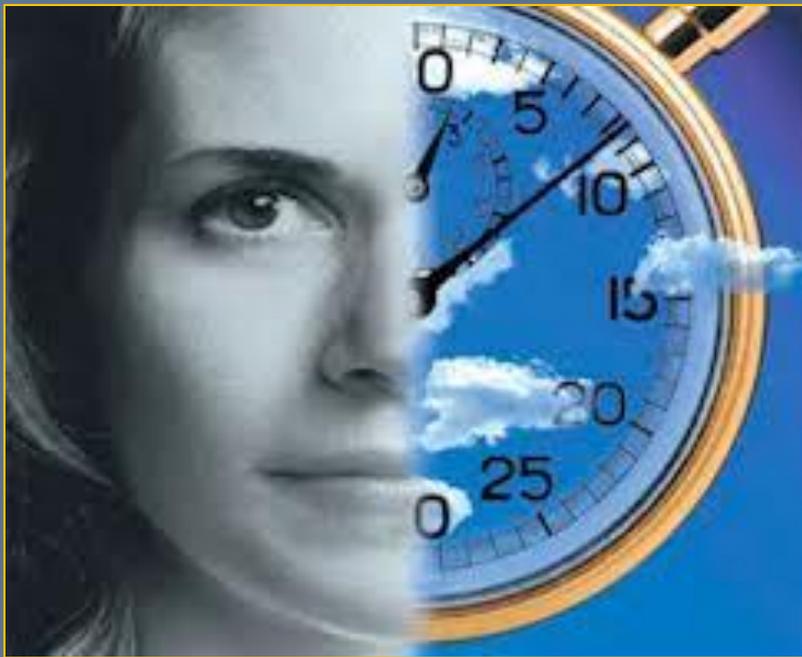
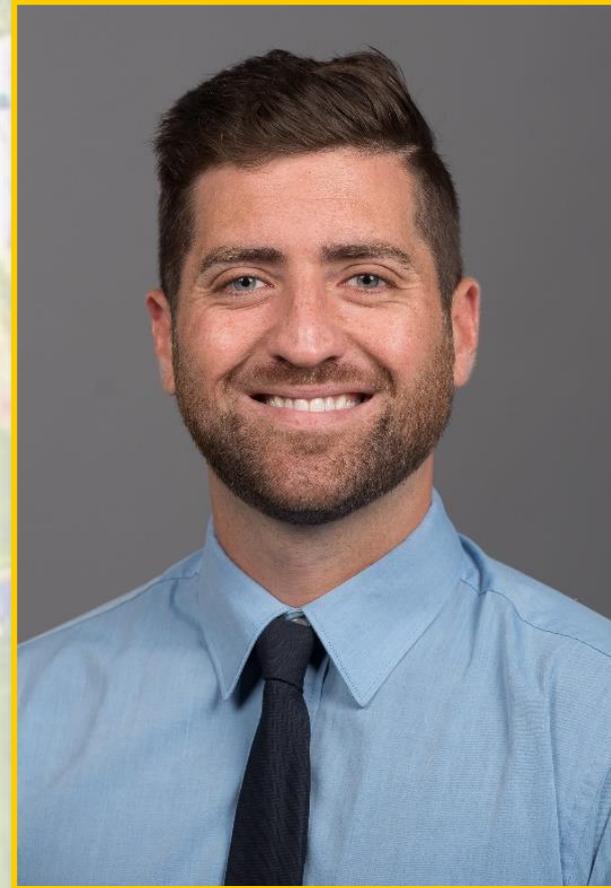


# Act Your Age: Resistance Training for Healthy Aging





University of Wisconsin  
**Eau Claire**

**Kinesiology**

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# The Road Map....

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## ● **Aging**

- Epidemiological overview of aging in US
- Explore physiological changes due to aging

## ● **Sarcopenia**

- Factors related to sarcopenia
- Sarcopenia and functional disability

## ● **Resistance training program**

- UWEC Community Fitness Program
- CFP Research

## ● **Concluding comments on RT and aging**



# Current Older Adult Demographics

**31.4%:  
no  
leisure  
time PA**

Least physically  
active of any age  
group

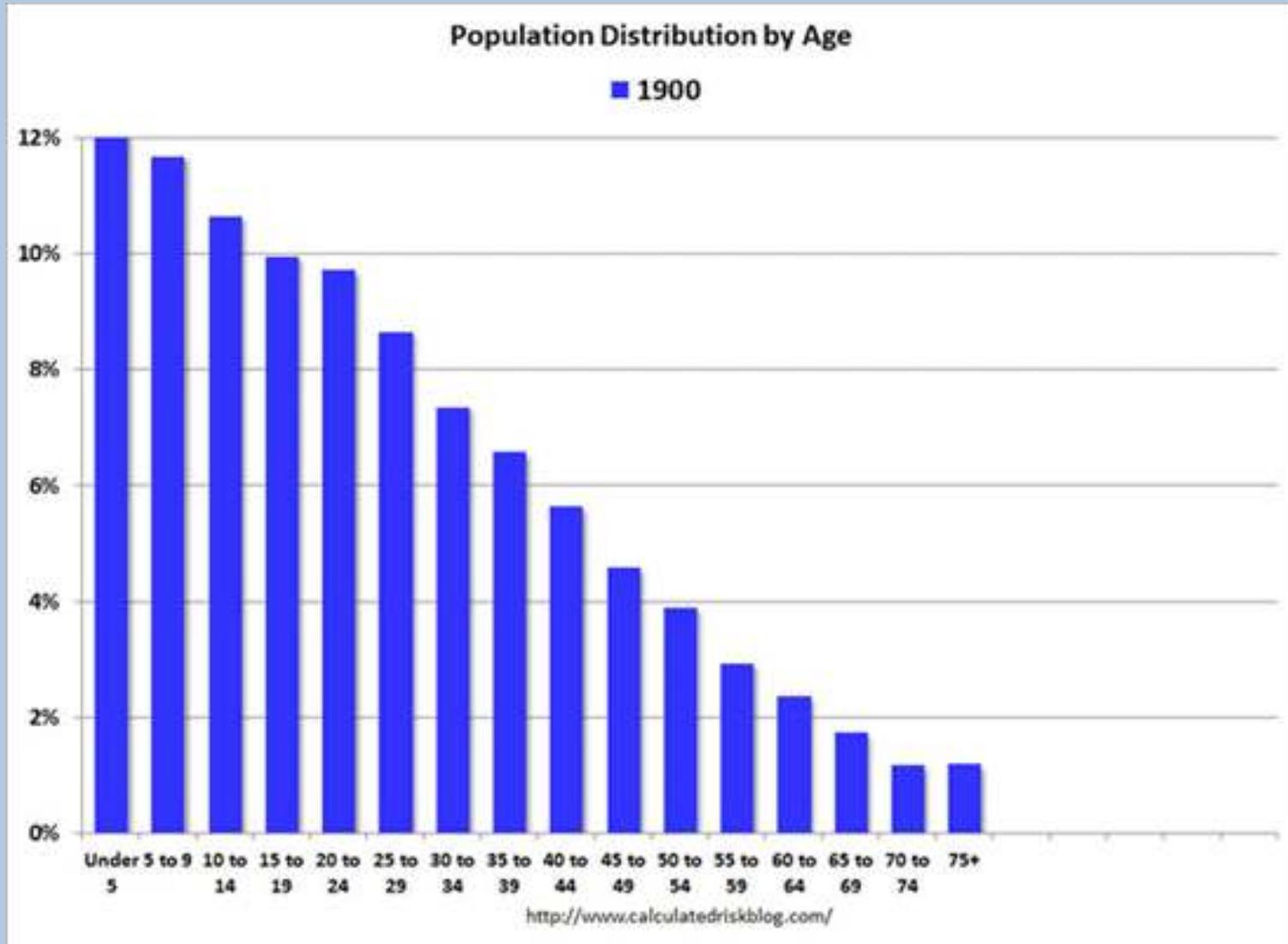
Accounts for  
~66% of all US  
expenditures for  
medical care

Are the most  
rapidly growing  
age group

Acceleration of  
growth will occur  
over the next 25  
years

Since 2011,  
millions of baby  
boomers will turn  
65 each year

# Current Older Adult Demographics



# Select physiological changes due to aging

## ⦿ Aging leads to progressive declines in:

- Cardiovascular
- Respiratory
- Metabolic function
- Muscle integrity/quality
- Bone mass
- Responses to environmental stress



# What is “Healthy Aging”?

Development and maintenance of optimal:

**Mental**

**Social**

**Physical  
well-being  
and function**



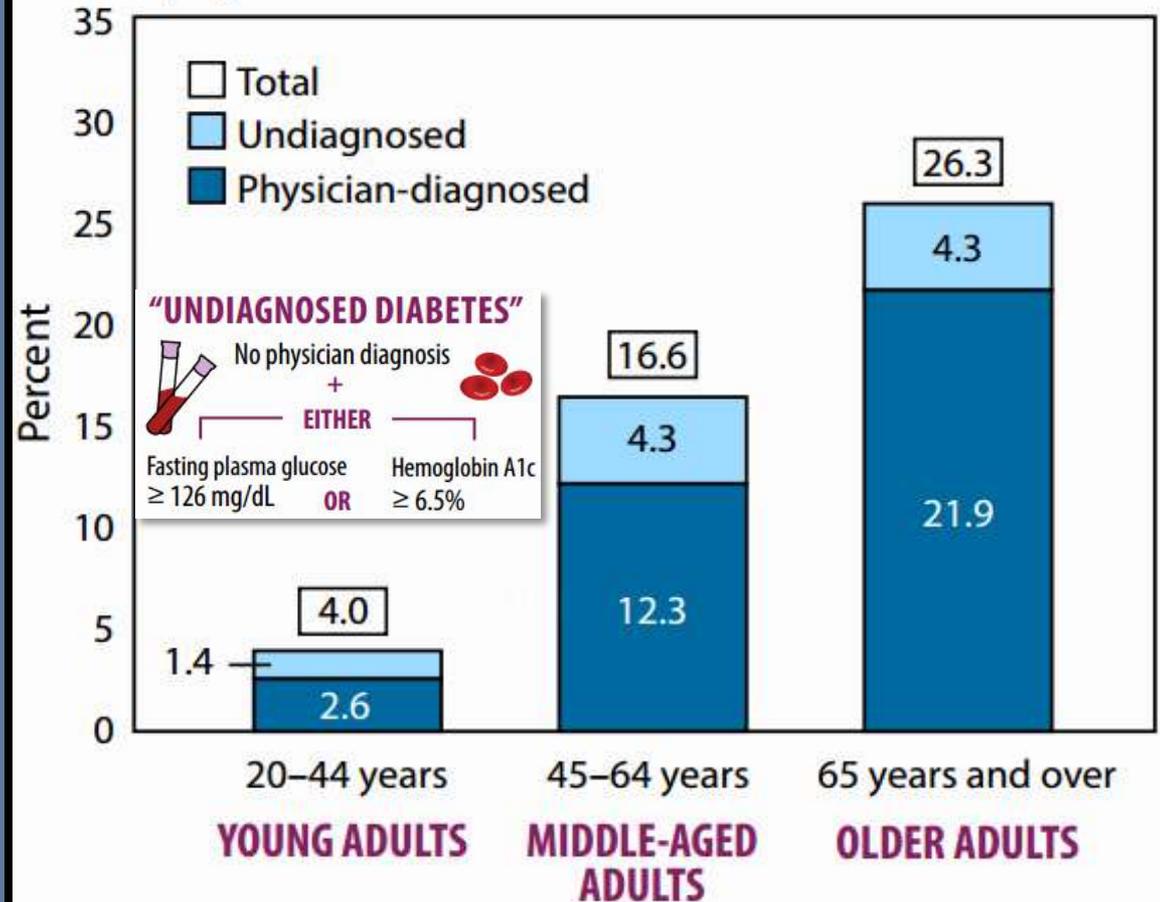
# Aging and Metabolic Function

Glucose tolerance begins ↓ near age 40



Potential connection w/ ↓ in LBM?

Diabetes prevalence among adults aged 20 and over, by age: 2011–2014



25 y male



# The Issue of Muscle Integrity

81 y male

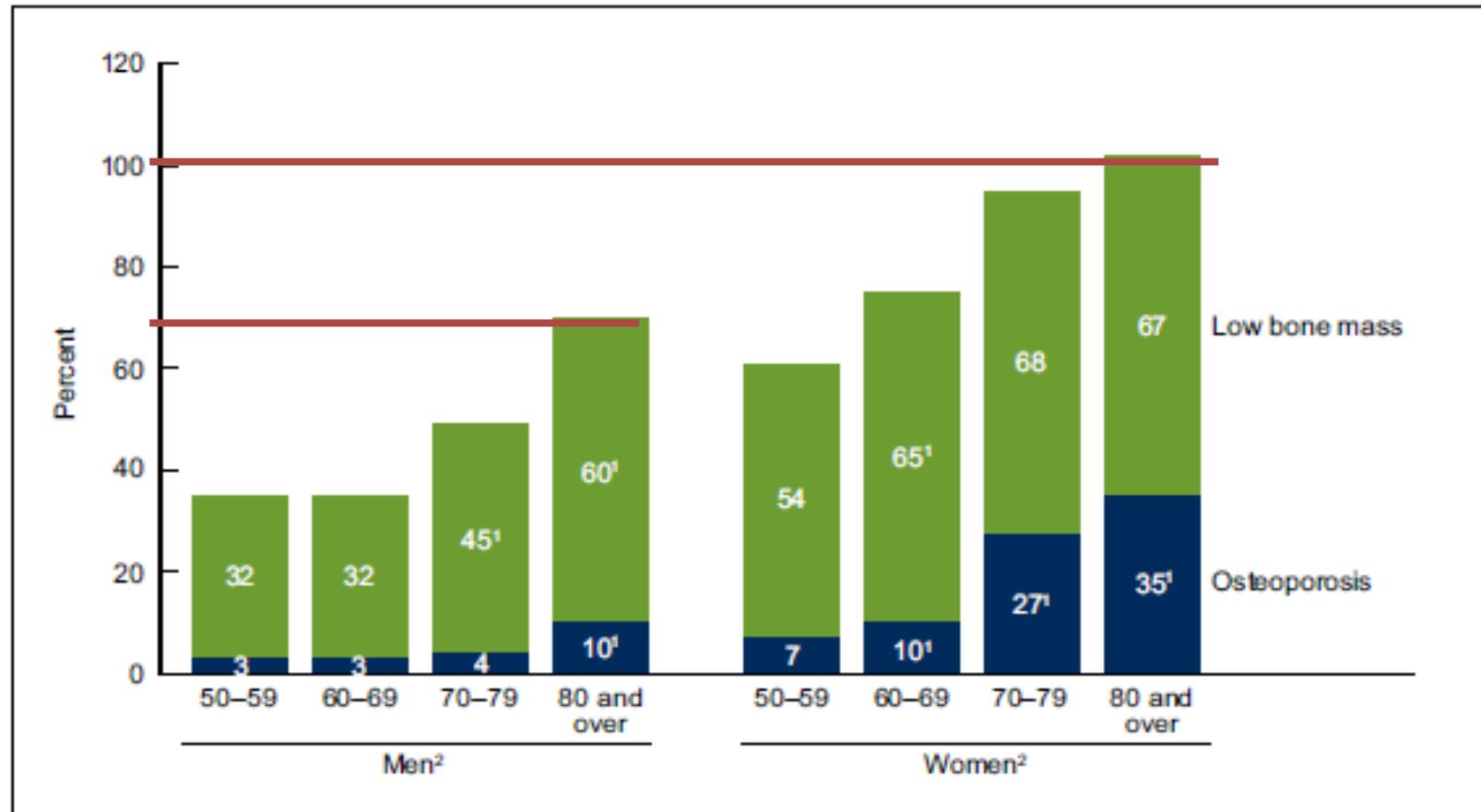


What is the white?  
What is the gray?  
What is the black?



# Bone mass changes with aging

Figure 3. Osteoporosis or low bone mass at the femur neck or lumbar spine, by age in adults aged 50 years and over



<sup>1</sup>  $p < 0.05$  compared with preceding age group within sex and skeletal status category.

<sup>2</sup>  $p < 0.05$  for trend by age group within sex for both osteoporosis and low bone mass.

SOURCE: CDC/NCHS, National Health and Nutrition Examination Survey, 2005-2008.

# Beyond mortality: the other cost of chronic disease

## **Diminished QOL & loss of independence**

- reflected by progressive disability over time

## **Instrumental activities of daily living**

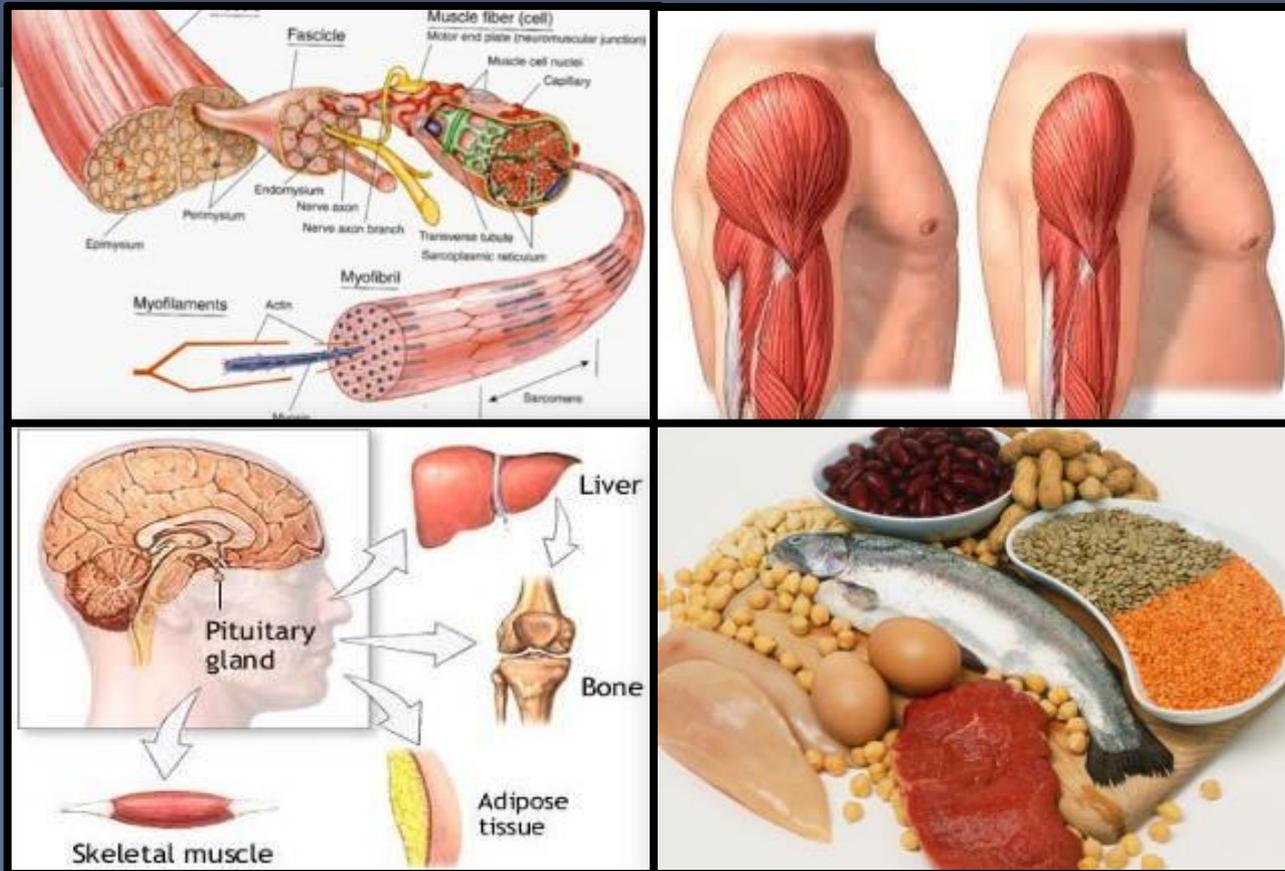
- Shopping, money management, preparing meals

## **Activities of daily living**

- Personal hygiene, getting dressed, toileting

**These issues can narrow an older adult's world and restrict a person's engagement in and enjoyment of life**

# Sarcopenia: The contributing factors



# Sarcopenia: The “poverty of flesh”

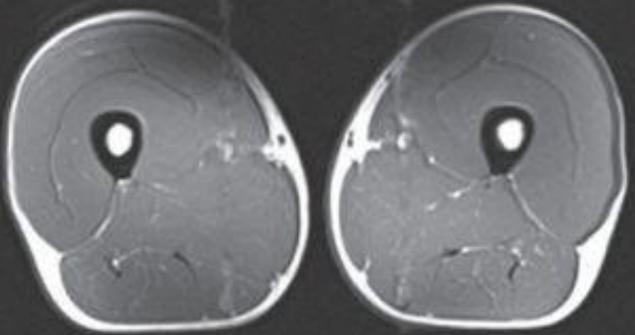
- Loss of muscle mass & strength/function associated with aging



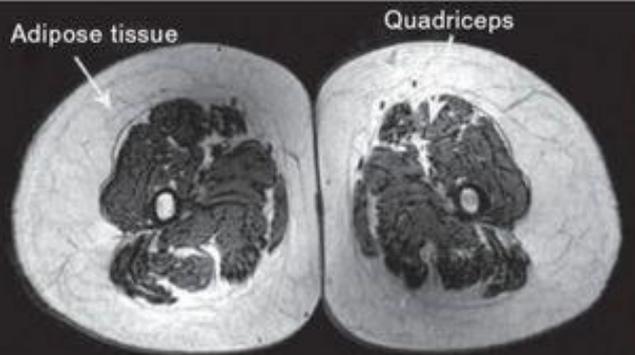
**General consensus:**

Sarcopenia primarily the result of diminishing neurological stimuli accompanied by age-related hormonal changes and sedentary lifestyle

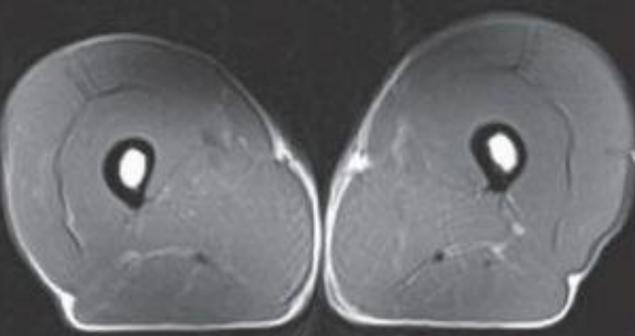
40-year-old triathlete



74-year-old sedentary man



70-year-old triathlete



muscle integrity/quality...

muscle architecture:

genes & protein content

"quality"

muscle thickness



Age 25



Age 63

# Lifestyle: Physical activity

## ● Physical inactivity

- key role in development of sarcopenia

## ● Age-related drop in PA

- leads to disuse atrophy



22% of adults  $\geq 65$  yr engage  
in regular PA

# Consequences of Sarcopenia

**Question : what is  
“increased perception  
of effort” & why is this a  
problem?**

## **Decreased PA**

- Decreased TDEE

## **Increased risk of disability**

- ↑ risk of fall/injury
- ↑ “perception of effort” w/ ADLs

## **Increased risk of chronic disease**



# Function reserve capacity: Bortz, 2002

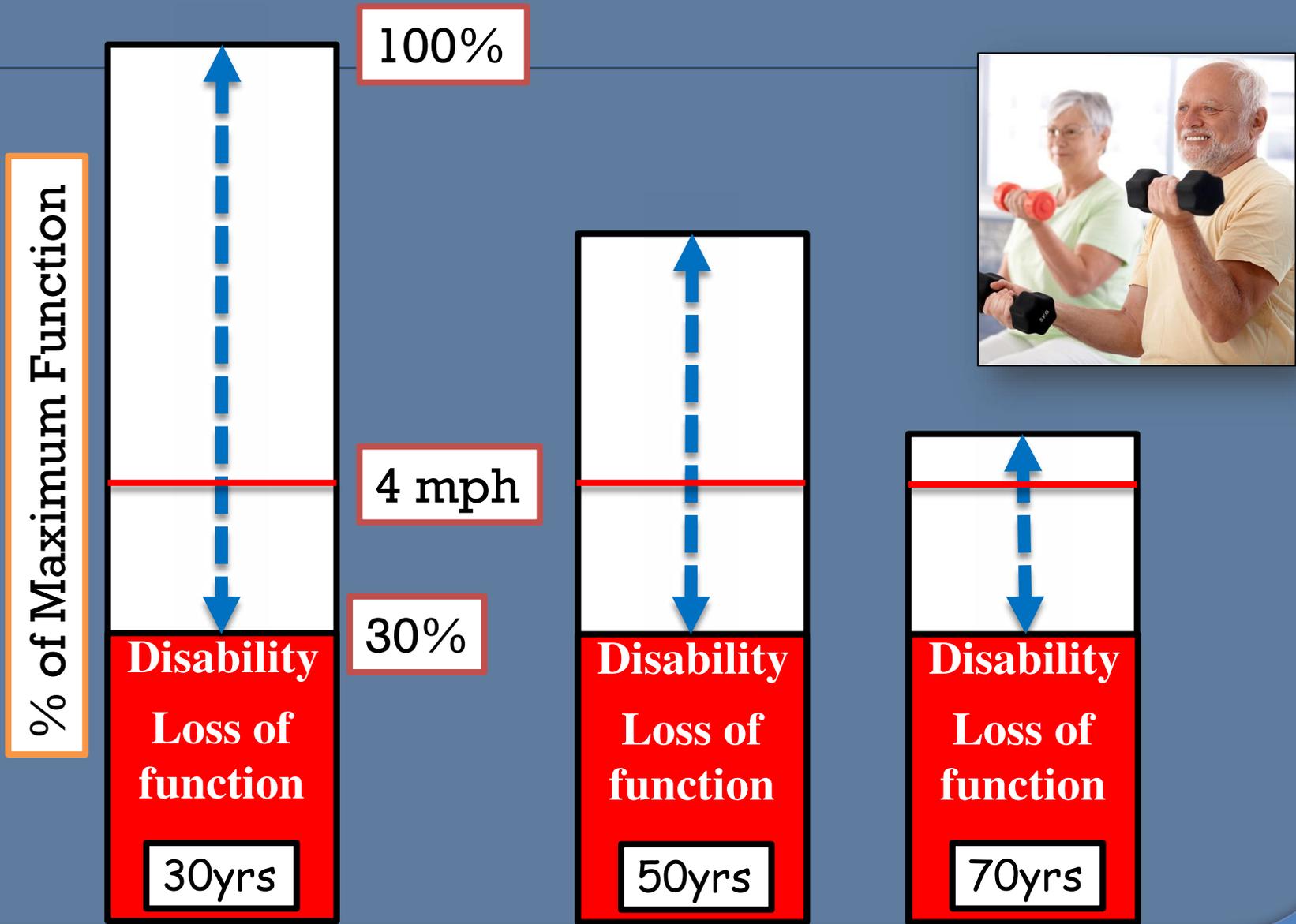
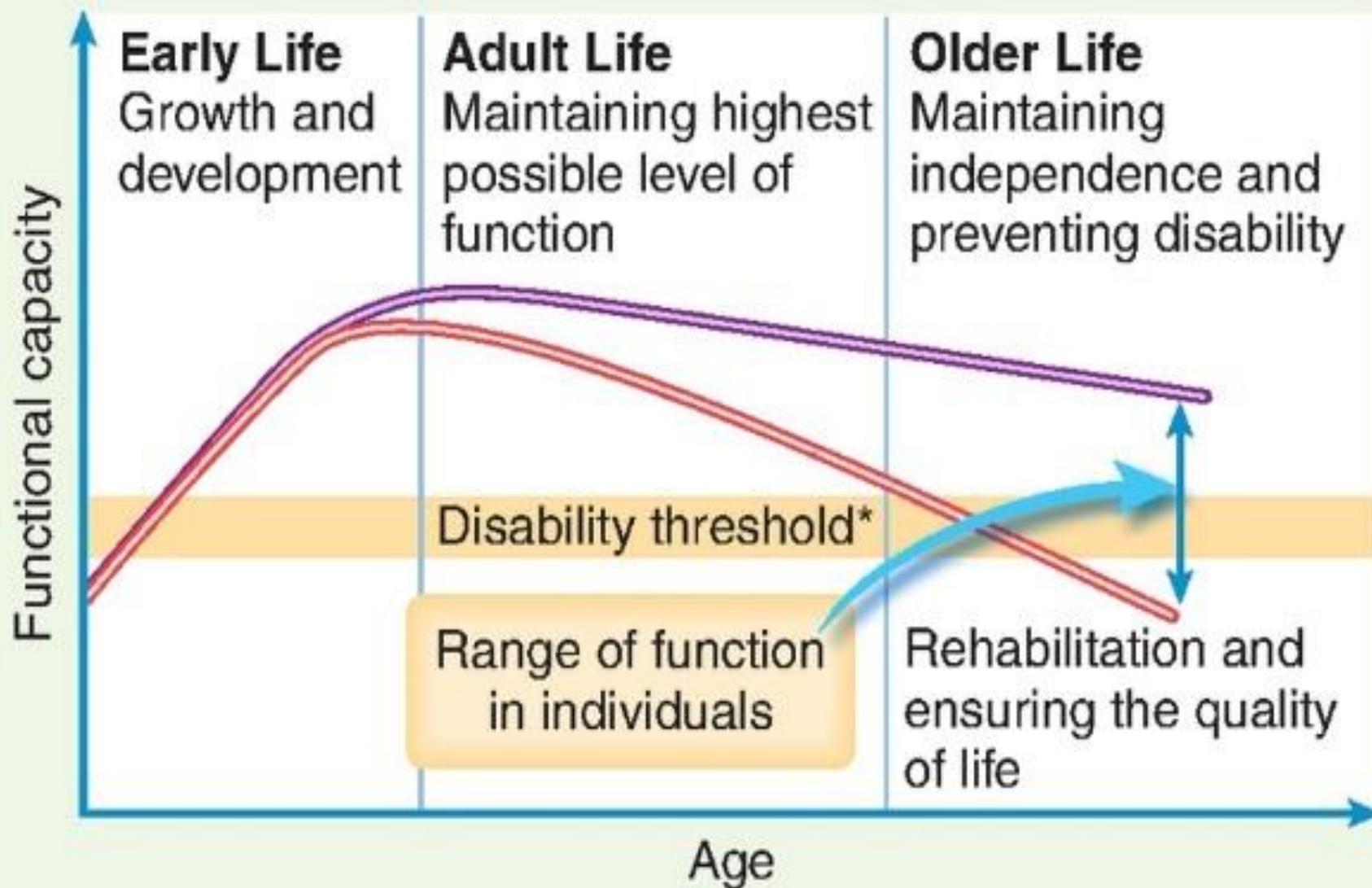


Figure illustrating aging trajectories for 2 individuals



Kalache & Kickbusch, 1997

# Resistance training design for healthy aging



# UWEC Community Fitness



# UWEC Community Fitness

100 Community Members, 40-75 years old

25-30 students, 3 clients each

MWF 5:30-7:30am for 12 wks during semester

## Pre and Post Physiological Testing



Cardiorespiratory  
Muscular Strength  
Lower Body Flexibility  
Dynamic Balance  
CV Risk Factors

Body Composition  
Core Endurance  
Upper Body Flexibility



**Table 1.** Exercise intervention protocol.

Warm-up	Circuit 1	Circuit 2
Jog	6 Hurdles into 10yd Sprint	Burpees
Knee to Chest Walk	Pushups	W Cone Drill
Butt Kicks	Line Drills	Ladders into 10yd Sprint
High Knees	Squat (Jumps)	Quick Feet
Alternating Side Lunges	Ball Throw w/ Side Shuffle	Ball Throw w/ Side Shuffle
High Skips	Stairs	Step Ups / Box Jumps
Carioca	Ladders	Mountain Climbers
Jog	Jumping Jacks	Square Cone Drill

# UWEC COMMUNITY FITNESS RESEARCH

## THE AGIL FUN

MEAGAN FISHER

ELIZABETH ERIC

<sup>1</sup> University of Wis

<sup>2</sup> University of Auc

Corresponding au

### ABSTRACT

**Purpose:** *The p functional ability r*

**Methods:** *Nine and control (n = 3 conducted pre- and*

**Results:** *The tra test, and 8-ft up-a group.*

**Conclusion:** *Pa in addition to balo dynamic movement*

## EFFECTS RESIST ON PE

Jeffrey Janot, Ta

University of W

University of W

Tel: 7

### ABSTRACT

**Purpose:** Few studies ha resistance training (RT). T measures of strength, co

**Methods:** Fifty-four you a TRX (younger n=15; old age group. A control gro and after completing the bench press for upper bo abdominal skinfold (aSKF right (SBR) test, and Biod

Diabetes Mellitus, Sedentary Lifestyle, Trauma, and Fractures: A Review of the Literature

Open Access

A co trans to a

### PREVALENCE OF DYSMOBILITY SYNDROME IN A COMMUNITY BASED EXERCISE PROGRAM

Morgan M. Anderson, Tessa L. Church, Anna L. Graaskamp, Dylan CM. Cooper, Samuel M. Ferch, Nicholas M. Beltz

Department of Kinesiology, University of Wisconsin-Eau Claire, Eau Claire, WI

#### ABSTRACT

**Background/Purpose:** Recently, ‘dysmobility syndrome’ (DMS) has been used to describe the presence of frailty and susceptibility to impaired mobility, fractures, and falls. The model is comprised of six factors: osteoporosis, self-reported fall risk, low appendicular lean mass, slow gait speed, low grip strength, and high fat mass. The positive identification of at least three factors indicates DMS. The present study sought to describe the prevalence of DMS in a community-based exercise program in individuals over the age of 50. **Methods:** Forty-two men (n=17) and women (n=25) aged 50 years or older completed the study. Participants completed the following assessments: fall risk questionnaire, dual energy x-ray absorptiometry, 4m gait speed test, hand-grip dynamometer, and Biodex Fall Risk assessment. Descriptives and frequencies were computed to highlight prevalence. Binomial regression was applied to determine the hazard ratio for fall-risk score. **Results:** Four of the 42 individuals (9.5%) were classified as having DMS. The frequency of positive identification were high body fat (22/42), fall history (14/42), osteoporosis (7/42), low appendicular lean body mass (5/42), low grip strength (1/42), and slow gait speed (0/42). **Conclusions:** This study suggests that participation in a community-based exercise program may mitigate the factors associated with DMS.

**KEY WORDS:** Frailty, Fall Risk, DMS, Community Based Exercise, Older Adults

Lance C. ... Gary P. Va ... Tara B. Ri ... Donald L. ... Jeffrey M. ... <sup>1</sup>Recreation, Science Dep ... Colorado Un ... USA; <sup>2</sup>Depart ... Nutritional S ... State Univers ... USA; <sup>3</sup>Depart ... University of ... Eau Claire, W

# Resistance Training for Older Adults

## Major benefits of a RT program:

- Maintain muscular fitness
- Improve mobility
- Maintain independence
  - ↓ Fall Risk
- Maintain LBM & bone mass
- Improve self-efficacy



# Final thoughts on fitness.....

The dominant effect of fitness over other risk factors, and its apparent effect as an antidote for other risk factors, makes physical fitness perhaps the single most important thing an older person can do to remain healthy.



# Final, final thought on fitness.....

Meanwhile, I continue to run, slowly but certainly.

Exercise for the young is an option.

Exercise for the old is an imperative.

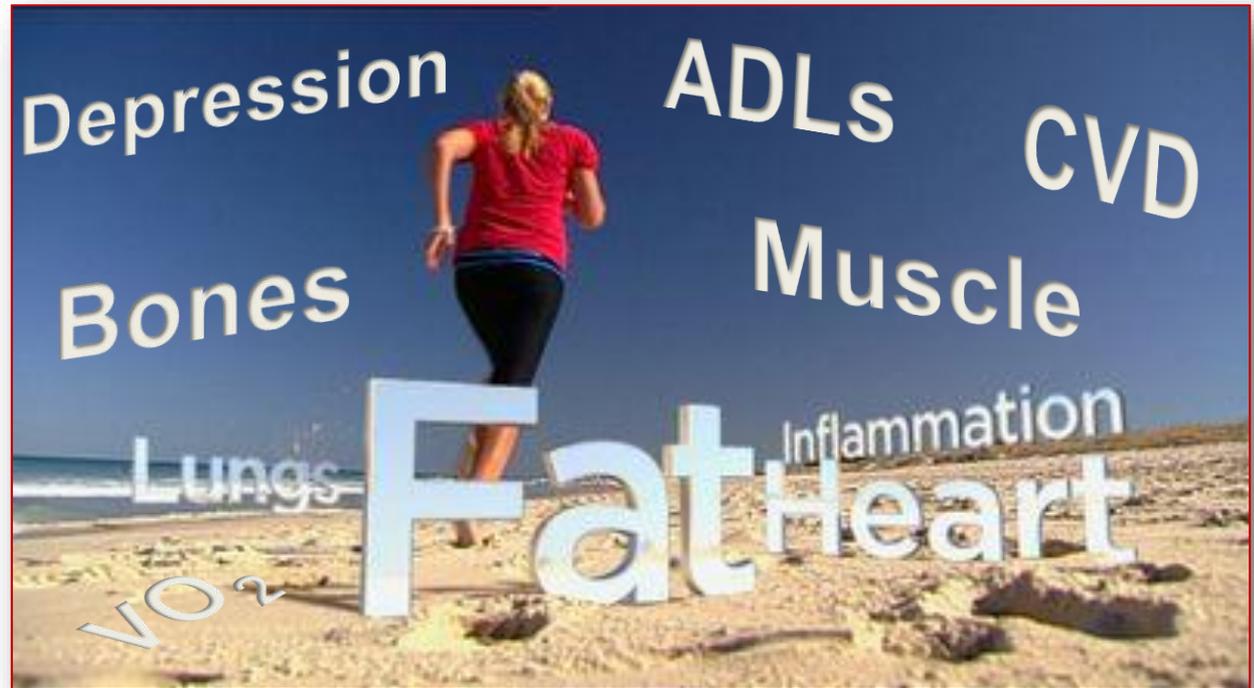


*Dr. Walter Bortz II, Huffpost Dare to Be 100 blog,  
March 21, 2015*



Thank you  
very much for  
your  
attendance  
today!

A special  
thank you to  
UMASH!



**Questions??**



