

## Attachment 1 — IDEAL Recruitment Presentations

The diverse interests and understandings of the audiences to whom IDEAL study staff present as well as operational changes have required some changes and additions to the information provided in the recruitment presentation. These power point presentations are identified herein as Attachment 1a (General Presentation) and Attachment 1b (Scientific Presentation). Attachment 1a has undergone minor revisions, whereas Attachment 1b constitutes the addition of scientifically focused slides to the recruitment presentation.

The changes to Attachment 1a are as follows:

1. Modifications of the content due to operational changes
  - a. Under Eligibility criteria no longer excludes participation for those using “hyperlipidemia” medications.
  - b. **MedStar** has been added to the title of the hospital, now known as MedStar Harbor Hospital
  - c. All reference to Home Visit for Physical Screening has been removed as all screening is conducted at MedStar Harbor Hospital for the IDEAL cohort.
  - d. An update to the role that Dr. Ferrucci now holds was added — Luigi Ferrucci, M.D., Ph.D, Scientific Director of NIA, Principal Investigator, NIA, NIH
2. Addition of content to present scientific observations
  - a. In addition to the slides which provide a general overview of the study and its purpose a series of slides which depict specific methods and examples of observations occurring during the testing and what this information is indicative of have been added. This information was previously limited to those who qualified for the physical exam.



Insight into the  
Determinants of  
Exceptional  
Aging and  
Longevity



The average age of our population is increasing at unprecedented rates. The current life expectancy for Americans is around 77.9 years. Improved medical care and prevention efforts mean that for the first time in history, older people have an opportunity to avoid major chronic diseases and remain healthy, active, and productive. But more research is needed to understand healthy aging.



- ❖ The IDEAL Study is sponsored by the National Institute on Aging (NIA) part of the National Institutes of Health (NIH)



## Purpose:

- ❖ Identify biological, physiological, and behavioral factors that distinguish “exceptional” agers from others their age.
- ❖ Understanding what differentiates “exceptional” agers from others their age may provide clues to how to preserve physical and cognitive function in late life and prevent disease and disability.



## Study population:

- ❖ People age 80 and older
- ❖ Living within 150 miles of Baltimore-Washington
- ❖ Meet the eligibility criteria



## Eligibility criteria:

- ❖ Can perform normal activities of daily living without any help
- ❖ Can walk a quarter mile without pain or shortness of breath
- ❖ Have no severe memory or cognitive issues



## **Eligibility criteria (cont'd.)**

Have no major medical conditions, including no history of:


- ❖ Cardiovascular disease
- ❖ Diabetes
- ❖ Active cancer
- ❖ Neurological or brain diseases





## Eligibility criteria (cont'd)

Have no major medical conditions, including no history of:

- ❖ Any medical condition that requires chronic drug treatment except drugs for hypertension and hyperlipidemia 
- ❖ Severe gastrointestinal or stomach diseases
- ❖ Significant vision and hearing problems




## Stage one of screening:

- ❖ 10 minute phone interview
- ❖ Questions to assess major diseases and disability status



## Stage two of screening

- ❖ Informed consent
- ❖ Confirm eligibility
- ❖ Assessment of physical and cognitive function at  
 MedStar Harbor Hospital in Baltimore
- ❖ Obtain a blood sample for eligibility criteria





## Enrollment in BLSA

- ❖ Baseline assessment
- ❖ Yearly follow-up visits



“Our aim is to learn the secrets of exceptionally healthy old age. What we find may one day help reduce the burden and suffering of others.”

Luigi Ferrucci, M.D., Ph.D., Scientific Director of NIA,  
Principal Investigator, NIA, NIH





# The **IDEAL** Study

In Search of the Secret  
to Healthy Aging



**ideal**

Insight into Determinants of  
Exceptional Aging and Longevity

**Luigi Ferrucci, MD, PhD**  
National Institute on Aging  
Baltimore, MD

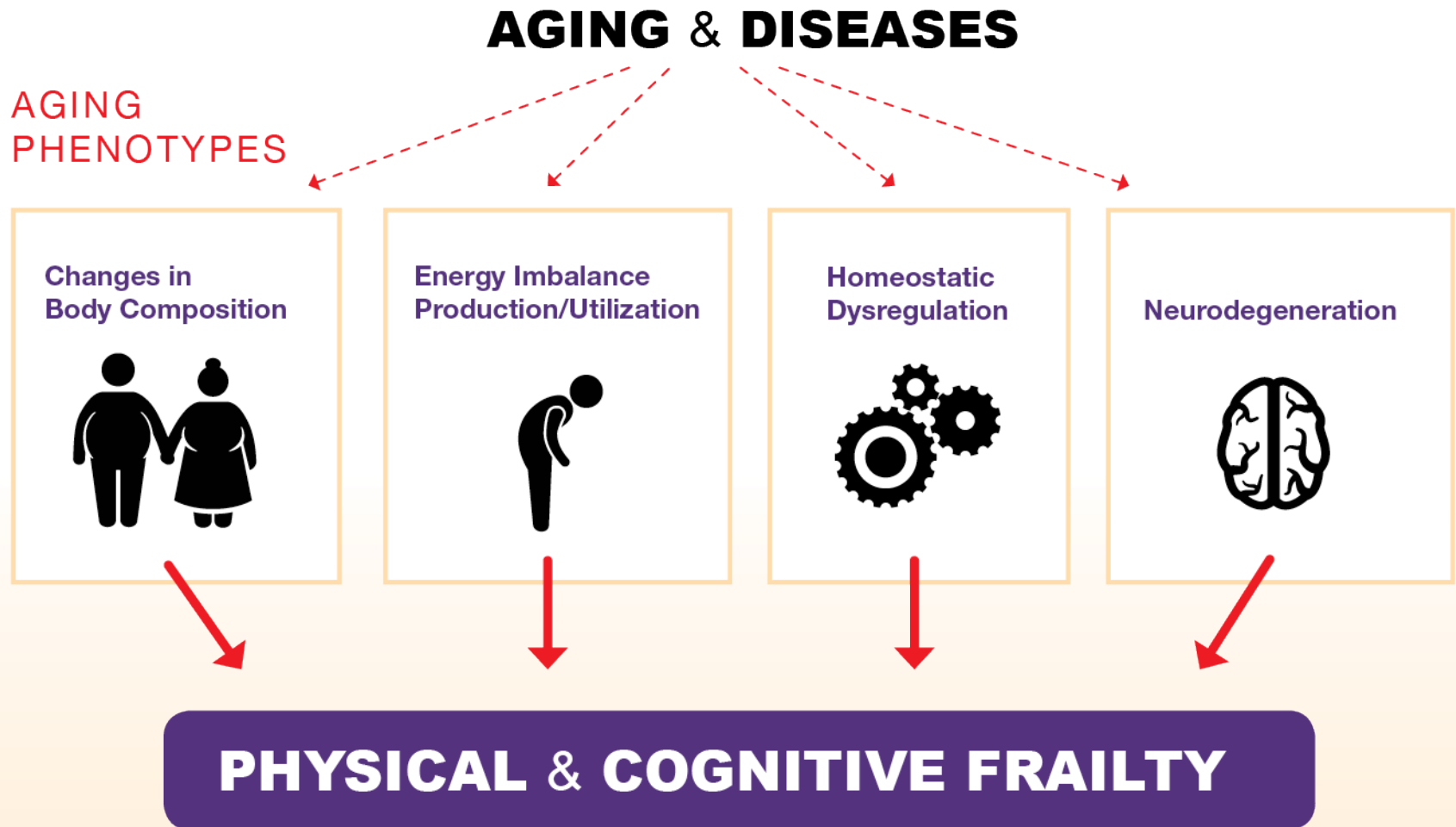




How old is she?



# The Process of Aging and Diseases

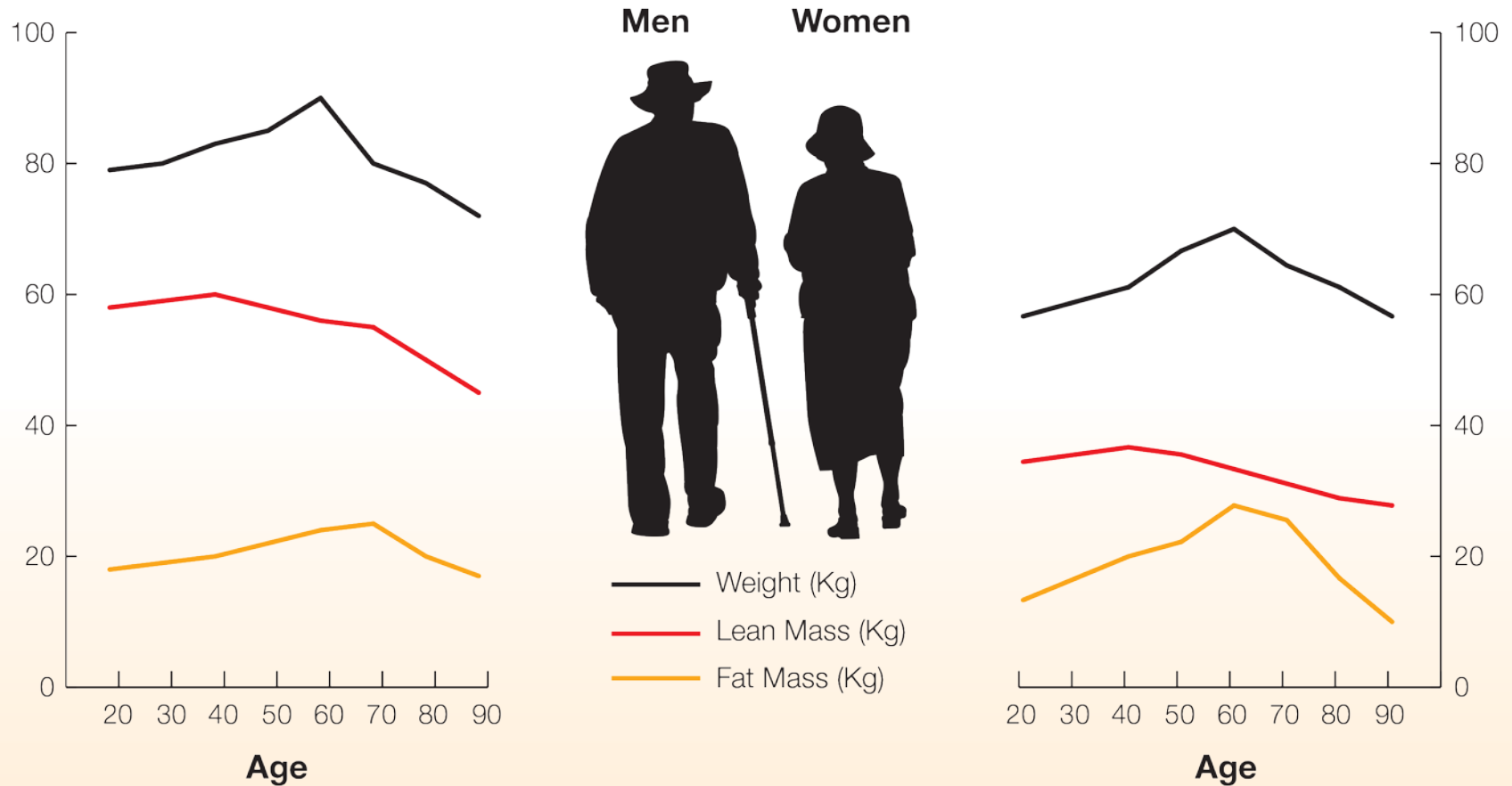




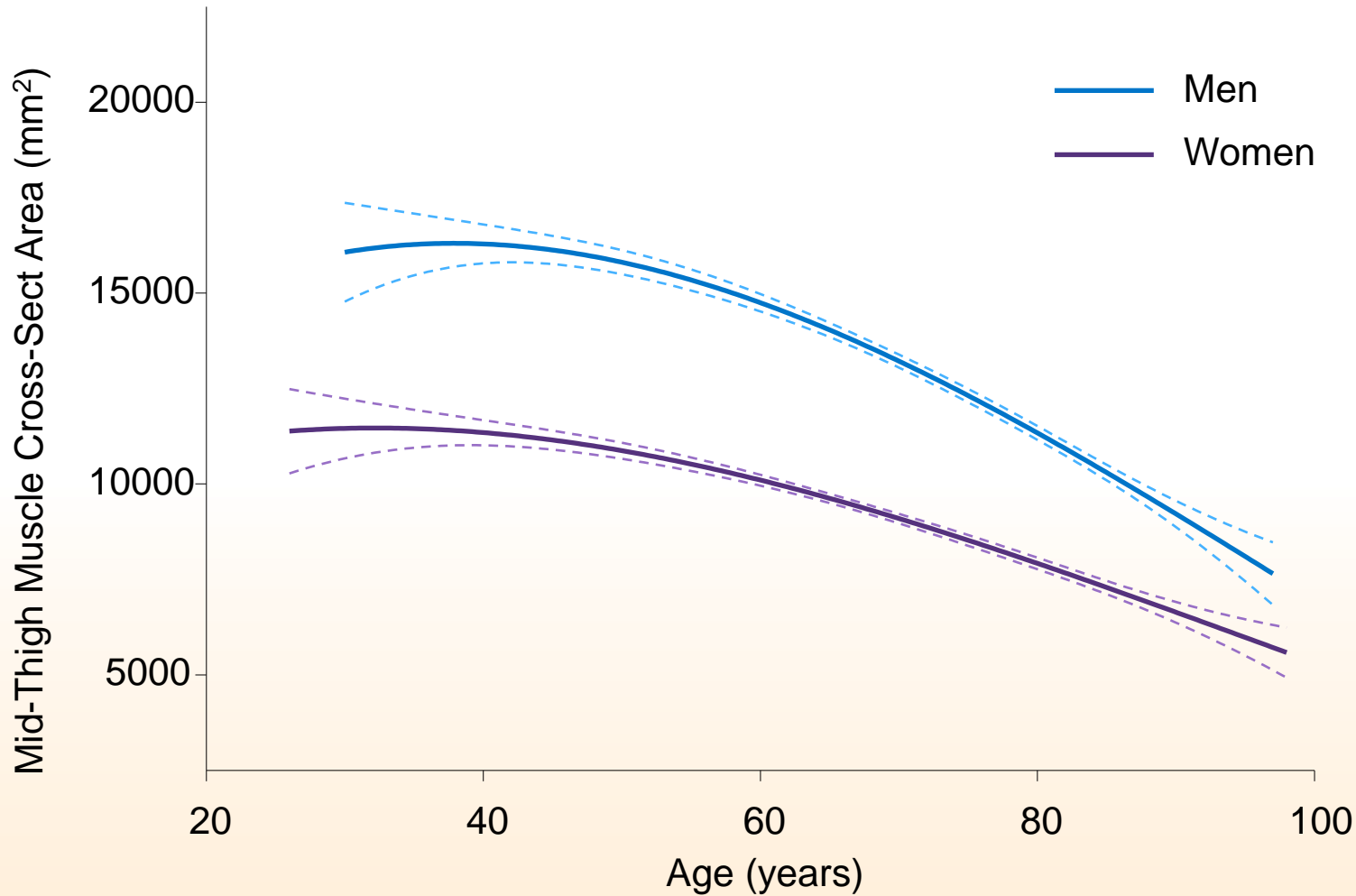
# Changes in Body Composition



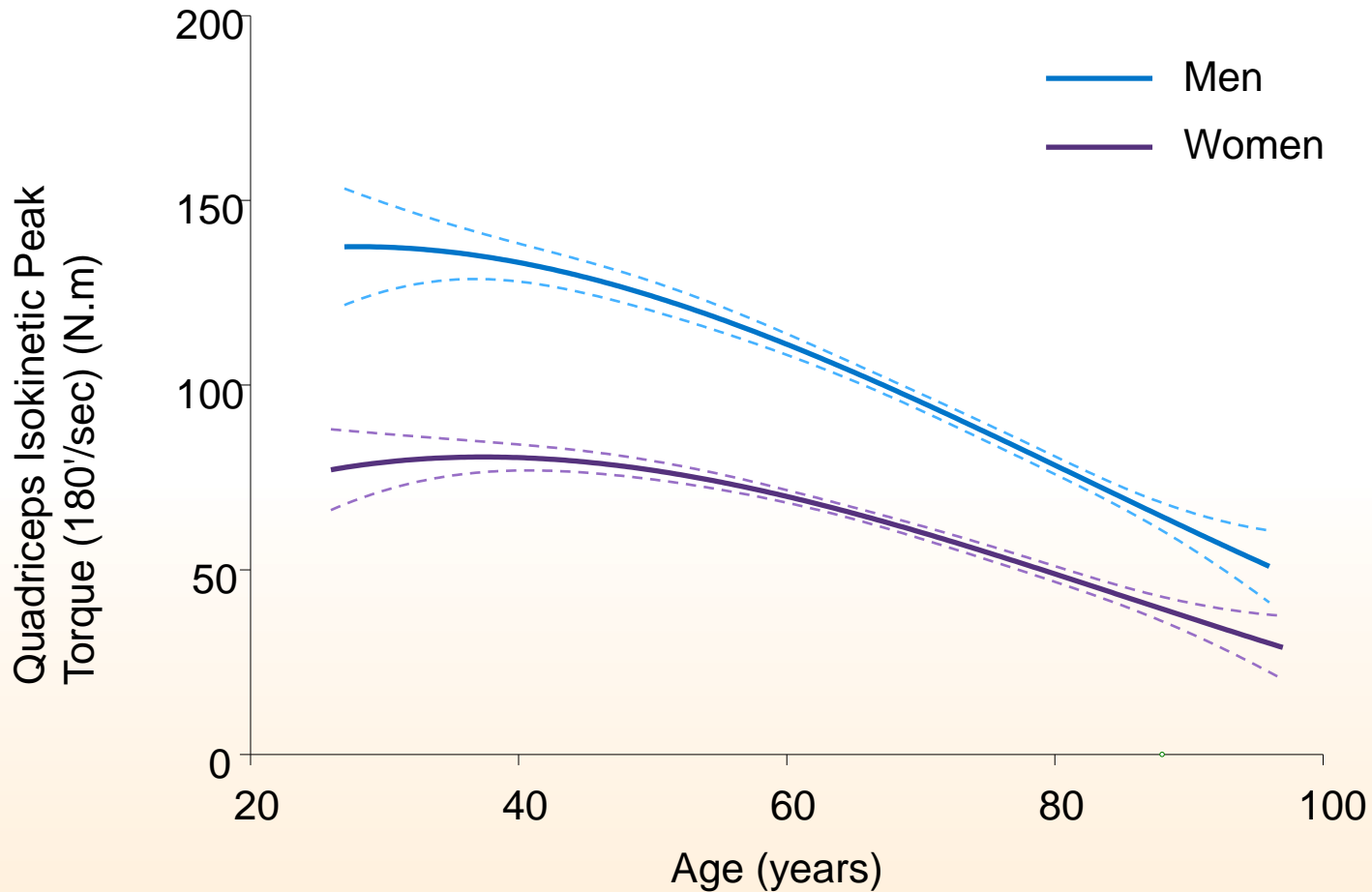
# Weight, Muscle and Fat Longitudinal Changes in Body Composition with Age



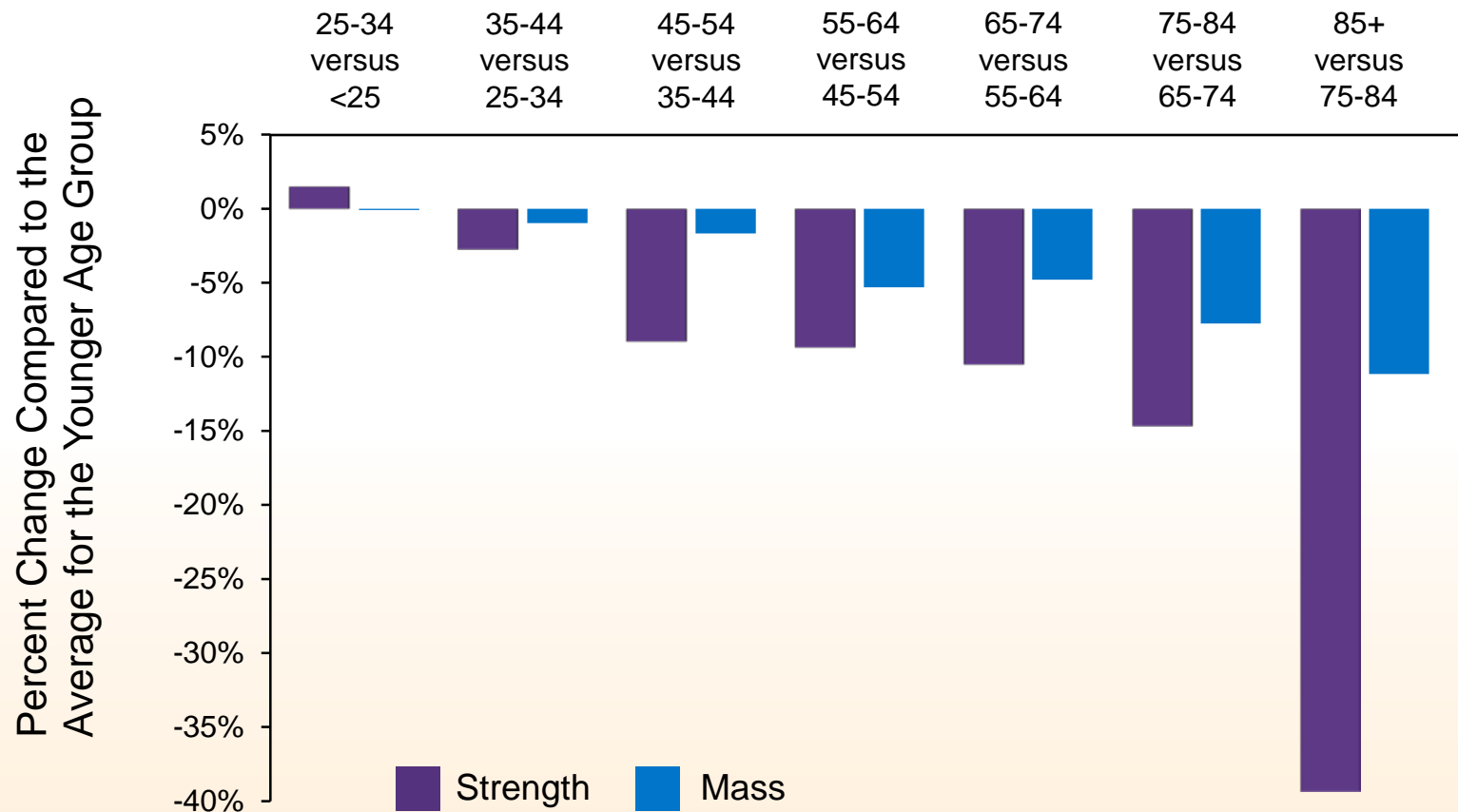
# Differences in Muscle Mass by Age



# Decrease in Muscle Strength by Age



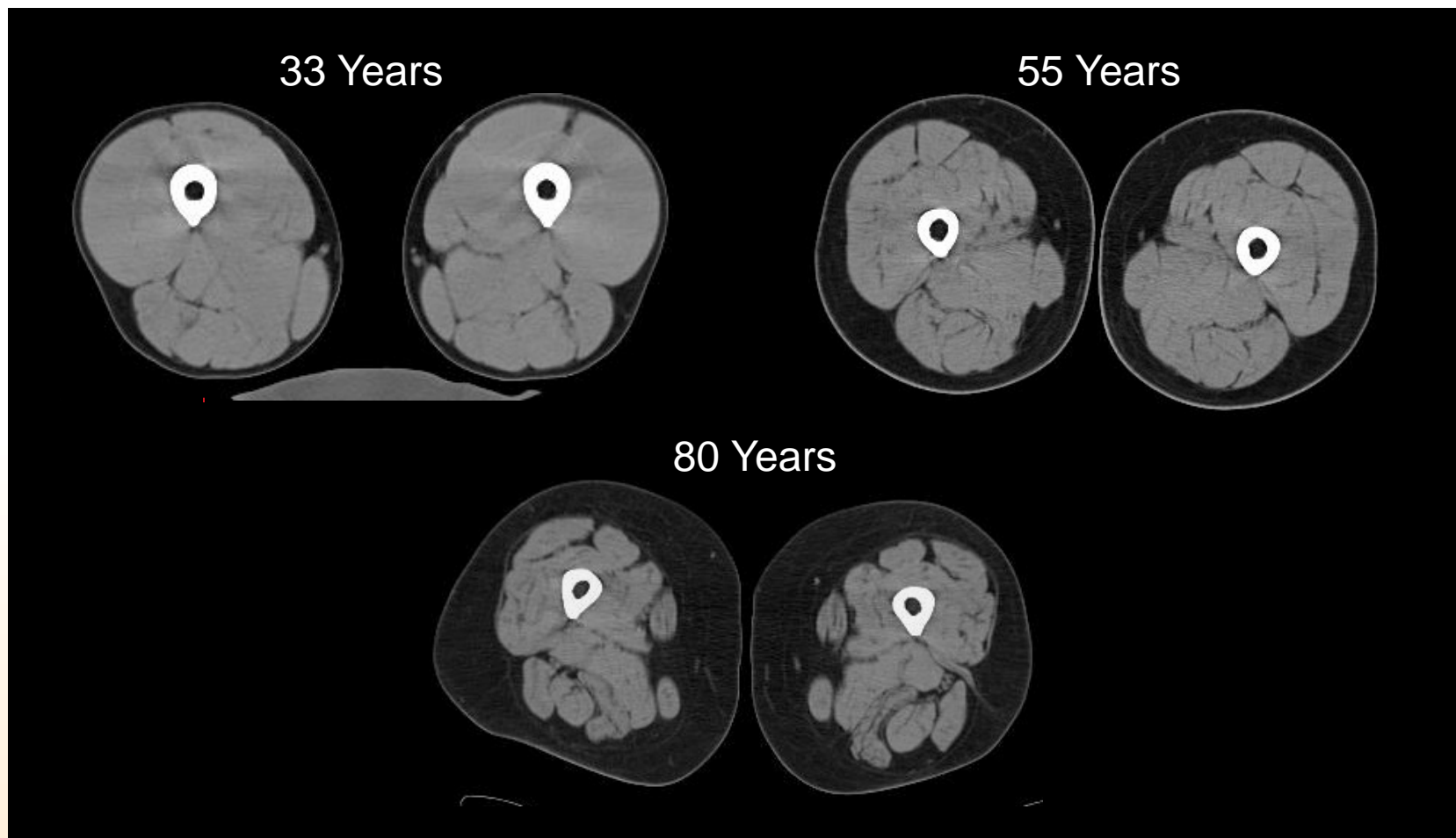
# Both Muscle Mass and Muscle Strength Decrease with Age



# Muscle

## Mid-Thigh CT Images for Women (BMI 30-32)

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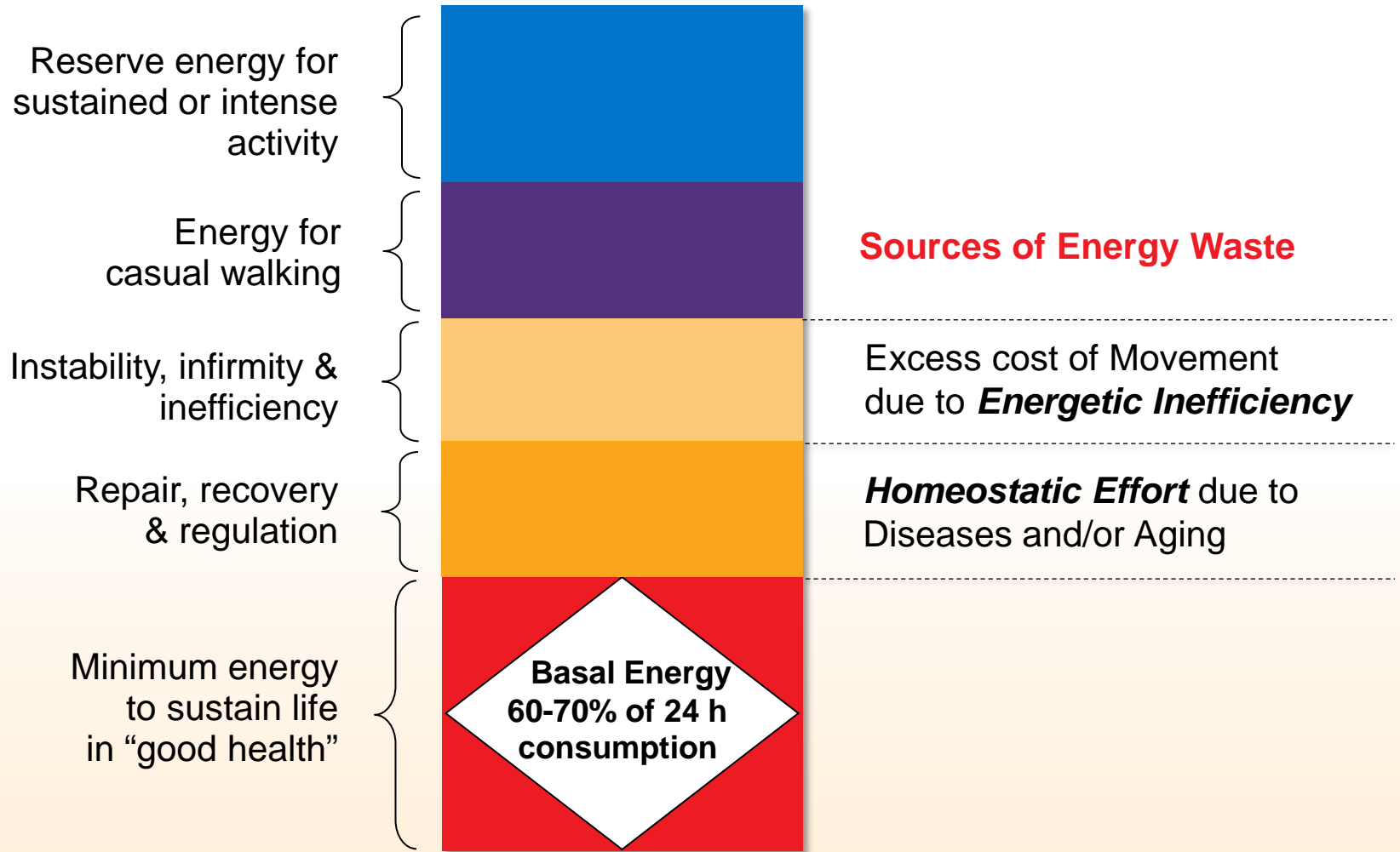
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# Energy Imbalance Production Utilization

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# Energy Budget





# How We Measure Energy Efficiency

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## GLOBAL MOTOR EFFICIENCY

$O_2$  Consumption / Work Performed



## EXERCISE TESTING

ORGANS & TISSUES

CELL BIOLOGY

PHYSICS & BIOMECHANICS

# Organs and Tissues

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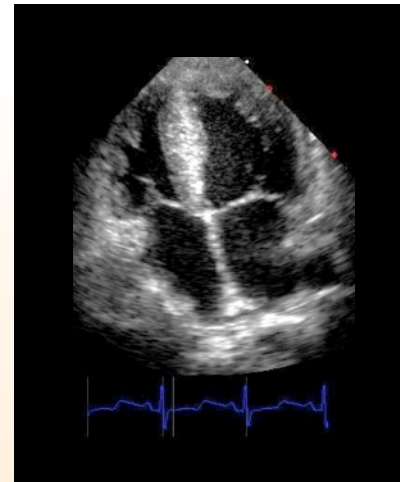
## Respiratory Testing

- Oxygen uptake efficiency slope
- Spirometer (FEV1)



## CV Testing

- Cardiac function (Echo)
- Vascular stiffness (PWV)
- Capillary density (biopsy)

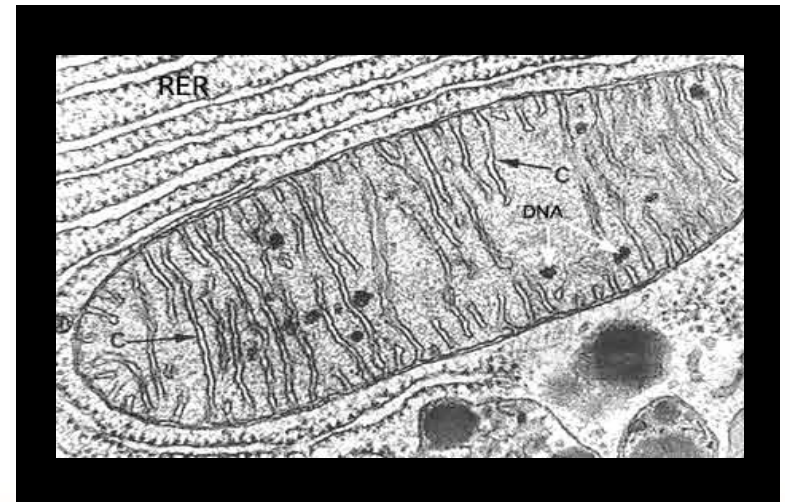


# Cell Biology

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## Cell Biology and MRS

- Mito volume (microscopy + EM)
- Mito content (cardiolipin)
- ADP-ATP phosphorylation (ATPmax) (31P MRS)
- Phase III mitochondrial respiration (oxygraph)
- ECT enzyme activity (NADH oxidase)



# Physics and Biomechanics

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## Gait Testing

- Muscle strength/mass
- Balance
- Joint pathology
- Sensory impairment





# Development of a Short Physical Battery to Predict Disability

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**Walking 4 m  
(0-4) points**



**Maintaining balance  
(0-4) points**

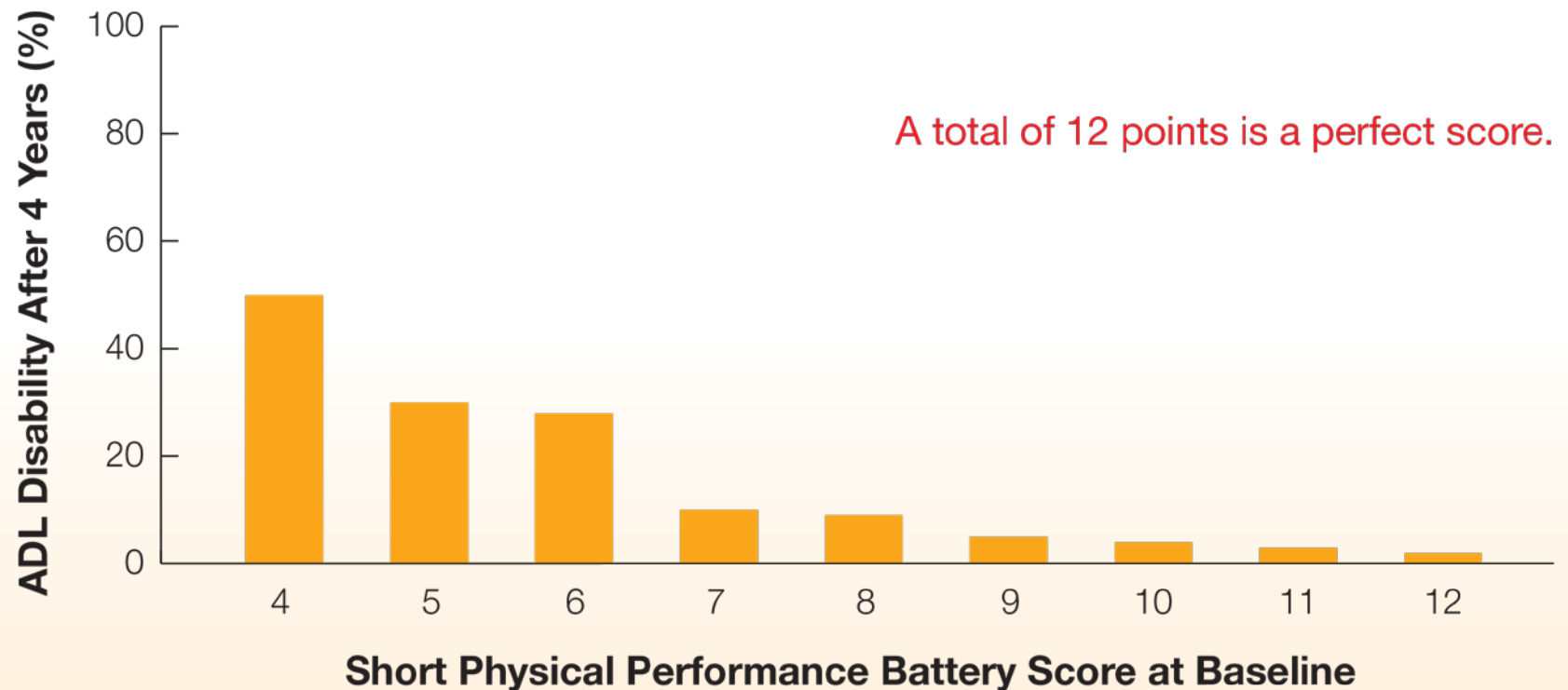


**Chair rising  
(0-4) points**



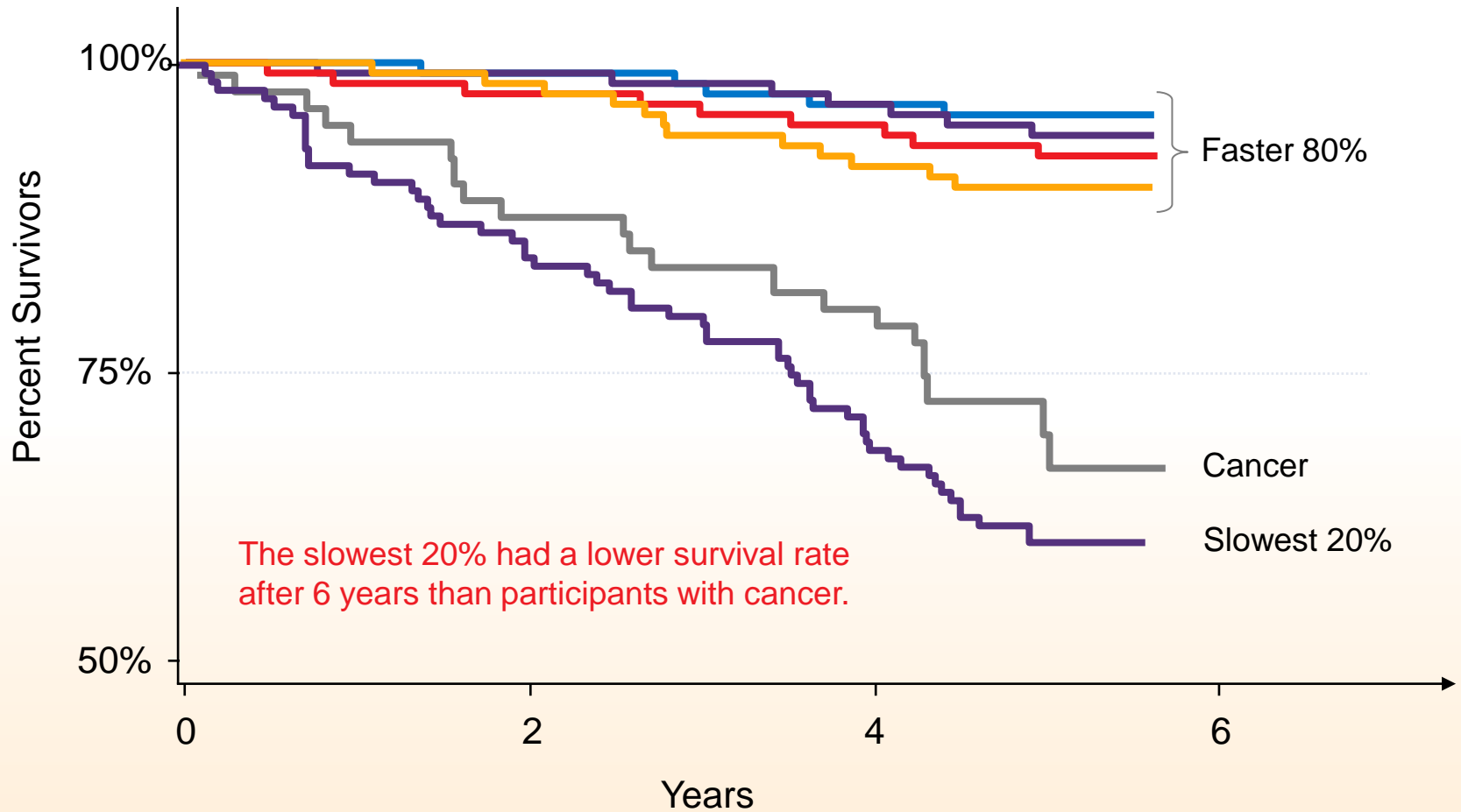
# Lower-Extremity Function in Persons over the Age of 70 Years as a Predictor of Subsequent Disability

Jack M. Guralnik, MD, PhD  
Luigi Ferrucci, MD, PhD  
Eleanor M. Simonsick, PhD  
Marcel E. Salive, MD, MPH  
Robert B. Wallace, MD





# Walking Speed A Powerful Predictor of Mortality





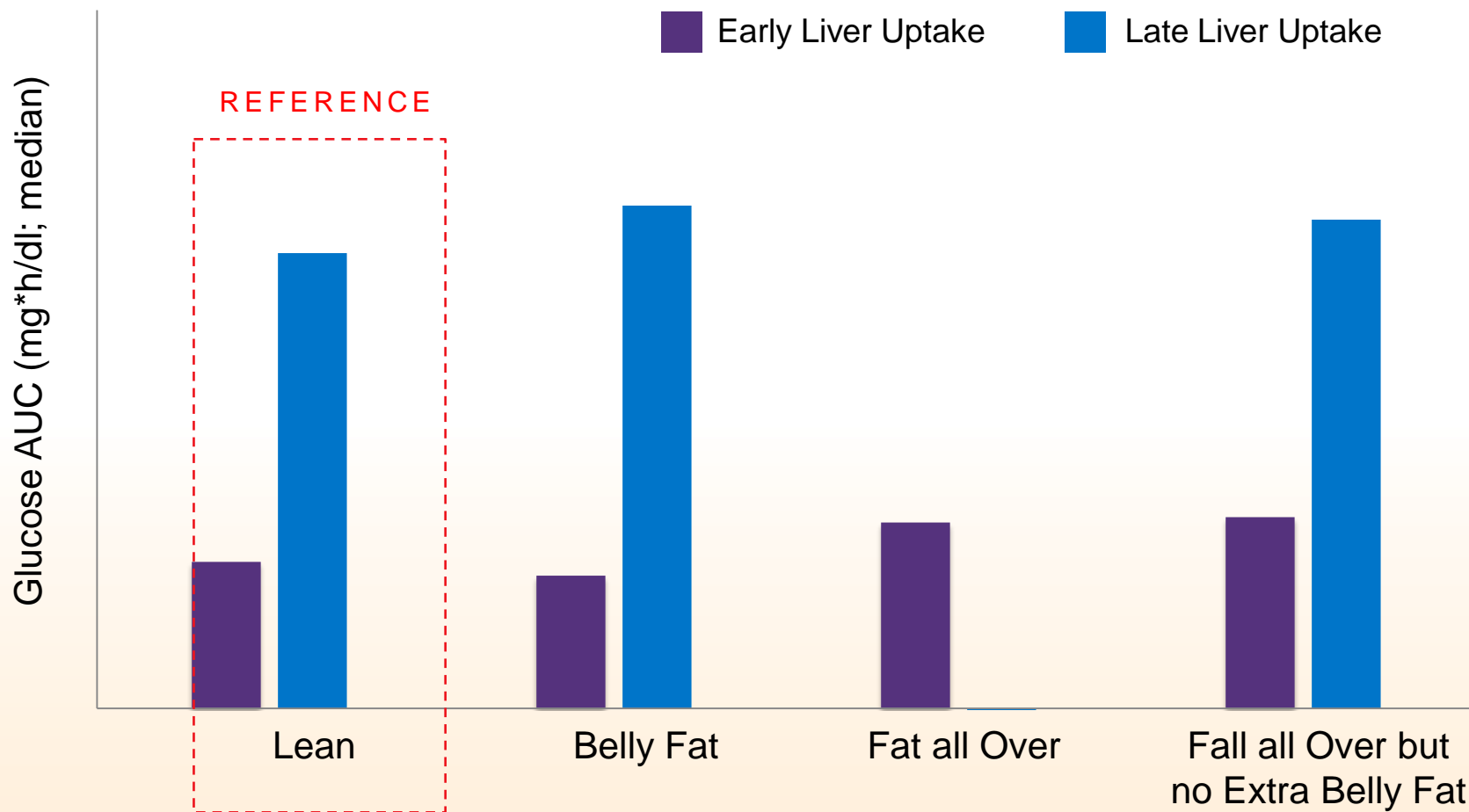


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# Homeostatic Dysregulation

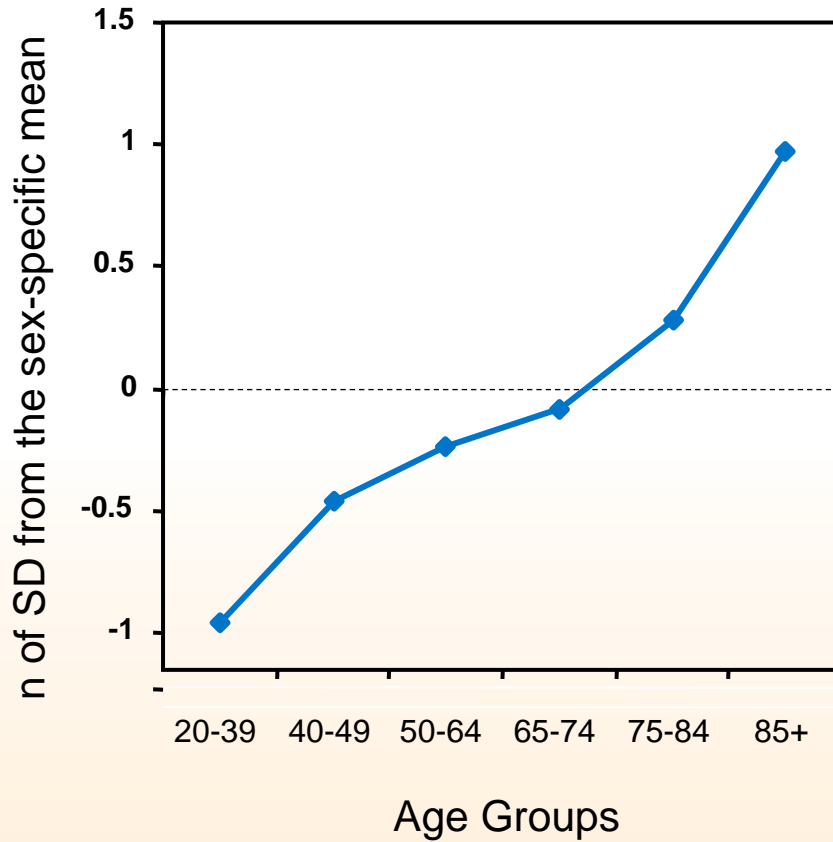
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# Fat and Where it is Located is Related to Glucose Intolerance in Older Adults

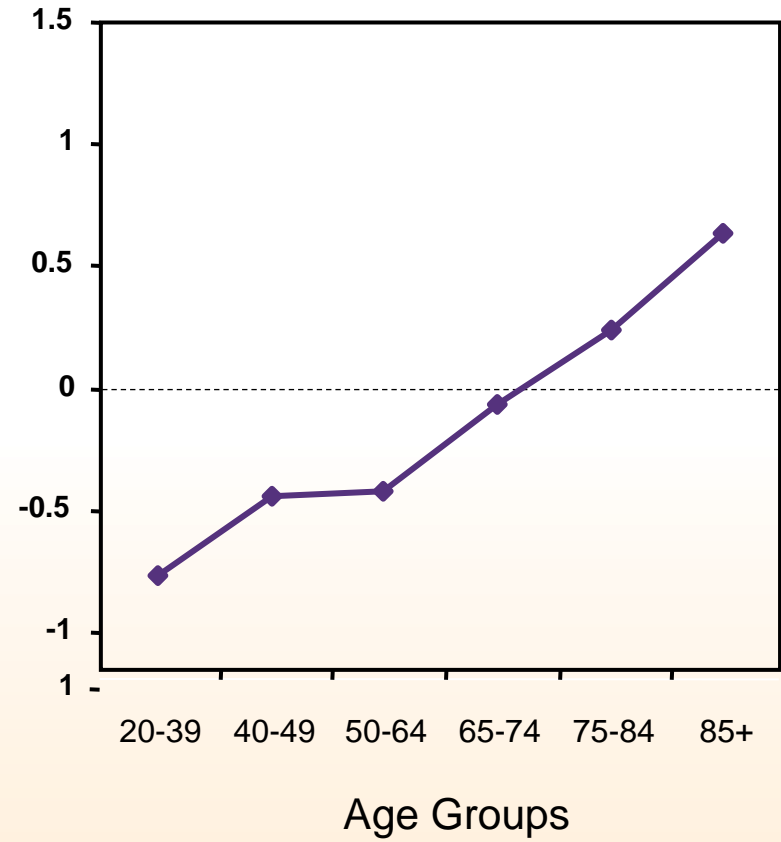


# The Mild Pro-Inflammatory State of Aging

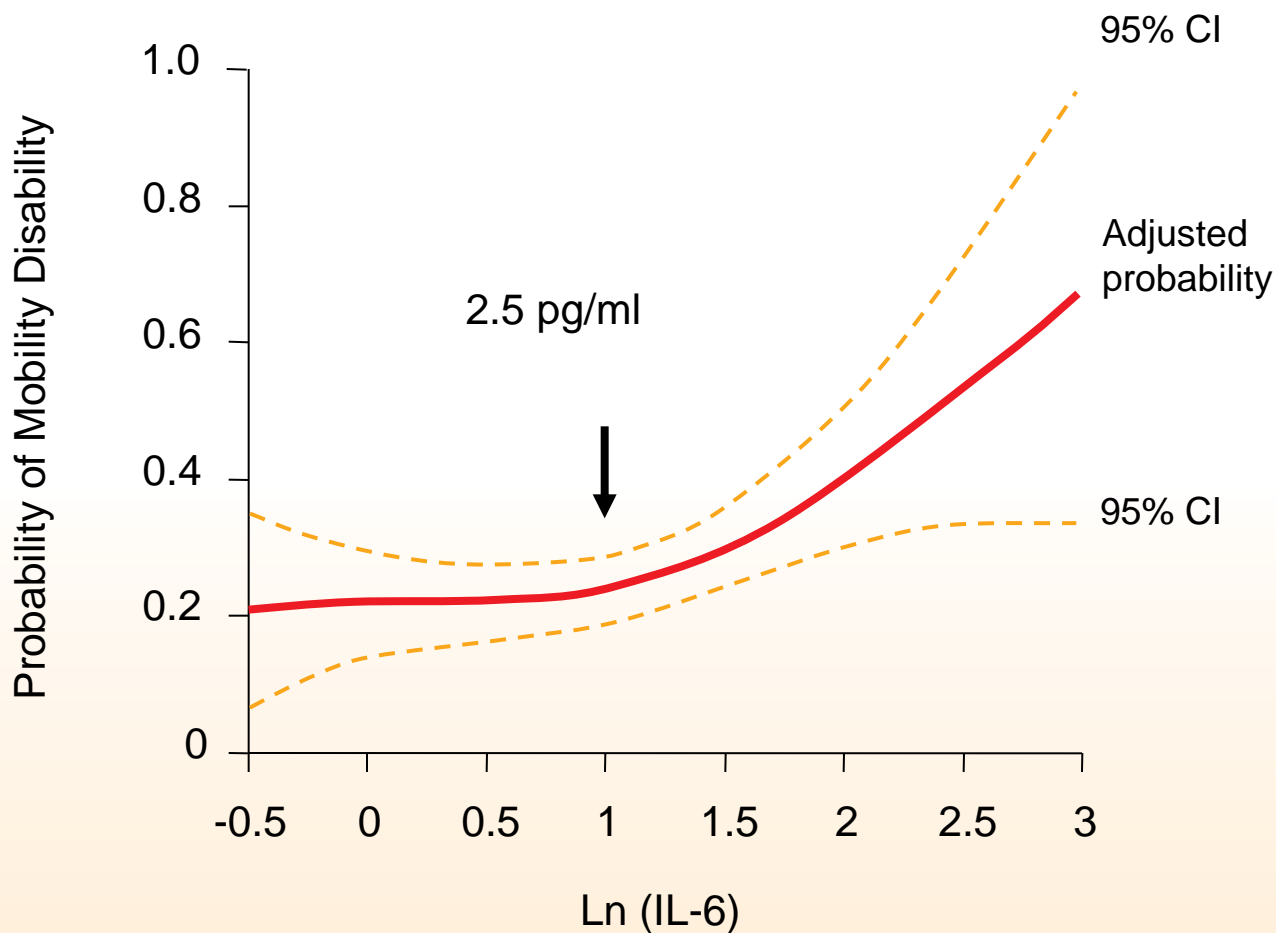
## IL-6 in Men



## IL-6 in Women



# Interleukin-6 Serum Levels in Older Adults Predict Incident Disability 4 years later





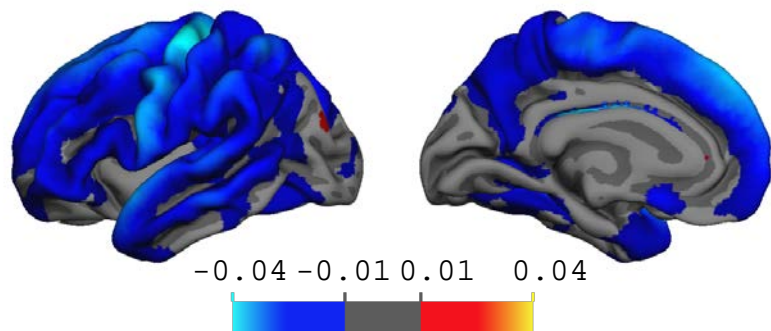
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# Neurodegeneration

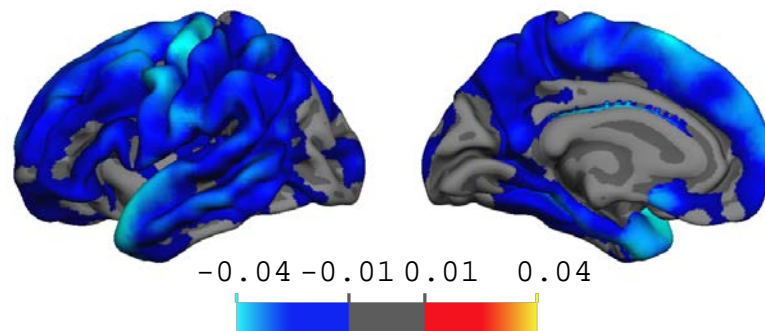
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# Annual Rates of Cortical Thinning over 8 Years in Normal Aging & Cognitive Impairment

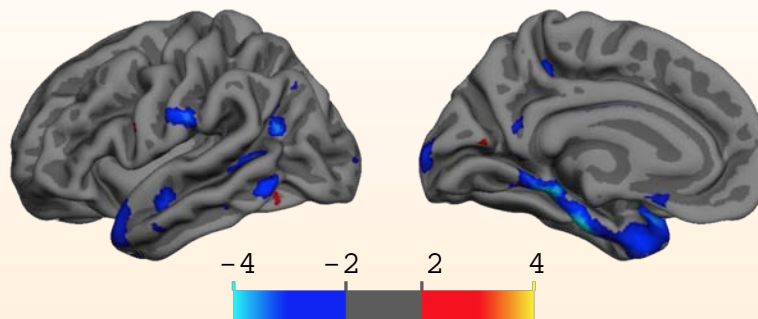
Cognitively Normal (n=96)



Cognitively Impaired (n=25)



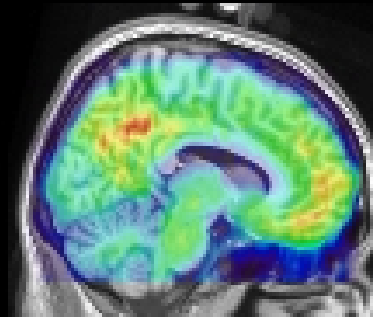
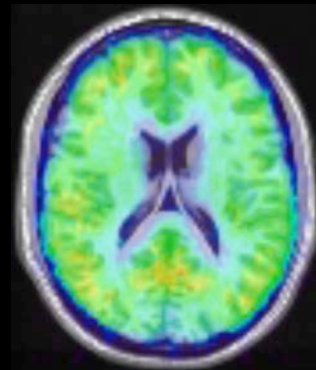
CI > CN



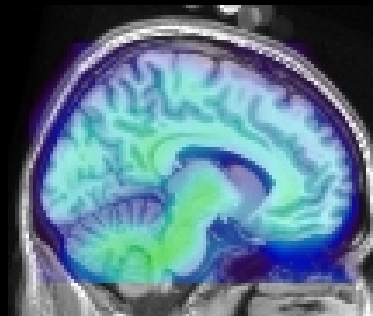
# Amyloid Plaques Precede Memory Problems

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Memory Problems  
4 years later



Stable Memory





# Measures in the BLSA Paradigm – A Hierarchical Network of Measures

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## Homeostatic Network

HORMONES  
INFLAMMATION  
AUTONOMIC  
OX STRESS  
NUTRITION  
PHYSICAL ACTIVITY

## Physiological Domains Relevant for Mobility

CENTRAL NERVOUS SYSTEM  
PERIFERAL NERVOUS SYSTEM  
MUSCLES  
BONES & JOINTS  
ENERGY  
FEEDBACK

## Mobility

SELF-REPORT  
PERFORMANCE  
GAIT LABORATORY





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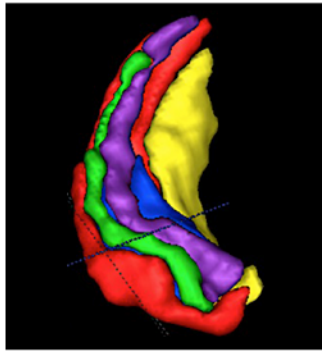
# Lessons from the BLSA

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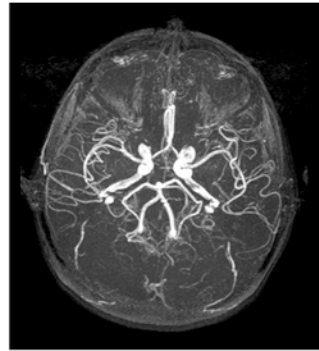
# Get Moving

## PHYSICAL ACTIVITY

✓ Better Functioning Hippocampus



✓ More Blood and Oxygen to Brain



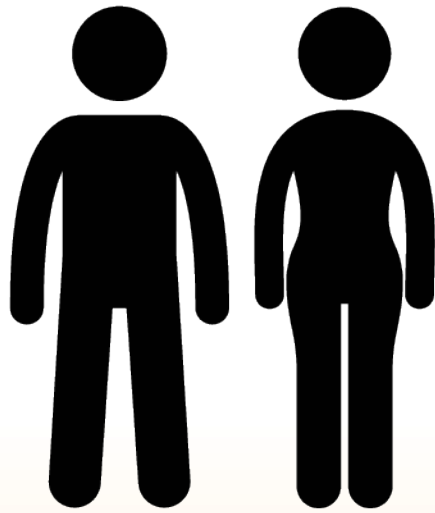
✓ Enhanced Fitness



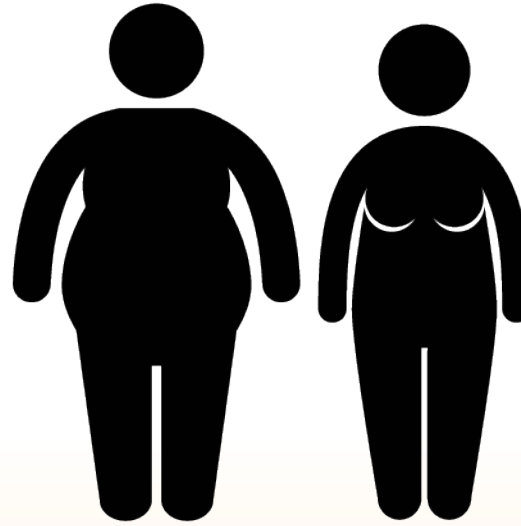
**ENHANCED COGNITIVE & PHYSICAL FUNCTION**

# Pay Attention to Weight and Shape

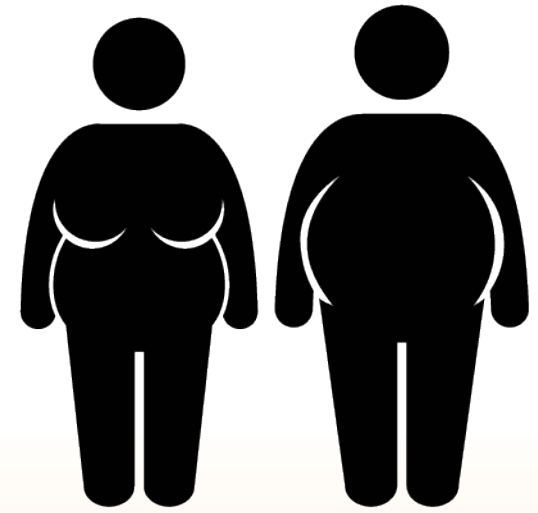
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LEAN



PEAR



APPLE

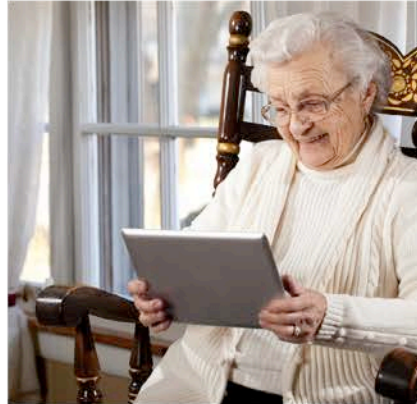
# Think About What you Eat

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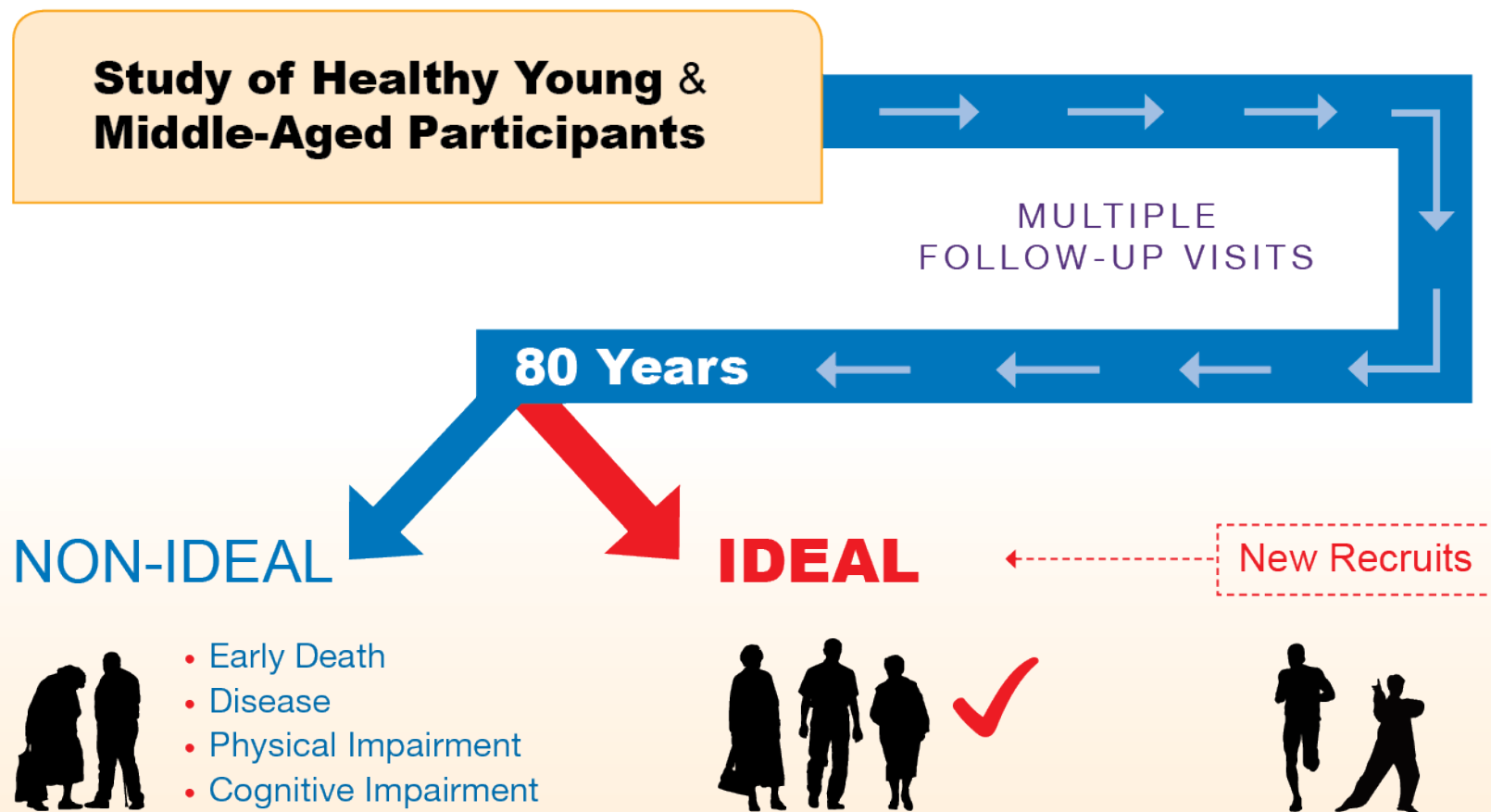
# Participate in Activities you Enjoy

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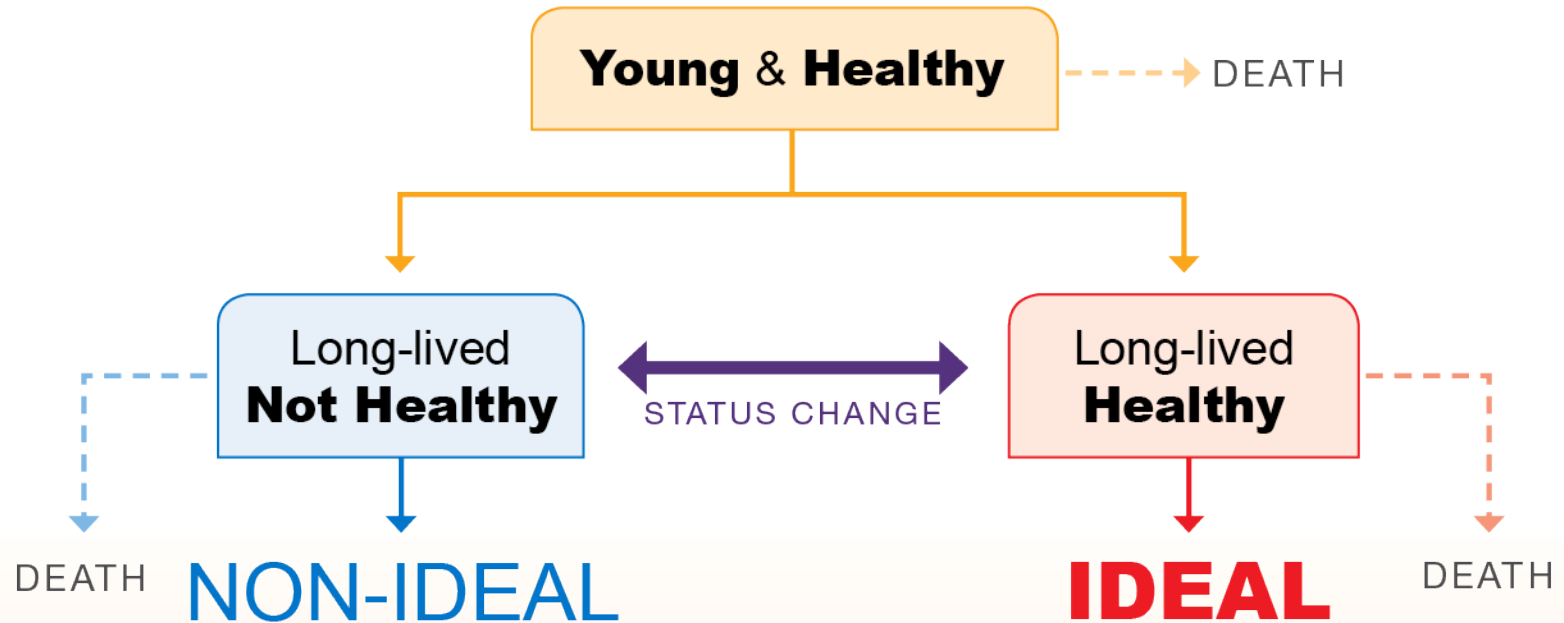


# The BLSA

## Baltimore Longitudinal Study of Aging



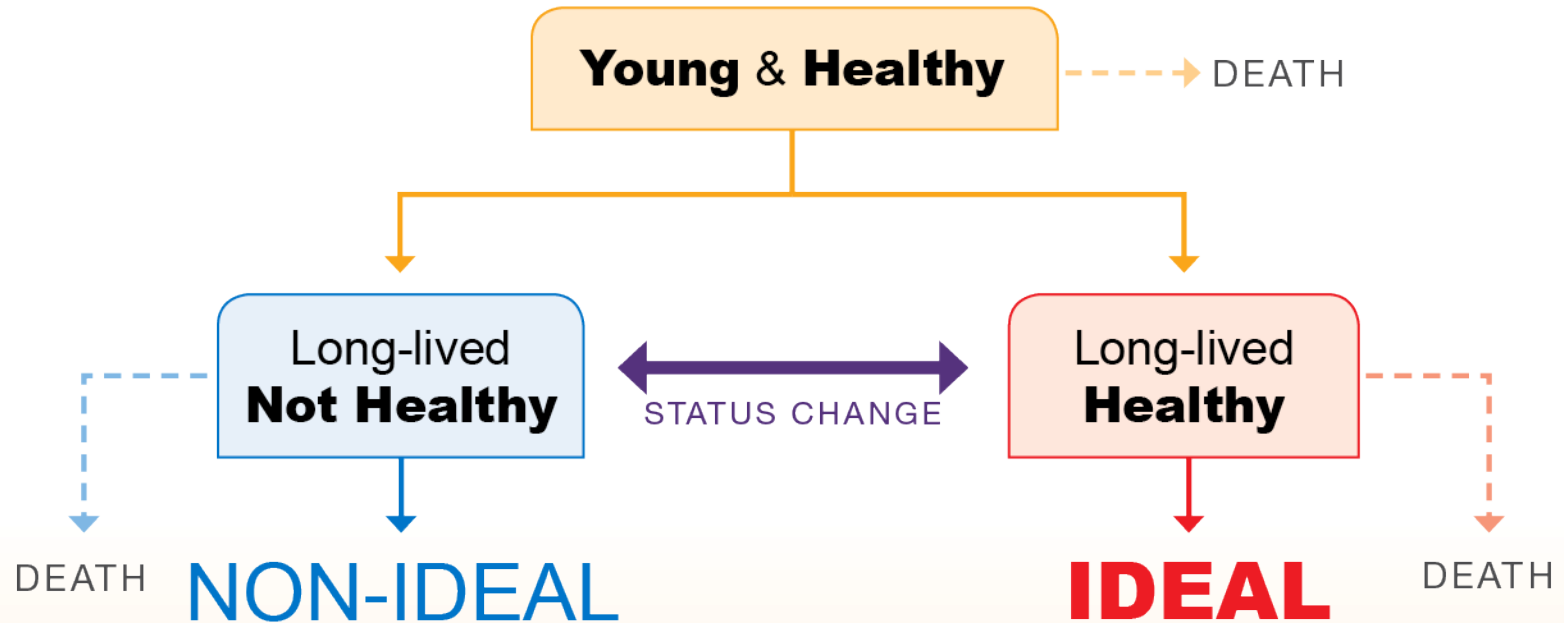
# What Can We Learn From IDEAL?



What differentiates people who survive to old age maintaining an IDEAL condition compared to those who also survive to old age but develop diseases and functional impairments?

# What Can We Learn From IDEAL?

(cont'd)



What are the risk factors for mortality or losing IDEAL status in IDEAL persons





ideal

Insight into Determinants of  
Exceptional Aging and Longevity

**Are you** ✓ 80 or older?  
✓ Mentally sharp?  
✓ In great health?

***You may be an exceptional ager!***



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**1-855-80 IDEAL (1-855-804-3325)**  
**[www.nia.nih.gov/ideal](http://www.nia.nih.gov/ideal)**

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# A Study for our Children and the Children of our Children





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# QUESTIONS?

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