

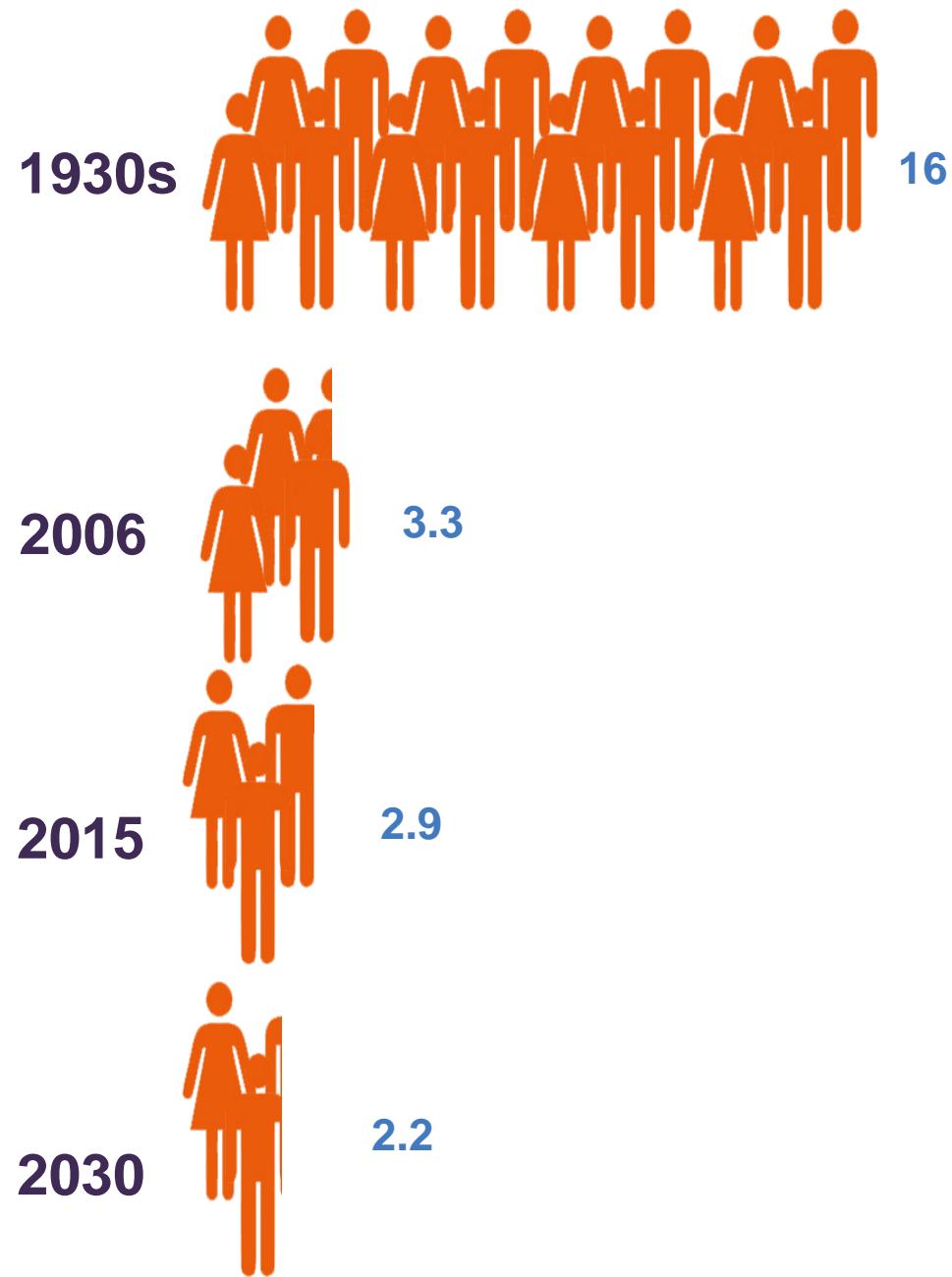
JEAN MAYER
USDA
HUMAN
NUTRITION
RESEARCH
CENTER ON
AGING



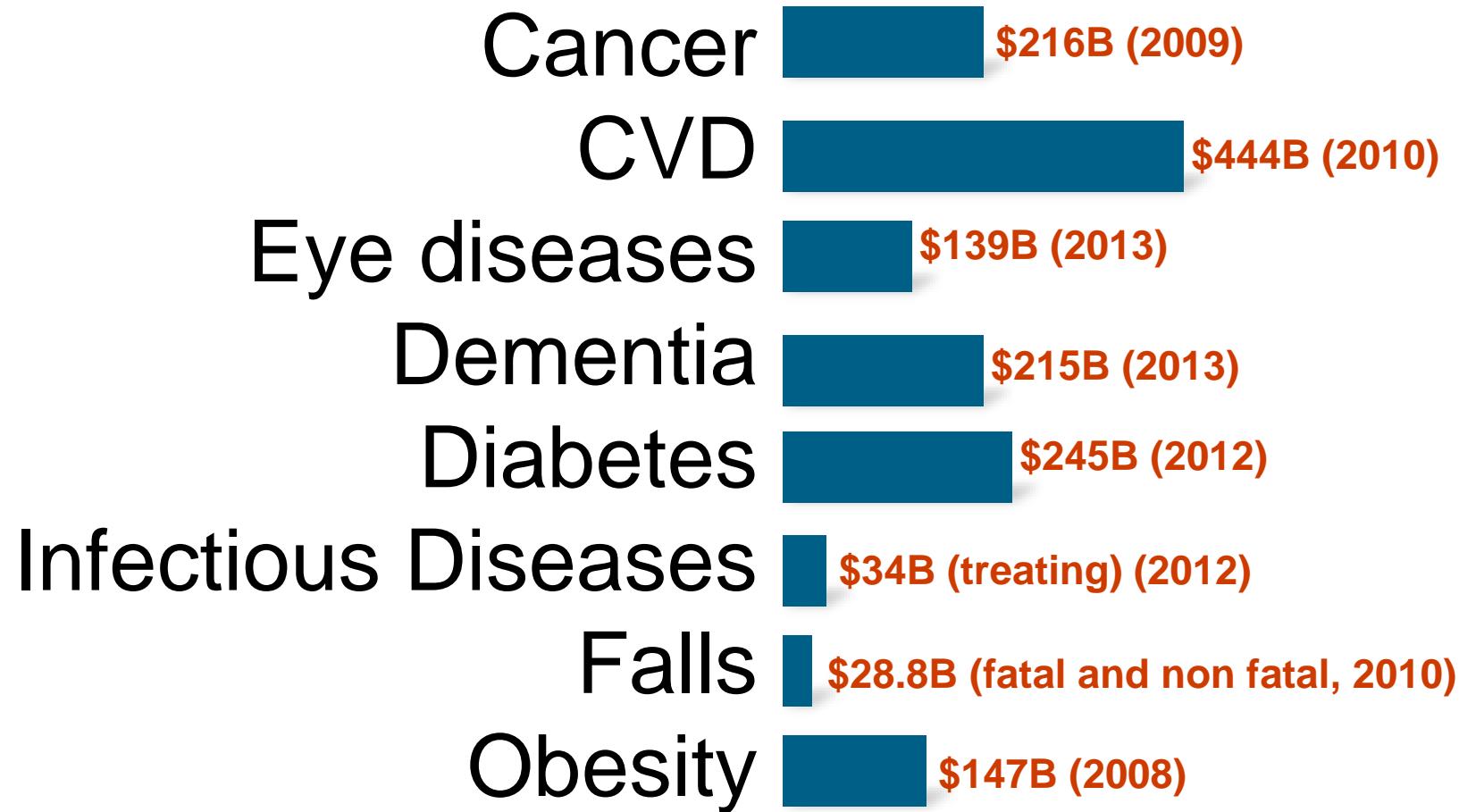
Healthy Aging: What is it?
Are there acceptable markers to utilize in developing
strategies to promote it?

Simin Nikbin Meydani

Workers per retiree

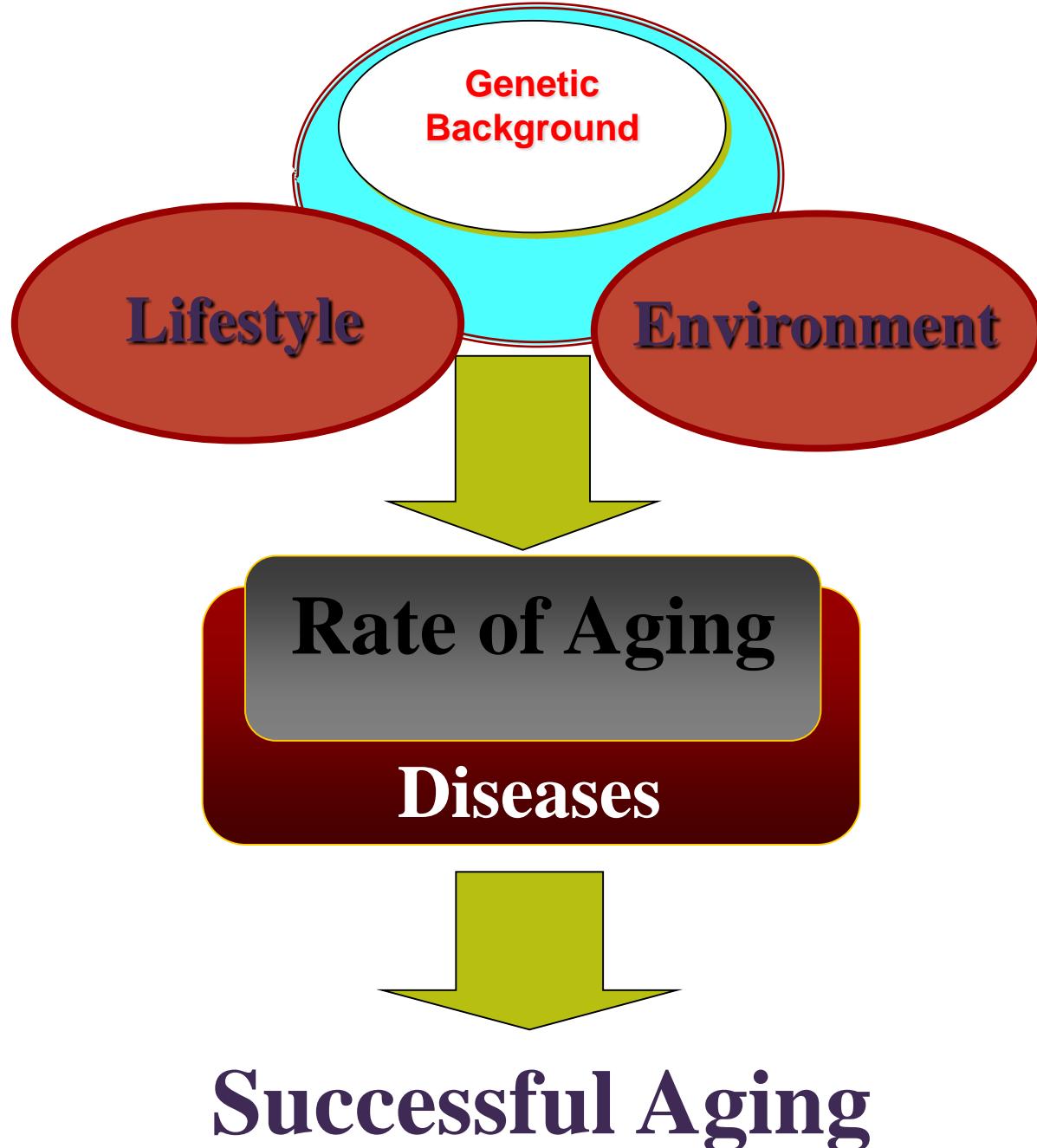


Annual healthcare spending



Developing strategies to increase “health span” or the years of “successfully aging” for older adults becomes critical—socially, and economically







genetics



lifestyle



environment



rate of aging



disease

contribute to

determine

Longevity
(healthspan)



nutrition



lifestyle



exercise

combined with



psychosocial

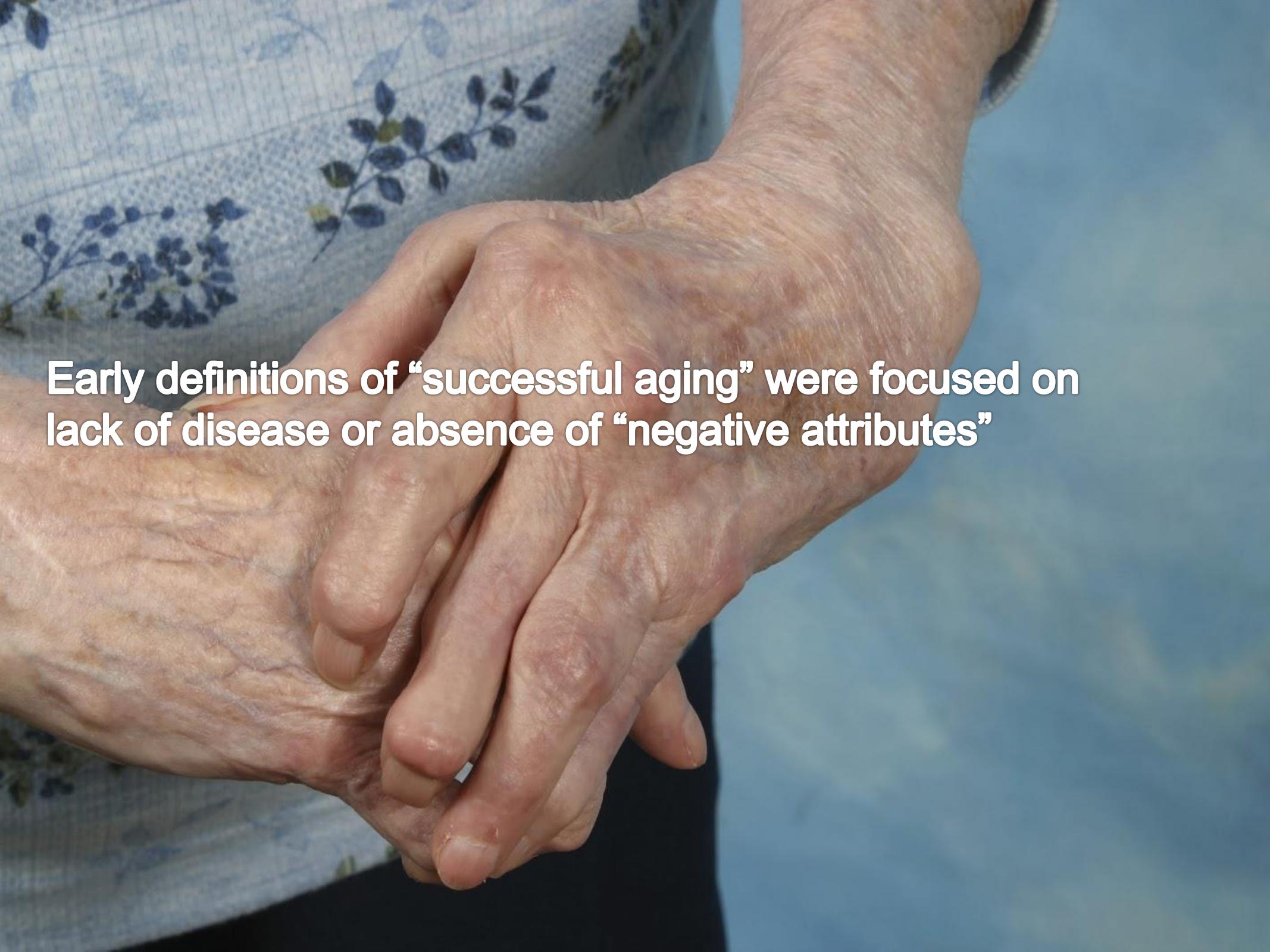
create

Healthy aging

improved functionality
improved quality of life

Key to developing such strategies is a universally accepted definition of “successful aging”.

However, consensus on what factors constitutes successful aging or what components are essential has not been reached.



**Early definitions of “successful aging” were focused on
lack of disease or absence of “negative attributes”**

Today



healthy aging is not
merely the opposite of
aging with disease or
functional impairment

Rowe and Kahn:

Based on MacArthur Research Network of Successful Aging describes successful aging as involving freedom from disability along with high cognitive, physical, and social functioning.

Rowe & Kahn, Science 1987; 237: 143.

Successful aging is characterized as using four components:

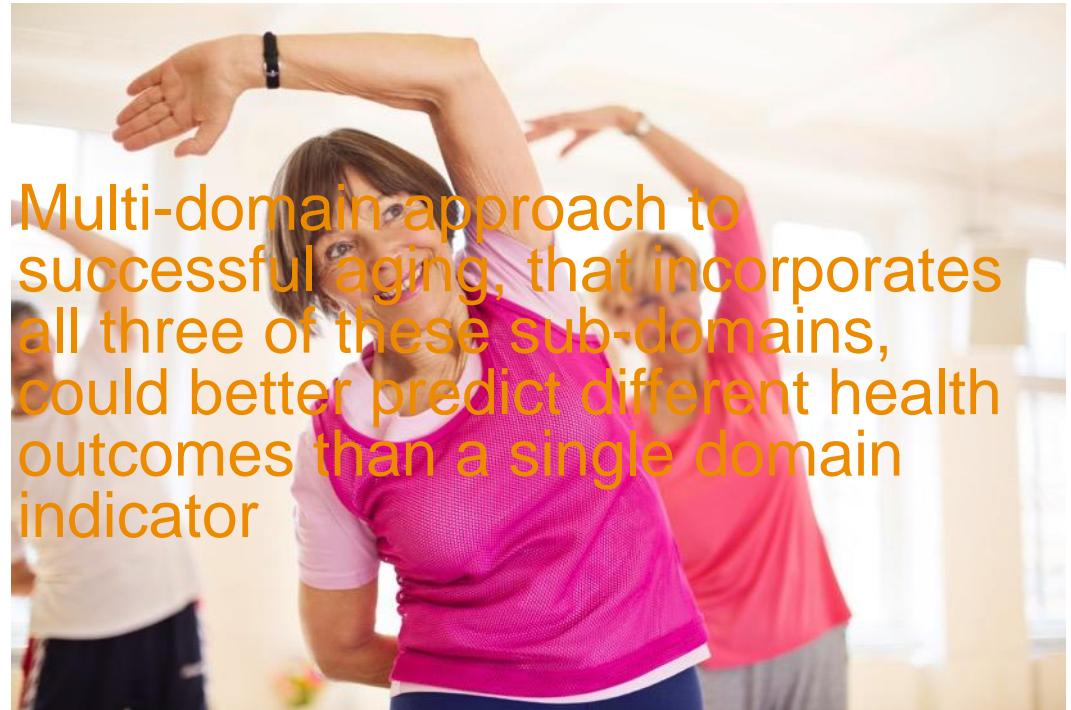
freedom from disease and disability
high cognitive and physical functioning
social and productive engagement
resilience

***Tyrovolas et al.* evaluated determinants of successful aging together with assessment of dietary habits in relation to healthcare facility use among elders living in the Mediterranean basin.**

Enrolled 2663 elderly (aged 65–100 years) individuals from 21 Mediterranean islands and rural Mani region (Peloponnesus).

successful aging could be defined through three main components:

1. low probability of disease and disability
2. high cognitive and physical capacity
3. active participation through social activities
(social relations, productive activities, education etc.).



Multi-domain approach to successful aging, that incorporates all three of these sub-domains, could better predict different health outcomes than a single domain indicator

10 point index of successful aging

ranging from a score of 0 to a score of 10 using 10 attributes:

- education
- financial status
- participation in social activities with friends
- Social activities with family
- number of yearly excursions
- BMI
- number of cardiovascular disease risk factors
- depression
- adherence to the Mediterranean diet
- frequency of physical activity

Higher score of successful aging was associated with less use of health care services

b coefficient and 95% CI: [-0.79 (-1.2 to -0.4)]

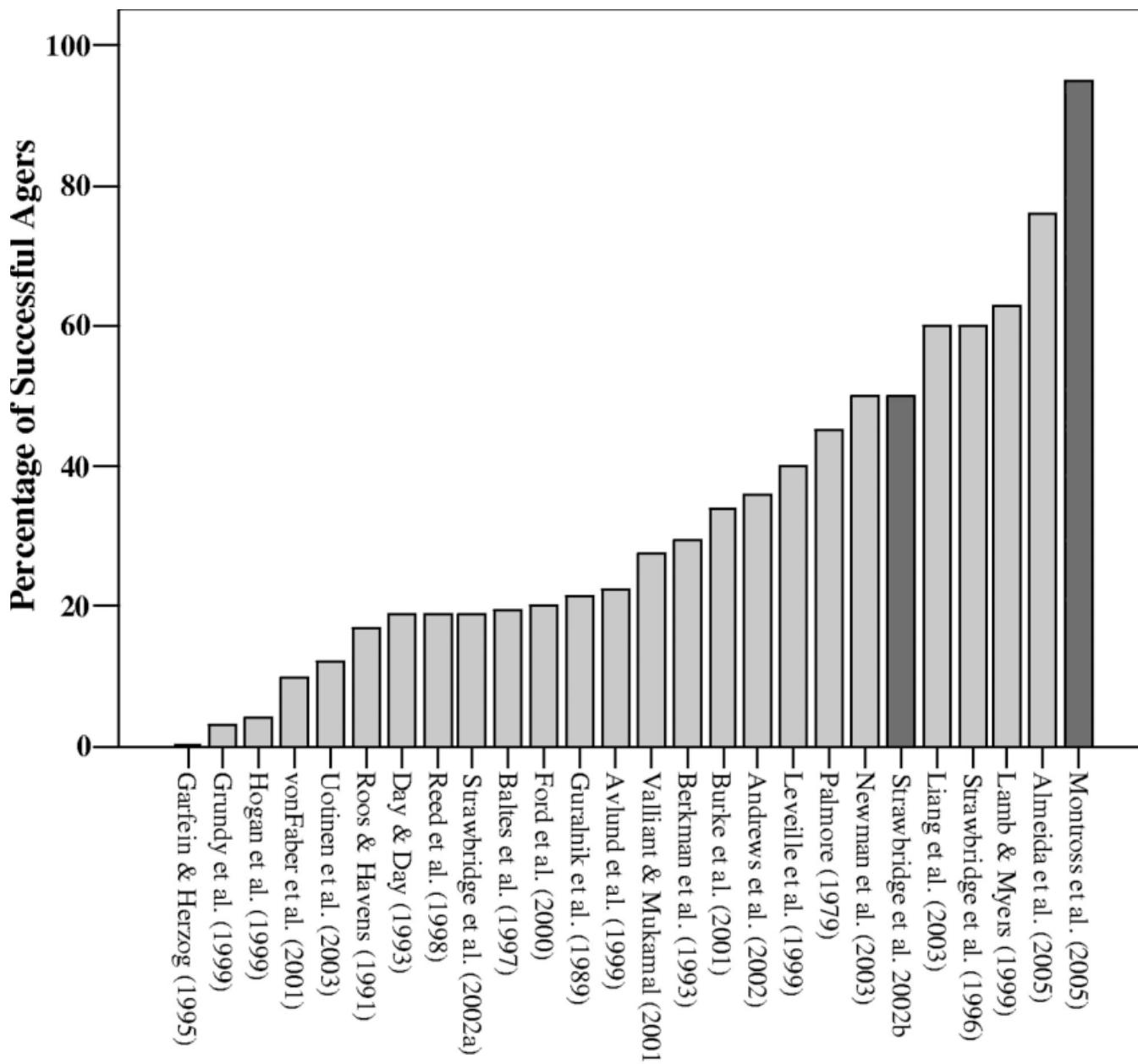
A 1/10-unit increase in the successful aging index was associated with 0.8 (95% CI -1.3 to -0.2) less times a person used the health care services or seeking consultation within a one-year period.

	“Psychosocial-economic” factor	“Clinical characteristics” factor	“Lifestyle characteristics” factor
Education (years of school)	0.72	–	–
Financial status	0.70	–	–
Social activities with friends	0.56	–	–
Social activities with family	0.56	–	–
Going to excursions	0.38	–	–
GDS score	–0.50	–	–
CVD risk score	–	0.84	–
Body mass index	–	0.83	–
MedDietScore	–	–	0.83
Frequency of daily physical activities	–	–	0.73
<i>Cumulative Variance explained (%)</i>	23%	38%	48%

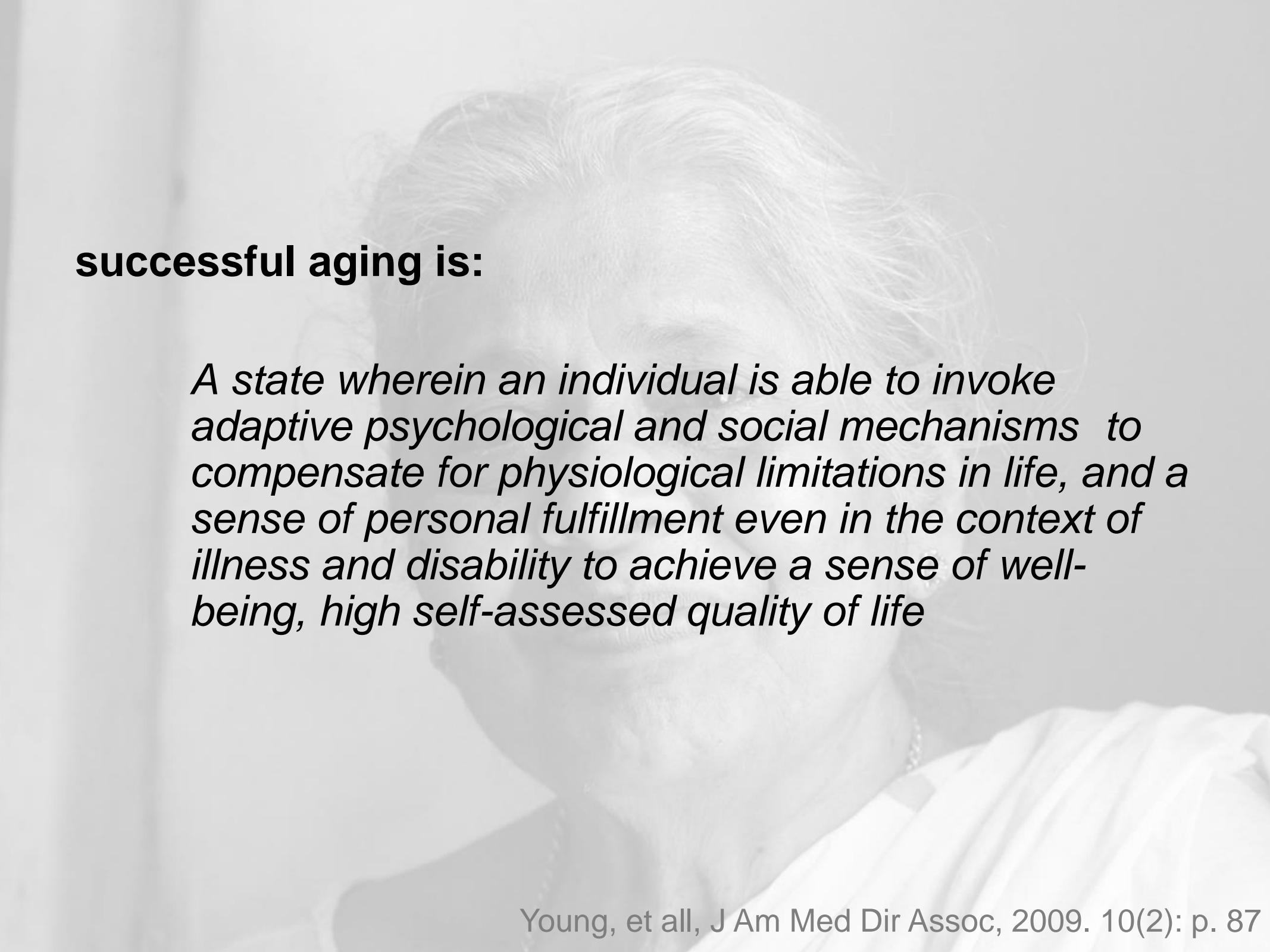
Depp & Jeste to determine % of successful agers conducted a literature search for published English-language peer-reviewed reports of data based studies of adults over age 60 that included an operationalized definition of successful aging.

Categorized the components of these definitions and independent variables examined in relation to successful aging.

Identified 28 studies with 29 different definitions
Mostly large samples of community-dwelling older adults.

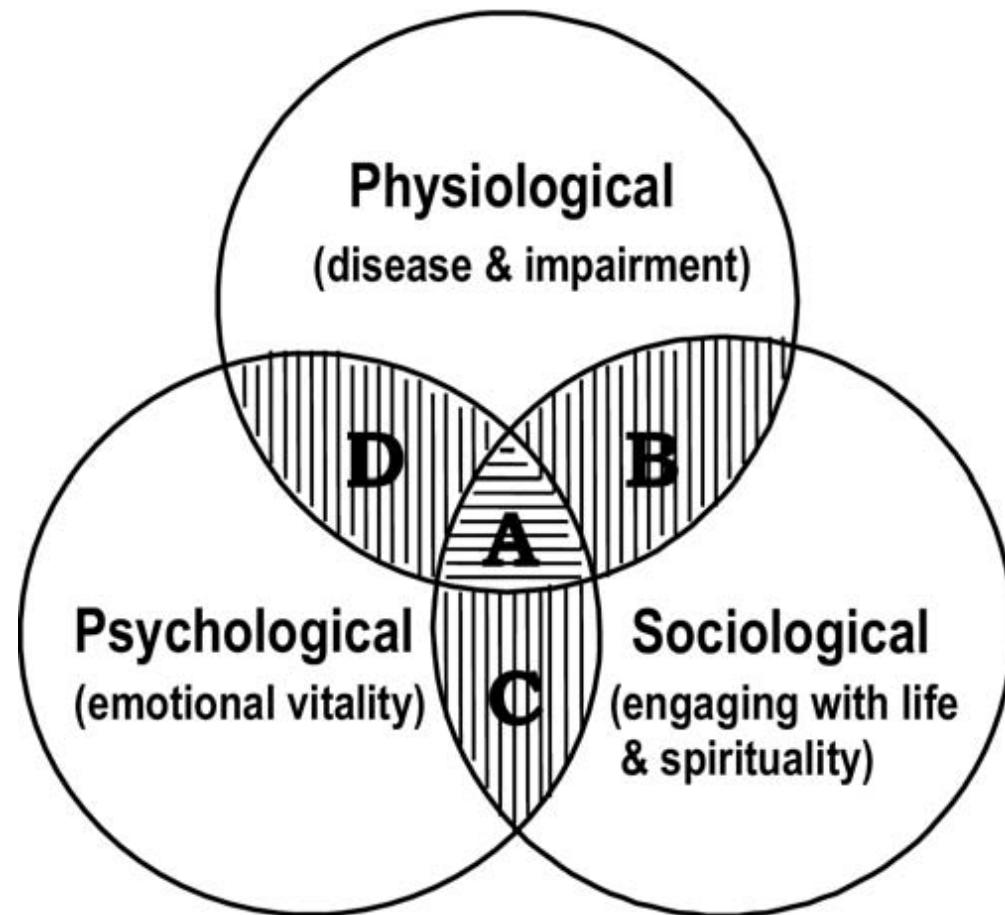


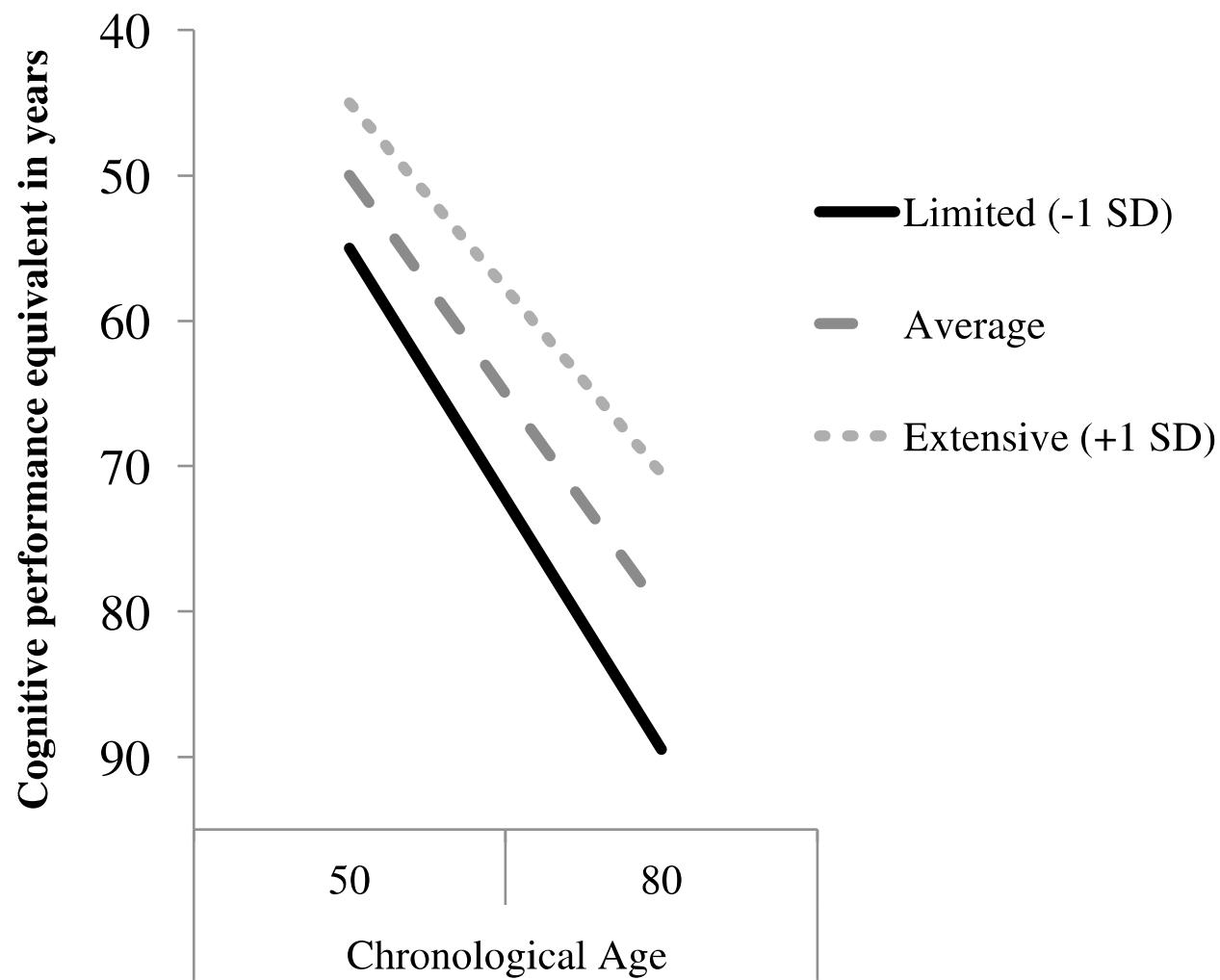
Vote: Darker bars represent self-rated (SR) successful aging.



successful aging is:

A state wherein an individual is able to invoke adaptive psychological and social mechanisms to compensate for physiological limitations in life, and a sense of personal fulfillment even in the context of illness and disability to achieve a sense of well-being, high self-assessed quality of life

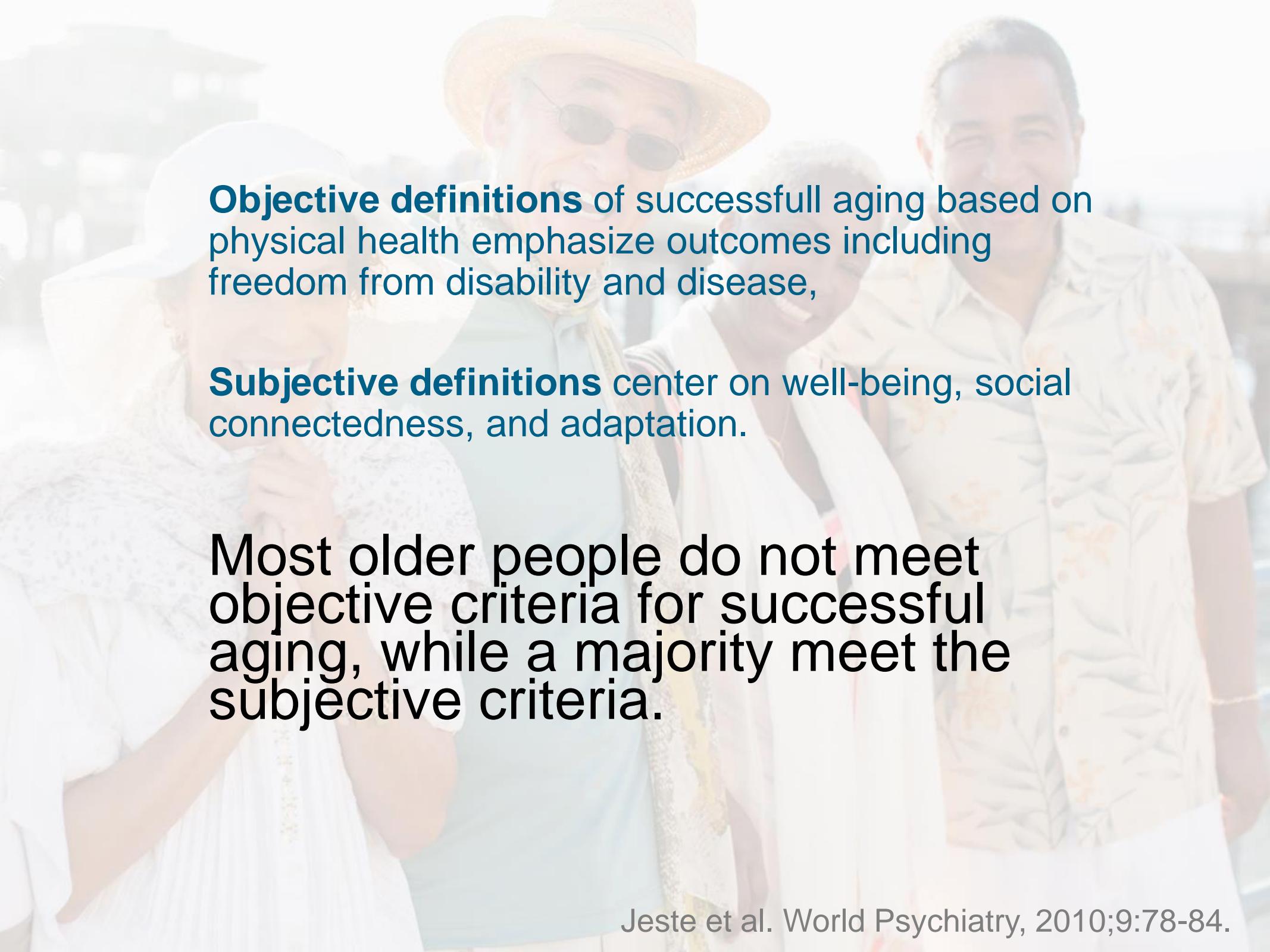






Being connected to social groups had the effect of reducing the cognitive age of an 80-year-old by 9.5 years.

“We no longer question the claim that social relationships are vital for health. What we lack is an understanding of the aspects of social relationships that are key to health”



Objective definitions of successfull aging based on physical health emphasize outcomes including freedom from disability and disease,

Subjective definitions center on well-being, social connectedness, and adaptation.

Most older people do not meet objective criteria for successful aging, while a majority meet the subjective criteria.

Percent of sample (n=1,979) meeting criteria for domains of successful aging

Absence of disease	15%
Freedom from Disability	38%
Normal cognitive functioning	71%
Active engagement with life	74%
Mastery/growth	81%
Positive adaptation	81%
Life satisfaction	84%
Self-rated successful aging	90%
Independent living	94%

Who Should Define Successful Aging?

Conclusions

Over the last 50 years the definition of successful aging has evolved from one focused on the absence of diseases and disability i.e. “objective negative outcomes” to one that includes psycho-social domains that are more subjective and reflect well-being from the point of view of the older adults.

While there is overlap among the different definitions of “healthy” or “successful” aging proposed to date, there is also debate on **WHICH** components are essential **WHO** should define it .

Nevertheless, high physical, cognitive, and social function/engagement is the common tread found among majority of the definitions.

Taste and smell, Oral Health, microbiome

What are the biological markers of physical, cognitive and social domains of successful aging and how are they related to diet and nutrition?

Tufts
UNIVERSITY

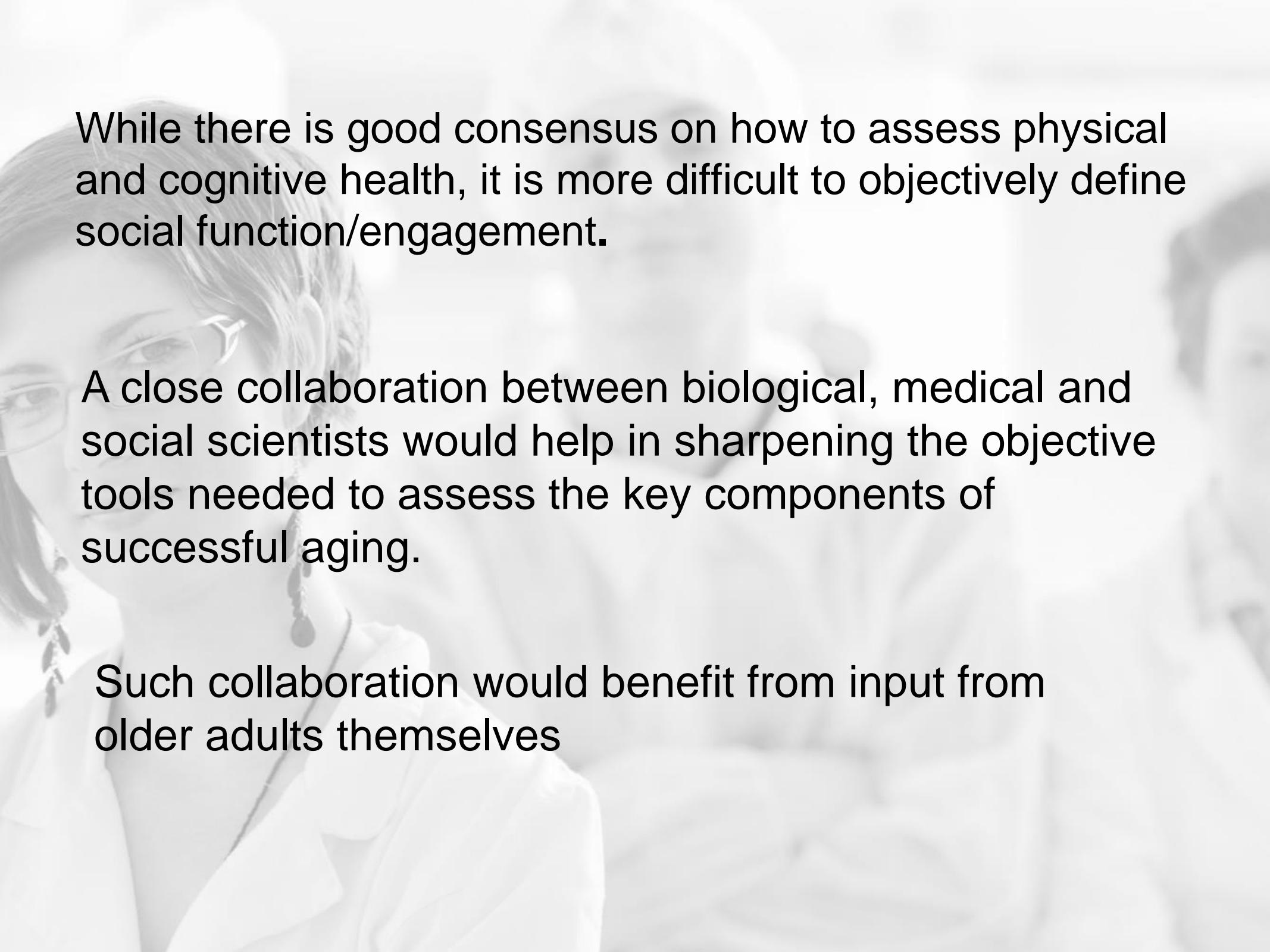


JEAN MAYER
USDA
HUMAN
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HNRCA

**ANNUAL
REPORT
2013**

A significant portion of older population in USA have nutritional problems exhibited as both under-nutrition (micronutrient deficiencies) and over-nutrition (obesity).



While there is good consensus on how to assess physical and cognitive health, it is more difficult to objectively define social function/engagement.

A close collaboration between biological, medical and social scientists would help in sharpening the objective tools needed to assess the key components of successful aging.

Such collaboration would benefit from input from older adults themselves

Compromised micronutrient status/intake observed in older adults in the USA

- Vitamin D** → bone and muscle strength, etc.
- Calcium** → bone and muscle strength
- Vitamin E** → protects cells from free radical damage
- B12** → nerve and blood health
- B6** → metabolism
- Folate** → cell division
- Zinc** → immune system
- Selenium** → fights infection
- Iron** → oxygen transport

GUT HEALTH

Focus on the gut microbiome and its modulation by diet and exercise to better understand its impact on cancer, infection, inflammation, weight control

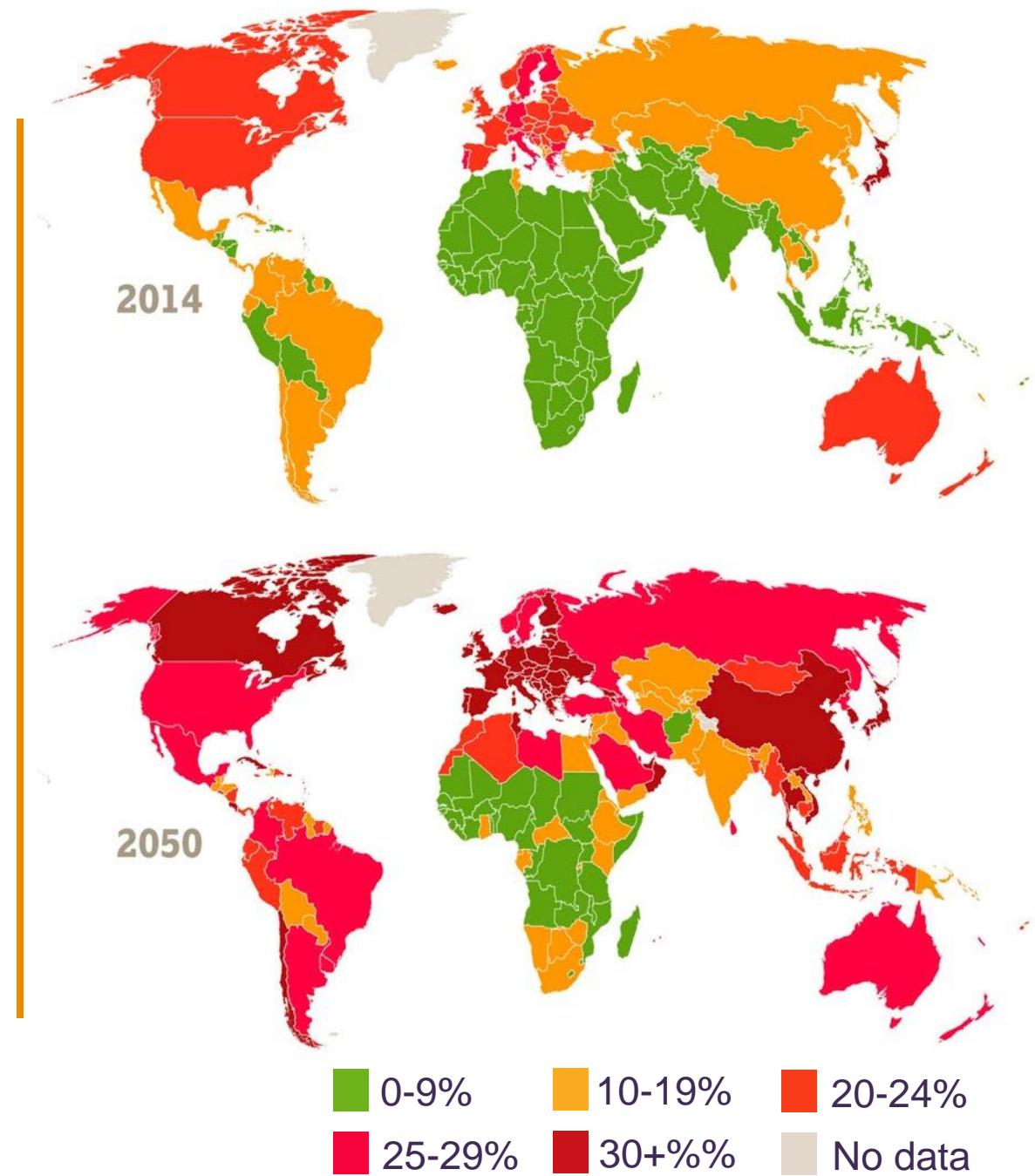
Since January 1, 2011, every day for the next 20 years, roughly 10,000 Americans will celebrate their 65th birthdays.



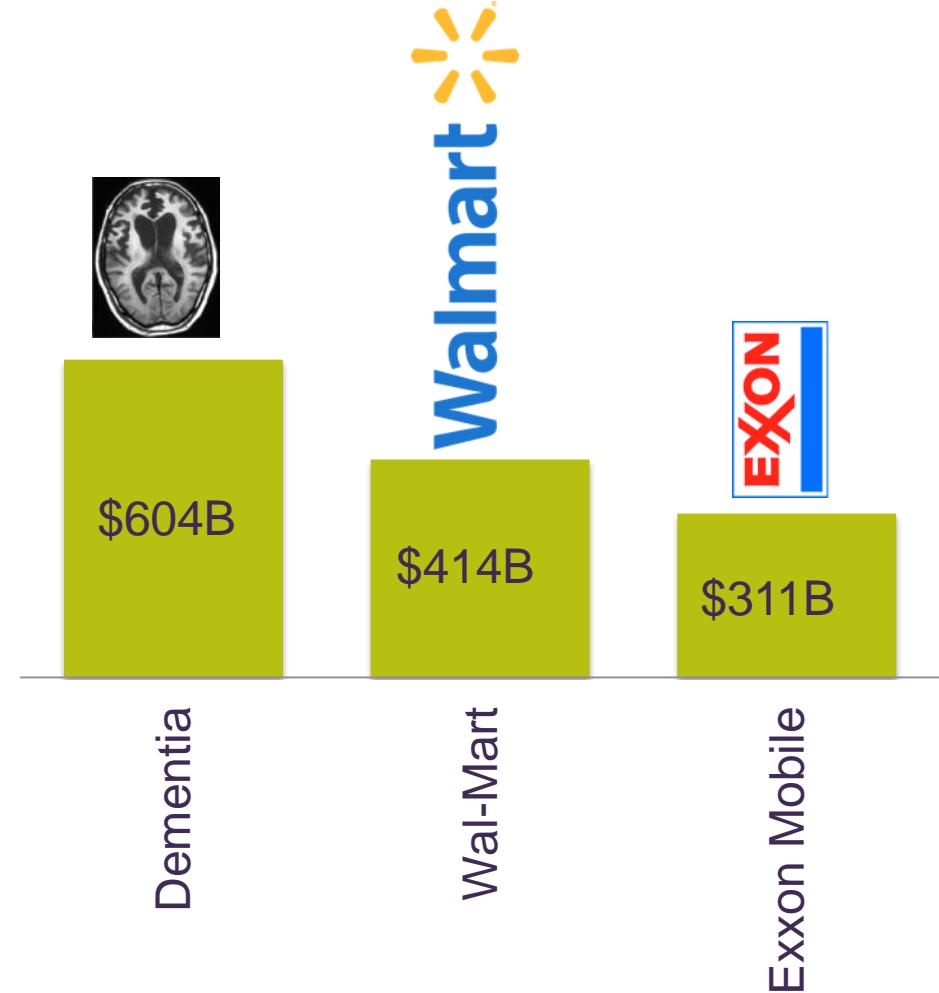
In 2030 One of every five Americans—about 72 million people—will be an older adult.



Proportion of population
aged 60 or over in 2014
and 2050



The annual cost associated with dementia world-wide in 2010 was one and a half times the revenue produced by the world's largest public corporation, Wal-Mart



WHAT IS HEALTHY AGING?



PERSONALIZED DIETS

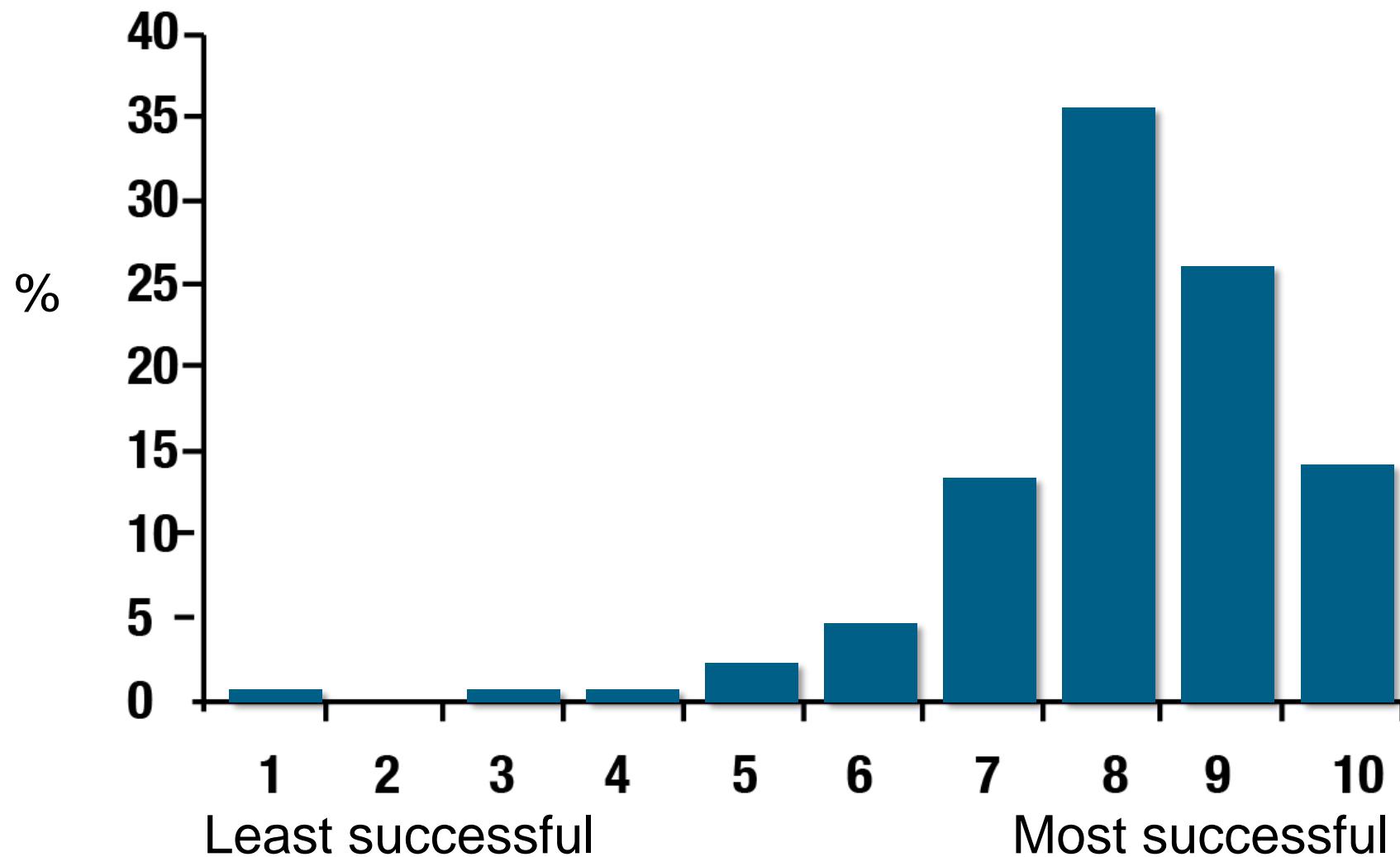
Global versus Genome-Based Personalized Dietary Recommendations



Furthermore, more research is needed to better define early determinants/risk factors for key components of successful aging.

There is a gulf between researcher and lay definitions – the former describes freedom from disease and disability, and the latter focuses on adaptation, meaningfulness, and connection.

Distribution of self-rated successful aging in older women (n=1,979)



Older adults view of successful aging is not the same as that of health professionals

Montrose et al. investigated criteria and correlates of subjectively rated successful aging.

92% community-dwelling older adults viewed themselves as aging successfully despite having chronic physical illnesses and some disability.

Additional lay definitions

- Accomplishments
- Enjoyment of diet
- Financial security
- Neighbourhood
- Physical appearance
- Productivity and contribution to life
- Sense of humour
- Sense of purpose
- Spirituality

	Survival	Impairment	Function	Impairment	Function	Survival	Impairment
Obesity	↓	↓	↓	↓	...	...	↓
Grip strength	0	↑	...	...	...	...	...
Lung function	↑	0	...	...	...	...	↑
Health habits							
Cigarette use	↓	↓	↓	↓	...	0	
Physical activity	0	0	...	...	...	↑
Alcohol use	↓	0	↑	↑	...	0	
Baseline conditions							
Poor health/disease			↓	↓	↓	↓	
Poor function			↓	↓	↓	0	
Poor cognition	...	...	...	...	↓	↓
Sociodemographic characteristics							
Social support	...	...	...	...	0	↑	
Life satisfaction	...	...	...	...	↑	0	
High education	0	0	↑	↑	0	0	↓
High income	...	...	↑	↑	0	0	↑

Note. See text for study details. ↑ = statistically significant direct association; ↓ = indirect association; 0 = no significant association.

independently related to the other outcomes. High grip strength had a borderline association with survival and predicted remaining free of clinical disease and impairment. This variable may be a surrogate indicator of physical fitness. The physical activity measure, however, was not associated with any of the outcomes. This result was unexpected but consistent with earlier findings concerning

tive studies of healthy aging (see Table 4). The Alameda County Study⁷ was quite similar to the present study in terms of age of cohort and time period of study. The 841 individuals born between 1895 and 1919 were followed from 1965 to death or a follow-up interview in 1984. The 2 aspects of healthy aging outcomes were survival and being in the highest quintile of physical function. The investiga-

tors, having close personal contacts, walking for exercise, and not reporting depression were significant, while alcohol use and cigarette use were not. High income and education were of borderline significance.

Most of the other studies involved cohorts of individuals who were more than 65 years old at baseline. Roos and Havens²⁹ followed a group of 2943 individuals who

WEIGHT

More than one-third of U.S. adults (35.7%) are obese.

Obesity-related conditions include heart disease, stroke, type 2 diabetes, certain types of cancer, and contribute to nutrient deficiencies in older adults.

WEIGHT

Restaurant calorie counts
are inaccurate

When you eat may be as
important as what you eat.

Mediterranean diet

CALORIE Restriction



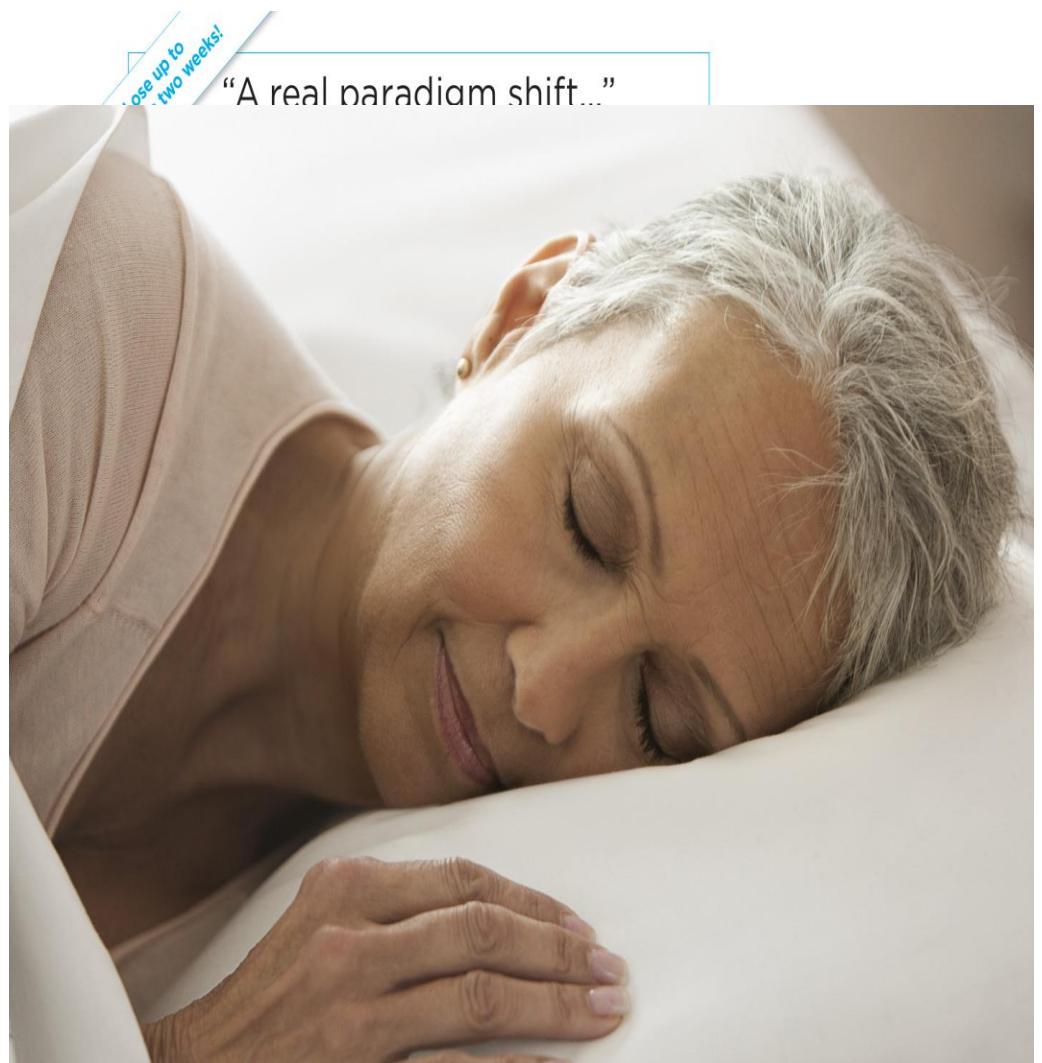
WEIGHT

Increased fiber intake can decrease appetite

(The iDiet)

Consuming yogurt can reduce weight gain over time.

Effects of sleep on weight loss



and Betty Kelly Sargent

MUSCLE AND BONE FUNCTION

Falls are the leading cause of fatal injury among older adults.

Falling is not an inevitable result of aging.

MUSCLE & BONE FUNCTION

Importance of vitamin D/calcium in falls and osteoporosis

Consume neutral or alkaline food for better bone density.

Eat vitamin K.



MUSCLE & BONE FUNCTION

Lift weights (all major muscle groups) at least 2 times a week to retain muscle.

Weekly: Do 150 min. of moderate intensity aerobic physical activity or 75 min of vigorous intensity aerobic activity.



HEART HEALTH

A common problem related to aging is “hardening of the arteries,” called arteriosclerosis.

HEART HEALTH

Have plenty of fiber.

Try eating an oily fish twice a week instead of fish oil pills.



COGNITION

All aging humans will develop some degree of decline in cognitive capacity as time progresses.

Piperhoff P et al. Deformation field morphometry reveals age-related structural differences between the brains of adults up to 51 years. *J Neurosci*. 2008 Jan 23;28(4):828-42.

COGNITION

The effects of blueberries and strawberries on neurocognition

Increase folate, B6 and B12 consumption to deter dementia.

Concord grape juice may enhance cognitive function.



VISION

Most of the aged will confront age related vision problems with compromises to quality of life.

VISION

Lower your glycemic index.

Lutein-rich foods can decrease risk of AMD and cataracts.



INFECTION & IMMUNE-RELATED DISEASES

The immune system is one function of the body profoundly affected by aging.

INFECTION & IMMUNE-RELATED DISEASES

Wolfberry or goji berry and possible flu protection

White mushrooms and food-born pathogens

Cranberries prevent UTIs

Adequate zinc



MyPlate for Older Adults

Fruits & Vegetables

Whole fruits and vegetables are rich in important nutrients and fiber. Choose fruits and vegetables with deeply colored flesh. Choose canned varieties that are packed in their own juices or low-sodium.

Healthy Oils

Liquid vegetable oils and soft margarines provide important fatty acids and some fat-soluble vitamins.

Herbs & Spices

Use a variety of herbs and spices to enhance flavor of foods and reduce the need to add salt.



Remember to Stay Active!



Fluids

Drink plenty of fluids. Fluids can come from water, tea, coffee, soups, and fruits and vegetables.

Grains

Whole grain and fortified foods are good sources of fiber and B vitamins.

Dairy

Fat-free and low-fat milk, cheeses and yogurts provide protein, calcium and other important nutrients.

Protein

Protein rich foods provide many important nutrients. Choose a variety including nuts, beans, fish, lean meat and poultry.

Things to look for in
the future in nutrition
and aging...

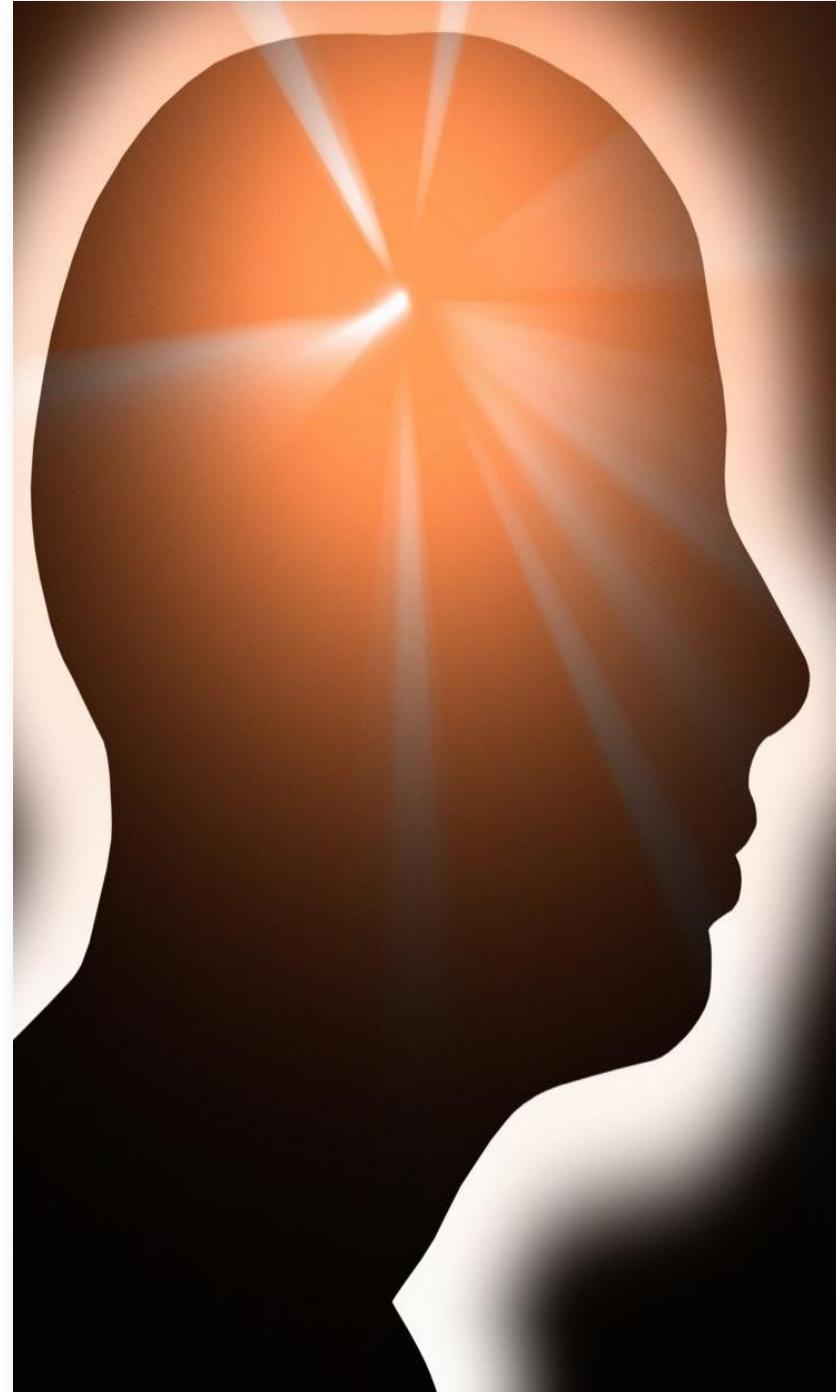
developing
diets that
complement
genetic
makeup



Neurobiology of aging

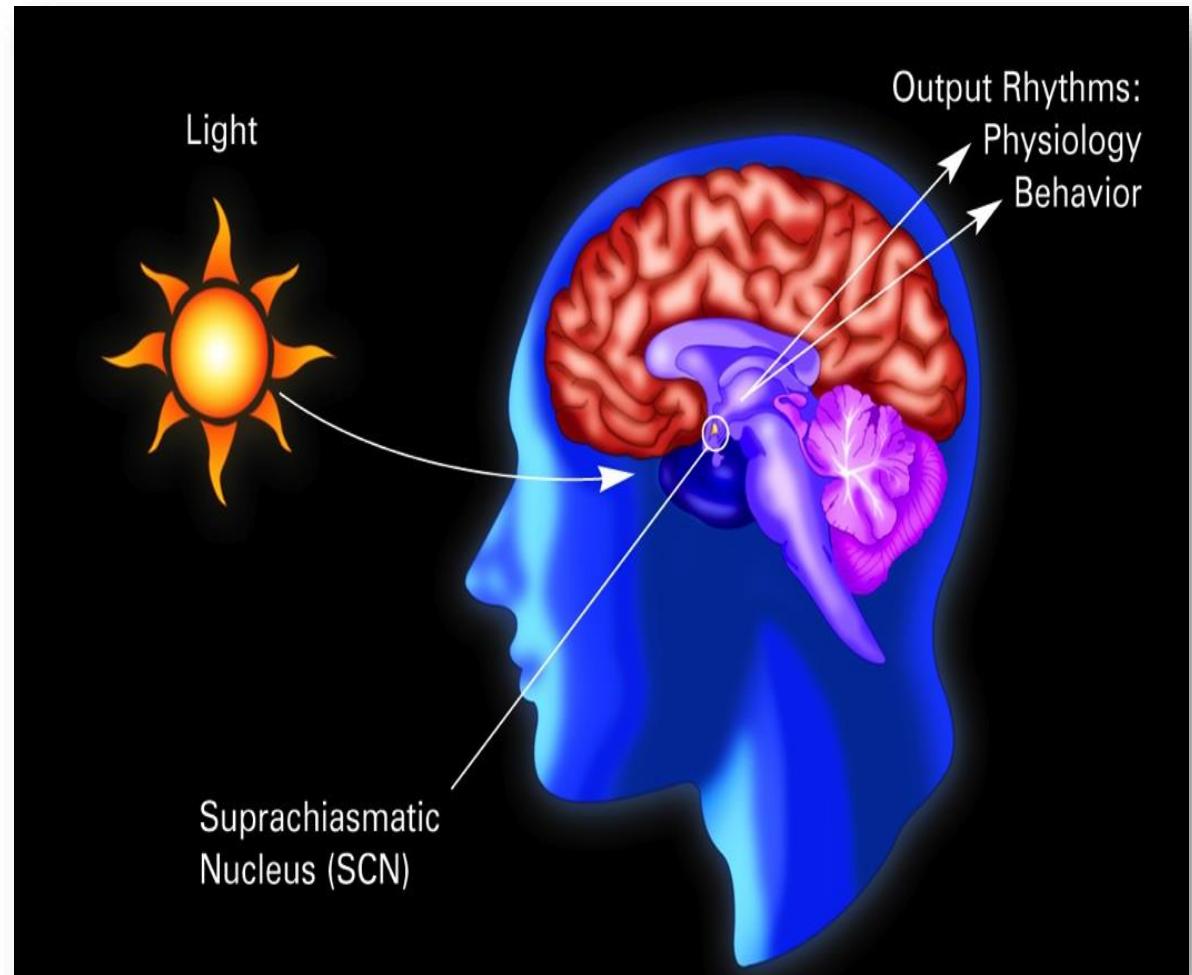
nutritional modification of
stem cells to repair the
aged brain

leading to possible
Alzheimer's cures



Circadian rhythm of clock genes

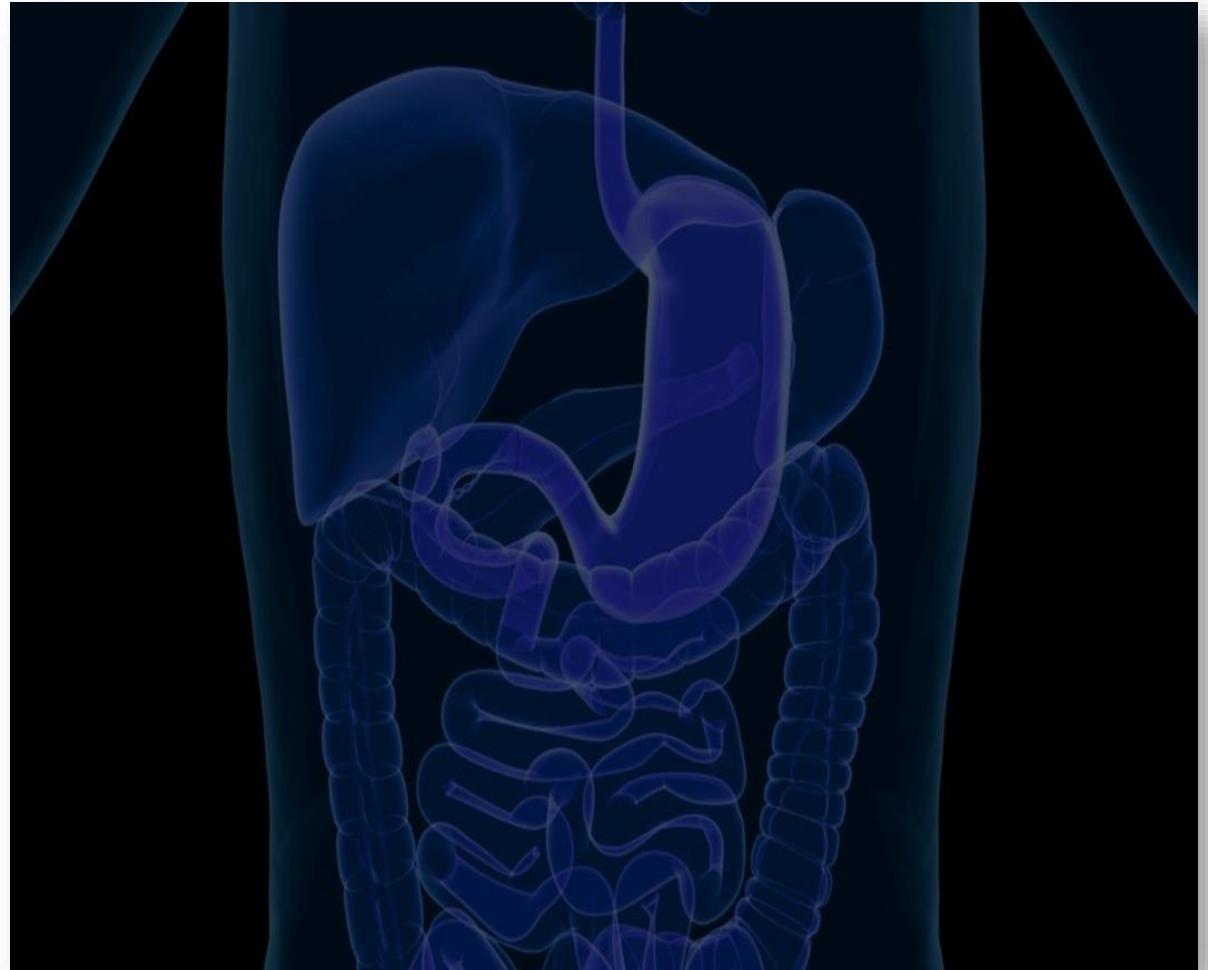
basing food intake on a personalized clock to deter obesity and chronic diseases



Gut microbiome

How diets impact gut microbiota:

impacts on cancer,
infection,
inflammation, weight
control



D2d trial

Does vitamin D supplementation help prevent or delay type 2 diabetes?





“Eat and sleep and you will live a long time...You have to learn to relax.”





WHAT IS HEALTHY AGING?

THANK YOU

Questions?

Modifiable factors

Carbohydrate Metabolism

Osteoporosis

Cognitive function

Psychosocial factors:

autonomy and control

social support

Support and control

Bereavement and relocation

“Strong” support for predicting successful aging:

absence of arthritis

hearing problems

better activities of daily living

not smoking

“Moderate” support:

higher exercise/physical activity level

better self-rated health

lower systolic blood pressure

fewer medical conditions

global cognitive function

absence of depression

“Limited” support:

**higher income
greater education
current marriage
white ethnicity**

Conclusion

“Prevention of disability and cognitive decline are of paramount interest for successful aging, and studies in this review offer evidence that health-related practices (e.g., smoking, exercise), chronic illnesses (e.g., diabetes, arthritis), and subjective health are more robust determinants of successful aging than are demographic or socioeconomic factors”.

***Peel et al.* looked at association between baseline behavioral risk factors and subsequent healthy aging in a cohort of people aged 60**

8 studies from 341 papers were looked at with follow up of 2-60 years

- mostly American studies
- All community older adults

The definitions of healthy or successful aging ranged from the primarily biological, such as survival to old age with absence of disability, to the comprehensive, such as sustained well-being using a bio-psychosocial model.

Despite the wide-ranging approaches to the study the majority of the selected studies emphasized:

maintenance of functional independence, measured as ability to perform basic and/or instrumental activities of daily living.

Less frequently:

High functioning in tests of physical performance
cognitive ability
absence of disease and psychiatric morbidity

The indicators used within the domains to measure outcome, and the way they were aggregated into summary scores, influenced the resulting proportion of healthy agers in the study population

Behavioral Determinants Associated with Healthy Aging

Normal weight

Physical activity

Not smoking

Moderate alcohol

Not being depressed

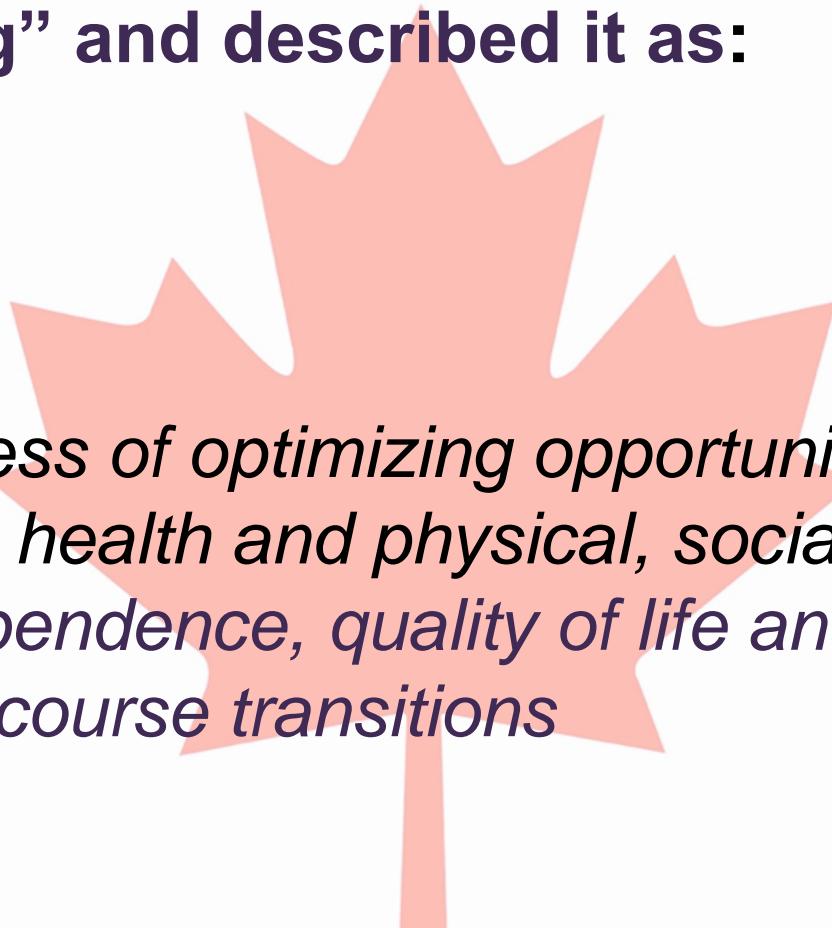
More social contact

The NIA, the White House Conference of Aging, and the WHO have emphasized that:

Healthy aging goes beyond absence of disease and disability.



Health Canada has expanded the definition of “healthy aging” and described it as:



A lifelong process of optimizing opportunities for improving and preserving health and physical, social and mental wellness, independence, quality of life and enhancing successful life-course transitions

Others have defined successful aging as the degree to which elderly individuals

adapt to age-associated changes

view themselves as successfully aging

are morbidity-free until the latest time point before death.

Baltes., Am Psychol, 1997;52: 366-80.
Schulz & Heckhausen, Am Psychol, 1996; 51:702-14.
von Faber et al., Arch Intern Med, 2001;161:2694-700.
Bowling & Dieppe, Bmj, 2005; 331:1548-51
Fries, Clin Geriatr Med, 2002; 18:371-82.

Source of variability

Definition of successful aging and its component

The “unsuccessful” group that the successful agers were compared with

A bias toward studying negative outcomes.

Longitudinal studies of the reliability and validity of subjective ratings of successful aging are needed