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Functional Capacity and Disability

Dr. Cynthia Boyd MD, MPH
Division of Geriatric Medicine and
Gerontology, Department of Medicine
Department of Health Policy and
Management
Center on Aging and Health

Domains of Functioning

- Physical
- Cognitive
- Psychological
- Sensory
- Social

Lecture Outline

1. Measurement of disability
2. Importance of physical function
3. Magnitude of problem
4. Risk Factors for disability
5. Pathway to disability
6. Consequences of Disability
7. Compression of Morbidity From Disability

General Categories of Instruments Used to Assess Physical Functioning

1. Self-care activities of daily living
i.e. Bathing, eating, dressing, transferring, toileting
2. Maintenance of independence in the community:
instrumental activities of daily living
i.e. shopping, meal preparation, housework
3. Other measures of usual functioning
i.e. Walking $\frac{1}{4}$ mile, climbing stairs
4. Physical activity/exercise/recreation
i.e. Frequency of activities i.e. gardening
5. Performance measures of functioning

Source: Guralnik and LaCroix. In: Wallace and Woolson, eds. *The Epidemiologic Study of the Elderly*. Oxford U Press. 1992

Objective Performance Measure of Physical Functioning

Assessment instrument in which an individual is asked to perform a specific task and is evaluated in an objective, standardized manner using predetermined criteria, which may include counting of repetitions or timing of the activity as appropriate.

Prevalence of Difficulty With Selected Tasks– 1993

	65 +	80+
Difficulty seeing words in newspaper	16.8 %	29.3%
Difficulty lifting and carrying 10lbs	26.6%	43.1%
Difficulty Climbing 1 flight of stairs	31.0%	45.3%
Difficulty walking ¼ mile	31.5%	50.1%

Table 3. Age=Adjusted Percent Prevalence of Any Reported Difficulty, Need for Help, and Walking Device Use by Race/Ethnicity and Gender, Ages 60 and Older: NHANES III 1988-1994

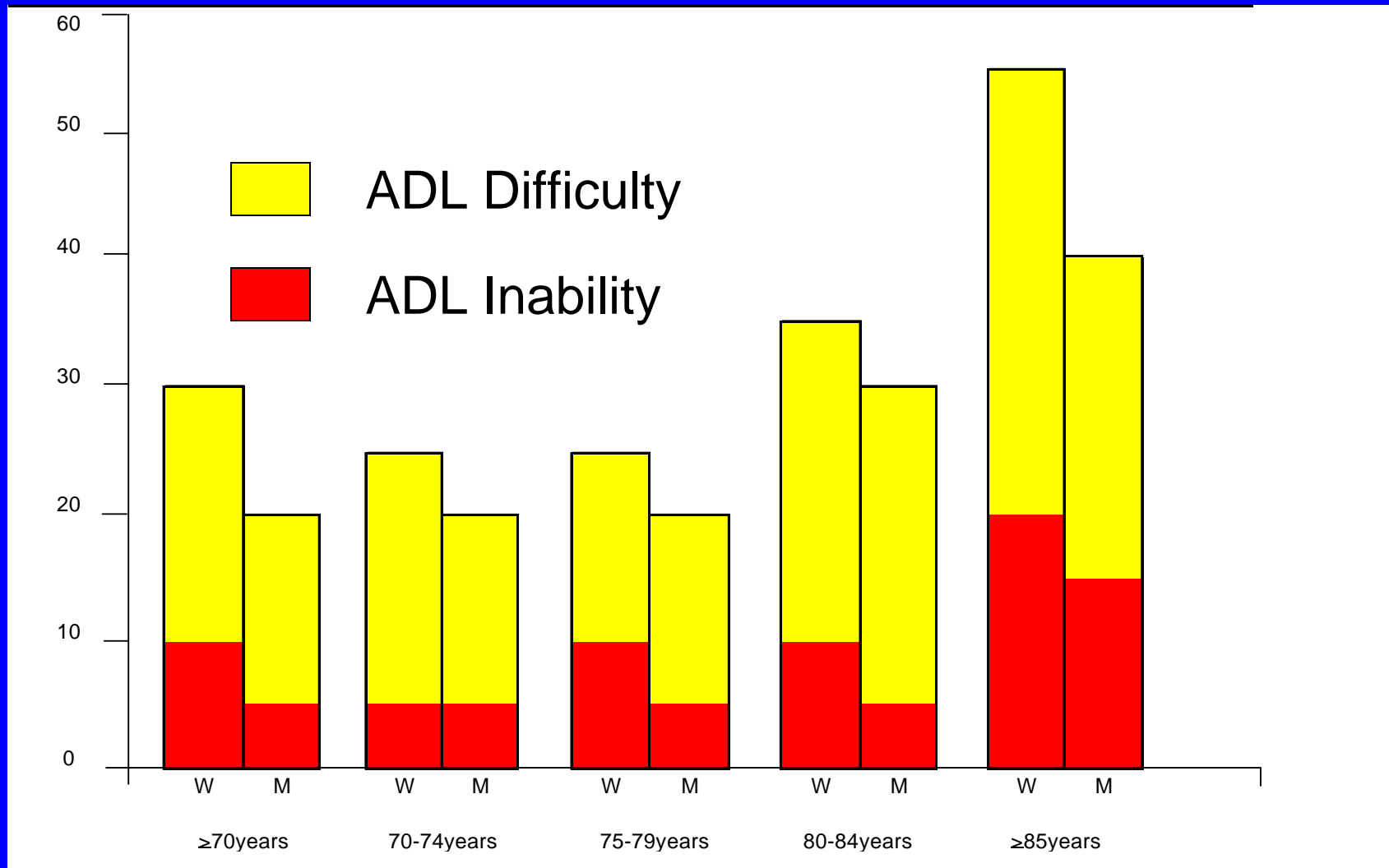
	Men				Women		
	NHW	Men	NHB	MA	NHW	NHB	MA
Walking quarter mile	22.8 ^a	32.9	27.0	30.2 ^{a,b}	43.0	39.2	
Walking 10 steps	19.1 ^{a,b}	32.2	29.0	28.7 ^{a,b}	46.7	45.4	
Stooping/crouching	40.0	38.4	41.7	49.5	49.9	52.6	
Lifting 10 lbs	13.1 ^{a,b}	24.2	23.9	29.3 ^{a,b}	39.5	44.8	
Up from an armless chair	17.0	19.1	18.3	22.1 ^{a,b}	29.1	34.2	
Doing chores	14.8 ^a	24.2 ^c	17.9	27.8 ^{a,b}	36.7	36.3	
Preparing meals	7.8 ^a	15.0	12.2	10.4 ^{a,b}	19.5	16.5	
Managing money	4.9 ^a	10.3	7.8	5.3 ^{a,b}	12.0	10.8	
Walking, no stairs	6.8 ^{a,b}	11.0	10.1	8.6 ^{a,b}	17.1	15.7	
Getting out of bed	13.3	15.2	16.3	15.4 ^b	19.9	26.0	
Feeding self	4.2	5.9	7.0	4.9	6.0	7.9	
Dressing self	8.0	11.2	10.6	10.1	12.7	15.5	
Help with personal care	5.7	6.5	9.5	6.7 ^a	12.3	10.9	
Help with routine care	10.9	15.2	12.2	16.1 ^{a,b}	26.7	21.8	
Use devices to aid walking	10.5 ^a	16.7	14.4	12.1 ^a	21.7	14.8	

^a=Non-Hispanic white significantly different from non-Hispanic black, $P<.01$.

^b=Non-Hispanic white significantly different from Mexican-American, $P<.01$.

^c=Non-Hispanic black significantly different from Mexican-American, $P<.01$.

ADL Difficulty and Inability, stratified by Age and Gender



Percent of women and men aged 70 and older who have difficulty (upper segment) or inability (lower segment) performing activities of daily living, according to 5-year age groups, 1995. Kramarow et al. Health and Aging Chartbook, National Center for Health Statistics, 1999.

Sociodemographic Factors Related to Disability

- Age
- Gender
- Socioeconomic status

Why Women Have a Higher Prevalence of Disability

- Women have a higher incidence of disability
- Women survive longer with their disability
- Men with disability are more likely to recover

Risk Factors for Disability

- Low physical activity
- Smoking
- High and low body mass index, weight loss
- Heavy and no alcohol consumption
- Cognitive impairment
- Vision impairment
- High medication use
- Depression
- Poor self-rated health
- Reduced social contacts

Diseases Associated with Disability – Acute and Chronic

Heart disease

Myocardial infarction

Angina

Congestive Heart Failure

Stroke

Osteoarthritis

Hip Fracture

Diabetes

Intermittent Claudication

Chronic Obstructive Pulmonary Disease

Cancer

Visual Impairment

Depression

Cognitive Impairment

Theoretical Models of the Pathway from Disease to Disability

Disease → Impairment → Disability → Handicap

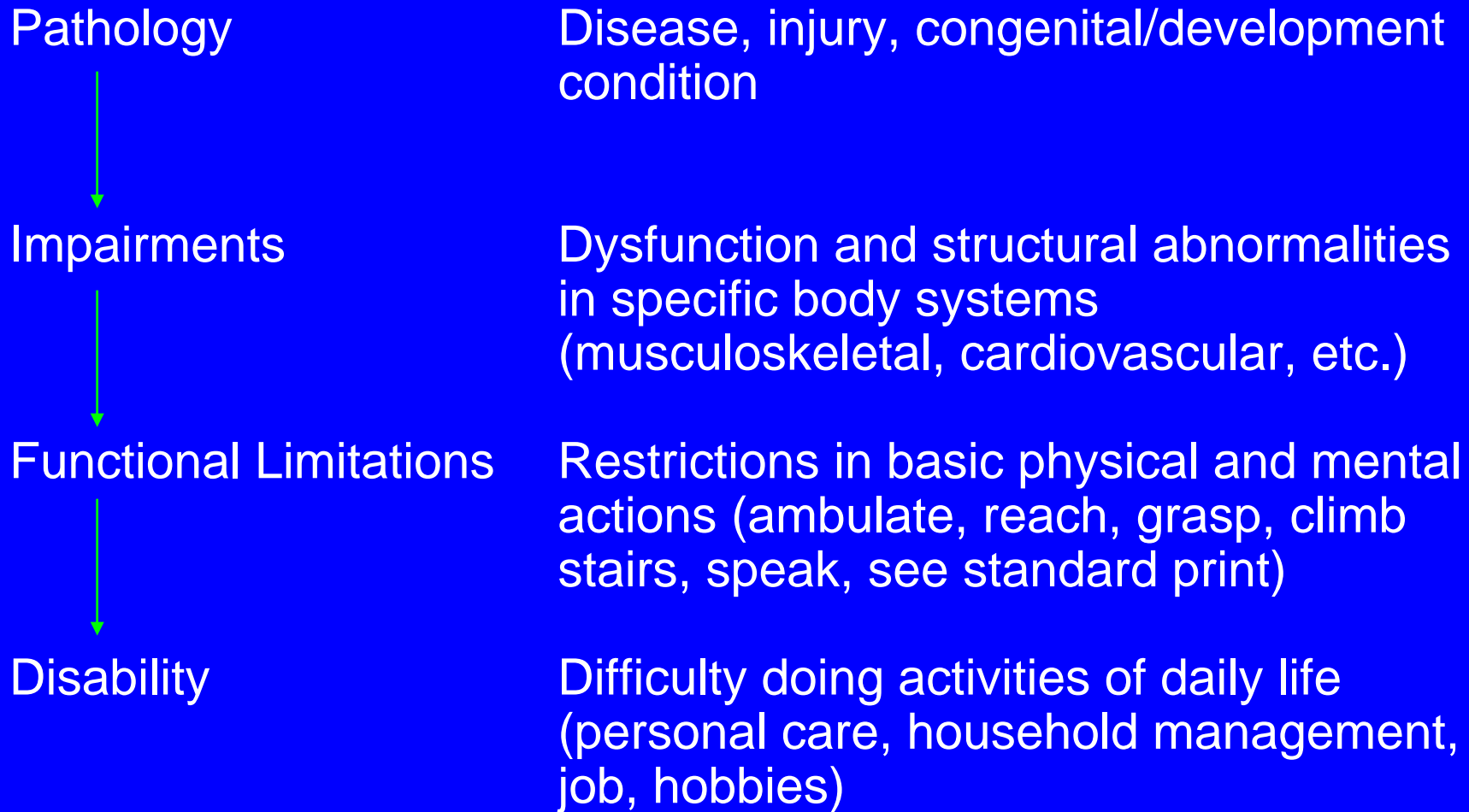
WHO

Disease → Impairment → Functional Limitations → Disability

Nagi

Institute of Medicine

A Model of the Disablement Process



Source: Verbrugge and Jette. *Soc Sci Med* 1994;38:1-4.

Women's Health and Aging Study

- Causes and course of physical disability
- One-third most disabled women age 65 and older living in the community
- Difficulty with tasks in 2 or more functional domains
 - Self-care tasks
 - Mobility tasks
 - Higher functioning tasks
 - Upper Extremity Tasks
- Text and tables of baseline monograph (*Health and Social Characteristics of Older Women with Disability*) available at:
www.nih.gov/nia/edb/whasbook/title.htm

Severe Walking Difficulty

WHAS

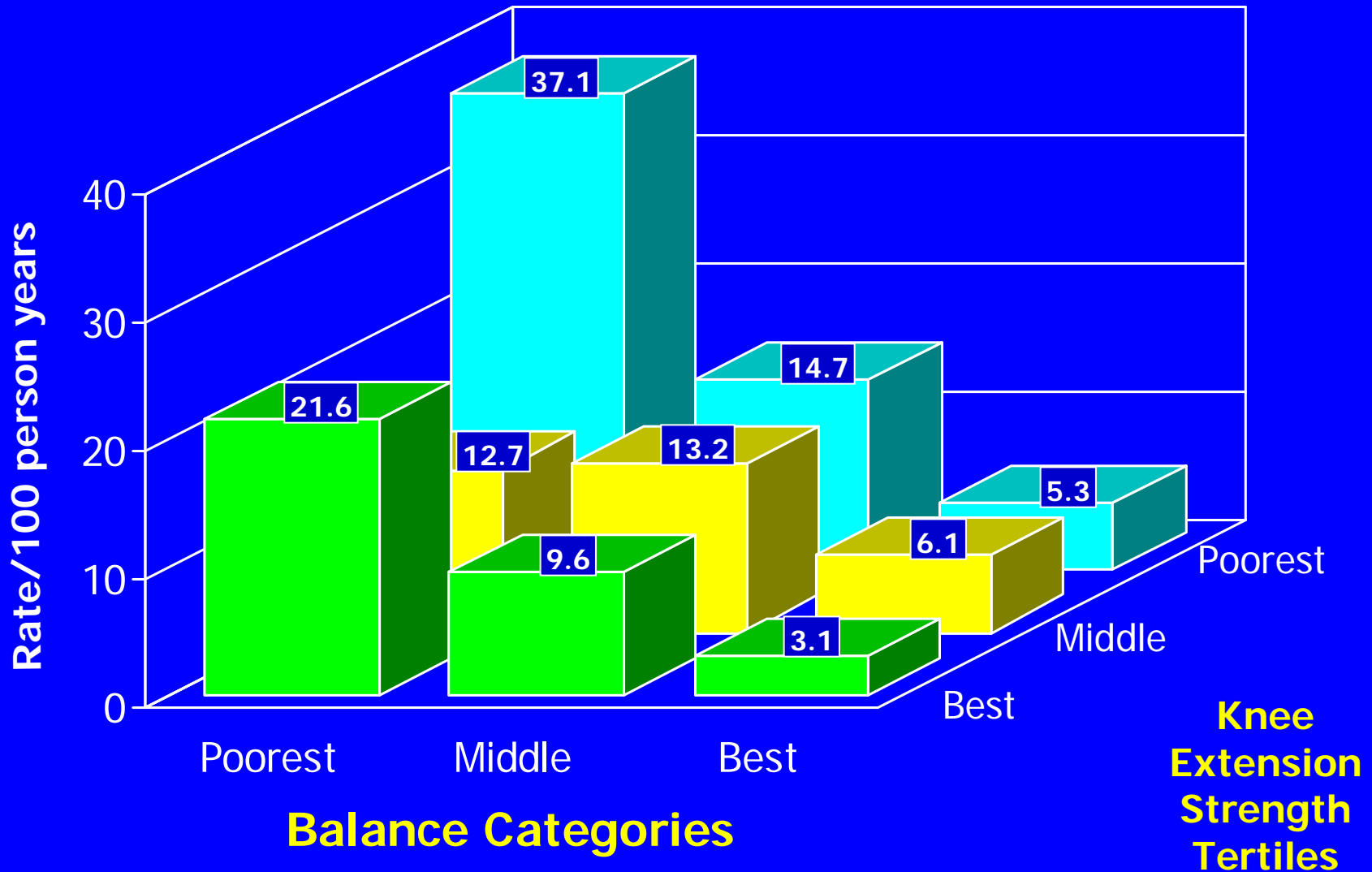
Customary walking speed

0.4 m/s or less

and

unable to walk 1/4 mile

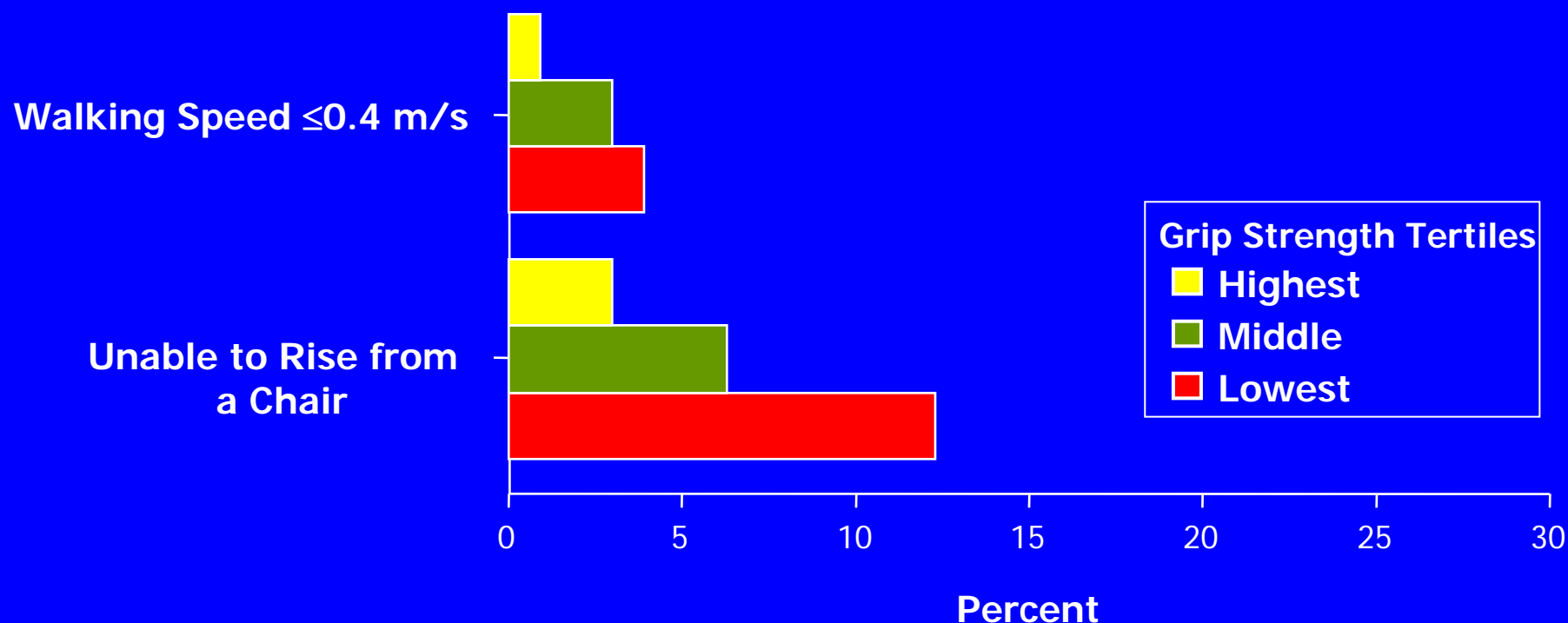
Rate of Incident Severe Walking Disability According to Balance and Strength, WHAS



Proportion of Subjects with Functional Limitations in 1991-93 According to Grip Strength Tertiles 25 Years Earlier

(3,218 Initially Healthy 45- to 68-year-old Men, Honolulu)

Functional Limitations

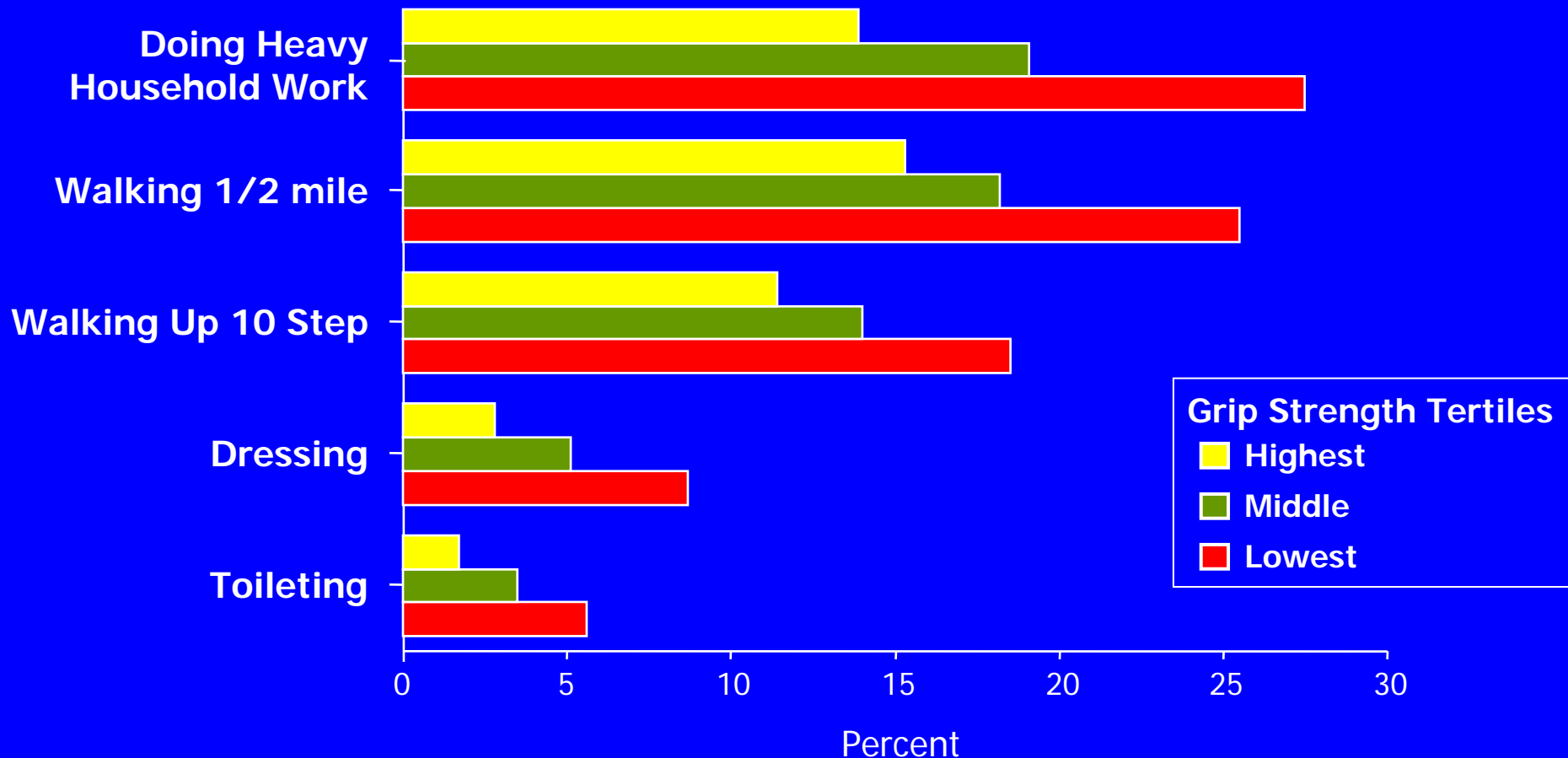


Data Source: Rantanen et al. *JAMA* 1999;281:558-560.

Proportion of Subjects with Disability in 1991-93 According to Grip Strength Tertiles 25 Years Earlier

(3,218 Initially Healthy 45- to 68-year-old Men, Honolulu)

Self-reported Difficulty



Established Populations for the Epidemiologic Study of the Elderly (EPESE)

Timed 8 foot walk

Single chair rise

Timed multiple (5) chair rises

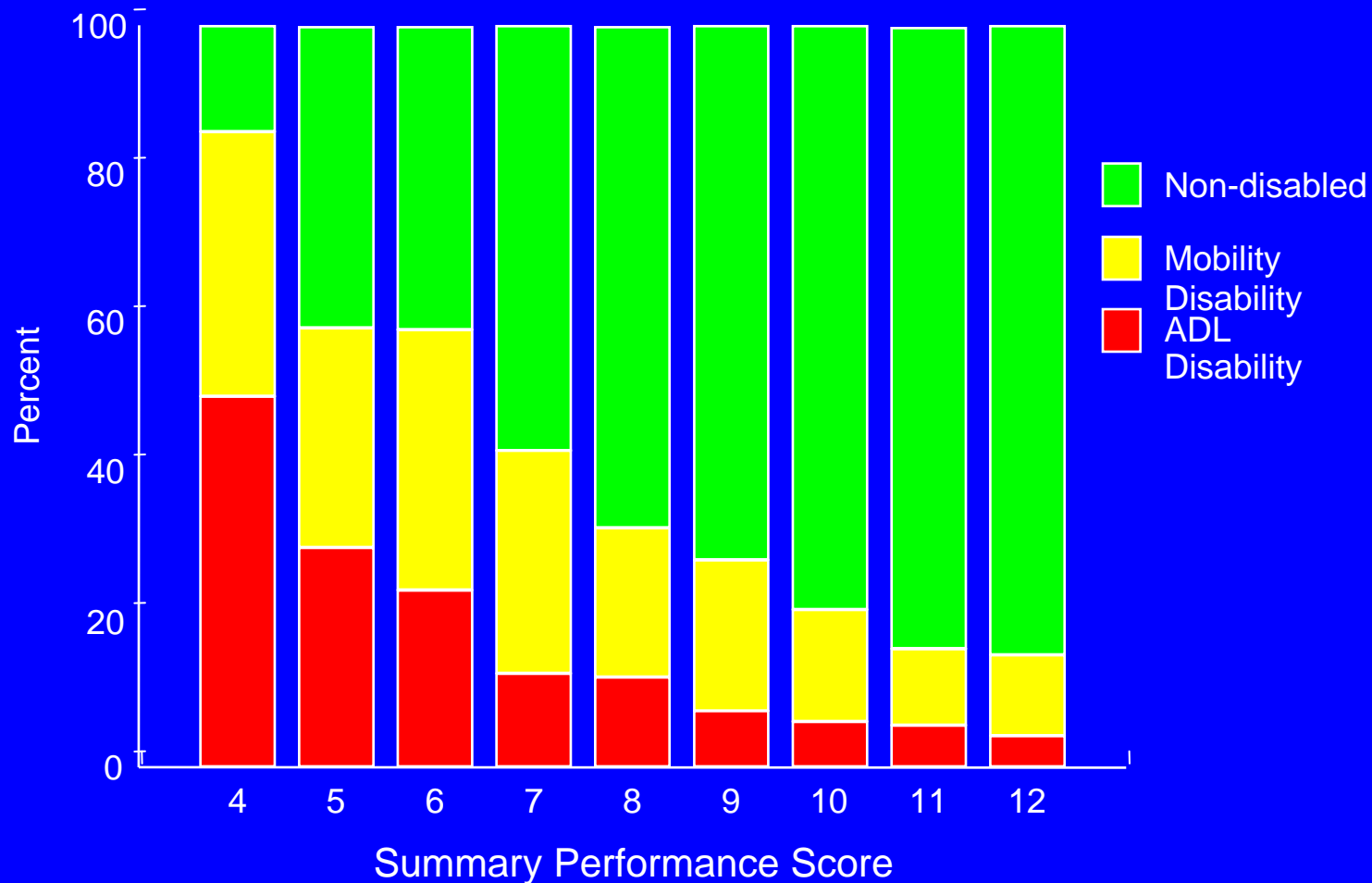
Timed standing balance (up to 10
seconds)

Side-by-side stand

Semi-tandem stand

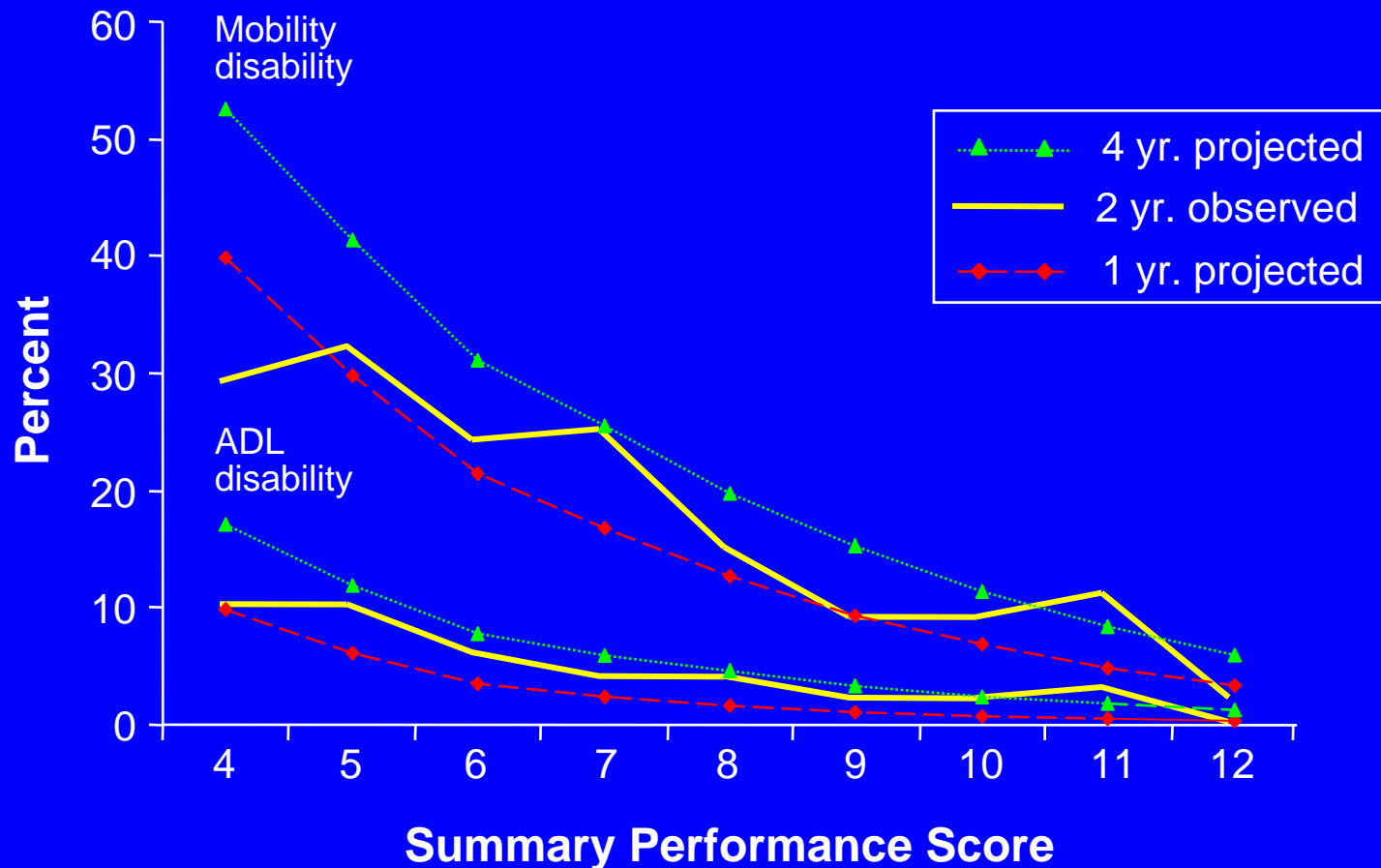
Tandem stand

Disability Status at Four Years According to Baseline Summary Performance Score Among Those Non-Disabled at Baseline



Data Source: Guralnik et al. *N Engl J Med* 1995;332:556-561.

Disability Rates According to Summary Performance Score: Observed Rates in Hispanic EPESE Compared to Predicted Rates from EPESE Models

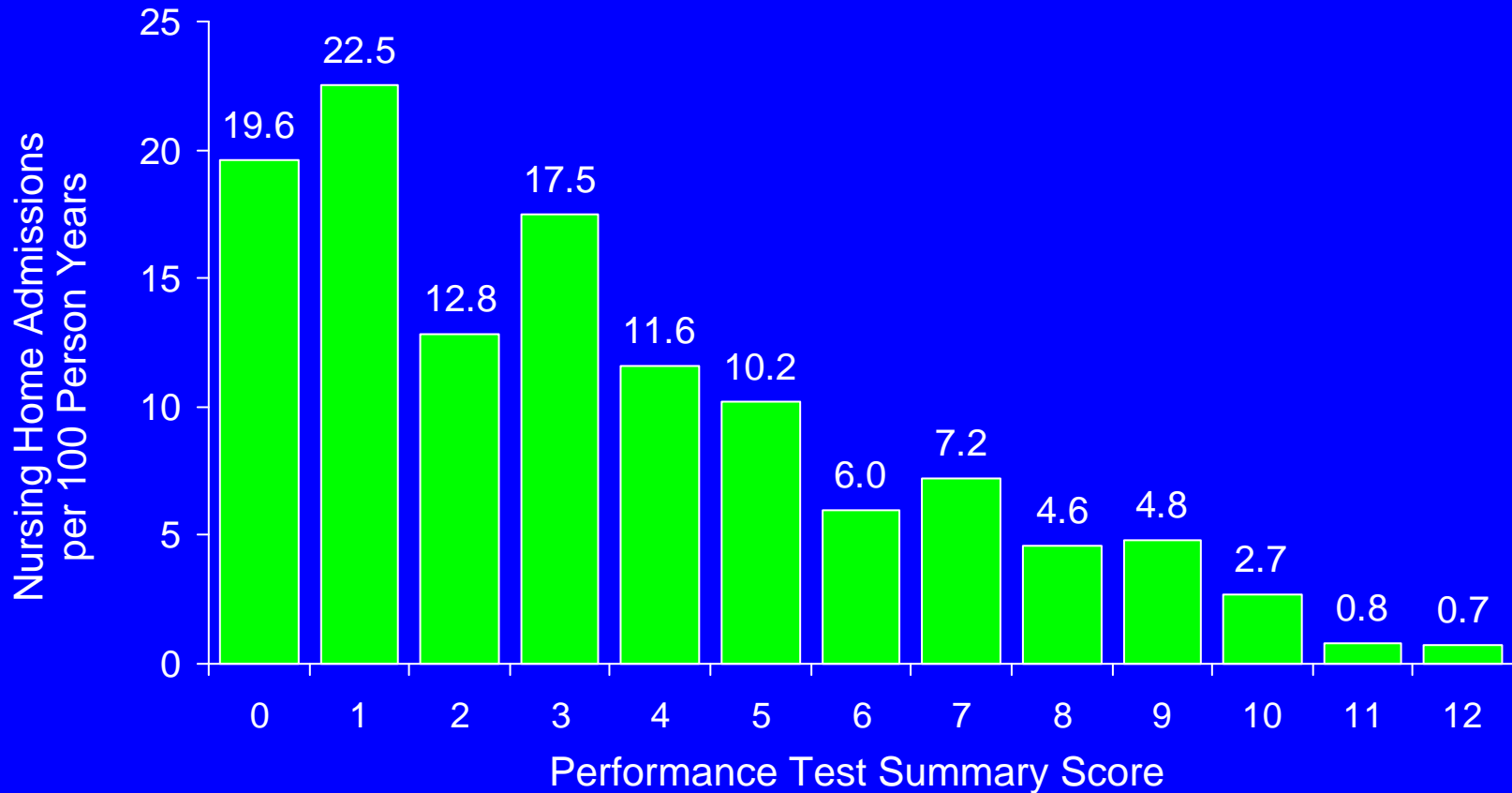


Data Source: Guralnik et al. *J Gerontol A Med Sci* 2000;55:M221-231.

Consequences of Disability Among Older Persons

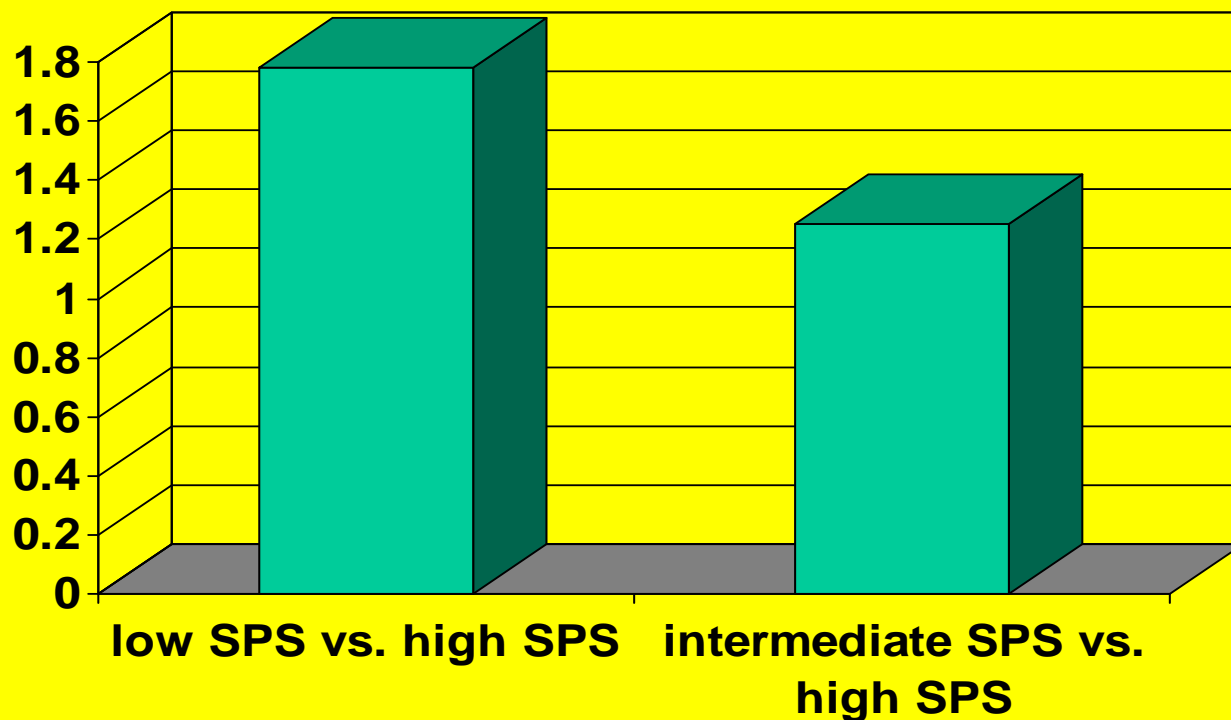
- Quality of Life
- Dependency
- Nursing home admission
- Falls
- Hospitalization
- Death

Nursing Home Admission Rates According to Performance Test Summary Score Age and Sex Adjusted



Data Source: Guralnik, et al. *J Gerontol Med Sci* 1994;49:M85-M94.

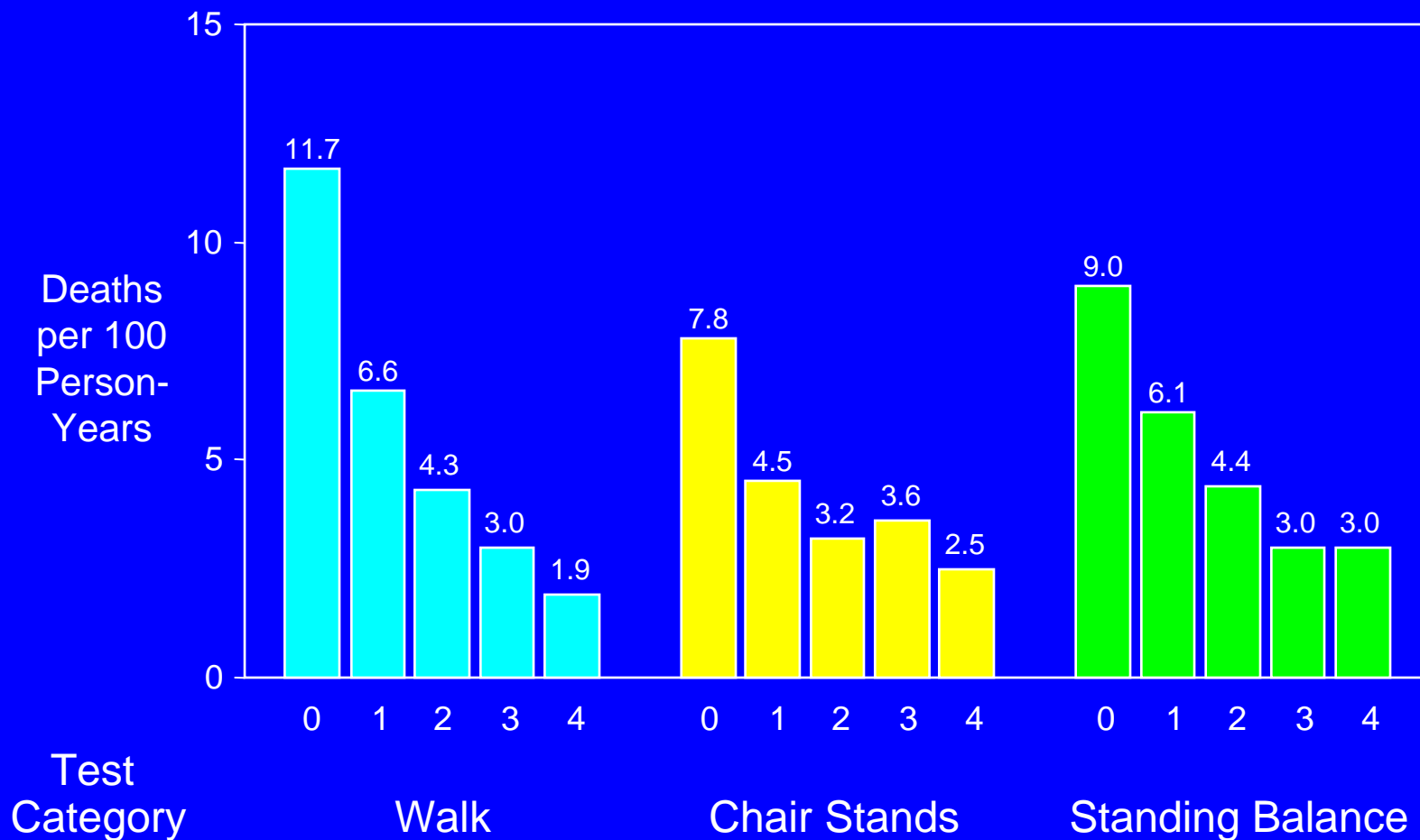
Summary Performance Score (SPS) and Risk of Subsequent Hospitalization among Non-disabled EPESE Participants



Relative risk
of being
hospitalized

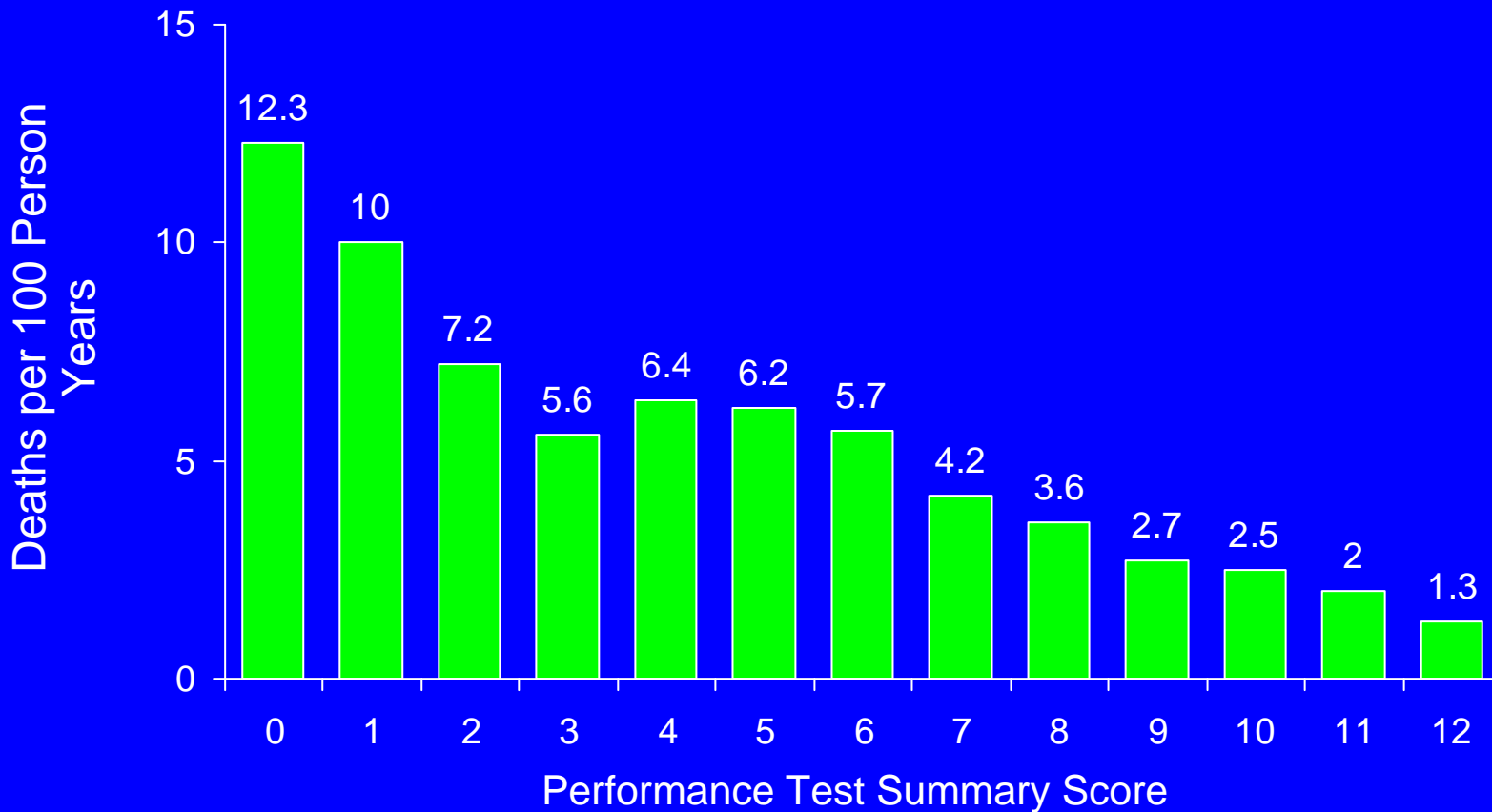
Death Rates According to Individual Performance Tests

Age and Sex Adjusted



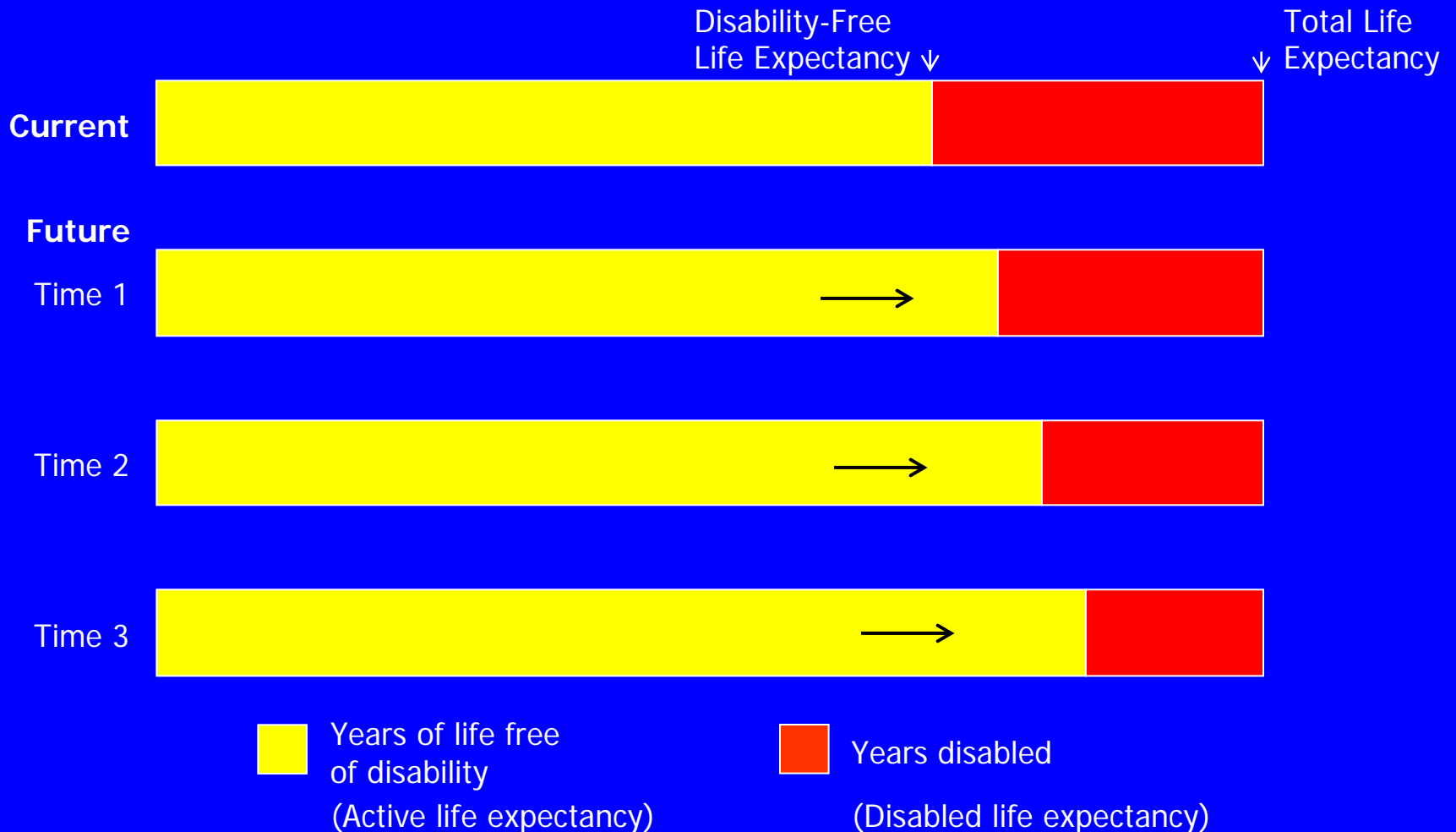
Death Rates According to Performance Test Summary Score

Age and Sex Adjusted

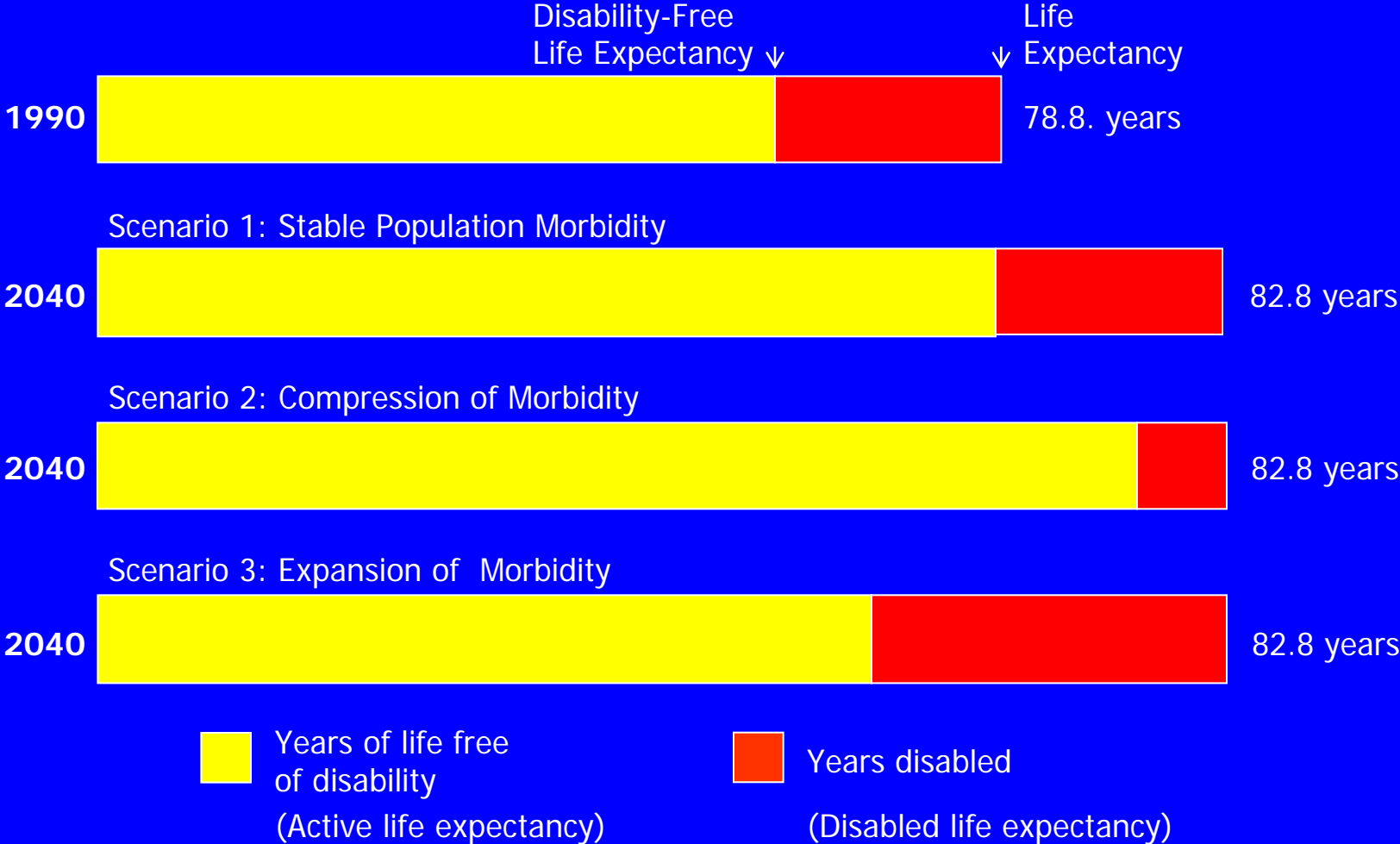


Source: Guralnik, et al. *J Gerontol Med Sci* 1994;49:M85-M94.

Compression of Morbidity Scenario



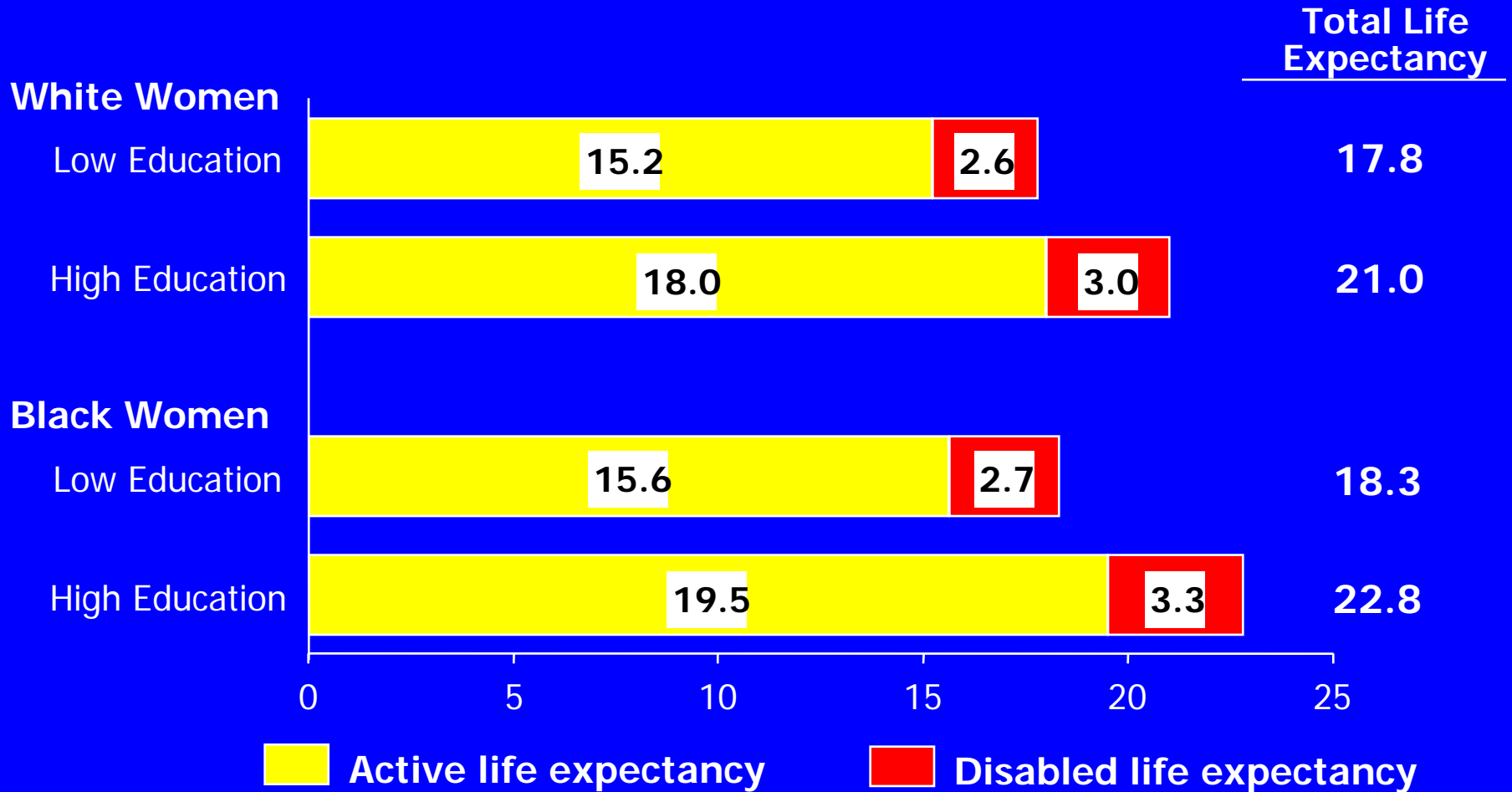
Scenarios for Change in Population Burden of Disability from 1990 to 2040



Courtesy of Jack Guralnik, National Institute on Aging

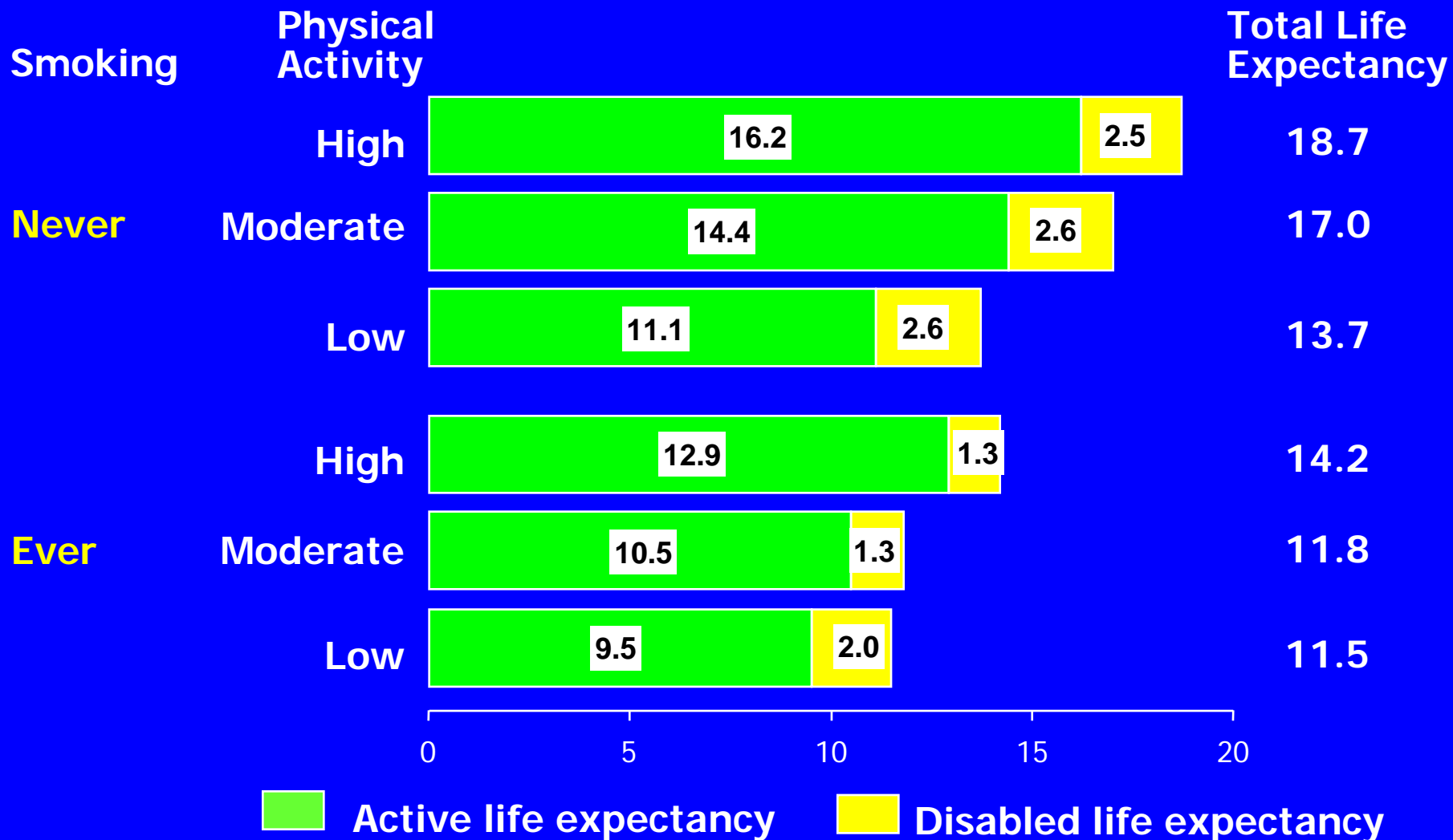
Total Life Expectancy, Active Life Expectancy and Disabled Life Expectancy

Piedmont Health Survey of the Elderly; Women, Age 65



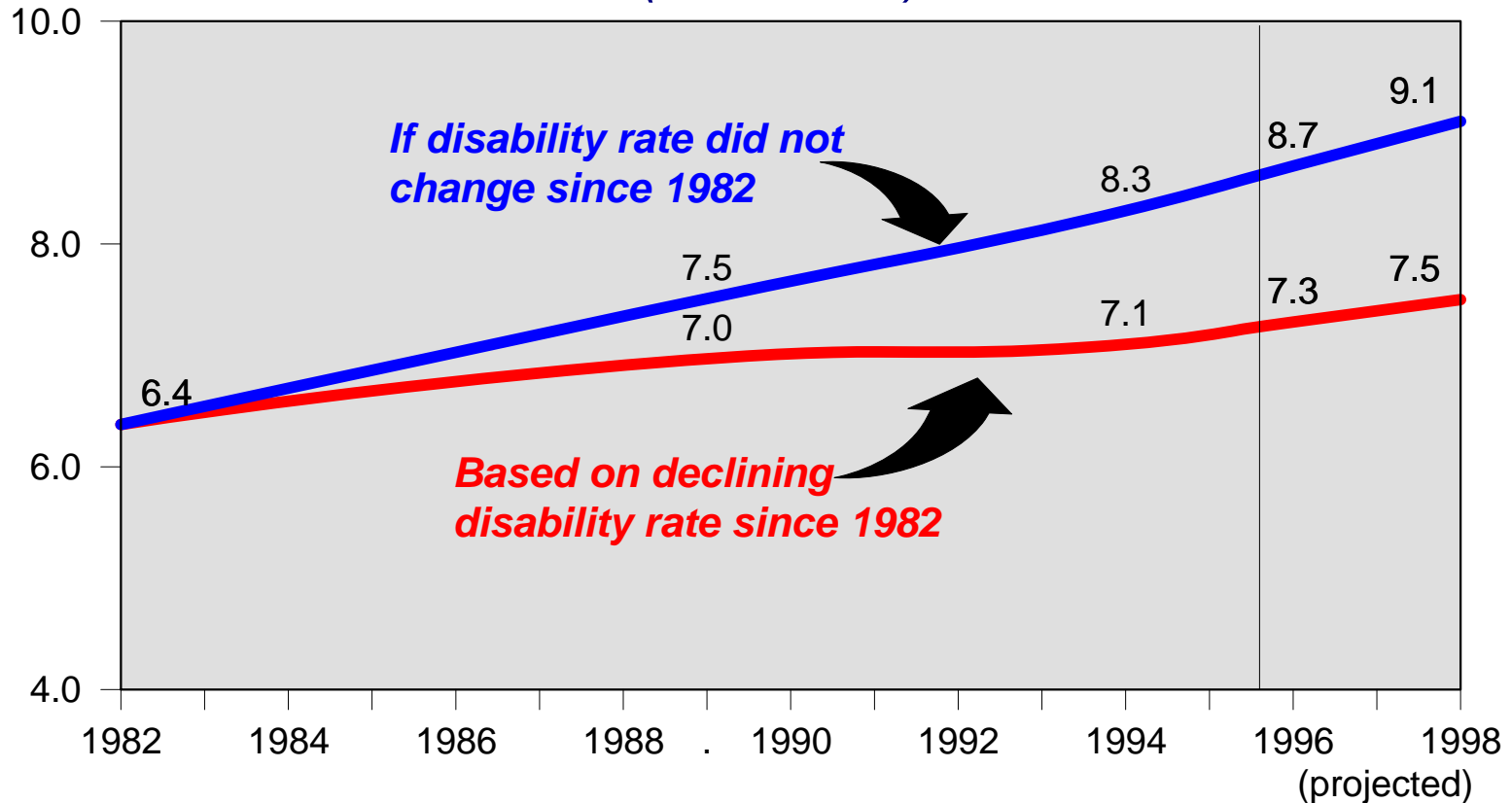
Total Life Expectancy, Active Life Expectancy, and Disabled Life Expectancy

EPESE



Source: Ferrucci et al., *Am J Epidemiol* 1999;149:645-653.

Number of Chronically Disabled Americans Age 65 and Over (In Millions)



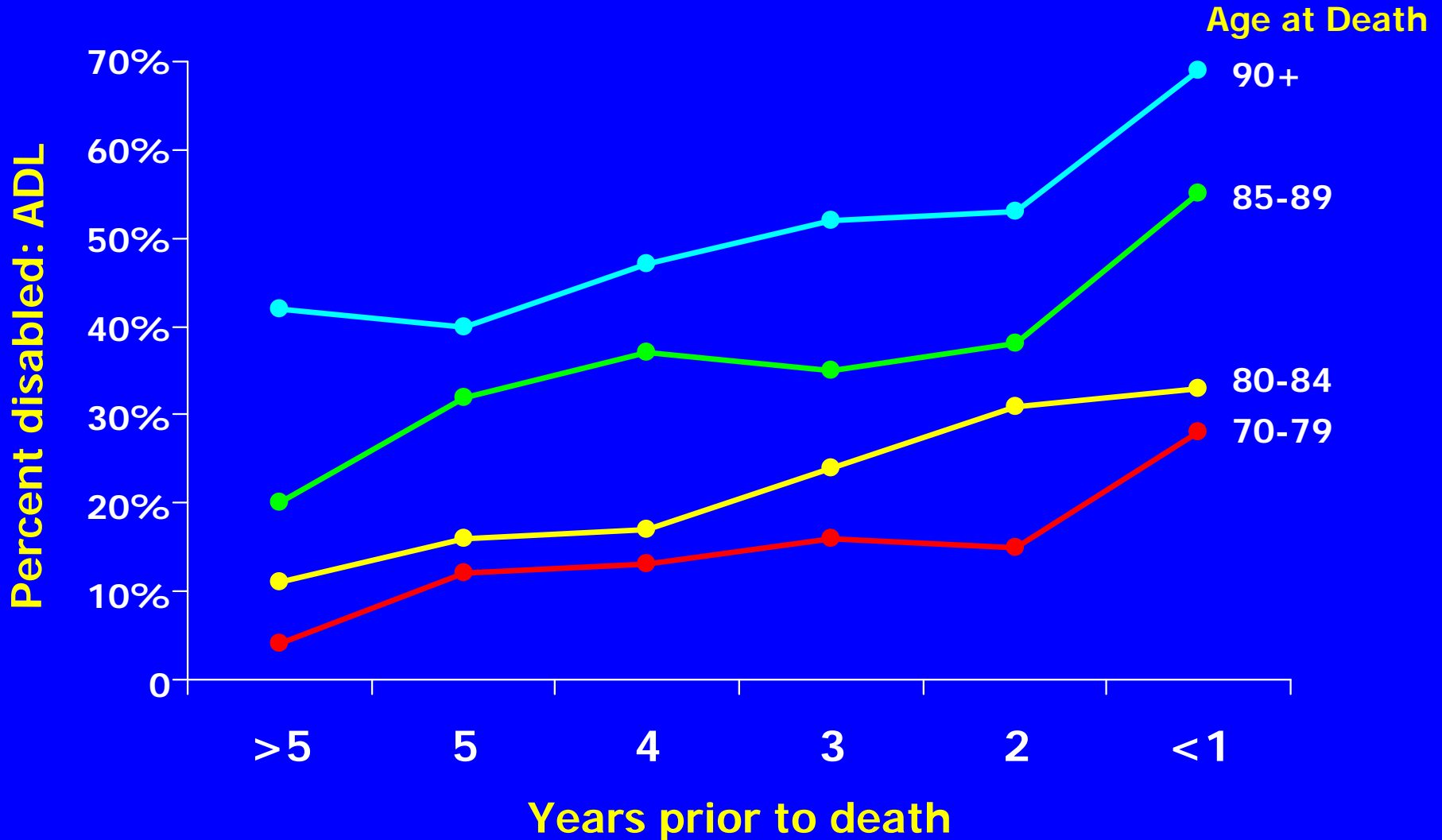
Note: The U.S. elderly population (age 65+) totaled 26.9 million in 1982, 30.8 million in 1989, 33.7 million in 1994, 34.1 million in 1996, and 34.8 million in 1998 (1996 and 1998 are projections).

Source: National Long Term Care Survey 1982-1994 (Kenneth Manton, Ph.D.)

Factors Influencing the Decline in Disability Rates

- Education
- Declines in the prevalence of several chronic diseases
- Changes in nutrition and public hygiene
- Improved health promotion and medical therapy

Disability Prevalence in the Years Prior to Death



Functional Recovery

ADLs: 20-50% over 2 – 6 years

Mobility: 20-50% over 2 – 6 years

Performance (Lower body): 10-38% over
4 years (decreased with increasing age)

Conclusions

- Interview and performance measures of physical function
- Disability addresses ability to function in community and home
- Disability is highly prevalent in older population
- Socioeconomic, behavioral, and disease factors all impact risk of disability
- Pathway from pathology to disability
- Disability increases risk of adverse outcomes
- While disability rates have decreased somewhat, numbers of disabled older persons are still rising