# PRIMARY CARE DERMATOLOGY: A PRACTICAL REVIEW

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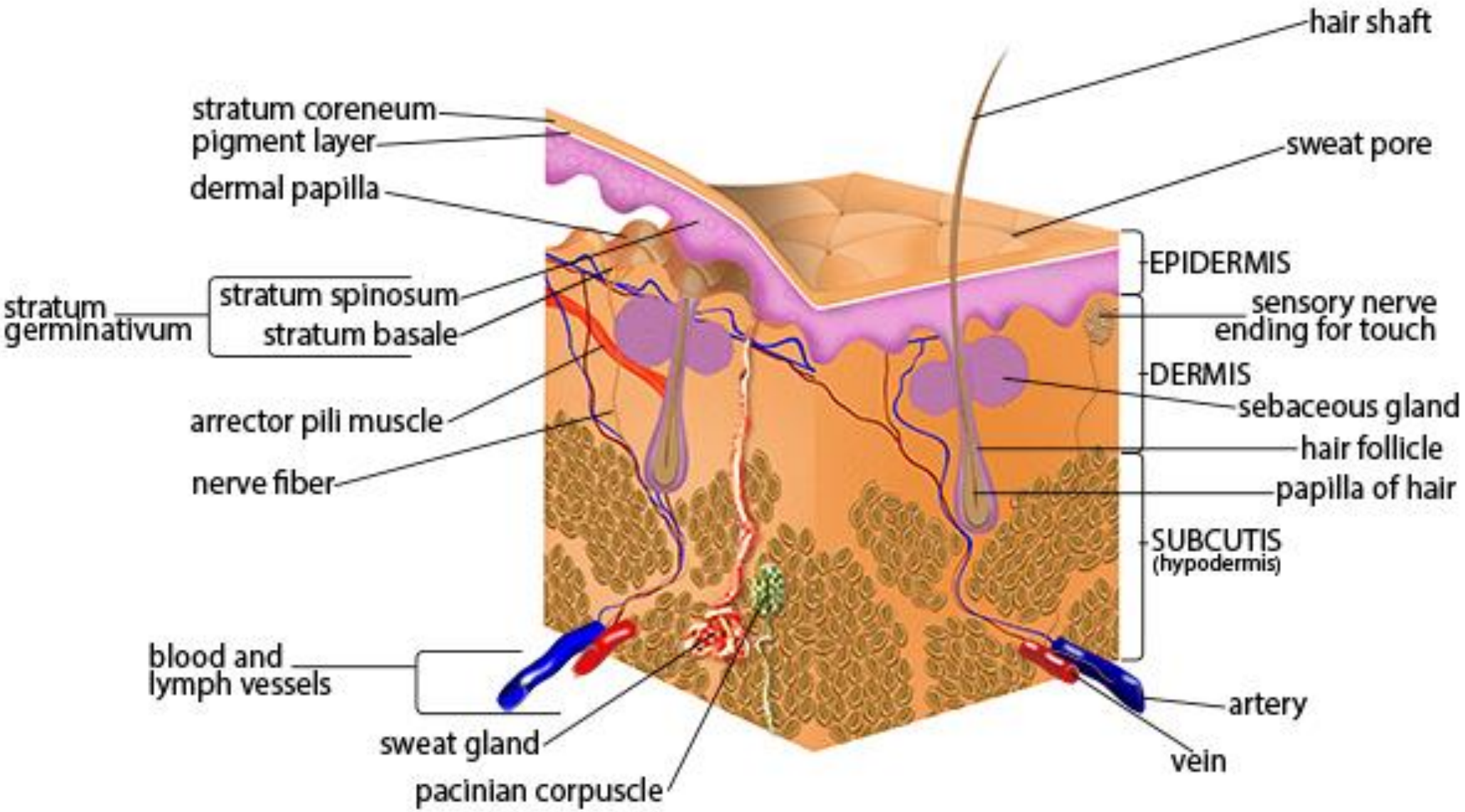
# DISCLOSURES

- I have no financial disclosures

# OBJECTIVES

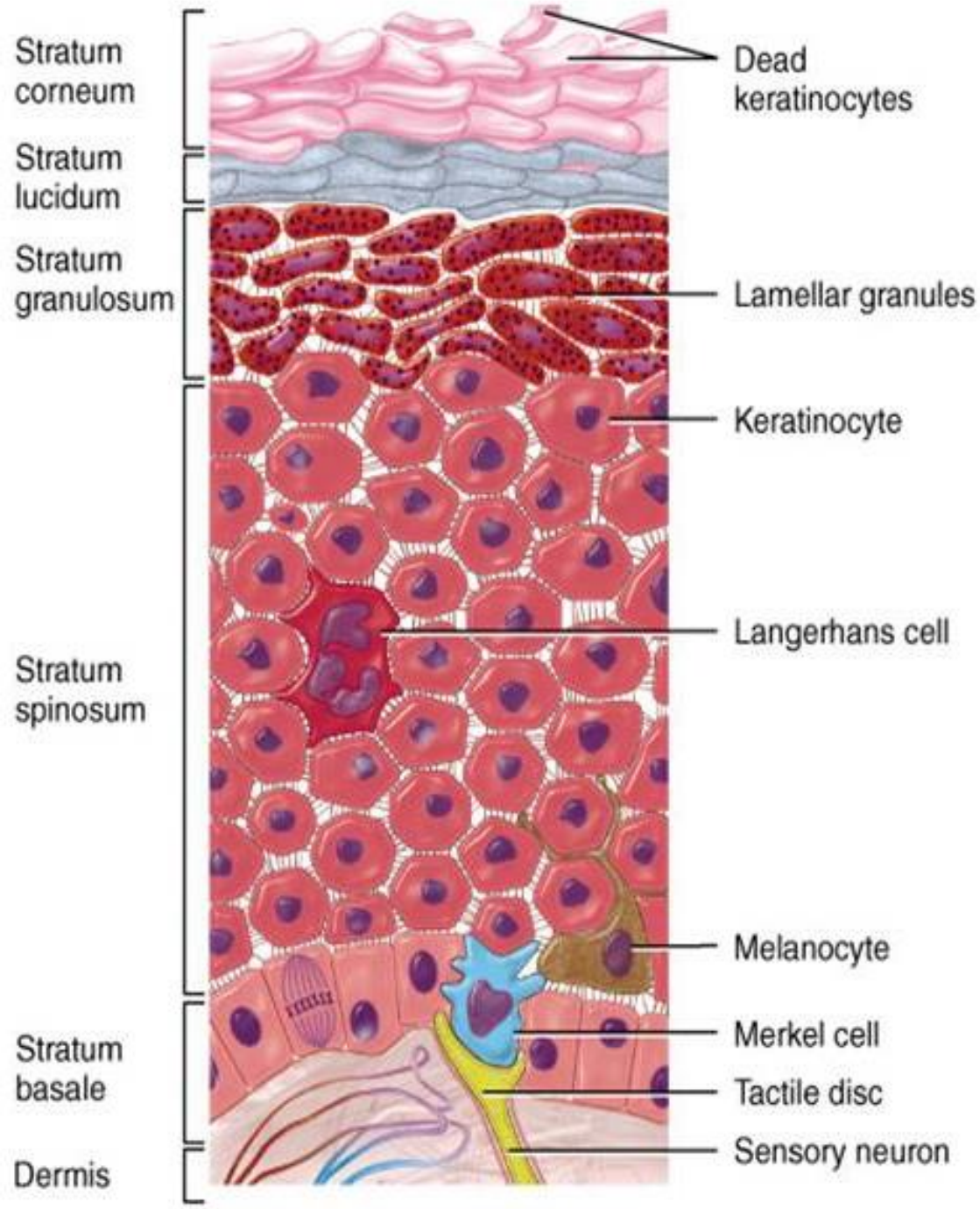
- Review the basic anatomy and physiology of normal skin
- Understand historic and current inequities in dermatology
- Identify the lumps and bumps most commonly seen in the primary care office
- Discuss management options and indications for removal

# SKIN ANATOMY AND SKIN TYPES


hair shaft
stratum coreneum
pigment layer
sweat pore
dermal papilla
EPIDERMIS
stratum spinosum
stratum germinativum
stratum basale
sensory nerve ending for touch
DERMIS
sebaceous gland
arrector pili muscle
hair follicle
nerve fiber
papilla of hair
SUBCUTIS
(hypodermis)
blood and lymph vessels
artery
sweat gland
vein
pacinian corpuscle

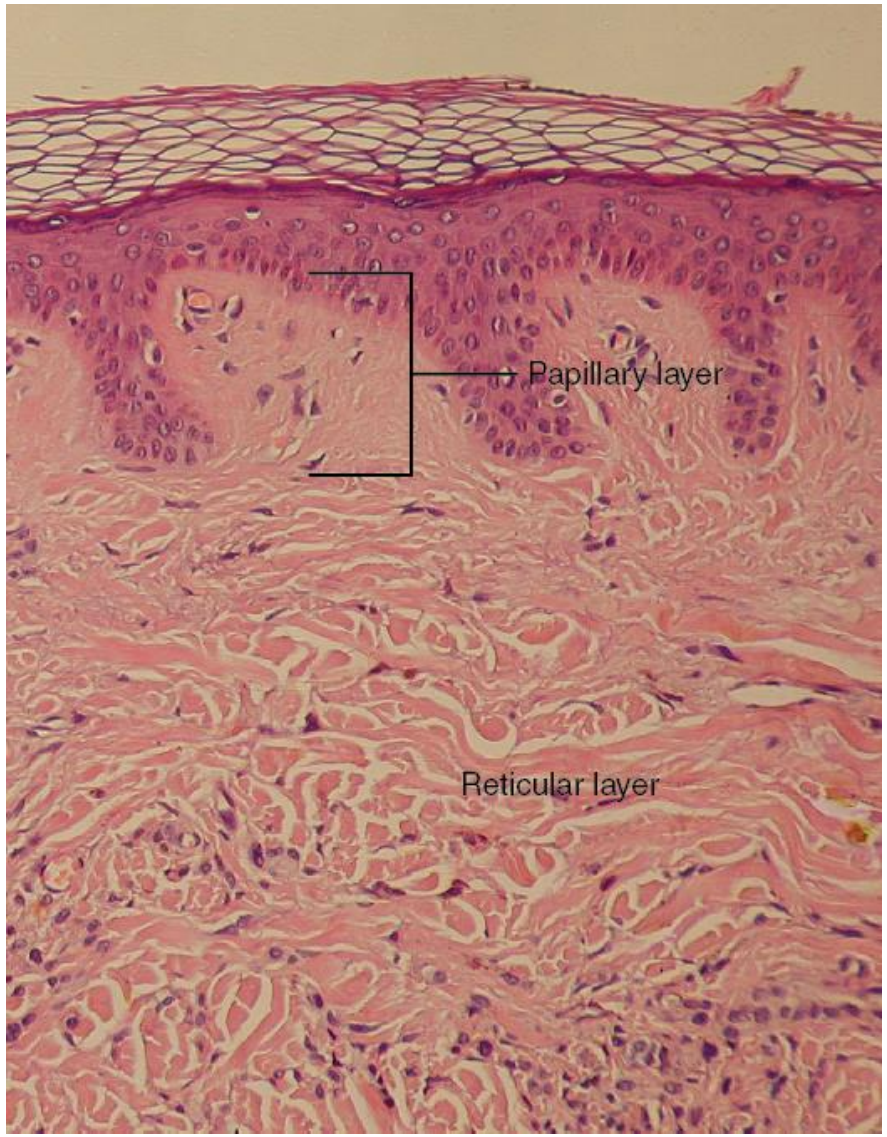
# EPIDERMIS

- Made up of stratified, keratinized squamous epithelium
- Thickness ranges from 0.05mm on the eyelids to 1.5mm on the palms and soles
  - Most skin has four layers, the strata basale, spinosum, granulosum, and corneum
  - The palms and soles also have a stratum lucidum, just deep to the stratum corneum



# DERMIS

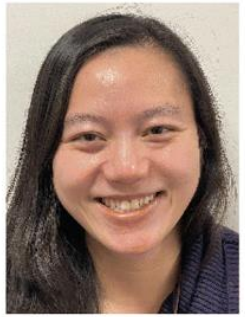
- Collagen and elastin fibers
- Papillary layer: projects into the stratum basale, contains fibroblasts, adipocytes
- Reticular layer: well-vascularized, rich with sensory and sympathetic nerves
- Connects to the hypodermis



# DIAGNOSTIC CHALLENGES IN DERMATOLOGY

- Skin findings of the same condition can be highly variable
- Physical appearance may change rapidly and at different rates
- Presentations can vary on different skin tones
- Terminology is specific and often not intuitive

# FITZPATRICK SKIN TYPES

| Type | Example | Possible skin conditions |
|---|---|---|
| I |  | Melanoma |
| II |  | Melanoma |
| III |  | Dermatosis papulosa nigra<br>Postinflammatory hyperpigmentation |

| Type | Example | Possible skin conditions |
|---|---|---|
| IV |  | Dermatosis papulosa nigra<br>Postinflammatory hyperpigmentation |
| V |  | Acne keloidalis nuchae<br>Dermatosis papulosa nigra<br>Keloids<br>Postinflammatory hyperpigmentation<br>Pseudofolliculitis barbae |
| VI |  | Acne keloidalis nuchae<br>Dermatosis papulosa nigra<br>Keloids<br>Postinflammatory hyperpigmentation<br>Pseudofolliculitis barbae |

# UNEQUAL REPRESENTATION

- People of color are dramatically underrepresented in medical education
  - Less than 14% of textbook images represent skin types V and VI
  - In images of STIs, 47% to 58% are depicted in skin of color
  - A 2020 review of cutaneous manifestations of COVID-19 showed 92% of images were Fitzpatrick I to III, with no images representing types V or VI
- In 2011, 47% of dermatologists reported inadequate training on skin conditions common in Black patients
- The percentage of non-white participants in clinical trials has not changed in the past 10 years, despite increased reporting of race and ethnicity

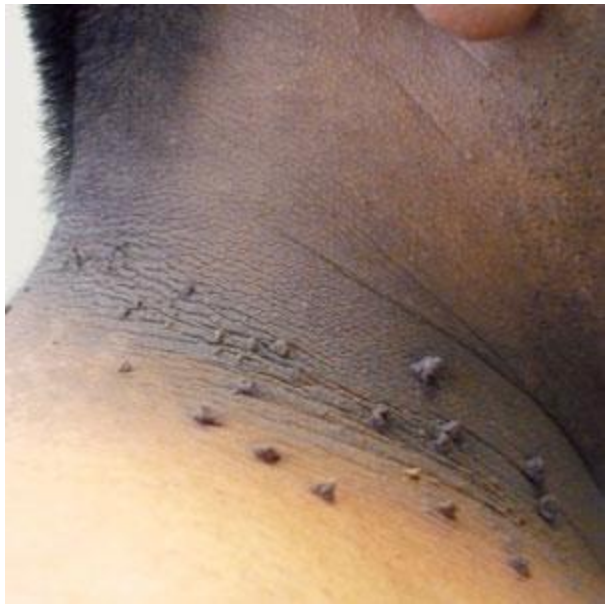
# UNEQUAL OUTCOMES

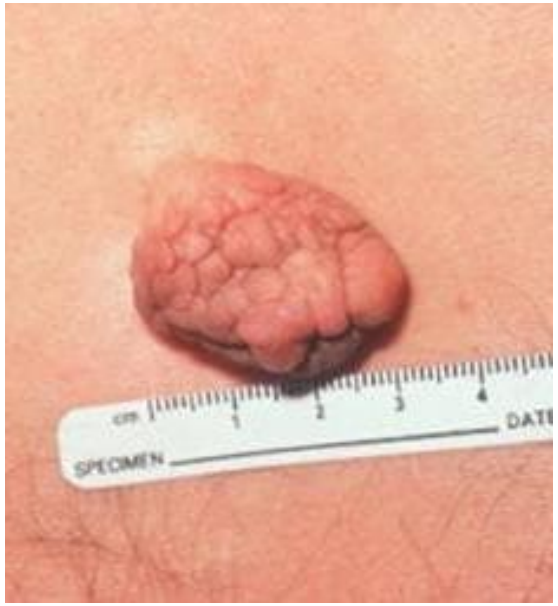
- Melanoma and nonmelanoma skin cancers are less prevalent in people of color, but people of color:
  - Present with more advanced disease (16% vs. 5%)
  - Have a lower 5-year survival rate (66.2% vs. 90.1%) compared with white patients
- Black patients are less likely to receive treatment for acne, atopic dermatitis, and psoriasis when compared with white patients

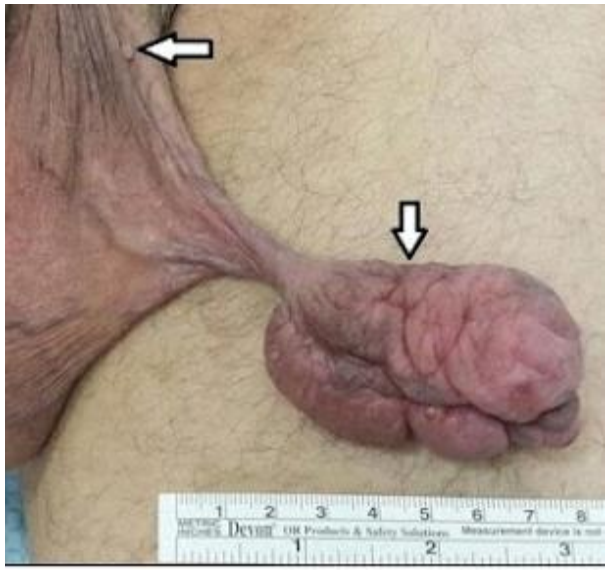
# TOP DIAGNOSES IN THE FAMILY MEDICINE SKIN CLINIC

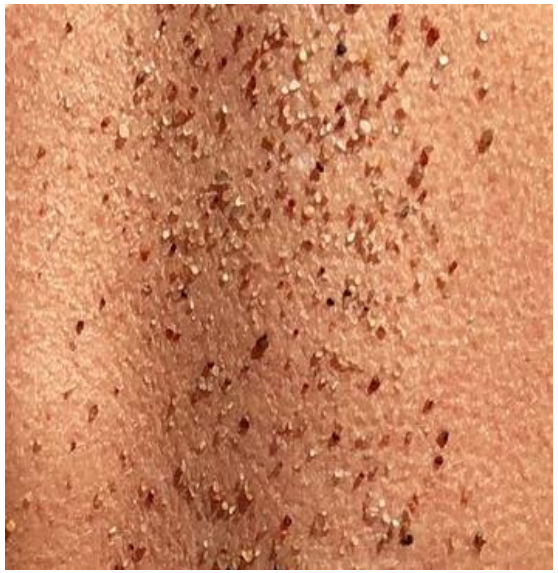
...AND WHAT TO DO ABOUT THEM

# SKIN TAGS
## (ACROCHORDONS)



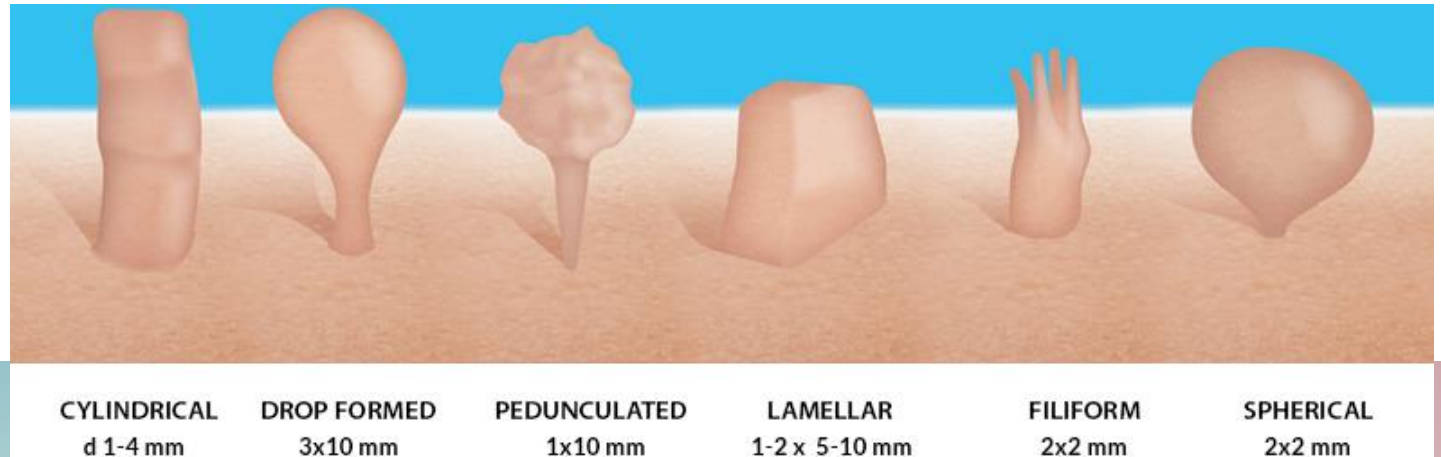




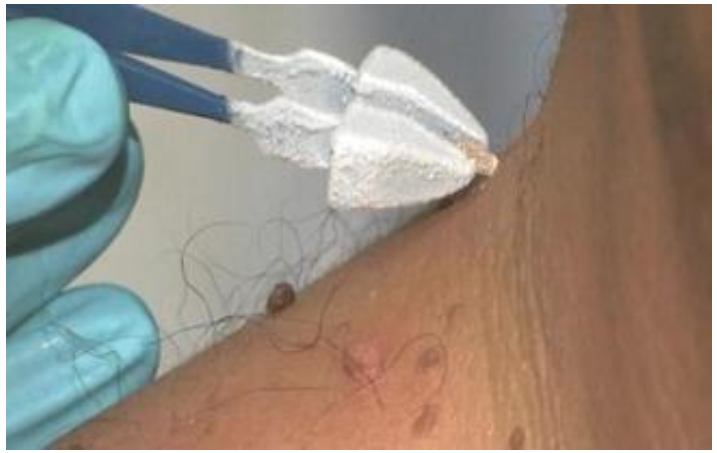
# SKIN TAGS

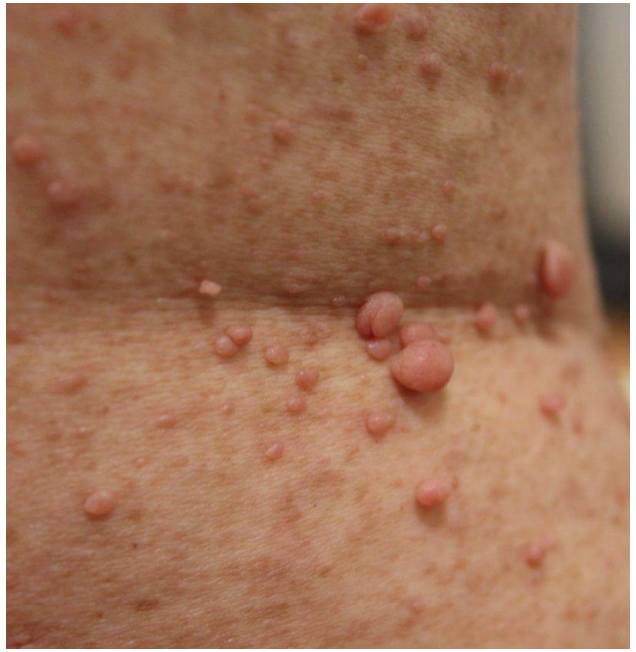
- Flesh-colored, pedunculated lesions that tend to occur in areas of skin folds
- Etiology unknown, but may be associated with hormone imbalances, tissue growth factors, and impaired carbohydrate metabolism
- Benign, but very rarely neoplasms are found at the base
- Can become strangulated or infarcted



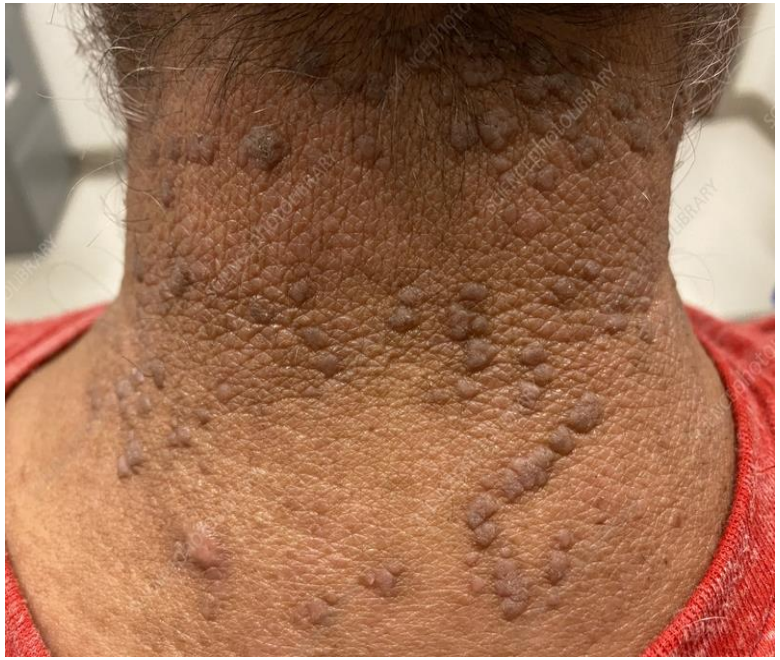
# SKIN TAGS: TREATMENT

- No treatment
- Cryotherapy
- Clipping (no anesthesia)
- Shave excision (anesthesia)
- Radiofrequency loop ablation
- Home removal tools

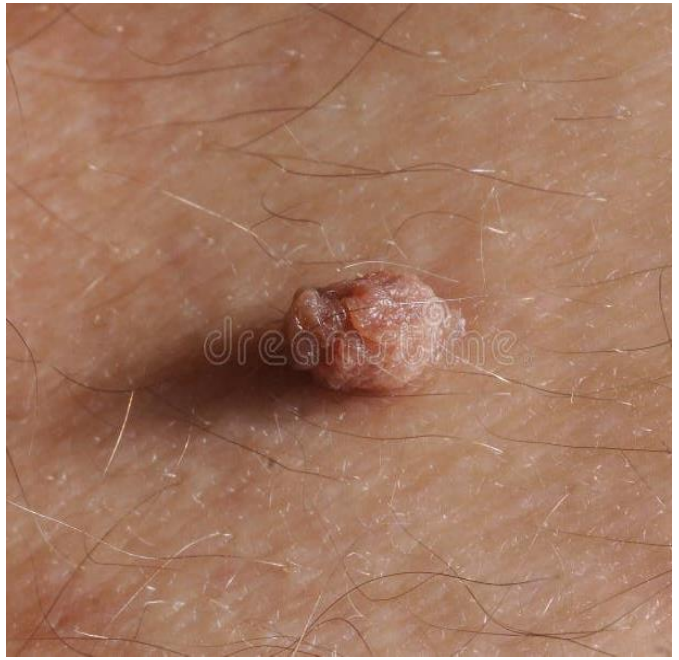




Neurofibroma



Warts



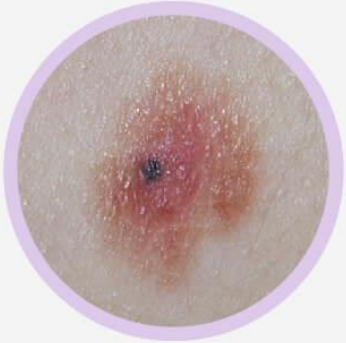
Intradermal nevus (mole)

# SKIN TAGS: DIFFERENTIAL DIAGNOSES

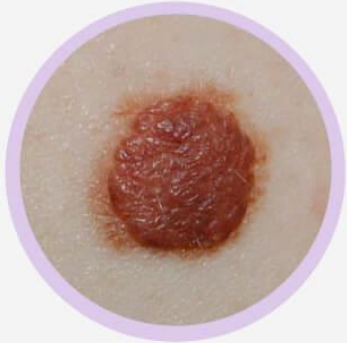
# BENIGN NEVUS

## TYPES OF MOLES

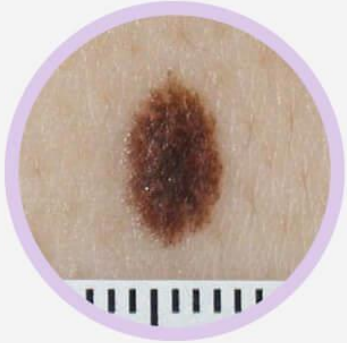
### CONGENITAL MELANOCYTIC NEVI



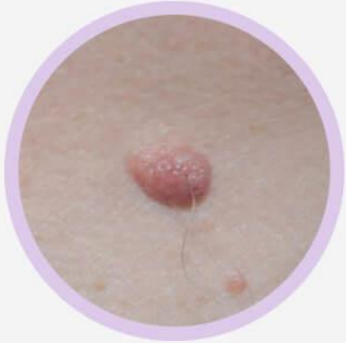
Combined Nevus



Compound Nevus

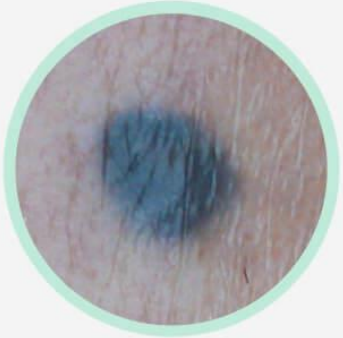


Junctional Nevus

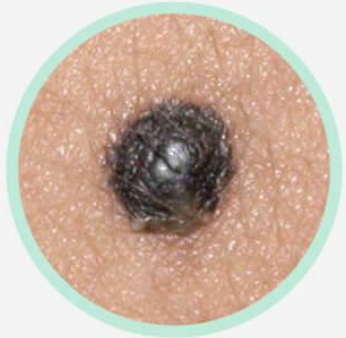


Intradermal Nevus

### ACQUIRED MELANOCYTIC NEVI

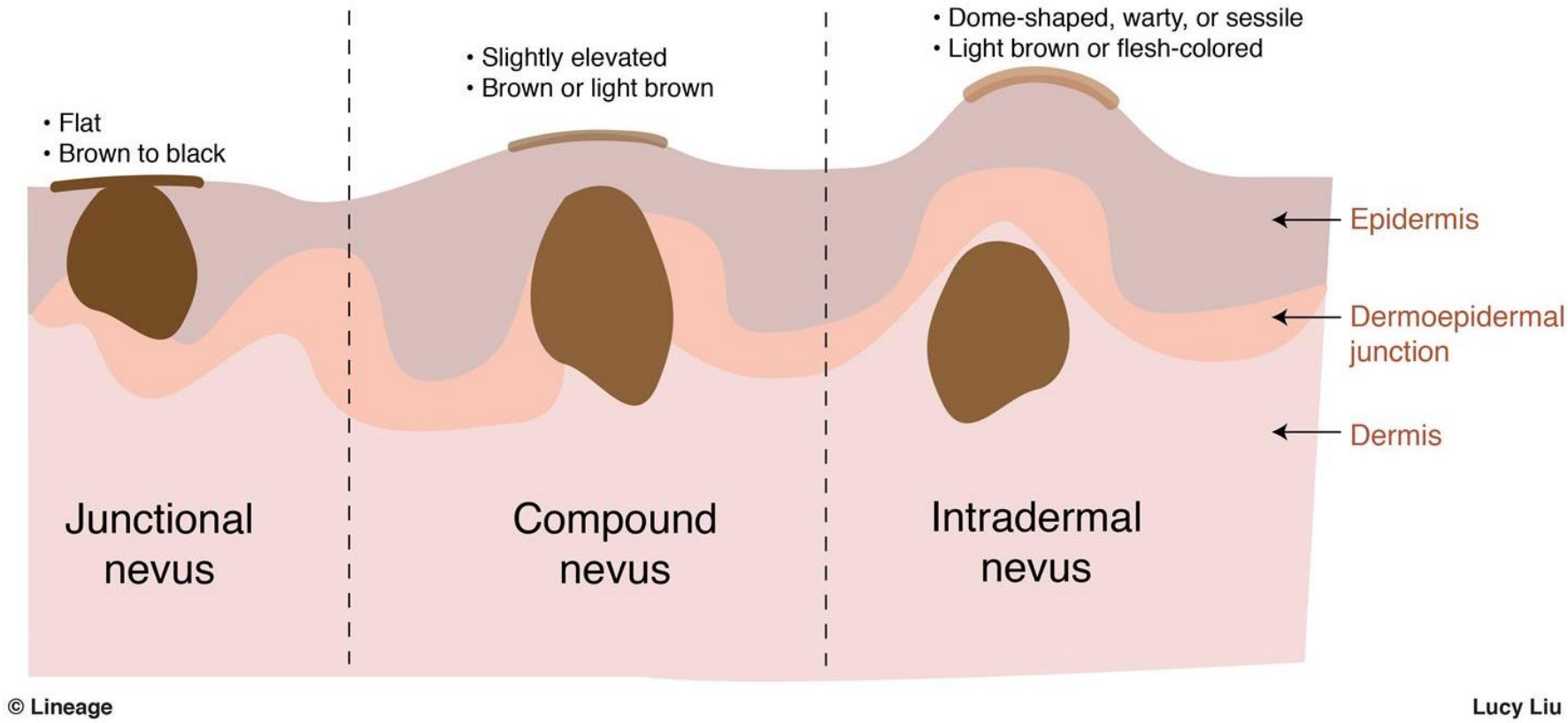


Blue Nevus

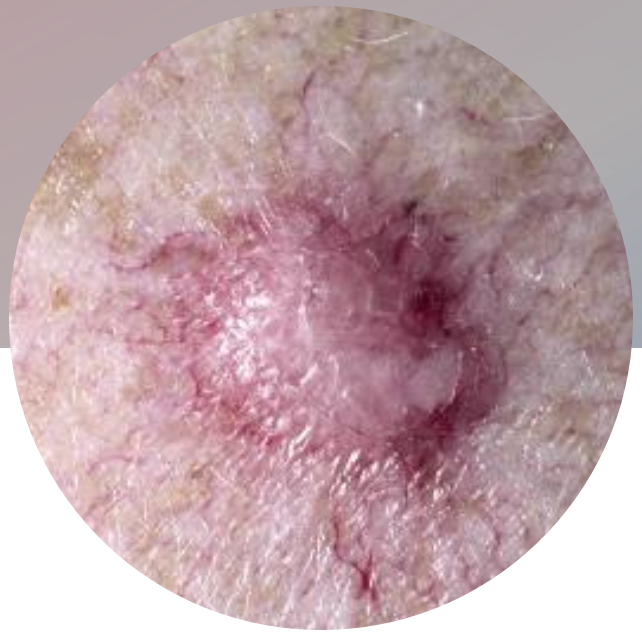


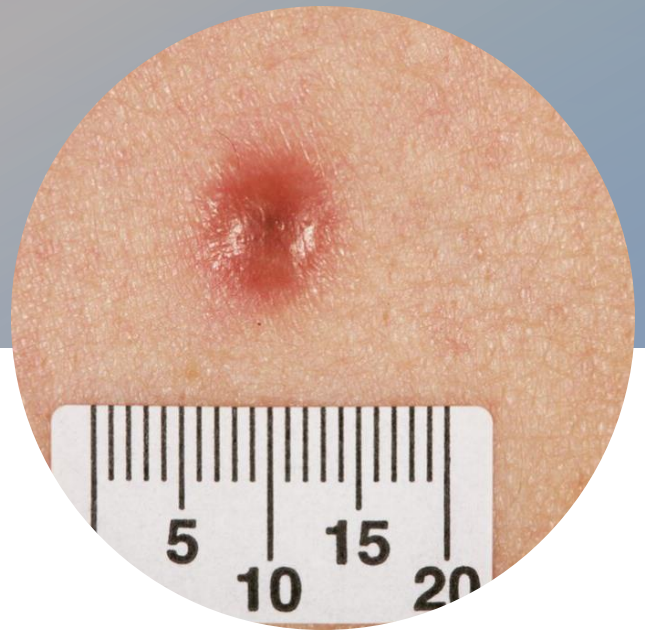
Dark Nevus

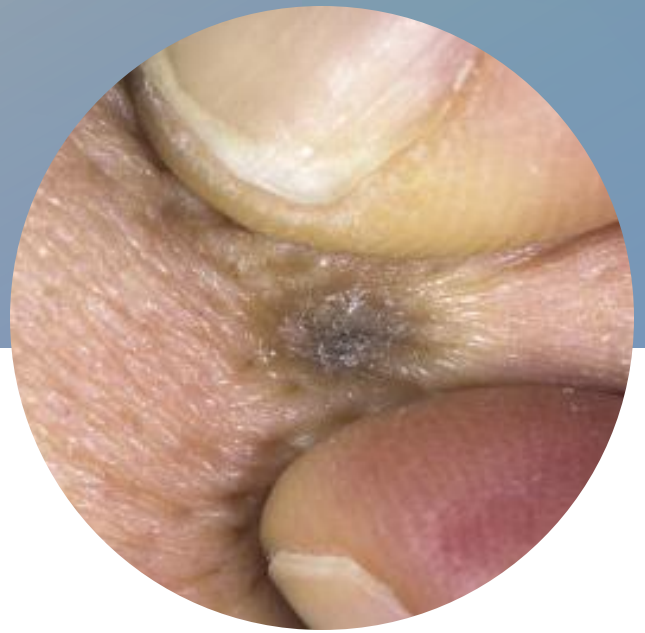
# CONGENITAL MELANOCYTIC NEVI



# DERMATOFIBROMA





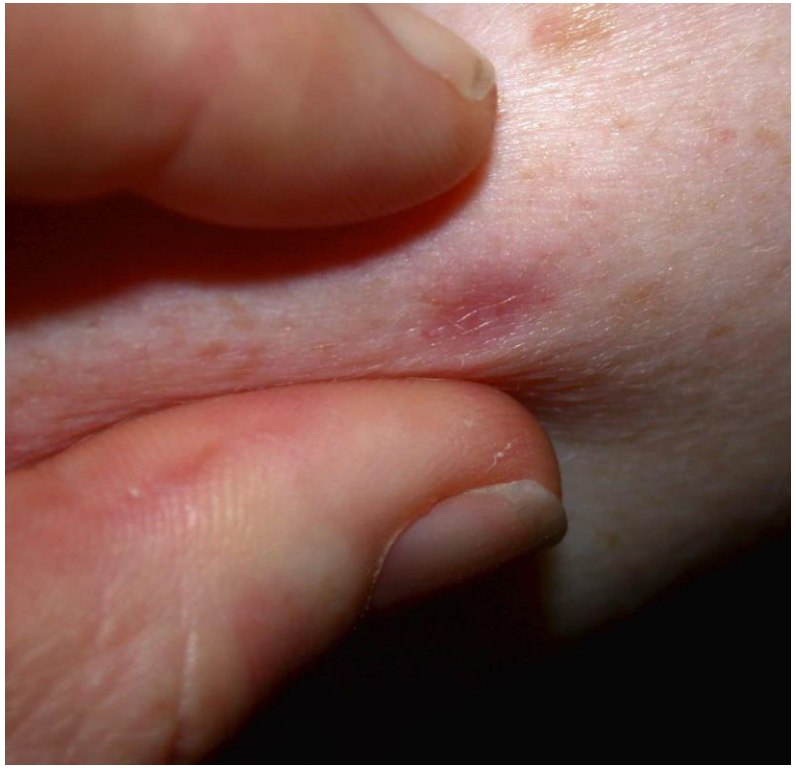



# DERMATOFIBROMA

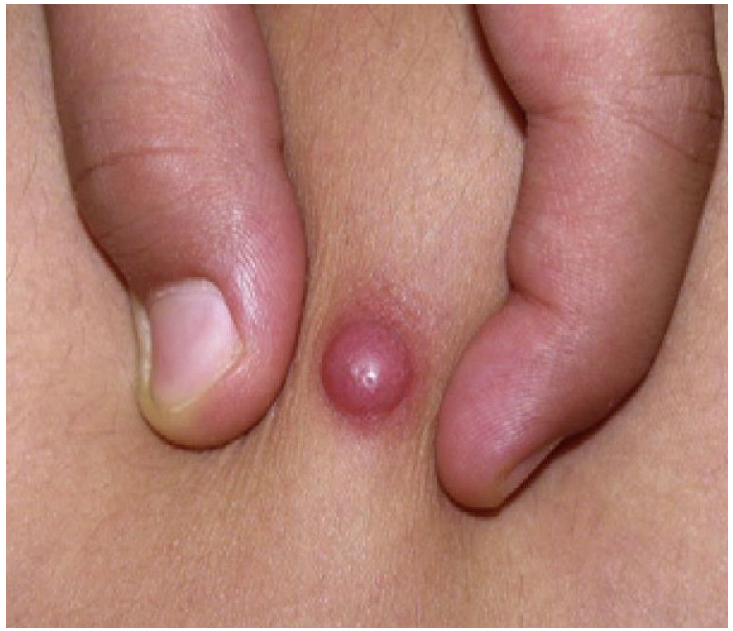
- Benign tumor found in the mid dermis
- Often occur on the extremities of adults
- Occur more often in women (4:1)
- Uncertain etiology
    - Hypothesized to be triggered by trauma, viral infection, or insect bite
- Multiple DFs (>15) have been associated with SLE, HIV, Trisomy 21, Grave's disease, and leukemia

# DERMATOFIBROMA: DIAGNOSIS & MANAGEMENT

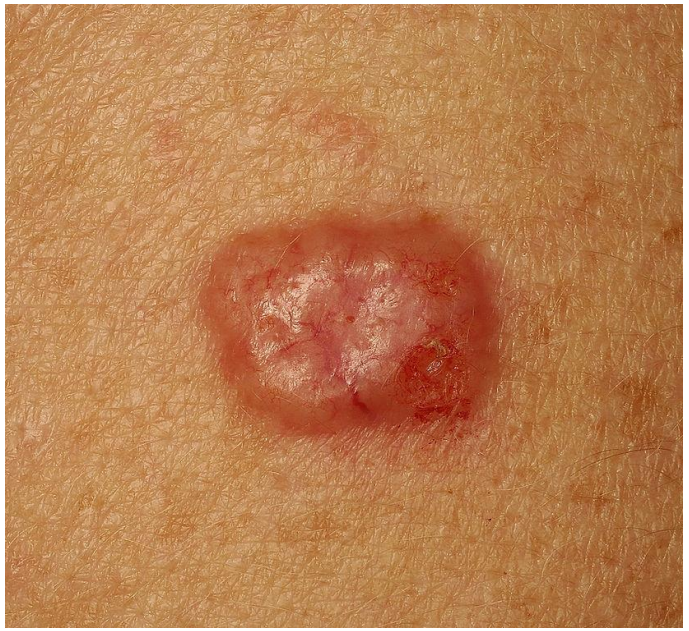
- Should dimple down with lateral pressure
- Dermoscopy
  - At least 10 different patterns have been identified
- Punch biopsy
  - DFs have been reported with overlying BCC and melanoma
- Electron microscopy and immunohistochemistry
- No treatment needed for asymptomatic lesions



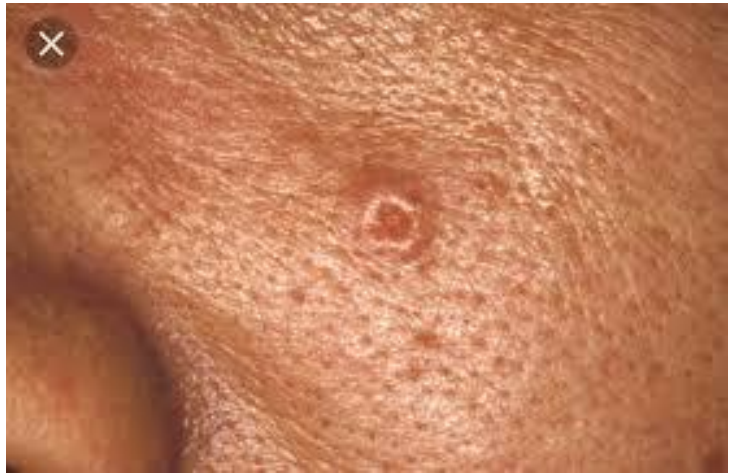
# DERMATOFIBROMA: DIFFERENTIAL DIAGNOSIS



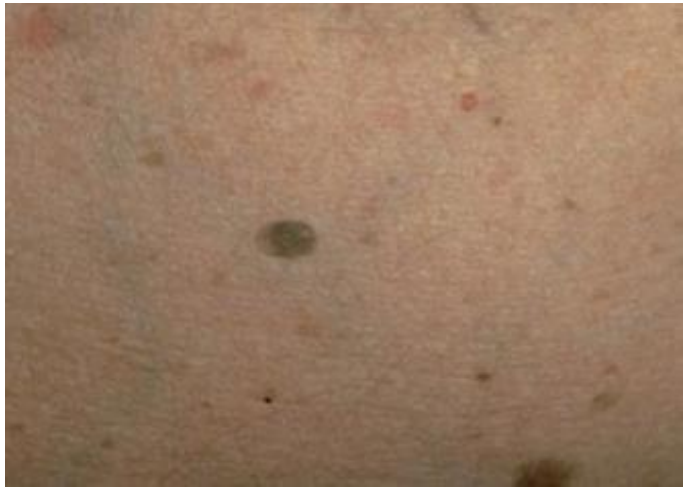
Dermatofibrosarcoma protuberans



Basal cell carcinoma

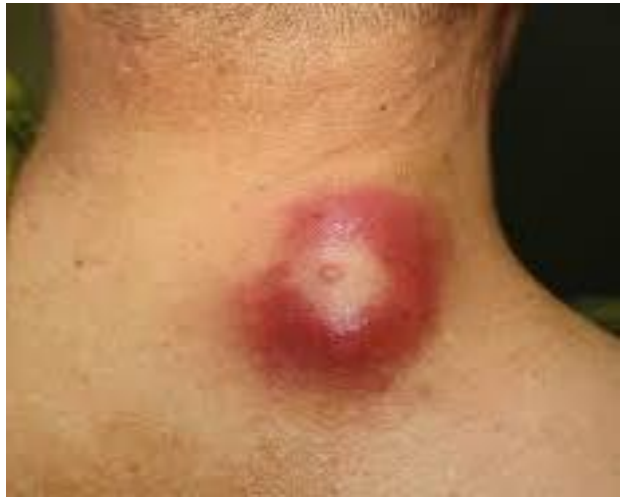


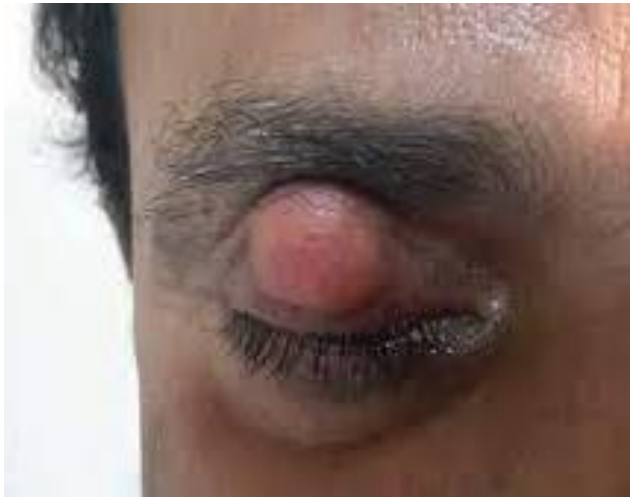
Sebaceous hyperplasia

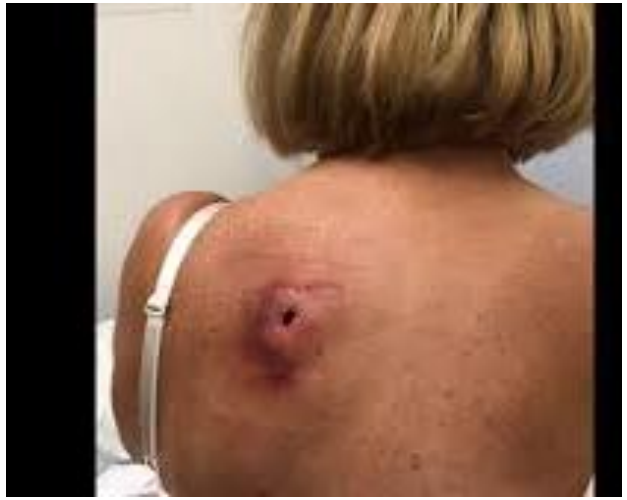


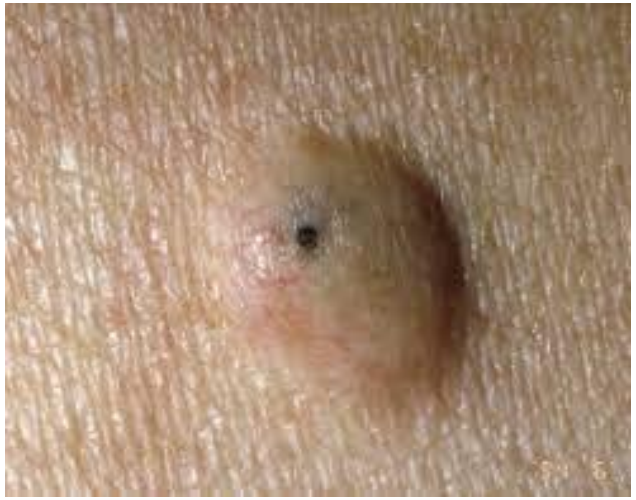
Seborrheic keratosis

# EPIDERMAL INCLUSION CYST



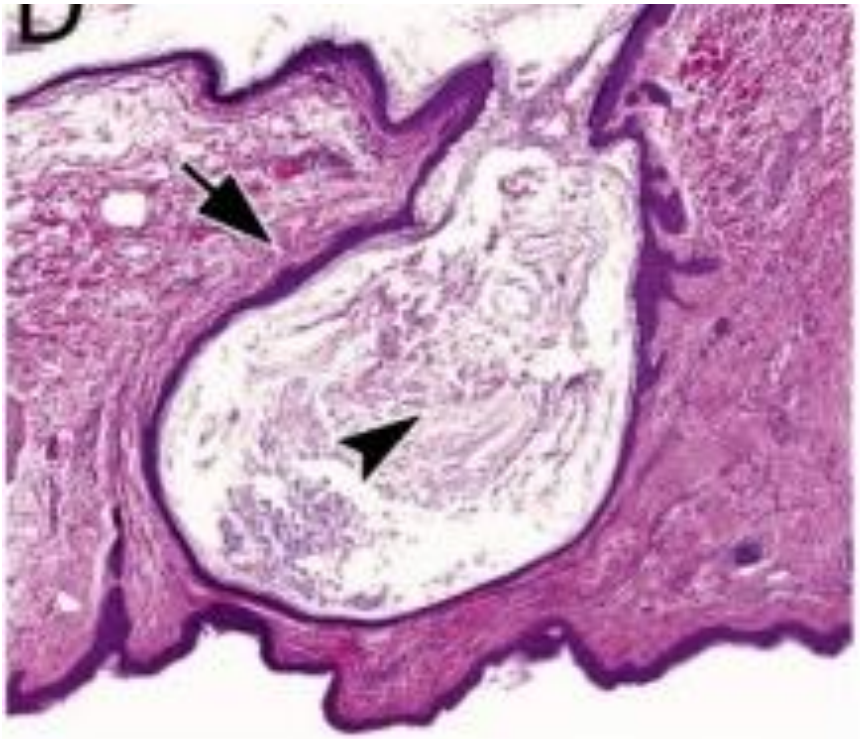




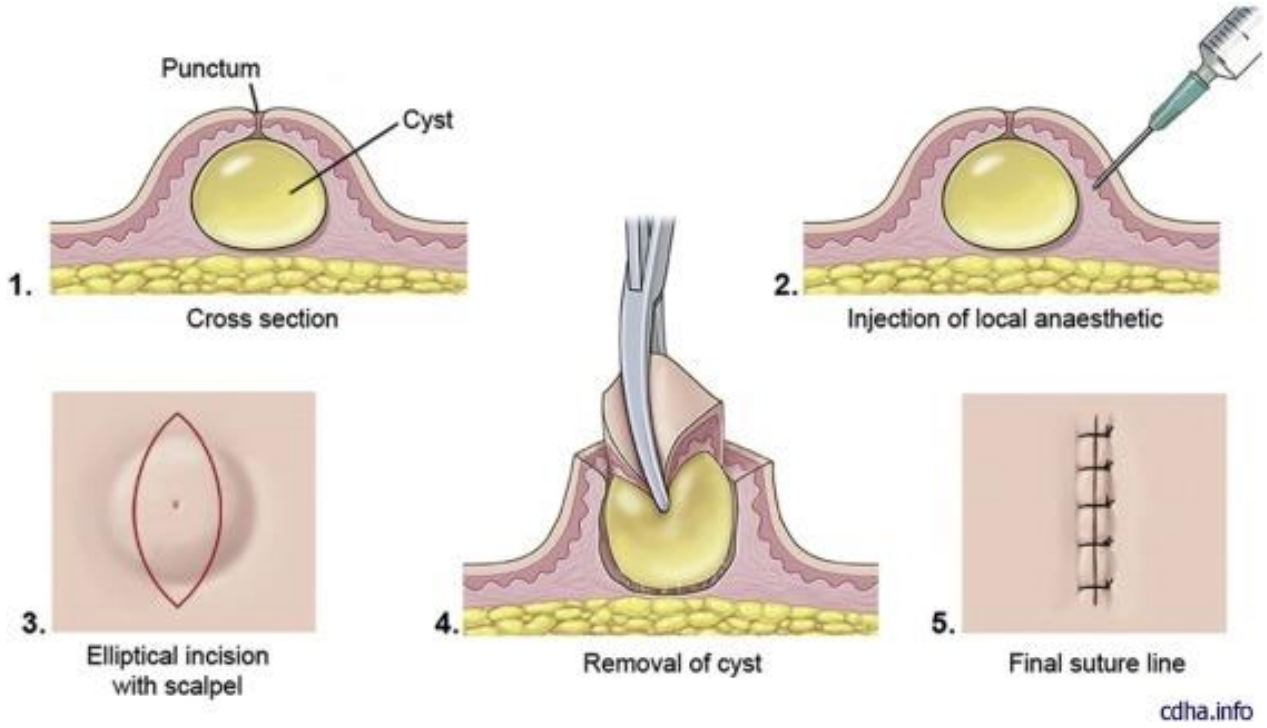


# EPIDERMAL INCLUSION CYST

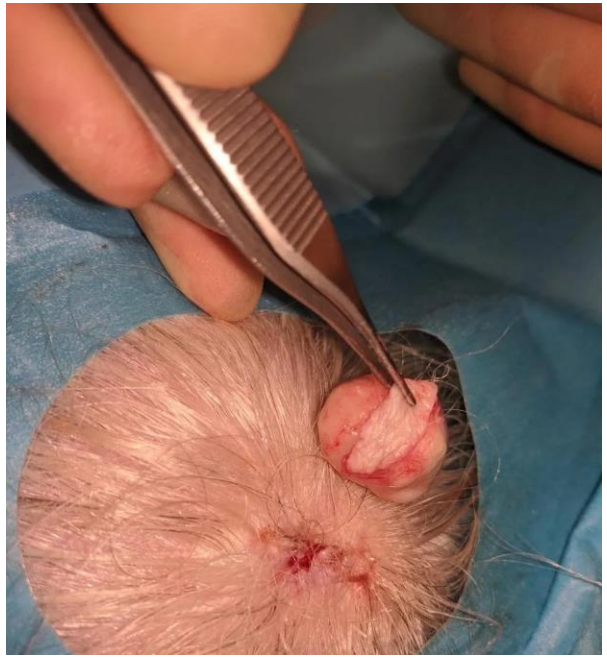
- Previous called “sebaceous cyst,” but do not originate from sebaceous glands
- Arise directly from the infundibulum of the hair follicle or from follicular epithelium in the dermis
- Follicular orifice becomes occluded with keratin
- Can become inflamed and infected (usually *S. aureus*), leading to concurrent cellulitis



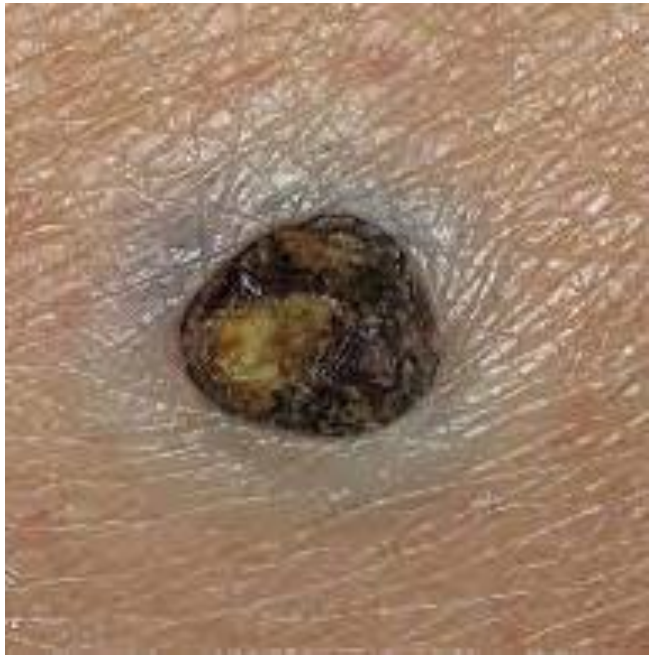
# EPIDERMAL INCLUSION CYST EXCISION



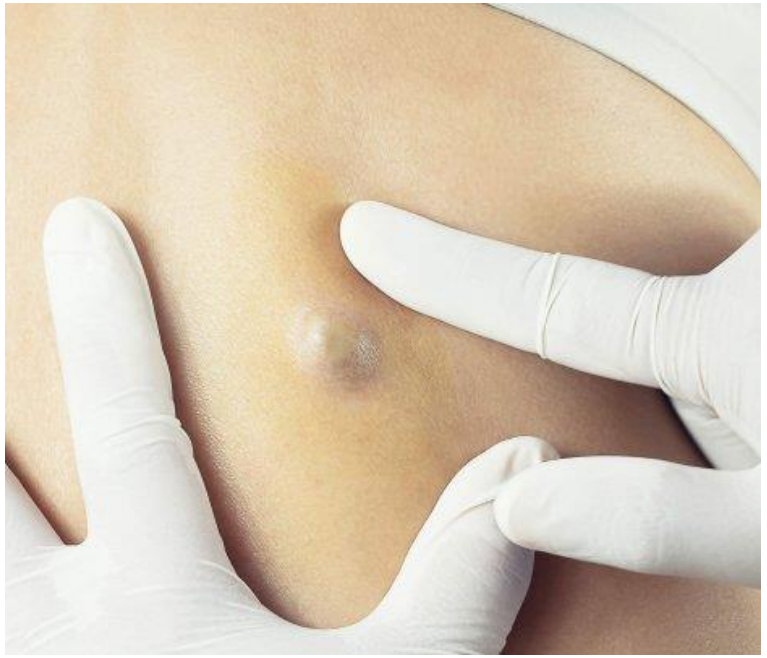
# EPIDERMAL INCLUSION CYST: DIFFERENTIAL DIAGNOSIS



Pilar cyst

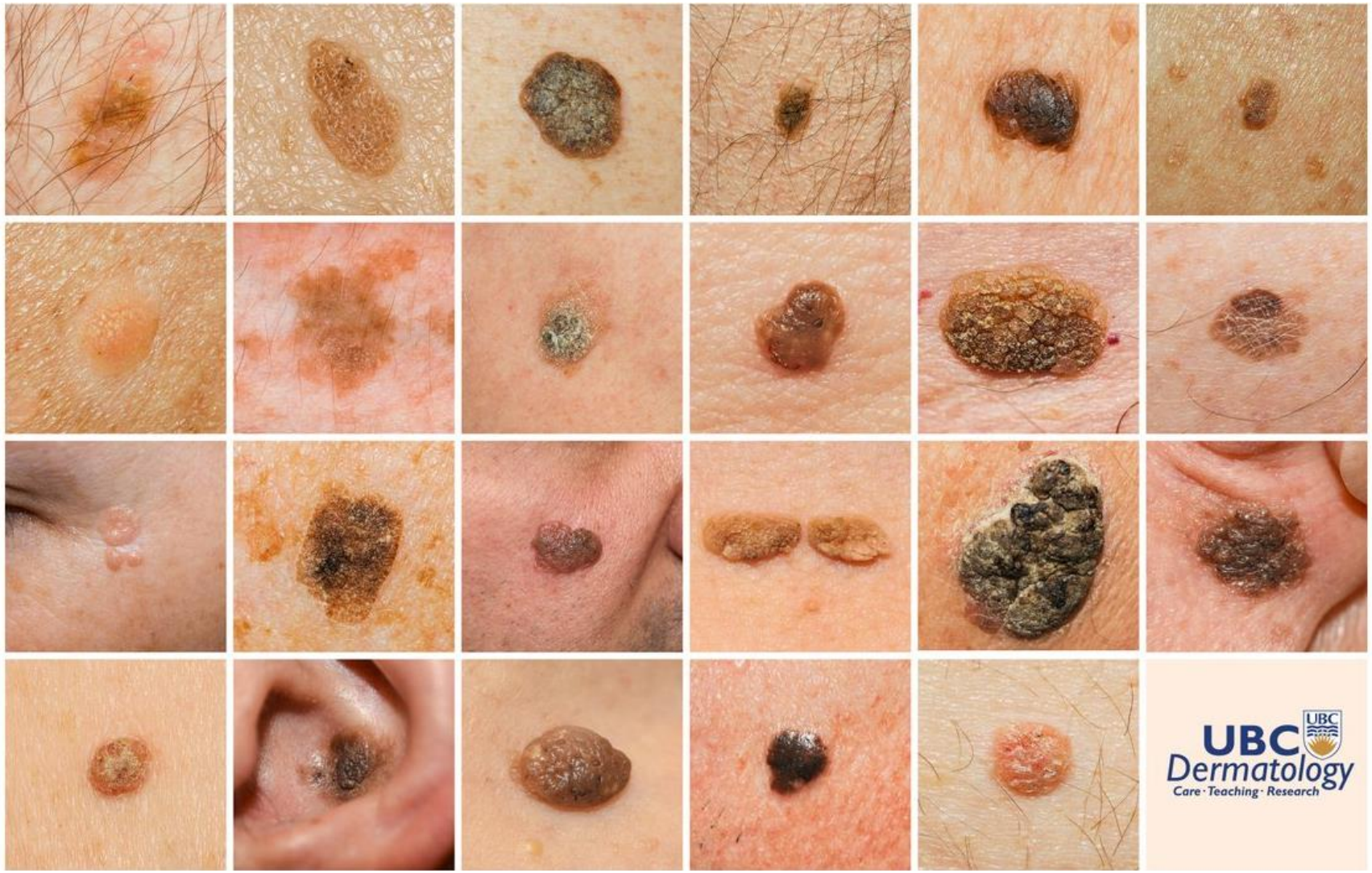


Dilated Pore of Winer



Lipoma

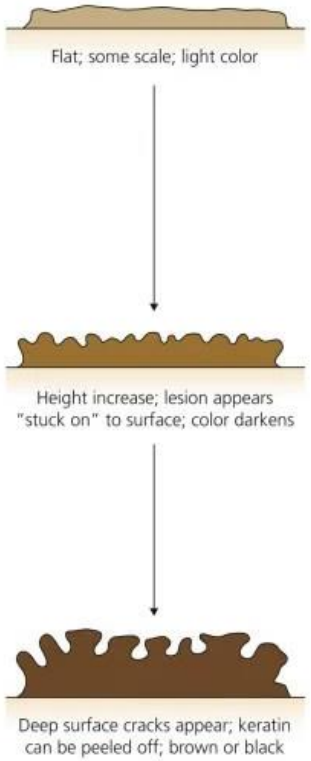
# SEBORRHEIC KERATOSIS

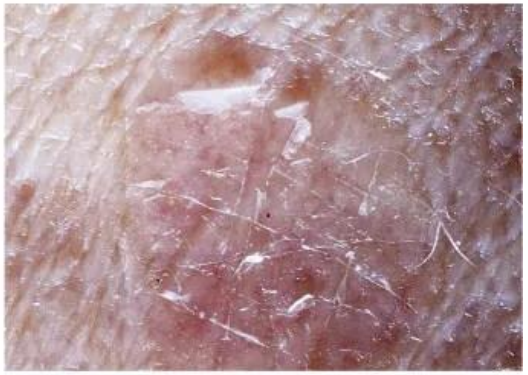


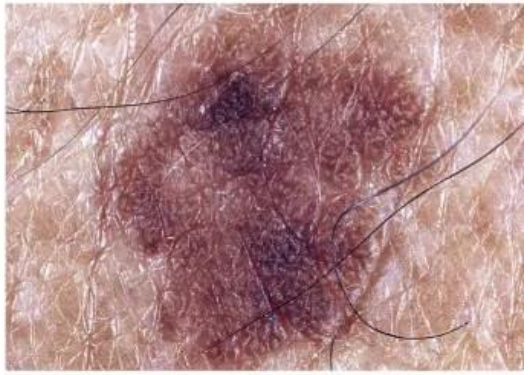
# SEBORRHEIC KERATOSIS

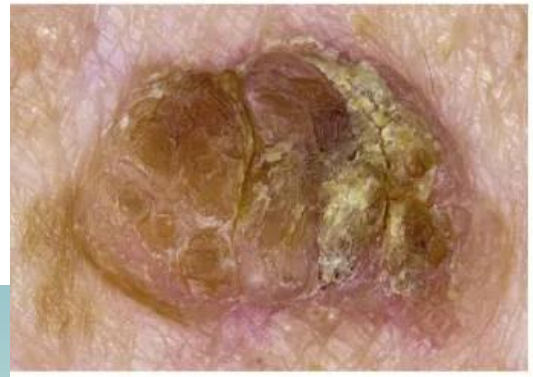
- Localized hyperpigmentation due to benign proliferation of immature keratinocytes
- Cause unknown, but high frequencies of mutations in fibroblast growth receptors have been found in SKs (not present in SCC)
- Prevalence increases with age, found in
  - 23.5% of people ages 15-30 yo
  - 88% of adults over 64 yo
- May occur on any hair-bearing surface; not due to sun exposure
- May have a rough or smooth surface
- Have a “stuck on” appearance

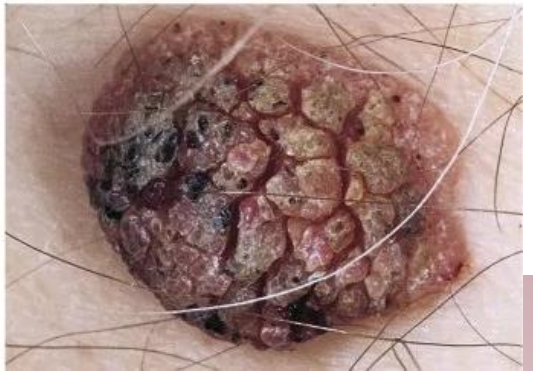
# ROUGH SURFACE SK EVOLUTION



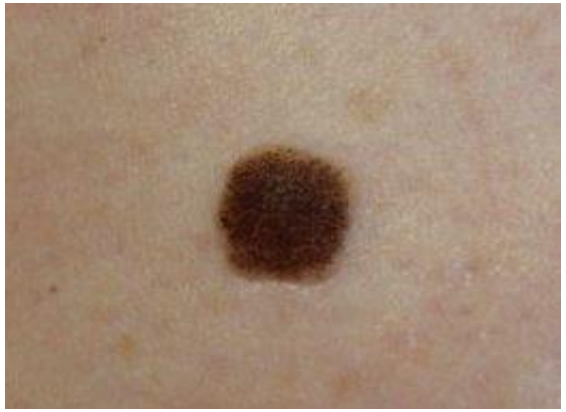



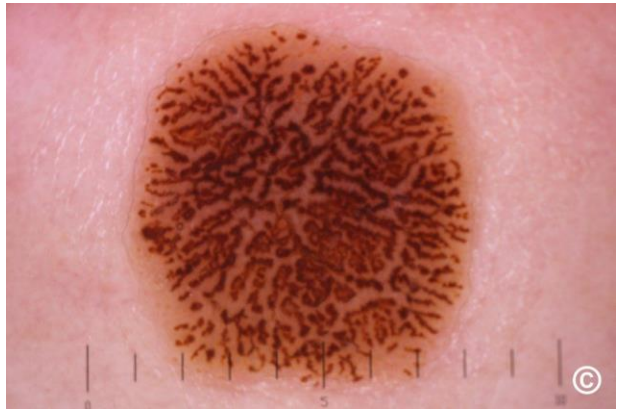




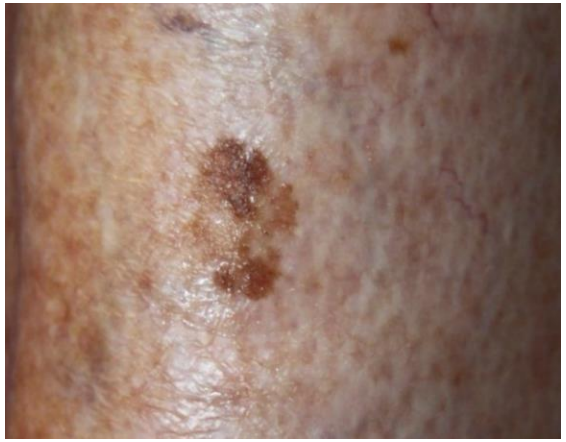


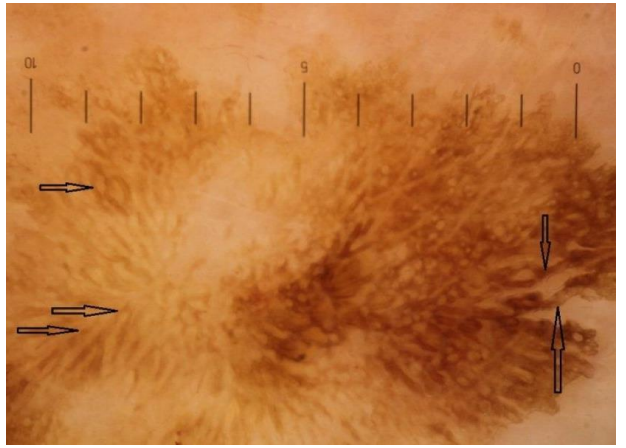
# ROUGH SURFACE SK DERMOSCOPY





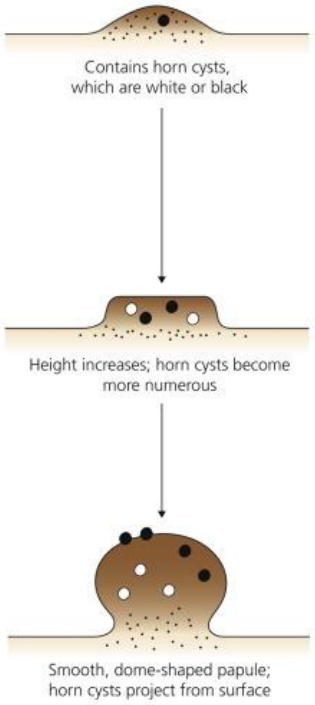
Multiple ridges and fissures give a brain-like appearance

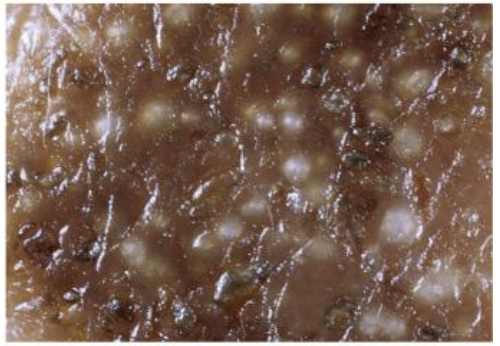


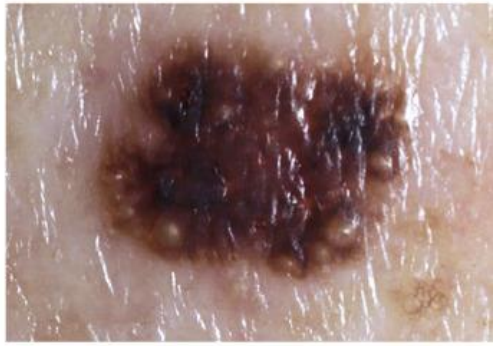


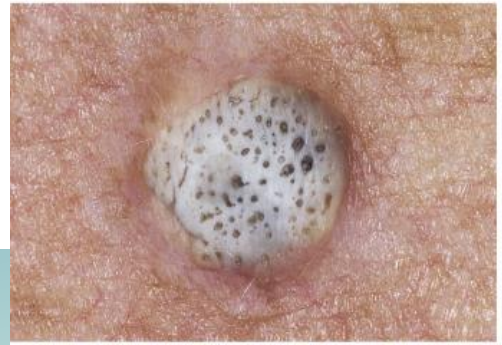
Yellow and brown pigment bands will develop into 3D ridges with fissures

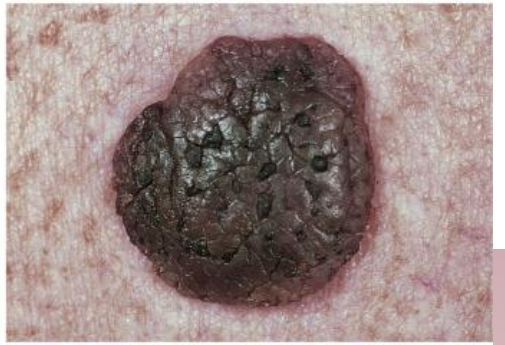
# SMOOTH SURFACE SK EVOLUTION



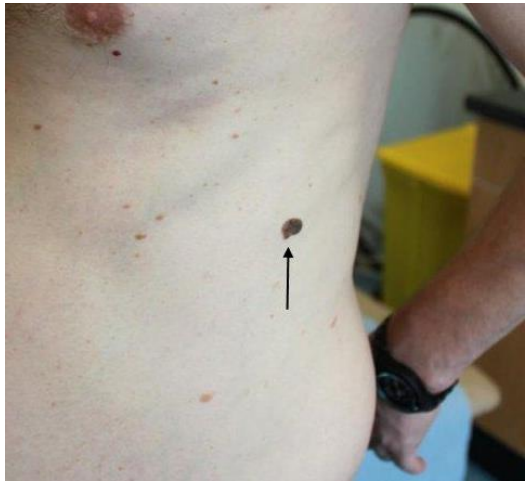



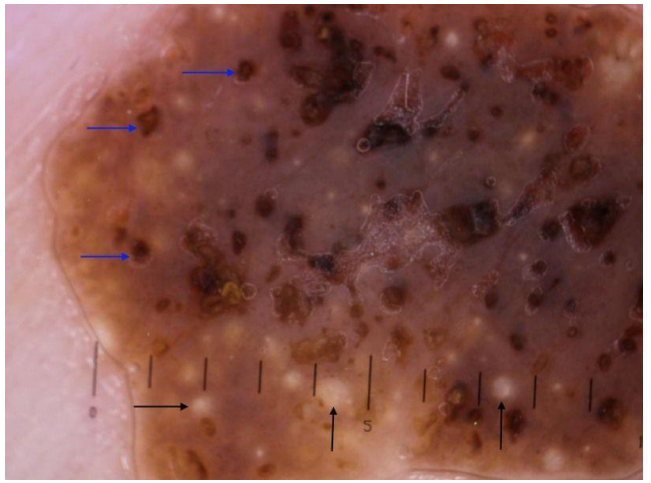


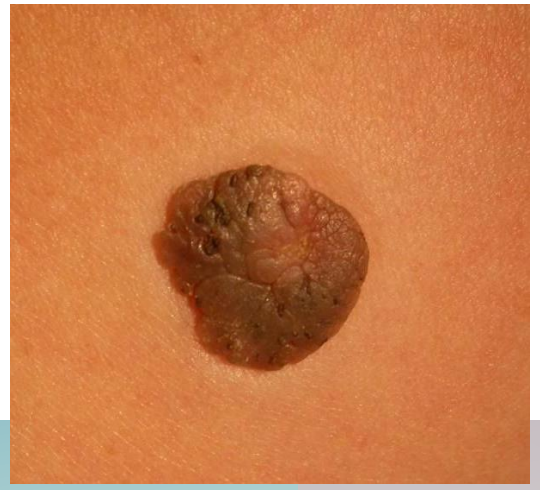


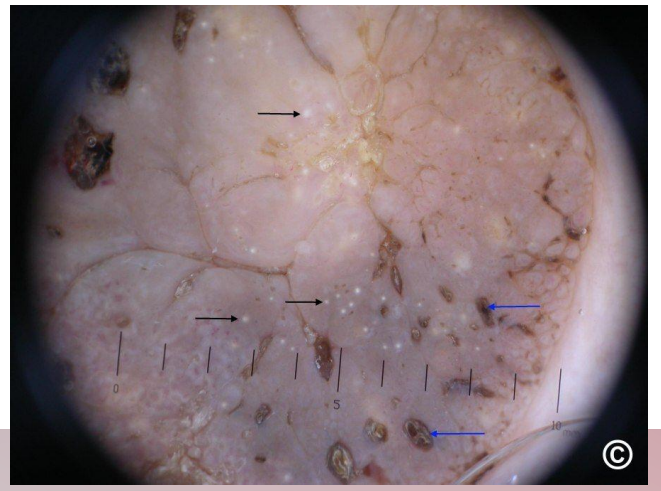


# SMOOTH SURFACE SK DERMOSCOPY



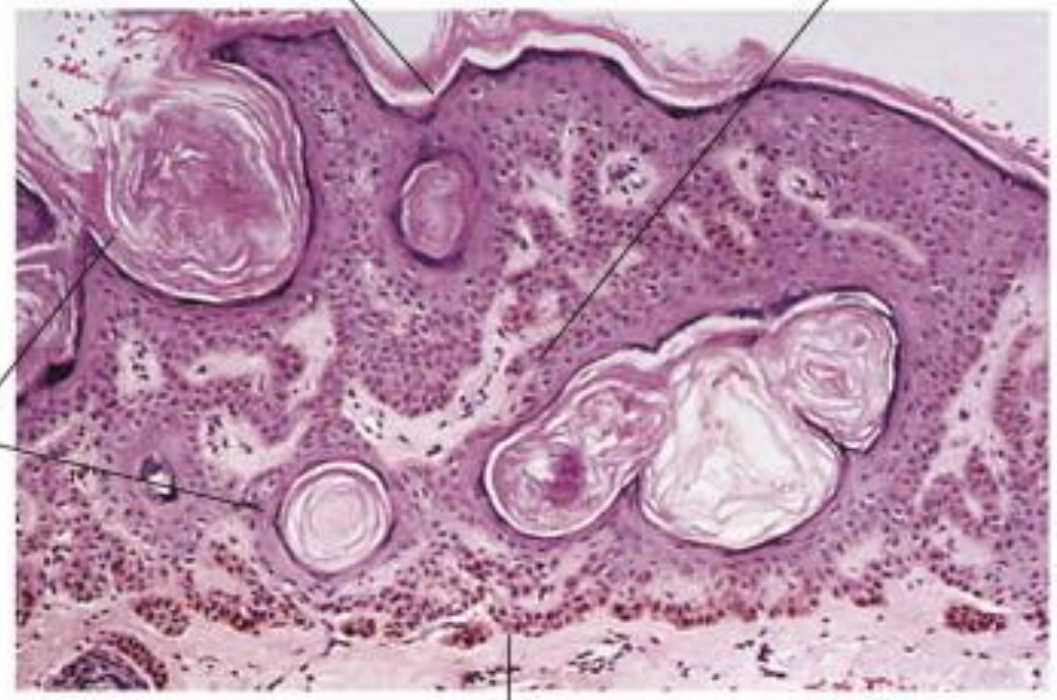






Black arrows indicate keratin pearls/horn cysts and blue arrows indicate comedo-like openings

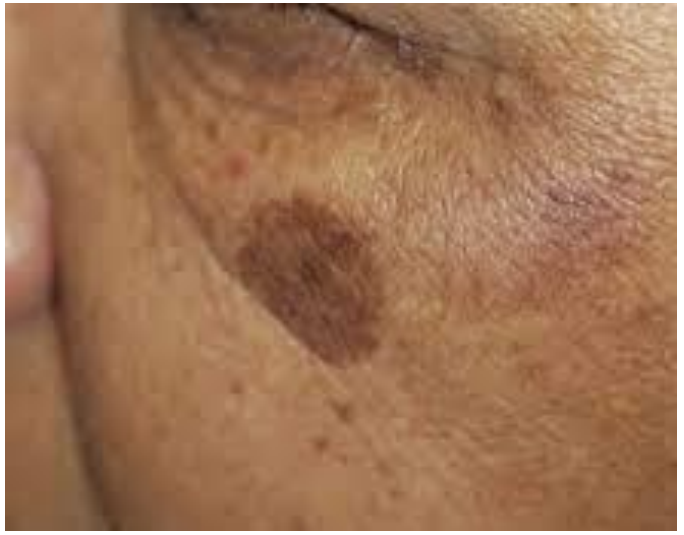
# SMOOTH SURFACE SK: HISTOLOGY



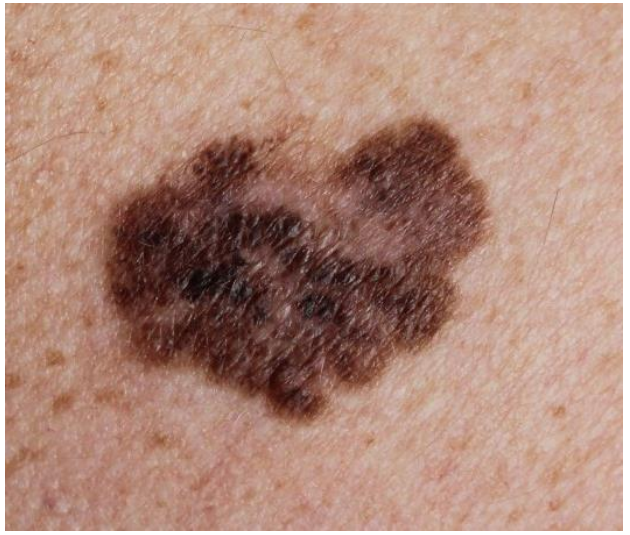

Focal keratinization occurs to produce horn cysts

Melanocytes proliferate and transfer melanin; color of lesion deepens from brown to black

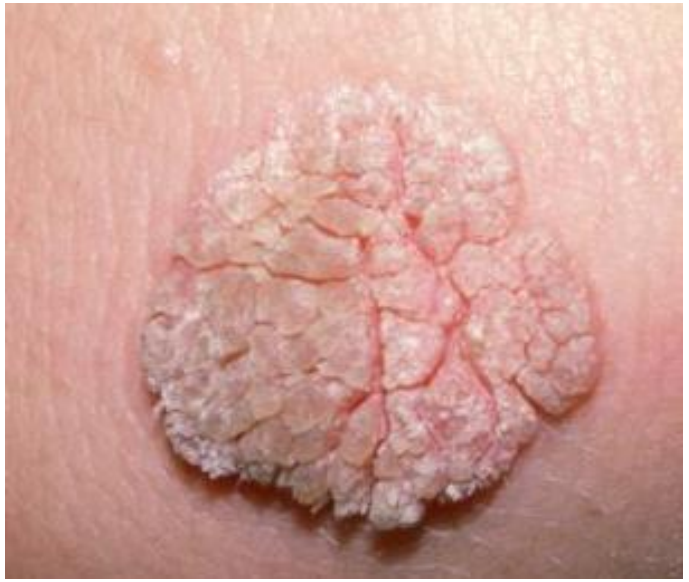
# SEBORRHEIC KERATOSIS: DIFFERENTIAL DIAGNOSES



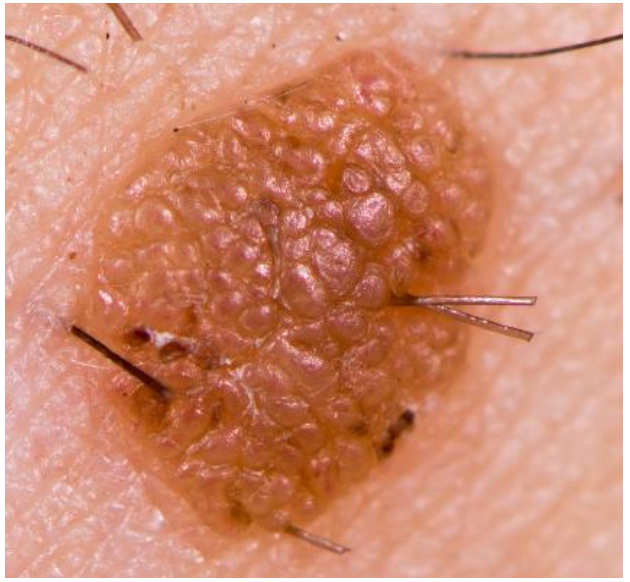
Solar lentigo



Melanoma

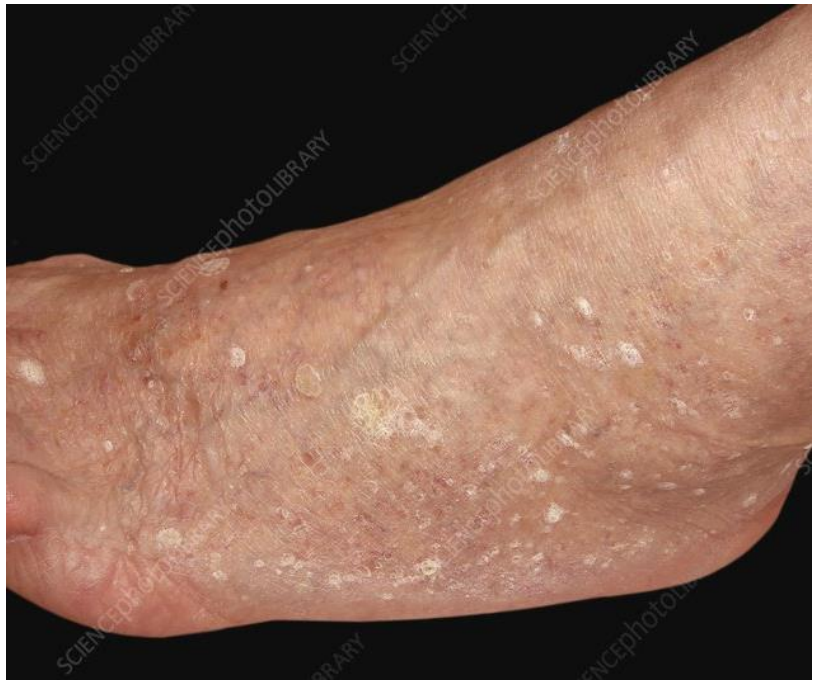


Wart

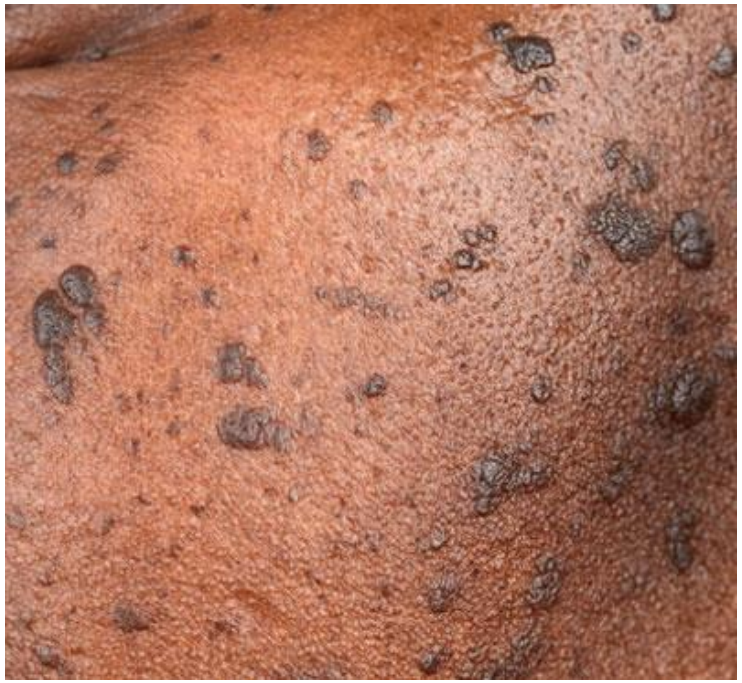


Pigmented actinic keratosis

# SEBORRHEIC KERATOSIS: VARIANTS

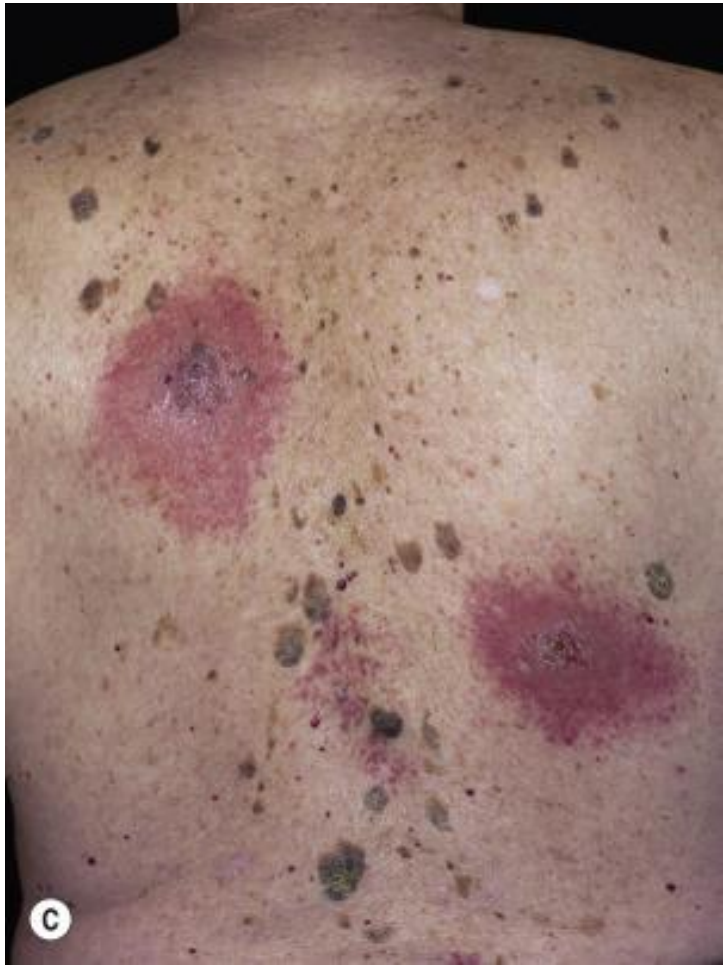


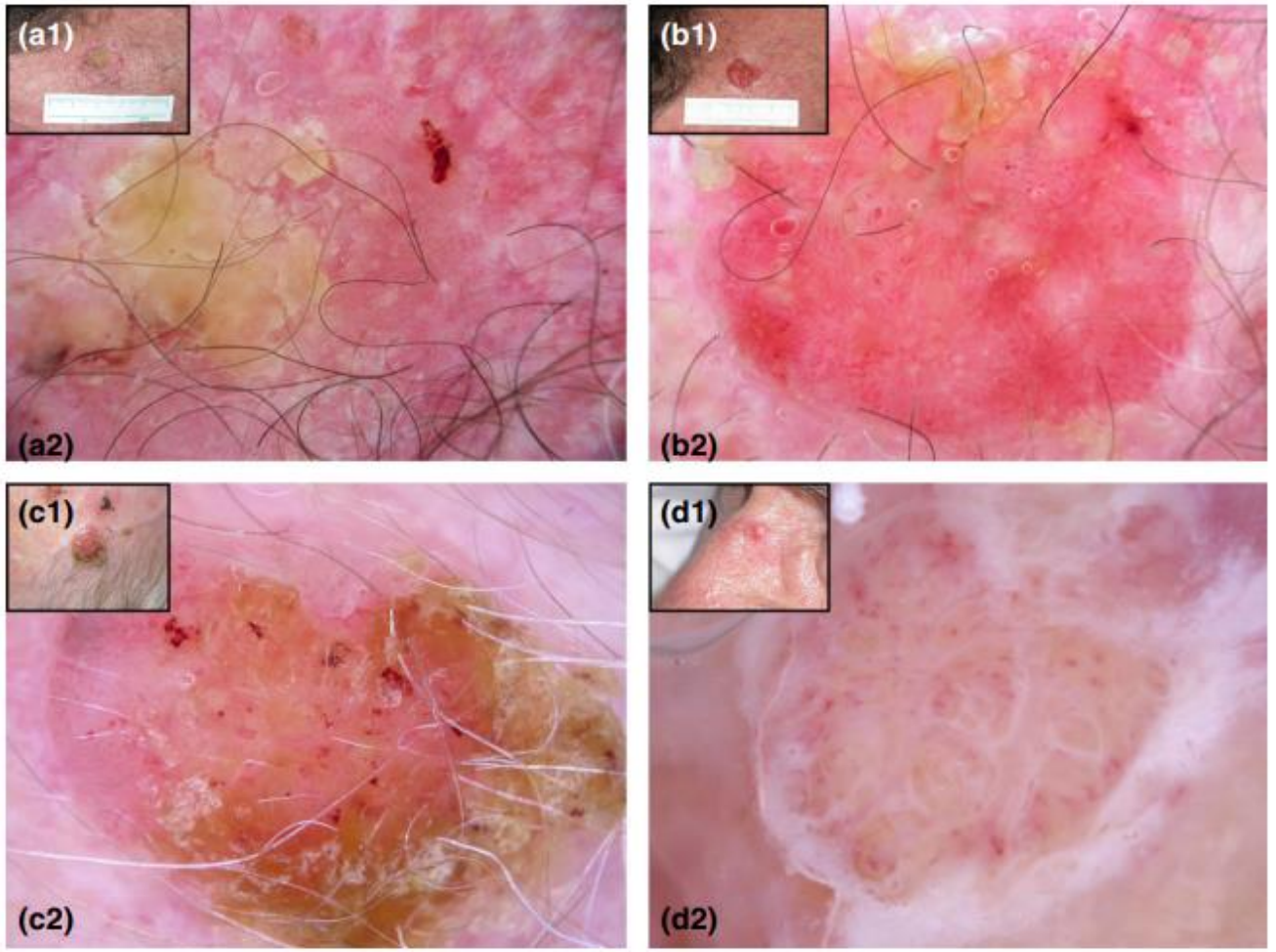
Stucco keratosis



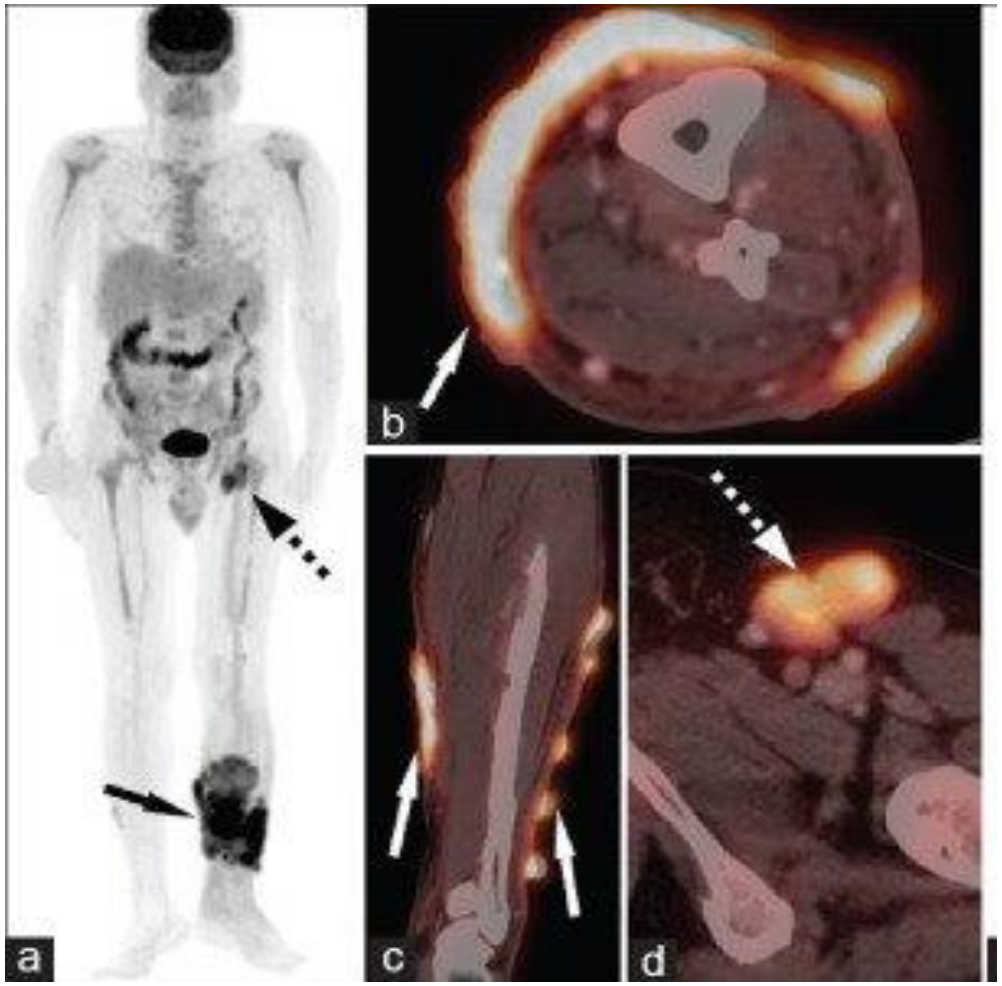
Dermatosis papulosa nigra

# IRRITATED SEBORRHEIC KERATOSIS



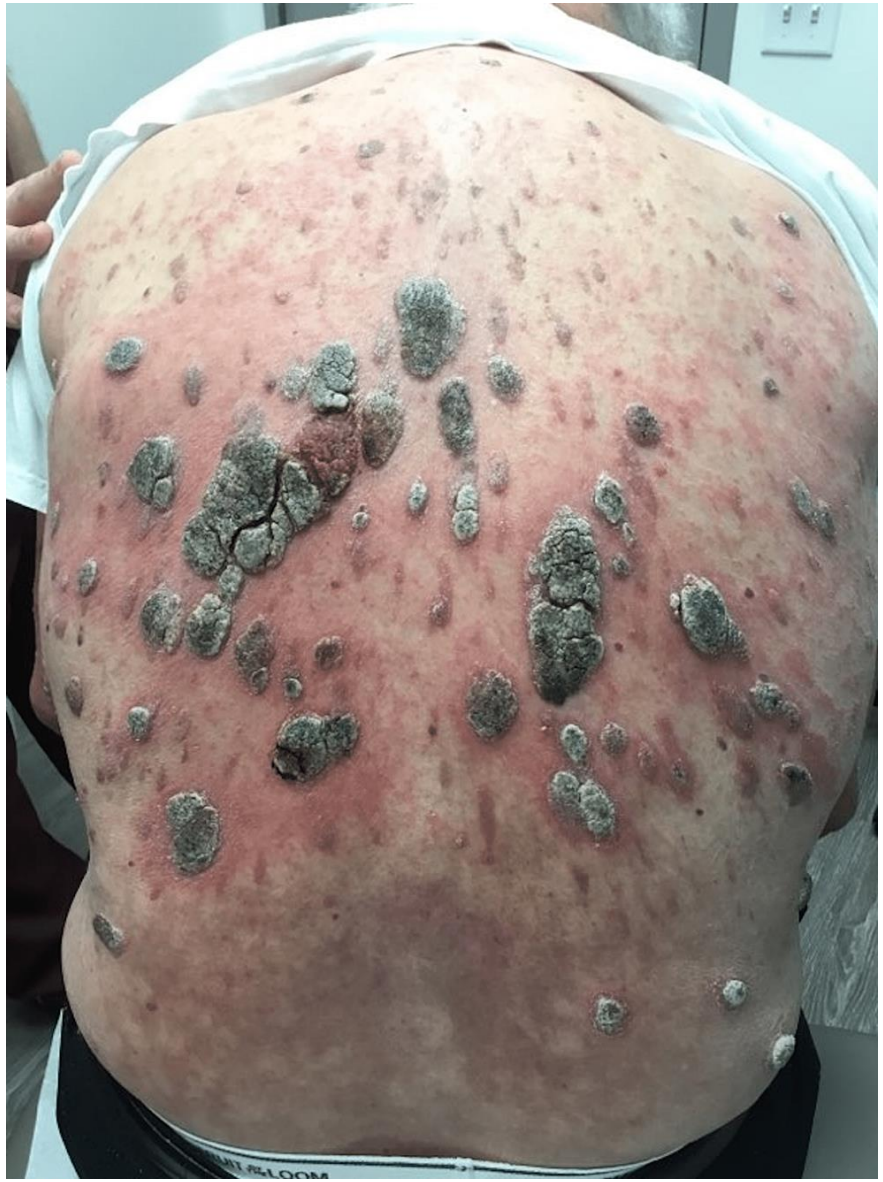
# SK MALIGNANCY MIMIC




- 55 yo M with h/o eczema presenting with LLE skin lesion and inguinal LAD
- Initial skin bx inconclusive
- F-FDG PET-CT showed uptake at the lesion and LN
- Repeat skin bx showed:
  - Hyperkeratosis
  - Horn cysts
  - Chronic inflammation
- FNA of the LN showed only inflammation

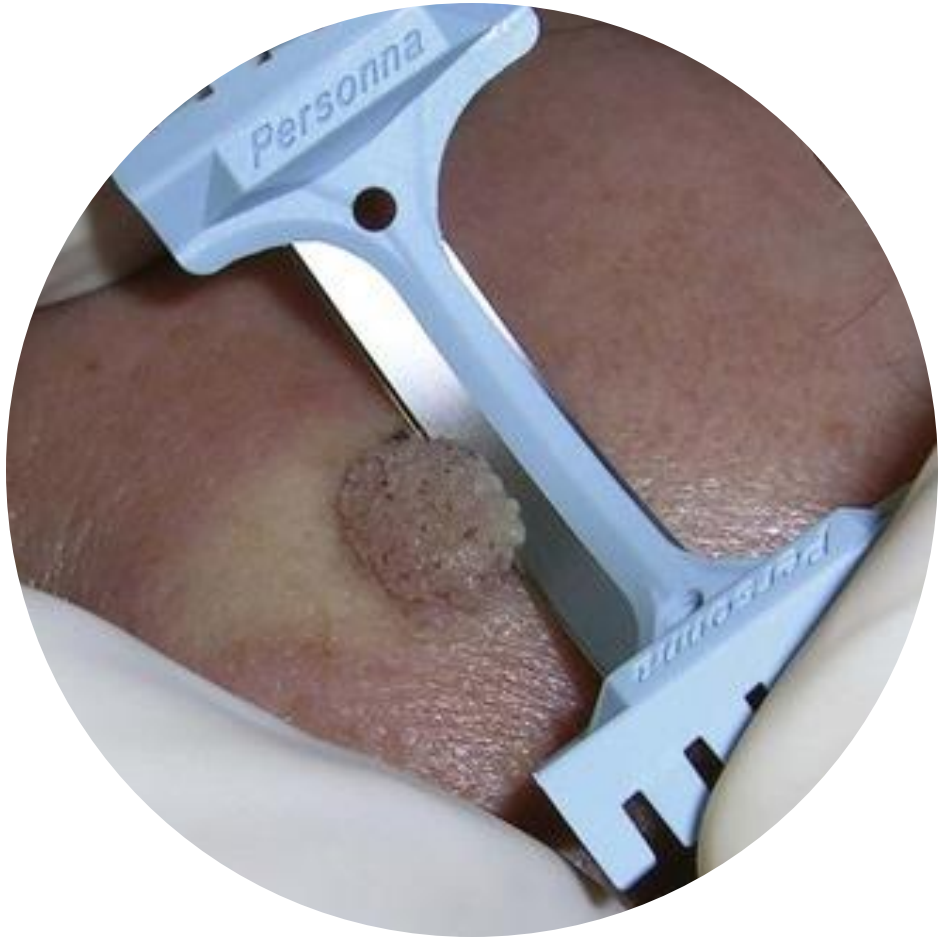
# SIGN OF LESER-TRÉLAT

- Sudden appearance of many SKs
- Associated with internal malignancy, usually GI
- Can also be a “pseudo-sign” of malignancy
  - 89 yo M presented with these SKs that developed in just 2 weeks
  - Normal work-up except for mild CA19-9 and CEA elevations
  - Extensive imaging and follow up found no evidence of malignancy

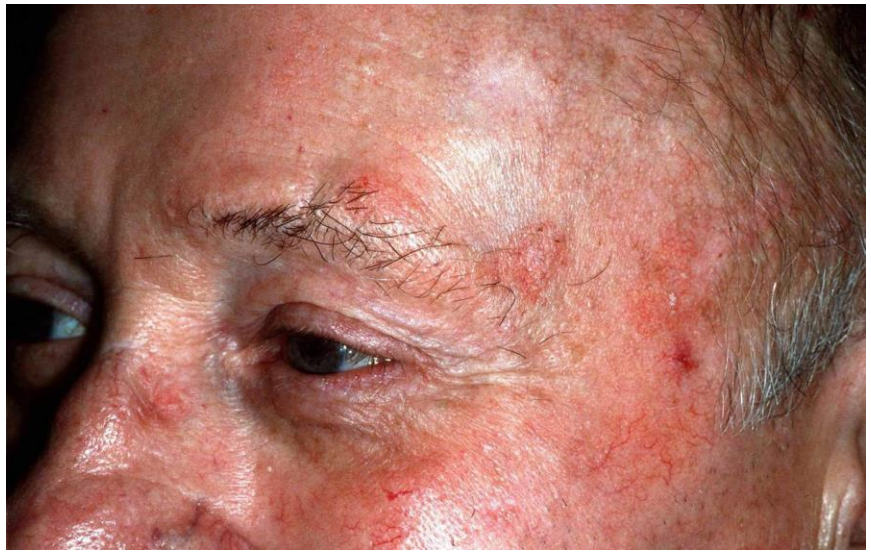


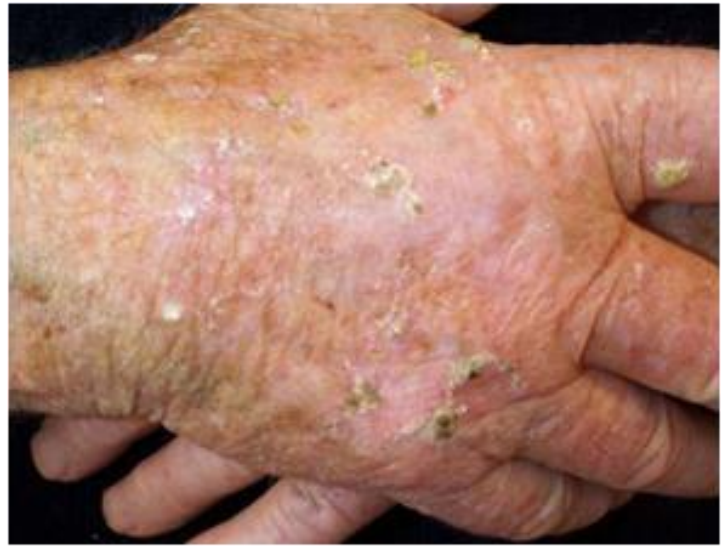
# SEBORRHEIC KERATOSIS: MANAGEMENT

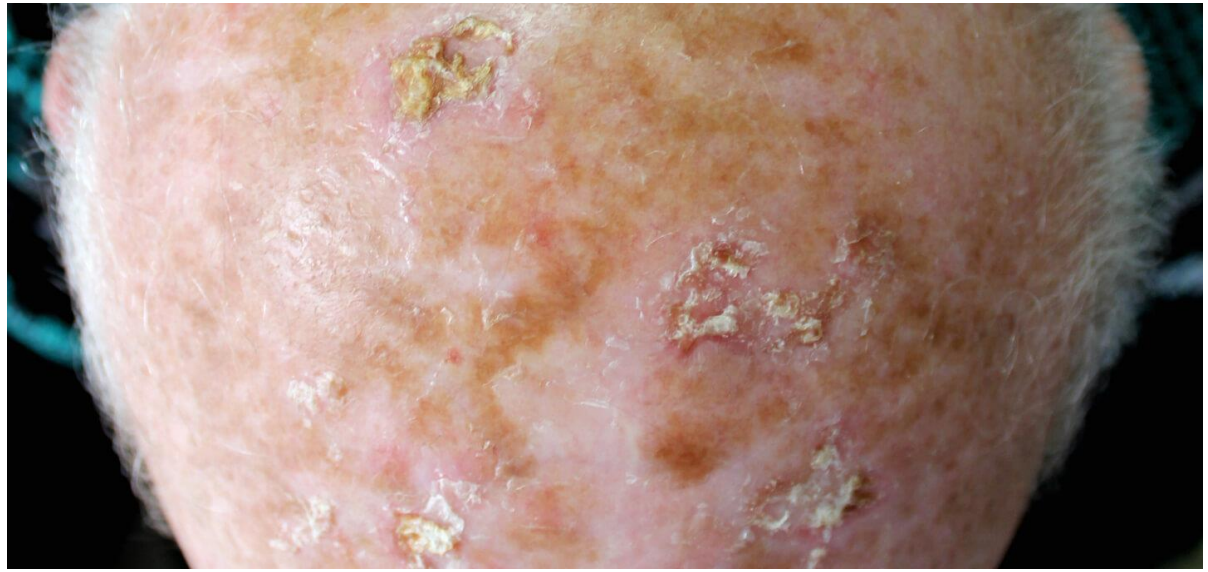
- No treatment is required
- Low threshold to biopsy if diagnosis is uncertain
- Cryotherapy
- Shave excision



# ACTINIC KERATOSIS







# ACTINIC KERATOSIS

- Occur on sun-exposed skin
- More common in lighter skin
- Occur in up to 25% of adults over 40 yo, and more with age
- Account for more than 10% of dermatologist visits annually

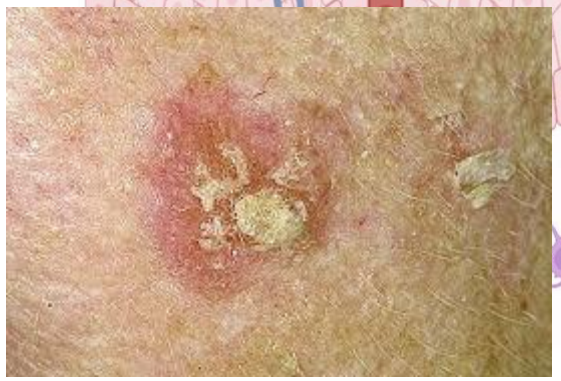
# ACTINIC KERATOSIS

*UV rays induce mutation of the tumor suppressor gene P53 and the accumulation of cytokines*

*ROS are produced, leading to oxidative stress*

*Damage to keratinocytes leads to skin barrier dysfunction, including trans-epidermal water loss*

*Hyperkeratosis occurs to compensate, and ongoing inflammation from ROS leads to development of red, dry, scaly appearance of AKs*



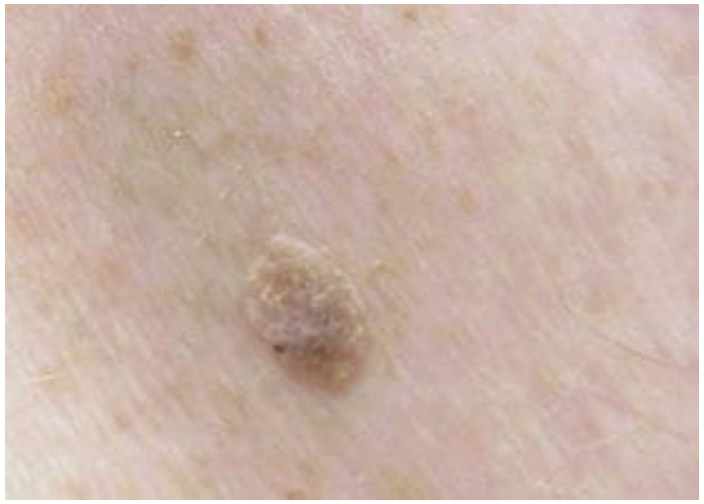
# ACTINIC KERATOSIS: CLINICAL COURSE

- Risk of progression to SCC is 0.6% at 1 yr and 2.57% at 4 yr, and probably less than 6% at 10 yr
- 65% of all primary SCCs and 36% of all primary BCCs likely arise from Aks
- Many AKs resolve spontaneously
  - 55% not present at 1 yr
  - 70% not present at 5 yr

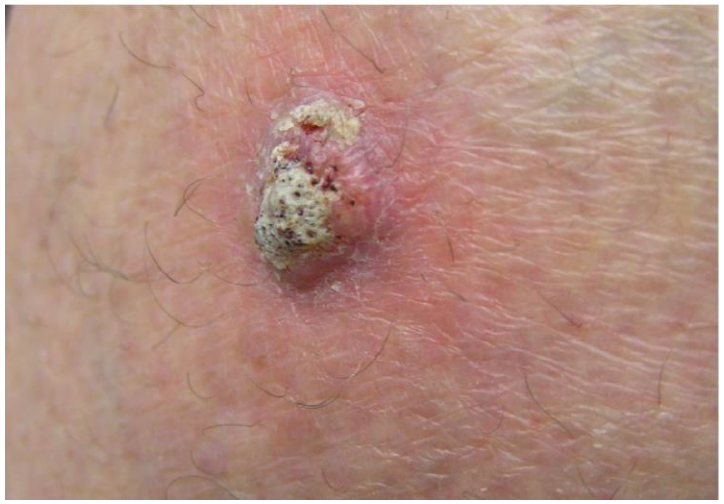
# ACTINIC KERATOSIS: MANAGEMENT

- Observation
- Sun protection
- Cryotherapy
- Shave excision
- Topical agents
  - 5-fluorouracil cream BID x 3-6 weeks ($)
  - Diclofenac 3% gel daily for 10-12 weeks ($$)
  - Imiquimod 5% cream daily for 12-16 weeks ($$$$)
  - Topical tretinoin
- Photodynamic therapy

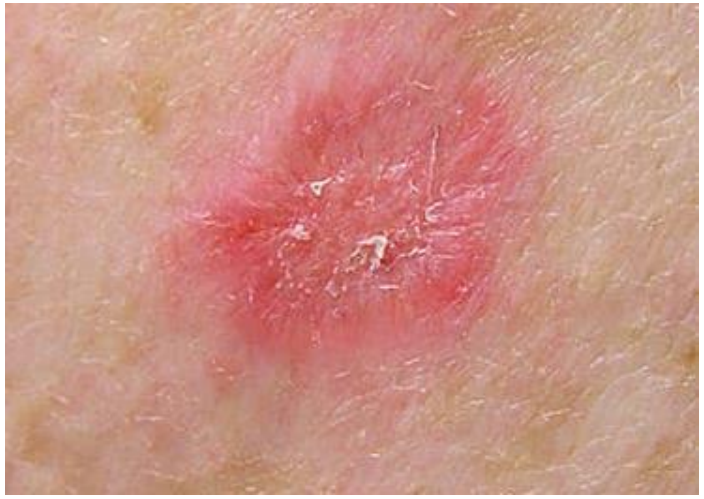
# ACTINIC KERATOSIS: DIFFERENTIAL DIAGNOSES



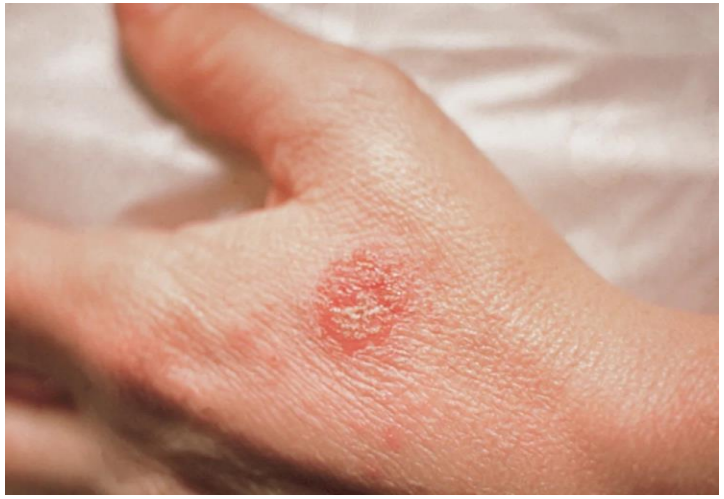
Seborrheic keratosis



Squamous cell carcinoma

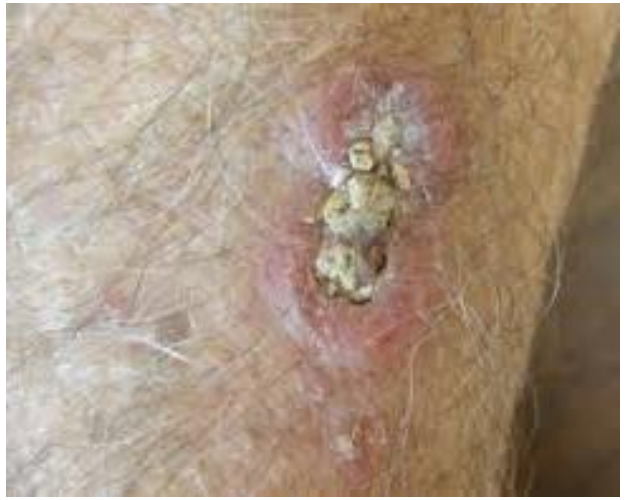


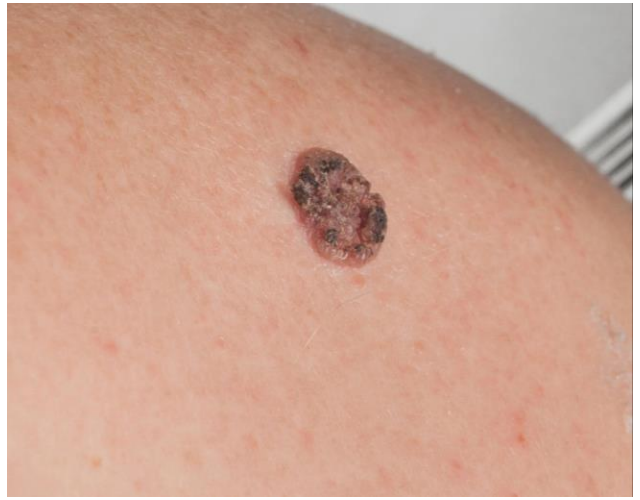
Basal cell carcinoma

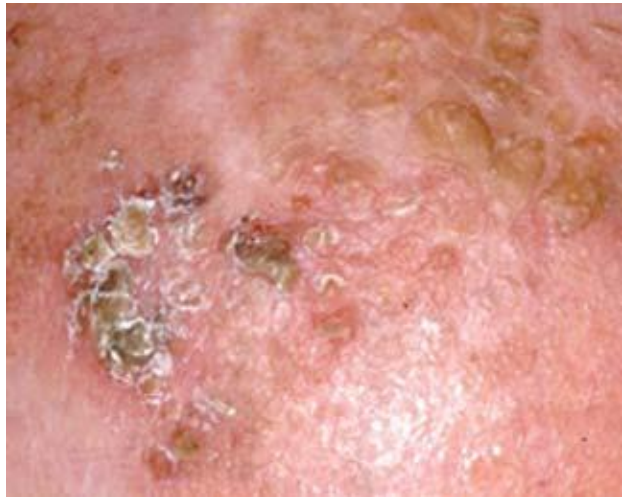


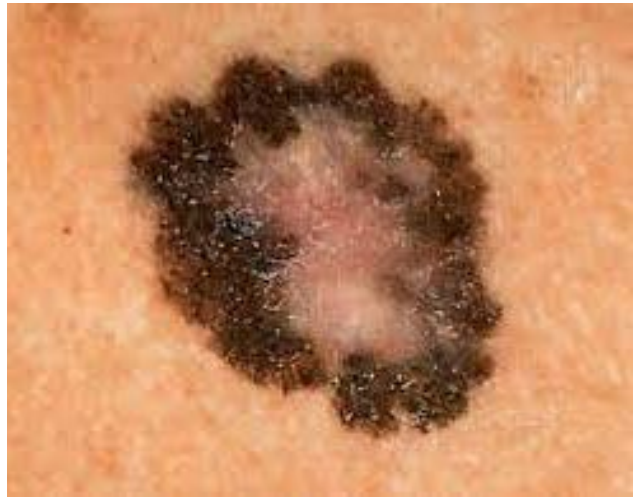
Nummular eczema

# SQUAMOUS CELL CARCINOMA









# SQUAMOUS CELL CARCINOMA

- Second most common cancer in humans
  - Accounts for 25% of nonmelanoma skin cancers
  - More than 250,000 cases diagnosed in the US annually
- Mortality rate 0.29 per 100,000
- Metastasis occurs in 2% to 9.9% of cases
  - Usually spreads by local extension
  - Capable of regional lymph node mets and distant mets
- Incidence is increasing in all age groups

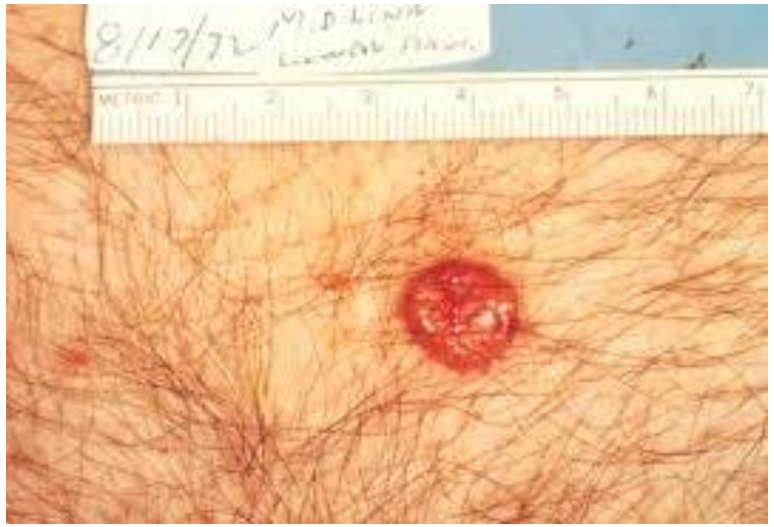
# SCC: MANAGEMENT

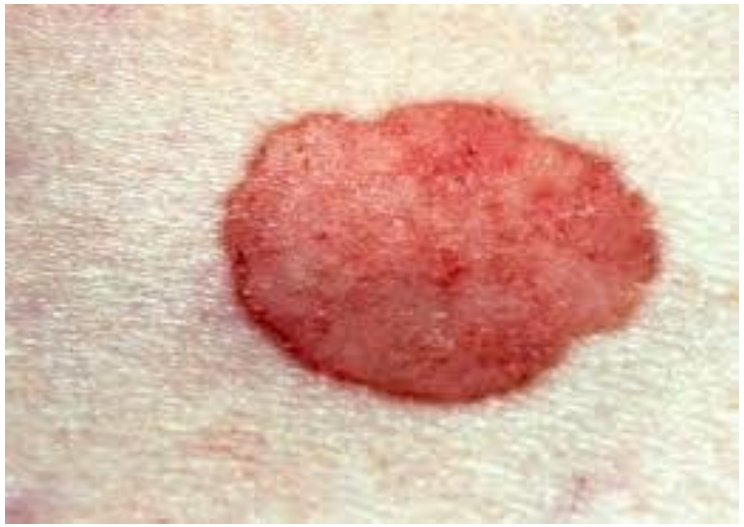
- Surgical excision with negative margins
  - 4 mm margin for low risk, well-defined tumors <2 cm removes tumor completely in 95% of cases
  - 6 mm margin for larger or high-risk tumors and tumors extending into subcutaneous tissue, or in high-risk locations (ear, lip, scalp, nose, eyelids)
- Consider Mohs surgery if tumor(s):
  - Larger than 2 cm
  - Irregular borders
  - Aggressive histiologic subtype
  - Recurrent lesion
  - High-risk location

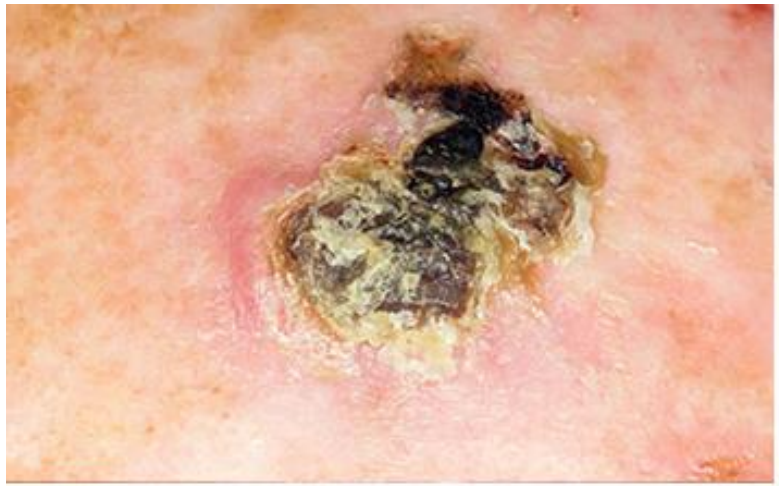
# SCC: MANAGEMENT (CONTINUED)

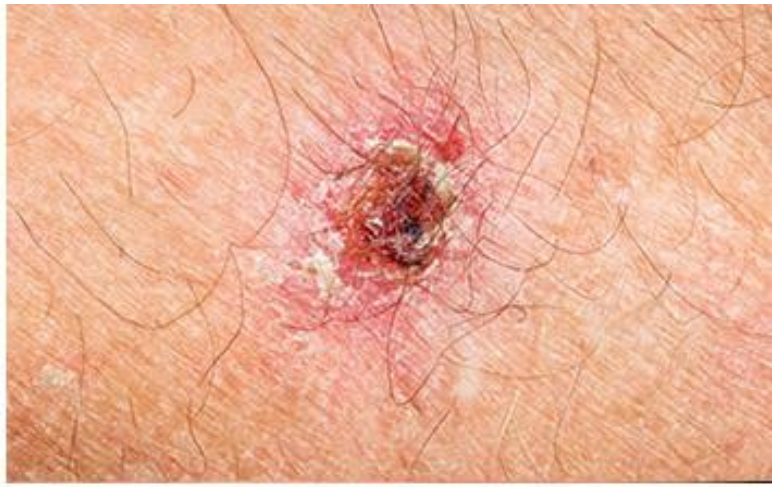
- Radiation therapy: consider in advanced, nonresectable tumors
- Curettage and cautery: consider in small (<1cm), low-risk tumors
- Cryotherapy: consider in small (<1cm), low-risk tumors, experienced practitioners only

# BASAL CELL CARCINOMA



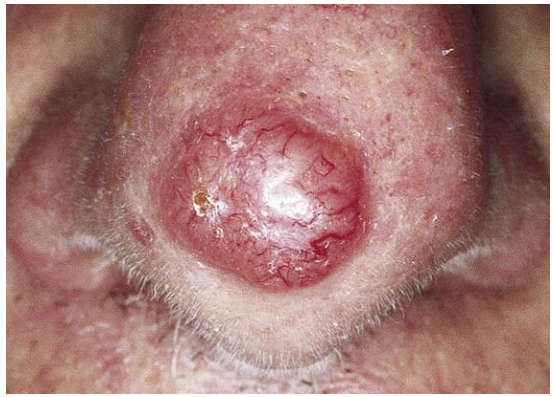




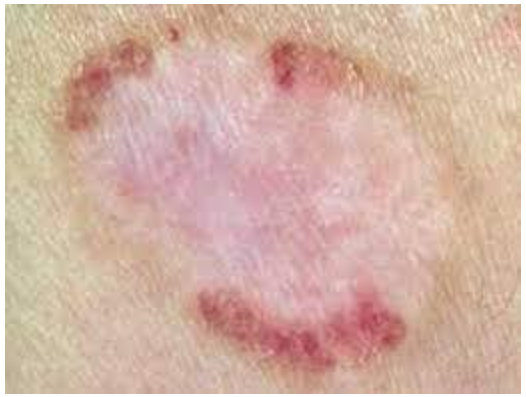


# BASAL CELL CARCINOMA

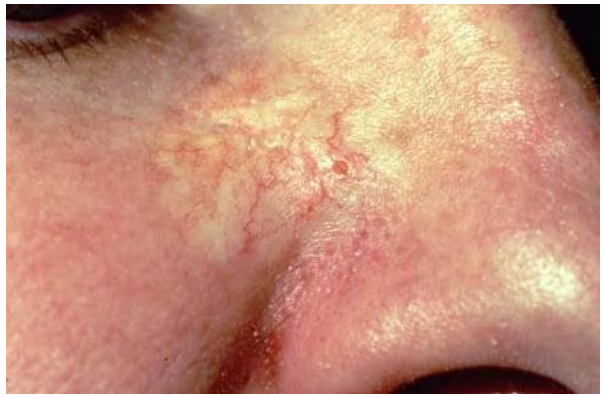
- Most common skin cancer
- Usually found on the head and neck (90%)
- May spread locally but almost never metastasizes or causes mortality
- Major types



Nodular (70%)



Superficial

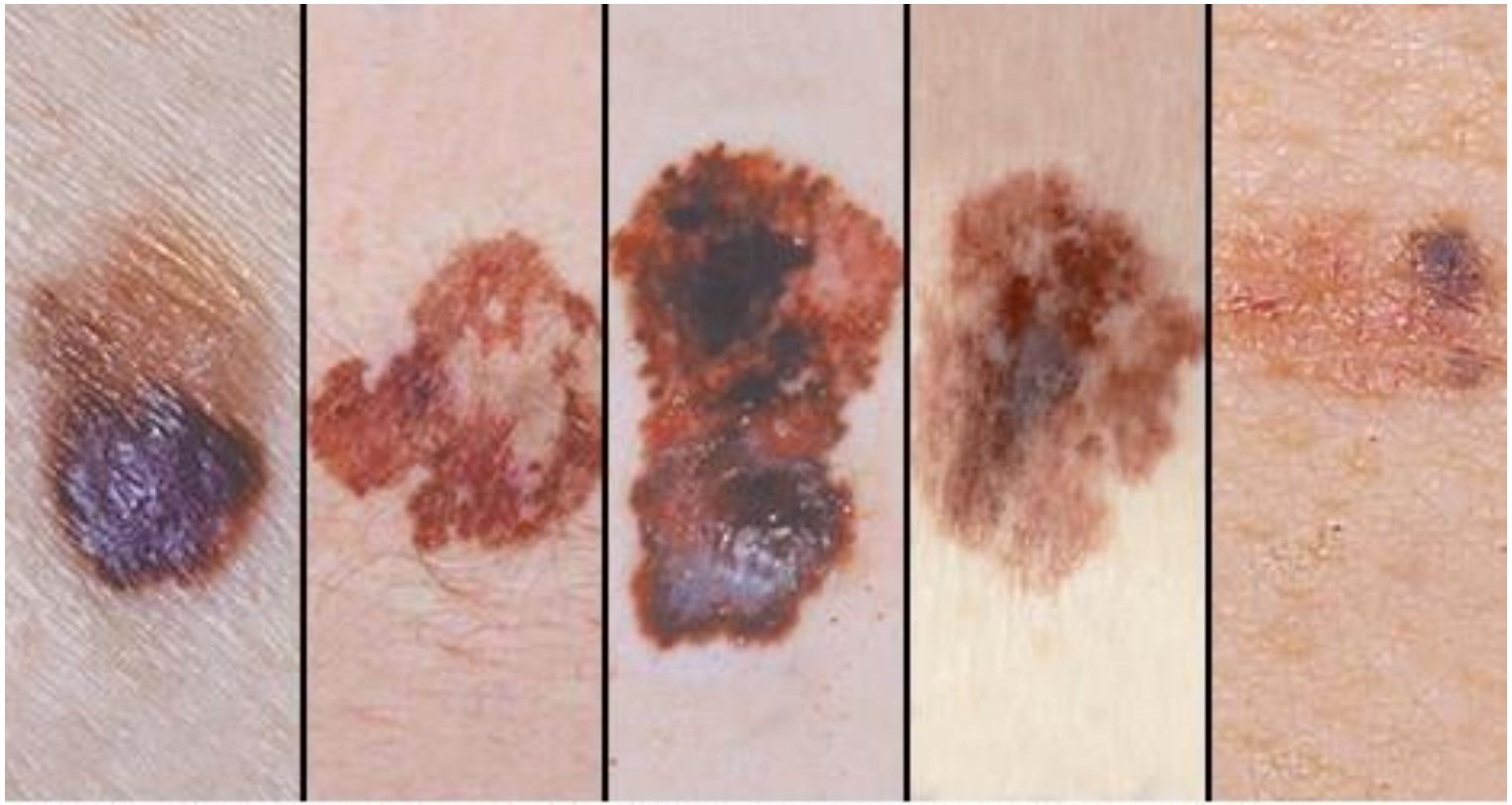


Sclerosing/morpheaform

# BCC: MANAGEMENT

- Mohs surgery = gold standard
- Surgical excision with 4-5 mm margins
- Cryotherapy
- Curettage and cautery
- Imiquimod can be used if surgery is contraindicated, tumor is <2 cm, and diagnosis is biopsy-confirmed

# MELANOMA



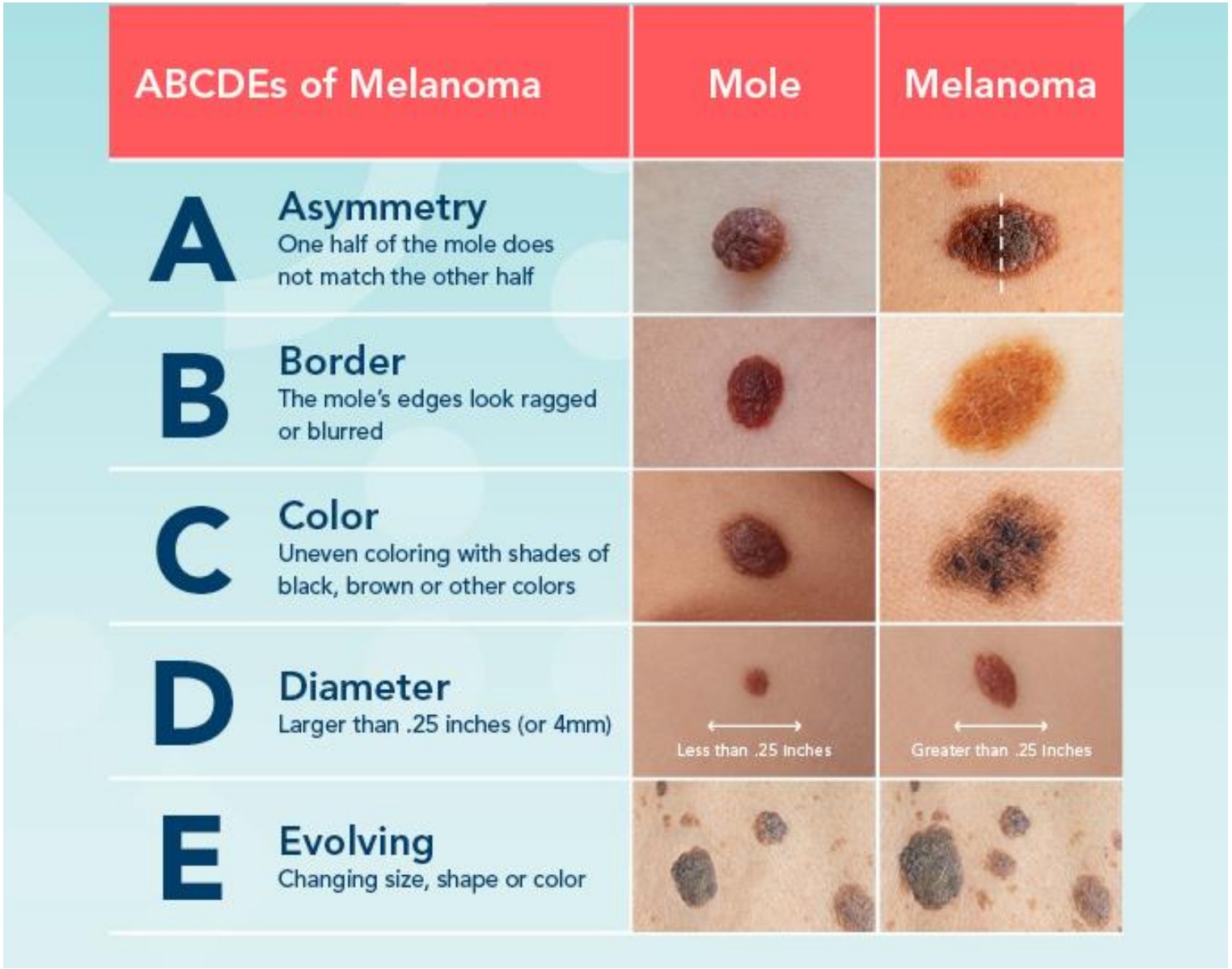
# MELANOMA

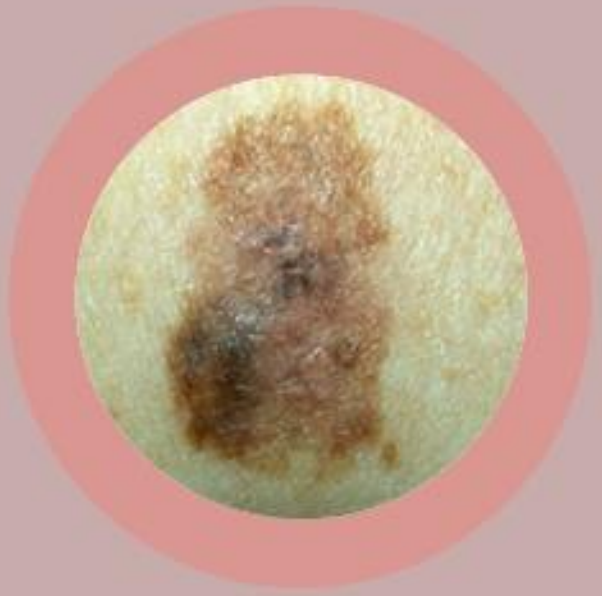
- Third most common skin cancer
- Highest mortality rate
- Lifetime risk is 1 in 55 for men and 1 in 36 for women
- Incidence continues to increase worldwide at approx 4-8% per year

# MELANOMA: RISK FACTORS

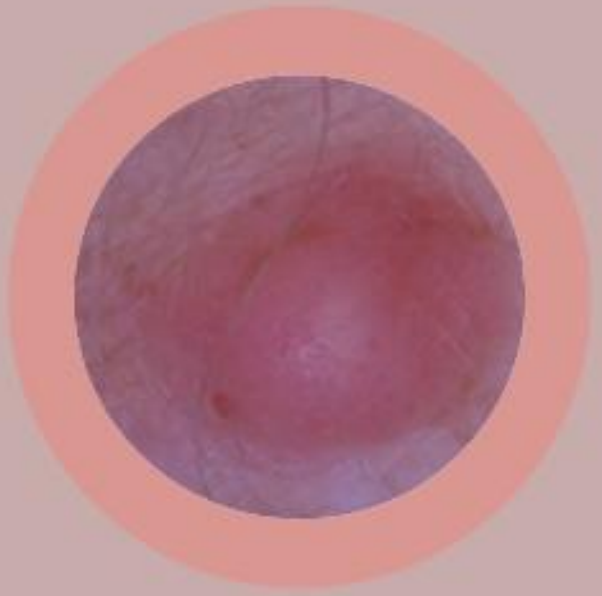
- Environmental
  - UV exposure: sunburn, indoor tanning, living close to the equator
  - Immunosuppression
- Genetic
  - Fair skin, blue or green eyes, red or blonde hair
  - Melanoma in first-degree relative
  - History of familial atypical mole melanoma syndrome
- Phenotypic
  - Many nevi, especially if dysplastic
  - Increased age
  - Personal history of any skin cancer

# MELANOMA: CLINICAL FEATURES

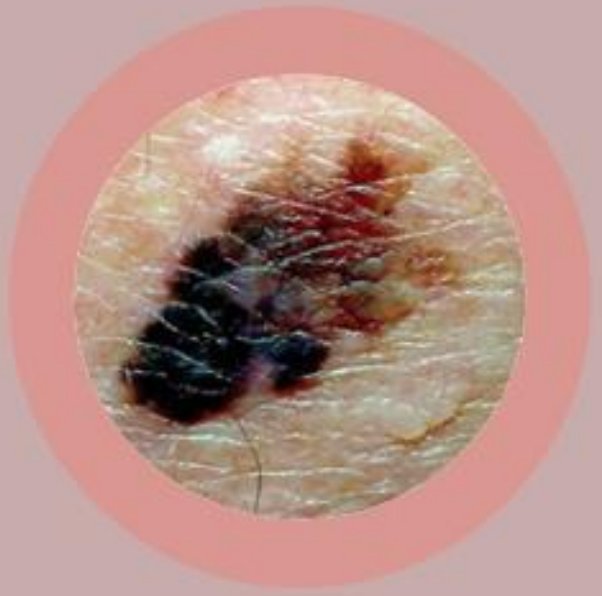




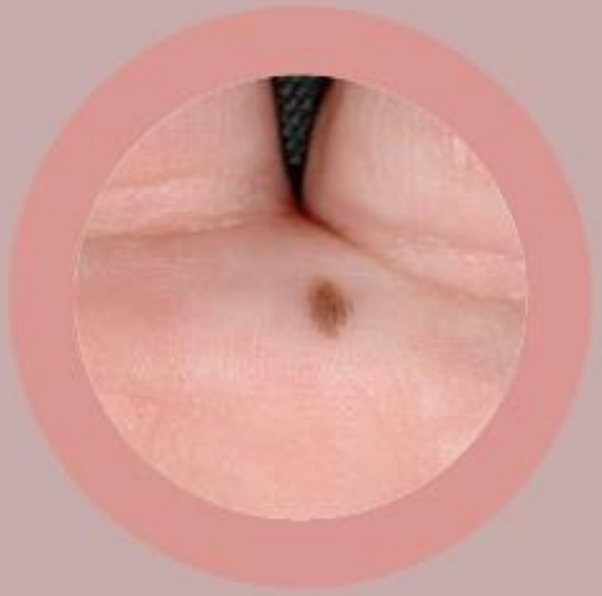
SUPERFICIAL SPREADING MELANOMA



NODULAR MELANOMA



LENTIGO MALIGNA MELANOMA

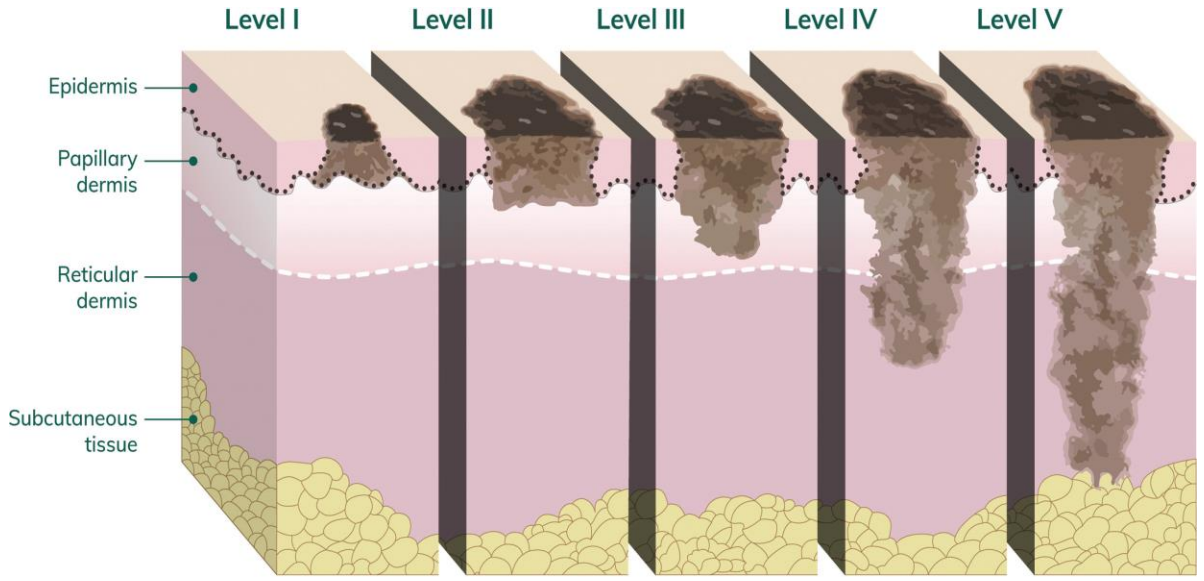


ACRAL LENTIGINOUS MELANOMA

# MELANOMA: SUBTYPES

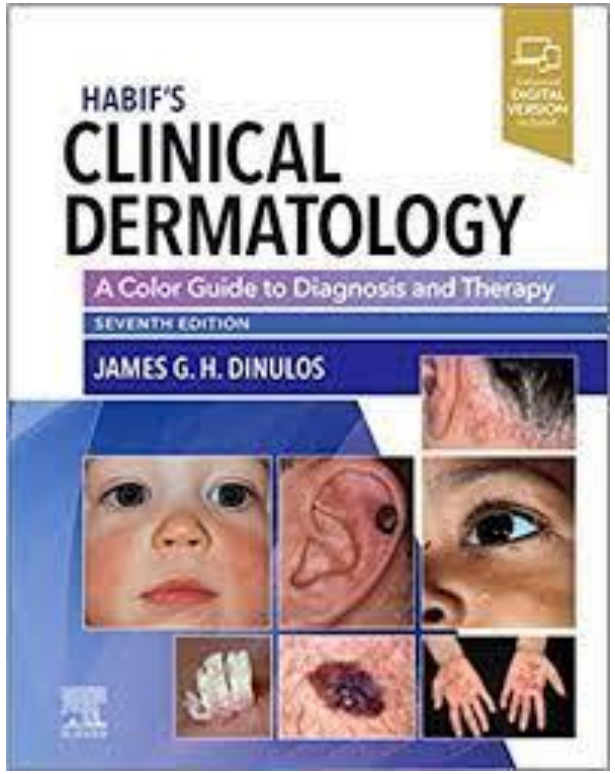
# MELANOMA: MANAGEMENT

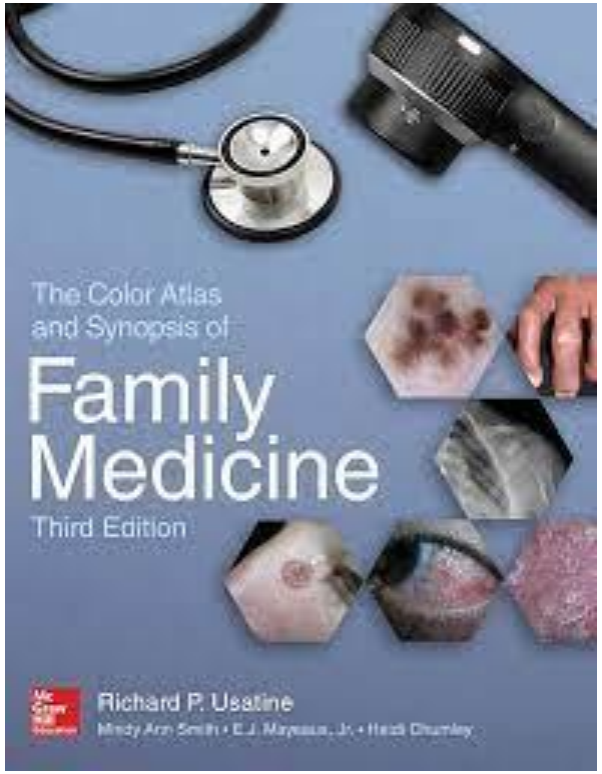
## +/- SENTINEL LYMPH NODE BIOPSY AND CHEMOTHERAPY

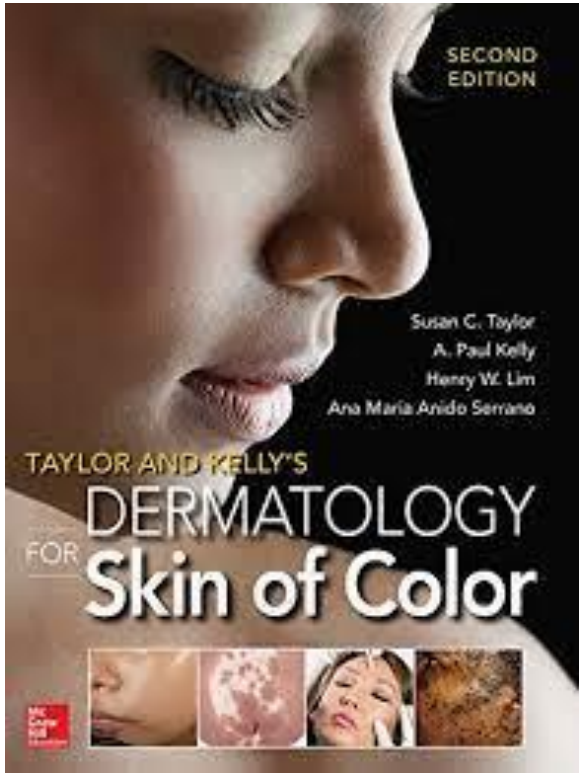



| BRESLOW THICKNESS | MARGIN |
|---|---|
| INSITU | 5 MM |
| < 1 MM | 10 MM |
| 1 - 2 MM | 10- 20 MM |
| 2 - 4 MM | 20 - 30 MM |
| > 4 MM | 30 MM |

# RECOMMENDED POINT OF CARE REFERENCES FOR YOUR OFFICE



# REFERENCES


- Adelekun A, Onyekaba G, Lipoff JB. Skin color in dermatology textbooks: an updated evaluation and analysis. *J Am Acad Dermatol*. 2021;84(1):194-196.
- Alvarzez-Salafranca M, Gomez-Martinez I, et. Al. Dermoscopy of inflamed seborrheic keratosis: A great mimic of malignancy. Australasian Journal of Dermatology. 2021.
- Arcuri D, Ramchatesingh B, Lagacé F, Iannattone L, Netchiporouk E, Lefrançois P, Litvinov IV. Pharmacological Agents Used in the Prevention and Treatment of Actinic Keratosis: A Review. International Journal of Molecular Sciences. 2023; 24(5):4989. https://doi.org/10.3390/ijms24054989.
- Barbieri JS, Shin DB, Wang S, et al. Association of race/ethnicity and sex with differences in health care use and treatment for acne. *JAMA Dermatol.* 2020;156(3):312-319.
- Buster KJ, Stevens EI, Elmets CA. Dermatologic health disparities. *Dermatol Clin*. 2012;30(1):53-59.
- Chen V, Akhtar S, Zheng C, et al. Assessment of changes in diversity in dermatology clinical trials between 2010–2015 and 2015–2020: a systematic review. *JAMA Dermatol*. 2022;158(3):288-292.
- Culp MB, Lunsford NB. Melanoma among non-Hispanic Black Americans. *Prev Chronic Dis.* 2019;16:E79.
- Dinulous, James. Habif's Clinical Dermatology: A Color Guide to Diagnosis and Therapy. Seventh edition. Elsevier. 2021.
- Frazier WT, Proddutur S, and K Swope. Common Dermatologic Conditions in Skin of Color. American Family Physician. 2023; 107 (1):26-34.

# REFERENCES


- Lester JC, Jia JL, Zhang L, et al. Absence of images of skin of colour in publications of COVID-19 skin manifestations. *Br J Dermatol*. 2020;183(3):593-595.
- Lester JC, Taylor SC, Chren MM. Under-representation of skin of colour in dermatology images: not just an educational issue. *Br J Dermatol*. 2019;180(6):1521-1522.
- Sharma P. Irritated seborrhoeic keratosis masquerading as malignancy on $^{18}$F-fluorodeoxyglucose positron emission tomography-computed tomography. World J Nucl Med. 2021 Feb 12;20(3):309-311. doi: 10.4103/wjnm.WJNM_109_20. PMID: 34703401; PMCID: PMC8488890.
- Suening B S, Neidenbach P J (February 18, 2023) The Pseudo-Sign of Leser-Trélat: A Rare Presentation. Cureus 15(2): e35155. doi:10.7759/cureus.35155
- Usatine, Richard. The Color Atlas of Family Medicine. Second Edition. McGraw Hill. 2013.
- Van Trung Hoang, Cong Thao Trinh, et. al, Overview of epidermoid cyst, European Journal of Radiology 2019: 6 (291-301). ISSN 2352-0477, https://doi.org/10.1016/j.ejro.2019.08.003.

# QUESTIONS?

# DERMATOLOGY TERMINOLOGY RAPID REVIEW

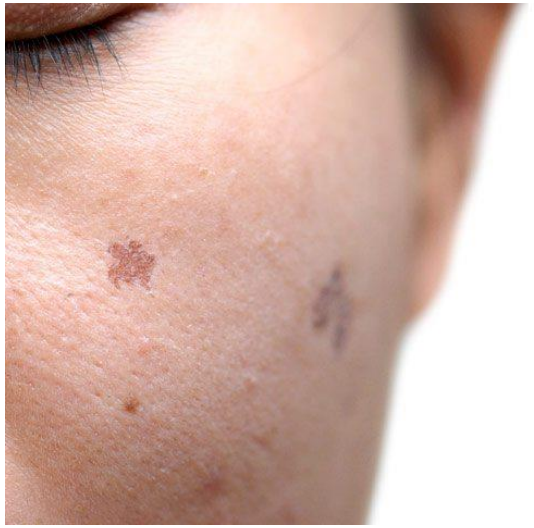
# DERM TERMS: PRIMARY LESIONS

- Direct result of pathology in the skin
- Most representative lesions of the disorder

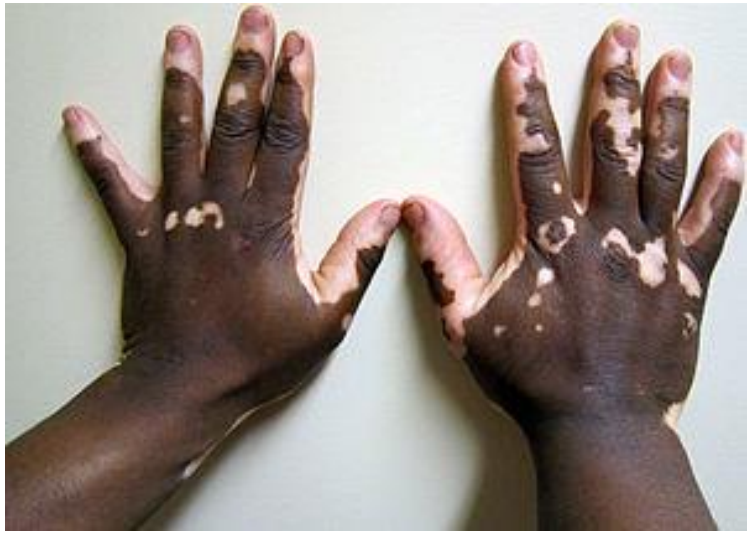
| | |
|---|---|
| macules | flat lesions <1cm |
| papules | raised lesions <1cm |
| nodules | solid raised lesions >1cm |
| wheals | local edema causing flat raised lesions; urticaria |
| vesicles | raised lesions filled with clear fluid <1cm |
| bullae | raised lesions filled with clear fluid >1cm |
| pustules | raised lesions filled with purulent exudate |
| patches | flat lesions >1cm |
| plaques | broad elevated lesions that cover a large area (>1cm) |

# PRIMARY LESION: MACULE

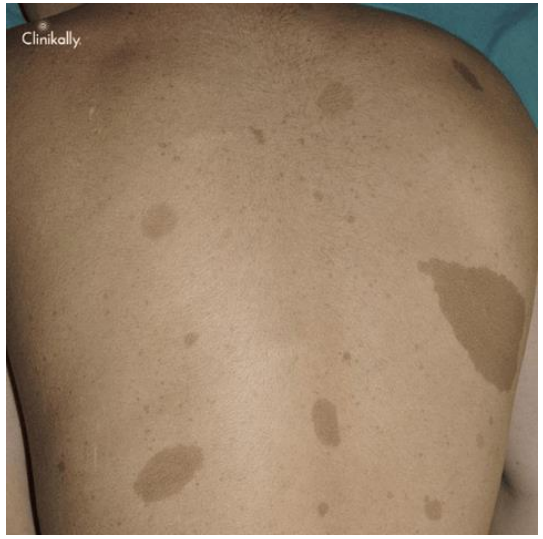
- A circumscribed, flat discoloration less than 1 cm in diameter
- May be brown, red, blue, or hypopigmented



Freckles



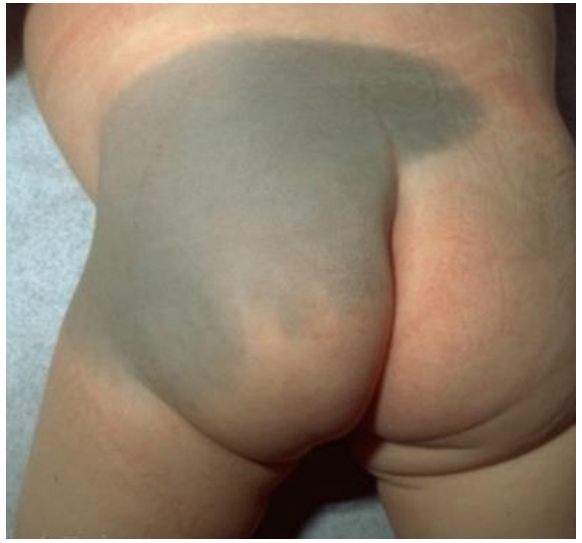
Vitiligo




Café au lait spots

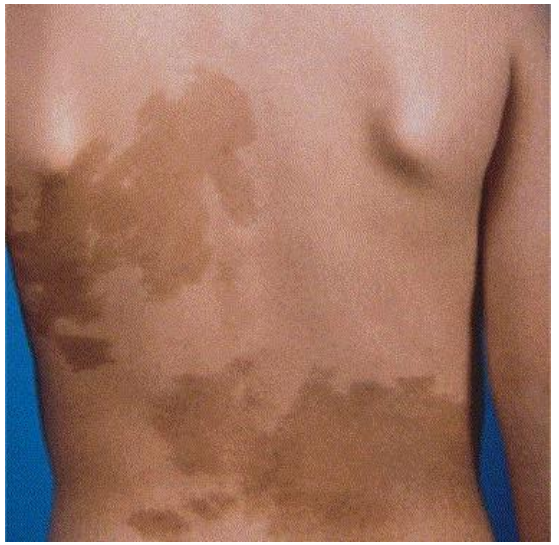
# PRIMARY LESION: PATCH

- A circumscribed, flat lesion greater than 1 cm
- A large macule



Congenital dermal melanosis

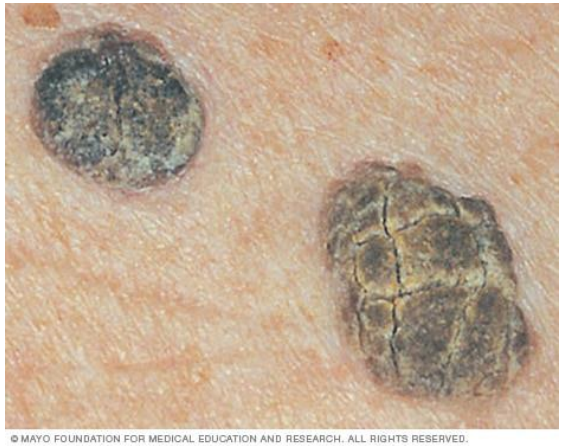
Vitiligo



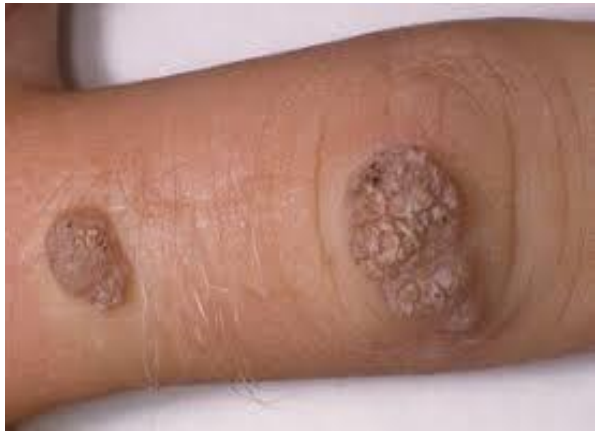
Café au lait spot

# PRIMARY LESION: PAPULE

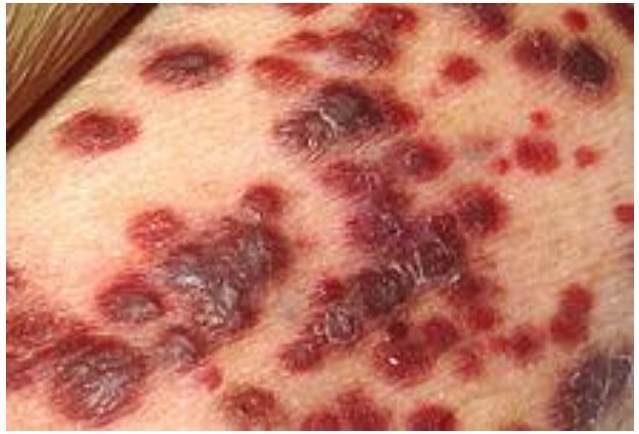
- A circumscribed, palpable elevation of the skin less than 1 cm (some sources say less than 5 mm)



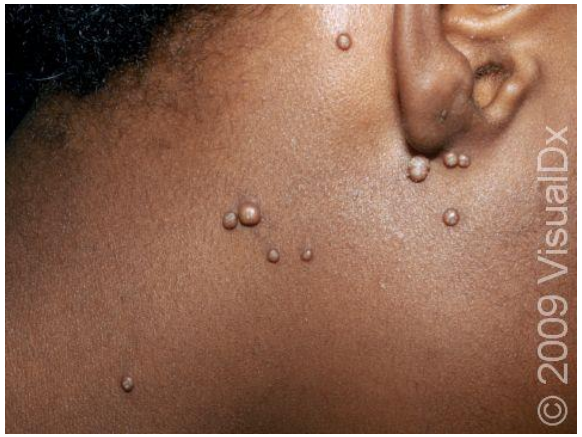

Seborrheic keratoses



Verruca vulgaris



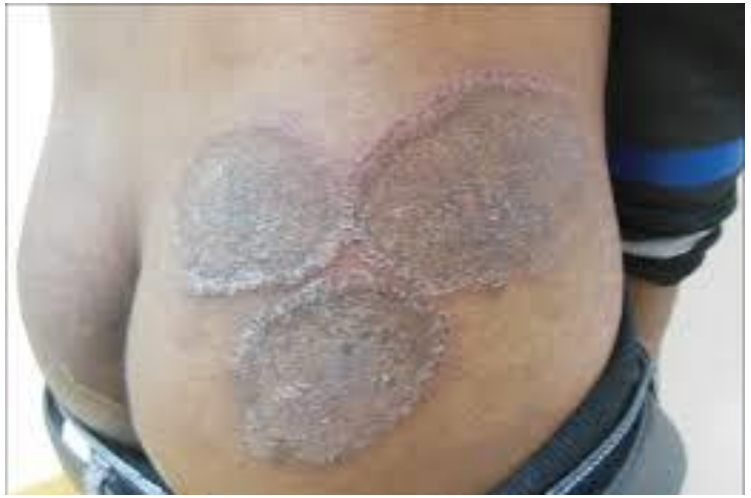
Kaposi's sarcoma




Molluscum contagiosum

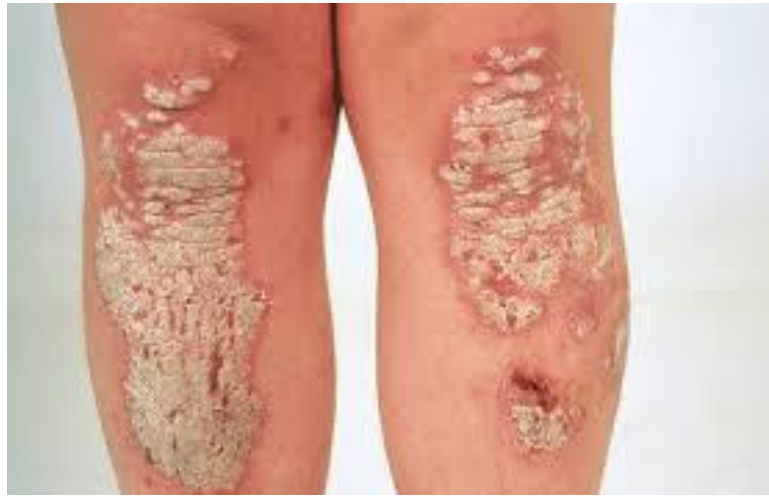
# PRIMARY LESION: PLAQUE

- A circumscribed, elevated lesion more than 1 cm (some sources say 5 mm)
- May form as a confluence of papules



Tinea corporis

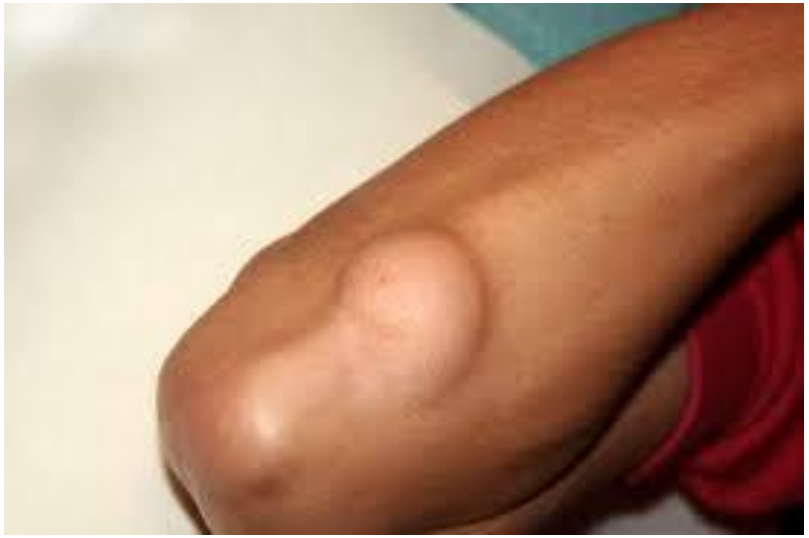
Seborrheic dermatitis



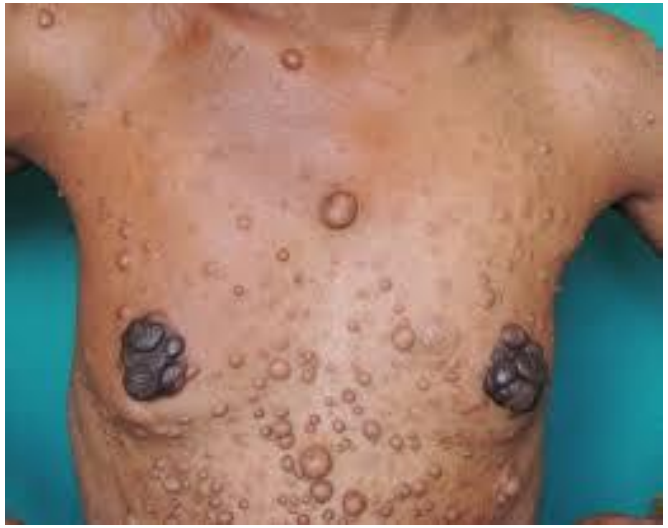
Psoriasis

# PRIMARY LESION: NODULE

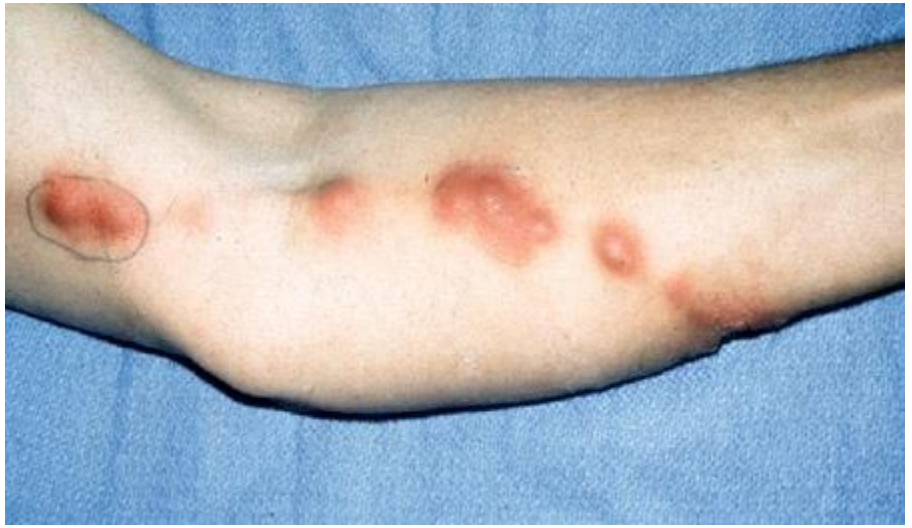
- A circumscribed, elevated, solid lesion more than 1 cm



Lipoma



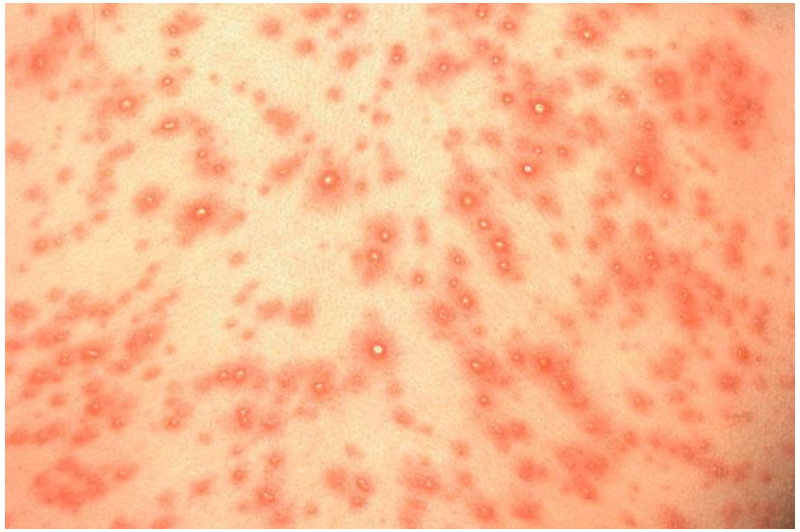
Neurofibromatosis



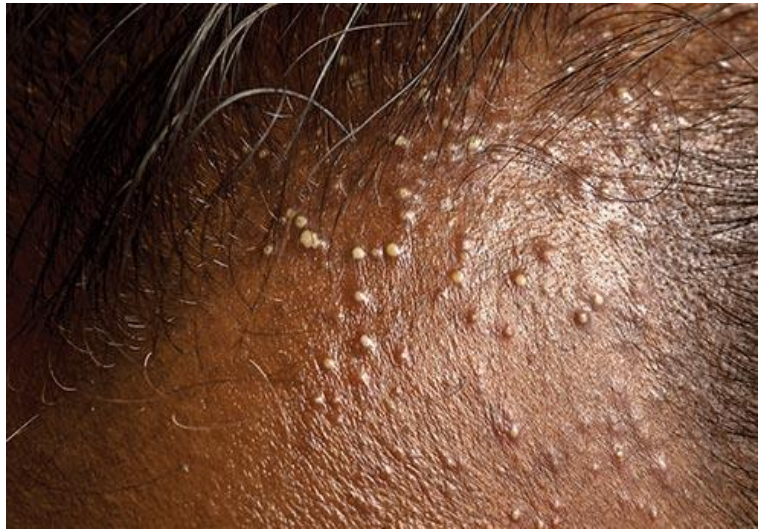
Sporotrichosis

# PRIMARY LESION: PUSTULE

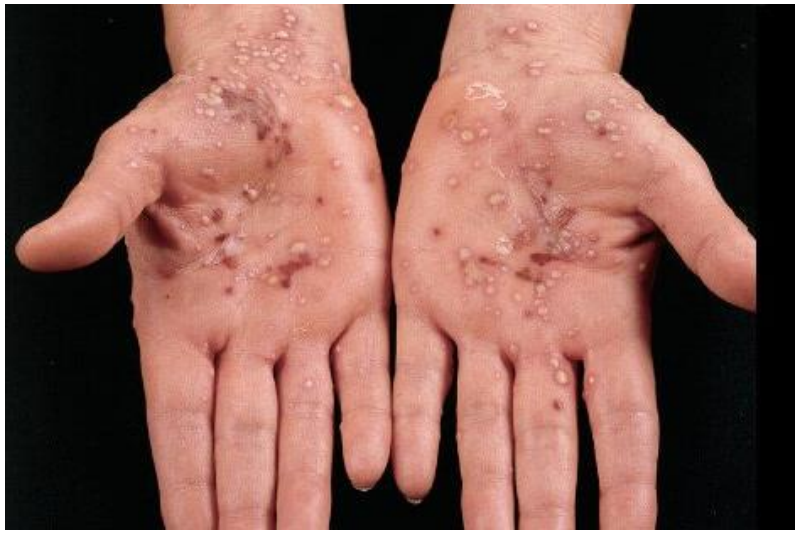
- A circumscribed lesion less than 1 cm (some definitions say 5 mm) containing leukocytes and free fluid; may be infected or sterile



Varicella zoster (chickenpox)



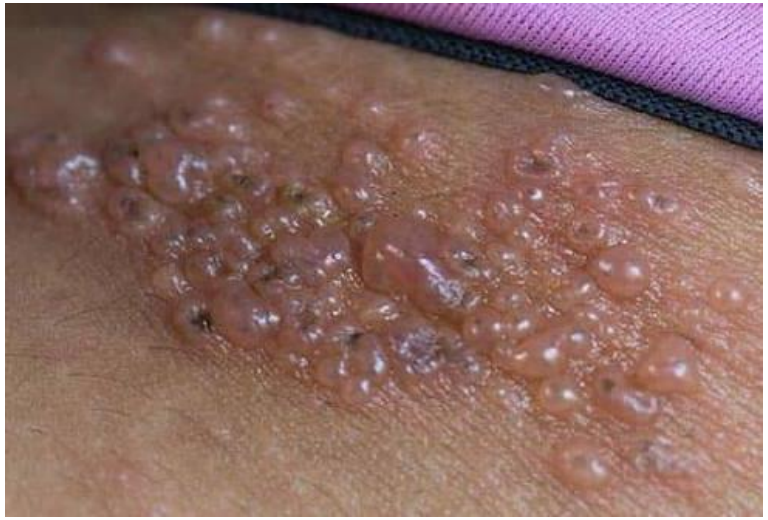
Folliculitis



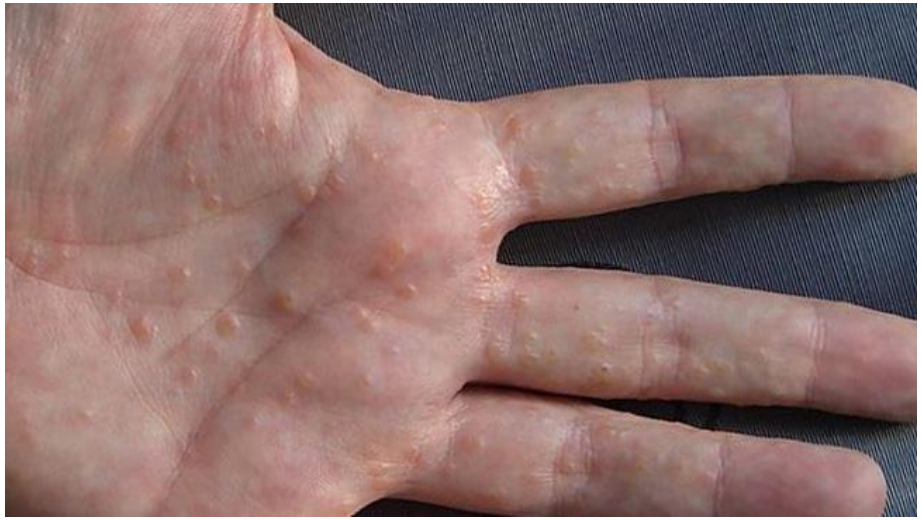
Palmoplantar pustulosis (PPP)

# PRIMARY LESION: VESICLE

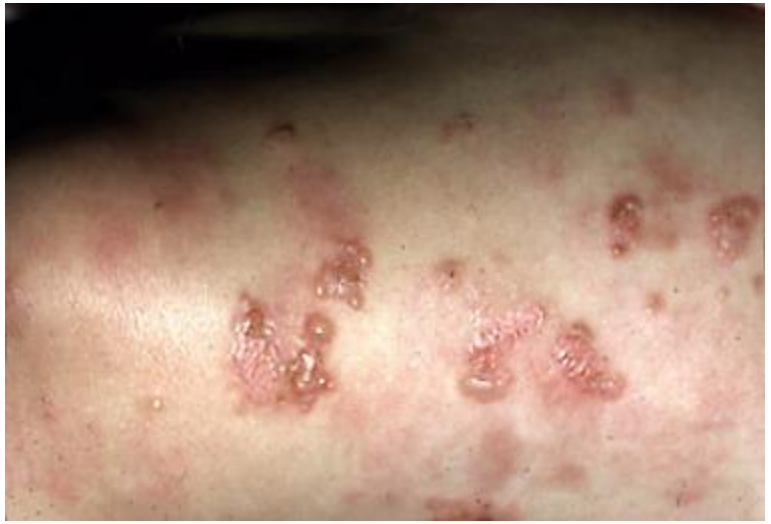
- A raised lesion containing free fluid up to 5 mm in diameter



Herpes zoster (shingles)



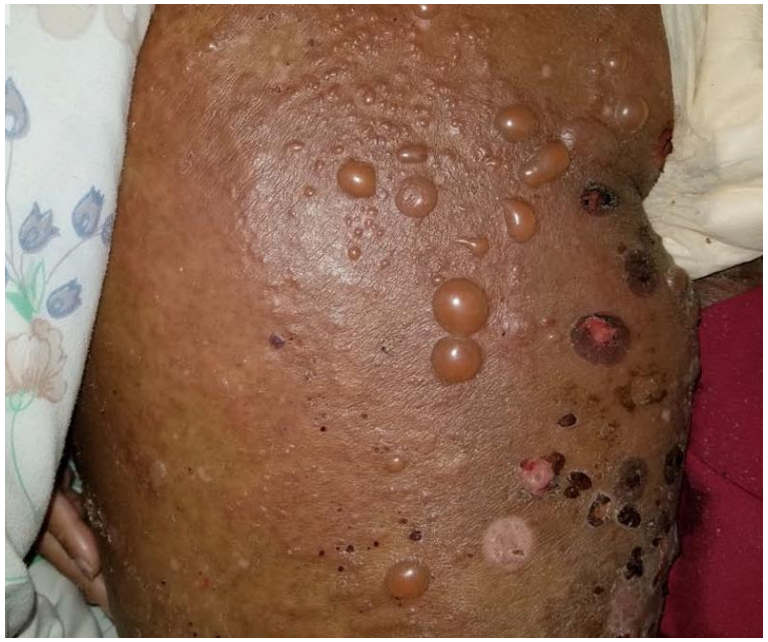
Dyshidrotic eczema



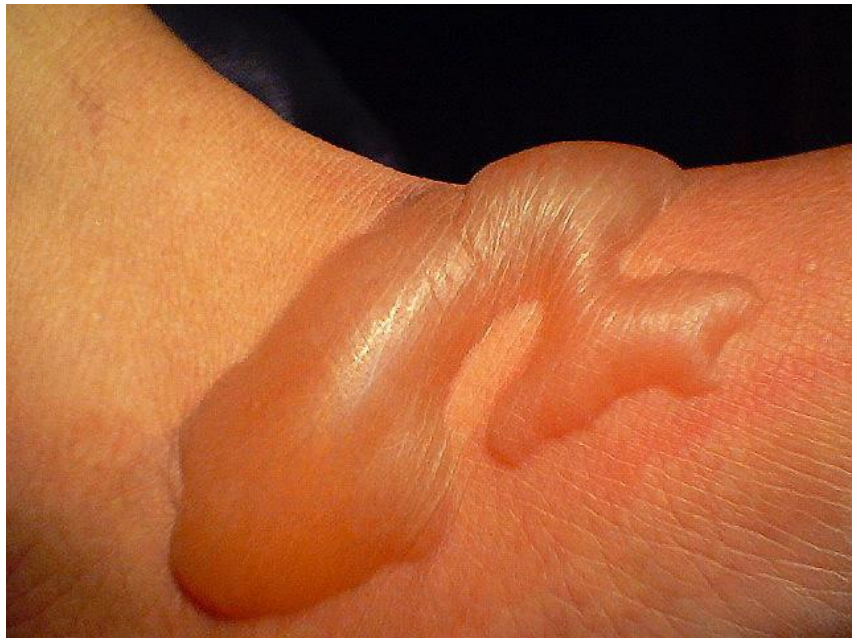
Dermatitis herpetiformis

# PRIMARY LESION: BULLA

- A circumscribed lesion containing free fluid greater than 5 mm in diameter



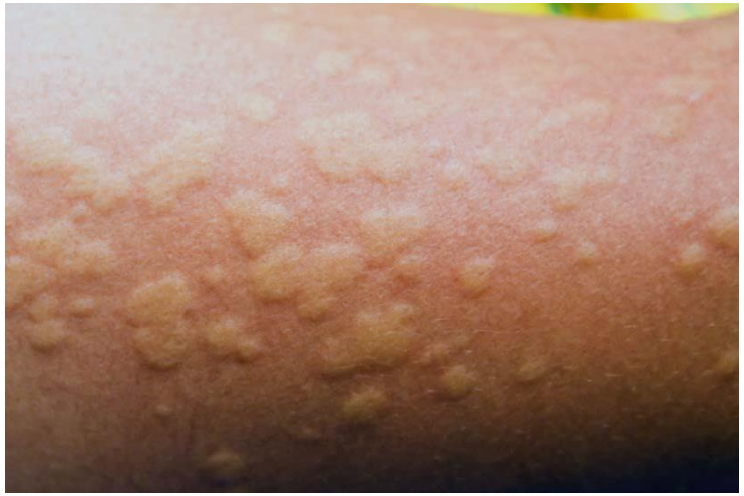
Bullous pemphigoid



Thermal trauma (second degree burn)

# PRIMARY LESION: WHEAL (HIVE)

- A firm, edematous raised lesion resulting from infiltration of the dermis with fluid
- Transient; resolves within hours



Urticaria

Angioedema

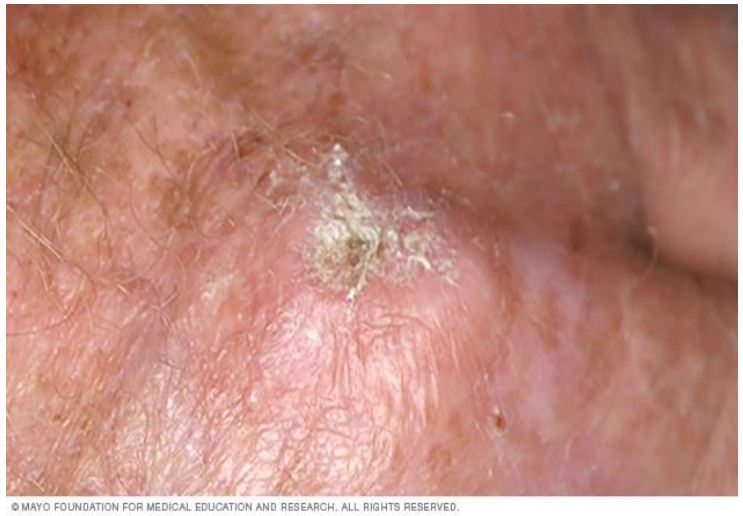
Dermatographism

- Evolutionary changes that occur to primary lesions as the disorder progresses

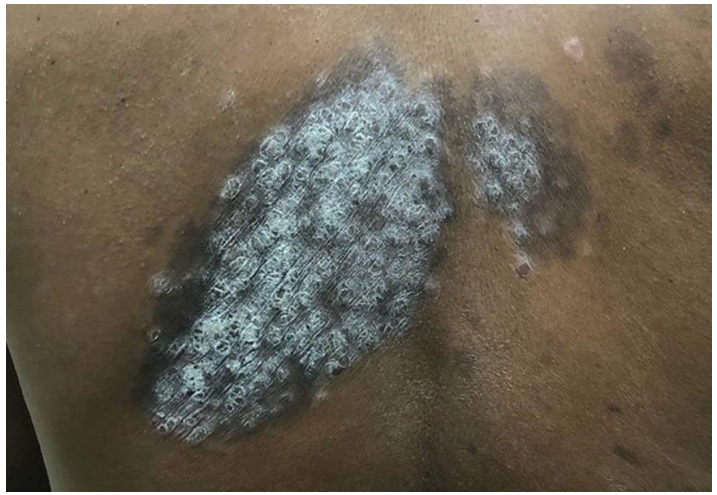
| | |
|---|---|
| scale | accumulation of compact desquamated layers of skin, may be skin colored or whitish |
| crust | dried remains of blood, pus, exudate, or serous fluid overlying areas of damaged skin |
| fissure | linear cleavage of skin |
| excoriations | loss of superficial layers of skin caused by abrasion, usually scratching |
| ulceration | depressions in the skin resulting from loss of the epidermis and some or all of the dermis or deeper tissues |
| atrophy | depression and thinning of skin which may occur in epidermis (fine wrinkling), dermis, or subcutaneous fat |
| scar | areas of pink or white, shiny, sclerotic skin caused by fibrotic skin changes that develop after damage to the dermis |

# SECONDARY LESION: SCALE

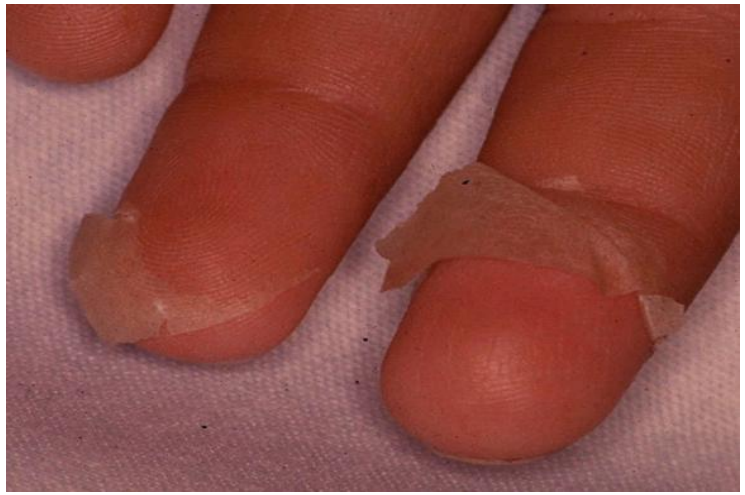
- Excess epidermal cells produced by abnormal keratinization and shedding
- May be fine scales or sheets (desquamation)




Actinic keratosis



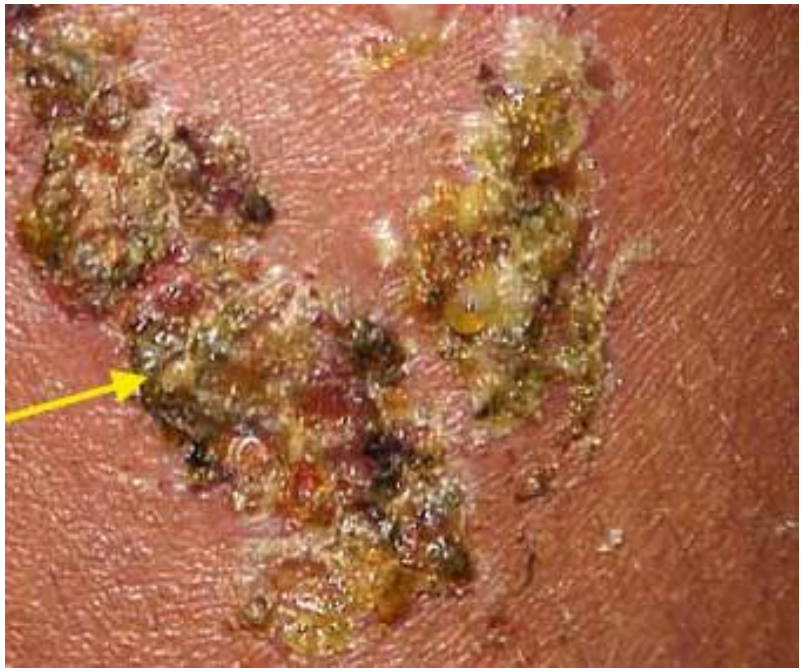
Psoriasis



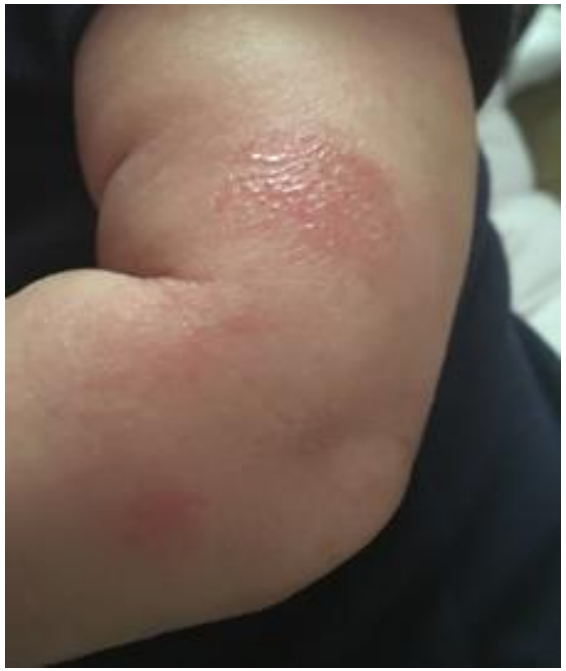
Staph Scalded Skin

# SECONDARY LESION: CRUST (SCAB)

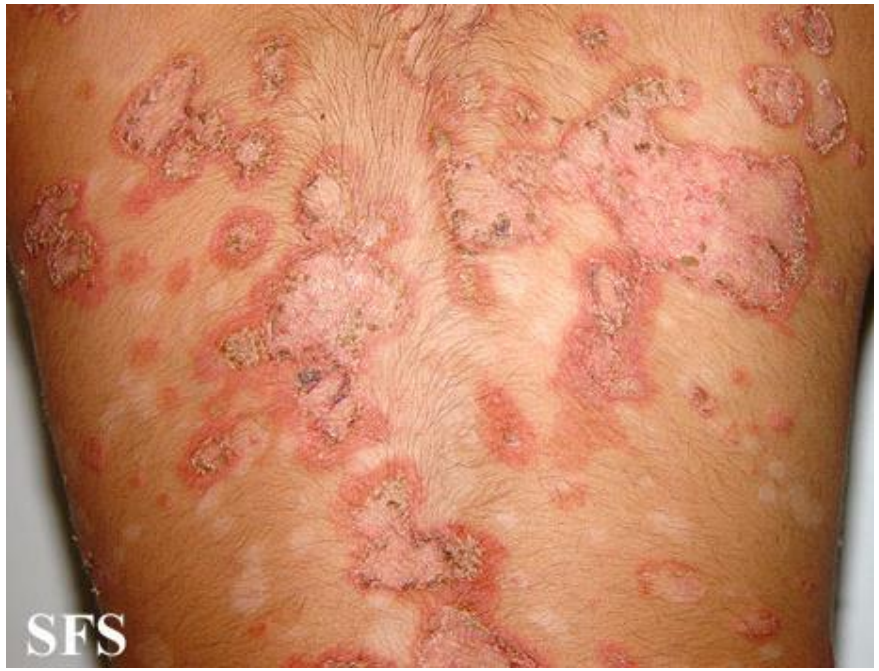
- A dried exudate that may be serous, purulent, or hemorrhagic; contains cellular debris



Impetigo



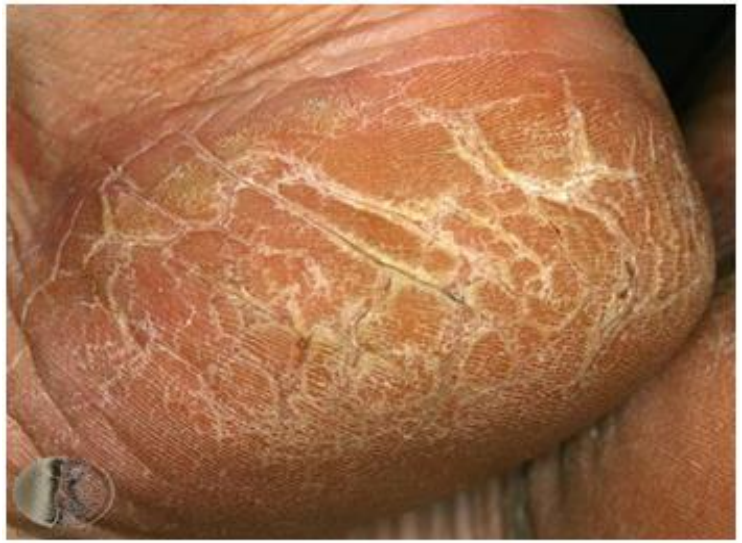
Atopic dermatitis



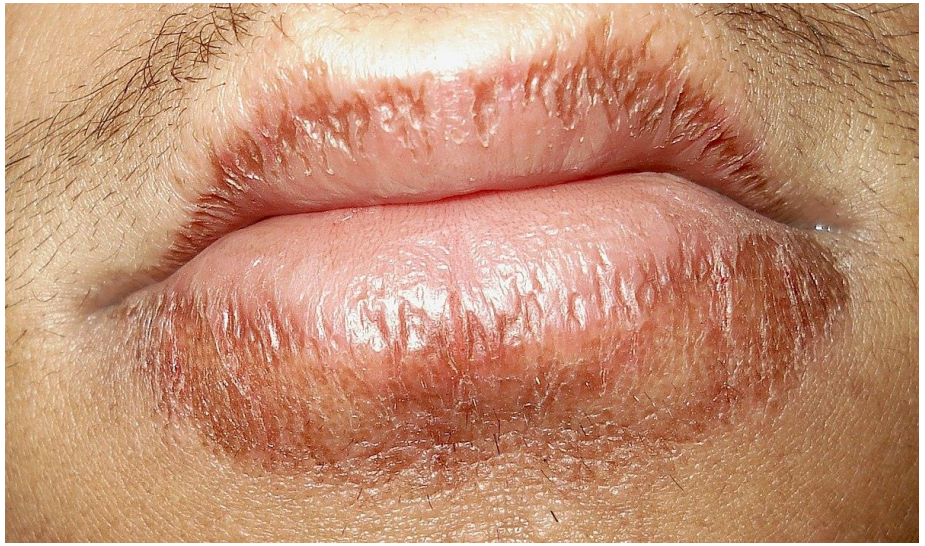

Pemphigus foliaceus

# SECONDARY LESION: FISSURE

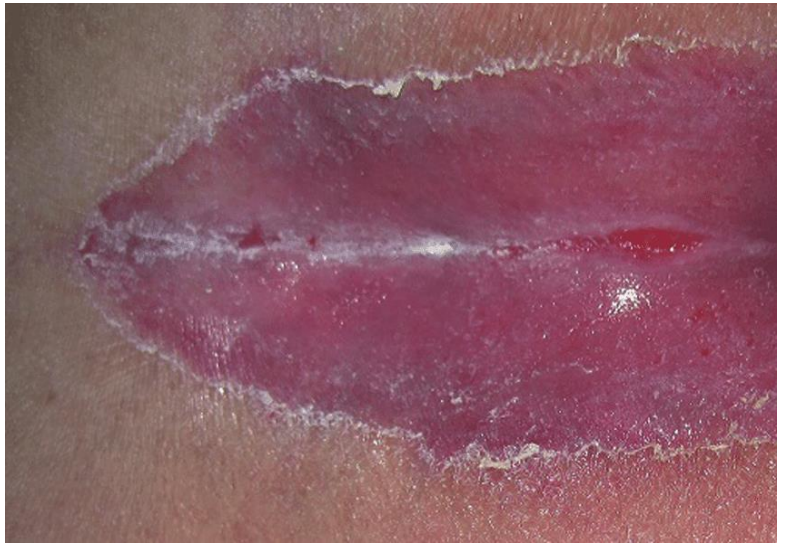
- A linear loss of the epidermis and dermis with sharply defined, nearly vertical walls



Tinea pedis



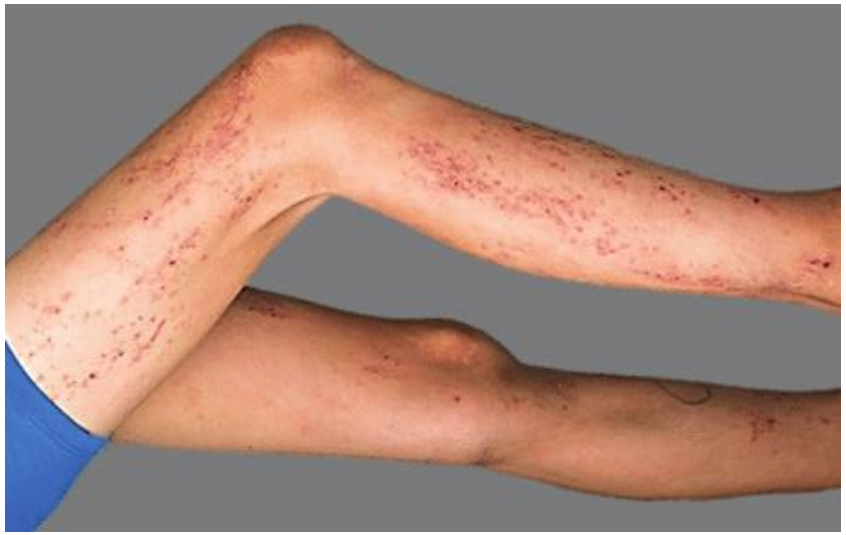
Chelitis



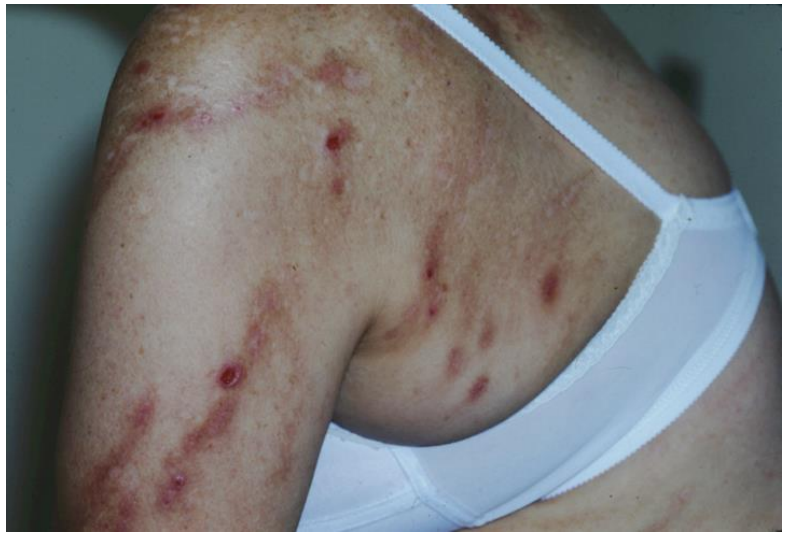
Intertrigo

# SECONDARY LESION: EXCORIATION

- A superficial erosion resulting from mechanical trauma, usually linear but may be discrete
- Often hemorrhagic



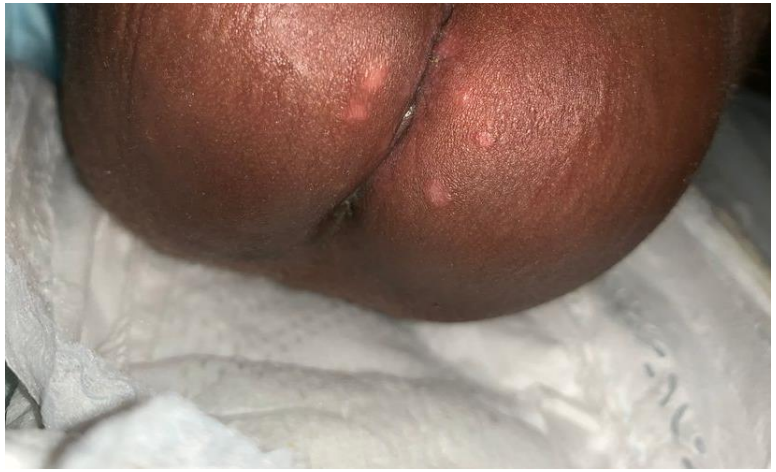
Typical excoriations



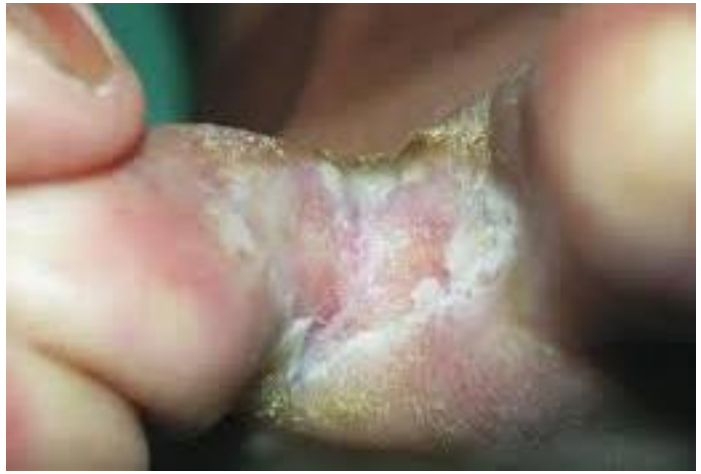
Neurotic excoriations (dermatillomania)

# SECONDARY LESION: EROSION

- A focal loss of the epidermis
- Does not penetrate the dermo-epidermal junction, and therefore heals without scarring (unless secondary infection occurs)



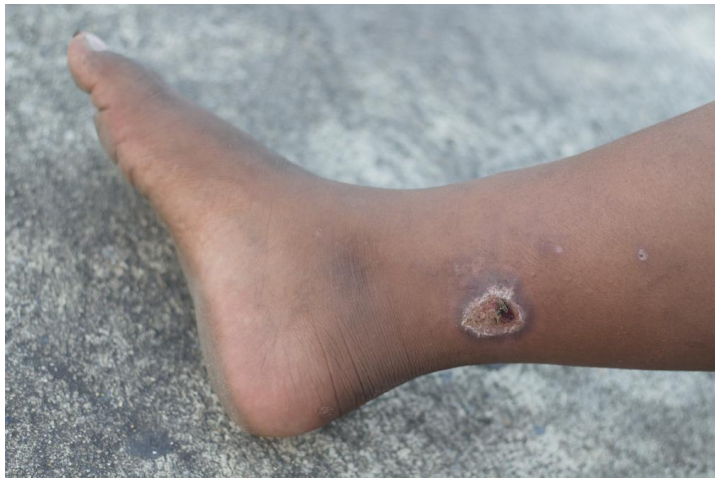
Diaper candidiasis



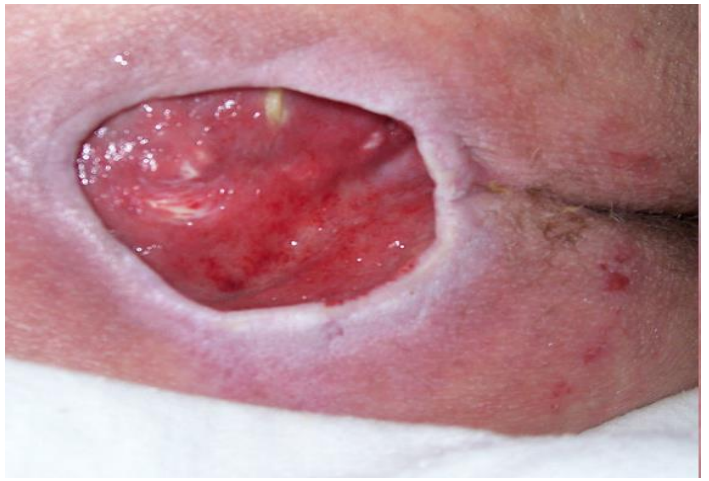
Tinea pedis (with maceration)

# SECONDARY LESION: ULCERATION

- A focal, full-thickness loss of the epidermis that extends into the dermis
- Heals with scarring



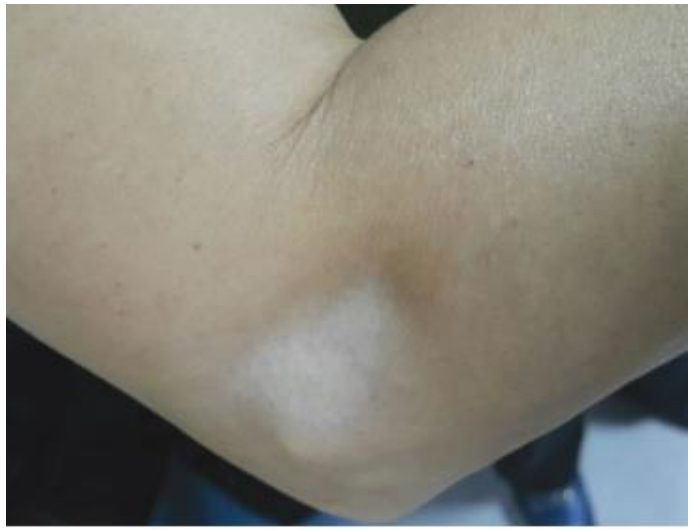
Venous stasis ulcer



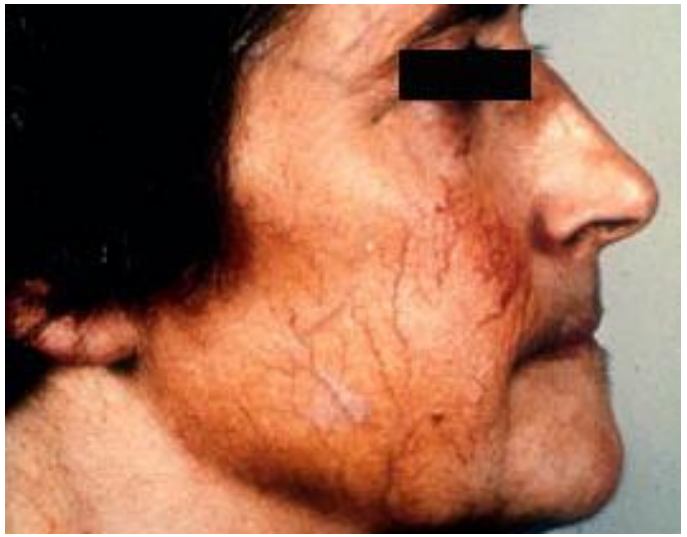
Sacral decubitus ulcer

# SECONDARY LESION: ATROPHY

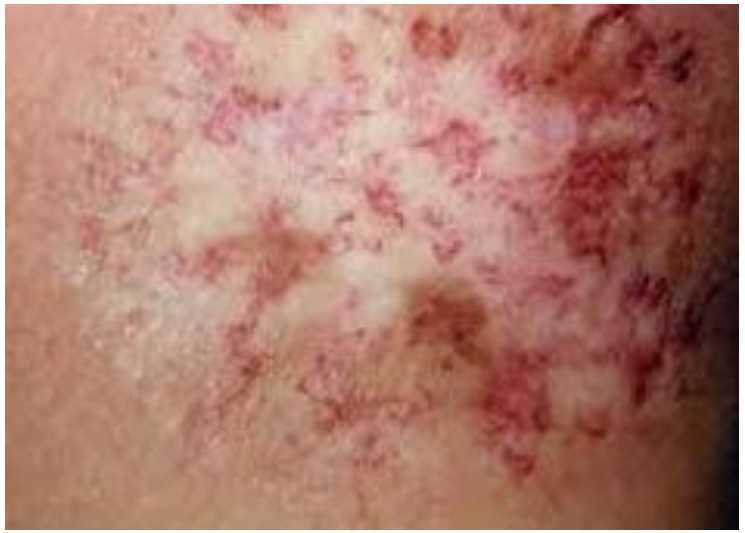
- A thinning of the skin due to thinning of the epidermis and/or dermis, with increased translucency of the skin and/or loss of skin markings



Corticosteroid injection



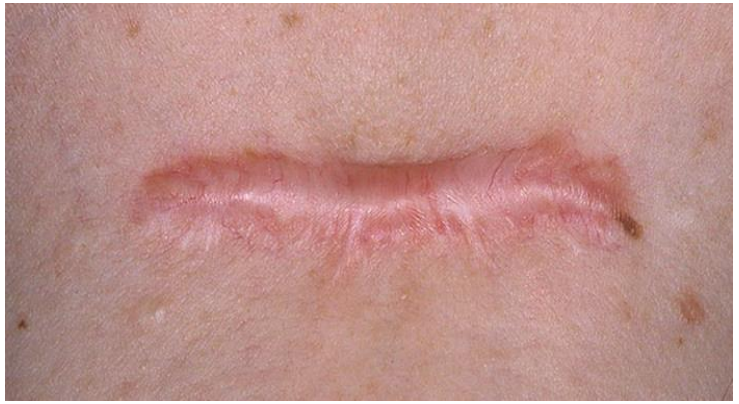
Topical steroid overuse



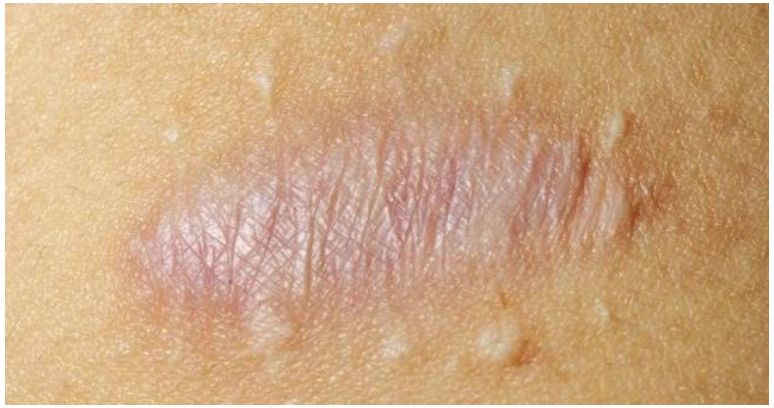
Radiation dermatitis

# SECONDARY LESION: SCAR

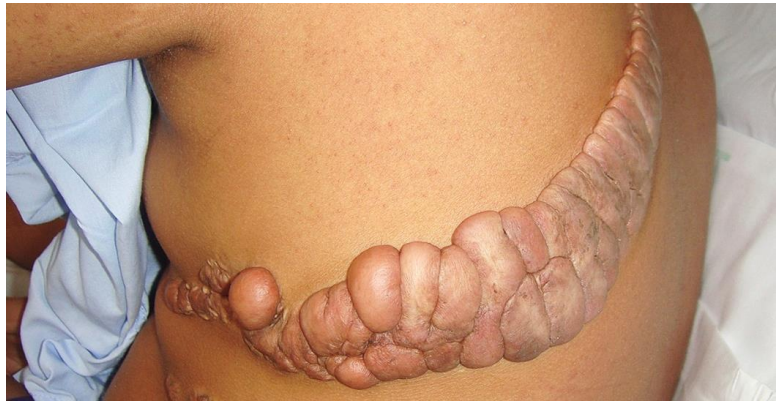
- A formation of connective tissue as a result of dermal damage
- Initially thickened and pink, but become atrophic and hypopigmented over time (exception being keloids)



Post-operative incisional scar



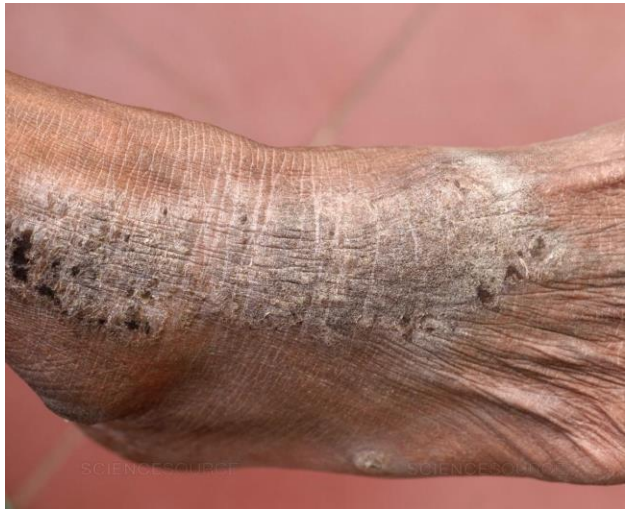
Well-healed incisional scar



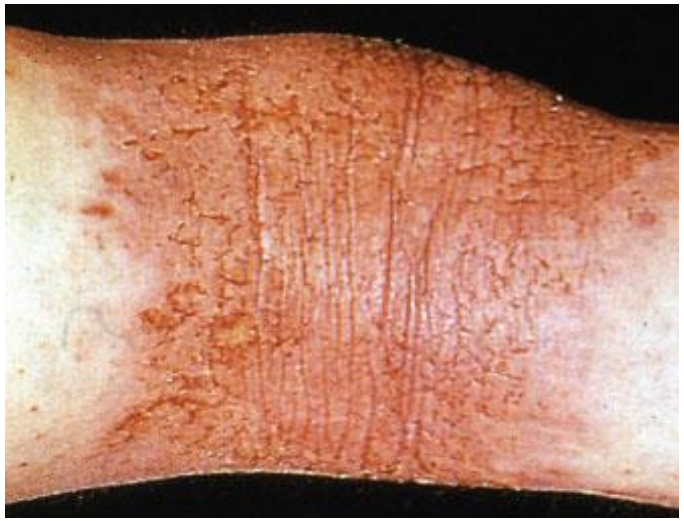
Keloid after pulmonary cyst resection

# SECONDARY LESION: LICHENIFICATION

- A focal thickening of the skin due to repetitive trauma (usually scratching)
- Characterized by exaggeration of skin creases

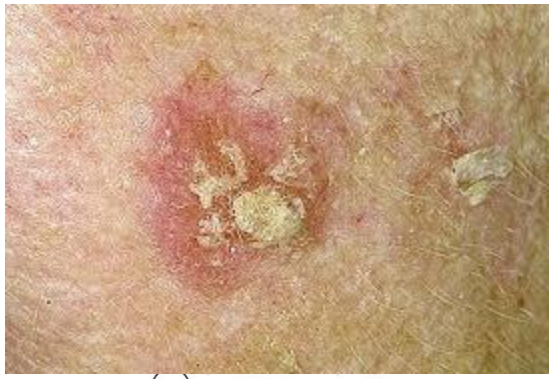


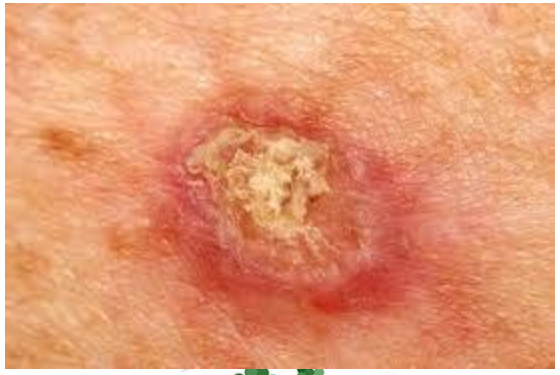
Lichen simplex chronicus



Lichenified atopic dermatitis

# ACTINIC KERATOSIS





*UV rays induce mutation of the tumor suppressor gene P53 and the accumulation of cytokines*

*ROS are produced, leading to oxidative stress*

*Damage to keratinocytes leads to skin barrier dysfunction*

*Hyperkeratosis occurs to compensate, and AK develops*

# HIV Primary Care Update

Cara McAnaney, MD, AAHIVS
Assistant Professor, Director of the HIV Primary Care Track
Department of Family Medicine, UPSOM
March 8, 2025

# Disclosures

No financial disclosures

# Bias Disclosure

- Our biases relate to our identities
- I do not intend to perpetuate bias or stigma in this presentation
- If I do, I am likely not aware that I have done so
- If you feel comfortable, please raise your hand or enter a message into the chat that I have done so during the presentation so that I may correct my messaging and we as a group can learn from my mistakes
- Gendered language is present in parts of the presentation- this reflects the limitations in the data

# Outline

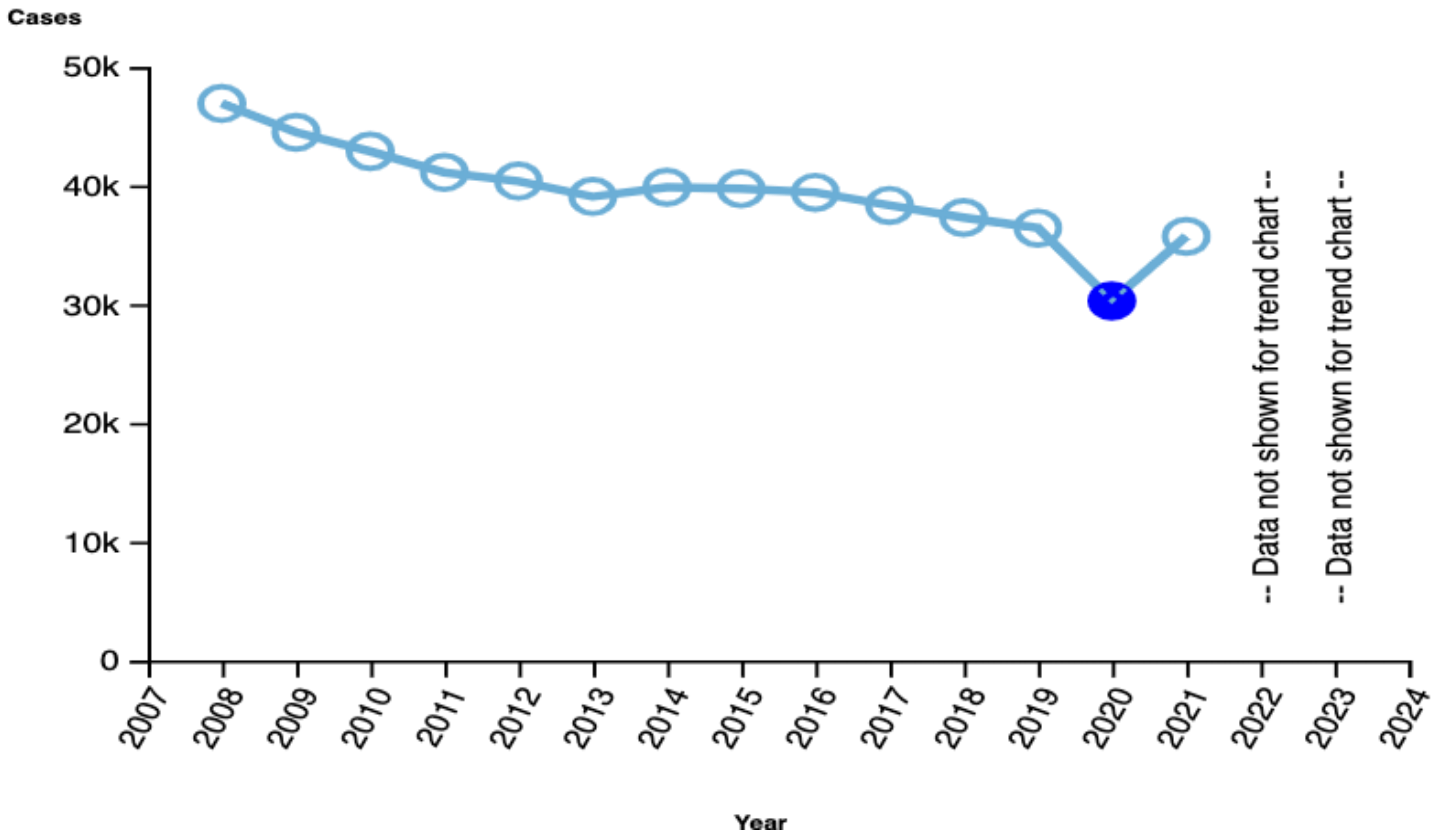
- Epidemiology
- Diagnosis
- Initial Evaluation
- Rapid Start
- Advances in Antiretroviral Therapy
- Statins
- Infant feeding
- Health maintenance

# Objectives

- Describe current epidemiology of HIV in the US
- Outline initial steps following diagnosis of HIV including laboratory tests and first line medications
- Identify new treatment strategies for HIV, including injectable regimens
- Review recommendations for primary care of people living with HIV, including CVD prevention, infant feeding, and cancer screenings

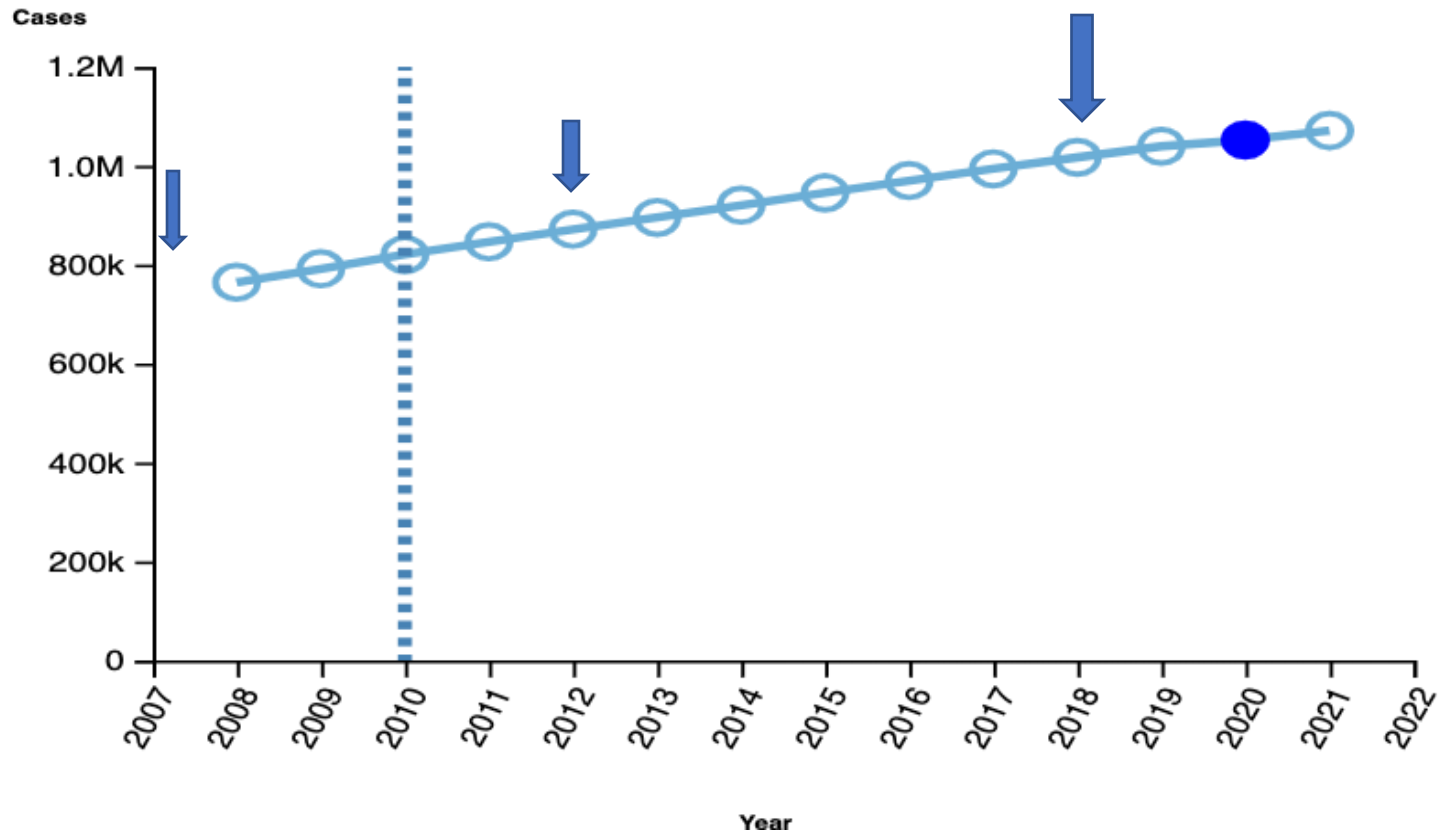
# Epidemiology

HIV diagnoses | 2021 | Ages 13 years and older | All races/ethnicities | Both sexes | All transmission categories | United States



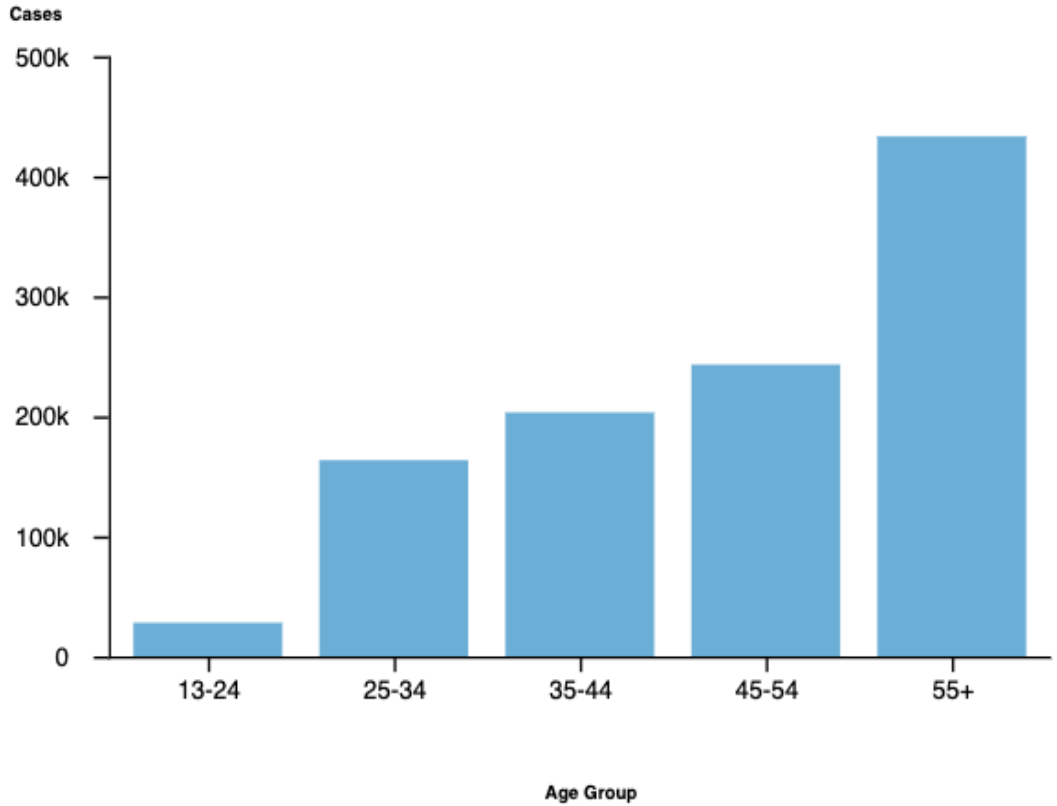

Footnotes: Data for 2022 and 2023 are preliminary and based on data received by CDC as of September 2023. Inclusion of preliminary data in trend assessments is discouraged. See Notes on second slide for details. NA - Not Applicable.

HIV prevalence | 2021 | Ages 13 years and older | All races/ethnicities | Both sexes | All transmission categories | United States



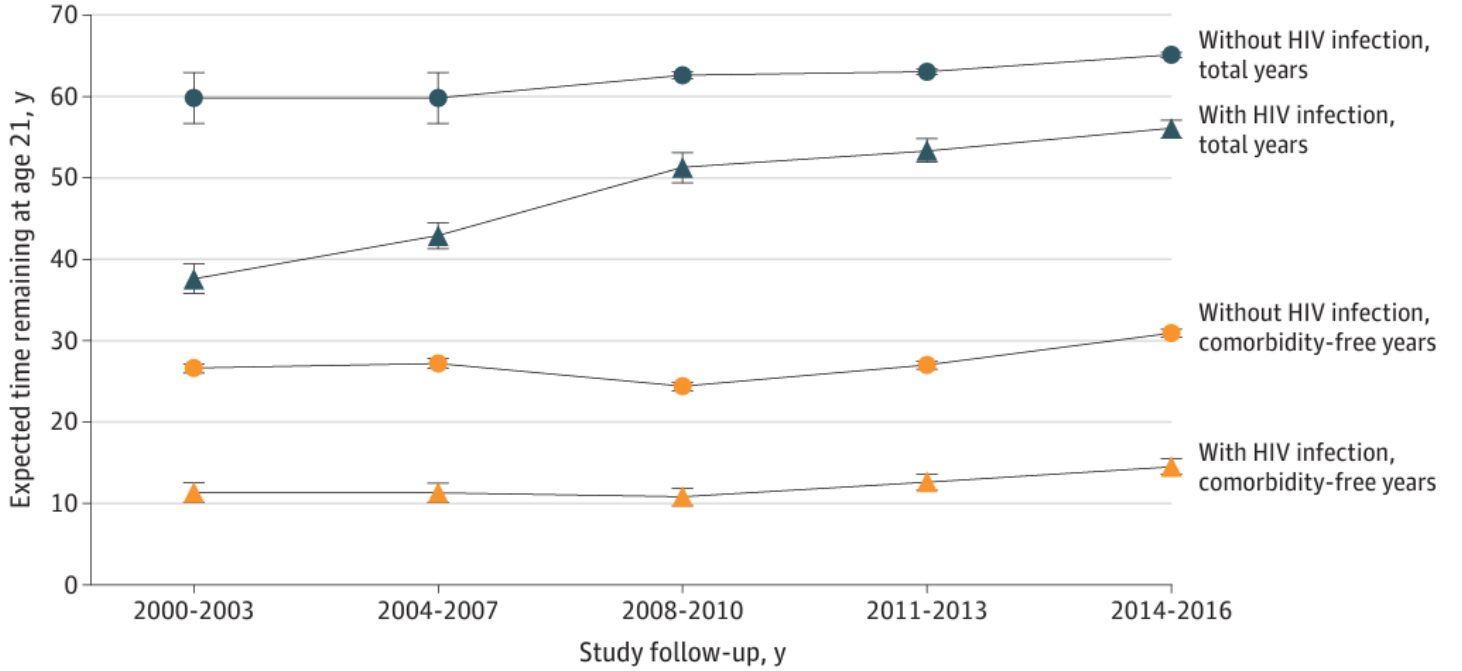

Footnotes: Data for 2022 and 2023 are preliminary and based on data received by CDC as of September 2023. Inclusion of preliminary data in trend assessments is discouraged. See Notes on second slide for details. Prevalence data for 2022 are preliminary and based on death data received by CDC as of December 2022. Prevalence data prior to 2010 are based on residence at diagnosis; prevalence data from 2010 to present based on most recent known address. ^ Jurisdiction with incomplete reporting of deaths for most recent year. NA - Not Applicable.

HIV prevalence | 2021 | Ages 13 years and older | All races/ethnicities | Both sexes | All transmission categories | United States




Footnotes: Data for 2022 and 2023 are preliminary and based on data received by CDC as of September 2023. Inclusion of preliminary data in trend assessments is discouraged. See Notes on second slide for details. Prevalence data for 2022 are preliminary and based on death data received by CDC as of December 2022. Prevalence data prior to 2010 are based on residence at diagnosis; prevalence data from 2010 to present based on most recent known address. ^ Jurisdiction with incomplete reporting of deaths for most recent year. NA - Not Applicable.

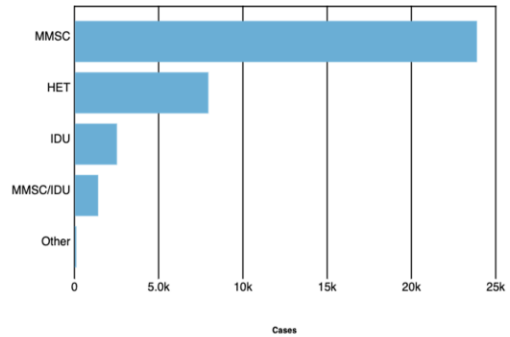
**Figure 1. Overall and Comorbidity-Free Life Expectancy at Age 21 Years for Individuals With and Without HIV Infection, Kaiser Permanente, 2000-2016**




*JAMA Network Open*. 2020;3(6):e207954. doi:10.1001/jamanetworkopen.2020.7954

Marcus JL, Leyden WA, Alexeeff SE, et al. Comparison of Overall and Comorbidity-Free Life Expectancy Between Insured Adults With and Without HIV Infection, 2000-2016. *JAMA Netw Open*. 2020;3(6):e207954. Published 2020 Jun 1. doi:10.1001/jamanetworkopen.2020.7954

HIV diagnoses | 2021 | Ages 13 years and older | All races/ethnicities | Both sexes | All transmission categories | United States



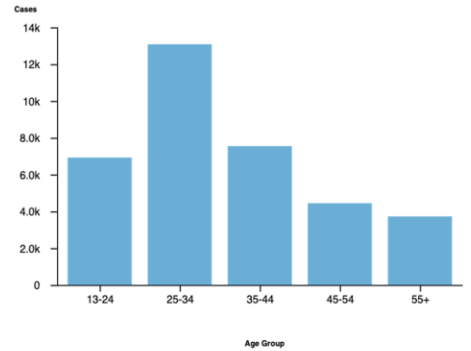

Footnotes: Data for 2022 and 2023 are preliminary and based on data received by CDC as of September 2023. Inclusion of preliminary data in trend assessments is discouraged. See Notes on second slide for details. NA - Not Applicable.

Atlas Plus

Centers for Disease Control and Prevention
National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention

CDC

HIV diagnoses | 2021 | Ages 13 years and older | All races/ethnicities | Both sexes | All transmission categories | United States

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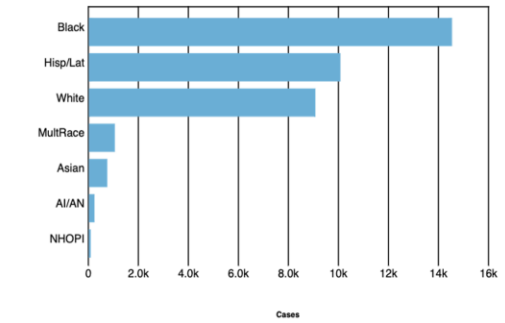


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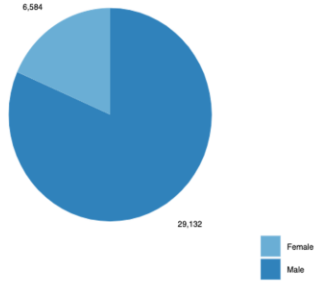


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Atlas Plus

Centers for Disease Control and Prevention
National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention

CDC

# HIV and Transgender People

**Nearly**

**1 million**

adults in the United States **identify as transgender**[1]

HIV diagnoses among transgender adults and adolescents

**increased 7%**

between 2015 and 2019[2]

Approximately

**1 in 7**

transgender people with HIV already had AIDS when they were diagnosed[3]

Disproportionately high numbers of transgender people of color were diagnosed with HIV in 2019:

**48%** were **Black or African American,**

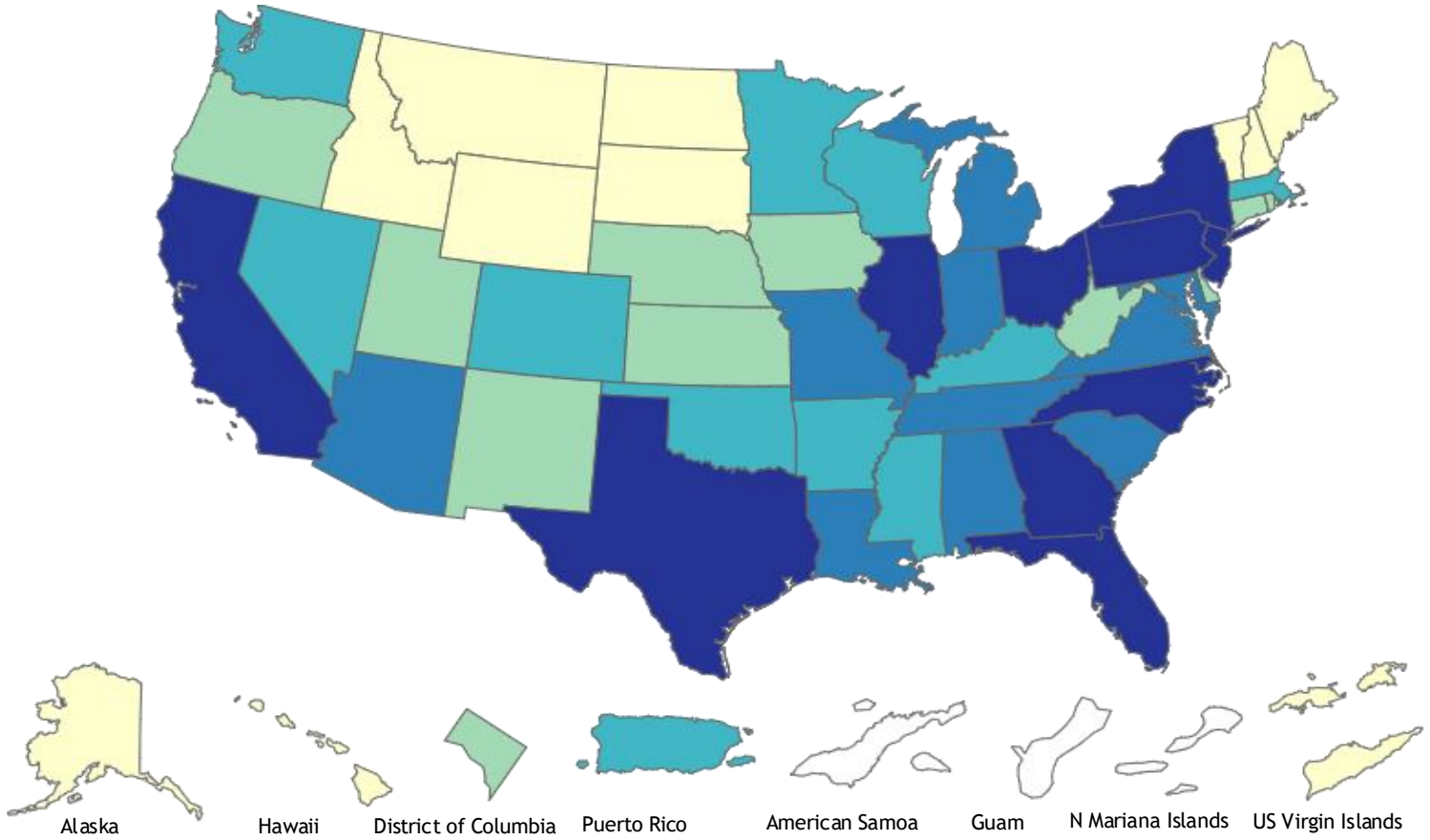
and **37%** were **Hispanic or Latino**[2]

[1] Becasen JS, Denard CL, Mullins MM, Higa DH, Sipe TA. Estimating the prevalence of HIV and sexual behaviors among the US transgender population: a systematic review and meta-analysis, 2006-2017. *Am J Public Health*. 2018;109(1):e1-e8.
[2] Centers for Disease Control and Prevention. Diagnoses of HIV infection in the United States and dependent areas, 2019.*HIV Surveillance* Report. 2021;32:57. https://www.cdc.gov/hiv/pdf/library/reports/surveillance/cdc-hiv-surveillance-report-2018-updated-vol-32.pdf
[3] Centers for Disease Control and Prevention. Monitoring selected national HIV prevention and care objectives by using surveillance data: United States and 6 dependent areas, 2019. *HIV Surveillance Report: Supplemental Report*. 2021;26(2):69. https://www.cdc.gov/hiv/pdf/library/reports/surveillance/cdc-hiv-surveillance-report-vol-26-no-2.pdf



Centers for Disease Control and Prevention. Ending the HIV Epidemic: Screening, Treatment, and Prevention- A Guide for Health Care Providers 2022 [Slide set}. (2022). https://www.cdc.gov/hiv/clinicians/materials/slidedecks.html. Accessed April 13, 2024.

HIV diagnoses | 2021 | Ages 13 years and older | All races/ethnicities | Both sexes | All transmission categories | US Map-State Level



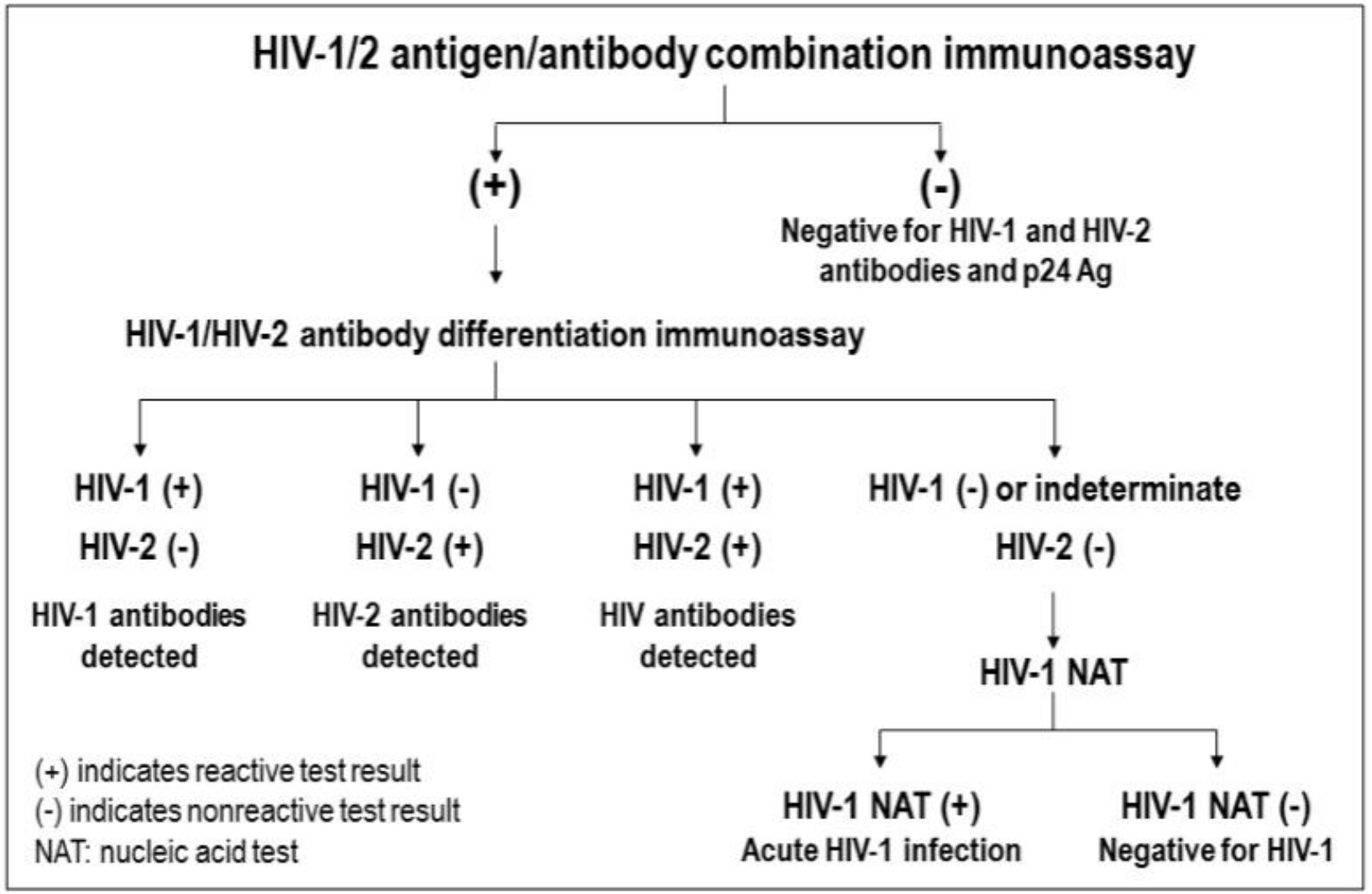

**Rate per 100,000 among selected population**

| 0 | 7 - 65 | 68 - 233 | 253 - 501 | 528 - 899 | 909 - 4,399 |
|---|---|---|---|---|---|

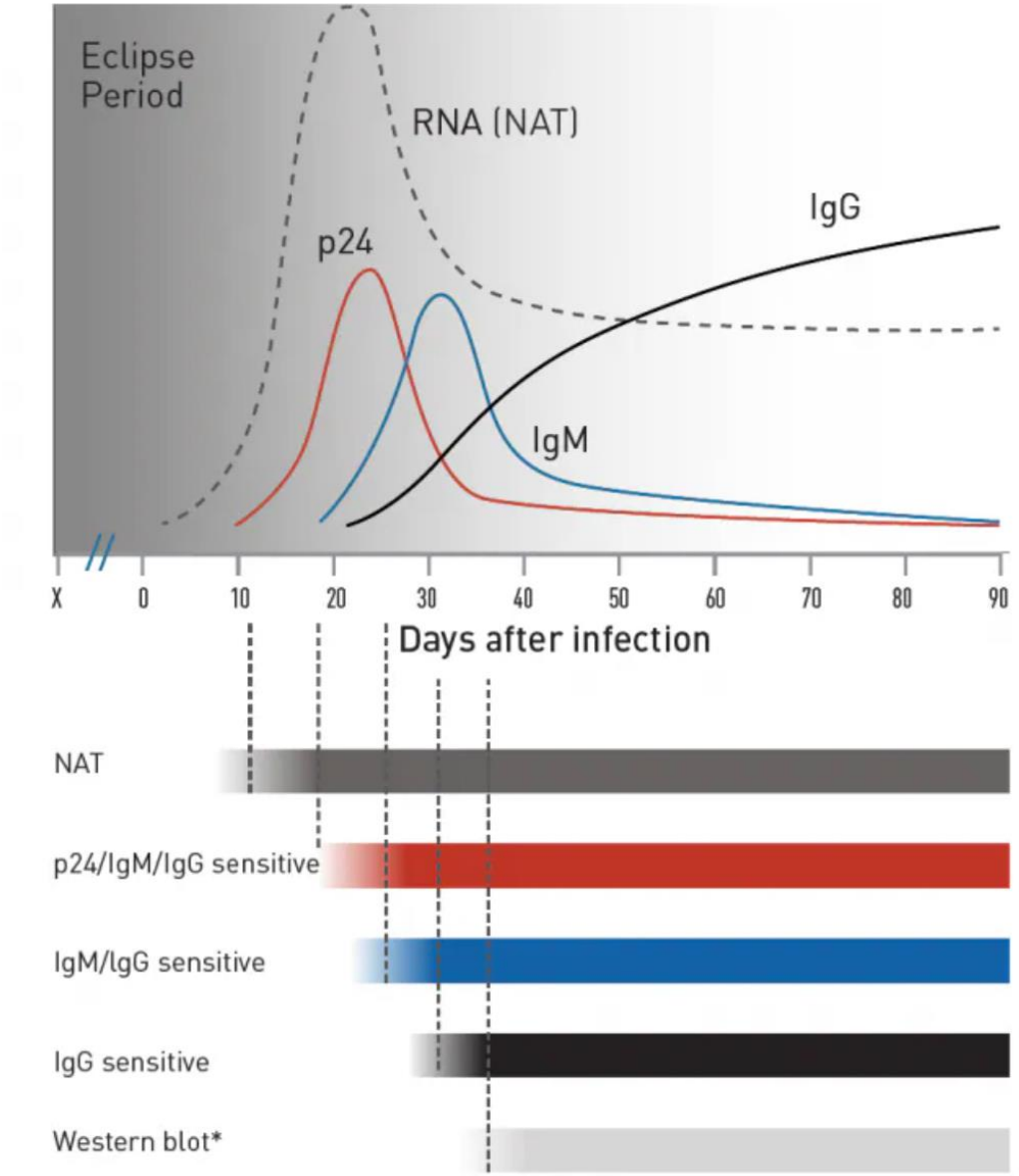
**Footnotes:** Data for 2022 and 2023 are preliminary and based on data received by CDC as of September 2023. Inclusion of preliminary data in trend assessments is discouraged. See Notes on second slide for details. NA - Not Applicable.

# Diagnosis

## Recommended Laboratory HIV Testing Algorithm for Serum or Plasma Specimens



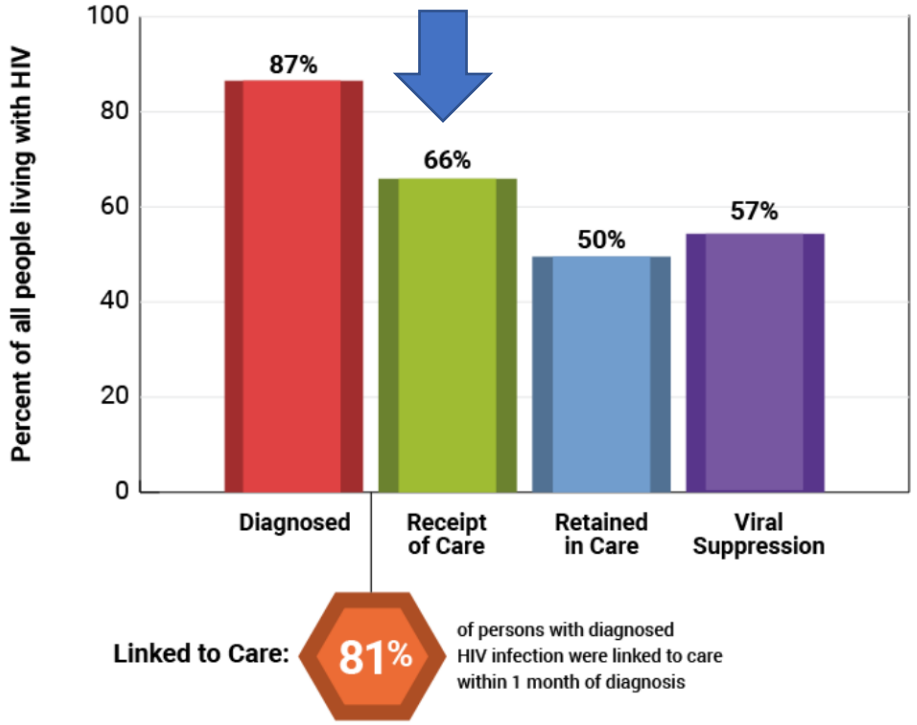

Centers for Disease Control and Prevention and Association of Public Health Laboratories. Laboratory Testing for the Diagnosis of HIV Infection: Updated Recommendations. 2014. http://stacks.cdc.gov/view/cdc/23447. Accessed April 12, 2024.




* Western blot is no longer used for HIV.

CDC- HIV Nexus Clinician Resources: HIV Screening. Which HIV Tests Should I Use?. https://www.cdc.gov/hiv/clinicians/screening/tests.html. Updated June 1, 2023. Accessed April 12, 2024.

## Prevalence-based HIV Care Continuum, U.S. and 6 Dependent Areas, 2019




**Note:** Receipt of medical care was defined as ≥1 test (CD4 or VL) in 2019. Retained in medical care was defined as ≥ 2 tests (CD4 or VL) ≥ 3 months apart in 2019. Viral suppression was defined as < 200 copies/mL on the most recent test in 2019. Linkage to care is defined as having ≥ one CD4 or VL test within 30 days (1 month) of diagnosis. (Linkage is calculated differently from the other steps in the continuum, and cannot be directly compared to other steps.)

*CDC, Monitoring selected national HIV prevention and care objectives by using HIV surveillance data—United States and 6 dependent areas, 2019. HIV Surveillance Supplemental Report 2021; 26(No. 2). Published May 2021.*

# Initial evaluation

| HIV Specific Labs for All Patients |
| --- |
| HIV-1 RNA quantitative |
| CD4 count |
| Genotype for Reverse Transcriptase and Protease Inhibitor Resistance |
| Genotype for Integrase resistance IF previously on injectable PrEP |

| Labs to assess for comorbid conditions |
| --- |
| CBC (also helps with interpretation of CD4) |
| CMP |
| UA |
| Lipids |
| Fasting or random glucose* |
| Pregnancy test if indicated |

Screen for substance use behaviors, do not need to collect a UDS

| Assess for co-infections | |
|---|---|
| Hepatitis B | HBsAg<br>HBsAb<br>HBcAb total (not IgM) |
| Hepatitis C | HCV Ab<br>HCV RNA if history of prior HCV |
| Hepatitis A (susceptibility) | Anti-HAV total (IgG) |
| Sexually transmitted infections | Syphilis (RPR if prior history)<br>GC/CT (site based)<br>Trichomonas (AFAB patients) |
| Tuberculosis | Quantiferon Gold |

# Rapid Start

## Recommended Initial Regimens for Most People with HIV

Recommended regimens are those with demonstrated durable virologic efficacy, favorable tolerability and toxicity profiles, and ease of use. Choice of ART during pregnancy should be guided by recommendations from the Perinatal Guidelines.

*For people who do not have a history of CAB-LA use as PrEP, the following regimens are recommended:*

**INSTI plus Two NRTIs**

- BIC/TAF/FTC **(AI)**[a]
- DTG/ABC/3TC **(AI)**—**if HLA-B*5701 negative**
- DTG plus (TAF or TDF)[c] plus (FTC or 3TC) **(AI)**

**INSTI plus One NRTI**

- DTG/3TC **(AI),** except for individuals with HIV RNA >500,000 copies/mL, HBV coinfection, or in whom ART is to be started before the results of HIV genotypic resistance testing for reverse transcriptase or HBV testing are available

*For people with HIV and a history of CAB-LA use as PrEP, INSTI genotypic resistance testing should be performed before the start of ART. If treatment is begun prior to results of genotypic testing, the following regimen is recommended:*

- DRV/c[b] or DRV/r with (TAF or TDF)[c] plus (FTC or 3TC)—pending the results of the genotype test **(AIII)**

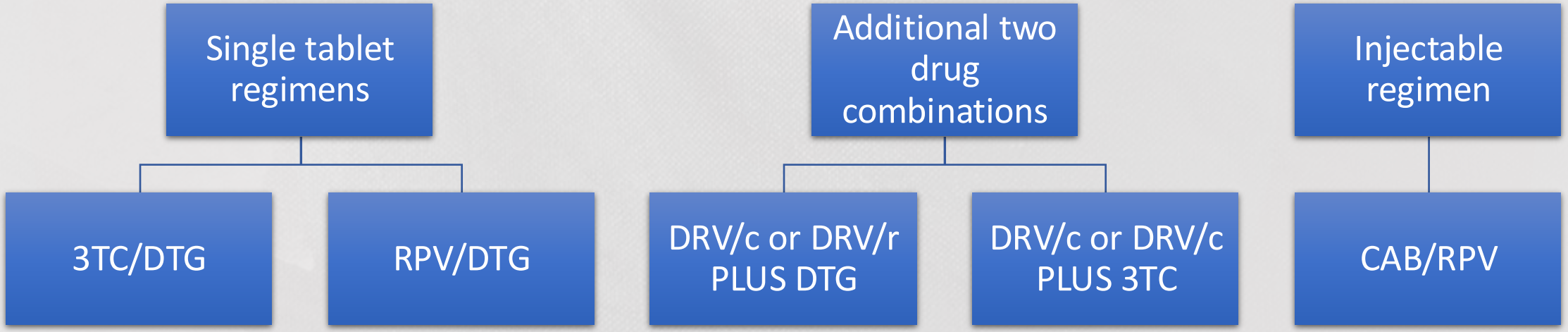
Panel on Antiretroviral Guidelines for Adults and Adolescents. Guidelines for the Use of Antiretroviral Agents in Adults and Adolescents with HIV. Department of Health and Human Services. 2024. Available at https://clinicalinfo.hiv.gov/en/guidelines/adult-and-adolescent-arv. Accessed April 12, 2024. Table 6.

| Suspected low CD4 count |
| --- |
| Assess for any neurological symptoms |
| If concern for opportunistic infection (OI), consult with an HIV specialist |
| Counsel on the possibility of immune reconstitution inflammatory syndrome (IRIS)- if feeling worse after starting medications, should continue taking but contact office immediately |

| Drug Prescribing and Counseling |
| --- |
| Check drug drug interactions (https://www.hiv-druginteractions.org/) |
| Advise patient to take the pill at the same time every day |
| If taking BIC or DTG, avoid taking ART with supplements or dairy products |
| Side effects are usually mild (GI upset, fatigue, or headache) and improve after the first few days |

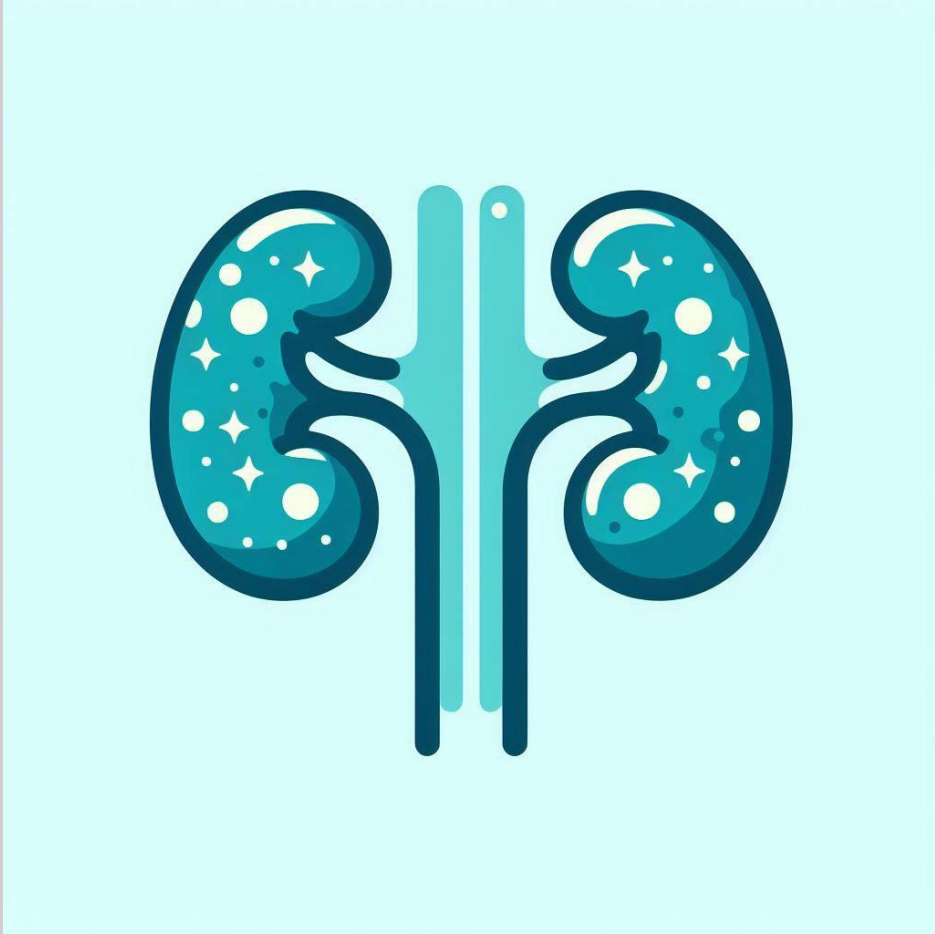
# Advances in ART

# Two drug regimens




Panel on Antiretroviral Guidelines for Adults and Adolescents. Guidelines for the Use of Antiretroviral Agents in Adults and Adolescents with HIV. Department of Health and Human Services. 2024. Available at https://clinicalinfo.hiv.gov/en/guidelines/adult-and-adolescent-arv. Accessed April 12, 2024.

# What’s the deal with tenofovir?



Produced by Microsoft Copilot

Clinical Trial > N Engl J Med. 2020 Mar 19;382(12):1112-1123. doi: 10.1056/NEJMoa1904398.
Epub 2020 Mar 4.

# Long-Acting Cabotegravir and Rilpivirine for Maintenance of HIV-1 Suppression

Susan Swindells [1], Jaime-Federico Andrade-Villanueva [1], Gary J Richmond [1], Giuliano Rizzardini [1], Axel Baumgarten [1], Mar Masiá [1], Gulam Latiff [1], Vadim Pokrovsky [1], Fritz Bredeek [1], Graham Smith [1], Pedro Cahn [1], Yeon-Sook Kim [1], Susan L Ford [1], Christine L Talarico [1], Parul Patel [1], Vasiliki Chounta [1], Herta Crauwels [1], Wim Parys [1], Simon Vanveggel [1], Joseph Mrus [1], Jenny Huang [1], Conn M Harrington [1], Krischan J Hudson [1], David A Margolis [1], Kimberly Y Smith [1], Peter E Williams [1], William R Spreen [1]

Affiliations + expand

PMID: 32130809 DOI: 10.1056/NEJMoa1904398

| Cabotegravir/Rilpivirine Highlights |
| --- |
| Approved by the FDA January 2021 |
| First injectable regimen available for the treatment of HIV |
| Not a first line agent |
| Can be given monthly or every two months |
| Intramuscular gluteal injections (one for each medication) |
| Increasing support for use in patients with viremia |
| Requires careful coordination of team to ensure appropriate administration and monitoring |

Clinical Trial > Lancet HIV. 2023 Aug;10(8):e497-e505. doi: 10.1016/S2352-3018(23)00113-3.
Epub 2023 Jul 11.

# Efficacy and safety of the novel capsid inhibitor lenacapavir to treat multidrug-resistant HIV: week 52 results of a phase 2/3 trial

Onyema Ogbuagu [1], Sorana Segal-Maurer [2], Winai Ratanasuwan [3], Anchalee Avihingsanon [4], Cynthia Brinson [5], Kimberly Workowski [6], Andrea Antinori [7], Yazdan Yazdanpanah [8], Benoit Trottier [9], Hui Wang [10], Nicolas Margot [10], Hadas Dvory-Sobol [10], Martin S Rhee [10], Jared M Baeten [10], Jean-Michel Molina [11]; GS-US-200-4625 investigators

Collaborators, Affiliations + expand

PMID: 37451297 DOI: 10.1016/S2352-3018(23)00113-3

# Statins

The NEW ENGLAND JOURNAL of MEDICINE



ORIGINAL ARTICLE

# Pitavastatin to Prevent Cardiovascular Disease in HIV Infection

**Authors**: Steven K. Grinspoon, M.D., Kathleen V. Fitch, M.S.N., Markella V. Zanni, M.D., Carl J. Fichtenbaum, M.D., Triin Umbleja, M.S., Judith A. Aberg, M.D., Edgar T. Overton, M.D., +19, for the REPRIEVE Investigators* Author Info & Affiliations

**Published July 23, 2023 | N Engl J Med 2023;389:687-699 | DOI: 10.1056/NEJMoa2304146 | VOL. 389 NO. 8**

## Table 1: Number Needed to Treat over 5 Years Based on REPRIEVE

| | Population | N | $NNT_5$ |
|---|---|---|---|
| **10-Year Atherosclerotic Cardiovascular Disease Risk Score** | >10% | 563 | 35 |
| | 5-10% | 2,995 | 53 |
| | 2.5% to <5.0% | 2,065 | 149 |
| | 0% to <2.5% | 2,156 | 199 |
| **Overall** | | 7,769 | 106 |

**Key:** $NNT_5$= number needed to treat over 5 years

Panel on Antiretroviral Guidelines for Adults and Adolescents. Guidelines for the Use of Antiretroviral Agents in Adults and Adolescents with HIV. Recommendations for the Use of Statin Therapy as Primary Prevention of Atherosclerotic Cardiovascular Disease in People with HIV. Department of Health and Human Services. 2024. Available at https://clinicalinfo.hiv.gov/en/guidelines/adult-and-adolescent-arv. Accessed April 12, 2024. Table 1.

# DHHS Guidelines Update (2/27/2024)

**Panel's Recommendations**

**For people with HIV who have low-to-intermediate (<20%) 10-year atherosclerotic cardiovascular disease (ASCVD) risk estimates**

- Age 40–75 years
  - When 10-year ASCVD risk estimates are 5% to <20%, the Panel for the Use of Antiretroviral Agents in Adults and Adolescents with HIV (the Panel) recommends initiating at least moderate-intensity statin therapy **(AI).**
    - Recommended options for moderate-intensity statin therapy include the following:
      - Pitavastatin 4 mg once daily **(AI)**
      - Atorvastatin 20 mg once daily **(AII)**
      - Rosuvastatin 10 mg once daily **(AII)**
  - When 10-year ASCVD risk estimates are <5%, the Panel favors initiating at least moderate-intensity statin therapy **(CI).** The absolute benefit from statin therapy is modest in this population; therefore, the decision to initiate a statin should take into account the presence or absence of HIV-related factors that can increase ASCVD risk.[a]
    - Same options for moderate-intensity statin therapy as recommended for 10-year ASCVD risk estimates of 5% to <20% (see above)
- Age <40 years
  - Data are insufficient to recommend for or against statin therapy as primary prevention of ASCVD in people with HIV. In the general population, lifestyle modifications are recommended for people age <40 years, with statin therapy considered only in select populations (see American Heart Association (AHA)/American College of Cardiology (ACC)/Multisociety Guidelines).

Panel on Antiretroviral Guidelines for Adults and Adolescents. Guidelines for the Use of Antiretroviral Agents in Adults and Adolescents with HIV. Recommendations for the Use of Statin Therapy as Primary Prevention of Atherosclerotic Cardiovascular Disease in People with HIV. Department of Health and Human Services. 2024. Available at https://clinicalinfo.hiv.gov/en/guidelines/adult-and-adolescent-arv. Accessed April 12, 2024.

## Key Recommendations for the General Population (Including People with HIV) Based on AHA/ACC/Multisociety Guidelines

**For people age 40–75 years who have high (≥20%) 10-year ASCVD risk estimates**

- Initiate high-intensity statin therapy.

**For people age 20–75 years who have low-density lipoprotein cholesterol (LDL-C) ≥190 mg/dL**

- Initiate high-intensity statin therapy at maximum tolerated dose.

**For people age 40–75 years with diabetes mellitus**

- Initiate at least moderate-intensity statin therapy. Perform further risk assessment to consider using a high-intensity statin.

Panel on Antiretroviral Guidelines for Adults and Adolescents. Guidelines for the Use of Antiretroviral Agents in Adults and Adolescents with HIV. Recommendations for the Use of Statin Therapy as Primary Prevention of Atherosclerotic Cardiovascular Disease in People with HIV. Department of Health and Human Services. 2024. Available at https://clinicalinfo.hiv.gov/en/guidelines/adult-and-adolescent-arv. Accessed April 12, 2024.

# Infant feeding

## Panel's Recommendations

- People with HIV should receive evidence-based, patient-centered counseling to support shared decision-making about infant feeding. Counseling about infant feeding should begin prior to conception or as early as possible in pregnancy; information about and plans for infant feeding should be reviewed throughout pregnancy and again after delivery **(AIII).** During counseling, people should be informed that—
  - Replacement feeding with properly prepared formula or pasteurized donor human milk from a milk bank eliminates the risk of postnatal HIV transmission to the infant **(AI).**
  - Achieving and maintaining viral suppression through antiretroviral therapy (ART) during pregnancy and postpartum decreases breastfeeding transmission risk to less than 1%, but not zero **(AI).**
- Replacement feeding with formula or banked pasteurized donor human milk is recommended to eliminate the risk of HIV transmission through breastfeeding when people with HIV are not on ART and/or do not have a suppressed viral load during pregnancy (at a minimum throughout the third trimester), as well as at delivery **(AI).**
- Individuals with HIV who are on ART with a sustained undetectable viral load and who choose to breastfeed should be supported in this decision **(AIII).**
- Individuals with HIV who choose to formula feed should be supported in this decision. Providers should ask about potential barriers to formula feeding and explore ways to address them **(AIII).**
- Engaging Child Protective Services or similar agencies is not an appropriate response to the infant feeding choices of an individual with HIV **(AIII).**

Clinicians are encouraged to consult the national Perinatal HIV/AIDS hotline (1-888-448-8765) with questions about infant feeding by individuals with HIV **(AIII).**

***Rating of Recommendations:*** *A = Strong; B = Moderate; C = Optional*

***Rating of Evidence:*** *I = One or more randomized trials with clinical outcomes and/or validated laboratory endpoints; II = One or more well-designed, nonrandomized trials or observational cohort studies with long-term clinical outcomes; III = Expert opinion*

Panel on Treatment of HIV During Pregnancy and Prevention of Perinatal Transmission. Recommendations for the Use of Antiretroviral Drugs During Pregnancy and Interventions to Reduce Perinatal HIV Transmission in the United States. Infant Feeding for Individuals with HIV in the United States. Department of Health and Human Services. 2024. Available at https://clinicalinfo.hiv.gov/en/guidelines/perinatal. Accessed April 12, 2024.

# Health care maintenance

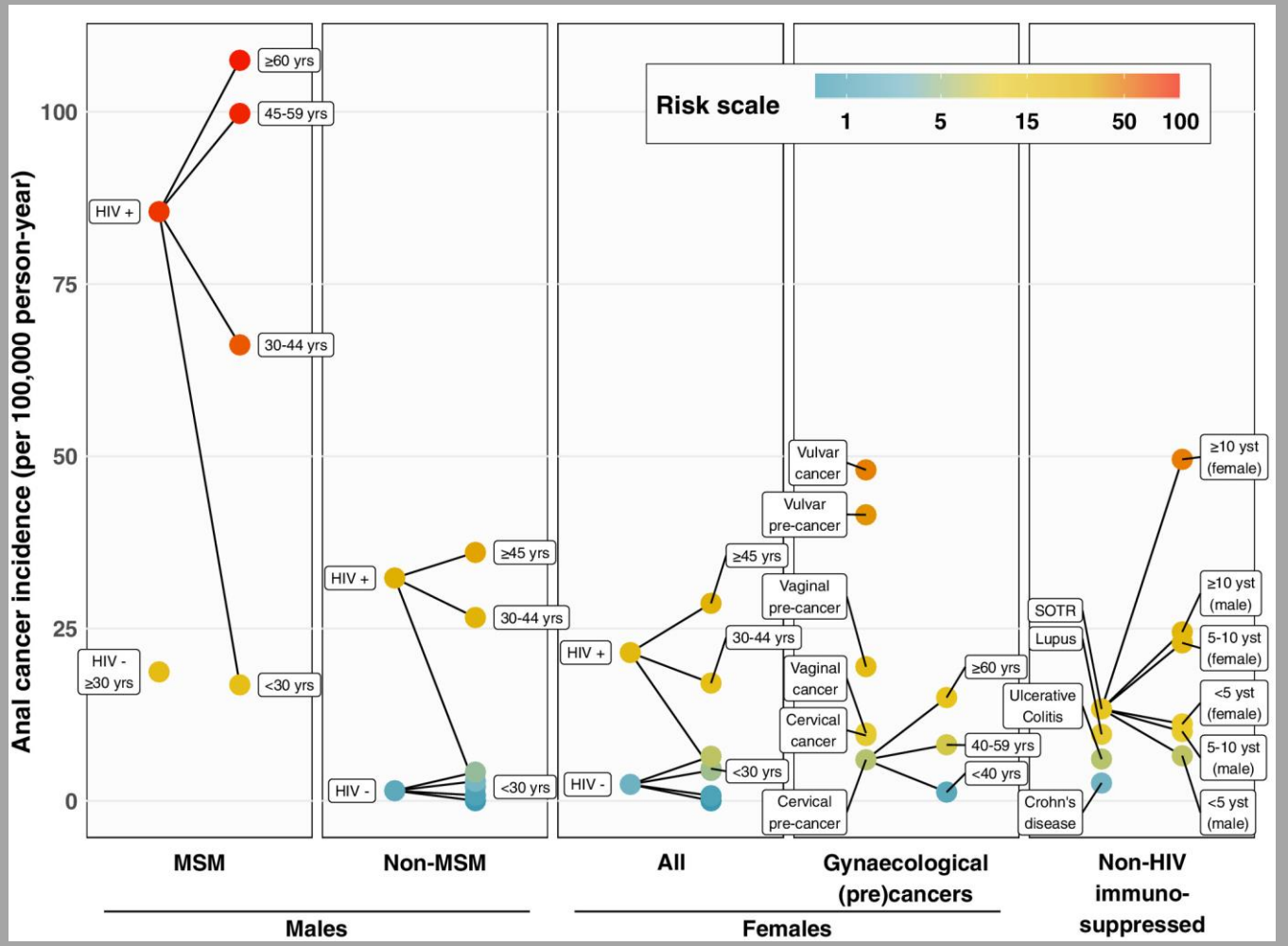
| Cancer screening recommendations | |
|---|---|
| Lung cancer | General guidelines (higher rates of smoking in PWH) |
| Colon cancer | General guidelines |
| Breast cancer | General guidelines |
| Prostate cancer | General guidelines |
| Hepatocellular carcinoma | General guidelines (higher risk of cirrhosis with HBV or HCV coinfection) |

*Hirsch B, Fine SM, Vail R, et al. Screening for Anal Dysplasia and Cancer in Adults With HIV [Internet]. Baltimore (MD): Johns Hopkins University; 2022 Aug. Available from: https://www.ncbi.nlm.nih.gov/books/NBK556472/

| Cervical cancer screening | |
|---|---|
| Assigned female at birth <21 years old | No Pap indicated |
| Assigned female at birth 21-29 years old | Perform Pap with reflex testing at baseline (time of diagnosis or age of 21) and then annually<br><br>Once 3 consecutive tests are normal, can space to every three years |
| Assigned female at birth ≥ 30 years old | Perform Pap and HPV cotesting at baseline<br>If results are negative, can space to every 3 years<br>Do not space to every 5 years |
| Assigned female at birth s/p hysterectomy | Done for benign conditions: no vaginal Pap indicated<br><br>Hx of high grade CIN or invasive cervical cancer: annual vaginal cuff Pap tests |

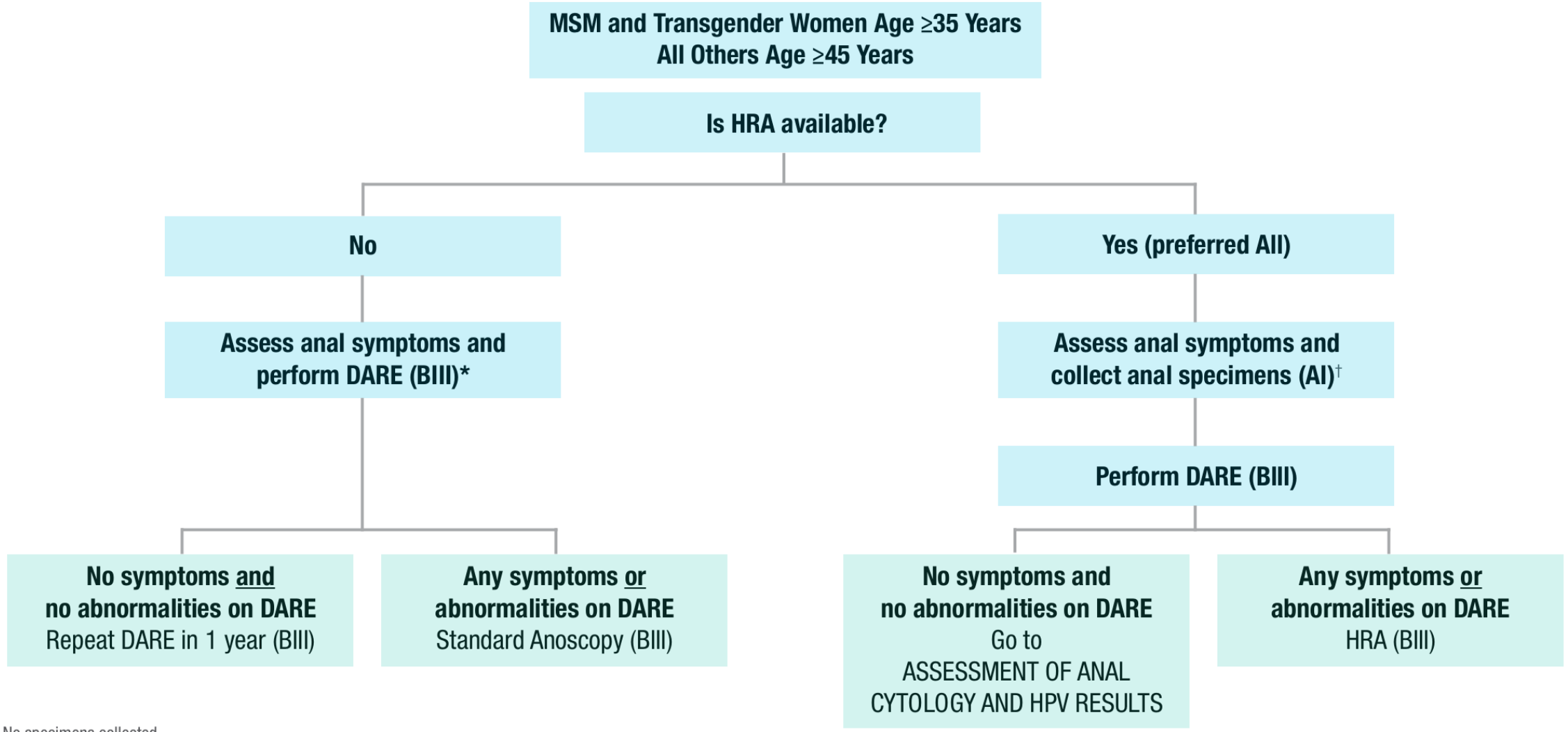
Panel on Guidelines for the Prevention and Treatment of Opportunistic Infections in Adults and Adolescents with HIV. Guidelines for the Prevention and Treatment of Opportunistic Infections in Adults and Adolescents with HIV. Human Papillomavirus Disease National Institutes of Health, Centers for Disease Control and Prevention, HIV Medicine Association, and Infectious Diseases Society of America. 2024. Available at https://clinicalinfo.hiv.gov/en/guidelines/adult-and-adolescent-opportunistic-infection. Accessed April 12, 2024.

A meta-analysis of anal cancer incidence by risk group: Toward a unified anal cancer risk scale




Intl Journal of Cancer, Volume: 148, Issue: 1, Pages: 38-47, First published: 04 July 2020, DOI: (10.1002/ijc.33185)

# SCREENING ALGORITHM FOR ANAL CANCER IN ASYMPTOMATIC PEOPLE WITH HIV




* No specimens collected

† Collect any specimens either for cytology or for cytology with HPV co-testing prior to DARE. HPV testing without cytology is not recommended (BIII)

**Key:** DARE = digital anorectal exam; HPV = human papillomavirus; hr-HPV = high-risk HPV; HRA = high-resolution anoscopy; MSM = men who have sex with men

# ASSESSMENT OF ANAL CYTOLOGY AND HPV RESULTS IN PEOPLE WITH HIV

**Was hr-HPV co-testing performed?**

## No

**Cytology Normal**
Repeat cytology in 1 year (BIII)

**Normal x 3 consecutive years**
Repeat cytology in 3 years (BIII)

**Cytology ≥ ASC-US**
HRA (BIII)

## Yes

**Cytology Normal**
Assess hr-HPV results

| | |
|---|---|
| **hr-HPV Negative** | Repeat cytology and hr-HPV in 3 years (BIII) |
| **hr-HPV Positive, No HPV typing** | Repeat cytology and hr-HPV in 6 months† (BIII) |
| **hr-HPV Positive, HPV 16 and 18 negative** | Repeat cytology and hr-HPV in 1 year† (BIII) |
| **hr-HPV Positive, HPV 16 or 18 positive** | HRA (BIII) |

**Cytology ASC-US**
Assess hr-HPV results

| | |
|---|---|
| **hr-HPV Negative** | Repeat cytology and hr-HPV in 1 year† (BIII) |
| **hr-HPV Positive** | HRA (BIII) |

**Cytology ≥ LSIL**
HRA (BIII)

† If at repeat testing either cytology is ≥ ASC-US or any hr-HPV is detected, refer for HRA (BIII)

**Key:** ASC-US = atypical squamous cells of undetermined significance; HPV = human papillomavirus; hr-HPV = high-risk HPV; HRA = high-resolution anoscopy; LSIL = low-grade squamous intraepithelial lesion

| Vaccinations |
| --- |
| PCV20 or PCV21 |
| Hepatitis B if not immune (preferably use two dose recombinant with adjuvant) |
| Hepatitis A if not immune |
| MenACWY |
| Shingles |
| MMR booster if not immune (contraindicated if CD4 <200) |
| HPV series if not previously completed (≤45 years) |
| Flu (live vaccine contraindicated) |
| COVID19 (if not previously vaccinated and CD<200 or not on ART, will need 3 total doses of Pfizer or Moderna) |
| Mpox (if at increased risk) |

# Questions?

# References


Centers for Disease Control and Prevention. NCHHSTP AtlasPlus. Accessed April 13, 2024. https://www.cdc.gov/nchhstp/atlas/index.htm

Centers for Disease Control and Prevention. Ending the HIV Epidemic: Screening, Treatment, and Prevention- A Guide for Health Care Providers 2022 [Slide set}. (2022). https://www.cdc.gov/hiv/clinicians/materials/slidedecks.html. Accessed April 13, 2024.

Centers for Disease Control and Prevention and Association of Public Health Laboratories. Laboratory Testing for the Diagnosis of HIV Infection: Updated Recommendations. 2014. http://stacks.cdc.gov/view/cdc/23447. Accessed April 12, 2024.

Centers for Disease Control and Prevention- HIV Nexus Clinician Resources: HIV Screening. Which HIV Tests Should I Use?. https://www.cdc.gov/hiv/clinicians/screening/tests.html. Updated June 1, 2023. Accessed April 12, 2024.

Centers for Disease Control and Prevention: US Public Health Service: Preexposure prophylaxis for the prevention of HIV infection in the United States—2021 Update: a clinical practice guideline. https://www.cdc.gov/hiv/pdf/risk/prep/cdc-hiv-prep-guidelines-2021.pdf. Published XXX 2021.

Clifford GM, Georges D, Shiels MS, et al. A meta-analysis of anal cancer incidence by risk group: Toward a unified anal cancer risk scale. *Int J Cancer*. 2021;148(1):38-47. doi:10.1002/ijc.33185

Grinspoon SK, Fitch KV, Zanni MV, et al. Pitavastatin to Prevent Cardiovascular Disease in HIV Infection. *N Engl J Med*. 2023;389(8):687-699. doi:10.1056/NEJMoa2304146

Hirsch B, Fine SM, Vail R, et al. Screening for Anal Dysplasia and Cancer in Adults With HIV [Internet]. Baltimore (MD): Johns Hopkins University; 2022 Aug. Available from: https://www.ncbi.nlm.nih.gov/books/NBK556472/

Landovitz RJ, Donnell D, Clement ME, et al. Cabotegravir for HIV Prevention in Cisgender Men and Transgender Women. *N Engl J Med*. 2021;385(7):595-608. doi:10.1056/NEJMoa2101016

Lippman SA, West R, Gómez-Olivé FX, Leslie HH, Twine R, Gottert A, Kahn K, Pettifor A. Treatment as Prevention-Provider Knowledge and Counseling Lag Behind Global Campaigns. J Acquir Immune Defic Syndr. 2020 Feb 1;83(2):e9-e12. doi: 10.1097/QAI.0000000000002197. PMID: 31929409; PMCID: PMC6961802.

Marcus JL, Leyden WA, Alexeeff SE, et al. Comparison of Overall and Comorbidity-Free Life Expectancy Between Insured Adults With and Without HIV Infection, 2000-2016. *JAMA Netw Open*. 2020;3(6):e207954. Published 2020 Jun 1. doi:10.1001/jamanetworkopen.2020.7954

Meunier É, Siegel K, Sundelson AE, Schrimshaw EW. Stages of Adoption of "Treatment as Prevention" Among HIV-Negative Men Who Have Sex with Men Who Engage in Exchange Sex. AIDS Patient Care STDS. 2020 Sep;34(9):380-391. doi: 10.1089/apc.2020.0062. PMID: 32931316; PMCID: PMC7480714.

Ogbuagu O, Segal-Maurer S, Ratanasuwan W, et al. Efficacy and safety of the novel capsid inhibitor lenacapavir to treat multidrug-resistant HIV: week 52 results of a phase 2/3 trial. *Lancet HIV*. 2023;10(8):e497-e505. doi:10.1016/S2352-3018(23)00113-3

Overton ET, Richmond G, Rizzardini G, et al. Long-acting cabotegravir and rilpivirine dosed every 2 months in adults with HIV-1 infection (ATLAS-2M), 48-week results: a randomised, multicentre, open-label, phase 3b, non-inferiority study. *Lancet*. 2021;396(10267):1994-2005. doi:10.1016/S0140-6736(20)32666-0

Panel on Antiretroviral Guidelines for Adults and Adolescents. Guidelines for the Use of Antiretroviral Agents in Adults and Adolescents with HIV. Department of Health and Human Services. 2024. Available at https://clinicalinfo.hiv.gov/en/guidelines/adult-and-adolescent-arv. Accessed April 12, 2024.

Panel on Guidelines for the Prevention and Treatment of Opportunistic Infections in Adults and Adolescents with HIV. Guidelines for the Prevention and Treatment of Opportunistic Infections in Adults and Adolescents with HIV. Human Papillomavirus Disease. National Institutes of Health, Centers for Disease Control and Prevention, HIV Medicine Association, and Infectious Diseases Society of America. 2024. Available at https://clinicalinfo.hiv.gov/en/guidelines/adult-and-adolescent-opportunistic-infection. Accessed February 26, 2025

Panel on Treatment of HIV During Pregnancy and Prevention of Perinatal Transmission. Recommendations for the Use of Antiretroviral Drugs During Pregnancy and Interventions to Reduce Perinatal HIV Transmission in the United States. Department of Health and Human Services. 2024. Available at https://clinicalinfo.hiv.gov/en/guidelines/perinatal. Accessed April 12, 2024.

Smit M, Brinkman K, Geerlings S, et al. Future challenges for clinical care of an ageing population infected with HIV: a modelling study [published correction appears in Lancet Infect Dis. 2015 Sep;15(9):998]. *Lancet Infect Dis*. 2015;15(7):810-818. doi:10.1016/S1473-3099(15)00056-0

Swindells S, Andrade-Villanueva JF, Richmond GJ, et al. Long-Acting Cabotegravir and Rilpivirine for Maintenance of HIV-1 Suppression. *N Engl J Med*. 2020;382(12):1112-1123. doi:10.1056/NEJMoa1904398

Thompson MA, Horberg MA, Agwu AL, et al. Primary Care Guidance for Persons With Human Immunodeficiency Virus: 2020 Update by the HIV Medicine Association of the Infectious Diseases Society of America [published correction appears in Clin Infect Dis. 2021 Dec 08;:] [published correction appears in Clin Infect Dis. 2022 Nov 30;75(11):2052]. *Clin Infect Dis*. 2021;73(11):e3572-e3605. doi:10.1093/cid/ciaa1391

Trickey A, Sabin CA, Burkholder G, et al. Life expectancy after 2015 of adults with HIV on long-term antiretroviral therapy in Europe and North America: a collaborative analysis of cohort studies. *Lancet HIV*. 2023;10(5):e295-e307. doi:10.1016/S2352-3018(23)00028-0

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# Pulmonary embolism: a practical overview

**47th Annual Family Medicine Refresher Course**

Richard H. Zou, MD, MS

March 8, 2025

# Disclosures

Verona Pharma PLC

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# Learning Objectives

- To recognize **clinical and radiographic features** of PE
- To **risk stratify** PE
- To understand PE **treatments** and controversies

# Overview

Pre-Diagnosis
- ❑ Definition
- ❑ Epidemiology
- ❑ Pathophysiology
- ❑ Risk Factors

Diagnosis
- ❑ Clinical Presentation
- ❑ Diagnostic Testing
- ❑ Risk Stratification
- ❑ Thrombophilia Testing

Treatment
- ❑ Anticoagulation
- ❑ Post-PE Care

# Overview

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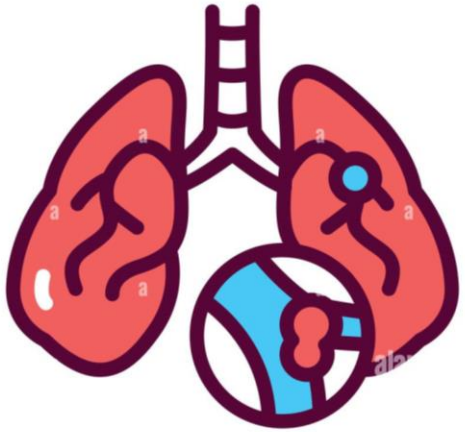
# Definition

- **Occlusion of blood flow** in the pulmonary arterial circulation due to embolus from systemic vasculature
- **Restricts normal pulmonary ventilation and perfusion** [1,2]



1 Giri et al, *Circulation*, 2019.
2 Freund et al, *JAMA*, 2022.

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# Overview

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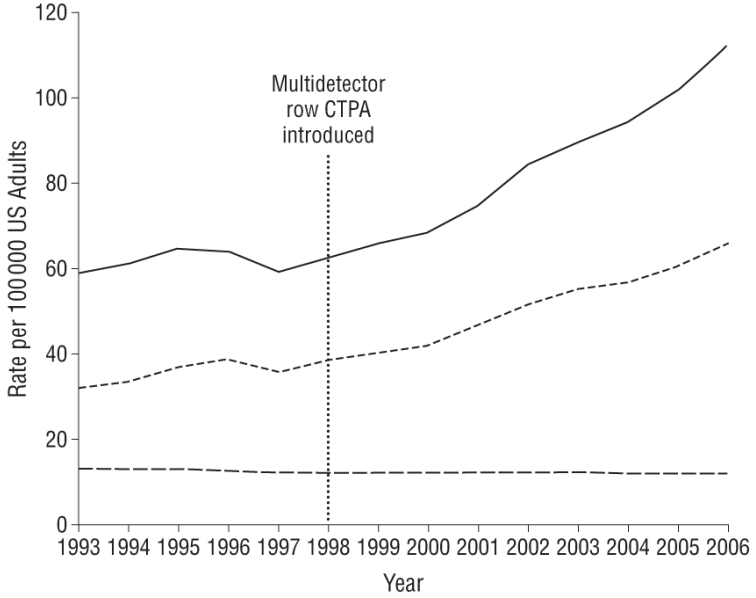
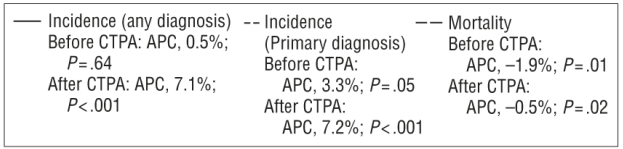
# Morbidity and Mortality in PE

- **Third leading cause** of cardiovascular mortality [3]
- General population incidence of **60-120 cases per 100,000** [4]




Weiner et al, *JAMA*, 2011.

3 Goldhaber et al, *Lancet*, 2012.
4 Wendelboe et al, *Circ Res*, 2016.

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# Morbidity and Mortality in PE

- ~900,000 VTE events/year → **1.8 VTE events every minute** [5]
- ~100,000 PE deaths/year → **1 PE death every 5 minutes** [5]
- **14% in-hospital mortality** [2]
- **20% all-cause 90-day mortality** [2]

2 Freund et al, *JAMA*, 2022.
5 Centers for Disease Control and Prevention, Apr 2022.

# Clinical Question #1

How does PE compare to other major causes of cardiovascular mortality in the US?

PE is the third leading cause of cardiovascular mortality (*behind only myocardial infarction and stroke*).

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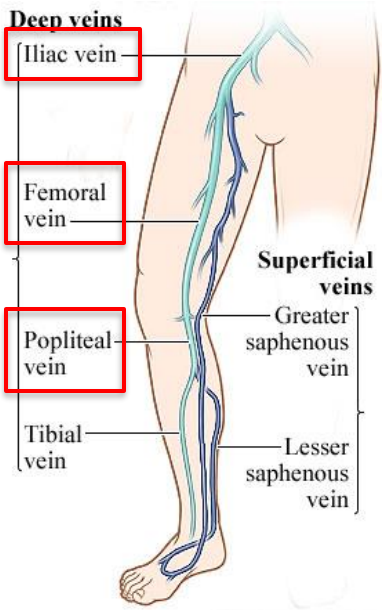
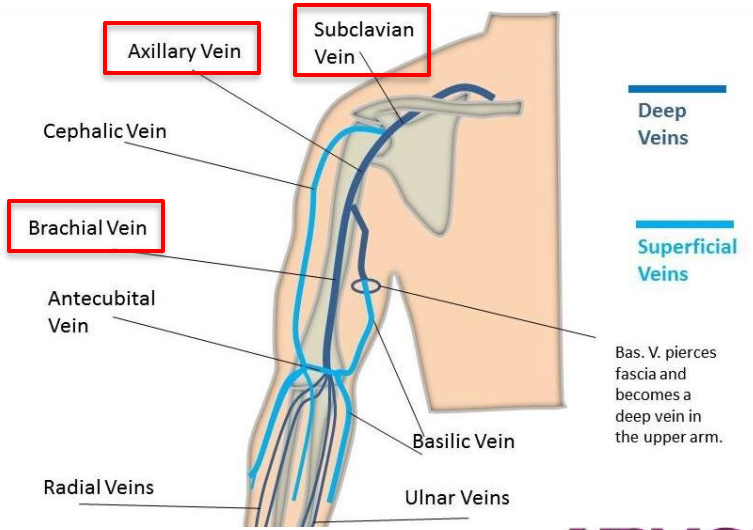
- ❑ Post-PE Care

# Where Does It Start?

- ~90% originate from **deep veins of lower extremity or pelvis** [8]
- ~10% originate from deep veins of upper extremity [9]




8 Hyeres, *Am J Respir Crit Care Med*, 1999.
9 Previtali et al, *Blood Transfus*, 2011.

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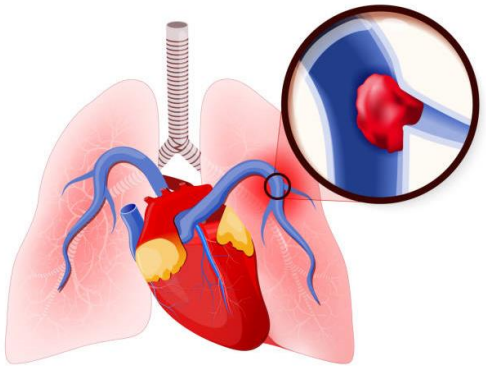
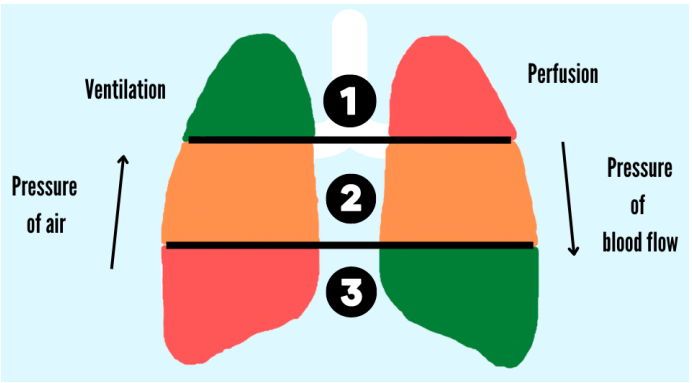
# Where Does It End?

- Migration to pulmonary arterial vasculature
- Typically multiple, **lower lobe > upper lobe** predominance [10]



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10 Moser, *Am Rev Respir Dis*, 1990.

# Pathophysiology

## V/Q mismatch

Obstruction of pulmonary vascular bed

↓

Impaired gas exchange

↓

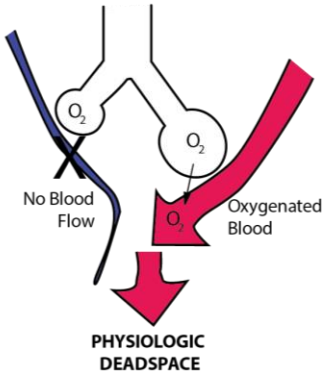
Ventilation/perfusion mismatch

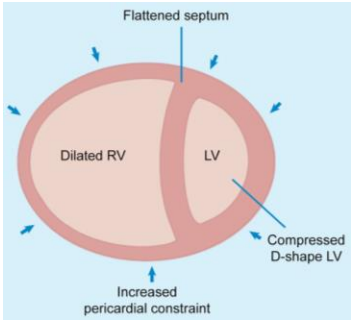
↓

Dead space ventilation

↓

Hypoxemia




## RV spiral of death

Increased pulmonary vascular resistance

↓

Increased RV afterload

↓

RV dilation

↓

Interventricular septal flattening

↓

Reduced LV preload

↓

Decreased cardiac output

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# Clinical Question #2

In patients with PE, where do the majority of clot burden originate?

90% of PEs originate from proximal deep veins of the lower extremity (*femoral, popliteal*) and pelvis (*iliac*).

# Overview

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- ❑ **Risk Factors**

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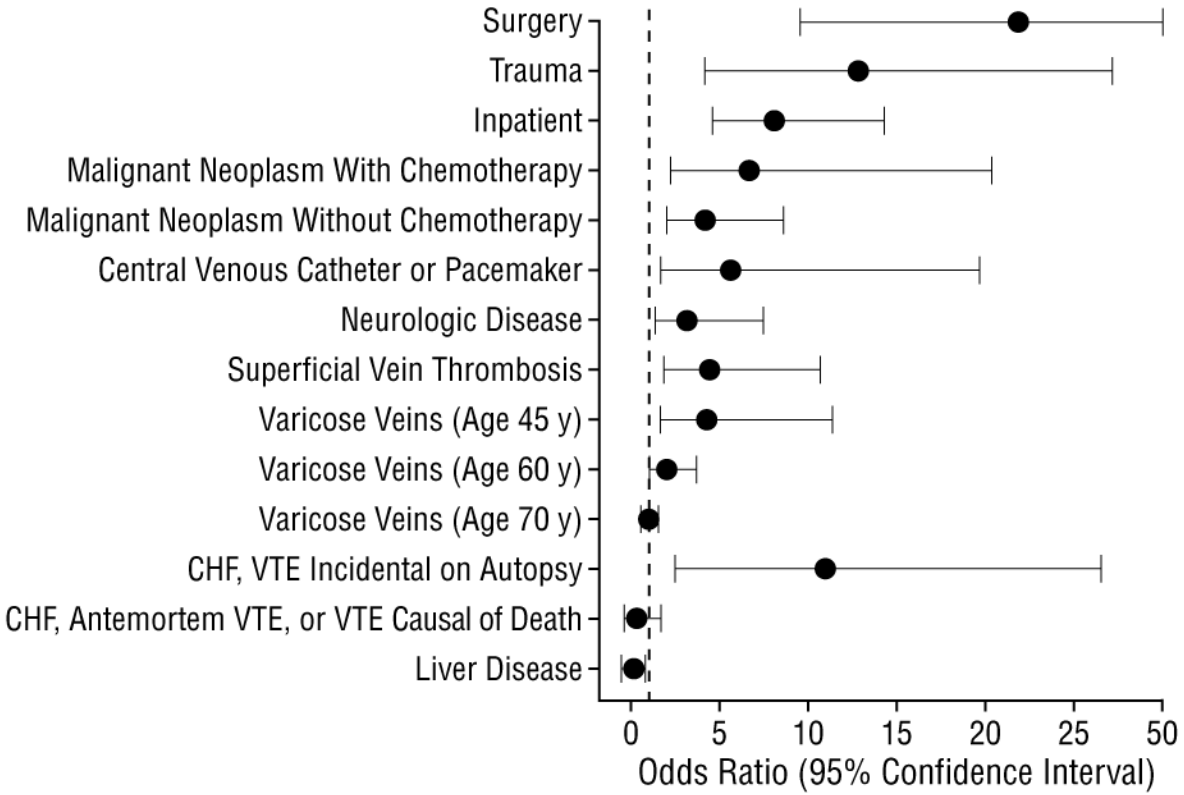
- ❑ Anticoagulation
- ❑ Post-PE Care

# Provoking Risk Factors

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11 Heit et al, *JAMA*, 2000.

# Provoking Risk Factors

- **Hospitalization is important (and often underestimated)** [11]
  - Relative immobilization, severe illness, acute inflammation, etc.
  - DVT prophylaxis alone does not absolve inpatient VTE risk
- COVID-19 infection [12]
  - ~4% of hospitalized patients in US
  - Higher risk of **mechanical ventilation** (HR 1.38) and **mortality** (HR 1.36)

11 Heit et al, *JAMA*, 2000.
12 Gul et al, *Respir Res*, 2023.

# Clinical Question #3

What is the single most provoking risk factor for PE?

Recent lower extremity musculoskeletal (*orthopedic*) surgery.

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- ❑ Post-PE Care

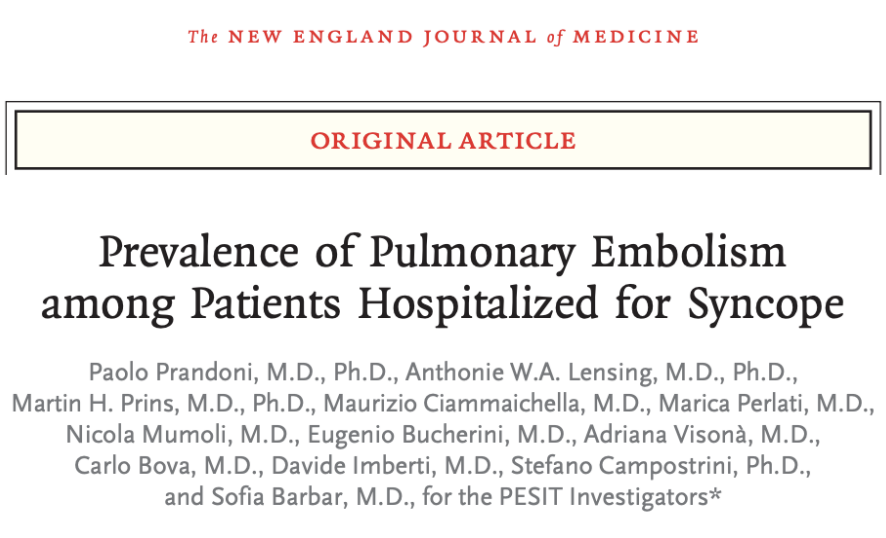
# Clinical Presentation

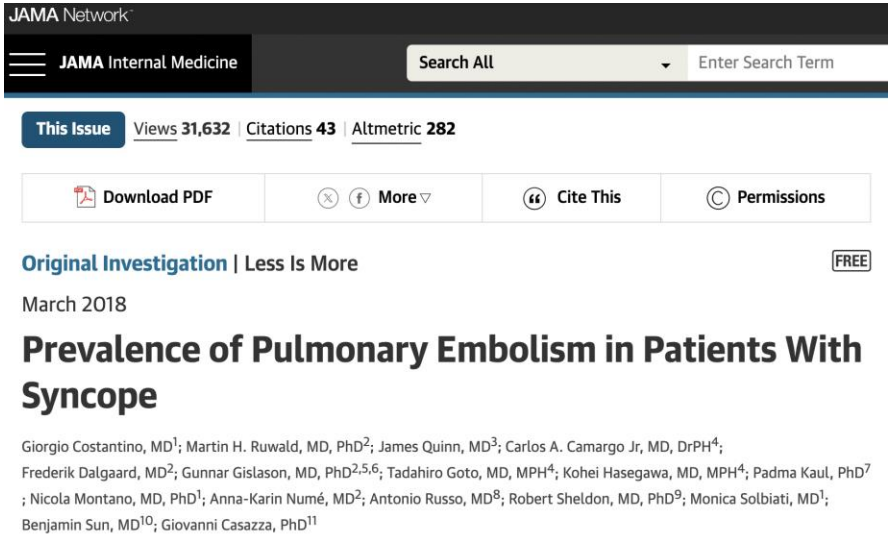
- **Dyspnea**
- **Pleurisy**
- **Unilateral calf pain/swelling**
- Non-productive cough
- Hemoptysis
- Hypoxemia *
- Syncope *
- Arrythmia (atrial fibrillation)
- Hemodynamic collapse
- Sudden cardiac arrest

# Not All Hypoxemia Needs PE Evaluation

- Significant hypoxemia due to PE is associated with **considerable clot burden, likely with hemodynamic compromise**
- What is your pretest probability?

# Syncope in PE




**17% prevalence!**
**n = 560**

→

**0.15-2% prevalence**
**n = 1.67 million**

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13 Prandoni et al, *N Engl J Med*, 2016.
14 Costantino et al, *JAMA Intern Med*, 2018.

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# My Diagnostic Workflow

| Pretest Probability | Clot Assessment | Biomarkers | RV Dysfunction | Vital Signs | Perfusion | Risk Scores | Classification |
|---|---|---|---|---|---|---|---|
| Well's | CTA | HS troponin | TTE | HR | Lactate | PESI | European (ESC) |
| D-dimer | Duplex | BNP | CTA | BP | Cr | | American (AHA) |
| | | | | $SpO_2$ | Na | | |

# What Is Your Pretest Probability?

## Wells' Criteria for Pulmonary Embolism

Objectifies risk of pulmonary embolism.

When to Use | Pearls/Pitfalls | Why Use

| | | |
|---|---|---|
| Clinical signs and symptoms of DVT | No 0 | Yes +3 |
| PE is #1 diagnosis OR equally likely | No 0 | Yes +3 |
| Heart rate > 100 | No 0 | Yes +1.5 |
| Immobilization at least 3 days OR surgery in the previous 4 weeks | No 0 | Yes +1.5 |
| Previous, objectively diagnosed PE or DVT | No 0 | Yes +1.5 |
| Hemoptysis | No 0 | Yes +1 |
| Malignancy w/ treatment within 6 months or palliative | No 0 | Yes +1 |

| Well's Score | Well's Tier | Prevalence |
|---|---|---|
| 0-1 | Low | 1.3% |
| 2-6 | Moderate | 16.2% |
| 7-12.5 | High | 37.5% |

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15 Wells et al, *Ann Intern Med*, 2001.

# D-Dimer

- **High negative predictive value** (97-99%) [16]
- Poor positive predictive value (44-67%) [16]
  - **Alternative causes**: malignancy, AKI, infection, etc.
- *Remember: use age-adjusted cutoff values*



16 Kearon et al, *N Engl J Med*, 2019.

# My Diagnostic Workflow

| Pretest Probability | Clot Assessment | Biomarkers | RV Dysfunction | Vital Signs | Perfusion | Risk Scores | Classification |
|---|---|---|---|---|---|---|---|
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| D-dimer | Duplex | BNP | CTA | BP | Cr | | American (AHA) |
| | | | | $SpO_2$ | Na | | |

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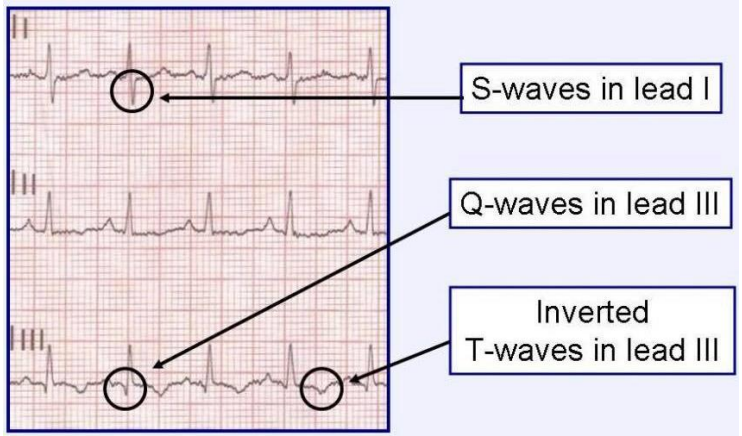
# Biomarkers of RV Strain

- Elevations in **HS troponin** and **BNP** reflect subendothelial RV ischemia and strain/stretch [17, 19]
- Associated with **clinical deterioration and mortality** in PE [18, 20]

17 Meyer et al, *J Am Coll Cardiol*, 2000.
18 Becattini et al, *Circulation*, 2007.
19 Binder et al, *Circulation*, 2005.
20 Coutance et al, *Crit Care*, 2008.

# EKG

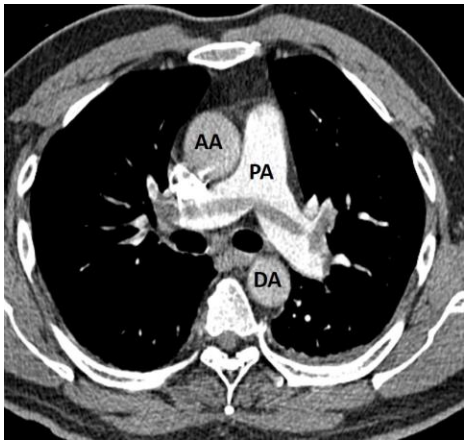
- Most common finding is **sinus tachycardia** (>50%)
- **S1Q3T3** (~20%) *
- New **right bundle branch block** (~20%) *



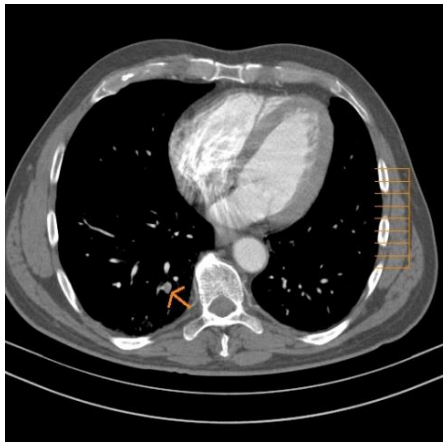
# CT Pulmonary Angiogram

- Evaluation of **clot burden** in the pulmonary arterial circulation
- Evaluation of **right heart strain**
  - May not always be accurate (in comparison with TTE)
  - Based on relationship between heart and cross-sectional cuts
- Assess for **reflux of contrast into IVC**
  - Correlates with degree of tricuspid regurgitation (TR) and pulmonary artery systolic pressure (PASP)
- *Remember: order CT angiogram (PE protocol), not CT chest w/ contrast*

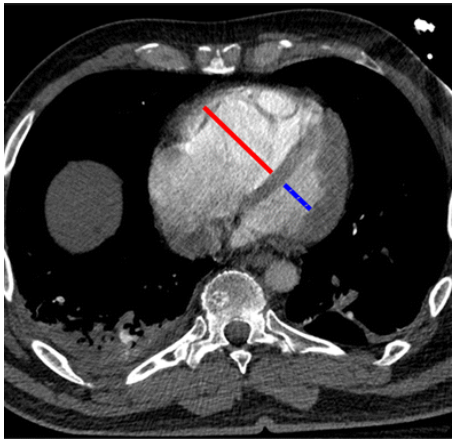
# CT Pulmonary Angiogram



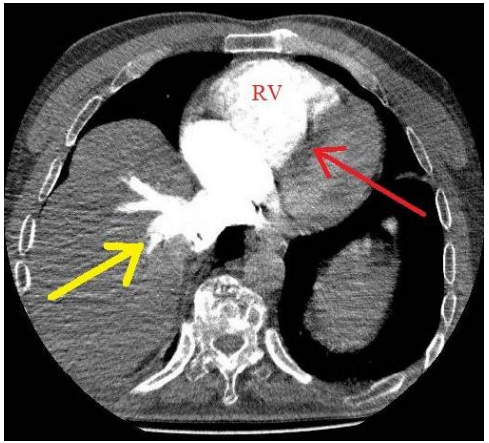

Proximal (saddle)



Distal (subsegmental)



RV/LV >1




Reflux of contrast

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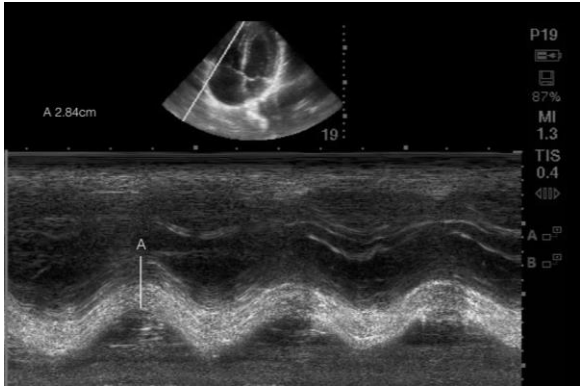
# TTE




- Measurement of left ventricular function
- Ideal evaluation of true **right heart strain**
  - **McConnell's sign** (*specific, but not sensitive*)
- Tricuspid annular plane systolic excursion (TAPSE)
  - Poor man's measure of "RV function"
  - Predicts short- and long-term adverse events [23]

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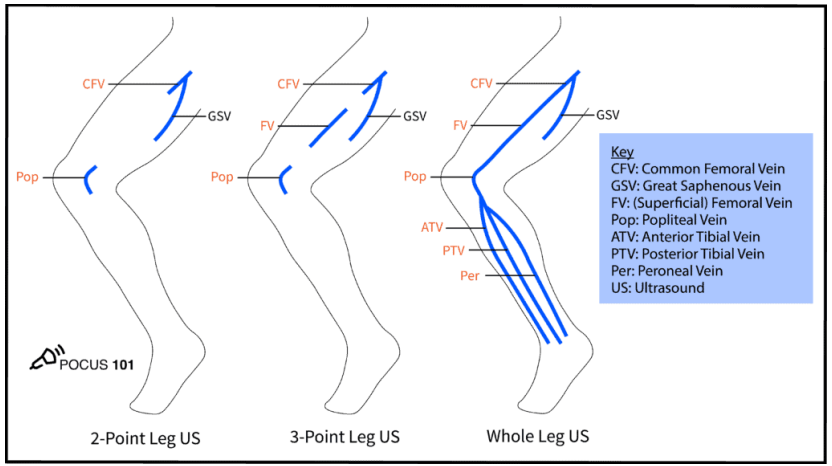
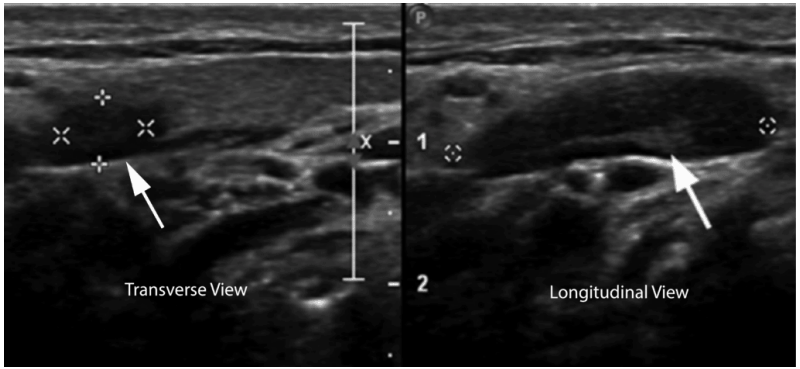
23 Lyhne et al, *Eur Heart J Cardiovasc Imaging*, 2021.

# Venous Duplex

- DVT is identified in only **~50%** of PE cases [24]



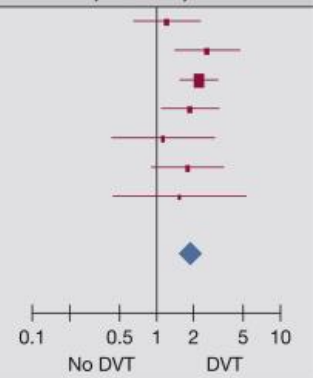

24 van Langevelde et al, *Haemotologica*, 2013.

# DVT + PE Matters

- Should we care about DVT if we already know there is a PE?
- Increased odds of **PE-related 30-day mortality** (OR 1.9) [25]
- Increased risk **recurrent VTE** (~4x) [25]

| Study or Subgroup | DVT Events | DVT Total | No DVT Events | No DVT Total | Weight | Odds Ratio M-H, Random, 95% CI |
|---|---|---|---|---|---|---|
| Jiménez, Chest 2007 | 21 | 266 | 22 | 333 | 12.8% | 1.21 [0.65, 2.25] |
| Jiménez, AJRCCM 2010 | 40 | 362 | 16 | 345 | 13.7% | 2.55 [1.40, 4.65] |
| RIETE, AJRCCM 2010 | 137 | 2,803 | 38 | 1,673 | 37.1% | 2.21 [1.54, 3.18] |
| Jiménez, Thorax 2011 | 31 | 228 | 28 | 361 | 16.9% | 1.87 [1.09, 3.21] |
| Vedovati, Chest 2012 | 17 | 271 | 6 | 108 | 5.4% | 1.14 [0.44, 2.97] |
| Jiménez, AJRCCM 2014 | 22 | 375 | 15 | 445 | 10.9% | 1.79 [0.91, 3.50] |
| Kabhrel, Thorax 2014 | 4 | 74 | 8 | 224 | 3.3% | 1.54 [0.45, 5.28] |
| **Total (95% CI)** | | **4,379** | | **3,489** | **100.0%** | **1.89 [1.52, 2.36]** |
| Total events | 272 | | 133 | | | |

Heterogeneity: $\tau^2 = 0.00$; $\chi^2 = 4.87$, df = 6 ($P = .56$); $I^2 = 0\%$
Test for overall effect: $z = 5.63$ ($P < .00001$)




25 Becattini et al, *Chest*, 2016.

# My Diagnostic Workflow

| Pretest Probability | Clot Assessment | Biomarkers | RV Dysfunction | Vital Signs | Perfusion | Risk Scores | Classification |
|---|---|---|---|---|---|---|---|
| Well's | CTA | HS troponin | TTE | HR | Lactate | PESI | European (ESC) |
| D-dimer | Duplex | BNP | CTA | BP | Cr | | American (AHA) |
| | | | | $SpO_2$ | Na | | |

# Overview

Pre-Diagnosis
- ❑ Definition
- ❑ Epidemiology
- ❑ Pathophysiology
- ❑ Risk Factors

Diagnosis
- ❑ Clinical Presentation
- ❑ Diagnostic Testing
- ❑ **Risk Stratification**
- ❑ Thrombophilia Testing

Treatment
- ❑ Anticoagulation
- ❑ Post-PE Care

# Nomenclature Is Confusing!

Crashing massive PE

Intermediate high risk PE

Intermediate low risk PE

Submassive PE

Subacute PE

Saddle PE ?

Massive PE

Non-crashing massive PE

Chronic thromboembolic disease (CTED)

Chronic thromboembolic pulmonary hypertension (CTEPH)

Acute PE

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# Classification Dictates Treatment

| | Category | Shock or hypotension | PESI III-IV or sPESI ≥1 | RV dysfunction | Biomarkers |
|---|---|---|---|---|---|
| American Heart Association (AHA) | Massive | + | + | + | + |
| | Submassive | – | + | Either or both + | |
| | Low | – | – | – | – |

| | Category | Shock or hypotension | PESI class III-IV or sPESI ≥1 | RV dysfunction | Biomarkers |
|---|---|---|---|---|---|
| European Society of Cardiology (ESC) | High | + | + | + | + |
| | Intermediate high | – | + | Both + | |
| | Intermediate low | – | + | Either + | |
| | Low | – | – | – | – |

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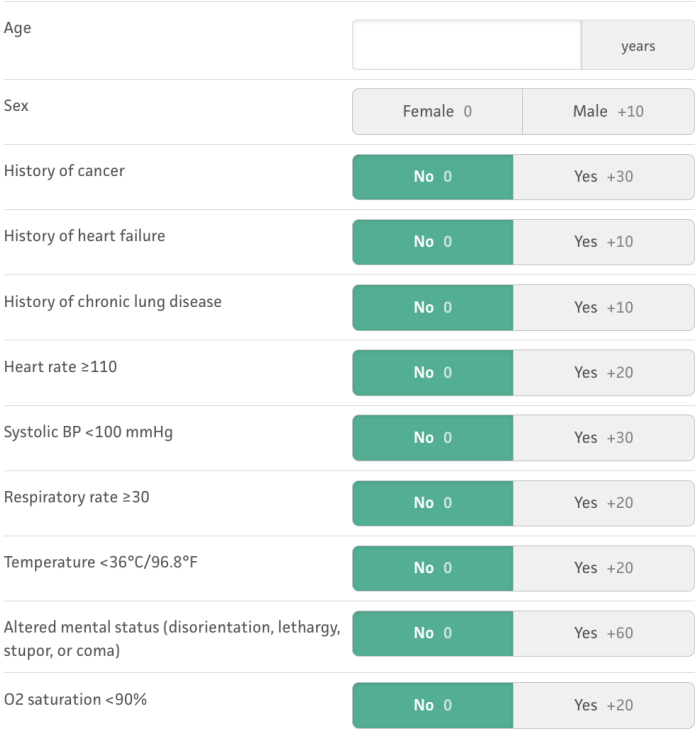
# PE Severity Index (PESI)




| PESI Score | PESI Class | 30-day Mortality |
|---|---|---|
| 0-65 | I | 0-1.6% |
| 66-85 | II | 1.7-3.5% |
| 86-105 | III | 3.2-7.1% |
| 106-125 | IV | 4.0-11.4% |
| 126-220 | V | 10.0-24.5% |

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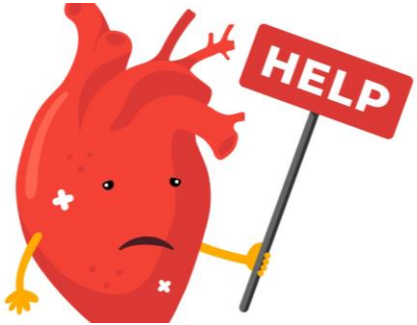
26 Aujesky et al, *Am J Respir Crit Care Med*, 2005.

# Biomarkers Associated with Mortality

- Hemodynamic instability
  - **Tachycardia (HR >110)** [27]
  - **Shock index (HR/SBP) >1** [28]
- Poor end organ perfusion
  - **Lactate >2** [29]
  - **AKI (eGFR <60)** [30]
- Hyponatremia (**Na <135**) [31]
  - RV dysfunction → activation of RAAS





27 Jaureguizar et al, *Chest*, 2022.
28 Otero et al, *Eur Respir J*, 2007.
29 Vanni et al, *Ann Emerg Med*, 2013.
30 Kostrubiec et al, *Thomb Haemostat*, 2019.
31 Zhou et al, *Int J Cardiol*, 2017.

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# My Diagnostic Workflow

| Pretest Probability | Clot Visualization | Biomarkers | RV Dysfunction | Vital Signs | Perfusion | Risk Scores | Classification |
|---|---|---|---|---|---|---|---|
| Well's | CTA | HS troponin | TTE | HR | Lactate | PESI | European (ESC) |
| D-dimer | Duplex | BNP | CTA | BP | Cr | | American (AHA) |
| | | | | $SpO_2$ | Na | | |

# Clinical Question #4

Why is saddle PE not a very helpful descriptor for PE treatment?

Saddle PE only describes the geographic location but does not provide meaningful information about risk stratification and classification, which dictates treatment options.

# Overview

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- ❑ Risk Factors

Diagnosis
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- ❑ Diagnostic Testing
- ❑ Risk Stratification
- ❑ **Thrombophilia Testing**

Treatment
- ❑ Anticoagulation
- ❑ Advanced Therapies
- ❑ Post-PE Care

# Thrombophilia Testing Not Required

- Patients with **clearly provoked VTE event**
  - Treat for 3-6 months
- Patients with **first unprovoked VTE event**
  - Indefinite treatment (benefit > risk)
  - Testing would not change management

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32 Middeldorp et al, *Blood Adv*, 2023.

# Thrombophilia Testing Beneficial

- Patients with **strong family history** of thromboembolic events
- Patients with **first VTE event w/o clear "major" provoking event**
  - ASH 2023: "non-surgical transient risk factors"
  - If negative, reasonable to spare indefinite full dose A/C
- Patients with **multisite clotting events** (venous and arterial)
  - Higher suspicion for antiphospholipid syndrome
  - Management differs (warfarin > DOAC)

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32 Middeldorp et al, *Blood Adv*, 2023.

# Which Thrombophilia Tests to Order?

- **Not affected** by presence of VTE or systemic anticoagulation:
  - **Prothrombin gene mutation**
  - **Factor V Leiden**
  - **Anti-beta-2-glycoprotein antibody**
  - **Anti-cardiolipin antibody**

- **Affected** by presence of VTE or systemic anticoagulation:
  - Protein C and S
  - Activated protein C
  - Antithrombin III
  - Lupus anticoagulant panel

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32 Middeldorp et al, *Blood Adv*, 2023.

# Clinical Question #5

In patients with PE who meet criteria for thrombophilia testing, when should testing be ordered?

Prothrombin gene mutation, Factor V Leiden, anti-beta-2-glycoprotein antibody, and anti-cardiolipin antibody at time of diagnosis. Remainder of tests should be completed as an outpatient, after 3-6 months of treatment, off anticoagulation.

# Overview

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- ❑ Pathophysiology
- ❑ Risk Factors

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- ❑ Diagnostic Testing
- ❑ Risk Stratification
- ❑ Thrombophilia Testing

Treatment
- ❑ **Anticoagulation**
- ❑ Post-PE Care

# Unfractionated Heparin (UFH)

- One of most common systemic anticoagulants in the hospital
- Benefits:
  - Quick on, quick off
  - Reversible with protamine sulfate
  - Different therapeutic ranges for different diseases


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# UFH or LMWH?

- Compared to LMWH, UFH is associated with:
  - **Longer time to first therapeutic anti-Xa level**

| UFH only (n=12) | Enoxaparin only (n=2) |
|---|---|
| 13 hours (6-46 hours) | 4 hours (3-5 hours) * |

* After single subQ dose, per available UPMC SMH pharmacokinetic data

  - **Longer duration (days) of use in the hospital**

| UFH only (n=12) | Enoxaparin only (n=2) |
|---|---|
| 5.3 days | 2.5 days |

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Courtesy of Brianna Ordons, PharmD, BCPS, BCCCP; data from May 2022.

# UFH or LMWH?

- Compared to UFH, LMHW is associated with:
  - **Decreased anti-Xa monitoring**
    - Decreased lab draws (and increased patient satisfaction)
    - Decreased cost

| Month/Year | # of anti-Xa levels drawn at SMH |
|---|---|
| January 2021 | 730 |
| February 2021 | 552 |
| January 2022 | 324 |
| February 2022 | 392 |

Courtesy of Brianna Ordons, PharmD, BCPS, BCCCP; data from May 2022.

# Prioritize LMWH over UFH

- Why: time to **early therapeutic level** matters
- Who: **low risk PE** or **intermediate risk PE**
- How: **1mg/kg Q12H**
- Duration: assess clinical stability over **36-48 hours** [33]
- *Remember: data is sparse for severe obesity (BMI ≥40 or >150kg)* [34, 35]


33 Klok et al, *Lancet Haematol*, 2021.
34 Nutescu et al, *Ann Pharmacother*, 2009.
35 Freeman et al, *Am J Hematol*, 2012.

# Oral Anticoagulants

- **Similar efficacy** between apixaban and rivaroxaban [36]
- **Decreased bleeding events** with apixaban c/w rivaroxaban [36]
- **Higher bleeding risk** with warfarin compared to DOACs [37, 38]
- Warfarin remains the treatment of choice for:
  - Failure of other anticoagulants
  - Valvular heart disease
  - Antiphospholipid syndrome

36 Aryal et al, *Blood Adv*, 2019.
37 Buller et al, *N Engl J Med,* 2012.
38 Agnelli et al, *N Engl J Med*, 2013.

# Fibrinolysis

- Standard of care for **massive/high risk PE**
  - Decreased risks of **mortality and recurrent PE** (OR 4.5) [39]
- Not routinely used for submassive/intermediate risk PE

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Fibrinolysis for Patients with Intermediate-Risk Pulmonary Embolism

Guy Meyer, M.D., Eric Vicaut, M.D., Thierry Danays, M.D., Giancarlo Agnelli, M.D., Cecilia Becattini, M.D., Jan Beyer-Westendorf, M.D., Erich Bluhmki, M.D., Ph.D., Helene Bouvaist, M.D., Benjamin Brenner, M.D., Francis Couturaud, M.D., Ph.D., Claudia Dellas, M.D., Klaus Empen, M.D., Ana Franca, M.D., Nazzareno Galiè, M.D., Annette Geibel, M.D., Samuel Z. Goldhaber, M.D., David Jimenez, M.D., Ph.D., Matija Kozak, M.D., Christian Kupatt, M.D., Nils Kucher, M.D., Irene M. Lang, M.D., Mareike Lankeit, M.D., Nicolas Meneveau, M.D., Ph.D., Gerard Pacouret, M.D., Massimiliano Palazzini, M.D., Antoniu Petris, M.D., Ph.D., Piotr Pruszczyk, M.D., Matteo Rugolotto, M.D., Aldo Salvi, M.D., Sebastian Schellong, M.D., Mustapha Sebbane, M.D., Bozena Sobkowicz, M.D., Branislav S. Stefanovic, M.D., Ph.D., Holger Thiele, M.D., Adam Torbicki, M.D., Franck Verschuren, M.D., Ph.D., and Stavros V. Konstantinides, M.D., for the PEITHO Investigators*

Mortality/decompensation: OR 0.44, NNT 33
Recurrent PE: OR 0.20, NNT 125

Major extracranial bleed: OR 5.55, NNH 20
Stroke: OR 12.1, NNH 45

39 Wan et al, *Circulation*, 2004.
40 Meyer et al, *N Engl J Med*, 2014.

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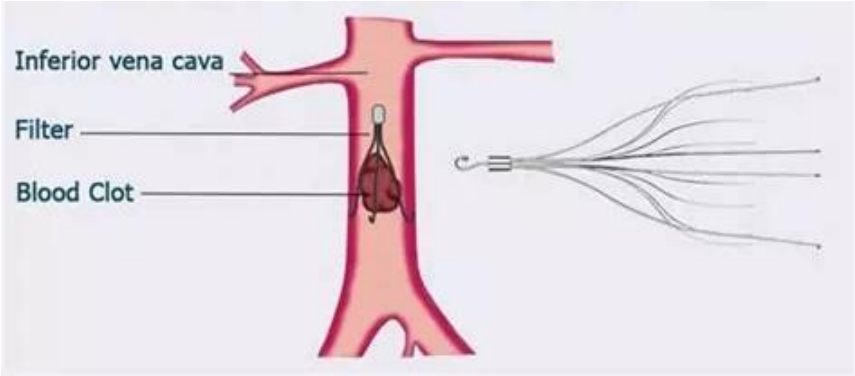
# IVC Filter

- Absolute contraindication (or failure of) systemic anticoagulation
- Ideally **removed after acute insult resolves**
- Substantially **increases risk of recurrent DVT** [41]
- Retrievable filters preferred over historic Greenfield filters

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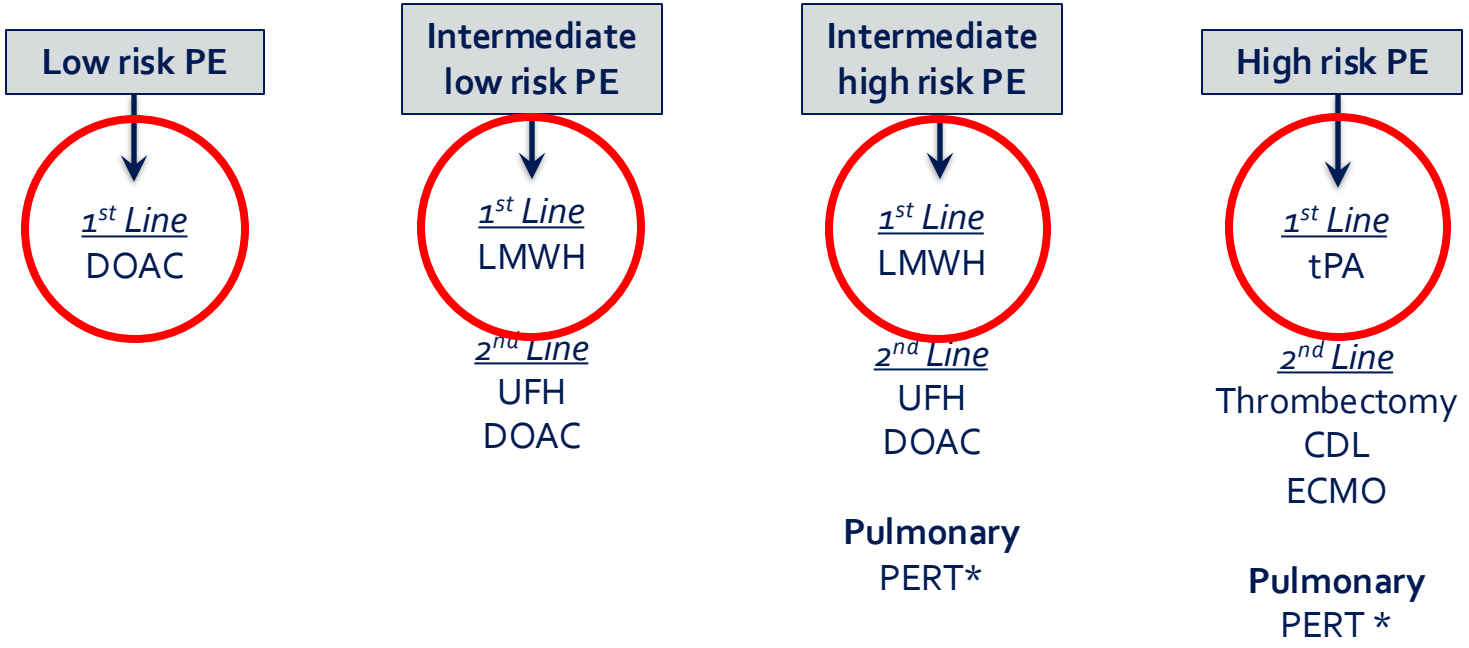
41 PREPIC Study Group, *Circulation*, 2005.

# My Therapeutic Workflow

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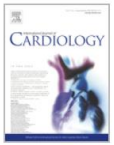
# Is Bedrest a Thing of the Past?

- Prior recommendations to avoid ambulation due to concerns about disease progression and/or hemodynamic collapse
- **Early ambulation reduces VTE progression** (RR 0.79)

ELSEVIER

International Journal of Cardiology

Volume 137, Issue 1, September 2009, Pages 37-41




## A meta-analysis of bed rest versus early ambulation in the management of pulmonary embolism, deep vein thrombosis, or both ☆

Nadia Aissaoui [a], Edith Martins [b], Stéphane Mouly [c], Simon Weber [a], Christophe Meune [a]

42 Aissaoui et al, *Int J Cardiol*, 2009.

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Treatment
- ❑ Anticoagulation
- ❑ **Post-PE Care**

# Timing of Procedures Post-PE

- Ideally postpone ≥**3 months**
- At a minimum, postpone ≥**4-6 weeks**
  - Highest VTE recurrence in the first 4 weeks [42]
  - Consider peri-operative IVC filter placement
- **Risk/benefit discussion** with **multidisciplinary involvement**

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43 Caron et al, *JAMA*, 2019.

# In Summary…

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| Well's | CTA | HS troponin | TTE | HR | Lactate | PESI | European (ESC) |
| D-dimer | Duplex | BNP | CTA | BP | Cr | | American (AHA) |
| | | | | $SpO_2$ | Na | | |

**Low risk PE**

↓

*1st Line*
DOAC

**Intermediate low risk PE**

↓

*1st Line*
LMWH

**Intermediate high risk PE**

↓

*1st Line*
LMWH

**High risk PE**

↓

*1st Line*
tPA

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# Thank You! Questions?

Email: zour@upmc.edu

Cell: 510-672-1617

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# Attention Deficit Hyperactivity Disorder in Adults

Shinnyi Cindy Chou, MD, PhD
Assistant professor of psychiatry
University of Pittsburgh
chous@upmc.edu

University of Pittsburgh

UPMC

# Disclosure

None

Note: This presentation includes discussions of off-label use of FDA approved medications.

# Objectives

At the end of the session, participants will be able to –

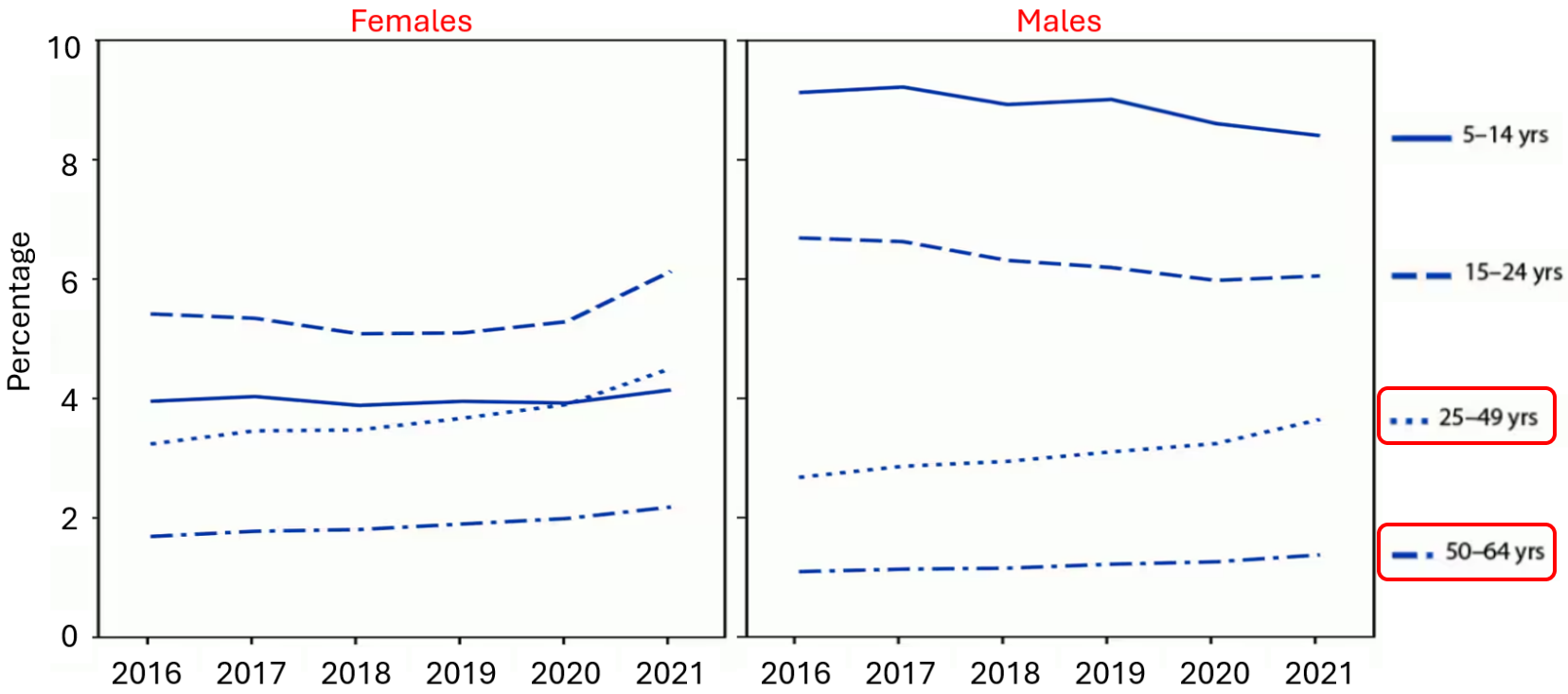
- appreciate recent trends in adult ADHD diagnosis & management
- implement appropriate diagnostic assessments for adult ADHD
- identify common evaluation considerations for adult ADHD
- provide first line adult ADHD treatment and monitoring
- determine when to refer patients to specialty care

# At the annual wellness visit…

- Current symptoms: depressed, anxious about responsibilities, easily irritated, impulsive behaviors leading to financial stress
- History: Gifted, excelled academically, performed tasks quickly, participated in many activities
  - Physical injury a few years ago led to decreased activity capacity, increased boredom, increased impulsive behaviors, easy frustration & “outbursts”, & brain fog
- Prior diagnoses: depression, anxiety, bipolar disorder, borderline personality disorder

# Adult ADHD trends

- Childhood: 5-9%
- Adult: 2.5-4%
- Males diagnosed more frequently
  - Recent increase in female diagnoses
- Worse functional outcomes, morbidity / mortality
- Developmental disorder




Danielson, et al., 2023

# Suspecting ADHD: executive dysfunction

Executive function: A set of cognitive processes necessary for goal executions

| Response inhibition | Working memory | Attention control (Set shifting) | Problem solving (Planning & organizing) |
|---|---|---|---|
| Responds without considering options | Difficulty keeping track of time | Distractible* | Difficulty forgoing current pleasure for future rewards |
| Easily excited, impatient, frustrated | Difficulty keeping track of belongings | Difficulty 'multi-tasking' | **Impulsive** actions (without regard for consequences) |
| Restlessness & **hyperactivity** | Difficulty following conversations for appropriate interactions | Fails to finish activities | Difficulty organizing tasks and activities |

* Does well with novel or stimulating activities ("hyperfocus")

*Whyte, 2024*

# Suspecting ADHD: associated symptoms

Emotional dysregulation

- Easy frustration & excitement
- Interpersonal difficulties

Sleep disruption

- Insomnia
- Circadian-rhythm disorder
  - Day time somnolence
- Restless leg
  - Periodic limb movements

| Variables | ADHD group (n = 61) | HCs group (n = 61) | *p values* |
|---|---|---|---|
| Age, years | 25.32 ± 6.45 | 26.18 ± 3.68 | 0.372[b] |
| Sex, female/male (n) | 24/37 | 21/40 | 0.573[a] |
| BMI, kg/m$^2$ | 25.03 ± 4.93 | 24.45 ± 3.53 | 0.452[b] |
| PSQI | 8.85 ± 3.84 | 5.77 ± 3.13 | < **0.001**[b] |
| ASRS | 43.44 ± 11.67 | 18.80 ± 10.32 | < **0.001**[b] |
| Clinical Insomnia (%) | 26.2 | 4.9 | < **0.001**[b] |
| Poor Sleeper (%) | 85.2 | 62.3 | < **0.001**[b] |

Uygur, 2025

- PSQI: Pittsburgh sleep quality index
- ASRS: Adult self-rating scale (for ADHD)
- Poor sleeper: Determined via PSQI

# A collaborative process: setting expectations

- 2-3 visits for in depth evaluation (including reviewing collateral information) to clarify longitudinal symptoms, functional impairments, diagnoses, & treatment plan
- Monthly appointments while optimizing medication
  - Then possible follow up every 3-6 months
- Must engage in non-pharmacological interventions
  - Medications improve core symptoms but do not improve functions in all domains

# Evaluating symptoms: ASRS

Part A (6 questions)

- Positive screen: > 4 marks in shaded boxes
- Sensitivity: 68.7%
- Specificity: 99.5%

Screener ≠ diagnosis

(Possible overreporting)

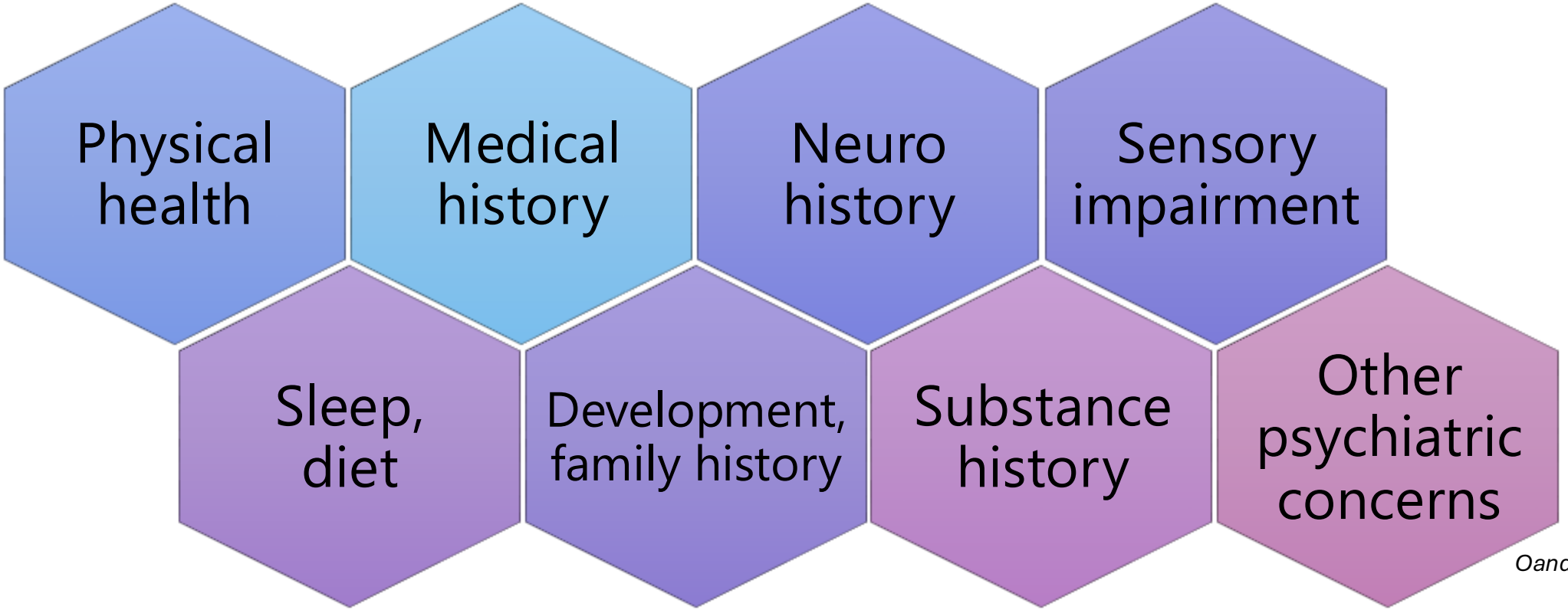
| Please answer the questions below, rating yourself on each of the criteria shown using the scale on the right side of the page. As you answer each question, place an X in the box that best describes how you have felt and conducted yourself over the past 6 months. Please give this completed checklist to your healthcare professional to discuss during today's appointment. | Never | Rarely | Sometimes | Often | Very Often |
|---|---|---|---|---|---|
| 1. How often do you have trouble wrapping up the final details of a project, once the challenging parts have been done? | | | | | |
| 2. How often do you have difficulty getting things in order when you have to do a task that requires organization? | | | | | |
| 3. How often do you have problems remembering appointments or obligations? | | | | | |
| 4. When you have a task that requires a lot of thought, how often do you avoid or delay getting started? | | | | | |
| 5. How often do you fidget or squirm with your hands or feet when you have to sit down for a long time? | | | | | |
| 6. How often do you feel overly active and compelled to do things, like you were driven by a motor? | | | | | |
| 7. How often do you make careless mistakes when you have to work on a boring or difficult project? | | | | | |
| 8. How often do you have difficulty keeping your attention when you are doing boring or repetitive work? | | | | | |
| 9. How often do you have difficulty concentrating on what people say to you, even when they are speaking to you directly? | | | | | |
| 10. How often do you misplace or have difficulty finding things at home or at work? | | | | | |
| 11. How often are you distracted by activity or noise around you? | | | | | |
| 12. How often do you leave your seat in meetings or other situations in which you are expected to remain seated? | | | | | |
| 13. How often do you feel restless or fidgety? | | | | | |
| 14. How often do you have difficulty unwinding and relaxing when you have time to yourself? | | | | | |
| 15. How often do you find yourself talking too much when you are in social situations? | | | | | |
| 16. When you're in a conversation, how often do you find yourself finishing the sentences of the people you are talking to, before they can finish them themselves? | | | | | |
| 17. How often do you have difficulty waiting your turn in situations when turn taking is required? | | | | | |
| 18. How often do you interrupt others when they are busy? | | | | | |

*Kessler, et al.., 2005 & Harvard HCP, open access*

# Childhood history / collateral information

- Transition points (elementary - middle - high school - college - work)
  - Independence in managing daily needs (school, chores, activities)
  - Symptoms may be setting dependent
    - Level of structure / supervision / activity engagement
    - Rewards / punishments based on expectations
    - Behaviors in group vs. individual settings

# More work-ups



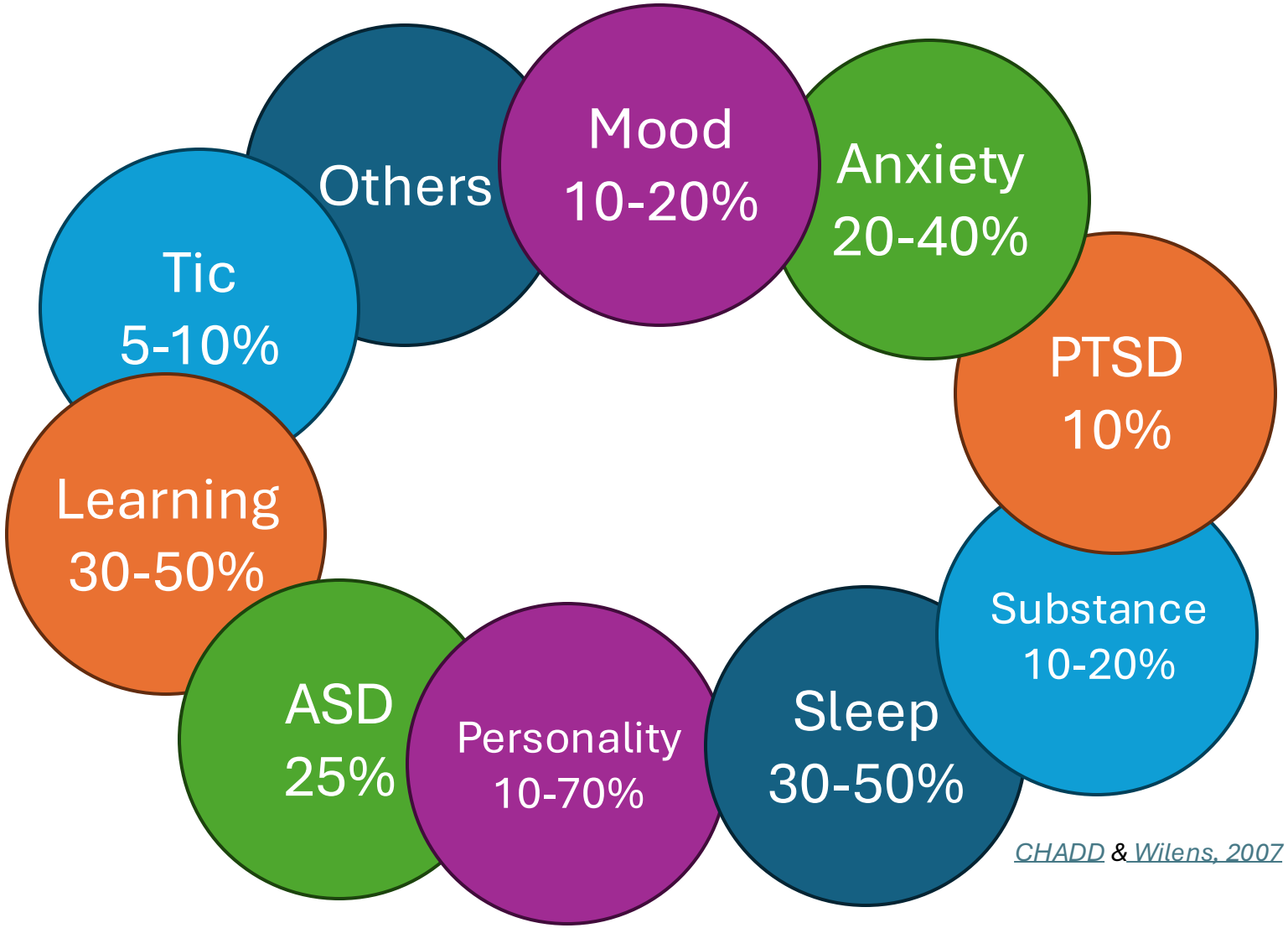

*Oandasan, 2024*

- Labs: CBC, thyroid function, iron panel, vitamin B12, lead exposure
- Other work-ups: Sleep apnea, ?seizure disorder

# Differentials vs. comorbidity

Comorbidity is the norm (consider treating first)

- Neuropsychological testing may help clarify other cognitive or learning disorders & malingering (otherwise less useful)



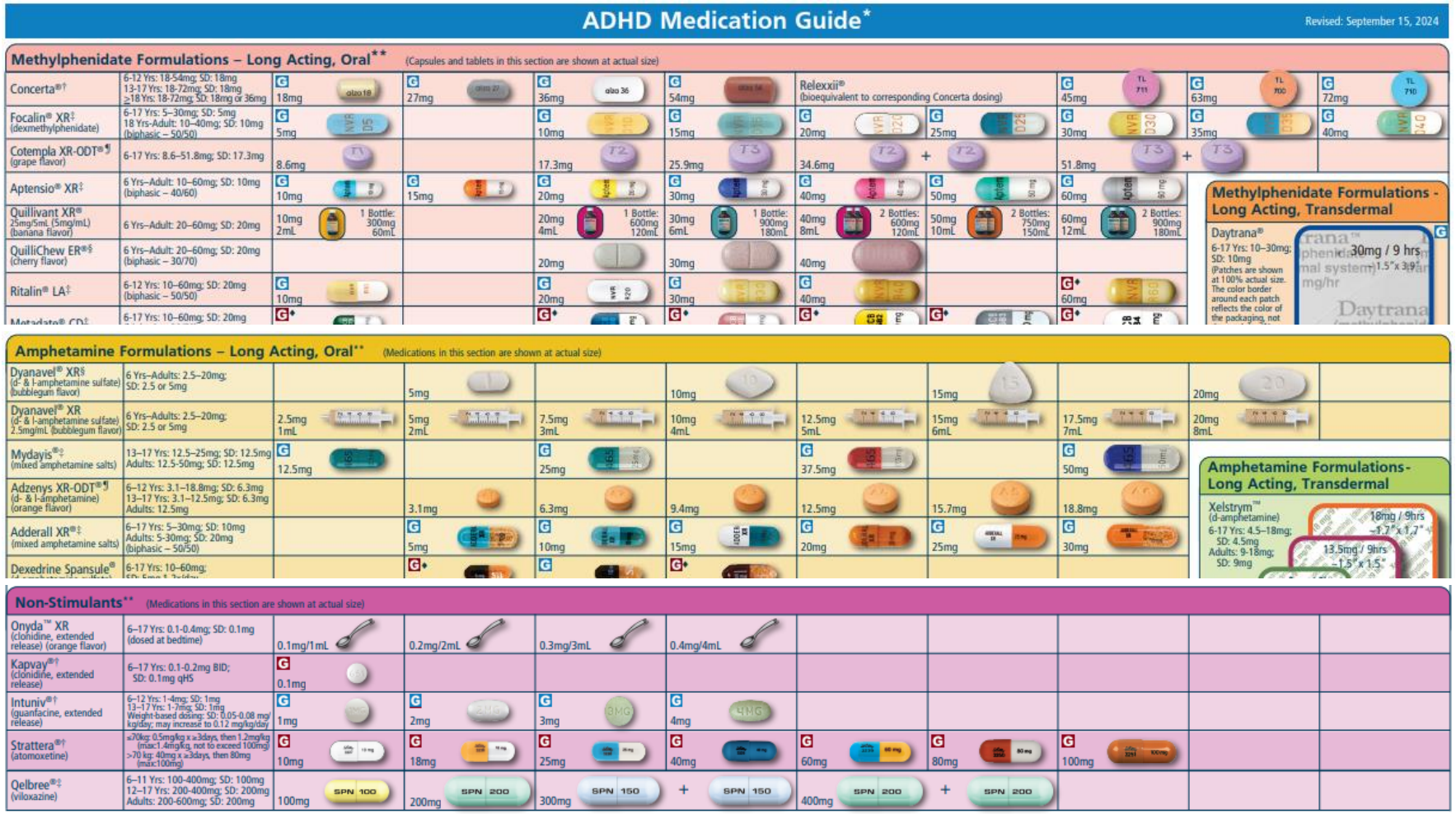

CHADD & Wilens, 2007

# Treating ADHD: general tips

- Reasonable to treat comorbidity first
- Monitor treatment success with patient-specific functional measures
- Utilize multi-modal treatment plans (medications + other treatments)

# Pharmacological treatments - stimulants

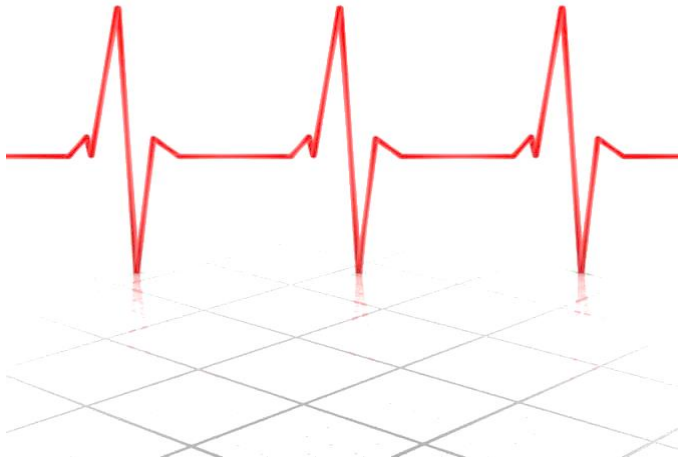
- 1st line: stimulants
- Consider long-acting amphetamine to start
- May switch between formulation / class
- Consider IR boosters




*ADHD Medication Guide*

# Stimulant treatment monitoring

- Prescribing logistics: Ryan Haight Act
- Side effects: psych, neuro, GI, CV (HR ≤ 10 bpm / BP ≤ 7 mmHg increase)
- Relative contraindications: glaucoma, CV considerations
- Cardiac monitoring
  - EKG ± echo: history of syncope; family history of sudden cardiac arrest
  - Cardiology: structural abnormalities, arrhythmias, uncontrolled hypertension
  - Long term use: higher risk of hypertension & arterial disease
  - Geriatric use: increased risk of CV events in the first 30 days
- Perinatal population: risk-benefit discussion
- Abuse potential: may also decrease rate of substance use

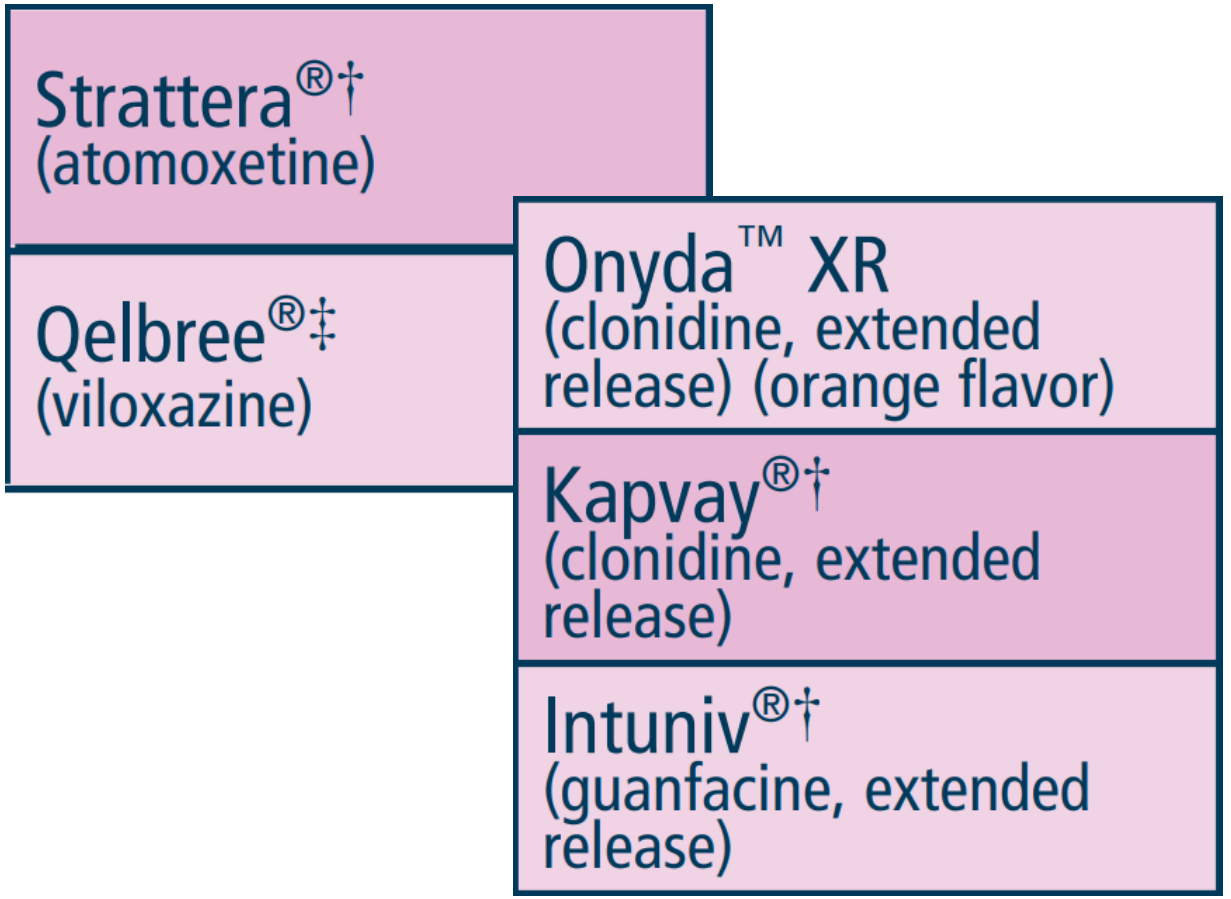


# Non-stimulant medications

- Specific norepinephrine reuptake inhibitors
- Alpha agonists

  (off-label for adults)
- Bupropion

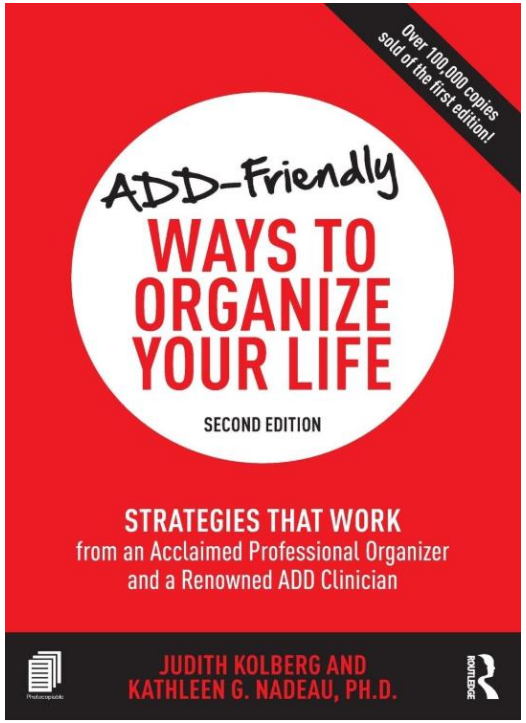
  (off-label)



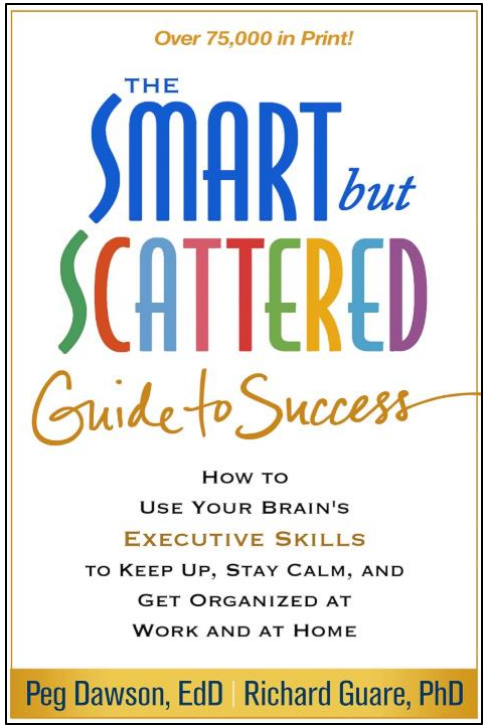

*ADHD Medication Guide*

# Non-pharmacological interventions

- Psychotherapy
  - Emotion regulation, problem solving
  - Address maladaptive cognitions
- Behavioral management
  - Coaching
    - Organization skills
    - Strategies to improve attention
  - Academic accommodations
- Less studied treatments
  - Digital treatment
  - Micronutrients




Kolberg & Nadeau, 2016



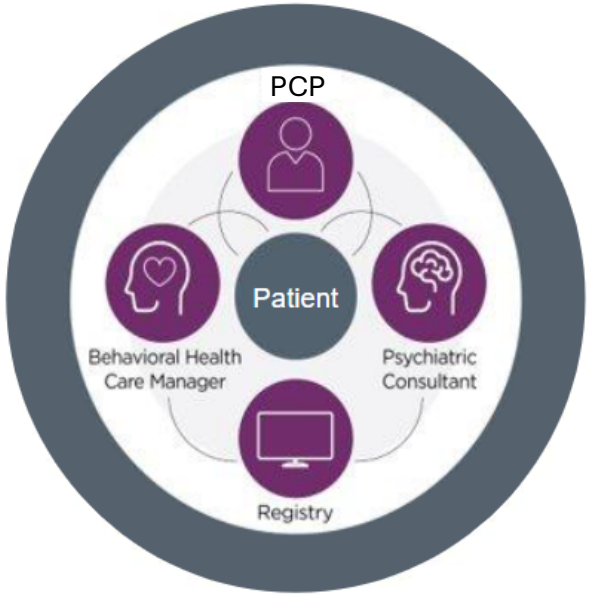

Dawson & Guare, 2024

# Referral to specialist / care collaboration

Consider referring for:

- Extreme dysfunction
- Lethality concerns
- Severe comorbidities
- Multi-treatment failures

## Collaborative Care Model (CoCM)




### Core Principles

- Patient-centered team care
- Population-based care
- Measurement-based treatment
- Evidence-based care
- Accountable care

### Benefits

- Expand access to evidence-based care
- Improve health outcomes
- Improve quality of care
- Pays for services that follow the model for any behavioral health diagnosis, including substance use disorder

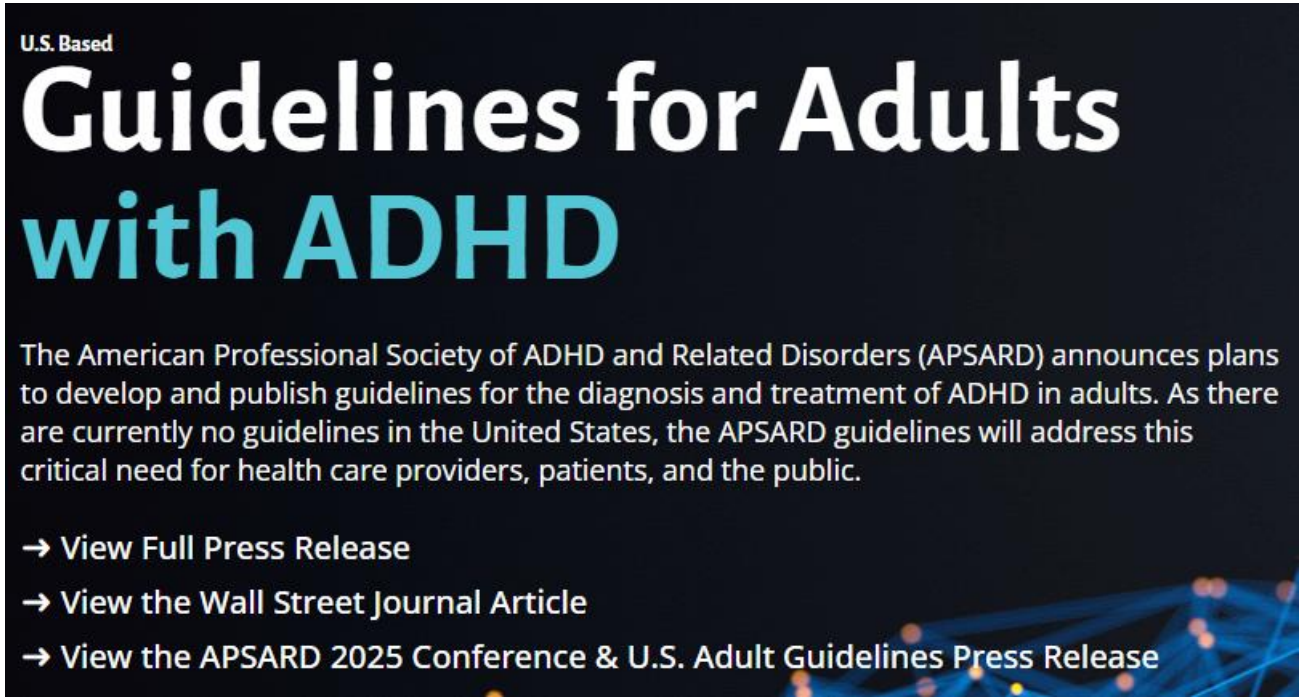
*AIMS Center, 2019*

# Resources

- AAFP Adult ADHD Toolkit
- ADHD Medication Guide
- ADHD Coaches Organization
- ADDitude expert podcasts
- CHADD
- APSARF

Thank you

chous@upmc.edu



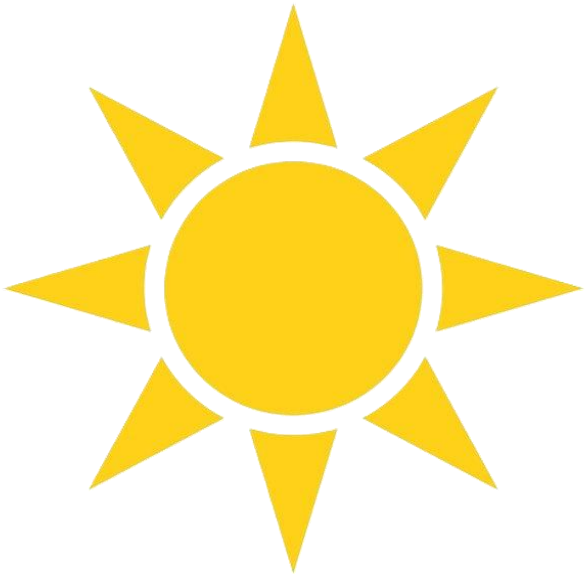
# YOU CAN (and should!) DO IT! Opioid Use Disorder Management in Primary Care

ALYSSA BRUEHLMAN, MD
UPMC ST MARGARET FAMILY MEDICINE RESIDENCY PROGRAM

3/17/2025

# DISCLOSURES

No financial disclosures



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| Recognize | diagnostic criteria for opioid use disorder (OUD) |
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| Empower | to incorporate OUD care into primary care practice |

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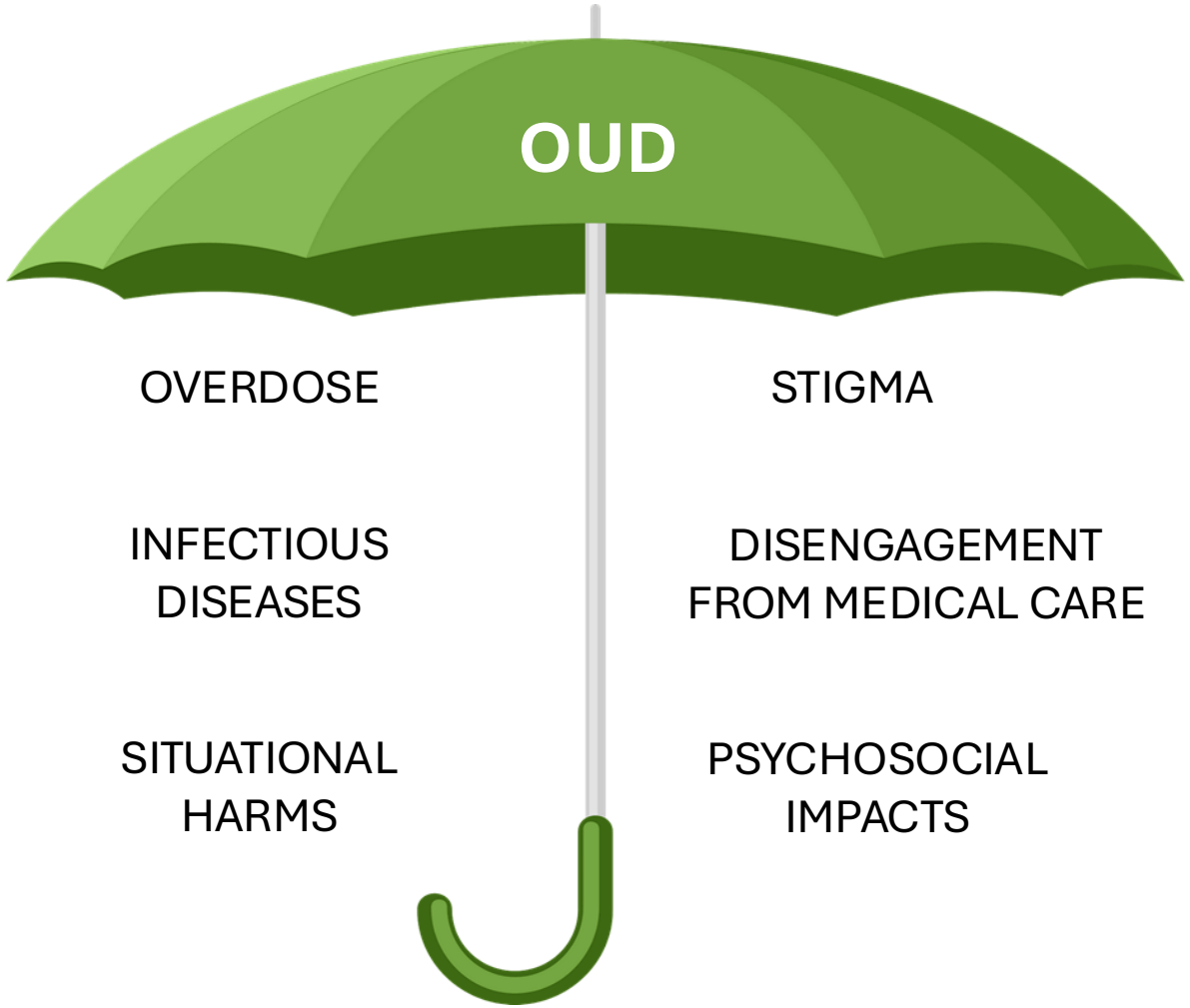
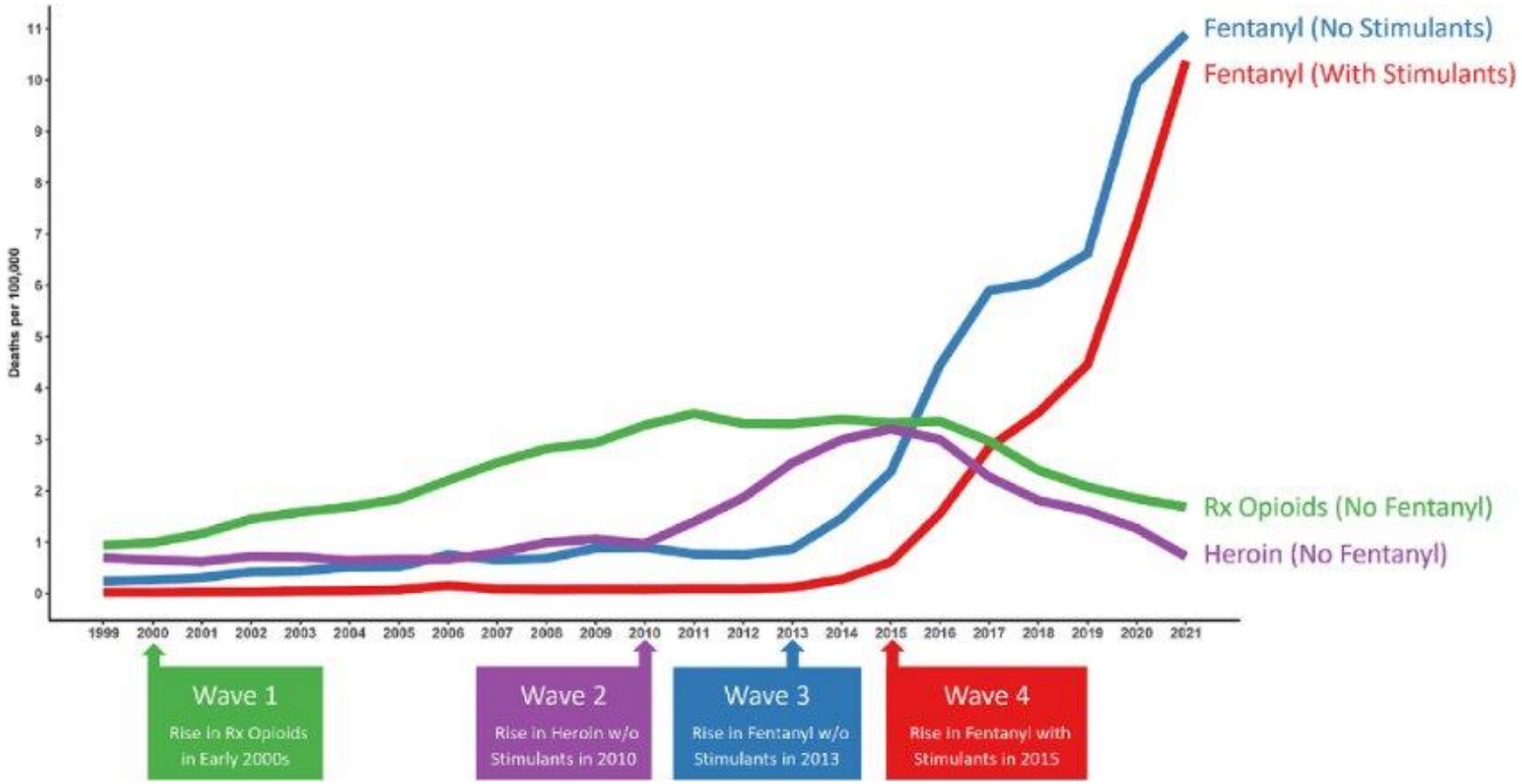
# Why We Care: Individual Harms



# Why We Care: Population-Wide Harms




Friedman et al. *Addiction* 2023.

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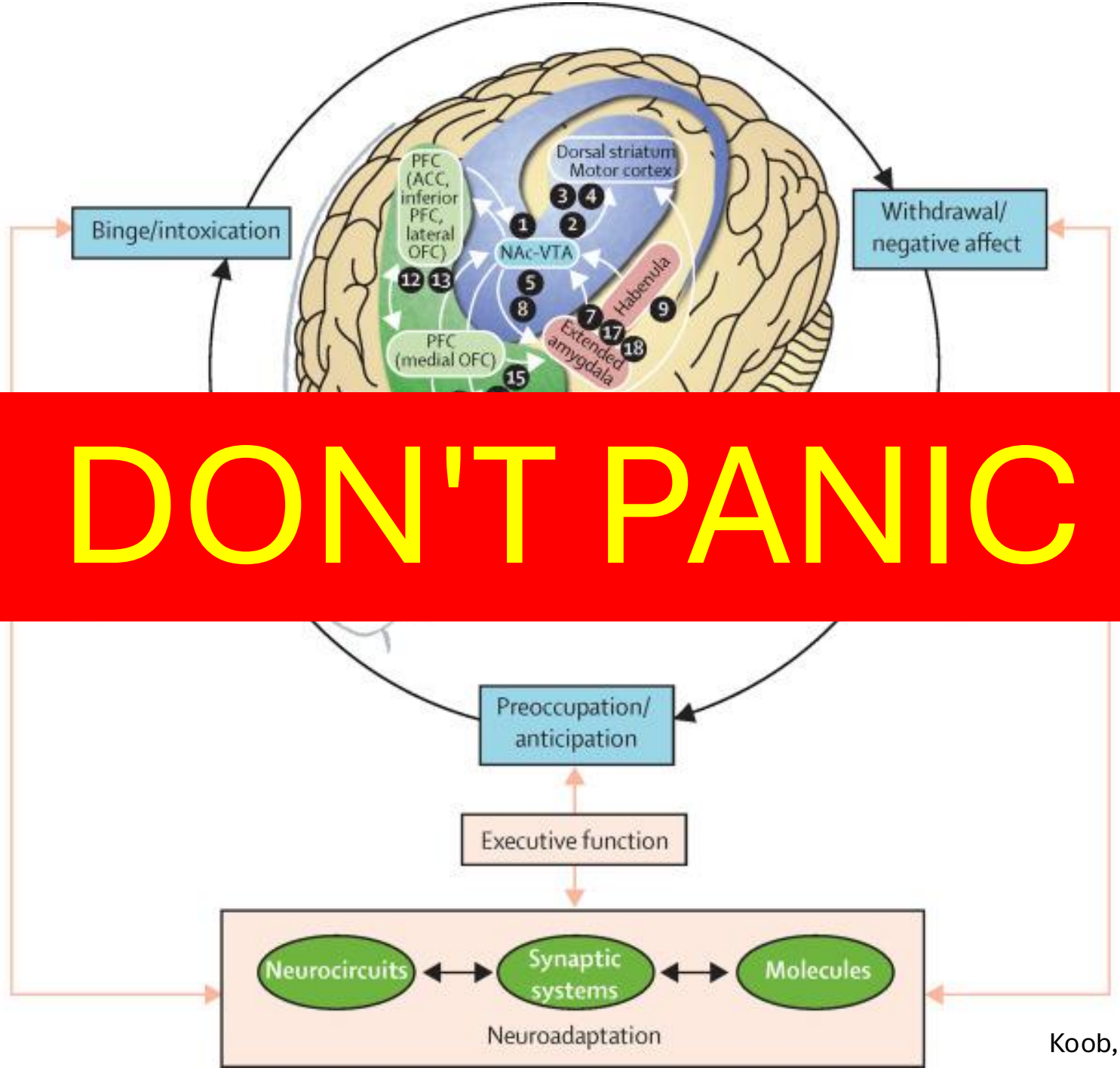



DON'T PANIC

Koob, Volkow. *Lancet Psychiatry* 2016.

# Screening

| Population | Recommendation | Grade |
|---|---|---|
| Adults age 18 years or older | The USPSTF recommends screening by asking questions about unhealthy drug use in adults age 18 years or older. Screening should be implemented when services for accurate diagnosis, effective treatment, and appropriate care can be offered or referred.<br>(Screening refers to asking questions about unhealthy drug use, not testing biological specimens.) | B |
| Adolescents | The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening for unhealthy drug use in adolescents.<br><br>See the "Practice Considerations" section for suggestions for practice regarding the I statement. | I |

USPSTF 2020.

# Screening Tools

| Tool | Substance type | | Patient age | | How tool is administered | |
|---|---|---|---|---|---|---|
| | Alcohol | Drugs | Adults | Adolescents | Self-administered | Clinician-administered |
| Screening to Brief Intervention (S2BI) | X | X | | X | X | X |
| Brief Screener for Alcohol, Tobacco, and other Drugs (BSTAD) | X | X | | X | X | X |
| Tobacco, Alcohol, Prescription medication, and other Substance use (TAPS) | X | X | X | | | |
| Alcohol Screening and Brief Intervention for Youth: A Practitioner's Guide (NIAAA) | X | | | X | | |
| Opioid Risk Tool – OUD (ORT-OUD) Chart | | X | X | | | |

| Tool | Substance type | | Patient age | | How tool is administered | |
|---|---|---|---|---|---|---|
| | Alcohol | Drugs | Adults | Adolescents | Self-administered | Clinician-administered |
| Tobacco, Alcohol, Prescription medication, and other Substance use (TAPS) | X | X | X | | X | X |
| CRAFFT | X | X | | X | X | X |
| Drug Abuse Screen Test (DAST-10)* *For use of this tool - please contact Dr. Harvey Skinner* | | X | X | | X | X |
| Drug Abuse Screen Test (DAST-20: Adolescent version)* *For use of this tool - please contact Dr. Harvey Skinner* | | X | | X | X | X |
| NIDA Drug Use Screening Tool (NMASSIST) *(discontinued in favor of TAPS screening above)* | X | X | X | | | X |
| Alcohol Screening and Brief Intervention for Youth: A Practitioner's Guide (NIAAA) | X | | | X | | X |

NIDA 2023.

# Diagnosing OUD

| In the last 12 months… | |
|---|---|
| Craving | Withdrawal from activities |
| Larger amounts or longer than intended | Use in physically hazardous situations |
| Persistent desire or attempts to cut down or stop | Use despite knowing its harm |
| Excessive time using, getting, recovering | To[illegible]n |
| Failure to fulfill a major role | Wi[illegible]al |
| Use despite social/interpersonal conflicts | |

**Compulsion**

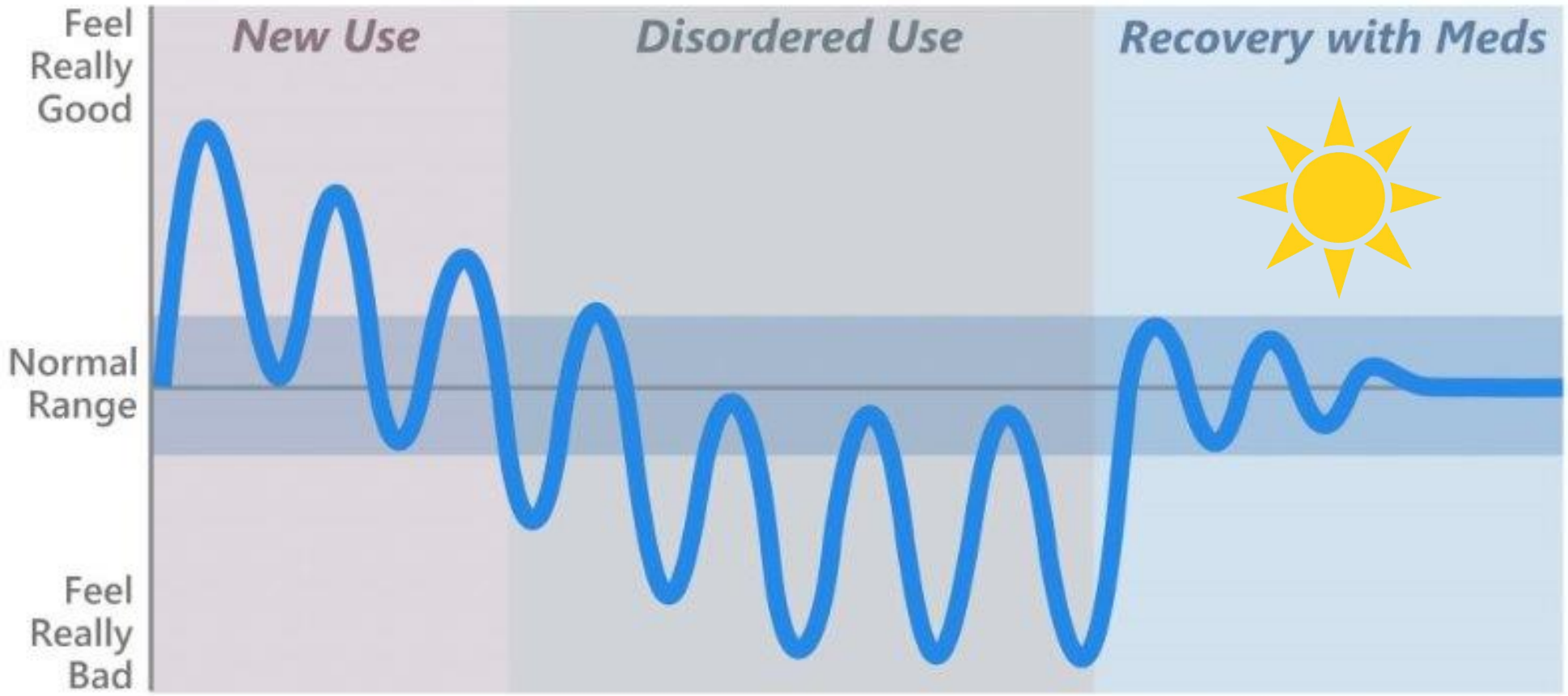
**Craving**

**Consequences**

**Control**

Am Psychiatric Assoc. *DSM-5* 2013.

# Opioid Use Disorder




Univ of Washington Addictions, Drug, & Alcohol Institute 2023.

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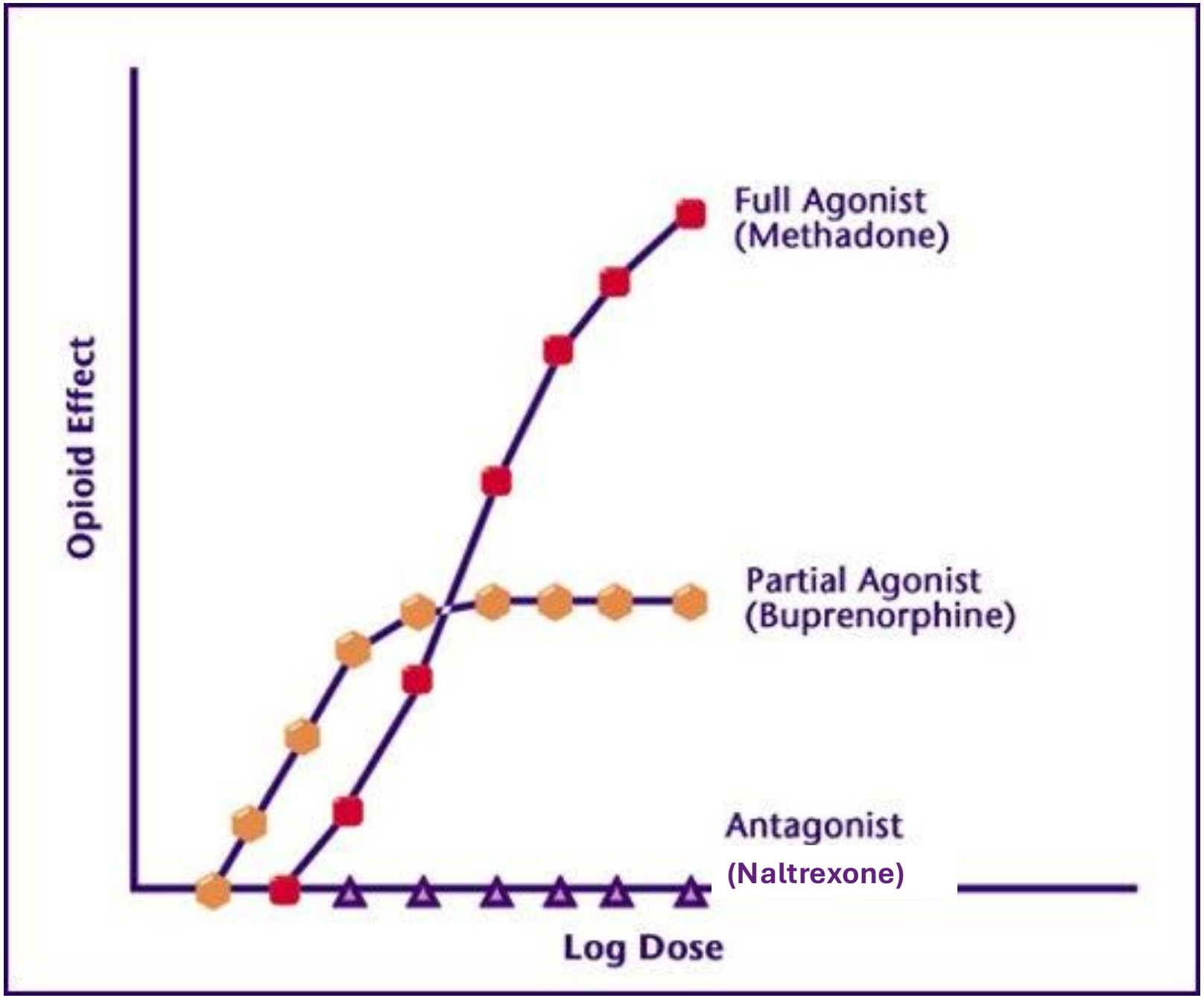
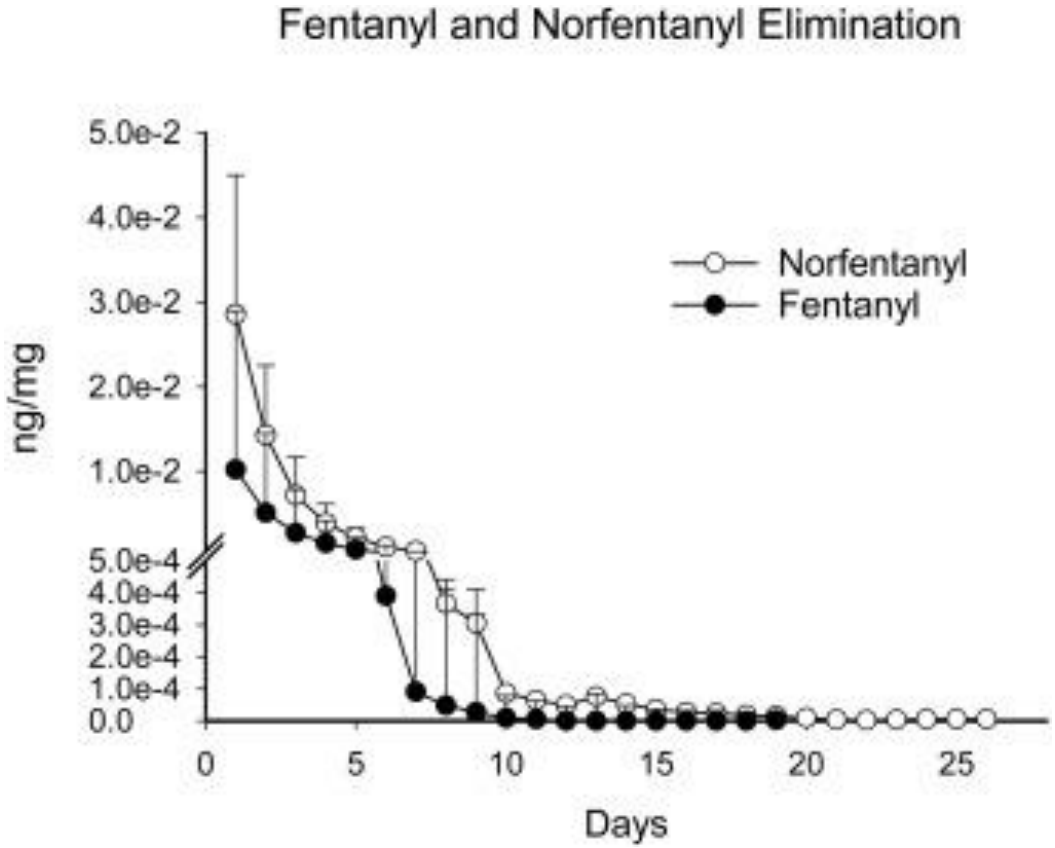



Adapted from naabt.org

# The fentanyl problem

- Potency
  - 50-100x more than morphine
- Lipophilicity
  - Rapidly crosses BBB
  - **Chronic heavy use: accumulation in adipose tissue, delayed clearance**




Huhn et al. *Drug Alcohol Dependence* 2020.

| | METHADONE | BUPRENORPHINE | NALTREXONE |
|---|---|---|---|
| Mechanism | **Agonist** | **Partial** agonist | **Antagonist** |
| Regulation | Schedule **II** | Schedule **III** | N/A |
| Dosing | QD or BID  | QD-QID  <br>WEEKLY OR MONTHLY  | MONTHLY  |
| Primary Care Rx | **NO** | YES | YES |
| Initiation | Start at low doses | **Variable strategies** | **7-14 days withdrawal** |
| Diversion/misuse | Observed dosing | Co-formulation with naloxone<br>Self-treatment of OUD | N/A |
| Overdose risk | If rapid titration<br>With polysubstance use | **Less risk**<br>**Ceiling effects** | After discontinuation |
| Mortality reduction | **50%**  | **50%**  | **?** |

Adapted from NEJM 2023

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Adapted from NEJM 2023

# Methadone

- Proactive ROI
- Learn about their dose!
- Monitor QTc: EKG at least yearly


*Eventual changes? S.644 Modernizing Opioid Treatment Access (MOTA) Act

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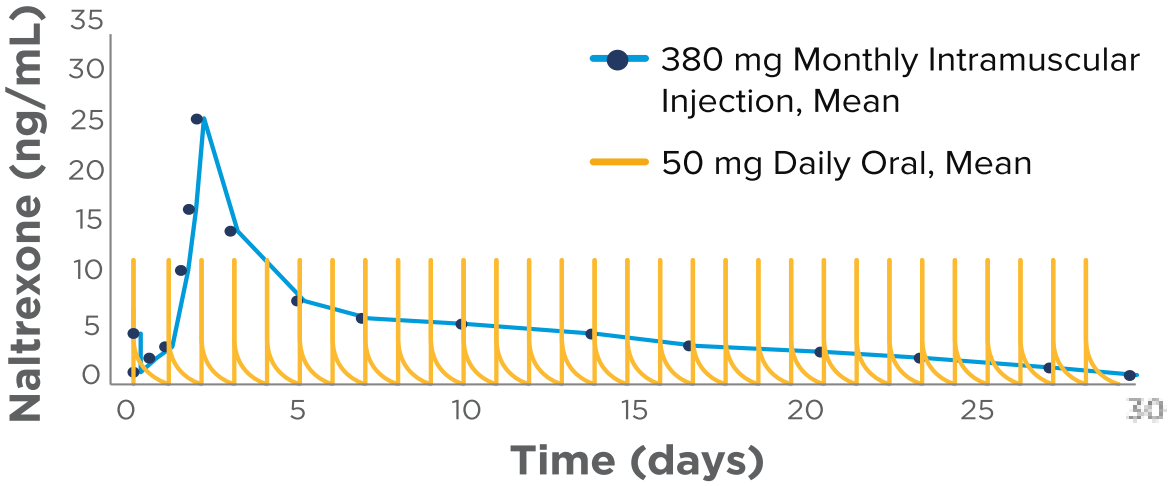
Adapted from NEJM 2023

# XR-Naltrexone

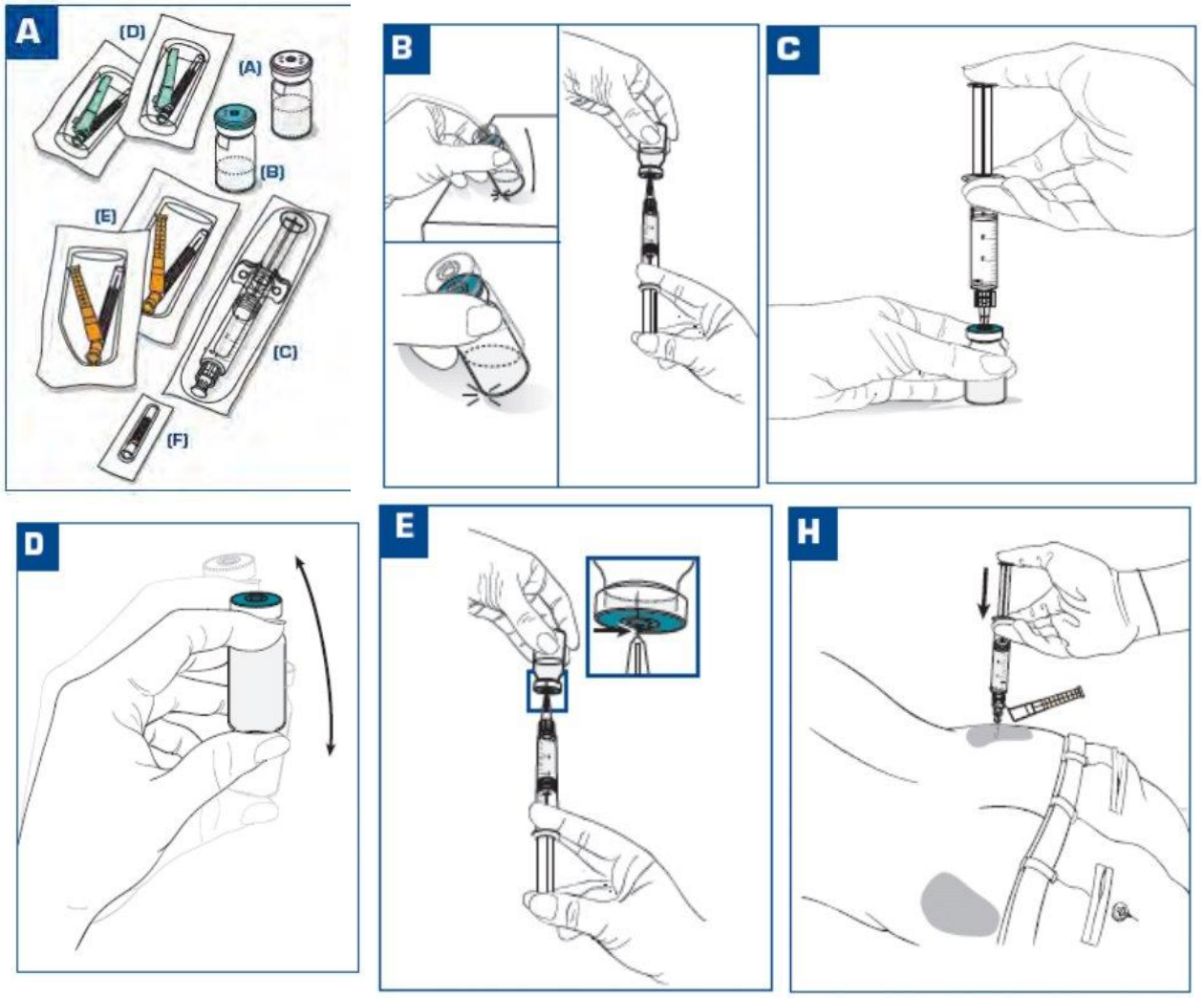
- Requires withdrawal
  - 7-14 days
  - PO naltrexone, IN/IM naloxone challenge
- Hepatoxicity warning
  - Avoid in acute hepatitis, decompensated cirrhosis
- **Overdose risk with treatment discontinuation**
  - Treatment retention lower than MET or BUP




Vivitrol: US Prescribing Information. Alkermes, Inc. 2024.

# XR-Naltrexone: Administration

- Storage
  - Refrigerate
  - Remove 45min prior to administration
- Preparation
  - 1 syringe
  - 2 vials
  - 3 needles
- Administration
  - IM gluteal
  - 1.5" or 2" 20-guage




Alkermes, Inc. 2024.

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Adapted from NEJM 2023

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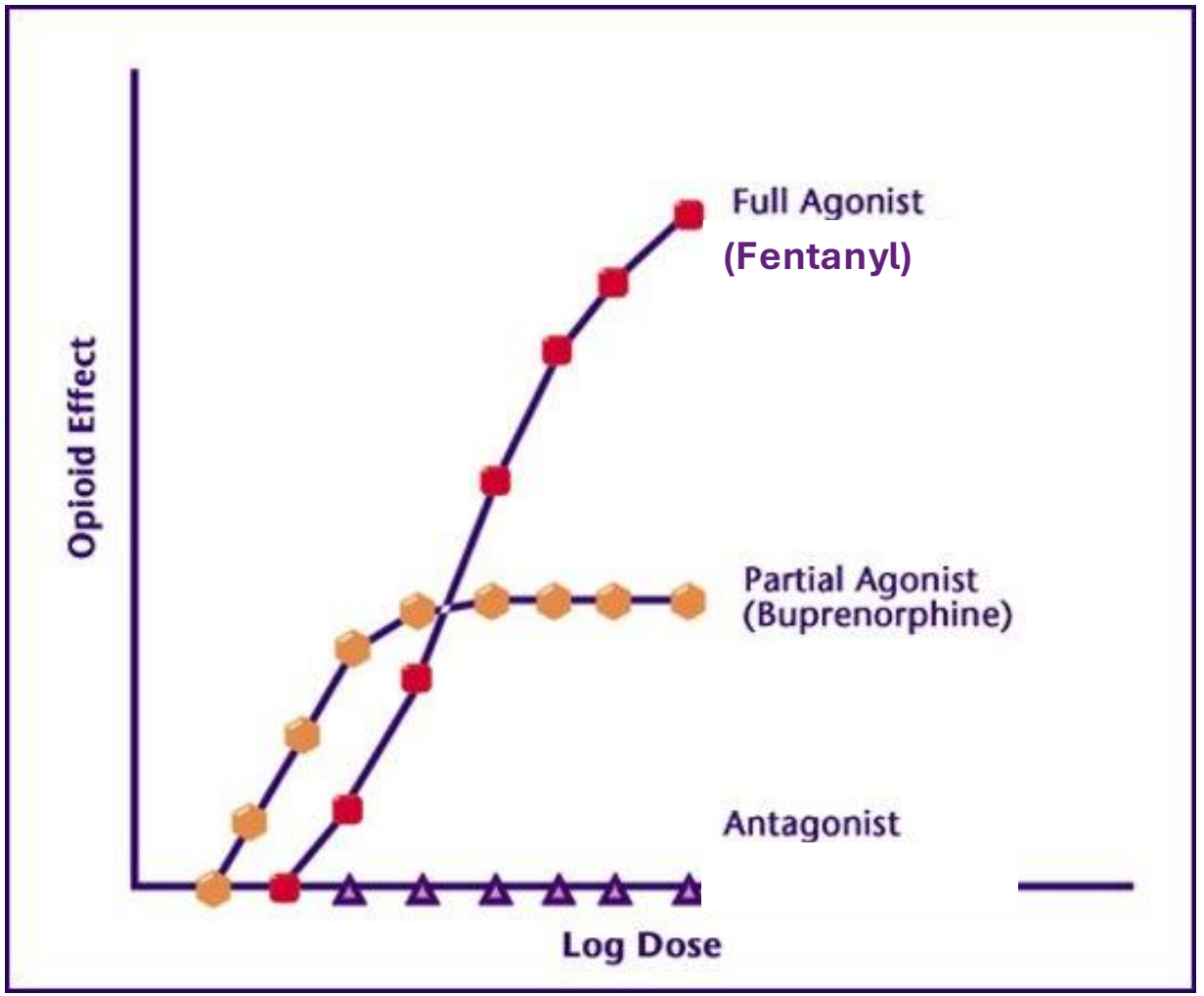
# BUP-Precipitated Withdrawal


* Naloxone is not the culprit

MGH 2021.

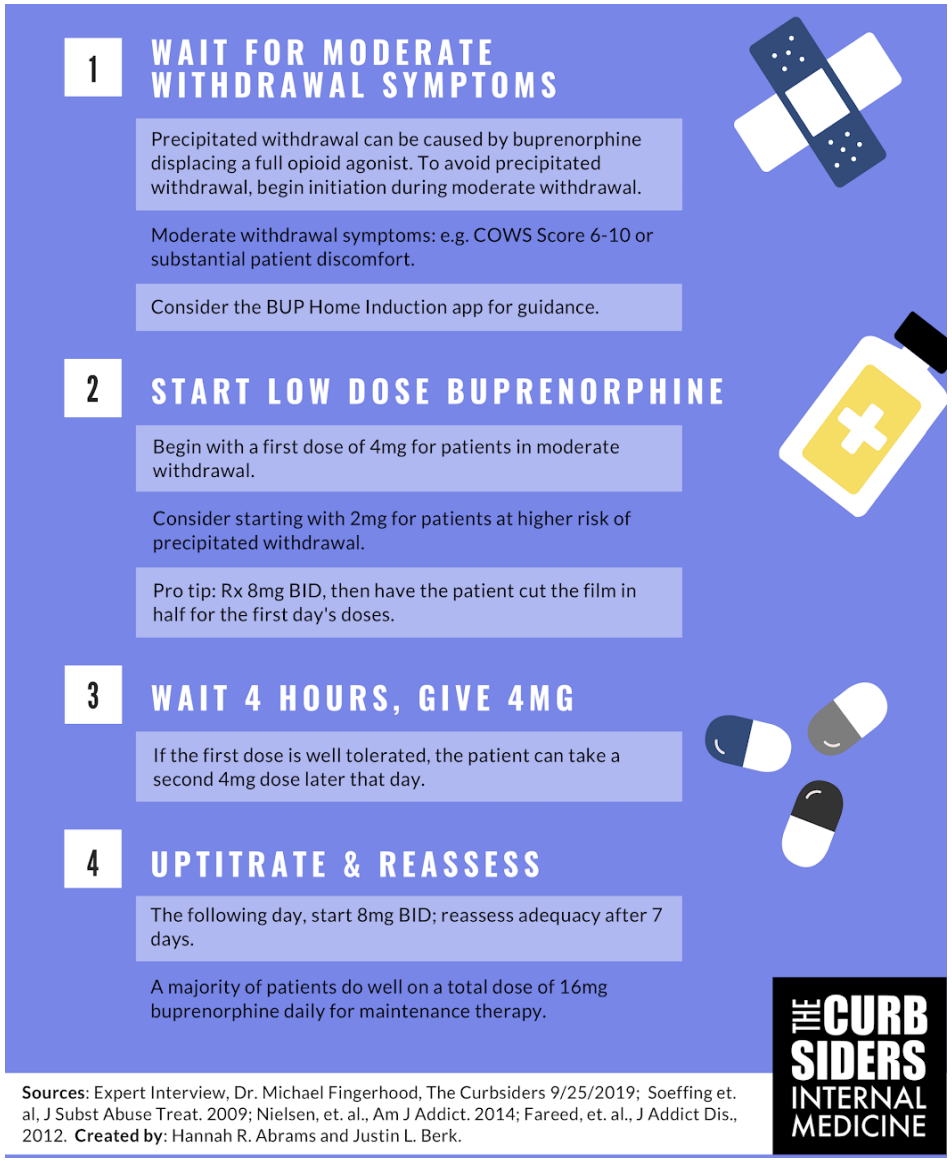



Adapted from naabt.org

# SL BUP Initiation: Approaches

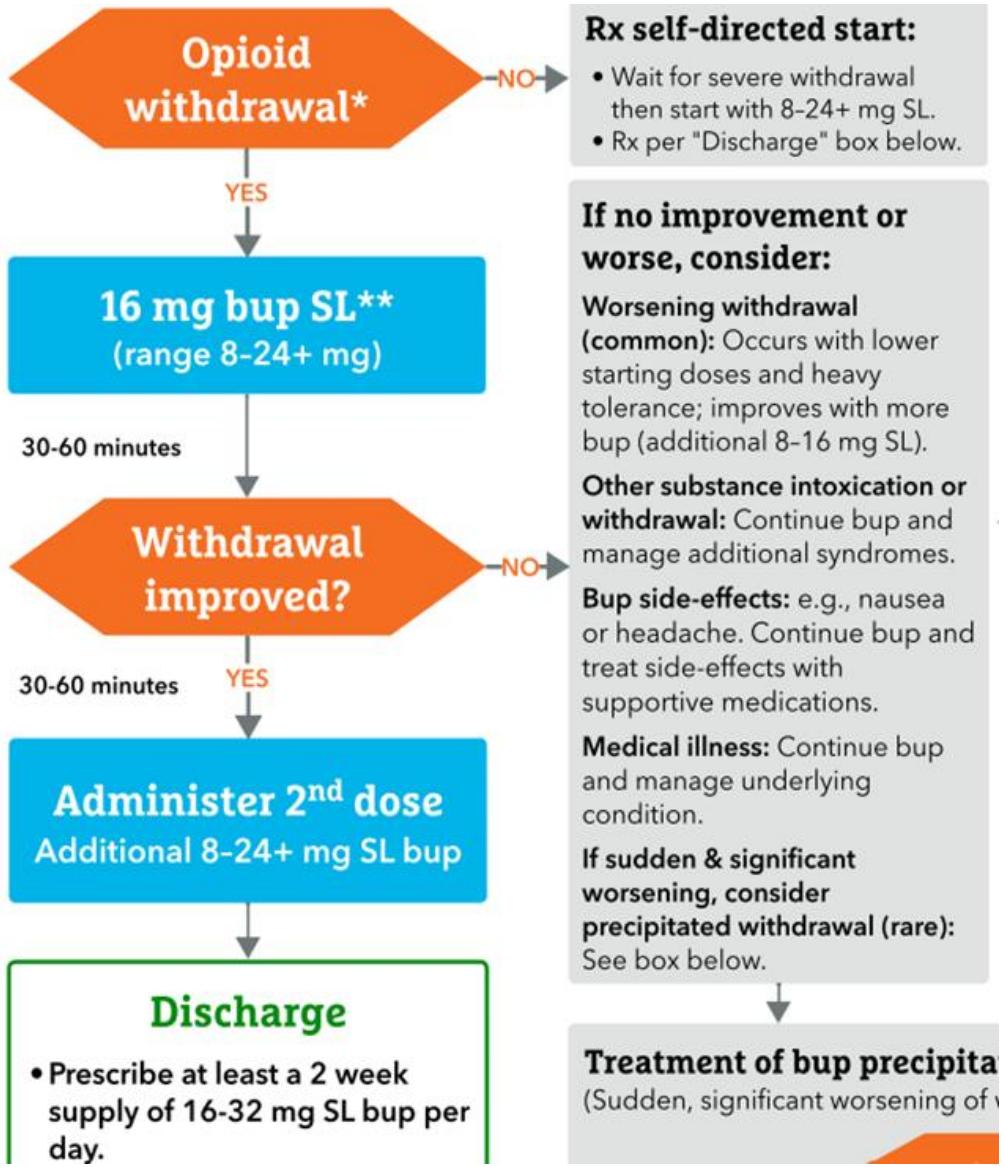
| | Instructions for other opioid use | Requires withdrawal to start? | Initial dose |
|---|---|---|---|
| Standard | **STOP** | YES | 2mg, 4mg |
| High-dose ("macro") | **STOP** | YES | 8-16mg |
| Low-dose ("macro") | Continue until goal dose BUP | **NO** | < 2mg |

# Standard initiation



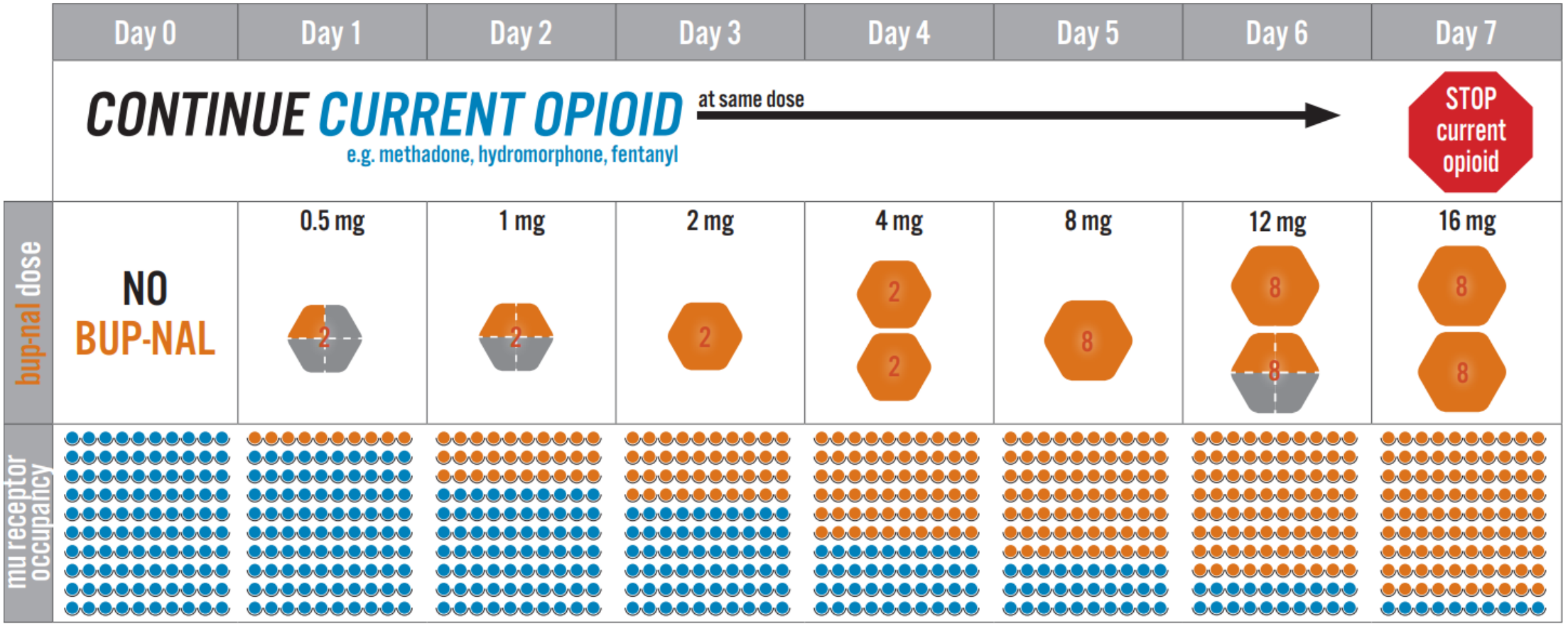

Curbsiders Addiction Medicine 2022.

# High-dose initiation




CA Bridge Project 2024.

# Low-dose initiation



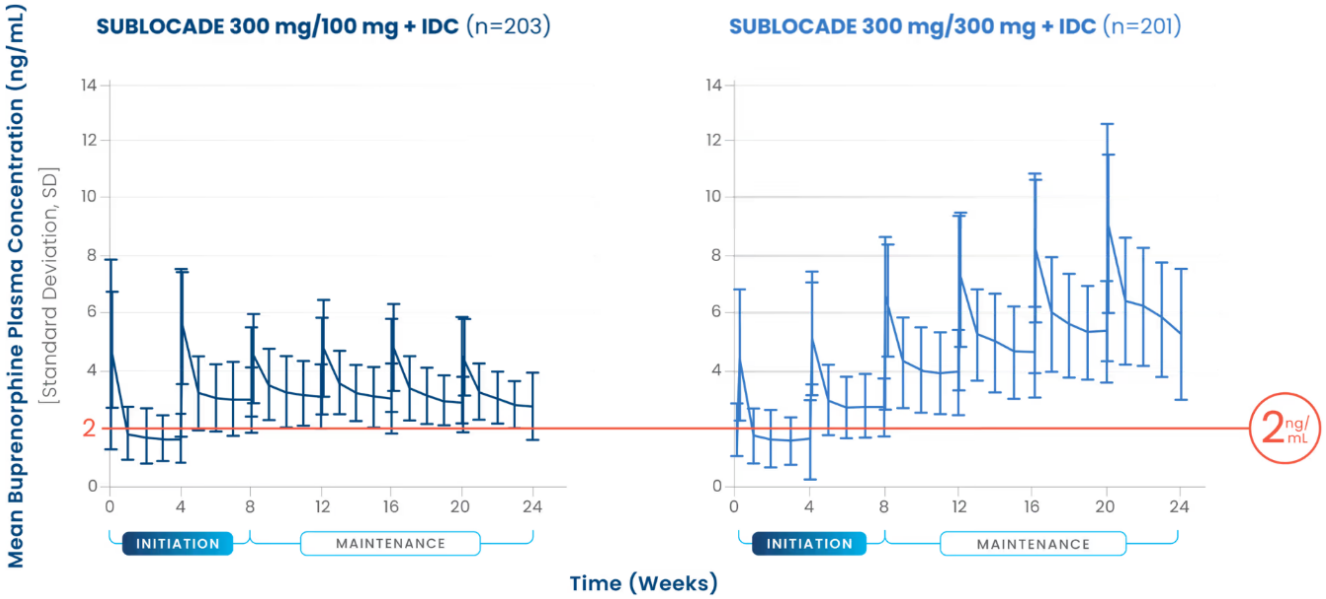

Saskatchewan Health Authority 2023.

# SL BUP: Finding a therapeutic Dose

- Short answer: The dose at which the patient feels comfortable
  - Withdrawal controlled
  - Return to use minimized
  - Overdose protection maximized

- Higher doses (> 16mg) associated with improved treatment retention
- Split dosing is common
- Variations in symptoms during daytime, diversion concern, sick of taking SL BUP --> consider LAI

# BUP-XR: Sublocade®



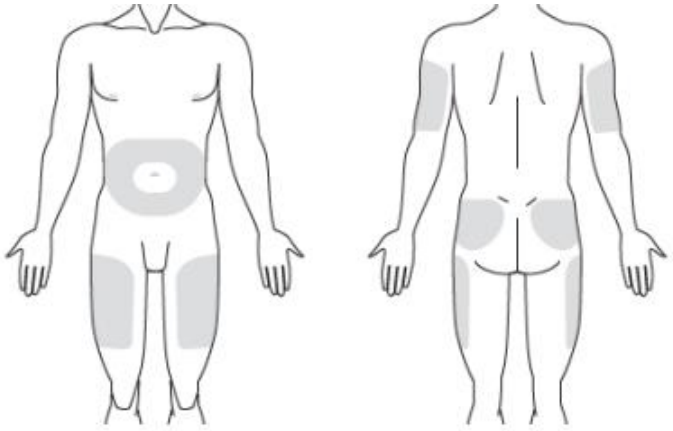

| Previous Dose of TM BUP | TM BUP | SUBLOCADE | | |
|---|---|---|---|---|
| | Initial Dose | Injection #1 | Injection #2[a] | Maintenance Dose[b] |
| Initiation in patients not already receiving buprenorphine | | | | |
| NA | 4 mg[c] | 300 mg | 300 mg | 100 mg |
| Transition of patients already receiving transmucosal buprenorphine | | | | |
| 8 – 24 mg/day | NA | 300 mg | 300 mg[d] | 100 mg |

Storage: room temp

Preparation: 1 syringe, 1 needle

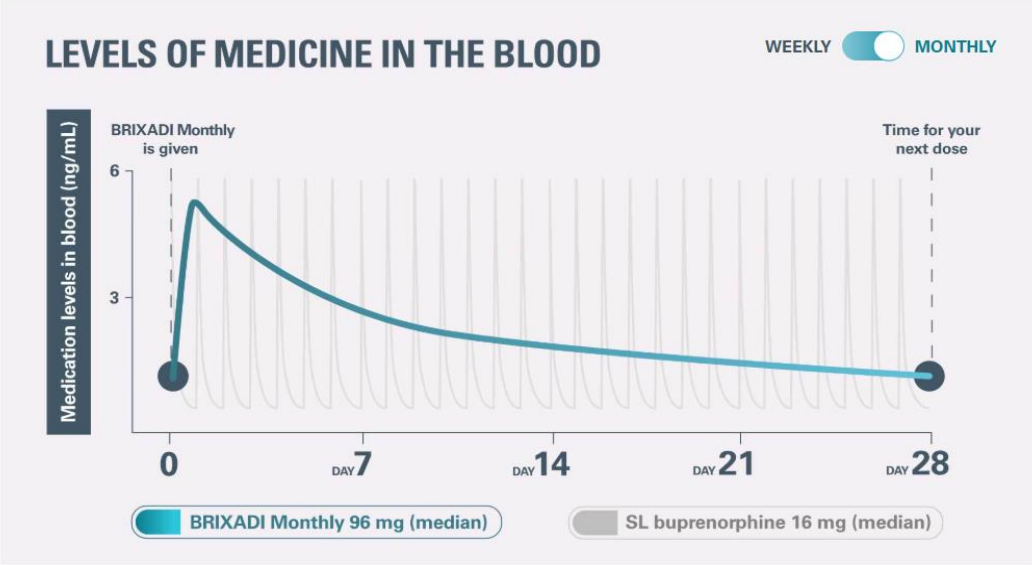
Administration: Monthly SubQ

*Consider lidocaine



**Potential teratogenicity

# BUP-XR: Brixadi®

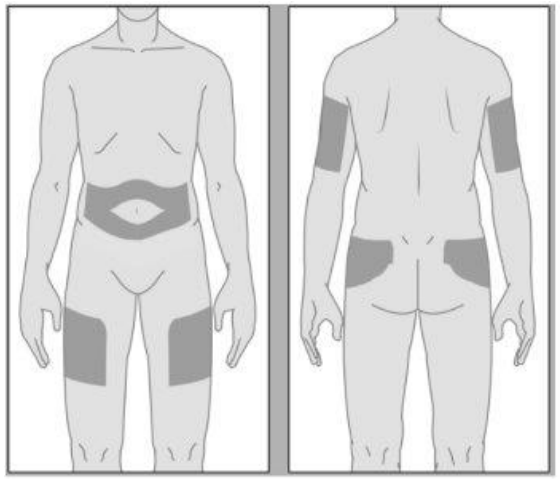



| Daily dose of sublingual buprenorphine* | BRIXADI Weekly | BRIXADI Monthly |
|---|---|---|
| Less than or equal to 6 mg | 8 mg | — |
| 8-10 mg | 16 mg | 64 mg |
| 12-16 mg | 24 mg | 96 mg |
| 18-24 mg | 32 mg | 128 mg |

Storage: room temp

Preparation: preloaded syringe and plunger

Administration: Monthly or weekly SQ injection



Braeburn Inc. 2023.

# Common Questions

- Telehealth rules
- Buprenorphine vs Bup/Naloxone
- Precipitated withdrawal management
- Diversion
- Acute pain management
- Urine drug testing
- Comorbid substance use
- Requirement of counseling

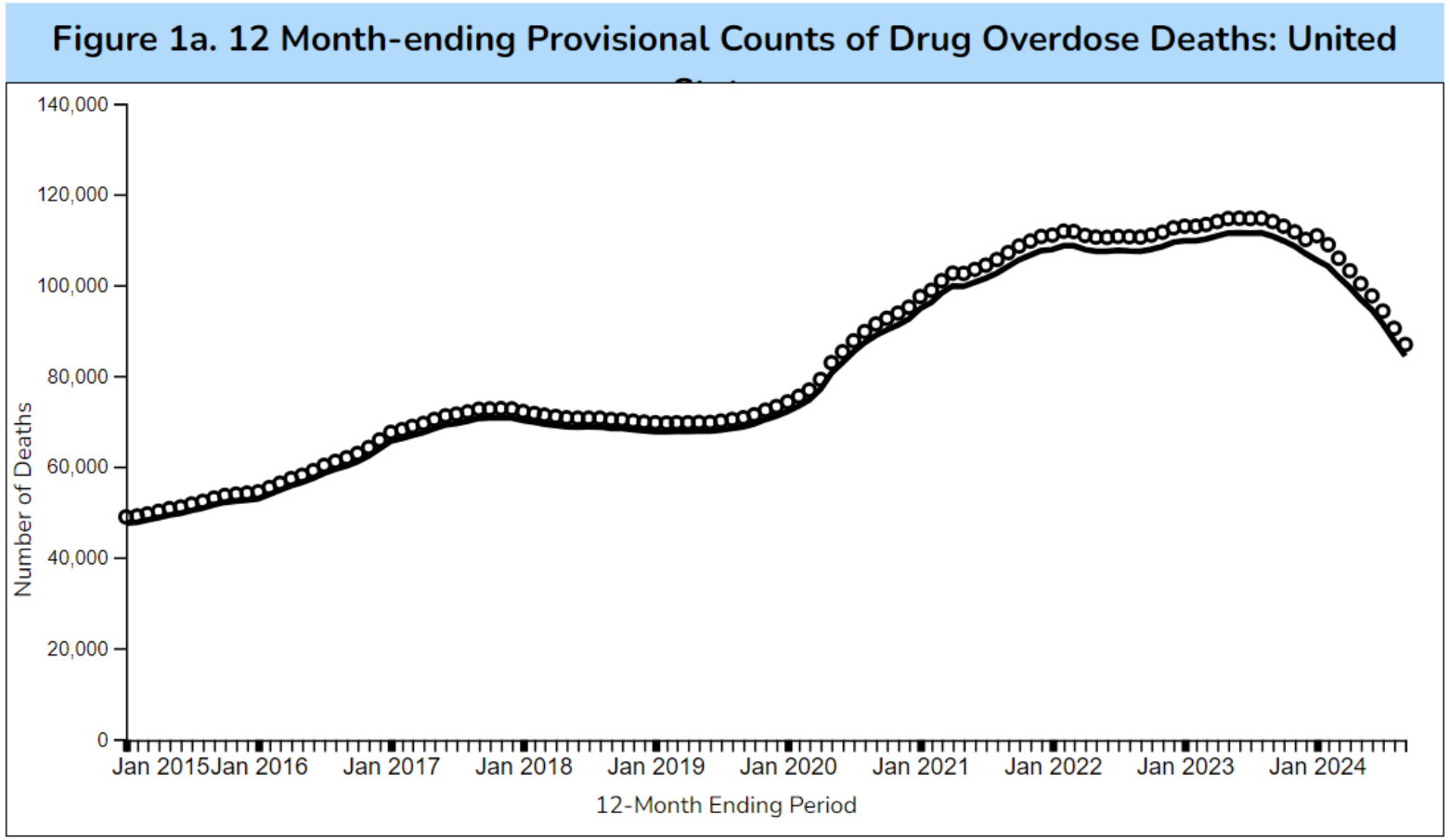
# Beyond MOUD

- Naloxone for ALL
- Safe medication storage
- Harm reduction and safe use strategies
- Risk-adjusted primary care: ID, contraception, pain
- Recovery supports (more than NA)
- Advocacy

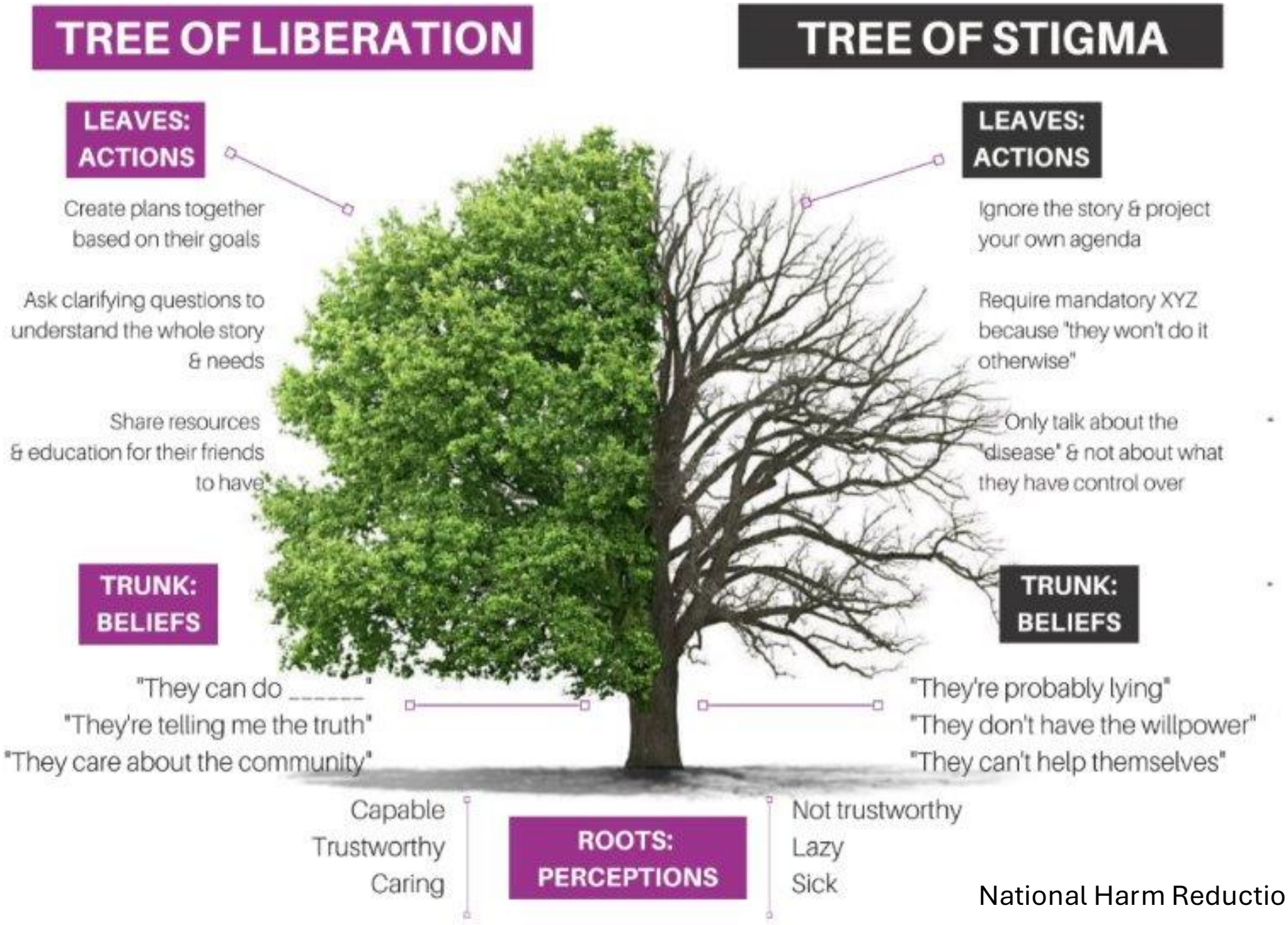
# OBJECTIVES

| | |
|---|---|
| Describe | opioid-related harms at the patient and population level |
| Recognize | diagnostic criteria for opioid use disorder (OUD) |
| Compare | medications for the treatment of opioid use disorder (MOUD) |
| Examine | strategies for buprenorphine initiation and maintenance |
| **Empower** | **to incorporate OUD care into primary care practice** |

# Why We Care




National Center for Health Statistics 2025.




National Harm Reduction Coalition 2024.

# Sources


- Harm Reduction. SAMHSA. 29 Oct 2024. Available at: https://www.samhsa.gov/substance-use/harm-reduction
- Friedman J, Shover CL. Charting the fourth wave: Geographic, temporal, race/ethnicity and demographic trends in polysubstance fentanyl overdose deaths in the United States, 2010-2021. *Addiction*. 2023;118(12):2477-2485. doi:10.1111/add.16318
- Koob GF, Volkow ND. Neurobiology of addiction: a neurocircuitry analysis. Lancet Psychiatry. 2016 Aug;3(8):760-773. doi: 10.1016/S2215-0366(16)00104-8. PMID: 27475769; PMCID: PMC6135092.
- Unhealthy Drug Use: Screening. USPSTF. 9 June 2020. Available at: https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/drug-use-illicit-screening#fullrecommendationstart
- Screening and Assessment Tools Chart. NIDA. 6 Jan 2023. Available at: https://nida.nih.gov/nidamed-medical-health-professionals/screening-tools-resources/chart-screening-tools
- American Psychiatric Association. DSM-5. 2013.
- Treatment for opioid use disorder. Center for Community-Engaged Drug Education, Epidemiology & Research (CEDEER), University of Washington Addictions, Drug & Alcohol Institute. 2023. Available at: https://www.learnabouttreatment.org/treatment/medications-for-opioid-use-disorder/
- Harm Reduction
- National Alliance of Advocates for Buprenorphine Treatment. Available at: https://www.naabt.org/education/technical_explanation_buprenorphine.cfm
- Harm Reduction. SAMHSA. 29 Oct 2024. Available at: https://www.samhsa.gov/substance-use/harm-reduction
- Huhn AS, Hobelmann JG, Oyler GA, Strain EC. Protracted renal clearance of fentanyl in persons with opioid use disorder. Drug Alcohol Depend. 2020 Sep 1;214:108147. doi: 10.1016/j.drugalcdep.2020.108147. Epub 2020 Jul 2. PMID: 32650192; PMCID: PMC7594258.
- Medications to Treat Opioid Use Disorder. Massachusetts Medical Society, NEJM Group. Oct 2023. Available at: https://pain-management-cme.nejm.org/wp-content/uploads/2023/10/meds_for_oud.pdf
- Pearce LA, Min JE, Piske M, et al. Opioid agonist treatment and risk of mortality during opioid overdose public health emergency: population based retrospective cohort study. *BMJ*. 2020;368:m772. Published 2020 Mar 31. doi:10.1136/bmj.m77
- Jarvis BP, Holtyn AF, Subramaniam S, Tompkins DA, Oga EA, Bigelow GE, Silverman K. Extended-release injectable naltrexone for opioid use disorder: a systematic review. Addiction. 2018 Jul;113(7):1188-1209. doi: 10.1111/add.14180. Epub 2018 Mar 24. PMID: 29396985; PMCID: PMC5993595.
- Larochelle MR, Bernson D, Land T, et al. Medication for Opioid Use Disorder After Nonfatal Opioid Overdose and Association With Mortality: A Cohort Study. *Ann Intern Med*. 2018;169(3):137-145. doi:10.7326/M17-3107
- Sordo L, Barrio G, Bravo MJ, et al. Mortality risk during and after opioid substitution treatment: systematic review and meta-analysis of cohort studies. *BMJ*. 2017;357:j1550. Published 2017 Apr 26. doi:10.1136/bmj.j1550
- S.644 Modernizing Opioid Treatment Access Act. US Congress. Available at: S.644 - 118th Congress (2023-2024): Modernizing Opioid Treatment Access Act | Congress.gov | Library of Congress
- Vivitrol: US Prescribing Information. Alkermes, Inc. Jan 2024. Available at: https://labeling.alkermes.com/uspi_vivitrol.pdf
- Kehoe. *Buprenorphine 101*. Mass General Brigham Quality and Patient Experience's Substance Use Disorders Initiative. 29 Sept 2021. Available at: https://cpd.partners.org/content/buprenorphine-101-basics-initiating-and-managing-opioid-use-disorder-treatment-medication#group-tabs-node-course-default5
- Do the OBOT: Buprenorphine for OUD in the Clinic. Curbsiders Addiction Medicine. 18 August 2022. Available at: https://thecurbsiders.com/curbsiders-podcast/187-buprenorphine
- Emergency Department Buprenorphine Quick Start. CA Bridge. 2024. Available at: https://bridgetotreatment.org/wp-content/uploads/CA-Bridge-Emergency-Department-Bup-Quick-Start.pdf
- Micro-dosing initiation of Buprenorphine-Naloxone. RxFiles.Ca. Saskatchewan Health Authority. 2023. Available at: https://www.rxfiles.ca/RxFiles/uploads/documents/members/bup-nal-microdosing.pdf
- Grande LA, Cundiff D, Greenwald MK, Murray M, Wright TE, Martin SA. Evidence on Buprenorphine Dose Limits: A Review. *J Addict Med*. 2023;17(5):509-516. doi:10.1097/ADM.0000000000001189. https://pmc.ncbi.nlm.nih.gov/articles/PMC10547105/pdf/jam-17-509.pdf
- Sublocade: US Prescribing Information. Indivior UK Ltd. 2025.
- Brixadi: Prescribing Information. Braeburn Inc. 2023.
- Ahmad FB, Cisewski JA, Rossen LM, Sutton P. Provisional drug overdose death counts. National Center for Health Statistics. 2025. Available at: https://www.cdc.gov/nchs/nvss/vsrr/drug-overdose-data.htm
- Respect to Connect: Undoing Stigma. National Harm Reduction Coalition. 2024. Available at: https://harmreduction.org/issues/harm-reduction-basics/undoing-stigma-facts/

# Thank you!

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