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Strength & Power Training for the Aging Adult

Michael Stack
ACSM-EP, ACSM-EIM, ACSM-PAPHS, CSCS

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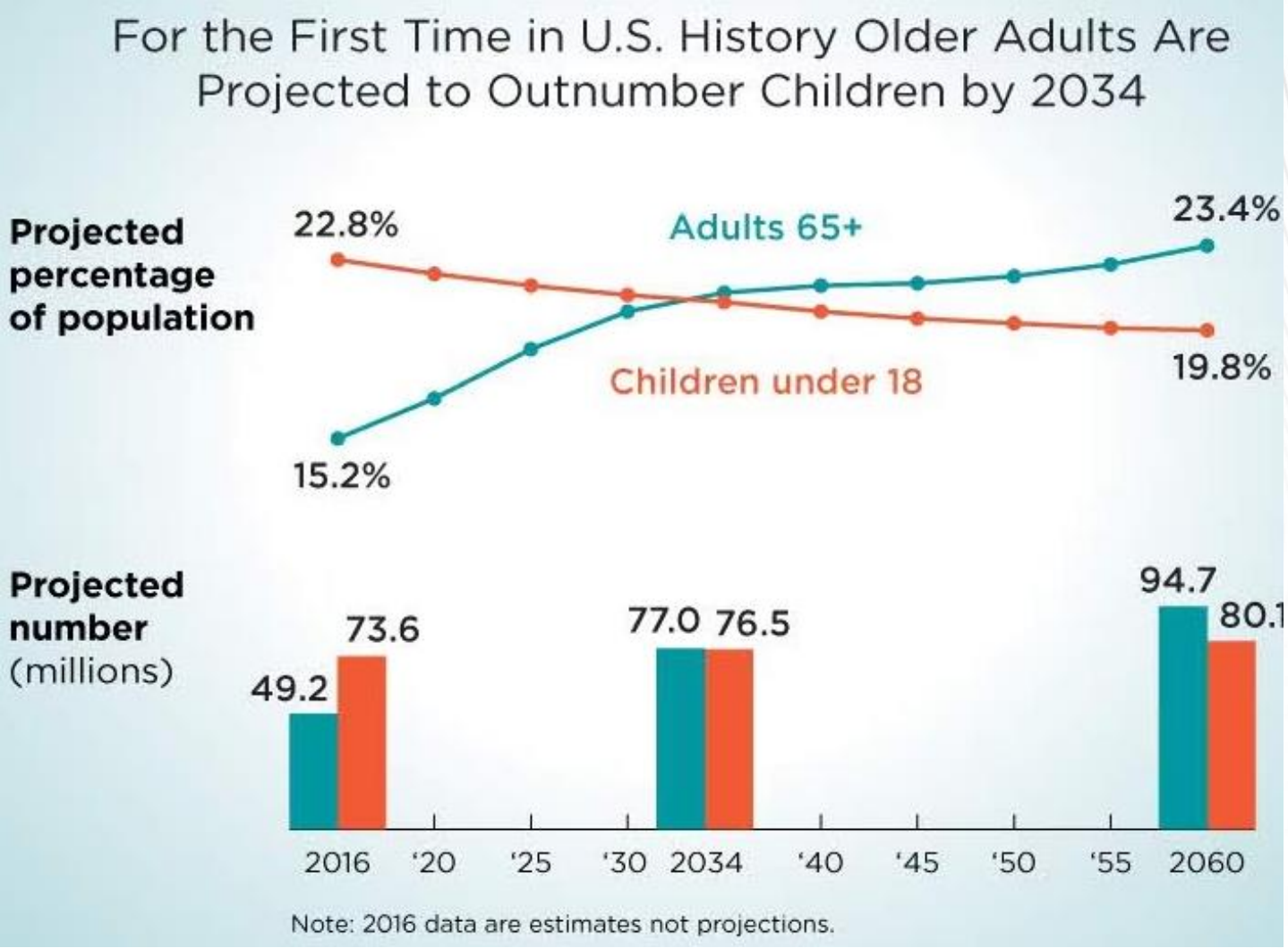
The “Graying” of America Opportunity

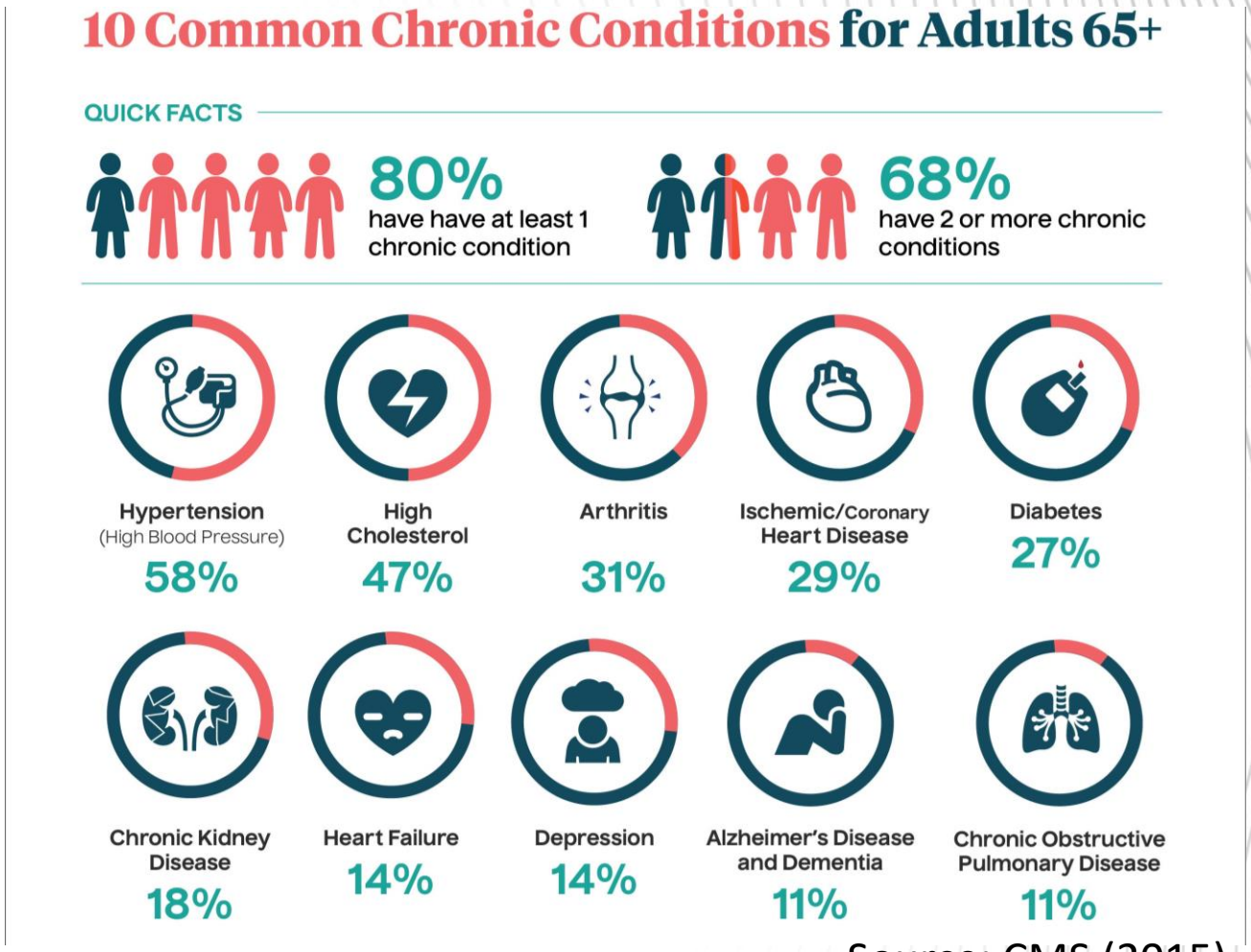
The “Graying” of America[1]



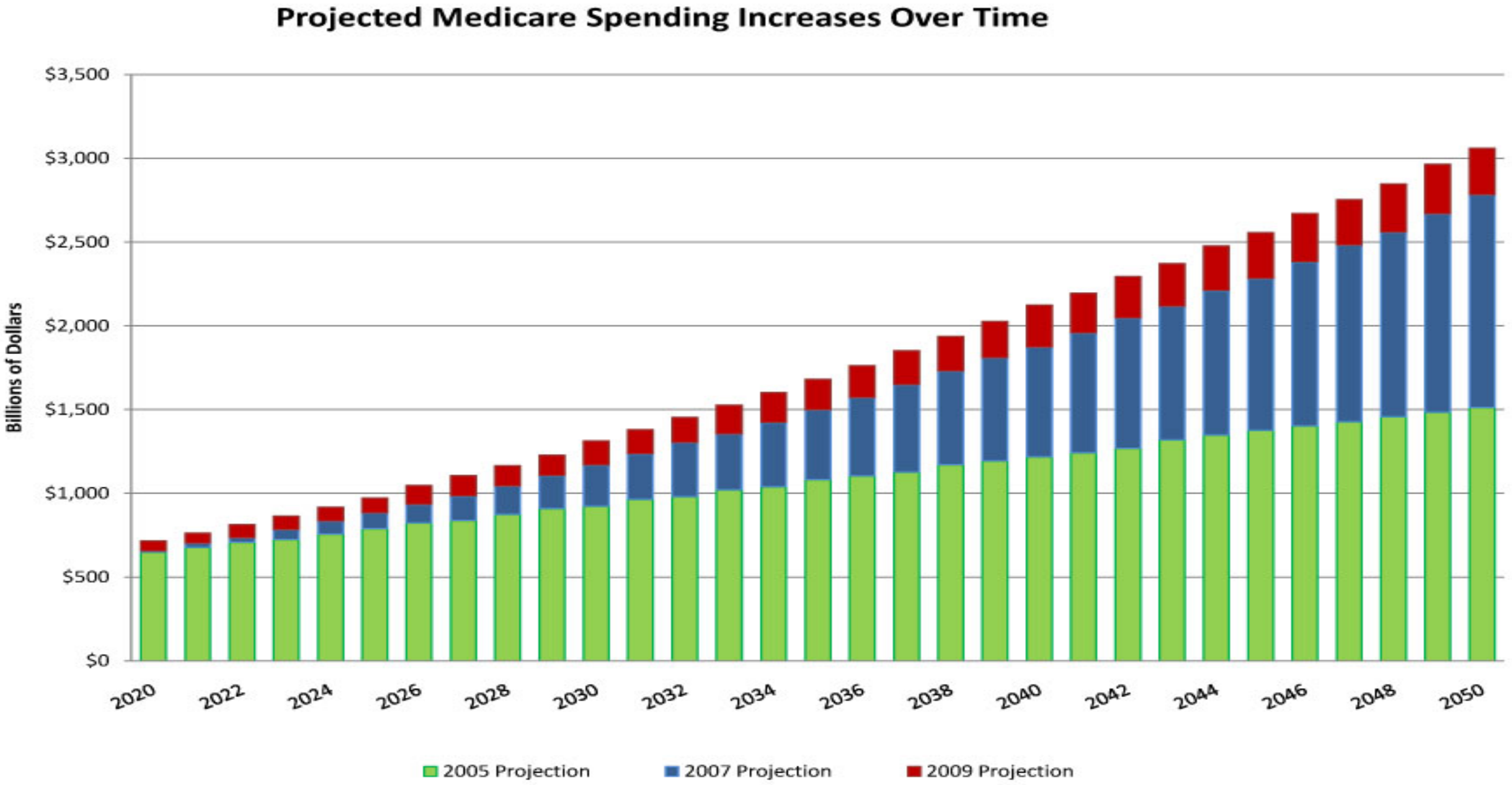
[1]Census.gov

“Graying” of America - Implications

- Modern medicine = live longer ≠ living better
- Longer we live the more chronic conditions we have
- Implications:
  - Increased healthcare costs
  - Decreased quality of life
  - Opportunity for lifestyle intervention

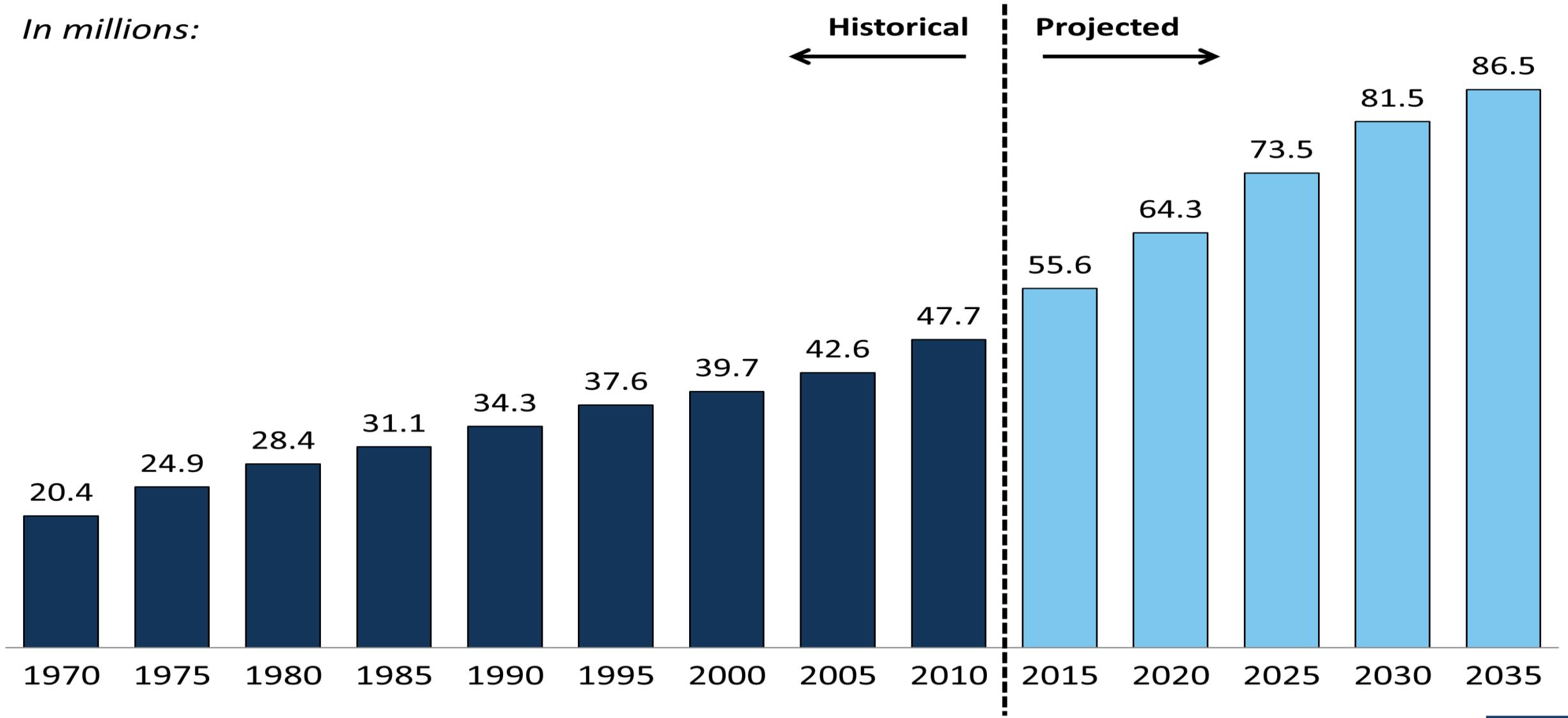


Source: CMS (2015)



Source: CBO (2009)

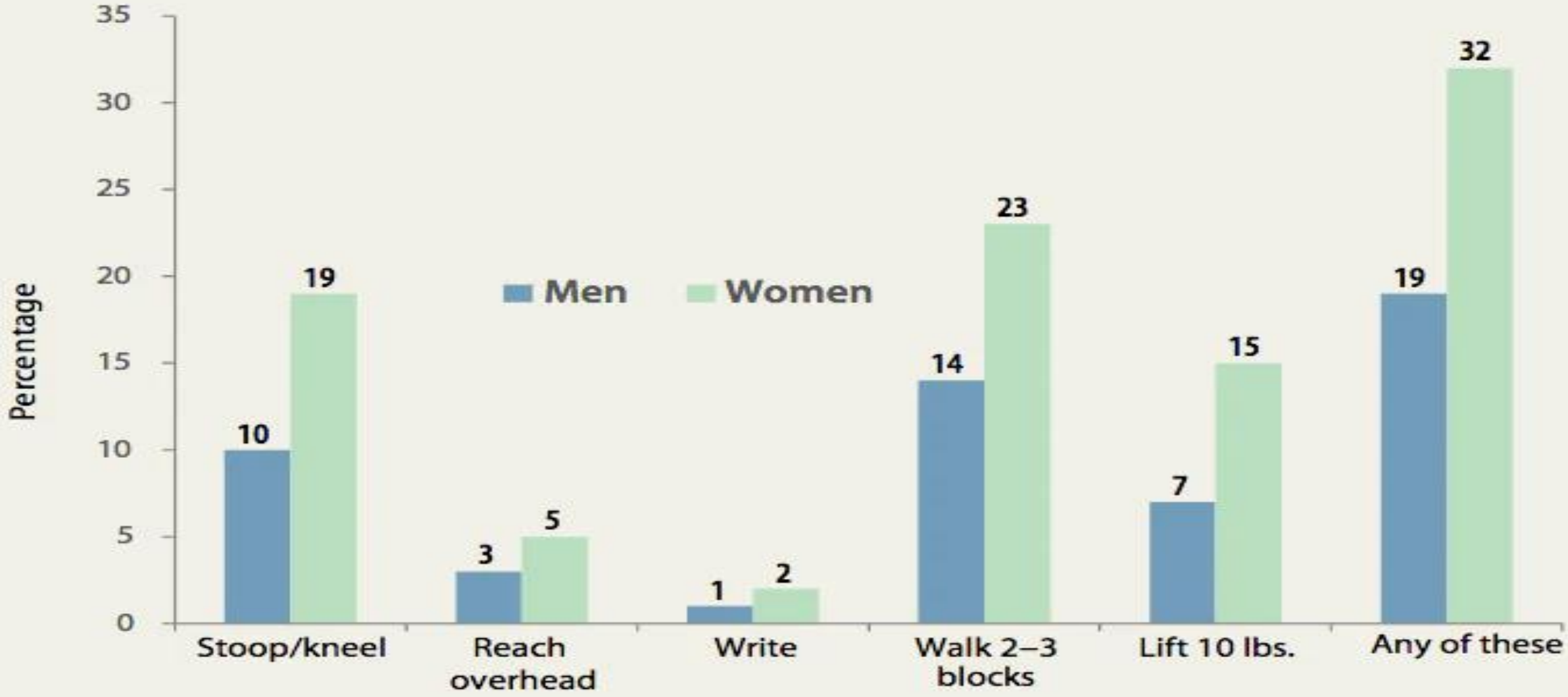
Medicare Enrollment, 1970-2035



SOURCE: 2013 Annual Report of the Boards of Trustees of the Federal Hospital Insurance and Federal Supplementary Medical Insurance Trust Funds.

THE HENRY J. KAISER FAMILY FOUNDATION

Figure 6. Percentage of Medicare enrollees aged 65 years or older who are unable to perform certain physical functions

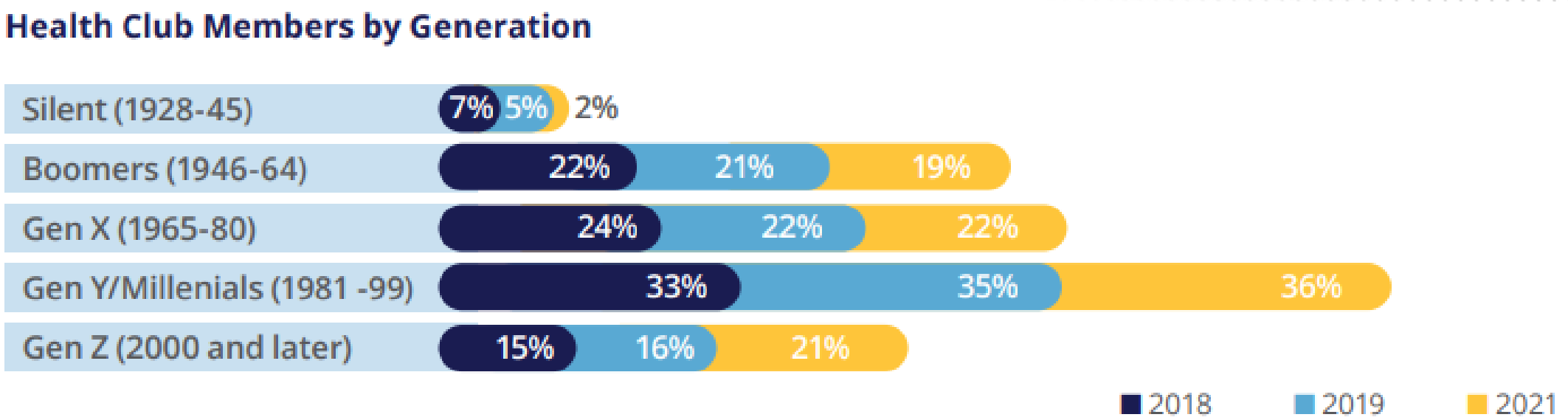


Source: Federal Interagency Forum on Aging-Related Statistics. Older Americans 2010: Key Indicators of Well-Being.

Medicare Opportunity

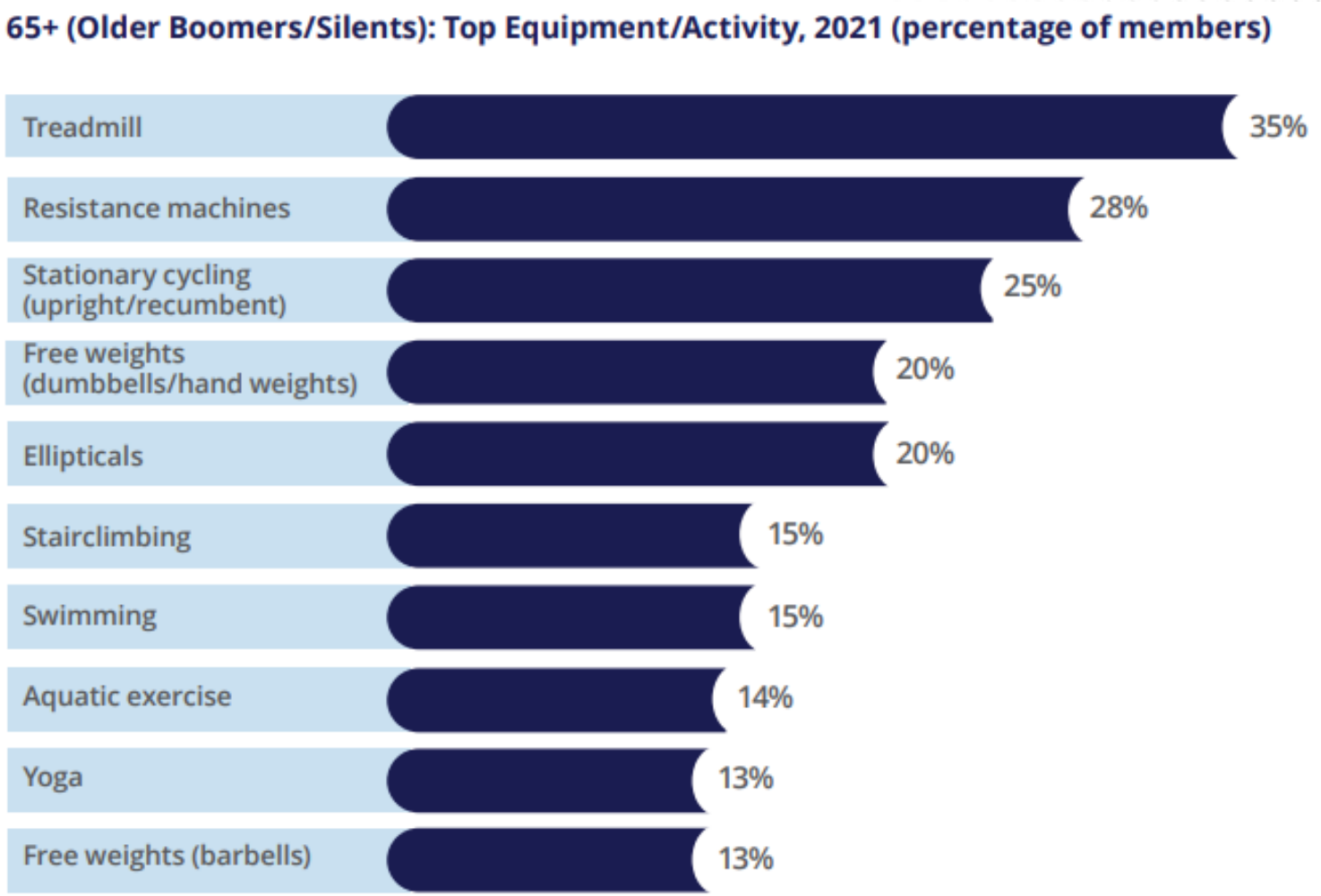
- Value-based care emphasis
  - Pay for value vs. pay for volume
- Single payer (government)
- Political flashpoint
- According to the CBO will become insolvent by 2031
- Opportunity: evidence-based programs to improve holistic health of the Medicare population

Fitness Industry Opportunity



2022 IHRSA Health Club Consumer Report

Fitness Industry Opportunity



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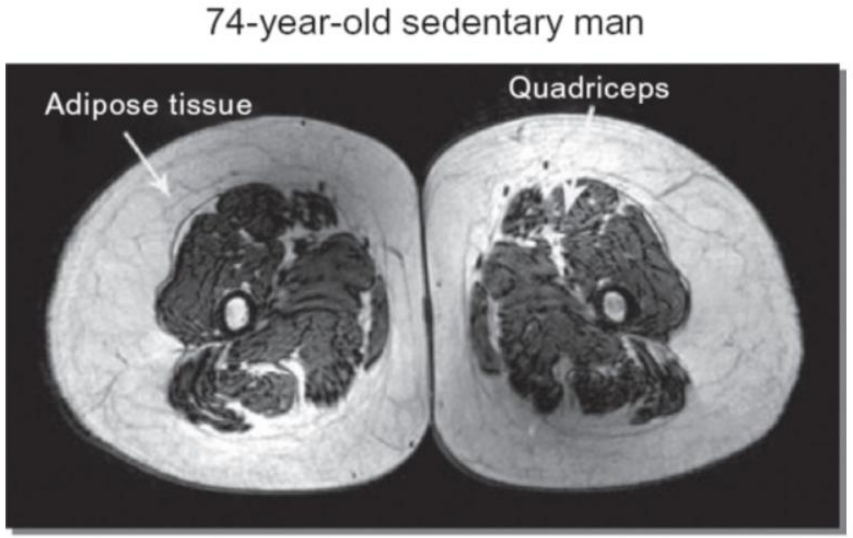
Age-Related Decrements in Functional Capacity

Musculoskeletal Decrements

- Decrease in muscle mass, strength, and power
  - Fiber shift and decrease in type II size
- Decreased BMR as a result of less muscle
- Loss of contractile force capability
- Collagen fiber changes causing reduced flexibility
  - Especially in spine and discs
- Bone loss (20% men, 35% women)
  - Accelerated 2-3 times in women after menopause



Physiological Decrements

- **Nervous System**
  - Cortical atrophy (CNS) and neurotransmitter decrease
  - Decline in cerebral blood flow
  - Conduction velocity slows 10-15%
  - PNS affected by conduction velocity delays

- **Sensory System**
  - Sight, hearing and taste diminish
  - Vision (farsightedness) and other diseases
  - Hearing and auditory problems lead to loss of balance and coordination

Reduction in Quality of Life

Quality of Life as an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns.

- World Health Organization (2023)

Threats to Quality of Life?

- Loss of Independence
- Fear of Falling
- Loss of Motivation
- Loss of Energy
- Increase in sickness and disease
  - Physical & Mental
- Impaired Recovery
- Fearful of enjoyable activities

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Role of Strength & Power Training for Aging Adults

Muscular Fitness Terminology

The multi-dimensional ability of skeletal to muscle to produce the following qualities based on imposed demands:

- **Strength:** the ability to produce maximum amounts of force, independent of speed
- **Power:** the ability to produce near maximum forces at near maximum speeds
- **Endurance:** the ability to produce sub-max force while resisting fatigue
- **Hypertrophy:** the ability to build adequate amounts of muscle mass, while limiting atrophy
- **Mobility:** the ability for a muscle, and it's associated connective tissue to go through a full, functional, range-of-motion WHILE producing necessary force

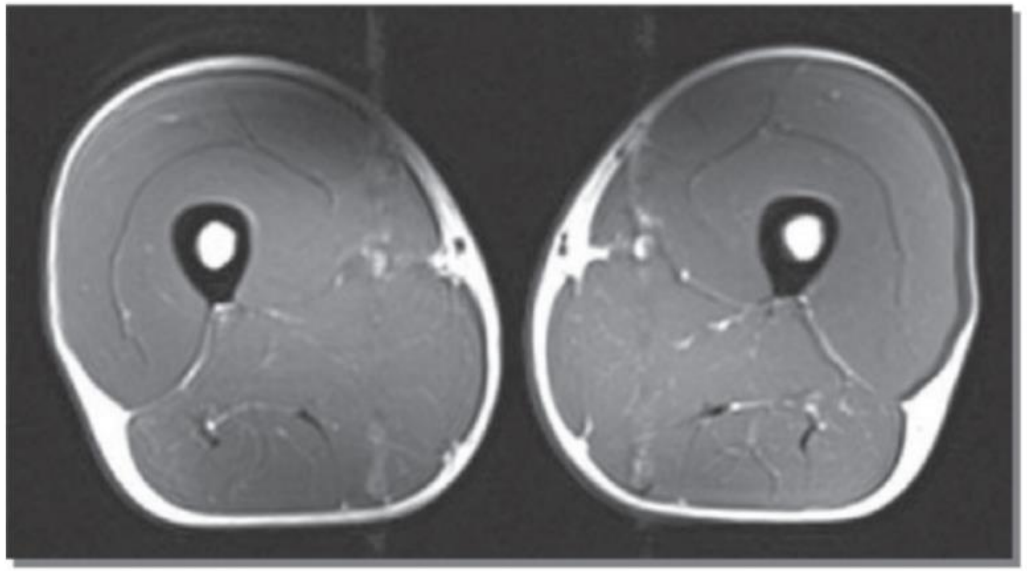
Grip Strength & Mortality

All-cause mortality	
Grip strength	1·37 (1·28–1·47); p<0·0001
Systolic blood pressure	1·15 (1·10–1·21); p<0·0001
MET-min per week	1·09 (1·04–1·15); p=0·002
Cardiovascular mortality	
Grip strength	1·45 (1·30–1·63); p<0·0001
Systolic blood pressure	1·43 (1·32–1·57); p<0·0001
MET-min per week	1·12 (1·03–1·22); p=0·01
Cardiovascular disease	
Grip strength	1·21 (1·13–1·29); p<0·0001
Systolic blood pressure	1·39 (1·32–1·47); p<0·0001
MET-min per week	1·04 (0·991–1·09); p=0·1

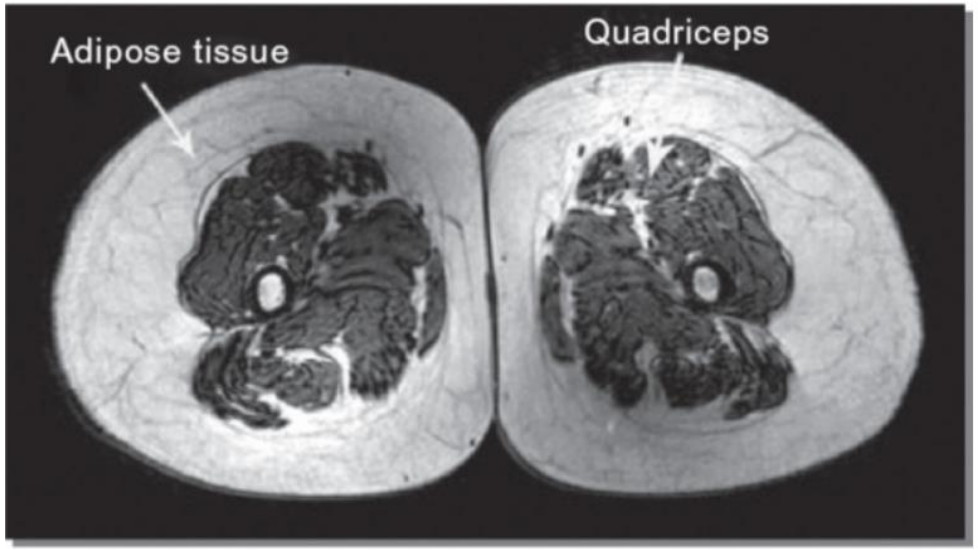
Leong et al (2015)

Attenuation of Atrophy

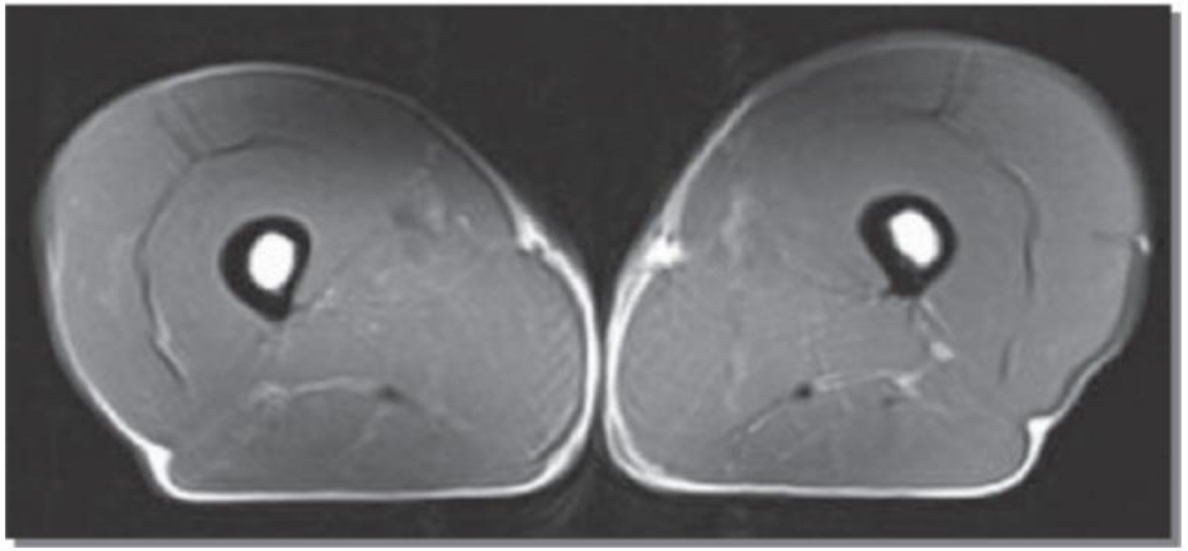
40-year-old triathlete



74-year-old sedentary man

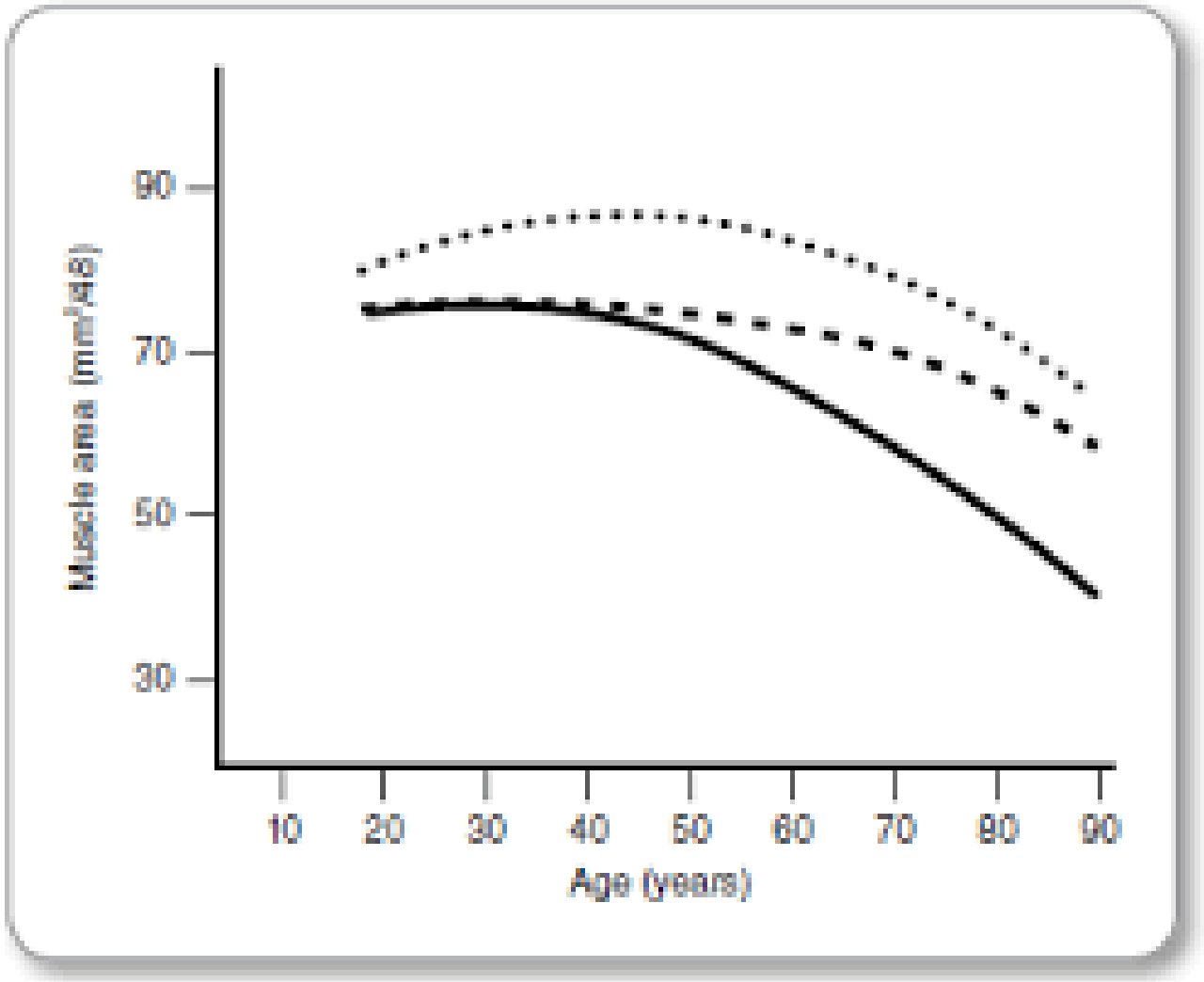


70-year-old triathlete



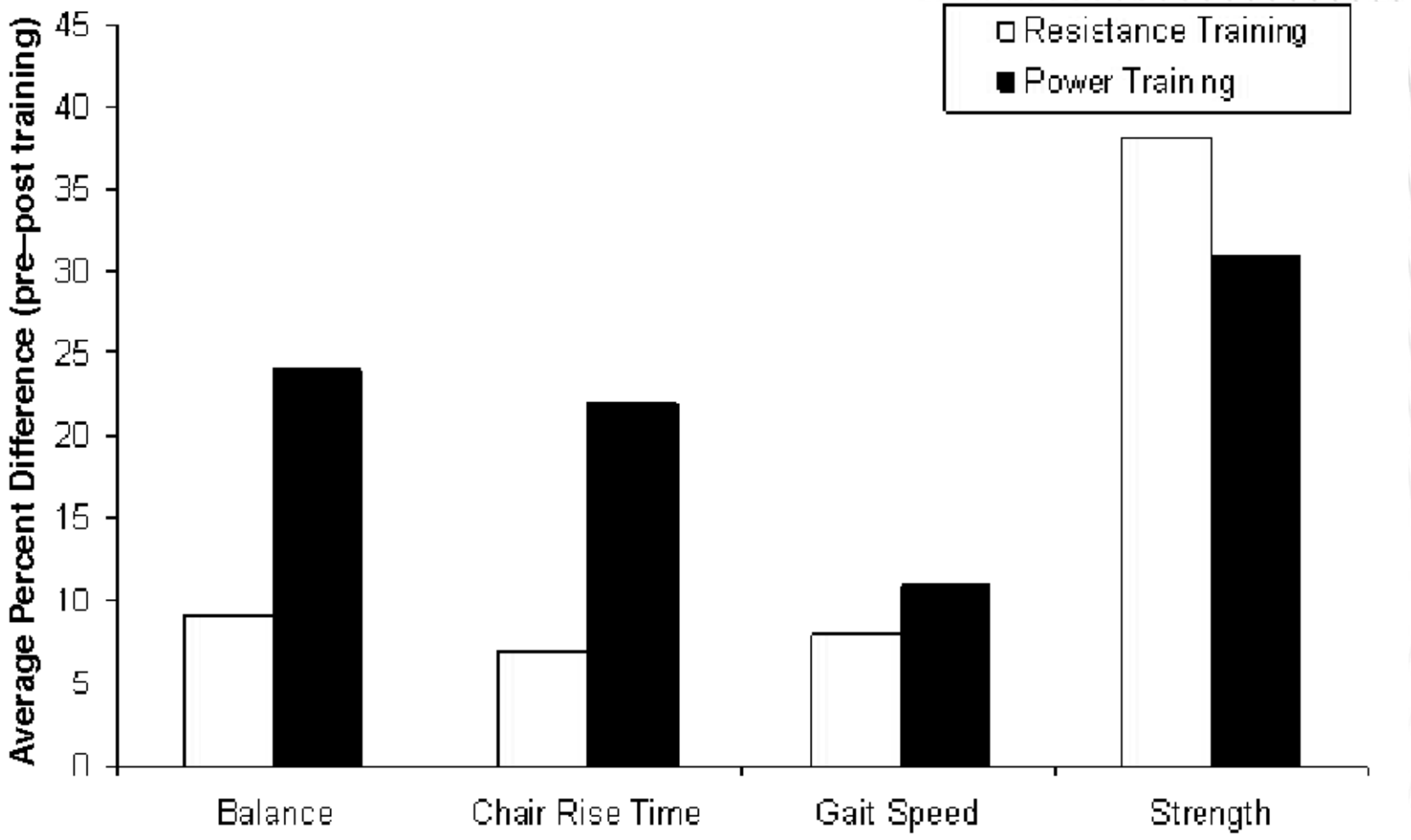
Wroblewski (2011)

“Bending” the Strength Curve



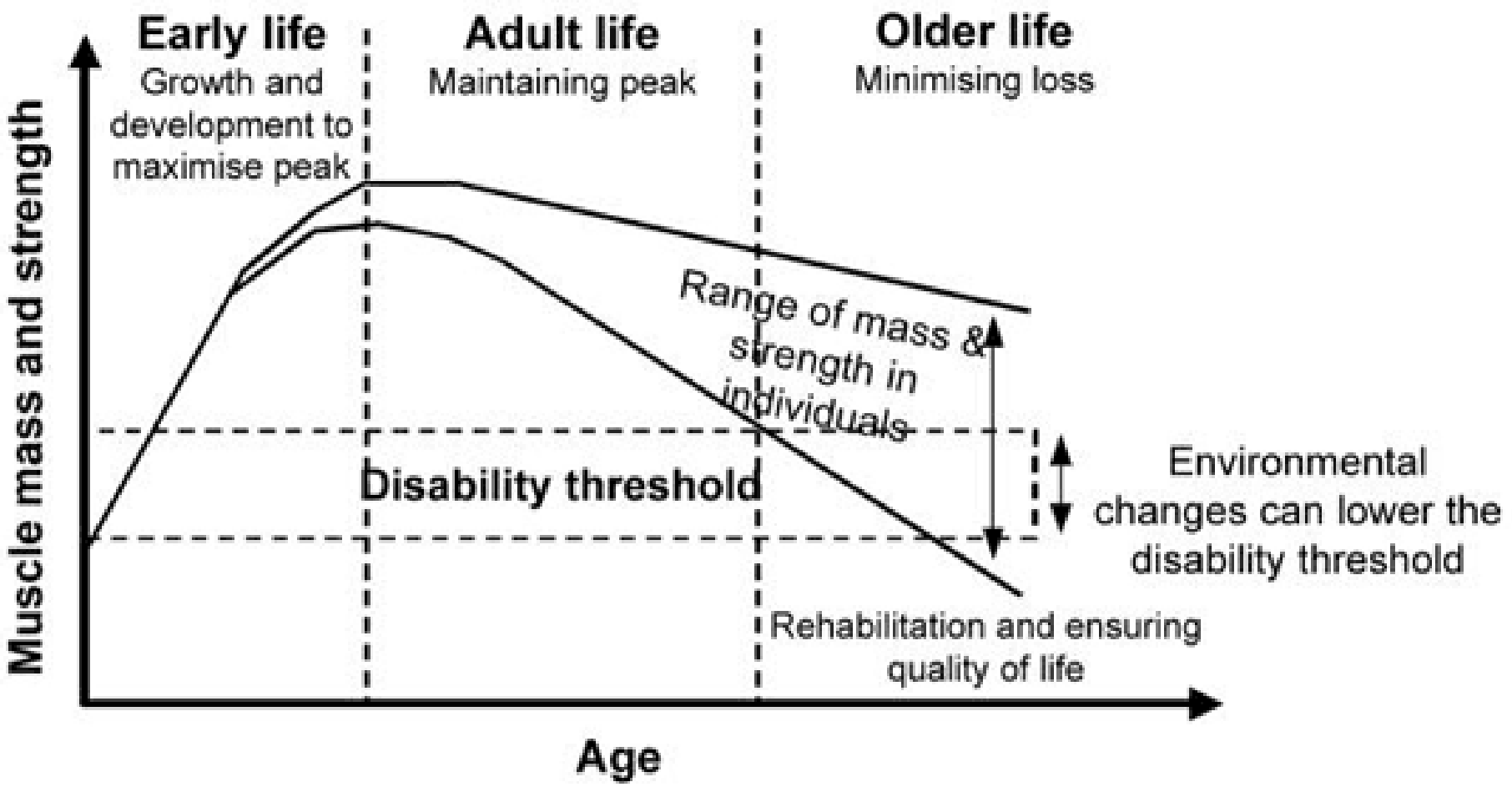
Signorile (2011)

Importance of Strength *AND* Power



Hazell et al (2007)

Avoiding Disability



Modified WHO/HPS, Geneva 2000

Strength Training & Health

Maestroni et al (2020)

Strength Training & Health

- Reduction in Musculoskeletal Injuries & Lower Back Pain
- Reduction in Visceral fat and low grade inflammation
- Increase in “positive” inflammatory factors
- Improvements in mental health (BDNF meditated)
- Improved metabolic health (Diabetes)
- Enhanced blood pressure responsiveness to stress

Maestroni et al (2020)

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Program Design & Periodization for the Aging Adult

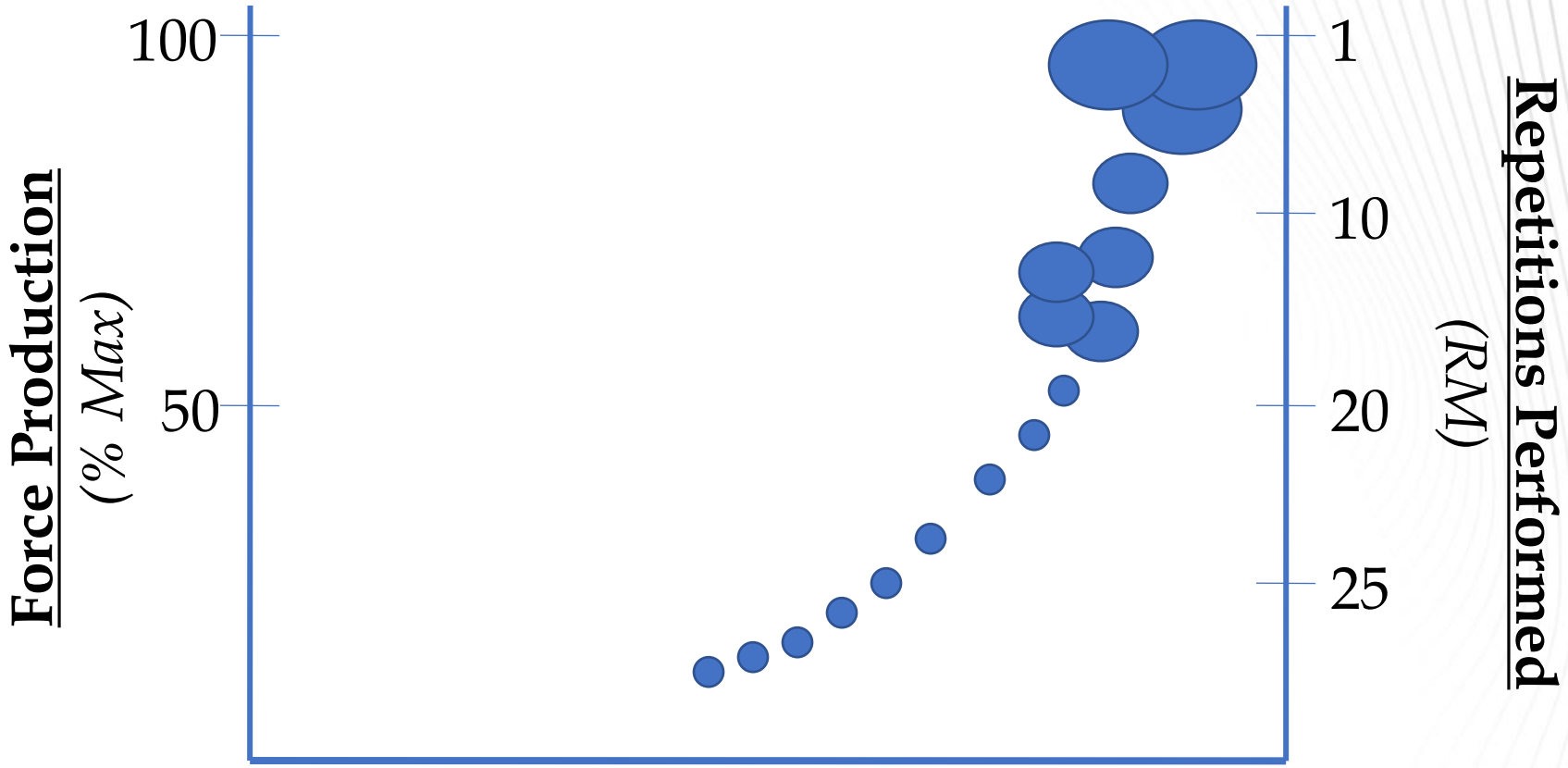
Important Considerations

- Understand medical history
  - Chronic conditions
  - Cognitive decline
  - Medications
- Use ACSM's Professionally Supervised Screening
  - Seek medical clearance when appropriate
- Start with a battery of age-appropriate assessments
  - Posture: photo-based visual assessment
  - Balance: CDC's 4-stage balance test
  - Power/Speed/Agility: 8ft Up & Go
  - Strength: Hand grip, arm curl, chair stand
  - Aerobic: 0.5 mile or 6 min walk
- Comprehensive program should include warmup/cool-down, balance, aerobic, and resistance training

Periodization for the Aging Adult

- **Periodization:** systematic variation of training parameters to achieve a specific outcome
  - Frequency
  - Sets
  - Rep Range
  - Rest Interval
  - Load
  - Rep Velocity
- **Linear Periodization:** Low load/high volume training progressing to higher load/lower volume training

Importance of Progression/Periodization



General Periodization Structure

- **Foundations Phase:** lower load/volume acclimation phase
- **Hypertrophy Phase:** moderate load/moderate-to-high volume phase focused on increasing muscle size
- **Strength Phase:** higher load/lower volume phase focused on increasing muscular force output
- **Power Phase:** lower load/higher velocity phase focused on increasing muscular power output

Foundations Phase

- Goals/Objectives of Workout:
  - Strengthen tendons
  - Build base of technique (motor skill acquisition)
  - Build capacity of buffering H+ ions (i.e., lactate)
- Primary Adaptations:
  - **Neuromuscular:** Motor unit recruitment/synchronization, GTO/MS changes
  - **Anatomical:** minimal hypertrophy, increased tendon strength, increased BMD
  - **Metabolic:** increased buffering capacity H+ ions, improved anaerobic metabolism

Foundations Phase

- **Frequency:** 1-3 non-consecutive days/wk (whole body workouts)
- **Load (Intensity):** 15-20 RM Loads (no Momentary Muscle Failure or MMF)
- **Volume:** 1-3 sets/exercise of 10-15 reps/set
- **8-10 Exercises:** 1 for each major muscle group (Legs, Hamstring/Calves), Back, Chest, Shoulders, Triceps, Biceps, Lower Back, Abs
- **Order:** Largest to Smallest/Alternate Upper Body and Lower Body
- **Rest Intervals:** 60-90s (could be upwards of 2-3min depending on client)
- **Velocity:** Low (controlled)

Example Foundations Phase

Exercise	Sets	Reps	Rest	Load
BW/DB Squat	2	10 to 15	90s	15-20RM
Superman	2	10 to 15	75s	15-20RM
DB Bench Row	2	10 to 15	90s	15-20RM
Lat Pulldown	2	10 to 15	90s	15-20RM
DB OH Press	3	10 to 15	75s	15-20RM
DB Curl	2	10 to 15	75s	15-20RM
Pushdown	2	10 to 15	75s	15-20RM
Mod Side Plank	2/sd	15-30sec	75s	N/A

Progression to Strength & Power

Phase	Sets/Ex	Reps	RM Load	Rest	Velocity
Hypertrophy	3-4	8-12	10-15 (2-3 RIR)	1-2min	Moderate
Strength	2-3	4-8	6-10 (2-4 RIR)	2-3 min	Slow (d/t heavy loads)
Power	2-3	4-8	10-15 (5-8 RIR)	2-3 min	Max

Example Hypertrophy Workout

Exercise	Sets	Reps	Rest	Load
BB/DB Squats	3	8 to 10	90s	8-12RM
Leg Curl	2	10 to 12	75s	10-15RM
Lat Pulldown	3	8 to 10	90s	8-12RM
Back Row	2	10 to 12	75s	10-15RM
DB Bench	3	8 to 10	90s	8-12RM
Pec Dec Flye	2	10 to 12	75s	10-15RM
Side Raise	2	8 to 12	60s	10-15RM
Pushdown	2	8 to 12	60s	10-15RM
DB Curl	2	8 to 12	60s	10-15RM

Example Strength Workout

Exercise	Sets	Reps	Rest	Load
Hex Bar Deadlift	2-3	4 to 8	3min	6-10RM
DB Bench Row	2-3	4 to 8	3min	6-10RM
DB/BB OH Press	2-3	4 to 8	3min	6-10RM
Leg Curl	2	8 to 10	90s	10-12RM
Lat Pulldown	2	8 to 10	90s	10-12RM
Pushdown	2	10 to 12	75s	12-15RM
DB Curl	2	10 to 12	75s	12-15RM
Anti-Rotation Press	2	8-10/sd	75s	10-15RM

Example Power Workout

Exercise	Sets	Reps	Rest	Load
BW Speed Squat	3	8	3min	12-15RM
Band Speed Row	3	8	3min	12-15RM
MB Chest Throw	2	6	3min	12-15RM
BB/DB Squats	2	4 to 8	2min	6-10RM
DB Bench	2	4 to 8	2min	6-10RM
BB BO Row	2	4 to 8	2min	6-10RM
DB Curl	2ss	8 to 12	75s	10-15RM
Pushdown		8 to 12		10-15RM

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Operationalizing in Your Business

General Implementation Principles

- PCPs are a key referral source
  - Physicians refer to programs not membership
  - Make referral easy for physician and patient
- Develop a 12-20 week program
- Collect baseline, midpoint, and post-program data
  - Report changes back to referring allied health professional(s)
- Use small group training to control labor and increase profitability
  - Size of group will vary based on ability levels

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Thank You!

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