

Successful Aging in People Living with HIV

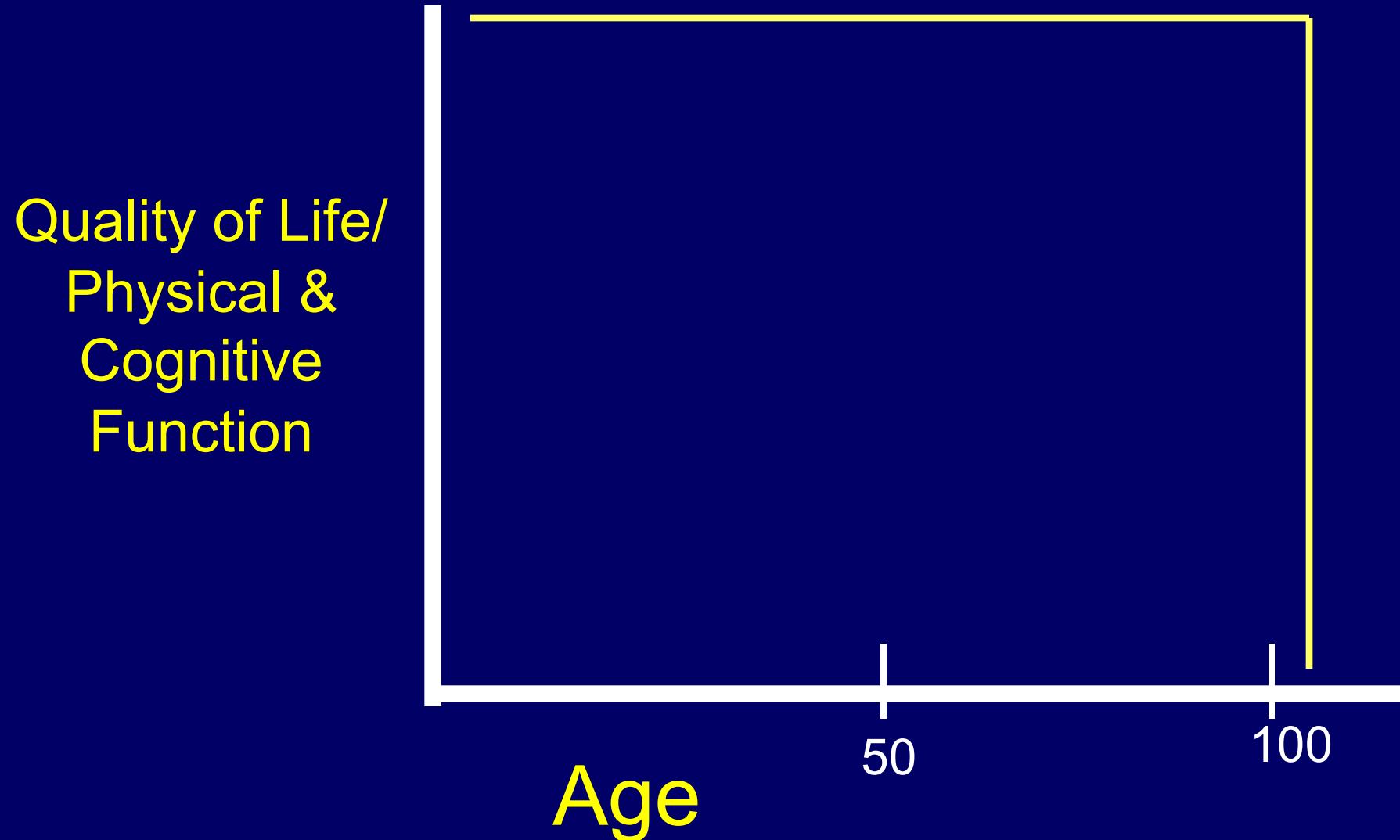


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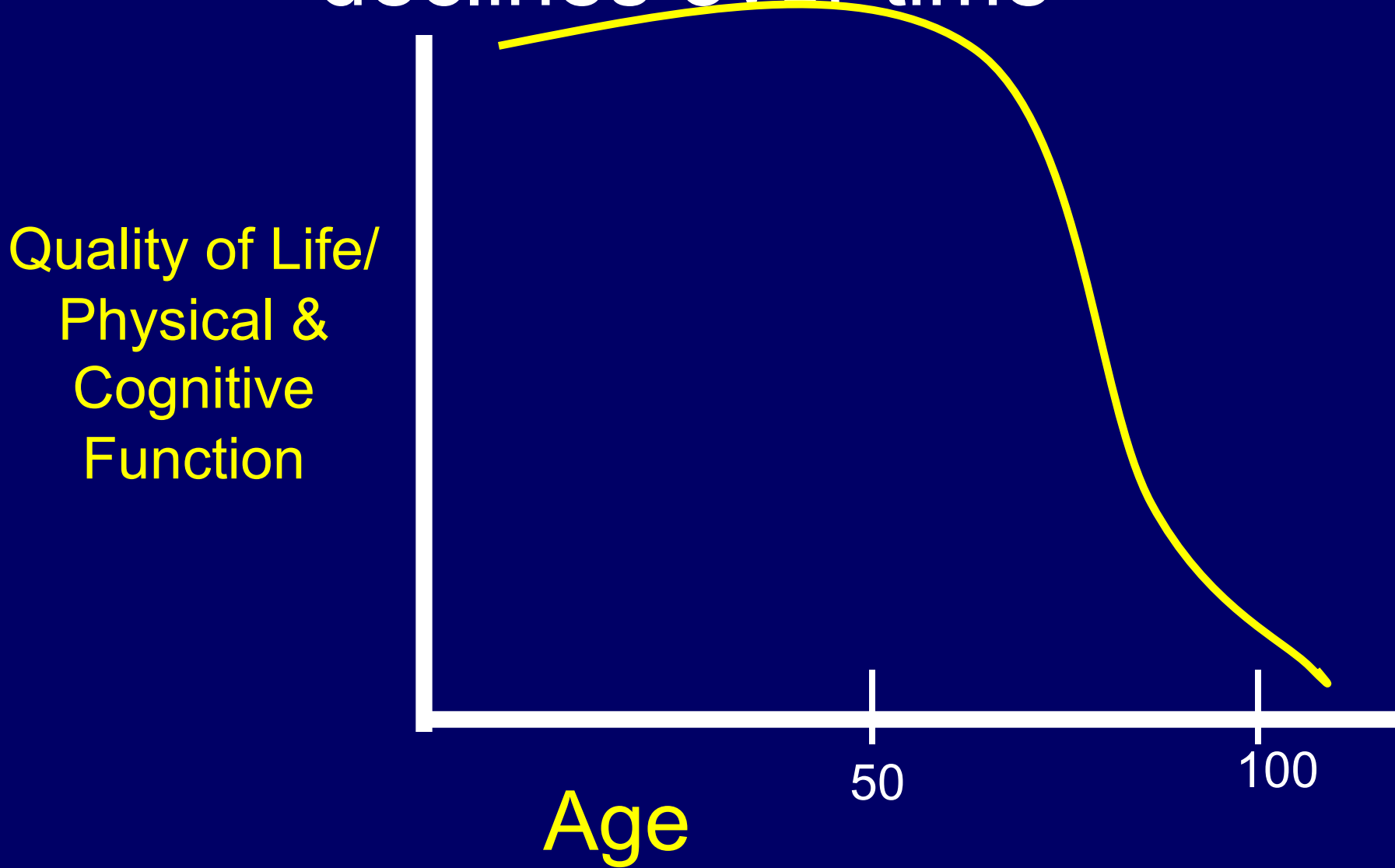


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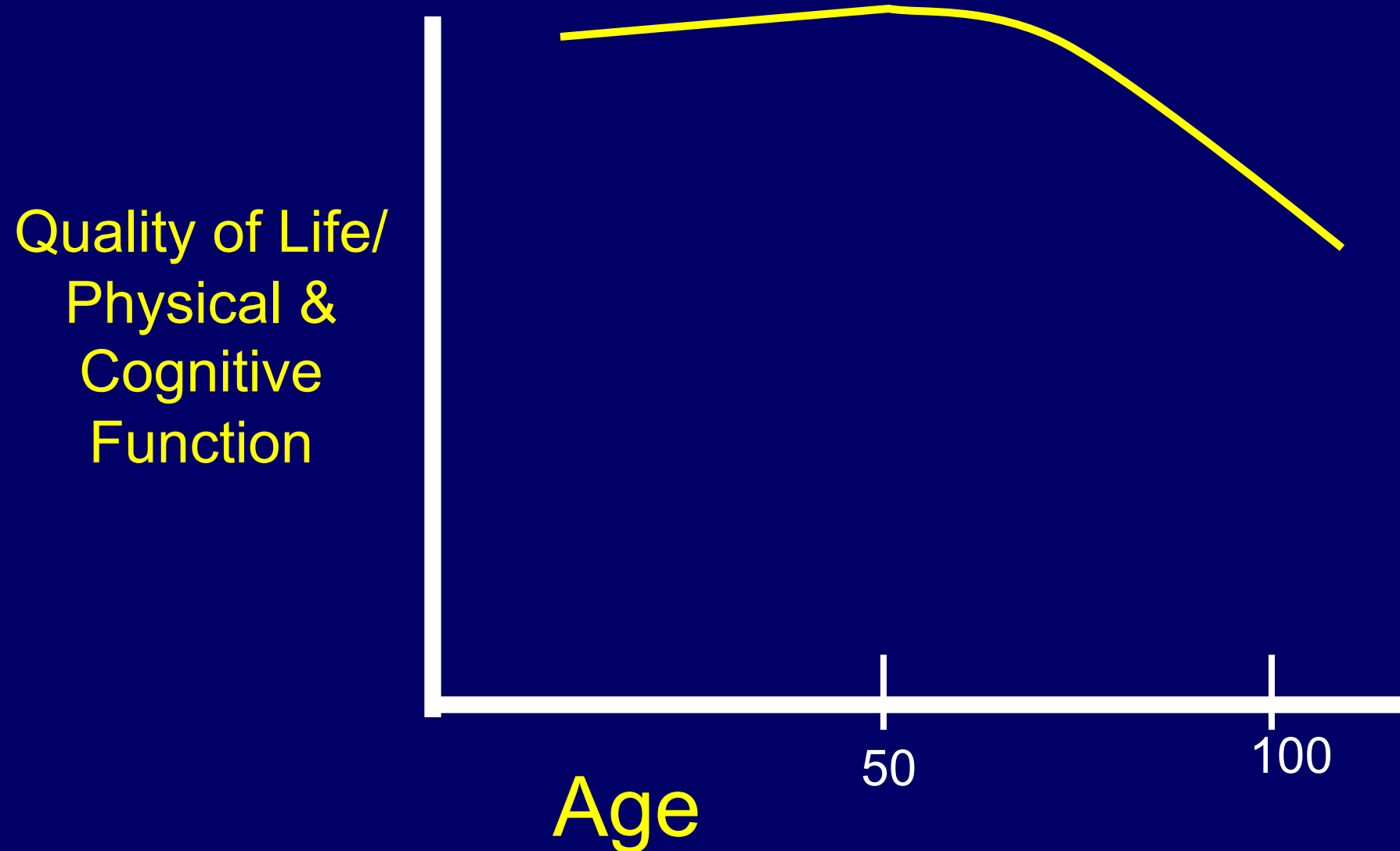
The Ideal Life: Quality x Time



Physical & cognitive function generally declines over time



How can we bend the aging curve upward?



Why do we age?

- Chronologic Age= number of candles on a birthday cake
- Biologic Age= wear and tear on organs/Age we look and feel
- Chronological Age $\neq$ Biological Age

Why do we age?

- Chronologic Age= number of candles on a birthday cake
Biologic Age= wear and tear on organs/Age we look and feel



Biologic vs Chronologic Age

John Turner - weightlifter



How old is he?

A.33

B.43

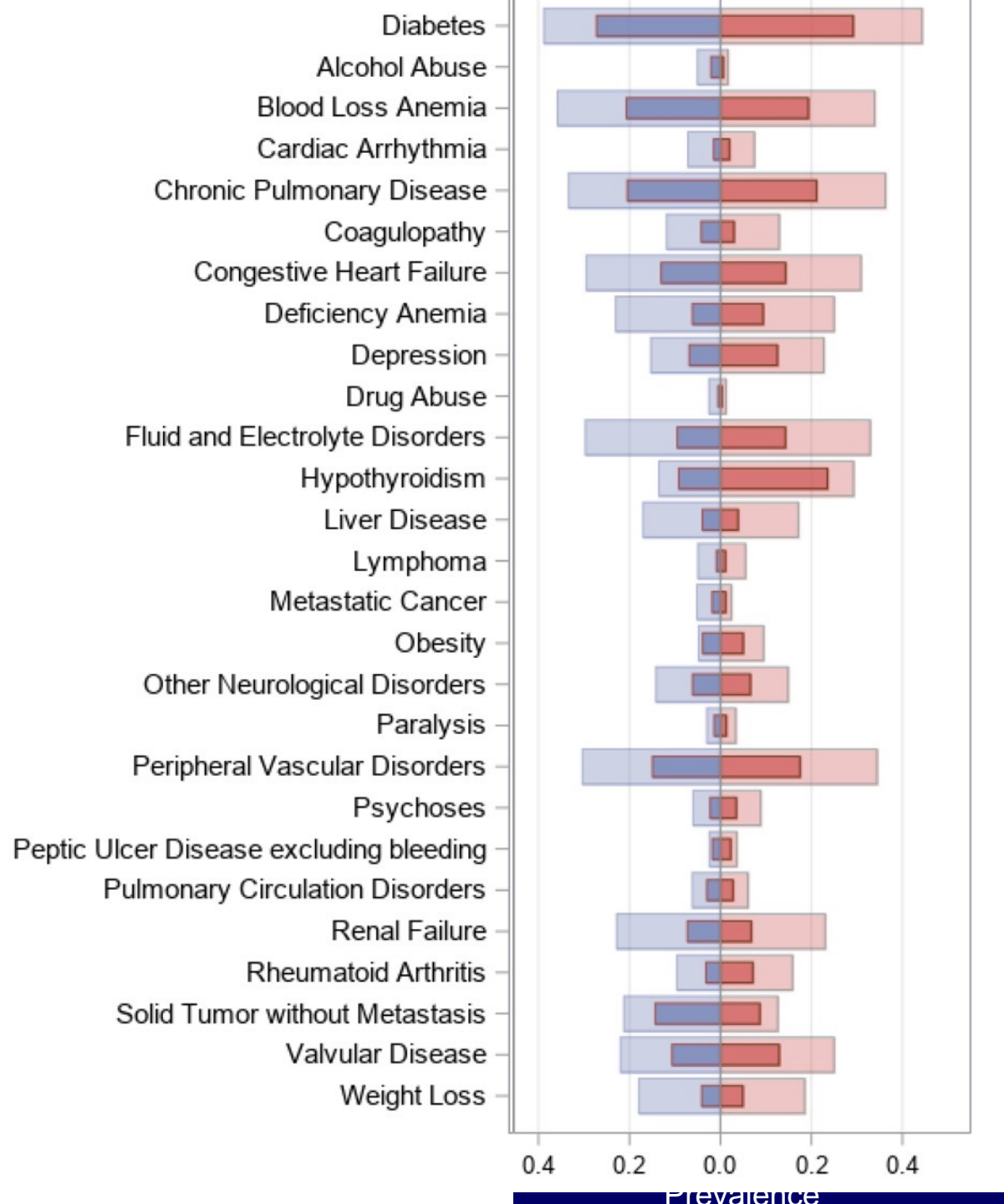
C.53

D.63

Aging & HIV: What do we know?

- People living with HIV are getting older
- Many aging-related diseases are more common in populations with HIV compared to populations without HIV

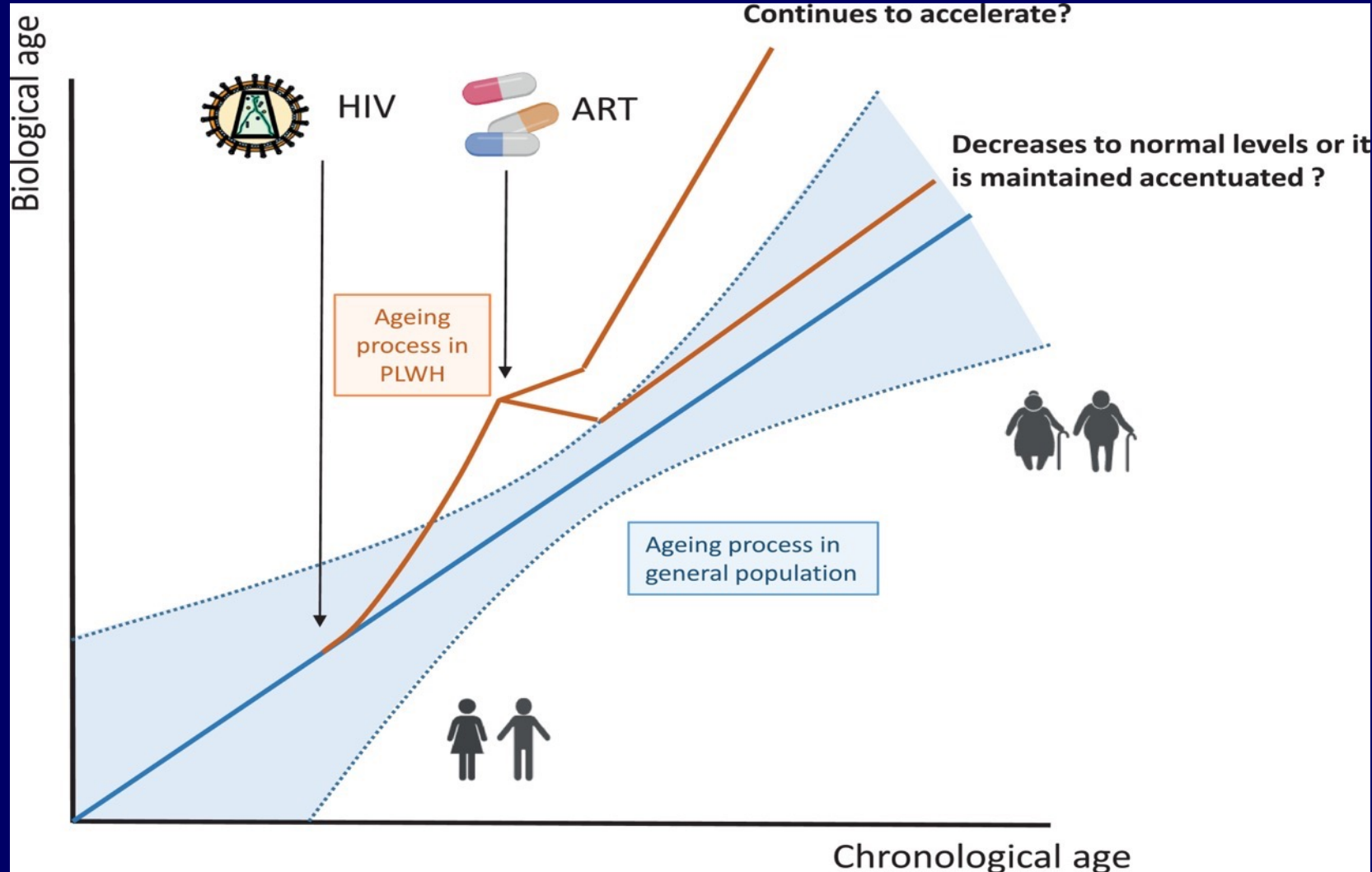
Prevalence of Essentially all Comorbidities is Greater among People with HIV compared to without HIV



■ Males with HIV ■ Males without HIV

■ Females with HIV ■ Females without HIV

Does HIV Accelerate Aging: Disconnect Between the Biologic and Chronologic Age



Driven by
inflammation, low
level viremia,
immune activation,
dysbiosis,
co-infection?

The Legacy Effects of HIV and Antiretroviral Therapy

Slide 11

Erlandson et al. AIDS 2016;
The Globe; Nature Reviews

- Profound immune suppression, high viral load
- ART toxicity
- Low-level inflammation
- Obesity



Will we see the same impact of HIV on aging in 10 years, or globally?

HIV Medications & Comorbidities

Current Effects

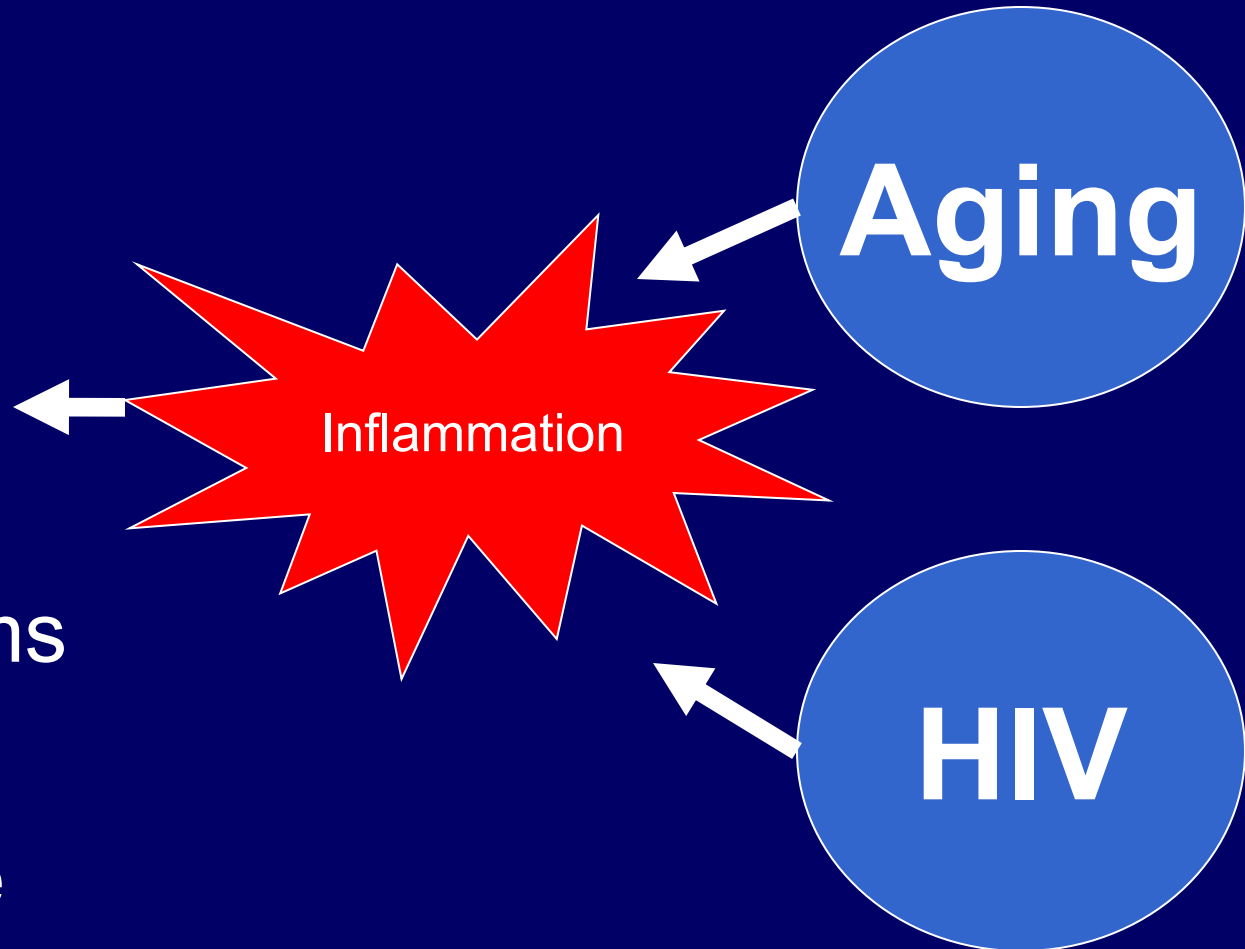
- TDF (eg Truvada, Atripla) → Bone and Kidney
- Protease Inhibitors → Cholesterol
- Integrase Inhibitors → weight gain, ? Diabetes, ? Heart disease

Legacy Effects

- Past use of stavudine (Zerit) can persist

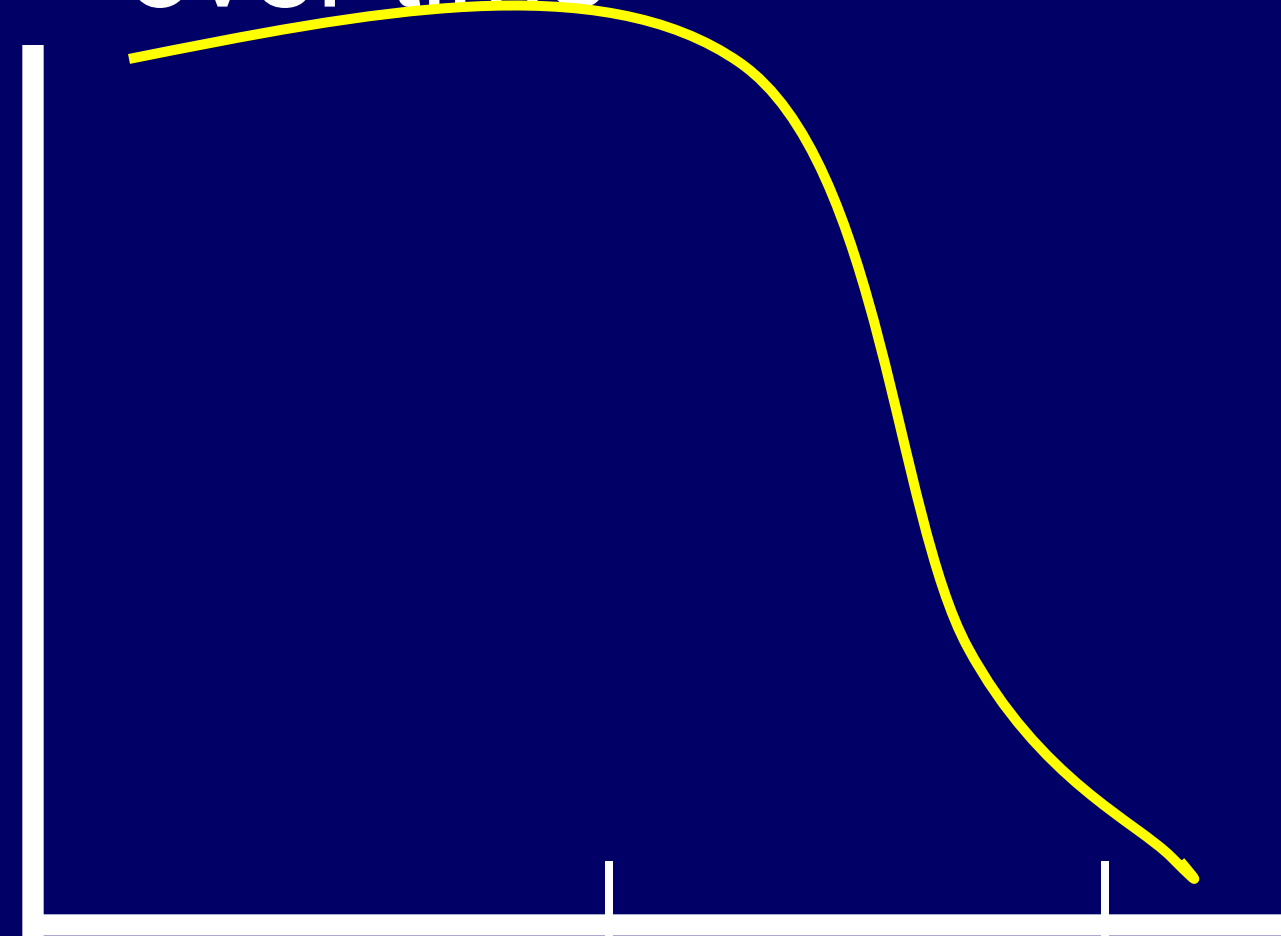
Aging and HIV: A Double Whammy of Inflammation

- Diabetes Mellitus
- Cardiovascular Disease
- Cancer
- Kidney Problems
- Cognitive Problems
- Osteoporosis
- Low Testosterone



Physical & cognitive function generally declines over time

Quality of Life/
Physical &
Cognitive
Function



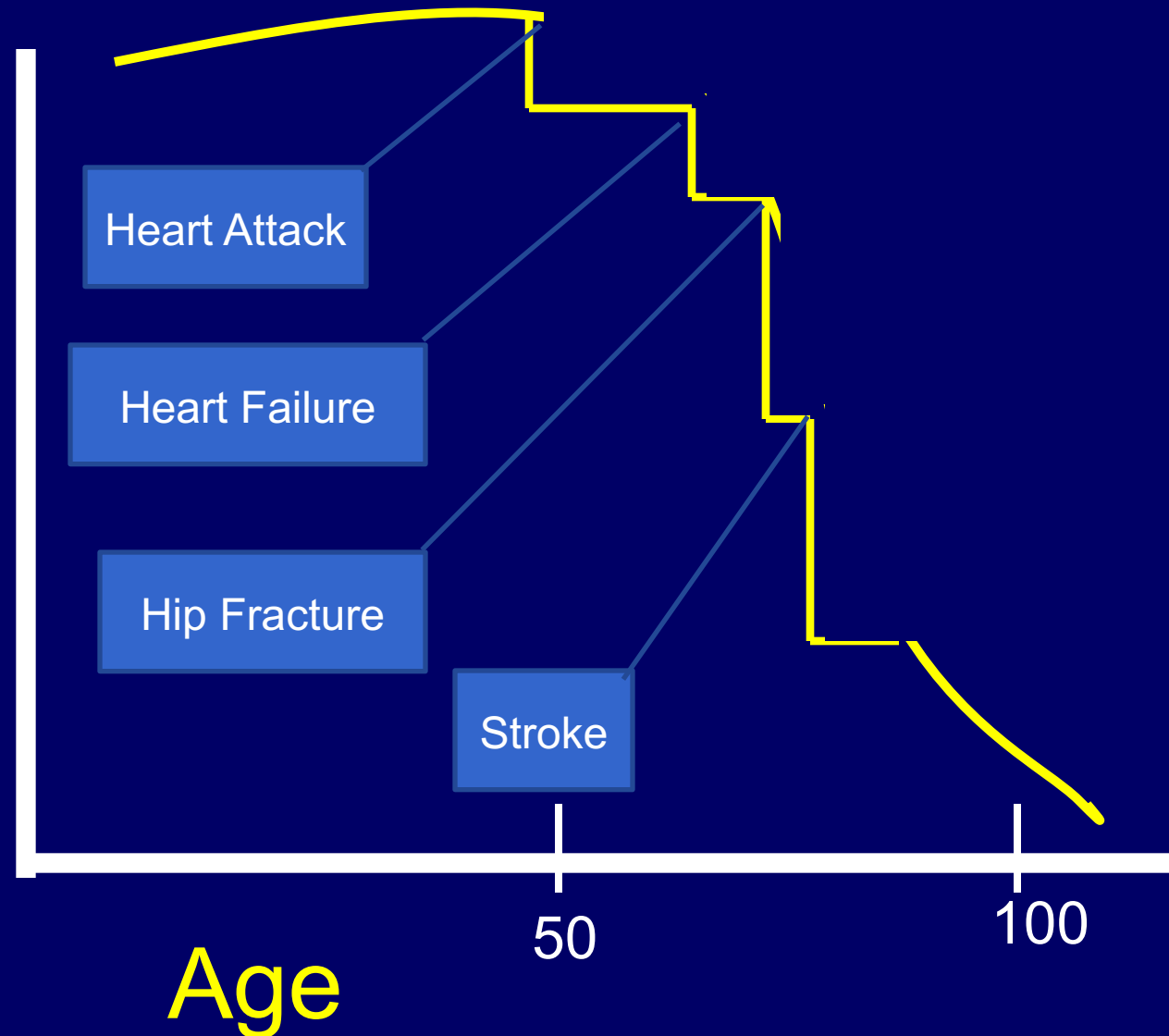
Age

50

100

Decline in Function May Not Be Gradual

Quality of Life/
Physical &
Cognitive
Function



Prevention of Comorbid Events is Essential and Achievable

- Good screening tests are available for comorbid conditions
- Many behavioral factors contribute to comorbid conditions and can be modified
- Early treatment is important
- Good treatments exist that can decrease the risk of events (cardiovascular disease, fracture)
- Preventing complications can alter the aging process

Following evidence-based guidelines is the
best place to start

Clinical Infectious Diseases

IDSA GUIDELINES



OXFORD

Primary Care Guidance for Providers Who Care for Persons With Human Immunodeficiency Virus: 2024 Update by the HIV Medicine Association of the Infectious Diseases Society of America

Michael Horberg,^{1,a} Melanie Thompson,^{2,a} Allison Agwu,³ Jonathan Colasanti,⁴ Marwan Haddad,⁵ Mamta Jain,⁶ Grace McComsey,⁷ Asa Radix,⁸ Natella Rakhmanina,⁹ William R. Short,¹⁰ Tulika Singh,¹¹ and Hansel Tookes¹²

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Implementation Science to Optimize HIV Prevention and Treatment

When beginning your next investigator-initiated application, consider the following NIH highlighted topic. The area of science described below is of interest to the listed NIH Institutes, Centers, and Offices (ICOs). This is not a notice of funding opportunity (NOFO).

Apply through an appropriate [NIH Parent Funding Announcement](#) or another broad NIH opportunity available on [Grants.gov](#). Learn how to interpret and use [Highlighted Topics](#).

Topic Description

Post Date: March 30, 2026

Implementation science (IS): study of methods to promote the adoption and integration of evidence-based practices and interventions into routine health care and public health settings to improve our impact on population health.

Comorbidities & HIV: Optimizing a Healthy Lifestyle

Condition	Goal	Clinical Screening
Tobacco	Smoking cessation	Every visit
Excessive Alcohol Use	Decrease alcohol intake	AUDIT*
Substance Use Disorders	Effective SUD treatment	Drug Abuse Screening Test
Sleep Disturbances	Adequate restorative sleep	On review of systems
Overweight/Obesity	Maintain healthy weight	Weight at every visit; Monitoring and counseling on diet and exercise

*Alcohol Use Disorders Identification Test

Get Screened

Slide 20

Condition	Test	Frequency
Diabetes	Fasting Glucose	Yearly
High Cholesterol	Lipid Panel	Yearly
High Blood Pressure	BP	At least yearly
Kidney Disease	Creatinine blood test, urine test for protein	Every 6-12 months
Osteoporosis	DXA Scan	Age 50+
Fatty Liver Disease	AST, ALT, Platelets	Yearly
Anal/Cervical Cancer	Pap test	Yearly
Liver cancer	Ultrasound (if HCV+, chronic HBV)	Every 6 months
Lung Cancer	CT (if a smoker)	
Breast Cancer	Mammogram	Yearly
Colon Cancer	Colonoscopy	Every 5 years
Prostate Cancer	PSA in those 50-69 y	

Get Screened. Get Treated: Four Common Comorbidities in HIV

- Osteoporosis
- Cardiovascular Disease
- Diabetes
- Metabolic Dysfunction Associated Fatty Liver Disease (MASLD)

How to prevent fractures

- Optimize a Healthy Lifestyle: Weight bearing exercise
- Get a DXA scan
 - Men with HIV > 50; Post-menopausal with HIV (earlier than general population)
- If indicated, get on osteoporosis medications
- Prevent falls
 - Most fractures happen when people fall
 - If at risk for falls, get physical therapy for strength and balance training
 - At risk for falls: previous falls, worried about falling, medications related to falls, nerve problems in feet

These Screenings are Under-Used in Many HIV Clinics: Ask your provider!

Open Forum Infectious Diseases

BRIEF REPORT

Bone Mineral Density Screening Among People With HIV: A Population-Based Analysis in the United States

Morgan Birabaharan,¹ David C. Kaelber,^{2,3} and Maile Y. Karris¹

¹Department of Infectious Diseases and Global Public Health, Department of Medicine, University of California, San Diego, La Jolla, California, USA, ²Departments of Internal Medicine, Pediatrics, and Population and Quantitative Health Sciences, School of Medicine, Case Western Reserve University, Cleveland, Ohio, USA, and ³Center for Clinical Informatics Research and Education, The MetroHealth System, Cleveland, Ohio, USA

HIV infection is associated with premature bone loss. The potential impact of recently updated osteoporosis screening guidelines is unknown. In a population-based cohort, we found low adherence and sex differences among eligible people with HIV.

AIDS RESEARCH AND HUMAN RETROVIRUSES
Volume 38, Number 3, 2022
© Mary Ann Liebert, Inc.
DOI: 10.1089/aid.2021.0095

Open camera or QR reader and
scan code to access this article
and other resources online.



Evaluation of Adherence to Guideline-Based Bone Mineral Density Screening in Veterans with HIV

Christie G. Turin,^{1,i} Naveed Khanjee,¹ Katharine Breau,^{1,2} Reina Armamento-Villareal,^{1,3}
Maria C. Rodriguez-Barradas,^{1,2} and Eva H. Clark^{1,4,5,ii}

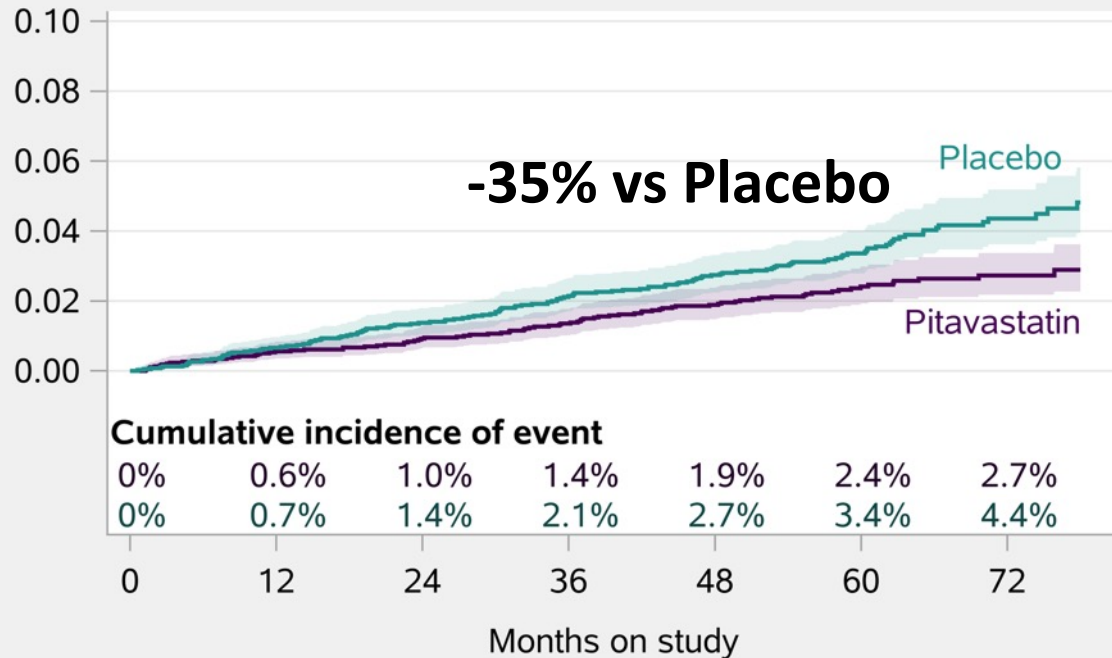
How to prevent cardiovascular events

Slide 24

- Optimize a Healthy Lifestyle
- Get screened for cardiovascular risk factors
 - Blood pressure
 - Lipid Panel
 - Blood Sugar
 - Kidney Function
- Know what your 10-year risk is for having a heart attack or stroke or heart failure
(<https://professional.heart.org/en/guidelines-and-statements/prevent-calculator>)
- Get on a statin if living with HIV and between 40-75 y

REPRIEVE: Statins prevent cardiovascular events in PWH with low/moderate CVD risk

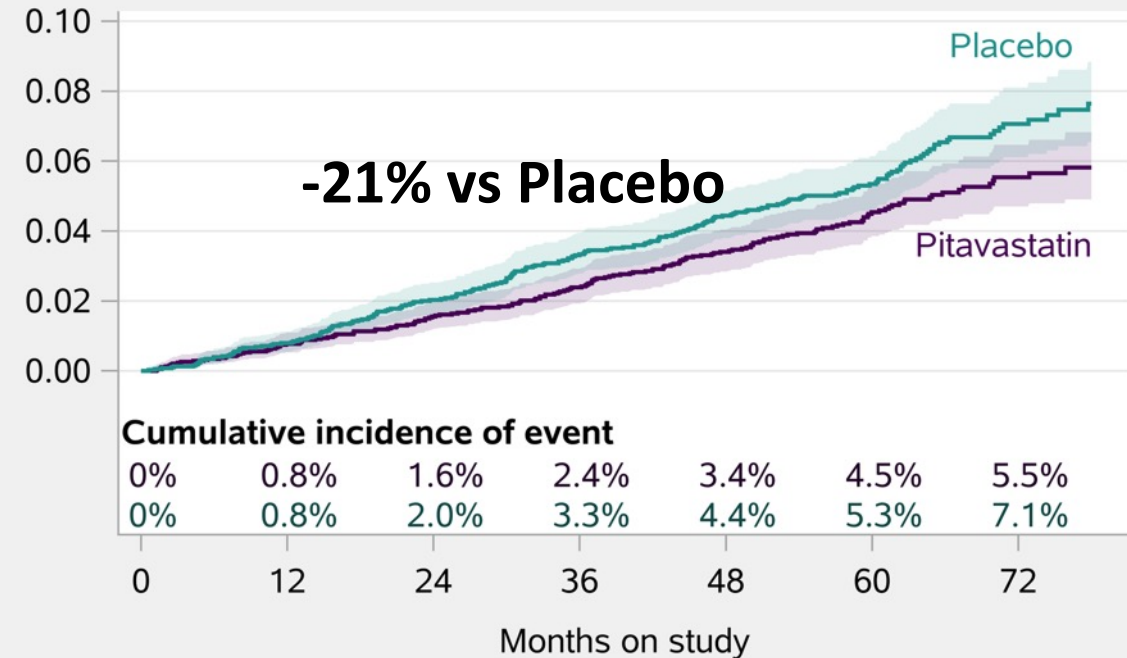
(a) First Primary MACE



Number at risk

	0	12	24	36	48	60	72
Pitavastatin	3888	3647	3475	3364	2997	1947	1052
Placebo	3881	3693	3506	3356	2997	2182	959

(b) First MACE or Death



Number at risk

	0	12	24	36	48	60	72
Pitavastatin	3888	3647	3475	3364	2998	1948	1027
Placebo	3881	3693	3506	3356	2997	1975	919

MACE: Major adverse cardiovascular event

2026 ACC/AHA Dyslipidemia Guidelines

Top Take-Home Messages

Early action. Better risk stratification. Clear LDL/non-HDL goals.

1



Start Earlier

- Begin health behavior counseling in youth.
- Consider pharmacotherapy for:
 - **Familial hypercholesterolemia**
- Young adults with **LDL-C ≥ 160 mg/dL**
- Strong family history of premature ASCVD
- Goal: Reduce lifetime exposure to atherogenic lipoproteins.

2



Use PREVENT Equations (Not PCE)

- Adopt **AHA PREVENT** for 10- and 30-year risk (ages 30–79).
- **CPR Model:** **C:** Calculate 10-year ASCVD risk
P: Personalize with additional risk factors
R: Reclassify with CAC selectively (if uncertain risk).

3



Primary Prevention Thresholds

- **Borderline risk** (3%–<5%): LDL-lowering therapy can be considered.
- **Intermediate risk** (5%–<10%): LDL-lowering therapy should be considered after discussion.

4



Targets Are Back: LDL-C and Non-HDL-C

- Use specific **LDL-C** and **non-HDL-C** treatment goals.
- Prioritize **% reduction in LDL-C** based on ASCVD risk.

6



Measure Lp(a) Once

- **Lp(a) ≥ 125 nmol/L (50 mg/dL):** $\sim 1.4\times$ ASCVD risk.
- **Lp(a) ≥ 250 nmol/L (100 mg/dL):** $\geq 2\times$ risk.
- Elevated Lp(a): Intensify LDL-C lowering and optimize risk factors.

7



CAC to Refine Risk and Goals

- CAC scoring refines risk and LDL/non-HDL goals.
- Indicated: **Men ≥ 40 yrs, women ≥ 45 yrs.**
- Use **absolute CAC** and **standardized percentile** (age, sex, race).

8



High-Risk Conditions: Treat Regardless of LDL-C (40–75 yrs)

- Recommend LDL-lowering for: **Diabetes, CKD stage 3–4, HIV**
- After >75 yrs: Consider pharmacotherapy with lifestyle changes.

9



Secondary Prevention Targets

- **Very high risk ASCVD:** **LDL-C < 55 mg/dL (1.4 mmol/L), non-HDL-C < 85 mg/dL (2.2 mmol/L).**
- Most with ASCVD: aim for **LDL-C < 55 mg/dL**; others at least **< 70 mg/dL.**

10



Triglycerides Management

- **Statins:** Foundation for ASCVD risk with high TG.
- **TG ≥ 1000 mg/dL (11.3 mmol/L):** Add TG-lowering therapy for pancreatitis prevention.
- Lifestyle interventions at all times.

How to prevent and optimally treat diabetes

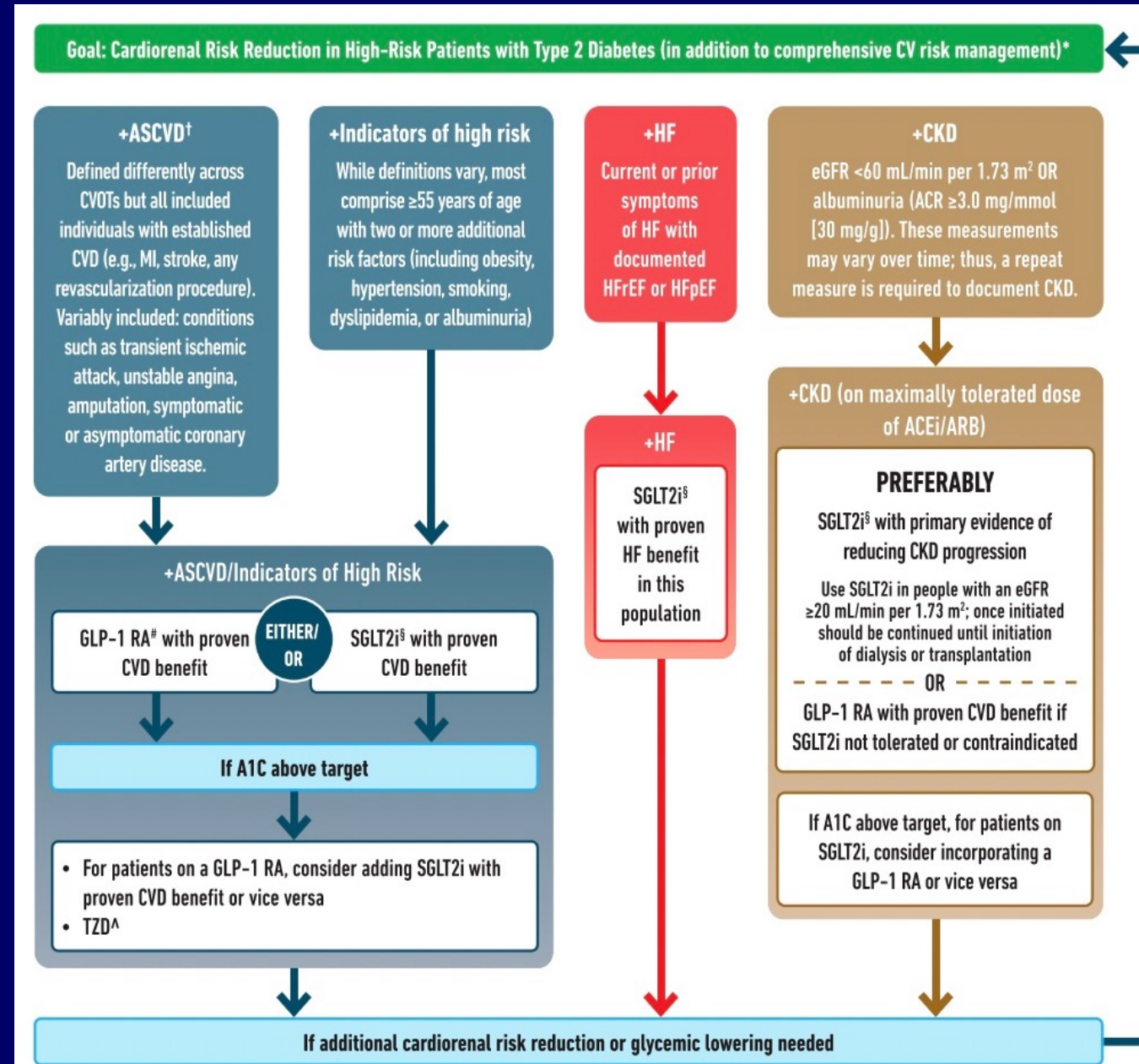
- Optimize a Healthy Lifestyle: Weight loss is key
- If you don't have diabetes, get screened with a fasting glucose yearly
- If you do have diabetes,
 - Keep blood sugars under control (Know your A1c!)
 - Get on diabetes medications that prevent comorbid events
 - Get screened for kidney disease, eye disease, neuropathy
 - Manage cardiovascular risk factors

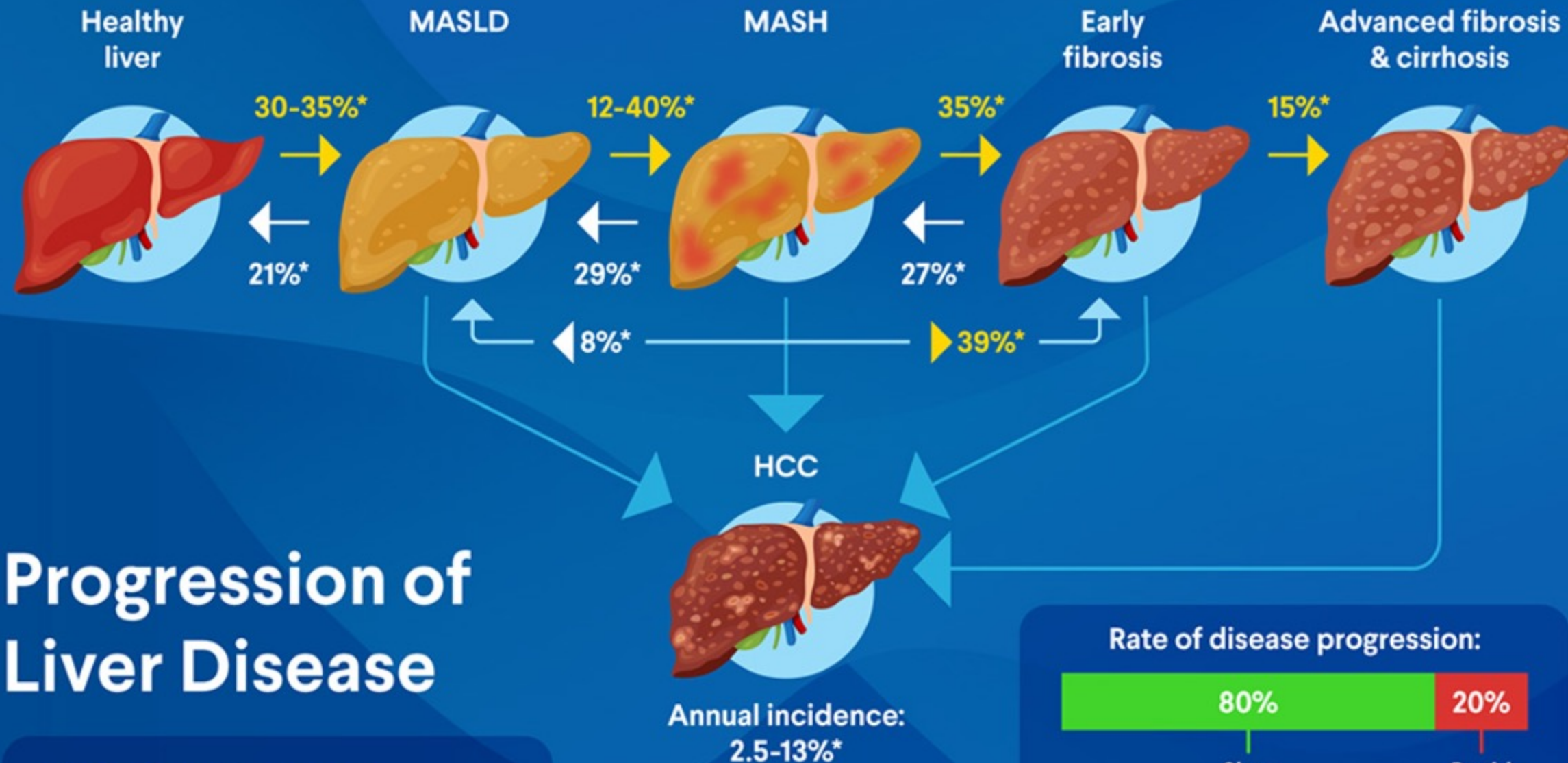
What's first line therapy for DM?

It depends...

- High risk of heart attack/stroke → GLP-1 RA
- Heart failure → SGLT2i (GLP1 RA)
- Kidney disease → SGLT2i (GLP1 RA)

ADA, Standard of Medical Care in Diabetes, 2026





Progression of Liver Disease

Yellow % = Chance disease worsens

White % = Chance disease improves with treatment

Screening for Metabolic Dysfunction Associated Liver Disease

Slide 30

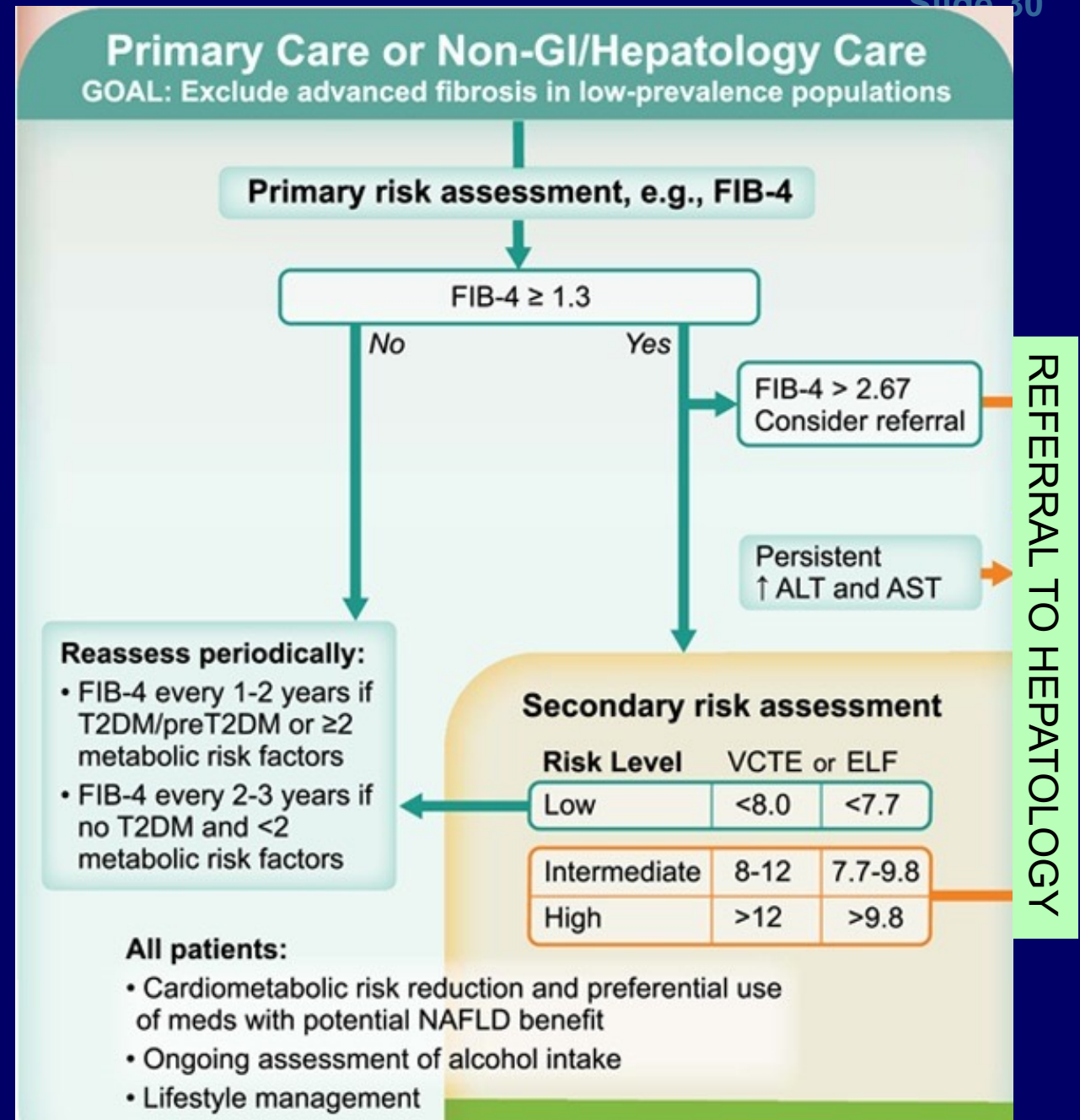
- FIB-4

- Age
- AST
- ALT
- Platelets

$$\text{FIB-4} = \frac{\text{Age (years)} \times \text{AST (U/L)}}{\text{Platelets (10}^9\text{/L)} \times \sqrt{\text{ALT (U/L)}}}$$

- Second screen:

- Vibration controlled transient elastography (eg FibroScan)
- Measure of liver stiffness



Comorbidities & HIV: Other Critical Screenings

Condition	Goal	Clinical Screening
Dental/Gum Disease	Healthy oral hygiene	Yearly
Depression	Behavioral/pharmacologic intervention +/- referral	Yearly (PHQ-2 or PHQ-9)
Anxiety	Behavioral/pharmacologic intervention +/- referral	Yearly (GAD-2)

Comorbidities & HIV: Frailty and Cognitive Problems

Condition	Goal	Clinical Screening
Frailty	* Prevention Physical activity/ Nutrition/ Geriatrics Referral	Consider yearly in 50+ y; Frailty phenotype/Frailty Index
Cognitive Problems	* Prevention -Referral to Neurology/ Memory Clinic if progressive, interfering with daily function, personality changes, other neuro	No specific screening recommendations on Primary Care guidelines for PWH

Frailty is All the Rage!

ARTICLE | Healthy Aging

Why is everyone talking about frailty?

- HIV infection is associated with immunologic aging and systemic inflammation, which may contribute to the development of comorbidities across multiple organ systems as well as aging phenotypes like frailty. HIV experts, primary care providers, and other specialists should work together to optimize the medical care of older people with HIV, including adhering to treatment and prevention guidelines for different medical comorbidities.

- Annual screening for frailty should be considered in people with HIV aged >50 years; the frailty phenotype screen is the most commonly used tool.

Dept Health Human Services Guidelines for ART now mention frailty
IDSA Primary Care Guidelines suggest annual screening for frailty

WHY Should We Measure Frailty?

Frailty is associated with:

- Increased falls, fractures, lower quality of life, loneliness, dementia, disability, nursing home placement
- Increased health-care costs

Frailty can help us deliver patient-centered care

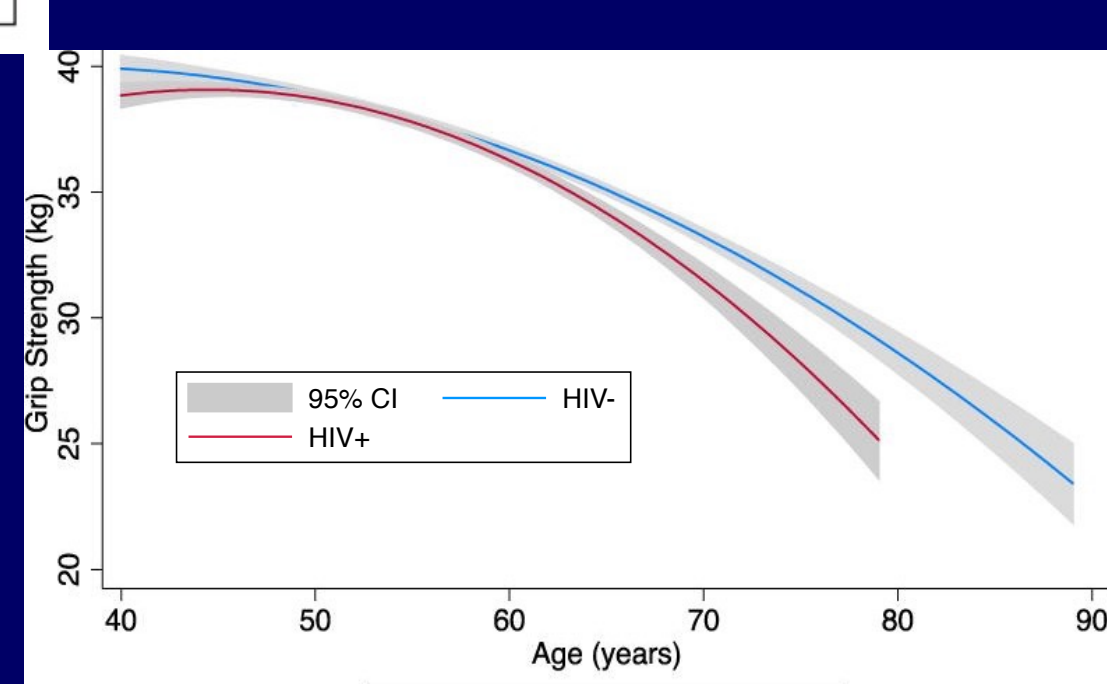
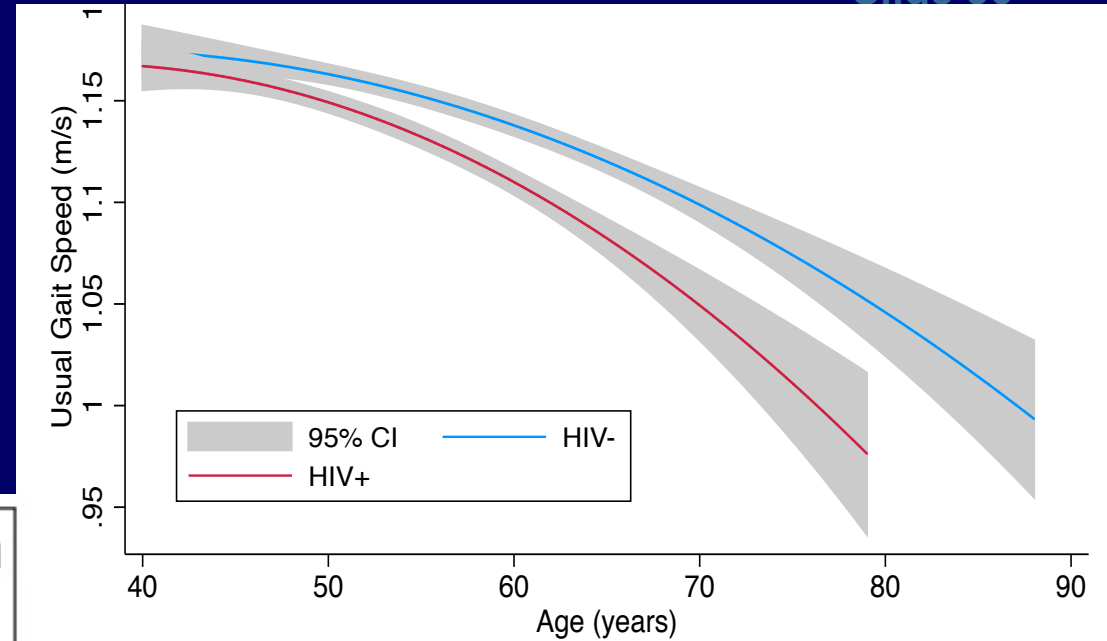
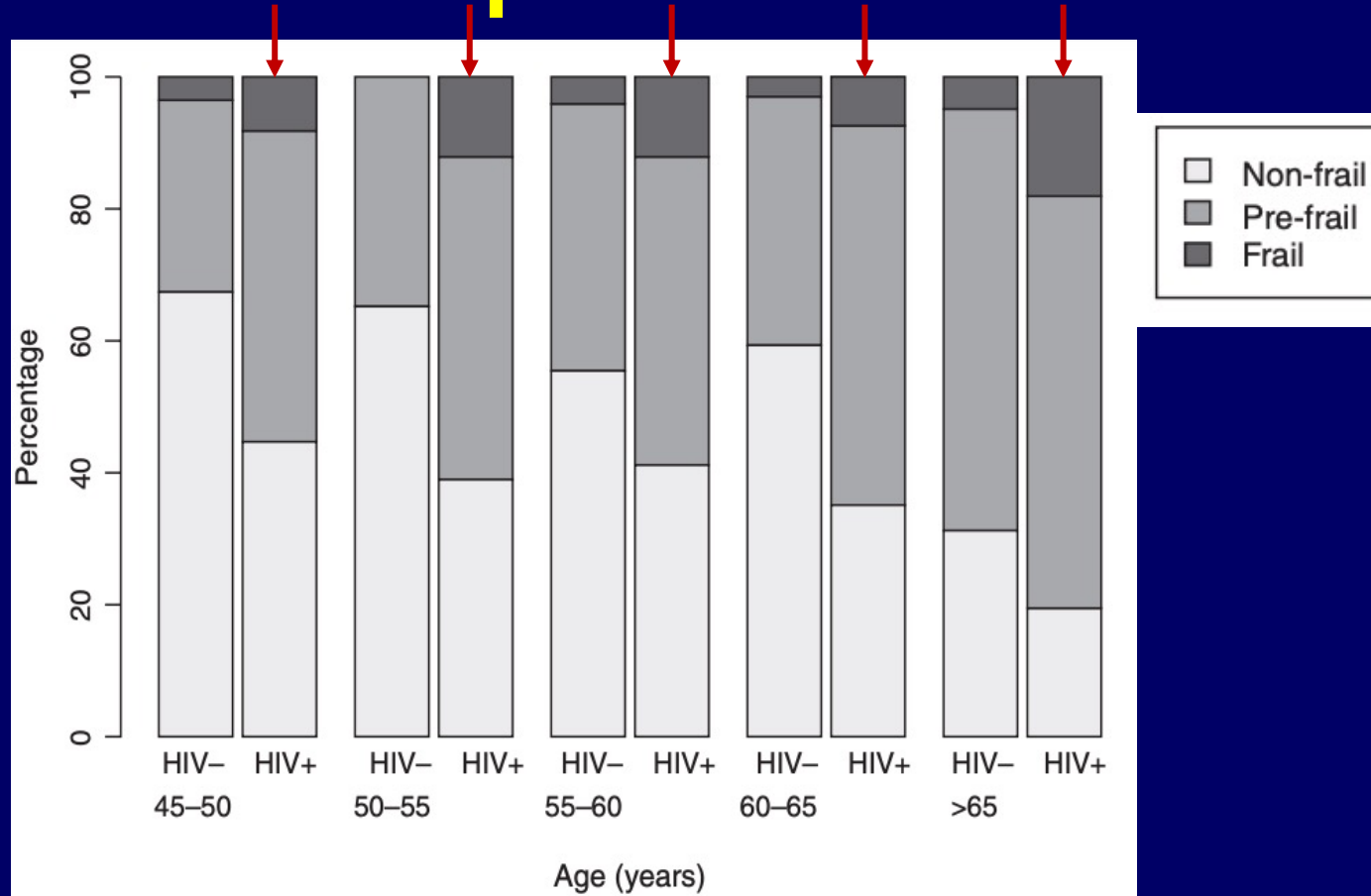
What is Frailty?

- *Frailty* = “the condition of being weak and delicate”
- Vulnerable to stressors



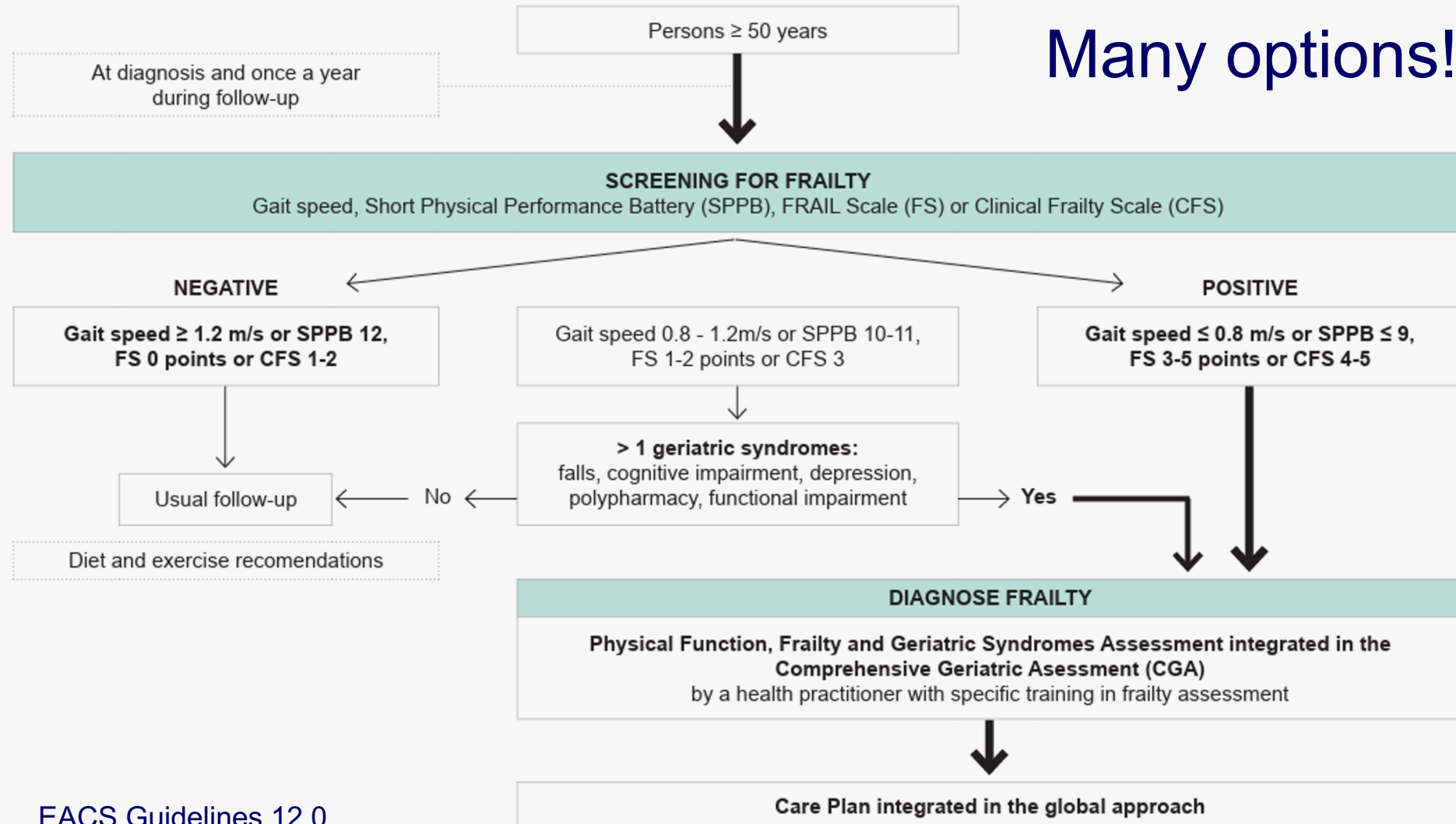
- Phenotype:
 - Weakness
 - Slowness
 - Weight loss
 - Fatigue
 - Low activity
- Index:
 - Greater number of comorbidities

Physical Function Impairment and Frailty Occur more Commonly among People with HIV

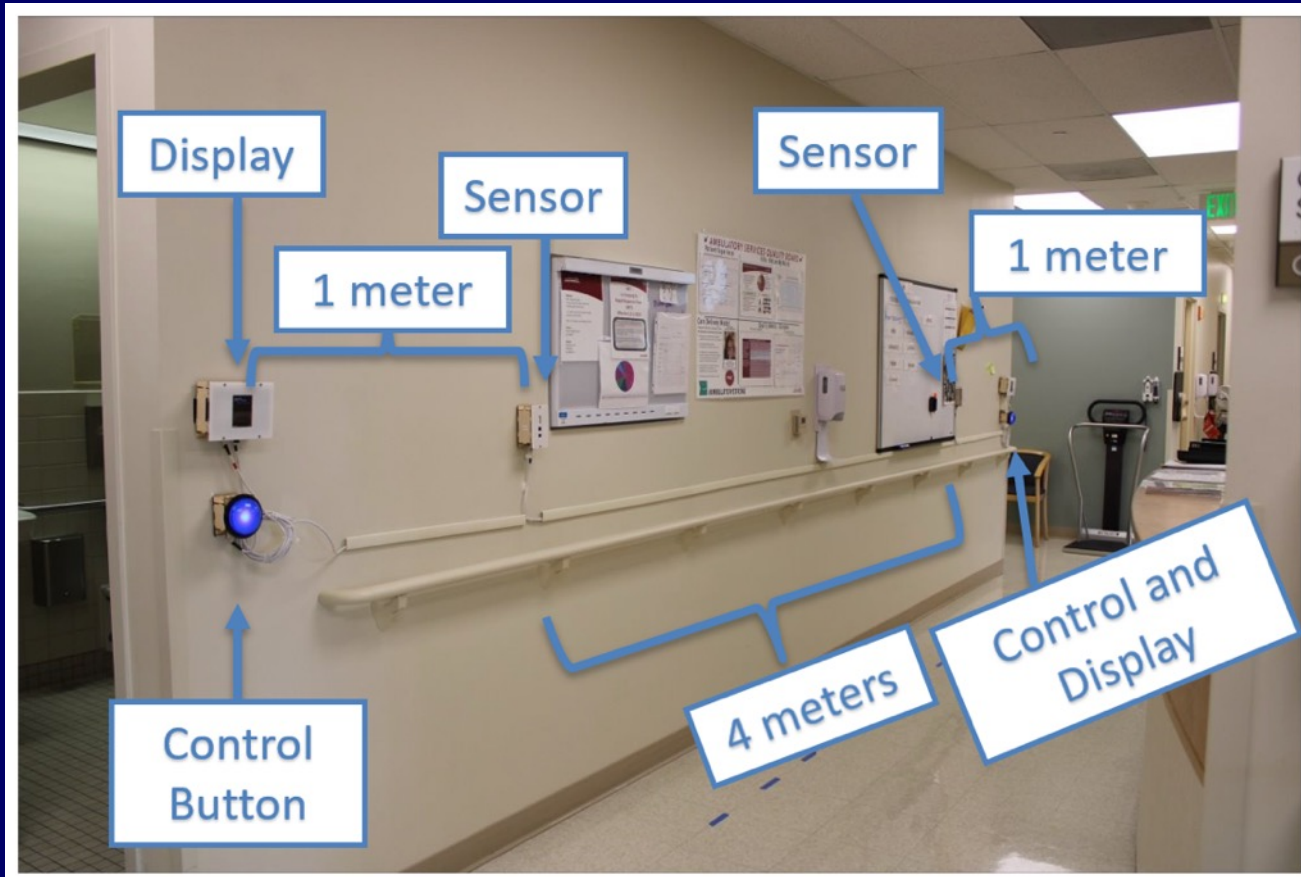


How Should We Screen for Frailty?

Algorithm Recommended for Frailty Screening



What might be feasible in a busy HIV clinic?



GaitRate Gait Speed Assessment (<1 min)

“Walking Speed: the Sixth Vital Sign”

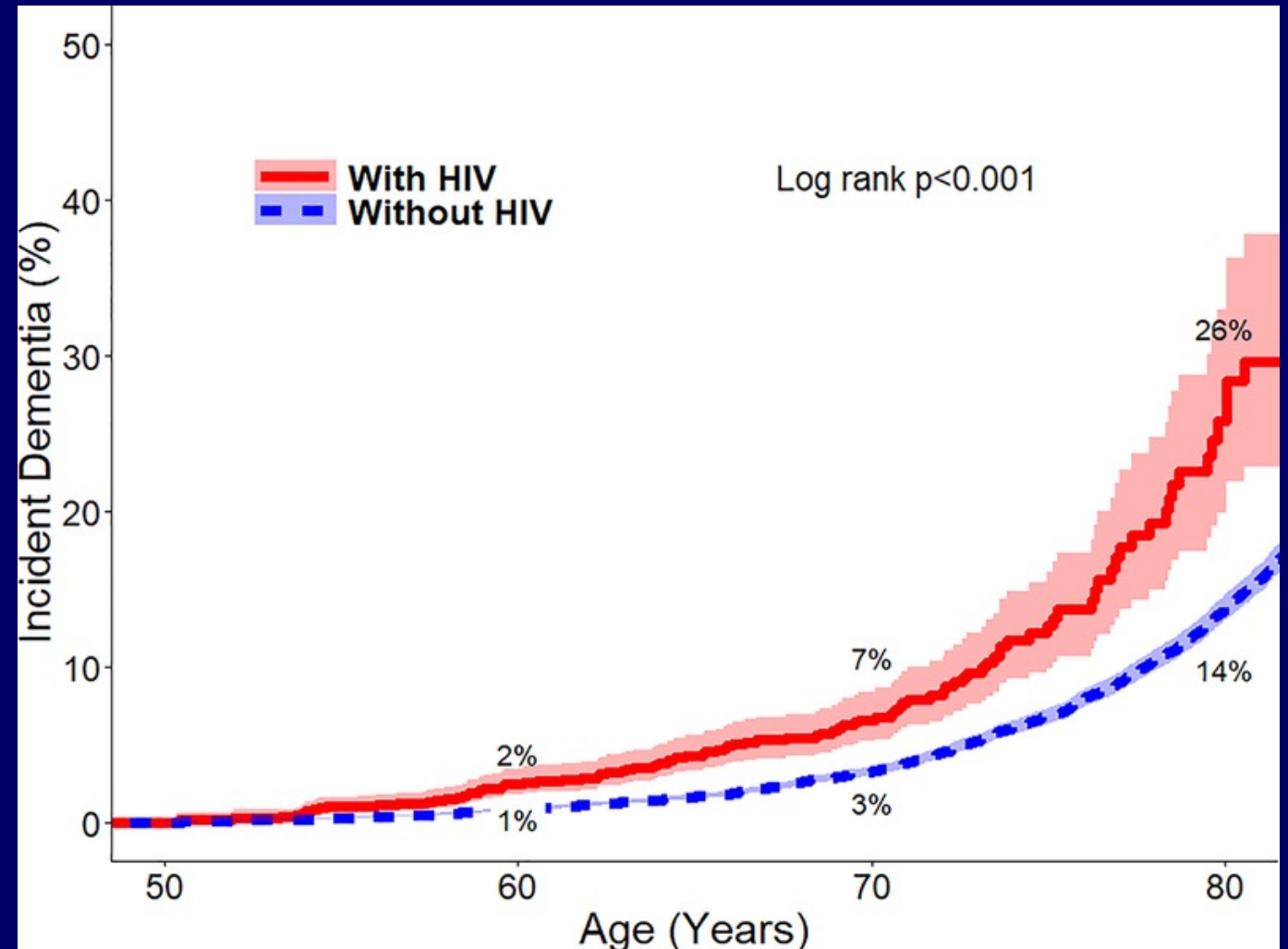
Stacy Fritz, PT, PhD;¹ Michelle Lusardi, PT, PhD²

5/6/2025 10:00 AM	
AMB - REVIEW FLOWSHEET - 4 METER WALK	
4 meter walk time (seconds)	6.8 Seconds
4 meter walk MPS	0.59 m/s ▼
Assisted Devices	None
Patient felt unsafe while walking?	No

	4/1/2025 10:00 AM	3/24/2025 10:00 AM	3/4/2025 10:00 AM	2/4/2025 11:00 AM
AMB - REVIEW FLOWSHEET - 4 METER WALK				
4 meter walk time (seconds)		3.53 Seconds	4.04 Seconds	3.94 Seconds
4 meter walk MPS		1.13 m/s	0.99 m/s	1.02 m/s

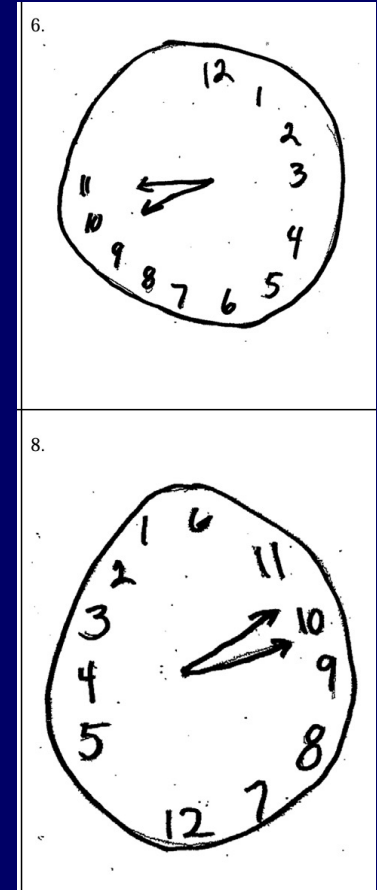
Increasing Concerns for Cognitive Impairments with Aging in PWH

- 5381 people with and 119,022 without HIV in Kaiser
- 58% higher risk for dementia (by diagnosis code) in PWH, after adjusting for additional risk factors



How Should We Screen for Cognitive Impairments?

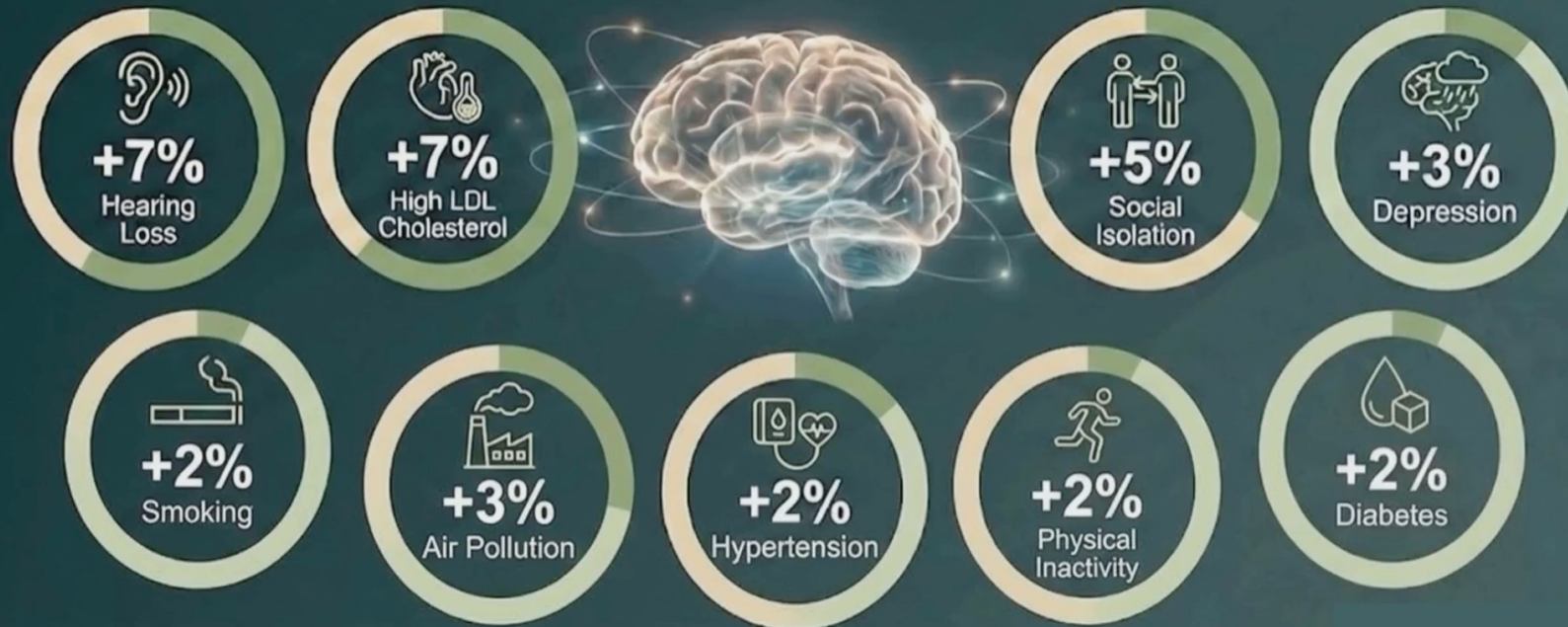
- For providers: Ask!
 - EACS 2025 Guidelines:
 - 1) Problems with memory loss?
 - 2) Slower with reasoning/planning?
 - 3) Difficulties paying attention?
 - Mini-cog (3-word recall and clock draw)
- For patients: Tell!
 - Nearly 80% of patients don't tell providers about symptoms



Prevention is Essential for both Frailty and Cognitive Impairment....

Up to 45% of Dementia Risk Factors are Potentially Modifiable

Examples include:



Livingston *Lancet* 2024; Mukadam N, et al. Effective interventions for potentially modifiable risk factors for late-onset dementia: a costs and cost-effectiveness modelling study. *Lancet Healthy Longev* 2020



Can prevent nearly half of dementia if we intervene early on modifiable factors

Very Similar Guidelines for Frailty

	Fit	Prefrailty	Frailty
Lifestyle	Exercise and physical activity High-quality diet Social engagement	Exercise and physical activity High-quality diet (protein intake) Social engagement	Less intense exercise may be better tolerated High-quality diet (protein intake) Social engagement
Disease Management	Apply disease-based guidelines	Apply disease-based guidelines	Consider trade-off between disease and treatment burden
Preventive Care	Vaccination Cancer screening	Vaccination Cancer screening	Vaccination Individualize cancer screening (time to benefit vs. remaining life expectancy)
Interventions for Frailty		Treat reversible causes of frailty Exercise and physical activity Nutritional counseling and supplementation CGA and multidisciplinary intervention Comprehensive medication review	Treat reversible causes of frailty Rehabilitation (PT and OT) Nutritional counseling and supplementation CGA and multidisciplinary intervention Comprehensive medication review

What is not on this list?

START XX medication!

The Five Pillars of Healthy Aging

Learning and practicing these pillars can help you live your best mountain lifestyle.



Physical Activity

Regular exercise. Even moderate activity has major benefits.



Healthy Diet

Fresh produce, whole grains, lean proteins, healthy fats. Adequate hydration.



Quality Sleep

7-9 hours daily. Consistent routine.



Brain Stimulation

Read, learn, and practice new and lifelong skills.



Relationships/ Purpose

Connect with others, stay engaged, find a purpose.

<https://www.aspenhospital.org/healthy-journey/living-well-at-altitude-the-five-pillars-of-healthy-aging/>

IS SITTING

There's no running away from it:
The more you sit, the poorer your
health and the earlier you may die,

no matter how fit you are



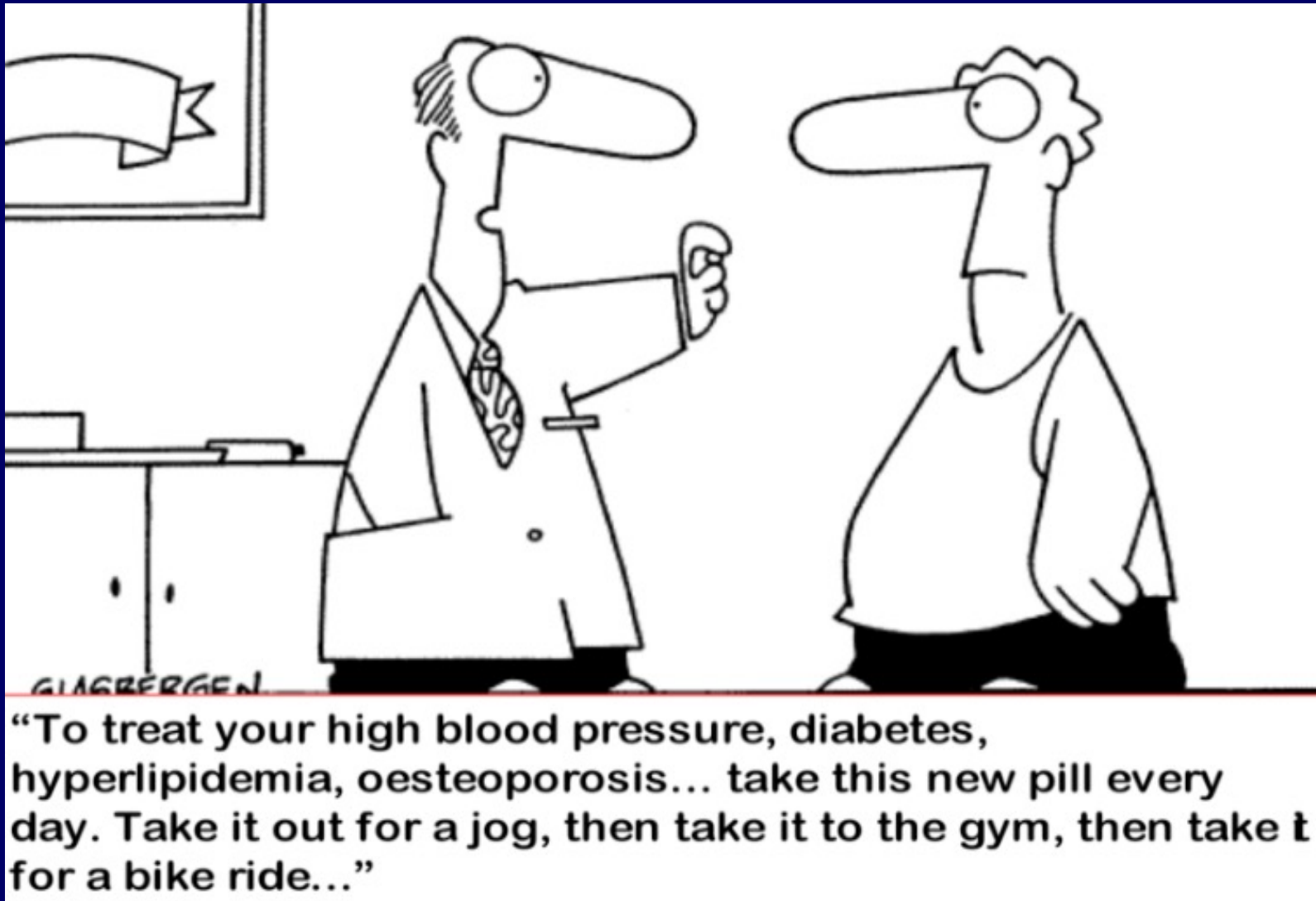
THE NEW SMOKING

?

BY SELENE YEAGER

PHOTOGRAPHS BY Nick Ferrari





Regular **physical activity** can prevent/slow decline.
Exercise is the most consistent intervention to successfully improve function and decrease frailty.

The only prescription with unlimited refills.

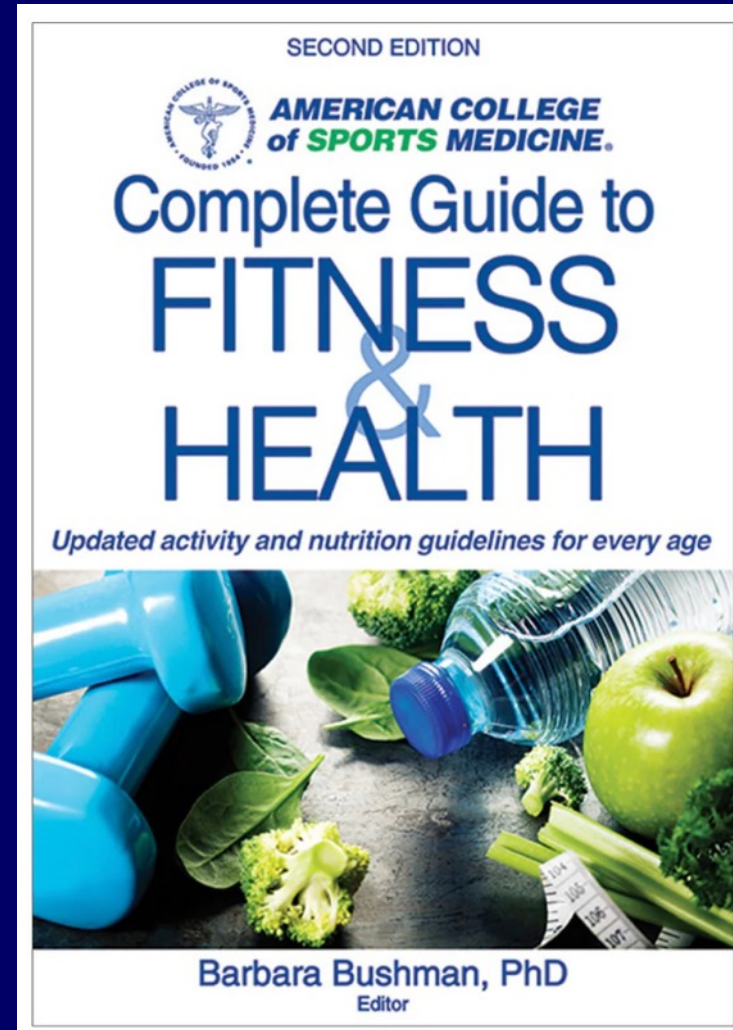


The Miracle Drug: Exercise is Medicine®

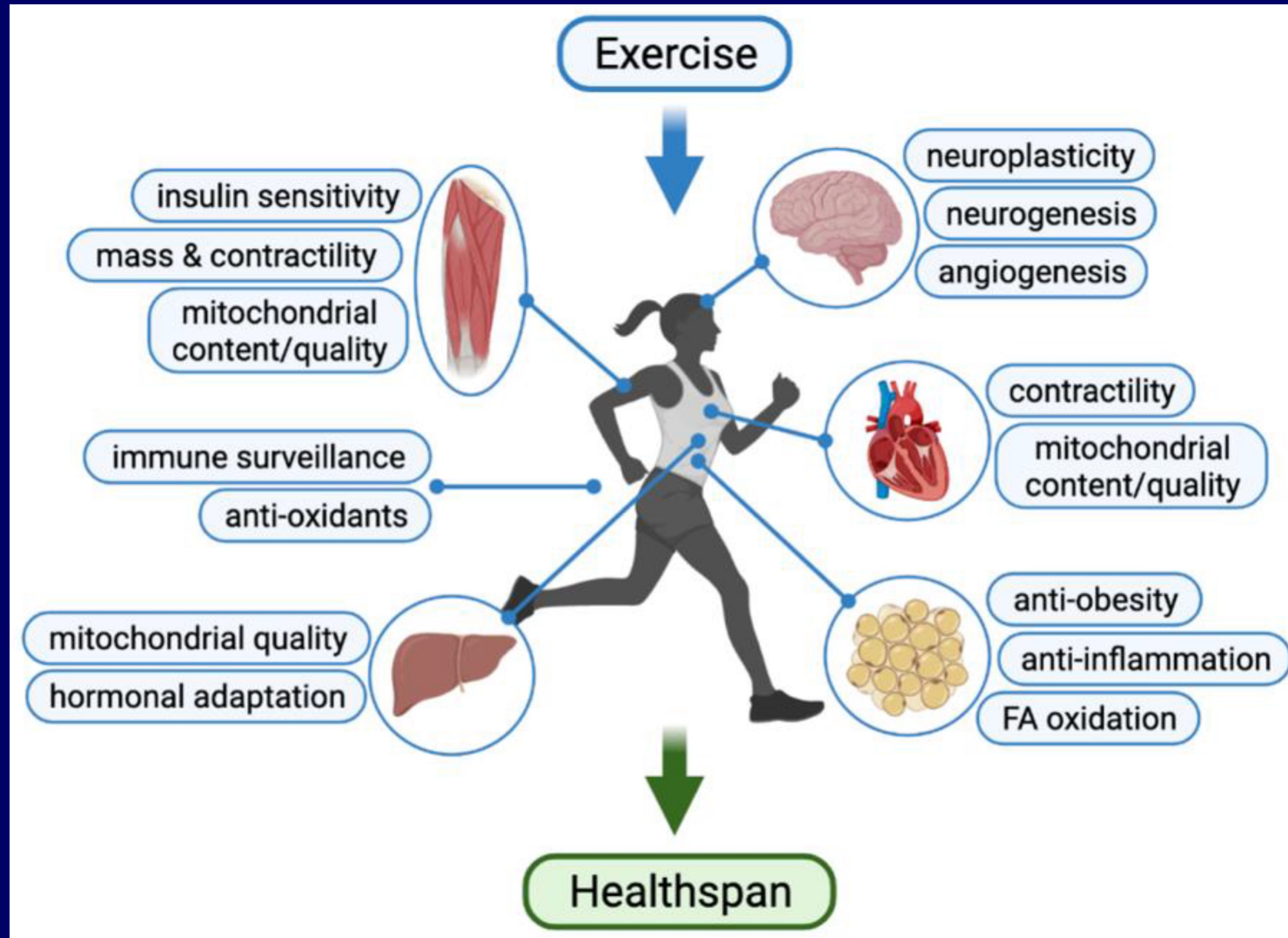
Exercise
is Medicine®

AMERICAN COLLEGE
of SPORTS MEDICINE®

Slide 46



Multi-System Benefits of Exercise



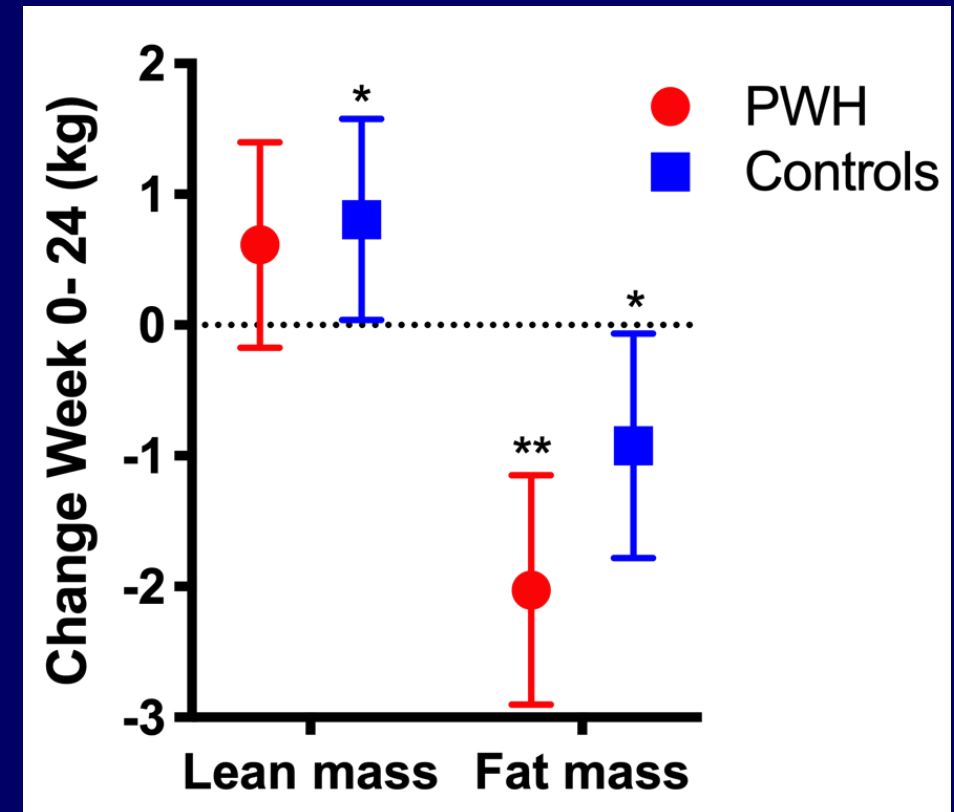
People with HIV have *Similar or Greater* Improvements in Function with Exercise

70 people with and without HIV, ≥ 50 years

- 24 weeks mod to high intensity exercise (resistance + cardio)
- Between a 10-45% improvement in both groups
 - People with HIV experienced greater gains in 400-m walk time, stair climb, endurance

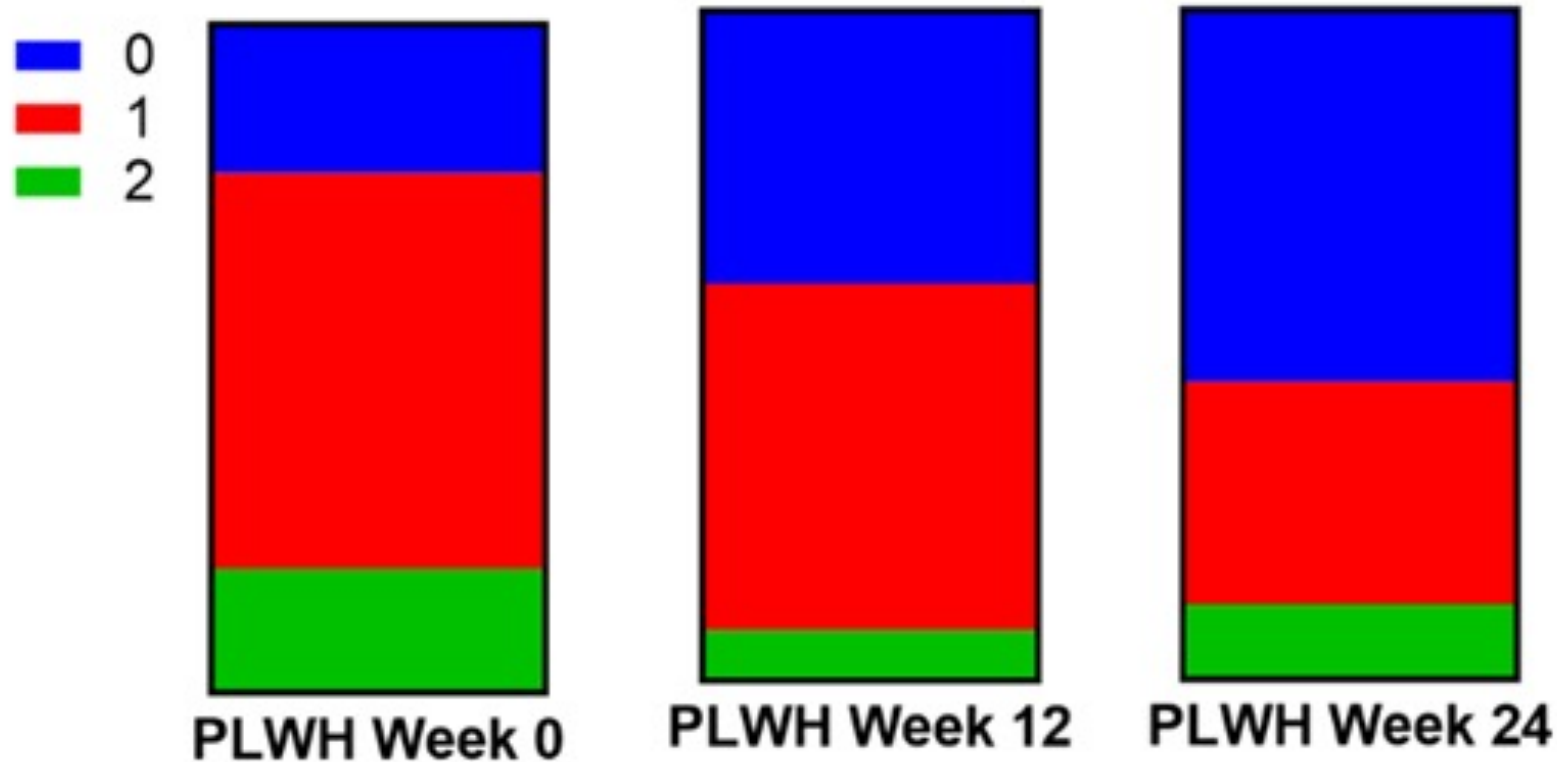
Erlandson, et al. AIDS 2018

Improved Lean (Muscle) Mass and Decreased Fat Mass

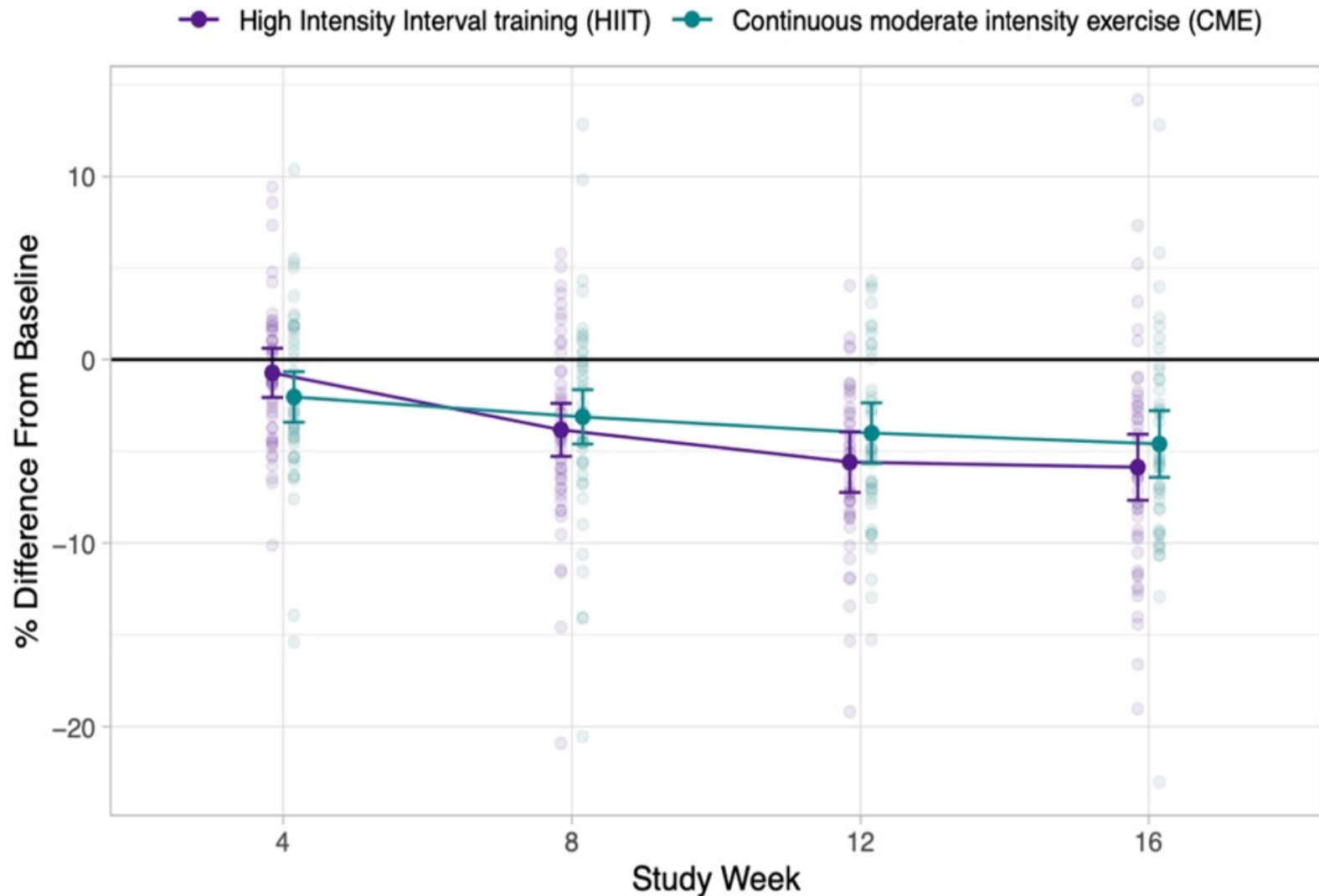


Jankowski, et al. JAIDS 2020

Frailty Components at Baseline and After 12 and 24 Weeks of Exercise



Physical Function Improves with Physical Activity, Regardless of Intensity



Physical Function Improves with Physical Activity, Regardless of Intensity

Model	Intensity	% Change Estimate [95%CI]	Between-Group Difference (%- points; CME-HIIT)
chair rise 10x	HIIT	-19.3 [-23.8, -14.8]*	4.1 [-2.4, 10.6]
	CME	-15.2 [-19.9, -10.5]*	
leg press 1-RM	HIIT	26.1 [18.5, 33.6]*	-5.9 [-16.5, 4.8]
	CME	20.2 [12.7, 27.7]*	
lateral pull down 1-RM	HIIT	25.4 [20.8, 30]*	-1.3 [-7.9, 5.4]
	CME	24.1 [19.4, 28.9]*	
bench press 1-RM	HIIT	29.8 [23.9, 35.8]*	-2.1 [-10.6, 6.3]
	CME	27.7 [21.7, 33.7]*	

Slightly greater improvements in all strength measures with HIIT vs CME

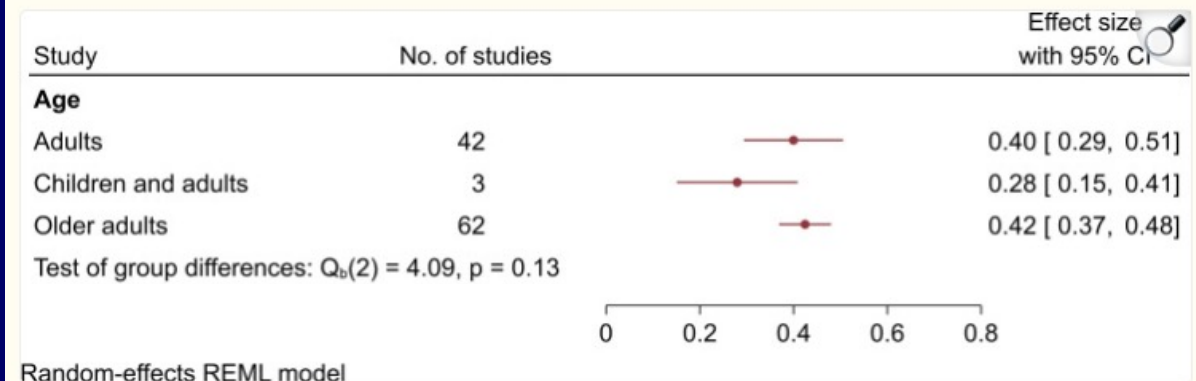
What other Benefits Are Achieved with Exercise?

- “And the thing about exercise is as soon as you start doing it, **you start feeling good**”
- “In a very short period of time ...your mood changes and you start to feel like, my god, **I'm happier than I was.**”
- “And then when I started exercising, I learned to...use the exercise to help build inner core to bring the pain down to a minimum”.
- “I feel empowered when I'm here. **I think it pulled me out of always wanting to be alone.**”

Consistent Benefits of Exercise on Cognition

- “Meta meta-analysis” of 2724 RCTS and ~260,000 participants
- Benefits for cognition, memory, executive function
- Benefits seen for many types of exercise, including exergaming and Tai Chi (dual-task activities)

Figure 2. Subgroup analyses for age and population for general cognition. REML, restricted maximum likelihood.

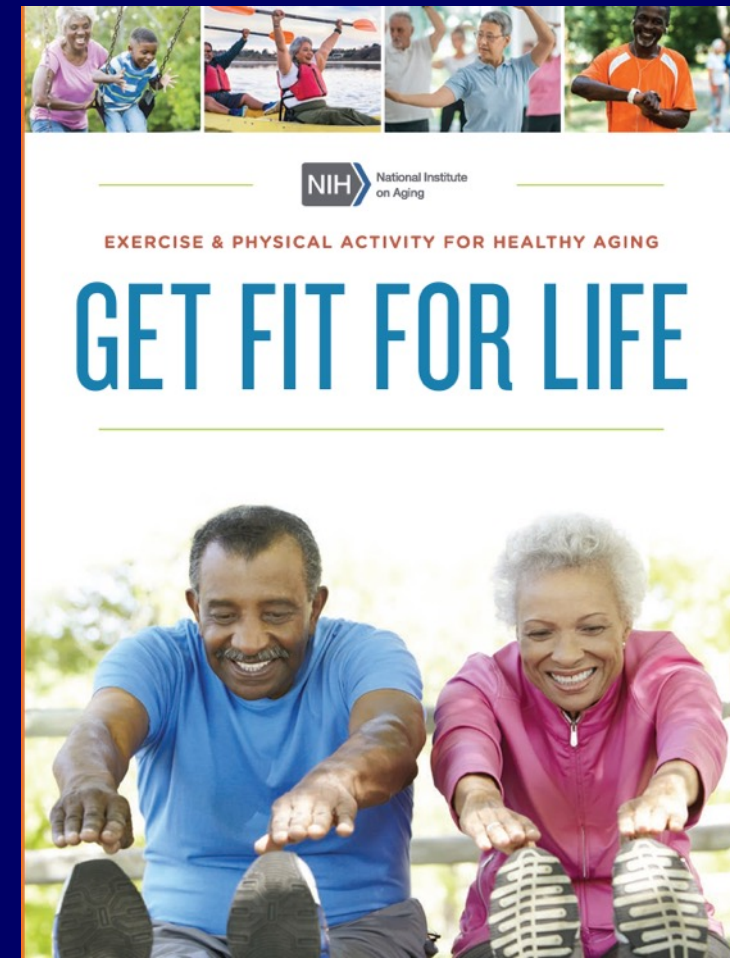


Aerobic Exercise

- At least 150 min/week of moderate (or 75 min of more vigorous) activity
 - Raise heart rate so that you feel short of breath but can still converse
- NIA “Get Fit for Life”: example exercises, tracking logs, tips (124 color page booklet)

<https://order.nia.nih.gov/publication/get-fit-for-life-exercise-physical-activity-for-healthy-aging>

YouTube: Go4Life Fitness Classes, Silver Sneakers



Muscle : A Major Component of Frailty

- Muscle mass declines $\sim 3\%$ per decade starting at age 30
- Strength declines 30% between the ages 50-70
- In the general population:
 - 40% of females 55 to 64 years of age and 65% between 75-84 *cannot lift 10 pounds*

What is 10 pounds?



Strength Training



- ~60% of adults do NO strength training
- *Any* strength training
 - Decreases CV mortality by 19%
 - Decreases blood pressure, stroke, and heart attack risk
 - Improves insulin sensitivity → decreases diabetes risk
 - Improves brain health
 - Decreases all-cause mortality up to 27%!

AHA SCIENTIFIC STATEMENT

Resistance Exercise Training in Individuals With and Without Cardiovascular Disease: 2023 Update: A Scientific Statement From the American Heart Association

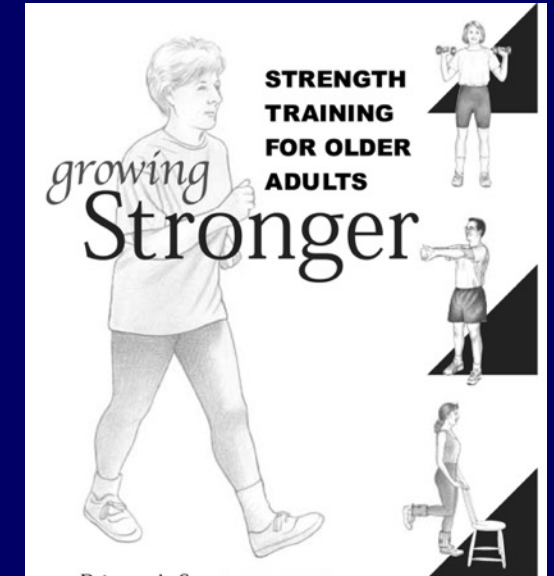
Amanda E. Paluch, PhD, FAHA, Chair; William R. Boyer, PhD; Barry A. Franklin, PhD, FAHA; Deepika Laddu, PhD, FAHA; Felipe Lobelo, MD, PhD, FAHA; Duck-chul Lee, PhD; Mary M. McDermott, MD, FAHA; Damon L. Swift, PhD, FAHA; Allison R. Webel, RN, PhD; Abbi Lane, PhD, FAHA, Vice Chair; on behalf the American Heart Association Council on Lifestyle and Cardiometabolic Health; Council on Arteriosclerosis, Thrombosis and Vascular Biology; Council on Clinical Cardiology; Council on Cardiovascular and Stroke Nursing; Council on Epidemiology and Prevention; and Council on Peripheral Vascular Disease

- *“Resistance training not only can improve or maintain muscle mass and strength, but also has favorable physiological and clinical effects on cardiovascular disease and risk factors.”*

Strength Training



- Strength (2-3 days/week)
- CDC “Strength Training for Older Adults”
 - https://www.cdc.gov/physicalactivity/downloads/growing_stronger.pdf
 - Pictures of exercise, logs, recommendations on how to safely increase resistance exercise
- Resistance bands can provide inexpensive, space-limiting options (5 bands for \$8.99 on Amazon)



Strength Training

Ask Chat GPT to help!

Day 1 – Lower Body Focus

Focus on leg strength and stability for walking and standing.

- Chair Sit-to-Stand (use hands if needed)
- Seated Leg Extensions (can add ankle weights or bands)
- Standing Heel Raises (hold chair for support)
- Seated Hamstring Curls (band around ankle)
- Side Leg Raises (holding chair)

Day 2 – Upper Body Focus

Focus on pushing, pulling, and carrying strength.

- Seated Dumbbell/Band Chest Press
- Seated Row with Resistance Band
- Overhead Press (light weights or band)
- Bicep Curls
- Triceps Extensions (seated or standing with support)

Day 3 – Full Body + Balance

Integrate movements and improve coordination.

- Sit-to-Stand (progression: slower tempo)
- Standing Marching (holding chair if needed)
- Wall Push-Ups
- Resistance Band Pull-Aparts
- Seated Core Bracing (tighten abdomen for 10–15 seconds)

1. Chair Sit-to-Stand (Lower Body Foundation)



What to notice:

- Lean slightly forward ("nose over toes")
- Push through your heels to stand
- Sit down slowly with control

This is one of the most important functional exercises—it strengthens legs and helps with daily tasks like getting out of a chair. Harvard Health +1

- Can use Rec Center or YMCA circuits
- Many, many other resources!

Novice machine-based strength training program

Workout A	
Exercise	Volume (reps × sets; frequency)*
Machine leg press	8 reps × 3 sets; 2 to 3 sessions/week
Machine chest press	8 reps × 3 sets; 1 to 2 sessions/week
Machine lat pulldown	8 reps × 3 sets; 2 to 3 sessions/week
Workout B	
Exercise	Volume (reps × sets; frequency)*
Machine leg press	8 reps × 3 sets; 2 to 3 sessions/week
Machine overhead press	8 reps × 3 sets; 1 to 2 sessions/week
Machine seated row	5 reps × 1 set; 2 to 3 sessions/week

Reps: repetitions.

* Reps, sets, and volume apply to work sets only; warm-up sets are not included.

UpToDate®

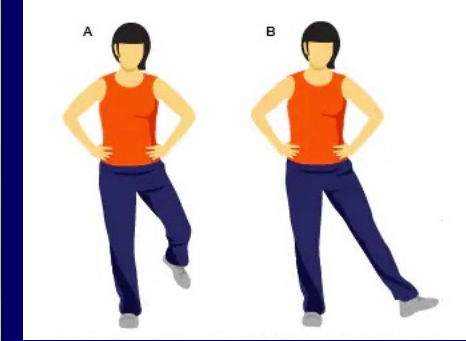
Balance & Flexibility

- Balance/flexibility (for older adults)
 - 2-3 days/week
 - Tai chi, heel-to-toe walk, stand on one foot
 - Stretching, yoga

Youtube.com (Silver Sneakers):
7-minute Yoga Workout for Older Adults

<https://www.unmc.edu/cctr/community/proactive/fourtypes>

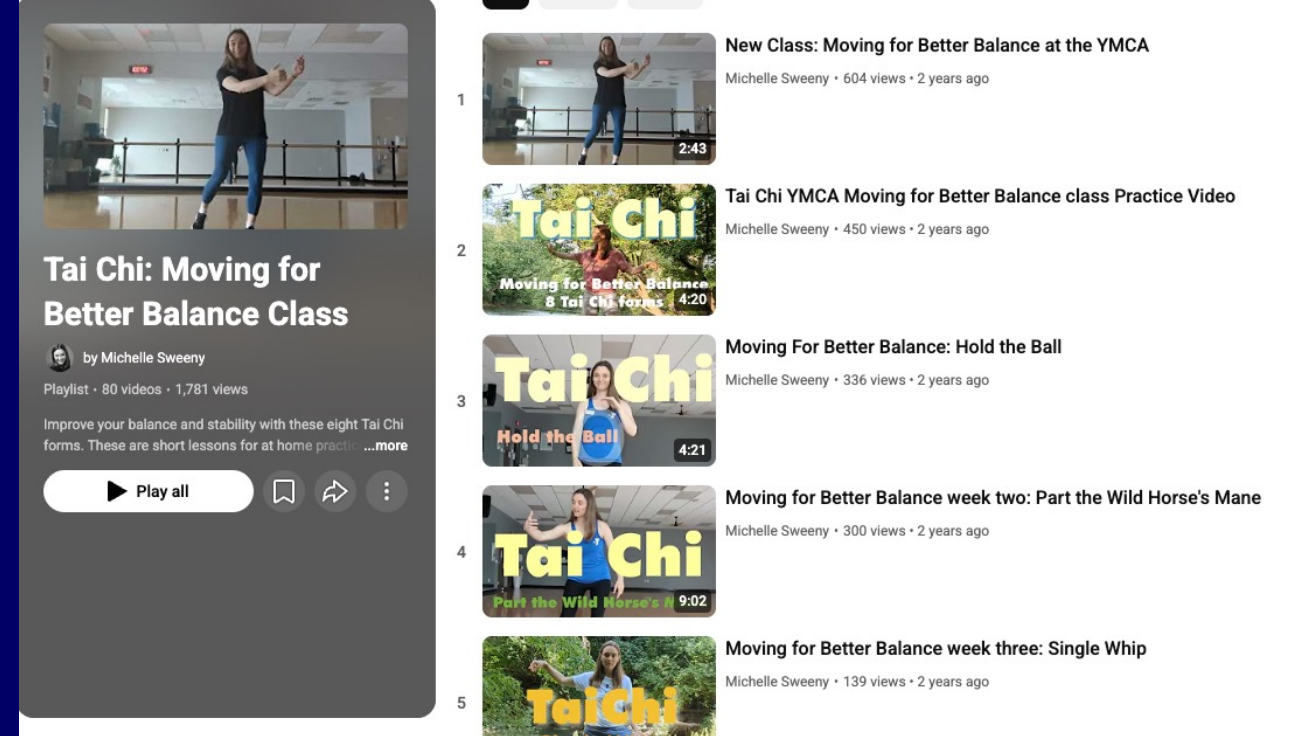
Links to balance, flexibility, strength exercise with detailed instructions and pictures



- #1 Marching
- #2 Single Leg Stance
- #3 Heel Raises
- #4 Foot Taps on Cone or Step
- #5 Single Leg Side Hold
- #6 Semi-Tandem Stance
- #7 Lateral Stepping
- #8 Clock Reach
- #9 Tandem Stance
- #10 Same Side Single Leg & Arm Hold
- #11 3-Way Hip Kick
- #12 Heel to Toe Walk

Added Benefits of Tai Chi

- Movement sequences
 - Benefit for cognition, balance, falls reduction beyond than standard progressive exercise



“Moving for Better Balance”: Program specifically developed for older adults

- Offered through YMCAs and other rec centers
- Learn the moves on YouTube

What Might A Week Look Like?

	Monday	Tuesday	Wednes	Thursday	Friday	Saturday	Sunday
Aerobic	30 min brisk walk/jog		30 min brisk bike	30 min brisk elliptical		30 min brisk walk	30 min hike
Strength		20 min upper body/core			20 min lower body/core		
Balance/ flexibility		20 min balance	10 min stretch		20 min Tai Chi		
Total minutes	30	40	40	30	40	30	30

Virtual Fitness and Wellness Classes



Mon, September 16 [📅 Functional Strength Training](#)

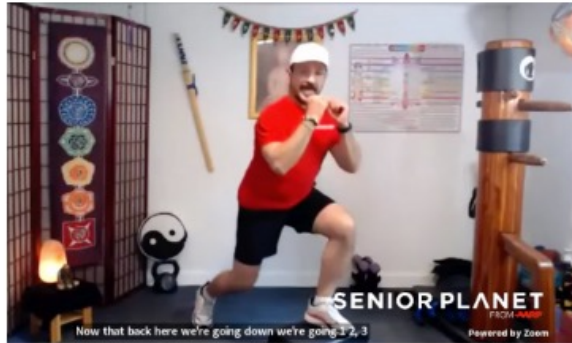
11:00AM EDT / 10:00AM CDT / 9:00AM MDT / 8:00AM PDT

Functional Strength Training

Online / By Phone

Trainer: Deb Gunn

Use bodyweight, bands, and dumbbells to build your strength.



Mon, September 16 [📅 Fit Fusion Workout](#)

12:00PM EDT / 11:00AM CDT / 10:00AM MDT / 9:00AM PDT

Fit Fusion Workout

Online / By Phone

Trainer: [Cas Castro](#)

Get your heart pumping during this fun, high-energy workout!



Mon, September 16 [📅 Easy-to-Follow Tai Chi](#)

2:00PM EDT / 1:00PM CDT / 12:00PM MDT / 11:00AM PDT

Easy-to-Follow Tai Chi

Online / By Phone

Trainer: [Josy Delaney](#)

Move, breathe and flow during this gentle, slow, flowing form of exercise

Free AARP classes

- Classes that target strength and balance
- Done at home with minimal equipment

<https://local.aarp.org> >
virtual events > exercise
& health

Lifestyle Modification: Diet

- Focus on CONTENT
- Keep a food log!
- Simple changes can lead to healthier choices
 - More fresh vegetables and fruits with a variety of colors
 - Whole grains, lean proteins (plant based, fish ideal)
 - Watch portion sizes
 - Avoid liquid calories (soda, juice, fruit drinks)
 - Limit/avoid simple sugars and starches (white bread, white rice, bagels, potatoes, corn flakes)

Portion Distortion

What you're served



1/2 lb. cheeseburger, French fries,
3/4 cup ketchup, tomato slice and lettuce.
1,345 calories
53 grams fat

What's one serving



1/4 lb. cheeseburger, half the French fries,
2 tablespoons ketchup, tomato slice and lettuce.
685 calories
33 grams fat

DID YOU KNOW?

- Americans are the heaviest of people in developed countries. The U.S. surgeon general has called obesity a national epidemic.
- 61 percent of Americans are overweight.

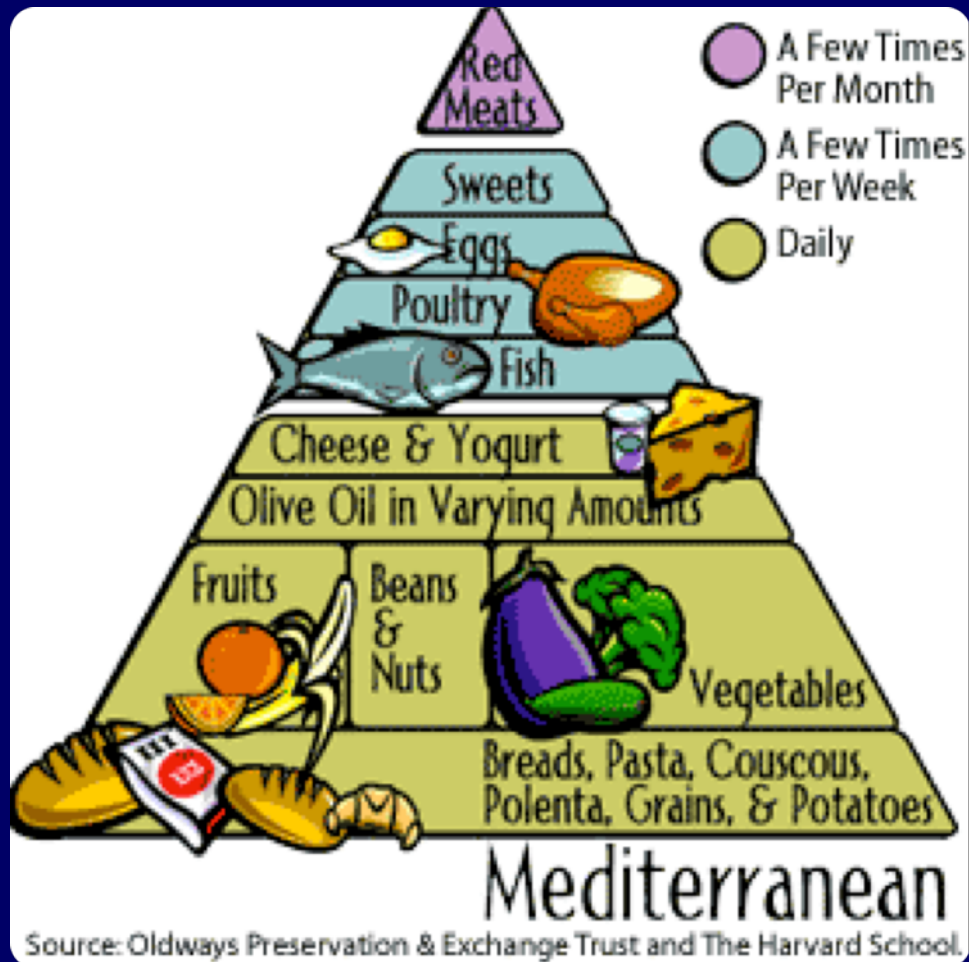
- Consuming an extra 100 calories daily for a year, without using them up, can lead to a weight gain of 10 pounds.
- Every gram of carbohydrate or protein equals 4 calories.

- The number of overweight people in the world – 1.1 billion – now equals the number of undernourished people.
- With each decade as we age, we need 100 fewer calories per day.

- Every gram of fat equals 9 calories.
- 10 calories a day (2 hard candies) of unexpended energy puts on an extra pound a year.

© L. S. Dean

The Mediterranean Diet



Is a Mediterranean Diet Feasible?

- Benefits:
 - Decreased risk of stroke, CVD events, dementia, all-cause mortality
- Can be less expensive!
 - Beans, nuts, whole grains can be bought in bulk (less \$\$ than meat or eggs)
 - Canned fish; low fat/plain dairy
 - Frozen vegetables and fruits can be stored
 - Olive oil (instead of butter)
 - No/very limited fast food
 - Plant-based protein

Rees, et al. Cochrane Syst Rev 2019; Delgado-Lista, et al. Lancet 2022; Estruch, et al. NEJM 2018; Drewnowski & Eichelsdoerfer; Pub Health Nutr 2010



Mediterranean diet benefits for frailty & cognition

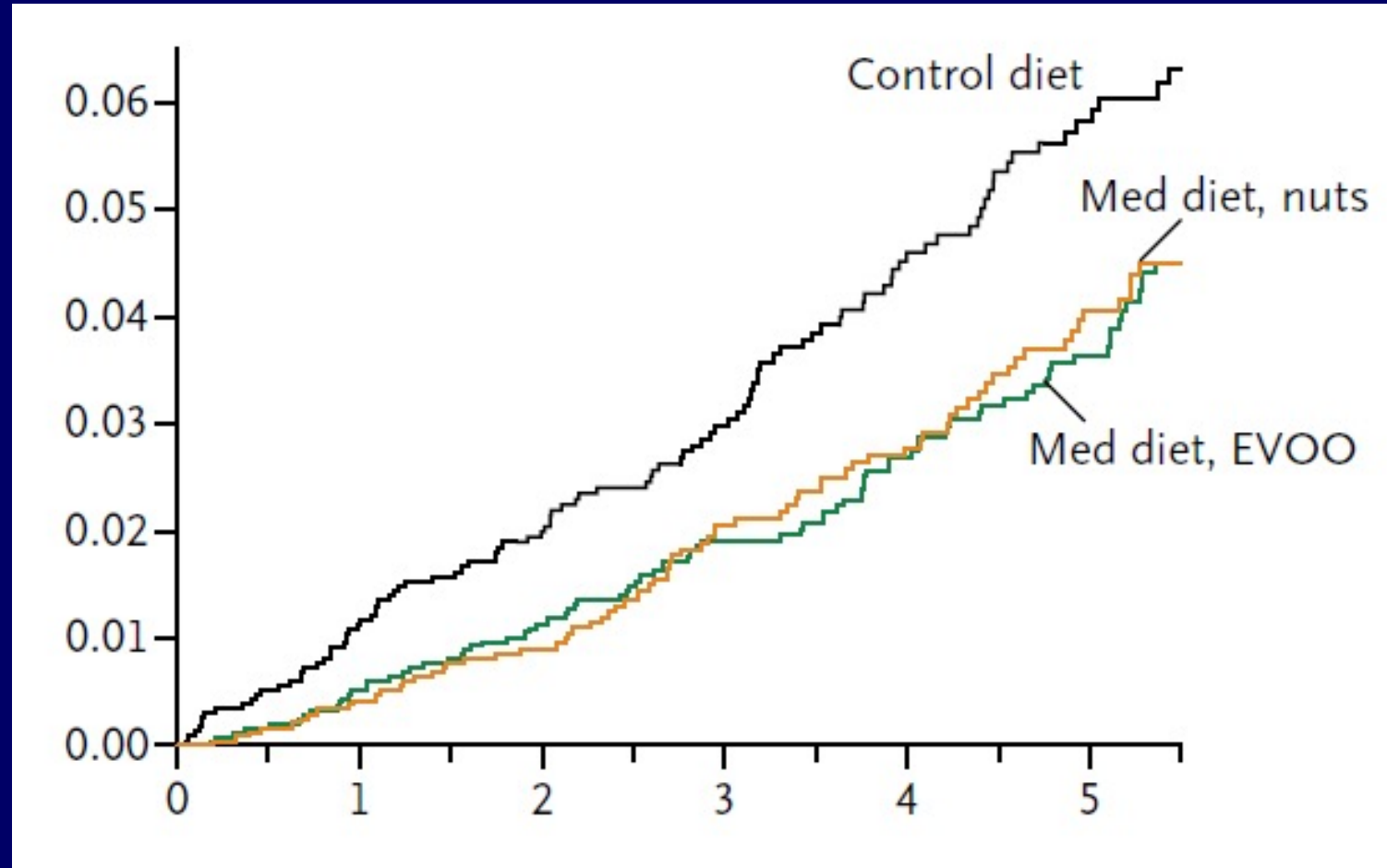
- Greater Mediterranean diet adherence associated with:
 - Decreased risk of frailty
 - Slower cognitive decline over 6 yrs
 - May be through improved microbiome

Give yourself 1 point for every Yes, 0 points for every No.

1. I eat at least 2 cups of vegetables every day.
2. I eat 2 or more pieces of fruit a day.
3. I eat 2 or more servings of whole grains a day.
4. I eat fish 2 or more times a week.
5. I eat beans or legumes 4 or more times a week.
6. I eat nuts or seeds almost every day.
7. I use olive oil as my main source of fat.
8. I drink a glass of red wine (but no more than 2) most days.
9. I eat red meat no more than once a week.

8-9 = highly consistent with
Mediterranean diet

Effect of Mediterranean Diet on Heart Attack and Stroke

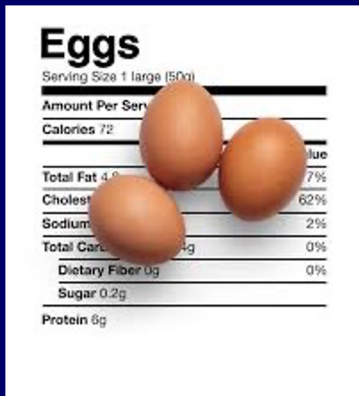


Estruch, NEJM, 2013

Are Older PWH Getting Adequate *Protein*?

- Review protein intake
 - Recommended daily allowance (RDA) is 0.8-1 grams/kilogram)*
 - May need 1.6-2.2 grams if strength training or to overcome losses during obesity treatment
- How much protein is really needed in a day?

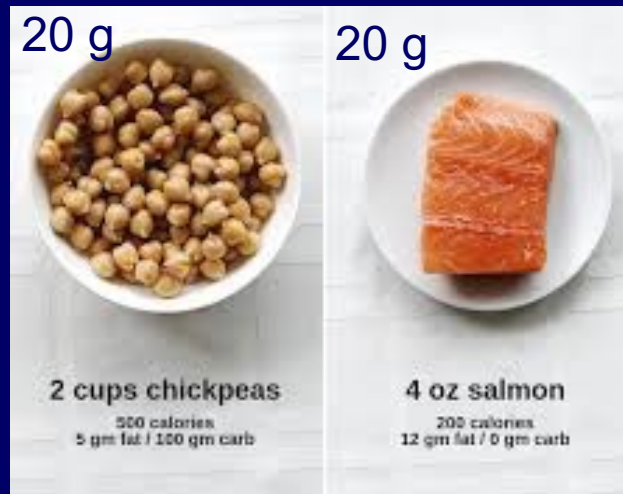
**200 pound = 91 kg
~ 91 grams of protein**



3 eggs =
18 g



8 oz milk =
8 g



4 oz chicken =
30 g

**Daily total = 100
grams of protein**

*kidney disease recommendations may be lower

Adequate Sleep May be More Important than Previously Realized

- Chronic sleep deprivation contributes to obesity, hypertension & other cardiovascular diseases, dementia, depression/anxiety, immunity
- Sleep disorders often more common in PWH
- Often underdiagnosed, especially sleep apnea

IOM Committee on Sleep. Sleep Disorders and Sleep Deprivation: An Unmet Public Health Problem

Sleep Deprivation

Common symptoms include:



Daytime sleepiness.



Fatigue.



Irritability.



Trouble thinking, focusing and remembering.



Headaches.



Slowed reaction times.

Severe symptoms include:



Microsleeps.



Uncontrollable eye movements.



Trouble speaking clearly.



Drooping eyelids.



Hand tremors.



Visual and tactile hallucinations.



Impaired judgment.



Impulsive (or even reckless) behavior.

Simple Steps to Improve Sleep Quality



- *Quantity:* Ideally ~ 7-9 hours/night
- *Quality:*
 - Catch-up sleep on weekends doesn't help with health benefits: try to keep same wake/sleep time on weekdays and weekends
 - Most sleep medications do NOT fix sleep architecture
 - Minimize/avoid daytime napping
 - Avoid screens (including phones) for at least an hour before bed
 - Avoid work, news, anything that will move away from a relaxing mindset
 - Dark, cool room
 - Limit noise (fan if helpful)

Importance of Purpose: Social Prescribing?

When the Prescription Is for a Dance Class, not a Pill

Prescriptions for social activities, exercise and the arts — first popularized in Britain — are coming to America. But some experts say the U.S. health care system may get in the way.

New York Times, April 2024

From the World Health Organization:

“Social prescribing is a means of connecting patients to a range of non-clinical services in the community to improve their health and well-being.

It builds on the evidence that addressing social determinants of health such as socioeconomic status, social inclusion, housing, and education is key to improving health outcomes”

Social Connections

- Volunteer opportunities
- Social groups at libraries, community centers, senior centers (many provide meals)
- "Memory Cafes": gathering places for people with dementia <https://www.memorycafedirectory.com/>
- Or do something active!
<https://walkwithadoc.org/join-a-walk/faqs/>

<https://www.who.int/publications/i/item/9789290619765>



A TOOLKIT ON HOW TO IMPLEMENT SOCIAL PRESCRIBING



What pills can treat frailty and cognitive impairment?

* No approved therapies *

Medications may be causing harm



You May Be at Risk

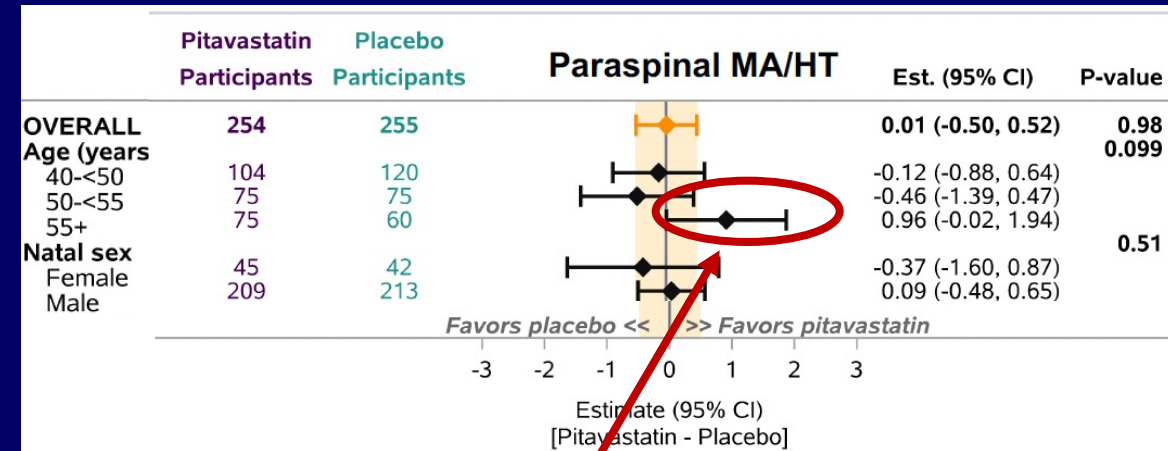
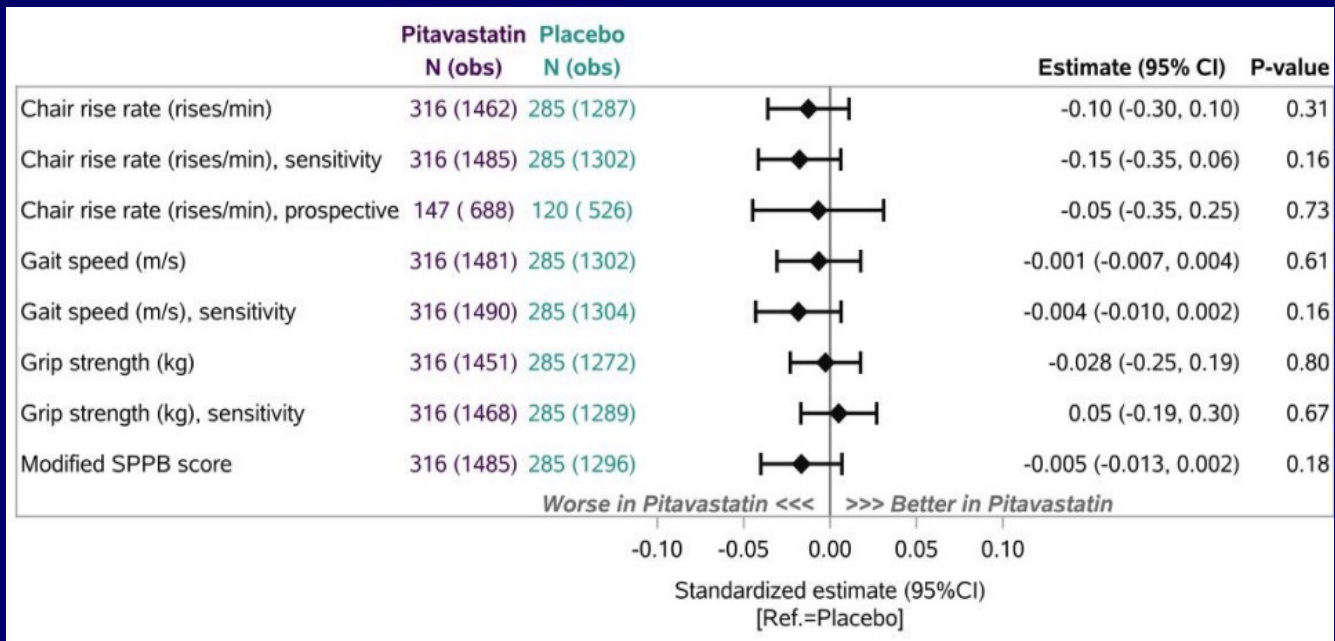
You are taking one of the following sedative-hypnotic medications:

- | | | |
|--|--|--|
| ☐ Alprazolam (Xanax®) | ☐ Diazepam (Valium®) | ☐ Temazepam (Restoril®) |
| ☐ Bromazepam (Lectopam®) | ☐ Estazolam | ☐ Triazolam (Halcion®) |
| ☐ Chlorazepate | ☐ Flurazepam | ☐ Eszopiclone (Lunesta®) |
| ☐ Chlordiazepoxide-amitriptyline | ☐ Loprazolam | ☐ Zaleplon (Sonata®) |
| ☐ Clidinium-chlordiazepoxide | ☐ Lorazepam (Ativan®) | ☐ Zolpidem (Ambien®, Intermezzo®, Edluar®, Sublinox®, Zolpimist®) |
| ☐ Clobazam | ☐ Lormetazepam | ☐ Zopiclone (Imovane®, Rhovane®) |
| ☐ Clonazepam (Rivotril®, Klonopin®) | ☐ Nitrazepam | |
| | ☐ Oxazepam (Serax®) | |
| | ☐ Quazepam | |

- Polypharmacy (5+ medications)
 - Increase risk for side effects (especially cognitive)
 - More medications added to treat side effects of medications!
 - Lower adherence
 - More cost
- What is the risk and benefit of each medication?

Are Statins Harmful?

- In REPRIEVE, we found no protective or detrimental effect of statins on frailty, muscle area, or cognition



**Trend towards protective effect
in those 55 or older**

What about GLP-1RAs?

- Numerous benefits:
 - *Very* effective weight loss for ~ 80% of people
 - Cardiometabolic effects
 - Potential benefits on numerous other endpoints (addiction, dementia [mixed data], among others)
- Negatives/unknowns:
 - Expensive
 - Side-effects, may be greater among older adults
 - Long-term adherence low despite efficacy
 - ? Bone and muscle risks over time



Effects of Semaglutide on Muscle Structure and Function in the SLIM LIVER Study

Slide 79

Ditzenberger..Erlandson,
Clin Infec Dis 2024

Grace L. Ditzenberger,^{1,✉} Jordan E. Lake,^{2,✉} Douglas W. Kitch,³ Amy Kantor,³ Raja Muthupillai,^{4,✉} Carlee Moser,^{3,✉} Pablo F. Belaunzaran-Zamudio,⁵ Todd T. Brown,⁶ Kathleen Corey,⁷ Alan L. Landay,⁸ Anchalee Avihingsanon,⁹ Fred R. Sattler,¹⁰ and Kristine M. Erlandson^{1,✉}

- >30% decrease in liver fat (Lake, et al. Annals Int Med 2024)
- Psoas muscle **decreased** by 1.5 mL from baseline (~9% loss) but there was no significant change in psoas muscle density
- Trends towards improved function; significantly fewer PWH with slow gait
- *lower dose semaglutide, only 24 weeks, long-term effects not known

Parameter	Baseline	Week 24	Change, Baseline to Week 24 (estimate, 95% CI)	P-value
10x Chair Rise (seconds)	26.2 (7.0)	25.0 (6.8)	-1.27 (-2.7, 0.10)	0.069
Gait speed (meters/second)	0.93 (0.23)	0.98 (0.24)	0.05 (-0.01, 0.10)	0.078
Presence of slow gait speed (<1 meters/second)	No: 18 (37%) Yes: 31 (63%)	No: 26 (54%) Yes: 22 (46%)	RR: 0.73 (0.55, 0.97)	0.029

Senolytics: Dasatinib and Quercetin (D+Q)

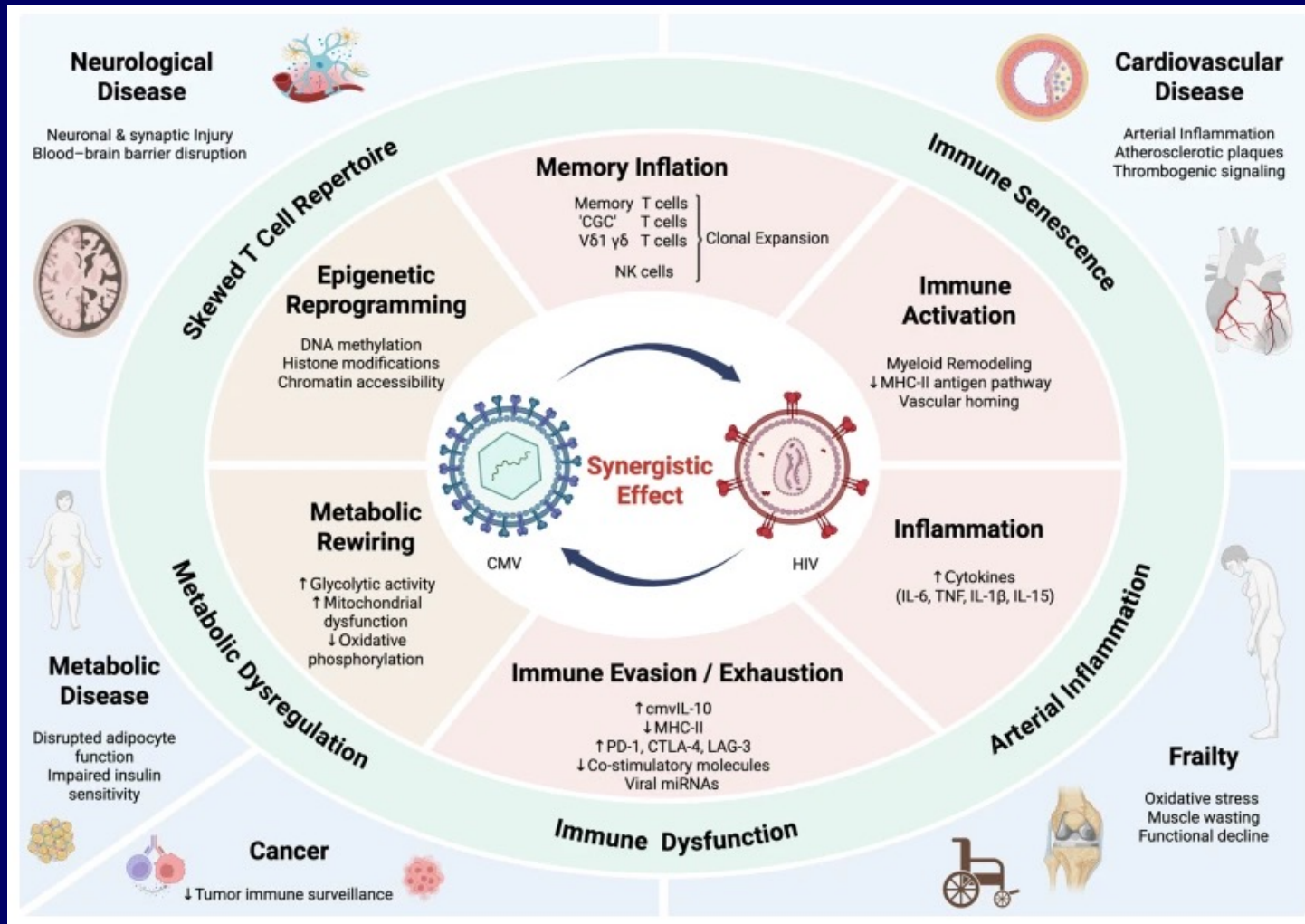
- Decreases senescent cells, thought to delay aging-related phenotypes and comorbidities
- Improved physical function in people with idiopathic pulmonary fibrosis

iPACE (A5426)

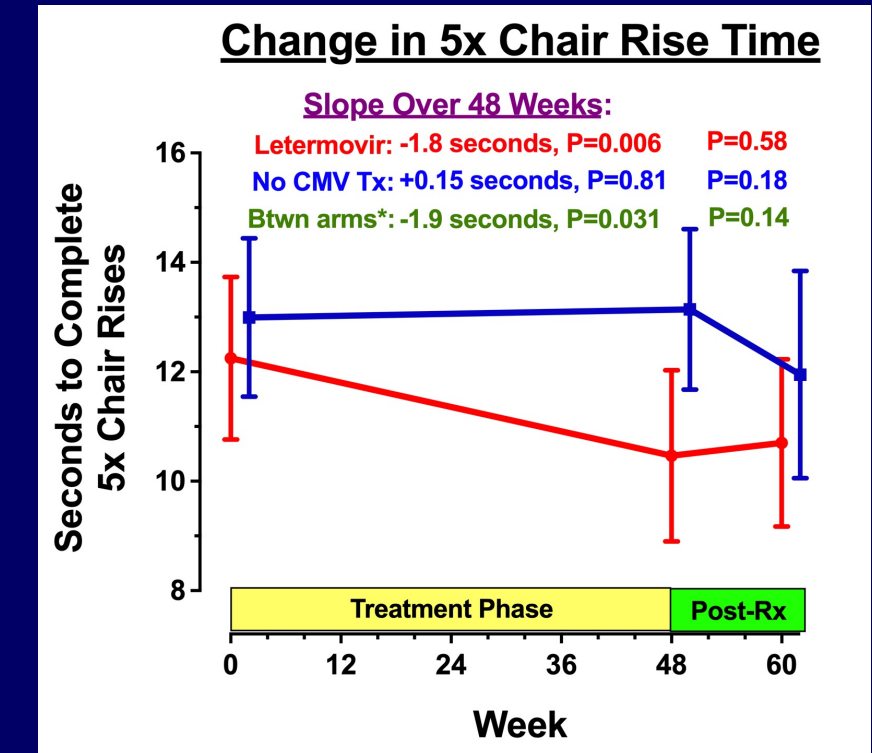
- Safety and efficacy of low-dose D&Q in older adults with HIV with impaired gait and pre-frailty/frailty
- Study enrolled, results pending

Functional measure	Baseline	Follow-up	Difference	Within-
	Mean $\pm$ SD	Mean $\pm$ SD	$\Delta \pm$ SD	p-Value
Physical function				
6-min walk distance (m)	447 $\pm$ 83	468 $\pm$ 81	+21.5 $\pm$ 28	0.012*
4-m gait speed (m/s)	1.1 $\pm$ 0.2	1.2 $\pm$ 0.2	+0.12 $\pm$ 0.2	0.024*
Timed chair-stands (s)	14.8 $\pm$ 3	12.6 $\pm$ 2	-2.2 $\pm$ 3	0.013*
SPPB score	10 $\pm$ 1	11 $\pm$ 0.9	+0.9 $\pm$ 1	0.003*
Grip strength (kg)	12.7 $\pm$ 5	12.1 $\pm$ 4	-0.6 $\pm$ 2	0.314

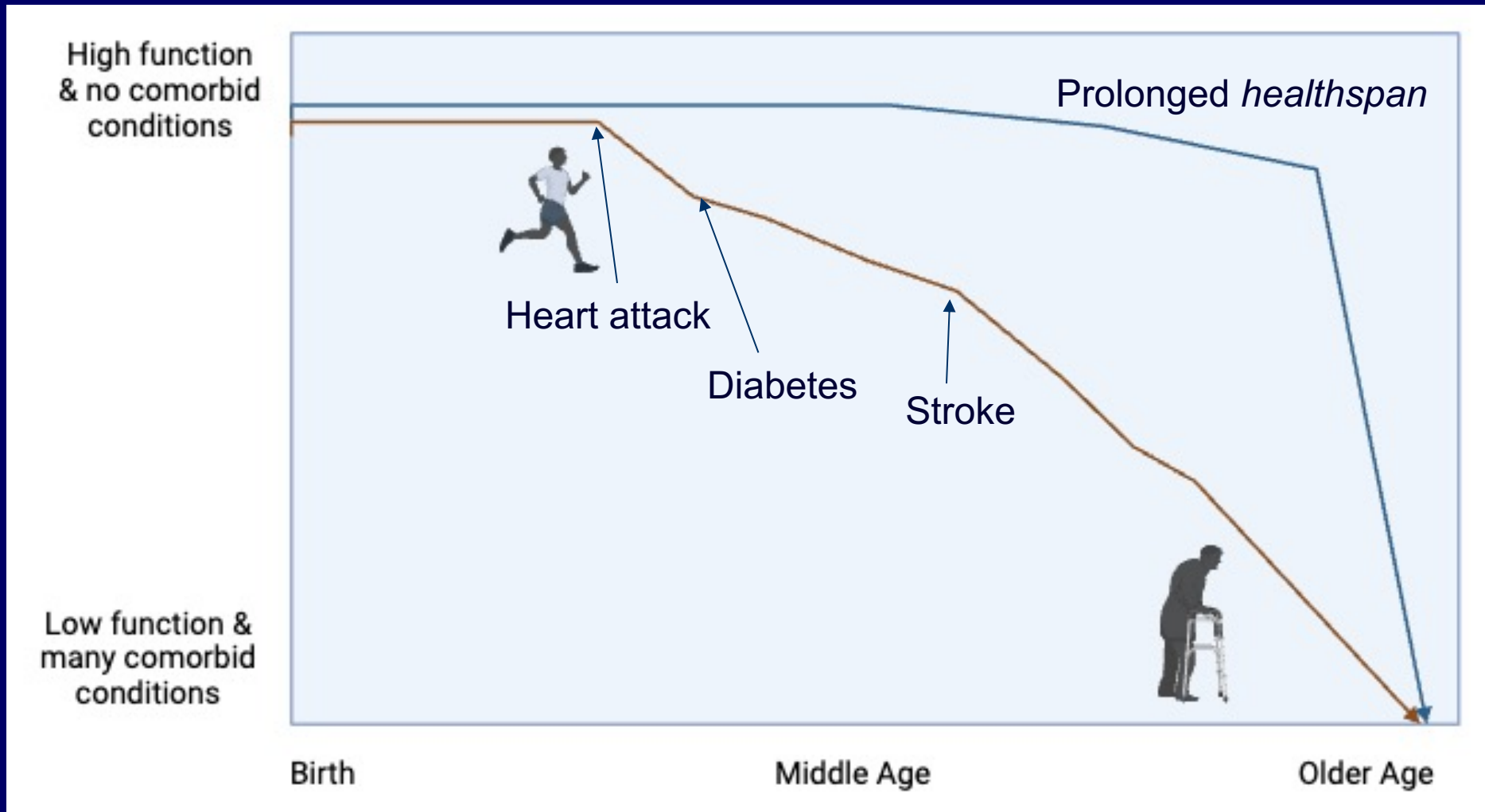
Benefit in frailty/cognition when treating cytomegalovirus?



Pilot data suggests potential beneficial effect of anti-CMV treatment (letermovir) on time to rise from a chair

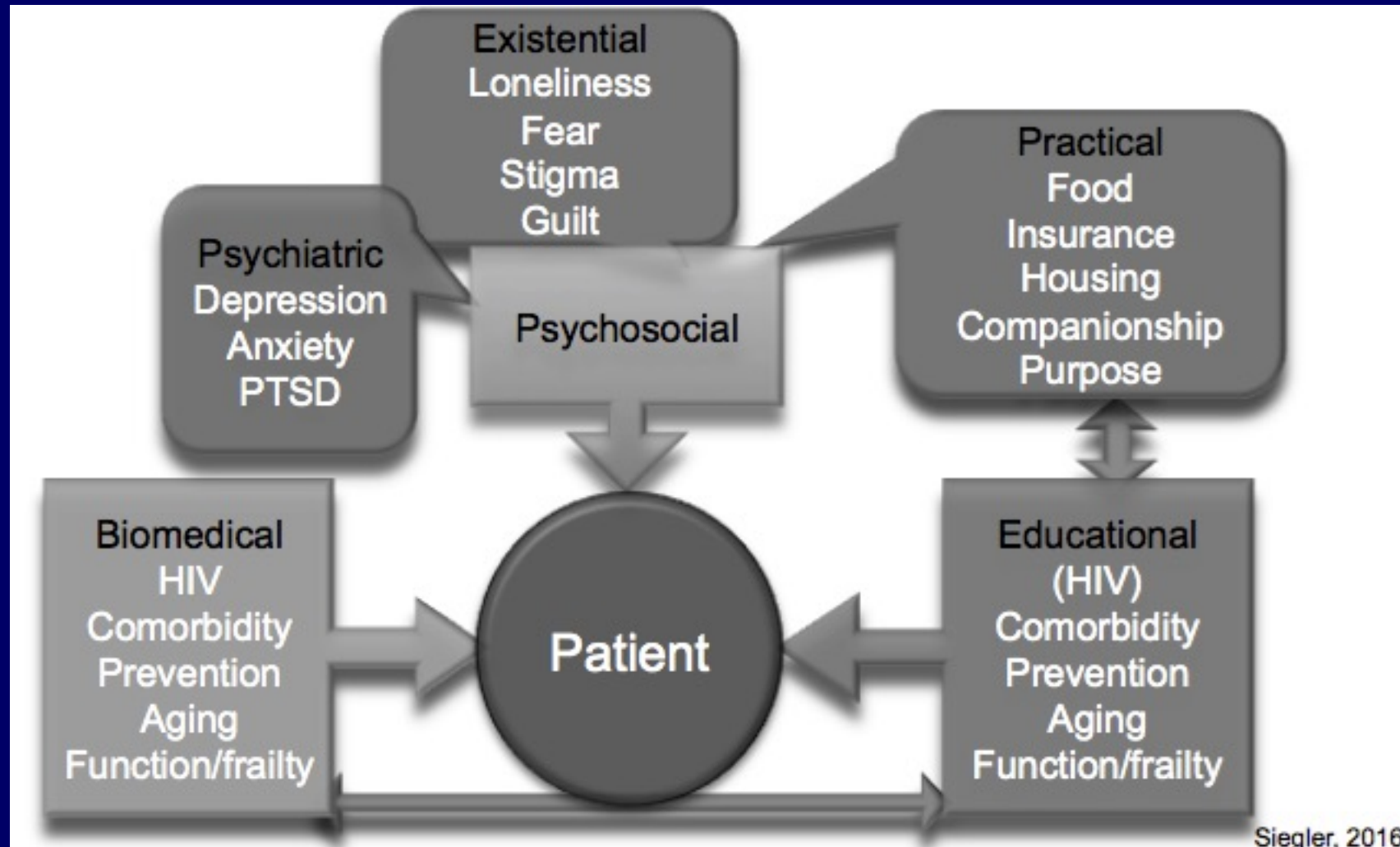


Aging is inevitable, but can we prolong the time *before* other conditions develop?



Health behaviors in MIDDLE age are important for long-term health!

Treating the Whole Patient

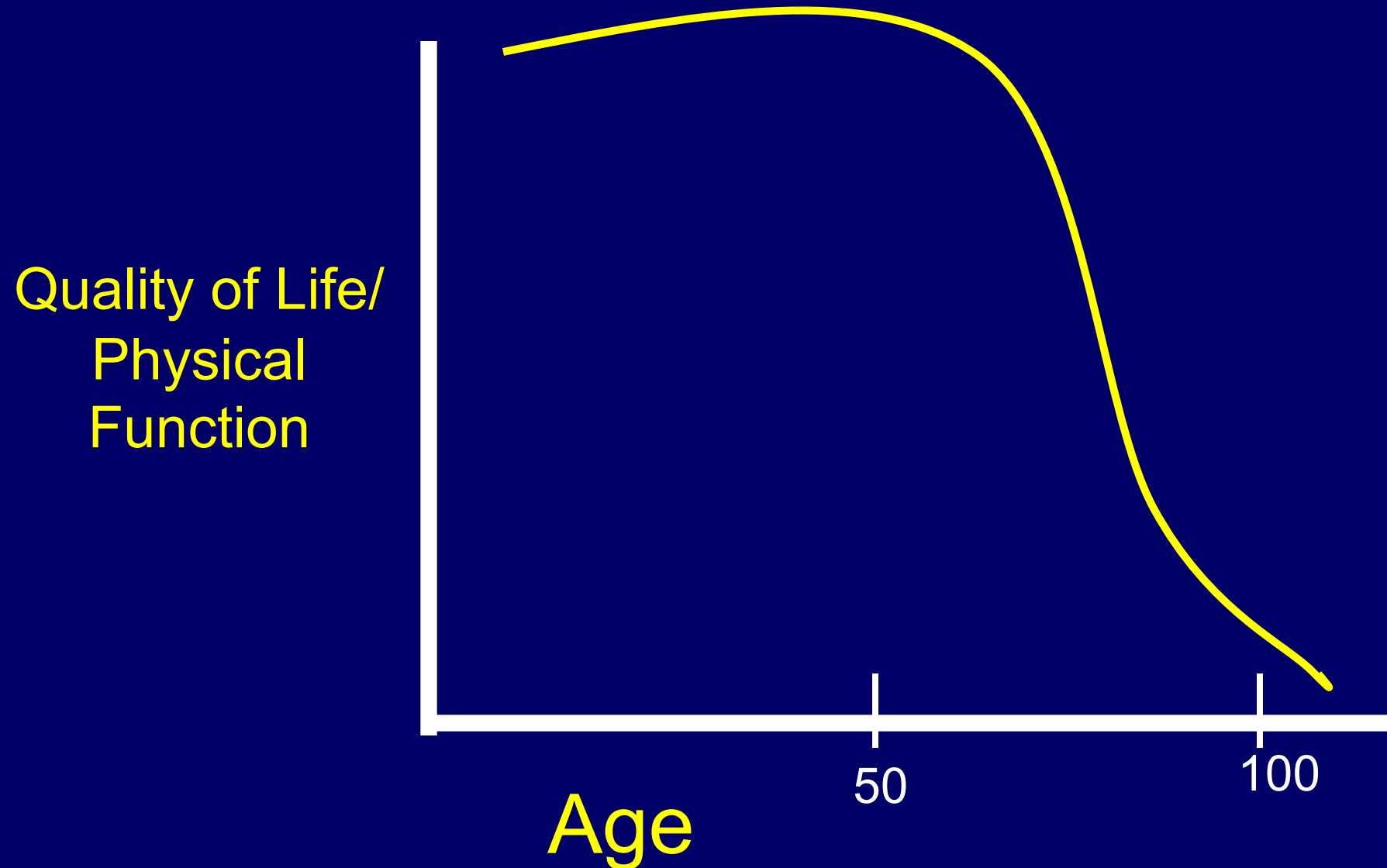




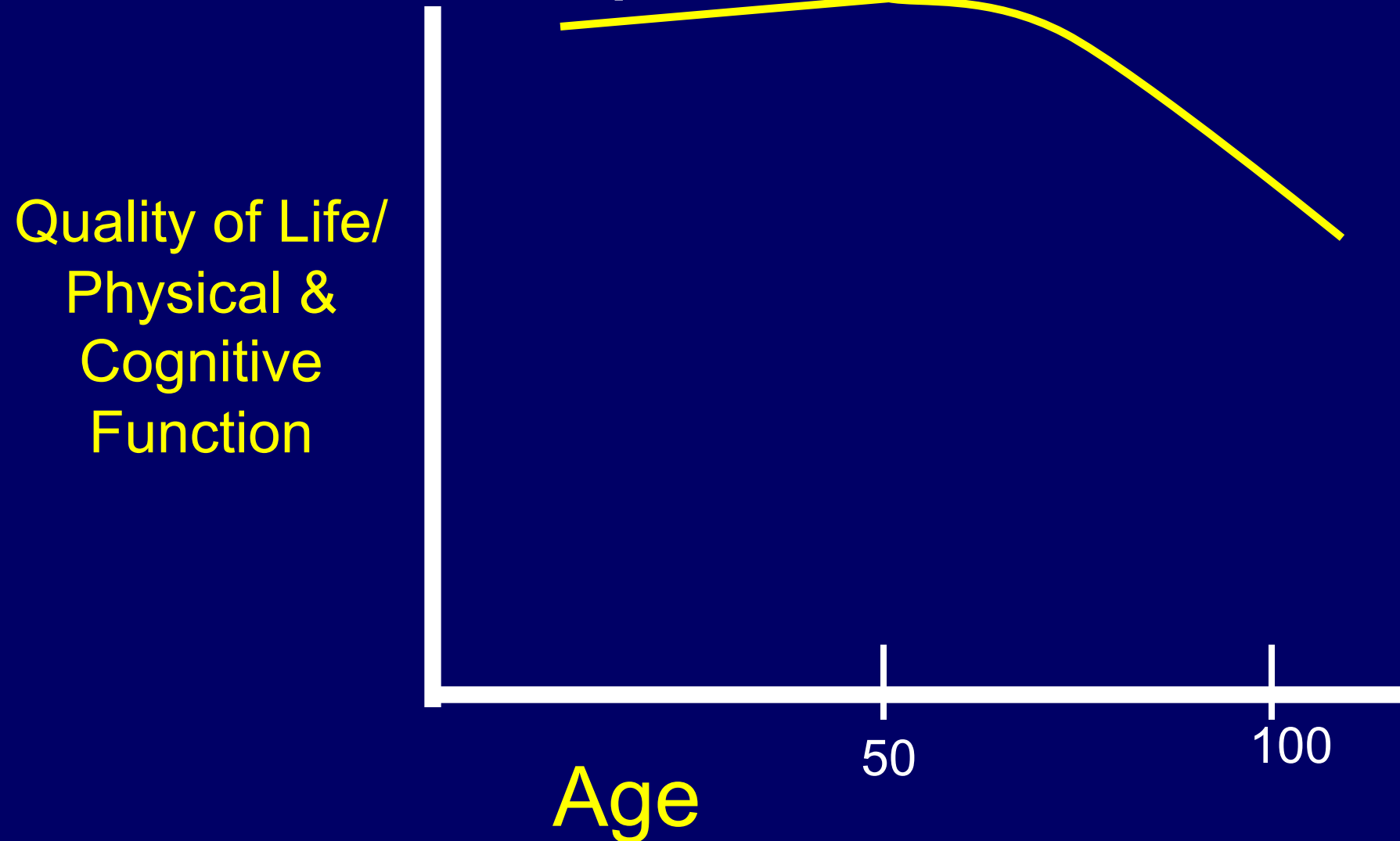
Conclusions

- HIV medications work well, so people are living longer
- We have a big role in how we are going to age
- We need to modify our modifiable risk factors
- Find disease early and try to reverse it

You can bend the aging curve



You can bend the aging curve upward



You can bend the aging curve upward

Slide 88

