- In patients with active disease, scarring is accompanied by inflammatory nodules and draining sinuses.



Hidradenitis suppurativa

- Stage I – Abscess formation (single or multiple) without sinus tracts and cicatrization/scarring
- Stage II – Recurrent abscesses with sinus tracts and scarring, single or multiple widely separated lesions
- Stage III – Diffuse or almost diffuse involvement, or multiple interconnected sinus tracts and abscesses across the entire area

Treatment

- Education and support
 - Avoidance of skin trauma
 - Hygiene
 - Dressings
 - Smoking cessation
 - Weight management
 - Diet
 - Management of comorbidities
- Surgery:
 - Punch debridement
 - Unroofing (local or extensive)
 - I&D is not effective! Only short-term relief

Punch debridement

- Punch debridement involves the use of a 5- to 7-mm circular punch instrument (identical to that used in a punch biopsy) to deeply excise the acutely inflamed FPSU within an inflammatory nodule with a small amount of surrounding tissue.
- This is followed by aggressive debridement using digital pressure and then curettage or simple grattage (scrubbing) with gauze wrapped around a cotton-tipped swab



Unroofing

- Surgical unroofing (also described as deroofing) is indicated for the treatment of inflamed nodules, abscesses, and sinus tracts typically found with moderate and severe HS
- The technique consists of careful unroofing and debridement of sinuses and inflamed tissue by a surgeon who has experience with this procedure.
- Under local or regional anesthesia, sinus tracts or the inflamed cavity are entered through the overlying skin or through a sinus opening and opened widely with scissors, explored with scissor tips or a malleable metal probe, and serially unroofed until no residual tracts of inflammatory activity remain



A close-up photograph of a medical professional, likely a nurse or surgeon, performing a surgical procedure on a patient's arm. The professional is wearing white gloves and using a surgical instrument to work on a large, open wound on the patient's forearm. The wound is deep and bloody, revealing underlying tissue. The patient's arm is resting on a green surgical drape. In the background, other medical staff in blue scrubs are partially visible. A dark grey semi-transparent box is overlaid on the top left of the image.

Thx for
attention!

**THE SMELL WAS SOOO BAD MOST PEOPLE HAD TROUBLE
TOLERATING IT. THIS NURSE WAS HAVING A VERY HARD TIME**