Common Outpatient Dermatologic Infections in Adults and How to Manage Them

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Disclosures

- None

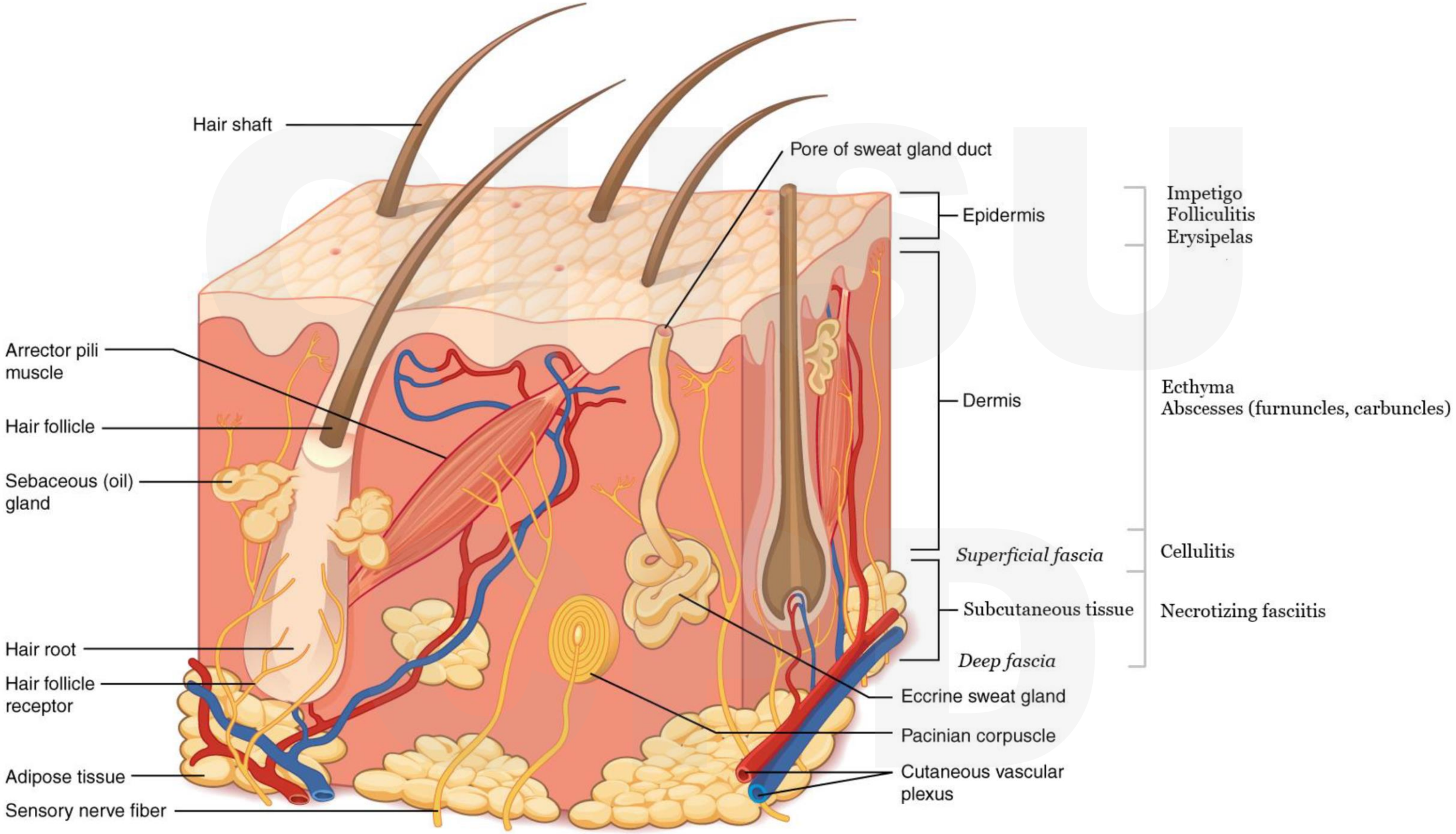
Objectives

- Review bacterial skin and soft tissue infections (SSTI)
- Discuss common viral causes of skin infections
  - Herpes viruses (HSV, VZV)
  - Measles
  - Molluscum
  - Warts
  - Mpox
- Describe common fungal infections of skin and nails
  - Tinea infections
  - Candidal intertrigo
  - Onychomycosis

Bacterial SSTIs

- Estimated 14.5 million patients diagnosed with cellulitis annually
  - Accounts for 650,000 hospital admissions
  - 10% of all Infectious Disease hospitalizations
- Primary cutaneous infections are most often due to *Staphylococcus aureus, Streptococcus pyogenes,* and other beta-hemolytic streptococci
- Secondary cutaneous infections can be extension of pre-existing lesions – i.e trauma/surgical wounds, ulcers
  - Often polymicrobial

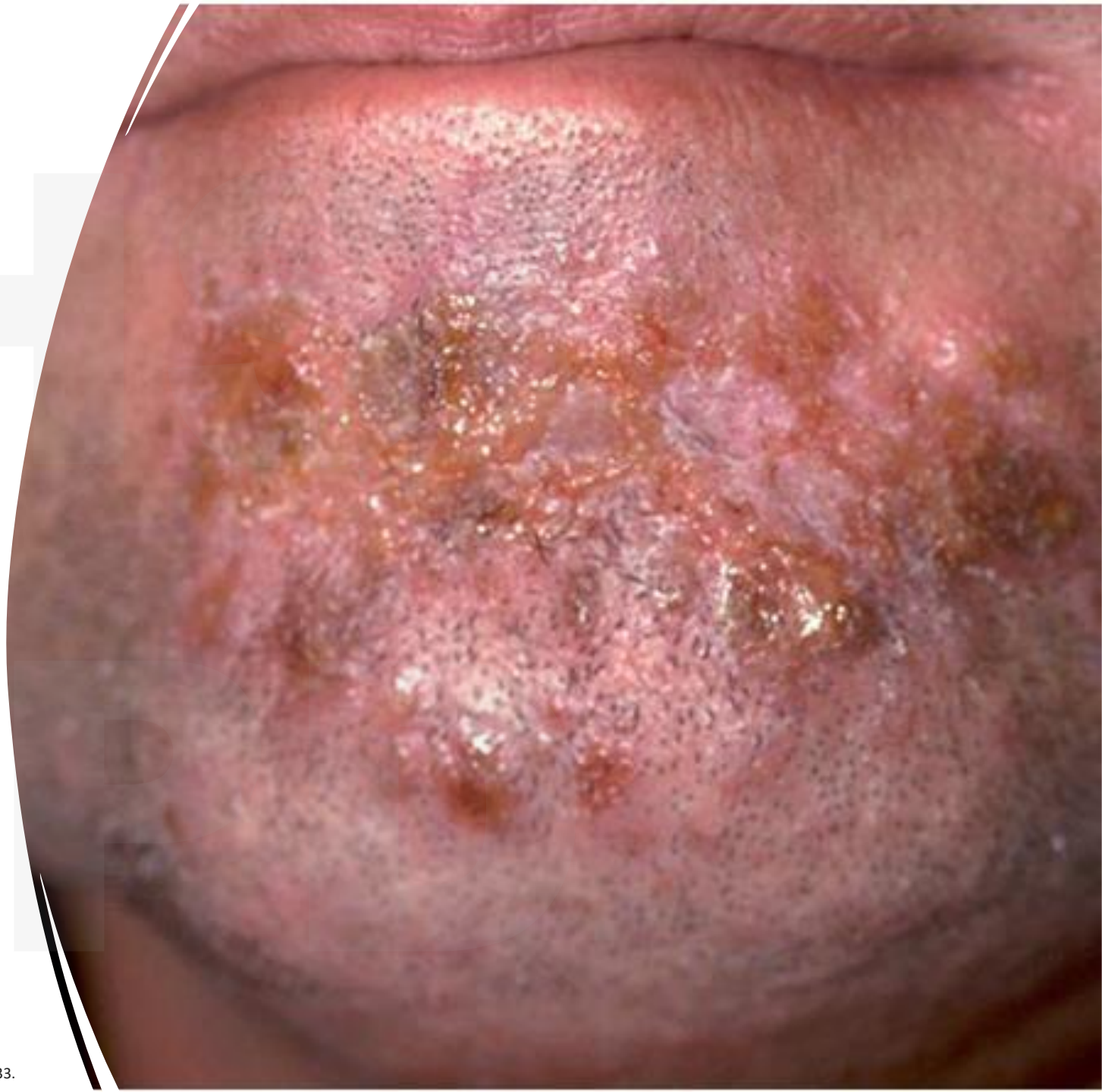
Cutler TS et al. Prevalence of misdiagnosis of cellulitis: A systematic review and meta-analysis. J Hosp Med 2023 Mar; 18:254. (https://doi.org/10.1002/jhm.12977)



Silverberg B. A Structured Approach to Skin and Soft Tissue Infections (SSTIs) in an Ambulatory Setting. Clinics and Practice. 2021; 11(1):65-74. https://doi.org/10.3390/clinpract11010011

Impetigo

- Infection of superficial epidermis
  - Most often seen in young children
- Often occurs in warm, humid conditions
  - Contagious and can spread to close contacts
- Most often due to MSSA and beta hemolytic streptococci (Group A)
- Nonbullous – papules/vesicles→honey colored crusting
  - Treatment with topical antibiotics for limited disease, systemic antibiotics for extensive disease



Picture taken from UptoDate, "Impetigo" 3/19/2025

Clebak KT, Malone MA. Skin Infections. Prim Care. 2018 Sep;45(3):433-454. doi: 10.1016/j.pop.2018.05.004. PMID: 30115333.

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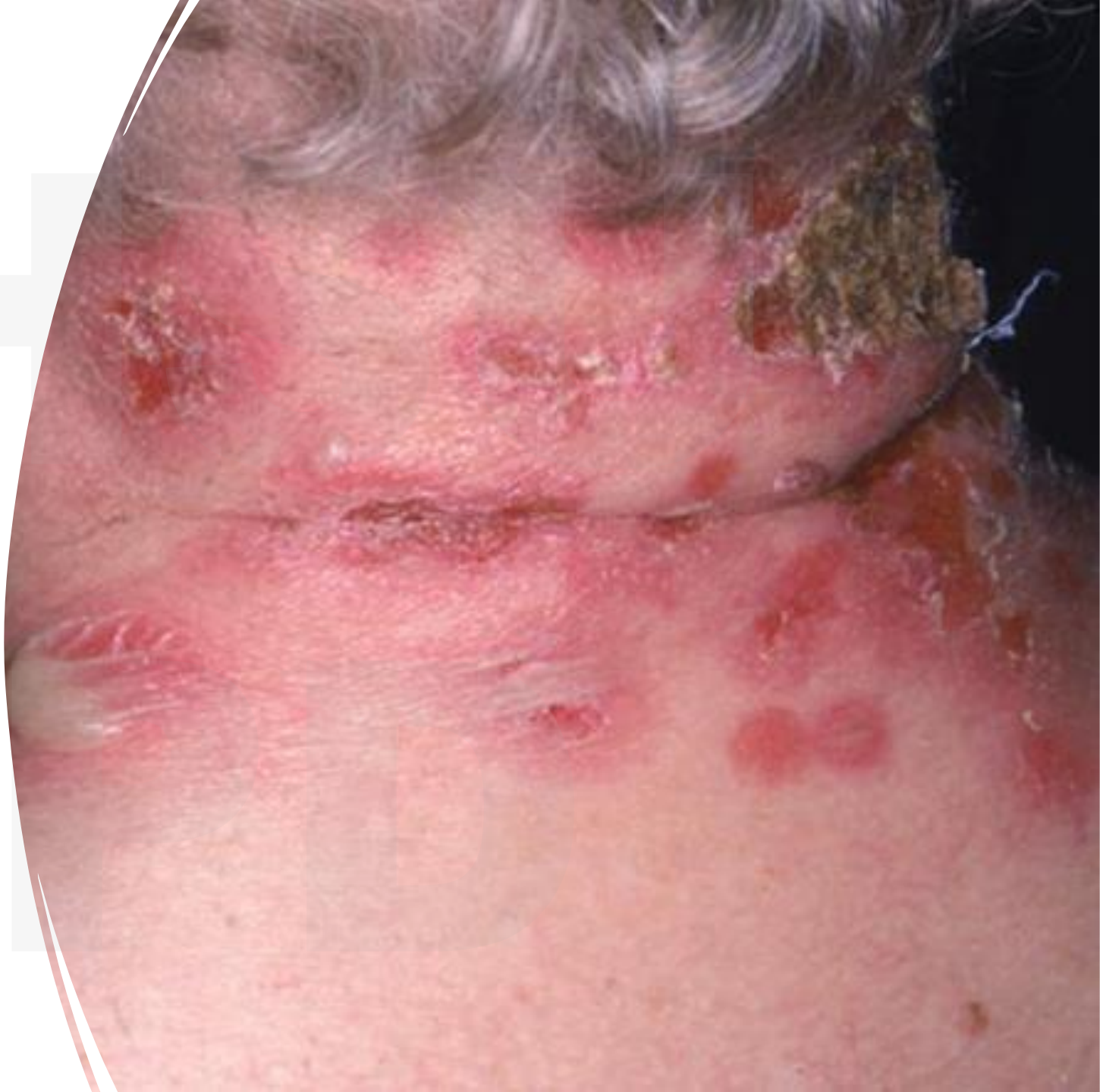
- Bullous – *Staph aureus* toxin mediated leading to epidermal/dermal lysis
  - Treat w/ oral antibiotics targeted towards MSSA



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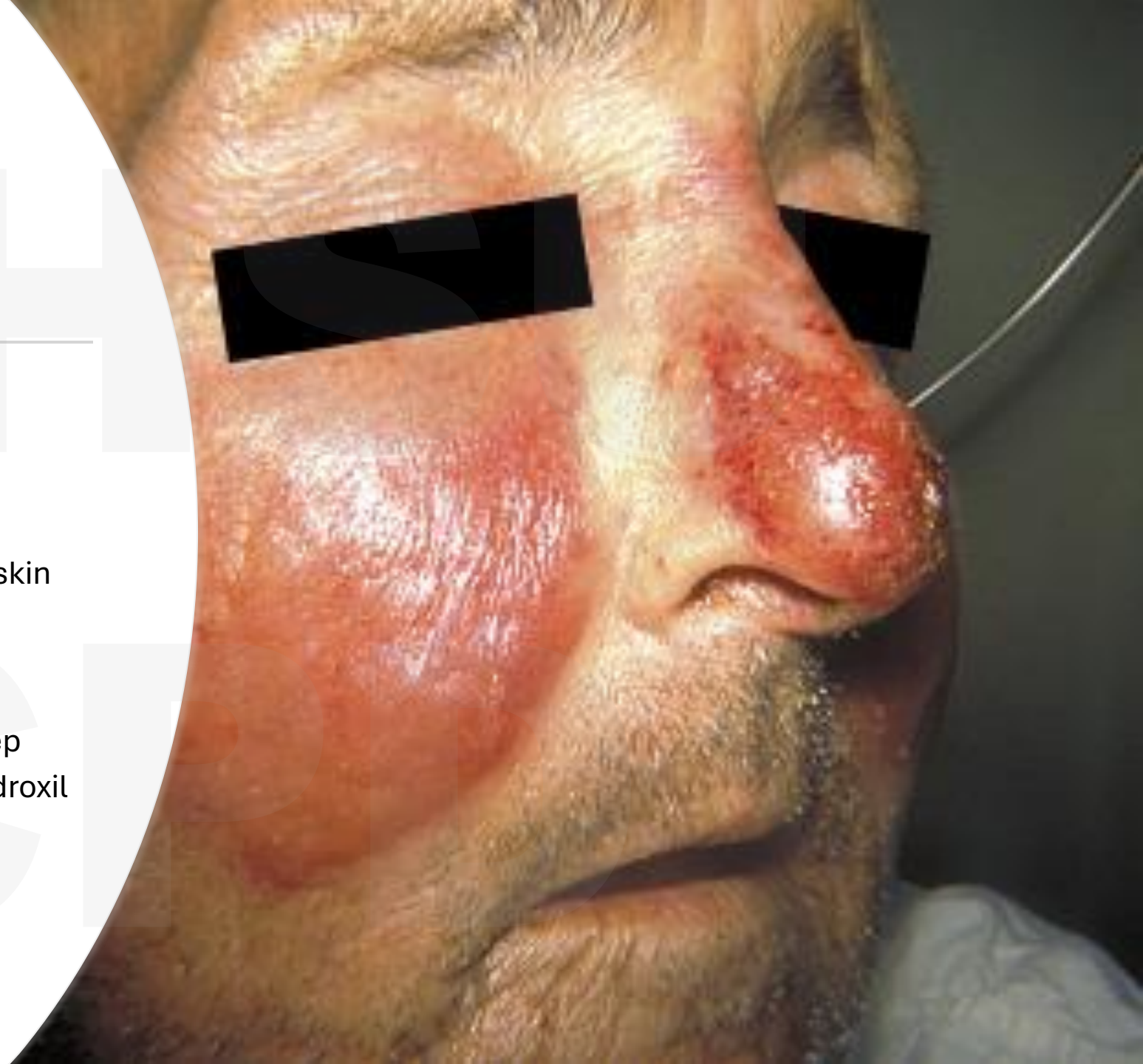
Erysipelas

- Superficial dermis including lymphatics
- Usually involves face or lower extremities
- Painful, red, swollen
  - Sharp line of demarcation from normal skin
- Systemic signs often present
- Group A streptococcus is most common
- Antibiotics active against beta hemolytic strep
  - Amoxicillin, penicillin, cephalexin, cefadroxil
- Treatment is 5-7 days



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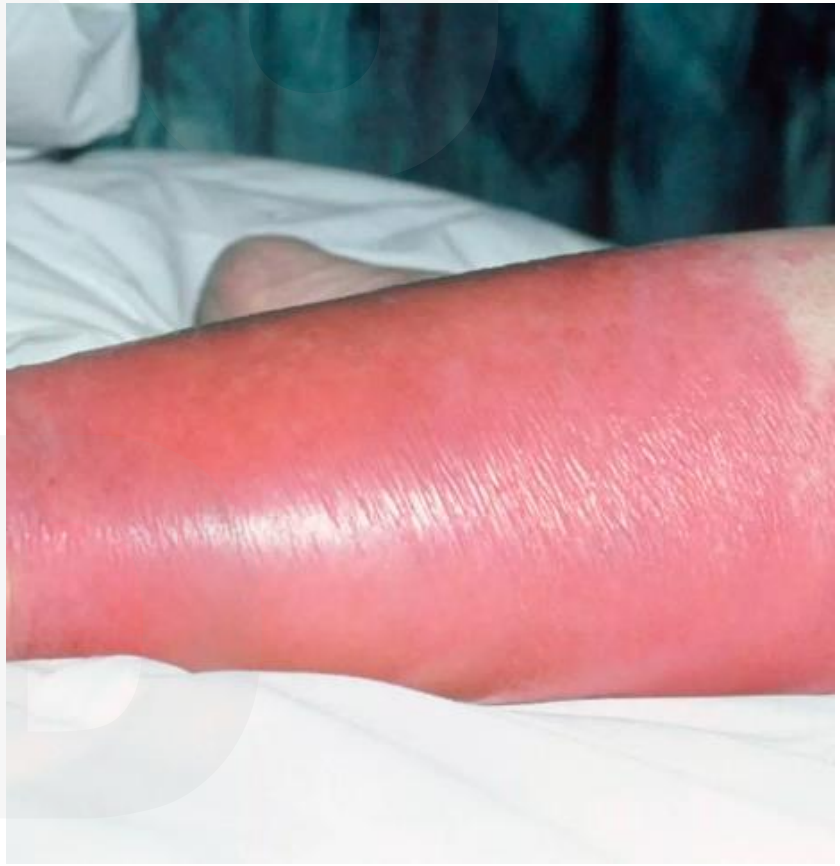
Cellulitis

- Bacterial infection involving subcutaneous tissue extending through the dermis
- Erythema, edema, warmth, pain
  - Can sometimes see bullae as well
  - Systemic symptoms may be present
- Bilateral involvement of limbs is highly unusual and usually happens with risk factors for both limbs such as trauma/injection drug use on both sides
  - In absence of risk factors, bilateral involvement should suggest alternative diagnoses such as venous stasis
- Differentiate between non-purulent and purulent to guide empiric treatment

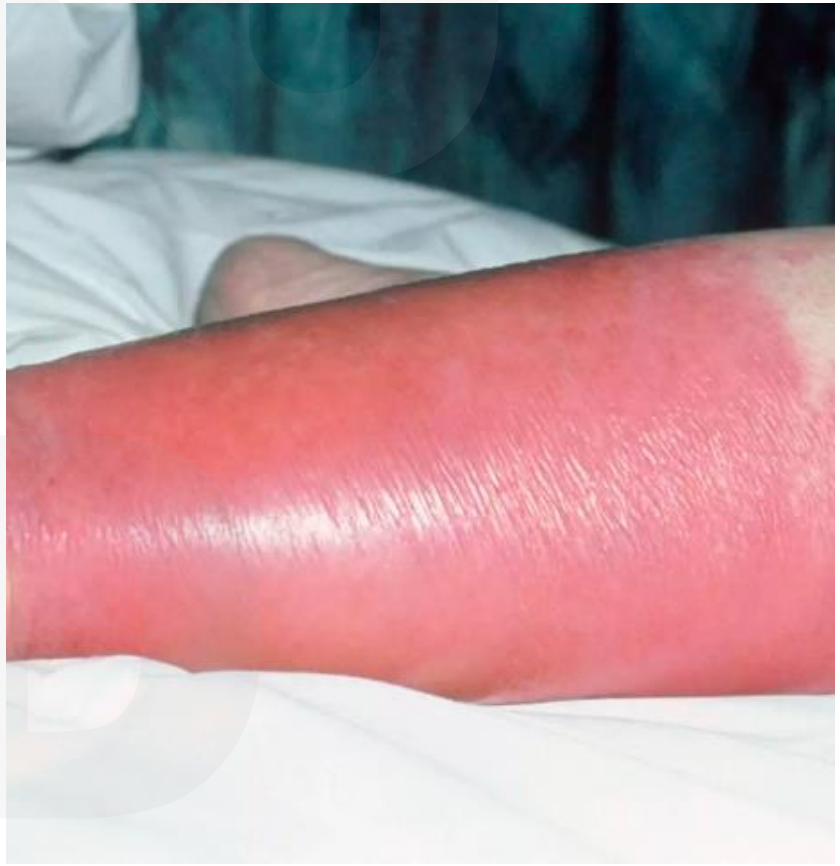


Int J Gen Med. 2022 Jun 9;15:5567–5578. doi: 10.2147/IJGM.S356852

Picture taken from https://pharmaceutical-journal.com/article/ld/cellulitis-recognition-and-management 3/24/2025

Non-Purulent Cellulitis

- Beta-hemolytic streptococci (Group A strep most commonly)
- MSSA



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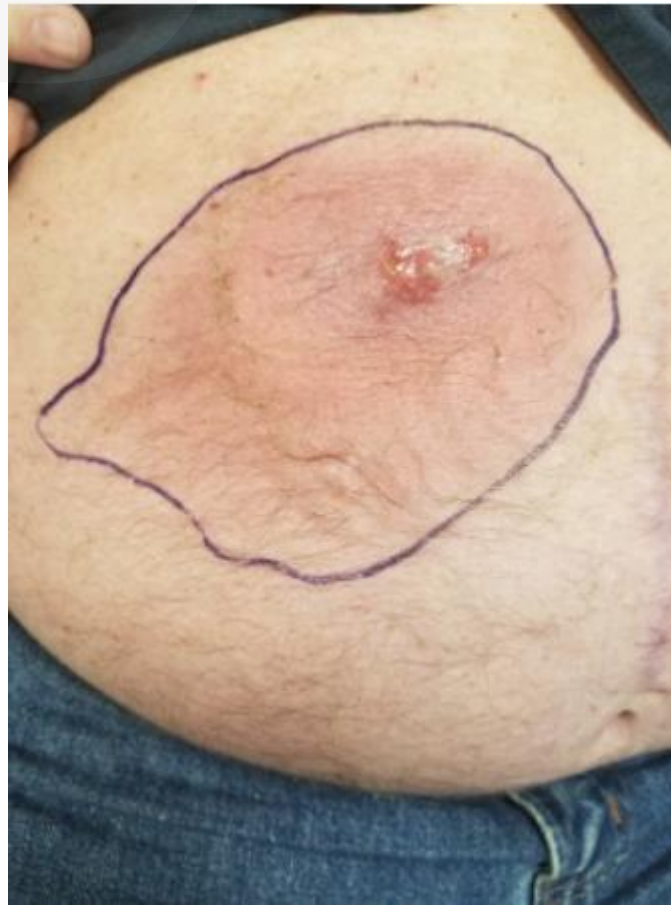
Purulent cellulitis

- Encompasses skin abscesses, furuncles, carbuncles
- Needs to have MRSA coverage
- Patients may complain of a “spider bite” but if a spider was not seen biting them, it could be MRSA



Potential of the Hobo Spider to Transfer MRSA.

Spiders were exposed to MRSA to determine their ability to acquire the pathogen from a MRSA-treated surface. This pathogen was chosen because the tissue lesions that it causes are often misdiagnosed as resulting from spider bites (Dominguez 2004, Baxtrom et al. 2006, Vetter et al. 2006b, Cohen 2007). We used a commercially available MRSA screening kit to detect the acquisition and transfer of MRSA by the hobo spider from polyethylene disks. No MRSA was found either on the spiders or on the clean surfaces to which the MRSA-exposed spiders were subjected. There was no MRSA pathogen carried or transferred to another surface by the MRSA-exposed spiders, although MRSA was found to persist on the polyethylene disks.

Melissa M. Gaver-Wainwright et al, Misdiagnosis of Spider Bites: Bacterial Associates, Mechanical Pathogen Transfer, and Hemolytic Potential of Venom From the Hobo Spider, Tegenaria agrestis (Araneae: Agelenidae), Journal of Medical Entomology, Volume 48, Issue 2, 1 March 2011, Pages 382–388, https://doi.org/10.1603/ME09224
Clebak KT, Malone MA. Skin Infections. Prim Care. 2018 Sep;45(3):433-454. doi: 10.1016/j.pop.2018.05.004. PMID: 30115333.

Diagnosis

- Clinical diagnosis based on history and appearance of skin
- Routine cultures of skin are not recommended

IV. What Is Appropriate for the Evaluation and Treatment of Erysipelas and Cellulitis?

Recommendations

1. Cultures of blood or cutaneous aspirates, biopsies, or swabs are not routinely recommended (strong, moderate).
2. Cultures of blood are recommended (strong, moderate), and cutaneous and microscopic examination of cutaneous aspirates, biopsies, or swabs should be considered in patients with malignancy on chemotherapy, neutropenia, severe cell-mediated immunodeficiency, immersion injuries, and animal bites (weak, moderate).

Steven et al. Practice Guidelines for the Diagnosis and Management of Skin and Soft Tissue Infections: 2014 Update by the Infectious Diseases Society of America, Clinical Infectious Diseases, Volume 59, Issue 2, 15 July 2014, Pages e10–e52, https://doi.org/10.1093/cid/ciu296

Cellulitis

Non-purulent (no MRSA risk factors)

Anti-MSSA and beta-hemolytic strep coverage

Cephalexin 500mg PO q8 hours
Cefadroxil 500mg PO q12 hours
Penicillin VK 500mg PO q8 hours
Allergy concerns:
TMP-SMX/Clindamycin*

Purulent (furuncle, carbuncle, abscess)

Perform I&D
Can send purulent tissue for culture

Anti-MRSA and beta-hemolytic strep coverage
TMP/SMX 1-2 DS tabs PO BID
Doxycycline 100mg PO BID
Clindamycin 450mg PO q8 hours*

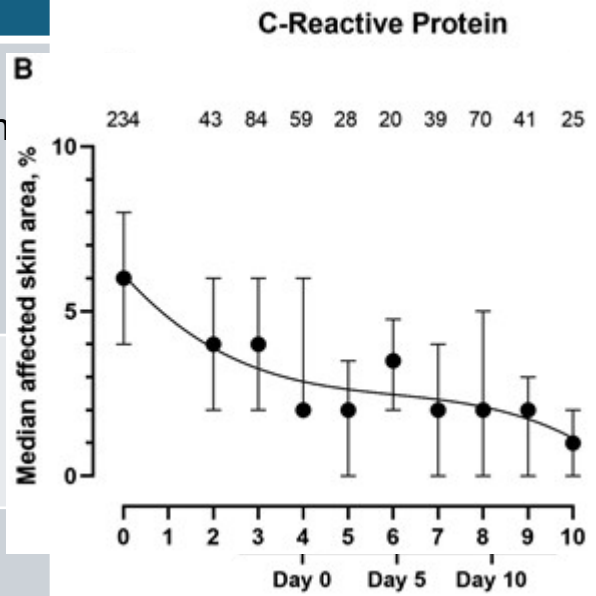
Typical duration – 5-7 days

DO NOT USE ORAL VANCOMYCIN TO TREAT SSTIs!!

Delayed resolution of cellulitis symptoms

- Data taken from RCT on cellulitis from 2017, 247 patients w/ lower limb cellulitis treated w/ 5 days of flucloxacillin

Parameter	Day 0-5	Day 0-10	Day 10
Reduction in limb circumference	0.5 cm reduction	0.85cm reduction	36% of pts still had ≥ 2cm difference between limbs
Reduction in limb temperature	1.4°C	1.8°C	29.5% had ≥1°C difference in local skin temp
Reduction in affected surface area (mean %)	34%	65%	
Reduction in pain score	2.0	2.9	54.3% had pain score ≥ 1 13.9% had pain score ≥ 5



October 2023, ofad488, Williams, O et al. Open Forum Infectious Diseases, Volume 10, Issue 10, https://doi.org/10.1093/ofid/ofad488

Misdiagnosis of cellulitis/mimics

- Meta-analysis of 8 studies with 858 patients (mostly inpatient) diagnosed with cellulitis
  - Dermatology/ID consultation was considered gold standard
  - 335 (39%) received an alternative diagnosis
  - 221 of these were non-infectious

Alternative diagnoses total patients = 327 [a]					
Noninfectious	**221**	**68%**	**Infectious**	**111**	**34%**
Stasis dermatitis/venous stasis	60	18%	Abscess	32	10%
Trauma	21	6%	Septic bursitis	17	5%
Eczematous dermatitis	17	5%	Osteomyelitis	16	5%
Gout/pseudogout	12	4%	Infected ulcer	14	4%
Unspecified dermatitis	10	3%	Erythema migrans	8	2%
Allergic reaction/dermatitis	10	3%	Septic arthritis	6	2%
Lymphangitis	7	2%	Viral rash	3	1%
Deep vein thrombosis	4	1%	Tenosynovitis	3	1%
Edema	4	1%	Other [c]	12	4%
Erythema nodosum	4	1%			
Chronic wound	3	1%			
Other [b]	69	21%			

Cutler TS, Jannat-Khah DP, Kam B, Mages KC, Evans AT. Prevalence of misdiagnosis of cellulitis: A systematic review and meta-analysis. J Hosp Med. 2023; 18: 254-261. doi:10.1002/jhm.12977

Recurrent cellulitis

- Annual recurrence rates of 8-20%
- Risk factors include edema, venous insufficiency, trauma, tinea pedis, obesity, tobacco use, peripheral arterial disease

VI. What Is the Preferred Evaluation and Management of Patients with Recurrent Cellulitis?

Recommendations

1. Identify and treat predisposing conditions such as edema, obesity, eczema, venous insufficiency, and toe web abnormalities (strong, moderate). These practices should be performed as part of routine patient care and certainly during the acute stage of cellulitis (strong, moderate).

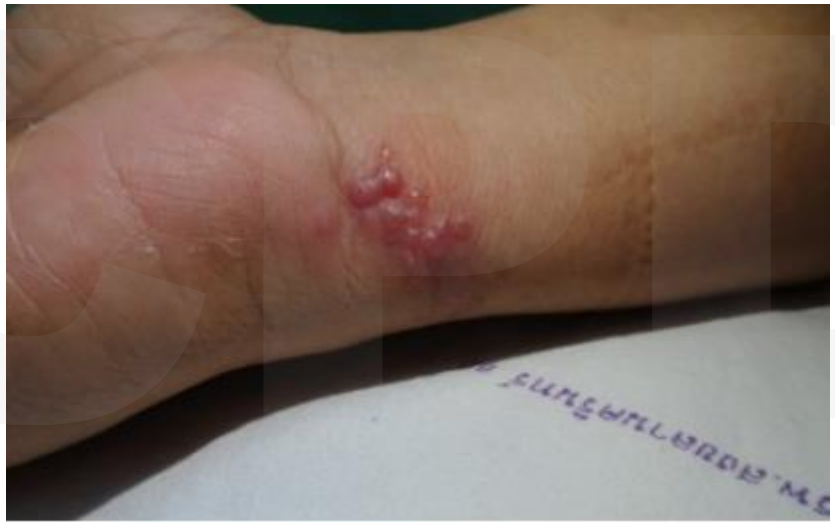
2. Administration of prophylactic antibiotics, such as oral penicillin or erythromycin bid for 4–52 weeks, or intramuscular benzathine penicillin every 2–4 weeks, should be considered in patients who have 3–4 episodes of cellulitis per year despite attempts to treat or control predisposing factors (weak, moderate). This program should be continued so long as the predisposing factors persist (strong, moderate).

Steven et al. Practice Guidelines for the Diagnosis and Management of Skin and Soft Tissue Infections: 2014 Update by the Infectious Diseases Society of America, Clinical Infectious Diseases, Volume 59, Issue 2, 15 July 2014, Pages e10–e52, https://doi.org/10.1093/cid/ciu296

Viral skin infections

Case

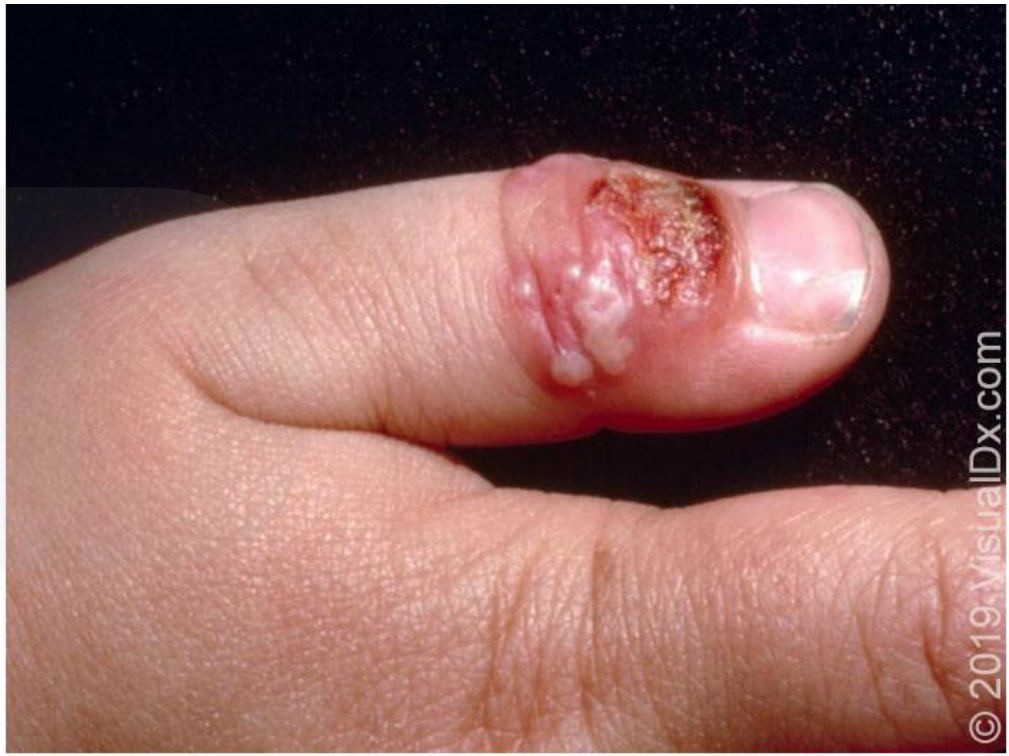
- A 54 year old female presents for evaluation of a recurrent rash on her R wrist. She has had 3 bouts of a painful, blistering rash. Appearance of the rash is accompanied by some subjective fevers and fatigue. It lasts a few days before resolving. She has been treated with antibiotics without improvement.



IDCases. 2020 May 11:21:e00783. doi: 10.1016/j.idcr.2020.e00783.

Herpes Simplex Virus 1&2

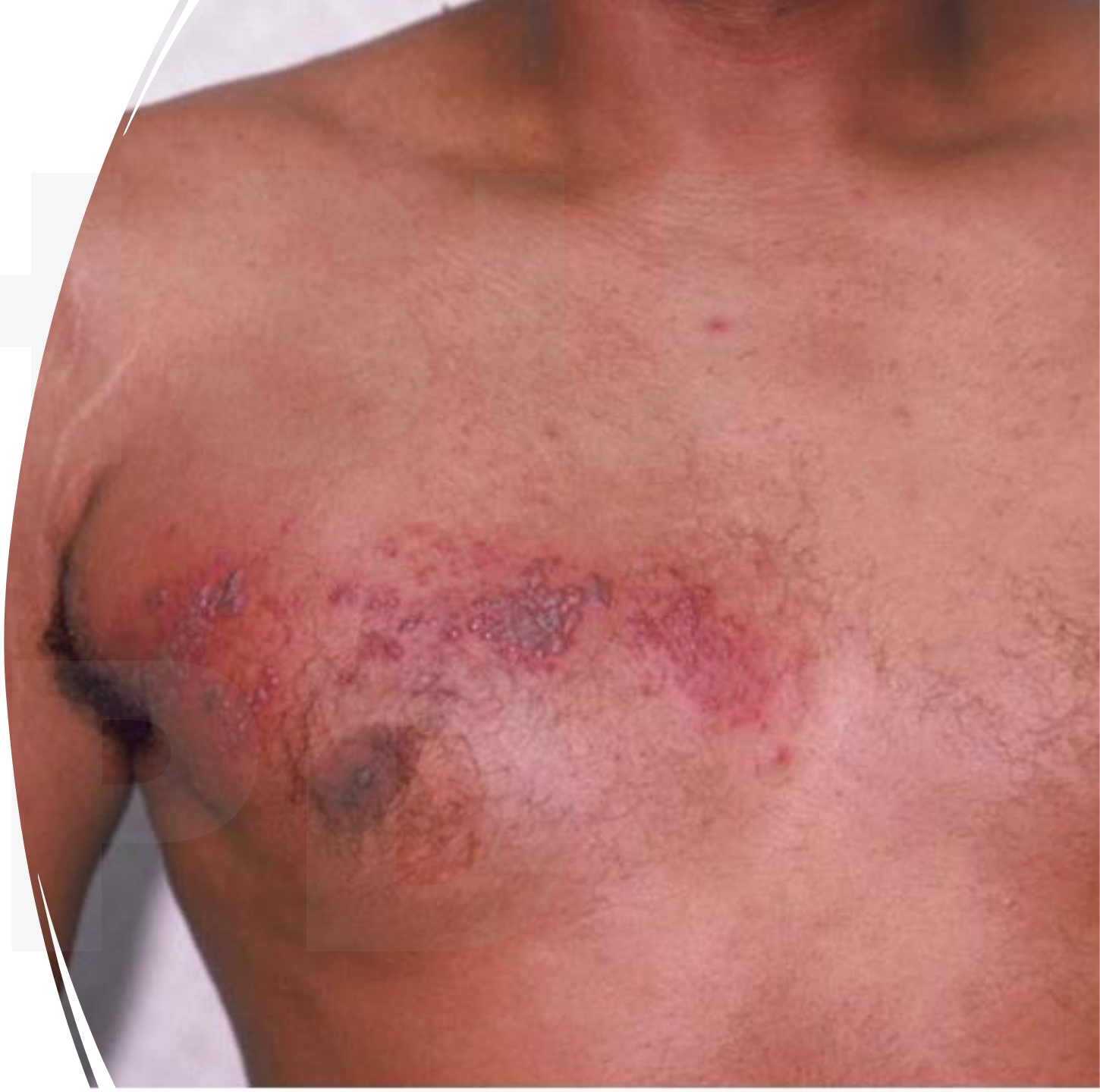
- Tense vesicles/pustules on an erythematous base
- Evolve into crusted, tender ulcerations
- Most often seen in perioral or genital regions
  - Herpetic whitlow – affects the fingers
- Diagnosis – classic clinical appearance
  - Can send PCR from lesions
- Do NOT send HSV serologies to diagnose cutaneous disease
  - Poor sensitivity/specificity



Picture taken from UptoDate, "Epidemiology, clinical manifestations, and diagnosis of herpes simplex virus type 1 infection" 3/20/2025

Varicella Zoster Virus

- Primary disease – chickenpox
- Reactivation – Shingles or zoster
  - Blistering, painful rash appearing in dermatomal distribution
  - Primary infection in adults, especially immunocompromised and pregnant patients can lead to life threatening pneumonia
- Can send PCR from lesions if diagnosis not clear from presentation



Picture from UptoDate, "Epidemiology, clinical manifestations, and diagnosis of herpes zoster" 3/20/2025

Treatment

- HSV – Valacyclovir 1gm PO BID or acyclovir 400mg PO TID
  - 7-10 days
- VZV – Valacyclovir 1gm PO TID or Acyclovir 800mg PO 5x daily
  - 7 days typical duration
  - Consider hospitalization/intravenous acyclovir for:
    - Disseminated disease (>2-3 contiguous dermatomes, bilateral involvement, non-contiguous dermatomes, visceral involvement)
    - Ocular manifestations
    - Neurologic complications
- Vaccination!

Measles

- Measles was officially eliminated from the US in 2000
  - Waning rates of vaccination has led to increasing outbreaks, including the one we are currently experiencing
  - 2024 – 285 cases were reported
  - 2025 – 712 confirmed cases so far, 2 confirmed deaths
- No cases in Oregon yet
  - If travel and/or unvaccinated, much higher concern
  - Extremely contagious – up to 9/10 susceptible people with close contact to a measles patient will develop measles

U.S. Cases in 2025

Total cases

712

Age
Under 5 years: **225 (32%)**
5-19 years: **274 (38%)**
20+ years: **198 (28%)**
Age unknown: **15 (2%)**

Vaccination Status
Unvaccinated or Unknown: **97%**
One MMR dose: **1%**
Two MMR doses: **2%**

U.S. Hospitalizations in 2025

11%

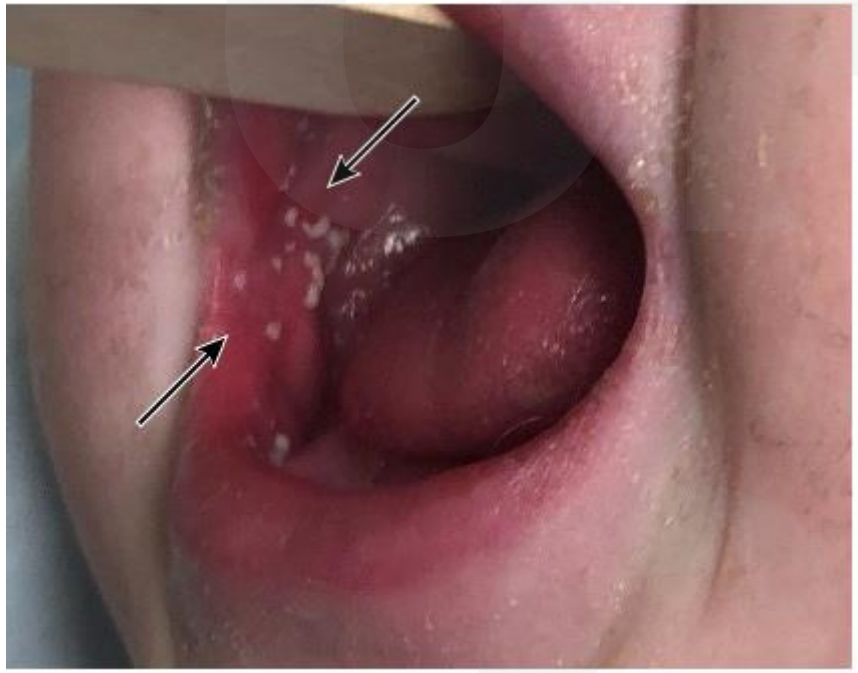
11% of cases hospitalized (79 of 712).

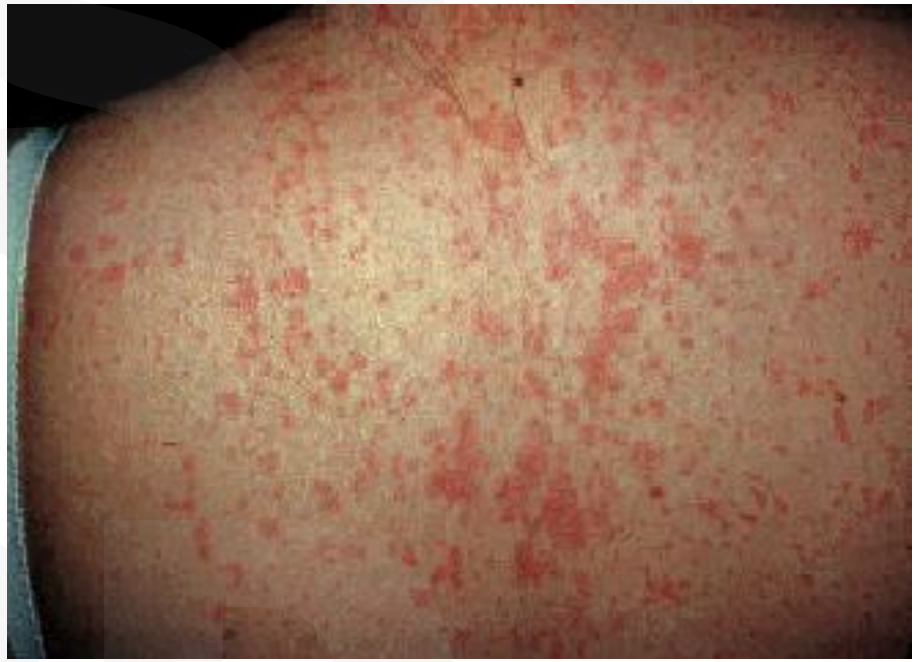
Percent of Age Group Hospitalized
Under 5 years: **20% (45 of 225)**
5-19 years: **7% (20 of 274)**
20+ years: **6% (12 of 198)**
Age unknown: **13% (2 of 15)**

https://www.cdc.gov/measles/data-research/index.html, 4/17/2025

Measles disease course

- Median Incubation period of 13 days
- Prodromal symptoms – fever, cough, coryza, conjunctivitis, Koplik's spots
- Followed by rash – maculopapular blanching rash that starts on head/face and spreads downward to trunk
  - Clinical improvement typically starts within 48 hours of rash
- Children younger than 5, adults older than 20, pregnant people, and immunocompromised patients are at risk of complications
  - Pneumonia, Encephalitis
- If concerned about measles, mask and isolate patient and call Oregon Acute and Communicable Disease Prevention Program





Picture from UptoDate, "Measles: Clinical manifestations, diagnosis, treatment, and prevention" 3/20/2025

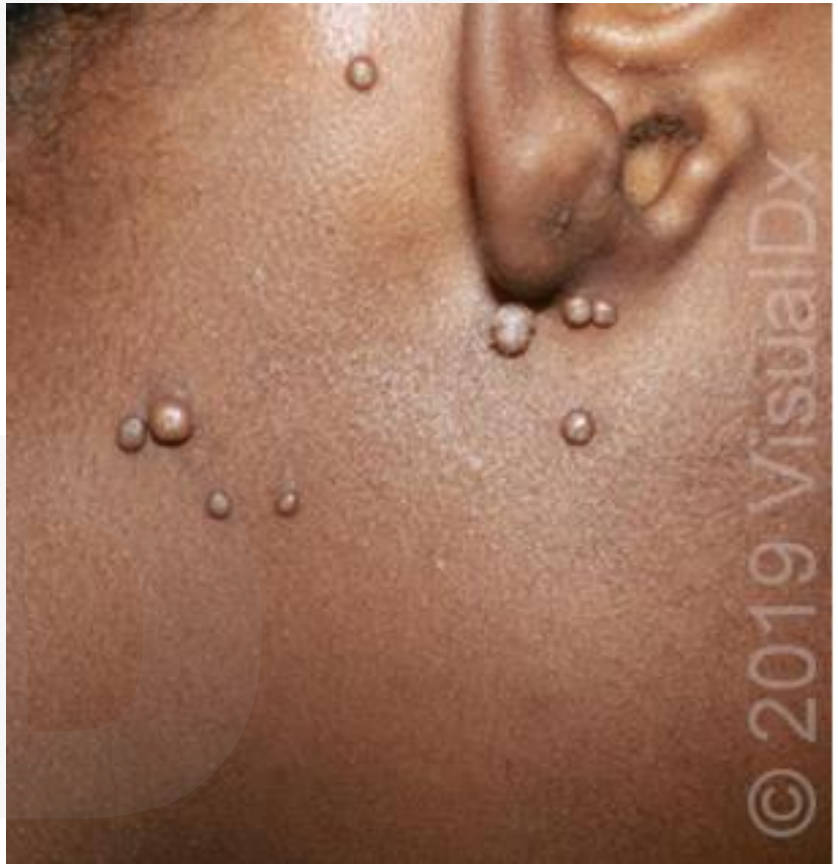
Prevention

- Vaccination!
- MMR is safe and effective
- Vaccination in kindergartners has decreased from 95.2% 2019-2020 to 92.7% 2023-2024
- Pts are considered to be contagious from 4 days before to 4 days after rash appears
  - Infected people should be isolated for 4 days after they develop a rash; airborne precautions should be followed in healthcare settings.

https://www.cdc.gov/measles/hcp/clinical-overview/index.html#cdc_clinical_overview_treat_pat-patient-management

Molluscum contagiosum

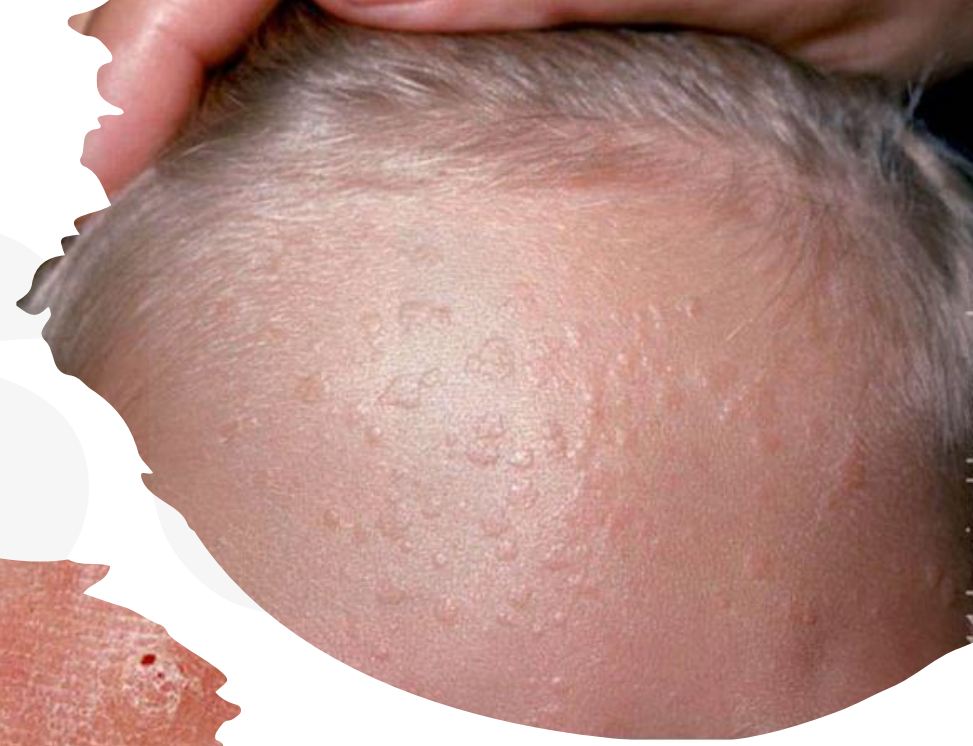
- Poxvirus infection, common in childhood
- Can occur in adults
  - STD
  - In relation to immunosuppression (HIV)
  - Skin contact (i.e contact sports)
- Diagnosis – classic clinical appearance
- Self-limited and no definitive evidence that treatment is effective
  - Recommended when present as STD or in immunocompromised patients
- Cryotherapy, curettage, cantharidin



Picture taken from UpToDate "Molluscum contagiosum" 4/15/2025
Prim Care 2018 Sep;45(3):433-454. doi: 10.1016/j.pop.2018.05.004.

Warts

- Caused by HPV
- Cutaneous warts (common, plantar, flat)
- Diagnosis is typically based on appearance
    - Can pare hyperkeratotic debris to show thrombosed capillaries
- Differential includes corns, seborrheic keratosis, skin tags, lichen planus, skin cancers
- Consider treatment when warts associated with:
    - Pain/functional impairment
    - Cosmetic
    - Persistence
    - Immunosuppression
- Topical salicylic acid, cryotherapy



Pictures taken from UpToDate "Cutaneous warts (common, plantar, and flat warts)" 4/15/2025

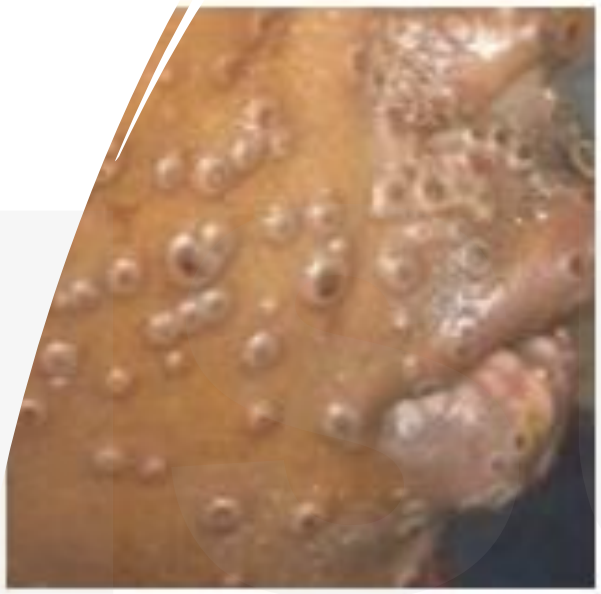
Prim Care 2018 Sep;45(3):433-454. doi: 10.1016/j.pop.2018.05.004.

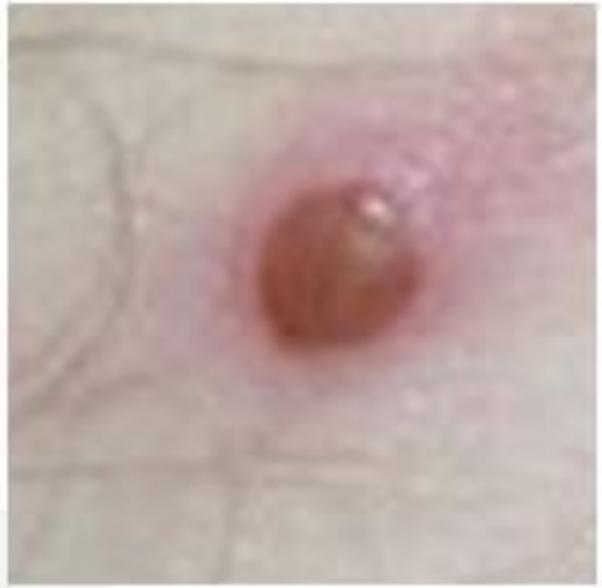
Mpox

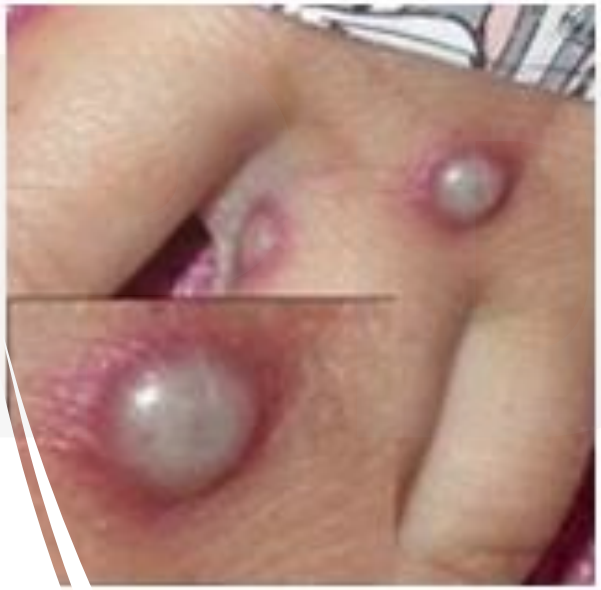
- Due to infection of monkeypox virus (MPXV)
- Same genus as variola (smallpox) and vaccinia (smallpox vaccine)
- 2 Clades
  - Clade II – responsible for the 2022 worldwide outbreak
  - Clade I – current outbreak in Central/East Africa, only 4 cases in the US
    - Burundi, Central African Republic, Democratic Republic of the Congo, Kenya, Republic of the Congo, Rwanda, Uganda, and Zambia

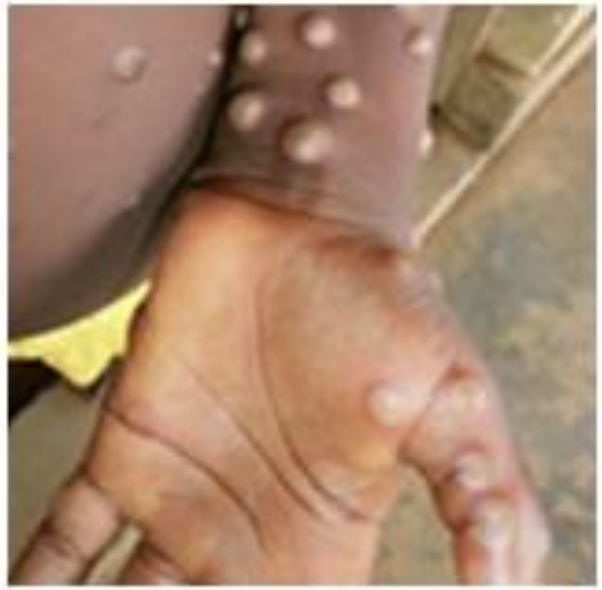
Clinical features

- Well circumscribed, firm, Painful lesions, often with umbilication
  - Usually develop and progress simultaneously→ macular, papular, vesicular, finally to pustular lesions
- Can have fever, malaise, chills, other prodromal symptoms









https://www.cdc.gov/mpox/hcp/clinical-signs/index.html

Mpox diagnosis

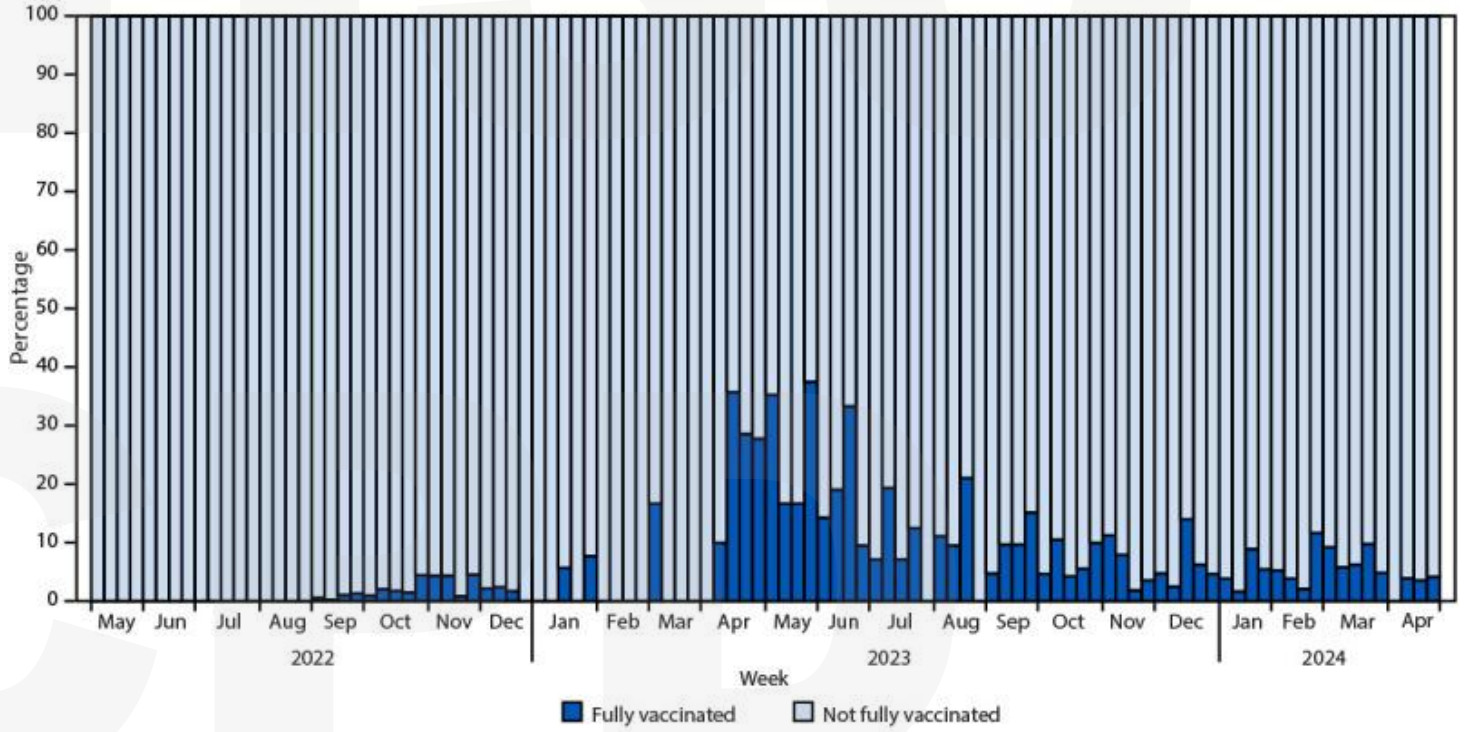
- Swab lesions and send for PCR
  - 2 swabs from each lesion
  - Notify state health department

Mpox treatment

- Most patients recover with supportive care/pain control
- Tecovirimat – antiviral drug stockpiled for smallpox preparedness
- 2 studies – PALM007, STOMP
  - Interim analyses – No reduction in duration of mpox lesions or pain in patients with mild/moderate disease and low risk of severe disease
  - Severely immunocompromised patients not studied
- Treatment currently limited to CDC EA-IND protocol:
  - Ocular/neurologic/cardiac involvement/extensive skin involvement
  - Severely immunocompromised patients – https://www.cdc.gov/mpox/hcp/clinical-care/tecovirimat.html
  - Active skin conditions placing at higher risk of dissemination
  - Pregnant patients
  - Patients < 18

Prevention

- Vaccination is effective!
- Indications: exposure, high risk sexual activities, recent STI, traveling to a country with a Clade 1 mpox outbreak with anticipation of higher risk activities



Proportion of fully vaccinated mpox cases* among all mpox cases, by epidemiologic week — United States, May 2022–May 2024

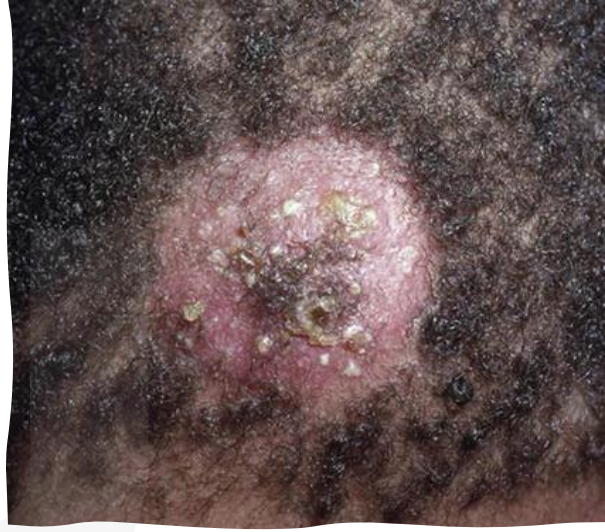
Fungal skin infections

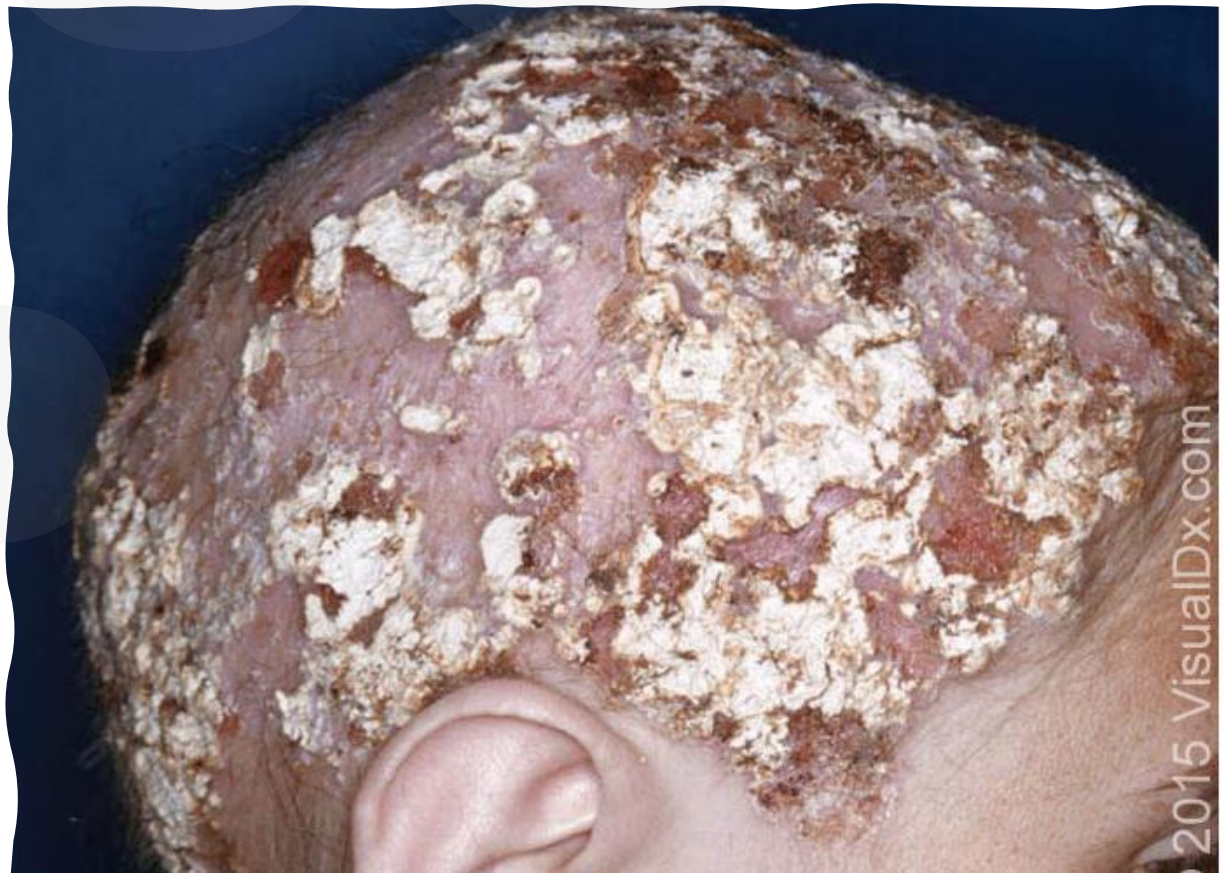
Tinea infections

- Caused by variety of fungi from genus *Trichophyton, Microsporum, Epidermophyton*
- Cutaneous manifestations based on anatomic location
  - Capitis – Hair follicles on scalp
  - Cruris – Jock itch – genital area/upper thighs
  - Corporis – Ringworm – face, trunk, back, extremities
  - Pedis – Athlete's foot

Tinea capitis

- Scaly patches with alopecia
- Patches of alopecia with black dots
- Widespread scaling with subtle hair loss
- Kerion
- Favus
- Diagnosis
  - Physical exam +/- dermoscopy
  - KOH prep, fungal culture, fungal PCR(?)





Pictures taken from UpToDate "Tinea capitis: Clinical features and diagnosis" 3/21/2025
Prim Care 2018 Sep;45(3):433-454. doi: 10.1016/j.pop.2018.05.004.

Tinea Capitis treatment

Antifungal therapy for adult tinea capitis *.

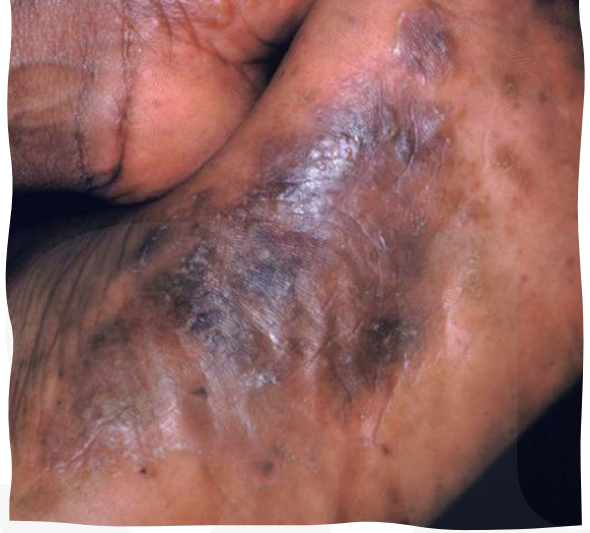
Drug Name	Dose	Frequency	Laboratory Monitoring
Griseofulvin ultramicrosize	10–15 mg/kg per day (maximum 750 mg per day)	6–12 weeks	Liver function panel and complete blood count if therapy extends ≥ 8 weeks
Terbinafine	250 mg per day	4–12 weeks depending on species 4–6 weeks for *Trichophyton* species 8–12 weeks for *Microsporum* species	Liver function panel before therapy begins and again if therapy extends ≥ 6 weeks CBC if therapy extends ≥ 6 weeks
Itraconazole	5 mg/kg per day (maximum 400 mg per day)	2–3 weeks, or consider pulse therapy	Liver function panel before therapy begins and again at 4 weeks
Fluconazole	6 mg/kg per day (maximum 400 mg per day)	3–6 weeks	No laboratory monitoring required

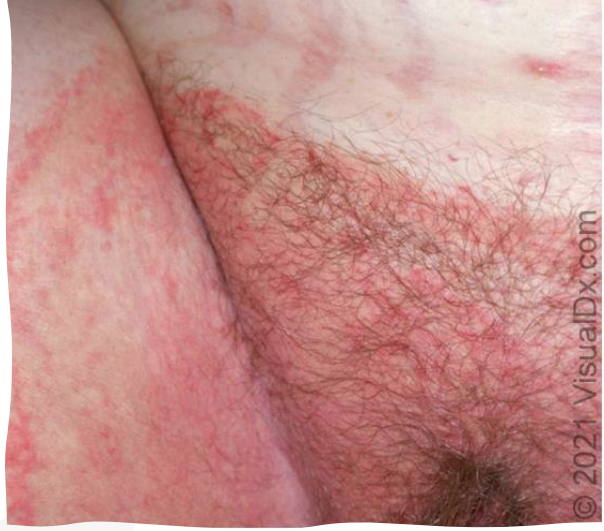
* Note, optimal treatment regimens for adult tinea capitis are not well-known. Standardized guidelines do not exist. CBC: complete blood count.

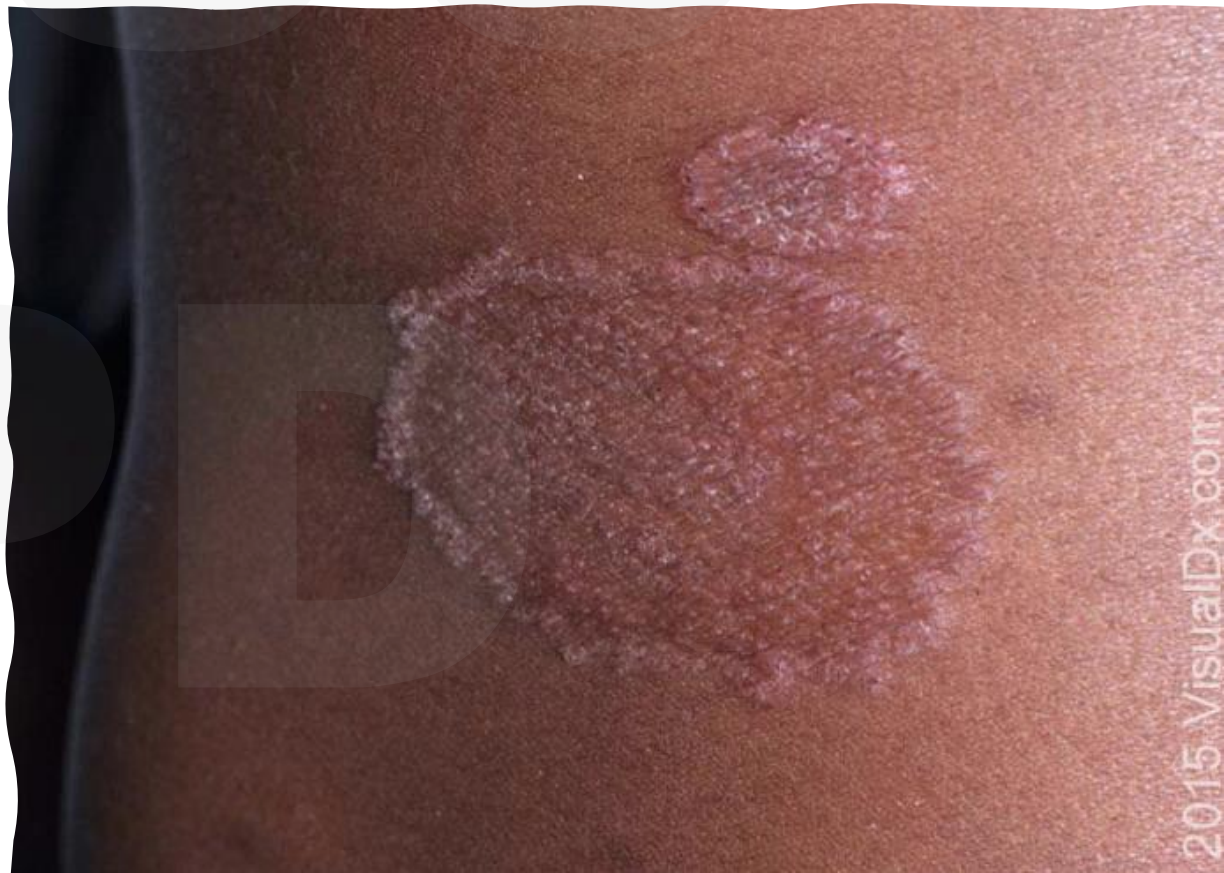
J Fungi (Basel). 2024 May 16;10(5):357. doi: 10.3390/jof10050357.

Tinea corporis/cruris/pedis

- Diagnosis – Exam, KOH prep
- Local disease – topical antifungals
  - Azoles, terbinafine, tolnaftate (Tinactin), ciclopirox, butenafine (Lotrimin Ultra)
- Systemic treatment for people who fail topicals or have widespread disease
  - Terbinafine, griseofulvin, itraconazole, fluconazole







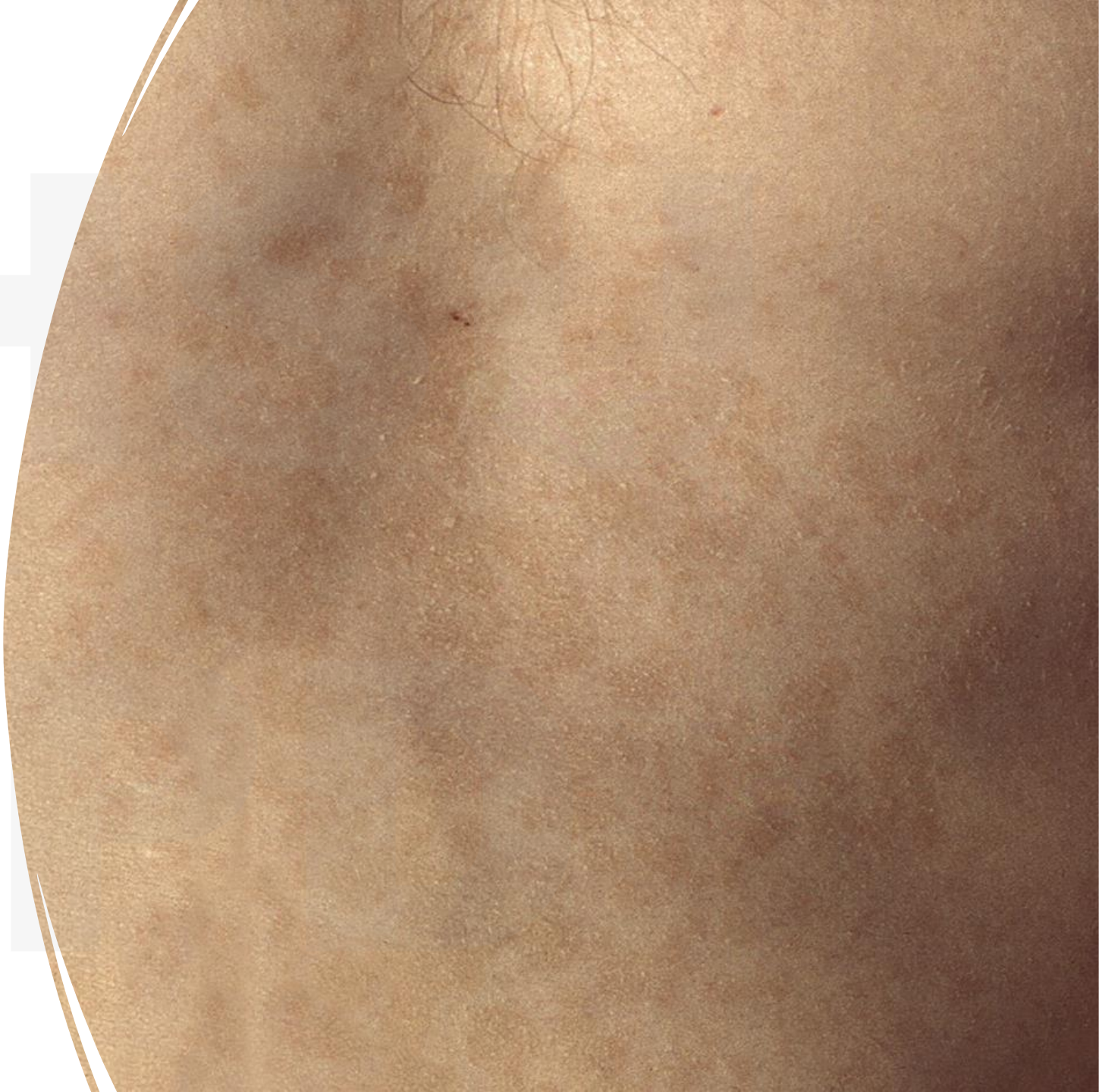
Pictures taken from UpToDate "Dermatophyte (tinea) infections" 3/21/2025

Trichophyton indotineae

- Cause of extensive, terbinafine-resistant dermatophytosis in immunocompetent patients
- Initial (and ongoing) outbreaks in southern Asia of tinea faciei (facial skin devoid of terminal hairs), corporis, or cruris
- Cases have been reported in the US, with sexual transmission
- Need high index of suspicion, confirm diagnosis of dermatophytosis if initial treatment courses are not working
- Itraconazole appears to be effective

Tinea Versicolor

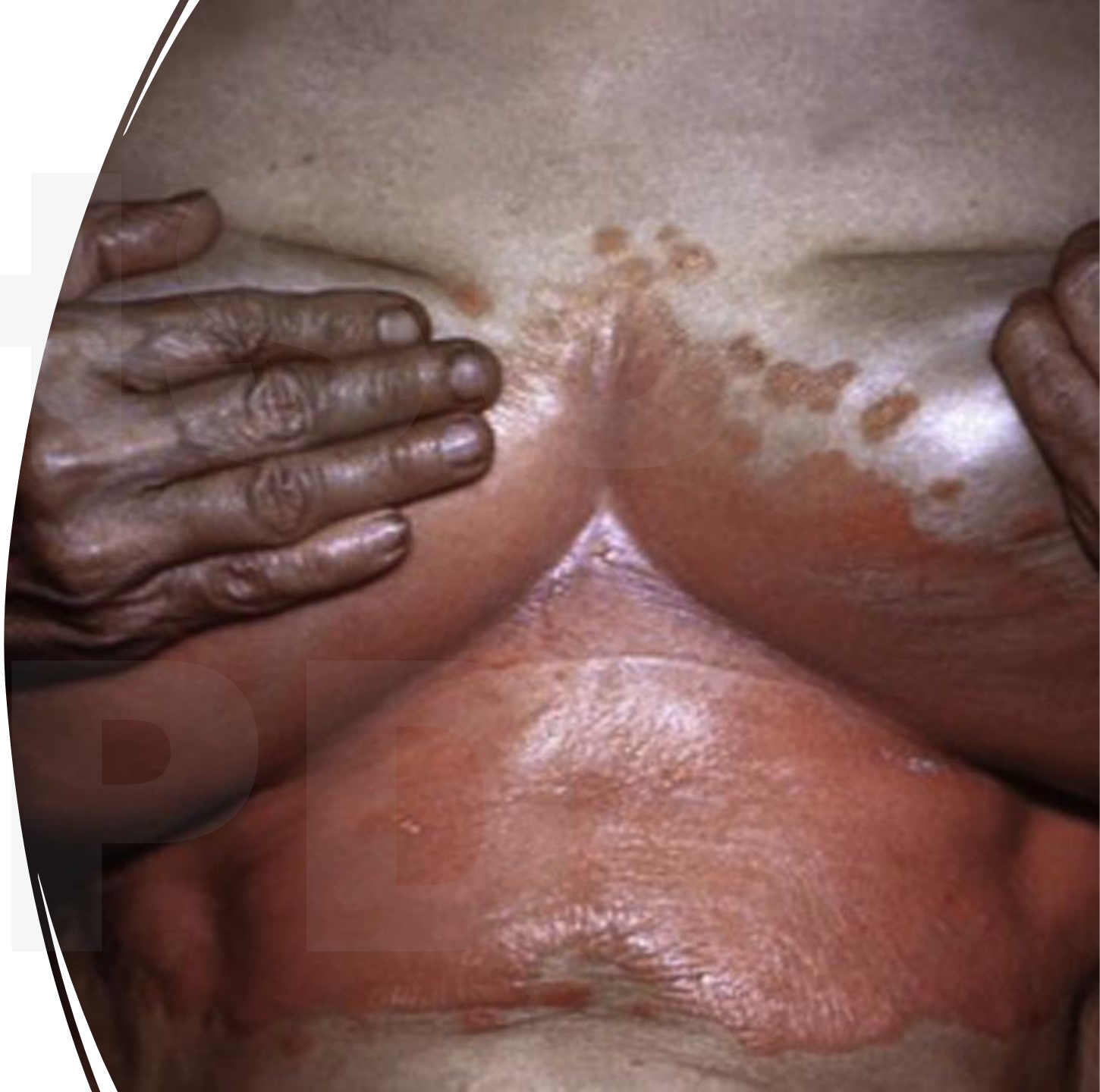
- Also known as Pityriasis versicolor
  - Superficial fungal infection caused by *Malassezia* species (not a dermatophyte)
- Present with pigmentation changes, typically of trunk, back, abdomen, extremities
- History/exam, consider KOH or Wood lamp
- Topical treatments – ketoconazole, zinc pyrithione, terbinafine
- If unable to use topicals or patient fails, fluconazole or itraconazole



Prim Care 2018 Sep;45(3):433-454. doi: 10.1016/j.pop.2018.05.004.

Candidal intertrigo

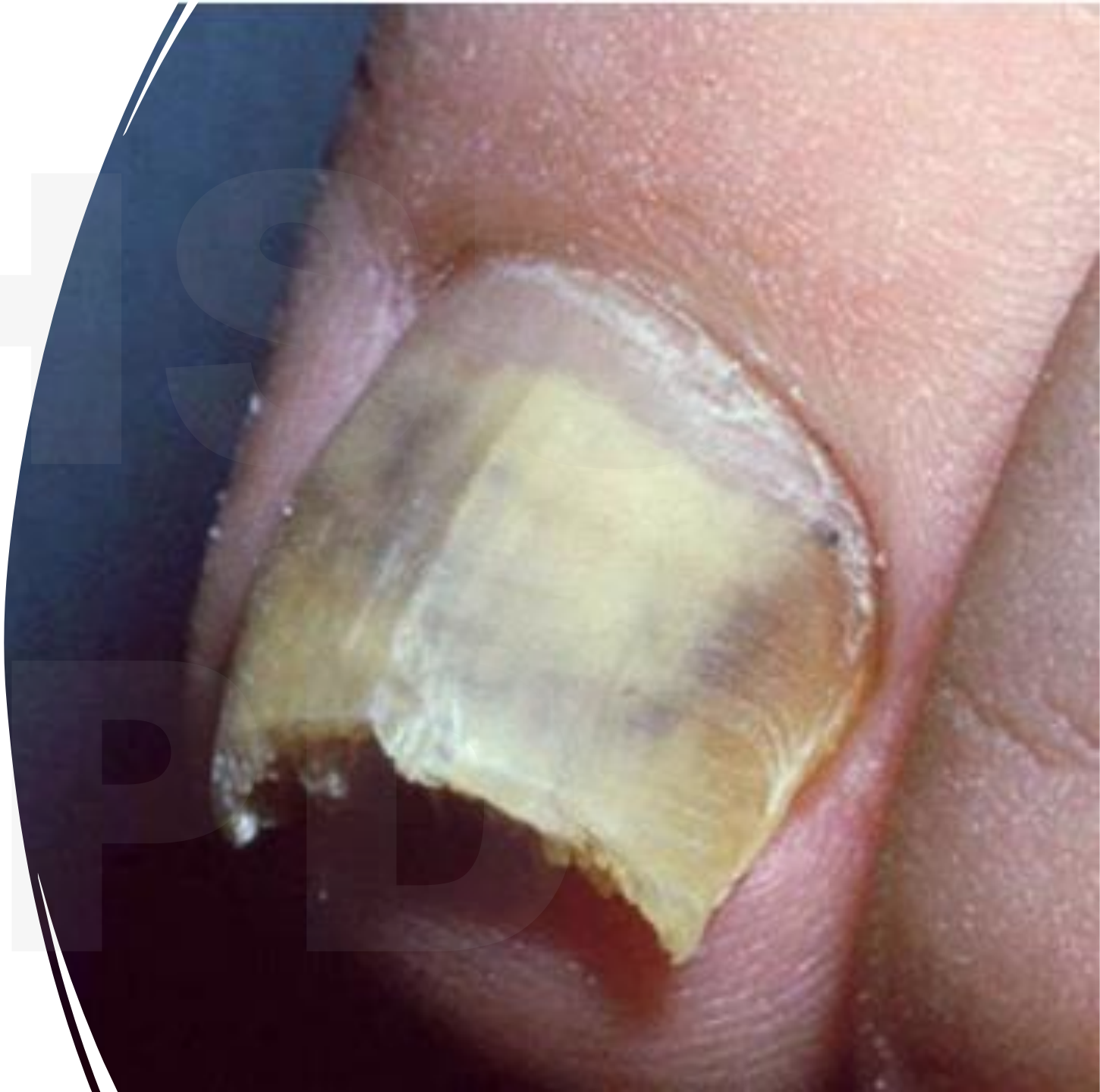
- Risk factors include obesity, skin friction, hyperhidrosis, DM, antibiotics
- Erythematous plaques/erosions w/ scaling and satellite lesions
- Clinical diagnosis, KOH can confirm
- Topical antifungals are usually first line, systemic antifungals for severe or recalcitrant cases
- Adding drying agents can help



Infect Dis Clin North Am. 2021 Mar;35(1):1-48. doi: 10.1016/j.idc.2020.10.011.

Onychomycosis

- Chronic fungal nail infection leading to discoloration, onycholysis, thickening
- Risk factors of diabetes, tinea pedis, PAD, immunosuppression, psoriasis, Down syndrome, occlusive footwear, obesity
- Worldwide prevalence of 10%
  - Dermatophytes – 70% (*Trichophyton rubrum* most common in US)
  - Yeasts – 20%
  - Non-dermatophytes – 10%



J Fungi (Basel.)2023 May 12;9(5):559. doi: 10.3390/jof9050559.

Picture taken from UpToDate “Onychyomycosis: Epidemiology, clinical features, and diagnosis” 3/21/2025

Diagnosis and Treatment

- Exam w/ dermoscopy helps with diagnosis
- Confirmation with KOH prep or PAS stain/histopath and consider fungal culture
- Recurrence rates as high as 53%
- Topical agents can be used with mild disease, though cure rates are low
  - Ciclopirox 8%→ 5.5-8.5% cure rates
  - Amorolfine 5% → 15.2-17.8% cure rates
  - Efinaconazole 10% → 15.2-25.6%

Current oral antifungal therapies.

Oral Antifungal	Dosing Regimen	Complete Cure Rate (%)
Terbinafine [16,17,18,55]	Fingernail: 250 mg/d for six weeks Toenail: 250 mg/d for 12–16 weeks Pulse: 250 mg/d for four weeks on, four weeks off, four weeks on	35–78
Itraconazole [16,17,18,19,20]	Continuous: 200 mg/d for 12 weeks Pulse: 400 mg/d for one week per month for 16 weeks	14–43
Fluconazole [21,22,62]	Fingernail: 150–450 mg/week for six months Toenail: 150–450 mg/week for 12 months	21–48

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Thank you