28th Donald B. Middleton, M.D. Family Medicine Refresher Course: Update in Diagnosis and Management of Peripheral Polyneuropathy

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Disclosures

None pertaining to this lecture

Goals - Objectives

DEFINE BASIC CLINICAL FEATURES OF PERIPHERAL POLYNEUROPATHY

PLAN FOR APPROPRIATE DIAGNOSTIC EVALUATION OF PERIPHERAL POLYNEUROPATHY

PLAN FOR BASIC TREATMENT OF PERIPHERAL POLYNEUROPATHY

What is Peripheral Polyneuropathy?

- Dysfunction or disease of many or all peripheral nerves
- Important to distinguish from a diagnosis of "neuropathy"
  - Not all numbness is neuropathy
- Epidemiology
  - Affects about 1% of the population and 7% of the elderly population in some papers
  - Others quote it affects about 1:1000 people over the course of their life

Clinical Features?

Common presentation

Negative Symptoms vs. Positive Symptoms

Red Flags?

Rapid Progression with significant debility
Significant motor weakness
Asymmetry

Questions to answer when diagnosing neuropathy?

- What is the temporal course and progression of this neuropathy or symptoms?
- What fiber types are involved?
- What is the pattern?
- What is the underlying nerve pathology?
- Family history?
- Other medical issues?
- Toxins – medications or otherwise?

How can I diagnosis it?

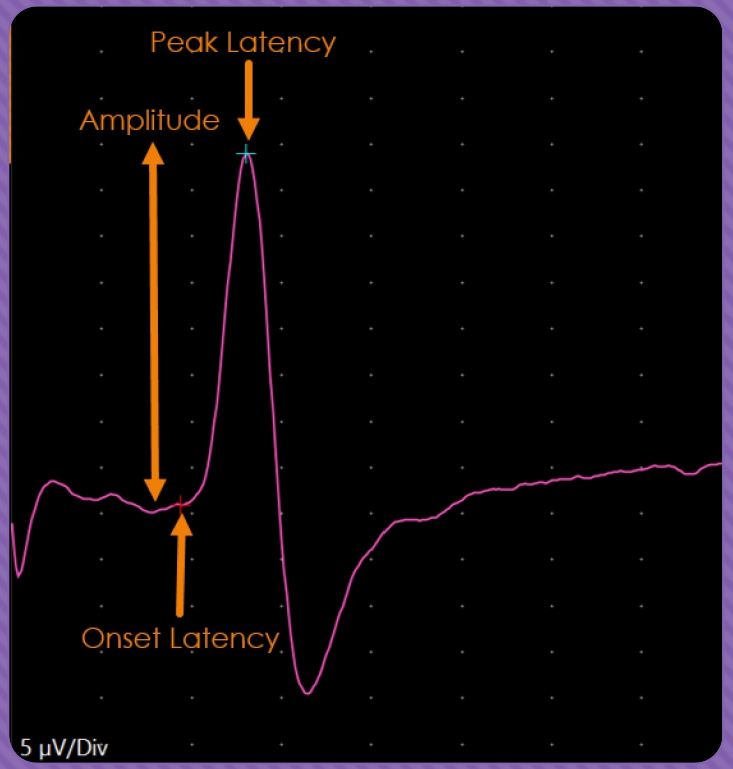
- Clinical diagnosis
- Electrodiagnosis
- QSART testing
- Pathological diagnosis

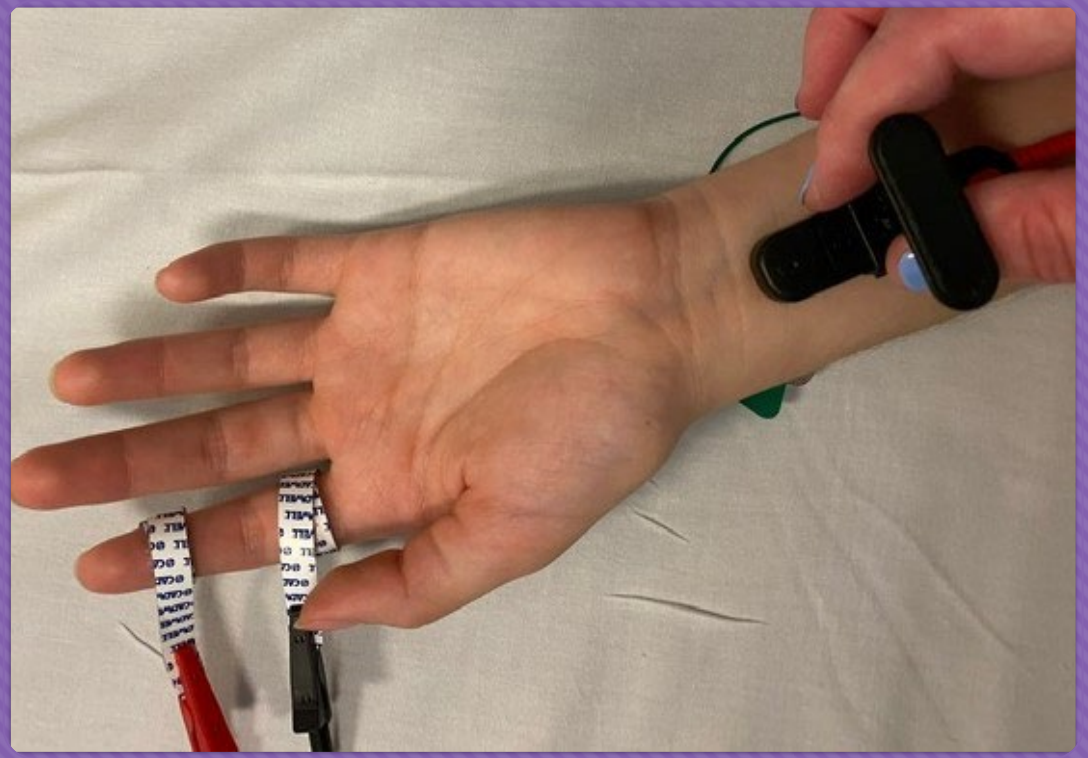
Clinical Diagnosis

- You do not always need further testing
- If the examination is classic with an obvious etiology not everyone needs further testing
- Follow up clinical examination to track how they are doing can be key and just as effective
- History can be key – family history, toxic exposures (alcohol), medical history etc.
- Example…

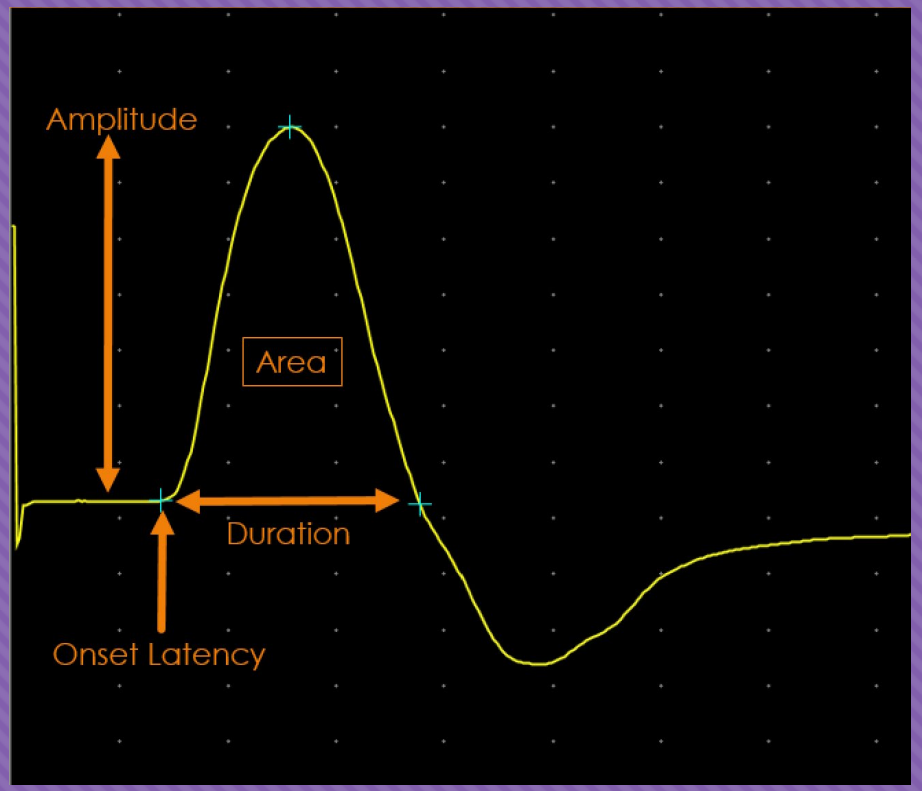
Electrodiagnostics

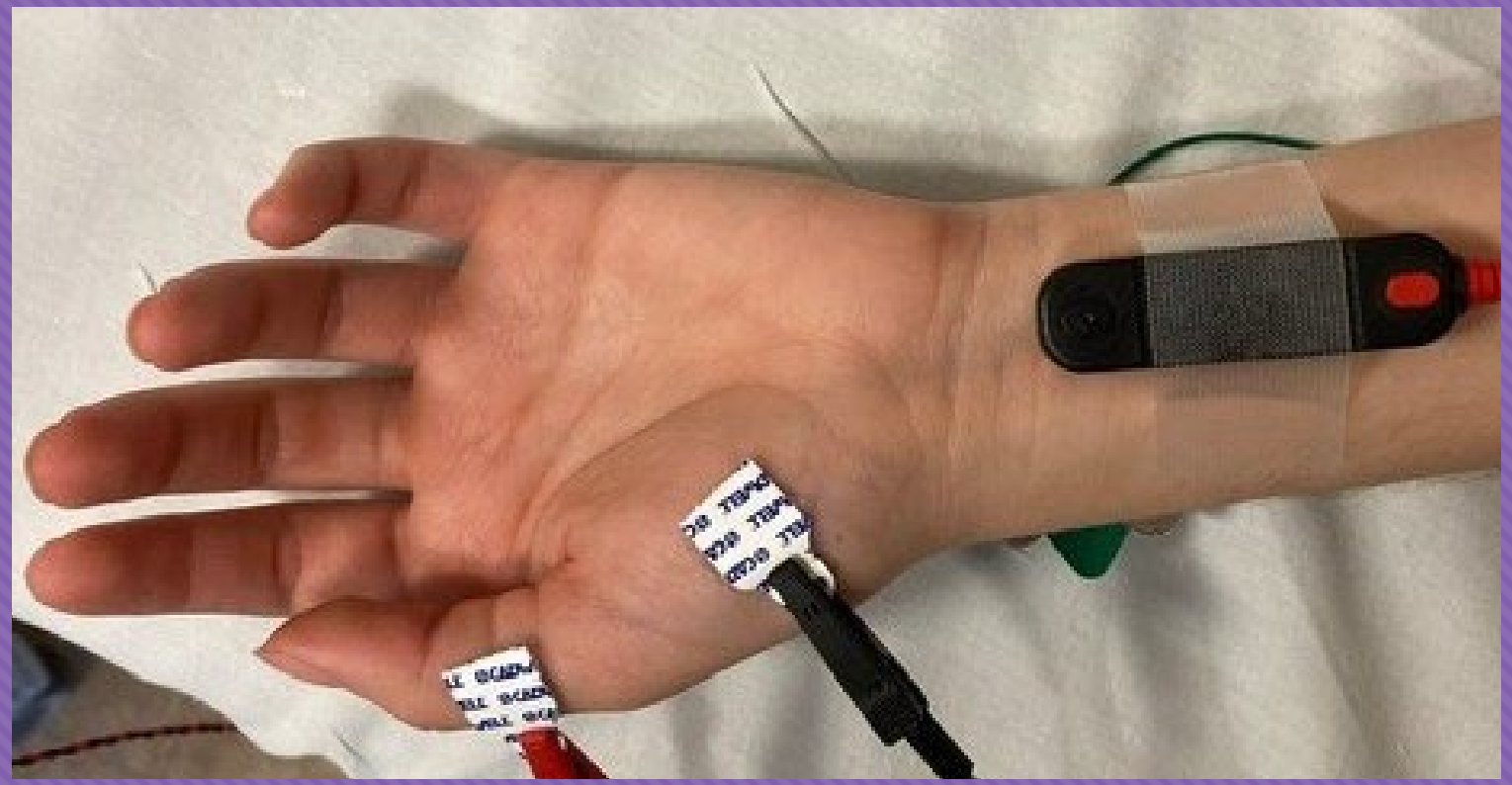
- Electromyography and nerve conduction study are the main tool used to diagnosis peripheral polyneuropathy
- We can determine if there it is present vs. other etiologies (entrapment, lumbar radiculopathy etc.)
  - Sometimes there are multiple things going on
- Severity and distribution
- Axonal vs. demyelinating features
  - Axonal by far is the most common
- This test can be very helpful for confirmation and helping to direct further investigations?
- Will not pick up a pure small fiber neuropathy





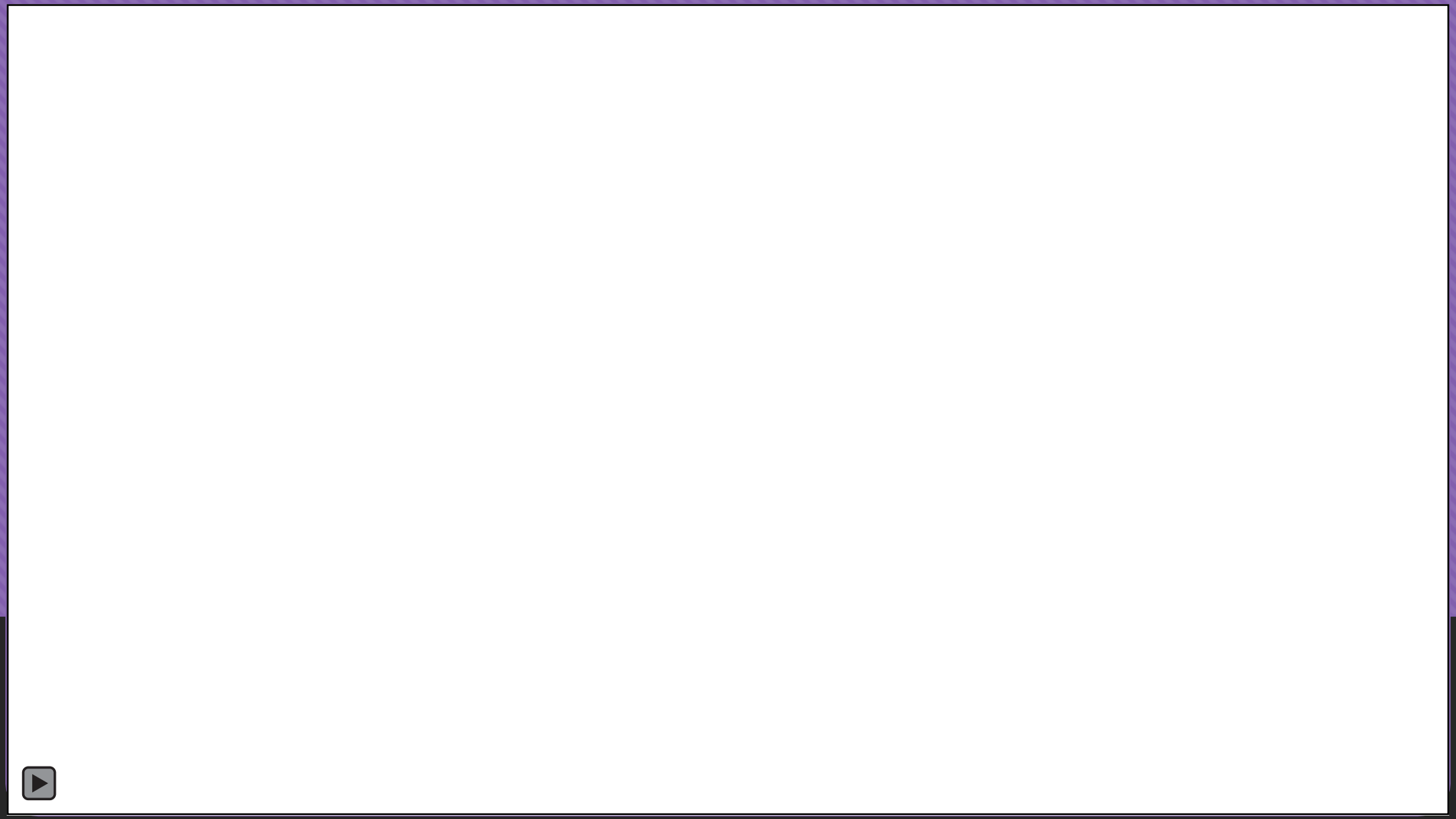
What happens during NCS?





What happens during NCS?

What happens during EMG?

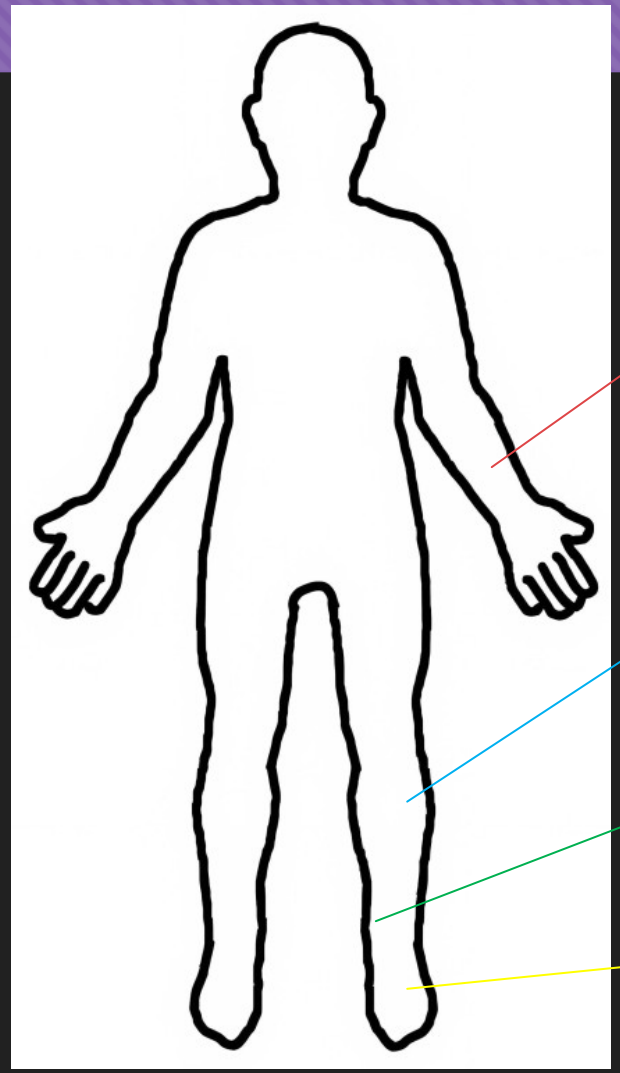


What happens during EMG?

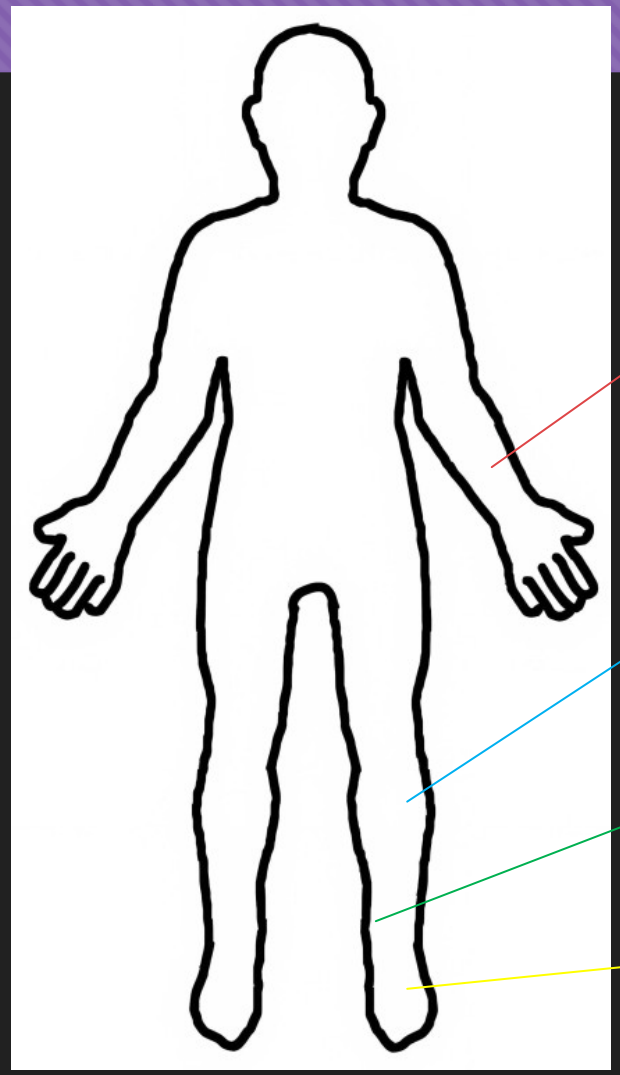
What is a QSART?

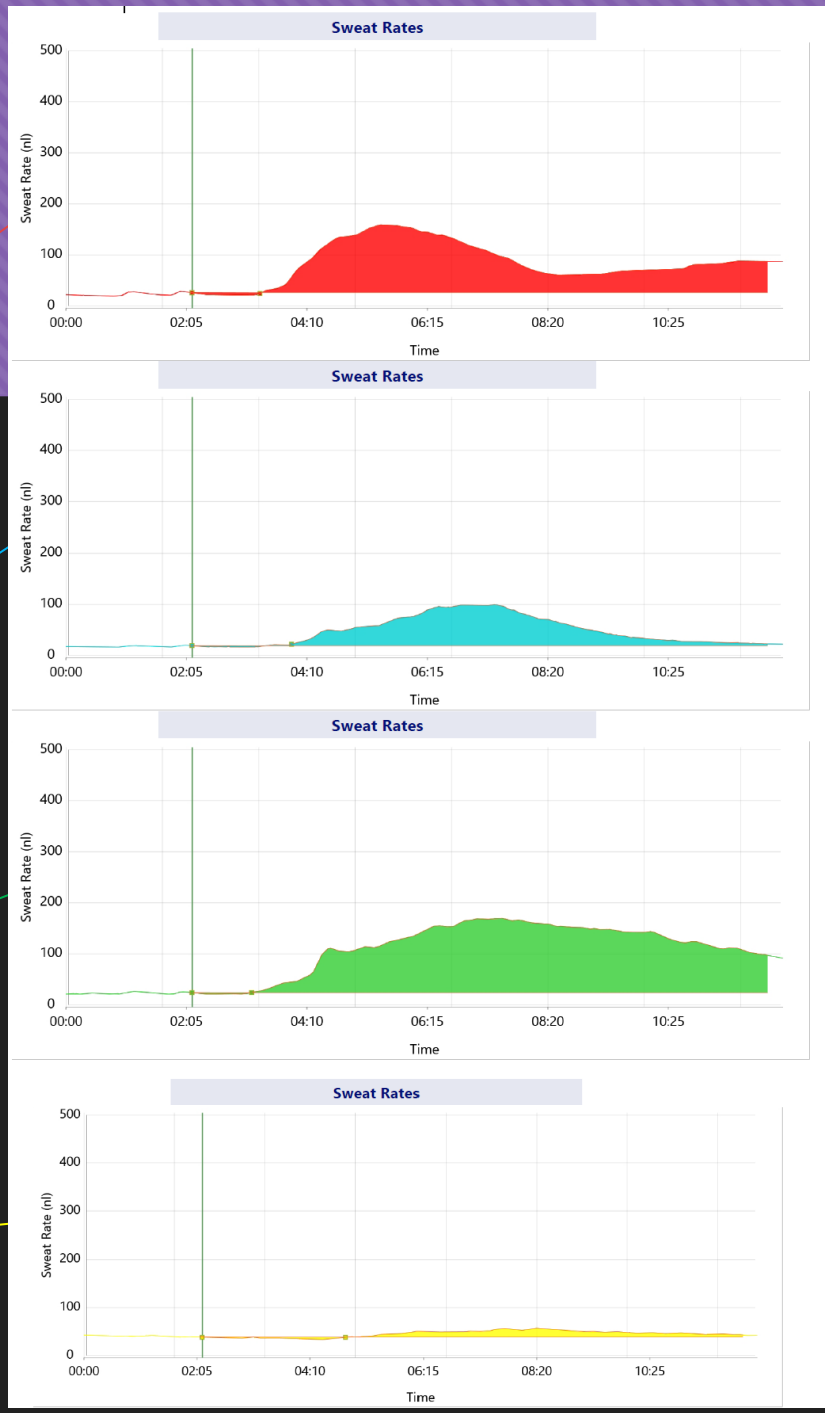
- Quantitative sudomotor axon reflex test
- This study assess post-ganglionic (past the sympathetic chain ganglia) sympathetic sudomotor (sweat) function
- Allows for indirect assessment of small fiber neuropathy
  - Small fiber neuropathy affects the nerves to the glands leading to reduced volumes
- Non-invasive but technically difficult and the testing is affected and made abnormal by many medications

Normal QSART

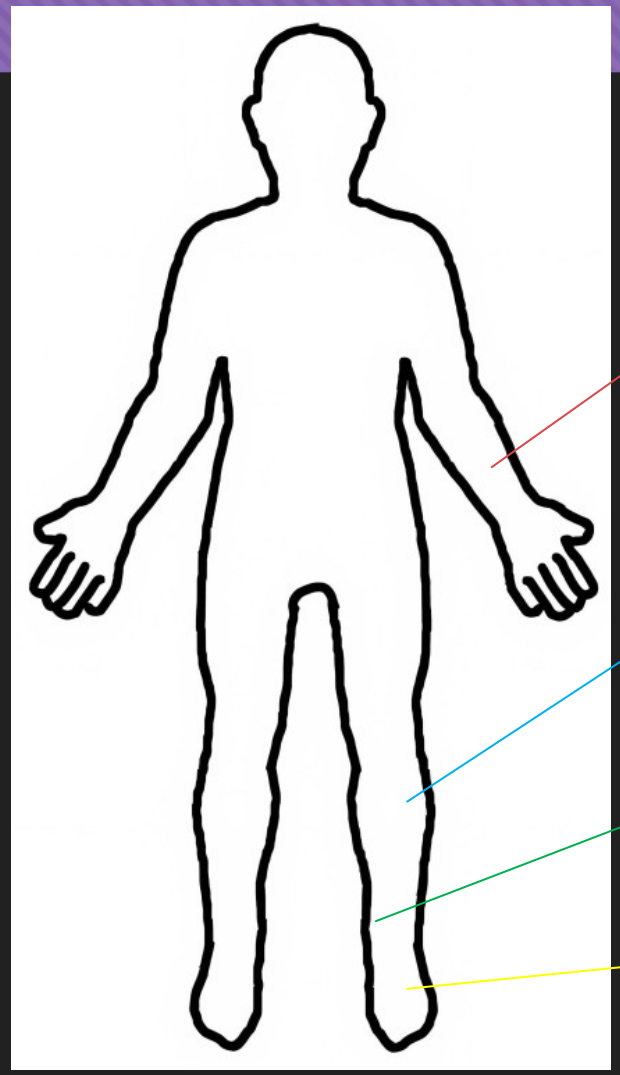


Abnormal QSART





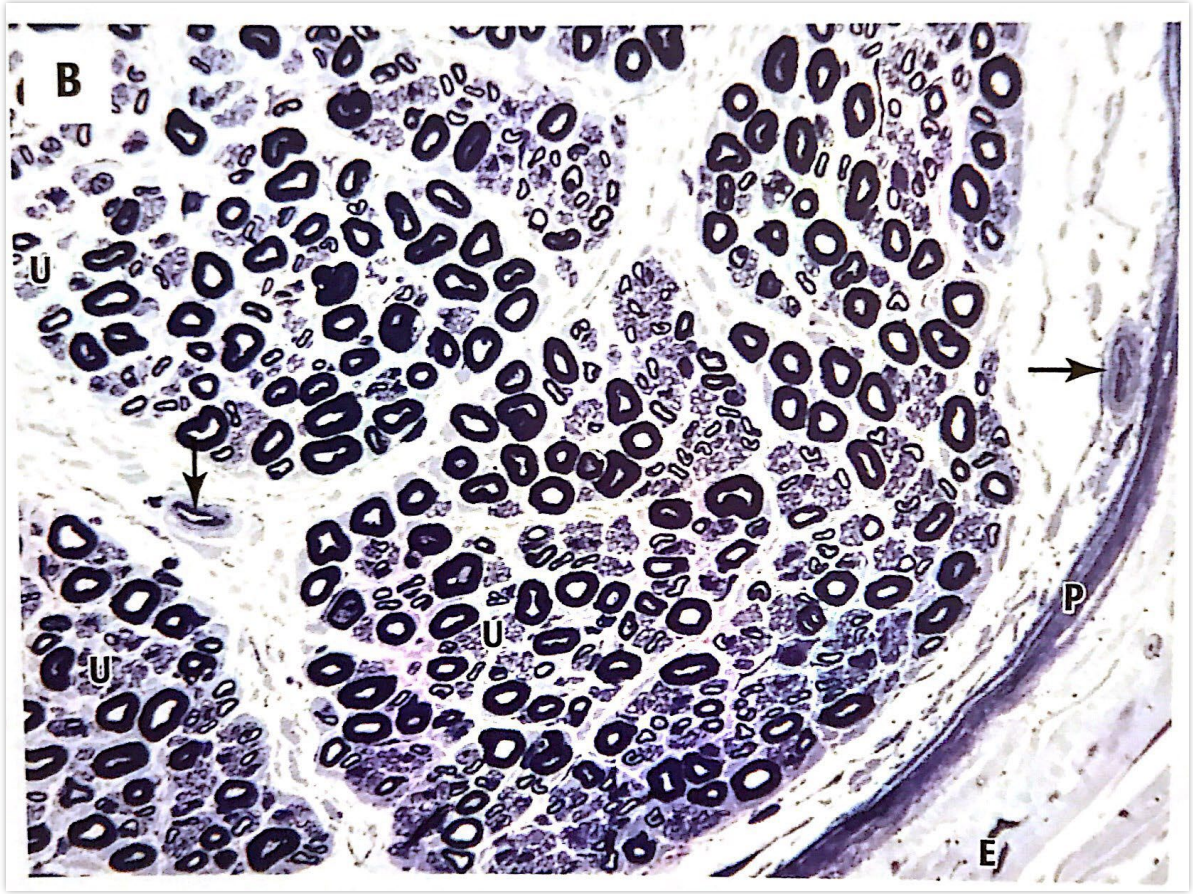
Abnormal QSART



Pathologic Diagnosis Nerve Biopsy

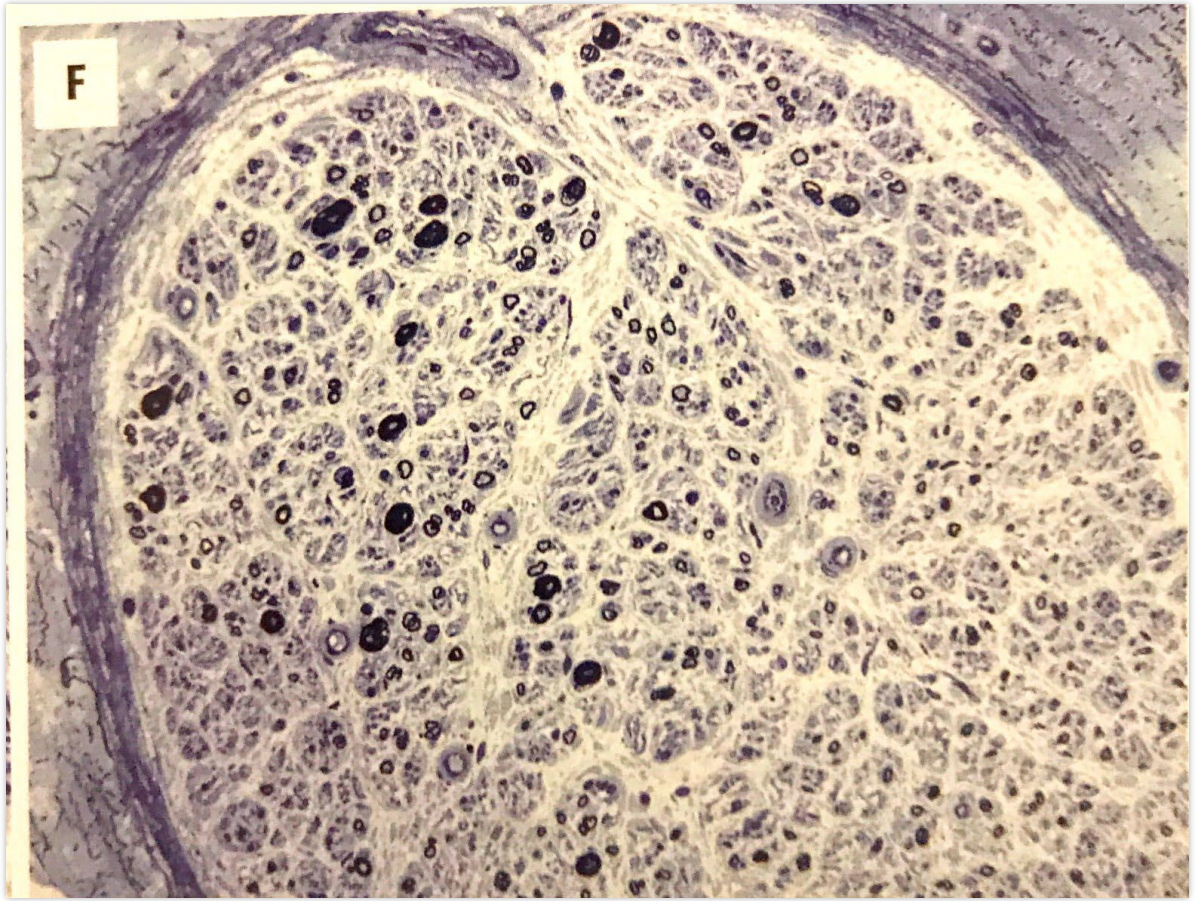
- Done much less frequently
- Tends to be most helpful if there is concern for vasculitis, amyloidosis or concern for infiltrative disease (neoplastic like lymphoma, sarcoid or infectious like leprosy etc.)
- Usually directed by a specialist

Normal Nerve Biopsy



Prayson RA. *Neuropathology: A Volume in the Foundations in Diagnostic Pathology Series*. 2nd ed. Philadelphia, PA: W B Saunders Company; 2012.

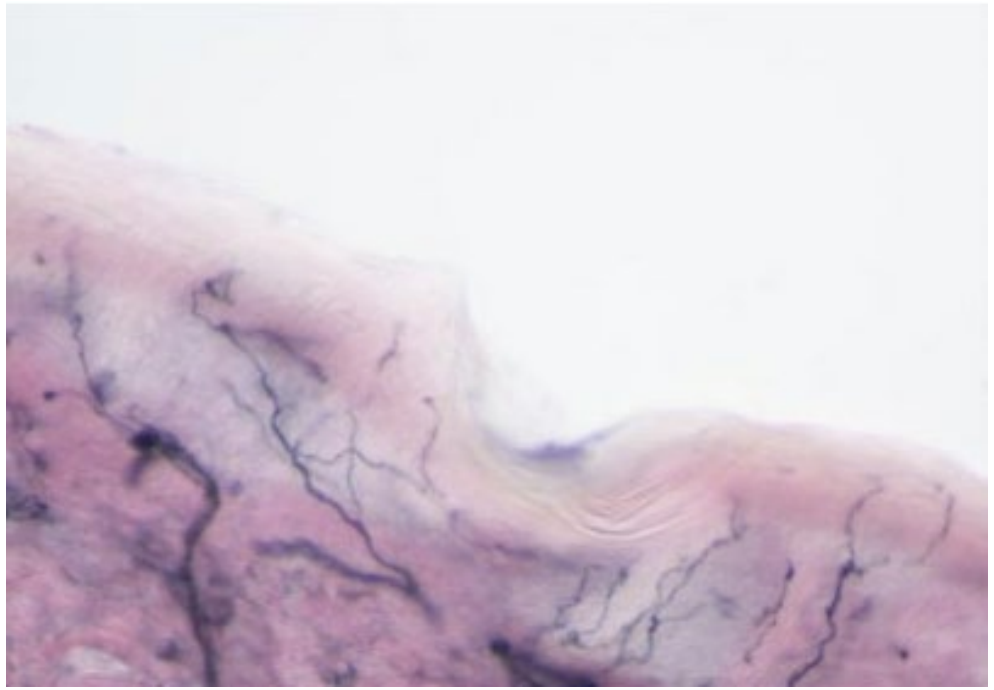
Abnormal Nerve Biopsy

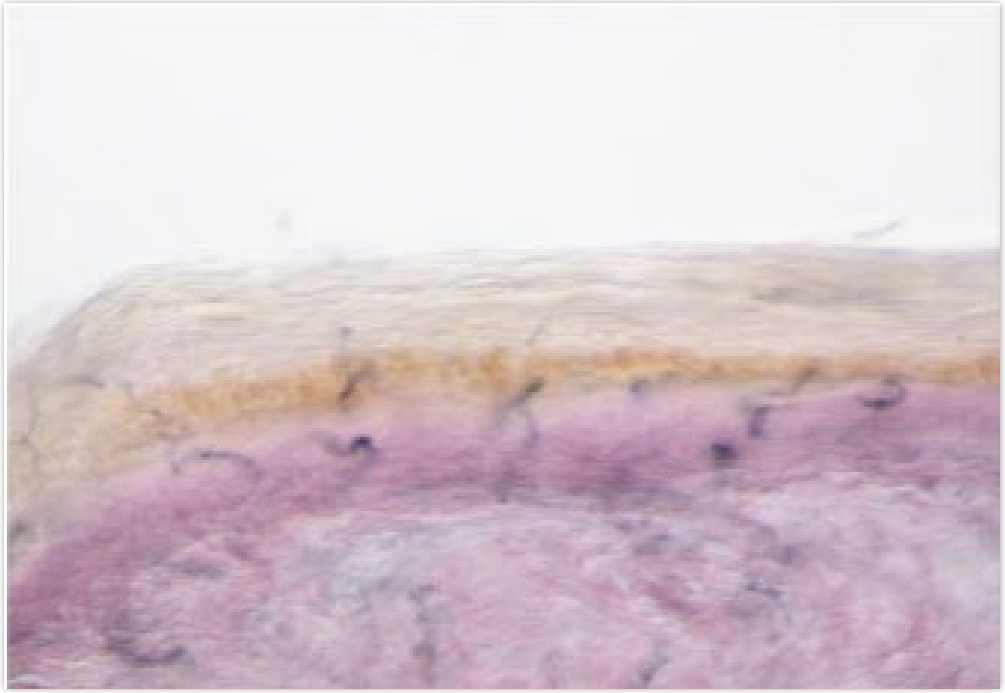


Prayson RA. *Neuropathology: A Volume in the Foundations in Diagnostic Pathology Series*. 2nd ed. Philadelphia, PA: W B Saunders Company; 2012.

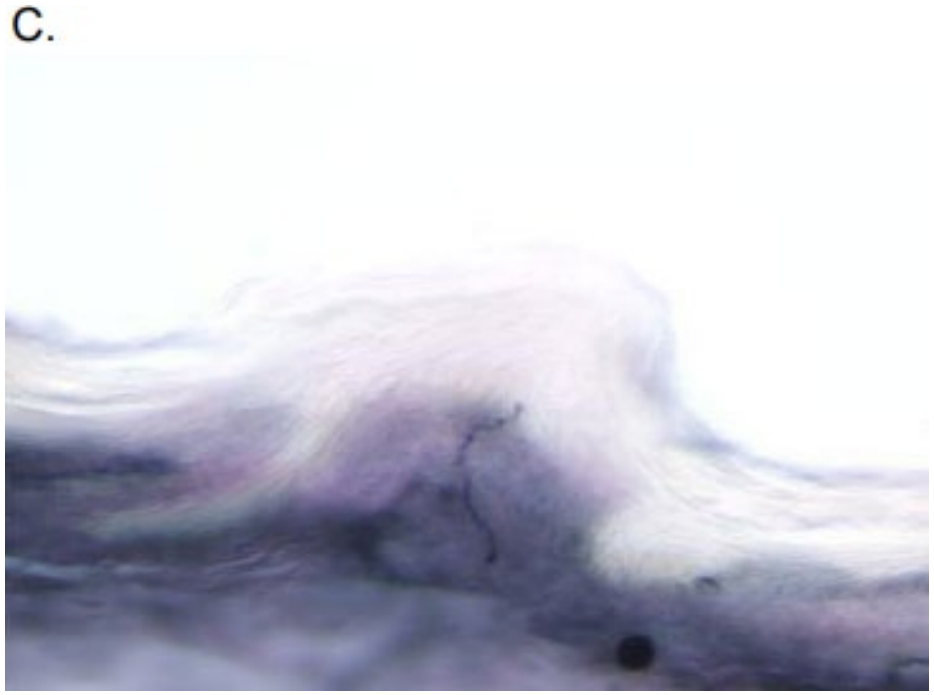
Pathologic Diagnosis Skin Biopsy

- Skin biopsy with epidermal nerve fiber density testing is the gold standard for diagnosis of small fiber neuropathy
- Usually, two to three 3 mm punch biopsies are performed – testing can be done to look for small vessel vasculitis, sweat gland innervation as well as amyloidosis in the surrounding tissues as well





Normal Skin Biopsies



Abnormal Skin Biopsies

What labs should I order?

AAN has recommendations…

Blood glucose	B12 + metabolites	Serum immunofixation + electrophoresis
• If you suspect metabolic syndrome, be aggressive – lipids, A1c, GTT etc.		• By adding serum light chains, you screen for myeloma very effectively

The phenotype of the neuropathy and other risks should be considered, often neuropathy is a sign the body is ill or dysfunctional – let the history and examination guide you

History can be just as important as the blood work

Alcohol exposure and other toxins (chemotherapeutics most common vs. inhaled hexanes or more exotic things such as NO inhalation leading to B12 deficiency)

Diabetes and Metabolic Syndrome

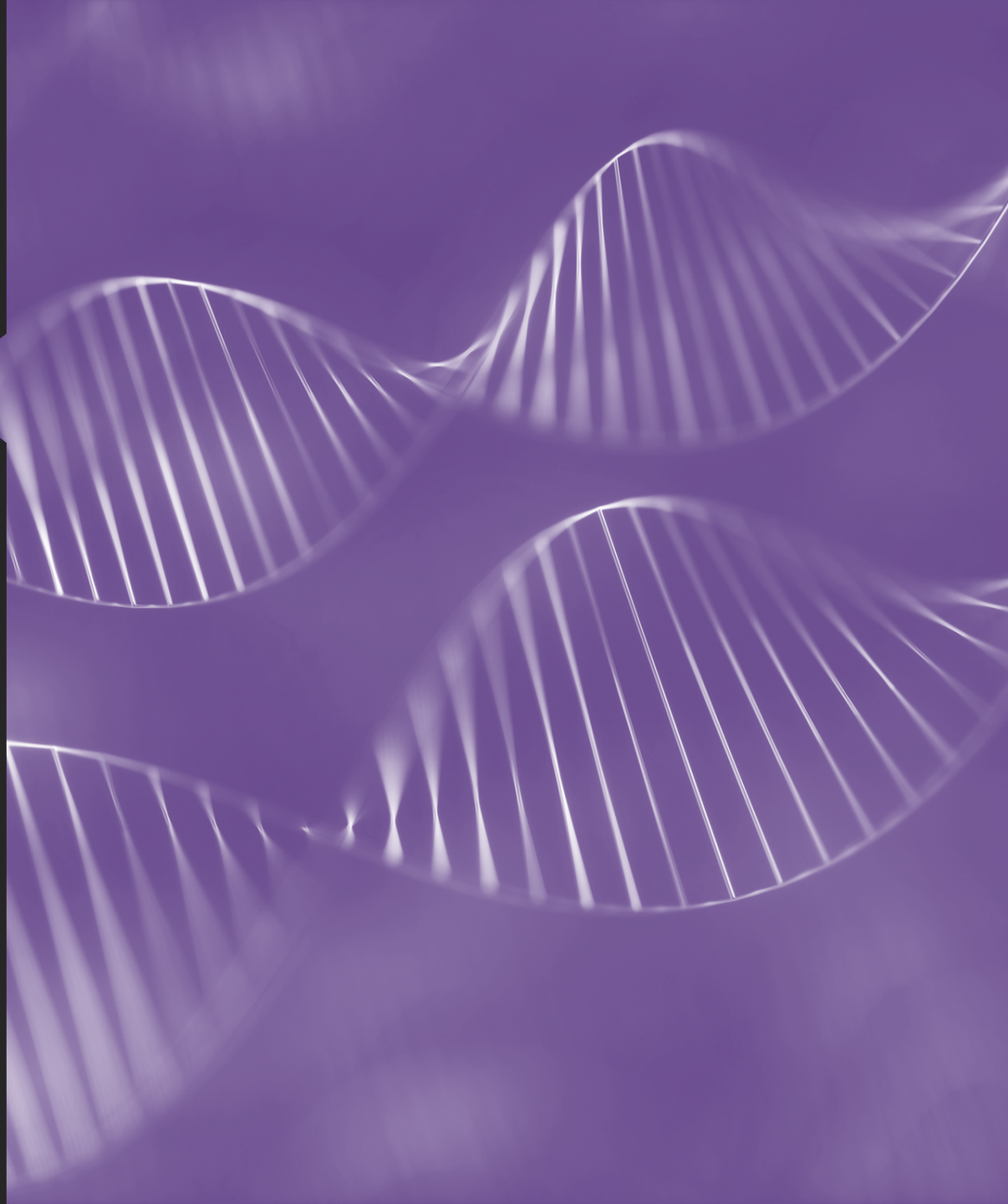
- Although type II > type I diabetes is the most common causes of peripheral polyneuropathy, you do not need to have overt diabetes to get neuropathy from metabolic dysfunction
- Hypertriglyceridemia is a common cause and in some research in those with metabolic syndrome might be more dangerous than the mild glucose dysregulation
- Pre-diabetes is highly associated with neuropathy
- Look for metabolic syndrome – often the neuropathy is painful and distal in the limbs and if you treat it, you can slow progression and avoid overt debility with paralysis over time

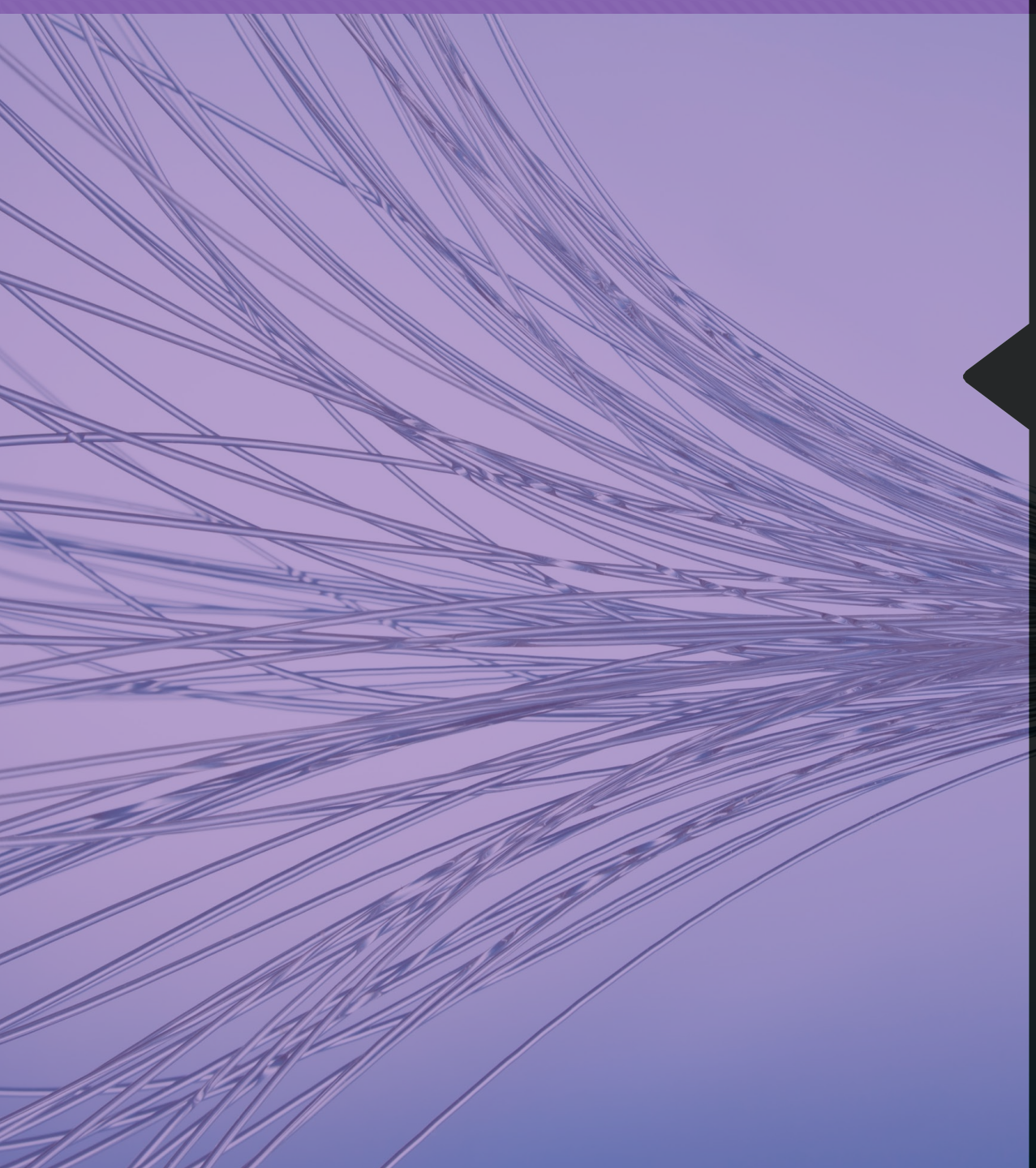
Alcohol

- Alcohol is a very common cause of peripheral neuropathy in the United States
- History is key, but labs can be helpful
  - Liver enzymes, sodium levels, elevated homocysteine, macrocytosis etc.
- Often this is a painful neuropathy, more affecting sensory fibers in the distal lower extremities.
- Always check for associated hypovitaminosis in theses cases as well – B1, B3, B6 etc.

When should I consider genetic testing?

- Hereditary neuropathies come in a variety of forms
  - Most common is hereditary sensory and motor neuropathy (HSMN) – Charcot Marie Tooth (CMT)
  - Hereditary sensory and autonomic neuropathy
  - Hereditary motor neuropathies
  - Hereditary sensory neuropathies – often part of a larger phenotype or genetic diagnosis
- In general family history is helpful, these neuropathies are often insidious and have strong negative symptoms compared to positive symptoms
  - Use your Neurology colleges or genetic counselors to help when this a concern





What about small fiber neuropathy?

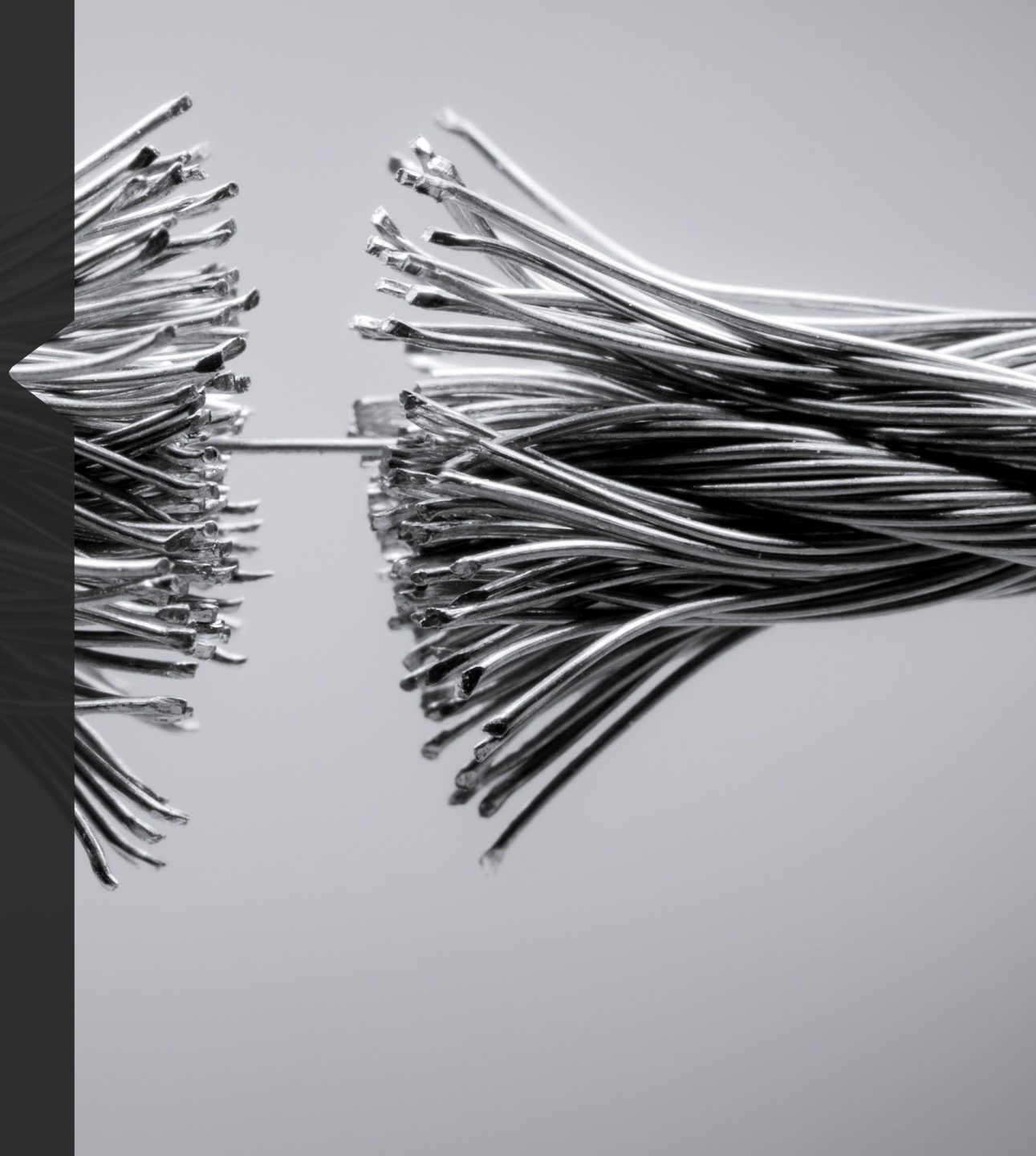
- Small fiber neuropathy can be present with large fiber involvement as well and thus often further testing is not needed
- However, there are those patients with a "pure" small fiber neuropathy without large fiber involvement
  - Classic situation is the distal extremities have burning neuropathic pain with associated sensory loss, but your NCS/EMG comes back normal
  - Consider QSART or skin biopsy for confirmation, but which do I pick?
- Serological work up is similar to large fiber neuropathy – be on the look out for metabolic syndrome, alcohol, or connective tissue disease

How can I manage the positive symptoms?

- Oral Medications
  - Gabapentinoids – Gabapentin, Lyrica
  - SNRIs – Cymbalta, Effexor
  - TCAs – Amitryptyline, Nortriptyline
  - Sodium blockers – Mexilitine, Carbamazepine, Lamictal etc.
- Topicals
  - Capsacin
  - Lidocain
  - Compounding – Ketamine, baclofen etc.
- Alpha Lipoic Acid?
- Opiates – Methadone?
- Spinal cord stimulators?

How can I manage the negative symptoms?

- It is important to know the medications will not treat the numbness, balance issues and weakness
- Bracing can be helpful especially if there is foot drop
- Physical therapy and exercise are key
- Home improvements
  - Bathroom adjustments – grab bars
  - Night lights
- Patient education is paramount



When should I consult Neurology?

- In general, I believe if you do think you have a firm grasp on the diagnosis then you should place a referral
- Other reasons
  - There is rapidly progressive weakness/symptoms
    - if theses are over days/weeks would recommend hospital admission
  - Prominent weakness and paralysis with little positive symptoms – can point towards a genetic diagnosis
  - Prominent weakness with concern for possibly treatable causes – amyloidosis, autoimmune (CIDP etc.)
  - Idiopathic etiology with symptom progression

Sources – Questions?

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Common Pediatric Infections and Evidence Based Antibiotics

2026 Donald B. Middleton Refresher Course in Family Medicine

Andy Nowalk, MD PhD
Pediatric Infectious Diseases
May 26, 2026

UPMC | CHILDREN'S HOSPITAL OF PITTSBURGH

Disclosures

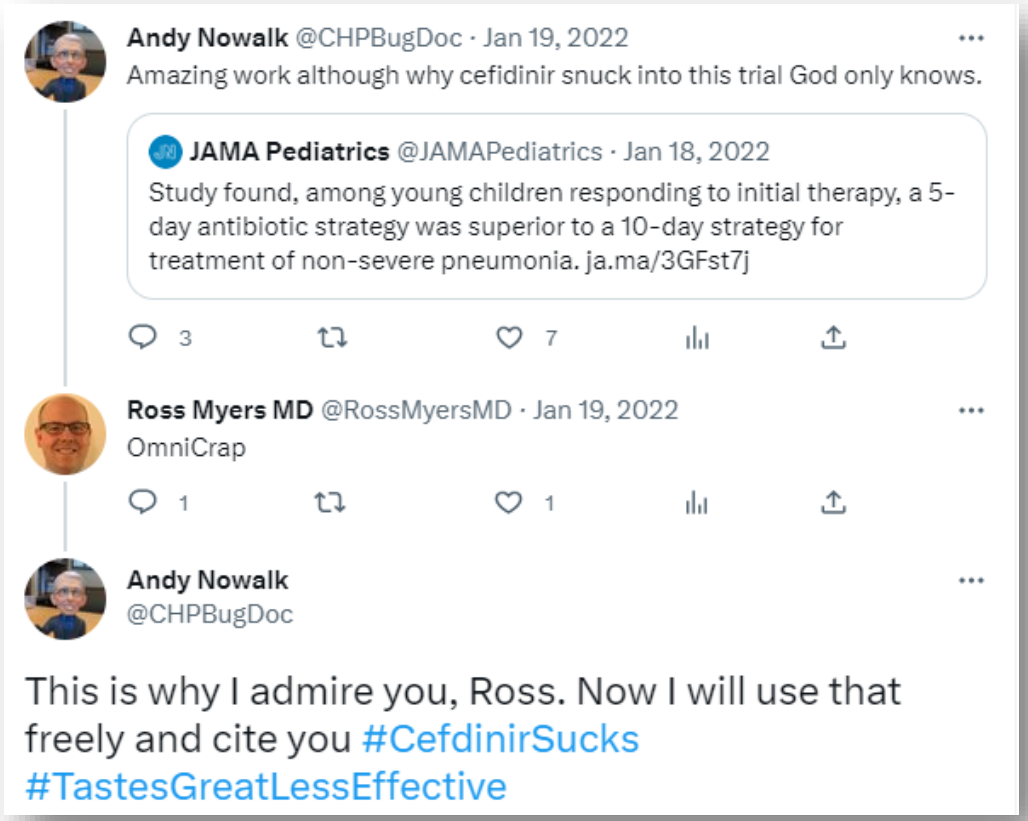
- I have no financial relationships or other conflicts of interest to disclose related to the subject of this lecture.
- I will discuss off-label use of some antibiotics
- I will reveal deep seated animus toward other antibiotics

Objectives

- Define how pharmacology can guide treatment of pediatric infections
- Review evidence and guidelines for optimal therapy of common infections
- Discuss common cases of challenging pediatric infections and best choices for antimicrobial therapy

Methods

- Work through cases
- Moderate humor
- Say mean things about cefdinir

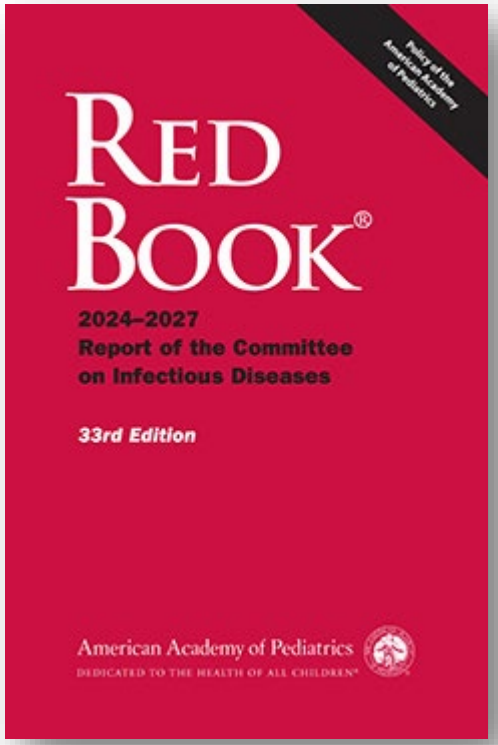


Pharmacology and making antibiotic choices

- Which oral drugs are reliable based on serum levels (especially peak)
- Why a shot of ceftriaxone works
- Why the kidney makes everything better

Guidelines

- All infections discussed have a practice guideline
  - American Academy of Pediatrics
  - Infectious Disease Society of America

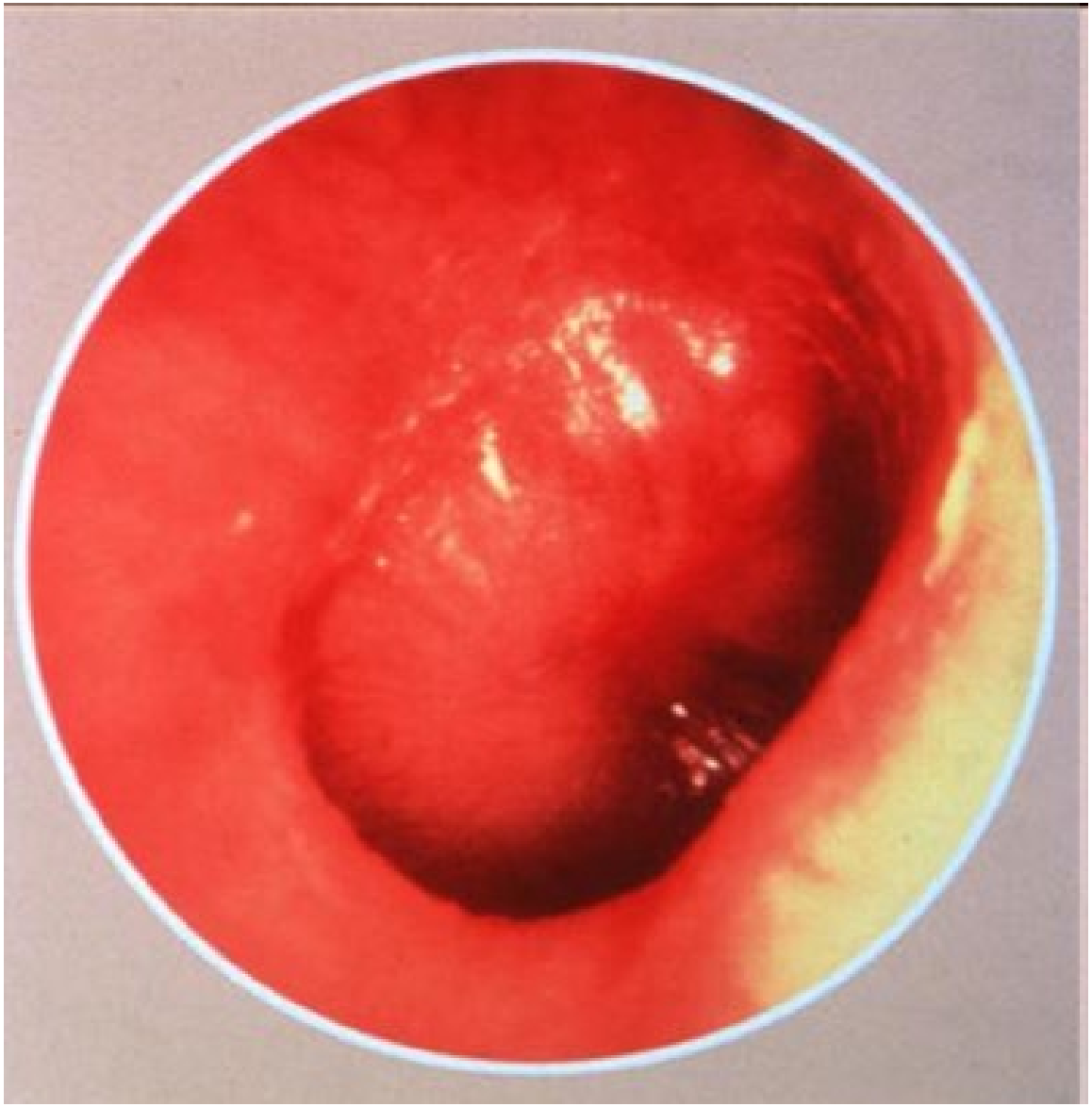


IDSA
Infectious Diseases Society of America

Case 1

Combinations are great

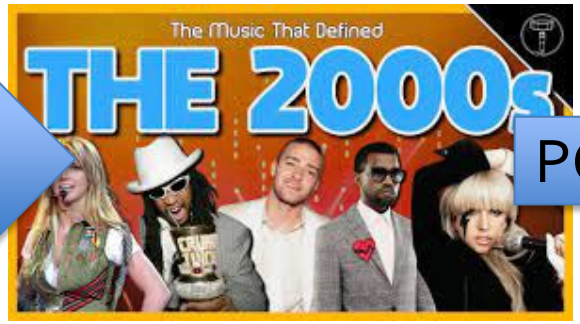
- A 11 mo boy in your office with fever (39.3°C rectal)
- 3 days of cold symptoms with impressive rhinorrhea
- Crying, pulling at right ear
- Exam is normal except AOM



Microbiology

- The main bugs…
  - *S. pneumoniae (Spn), H. influenzae (Hflu) and M. catarrhalis (Mcat)*
- …differ in resistance mechanism
  - *Spn* – altered PBP (pcn MIC 0.5-8), **overcome with ↑ drug**
  - *Hflu/Mcat* – β-lactamases (pcn MIC >256), **overcome with β-lactamase inhibitor**

Things change

Ancient times (1990s)	Post PCV (2000s)	Glory days (2020s)
		
Spn 2/3 *Hflu/Mcat* 1/3	*Spn* 1/2 *Hflu/Mcat* 1/2	*Spn* 1/3 *Hflu/Mcat* 2/3

PCV7

PCV13/20

NEJM 2025:392;1418

Active Bacterial Core Surveillance (ABCs) Report
Emerging Infections Program Network
Streptococcus pneumoniae, 1998

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

Antibiotic Susceptibility	S* %	I† %	R‡ %
Penicillin	75.6	10.5	13.9
Cefotaxime	85.9	8.0	6.1
Erythromycin	84.9	0.2	15.0
TMP/Sulfa	70.9	6.0	23.1
Levofloxacin	99.8	0.0	0.2
Vancomycin	100.0	0.0	0.0

Active Bacterial Core Surveillance (ABCs) Report
Emerging Infections Program Network
***Streptococcus pneumoniae*, 2023**

Antibiotic	S*	I†	R‡
TMPsulfa	80.1	13.1	6.8
Erythromycin	74.8	0.2	24.8
Levofloxacin	100.0	0.0	0.0
Penicillin+	96.2	0.8	1.9
Cefotaxime	97.1	1.3	0.3
Tetracycline	89.8	0.0	10.2
Vancomycin	100.0	0.0	0.0

Guideline: AOM

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™

Organizational Principles to Guide and Define the Child Health Care System and/or Improve the Health of all Children

CLINICAL PRACTICE GUIDELINE

The Diagnosis and Management of Acute Otitis Media

Pediatrics **2013**;131:e964

Case 1

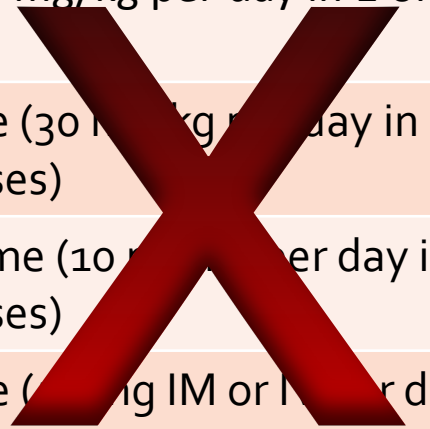
AAP recommendations

Age	Otorrhea With AOM	Unilateral or Bilateral AOM With Severe Symptoms	Bilateral AOM Without Otorrhea	Unilateral AOM Without Otorrhea
6 mo to 2 y	Antibiotic therapy	Antibiotic therapy	Antibiotic therapy	Antibiotic therapy or additional observation
≥2 y	Antibiotic therapy	Antibiotic therapy	Antibiotic therapy or additional observation	Antibiotic therapy or additional observation

Severe symptoms = toxic, otalgia >48 h, T ≥39°C in past 48 h, uncertain follow-up

AAP recommendations: initial therapy

Initial Immediate or Delayed Antibiotic Treatment	
Recommended First-line Treatment	**Alternative Treatment (if Penicillin Allergy)**
Amoxicillin (80–90 mg/kg per day in 2 divided doses)	Cefdinir (14 mg/kg per day in 1 or 2 doses)
or	Cefuroxime (30 mg/kg per day in 2 divided doses)
	Cefpodoxime (10 mg/kg per day in 2 divided doses)
Amoxicillin-clavulanate (90 mg/kg per day of amoxicillin, in 2 divided doses)	Ceftriaxone (50 mg IM or IV per day for 1 or 3 d)



Cefdinir sidebar

- Popular – ~ 3 million rx per year
- Easy – once daily dosing
- Inferior
  - Cefdinir peak serum ~3 ug/mL for QD
  - Amox HD peak serum ~19 ug/mL for BID
  - Time above MIC = 0.25 (sens)
    - Cefdinir 20% of dosing interval
    - Amox/clav 85% of dosing interval

https://clincalc.com/DrugStats/Drugs/Cefdinir

AAP recommendations: failure therapy

Initial Immediate or Delayed Antibiotic Treatment	
Recommended First-line Treatment	**Alternative Treatment**
Amoxicillin-clavulanate (90 mg/kg per day of amoxicillin, in 2 divided doses)	Ceftriaxone, 3 d Clindamycin (30–40 mg/kg per day in 3 divided doses), with or without third-generation cephalosporin
or	Clindamycin (30–40 mg/kg per day in 3 divided doses) plus third-generation cephalosporin
	Tympanocentesis
Ceftriaxone (50 mg IM or IV per day for 1 or 3 d)	Consult specialist

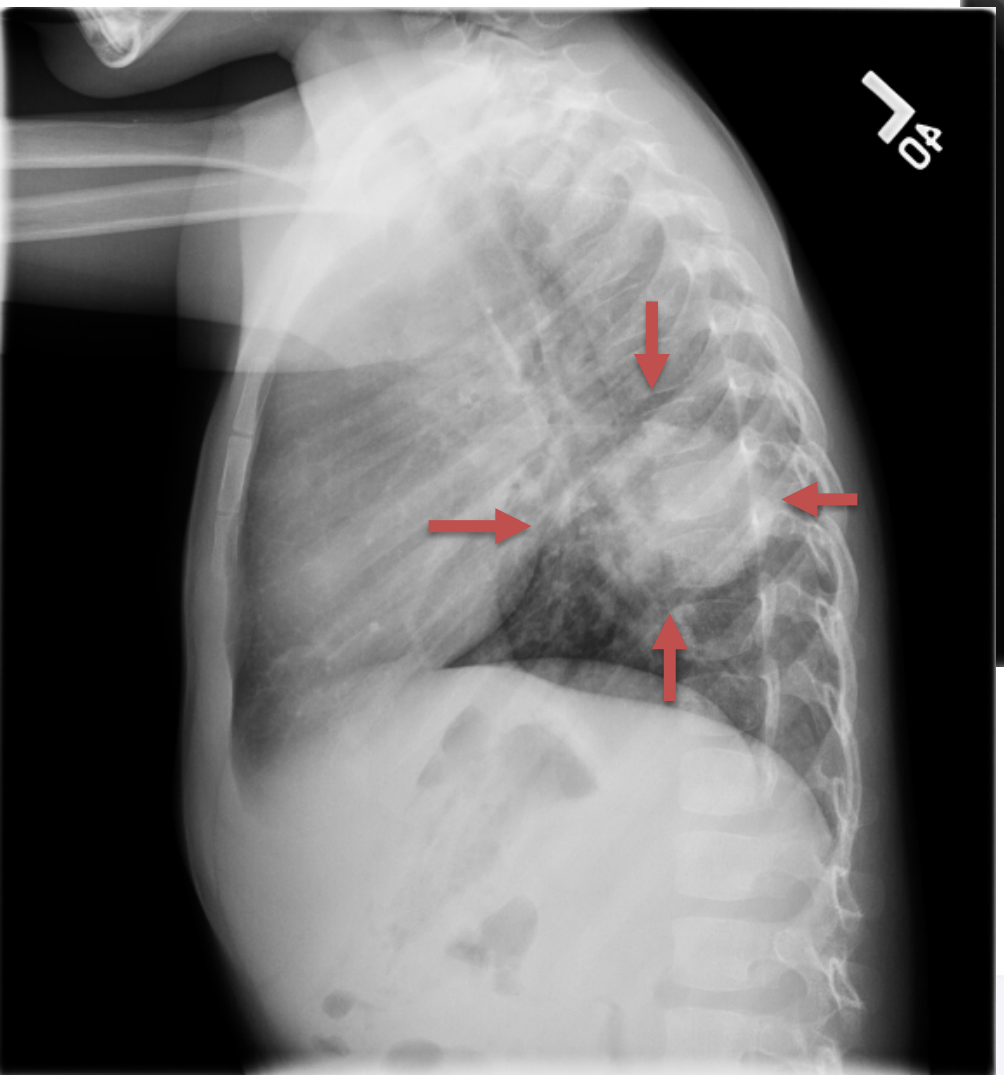
When to use ceftriaxone?

- Salvage therapy…and it works
  - 1 dose ceftriaxone gives 150 µg/mL in serum
- Ceftriaxone has high levels and long half life in ear fluid (25 hours)
- But increased use = increased resistance, so use sparingly

Case 2

Get down with PBP

- A 1 yo boy comes to your Urgent Care with fever (39.3°C rectal)
- 3 days of mild cold symptoms and low grade temps
- Now tachypneic, febrile, ill appearing
- Exam is normal except for crackles heard over his right lung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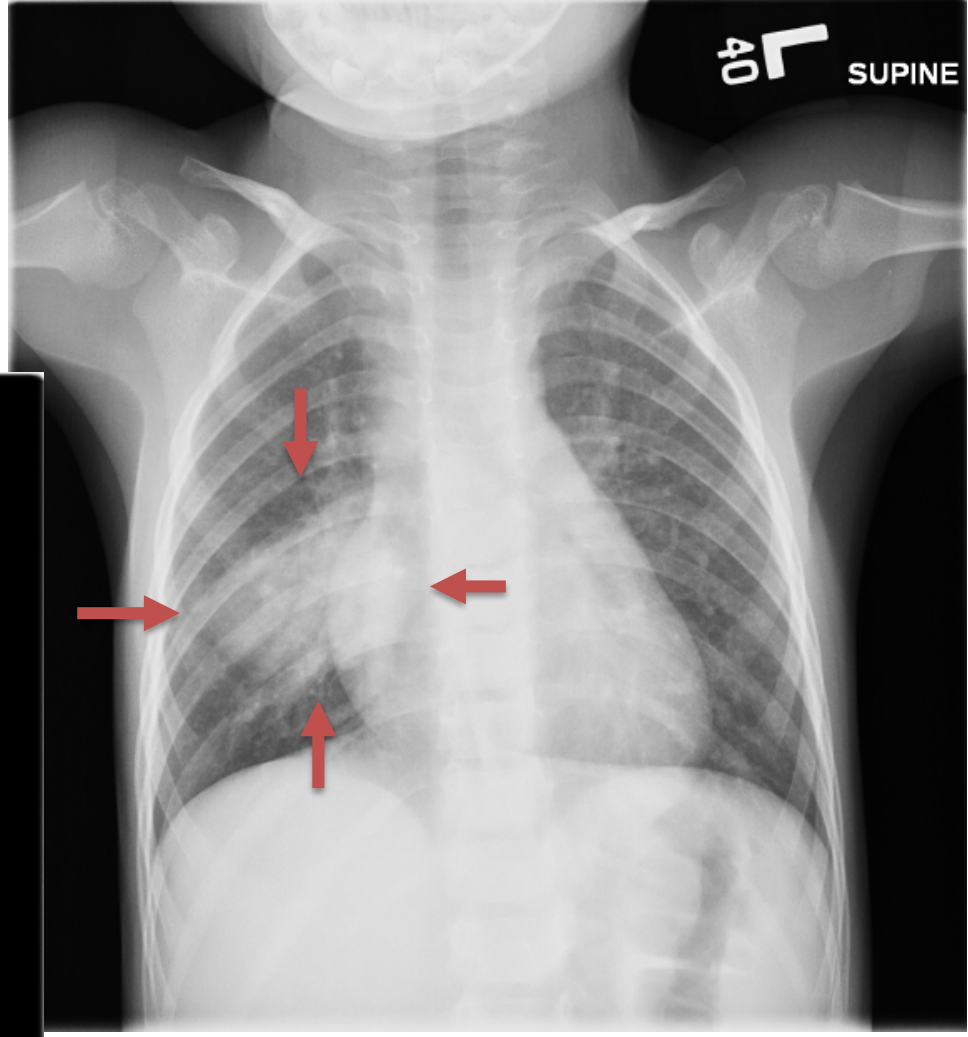
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SUPINE

Pediatric pneumonia <5 yo

- Pneumococcus, pneumococcus, pneumococcus (and viruses)
- Ergo, amoxicillin, amoxicillin, amoxicillin!

Pediatric pneumonia <5 yo

- No need for cephalosporins
- Pneumococcus – resists with altered PBP (pcn MIC 0.5-8), **overcome with ↑ drug**
- High dose amoxicillin (80-90 mg/kg/day divided BID)
  - Peak serum ~19 µg/mL
  - Enough to overcome pen^{I} strains!

Guideline: pneumonia

IDSA GUIDELINES

The Management of Community-Acquired Pneumonia in Infants and Children Older Than 3 Months of Age: Clinical Practice Guidelines by the Pediatric Infectious Diseases Society and the Infectious Diseases Society of America

John S. Bradley,[1,a] Carrie L. Byington,[2,a] Samir S. Shah,[3,a] Brian Alverson,[4] Edward R. Carter,[5] Christopher Harrison,[6] Sheldon L. Kaplan,[7] Sharon E. Mace,[8] George H. McCracken Jr,[9] Matthew R. Moore,[10] Shawn D. St Peter,[11] Jana A. Stockwell,[12] and Jack T. Swanson[13]

Clin Infect Dis 2011;53:e25

Empiric outpatient therapy

	Empiric bacterial pneumonia	Empiric atypical pneumonia	Empiric influenza pneumonia
< 5 year old	Amoxicillin (90 mg/kg/day in 2 doses) or amox/clav	Azit…	
> 5 year old	Amoxicillin ± azithromycin	cla… or dox…cycline	Oseltamivir or zanamavir

Note **NO** cefdinir or quinolones

Guidelines

- For <5 yo – amoxicillin at high dose
- Never use cephalosporins before amoxicillin. Ever.
- For >5 yo – amoxicillin at high dose and/or azithromycin (gets the *Mycoplasma*)
- Azithromycin works for many kids because it's viral, not *Mycoplasma*!
- New data – 5 days therapy = 10

JAMA Pediatr 2022;176:253

Case 3

I say tomato, you say cephalosporin

- An 18 yo male comes into your office with fever to 39.3°C oral
- 3 days of sore throat, headache, and mild abdominal pain
- Exam shows tender cervical LAD and…

Case 3

Case 3

Acute suppurative pharyngitis

- His rapid strep is positive for group A strep (*S. pyogenes*)
- Is this truly pharyngitis?

New guideline: SCORE!!!

Table 3. Clinical Scoring for Predicting Group A Streptococcal Pharyngitis

Feature	Centor	Score	McIsaac	Score	FeverPAIN*	Score
Viral Symptoms	Absence of Cough	1	Absence of Cough	1	Absence of Cough or Coyrza	1
Cervical Adenopathy	Swollen tender anterior cervical nodes	1	Swollen tender anterior cervical nodes	1	N/A	
Fever	≥100.4°F (38°C)	1	≥100.4°F (38°C)	1	Febrile in past 24 h	1
Tonsillar Appearance	Tonsillar Exudate or swelling	1	Tonsillar Exudate or swelling	1	Inflamed Tonsils Purulent Tonsils	1 1
Duration	N/A		N/A		<3 days since symptom onset	1
Age	N/A		3 y – 14 y 15 y – 44 y ≥45 y	1 0 -1	N/A	
Risk Stratification	**Points**	**% Strep**	**Points**	**% Strep**	**Points**	**% Strep**
Low Risk	0-1	7-12%	0-1	7.6-13.1%	0-1	1-10%
Intermediate Risk	2-3	21-38%	2-3	20.8-33.6%	2-3	11-35%
High Risk	4	57%	4-5	50.7-69.3%	4-5	51%-53%

https://www.idsociety.org/practice-guideline/streptococcal-pharyngitis2/

Guideline: strep pharyngitis

Clinical Practice Guideline for the Diagnosis and Management of Group A Streptococcal Pharyngitis: 2012 Update by the Infectious Diseases Society of America[a]

Stanford T. Shulman,[1] Alan L. Bisno,[2] Herbert W. Clegg,[3] Michael A. Gerber,[4] Edward L. Kaplan,[5] Grace Lee,[6] Judith M. Martin,[7] and Chris Van Beneden[8]

[1]Department of Pediatrics, Division of Infectious Diseases, Ann & Robert H. Lurie Children's Hospital, Northwestern University Feinberg School of Medicine, Chicago, Illinois; [2]Department of Medicine, University of Miami Miller School of Medicine, Miami Veterans Affairs Healthcare System, Miami, Florida; [3]Department of Pediatrics, Hemby Children's Hospital and Eastover Pediatrics, Charlotte, North Carolina; [4]Department of Pediatrics, Cincinnati Children's Hospital Medical Center, Cincinnati, Ohio; [5]Department of Pediatrics, University of Minnesota Medical School, Minneapolis, Minnesota; [6]Division of Infectious Diseases, Boston Children's Hospital, Boston, Massachusetts; [7]Department of Pediatrics, University of Pittsburgh, Pittsburgh, Pennsylvania; and [8]Respiratory Diseases Branch, National Center for Immunization and Respiratory Diseases, Centers for Disease Control and Prevention, Atlanta, Georgia

Clin Infect Dis 2012;55:1279 (update coming soon…)

Treatment

Table 2. Antibiotic Regimens Recommended for Group A Streptococcal Pharyngitis

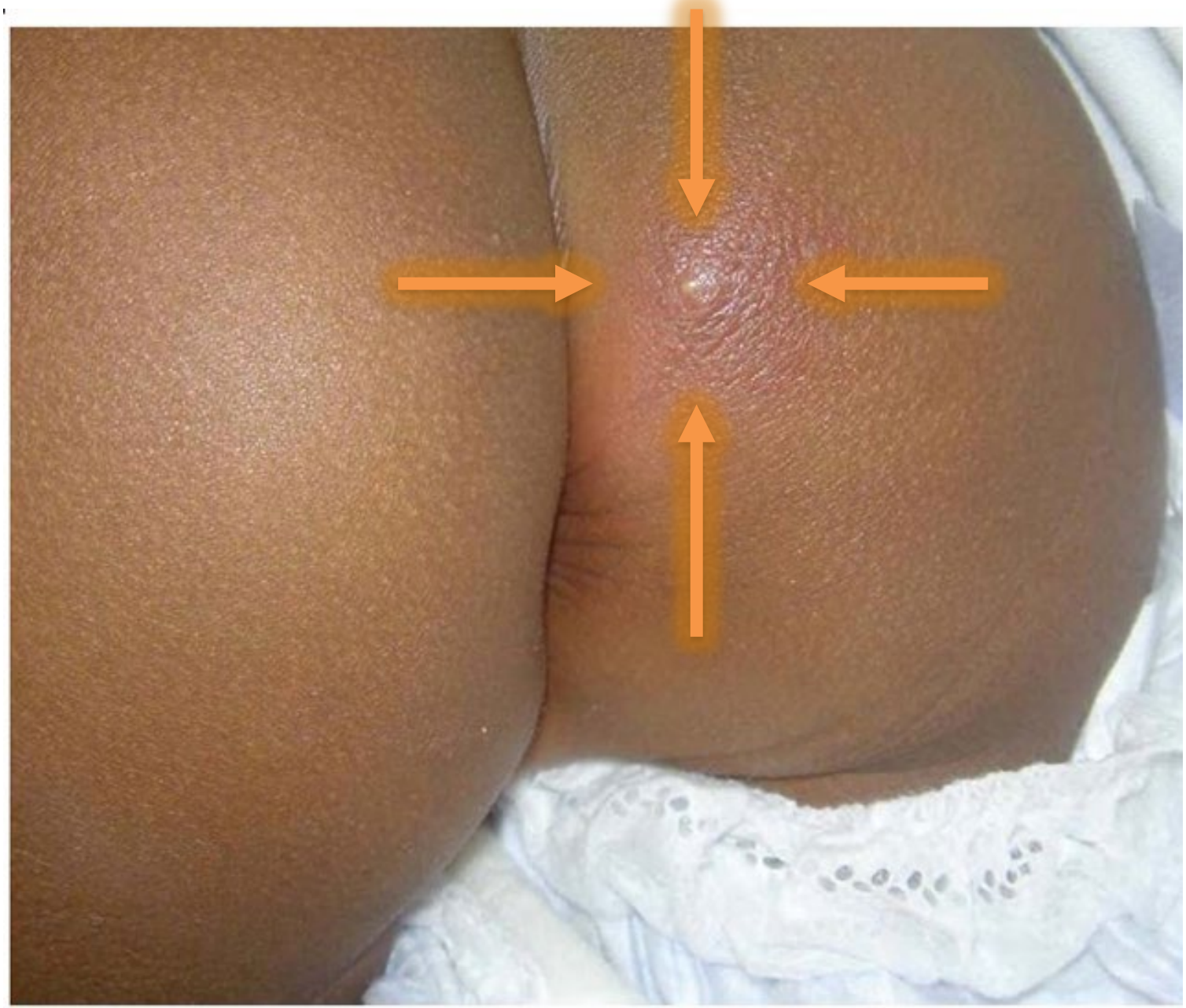
Drug, Route	Dose or Dosage	Duration or Quantity	Recommendation Strength, Quality[a]
For individuals without penicillin allergy			
Penicillin V, oral	Children: 250 mg twice daily or 3 times daily; adolescents and adults: 250 mg 4 times daily or 500 mg twice daily	10 d	Strong, high
Amoxicillin, oral	50 mg/kg once daily (max = 1000 mg); alternate: 25 mg/kg (max = 500 mg) twice daily	10 d	Strong, high
Benzathine penicillin G, intramuscular	<27 kg: 600 000 U; ≥27 kg: 1 200 000 U	1 dose	Strong, high
For individuals with penicillin allergy			
Cephalexin,[b] oral	20 mg/kg/dose twice daily (max = 500 mg/dose)	10 d	Strong, high
Cefadroxil,[b] oral	30 mg/kg once daily (max = 1 g)	10 d	Strong, high
Clindamycin, oral	7 mg/kg/dose 3 times daily (max = 300 mg/dose)	10 d	Strong, moderate
Azithromycin,[c] oral	12 mg/kg once daily (max = 500 mg)	5 d	Strong, moderate
Clarithromycin,[c] oral	7.5 mg/kg/dose twice daily (max = 250 mg/dose)	10 d	Strong, moderate

Once a day amoxicillin is preferred

Case 4

Double, double, boils are trouble

- A 1 yo patient comes into your office with a “spider bite”
- His mother noted a “spider bite” on his left buttock three days ago
- Now it’s big, red and angry



"Spider bite"

- The abscess is drained in the office with copious purulent fluid
- It grows MRSA
- Antibiotic choice?

Which will work?

- ✓Trimethoprim-sulfa (Bactrim)
- ✓Clindamycin
- ✓Nothing

Case 4

Infect Dis Clin N Am 23 (2009) 35–52

Guideline: MRSA

IDSA GUIDELINES

Clinical Practice Guidelines by the Infectious Diseases Society of America for the Treatment of Methicillin-Resistant *Staphylococcus Aureus* Infections in Adults and Children

Catherine Liu,[1] Arnold Bayer,[3,5] Sara E. Cosgrove,[6] Robert S. Daum,[7] Scott K. Fridkin,[8] Rachel J. Gorwitz,[9] Sheldon L. Kaplan,[10] Adolf W. Karchmer,[11] Donald P. Levine,[12] Barbara E. Murray,[14] Michael J. Rybak,[12,13] David A. Talan,[4,5] and Henry F. Chambers[1,2]

Clin Infect Dis 2011;52:e18

I. What is the management of skin and soft-tissue infections (SSTIs) in the era of community-associated MRSA (CA-MRSA)?

I. What is the management of skin and soft-tissue infections (SSTIs) in the era of community-associated MRSA (CA-MRSA)?

SSTIs

1. For a cutaneous abscess, incision and drainage is the primary treatment (**A-II**). For simple abscesses or boils, incision and drainage alone is likely to be adequate, but additional data are needed to further define the role of antibiotics, if any, in this setting.
2. Antibiotic therapy is recommended for abscesses associated with the following conditions: severe or extensive disease (eg, involving multiple sites of infection) or rapid progression in presence of associated cellulitis, signs and symptoms of systemic illness, associated comorbidities or immunosuppression, extremes of age, abscess in an area difficult to drain (eg, face, hand, and genitalia), associated septic phlebitis, and lack of response to incision and drainage alone (**A-III**).
3. For outpatients with purulent cellulitis (eg, cellulitis associated with purulent drainage or exudate in the absence of a drainable abscess), empirical therapy for CA-MRSA is recommended pending culture results. Empirical therapy for infection due to β-hemolytic streptococci is likely to be unnecessary (**A-II**). Five to 10 days of therapy is recommended but should be individualized on the basis of the patient's clinical response.

So…do I need to treat?

- Small abscesses – drainage only
- Focus on good wound care – soaks, topical antibiotics
- Larger abscesses, systemic symptoms need antibiotics
- A *good* incision and drainage is key!
  - Sedation if necessary
  - Aggressive palpation
  - Minor exploration to break up septations
- MRSA and MSSA the same!

Case 5

Any drug will do

- A 1 yo girl comes into your walk-in hours with 3 days of fevers to 102F
- No rash, respiratory or GI symptoms, or other localizing signs
- You send urinalysis, which shows
  - pyuria (lots of WBC, LE+)
  - bacteriuria (lots of GNR, nitrate+)

Urinary tract infection (UTI)

- You diagnose her with UTI and the culture comes back with a sensitive *E. coli*

Microbiology

Table 1. Most Common Uropathogens among Children from a Large US Surveillance Network

ORGANISM	URINARY TRACT INFECTIONS, % FEMALES	MALES
Escherichia coli	83	50
Enterococcus species	5	17
Proteus mirabilis	4	11
Klebsiella species	4	10
Pseudomonas aeruginosa	2	7
Enterobacter species	1	

Data from Edlin et al. (7)

Trends:
- **Increasing *Enterococcus***
- **Increasing resistance**

Pediatr Rev 2024;45:260

Pediatric UTI

- Most common SBI < 2 mo post Hib/PCV20
- Most common SBI in RSV+ children
- Common in ♀ <2 yo, fever without source
  - When selected by this, at our ED, you have a >10% chance of having a UTI!
  - Increased risk in children with urinary tract abnormalities

Guideline: UTI

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™

FROM THE AMERICAN ACADEMY OF PEDIATRICS

CLINICAL PRACTICE GUIDELINE

Urinary Tract Infection: Clinical Practice Guideline for the Diagnosis and Management of the Initial UTI in Febrile Infants and Children 2 to 24 Months

Pediatrics 2011;128:595

MANAGEMENT

Action Statement 4

Action Statement 4a

When initiating treatment, the clinician should base the choice of route of administration on practical considerations. Initiating treatment orally or parenterally is equally efficacious. The clinician should base the choice of agent on local antimicrobial sensitivity patterns (if available) and should adjust the choice according to sensitivity testing of the isolated uropathogen (evidence quality: A; strong recommendation).

Action Statement 4b

The clinician should choose 7 to 14 days as the duration of antimicrobial therapy (evidence quality: B; recommendation).

Oral therapy

TABLE 3 Some Empiric Antimicrobial Agents for Oral Treatment of UTI

Antimicrobial Agent	Dosage
Amoxicillin-clavulanate	20–40 mg/kg per d in 3 doses
Sulfonamide	
Trimethoprim-sulfamethoxazole	6–12 mg/kg trimethoprim and 30-60 mg/kg sulfamethoxazole per d in 2 doses
Sulfisoxazole	120–150 mg/kg per d in 4 doses
Cephalosporin	
Cefixime	8 mg/kg per d in 1 dose
Cefpodoxime	10 mg/kg per d in 2 doses
Cefprozil	30 mg/kg per d in 2 doses
Cefuroxime axetil	20–30 mg/kg per d in 2 doses
Cephalexin	50–100 mg/kg per d in 4 doses

The helpful kidney

- Concentrates most medications
- Example: ceftriaxone
  - Serum peak: 150 ug/mL
  - Urine peak: 3000 ug/mL!
- Can consider cephalosporin, amoxicillin or trimethoprim-sulfa
- Narrow when able!

Summary

- Pediatric infections are common
- Evidence based guidelines can provide best care and appropriately limit interventions
- Be an Antibiotic Steward!

COMPREHENSIVE GERIATRIC ASSESSMENT

DAVID YUAN, MD, MS

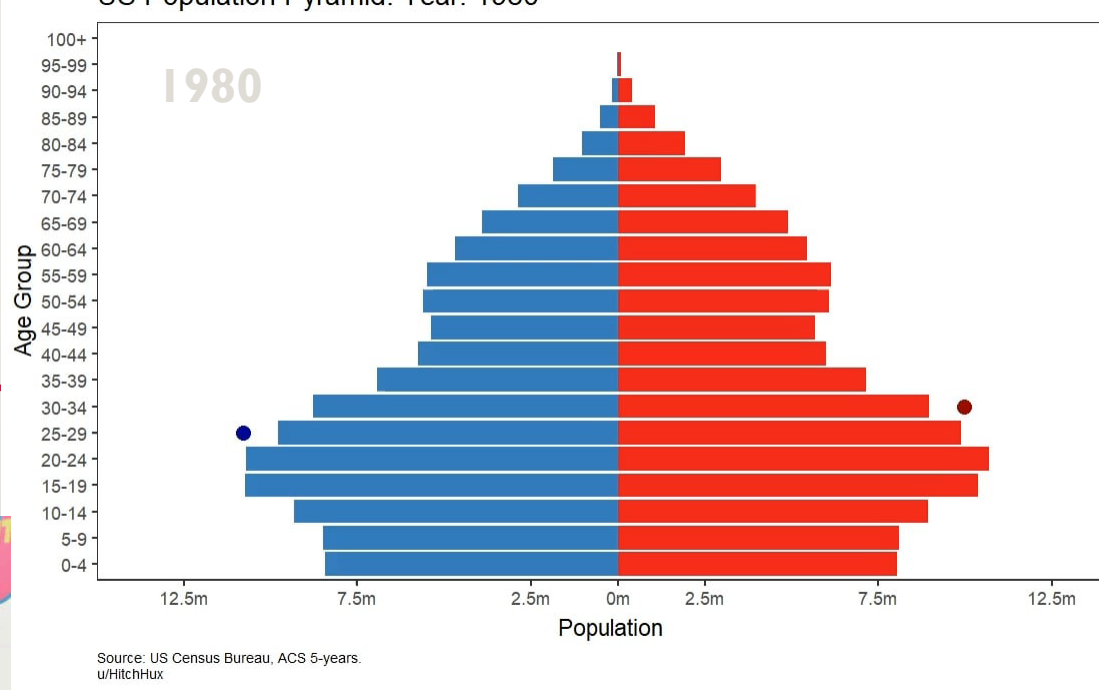
FAMILY MEDICINE PHYSICIAN

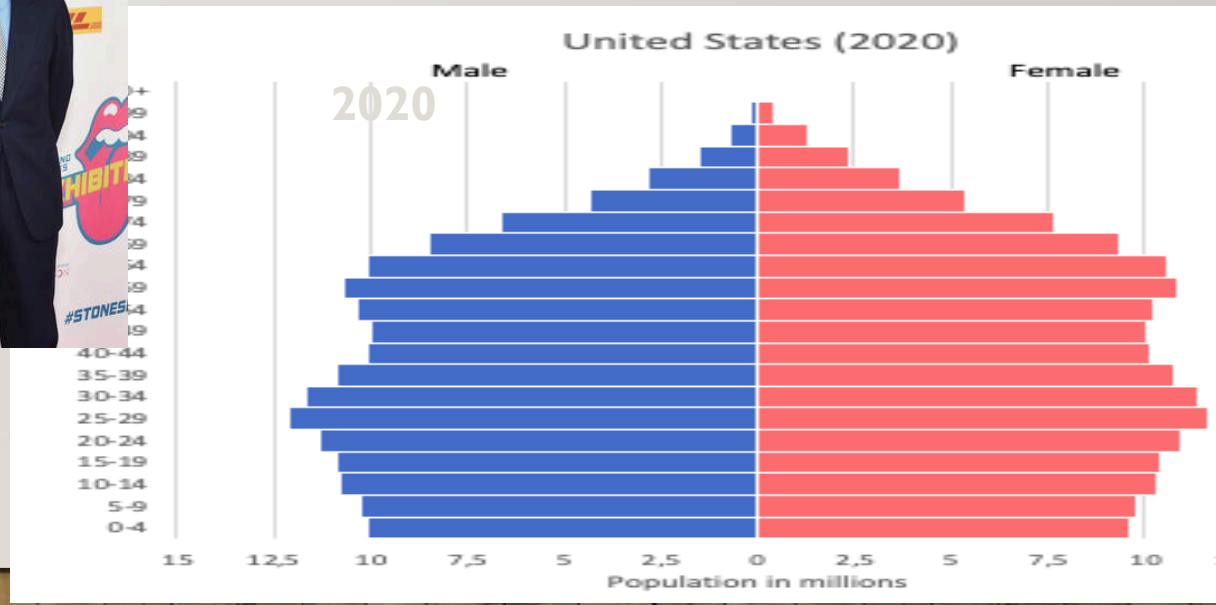
GERIATRICS

- **Relevance:**
  - People living longer - an **expanding** population
  - More older adults seeking care in **all settings**
  - **Aging:** Biological process affecting health and **function**
  - Calls for a **different** approach

WHAT IS "AGING"

- Our society is getting 'older'

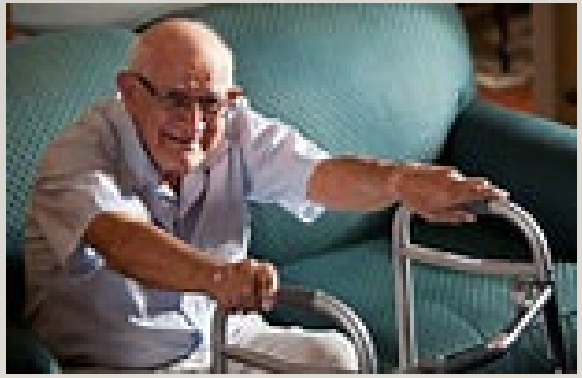




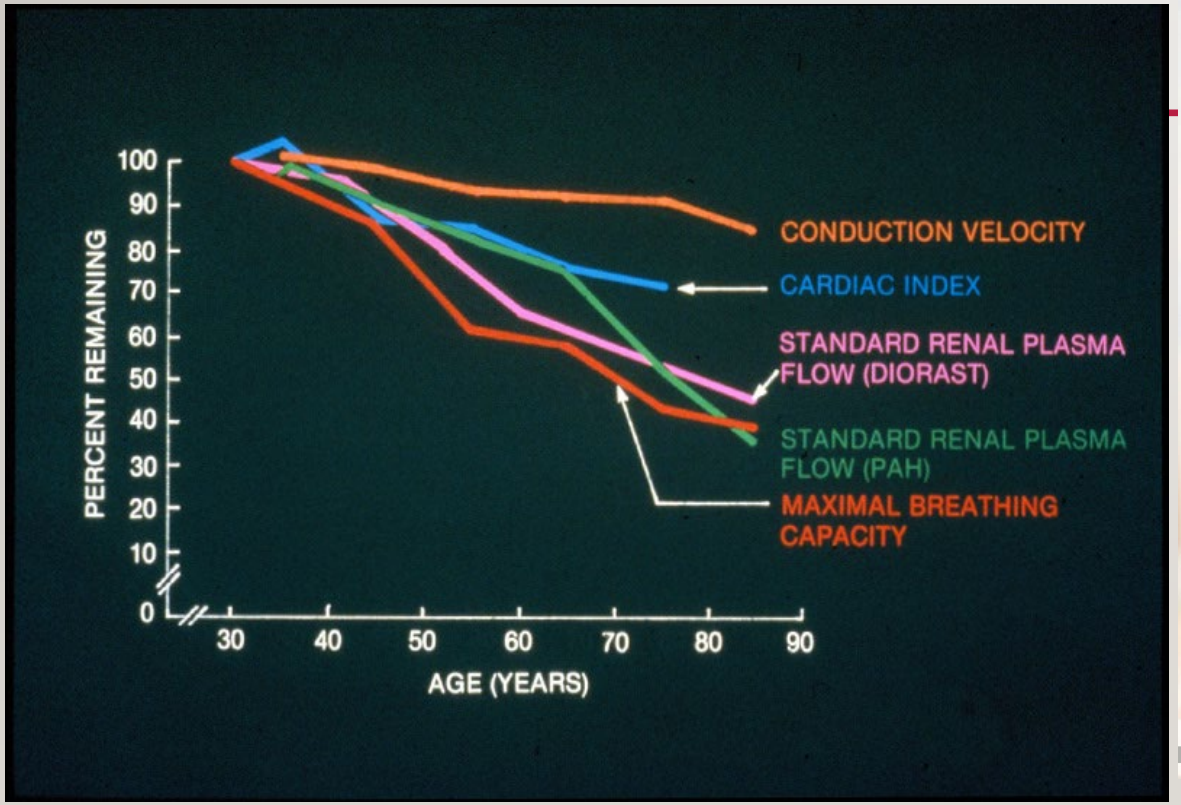
time dependent sequential deterioration, physiological changes; increased susceptibility to stress, disease

WHO ARE "OLDER ADULTS"

- Officially, 65 and over
- Clinically, ~75 and over
- The oldest old: over 85*
- A diverse group – from robust to frail



AGING – PHYSIOLOGIC CHANGES & PHYSICAL SIGNS



Decline in PHYSIOLOGIC FUNCTION - decreased FUNCTIONAL RESERVE – clinical signs and SYMPTOMS

GERIATRIC SYNDROMES & FRAILTY

- Impaired gait and falls
- Impaired memory and dementia
- Urinary incontinence
- Sleep difficulty
- Weight loss
- Late-life late-onset depression
- **Frailty**

GERIATRIC SYNDROMES & FRAILTY

People **don't age the same** and not all older persons are frail.

- Variability in heath and abilities of older adults makes **FUNCTIONAL STATUS o**f a person - a **major** guide for clinical assessment and approach, along with their **physical, psychological and social environment**

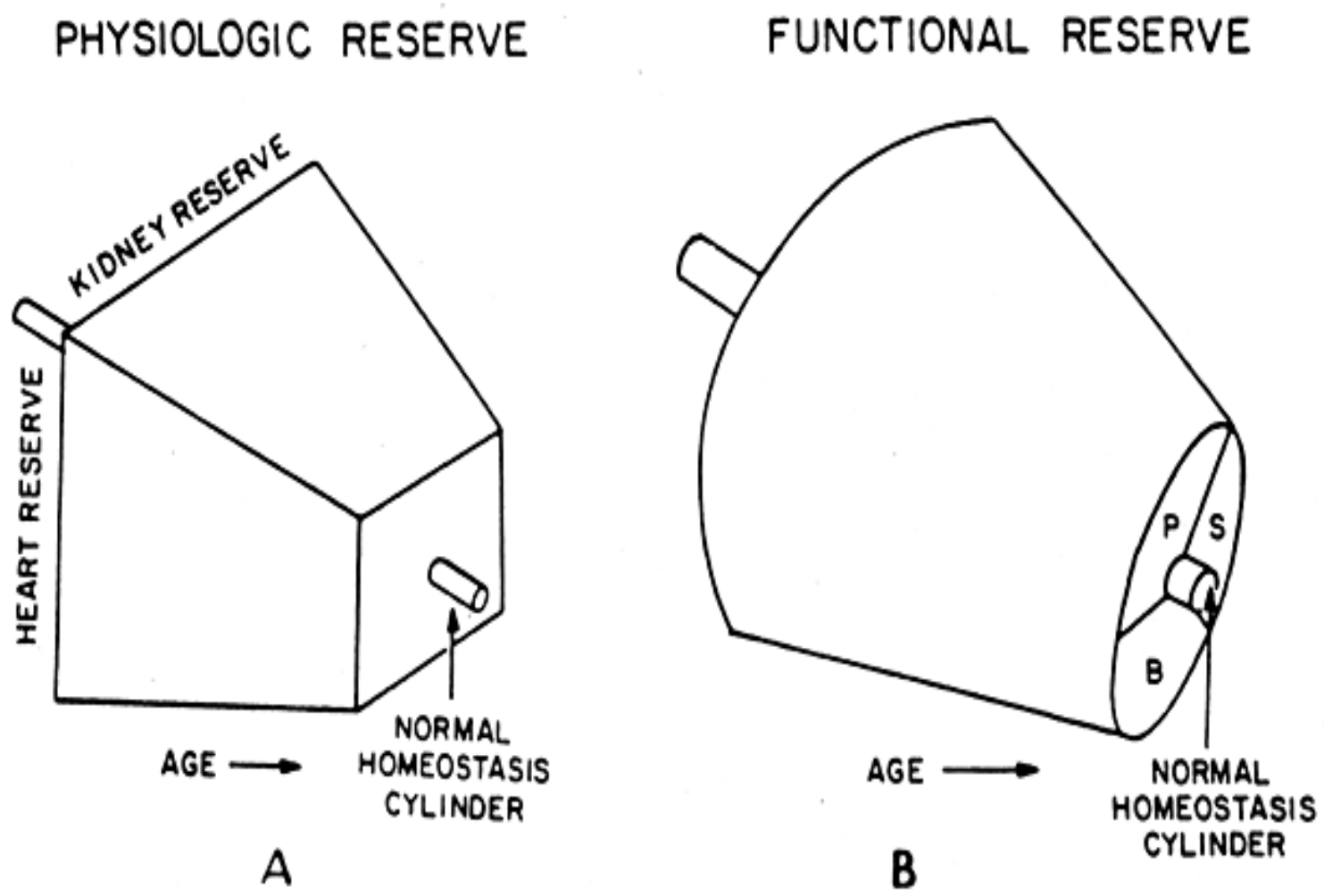


Figure 2. Functional aging. *A*, The Fries and Crago model of diminishing area of physiologic reserve due to the decline in organ function. A stress to the individual that carries outside the outer envelope will result in death. (Reproduced with permission from Fries JF and Crapo LM: Vitality and Aging. Implications of the Rectangular Curve. San Francisco, W. H. Freeman, 1981, p. 36.) *B*, An expanded model representing the diminishing area of functional reserve due to the decline in biopsychosocial functions. The normal homeostasis cylinder represents the physical and instrumental activities of daily living (see text). Death will occur when functional reserves decrease to a point less than that amount required by the homeostatic cylinder or when a stress exceeds the compensatory functional reserves.

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WHOLE-PERSON APPROACH TO CARE

OLDER PATIENTS VS. YOUNGER PATIENTS

- Aging physiology with decreased functional reserve
- Geriatric syndromes
- Often: More chronic medical conditions
- Often: longer list of medications
- Sometimes: Cognitive impairment impacting decision making **capacity**, **caregivers** often involved
- Mostly retired, may be on fixed income, may live **alone**
- May **need help** in daily life (ADLs/IADLs)
- Care is provided in ***interdisciplinary/interprofessional*** teams in different ***health care settings***

COMPREHENSIVE GERIATRIC ASSESSMENT ("H&P+")

- Physical Function
- Cognitive Function
- Balance/Gait/Falls
- Frailty
- Visual/hearing impairment
- Affective assessment
- Polypharmacy
- Weight loss
- Urinary incontinence
- Social support
- Abuse/neglect
- Economic assessment
- Environmental assessment
- Spirituality
- Goals of care

FUNCTIONAL STATUS - ADLS/IADLS

Do you need assistance with shopping or finances?

Do you need assistance with bathing or taking a shower?

Table 1. Katz Index of Independence in Activities of Daily Living

Activities (1 or 0 points)	*Independence (1 point)**	*Dependence (0 points)†*
Bathing Points: _____	Bathes self completely or needs help in bathing only a single part of the body, such as the back, genital area, or disabled extremity	Needs help with bathing more than one part of the body, getting in or out of the bathtub or shower; requires total bathing
Dressing Points: _____	Gets clothes from closets and drawers, and puts on clothes and outer garments complete with fasteners; may need help tying shoes	Needs help with dressing self or needs to be completely dressed
Toileting Points: _____	Goes to toilet, gets on and off, arranges clothes, cleans genital area without help	Needs help transferring to the toilet and cleaning self, or uses bedpan or commode
Transferring Points: _____	Moves in and out of bed or chair unassisted; mechanical transfer aids are acceptable	Needs help in moving from bed to chair or requires a complete transfer
Fecal and urinary continence Points: _____	Exercises complete self-control over urination and defecation	Is partially or totally incontinent of bowel or bladder
Feeding Points: _____	Gets food from plate into mouth without help; preparation of food may be done by another person	Needs partial or total help with feeding or requires parenteral feeding

Table 2. Lawton Instrumental Activities of Daily Living Scale (Self-Rated Version)

For each question, circle the points for the answer that best applies to your situation.

1. Can you use the telephone?
   - Without help 3
   - With some help 2
   - Completely unable to use the telephone 1
2. Can you get to places that are out of walking distance?
   - Without help 3
   - With some help 2
   - Completely unable to travel unless special arrangements are made 1
3. Can you go shopping for groceries?
   - Without help 3
   - With some help 2
   - Completely unable to do any shopping 1
4. Can you prepare your own meals?
   - Without help 3
   - With some help 2
   - Completely unable to prepare any meals 1
5. Can you do your own housework?
   - Without help 3
   - With some help 2
   - Completely unable to do any housework 1
6. Can you do your own handyman work?
   - Without help 3
   - With some help 2
   - Completely unable to do any handyman work 1
7. Can you do your own laundry?
   - Without help 3
   - With some help 2
   - Completely unable to do any laundry 1

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FRAILTY & CLINICAL FRAILTY SCALE

- Weakness
- Weight loss
- Slow gait
- Exhaustion
- Low activity

Clinical Frailty Scale*

1 **Very Fit** – People who are robust, active, energetic and motivated. These people commonly exercise regularly. They are among the fittest for their age.

2 **Well** – People who have **no active disease symptoms** but are less fit than category 1. Often, they exercise or are very **active occasionally**, e.g. seasonally.

3 **Managing Well** – People whose **medical problems are well controlled,** but are **not regularly active** beyond routine walking.

4 **Vulnerable** – While **not dependent** on others for daily help, often **symptoms limit activities.** A common complaint is being "slowed up", and/or being tired during the day.

5 **Mildly Frail** – These people often have **more evident slowing,** and need help in **high order IADLs** (finances, transportation, heavy housework, medications). Typically, mild frailty progressively impairs shopping and walking outside alone, meal preparation and housework.

6 **Moderately Frail** – People need help with **all outside activities** and with **keeping house**. Inside, they often have problems with stairs and need **help with bathing** and might need minimal assistance (cuing,

7 **Severely Frail** – **Completely dependent for personal care**, from whatever cause (physical or cognitive). Even so, they seem stable and not at high risk of dying (within ~ 6 months).

8 **Very Severely Frail** – Completely dependent, approaching the end of life. Typically, they could not recover even from a minor illness.

9. **Terminally Ill** - Approaching the end of life. This category applies to people with **a life expectancy <6 months**, who are **not otherwise evidently frail.**

Scoring frailty in people with dementia

The degree of frailty corresponds to the degree of dementia. Common **symptoms in mild dementia** in details of a recent event, though still reme repeating the same question/story and so

In **moderate dementia**, recent memory is very impaired, even though they seemingly can remember their past life events well. They can do personal care with prompting.

In **severe dementia**, they cannot do personal care without help.

* 1. Canadian Study on Health & Aging, Revised 2008.
2. K. Rockwood et al. A global clinical measure of fitness and frailty in elderly people. CMAJ 2005;173:489-495.

Participating Sites:

AVH

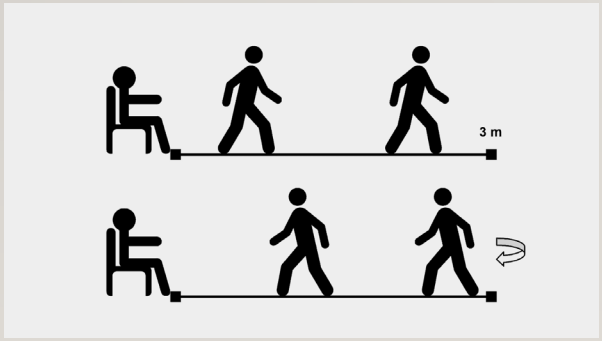
Cape Breton District HEALTH AUTHORITY
Making Healthier Choices Together

Sponsors:

UPMC St. Margaret's

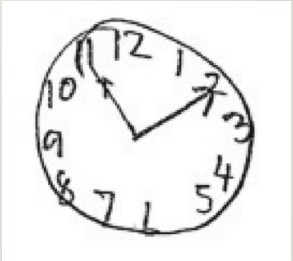
BALANCE/GAIT IMPAIRMENT AND FALLING

- “Have you fallen and hurt yourself in the past year?”
- “Have you fallen two or more times in the past year?”*
- “Do you fear falling because of balance or gait?”
- **Timed UP AND GO** **GAIT SPEED**



COGNITIVE SCREEN: MINICOG
DELIRIUM SCREEN: UB CAM

- **MINICOG** (recall items, clock)
- E.g. Banana, sunrise, chair (e.g. 10 after 11)



- **UB-CAM** (Ultra Brief Confusion Assessment Method)

- which day of the week it is?

- Months of the year, starting with December - backwards?

VISION & HEARING

- Do you have trouble seeing, reading, or watching TV?
- Do you have difficulty hearing conversation in a quiet room?
- Sensory organ impairment impacts function in daily life
- Increases risk for falls, cognitive impairment, depression
- **Snellen eye chart**
- **Whispered voice test**
- Self-reports, short questionnaires

MALNUTRITION, URINARY INCONTINENCE, POLYPHARMACY

- Malnutrition
  - Weight loss >10% in previous year
- Urinary Incontinence
  - "In the last year, have you ever lost your urine and gotten wet?"
  - Have you lost urine on at least six separate days?"
- Polypharmacy
  - Do you take 9 or more routine medications (excluding vitamins and other supplements)?
  - Do you understand the reason for each of your medications?

SOCIAL, ECONOMIC, ENVIRONMENTAL

- Do you live alone?
- "Who would be able to help if you become ill?
- Financial stress, food insecurity, transportation
- Home safety evaluation/Access to medical and other services

ELDER ABUSE AND SELF-NEGLECT

- Experienced by 10% of older adults in the U.S. annually
- Healthcare providers and trainees are mandated reporters
- Anonymous reports made to Older Adult Protective Services: 24 Hour Helpline: 1-800-490-8505
- Questions to ask patient: "In the past 6-months:"
  - 1) Has anyone close to you harmed you?
  - 2) Has anyone close to you failed to give you the care that you need?
  - 3) Has anyone tried to force you to sign papers or use your money against your will?

GOALS OF CARE/ADVANCE DIRECTIVES

Health-care values

- Patient-directed wishes for either a state of wellbeing to be attained or maintained, or specific goals

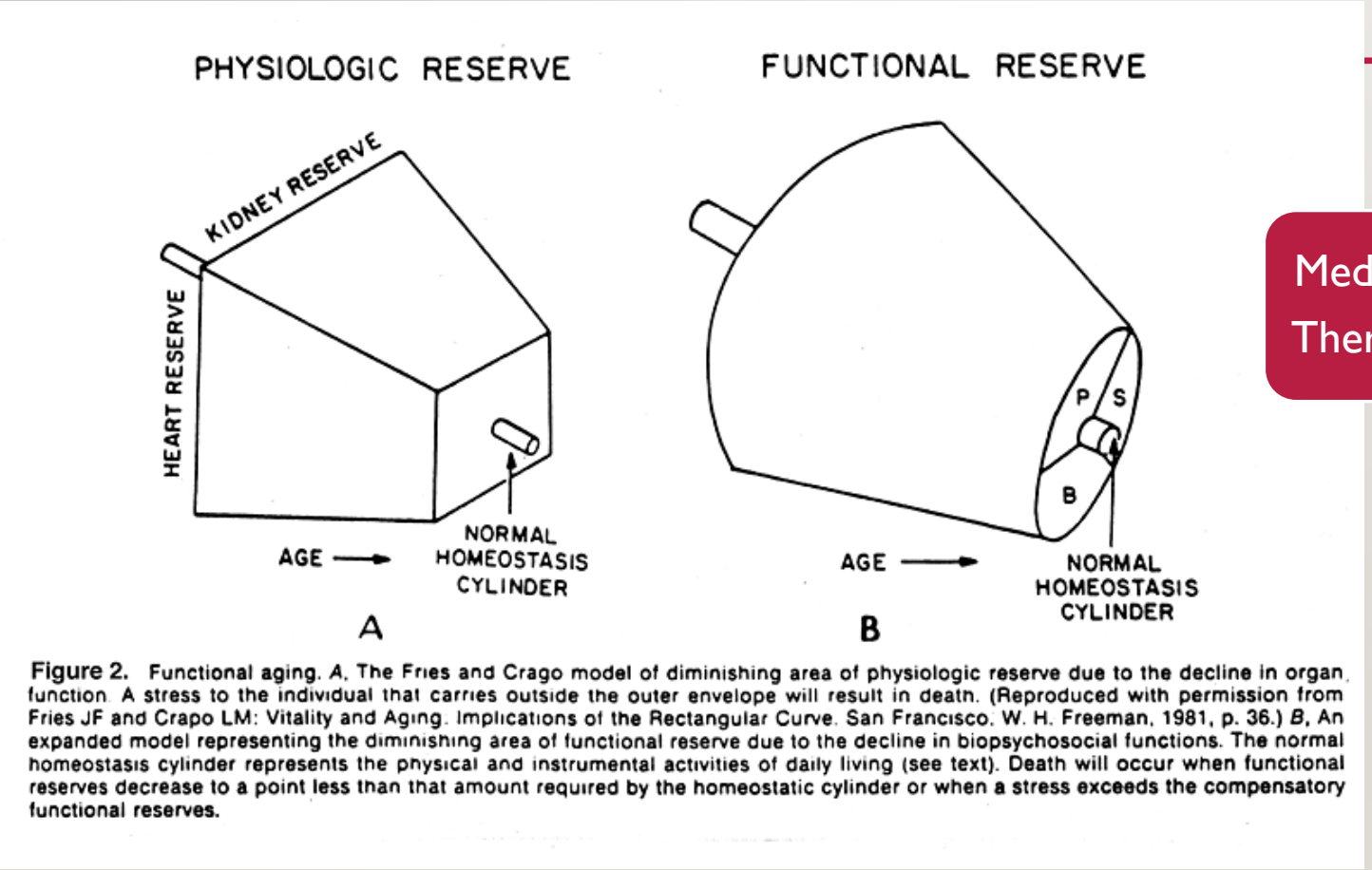
Advance directives/ POLST

- Wishes for care in the context of serious, acute, illness, linked to specific orders

Durable Power of Attorney

- Person authorized to make health care decisions in the event patient is incapacitated

A CONCEPTUAL FRAME



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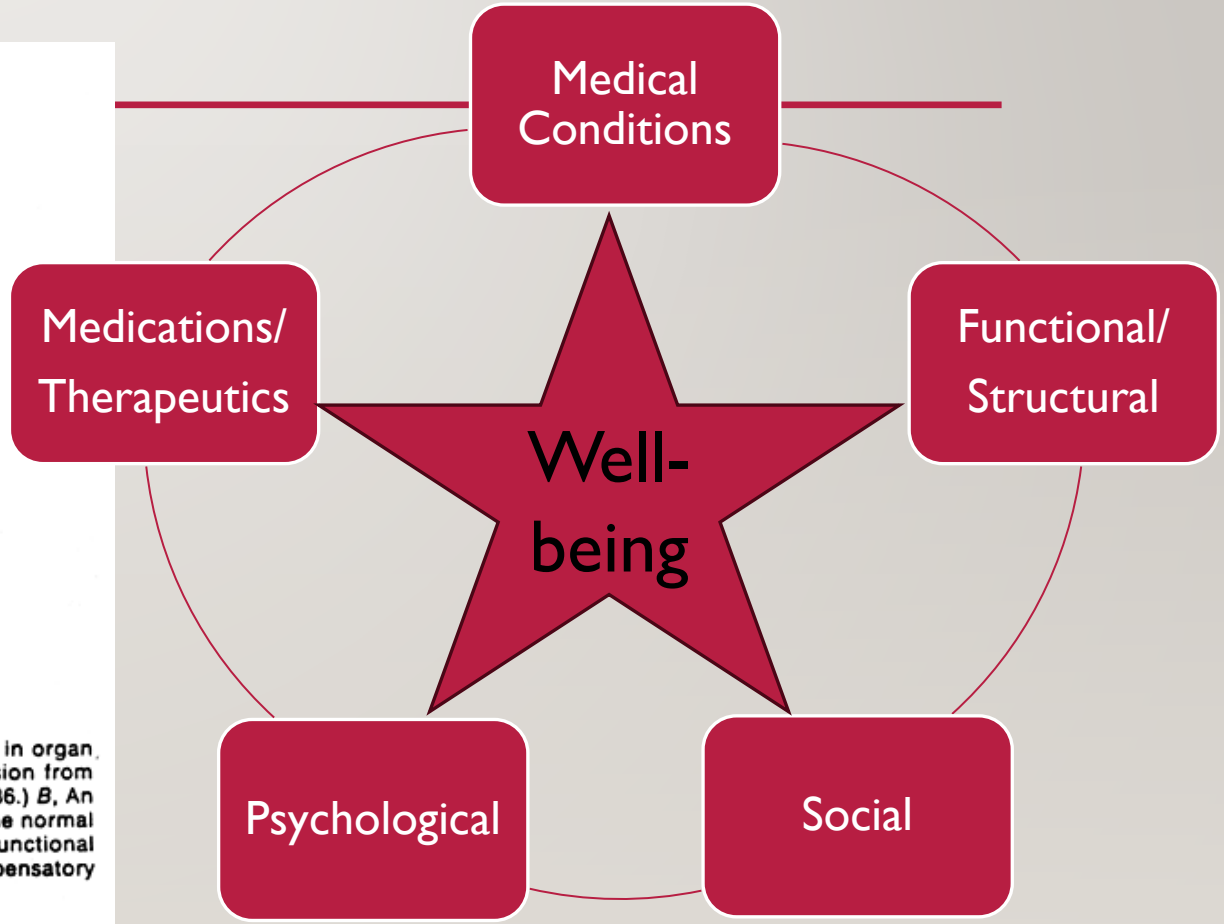

TODAY – PRACTICE

- **Impaired Cognition –** review and discuss Mini Cog, MMSE, MoCA
- **Hx of Falls/impaired gait and balance** – discuss Timed Up and Go, gait speed *((e.g. very slow at .45m/s))*
- **Functional decline** – review ADLs and IADLs forms.
- **Frailty** – review and discuss Frailty Scale.

TAKE HOME POINTS

- Assessment of an older person requires **additional** inquires related to functional deficits due to aging and care is provided in context of a **whole person**
- CGA & tools are **valuable and useful** for older patients in **any settings**, including inpatient/hospital wards
- Functional deficits in older patient affect hospital and post-hospital outcome
- CGA tools are part of **4Ms/age-friendly care** framework (mind, mobility, meds and matters most)+comorbidities/complexities (**5thM**)

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Pittsburgh
School of Medicine
A Fresh Approach to COPD Management: Integrating New Evidence into Personalized Treatment Strategies
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University of Pittsburgh
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Disclosures

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- **Scientific Advisory Board:** Sanofi/Regeneron, AstraZeneca, GlaxoSmithKline (GSK), Boehringer Ingelheim

Diagnosis and Treatment of COPD

- Impact and Diagnosis
- Treatment
  - General
  - Hospital and Transitional Care
  - “Precision” (Pulmonology Referral)

Definition and Early Symptoms of Chronic Obstructive Pulmonary Disease - COPD

- **Common, preventable, treatable disease characterized by persistent respiratory symptoms and airflow limitation due to airway and/or alveolar abnormalities caused by significant exposure to noxious particles or gases**
- **Umbrella term for progressive lung diseases, including**
  - Emphysema
  - Chronic bronchitis
  - Refractory (nonreversible) asthma/asthma-COPD overlap syndrome
  - Some forms of bronchiectasis…….ETC.
- **Most common early symptoms[3]**
  - Dyspnea on exertion
  - Chronic cough
  - Abnormal sputum production
  - Chest Tightness

[1]Global Initiative for Chronic Obstructive Lung Disease. 2017 Report.
Available at http://goldcopd.org/gold-2017-global-strategy-diagnosis-management-prevention-copd/
[2]COPD Foundation. http://www.copdfoundation.org/What-is-COPD/Understanding-COPD/What-is-COPD.aspx
[3]Fromer L. *Intern J Gen Med*. 2011;4:729-739.

Epidemiology of COPD

United States[1,2]

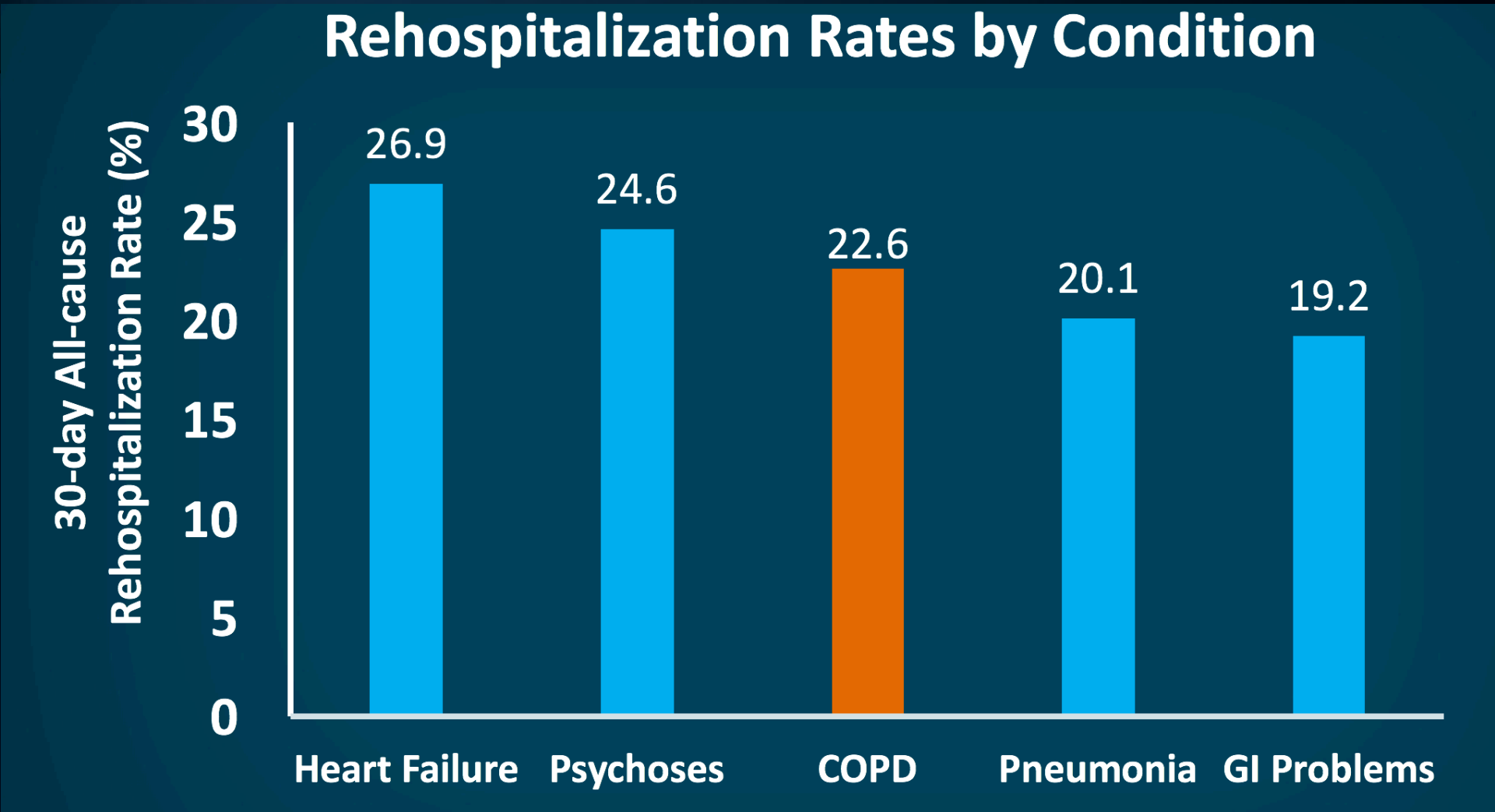
- ~~3rd 4th 5th~~ 4th leading cause of death
- Number affected: 13.7 million
- Now affects more women than men

Worldwide[3,4]

- 4th leading cause of death
- Number affected: 384 million
- Prevalence among individuals ≥30 y: 11.4%
- Prevalence is expected to increase with increasing prevalence of smoking in developing countries and increasing age of populations in high-income countries

[1]Ford ES et al. *CHEST.* 2013:144:284-305.
[2]Akinbami LJ and Liu X. NCHS data brief, no. 63. 2011.
[3]Adeloye D, et al. *J Global Health.* 2015 5:02415.
[4]World Health Organization. http://www.who.int/mediacentre/factsheets/fs310/en/

Conditions Most Commonly Associated with Hospital Readmission



- Reducing hospitalizations is a primary target of health care organizations and agencies

Jencks SF, et al. NEJM. 2009;360(14):1418-1428.

Spirometry Necessary for COPD Screening and Diagnosis

Consider COPD in patients with *any* symptoms and history of exposure to risk factors

SYMPTOMS
Shortness of breath
Chronic cough
Sputum

RISK FACTORS
Host factors
Tobacco smoke
Occupation
Indoor/outdoor air pollution

Spirometry is ***required*** to make diagnosis

Post-bronchodilator $FEV_1/FVC < 0.70$ confirms presence of *persistent* airflow limitation*

*Post-bronchodilator FEV_1/FVC measured 10-15 min after 2-4 puffs of a short-acting bronchodilator.
FEV_1, forced expired volume in 1 second; FVC, forced vital capacity.

Global Initiative for Chronic Obstructive Lung Disease. 2017 Report.
Available at http://goldcopd.org/gold-2017-global-strategy-diagnosis-management-prevention-copd/.

Current COPD Initial Classification Is Based on Symptoms and Exacerbation Risk (GOLD) 2026

Spirometrically confirmed diagnosis[1]

Post-BD FEV_1/FVC <0.7

Assessment of airflow limitation[1]

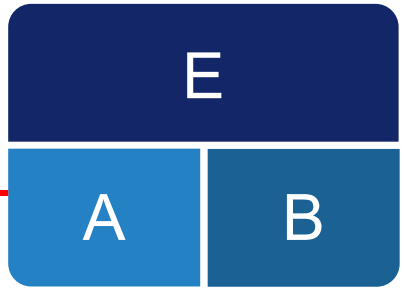
Grade	FEV_1 (% predicted)
GOLD 1	≥80
GOLD 2	50–79
GOLD 3	30–49
GOLD 4	<30

Assessment of symptoms/ risk of exacerbations[1]

EXACERBATION HISTORY (per year)

~~≥2 moderate~~ exacerbations ≥ 1 ~~or ≥1 leading to hospitalisation~~

0 ~~0 or 1 moderate~~ exacerbation ~~(not leading to hospitalisation)~~



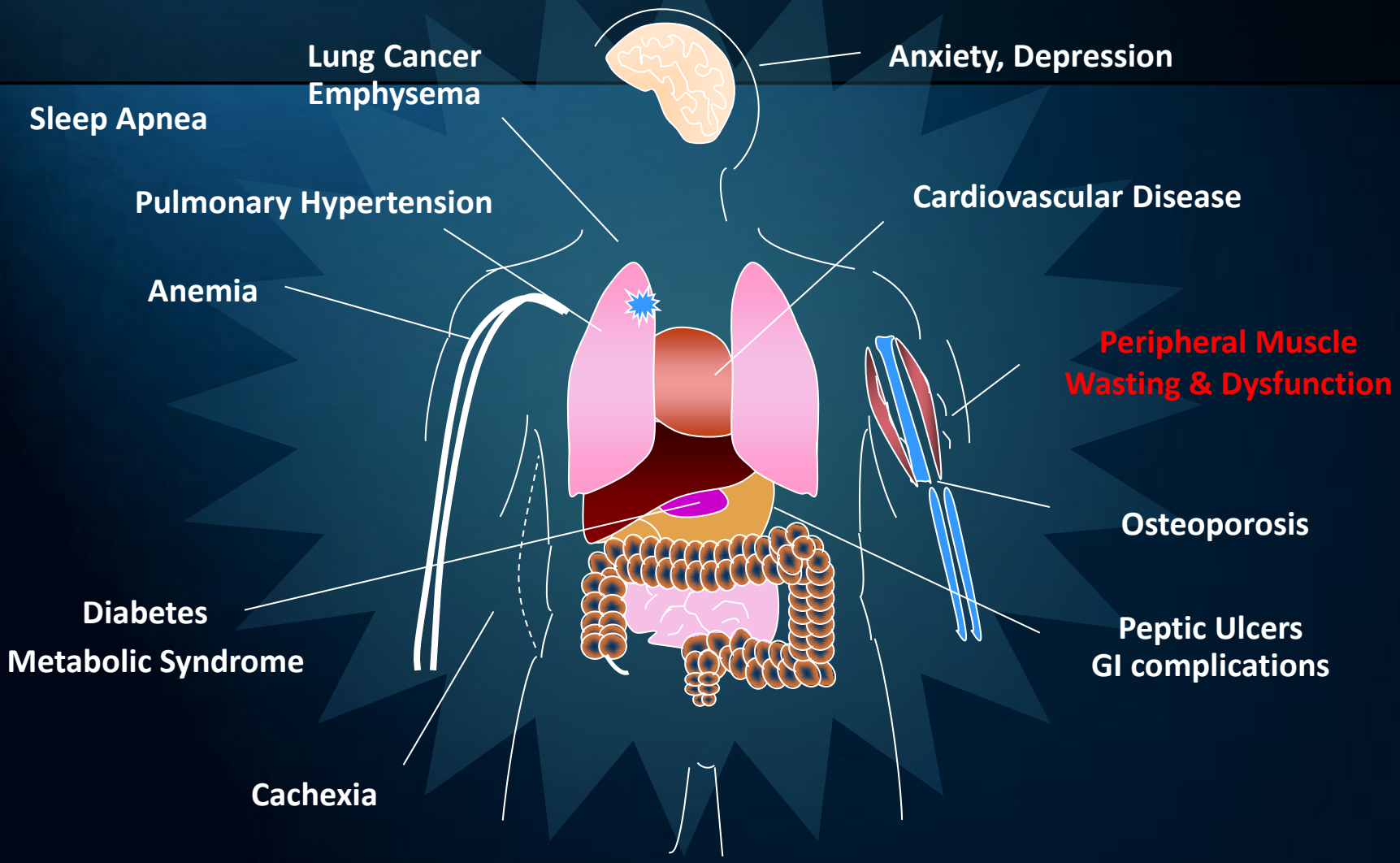
GOLD 2023 ABE assessment tool highlights the clinical relevance of exacerbations independently of the level of symptoms for initial assessment[1,2]

APP: COPD Pocket Consultant (COPD foundation)

© 2022, 2023, Global Initiative for Chronic Obstructive Lung Disease, available from www.goldcopd.org, published in Deer Park, IL, USA. All rights reserved. Use is by express license from the owner.
BD=bronchodilator; CAT=COPD Assessment Test; COPD=chronic obstructive pulmonary disease; FEV_1=forced expiratory volume in 1 second; FVC=forced vital capacity; mMRC=modified Medical Research Council.

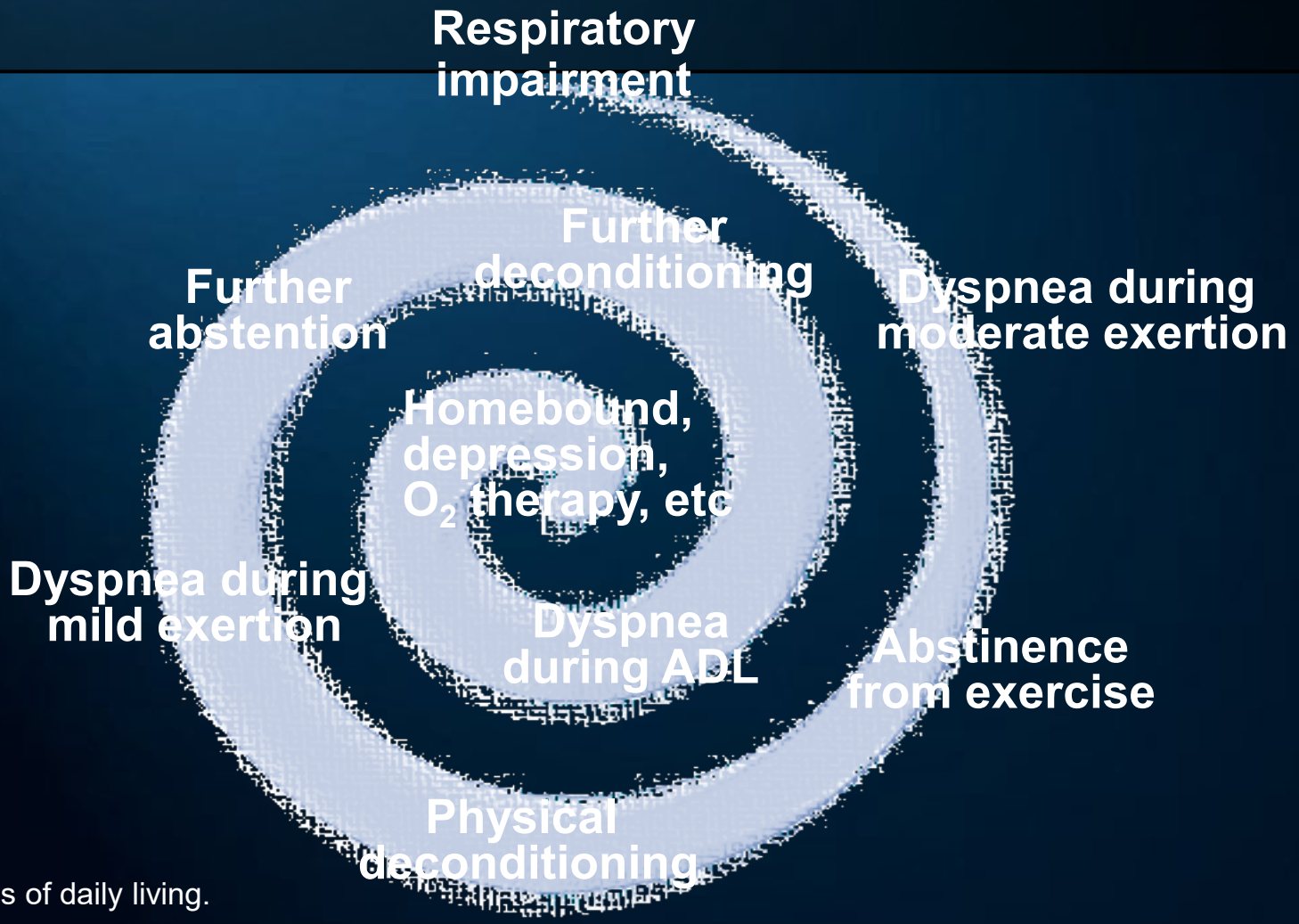
1. Global Initiative for Chronic Obstructive Lung Disease (GOLD). Accessed 6 March 2023. https://goldcopd.org/2023-gold-report-2/ 2. Agustí A, et al. *Eur Respir J*. 2023;61(4):2300239.

Comorbidities Are Common in COPD



Adapted from Kao C et al. *Atlas of COPD*. 2008.
Barnes PJ et al. *Eur Respir J*. 2009;33:1165-1185.
Fishman A et al. *N Engl J Med*. 2003;348:2059-2073.

The Inactivity-Dyspnea Spiral

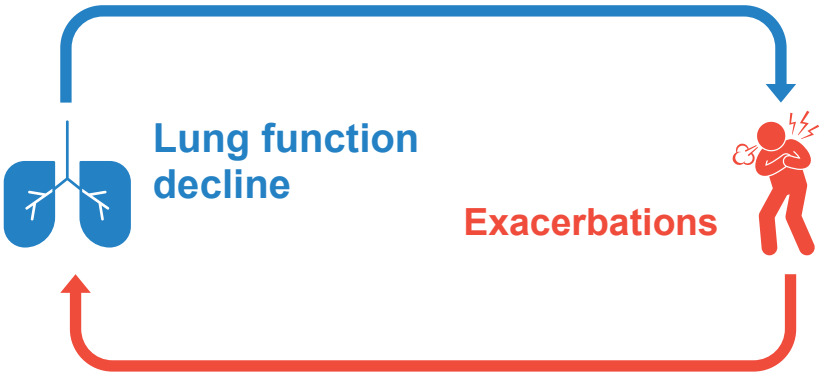


ADL, activities of daily living.

Adapted from Denis O´Donnell, MD.

Summary: Lung Function Decline and Exacerbations are Interconnected and Have a High Impact on Patients With COPD

Lung function decline is associated with increasing frequency and severity of exacerbations[1]



Exacerbations contribute to progressive and potentially irreversible lung damage[2]

Exacerbations and declining lung function are associated with:

- Increased dyspnoea[3]
- Impaired physical activity[4,5]
- Reduced quality of life[3]
- Hospitalization and medical costs[6]
- Death[7,8]

COPD=chronic obstructive pulmonary disease.

1. Hurst JR, et al. *N Engl J Med*. 2010;363(12):1128-1138. 2. Hansel TT, Barnes PJ. *Lancet*. 2009;374(9691):744-755. 3. de la Loge C, et al. *Chronic Obstr Pulm Dis*. 2016;3(2):519-538. 4. Hurst JR, et al. *Eur J Intern Med*. 2020;73:1-6. 5. Alahmari AD, et al. *Eur Respir J*. 2016;48(2):340-349. 6. Ozkaya S, et al. *Clinicoecon Outcomes Res*. 2011;3:15-18. 7. Suissa S, et al. *Thorax*. 2012;67(11):957-963. 8. Boutou AK, et al. *Eur Respir J*. 2013;42(3):616-625.

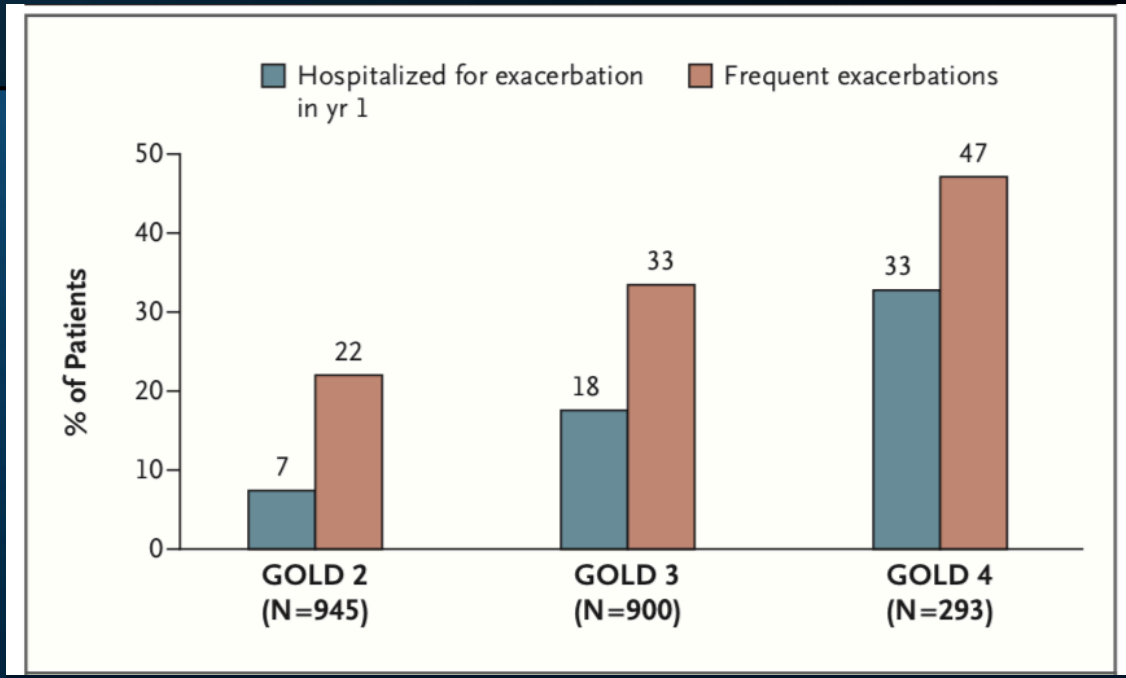
The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Susceptibility to Exacerbation in Chronic Obstructive Pulmonary Disease

John R. Hurst, M.B., Ch.B., Ph.D., Jørgen Vestbo, M.D., Antonio Anzueto, M.D., Nicholas Locantore, Ph.D., Hana Müllerova, Ph.D., Ruth Tal-Singer, Ph.D., Bruce Miller, Ph.D., David A. Lomas, Ph.D., Alvar Agusti, M.D., Ph.D., William MacNee, M.B., Ch.B., M.D., Peter Calverley, M.D., Stephen Rennard, M.D., Emiel F.M. Wouters, M.D., Ph.D., and Jadwiga A. Wedzicha, M.D., for the Evaluation of COPD Longitudinally to Identify Predictive Surrogate Endpoints (ECLIPSE) Investigators*

ABSTRACT



"Since moderate COPD is much more prevalent than very severe COPD, the overall health system burden of exacerbations may be greater in moderate disease."

IMPACT of PRIOR EXACERBATIONS in MODERATE COPD on FUTURE RISK

ORIGINAL ARTICLE

Natural History of Chronic Obstructive Pulmonary Disease Exacerbations in a General Practice–based Population with Chronic Obstructive Pulmonary Disease

Kieran J. Rothnie[1,2], Hana Müllerová[3], Liam Smeeth[2], and Jennifer K. Quint[1,2]

[1]Respiratory Epidemiology, Occupational Medicine and Public Health, National Heart and Lung Institute, Imperial College London, London, United Kingdom; [2]Faculty of Epidemiology and Population Health, London School of Hygiene and Tropical Medicine, London, United Kingdom; and [3]Respiratory Epidemiology, GlaxoSmithKline R&D, Uxbridge, United Kingdom

ORCID ID: 0000-0003-4279-1624 (K.J.R.).

- 99,574 COPD patients from UK Clinical Practice Research Database
  - mean 67 yo
  - 70% GOLD 2/3
  - 52% smoker
- 10 years of follow-up, 2004 - 2015

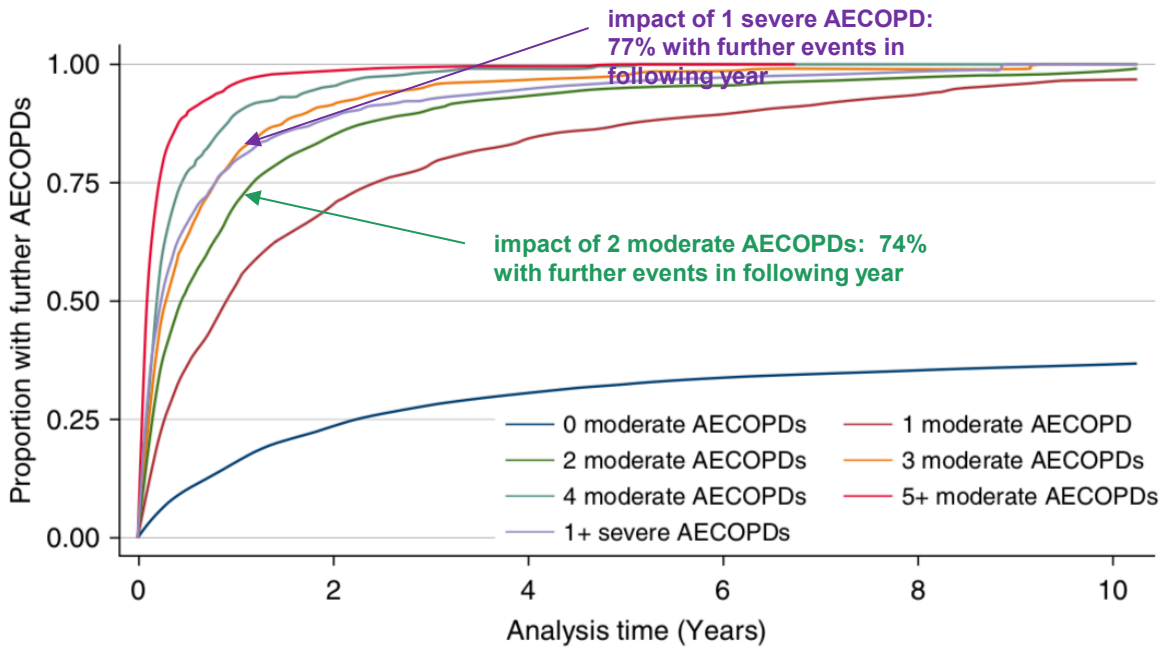


Figure 1. Time to first acute exacerbation of chronic obstructive pulmonary disease (AECOPD) by baseline AECOPD frequency and severity, established patients with chronic obstructive pulmonary disease.

Diagnosis and Treatment of COPD

- Impact and Diagnosis

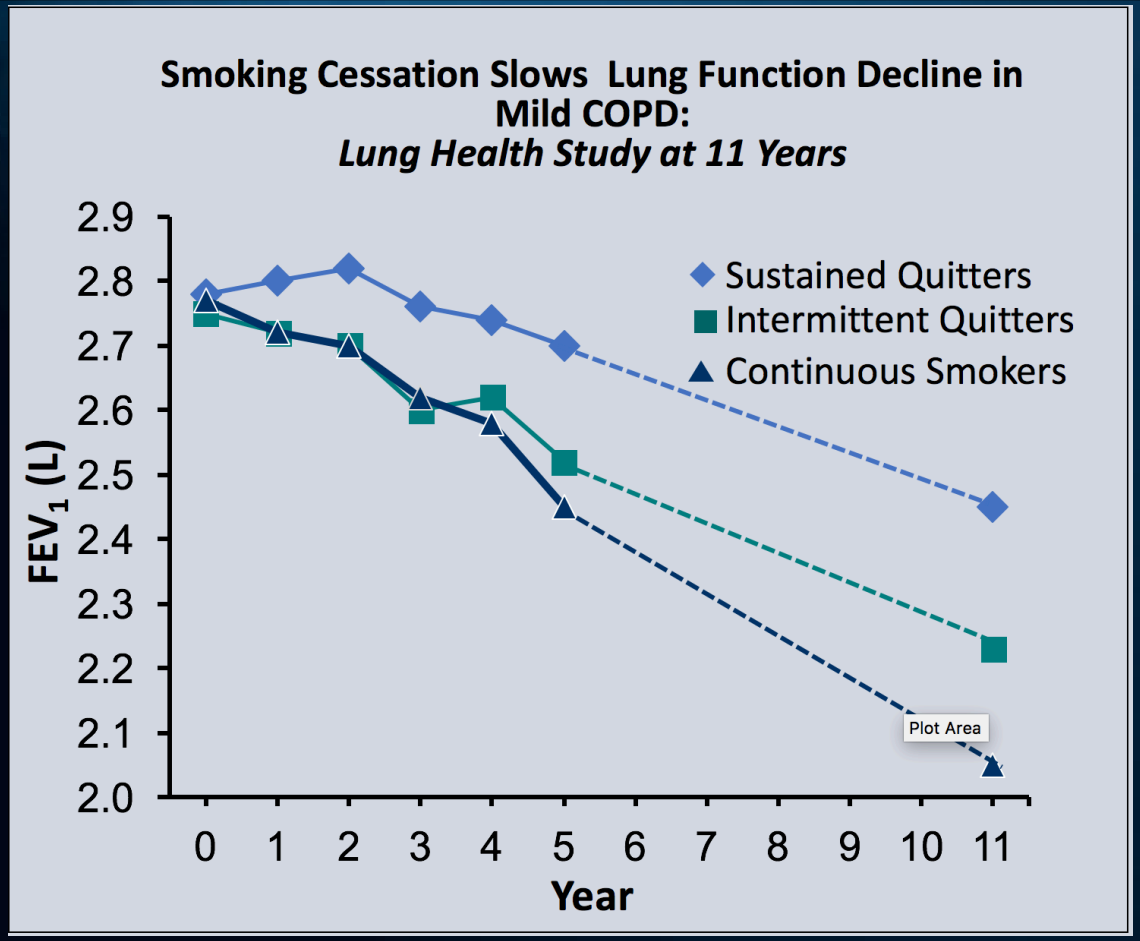
- Treatment
  - General
  - Hospital and Transitional Care
  - “Precision” (Pulmonology Referral)

Management of COPD: Initial Focus on Prevention and Maintenance

Nonpharmacologic interventions

- Smoking cessation
- Influenza Vaccination (yearly)
- Pneumococcal (PCV-20 in most per CDC recs)
- COVID-19 ?yearly or major variant
- RSV ?frequency
- Avoidance of indoor/outdoor air pollution
- Reduce occupational exposure to irritants
- Encourage Physical activity/exercise training

Does Early Diagnosis Improve Outcomes?



- Smoking cessation even at early stages of disease slows the decline of lung function.
- Does early detection of COPD with spirometry increase likelihood of smoking cessation?

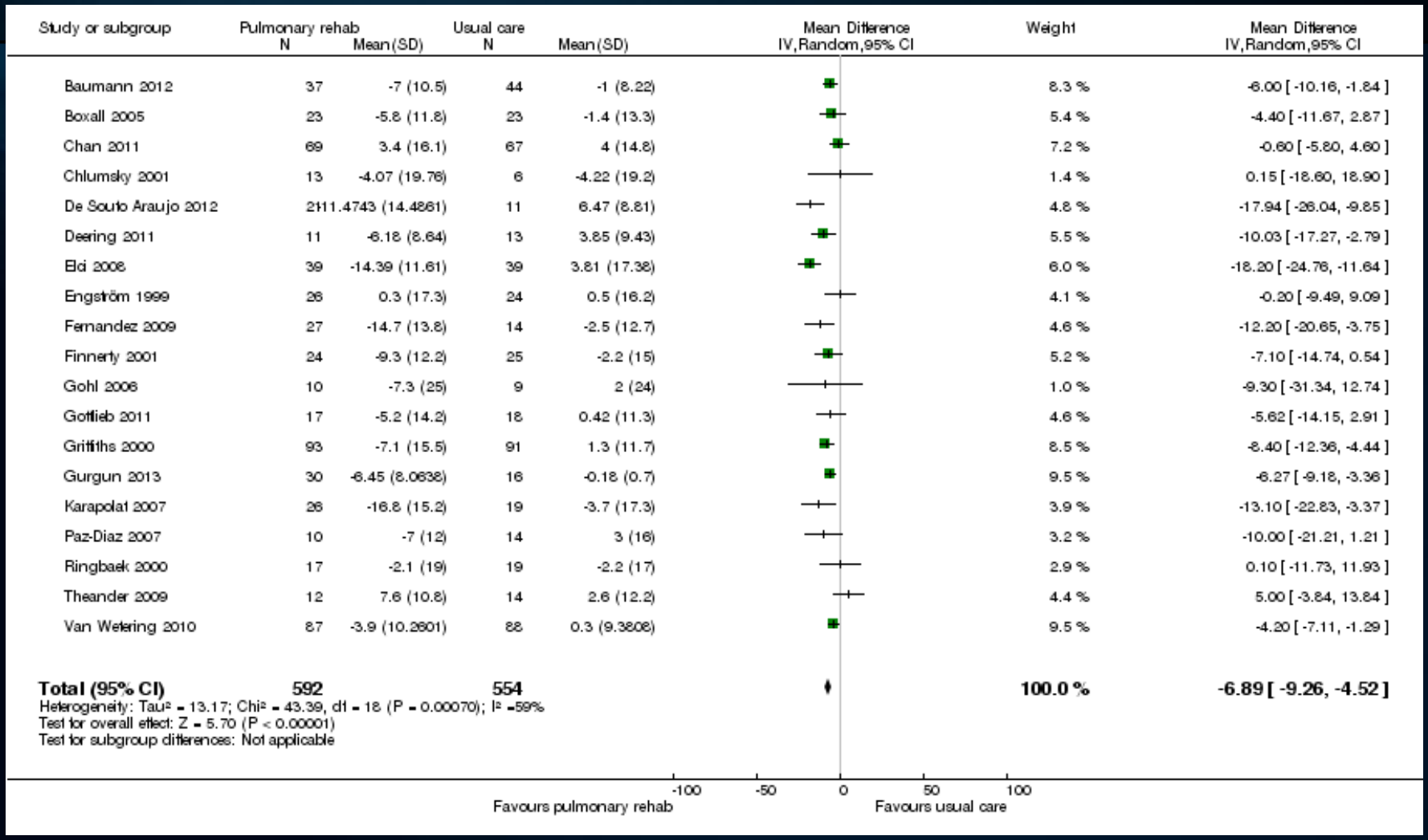
Figure adapted from Anthonisen NR, et al. *Am J Respir Crit Care Med.* 2002;166:675-679. Calverley et al. *Lancet.* 2003;362:1053-1061. BMJ Publishing Group.

Nonpharmacologic Treatments

Pulmonary Rehabilitation

Global Initiative for Chronic Obstructive Disease (GOLD) 2014. www.goldcopd.com. Accessed 3/10/14.

Pulmonary rehabilitation improves Quality of Life



McCarthy et al. Cochrane Database of Systematic Reviews 2015, issue 2.

Pharmacologic Options in COPD

Current Acceptable Maintenance

Bronchodilators

Short-Acting

Anticholinergic (SAMA):
Ipratropium

β-agonists (SABA):
Albuterol
Levalbuterol
Metaproterenol

SAMA + SABA:
Ipratropium + albuterol

Long-Acting

Anticholinergic (LAMA):
Tiotropium
Aclidinium (BID)
Umeclidinium
Revefenacin (nebulized)
Glycopyrrolate

β-agonists (LABA)
Salmeterol (BID)
Formoterol (BID, nebulized)
Arformoterol (BID, nebulized)
Indacaterol (QD)
Olodaterol (QD)

LAMA + LABA
Umeclidinium + vilanterol
Tiotropium + olodaterol
Indacaterol + glycopyrrolate (BID)
Formoterol + glycopyrrolate (BID)

Theophylline (pill)

Biologic

Dupilimab
Mepolozumab

Anti-Inflammatory

ICS + LABA

~~Fluticasone + salmeterol (bid)~~
~~Budesonide + formoterol (bid)~~
~~Fluticasone + vilanterol (qd)~~

ICS + LAMA + LABA

Fluticasone + vilanterol + Umeclidinium (qd)

Budesonide + Formoterol + Glycopyrrolate (bid)

PDE-4 inhibitors

Roflumilast (pill)
Ensifentrine (PDE3/4 nebs)

Antibiotic

Azithromycin* (pill)

Oral steroids

Prednisone*
Methylprednisolone*

*Not FDA-approved for use in COPD specifically.
SAMA, short-acting antimuscarinic agent; SABA, short-acting β2 andrenergic agent; LAMA, long-acting antimuscarinic agent; LABA, long-acting β2 andrenergic agent; ICS, inhaled corticosteroid; PDE-4, phosphodiesterase 4.

Clinical Review & Education

JAMA | Review

Diagnosis and Outpatient Management of Chronic Obstructive Pulmonary Disease
A Review

Craig M. Riley, MD; Frank C. Sciurba, MD

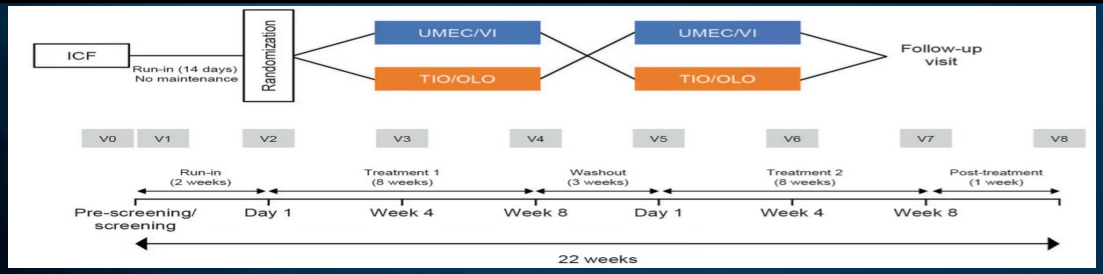
Pharmacologic Options in COPD

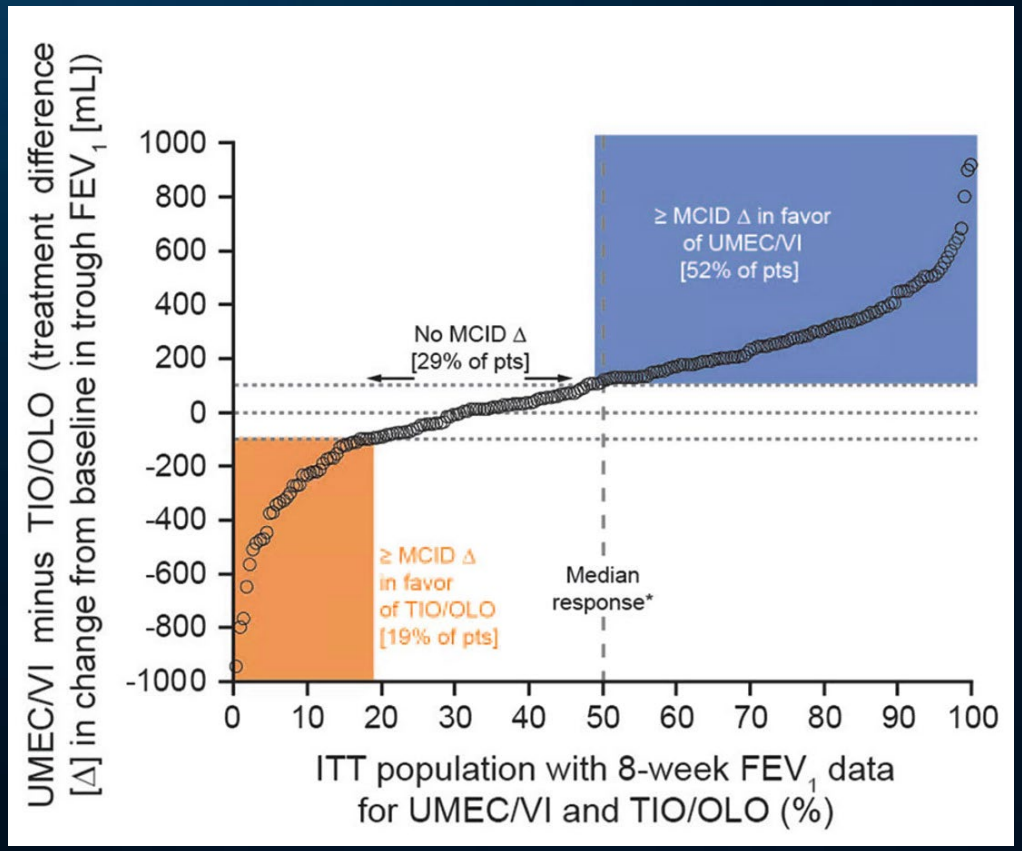
Table 1. Pharmacotherapy for COPD

Source	Class	Mechanism of Action	Medication Dose	Frequency	Device	Benefits[a]	Adverse Effects, %[b]
Short-Acting Inhaled Rescue Medications							
Combivent Inhalation Aerosol Study Group,[29] 1994	β_2-Agonist	Bronchodilation via airway smooth muscle β_2 receptor stimulation	Albuterol 180 or 200 µg	Every 4-6 h	pMDI, DPI	Mean peak effect vs placebo ↑FEV_1 170 mL	Headache, 3-5 Tachycardia, 2-3 Nasopharyngitis, 0-5 Muscle pain, 0-3 Dizziness, 0-3
			Albuterol 2.5 mg	Every 4-6 h	Nebulizer		
			Levalbuterol 90 µg	Every 4-6 h	pMDI		
			Levalbuterol 0.63 mg	Every 4-6 h	Nebulizer		
	Muscarinic antagonist	Inhibition of bronchoconstriction via airway smooth muscle M_1 and M_3 receptor blockade	Ipratropium 34 µg	4/d	pMDI	Mean peak effect vs placebo ↑FEV_1 170 mL	Dry mouth, 2 Nausea, 2 Flu-like symptoms, 2
			Ipratropium 0.5 mg	4/d	Nebulizer		
	Muscarinic antagonist and β_2-agonist combination	Bronchodilation via combination β_2 agonism and M_1 and M_3 receptor antagonism	Albuterol 100 µg and ipratropium 20 µg	4/d	SMI	Mean peak effect vs placebo, ↑FEV_1 240 mL	No difference vs monocomponents
			Albuterol 2.5 mg and ipratropium 0.5 mg	Every 4-6 h	Nebulizer		
Long-Acting Inhaled Maintenance Medications							
Karner et al,[32] 2014; Kew et al,[33] 2014	Muscarinic antagonist	Inhibition of bronchoconstriction via airway smooth muscle M_1 and M_3 receptor blockade	Aclidinium 400 µg	2/d	DPI	Mean peak effect vs placeb ↑FEV_1, 104 mL (82-125) ↓SGRQ, 2.6 U (2.0-3.5) ↓AE risk, 0.78 (0.70-0.87)[d]	Nasopharyngitis, 1-2 Dry mouth, 0-2
			Glycopyrrolate 15.6 µg	2/d[c]	DPI		
			Glycopyrrolate 25 µg	2/d	Nebulizer		
			Tiotropium 18 µg	Daily	DPI		
			Tiotropium 5 µg	Daily	SMI		
			Umeclidinium 62.5 µg	Daily	DPI		
			Revefenacin 88 µg	Daily	Nebulizer		
Kew et al,[33] 2014; Kew et al,[34] 2013	β_2-Agonist	Bronchodilation via airway smooth muscle β_2 receptor stimulation	Arformoterol 15 µg	2/d	Nebulizer	Mean peak effect vs placebo ↑FEV_1, 99 mL (72-128) ↓SGRQ, 2.3 U (1.5-3.2) ↓AE risk, 0.88 (0.76-1.02)	Nasopharyngitis, 1-3 Headache, 0-3 Muscle cramp, 1-2 Arthralgia, 0-2
			Formoterol 12 µg	2/d	DPI		
			Formoterol 20 µg	2/d	Nebulizer		
			Indacaterol 75 µg	Daily	DPI		
			Olodaterol 5 µg	Daily	SMI		
			Salmeterol 50 µg	2/d	DPI		
Oba et al,[35] 2016	Muscarinic Antagonist and β_2-agonist combination	Bronchodilation via combination β_2 agonism and M_1 and M_3 receptor antagonism	Glycopyrrolate 18 µg and formoterol 9.6 µg	2/d	pMDI	Mean peak effect vs placeb ↑FEV_1, 210 mL (190-230) ↓SGRQ, 4.6 U (3.3-5.9) ↓AE risk, 0.66 (0.57-0.77) vs LABA ↑FEV_1, 100 mL (80-130) ↓SGRQ, 2.3 U (1.3-3.3) ↓AE risk, 0.82 (0.73, 0.93) vs LAMA ↑FEV_1, 60 mL (50-80) ↓SGRQ, 2.3 U (1.7-2.9) ↓AE risk, 0.92 (0.84-1.00)	Nasopharyngitis, 1-2
			Indacaterol 27.5 µg and glycopyrrolate 15.6 µg	2/d[c]	DPI		
			Olodaterol 5 µg and tiotropium 5 µg	Daily	SMI		
			Umeclidinium 62.5 µg and vilanterol 25 µg	Daily	DPI		

Riley & Sciurba JAMA 2019

Comparative Efficacy of Two Dual Maintenance Bronchodilators: Individual Variation





Feldman et. al. Adv. Ther. 2017

Pharmacologic Options in COPD

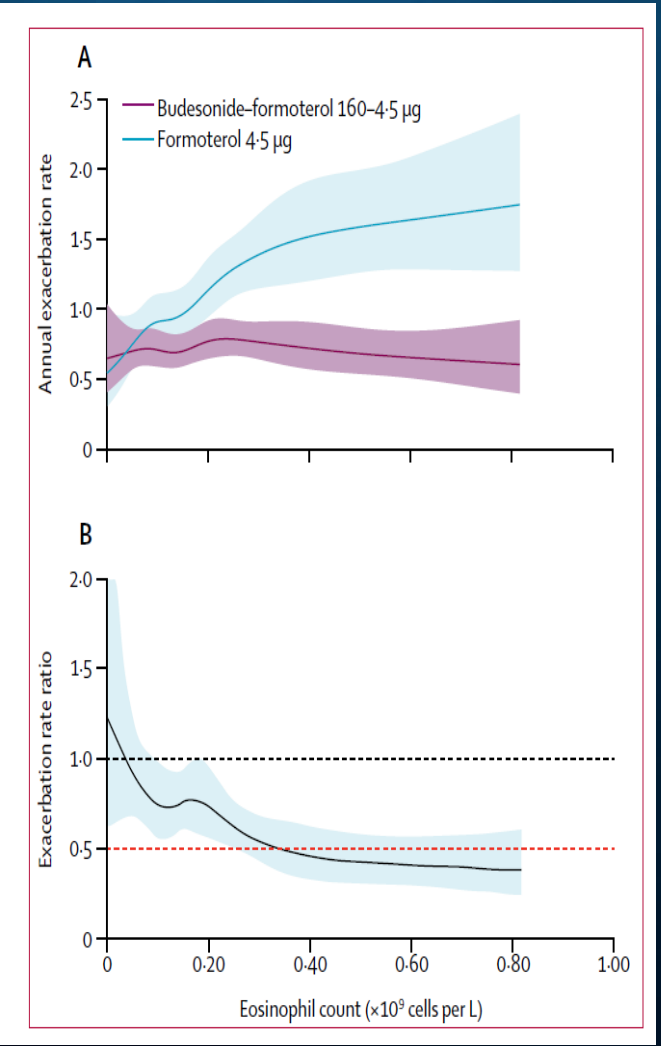
Table 1. Pharmacotherapy for COPD (continued)

Source	Class	Mechanism of Action	Medication Dose	Frequency	Device	Benefits[a]	Adverse Effects, %[b]
Kew et al,[33] 2014; Rodrigo et al,[36] 2017; Nannini et al,[37] 2013	β_2-Agonist and ICS combination	Bronchodilation via airway smooth muscle β_2 receptor stimulation and decreased airway inflammation	Budesonide 320 µg and formoterol 9 µg	2/d	pMDI[e]	Mean peak effect vs placebo ↑FEV_1, 133 mL (101-164) ↓SGRQ, 3.9 U (3.0-4.7) ↓AE risk, 0.73 (0.69-0.78) vs combination LAMA and LABA ↓FEV_1, 60 mL (0-120) ↑SGRQ, 1.13 U (0.5-1.8) ↓AE risk, 1.22 (1.10-1.33)	Pneumonia, 3 Candidiasis, 1-9 Dysphonia, 1-5 Headache, 1-4 Nasopharyngitis, 1-2
			Fluticasone propionate 250 µg and salmeterol 50 µg	2/d	DPI		
			Fluticasone furoate 100 µg and vilanterol 25 µg	Daily	DPI		
Zeng et al,[38] 2018	Muscarinic antagonist, β_2-agonist, and ICS combination (Triple)	Combination bronchodilation via β_2 agonism and M_1 and M_3 receptor antagonism and decreased airway inflammation	Fluticasone furoate 100 µg, umeclidinium 62.5 µg and vilanterol 25 µg	Daily	DPI	Mean peak effect vs combination LAMA and LABA ↑FEV_1, 40 mL (20-70) ↓SGRQ, 1.81 U (1.04-2.57) ↓AE risk, 0.78 (0.70-0.88) Vs combination LABA and ICS ↑FEV_1, 110 mL (100-130) ↓SGRQ, 1.81 U (1.35-2.28) ↓AE risk, 0.77 (0.66-0.91)	Increase in event rate vs non-ICS regimens pneumonia: 3 vs combination LABA and ICS back pain, 2 Diarrhea, 1-2
Oral Medications							
Chong et al,[39] 2017	PDE4 inhibitors	Decreased airway inflammation and increased bronchodilation via inhibition of cAMP breakdown in inflammatory and airway smooth muscle cells	Roflumilast 500 µg	Daily	Tablet	Mean peak effect vs placebo ↑FEV_1, 52 mL (43-60) ↓SGRQ, 1.1 U (0.4-1.7) ↓AE risk, 0.78 (0.73-0.83)	Diarrhea, 7 Weight loss, 6 Any psychiatric disorder, 4 Nausea, 3 Headache, 2
Albert et al,[40] 2011	Macrolides	Decreased airway inflammation from decreased bacterial burden +/− impaired neutrophil chemotaxis	Azithromycin 250 mg[f]	Daily	Tablet	Mean peak effect vs placebo ↓SGRQ, 2.2 U (0.7-3.7) ↓AE risk, 0.83 (0.72-0.96)	Hearing impairment, 6

Riley & Sciurba JAMA 2019

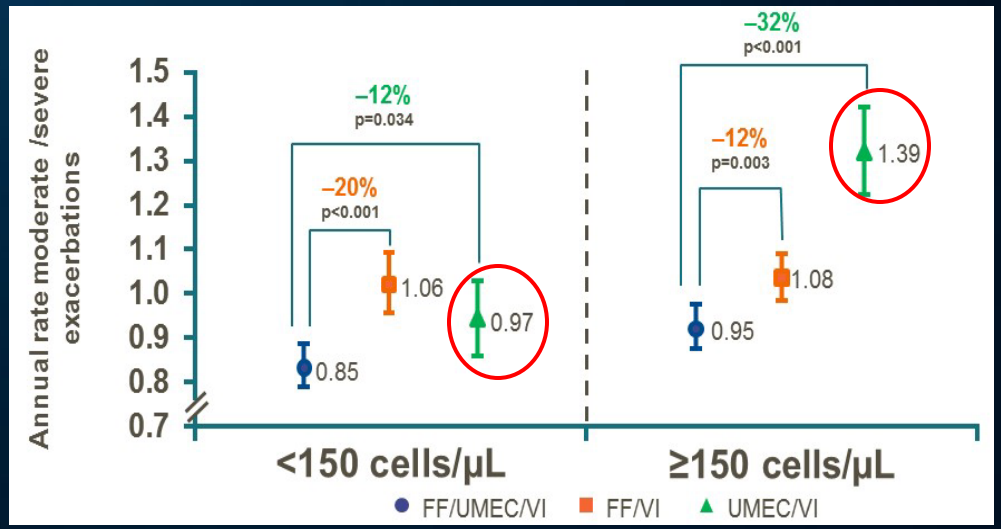
Eosinophils in COPD as a Predictor of Exacerbation Frequency and Response to ICS

n=4528



Bafadhel et al. Lancet Resp Med 2018;6:117-126

IMPACT n= 10,335



Lipson et al. NEJM 2018;378:1671-80

ICS Triple therapy vs. ICS/LABA vs LAMA/LABA Impact Trial – Pneumonia Rates

Table 3. Adverse Events of Special Interest in the Intention-to-Treat Population.*

Event	Triple Therapy (N=4151)		Fluticasone Furoate–Vilanterol (N=4134)		Umeclidinium–Vilanterol (N=2070)	
	No. of Patients (%)	Rate per 1000 Patient-Yr (No. of Events)	No. of Patients (%)	Rate per 1000 Patient-Yr (No. of Events)	No. of Patients (%)	Rate per 1000 Patient-Yr (No. of Events)
Anticholinergic syndrome	184 (4)	60.8 (226)	140 (3)	47.1 (163)	70 (3)	47.7 (81)
Asthma or bronchospasm	27 (<1)	7.5 (28)	34 (<1)	10.1 (35)	16 (<1)	9.4 (16)
Cardiovascular effects	450 (11)	167.2 (621)	430 (10)	157.0 (543)	224 (11)	166.6 (283)
Cardiac arrhythmia	153 (4)	50.9 (189)	161 (4)	51.5 (178)	81 (4)	51.2 (87)
Cardiac failure	138 (3)	42.5 (158)	126 (3)	42.8 (148)	68 (3)	44.8 (76)
CNS hemorrhages and cerebrovascular conditions	41 (<1)	12.1 (45)	28 (<1)	9.3 (32)	11 (<1)	6.5 (11)
Hypertension	113 (3)	35.5 (132)	115 (3)	35.0 (121)	54 (3)	34.2 (58)
Ischemic heart disease	80 (2)	26.1 (97)	57 (1)	18.5 (64)	47 (2)	30.6 (52)
Lower respiratory tract infection, excluding pneumonia	200 (5)	63.0 (234)	199 (5)	69.7 (241)	108 (5)	76.0 (129)
Pneumonia	317 (8)	95.8 (356)	292 (7)	96.6 (334)	97 (5)	61.2 (104)
Urinary retention	8 (<1)	2.7 (10)	12 (<1)	3.5 (12)	9 (<1)	5.3 (9)

From *N Engl J Med.*, Lipson et. Al. 2018

Unmet Need Persists Post Guideline Based Tx

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 MAY 3, 2018 VOL. 378 NO. 18

Once-Daily Single-Inhaler Triple versus Dual Therapy in Patients with COPD

David A. Lipson, M.D., Frank Barnhart, D.V.M., Noushin Brealey, M.D., Jean Brooks, M.Sc., Gerard J. Criner, M.D., Nicola C. Day, Ph.D., Mark T. Dransfield, M.D., David M.G. Halpin, M.D., MeiLan K. Han, M.D., C. Elaine Jones, Ph.D., Sally Kilbride, M.Sc., Peter Lange, M.D., David A. Lomas, M.D., Ph.D., Fernando J. Martinez, M.D., Dave Singh, M.D., Maggie Tabberer, M.Sc., Robert A. Wise, M.D., and Steven J. Pascoe, M.B., B.S., for the IMPACT Investigators

- 77% Group "E", FEV_1 45.5±14.8
- **Primary Outcome shows 15 -25% reductions in EVENTS PER PATIENT**
  but….
- **6% relative reduction in PROPORTION OF PATIENTS w/ EVENTS (higher bar)**
- **~50% of patients had at least one moderate-to-severe event**

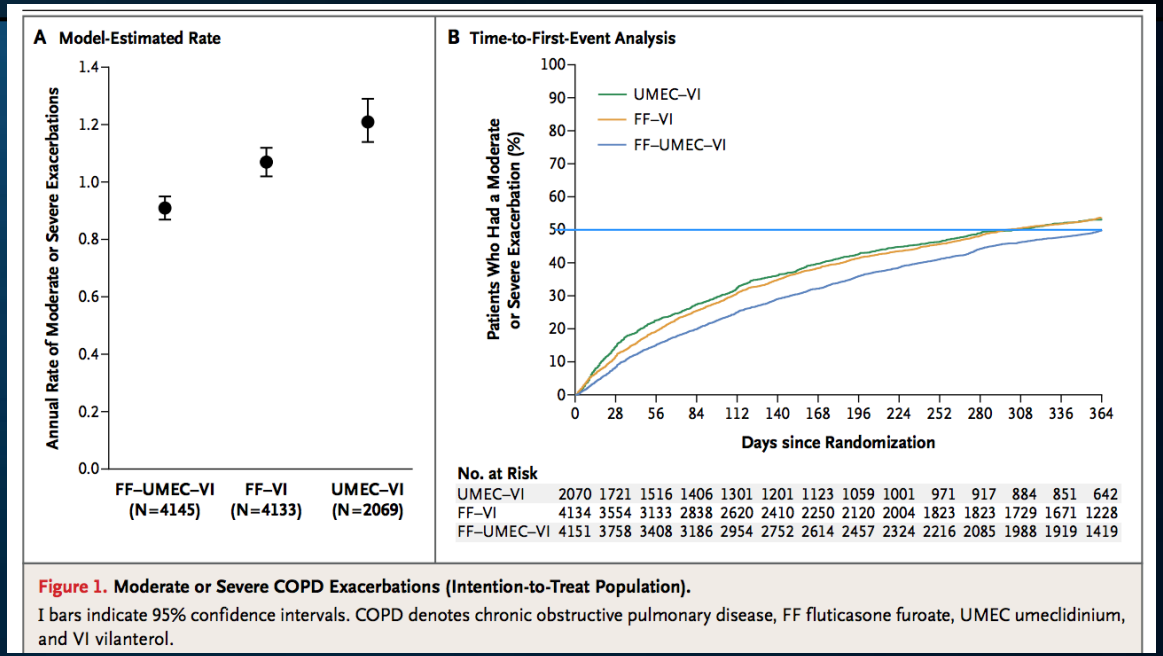
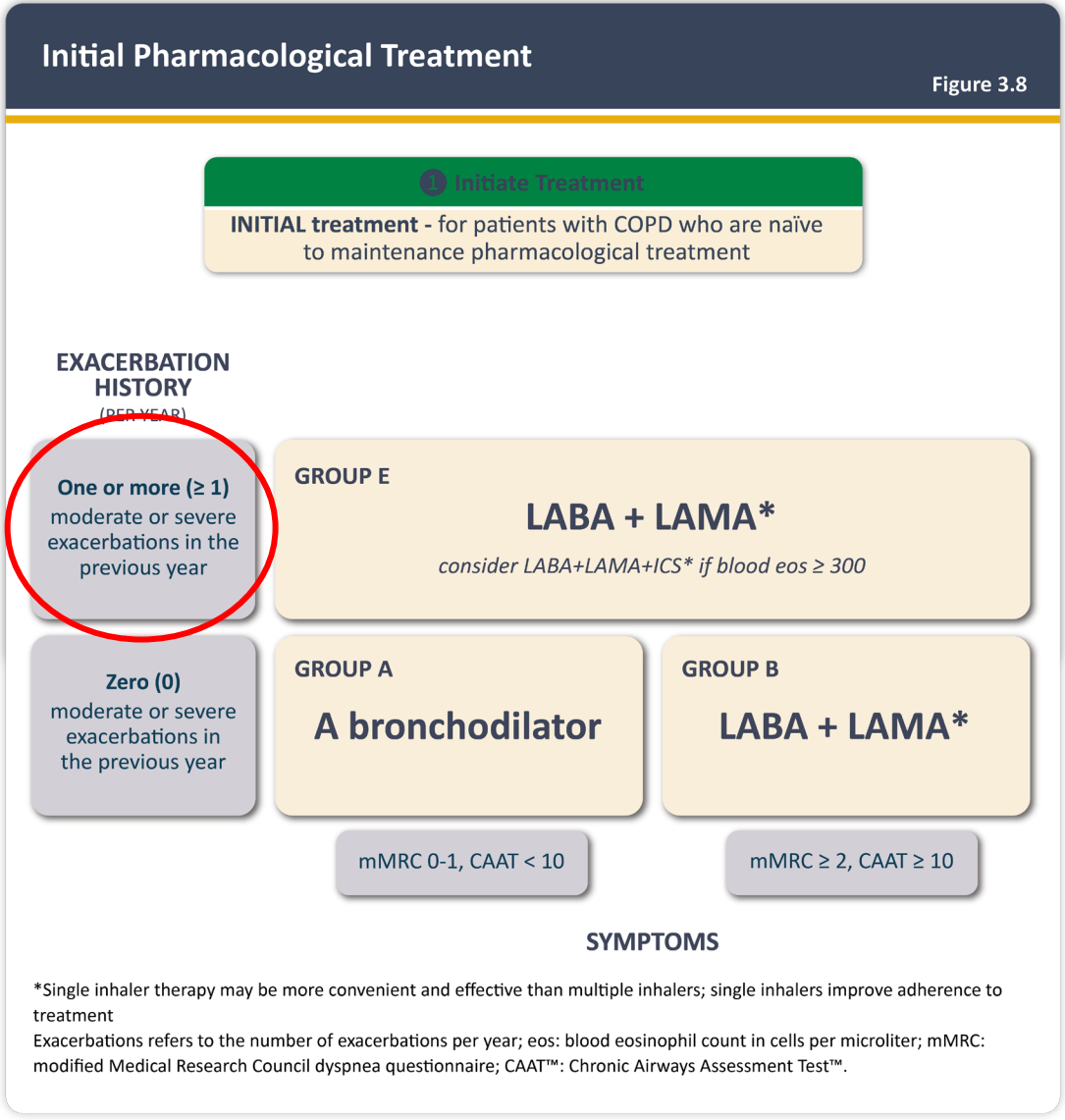


Figure 1. Moderate or Severe COPD Exacerbations (Intention-to-Treat Population).

I bars indicate 95% confidence intervals. COPD denotes chronic obstructive pulmonary disease, FF fluticasone furoate, UMEC umeclidinium, and VI vilanterol.

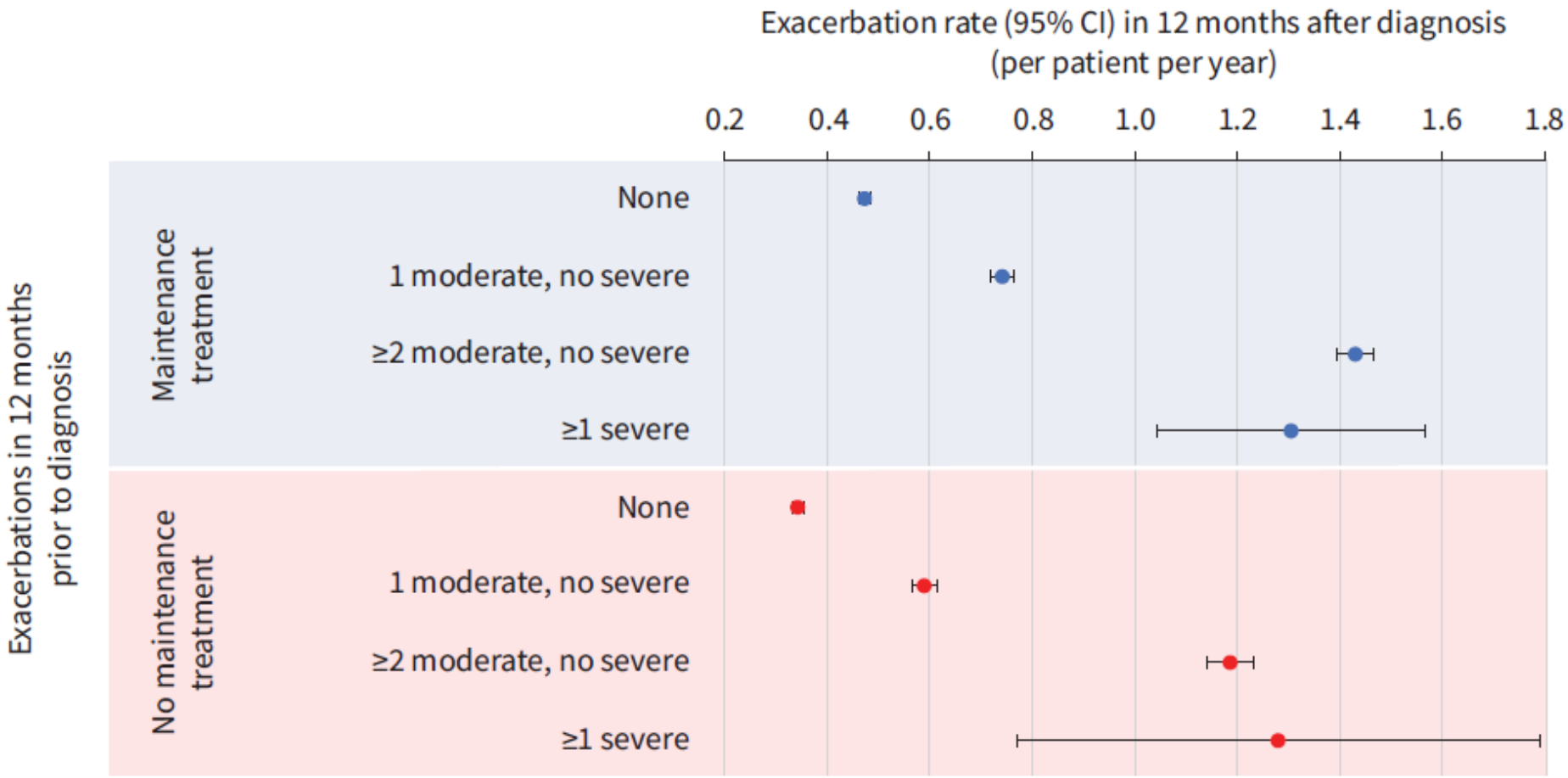
Persistent exacerbations in patients on maximal (triple-therapy) single inhaler and under "best care" in a clinical trial

GOLD Initial Maintenance Therapy



GOLD 2026

Variation in Frequency of Prior Exacerbations on Future Risk - 2



Halpin ERJ 2024

GOLD Follow-up Maintenance Therapy

Follow-up Pharmacological Treatment

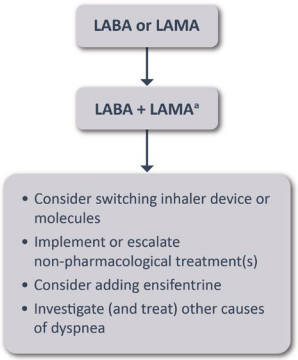
Figure 3.9

2 Adjust Treatment

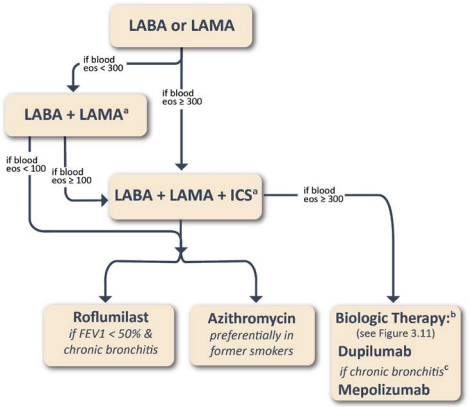
FOLLOW-UP treatment - for patients with COPD who are already receiving maintenance pharmacological treatment

- **CONTINUE CURRENT TREATMENT** unless dyspnea or exacerbation management require optimization

- **IF PERSISTENT DYSPNEA**



- **IF ONE OR MORE MODERATE OR SEVERE EXACERBATION**



[a]Single inhaler therapy may be more convenient and effective than multiple inhalers; single inhalers improve adherence to treatment.

[b]Listed in order of approval in the US.

[c]Patient-reported history of chronic bronchitis (chronic productive cough) for 3 months in the year up to screening, absent other known causes. Consider de-escalation of ICS if pneumonia or other considerable side-effects. In case of blood eosinophils ≥ 300 cells/µl de-escalation is more likely to be associated with the development of exacerbations.

Considering Device Types

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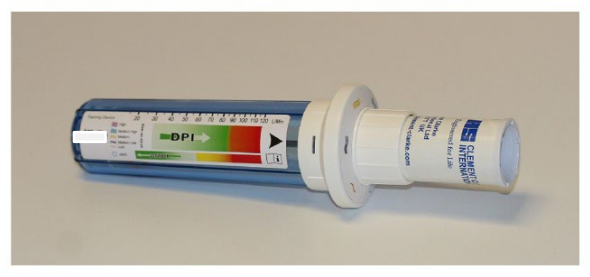
Devices and Maintenance Inhalers.

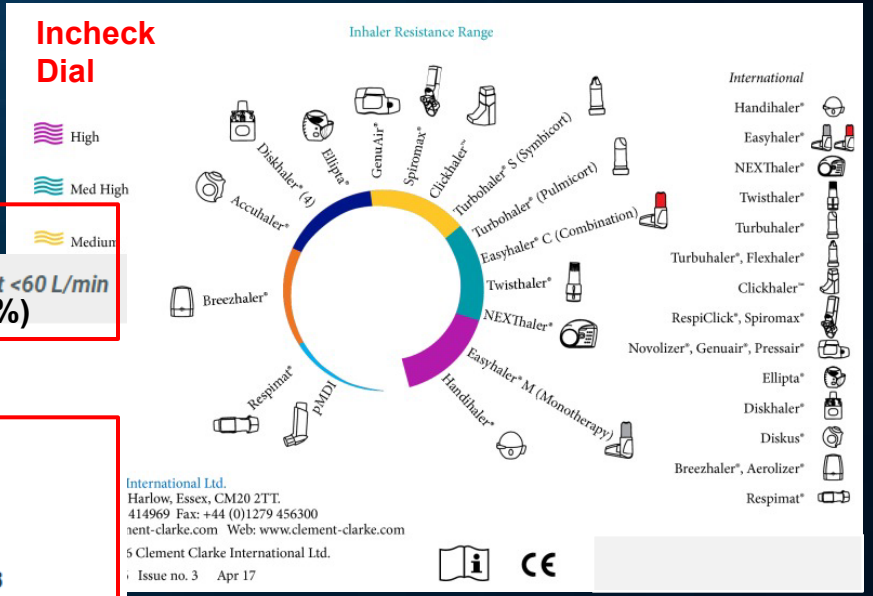
	Powered Metered Dose Inhaler (pMDI)	Soft Mist Inhaler (SMI)	Dry Powder Inhaler (DPI): Single Dose	Dry Powder Inhaler (DPI): Multi-Dose	Nebulizer
Description	Medication and propellant contained in a pressurized cannister and propelled through a nozzle for inhalation.	Medication is propelled by a spring-loaded mechanism through a nozzle for inhalation.	Encapsulated medication is loaded prior to each dose, which is pierced by the device and delivered by patient inspiratory effort.	Doses of pre-loaded medication are delivered by patient inspiratory effort.	Medication is aerosolized by an air jet, ultrasonic energy or vibrating mesh and can be inhaled during normal tidal breathing.
Advantages	Patient familiarity (error rates (87%)	No spacer required Easier coordination of breath and actuation	Ease of use	Ease of use (error rates 61%)	No coordination or special breathing techniques
Pitfalls	Requires coordination of inhalation and actuation (improved with spacer)	Device assembly Limited medication options	Inadequate inspiratory flow rate Mishandling of capsules	Inadequate inspiratory flow rate Exposure to moisture	Less portable Requires frequent cleaning Limited medication options

Riley & Sciurba JAMA 2019

Global Initiative for Chronic Obstructive Disease (GOLD) 2014. www.goldcopd.com. Accessed 3/10/14.

Suboptimal Peak Inspiratory Flow





	Total	PIFRresist ≥60 L/min	PIFRresist <60 L/min (19%)
Number of subjects	213	172	41
Female/male	115/98	82/90	33/8
Age (yr)	70.1±6.9	69.9±7.1	71.3±6.0
Height (cm)	164.4±9.0	165.6±8.5	159.0±9.3
Weight (kg)	75.1±20.0	76.0±19.0	70.0±23.4
FEV1 (L)	0.92±0.26 (37±9%)	0.95±0.26 (38±8%)	0.77±0.23 (36±10%)
FVC (L)	2.51±0.84 (75±17%)	2.66±0.82 (77±16%)	1.91±0.64 (66±15%)

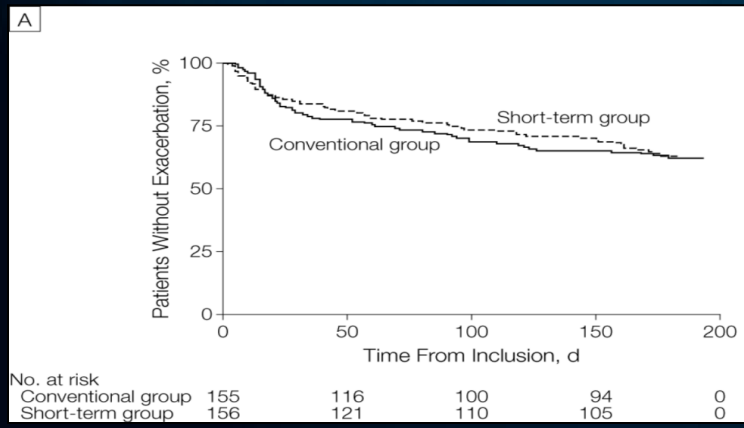
Mahler. J Aerosol Med Pulm Drug Deliv 2013;26:174–179

Acute Exacerbations of COPD

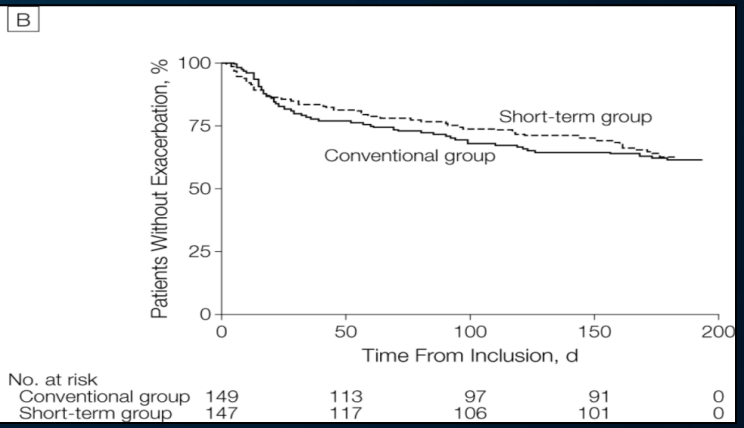
A 5-day Course of Oral CS (40mg/day) May Be Appropriate for tx COPD Exacerbations

Re-exacerbations in the REDUCE Trial

Proportion of patients without re-exacerbation
ITT analysis
HR, 0.95 (90% CI, 0.70-1.29)
***P* for noninferiority = 0.006**



Proportion of patients without re-exacerbation
Per-protocol analysis
HR, 0.93 (90% CI, 0.68-1.26)
***P* for noninferiority = 0.005**



ITT = intention to treat; REDUCE = Reduction in the Use of Corticosteroids in Exacerbated COPD

Lueppi JD et al. *JAMA*. 2013;309:2223-2231.

Diagnosis and Treatment of COPD

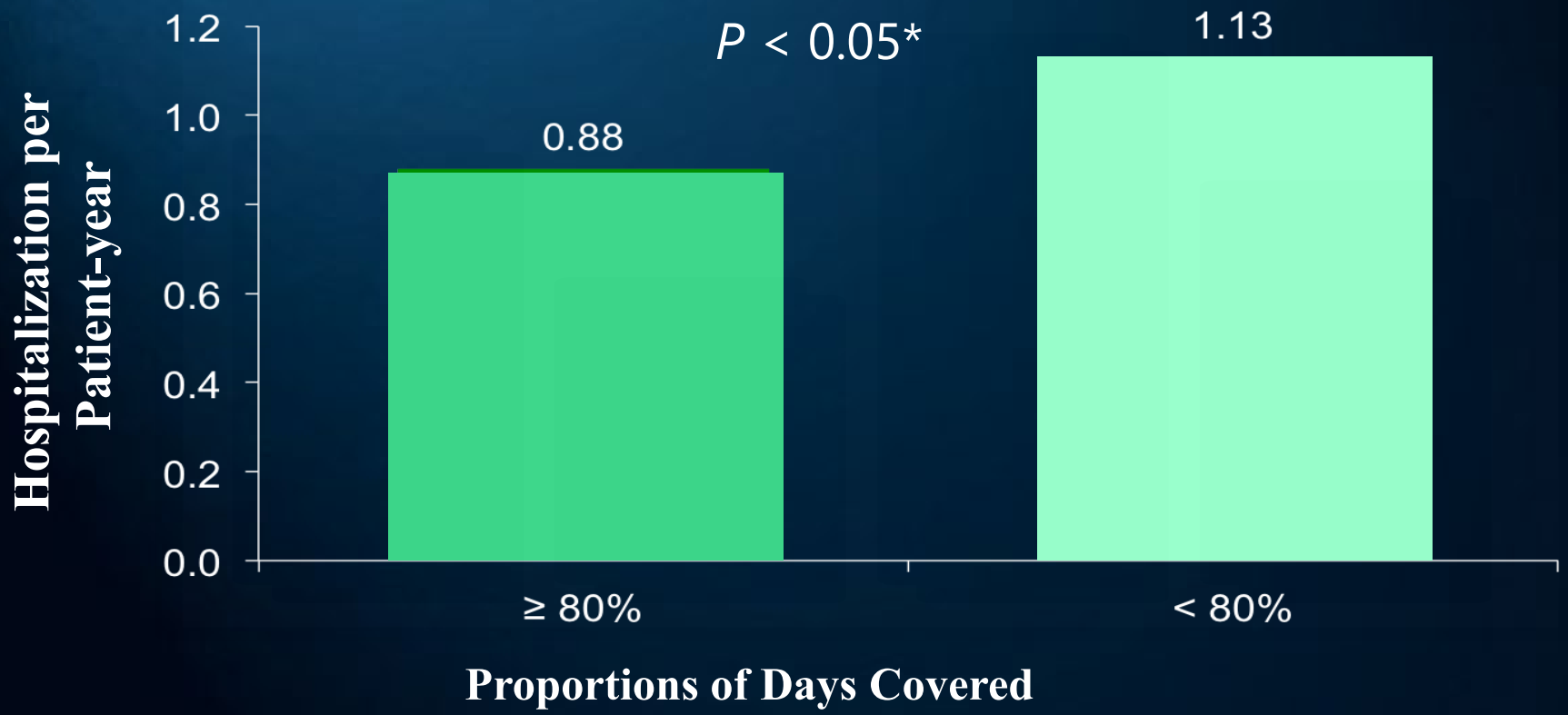
- Impact and Diagnosis
- Treatment
  - General
  - Hospital and Transitional Care
  - “Precision” (Pulmonology Referral)

Hospital Medication Discharge Planning

- In general, the consistent use of maintenance bronchodilator therapy for COPD is lacking1
- At discharge only 45% were prescribed maintenance bronchodilators
- At discharge, 23% were not prescribed an inhaled therapy at all

Make B, et al. Int J Chron Obstruct Pulmon Dis. 2012;7:1-9.
Yip NH, et al. COPD. 2010;7(2):85-92.

Higher Adherence to Therapy Lowers Risk for Hospitalization in COPD



Medicare Data: N = 33,816 patients

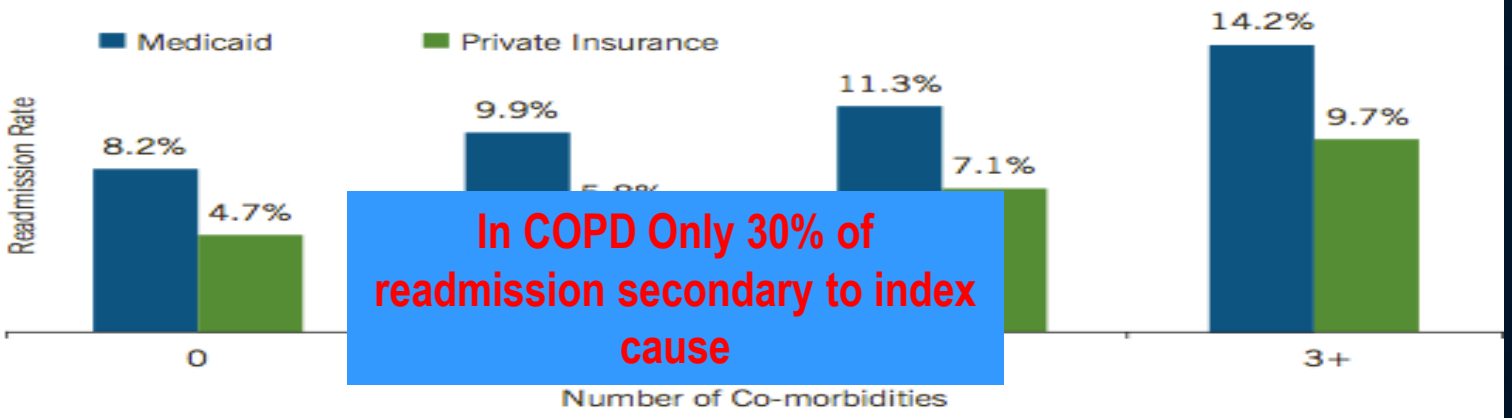
*Based on 95% CI for relative risk

Simoni-Wastila L, et al. Am J Geriatr Pharmacother. 2012;10:201-210.

Comorbidities and Social Issues Have a Significant Impact on Readmissions

Medicaid beneficiaries are consistently at greater risk of readmission than privately insured adults.

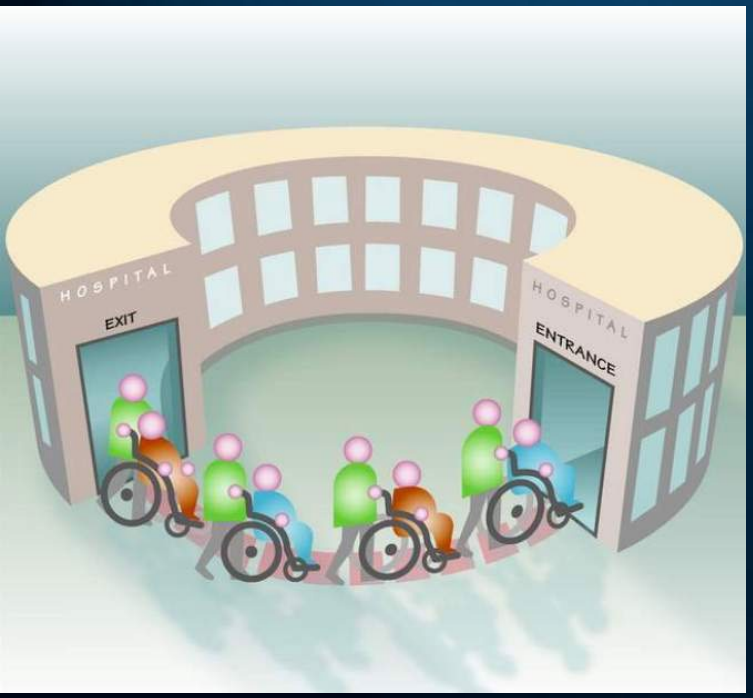
Chart 5: Non-obstetric, Adult 30-day Readmission Rates by Insurance Coverage and Number of Co-morbidities, 2007



In COPD Only 30% of readmission secondary to index cause

Source: Jiang, H.J., and Wier, L.M. (April 2010). *All-cause Hospital Readmissions among Non-elderly Medicaid Patients, 2007.* HCUP Statistical Brief #89. Rockville, MD: Agency for Healthcare Research and Quality.

Preventing Readmission/The Next Admission

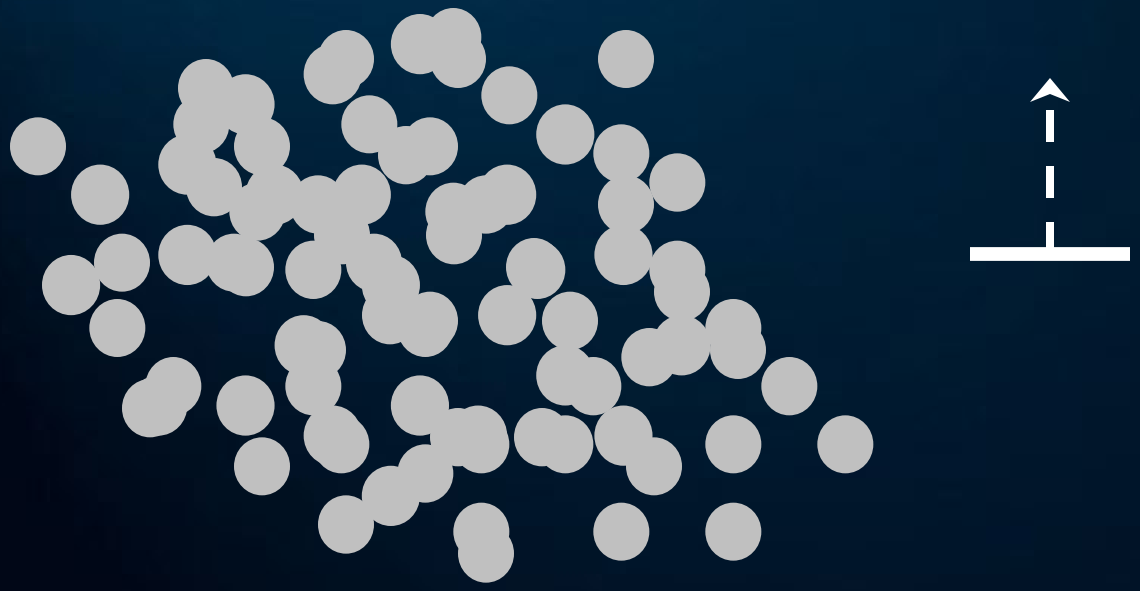


- **When to schedule follow up?**
  - Preferably within 1 week
  - At most, within 2 weeks
- **Who should see pulmonary?**
  - Multiple hospitalizations within 12 months
  - High baseline symptoms despite maximal inhaled therapy and pulmonary rehab
  - Severe obstruction in younger patients and/or rapid FEV1 decline

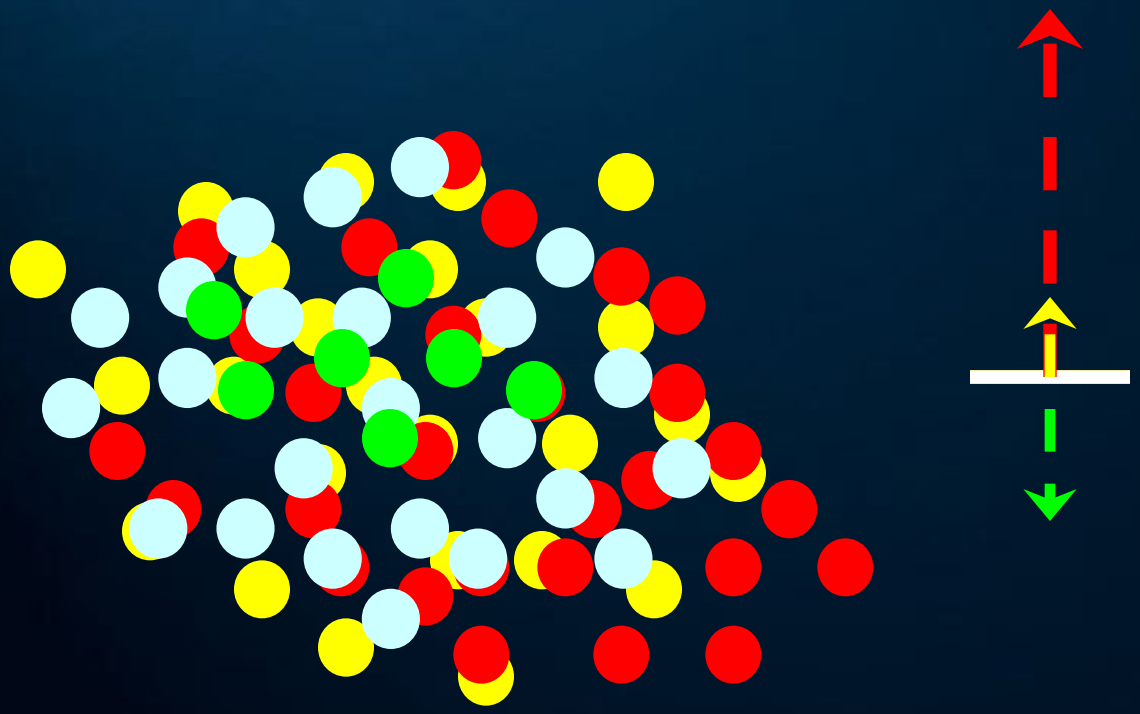
Diagnosis and Treatment of COPD

- Impact and Diagnosis
- Treatment
  - General
  - Hospital and Transitional Care
  - “Precision” (Pulmonology Referral)

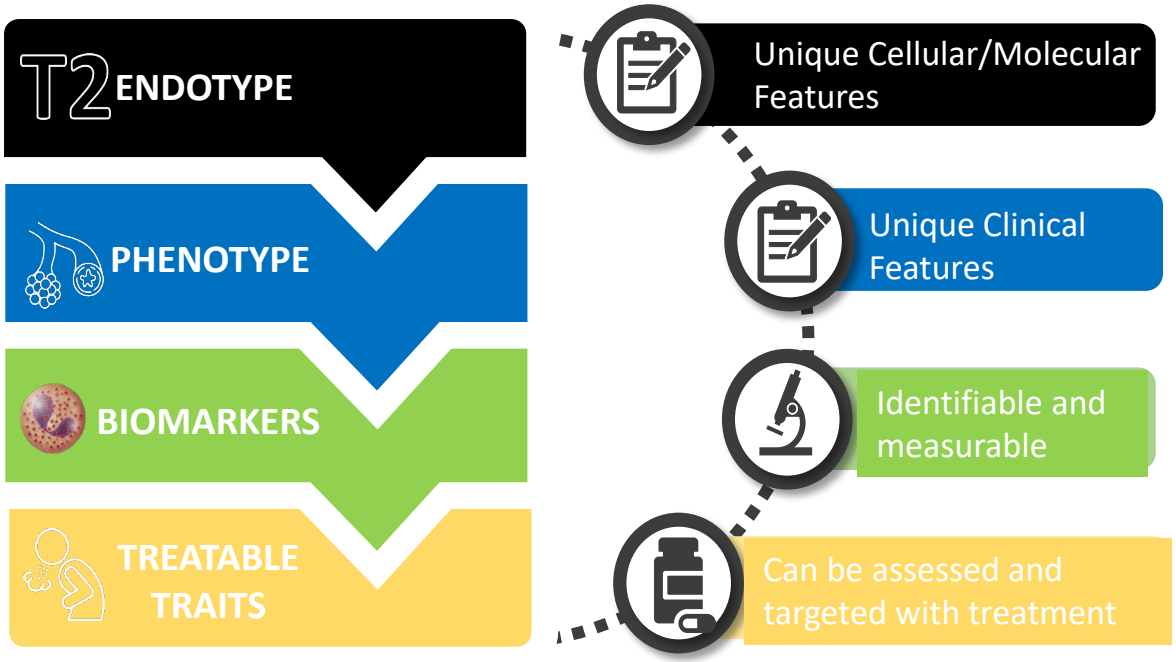
Response of a Population to an Intervention: Blind to Phenotype



Response of a Population to an Intervention: Precision Approach



Treatable Traits Strategy as the Basis for Targeted Therapeutic Intervention[1–4]



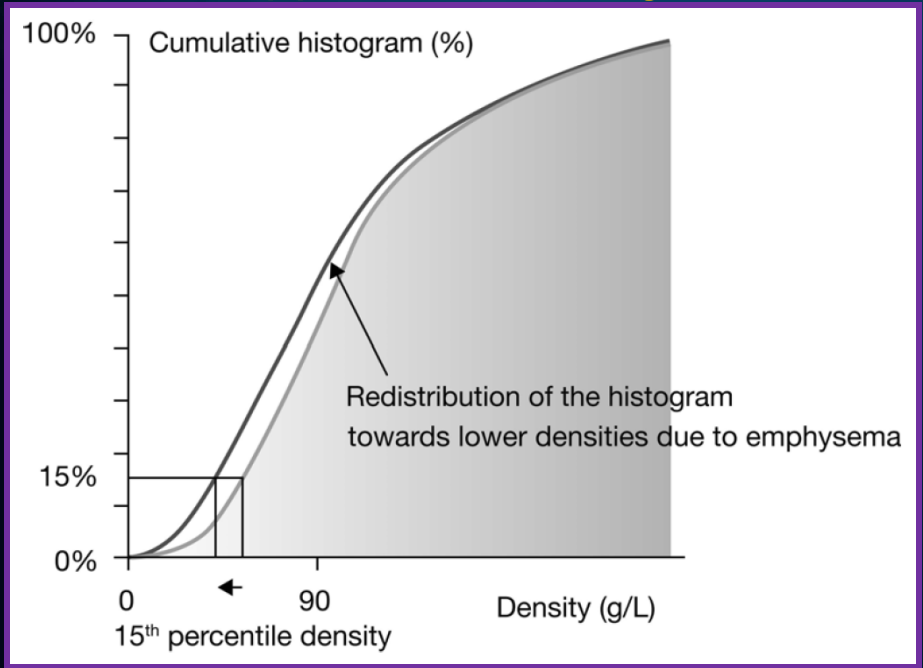
A treatable trait is defined as a **"therapeutic target** identified by **phenotypes** or **endotypes** through a **validated biomarker"**[4]

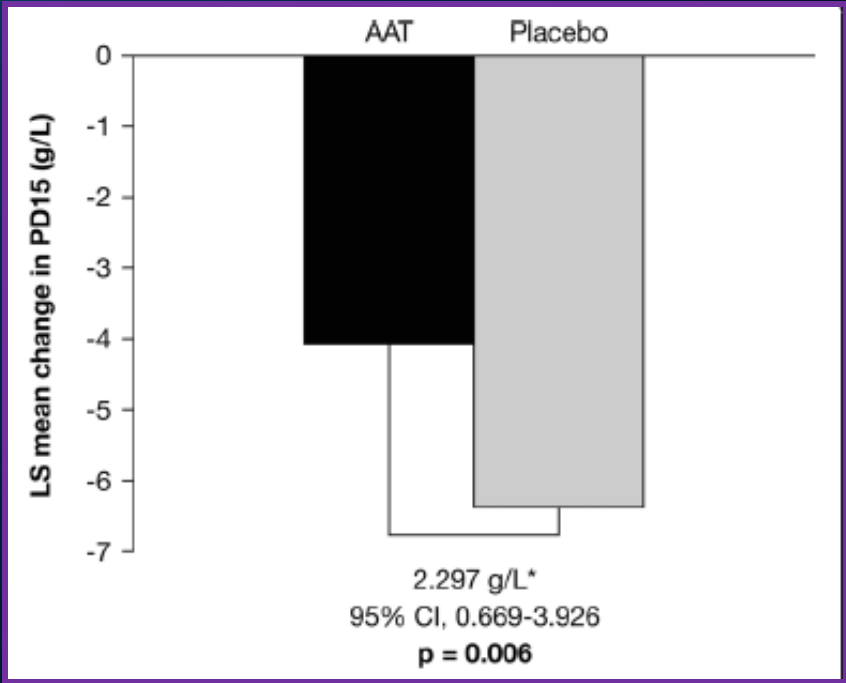
1. Garudadri S, et al. *Ann Am Thorac Soc*. 2018;15:S234–S238 2. Global Initiative for Chronic Obstructive Lung Disease (GOLD). Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease. Updated 2025. Accessed Feb 23, 2025. https://goldcopd.org/2025-gold-report/. 3. McDonald VM, et al. *Eur Respir J*. 2019;53:1802058. doi:10.1183/13993003.02058-2018. 4. McDonald VM, et al. *Arch Bronconeumol.* 2022;58:583-585. doi:10.1016/j.arbres.2021.07.003.

Alpha-1 Antitrypsin Deficiency

Impact of Alpha-1 Antitrypsin Augmentation Tx on CT Density measured emphysema

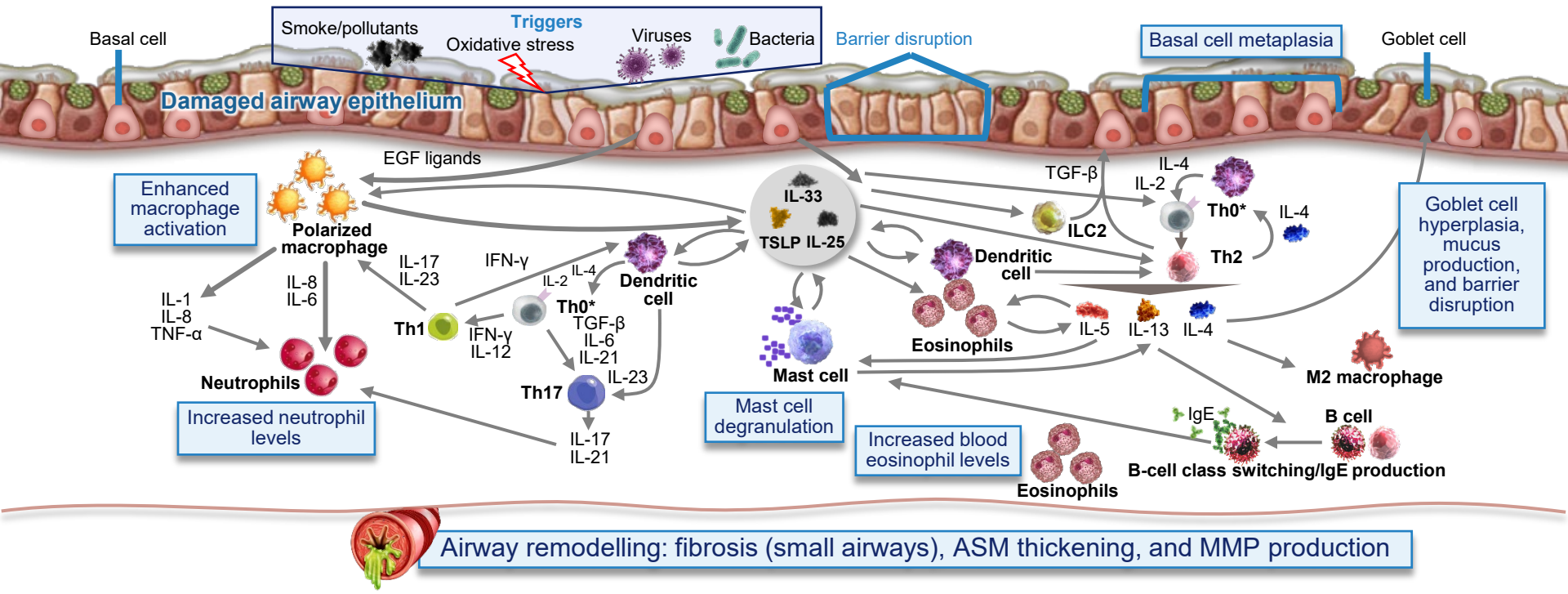
- 2 studies showed trend but no significance
- Only pooled data (n=119) identified response (mean F/U 2.5 years)
- Supported in FDA guidance





Dirksen AJRCCM '99
Dirksen ERJ '09
Stockley Respiratory Research '10

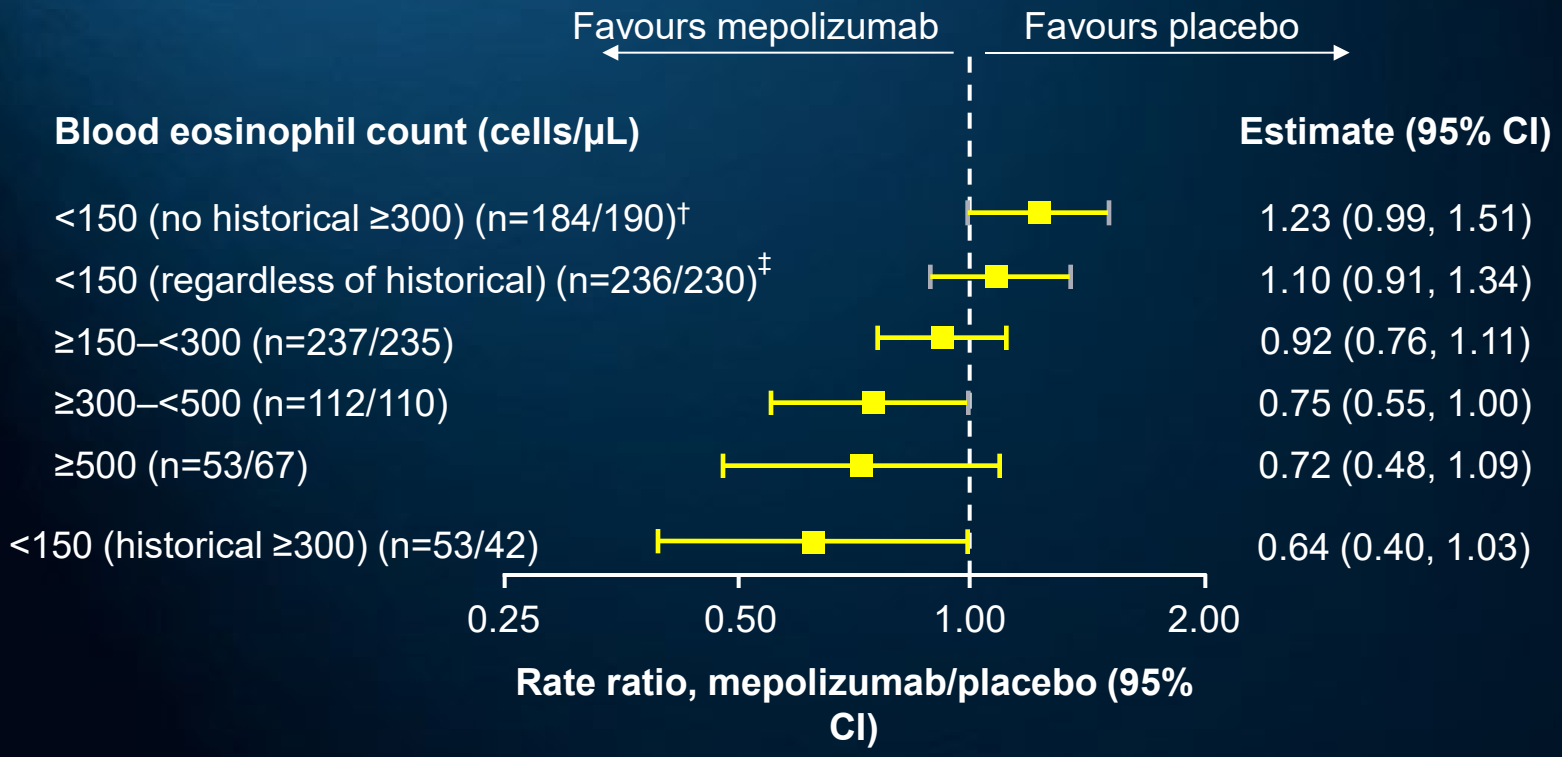
There Are Multiple Inflammatory Pathways in COPD[1-21]



*T cell differentiation takes place in lymph nodes and is included in the schematic for the purposes of illustration only.
ASM=airway smooth muscle; EGF=epidermal growth factor; IFN-γ=interferon gamma; IgE=immunoglobulin E; IL=interleukin; ILC2=group 2 innate lymphoid cell; M2=alternatively-activated; MMP=matrix metalloproteinase; TGF-β=transforming growth factor beta; Th=T helper cell; TNF-α=tumor necrosis factor alpha; TSLP=thymic stromal lymphopoietin.

1. Yousuf A, et al. *J Allergy Clin Immunol Pract*. 2019;7(5):1405-1416. 2. Aghapour M, et al. *Am J Respir Cell Mol Biol*. 2018;58(2):157-169. 3. Barnes PJ. *J Clin Invest*. 2008;118(11):3546-3556. 4. Gandhi NA, et al. *Nat Rev Drug Discov*. 2016;15(1):35-50. 5. Doyle AD, et al. *Eur Respir J*. 2019;53(5):1801291. 6. Arora S, et al. *Immunobiology*. 2018;223(4-5):383-396. 7. He S, et al. *Int J Chron Obstruct Pulmon Dis*. 2017;12:3029-3039. 8. Linden D, et al. *Eur Respir Rev*. 2019;28(151):180063. 9. Papi A, et al. *Am J Respir Crit Care Med*. 2006;173(10):1114-1121. 10. Smithgall MD, et al. *Int Immunol*. 2008;20(8):1019-1030. 11. Allakhverdi Z, et al. *J Immunol*. 2007;179(4):2051-2054. 12. Chan BCL, et al. *Front Immunol*. 2019;10:364. 13. Griesenauer B, Paczesny S. *Front Immunol*. 2017;8:475. 14. McCarthy PC, et al. *Immunol Cell Biol*. 2019;97(1):54-71. 15. Zhu J, et al. *Annu Rev Immunol*. 2010;28:445-489. 16. Shaykhiev R. *Am J Respir Cell Mol Biol*. 2021;65(1):10-12. 17. Ruysseveldt E, et al. *Front Allergy*. 2021;2:787128. 18. Thuenauer R, et al. *Analyst*. 2014;139(13):3206-3218. 19. Shoda T, et al. *Allergol Int*. 2016;65(1):21-29. 20. Liu M, et al. *Front Pharmacol*. 2021;12:695957. 21. Senra L, et al. *J Invest Dermatol*. 2019;139(8):1732-1742.e17.

Mepolizumab (METREX and METREO) : Annual Rate of Exacerbations by Blood Eosinophil



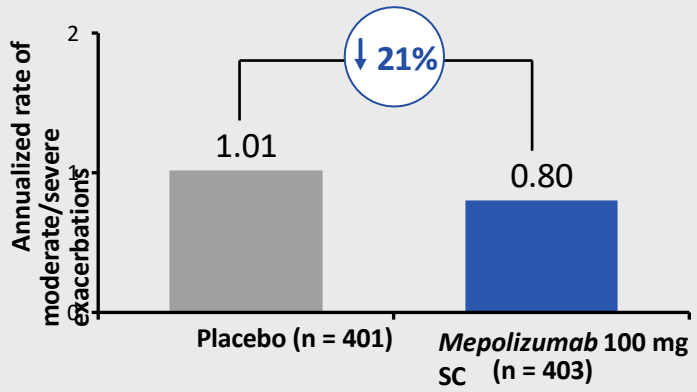
*Moderate exacerbation: requiring either SCS and/or antibiotics; severe exacerbation: requiring hospitalisation/resulting in death; †data from METREX mITT population patients without an eosinophilic phenotype; ‡post hoc analysis of METREX mITT-All and METREO mITT includes patients with an eosinophil count ≥300 cells/µL in previous year; all others are the METREX mITT-Eos plus METREO mITT

Mepolizumab: MATINEE Primary Endpoint: *Annualized rate of moderate/severe exacerbations*

Primary Endpoint

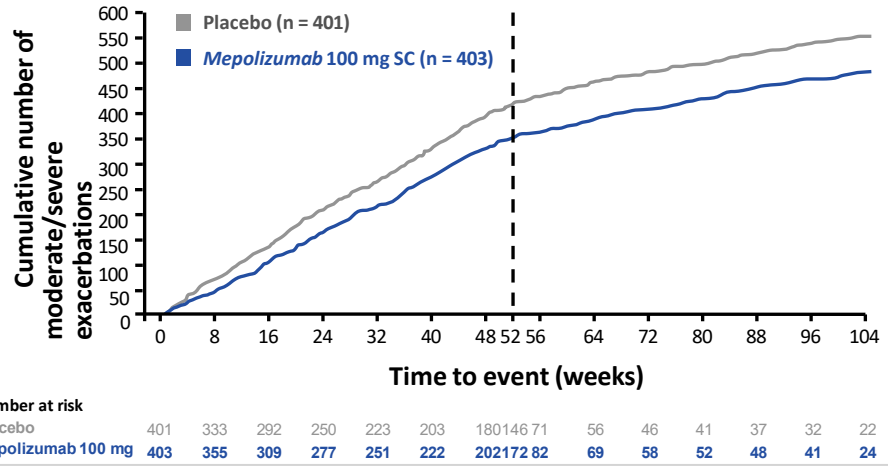
Annualized rate of moderate/severe exacerbations[a] up to Week 104

RR: 0.79 (95% CI: 0.66 - 0.94)
P = 0.011



The difference between *Mepolizumab* and placebo was maintained throughout the 104-week period

Cumulative number of moderate/severe exacerbations[a]



Number at risk														
Placebo	401	333	292	250	223	203	180	146	71	56	46	41	37	32	22
Mepolizumab 100 mg	403	355	309	277	251	222	202	172	82	69	58	52	48	41	24

The mITT population was the primary population for assessing efficacy and included all randomized patients who received ≥1 dose of investigational product, with analysis according to randomized treatment group.

[a]Moderate and severe exacerbations: 'Moderate' defined as treated with systemic corticosteroids and/or antibiotics; 'severe' defined as requiring hospitalization ≥24 hours or resulting in death.

CI = confidence interval; mITT = modified intention-to-treat; RR = rate ratio.

Sciurba F et al. *N Egl J Med*. 2025;392:1710-1720.

Figure reproduced from Sciurba et al. © 2025 Massachusetts Medical Society.

- Frequent Exacerbators with Eosinophils >300
- 35% reduction in severe exacerbation (ED visit or hospitalization)
- 31% reduction is AER in patients with Chronic Bronchitis only

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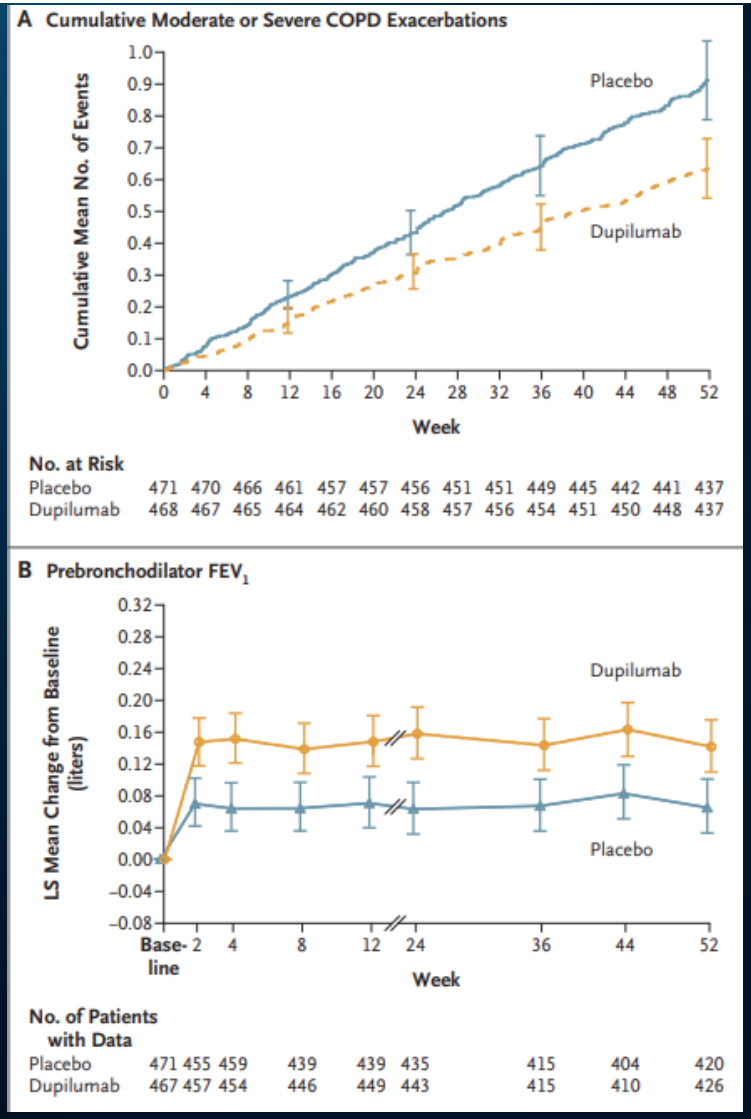
Dupilumab for COPD with Type 2 Inflammation Indicated by Eosinophil Counts

S.P. Bhatt, K.F. Rabe, N.A. Hanania, C.F. Vogelmeier, J. Cole, M. Bafadhel, S.A. Christenson, A. Papi, D. Singh, E. Laws, L.P. Mannent, N. Patel, H.W. Staudinger, G.D. Yancopoulos, E.R. Mortensen, B. Akinlade, J. Maloney, X. Lu, D. Bauer, A. Bansal, L.B. Robinson, and R.M. Abdulai, for the BOREAS Investigators*

Anti-IL-4 Rα
(IL-4/IL-13 TH2 Inhibition)
32% decrease exacerbations

Inclusion:
- >300 eosinophils
- GOLD E
- Chronic Bronchitis



NEJM 2023

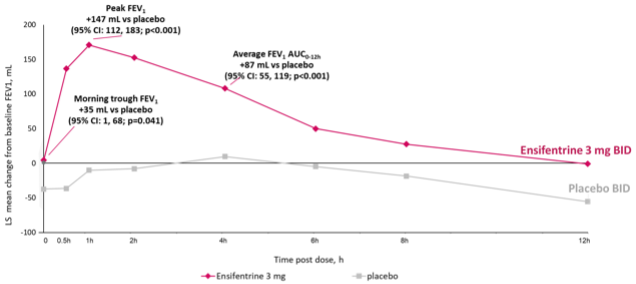
Ensifentrine, a Novel Phosphodiesterase 3 and 4 Inhibitor for the Treatment of Chronic Obstructive Pulmonary Disease

Randomized, Double-Blind, Placebo-controlled, Multicenter Phase III Trials (the ENHANCE Trials)

Antonio Anzueto[1,2], Igor Z. Barjaktarevic[3], Thomas M. Siler[4], Tara Rheault[5], Thomas Bengtsson[6], Kathleen Rickard[5], and Frank Sciurba[7]; for the ENHANCE investigators

Figure 1. Week 12 FEV_1 Profiles

a) ENHANCE-1 (N=760)



b) ENHANCE-2 (N=789)

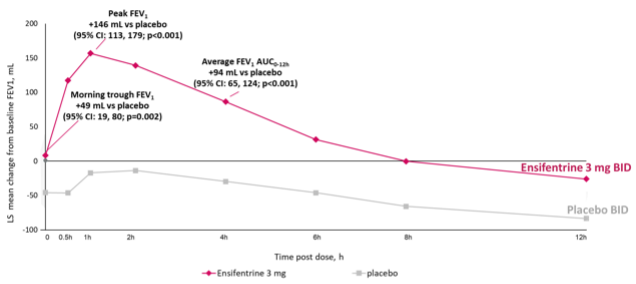
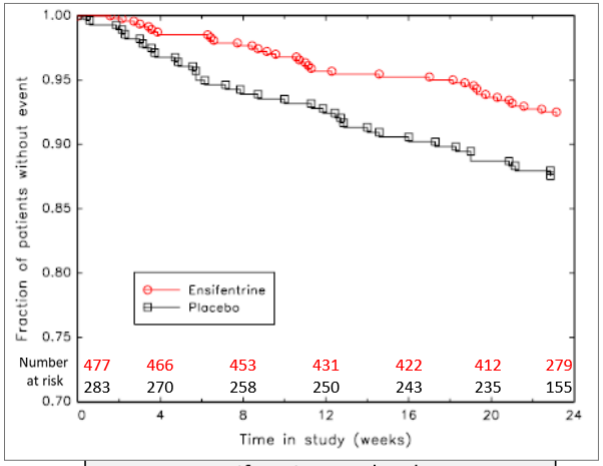


Figure 2. Time to First Moderate/Severe COPD Exacerbation

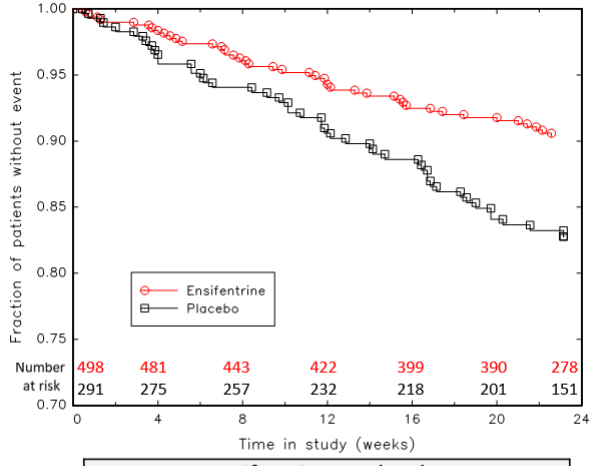
- Ensifentrine significantly delayed the time to first moderate/severe COPD exacerbation in both trials.

a) ENHANCE-1 (N=760)



Ensifentrine vs Placebo	
Hazard ratio (95% CI)	0.62 (0.39, 0.97)
Risk Reduction	38%
p value	0.038

b) ENHANCE-2 (N=789)

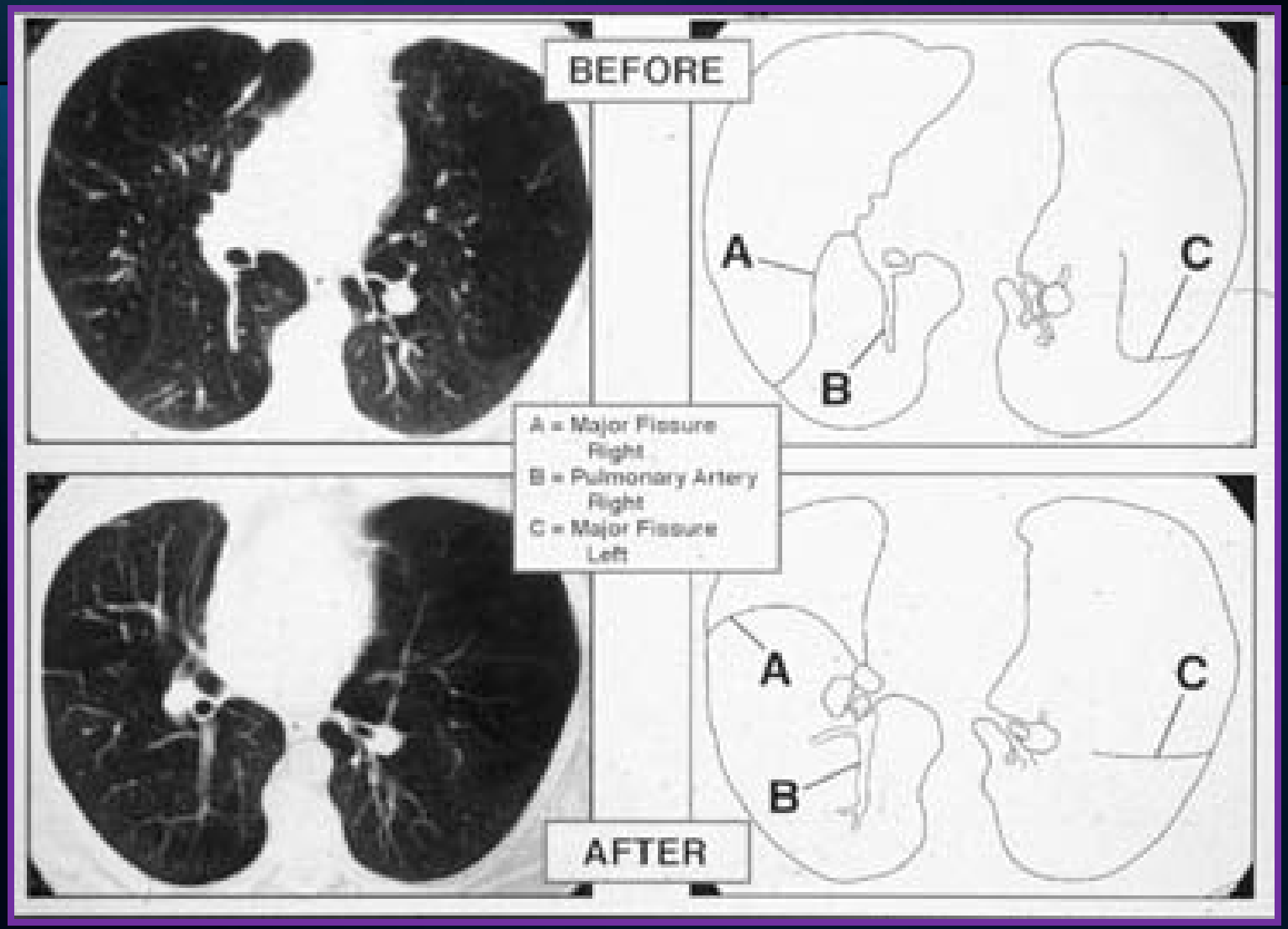


Ensifentrine vs Placebo	
Hazard ratio (95% CI)	0.58 (0.38, 0.87)
Risk Reduction	42%
p value	0.009

AJRCCM 2023

Bronchoscopic Precision Therapy for Hyperinflated Emphysema: Lung Volume Reduction

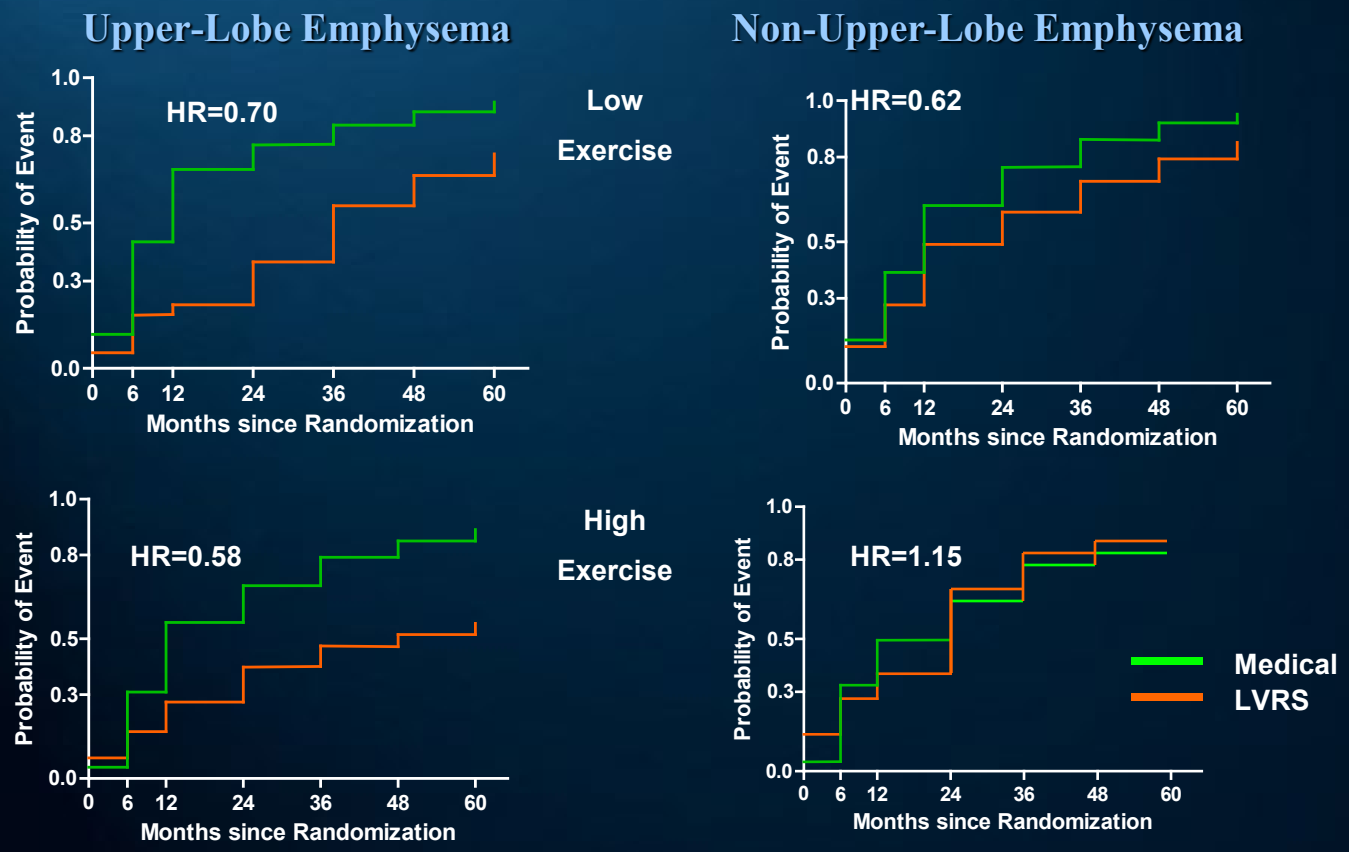
Surgical and Bronchoscopic Volume Reduction Approaches For Emphysema Phenotype



260477

Lung Volume Reduction Surgery (NETT)

Composite Endpoint (Mortality or QOL Decline)



(HR at 3 yrs)

Benzo et al. *Am J Respir Crit Care Med.* 2009;180: 239-46

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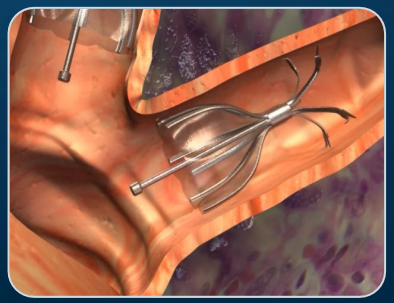
EDITORIAL

Editorials represent the opinions of the authors and *JAMA* and not those of the American Medical Association.

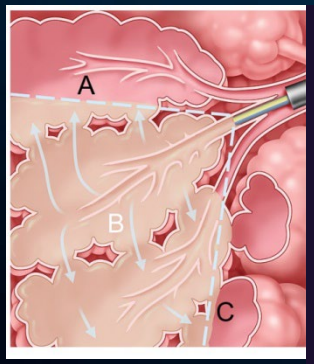
Bronchoscopic Lung Volume Reduction in COPD
Lessons in Implementing Clinically Based Precision Medicine

Frank C. Sciurba, MD; Divay Chandra, MD, MS; Jessica Bon, MD, MS

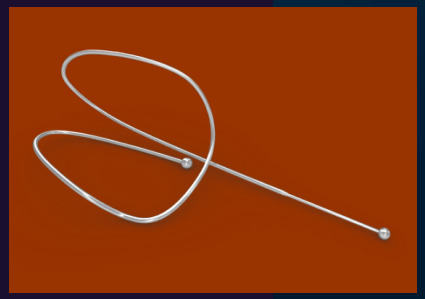
Valves



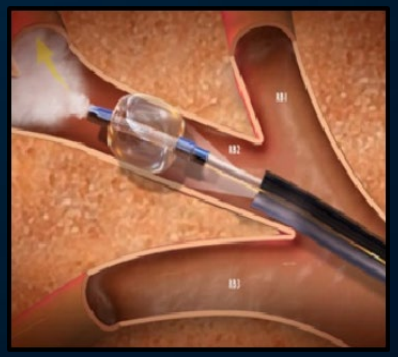
Foam



Coils



Steam



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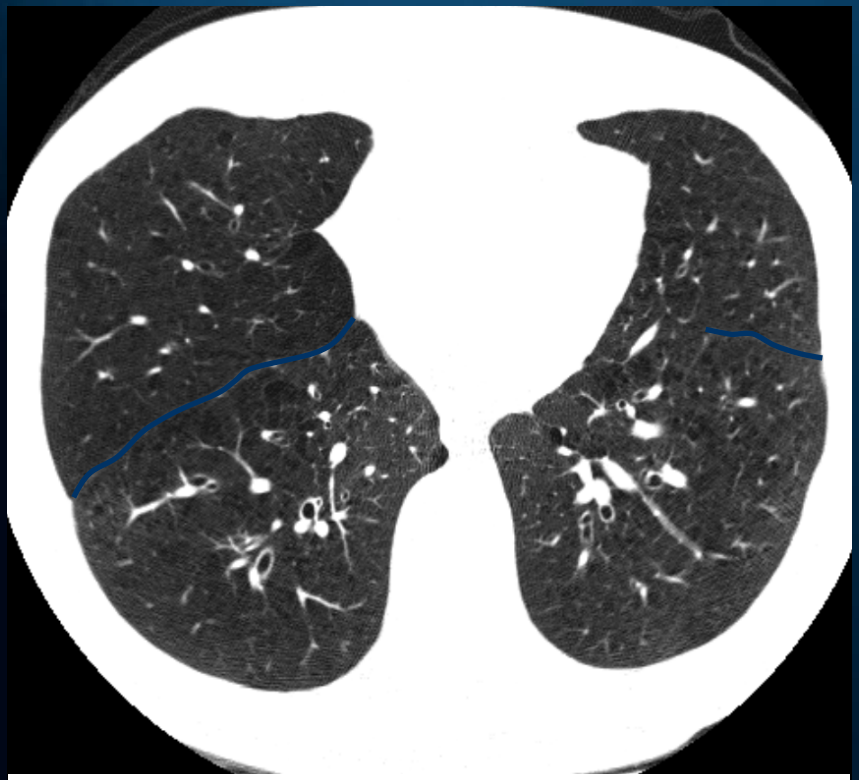
Inter-lobar Fissure Integrity Impacts Effectiveness of Endobronchial Valve Treatment in Emphysema



Complete Incomplete

- **Incomplete fissures**
  - Proxy for inter-lobar Collaterals
  - Attenuates volume reduction
- **Categorized by HRCT Core lab as:**
  - Complete
  - Incomplete
- **Rates of Incomplete Fissure:**

  - Right Oblique = 46%
  - Right Horizontal = 61%
  - Left Oblique = 38%

Lukose et al. Morphology of the lungs: Variations in the lobes and fissures. Biomedicine 1999;19:227-32.

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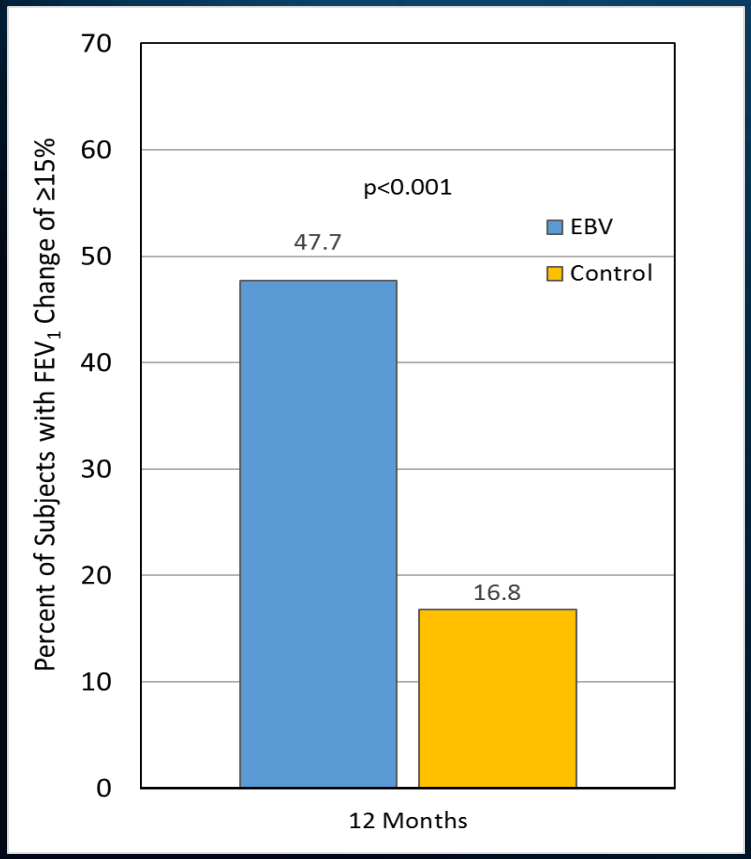
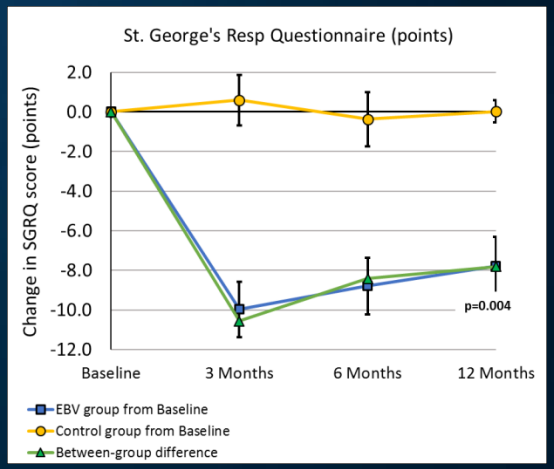
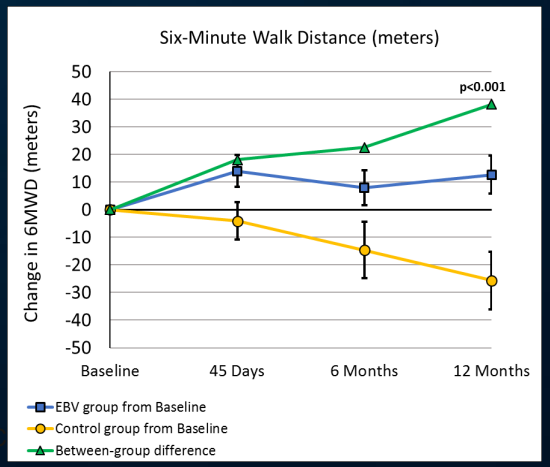
Zephyr Endobronchial Valve Pivotal Outcome: LIBERATE

Percent of Subjects with FEV_1 Change from Baseline to 12-months of ≥15%



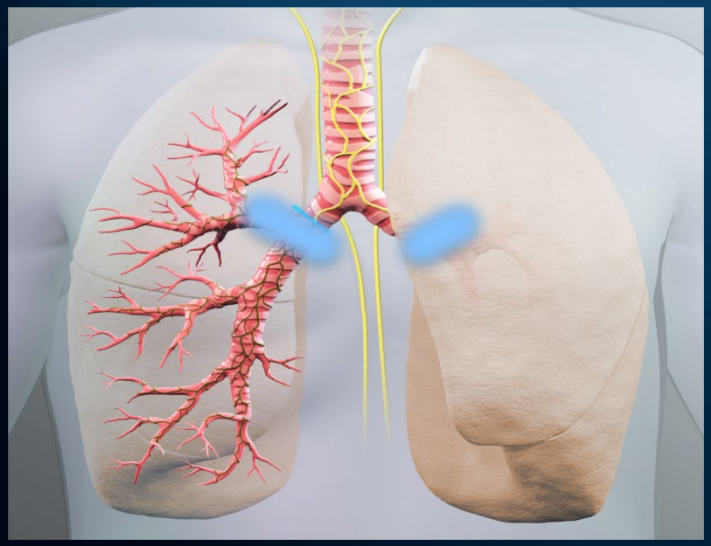


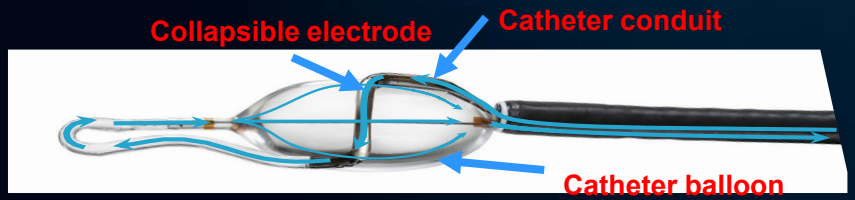


Criner G et al. AJRCCM. 2018; Published on 22-May-2018 as 10.1164/rccm.201803-0590OC

Criner et. al. AJRCCM 2018

Targeted Lung Denervation (TLD): For Airway Dominant Precision Tx





Denervation

- Interrupts vagus nerve signaling to and from the lung (sensory disruption and decreased acetylcholine release)

Lung

- Attenuates basal parasympathetic tone
  - decrease airway smooth muscle tone
  - decrease mucous secretion
- Blunts pulmonary nerve reflexes
  - decrease airway hyper-responsiveness and decreases exacerbations

Targeted

- Anatomically to only the lung
- At the depth of the pulm

Pivotal Trial

- Negative for exacerbation reduction
- Subgroup with airway dominant (low emphysema) & hyperinflation with physiologic and symptom improvement

Conclusions

- COPD burden includes: Mortality, Exacerbations, Hospitalizations and readmissions, Symptoms and Costs
- Existing and emerging treatments are increasingly effective in altering the burden of COPD
- Attention to maintenance Inhaler Device Selection and and Adherence is as important as the specific drug
- Precision therapy is emerging ranging from biologicals targeting specific molecular pathways and devices targeting specific physiologic attributes

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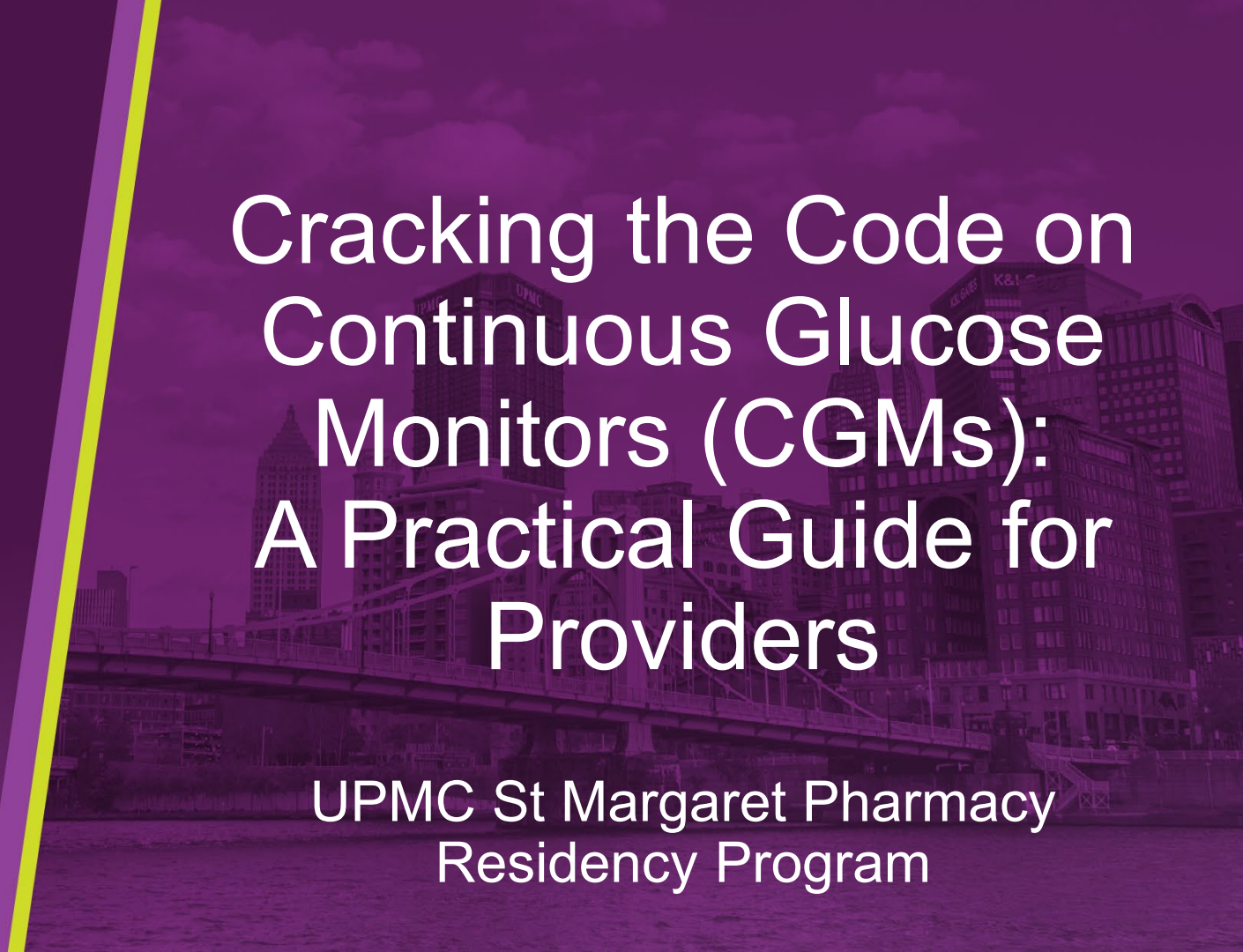
Cracking the Code on Continuous Glucose Monitors (CGMs): A Practical Guide for Providers



UPMC St Margaret Pharmacy Residency Program

Sydney Lee, PharmD
PGY2 Geriatrics Pharmacy Resident
Faculty Development Fellow

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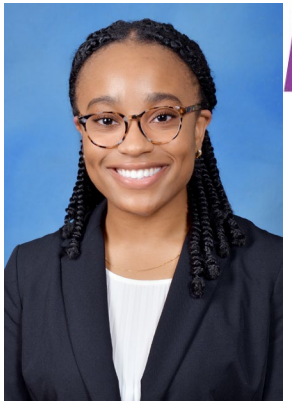
PGY2 Ambulatory Care Pharmacy Resident
Faculty Development Fellow



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Objectives

Recall the purpose and at least 2 components of CGMs

Discuss how to:

- Order CGMs
- Initial set up of CGM
- Review and interpret CGM data

Apply new knowledge to patient case example

Disclosure

None of the presenters have any conflicts of interest to disclose.

Introduction

- Continuous glucose monitors (CGM) allow for real time glucose information to guide treatment
- Who does CGMs benefit:
  - Patient
  - Provider

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Ordering a CGM

CGM Options

	Freestyle Libre 2 Plus & 3 Plus	Dexcom G7	Dexcom G7 15 days	Dexcom G6	Stelo
Sensor Life	Up to 15 days	Up to 10 days	Up to 15 days	Up to 10 days	Up to 15 days
Time Between Readings	1 minute	5 minutes	5 minutes	5 minutes	15 minutes
Warm-up Period	1 hour	30 minutes	1 hour	2 hours	--
Body sites with FDA approval	Upper arm	Upper arm, buttocks	Upper arm, buttocks	Abdomen, buttocks	--
FDA pregnancy approval	Yes	Yes	Yes	No	--
FDA approved age	≥ 2 yr	≥ 2 yr	≥ 18 yr	≥ 2 yr	--
Pearls	Replacing Freestyle Libre 2 and 3	Sensor only, transmitter no longer needed	Newest CGM	Separate sensor/transmitter	OTC Product

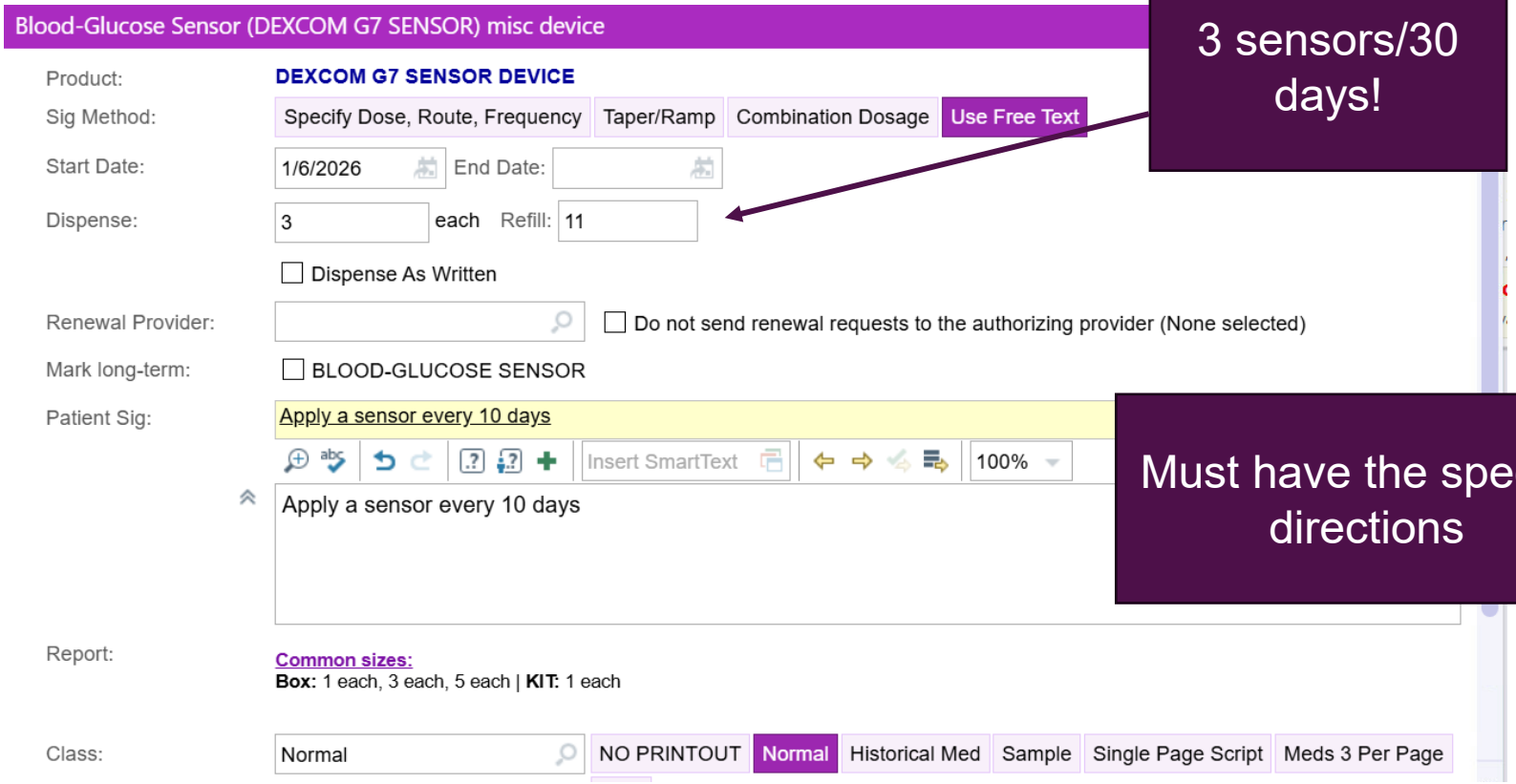
dexcom
dexcom

dexcom

Abbott
FreeStyle
Libre 3
PLUS
Sensor

DEXCOM

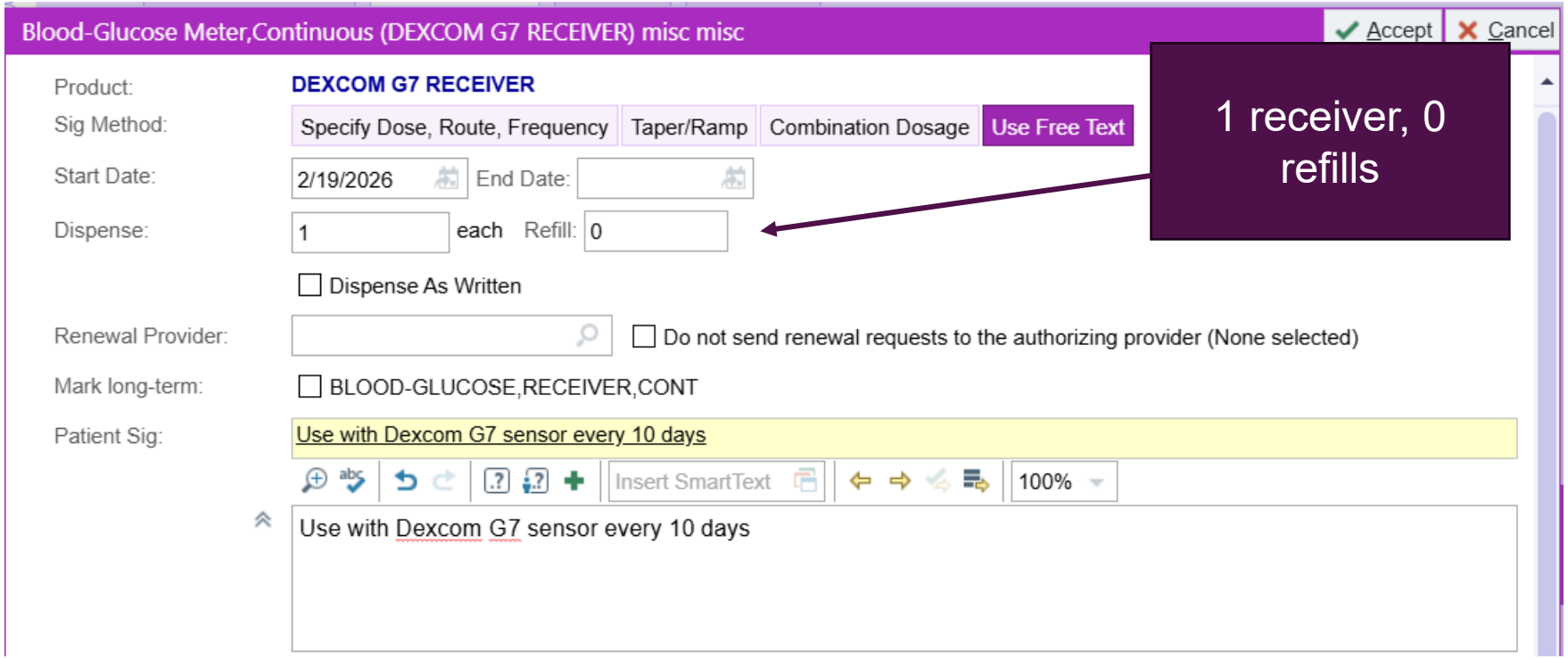
Ordering CGM Supplies – Dexcom G7



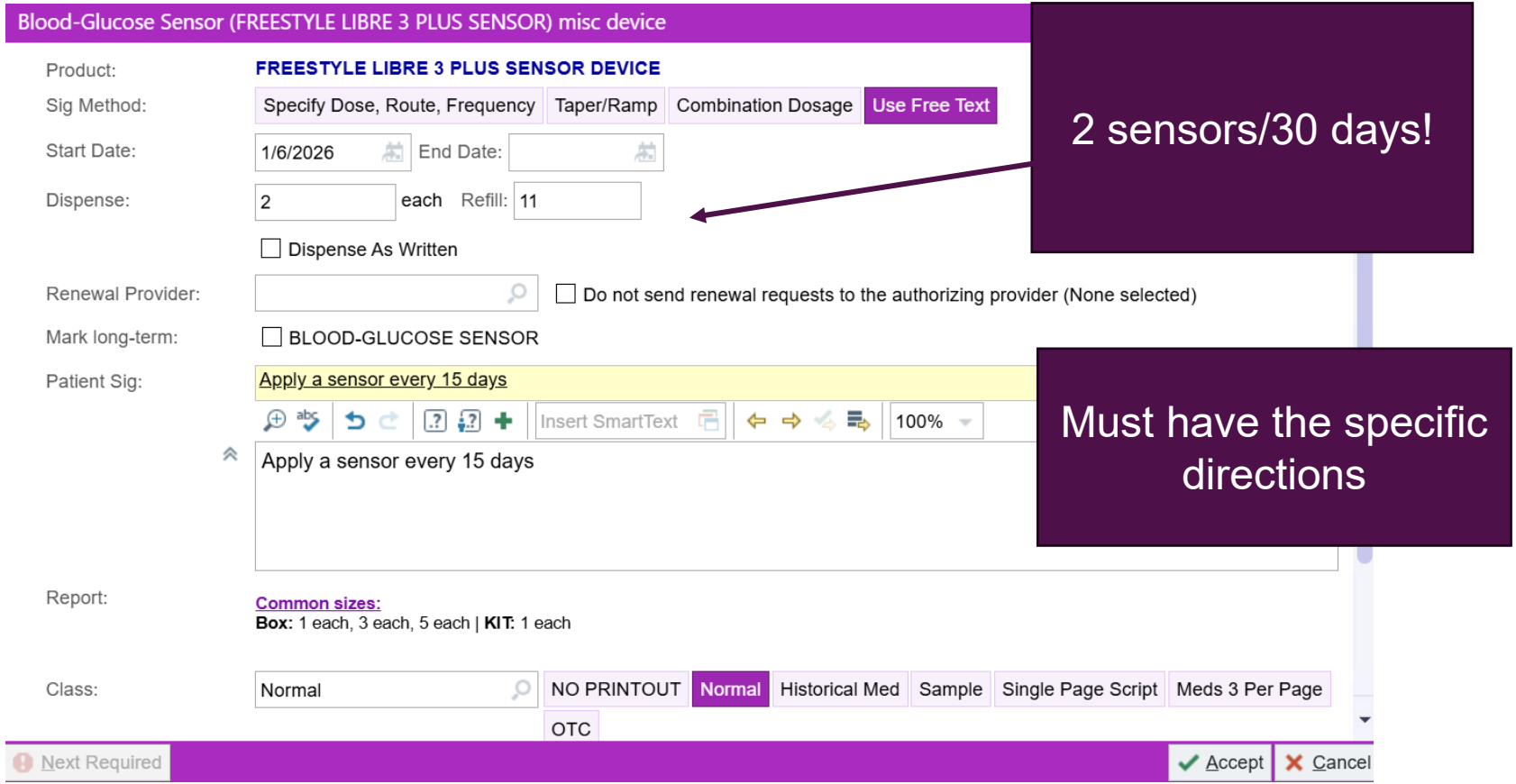
3 sensors/30 days!

Must have the specific directions

Ordering CGM Supplies – Dexcom G7



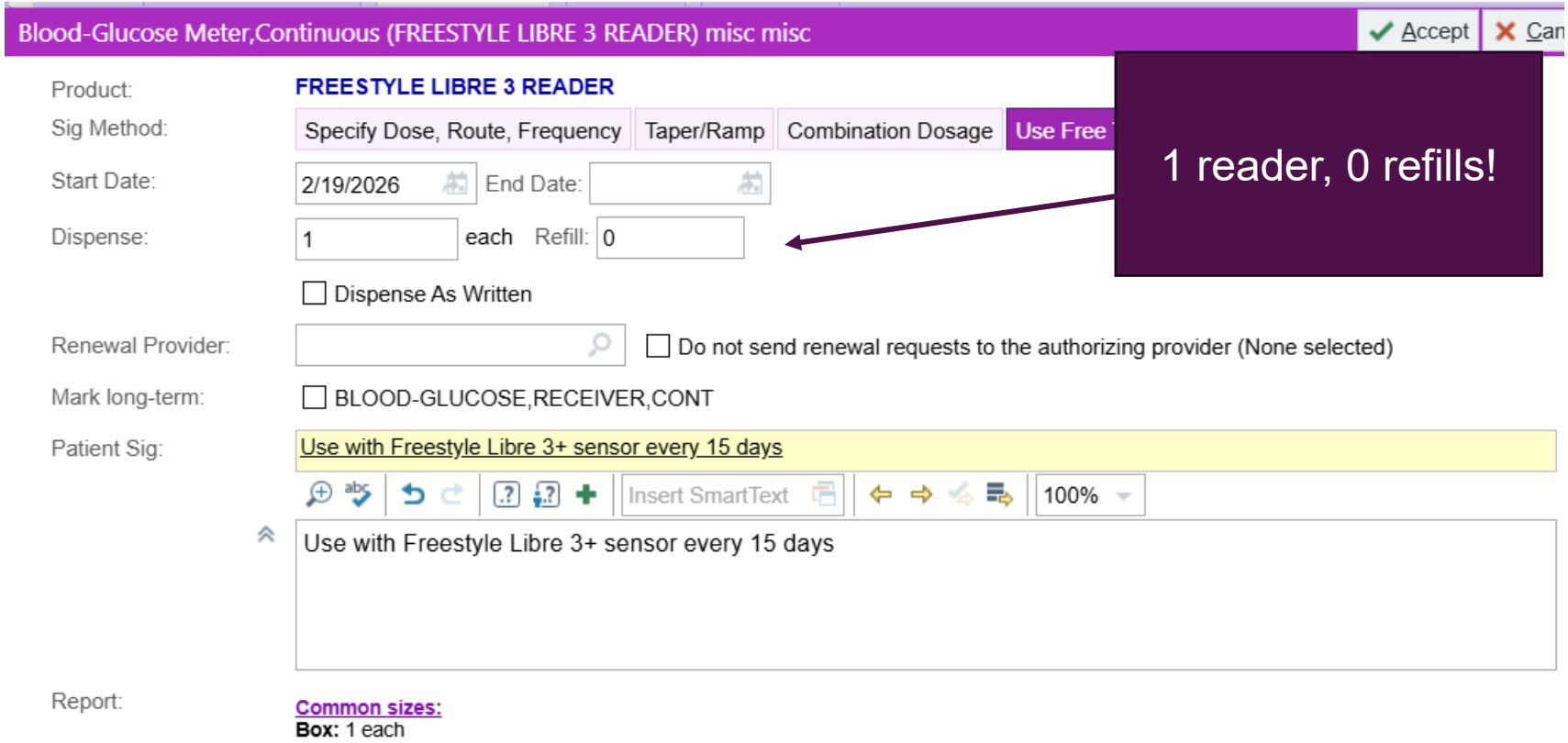
Ordering CGM Supplies – Freestyle Libre 3+



2 sensors/30 days!

Must have the specific directions

Ordering CGM Supplies – Freestyle Libre 3+



UPMC Billing

- **Billing**
  - 95249 – first time you see the patient to review CGM set up **AND** interpret at least 72 hours' worth of CGM data
  - 95251 – code you can bill once every 30 days for CGM interpretation
- **Revenue**
- **Improving STAR ratings**

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Insurance Coverage

	Freestyle Libre
Medicare	
Requirements	1 or more insulin injection **OR** problematic hypoglycemia
Where to send	Pharmacy or Durable Medical Equipment (DME) company
Medicaid	
Requirements	None
Where to send	Pharmacy
UPMC Commercial **	
Requirements	Problematic hypoglycemia **AND** 1 or more insulin injections
Where to send	Pharmacy
Highmark & Aetna Commercial **	
Requirements	Multiple daily injections
Where to send	Durable Medical Equipment (DME) company
*Patients can always get 2 sensors at the pharmacy for $74.99/month if not on insulin	

Dexcom – Cost & Coverage

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[Dexcom Cost & Coverage Estimator]

Dexcom Coverage Evaluator

This tool evaluates Dexcom pharmacy coverage for clinicians and determines the most affordable option for each patient.

Simply input the patient information along with NPI in the form below to receive coverage results, recommended action, and consideration.

Verifying patient information is accurate is crucial for determining coverage.

Patient First Name *

Patient Last Name *

Patient Date of Birth *

mm/dd/yyyy

Patient Gender *

- Select -

Patient Zip Code *

A valid 5 digit zip code.

Provider NPI Number *

Provider's 10 digit NPI number.

Knowledge Check

How often can providers bill for CGM interpretation?

A. Once every 2 weeks (14 days)

B. Once a month (30 days)

C. Once every 2 months (60 days)

D. Once yearly

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Initial CGM Set-Up Visit

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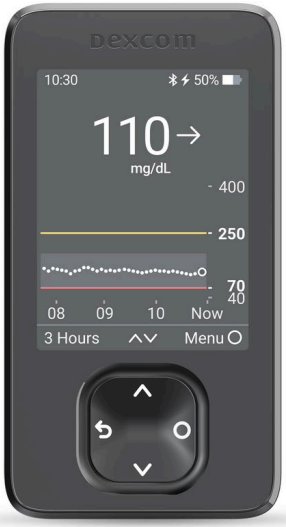
Disclaimer: The graphics and information come directly from Dexcom / Freestyle Libre

Initial Visit

- Introduce CGM and Components



Initial Visit

App/ Device pairing

- Phone
  - Download Dexcom G7 app → create account
  - Download Dexcom clarity → login with same credentials
    - No longer required for data sharing
- Receiver
  - Set date and time

Apps

Dexcom G7 app

- **Who uses it?** The person wearing the Dexcom G7.
- **What does it do?** Shows user's glucose information.

Dexcom Clarity app

- **Who uses it?** Dexcom G7 user wearing the sensor.
- **What does it do?** Review key metrics, create reports, or authorize data sharing with your clinic.

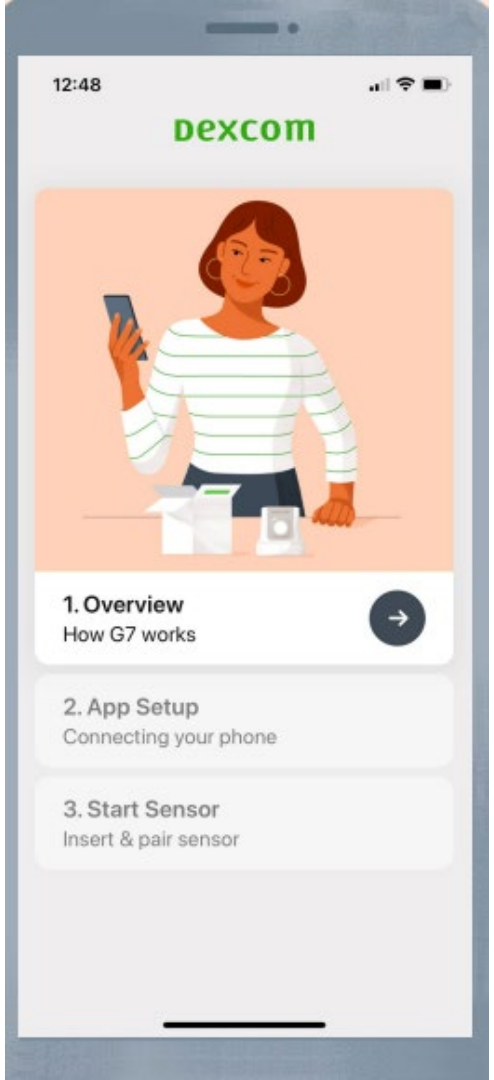
Dexcom Follow app*

- **Who uses it?** Someone who wants to view Dexcom G7 user's data. Examples: Parents, spouse, or caregivers.
- **What does it do?** Allows a person to view and follow the glucose levels and trends of a loved one.

*Internet connectivity required for data sharing. Following requires the use of the Follow app. Followers should always confirm readings on the Dexcom G7 app or receiver before making treatment decisions.

Overview Walkthrough

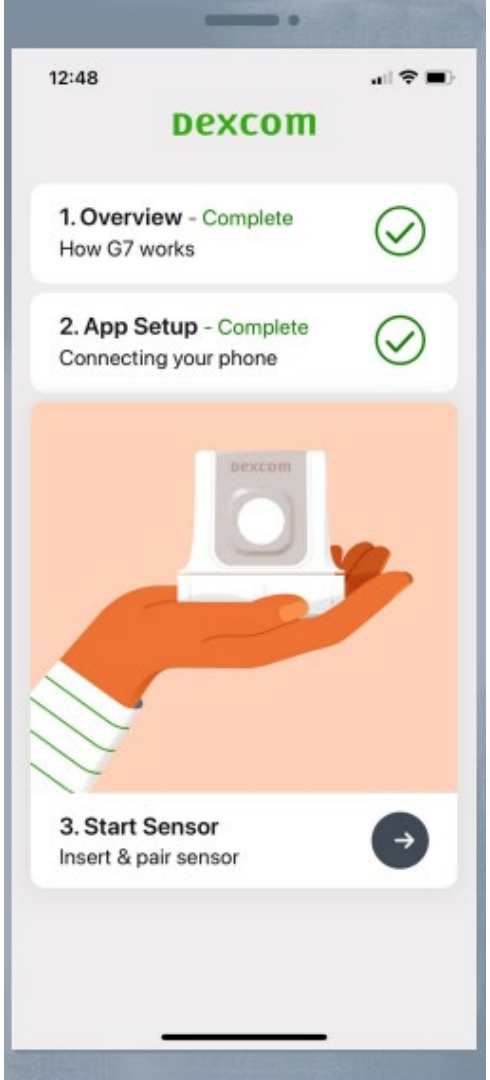
- The app walks you through the entire setup process step-by-step.
  - G7 Basics
  - Sensor readings (video and text versions available)
  - Alerts (video and text versions available)
  - When to use your blood glucose meter
    (video and text versions available)
  - Safety

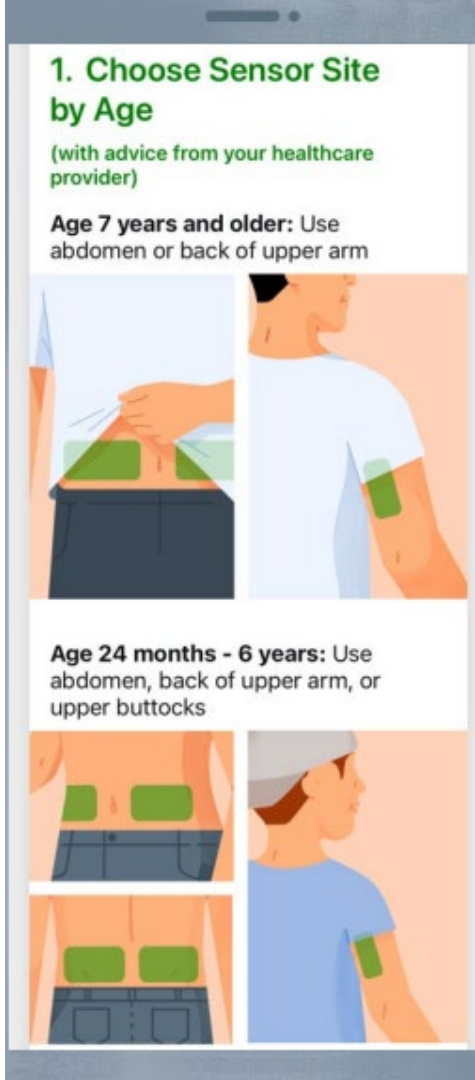


Start Sensor

Avoid areas:

- With loose skin or without enough fat to avoid muscles and bones
- That get bumped, pushed, or you lie on while sleeping
- Within 8 centimeters of infusion or injection site
- Near waistband or with irritations, scarring, tattoos, or lots of hair





Wash hands with soap and water. Dry.

Rub site with an alcohol wipe. Wait until dry.

Unscrew cap. Don't touch inside applicator.

Press and hold applicator firmly against skin and then push button.

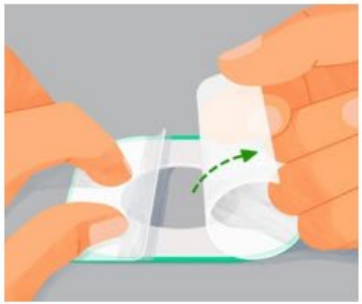
Remove applicator.

Rub firmly around patch 3 times.

Gently press on top of sensor for 10 seconds.

Apply Over-Patch

- Bundled in the patient instructions in the sensor box



Carefully pull off both clear liners, one at a time. Don't touch white adhesive area.

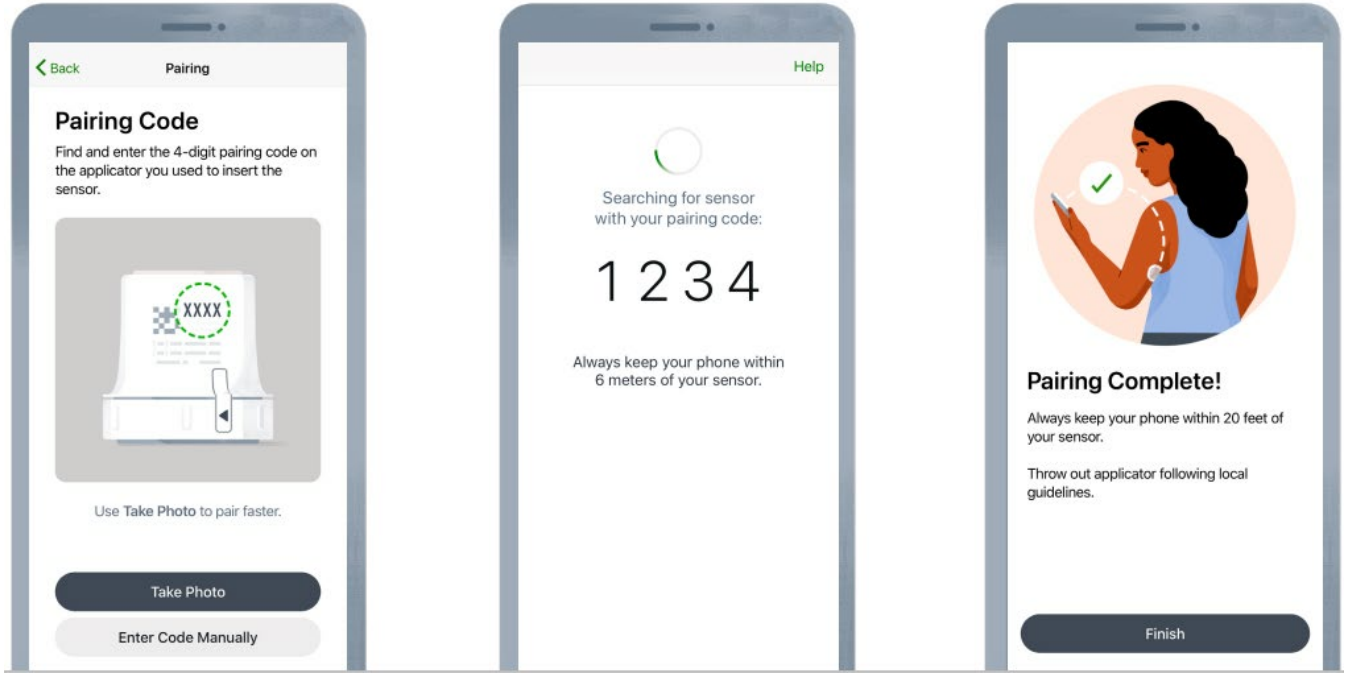
Use colored tab to place overpatch around sensor.

Rub around overpatch.

Use tab to peel off colored liner.

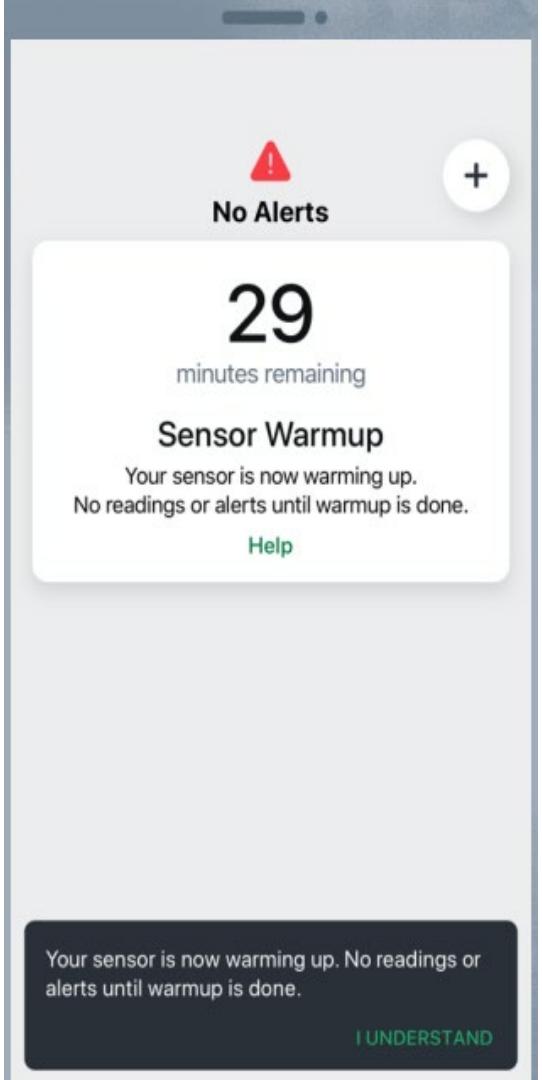
Rub around overpatch.

Pair Sensor with Device



Warmup

- This will happen each time it is paired
- The sensor warmup timer tells you when readings and alerts will start
- The warmup starts at sensor insertion, so you may see fewer than 30 minutes
- Keep smart device within 6 meters during this time



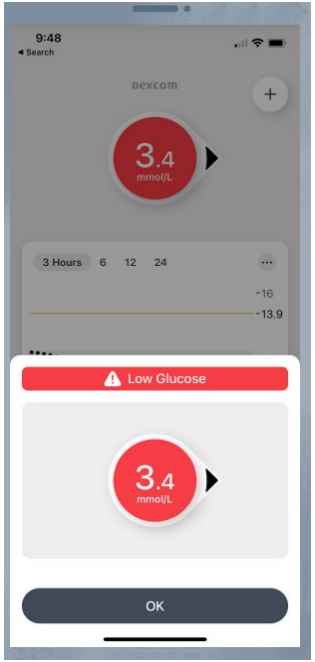
Review the Basics

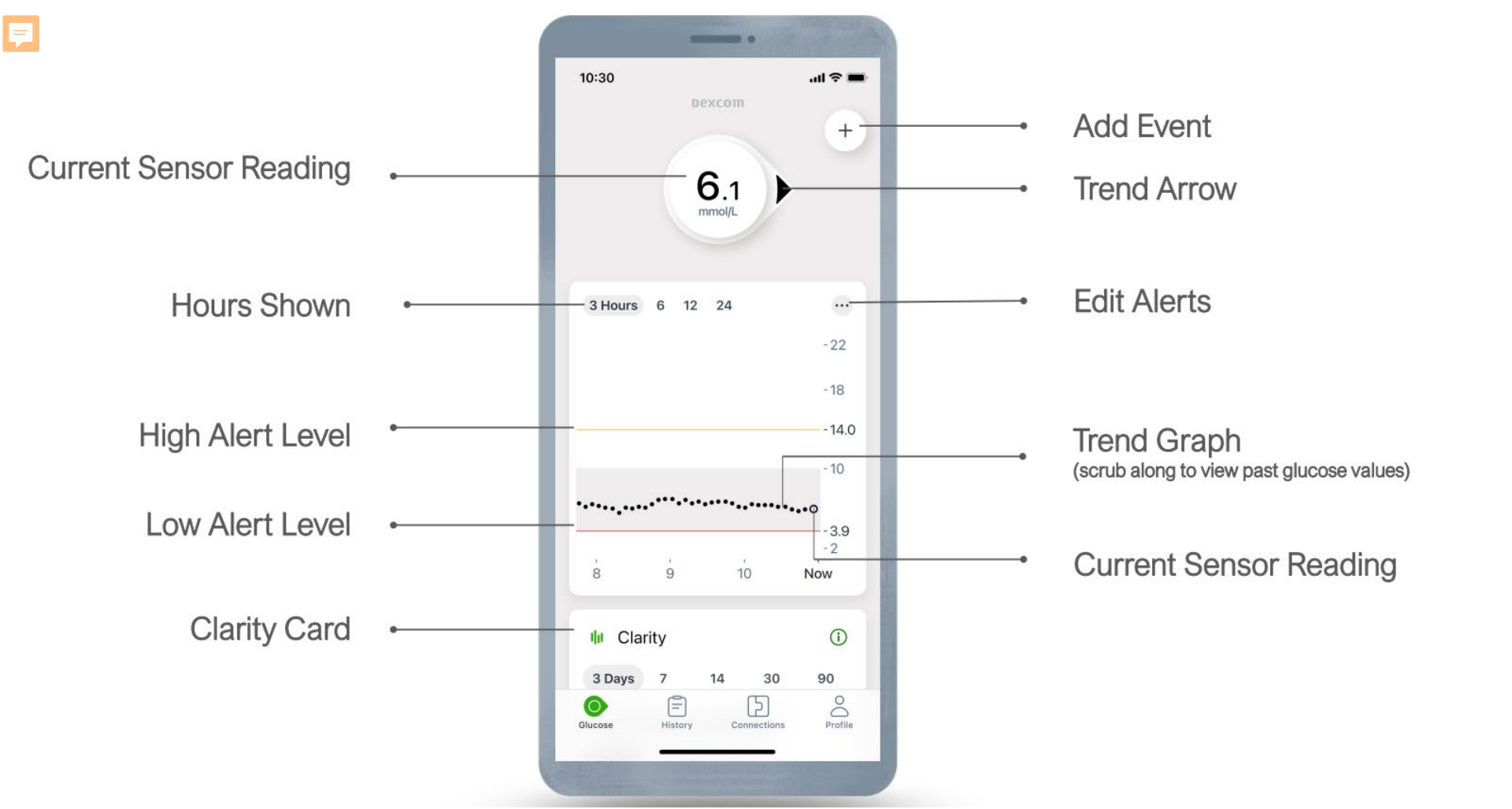
Steady
Changing less than 0.8 mmol/L in 15 minutes

Slowly rising or falling
Changing 0.8-1.7 mmol/L in 15 minutes

Rising or falling
Changing 1.7-2.5 mmol/L in 15 minutes

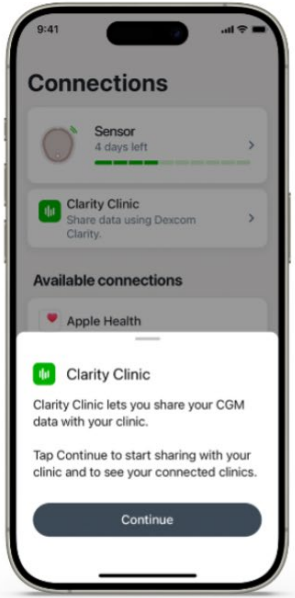
Rapidly rising or falling
Changing more than 2.5 mmol/L in 15 minutes

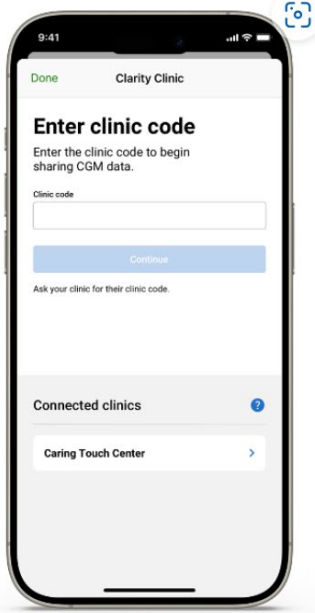


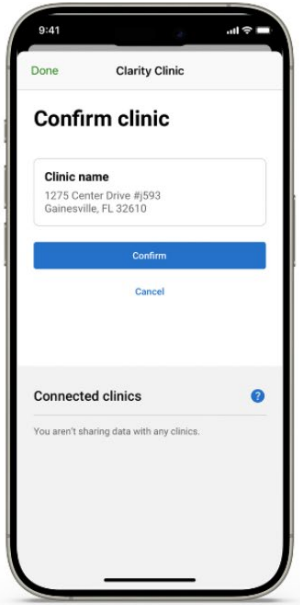

Current Sensor Reading
Hours Shown
High Alert Level
Low Alert Level
Clarity Card
Add Event
Trend Arrow
Edit Alerts
Trend Graph
(scrub along to view past glucose values)
Current Sensor Reading
10:30
dexcom
6.1
mmol/L
3 Hours
6
12
24
22
18
14.0
10
3.9
2
8
9
10
Now
Clarity
3 Days
7
14
30
90
Glucose
History
Connections
Profile

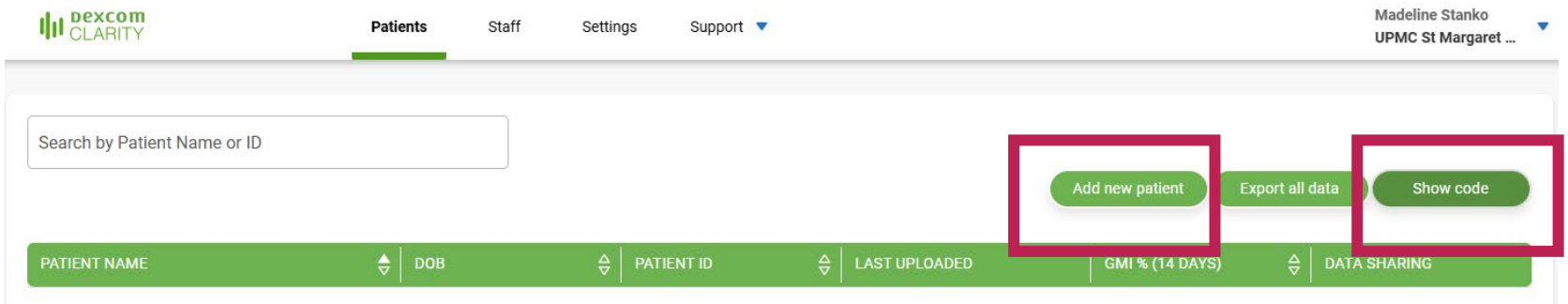
Setup data sharing (Dexcom Clarity)

Add patient to list (provider professional account)









Information for the Patient

- It may take 24 hours for sugars to normalize
- Keep phone/reader within 20 feet of sensor
- If CGM does not match symptoms, check with glucometer

End of Sensor/ Removing

- Sensor lasts for 10 days (12-hour grace period)
- To make it easier and avoid irritating skin:
  - Loosen edge and soak patch in body oil, like baby oil or an adhesive remover for skin (alcohol wipe)
  - Use adhesive removal wipes to rub the skin that gets exposed as you peel back the patch

Keep Sensor On When...

- **Showering & Bathing** – Waterproof up to 24 hours (G7)
- **Swimming** – Waterproof up to 8 feet deep for 24 hours
- **Exercise & Sweating** – Adhesive may loosen but reinforcement (tape/overlay patches) can help
- **Sleep** – No need to remove it overnight
- **Airport Security** – Safe through metal detectors and body scanners; avoid x-ray machines
- **Mild Skin Irritation** – If not severe, try barrier wipes, different site placement, or medical tape

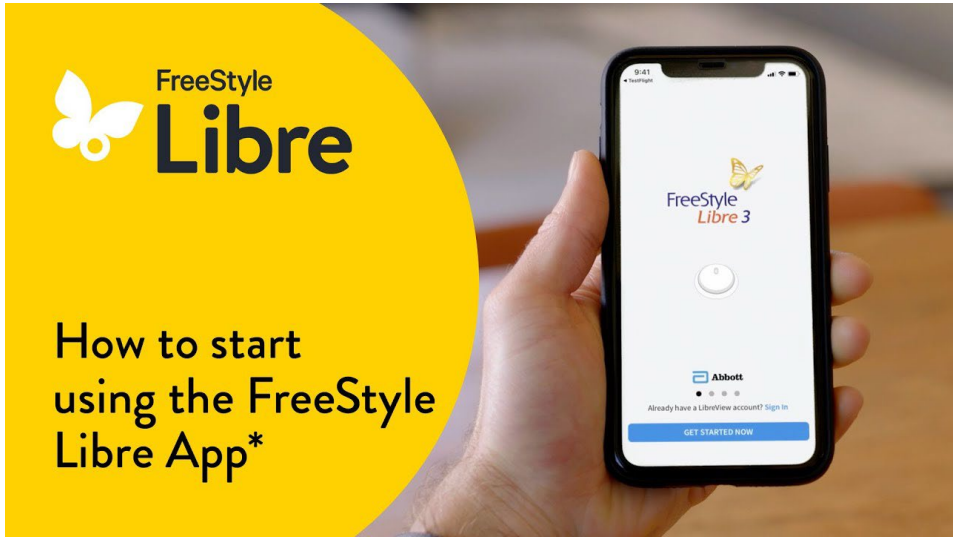
Remove Sensor When...

- **Imaging** – MRI, CT Scan, X-rays, or Radiation Therapy
- **Severe Skin Reaction** or Infection
- **Sensor Expiration** – G7: Remove after 10 days (auto shut-off).
- **Prolonged Water Exposure** (>24 hours) – Dexcom is water-resistant but not designed for extended soaking.
- **Surgery** – Remove before procedures where medical staff require it

Troubleshooting

- Always keep sensor box/applicator until end of 10 days
- If problems with sensor (not working/ falls off) remove sensor and place new one
- Call manufacturer – explain error and request replacement
- Manufacturer phone #s:
  - Dexcom: 888-738-3646
  - Freestyle: 1-855-632-8658

Freestyle Libre



Knowledge Check

Which of the following is an appropriate counseling point for CGMs?

A. If CGM does not match symptoms, check with glucometer
B. Remove CGM to bathe and shower
C. It is safe to keep CGM sensor on during X-ray imaging
D. It is not necessary to keep phone/reader close to sensor

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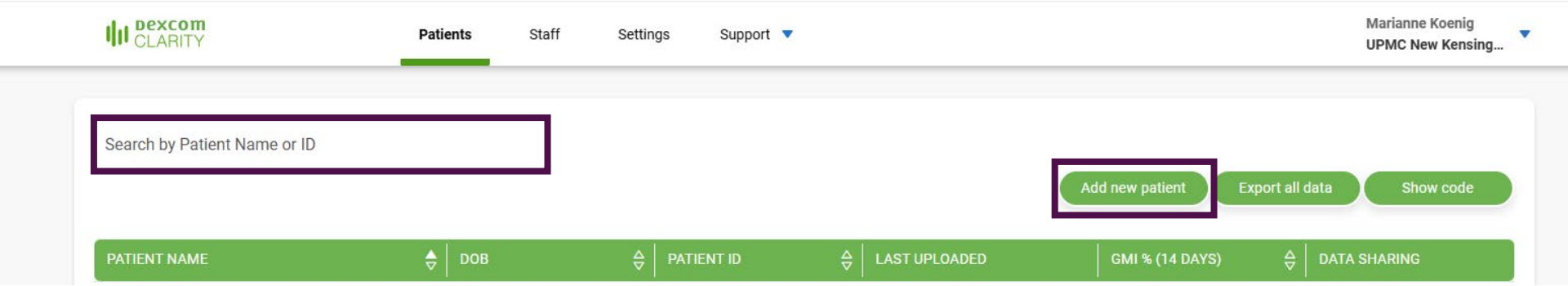
Data Interpretation

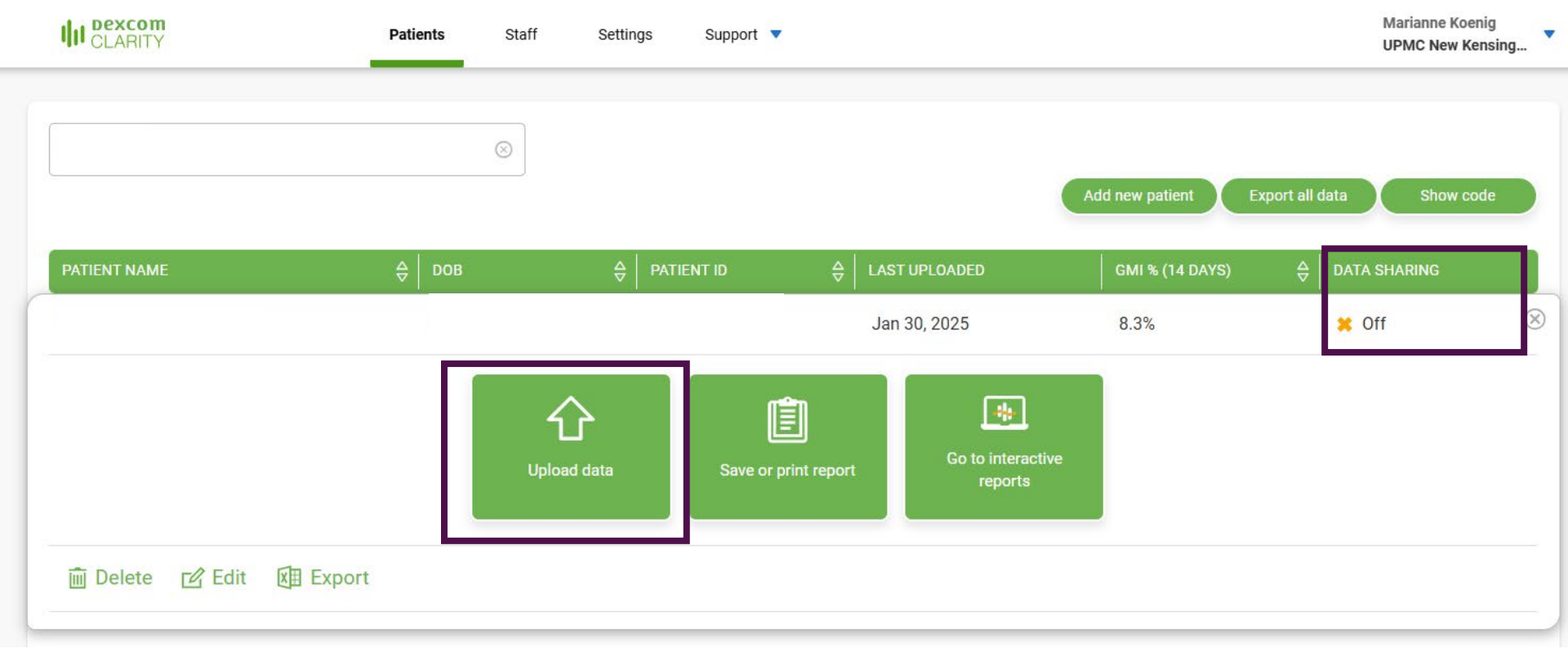
DISCLAIMER

- Additional software is needed on the *physical* computer that is connected to a reader device
- At UPMC, information technology can download the driver needed to upload data
- This is not needed for viewing and interpreting data from patients that share remotely

Dexcom


dexcom CLARITY
Patients
Staff
Settings
Support
Marianne Koenig
UPMC New Kensing...
Search by Patient Name or ID
Add new patient
Export all data
Show code
PATIENT NAME
DOB
PATIENT ID
LAST UPLOADED
GMI % (14 DAYS)
DATA SHARING

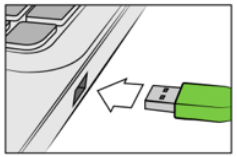
Dexcom


dexcom CLARITY
Patients
Staff
Settings
Support
Marianne Koenig
UPMC New Kensing...
Add new patient
Export all data
Show code
PATIENT NAME
DOB
PATIENT ID
LAST UPLOADED
GMI % (14 DAYS)
DATA SHARING
Jan 30, 2025
8.3%
Off
Upload data
Save or print report
Go to interactive reports
Delete
Edit
Export

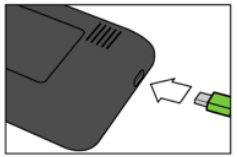
Upload Data

PATIENT NAME	DOB	PATIENT ID	LAST UPLOADED	DATA SHARING
			Jan 30, 2025 4:06 PM	✖ Off

Verify (✓) — 2 Connect Device — 3 Collect Data — 4 Success



1. Connect the USB cable to your computer.



2. Connect the cable to your receiver.

3. Press and hold the power button on the receiver until it turns on.

Cancel Upload

Upload Data

PATIENT NAME	DOB	PATIENT ID	LAST UPLOADED	DATA SHARING
			Jan 30, 2025 4:06 PM	Off

Verify — Connect Device — 3 Collect Data — 4 Success

Collecting Data

Please wait while data is collected.

Reading...

Upload Data

PATIENT NAME	DOB	PATIENT ID	LAST UPLOADED	DATA SHARING
			Feb 13, 2025 3:34 PM	Off

Upload complete!

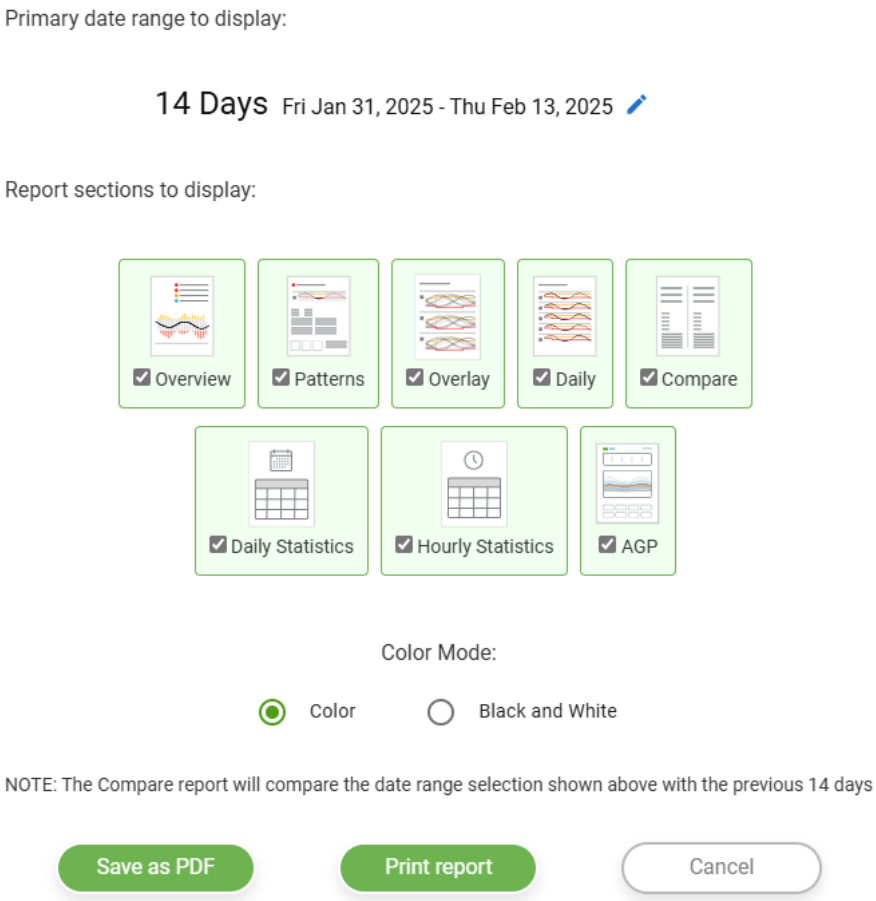
Upload data

Save or print report

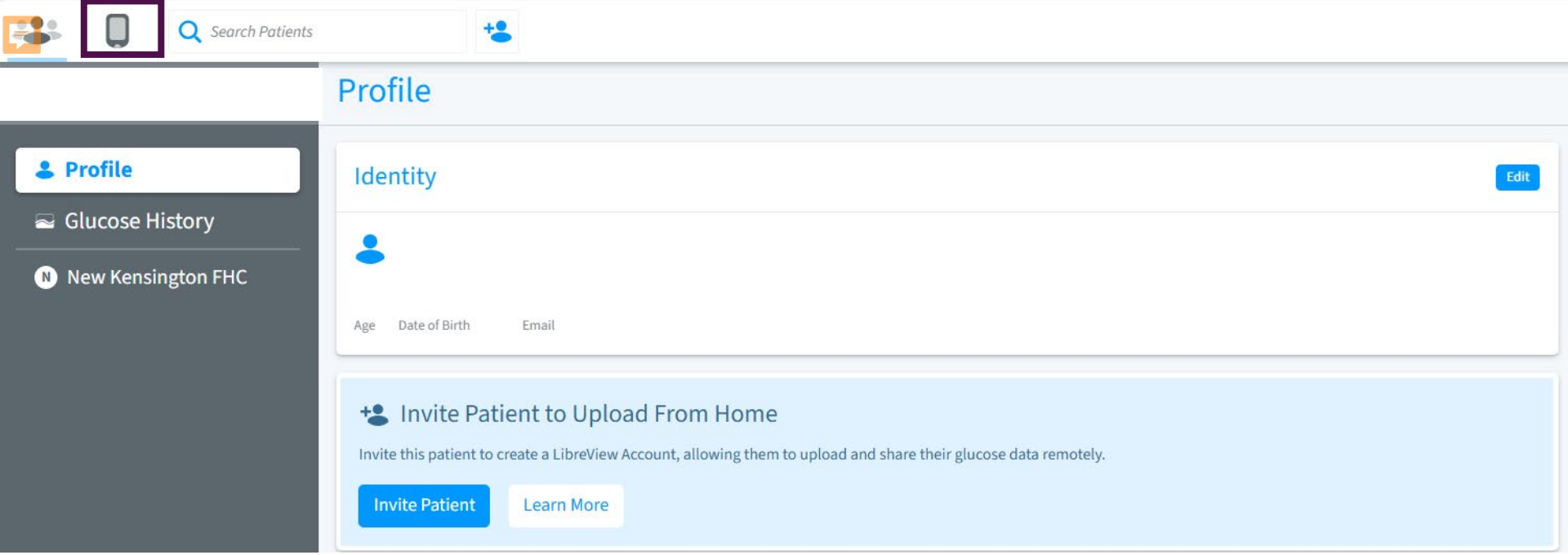
Go to interactive reports

← Return to Patient List

Save or print report



- Can change date range for report
- 7 days up to 90 days
- Can upload full PDF to patient chart
- Provide printed reports to patients upon request


Search Patients
Profile
Profile
Glucose History
New Kensington FHC
Identity
Edit
Age
Date of Birth
Email
Invite Patient to Upload From Home
Invite this patient to create a LibreView Account, allowing them to upload and share their glucose data remotely.
Invite Patient
Learn More

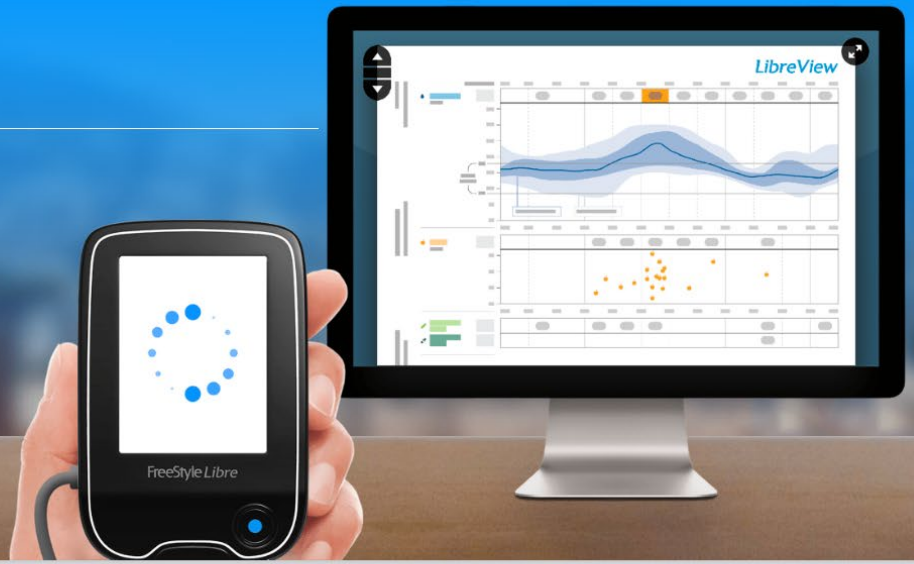
Search Patients

LibreView

Upload a Device

1. Connect the device to your computer with the correct cable
2. Choose upload option below

The LibreView Device Drivers software is required to upload a device. Download the LibreView Device Drivers software



Create 1-Time Report

Upload a device to view and print a report now.

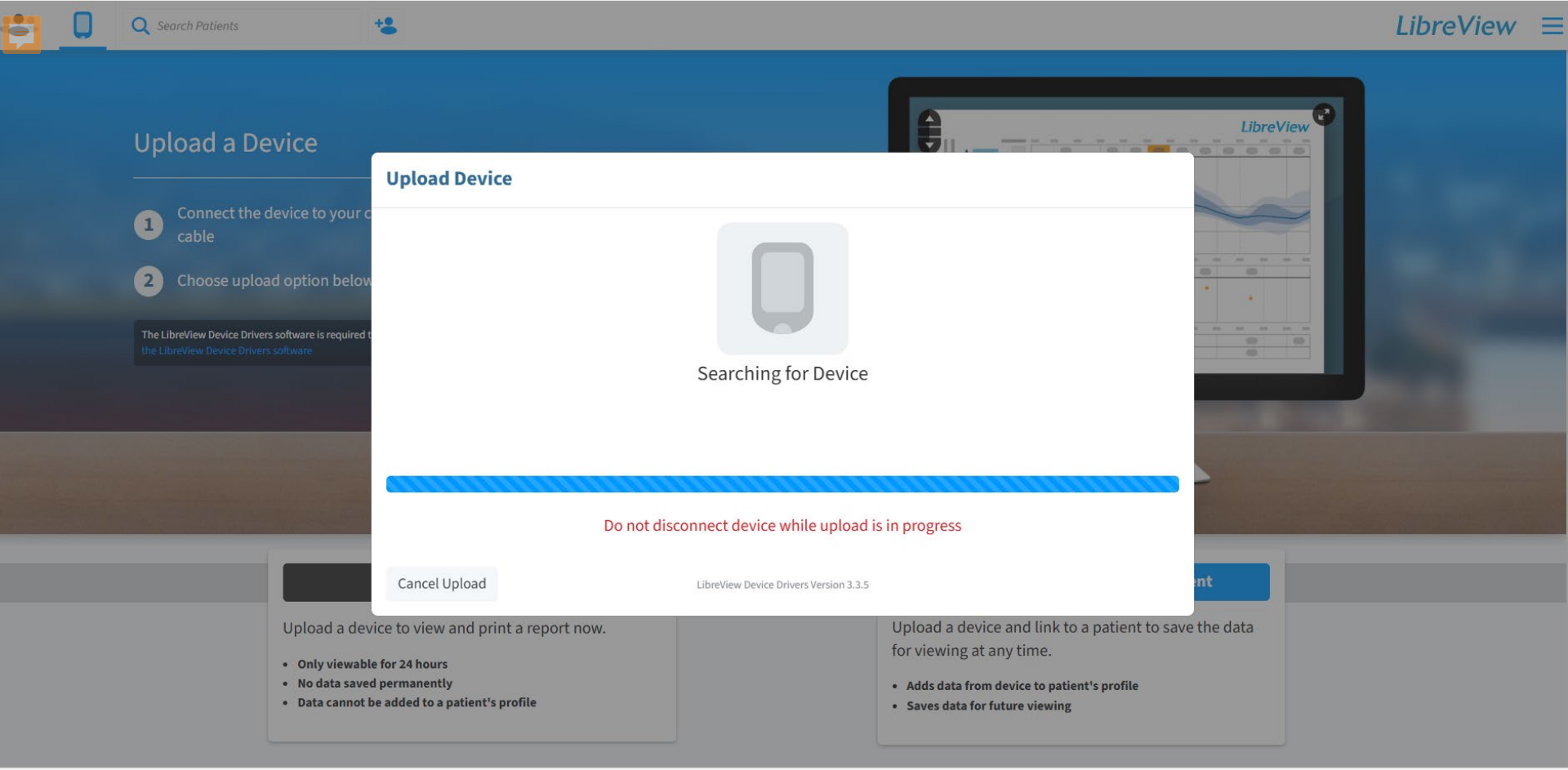
- **Only viewable for 24 hours**
- **No data saved permanently**
- **Data cannot be added to a patient's profile**

OR

Create Report Linked to Patient

Upload a device and link to a patient to save the data for viewing at any time.

- **Adds data from device to patient's profile**
- **Saves data for future viewing**


Search Patients
LibreView
Upload a Device
1 Connect the device to your c
cable
2 Choose upload option below
The LibreView Device Drivers software is required t
the LibreView Device Drivers software
LibreView
Upload Device
Searching for Device
Do not disconnect device while upload is in progress
Cancel Upload
LibreView Device Drivers Version 3.3.5
Upload a device to view and print a report now.
Only viewable for 24 hours
No data saved permanently
Data cannot be added to a patient's profile
Upload a device and link to a patient to save the data for viewing at any time.
Adds data from device to patient's profile
Saves data for future viewing

AGP Report
Glucose Pattern Insights
Monthly Summary
Daily Log
Snapshot
Mealtime Patterns
Weekly Summary
Device Details
Daily Patterns

MRN: _____
DEVICE: FreeStyle Libre 3 + 7

New Kensington FHC
PHONE: 724-334-3640

Generated: 02/13/2025

AGP Report

LibreView

January 31, 2025 - February 13, 2025 (14 Days)

GLUCOSE STATISTICS AND TARGETS

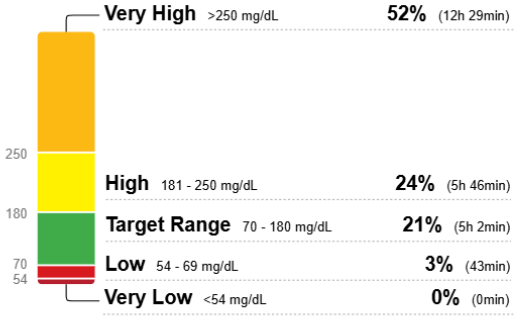
January 31, 2025 - February 13, 2025	**14 Days**
Time CGM Active:	**80%**

Ranges And Targets For	Type 1 or Type 2 Diabetes
Glucose Ranges	**Targets** % of Readings (Time/Day)
Target Range 70-180 mg/dL	Greater than 70% (16h 48min)
Below 70 mg/dL	Less than 4% (58min)
Below 54 mg/dL	Less than 1% (14min)
Above 180 mg/dL	Less than 25% (6h)
Above 250 mg/dL	Less than 5% (1h 12min)
Each 5% increase in time in range (70-180 mg/dL) is clinically beneficial.	

Average Glucose	**252** mg/dL
Glucose Management Indicator (GMI)	**9.3%**
Glucose Variability	**38.1%**

Defined as percent coefficient of variation (%CV); target ≤36%

TIME IN RANGES



Very High	>250 mg/dL	**52%**	(12h 29min)
High	181 - 250 mg/dL	**24%**	(5h 46min)
Target Range	70 - 180 mg/dL	**21%**	(5h 2min)
Low	54 - 69 mg/dL	**3%**	(43min)
Very Low	<54 mg/dL	**0%**	(0min)

AMBULATORY GLUCOSE PROFILE (AGP)

AGP is a summary of glucose values from the report period, with median (50%) and other percentiles shown as if occurring in a single day.

Change Report End Date | 8 Data Sources | Report Settings

16 pages | Print/Save PDF

Goal: Flat, Narrow, In-Range

GLUCOSE STATISTICS AND TARGETS

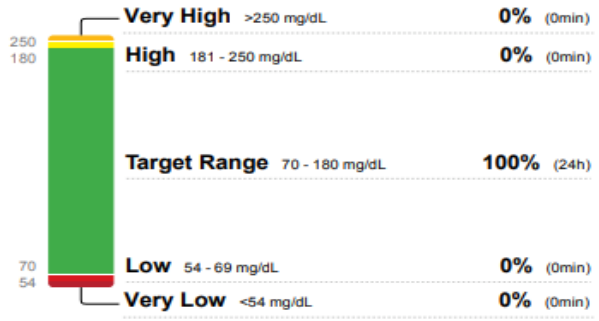
September 4, 2024 - September 17, 2024	**14 Days**
Time CGM Active:	**84%**

Ranges And Targets For	Type 1 or Type 2 Diabetes
Glucose Ranges	**Targets** % of Readings (Time/Day)
Target Range 70-180 mg/dL	Greater than 70% (16h 48min)
Below 70 mg/dL	Less than 4% (58min)
Below 54 mg/dL	Less than 1% (14min)
Above 180 mg/dL	Less than 25% (6h)
Above 250 mg/dL	Less than 5% (1h 12min)
Each 5% increase in time in range (70-180 mg/dL) is clinically beneficial.	

Average Glucose	**112** mg/dL
Glucose Management Indicator (GMI)	**6.0%**
Glucose Variability	**14.0%**

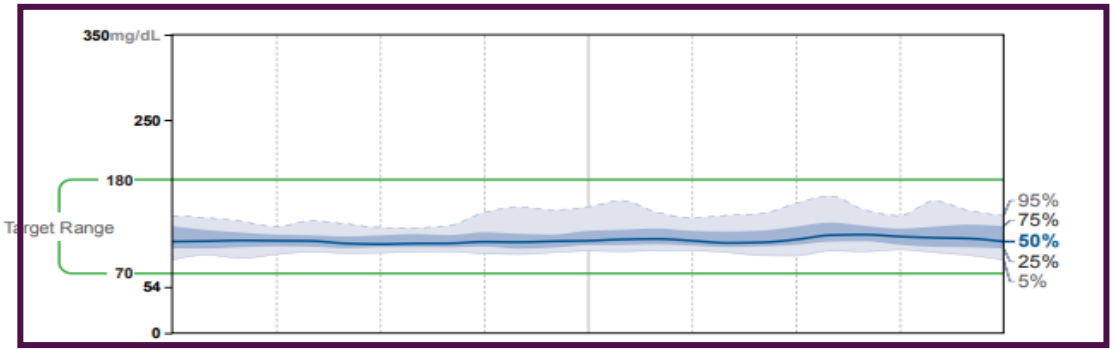
Defined as percent coefficient of variation (%CV); target ≤36%

TIME IN RANGES

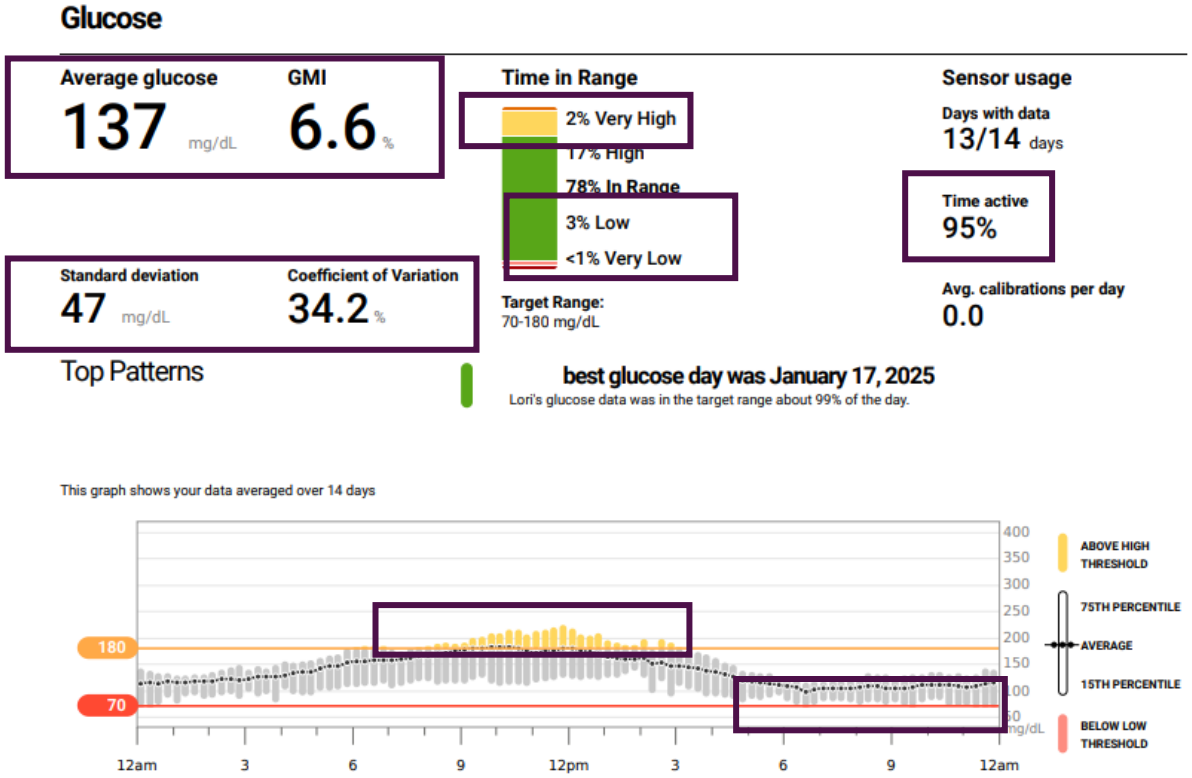


AMBULATORY GLUCOSE PROFILE (AGP)

AGP is a summary of glucose values from the report period, with median (50%) and other percentiles shown as if occurring in a single day.



Interpretation - Overview



Knowledge Check

You have a 45-year-old patient with T2DM, HTN, and HLD. What is the goal time in range of the CGM?

A. >80%

B. >70%

C. >50%

D. >25%

UPMC
LIFE CHANGING MEDICINE
LET'S PRACTICE!

Interpretation - Patient Case Example

CG is a 65 yo M pt with T2DM, obesity, HTN, and HLD comes into clinic for diabetes f/u.

Pertinent Labs/Vitals:

- A1c 2 months ago: 10.3%
- Last weight: 103 kg

Current T2DM Regimen:

- Metformin 1,000 mg BID
- Jardiance 25 mg daily
- Ozempic 2 mg weekly
- Lantus 30 units qHS
  - ~0.3 units/kg
- Humalog 10 units TID w/meals
- Dexcom G7

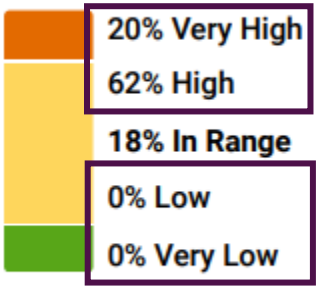
Interpretation - Patient Case Example

UPMC
LIFE CHANGING MEDICINE

Average glucose
220 mg/dL

GMI
N/A

Time in Range



- 20% Very High
- 62% High
- 18% In Range
- 0% Low
- 0% Very Low

Target Range:
70-180 mg/dL

Sensor usage

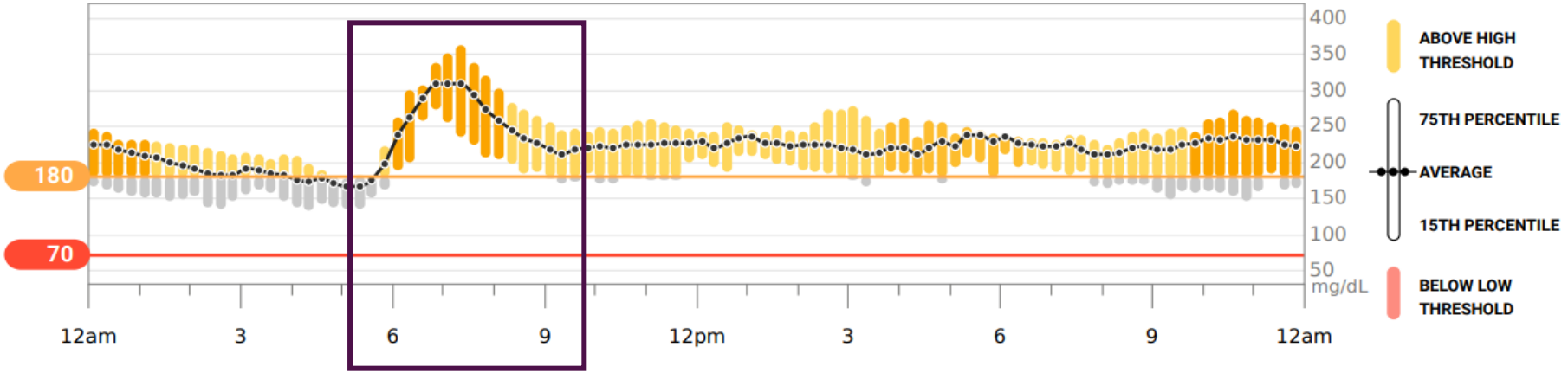
Days with data
4/14 days

Time active
67%

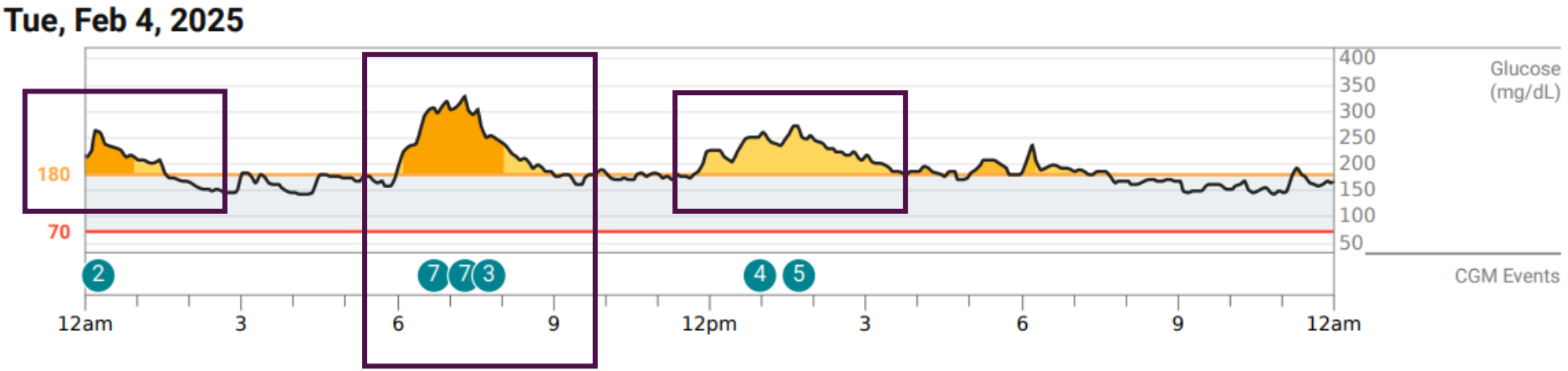
Standard deviation
42 mg/dL

Coefficient of Variation
19.2 %

Avg. calibrations per day
0.0



Interpretation - Patient Case Example

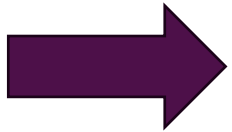


7:51 AM	CGM	Alert	High	--	250 mg/dL
7:46 AM	CGM	Alert	High	--	252 mg/dL
7:36 AM	CGM	Alert	High	--	272 mg/dL
7:31 AM	CGM	Alert	High	--	302 mg/dL
7:26 AM	CGM	Alert	High	--	294 mg/dL
7:21 AM	CGM	Alert	High	--	302 mg/dL
7:16 AM	CGM	Alert	High	--	328 mg/dL
7:11 AM	CGM	Alert	High	--	314 mg/dL
7:06 AM	CGM	Alert	High	--	306 mg/dL

What Would You Recommend For This Patient?

Current T2DM Regimen:

- Metformin 1,000 mg BID
- Jardiance 25 mg daily
- Ozempic 2 mg weekly
- Lantus 30 units qHS
  - ~0.3 units/kg
- Humalog 10 units TID w/meals
- Dexcom G7



Our Recommendation:

- Lifestyle interventions
- Increase Humalog to 12 units with breakfast, 10 units with lunch and dinner
- Increase Lantus to 32 units qHS

Don't Forget to Bill!

★

CONTINUOUS GLUCOSE MONITORING ANALYSIS I&R
95251 (CPT®)

Can only bill once every **30 days**!

Key Points

CGMs are useful tools to monitor glycemic trends in patients with diabetes and assist in informing medication adjustments, particularly insulin

CGMs initial and interpretation visits utilize different billing codes, and the latter can only be billed once every 30 days

While different patient populations have different targets for glycemic control, the goal CGM trend is flat, narrow, and in-range

References

1) American Diabetes Association Professional Practice Committee. Diabetes Technology: Standards of Care in Diabetes-2025. *Diabetes Care*. 2025;48:S146-S166. doi:10.2337/dc25-S007.

2) Abbott. FreeStyle Provider – Continuous Glucose Monitoring (CGM) Systems. Accessed February 10, 2025. https://www.freestyleprovider.abbott/us-en/home.html.

3) Dexcom Provider – Continuous Glucose Monitoring for Healthcare Providers. Accessed February 10, 2025. https://provider.dexcom.com.

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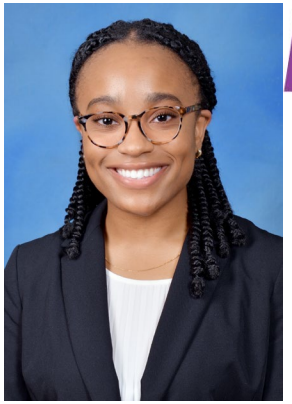

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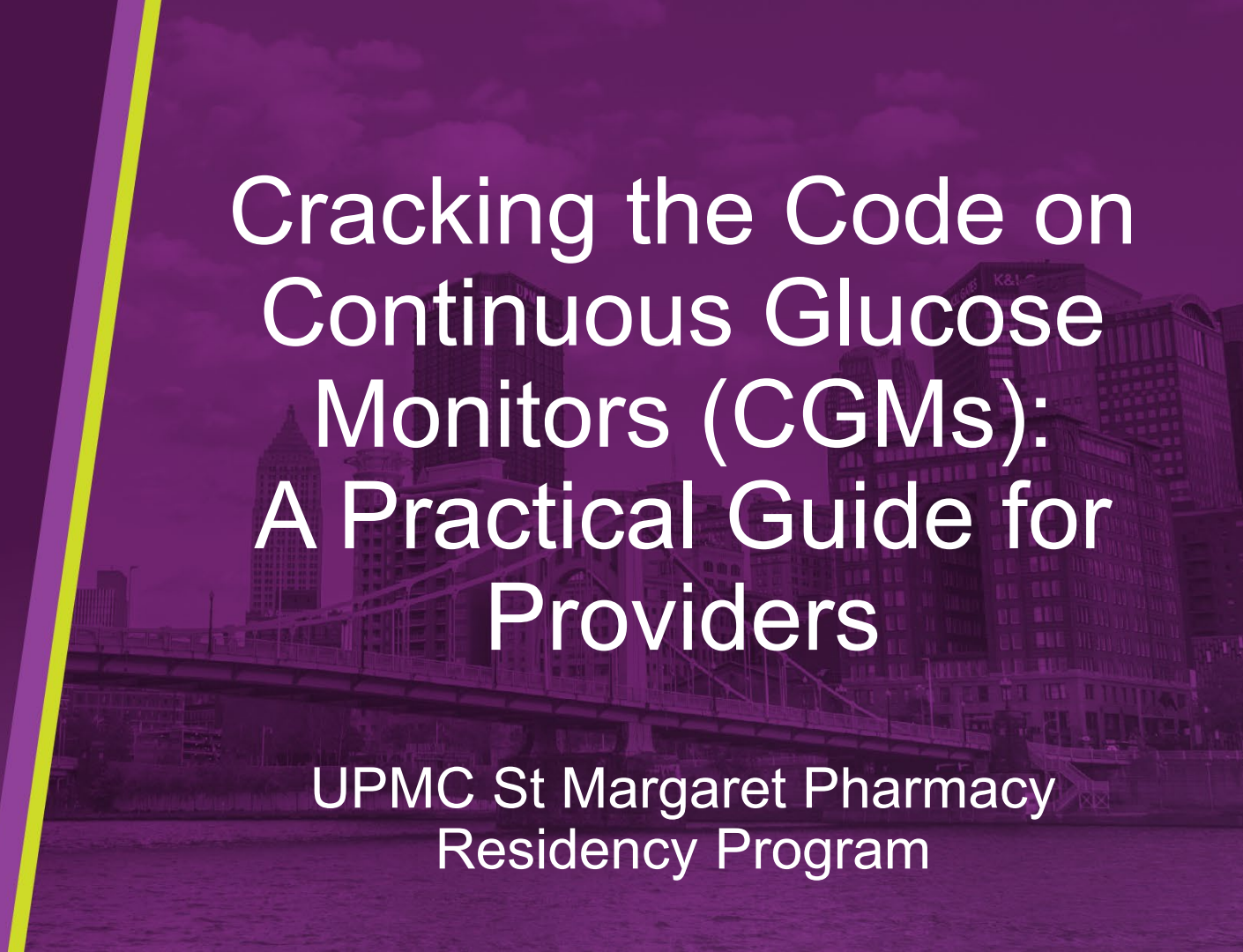
LIFE CHANGING MEDICINE

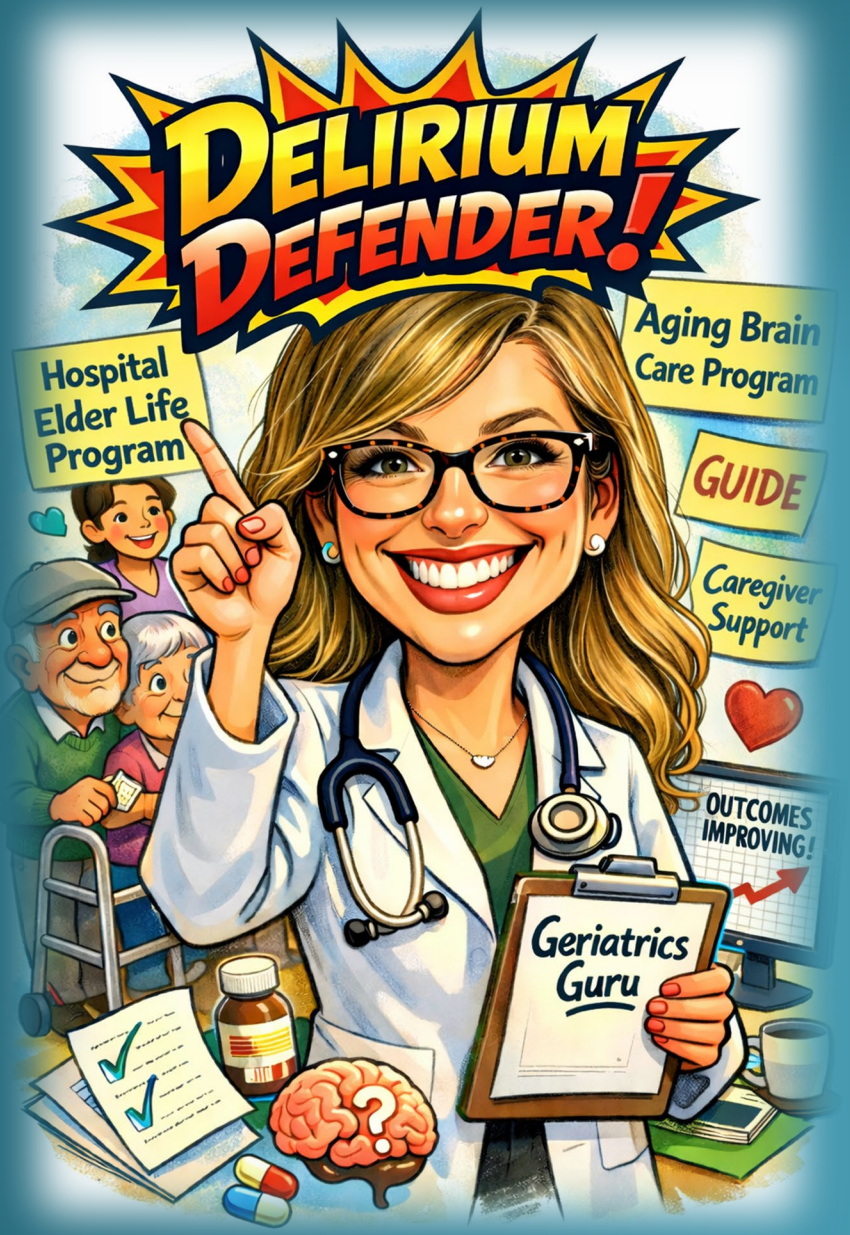
Cracking the Code on Continuous Glucose Monitors (CGMs): A Practical Guide for Providers



UPMC St Margaret Pharmacy Residency Program

Special Thank You to Alexa Wardoclip, Madeline Stanko, Jason Fine, Lauren Fasth, Devon Hess, Keri Courtnage, Alex Mannino

February 27th, 2026



An Age-Friendly Approach to Delirium

Lyn Weinberg, MD
Director, Division of Geriatrics
Medical Director, Hospital Elder Life Program
Associate Professor of Clinical Medicine,
Drexel University College of Medicine

American Geriatrics Society CoCare® HELP
HOSPITAL ELDER LIFE PROGRAM
CENTER OF EXCELLENCE

AHN

Age-Friendly Health Systems
Committed to Care Excellence for Older Adults

“Delirium provides a window to hospital care and a way to examine and improve the quality of hospital care for the geriatric population. It is common, frequently iatrogenic, and closely linked to the processes of care. Thus, delirium serves as a useful outcome measure to assess quality of care in hospitalized elderly patients.”

Sharon Inouye, MD - creator of Hospital Elder Life Program (HELP)

“Delirium: A Symptom of How Hospital Care is Failing Older Persons and a Window to Improve Quality of Hospital Care” **1999**

Delirium Journey at AHN: History and Milestones

2016
HELP implemented at West Penn Hospital for delirium prevention

2018
HELP expanded to Allegheny General Hospital

2022
Widespread delirium screening and Age-Friendly protocols implemented across 10 AHN hospitals

2023
AHN HELP launched as an ENHANCE trial site, evaluating caregiver-delivered delirium prevention strategies

ENHANCE

AHN

Definition of Delirium

Acute decline in cognitive functioning and attention

Acute brain failure

Delirium: Common Misconceptions

Myth: Delirium is easily recognizable

Fact: Frequently unrecognized, especially hypoactive form

Myth: Delirium is an inevitable part of hospitalization in older adults

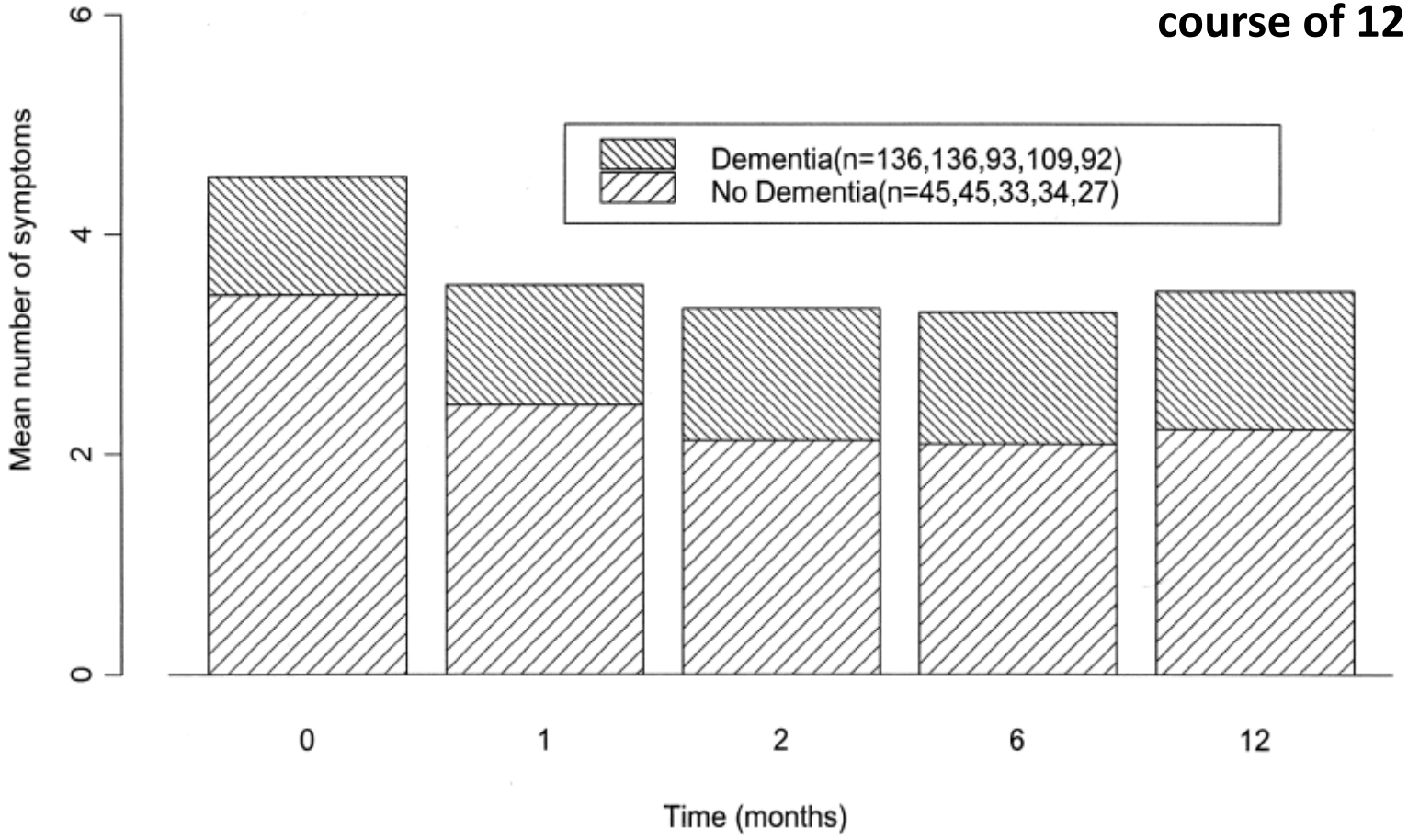
Fact: Delirium is preventable in 30-40% of cases

Myth: Delirium is transient and easily reversible

Fact: Delirium associated with long-term consequences

Delirium Often Persists After Hospitalization

193 patients with delirium followed over the course of 12 months



Take Home:

- Among patients with and without dementia, symptoms persist up to 12 months after diagnosis
- Mortality 31%
- Quicker in-hospital recovery was associated with better outcomes

McCusker J, *et al*. The Course of Delirium in Older Medical Inpatients *Journal of General Internal Medicine*, 2003

AHN

Patients' Traumatic Experiences of Delirium

- Delirium recognized by patients as a negative experience
- Associated with fear, helplessness, severe distress
- Hallucinations and delusions can be perceived as life-threatening experiences
- Feelings can persist for a prolonged period of time
- Some patients report a permanent loss of dignity after recovering from delirium

Kuusisto-Gussman E *et al.*. *J Adv Nurs*, 2021

Delirium as a Geriatric Syndrome

Vulnerable Brain is at the Core of Delirium

Predisposing Factors or Vulnerability

Precipitating Factors or Insults

High Vulnerability

Noxious Insult

Top risk factors
("Vulnerable brain")

- Functional impairment
- Hearing/vision
- Comorbidity/severity of illness
- Alcohol use
- Older age (≥75 years)

Common insults:

- Dehydration
- Psychoactive medications
  - Sedative/hypnotics
  - Anticholinergics
  - BZD
- Medication withdrawal
- Bedrest
- Restraints/tethers
- Hospital environment

Low Vulnerability

Less Noxious Insult

Adapted from: Inouye SK *et al*, *Lancet*, 2014

Delirium Evaluation and Management

Confusion Assessment Method (CAM)

- Gold standard; best-performing bedside tool
- Validated in high-quality studies including >1000 patients
- Assesses 10 delirium features (based on DSM criteria)
- Sensitivity: 94%; Specificity: 89%, high inter-rater reliability
- Adaptations: ICU, ED, SNF, Family-administered
- Limitation: Long; requires formal cognitive assessment

Simplified versions:
- **UB-2**
- **3D-CAM**

Inouye SK *et al.* *Ann Internal Med*, 1990
Wei LA *et al.* *JAGS*, 2008

UB-2

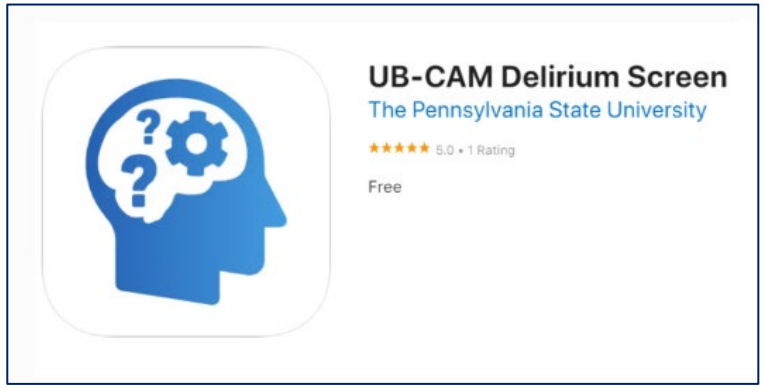
1. “Tell me the day of the week”

+

2. “Name the months of the year in reverse”

Both Correct = NOT delirious

1 or 2 incorrect = Proceed to 3D-CAM



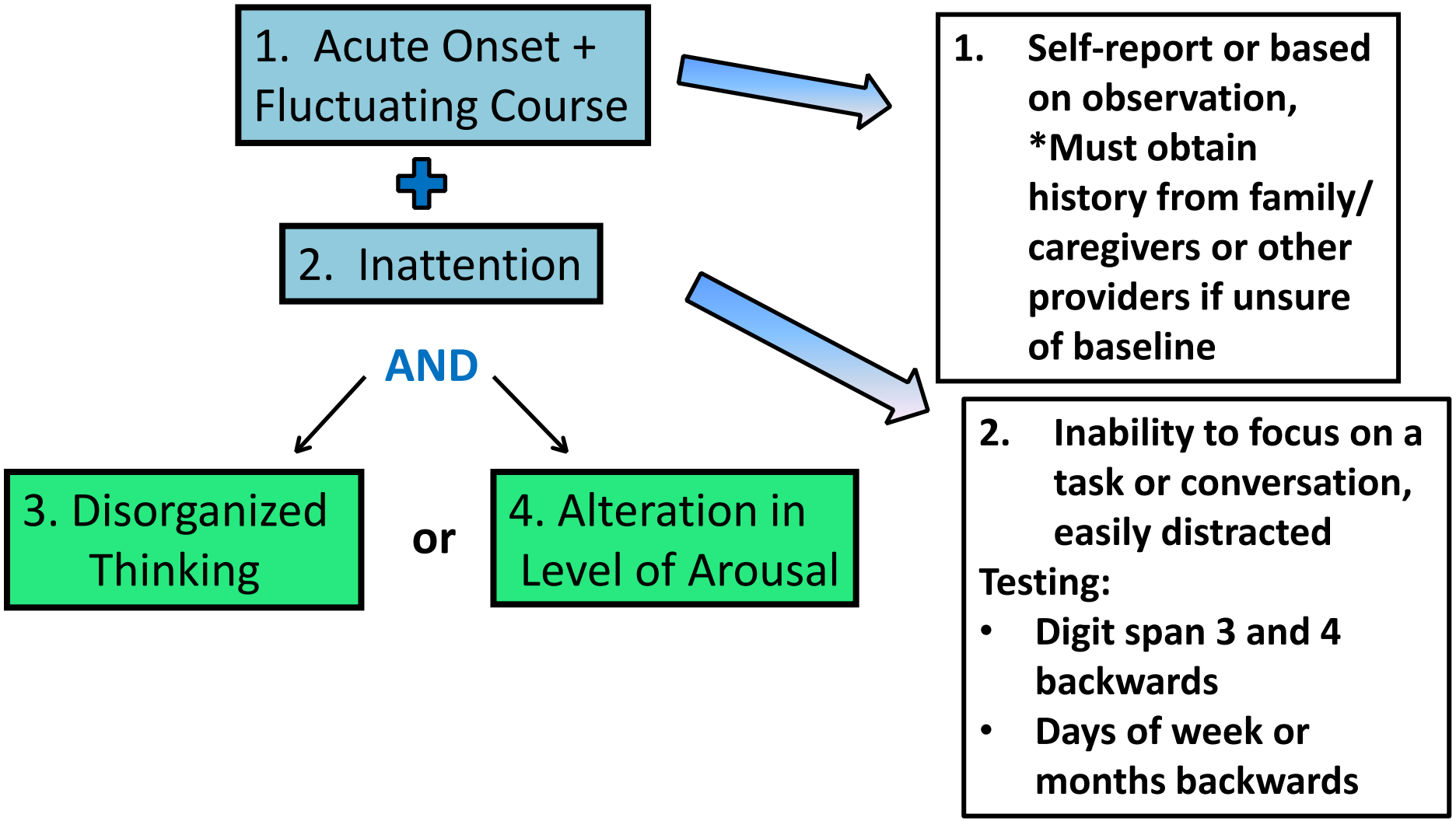
SCAN ME

AHN

Fick DM *et al.* *J Hosp Med*, 2015

3D-CAM

*If UB-2 positive or as a standalone assessment



AHN

Marcantonio ER, *et al*. *Ann Internal Med*, 2014

Intersection of Delirium and Dementia

Delirium superimposed on dementia is common and associated with worse outcomes

Overlapping features exist between delirium and advanced dementia

- Disorganized thinking, fragmented sleep, psychomotor changes

Typical delirium assessment tools may need to be modified in advanced dementia

- Family can clarify subtle changes from baseline
- Assess inattention: Counting backwards from 20, simple counting
- Assess disorganized thinking: Simple identification of photos

Take home:
Delirium is a clinical diagnosis; severity matters

Fong TG *et al.* *American Journal of Geriatric Psychiatry*, 2022

Mainstay of Delirium Management: Nonpharmacological

Medication Review:

- Reconcile meds
- Review/reduce high risk medications; substitute less toxic alternatives

Address multifactorial medical issues:

- Metabolic derangements, infection, pain
- *Avoid the UTI trap*

Environmental issues:

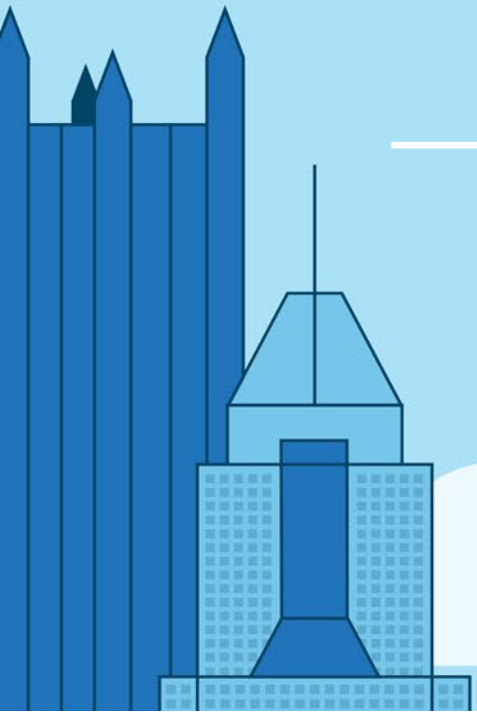
- Maintain safe mobility, ↓ tethers
- Normalize sleep/wake cycle
- Increase social support

Requires a multi-disciplinary, systematic/team-based approach

Multicomponent non-pharmacological interventions reduce delirium incidence by 43% compared to usual care

Burton JK *et al.* *Cochrane Database of Systematic Reviews*, 2021

Multicomponent Models of Care for Delirium



American Geriatrics Society CoCare® HELP
HOSPITAL ELDER LIFE PROGRAM

Age-Friendly Health Systems

AHN

Hospital Elder Life Program

A comprehensive, evidence-based model of care designed to prevent delirium and improve healthcare outcomes for older adults, while lowering costs

American Geriatrics Society CoCare® HELP
HOSPITAL ELDER LIFE PROGRAM

High Touch, Low Tech

- Orientation & therapeutic activities
- Early mobilization
- Sleep enhancement
- Feeding assistance & fluid repletion
- Vision/hearing assistance
- Geriatric nursing assessment & interventions

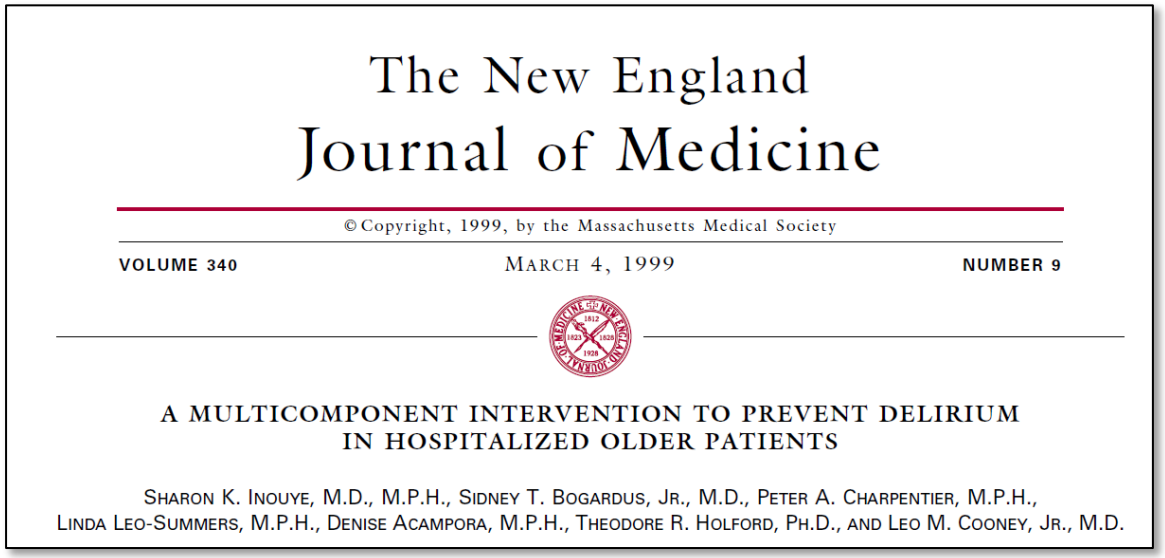
Evidence-Based Impact of HELP

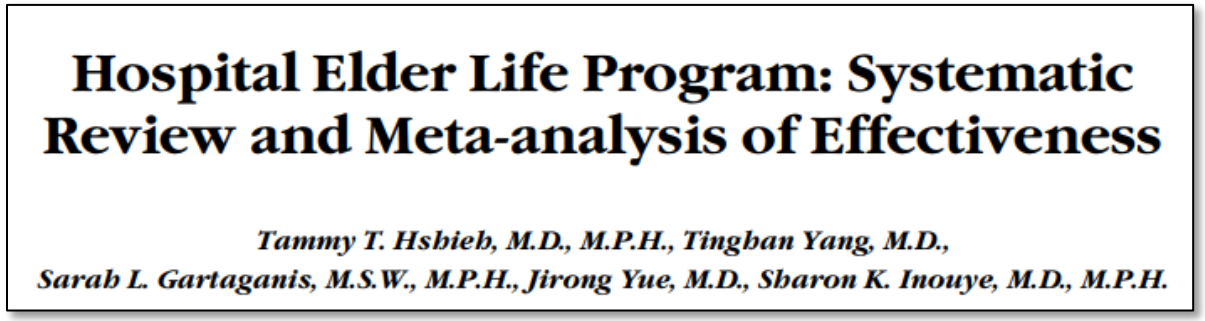
1999: Landmark Study - Inouye SK *et al*.
New England Journal of Medicine

2018: Meta-analysis of 44 studies; 3,605 patients

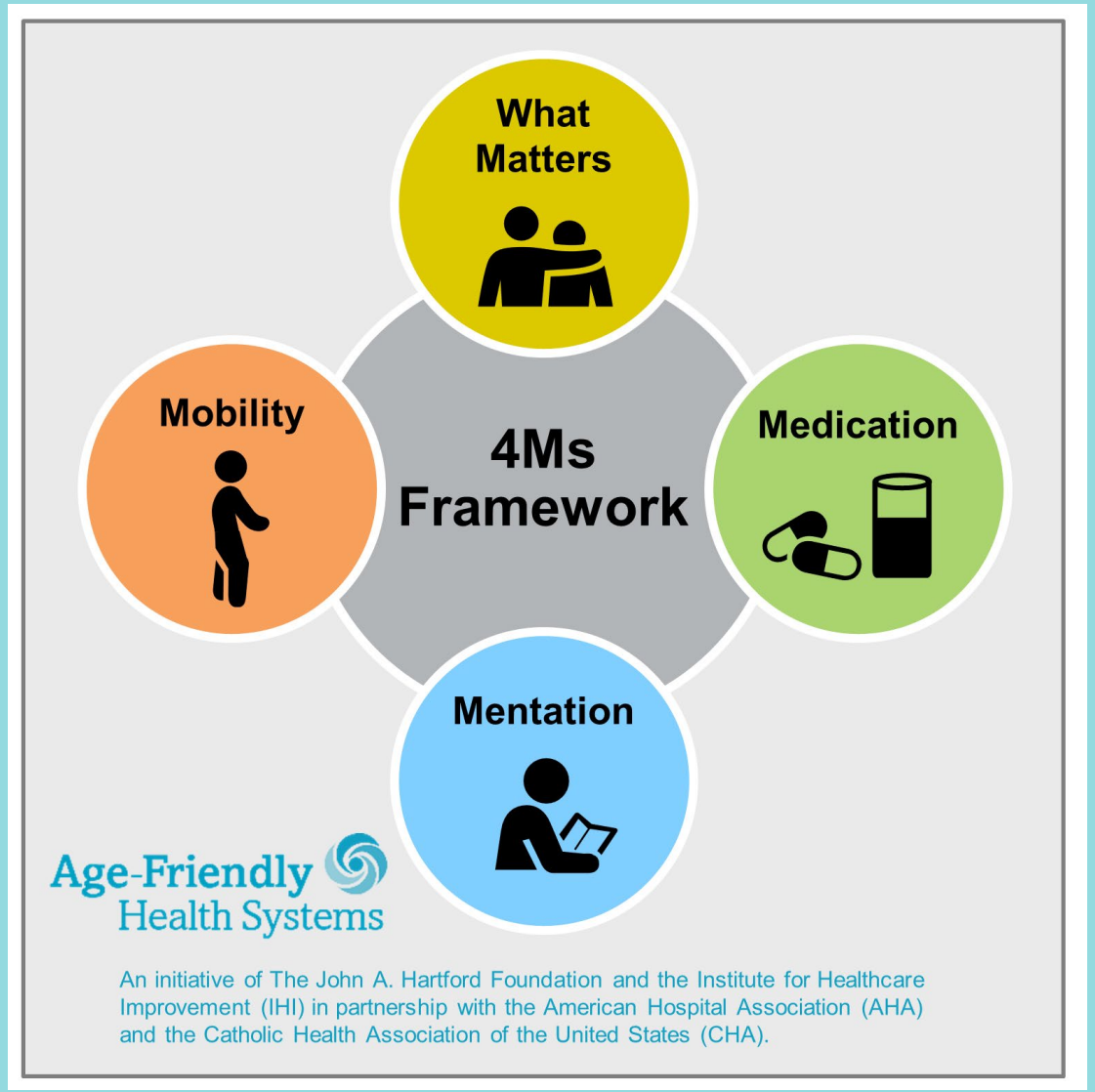
- **Delirium incidence:** Odds of delirium 53% lower with HELP
- **Falls:** Odds of falls 47% lower with HELP
- **Cost Savings:** $1,600 to 3,800 (2018 USD) per patient per hospitalization

  $16,000 per person-year in long term care costs





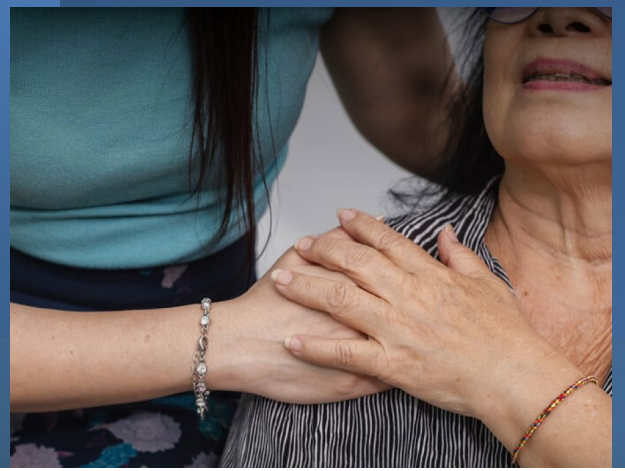
Age-Friendly Framework for Delirium Care



Everyone can play a role in delirium prevention by addressing 4Ms

Mobility and delirium are closely linked

Effective delirium prevention and management is all about **culture**



Posted August 1, 2024

CMS Approves New 2025 Age-Friendly Hospital Measure

Posted In: Age-Friendly Health Systems, Other Resources

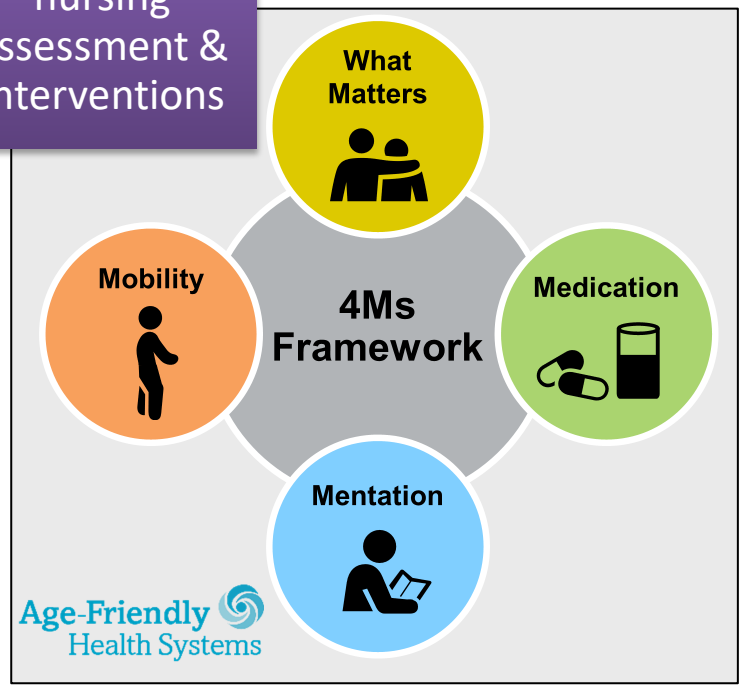
The Centers for Medicare & Medicaid Services (CMS) has announced its FY2025 Inpatient Prospective Payment Systems final rule that includes a new Age Friendly Hospital Measure. Hospitals can take advantage of JAHF-supported initiatives to help meet this new measure.

AHN

Age-Friendly Targeted Interventions

High Touch, Low Tech

Orientation & therapeutic activities	Early mobilization	Sleep enhancement
Feeding assistance & fluid repletion	Vision/hearing assistance	Geriatric nursing assessment & interventions



What WE as individuals can do:

- **Orient the patient in a conversational way**
  - Favorite sports? Do you have a pet? Favorite music?
- **Mobility orders, knowing baseline mobility, put it in your notes**
- **Removing nighttime lab draws and vitals if possible**
- **Pulling tray closer and opening containers**
- **Liberalize diet**
- **Ask family about glasses/hearing aides**
- **Check in with bedside nurse**
  - Efficacy of PRN meds
- **Talk to nurse leaders about barriers to these interventions**

AHN

Use of Medications in Delirium

“The desire to take medications is perhaps the greatest feature which distinguishes man from animals”
– Sir William Osler

BEYOND THE GUIDELINES

Annals of Internal Medicine

Should This Patient Receive Prophylactic Medication to Prevent Delirium?

Grand Rounds Discussion From Beth Israel Deaconess Medical Center

Anjala V. Tess, MD; Melissa L.P. Mattison, MD*; Joshua R. Leo, MD, MPH*; and Eileen E. Reynolds, MD

Vol. 168(7), 2018

Take Home Points:

- Inconclusive evidence for use of any medications for prophylaxis or treatment of delirium
- May relieve distress
- Risk of worsening long-term outcomes; risk of death in dementia
- Turns hyperactive delirium → hypoactive delirium

Use if patient at risk for self harm, harm to staff, high level of distress

Medication Management

Haloperidol: Start with 0.5 mg (IV, IM, PO, SL), up to q6

Aripiprazole: Start with 2 mg (PO, ODT, liquid), up to TID
Least risk of QT prolongation

Quetiapine: Start with 12.5 mg (PO), keep to nighttime
Sedating, anticholinergic, least risk EPS

Risperidone: Start with 0.25 mg (PO, ODT, liquid), up to bid
Sedating, potent

Olanzapine: Start with 2.5 mg (PO, ODT, IM), up to bid
Sedating, potent

Other potential options: Trazodone, valproic acid

Avoid: BZD, hydroxyzine, diphenhydramine

Pearls:

- Think about the distressing symptom you're treating
- Communicate with caregivers
- **Start low, go slow**
- Start PRN, can schedule short-term
- High caution in Parkinson's disease, Lewy body dementia
- All QT prolonging (risk/benefit)
- Check in with RN about response
- Taper and dc when able

Transitions of Care

4Ms review for post-hospital care

Mobility	• Screen for functional decline, assess need for home PT/OT/assistive devices
Medications	• Review/reconcile medication list, side effects, assess ongoing need for medications
Mentation	• Screen for depression and cognitive impairment, IADL and home safety • Check-in with caregivers for caregiver stress/burnout/mood • Connect to outpatient specialty services if needed
What Matters	• Are treatments still in line with patient's goals/wishes? Advanced directives?

Take-Home Thoughts

Delirium is multifactorial and leads to long term adverse outcomes

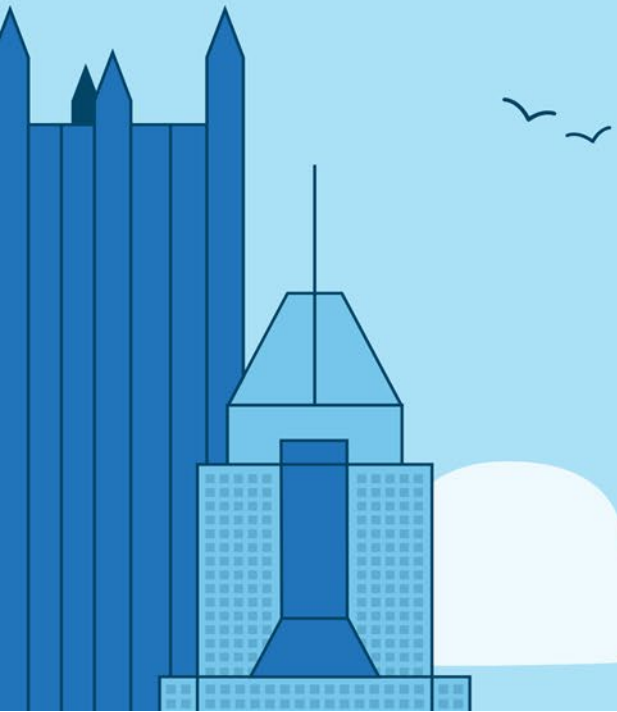
Multicomponent interventions improve outcome and costs and humanize the care

Intensify prevention strategies as first line treatments before meds

Involve caregivers early

Thank you!

Contact: Lyn.Weinberg@ahn.org

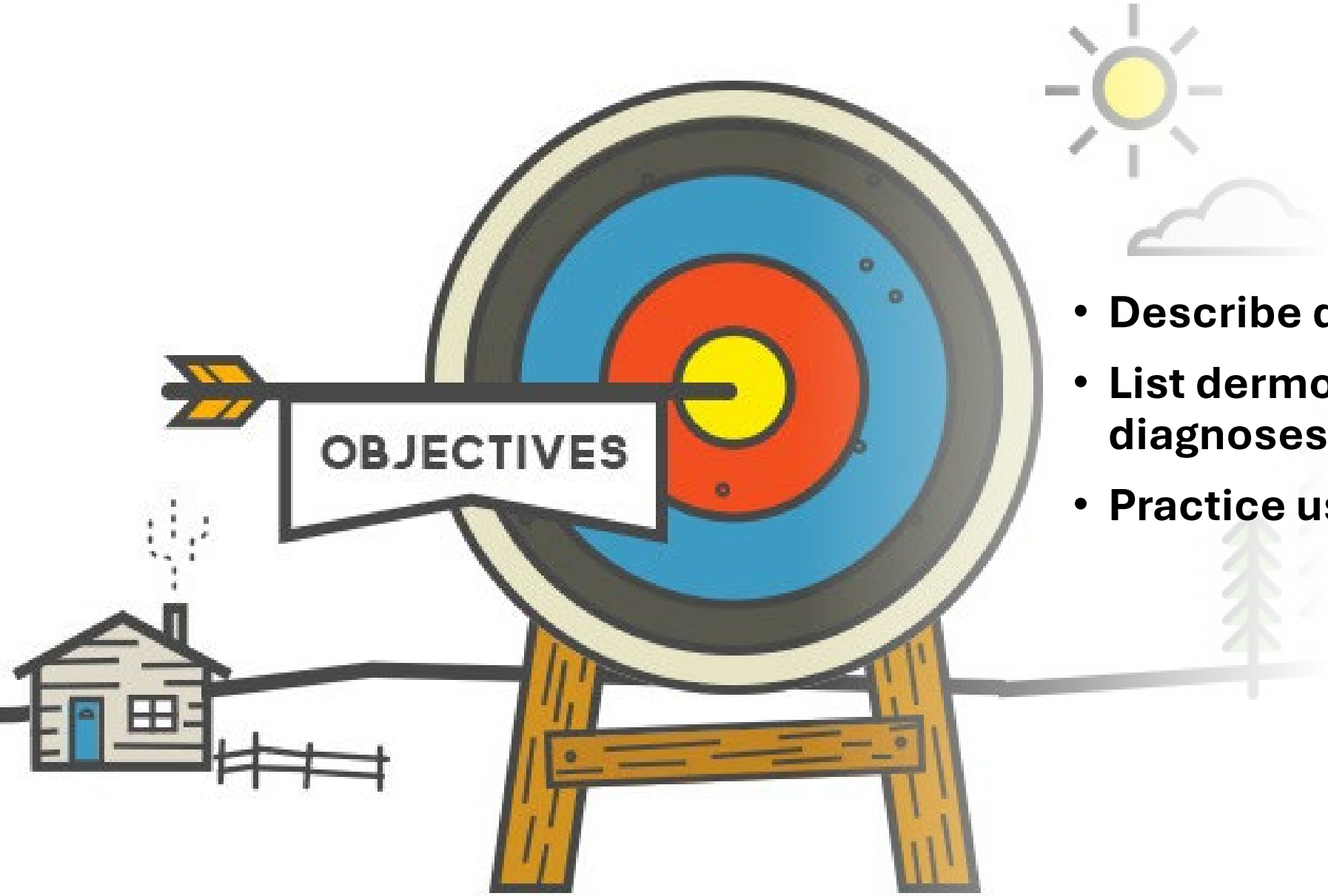


Primary Care Dermoscopy

Winfred Frazier, MD, MPH, FAAFP

Family Medicine Refresher Course

February 26th, 2026



- **Describe dermoscopy indications**
- **List dermoscopic features of skin diagnoses**
- **Practice using dermatoscopes**

Clinical Scenario

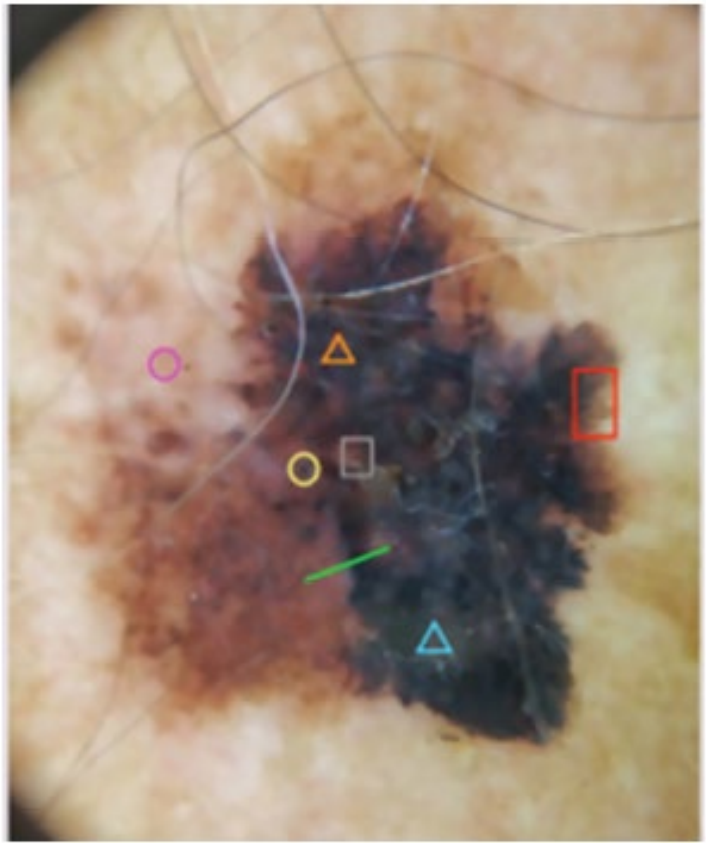
You see a 62 y/o patient who is concerned about a new skin lesion. The lesion has been present for several months, it is itchy and growing.

What features in the history or physical exam would reassure you and concern you?

What further information would help you decide next steps in evaluation and treatment?

Dermatoscope as an essential tool

Macroscopic View



Microscopic View

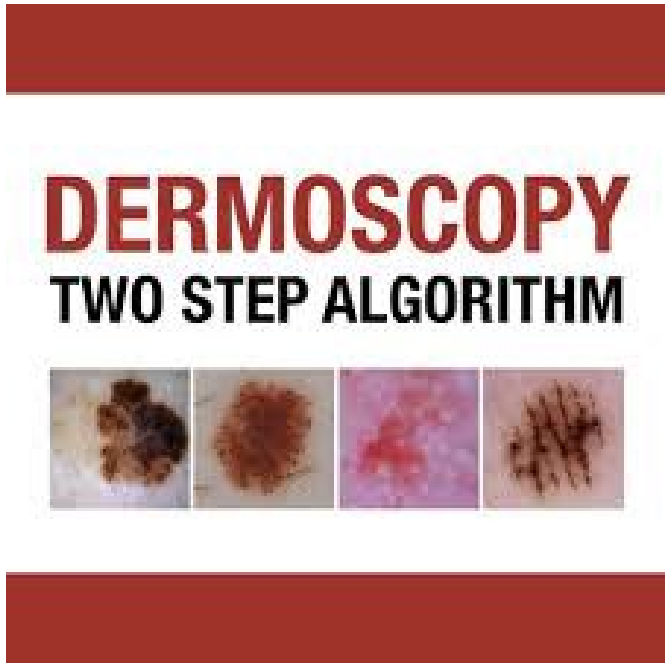
Purpose of Dermoscopy

- Find melanomas when they are curable
- Find skin cancers early
- Differentiate benign from malignant
- Biopsy less benign lesions
- Improve diagnostic accuracy of skin lesions
- Reassurance for physician/patient

Indications

- Any skin condition
- Can visualize skin, hair, nails

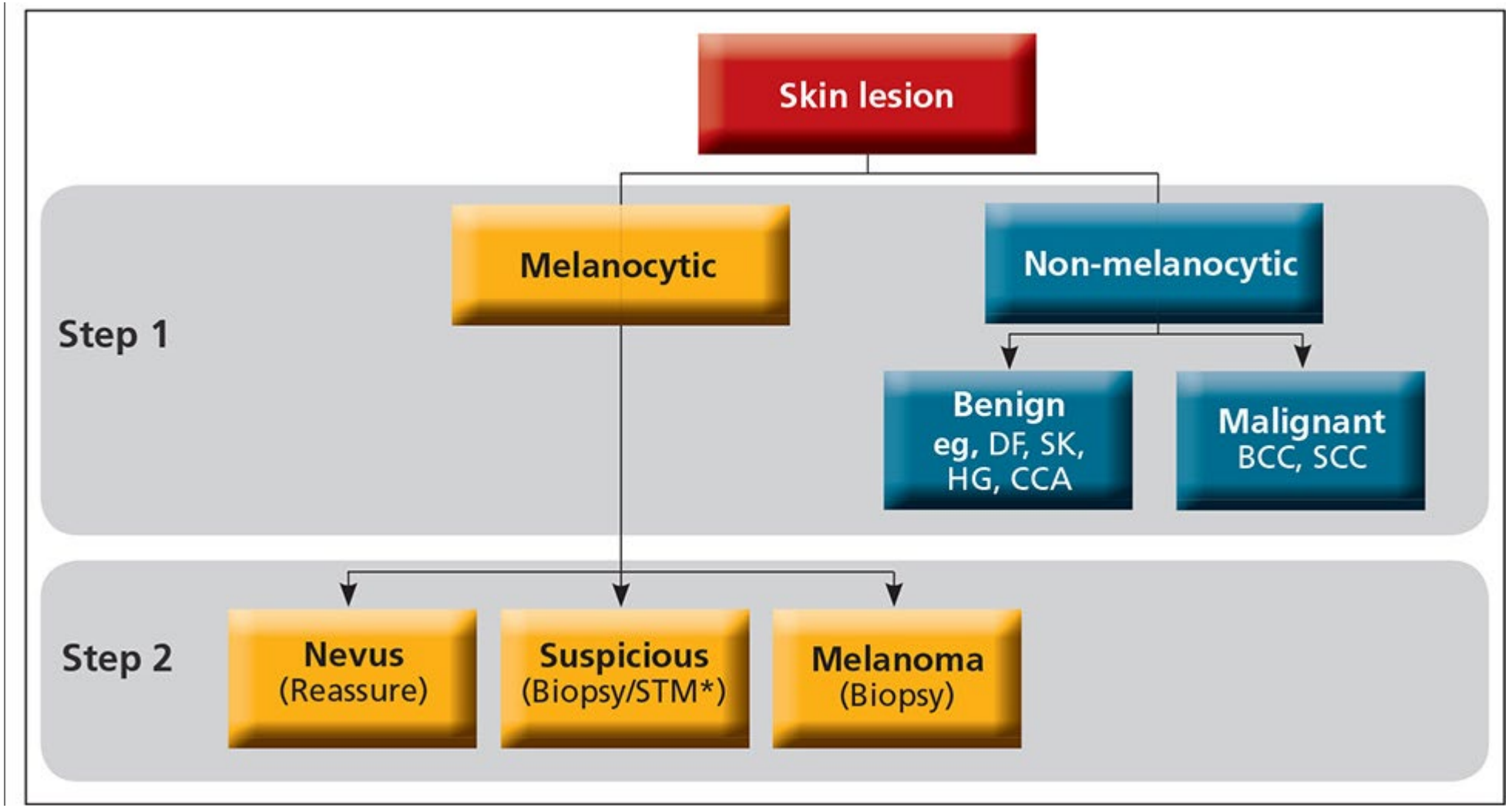
Dermoscopy Algorithms



- Two-step
- TADA (three-step)

Free App

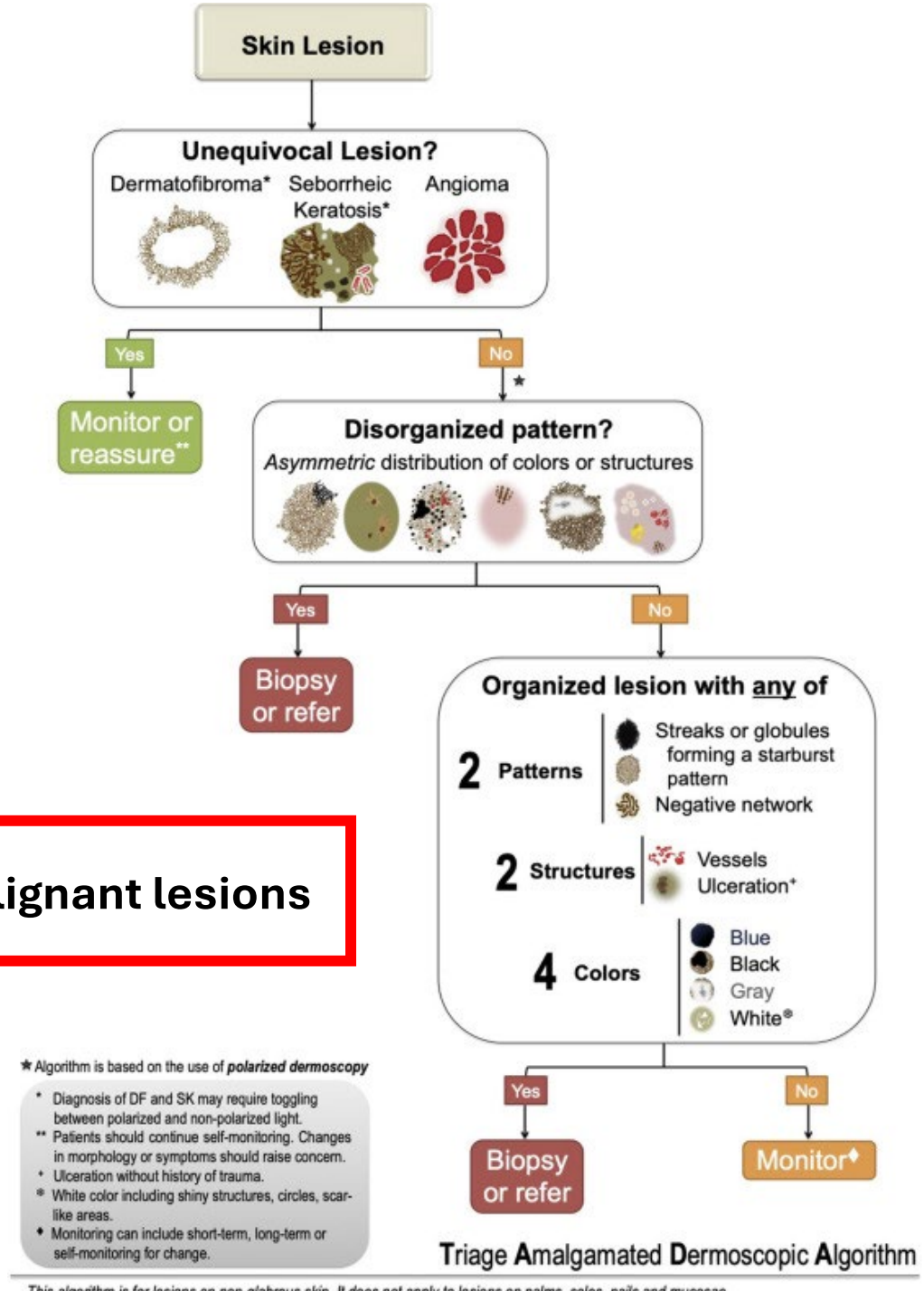
Two Step Algorithm



Argenziano *et al.*: Dermoscopy of pigmented skin lesions: results of a consensus meeting via the Internet. *J. Am. Acad. Dermatol.* 2003;48:679-93.

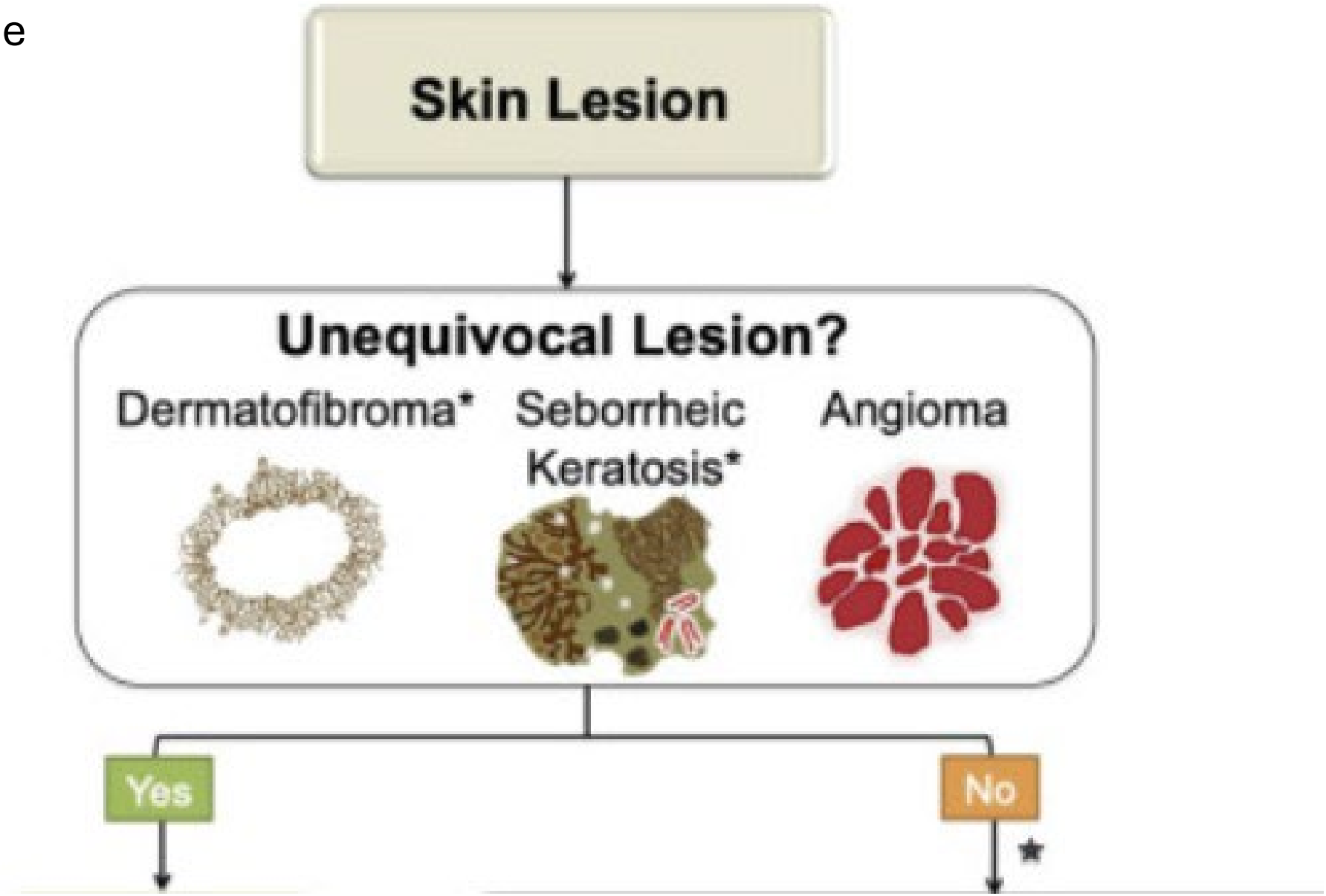
TADA Algorithm (three-step)

Sensitivity 94.8%, specificity 72.3% for malignant lesions



Jaimes N, Marghoob AA. Triage amalgamated dermoscopic algorithm. J Am Acad Dermatol. 2020 Jun;82(6):1551-1552.

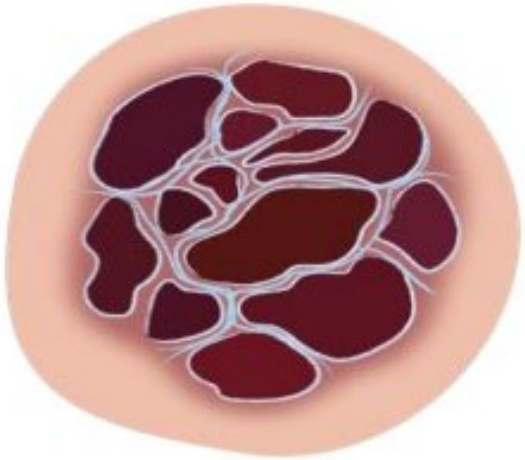
Majority of skin lesions are **benign**, so we start the algorithm with benign lesions

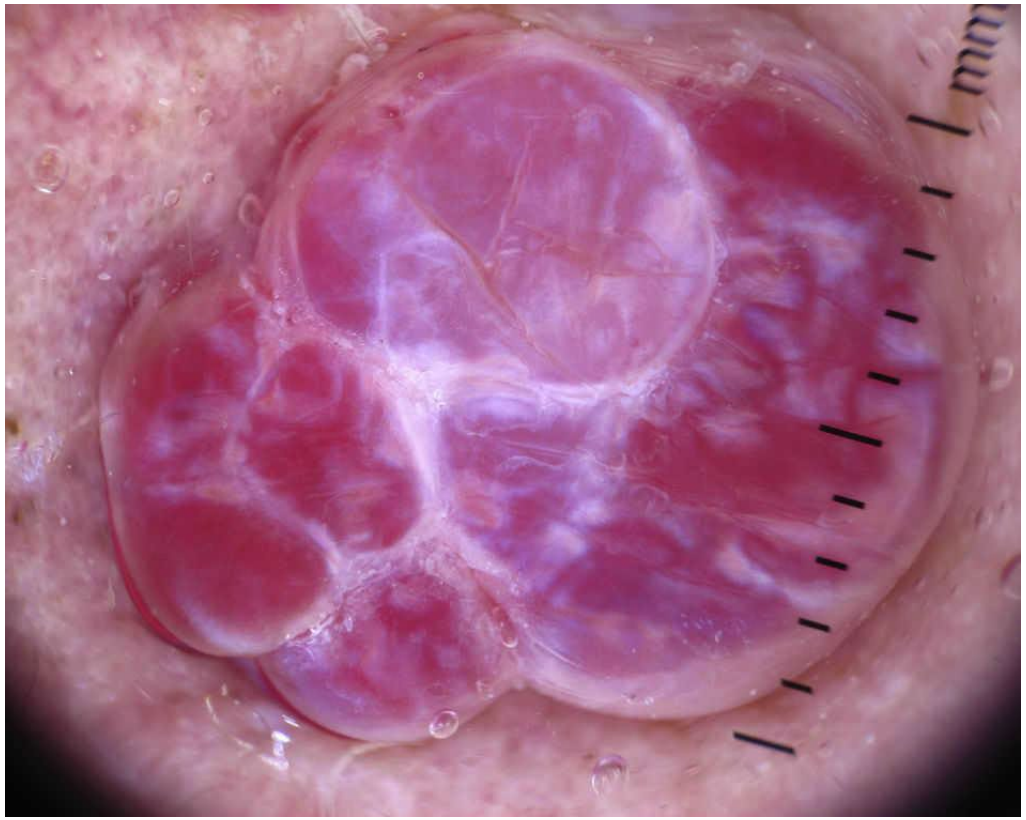


Cherry angiomas: Clinical

Angiomas: Dermoscopic View

- Lacunae separated by white space
- Colors
  - Red
  - Maroon
  - Purple
  - Black





In general, try not to focus on the color of the lesion

Source: Usatine RP, Smith MA, Mayeaux EJ, Chumley HS: *The Color Atlas*

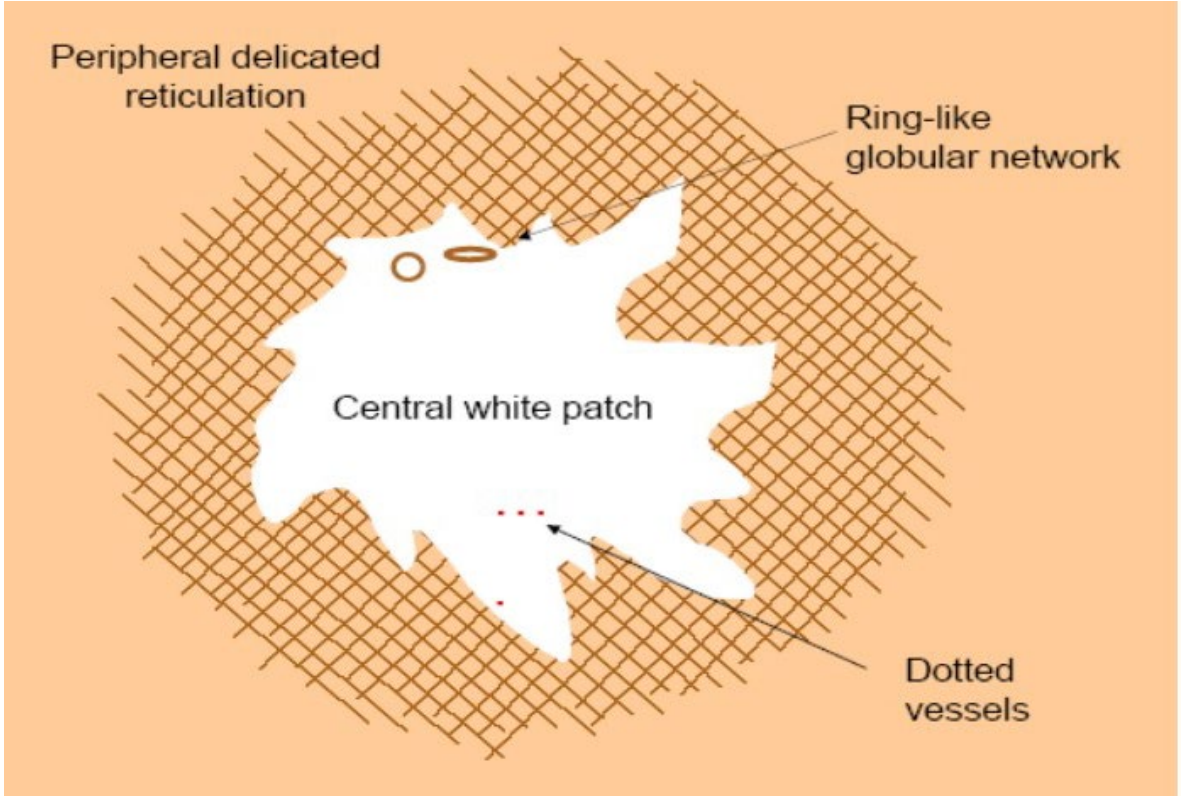
Dermatofibroma: Clinical

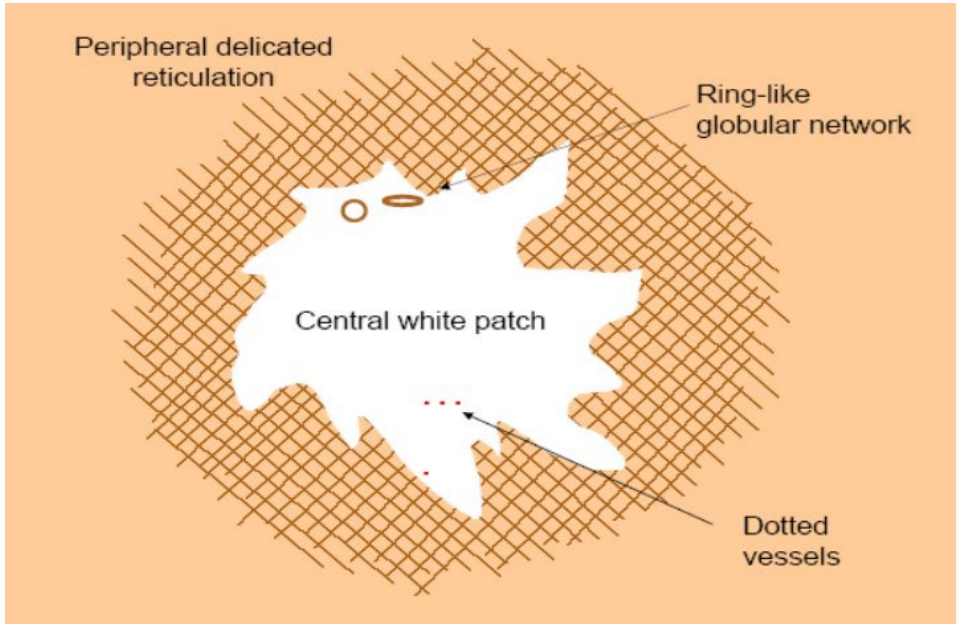
- Solitary fibrous nodule
- Dimples with lateral pressure
- Commonly found on lower extremities

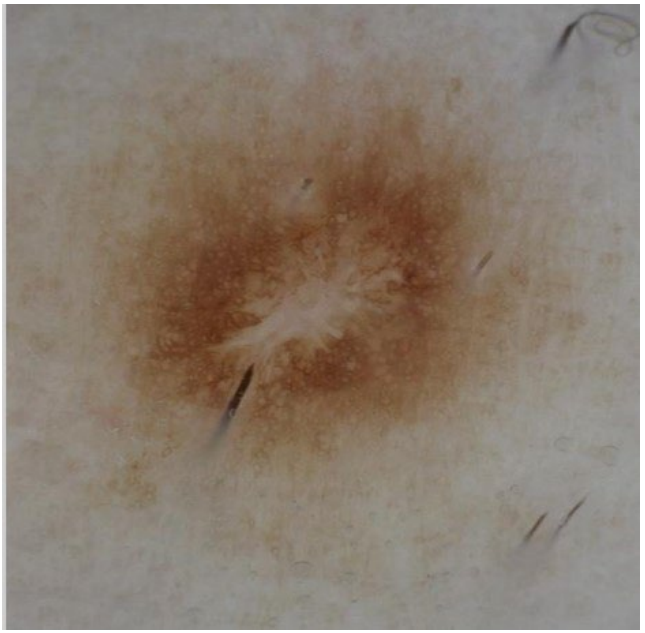
Dermatofibroma: Dermoscopic View

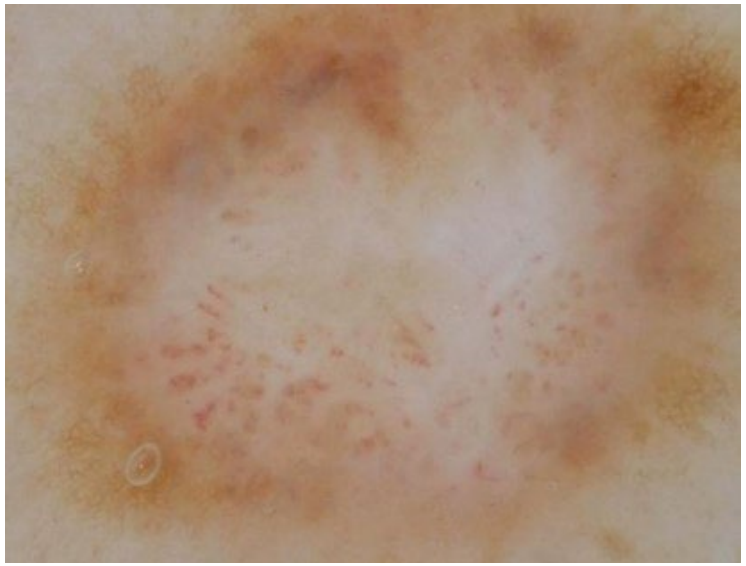
Structures:

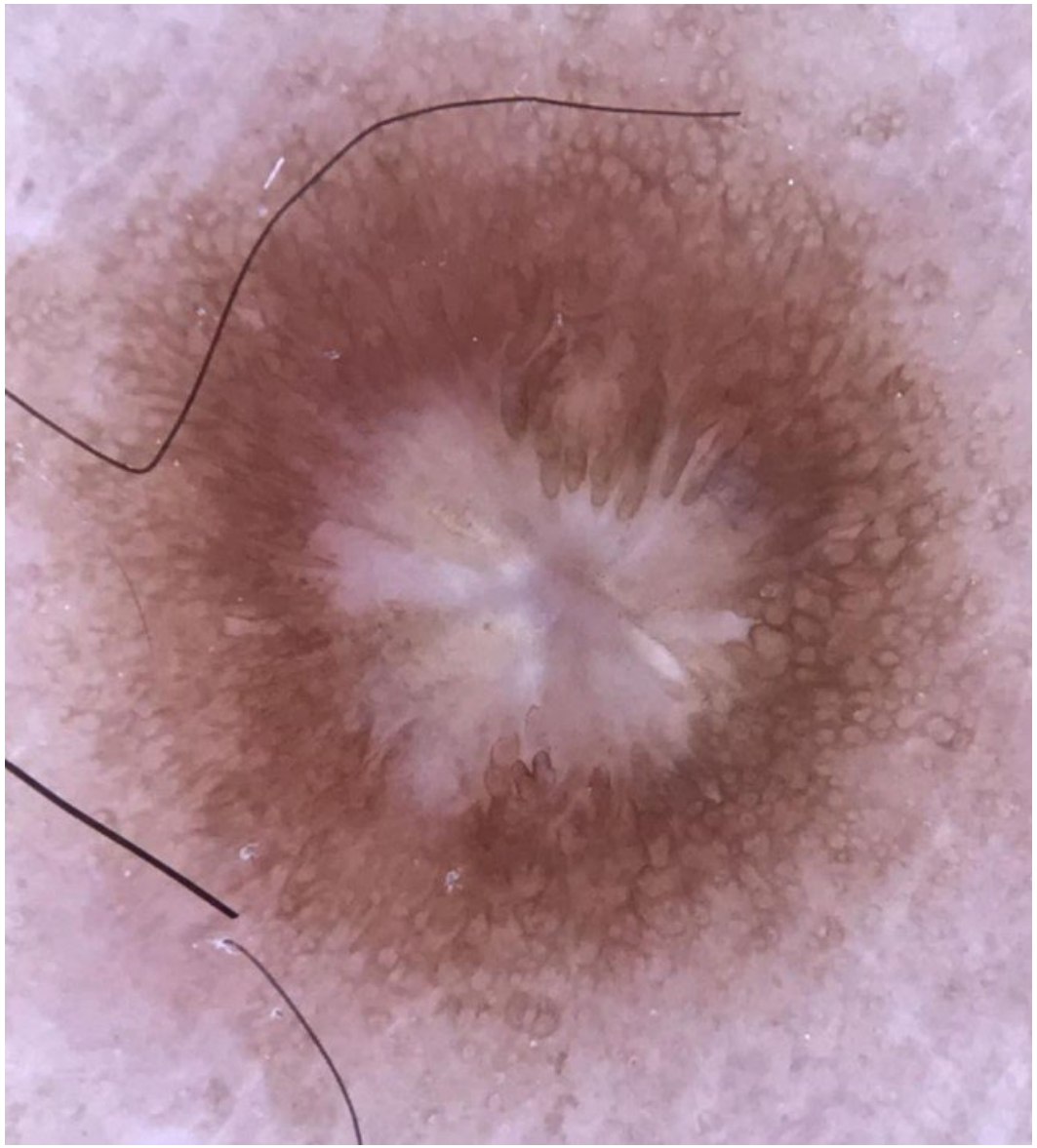
- Peripheral fine network
- Central hypopigmented scar-like area
- Ring-like globules
- Dotted vessels




Peripheral delicated reticulation
Ring-like globular network
Central white patch
Dotted vessels







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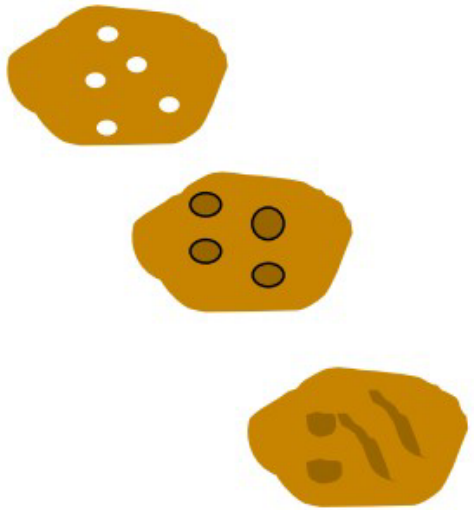
Seborrheic Keratosis

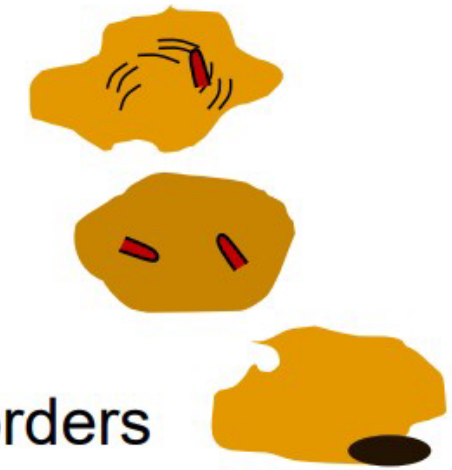
- Scale (important to feel lesions)
- Stuck-on appearance
- Many may be present

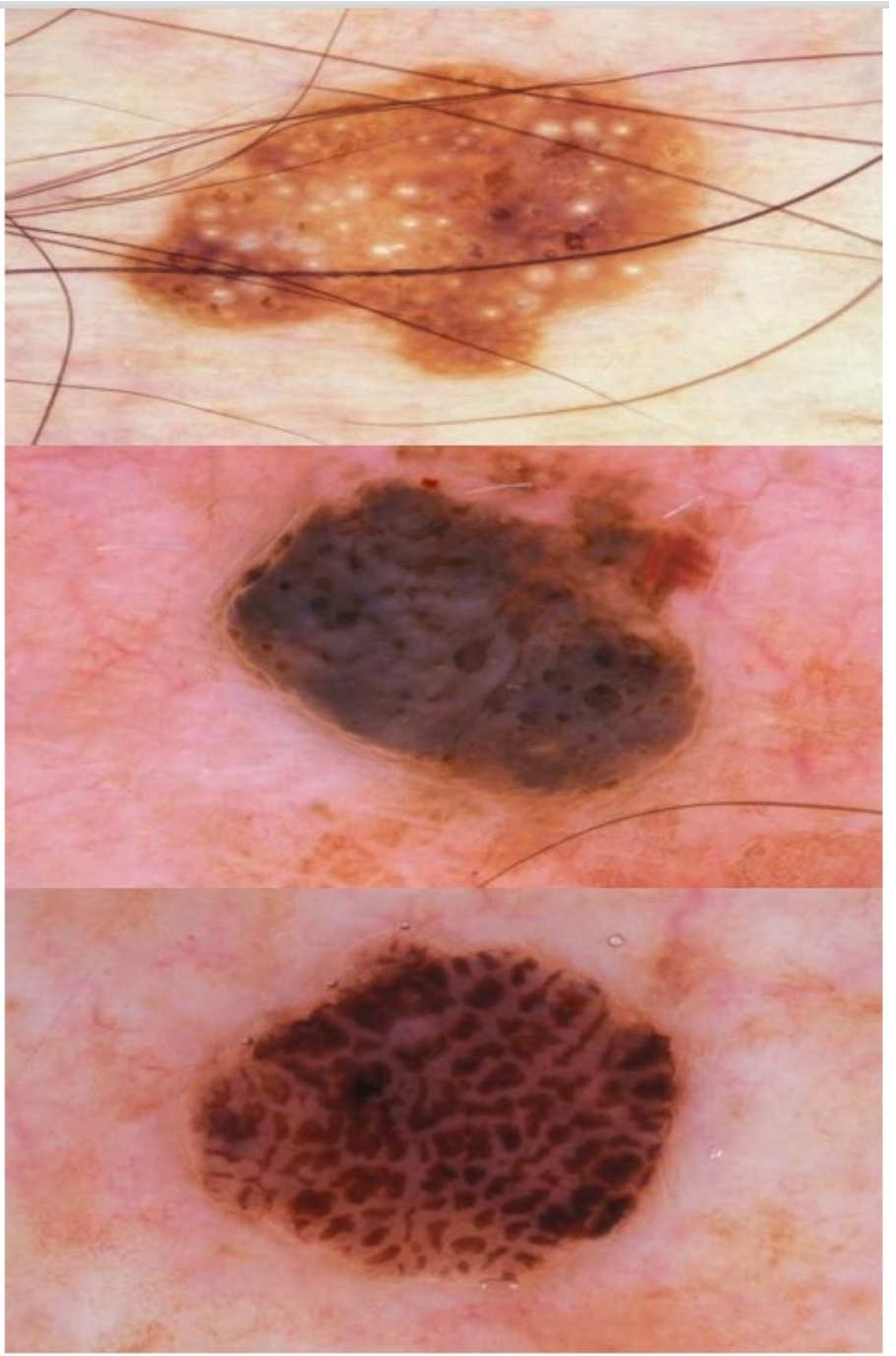
Dermoscopic Features

- Milia-like cyst
- Comedo-like opening
- Fissures & ridges

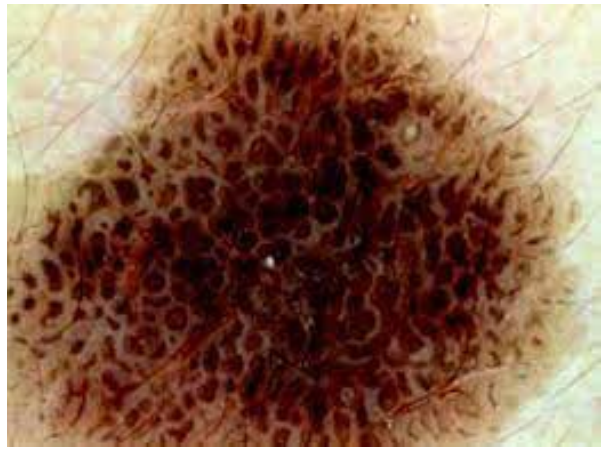


- Fingerprint-like
- Hairpin vessels
- Moth-eaten borders
- Well demarcated borders

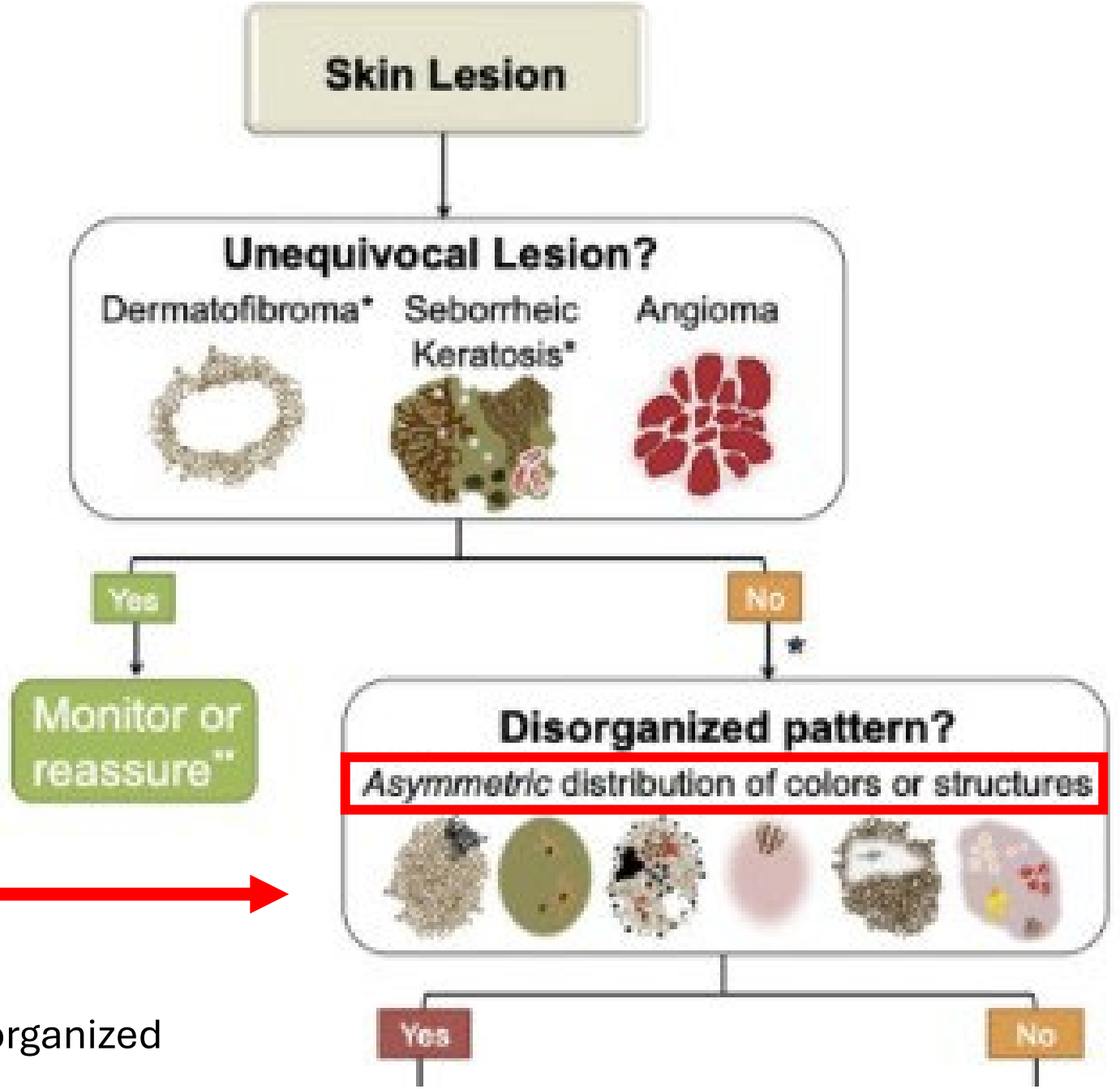




Fissures and ridges



TADA Algorithm Step 2



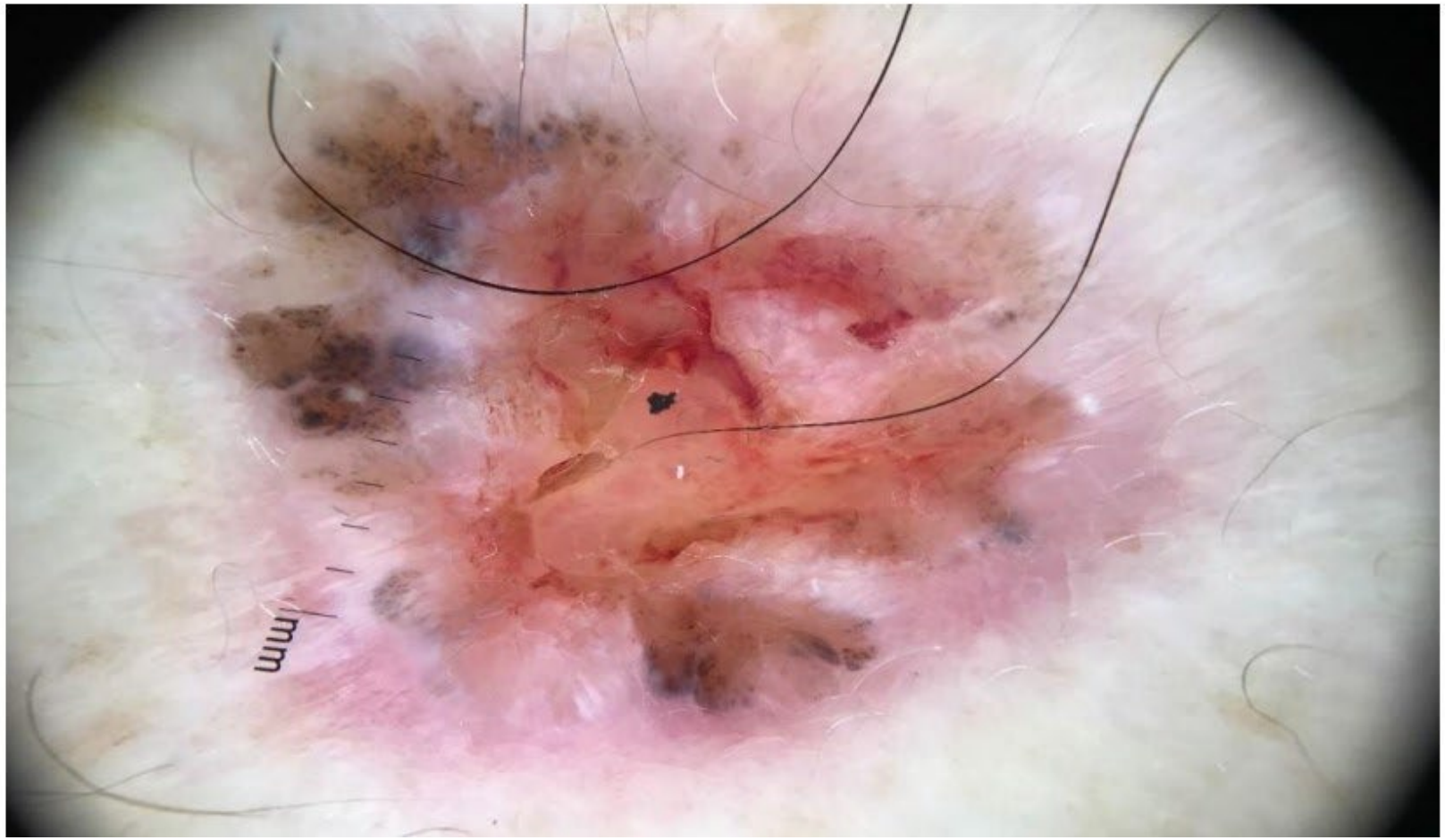
Don’t necessarily need to name the disorganized pattern

Organized

Disorganized

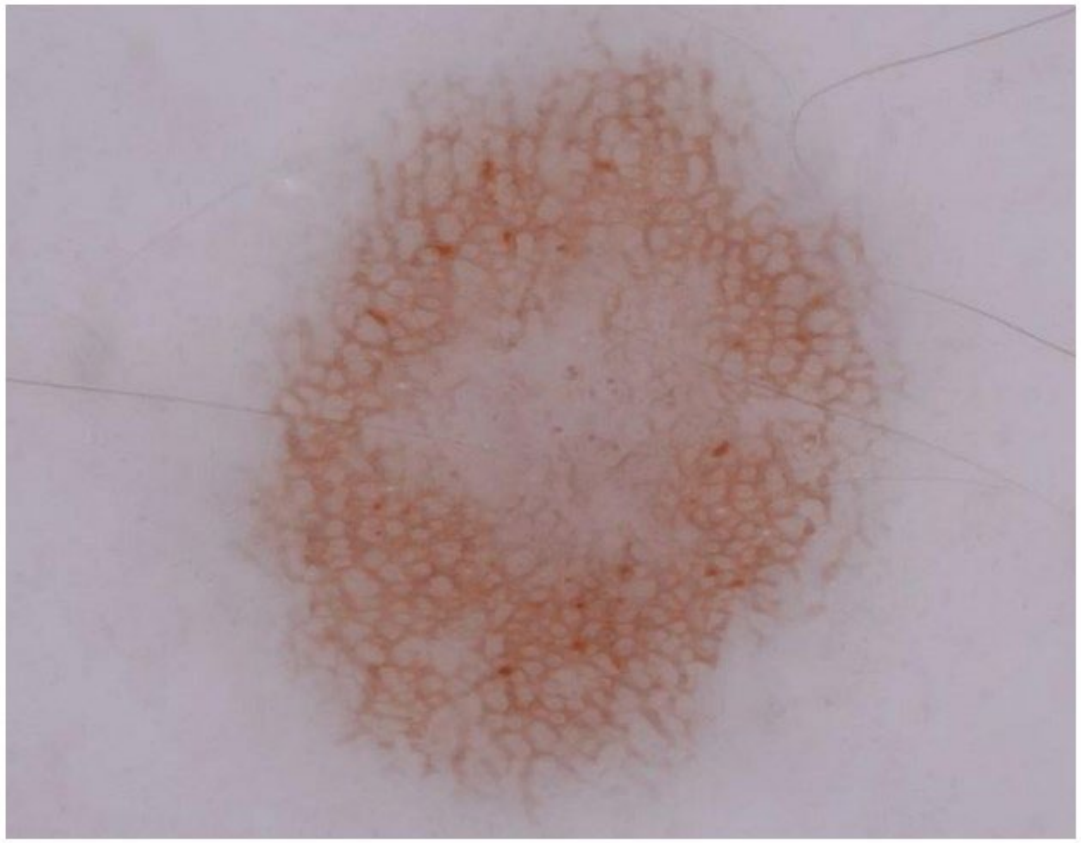
Step 2: Organized or disorganized?

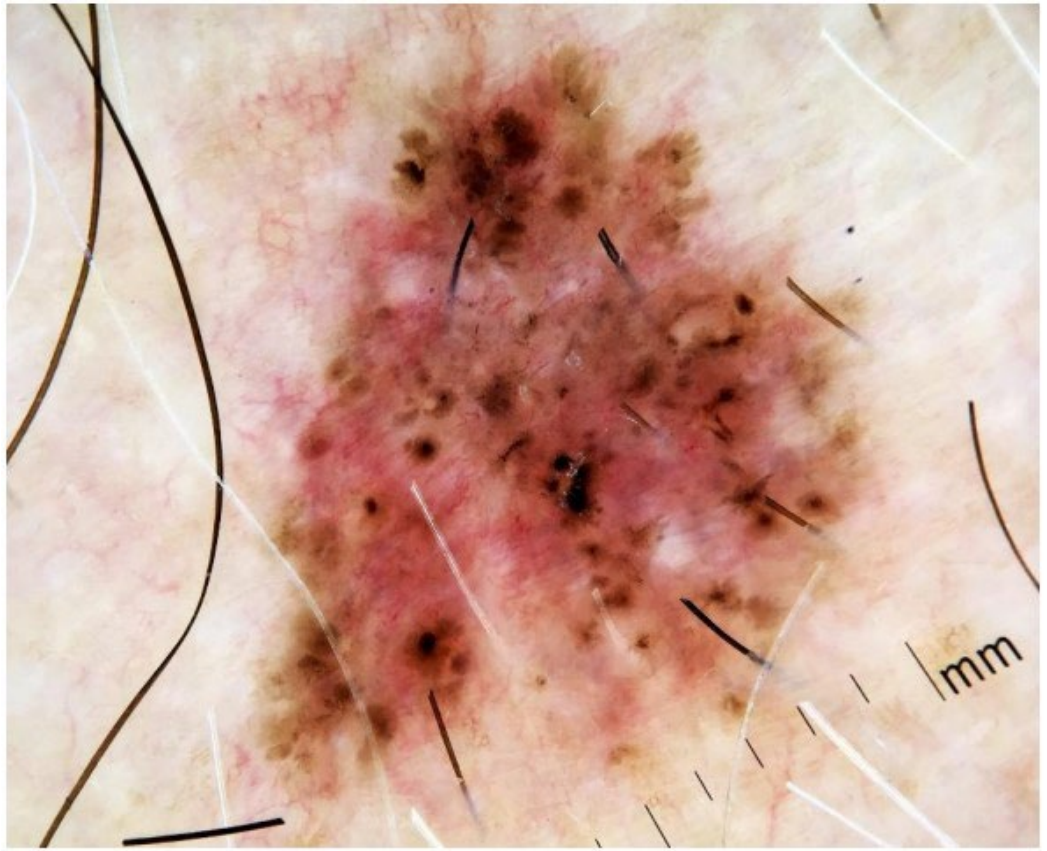
- Most skin cancers are disorganized or chaotic.



Organized

Disorganized





Melanocytic Nevus

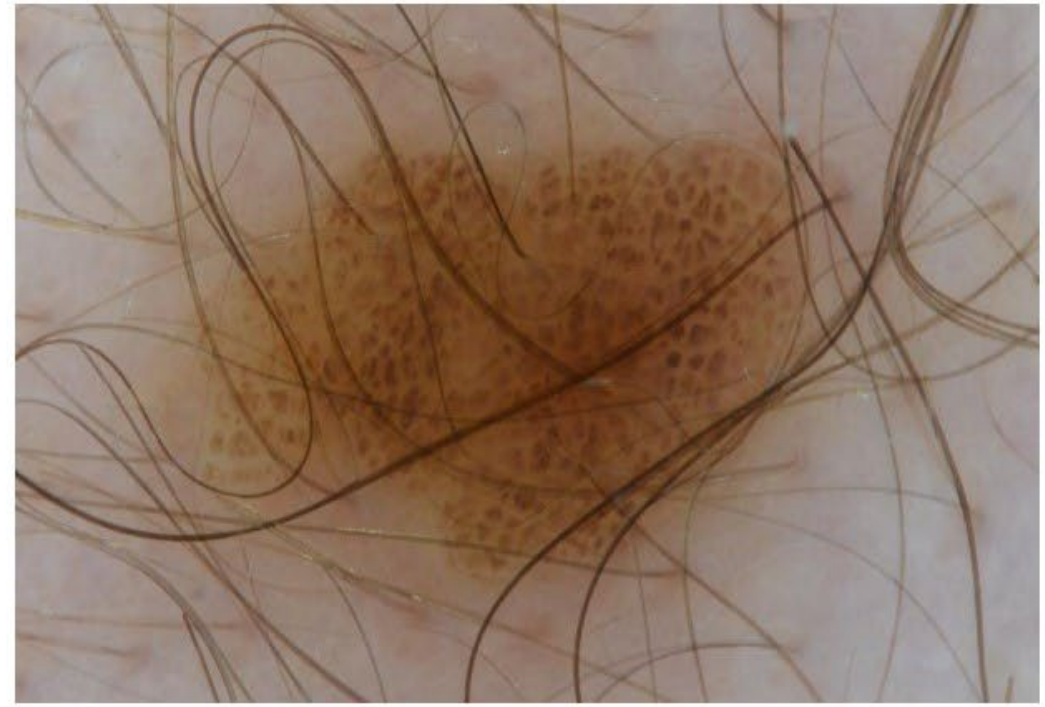
Basal Cell Carcinoma

Dermoscopy Focuses on Content not Shape

Disorganized pattern

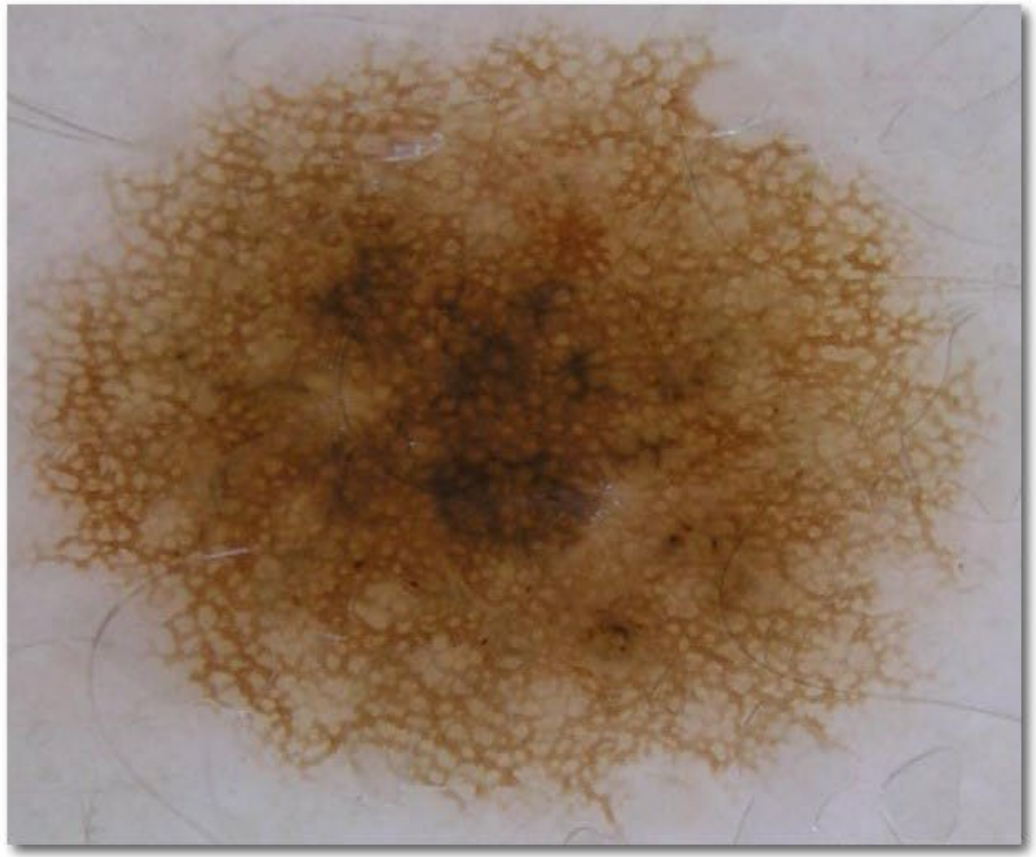
Symmetric shape

Organized pattern



Asymmetric shape

Organized

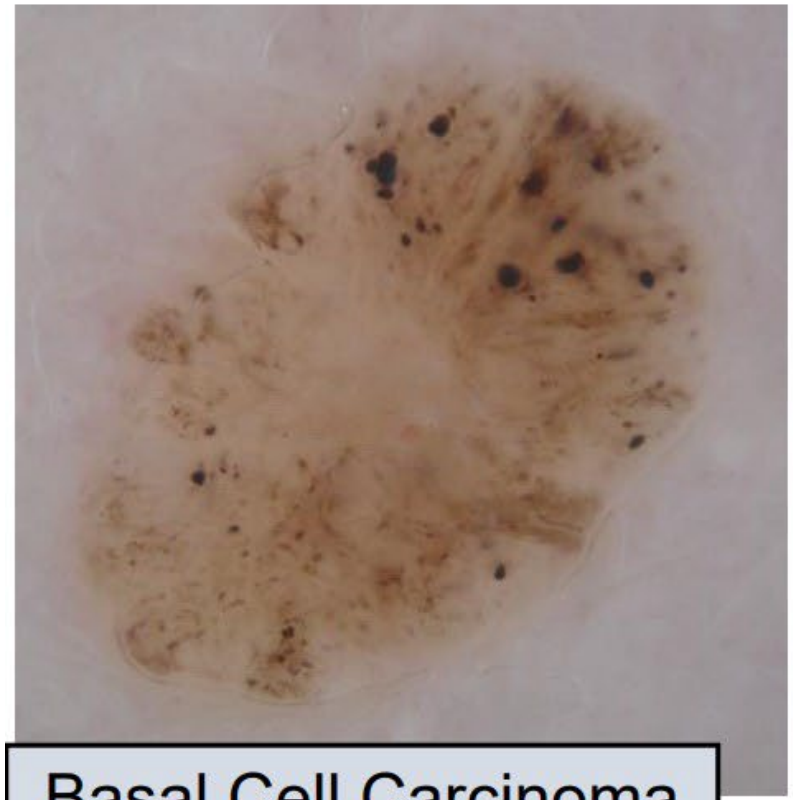


Melanocytic Nevus

Disorganized

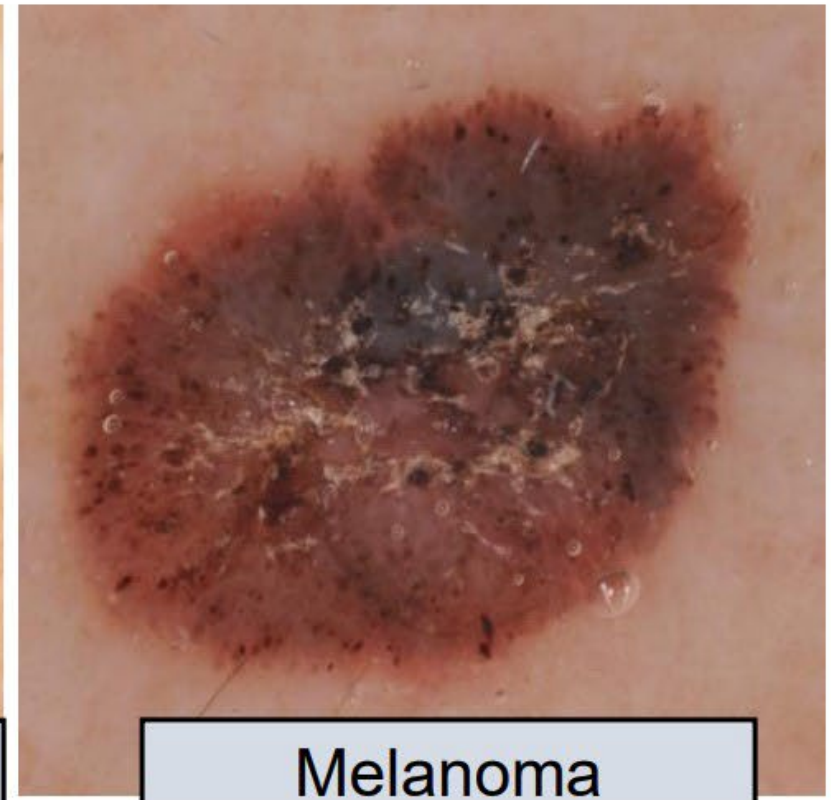
Melanoma

Most Skin Cancers are Disorganized

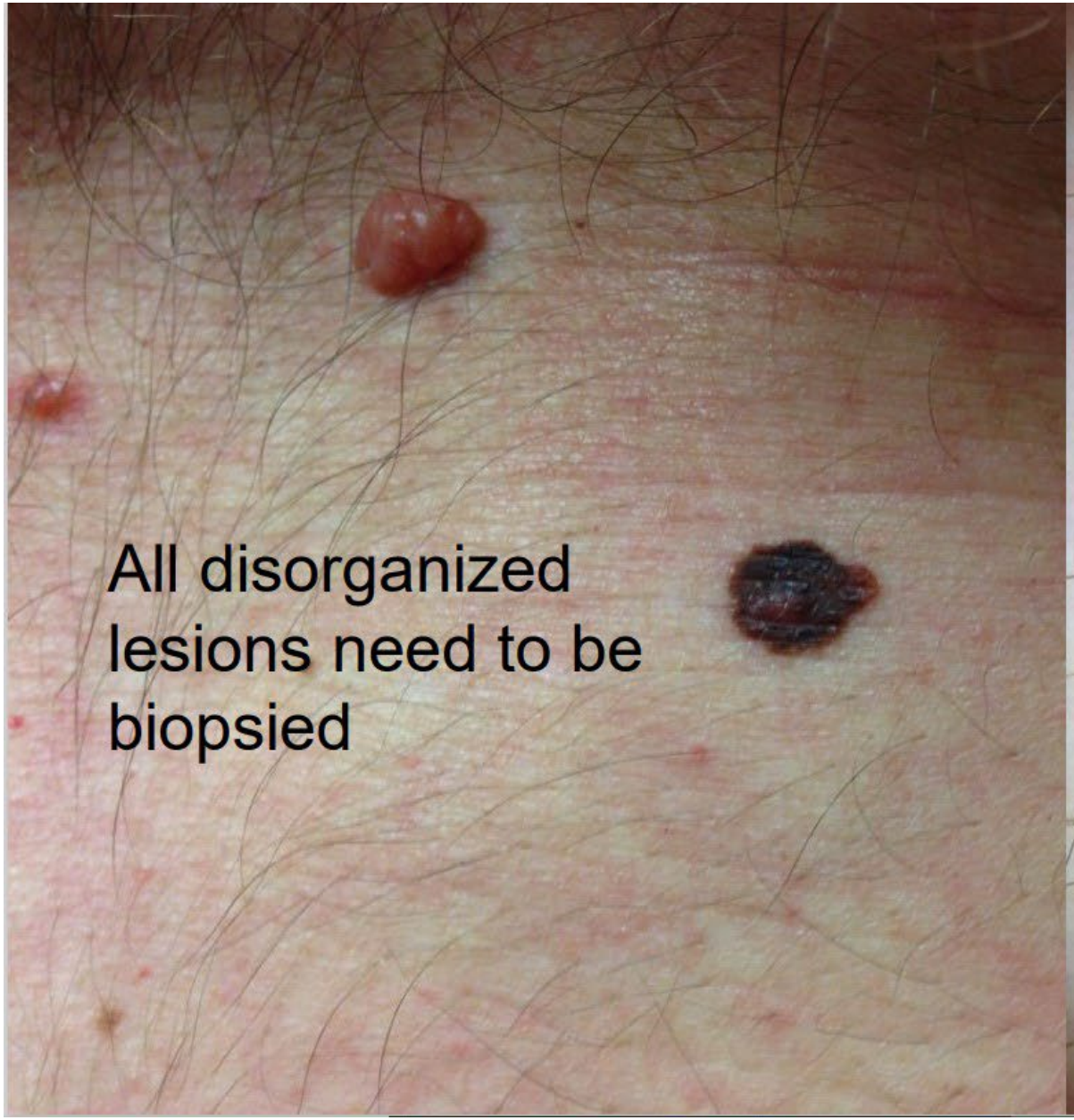


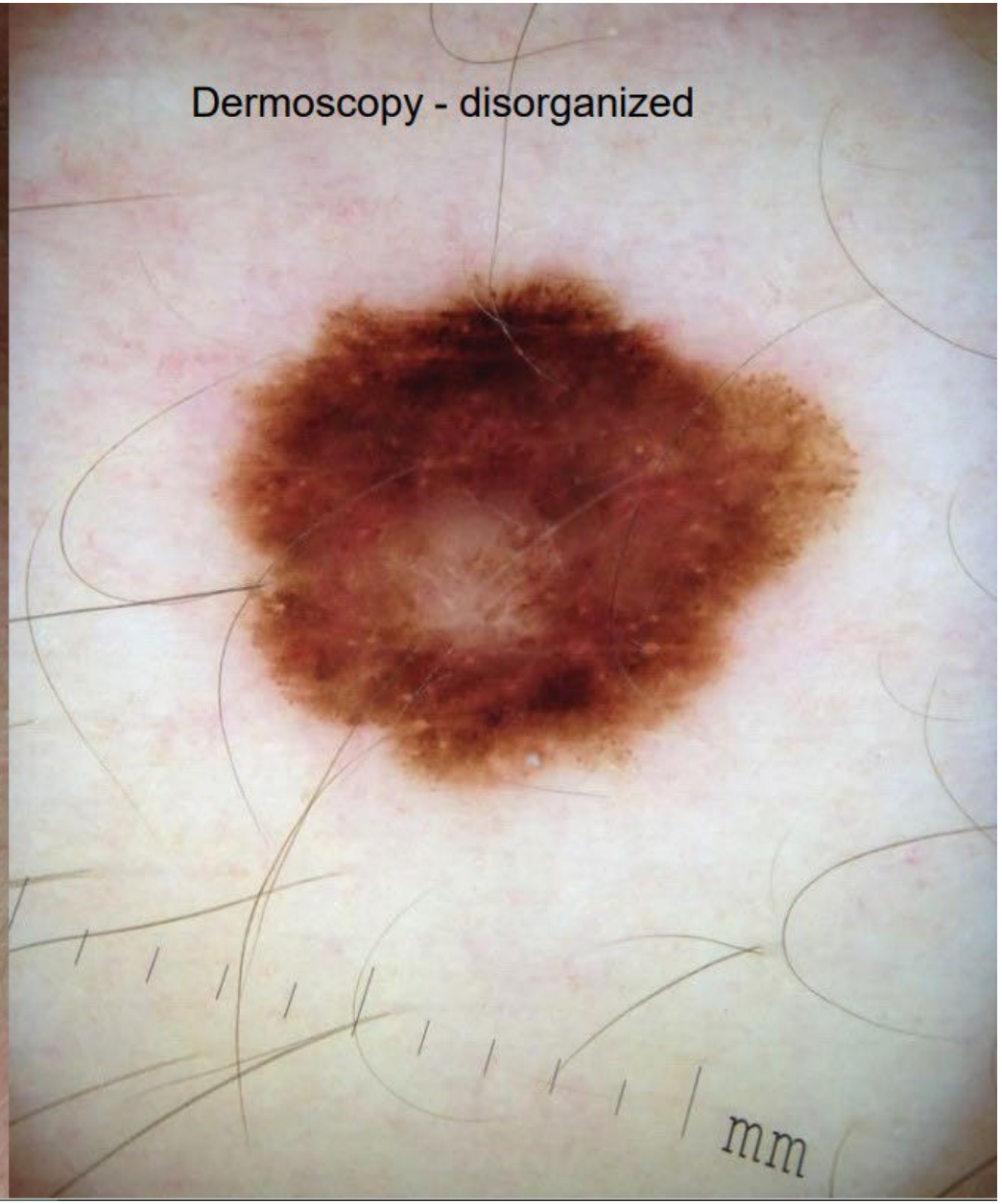
Basal Cell Carcinoma

Squamous Cell Carcinoma

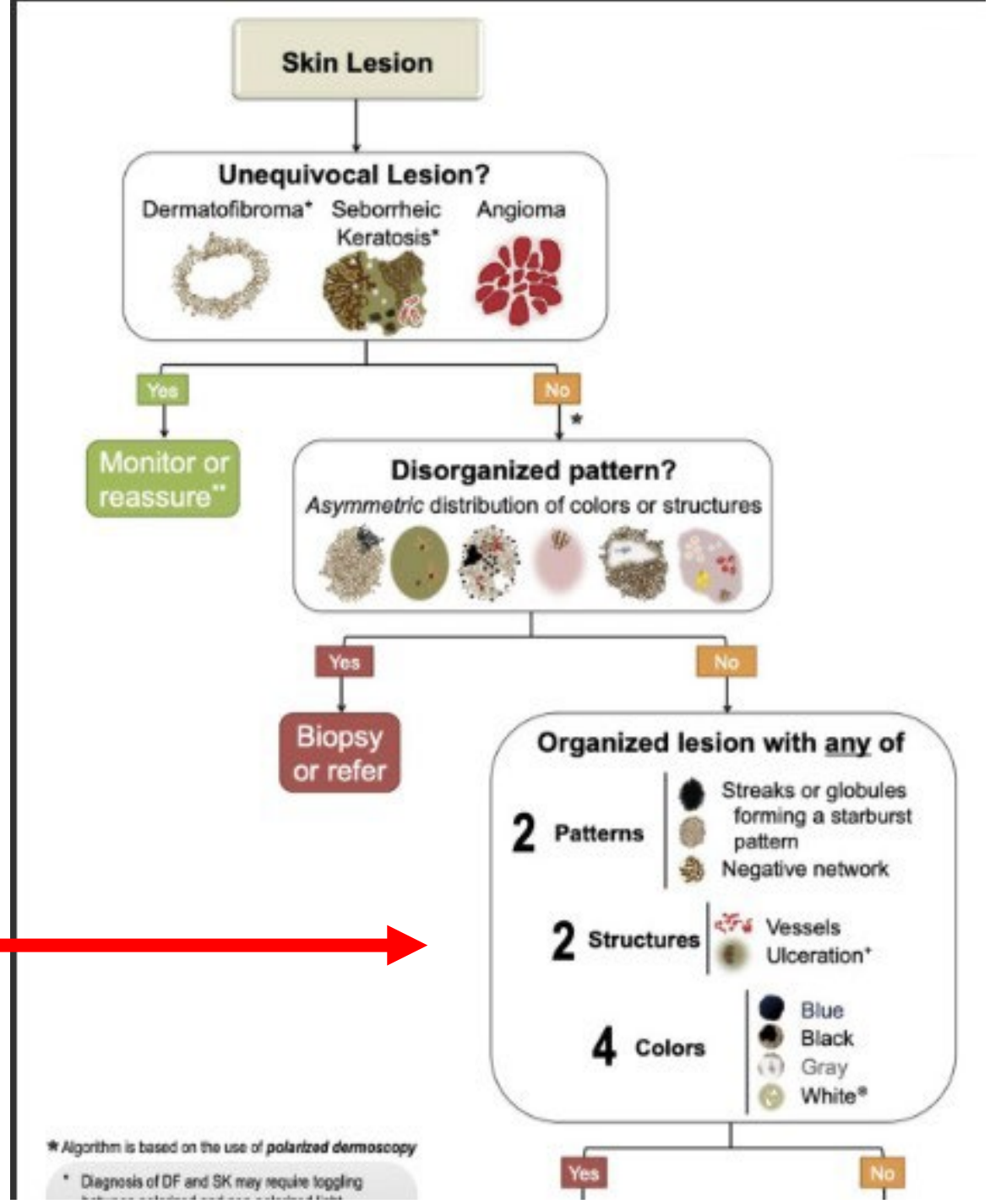


Melanoma


All disorganized lesions need to be biopsied


Dermoscopy - disorganized
mm

TADA Algorithm
Step 3

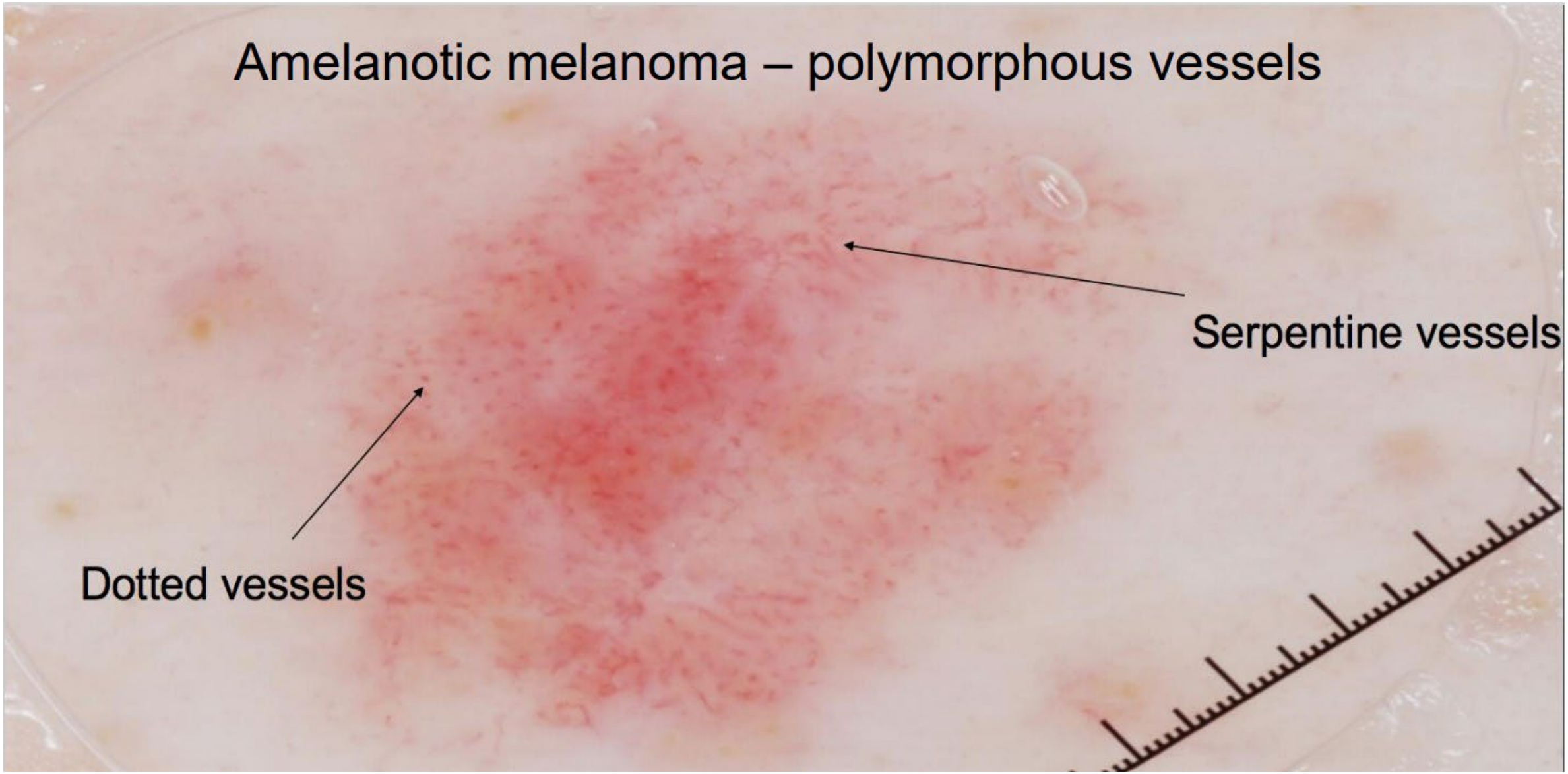


Organized lesion with any of

4

Structures	Streaks→Starburst pattern Negative network Vessels Ulceration⁺
or	
Colors	Blue Black Gray White→Shiny structures,Circles

3. Vessels

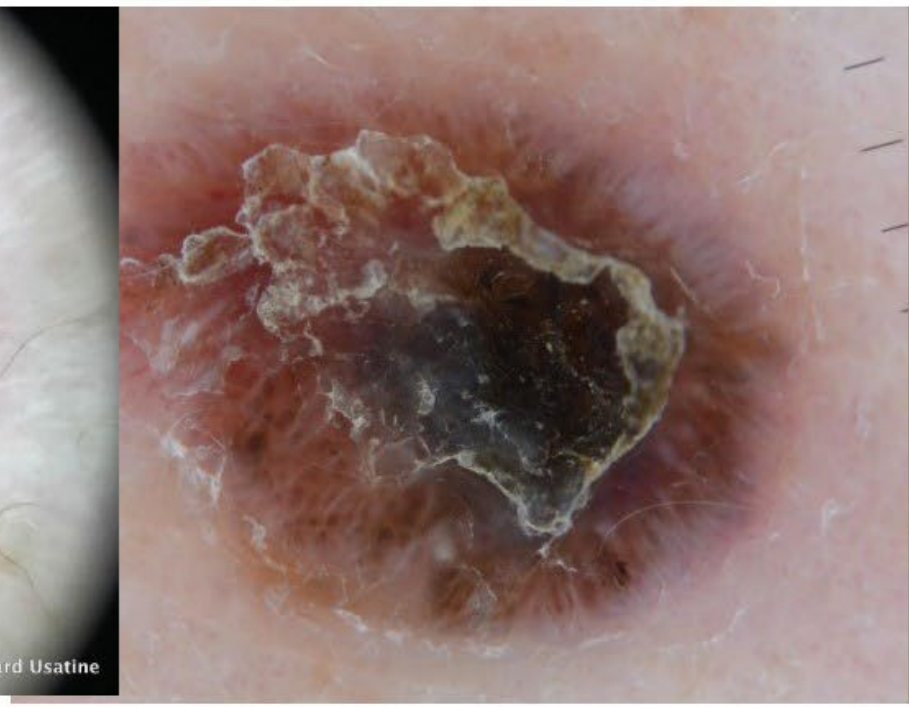

Amelanotic melanoma – polymorphous vessels
Serpentine vessels
Dotted vessels

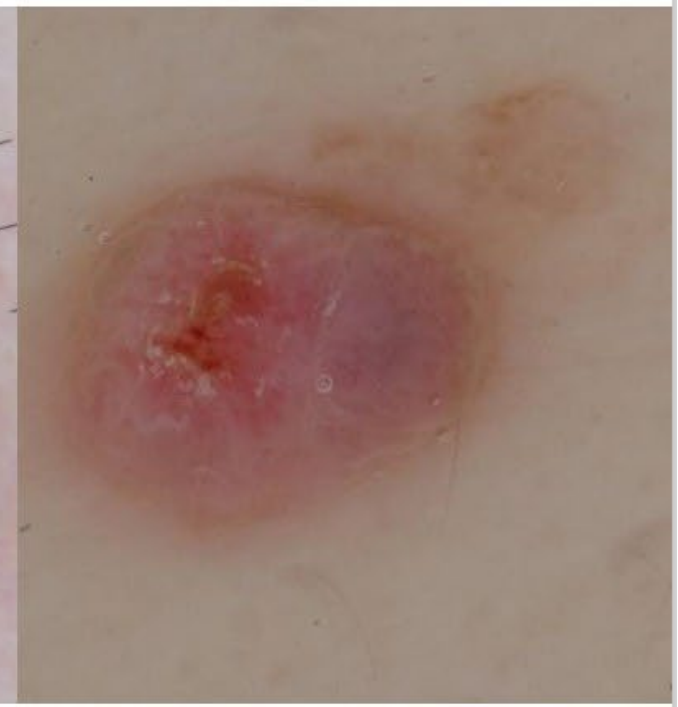
Organized lesion with any of

4

Structures	Streaks→Starburst pattern Negative network Vessels Ulceration⁺
or	
Colors	Blue Black Gray White→Shiny structures,Circles

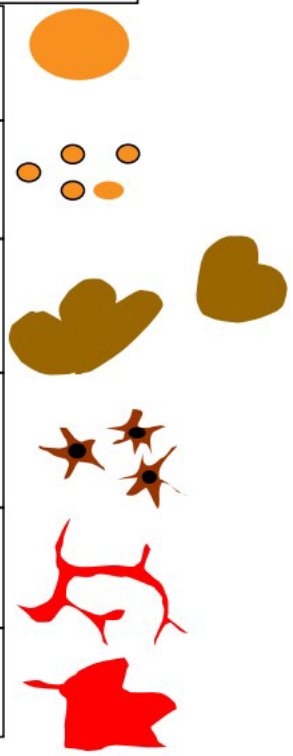
4. Ulceration

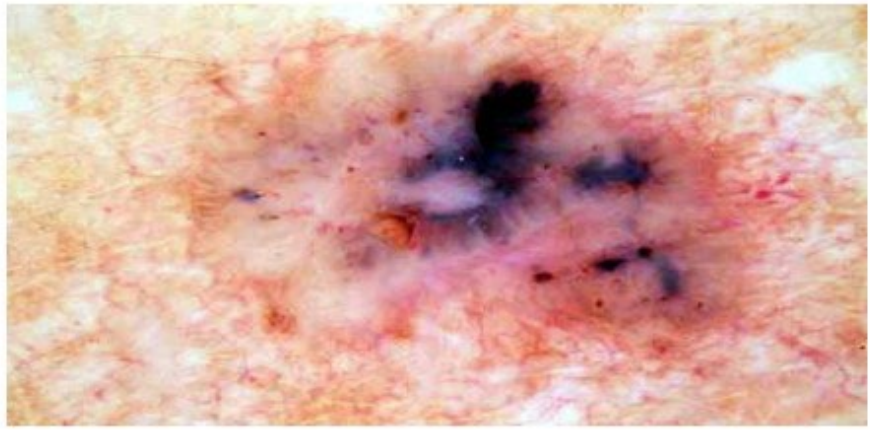




Basal Cell Carcinoma

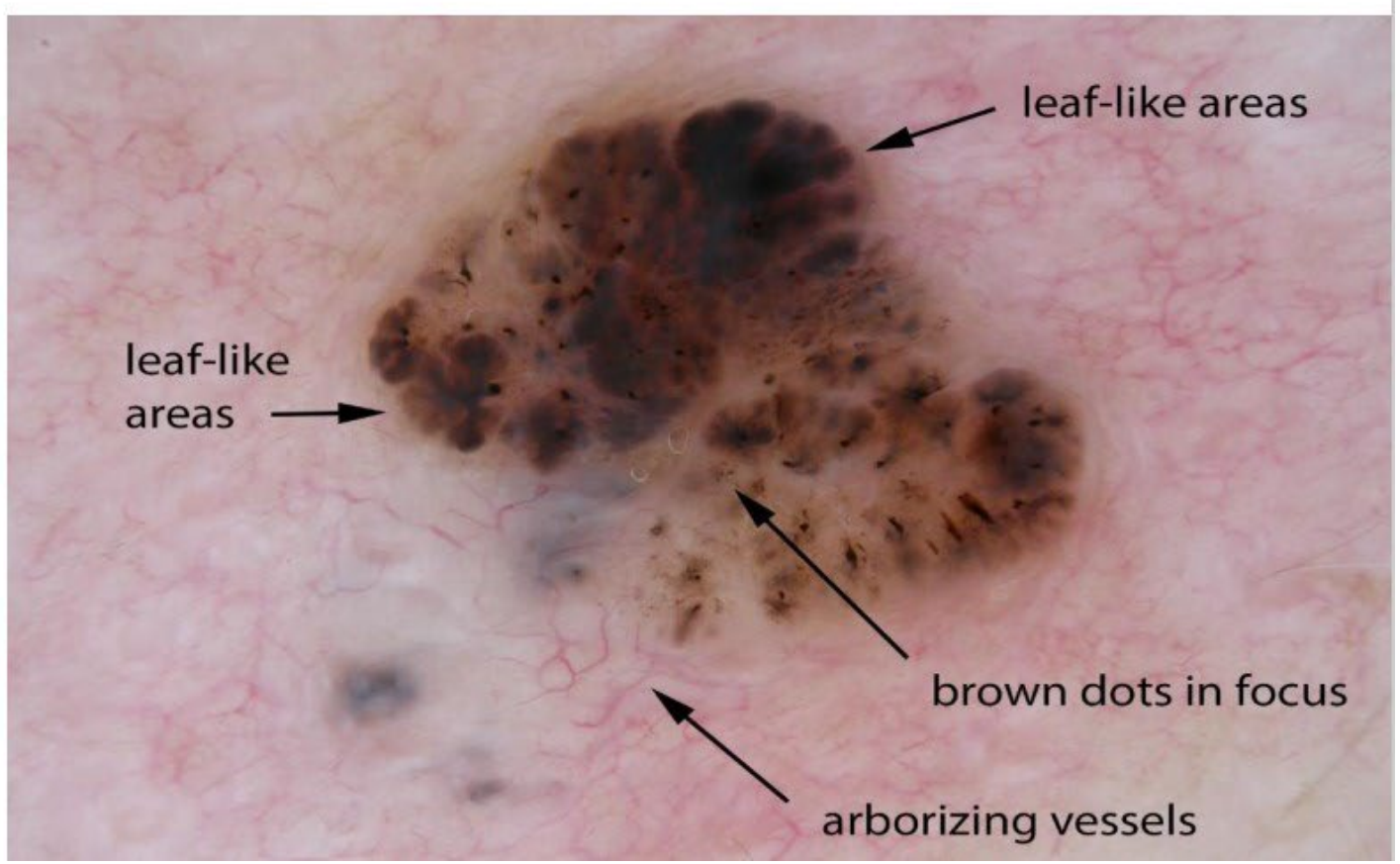
Positive features (At least one present):
Large grey-blue ovoid nests
Multiple grey-blue globules
Leaflike areas
Spoke wheel areas
Arborizing "tree-like" telangiectasia
Ulceration





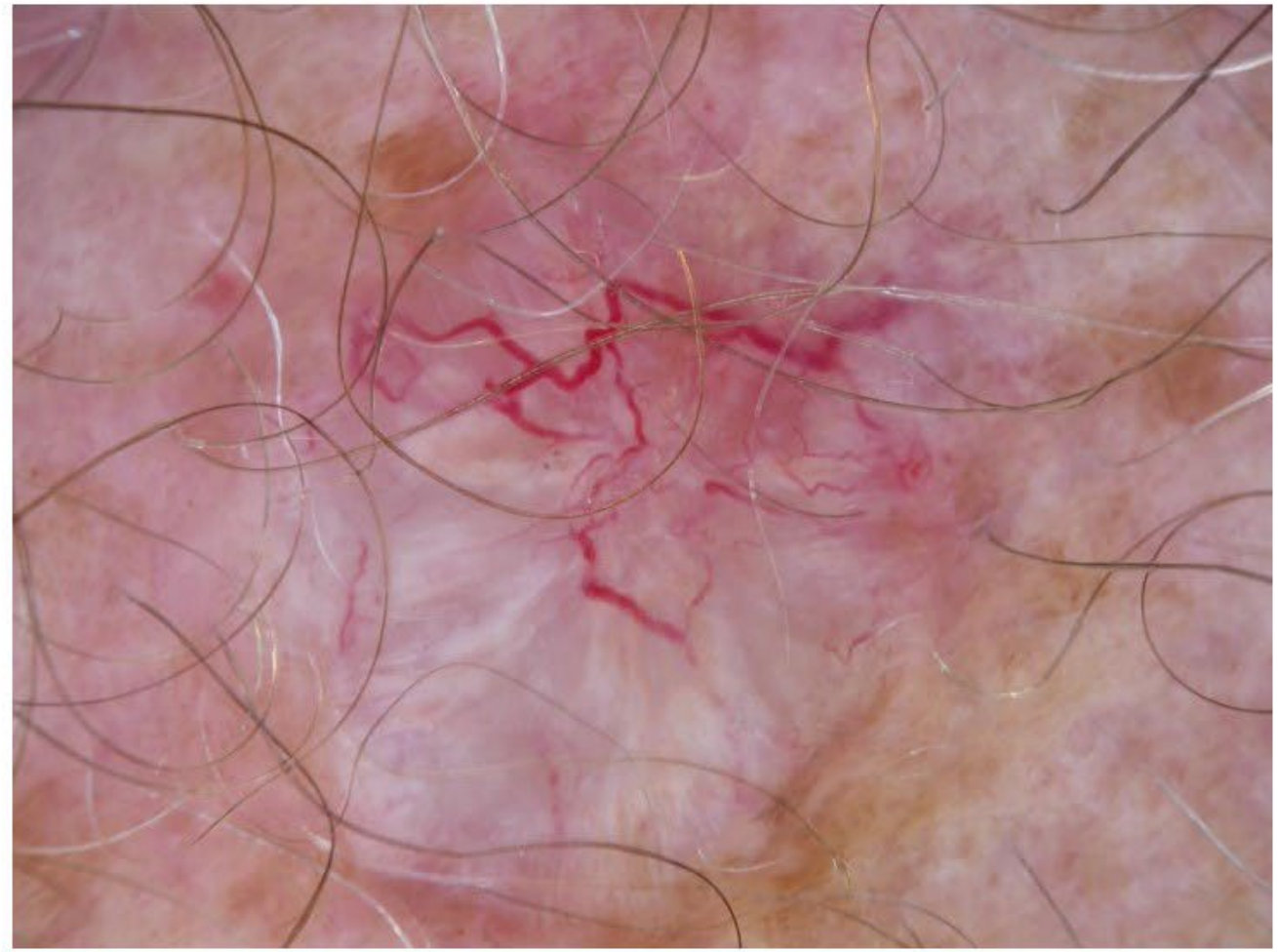
Leaf-like areas

- Brown to gray-blue discrete bulbous blobs
- “Leaf-like” pattern

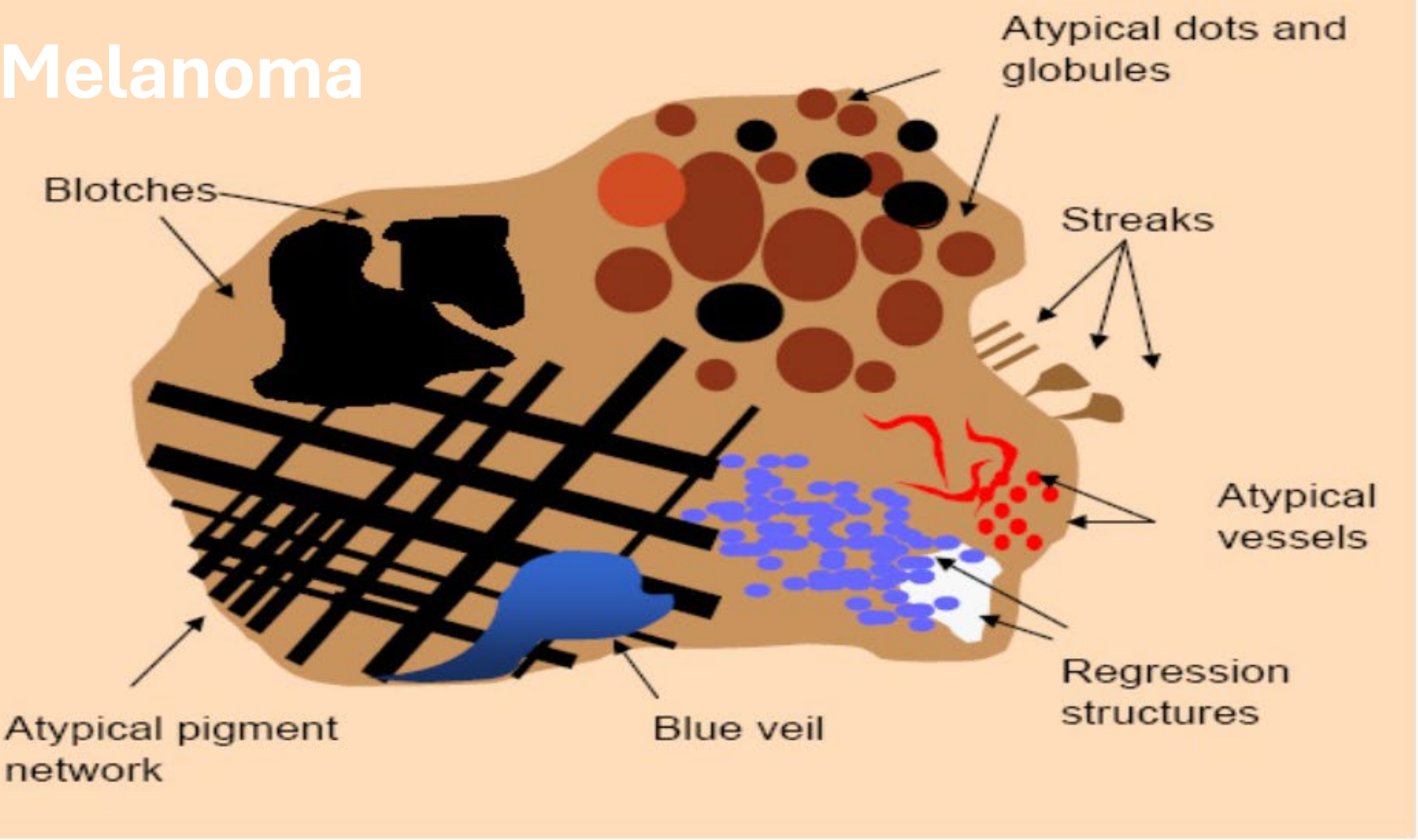


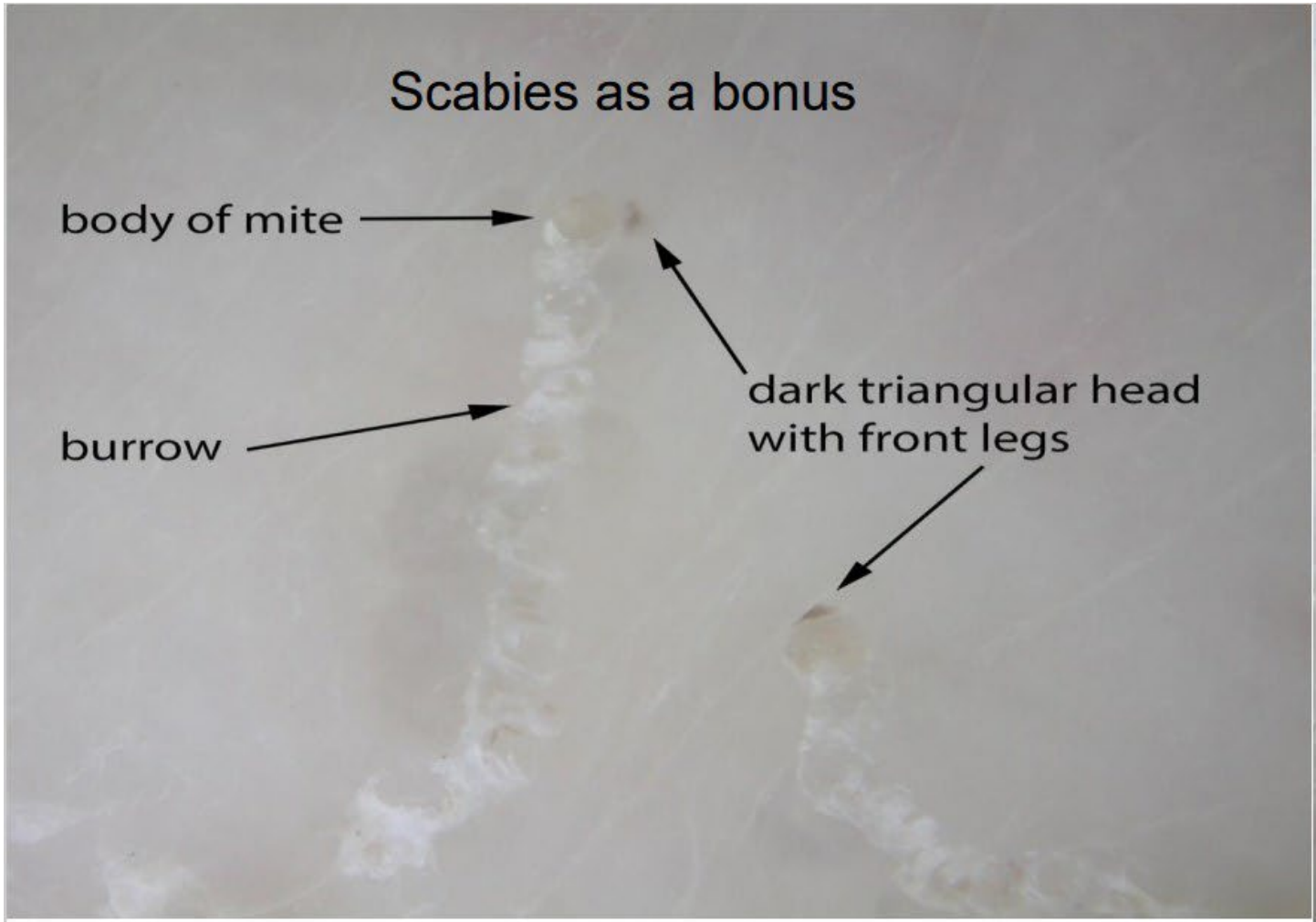
Arborizing vessels - BCC

- In-focus, red, branching vessels
- Note white lines too
- Tree metaphor!



Melanoma


Atypical dots and globules
Blotches
Streaks
Atypical vessels
Regression structures
Atypical pigment network
Blue veil



Jet plane – Delta wing – with contrail

Scabies mite

Advantages and Limitations

Advantages	Limitations
Aids in diagnosis and differentiation of tumor pathologies and borders	Cost (equipment and inadequate reimbursement)
Better patient-physician communication	Training
Reduces the number of unnecessary biopsies	Lack of time (training and use in practice)
Allows digital surveillance and monitoring	Anchoring bias and search satisfaction
Improves accuracy, sensitivity, specificity for melanoma diagnosis (increases sensitivity by 20% and specificity by 10%)	May not detect early melanomas
Non-invasive	Lower diagnostic accuracy when lesions are diagnosed using dermoscopy alone

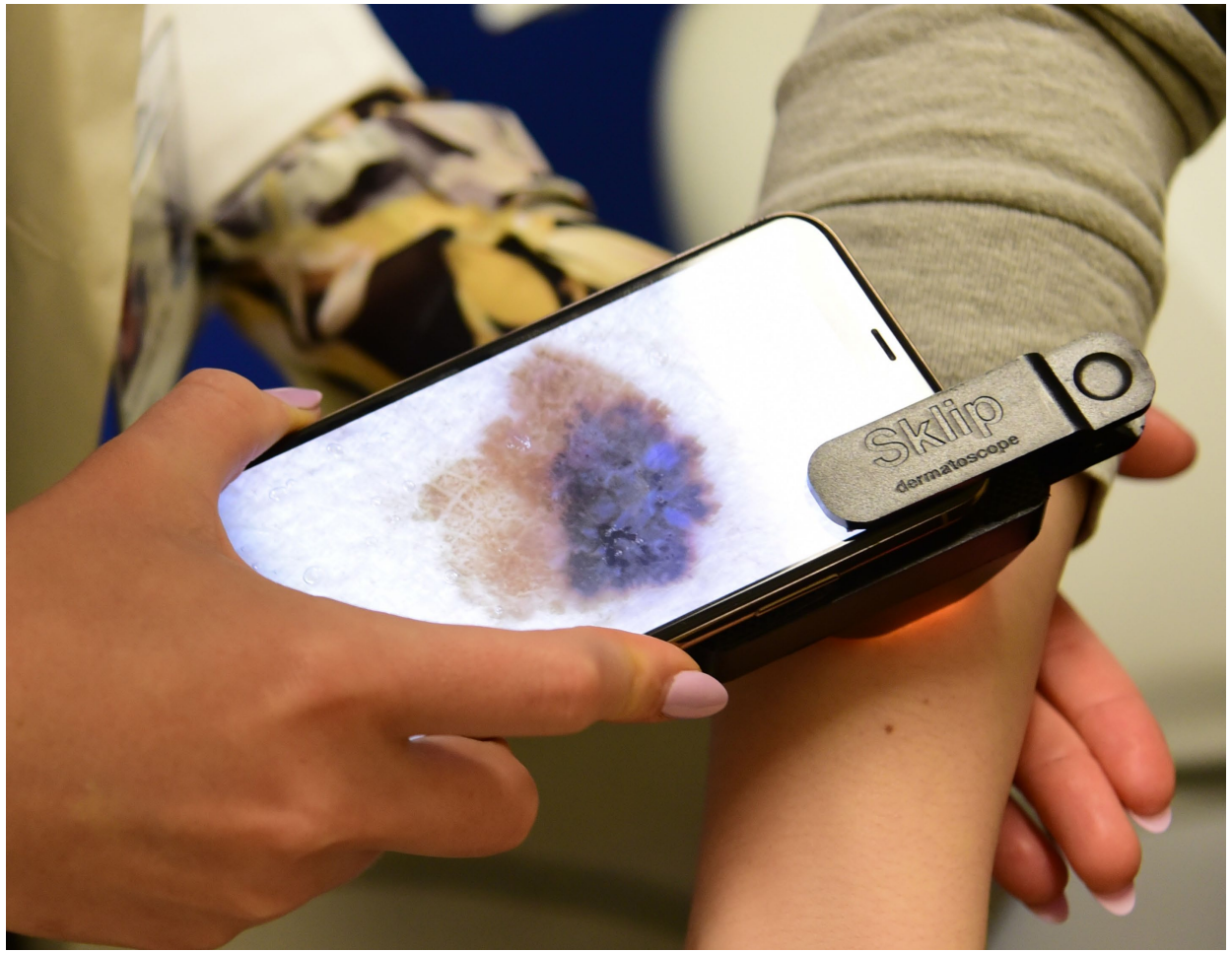
Summary

- “When in doubt, cut it out”, especially raised lesions
- Use the TADA algorithm to help triage
- Melanomas break rules
- Photograph lesions and learn from biopsy results
- Practice!

Resources

- Download the TADA algorithm app
- American Dermoscopy Meeting
- AAFP Skin Conditions and Diseases Course

Practice!



Objectives

- Described dermoscopy indications
- Listed dermoscopic features of skin diagnoses
- Practiced using dermatoscopes

THE EPIC SURVIVAL GUIDE

PRACTICAL TIPS TO HELP YOU CHART SMARTER NOT HARDER

REBECCA HALVORSEN, MD

Objectives

By the end of this session, participants will be able to:

1. **Apply practical tips** to streamline workflows and improve efficiency in Epic.
2. **Personalize Epic** to better fit individual practice styles and reduce unnecessary clicks.
3. **Use time-saving features** like user dictionaries, filters, SmartPhrases, diagnosis aware charting.
4. **Minimize charting time** so you can spend more time with your loved ones, hobbies, or just not staring at a screen.

About Me

UPMC Shadyside | Family Health Cente
FACULTY AT SHADYSIDE FMR
Epic
UNIVERSITY

Epic
UNIVERSITY
EPIC TRAINED

WIFE, MOM

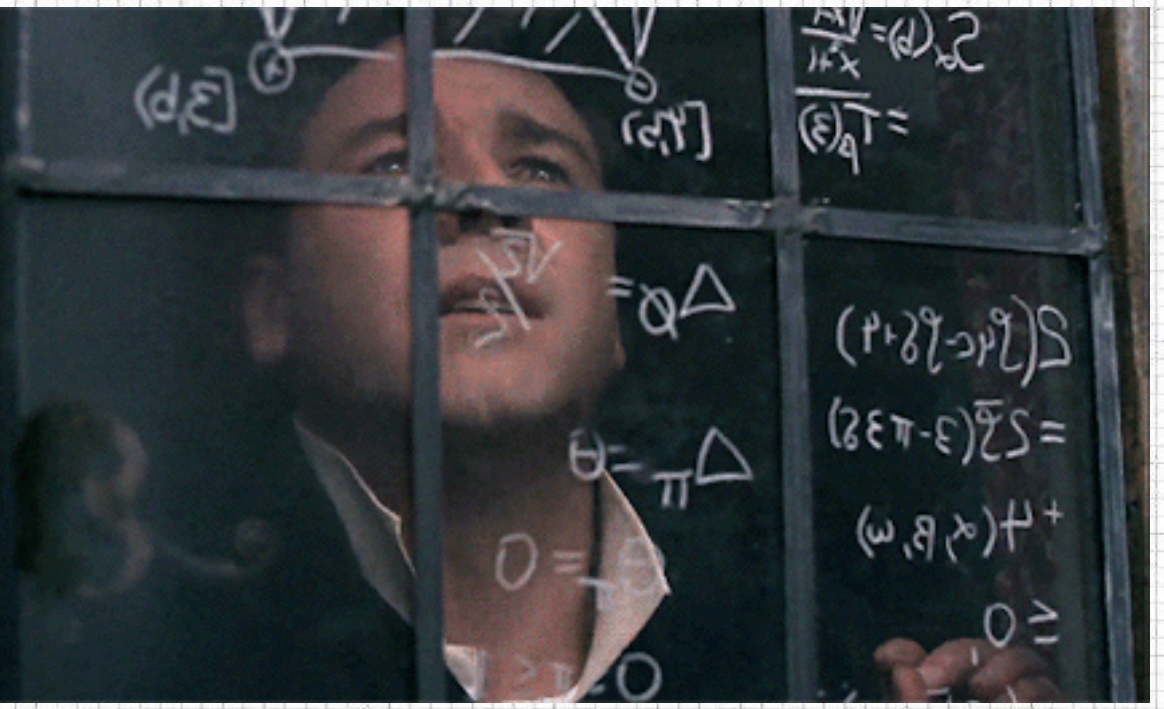
ADVENTUROUS, CREATIVE

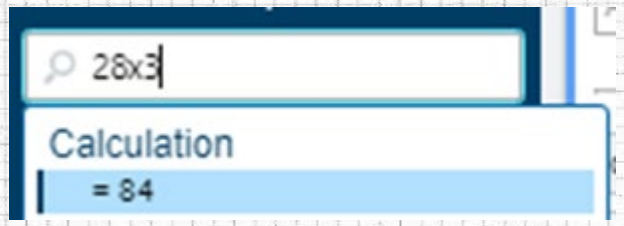
I want to be
the kind of doctor who can
go home and sleep well
knowing I've done well by my patients.

But I also want to be
the kind of doctor who can
GO HOME and SLEEP

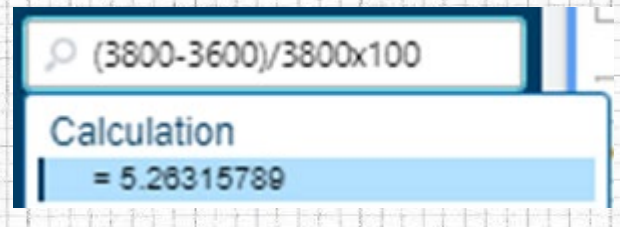
Chapter 1: Search

Ctrl



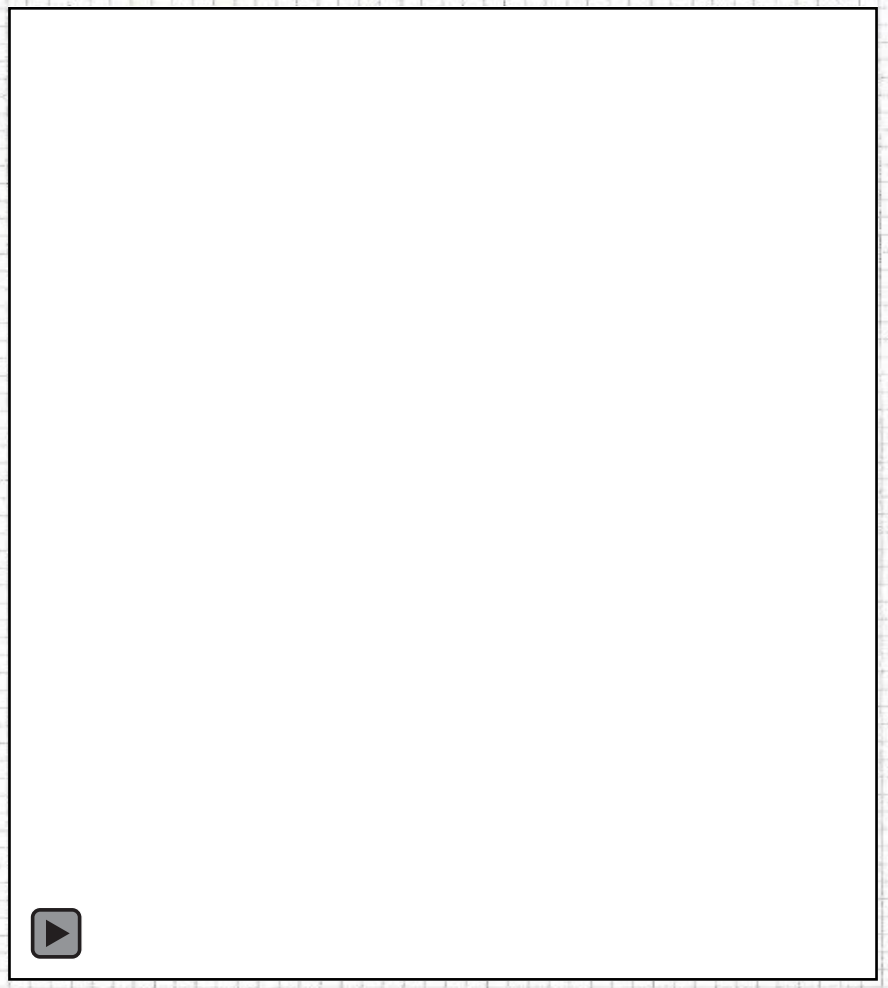


You can also use Search to do math



How do you use search when charting?

Chapter 2: Custom Filters



← Not that kind of filter.

What are you going to filter?

Chapter 3: Lab Smartphrases

Lab Results

Component	Value	Date
HGB	11.0 (L)	12/18/2025
HGB	10.8 (L)	12/17/2025
HGB	11.4 (L)	12/16/2025
FE	59	06/22/2020
TIBC	273	06/22/2020
FESAT86	22 (L)	06/22/2020
FERRITIN	271	06/22/2020
FERRITIN	117	02/11/2013
VITAMINB12	274	07/24/2025
VITAMINB12	303	01/17/2023

Lab Results

Component	Value	Date
BUN	34 (H)	12/18/2025
SCREAT	1.5 (H)	12/18/2025
K	4.3	12/18/2025
EGFRNAA	38 (L)	12/18/2025

Lab Results

Component	Value	Date
HGB	11.0 (L)	12/18/2025
HGB	10.8 (L)	12/17/2025
HGB	11.4 (L)	12/16/2025
FE	59	06/22/2020
TIBC	273	06/22/2020
FESAT86	22 (L)	06/22/2020
FERRITIN	271	06/22/2020
FERRITIN	117	02/11/2013

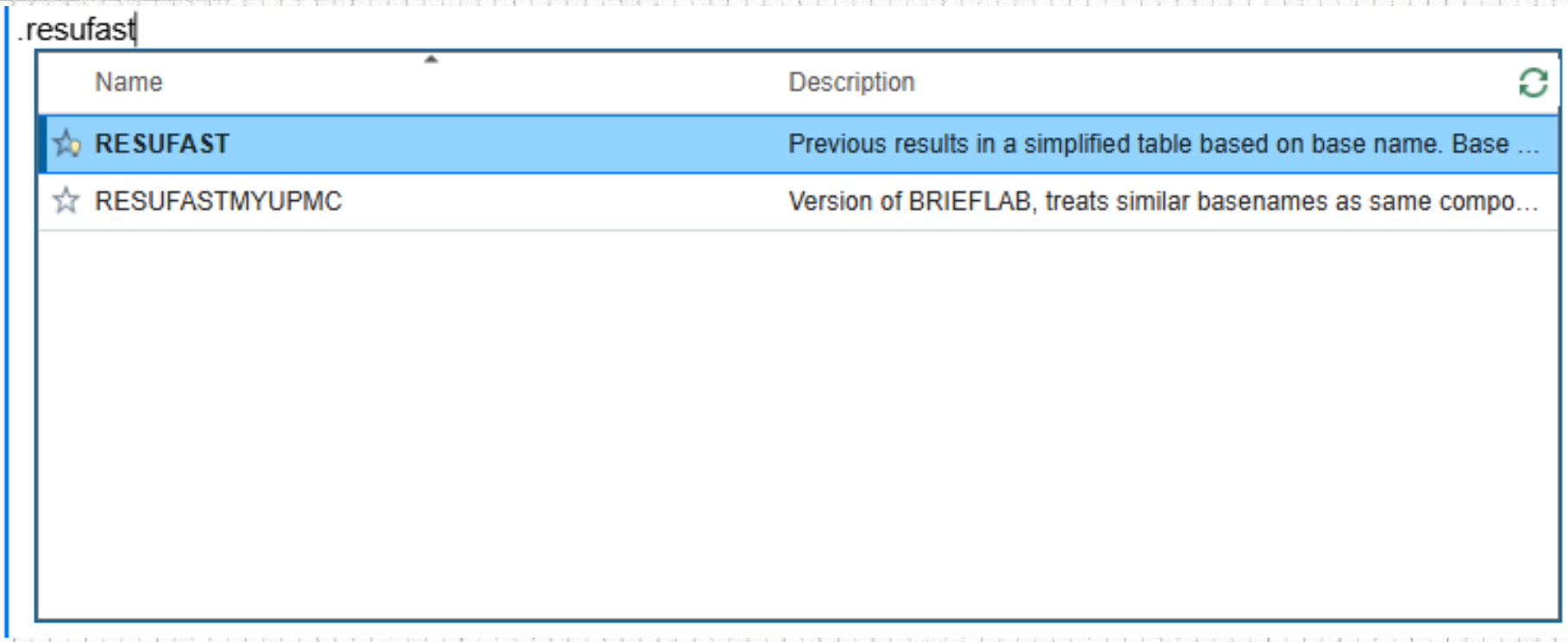
Lab Results

Component	Value	Date
PHOSPHORUS	3.4	12/18/2025
VITAMIND25OH	Quantity not sufficient.	10/06/2020
CA	9.2	12/18/2025

Lab Results

Component	Value	Date
TSH	1.375	06/22/2020
TSH	1.263	10/11/2016
FREET4	1.11	06/22/2020
FREET4	1.23	10/11/2016

The SmartLink .RESUFAST allows you to pull in labs in a table format.



Edit SmartLink Parameters - RESUFAST

Parameters:

Result Components

	Name	Number of results
1		

Preview:

```
{*** HELP TEXT ***

This SmartLink requires parameters for processing. Parameters allow for more
information to be given to the SmartLink. This allows you to request specific information
by giving the SmartLink precise direction.

The SmartLink accepts a list of result component base names separated by commas. You
can also request the number of results to display for each component. To indicate the
number of results for each component, type the component name followed by a colon and
then the number of results (Name:4). For all results for that particular component, type a
star in place of the number (Name:*). To obtain the first and last results for a particular
component, type FL in place of the number or the star (Name:FL). To obtain the last result
for a particular component, type the component name without a colon, number, or star.

Example: .RESUFAST[MCH:3,MCV:*,HCT
}
```

Accept Cancel

Edit SmartLink Parameters - RESUFAST

Parameters:

Result Components

	Name	Number of results
1	a1c	
2		

Id	Name	Component
303	HBA1C	HEMOGLOBIN A1C
21802	HEMOGLOBINA1	HEMOGLOBIN A1C
33021	HBA1C	HEMOGLOBIN A1C (POC)
33171	HGBA1CPOCT	HEMOGLOBIN A1C (POCT)

Preview:

{*** HELP TEXT ***

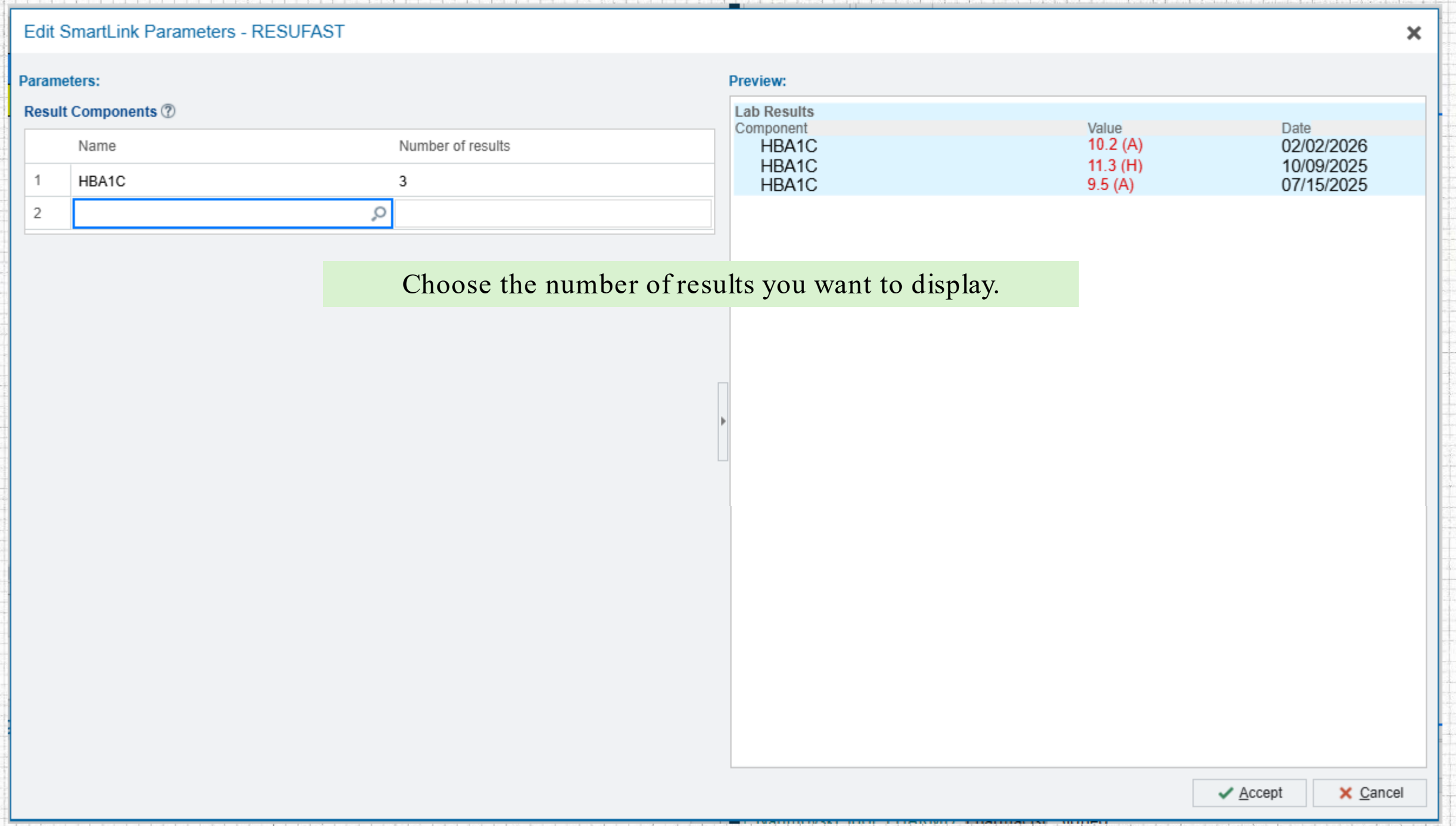
This SmartLink requires parameters for processing. Parameters allow for more information to be given to the SmartLink. This allows you to request specific information by giving the SmartLink precise direction.

The SmartLink accepts a list of result component base names separated by commas. You can also request the number of results to display for each component. To indicate the number of results for each component, type the component name followed by a colon and then the number of results (Name:4). For all results for that particular component, type a star in place of the number (Name:*). To obtain the first and last results for a particular component, type FL in place of the number or the star (Name:FL). To obtain the last result for a particular component, type the component name without a colon, number, or star.

Example: .RESUFAST[MCH:3,MCV:*,HCT
}

Type the name of the lab you want to pull in. (It might take some trial and error to find the correct component name.)

Accept Cancel


Edit SmartLink Parameters - RESUFAST
Parameters:
Result Components
Name
Number of results
1
HBA1C
3
2
Preview:
Lab Results
Component
Value
Date
HBA1C
10.2 (A)
02/02/2026
HBA1C
11.3 (H)
10/09/2025
HBA1C
9.5 (A)
07/15/2025
Choose the number of results you want to display.
Accept
Cancel

Objective

General: well-appearing, no acute distress
Cardiovascular: regular rate and rhythm, no murmurs, no lower extremity edema
Pulmonary: normal respiratory effort, clear lungs bilaterally, no wheezes, crackles, or rhonchi
Abdomen: soft, nontender, nondistended
Psych: normal mood and affect

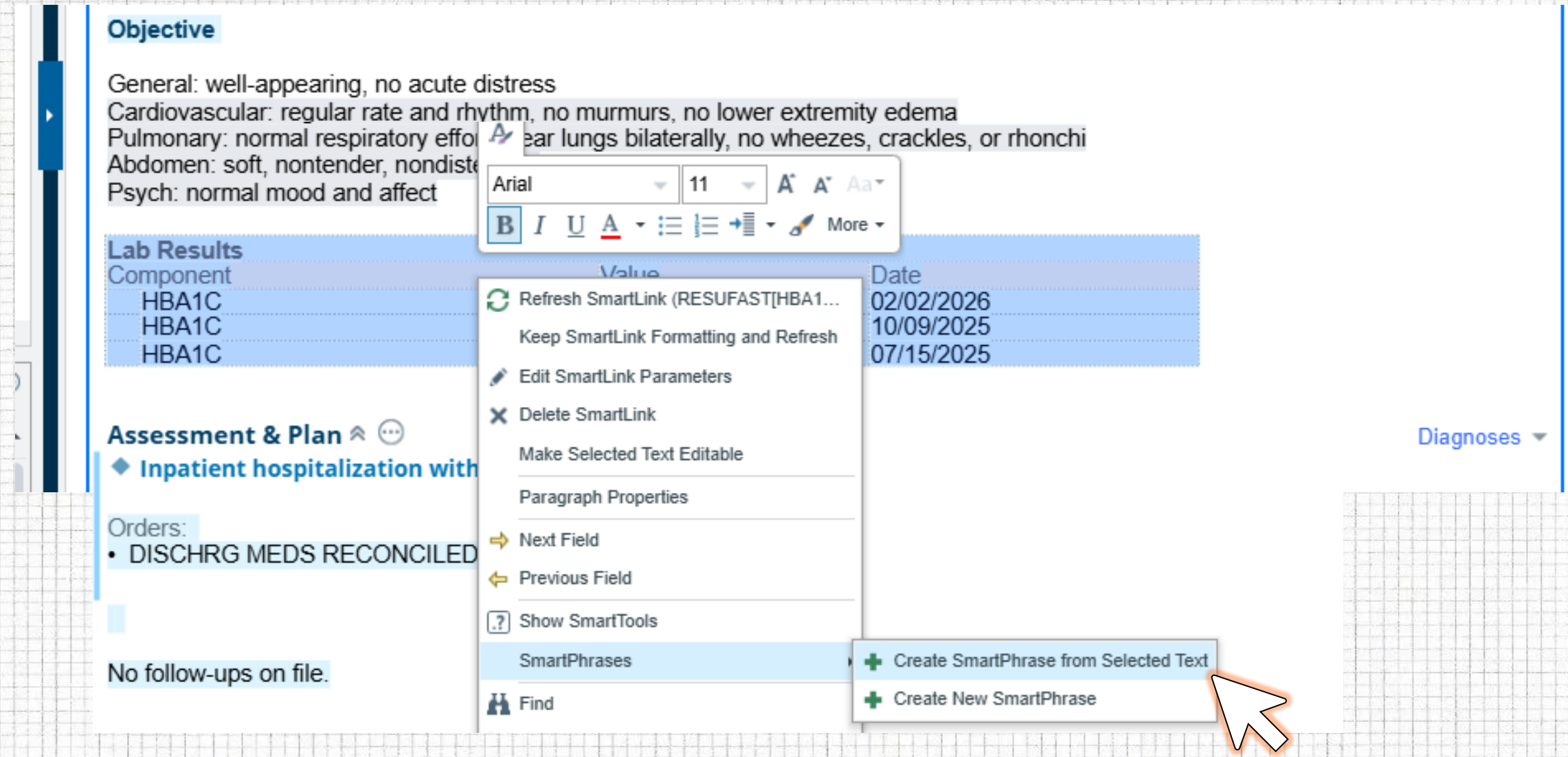
Lab Results

Component	Value	Date
HBA1C	10.2 (A)	02/02/2026
HBA1C	11.3 (H)	10/09/2025
HBA1C	9.5 (A)	07/15/2025

Assessment & Plan

Diagnoses

Inpatient hospitalization within last 30 days


Objective
General: well-appearing, no acute distress
Cardiovascular: regular rate and rhythm, no murmurs, no lower extremity edema
Pulmonary: normal respiratory effo ear lungs bilaterally, no wheezes, crackles, or rhonchi
Abdomen: soft, nontender, nondiste
Psych: normal mood and affect
Arial
11
More
Lab Results
Component
Value
Date
HBA1C
02/02/2026
HBA1C
10/09/2025
HBA1C
07/15/2025
Refresh SmartLink (RESUFAST[HBA1...
Keep SmartLink Formatting and Refresh
Edit SmartLink Parameters
Delete SmartLink
Make Selected Text Editable
Paragraph Properties
Next Field
Previous Field
Show SmartTools
SmartPhrases
Find
Create SmartPhrase from Selected Text
Create New SmartPhrase
Assessment & Plan
Diagnoses
Inpatient hospitalization with
Orders:
• DISCHRG MEDS RECONCILED
No follow-ups on file.

User SmartPhrase

Do not include PHI or patient-specific data in SmartPhrases.

Insert SmartText | Insert SmartList

@RESUFAST(HBA1C:3)@

Settings

Name

Description — Populate from Text

Text Format: Rich Text | Plain Text

SmartLink Text Size and Font: Match Template Formatting | Keep SmartLink Formatting

Released

Synonyms

	Synonym
1	

Sharing

You are an editor

	User	Can Edit?
1	HALVORSEN, REBECCA A [HALVORSENRA]	☑
2		☐

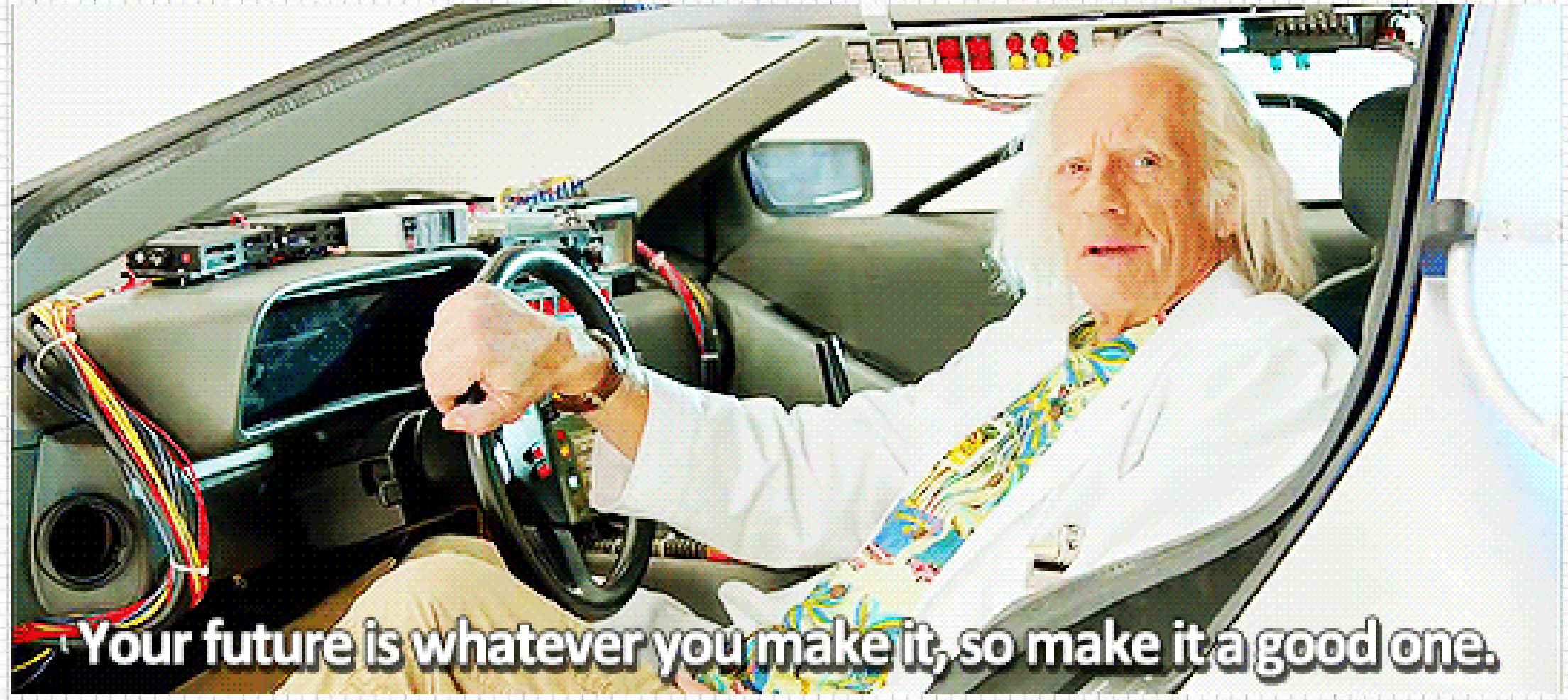
Copy Users | Mark All as Editors

Upload And Download Actions

Preview | Save | Accept and Insert | Accept | Cancel

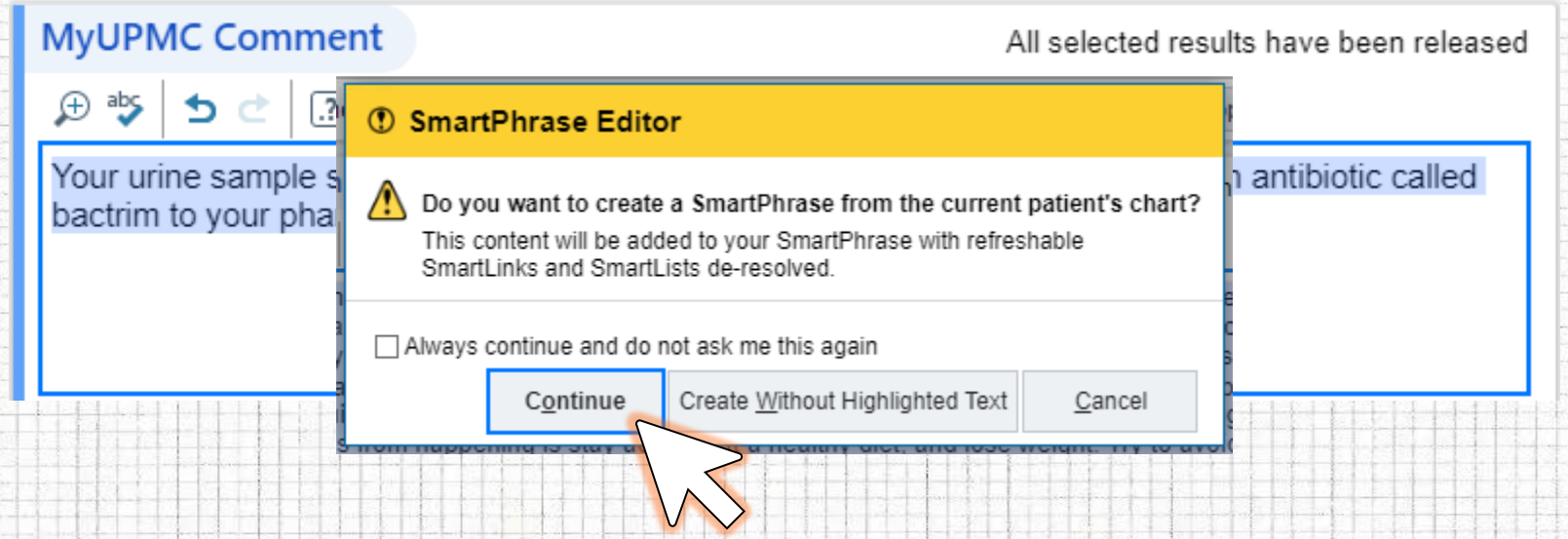
What labs do you always review together?

Chapter 4: SmartPhrases on the Fly



The Future Is Now! - A Special Message From Doc Brown

Highlight the text that you would like to turn into a SmartPhrase and click the green **+** at the top of the text input area.



User SmartPhrase

Do not include PHI or patient-specific data in SmartPhrases.

Insert SmartText | Insert SmartList

Your urine sample showed signs of a urinary tract infection. I am going to send an antibiotic called bactrim to your pharmacy. You should take this twice daily for three days.

Settings

Name: MCUTI

Description | Populate from Text

Text Format: **Rich Text** | Plain Text

SmartLink Text Size and Font

Match Template Formatting | Keep SmartLink Formatting

Synonyms

	Synonym
1	

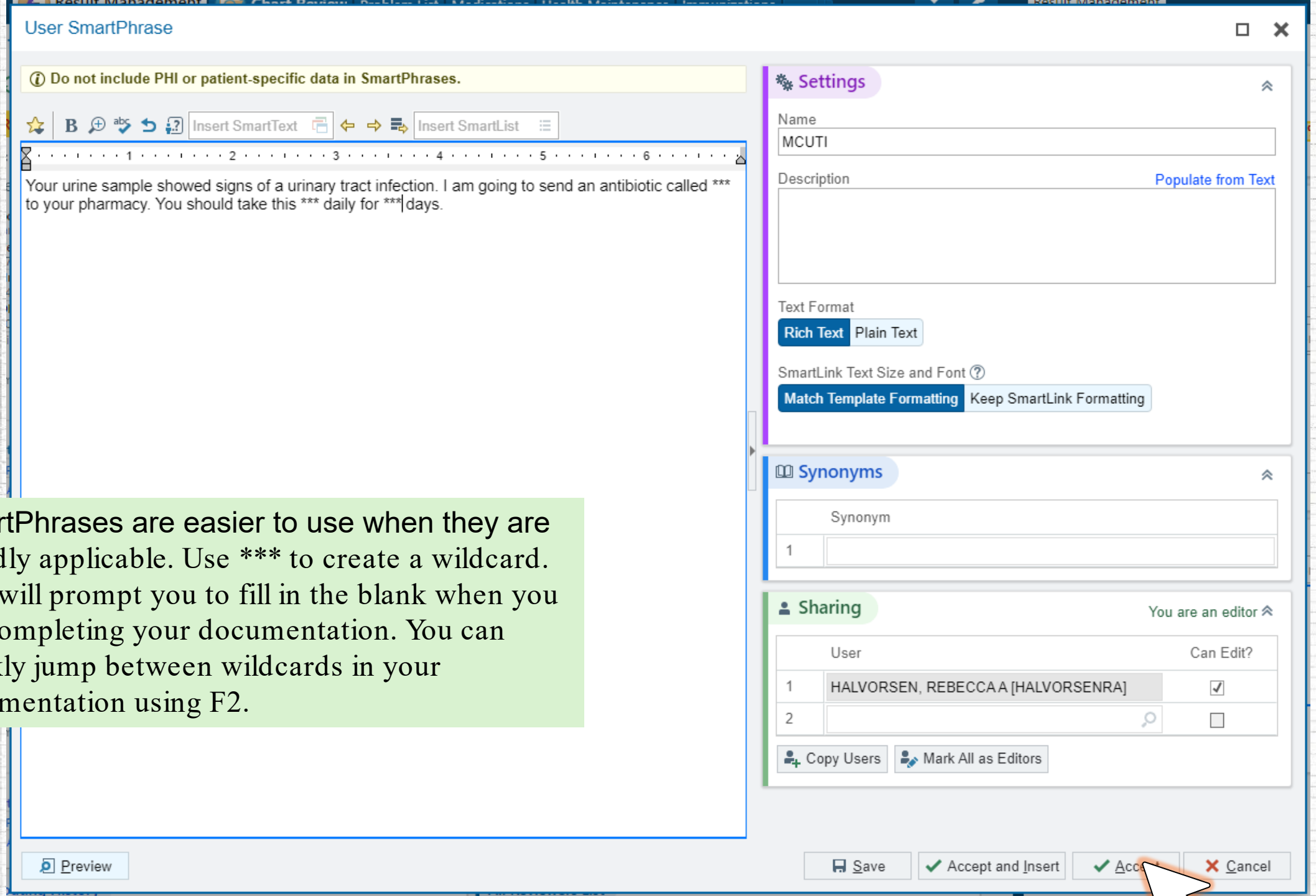
Sharing

You are an editor

	User	Can Edit?
1	HALVORSEN, REBECCA A [HALVORSENRA]	☑
2		☐

Copy Users | Mark All as Editors

Preview | Save | Accept and Insert | Accept | Cancel



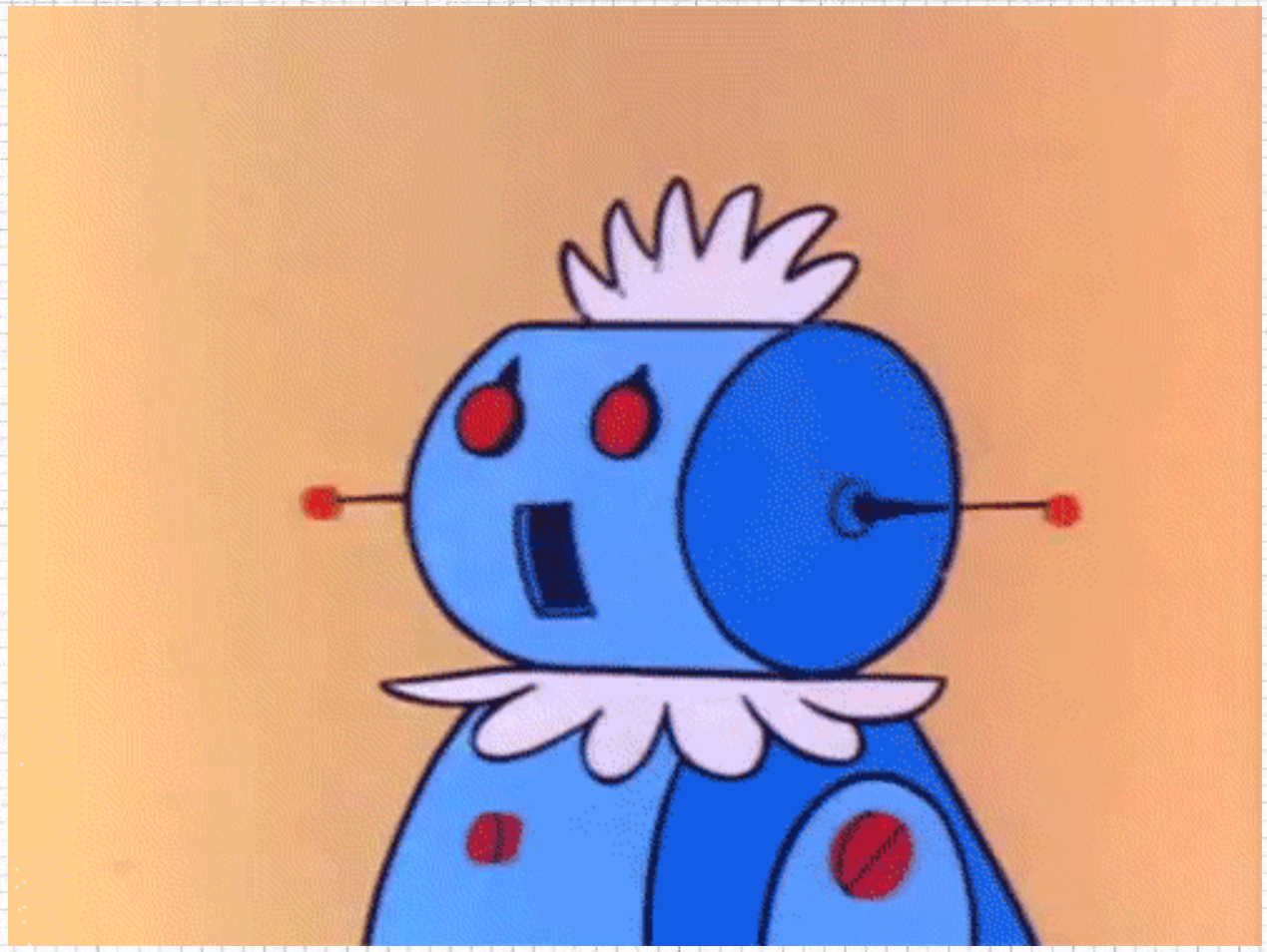
SmartPhrases are easier to use when they are broadly applicable. Use *** to create a wildcard. This will prompt you to fill in the blank when you are completing your documentation. You can quickly jump between wildcards in your documentation using F2.

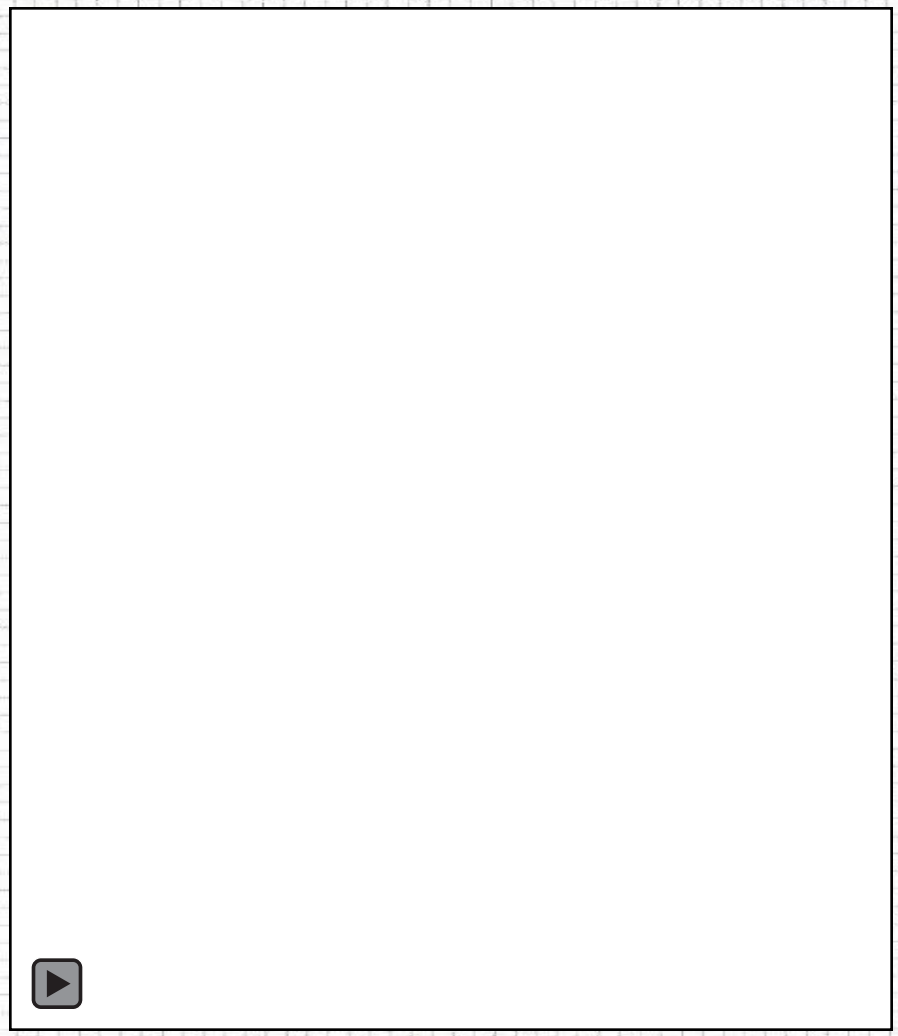
SmartLink	Expands to
.HE	he or she
.HIM	him or her
.CAPHE	He or She
.NAME	First M Lastname
.LNAME	Lastname
.DOB	Date of birth in m/dd/yyyy format
.AGE	patient’s age
.M	Mr. or Ms.

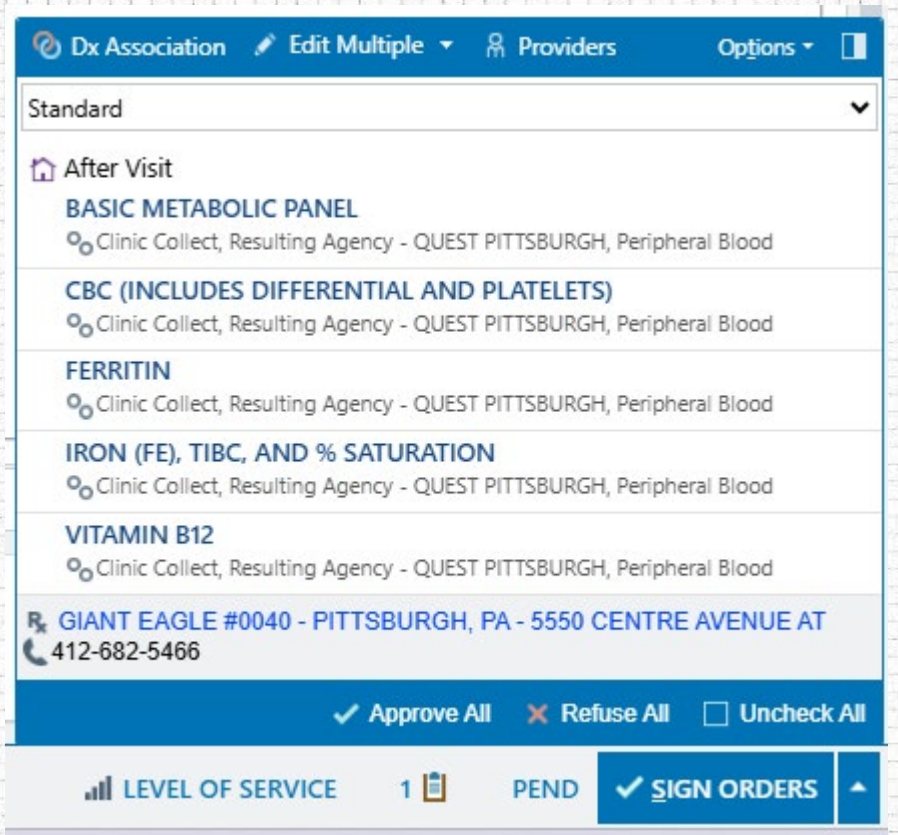
Name	Description
.EXAM___	Goes in an exam section. For example, .EXAMSEBDERM is a description of classic seborrheic dermatitis.
.HPI___	Goes in the HPI section. For example, .HPIINCONTINENCE is a phrase that I use when talking with patients about urinary incontinence.
.LETTER___	Goes into a letter.
.MC___	Stands for MyChart. These are my patient facing SmartPhrases. I use them in the patient instructions in my AVS, in my results management to communicate results to patients, as responses to mychart messages, etc.
.PA___	Used to document clinical justification for things that will need a prior authorization. I tend to use these phrases to remind myself what the requirements are, for example PACGM includes the CMS requirements for a CGM.
.PLAN___	Goes in the plan section. For example, .PLANDIABETES or .PLANCOPDEXACERBATION
.ROS___	ROS for a specific problem. For example, mania or hyperglycemia.

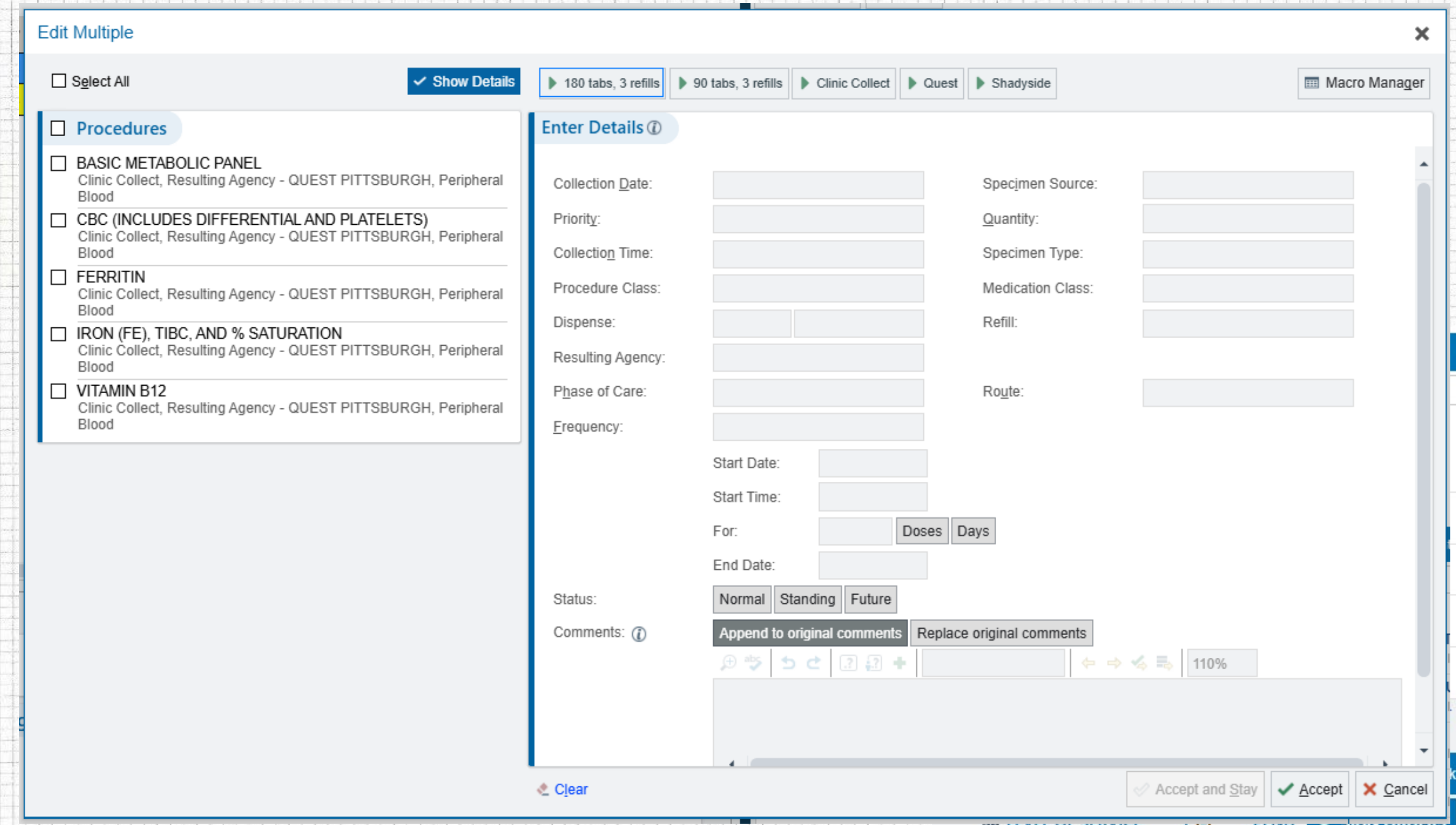
What’s something that you type frequently that could be a SmartPhrase?

Chapter 5: MACROS FOR ORDERS






Dx Association
Edit Multiple
Providers
Options
Standard
After Visit
BASIC METABOLIC PANEL
Clinic Collect, Resulting Agency - QUEST PITTSBURGH, Peripheral Blood
CBC (INCLUDES DIFFERENTIAL AND PLATELETS)
Clinic Collect, Resulting Agency - QUEST PITTSBURGH, Peripheral Blood
FERRITIN
Clinic Collect, Resulting Agency - QUEST PITTSBURGH, Peripheral Blood
IRON (FE), TIBC, AND % SATURATION
Clinic Collect, Resulting Agency - QUEST PITTSBURGH, Peripheral Blood
VITAMIN B12
Clinic Collect, Resulting Agency - QUEST PITTSBURGH, Peripheral Blood
GIANT EAGLE #0040 - PITTSBURGH, PA - 5550 CENTRE AVENUE AT
412-682-5466
Approve All
Refuse All
Uncheck All
LEVEL OF SERVICE
1
PEND
SIGN ORDERS


Edit Multiple
Select All
Show Details
180 tabs, 3 refills
90 tabs, 3 refills
Clinic Collect
Quest
Shadyside
Macro Manager
Procedures
BASIC METABOLIC PANEL
Clinic Collect, Resulting Agency - QUEST PITTSBURGH, Peripheral Blood
CBC (INCLUDES DIFFERENTIAL AND PLATELETS)
Clinic Collect, Resulting Agency - QUEST PITTSBURGH, Peripheral Blood
FERRITIN
Clinic Collect, Resulting Agency - QUEST PITTSBURGH, Peripheral Blood
IRON (FE), TIBC, AND % SATURATION
Clinic Collect, Resulting Agency - QUEST PITTSBURGH, Peripheral Blood
VITAMIN B12
Clinic Collect, Resulting Agency - QUEST PITTSBURGH, Peripheral Blood
Enter Details
Collection Date:
Priority:
Collection Time:
Procedure Class:
Dispense:
Resulting Agency:
Phase of Care:
Frequency:
Specimen Source:
Quantity:
Specimen Type:
Medication Class:
Refill:
Route:
Start Date:
Start Time:
For:
Doses
Days
End Date:
Status:
Normal
Standing
Future
Comments:
Append to original comments
Replace original comments
110%
Clear
Accept and Stay
Accept
Cancel

Edit Multiple Macro Manager

New Macro

- 180 tabs, 3 refills
- 90 tabs, 3 refills
- Clinic Collect
- Quest
- Shadyside

Macro Name: Shadyside

Macro Description:

Order

Order Type: Add | Labs | Imaging | Medications

Order Mode: Outpatient | Inpatient

Details

Collection Date:

Priority:

Collection Time:

Procedure Class: Lab Collect

Dispense:

Resulting Agency: UPMC SHADYSIDE

Phase of Care:

Frequency:

Start Date:

Start Time:

For: Doses | Days

End Date:

Status: Normal | Standing | Future

Specimen Source:

Quantity:

Specimen Type:

Medication Class:

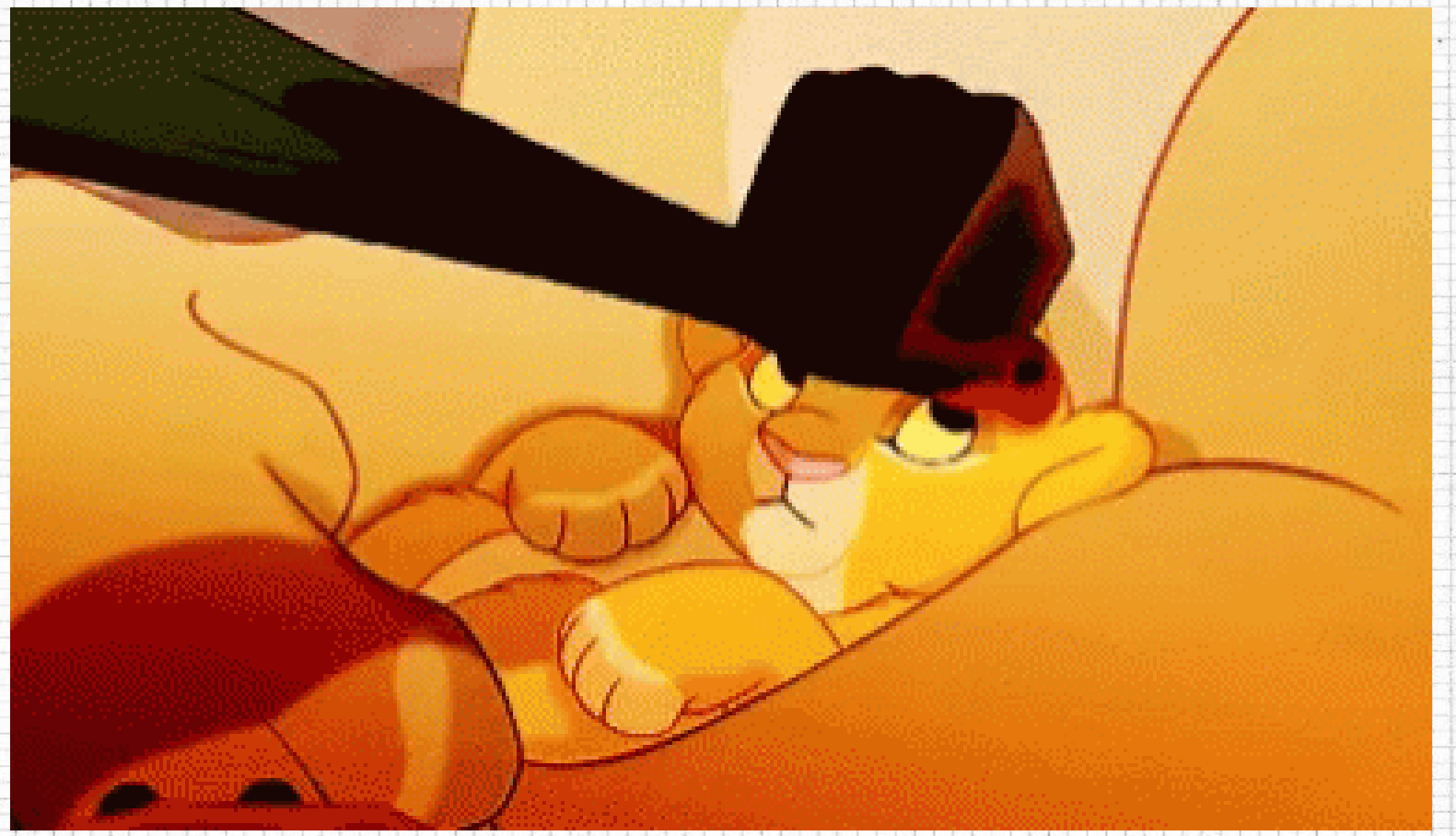
Refill:

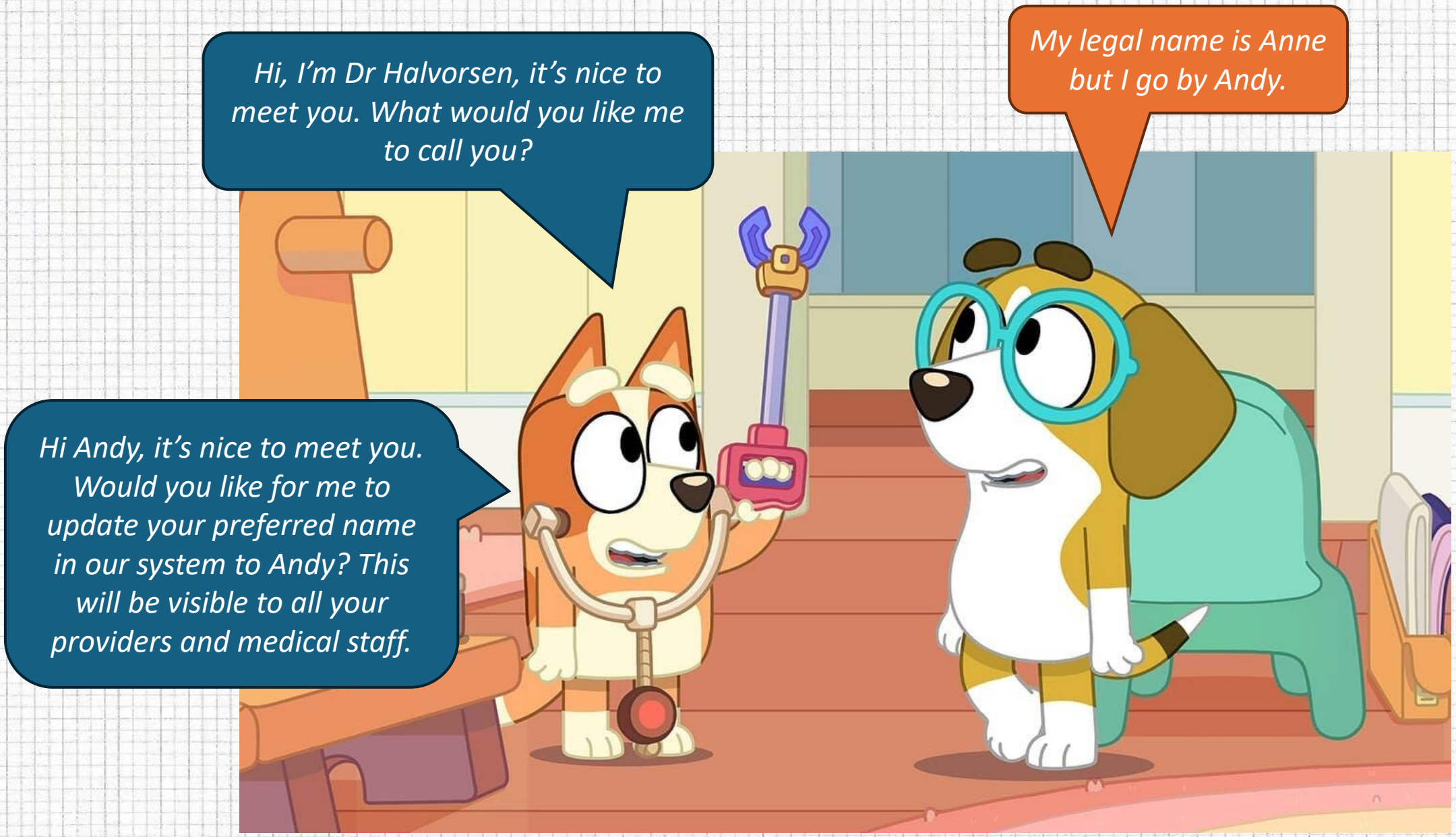
Route:

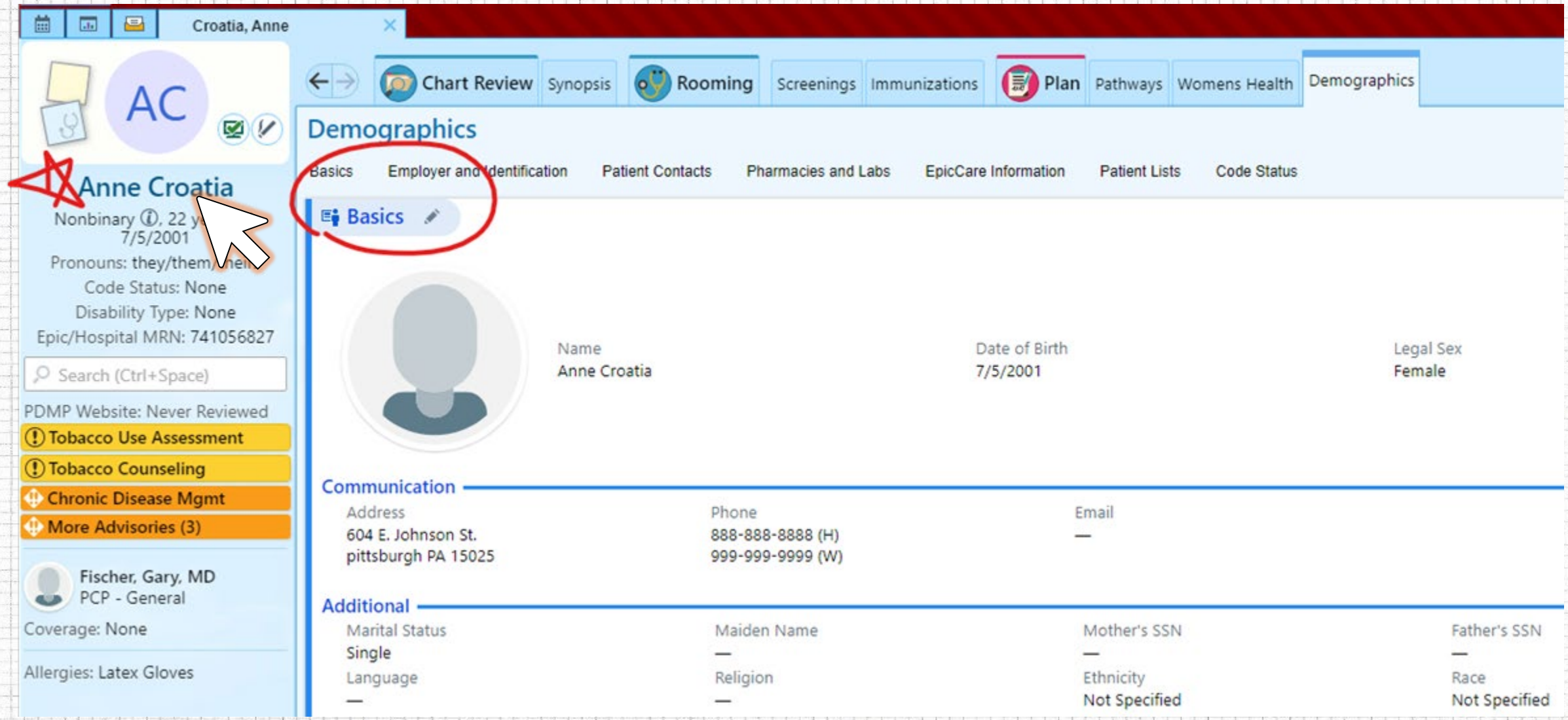
Save As | Save | Close

Which macros do you plan to make?

Chapter 6: Preferred Name




Hi, I'm Dr Halvorsen, it's nice to meet you. What would you like me to call you?
My legal name is Anne but I go by Andy.
Hi Andy, it's nice to meet you. Would you like for me to update your preferred name in our system to Andy? This will be visible to all your providers and medical staff.


Croatia, Anne
AC
Anne Croatia
Nonbinary ⓘ, 22 y
7/5/2001
Pronouns: they/them/
Code Status: None
Disability Type: None
Epic/Hospital MRN: 741056827
Search (Ctrl+Space)
PDMP Website: Never Reviewed
Tobacco Use Assessment
Tobacco Counseling
Chronic Disease Mgmt
More Advisories (3)
Fischer, Gary, MD
PCP - General
Coverage: None
Allergies: Latex Gloves
Chart Review
Synopsis
Rooming
Screenings
Immunizations
Plan
Pathways
Womens Health
Demographics
Demographics
Basics
Employer and Identification
Patient Contacts
Pharmacies and Labs
EpicCare Information
Patient Lists
Code Status
Basics
Name
Anne Croatia
Date of Birth
7/5/2001
Legal Sex
Female
Communication
Address
604 E. Johnson St.
pittsburgh PA 15025
Phone
888-888-8888 (H)
999-999-9999 (W)
Email
—
Additional
Marital Status
Single
Maiden Name
—
Mother's SSN
—
Father's SSN
—
Language
—
Religion
—
Ethnicity
Not Specified
Race
Not Specified

Basics | Employer and Identification | Patient Contacts | Pharmacies and Labs | EpicCare Information | Patient Lists | Code Status

+ Add Photo

Name
Anne Croatia
Aliases

Date of Birth
Jul 5, 2001

Legal Sex
Female

Permanent

Address
604 E. Johnson St

City (or ZIP)
pittsburgh

State
PA

ZIP
15025

County

Country

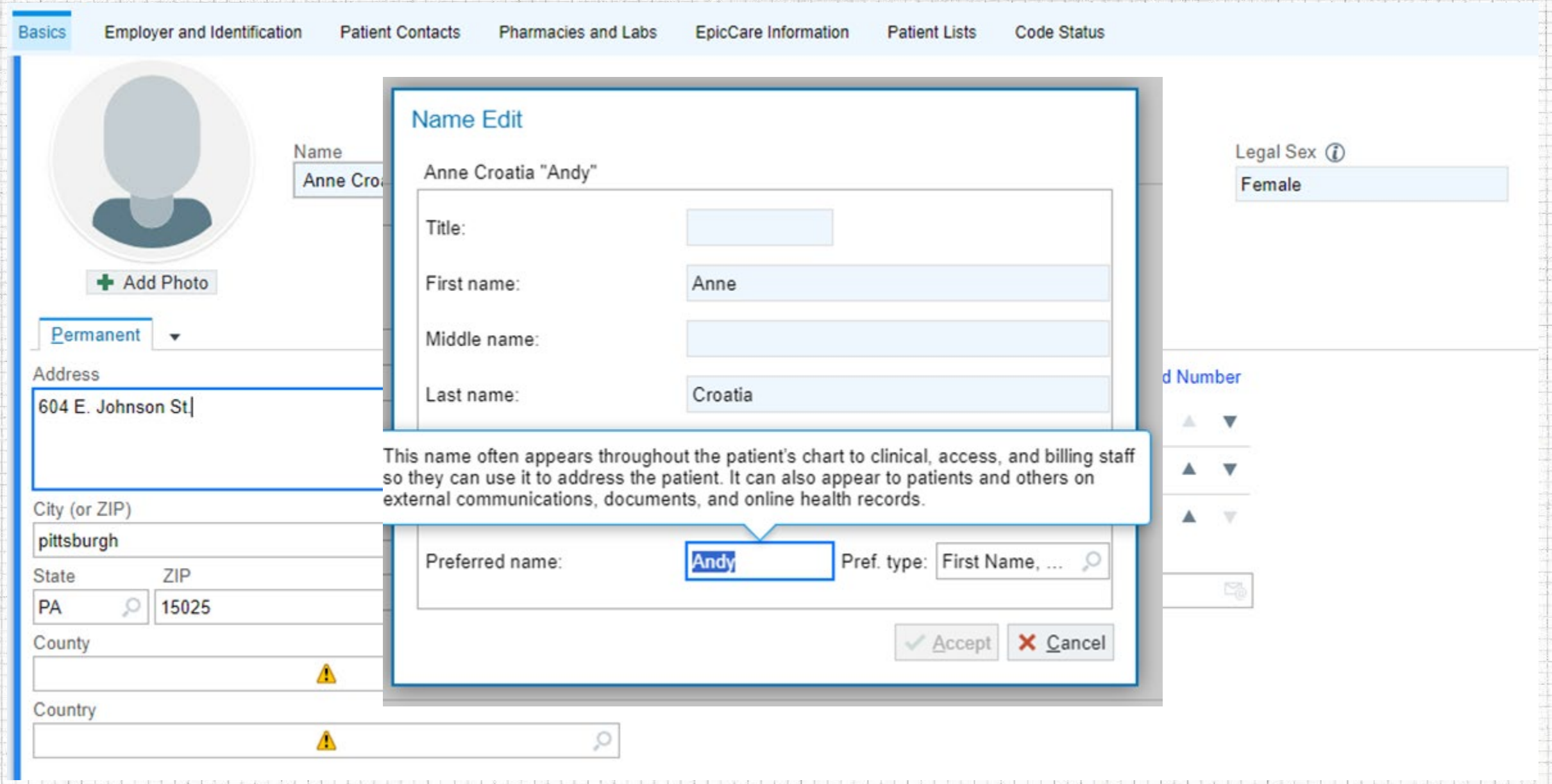
Phone Numbers
+ Add Number

Home Phone	888-888-8888	
Work Phone	999-999-9999	
Mobile		

Email Address

No email

Add Comment


Basics
Employer and Identification
Patient Contacts
Pharmacies and Labs
EpicCare Information
Patient Lists
Code Status
Add Photo
Name
Anne Cro
Legal Sex
Female
Permanent
Address
604 E. Johnson St
City (or ZIP)
pittsburgh
State
PA
ZIP
15025
County
Country
d Number
Name Edit
Anne Croatia "Andy"
Title:
First name:
Anne
Middle name:
Last name:
Croatia
This name often appears throughout the patient's chart to clinical, access, and billing staff so they can use it to address the patient. It can also appear to patients and others on external communications, documents, and online health records.
Preferred name:
Andy
Pref. type:
First Name, ...
Accept
Cancel

Andy Croatia

Legal: **Anne Croatia**

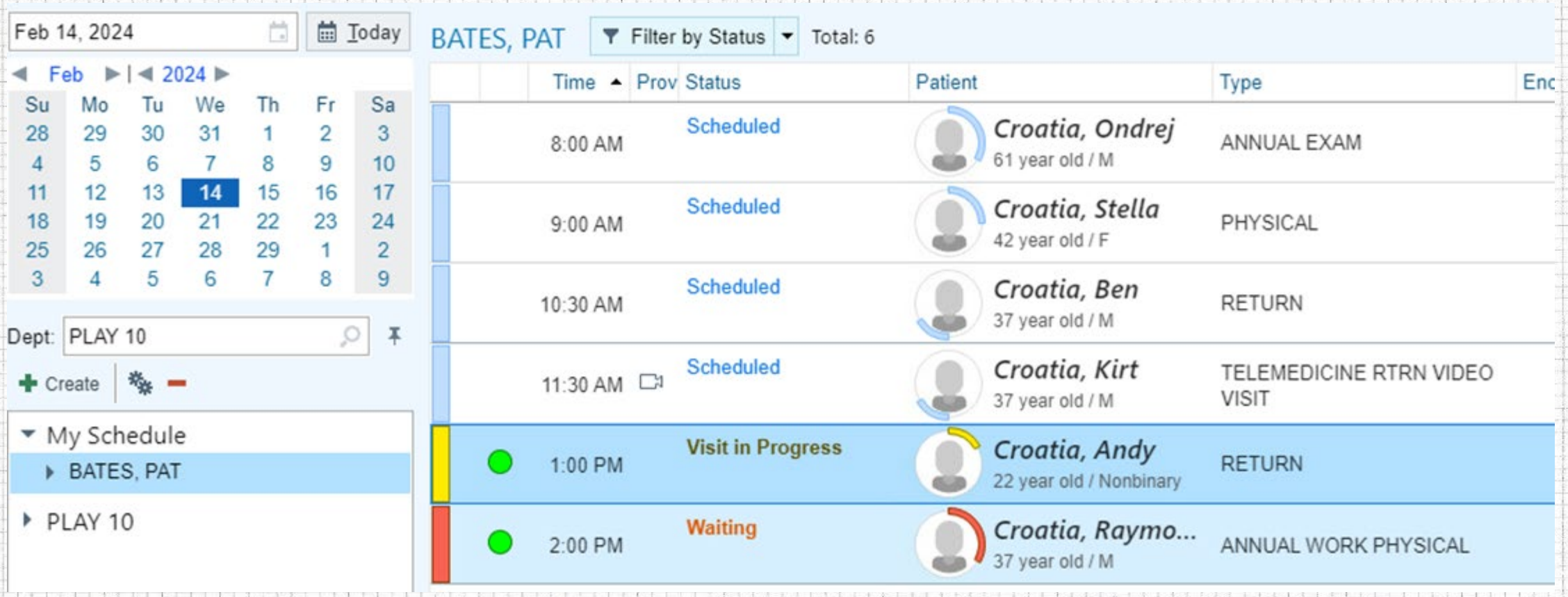
Nonbinary ⓘ, 22 year old, 7/5/2001

Pronouns: they/them/theirs

Code Status: None

Disability Type: None

Epic/Hospital MRN: 741056827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Today
Feb
2024
Su Mo Tu We Th Fr Sa
28 29 30 31 1 2 3
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11 12 13 14 15 16 17
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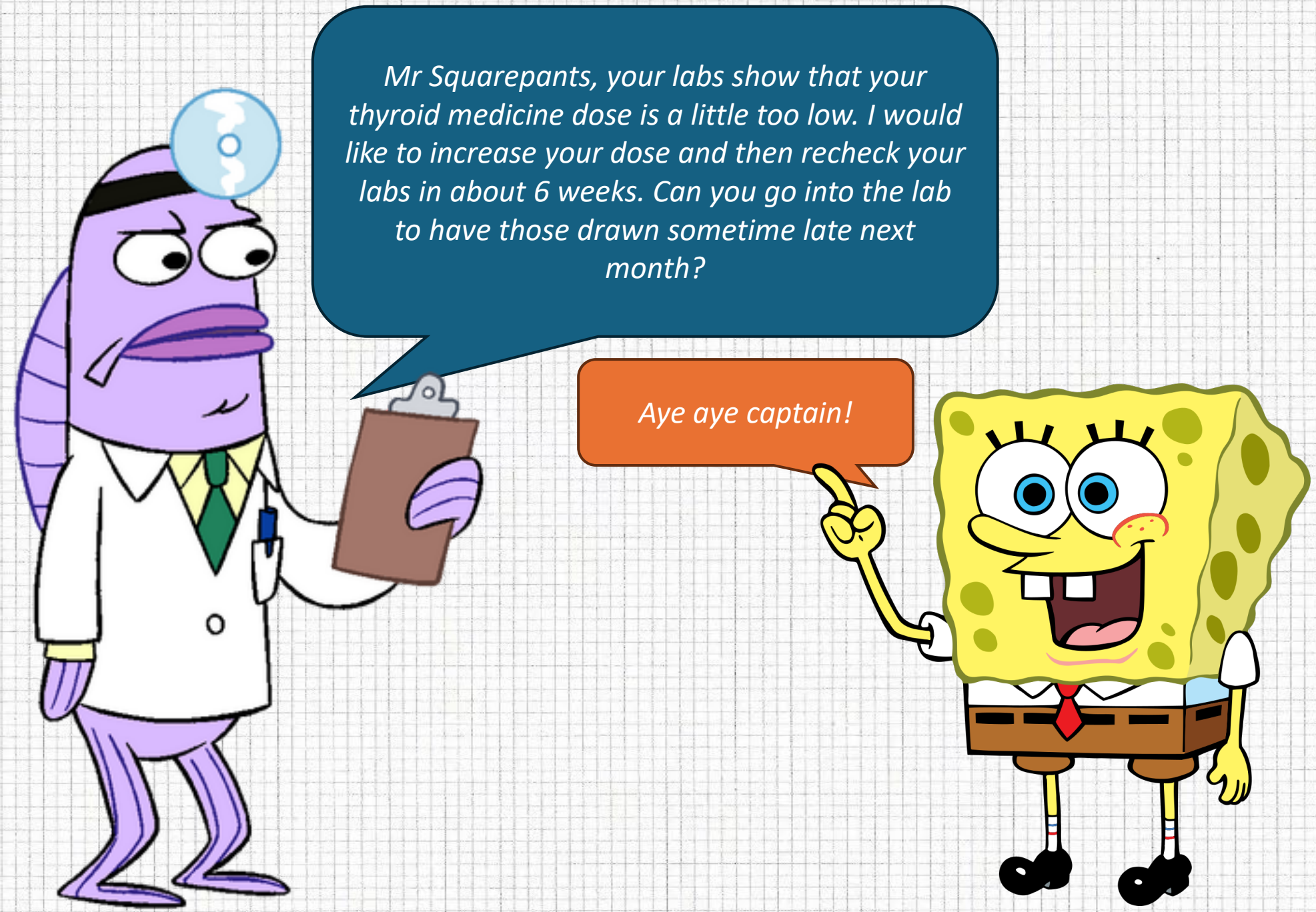
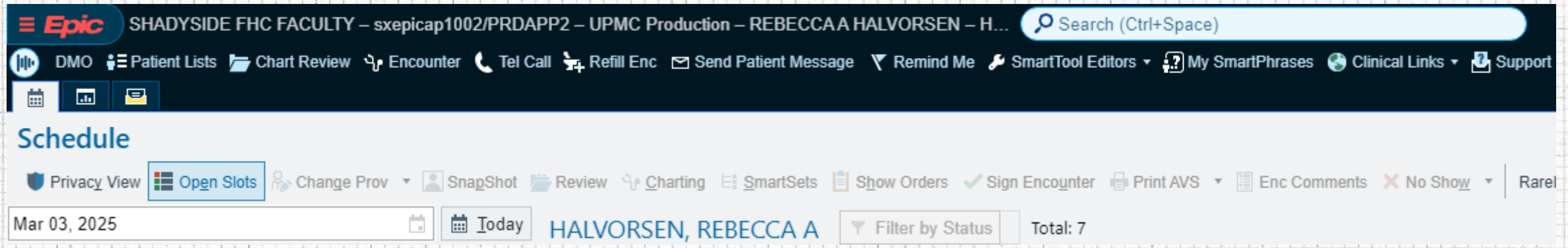
25 26 27 28 29 1 2
3 4 5 6 7 8 9
Dept: PLAY 10
Create
My Schedule
BATES, PAT
PLAY 10
BATES, PAT
Filter by Status
Total: 6
Time
Prov
Status
Patient
Type
Enc
8:00 AM
Scheduled
Croatia, Ondrej
61 year old / M
ANNUAL EXAM
9:00 AM
Scheduled
Croatia, Stella
42 year old / F
PHYSICAL
10:30 AM
Scheduled
Croatia, Ben
37 year old / M
RETURN
11:30 AM
Scheduled
Croatia, Kirt
37 year old / M
TELEMEDICINE RTRN VIDEO VISIT
1:00 PM
Visit in Progress
Croatia, Andy
22 year old / Nonbinary
RETURN
2:00 PM
Waiting
Croatia, Raymo...
37 year old / M
ANNUAL WORK PHYSICAL

Chapter 7: Remind Me

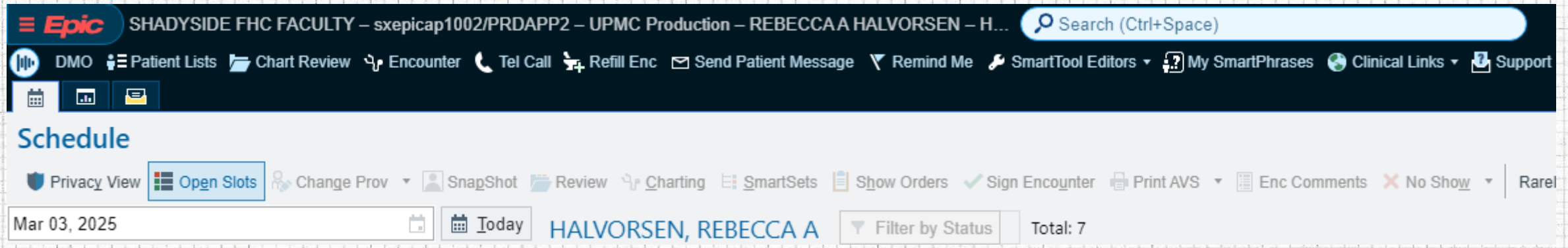

Mr Squarepants, your labs show that your thyroid medicine dose is a little too low. I would like to increase your dose and then recheck your labs in about 6 weeks. Can you go into the lab to have those drawn sometime late next month?
Aye aye captain!

MANY
MONTHS LATER

Whatever happened with that guy's labs? What was his name? Mr. Starhat?


Epic
SHADYSIDE FHC FACULTY – sxepicap1002/PRDAPP2 – UPMC Production – REBECCA A HALVORSEN – H...
Search (Ctrl+Space)
DMO
Patient Lists
Chart Review
Encounter
Tel Call
Refill Enc
Send Patient Message
Remind Me
SmartTool Editors
My SmartPhrases
Clinical Links
Support
Schedule
Privacy View
Open Slots
Change Prov
SnapShot
Review
Charting
SmartSets
Show Orders
Sign Encounter
Print AVS
Enc Comments
No Show
Rarel
Mar 03, 2025
Today
HALVORSEN, REBECCA A
Filter by Status
Total: 7

Remind Me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SHADYSIDE FHC FACULTY – sxepicap1002/PRDAPP2 – UPMC Production – REBECCA A HALVORSEN – H...
Search (Ctrl+Space)
DMO
Patient Lists
Chart Review
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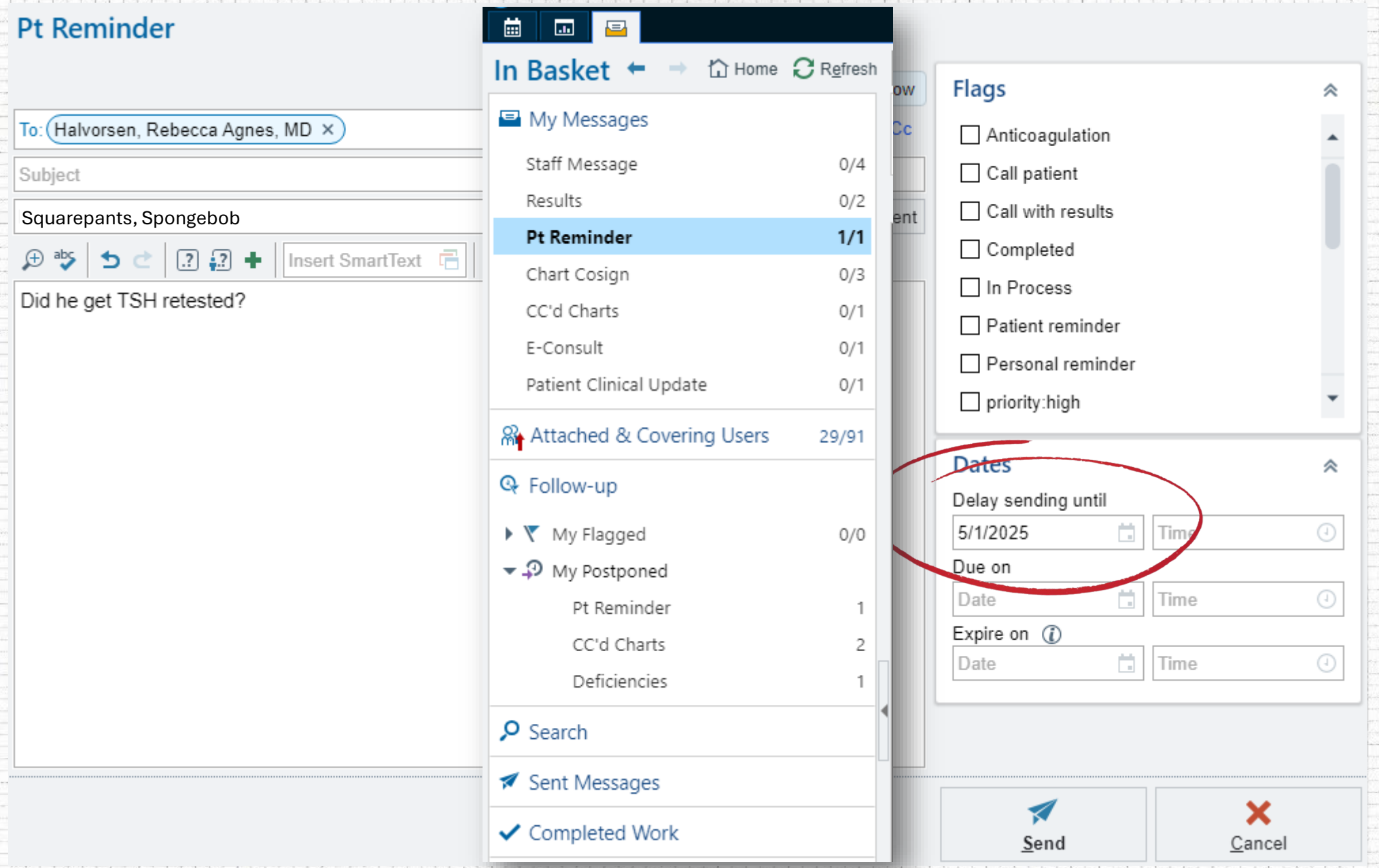
SmartTool Editors
My SmartPhrases
Clinical Links
Support
Schedule
Privacy View
Open Slots
Change Prov
SnapShot
Review
Charting
SmartSets
Show Orders
Sign Encounter
Print AVS
Enc Comments
No Show
Rarel
Mar 03, 2025
Today
HALVORSEN, REBECCA A
Filter by Status
Total: 7


Pt Reminder
To: Halvorsen, Rebecca Agnes, MD
Subject
Squarepants, Spongebob
Insert SmartText
Did he get TSH retested?
In Basket
Home
Refresh
My Messages
Staff Message 0/4
Results 0/2
Pt Reminder 1/1
Chart Cosign 0/3
CC'd Charts 0/1
E-Consult 0/1
Patient Clinical Update 0/1
Attached & Covering Users 29/91
Follow-up
My Flagged 0/0
My Postponed
Pt Reminder 1
CC'd Charts 2
Deficiencies 1
Search
Sent Messages
Completed Work
Flags
Anticoagulation
Call patient
Call with results
Completed
In Process
Patient reminder
Personal reminder
priority:high
Dates
Delay sending until
5/1/2025
Time
Due on
Date
Time
Expire on
Date
Time
Send
Cancel

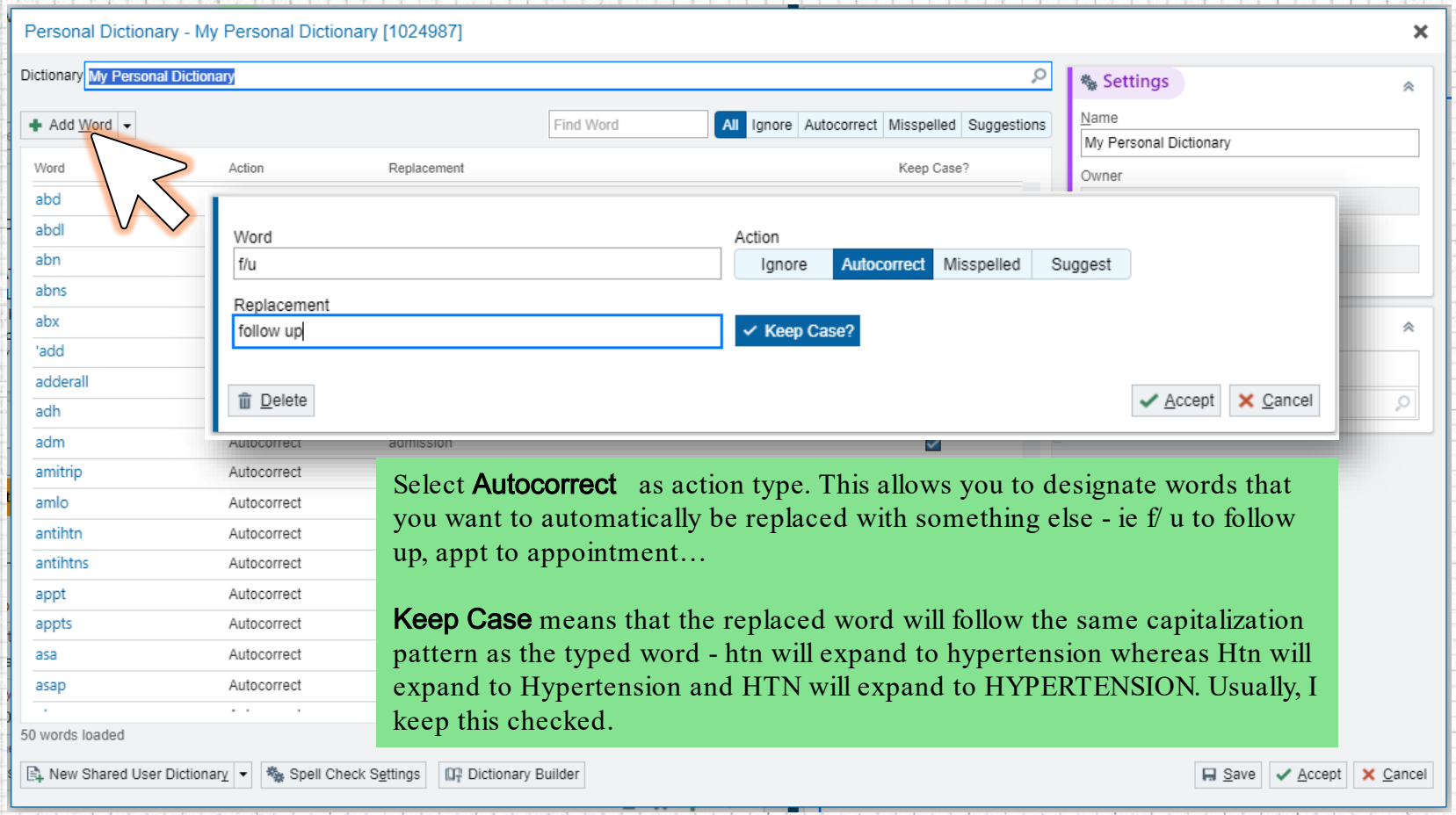
What's a clinical scenario in which you may use remind me?

Chapter 8: User Dictionaries

P/w c/o UTI d/t 3 days of dysuria and urgency. No f/ c/ n/ v. Prev hx of UTI in June, responded well to abx. No hx of pyelo. No chr conditions. No current meds.

Presents with concern of UTI due to 3 days of dysuria and urgency. No fevers, chills, nausea, vomiting. Previous history of UTI in June, responded well to antibiotics. No history of pyelonephritis. No chronic conditions. No current medications.

Search to open the User Dictionaries Tool. *(You can also navigate there by right clicking in almost any text field – ie note, patient instructions, wherever you might be typing – and clicking Dictionaries.)* This will bring up your personal dictionary. Click 'Add Word' on the top left to add a word.



Select **Autocorrect** as action type. This allows you to designate words that you want to automatically be replaced with something else - ie f/ u to follow up, appt to appointment…

Keep Case means that the replaced word will follow the same capitalization pattern as the typed word - htn will expand to hypertension whereas Htn will expand to Hypertension and HTN will expand to HYPERTENSION. Usually, I keep this checked.

ROM

rupture of membranes

range of motion

What personal shorthand are you going to add to your user dictionaries?

Cut Clicks & Save Time

Learn efficiency tips for being your best in Epic.

Physician SmartUser Efficiency Program

Physicians and APPs report saving an average of almost an hour per week for each SmartUser class attended. Choose from over 20 virtual classes, which are available at no cost and eligible for CME credits.

- Interested in earning the SmartUser Badge? Send and email to inquire about getting access to the SmartUser Badge program.
- If you're already working on the badge, click here to access it.

Click here to learn more about the program.

Expand/Collapse All

Popular Sessions

MD30Dv: In Basket Workflows

This 30-minute course focuses on efficiently managing In Basket. You'll see how to prioritize messages and develop a system for keeping your In Basket clean by following up on the right message at the right time.

Materials
- Training Companion
- Physician CME Information

MD207v: In Basket Efficiency

This 60-minute course focuses on managing In Basket. You will learn how to filter and sort your messages, optimize the In Basket display, create and use Quick Actions, share your In Basket with support staff, and how to search In Basket.

Materials
- Training Companion
- Physician CME Information

AMBMD202v: Outpatient Quick Wins

Version: August 2021. Completed on Mar 11, 2022

IPMD202v: Inpatient Quick Wins

This 60-minute course focuses on quick win tips and tricks for the inpatient provider. You will learn how to personalize Hyperspace and the Patient List activity, efficiently place orders and write notes, and how to personalize In Basket.

Materials
- Training Companion
- Physician CME Information

MD203v: Reviewing the Chart

Version: August 2021. Completed on Feb 18, 2022

Program Introduction

MD201v: SmartUser Badge Introduction (Recommended)

Version: August 2021. Completed on Feb 18, 2022

MD30Av: Overview of Epic Physician Training

This 30-minute course shares an overview of Epic's available courses for physicians and providers, like Thrive, SmartUser, and Physician Builder, and learn how the programs build on each other.

Materials
- Training Companion
- Physician CME Information

Quick Wins

AMBMD202v: Outpatient Quick Wins

Version: August 2021. Completed on Mar 11, 2022

IPMD202v: Inpatient Quick Wins

Register for Epic Efficiency Classes

training.epic.com/ efficiency

Epic Tip Friday: Search Active Guidelines 🔎⚓🍎 Business General

Halvorsen, Rebecca A

To: Epic Tip Friday List

Fri 1/10/2025 9:49 AM

❤️1

Happy Friday to all. 🥳😎✌️ Are you ready for another fun Epic tip?

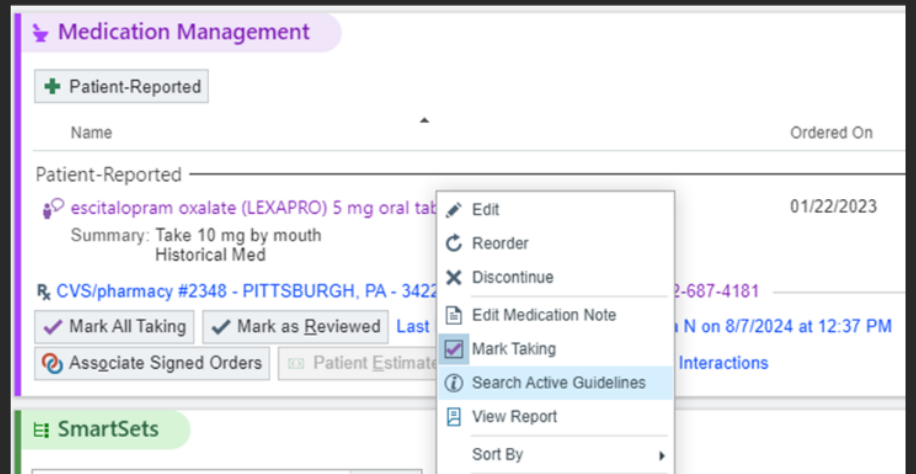
Topic: Search Active Guidelines 🔎⚓🍎

Have you ever had to **whispers** look up the appropriate dose of a medication? Of course you have! We all have. Let me guess your current workflow: you either click the UpToDate link from Epic and type in your search or you pull out your phone to look it up. Did you know there's a faster way, right in Epic?

Introducing **Search Active Guidelines**

Here's how it works:

1. From the medication list (this could be in Medication Management in the Plan tab, the Medication tab, or your Order Drawer—anywhere you might reorder or edit meds), right-click on the medication you want more information about.
2. Select 'Search Active Guidelines' from the menu.



Want more tips?
halvorsenra@upmc.edu

EYE STUFF THAT SHOWS UP IN PRIMARY CARE

Evan "Jake" Waxman MD PhD

waxmane@upmc.edu

- I have no relationships with industry to disclose.

Red Eye	Chronic Vision Loss	Acute Vision Loss	Other Stuff
Scary Looking	Pre-Op or No-Op	Pain & Haloes	Flash!
Icky Sticky	The Eye Bone's Connected to the Lung Bone	Not So Fugax	How Many Fingers am I Holding Up?
The Light! It Burns!	Up in Smoke	Blood & Thunder	Droopy
Red & Angry	The Needle Goes Where?	The Patient Sees Nothing The Doctor Sees Nothing	Marcus Who?
Dry & Burny	Sweet, Sweet Vision	A Lot of Nerve	Headaches Headaches

A 68 year old man presents with a red right eye since this morning

- What questions can you ask him that will help you figure out what's wrong?
- What signs can help you know that this is or isn't something bad?
- What are reasonable treatment options?

SCARY LOOKING

ICKY, STICKY

A 34 year old woman presents with red, irritated eyes for the past two days.

- What questions can you ask her that will help you figure out what's wrong?
- What signs can help you know that this is or isn't something bad?
- What are reasonable treatment options?

A 28 year old man presents with a red painful left eye over the past two days. Light makes the pain much worse.

- What questions can you ask him that will help you figure out what's wrong?
- What signs can help you know that this is or isn't something bad?
- How do you proceed?

THE LIGHT! IT BURNS!

A 25 year old surgery resident wakes up post call with an angry left eye.

- What questions can you ask him that will help you figure out what's wrong?
- What signs can help you know that this is or isn't something bad?
- How do you proceed?

RED & ANGRY

DRY AND BURNY

A 51 year old man presents with bilateral redness and irritation for months.

- What questions can you ask him that will help you figure out what's wrong?
- What signs can help you know that this is or isn't something bad?
- How do you proceed?

- A 73 year old man recently went to see his eye doc. The eye doc told him that he has cataracts and needs to have them out. The patient has reservations.
- How would you proceed?
- Assuming the decision is made to proceed what pre-op workup needs to be done?
- Are there medications that need to adjusted before surgery?

PRE-OP OR NO-OP

A 58 year old man presents with a complaint of decreased energy. He has mild COPD and open angle glaucoma. He thinks he might be depressed.

- What additional historical details might be helpful?
- What might be helpful on exam?
- Is it safe for open angle glaucoma patients to take anti-depressants with possible anti-cholinergic side effects?

THE EYE BONE'S CONNECTED TO THE LUNG BONE

UP IN SMOKE

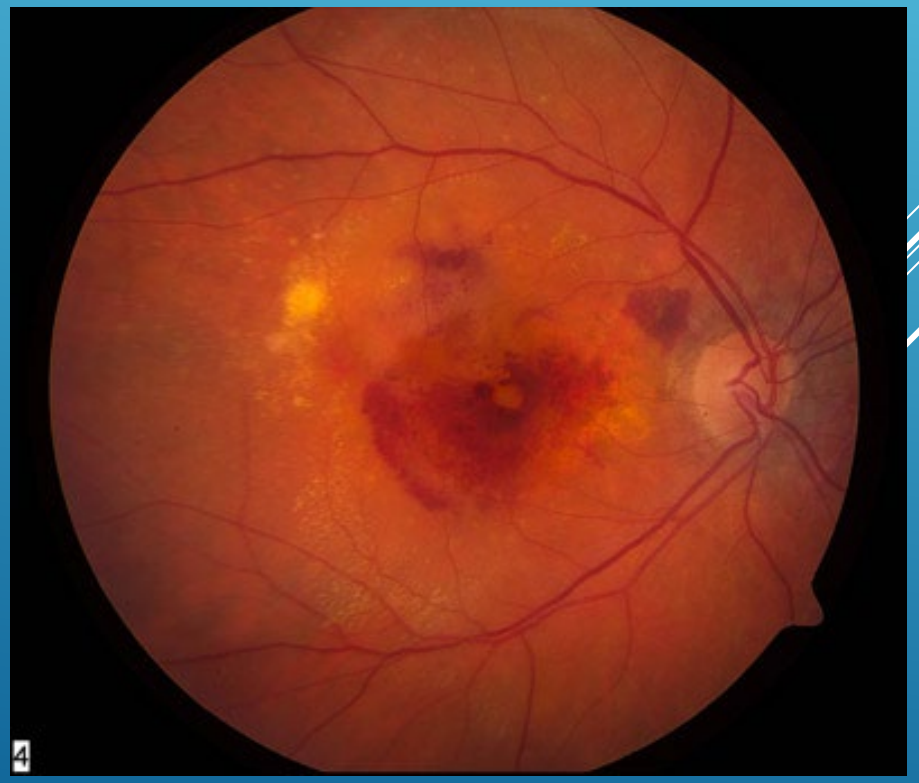
A 72 smoker with HTN and CAD is noted to have an increase in BP at today's visit. Medications include Diovan and a vitamin he gets from his eye doc.

- What additional historical details might be helpful?
- How would you advise this patient?

A 69 year old woman a slow drop in the vision of her right eye over the last few months. She's reluctant to see an eye doc.

- What additional historical details might be helpful?
- How would you advise this patient?

THE NEEDLE GOES WHERE?



SWEET, SWEET VISION

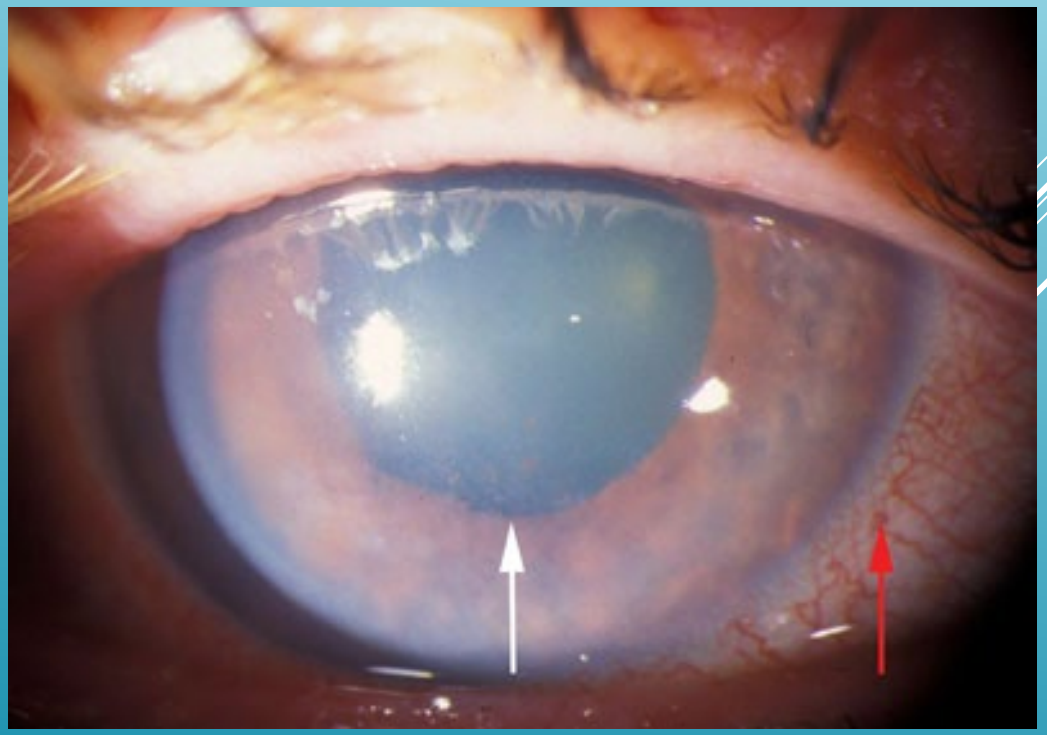
You're seeing a 24 year old woman with type I DM. On ROS she makes mention of decreased vision in the right eye.

- What are your concerns?
- Your EHR shows that she's been to the eye doc every year. What additional questions should you ask?

PAIN & HALOES

A 59 year old woman comes to the ED complaining of severe left eye pain since this morning. The pain has been getting worse through the day and the vision in that eye has been getting progressively foggy and dim.

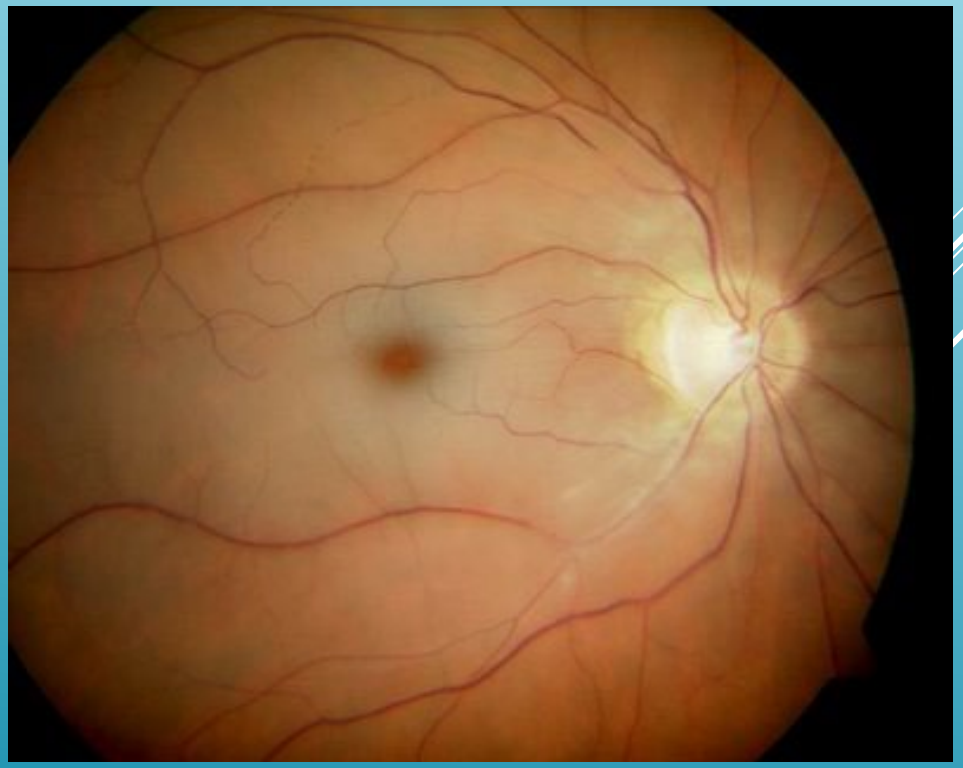
- What additional historical details might be helpful?
- What parts of the eye exam might be helpful?
- What are your concerns?
- How would you proceed?



NOT SO FUGAX

A 65 year old man comes to the ED with loss of vision in his right eye that he noticed when he woke up this morning.

- What additional historical details might be helpful?
- What parts of the eye exam might be helpful?
- What are your concerns?
- How would you proceed?



BLOOD & THUNDER

A 65 year old man comes to the ED with loss of vision in his left eye worsening over the last few days.

- What additional historical details might be helpful?
- What parts of the eye exam might be helpful?
- What are your concerns?
- How would you proceed?

A 33 year old woman comes to the ED with loss of vision in her right eye worsening over the last few days.

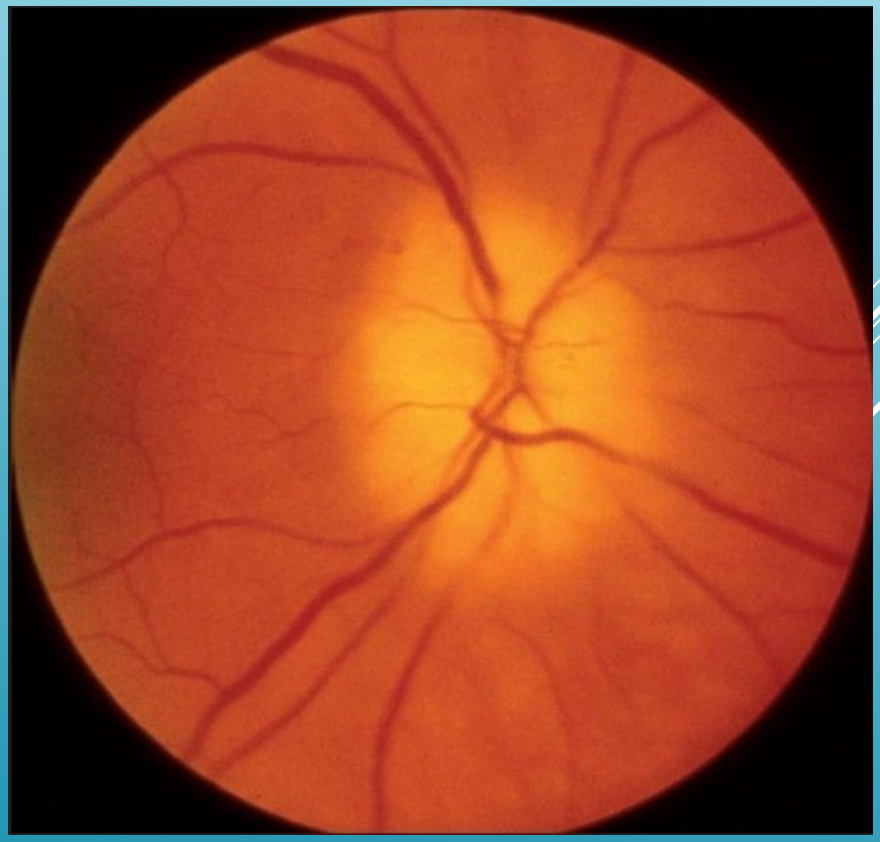
- What additional historical details might be helpful?
- What parts of the eye exam might be helpful?
- What are your concerns?
- How would you proceed?

THE PATIENT SEES NOTHING
THE DOCTOR SEES NOTHING

A LOT OF NERVE

A 65 year old woman comes to the ED with loss of vision in her right eye suddenly two hours ago.

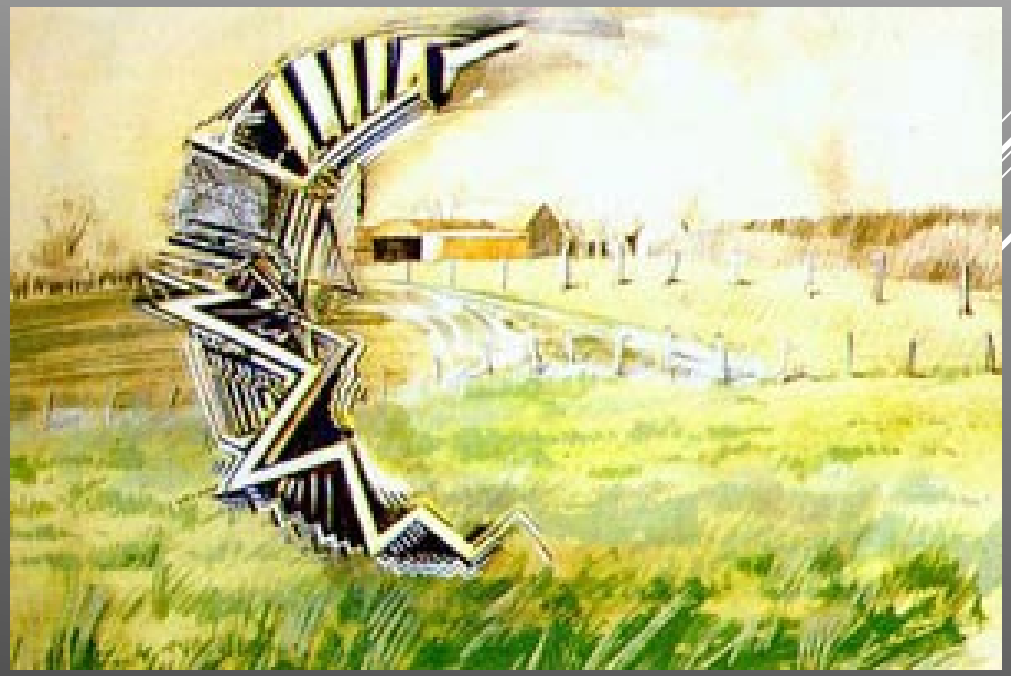
- What additional historical details might be helpful?
- What parts of the eye exam might be helpful?
- What are your concerns?
- How would you proceed?



- A 34 year old woman reports recent onset of episodes of zig-zag strobe lights in her vision.
- A 58 year old man reports flashes of light in his right eye over the last few days.
- A 71 year old woman reports episodes of sparkles of light in both eyes when she stands up quickly.

- When are the causes of photopsias?
- How do we sort them out?
- When do they represent an urgent problem?

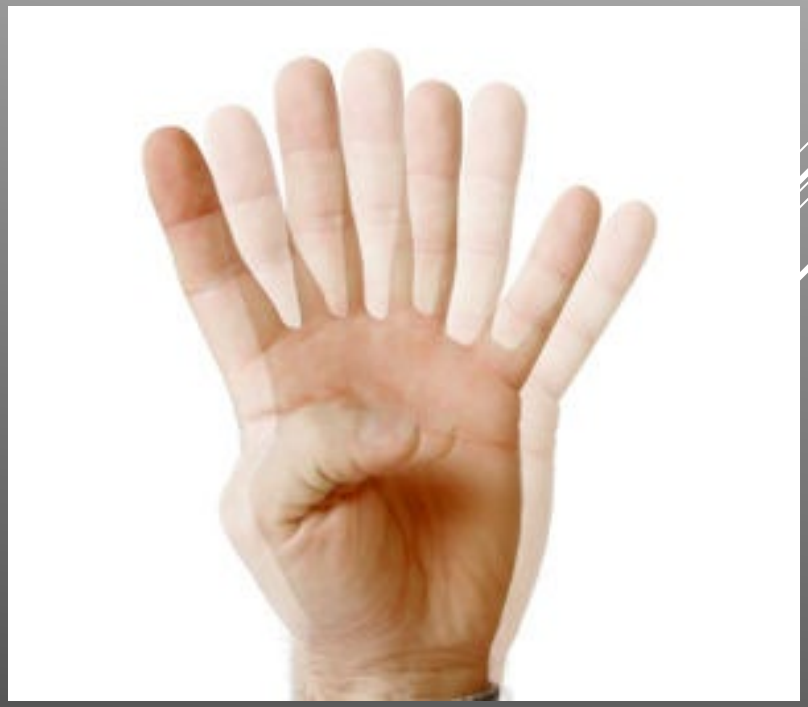
FLASH!



A 63 year old man reports recent onset of ‘double vision’

- What are the most important questions to ask?
- What are some of the possible causes?

HOW MANY FINGERS AM I HOLDING UP?



DROOPY

An 81 year old woman reports that her eyelids droop.

- What are the most important questions to ask?
- What are the possible causes?

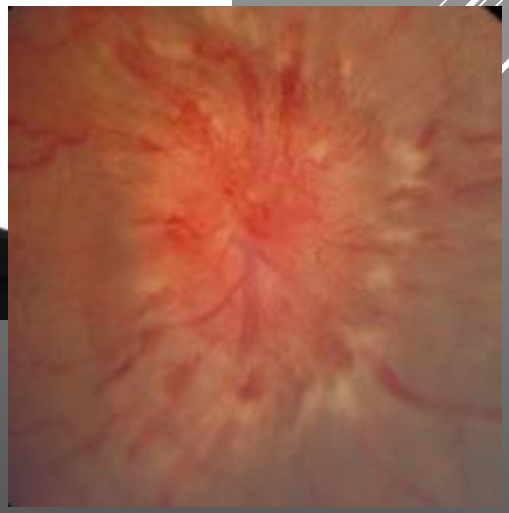
What are the really important pupil signs to look for?

MARCUS WHO?

When are headaches associated with eye problems?

When are eye signs associated with headaches?

HEADACHES



Concussion Evaluation & Management in Primary Care

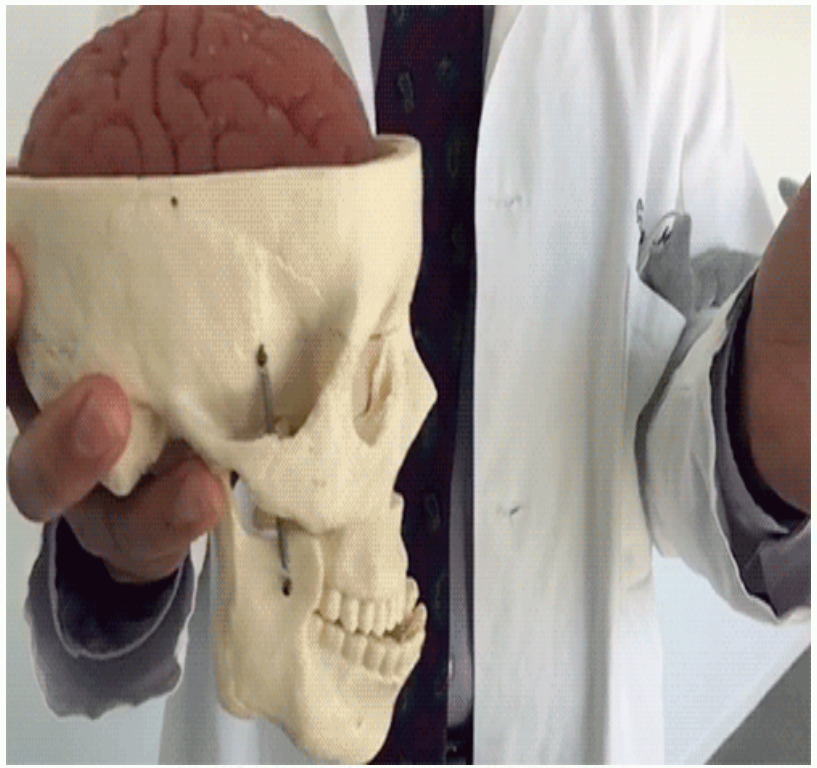
Donnie Ours DO,CAQSM,FAAFP,RMSK

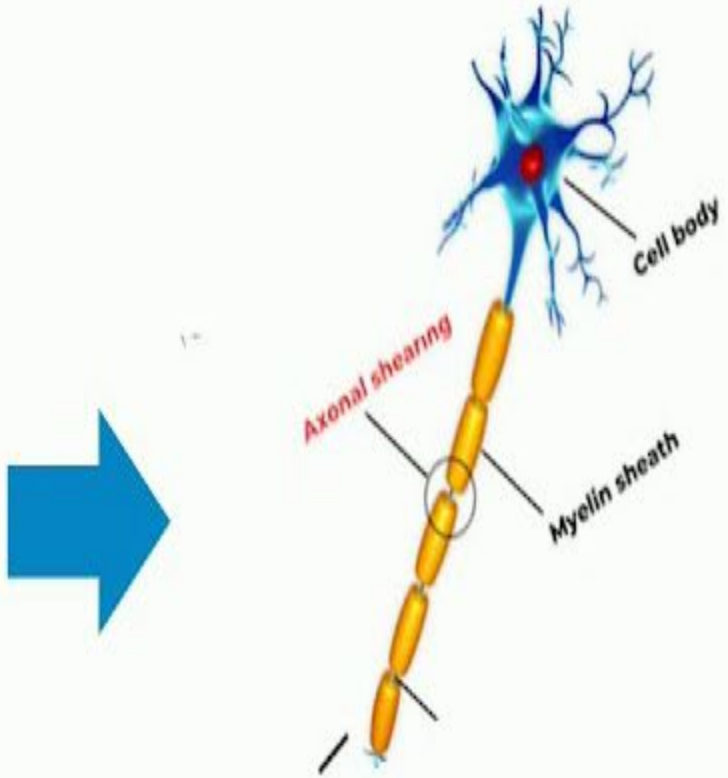
WAGNER
54
24
HOW
TO
TACKLE

Goals and Objectives

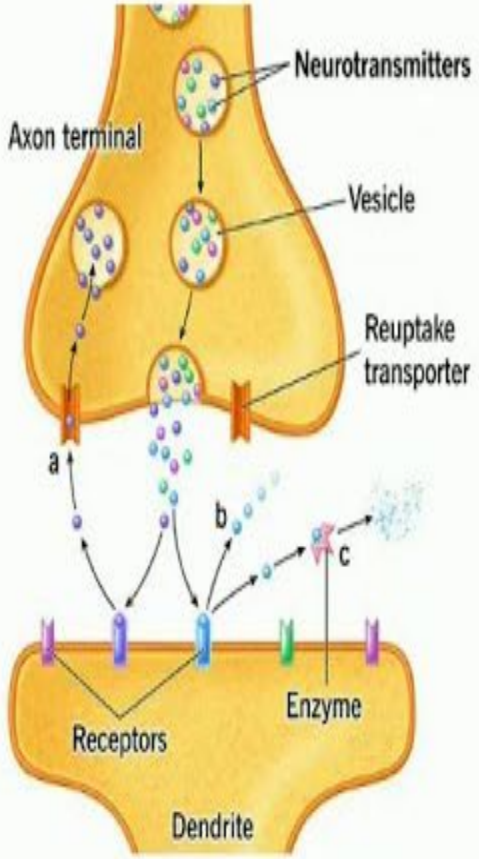
By the end of the lecture audience will:

- Be confident in ability to diagnose a concussion in the outpatient clinic setting
- Be familiar with resources and tools available to aid in diagnosis
- Improve knowledge in treatment of a sports related concussion





Axonal shearing



Indiscriminate release of neurotransmitters

Definition of sports related concussion

- A mild traumatic brain injury caused by an impulsive force that is transmitted to the brain by a direct blow to the head, neck, or body
- This force initiates a neurotransmitter and metabolic cascade with possible axonal injury, resulting in blood flow change and inflammation affecting the brain
- No abnormality seen on standard structural neuroimaging studies
- May or MAY NOT involve loss of consciousness
- Signs and symptoms may present immediately, minutes, hours, or days later
- Symptoms cannot be explained by drug, alcohol, medication use, or other injuries

1. Patricios JS, Schneider KJ, Dvorak J, et al. Consensus statement on concussion in sport: the 6th International Conference on Concussion in Sport-Amsterdam, October 2022. *Br J Sports Med*. 2023;57(11):695-711. doi:10.1136/bjsports-2023-106898

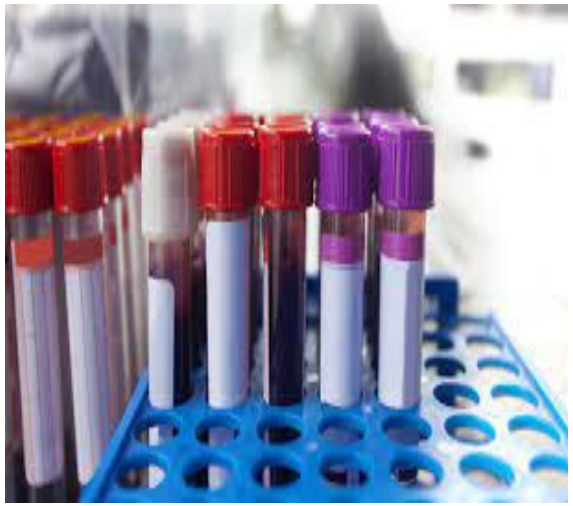
- Reported symptoms are the gold standard for diagnosing concussion

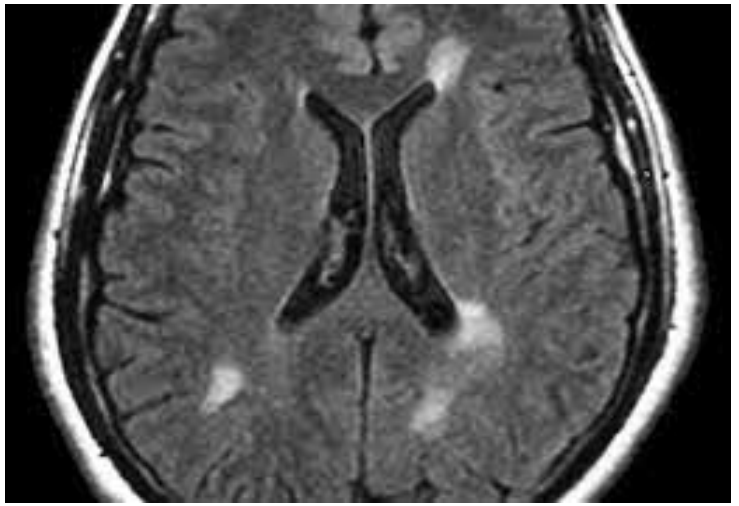
- Currently no fluid-based biomarkers, genetic testing, or advanced imaging that is approved for diagnosis

- i-STAT® Alinity tests for two biomarkers UCH-L1 & GFAP, help to rule out need for CT head in patients 18YO+, up 24hrs after injury

Imaging helpful to rule out other causes:

- Subdural Hematoma
- Epidural Hematoma
- Subarachnoid Hemorrhage
- Skull Fracture
- Cspine Injury





SOMATIC

- Headache
- Nausea
- Vomiting
- Sensitivity
  - to light
  - to noise
- Visual problems
- Fatigue
- Dazed
- Dizzy
- Balance problems

COGNITIVE

- Foggy
- Slowed down
- Delayed responses
- Difficulty concentrating
- Forgetful
- Repeating
- Decreased academic performance
- Confusion
- Amnesia

AFFECTIVE

- Irritability
- Sadness
- Depression
- Personality changes
- Anxiety
- Panic
- More emotional
- Apathetic

SLEEP

- Drowsy
- Sleeping more
- Sleeping less
- Difficulty falling asleep
- Difficulty staying asleep
- Not feeling rested

Back to our patient

How do we approach this?

Jointly organised by:

International Olympic Committee · FEI · FIA · FIFA · IIHF International Ice Hockey Federation · World Rugby

SCOAT6™

Sport Concussion Office Assessment Tool

For Adults & Adolescents (13 years +)

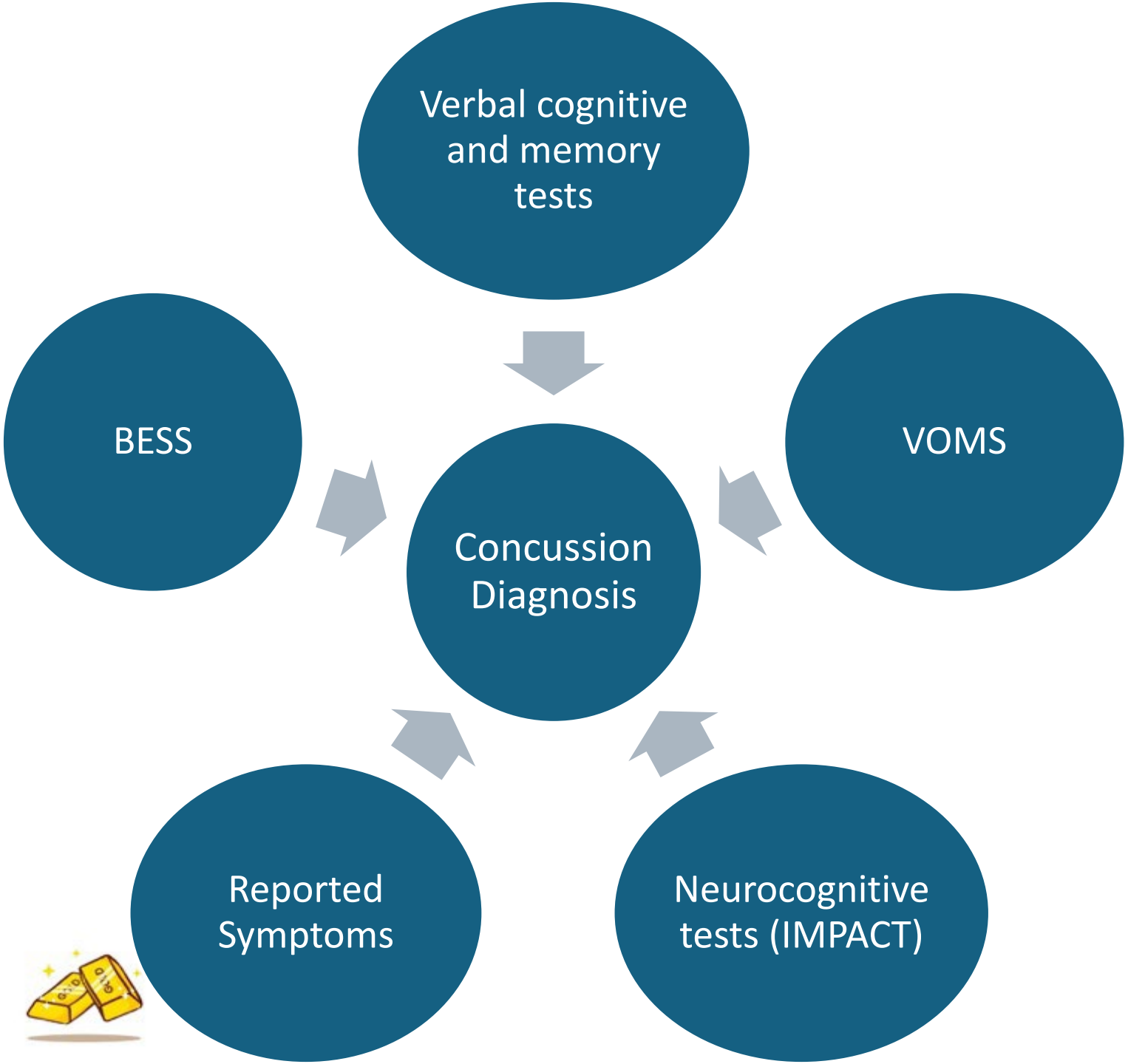
Child SCOAT6™

Sport Concussion Office Assessment Tool

For Children Ages 8 to 12 Years

Tools in the toolbox

- Verbal cognitive & memory tests
- Vestibular Ocular Motor Screening (VOMS)
- Balance Error Scoring System (BESS)
- Neurocognitive testing (IMPACT)


Verbal cognitive and memory tests
BESS
VOMS
Concussion Diagnosis
Reported Symptoms
Neurocognitive tests (IMPACT)

Office evaluation

Before going into room, review symptom score evaluation and neurocognitive tests (IMPACT) if available

Ask about:

Mechanism of injury? LOC?

Any Red flags?

- Worse headache of life, worsening HA
- Uncontrolled vomiting
- Numbness/tingling
- Blurry or double vision

prior concussions?

- # they have had, how they were managed, recovery time

Hx of migraines or other headache disorders, MDD, GAD, ADHD

SYMPTOM EVALUATION

3 **How do you feel?**

"You should score yourself on the following symptoms, based on how you feel now".

	none	mild		moderate		severe	
Headache	0	1	2	3	4	5	6
"Pressure in head"	0	1	2	3	4	5	6
Neck Pain	0	1	2	3	4	5	6
Nausea or vomiting	0	1	2	3	4	5	6
Dizziness	0	1	2	3	4	5	6
Blurred vision	0	1	2	3	4	5	6
Balance problems	0	1	2	3	4	5	6
Sensitivity to light	0	1	2	3	4	5	6
Sensitivity to noise	0	1	2	3	4	5	6
Feeling slowed down	0	1	2	3	4	5	6
Feeling like "in a fog"	0	1	2	3	4	5	6
"Don't feel right"	0	1	2	3	4	5	6
Difficulty concentrating	0	1	2	3	4	5	6
Difficulty remembering	0	1	2	3	4	5	6
Fatigue or low energy	0	1	2	3	4	5	6
Confusion	0	1	2	3	4	5	6
Drowsiness	0	1	2	3	4	5	6
Trouble falling asleep	0	1	2	3	4	5	6
More emotional	0	1	2	3	4	5	6
Irritability	0	1	2	3	4	5	6
Sadness	0	1	2	3	4	5	6
Nervous or Anxious	0	1	2	3	4	5	6

Total number of symptoms (Maximum possible 22)

Symptom severity score (Maximum possible 132)

Do the symptoms get worse with physical activity? Y N

Do the symptoms get worse with mental activity? Y N

self rated | self rated and clinician monitored

clinician interview | self rated with parent input

Overall rating: If you know the athlete well prior to the injury, how different is the athlete acting compared to his/her usual self?

Please circle one response:

no different | very different | unsure | N/A

Discuss upcoming sporting schedule -

how school is going with symptoms, need accommodations?

Physical Exam

Cspine ROM, palpation

Cranial nerve/neuro examination

1. Verbal cognitive test

- Immediate memory recall
- Digits backwards
- Months in reverse order
- Delayed word recall

2. Balance with modified BESS

3. Modified Vestibular/Ocular-Motor Screening (mVOMS)

- Smooth pursuits
- Horizontal saccades
- Horizontal VOR
- Visual Motion Sensitivity

Verbal cognitive testing

- Immediate Memory (5-10 word immediate recall)
- Digits backwards (1-2-3, athlete says 3-2-1)
- Months in reverse order (note # of errors and time to complete)
- At end of evaluation perform delayed word recall (10 words tested with immediate memory)

Delayed Word Recall

Minimum of 5 minutes after immediate recall

Say *"Do you remember that list of words I read a few times earlier? Tell me as many words from the list as you can remember in any order."*

Word list used: A ☐ B ☐ C ☐

List A	Score	Alternate Lists: List B	Alternate Lists: List C
Jacket	0 1	Finger	Baby
Arrow	0 1	Penny	Monkey
Pepper	0 1	Blanket	Perfume
Cotton	0 1	Lemon	Sunset
Movie	0 1	Insect	Iron
Dollar	0 1	Candle	Elbow
Honey	0 1	Paper	Apple
Mirror	0 1	Sugar	Carpet
Saddle	0 1	Sandwich	Saddle
Anchor	0 1	Wagon	Bubble

Score: ____ of 10 Record Actual Time (mins) Since Completing Immediate Recall: ____

Identifying Vestibular and Ocular Problems after Concussion: UPMC VOMS

Horizontal & Vertical Pursuits

Horizontal & Vertical Saccades

Near Point Convergence

Horizontal & Vertical VOR

Visual Motion Sensitivity

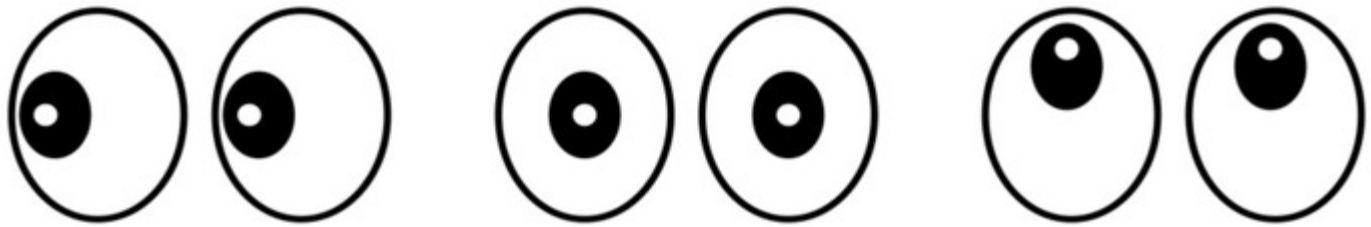
- A brief 5 minute ***clinical screening*** tool to identify additional vestibular and ocular motor impairment and symptoms following concussion
- Used in conjunction with symptom reporting, neurocognitive assessment, balance testing, cervical and exertion screening in order to provide more complete clinical picture

Mucha et al, 2014

"Follow this target with your eyes, without moving your head."

After the test is completed, ask: ***"Rate the following on a scale of 0-10:***

- ***Current Headache***
- ***Current Dizziness***
- ***Current Nausea***
- ***Current Fogginess***



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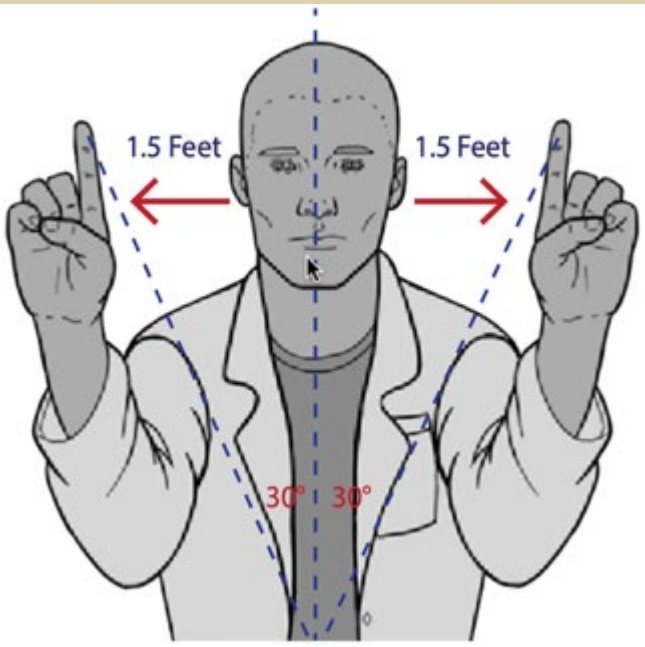
Mucha et al, 2014

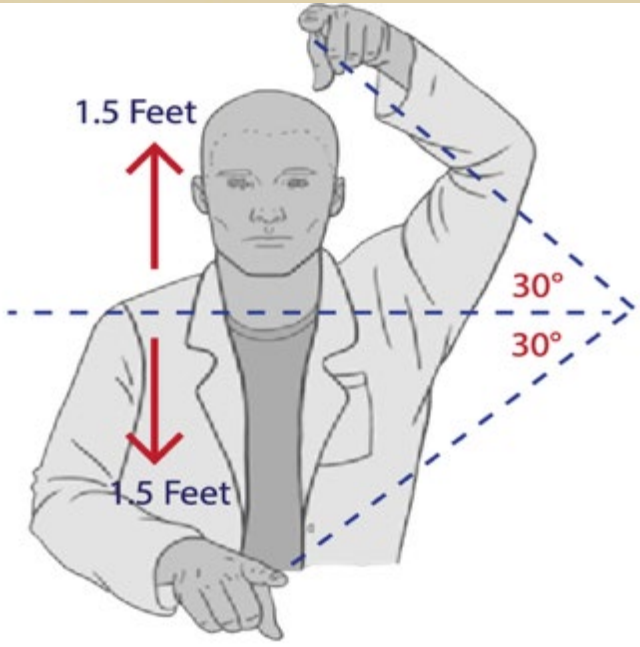
"Look as quickly as you can from target to target, 10 times, without moving your head."

After 10 repetitions are completed, ask:

Rate the following on a scale of 0-10:

- ***Current Headache***
- ***Current Dizziness***
- ***Current Nausea***
- ***Current Fogginess***





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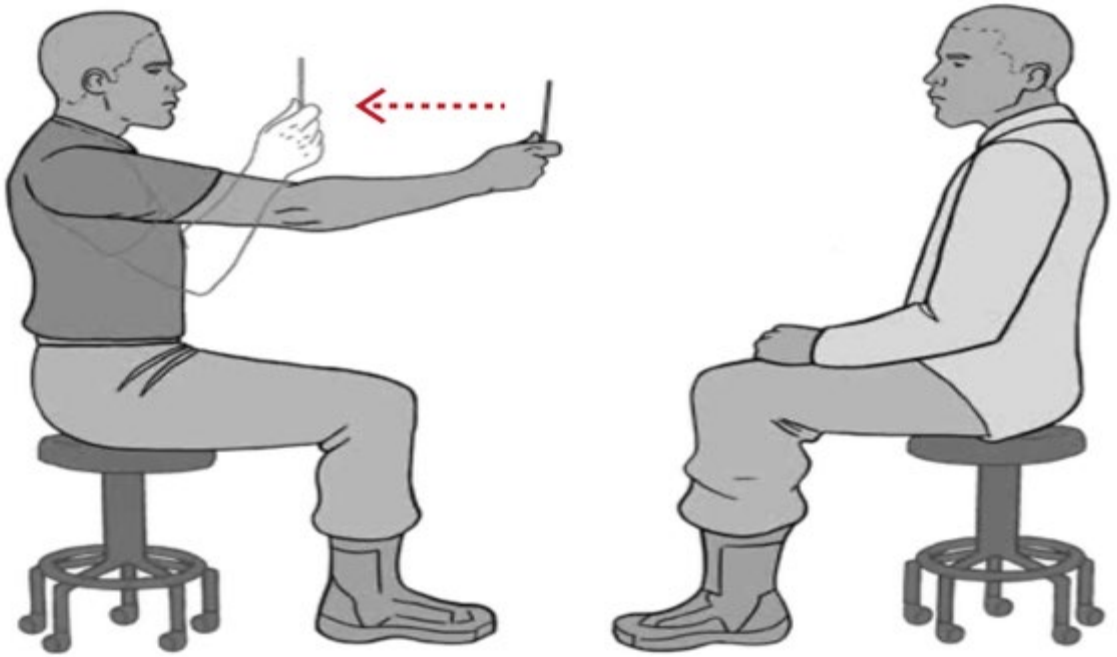
Mucha et al, 2014

*Not used in the SCOAT 6

- **Ask the patient to slowly move the target toward the tip of their nose and stop when they see two distinct images, or when you see an outward deviation of the eye.**
- **Measure the distance between the nose and the target, and record it in centimeters. Repeat 2 more times.**
- **Convergence points greater than or equal to 5 centimeters are considered abnormal.**

Near Point Convergence



Identifying Vestibular and Ocular Problems after Concussion: UPMC VOMS

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Mucha et al, 2014

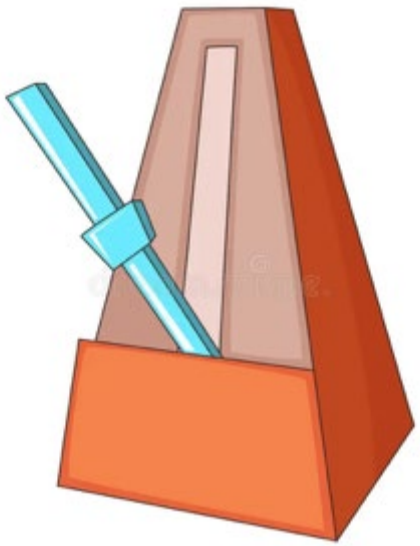
"Focus on the target while moving your head side to side, at the speed of this beat."

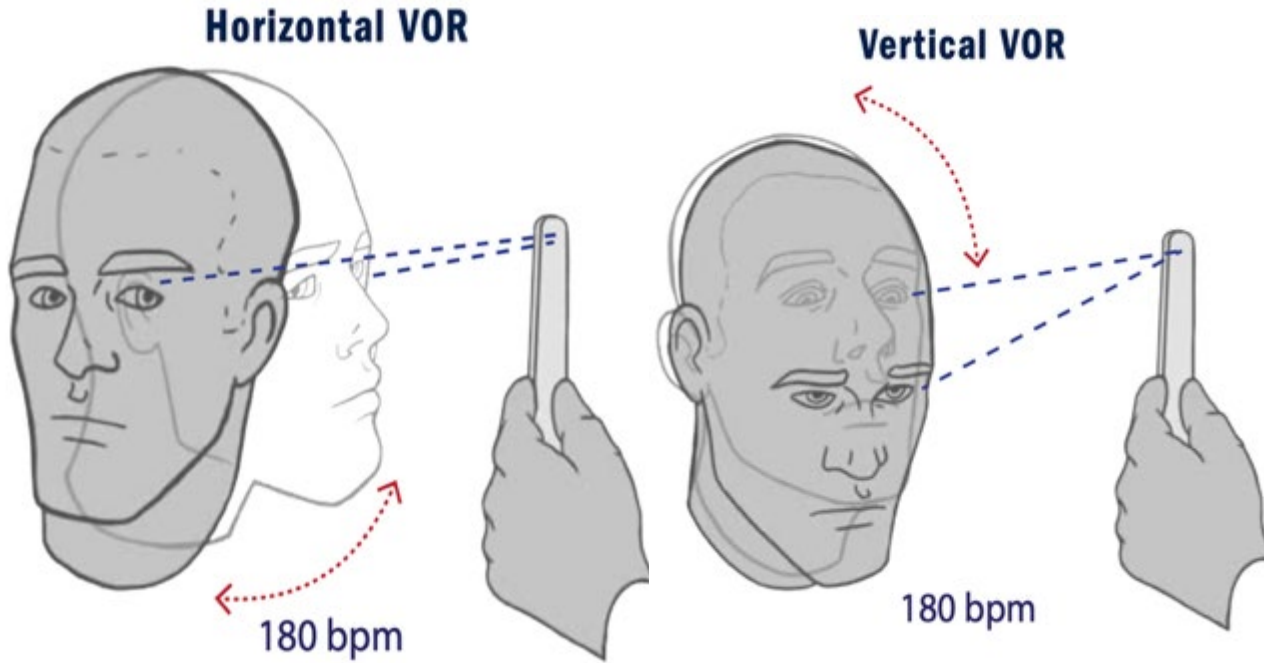
–demonstrate the speed and amount of motion required

After 10 repetitions, wait for 10 seconds, then ask

Rate the following on a scale of 0-10:

- ***Current Headache***
- ***Current Dizziness***
- ***Current Nausea***
- ***Current Fogginess***





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Mucha et al, 2014

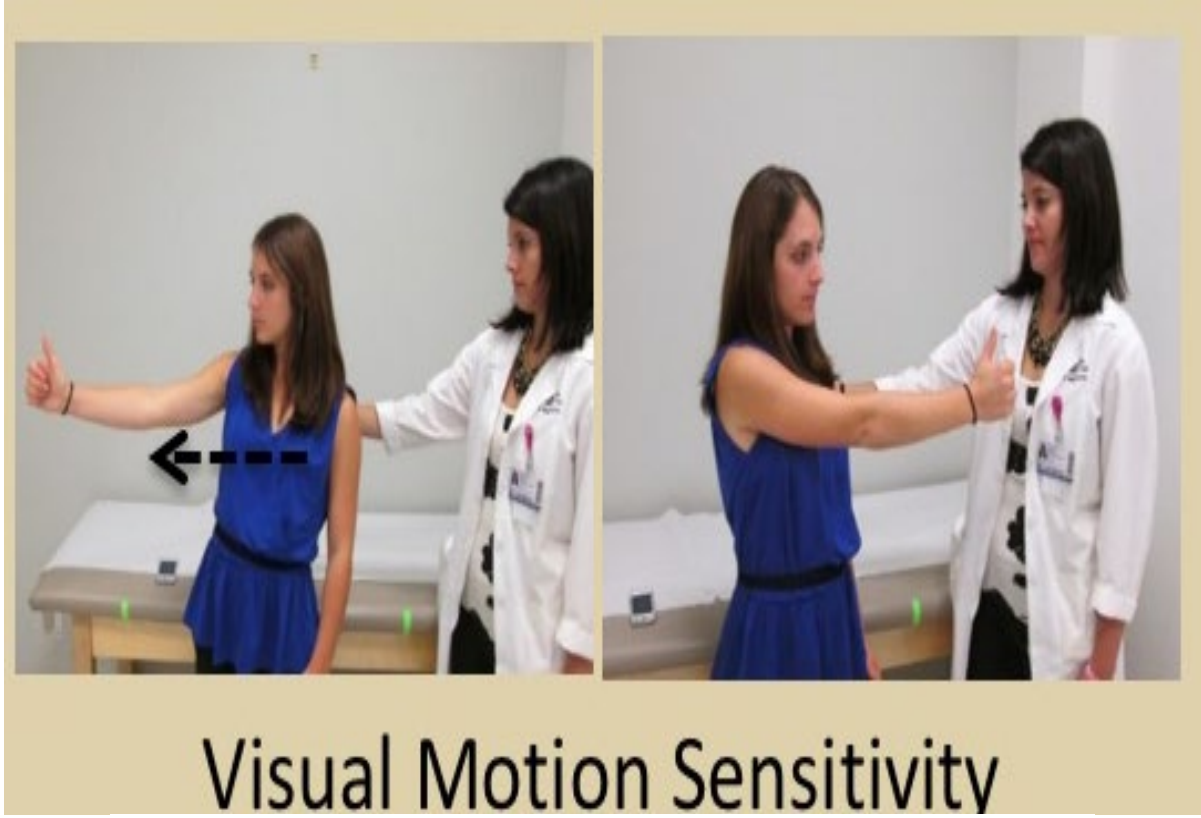
"Stand and hold your arm outstretched with your thumb up. Keep your head and eyes focused on your thumb, as you rotate your entire body side to side."

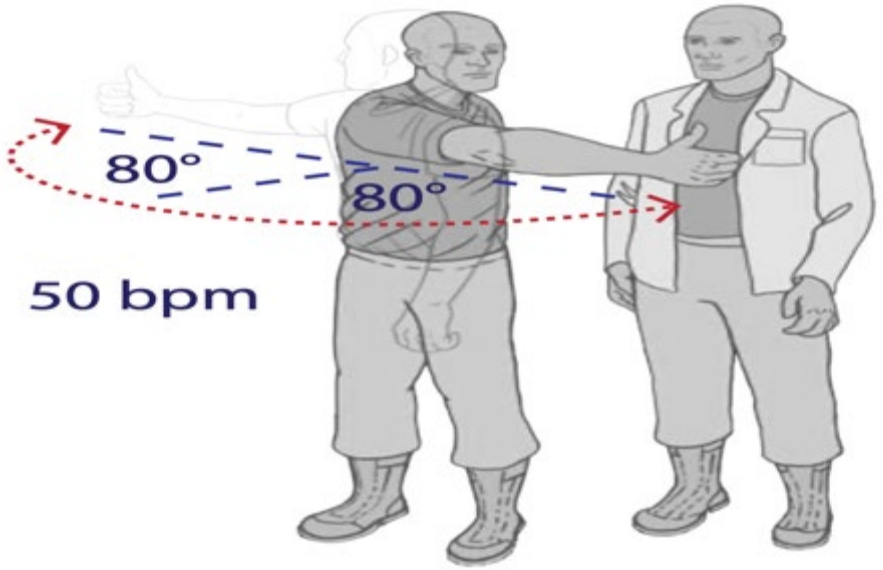
Demonstrate the movement, speed and amplitude if necessary.

After stopping, wait for 10 seconds, then ask:

Rate the following on a scale of 0-10:

- ***Current Headache***
- ***Current Dizziness***
- ***Current Nausea***
- ***Current Fogginess***





Vestibular Ocular Motion Screening Tool for Concussion Evaluation

Action / Symptoms	Headache (0-10)	Dizziness (0-10)	Vision Changes	Mental 'fogginess'
Smooth pursuit (extra-ocular movements)				
Horizontal saccades				
Vertical saccades				
Horizontal vestibular ocular reflex (VOR)				
Vertical vestibular ocular reflex (VOR)				
Visual motion sensitivity				
Near point of convergence	Normal < 10 cm (best of three trials)			

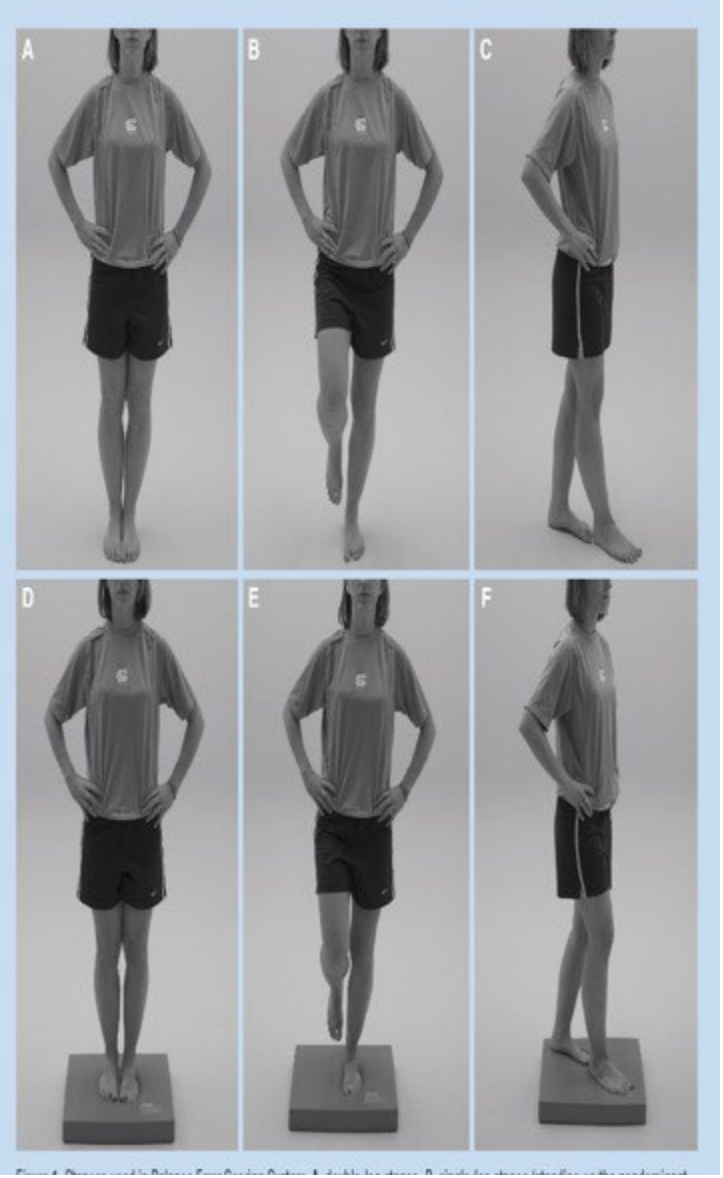
Balance Error Scoring System (BESS)

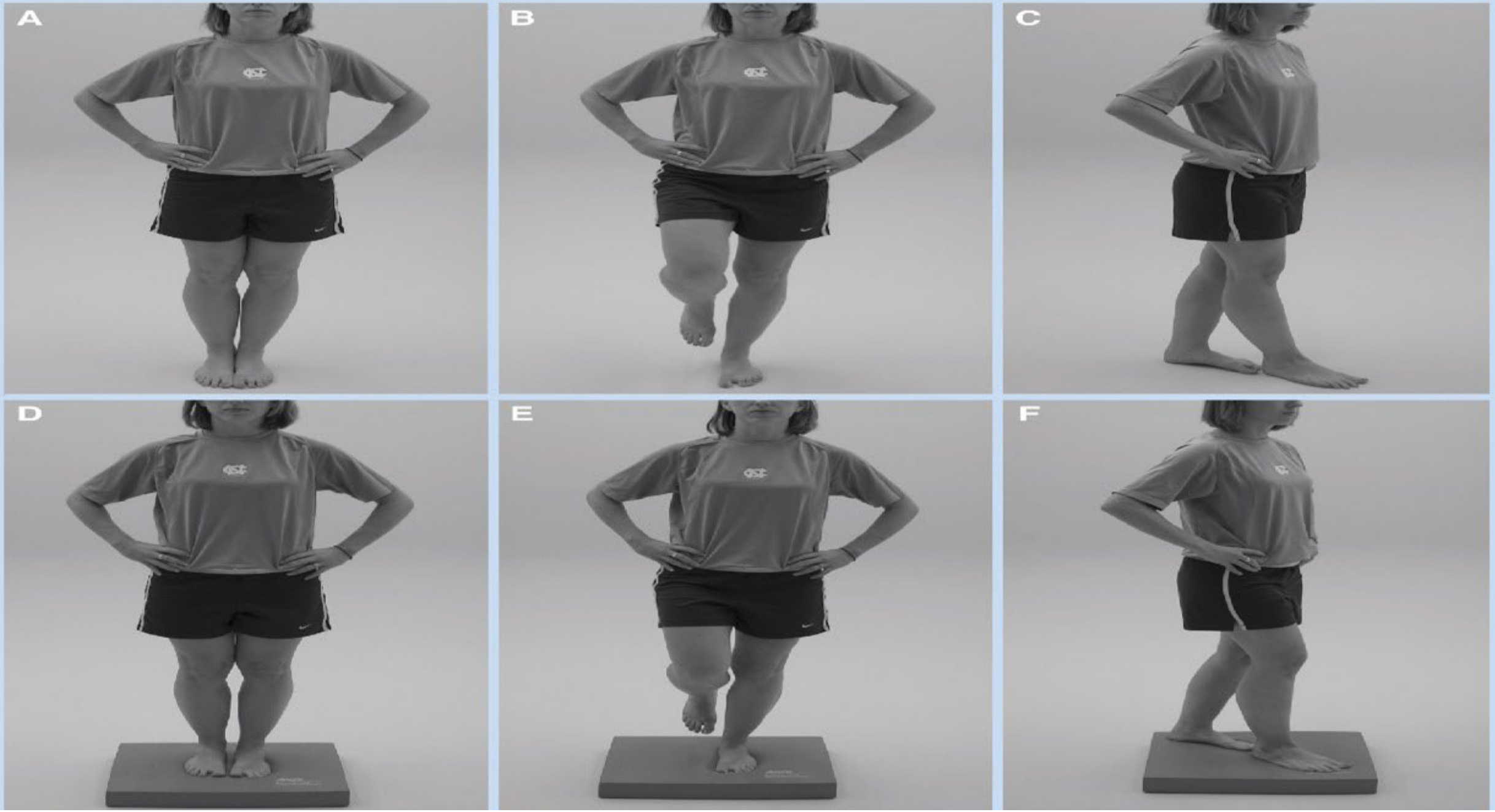
- Assesses static postural stability
- Balance in 3-6 different positions
- Scored by counting errors
- Each position scored for 20 secs

An error is counted when any of the following occur:

- ♦ moving the hands off of the iliac crests
- ♦ opening the eyes
- ♦ step, stumble ,or fall
- ♦ abduction or flexion of the hip beyond 30°
- ♦ lifting the forefoot or heel off of the testing surface
- ♦ remaining out of testing position for > 5 seconds

The maximum total number of errors for any single condition is 10.



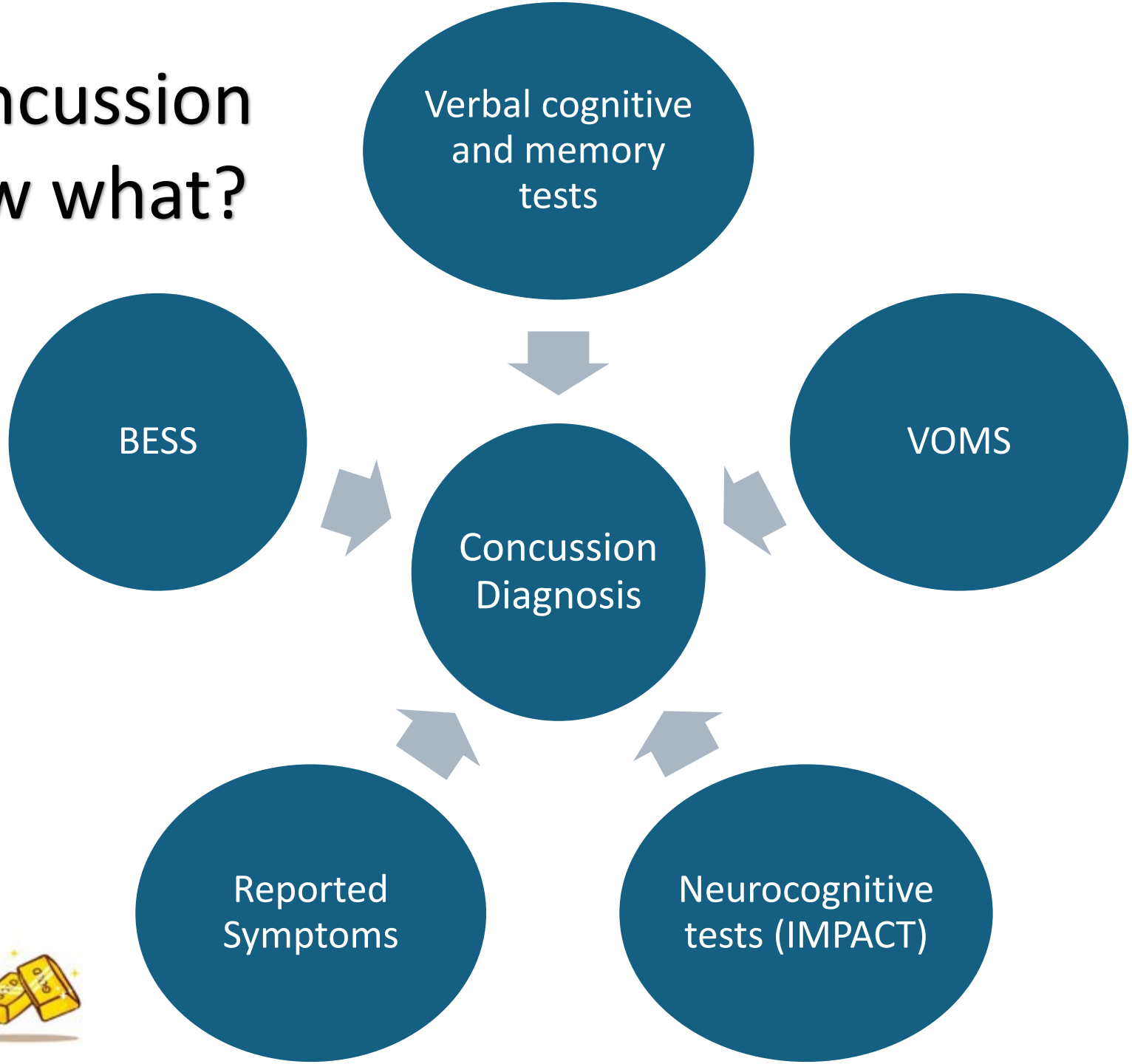


Bell, D.R., Guskiewicz, K.M., Clark, M.A., & Padua, D.A. (2011). Systematic Review of the Balance Error Scoring System. *Sports Health, 3*, 287 - 295.

BESS Score Card (# of errors)

	Firm Surface	Foam Surface
Double Leg Stance		
Single Leg Stance		
Tandem Stance		
Total Scores		
BESS Total		

We have a concussion diagnoses now what?



Treatment of Concussion

Prevent further injury

- Removal from play
- No contact activities
- No gym class

Return to Learning

- Modified days
- Excused absences
- School accommodations

Return to Play

- Graduated RTP protocol
- Close follow up with athletic trainer

Encourage early (24-48 hrs) return to physical activity as tolerated, change from prior recommendation of strict rest “cocoon therapy”

- Walking, stationary cycling
- Avoid risk of contact, collision or fall with activity

Subthreshold aerobic exercise shown to help

Activity is OK if athlete only experiences

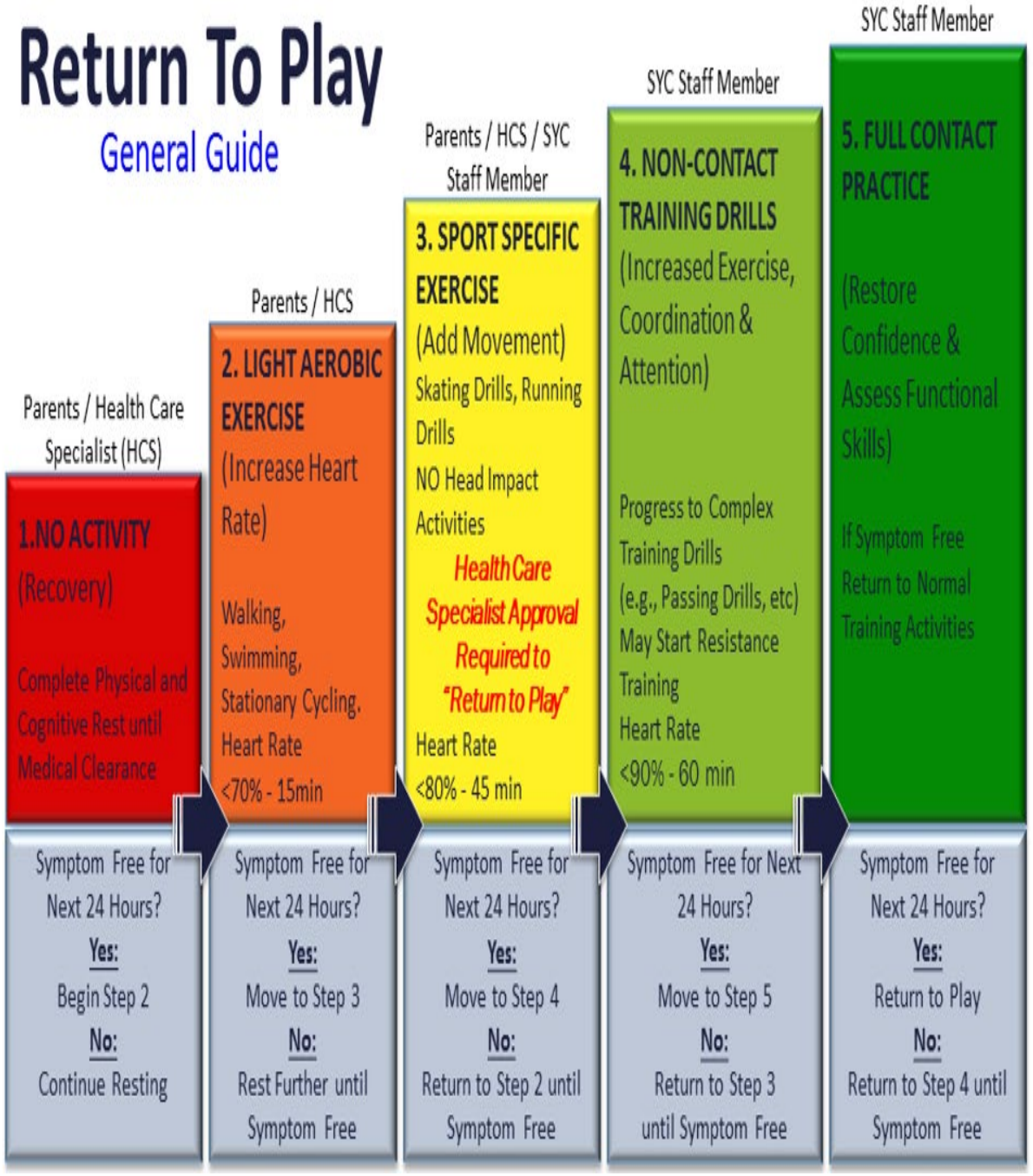
- MILD (increase of no more than 2 points vs pre-exercise value) and
- BRIEF (<1 hour) exacerbation of their concussion-related symptoms

Exacerbation of symptoms that is mild and brief will not delay recovery

(Patricios et al, 2022)

Return to play protocol

- 6 staged protocol used to re-introduce players to participation in sport
- Each stage 24 hrs, if s/s worsen > than mild & brief, stop at that stage and try again the next day
- ATC at school can help with protocol
- Stages 1-3 therapeutic & stages 4-6 reintroducing contact risk
- Complete Return to Learning before allowing to return to play



Step 1: Symptom-Limited Activity: Daily activities that do not trigger symptoms (e.g., reading, schoolwork) First 24 hrs

Step 2: Light Aerobic Exercise: Walking, swimming, or stationary cycling, keeping heart rate <70%maximum. No resistance training.

Step 3: Sport-Specific Exercise: Running or skating drills. No head impact activities.

Step 4: Non-Contact Training Drills: More complex, high-intensity drills (e.g., passing, dribbling). May start resistance training.

Step 5: Full-Contact Practice: Following medical clearance, participation in normal training activities.

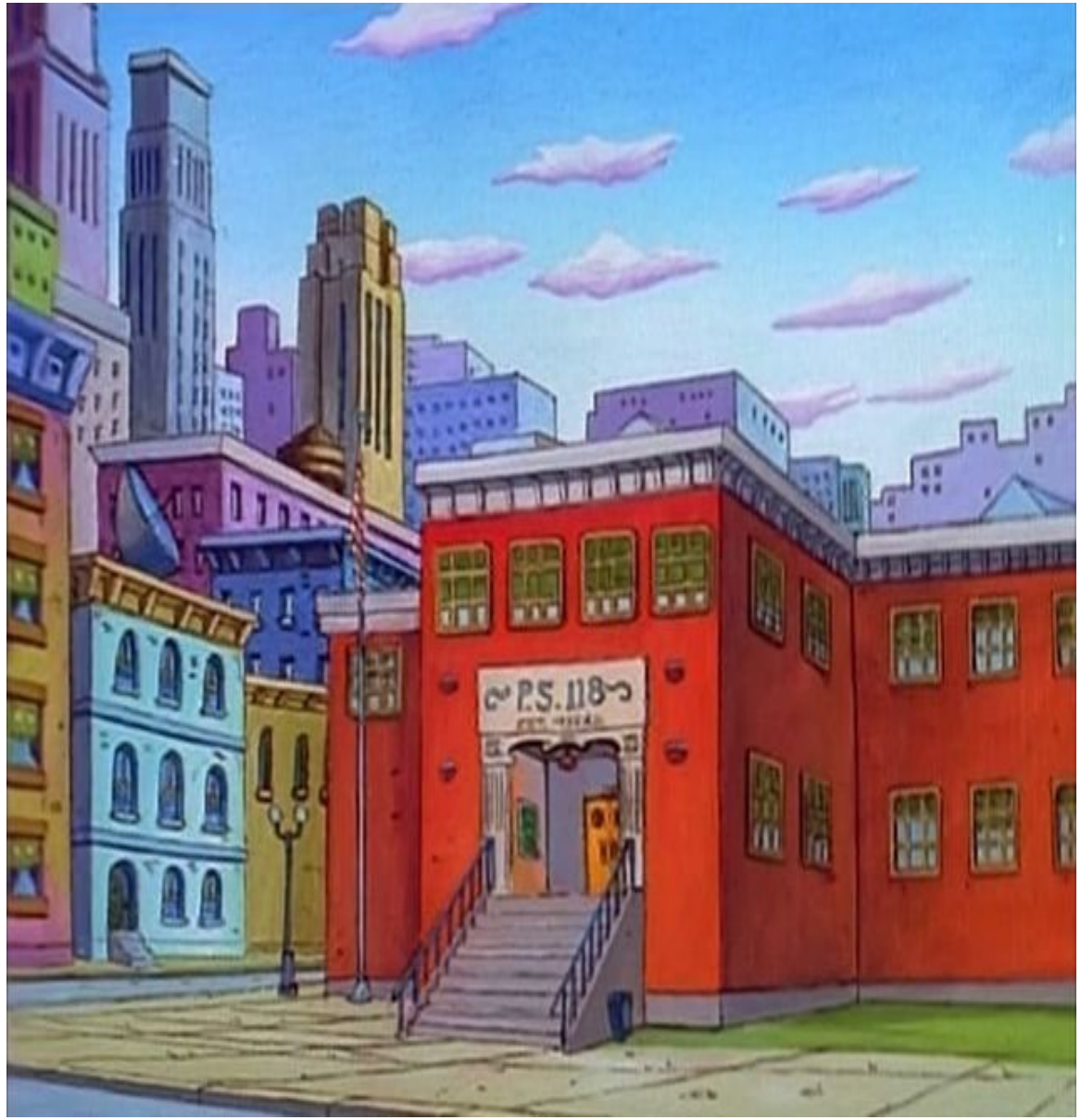
Step 6: Return to Competition: Normal game play

Return to Learn

Systematic review showed that 93% of athletes of all ages in their study had full RTL with no additional academic support by 10 days

Consider these academic accommodations if needed

- Modified school attendance
- Rest breaks
- Avoid loud hallways, allowed to change class earlier
- Extra time to complete assignments, homework
- Delaying test/quizzes
- Limited screen time



(Putukian et al 2023)

CLEARED

40
50

Key Points

- Reported symptoms gold standard for diagnosis
- Avoid cocoon therapy, subthreshold exercise helps recovery
- Remember the tools in your toolbox (VOMS, BESS, Verbal cognitive and memory tests, IMPACT)

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Thank you

Email: oursdl@upmc.edu

Allegheny Health Network

HIV Primary Care

2026 Donald B. Middleton, MD Refresher Course in Family Medicine

February 27, 2027

Steven R. Wolfe, DO, MPH, FAAFP, AAHIVS
Assistant Dean, AHN/Duquesne University, Nasuti College of Osteopathic Medicine
Clinical Professor, Duquesne University, Department of Family Medicine
Clinical Professor, Drexel University, Department of Family, Community and Preventive Medicine

DISCLOSURE

None

OBJECTIVES

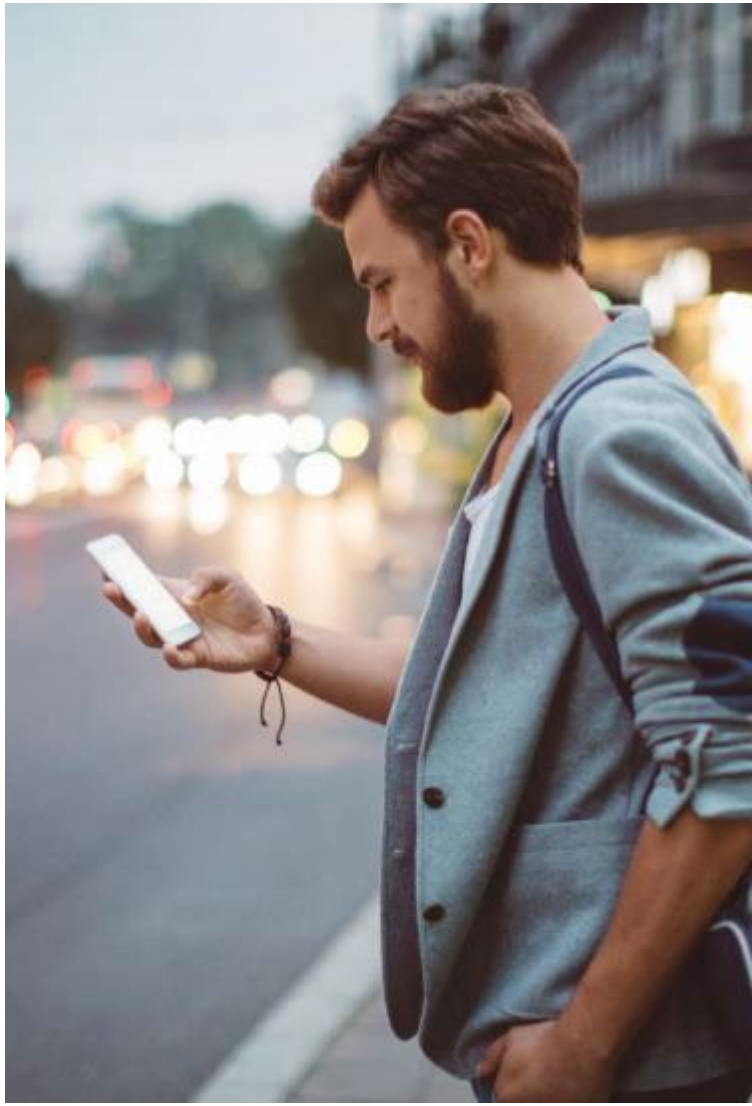
Recognize the HIV care continuum and why it is important for primary care physicians to include HIV Primary Care in the practice.

List the different ways to prevent HIV including U=U and different forms of Pre-exposure Prophylaxis (PrEP).

List the initial HIV regimens to start within one week of diagnosis.

Describe the difference in management between persons living with HIV and those that are HIV negative.

State the age in which anal Pap screening should start with HIV+ patients and the age difference between HIV- patients.

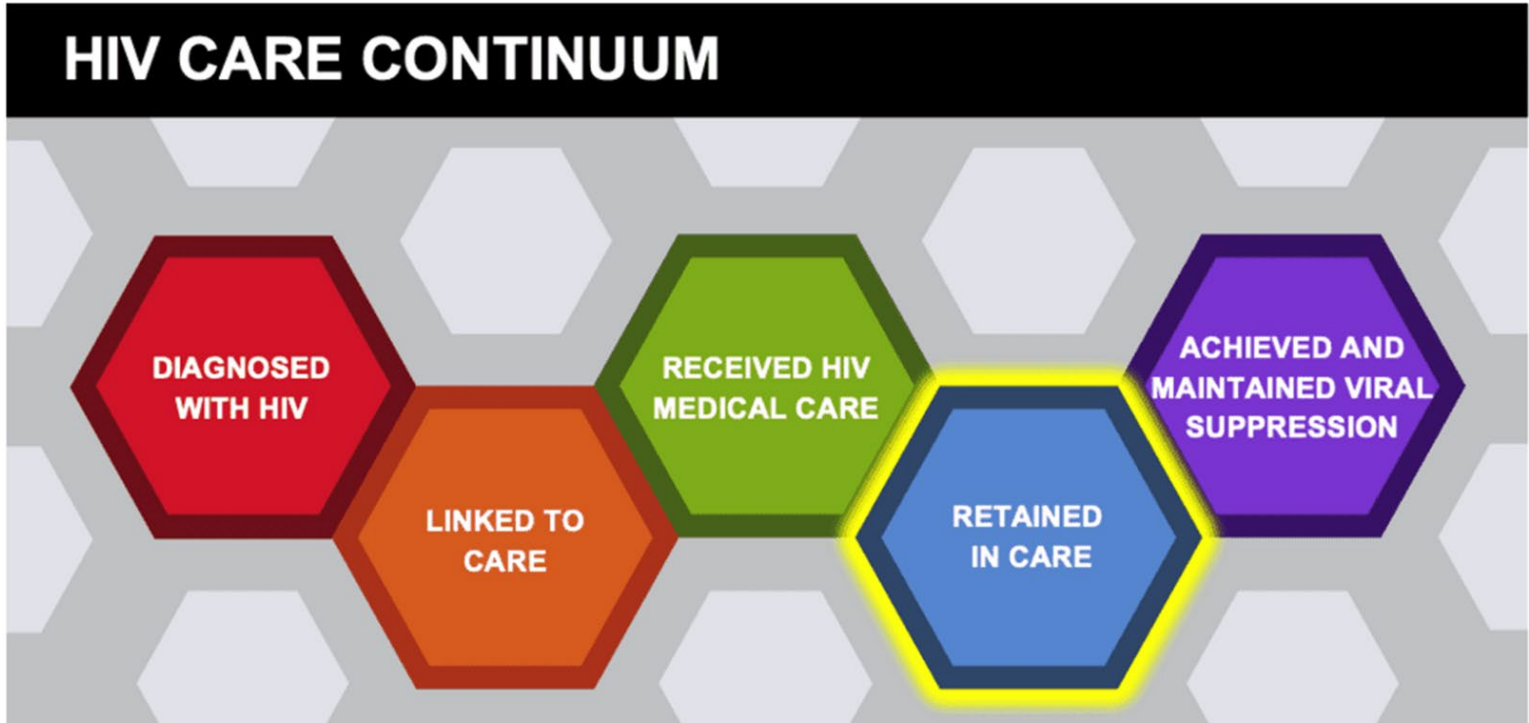


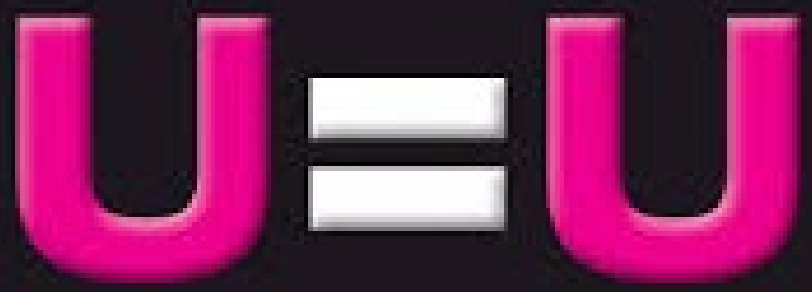
GOAL

65% of those diagnosed with HIV in the US have achieved and maintained viral suppression

Healthy People 2030

- Reduce new HIV infections by 90%
- Provide rapid and effective treatment for everyone with HIV
- Quickly respond to potential HIV outbreaks





An undetectable HIV viral load means you cannot transmit the HIV virus to someone else

Treatment as Prevention

- Many labs measure HIV viral load down to zero
- Clinically undetectable < 200
- Intermittent “blips” between 0 – 200 or low-level viremia should not prompt change in regimen
  - Understand adherence
  - Look into concomitant use of minerals, MVI or protein shakes

TREATMENT

Initial Antiretroviral Treatment

(Guideline recommended)

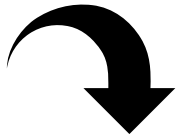
- Integrase strand transfer inhibitor (INSTI)
  - Bictegravir
  - Dolutegravir
- 2 (or 1) Nucleoside/nucleotide Reverse Transcriptase Inhibitor (RTI)

INITIAL TREATMENT

INSTIs

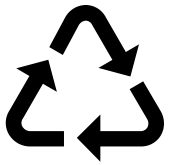
BICTEGRAVIR (BIC)

DOLUTEGRAVIR (DTG)



High viral suppression

Excellent tolerability and infrequent toxicity



Limited drug interactions

High barrier to resistance

Low pill burden

Initial Backbone of Treatment

Nucleoside/Nucleotide Reverse Transcriptase Inhibitor (NRTI)

- Tenofovir alafenamide (**TAF**) – OR – Tenofovir disoproxil fumarate (**TDF**)
- TXF is abbreviation referred to both drugs

– AND –

- Emtricitabine (FTC or XTC)

TOTAL TREATMENT

INSTI + NRTI

3-drug regimen

- BIC + TXF/XTC (**Biktarvy**)
- DTG + TXF/XTC (**Tivicay + Descovy**)

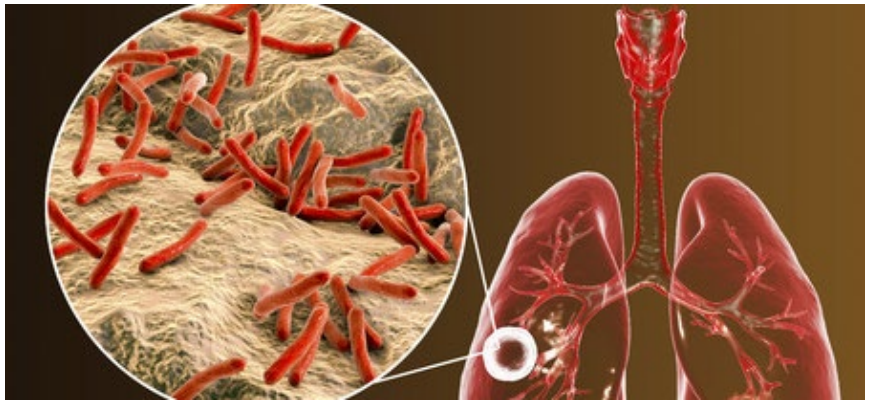
2-drug regimen

- DTG + 3TC (**Dovato**)
- Should not be used if
  - Lamivudine (3TC) resistance is detected on genotyping
  - HIV RNA level is 500,000 copies/mL or higher
  - Hepatitis B co-infection present
  - Pregnant

When to Start Treatment

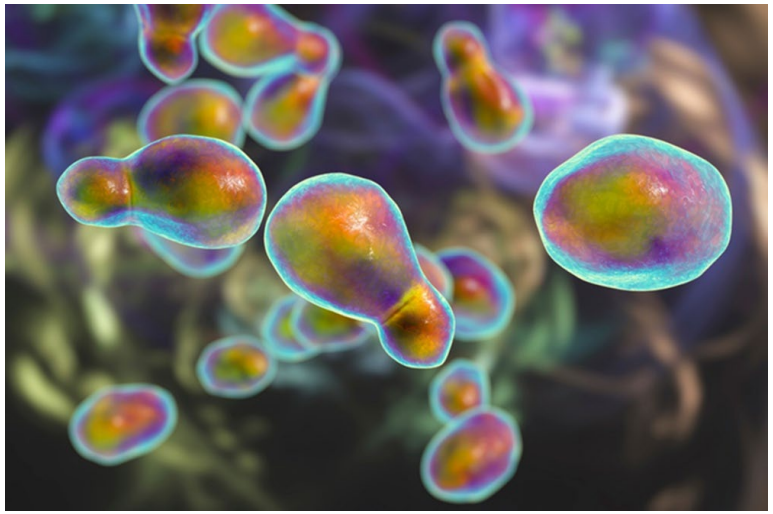
- Initiation of ART as soon as possible after diagnosis, ideally within 7 days and preferrable within **2 days**
- Initiation of ART at the time of diagnosis of acute HIV infection or in a person who is pregnant is recommended
- Initiation of ART is recommended immediately in the setting of a new diagnosis of cancer with attention to drug-drug interactions

Active Opportunistic Disease



Active tuberculosis (TB) without evidence of TB meningitis, ART should be initiated within 2 weeks after initiation of TB treatment, especially for those with CD4+ cell count below 50/µL

Cryptococcal meningitis who can be closely monitored and treated for increased intracranial pressure and immune reconstitution inflammatory syndrome, ART initiation is recommended 2 to 4 weeks after starting antifungal therapy



Initiation of ART is recommended within 2 weeks of initiation of treatment for most opportunistic infections.

TREATMENT IN PREGNANCY

BIC/FTC/TAF (Biktarvy) is the preferred regimen

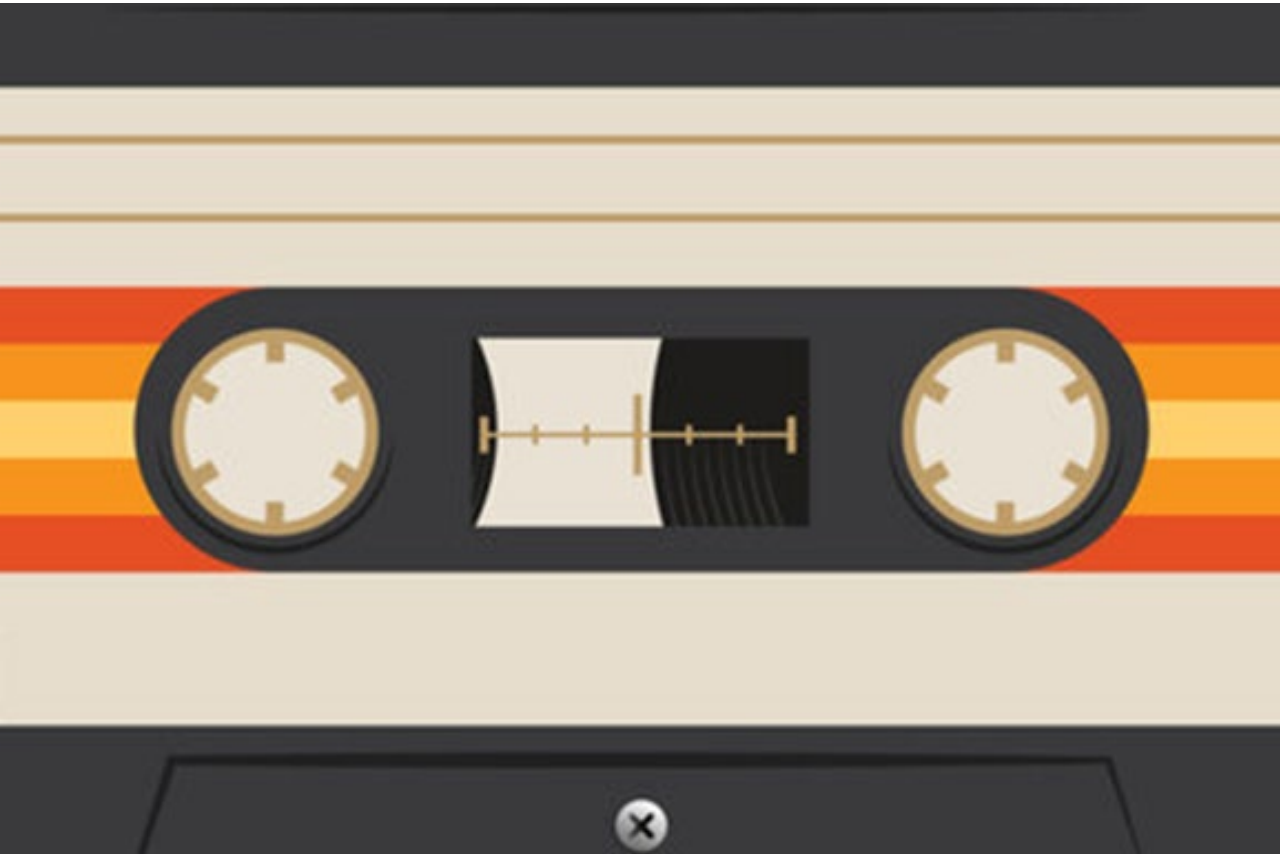
- OR-

TAF/FTC (Descovy) +DTG (dolutegravir)

TREATMENT IN PREGNANCY

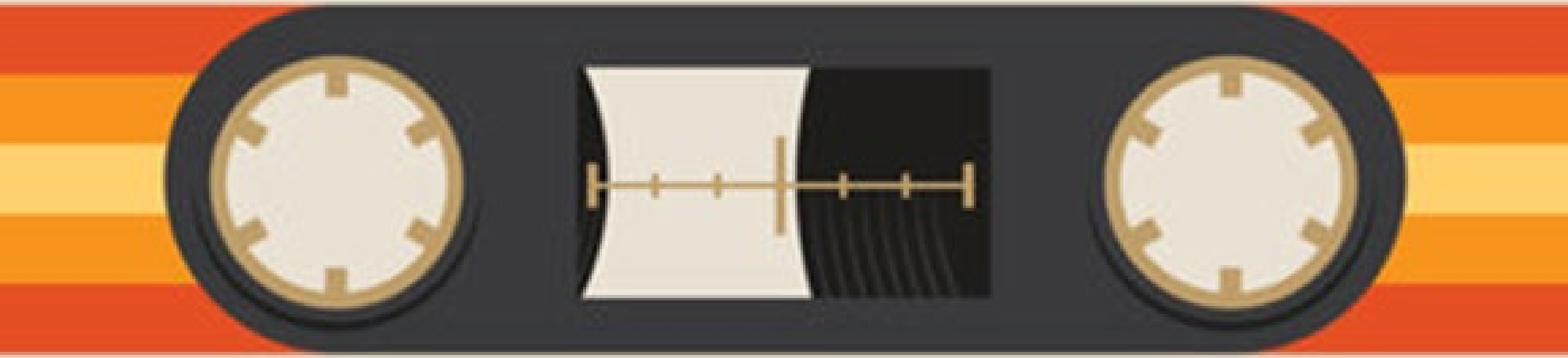
If on cabotegravir + long-acting rilpivirine (Cabenuva) injections, switching to an oral triple-drug regimen is recommended

Switching Antiretroviral Therapy



Why?

- Medication no longer recommended due to short or long-term side effects
- Inconvenience
- Regimen complexity
- Drug-drug interactions
- Progressive kidney disease
- Risk of CV disease
- Cost
- Virologic failure



Switching Antiretroviral Therapy

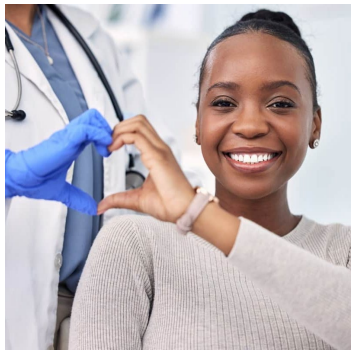
What to do?

- Boosted protease inhibitors can be switch to integrase-based regimen provided there is no INSTI resistance
- Individuals with NRTI resistance, should be monitored more closely for the first year
- Cabotegravir and long-acting rilpivirine (Cabenuva) is recommended for those that experience stigma or other adverse consequence or strong patient preference

LONG-ACTING ART

Forgetting to take meds

Difficulty taking oral meds



Patient preference

Discretion

LABORATORY MONITORING

Lab test	At HIV Dx and ART start	During ART	At virologic failure
HIV RNA level (viral load)	√	4-6 weeks after ART initiation; then q 3 months until suppressed; then q 6 months	√
CD4 cell count	√	Every 6 months until CD4 > 250 for over a year, then stop.	√
HIV RT and PI genotype	√		√
HIV integrase genotype	If a partner has a known failing HIV regimen or a personal acquires HIV after using cabotegravir for PrEP		If failing ART regimen including an INSTI
Cryptococcal Ag if CD4 < 100	√		
Age-appropriate CA screen	√	√	
Safety lab tests, lipids, STI screen	√	√	√

Management of Substance Use Disorders (SUD)

SUD treatment should be integrated into HIV prevention and treatment

Rapid HIV testing and linkage to rapid ART or PrEP are recommended

Harm reduction services should be provided to all that report drug use

Persons who use drugs should be offered PrEP

Pharmacotherapy should be offered for those with opioid, alcohol and tobacco use

Behavioral modification techniques using positive reinforcement to increase desired behaviors for stimulant use disorders and in some cases medical management

Weight Changes

Follow weight, BMI and blood pressure every six months, or more if indicated

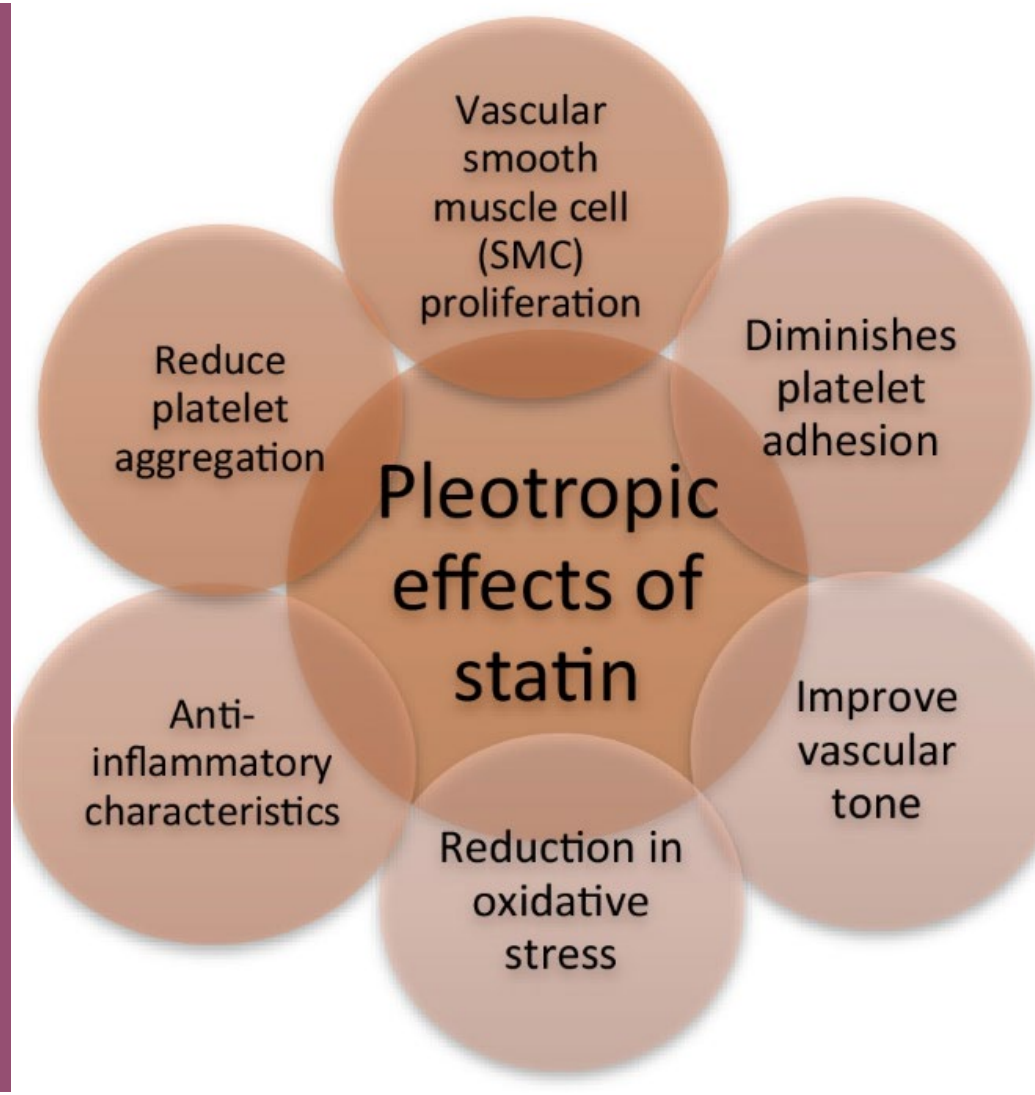
Changing regimens secondary to weight gain, hypertension or insulin resistance is not recommended

Cardiometabolic Comorbidities

10-year ASCVD risk > 20% or LDL > 190: High-intensity statin

Age 40-75 YO with 10-year risk between 5-20%: Moderate-intensity statin

People with or at high-risk for CV disease who are receiving abacavir-containing regimens should be switch off abacavir



Anal Dysplasia and Cancer Screening

International Anal Neoplasia Society Guidelines (2024)

Risk Category Incidence ≥ 10-fold greater than general population	Age to start
MSM and Transwomen (TW) with HIV	35
Women with HIV	45
Heterosexual men with HIV	
MSM and TW without HIV	
H/O vulvar HSIL or cancer	Within 1 year of diagnosis
Solid organ transplant recipients	10 years post-transplant

Osteoporosis and Fragility

Risk of fragility fractures is increased in persons living with HIV

Risk cannot entirely be explained by reduction of BMD

If patient has osteopenia/osteoporosis, check vitamin D level and treat with supplementation if low.

DEXA scan starting at age 50 YO

IMMUNIZATIONS

- **Persons living with HIV with CD4 > 200**
  - Seasonal Influenza (other than live IN) and COVID yearly
  - RSV single dose at age 75 YO
  - HPV-9 3-dose series up to age 45 (more efficacious before 26)
  - Tdap (or Td) every 10 years
  - Hep A 2-dose series with titers every 5 years
  - Hep B 2-dose series with titers every 5 years
  - Recombinant Zoster Vaccine 2 dose series at age 50
  - PCV-20 once
  - MMR 2-dose series
  - Varicella 2-dose series if patient never had chickenpox
  - Men ACWY 2-dose series with booster every 5 years for high-risk individuals
  - Men B 2-dose series with booster every 2-3 years for high-risk individuals
  - Modified Vaccinia Ankara (MPox) for high-risk individuals

IMMUNIZATIONS

Persons Living with HIV with CD4 < 200

- Can give COVID up to every 2 months
- Do not give MMR-V (no live vaccines)
- RSV can be given at age 60

Gender Identity

Transgender women are at an increased risk for acquiring HIV

- Stigma and discrimination
- Homelessness
- Violence
- Incarceration
- Unemployment
- Substance use/abuse
- Transactional sex
- Limit their access to HIV prevention services and care

Prevention

2

HIV Prevention

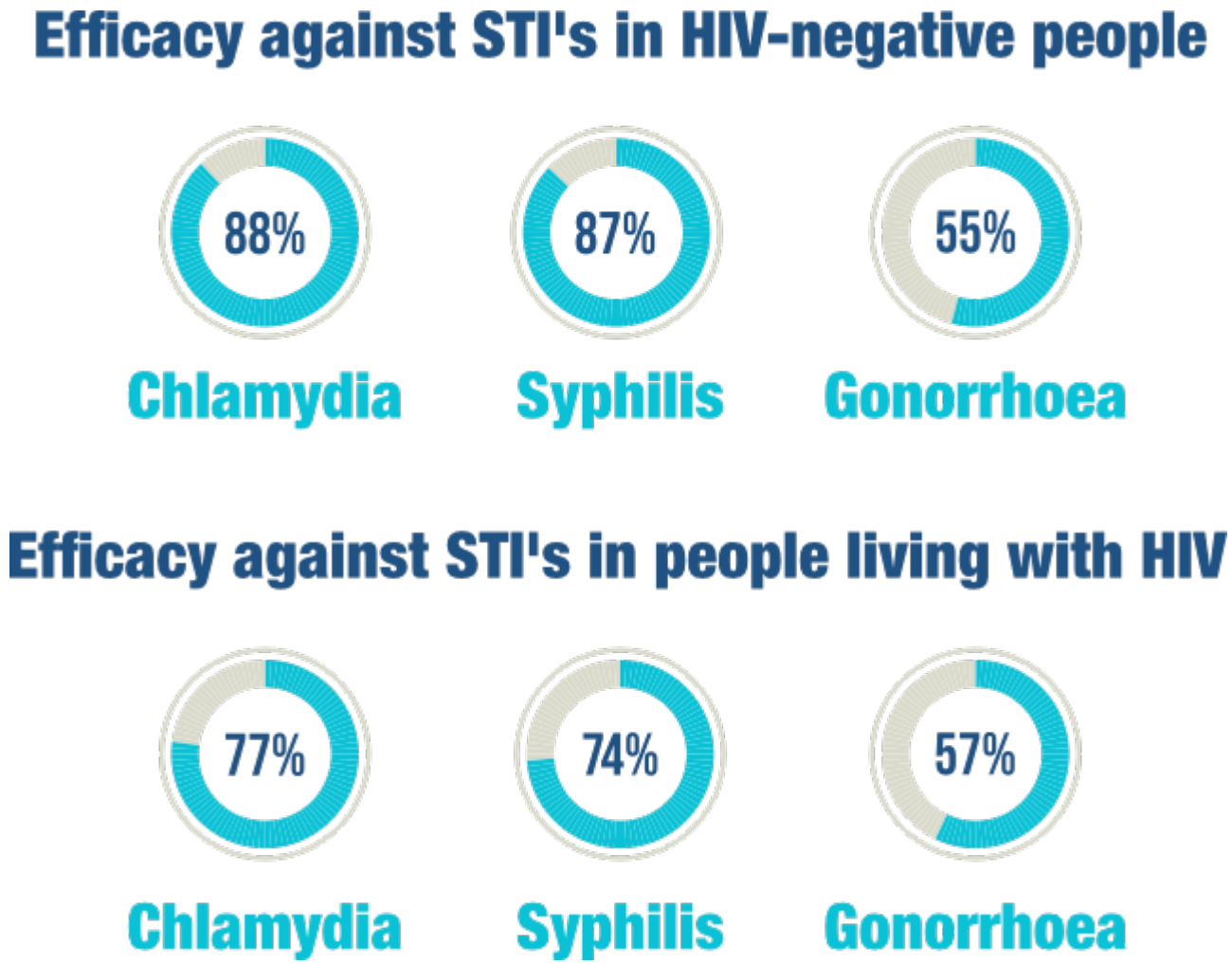
- Oral
  - Daily
  - Intermittent
- Injectable long-acting
  - IM every 2 months (cabotegravir)
  - IM every 4 months study starts this June 2026
    - Reach out to me if you know a patient that would like to be in study
  - Subq every 6 months (lenacapavir) – currently limited insurance coverage

PrEP Options

	Generic Truvada (F/TDF)		Descovy (F/TAF)	Injectable Cabotegravir
	Daily	On-Demand 2-1-1 PrEP	Daily	Every 2 months
Insertive anal or vaginal sex	FDA On-Label Guideline Recommended (DHHS, IAS-USA, WHO)	FDA Off-Label Guideline Recommended (IAS-USA, WHO)	FDA On-Label Guideline Recommended (DHHS, IAS-USA, WHO)	FDA On-Label Guideline Recommended (DHHS, IAS-USA, WHO)
Receptive anal sex				
Receptive vaginal or neovaginal sex		FDA Off-Label Not Recommended	FDA Off-Label Guideline Recommended	
Injection drug use			FDA Off-Label Not Recommended	Not Recommended
Pregnant or breastfeeding				FDA On-Label Guideline Recommended (DHHS, IAS-USA, WHO
Cr clearance 30-60 or has osteopenia/porosis	Not Recommended		FDA On-Label Guideline Recommended	

STI Prophylaxis with DoxyPEP

Doxycycline 100 mg, TWO tablets within 48-72 hours after condomless sex



QUESTIONS

Clinical Review & Education

JAMA | Special Communication

Antiretroviral Drugs for Treatment and Prevention of HIV in Adults: 2024 Recommendations of the International Antiviral Society–USA Panel

Rajesh T. Gandhi, MD; Raphael J. Landovitz, MD; Paul E. Sax, MD; Davey M. Smith, MD; Sandra A. Springer, MD; Huldrych F. Günthard, MD; Melanie A. Thompson, MD; Roger J. Bedimo, MD; Constance A. Benson, MD; Susan P. Buchbinder, MD; Brenda E. Crabtree-Ramirez, MD; Carlos del Rio, MD; Ellen F. Eaton, MD; Joseph J. Eron Jr, MD; Jennifer F. Hoy, MBBS; Clara Lehmann, MD; Jean-Michel Molina, MD; Donna M. Jacobsen, BS; Michael S. Saag, MD

Editorial page 576
Multimedia
Supplemental content
CME at jamacmelookup.com

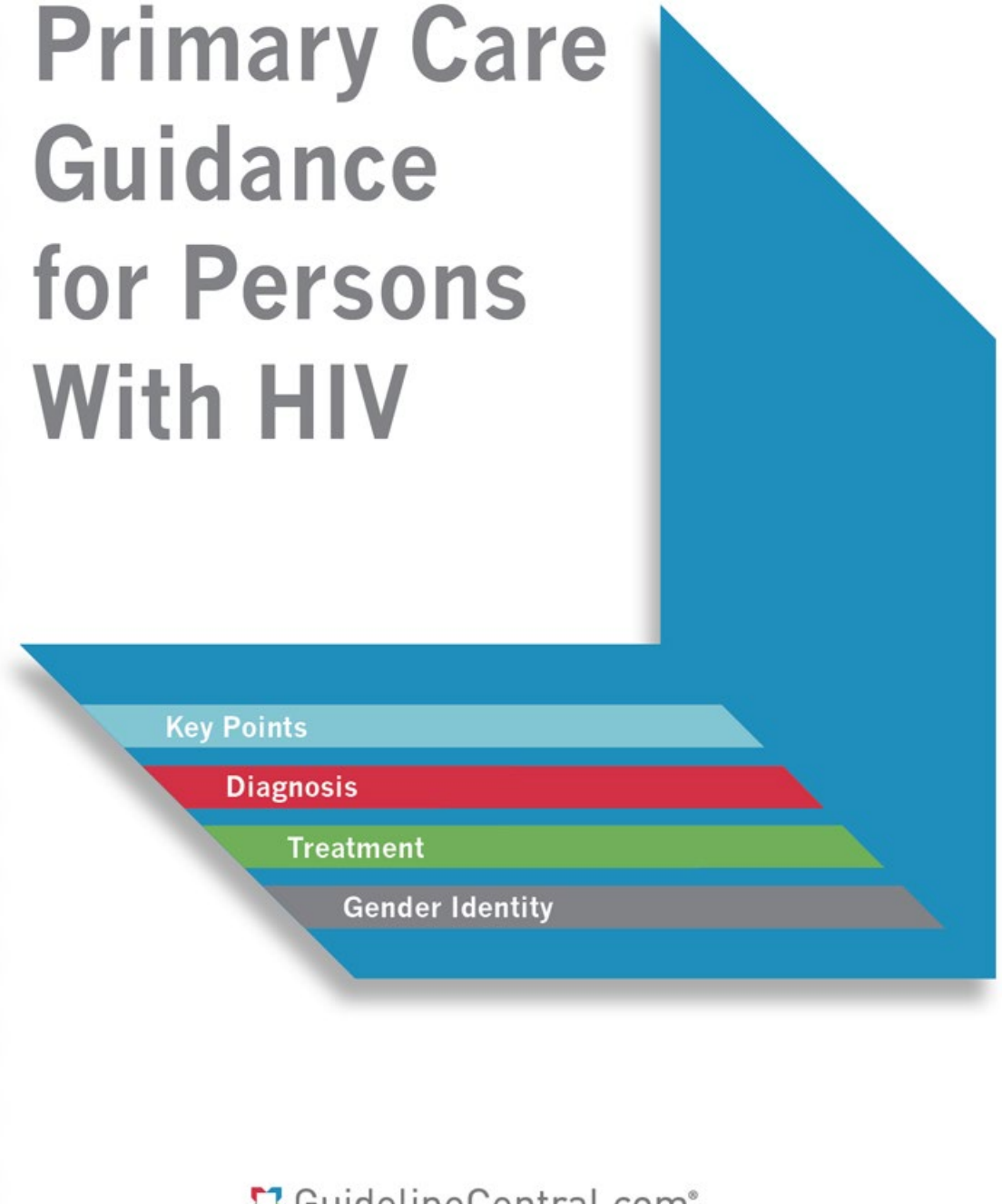
IMPORTANCE New data and new antiretroviral drugs and formulations continue to become available for the prevention and management of HIV infection.

OBJECTIVE To provide updated recommendations for HIV treatment and clinical management and HIV prevention.

METHODS A panel of volunteer expert physician scientists were appointed to provide updated consensus recommendations for 2024. Relevant evidence in the literature since the last report was identified from PubMed and Embase searches (which initially yielded 3998 unique citations, of which 249 were considered relevant); from ongoing monitoring of the literature by the panel members; from data submitted by product manufacturers; and from studies presented at peer-reviewed scientific conferences between June 2022 and October 2024.

FINDINGS Antiretroviral therapy continues to be recommended for all individuals with HIV. For most people with HIV, initial regimens composed of an integrase strand transfer inhibitor (InSTI), specifically bictegravir or dolutegravir, with 2 (and in some cases 1) nucleoside or nucleotide reverse transcriptase inhibitors are recommended. Recommendations are made for those with particular clinical circumstances, such as pregnancy and active opportunistic diseases, as well as for those unable to take InSTIs. Regimens may need to be changed for virologic failure, adverse effects, convenience, or cost, among other reasons. Long-acting injectable therapy is available for those who prefer not to take daily oral medications and for people struggling with adherence to daily therapy. Recommendations are provided for laboratory monitoring, management of substance use disorders and weight changes, as well as use of statins for cardiovascular disease prevention. For HIV prevention, oral (daily or intermittent) and injectable long-acting medications are effective options for people at increased likelihood of HIV exposure. Further, new tools for maintaining health and well-being among people with HIV, such as doxycycline postexposure prophylaxis to avert sexually transmitted infection, and strategies to treat substance use disorders, are recommended. Disparities in HIV acquisition and care access are discussed and solutions proposed.

CONCLUSIONS New approaches for treating and preventing HIV offer additional tools to help end the HIV epidemic, but achieving this goal depends on addressing disparities and inequities in access to care.



Laura Novak

Under Pressure-Hypertension Guidelines 2026

Goals

- Review new AHA guidelines for HTN
- Review the importance of HTN control
- Review basic principles of HTN care
- Review the approach to resistant hypertension

I've been looking forward to this

Why this is important

- HTN is a primary care issue
- It is one of the most important causes of cardiovascular diseases
- As blood pressure increases, cardiac risk increases in a linear fashion
- But there is disagreement on where to intervene to maximize benefit and minimize harm

Option one…

- The new AHA/ACC definitions are similar to the 2017 ones

- They Reiterate:
- 130/90 is their definition of hypertension and
- Their treatment goal is 120/80
- They don't understand why we aren't all on board
- They aren't mad at us, they are just disappointed

The problem

- The guidelines are a mix of category A strength of evidence and clinical opinion
- They use relative risk rather than absolute risk in most discussions of benefit
- They minimize any side effects of aggressive treatment

- But they rightly point out patient outcomes are worsening

Option two: Other guidelines

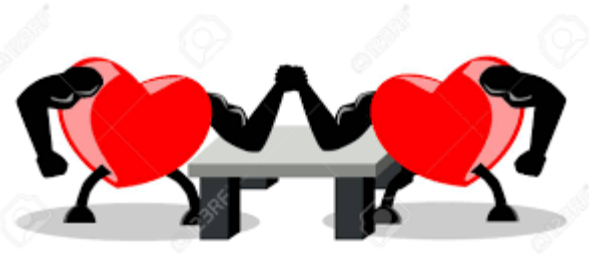
- International Society of Hypertension 2020
- 140/90
- 130/80 goal for high risk

AAFP 2022 guidelines (yay!)

- Treat to < 140/90 to decrease all cause mortality
- Consider treating to < 135/85 but there is weak mortality benefit
- Consider treating to <135/85 in patients with DM or stroke or CAD

It boils down to Philosophy

- Family medicine and internal medicine can have different approaches to the same problems
- Cardio and renal see the downstream damage and want to avoid these at all costs
- FM sees the need to balance side effects with realistic outcomes
- Both sides have a point



Philosophy

Any doctor here?
I'm a doctor what's going on
A heart attack
I'm a doctor in philosophy
he is going to die
we are all going to die
boredpanda.com

In this talk

- I will emphasize the new recommendations in the AHA guidelines
- But still assume many of us will use <140/90

Start with the basics

- Accurate blood pressures
- Use home monitors for all patients
- Emphasize lifestyle changes
- Ally with our patients for more patient autonomy

Accurate Blood Pressures

- Wait 5 quiet minutes
- Support the feet and back
- Right size cuff on a bare arm
- Support the arm at heart level
- On the first visit check both arms
- If elevated, recheck in 2 min

Patience is a virtue…

- It adds time to the rooming of a patient
- Alternative
  - Coach the patient
  - Leave patient alone in the room
  - They push the button to autocycle x 3

NOPE

YEP

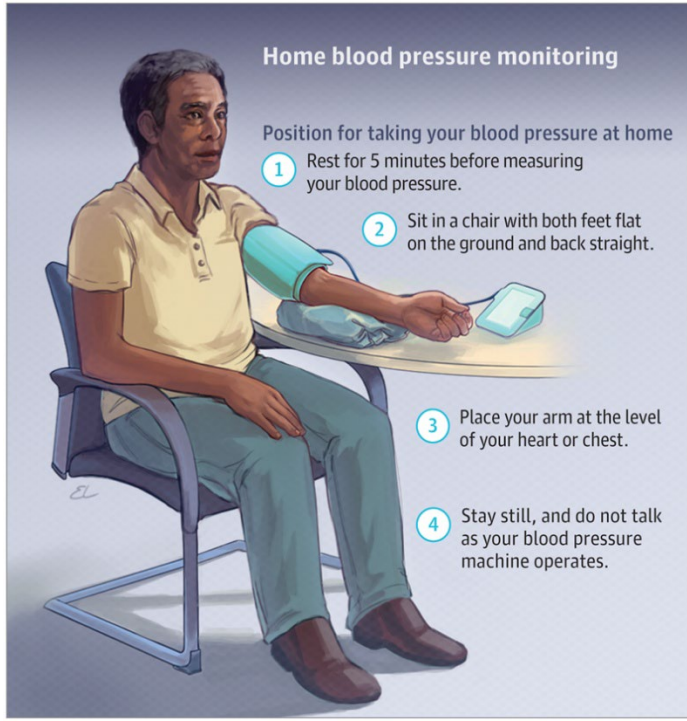
USE CORRECT CUFF SIZE
Cuff too small adds 2–10 mm Hg
DON'T HAVE A CONVERSATION
Talking or active listening adds 10 mm Hg
PUT CUFF ON BARE ARM
Cuff over clothing adds 5–50 mm Hg
EMPTY BLADDER FIRST
Full bladder adds 10 mm Hg
SUPPORT ARM AT HEART LEVEL
Unsupported arm adds 10 mm Hg
SUPPORT BACK/FEET
Unsupported back and feet adds 6 mm Hg
KEEP LEGS UNCROSSED
Crossed legs add 2–8 mm Hg

Teamwork

- This doesn't happen without active teaching and monitoring of staff technique
- If this is not part of your office's quality metrics, it should be
- Remember to use the correct cuff size

Next : Confirm the Diagnosis of HTN

- Home monitors for ALL
  - high or high normal
  - Many will need a large cuff –readily available
- Norms are lower at home
  - 135/85 home
- No recommendation for ambulatory monitors



You get a home monitor and You get a home monitor …

- Automated and validated
  - validatebp.org -Omron is a validated brand
- Arm cuff only
  - Wrist cuffs and watches are not accurate
- Consider working with a medical supplier to have kits in your office

Helps with Confirmation and monitoring

- R/O false positives office pressures
  - white coat HTN
- R/O false negatives office pressures
  - masked HTN

How

- Two readings in the morning and two in the evening*
- For 3-7 days
- Follow up appointment in one month (no later)

After Confirming diagnosis

- Work on secondary causes and lifestyle BUT
- Begin treatment at confirmation of >140/90
  - don't wait*

Look for reversible causes

- Sleep apnea
- Alcohol use
- Obesity
- Salt intake / fluid overload
- Medications

Common Medications

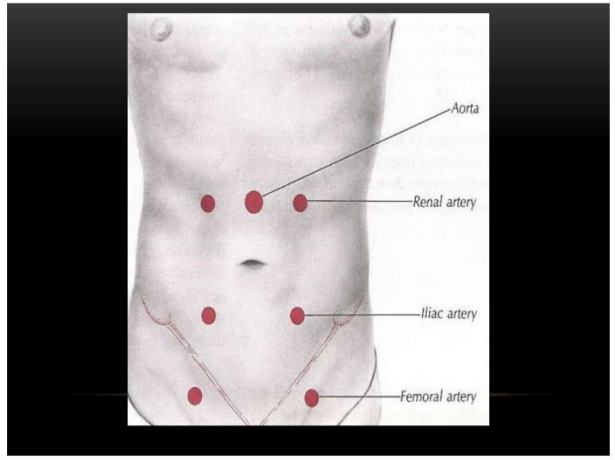
- Alcohol
- NSAIDs
- Decongestants
- caffeinemaxxing
- SSRI/SNRI
- Stimulants

New Medication listed in guidelines

- Tizanidine
  - What???
  - Alpha blocker
  - Acts like a mini clonidine
  - Can drop BP AND can cause rebound HTN when stopped

Next-good initial workup

- Exam-it is all about the arteries…
  - **Bilateral** blood pressure
  - Femoral Pulses - (coarctation)
  - Bruits - especially epigastric (renal)
    - 2cm above and over from navel
  - Fundi
    - (practice makes perfect)



Initial Testing

- Complete blood count
- CMP or BMP
- Lipids
- TSH
- Uric acid (for thiazide use)
- Microalbumin *

- 12-lead EKG

Has it been done?

- You frequently pick up established pts
- Confirm the work up was done

Aldosterone/renin activity ratio

- NEW- recommended by AHA for all stage 2 and up*
  - almost everyone
- Very few people have the classic triad
  - HTN, Low K, high bicarb
- Test impacted by meds and diet, but just hold any MRA for 4 weeks and order it

If positive

- Send to renal?
- Add MRA (spironolactone)
- Adrenalectomy
- I will only screen my hard to control patients

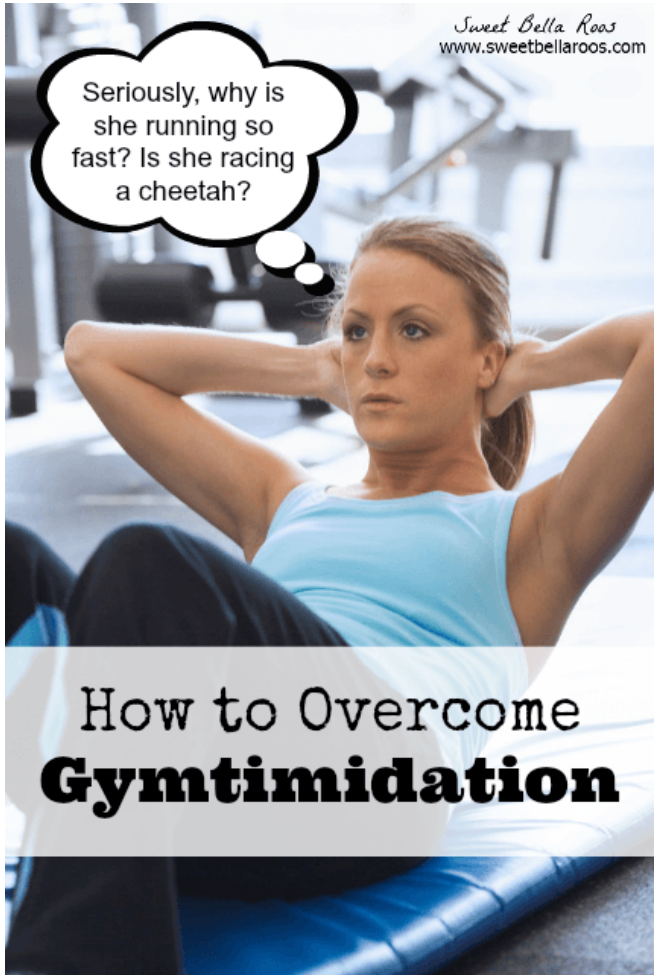
Lifestyle

YOU DISGUST ME RONALD!
YOU'RE NOT EVEN SCARY!
I'VE KILLED MORE PEOPLE THAN YOU

Diet

- DASH-S diet –we should all eat this
  - Whole grains, fresh fruits and vegetables
  - Dairy, nuts and lean meats
  - Limit fats and sweets
  - Less than 2.3 g sodium per day
  - Link patient ed into the homegoing avs
  - NEW-emphasis on adding potassium *
    - Bananas. potatoes, citrus
    - Mix salt substitute with salt at home

Structured Exercise *



Stress reduction

- Stress
  - decreases Nitrous Oxide
  - Increases vasoconstriction
  - Increases oxidation of lipids

Stress reduction

- Encourage patients to use the time they are waiting for you to open You Tube and practice mindfulness

Alcohol

- Old
  - Men <14/wk
  - Women <7/wk
- New
  - no alcohol at all *
  - but weak evidence

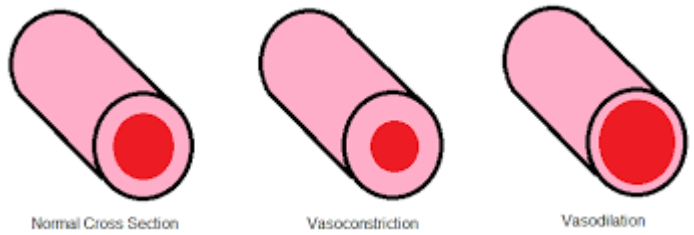
Next- start Medications

- The best medication is the one the patient will actually take
- Consider cost, convenience and side effects
- Potency and duration within classes can vary, but usually aren't significant
- Think of 'control' as the time in range and not just one number
  - Similar to CGMs for DM

Quick refresher on BP

- Blood pressure maintains organ perfusion which is good
- Blood pressure =
  - Volume x
  - Heart rate x
  - Peripheral resistance
    - Balance of vasoconstriction vs vasodilation

- So interventions should address
  - Volume
  - Heart rate
  - Vasodilation
  - Vasoconstriction



Medications per guidelines

- Preferred meds (in no order)
  - ARB/ACE
  - Dihydropyridine calcium channel blockers
  - Thiazides

Initial Medications

- NEW
  - Start with low dose combination meds in all
  - Start with low doses (quarter, half)
  - Low dose combos are more potent than high dose monotherapy
- MY opinion
  - I usually use ARB in combo
    - ARB/thiazide
    - ARB/amlodipine

Race-informed care*

- No race-based prescribing

Mnemonic-ABCDS - O

- A-ARB/ACE
- B-(Beta blocker)
- C-Calcium channel blocker (dihydropyridine)
- D-Diuretic
- S-SGLT2 / Spironolactone
- O-Others

A - ARB/ACE

- ARB
  - Minimal cough and angioedema
- Both are Category D so
  - <u>Careful in fertile women !!!!!!!!!!!!!!!!!!!!!!!!!</u>
  - Most harm starts in second trimester so do good patient ed

ARB/ACE can change kidney function

- AKI
  - If a patient with normal renal function starts an ARB/ACE and renal function worsens by 30%
  - Stop it and consider renal artery stenosis
- CKD
  - If they already have CKD, ACE/ARB will lower GFR but improve outcomes

B-Beta blockers

- Not first line
- Coreg > metoprolol for BP
- Watch heart rate

C-Calcium channel blockers

- Dihydropyridine preferred*
  - (Dihydropyridines Dilate)
  - nifedipine XL / amlodipine
  - Watch edema

Calcium channel blockers

- Non-dihydropyridines
  - Diltiazem/Verapamil
- Not first line*
  - Less effective
- Not in HFrEF

D- thiazides

All thiazides should work for HTN *

- HCTZ
  - Less potent
  - more combos
- Chlorthalidone
  - More potent
  - More hypokalemia
  - Longer acting

D- Indapamide

- Older thiazide
- Less potent
- Comes in lower doses
- Good choice for patients who get symptoms on thiazides

Previous

- OLD -Stop thiazides if creatinine >2*
- NOW studies show ongoing effect down to GFR of 20

D-Loop

- For patients with fluid overload, loops will work better than a thiazide
- Choose longer acting products- torsemide
- When adding loop and pt has HTN
  - Stop thiazide !!!!!!!!!!!!!!!

S - Good add ons

- Spironolactone (any MRA)
  - Ideal add on in resistant HTN
  - Watch hyper K
- SGLT2
  - Used in DM,HF,CKD
  - Causes diuresis and lowers BP

O- Others – last resort

- Hydralazine
  - good short term hospital med (iv)
  - Used a lot in renal failure but last resort
  - Tachycardia and drug induced SLE
- Clonidine -Alpha blocker
  - 'last line'
  - Sedation and rebound

New-ish

- Check a bmp 2-4 weeks after starting or changing meds

Statins? Do a risk score

- OLD - use ASCVD pooled cohort risk score
- NOW - use PREVENT score
  - Full vs base
- Cut off 7.5%
- Both have flaws and are overinclusive

PREVENT Score

- Good
  - Includes DM and stroke hx
  - Includes zip code for social deprivation
- Bad
  - Very age dependent

If BP is actually controlled

- See q 3 mo
- Check BMP and Urine **yearly**
- Risk assess yearly with the Prevent score
- Keep working with the patient on lifestyle

If BP is not at goal

- Either:
  - Add a third med
  - Increase the dose
- Less emphasis on nighttime dosing*
- Think about duration and potency of different products

Why is it hard to treat to goal?

- We don't react quickly to 138 or 142
- Adherence- it's asymptomatic
- Side effects (sexual dysfunction)
- Not there for a 'BP check'
- Silos

SO.....
TELL ME EVERYTHING YOU TOLD
THE NURSE 5 MINUTES AGO

New topic -Resistant HTN

- Definition :
- Above goal on 3 meds
  - One of which is a thiazide
  - With meds dosed to at least 50% max
- OR controlled with 4 meds

Resistant HT Evaluation

- Confirm the Dx
  - Poor compliance is >50%
  - White coat, cuff size, CPAP use, diet
- Fine tune the treatment
  - Review home monitor numbers
  - The right meds at 50% max or more
  - Change thiazide to chlorthalidone for duration
  - Consider longer acting ARBs (olmasartan)

Resistant HT Evaluation

Recheck

- Alcohol
- OSA (up to 80%)
- Med list

Exam

- Recheck with attention to vascular

Labs

- Recheck renal lab and microalbuminuria
- Aldosterone labs

Resistant HT treatment

- Add MRA
  - Low dose (eg 12.5-25 mg spironolactone)
  - Watch K
  - Watch gynecomastia (eplerenone doesn't do this)
- Consider occult fluid overload (change to loop)
- If BP becomes controlled-no further work up

New med for resistant HTN

- Aprocitentan (Tryvio)
- Endothelin receptor agonist
- Dilates
- Expensive

Resistant hypertension surgery

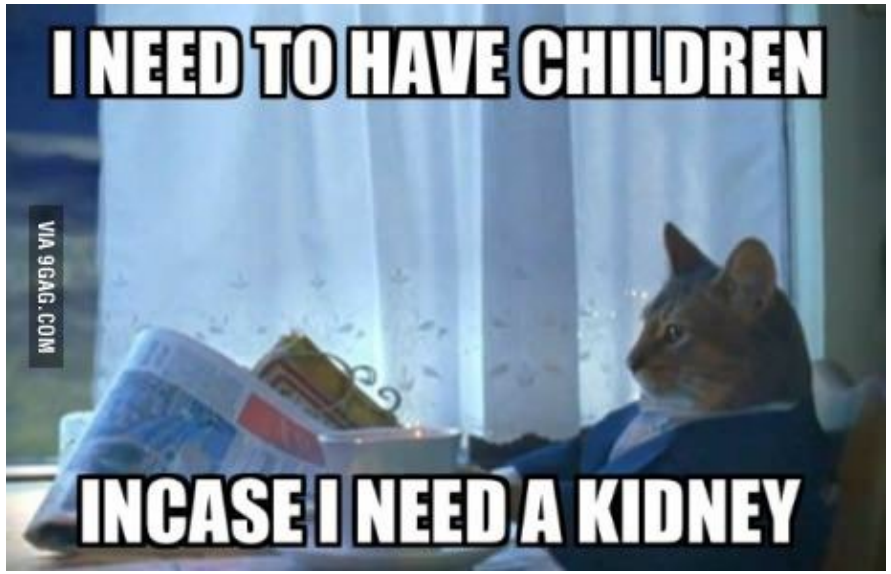
- Renal denervation
  - Not used much
  - Low efficacy

Resistant hypertension

- Consider renal artery disease
  - RAS and fibromuscular dysplasia
- Who to check:

- Resistant HTN that doesn't resolve
- Quickly worsening CKD
- Flash pulmonary edema
- Severe HTN in normal weight women under 40

- Renal US for size or asymmetry
- CT angio *
  - Doppler is too inconsistent
- Intervention if meds don't work



Very Rare

- Pheochromocytoma
- Coarctation
- Cushings

Recap

I think I got it. But just in case...
tell me the whole thing again, I wasn't listening.

Recap

- Accurate BP measurement-teach your staff
- Accurate home monitors
- **Follow up** q 4 weeks till controlled
- Do BMP 2-4 weeks post starting /changing meds
- Use ARB / thiazide as default

Recap

- 130/80????
- Don't neglect lifestyle
  - Dash diet and potassium
- Ally with the patient – encourage self management
- Get to goal
- Labs and PREVENT score yearly

New stuff

- Use combo meds
- PREVENT > pooled cohort
- No race-based prescribing
- Thiazide ok with creatinine over 2
- Less concern with nighttime meds
- No alcohol ???
- Tizanidine

Recap - resistant HT

- Confirm the diagnosis
- Good vascular and renal exam
- Change hctz to chlorthalidone
- Add spironolactone or eplerenone
- Work up secondary causes
- Check Aldosterone/renin activity

We are Family Medicine!

Family Medicine Refresher 2026

Michelle Thompson DO, AOBFP, ABOIM, DipABLM, FACLM
Medical Director UPMC Lifestyle Medicine

Family Medicine Refresher 2026

UPMC
LIFE CHANGING MEDICINE

UPMC Lifestyle Medicine

- Member of ACLM Health Systems Council
- Lifestyle Medicine Residency Curriculum
- University of Pittsburgh School of Medicine in curriculum & elective rotations 2 or 4 weeks
- Lifestyle Medicine Interest Group
- Lifestyle Medicine Residency Curriculum
- Lifestyle Medicine Department
- 50+ ABLM providers in multiple specialties
-

Michelle Thompson DO, AOBFP, ABOIM, DipABLM, FACLM

Medical Director UPMC Lifestyle Medicine

1992	**Changed own diet & lifestyle**
1998	Nutrition Great Lakes Institute Technology Integrative Journey, Director of Massage
1996-2003	LECOM
2003-2006	UPMC Mercy Family Medicine Residency
2006	Reversing Diabetes lecture, health coaching, disease reversal
2011	Cleveland Clinic, Dr. Esselstyn WFPB program
2016	Dietitian added to Family Medicine practice
2016	Community Events: Health Living Series, moving away from bick-and-mortar
2016	Launched digital space with Be Well Therapies, LLC offering resources including Shop with a Doc teaching video
2017	Physician Wellness & Docs in the Kitchen
2018	Nutrigenomics, Pharmacogenomics, Mind-Body Medicine
2019	Culinary, Medicine, Mindful Medicine, Yoga Medicine, launched Wholehearted Medicine, LLC
2020	Pandemic Grant Work: Mobile Teaching Kitchen, Virtual Dr. Yum
2021	Certified in Mind-Body Medicine with CMBM
2022	Medical Director of UPMC Lifestyle Medicine
2024	Physician Coaching Certification
2025	ACLM Board or Directors

Let’s take a breath

UPMC
LIFE CHANGING MEDICINE

Dr. Michelle Thompson DO, AOBFP, ABOIM, DipABLM, FACLM

does not have any relevant financial relationships with ineligible companies to disclose in relation to this activity.

SELF CARE

We need to start with ourselves. Create our OWN Prescription for Wellness

I tell my patients “I cannot care more about your health than you do”-

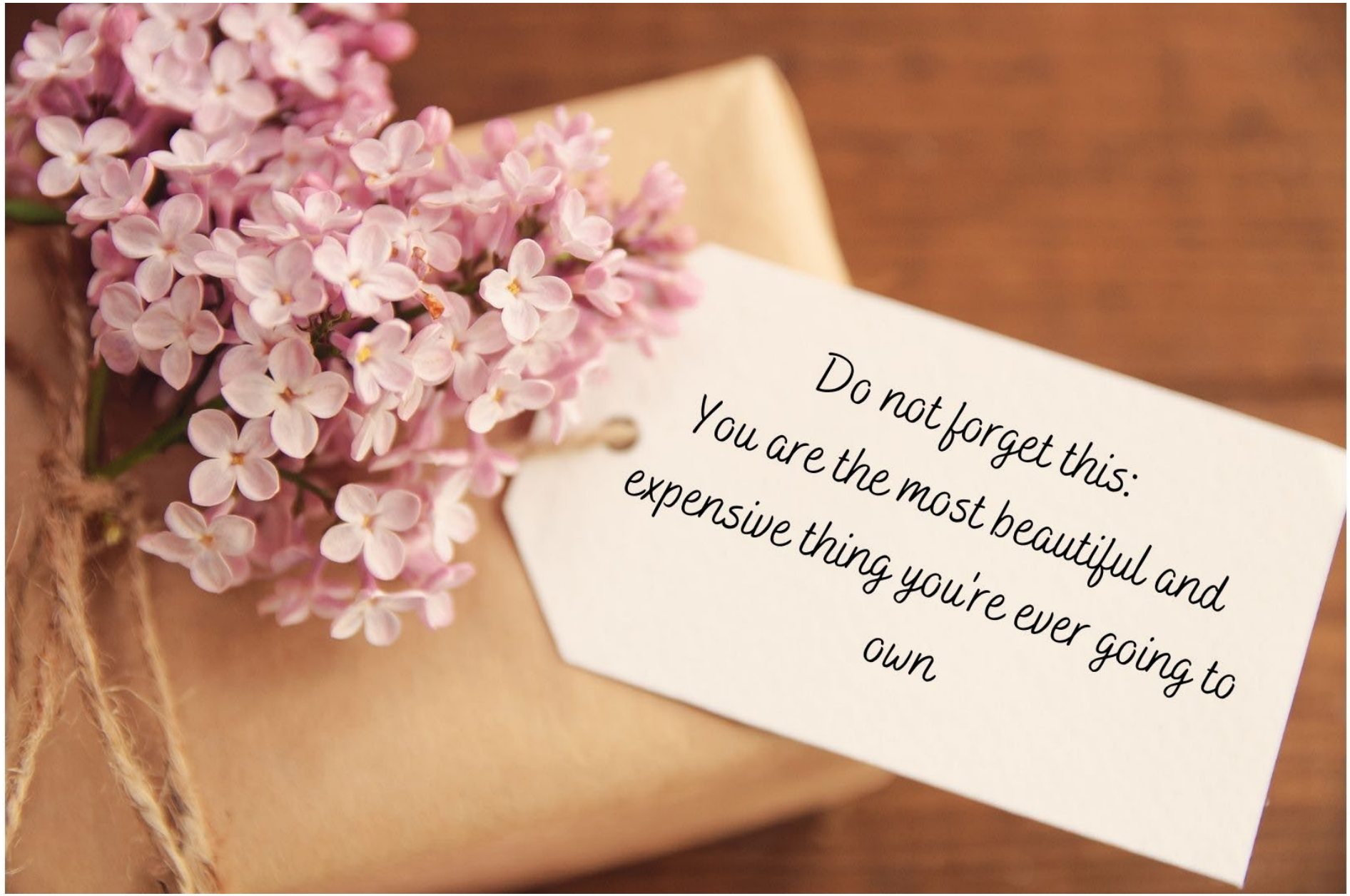
We cannot care more about the people we care for than ourselves!

Type text

Find calmness in our mind – like an ocean, if turbulence, you cannot see or have clarity. If ocean becomes calm, you can see all the way to the bottom and the treasures that lie within.

Space to breathe and to just be.

All those tools and techniques that we can use to understand and better know ourselves mentally and physiologically


Do not forget this:
You are the most beautiful and
expensive thing you're ever going to
own

Start with SELF

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Create your OWN Lifestyle Medicine Prescription

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What does self-care look like?

Source: https://soundgirls.org/self-care-develop-a-routine-that-works-for-you/

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What Does Self-Care Look Like?

Drink water – The body is mostly water. Focus on slowly working up to half your body weight in ounces (***SLOWLY***)

Bring your favorite snack – Plan ahead &prep. Whether you know your day is going to be long with limited breaks or not, it is helpful to create a habit of having quick grab-and-go healthy snacks.

Exercise – ANY amount matters. Physical activity is different than exercise. Do your best and aim for 20-30 minutes a day of what you can do.

Think RAINBOW: Wear one of your favorites & eat your colors – A favorite shirt, shoes, socks, or even your favorite accessory can make a difference. Wear it. Change up your colors on your body and your plate. Varied colors in food bring a variety of nutrients.

What Does Self-Care Look Like?

Journal – Express your emotions: leave it on paper, and then move forward.

Take a time-out– Make time to regroup and reconnect with YOU. If you can't commit to a solo moment, schedule regular time with friends or family to socially step outside yourself.

Speak positively to and about yourself – Increase your awareness of your word choices. Pause and rephrase when you can. Change your inner and outer voice. Treat yourself like you would your best friend.

Solutions-only problem solving– Take time to re-think your actions if you are repeating habits you want to change. Always running late? Book time in your calendar to address the situation and work on action-steps for positive solutions. No more procrastination.

- Disconnecting digitally for 2 or more hours
- Silent eating for a meal
- Schedule a movie night with yourself
- Read, journal, cook: consider doing something different and out-of-the-ordinary
- Find what brings you joy
- If you find you cannot fit in any or enough self-care steps every day, then make sure to set aside a day or two for yourself each month.
    - Take yourself on a movie date, shut off all electronics for a day, read something for fun, cook for yourself.
    - Find something you enjoy that provides satisfaction and do it.
    - Taking care of yourself means you will be able to continue taking care of everything, and everyone else you encounter each day.
- REMEMBER
    - Self-care will look and feel differently for everyone.
    - Find 2-3 things for you, so you can handle our crazy industry a little bit better every day.

Setting boundaries

Leave	Leave work at work.
Come	Come all the way home.
Change hats	Take off your work hat/primary role hat unless necessary
Leave	Certain things behind…work items can be left in work-spaces & not intermingled with home/personal space.
Do not let	Do not let your identity be completely wrapped up in your occupation
Learn	Learn to be present-just a human being and not a human doing.

UPMC Life Changing Medicine

Lifestyle Medicine

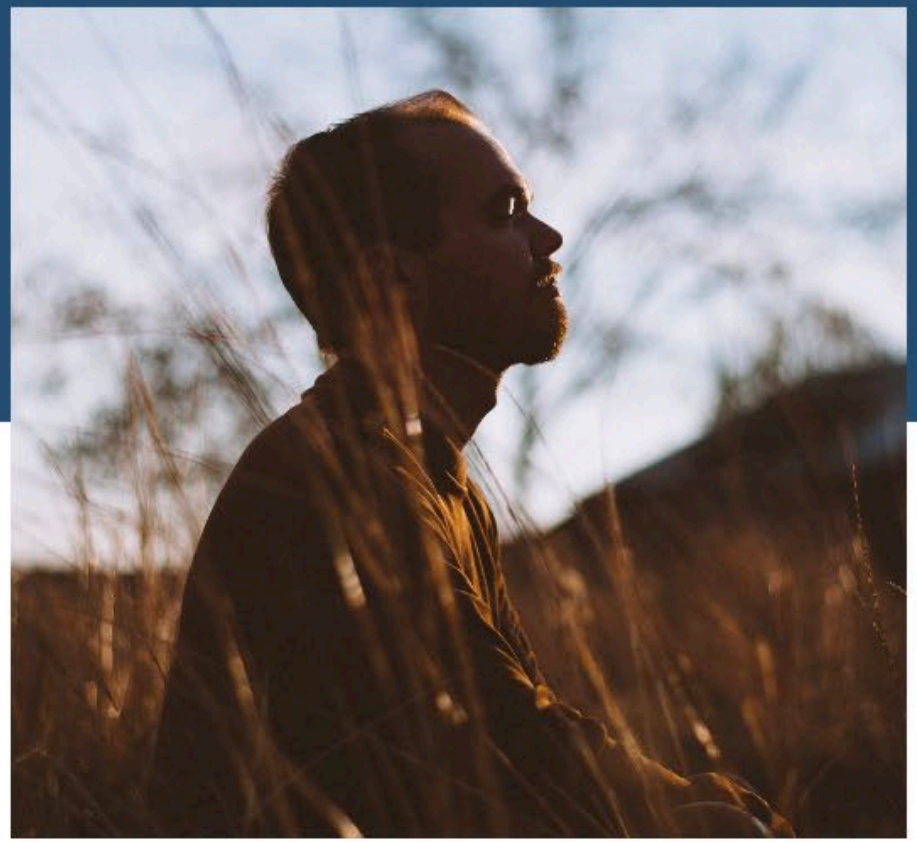
Mind-Body Medicine

Integrative Medicine

What is Mind-Body Medicine

Mind-body practices focus on the interactions of mind, body, and behavior, with the intent to use the mind to affect physical functioning and promote health.

– National Center for Complementary and Alternative Medicine



"MBM is the understanding of the complete interpenetration of mind and body and the possibility that all their aspects can speak with one another and can promote healing".

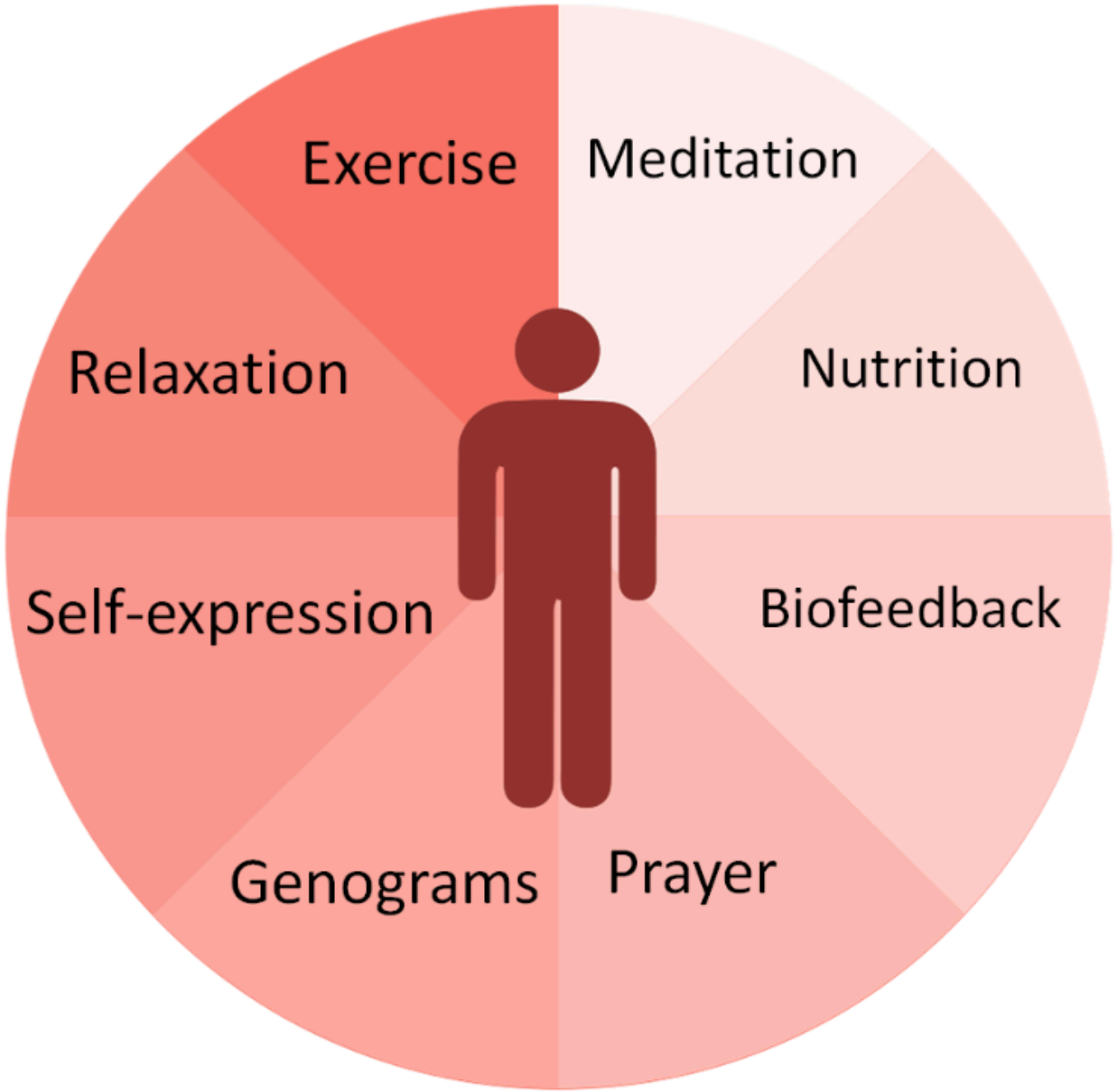
Dr. James Gordon

MBM is about taking care of ourselves and sharing with others

8-12 week program
One 2h session per week.

Robust evidence in different populations.

The Center for Mind-Body Medicine

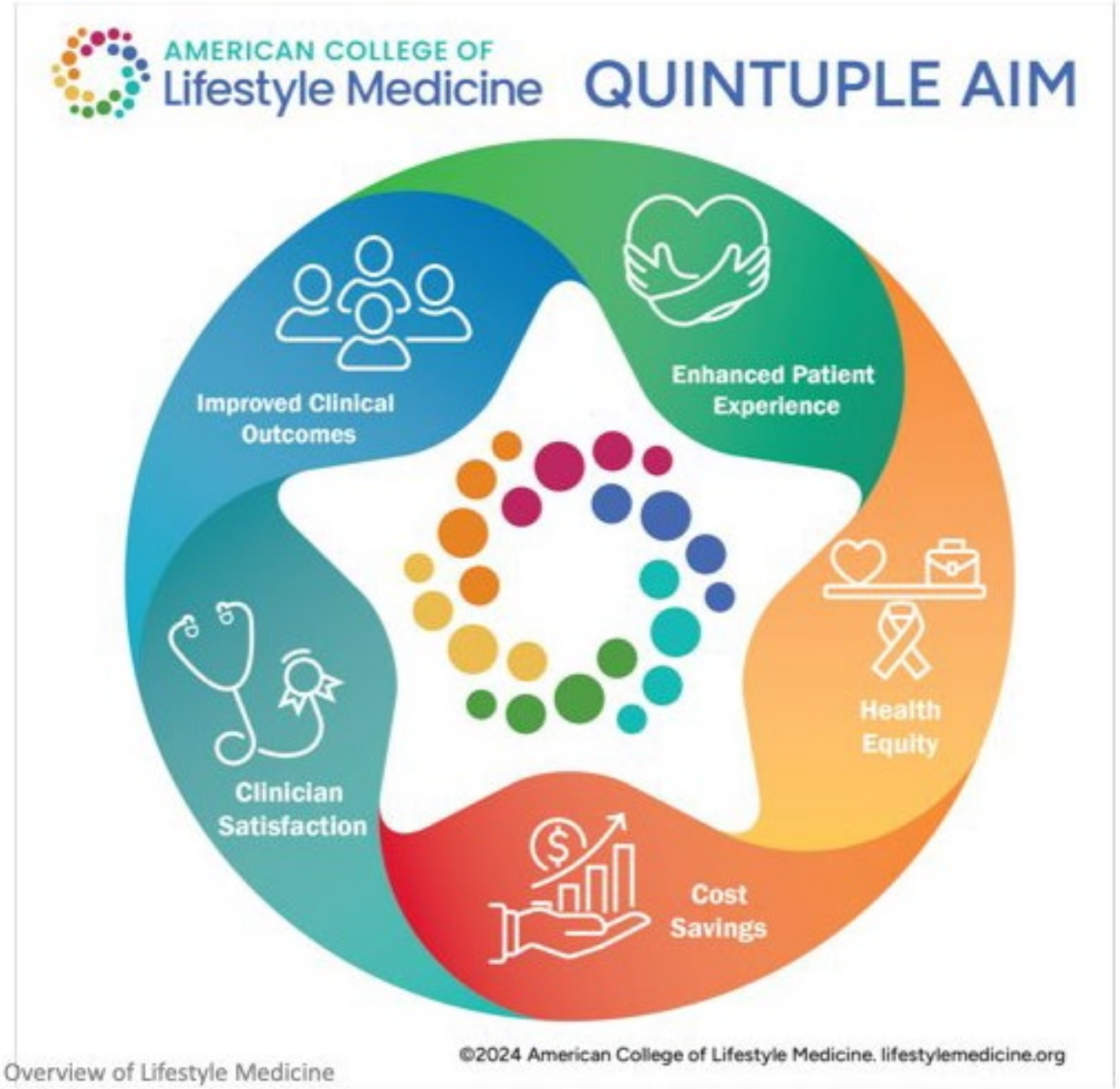


Integrative Approaches

Yoga Medicine	Exercise	Genomics	Botanicals	Self Care	Neuromuscular/ Manual Medicine
Meditation/ Mindfulness	Energy Medicine	Nutrition	Sleep	Acupuncture	Environmental Elements
Mind Body Medicine	Art Therapy	Aroma Therapy	Lifestyle Medicine	Culinary Medicine	Sound Therapy

WHAT IS LIFESTYLE MEDICINE

- Medical specialty
- Uses therapeutic lifestyle interventions as a primary modality to treat chronic conditions
- Applies evidence-based, whole-person, prescriptive lifestyle change to treat and, in some cases, reverse such conditions
- Governed by the American College of Lifestyle Medicine
- Applies six pillars of care for treatment and prevention



LIFESTYLE MEDICINE IS THE SOLUTION

6 KEY DOMAINS OF HEALTH BEHAVIOR:

- Nutrition
- Physical activity
- Restorative Sleep
- Stress management
- Social connection
- Avoiding risky substances

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Self Care in Health Care

How Lifestyle Medicine Can Transform Self & System

LIFESTYLE MEDICINE
Mission & Values

Vision: We empower people on the journey to whole health.

Mission: By using evidence-based programs and recommendations, we serve and fulfill potential through lifestyle change.

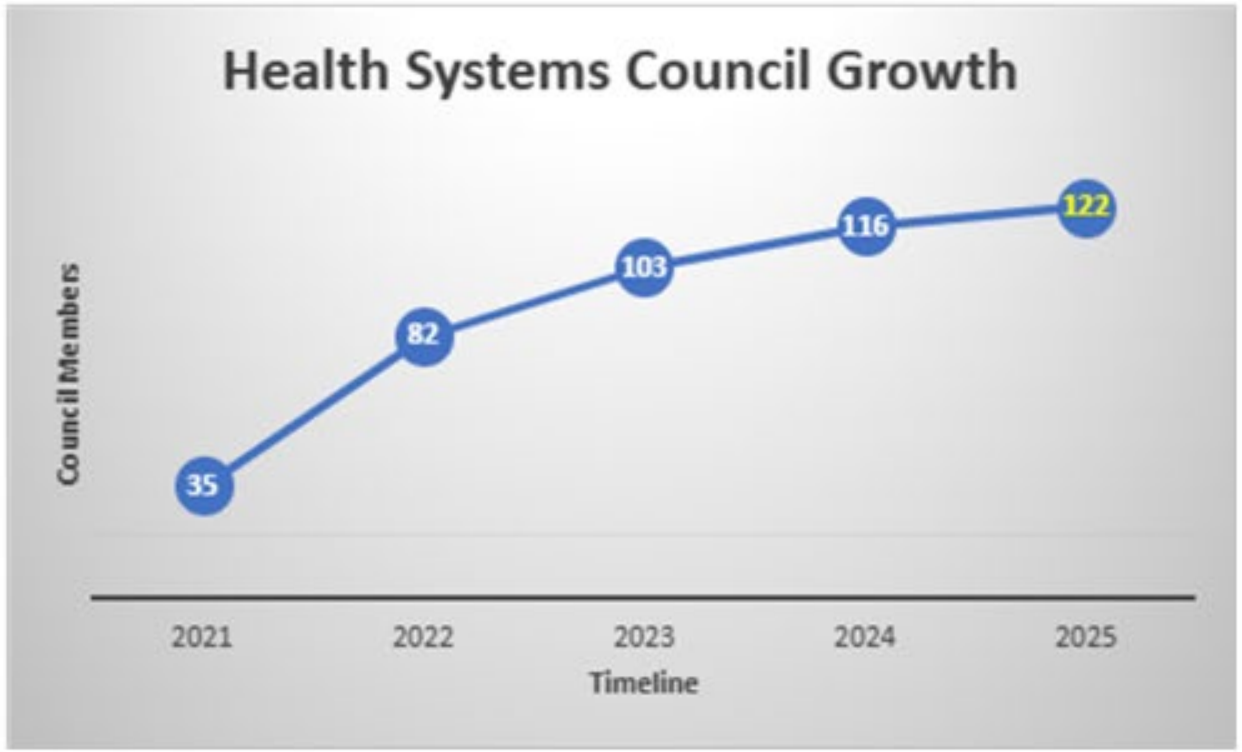
We Value:

- Leading systems in service and justice for the poor and underserved.
- Championing non-biased, evidence-based approaches to disease prevention, treatment and reversal.
- Collaborative partnerships for promoting lifestyle medicine in the interest of public health
- Restoring whole health in health care.
- Establishing virtual and physical environments that promote whole health.

"Every patient deserves to know when LIFESTYLE CHANGE is a viable option to address the root cause of their disease."

ACLM PRESIDENT DR. PADMAJA PATEL

AMERICAN COLLEGE OF
Lifestyle Medicine
HEALTH SYSTEMS COUNCIL



* map represents headquarter location of member health systems.

Training Our Future Doctors

- 8 Family Medicine Residency Programs across PA have a Lifestyle Medicine Track available
- 32 Internal Medicine residents at UPMC Pinnacle have LM mandatory curriculum.
- 2023 Physical Medicine & Rehab added
- 2025 Pediatrics

Lifestyle Medicine Transformation of Chronic Diseases in a Patient with Obesity

WPXI News Story

https://www.wpxi.com/news/local/new-castle-woman-says-upmc-program-helped-her-lose-100-pounds/VJ77VR52ZRDMBC4KQ2DTSCPZWQ/

BASELINE

Healio

- 50 YO F pt with PMHx of DM, HTN, HLD, food allergies, fibromyalgia, and other conditions presents to her PCP with c/o obesity. She also has multiple GI, MSK, psychiatric, and skin conditions. At baseline, she takes 23 meds, suffers from pain daily, is hardly able to get out of bed, and on disability.

- Vitals show BP 160/98 and HR 85. Weight is 256 lbs (class III/extreme obesity, BMI ≥40).

- Labs show high total (531) and LDL (423) cholesterol. AST high(91) ALT (62), Cr high (1.22), gFR low (54), + ANA

RESULTS

- Baseline:
  - BP 160/98, HR 85
  - Total cholesterol 531, LDL 423
  - 256 lbs, class III/extreme obesity
  - 23 daily meds
- In Fall '24, after

lifestyle transformation:
  - BP 106/66, HR 58
  - Total cholesterol 199, LDL 135
  - LFTs, Cr, gFR, ANA normal
  - 140 lbs, normal (20.38) BMI
  - 2 daily meds
- Predominantly, she has noted feeling liberated from a multitude of conditions and has said, **"I'm almost 95 percent pain-free now"**

DISCUSSION

- Through the adoption of a Food as Medicine philosophy and adherence to a whole food, plant-based diet, the patient dramatically reduced widespread bodily inflammation, sending multiple **chronic diseases (below) into remission** and holistically **improving her quality of life and now desires to return to work.**

Obesity	Sleep apnea	Food allergies	Arthritis	Hepatic steatosis	Fibromyalgia
Lupus	IBS	Depression	Back pain	DM	HTN
Colitis	Psoriasis	Nephrolithiasis		HLD	Anxiety

AN EXAMPLE OF CARROT OVER STENT ; LIFESTYLE TRANSFORMATION OF A 46-YEAR-OLD WITH SEVERE CAD/HIGH RISK PLAQUE/STENOSIS OF THE LAD

- 46-year-old male with a history of CAD, Hypertension, Hyperlipidemia who initially was evaluated in 2022 for episodes of chest pain with exertion. He had a CTA Heart ordered by a PCP for assessment of CAD risk.

- **CTA Heart 10/5/2022 (Outside facility)**

LAD → high risk plaque in the proximal segment with 70% stenosis in the midsegment has 30 to 40% stenosis.
Second diagonal artery → 70 to 80% stenosis in the proximal segment.
Left circumflex artery → high risk plaque in the mid segment with 70 to 80% stenosis.
The right coronary artery →50 to 60% stenosis in the proximal segment and mid segment has a long lesion with 70% stenosis.
Total Calcium score of 267 with moderate plaque burden.

A CROSSROADS IN CARE : STENTING VS LIFESTYLE

- His Cardiologist at Cleveland clinic recommended he undergo LHC with possible stenting. He had an appointment with lifestyle medicine a day before his procedure. He was on the table for the procedure when he refused to undergo the procedure and wanted to try lifestyle medicine by implementing significant lifestyle modifications including whole food plant-based diet and exercise

THE REMARKABLE CLINICAL REVERSAL AFTER THE LIFESTYLE MODIFICATIONS:

- **CTA 10/26/2023**
- No evidence of functionally significant lesion at the level of the
- proximal LAD segment or RCA based on Fract modeled within 2 cm of the
- reported coronary artery lesion on concurrent coronary CTA study.
- **Cardiac MRI 11/8/2024**
- - Normal 1st pass myocardial perfusion during Regadenoson stress. The probability of hemodynamically significant obstructive coronary artery disease is low.
- **Recent LDL level 41**
- **No further episode of chest pain with exertion**

Case: Low-dose naltrexone success

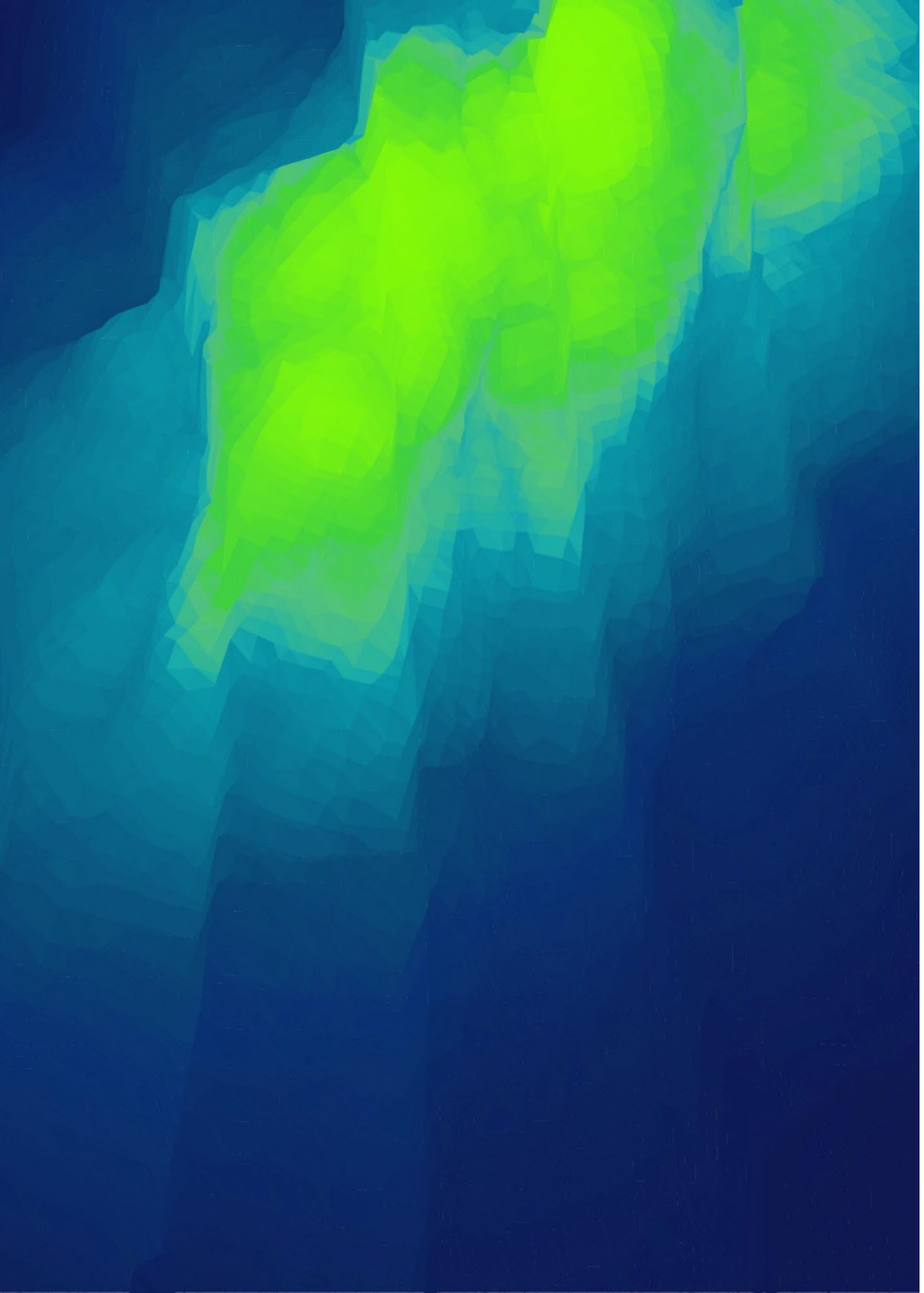
- 55 year old female PMH Sjogren's syndrome, malignant lymphoma, IBS, myalgia presents for an integrative consult complaining of poor sleep, poor nutrition and increased life stress
- Living on fast food, feels like she needs to take care of everyone
- Husband wanted her to try low-dose naltrexone (LDN)
- LDN (4.5 mg) initiated September 2019
- Initial labs: ESR 91, WBC 2.0, Hgb 11.6, Na 127, K 3.1

Case: Low-dose naltrexone success

- June 2020 - myalgias, arthralgia improved, able to return to golfing
- Sept 2021 – ESR finally normal (24) after 2 years
- March 2023 – dairy-free, gluten-free diet limiting alcohol and processed food
- March 2024 - Patient credits LDN for alleviating many Sjogren's symptoms. She describes this medication as a "game changer"
- Feb 2025 – Increased dose to 6 mg to manage autoimmune ear disease. Feels "wonderful" since increase
- June 2025 – Able to walk daily and golf weekly, attributes success to LDN

Case: Low-dose naltrexone success

- Feb 2026 - Significant improvement in her overall condition since starting low dose naltrexone. **Not bothered by any syndrome symptoms and describes the medication as working 'really well' for her.** Since starting LDN, she has noticed improvements in sleep and stress, which have positively impacted her mood and energy levels
- CBC and CMP WNL
- ESR 22



Case Presentation: 51 year old female

Medical History:

Vitamin D deficiency

B12 deficiency

Hypomagnesemia

Elevated LDL cholesterol level

Cervical spinal stenosis

Type 2 diabetes mellitus without complication, without long-term current use of insulin (HCC)

Menopause

Constipation, slow transit

Pelvic pain

Hormone replacement therapy (HRT)

Chief Complaints Managed:

Hypertension

Hyperlipidemia

Obesity

Diabetes 2 Mellitus

Medication Changes (2022 – present)

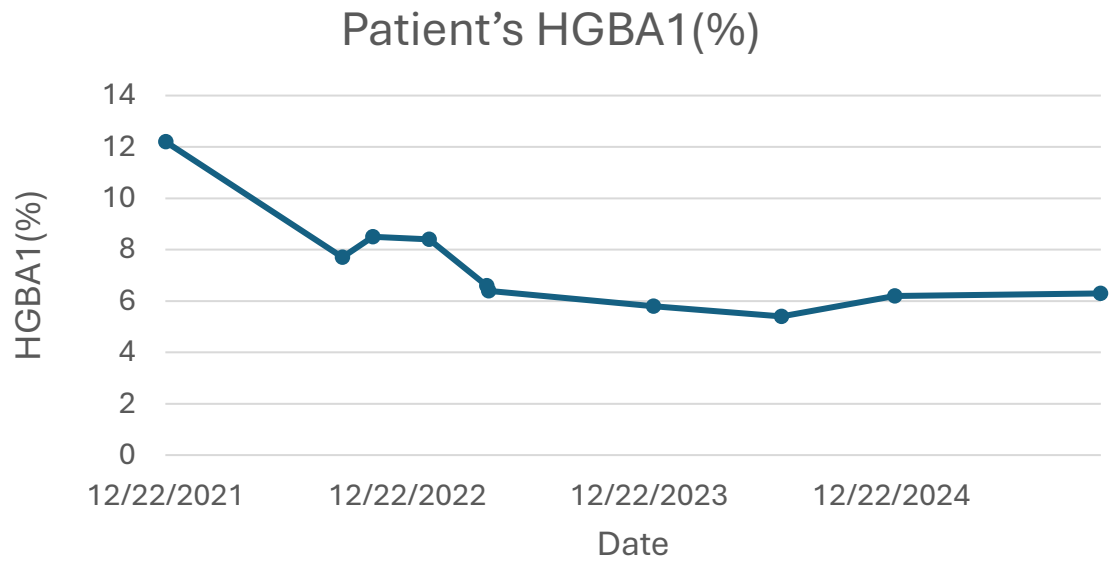
Past Medications:

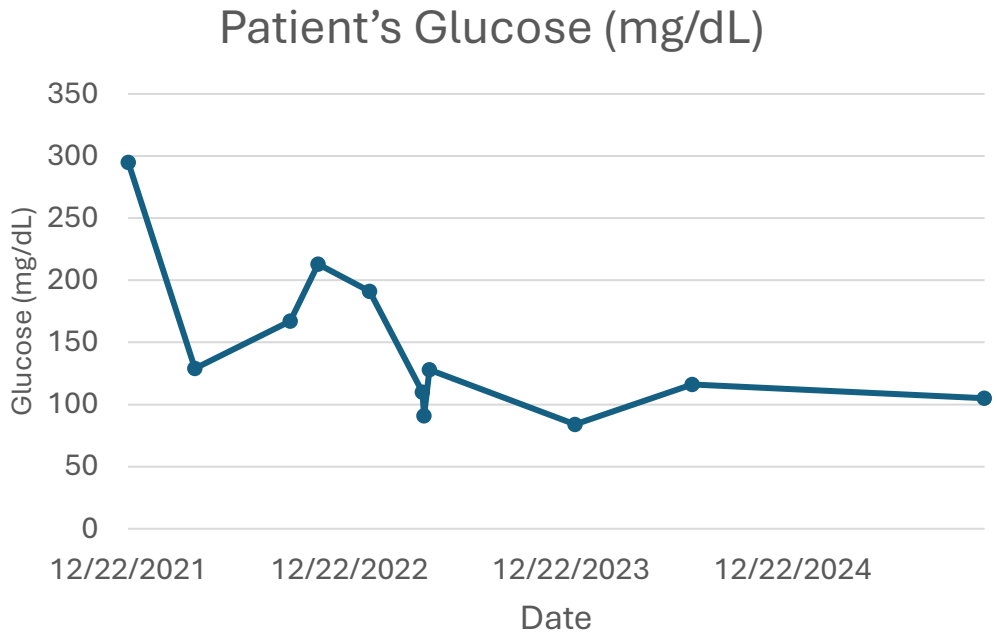
- Atorvastatin (Lipitor) 10mg, 20mg PO QD
- Lisinopril 5mg PO QD
- Metoprolol succinate (Toprol XL) 25mg QD
- Oxycodone (Roxicodone) 5mg PO q4 PRN
- Metformin (Glucophage) 500mg 2xPO BID
- Gabapentin (Neurontin 300mg PO
- Brompheniramine-Pseudoephrine DM (Bromfed DM) oral syrup 5mL PO q4 PRN
- Docusate sodium (Colace) 100 mg PO
- Linaclotide (Linzess) 145 mcg PO QD
- Ondansetron Hcl (Zofran) 4mg PO Q8 PRN
- Polyethylene glycol (Miralax) PO
- Methylprednisolon (Medrol) 4mg PO
- Cyclobenzaprine (Flexeril) 5 mg oral tablet TID PRN
- Cyanocobalamin (Vitamin B12) 1000mcg IM

- **Current Medications:**
- cholecalciferol, Vitamin D3, (VITAMIN D3) 125 mcg (5,000 unit) oral tablet
- estradioL 0.025 mg/24 hr TD
- semaglutide (OZEMPIC) 0.25 mg or 0.5 mg (2 mg/3 mL)

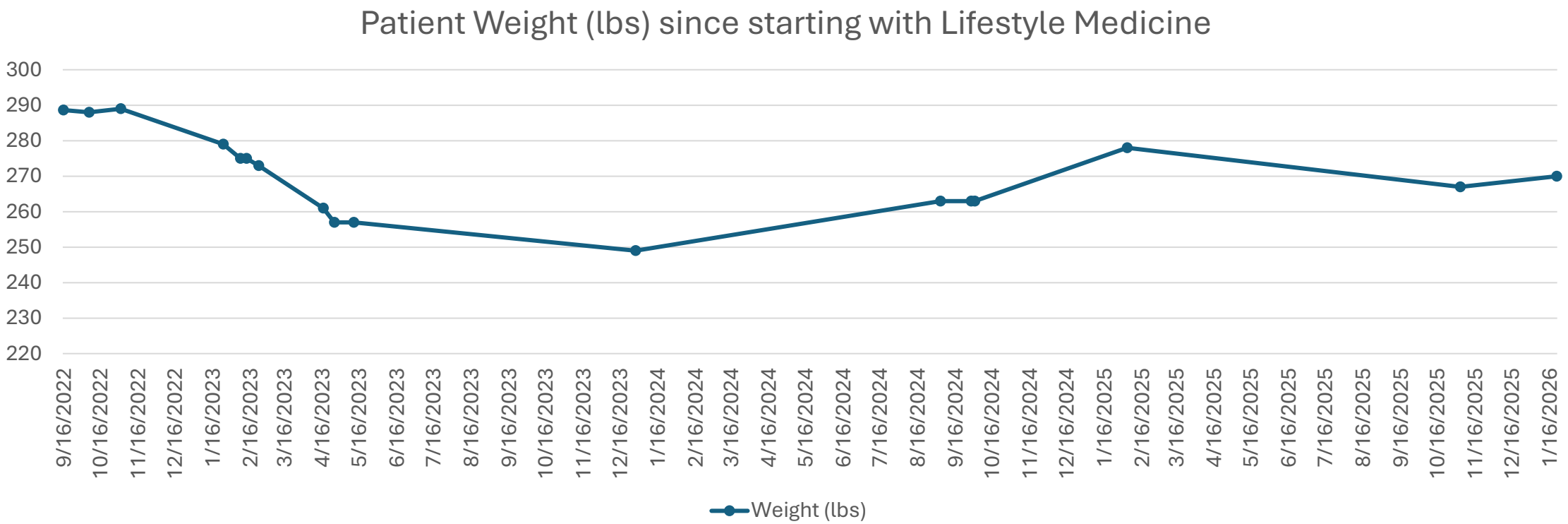
Health Trends over time

Patient started with Lifestyle Medicine: **September 2022**





Patient Height: 5 ft 10 in
BMI: decrease from 41.38 to 38.74
Weight: decrease from 288 to 270 (18 lbs lost)
% Total Body Weight Lost: 6.25%
Research has shown that as low as 3 to 5% total body weight lost correlates with improved health outcomes



LM is Needed Now More Than Ever

Unhealthy lifestyle behaviors are at the root of the global burden of noncommunicable diseases and account for about 63% of all deaths.

Poor diet is the leading cause of poor health in the U.S. and the root cause of more than half a million deaths per year.

Only 5% of the adult population of the U.S. practices all positive lifestyle measures known to significantly reduce the risk of developing cardiovascular disease (CVD).

American Heart Association Strategic Planning Task Force and Statistics Committee. Defining and setting national goals for cardiovascular health promotion and disease reduction: the American Heart Association's strategic impact goal through 2020 and beyond. Circulation. 2010 Feb 2; 121 (4): 586-613. doi:10.1161/CIRCULATIONAHA. 109.192703.

Scope of Lifestyle Medicine

Primary prevention

- Preventing a disease from developing by modifying the behavioral or environmental cause

Secondary prevention

- Modifying existing risk factors to avert the disease

Tertiary prevention

- Rehabilitation from a disease state and prevention of recurrence

UPMC Lifestyle Medicine

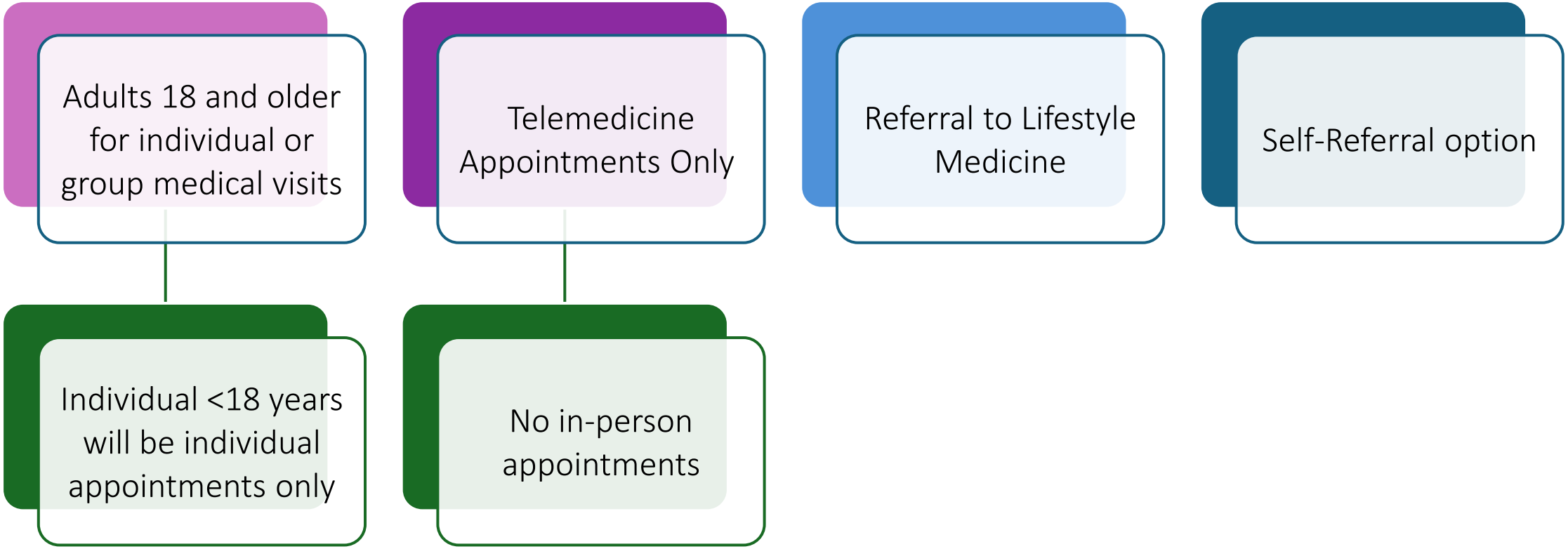
Does **NOT**:

Prescribe medication

- Our providers can work with referring providers on
  - Reducing medications based on positive effects of Lifestyle Medicine

ThePhoto by PhotoAuthor is licensed under CCYYSA.

UPMC Lifestyle Medicine Facts



UPMC Lifestyle Medicine is transitioning from Electronic Consults to Referral to Lifestyle Medicine in Epic. Consult/Referral to Lifestyle Medicine. Referrals are given priority scheduling over self-referrals.

UPMC Lifestyle Medicine does *not* accept direct/self-referrals for dietitian services only.

Lifestyle Medicine Communication

MyUPMC Messaging

- Primary way of scheduling
- Patients CANNOT respond to a message if older than 2 weeks
- If patients do not read our initial messages to schedule we will reach out via phone and document in Epic.
- Direct questions regarding patients in Epic
  - Fam Med Lifestyle clinical – 1079900102

Phone & Email

- Responses to phone & email may take 1-3 business days
- Department email is used only for general communication

Insurance

Challenges

- University of Pittsburgh Physician Services Department of Family Medicine (UPP DFM)
- Specialist or primary care?

In-Network?

- Telemedicine only
- Downtown Pittsburgh address

Credentialing

- Each provider may have differing privileges/credentialing

Lifestyle Medicine Services

Lifestyle Medicine Assessment

- Individual appointment with a Lifestyle Medicine physician/physician assistant designed to thoroughly review patient medical history, readiness, and appropriateness for Lifestlye Medicine services
- Follow-up appointments scheduled accordingly

Group Medical Visit

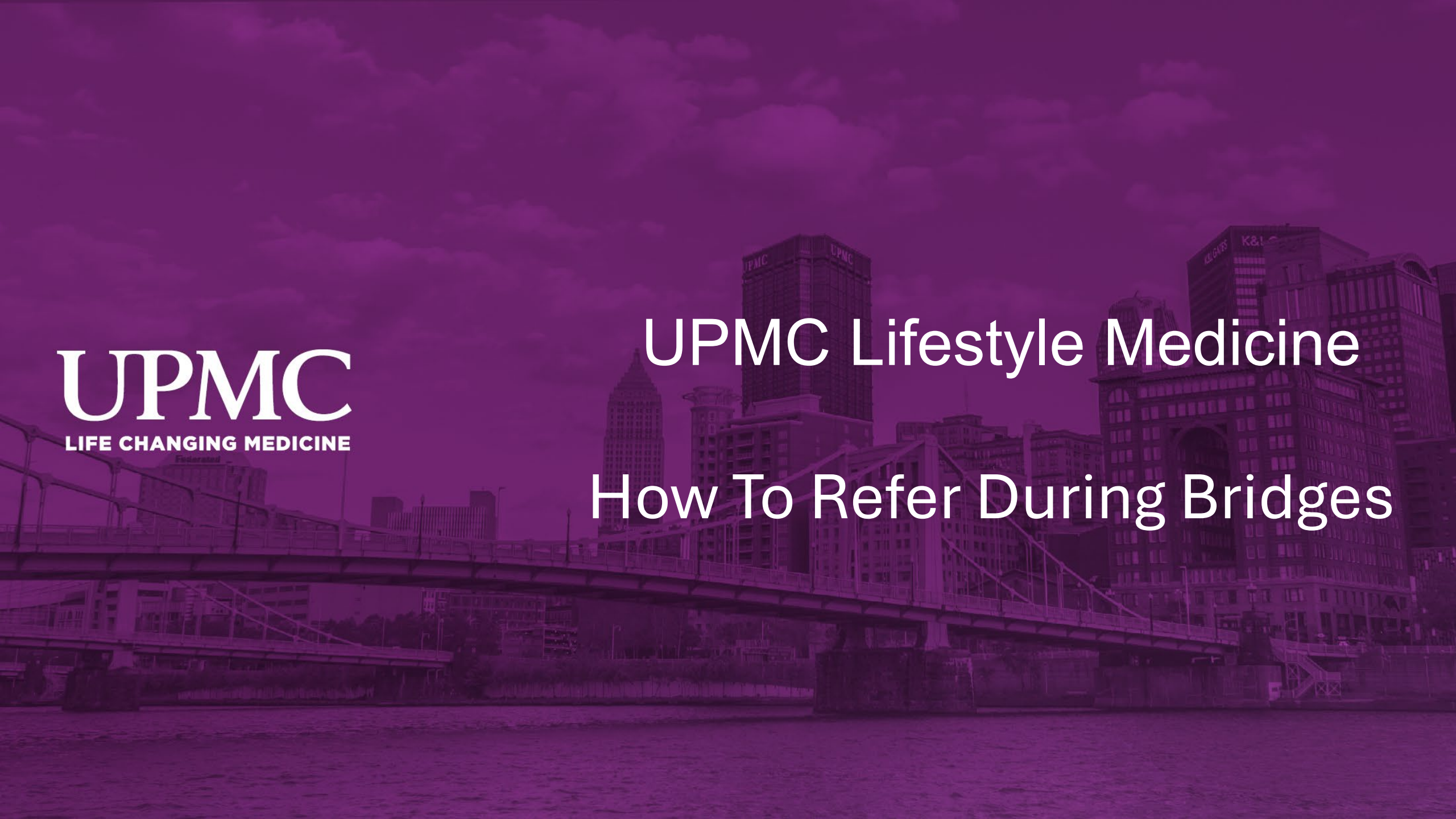
- Lifestyle Medicine provider meets with a group of ~8-12 patients with similar health concerns to discuss the topic, learn how lifestyle changes can positively improve health, and then actively work on making changes.
- Duration, frequency, and topics vary

Nutrition Services

- Medical Nutrition Therapy
  - Direct referral to our dietitian
- Nutrition Counseling
  - Co-visit with a nutritionist and physician
- Diabetes Counseling
  - Co-visit with a nutritionist specializing in diabetes/pre-diabetes and a physician

Lifestyle Coaching : Individual and Group Coaching Appointments

- Appointments designed for maintaining, progressing, and assessing the effectiveness of a patient's current Lifestyle Medicine plan and goals via coaching.
  - Coaching services are supplemental to other services and appointments are limited



UPMC Lifestyle Medicine

How To Refer During Bridges

WAVE 1:
EMAIL or FAX

Email;

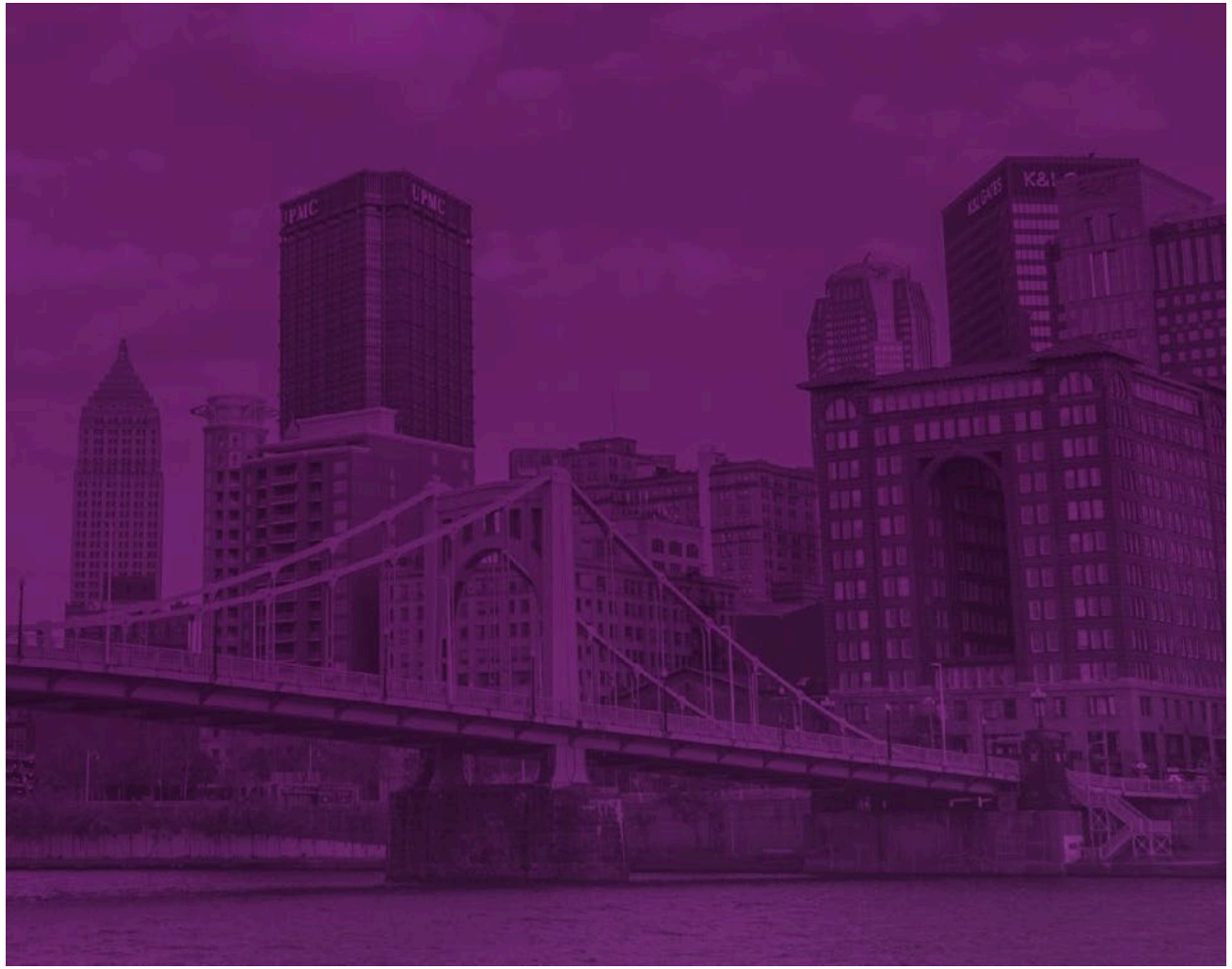
Lifestylemed@upmc.edu

Fax number:

724-786-7695

For immediate assistance:

kerrm5@upmc.edu



PLEASE INCLUDE THE FOLLOWING WITH REFERRALS:

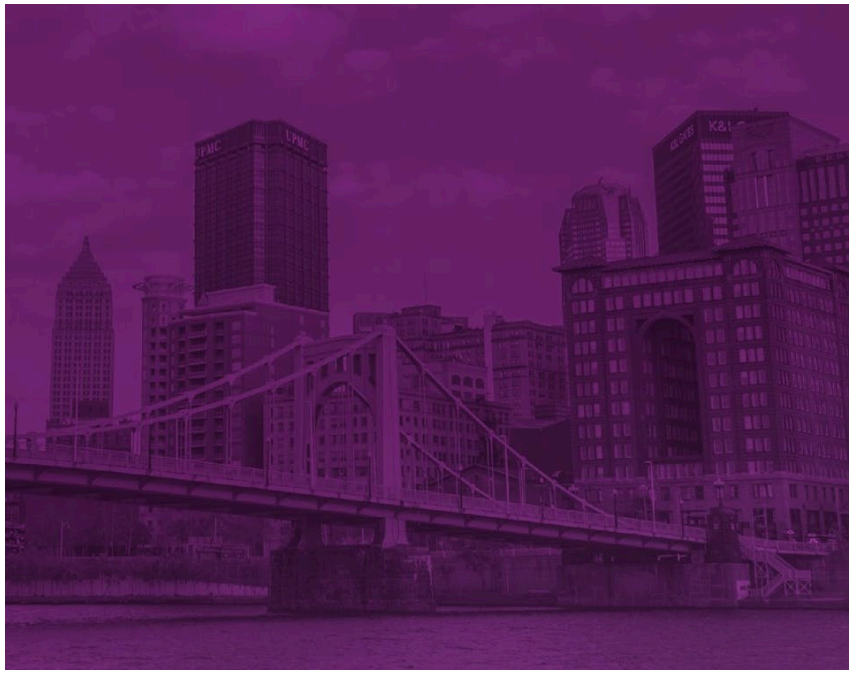
REASON for referral

- Anti-inflammatory lifestyle to support _____
  - HTN, CKD, Renal Calculi, DM, HLD, Obesity, etc
- Stress manage to assist with reducing chronic inflammation
- Sleep and stress management to balance hormones for skin repair
- Mind-Body techniques with stress reduction to manage exacerbations
- Others, etc. (many options)

ADDITIONALLY, include if you prefer placement in a specific group visit OR with a specific Lifestyle Medicine provider

For nutrition services: place a referral for Lifestyle Medicine

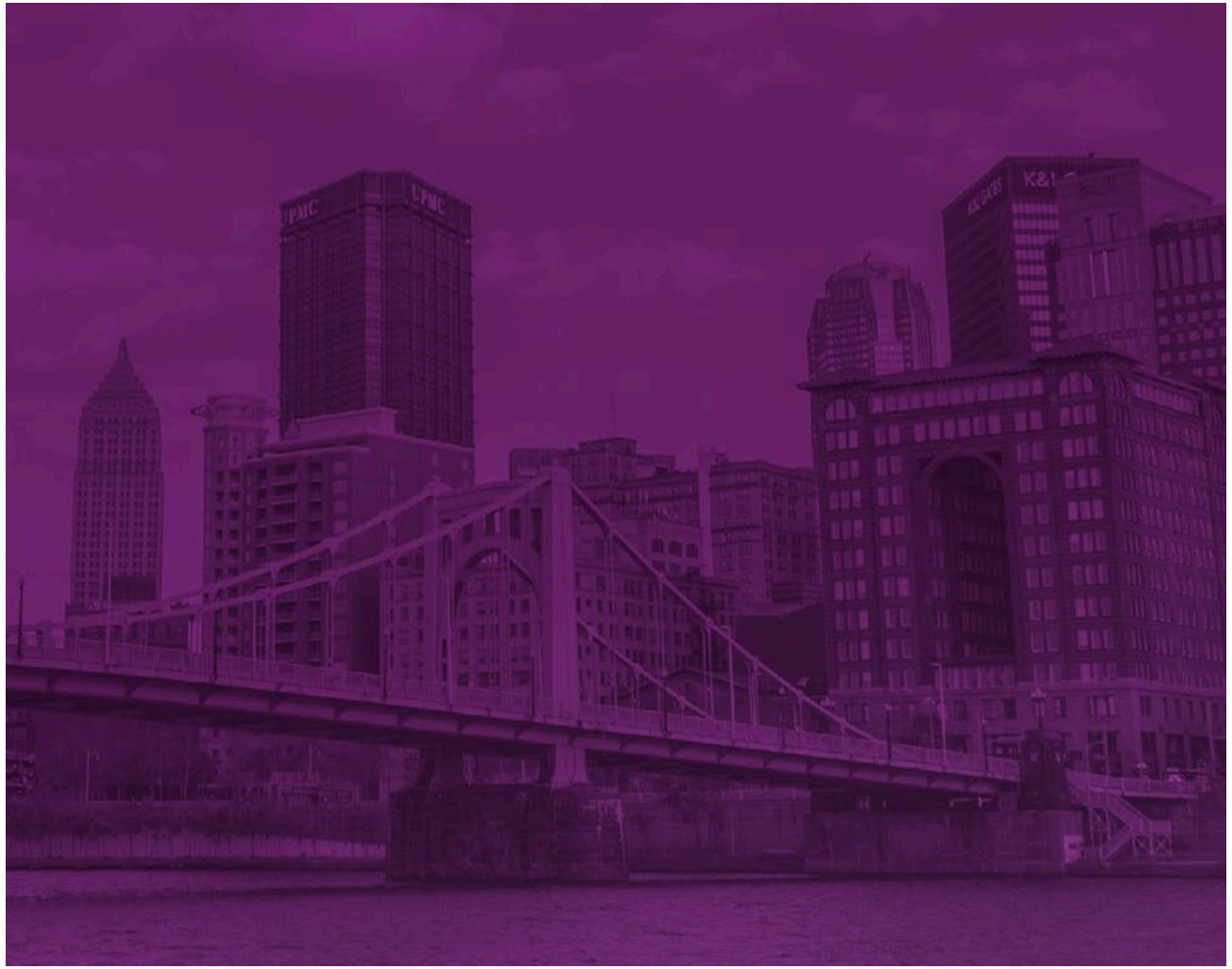
- We do not offer direct referral to Medical Nutrition Therapy but we have dietitians and nutritionists working with our team.



WAVE 2:

EPIC

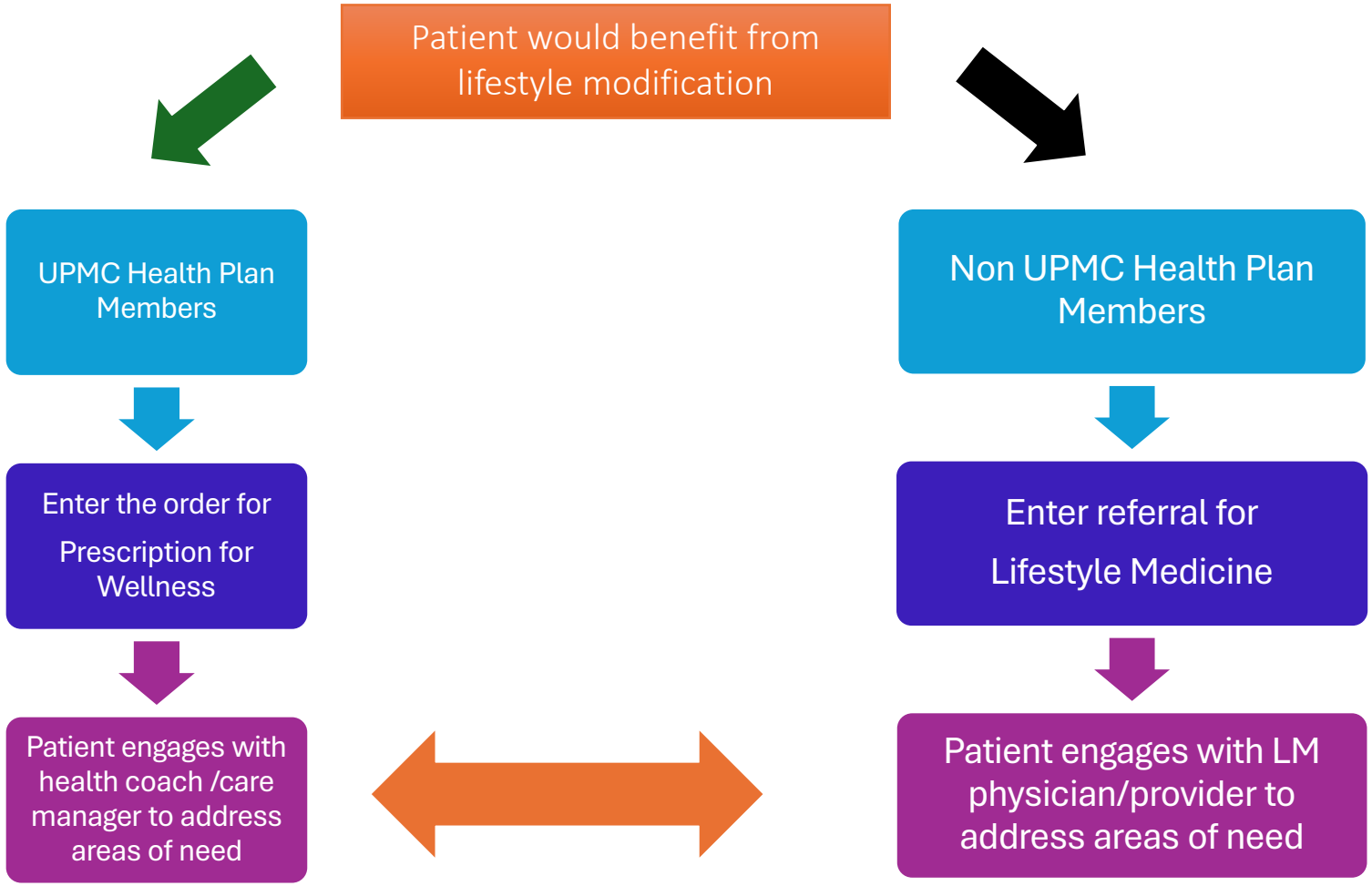
CONSULT/REFERRAL TO LIFESTYLE MEDICINE



<u>For immediate assistance:</u>

kerrm5@upmc.edu

Entering a Patient Referral Based on Health Plan Coverage



UPMC Health Plan

Bonus: ACLM Dot Phrases

- The American College of Lifestyle Medicine (ACLM) patient handouts have been created into dot phrases.
  - Include Spanish versions of the handouts
  - All dot phrases start with .ACLM and can be found by searching under mySmartPhrases. See instructions on next slides
  - We are working to have these easier to access by just typing .ACLM but for now search under mySmart Phrases

Accessing ACLM handouts

Apollo Neuro

Heart Rate Variability and Stress Management Enhancement

- A wearable technology
  - Enhances autonomic tone by delivering gentle sound wave vibrations anywhere on the body, through our sense of touch.
  - Currently commercially available and used by children and adults.
- Now being studied to improve clinician wellbeing
  - Currently recruiting

You're Invited

Heart Rate Variability and Stress Management Enhancement

This study will be conducted by using a Tuned Vibroacoustic Stimulation device **(Apollo Neuro)** developed at the University of Pittsburgh that has been shown to improve heart rate variability and recovery under stress in clinical studies.

Objective: assess whether slight modulation of heart rate variability (HRV) will result in a reduction in stress, improved recovery, and recovery in and around the hospital.

Duration: 8 weeks

https://pitt.co1.qualtrics.com/jfe/form/SV_0pvEaxUcaAglmse

ABRIDGE

Developed @ UPMC:

Artificial Intelligence as SCRIBE to reduce physician burnout from notetaking.
NYT article: reduced pajama time, increased family time and free time, allowing physicians to more mindfully practice medicine.

The New York Times

"All the News That's Fit to Print" TUESDAY, JUNE 27, 2023 Reprinted With Permission

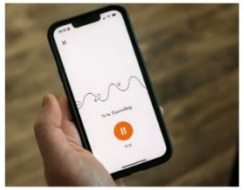
National

A.I. May Someday Work Medical Miracles. For Now, It Helps Do Paperwork.

The best use for generative A.I. in health care, doctors say, is to ease the heavy burden of documentation that takes them hours a day and contributes to burnout.

AUDRA MELTON FOR THE NEW YORK TIMES

Dr. Matthew Hitchcock, a family practice physician in Tennessee, uses Abridge A.I. software to produce summaries of patient visits.



AUDRA MELTON FOR THE NEW YORK TIMES

Abridge, founded in 2018, provides an automated solution to a modern clerical overload in health care by using A.I. to record and generate a summary of patient visits.

MADDIE MCGARVEY FOR THE NEW YORK TIMES

Using A.I. software, Dr. Michelle Thompson said, has freed up two hours in her workday and has helped patients become more engaged in their care.

By STEVE LOHR

Dr. Matthew Hitchcock, a family physician in Chattanooga, Tenn., has an A.I. helper.

It records patient visits on his smartphone and summarizes them for treatment plans and billing. He does some light editing of what the A.I. produces, and is done with his daily patient visit documentation in 20 minutes or so.

Dr. Hitchcock used to spend up to two hours typing up these medical notes after his four children went to bed. "That's a thing of the past," he said. "It's quite awesome."

ChatGPT-style artificial intelligence is coming to health care, and the grand vision of what it could bring is inspiring. Every doctor, enthusiasts predict, will have a superintelligent sidekick, dispensing suggestions to improve care.

But first will come more mundane applications of artificial intelligence. A prime target will be to ease the crushing burden of digital paperwork that physicians must produce, typing lengthy notes into electronic medical records required for treatment, billing and administrative purposes.

For now, the new A.I. in health care is going to be less a genius partner than a tireless scribe.

From leaders at major medical centers to family physicians, there is optimism that health care will benefit from the latest advances in generative A.I. — technology that can produce everything from poetry to computer programs, often with human-level fluency.

> A mundane task responsible for high levels of burnout.

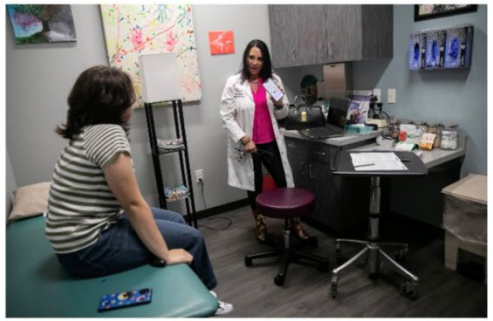
But medicine, doctors emphasize, is not a wide open terrain of experimentation. A.I.'s tendency to occasionally create fabrications, or so-called hallucinations, can be amusing, but not in the high-stakes realm of health care.

That makes generative A.I., they say, very different from A.I. algorithms, already approved by the Food and Drug Administration, for specific applications, like scanning medical images for cell clusters or subtle patterns that suggest the presence of lung or breast cancer. Doctors are also using chatbots to communicate more effectively with some patients.

Physicians and medical researchers say regulatory uncertainty, and concerns about patient safety and litigation, will slow the acceptance of generative A.I. in health care, especially its use in diagnosis and treatment plans.

Those physicians who have tried out the new technology say its performance has improved markedly in the last year. And the medical note software is designed so that doctors can check the A.I.-generated summaries against the words spoken during a patient's visit, making it verifiable and fostering trust.

"At this stage, we have to pick our use cases carefully," said Dr. John Halamka, president of Mayo Clinic Platform, who oversees the health system's adoption of artificial intelligence. "Reducing the documentation burden would be a huge win on its own."



PHOTOGRAPHS BY MADDIE MCGARVEY FOR THE NEW YORK TIMES

Using A.I. software, Dr. Michelle Thompson said, has freed up two hours in her work day and has helped patients become more engaged in their care.

Recent studies show that doctors and nurses report high levels of burnout, prompting many to leave the profession. High on the list of complaints, especially for primary care physicians, is the time spent on documentation for electronic health records. That work often spills over into the evenings, after-office-hours toil that doctors refer to as "pajama time."

Generative A.I., experts say, looks like a promising weapon to combat the physician workload crisis.

"This technology is rapidly improving at a time health care needs help," said Dr. Adam Landman, chief information officer of Mass General Brigham, which includes Massachusetts General Hospital and Brigham and Wom-en's Hospital in Boston.

For years, doctors have used various kinds of documentation assistance, including speech recognition software and human transcribers. But the latest A.I. is doing far more: summarizing, organizing and tagging the conversation between a doctor and a patient.

Companies developing this kind of technology include Abridge, Ambience Healthcare, Augmedix, Nuance, which is part of Microsoft, and Suki.

Ten physicians at the University of Kansas Medical Center have been using generative A.I. software for the last two months, said Dr. Gregory Ator, an ear, nose and throat specialist and the center's chief medical informatics officer. The medical center plans to eventually make the software available to its 2,200 physicians.

But the Kansas health system is steering clear of using generative A.I. in diagnosis, concerned that its recommendations may be unreliable and that its reasoning is not transparent. "In medicine, we can't tolerate hallucinations," Dr. Ator said. "And we don't like black boxes."

Studies show that patients forget up to 80 percent of what physicians say during a visit, so an A.I.-generated summary is a resource for patients to return to.

The University of Pittsburgh Medical Center has been a test bed for Abridge, a start-up led and co-founded by Dr. Shivdev Rao, a practicing cardiologist who was also an executive at the medical center's venture arm.

Abridge was founded in 2018, when large language models, the technology engine for generative A.I., emerged. The technology, Dr. Rao said, opened a door to an automated solution to the clerical overload in health care, which he saw around him, even for his own father.

"My dad retired early," Dr. Rao said. "He just couldn't type fast enough."

Today, the Abridge software is used by more than 1,000 physicians in the University of Pittsburgh medical system.

Dr. Michelle Thompson, a family physician in Hermitage, Pa., who specializes in lifestyle and integrative care, said the software had freed up nearly two hours in her day. Now, she has time to do a yoga class, or to linger over a sitdown family dinner.

Another benefit has been to improve the experience of the patient visit, Dr. Thompson said. There is no longer typing, notetaking or other distractions. She simply asks patients for permission to record their conversation on her phone.

"A.I. has allowed me, as a physician, to be 100 percent present for my patients," she said.

The A.I. tool, Dr. Thompson added, has also helped patients become more engaged in their own care. Immediately after a vis-it, the patient receives a summary, accessible through the University of Pittsburgh medical system's online portal.

The software translates any medical terminology into plain English at about a fourth-grade reading level. It also provides a re-cording of the visit with "medical moments" color-coded for medications, procedures and diagnoses. The patient can click on a colored tag and listen to a portion of the conversation.

Studies show that patients forget up to 80 percent of what physicians and nurses say during visits. The recorded and A.I.-generated summary of the visit, Dr. Thompson said, is a resource her patients can return to for reminders to take medications, exercise or schedule follow-up visits.

After the appointment, physicians receive a clinical note summary to review. There are links back to the transcript of the doctor-patient conversation, so the A.I.'s work can be checked and verified. "That has really helped me build trust in the A.I.," Dr. Thompson said.

In Tennessee, Dr. Hitchcock, who also uses Abridge software, has read the reports of ChatGPT scoring high marks on standard medical tests and heard the predictions that digital doctors will improve care and solve staffing shortages.

Dr. Hitchcock has tried ChatGPT and is impressed. But he would never think of loading a patient record into the chatbot and asking for a diagnosis, for legal, regulatory and practical reasons. For now, he is grateful to have his evenings free, no longer mired in the tedious digital documentation required by the American health care industry.

And he sees no technology cure for the health care staffing shortfall. "A.I. isn't going to fix that anytime soon," said Dr. Hitchcock, who is looking to hire another doctor for his four-physician practice.

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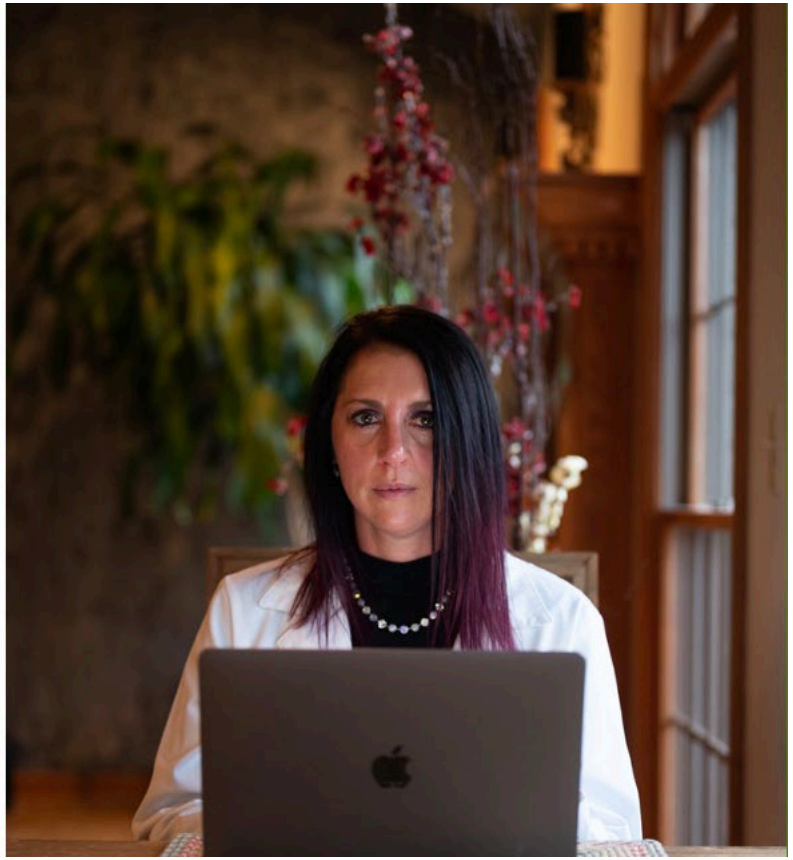
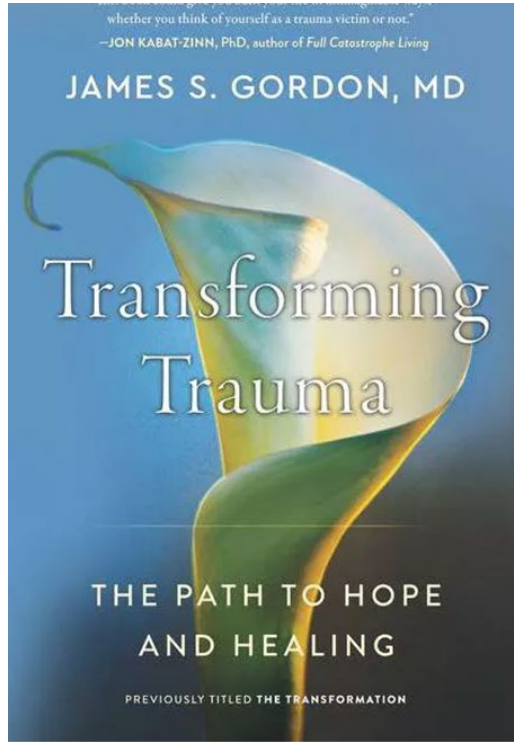
The Center for Mind-Body Medicine

The New York Times

Doctors, Facing Burnout, Turn to Self-Care

A growing number of programs aim to help doctors, nurses and medical students who are struggling with mental health issues during the pandemic.





Online MBM skill groups at

The Center for Mind-Body Medicine:

https://cmbm.org/onlinegroup/

The Center for Mind-Body Medicine

YouTube Channel:
https://www.youtube.com/user/cmbmuser

YouTube Channel:
https://www.youtube.com/channel/UCRcm8ziVeLa5yp6IAypigmQ

WHOLE HEARTED MEDICINE

https://www.wholeheartedmedicine.org/resources

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UPMC LIFESTYLE MEDICINE

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- www.bewelltherapies.org

Take Time for Self-Care

Keep to a Routine

SLEEP

A regular bed time and wake time that allows for 7 to 9 hours of sleep is optimal. Have a wind-down routine that includes limiting screen time and being in a dark, cool room.

EXERCISE

Incorporate physical activity into each day. Stand, rather than sit; take the stairs; stretch; garden; go for a walk. Remember that any movement is better than no movement.

NUTRITION

To balance mood and stabilize blood sugar, eat complex carbohydrates found in fruits, vegetables, whole grains, beans, nuts and seeds at regular intervals throughout the day.

Drink Water

Water consumption for hydration is vital! Daily goal for men: ~15.5 cups (3.7 liters). Daily goal for women: ~11.5 cups (2.7 liters).

Socialize

Reach out to friends, peers, older adults and family by phone, email, text, or social media platforms. Even brief virtual connections improve your mood and immune response.

Don't rely on alcohol as a stress reducer.

Listen to your Body

Know the signs of too much **STRESS,** and ask for help before you think you need it. **Watch out for:** muscle tension, headaches, upset stomach or difficulty sleeping. Be compassionate with yourself as well as with others.

Respect Your Emotions

Establish "no judgment" rules for yourself and your family as you experience a full range of human emotions: fear, anger, gratitude and grief.

References:
https://www.mayoclinic.org/healthy-lifestyle/nutrition-and-healthy-eating/in-depth/water/art-20044256
https://www.hhs.gov/fitness/be-active/physical-activity-guidelines-for-americans/index.html
https://www.sciencedirect.com/journal/brain-behavior-and-immunity/vol/61/suppl/C
https://www.sleepfoundation.org/articles/how-much-sleep-do-we-really-need
https://www.apa.org/helpcenter/stress-body

@ACLifeMed

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Lifestyle Sleep Health

Sleep is an extremely important part of human health. Negative effects of sleep delays or interruptions include sluggishness, low attention span, decreased sociability, depressed mood, decreased deep sleep, decreased caloric burn during the day, increased hunger and decreased feeling of fullness, insulin resistance and decreased performance.

Sleep Disrupters

- Too much food or drink close to sleep time
- Blue light from phone/computer/television screen
- Caffeine and alcohol use
- Stress/anxiety/worry
- Certain noises/sounds
- Temperature (too hot or too cold)
- Lack of daytime sunlight exposure
- Medications and medical conditions
- Bed partner and/or pets

Tips for Better Sleep

- Use bed for sleep only
- Establish regular sleep schedule (same sleep and wake times)
- Minimize/eliminate bedroom noise and lights
- Increase daytime exposure to sunlight
- Move at least every hour during the day
- Eliminate nighttime caffeine and limit daytime caffeine
- Avoid alcohol within 3 hours of bedtime
- Avoid high-sodium foods close to bedtime
- Eliminate/limit after-dinner and late-night snacking
- Maintain a healthy BMI
- Stay hydrated during the day
- Cognitive Behavioral Therapy for Insomnia
- Exercise
- Food choices
- Meditation

Sleep Management Goals

Setting goals around sleep health is a great way to increase your sleep quality. It's often easier to achieve positive goals. An example of a positive sleep goal is, "I will begin a new bedtime routine of shutting off the television and instead, read a book for at least 30 minutes before bed, four nights this week."

Specific - What are you going to do to improve your sleep quality/quantity?

Measurable - How much time, how many sessions?

Attainable - Do you have what it takes to follow through?

Realistic - What can you actually do? (improvement over perfection)

Time-Connected - How frequent? How long will you commit?

Helpful resources:

American Sleep Association: sleepassociation.org

Sleepeducation.org

Recommendations for Optimal Health

Infants* 4 months to 12 months:
12 to 16 hours per 24 hours

Children 1 to 2 years of age:
11 to 14 hours per 24 hours (including naps)

Children 3 to 5 years of age:
10 to 13 hours per 24 hours (including naps)

Children 6 to 12 years of age:
9 to 12 hours per 24 hours

Teenagers 13 to 18 years of age:
8 to 10 hours per 24 hours

Adults:
7-9 hours of sleep per 24 hours

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lifestylemedicine.org

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DIGITAL RESOURCES

YouTube

Website

Facebook

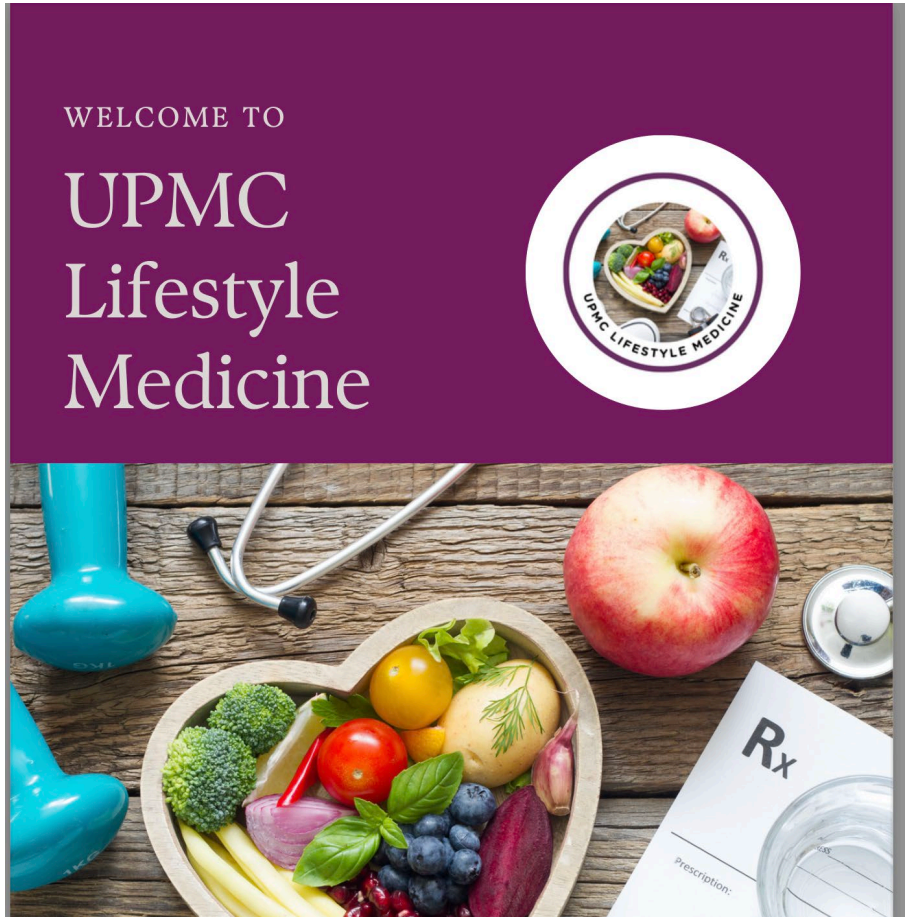
UPMC Lifestyle Medicine YouTube
https://www.youtube.com/@UPMCLifestyleMed

UPMC Lifestyle Medicine Website at Pitt Department of Family Medicine
https://www.familymedicine.pitt.edu/upmc-lifestyle-medicine

UPMC Lifestyle Medicine Private Facebook Group

https://www.facebook.com/groups/upmclifestylemedicine

LM GUIDE = smartphrase in Epic



- **UPMC Lifestyle Medicine Guide**
  - This is a 10-page e-book

- To learn more about UPMC Lifestyle Medicine, please click on Lifestyle Medicine Guide or copy/paste the URL below in any browser.

- https://acrobat.adobe.com/id/urn:aaid:sc:VA6C2:291ecf9d-c8c2-4301-b976-4f41410416d7

Lifestyle Medicine Interest Group

- OT, PT, APPs, physicians, pharmacists, residents, nurses, dietitians, respiratory therapists, students, educators, health care administrators, patient navigators, social and community health workers, kinesiologist, health coach, allied health, etc.
- ANY hospital or private practice affiliation
- Open to ALL interested in lifestyle medicine
- Sign Up Here palifestylemedicinegroup@gmail.com

Lifestyle Medicine InterestGroup
Central & Western Pennsylvania

FOLLOW US

On INSTAGRAM

Lifestyle Medicine InterestGroup
Central & Western Pennsylvania

- INTRODUCTION TO LIFESTYLE MEDICINE
- LIFESTYLE MEDICINE FOR DIABETES & PRE-DIABETES
- LIFESTYLE MEDICINE FOR SLEEP
- CHOLESTEROL & LIVER HEALTH: HYPERLIPIDEMIA & FATTY LIVER
- BRAIN HEALTH
- LIFESTYLE MEDICINE: STRESS & MIND BODY MEDICINE
- MIND BODY SKILLS GROUPS (4-VISIT SERIES & 1-VISIT MAINTENANCE)
- FOOD AS MEDICINE
- DIGESTIVE HEALTH
- GUT HEALTH
- EMOTIONAL EATING
- CULINARY MEDICINE
- MENS HEALTH
- LIFESTYLE MEDICINE FOR HIGH BLOOD PRESSURE
- FODMAPs: EATING FOR FOOD SENSITIVITIES

HORMONE HEALTH:

- MENOPAUSE
- PCOS
- Q&A: PERIMENOPAUSE & MENOPAUSE

MONTHLY WEIGHT MANAGEMENT GROUP

ADDICTIONS/HABITS & LIFESTYLE MEDICINE

TOBACCO/NICOTINE

TEACHING KITCHENS

- MEAL PLAN
- MEAL PREP
- EATING OUT

LIFESTYLE INDIVIDUAL & GROUP HEALTH COACHING

Q&A GROUPS

- MANAGING CHOLESTEROL WITH / WITHOUT MEDS
- FATTY LIVER

EATING WELL FOR LESS

- BUDGET FRIENDLY EATING FOR BREAKFAST, LUNCH, DINNER & SNACKS

SUPPORTING GRIEF WITH LIFESTYLE & MIND-BODY MEDICINE

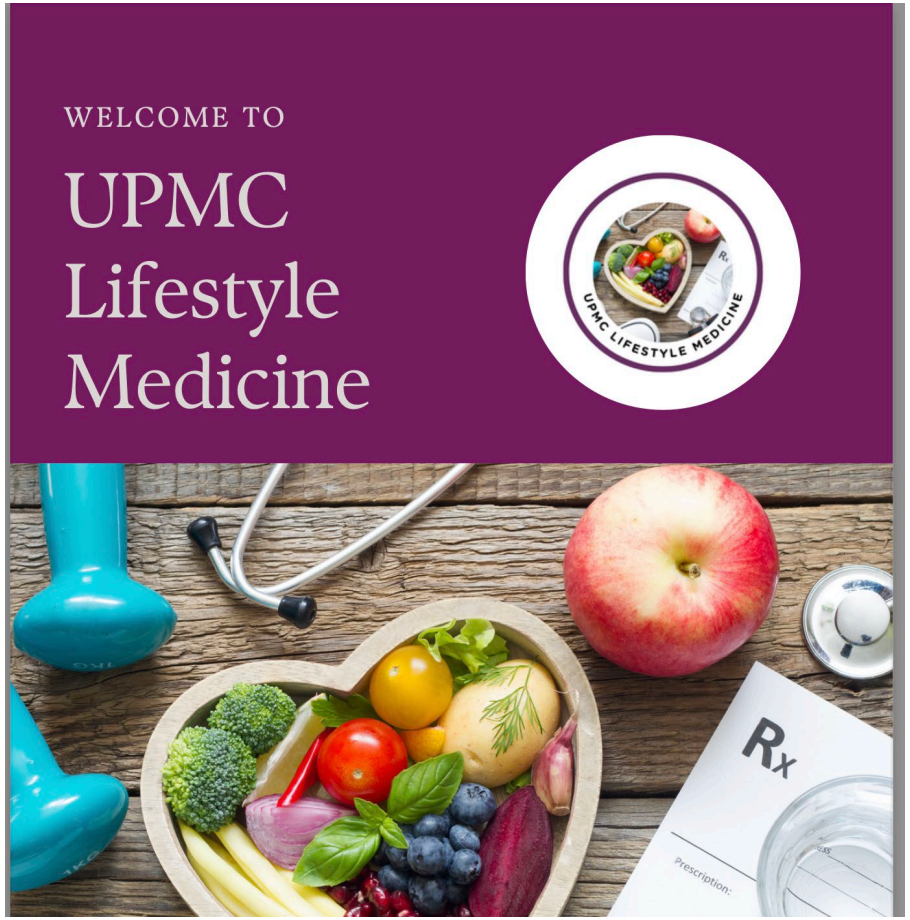
COMING SOON: MOVEMENT:

- BEGIN TO MOVE

COMING SOON

- Q&A GROUPS
  - CONSTIPATION
  - REGULATING BLOOD SUGAR
  - EATING TO REDUC INFLAMMATION

LM GUIDE = smartphrase in Epic



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Men’s Health Topics in Lifestyle Medicine

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Clinical Assistant Professor - University of Pittsburgh School of Medicine Department of Family Medicine

Family and Lifestyle Medicine Physician - University of Pittsburgh Physicians

Physician Preceptor - UPMC McKeesport Family Medicine Residency Program

Learning Objectives

- Define Lifestyle Medicine and its six core components
- Gain familiarity with the Department of Family Medicine's Lifestyle Medicine services
- Describe common topics, statistics and terms regarding Men's Health
- Make lifestyle recommendations for a variety of men's health issues

Lifestyle Medicine

- *'Lifestyle medicine is an evidence-based medical specialty that applies therapeutic lifestyle interventions to treat, reverse, and prevent chronic conditions like cardiovascular diseases, type 2 diabetes, and obesity. By empowering patients to make lifestyle behavior changes in six interconnected pillars—optimal nutrition, physical activity, restorative sleep, stress management, connectedness, and risky substance avoidance—lifestyle medicine aims to eliminate the root cause of a disease'- American College of Lifestyle Medicine*
- Board certification available for physicians and other health professionals
  - Residency-based pathway
  - Practice-based pathway
- What is Lifestyle Medicine? | Healthcare Transformation | ACLM

Lifestyle Medicine Team

- Physicians
- Physician Assistant
- Dietician
- Health Coaches

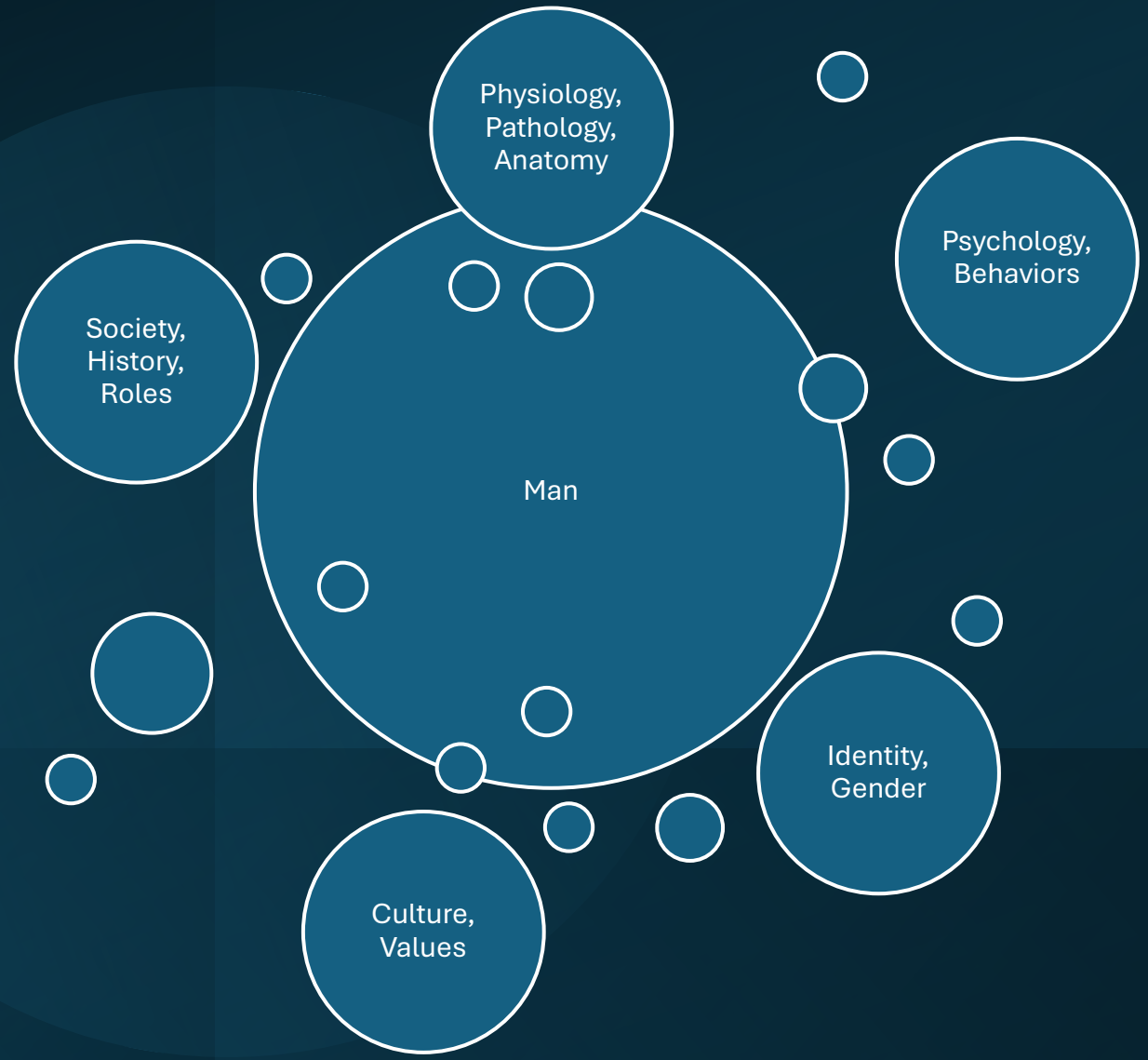
Lifestyle Medicine Services

- All services are VIRTUAL
- Referral for Lifestyle Medicine placed in Epic by other UPMC practices (Primary care, bariatric surgery, OBGYN, etc.)
- Examples of services:
  - Initial Individual Assessment (60 minutes)
  - Individual Follow Up (30 minutes)
  - Dietician co-visit
  - Health coaching sessions
  - **Group Medical Visits**

Group Medical Visits

- Physician-led visits
- Multiple patients in same video visit through Epic
- Mix of general educational information and patient-shared experiences and goals
- Examples of Topics:
  - Introduction to Lifestyle Medicine
  - Food as Medicine
  - Culinary Medicine (Cooking, Meal Prep)
  - Perimenopause/Menopause
  - Hormone Health
  - Weight Management +/- GLP1 agonist
  - **Men's Health**
  - Mind-Body Skills Groups
  - Addiction, Smoking, Habits
  - Sleep
  - Gut Health and Microbiome
  - Stress Management
  - And many more…

Men’s Health


Physiology,
Pathology,
Anatomy
Psychology,
Behaviors
Society,
History,
Roles
Man
Identity,
Gender
Culture,
Values

A place of commonality

Topics, Questions, Problems, Journeys…

- Stress management
- Emotional wellness
- Body image
- Sexual dysfunction
- Social isolation
- Dietary guidance
- Physical exercise
- Hormonal health
- Aging
- Seeking medical care
- And many more….

Common Battles?

- ‘Standard *American?* Man’
  - Thoughts?

Epidemiology

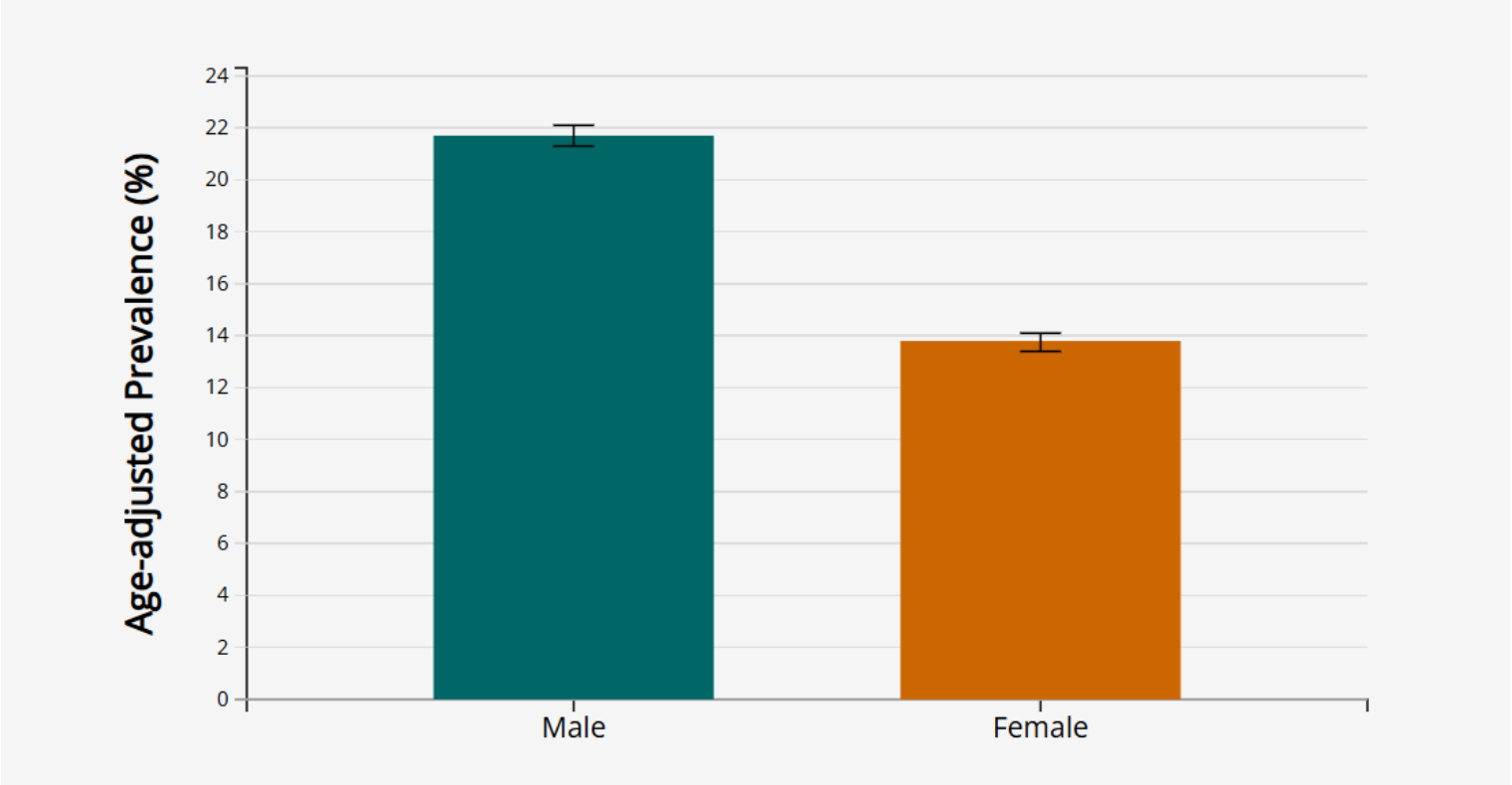
Chronic Disease Data and Surveillance | Chronic Disease | CDC

Do Men Avoid Medical Care?

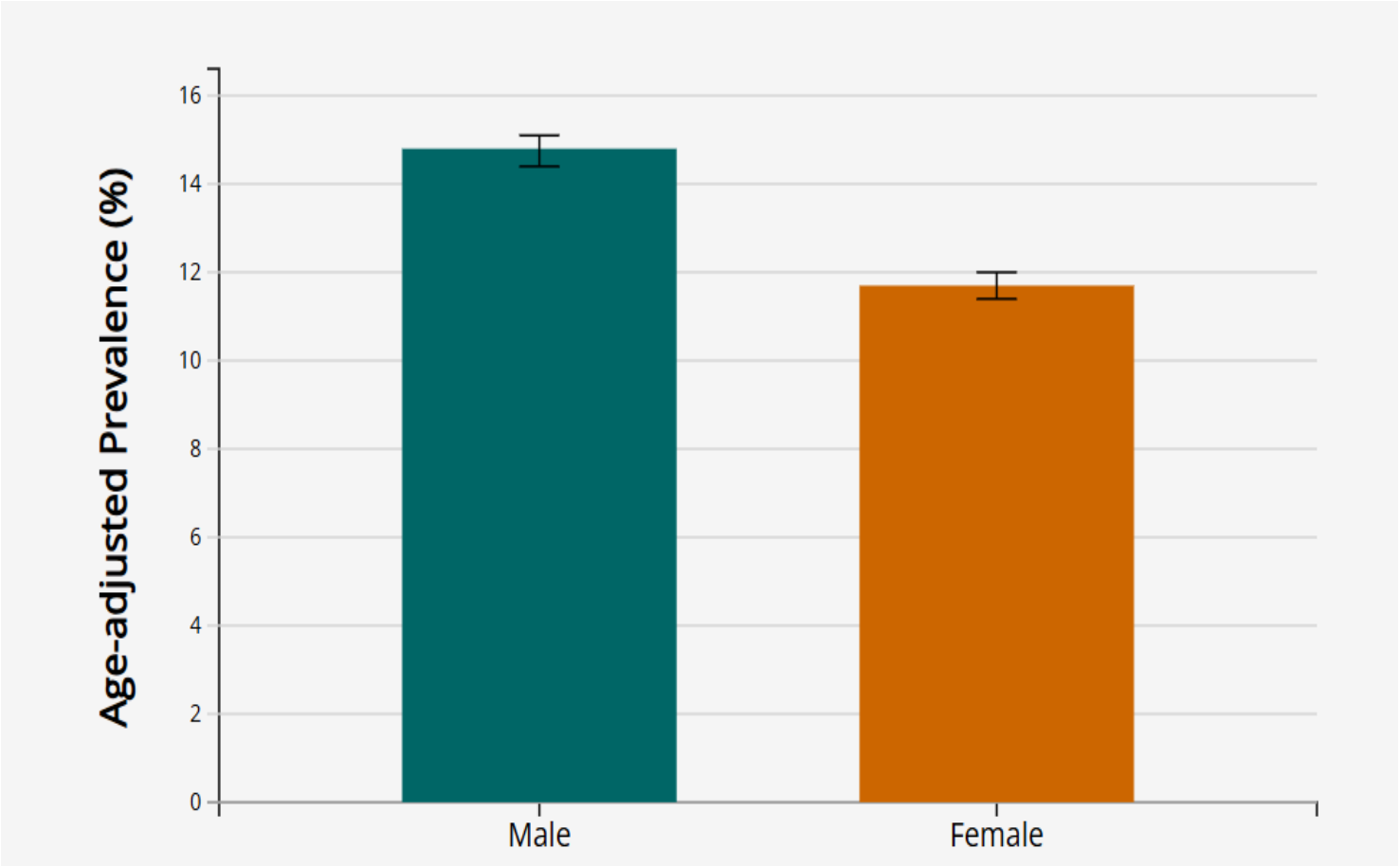
Variable numbers, but overall, yes.

- Why Do So Many Men Avoid Mental Healthcare? | Psychology Today
- Cleveland Clinic Survey: Men will do Almost Anything to Avoid Going to the Doctor
- Cleveland Clinic Survey Examines the Current State of Men's Health in America
- Clinical Advances in Sex- and Gender-Informed Medicine to Improve the Health of All: A Review | Patient Care | JAMA Internal Medicine | JAMA Network
- Gender Differences in Health Care, Status, and Use: Spotlight on Men's Health | KFF

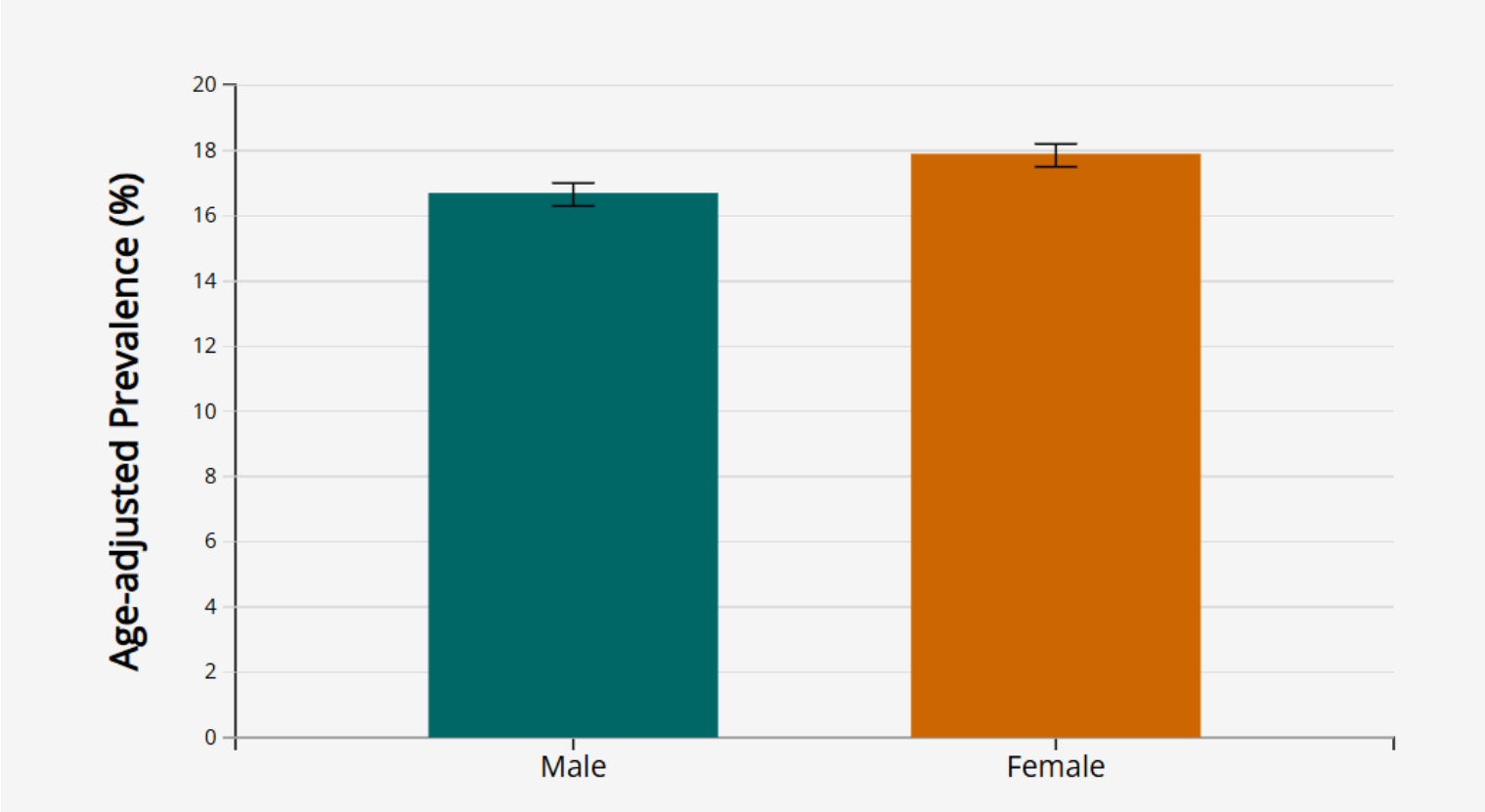
Binge Drinking



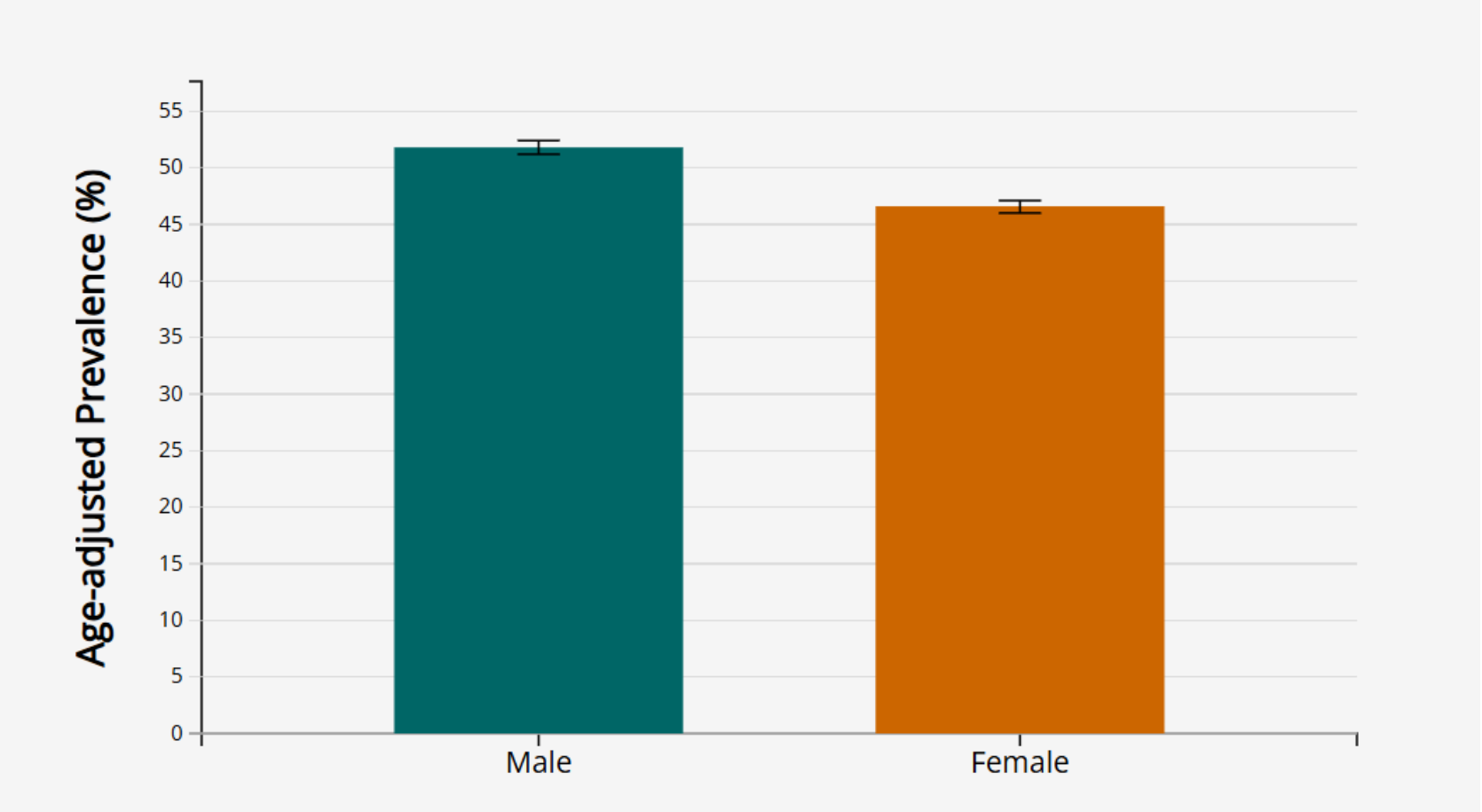
Tobacco Use



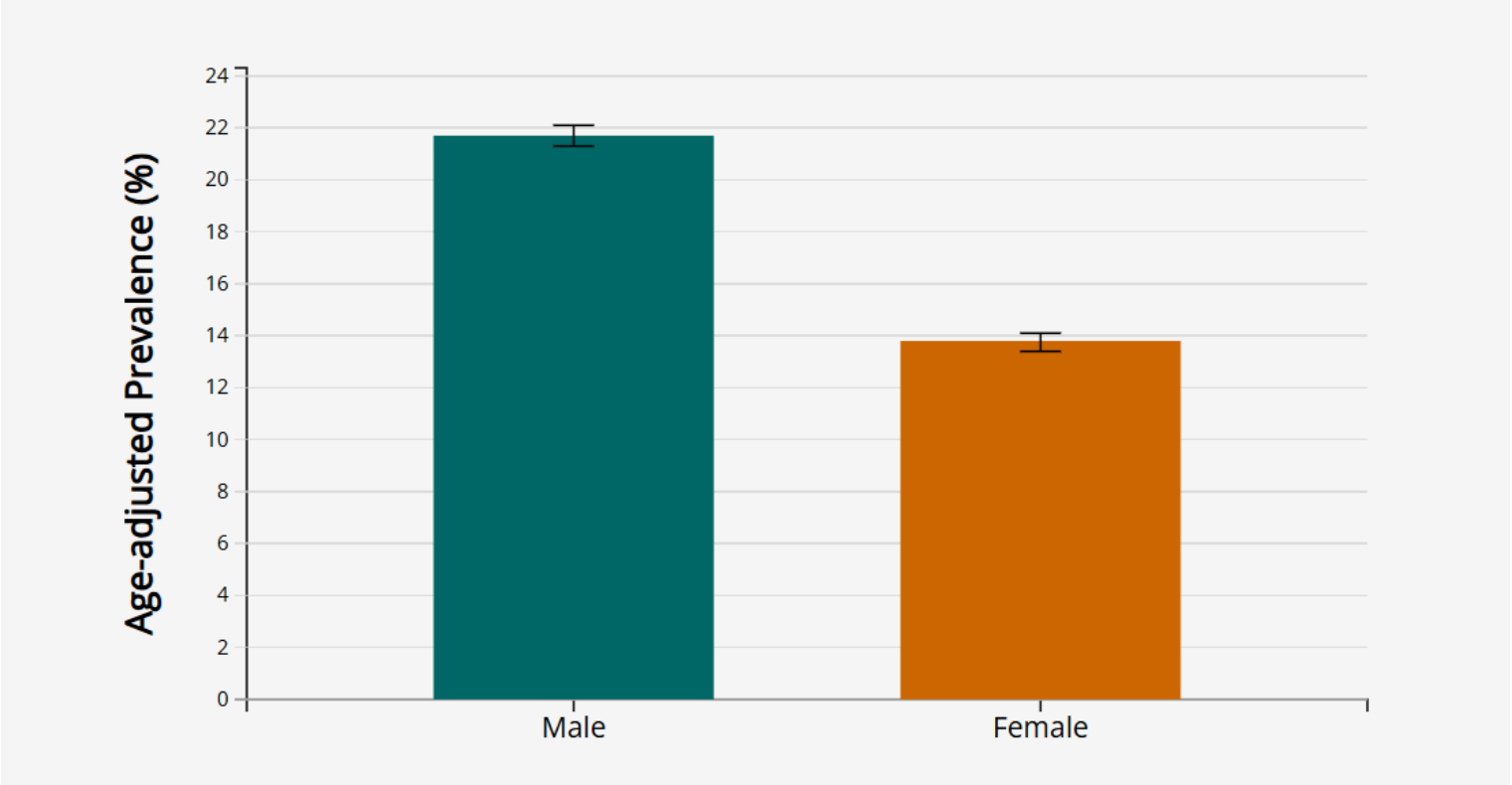
Fair to Poor Health Status (Self- Rated)



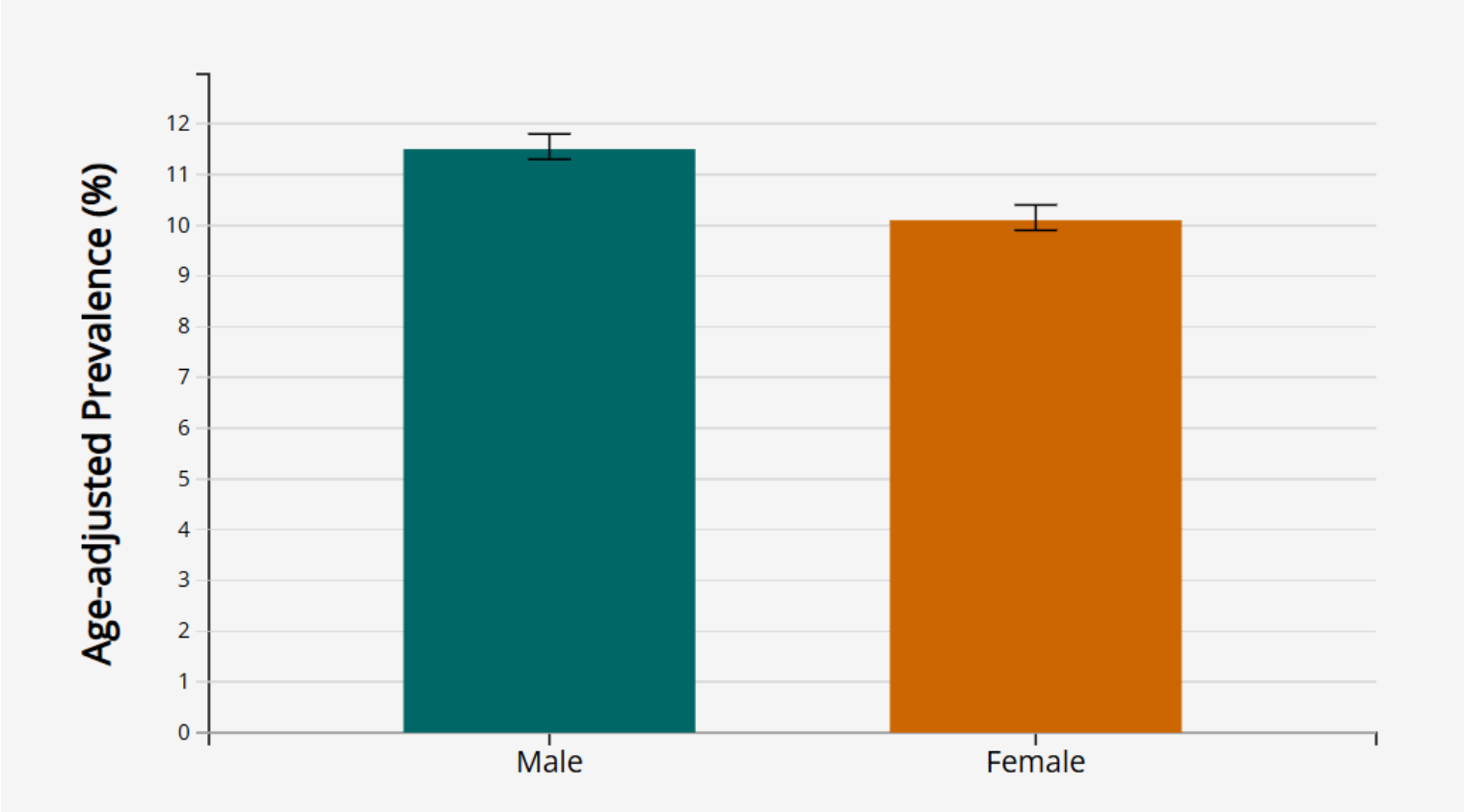
Hypertension



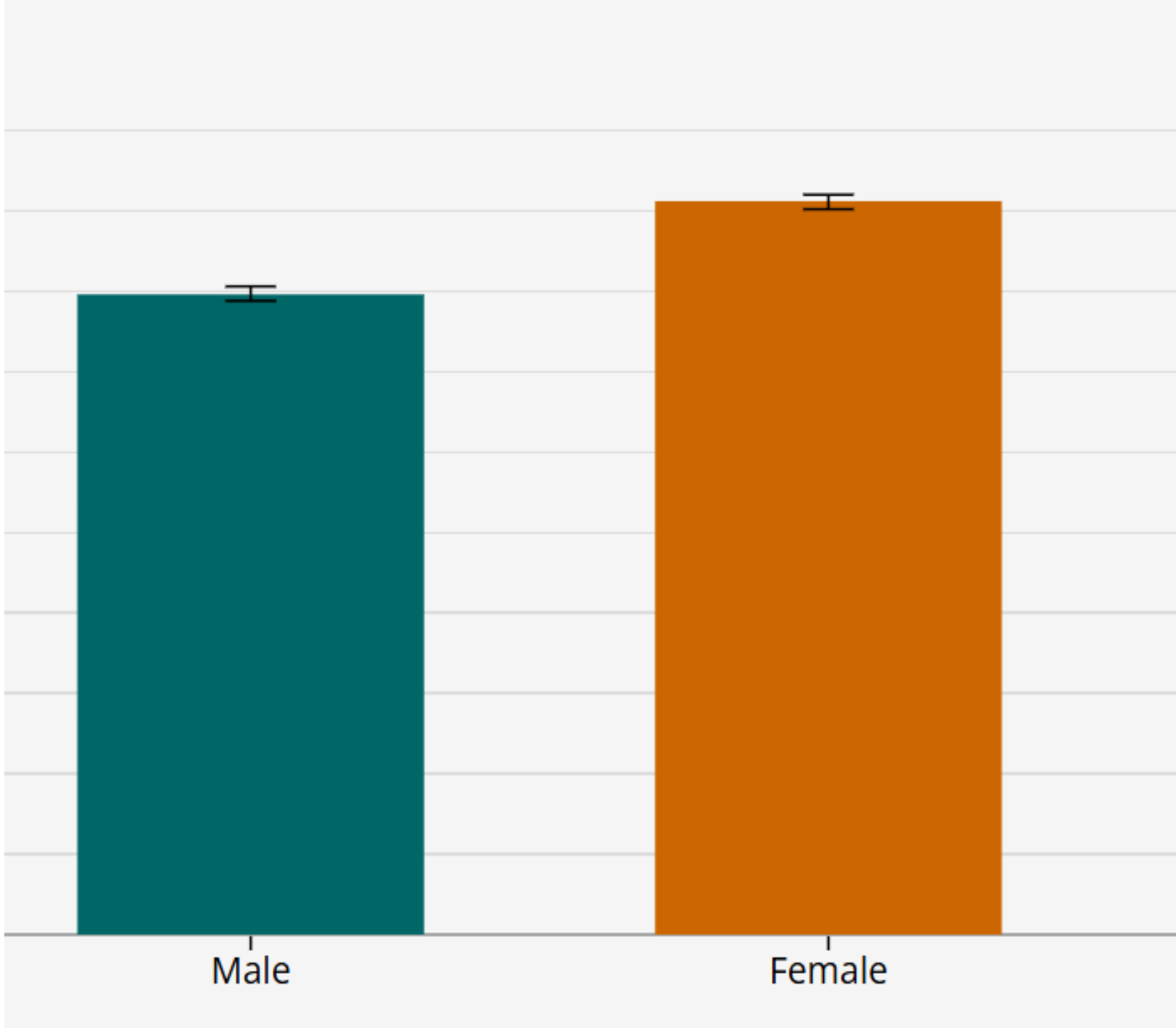
Coronary Heart Disease Mortality



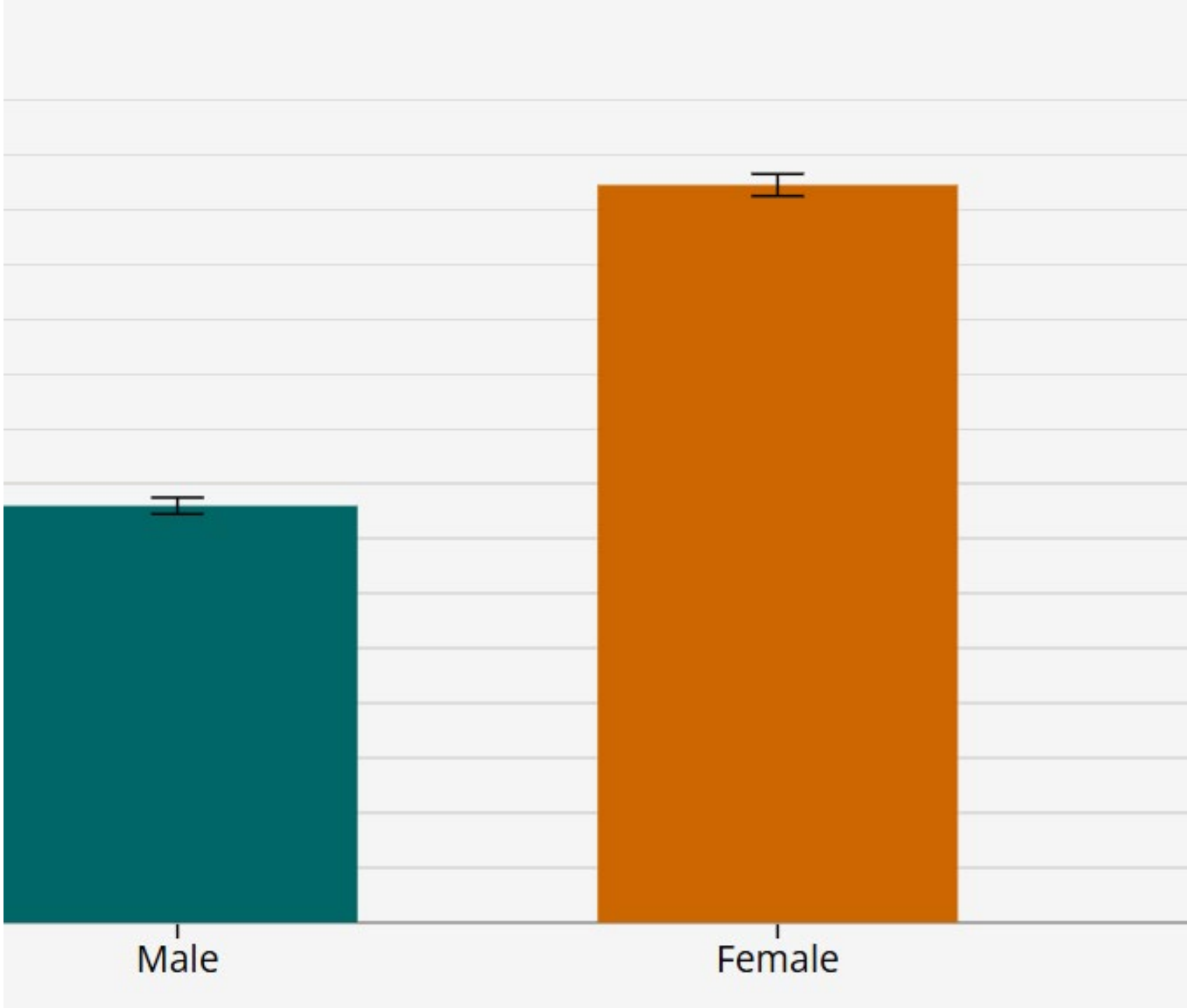
Diabetes



Receive Flu Shot

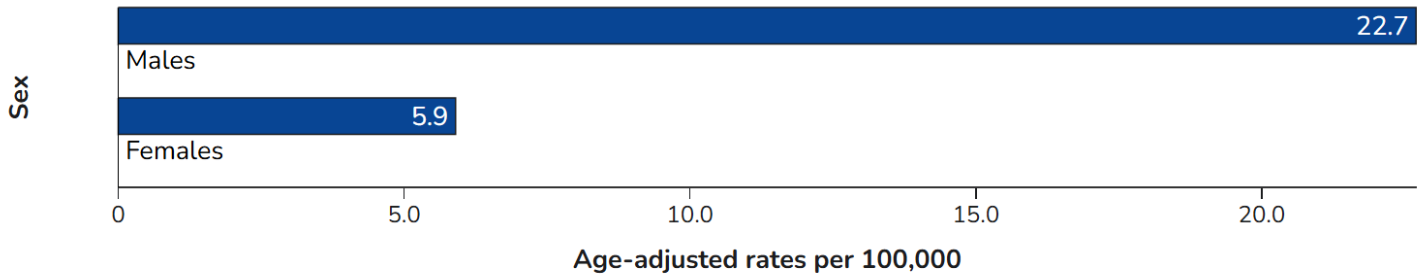


Depression Among Adults

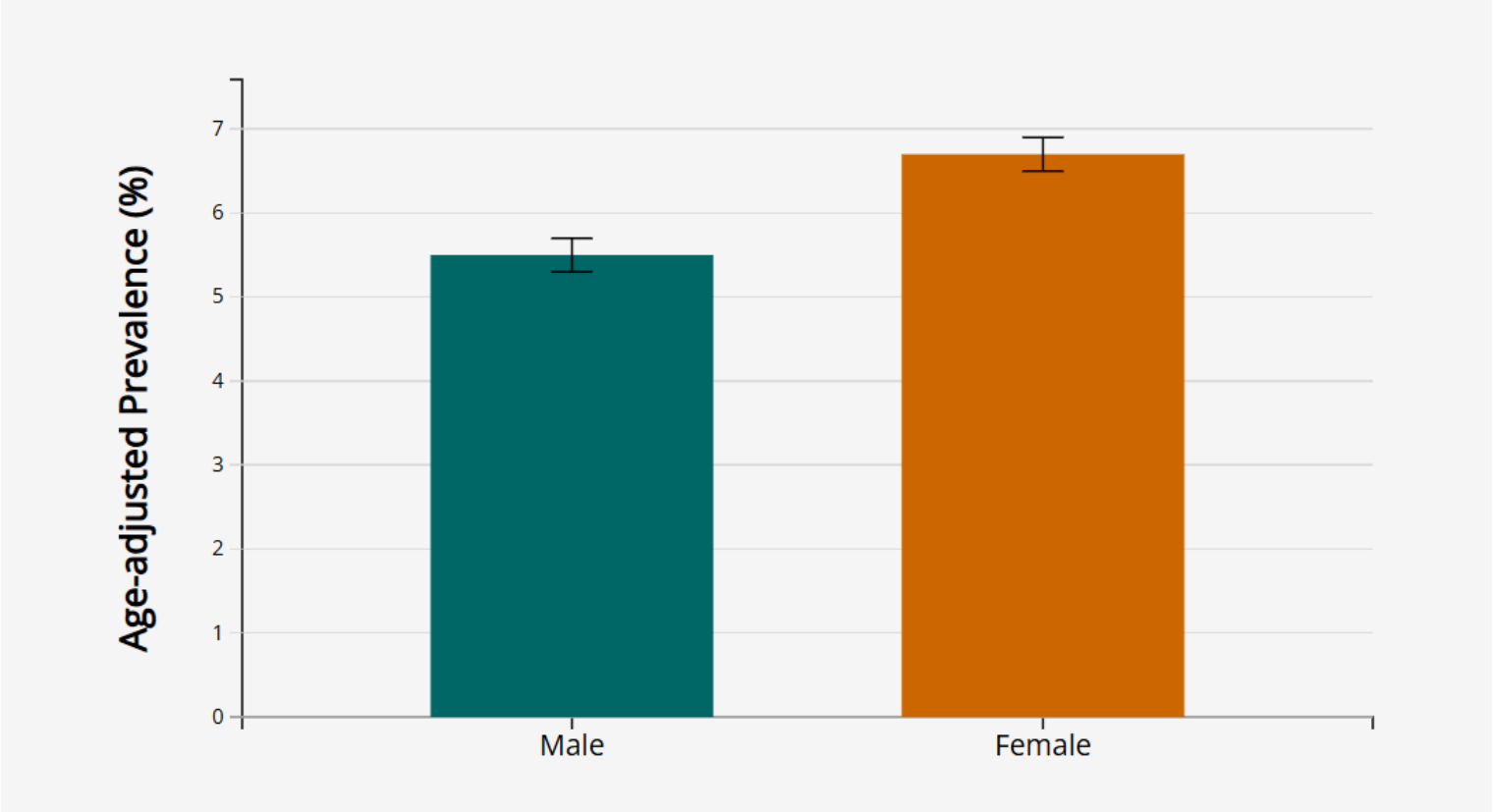


Suicide

The suicide rate among males in 2023 was approximately four times higher than the rate among females. Males make up 50% of the population but nearly 80% of suicides.



COPD



The American Lifestyle
..or the prelude to Men's Health

- Live to Work vs Work to Live
- Screens
- "Information" overload
- Fake food
- Alcohol
- Inactivity
- Built for cars, not people

Topics and Recommendations

The Basics- Diet

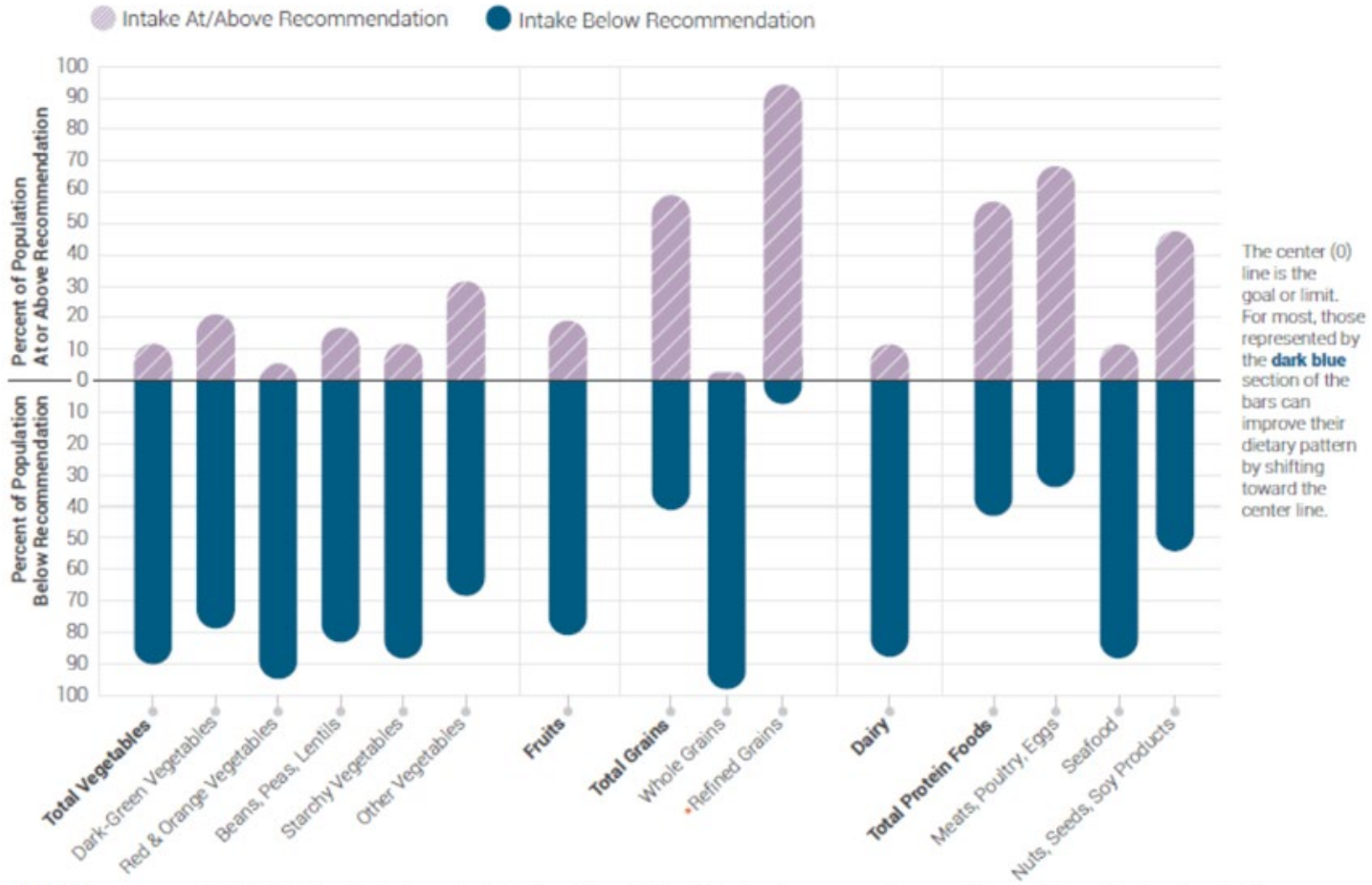
- Whole food, plant-predominant diet
- 20% US population meets daily fruit goal
- 25% US population meets daily vegetable goal
- Protein 0.8-1.2g/kg/day
  - Increase for athletics, aging, pregnancy, etc.
- Fiber 25-35+ g/day
- 45-65% carbohydrate, 20-35% fats, 10-35% protein

Plants foods such as beans, lentils, nuts, whole grains, and veggies provide a fantastic source of protein without the added drawbacks of meat.

PLANT PROTEIN per serving	18g Red Lentils boiled, 1 cup	17g Edamame boiled, 1 cup	15g Black Beans cooked, 1 cup	6g Almonds 1 oz	5g Peas cooked, 1 cup	5g Baked Potato 1 medium	5g Spinach boiled, 1 cup
ADVANTAGES • Fiber • Phytonutrients • Vitamins & minerals • Low or healthy fat profile • No cholesterol							
ANIMAL PROTEIN per serving	6g Egg cooked, 1	20g Salmon cooked, 3 oz	25g Steak cooked, 3 oz	25g Chicken cooked, 3 oz			
DISADVANTAGES • Cholesterol • Saturated fat • No fiber • Higher in calories							

Eating minimally processed whole plant foods such as vegetables, fruits, whole-grains, legumes, and nuts lower the risk of diabetes, heart disease, cancer, and promote overall health.

Source: USDA Nutrient Analysis Database



•**NOTE:** Recommended daily intake of whole grains is to be at least half of total grain consumption, and the limit for refined grains is to be no more than half of total grain consumption.

Data Source: Analysis of What We Eat in America, NHANES 2013-2016, ages 1 and older, 2 days dietary intake data, weighted. *Recommended Intake Ranges*: Healthy U.S.-Style Dietary Patterns (see ***Appendix 3***).

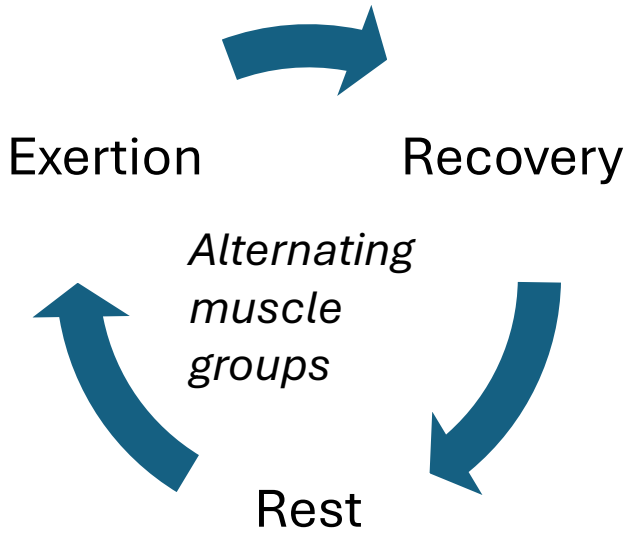
Diet Trends

- Mediterranean-style diet
  - Generally the most representative of healthy food choices and a sustainable diet structure
    - Whole foods
    - Plant predominant
    - Healthy oils/fats
    - Seafood/ Poultry in moderation
    - Beans, nuts, etc
  - Accepted diet of AHA, ADA, AMA, etc.
- Keto, Low-carbohydrate
  - Very hard to sustain
  - Transition fuel utilization from glucose to fats; less insulin relative to glucagon and thus increased liplolysis
- Intermittent fasting
  - Mixed evidence

Diets | New England Journal of Medicine

Physical Activity

- 30 minutes of moderate-intensity exercise 5 days/ week
  - Total 150 minutes
  - Cycle exercises through the week
- Cardio
  - Running, cycling, swimming, etc.
  - Retain good functional capacity (METS) and endurance
- Resistance
  - Weightlifting, resistance bands
  - Good joint stabilization and promotes muscle hypertrophy
- Movement
  - Yoga, pilates, etc.
  - Mind-body connection and balance



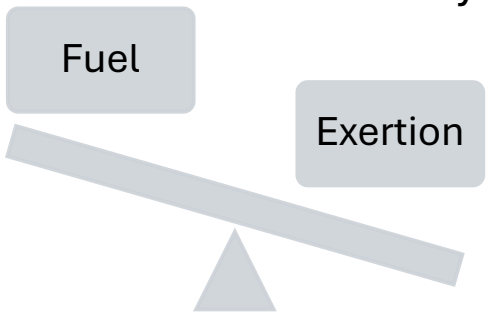
Additional Pillars

- Sleep
  - 7-8 hours/ night
  - Circadian rhythm and hormone regulation
  - Pre-sleep routine and sleep hygiene
    - Cool, quiet, dark or low light
    - Phone and screens avoided at least 30 minutes before bed
    - Clocks out of your line of sight
    - Wake up with natural light/ happylight for 30 minutes
- Substance
  - Alcohol 2 drinks/day male, 1 drink/day female
- Social connections
  - Family, friends, purposeful work, sense of community
- Stress
  - Communication, reflection, and patience

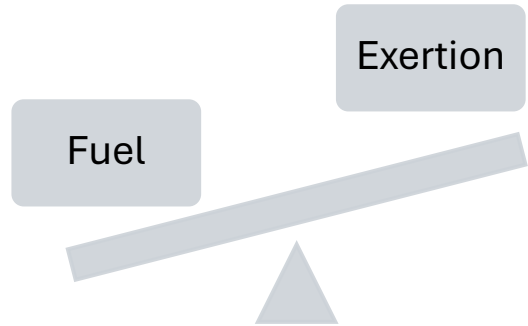
Survive vs Thrive

What is your fuel and how do you use it?

-Intense athletics
-Dietary restriction



-Unhealthy or excessive intake
-Inactivity



Survive	Thrive	Excess
Hormonal suppression	Hormonal regulation	Hormonal resistances

Hormonal Health

- Leptin
  - Drives satiety
  - In low body fat, low GnRH
  - In high body fat, leptin resistance
- Adiposity
  - Aromatization

Hormone	Effect in Men	Effect in Women
Total testosterone	↓ Decreased	↑ Increased (hyperandrogenism)
Free testosterone	↓ Decreased	↑ Increased
Estradiol	↑ Increased	↑ Increased
SHBG	↓ Decreased	↓ Decreased
LH/FSH	↓ or inappropriately normal	↓ Decreased
DHT	↓ Decreased	Variable

Male Obesity-related Secondary Hypogonadism – Pathophysiology, Clinical Implications and Management – PMC
The Effect of Weight Loss and Weight Loss Interventions on Sex Hormones: An Umbrella Review of Systematic Reviews and Meta-Analyses - PubMed

Low Testosterone and Lifestyle Medicine

- Symptoms: Decreased libido, decreased energy, depressed mood, erectile dysfunction, irritability
- Reasonable to check Total and Free Testosterone
  - Should be AM and fasting
  - Should check more than once +/- LH, FHS, remember Hct
- European Male Ageing Study (EMAS)- while 17% of men over 40 had low serum testosterone, only 2% had both symptoms and low testosterone
  - Male hypogonadism: pathogenesis, diagnosis, and management - PubMed
- Testosterone will reduce with age
  - Normal/ borderline Total testosterone (inc SHBG) and low T4
- Obesity
  - Pseudo-hypogonadism with low total and normal free testosterone
- **Reduce adiposity -> Increase Testosterone**

#462 Male Hypogonadism Pearls with Dr. Bradley Anawalt: Insights on Testosterone Deficiency - The Curbsiders

Erectile Dysfunction

- Not necessarily the same as decreased libido
- DDx: HTN, CAD, PVD, DM, OSA, Dep/Anx, Stress, Obesity, Alcohol, Tobacco, Medications, Prostate, etc, etc, etc.
- Communicate a pattern
  - Interest? Duration? Nocturnal/AM? Medications?
- Assess other factors
  - Narrow in to the most applicable
- Recommendations
  - Medications
    - Avoid online services- expensive, non-FDA approved medication formulations, promote avoidance of real healthcare
  - Lifestyle Modification
    - Exercise and Diet > specific
  - Communication and connection
    - Express your needs, concerns, etc.

Body Image

- Cleveland Clinic Survey: about 50% of Men are not happy with their weight
- Masculinity
- Muscle definition
- Gynecomastia
- Hair volume

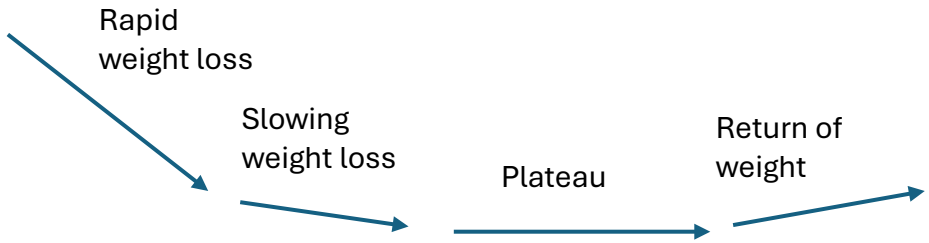
- Many similar themes for men in social media about **unrealistic expectations**

Weight Management

- Focus more on **body composition** (muscle vs fat)
- Waist circumference > BMI
- Functionality
  - Assess daily activity tolerance
- Endurance
  - How long can you do X activity?
- Diet: Add vs Eliminate
  - I prefer to begin diet modification with adding healthy foods rather than complete elimination or replacement
  - Whole foods and plants
- Do NOT overlook patient's metabolic baseline
  - Former athlete?
  - Work from office to home?
  - Active work to sedentary work?
  - Walk to activities, groceries, etc?
  - Coming from a different cultural/ societal background?

GLP 1 Agonist

- Neurohormonal appetite suppression
- Delayed gastric emptying
- Insulin/ Glucagon regulation
- Reduced adiposity
- Sarcopenia
  - Reduced caloric intake and utilization
  - Opposite of what we want for good body composition!
- Tips and tricks
  - Meeting protein goals
  - Supplementing with resistance training
  - ‘One cheeseburger is not much better than two cheeseburgers’
    - Keep balanced diet for variety of nutrients
  - Consider counseling of how long we use these medications



Mechanisms of GLP-1 Receptor Agonist-Induced Weight Loss: A Review of Central and Peripheral Pathways in Appetite and Energy Regulation - PubMed

Substances

- Assessing relationship to substances
- Pattern, emotional connection, reliance, dependence
- Promoting mindfulness
  - Integrating health outcomes in conversation
- Alcohol
  - Limiting alcohol to below 2 drink/ day (this does not roll over to 14 drinks on the weekend!)
    - Limit binge episodes of >5 drinks in one setting
- Tobacco
  - Advise tobacco cessation
    - Vape is not suitable alternative
- Opioids
  - Low testosterone with some formulations
- Stimulants
  - Poor sleep, cardiac risks

Social Isolation and the Men's Loneliness Epidemic

- ?Controversial
  - Similar reporting of loneliness in recent Pew Research Survey
    - Men, Women and Social Connections | Pew Research Center
    - Adults younger than 50:
      - Men 16%
      - Women 15%
    - But- women more likely to seek care
- HHS - Our Epidemic of Loneliness and Isolation
  - https://www.hhs.gov/surgeongeneral/reports-and-publications/connection/index.html
- CDC- Men's Health
  - https://www.cdc.gov/nchs/fastats/mens-health.htm

Emotional Wellness and Stress Management

- Communication and connectivity is key
  - Cultural significance of avoiding care and discussing feelings
- Focus on positive relationships
  - Explore emotions
    - Emotional Intelligence
- Purposeful activity
- Sense of community

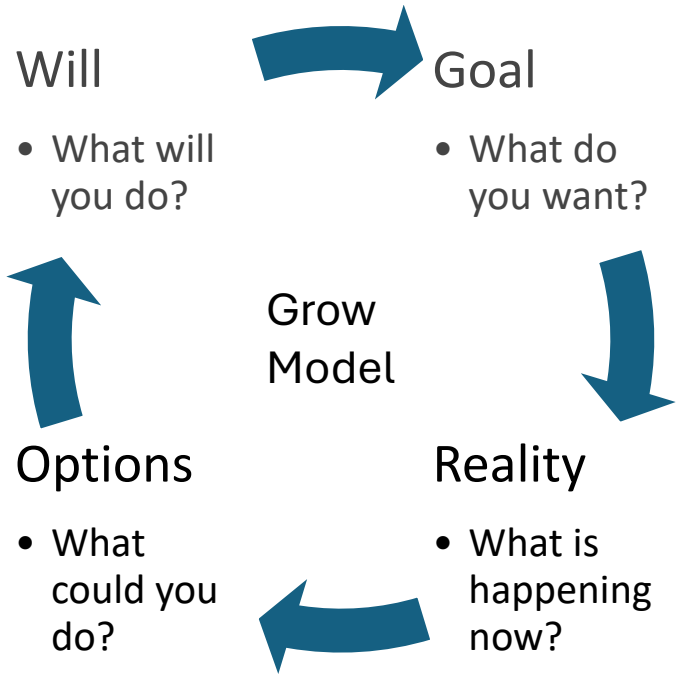
Goals and Change

- SMART
  - Specific, Measurable, Achievable, Relevant, Timely
  - Reflect on previous changes
  - Small goals > Habits > Behavior > Change > Identity
  - Consider stepwise planning for weeks with some variability
    - Try again
    - Try something else
    - Add something new
    - Just don’t stop!
- Problem solving……
  - HOW >>>>>>WHAT
  - Trying to build a strong ability to execute different goals more so than just finding the perfect goal

Goals and Change

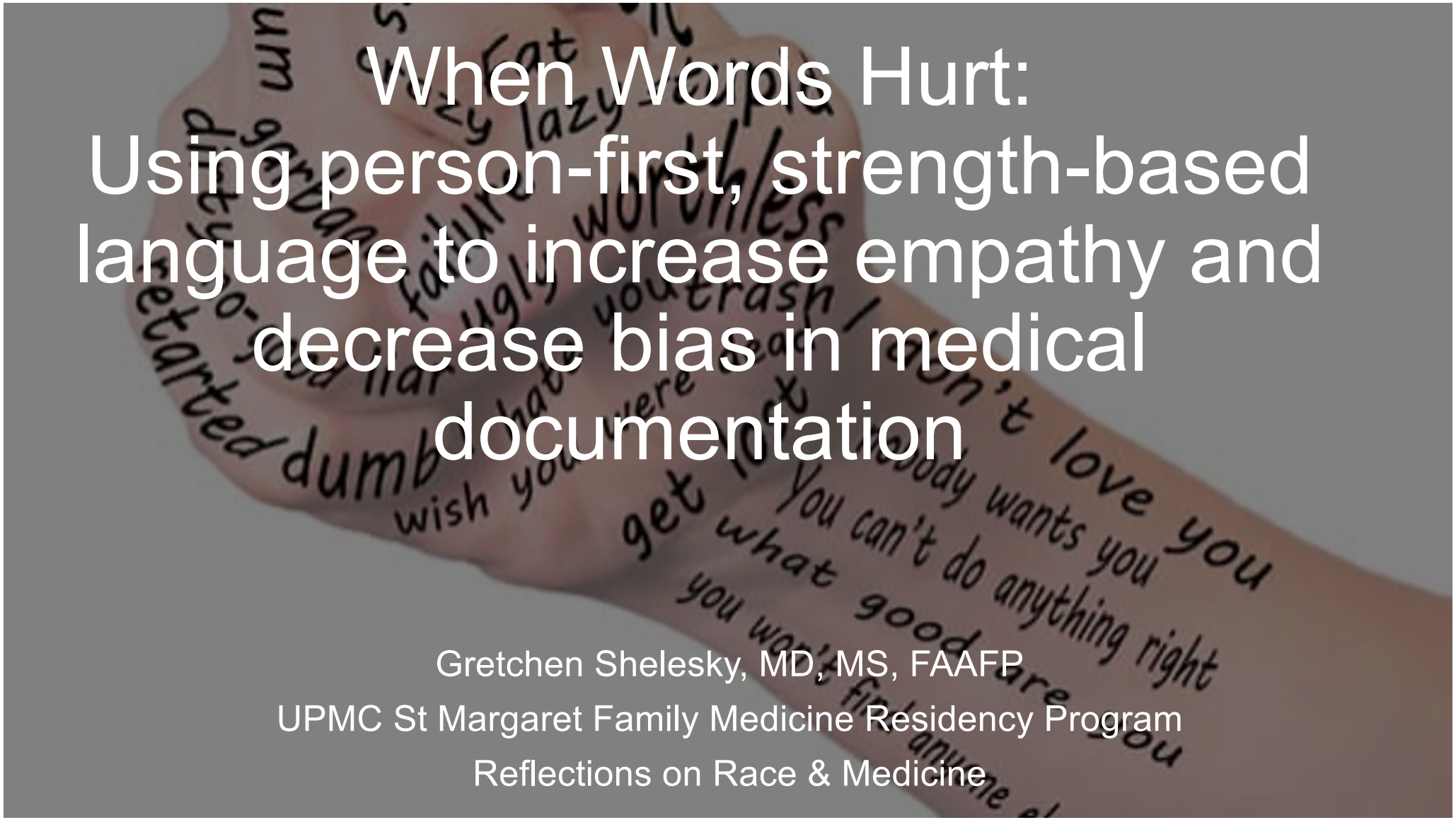
- Preparation
  - SWOT analysis
  - Learn!!!
    - Builds creativity and confidence
  - Scheduling
- Motivation
  - Consistency
  - Modification
  - Durability

Effective lifestyle modification is a lifelong journey



On the horizon..

- prostate cancer
-aging
-adolescent / young adult
-body image
-social media
-Meny more



When Words Hurt: Using person-first, strength-based language to increase empathy and decrease bias in medical documentation

Gretchen Shelesky, MD, MS, FAAFP

UPMC St Margaret Family Medicine Residency Program

Reflections on Race & Medicine

Help to Create a Safe Environment

- **Actively Participate & Stay Engaged:** Share your story & state your opinion. Use "I" statements. All questions are valid— risk and grow in bravery!
- **Speak Your Truth**: Value everyone's thoughts & initially assume good intentions. It's important that everyone is free to speak openly & disagree respectfully
- **Be Honest, Authentic, Open-minded, Present, & Vulnerable**
- **Allow for mistakes/Faux pas:** There will be concerns of saying something wrong. Consider these learning opportunities.
- **Actively Listen for Understanding:** Listen and try to understand where another person is coming from as best as you can.
- **Suspend Judgement & Critique**
- **Honor & Respect Confidentiality**: What is shared here, stays here. What is learned here, leaves here.
- **Expect and Accept Non-closure/ No resolution:** These conversations are challenging and ongoing. Accept that much of this is about changing yourself, not others.
- **Responsibility to Each Other and to the Process**: Everyone should follow the community agreement and propose news ones to create a safe environment for sharing

UN Human Rights Commission: ttps://www.standup4humanrights.org/en/fightracismengage.html

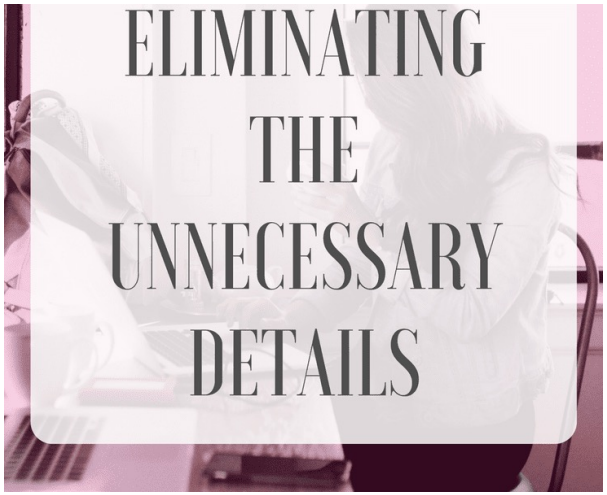
After your active participation, learners will

IDENTIFY STIGMATIZING LANGUAGE IN MEDICAL DOCUMENTATION

REFLECT ON THE BENEFIT OF PERSON-FIRST LANGUAGE

PRACTICE CHANGING STIGMATIZING LANGUAGE TO NEUTRAL LANGUAGE

How would you define stigmatizing language?



JAMA Netw Open. 2021 Jul 14;4(7):e2117052. doi: 10.1001/jamanetworkopen.2021.17052

Physician Use of Stigmatizing Language in Patient Medical Records

Jenny Park [1,2], Somnath Saha [1,2,3], Brant Chee [4], Janiece Taylor [5], Mary Catherine Beach [2,6,7,✉]

Author information · Article notes · Copyright and License information

PMCID: PMC8281008 PMID: 34259849

- Qualitative study of 600 encounter notes in urban academic center, written by 138 physicians in 2017 (randomly selected from pool of 10,550)
- Reviewed 100 notes at a time
- Inductive approach to identify positive and negative reactions
  - Pride, admiration, personal investment, happiness
  - Frustration, anger, irritation, judgement

Table 2. Positive Language Categories[a].

Name	Definition	Example[b]
Compliment	Explicit adjectives to describe patient positively	• Mr. [Patient] is charming, pleasant, and kind. • Mrs. [Patient] is a delightful female.
Approval	Highlighting patient knowledge, character, reasoning skills and self-care patient behaviors	• She has a physical/mental robustness that belies her age. She remembers both recent and distant events and is enjoyable to converse with on many subjects. • She struggled with quitting over the spring and summer but as of this clinic visit has quit tobacco for 1 week!! • I provided much deserved praise and encouraged her to continue her trajectory.

Self-disclosure	Physician self-disclosure of their own positive emotions related to patient	• I am happy to continue coordinating her care. • I am also encouraged by his new spirit to improve his health.
Minimizing blame	Reports reduced patient capacity or unhealthy behaviors with patient-centered reasons that convey understanding and minimize blame	• She has not been checking her morning glucose for a month because she lost her blood glucose monitor. • She has not been taking iron because it makes her constipated.

Personalize	Incorporation of details about the patient as an individual or particular person	• She is a song writer and also sings. She has a strong faith in God and believes that he has blessed her and continues to keep her strong in light of her progressive disease. • She enjoys walking with her fiancé and her dog named Scout.
Bilateral decision making	References to the incorporation of patient preferences into the treatment plan	• He does not want to add a medication so I will increase the dose. • She stated that even if it was positive, she would not want further testing. She will think about this and let me know next time if she wishes to proceed.

Table 1. Negative Language Categories[a].

Categories	Definitions	Examples[b]
Questioning credibility	Implication of physician disbelief of patient reports of their own experience or behaviors	• He insists the pain is behind his knee. • He claims that nicotine patches don't work for him. • I listed several fictitious medication names and she reported she was taking them, and that she takes "whatever is written there"

Disapproval	Highlights poor reasoning, decision-making, or self-care, usually in a way that conveys the patient is unreasonable	• Reports that if she were to fall, she would just “lay there” until someone found her • He was adamant that he does not have prostate cancer because his “bowels are working fine.” • Counseled that there is no evidence for this, but patient has strong beliefs. • She is adamant that she cannot perform any kind of exercise due to pain and will not change her diet.
Stereotyping	Quoting African American Vernacular English	• Chief complaint - “I stay tired” • Reports that the bandage got “a li’l wet”
	Quoting incorrect grammar or unsophisticated terms	• States that the lesion “busted open” • Reports she was unable to fill prescription for the “sugar pill”

Difficult patient	Inclusion of details with questionable clinical significance that depict the patient as belligerent or otherwise suggests that the physician is annoyed	• She persevered on the fact that “a lot of stuff is going on at home with my family” but that “you wouldn't understand.” • I informed her that this is unlikely to be helped by antibiotics and talked about smoking cessation with her. She said she will ask her ‘sinus doctor’ for antibiotics.
Unilateral Decisions	Language that emphasizes physician authority over patient	• She was told to discontinue… • I have instructed him to…

RESEARCH ARTICLE | HEALTH EQUITY

HEALTH AFFAIRS > VOL. 41, NO. 2: RACISM & HEALTH

Negative Patient Descriptors: Documenting Racial Bias In The Electronic Health Record

Michael Sun, Tomasz Oliwa, Monica E. Peek, and Elizabeth L. Tung

AFFILIATIONS

PUBLISHED: JANUARY 19, 2022 Open Access https://doi.org/10.137

- 12.3% vs 2.3% of Black patients reported discrimination
- Higher implicit bias led to:
  - more verbally dominant, less patient-centered language, lower levels of patient adherence, lower trust
- Stigmatizing language: Sickler, frequent-flyer, trainwreck, addict
  - Negative perception of pain
  - Less aggressive pain management

- Used machine learning of 18,459 patients in Chicago, IL
  - Adherent, aggressive, agitated, angry, challenging, combative, compliant, confront, cooperative, defensive, exaggerate, hysterical, pleasant, refuse, resist
  - Positive, negative, out of context

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- Black patients 2.54 (CI 1.99-3.24) odds of having at least 1 negative comment
- Medicaid 2.66 (CI 2.08-3.40) and Medicare 2.08 (CI 1.57-2.75)
- Unmarried 2.12 (CI 1.7-2.65)
- Increased comorbidity 1.11 (CI 1.07-1.15)

J Gen Intern Med. 2018 May;33(5):685-691. doi: 10.1007/s11606-017-4289-2.
Epub 2018 Jan 26.

Do Words Matter? Stigmatizing Language and the Transmission of Bias in the Medical Record

Anna P Goddu [1], Katie J O'Conor [2], Sophie Lanzkron [3], Mustapha O Saheed [4], Somnath Saha [5 6], Monica E Peek [7], Carlton Haywood Jr [3], Mary Catherine Beach [2]

Affiliations + expand

PMID: 29374357 PMCID: PMC5910343 DOI: 10.1007/s11606-017-4289-2

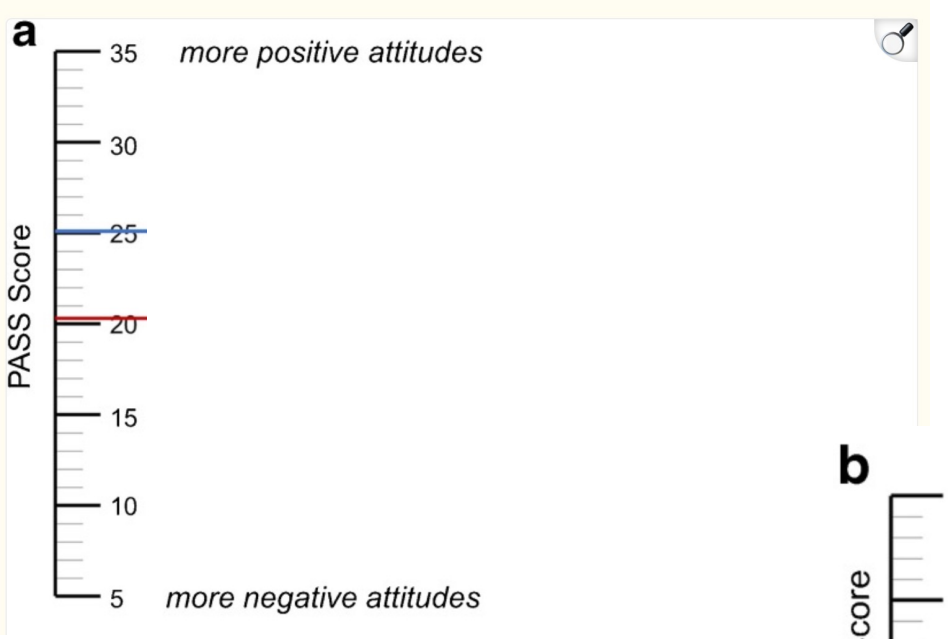
- RCT
- Read one of 2 notes with medically identical information
  - Stigmatizing
  - Neutral
- Survey about attitude re: pt
  - Treatment decisions
- MS and residents (EM/IM)

Neutral

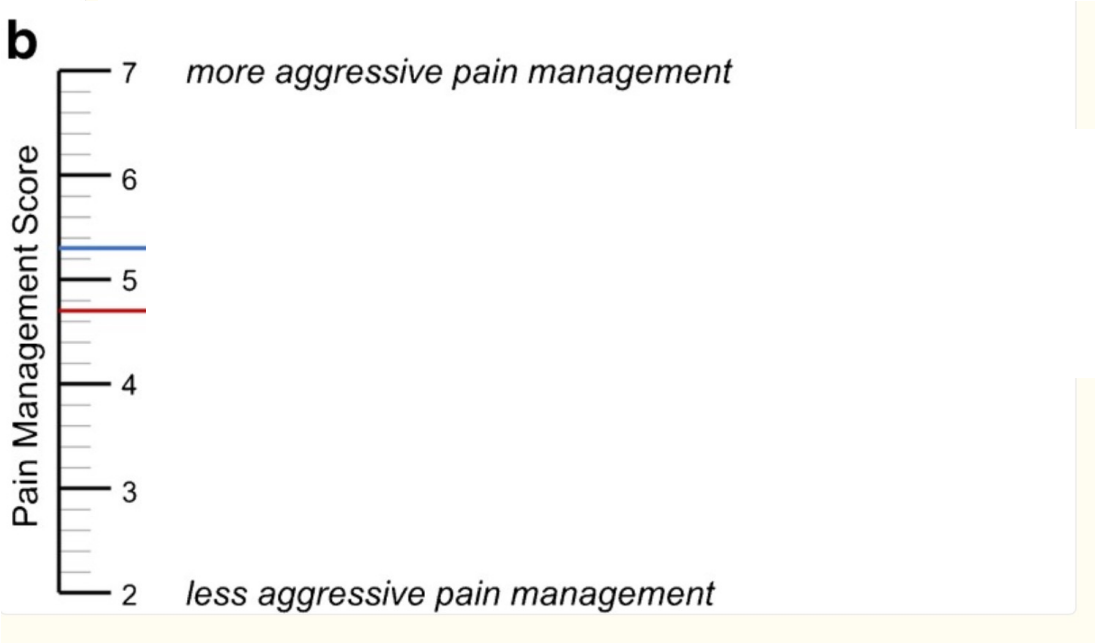
- Mr. R is a 28-year old man with sickle cell disease and chronic left hip osteomyelitis who comes to the ED with 10/10 pain in his arms and legs. He has about 8–10 pain crises per year, for which he typically requires opioid pain medication in the ED. At home, he takes 100 mg OxyContin BID and oxycodone 5 mg for breakthrough pain. Over the past few days, he has taken 2 tabs every 4–6 hours. About 3 months ago, he moved to a new apartment and now has to wheel himself in a manual wheelchair up 3 blocks from the bus stop.
  He spent yesterday afternoon with friends and wheeled himself around more than usual, which caused dehydration due to the heat. He believes that this, along with recent stress, precipitated his current crisis. The pain is aching in quality, severe (10/10), and not alleviated by his home pain medication regimen.
  On physical exam, he is in obvious distress. He has no fever and his pulse ox is 96% on RA. The rest of the physical exam is normal other than tenderness to palpation on the left hip.
- Mr. R is sleeping but easily arousable and seems distressed. He is not tolerating the oxygen mask and still has 10/10 pain. His girlfriend is by his side but will need to go home soon.

Stigmatizing

- Mr. R is a 28-year old sickle cell patient with chronic left hip osteomyelitis who comes to the ED stating he has 10/10 pain “all up in my arms and legs.” He is narcotic dependent and in our ED frequently. At home he reportedly takes 100 mg OxyContin BID and oxycodone 5 mg for breakthrough pain. Over the past few days, he says that he has taken 2 tabs every 4–6 hours. About 3 months ago, patient states that the housing authority moved him to a new neighborhood and he now has to wheel himself in a manual wheelchair up 3 blocks from the bus stop. Yesterday afternoon, he was hanging out with friends outside McDonald’s where he wheeled himself around more than usual and got dehydrated due to the heat. He believes that this, along with some “stressful situations,” has precipitated his current crisis. Pain is aching in quality, severe (10/10), and has not been helped by any of the narcotic medications he says he has already taken.
  On physical exam, he appears to be in distress. He has no fever and his pulse ox is 96% on RA. The rest of the physical exam is normal although he reports tenderness to palpation on the left hip.
- Mr. R is sleeping but easily arousable and has been cussing at nurse. He refuses to wear his oxygen mask and is insisting that his pain is “still a 10.” His girlfriend is lying on the bed with shoes on and requests a bus token to go home.



Positive **A**ttitudes towards patients with **S**ickle Cell **S**cale



Copy
& Paste

Talking about someone with pain

Use...	Instead of...	Because...
• Person with chronic pain • Person with a particular chronic pain condition	• (Chronic) Pain patient	• Using person-first language shows that chronic pain is an illness. • Using these words shows that a person with a chronic pain "has" a problem/illness, rather than "is" the problem.
• Person who is asking for opioid medications for pain	• "Drug seeker" • "Addict"	• Use medically accurate terminology the same way it would be used for other medical conditions.
• When a person sees multiple clinicians for their chronic pain and/or opioid prescription	• "Doctor shopping"	• Use medically accurate terminology the same way it would be used for other medical conditions.

Talking about recovery and treatment

Use...	Instead of...	Because...
• Medication treatment for OUD • Medications for OUD • Medications for addiction treatment • Opioid agonist therapy • Pharmacotherapy • Medication for a substance use disorder	• Opioid substitution • Replacement therapy • Medication-assisted treatment (MAT)	• It is a misconception that medications merely "substitute" one • The t supp "MOU are u critic
• Abstinent from drugs • Person with sustained abstinence/decreased use/person who previously used drugs • Not consuming alcohol or taking drugs • Testing negative (on a drug screen)	• Clean • In recovery	• Use of medical terminology (the same way you would for other illnesses) can help reduce stigma. • The term recovery does not reflect that substance use disorders are chronic relapsing conditions.
• Buprenorphine initiation • Low dose buprenorphine	• Buprenorphine induction • "Microdosing" buprenorphine	• Using the term "initiation" as one would for any medication demystifies starting buprenorphine. • "Microdosing" is a term associated with psychedelics, and is inappropriate in this context. Describing what is being done, which is using a low dose of buprenorphine, is preferred.

ADVANCING HEALTH EQUITY:

A GUIDE TO LANGUAGE, NARRATIVE AND CONCEPTS

WZ is a 26-year-old Spanish-speaking male who has antisocial personality disorder and is an alcoholic and polysubstance abuser, presenting to the emergency department for (now resolved) intermittent chest pain and shortness of breath.	WZ is a 26-year-old Spanish-speaking male (he/him/his) with antisocial personality disorder, alcohol, cocaine, and cannabis use disorder, presenting to the emergency department for (now resolved) intermittent chest pain and shortness of breath.
His most recent episode was earlier this morning and has resolved completely; he now appears completely comfortable and is repeatedly demanding food and work excuse notes, despite stating that he needs a full workup.	His most recent episode was earlier this morning and has since resolved.
WZ claims that the chest pain began several weeks ago without any apparent inciting factors and he describes it as episodic.	His chest pain is episodic and began several weeks ago without any known inciting factors.
He reports that the pain lasts for 3-5 minutes, yet is “debilitating,” rating it as a “20 out of 10.” States that it often begins with a sensation “like choking.”	The pain lasts for 3-5 minutes, is debilitating, and is 20 out of 10. It often begins with a sensation like choking.

TextStudio

After your active participation, learners will

IDENTIFY STIGMATIZING LANGUAGE IN MEDICAL DOCUMENTATION

REFLECT ON THE BENEFIT OF PERSON-FIRST LANGUAGE

PRACTICE CHANGING STIGMATIZING LANGUAGE TO NEUTRAL LANGUAGE

Resources

- https://www.ama-assn.org/system/files/ama-aamc-equity-guide.pdf
- https://www.omed.pitt.edu/diversity-social-justice-cultural-competence
- Park J, Saha S, Chee B, Taylor J, Beach MC. Physician Use of Stigmatizing Language in Patient Medical Records. *JAMA Netw Open*. 2021;4(7):e2117052. Published 2021 Jul 1. doi:10.1001/jamanetworkopen.2021.17052
- Sun M, Oliwa T, Peek ME, Tung EL. Negative Patient Descriptors: Documenting Racial Bias In The Electronic Health Record. *Health Aff (Millwood)*. 2022;41(2):203-211. doi:10.1377/hlthaff.2021.01423
- Goddu AP, O'Conor KJ, Lanzkron S, et al. Correction to: Do Words Matter? Stigmatizing Language and the Transmission of Bias in the Medical Record. *J Gen Intern Med*. 2019;34(1):164. doi:10.1007/s11606-018-4583-7
- https://www.opioidalgorithms.pitt.edu/ideal-medical-records-documentation
- Healy M, Richard A, Kidia K. How to Reduce Stigma and Bias in Clinical Communication: a Narrative Review. *J Gen Intern Med*. 2022;37(10):2533-2540. doi:10.1007/s11606-022-07609-y
- Raney J, Pal R, Lee T, et al. Words Matter: An Antibias Workshop for Health Care Professionals to Reduce Stigmatizing Language. *MedEdPORTAL*. 2021;17:11115. Published 2021 Mar 2. doi:10.15766/mep_2374-8265.11115

Psychopharmacology Across the Reproductive Lifespan

Em Ketterer, MD

Family Medicine & Psychiatry

Disclosures & Relevant Experience:

No financial disclosures!

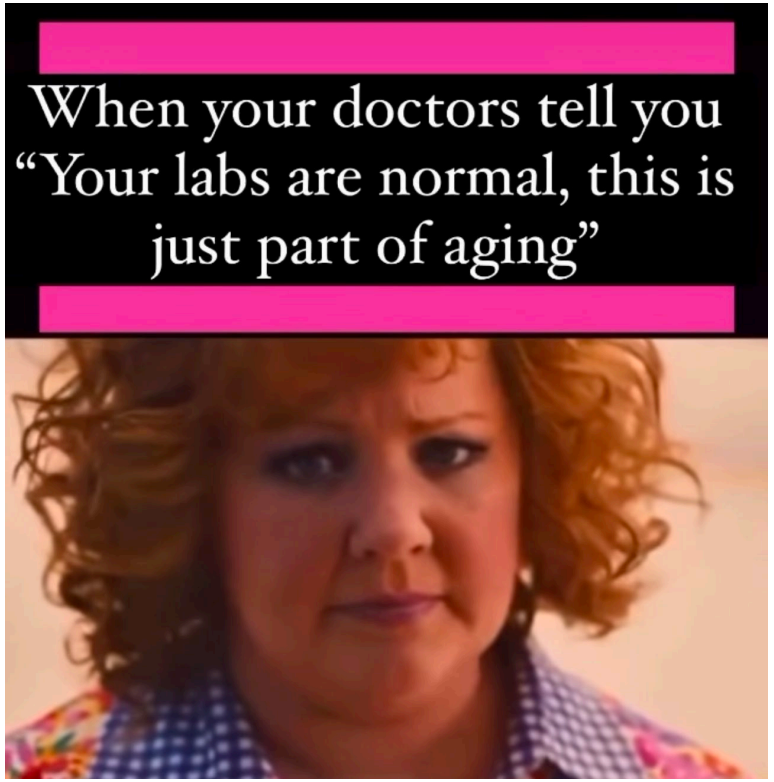
Boarded in Family Medicine & Psychiatry, APD for the Combined FM/Psych Program at UPMC

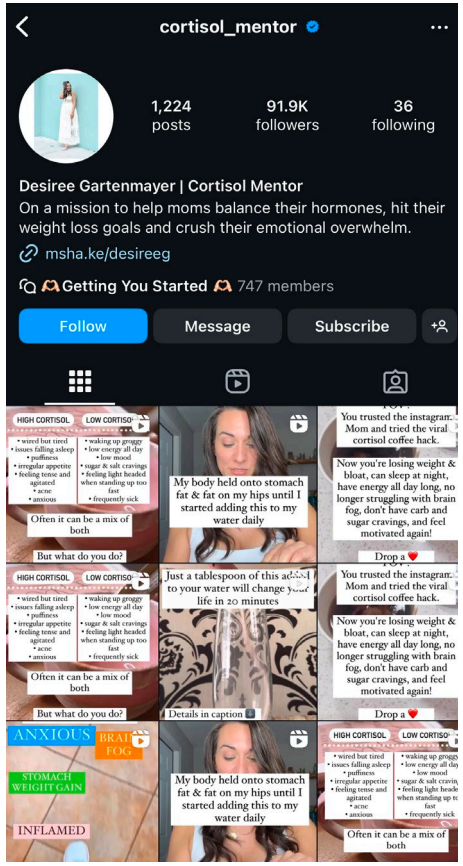
Interest in women's health, gender care, and menopause

Certified by the Menopause Society (MSCP) and World Professional Association of Transgender Health (WPATH)

GOALS:

- Identify key neuroendocrine elements of behavioral health
- Recognize distinct reproductive life phases and their behavioral health risks
- Understand the bidirectional nature of reproductive hormones/stages and behavioral health diagnoses and meds
- Useful diagnostic and prescribing pearls that you can use





You do not have “cortisol face”

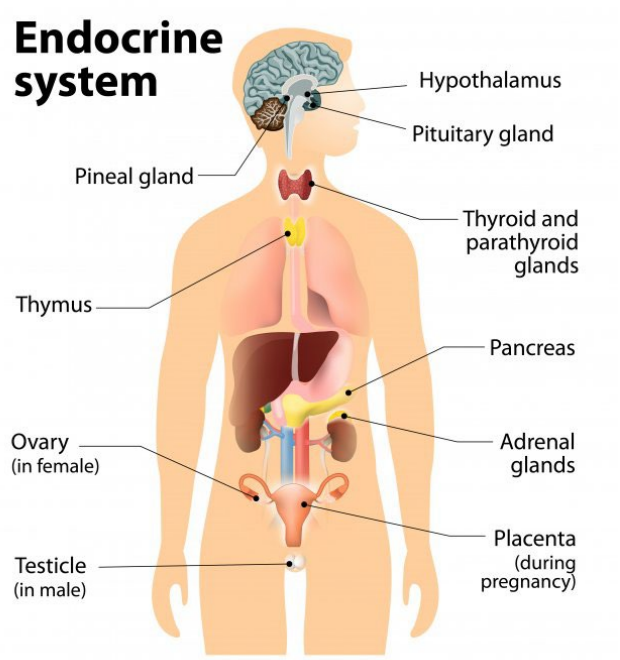
Hormone health and the internet age

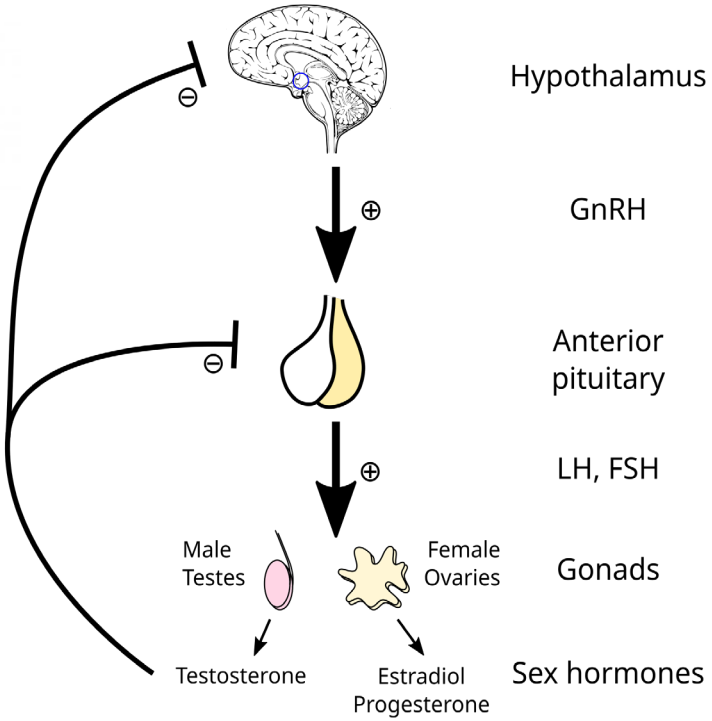
A note on sex and gender

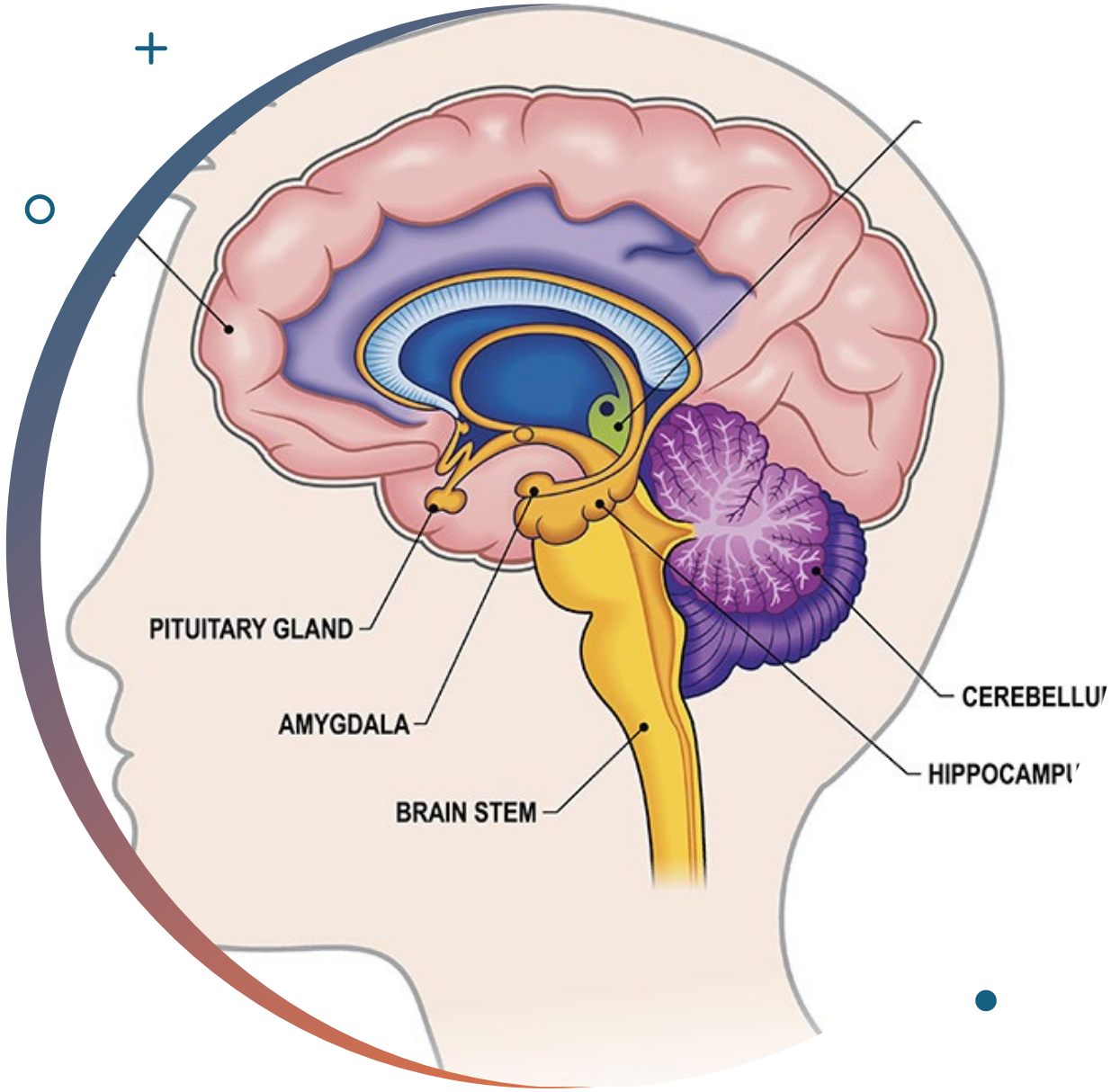
- Truly – everything is a spectrum, even sex!
  - 45X
  - XXY
  - Androgen insensitivity
- Defining “woman” for the purpose of this lecture
- Gender affirming hormone therapy

Neuroendocrine system

- Hypothalamic pituitary adrenal axis
- Hypothalamic pituitary gonadal axis



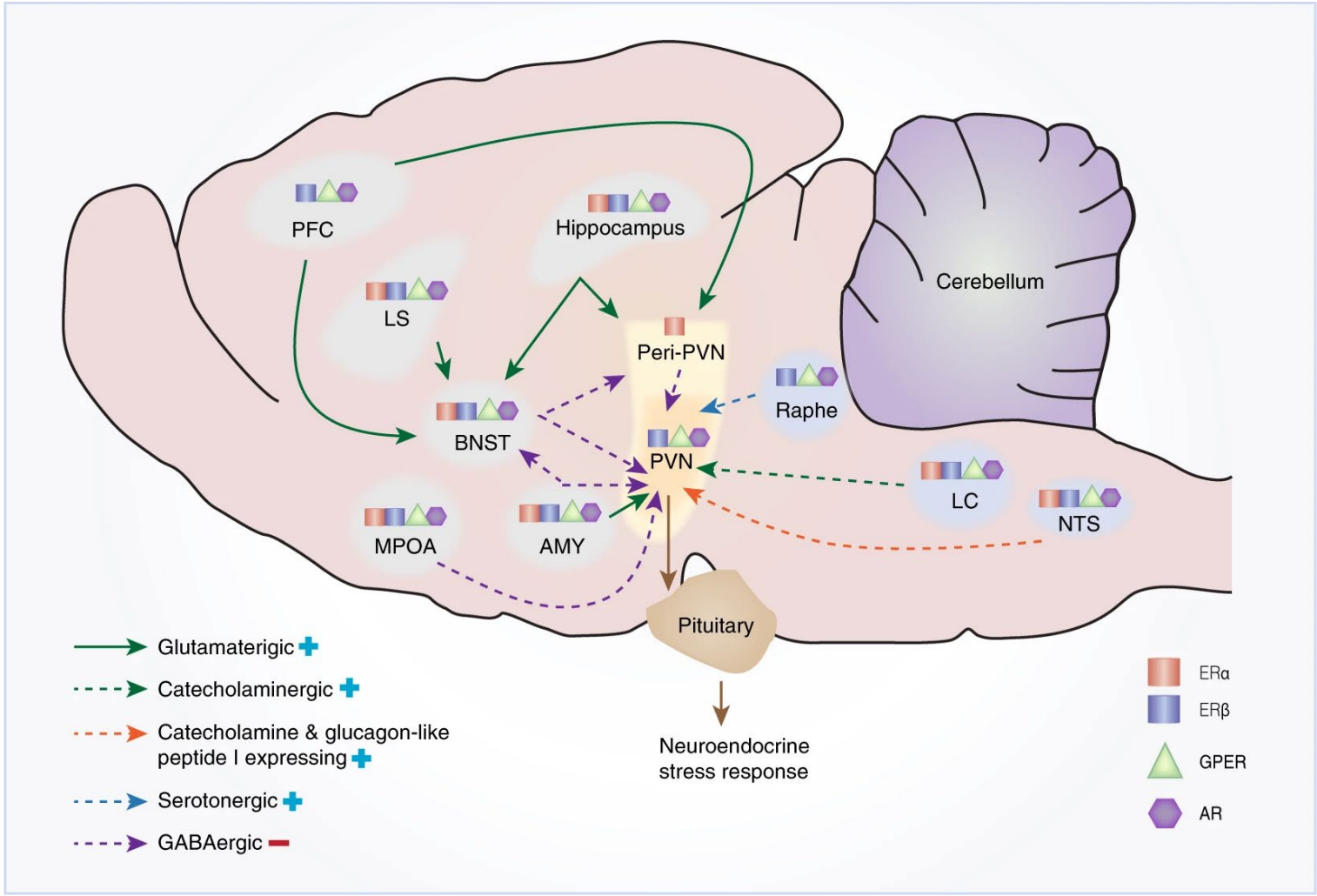




The Limbic System regulates…

- Emotional/social processing
- Learning
- Motivation
- Memory

Estrogen/Androgen pathways in the brain



First Period ↓ — 12th month, Final Menstrual Period (FMP 0) ↓

Stages	-5	-4	-3b	-3a	-2	-1	+1a	+1b	+1c
Terminology	REPRODUCTIVE				MENOPAUSAL TRANSITION		POST MENOPAU		
	Early	Peak	LATE		Early	Late	Early		
					PERIMENOPAUSE				
Duration	variable				variable	1 – 3 years	2 years (1+1)	3 - 6 years	Rem
PRINCIPAL CRITERIA									
Menstrual Cycle	Variable to regular	Regular	Regular	Subtle changes in flow/length	Variable length. Persistent ≥7 day difference in length of consecutive cycles	Interval of amenorrhea >= 60 days			
SUPPORTIVE CRITERIA									
Endocrine FSH AMH Inhibin B			Normal Low Low	Variable Low Low	↑Variable Low Low	↑>25 IUL Low Low	↑Variable Low Low	Stabilises Very Low Very Low	
Antral Follicle Count 2-10mm			Low	Low	Low	Low	Very Low	Very Low	
DESCRIPTIVE CHARACTERISTICS									
Symptoms						Vasomotor symptoms Likely	Vasomotor Symptoms Most Likely		Increa of uro

*Perimenopause ends after 12 consecutive months without menstruation. These 12-months are defined as the m

Reproductive stages

- Stages of Reproductive Aging Workshop (STRAW+10)

Key sex hormones and peptides in behavioral health

- DHEA/S – starts adrenarche
- GnRH – starts gonadarche, pulsatile
- Estradiol (E2)
- Allopregnanolone (ALLO)
- Progesterone (PRG)
- GnRH pulse generator (secreted by KNDy neurons, activated by E2 and PRG):
  - Excitatory Peptides: neurokinin B (NKB) & Kisspeptin (Kp)
  - Inhibitor Peptides: dynorphin (DYN)

Puberty – hormonal process

Adrenarche

- Adrenal maturation
- Release of DHEA/DHEAS
- Stimulates growth of pubic and ancillary hair

Gonadarche

- GnRH release from hypothalamus
- FSH and LH from pituitary
- Estradiol and testosterone production

Physiologic changes

- Growth of ovaries and testes
- Breast and genital development
- Height and weight changes
- Rapid neural development

Pop quiz!

- The gender gap in depression starts and then grows over the course of adolescence.
- Once teens reach Tanner 5, how big is that gap?
- A: 2:1

Pubertal behavioral health considerations

Start of anxiety and mood episodes

The gender gap in depression – why?

Adolescent brain changes:

Cognitive control

Reward sensitivity

ADHD

Diagnostic gap

Luteal changes

Start of PMS symptoms

More on this!

Stumper, A et al., 2021.

Social media + teenage girls

- Social media use in nearly universal
  - YouTube – 95%
  - TikTok – 67%
  - Instagram – 62%
  - Snapchat 59%
- Widely suspected to be primary cause of sharp increase in suicidal thinking and behaviors since 2009
  - Isolation/loneliness is a key predictor of suicidal behaviors
- Contributes to normalization of body dissatisfaction
- Strongest correlation to body image/self perception

CDC, 2024.

Reproductive Years

- Hormonal shifts and brain changes during the fertile years
- Diagnoses and issues particular to reproductive years:
  - PMDD
  - Contraception
  - PPA/PPD
  - Breastfeeding
- Typical onset of depression, schizophrenia, bipolar d/o
  - Estrogen theory in schizophrenia

Fruzzetti, 2020: Brzezinski-Sinai, 2020.

What IS PMDD?

In the majority of menstrual cycles, **at least 5 symptoms** must be present in the final week before the onset of menses, start to improve within a few days after the onset of menses, and become minimal or absent in the week postmenses

One or more of the following symptoms must be present:

Marked affective lability (e.g., mood swings, feeling suddenly sad or tearful, or increased sensitivity to rejection)

Marked irritability or anger or increased interpersonal conflict

Markedly depressed mood, feelings of hopelessness, or self-deprecating thoughts

Marked anxiety, tension, and/or feelings of being keyed up or on edge

One (or more) of the following symptoms must additionally be present to reach a total of 5 symptoms when combined with symptoms from criterion B above

1. Decreased interest in usual activities
2. Subjective difficulty in concentration
3. Lethargy, easy fatigability, or marked lack of energy
4. Marked change in appetite; overeating or specific food cravings
5. Hypersomnia or insomnia
6. A sense of being overwhelmed or out of control
7. Physical symptoms such as breast tenderness or swelling; joint or muscle pain, a sensation of “bloating” or weight gain

PMDD

- Pathophysiology
  - Allopregnanolone (ALLO, metabolite of progesterone) action on GABA-A receptors
  - Dysregulated interactions between HPA and HPG axes
  - Immune regulating factors
- Treatment
  - Luteal phase SSRI – FIRST LINE
  - Contraceptive
    - Only 24/4 ethinyl estradiol/drospirinone and continuous combined OCP have show efficacy
    - Less androgenic PRG less likely to cause mood symptoms – drospirinone > levonorgestrel

Fruzzetti, 2020; McCloskey, 2021.

In your experiecnce

- What kinds of mood changes do people experience with contraceptives?
- What is the main reason people stop or switch contraceptive methods?
- A: Headaches and “moodiness”

Contraceptives and Mood

- Estrogen is neuroprotective, progesterone is not
- Link between hormonal contraceptive and depression is more likely related to progesterone
  - Drospirinone > Levonorgestrel
- Patients w/history of depression are more likely to experience negative mood effects
- There is no “slam dunk” link between HC and mood
- Nomegestrol acetate/17-beta estradiol (Zoely) 24/4 regimen appears to have better results in certain circumstances

McCloskey, 2021; Fruzzetti, 2020; Mu, 2022.

Pop quiz!

- What risk goes DOWN in pregnancy and UP immediately post-partum?
- A: suicidal behavior and self harm

Peripartum behavioral health considerations

- Post-partum risk extends TWO YEARS after delivery
- Poor behavioral health in pregnancy has been linked to prematurity, poor fetal development
- Antenatal and postnatal depression
- Perinatal anxiety disorders
- Post-partum psychosis - gradual vs. immediate
- Risks particular to schizophrenia
- IVF and mood considerations

Betcher, 2020.

Keep it simple!

- What is the best anti depressant in pregnancy and post-partum?
- A: the one that's worked before!

Pharmacotherapy in pregnancy

- SSRIs/SNRIs
  - Loosely associated with preterm delivery, reduced Apgar scores
  - 5X increase in poor neonatal adaptation
  - Avoid Paxil – slightly higher risk of heart defects
  - If it ain't broke…
- Wellbutrin – probably OK
- Brexanolone – synthetic ALLO! GABA-A positive neuromodulator
- Antipsychotics – no significant increase in congenital malformations, risk of GDM (?)

Cantwell, 2021; Betcher, 2020.

Pharmacotherapy in pregnancy

- Lithium
  - Previous risk of Ebstein's anomaly over-stated
  - Level must be tightly monitored, consider hydration status
  - DC at onset of labor, continue after delivery
- AEDs – avoid valproate and carbamazepine
- Lamotrigine – supplement with more folate, due to induction of metabolism with estrogen dose increase is necessary
- Stimulants – amphetamine > methylphenidate (cardiac defects)

Cantwell, 2021; Betcher, 2020.

Psych meds & breastfeeding

- Guiding principle should be mother's mental health
- All meds enter breast milk, lower levels than through placenta
  - Molecular weight, lipid solubility, protein binding determine passage in to breast milk
  - Premature babies w/underdeveloped livers most likely to have issues
  - Any medication that enters breast milk at 10% concentration is OK
- Sertraline best studied
- SSRIs seem to work faster post-partum – possibly through GABA modulation

Kaufman, 2022.

Recall check:

How are reproductive stages defined, and what defines perimenopause?

A: by menstrual cycle; persistent 7-day difference in length of consecutive cycles

Peri/menopausal years

- Early perimenopause: difference in cycle length of 7+ days or more, recurring within 10 cycles of first variability
- Late perimenopause: at age 45, 60+ days of amenorrhea, at age 40-45, two periods of 60+ days amenorrhea
- Menopause: 12 months amenorrheic
- Early post-menopause: 1-3 years after LMP
- Late post-menopause: 5 years after LMP

Crandall, 2019.

Physiology of menopause transition

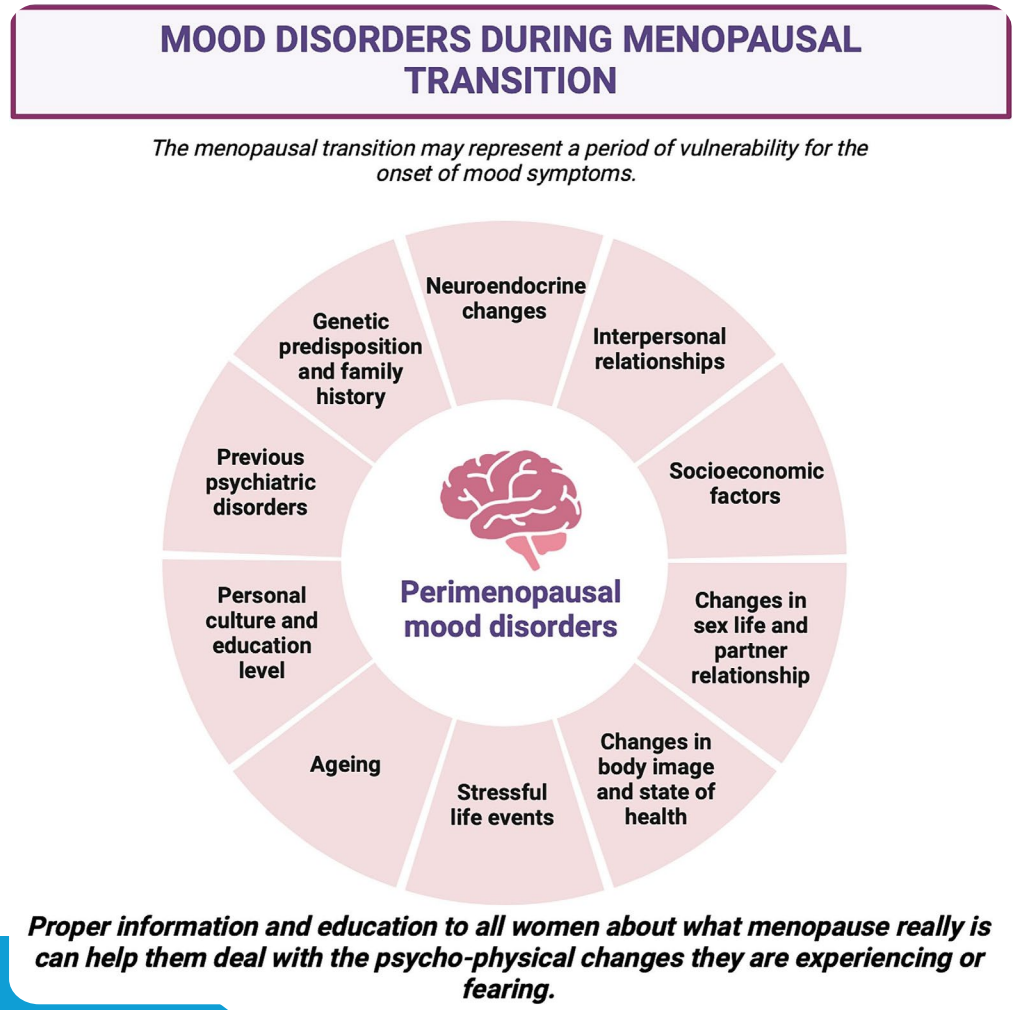
- Ovarian follicular depletion drives changes in GnRH pulse generation
- Early transition – decrease in follicle count causes decrease in Inhibin B and AMH, which cause increase in FSH, will keep cycle somewhat regular
- Late transition – follicular depletion drops past critical threshold and low estrogen symptoms become more prominent

Physiology of menopause transition

Estrogen withdrawal

- Decreases serotonin activation
- Increases MAO A&B activity
- Decreases NE and DA
- Long term deprivation has adverse effects on brain structure, function, and biochemistry
  - Alzheimer’s and vascular dementia are active areas of research
- Perceived poor sleep, not detectable on ratings and cognitive scales

Mood & Menopause



- Issues w/concentration and "brain fog" reported by 62-67% of women
  - Extensive studies show little meaningful change on cognitive testing
  - Limitations in study design
  - Far more pronounced with surgical menopause – verbal memory and executive function
- Depression reported by 45-70% of women
  - Risk is primarily among women w/prior history
  - Rare to have new clinical depression in menopausal transition
  - Higher risk among those w/severe vasomotor symptoms
  - SSRI is still first line
- Anxiety reported by 37%

Hogervorst, 2021; Fidecicchi, 2024.

Perimenopause – SSRI vs. MHT, the great debate

- Not enough head-to-head studies to suggest superiority/inferiority
- Studies support good response and tolerability with citalopram, escitalopram, duloxetine, venlafaxine, and vortioxetine
  - Think like a family doc: if it's not broke, don't fix it
- Estrogen most effective as augmentation in perimenopausal women
- Only two primary indications for menopausal hormone therapy remain insomnia and vasomotor symptoms

PEARLS for puberty

- Rates of depression equal among boys and girls until adolescence – by end of puberty rate of depression is 2X in girls
- Sharp increase in suicidal thinking and behaviors in teens in the last decade; girls more affected by isolation
- ALLO and its action on GABA is key player on mood

PEARLS for reproductive years

- In women with no psych history, no consistent behavioral health effect with HC
- SSRI is first line for PMDD
- Drospirinone products > Levonorgestrel products for mood
    - Nomegestrol or *Zoely* formulated specifically for this purpose
- Encourage continuation of medications during pregnancy in MOST cases
- Brexanolone is a new PPD infusion – synthetic ALLO
- Post-partum psychosis:
    - Rapid: bipolar disorder
    - Slow: schizophrenia
- Lithium – stop at start of labor, resume after delivery
- Lamictal – needs to be adjusted upward in pregnancy

PEARLS for peri/menopause

- Studies have never shown objective evidence of cognitive changes attributable to menopause
- Surgical menopause with more pronounced symptoms – REQUIRE MHT
- Rare to have new onset MDD in perimenopausal years
- Higher risk among women with severe VMS
- SSRI remains first line

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NUTRITION

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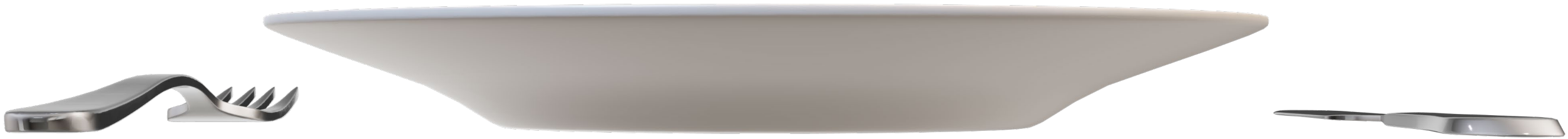
UPMC St. Margaret Family Medicine Residency Program

2026

UPMC Refresher Course in Family Medicine

Pittsburgh, PA



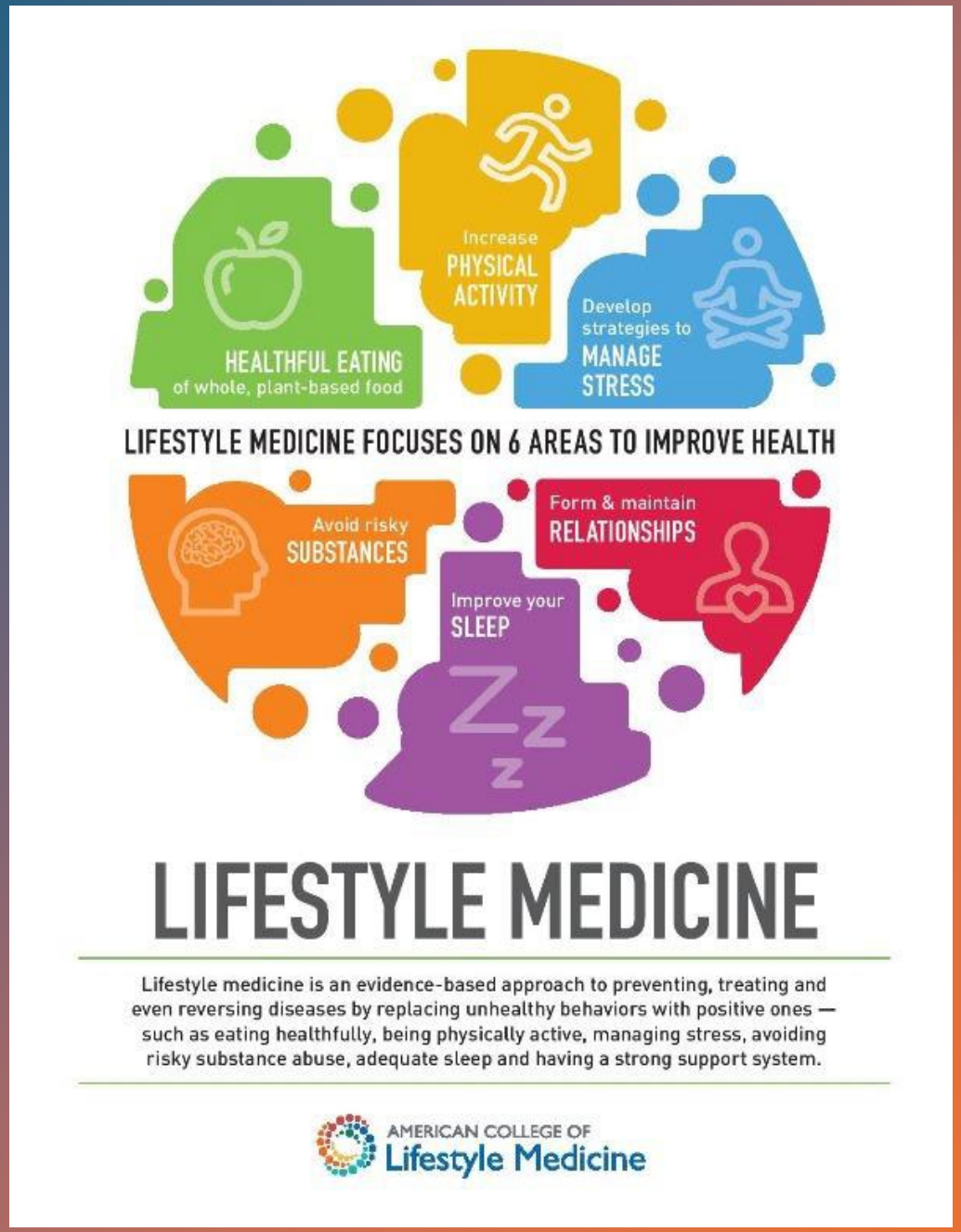
OBJECTIVES

After active participation, you will be able to...

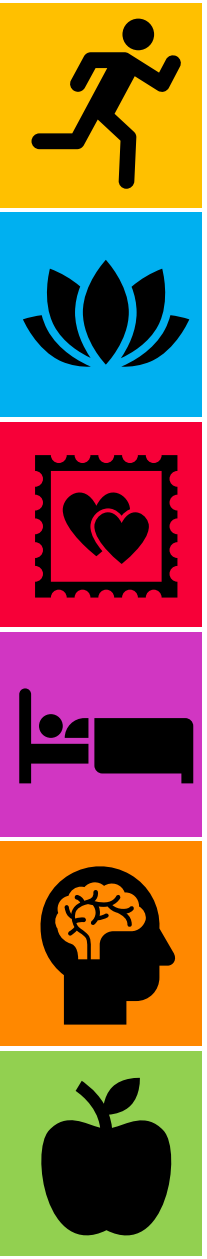
1. List 2 health benefits of predominantly whole food plant based eating

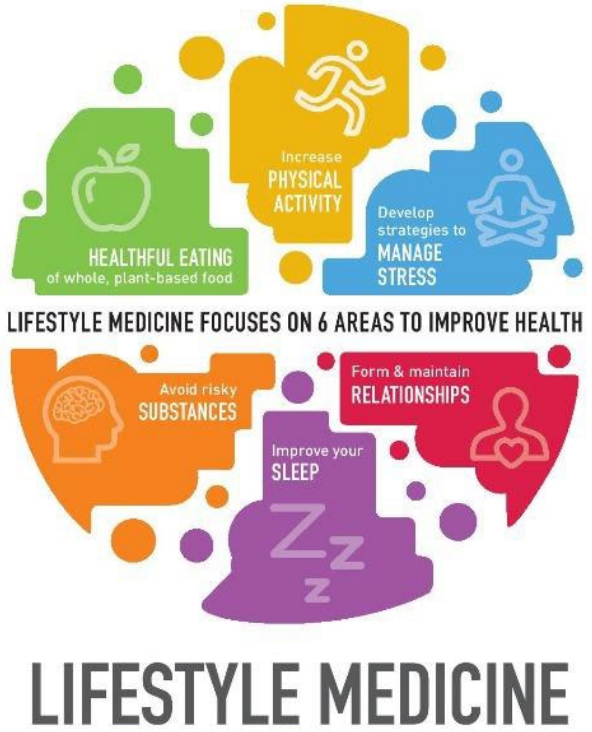
2. Describe the components
of predominantly whole
food plant based eating

3. Write “Food as Medicine” prescriptions for patients



- American College of Lifestyle Medicine established in 2004
- Evidence-based
- Individuals and Communities
- Addresses health disparities through health equity
- Positive impact on planetary health
- Root causes of chronic diseases
- Prevent, treat, and reverse the progression of chronic diseases
- New wave of Lifestyle Medicine providers in Primary Care




Increase
PHYSICAL
ACTIVITY
HEALTHFUL EATING
of whole, plant-based food
Develop
strategies to
MANAGE
STRESS
LIFESTYLE MEDICINE FOCUSES ON 6 AREAS TO IMPROVE HEALTH
Avoid risky
SUBSTANCES
Form & maintain
RELATIONSHIPS
Improve your
SLEEP
LIFESTYLE MEDICINE

MOVEMENT

Engaging in regular and consistent physical activity.

MANAGE STRESS

Incorporate stress-reducing behaviors.

CONNECTION

Strengthening and maintaining relatio nships and connections with others that bring meaning and purpose to life.

RESTORATIVE SLEEP

Strive for high-quality sleep, allowing the body to reset and recover.

AVOID RISKY SUBSTANCES

Reduce or eliminate substances that cause harm through toxicity, addiction, physical damage, or adverse side effects.

Consume a fiber-filled, nutrient-dense, antioxidant-rich eating pattern based predominantly on a variety of minimally processed vegetables, fruits, whole grains, legumes, nuts and seeds.

HEALTHFUL EATING

Predominately Whole Food, Plant Based (WFPB) Diet

Whole Foods → Single ingredient food

Plant based → Fruits, vegetables, whole grains, legumes (beans, lentils), seeds and nuts

Minimize processed foods, oils, animal foods

Great grandparent Rule of Thumb

Lifestyle Heart Trial (RCT)

JAMA Dean Ornish, MD, et. al. 1998

Experimental group
(n = 28)
(Intensive Lifestyle changes)

Control group
(n = 20)
(Physician's diet advice)

Experimental Group: Intensive lifestyle changes with **whole foods vegetarian (10% fat) diet**, aerobic exercise, stress management, smoking cessation, group psychologic social support.

Lifestyle Heart Trial (RCT)

JAMA Dean Ornish, MD, et. al. 1998

Experimental group (n = 28)

(Intensive Lifestyle changes)

- 71% made lifestyle changes for 5 years
- 1 year: Average % diameter stenosis ***decreased*** with **4.5% relative improvement**
- 5 years: ***decreased*** with **7.9% relative improvement**
- Fewer cardiac events

Control group (n = 20)

(Physician's diet advice)

- 75% made moderate changes for 5 years
- 1 year: Average % diameter stenosis ***increased*** with **5.4% relative worsening**
- 5 years: increased with **27.7% relative worsening**
- More cardiac events

Experimental Group: Intensive lifestyle changes with **whole foods vegetarian (10% fat) diet**, aerobic exercise, stress management, smoking cessation, group psychologic social support.

“Eat well, Move More, Stress Less”

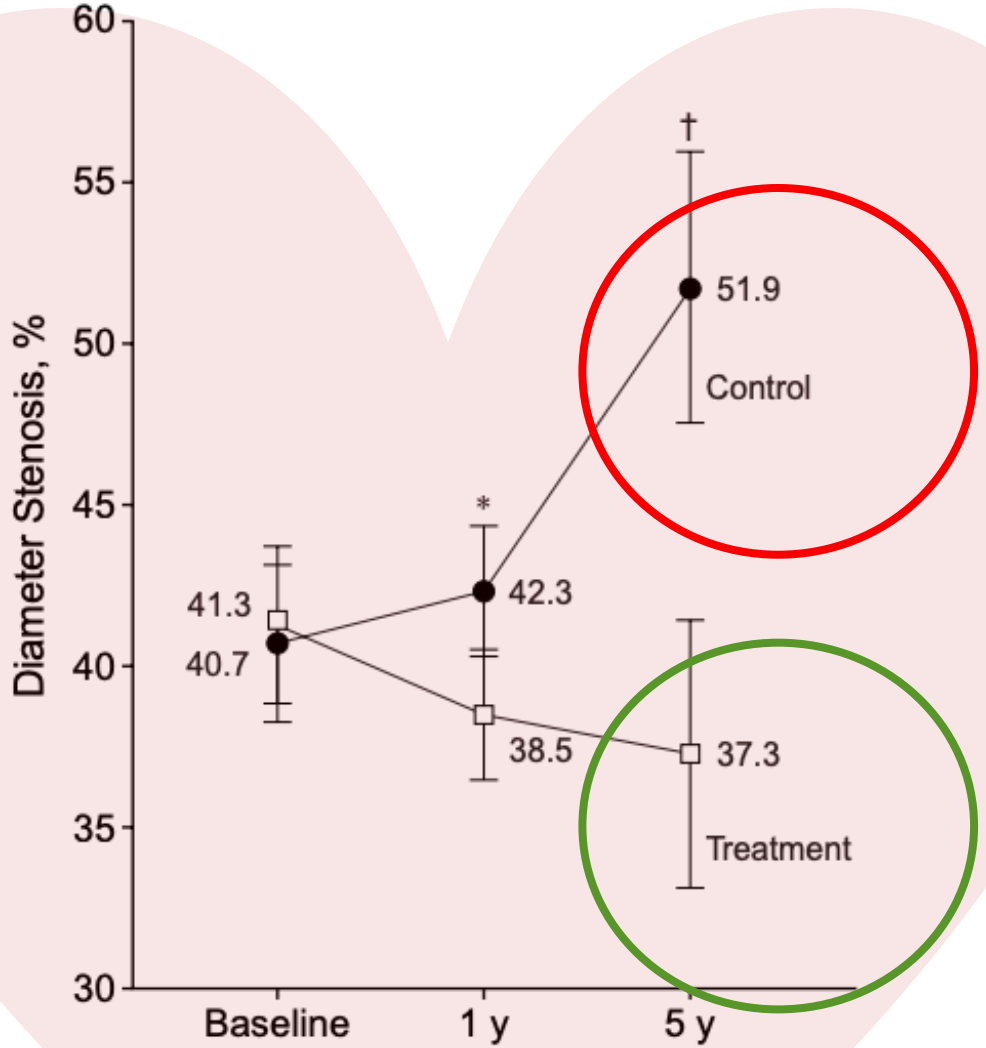


Figure 1.—Mean percentage diameter stenosis in treatment and control groups at baseline, 1 year, and 5 years. Error bars represent SEM; asterisk, $P = .02$ by between-group 2-tailed test; dagger, $P = .001$ by between-group 2-tailed test.

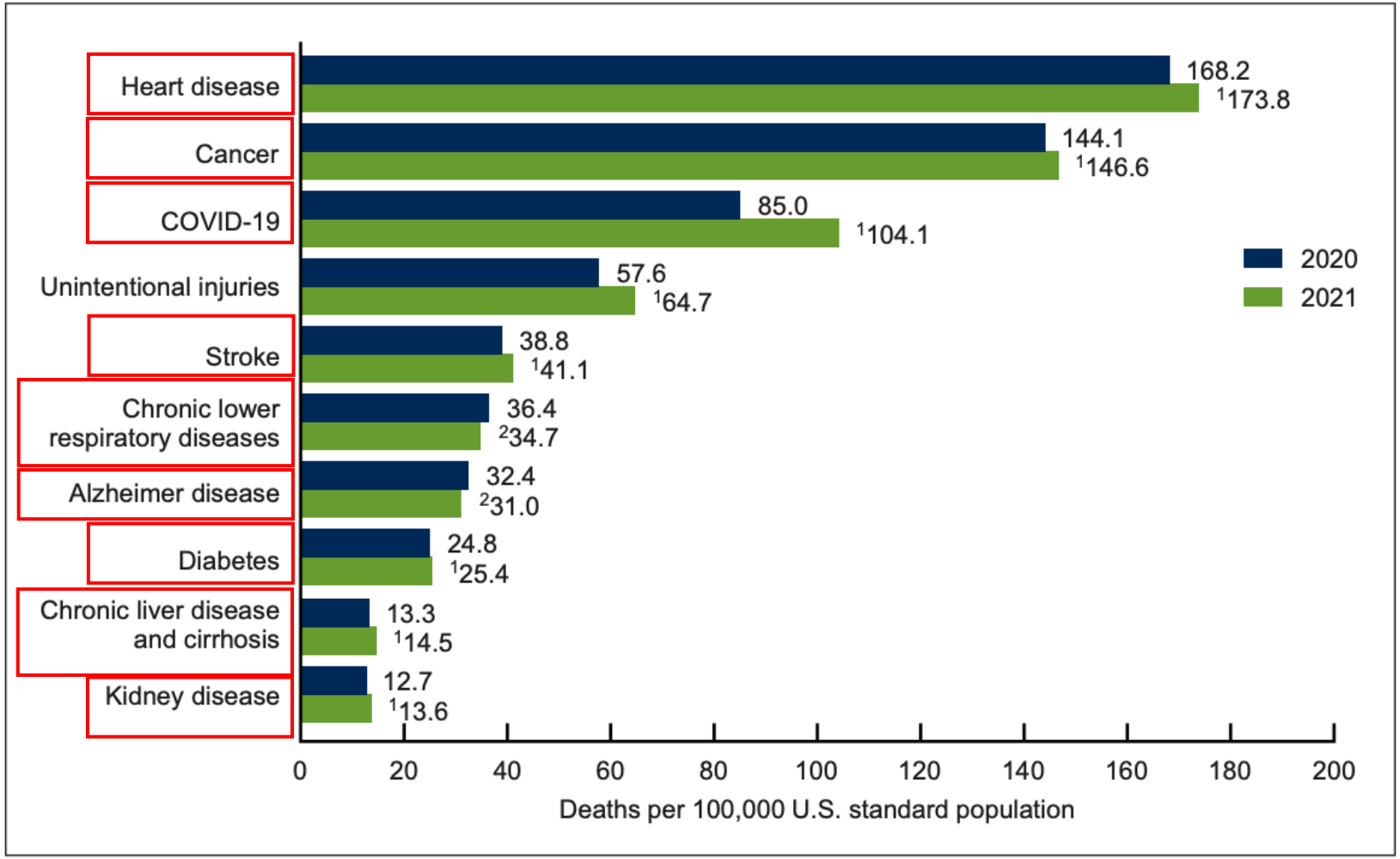
BROAD Study:

RCT using a whole food plant-based (WFPB) diet in the community

Nutrition & Diabetes, N Wright, et. al, 2017

- Community **based** dietary program on **improving BMI and cholesterol at 6 months**
- 35–70 yo, New Zealand, n = 65 (**75.4% completed** the study)
- **Obesity or Overweight + at least type 2 diabetes, ischemic heart disease, hypertension and/or hypercholesterolemia**
- Intervention: twice-weekly meetings for **12 weeks** and non-energy-restricted **WFPB diet** with vitamin B_{12} supplementation.
- **Mean BMI reduction and cholesterol reduction greater with WFBP diet at 6 and 12 months**
- Did not limit energy intake
- Did not mandate regular exercise

Figure 4. Age-adjusted death rate for the 10 leading causes of death in 2021: United States, 2020 and 2021



[1]Statistically significant increase from 2020 to 2021 ($p < 0.05$).
[2]Statistically significant decrease from 2020 to 2021 ($p < 0.05$).
NOTES: A total of 3,464,231 resident deaths were registered in the United States in 2021. The 10 leading causes of death accounted for 74.5% of all U.S. deaths in 2021. Causes of death are ranked according to number of deaths. Rankings for 2020 data are not shown. Data table for Figure 4 includes the number of deaths for leading causes and the percentage of total deaths. Access data table for Figure 4 at: https://www.cdc.gov/nchs/data/databriefs/db456-tables.pdf#4.
SOURCE: National Center for Health Statistics, National Vital Statistics System, Mortality.

Standard American Diet (SAD)

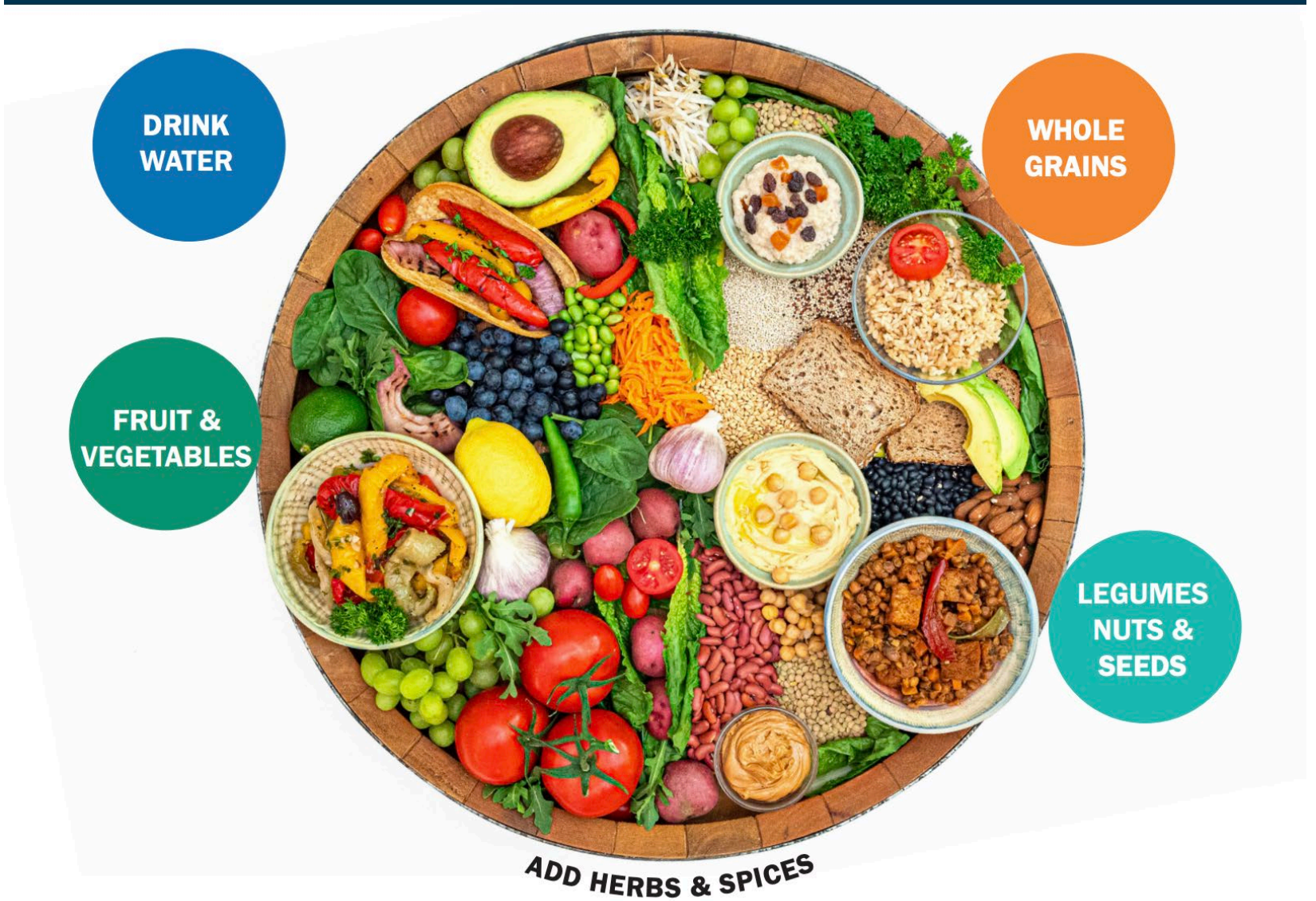
- 2017 comparative risk assessment model looked at the association between **Dietary Factors** and **Mortality** from:
  - Heart Disease
  - Stroke
  - Type 2 Diabetes
- 702,308 cardiometabolic deaths in 2012 in the US
- 45.4% associated with suboptimal diet

Whole Food Plant Based Diet

Standard American Diet (SAD)

AMERICAN COLLEGE OF
Lifestyle Medicine

A WHOLE FOOD, PLANT-BASED PLATE



DRINK WATER

WHOLE GRAINS

BENEFITS

- High quality carbohydrate, Fiber, vitamins, antioxidants
- Eat the rainbow
- Local
- Seasonal
- Fresh or Frozen
- Organic

LEGU
NUT
SE

A WHOLE FOOD PLANT-BASED PLATE

EAT THIS...

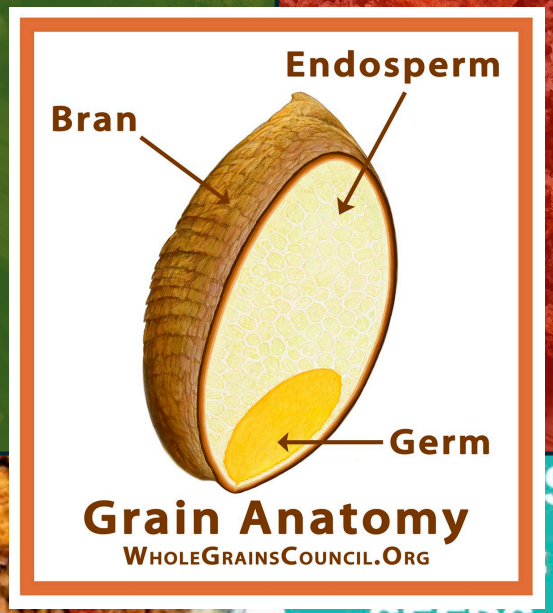
- Whole grain (name of grain)
- Whole wheat
- Stone ground whole
- Brown rice
- Oats/Oatmeal
- Wheat berries

(includes B vitamins, antioxidants, minerals, fiber)

AVOID THIS...

- Enriched flour
- Wheat flour
- Cornmeal/degerminated
- Bran
- Wheat germ

(starchy part only)



Legumes = Protein + Vegetable

- Legumes: Peas, beans (kidney, pinto, white, black, lima, garbanzo), split peas, lentils, edamame, tofu, tempeh.
- High in protein and fiber
- High in poly and mono unsaturated fats
- Inexpensive, especially compared to meat

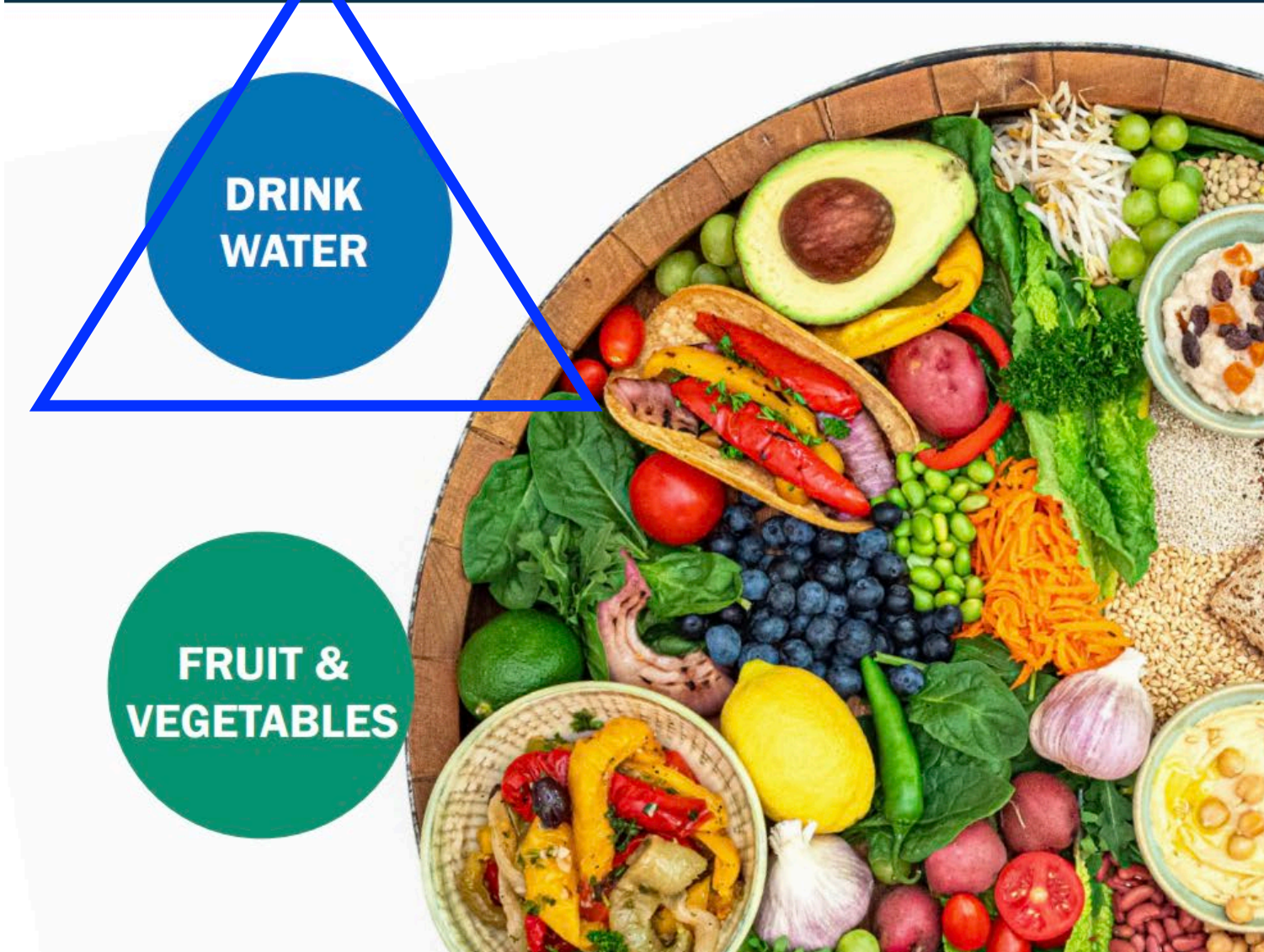
Nuts/Seeds

- Almonds, pistachios, walnuts, pecans, cashews, pumpkin, sunflower, chia, flax, hemp seeds, nut butters
- Omega 3 = brain, retina, heart health

FRUIT &
VEGETABLES
LEGUMES
NUTS &
SEEDS
ADD HERBS & SPICES

AMERICAN COLLEGE OF
Lifestyle Medicine

A WHOLE FOOD, PLANT-BA



THINK
PAIR
SHARE

Death by Ultra-processed foods (UPFs)

UPF have a long list of chemicals in the ingredients.

Ready to eat products, packaged snacks, carbonated soft drinks, etc.

2024 BMJ Umbrella review of meta-analyses (45 unique pooled analyses, n = 9,888,373)

Direct associations found between exposure of UPF and 32 health parameters including **mortality, cancer**, and negative **mental**, **respiratory**, **CV, GI**, and **metabolic** health outcomes.

Lane et al., 2024

Standard American Diet

Standard American Diet

Whole Food Plant Based Diet

When should I focus on healthful eating?

Bogalusa Heart Study

Community-based, longitudinal, biracial investigation (n=14,000, ages 4-52yo, 1973).

Atherosclerotic lesions begin in childhood and correlate with dyslipidemia, hypertension and obesity.

Health Professionals Follow up Study

2022 study, Men (60-70 yo) with the highest adherence of a healthy plan—based diet had 18% lower risk of incident erectile dysfunction.

Processed foods in the context of a vegan diet, and changes in body weight and severe hot flashes in postmenopausal women: a secondary analysis of a randomized clinical trial (N=84)

Menopausal women decreased severe hot flashes by 92% and lost weight (avg 8lbs) with 12 weeks of a low-fat vegan diet.

Dean Ornish: Effects of intensive lifestyle changes on the progression of mild cognitive impairment or early dementia due to Alzheimer's disease (2024 RCT, N=51, mean age 73.5 yo)

Intensive lifestyle changes, including plant based diet, improved cognition after just 20 weeks.

Move it to the start

Tell me...
24 hour recall

- Rather than “Eat healthy…”

- Specific
- Measurable
- Attainable
- Relevant
- Timely
- Inclusive
- Equitable

- Eat 1 more frozen vegetable per day, 3 days a week for 2 weeks.

Lifestyle Medicine has led to a more ***joyful*** personal and professional life.

Take Home Points

LM is <u>evidence based</u> medicine that prevents, treats and reverses disease by addressing the root of the problem.

Whole food, plant based eating decreases the risk and severity of heart disease, stroke, diabetes, and many other chronic conditions. It is beneficial for all ages.

Whole food, plant based eating includes fruits, vegetables, whole grains, legumes, nuts, seeds.

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2026

UPMC Refresher Course in Family Medicine

Pittsburgh, PA

NUTRITION

OMT FOR LOW BACK PAIN: HANDS-ON TECHNIQUES FOR ALL CLINICIANS

Justine Bensur, DO, MS MedEd

Laura Bucci, DO

Donald B. Middleton, MD Refresher Course in Family Medicine

February 26, 2026

OBJECTIVES

01	Discuss the foundational principles of osteopathic medicine and their implications for clinical practice

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05	Perform and refine core muscle energy techniques through guided, hands-on practice

WHAT IS OSTEOPATHIC MEDICINE?

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- Structure and function are reciprocally interrelated
- DOs use a hands-on treatment called osteopathic manipulative treatment/medicine(OMT/OMM)

MANUAL MEDICINE TYPES

- **Licensed Physicians in the US:** DO (or MD) perform OMT/OMM
- **Physical therapists:** Doctorate of PT, ~6-7 years (3 after bachelor/undergrad)
- **Chiropractic** (Doctorate of Chiropractic, ~6-8 years, usually 3-4 years undergrad then 3-4 years doctorate program, clinical experience wrapped into school), focus on spinal manipulation
- **Chinese medicine practitioners**
  - Acupressure/Acupuncture, Tui-Na
  - (Masters vs Doctorate (~5-6 years total), clinical experience wrapped into school) typically need 2+ years undergrad
- **Naturopath**
- **Massage therapists** (~6-12 months, no BA required)
- **Other modalities** practiced by non-physician therapists who can use their hands
  - Lymphatic massage, craniosacral therapy

WHEN TO REFER FOR OMT

OMT can be just one part of treatment plan, often in conjunction with medication and/or physical therapy

- **Musculoskeletal concern** (sports injury, acute or chronic neck/back pain, hip pain, post MVC)
- **Headaches**
- **Postconcussive syndrome**
- **Illness with MSK or referred component** (pneumonia with rib or back pain, Gastritis)
- **Constipation, IBS**

OMT CONTRAINDICATIONS

Absolute Contraindications

- **Pose a high risk of harm and generally preclude OMT altogether:**
- Lack of patient consent
- Absence of structural diagnosis
- Medical instability
- Fracture or dislocation at or near the treatment site
- Severe neurologic compromise
- Active infection in the area
- Malignancy in the region being treated
- Open wounds or burns at the treatment site.

Relative Contraindications

- **Require clinical judgment, technique modification, or selection of gentler methods:**
- Severe osteoporosis
- Acute herniated disc
- Anticoagulation or bleeding disorders
- Post-surgical states
- Severe pain or guarding
- Rheumatologic instability
- Pregnancy
- Vascular compromise
- Advanced age or frailty

WHAT TO SAY TO PATIENTS ABOUT OMT

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"My DO colleagues can perform a type of therapy called Osteopathic Manipulative treatment (OMT)"

"The doctor will use their hands to gently stretch, move, or apply pressure to your muscles and joints to help your body to heal itself"

"OMT is not the same as chiropractic care. Its part of the doctor's medical education and often used alongside other treatments like medication, physical therapy, and lifestyle changes"

WHAT DOES AN OMT VISIT LOOK LIKE?

- Focused history
- General musculoskeletal exam +/- neuro exam
- Structural exam
- Looking for “somatic dysfunction”
  - *an impaired or altered function of related components of the somatic system*
    - **T**exture abnormalities (often hypertonicity = spasm)
    - **A**symmetry
    - **R**ange of motion changes
    - **T**enderness
- Techniques
- Follow up (discuss home exercises, next OMT etc)
  - *patients will likely need more than 1 session, ex Q 2 weeks for 6 weeks*

OVERVIEW OF TECHNIQUES

Direct: move the dysfunctional joint/tissue toward the restriction	Indirect: move the dysfunctional joint/tissue away from the barrier
• **Soft tissue (like massage)** • **Muscle energy** ("active stretching") • High-Velocity Low Amplitude (HVLA = cracking)	• Counterstrain • Fascial release

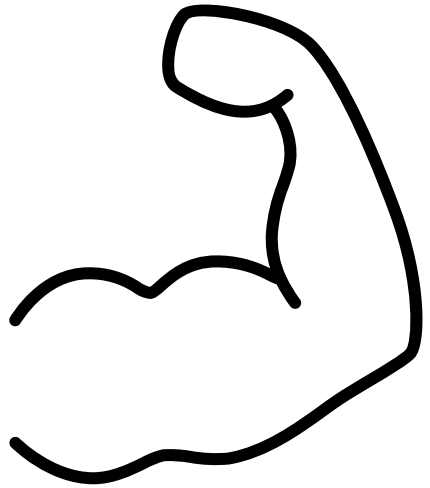
MYOFASCIAL RELEASE

- Indications - used to treat somatic dysfunctions involving myofascial tissues or other connective tissues
- Direct or indirect (pressure into the restriction or away from)
- Technique: gentle, sustained pressure for 30-120 seconds until a release is felt

MUSCLE ENERGY

Muscle energy takes advantage of the physiology pertaining to Golgi tendon organs and muscle spindle, resulting in **relaxation of hypertonic musculature**

- **Patient participation is needed**
- Direct and active technique
- Patient is instructed to use their muscles against a controlled counterforce from the physician
- Goal: relax/stretch/lengthen muscles, increase range of motion and improve function



TYPES OF MUSCLE ENERGY

Post-isometric relaxation and reciprocal inhibition

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Post-isometric relaxation and reciprocal inhibition

Post-isometric relaxation: the patient is instructed to move away from the restrictive barrier

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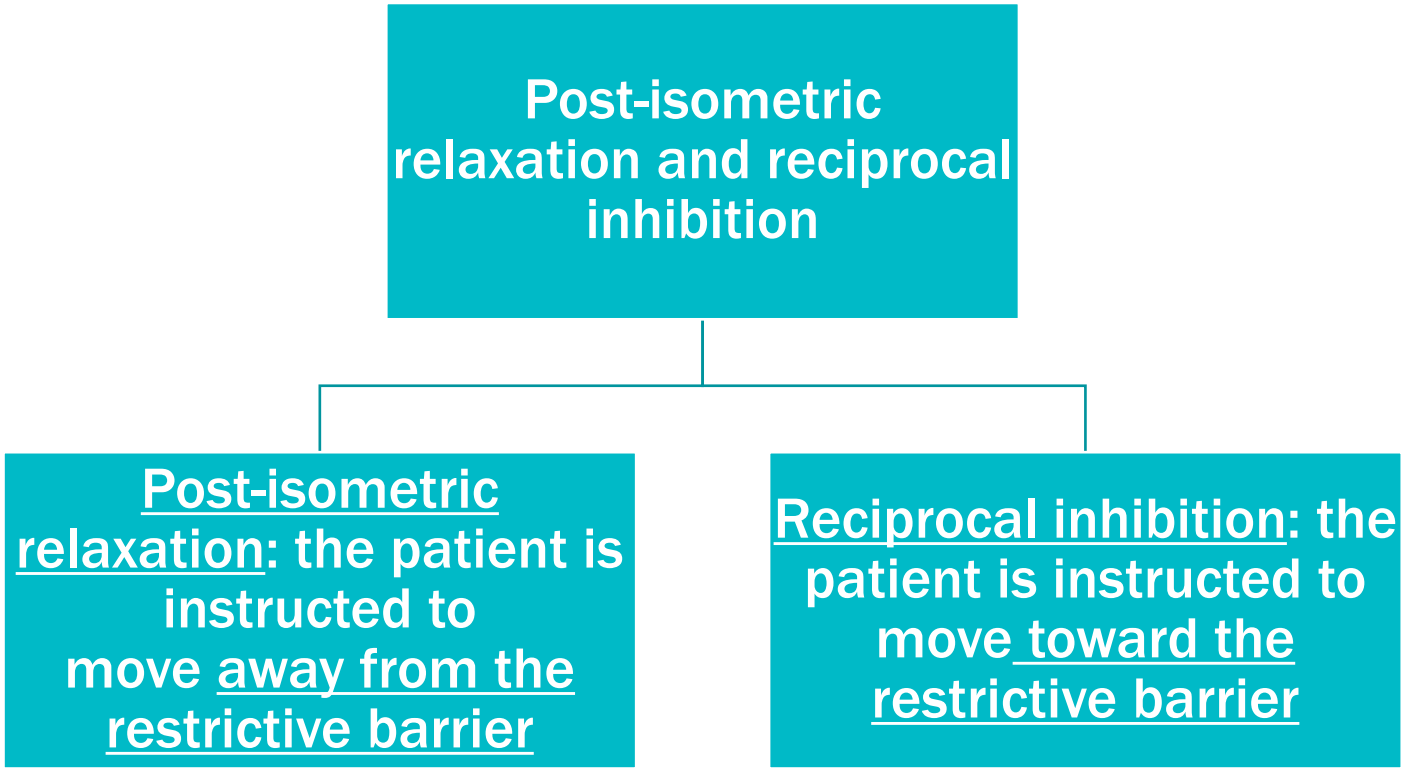


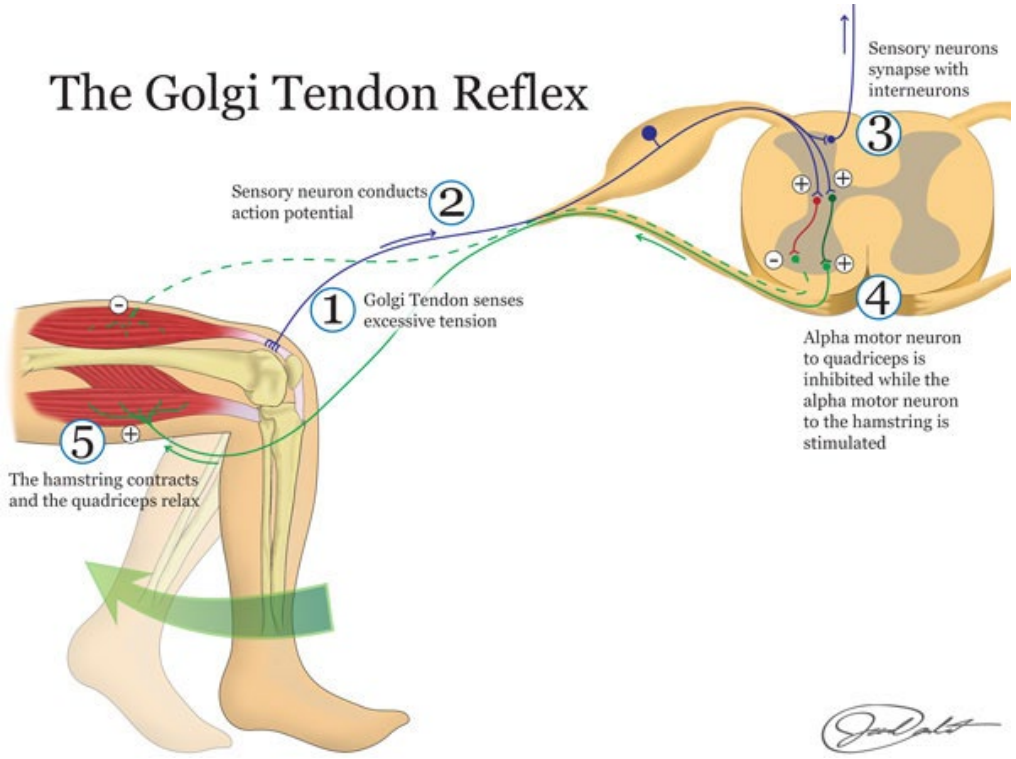
HOW IT WORKS

Golgi tendon organ senses increased tension within a muscle belly

- **contraction of the respective (agonist) muscle group**
- **activating contraction of the opposing (antagonist) group**

Muscle spindle fibers are activated when it senses an increase in length

- **contraction of the agonist muscle (same muscle group)**
- **relaxation of the antagonist muscle (opposite)**



STEPS OF MUSCLE ENERGY

Position patient to their restrictive barrier (most they can reasonably stretch)
Instruct patient to **move away from the barrier** (or toward it if using reciprocal inhibition)
Resist patient's force for **3–5 seconds**
Instruct patient to stop their force and allow for tissue relaxation
Position patient to edge of new restrictive barrier **(pick up the slack)**
Repeat 3–5 times until their somatic dysfunction improves or resolves
Recheck patient's pain and range of motion to assess success

COMMON REGIONS CONTRIBUTING TO LOW BACK PAIN THAT CAN BE TREATED WITH OMT

Lumbar Spine

Sacrum

Hip and Pelvis

COMMON CONDITIONS CONTRIBUTING TO LOW BACK PAIN THAT CAN BE TREATED WITH OMT

- Quadratus lumborum myofascial pain
- Psoas syndrome
- Piriformis syndrome

QUADRATUS LUMBORUM MYOFASCIAL PAIN

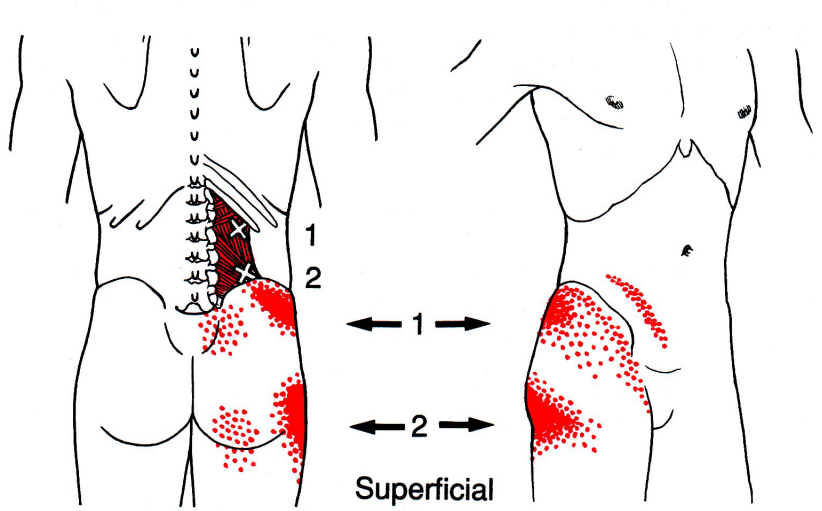
A postural muscle: The quadratus lumborum attaches to the twelfth rib, the spinal column, and the iliac crest

Symptoms: Low back pain referred to the groin and hip

Hx: Overuse- extended sitting, walking, standing
Weakness of back extensor muscles

Exam: hypertonicity, spasm, bogginess; pain at origin or insertion sites

[Positional Release for the Quadratus Lumborum]



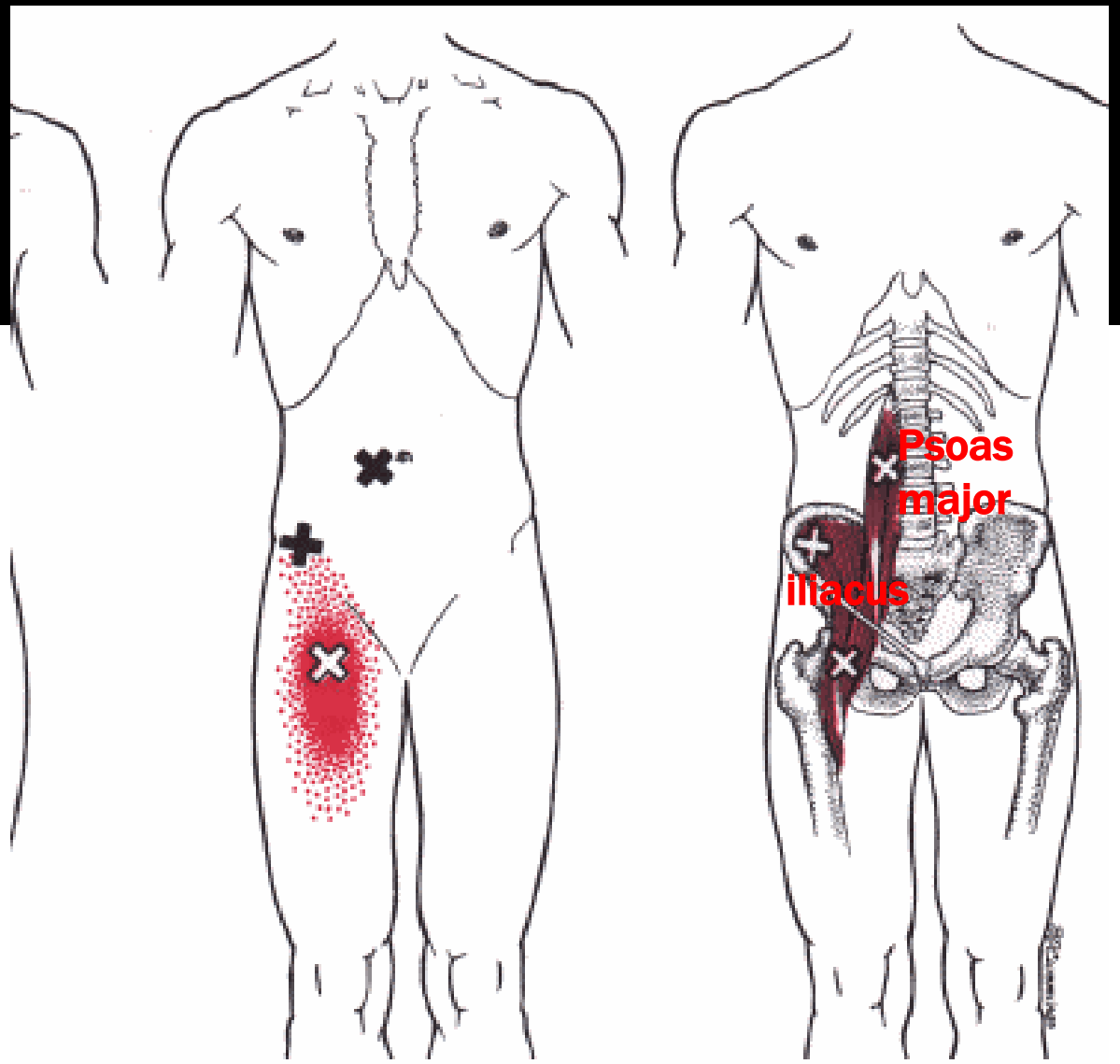
PSOAS SYNDROME

Symptoms: difficulty standing upright, low back and/or pelvic pain

Hx: prolonged sitting

Exam: tenderpoint near ASIS, limited hip extension, positive Thomas test, **patient bent over toward side of spasm** (rule out spine pathology– no red flag symptoms)

[OMT: Muscle Energy – Psoas]



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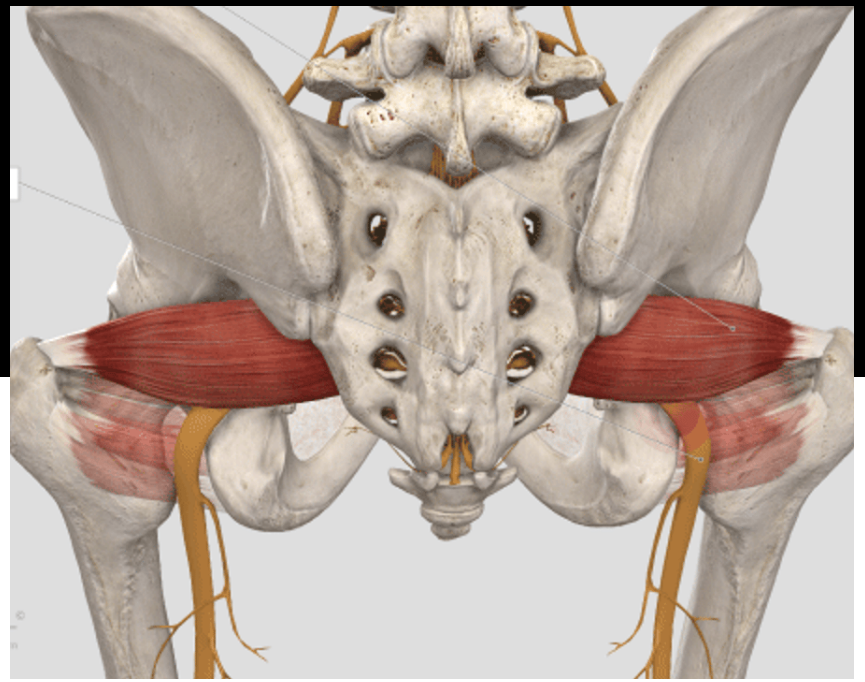
PIRIFORMIS SYNDROME



Symptoms: pain in buttocks, numbness/tingling down leg, worsens after sitting or inactivity

Hx: prolonged sitting, typically younger patient population (vs radiculopathy)

Exam: Tenderpoints over piriformis, restricted motion in hip/pelvis (internal rotation of lower extremity)

(rule out spine pathology– no red flag symptoms)

COUNSELING POST TREATMENT

You may feel sore, pain temporarily exacerbated after treatment

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Hydrate! There may be increased lactic acid production similar to a workout

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Pain, soreness should improve in 24-48 hours, call if worsening after that time period or new symptoms

OMT BILLING

DEMYSTIFYING DOCUMENTATION AND BILLING FOR OSTEOPATHIC MANIPULATIVE TREATMENT

OMT CODING

Dysfunctional body region	ICD 10 code
Head	M99.00
Cervical	M99.01
Thoracic	M99.02
Lumbar	M99.03
Sacral	M99.04
Pelvic	M99.05
Lower extremity	M99.06
Upper extremity	M99.07
Rib cage	M99.08
Abdomen/viscera	M99.09

Number of treated body regions	CPT code
1-2	98925
3-4	98926
5-6	98927
7-8	98928
9-10	98929

- E/M service code (unless no evaluation is performed)
  - Document problem, rationale for OMT (back pain, neck pain, etc) as primary diagnosis
  - Somatic dysfunction of – cervical, thoracic, sacral etc as secondary diagnoses
- +Procedure modifier (25 modifier), GC (if supervision of resident)
- +CPT codes based on number of body regions treated (98925-9)

When combining OMT with an E/M service, the chief complaint the rooming staff enters for the visit should not be OMT, but rather the patient's problem or concern ("back pain")

LET'S PRACTICE!

Front of the Room
Techniques Discussed Today

Quadratus lumborum MFR
Psoas ME
Piriformis ME

Back of the Room
Advanced Techniques

Standardized Approach to Low Back Pain

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Immunization Update 2026 and Addressing Hesitancy

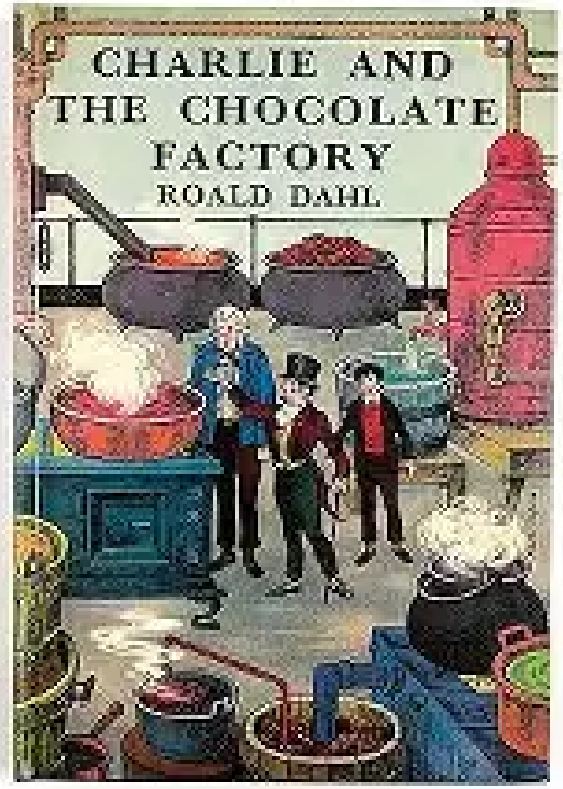
Richard K Zimmerman MD MPH
Professor and Vice Chair for Research

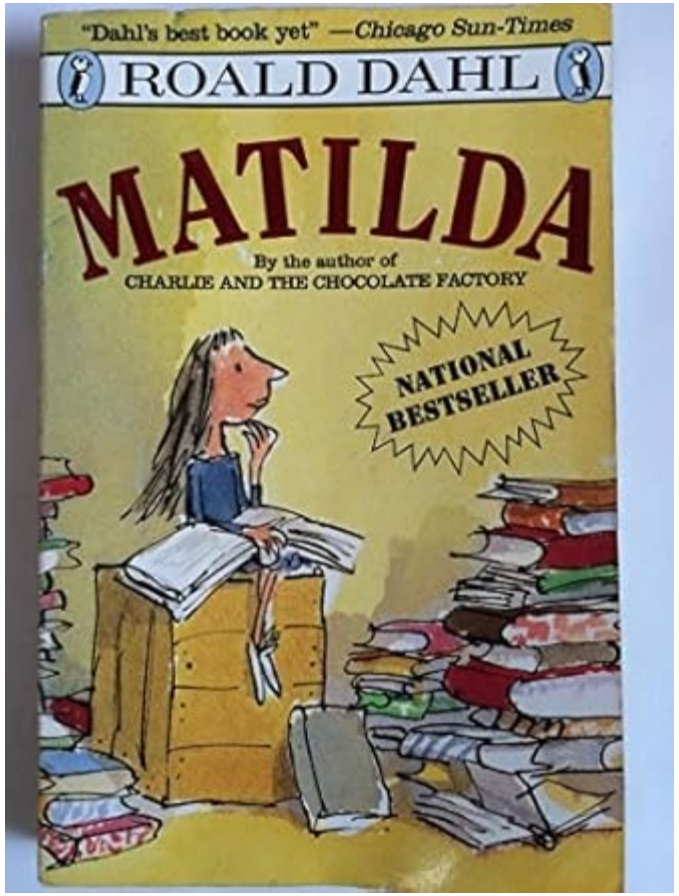
Pitt Vax
Protecting people
Vaccine policy to practice

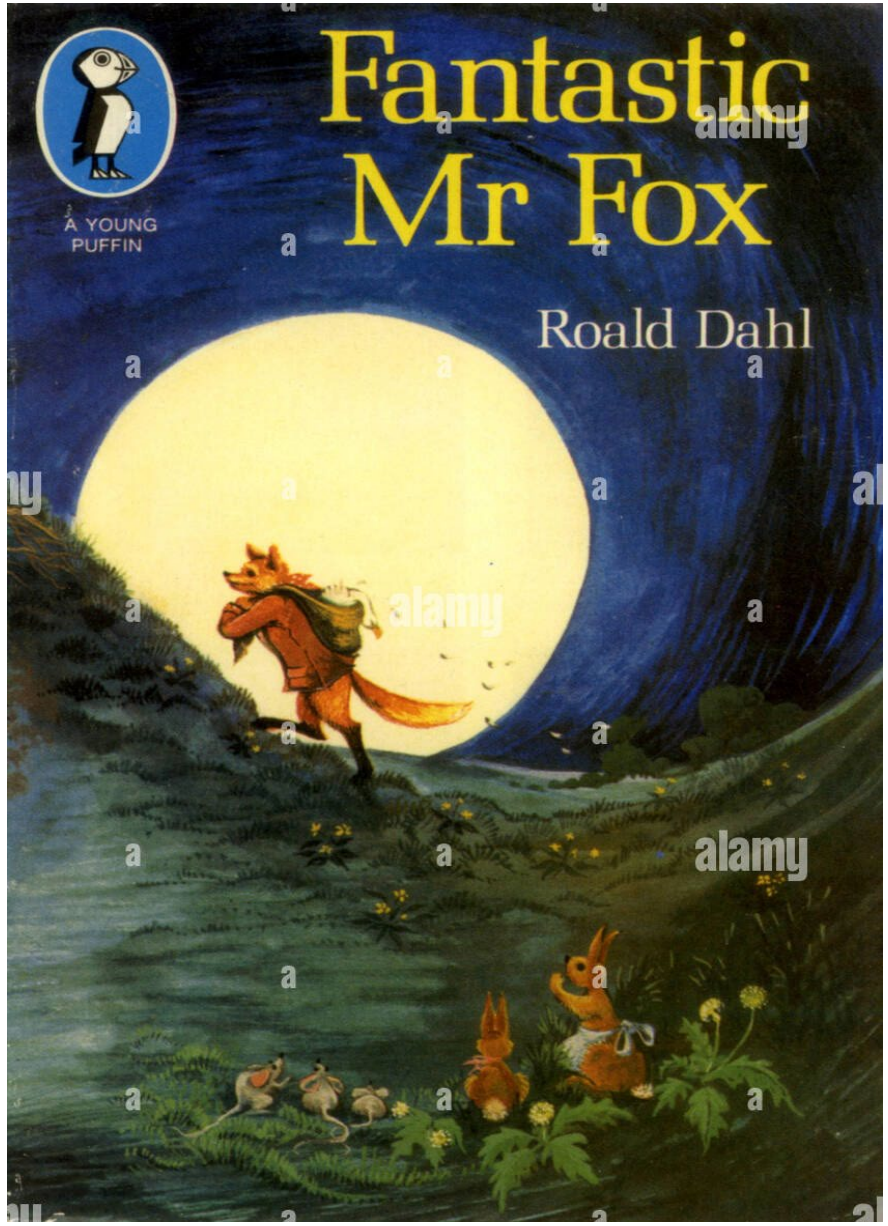
Conflicts of Interest

- Dr. Zimmerman: Research grants from Sanofi Pasteur, Merck, NIH, and CDC
- Primarily federally funded
- Consulting: Sanofi Pasteur, Merck

Ron Dahl's Books







Ron Dahl and family, including eldest daughter Olivia

[Olivia Twenty “Livy” Dahl (1955-1962) - Find a Grave Memorial]

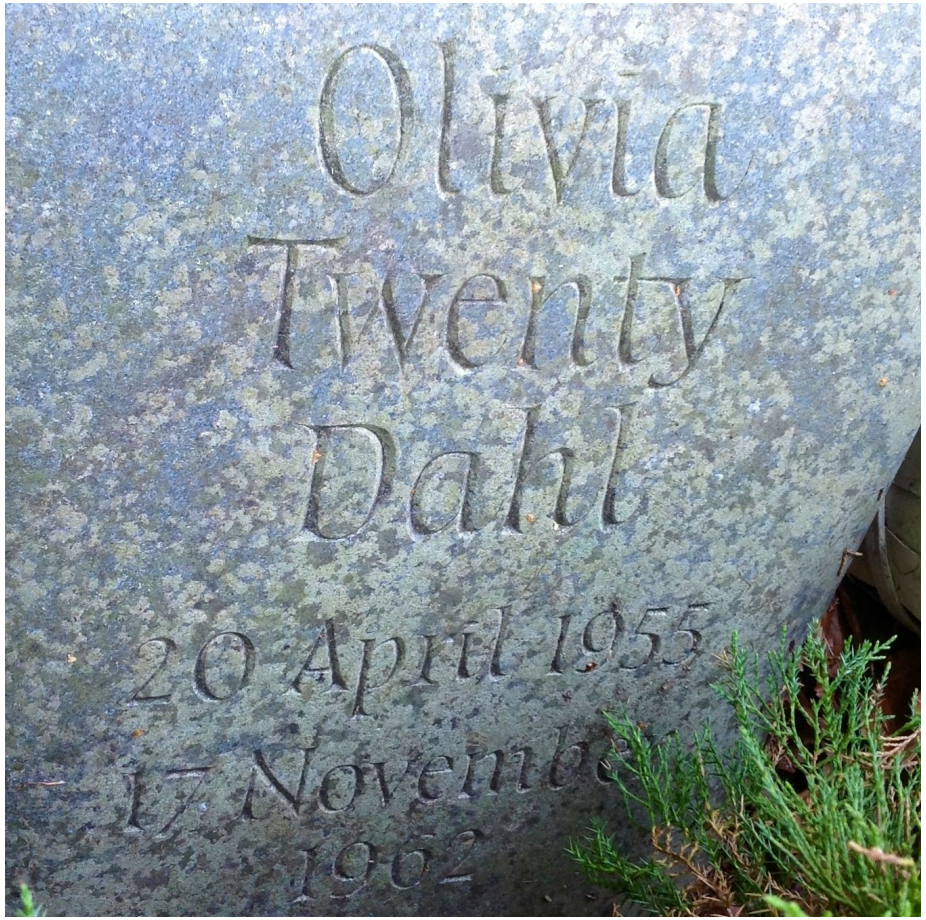
Ron Dahl's Personal Perspective with Measles

- "Olivia, my eldest daughter, caught measles when she was seven years old. As the illness took its usual course I can remember reading to her often in bed and not feeling particularly alarmed about it. Then one morning, when she was well on the road to recovery, I was sitting on her bed showing her how to fashion little animals out of coloured pipe-cleaners, and when it came to her turn to make one herself, I noticed that her fingers and her mind were not working together and she couldn't do anything.
- 'Are you feeling all right?' I asked her.
- 'I feel all sleepy,' she said.

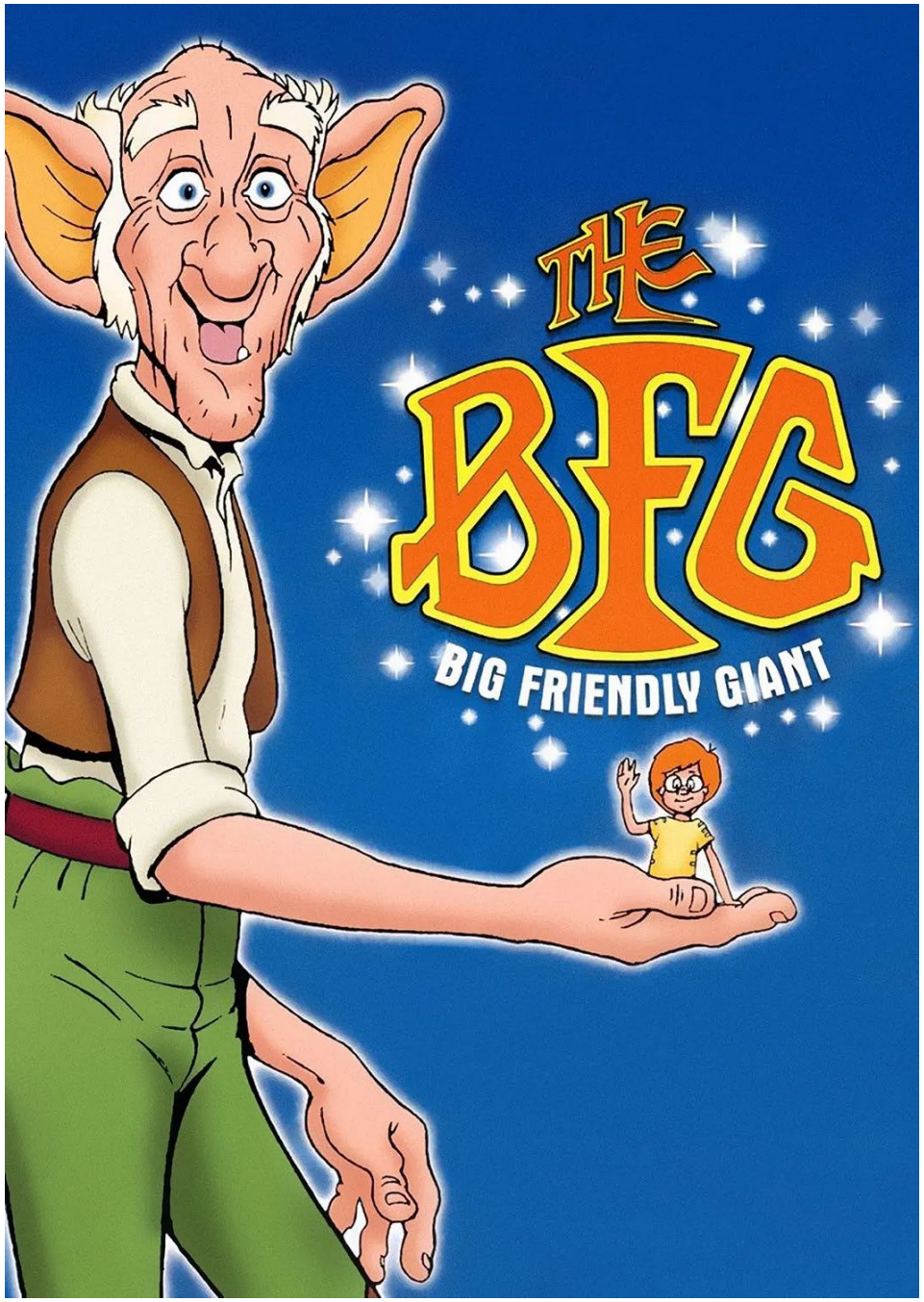
- https://www.unmc.edu/healthsecurity/transmission/2025/03/05/roald-dahls-heartbreaking-letter-about-losing-his-daughter-in-1962/
- The letter is as relevant today as when it originally appeared, in a pamphlet published by the Sandwell Health Authority, in 1988.

Ron Dahl's Personal Perspective with Measles

- "In an hour, she was unconscious. In twelve hours she was dead.
- The measles had turned into a terrible thing called measles encephalitis and there was nothing the doctors could do to save her…"
- That was in 1962, before measles vaccine was available
- In 1986, "Here in Britain, because so many parents refuse, either out of obstinacy or ignorance or fear, to allow their children to be immunized, we still have a hundred thousand cases of measles every year. Out of those, more than 10,000 will suffer side effects of one kind or another…"



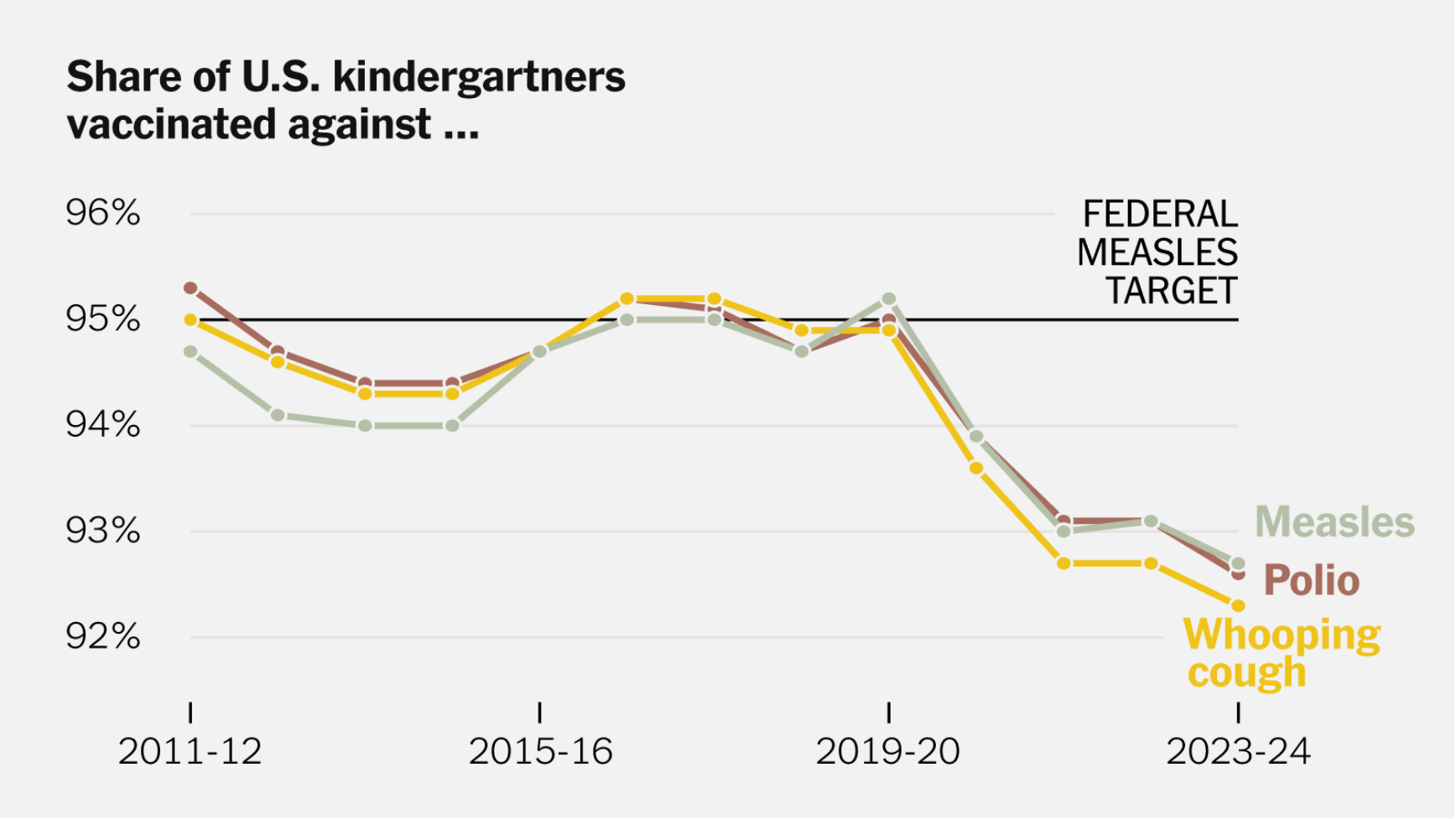
Olivia Twenty "Livy" Dahl (1955-1962) - Find a Grave Memorial



- *"For Olivia"*

- "And I know how happy she would be if only she could know that her death had helped to save a good deal of illness and death among other children."

Childhood Vaccine Coverage Rates Falling in the US



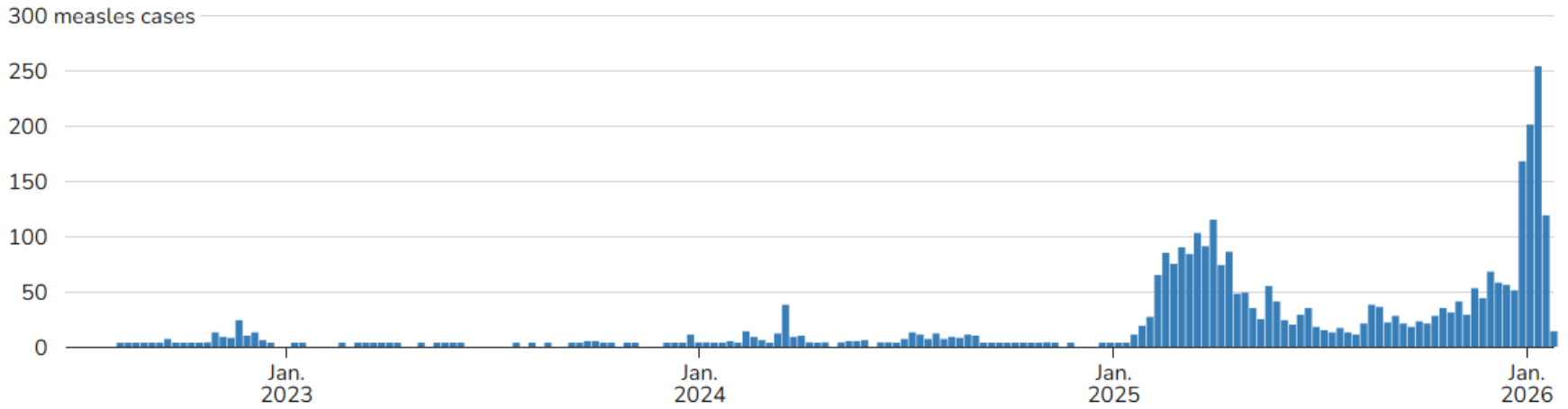
https://www.nytimes.com/interactive/2025/01/13/upshot/vaccination-rates.html

Clinicians Need to Know Facts and Impact Data

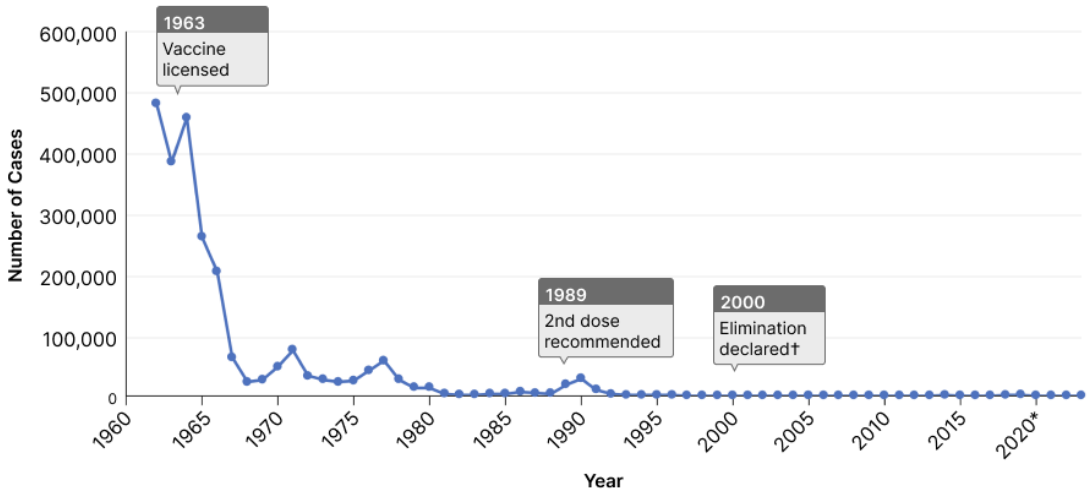
So that we can relay reliable, confident messages

Weekly measles cases by rash onset date

2023–2026* (as of January 29, 2026)



Reported Measles Cases in the United States from 1962 – 2023*



- 2025: 93% unvaccinated
- 2025: 11% hospitalized
- 2025: 3 deaths
- Current South Carolina Outbreak >800 cases
- Many states have MMR coverage below herd (community) threshold

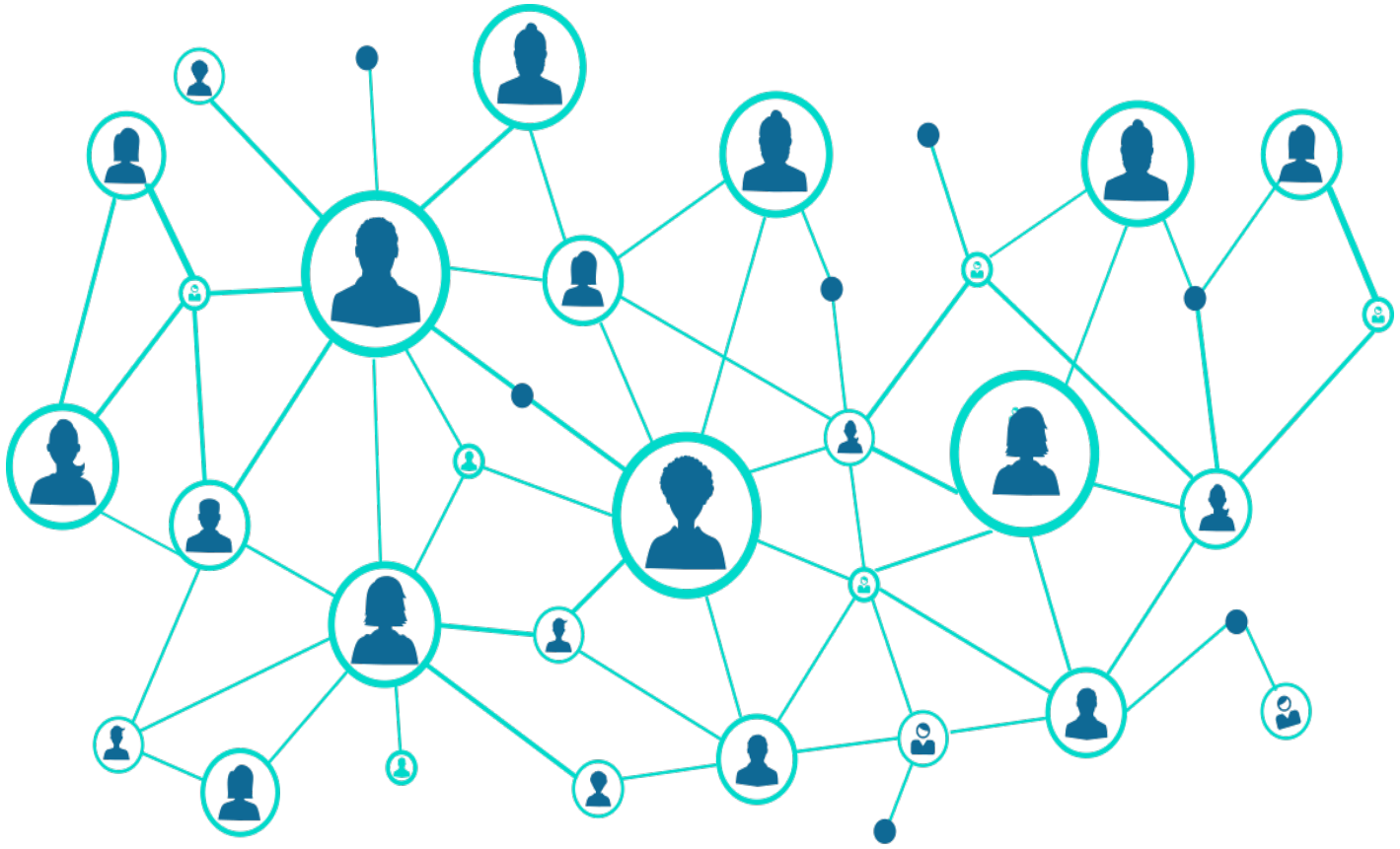
Clinical Features of Measles

- Incubation period 11 to 12 days
  - Exposure to rash onset averages 14 days (range, 7 to 21 days)
- Prodrome lasts 2 to 4 days (range, 1 to 7 days)
  - Stepwise increase in fever to 103°F–105°F
  - Cough, coryza, and conjunctivitis
  - Koplik spots (on mucous membranes)
- Rash
  - Persists 5 to 6 days
  - Begins at hairline, then involves face and upper neck
  - Proceeds downward and outward to hands and feet
  - Severe areas peel off in scales
  - Fades in order of appearance

University of Pittsburgh®

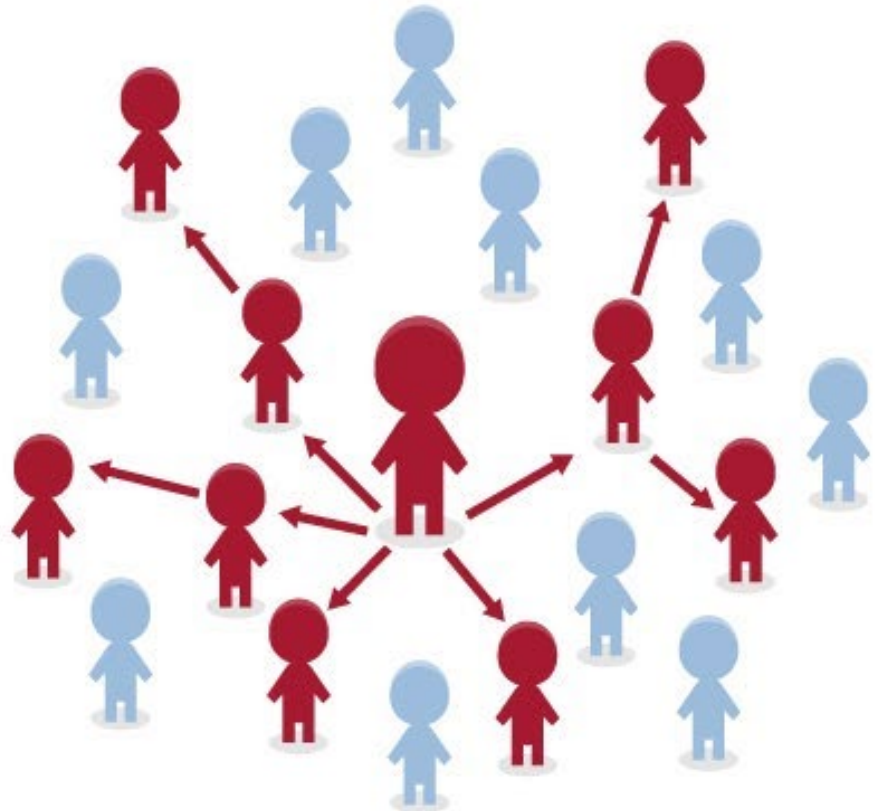
3 transmission Modes: Large Droplet, small droplet, Hand/Fomite

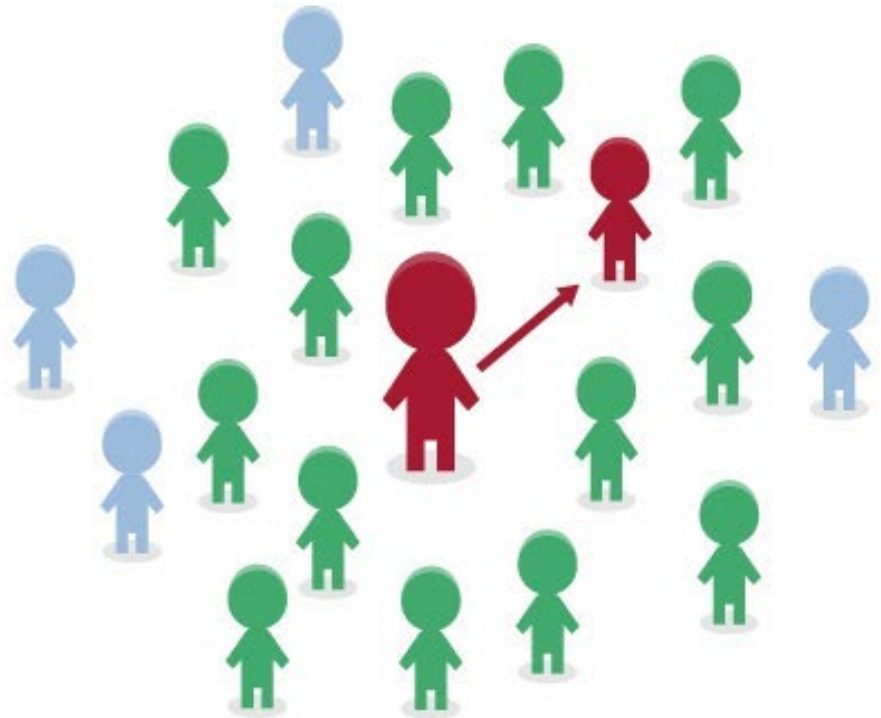
Measles Communicability



CDC Pink Book

- Communicable before rash
- Airborne droplets communicable for 2 hours
- Transmission rate to susceptible household contacts >90% in closed settings
- Face-to-face contact not required
- The **basic reproduction number (R_0)** is between **12 and 18**.
- Thus, **herd immunity threshold is about 95%**





No herd immunity | **Herd immunity achieved**

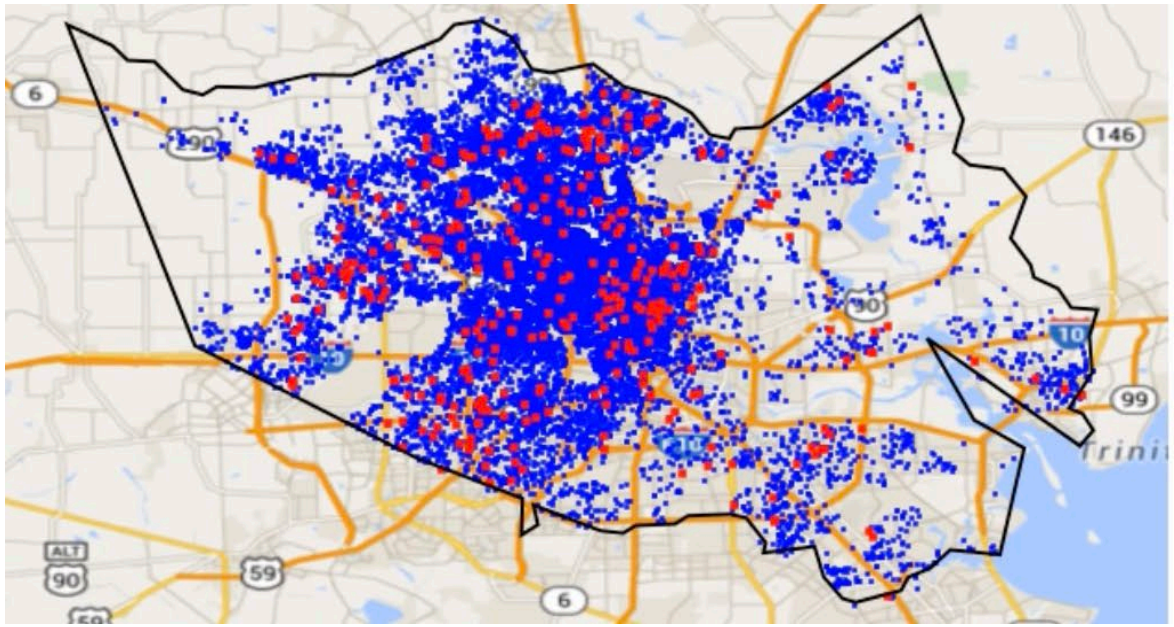
Susceptible Infected Immune Disease transmission

Source: GAO adaptation of NIH graphic. | GAO-20-646SP

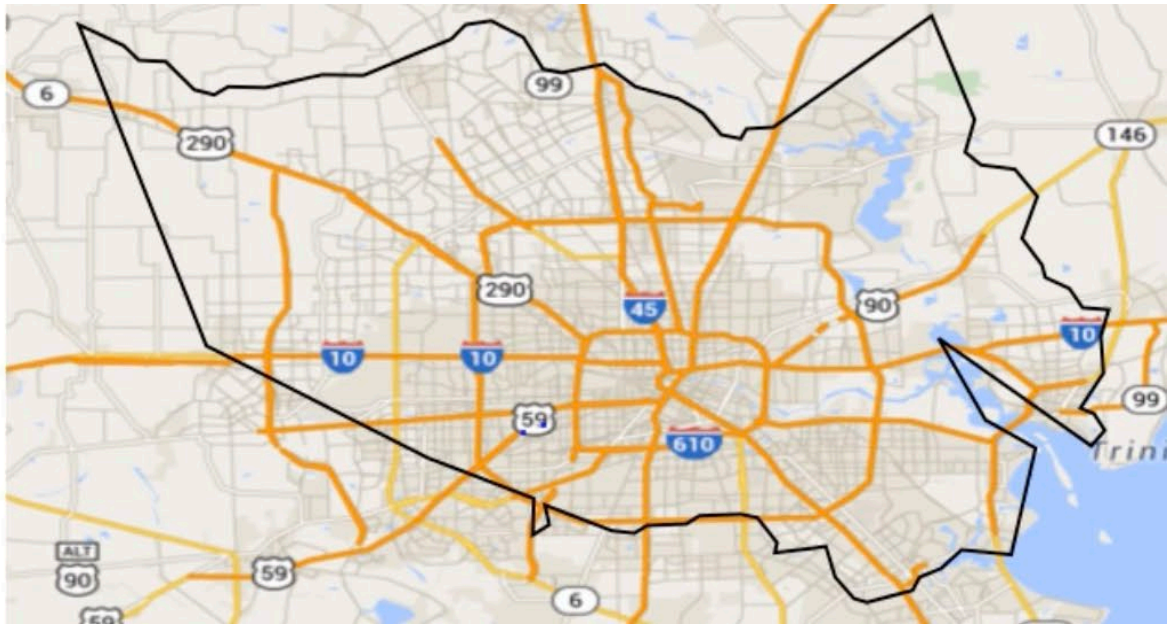
Rephrase as community immunity

Measles Simulation in Houston TX

80% MMR coverage



95% MMR coverage



Comparison in measles cases by 80% vs. 95% measles vaccine coverage in simulation in Harris County (Houston), Texas after 238 days with red showing infectious cases and blue recovered cases

From FRED Web, University of Pittsburgh

Risk of Complications/Sequelae #1

Sequelae	Measles	Mumps	Rubella	MMR
Case-fatality rate	1-3 deaths/1000 cases[1,2]	1 per 5,000 cases[2]	Rare unless encephalitis or congenital rubella syndrome	Only if severely immunocompromised which is a contraindication[9]
Encephalitis	1-2 cases/1000 measles cases[1]	0.5%[2]	1/6000 rubella cases, including chronic*	
Neurologic	-Subacute sclerosing panencephalitis 1 case/100,000 cases,[1] -Seizures	-Meningitis (5%), [2] -Deafness transient (4%)[4]; unilateral-permanent (1/20,000), [2]	- Progressive panencephalitis -Neuritis -Congenital rubella syndrome (CRS) with deafness (60-90%), microcephaly, autism, intellectual disability	Febrile seizures 1 in 3,000 to 4,000 doses*

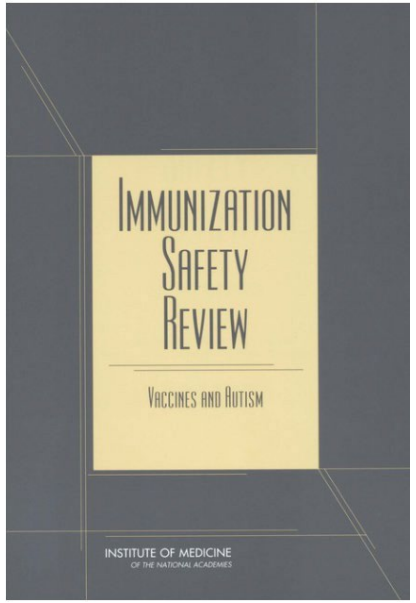
Risk of Complications/Sequelae #2

Sequelae	Measles	Mumps	Rubella	MMR
Thrombo-cytopenia	Described		1/3000 rubella cases	1 case per 30,000 to 40,000 vaccinated children[9]
Other	-Pneumonia (1%-6%)[1] -Otitis Media (7%-9%)[1] -Diarrhea (8%)[1]	-Orchitis (30%)[4] with risk for testicular atrophy, oligospermia, -Mastitis (30%),[4] -Oophoritis (7%),[4] -Pancreatitis (4%),[4] -Myocarditis (6%)[2]	-CRS with congenital heart disease, eye abnormalities, interstitial pneumonitis, diabetes, low birth weight (23-85%)[6] -Miscarriage, prematurity, fetal death -Arthralgia up to 70% of adult women including chronic[4] -Granulomas -Fuchs' uveitis -Orchitis	Anaphylaxis in 8-14.4 cases/million doses; none fatal* Arthralgia in 25% of adult women*

Congenital Rubella Syndrome

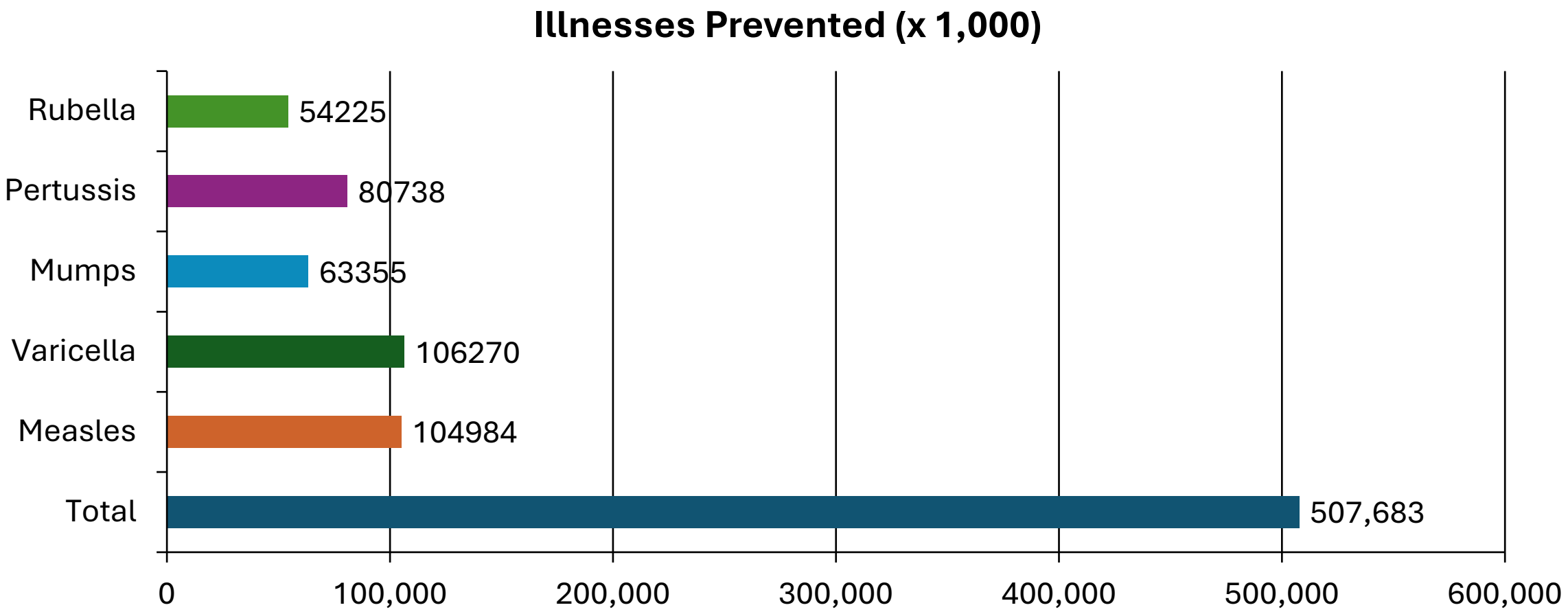
MMR Vaccine Safety

"The committee concludes that the evidence favors **rejection** of a causal relationship between MMR vaccine and autism." Institute of Medicine, 2004



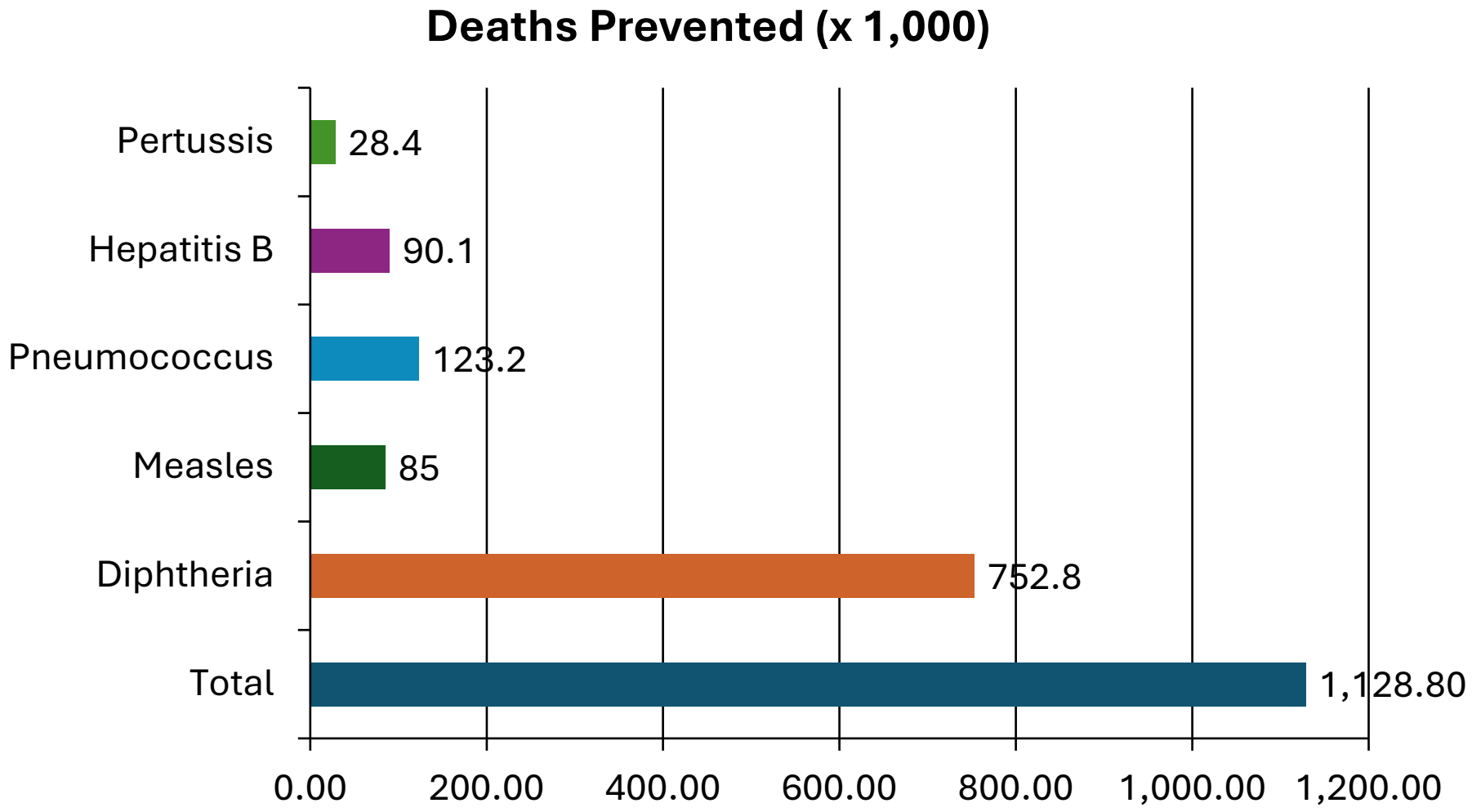
Vaccine safety information: https://www.cdc.gov/vaccinesafety/index.html
https://nap.nationalacademies.org/catalog/10997/immunization-safety-review-vaccines-and-autism
https://www.cdc.gov/measles/cases-outbreaks.html

Top 5 Vaccine-preventable Diseases by Illnesses and Total Prevented by Childhood Vaccination, US, 1994-2023



Health and Economic Benefits of Routine Childhood Immunizations in the Era of the Vaccines for Children Program — United States, 1994–2023 (cdc.gov)

Top 5 Vaccine-preventable Diseases by Deaths Prevented by Childhood Vaccination, US, 1994-2023



Health and Economic Benefits of Routine Childhood Immunizations in the Era of the Vaccines for Children Program — United States, 1994–2023 (cdc.gov)

Unharmonized Schedules – new 2026 CDC schedule

Immunizations Recommended for All Children

Vaccine and other immunizing agents	Birth	1 mo	2 mos	4 mos	6 mos
Diphtheria, tetanus, acellular pertussis (DTaP < 7 yrs)			1st dose	2nd dose	3rd dose
Tetanus, diphtheria, acellular pertussis (Tdap ≥ 7 yrs)					
Haemophilus influenzae type b (Hib)			1st dose	2nd dose	3rd dose
Pneumococcal conjugate (PCV15, PCV20)			1st dose	2nd dose	3rd dose
Inactivated poliovirus (IPV < 18 yrs)			1st dose	2nd dose	
Measles, mumps, rubella (MMR)					
Varicella (VAR)					
Human papillomavirus (HPV)					

Unharmonized Schedules – new 2026 CDC schedule

Immunizations Based on Shared Clinical Decision-Making

Vaccine and other immunizing agents	Birth	1 mo	2 mos	4 mos	6 mos
Rotavirus (RV): RV1 (2-dose series), RV5 (3-dose series)			1st dose	2nd dose	3rd dos
COVID-19 (1vCOV-mRNA, 1vCOV-aPS)					
Influenza (IIV3, ccIIV3) OR Influenza (LAIV3)					
Hepatitis A (HepA)					
Hepatitis B (HepB)*			1st dose	2nd dose	
Meningococcal ACWY					
Meningococcal B					

Unharmonized Schedules – new CDC schedule

Immunizations recommended for Certain High-Risk Groups or Populations

Vaccine and other immunizing agents	Birth	1 mo	2 mos	4 mos	6 mos	7 mos	8 mos	1
Respiratory syncytial virus (RSV-mAb)[1]	1 dose							
Respiratory syncytial virus (RSV-mAb)[2]	1 dose							
Hepatitis B (HepB)[3]	1st dose	2nd dose			3rd do			
Dengue[4]								
Meningococcal ACWY[5]								
Meningococcal B[6]								
Hepatitis A (HepA)[7]								

New HHS Immunization Recommendations

- **Key Parts of New Recommendations:**
- “CDC will continue to recommend that all children are immunized against 10 diseases for which there is international consensus, as well as varicella (chickenpox)”.
- This reduces recommended vaccines from 17 to 11.
- “allows for more flexibility and choice, with less coercion, by reassigning non-consensus vaccines to certain high-risk groups or populations and shared clinical decision-making”.
- Vaccines “will still be available to anyone who wants them through Affordable Care Act insurance plans and federal insurance programs…”.

- US Department of Health and Human Services. Fact Sheet: CDC Childhood Immunization Recommendations. US Department of Health and Human Services,. (https://www.hhs.gov/press-room/fact-sheet-cdc-childhood-immunization-recommendations.html).
- Hoeg TB KM. Assessment of the U.S. Childhood and Adolescent Immunization Schedule Compared to Other Countries. Department of Health and Human Services,. (https://www.hhs.gov/sites/default/files/assessment-of-the-us-childhood-and-adolescent-immunization-schedule-compared-to-other-countries.pdf).

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Concerns about Closed-Door Processes in the new HHS Schedule

- Closed-door process leading did NOT involve:

1. open presentation of the rationale including benefits and risks,
2. opportunity for opposing viewpoints,
3. following the Congressional charter for recommendations via ACIP, and
4. collaborating with professional medical societies.

- two authors wrote the rationale for the policy for the nation.
  - That is not to minimize the excellent training or intelligence of the two federal authors who wrote the background rationale
- The major outcome is that the professional societies are developing their own recommendations
- Mistrust and disharmony between CDC's and professional societies' recommendations.

DHHS Issue #1: The US recommends more vaccines than other developed nations

- Reply:
- The number of vaccines recommended in the US is fairly similar to many high-income countries
  - 17 in US vs. 14 in France, Germany, and Israel
- If we can afford these vaccines and if they better protect our children, then having a larger number is a virtue to promote the health flourishing of children.

DHHS Issue #2: Loss of trust in public health has occurred. "With COVID-19 vaccine mandates and false CDC claims…the loss of trust …contributed to less adherence to the full CDC childhood immunization schedule…A new U.S. childhood schedule that removes the routine recommendation for non-consensus vaccines could lessen coercion and increase public trust".

- Reply:
- We agree that trust in public health is diminished but this as a solution is untested and theoretical.
- Indeed, the confusion between competing federal and professional society schedules might actually worsen the situation.
- Furthermore, Denmark, the country that the new recommendations emulated, is a relatively homogenous country and international diversity among developed nations does occur;
  - For instance, Britain, a diverse country, recommends childhood influenza vaccination.

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DHHS Issue #3: Lack of double-blind placebo-controlled randomized trials.

- All vaccines of which we are aware have had randomized controlled trials (RCT) of at least one type.
- As to placebos, three scenarios are common:

(1) true placebo,

(2) a dissimilar vaccine was given to the control group so that they received something and were not disadvantaged by receiving nothing, and

(3) a previous version of the vaccine with fewer serotypes to the control because it was unethical to deprive a child of the current standard of care (e.g., compare a 13-valent pneumococcal vaccine with the previously licensed and recommended 7-valent vaccine).

- Difficult and expensive to do annual RCT on seasonal vaccines with high mutation rates such as influenza and COVID
    - Would not occur in time for data for the season start

DHHS Issue #4: Number needed to vaccinate (NNV) and number needed to harm (NNH) calculations should be performed for low- and high-risk children for each vaccination on an ongoing basis as harms are identified and as new information is obtained

- Agreed that NNV and NNH are key parameters and such information was possible from public health and cost-effectiveness modeling that was a part of the previously used Evidence-to-Recommendations process.
- We agree that this could have been done more frequently, but that in itself does not necessarily call for a change in recommended vaccines, just in a prioritization of calculation and recalculation of NNV and NNH.

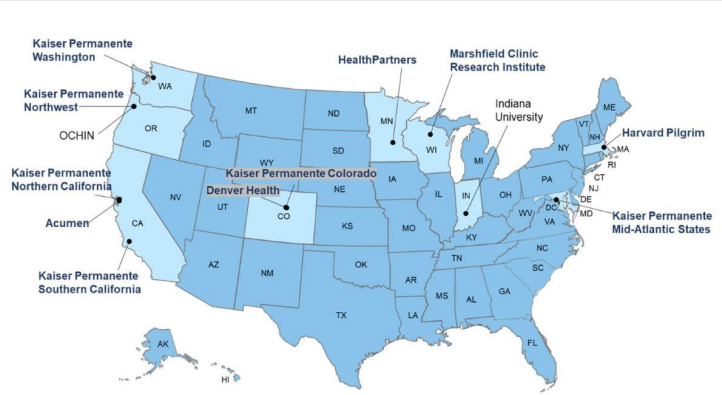
DHHS Criticism #5: Vaccine safety surveillance systems "have serious shortcomings …underutilized, including for evaluating long-term effects and the combined schedule

Response: 5 Vaccine safety systems in the US -slide #1

System	Details
VAERS – Vaccine Adverse Event Reporting System	Passive reporting system open to anyone Useful for signals for new vaccine No control group, denominators or causality
V-safe	Self-reported vaccine safety monitoring system that lets individuals tell CDC how they felt after a vaccination by short check-ins by text message or email. No control group
CISA – Clinical Immunization Safety Assessment Project	National network of vaccine safety experts from CDC & 8 medical research centers. Improve understanding of adverse events at the individual patient level. Conduct clinical research studies to better understand vaccine safety (e.g., how to prevent feeling faint after vaccination).

Vaccine safety systems in the US -2

System	Details
Vaccine Safety Datalink	11 sites provide electronic health record data on >10 million annually (3% of USA) yielding >350 published articles Controlled studies using either self-control periods or other patients Case confirmation possible via record review Rapid cycle analyses if rates of predefined adverse events of interest are higher than comparison
PRISM	Post-licensure Rapid Immunization Safety Monitoring System (PRISM) of FDA uses computer algorithm of health insurance claims data for safety signals.



Special project

Vaccine Integrity Project - Fall Immunization Information

From Data to Decisions: The Evidence Base for 2025 Fall/Winter Immunizations

As we prepare for the upcoming respiratory virus season, it is important to recognize that flu, COVID, and RSV will all play significant roles in the months ahead. Following a flu season with nearly 270 pediatric deaths, clear and trustworthy information is essential to guide immunization decisions. Vaccines remain one of our most effective tools for preventing severe illness and death, but that protection depends on people knowing when and why to get vaccinated and trusting the guidance that informs those choices.

The Vaccine Integrity Project assembled a team of experts in epidemiology, infectious diseases, and evidence review to look at the recently published body of publicly available data concerning vaccine safety and efficacy for flu, COVID, and RSV immunizations. During the live stream on August 19th, the scientific research team focused on the effectiveness and safety of COVID-19 and RSV immunizations in pregnant, pediatric, and immunocompromised populations, coupled with a panel-led Q&A session.

WATCH THE RECORDING

Vaccine Integrity Project - Fall Immunization Information | CIDRAP

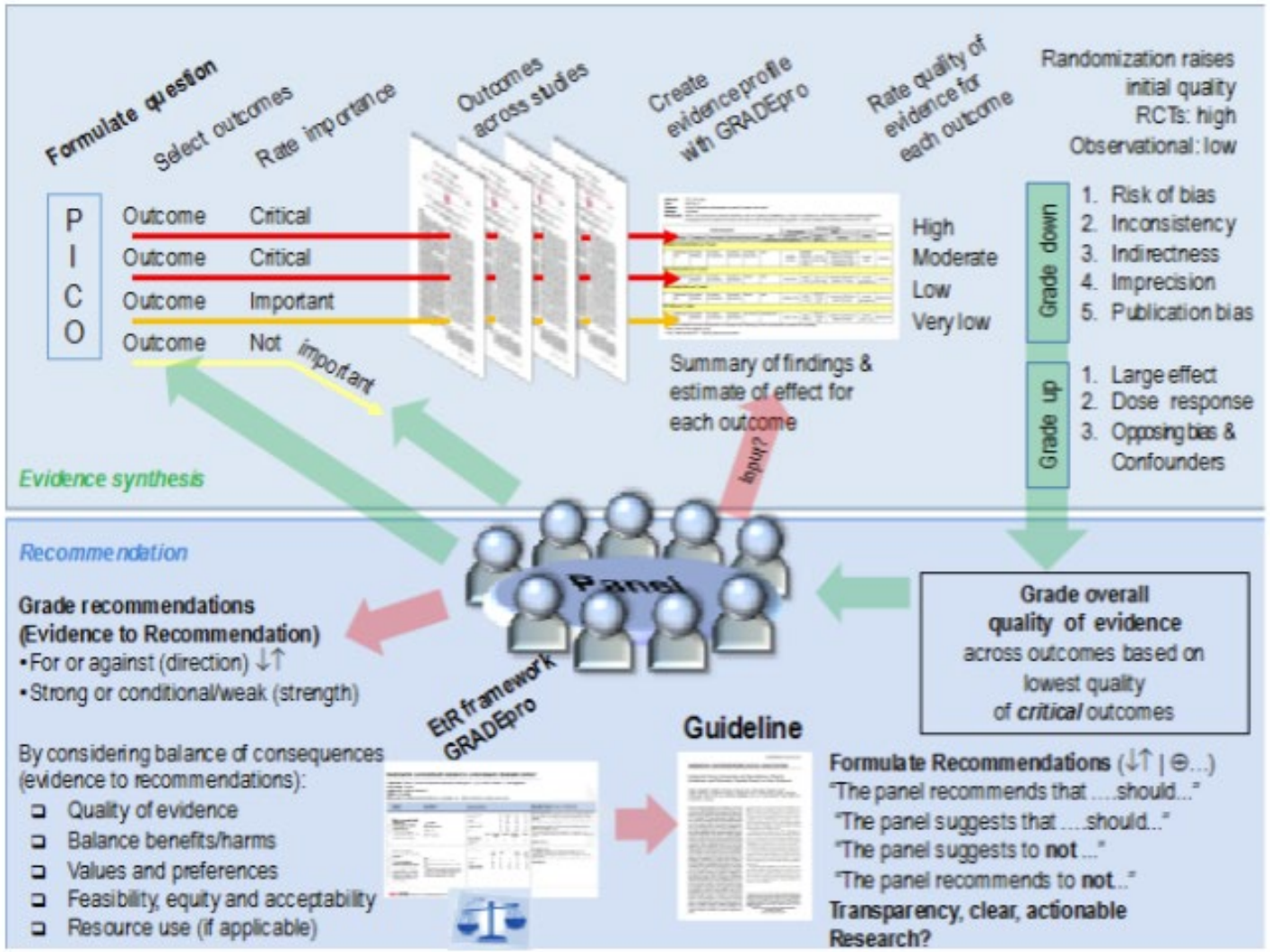
Meeting Materials

- Presentation slides

Medical Society Guidelines

Individual medical societies create clinical guidelines and evidence-based recommendations to inform their providers and the public. The following guidelines have been published by US medical societies that are

Prior GRADE & EtR: Process flow diagram



1. Formulate PICO
2. Grade Quality of Evidence using McMasters GRADE process
3. Evidence to Recommendation Framework based on:
   - Evidence Quality
   - Balance of Benefits/Harms
   - Values and preferences of potential recipients
   - Feasibility, equity & acceptability
   - Resource use/cost-effectiveness

Endorsed by AAFP AMA, & IDSA among others

Table 1 Recommended Child and Adolescent Immunization Schedule for Ages 18 Years or Younger, United States, 2026

American Academy of Pediatrics
DEDICATED TO THE HEALTH OF ALL CHILDREN®

These recommendations must be read with the Notes that follow. For those who fall behind or start late, provide catch-up vaccination at the earliest opportunity as indicated by the outlined purple bars. To determine minimum intervals between doses, see the catch-up schedule (Table 2).

Vaccine and other immunizing agents	Birth	1 mos	2 mos	4 mos	6 mos	8 mos	9 mos	12 mos	15 mos	18 mos	19–23 mos	2–3 yrs	4–6 yrs	7–10 yrs	11–12 yrs	13–15 yrs	16 yrs	17–18 yrs
Respiratory syncytial virus (RSV-mAb [nirsevimab, clesrovimab])	1 dose during RSV season depending on maternal RSV vaccination status (See Notes)					1 dose nirsevimab during RSV season (See Notes)												
Hepatitis B (HepB)	1st dose	2nd dose			3rd dose													
Rotavirus (RV): RV1 (2-dose series), RV5 (3-dose series)			1st dose	2nd dose	See Notes													
Diphtheria, tetanus, and acellular pertussis (DTaP <7 yrs)			1st dose	2nd dose	3rd dose				4th dose				5th dose					
Haemophilus influenzae type b (Hib)			1st dose	2nd dose	See Notes			3rd or 4th dose (See Notes)										
Pneumococcal conjugate (PCV15, PCV20)			1st dose	2nd dose	3rd dose			4th dose										
Inactivated poliovirus (IPV)			1st dose	2nd dose	3rd dose								4th dose					See Notes
COVID-19 (1vCOV-mRNA, 1vCOV-aPS)					1 or more doses of 2025–2026 vaccine (See Notes)							1 or more doses of 2025–2026 vaccine (See Notes)	1 or more doses of 2025–2026 vaccine (See Notes)					
Influenza					1 or 2 doses annually (See Notes)										1 dose annually (See Notes)			
Measles, mumps, and rubella (MMR)					See Notes			1st dose					2nd dose					
Varicella (VAR)								1st dose					2nd dose					
Hepatitis A (HepA)					See Notes			2-dose series (See Notes)										
Tetanus, diphtheria, and acellular pertussis (Tdap ≥7 yrs)															1 dose			
Human papillomavirus (HPV)														2-dose series		See Notes		
Meningococcal (MenACWY-CRM ≥2 mos, MenACWY-TT ≥2years)			See Notes												1st dose		2nd dose	
Meningococcal B (MenB-4C, MenB-FHbp)																See Notes		
Respiratory syncytial virus vaccine (RSV [Abrysvo])															Seasonal administration during pregnancy if not previously vaccinated			
Dengue (DEN4CYD: 9–16 yrs)														Seropositive in areas with endemic dengue (See Notes)				
Mpox																		

Range of recommended ages for all children
Range of recommended ages for catch-up vaccination
Range of recommended ages for certain high-risk groups or populations
Recommended vaccination for those who desire protection
Recommended vaccination based on shared clinical decision-making

Endorsed by AAFP AMA, & IDSA among others

Also has catch-up & contra-indications

Table 3 Recommended Child and Adolescent Immunization Schedule by Medical Indication, United States, 2026

American Academy of Pediatrics
DEDICATED TO THE HEALTH OF ALL CHILDREN®

Always use this table in conjunction with Table 1 and the Notes that follow. Medical conditions are often not mutually exclusive. If multiple conditions are present, refer to guidance in all relevant columns. See Notes for medical conditions not listed.

Vaccine and other immunizing agents	Pregnancy	Immunocompromised (excluding HIV infection)[a]	HIV infection CD4 percentage and count[a]		CSF leak or cochlear implant	Asplenia or persistent complement component deficiencies	Heart disease or chronic lung disease (CLD)	Kidney failure, End-stage renal disease or on dialysis	Chronic liver disease	Diabetes
			<15% or <200/mm³	≥15% and <200/mm³						
RSV-mAb (nirsevimab, clesrovimab)		1 dose clesrovimab or nirsevimab during 1st RSV season depending on maternal RSV vaccination status (See Notes)								
		1 dose nirsevimab 2nd RSV season (See Notes)					1 dose nirsevimab 2nd RSV season for CLD (See Notes)			
Hepatitis B										
Rotavirus		SCID[b]								
DTaP/Tdap	DTaP: not applicable Tdap: 1 dose each pregnancy									
Hib		HCT[c]: 3 doses	See Notes			See Notes				
Pneumococcal										
IPV										
COVID-19	*	See Notes								
Influenza inactivated, recombinant		Solid organ transplant: 18 yrs (See Notes)								
LAIV3							Asthma, wheezing: 2–4 years[d]			
MMR	**									
VAR	**									
Hepatitis A										
HPV	**	3-dose series (See Notes)								
MenACWY										
MenB										
RSV (Abrysvo)	Seasonal administration (See Notes)									
Dengue										
Mpox	See Notes									

[a]For more information, refer to https://www.acog.org/clinical/clinical-guidance/practice-advisory/articles/2020/12/covid-19-vaccination-considerations-for-obstetric-gynecologic-care

- Recommended for all age-eligible children who lack documentation of a complete immunization series
- Not recommended for all children, but recommended for some children based on increased risk for severe outcomes from disease
- Recommended for all age-eligible children, and additional doses may be necessary based on medical condition or other indications. See Notes.
- Precaution: Might be indicated if benefit of protection outweighs risk of adverse reaction
- Contraindicated or not recommended. **Vaccinate after pregnancy, if indicated

PA DOH allows AAFP, AAP, and ACOG schedules

- PA DOH recommends that Pennsylvanians follow the most recent immunization recommendations issued by the American Academy of Pediatrics (AAP), American Academy of Family Physicians (AAFP), and American College of Obstetricians and Gynecologists (ACOG)
- AAFP's Immunization Schedule includes vaccines by age, condition, and special populations.
  https://www.aafp.org/family-physician/patient-care/prevention-wellness/immunizations-vaccines/immunization-schedules.html?
  09.19.25 DOH General Immunization Guidance
- Multiple sets of cradle-to-grave recommendations: FDA, CDC, AAFP; use AAFP

pennsylvania
DEPARTMENT OF HEALTH

AAFP Adult Schedule for 2026 not out yet

Use 2025

ACP may develop 2026 schedule but they limited some vaccines to just RCT and some consider too ivory tower for practical use

IDSA has schedule for immunocompromised

AAFP has NOT endorsed the CDC 2025 or 2026 immunization schedules

Clinician- patient Communications

1. Presumptive approach
2. Motivational interviewing
3. Tell stories
4. Framing

With appreciation to Professor Deb Moss MD MPH for some slides

Tell Stories

- Saw a preschooler seizure from whooping cough
- Partner had a patient commit suicide from zoster pain
- Grandparents denied access to grandchildren until they were vaccinated
- Colleague had a patient with a mysterious cough– her dad, a lawyer brought an audio clip of it…
- Resident brought home whooping cough to her own child

Pitt Vax
Protecting people
Vaccine policy to practice

Re-framing information – use metaphors

Consider a narrative shift from Vaccines → Immune System Trainers

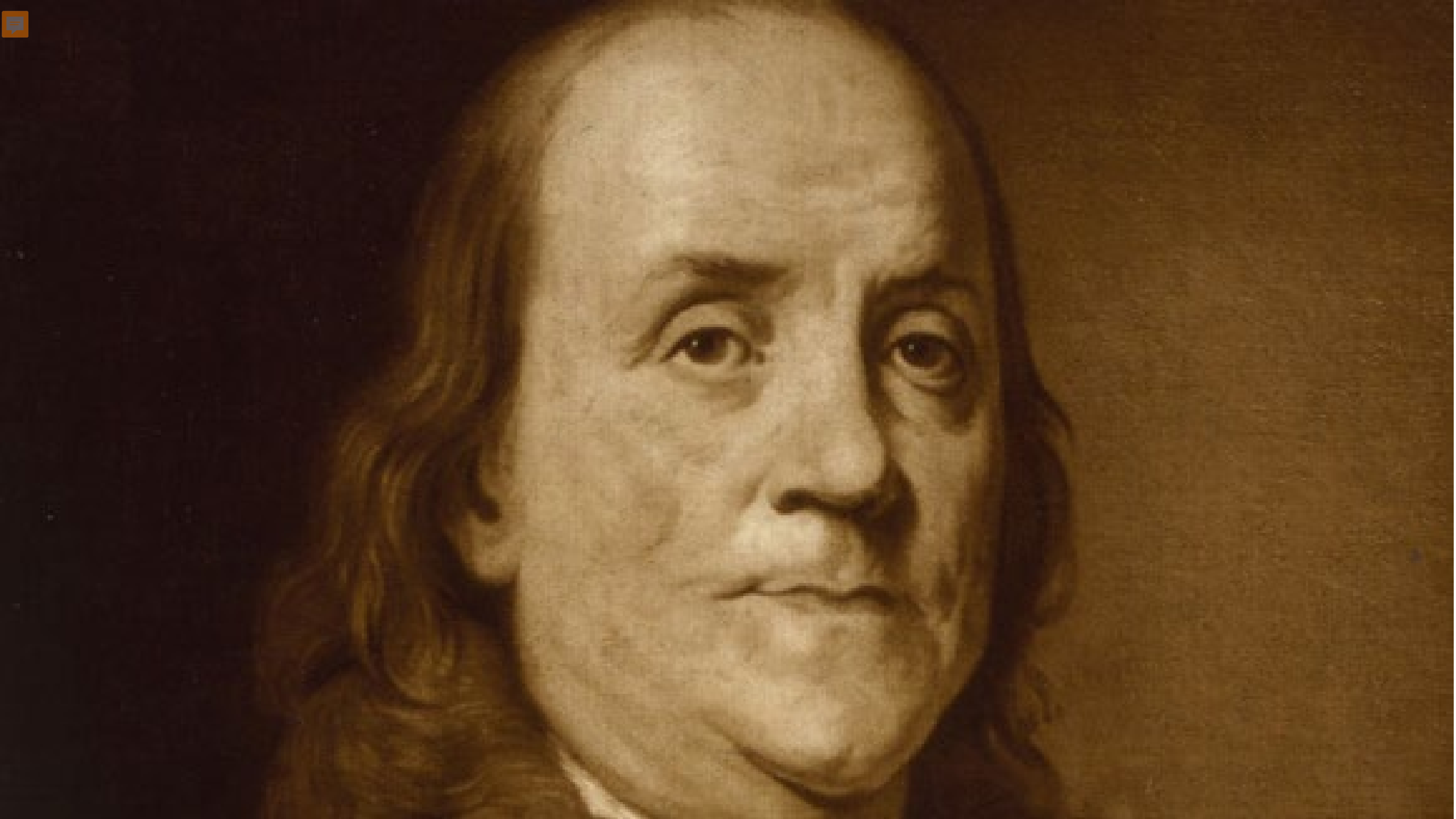
- **Use a *software updates* metaphor to explain how the immune system improves its performance through vaccination.**
  - **Compare vaccines to computer or cell phone updates to explain how vaccines help the body stay safe from "network" viruses.**
    - "Just like our digital devices perform better after we've updated the software, our immune systems work more effectively in response to vaccines. When we prepare children's immune systems to detect and resist a virus, it protects them."
    - Useful for repeat vaccines, such as influenza
- Other metaphor is flight simulator training for pilots
  - Useful for vaccines not previously received
  - Instead of having pilots learn in actual danger, flight simulator training allows them to prepare ahead of time

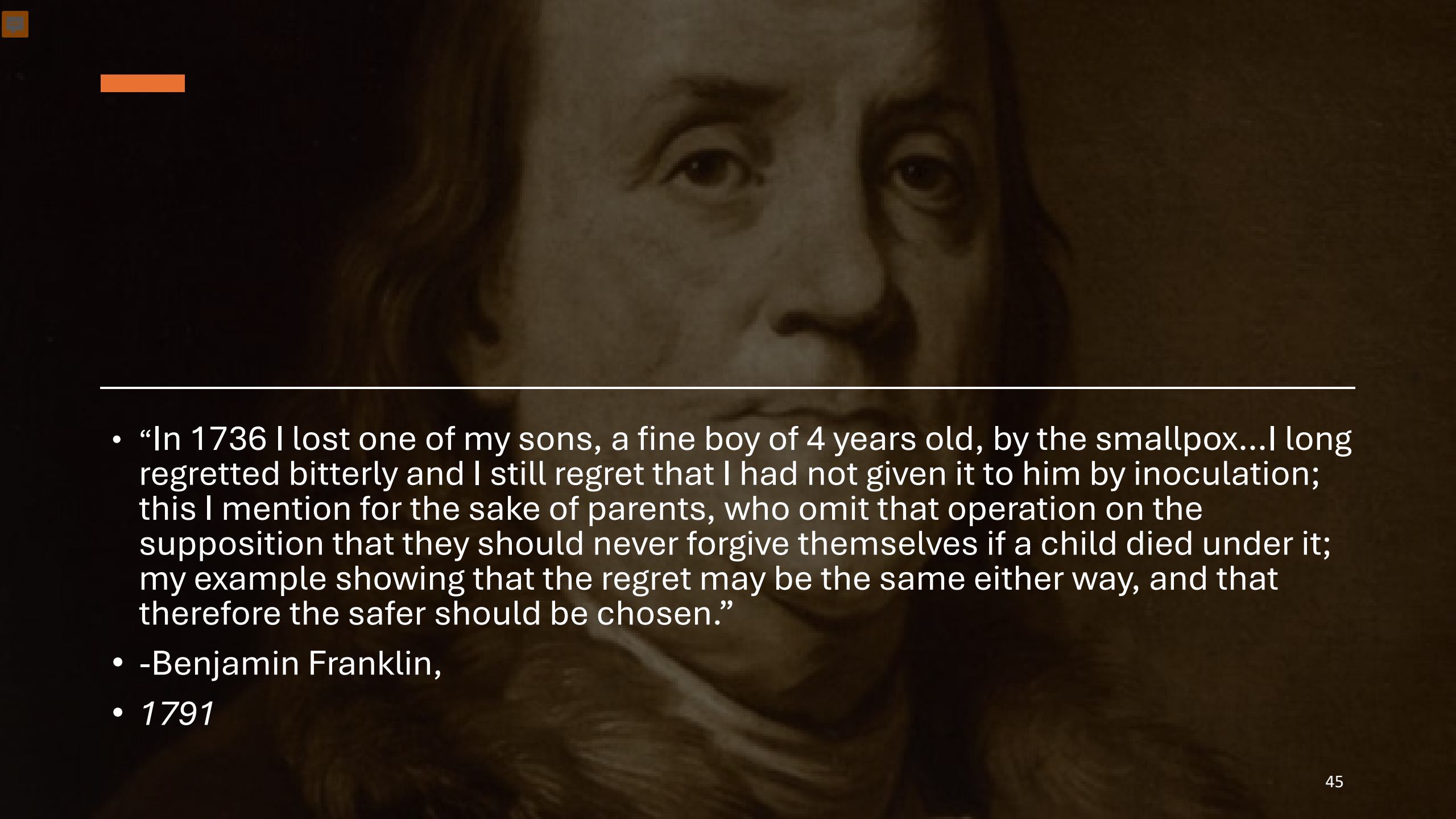
Resources

- Frameworks on Reframing Childhood Immunization's Talking Points
- Boosting Public Discourse: Reframing Childhood Immunization - FrameWorks Institute
- Immunization.org Vaccine Confidence page of Topic Areas
- Vaccine Confidence & Addressing Concerns | Immunize.org
- Vaccine Education Center of Children's Hospital of Philadelphia
- www.familiesfightingflu.org

Recombinant Zoster Vaccine prevents Dementia: Key Peer-Reviewed Studies

- RZV associated with significantly lower dementia risk; 17% increase in dementia-free time
  - 164 more dementia-free days, especially in women
  - Taquet et al. Nature Medicine, 2024 https://doi.org/10.1038/s41591-024-03201-5
- In large cohort of 4.5 million, full RZV vaccination linked with 32% reduced dementia risk (HR 0.68) in Optum Labs Data Warehouse database
  - Tang et al. Vaccine, 2025 doi:10.1016/j.vaccine.2024.126673
- 1.5 million Medicare cohort; 33% reduced dementia risk among RZV recipients.
  - dosReis et al., Alzheimer's & Dementia, 2025 DOI: 10.1002/alz70861_108646



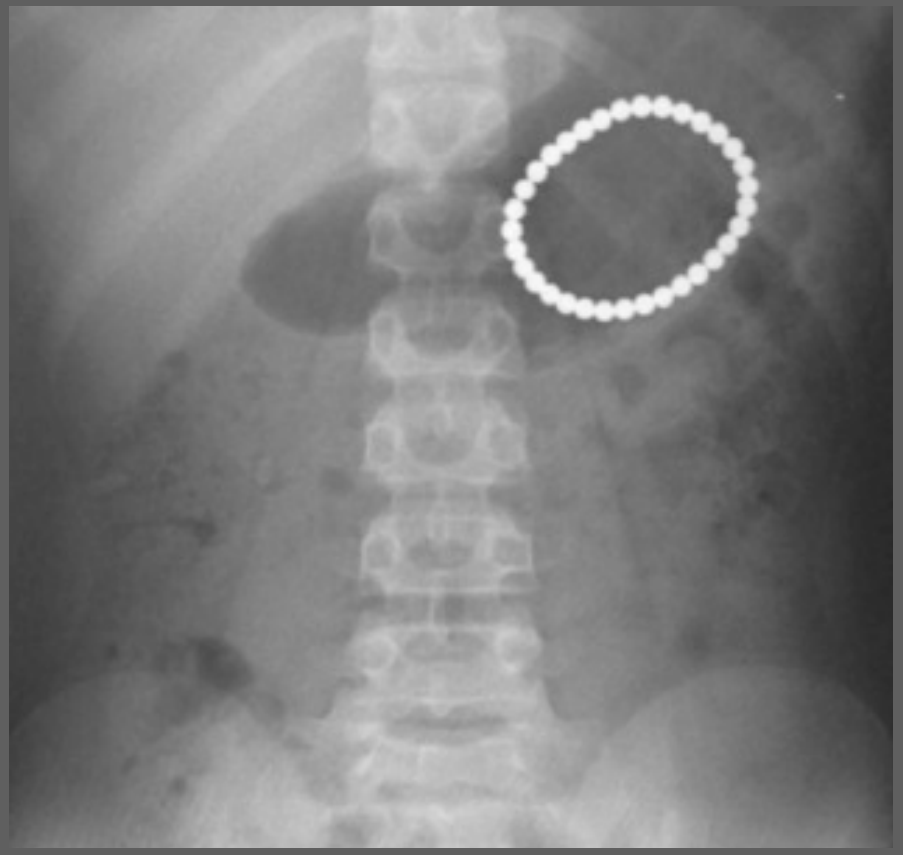


- “In 1736 I lost one of my sons, a fine boy of 4 years old, by the smallpox…I long regretted bitterly and I still regret that I had not given it to him by inoculation; this I mention for the sake of parents, who omit that operation on the supposition that they should never forgive themselves if a child died under it; my example showing that the regret may be the same either way, and that therefore the safer should be chosen.”
- -Benjamin Franklin,
- *1791*

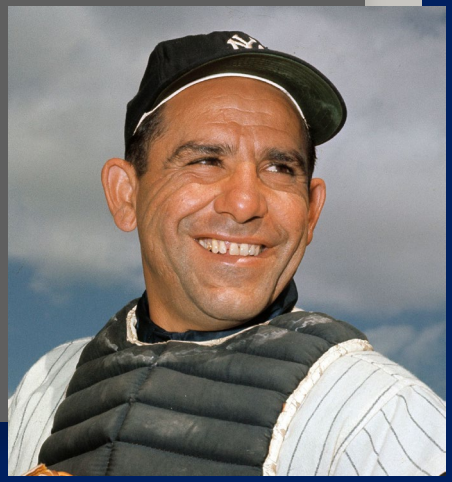
Questions and Comments

Pediatric Pearls

Donald B. Middleton, M.D.
Refresher Course in
Family Medicine
Feb. 28, 2026



"You can observe a lot, just by looking."
Yogi Berra



Conflicts of Interest

- Advisory boards for vaccine manufacturers:
  Sanofi Pasteur, GlaxoSmithKline, Pfizer, Dynavax, Seqirus, Moderna, Novavax, Vaxcyte
- Lecturer for:
  Pfizer, Merck, CSL Seqirus

- The office visit: so much to do, so little time!

Are Childhood Vital Signs Worth Taking?

- Most of us follow growth well; BP +/-
- BUT is it worth taking any action? For BP, yes.
- QUIZ: which bit of childhood advice reduces the risk of adult hypertension?
  - Exercise more
  - Reduce calories
  - Avoid salt
  - Get 8 hours sleep

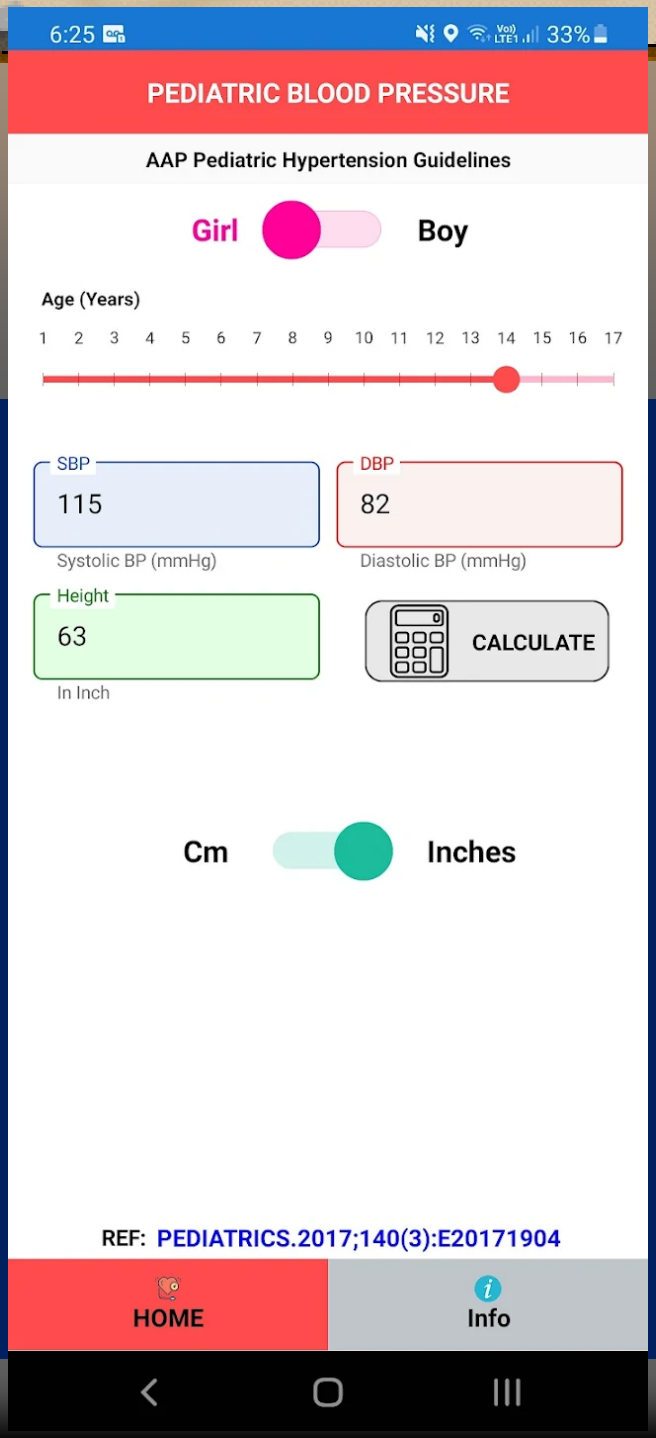
Childhood BP Chart; AAP Age 3 Yrs.

Age group (weight in kg)	Age (years)	Height (cm)	Blood pressure (mmHg) (50th - 90th percentile)			
			Boys		Girls	
			Systolic	*Diastolic*	*Systolic*	*Diastolic*
*Infant	1-12 months	-	72 -104	37-56	72-104	37-56
Toddler (10-14kg)	1	77-87	86-101	41-54	85-102	42-58
	2	86-98	89-104	44-58	89-106	48-62
Preschooler (14-18kg)	3	92-105	90-105	47-61	90-107	50-65
	4	93-113	92-107	50-64	92-108	53-67
	5	104-120	94-110	53-67	93-110	55-70
School-age (20-42 kg)	6	111-127	90-109	59-73	91-108	59-73
	7	116-134	91-111	60-74	92-110	60-74
	8	120-140	93-113	60-75	94-112	60-75
	9	124-145	94-115	61-75	95-114	61-76
	10	130-151	96-117	62-76	97-116	62-77
	11	135-157	98-119	62-77	99-118	63-78
	12	141-164	100-121	63-78	100-120	64-78
Adolescent (50 kg)	>13	147-172	102-124	64-80	102-121	64-79

***Note:** Blood pressure values in newborn infants may vary considerably during the first few weeks. The definition of HTN in preterm and term neonates also varies.

Blood Pressure Tracking From Childhood to Adulthood - PMC

Childhood BP: AAP app



https://play-lh.googleusercontent.com/VokbObeWrsS3uDTHVvON_ZRB7cliA6d_2NJ2brzszxqGVta7SVEGN8sTA3zKmWcHgKQ=w2560-h1440-rw

Cost: $2.99

Online:

Pediatric Blood Pressure Calculator

Hypertension: Age 13 Years

BP Category	SBP		DBP
Normal	< 120	and	< 80
Elevated	120-129	and	< 80
Hypertension Stage 1	130-139	or	80-89
Hypertension Stage 2	≥ 140	or	≥ 90

Aligning Adult and Pediatric Blood Pressure Guidelines | Hypertension

Predictors of Adult Hypertension: 120 Million Adult Hypertensives in US

- Childhood hypertension
- Childhood obstructive sleep apnea
- Childhood obesity: maybe, conflicting evidence:
  - "multivariate regression analysis… height, weight, and BMI in childhood did NOT predict young adult blood pressure after adjustment for childhood blood pressure"
  - BUT "after adjustment for childhood hypertension; children with overweight or obesity had an odds ratio of future hypertension of 1.65 (95% CI, 1.16–2.34)"
- Note: in childhood, high uric acid level is marker for adult HTN

Aligning Adult and Pediatric Blood Pressure Guidelines | Hypertension

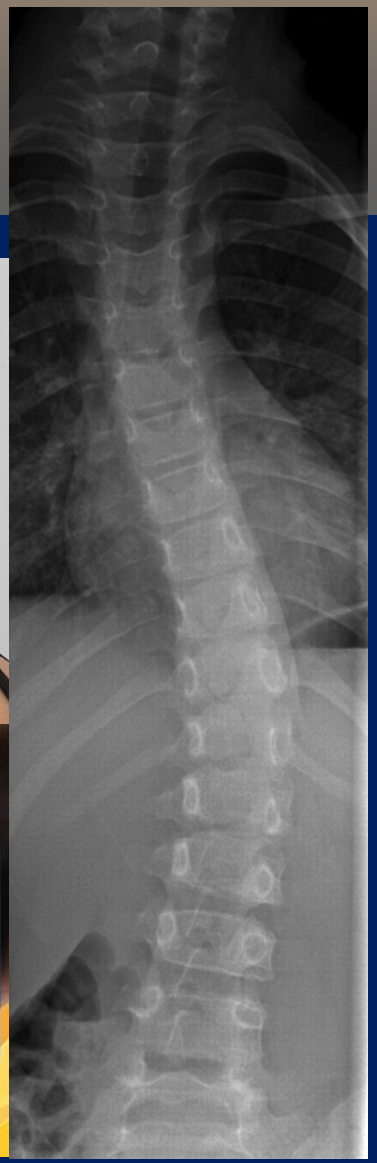
Childhood Hypertension

- Screen for it; action especially after age 13 years
- Ask about salt intake: DASH Diet for High Blood Pressure | Nemours KidsHealth

- **Ages 1–3:** Less than 1,200 mg
- **Ages 4–8:** Less than 1,500 mg
- **Ages 9–13:** Less than 1,800 mg
- **Ages 14–18:** Less than 2,300 mg

Do you screen for scoliosis?

- Incidence of 3%
- Adam's forward bend test
  - Girls age 10 to 12 yrs.
  - Boys age 13 to 14 yrs.
- Scoliometer or app: ≥7º
- Idiopathic vs non-idiopathic
- Most benign; no Rx
- Back pain: not scoliosis



Scoliosis Management for Primary Care Practitioners | Pediatrics In Review | American Academy of Pediatrics

A Case of Scoliosis

10 yo girl with scoliosis; complaining of neck pain for 4 months. No neuro loss. What would you do?

Osteoblastoma

Encopresis

- Fecal impaction: result stool leak
- Family education
- High-fiber diet
- Toilet: 5-15 mins, 2-3 X QD after meals
- Gastro-colic reflex: cold liquid, 50% prune juice
- Polyethylene glycol: 1 g/kg daily or 1.5 g/kg divided BID; MiraLAX has 17g/cap
- No stool in 3-4 days, sodium phosphate enema 1-2 ounces, size dependent;
- Oral magnesium citrate: 4 ml/kg/QD X 2
- Reward (not food) for BM
- Treatment may take several years

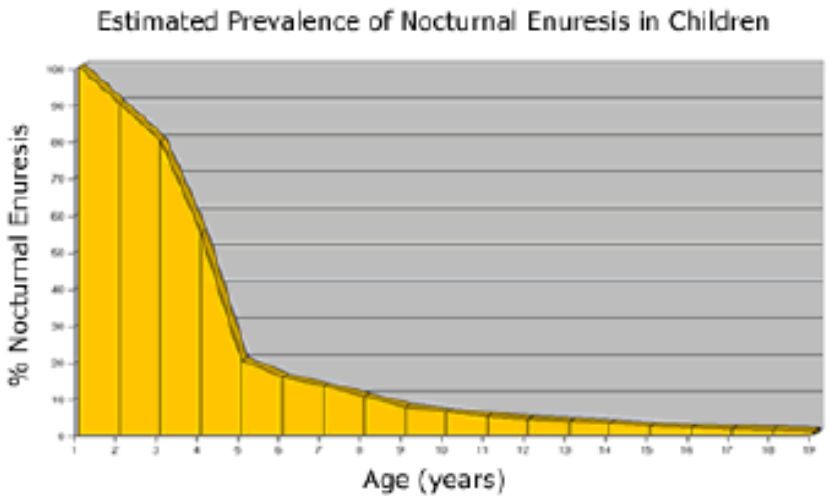
Constipation and Encopresis in Childhood

Encopresis: maintenance Rx

- Polyethylene glycol 1 gm/kg/QD
- Lactulose 1-3 ml/kg/QD
- Magnesium OH: depends on age, 5-60 ml/QHS
- Docusate 5 mg/kg/QD
- Mineral oil 1-3 ml/kg/divided BID
- Senokot: depends on age, 4.4 to 26.4 mg/QD
- Bisacodyl 5 to 15 mg/QD
- FAMILY BEHAVIOR MODIFICATION: Diet and exercise

Enuresis

* Common childhood disorder, incidence decreases with age
* ~ 15 % of 6 year olds, ~15% will outgrow enuresis / year
* 1-2% of adolescents / adults
* Boys > girls
* More common in patients with ADHD



Link to constipation. Ultimate Cure: Navy, marriage

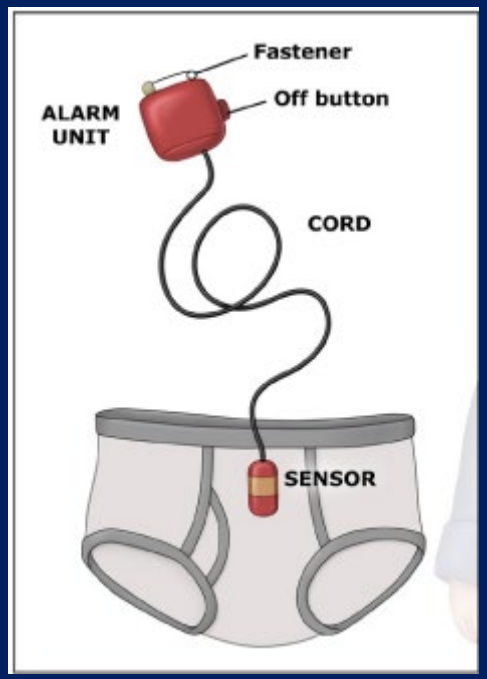
Enuresis Treatment

- Bladder training: battleship, delayed voiding
- Reduce evening liquids
- Schedule urination
- Calendar reward system: stars for dry nights, reward
- Child management of soiled bedding: bedside bucket
- Enuresis alarms: 8 yo; bed, underpants; 2/3 effective
- Desmopressin: 6 yo; oral tab/nasal spray, 0.1-0.6 mg, overnights
- Oxybutynin: 5 yo; 5-10 mg QHS, daytime; recurrence when stopped
- Imipramine: 5 yo; 10-25 mg, less effective, recurrence after ending
- Many others: indomethacin, atomoxetine, diazepam, etc.: not better

https://www.aafp.org/afp/2008/0815/p489.html

Enuresis

Bedwetting in Children & Teens: Nocturnal Enuresis - HealthyChildren.org



From Epic Chart Resources

Bed-Wetting in Children: Care Instructions

Bed-Wetting in Teens: Care Instructions

E.g.: Nighthawk or Malem Medical

Cream to prevent chaffing
Room deodorizer
Disposal underwear for special situations: trips, etc.

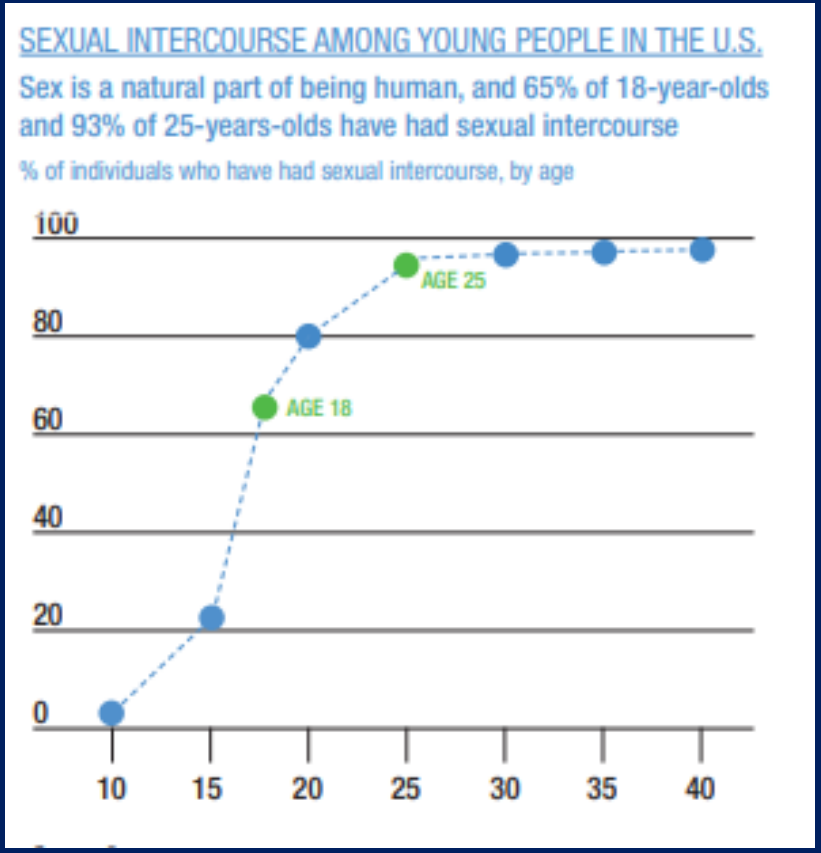
Case of the Adolescent UTI

A previously healthy 16-year-old girl develops urinary frequency and dysuria of 24 hours duration. She has no fever. A urine dipstick shows positive white blood cells, leukocyte esterase, and nitrites. What would you do?

- Urinary Symptoms in Adolescent Females: STI or UTI? - Journal of Adolescent Health
- Urinary tract infections in adolescents | Request PDF

Case of the Adolescent UTI

1) Fill in history
2) +/- culture; E.coli antibiotics
3) Between 50-80% of UTIs in adolescent girls signal onset of sexual intercourse
3) Birth control? Condoms!
4) HCG/STI/HIV checks
5) Vaccine history: HPV, HepB
6) Folic acid 400 mcg daily
7) Counsel about hygiene: fluid, BMs
8) Counsel about sexual activity
9) Discuss parent awareness



Screening Adolescents for Sexually Transmitted Infections.pdf

Causes of Death: 2021 by Age

	<1	1-4	5-9	10-14	15-24
1	Congenital Anomalies 3,963	Unintentional Injury 1,299	Unintentional Injury 827	Unintentional Injury 915	Unintentional Injury 15,792
2	Short Gestation 2,946	Congenital Anomalies 412	Malignant Neoplasms 347	Suicide 598	Homicide 6,635
3	SIDS 1,459	Homicide 309	Homicide 188	Malignant Neoplasms 449	Suicide 6,528
4	Unintentional Injury 1,306	Malignant Neoplasms 282	Congenital Anomalies 171	Homicide 298	COVID-19 1,401
5	Maternal Pregnancy Comp. 1,113	Heart Disease 116	Heart Disease 66	Congenital Anomalies 179	Malignant Neoplasms 1,323

Unintentional causes of death

- Auto accident
- Drowning
- Poisoning

TIPP, The Injury Prevention Program:

Price: $**159.95**.
Member Price: $129.95.

https://shop.aap.org/tipp-safety-sheet-package/

Water Safety: Can You Swim?

- Drowning: 2nd leading cause of unintentional injury in children
- 1-4 yo most vulnerable
- Swimming lessons at age 4 yrs
- Swimming lessons age 1-4 yrs may reduce drowning but do NOT take the place of adult supervision
- Lifejackets NOT water wings; Coast Guard approved
- Older children/adolescents drown in natural water settings (lakes, rivers): alcohol, drugs

Omoruyi EA. Ped in Rev 2019;40:205-206; DOI: 10.1542/pir.2017-0240

Allergy/Urticaria/Eczema/Asthma

- The Medical Letter is a great source; UPMC access
  - My old pharmacy teacher: Dr. Louis Lasagna was editor
- Drugs for Atopic Dermatitis 3/2/26 TML-issue-1749.pdf
  - Between 15-25% of children have some form of atopic dermatitis
- Drugs for Asthma | The Medical Letter Inc.11/25/24
  - Between 5-15% of children have asthma

Antihistamines

- H2 antihistamines:
  - May give up to 4 times usual dose
  - May give with H1 antihistamine which are usually sedating
  - Fexofenadine is nonsedating even at high doses
  - Loratadine may be sedating in high dose
  - Cetirizine may be sedating at recommended doses in some children and is sedating at higher doses; sudden discontinuation can cause severe pruritus
  - Antihistamines probably do NOT improve eczema
- Treatment of Allergic Rhinitis and Allergic Conjunctivitis | The Medical Letter Inc.
- Comparison Table: Some Oral Drugs for Allergic Rhinitis (online only) | The Medical Letter Inc.

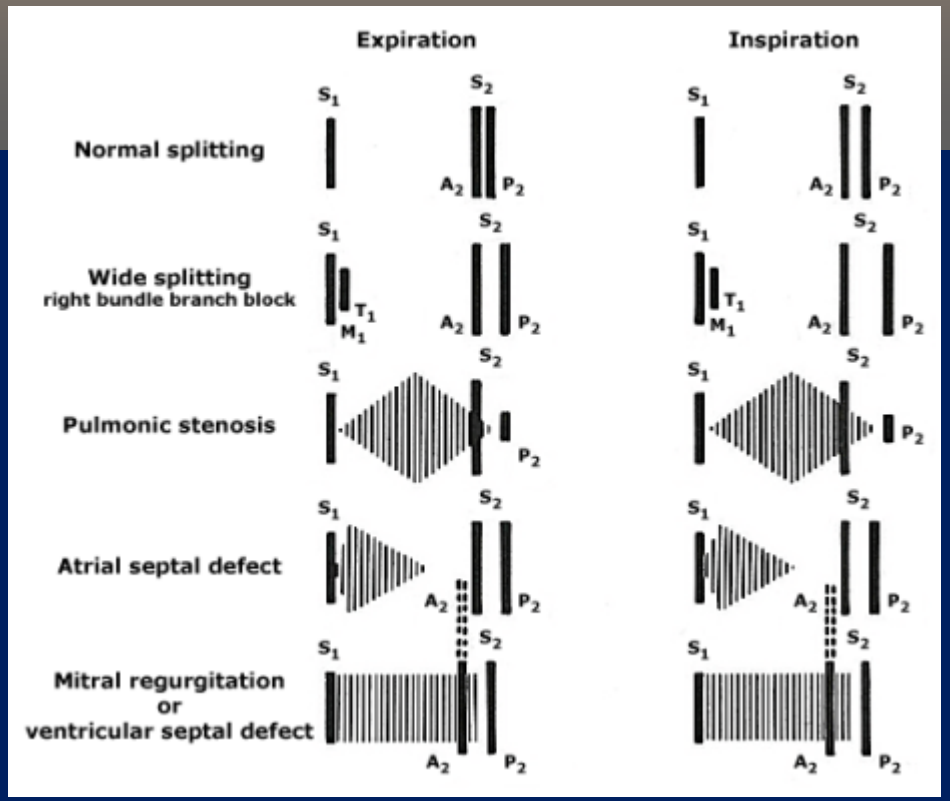
Murmur Evaluation Reminders

- Murmur
  - Grading: 1-6
  - Systolic vs diastolic: finger on a pulse (neck)
  - Musical vs harsh; duration
  - Location: front and back
  - Position: louder leaning forward, lying down, compress neck veins
  - Changes over time: changing pulmonary pressures, closing holes
- S2 is the key: A2 first then P2
  - Normal, LBBB, RBBB, ASD, HCM, etc.
- Maneuvers: squat, Valsalva
- History/physical findings: symptoms = pathologic more likely
- Rub: 1, 2, 3 components (demonstration)

Signs of Cardiac Disease

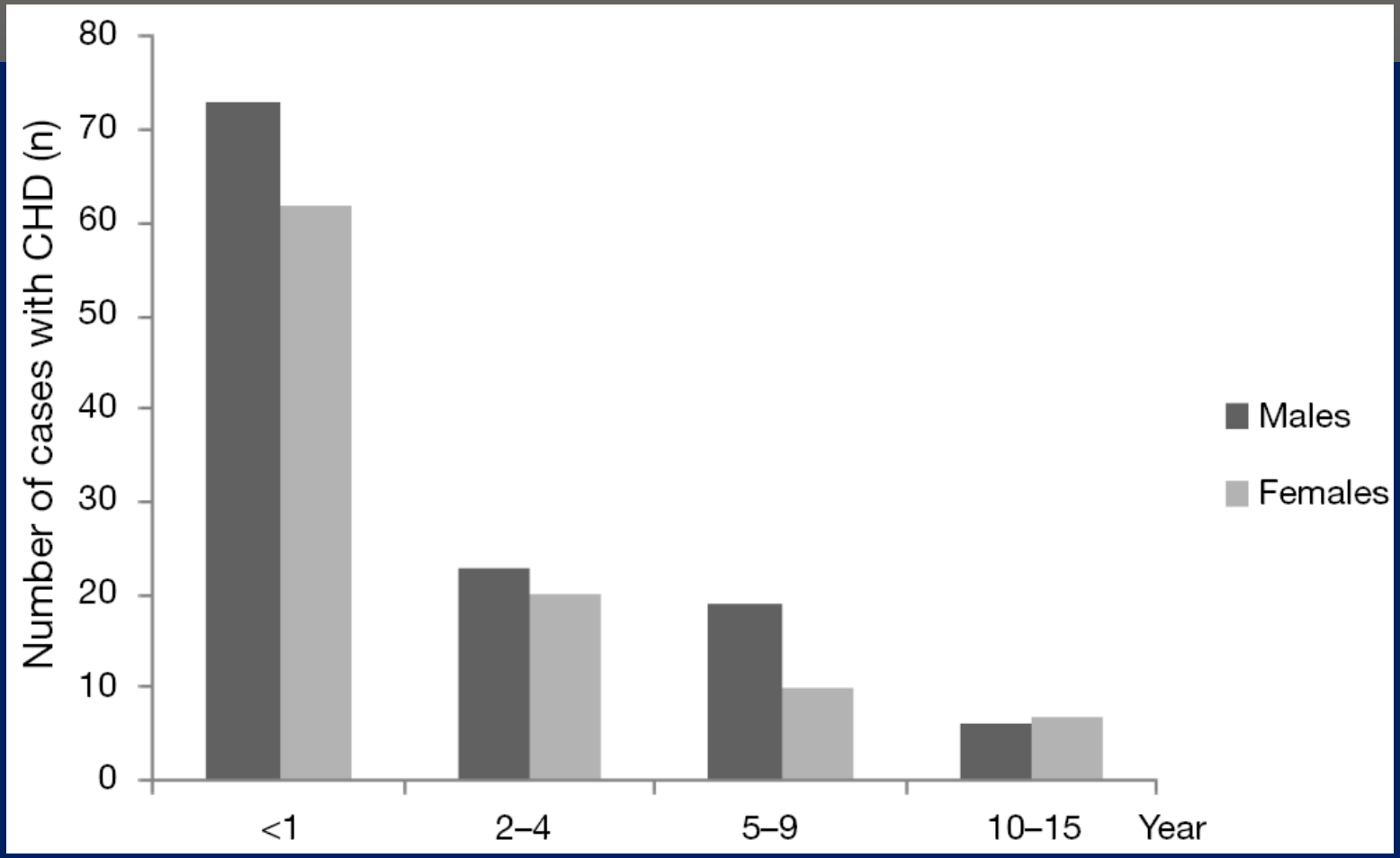
- Syndrome appearance: Down
- Cyanosis: central vs peripheral
- Diastolic murmur
- Continuous murmur (no humming!)
- Abnormal pulses: legs
- Rales
- Abnormal S2
- Clicks/opening snaps

Physical Signs



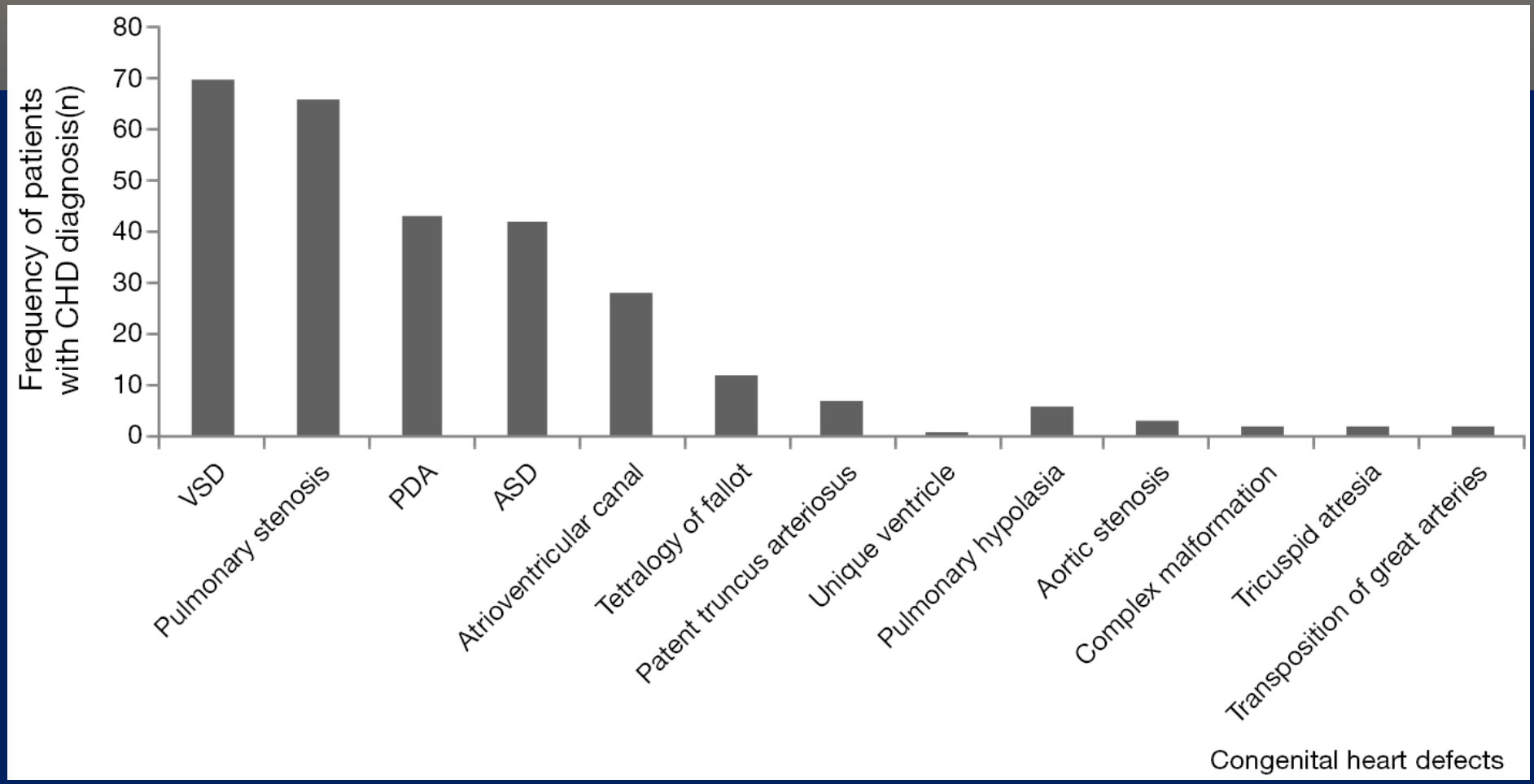
- Deep inspiration:
  - split S2 normal
  - single S2 LBBB
- Squat: more blood to heart
  - ↑ aortic stenosis (AS)
  - ↑ VSD
  - ↓ hypertrophic cardiomyopathy (HCM)
- Stand: less blood to heart
  - ↑ HCM; ↓ AS; ↓ VSD

Age of Pathologic Murmur Diagnosis



http://tp.amegroups.com/article/view/13236/13574

9,390 ECHOs; 834 (9%) Abnormal



Venous hum not included

http://tp.amegroups.com/article/view/13236/13574

Thank You!

- Keep a list of what you see. You will be surprised!

Pediatric Dermatology: Common Findings In Newborns and Infants

Bridget Peterson, MD
UPMC Washington Family Medicine
2026 Donald B. Middleton, MD Refresher Course in Family Medicine

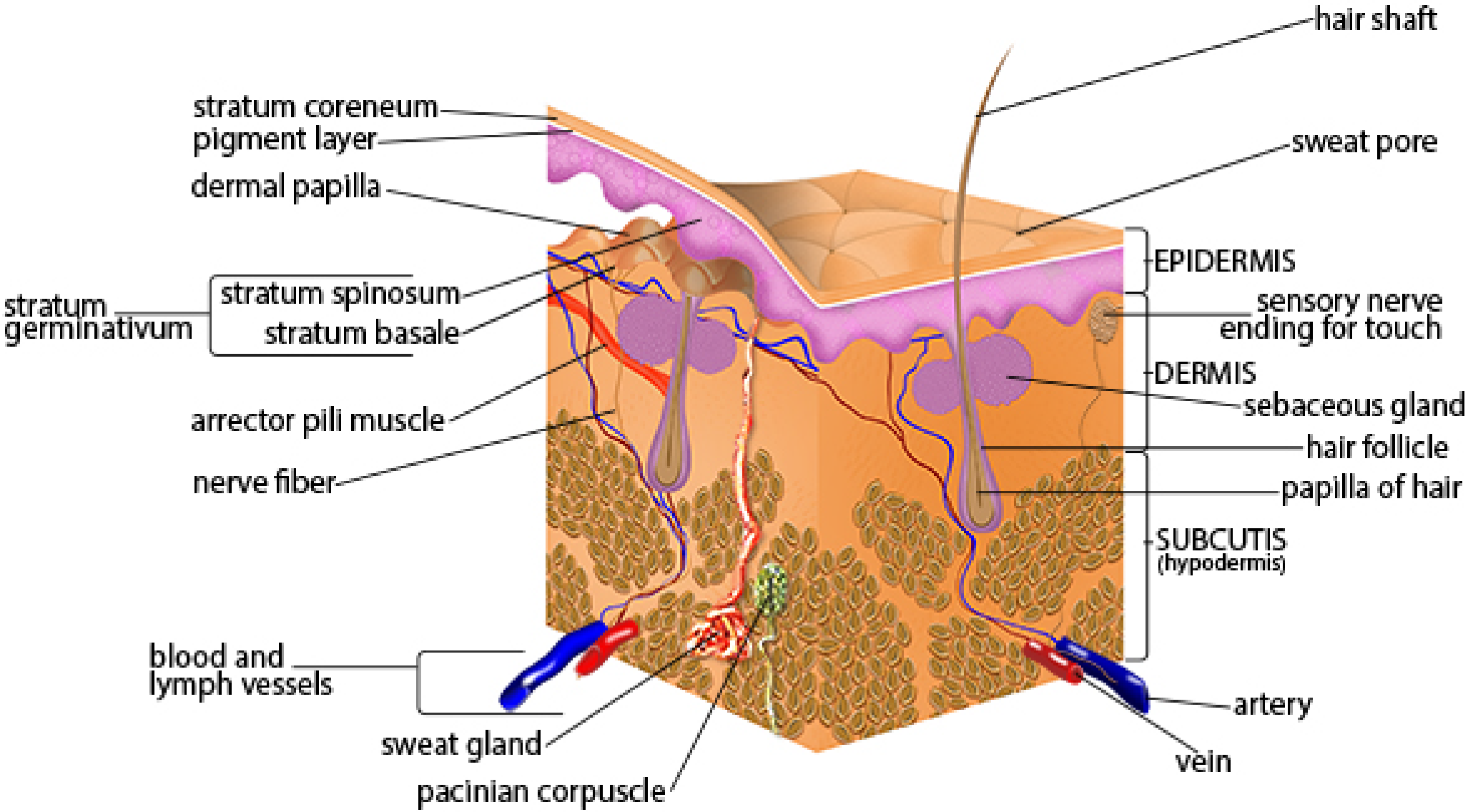
Session Overview

- Review anatomy and physiology of normal skin
- Review common terminology for the skin exam
- Recognize common findings in infants and children
  - Skin findings
  - Vascular findings
- Use clinical history to inform differential diagnosis
- Differentiate benign lesions from lesions that require further evaluation and/or treatment

Financial Disclosures

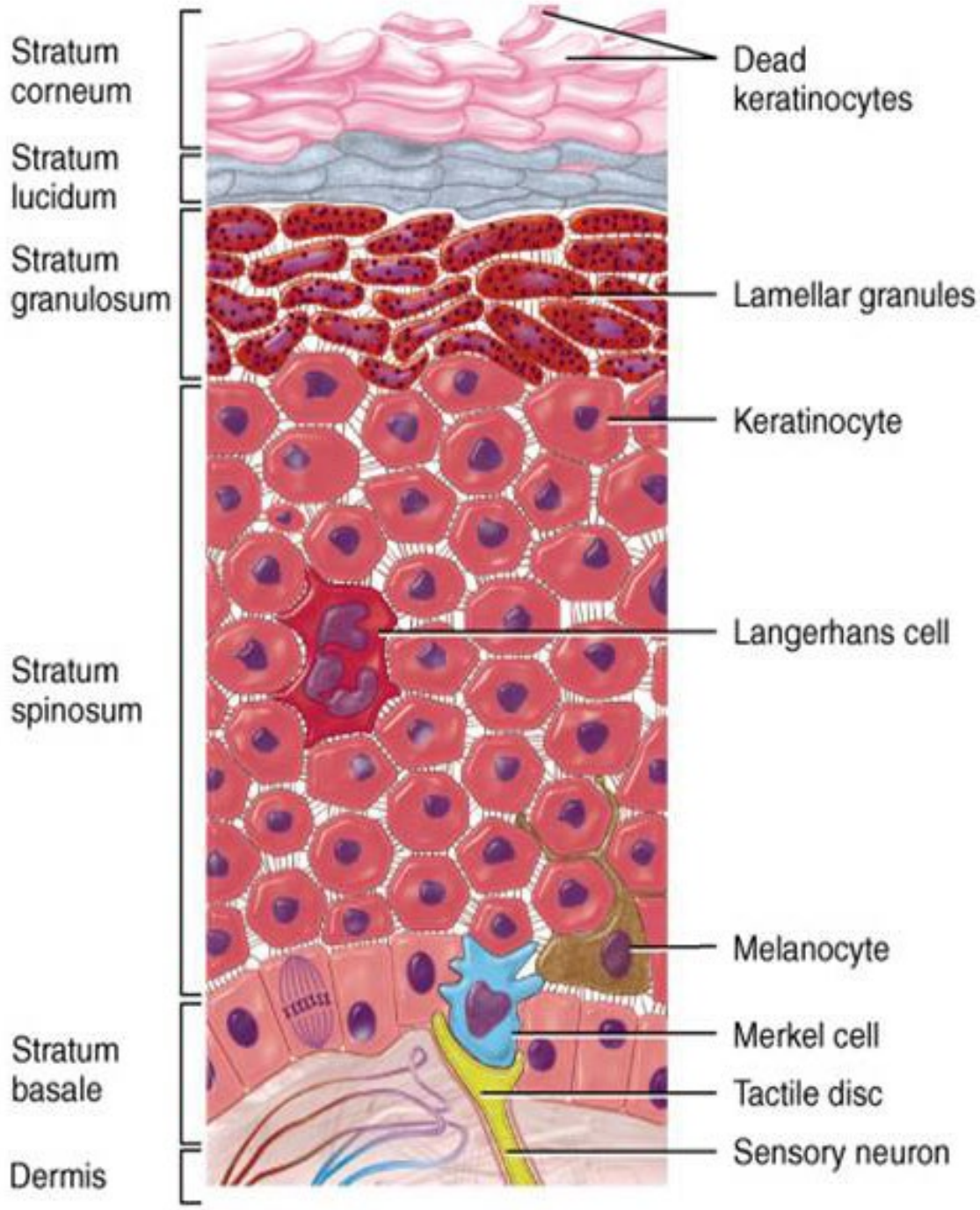
- I have nothing to disclose

Anatomy Review


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

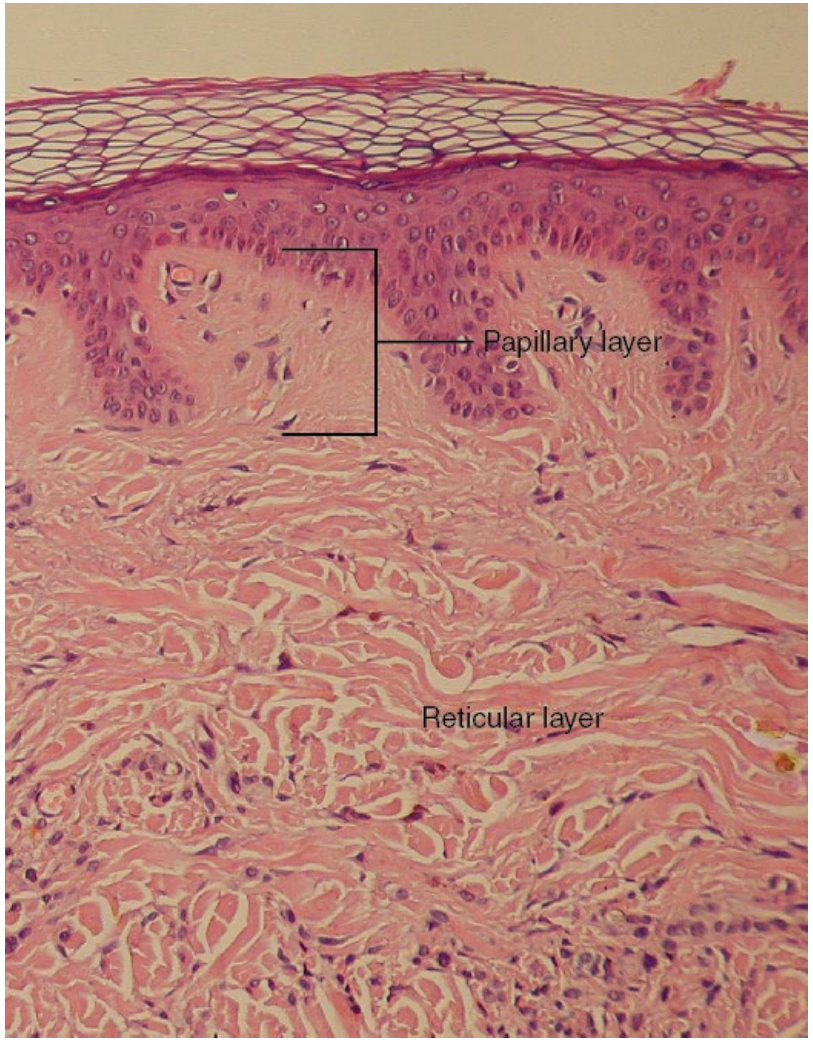
Epidermis

- Made up of stratified, keratinized squamous epithelium, and contains
  - Keratinocytes
  - Merkel cells-sensory function
  - Melanocytes-produce melanin
  - Langerhans cells-macrophage function
- Thickness ranges from 0.05mm on the eyelids to 1.5mm on the palms and soles
  - Most skin has four layers
  - The palms and soles also have a fifth: stratum lucidum



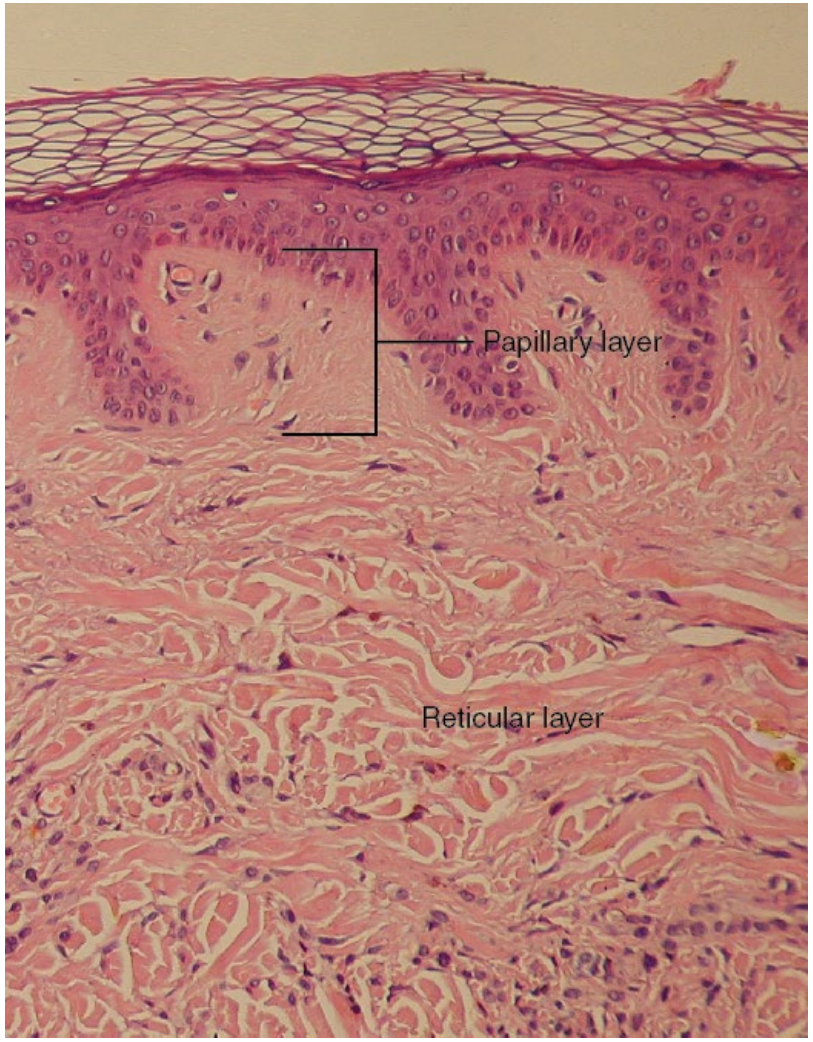
Dermis: Papillary Layer

- Collagen and elastin fibers form a loose mesh
- Projects into the stratum basale to form dermal papillae
- Contains
  - Fibroblasts
  - Adipocytes
  - Blood vessels
  - Phagocytes
  - Lymphatic capillaries
  - Nerve fibers
  - Meissner corpuscles



Dermis: Reticular Layer

- Dense, irregular connective tissue
- Well vascularized, also rich sensory and sympathetic nerve supply
- Elastin fibers provide elasticity
- Collagen fibers
  - Provide structure and tensile strength
  - Extend into both the papillary layer and the hypodermis
  - Binds water to keep the skin hydrated



Derm Terms

A Brief Review of Primary Skin Lesions

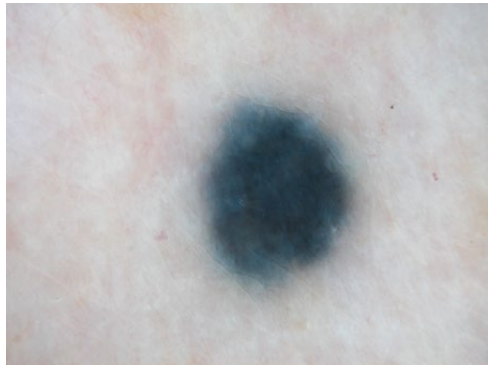
Primary Lesion: Macule

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

Café au lait spots

Freckles

Vitiligo



Blue nevus

Primary Lesion: Patch

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

Congenital dermal melanosis

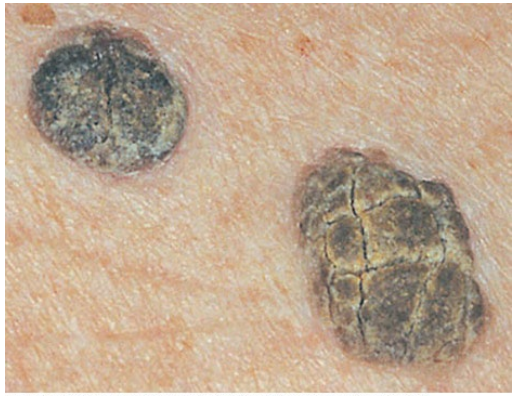
Vitiligo

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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Kaposi's sarcoma

Molluscum contagiosum

Verruca vulgaris

Primary Lesion: Plaque

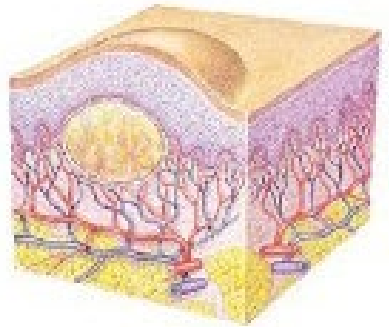
- A circumscribed, elevated lesion more than 1 cm (some sources say 5 mm)
- May form as a confluence of papules

Tinea corporis

Seborrheic dermatitis

Psoriasis

Primary Lesion: Nodule



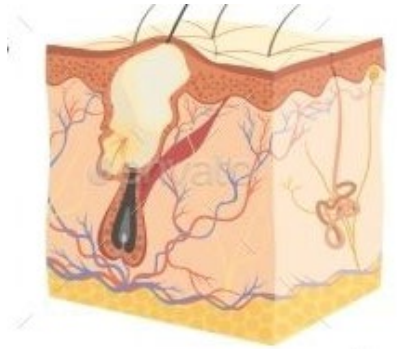
- A circumscribed, elevated, solid lesion more than 1 cm

Lipoma

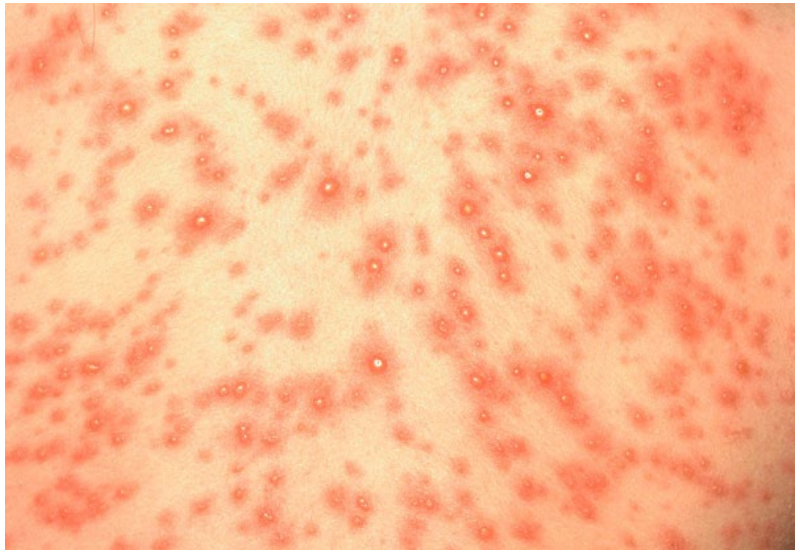
Neurofibromatosis

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

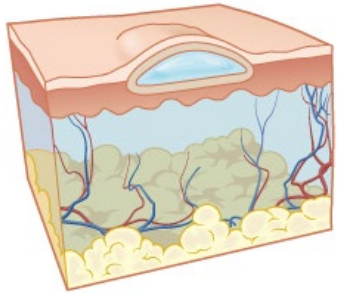


Varicella zoster (chickenpox)

Folliculitis

Palmoplantar pustulosis (PPP)

Primary Lesion: Vesicle



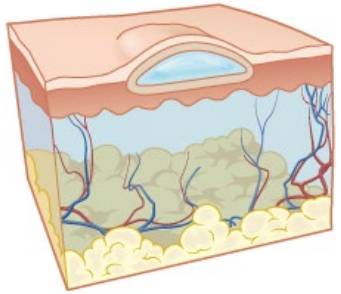
- A raised lesion containing free fluid up to 5 mm in diameter

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)

Mechanical trauma (unroofed)

Primary Lesions

Flat

- Macule
- Patch

Raised/Palpable

- Papule
- Plaque
- Nodule
- Pustule
- Vesicle
- Bulla

Congenital and Infantile Skin Findings

DOL 3, full-term NSVD at 39 weeks

Describe your physical exam (not dx)

Erythema toxicum neonatorum (ETN)

- Erythematous **macules** with 1-3mm white-yellow **papules** or **pustules**
- May be present at birth, but more common on DOL 2 or 3
- Fades over 5-7 days, but can last weeks
- Face, trunk, extremities can be affected
- Occurs in 40-70% of newborns
- Etiology is unknown, but Wright stain will show eosinophils
- No treatment needed

HOL 3, full-term NSVD at 39 weeks

Describe your physical exam (not dx)

DOL 3

Transient neonatal pustular melanosis

- Begins as sterile **vesiculopustular** lesions
- **Pustules** rupture easily within 24-48 hr, leaving a collarette of fine scale around non-erythematous hyperpigmented **macules**
- More common in infants with darker skin
- Typically appear on the chin, forehead, neck, back, and shins
- Rarely can be seen on the scalp, palms, and soles
- Fade over 3 to 4 weeks
- Wright stain will show neutrophils
- No treatment needed

Erythema Toxicum Neonatorum

Usually appears between 24 to 72 hours of life

Presents with small papules that quickly become pustules

Papules are surrounded by an erythematous halo

Lesions do NOT occur on the palms and soles

Lesions do NOT result in hyperpigmentation

Transient Neonatal Pustular Melanosis

Usually present at birth

Presents with vesicles, pustules, and macules

Significant surrounding erythema is NOT present

Lesions can occur almost anywhere on the body, including the palms and soles

Lesions rupture easily leaving behind a hyperpigmented macule ± collarette

HOL 12, full-term NSVD at 40 weeks

Describe your physical exam (not dx)

Milia (aka “Milk Spots”)

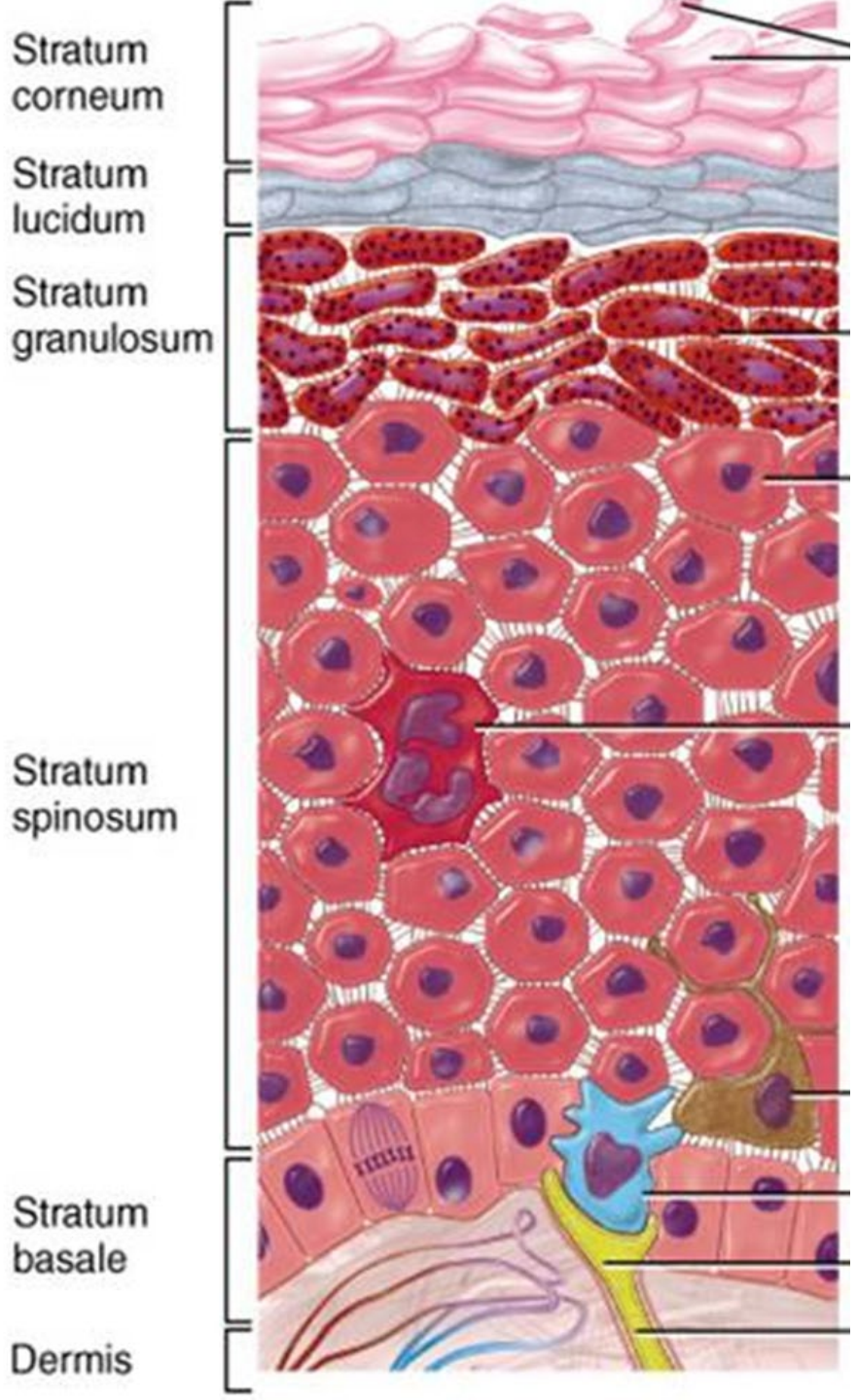
- Small (1 to 2 mm) pearly white **papules**
- Keratin retention cysts within the dermis
- Usually on the chin, forehead, nose, and cheeks
- Occur in up to 50% of newborns
- Resolve spontaneously in the first 1 to 2 months
- Not “baby acne;” no inflammatory component
- No treatment needed

DOL 7, SVD at 36 wks

Describe your physical exam (not dx)

Miliaria

- Mean age 1 wk
- Caused by immaturity of eccrine ducts and sweat retention
- Two main types affect newborns
  - Crystallina
    - 1-2 mm **vesicles** due to obstruction of sweat ducts in the stratum corneum (most superficial)
  - Rubra aka “Prickly Heat”
    - 2-4 mm **papules** and **vesicles** with an erythematous base
    - Due to eccrine obstruction in the middle layers of the epidermis (deeper)
- Will resolve with cooling



3 weeks old

2 months old

Describe your physical exam (not dx)

Neonatal acne

- Eruption of **papules** and **pustules**
- Onset age 3 weeks and resolves by 4 months
- Occurs due to maternal androgens in utero
- Treat with soap and water, can also use ketoconazole 2% or 1% hydrocortisone
- No impact on adolescent acne
- Distinct from infantile acne
  - Onset 3-4 month
  - More severe
  - Clears around a year, but may last to age 3

A Practical Note

DOL 1

5 months old

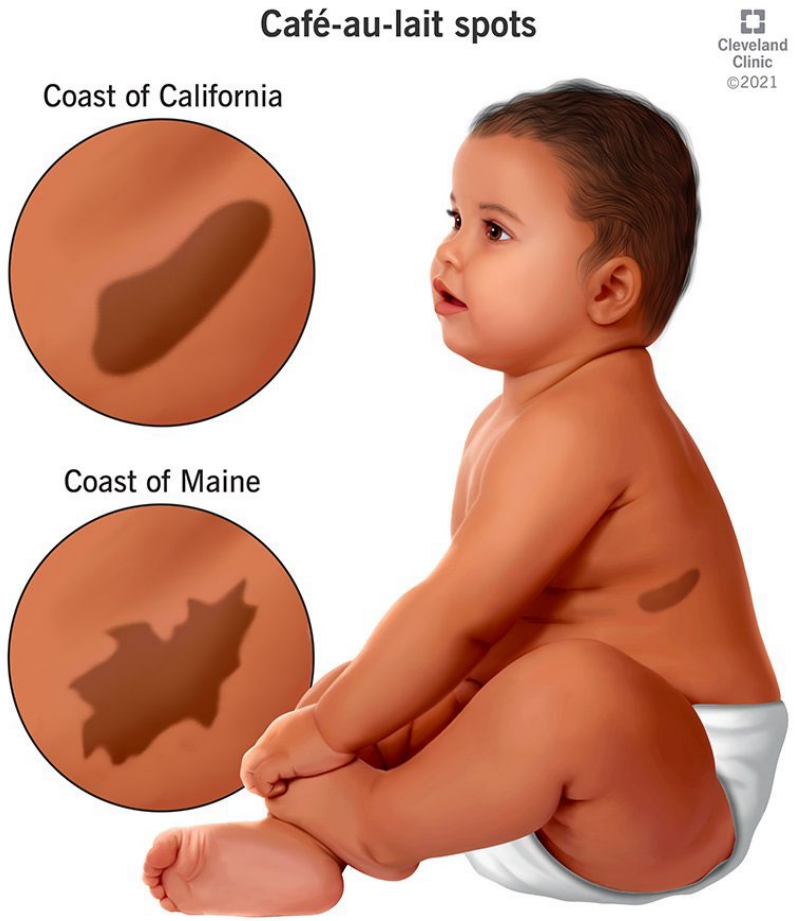
Describe your physical exam (not dx)

Dermal melanosis (congenital dermal melanocytosis or cerulean spot)

- Bluish-gray **patch** resulting from accumulation of melanocytes in dermis
- Often on lower back or buttocks, but can affect the extremities
- More common in infants with more pigmented skin
- Generally fade by age 2 without intervention
- Important to document
- If patches are very large or numerous, consider a lysosomal storage disease
- Previously called “Mongolian spots”

Describe your physical exam (not dx)

Café au lait spots

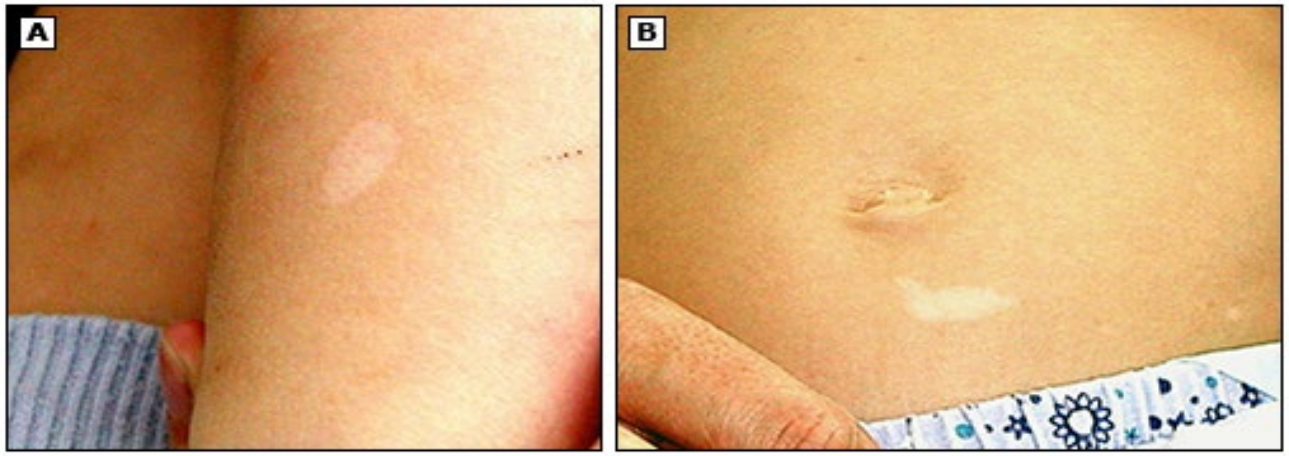


- Flat, light or dark brown **macules** or **patches** present in up to 10% of newborns
- Usually benign and require no treatment
- Caused by increased melanocytes in the epidermis
- Can be present at birth or present during childhood
- If *more than 6 present*, consider neurofibromatosis type 1 (95% sensitivity)

Describe your physical exam (not dx)

Ash Leaf Spots

- Hypomelanotic **macules**
- Solitary macules are common in normal newborns, but *more than one ash leaf spot* warrants further evaluation
- Present at birth or early infancy of 87% of pts with tuberous sclerosis
- Benign hamartomas of brain, eyes, heart, lungs, liver, kidney, skin
- May be associated with:
  - Seizures
  - Behavior problems
  - Cognitive deficits



Describe your physical exam (not dx)

Aplasia cutis congenita

- Presents as a hairless **patch** or tense **bulla** in the midline, vertex of the scalp
- Congenital absence of skin in a small area
- In 15 to 30% of cases, involves underlying bone and dura
- Can be associated with a cranial neural tube defect
- Can have complications leading to scarring, alopecia
- May be associated with genetic syndromes and other congenital anomalies, including abdominal wall defects, limb abnormalities, cleft deformities

DOL 15

6 months old

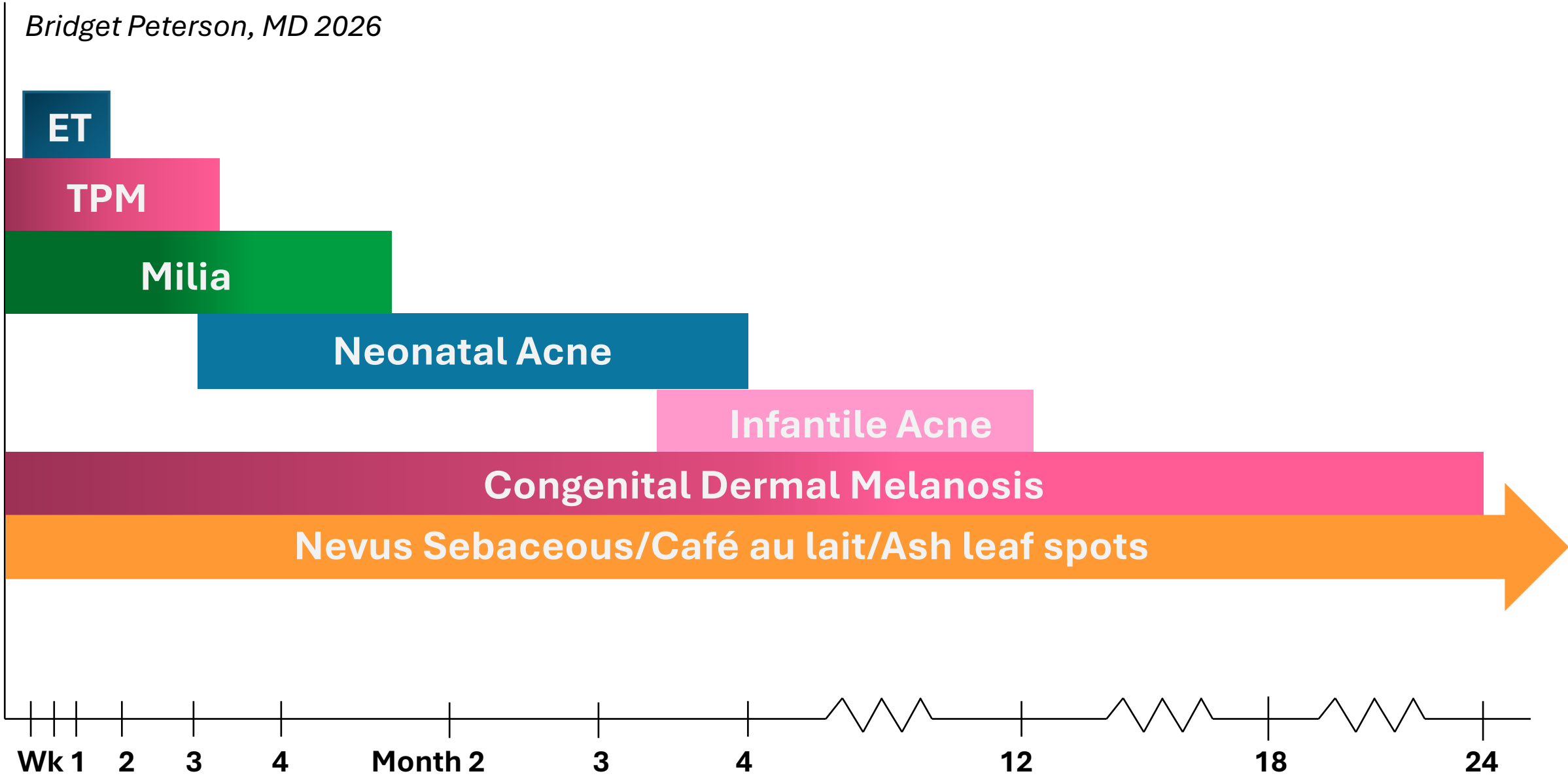
Describe your physical exam (not dx)

Nevus sebaceous

- Linear or ovoid waxy **plaques**, often salmon or tan in color
- Most often on scalp or face
- May cause focal alopecia of the scalp
- Present at birth but likely to become more prominent at puberty and appear verrucous or greasy
- Rare (0.3%) but can progress into basal cell carcinoma in adulthood
- Treatment not necessary but should be routinely monitored

Timeline of Congenital and Newborn Findings

Bridget Peterson, MD 2026



Rapid Review: Congenital and Newborn Findings

Ash leaf spot

DOL 3

Erythema toxicum

Nevus sebaceous

Congenital dermal melanocytosis

Rapid Review: Congenital and Newborn Findings

DOL 7

Milia

Miliaria crystillina

Café au lait spots

Aplasia

Vascular Skin Findings

Nomenclature

- **Vascular malformation**: congenital developmental disorder consisting of capillary, lymphatic, venous, and arterial vessel formation

- **Vascular tumor**: neoplasm caused by the proliferation and hyperplasia of abnormal endothelial and other vascular cells; may not be present at birth

- **Vascular phenomenon**: transient changes in the appearance of the skin due to normal newborn physiology

Note: Primary lesion Derm Terms may be of limited value for vascular findings

DOL 1

DOL 15

Describe your physical exam (not dx)

Nevus simplex (aka Stork bite or angel kiss)
Vascular malformation

- Occurs in up to 40-60% of newborns
- Blanching, vascular **macules** and **patches** with irregular borders
- Found on the glabella, eyelids, and nape of the neck
- Caused by telangiectasias in the dermis
- More prominent with crying, activity, or changes in ambient temperature
- Usually resolve by 18 months as the epidermis thickens

DOL 1

DOL 1

Describe your physical exam (not dx)

Nevus flammeus (Port wine stain)
Vascular malformation

- Rare finding (0.1-0.6% of births)
- *Non-blanching*, erythematous **macules** and **patches**
- Deeper in color than nevus simplex with more defined borders
- Typically unilateral or segmental distribution
- Does not regress; grows in proportion with child
- Can be associated with several syndromes including Sturge-Weber (CNS angiomas)
- Can be treated with laser therapy at 6 week intervals

Rapid Review: Vascular Malformations

Nevus simplex

Nevus flammeus

Nevus simplex

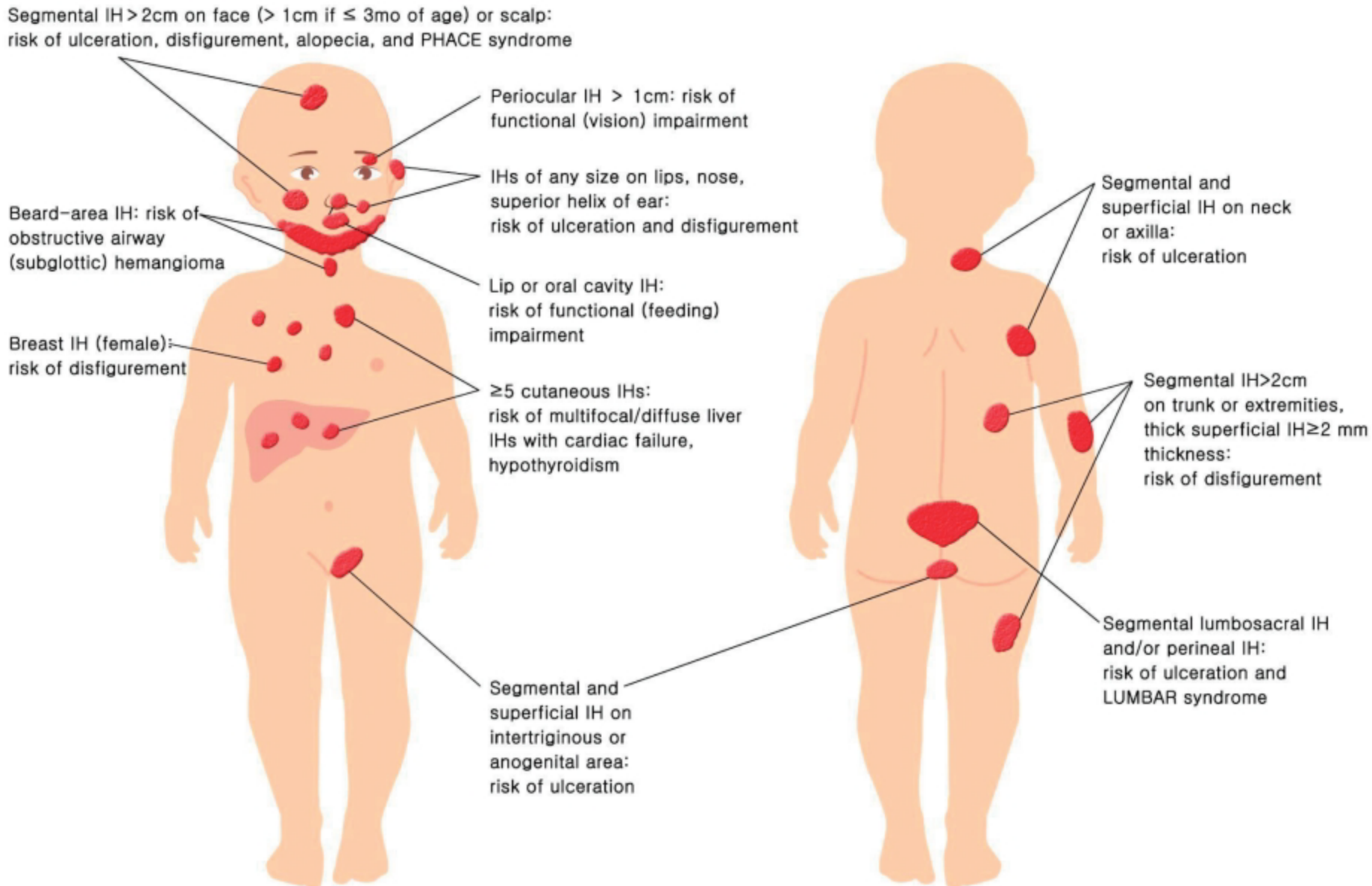
Nevus flammeus

Describe your physical exam (not dx)

Infantile hemangioma
Vascular tumor

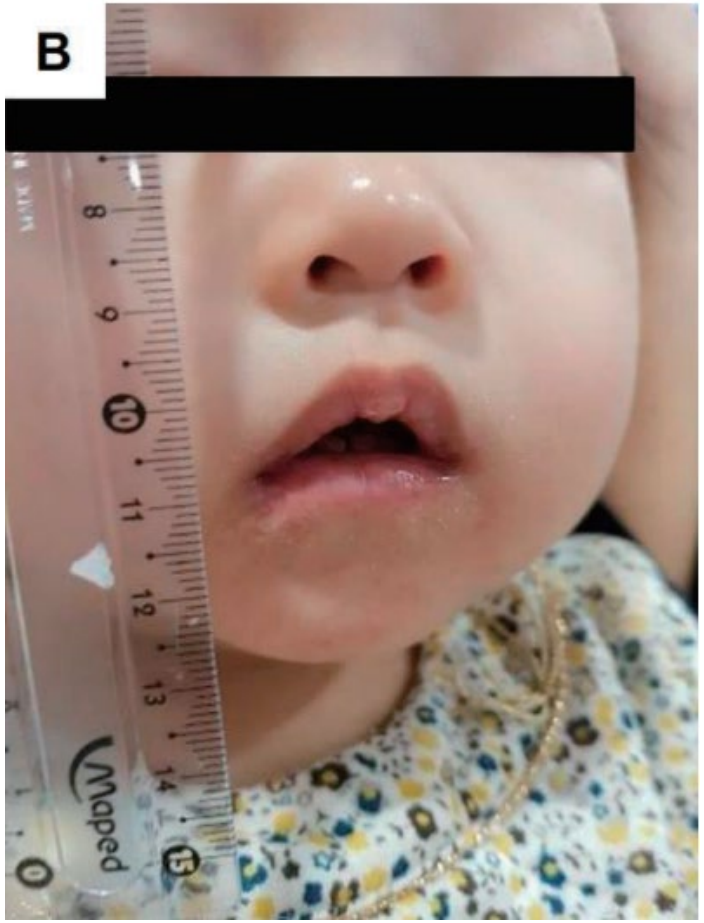
- Most common benign vascular tumor (5-10% of infants)
- Can be superficial, deep, or combined
- More common in AFAB, Caucasian, premature, or low birth weight infants
- Usually present at 1-4 weeks of age, rapidly proliferate until 5 months, then spontaneously involute by 12 months
- 10% of IH are high risk and require treatment from 1 month of age
- First line treatment is oral propranolol
- Potential Complications
  - Bleeding
  - Ulcerations
  - Airway obstruction
  - Vision loss

High-Risk Infantile Hemangiomas (IHs)



Infantile hematoma of tongue, palate, and gingiva causing feeding difficulty

At 1 month of age



At 12 months of treatment with propranolol PO (2mg/kg/day)

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Pyogenic granuloma
Vascular tumor

- Not pyogenic or a granuloma; actually a lobular capillary hemangioma
- Benign vascular tumor common in children under 5 yo
- Mainly occurs on the head and upper extremities
  - Umbilical pyogenic granuloma also common
- Friable, tend to bleed
- Can remove surgically or treated topically with imiquinoid, timolol, or silver nitrate (umbilical)

Rapid Review: Vascular Tumors

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Infantile hemangioma

Pyogenic granuloma

Umbilical pyogenic granuloma

Infantile hemangioma

Cutis marmorata
Transient vascular phenomenon

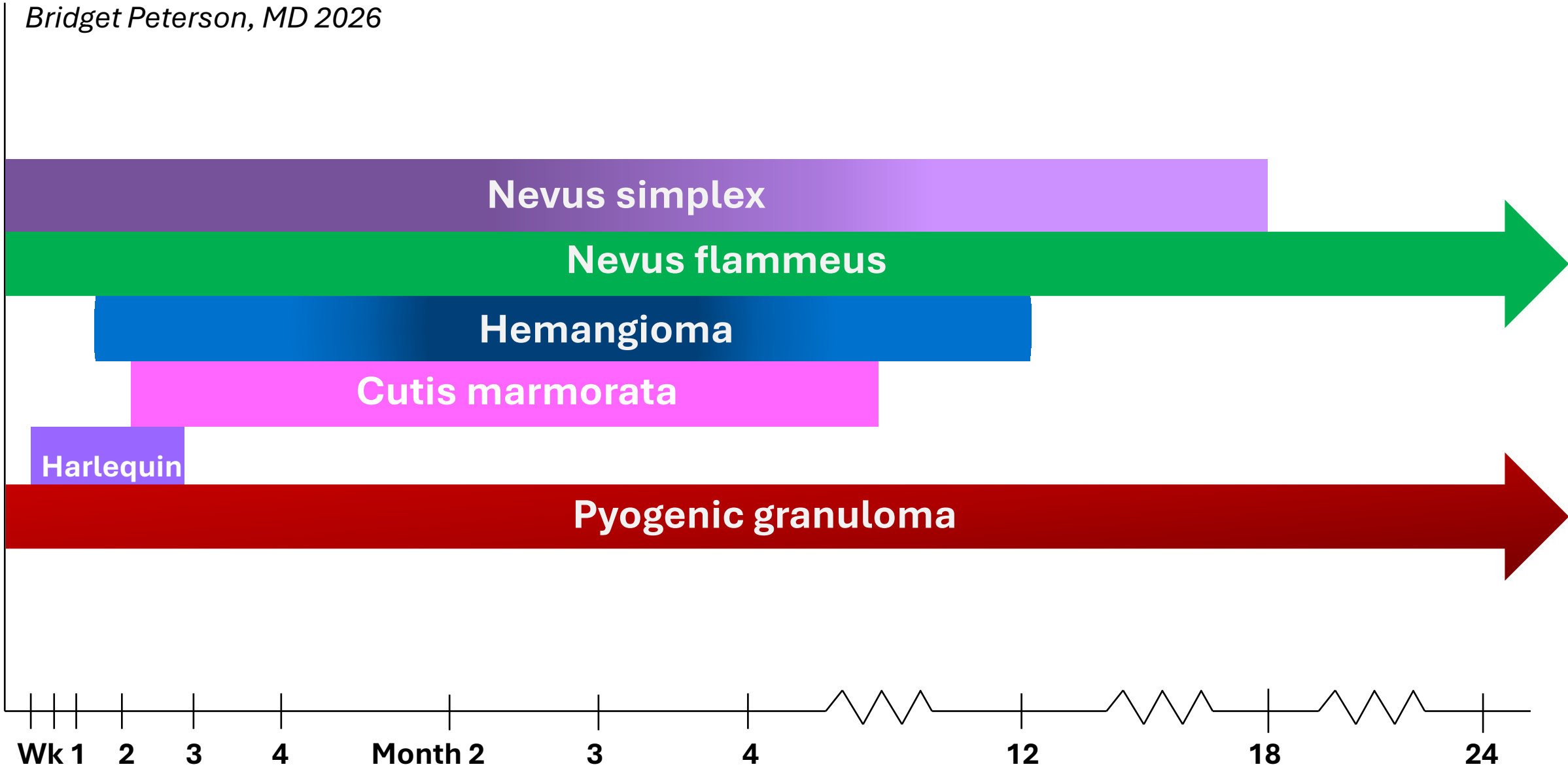
- Reticulated mottling of the skin
- Symmetrically involves the trunk and extremities
- Vascular response to cold; resolves with warming
- Typically resolves by 6-12 mos, but sometimes into childhood
- Distinguish from cutis marmorata telangiectasia congenita (vascular malformation; does not resolve with warming)

Harlequin color change
Transient vascular phenomenon

- Affects up to 10% of full term infants
- Typically occurs DOL 2-5, but may last 3 weeks
- Unilateral erythema on the dependent side when infant lies on his/her side, with contralateral blanching
- Develops rapidly and lasts 30 sec to 20 min
- Secondary to immature hypothalamic center

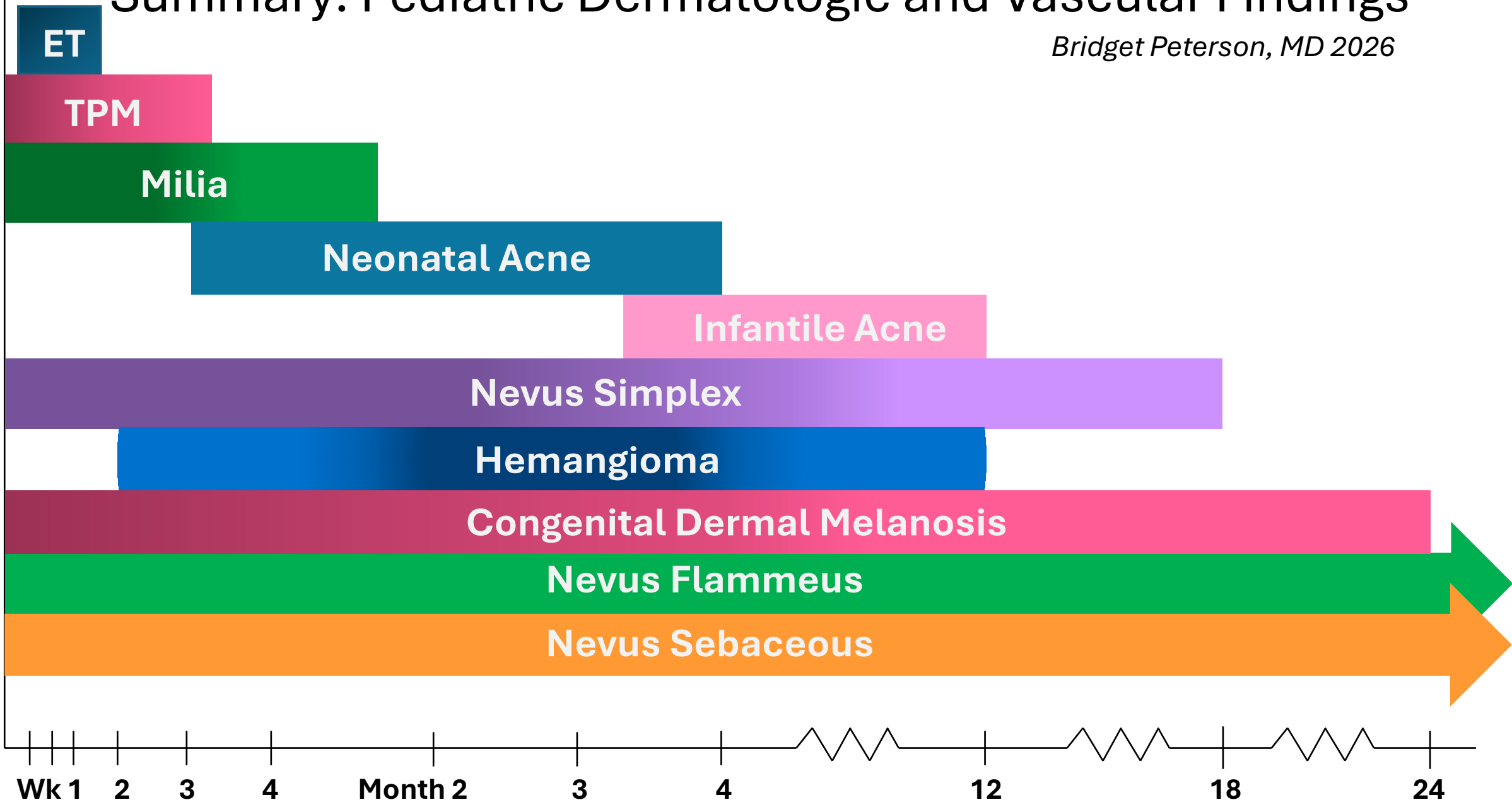
Timeline of Pediatric Vascular Skin Findings

Bridget Peterson, MD 2026



Summary: Pediatric Dermatologic and Vascular Findings

Bridget Peterson, MD 2026



Neonatal acne is primarily caused by:

A. Obstructed sweat glands
B. Disrupted skin barrier
C. Environmental bacteria exposure
D. Maternal androgens
E. Use of topical barrier products

Observation and reassurance only is appropriate for all of the following *except*:

A. Nevus sebaceous
B. A newborn with 3 café au lait spots at birth
C. A newborn with 2 ash leaf spots
D. Cutis marmorata
E. Aplasia cutis

Which of the following are typically present at the time of birth?

A. Milia
B. Erythema toxicum
C. Neonatal acne
D. Nevus simplex
E. Transient pustular melanosis

What is the most appropriate treatment for the condition pictured in this 6 day old child?

A. Swaddle the infant
B. Routine cleansing with gentle soap and water
C. Observation only; condition is self-limited
D. Remove extra blankets
E. Specialist referral

Miliaria Rubra

Thank You

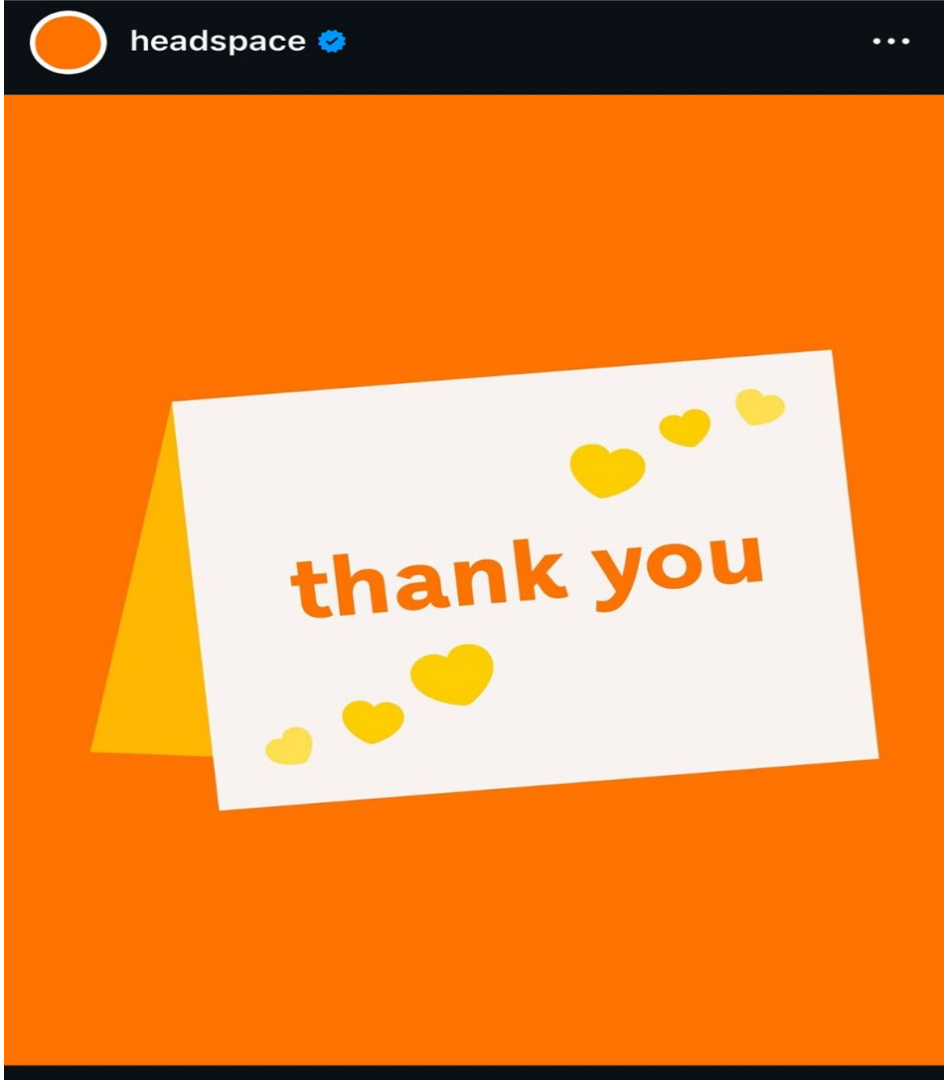
PetersonBK@upmc.edu

References

- Individual images cited on each side
- Available upon request

Mindfulness for the Modern Physician

2026 Donald B. Middleton, MD Refresher Course in Family Medicine
Arthi Chawla, MD, FAAFP
February 28, 2026


headspace
thank you

Disclosure

I have an agenda - to use my lived experiences to improve the wellness of others

I have a conflict of interest - I want to live in a world of happy people

Connection from head to heart is through the hand, I strongly recommend using the hand out provided. Inspired by Brené Brown

Objectives

Arm you with 3 easy and practical tools to improve your mental health

Practice said tools

Hopefully, smile and laugh

Monitor

Your

Inner

Dialogue

Reflection

Think about one positive or negative thing you recently said to yourself about yourself.

Would you say this to a loved one? Why or why not?

If not, why are you saying it to yourself?

Create

An Emotional

Emergency

Kit

Reflection

Write down a few things you would want in your emotional emergency kit

When you are having a terrible day, what can you reliably do in order to help you get some space?

Music? Pictures? Memories? Consider keeping this list on your phone, so it is easily accessible

This is inspired by NPR article - A First Aid Kit For Mental Health Emergencies : NPR

Gratitude

Practice gratitude

Gratitude

Reflection - what is one thing you are grateful for? Allow yourself permission to use AND

I am grateful for this opportunity to share these thoughts with you AND I am nervous

I am grateful for my health AND I also feel empathy for those who are not healthy

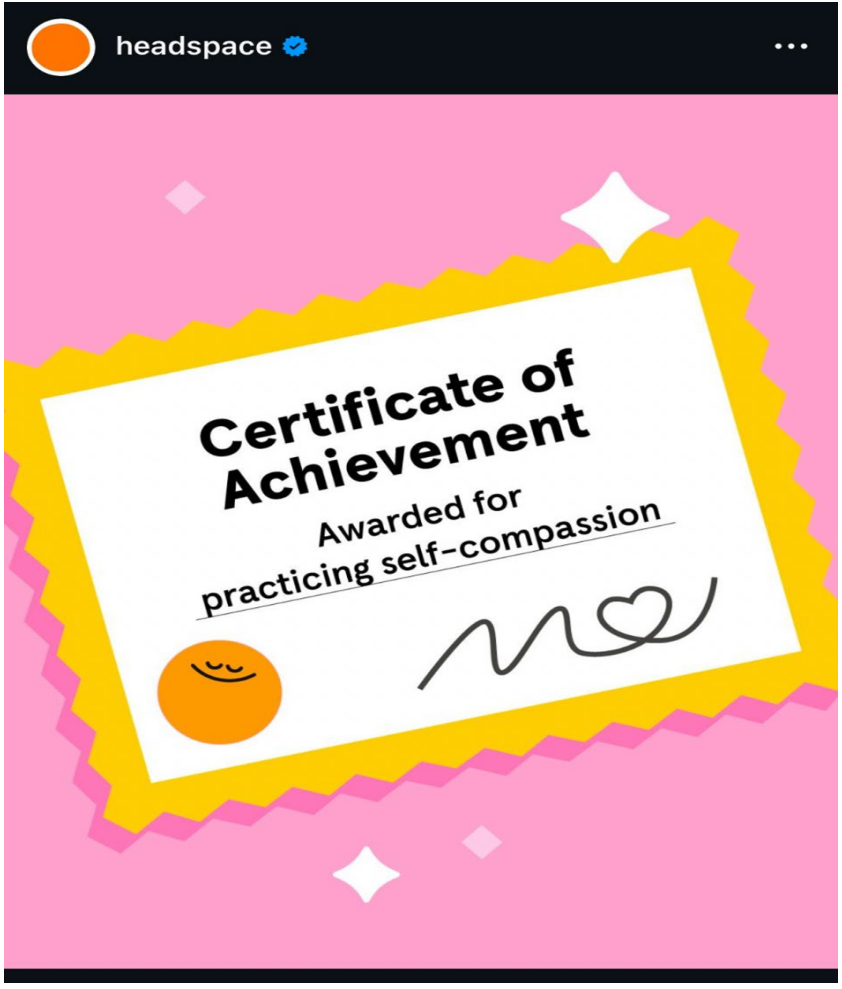
Objectives

Arm you with 3 easy and practical tools to improve your mental health

Practice said tools

Hopefully, smile and laugh

Thank you!


headspace
Certificate of Achievement
Awarded for
practicing self-compassion

Curious? Check out these

How to Practice Self-Compassion -

How to Prahttps://www.therapistaid.com/therapy-article/how-to-practice-self-compassionctice Self-Compassion | Article | Therapist Aid

Challenging Negative Thoughts -

https://www.therapistaid.com/worksheets/challenging-negative-thoughts

A First Aid Kit for Mental Health -

https://www.npr.org/2011/10/18/141473382/a-first-aid-kit-for-mental-health-emergencies

Resources

Grounding Techniques

https://www.therapistaid.com/therapy-worksheet/grounding-techniques

Mindfulness: DBT “what” and “how” skills

Resources

Podcasts - Stop Physician Burnout Podcast: Leadership Skills for Physician Wellness by Dike Drummond MD

Books - Stop Physician Burnout. What To Do When Working Harder Isn't Working by Dike Drummond MD.
Brene Brown - all of her books are amazing
The Book of Joy by the Dalai Lama and Archbishop Desmond Tutu.
How to Keep House While Drowning by KC Davis
Extreme Ownership and The Dichotomy of Leadership by Jocko Willink and Leif Babin
Fish! A Proven Way to Boost Morale and Improve Results by Stephen C. Lundin PhD, John Christensen, Harry Paul and Ken Blanchard

Therapy - Betterhelp
App's - Calm. Headspace.
Netflix - Headspace
Website - Therapist aid. HappyMd. Betterhelp. Between sessions
Electronic access to your local public library. Libby app to listen to ebooks.

Resources

MasterClass - Mental Strength by Robin Arzon.
Small Habits that Make a Big Impact on Your Life by James Clear.
Critical Leadership Training by Jocko Willink.
The Power of Mindset with Carol Dweck, David Yeager, Steve Young, Jeremy Bohannon, and Lorena Tareszkiewicz
In Practice: Your Anxiety Toolkit by Dr. Alexandra Solomon

Free webinars - echelon front https://echelonfront.com/ → academy → create account → free training → first responder training, womens assembly → enroll → one hour classes monthly

Knee POCUS and Injection

Family Medicine Refresher Course

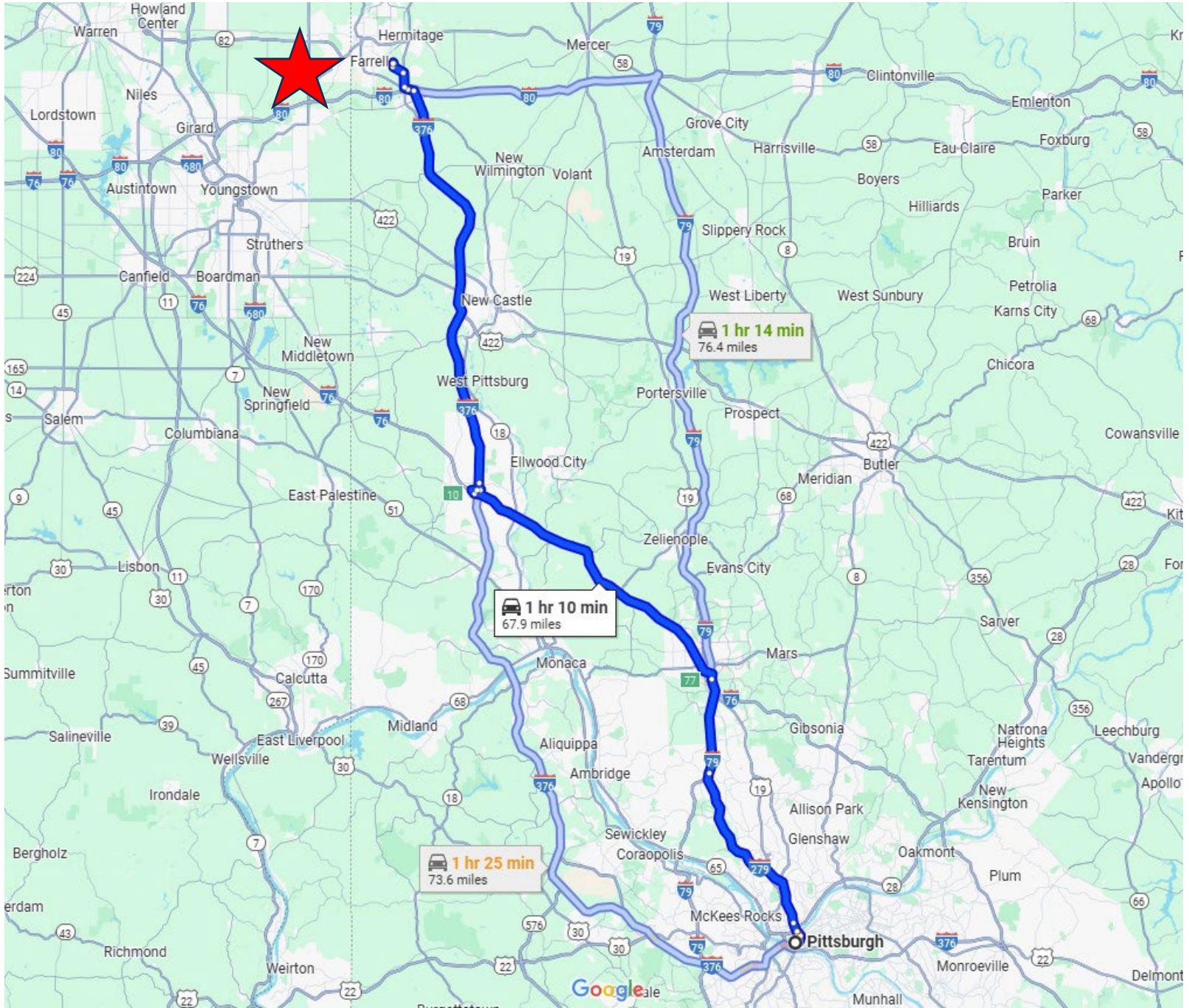
February 26, 2026

Jim Liszewski MD

Introduction

UPMC Horizon Family Medicine Residency faculty and residents
Jim Liszewski MD - faculty
Erin Meier DO - faculty
Jessica Dawson MD – 3rd year FM resident
Isaac Hodapp MD – 3rd year FM resident
Ultrasound models: Malvika Gupta, Alec Nolan, Riley King, Alina Nguyen, Nate Dahl
(no financial disclosures)

UPMC Horizon
Family Medicine
Residency
Farrell, PA
70 miles north of
Pittsburgh



Knee POCUS and Injection

Overview

- Knee anatomy
- Knee osteoarthritis facts
- Diagnosis
- POCUS knee exam
- Treatment/Steroid injections
- POCUS knee injection
- POCUS lab:
  - Exam with POCUS
  - Injection

Objectives

- Understand the benefit of corticosteroid injections in treatment of OA
- Describe the key POCUS findings in OA
- Understand the importance of ultrasound guidance for knee injections
- Perform an intraarticular joint injection using ultrasound guidance

References

- Knee Pain in Adults and Adolescents: The Initial Evaluation. CHRISTOPHER W. BUNT, MD, CHRISTOPHER E. JONAS, DO, AND JENNIFER G. CHANG, MD. Am Fam Physician. 2018;98(9):576-585 https://www.aafp.org/pubs/afp/issues/2018/1101/p576.html
- Injections of the Hip and Knee, CHARLES W. WEBB, DO, GEOFF MCLEOD, DO, AND RATHNA NUTI, MD. Am Fam Physician. 2024;109(1):61-70. https://www.aafp.org/pubs/afp/issues/2024/0100/hip-and-knee-injections.html
- Journal of the American Academy of Orthopaedic Surgeons 30(9):p e721-e729, May 1, 2022. Clinical Practice Guideline Summary: Management of Osteoarthritis of the Knee (Nonarthroplasty)
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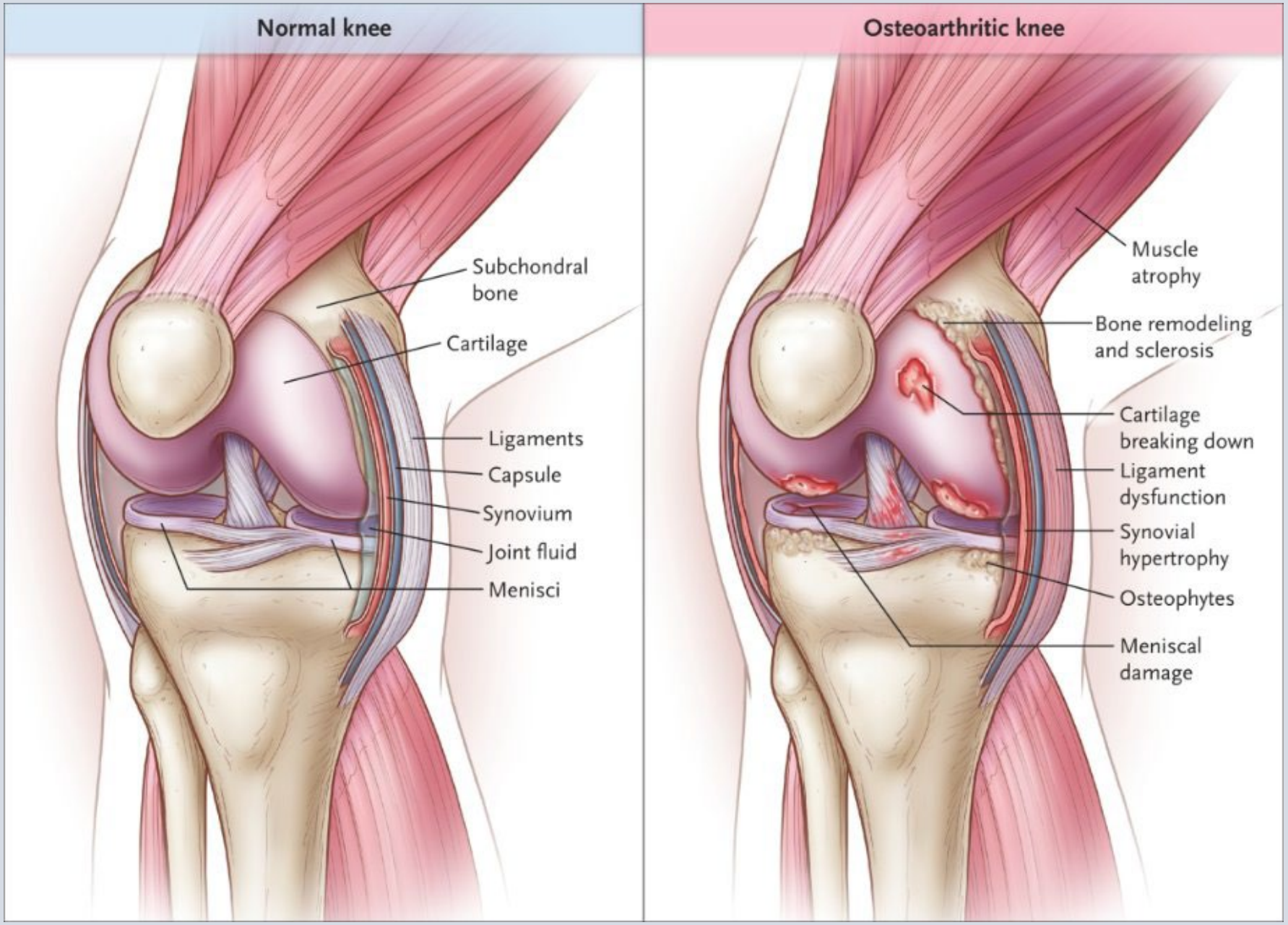
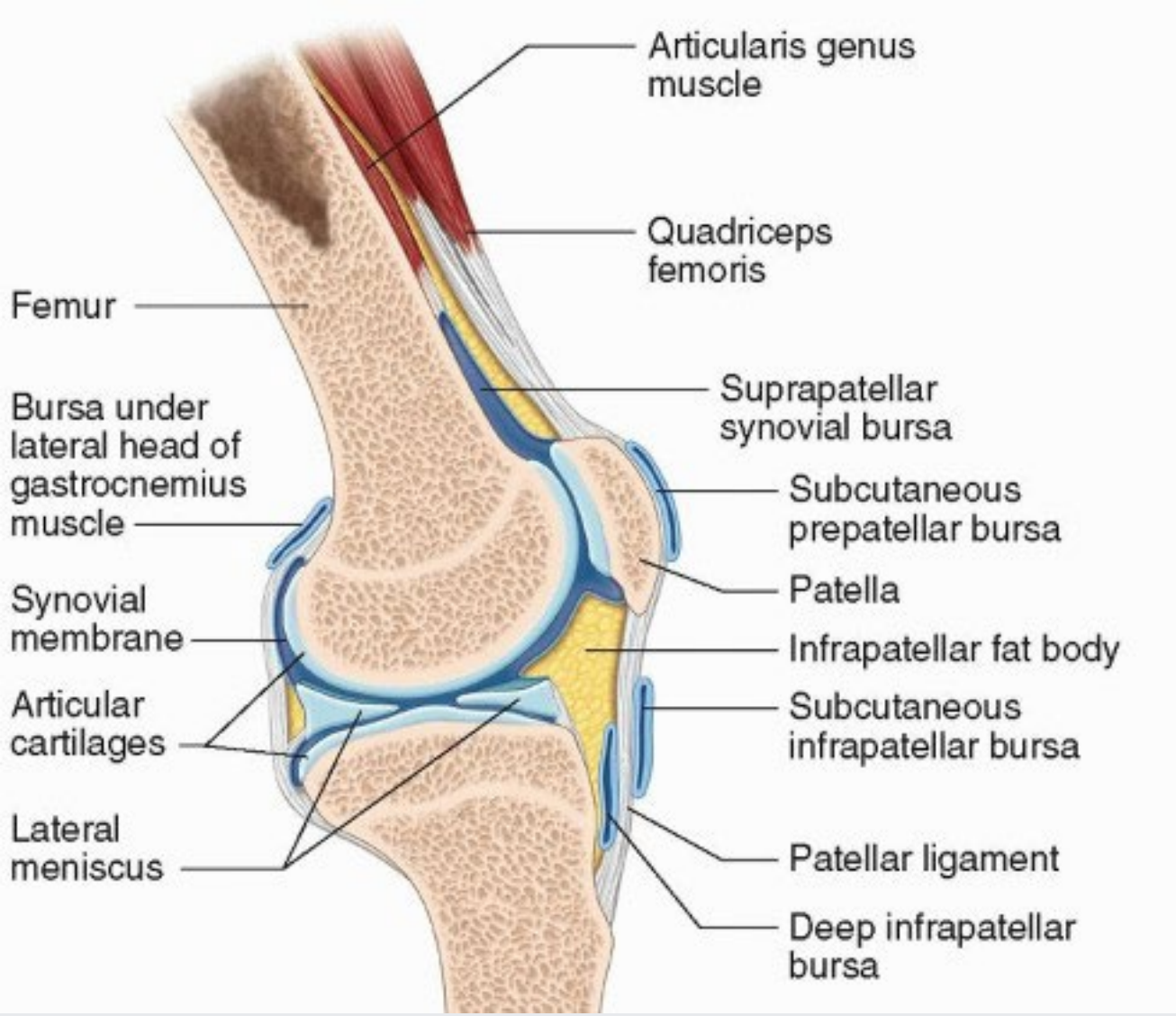
- Treatment of Knee Osteoarthritis. Ringdhal E, Pandit S. Am Fam Physician. 2011;83(11):1287-129. https://www.aafp.org/pubs/afp/issues/2011/0601/p1287.html
- Osteoarthritis of the Knee. Sharma, L. N Engl J Med 2021;384:51-9
- Prevalence of Knee Osteoarthritis in the United States: Arthritis Data from the Third National Health and Nutrition Examination Survey 1991-94. Dillon CF et al. J Rheumatol 2006;33:2271–9.
- Treatment of Knee Osteoarthritis. Ringdahl E, Pandit S. Am Fam Physician. 2011;83(11):1287-1292
- Ultrasound-guided versus landmark in knee arthrocentesis: A systematic review. Wu T et al. Semin Arthritis Rheum 2016 Apr;45(5):627-32
- The ultrasound assessment of osteoarthritis: the current status. Nevalainen MT, Uusimaa A, Saarakkala S. Skeletal Radiology (2023) 52:2271–2282

Knee osteoarthritis

- Osteoarthritis (OA) is the most common form of arthritis, affecting an estimated 302 million people worldwide
- OA is a leading cause of disability among older adults, with 37% of people over 60 years of age afflicted (1990's data)
- Pathology involves the whole joint, including cartilage degradation, bone remodeling, osteophyte formation, and synovial inflammation
- Pain, stiffness, swelling, and loss of normal joint function are typical symptoms
- About 80 percent of patients with knee osteoarthritis have some limitation of movement
- 25 percent of patients cannot perform major activities of daily living



N Engl J Med Vol 384(1):51-59 Jan 7, 2021



Lateral knee anatomy

- Synovial membrane is continguous with the suprapatellar bursa
- Synovitis is demonstrated as presence of joint effusion

Knee OA Diagnosis

- Knee pain worse with activity
- Swelling or effusion, and crepitus on exam
- Osteophytes on X-ray
- Formal criteria: 3 clinical criteria
- Testing can enhance diagnosis

Table 3. Diagnosis of Knee Osteoarthritis

Clinical criteria

Age older than 50 years

Bony enlargement

Bony tenderness

Crepitus

No palpable warmth

Stiffness for less than 30 minutes

Laboratory criteria

Erythrocyte sedimentation rate less than 40 mm per hour

Rheumatoid factor less than 1:40

Synovial fluid analysis: clear, viscous, white blood cell count less than 2,000 per µL (2.00×10^9 per L)

Radiographic criteria

Presence of osteophytes

Diagnostic accuracy

Criteria	*Sensitivity (%)*	*Specificity (%)*	*LR+*	*LR–*
Knee pain plus at least three clinical criteria	95	69	3.1	0.07
Knee pain plus at least five clinical or laboratory criteria	92	75	3.7	0.11
Knee pain plus at least five clinical or laboratory criteria, plus osteophytes present	91	86	6.5	0.10

LR+ = positive likelihood ratio; LR– = negative likelihood ratio.

Information from references 5 and 6.

Knee OA – Why should I POCUS?

POCUS is accurate for detecting signs of osteoarthritis

Does not replace the physical exam and maneuvers

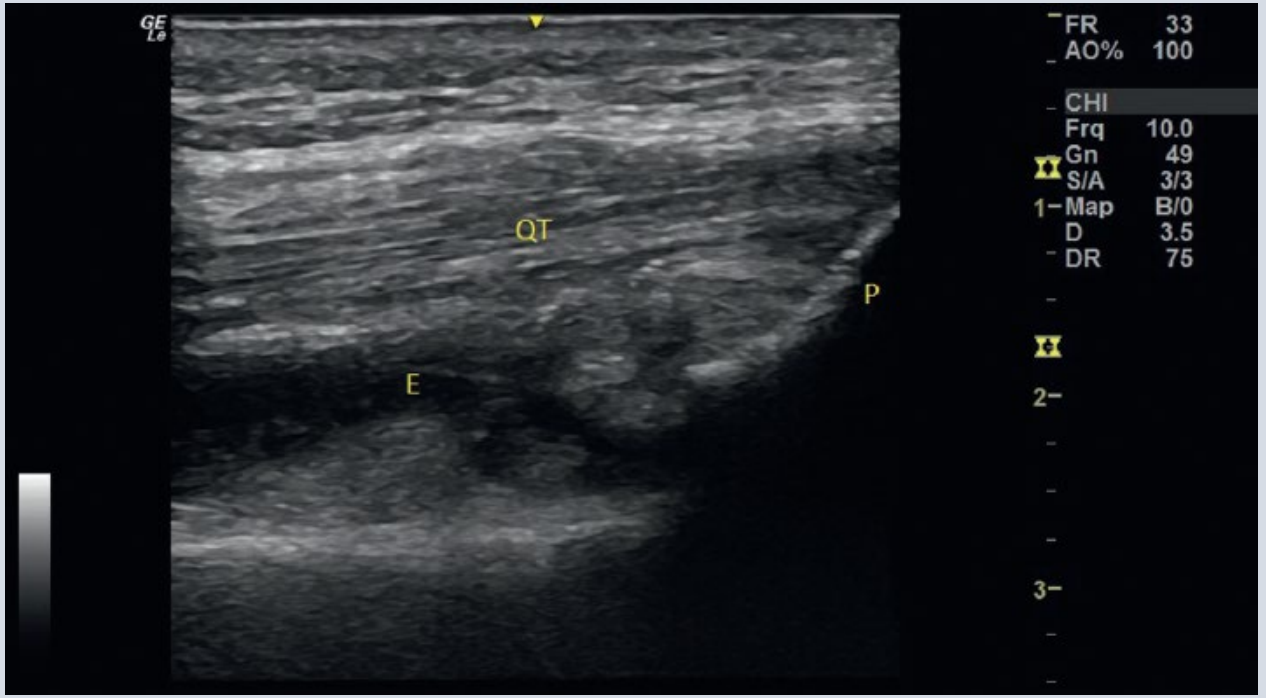
Best utilized to complement the physical exam

Knee OA Why POCUS?

- Supplements clinical exam
- No radiation
- Ease of use (handheld or platform ultrasound)
- For osteoarthritis, perform an anterior compartment and medial compartment exam
- Focus on suprapatellar bursa and medial joint line
- Your proctor will review these

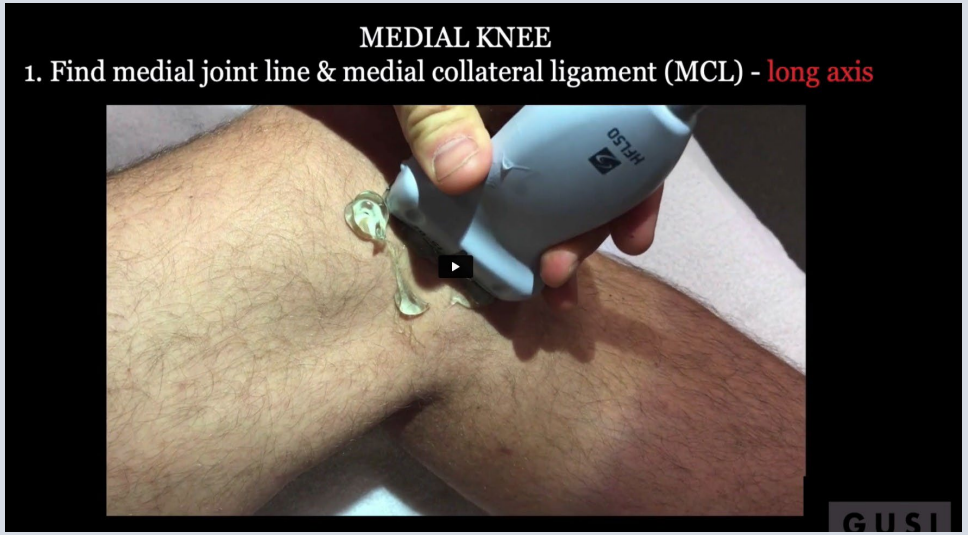
Knee OA: POCUS findings - effusion

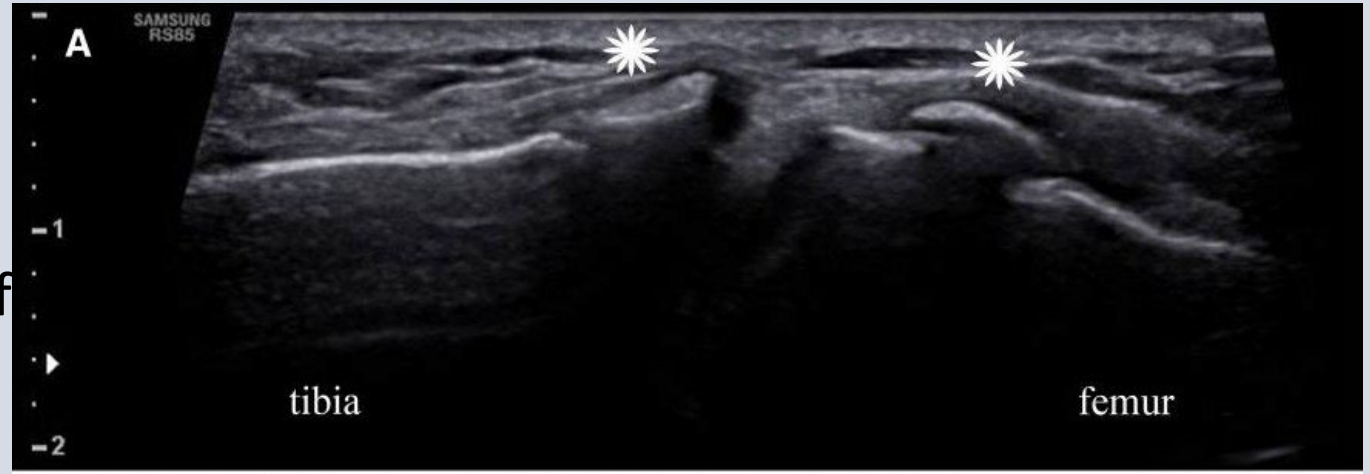
- Presence of suprapatellar effusion = synovitis
- Synovitis is linked with both the intermittent and constant pain
- Baker's cyst associated with OA
- POCUS highly sensitive to detect knee effusions and Baker's cysts
- X-rays can only detect large effusions

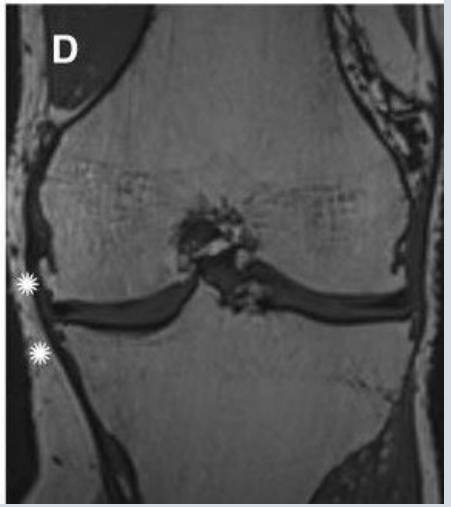


Knee OA: POCUS findings - osteophytes

- POCUS correlates moderately well with Xray for detecting osteophytes
- Examination of the medial aspect of knee (tibio-femoral location)







Knee OA: Treatment

- Topical/oral NSAIDs
- Acetaminophen
- Corticosteroid injections
- Hyaluronic acid injections
- Physical therapy
- Radiotherapy
- Opioids

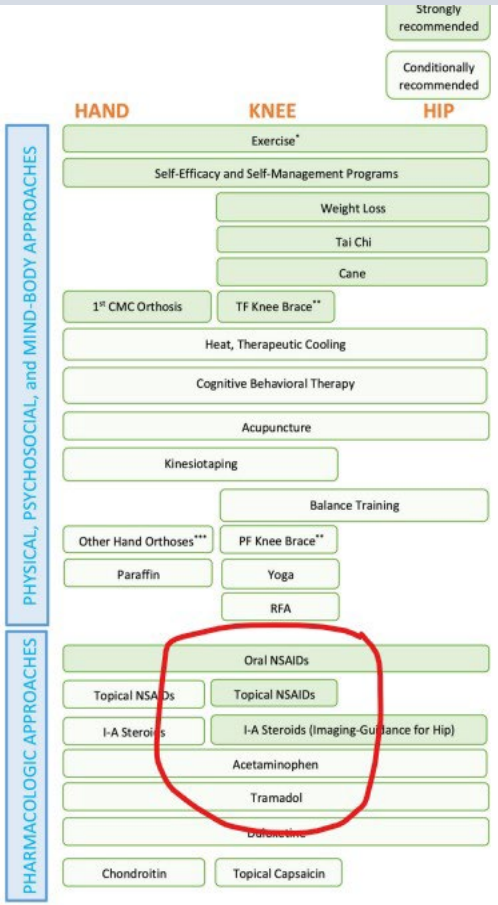


Figure 1.
Recommended therapies for the management of osteoarthritis (OA). Strongly and conditionally recommended approaches to management of hand, knee, and/or hip OA are shown. No hierarchy within categories is implied in the figure, with the recognition that the various options may be used (and reused) at various times during the course of a particular patient's disease. *= Exercise for knee and hip OA could include walking, strengthening, neuromuscular training, and aquatic exercise, with no hierarchy of one over another. Exercise is associated with better outcomes when supervised. ** = Knee

2019 American College of Rheumatology/Arthritis Foundation Guideline for the Management of Osteoarthritis

Oral Acetaminophen

Oral acetaminophen is recommended to improve pain and function in the treatment of knee osteoarthritis when not contraindicated.

Strength of Recommendation: Strong ★★★★

Evidence from two or more "High" quality studies with consistent findings for recommending for or against the intervention. Also requires no reasons to downgrade from the EtD framework.

Oral Narcotics

Oral narcotics, including tramadol, result in a significant increase of adverse events and are not effective at improving pain or function for treatment of osteoarthritis of the knee.

Strength of Recommendation: Strong ★★★★

Evidence from two or more "High" quality studies with consistent findings for recommending for or against the intervention. Also requires no reasons to downgrade from the EtD framework.

Hyaluronic Acid

Hyaluronic acid intra-articular injection(s) is not recommended for routine use in the treatment of symptomatic osteoarthritis of the knee.

Strength of Recommendation: Moderate ★★★☆ (downgrade)

Evidence from two or more "Moderate" quality studies with consistent findings, or evidence from a single "High" quality study for recommending for or against the intervention. Also requires no or only minor concerns addressed in the EtD framework.

Intra-articular Corticosteroids

Intra-articular (IA) corticosteroids could provide short-term relief for patients with symptomatic osteoarthritis of the knee.

Strength of Recommendation: Moderate ★★★☆ (downgrade)

Evidence from two or more "Moderate" quality studies with consistent findings, or evidence from a single "High" quality study for recommending for or against the intervention. Also requires no or only minor concerns addressed in the EtD framework.

Platelet-rich Plasma

Platelet-rich plasma (PRP) may reduce pain and improve function in patients with symptomatic osteoarthritis of the knee.

Strength of Recommendation: Limited ★★☆☆ (downgrade)

Description: Evidence from one or more "Low" quality studies with consistent findings or evidence from a single "Moderate" quality study recommending for or against the intervention. Also, higher strength evidence can be downgraded to limited due to major concerns addressed in the EtD Framework.

11

Management of Osteoarthritis of the Knee (Non-Arthroplasty) Evidence-Based Clinical Practice Guideline – American Academy of Orthopedic Surgeons

Steroid injections

- Intra-articular corticosteroid injections may provide short-term symptomatic relief
- A typical dose for knee injections is 40 mg of triamcinolone acetonide (Kenalog)
- Number needed to treat of two or three

Knee OA: injections

Ultrasound-guided versus landmark in knee arthrocentesis: A systematic review. Wu T et al. Semin Arthritis Rheum 2016 Apr;45(5):627-32

Landmark guided

- Supralateral, mid patella, suprapatellar approaches
- Traditional practice
- Minimal time involved

Ultrasound guided

- More accurate esp. for less experienced physicians
- Less pain
- More aspiration volume
- Decreased pain score at 2 weeks
- No significant difference in procedural time

Knee injection – US guided

eTABLE A

Accuracy Comparison Between Anatomic Landmark–Guided and Ultrasound-Guided Hip and Knee Injections

Author	Type of study	Sample size	Accuracy of landmark-guided injections (%)	Accuracy of ultrasound-guided injections (%)
Hip joint				
Diraçoğlu, et al.	Cohort	16 patients	66.7	–
Levi	Retrospective review	11 patients	–	100
Pourbagher, et al.	Case series	10 patients	–	100
Smith, et al.	Cohort	28 patients	–	97
Ziv, et al.	Cohort	40 patients	77.5	–
Knee joint				
Berkoff, et al.	Meta-analysis	5 studies	77.8	95.8
Curtiss, et al.	Cohort	20 patients	55 (less experienced clinician) 100 (experienced clinician; superolateral)	100 (any clinician; superolateral)
Daley, et al.	Systematic review	11 studies	70 (medial) 83 (superolateral) 84 (lateral midpatellar)	99 (superolateral)
Esenyel, et al.	Cohort	39 patients	56 (medial midpatellar) 73 (anteromedial) 76 (lateral midpatellar) 85 (anterolateral)	–
Hermans, et al.	Systematic review	9 studies	67 (anterolateral) 72 (anteromedial) 85 (lateral midpatellar 91 (superolateral)	–
Jackson, et al.	Cohort	240 patients	71 (anterolateral) 75 (anteromedial) 93 (lateral midpatellar)	–
Lopes, et al.	Case series	37 patients	100 (superolateral)	–

Information from:

Knee OA: US guided injection

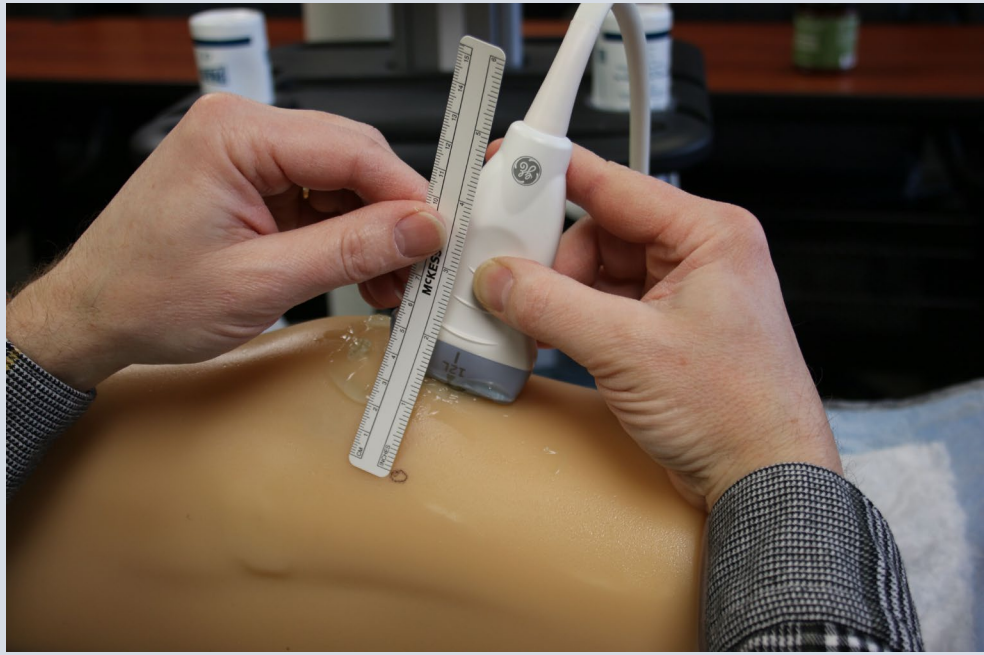
- Suprapatellar/lateral approach
- Typically performed in setting of knee effusion
- Can aspirate and inject, or just inject
- Can be performed with hand held, or platform ultrasound device

Knee OA: US guided injection

- Obtain your equipment:
  - US with probe cover
  - Sterile gel
  - Pen to mark skin
  - Skin prep
  - 23g 1 ½ needle, 5ml syringe
  - 1ml steroid solution/4ml lidocaine
- Patient supine
- Knee at 30 degrees
- Position US monitor across from examiner

Knee OA: US guided injection

- Obtain *long axis view*
- Identify suprapatellar effusion
- Mark location of entry
- Anesthetize skin if aspirating
- Change US position to *short axis view*

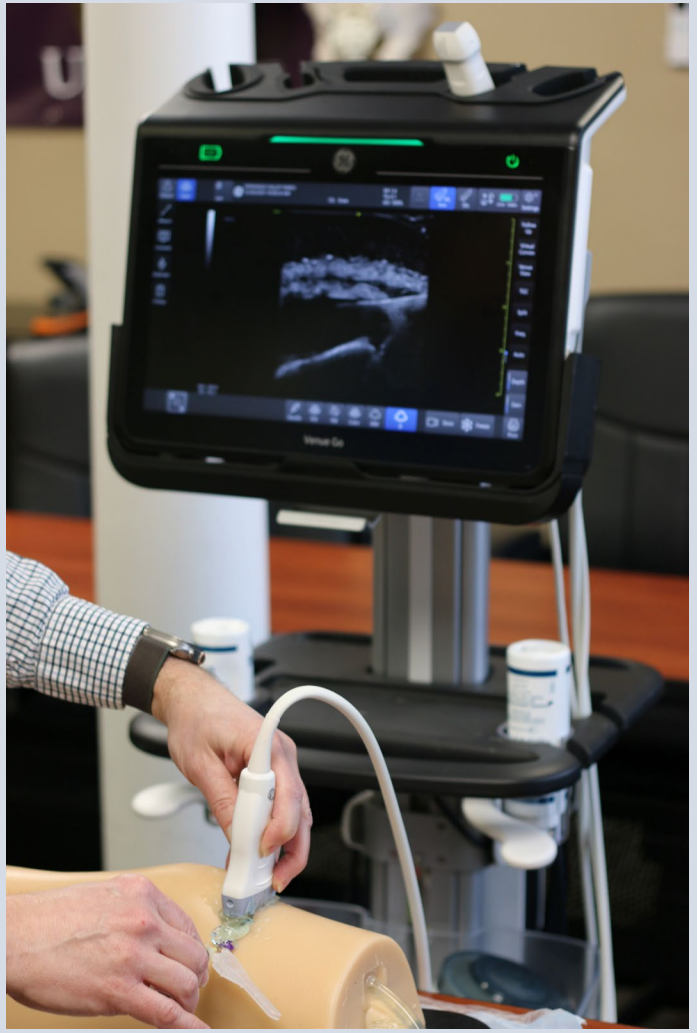


Knee OA: US guided injection

- Utilize gel to fill gap to needle site
- Insert needle 1-1.5 cm
- Observe needle on monitor, readjust US probe as needed
- Advance into bursa
- Aspirate/inject

Knee OA and POCUS: Closing thoughts

- Osteoarthritis of the knee is very common primary care issue
- Ultrasound is a bedside tool to assist with diagnosis
- Knee injections with ultrasound are safer and more effective than landmark guided injections
- Learning to use ultrasound can add to QOL for family doctors!



POCUS Lab

POCUS EXAM

- Dr Meier and Dr Hodapp
- Long axis view
- Identify suprapatellar space
- Medial view
- Identify tibiofemoral region

KNEE INJECTION

- Dr Liszewski and Dr Dawson
- Identify effusion
- Mark site
- Aspirate/inject

LUNG POCUS

Family Medicine Refresher

February 26, 2026

Erin Meier, DO

Introduction

- UPMC Horizon Family Medicine faculty and residents
- Erin Meier, DO – faculty
- Jim Liszewski, MD – faculty
- Jessica Dawson, MD – 3rd yr FM resident
- Isaac Hodapp, MD – 3rd yr FM resident
- US models – Malvika Gupta, Alec Nolan, Nate Dahl, Alina Nguyen
- No financial disclosures

Objectives

- Why Lung Pocus is valuable
- Quick review of US
- How to perform Lung POCUS
- How to apply findings
- Additional findings

Clinical Scenario

- 82 yo female with history of COPD, HFrEF, mod AS presents to clinic with complaint of productive cough and SOB, no F or chills. Has increased oxygen demand.
- What would be next steps to determine cause of SOB?
- Physical Exam, CXR, Labs
- ? POCUS

Stethoscope accuracy

- Crackles – short, explosive and non-musical
  - Parenchymal lung diseases
- Wheezing – musical, high-pitched
  - Airway disease
- Rhonchi – musical, low-pitched sounds, like a snore
  - Secretions in airway

scientific reports

OPEN

Respiratory sound classification for crackles, wheezes, and rhonchi in the clinical field using deep learning

Yoonjoo Kim[1,5], YunKyong Hyon[2,5], Sung Soo Jung[1], Sunju Lee[2], Geon Yoo[3], Chaeuk Chung[1,4✉] & Taeyoung Ha[2✉]

	Medical Student	Intern	Resident	Fellow
Normal Sound	67	75	73	87
Crackle	62	72	76	90
Wheeze	55	41	57	69
Rhonchi	42	15	37	82
Total %	59	56	68	84

	Auscultation	CXR	POCUS
Pleural Effusion	61%	47%	93%
Alveolar Consolidation (PNA)	36%	75%	97%
Alveolar Interstitial Syndrome (Pulm Congestion/ Edema)	55%	72	95%

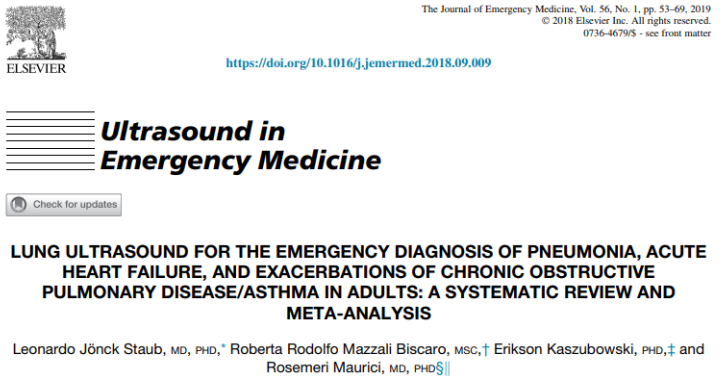
Comparison between modalities

Comparative Diagnostic Performances of Auscultation, Chest Radiography, and Lung Ultrasonography in Acute Respiratory Distress Syndrome

Lichtenstein, Daniel M.D.[*]; Goldstein, Ivan M.D.[†]; Mourgeon, Eric M.D.[†]; Cluzel, Philippe M.D., Ph.D.[‡]; Grenier, Philippe M.D.[§]; Rouby, Jean-Jacques M.D., Ph.D.[‖]

Literature Review

- Looked at 25 studies
- Concluded Lung POCUS is accurate tool for ER dx
  - PNA
  - Acute heart failure
  - Exacerbation of COPD/Asthma



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0736-4679/$ - see front matter

ELSEVIER

https://doi.org/10.1016/j.jemermed.2018.09.009

Ultrasound in Emergency Medicine

Check for updates

LUNG ULTRASOUND FOR THE EMERGENCY DIAGNOSIS OF PNEUMONIA, ACUTE HEART FAILURE, AND EXACERBATIONS OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE/ASTHMA IN ADULTS: A SYSTEMATIC REVIEW AND META-ANALYSIS

Leonardo Jönck Staub, MD, PHD,* Roberta Rodolfo Mazzali Biscaro, MSC,† Erikson Kaszubowski, PHD,‡ and Rosemeri Maurici, MD, PHD§||

	Sensitivity	Specificity
PNA - Consolidation	0.82	0.94
Acute HF – mod diffuse interstitial syndrome	0.90	0.93
Exacerbation of COPD/Asthma	0.78	0.94

How it can help

QUICKER DIAGNOSIS AND PLAN OF CARE

BETTER ADJUSTMENT OF THERAPIES

ARRANGEMENT OF TIMELY FOLLOWUP

BETTER ALLOCATION OF RESOURCES

LESS RADIATION

How might we use this

Both in the clinic and hospital settings

For patient’s benefit and resident learning

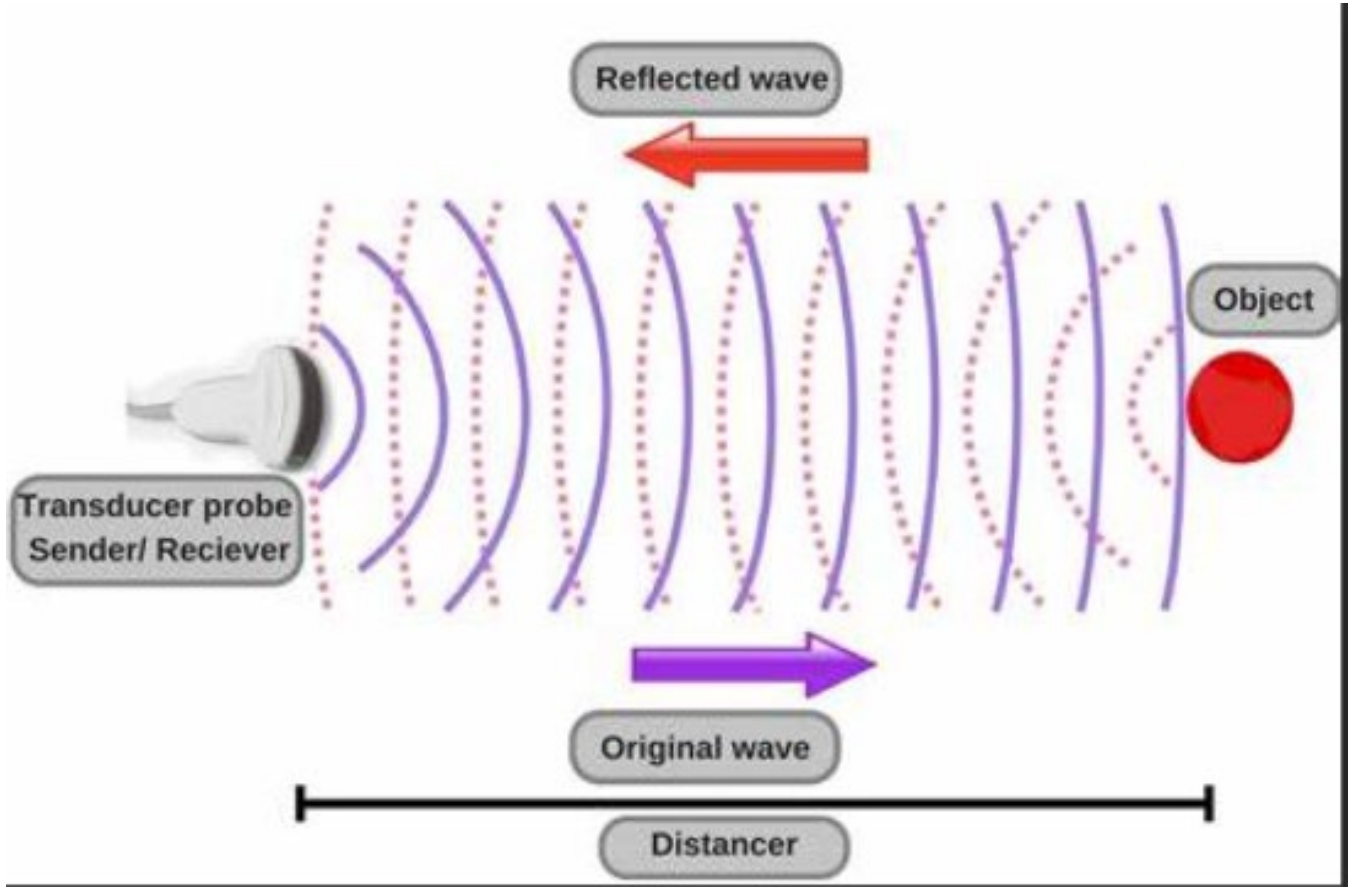
Ultrasound Review

Ultrasound Physics

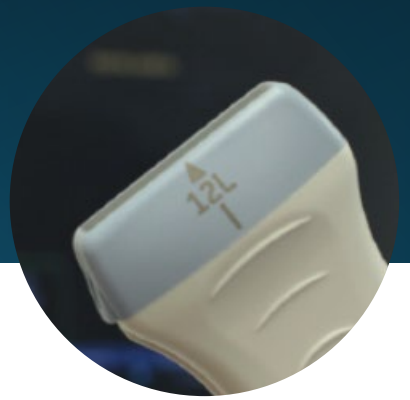
Sound wave

Beyond the hearing range of humans (20Hz to 20kHz)

Moves through the medium by producing alternating compression and decompression zones



Transducers



Linear (High)

- Provide high resolution images
- Best – MSK, soft tissue, peripheral vessels
- Limited depth of penetration (6cm)

Curvilinear (Low)

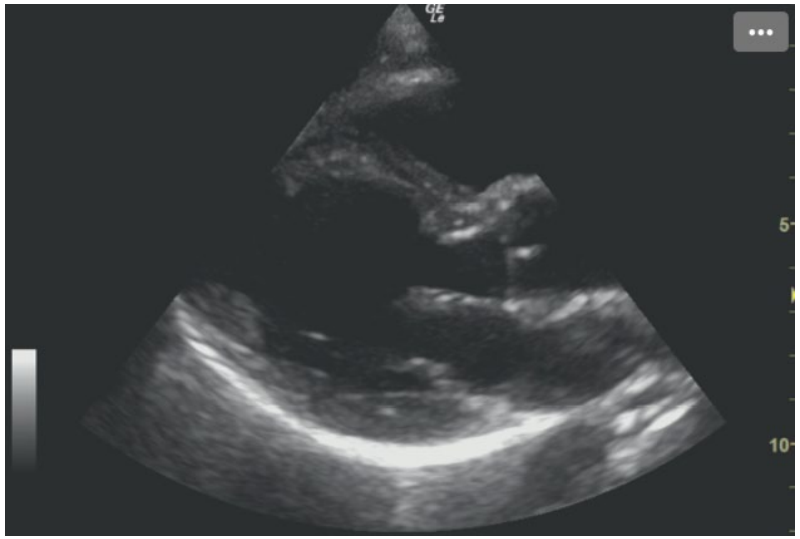
- Large convex footprint
- Wide field of view
- Lower quality images
- Best – Abd, Pelvis, OB
- More depth of penetration (30cm)

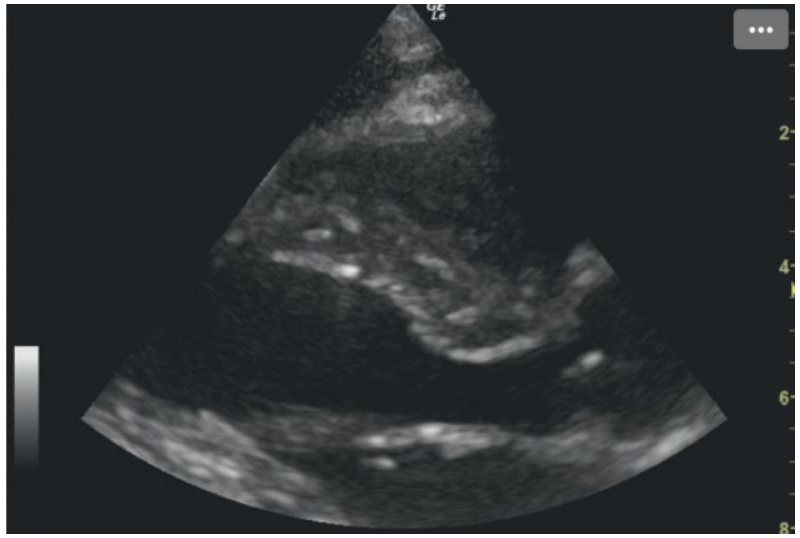
Phased Array (Low)

- Small footprint
- Wide field of view
- Best for moving structures – Echos
- Okay for Abd/Pelvis – but resolution is lower that curvilinear

Gain – brighter or darker image

Depth – adjust so can see what looking at



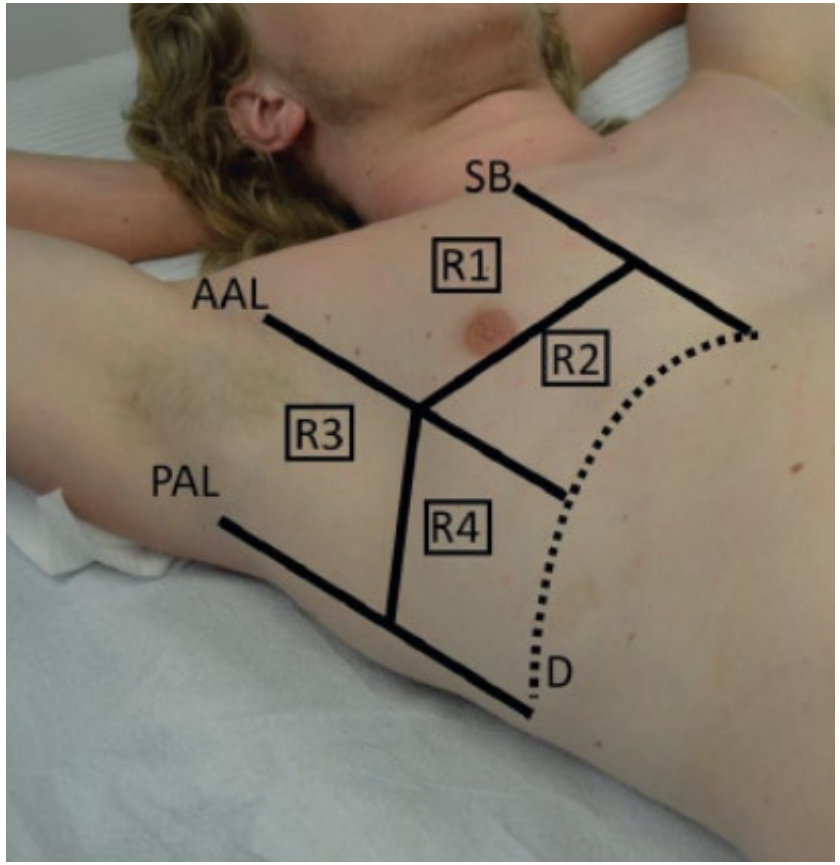


Reflection of Ultrasound Waves

Hyperechoic	• Highly reflective, Relatively brighter • White • Bone, calcifications, air, foreign body, calculi
Hypoechoic	• Less reflective, Relatively darker • Gray
Anechoic	• Doesn't produce echoes • Black • Fluid – ascites, pleural effusion
Isoechoic	• Any structure with same echogenic property as those around it

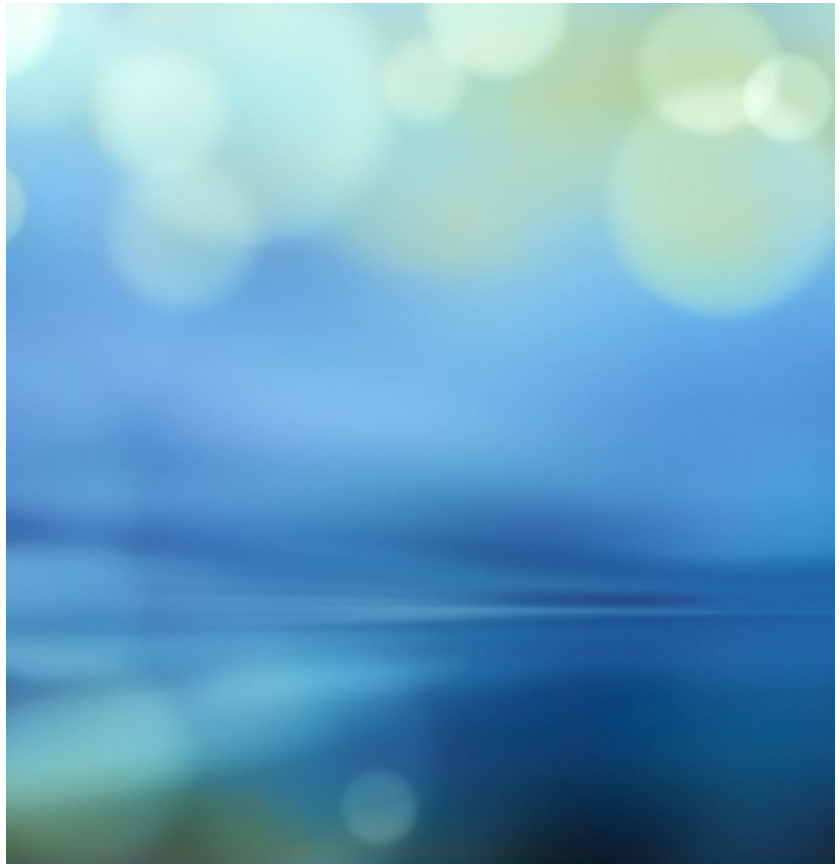
How to perform Lung POCUS

- Supine Patient (upright if needed)
- Low frequency probe (curvilinear or phased array)
- Depth 16-18cm
- Lung or Pleural Preset (Abdomen if needed)
- Start 2nd intercostal space – lateral to sternum
- 8 zones – 4 on R and 4 on L
- 10 minutes

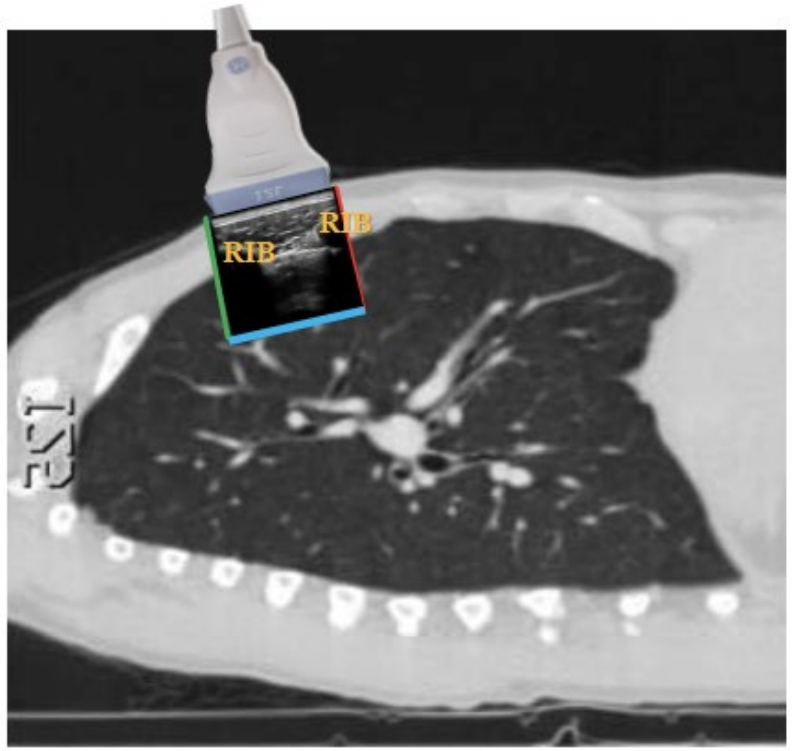


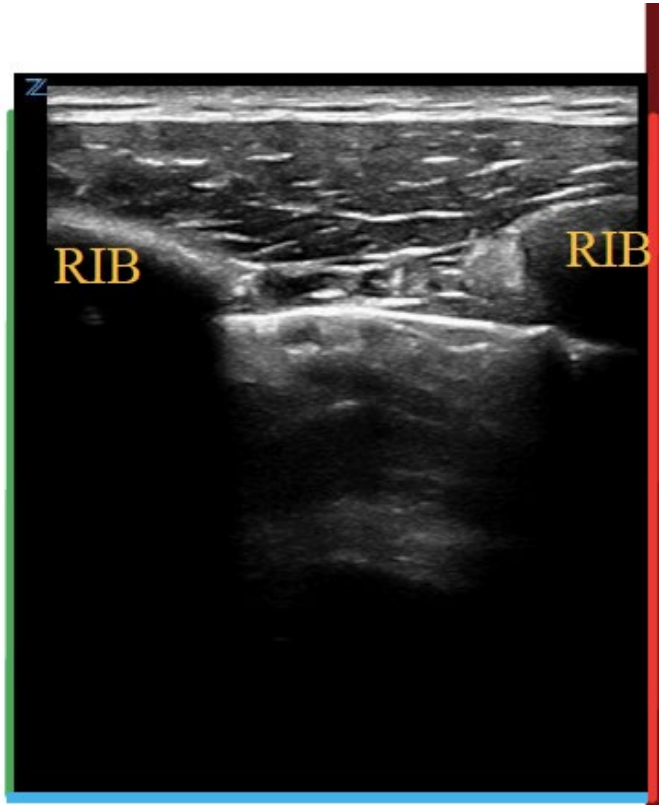
Limitations to Lung POCUS

- Skin Conditions
- Subcutaneous Emphysema
- Dressings
- Extreme Obesity
- Is user dependant



Probe Position on Chest





What are we looking for?

Pleural Line

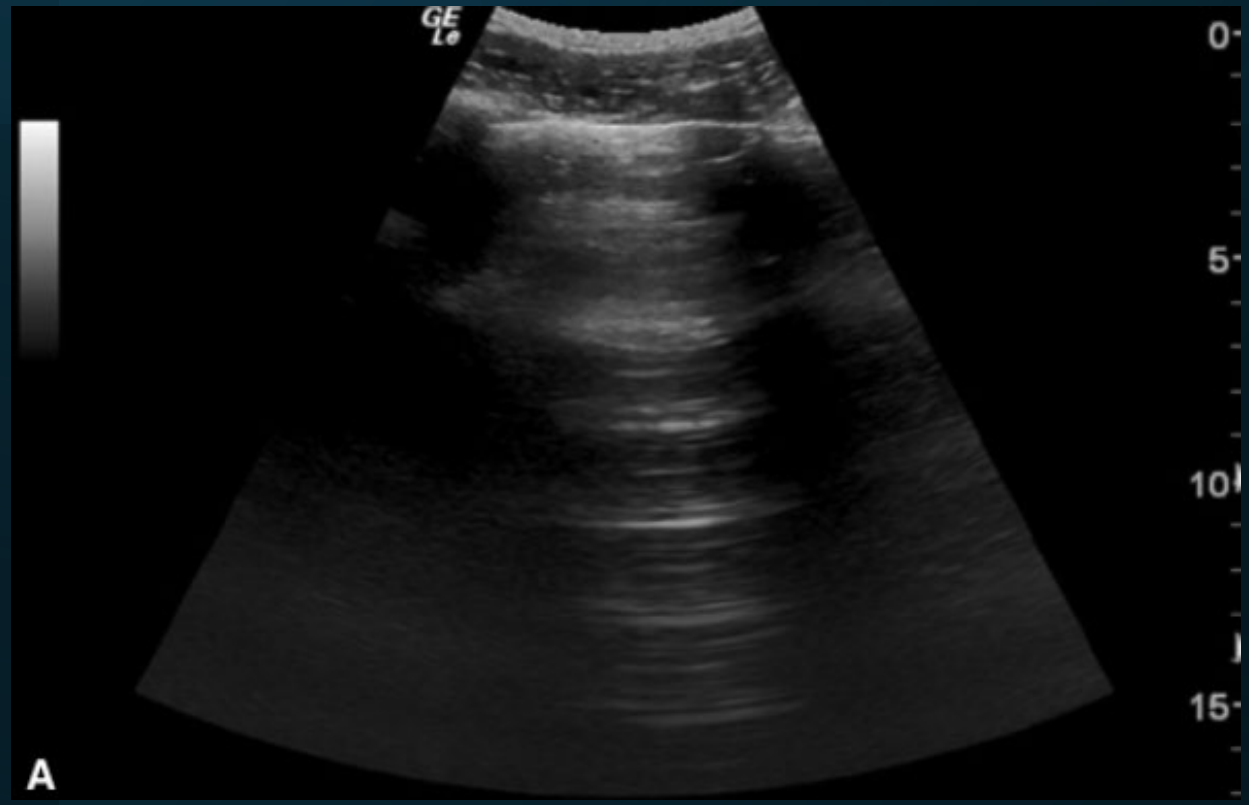
Ribs and Rib Shadows

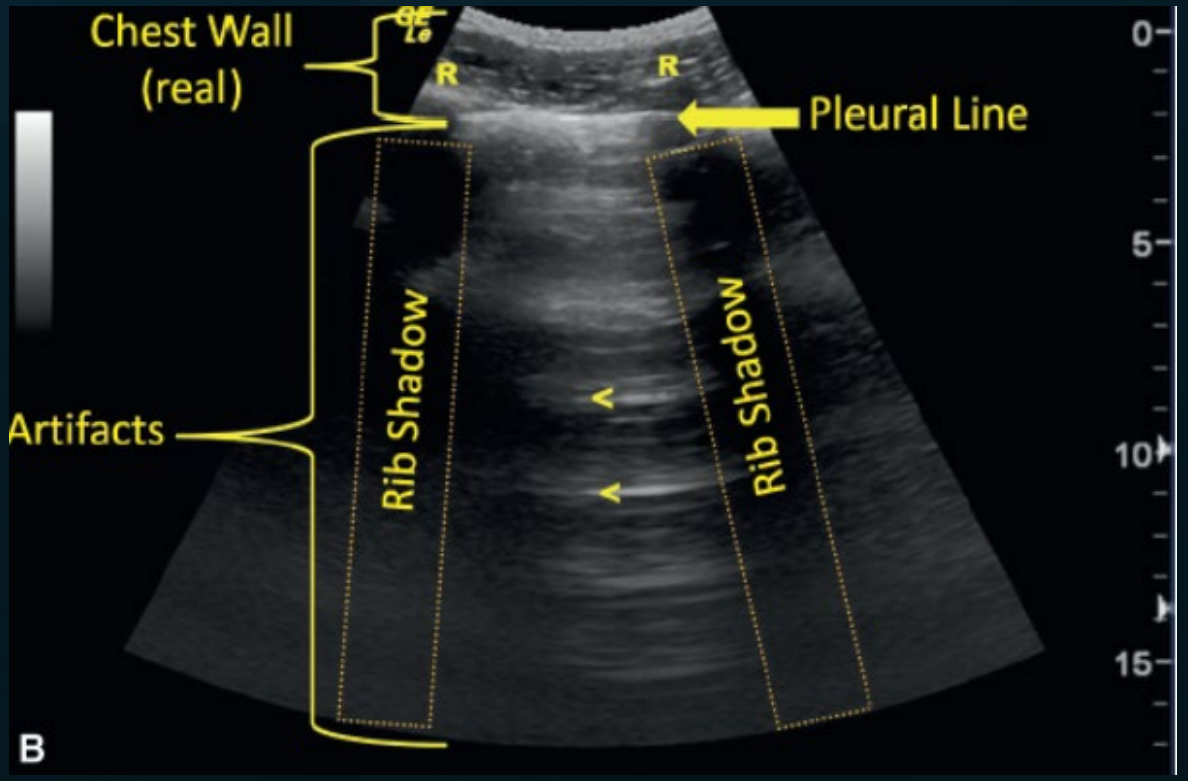
Lung Sliding

A lines

B lines

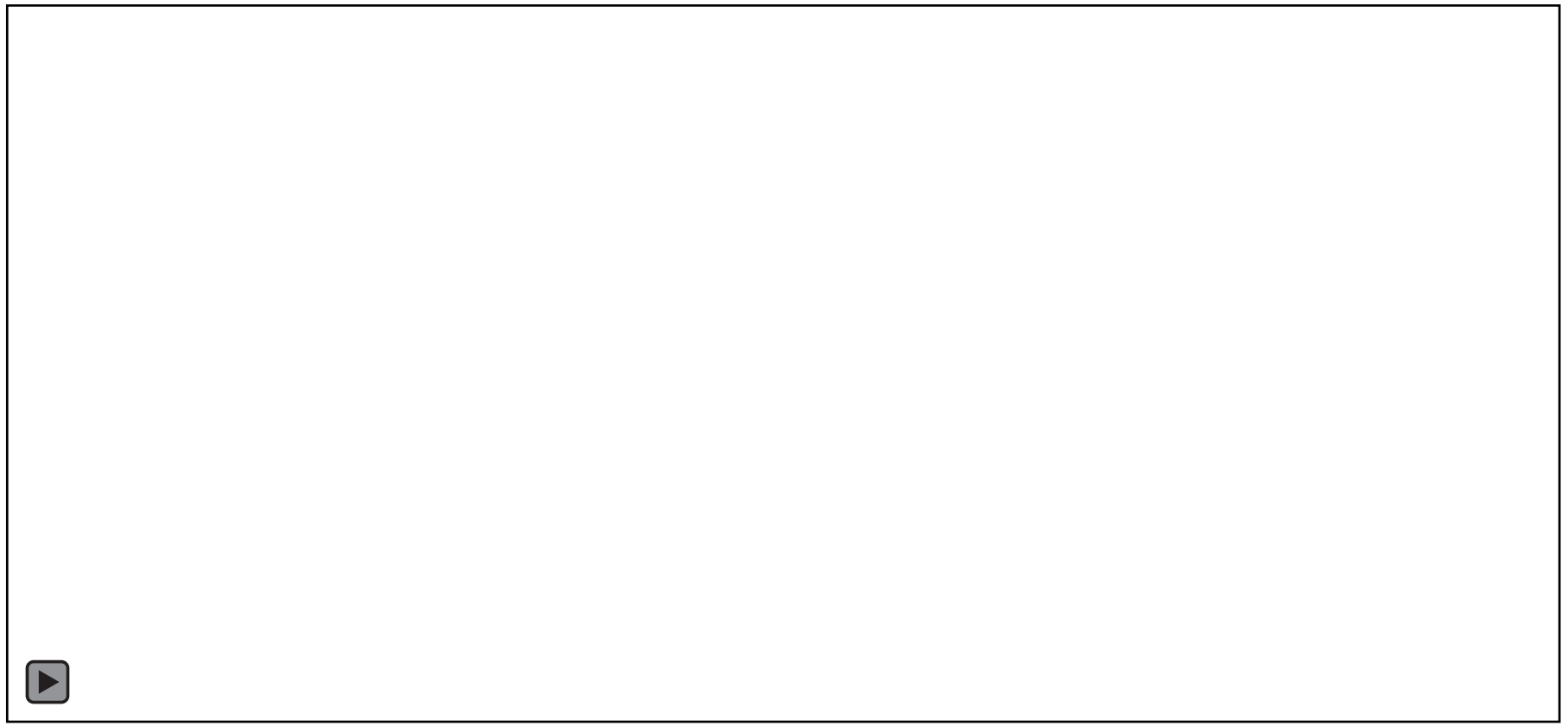
Home Image of Lungs





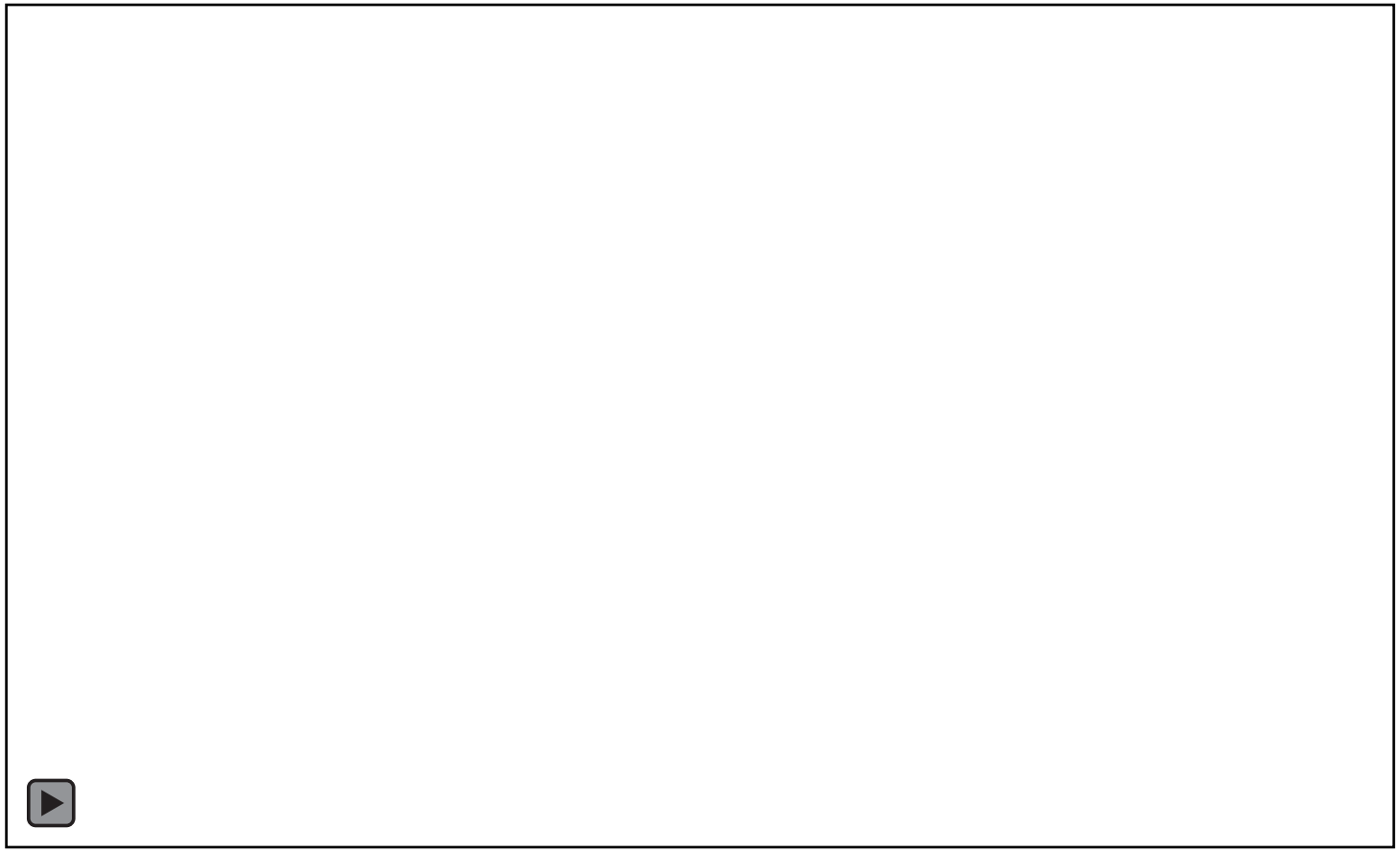
Lung Sliding

- Parietal pleura moving on top of visceral pleura



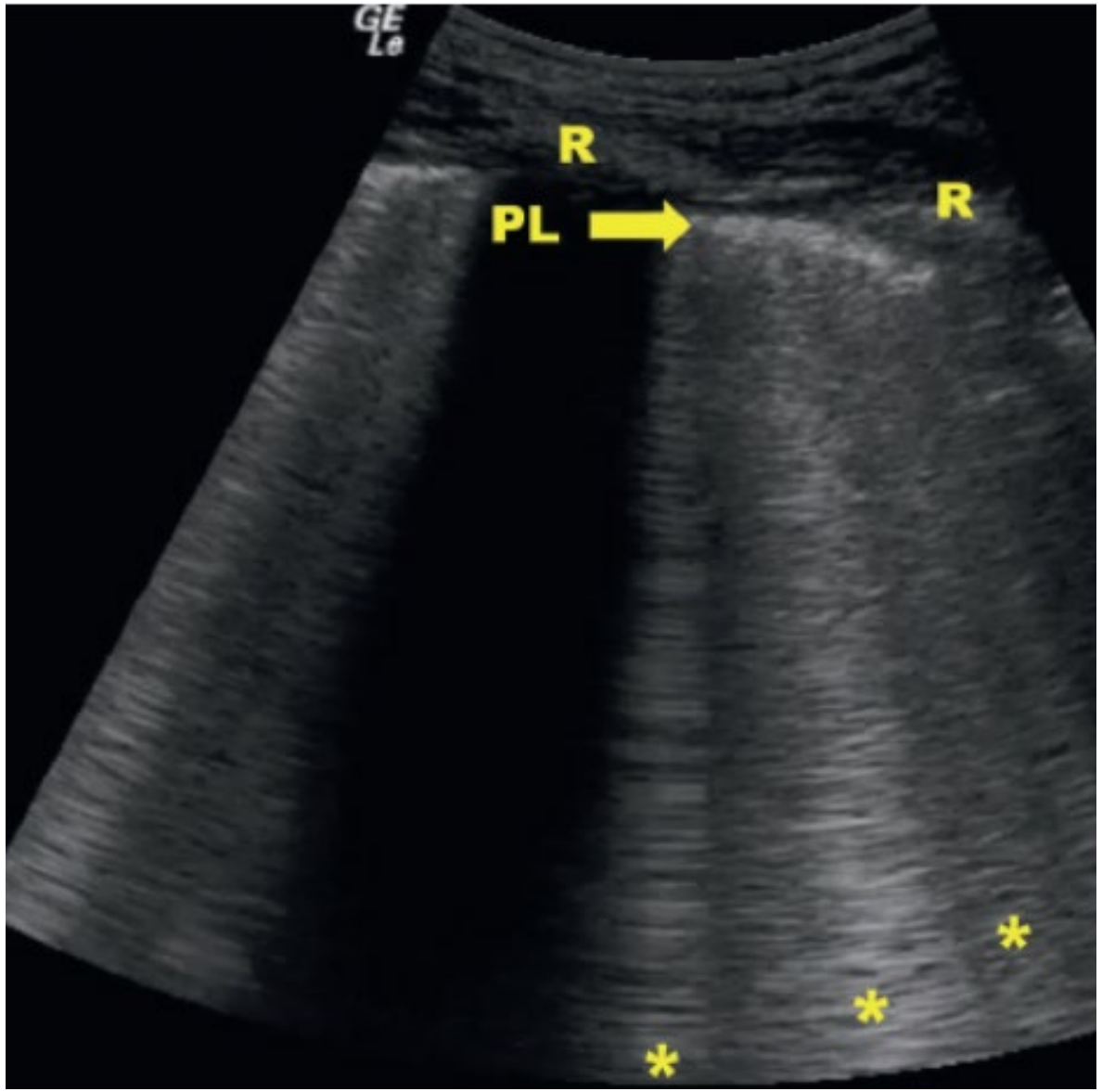
A lines

- Horizontal, Echogenic reverberation artifacts
- Appear equidistant fashion
- Parallel to Pleural Line
- May need to fan/angulate the probe to see better
- See with aerated lungs and in PTX



B lines - Abnormal

- Discrete laser like vertical hyperechoic artifacts
- Arise from Pleural Line
- Extend **to bottom of screen** without fading
- Move synchronously with lung sliding



B lines - Abnormal

1 or 2 can be normal

Fewer/Thinner B lines

- mild edema

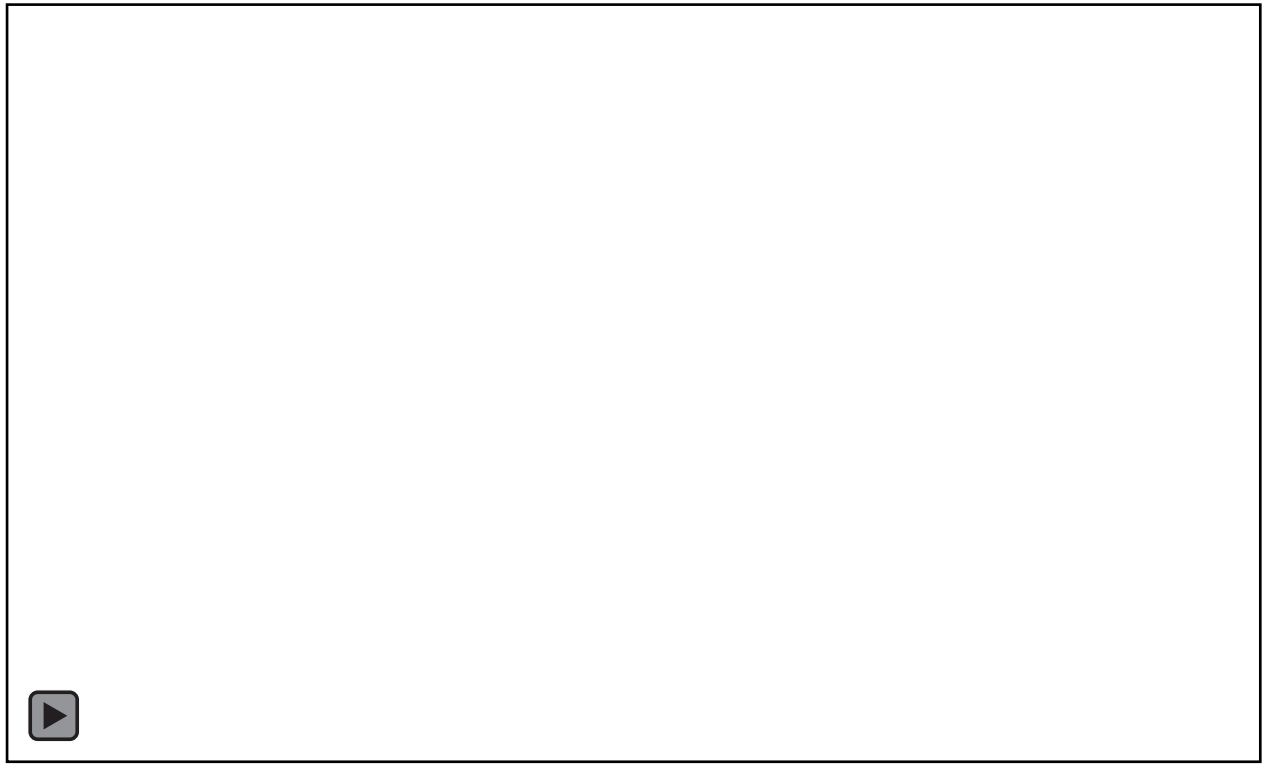
Thicker/more confluent B lines

- more severe disease

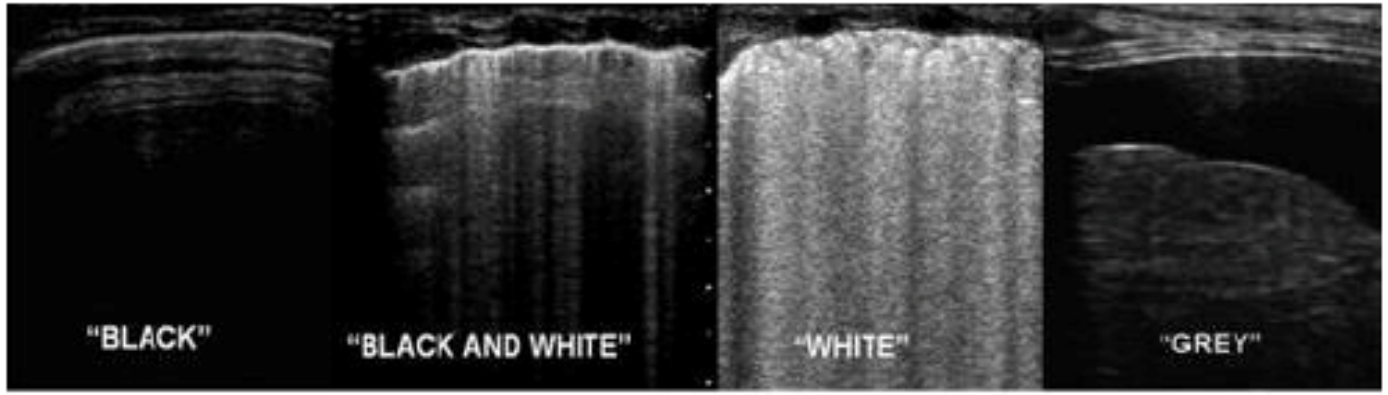
Positive zone

- 3 or more B lines in longitundinal plane
- >30% of rib space occupied by confluent B line
- White lung pattern

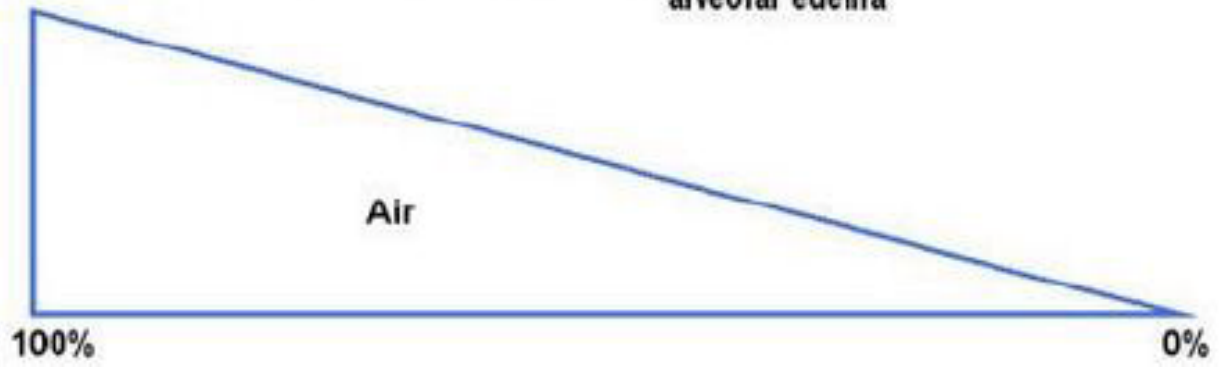
Doesn’t have to erase A lines



ULTRASOUND AS A *DENSIMETER* OF THE LUNG

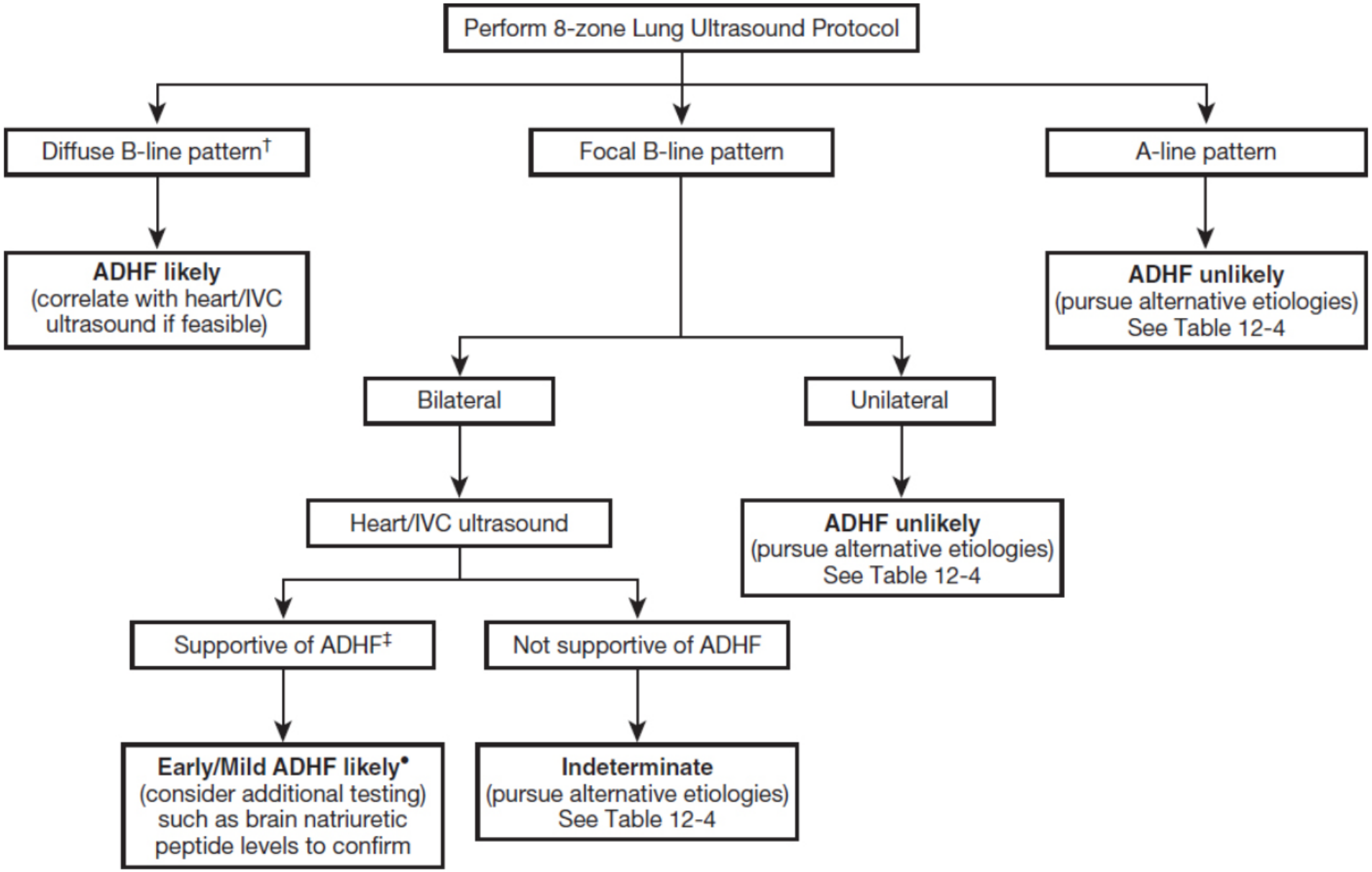


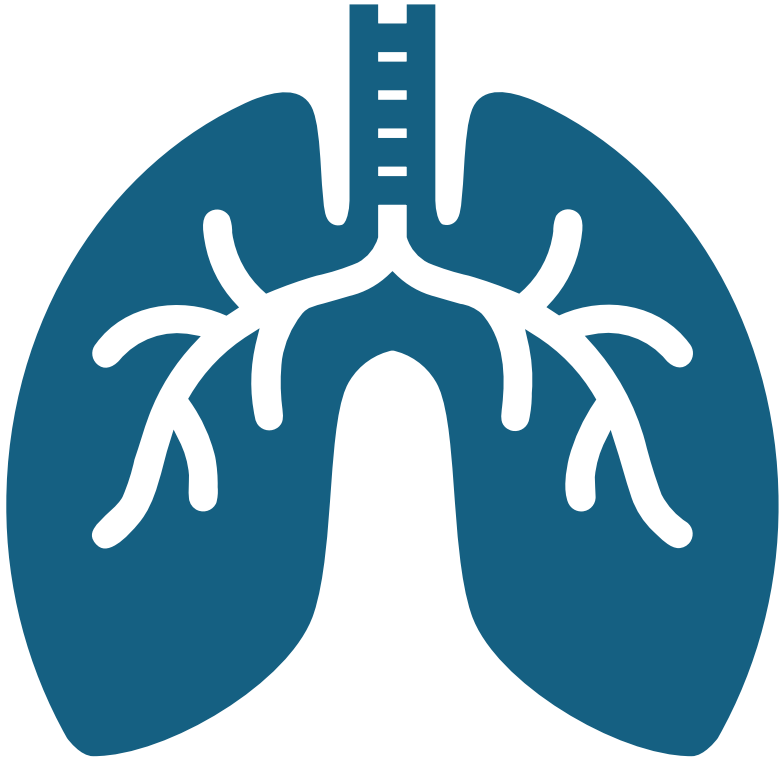
Normal | Mild/moderate interstitial edema | Severe interstitial edema/ alveolar edema | Consolidation



Gargani. 2011. *Cardiovascular Ultrasound*.

U of SC South Carolina


Perform 8-zone Lung Ultrasound Protocol
Diffuse B-line pattern†
Focal B-line pattern
A-line pattern
ADHF likely
(correlate with heart/IVC ultrasound if feasible)
ADHF unlikely
(pursue alternative etiologies)
See Table 12-4
Bilateral
Unilateral
Heart/IVC ultrasound
ADHF unlikely
(pursue alternative etiologies)
See Table 12-4
Supportive of ADHF‡
Not supportive of ADHF
Early/Mild ADHF likely•
(consider additional testing)
such as brain natriuretic
peptide levels to confirm
Indeterminate
(pursue alternative etiologies)
See Table 12-4



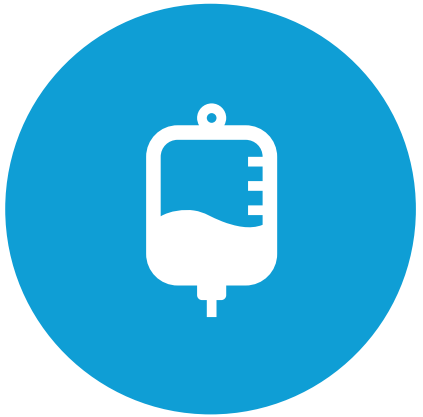
How we apply this

A line pattern	• Normal • Asthma/COPD
Diffuse B lines	• CHF exacerbation • Pulm Edema
Focal B line pattern	• PNA • CHF – if b/l and supportive findings • Atelectasis

Other things we can see

PLEURAL EFFUSIONS

CONSOLIDATION

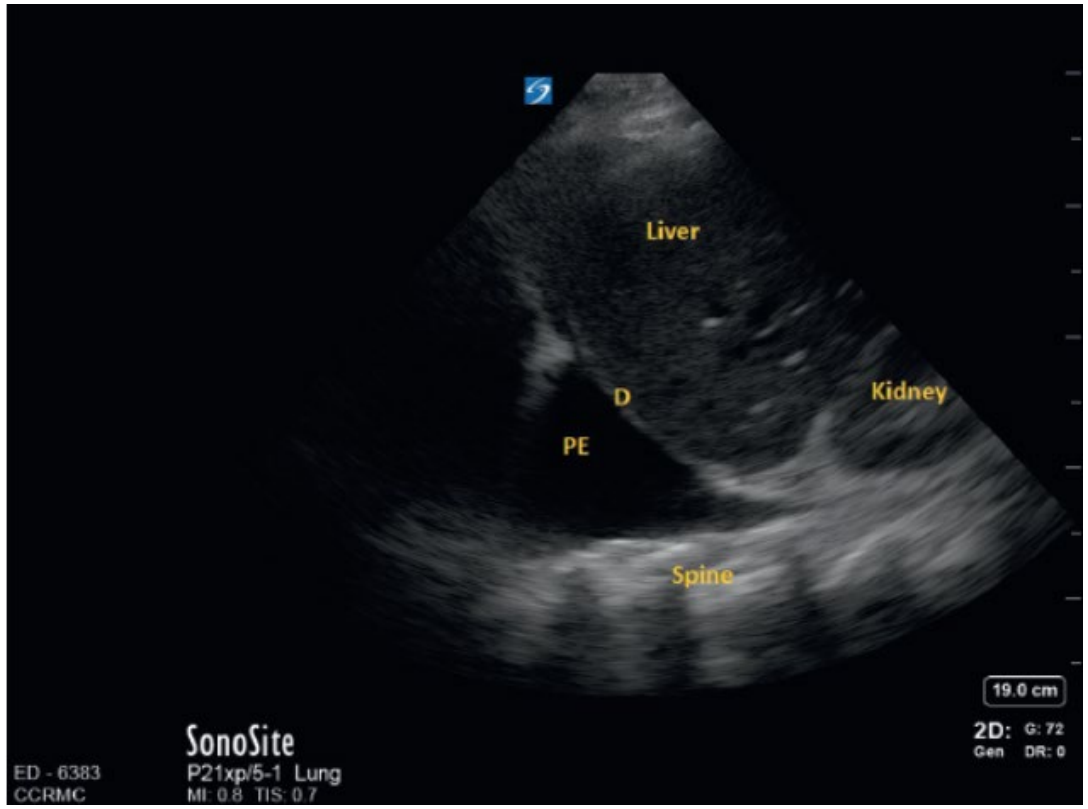


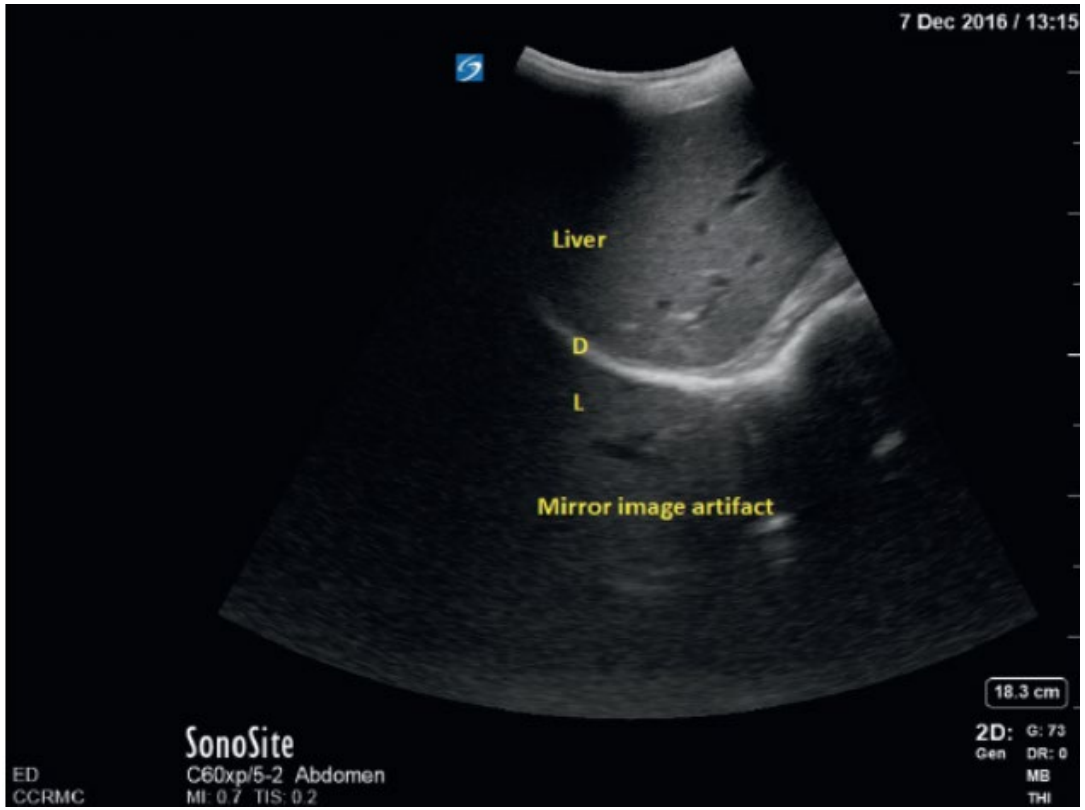
PNEUMOTHORAX

Pleural Effusions

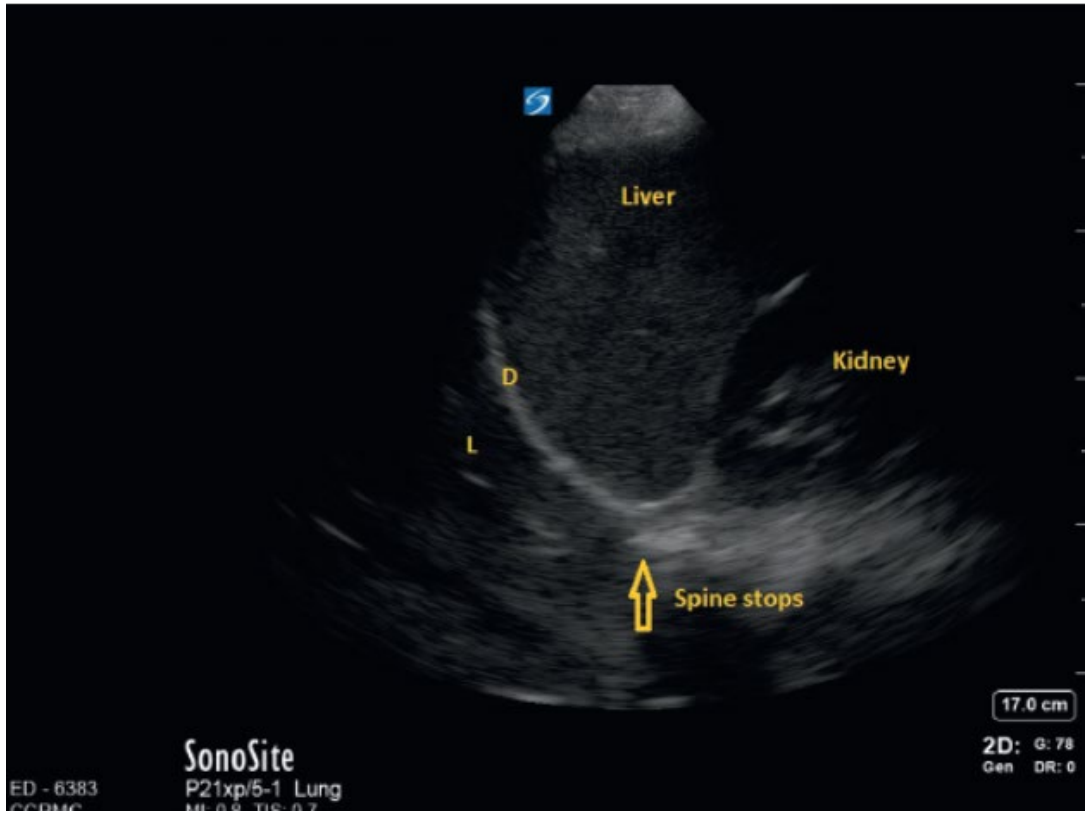
- Pt position – sitting or recumbent
- Probe – curvilinear or phased array – abd setting
- Probe Position – midaxillary line – position 4
- Anatomy Identification

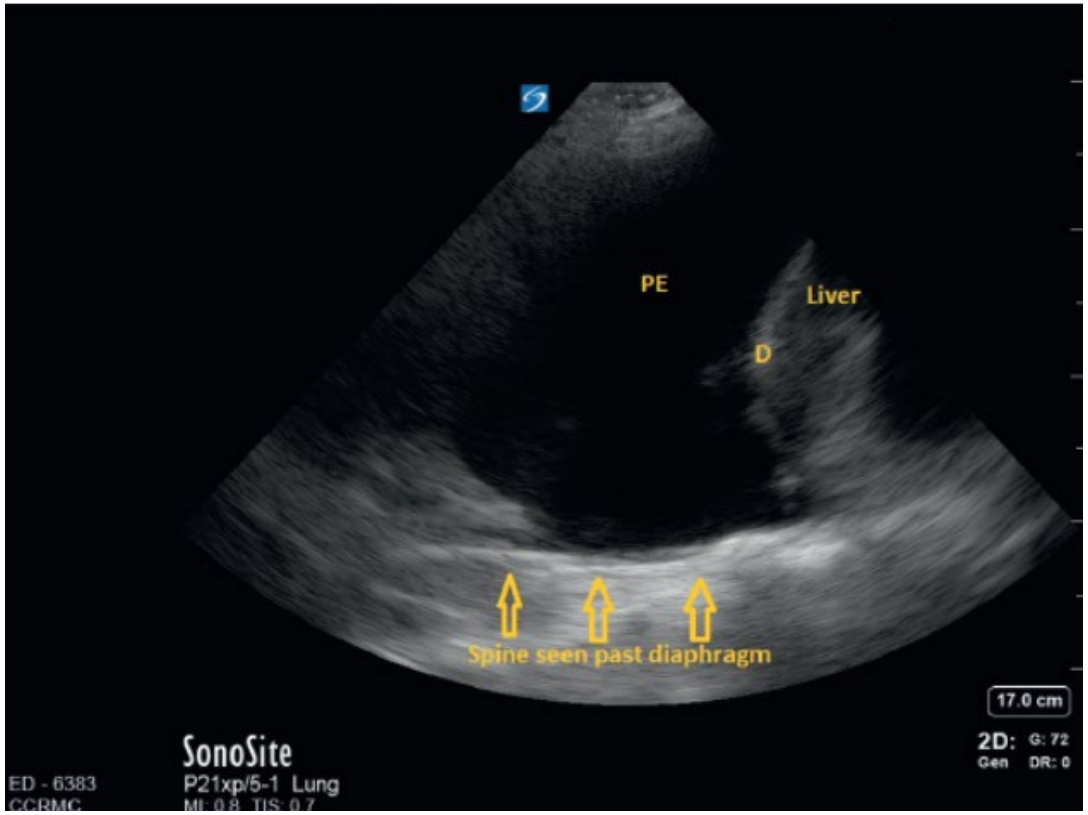
Normal Lung vs Pleural Effusion



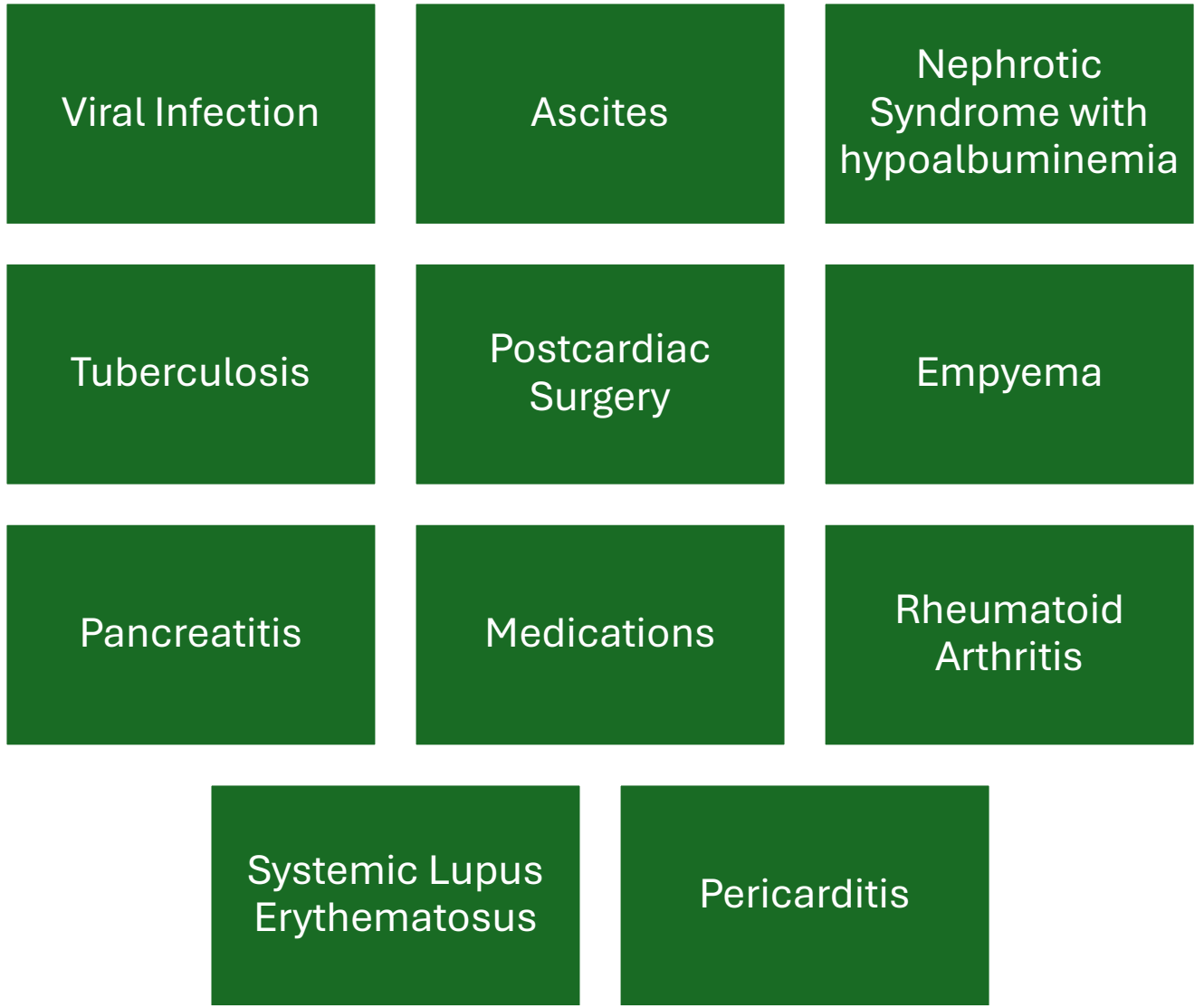


Normal Lung vs Pleural Effusions

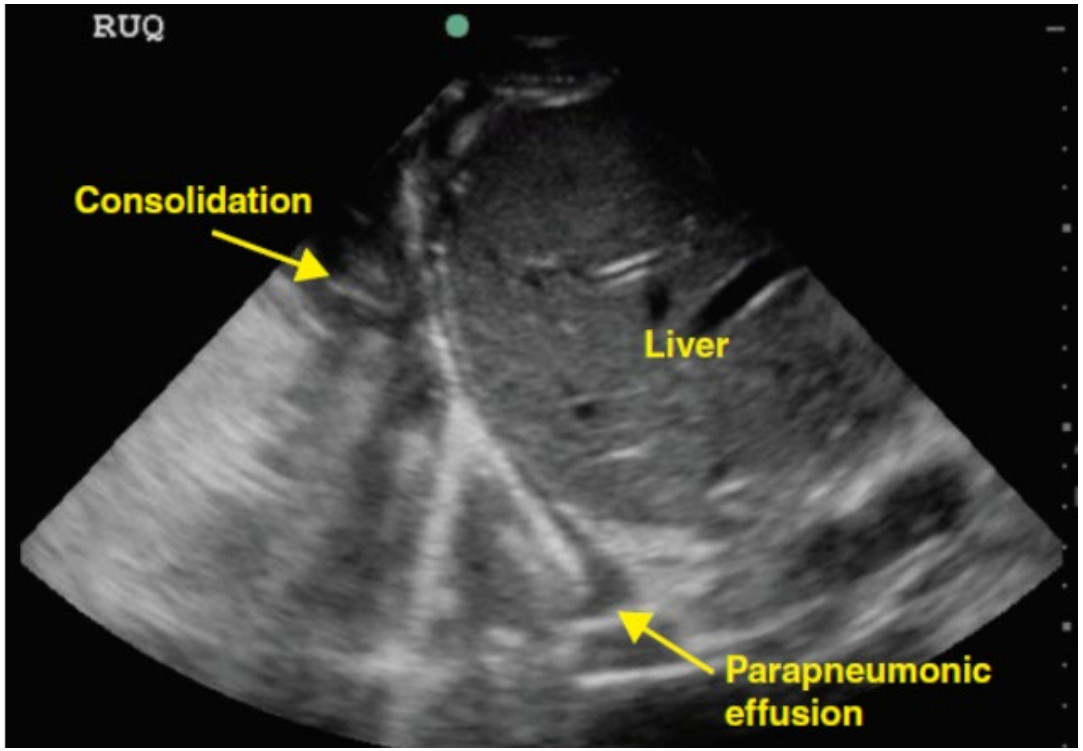


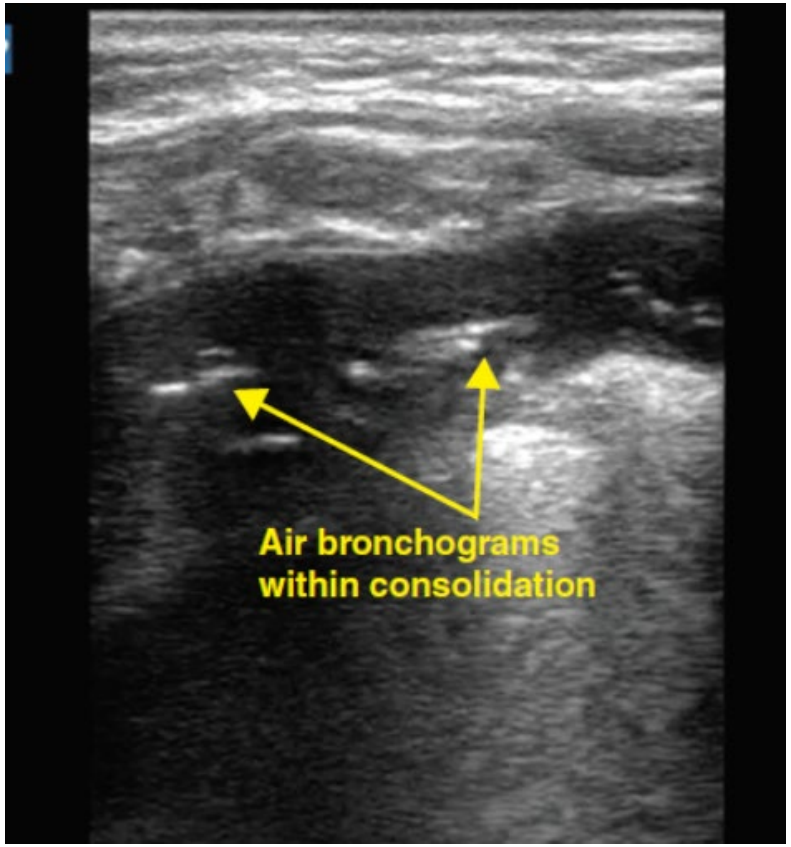


Pleural Effusion Etiologies



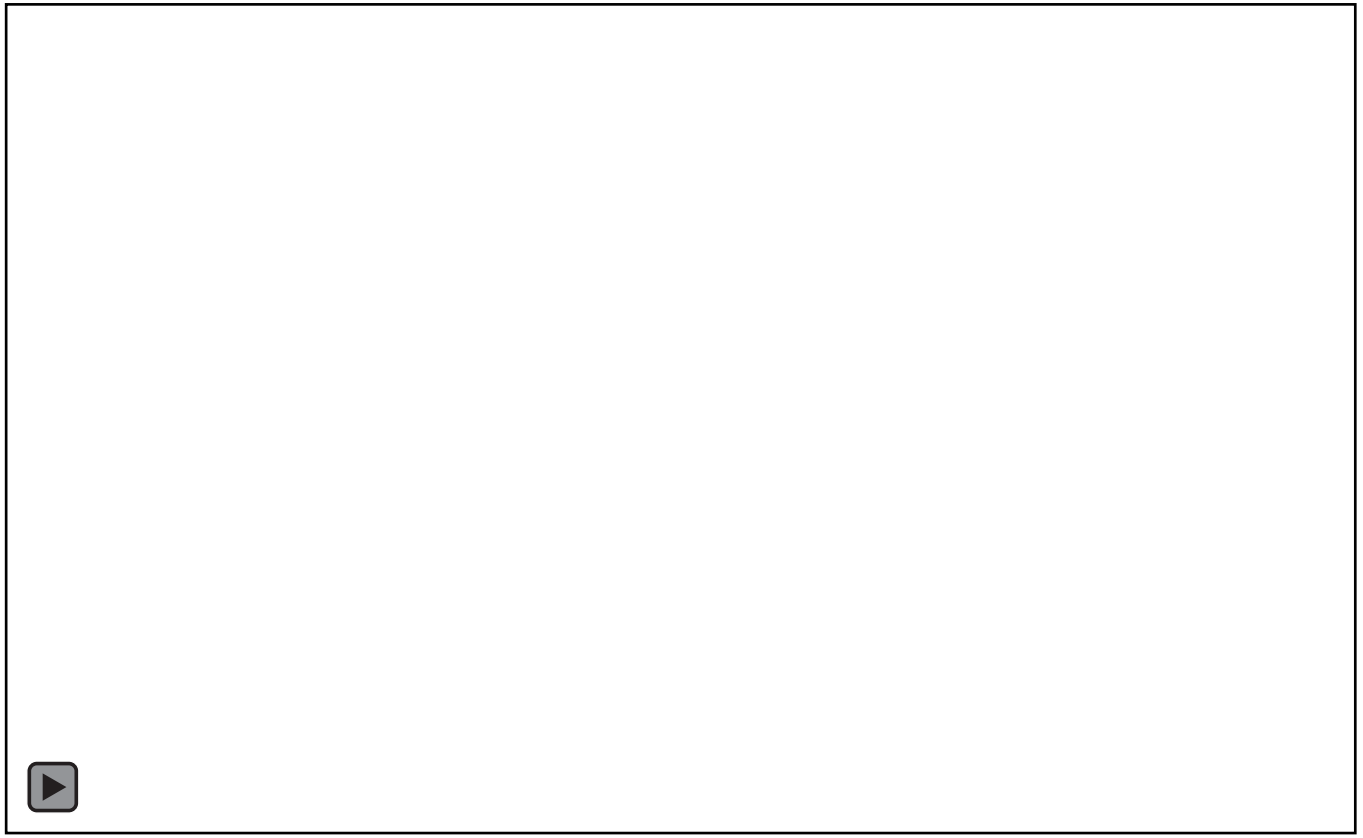
Pneumonia


RUQ
Consolidation
Liver
Parapneumonic
effusion


Air bronchograms
within consolidation

Pneumothorax

- Lack of Lung Sliding
- Still see A lines



Summary

5-10 minutes

In Clinic or Hospital

Distinguish between CHF vs not

Benefits

- Quicker diagnosis
- Focus management in a clinic setting without extra tests
- Follow progress in Hosp to know if tx working

References

- Lichtenstein, Daniel M.D.*; et al. *Comparative Diagnostic Performances of Auscultation, Chest Radiography, and Lung Ultrasonography in Acute Respiratory Distress Syndrome*. The Journal of the American Society of Anesthesiologists 100(1):p 9-15, January 1, 2004.
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Rapid Fire Rheumatology

Rheumatology for Primary Care

AHN

Adam Dore', DO, RhMSUS
Rheumatology Division Chief, AHN
Associate Professor, Drexel College of Medicine

Objectives:

- Review common rheumatologic topics encountered in primary care
- Understand early workup and diagnostic approaches to rheumatologic topics
- Review potential early treatment options

Disclosures:

- No relevant disclosures

What is Arthritis?

- Chat GPT says:
  - Arthritis is a general term for a condition that causes pain, swelling, stiffness, and limited motion in the joints. It can affect one joint or multiple joints. There are many different types of arthritis, with osteoarthritis and rheumatoid arthritis being the most common.

- Rheumatologist perspective:
  - **Inflammatory vs Noninflammatory**

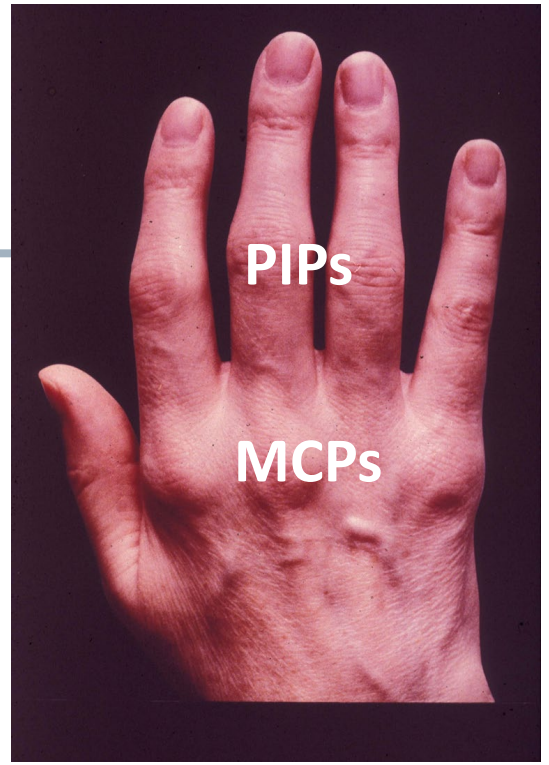
Inflammatory Arthritis: Pattern Recognition

- INFLAMMATORY:
  - On history: AM stiffness usually ≥60 min, improves with activity
  - On physical exam: swelling, effusion, warmth, and erythema of joint
  - If joint fluid available (look for WBC amount, gram stain, culture, and crystals): WBC ≥2k (and not hemarthrosis)
- NON-INFLAMMATORY:
  - On history: AM pain usually ≤ 30 min, worsens with use
  - On physical exam:
    - Crepitus +/- locking, clicking
    - Bony hypertrophy (longstanding OA) or effusion may be present, but the joint will not be warm and soft tissue swelling will be absent.
  - If joint fluid available: WBC <2K

Inflammatory Arthritis

- Rheumatoid Arthritis (RA)
- Crystalline: Gout, Calcium Pyrophostate Deposition (CPPD)
- Spondyloarthritis (SpA): Axial Spondyloartritis (ankylosing spondylitis), Psoriatic Arthritis, Reactive Arthritis
- Polymyalgia Rheumatica (PMR)
- Autoimmune Connective Tissue Disease (Lupus, Sjogren's, etc)
- Always rule out septic arthritis

Rheumatoid Arthritis (RA)



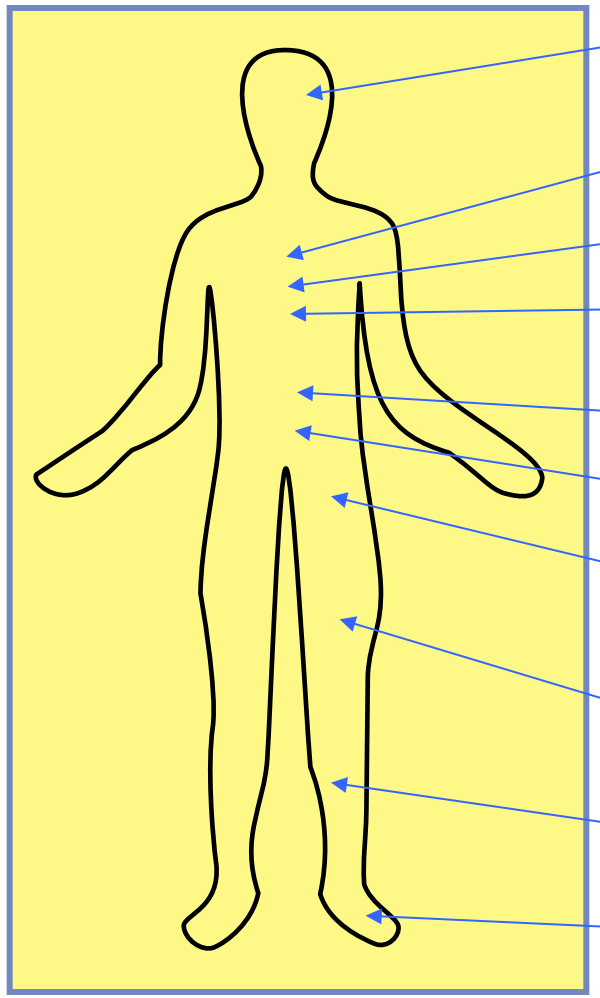
- Most common onset in middle-age
- **Bilateral symmetric polyarthritis involving small joints**
  - **MCPs**, PIPs, **MTPs, wrists**, ankles, knees > hips, shoulders
  - **Spares DIPs** and spine
- Stiffness lasting AT LEAST an hour in the AM, usually more

- Xrays - **marginal erosions** with lucent edges > central, and periarticular osteopenia

- Advanced RA – non-reducible ulnar deviation of MCPs, high riding ulnar styloid, will see ankylosis and bony fusion in the wrists, flexion contracture of elbows, cock up toe deformities

RA: A Systemic Disease

Seropositive (RF+) RA



- Eyes: scleritis, dry eyes (Sjögren syndrome)
- Pericardium: effusion
- Vascular system: vasculitis, atherosclerosis
- Lungs: fibrosis, nodules, pleural effusions
- Hematologic: anemia, thrombocytosis; Felty's syndrome
- Kidney and gut: amyloidosis
- Lymphatic system: lymphadenopathy, splenomegaly, anemia
- Muscles: myopathy
- Dermatologic: thinning, ulceration
- Nervous system: peripheral neuropathy

So, I suspect RA – now what?

- What to order? - **Labs**
  - Rheumatoid factor (RF)
    - Present in70-90% patients but NOT SPECIFIC to RA
    - Other possible etiologies of +RF: autoimmune conditions with RF include Sjogren's, MCTD, scleroderma, myositis, vasculitis. Also, chronic infections: Hepatitis C!
  - Cyclic Citrullinated peptide (CCP)
    - Very Specific for RA: up to 95% specific
    - Correlates with erosive disease and worsened outcomes in RA more than RF

- Likelihood of RA in patients with both RF and anti-CCP positive is nearly 100%, especially with high titers
- Around 20% patients are "seronegative"

I highly suspect RA – now what?

- **If both +RF and +CCP: Call your rheumatologist!**
  - Baseline bilateral hand and foot xrays
  - CBC, CMP, ESR, CRP, hepatitis B (sAg, cAb, sAb), Hepatitis C, and Quant Tb
    - Rule out and evaluate for comorbidities and can help expedite treatment initiation

- Consider low dose steroids and/or NSAIDs to control symptoms while awaiting appointment with rheumatology
  - *You don't need more than 10-15 mg of prednisone!*

- Methotrexate is gold standard initial management
  - Often starting dose is 15mg once weekly
- Can consider Hydroxychloroquine in more mild and early disease states given overall safety and tolerability of medication

Erosive (Inflammatory) OA:

- **DIP involvement**: Xrays with productive changes as well as **central** well-defined erosions, “gull wing” appearance; anklyosis may occur

Gout

- Urate crystal deposition
  - Monosodium urate crystals: *intracellular* urate crystals in inflammatory joint fluid is diagnostic gold standard
  - Tophus – usually periarticular but may be anywhere (1st MTP joint, olecranon bursa, etc)

- Most commonly affects 1st MTP joints (podagra) initially
  - Can effect elbow, knee, IP joints of the hands, etc
  - Rarely even seen in the spine & SI joints
- Most common in men
  - Can occur in women post-menopause especially with other risk factors (most common CKD)

So, I think they have Gout…

- Labs: Uric acid level
  - Although "normal" on lab reference range, **anything above 6 is considered elevated**
    - Do not treat incidentally found elevated uric acid levels (except in advanced CKD and significantly elevated uric acid level)
  - Uric acid level will be falsely lowered during a flare: Ideally wait until flare has subsided to obtain baseline uric acid level
- Xrays
  - Gout erosions – punched out erosions w sclerotic border and overhanging ed
    bite" appearance)
  - Could consider to rule out CPPD

Gout Management

- Acute Flare Treatment Options
  - NSAIDs (ibuprofen 800mg BID or TID, indomethacin 50mg or 75mg BID, naproxen 500mg BID, etc)
  - Colchicine 0.6mg BID; can consider one time dose of 1.2mg then 0.6mg BID
    - Must be started with 24-48 hours of flare onset to be efficacious
  - Steroids
    - Consider Methylprednisolone (Medrol Dose Pack) with non-complicated flare
    - May need a higher dose of steroid (30-40 mg prednisone) in more chronic, sigificant and recurrent gout flares
      - May only need for 3-5 days though if more chronic, may require a taper

Gout Management

- **More than 2 flares a year? Time for urate lowering therapy (ULT)**
  - Always start a prophylactic agent when initiating and titrating ULT
    - NSAID, colchicine, steroids: remain on this agent until uric acid is at goal and pt without flares for up to 6 months
  - Urate lowering options:
    - Allopurinol is gold standard
    - Febuxostat (Uloric)
  - Uric acid goal: 6 or below
    - Favor lower than 5 in tophaceous gout
    - Monitor uric acid at least every 4-6 weeks and adjust medications accordingly during this initial process
  - Do NOT stop urate lowering therapy during a flare or hospitalization (unless there is an absolute contraindication)

Gout Management in CKD

Allopurinol: Suggested Initial Doses in Kidney Impairment[a]

eGFR mL/minute/1.73 m^2	Suggested initial dose
>30 to 60	50 mg daily
>15 to 30	50 mg every other day
5 to 15	50 mg twice **weekly**
<5	50 mg once **weekly**

[a]ACR (FitzGerald 2020a); Perez-Ruiz 2022; Stamp 2012; Vargas-Santos 2017.

In CKD, increase allopurinol in increments of 50mg based on uric acid until the goal is reached

Gout Management in CKD

Colchicine Dosage Adjustments in Altered Kidney Function[a]

CrCl (mL/minute)[b]	Atherosclerotic cardiovascular disease, risk reduction (Lodoco)	Gout flare, treatment[c,d]	Gout flare, prophylaxis[d]	Familial Mediterranean fever
30 to 80	There are no specific dose adjustments provided in the manufacturer's labeling; however, total clearance of colchicine is significantly reduced with kidney impairment; monitor closely for adverse effects.	No dosage adjustment necessary.	No dosage adjustment necessary. Alternatively, some experts limit the dose to 0.6 mg daily in patients with CrCl 30 to 60 mL/minute (Perez-Ruiz 2023).	No specific dosage adjustments are recommended; however, use of a reduced dose should be considered.
<30[d]	***CrCl 15 to <30 mL/minute*** *:* Avoid use (AHA/ACC [Virani 2023]). There are no specific dose adjustments provided in the manufacturer's labeling; however, total clearance of colchicine is significantly reduced with kidney impairment. ***CrCl <15 mL/minute:*** Contraindicated.	Consider alternate therapy (preferred). If alternate therapy is not available/tolerated, the following adjustment is recommended: 1.2 mg at the first sign of flare, followed in 1 hour with a single dose of 0.6 mg; repeat treatment should not occur for at least 14 days. Alternatively, some experts recommend a single dose of 0.3 mg at the first sign of a flare; if flare symptoms persist after 3 days, may consider subsequent doses of no more than 0.3 mg every 3 days until flare resolves (Gaffo 2024).	Consider alternate therapy (preferred). If alternate therapy is not available/tolerated, the following adjustment is recommended: 0.3 mg once daily (or 0.6 mg every other day); titrate only if necessary and with extreme caution. Maximum: 0.6 mg/day (expert opinion).	Initial: 0.3 mg once daily; titrate in 0.3 mg increments (refer to adult dosing for titration frequency). Risk of toxicity is high; monitor closely (Ozen 2016). Maximum: 1.5 mg/day (expert opinion).

[a] Recommendations from manufacturer's labeling and expert opinion unless otherwise specified.

[b] Calculated using the Cockcroft-Gault formula.

[c] Use of colchicine to treat gout flares is not recommended in patients with kidney impairment (CrCl <80 mL/minute) receiving prophylactic colchicine.

[d] Many experts recommend avoiding colchicine for the treatment and prophylaxis of gout flares in severe kidney impairment (Bardin 2017; El-Zawawy 2010; EULAR [Richette 2017];

CPPD: Calcium pyrophosphate deposition

- Crystalline arthropathy that can mimic gout: Pseudogout
- Need aspiration to confirm diagnosis (with inflammatory synovial fluid)
  - "chondrocalcinosis" on xray and CPP crystals in fluid can be incidental

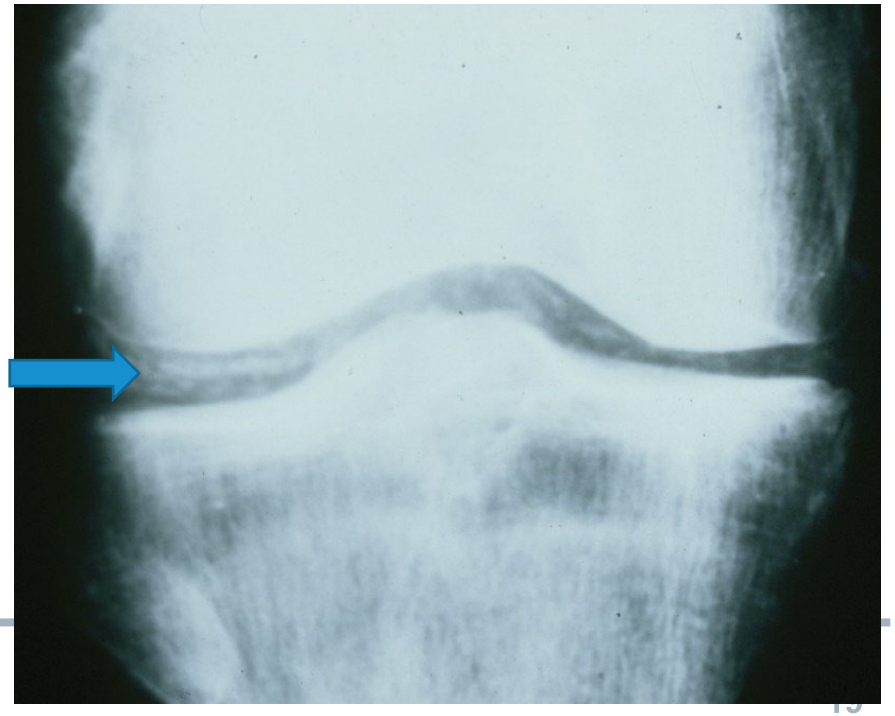
- Often involves wrists, knees but can also affect hands including hands at MCPs, ankles
  - Symmetric and chronic (pseudo-RA pattern with MCP and hook like osteophytes at the MCPs) or asymmetric and acute

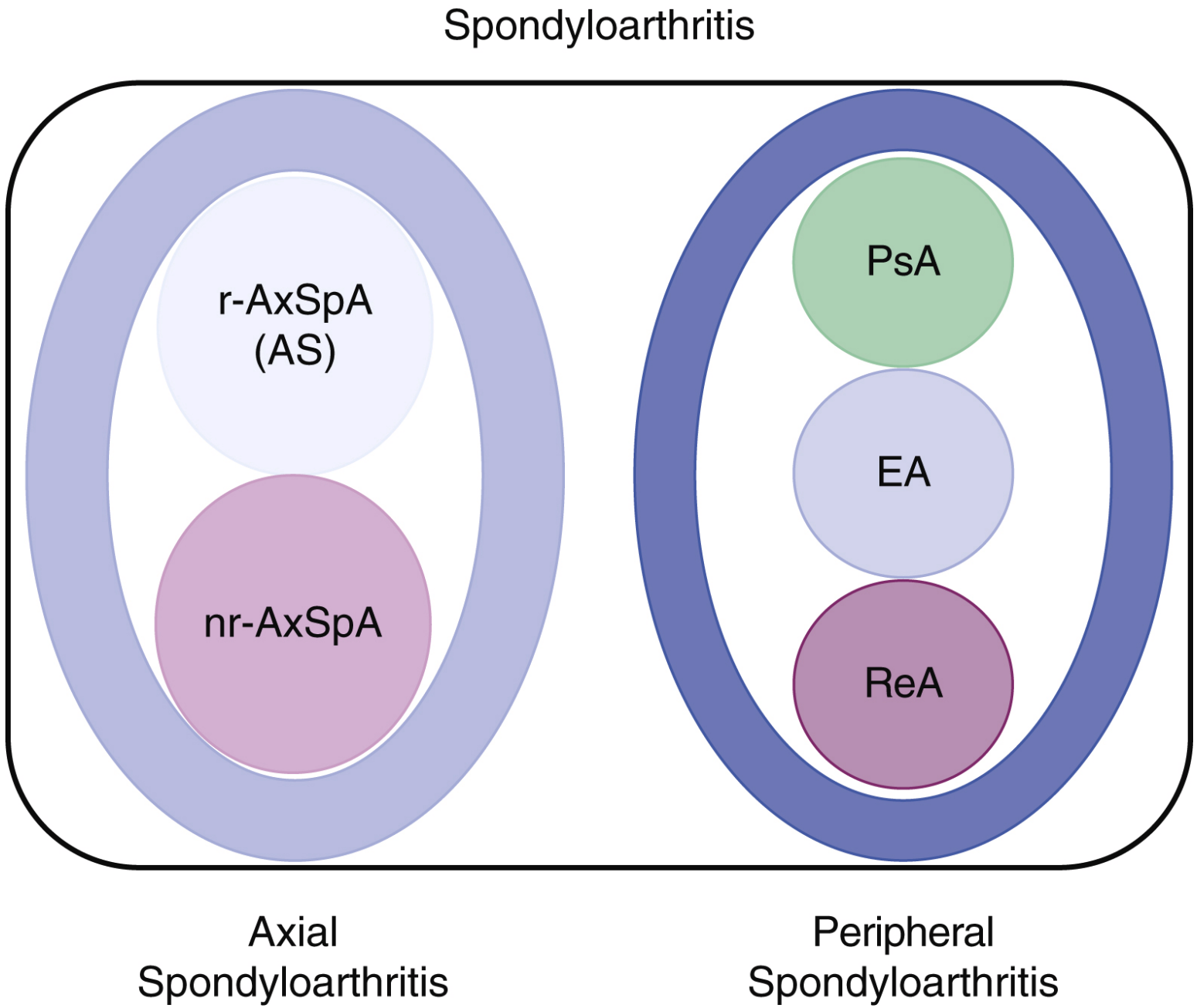
- Can be idiopathic (related to OA) but also secondary to underlying condition
  - Think about 2ndary causes in those younger than 60 y/o: **hemochromatosis**, **hyperparathyroidism**, hypomagnesemia, hypophosphatasia (low alk phos), Wilson's

CPPD/Pseudogout

- Treatment includes:
  - Acute flares (Just like gout!): NSAIDs, colchicine, steroids, IA aspiration/injection
  - Managing underlying condition if appropriate, though most are idiopathic
  - Idiopathic: symptomatic management, but can continue daily prophylaxis if appropriate for patient

Triangular fibrocartilage





r-AxSpA: Radiographic axial spondyloarthritis (Ankylosing Spondylitis)

Nr-AxSpA: Non-radiographic axial spondyloarthritis

PsA: Psoriatic Arthritis

EA: Enteropathic Arthritis

ReA: Reactive Arthritis

Spondyloarthritis

Clinical Manifestations

Axial Involvement

Inflammatory back pain

Predilection for the **sacroiliac joint**

Bone formation: ankylosing

Peripheral Joints

Mono/oligo-articular large joints

Polyarticular small joints

Enthesitis: tendon/bone junction

Dactylitis: sausage digit

Extra-Articular

Inflammatory eye disease: uveitis, scleritis

Psoriasis

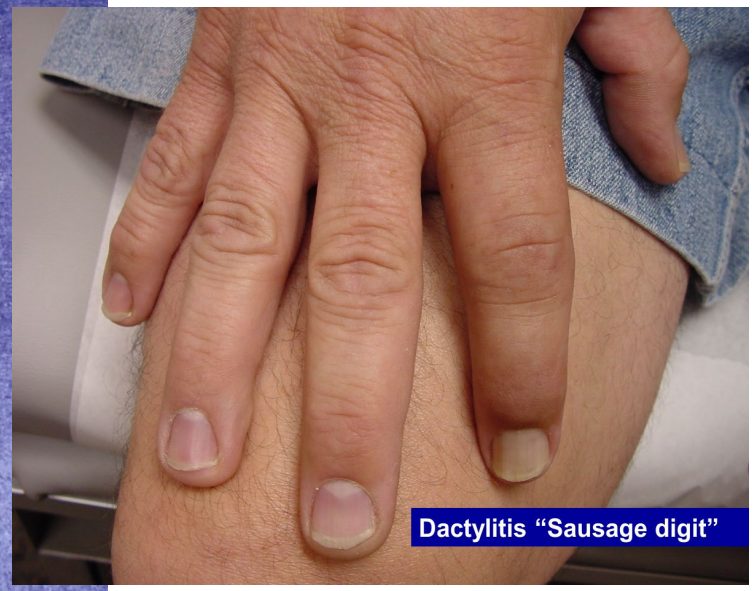
Inflammatory bowel disease

Spondyloarthritis

Clinical Manifestations

Dactylitis: sausage digit

Enthesitis: tendon/bone junction



Axial Spondyloarthritis (Ankylosing Spondylitis)

- **Onset <40 years old**

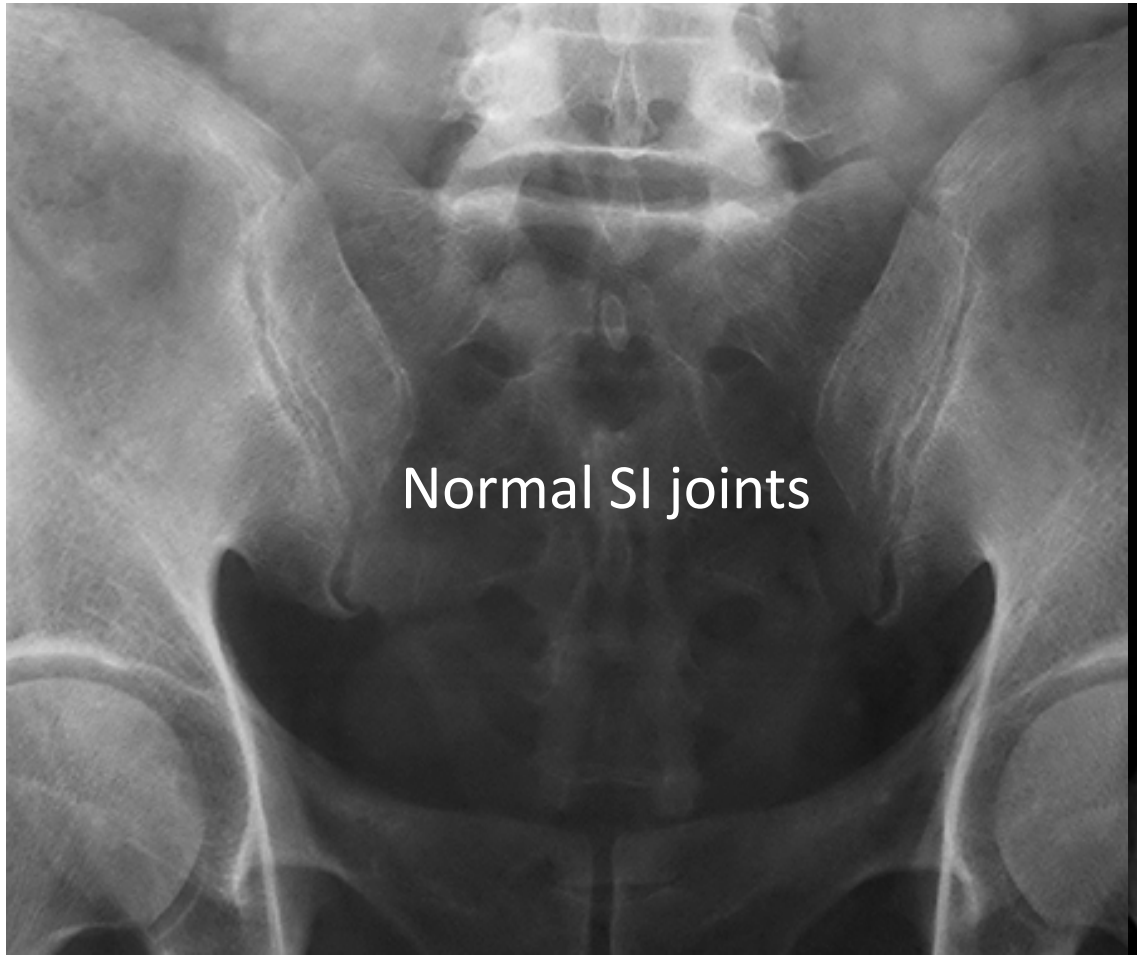
- Inflammatory back features – prolonged morning stiffness (>2 hours), nighttime awakening (requires getting up and moving), better with activity, NSAID responsive

- Axial spine: **Sacroiliac joints** and progresses proximally
- Can have peripheral and extra-articular involvement
  - Enthesitis, inflammatory eye disease (uveitis), psoriasis, association w IBD

- Labs: Seronegative; classically have elevated CRP with nml ESR
- HLAB27 association, but is NOT diagnostic

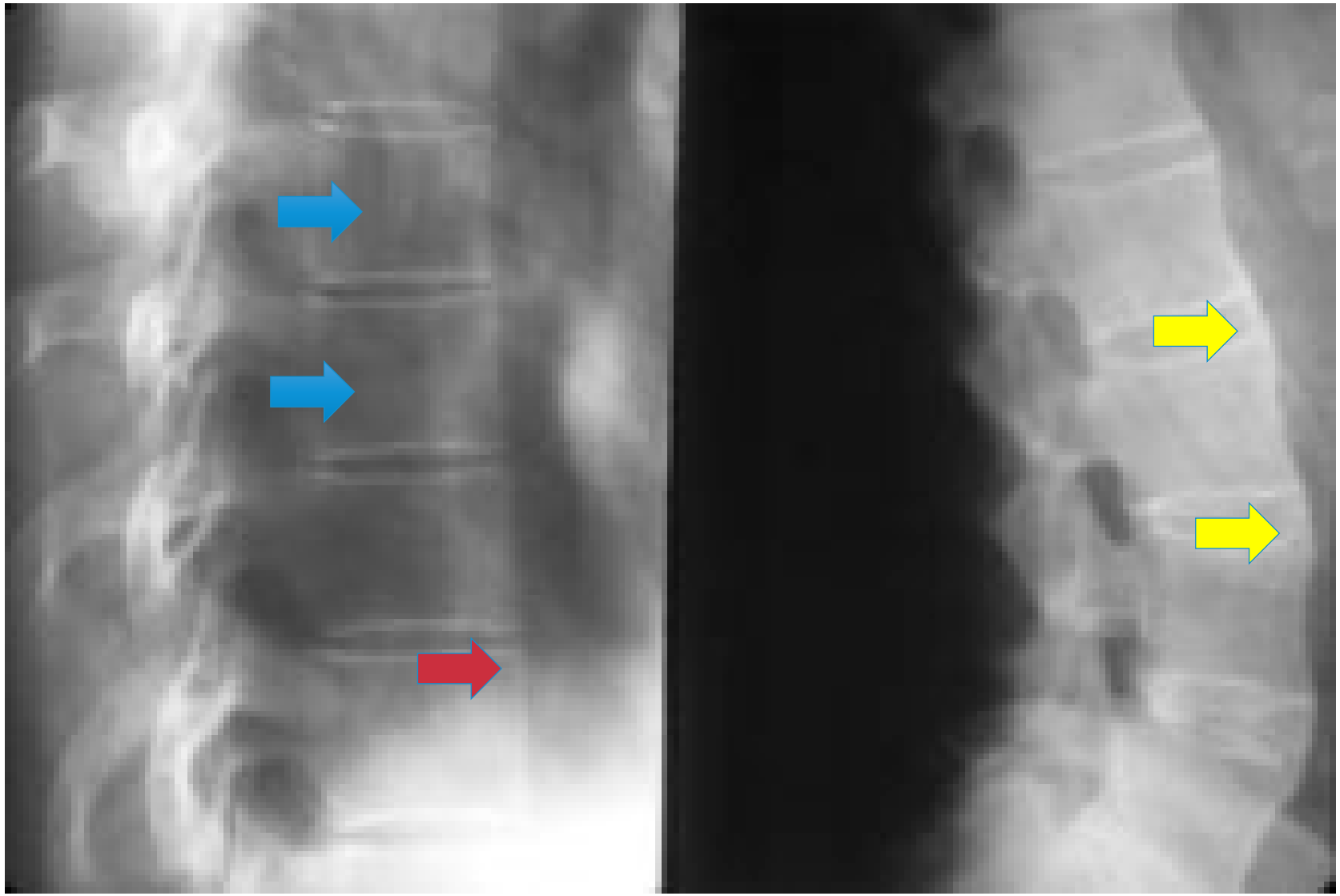
Radiographs: SI joints

- SI joint xrays = sclerosis, ankylosis, erosions
  - If high suspicion = MRI to detect early ds, sacroiliitis



Radiographs: Lumbar Spine

- Squaring of vertebral bodies
- Shiny corners
- Syndesmophytes



Psoriatic Arthritis

- About 30% of patients with psoriasis will develop psoriatic arthritis
  - Scalp, nail, inverse, more severe involvement are highest risk
  - Up to 10% of psoriatic arthritis patients do not have psoriasis or develop the arthritis prior to psoriasis

- Inflammatory arthritis: can mimic RA, OA, AS, Reactive Arthritis
- Small, large, spine; mono-, oligo-, poli-articular

- Dactylitis: **“sausage digit”**
- Enthesitis: inflammation where the tendon inserts at the bone
  - Achilles, epicondyles, knee

Psoriatic Arthritis

Clinical Manifestations: **Extra-Articular**

Inflammatory eye disease: uveitis, scleritis

Inflammatory bowel disease: colitis

Psoriasis

Inflammatory Arthritis: Pattern Recognition

- Distribution
  - 1st MTP arthritis: gout, "podagra"
  - 5th MTP erosion: rheumatoid arthritis
  - DIP arthritis +/- erosions or fluffy periostitis: Psoriatic arthritis
  - CMC arthralgia: osteoarthritis
  - MCPs 2/3: CPPD, hemochromatosis, rheumatoid arthritis
  - Sacroiliac joint: ankylosing spondylitis, axial involvement with IBD-associated arthritis, psoriatic arthritis or reactive arthritis
- Rheumatoid arthritis does not involve:
  - DIP
  - Thoracolumbar spine
- Osteoarthritis does not involve:
  - MCP
  - Elbow
  - Rarely glenohumeral shoulder joint
- Gout does not involve the axial spine.

Polymyalgia Rheumatica (PMR)

- Affects patients 50+ year old
  - Most commonly 70+
- Symmetric bilateral hip and shoulder girdle **pain and stiffness**
  - **AM stiffness for hours**
  - Patient make complain of proximal weakness and/or functional limitations: but *weakness is 2ndary to pain NOT true weakness (not myopathy/myositis)*
  - Infrequently involves peripheral joints: can mimic RA
- Often includes fatigue, malaise, depression, anorexia, weight loss
  - If fever, suspect infection vs GCA
- Diagnosis based on clinical suspicion and elevated inflammatory markers
  - **Normal inflammatory markers excludes PMR or GCA**
  - Hallmark, rapid response to low dose steroids – **lack of response to steroids excludes PMR**

So, I think they have PMR…

- Try 15 mg prednisone for 5-7 days
  - Should completely resolve symptoms in 24-48 hours
- Start with prednisone 15mg daily for 2-4 weeks, then taper by 2.5mg until on 10mg daily, then decrease by 1mg every month until off

- Note – it is not uncommon for OA symptoms/fatigue to increase with taper
  - Can trend inflammatory markers when patient reports “flare” symptoms – if normal ESR, CRP, then no active PMR. Treat OA and continue slow taper.
- Remember: Age adjusted ESR
  - Men: age/2
  - Women: (age + 10)/2

- Don’t forget about GCA (temporal arteritis questions: unilateral Headache, jaw claudication (pain with prolonged chewing)

The Infamous ANA -Anti Nuclear Antibody

- Antibody directed against nuclear material
  - **ANA by Indirect immunofluorescence (Hep2) is gold standard**

- Should I order an ANA? Ask yourself - what is the pretest probability of disease?
  - It is useful to order in setting of inflammatory arthritis or extra-articular manifestations of SLE or other connective tissue diseases (Review of Systems!!!)

  - DO NOT order for vague symptoms such as fatigue, arthralgias, fibromyalgia without other concerning ROS

Antinuclear Antibody Test Result

Abeles AM, Abeles M. Amer J Med 126; 324-328, 2013

- Patients referred to Rheumatology by non-rheumatologists for a positive ANA test result over a 2 year period (n=232).
- Positive predictive values for a "positive ANA test result" were calculated for all ANA-associated rheumatic diseases
  - PPV for Lupus 2.1%
  - PPV for any ANA-ard 9.1% (half were RA)
  - No ANA-assoc RD was present in patients with an ANA < 1:160
  - Most common reason for ordering ANA : widespread pain (54/232, 23.2%). PPV in this group was 0%.
- **Conclusion:** Poor predictive value of a + ANA attributable to unnecessary testing in patients with a low pretest probability for ANA-associated rheumatic disease

So, I ordered an ANA…

- ANA does **NOT** = lupus
  - ANA is seen in other autoimmune diseases, non-autoimmune disease, and can be clinically insignificant
    - Up to 20% of the general population of +ANA: incidence increases as we age
  - Always interpret ANA in the clinical setting –False positives in infections, malignancy, normal aging, medications, over read, drugs, chronic liver disease, family history of autoimmune disease
  - Common autoimmune diseases to be associated with a +ANA is autoimmune thyroid disease (thyroglobulin, thyroid peroxidase)

+ANA…The Patterns and Titer

- Used to be 5 patterns, now many more
  - Dense fine speckled = **not** associated with autoimmunity (even at high titers)
  - Nucleolar, Centromere: think scleroderma, MCTD

- **Titer is more significant**
  - 1:40 is **negative**
  - 1:80 very low titer, most often benign with low clinical relevance except with a very high suspicion for an autoimmune disease: lowest titer to be considered positive in ACR guidelines
  - 1:160 considered “truly” positive and potentially clinically relevant
  - 1:320 moderate titer
  - High titers warrant rheum evaluation - 1:640, 1:1280 and high titer

- ANA IS **NOT** A DISEASE ACTIVTY MARKER – no utility in checking serial ANAs overtime, unless there is a clinical change or development

Systemic Lupus Erythematosus

- Common manifestations: Remember the **specific ROS!!!**
  - Rash +/- photosensitivity (does not come and go in hours/days; differentiate malar from routine flushing and rosacea)
  - Sicca (think about other etiologies: meds, aging, Lasix)
  - Mucocutaneous ulcers (usually painless involving palate or buccal surface: different than aphthous ulcers)
  - Alopecia (temporal region, patchy, discoid lesions)
  - Raynaud's (only includes digits: not whole hand/foot; color changes are not persistent: resolves with re-warming; does not need tri-color changes)
  - Inflammatory arthritis/arthralgia
  - Serositis (pleuritic chest pain, pleural effusions, pericarditis)

Systemic Lupus Erythematosus

- **ANA is sensitive** for lupus….extraordinarily **non-specific**
- **Anti-Smith** antibody: **specific** for lupus
- **Anti-dsDNA**: **specific** and can correlate with disease activity
- Complement: **C3 and C4**: **decreased in lupus** (but not always), can correlate with disease activity
- CBC: cytopenias – anemia, leukopenia, thrombocytopenia

- Lupus nephritis – ALWAYS check a UA with microscopy: proteinuria, RBCs, WBCs. Consider a urine protein creatinine ration.

Thank you!

Q&A

Check out: www.rheumforprimarycare.org

UPMC
LIFE CHANGING MEDICINE

Population Health in Rural Communities

Donald B Middleton Refresher Course in Family Medicine

John Boll, DO, FAAFP

UPMC Rural Family Medicine Residency

February 27, 2026

Disclosures

- HRSA Rural Residency Planning and Development Program Grant, Cohort 3, 8/1/2021 – 7/31/2024

Objectives

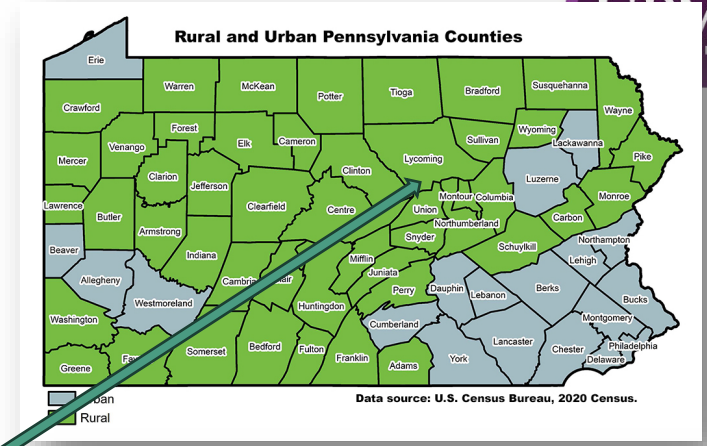
1. Define “rural” and “population health” to better characterize the many nuances of these definitions.
2. Discuss rural health disparities from a population health perspective.
3. Discuss the causes of rural health disparities and patterns of health determinants.
4. Review solutions to address rural health disparities including the PA Health Transformation Program and the PA Rural Health Plan.

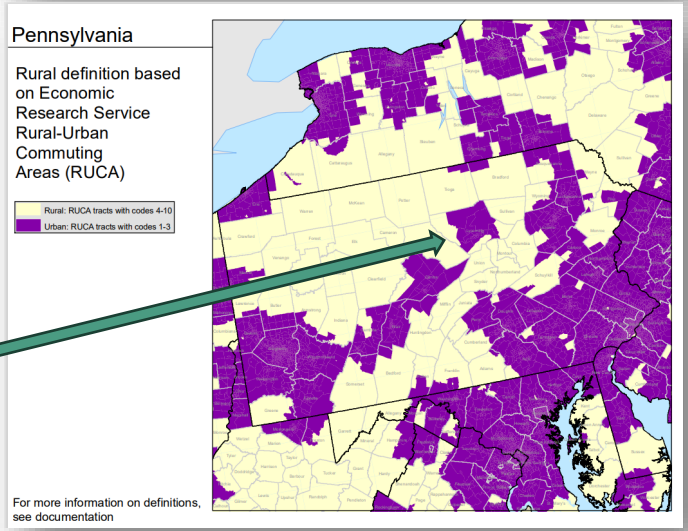
What is Rural?

What is Rural?

Complexities of Defining Rural:

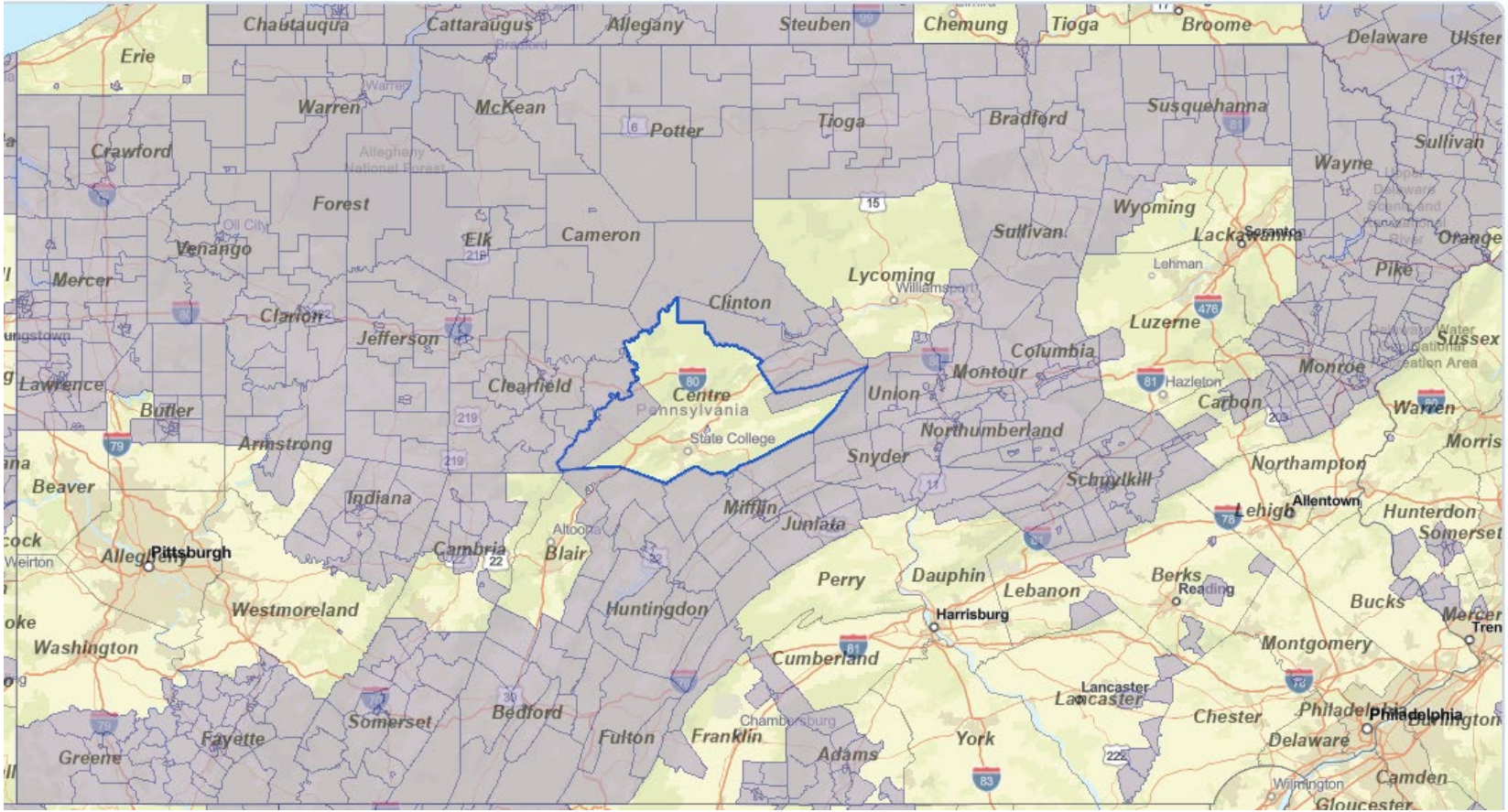
- Rural definitions can be based on administrative, land-use, or economic concepts.
  - **Administrative** – used by the USDA – municipal or jurisdictional boundaries
  - **Land-use** – used by the Census Bureau – population density – similar to the view from an airplane
  - **Economic** – rural research applications – recognizes labor, trade, and media, includes "commuting areas".
- **ERS Rural-Urban Commuting Area (RUCA) codes** – focus on census tracts and economic classification.





Cromartie, J & S Bucholtz. Defining the "Rural" in Rural America. *Amber Waves*, June 2008, accessed online at Rural Urban Definitions - Center for Rural PA (palegislature.us) and at Pennsylvania - Rural Definitions: State-Level Maps (usda.gov) on 3/22/22.

HRSA Eligible Rural Census Tracks



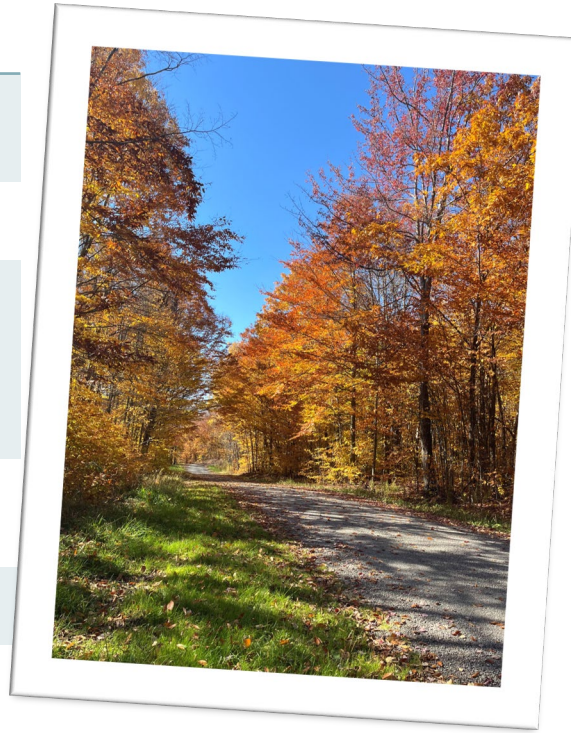
Rural Population Statistics

- **In US & PA** – 1 in 5 people live in HRSA defined rural communities
  - US - 60 million people
  - PA – 3.37 million people
- **PA – 48 out of 67 counties are rural;** only two counties don't have rural classified areas (Philadelphia & Delaware)
- Per US Census Bureau, in 2020, 71% of PA's rural municipalities had a population of < 2,000 people.

Pennsylvania Rural Health Plan 2025-2030. PARHA, November 2025 & Rural Quick Facts - Center for Rural PA accessed online on 1/20/2026.

Competency in Rural Care

Domain	Example
Adaptability	**Demonstrates Improvision/Creativity**, adapts scope of practice to community needs
Agency and Courage	**Articulates a calling**, tolerates risk, gets things done
Collaboration and Community Responsiveness	**Engages the community in responding to need**, exhibits grace and respect for individuals and culture, accepts multiple leadership roles, builds effective networks
Comprehensiveness	Maintains and expands as necessary a **wide scope** of clinical practice
Integrity	**Negotiates dual relationships** with integrity
Abundance in the Face of Scarcity and Limits	**Demonstrates humility** and knows the limits of his/her own competence, “looks things up”, effectively uses resources at hand



Longenecker, RL, *et al.* Competence Revisited in a Rural Context. *Fam Med*. 2018;50(1):28-35.

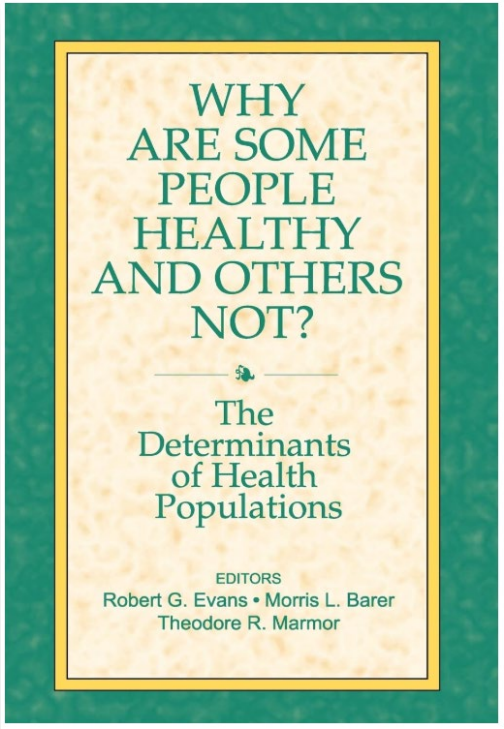
Concept of a "Rural Generalist"

The Australian College of Rural and Remote Medicine describes the competencies of a Rural Generalist Medical practitioner as:

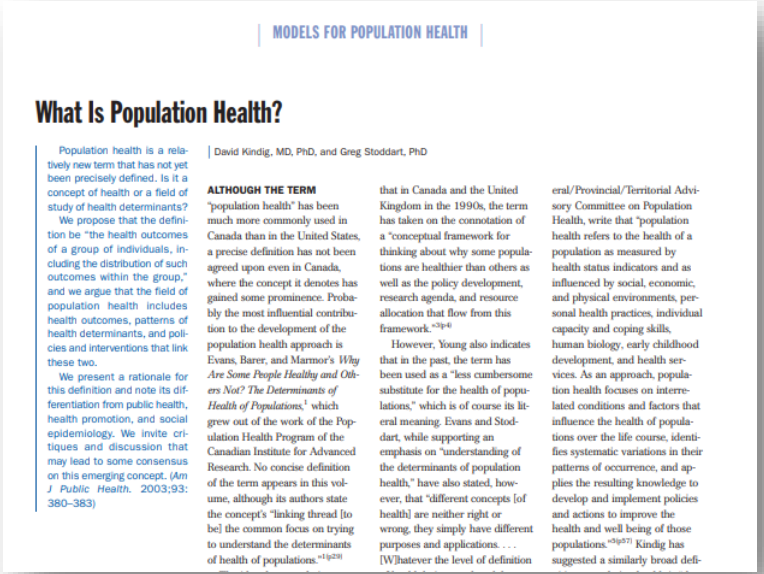
- Providing **expert medical care** in all rural contexts
- Providing **primary and secondary** care
- Respond to **medical emergencies**
- Applying a **population health** approach
- Work with Aboriginal, Torres Strait Islander and other **culturally diverse communities** to improve health and wellbeing
- Practice medicine within an **ethical, intellectual and professional framework**; and
- Provide **safe medical care** while working in geographical and professional **isolation**

Accessed online at What is a rural generalist? | Rural Generalist Program South Australia on 6/15/2023.

What is "Population Health"?



"…conceptual framework for thinking about why some populations are healthier than others…"



MODELS FOR POPULATION HEALTH

What Is Population Health?

Population health is a relatively new term that has not yet been precisely defined. Is it a concept of health or a field of study of health determinants?

We propose that the definition be "the health outcomes of a group of individuals, including the distribution of such outcomes within the group," and we argue that the field of population health includes health outcomes, patterns of health determinants, and policies and interventions that link these two.

We present a rationale for this definition and note its differentiation from public health, health promotion, and social epidemiology. We invite critiques and discussion that may lead to some consensus on this emerging concept. (*Am J Public Health*. 2003;93:380–383)

David Kindig, MD, PhD, and Greg Stoddart, PhD

ALTHOUGH THE TERM "population health" has been much more commonly used in Canada than in the United States, a precise definition has not been agreed upon even in Canada, where the concept it denotes has gained some prominence. Probably the most influential contribution to the development of the population health approach is Evans, Barer, and Marmor's *Why Are Some People Healthy and Others Not? The Determinants of Health of Populations*,[1] which grew out of the work of the Population Health Program of the Canadian Institute for Advanced Research. No concise definition of the term appears in this volume, although its authors state the concept's "linking thread [to be] the common focus on trying to understand the determinants of health of populations."[1(p23)] that in Canada and the United Kingdom in the 1990s, the term has taken on the connotation of a "conceptual framework for thinking about why some populations are healthier than others as well as the policy development, research agenda, and resource allocation that flow from this framework."[2(p4)]

However, Young also indicates that in the past, the term has been used as a "less cumbersome substitute for the health of populations," which is of course its literal meaning. Evans and Stoddart, while supporting an emphasis on "understanding of the determinants of population health," have also stated, however, that "different concepts [of health] are neither right or wrong, they simply have different purposes and applications. . . . [W]hatever the level of definition eral/Provincial/Territorial Advisory Committee on Population Health, write that "population health refers to the health of a population as measured by health status indicators and as influenced by social, economic, and physical environments, personal health practices, individual capacity and coping skills, human biology, early childhood development, and health services. As an approach, population health focuses on interrelated conditions and factors that influence the health of populations over the life course, identifies systematic variations in their patterns of occurrence, and applies the resulting knowledge to develop and implement policies and actions to improve the health and well being of those populations."[3(p57)] Kindig has suggested a similarly broad defi-

Kindig, D & G Stoddart. What is Population Health? *Am J Public Health*. 2003;93:380383.

Defining Population Health: A Framework for Better Outcomes

The term “population health” is widely used but lacks a precise, agreed-upon definition. This framework, proposed by Kindig and Stoddart, clarifies the concept by focusing on measurable health outcomes and the interconnected factors that produce them.

What is Population Health?

The health outcomes of a group of individuals, including the distribution of such outcomes within the group.

This focuses on measurable results for a specific population, not just individuals.

1. Health Outcomes (The Goal)

These are the dependent variables, measuring length and quality of life for a population.

2. Patterns of Health Determinants (The Causes)

These are the independent variables, like medical care, environment, social factors, and genetics.

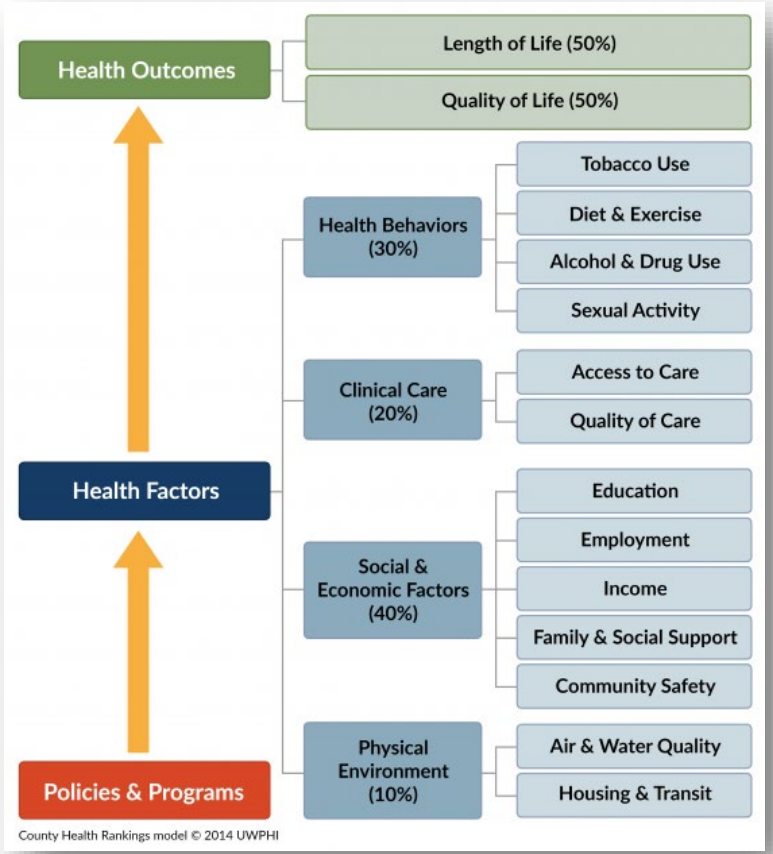
3. Policies & Interventions (The Levers)

These are actions that link determinants to outcomes through resource allocation and partnerships.

Kindig, D & G Stoddart. What is Population Health? *Am J Public Health*. 2003;93:380383.

NotebookLM

Health Outcomes (The Goal)



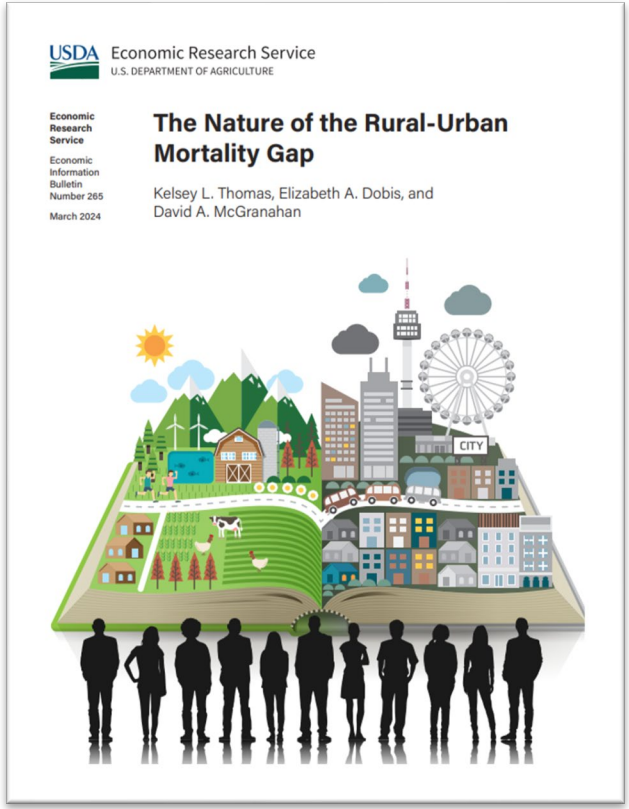
Accessed online at www.aafp.org on 7/14/20.

Rural Health Disparities

"Although rural living was once synonymous with clean, healthy living, a look at today's rural population identifies significant health problems."

Crosby, RA, *et al. Rural Populations and Health.* John Wiley and Sons, Inc, 2012.

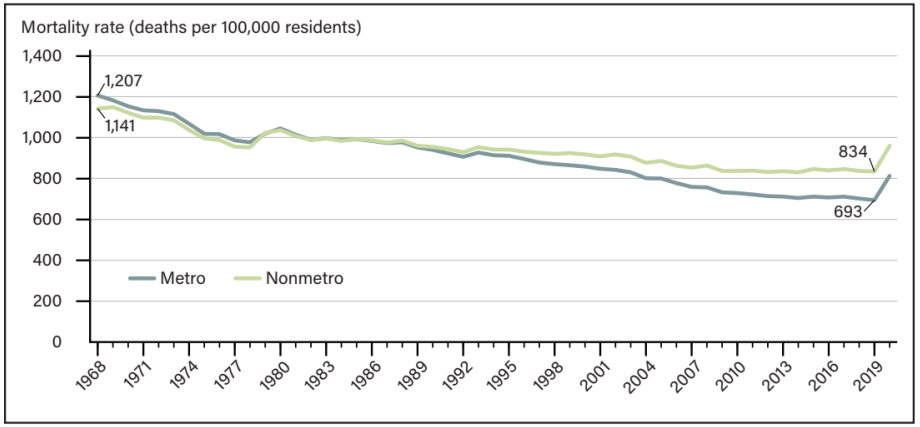
Rural Health Disparities



Thomas, KL, EA Dobis, and DA McGranahan. *The Nature of the Rural-Urban Mortality Gap*. ERS Economic Information Bulletin #265, March 2024.

In 2019, age adjusted mortality rates were > 20% higher in rural areas than urban whereas in 1999 there was only a 6% gap

Figure 1
Age-adjusted all-cause mortality rates for metro and nonmetro areas, 1968–2020

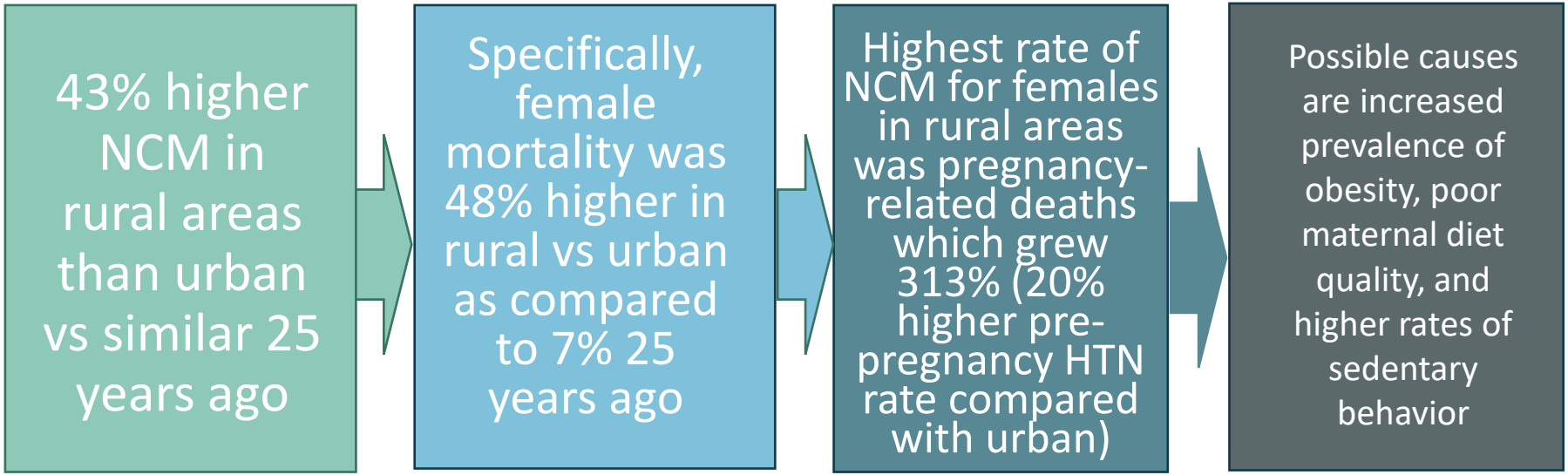


Note: Mortality rates are age-adjusted to reflect the 2000 U.S. population age structure to minimize the influence of changes in age structure over the study period. Metropolitan (metro) and nonmetropolitan (nonmetro) areas are delineated by the Office of Management and Budget's 2013 Core-Based Statistical Area definition, disregarding contemporary definitions of metro and nonmetro, to minimize the influence of rural-urban reclassifications on mortality change.

Source: USDA, Economic Research Service using data from the U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, Wide-ranging Online Data for Epidemiologic Research (WONDER).

Rural-Urban Mortality Gap

2017-2019 age-adjusted natural-cause mortality (NCM) rate for the prime working-age population (25-54 years old) compared to 1999-2001→



Thomas, KL, EA Dobis, and DA McGranahan. *The Nature of the Rural-Urban Mortality Gap*. ERS Economic Information Bulletin #265, March 2024.

Rural-Urban Mortality Gap

“Rural Disadvantage”

Access to healthy, nutritional foods, physical activity facilities, and availability of health resources…

…It’s more than just geography…

Thomas, KL, EA Dobis, and DA McGranahan. *The Nature of the Rural-Urban Mortality Gap*. ERS Economic Information Bulletin #265, March 2024.

Contributors to "The Health Gap"

The Health Gap

- Conditions of birth and early childhood
- Education
- Work
- Social circumstances of elders
- Collection of elements of community resilience:
  - Transportation
  - Housing
  - Security
  - Sense of community self-efficacy

Berwick, D. The Moral Determinants of Health. JAMA 324(3):225-226.

Patterns of Health Determinants (The Causes)

UPMC LIFE CHANGING MEDICINE

Social Determinants of Health

"Conditions in the environments in which people are born, live, learn, work, play, worship, and age that affect a wide range of health, functioning, and quality-of-life outcomes and risks."

Healthy People 2030

Health Care Disparity

- Differences between groups in health insurance coverage, access to and use of care, and quality of care.

Health Disparity

- A higher burden of illness, injury, disability, or mortality experienced by one population group relative to another group.

https://www.healthypeople.gov/2020/about/foundation-health-measures/Disparities. Accessed online on 7/21/16 and Focus on Health Care Disparities. The Henry J. Kaiser Family Foundation. December 2012.

Rural Healthy People 2030 Survey

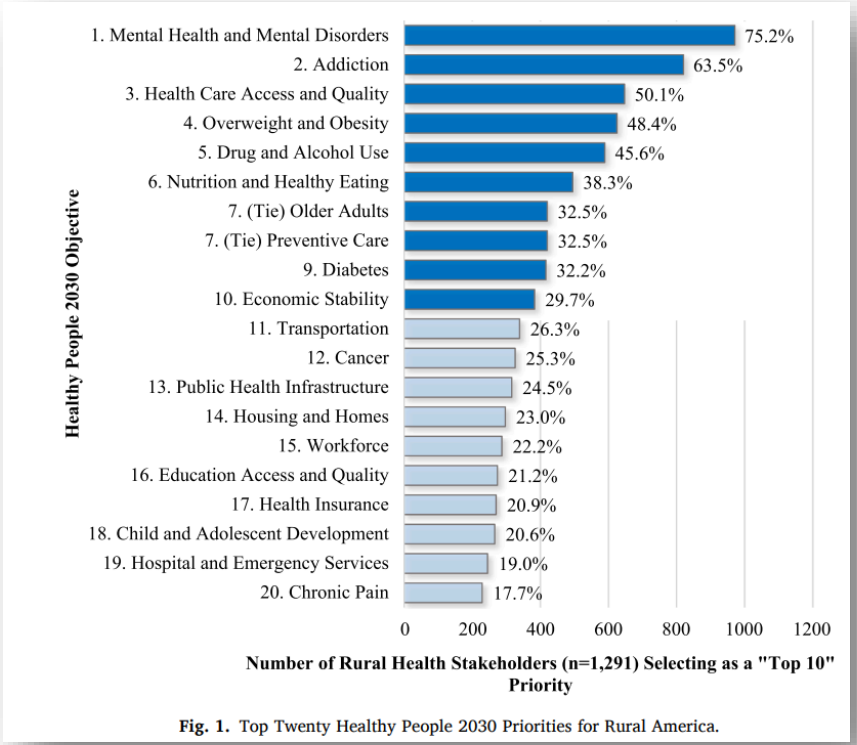


Fig. 1. Top Twenty Healthy People 2030 Priorities for Rural America.

Callaghan, T, *et al*. Rural health people 2030: New decade, new challenges. *Preventive Medicine Reports* 33 (2023) 102176.

- **Average household income** - rural - $77,975 vs urban - $89,959
- **Adults with bachelor's degrees** – rural – 24% vs urban – 36%
- **Rural Communities are aging** – by 2040 – 25% > 65 yo (2020 – 21% rural vs 18% urban)

Pennsylvania Rural Health Plan 2025-2030. PARHA, November 2025

Rural Broadband Access

Telehealth and remote monitoring is crucial for residents in communities with few or no medical providers.

- 2018 report: **80% of the 24 million US households without access to reliable, affordable high-speed internet are rural**.
- **In PA, 187,000 residents lack access to meet federal standards for minimal connectivity levels**.
- **Barriers:** geographic isolation, terrain limitations, affordability, relevancy, and digital literacy.

Pennsylvania Rural Health Plan 2025-2030. PARHA, November 2025

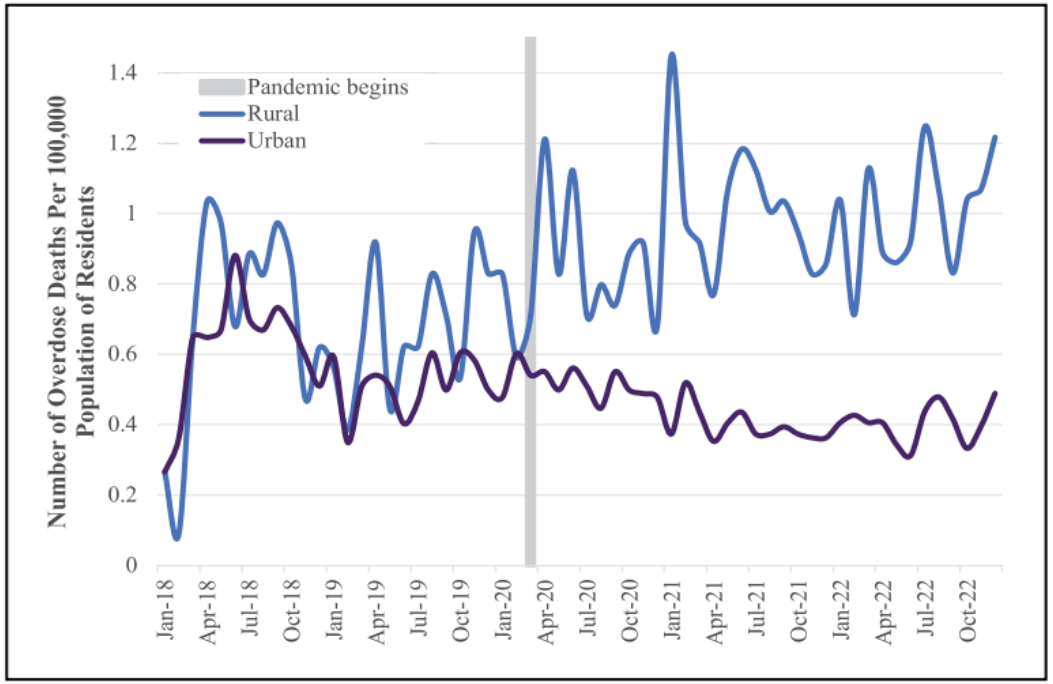
Injury-Related Mortality

- 60 minute "**Golden Hour**" = 113 minutes in rural PA
- **EMS transport times are double in rural communities** (14 min vs 7 min)
- **Injury related mortality** is 40% higher in rural PA.
- **Suicide rates** are 25% higher in PA rural counties than urban

Emergency Medical Services Response Time in Rural, Suburban, and Urban Areas. JAMA Surgery. 152(10):983-984 and Pennsylvania Rural Health Plan 2025-2030. PARHA, November 2025.

Opioid Overdoses

Figure 5: Pennsylvania Overdose Deaths by Rural and Urban Location, 2018-2022



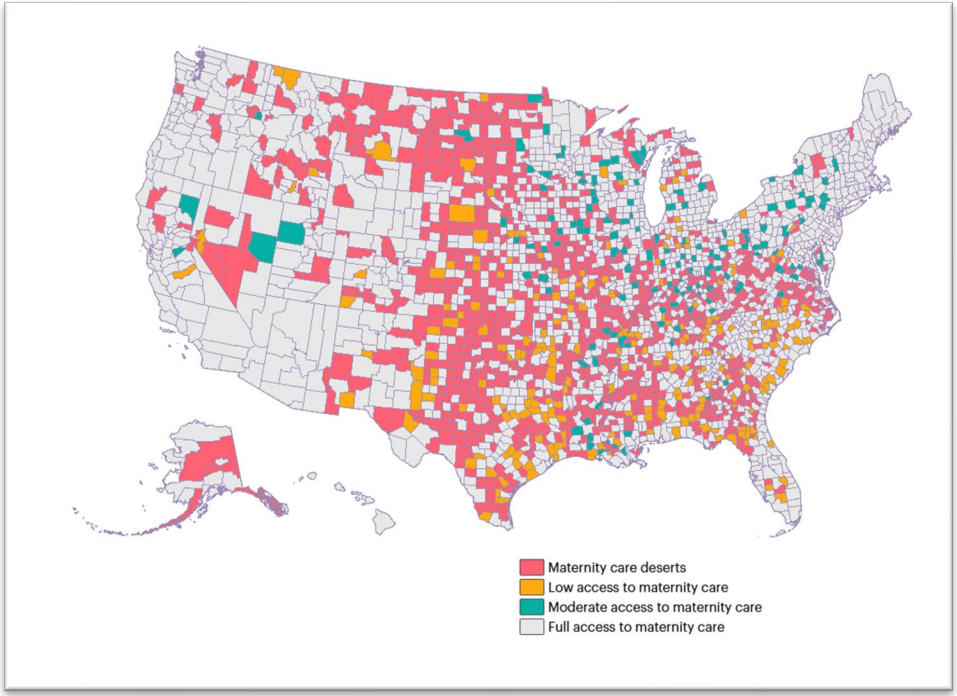
Data source: Open Data Pennsylvania, 2023; prepared by the Center for Rural Pennsylvania, 2023

- **Initially, in rural communities, opioid overdoses were from prescription medication** – Opioid Rx's decreased by 52% since 2012.
- Historically, 90.4% of physicians who prescribe buprenorphine were in urban counties.
- **Opioid Overdose reversal is very time dependent**
  - Individuals overdosing in rural communities had a 24% chance of dying vs 16% in urban communities.

Pennsylvania Rural Health Plan 2025-2030. PARHA, November 2025, 2025-AMA-Report-on-Substance-Use-and-Treatment-Progress-Policy-and-Future-Directions.pdf accessed online on 1/20/2026, and Lenardson, J, et al. Rural Opioid Abuse: Prevalence and User Characteristics. Maine Rural Health Research Center, PB-63-1, Feb 2016..

Maternity Care Deserts

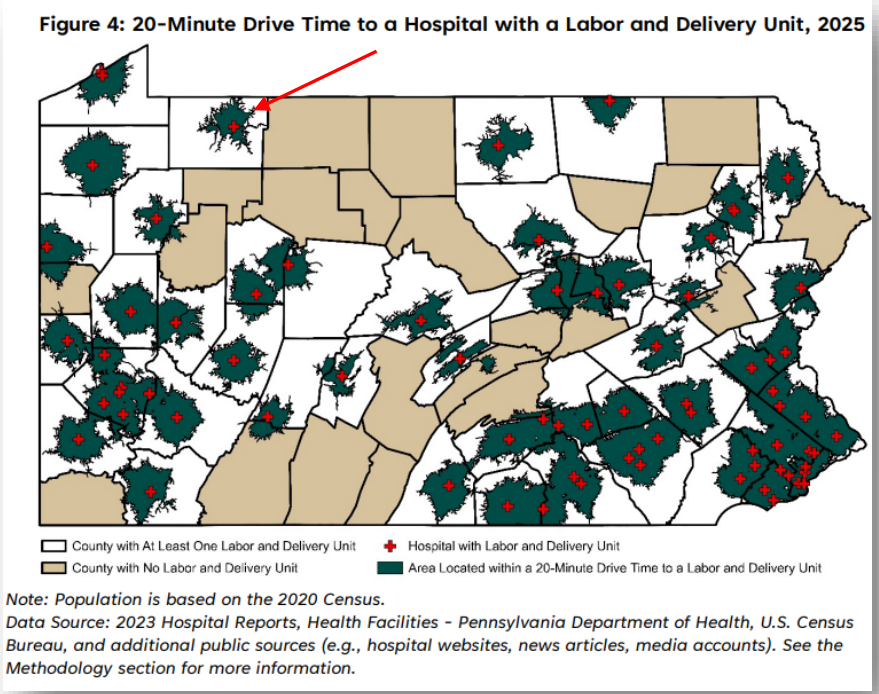
"Maternity Care Deserts" – counties with no access to birthing hospitals, birth centers, or obstetric providers



- **35% of counties** – 2.3 million women and 150,000 births in 2022
- **Per March of Dimes leads to > 10,000 preterm births** among those living in maternity care deserts or limited access counties.

Nowhere to Go: Maternity Care Deserts Across the US | March of Dimes accessed online on 1/14/2026 and Merkt, P, *et al*. Urban-Rural Differences in Pregnancy-Related Deaths, United States, 2011-2016. *Am J Obstet Gynecol*. 2021 Aug;225(2):183.e1-183.e16.

Obstetrical Care Example



Access to Maternity Care in Pennsylvania: Labor and Delivery Services. Center for Rural Pennsylvania, May 2025.

Maternity care desert expands to eight PA counties, with end of Warren hospital labor and delivery

WPSU | By Sydney Roach
Published January 12, 2026 at 5:45 PM EST

Maternity care desert expands to eight PA counties, with end of Warren hospital labor and delivery | WPSU Accessed online on 1/14/2026.

US Birth Rates

687,000 fewer US Births in 2024 than in 2007

- **Facilities with < 300 births/year struggle to cover fixed costs of an OB unit.**
- **Since 2020, at least 117 rural US hospitals have eliminated or plan to eliminate their L&D units**, 11% reduction…due to high operational costs.
- **In PA, 38 L&D units closed since 2005** – more than ½ of rural women are more than 30 minutes from the nearest birthing hospital.

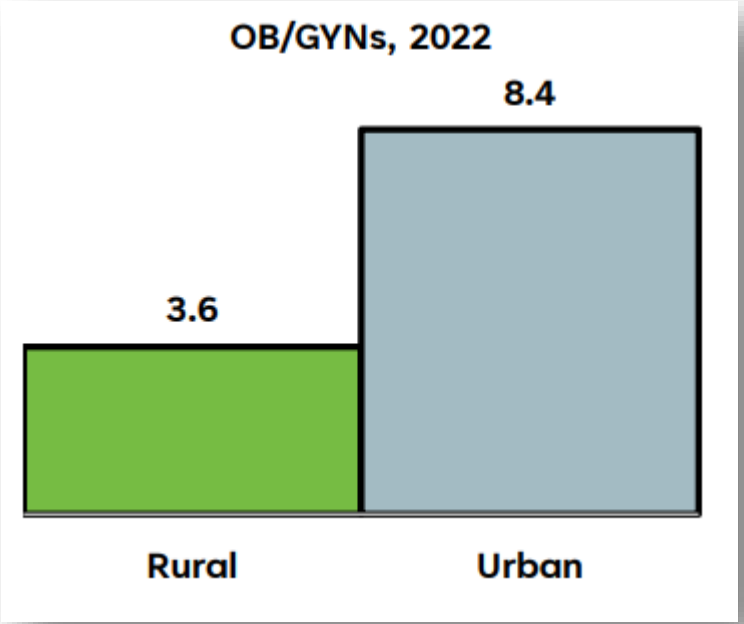
"a reduction in maternity beds is rational… However, the cutbacks have not been done in any systematic way in consultation with communities."

'The Loss of a Rural Hospital Is Devastating for a Local Community' | SPH accessed online on 1/20/206, Desisto, CL, et al. Examining the Ratio of Obstetrics Beds to Births, 2000-2019. J Community Health. 2022 Oct;47(5):828-834, PA Health Transformation Program CMS-RH Rural T-26-001, November 2025, and REH Learning Brief: Obstetric Care in Rural Emergency Hospitals. Accessed online on 2/12/2026 at REH Learning Brief: Obstetric Care in Rural Emergency Hospitals - Rural Health Redesign Center.

Obstetrical Providers

- **Studies show equivalent outcomes between OB and FM with OB.**
- **Family physicians are the most common health professional providing rural OB care**.
- 2019 – > ½ rural counties had no FM doing deliveries and 1/3 had no clinicians practicing OB.
- **Proportion of FM doing OB is declining** – In 2000 - 23.3%, 2010 – 9.7%, and 2016 – 7%.

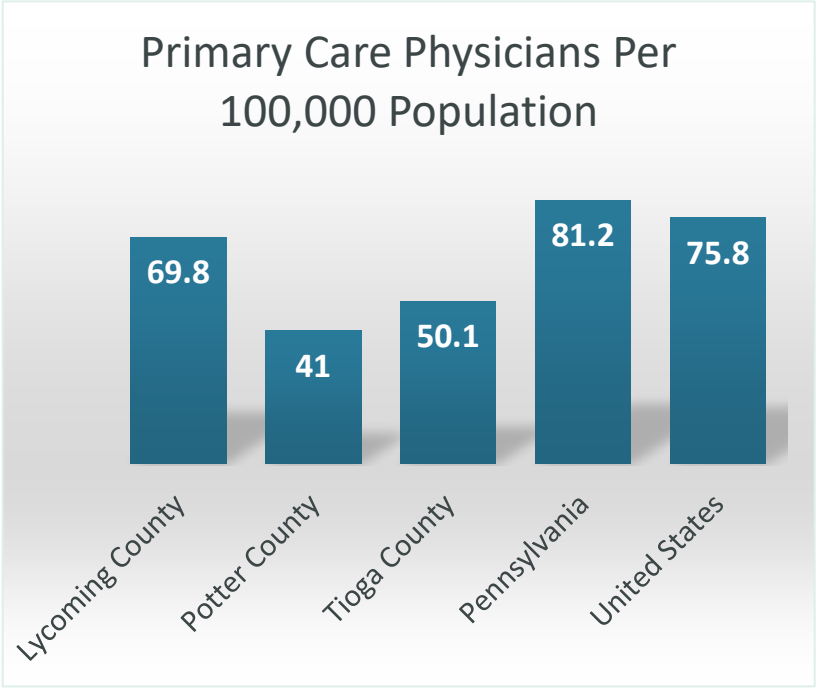
Number of PA OB/Gyns per 10,000 Females of Childbearing Age (15–44 yo)



Avery, DM and JT McDonald. The Declining Number of Family Physicians Practicing Obstetrics: Rural Impact, Reasons, Recommendations, and Considerations. *Am J of Clin Med*. 2014;10(2):70-78, Barr, WB and MP DeMarco. Family Medicine Obstetrics: Answering the Call. *Ann of Fam Med*. 2024;22(5):367-368, VanGompel, EW, *et al*. Family Medicine Presence on Labor and Delivery: Effect on Safety Culture and Cesarean Delivery. *Ann of Fam Med*. 2024;22(5):375-382, and Aubery-Bassler, K, *et al*. Outcomes of deliveries by family physicians or obstetricians: a population-based cohort study using an instrumental variable. *CMAJ*. 2015;187(15):11251132, and Fredrickson, E, *et al*. Understanding and Overcoming Barriers to Rural Obstetric Training for Family Physicians. *Fam Med*. 2023;55(6):381-388.

Rural Workforce

- **Physicians per residents:**
  - **Rural PA**: 1 physician per 534 residents (36% primary care)
  - **Urban PA**: 1 physician per 225 residents (26% primary care)
- 66.6 primary care physicians per 100,000 rural residents & 114.7 per 100,000 urban residents
- **½ of all PA's primary care physicians practice in just 4 urban counties**



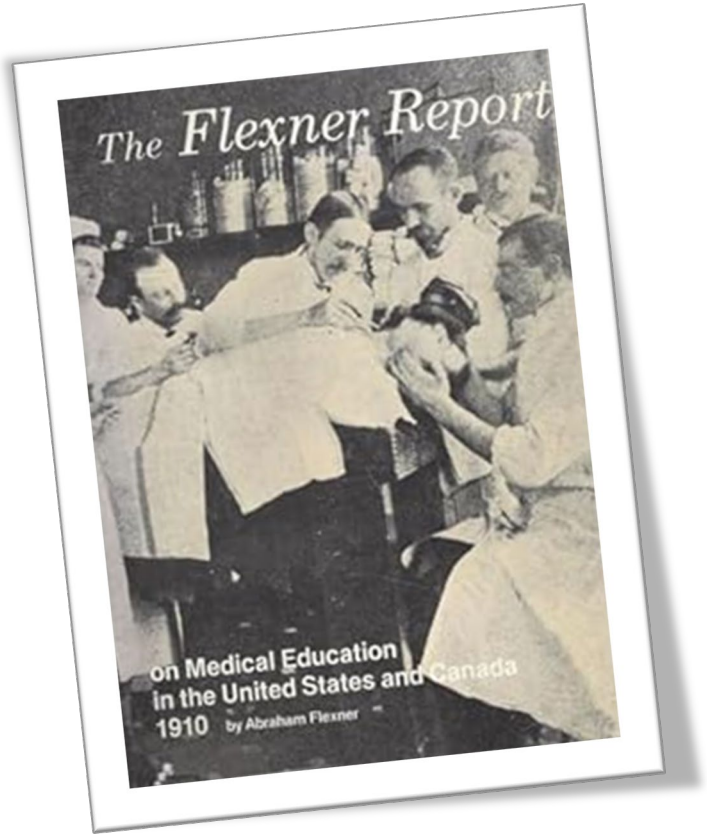
Pennsylvania Rural Health Plan 2025-2030. PARHA, November 2025.

Robert Wood Johnson County Health Rankings & Roadmaps, 2018.

Rural Workforce Projections

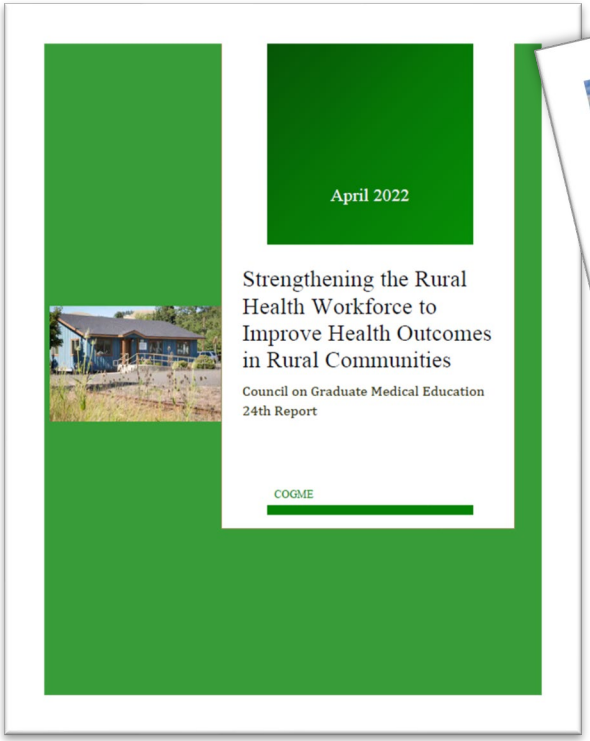
According to the Bureau of Healthcare Workforce by 2036 the percentage of …

Urban Areas with physician shortage will be 6% vs 56% in **Rural Areas**.



Growing the Rural Physician Workforce: Decades of Federal Funding Impacts Rural Graduate Medical Education - The Rural Monitor accessed online on 12/31/2024.

Rural Population Health: Policies & Interventions (The Levers)



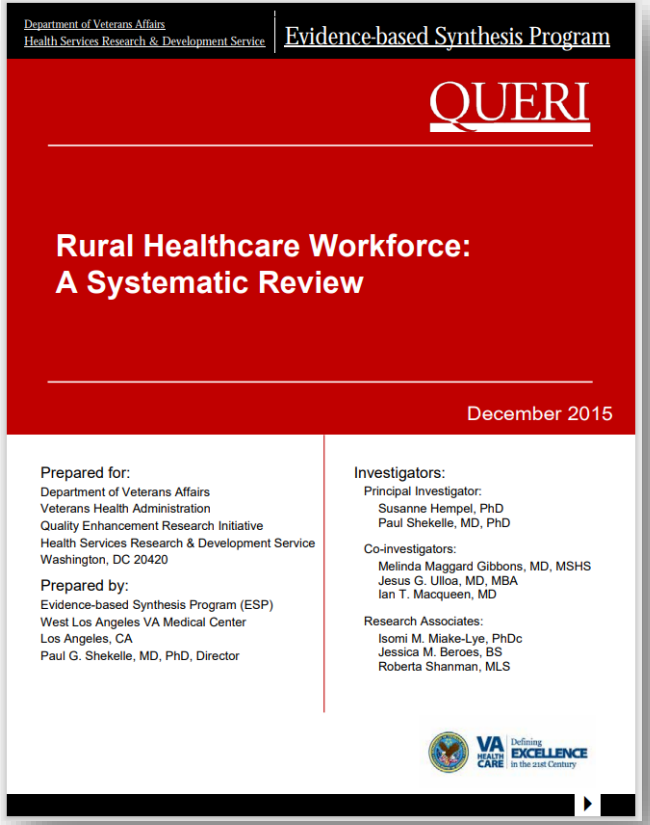
Transforming Rural Population Health

UPMC
LIFE CHANGING MEDICINE

1. Cultivate a robust and sustainable workforce
2. Modernize infrastructure and expand digital health capabilities
3. Implement financial sustainability and payment reform
4. Foster regional collaboration and community-integrated care
5. Prioritize access for vulnerable populations and critical services
6. Address transportation and emergency services barrier

1. Cultivate a Robust and Sustainable Workforce

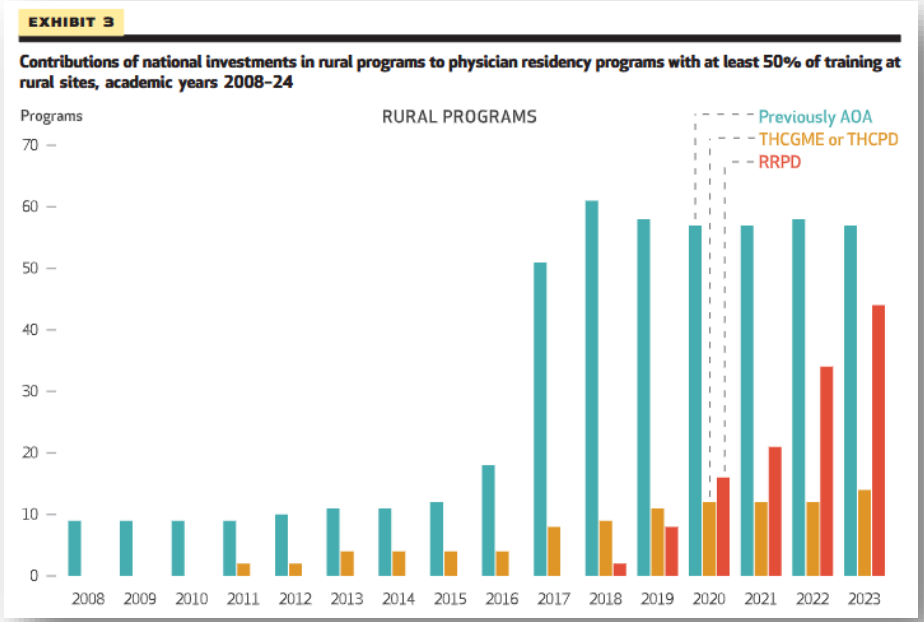
- **Focus on shifting from urban-centric training to models that recruit, train, and retain providers in rural environments**.
  - Learning flexibility and adaptability in low-resources settings
- **Recruitment for all levels of the health care workforce** prioritizing students born and raised in rural areas, with retention supported through service obligations.



Rural Health Policy Brief 1, Special Needs of Rural America: Implications for Healthcare Workforce Education, Training, and Practice. COGME, July 2020 and Family Medicine Rural Training Track Residencies: 2008-2015 Graduate Outcomes. Rural Training Track Policy Brief, Feb 2016.

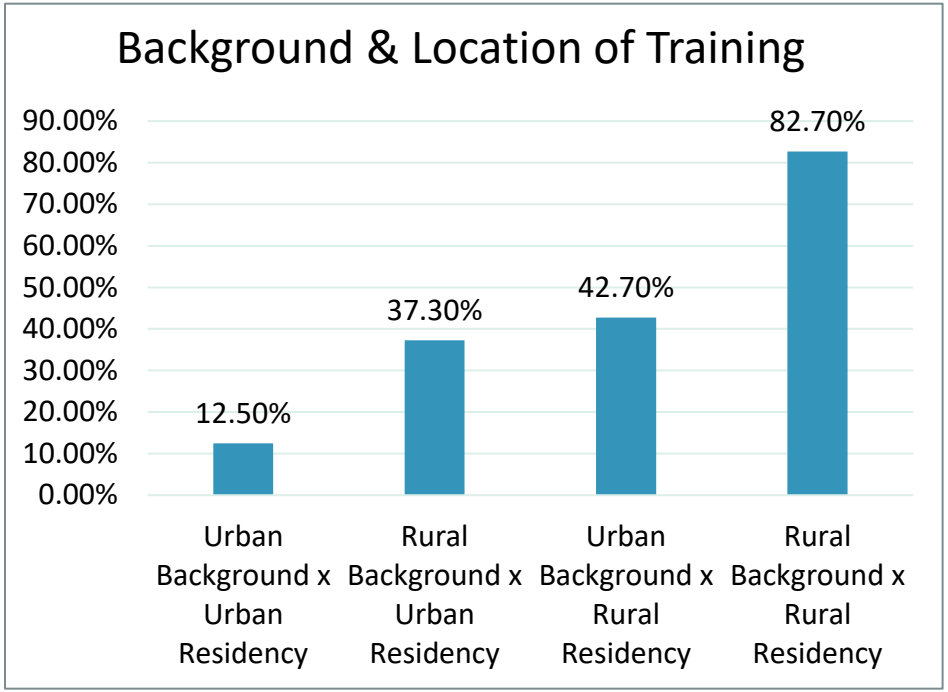
Rural Residency Program and Development (RRPD)

- **HRSA Rural Residency Program and Development grants:**
  - Since 2018, $64 million for RRPD: 54 new accredited residency programs with 683 approved positions (FM/IM/Psych/Surg)
- **Rural residency programs increased from 120 (6.18% of all programs) in 2008-2009 to 412 (14.34%) in 2023-2024.**
- **21% of rural residencies are RRPD programs.**



Hawes, EM, *et al*. Physician Training in Rural and Health Center Settings More than Doubled, 2008-2024. *Health Affairs*. May 2025:44(5):572-579.

Residency Training Impact on Rural Practice



- **Completing a residency in a rural setting is the single strongest predictor of rural practice choice.**
- **50.9%** of trainees from rural residencies chose rural practice, compared to only **18.0%** of urban trainees.
- Physicians with an **urban background** who completed a **rural residency** were more likely to practice in a rural area (42.7%) than physicians with a **rural background** who completed an **urban residency** (37.3%)

Patterson DG, Shipman SA, Pollack SW, et al. Growing a rural family physician workforce: The contributions of rural background and rural place of residency training. Health Serv Res. 2023; 1-7. doi:10.1111/1475-6773.14168

Role of Critical Access Hospitals in Rural Residency Training

7% of Critical Access Hospitals train residents (96 of 1364) – UPMC Rural Family Medicine Residency is an example.

JAMA Health Forum.

Research Letter

The Evolving Role of Critical Access Hospitals in Rural Physician Training

Lori Rodefeld, MS; Mukesh Adhikari, MPH; Catherine (Kasia) Horger, BSPH, MHA; John Boll, DO; Emily M. Hawes, PharmD

Introduction

The 1364 critical access hospitals (CAHs) across the US—hospitals with 25 or fewer beds often located in rural locations delivering essential health care services—represent an emerging option to increase rural graduate medical education (GME).[1] Between 2000 and 2009, only 3 to 11 CAHs were reported as hosting residents.[2]

Recent policy reforms enhancing GME flexibility have created growth opportunities, including streamlined accreditation for Rural Track Programs (RTPs) and changes in Medicare reimbursement for urban hospitals partnering with CAHs.[3] Federal initiatives such as the Rural Residency Planning and Development (RRPD) program support GME expansion in CAHs through startup funding and technical assistance.[4] This cross-sectional study examines the prevalence of CAH-based training and compares these sites with other rural teaching hospitals to understand potential for expansion.

Supplemental content

Author affiliations and article information are listed at the end of this article.

Methods

We analyzed 2023 to 2024 data from the Accreditation Council for Graduate Medical Education (ACGME) Data System, including program codes, site addresses, and months at each site. A list of CAHs was obtained from 2023 hospital data.[1] We geocoded sites and CAHs using ArcGIS Pro 3.2.2 (Esri), creating a 8-km (5-mile) buffer around each CAH, and performed a spatial join to identify overlapping sites. Matches were validated by cross-referencing names and addresses. As over 95% of CAHs are rural, we compared them with rural teaching hospitals, using 2022 Medicare Cost reports[5] and 2022 County Health rankings data.[6] We received an exemption determination from the University of North Carolina institutional review board because the study did not involve human participants and followed the STROBE reporting guideline.

Results

Table 1 describes characteristics of 80 programs with CAH-participating sites, representing a median of 6.5% (IQR, 2.8%-53.5%) training time in CAHs. Family medicine, internal medicine, and surgery programs train most frequently in CAHs. Twenty-three programs offer at least 50% training in CAHs, while 57 programs offer CAH rotations. Fifteen new programs with training in CAHs attained accreditation during the study period. Examples include Oregon Health & Science University Three Sisters RTP—a CAH partnered with a Federally Qualified Health Center and Tribal Clinic—and University of Pittsburgh Medical Center's family medicine RTP.[4] **Table 2** compares 93 CAH training sites with 171 rural non-CAH teaching hospitals. CAHs serve higher percentages of older adults (20.3% vs 19.1%), Hispanic individuals (5.7% vs 3.5%), and uninsured children (5.8% vs 4.9%) compared with rural teaching hospitals and have comparable primary care physician to population ratios (5.7 vs 6.3). Of RRPD programs, 31 of the sites are CAHs.[4]

Table 1. Characteristics of Residency Programs Training Residents in CAHs

Characteristic	No. (%) (N = 80)
Specialty	
Family medicine	55 (68.8)
Internal medicine	9 (11.3)
Surgery	9 (11.3)
Obstetrics and gynecology	4 (5.0)
Psychiatry	2 (2.5)
Pediatrics	1 (1.3)
Training in CAH, median (IQR), %	6.5 (2.8-53.5)
Program with ≥50% training at CAH	
Yes	23 (28.8)
No	57 (71.3)

Abbreviation: CAH, critical access hospital.

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JAMA Health Forum. 2025;6(10):e254742. doi:10.1001/jamahealthforum.2025.4742 October 31, 2025 1/3

Rodefeld L, Adhikari M, Horger C, Boll J, Hawes EM. The Evolving Role of Critical Access Hospitals in Rural Physician Training. JAMA Health Forum. 2025;6(10):e254742. doi:10.1001/jamahealthforum.2025.4742.

Cultivate a Robust and Sustainable Workforce

UPMC
LIFE CHANGING MEDICINE

Pipeline and Recruitment	Rural-Centric Training	Innovative Roles and Teams
• Target rural students early in the education pathway (Emerging Pathway Model) • Offer scholarships tied to service commitments • Ex – NHSC & Pa Primary Care Loan Repayment Programs	• Expand clinic rotations, residencies, and fellowships located in rural sites • Ex – FM-OB Fellowships	• Utilize interprofessional teams and create new “credentialed” provider roles • Ex – “Primary Care Medics” model, Community Health Workers, Centralized Nurse Advice Line, etc

2. Modernize infrastructure and expand digital health capabilities

Impact of Broadband Gap on Care:

- Telemedicine services
- Medical information exchange - PA Patient and Provider Network (P3N)
- Remote patient monitoring
- Access to specialized care
- Access to Patient Education

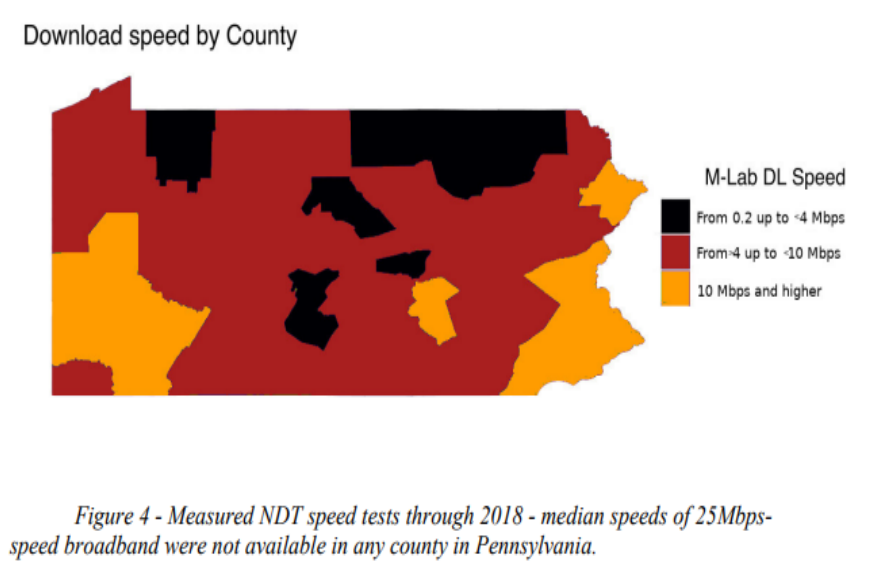


Figure 4 - Measured NDT speed tests through 2018 - median speeds of 25Mbps-speed broadband were not available in any county in Pennsylvania.

Broadband Availability and Access in Rural Pennsylvania. Center for Rural PA, 2019. Accessed online on 1/29/2026.

Modernize infrastructure and expand digital health capabilities

UPMC
LIFE CHANGING MEDICINE

Broadband and Connectivity	Telehealth Expansion	AI and Digital Tools
• Expand reliable high-speed broadband • Modernize statewide health data – Ex – PA Patient and Provider Network (P3N)	• Bring specialty care to the bedside • Support remote patient monitoring • Ex - “Hub-and-spoke” telehealth models	• Leverage next-gen AI to relieve workforce burdens (documentation) • Improve care quality through predictive analytics

3. Implement financial sustainability and payment reform

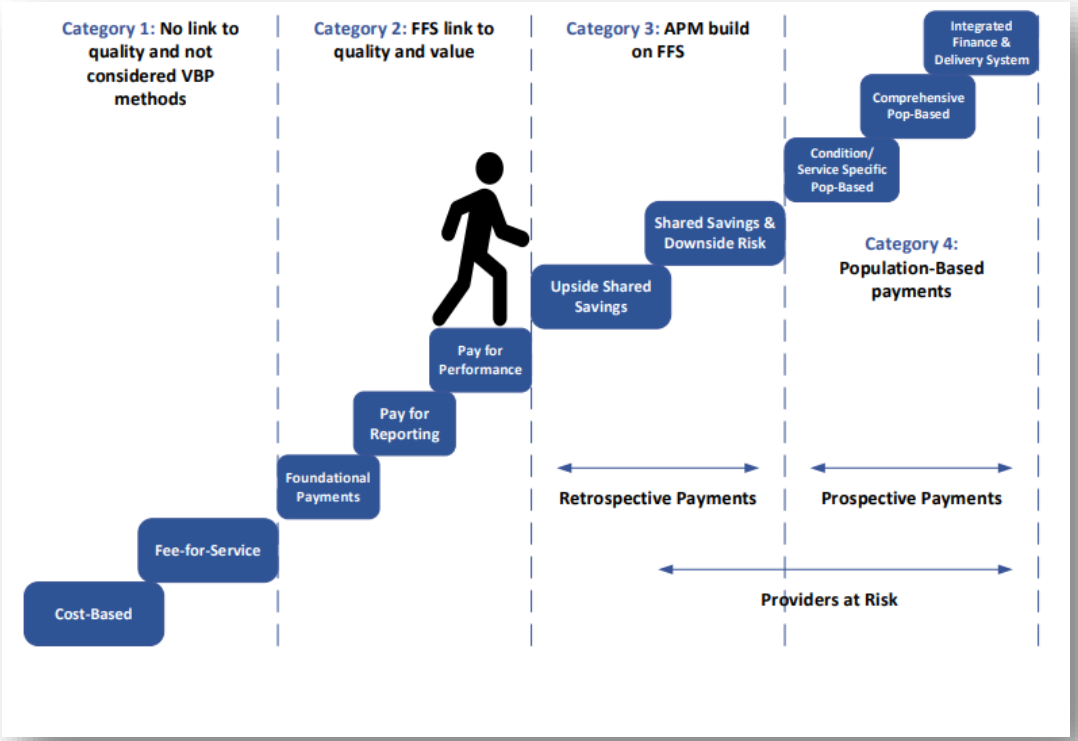
UPMC LIFE CHANGING MEDICINE

Value-based payment (VBP):

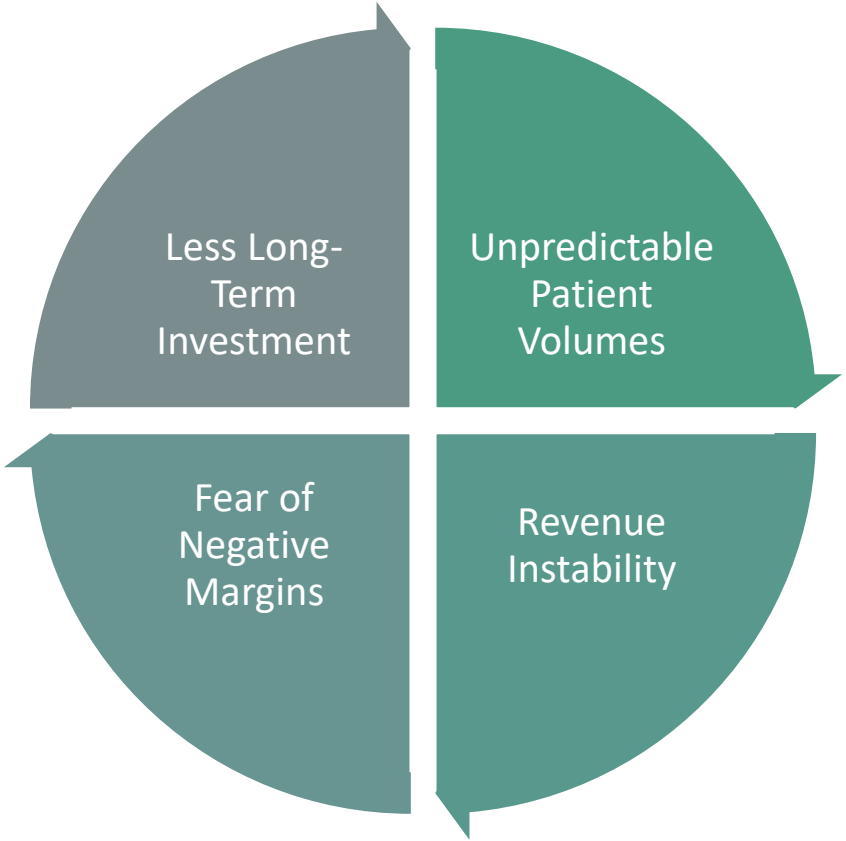
- Reimbursement tying payment to the quality of care provided and rewards providers for both efficiency and effectiveness.

How Alternative Payment Models Can Help Rural Providers Improve Care and Sustainability. Georgia Health Policy Center, 2020.

"Stairsteps" to Value-Based Payment



Rural Financial Stability

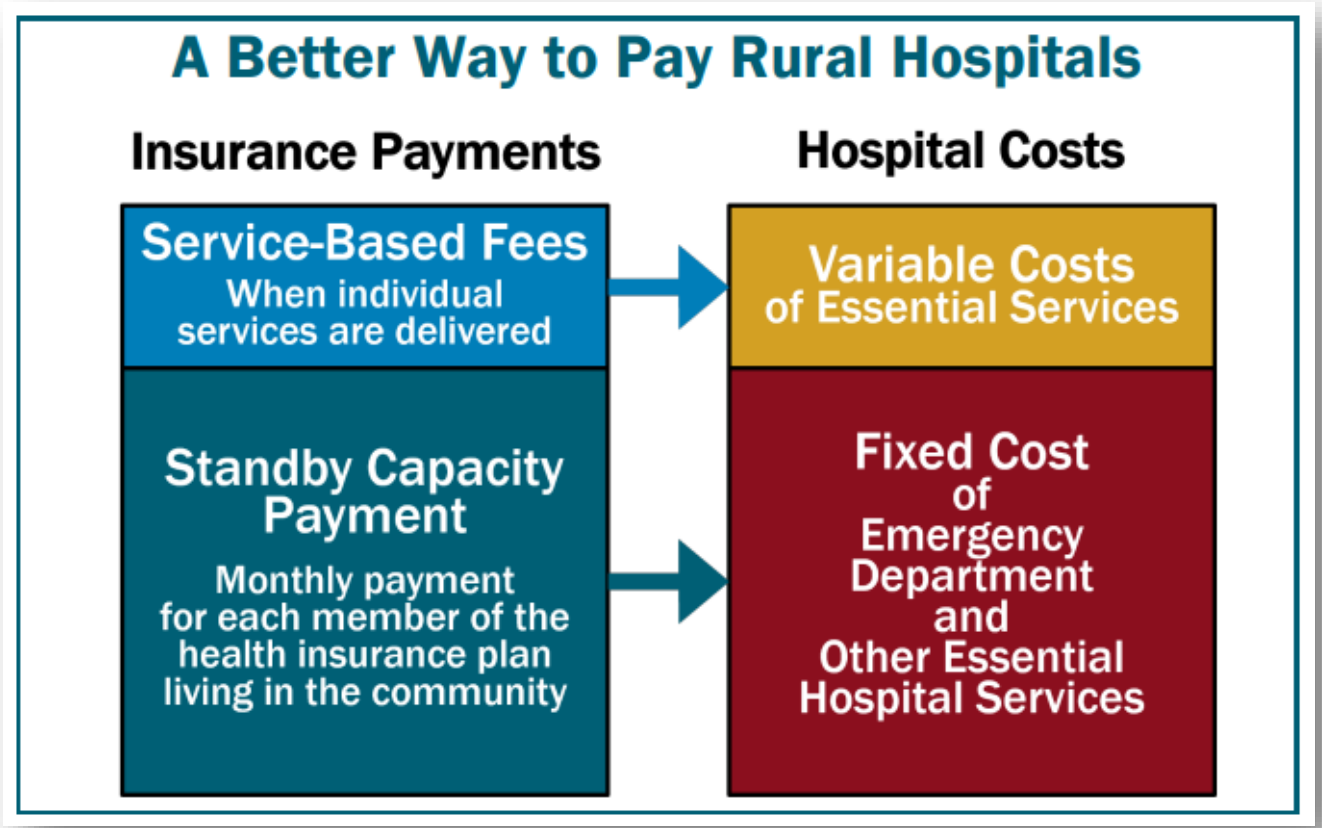


- **Focus on identifying workforce gaps to ensure value and return on investment** – use the metrics from AHRQ, HRSA, etc.
- **Focus on novel payment systems** such as alternative payment models or value-based payments.
- **Focus on patient-centered care, care coordination, integrating behavioral health, addressing social determinants of health, patient self-management, and optimizing health information technology.**

Pennsylvania Rural Health Plan 2025-2030. PARHA, November 2025

Strengthening the Rural Health Workforce to Improve Health Outcomes in Rural Communities. COGME, April 2022.

Analysis of Rural Hospital Payment



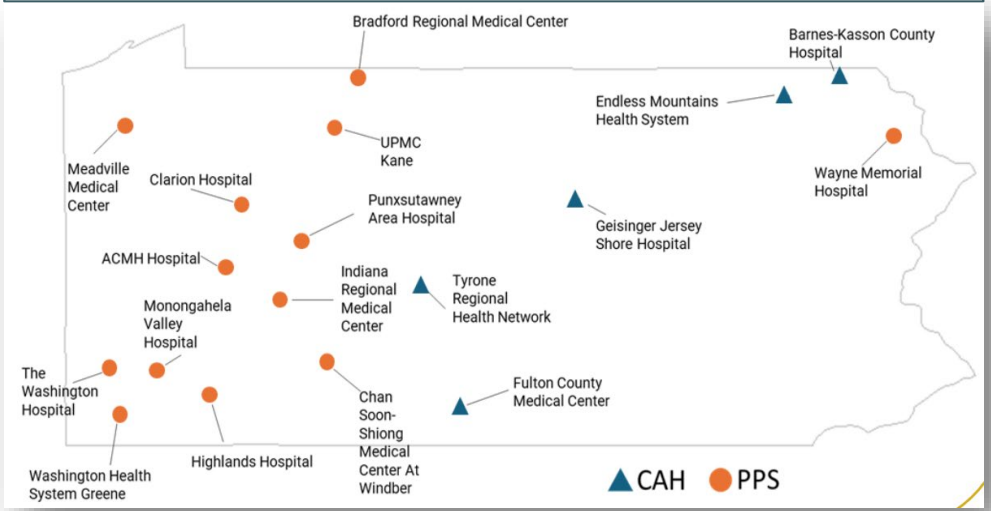
Rural_Hospitals_at_Risk_of_Closing.pdf accessed online on 1/31/2026.

Implement financial sustainability and payment reform

- In 2017, Center for Medicare and Medicaid Innovation provided funds to launch **Pennsylvania Rural Health Model (PARHM)**
- **PARHM is an alternative payment model which transitions eligible rural hospitals from fee-for-service to global budget payments**
  - **Global budget payments** are calculated based on 12 month or 3-year averages
  - Medicare, Medicaid, and participating private insurers provide fixed monthly payments
  - By 2023, 18 hospitals participate with six payors; 5 hospitals are Critical Access Hospitals…estimated net patient revenue of $725 million and approximately 1,000,000 rural lives in PA impacted.

Pennsylvania Rural Health Plan 2025-2030. PARHA, November 2025

PA Rural Health Model Participating Hospitals



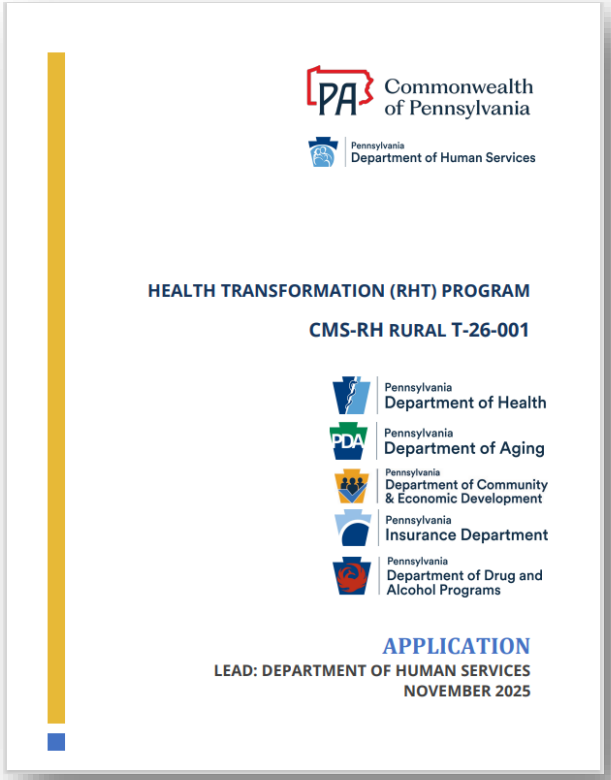
Fourth Annual Report – Findings at a Glance Accessed online on 1/30/2026.

Implement financial sustainability and payment reform

Rural Health Transformation Program (RHTP)

- $50 billion FY 2026-2030
  - 50% appropriately equally to all States
  - 50% appropriated among States as determined by CMS
  - State applications due 12/31/2025.
  - PA was awarded $193,294,054

RHT Program State project abstracts accessed online on 1/30/2026.



Implement financial sustainability and payment reform

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Global Budgets and Alternative Payment Models (APMs)	Reimbursement Reform	Facility Viability
• Fixed monthly payments based on historical volumes • APMs that support team-based care	• Address reimbursement rates • Support Maternal Hubs with Per Member Per Month payments and value-based contracts	• Ensure rural hospital viability through sustainable funding, operational efficiency, and designating Critical Access Hospitals & Rural Emergency Hospitals when appropriate

4. Foster regional collaboration and community-integrated care

- **Build and expand effective collaboration, coordination, and trust** with partners at local, state, and national levels to address rural health needs.
- **Recognize and respect** the multiple factors influencing the health and well-being of our rural communities.
- **Promote "bidirectional exchange"** of learners between rural health providers and academic medical centers.

Figure 3. Types of Organizations to Learn More About In Your Rural Community

Type	Examples
Behavioral Health and Substance Abuse	• Community Mental Health Center (CMHC) • Private Mental Health Provider
Long- Term and End-of-Life Care	• Palliative Care • Home Health Agency • Swing beds • Skilled Nursing Facility (SNF) • Hospice
Primary Care	• Rural Health Clinic (RHC) • Health Center/FQHC • Private clinic
Acute and Tertiary Care	• Critical Access Hospital (CAH) • Rural Referral Center (RRC) • Sole Community Hospital (SCH) • Medicare-Dependent Hospital (MDH) • Disproportionate Share Hospital (DSH) • Regional Tertiary Hospital
Public Health	• State Health Department • Local Health Department/Unit • Rural Cooperative Extension
Law Enforcement	• Juvenile Justice • Law Enforcement
Economic Development	• Community Development Financial Institution (CDFI) • Academic Health Department
Housing	• Public Housing Agency (PHA)
Community-based Organizations	• Faith-based Organization • Senior Citizen Center
Education	• Trade schools, colleges/universities, etc.
Other	• Foundations • Charitable organizations • Local businesses

Pennsylvania Rural Health Plan 2025-2030. PARHA, November 2025, Cohn, J, *et al*. Academic-rural Partnerships Need Bidirectionality. *Academic Medicine*. Sept 2025;100(9):999, and A Guide for Rural Health Care Collaboration and Coordination accessed online on 1/31/2026.

PA Area Health Education Centers

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PA AHEC
AREA HEALTH EDUCATION CENTER

Mission and Vision

Improve health and wellness by collaboratively developing and providing education programs to enhance community health and broaden the distribution of the health workforce, particularly for rural and vulnerable communities in Pennsylvania.

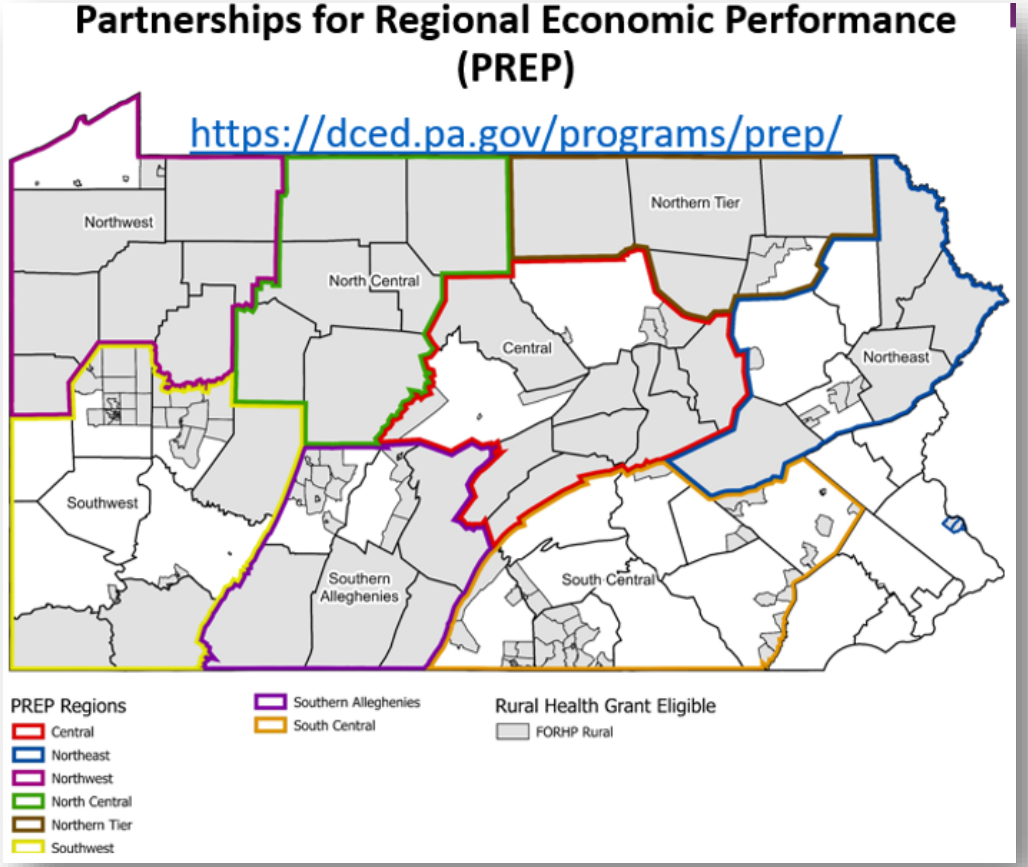
Accessed online at PA AHEC | Scholars Program | Home on 1/31/2026.

Core Topic Areas:

- Social determinants of health
- Cultural competency
- Behavioral health integration
- Practice transformation
- Interprofessional education
- Connecting Communities and Supporting Health Professionals
- Virtual Learning and Telehealth

Regional Care Collaboratives (RCCs)

- **RCCs use traditional PREP regions and will engage**:
  - Health Care Providers;
  - Business & Economic Development;
  - Hospitals, FQHCs, public health officials;
  - Educational Institutions;
  - Community-based organizations and non-profits; and,
  - State and local elected officials.
- **RCCs will prioritize CMS initiatives** to meet regional healthcare needs (primary care, specialists, telehealth, shared services, etc.)



Foster regional collaboration and community-integrated care

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Rural Care Collaboratives (RCCs)	Community Wellness Hubs	Partnerships
• Establish regional RCCs of diverse stakeholders to prioritize local needs and manage regional health initiatives	• Create hubs as a central point for wellness navigation, connecting residents to social supports and preventative care	• Strengthen partnerships between health systems, academic institutions, and community-based organizations

5. Prioritize access for vulnerable populations and critical services

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Vulnerable populations:

- **Individuals more likely to experience poor health outcomes due to income and education levels, age, disability, geographic location, cultural and linguistic barriers, and more**.
- **Reducing barriers to care potentially reduces cost of health care and leads to community economic benefit.**
- **Strengthens public health preparedness and response** since vulnerable groups are disproportionally affected during public health emergencies.

PA Health Transformation Program CMS-RH Rural T-26-001, November 2025.

PA Priority Vulnerable Populations:

- Maternal Health
- Behavioral Health
- Aging & Disability

PA Health Transformation Program CMS-RH Rural T-26-001, November 2025.

Comprehensive Maternal Health Hubs

Regional Maternal Health Hubs serve as centralized access points for comprehensive, coordinated maternity care.

Maternal Health Hubs Core Functions:

- **Provide comprehensive care function and navigation** for patients from preconception - 12 months postpartum, and for newborns to 1 year of life.
- **Recruit and manage multi-disciplinary teams based on regional needs**.
- **Initiate behavioral health** with screening & referral to tele-behavioral health, mobile outreach, TiPS, etc.
- **Lead regional quality improvement and maternal health innovation**.
- **Develop regional infrastructure strategies for maternal health** focused on building the maternal health workforce – OB, FM trained in OB, etc.

Prioritize access for vulnerable populations and critical services

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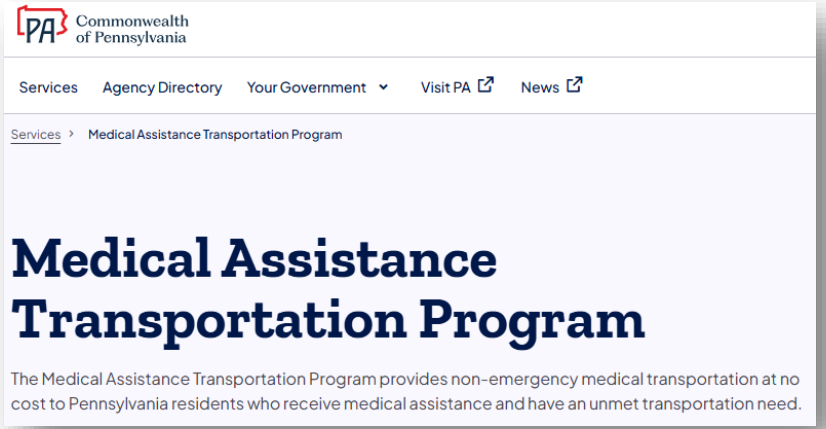
Maternal Health	Behavioral Health	Aging and Long-Term Care
• Establish comprehensive maternal health hubs • Reopen L&D units • Utilize remote monitoring	• Expand 988 crisis line • Implement “bridge” clinics for SUD • Utilize psychiatric consultant (TiPS) program to support primary care	• Expand PACE/LIFE (Program for All-Incluside Care for the Elderly) model • Invest in long-term care QI • Utilize community paramedicine to facilitate “hospital-to-home” transitions

6. Address transportation and emergency services barrier

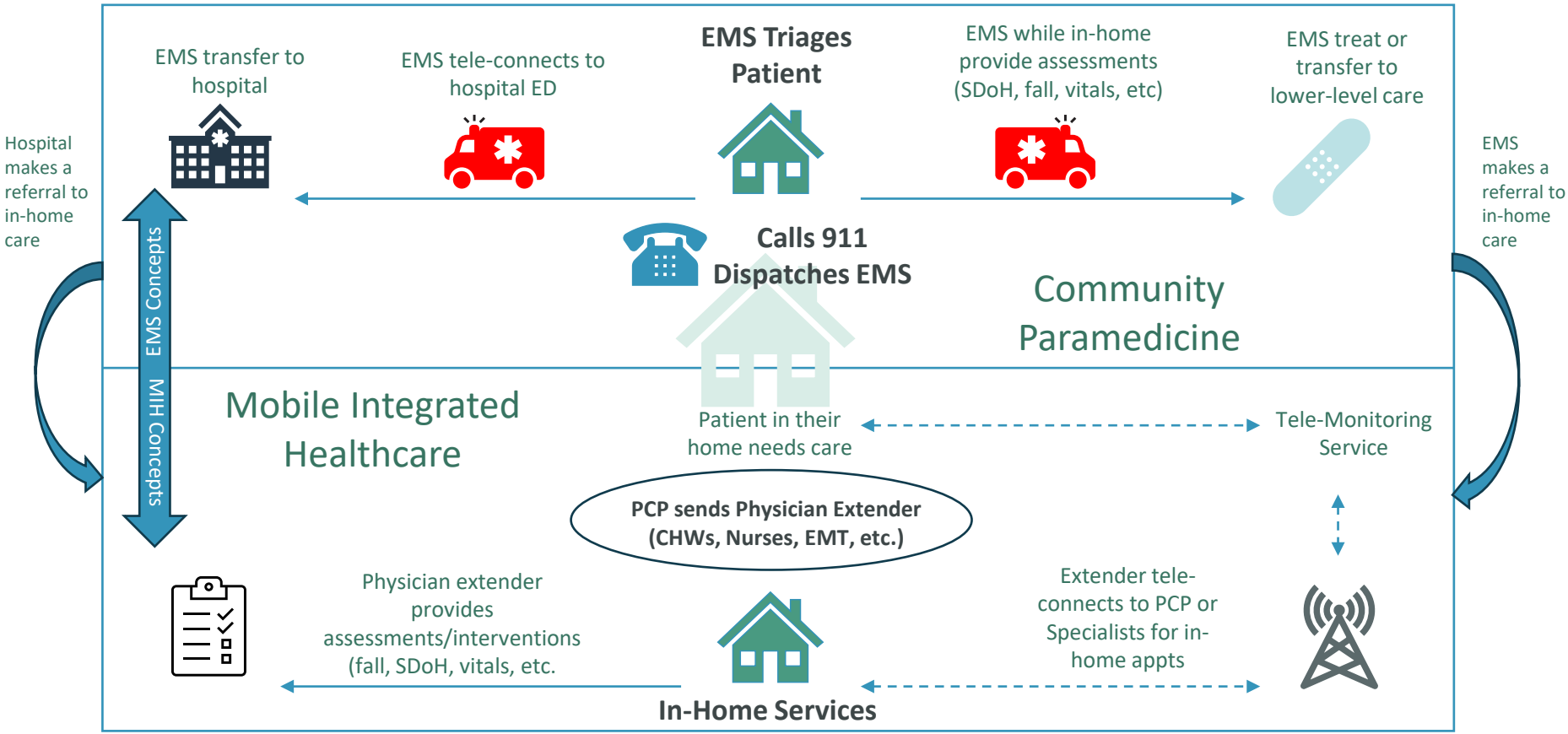
"EMS is the frontline of care in rural communities, but agencies struggle with outdated fleets, underfunding, and workforce instability."

PA Health Transformation Program CMS-RH Rural T-26-001, November 2025.



Medical Assistance Transportation Program | Commonwealth of Pennsylvania Accessed online on 1/31/2026.

Re-imagining Rural Healthcare



Adapted *from Next Generation Working Session*. Rural Health Redesign Center Presentation 5/14/2025 and assessed on Community Paramedicine Overview - Rural Health Information Hub on 2/14/2026..

Address transportation and emergency services barrier

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EMS Modernization

- Stabilize workforce through recruitment campaigns and bonuses
- Modernize ambulance fleets
- Develop regional triage systems

Transportation Solutions

- Expand non-emergency medical transportation flexibility
- Invest in ride-share programs
- Combine with mobile health units to bring care directly to residents

Summary

- Rural populations have a 20% higher age-adjusted mortality rate than urban populations.
- Using a population health framework can be helpful for improving health outcomes by examining the goals, the causes, and the levers impacting a population's health.
- Focusing on workforce, digital infrastructure, financial reform, community-integrated care, care of the most vulnerable, and transportation/EMS are possible mechanisms to facilitate change in rural population health.

Discussion

John Boll, DO, FAAFP

UPMC Rural Family Medicine Residency

bolljn@upmc.edu

UPMC Rural Family Medicine Residency (@ruralfmresidency) | Instagram

UPMC Rural Family Medicine Residency | Williamsport PA | Facebook

UPMC Rural Family Medicine Residency | North Central Pa.

Social *Drivers* of Health

Scott Brown, DO, FAAFP
UPMC Shadyside FM Residency
2026 Donald B. Middleton, MD
Refresher Course in Family Medicine

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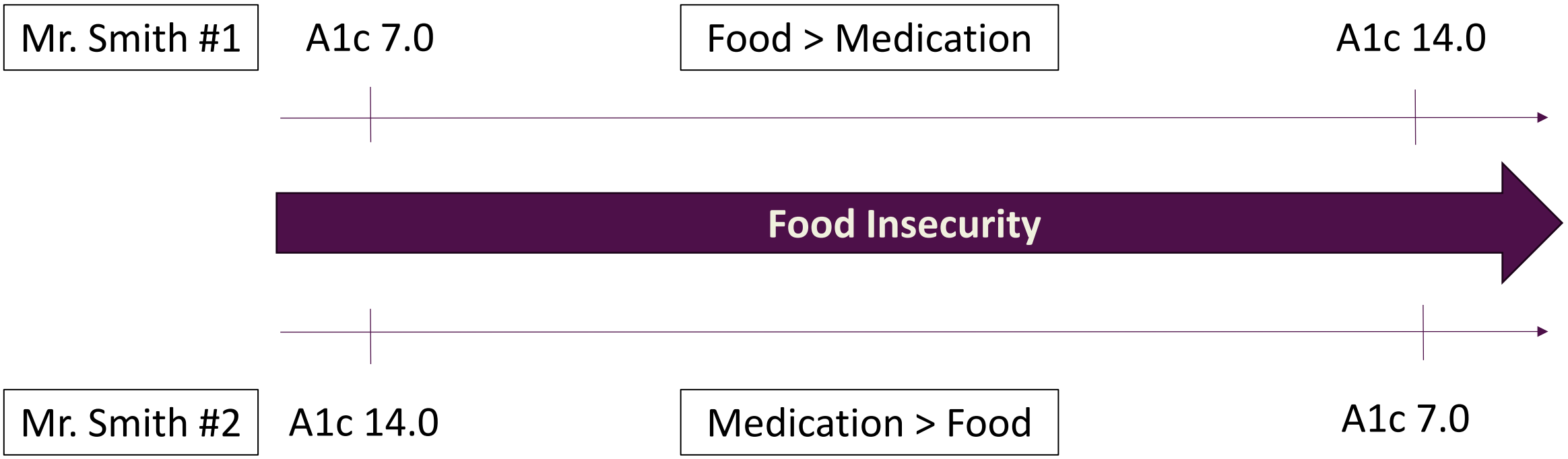
Objectives

- Describe the emergence of Social Determinants of Health within the medical literature.
- Utilize a four-step process to combat Social *Drivers* of Health in a primary care setting.


Mr. Smith #1
A1c 7.0
Food > Medication
A1c 14.0
Food Insecurity
Mr. Smith #2
A1c 14.0
Medication > Food
A1c 7.0

Rudolf Virchow (1848)

The first explicit articulation in medical literature that health outcomes are socially produced, not merely biologically determined:

"Medicine is a social science, and politics is nothing but medicine on a large scale."

"Social Determinants of Health"

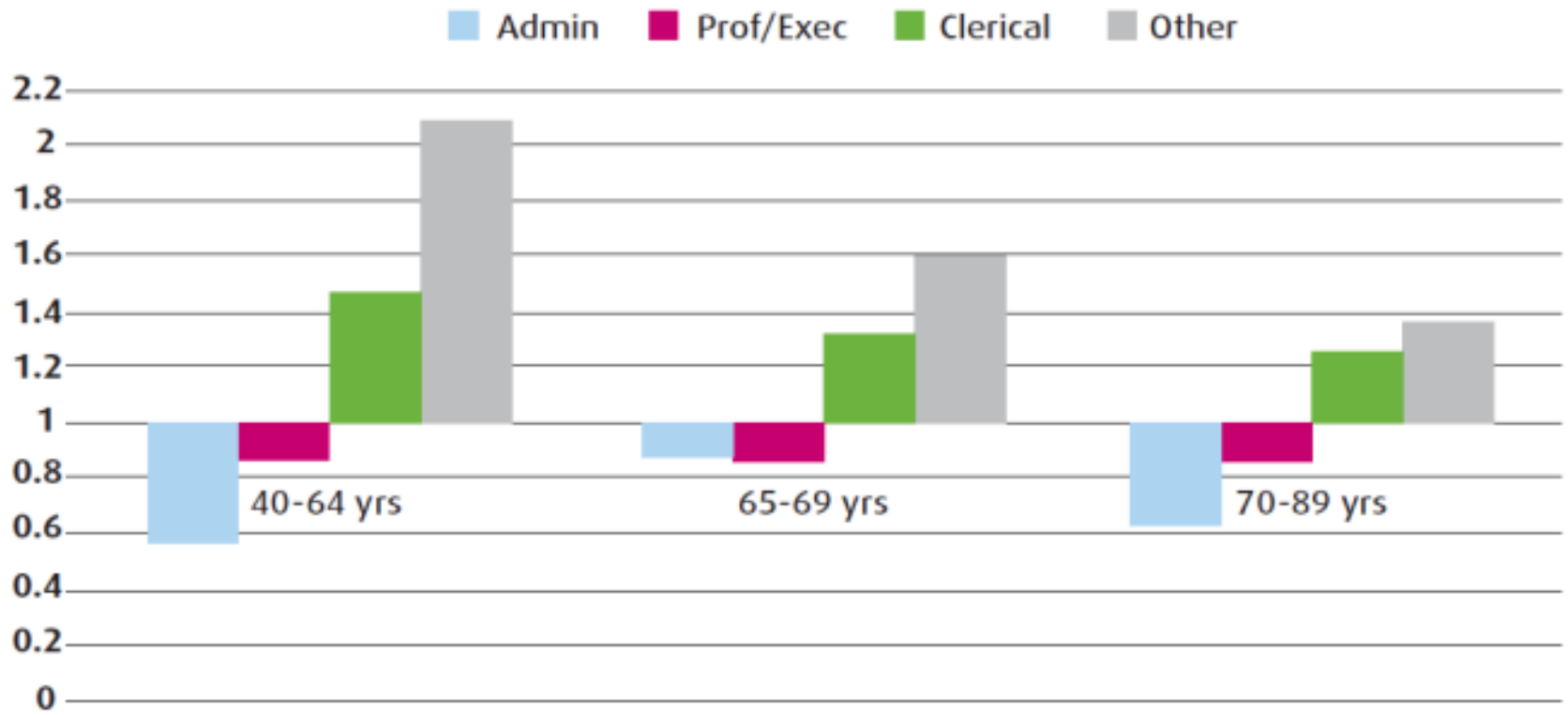


Figure 1 shows the death rate in each grade relative to the average for the whole civil service population (set at 1). The Administrators have about half the average mortality at age 40-64 yrs, while the office support staff who make up the 'other' grade have about twice the average. Hence there is a four-fold difference between the bottom and top grade.

Marmot MG, Smith GD, Stansfeld S, et al. Health inequalities among British civil servants: the Whitehall II study. *Lancet*. 1991;337(8754):1387-1393. doi:10.1016/0140-6736(91)93068-k

WHO's Commission on Social Determinants of Health

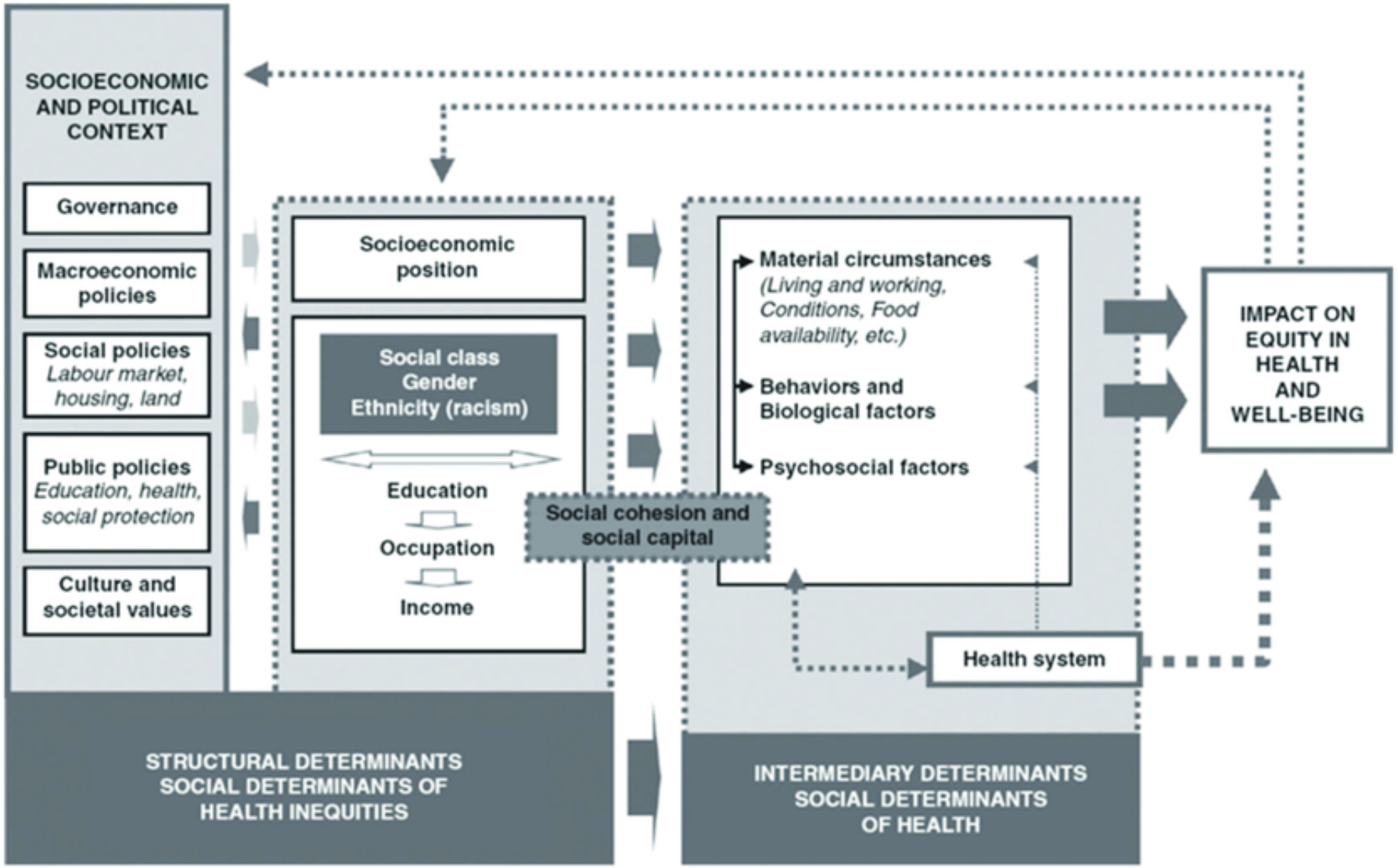
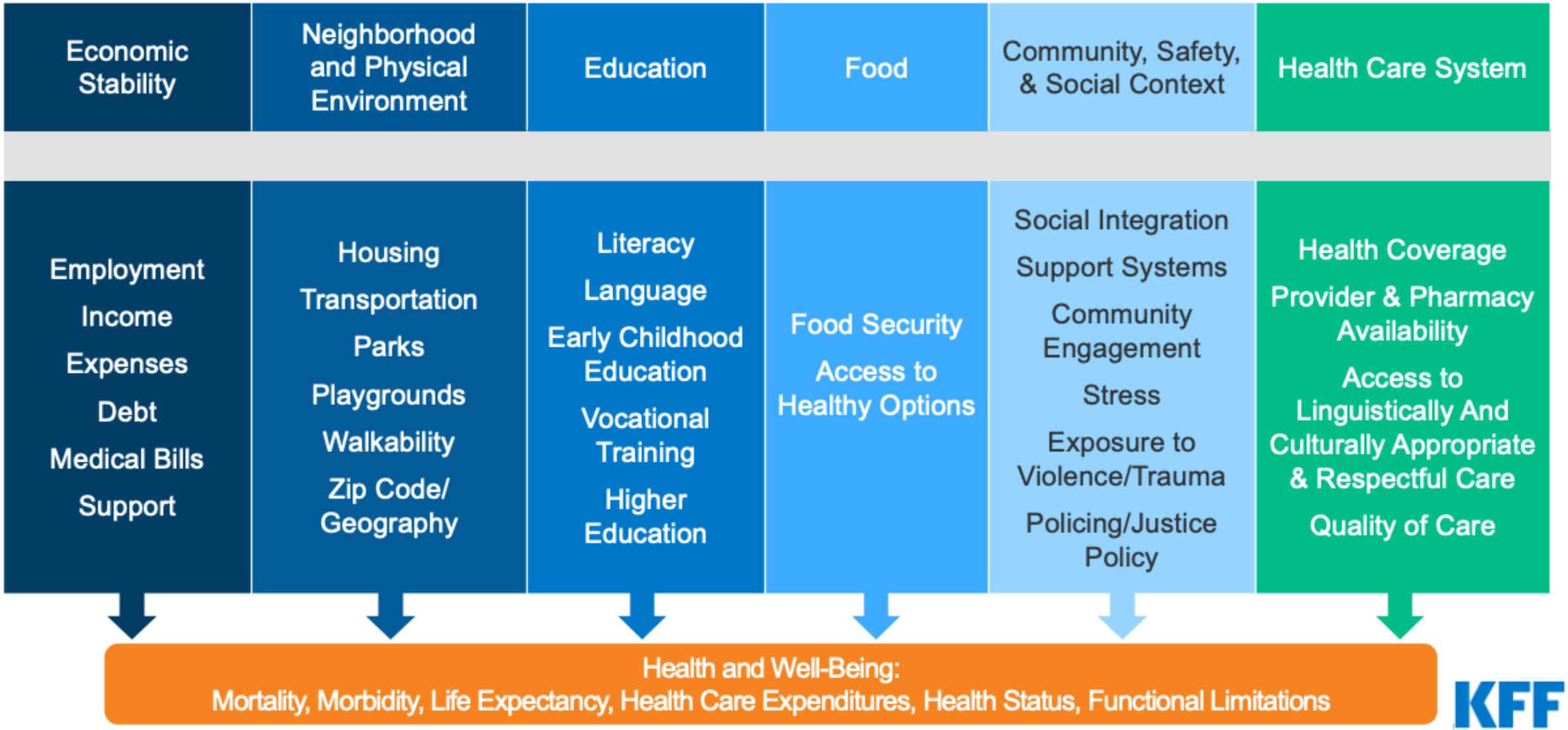


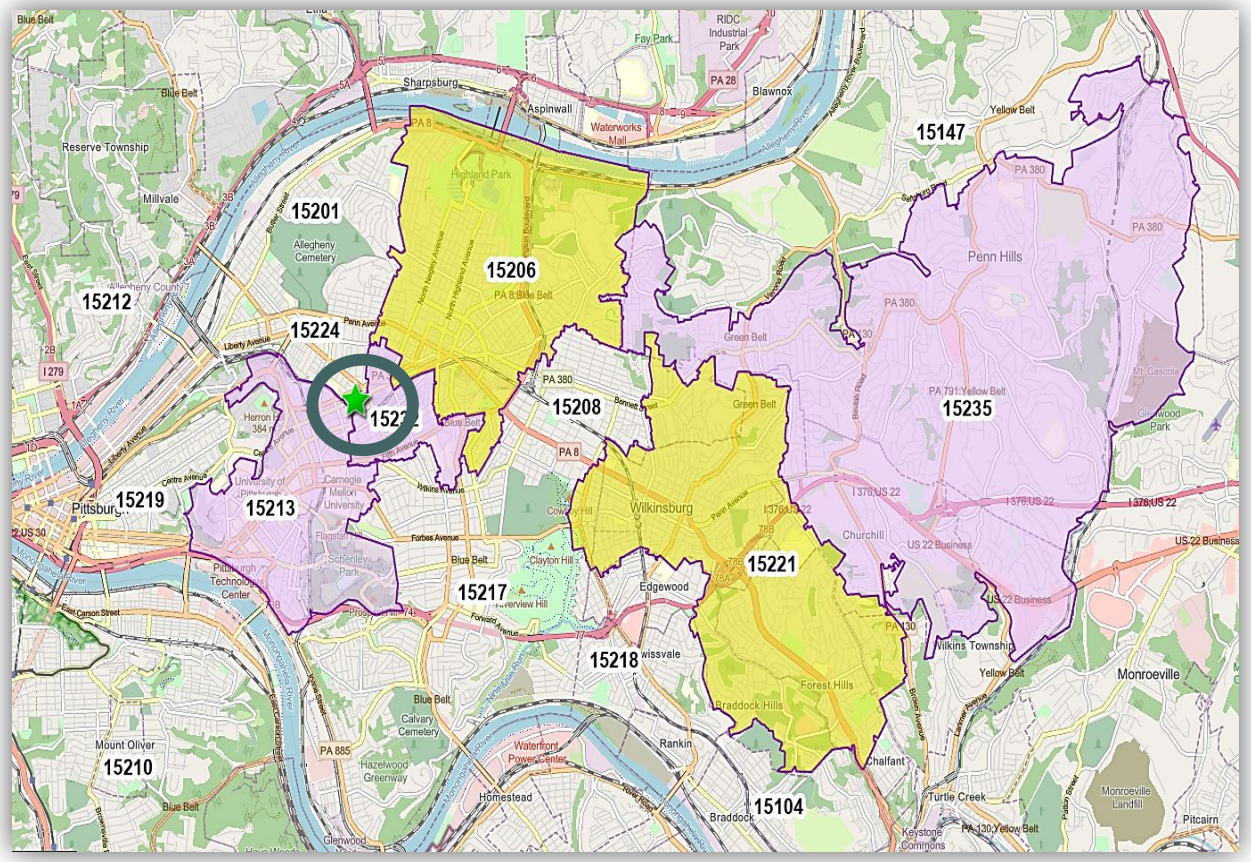
Figure 1

Social Determinants of Health



Social Drivers of Health at the UPMC Shadyside Family Health Center (2025)

Social Driver	% Affected
Moderate to High Isolation	67%
Not Enough Physical Activity	61%
Food Insecurity	36%
Stress	36%
Transportation Insecurity	21%
Alcohol Misuse	21%
High Tobacco Risk	19%
High Risk Housing	18%



News | Articles | October 23, 2024

Social Determinants of Health Linked to Higher Health Care Costs, Payer Expenditures

Author(s) Giuliana Grossi

- **Educational attainment:** Medicaid beneficiaries with a high school diploma or GED had on average $2245.39 lower annual expenditures than those with less than a high school education (95% CI, −$3700.97 to −$789.80)
- **Social isolation:** Medicaid beneficiaries who often felt isolated had $2706.94 higher annual health care costs than those who did not experience isolation (95% CI, $1339.06-$4074.82).
- **Neighborhood and built environment:** Medicare beneficiaries living in neighborhoods with fewer parks faced $5959.27 higher annual costs compared with those in park-rich areas (95% CI, $1679.99-$10,238.55).

Grossi G. Social determinants of health linked to higher health care costs, payer expenditures. *American Journal of Managed Care*. Published October 23, 2024. Accessed February 2, 2026. https://www.ajmc.com/view/social-determinants-of-health-linked-to-higher-health-care-costs-payer-expenditures

NEJM Catalyst

JOURNAL

ARTICLE

The Impact of Supplemental Nutrition Assistance Program (SNAP) Enrollment on Health and Cost Outcomes

Authors: Lisa Dillman, PhD, MEd, Joan Eichner, DrPH, MPH, MPA, Ashley Humienny, MBA, Suzanne Kinsky, PhD, MPH, Qingfeng Liang, MS, MA, Elaine Yuen Ling Kwok, PhD, CCC-SLP, and Julian Xie, MD, MPP Author Info & Affiliations

Published May 17, 2023 | NEJM Catal Innov Care Deliv 2023;4(6) | DOI: 10.1056/CAT.22.0366 | VOL. 4 NO. 6

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SNAP enrollees' total cost of care was **lower by 16%** (β = −0.18, *P* = 0.01). Similarly, SNAP enrollment status also significantly predicted pharmacy cost in years 1 and 2. SNAP enrollees' pharmacy costs were **21%** (β = −0.24, *P* = 0.01) and **20%** (β = −0.22, *P* = 0.02) lower than non-SNAP enrollees during years 1 and 2, respectively.

Food Insecurity: Screening

March 11, 2025

Recommendations made by the USPSTF are independent of the U.S. government. They should not be construed as an official position of the Agency for Healthcare Research and Quality or the U.S. Department of Health and Human Services.

Read the Full Recommendation | Read the Full Recommendation in *JAMA* (FREE) | Download *JAMA* PDF

Recommendation Summary

Population	Recommendation	Grade
Children, adolescents, and adults	The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening for food insecurity on health outcomes in the primary care setting.	I

1.7 During clinical encounters, assess for social determinants of health, including food insecurity, **(A)** housing insecurity, financial barriers, health insurance and health care access, environmental and neighborhood factors, and social capital/social community support, **(B)** to inform treatment decisions, with referral to appropriate local community resources.

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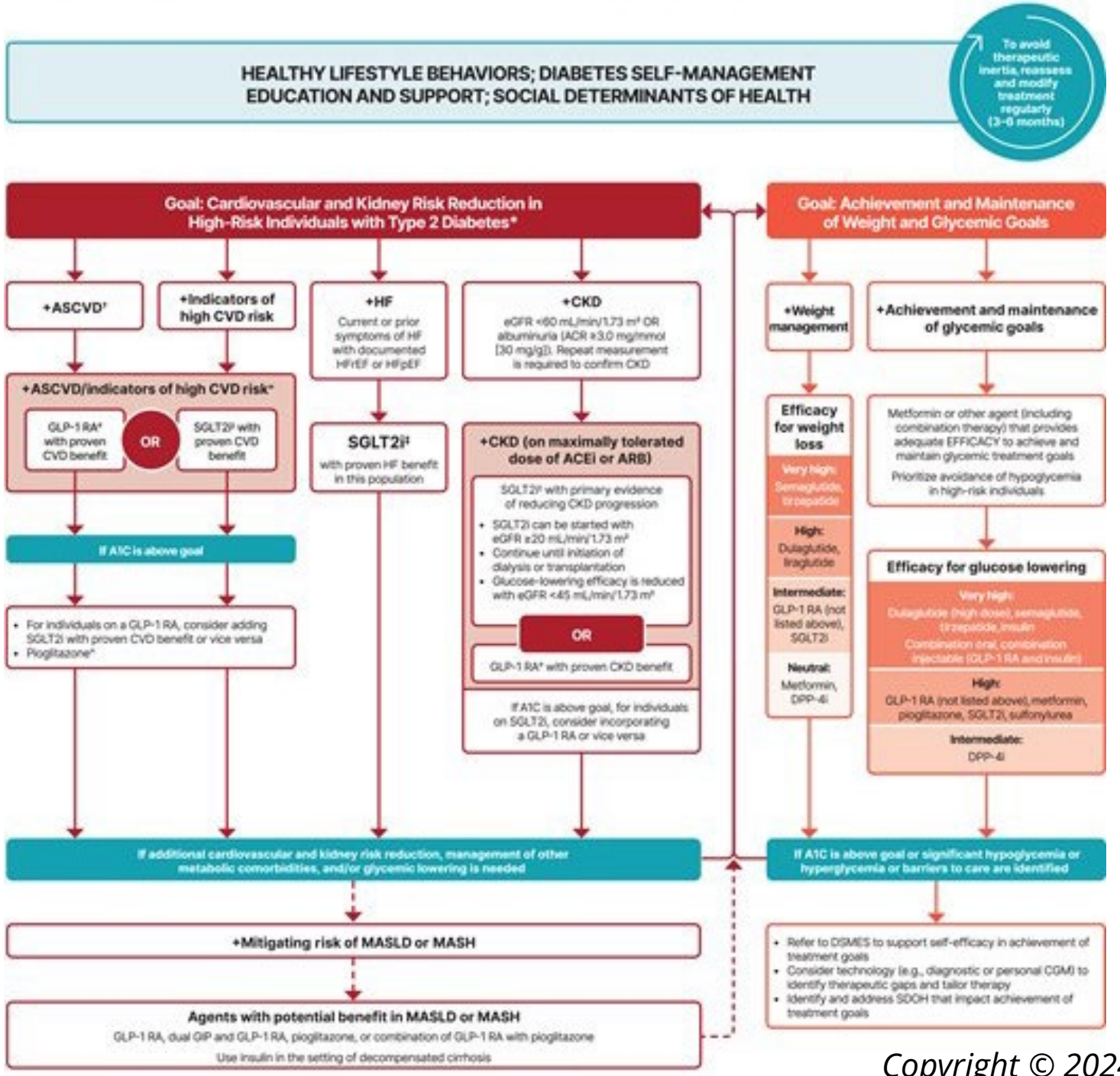

UPMC LIFE CHANGING MEDICINE

American Diabetes Association®

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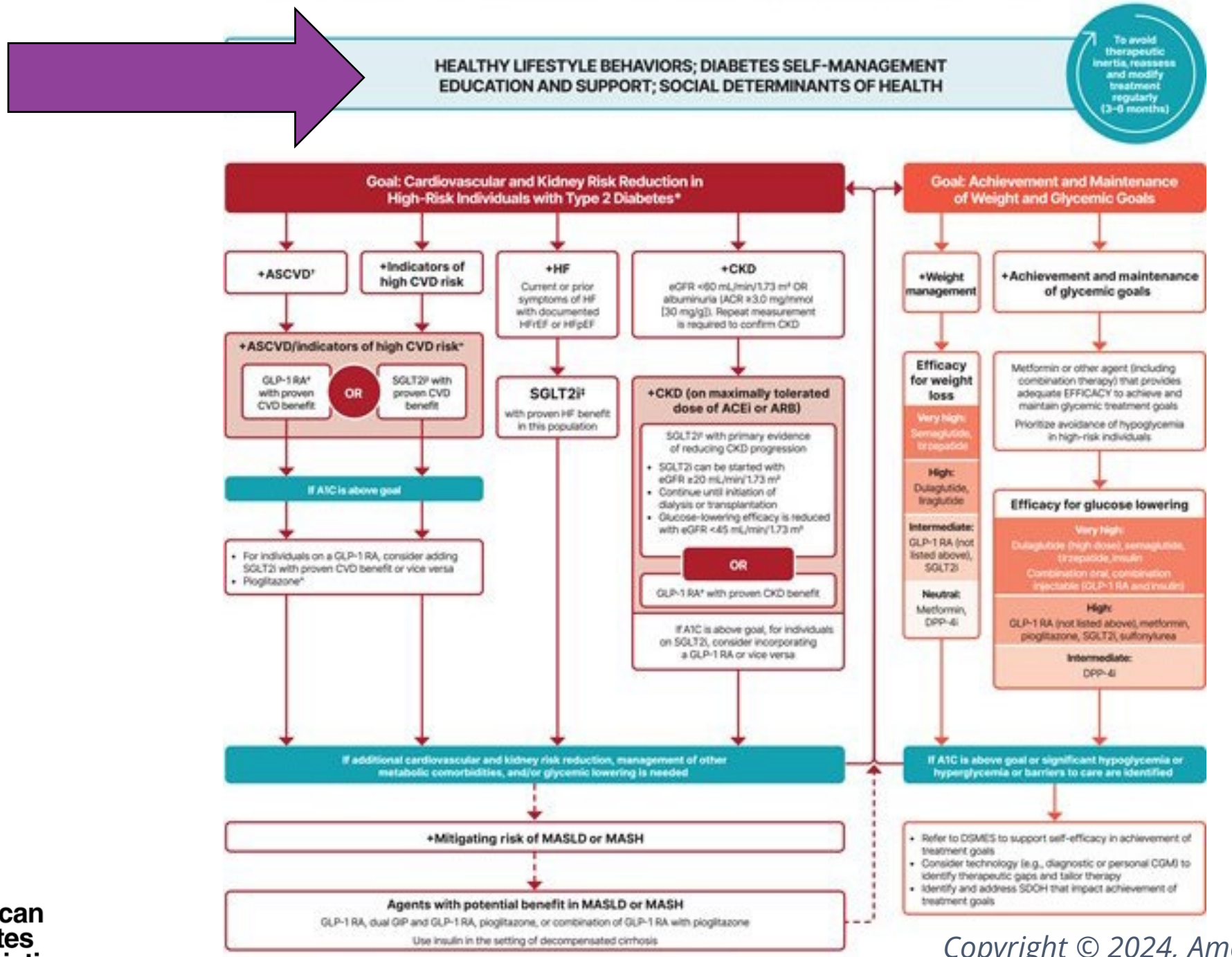

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HEALTHY LIFESTYLE BEHAVIORS; DIABETES SELF-MANAGEMENT EDUCATION AND SUPPORT; SOCIAL DETERMINANTS OF HEALTH

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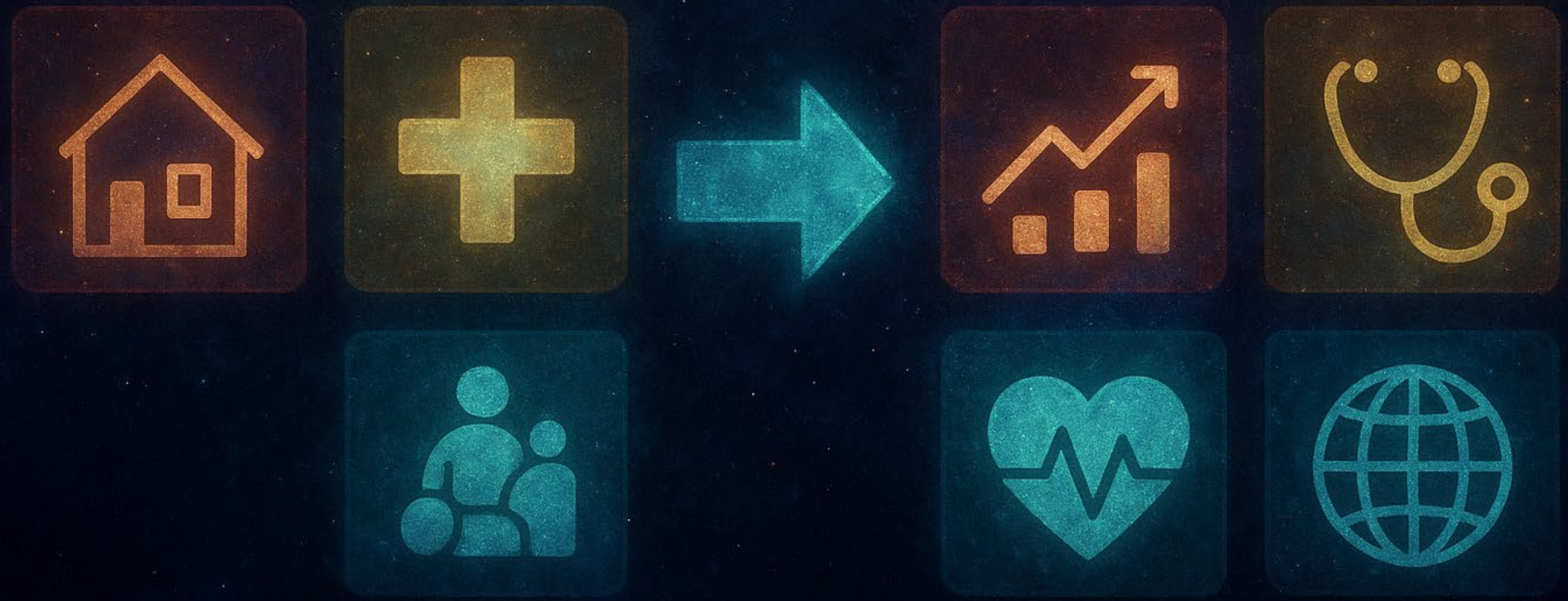
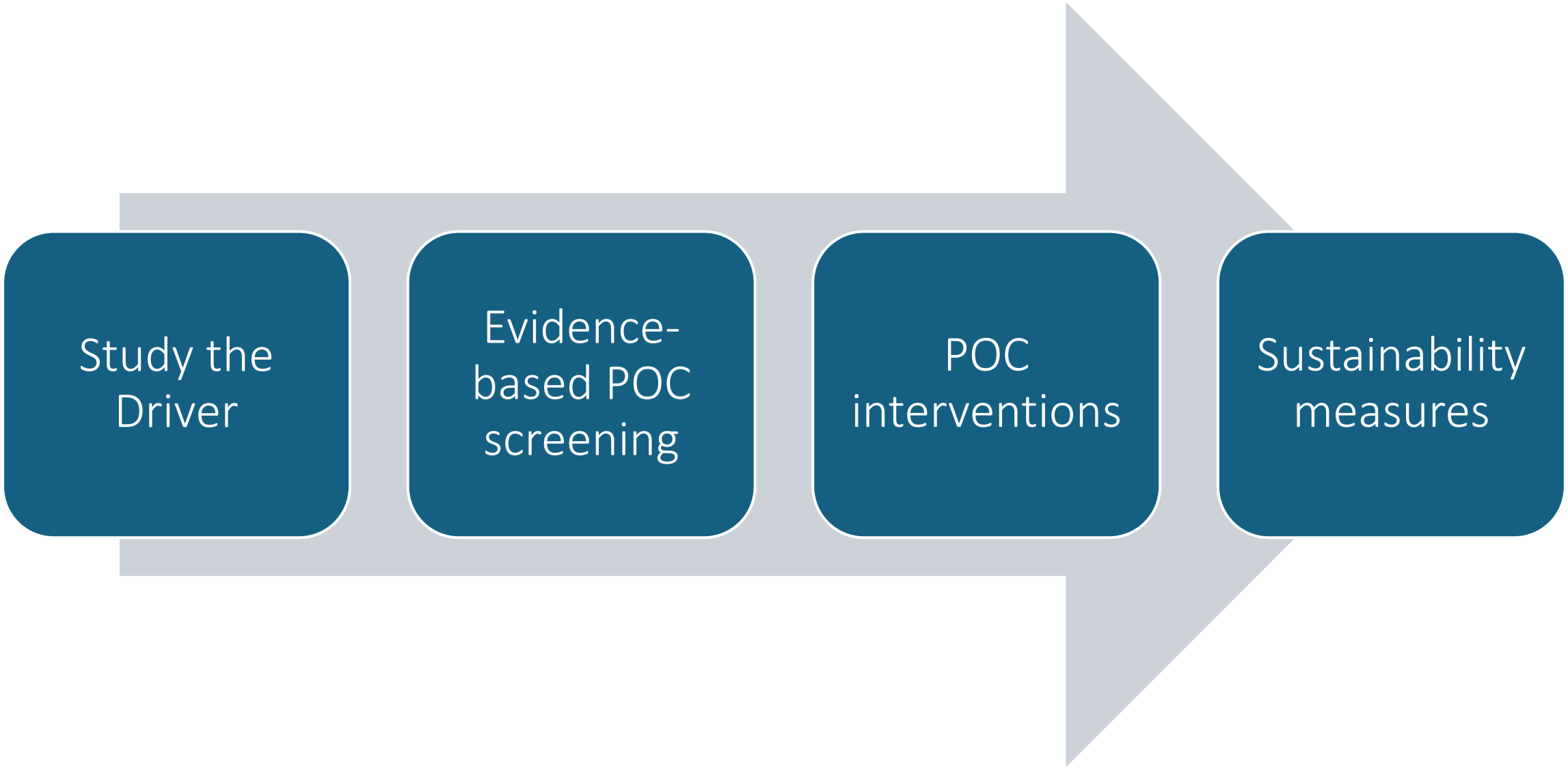
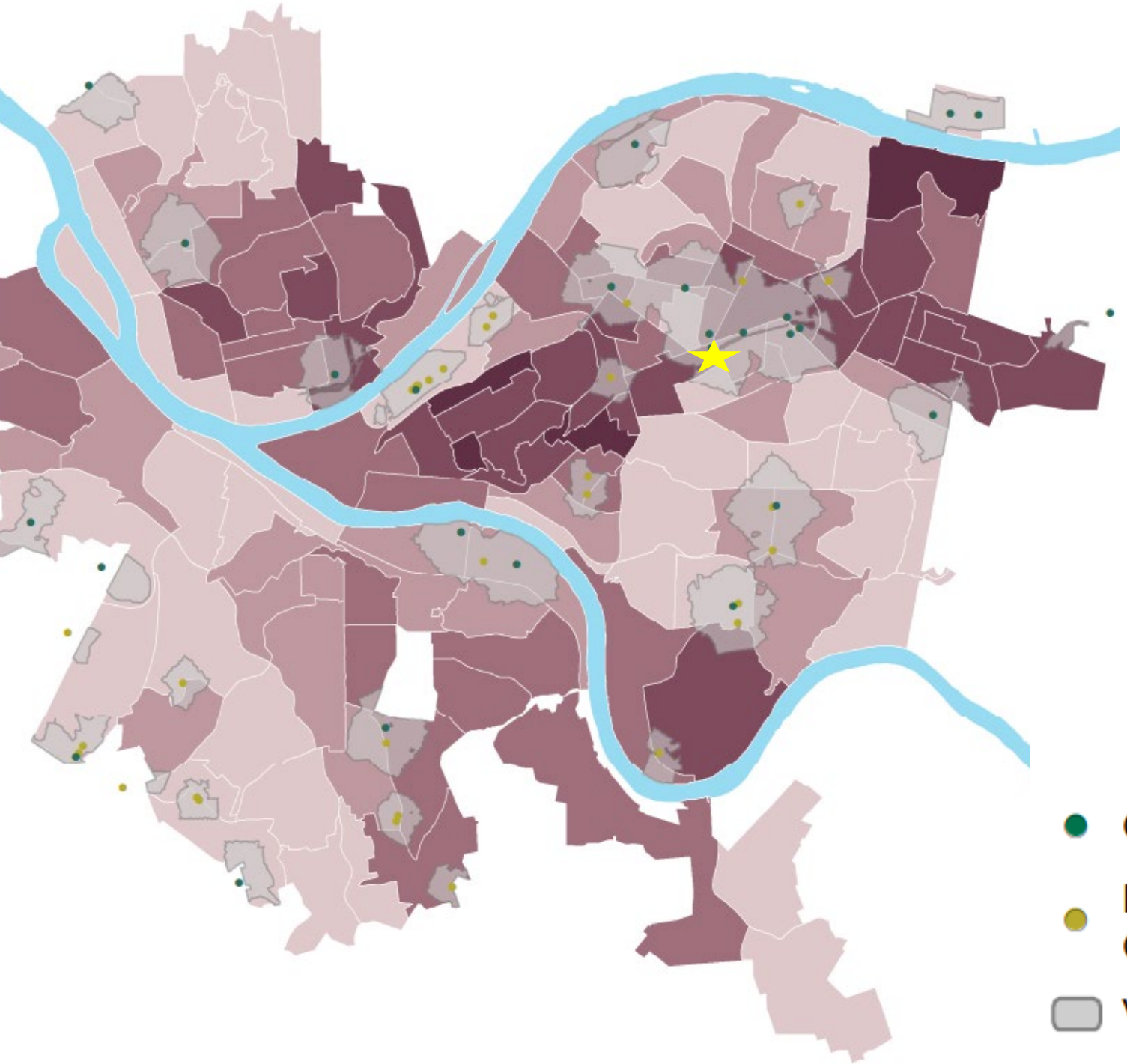
SOCIAL DETERMINANTS OF HEALTH

SOCIAL DRIVERS OF HEALTH




Study the Driver
Evidence-based POC screening
POC interventions
Sustainability measures



Grocery Stores

Ethnic Markets and Convenience Stores

Walksheds

Percentage of Households with No Vehicle Access

0% - 12.2%

12.3% - 23.7%

23.8% - 35.8%

35.9% - 58.7%

58.8% - 84.1%

UPMC Shadyside FHC Patients from Food Deserts or Food Swamps Served Between 7/1/2020 – 6/30/2023

Community	Unique Patients	Unique Encounters
Wilkinsburg	1,234	7,491
The Hill District	1,195	5,706
Penn Hills	647	3,688
East Liberty, Homewood	572	3,142
Bloomfield, Garfield	513	2,578
North Side	335	1,600
TOTAL	**4,496**	**24,205**

UPMC LIFE CHANGING MEDICINE

Hunger Vital Sign (Screening Tool)

1. "Within the past 12 months, we worried whether our food would run out before we got money to buy more."

   ◯ Often true ◯ Sometimes true ◯ Never True ◯ Don't know

2. "Within the past 12 months, the food we bought just didn't last and we didn't have money to get more."

   ◯ Often true ◯ Sometimes true ◯ Never True ◯ Don't know

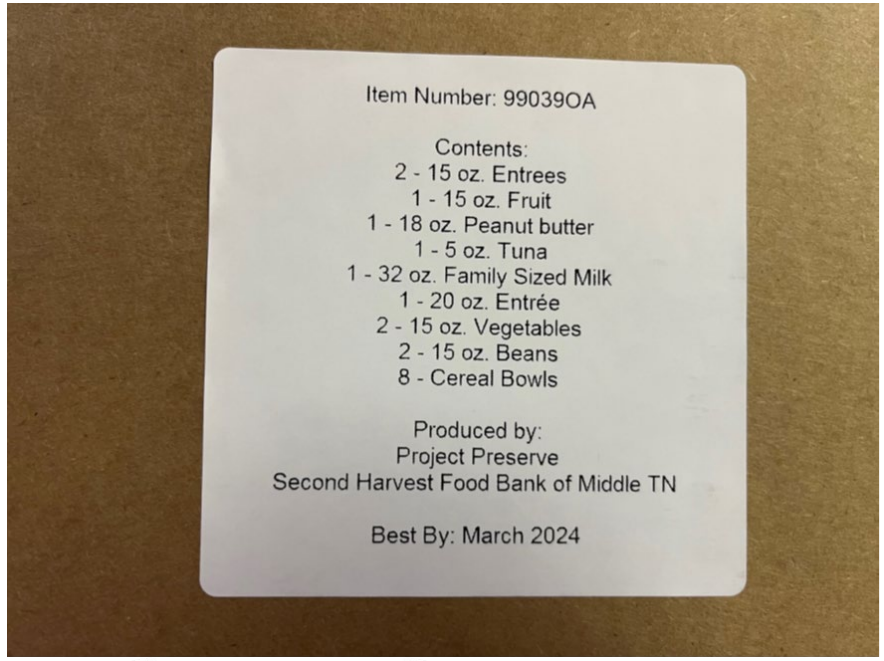
Patients screen positive for food insecurity if the response is "often true"or "sometimes true" for either or both statements.

Hager ER, Quigg AM, Black MM, et al. Development and validity of a 2-item screen to identify families at risk for food insecurity. *Pediatrics*. 2010;126(1). doi:10.1542/peds.2009-3146

UPMC LIFE CHANGING MEDICINE

Point-of-Care Interventions

Food Boxes



Food Bucks Rx

Shadyside Hospital Foundation
Founded in 1975

Greater Pittsburgh community food bank

The FOOD TRUST

Objectives Towards Increasing Food Security

Food Availability

The production, transportation, and distribution of adequate food to a population, or the availability of local and wild foods or food reserves

Improve **Distribution** of food to people

Address **Transportation** of people to food

Food Access

The ability to afford healthy food

Reduce Cost Barriers to purchasing healthy food

Provide **Workforce Development** protections and opportunities – especially with *growing* and *cooking* food

Food Utilization

Adequate knowledge about nutrition and food preparation to make healthy choices

Enable people to **Grow** their food to increase familiarity and establish norms around fresh vegetables

Enable people to **Cook** healthy foods

Create opportunity for a **Cultural Shift** around how we eat and waste food

Food System Stability

Ability to withstand shocks and stressors without collapsing

Support Institutions that develop and bolster urban and regional agriculture

Where to Earn Food Bucks in Western PA
This map was made with Google My Maps. Create your own.
Pittsburgh
Ross Township
Glenshaw
West View
Emsworth
Bellevue
Kennedy Township
McKees Rocks
O'Hara Township
Fox Chapel
Oakmont
Verona
Cheswick
Pittsburgh Zoo & Aquarium
Penn Hills
Wilkinsburg
Swissvale
Monroeville
Carnegie
Scott Township
Dormont
Mt Lebanon
Homestead
Munhall
Kennywood
North Versailles
West Mifflin
Google My Maps
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Keyboard shortcut

SNAP (food stamps)	SNAP helps make ends meet by providing money to buy groceries. We can help you with the application process. Income guidelines increase yearly. See if you qualify today!
LIHEAP	The Food Bank can help you apply for LIHEAP along with a SNAP application. This program provides heating assistance.
Medical Assistance	You can apply for medical assistance along with a SNAP application. This program provides healthcare coverage.
Drive-up or Walk-in Distributions	Whether you prefer to drive-up or walk-in, everyone is eligible to attend monthly food distributions throughout our service area. No pre-registration is required.
Local Food Pantry	Our network of partners and programs reaches 11 counties of southwestern PA. The Food Bank can help you find the most convenient food pantry for you.
Senior Boxes	Seniors who are 60 and older and meet income requirements can get a box of self-stable food monthly. The Food Bank can help you apply.
Food for Kids and Teens	Many schools and community sponsors offer free or low-cost meals for children in the summer and during the school year. The Food Bank can help you find a location near you.
Employment Resources	The Food Bank can connect you with partners who can help with finding employment, learning new skills, resume writing and more.
Financial Wellness	The Financial Empowerment Center can help with saving more money, budgeting, improving your credit score and more. The Food Bank can make a connection for you.
The Market	The Market, in partnership with Giant Eagle, is the Food Bank's on-site food pantry. Located at our warehouse in Duquesne.

AMERICORPS
A

The FOOD
TRUST

Shadyside Hospital Foundation
Founded in 1975

UPMC
HEALTH
PLAN

Greater Pittsburgh
community
food bank

giant
eagle

Impact Thus Far

Food Boxes

- 3/2021 – present
- Over 3,000 boxes
- 2026 Projection: over 900 boxes

1000’s of referrals to the GBCFB

Food Bucks Rx

- 10/2023 – present
- Over $245,000
- 2026 Projection: over $100,000

Over 30 Different Fresh Food Partners for our Patients

SNAP cuts seen hitting family, grocery store budgets hard

Dave Ress Aug 26, 2025 3

The Market at 25th in Richmond, shown in this 2019 file photo, raised concerns about cuts in SNAP be
MARK GORMUS, TIMES-DISPATCH

2025

LEGISLATION:

"One Big Beautiful Bill"

Being Debated In Senate

CONGRESSIONAL BUDGET OFFICE

Cuts $300 Billion

Over 10 Years

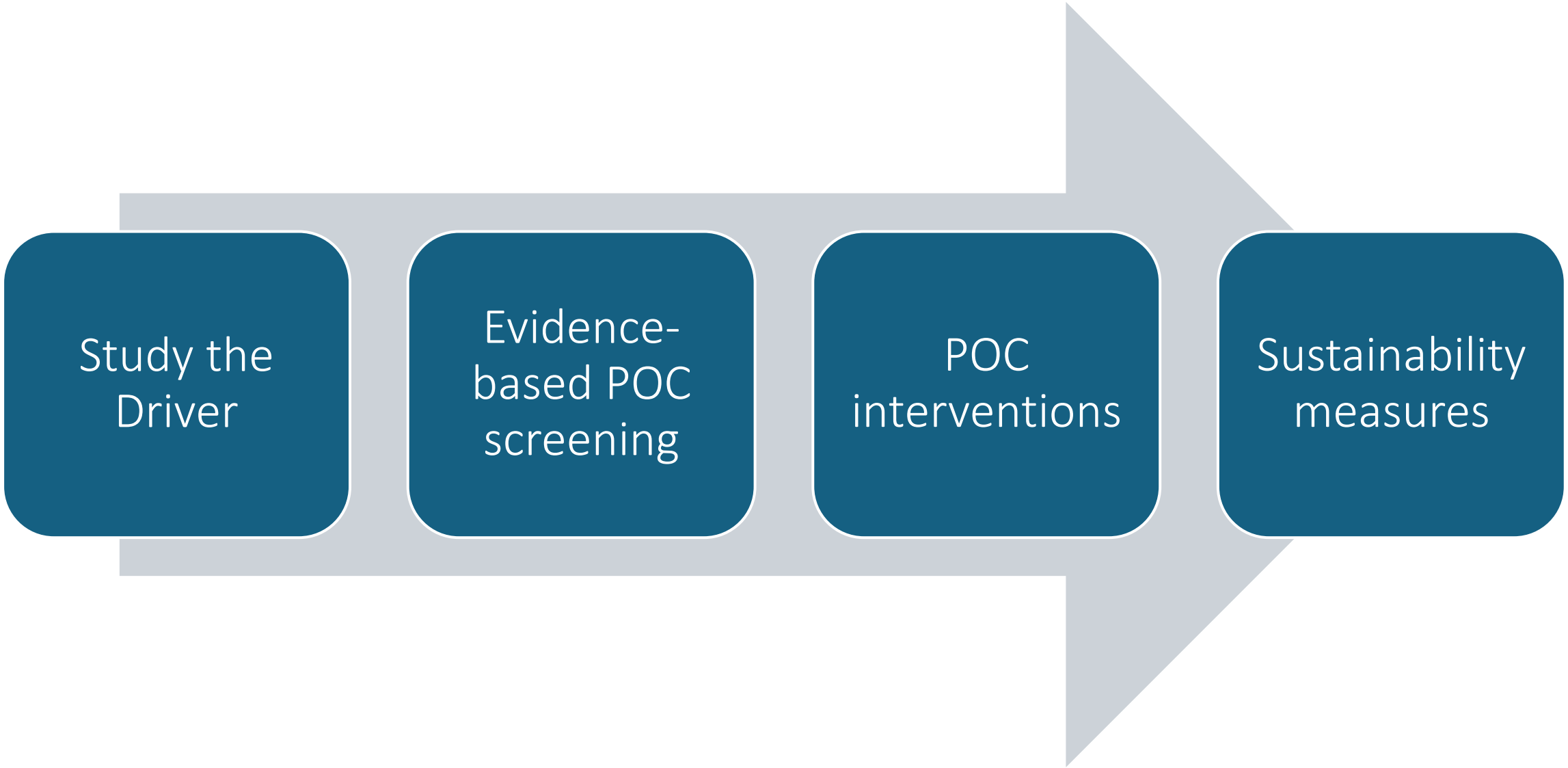
CONGRESS JUST PASSED THE LARGEST CUTS TO SNAP IN US HISTORY

Changes to SNAP will impact hunger, employment, and local economies across the country for years to come

The Social Drivers of Health

Working Together to Promote Community Well-Being

In Partnership with the Patient Advisory Council


Study the Driver
Evidence-based POC screening
POC interventions
Sustainability measures

Patient Sticker

☐ I do not want to participate in this screening.

Transportation

In the past 12 months, has lack of transportation kept you from medical appointments or from getting medications?

☐Yes ☐No

In the past 12 months, has lack of transportation kept you from meetings, work, or from getting things needed for daily living?

☐Yes ☐No

Pennsylvanians aged 65 or older can ride public transit for free with a Senior ConnectCard or a Pennsylvania Senior Citizen ID card. If you already use this service, you can skip to the last question.

If you answered "Yes" to the above questions, are you interested in receiving bus tickets today?

☐Yes ☐No

I would like a list of local transportation resources that I may qualify for.

☐Yes ☐No

Nutrition

Answer the questions in this box about your household:

In the past 12 months (one-year), we worried whether our food would run out before we got money to buy more.

☐Often true ☐Sometimes true ☐Never true

In the past 12 months (one-year), the food that we bought just didn't last, and we didn't have money to get more.

☐Often true ☐Sometimes true ☐Never true

If you answered "Often true" or "Sometimes true" to the above questions, are you interested in receiving a free food box and/or Food Bucks?

(Only one (1) food box and/or set of Food Bucks per patient visit)

☐Food Box ☐Food Bucks ☐Both ☐Neither

Food Box: About 12lbs of shelf stable food items—must take all items home.

Food Bucks: Vouchers worth $50/month for purchasing fresh fruit and vegetables at some farmers' markets and stores. Envelope #:_____

Note: If you have UPMC Insurance, we are required to share information about your fruit and vegetable intake with the health plan to fund this project.

I consent to being referred to an outreach coordinator at the Greater Pittsburgh Community Food Bank for assistance with the following additional programs (check all that apply):

☐Drive-up/Walk-in distributions ☐Food for Kids/Teens ☐Food Pantries
☐Senior Food Boxes ☐SNAP/EBT ☐The Market
☐LIHEAP (heating/cooling costs) ☐Employment Resources ☐Financial Wellness

Housing

In the past 2 months, have you been living in stable housing that you own, rent, or stay in as part of a household?

☐Yes ☐No

Are you worried or concerned that in the next two months you may not have stable housing that you own, rent, or stay in as part of a household?

☐Yes ☐No

I would like to discuss my housing options with a social worker.

☐Yes ☐No

I would like more information about Allegheny Link and 2-1-1.

☐Yes ☐No

Food boxes, Food Bucks, and bus tickets will only be provided to patients during appointments at the Family Health Center. Food boxes and bus tickets are generously supported by grant funding from the Shadyside Hospital Foundation and anonymous donors to the Family Health Center. Food Bucks are provided in partnership with The Food Trust.

Connection

How often do you feel a lack of companionship?

☐Often ☐Some of the time ☐Hardly Ever

How often do you feel left out?

☐Often ☐Some of the time ☐Hardly Ever

How often do you feel isolated form others?

☐Often ☐Some of the time ☐Hardly Ever

I would like a list of social connection resources in our area.

☐Yes ☐No

SHADYSIDE FHC FLOW/ROOMING WORKSHEET

Patient _____ Provider _____ Date _____

Temp _____ HR _____ Resp _____ BP _____

Height _____ Weight _____ Pain _____ LMP _____

Tab given? Y N R PHQ given? Y N R GAD given? Y N R DM foot: N AbN

Reason for Visit

Social Drivers

Physician reminders/shortcuts here:

UPMC LIFE CHANGING MEDICINE

Objectives

- Describe the emergence of Social Determinants of Health within the medical literature.
- Utilize a four-step process to combat Social *Drivers* of Health in a primary care setting.

Resources

- Greater Pittsburgh Community Food Bank: Home | Greater Pittsburgh Community Food Bank (pittsburghfoodbank.org)
- The Food Trust: Food Bucks – The Food Trust
- FI Toolkit: Screen and Intervene: A Toolkit for Pediatricians to Address Food Insecurity - Food Research & Action Center (frac.org)
- AAFP Review: Food Insecurity: How You Can Help Your Patients | AAFP

Genetic Cancer Risk Assessment in the Primary Care Setting

UPMC LIFE CHANGING MEDICINE

Title Slide

Title of Course:

Genetic Cancer Risk Assessment in the Primary Care Setting

Course Directors:

- Kevin C. Lee, DO
- No relationships with industry relevant to the content of this education activity have been disclosed for all parties

Objectives

1. Define Genetic Cancer Risk Assessment (GCRA) and its role in Primary Care
2. Identify clinical information needed for GCRA
3. Learn how to collect family medical history needed for GCRA
4. Understand indications for cancer genetic testing based on national guidelines
5. Learn how to calculate for increased risk for cancer
6. Understand management strategies in the primary care based on cancer risk

Intensive Course in Genomic Cancer Risk Assessment

How to Apply

Course Description

Course Schedule

Fees

Accreditation

Course Description

The Cancer Genomics Education Program of the City of Hope's Division of Clinical Cancer Genomics offers a CME/CEU/MOC-accredited certificate program to address the need for professional training and proficiency in clinical cancer genetics for community-based clinicians.

The Intensive Course in Genomic Cancer Risk Assessment (GCRA) gives you a foundational understanding of the field of cancer genetics, genomics, and personalized medicine.

The Intensive Course in Genomic Cancer Risk Assessment is a continuing medical education (CME) accredited certificate program for Physicians, Physician Assistants, Genetic Counselors, Master's or PhD in Genetics or Advanced Practice Nurses, and Geneticists.

Participation in the Intensive Course confers membership to the Clinical Cancer Genetics Community of Practice, an online community that brings cancer genetics practitioners from diverse practice settings together for professional learning, patient-centered support, and research collaborations, and to promote quality care and improved patient outcomes across the U.S. and internationally.

What is Genetic Cancer Risk Assessment (GCRA)?

- Assessment in a patient for the risk of cancer based on genetic factors
- Takes into account a patient's personal medical history AND family medical history to objectively predict the risk of cancer
- Identify patients who can qualify for cancer genetic testing based on their level of risk
- Individualize management approaches to cancer screening based on their risk of cancer

What is Genetic Cancer Risk Assessment (GCRA)?

- GCRA is a constantly and fast evolving field
  - New genes and variants that can be pathogenic are discovered regularly
  - Cancer is inherently a constantly changing disease, so guidelines for cancer screening is also constantly changing
- Risk of developing cancer vs. risk of having a genetically testable cancer syndrome
- Focus of this presentation will be for Hereditary Breast and Ovarian Cancer Syndrome (HBOC), and Lynch Syndrome

Why GCRA in Primary Care?

- One of the primary roles in Primary Care is the review of the personal and family medical history
- Early detection = Improved remission/cure rates
- Early identification of higher risk can qualify patients for individualized screening approaches and/or prophylactic treatment
- Most individuals, including both patients and providers, who are elevated risk for cancer are not aware that they can qualify for genetic testing

Steps to GCRA

1. Obtain the personal/medical history (aka the phenotype)
2. Obtain the Family History (aka the pedigree)
3. Identify next step interventions based on national guidelines
4. Genetic counseling and consent, if applicable

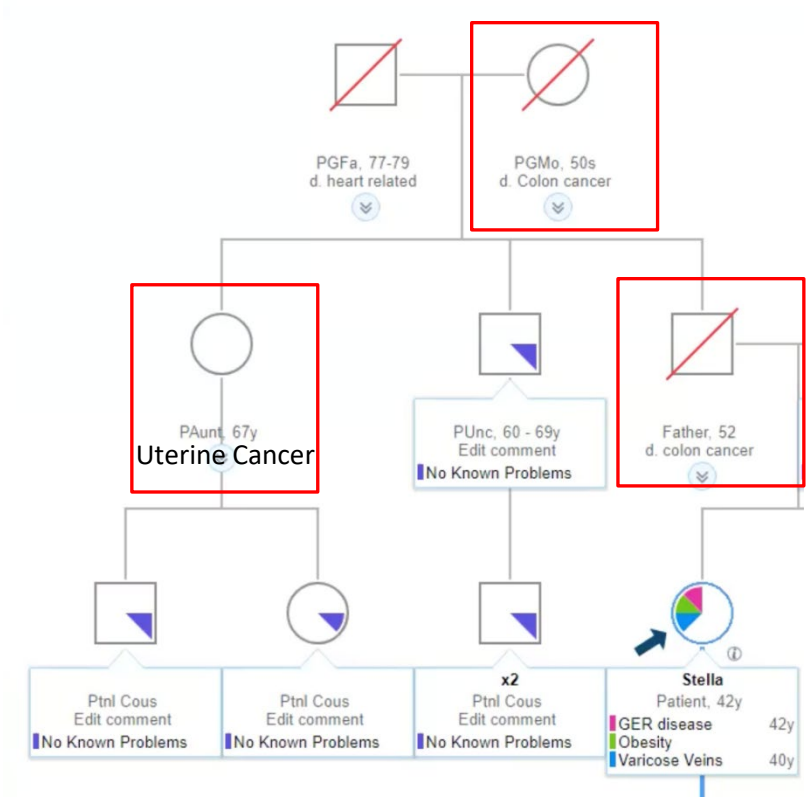
Clinical History for GCRA

- Ultimately dependent on the type of cancer you are trying to assess
- In general,
  - Any personal history of cancer?
  - Any prior studies that may be applicable for the assessment of cancer (ex. Prior mammograms, EGDs, colonoscopies, biopsy results, etc.)?
- For HBOC:
  - Hx of breast, ovarian, pancreatic, prostate (metastatic/Gleason score >7) cancers
  - DOB, Sex, Weight, Height, EtOH Use, Children Number and Gender and Age, menstrual status, ethnicity (ask explicitly if any Eastern European Jewish/Ashkenazi Jewish ancestry)
  - Hx of endometriosis, tubal ligation, oral contraception pill use (both combined and progesterone only), hormonal replacement therapy use, oophorectomy, mastectomy
- For Lynch:
  - Hx of Lynch cancers (colon, ovarian, stomach, small intestine, kidney, bladder, urinary, bile duct, brain, pancreas, sebaceous gland skin tumors)
  - Number of colonic polyps

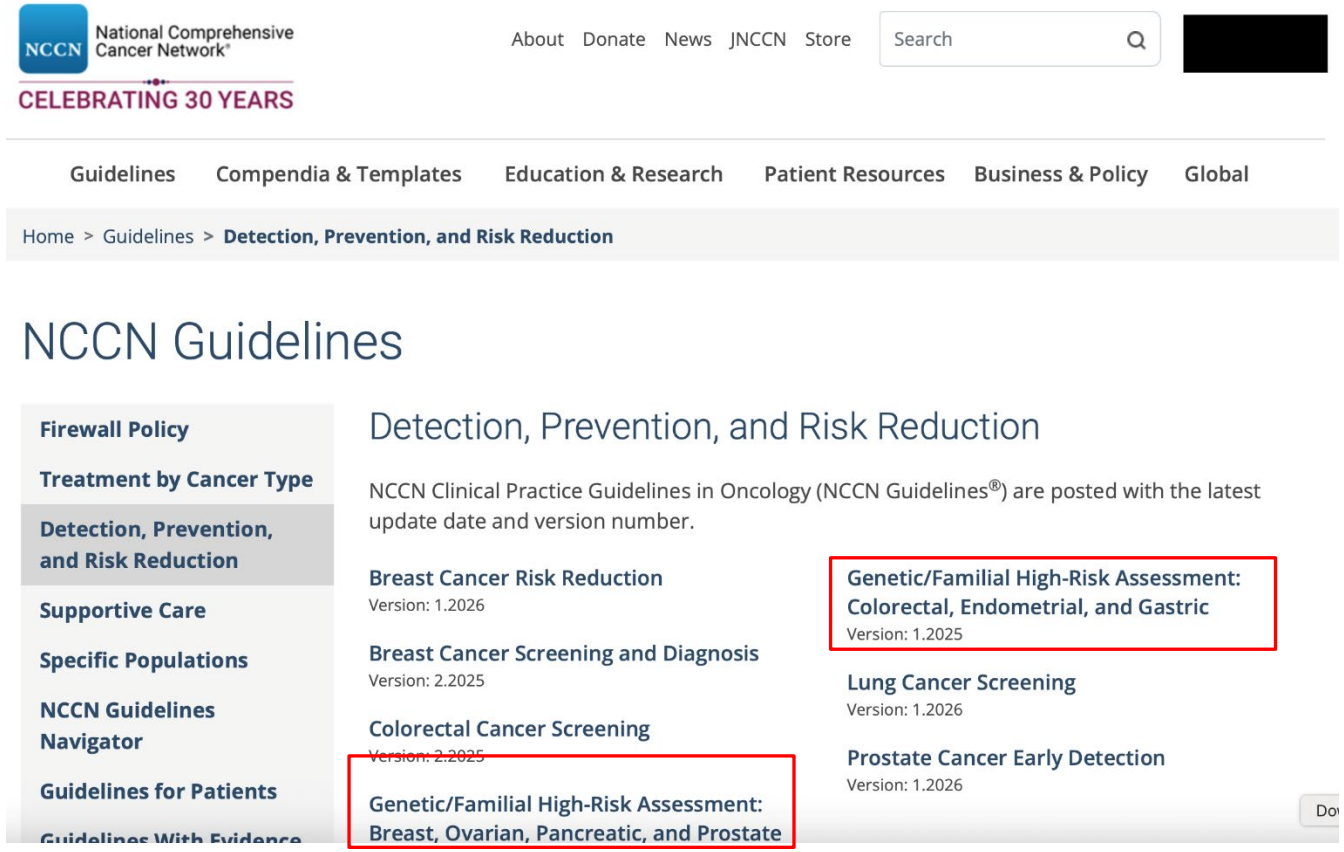
Family Medical History for GCRA

- Primary goal is to obtain the medical pedigree
- Can focus only on cancer family medical history
- Good screening questions to ask:
  - Any family history of cancer diagnosed under the age of 50?
  - Any family history of pancreatic or ovarian or metastatic prostate cancer at any age?
  - Any side of the family that had 2 or more cancers?
  - Any of your ancestry can be described as Eastern European Jewish/Ashkenazi?
- Video example for pedigree collection (until 0-1:30, then 5:00-10:00)

Family Medical History for GCRA



Guidelines for Cancer Genetic Testing



Guidelines for Lynch Syndrome Genetic Testing

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NCCN Guidelines Version 1.2025
Genetic/Familial High-Risk Assessment: Colorectal, Endometrial, and Gastric

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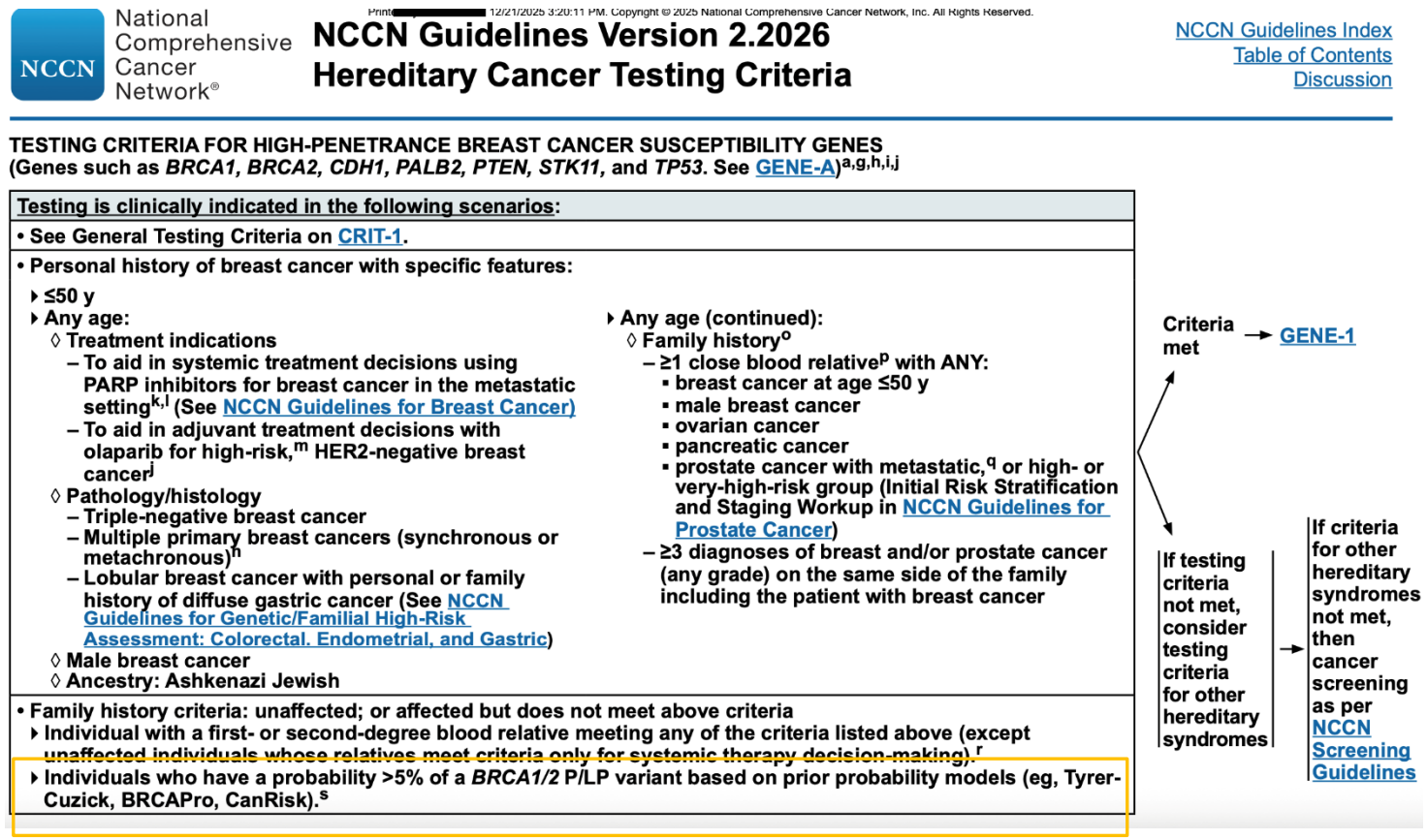
CRITERIA FOR TESTING FOR LYNCH SYNDROME[n]

Testing is clinically indicated in the following scenarios:	
• Known LS PV in the family • Personal history of an LS-related cancer (CRC, EC, or other[e]) and any of the following: ‣ Diagnosed <50 y[o,p] ‣ A synchronous or metachronous LS-related cancer[e] regardless of age ‣ 1 first-degree or second-degree relative with an LS-related cancer[e] diagnosed <50 y ‣ ≥2 first-degree or second-degree relatives with an LS-related cancer[e] regardless of age • Family history[q] of any of the following: ‣ ≥1 first-degree relatives with a CRC or EC diagnosed <50 y ‣ ≥1 first-degree or second-degree relatives with a CRC or EC and a synchronous or metachronous LS-related cancer[e] regardless of age ‣ ≥2 first-degree or second-degree relatives with LS-related cancers[e] including ≥1 diagnosed <50 y ‣ ≥3 first-degree or second-degree relatives with LS-related cancers[e] regardless of age • Increased model-predicted risk for LS ‣ An individual with a ≥5% risk of having an MMR gene PV based on predictive models (ie, $PREMM_5$, MMRpro, MMRpredict) ◊ Individuals with a personal history of CRC and/or EC with a $PREMM_5$ score of ≥2.5% should be considered for MGPT. ◊ For individuals without a personal history of CRC and/or EC, some data have suggested using a $PREMM_5$ score threshold of ≥2.5% rather than ≥5% to select individuals for MMR genetic testing. Based on these data, it is reasonable for testing to be done based on the ≥2.5% score result and clinical judgment. Of note, with the lower threshold, there is an increase in sensitivity, but a decrease in specificity.	Strategies for Testing for LS (LS-1)
• Personal history of CRC, EC, or of other tumor with MMR deficiency determined by polymerase chain reaction (PCR), next-generation sequencing (NGS), or IHC diagnosed at any age[r,s] • Personal history of a P/LP variant identified on tumor genomic testing that has clinical implications if also identified in the germline[t,u]	Additional tumor-based testing (LS-A) OR Germline MGPT for LS and other hereditary cancer syndromes[z] [Strategies for Testing for LS (LS-1)]

Guidelines for HBOC Cancer Genetic Testing



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NCCN Guidelines Version 2.2026
Hereditary Cancer Testing Criteria

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TESTING CRITERIA FOR HIGH-PENETRANCE BREAST CANCER SUSCEPTIBILITY GENES
(Genes such as *BRCA1, BRCA2, CDH1, PALB2, PTEN, STK11,* and *TP53*. See GENE-A)[a,g,h,i,j]

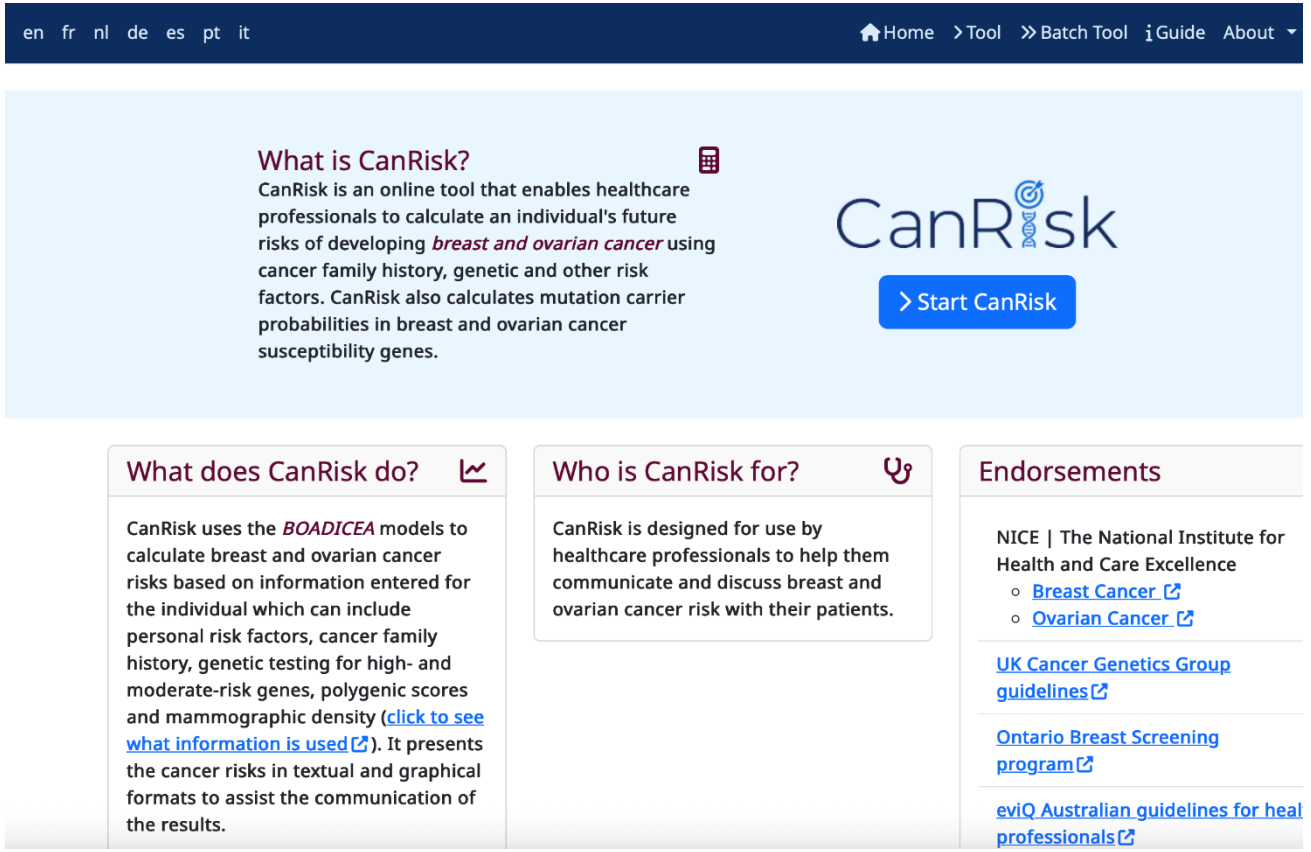
Testing is clinically indicated in the following scenarios:

- See General Testing Criteria on CRIT-1.
- Personal history of breast cancer with specific features:
  - ≤50 y
  - Any age:
    - ◊ Treatment indications
      - – To aid in systemic treatment decisions using PARP inhibitors for breast cancer in the metastatic setting[k,l] (See NCCN Guidelines for Breast Cancer)
      - – To aid in adjuvant treatment decisions with olaparib for high-risk,[m] HER2-negative breast cancer[j]
    - ◊ Pathology/histology
      - – Triple-negative breast cancer
      - – Multiple primary breast cancers (synchronous or metachronous)[n]
      - – Lobular breast cancer with personal or family history of diffuse gastric cancer (See NCCN Guidelines for Genetic/Familial High-Risk Assessment: Colorectal, Endometrial, and Gastric)
    - ◊ Male breast cancer
    - ◊ Ancestry: Ashkenazi Jewish
  - Any age (continued):
    - ◊ Family history[o]
      - – ≥1 close blood relative[p] with ANY:
        - ▪ breast cancer at age ≤50 y
        - ▪ male breast cancer
        - ▪ ovarian cancer
        - ▪ pancreatic cancer
        - ▪ prostate cancer with metastatic,[q] or high- or very-high-risk group (Initial Risk Stratification and Staging Workup in NCCN Guidelines for Prostate Cancer)
      - – ≥3 diagnoses of breast and/or prostate cancer (any grade) on the same side of the family including the patient with breast cancer
- Family history criteria: unaffected; or affected but does not meet above criteria
  - Individual with a first- or second-degree blood relative meeting any of the criteria listed above (except ~~unaffected individuals whose relatives meet criteria only for systemic therapy decision-making~~).[r]
  - Individuals who have a probability >5% of a *BRCA1/2* P/LP variant based on prior probability models (eg, Tyrer-Cuzick, BRCAPro, CanRisk).[s]

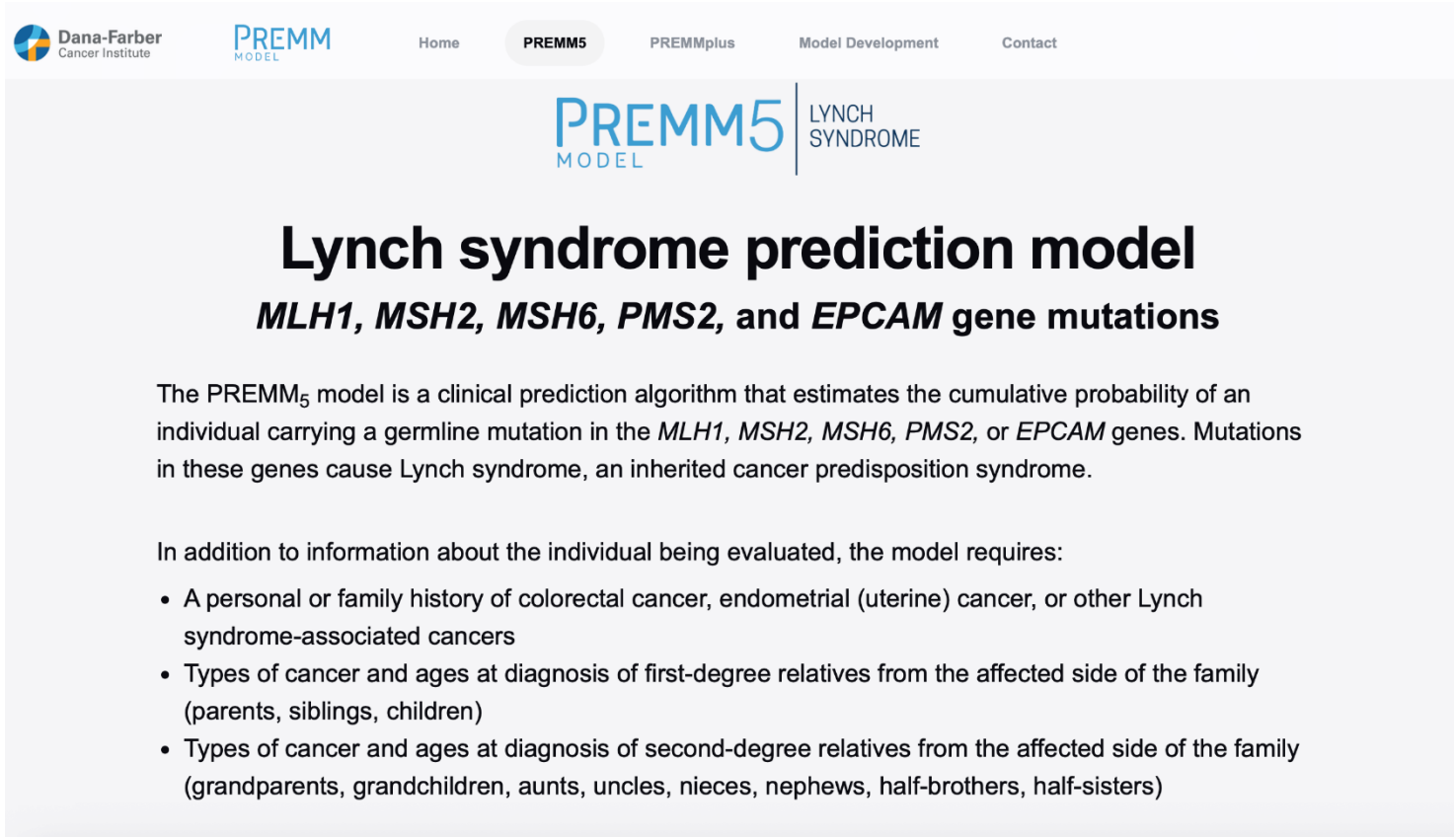
Criteria met → GENE-1

If testing criteria not met, consider testing criteria for other hereditary syndromes → If criteria for other hereditary syndromes not met, then cancer screening as per NCCN Screening Guidelines

Risk assessment calculation for HBOC



Risk assessment calculation for Lynch Syndrome



Genetic Testing for Cancer

Position and Role of Genetic Counseling

- Genetic counseling is the process of discussing the purpose, potential consequences, and implications of genetics before and after testing
- Certified Genetic Counselors (CGC) are healthcare professionals certified by the Accreditation Council for Genetic Counseling who perform this service. They play an essential role in multidisciplinary clinician teams to not only provide counseling, but also advises on genetic testing approaches and recommendations for management for the genetic condition
- **Genetic counseling, regardless of the provider giving the counseling, SHOULD be given to every patient being considered for genetic testing AND every patient who has undergone genetic testing**
  - Genetic counselors play a key role in providing this counseling especially on behalf of providers who do not feel they have the expertise to provide this counseling to patients

(Some) Possible Benefits of Genetic Testing

- Potential for treatment and/or early surveillance
- Prognostic information for families
- Alleviation of anxiety associated with the diagnostic odyssey
- Ability to provide clear recurrence risk
- Option to seek out a tailored support group/network
- Opportunity to participate in research studies or trials

(Some) Possible Caveats of Genetic Testing

- Negative and/or uncertain results
- Unintentional Results
- Positive Results without Cure or Treatment
- Impact to biological family members and preconception planning
- Expense and Lack of Coverage
- Legal

UPMC Primary Care Precision Medicine Clinic

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Natasha Berman
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Lucy Galea
MS, CGC

Gabi Slizewska
MS, CGC

How to Refer to PCPM

- Scheduling Line: 412-647-9304
- Referral orders:
  - Fax to 412-863-5788
  - "Electronic Consult/Referral to Genetics" in Epic. Please write referral reason

Consulting PCPM: Things to Note

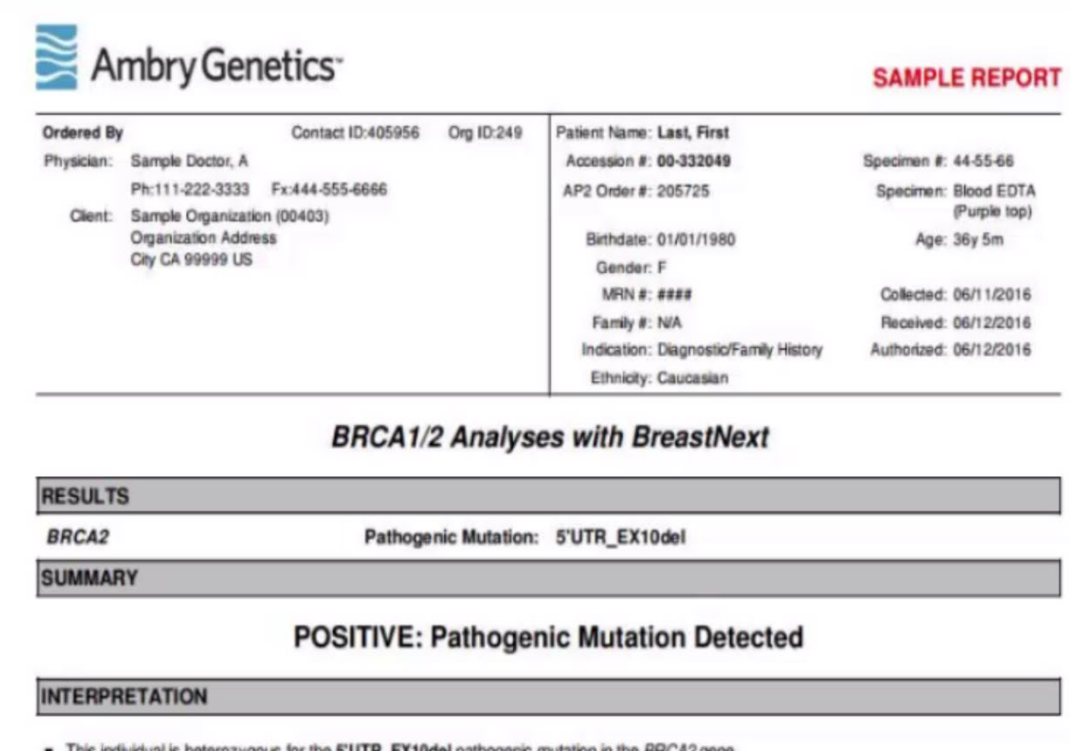
- We do NOT provide continuity care, we will see patients on a consultant basis until the clinical question is adequately addressed
- We are board certified in Family Medicine, not in Medical Genetics, and therefore we may recommend referrals to specialists depending on the clinical case
- Please ensure that any relevant records especially genetic testing records from the patient and/or family members are available for us to review at the time of the visit. Failure to do so will likely result in delays in care such as additional appointments.
- We primarily operate in a telemedicine approach but we also offer in-person appointments.
  - Any patient whose home address is in PA may have their initial and subsequent visits via telemedicine regardless if they are a UPMC patient
  - Any patient whose home address is outside of PA AND are not active UPMC patients MUST have their initial appointment in person. Any subsequent visits can be facilitated via telemedicine.

Example of Genes in a Cancer Panel

- Ambry CancerNext panel

APC	*ATM*	*AXIN2*	*BAP1*
BARD1	*BMPR1A*	*BRCA1*	*BRCA2*
BRIP1	*CDH1*	*CDKN2A*	*CHEK2*
EPCAM	*FH*	*FLCN*	*GREM1*
HOXB13	*MBD4*	*MET*	*MLH1*
MSH2	*MSH3*	*MSH6*	*MUTYH*
NF1	*NTHL1*	*PALB2*	*PMS2*
POLD1	*POLE*	*PTEN*	*RAD51C*
RAD51D	*RPS20*	*SMAD4*	*STK11*
TP53	*TSC1*	*TSC2*	*VHL*

Example of Results from positive Cancer Genetic Testing



Ambry Genetics

SAMPLE REPORT

Ordered By Contact ID:405956 Org ID:249

Physician: Sample Doctor, A
Ph:111-222-3333 Fx:444-555-6666
Client: Sample Organization (00403)
Organization Address
City CA 99999 US

Patient Name: **Last, First**
Accession #: **00-332049**
AP2 Order #: 205725
Birthdate: 01/01/1980
Gender: F
MRN #: ####
Family #: N/A
Indication: Diagnostic/Family History
Ethnicity: Caucasian

Specimen #: 44-55-66
Specimen: Blood EDTA (Purple top)
Age: 36y 5m
Collected: 06/11/2016
Received: 06/12/2016
Authorized: 06/12/2016

BRCA1/2 Analyses with BreastNext

RESULTS

BRCA2 **Pathogenic Mutation: 5'UTR_EX10del**

SUMMARY

POSITIVE: Pathogenic Mutation Detected

INTERPRETATION

- This individual is heterozygous for the **5'UTR_EX10del** pathogenic mutation in the *BRCA2* gene

Management Based on Results

- Perform initial post-testing genetic counseling
  - If positive:
    - Refer to High-Risk Cancer: UPMC Cancer Genetics Program (855-733-0739)
      - Post-test genetic counseling should be formally performed by a licensed genetic counselor
    - Follow national guidelines based on positive results
    - Discuss familial variant testing
  - Negative results DOES NOT mean zero risk for cancer. At least population-based cancer screening is still recommended for all patients regardless of results
  - Variants of Uncertain Significance is NOT actionable genetic results. Next steps are depending on patient's cancer risk

Management Based on Results: HBOC

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NCCN Guidelines Version 2.2026
BRCA-Pathogenic/Likely Pathogenic Variant - Positive Management

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BRCA PATHOGENIC/LIKELY PATHOGENIC VARIANT-POSITIVE MANAGEMENT

Site	Screening/Surveillance Procedure and Interval
General	• Education regarding signs and symptoms of cancer(s), especially those associated with *BRCA* P/LP variants.
Breast cancer (female)	• Breast awareness[a]. • Clinical breast exam, every 6–12 months,[b] starting at age 25 years. • Breast screening[c,d] ▸ Age 25–29 years, annual breast MRI[e] screening with and without contrast[f] (or mammogram, only if MRI is unavailable) or individualized based on family history if a breast cancer diagnosis before age 30 is present. ▸ Age 30–75 years, annual mammogram and breast MRI[e] screening with and without contrast. ▸ Age >75 years, management should be considered on an individual basis. ▸ For individuals with a *BRCA* P/LP variant who are treated for breast cancer and have not had a bilateral mastectomy, screening with annual mammogram and breast MRI should continue as described above. ▸ Discuss option of RRM ◊ Counseling should include a discussion regarding degree of protection, reconstruction options, and risks. In addition, the family history and residual breast cancer risk with age and life expectancy should be considered during counseling. – Address psychosocial and quality-of-life aspects of undergoing RRM. ◊ Screening with clinical breast exam should continue after RRM. Routine screening with mammogram and breast MRI are not indicated. • Consider risk reduction agents as options for breast cancer, including discussion of risks and benefits (see Discussion for details). (NCCN Guidelines for Breast Cancer Risk Reduction).
Breast cancer (male)	• Breast self-exam training and education starting at age 35 years. • Clinical breast exam, every 12 months, starting at age 35 years. • Consider annual mammogram, especially for those with *BRCA2* P/LP variants in whom the lifetime risk of breast cancer is up to 7%, starting at age 50 or 10 years before the earliest known male breast cancer in the family (whichever comes first).[g,h]

Management Based on Results: HBOC

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NCCN Guidelines Version 2.2025
Breast Cancer Screening and Diagnosis

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SCREENING OR SYMPTOM CATEGORY[a]	SCREENING/FOLLOW-UP[b]
Increased Risk:	
Residual lifetime risk ≥20% as defined by models that include a comprehensive family history[h,j,k]	• Clinical encounter[b,d,l] every 6–12 mo ▸ To begin when identified as being at increased risk ▸ Consider referral to a genetic counselor or other health professional with expertise and experience in cancer genetics, if not already done ▸ Consider referral to a breast specialist as appropriate • Annual screening[b] mammogram[c,n] with tomosynthesis[p] ▸ To begin no later than age 40 y, or 10 y prior to when the youngest family member[r] was diagnosed with breast cancer, not prior to age 30 y[s] (whichever comes first) • Annual breast MRI[b,t,u] with and without contrast ▸ To begin no later than age 40 y, or 10 years prior to when the youngest family member[r] was diagnosed with breast cancer, not prior to age 25 y[v,w] (whichever comes first) ▸ Consider contrast-enhanced mammography (CEM)[b] or molecular breast imaging (MBI)[b] for those who qualify for but cannot undergo MRI. Whole breast ultrasound[b] may be done if CEM or MBI is not available/accessible • Consider risk reduction strategies (see NCCN Guidelines for Breast Cancer Risk Reduction) • Breast awareness[m]

Management Based on Results: Lynch

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NCCN Guidelines Version 1.2025
Lynch Syndrome

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***MLH1* LYNCH SYNDROME: SURVEILLANCE/PREVENTION STRATEGIES[m,n]**

Site	Surveillance
Colorectal cancer	• High-quality colonoscopy[o] at age 20–25 y or 2–5 y prior to the earliest CRC if it is diagnosed before age 25 y[p] and repeat every 1–2 y.[q,r] See Follow-up of Surveillance Colonoscopy Findings (LS-F). • The Panel recommends that all individuals with LS who have a risk for future CRC (ie, excluding those with prior total proctocolectomy [TPC]) consider using daily aspirin to reduce their future risk of CRC.[s] The decision to use aspirin for reduction of CRC risk in LS and the dose chosen should be made on an individual basis, including discussion of individual risks, benefits, adverse effects, and childbearing plans.[t] In determining whether an individual with LS should take aspirin and in deciding on the appropriate dosing, the Panel recommends that providers carefully review patient-specific factors that may increase the risk of aspirin therapy—including but not limited to increased age, prior allergy, concurrent use of antiplatelets/anticoagulants, untreated *H. pylori* or unconfirmed *H. pylori* eradication—as well as patient-specific factors that indicate a comparably low future cumulative risk of CRC (ie, increased age, *PMS2*-associated LS, history of prior colectomy) and who may thus be less likely to experience significant benefit.

Management Based on Results: Lynch

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Lynch Syndrome

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Discussion

***MLH1* LYNCH SYNDROME: SURVEILLANCE/PREVENTION STRATEGIES[m,n]**

Site	Surveillance
Endometrial cancer	• Because EC can often be detected early based on symptoms, patients should be educated regarding the importance of prompt reporting and evaluation of any abnormal uterine bleeding or postmenopausal bleeding. The evaluation of these symptoms should include endometrial biopsy. • Total hysterectomy has not been shown to reduce EC mortality, but can reduce the incidence of EC. Therefore, hysterectomy is a risk-reducing option that can be considered. • Timing of total hysterectomy can be individualized based on whether childbearing is complete, comorbidities, family history, and LS gene, as risks for EC vary by LS gene. For patients requiring a colorectal surgery such as for CRC resection, coordination with risk-reducing gynecologic surgery should be considered. Given the higher risks of early EC and ovarian cancer in *MLH1*, hysterectomy with BSO may be considered starting at age 40 y. As premature menopause due to oophorectomy can cause detriments to bone health, cardiovascular health, and generalized quality of life, estrogen replacement therapy should be considered. • EC screening does not have proven benefit in patients with LS. However, endometrial biopsy is both highly sensitive and highly specific as a diagnostic procedure. Screening via endometrial biopsy every 1–2 y starting at age 30–35 y can be considered. • Transvaginal ultrasound to screen for EC in postmenopausal patients has not been shown to be sufficiently sensitive or specific as to support a positive recommendation, but may be considered at the clinician's discretion. Transvaginal ultrasound is not recommended as a screening tool in premenopausal patients due to the wide range of endometrial stripe thickness throughout the normal menstrual cycle.
Ovarian cancer	• Bilateral salpingo-oophorectomy (BSO) may reduce the incidence of ovarian cancer. The decision to have a BSO as a risk-reducing option should be individualized. • Timing of BSO should be individualized based on whether childbearing is complete, menopause status, comorbidities, family history, and LS gene, as risks for ovarian cancer vary by LS gene. For patients requiring a colorectal surgery such as for CRC resection, coordination with risk-reducing gynecologic surgery should be considered. Given the higher risks of EC and ovarian cancer in *MLH1*, hysterectomy with BSO may be considered starting at age 40 y. As premature menopause due to oophorectomy can cause detriments to bone health, cardiovascular health, and generalized quality of life, estrogen replacement therapy should be considered. • Data do not support routine ovarian cancer screening for LS. CA-125 and pelvic ultrasound are recommended for preoperative planning. • Salpingectomy has been shown to reduce the risk of ovarian cancer in the general population and is an option for premenopausal patients with hereditary cancer risk who are not yet ready for oophorectomy. • Consider risk-reduction agents for endometrial and ovarian cancers, including oral contraceptive pills and progestin intrauterine systems (see Discussion for details).
Gastric and small bowel cancer	• Perform upper gastrointestinal (GI) surveillance with high-quality EGD and consider extended duodenal examination (eg, ligament of Treitz) starting at age 30–40 y and repeat every 2–4 y, preferably in conjunction with colonoscopy (Ladigan-Badura S, et al. Int J Cancer 2021;148:106-114; Farha N, et al. Gastrointest Endosc 2022;95:105-114; Kumar S, et al. Can Prev Res [Phila] 2020;13:1047-1054; Latham A, et al. Clin Canc Res 2021;27:1429-1437). Age of initiation prior to 30 y and/or surveillance interval <2 y may be considered based on family history of upper GI cancers or high-risk endoscopic findings (such as incomplete or extensive gastric intestinal metaplasia [GIM], gastric or duodenal adenomas, or Barrett esophagus with dysplasia). Random biopsy of the proximal and distal stomach should at minimum be performed on the initial procedure to assess for *H. pylori* (with treatment indicated if *H. pylori* is detected), autoimmune gastritis, and intestinal metaplasia. Push enteroscopy can be considered in place of EGD to enhance small bowel visualization, although its incremental yield for detection of neoplasia over EGD remains uncertain (Jain A, et al. Gastrointest Endosc 2022;95:202). • Individuals not undergoing upper endoscopic surveillance should have one-time noninvasive testing for *H. pylori* at the time of LS diagnosis, with treatment indicated if *H. pylori* is detected. The value of eradication for the prevention of gastric cancer in LS is unknown.

Management Based on Results: Lynch

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National Comprehensive Cancer Network®

NCCN Guidelines Version 2.2025
Colorectal Cancer Screening

NCCN Guidelines Index
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Discussion

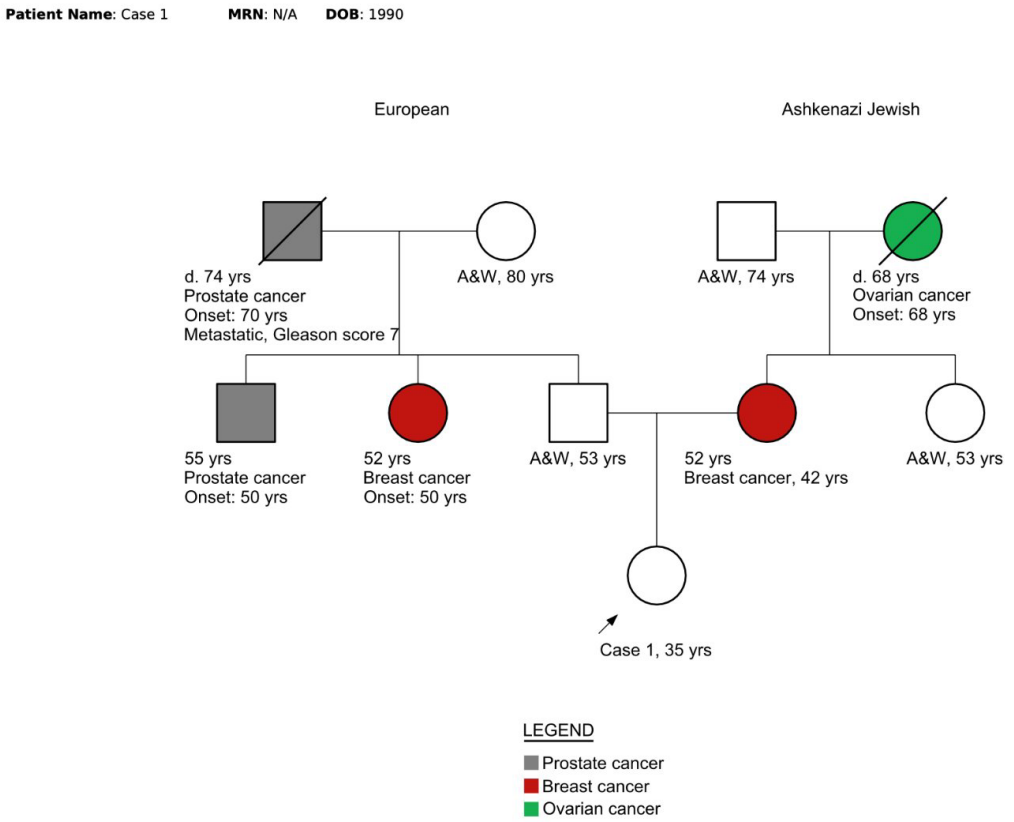
INCREASED RISK BASED ON POSITIVE FAMILY HISTORY
(Not meeting criteria for consideration of a hereditary cancer syndrome or appropriate testing for a hereditary cancer syndrome non-diagnostic or not done)[ccc]

FAMILY HISTORY CRITERIA	SCREENING[ddd]	
≥1 first-degree relative with CRC at any age	Colonoscopy beginning at age 40 y or 10 y before earliest diagnosis of CRC, whichever is first	Repeat every 5 y[ddd,eee,fff,ggg] or if positive, repeat per colonoscopy findings
Second- and third-degree relatives with CRC at any age	Colonoscopy beginning at age 45 y[eee]	Repeat every 10 y or if positive, repeat per colonoscopy findings
First-degree relative with confirmed advanced adenoma(s) (ie, high-grade dysplasia, ≥1 cm, villous or tubulovillous histology, TSA), or advanced SSPs/ SSLs (≥1 cm, any dysplasia) at any age[hhh,iii,jjj]	Colonoscopy beginning at age 40 y or at age of onset of adenoma in relative, whichever is first	Repeat every 5–10 y[ddd,fff] or if positive, repeat per colonoscopy findings

Case Activity

- With a partner, ask screening questions and draw a medical pedigree focusing on cancer
- There are 2 cases, each partner will do one case and set of questions
- 5 minutes for each case (we will call out 'Switch!') for 10 minutes total
  - If time permitting, for Case 2 please use the PREMM5 tool (https://premm.dfci.harvard.edu/screener/premm5) to estimate Lynch syndrome gene risk
- There is a key for the pedigree symbols with each case

Case 1 Answer



Case 1 Insights

- Patient qualifies for cancer genetic testing due to:
  - Mother with breast cancer dx age 42
  - Maternal Grandmother who had ovarian cancer
  - Paternal Grandfather who had metastatic prostate cancer
  - Paternal Aunt with breast cancer dx age 50
  - Maternal ancestry being Ashkenazi Jewish

Case 2 Answer

Case 2 Insights

- Patient qualifies for cancer genetic testing due to:
  - Paternal family history of 3 Lynch syndrome related cancers regardless of age
  - PREMM5 score 4.1%

Can I bill for this?

- Yes!
- If positive on a screening question:
  - Z80.9 Family history of cancer
  - Z84.89 Family history of genetic disease
- Bill by time
- Can also refer directly to PCPM!

Conclusions

- Genetics is here
- Genetics is applicable to all patients, and therefore in the purview of primary care
- Cancer Genetic Risk Assessment is an opportunity to introduce genetics care into primary care

Thank you!

Steroid treatment and benefit/harm on various infectious disease outcomes

Raymond E. Pontzer, MD, FACP
Clinical Associate Professor
University of Pittsburgh School of Medicine

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- Overview of Sepsis and its Pathophysiology
- Mechanisms of Corticosteroid Action in Sepsis
- Clinical Evidence and Outcomes of Corticosteroid Therapy
- Guidelines and Recommendations for Clinical Practice

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Definition and Clinical Criteria of Sepsis

- Sepsis is an infection-induced condition causing organ dysfunction and systemic inflammation
- 11 million cases/yr worldwide with ~20% mortality
- Septic shock rates increased from 12.8 to 18.6 per 1000 pt admissions between 2005 and 2014 with mortality of 50-55% in U.S. academic hospitals

Kadri SS, et al. Chest 2017;151(2):278, Epub 2016 Jul 22

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Underlying Pathophysiological Mechanisms

- Sepsis triggers widespread immune system activation initiating a cascade of defense responses
- Excessive inflammation can damage tissues and organs, contributing to disease severity
- Damage to blood vessel endothelium leads to impaired vascular function and fluid leakage
- Causes microvascular thrombosis and bleeding risks

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Traditional Approaches to Sepsis Management

- Prompt antibiotic therapy
- Fluid resuscitation
- Vasopressor use
- Supportive care to maintain vital organ functions

Evans L, et al. Surviving Sepsis Campaign. Crit Care Med 2021;49(11):re1063

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Role of Corticosteroids in Sepsis

- Serum cortisol usually rises in sepsis
- Critical illness-related corticosteroid insufficiency (CIRCI) is difficult to measure
- Possibly due to suppression hypothalamic-pituitary-adrenal axis or glucocorticoid resistance
- Adrenal cortisol production may be insufficient

Boonen E, et al. Reduced cortisol metabolism during critical illness. N Engl J Med 2013;368:1477

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Assessing Adrenal Reserve in Sepsis

- Generally not performed because:
  - Cortisol levels vary widely in septic shock
  - Poor reliability of ACTH stimulation tests
  - Technically difficult to measure free cortisol levels

Vadas P, Pruzanski W. Crit Care Med 1991;19(2):300
Hamrahaian AH, et al. N Engl J Med 2004;350(16):1629
Bouachour G, et al. Ann Intern Med 1995; 123(12)962

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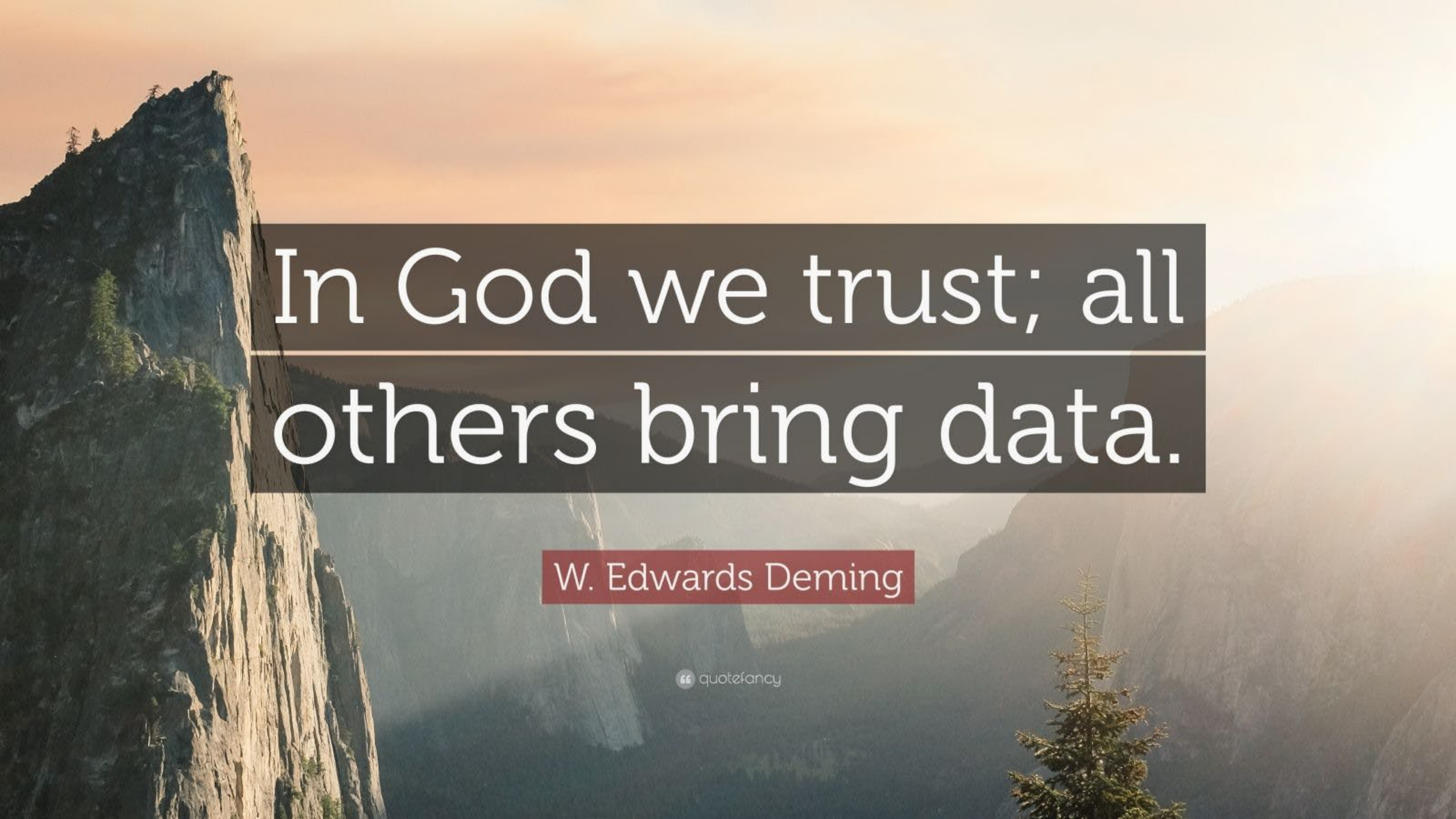
In God we trust; all others bring data.
W. Edwards Deming
quotefancy

Corticosteroid Rx for refractory septic shock

- Studies prior to 2000 yielded conflicting results
- More recent meta-analyses show probable benefit with hydrocortisone ± fludrocortisone
- Society of Critical Care Medicine 2024 Guideline update recommends corticosteroid for **severe** sepsis, ARDS and community acquired pneumonia.

Chaudhuri D, et al. Crit Care Med 2024;52(5):e219. Epub 2024 Jan 19

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2024 SCCM Guidelines

- Based upon meta-analysis of 46 studies
- Ideal dose, timing and type remains unknown and left up to clinician comfort for severe sepsis, ARDS, and CAP
- Multiple studies suggest benefit of survival is increased with addition of fludrocortisone to hydrocortisone
- Pertain only to adults

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Severe Sepsis

- Severe Sepsis = refractory septic shock
- Definition:

  Systolic blood pressure <90 for > 1 hour following both adequate fluid resuscitation and vasopressor support

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2024 SCCM Guidelines
Dosing Guidelines for Severe Sepsis

- Hydrocortisone 100 mg q 8 hrs or 50 mg q 6 hrs
  - Alternative: Methylprednisolone 40 to 60 mg q day in divided doses (Less well studied)

PLUS

- Fludrocortisone 0.05 to 0.1 mg oral or via gastric tube once daily
- Duration 5 to 7 days without taper
- Optimal to start steroid Rx w/i 12 hrs of presentation

Matthay MA, et al. JAMA Intern Med. 2023;183(5):460
Teja B, et al. UpToDate Jan 2026
Zhang L, et al. Anesth Analg. 2023;137:850

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Corticosteroid Rx and ARDS

- Meta-analysis review of 20 studies assessing effect of corticosteroids in severe pneumonia and ARDS
  - Probable reduction in mortality
  - Probable reduction in secondary sepsis
  - No significant increase in hospital acquired infections

Soumare A, et al. Ann Intern med. 2026;179(1):67

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Corticosteroid Rx and ARDS Dosing Recommendations

- Optimal dosing uncertain
- Commonly used options in ARDS studies:
  - Dexamethasone 20 mg IV daily x 5 days followed by 10 mg daily x 5 additional days
  - Methylprednisolone 1 mg/kg/day in divided doses for 14 days followed by taper
  - Many experts now prefer shorter courses
  - Efficacy of dexa, methylpred and hydrocortisone regimens appear to have similar efficacy

Vilar J, et al. Lancet Respir Med. 2020;8(3):267
Annane D, et al. Intensive Care Med. 2017;43(12):1751
Lewis SR, et al Cocrane Database Syst Rev. 2019;7(7):CD004477

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Corticosteroid Rx for Severe Community-acquired Pneumonia

- History of ATS/IDSA Guidelines:
  - 2007: did not address steroid use
  - 2019: recommended against using corticosteroids for CAP due to mixed study results and concern for adverse effects. However did agree with Surviving Sepsis Campaign for use in cases where severe CAP is accompanied by refractory septic shock
  - 2025: Firm recommendation for steroid Rx in adults with severe CAP

Jones BE, et al. AJRCCM DOI: 10.1164/rccm.202507-1692ST July 18, 2025

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Corticosteroid Rx for Severe Community-acquired Pneumonia

- Multi-center randomized trial of 795 patients requiring ≥ 50% FiO2 placebo vs hydrocortisone within 20 hrs of admission
  - Hydrocortisone 200mg x 4 days then taper to 8-14 days total Rx duration
  - Reduced mortality by 5.6%
  - Also reduced need for intubation and vasopressor

Dequin PF, et al. Hydrocortisone in Severe Community-Acquired Pneumonia. N Engl J Med. 2023;388(21):1931. Epub 2023 Mar 21

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Corticosteroid Rx for Severe Community-acquired Pneumonia

- Reasons to consider exclusion of corticosteroid Rx for CAP:
  - Concurrent fungal, influenza or tuberculosis infection
  - Concurrent acute viral hepatitis
  - Concurrent acute herpes virus infection
  - Active GI bleeding

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Dexamethasone in Hospitalized Patients with Covid 19

- Recovery Collaborative Trial
- Dexamethasone 6mg oral or IV once daily

  2104 patients dexamethasone 4321 patients usual care
- Duration 10 days or until discharge
  - Whichever is shorter
- Effect varied considerably depending on level of respiratory support

Horby P, et al. N Engl J Med. 2021;384(8):693. Epub 2020 Jul 17

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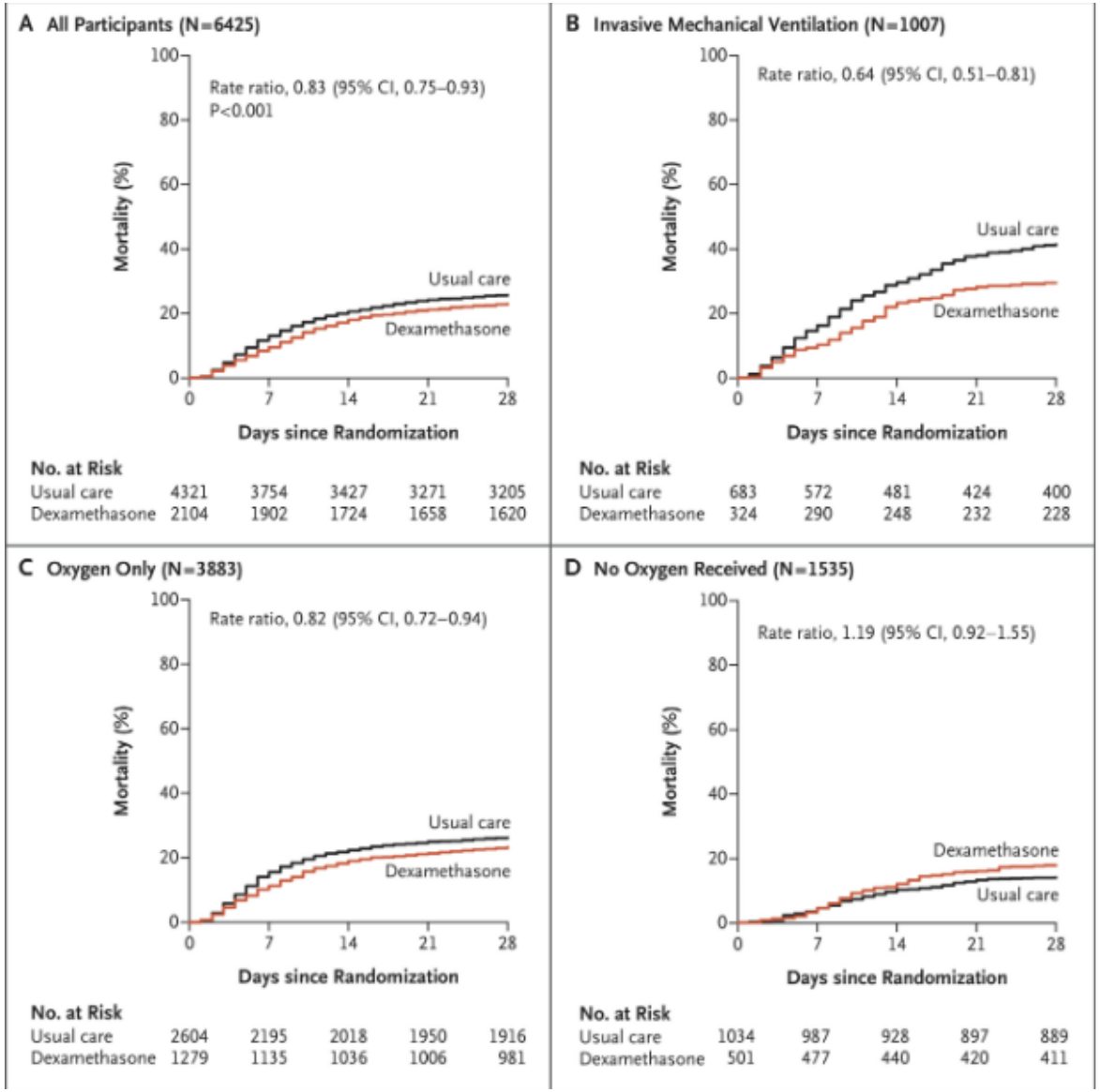
Dexamethasone in Hospitalized Patients



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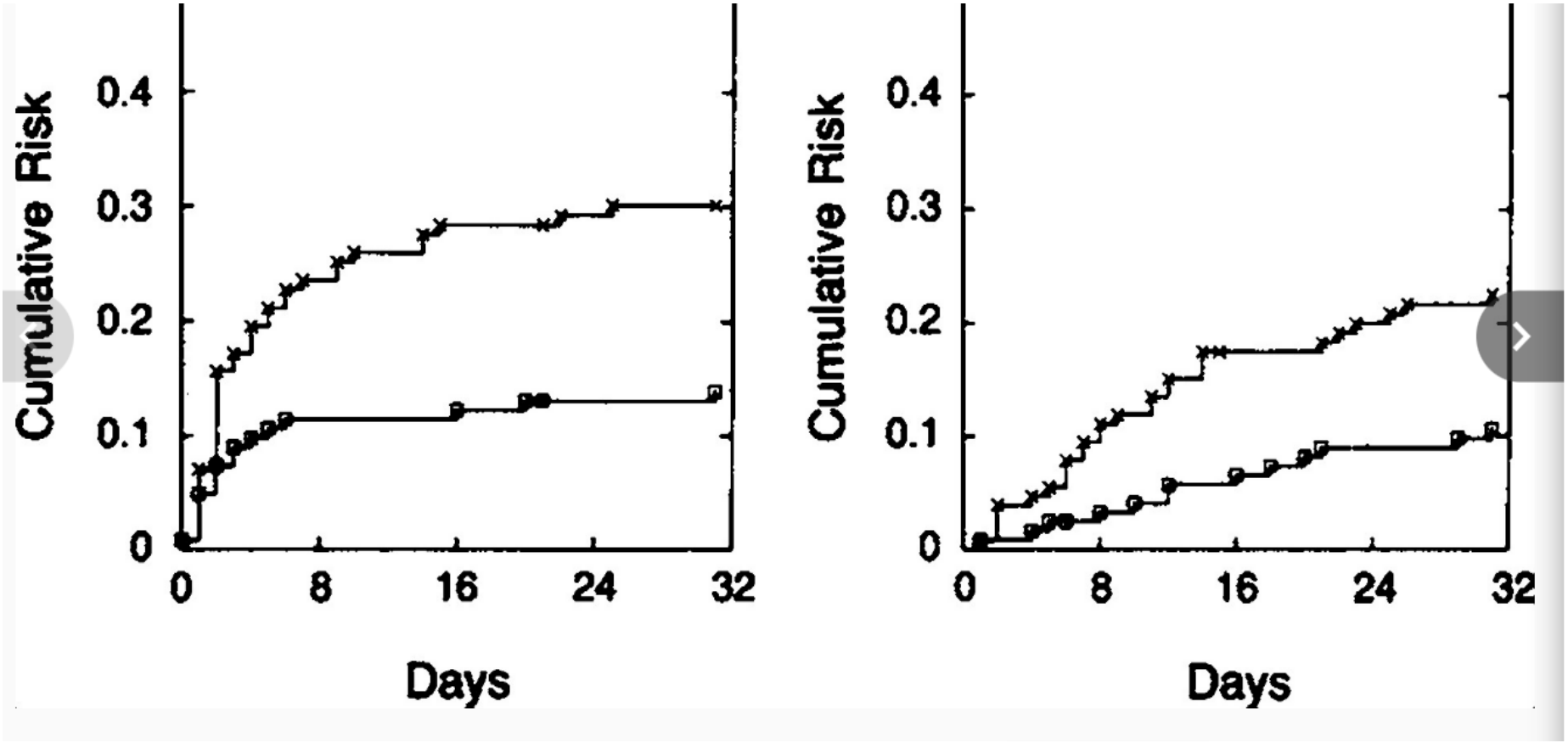
Corticosteroid Rx for Pneumocystis Pneumonia



Rerspiratory Failure **Death**

Bozzette SA, et al. N Engl J Med. 1990;323(21):1451

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Corticosteroid Rx for Pneumocystis Pneumonia

- Indicated when
  - PaO2 < 70 mmHg **or**
  - O2 sat < 92% on room air **or**
  - A-a oxygen gradient > 35 mmHg
- Prednisone dosage:
  - 40mg bid x 5 days
  - Then 40mg daily x 5 days
  - Then 20 mg daily for 11 days
  - Alternative: Methylprednisolone at 80% prednisone dose

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Bacterial Meningitis & Dexamethasone

- Probable benefit to decrease neurologic sequelae and mortality
- Mortality decrease from 15% to 7%
- Unfavorable outcome reduced from 25% to 15% in dexamethasone group
  - 52% to 26% reduction in pneumococcal subgroup

De Gans J, et al. Dexamethasone in adults with bacterial meningitis.
N Engl J Med. 2002;347(2):1549

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TABLE 2. OUTCOMES EIGHT WEEKS AFTER ADMISSION, ACCORDING TO CULTURE RESULTS.*

OUTCOME AND CULTURE RESULTS	DEXAMETHASONE GROUP	PLACEBO GROUP	RELATIVE RISK (95% CI)†	P VALUE
	no./total no. (%)			
Unfavorable outcome				
All patients	23/157 (15)	36/144 (25)	0.59 (0.37–0.94)	0.03
Streptococcus pneumoniae	15/58 (26)	26/50 (52)	0.50 (0.30–0.83)	0.006
Neisseria meningitidis	4/50 (8)	5/47 (11)	0.75 (0.21–2.63)	0.74
Other bacteria	2/12 (17)	1/17 (6)	2.83 (0.29–27.8)	0.55
Negative bacterial culture‡	2/37 (5)	4/30 (13)	0.41 (0.08–2.06)	0.40
Death				
All patients	11/157 (7)	21/144 (15)	0.48 (0.24–0.96)	0.04
S. pneumoniae	8/58 (14)	17/50 (34)	0.41 (0.19–0.86)	0.02
N. meningitidis	2/50 (4)	1/47 (2)	1.88 (0.76–20.1)	1.00
Other bacteria	1/12 (8)	1/17 (6)	1.42 (0.10–20.5)	1.00
Negative bacterial culture	0/37	2/30 (7)	—	0.20
Focal neurologic abnormalities				
All patients	18/143 (13)	24/119 (20)	0.62 (0.36–1.09)	0.13
S. pneumoniae	11/49 (22)	11/33 (33)	0.67 (0.33–1.37)	0.32
N. meningitidis	3/46 (7)	5/44 (11)	0.57 (0.15–2.26)	0.48
Other bacteria	3/11 (27)	3/16 (19)	1.45 (0.36–5.92)	0.66
Negative bacterial culture	1/37 (3)	5/26 (19)	0.14 (0.02–1.13)	0.07
Hearing loss				
All patients	13/143 (9)	14/119 (12)	0.77 (0.38–1.58)	0.54
S. pneumoniae	7/49 (14)	7/33 (21)	0.67 (0.25–1.69)	0.55
N. meningitidis	3/46 (7)	5/44 (11)	0.57 (0.15–2.26)	0.48
Other bacteria	2/11 (18)	1/16 (6)	2.91 (0.30–28.3)	0.55
Negative bacterial culture	1/37 (3)	1/26 (4)	0.70 (0.05–10.7)	1.00

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Bacterial Meningitis & Dexamethasone

- Ideally dexamethasone should be administered **before or simultaneous** with initial antibiotic Rx
  - Probably of no benefit if administered > 12 hrs later
- Dose: 0.15 mg/kg q 6 hrs x 4 days
- Probably no need to add rifampin or alter vancomycin dosage

Tunkel AR, et al. IDSA Practice Guidelines for the Management fo Bacterial Meningitis. CID 2004:39;1267

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Potential Adverse Effects

- Hyperglycemia
- GI bleeding
- Thromboembolism
- Neuropsychiatric disorder

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Future Direction
Ongoing Research

Optimizing Corticosteroid Use

Ongoing research aims to refine corticosteroid dosing and timing to maximize therapeutic benefits while reducing adverse effects.

Patient Selection Strategies

Studies focus on identifying which patients will benefit most from corticosteroid treatment to improve sepsis outcomes.

Personalized Medicine Promise

Personalized approaches in sepsis treatment hold promise for tailored therapies that increase effectiveness and safety.

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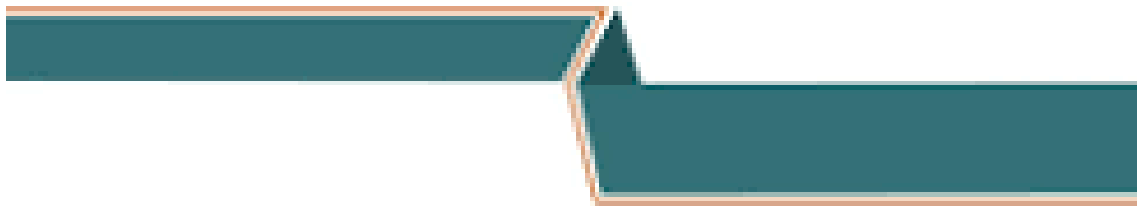
“Thank You”



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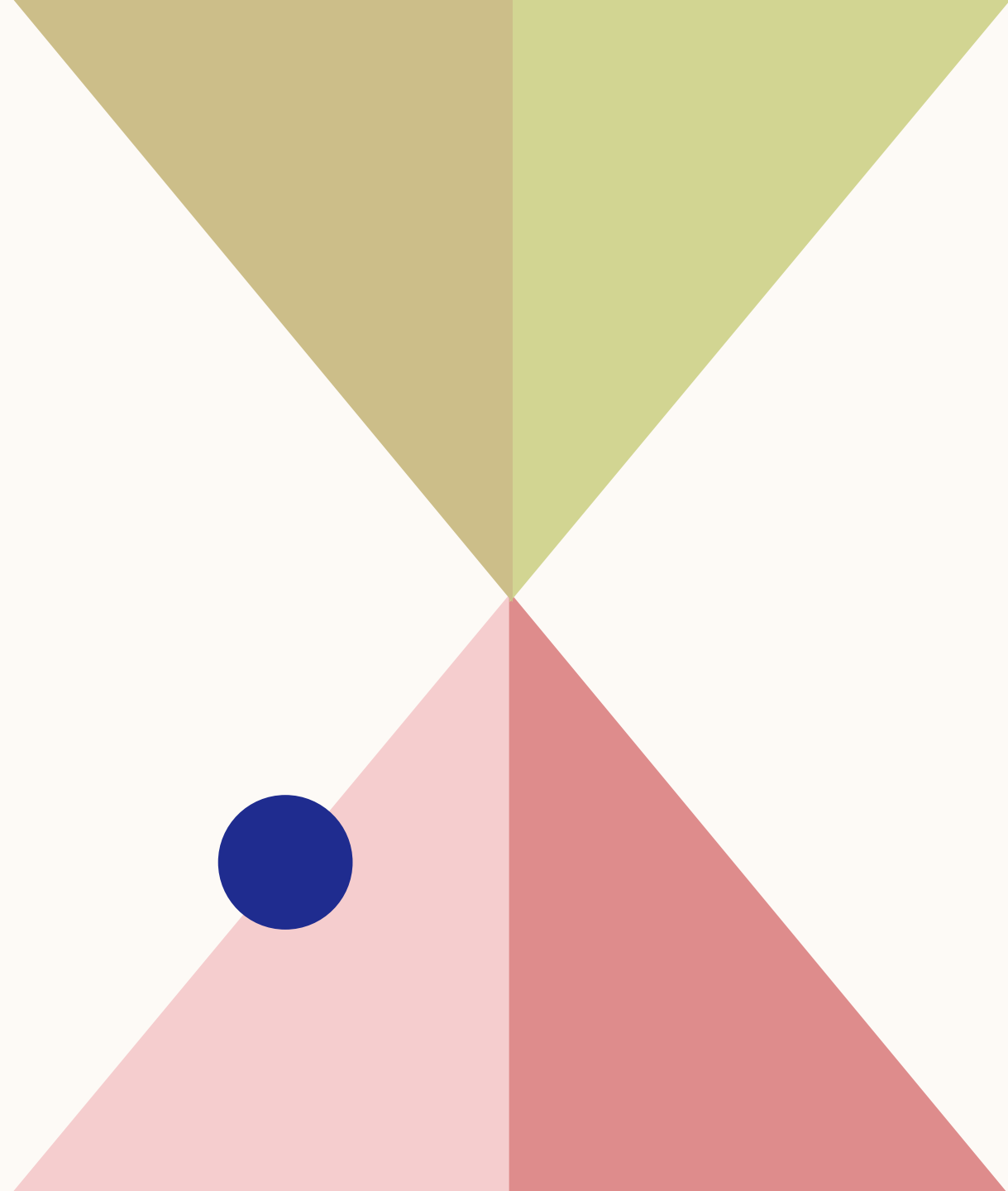
TEEN SLEEP LOSS: A PUBLIC HEALTH CRISIS AND WHAT YOU CAN DO

JOANNA FONG-ISARIYAWONGSE, MD

UPMC LIFE CHANGING MEDICINE

Pitt

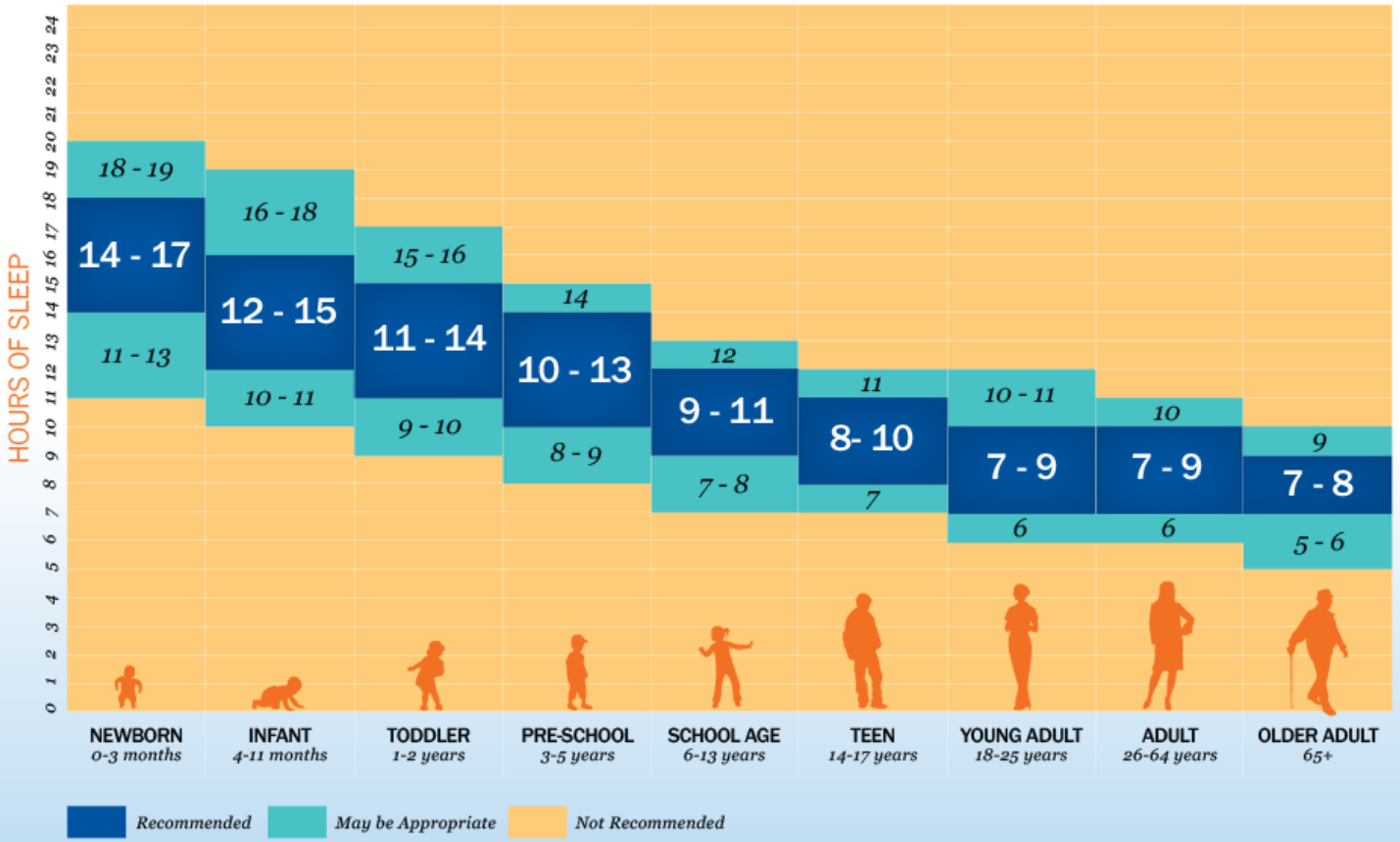
No disclosures



Public Health Education, Policy, Advocacy

Healthcare Workers	Ground Transportation Personnel	Athletes
Medical Students	Pilots & Air Traffic Controllers	Athletic Trainers, Coaches, Nutritionists
First Responders	High School Students	Performing Arts Professionals

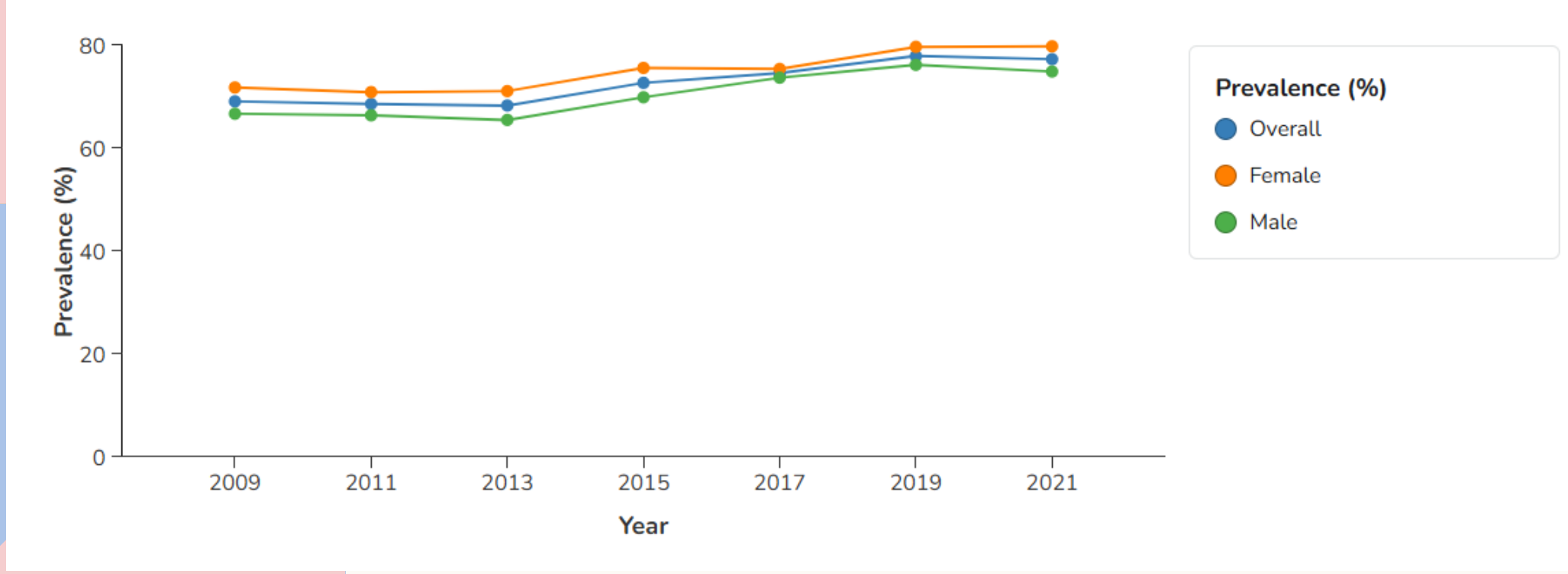
SLEEP DURATION RECOMMENDATIONS



SLEEPFOUNDATION.ORG | SLEEP.ORG

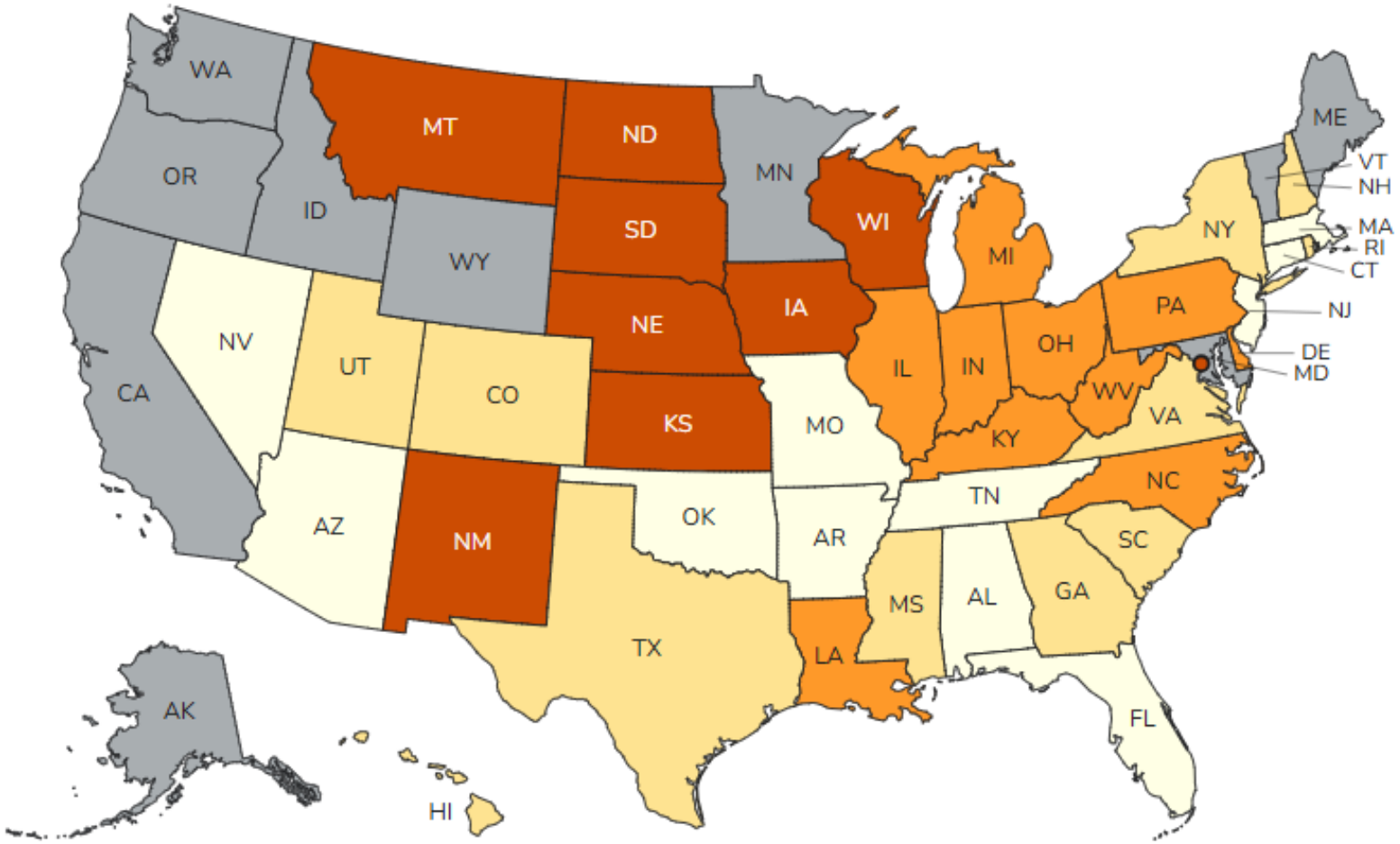
Hirshkowitz M, The National Sleep Foundation's sleep time duration recommendations: methodology and results summary, Sleep Health (2015), http://dx.doi.org/10.1016/j.sleh.2014.12.010

INSUFFICIENT SLEEP IN ADOLESCENTS: A PUBLIC HEALTH CRISIS



CDC: National trends in short sleep duration among US high school students

Data Source: CDC National Youth Risk Behavior Survey (YRBS), 2009–2021.



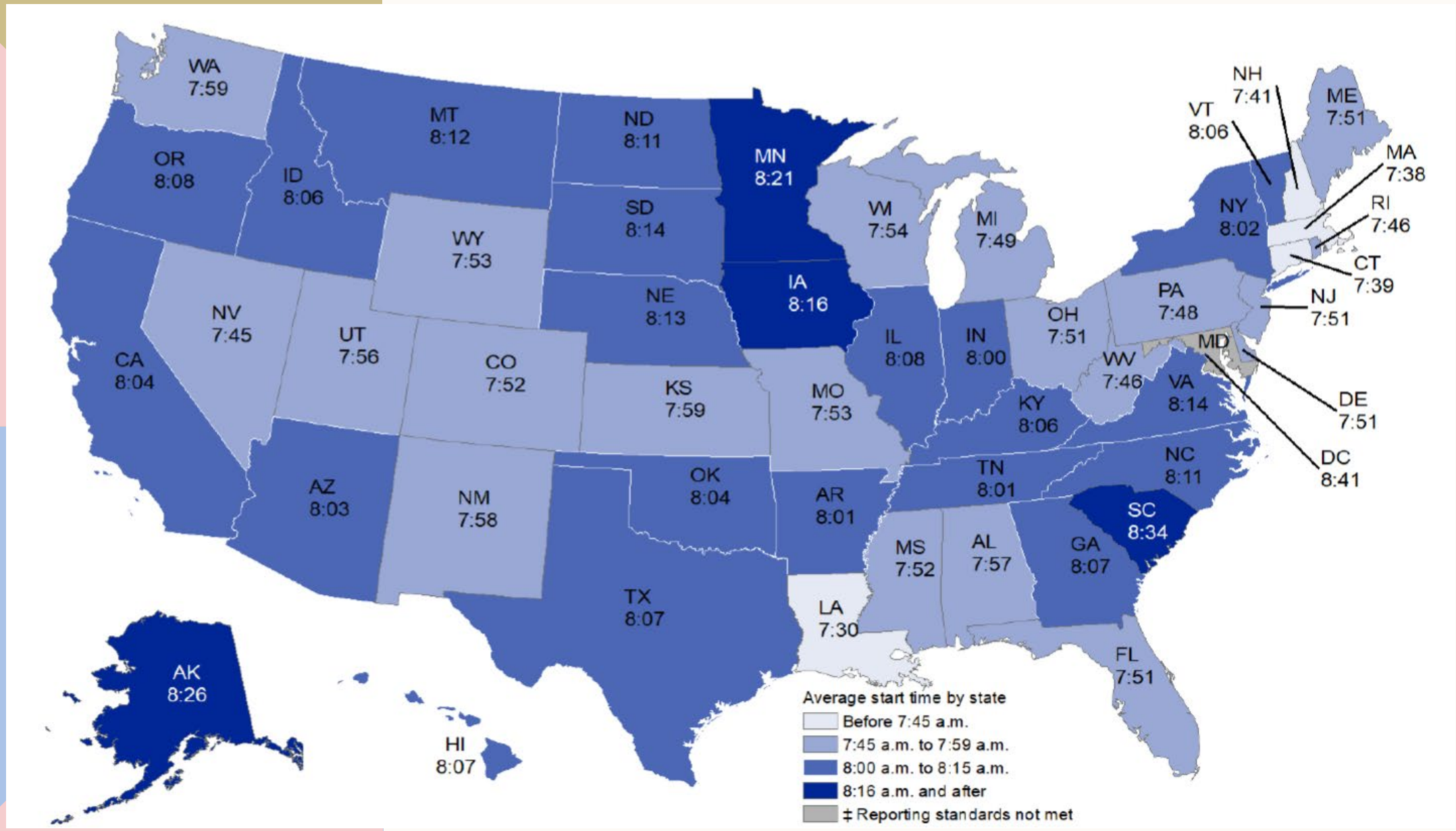
Prevalence (%)

- 77.4–79.6
- 75.6–77.1
- 80.0–83.9
- 71.1–75.5
- Data unavailable

U.S. Territories

PR

Data Source: CDC National Youth Risk Behavior Survey (YRBS), 2021.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UT 7:56
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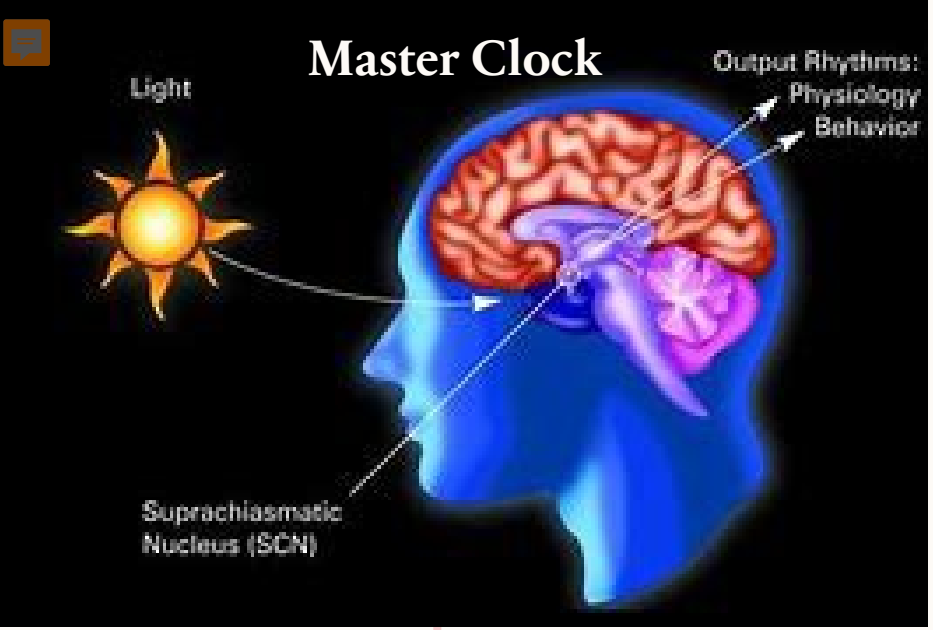
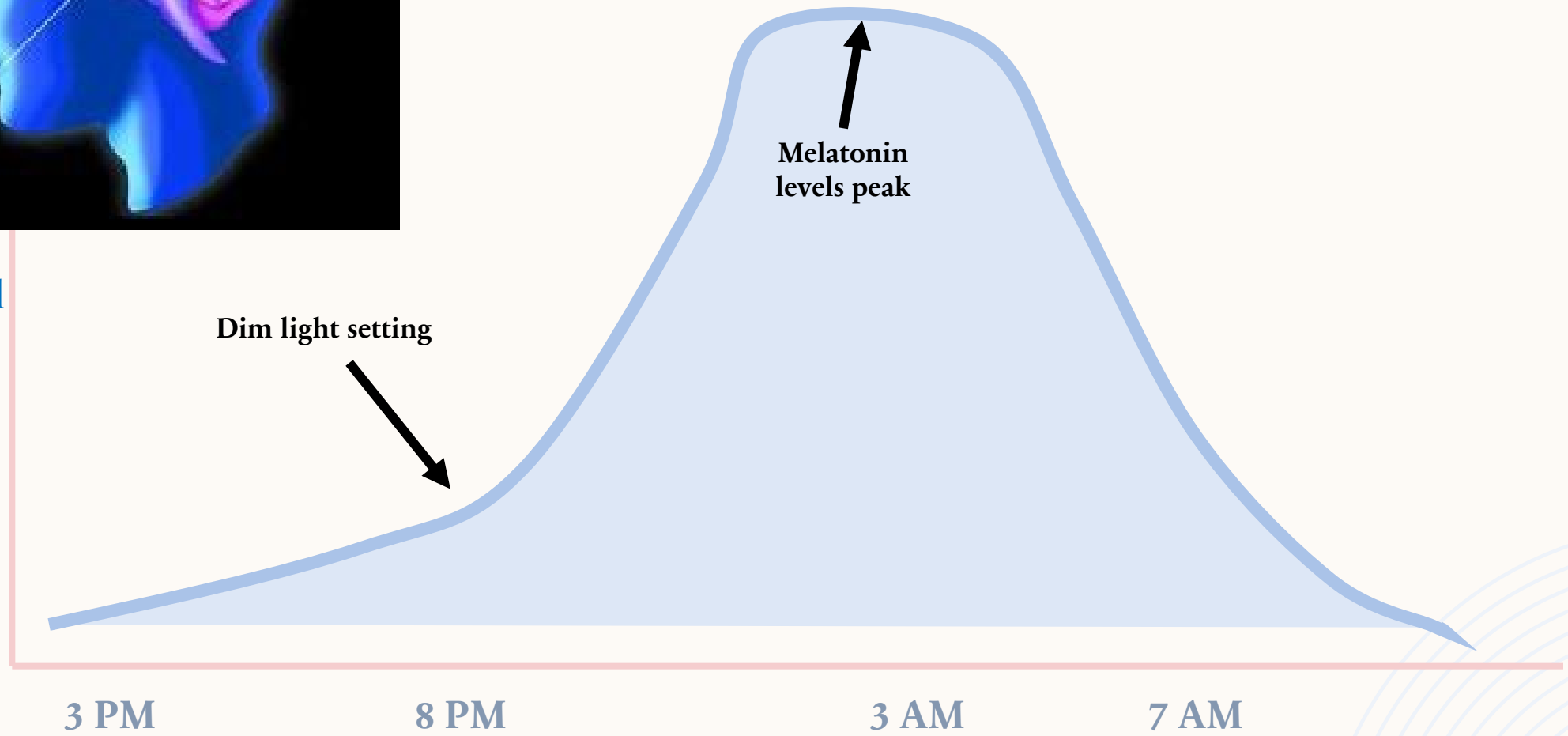
NM 7:58
ND 8:11
SD 8:14
NE 8:13
KS 7:59
OK 8:04
TX 8:07
MN 8:21
IA 8:16
MO 7:53
AR 8:01
LA 7:30
WI 7:54
MI 7:49
IL 8:08
IN 8:00
KY 8:06
TN 8:01
MS 7:52
AL 7:57
GA 8:07
FL 7:51
SC 8:34
NC 8:11
VA 8:14
WV 7:46
OH 7:51
PA 7:48
NY 8:02
VT 8:06
NH 7:41
ME 7:51
MA 7:38
RI 7:46
CT 7:39
NJ 7:51
MD
DE 7:51
DC 8:41
AK 8:26
HI 8:07
Average start time by state
Before 7:45 a.m.
7:45 a.m. to 7:59 a.m.
8:00 a.m. to 8:15 a.m.
8:16 a.m. and after
‡ Reporting standards not met

THE SCIENCE OF SLEEP: WHY EARLY SCHOOL START TIMES HURT TEENS

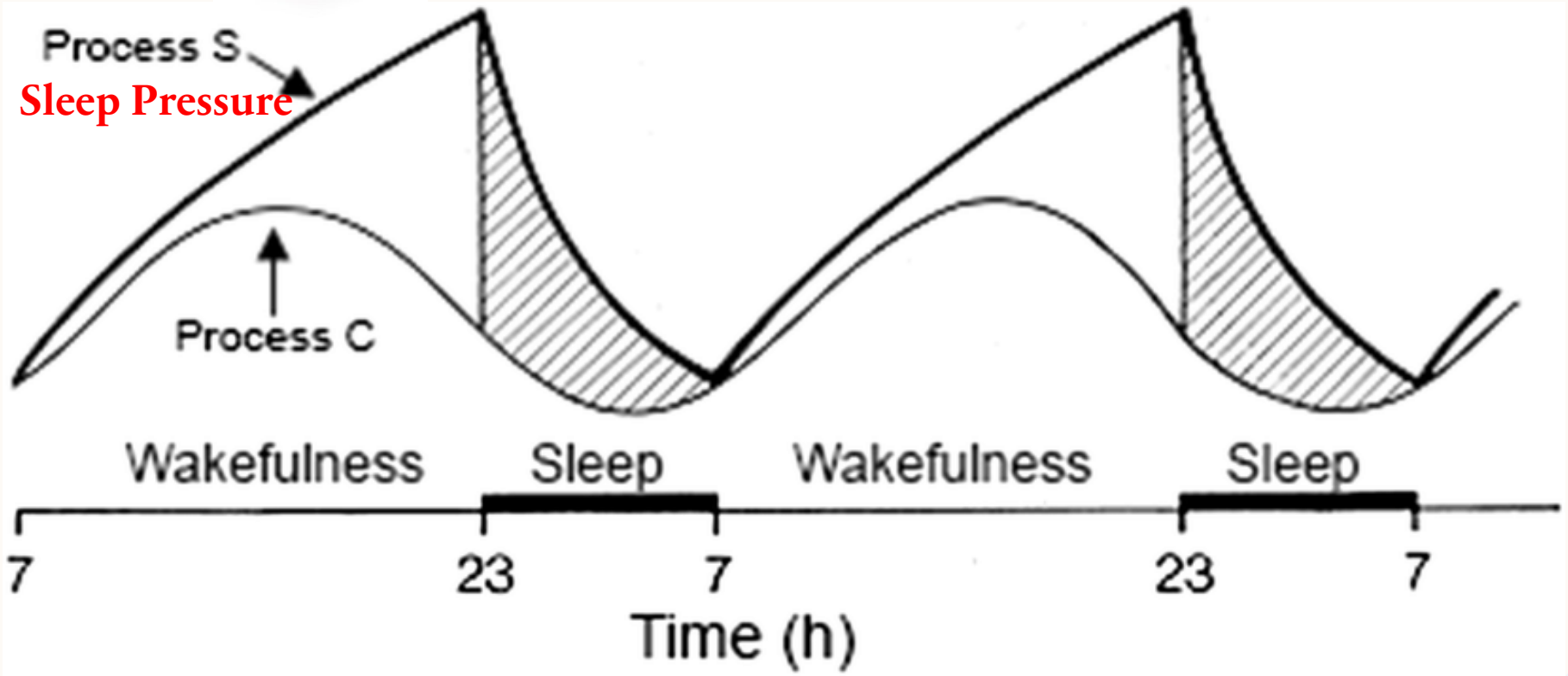

Master Clock
Light
Output Rhythms:
Physiology
Behavior
Suprachiasmatic
Nucleus (SCN)

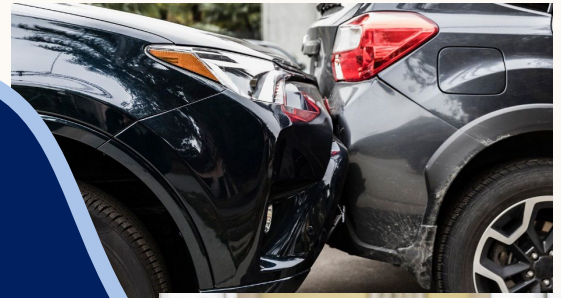
Process C


Melatonin level
Melatonin
levels peak
Dim light setting
3 PM
8 PM
3 AM
7 AM

Adenosine

Sleep deprivation





Melatonin level

Dim light setting

Mela
leve

Biological Shift
in Teen's Circadian Rhythm
(Internal Sleep-Wake Rhythm)

3PM

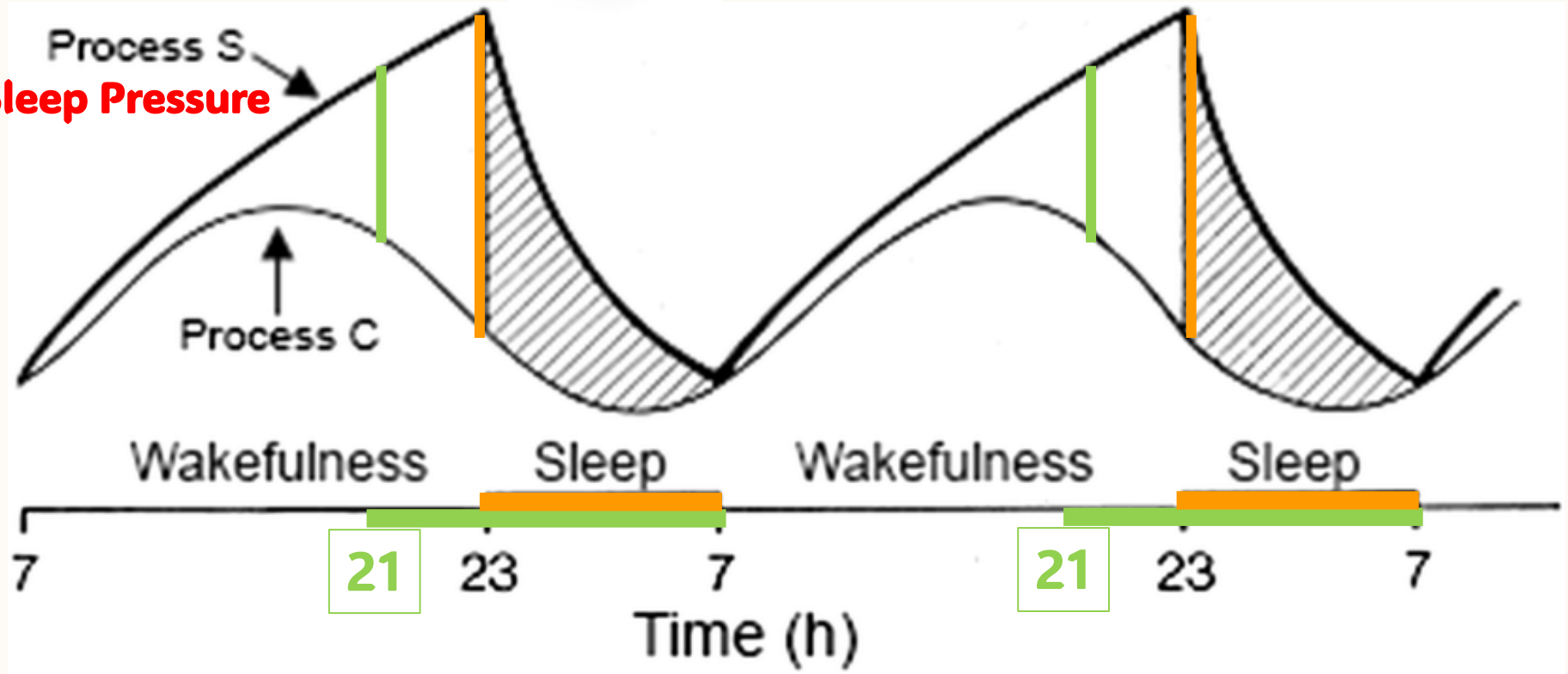
9PM → 11PM

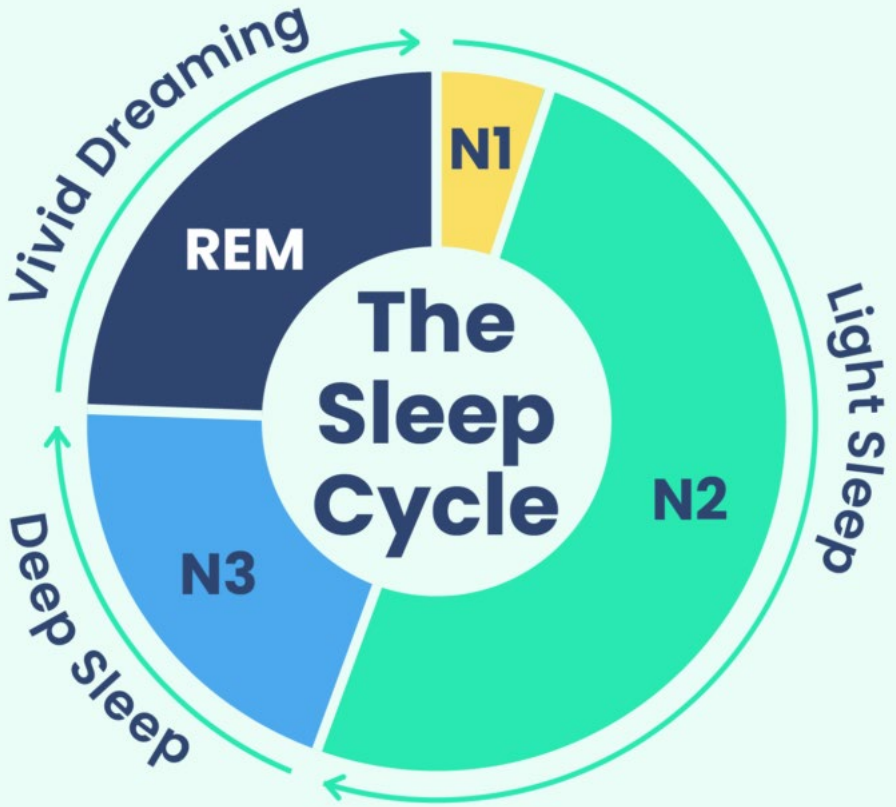
3AM

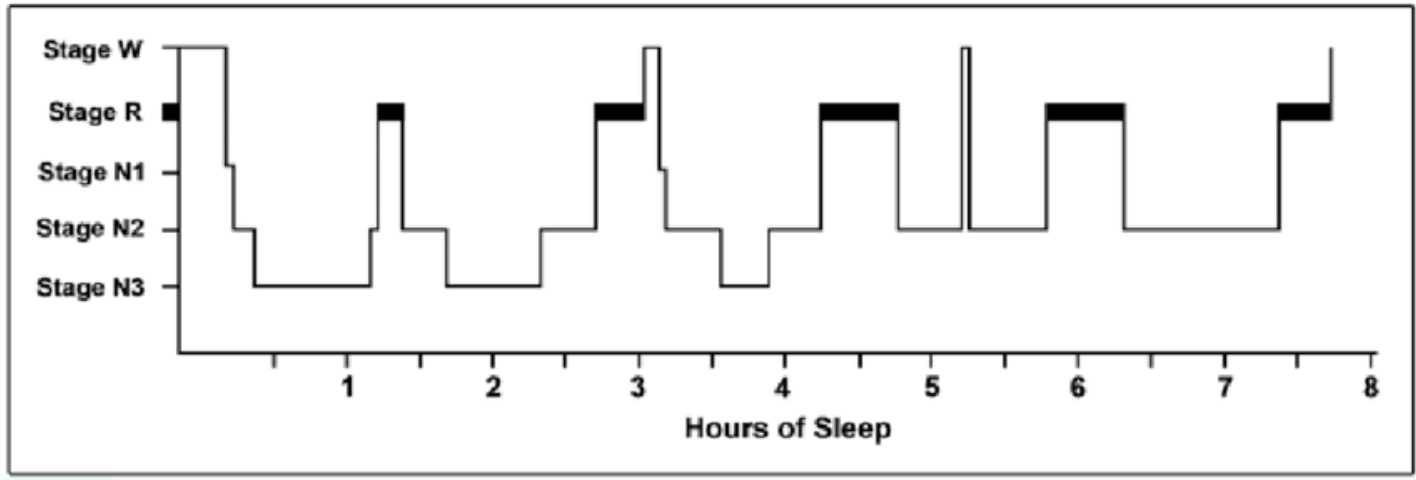
7AM → >8AM

Adenosine

Teens

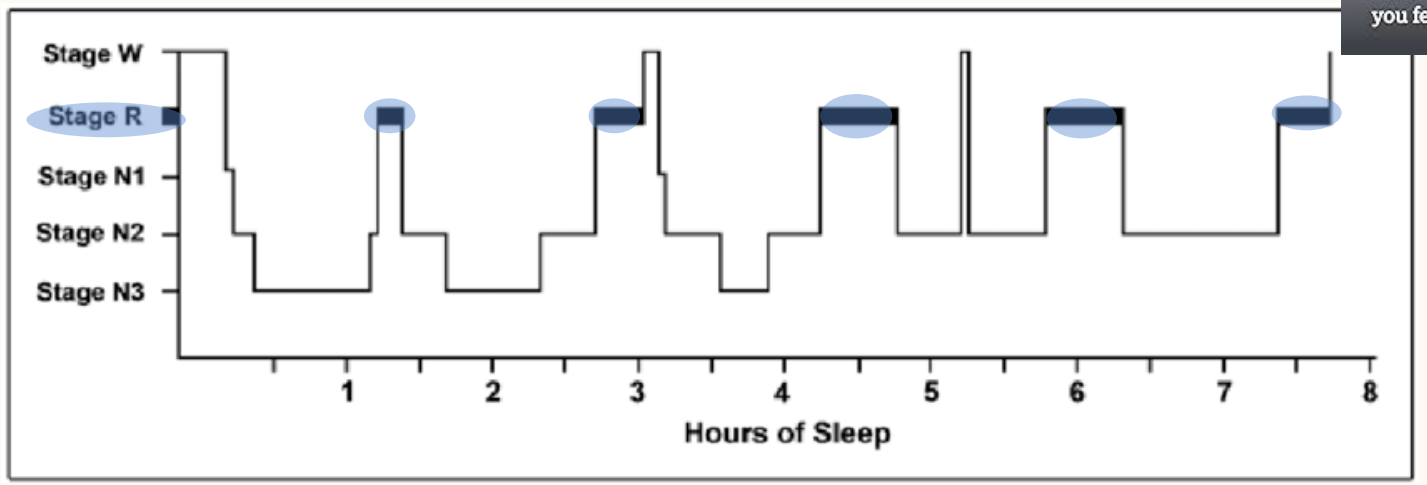

Process S
Sleep Pressure
Process C
Wakefulness
Sleep
Wakefulness
Sleep
7
21
23
7
21
23
7
Time (h)

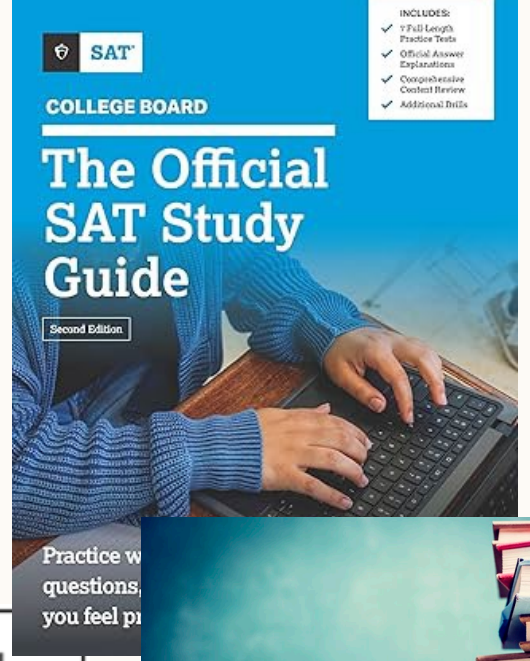

Vivid Dreaming
REM
N1
The Sleep Cycle
N2
Light Sleep
N3
Deep Sleep

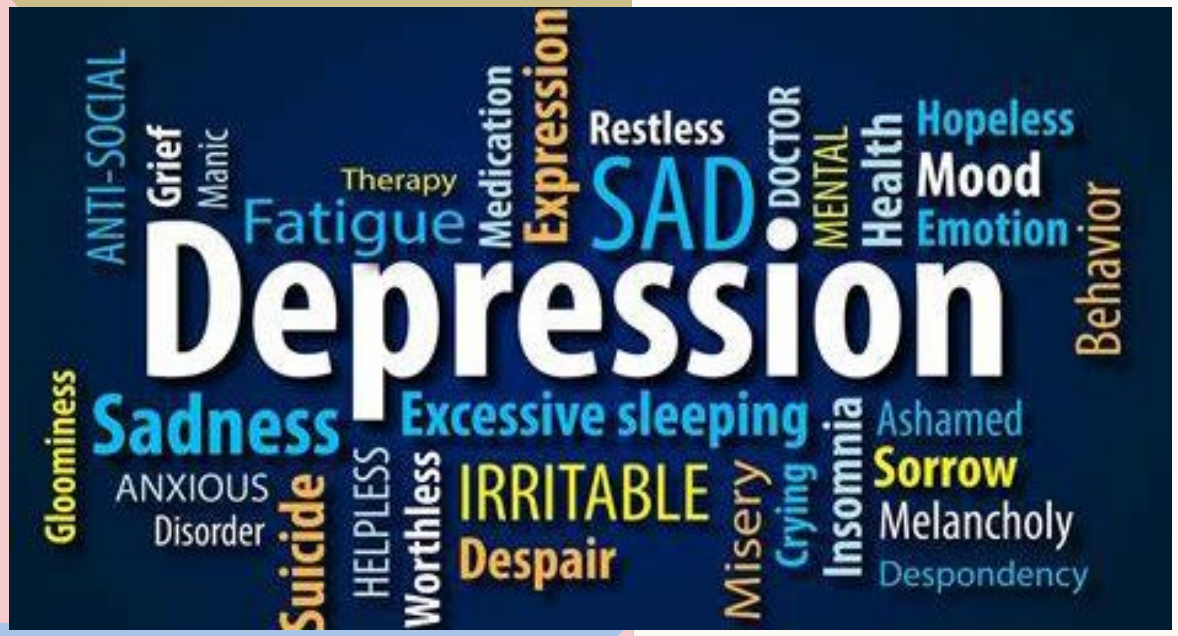

Stage W
Stage R
Stage N1
Stage N2
Stage N3
1
2
3
4
5
6
7
8
Hours of Sleep

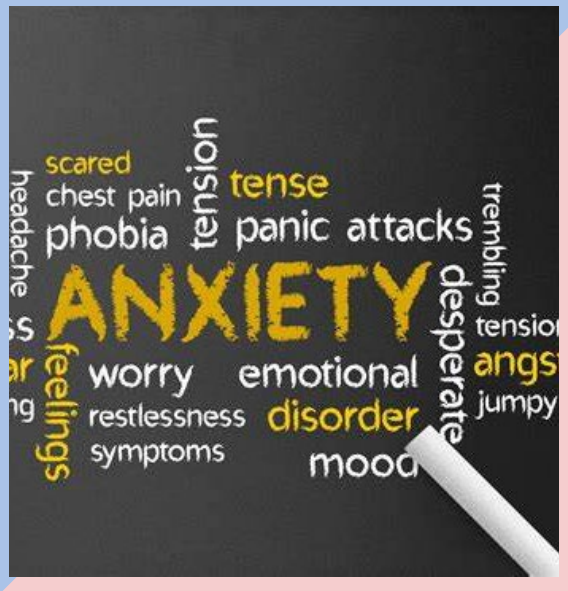
REM (DREAM)

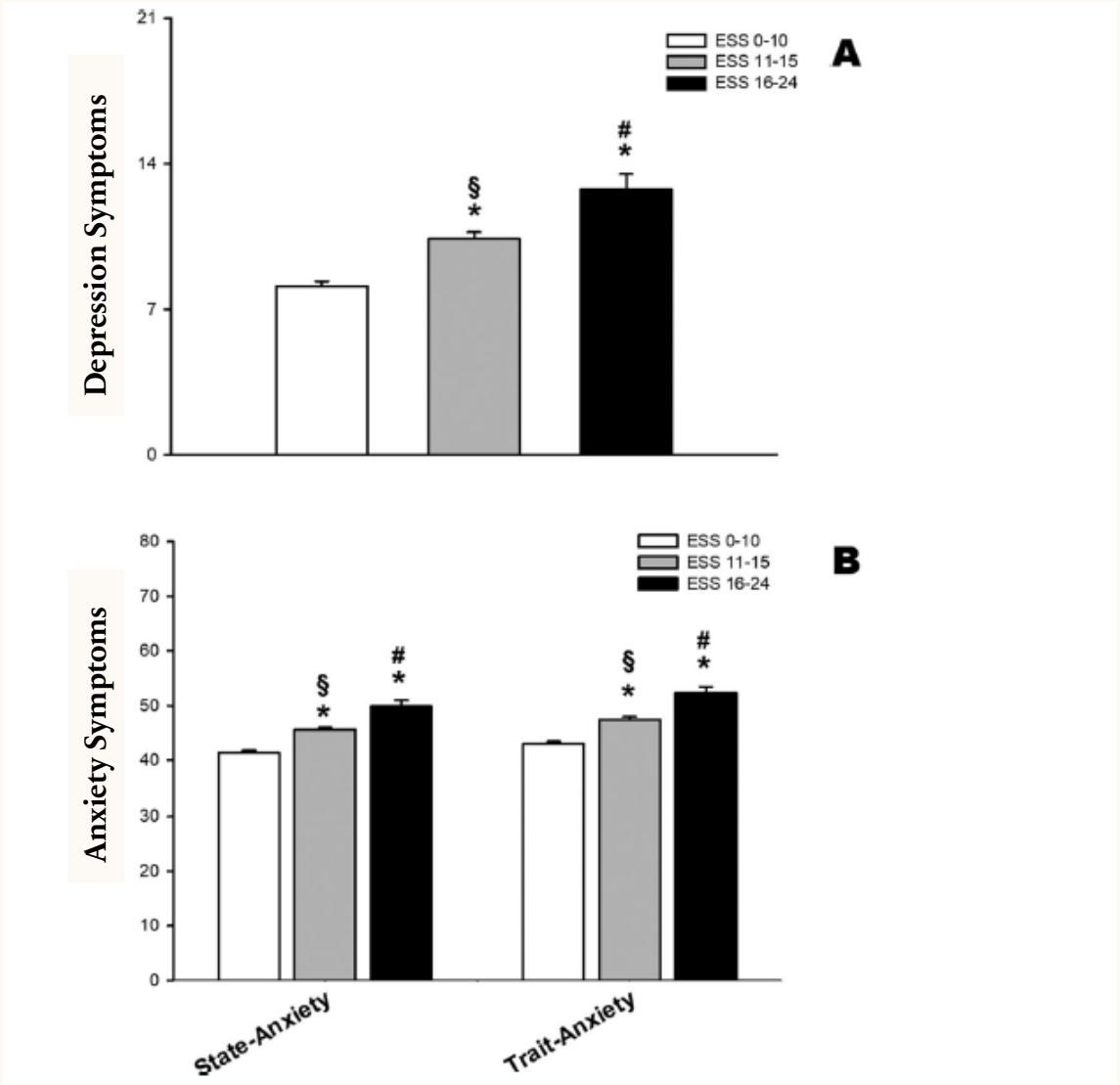
Memory Consolidation
Emotion Regulation






ANTI-SOCIAL
Grief
Manic
Therapy
Fatigue
Medication
Expression
Restless
SAD
DOCTOR
MENTAL
Health
Hopeless
Mood
Emotion
Behavior
Depression
Gloominess
Sadness
Excessive sleeping
Ashamed
ANXIOUS
Disorder
HELPLESS
Worthless
IRRITABLE
Misery
Crying
Insomnia
Sorrow
Melancholy
Suicide
Despair
Despondency


scared
chest pain
tension
tense
phobia
panic attacks
ANXIETY
worry
emotional
restlessness
disorder
symptoms
mood
desperate
trembling
jumpy


Depression Symptoms
21
14
7
0
ESS 0-10
ESS 11-15
ESS 16-24
A
§
*
#
*
Anxiety Symptoms
80
70
60
50
40
30
20
10
0
B
State-Anxiety
Trait-Anxiety

SLEEP DEPRIVATION & MENTAL HEALTH

Youth Athletes

2-4x higher risk of depression and anxiety[1-3]

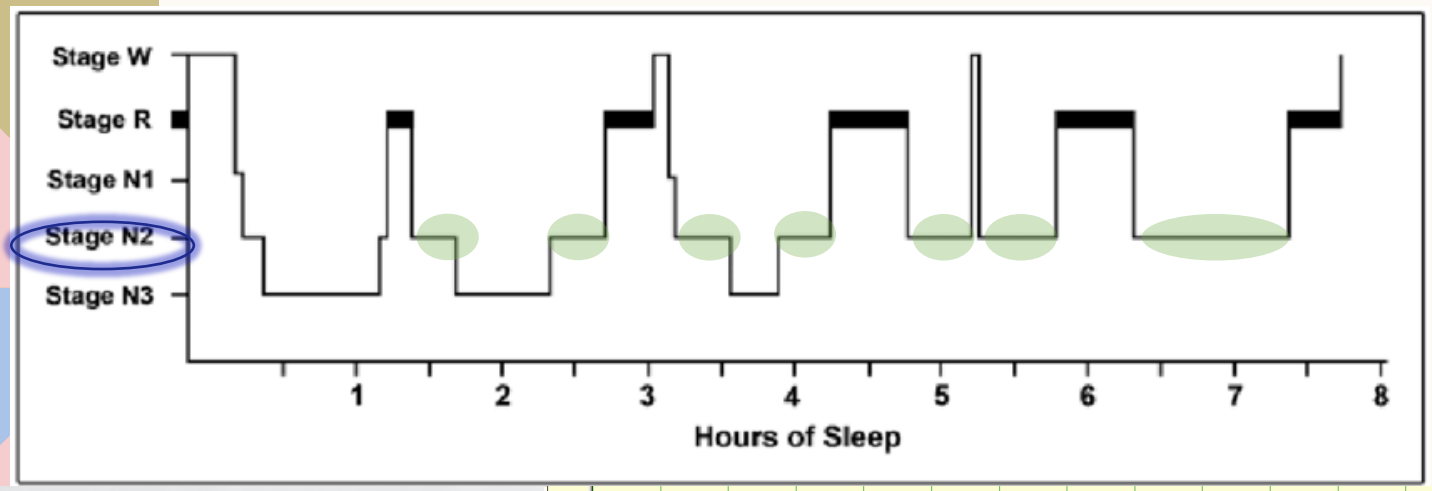
Professional Athletes

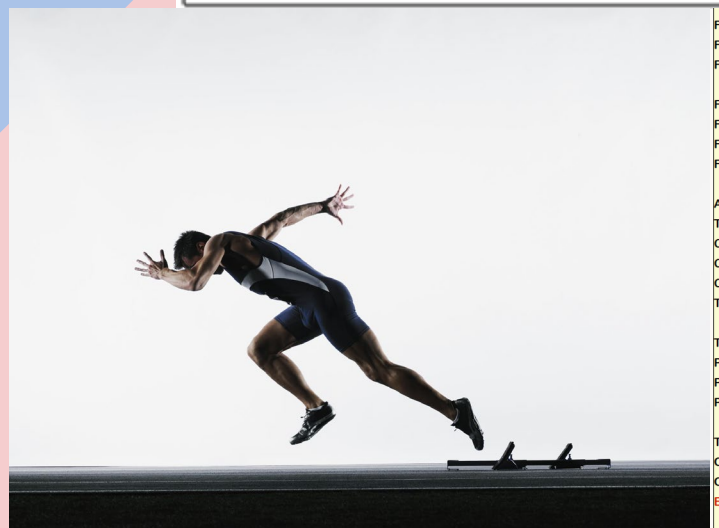
4.26x more likely to report depressive symptoms[4, 5]

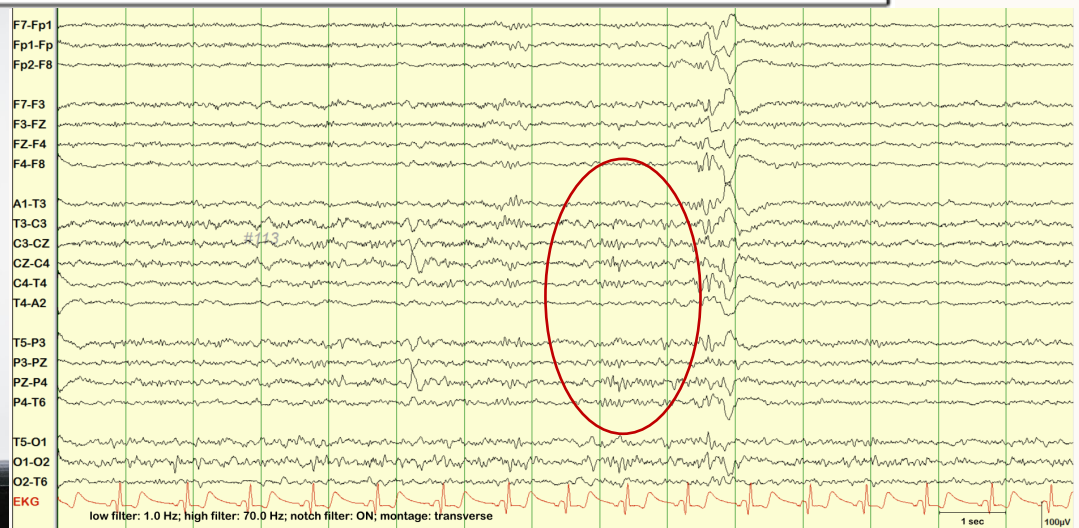
1. Choi Y, Kim S, Park SH, et al. Relationship between poor sleep and depressive symptoms in Korean elite youth athletes. *J Clin Med*. 2025;14(2):479. doi:10.3390/jcm14020479.
2. Wei W, Liu W. Sleep pattern is related to mental health among Chinese collegiate student athletes. *Int J Environ Res Public Health*. 2022;19(15):8961. doi:10.3390/ijerph19158961.
3. Chang CJ, Putukian M, Aerni G, et al. Mental health issues and psychological factors in athletes: detection, management, effect on performance, and prevention: American Medical Society for Sports Medicine position statement. *Clin J Sport Med*. 2020;30(2):e61-e87. doi:10.1097/JSM.0000000000000817.
4. Cooper R, Di Biase MA, Bei B, Quach J, Cropley V. Associations of changes in sleep and emotional and behavioral problems from late childhood to early adolescence. *JAMA Psychiatry*. 2023;80(6):585-596. doi:10.1001/jamapsychiatry.2023.0379.
5. Orchard F, Gregory AM, Gradisar M, Reynolds S. Self-reported sleep patterns and quality amongst adolescents: cross-sectional and prospective associations with anxiety and depression. *J Child Psychol Psychiatry*. 2020;61(10):1126-1137. doi:10.1111/jcpp.13288.

STAGE 2 SLEEP (N2)

Muscle Memory

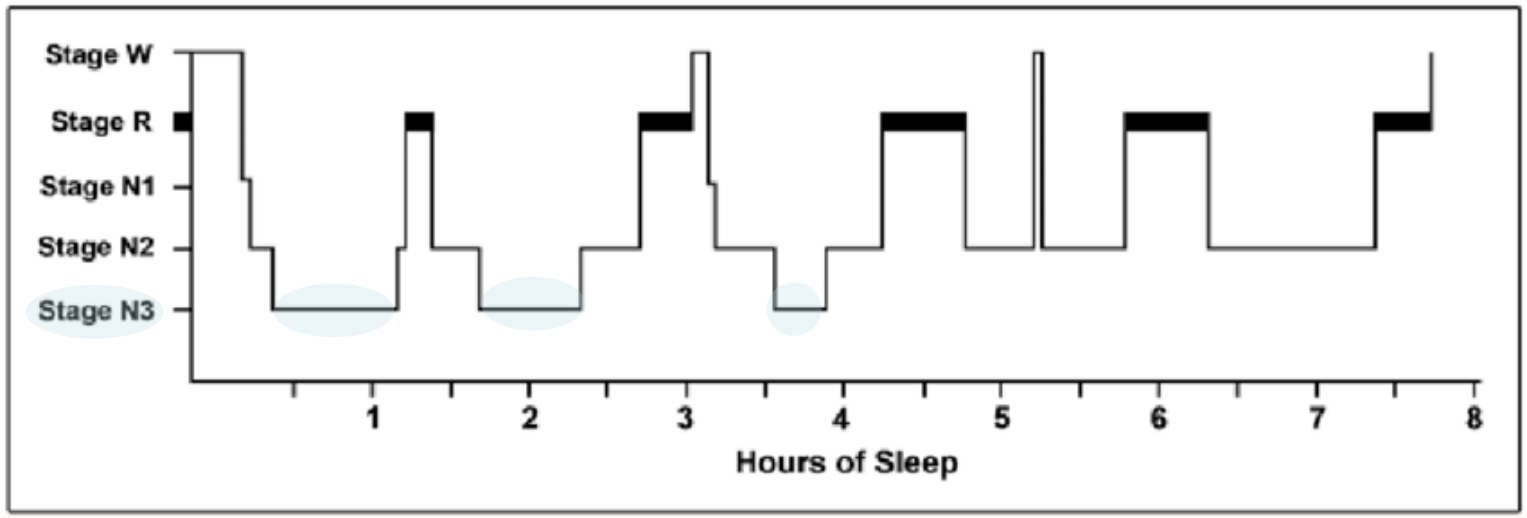


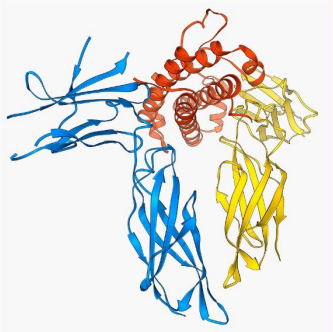




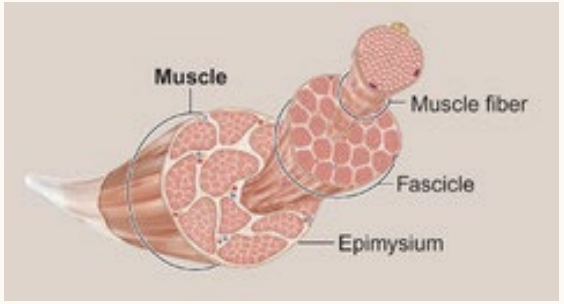
SLOW WAVE SLEEP (DEEP SLEEP)

RESTORATIVE (RECOVERY)

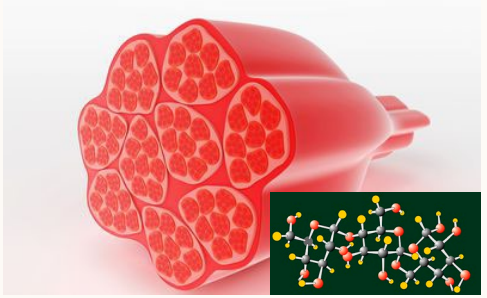




Human Growth Hormone

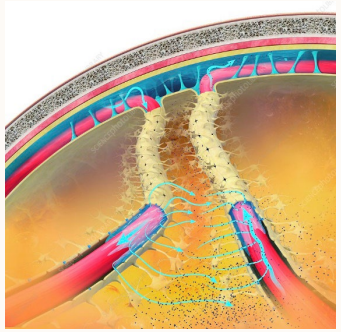


Muscle Repair Tissue Regeneration



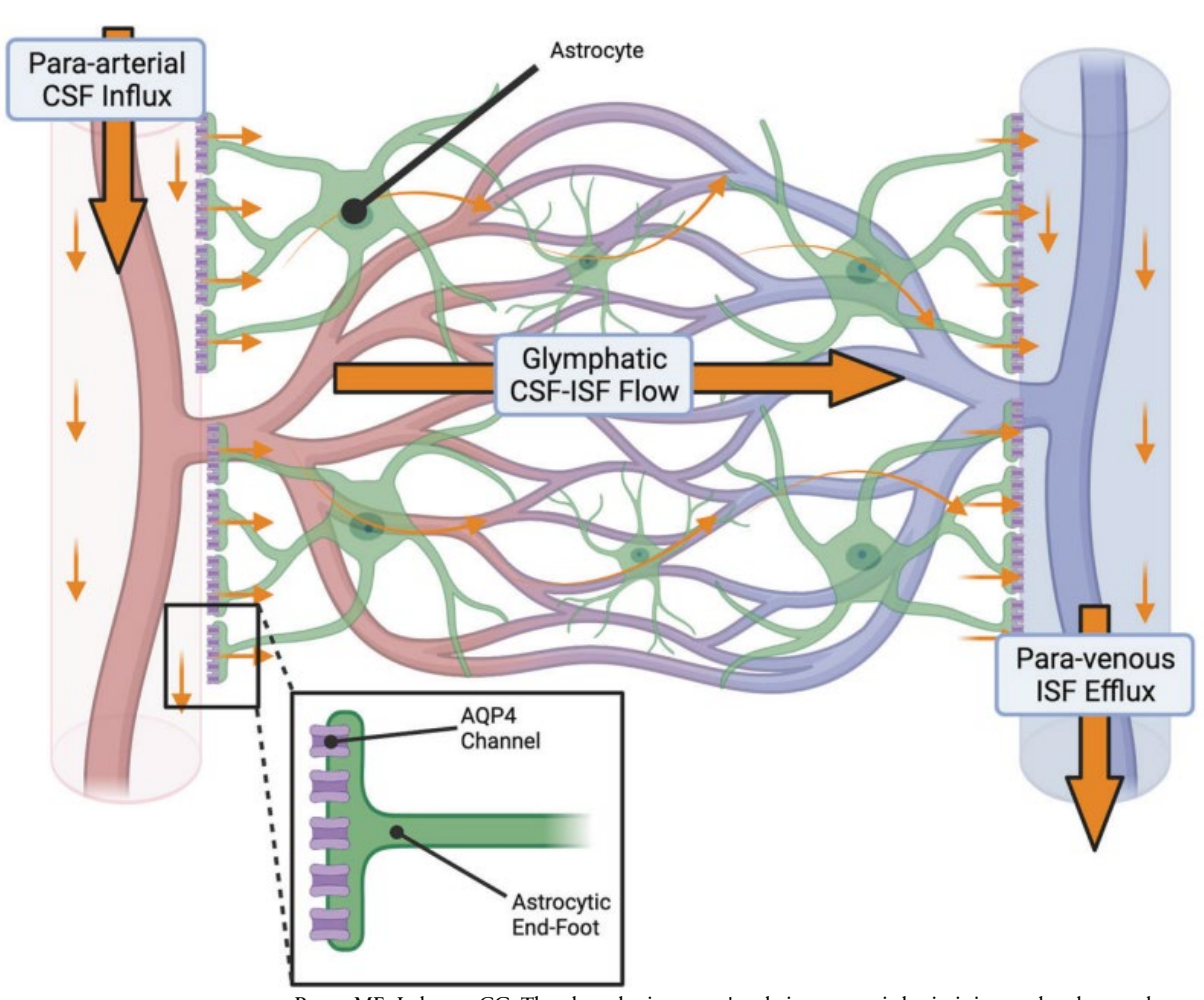
Glycogen Restoration

Boosts Immune System Lower Inflammation

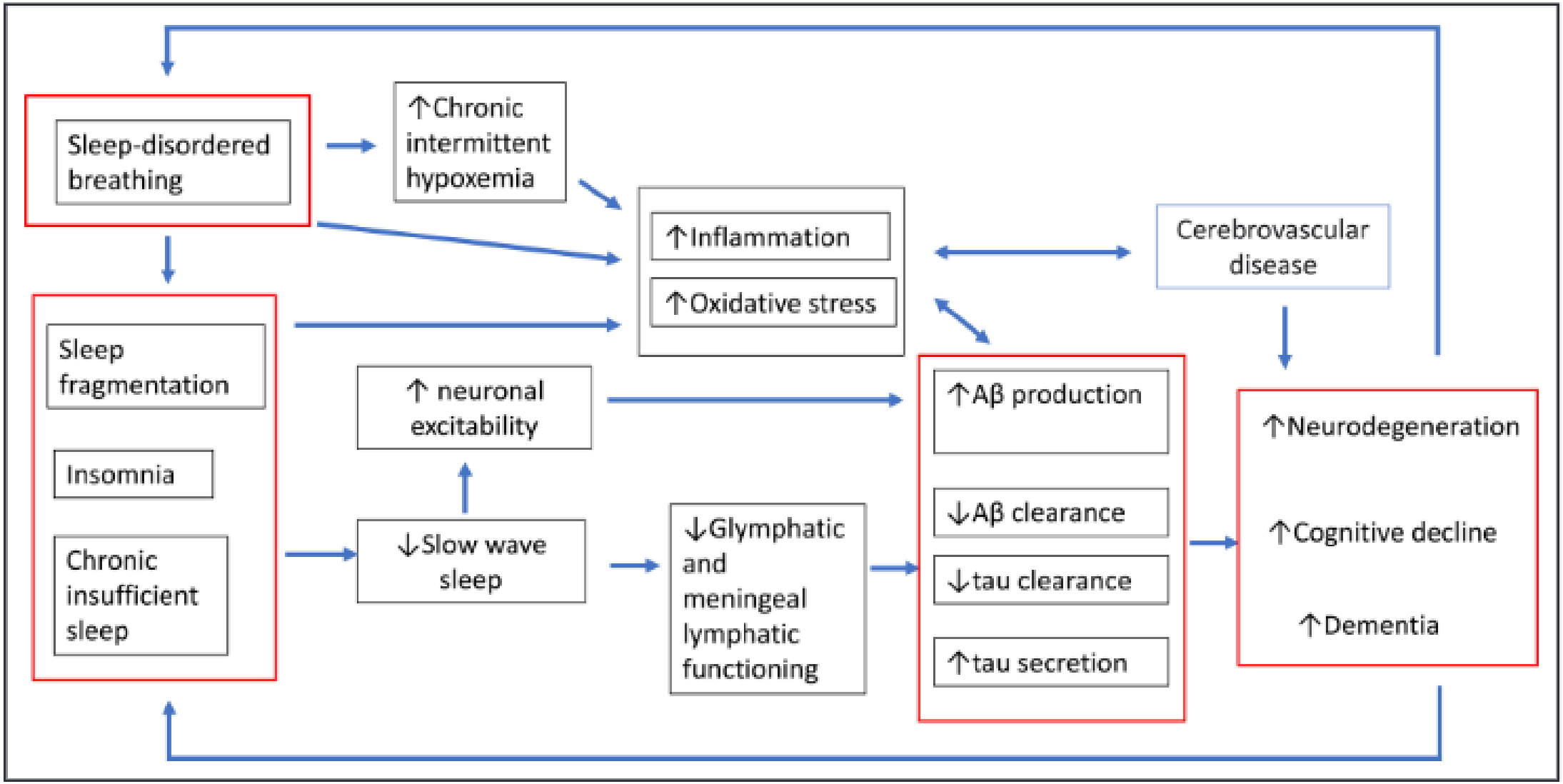


Glymphatic System

GLYMPHATIC SYSTEM



Peters ME, Lyketsos CG. The glymphatic system's role in traumatic brain injury–related neurodegeneration. *Mol Psychiatry*. 2023;28(7):2707-2715. doi:10.1038/s41380-023-02070-7.


Sleep-disordered breathing
↑Chronic intermittent hypoxemia
↑Inflammation
↑Oxidative stress
Cerebrovascular disease
Sleep fragmentation
Insomnia
Chronic insufficient sleep
↑ neuronal excitability
↓Slow wave sleep
↓Glymphatic and meningeal lymphatic functioning
↑Aβ production
↓Aβ clearance
↓tau clearance
↑tau secretion
↑Neurodegeneration
↑Cognitive decline
↑Dementia

Dose-dependent Relationships between Sleep Duration and Unsafe Behaviors among US high school students

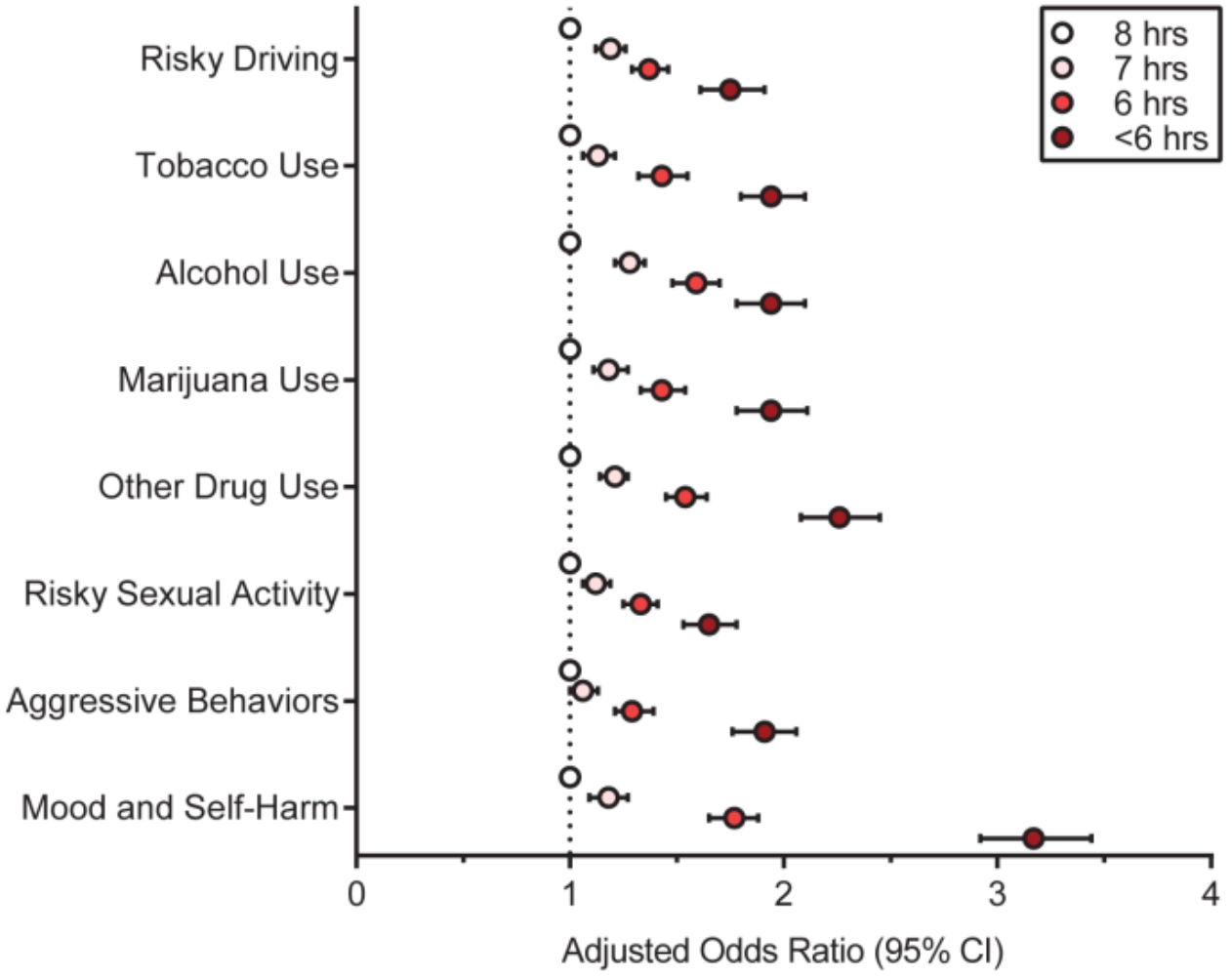


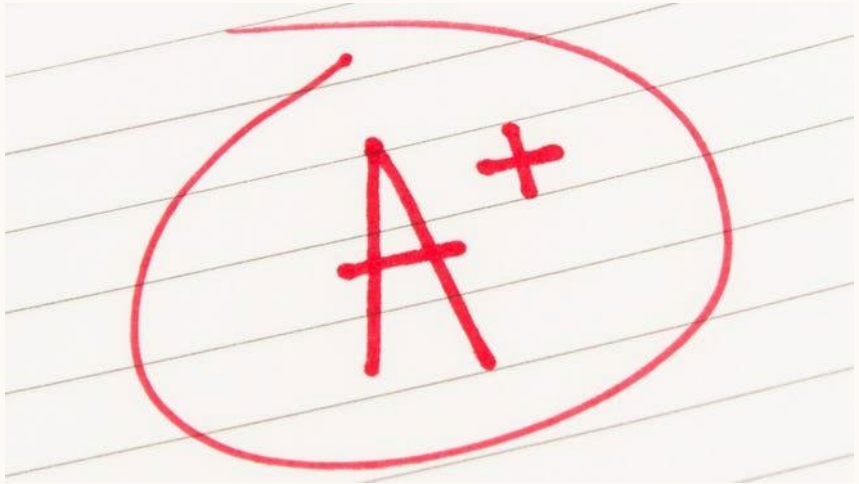
Figure 1. Adjusted association between sleep duration and risk-taking behaviors.
Estimated odds ratios are from weighted logistic regression models adjusted for age, sex, race, and year of survey.

Weaver MD, Barger LK, Malone SK, Anderson LS, Klerman EB. Dose-Dependent Associations Between Sleep Duration and Unsafe Behaviors Among US High School Students. *JAMA Pediatr*. 2018;172(12):1187-1189. doi:10.1001/jamapediatrics.2018.2777

EDUCATIONAL SUCCESS

Attendance Matters

Every student. Every day.



Reduced Truancy
Better attendance

Improved GPA, SAT
Less achievement gap

Higher Graduation Rates

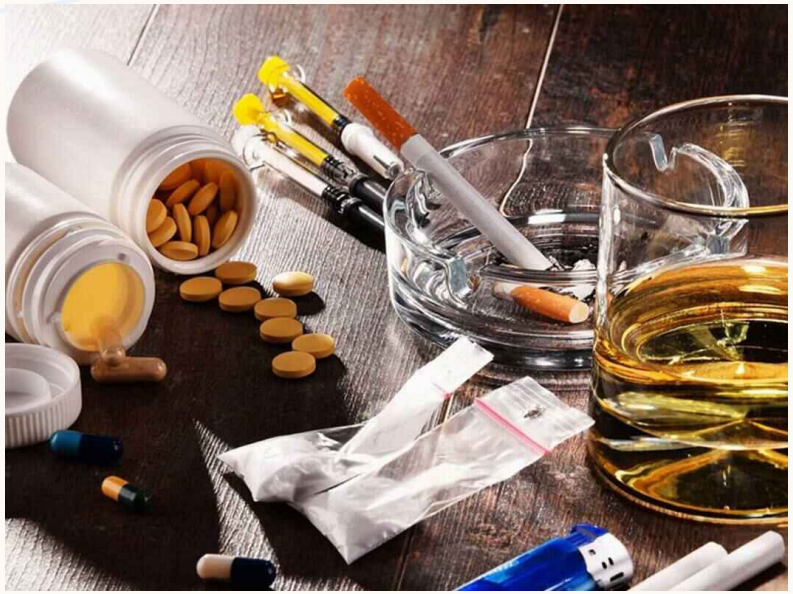
PHYSICAL & MENTAL HEALTH

Less Depression, Anxiety, & Suicide

Less Childhood Illness, Obesity & Diabetes

Fewer Car Crashes

RISK-TAKING BEHAVIORS



Less Substance Abuse

Less Youth Crime & Delinquency

Less Risky Sexual Activity

Adapted from Weaver et al. *JAMA Pediatr*. 2018;172(12):1187-1189

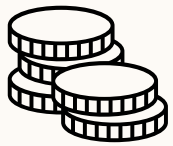
ATHLETIC PERFORMANCE

Better Athletic Performance

Fewer Injuries

Fewer Concussions

With Implementation of Later Secondary School Start Times



PA economy projected to grow by $1.2 BILLION in 5 years

Hafner M, Stepanek M, Troxel WM. The economic implications of later school start times in the United States. *Sleep Health*. 2017;3(6):451-457. doi:10.1016/j.sleh.2017.08.007

The List of Prominent Organizations Endorsing Later School Start Times Keeps Growing Longer

Start School Later®
Healthy Hours

2021
- U.S. Surgeon General

2019
- American Association of Sleep Technologists

2017
- National Parent Teacher Association (PTA)
- American Academy of Sleep Medicine
- Society of Behavioral Medicine

2016
- American Medical Association

2015
- Centers for Disease Control & Prevention (CDC)

2014
- American Psychological Association
- National Association of School Nurses/Society of Pediatric Nurses
- American Academy of Child & Adolescent Psychiatry
- American Academy of Pediatrics

2011
- National Education Association (Resolution C-5 - Adequate Rest, p. 248)

What Are We Waiting for?

PROBLEM

SOLUTION

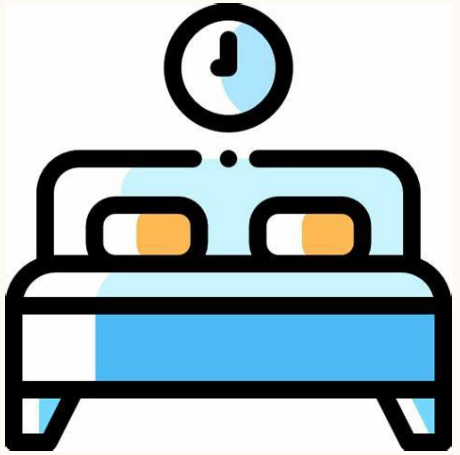
GOOD SLEEP HYGIENE

SLEEP DURATION

Teens (8-10 hours)

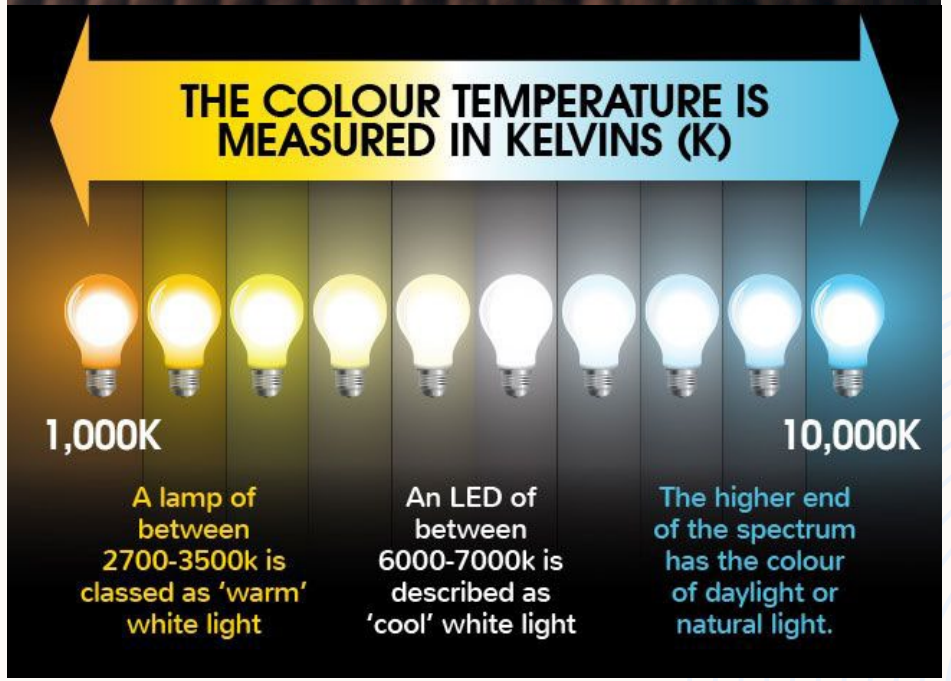
Adults (7-9 hours)

MAINTAIN REGULAR SLEEP-WAKE HOURS/ROUTINES

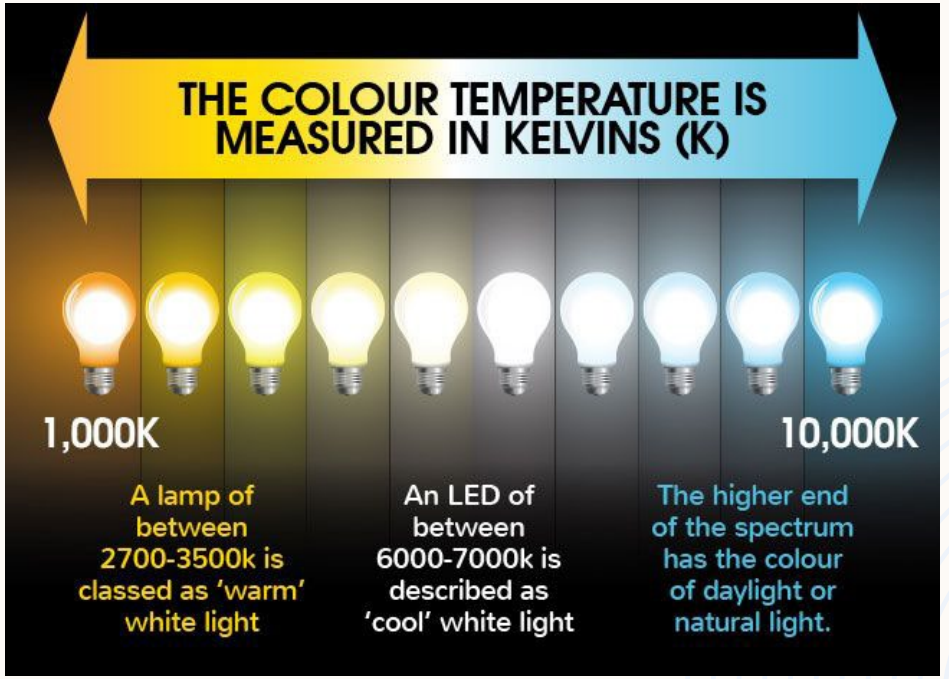


LIMIT EXPOSURE TO ELECTRONICS BEFORE BED

- No screen time 1-2 hour before bed
- Use Blue light filter
- Do screen-based homework early



MAXIMIZED LIGHT INTENSITY AT WORK



NO CAFFEINE 8 HOURS BEFORE BED

- Caffeine has long half life!

NO NICOTINE AND ALCOHOL BEFORE BED

CANNABIS:

BAD FOR SLEEP, MENTAL HEALTH, BRAIN DEVELOPMENT

WIND DOWN BEFORE BED

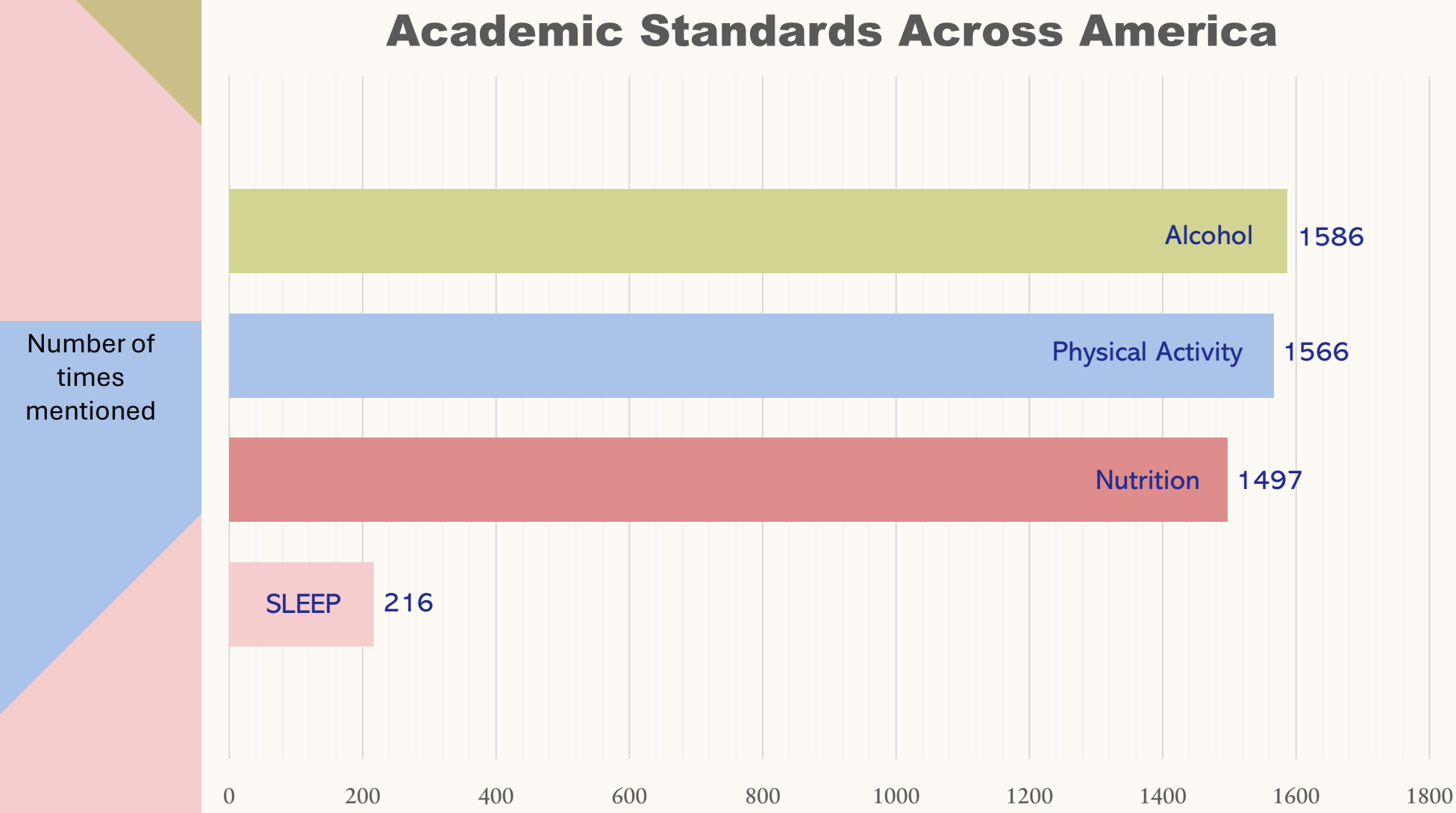
- Take time to relax and unwind before bed

SLEEP-CONDUCIVE ENVIRONMENT

- Cool (68F), quiet, dark room

TALK ABOUT IT

SLEEP IS NOT PRIORITIZED IN SCHOOLS



Unpublished data provided by Payne et al.

SLEEP AND SPORTS

"In the nearly 100 years prior to our start time change we had won three state championships. In the first year after we changed start times we won three state championships."

- Dr. John Sanville, Superintendent of the Unionville-Chaddsford School District and Past President of the PA Association of School Administrators (PASA)

NOTABLE QUOTES

- *What's the point of scientific research if we don't use the results to benefit humanity? Please start school later. Listen to the kids "biological clocks" and help them become achievers! - Patrician Oulette, West Suffield, CT, Feb 6, 2012*

- *I lost a child, he was hit by a driver because it was dark and the driver states that he couldn't see him. I raised my son for 15 years and now he is no longer with us! ALOT OF AREAS don't have enough street lighting and sidewalks. You should not be putting KIDS AT RISK! I now live with depression and pain everyday! Please Start School Later!* Holly Ford Cape Coral, FL SIDEWALKS4KIDS, Feb 6, 2012

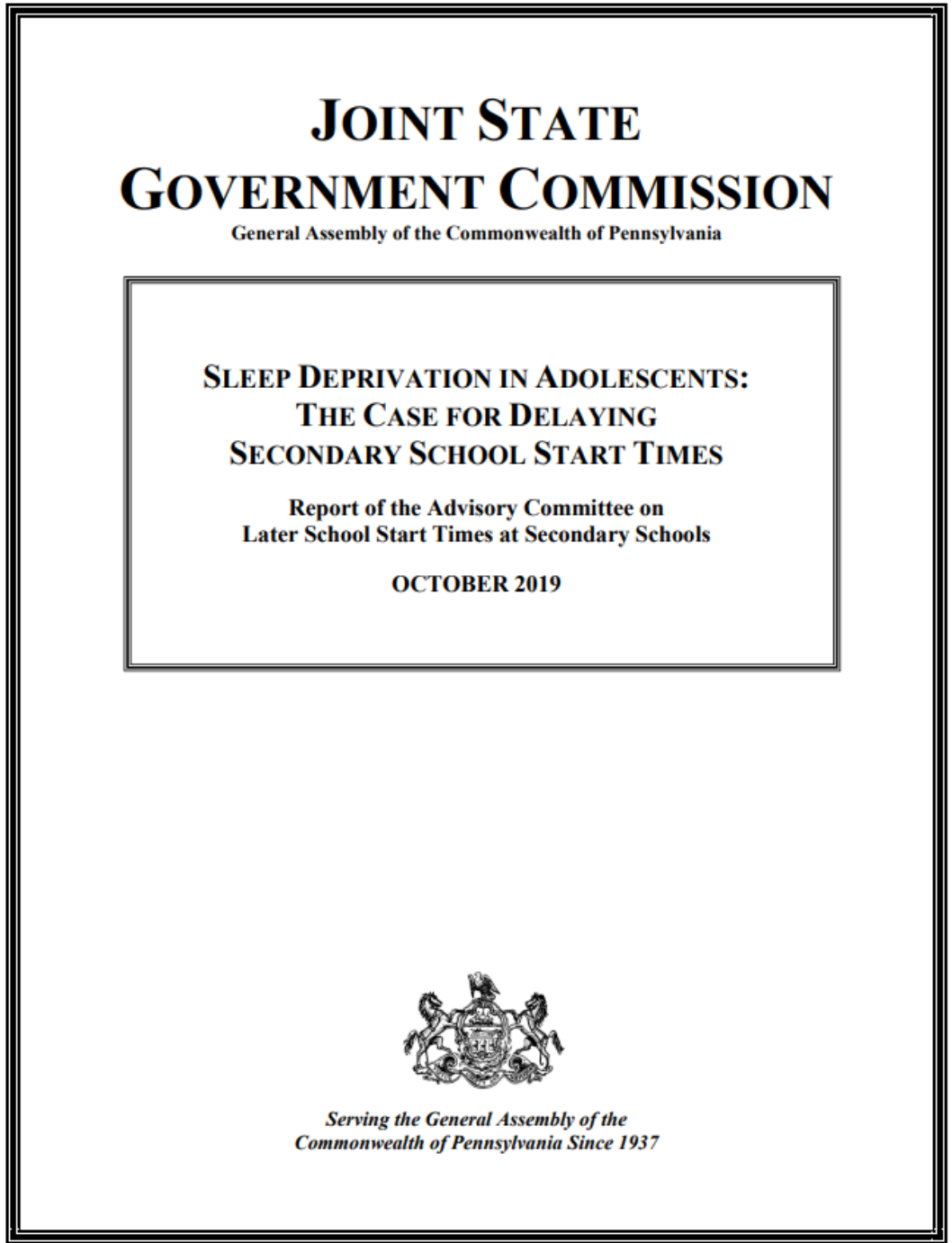
- *US routes for our high school students start at 6:15 a.m The school district admits that the reason our high schools start so early is for transportation reasons and athletics. Our country has its priorities wrong if they allow school districts to do this. When does it end? How early are school districts going to go for start times? Right now it is 7:30 a.m. Not year they are proposing 7:15 a.m. It's sad that we have to legislate something like this*. - Stephanie Alvendia, Oswego, IL, Jan 27, 2012

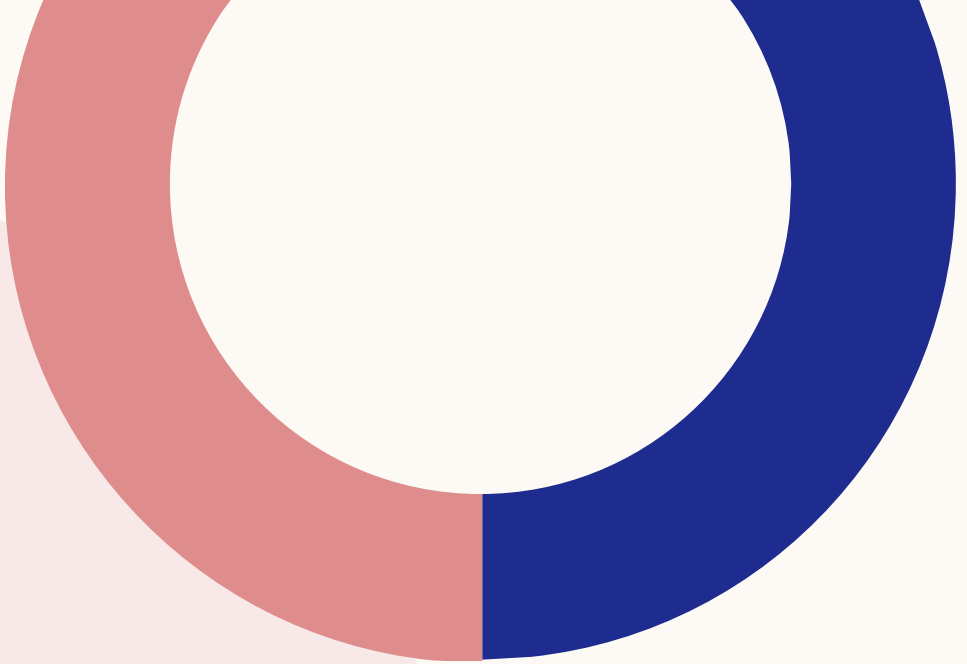
NOTABLE QUOTES

I have watched with shock the immediate impact on my son. He was a kid who never fell sick in Elementary school; in 8 months of Middle School he has been sick 12 times and he is always tired. I try to be a sleep advocate and push him to bed early, but I have also observed that he cannot start sleeping at a very early time too. I think the morning sleep is key to feeling completely refreshed and I feel so sad that my son is deprived of this just to meet some bus productivity! Just watch the kids trudging to the bus stops in total darkness in the winter..it looks like they are going to do some hard labor work, and not to get some fun education. And finally, the early start hours also lead to early lunch hours - lunch at 10 am in the morning?? I believe this has an impact too!

– Leena Palav, Sussex, WI, Jan 27, 2012

PA LEGISLATIVE ACTIONS





The 2019 PA Joint State Commission Report highlights an urgent health crisis among our youth and recommends that PA's school districts consider delayed school start times to improve the health and welfare of their students.

EDUCATION COMMITTEE

Senator Dave Argall, Chair

PRIOR PRINTER'S NO. 2779 PRINTER'S NO. 2879

THE GENERAL ASSEMBLY OF PENNSYLVANIA

HOUSE BILL

No. 2152 Session of 2026

INTRODUCED BY COOPER, BRIGGS, FREEMAN, M. MACKENZIE, PROBST, MIHALEK, SANCHEZ, DIAMOND, RABB, FLEMING, BRENNAN, NEILSON, BURGOS, BOROWSKI, MADDEN, ROWE, SOLOMON, SMITH-WADE-EL, KOZAK, ORTITAY, BOYD, FRIEL, O'MARA, FRANKEL, TAKAC, WARREN, HARKINS, RIVERA AND GREEN, JANUARY 21, 2026

AS REPORTED FROM COMMITTEE ON EDUCATION, HOUSE OF REPRESENTATIVES, AS AMENDED, FEBRUARY 4, 2026

AN ACT

https://aasm.org/advocacy/take-action/

Take Action

PA: Tell your State Representative to support HB 2152!

Pennsylvania House Bill 2152 urges school districts to adopt later secondary school start times and work with local health professionals, educators, and parents to develop a balanced schedule for students. The bill also allows districts to use existing PCCD school safety and mental health program funding to support implementation.. Ask your state representative to support this resolution!

Compose Your Message

- State Representative

Subject

Support HB 2152 to support schools adopting l

Message Body

Studies have shown that adolescents need 8 -10 hours of sleep each night for optimal health and wellbeing but their natural circadian rhythm (body clock) and current school start times do not allow this to

Enter Your Info

Your Information

Prefix * | First Name * | Last Name *

Email *

☐ Yes, sign me up to receive text alerts

By providing your mobile number, you agree to receive periodic call to action text messages from American

THANK YOU

Joanna Fong-Isariyawongse, MD
fongjs@upmc.edu

HB 2152 Voter Voice

Top Practice Changing Articles for the Busy Clinician

Gregory Castelli, PharmD, FCCP, BCPS, BC-ADM, CDCES

Associate Professor

Director, Academic and Clinical Pharmacy

Co-Lead, Interprofessional Education Thread

University of Pittsburgh | School of Medicine | Department of Family Medicine

Objectives

At the end of this presentation, participants will be able to:

1. Review **components** of a well-written **PICO** question.

2. Identify **POEM** from selected trials.

3. Recall at least 3 **practice changing** updates from recently **published** literature.

Vote!

2025 Articles

Using BB for MIs

CGM outcomes for T2DM

Treatment for Influenza

Suboxone vs Subutex Fetal Outcomes

Timing of IUD Insertion Postpartum

PREVENT Calculator for ASCVD Risk

Injectable for PrEP

GLP1 Agonists for ASCVD Prevention

PCI for Older Adults

Potential Articles

- Tirzepatide vs Semaglutide
- BP Meds: Max vs Combos
- Caffeine with Afib
- New Abx for UTI Treatment
- One dose of HPV Vaccine
- Partner Tx to prevent BV
- Clopidogrel vs ASA for secondary ASCVD
- Adding Aspirin to DOAC for CCS
- Acetaminophen and Autism

Which GLP-1 agonist is best for weight loss?

P In patients with obesity but not DM2,

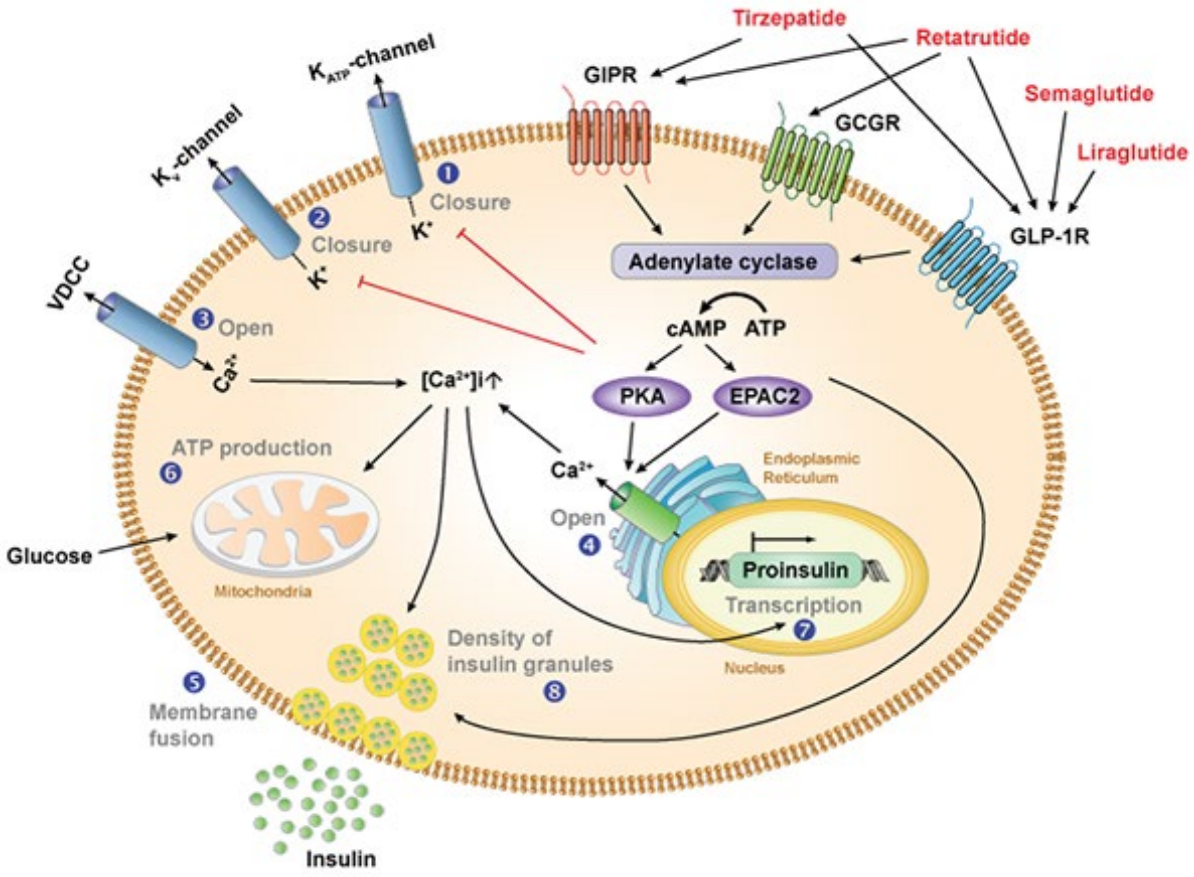
I Does tirzepatide (10 mg or 15 mg)

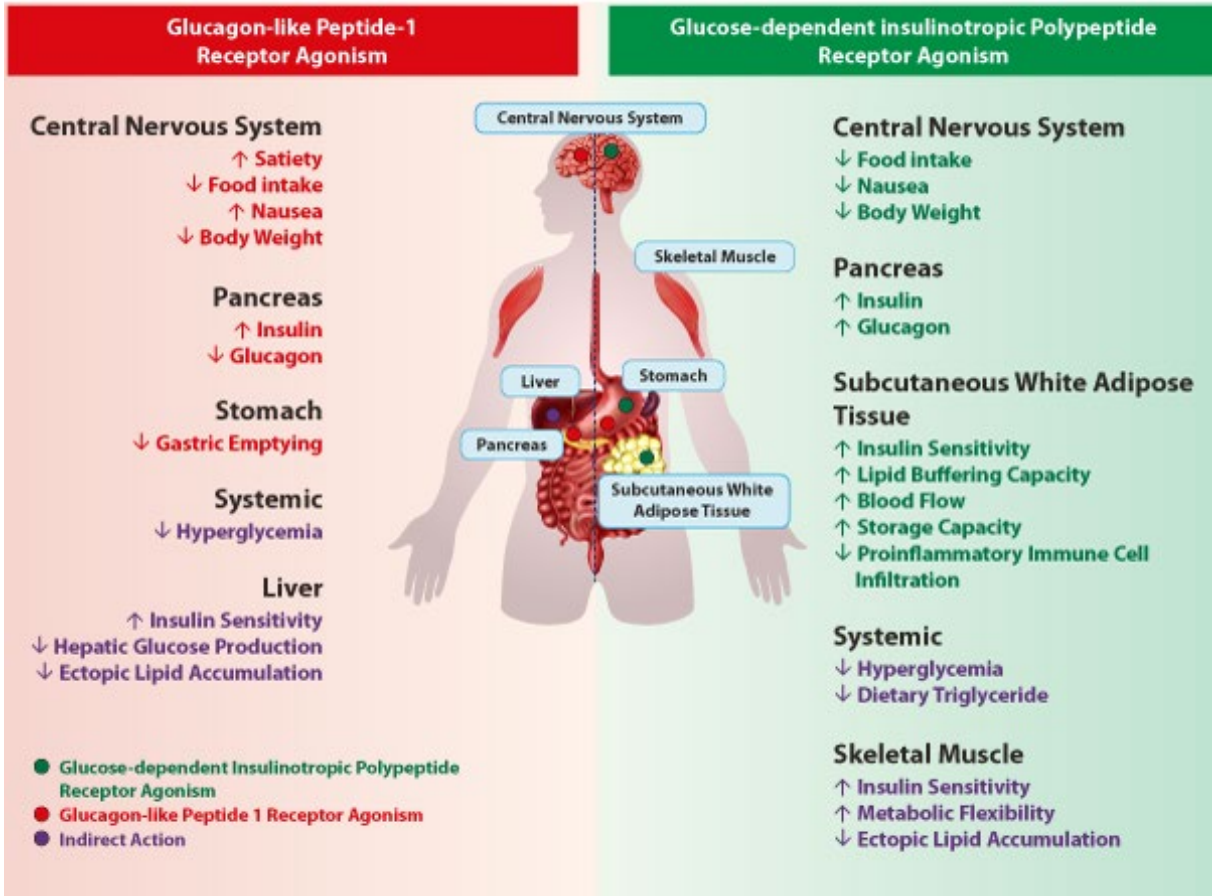
C Compared semaglutide (1.7 mg or 2.4 mg)

O lead to a greater change in weight?

Aronne LJ, et al. N Engl J Med. 2025 Jul 3;393(1):26-36.

Review of GLP vs GIP





Methods

- Multicenter, parallel-arm, open-label RCT
- Modified ITT; 1:1 ratio
- 72-week duration all done in the US
- Inclusion criteria was >18yoa, BMI over 30 or BMI over 27 plus HTN, HLD, OSA, or ASCVD.
- Excluded if they had diabetes
- Randomized to receive max tolerated doses of each after titration
- All participants received lifestyle counseling

Primary outcomes: percent change in body weight at week 72.

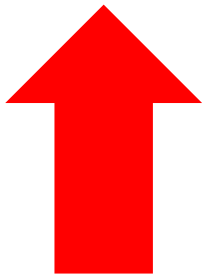
Secondary outcomes: weight reduction categories and adverse effects

Tirzepatide 2.5 mg ↗ 15 mg

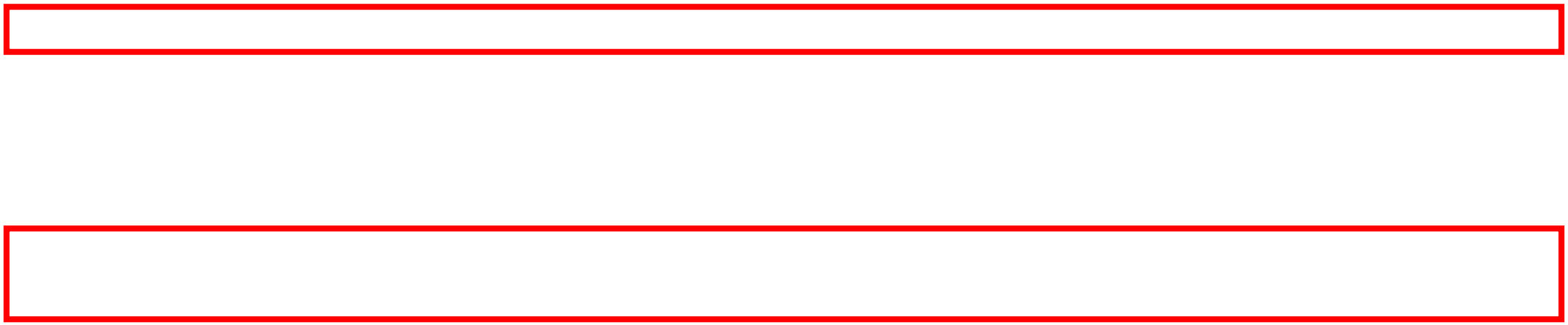
Semaglutide 0.25 mg ↗ 2.4 mg

Results

Results



Results



About 7% of patients discontinued the trial for adverse effects.

Bottomline Recommendation (Castelli Coefficient)

In patients with obesity, both semaglutide and tirzepatide resulted in significant body weight reduction with tirzepatide resulting in 6.5% more weight loss than semaglutide. Applying this to a 300 lb person would result in an additional 20 lb weight loss. Likely, the decision will be made by the patient's insurance, but if you have access to both tirzepatide is likely better.

Which combinations of BP meds are best?

P In patients being managed for hypertension,

I Does combination antihypertensives

C Compared to monotherapy

O Lead to a greater reduction in BP?

Wang N, et al. Lancet. 2025 Aug 30;406(10506):915-925.

Methods

- SR/MA following Cochrane Review process
- Trials included were RCTs, published in English, double blind, placebo controlled.
- Patients in included trials were adults and treated for at least 4 weeks
- Study medications included ACE-I, ARBs, BB, CCBs, and diuretics to placebo
- “Background” therapy allowed→ patients may have been on other stable meds prior to enrollment
- Many variables did not change final model results (sex and age)

Primary outcome: reduction in SBP reported as a change in mean SBP from baseline to maximum follow-up

Secondary outcomes: reduction in DBP

Risk of bias from studies also reported.

Results

Standard Doses (1.0)

- ✓ Lisinopril 10 mg
- ✓ Losartan 50 mg
- ✓ Valsartan 80 mg
- ✓ HCTZ 25 mg
- ✓ Metoprolol 100 mg
- ✓ Amlodipine 5 mg

Example:

- Lisinopril 10 mg to 20 mg =3 mmHg additional
- Lisinopril 10 mg plus amlodipine 5 mg = 8 mmHg additional

Bottomline Recommendation (Castelli Coefficient)

In patients being managed for hypertension, adding a second antihypertensive to a standard dose of an ACE-I, leads to better BP reduction. While DOE, lower doses of medications can produce less side effects and work in combination with one another.

Avoid coffee if you have afib?

P In patients with atrial fibrillation

I Does caffeine consumption

C Compared to caffeine abstinence

O Lead a clinical recurrence of symptoms?

Wong CX, et al. JAMA. 2026 Jan 27;335(4):317-325.

Methods

- The DECAF (Does Eliminating Coffee Avoid Fibrillation) trial
- Prospective, open-label, international, multicenter, RCT
- 5 tertiary hospitals in US, Australia, and Canada
- Inclusion criteria:
  - 21 years or older
  - Sustained AF or flutter with history of AF
  - Planned cardioversion
  - Coffee consumption of 1 or more cups
  - Willingness and ability to adhere to coffee abstinence or continuation

Methods

- Randomized only after successful cardioversion
- Coffee group
  - Drink 1 or more cups of coffee consistently every day.
- Abstinence group
  - Avoid coffee, including decaffeinated coffee or other caffeine containing products

- Followed at 1, 3, and 6 months

Primary outcome: clinically detected (physician confirmed) recurrence of AF lasting at least 30 seconds

- Secondary outcomes: AF and atrial flutter separately and adverse events before censorship

Results: Demographics

A majority (53%) had continuous recording device during follow-up, such as consumer device, wearable ECG monitor, and/or implanted cardiac device

Bottomline Recommendation (Castelli Coefficient)

In coffee drinking patients with AF who recently underwent cardioversion, continued consumption of caffeine decreases recurrence of AF. This result adds further scrutiny to “one size fits most” data surrounding many dietary recommendations.

What’s the deal with gepotidacin for UTIs?

P In AFAB patients

I does gepotidacin (a new antibiotic for UTIs)

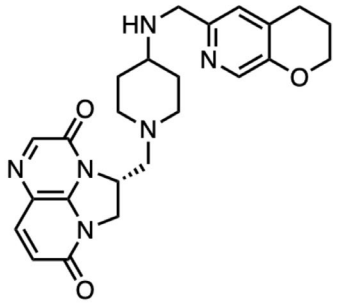
C compared to nitrofurantoin

O lead to therapeutic response at day 10?

Wagenlehner F, et al. Lancet. 2024 Feb 24;403(10428):741-755.

Background

gepotidacin



oral bacterial type II topo inhibitor

GSK, STEVENAGE, UK

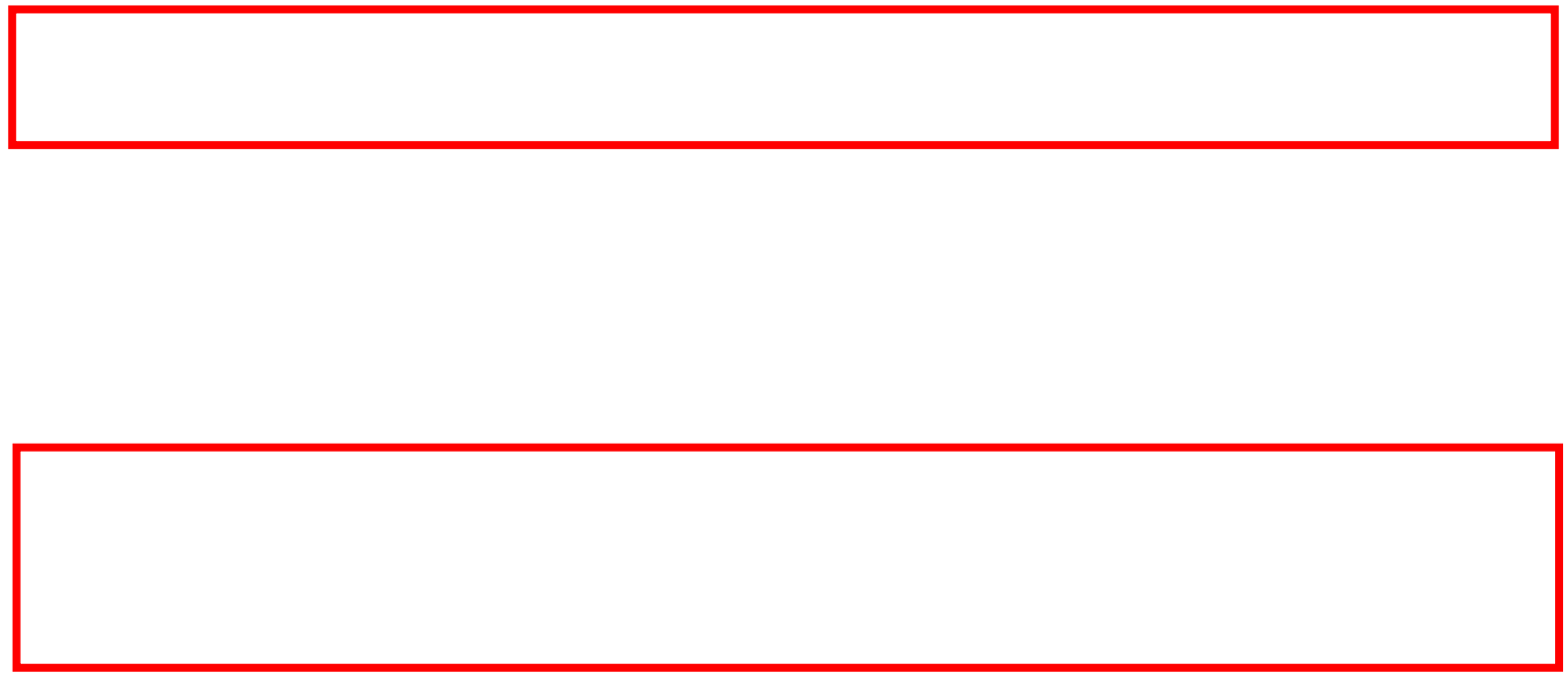
- Bactericidal agent that combines DNA gyrase and topoisomerase IV inhibition
- Active against E.coli
- Avoid in eGFR less than 30 mL/min
  - Can cause prolonged QT
- Bioavailability: ~45%.
- Excretion: Feces: 52% (30% as unchanged drug); Urine: ~31% (20% unchanged drug; major route of elimination for absorbed gepotidacin).

Methods

- Combination of two RCTs, double blind, double dummy, noninferiority study
- Inclusion criteria:
  - AFAB weighing 40 kg or more
  - Clinical and laboratory diagnosis of UTI
- Lots of exclusion criteria including diabetes
- Randomly assigned to nitrofurantoin of gepotidacin twice daily for 5 days

Primary outcome: therapeutic response at test of cure appointment at 10-13 days. Included symptoms relief and microbiological success.

Secondary outcomes: adverse effects



Bottomline Recommendation (Castelli Coefficient)

In patients with acute cystitis, the use of a new antibiotic gepotidacin was no worse than nitrofurantoin for clinical cure at day 10-13. Given the cost and availability, plus the high susceptibility of nitrofurantoin to E. coli locally, this remains a more niche option.

How many doses of HPV vaccine?

P In AFAB patients,

I is one dose of the HPV vaccine,

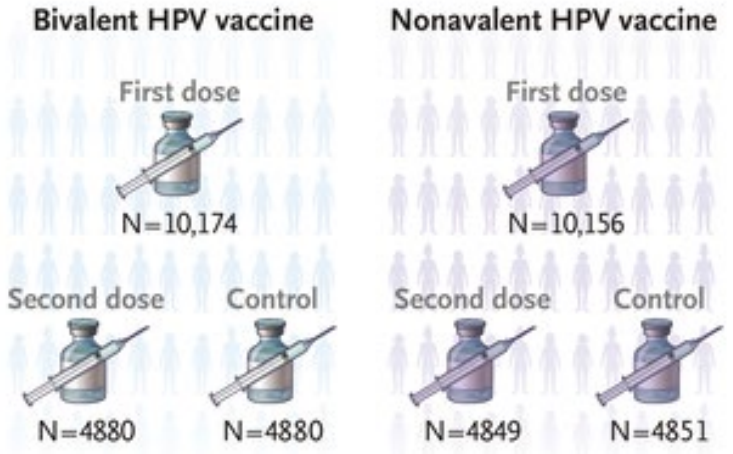
C compared to a two-dose regimen,

O No worse at preventing HPV related infections?

Kreimer A, et al. *N Engl J Med*. 2025.

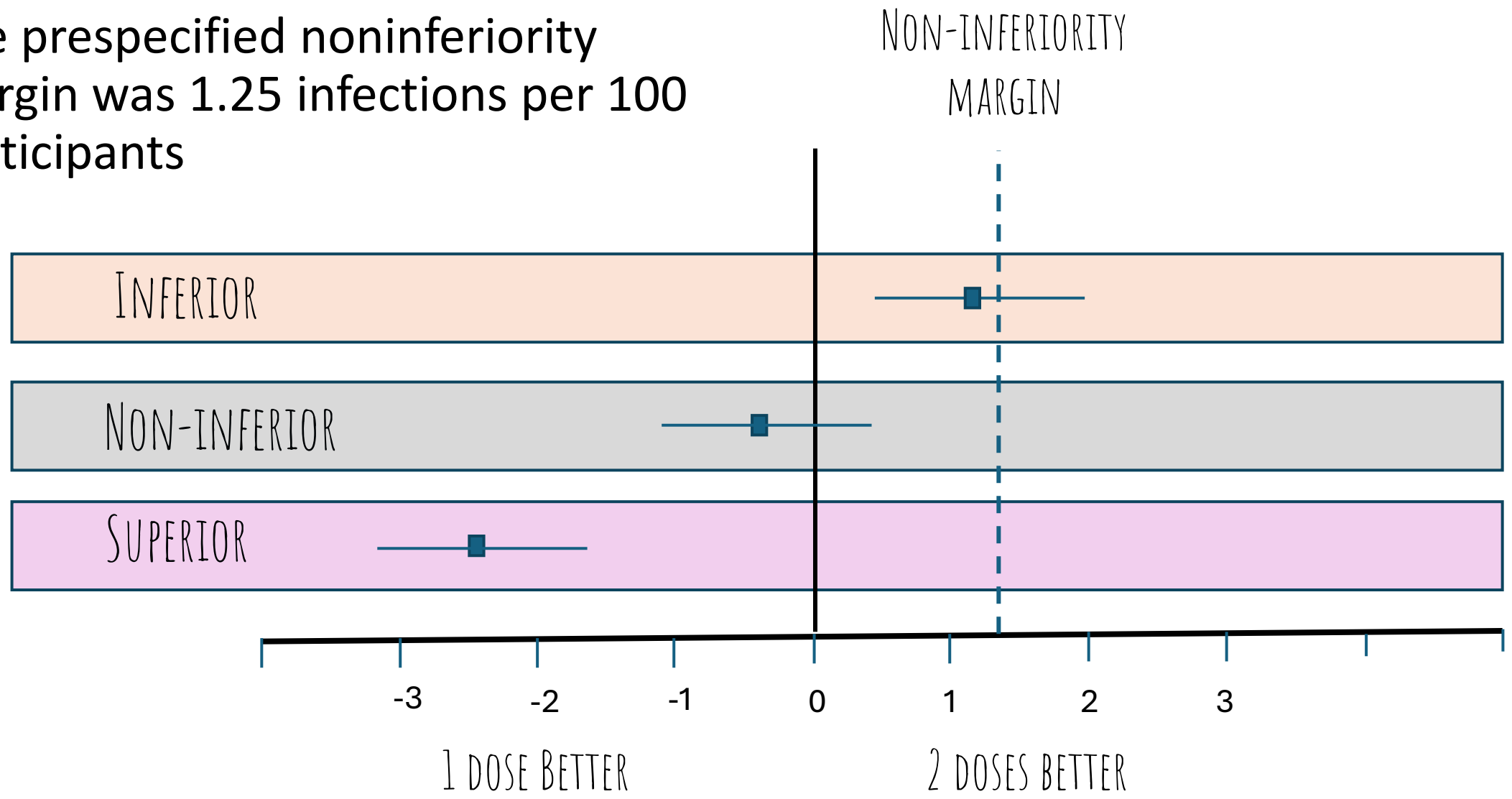
Methods

- Randomized, double-blind, noninferiority trial
- Patients 12-16 years of age from Costa Rica (200 districts)
- A max of 35% of each district were eligible for randomization to limit herd protection
- Trial design:
  - Dose 1: Cervarix (bivalent) or Gardasil 9 (nonvalent)
  - Dose 2: Second dose of first product OR Tdap
- Followed every 6 months for 5 years



Methods

The prespecified noninferiority margin was 1.25 infections per 100 participants

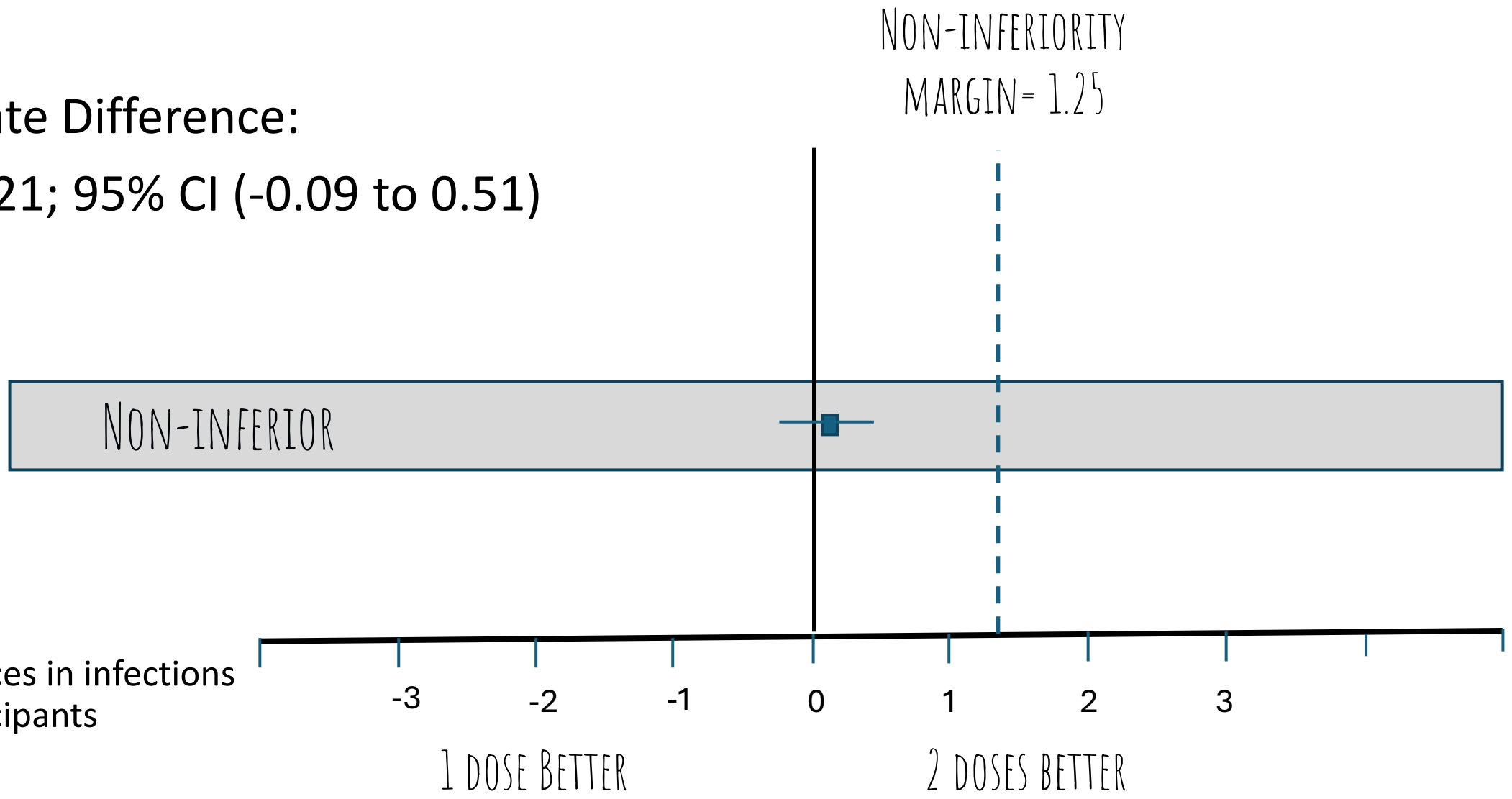


Primary outcome: noninferiority analysis was incident, persistent HPV16 or HPV18 infection that occurred during the period from month 12 to month 60 and persisted for at least 6 months (per-protocol)

Secondary outcomes: infections of several HPV subtypes and vaccination effectiveness

Rate Difference:

0.21; 95% CI (-0.09 to 0.51)



Bottomline Recommendation (Castelli Coefficient)

In AFAB patients aged 12-16, one dose of HPV vaccination is no worse than two doses of HPV vaccination to prevent HPV 16 and 18 subtypes. This trial prompted the CDC to update their recommendations for all adolescents which now fall in line with WHO recommendations from 2022.

Male partner BV treatment

P In monogamous couples where women are diagnosed with bacterial vaginosis

I Does treating the male partner

C Compared to standard of care (no treatment)

O Lead to less BV at 12 weeks

Vodstrcil LA, et al. N Engl J Med. 2025 Mar 6;392(10):947-957.

Methods

- Patients enrolled through several sites in Australia
- First, women were screened:
  - Diagnosis of BV
  - Regular male partner for at least 8 weeks
  - Received first-line antimicrobial treatment (metronidazole 400-mg tablets twice daily for 7 days or, if contraindicated, intra-vaginal 2% clindamycin cream for 7 nights or intravaginal 0.75% metronidazole gel for 5 nights)
- Eligible women were asked to refer their male partner to enroll within one week
- Exclusion criteria included not having other partners, not be a sex worker, not be known to be living with HIV

Methods

- Randomization stratified by recruitment site, use of IUD, and male circumcision status
- Male partners were treated with metronidazole 400-mg tablets BID for 7 days and were instructed to apply a 2-cm- diameter volume of 2% clindamycin cream topically to the glans penis and upper shaft twice daily for 7 days
- A placebo cream was not used →did not want to alter male biome
- Modified ITT analysis

Primary outcome: a recurrent diagnosis of BV within 12 weeks.

Secondary outcomes: recurrent BV at 4 weeks and vaginal microbiota; adverse events captures by a questionnaire

Bottomline Recommendation (Castelli Coefficient)

In women-men partners, treating male partners with oral and topical antimicrobial agents decreases the recurrence of BV in their female partner. This corresponds to about 2.6 less BV episodes per year. Presumptive prescribing should be used, especially if the patient is in a monogamous relationship

Clopidogrel for secondary ASCVD prevention

P In with established ASCVD,

I Does clopidogrel monotherapy

C Compared to aspirin monotherapy

O Lead to less recurrent ASCVD?

Valgimigli M, et al. Lancet. 2025 Sep 13;406(10508):1091-1102.

Methods

- Systematic review and individual patient level data
  - Fancy, get raw data from each trial included and aggregate
  - Better than regular SR/MA
- RCT trials included→ Initially on DAPT but transitioned to monotherapy and those with anticoagulation if less than 20% of the population
- Followed Cochrane and PRISMA guidelines
- Conducted on an ITT basis and included HR and time to events

Primary outcome: major cardiovascular or cerebrovascular events (composite of CV death, MI, and stroke)

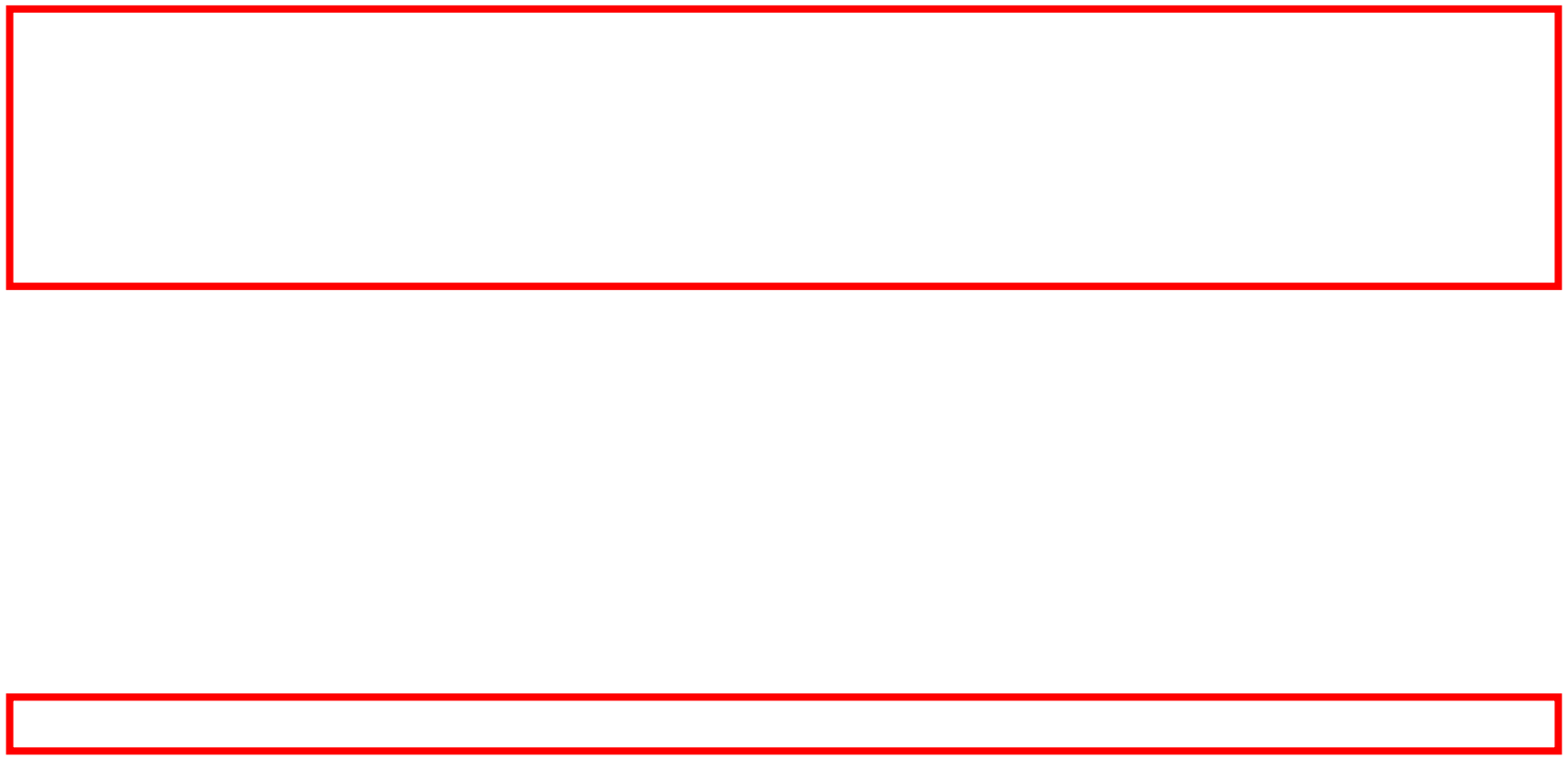
Safety outcome was major bleed

Secondary outcomes: net of the above.

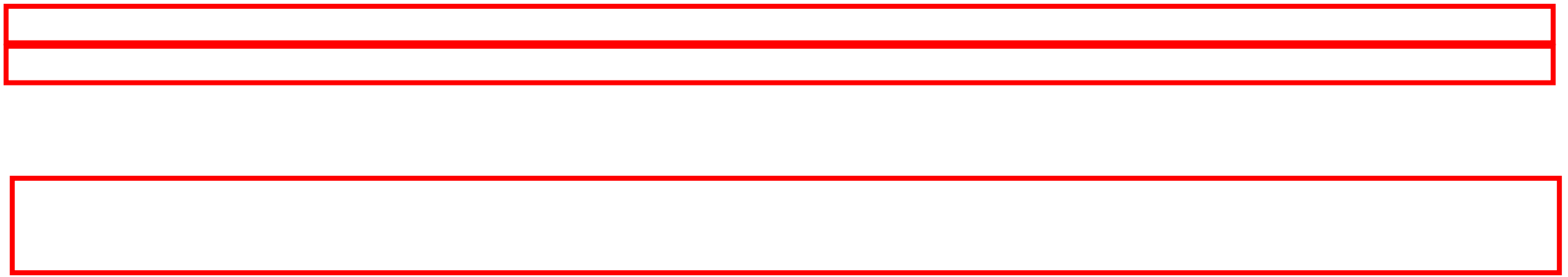
Demographics

7 trials ultimately included for a total of ~30,000 patients

Demographics



Results



Primary Outcome

Major Bleeding Events

Bottomline Recommendation (Castelli Coefficient)

In patients with established CAD, clopidogrel is superior to aspirin in preventing recurrent MACCE without increasing the risk of major bleeding events. Patients eligible for deprescribing of DAPT to monotherapy should preferentially be continued on clopidogrel.

What role does ASA play in patients on DOACs?

P In patients with chronic coronary syndrome (stenting >6months)

I Does aspirin

C Compared to placebo

O Reduce a composite of ASCVD or contribute to bleeding?

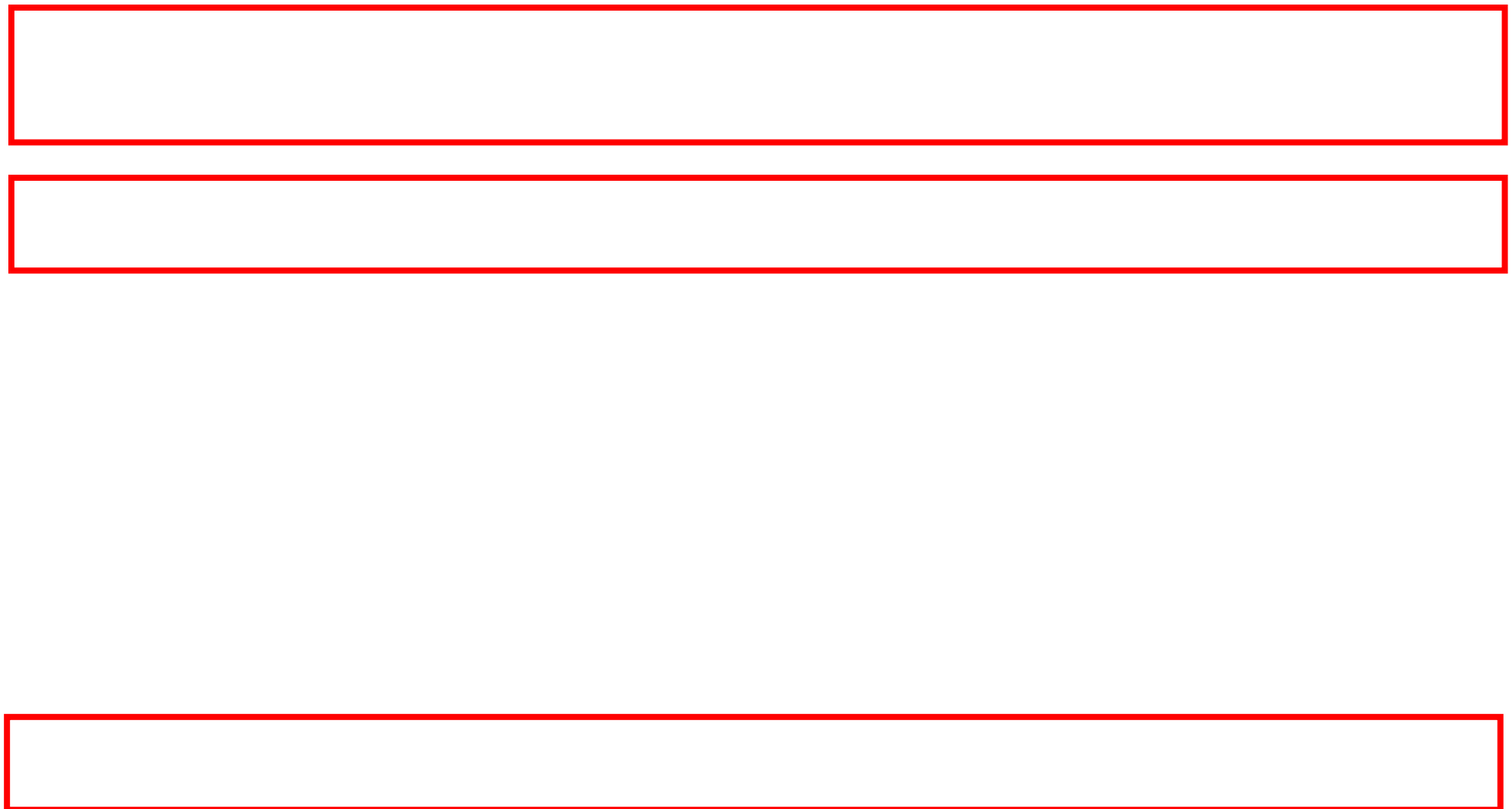
Lemesle G, et al. N Engl J Med. 2025 Oct 23;393(16):1578-1588.

Methods

- Prospective, double-blind, RCT, ITT analysis
- 51 centers in France
- Adult patients who had a documented chronic coronary syndrome more than 6 months
- Currently receiving anticoagulation
- High risk for thrombotic events
- 1:1 ratio to receive 100 mg of aspirin or placebo
- Visits every 6 months for at least 2 years

Primary outcome: Composite of CV death, MI, stroke, systemic embolism, coronary revascularization, limb ischemia

Secondary outcomes: net of primary outcomes and adverse outcomes like major bleeding.



Bottomline Recommendation (Castelli Coefficient)

In patients with chronic coronary syndrome, using aspirin as a means of secondary prevention while the patient also receives anticoagulation does not improve outcomes. In fact, it leads to more ASCVD, death, and bleeding. Deprescribing aspirin in these patients seems prudent.

APAP and autism?

P In pregnant patients,

I Does taking acetaminophen

C Compared to avoiding acetaminophen

O Increase the likelihood of autism, ADHD in offspring?

D'Antonio F, et al. Lancet Obstet Gyna. S3050-5038(26)00012-9

Methods

- Systematic review and meta-analysis
- Following Cochrane procedures
- Studies were eligible if they were a cohort design, had information regarding acetaminophen exposure in pregnant patients
- Studies were excluded if only reported unadjusted estimates
- Utilized I^2 for heterogeneity
- Also looked at sibling comparison studies

Primary outcome: autism spectrum disorder, ADHD, intellectual disabilities

Bottomline Recommendation (Castelli Coefficient)

In offspring of women, autism, ADHD or intellectual disability was not associated with acetaminophen exposure. Recommendations regarding acetaminophen safety in pregnancy is supported and this study adds more information to share with patients.

Top Practice Changing Articles for the Busy Clinician

Gregory Castelli, PharmD, FCCP, BCPS, BC-ADM, CDCES

Associate Professor

Director, Academic and Clinical Pharmacy

Co-Lead, Interprofessional Education Thread

University of Pittsburgh | School of Medicine | Department of Family Medicine

Prioritizing Primary Care to Anchor Our Communities and the Nation

Jeannette E. South-Paul, MD, DHL(Hon), FAAFP

EVP and Provost

Meharry Medical College

Nashville, Tennessee

February 26, 2026

Pittsburgh, Pennsylvania

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Where do we work?

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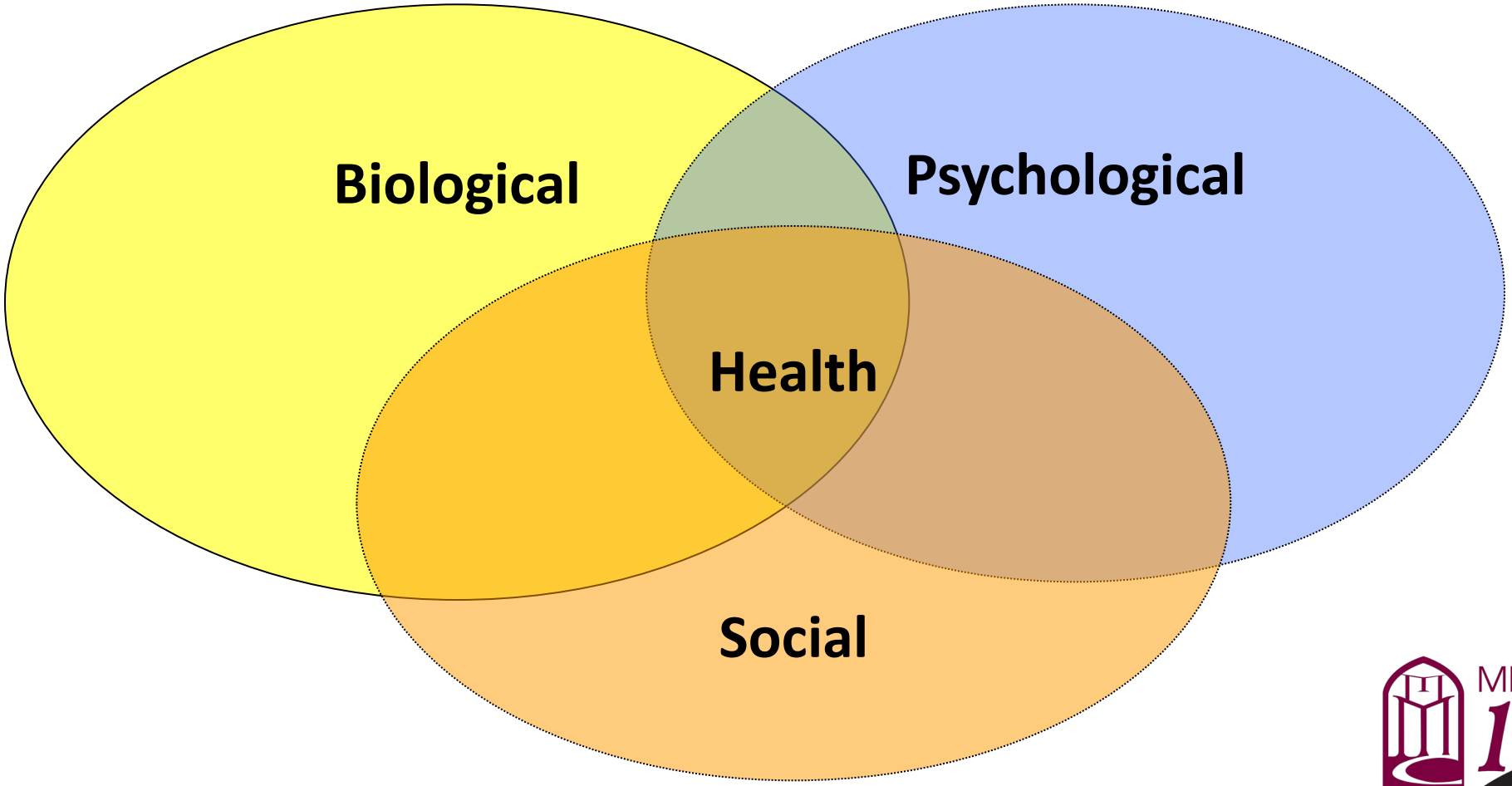
Biopsychosocial Model



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Continuity of Care

Through Time

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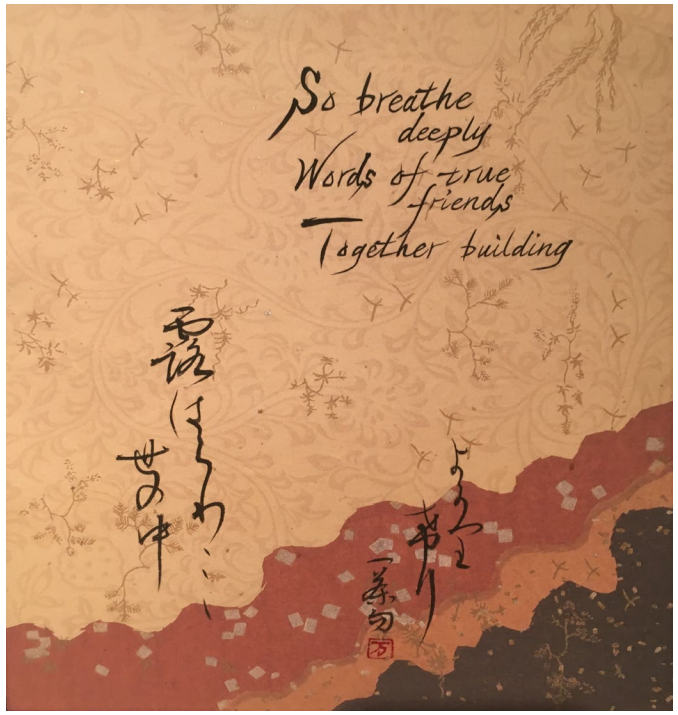
Continuity of Care

Across locations of care

AIH/Kaita Faculty Development Week in Pittsburgh 2015

An Enduring Partnership

Painting by Michael Yonas, DrPH



Haiku by Michael Lamb, MD

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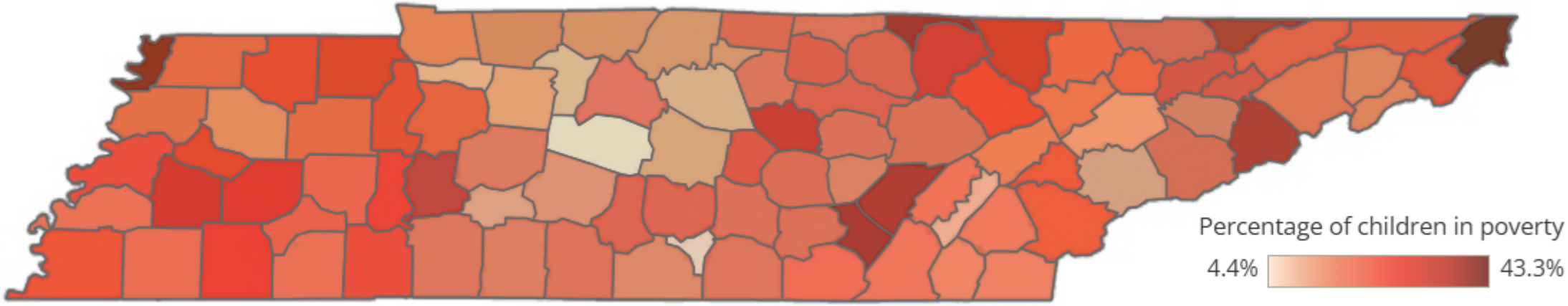
Health Status Indicators in Tennessee

2019-2023

Children in Poverty

Percentage of all persons under 18 years of age whose income in the past 12 months is below the poverty level.



Data Source: United States Census Bureau. American Community Survey 5-Year Public Use Estimates.

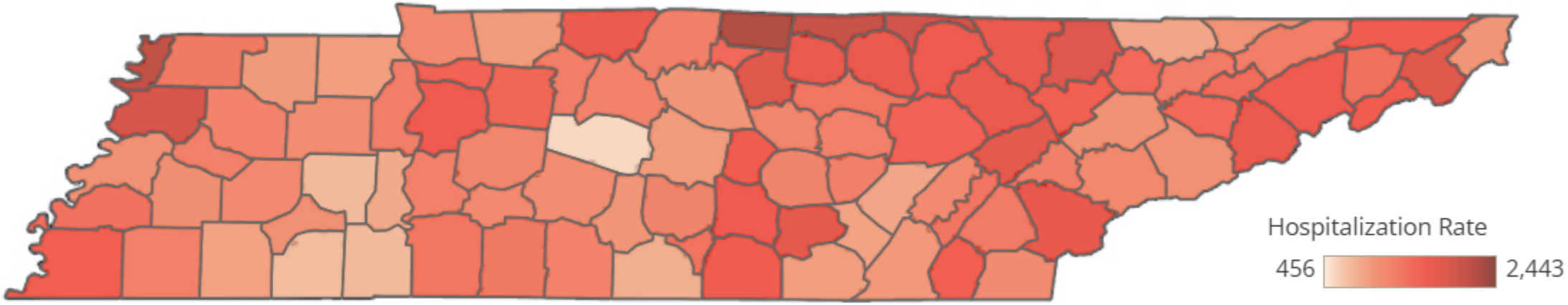
Click to view county-level child food insecurity data from Feeding America

Preventable Hospitalizations in Tennessee

2023

Preventable Hospitalizations by Year and County

Rate of hospitalizations for ambulatory care-sensitive conditions per 100,000 adults.



Data Source: Tennessee Department of Health, Office of Healthcare Statistics, Hospital Discharge Data System (HDDS), 2021-2023
Methodology for PQI 90.
Data Note: COVID-19 has also been associated with statistically significant decreases in preventable hospitalizations, particularly respiratory-related preventable hospitalizations such as asthma. Despite these seemingly positive decreases in preventable hospitalizations, the pandemic impacted both patient decision making as well as hospital capacity. The decreases should be interpreted with caution.

A National Academies of Science, Engineering, and Medicine (NASEM) committee published a landmark report in 2021 - ***Implementing High-Quality Primary Care: Rebuilding the Foundation of Health Care.***

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2021

Implementing High-Quality Primary Care: Rebuilding the Foundation of Health Care

High-quality primary care is the foundation of the health care system. It provides continuous, person-centered, relationship-based care that considers the needs and preferences of individuals, families, and communities. Without access to high-quality primary care, minor health problems can spiral into chronic disease, chronic disease management becomes difficult and uncoordinated, visits to emergency departments increase, preventive care lags, and health care spending soars to unsustainable levels.

Read Full Description

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To achieve the Quadruple Aim of Health Care

High-quality primary care is a critical component —

- Enhancing patient experience,
- Improving population health,
- Reducing costs, and
- Improving the health care team experience

…and it can both make health care more personal and address the inequities that currently plague the U.S. health care system

Bodenheimer and Sinsky, 2014; Christian et al., 2018; Kringos et al., 2013; Macinko et al., 2003; Park et al., 2018; Phillips and Bazemore, 2010; Starfield et al., 2005

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Implementing High Quality Primary Care Report, 2021

BOX 2-2
Facilitators of High-Quality Primary Care

1. **Payment Models.** Payment models that support integrated, interprofessional teams working in sustained relationships with patients will ensure that high-quality primary care is possible to implement and sustain.
2. **Accountability and Improving Quality.** Effective measurement that is not onerous and holds primary care accountable for its high-value function will facilitate improvement over time.
3. **Digital Health Care.** An equitable use of technology can make care more accessible and make the primary care experience more efficient, higher quality, and convenient for people and the interprofessional care team.
4. **Interprofessional Care Teams.** Care provided by teams of clinicians and other professionals fit to the needs of communities, working to the top of their skills, and in coordination leads to better health.
5. **Research.** Building the empirical evidence on the epidemiology, organization, and provision of primary care will facilitate continuous improvement within the field.
6. **Leadership.** Coordination among primary care leaders will provide a unified voice on critical issues that will guide decisions of health care organizations and government while increasing accountability.
7. **Policy, Laws, and Regulations.** Federal and state policy, laws, and regulations that are compatible with locally tailored care can enable primary care stakeholders to implement needed changes.

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THE HEALTH OF US PRIMARY CARE: 2024 SCORECARD REPORT

No One Can See You Now:

Five Reasons Why Access to Primary Care Is Getting Worse (and What Needs to Change)

BY YALDA JABBARPOUR, ANURADHA JETTY, HOON BYUN, ANAM SIDDIQI, STEPHEN PETTERSON, AND JEONGYOUNG PARK, ROBERT GRAHAM CENTER

THE PHYSICIANS FOUNDATION
Empowering Physicians Improving Healthcare

Milbank Memorial Fund
Using evidence to improve population health

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Dwindling support for primary care

Despite the overwhelming evidence that access to primary care **improves population health, reduces health disparities, and saves health care dollars**, support for primary care continues to dwindle. As a result the average life expectancy in the United States continues to stagnate, and health disparities in preventive services and other basic primary care services persist, accounting for **60,000 excess deaths** each year.

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Primary care inaccessibility in US

Reason 1: ***The primary care workforce is not growing fast enough to meet population needs.***

- The number of primary care physicians (**PCPs) per capita has declined** over time from a high of 68.4 PCPs per 100,000 people in 2012 to 67.2 PCPs per 100,000 people in 2021.

- While the rate of total clinicians in primary care (physicians, NPs, and PAs), has grown over the past several years, it is **still insufficient to meet the demands of overall population growth,** a rapidly **aging population** with higher levels of chronic disease, and **workforce losses** during the pandemic. Canada - a primary care physician-only density of 133 per 100,000 people, the US primary care *total clinician (physician, NP, and PA)* density was only 105 per 100,000 people in 2021.

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Reason 2: The **number of trainees** who enter and stay on the professional pathway to primary care practice is **too low,** and too few primary care residents have community-based training.

- In 2021, 37% of all physicians began training in primary care, yet only 15% were practicing primary care 3-5 years after residency. More than half of residents with the potential to enter primary care subspecialized or became hospitalists instead.
- In 2020, only 15% of primary care residents spent a majority of their time **training in outpatient settings** where a majority of the US population receives their care. **Fewer than 5%** of primary care residents **spent a majority of their training with the most underserved** communities in the United States.
- The number of medical residents per person in primary care has **risen at a slower pace** than all other specialties, increasing by only 21% compared to 26% in other specialties

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Reason 3: The US continues to under-invest in primary care.

- The **investment in primary care** as a share of total health care spending **has dropped** from 5.4% in 2012 to 4.7% in 2021.
- Medicaid and commercial insurer investment in primary care has decreased since 2012, and Medicare investment remains low. Since 2019, **primary care investment has steadily declined for all payers;** this decline is most pronounced in the Medicare population.

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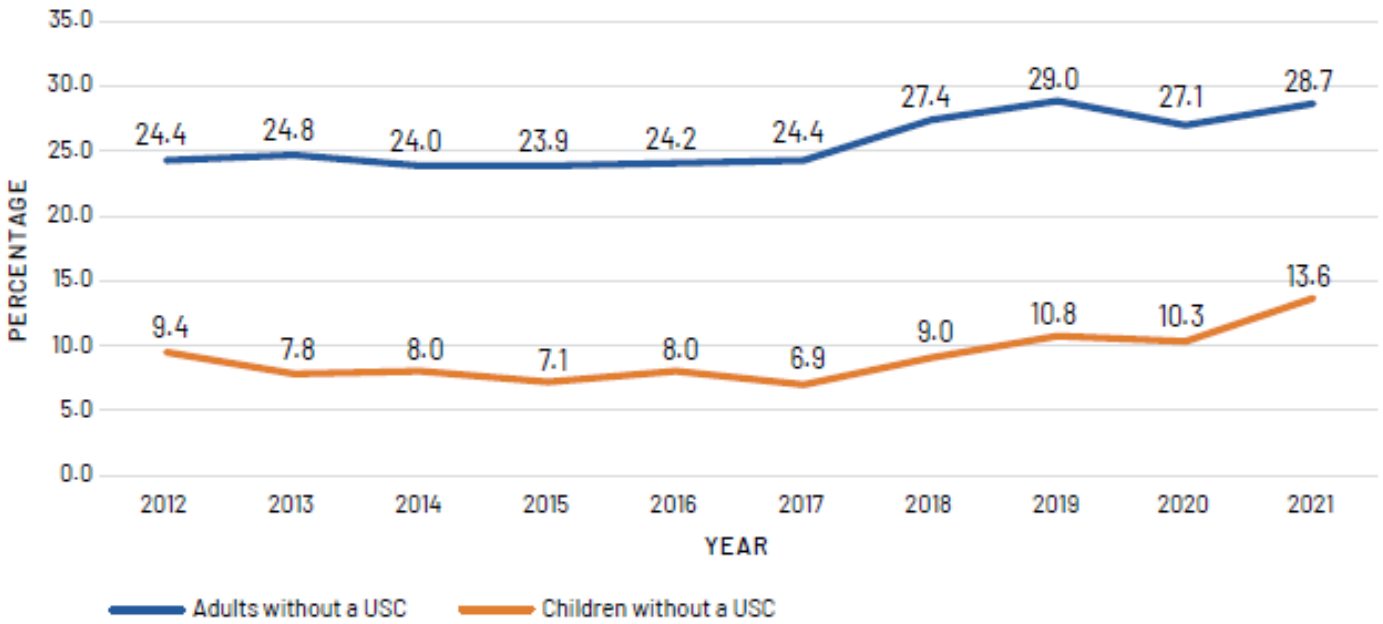
Access to Primary Care is Worsening

Figure 1. The Percentage of the US Population Without a Usual Source of Care Is Rising (2012–2021)



Data Source: Analyses of Medical Expenditure Panel Survey data, 2012–2021.

Notes: Usual source of care (USC) ascertained whether that is a particular doctor's office, clinic, health center, or other place where the individual usually goes when sick or in need of health advice. No usual source of care includes those who reported no usual source of care and those who indicated the emergency department as their usual source of care.

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Recommended actions to improve primary care – *Implementing Primary Care* Report

(1) Pay for **primary care teams** to care for people, not doctors to deliver services,

(2) Ensure that high-quality primary care is available to every individual and family in **every community**,

(3) Train primary care teams **where people live and work**,

(4) Design **information technology** that serves patients, their families, and the interprofessional primary care team, and

(5) **Ensure that high-quality primary care is implemented in the United States**.

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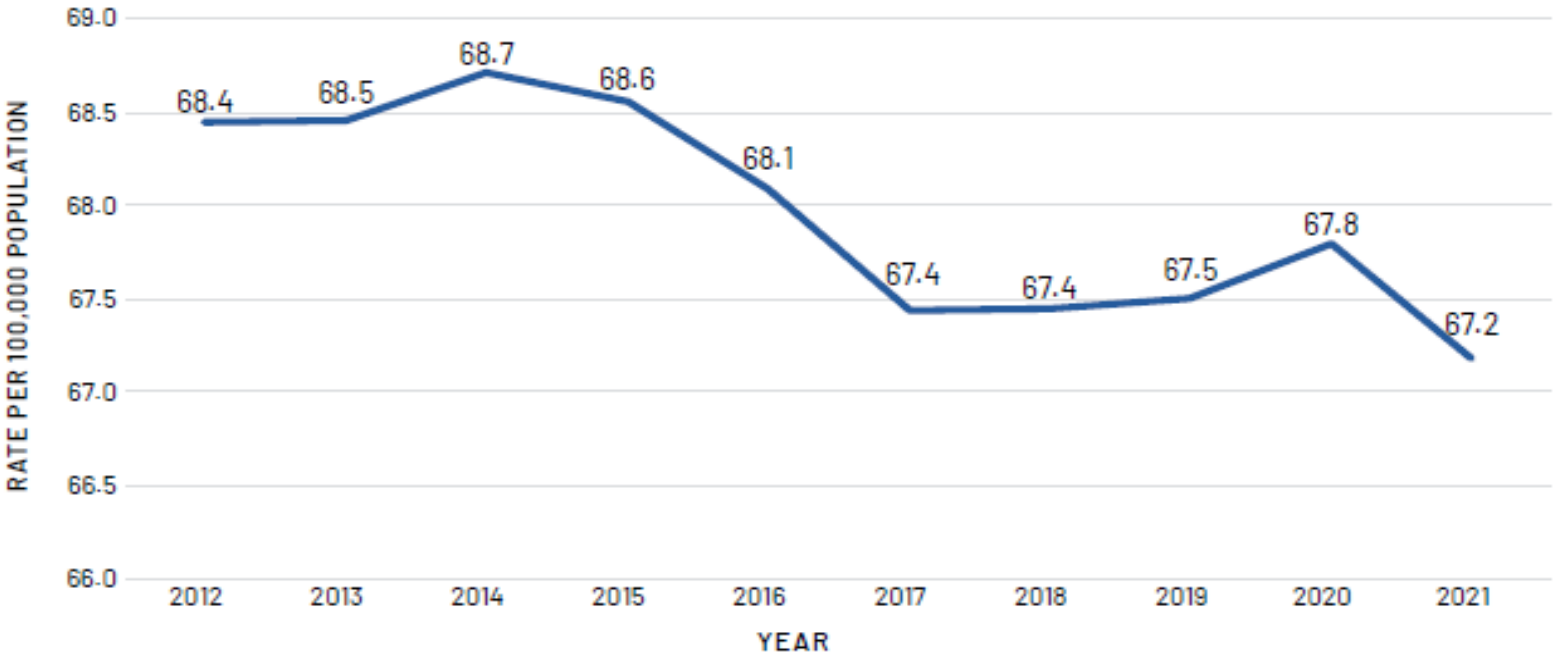
Why no one can see you now…

Figure 2. The Number of Primary Care Physicians per Capita Is Falling (2012–2021)



Data Source: Analyses of American Medical Association Masterfile (2012–2021), Centers for Medicare and Medicaid Services Physician and Other Practitioners data (2012–2021), and the American Community Survey Five-Year Summary Files (2012–2021).

Notes: Primary care specialties included family medicine, general practices, internal medicine, geriatrics, pediatrics, and osteopathy.

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Clinicians working in primary care stagnant

Figure 4. The Share of All Clinicians (Physicians, NPs, and PAs) Working in Primary Care Remains Stagnant (2018–2021)

Data Source: Analyses of Centers for Medicare and Medicaid Services Medicare Provider Enrollment, Chain, and Ownership System data, National Plan and Provider Enumeration System data, and Centers for Medicare and Medicaid Services Physician and Other Practitioners data, 2016–2021.

Notes: Primary care specialties included family medicine, general practice, internal medicine, geriatrics, pediatrics, and osteopathy. Estimates of nurse practitioners and physician assistants working in primary care were derived and are included in this figure. (See Appendix for detailed methodology.)

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The **social drivers of health** such as housing, transportation, income, and educational attainment impact the health status of individuals.

Specifically, **people in areas of high social disadvantage have higher chronic disease rates** and worse health than those in areas of less social disadvantage

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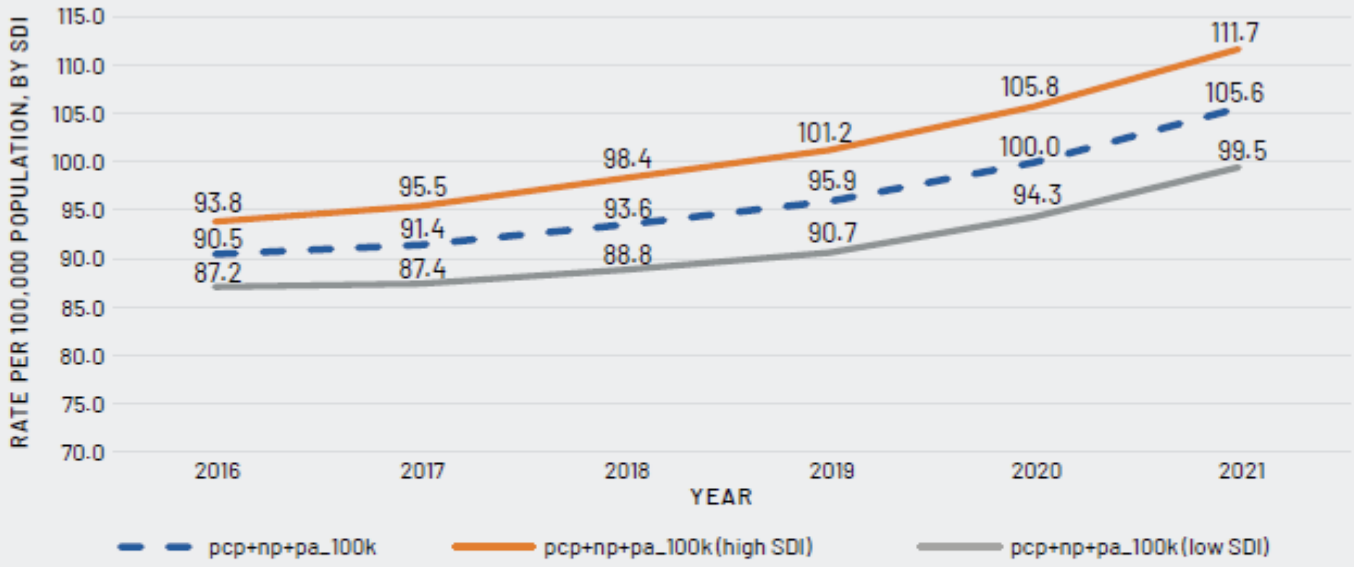
Primary Care clinicians in highest need areas

Figure 5. Primary Care Clinician Density Is Highest in High-Need Areas (2016-2021)



Data Source: Analyses of American Medical Association Masterfile (2012–2021), Centers for Medicare and Medicaid Services Medicare Provider Enrollment, Chain, and Ownership System data (2016–2021), National Plan and Provider Enumeration System data (2016–2021), Centers for Medicare and Medicaid Services Physician and Other Practitioners data (2012–2021), Robert Graham Center Social Deprivation Index (2012–2021), and the American Community Survey Five-Year Summary Files (2012–2021).

Notes: Primary care specialties included family medicine, general practices, internal medicine, geriatrics, pediatrics, and osteopathy. Estimates of nurse practitioners and physician assistants working in primary care were derived and are included in this figure. (See Appendix for detailed methodology.)

Abbreviations: NP, nurse practitioner; PA, physician assistant; PCP, primary care physician; SDI, Social Deprivation Index

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Reason 4: Technology has become a burden to primary care.

- Data limited to family physicians demonstrate that health care technologies **do not serve primary care physicians** adequately
- More than 40% of family physicians report **unfavorable scores in electronic health record (EHR) usability**
- Over 25% report overall **dissatisfaction** with their EHR.

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Reason 5: Primary care research to identify, implement, and track novel care delivery and payment solutions is lacking.

- Since 2017, only around **0.3% of federal research funding** (eg NIH and the AHRQ) per year has been invested in primary care research, limiting new information on primary care systems, payment and delivery models, and quality.
- **Lack of adequate data about the primary care infrastructure** hinders the Scorecard's capacity to fully track progress on the NASEM report objectives: (1) Pay for primary care teams to care for people, not doctors to deliver services; (2) Ensure that high-quality primary care is available to every individual and family in every community; (3) Train primary care teams where people live and work; (4) Design information technology that serves the patient, family, and the interprofessional care team; (5) Ensure that high-quality primary care is implemented in the United States.

AJPH Weekly Newsletter

Denys Lau <apha@apha.org>
To jsouthpaul@outlook.com

In this week's **public health news**, the new acting director of the CDC - now the agency's fourth leader in one year - will be Dr. Jay Bhattacharya, who also directs the NIH, in effect temporarily concentrating the HHS top decision-making authority among fewer individuals. Last week, the FDA refused to review Moderna's mRNA-based flu vaccine application due to its clinical trial design that the agency itself approved in 2024. This week, however, the FDA has reversed its decision to review the application, now requiring a confirmatory post-marking study for a high-dose flu vaccine in adults aged 65 and older. As the US finalizes its withdrawal from the WHO, California, Colorado, Illinois, New York, and New York City plan to join the WHO's Global Outbreak and Response Network to maintain access to global early-warning systems and scientific expertise.

February
2026

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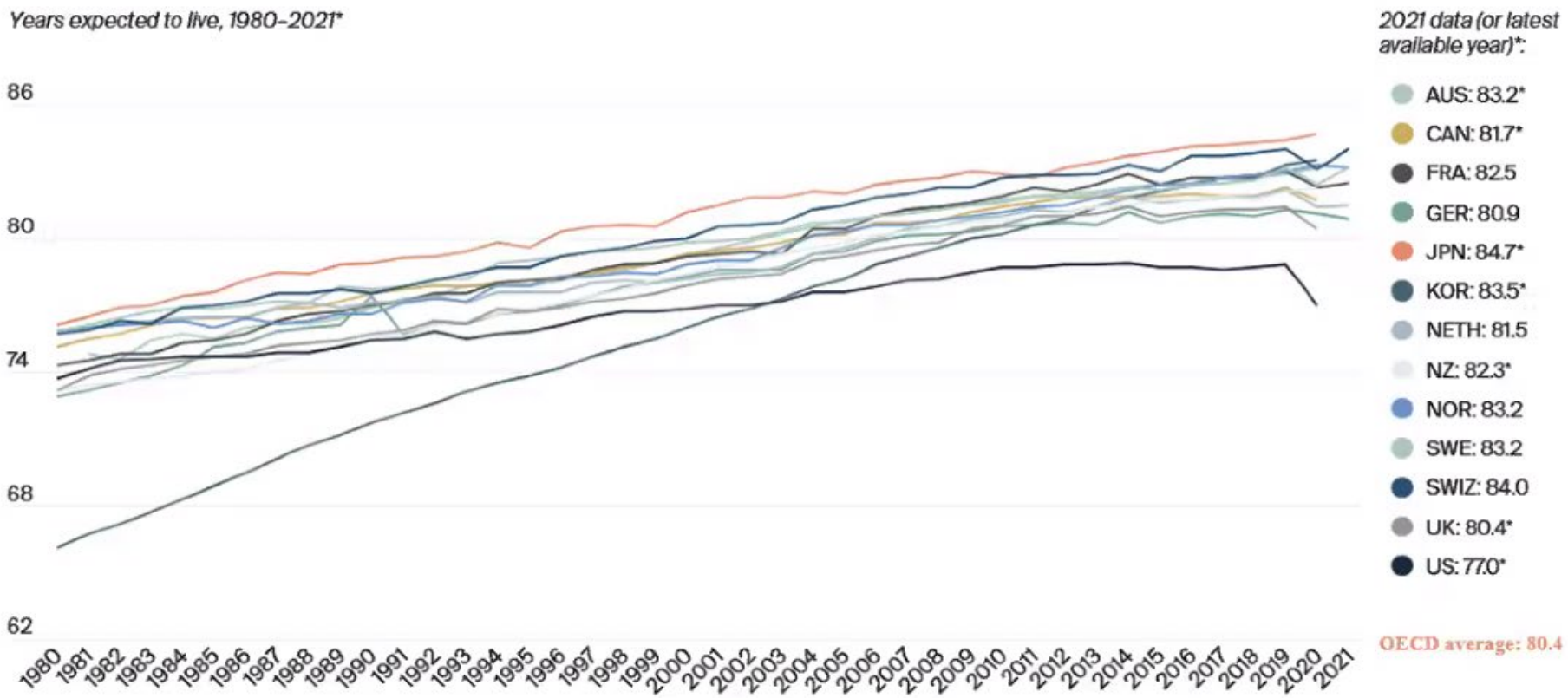
THE HEALTH OF US PRIMARY CARE: 2026 THEMATIC REPORT

Investing in Primary Care

The Missing Strategy in America's Fight Against Chronic Disease

U.S. life expectancy at birth is three years lower than the OECD average.



Download data

Note: * 2020 data. Total population at birth. OECD average reflects the average of 38 OECD member countries, including ones not shown here. Because of methodological differences, JPN and UK data points are estimates.

Data: OECD Health Statistics 2022.

Source: Munira Z. Gunja, Evan D. Gumas, and Reginald D. Williams II, *U.S. Health Care from a Global Perspective, 2022: Accelerating Spending, Worsening Outcomes* (Commonwealth Fund, Jan. 2023). https://doi.org/10.26099/8ejy-yc74

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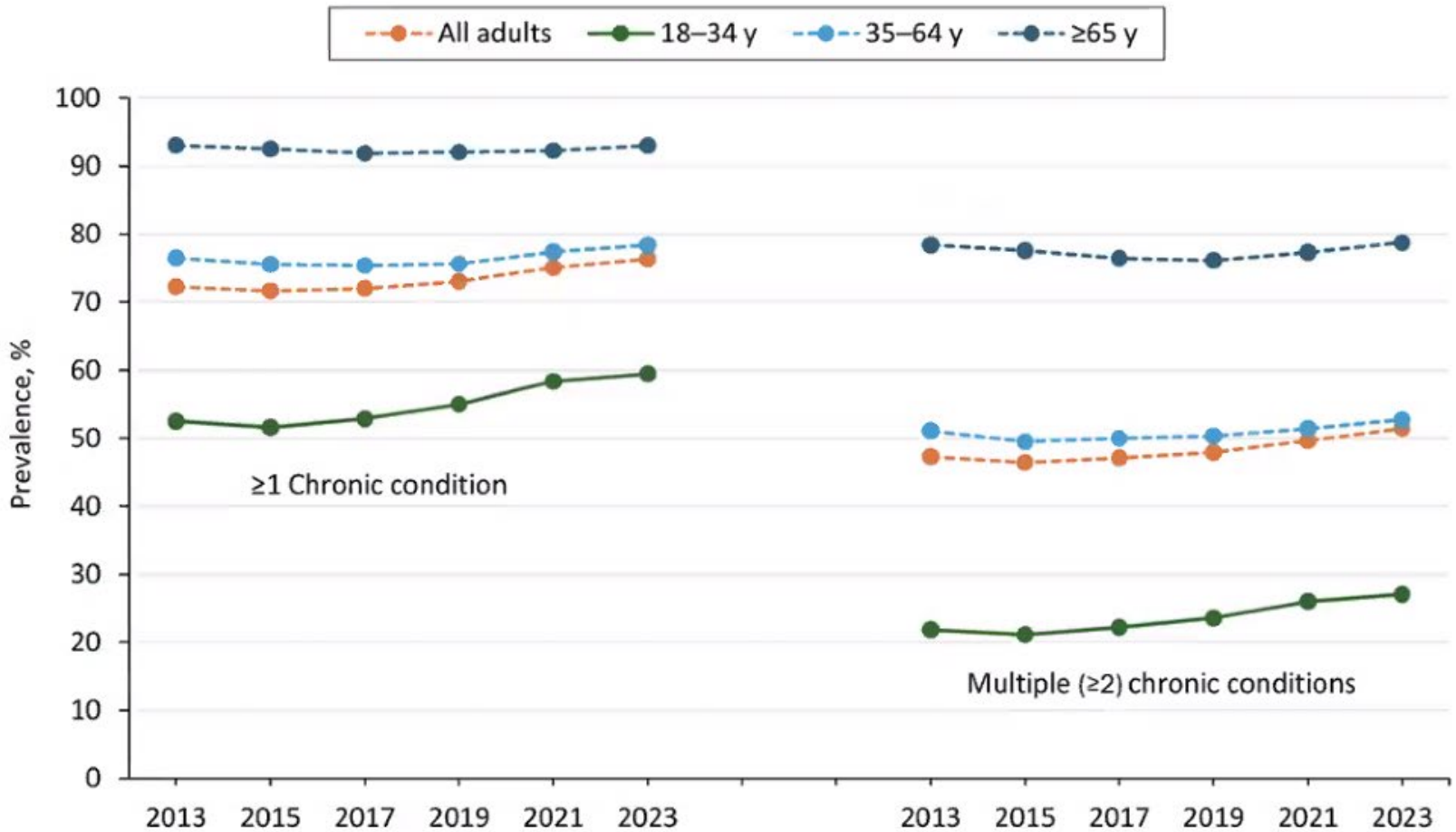
Chronic disease rates are rising fastest among young adults, and many have more than two conditions



Watson KB, Wiltz JL, Nhim K, Kaufmann RB, Thomas CW, Greenlund KJ. Trends in Multiple Chronic Conditions Among US Adults, By Life Stage, Behavioral Risk Factor Surveillance System, 2013–2023. Prev Chronic Dis 2025;22:240539.

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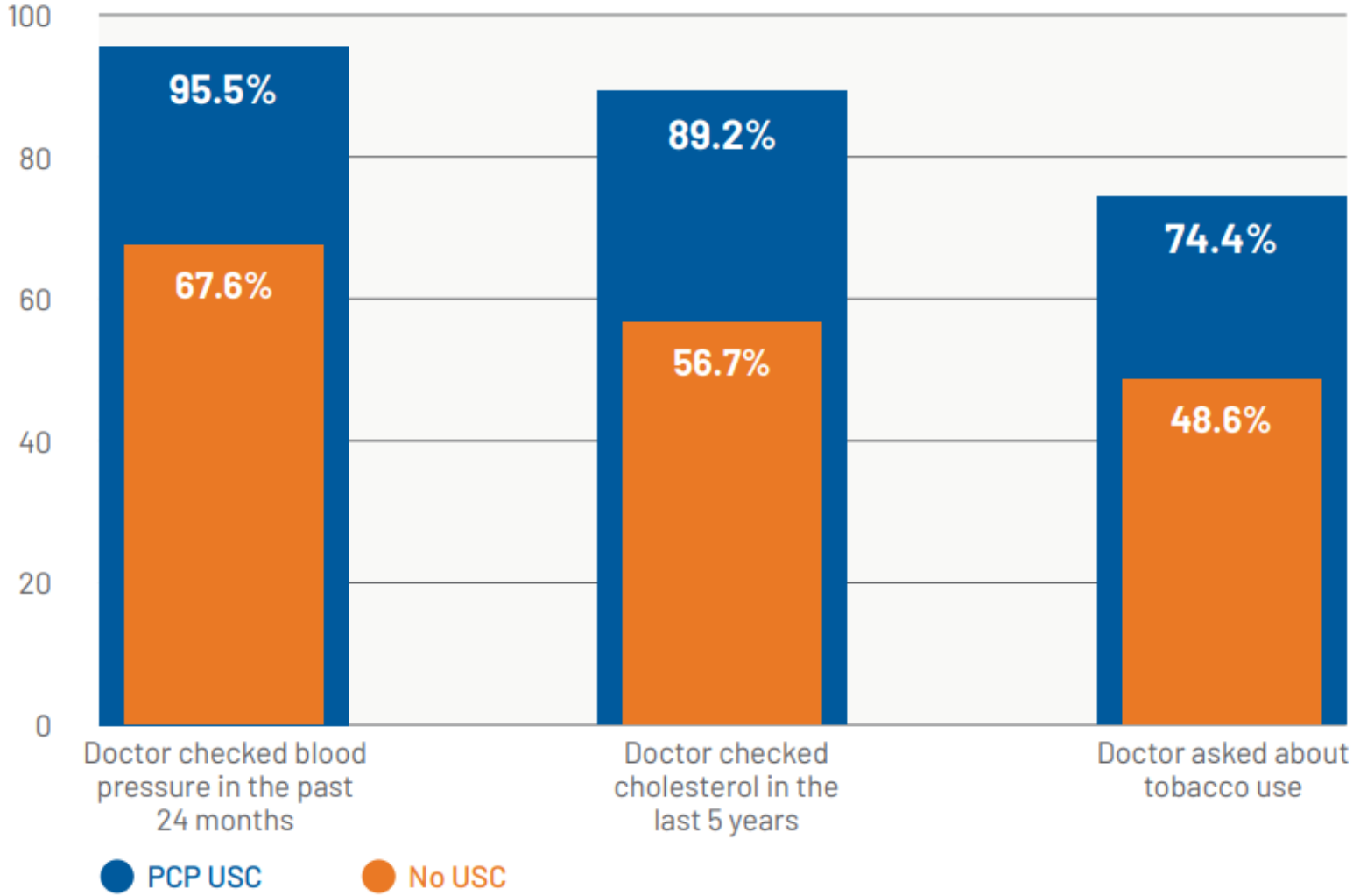
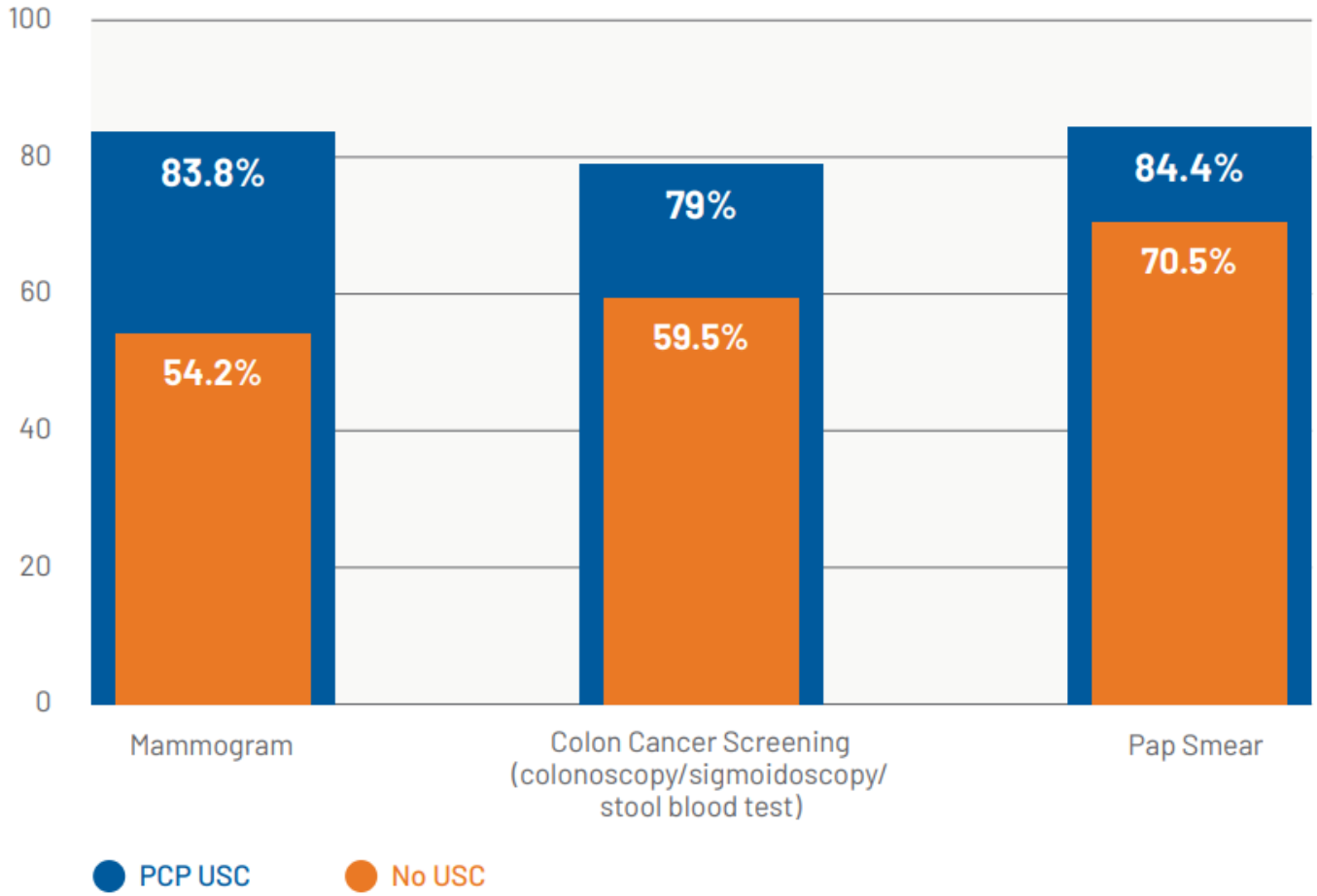
Figure 1. Adults with a Usual Source of Primary Care Are More Likely to Be Screened for Cardiovascular Risk Factors (2016–2022)



Source: Authors' analyses of Medical Expenditure Panel Survey data (2016–2022).
Note: PCP USC=usual source of primary care.

Figure 2. Adults with a Usual Source of Primary Care Are More Likely to Receive Cancer Screenings (2016–2022)



Source: Authors' analyses of Medical Expenditure Panel Survey data (2016–2022).

Notes: PCP-USC=usual source of primary care. Of the eligible population, women 21–65 years old who have not had a hysterectomy and have no history of prior cervical cancer, the percentage who had a Pap smear in the last five years. Of the eligible population, women 50–74 years old who have not had a mastectomy or have no previous history of breast cancer, the percentage who had a mammogram in the last two years. Of the eligible population, all respondents 50–75 years old who have not had a colectomy or have no previous history of colon cancer, the percentage who had a colonoscopy in the last 10 years or sigmoidoscopy in the last five years, or stool blood test in the last one to three years.

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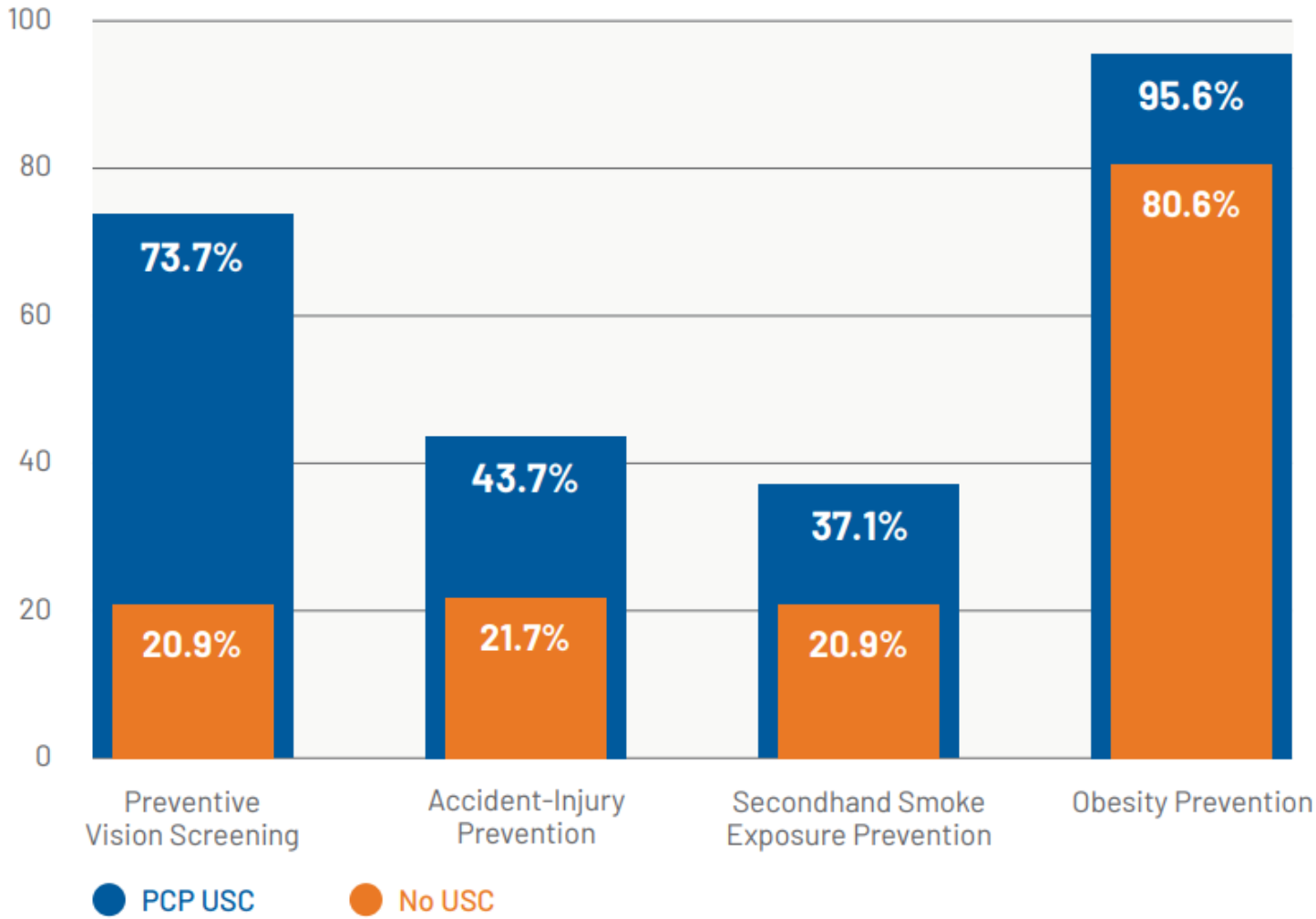
Figure 3. Children with a Usual Source of Primary Care Are More Likely to Receive Essential Preventive Screenings (2016–2022)



Source: Authors' analyses of Medical Expenditure Panel Survey data (2016–2022).
Note: PCP USC=usual source of primary care.

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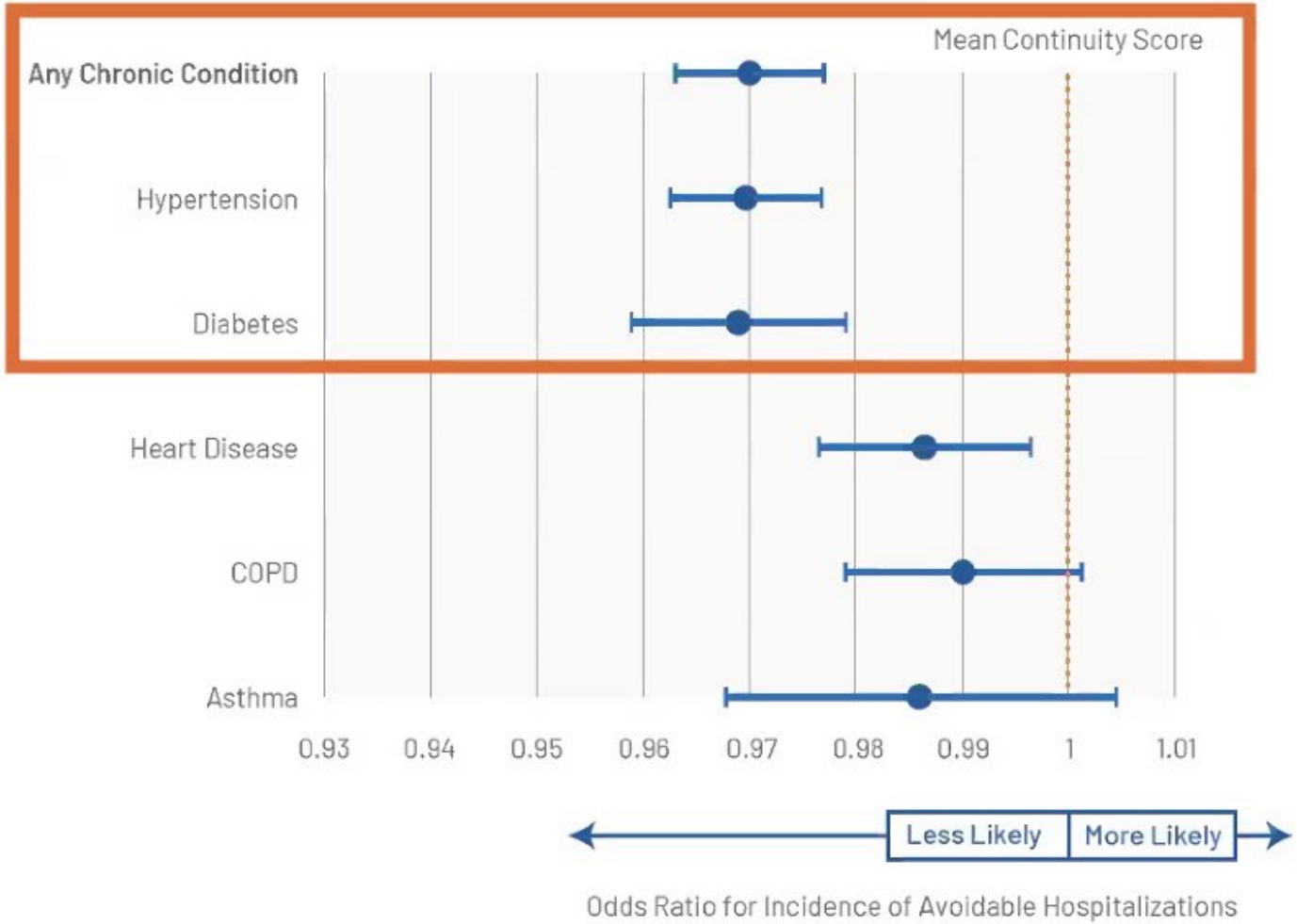
More continuity of care with a primary care clinician means...

3-4% lower likelihood of being **hospitalized** for:

- Any chronic condition
- Hypertension
- Diabetes

...for every 10% increase in continuity scores

Figure 7. Higher Levels of Primary Care Continuity Are Associated with Lower Odds of Hospitalization for Patients with Chronic Disease



Source: Authors' analyses of Medicare fee-for-services claims data (2018–2019).
Note: COPD=chronic obstructive pulmonary disease. Adjusted for age, sex, race/ethnicity, dual eligibility status, comorbidities, total evaluation and management visits to a usual source of care provider, and census region.

NATIONAL ACADEMIES Sciences Engineering Medicine

Achieving Whole Health

A New Approach for Veterans and the Nation

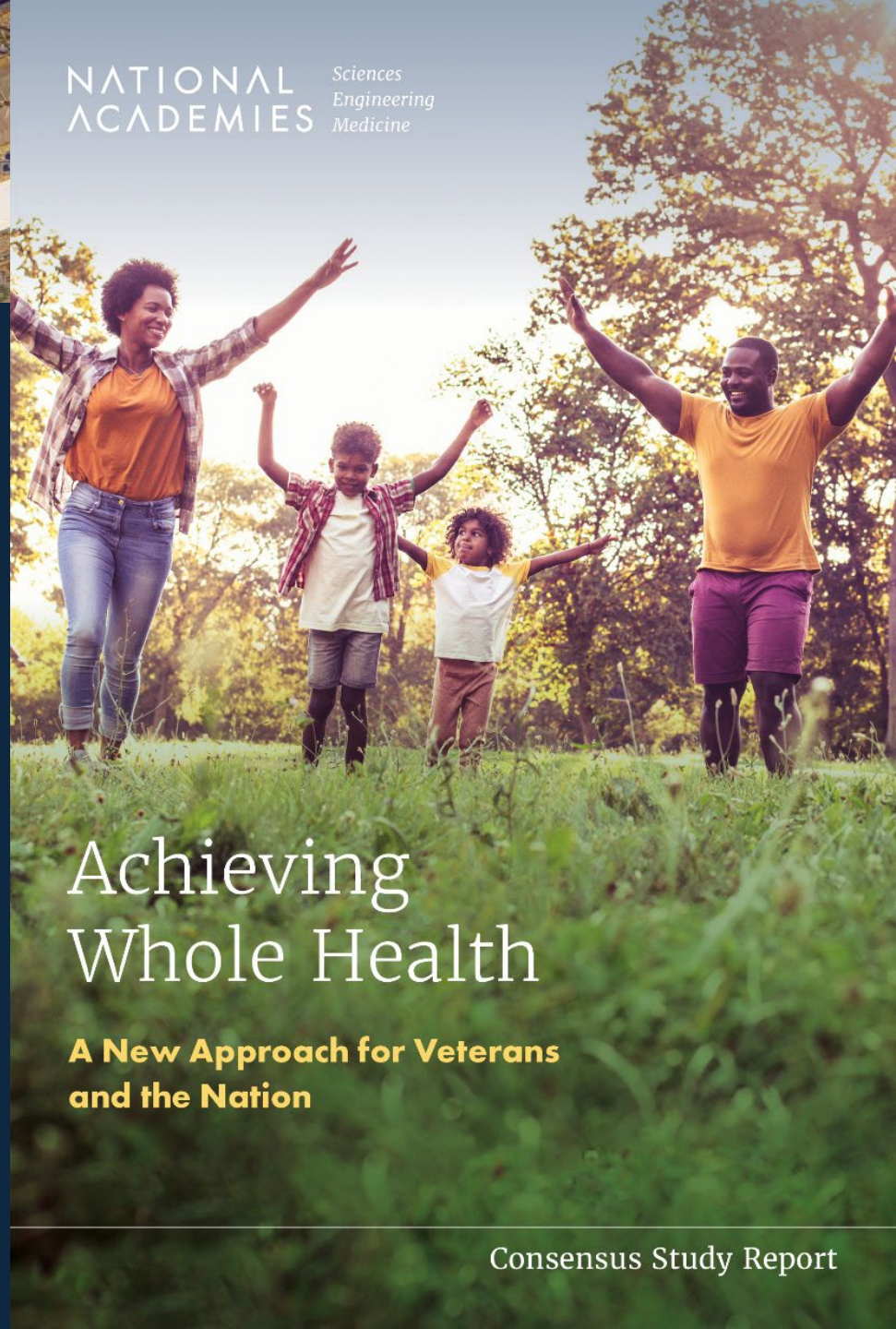
Alex Krist, Virginia Commonwealth University

Jeannette South-Paul, Meharry Medical College

Andrew Bazemore, American Board of Family Medicine

Harold Kudler, Duke University

Sara Singer, Stanford University



Study Committee

- **Jeannette South-Paul (co-chair),** Meharry Medical College
- **Alex Krist (co-chair),** Virginia Commonwealth University
- **Andrew W. Bazemore** , American Board of Family Medicine
- **Tammy Chang**, University of Michigan
- **Margaret A. Chesney** , UCSF Osher Center for Integrative Medicine
- **Deborah J. Cohen**, Oregon Health & Science University
- **A. Seiji Hayashi,** CareFirst
- **Felicia Hill-Briggs,** Northwell Health
- **Shawna Hudson,** Rutgers University
- **Carlos R. Jaén,** University of Texas San Antonio
- **Christopher Koller,** Milbank Memorial Fund
- **Harold Kudler,** Duke University
- **Sandy C. Leake ,** University of Tennessee Health System
- **Patricia K. Lillis,** Marshfield Clinic Health System
- **Ajus Ninan,** U.S. Army
- **RADM Pamela Schweitzer,** U.S. Public Health Service (retired)
- **Sara J. Singer,** Stanford University
- **Zirui Song,** Harvard Medical School

Study Context

- U.S. has consistently lagged OECD countries in health outcomes
- This gap is widening
- U.S. spends far more on health care compared to OECD countries
- U.S. life expectancy differs by as much as 18 years depending on race / ethnicity

Study Context

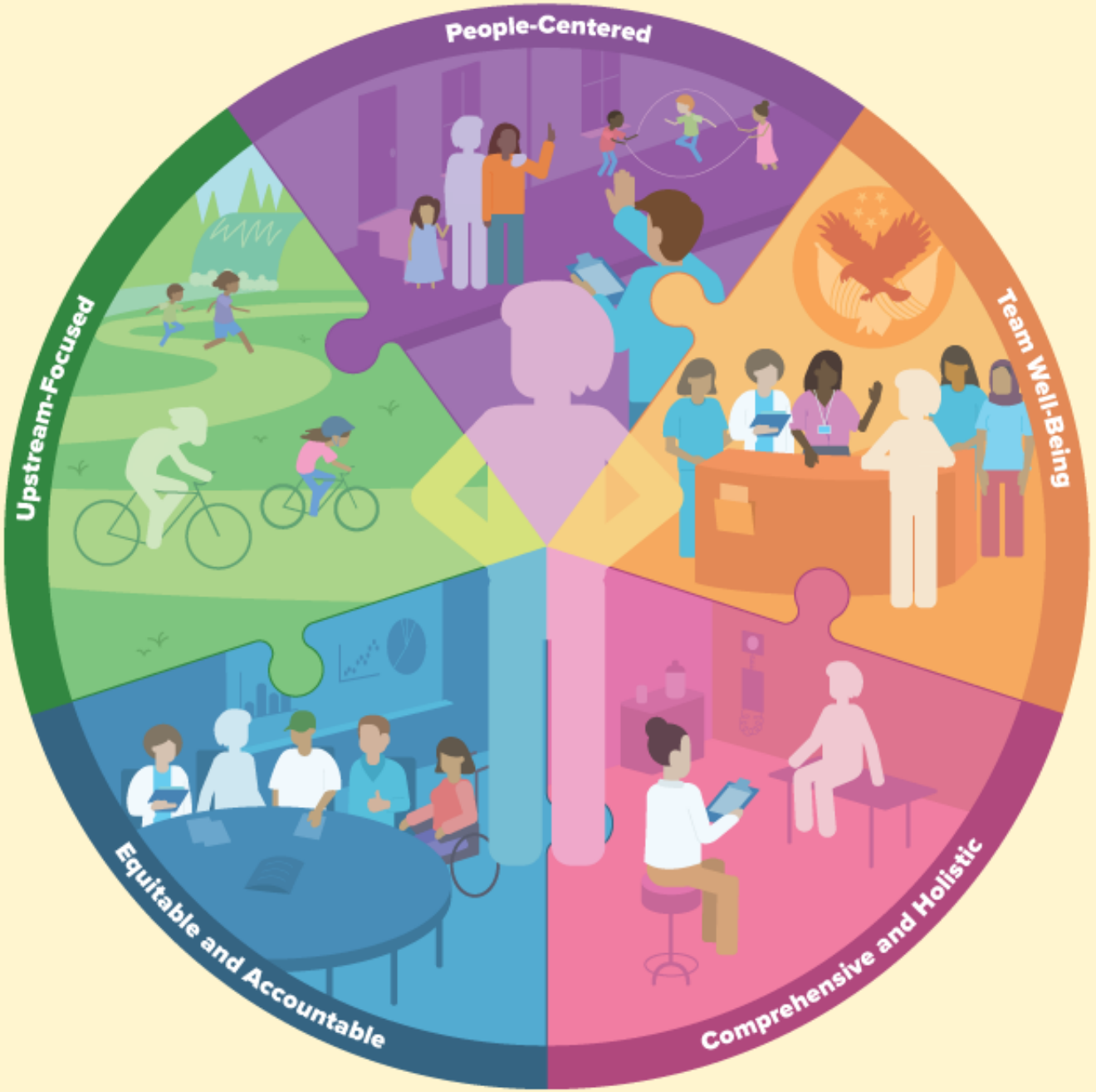
- Most health care in the U.S. is reactionary, transactional, and treats problems after they arise.
- Few resources devoted to proactive prevention
- System is optimized around billable services **not health creation**
- Structural and social determinants are **not integrated** into health care services
- Even within conventional medical care, **services are fragmented** and not integrated
- **Whole health is built on a fundamentally different chassis**

Study Context (continued)

- **VA health care is a closed system** with payment flexibility that allows for more experimentation and innovation than most systems
- But more than half of the ~19 million living veterans are not enrolled in VA care
- Many that are enrolled seek at least some of their **care outside of VA**
- Scaling and spreading a national system of whole health for veterans within and outside VA naturally extends to all health systems for all people, families, and communities

Committee's definition of whole health & whole health care

"Whole health is physical, behavioral, spiritual, and socioeconomic well-being as defined by individuals, families, and communities. To achieve this, whole health care is an interprofessional, team-based approach anchored in trusted longitudinal relationships to promote resilience, prevent disease, and restore health. It aligns with a person's life mission, aspiration, and purpose."

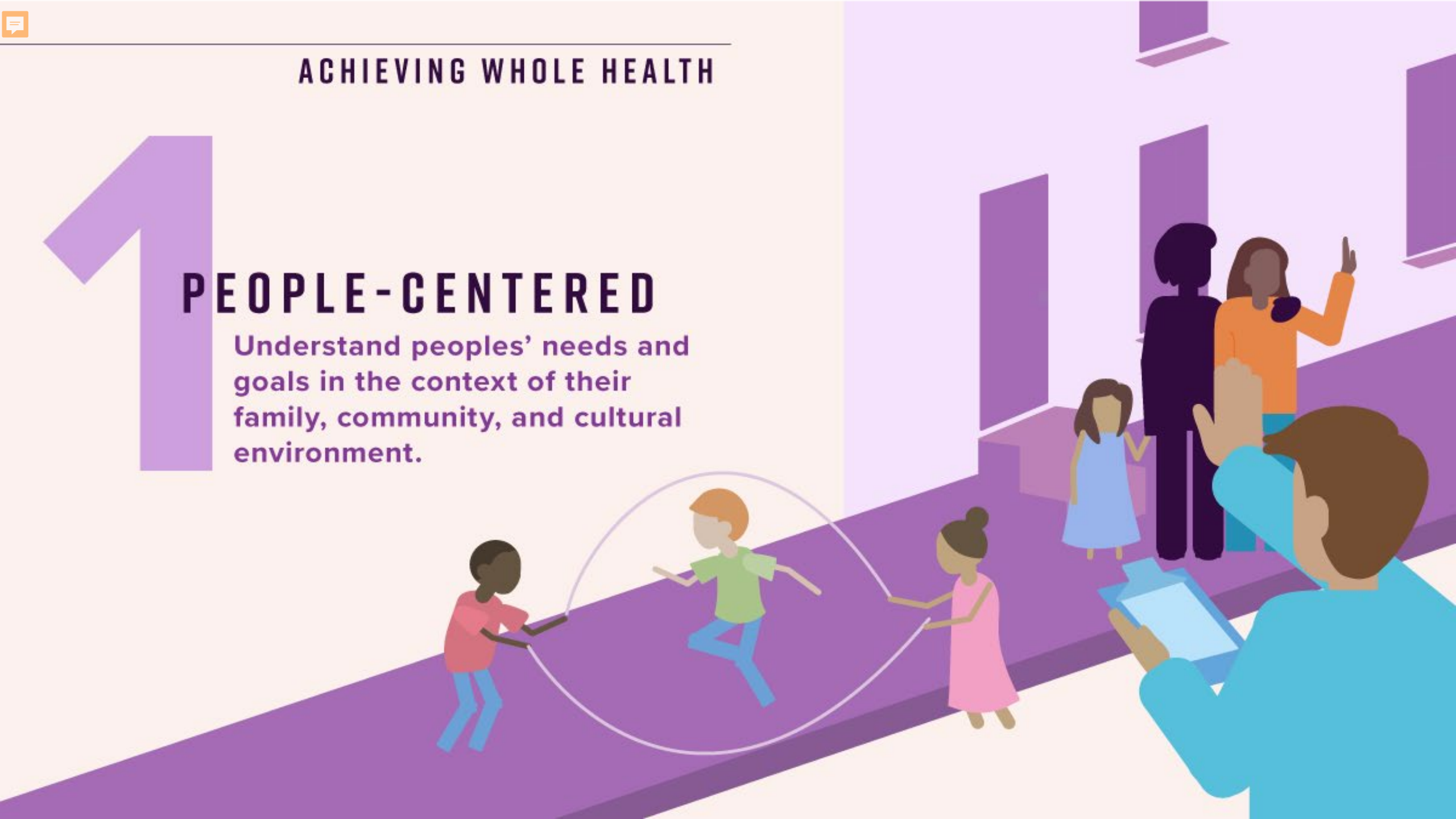


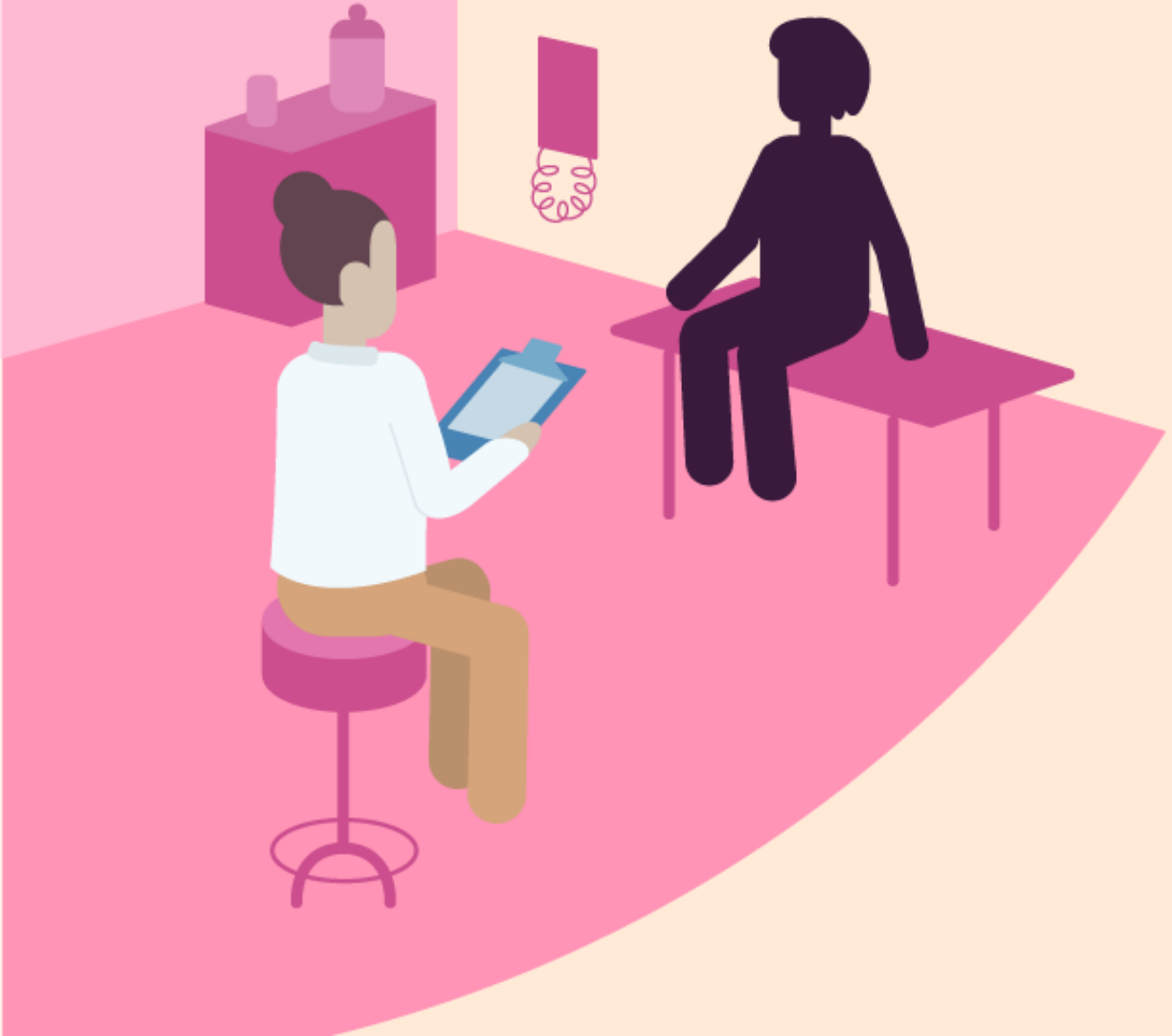
ACHIEVING WHOLE HEALTH

Five foundational elements of whole health that are necessary for an effective whole health care system.

1 PEOPLE-CENTERED

Understand peoples' needs and goals in the context of their family, community, and cultural environment.





2

COMPREHENSIVE AND HOLISTIC

Address the entirety of a person's well-being, spanning conventional medical care, complementary and integrative health, spiritual care, and social needs.

3

UPSTREAM-FOCUSED

Address health behaviors and the social and structural determinants of health.

4

EQUITABLE AND ACCOUNTABLE

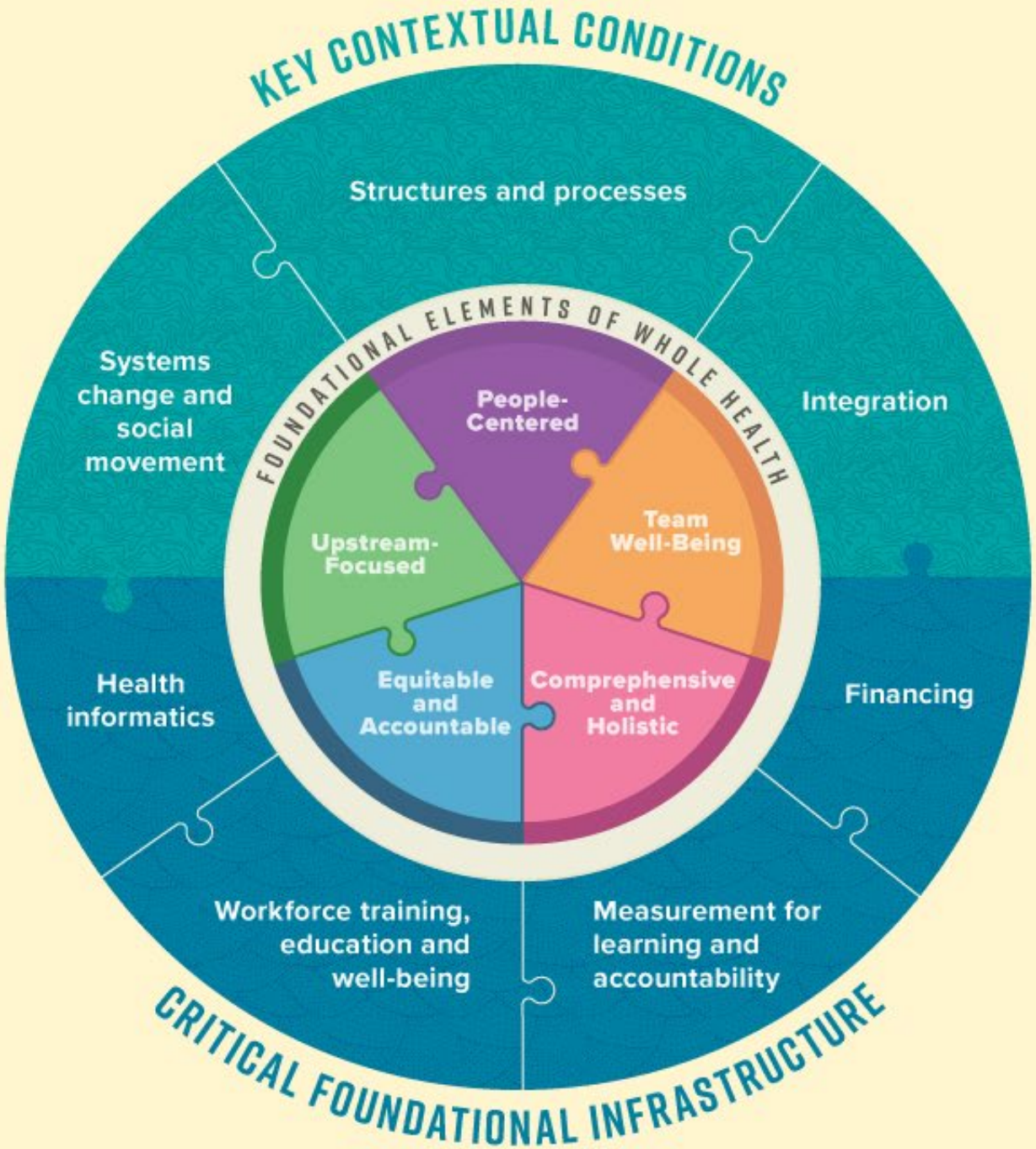
Ensure accountability for people, families, and communities and proactively engage with them to equitably address their whole health needs.

5 TEAM WELL-BEING

Ensure the well-being of care team members with a positive work environment and by helping them achieve whole health themselves.

What does the evidence say (from 12 US and international health care systems)?

- Improved patient experience and reported outcomes
- Increased access, reduced ED usage, fewer hospitalization
- Improved quality metrics
- Improved outcomes for specific conditions (pain management, mental health, TBI, healthy aging)
- Reduced maternal and infant mortality
- Improved equity, promotion of team well-being, some cost reductions



Key contextual conditions and critical foundational infrastructure for scaling and spreading whole health.

Where do we go from here?

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Needs to be addressed at multiple levels -

Leadership – be at the table or we will be on the menu

Graduate medical education – address scope of practice

Plan and work as teams

Advocacy – local, state and federal level

Mentoring

Collaboration with our subspecialty colleagues

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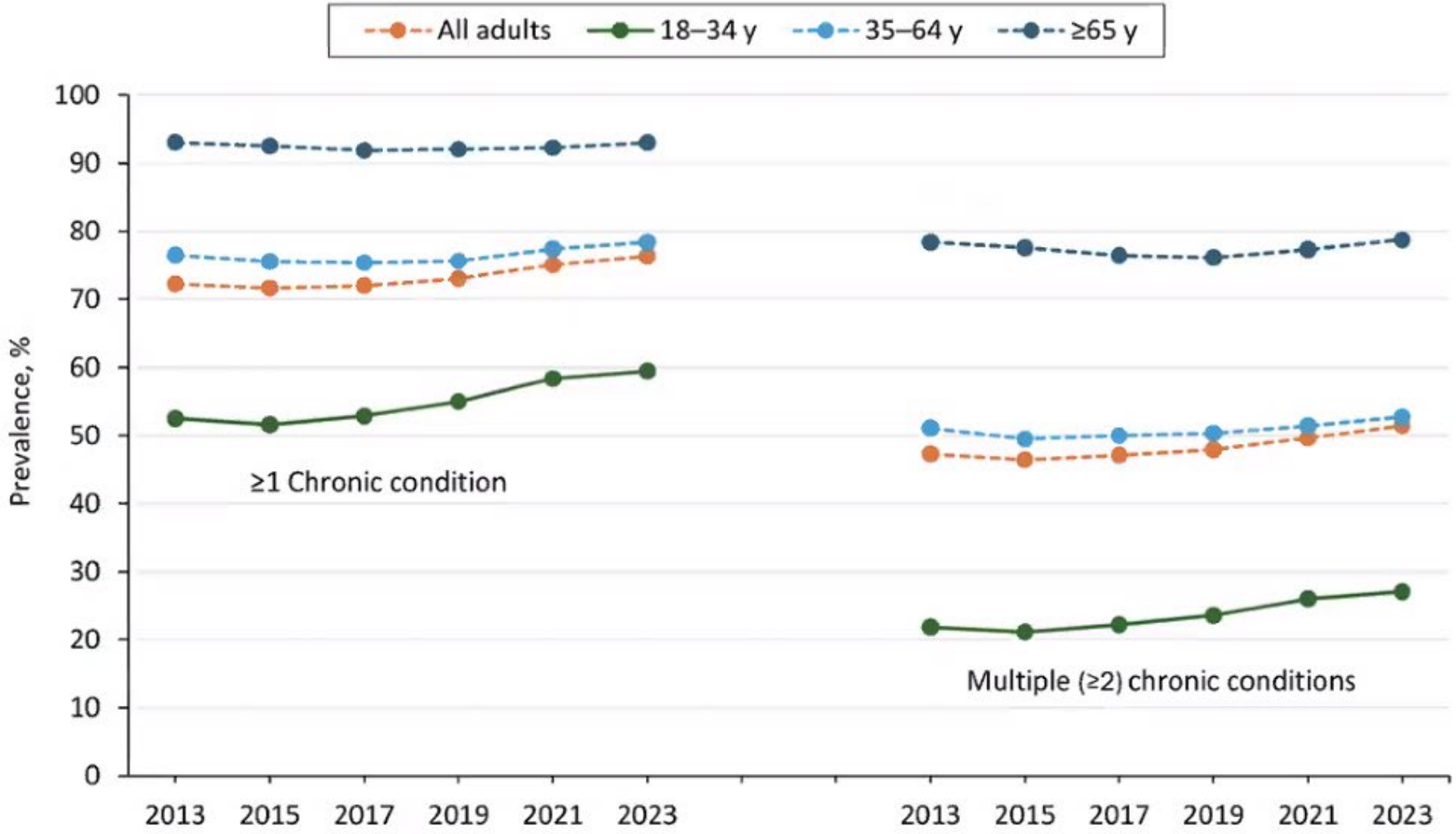
Panelists

- **Vishal S. Arora**, MD, Senior Advisor, Centers for Medicare and Medicaid Services
- **Jennifer Bacani McKenney**, MD, Owner, Fredonia Family Care, Kansas
- **Seiji Hayashi**, MD, MPH, Chief Medical Officer, CareFirst Community Health Plan Maryland
- **Yalda Jabbarpour**, MD, lead author and Vice President and Director, Robert Graham Center
- **Jake Quinton**, MD, MPH, Chief Medical Officer, Original Medicare. Center for Medicare and Medicaid Services

*Moderated by **Shira Schoenberg** of* The Boston Globe

Chronic disease rates are rising fastest among young adults, and many have more than two conditions

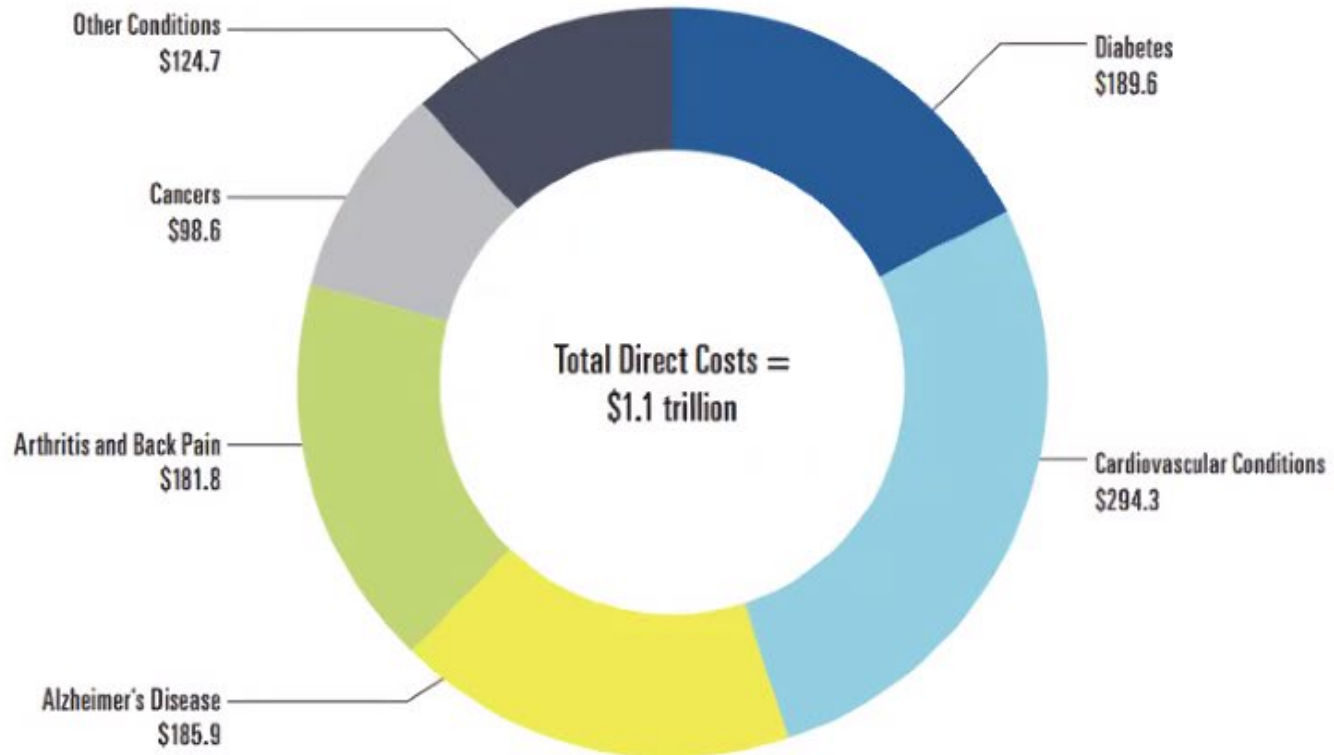


Watson KB, Wiltz JL, Nhim K, Kaufmann RB, Thomas CW, Greenlund KJ. Trends in Multiple Chronic Conditions Among US Adults, By Life Stage, Behavioral Risk Factor Surveillance System, 2013–2023. Prev Chronic Dis 2025;22:240539.

By 2050, costs from chronic diseases are projected to hit around $2 trillion.

FIGURE 1

Total Direct Costs of Chronic Diseases in the U.S., 2016 ($ billions)

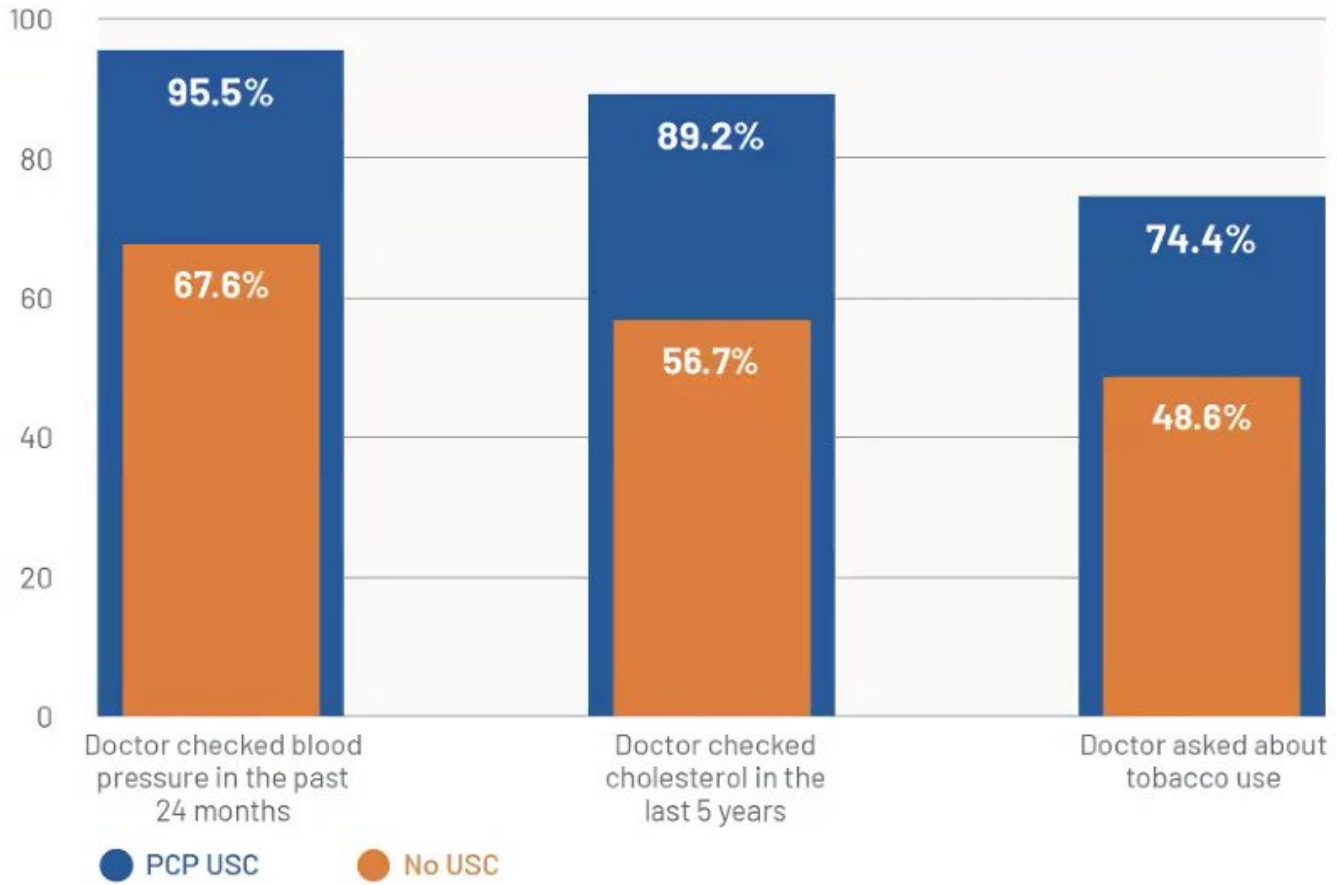


Source: Milken Institute.

Having a usual source of primary care means:

- 28% more **blood pressure checks**
- 33% more **cholesterol screenings**
- 26% more **tobacco screenings**

Figure 1. Adults with a Usual Source of Primary Care Are More Likely to Be Screened for Cardiovascular Risk Factors (2016–2022)



Source: Authors' analyses of Medical Expenditure Panel Survey data (2016–2022).
Note: PCP USC=usual source of primary care.

Seiji Hayashi

- Best primary care results in lower costs
- Medicare requires a certain no of providers in a designated network – good CMS extending payments for telehealth providers till end of 2027
- Network pays for many associated services – coordination, transportation,

Yalda Jabbarpour

- New models and impact of access to care – concierge practices, etc – results in creation of CVS Health and like practices
- Need shorter waits to see one's continuity provider
- Rural Health Transformation Fund ???
- Vishal – part of the reconciliation package this past fall – 50% disbursed to states and the other 50% tied to agreed upon outcomes
- Tech innovation in care delivery – such as coordinated care of patient transferred between sites

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Unlikely Partners

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Calvin Coolidge

Nothing in the world can take the place of persistence. Talent will not; nothing is more common than unsuccessful men with talent. Genius will not; unrewarded genius is almost a proverb. Education will not ; the world is full of educated derelicts. Persistence and determination are omnipotent.

O'Neil WJ. Military and Political Leaders and Success. McGraw-Hill, New York, 2005.

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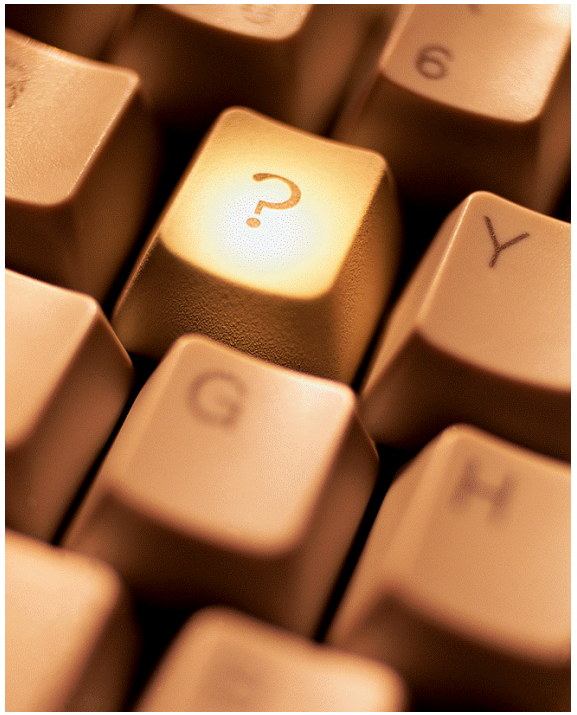
Questions and Discussion



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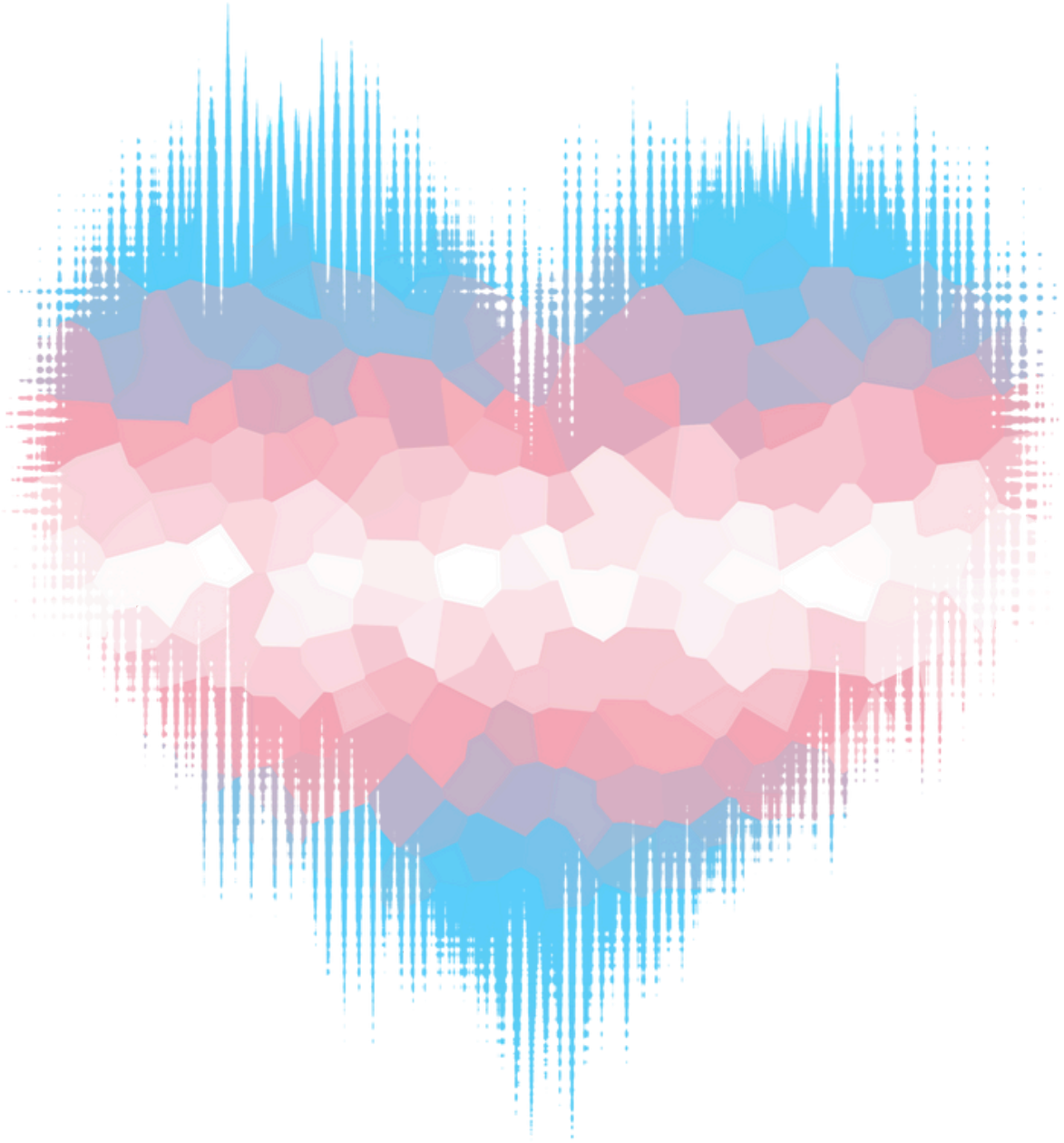


Transgender Healthcare in Adults

Molly Ainsman Fisher MD, MS

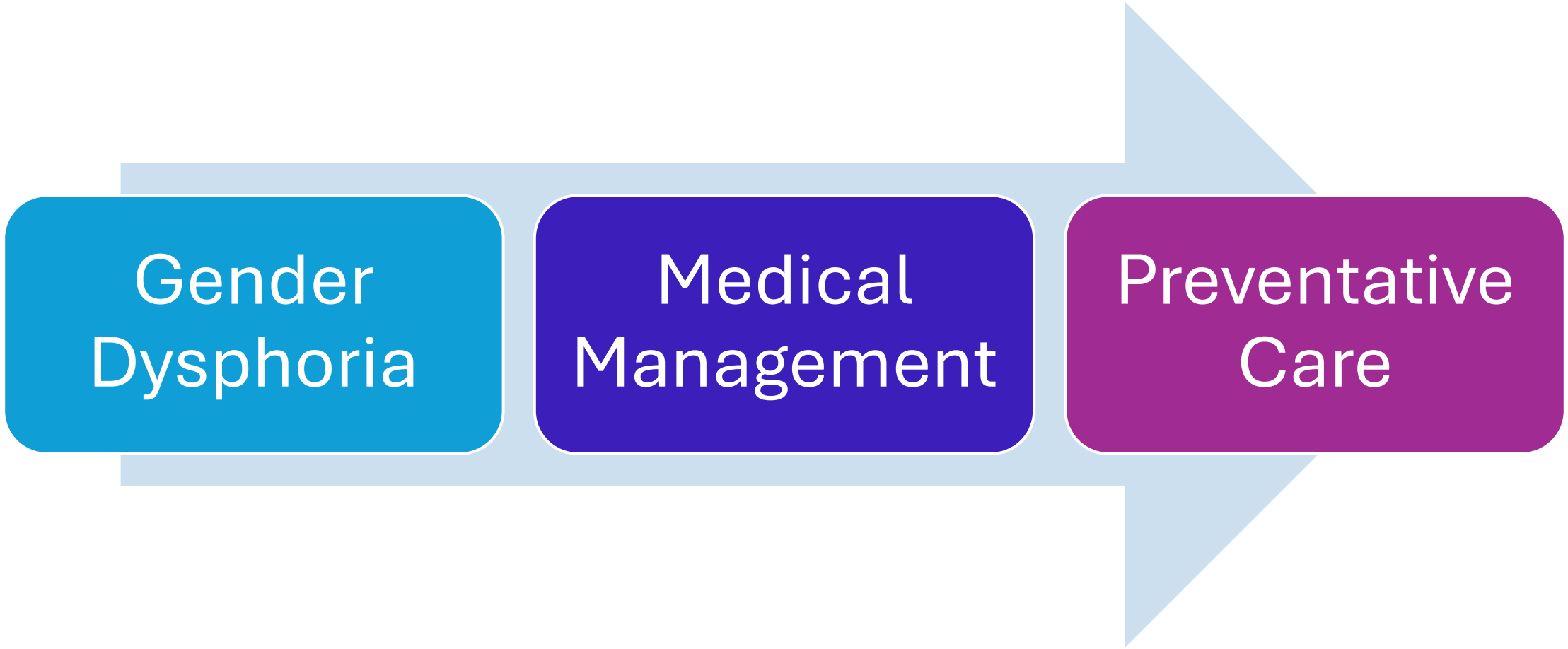
Assistant Professor in the Department of Medicine Drexel University

Director of Women's Health of the Medicine Institute, Allegheny Health Network

UPMC Family Medicine Conference

February 26th, 2026

Outline



Definitions

- **Gender identity**: a person's innate, deeply felt identification as a male person, female person, both male and female or neither
- **Gender expression**: the way in which a person communicates gender by external means such as clothing, hairstyles, mannerisms or voice
- **Transgender**: a person's gender identity is different from their sex assigned at birth
- **Gender diverse**: describes people with gender identities or expressions that are different from social and cultural expectations attributed to their sex assigned at birth
- **Transgender male** or **transmale**: male person who was assigned female at birth (AFAB)
- **Transgender female** or **transfemale**: female person who was assigned male at birth (AMAB)
- **Cisgender male:** male person who was assigned male at birth (AMAB)
- **Cisgender female:** female person who was assigned female at birth (AFAB)

Gender Dysphoria DSM-V

- Must meet 2 of the following criteria:
  - Marked incongruence between experienced/expressed gender and primary/secondary sex characteristics
  - Strong desire to be rid of one's primary and/or secondary sex characteristics because of a marked incongruence with one's experienced/expressed gender
  - A strong desire for the primary and/or secondary sex characteristics of the other gender
  - A strong desire to be of the other gender
  - A strong desire to be treated as the other gender
  - A strong conviction that one has the typical feelings and reactions of the other gender
- The condition is associated with clinically significant distress or impairment in social, occupational, or other important areas of functioning

Prevalence of TGD Individuals

- Early health-system based studies: 0.02-0.1%
- Newer survey-based studies
  - Adults
    - 0.3-4.5% TGD
    - 0.3-0.5% transgender
  - Children/adolescents
    - 2.5-8.4% TGD
    - 1.2-2.7% transgender
- In the US, up to 16 million people identify as TGD

Diagnosis

- Any medical provider with a clear understanding of the DSM-V criteria can diagnose gender dysphoria
- Diagnosis provides an avenue for medical and surgical treatment including insurance coverage
- Gender Incongruence (ICD-10): not all patients whose gender identity is different from their sex assigned at birth have dysphoria

Gender History Taking

- Use open-ended questions
  - “Tell me about your journey with gender”
- Assess previous gender affirming medical and/or surgical treatments
- Assess goals – everyone is different

What is Gender Affirmation

- Process of recognizing, accepting, and expressing one's gender identity
- Proven benefit for dysphoria symptoms, suicidal ideation, depression, anxiety, quality of life, sexual function, and psychosocial functioning1, 2, 3
- According to the AMA, WPATH, Endocrine society, ACP, AAFP, AAP, AACAP, APA, gender affirmation is medically necessary
- The AMA states "medical and surgical treatments for gender dysphoria and gender incongruence, as determined by shared decision making between the patient and physician, are medically necessary as outlined by generally-accepted standards of medical and surgical practice."

Ways to Affirm Gender

- Social: clothing, hair, name or gender marker change
- Binding
- Facial/body hair removal
- Voice modification
- Genital tucking/packing
- Gender-affirming medical treatment
- Gender-affirming surgical treatment

Ways to Affirm Gender

- Social: clothing, hair, name or gender marker change
- Binding
- Facial/body hair removal
- Voice modification
- Genital tucking/packing
- Gender-affirming medical treatment
- Gender-affirming surgical treatment

Initiating GAMT

- Assess readiness based on your history taking
- Assess risk factors and relative contraindications
- Assess patient’s goals and expectations
- Discuss reversible vs irreversible changes
- Discuss patient’s desire for biological children

Feminizing Medical Management

Estradiol

- Oral
- Transdermal
- Injectable IM or SQ

Antiandrogens

- Spironolactone
- Finasteride
- Bicalutamide
- GnRH agonists

Progesterone

Feminizing Effects and Timeline

NOTE: Voice will not change from medical management alone

Decreased libido
Decreased spontaneous erections

Initiation | 3 months | 6 months | 9 months | 12 months

Redistribution of body fat
Decrease in muscle mass/strength
Softening of skin
Breast growth (2 years)
Decreased testicular volume

Decreased terminal hair growth on body though increased fullness of scalp hair

Adapted from Hembree et al., 2017

Dosing

Medication	Dosing	Goal Serum Level	Notes
Estradiol oral/sublingual	2-8mg daily (or split in divided doses)	Estradiol 100-200 pg/mL	SL dosing has a spike
Estradiol transdermal	0.025-0.2mg patches		Weekly or twice weekly dosing
Estradiol Valerate/Cypionate IM/SQ	2-10mg weekly		Can double the dose for q2wk dosing
Spironolactone	100-300mg daily	Total testosterone < 55 ng/dL	Can do divided doses
Medroxyprogesterone acetate (Provera)	5-10mg po daily		
Micronized progesterone (Prometrium)	100-200 mg po daily		Preferred agent

Monitoring

Tests	Baseline	Q3 Months	Goal	Monitoring Once at Goal
BUN/Cr/K+ (if using spiro)	X	X	Normal range	1-2x/year
Estradiol		X	150-200 pg/dL	1-2x/year
Total Testosterone		X	< 50 ng/dL	1-2x/year

- Check lipids and A1C based on USPSTF guidelines
- Can consider SHBG, albumin, and prolactin based on clinical indications
- Lower levels are appropriate based on patient preference
- Estradiol levels should be checked mid-cycle for patients injecting estradiol

Risks Associated with Feminizing Treatment

Likely Increased Risk	Increased Risk with Presence of Additional Risk Factors	Possible Increased Risk	No Increased Risk or Inconclusive
• VTE (less with transdermal) • Infertility • Weight gain • Hyperkalemia (with spironolactone) • Hypertriglyceridemia	• Cardiovascular disease • Cerebrovascular disease • Gallstones • Polyuria/dehydration (with spironolactone)	• Hypertension • Erectile dysfunction • Type 2 diabetes • Lone bone mass/osteoporosis • Hyperprolactinemia	• Breast cancer • Prostate cancer

Contraindications

- VTE
  - Increased risk with oral estrogen
  - Can consider transdermal (may also use anticoagulation)
- Unstable cardiac disease
- End-stage liver disease
- Active hormone-sensitive cancers

Masculinizing Medical Management

Testosterone

- Oral (not typically covered by insurance)
- Transdermal gel
- Injectable IM or SQ

MASCULINIZATION ONSET TIMELINE

Skin oiliness/Acne
Cessation of menses
Voice deepening
Fat redistribution
Clitoral enlargement
Vaginal atrophy

Initiation | 3 months | 6 months | 9 months | 12 months

Facial/body hair growth
Scalp hair loss
Increased muscle mass/strength

Adapted from Hembree et al., 2017

Dosing

Medication	Dosing	Goal Serum Level	Comments
Testosterone Cypionate/Enanthate IM/SQ	50-100mg weekly	400-700 ng/dL	Can double dose for q2wk dosing
Testosterone topical gel 1%	50-100mg daily		Pump or packet form. Apply on shoulders or upper arms
Tesotsterone topical gel 1.62%	40.5-103.25mg daily		

Monitoring

Tests	Baseline	Q3 Months	Target	Monitoring Once at Goal
Hgb/Hct	X	X	Normal male range	1-2x/year
Testosterone		X	400-700	1-2x/year

- Check lipids and A1C based on USPSTF guidelines
- Can consider SHBG, albumin, and prolactin based on clinical indications
- Lower levels are appropriate based on patient preference

- **Checking testosterone levels**
  - Testosterone injection
    - Mid-cycle
    - If not done mid-cycle, adjust goal level down if after mid-cycle or up if before mid-cycle
  - Testosterone patch/gel: No sooner than one week than after one week of application and at least two hours after application

Risks Associated with Masculinizing Treatment

Likely Increased Risk	Increased Risk with Presence of Additional Risk Factors	Possible Increased Risk	No Increased Risk or Inconclusive

• Erythrocytosis
• Infertility
• Acne
• Androgenic alopecia
• Hypertension
• Sleep apnea
• Weight gain
• Decreased HDL and increased LDL
	• Cardiovascular disease
	• Hypertriglyceridemia
		• Type 2 diabetes
		• Intracranial hypertension
			• Osteoporosis
			• Cancers
			  • Breast
			  • Cervical
			  • Ovarian
			  • Uterine

Contraindications

- Unstable psychiatric illness
- Erythrocytosis with Hgb >18 or Hct >55%
- Unstable coronary disease
- Pregnancy
- Hormone sensitive cancers

Preventative Care

Smoking

- Not an absolute contraindication
- Counsel at each visit
- Use informed decision and harm reduction approach
- Transdermal estrogen preferred in transwomen
- Monitor closely for erythrocytosis in transmen
- Abstain from tobacco/nicotine prior to gender-affirmation surgery

Cardiovascular Disease

- Transgender men: cardiovascular (CV) risk is unchanged
  - CV risk likely increased with the presence of additional risk factors
- Transgender women: data are unclear for risk
  - CV risk likely increased with the presence of additional risk factors
  - Some studies found increased morbidity and mortality from MI and CVA, however these studies did not adjust for risk factors including tobacco use, obesity, and diabetes
- To calculate ASCVD risk, determine which sex to use based on age at which hormones are started and total length of exposure to hormones

  <u>EXAMPLES</u>
  - If a patient AFAB started testosterone late in life, continue to use female in the calculation
  - If a patient AMAB started estradiol at age 20, and they are now 50 YO, then use female for risk calculation given they have lived longer with estradiol influencing their body (~30 years) than testosterone (~10 years)

Osteoporosis Screening

- Transgender women: mixed data
  - Risk factors: underutilization of hormones after gonadectomy, use of androgen blockers without estrogen, GnRH analogues
- Transgender men: no change or increase in BMD
  - Risk factor: oophorectomy without optimal hormone replacement
- Screening for transgender people (regardless of sex assigned at birth)
  - s/p gonadectomy and 5 years without hormones
  - 50-64 with known risk factors
  - All transgender people starting at age 65

Breast Cancer Screening

- Transgender women:
  - Begin at age 40-50, every 2 years, at least 5 years after starting hormones
- Transgender men:
  - If they have breast tissue, should follow screening guidelines for cis-women
  - If they had a mastectomy, discuss breast cancer risk and potentially screen using US

Cervical Cancer Screening

- Transgender men are less likely to be current on cervical cancer screening
- As long as someone has a cervix, the recommendations are the same as for cis-women
- Pap smears on transgender men have a ten-fold higher incidence of an unsatisfactory result compared to cis-women
- Ways to improve the experience: only undress from the waist down, pediatric speculum, self insertion of speculum, vaginal estrogen for 1-2 weeks prior to exam
- Preliminary research on self-collected vaginal samples for HPV compared to clinician obtained samples show promise

Prostate/Testicular Cancer Screening

- Prostate cancer in transgender women
  - Likely lower risk than in cis-men
  - Same screening recommendations as cis-men
  - In patients that are post-vaginoplasty, if a manual exam of the prostate is needed it should be done vaginally instead of rectally
- Testicular cancer in transgender women
  - Likely lower risk than in cis-men

Contraceptive Counseling

- <u>GAHT is not contraception</u>
  - In one study, 20% of pregnancies in AFAB transmasculine patients were when the person was amenorrheic on testosterone
- Testosterone is a known teratogen
  - If pregnancy is desired, testosterone should be stopped several months before trying to conceive
- Contraception should be offered to anyone who can become pregnant
- There is no data on comorbidity risk stratification in transmasculine patients on testosterone using contraception or on the impact of testosterone on the efficacy of contraception

Fertility Planning

- A discussion about fertility is essential
- The impact of hormones on future fertility is unclear
  - The time to return of fertility can range from 3-6 months, though some may experience permanent loss of fertility or require assisted technologies
- Sperm, oocyte and embryo preservation should be offered to everyone prior to starting hormones. Newer options such as ovarian or testicular tissue cryopreservation may be an option

Additional Resources

- WPATH Standards of Care for the Health of Transgender and Gender Diverse People, Version 8, Standards of Care for the Health of Transgender and Gender Diverse People, Version 8 (tandfonline.com)
- UCSF Transgender Care: https://transcare.ucsf.edu/guidelines
- Hembree et al. Endocrine treatment of gender-dysphoric/gender-incongruent persons: an endocrine society clinical practice guideline. The Journal of Clinical Endocrinology & Metabolism 2017; 102:11 (3869-3903).
- Health care for transgender and gender diverse individuals. ACOG Committee Opinion No. 823. American College of Obstetricians and Gynecologists. Obstetrics and Gynecology 2021; 137:e75-88.
- General approaches to medical management of menstrual suppression. ACOG Clinical Consensus No.3. Obstetrics and Gynecology 2022; 140:528-41.