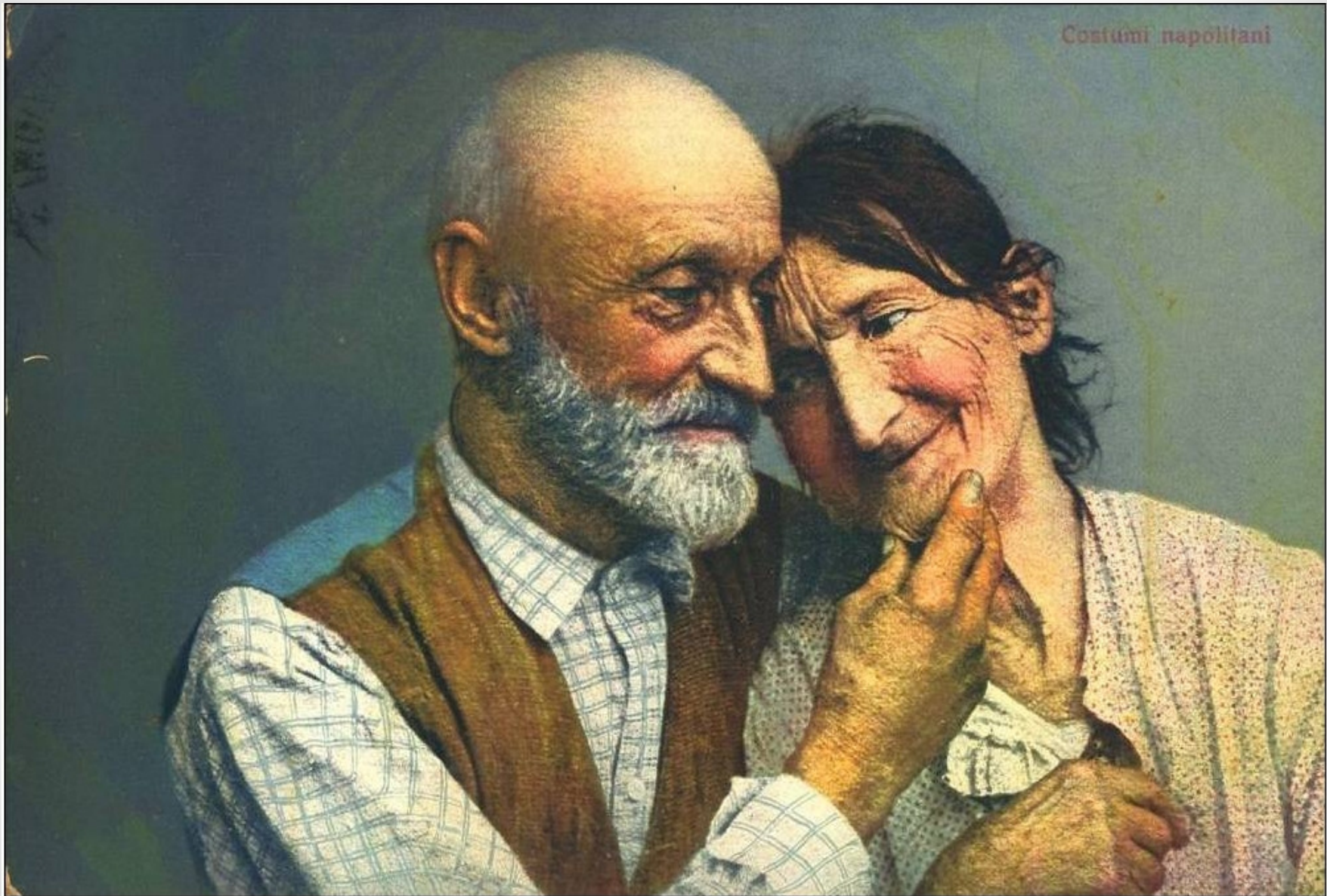# Successful & Unsuccessful Aging
Where's the Risk?

AAIM 2015 Triennial Old Age Workshop

Drs. Marjorie Keymer & Craig Davidson
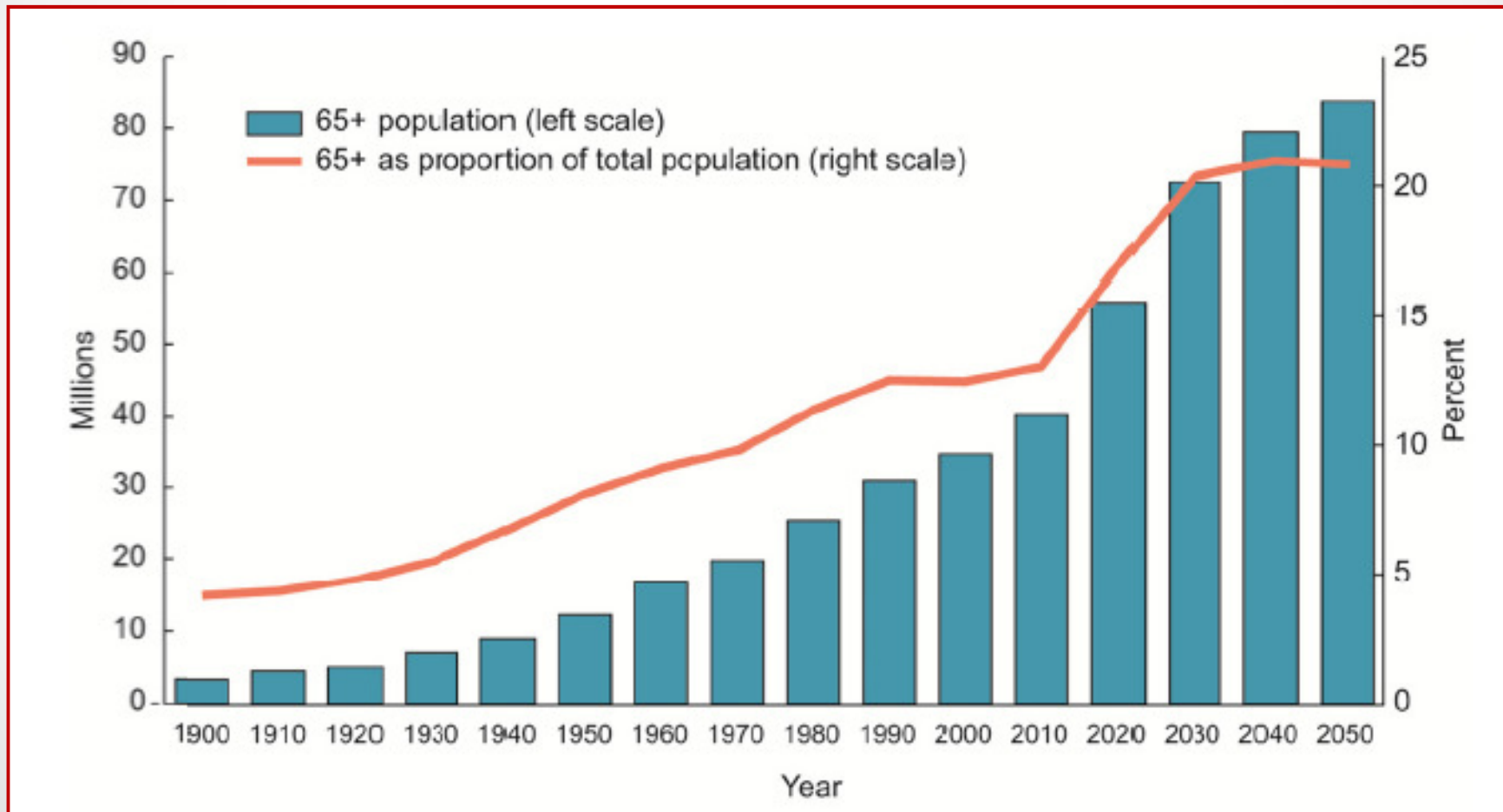
Older Age Risk Assessment
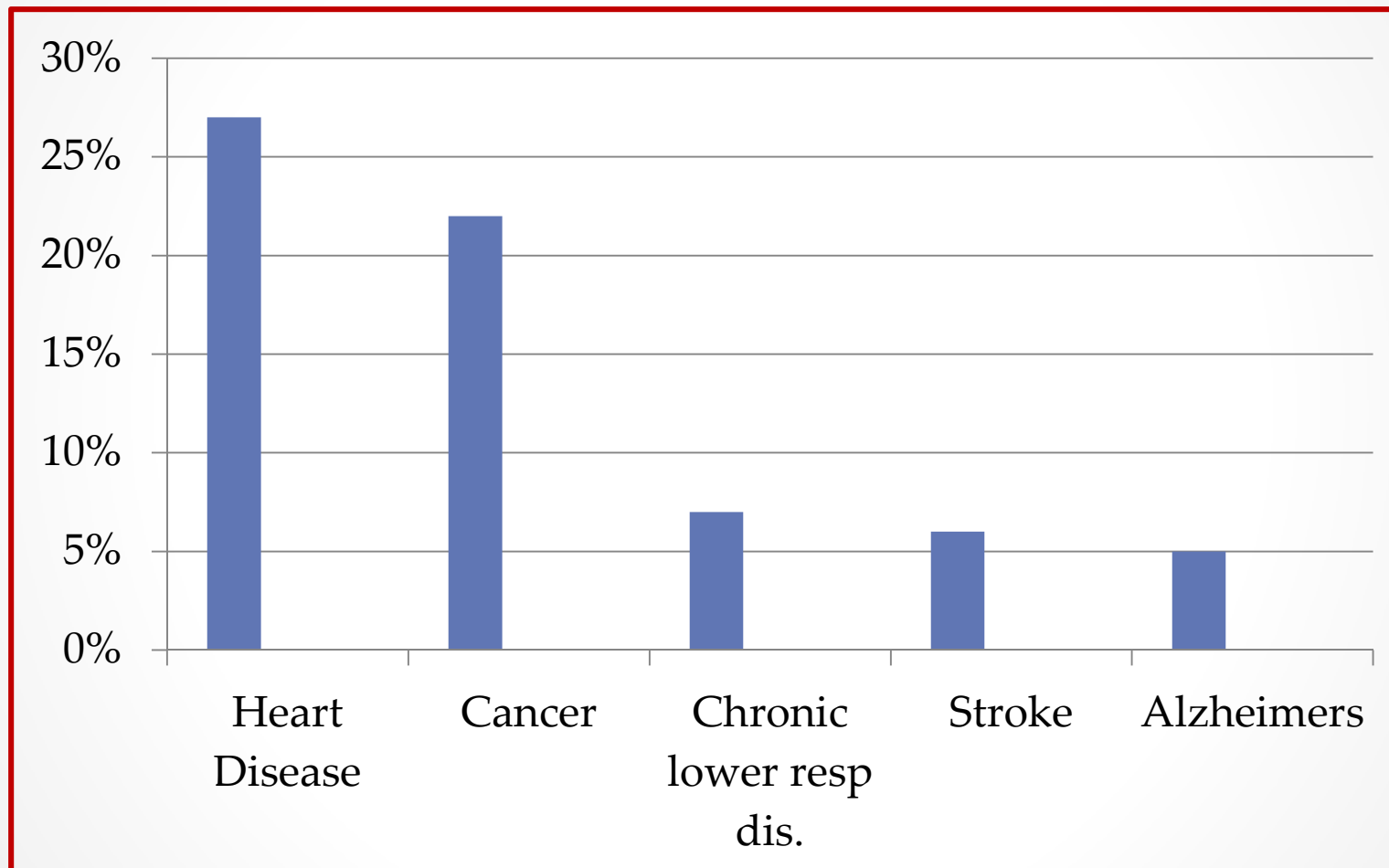

Costumi napolitani

Population Age 65yrs and Older
1900 to 2050

West L et al. http//www.census.gov/content/dam/Census/library/publications/2014/demo/p23 accessed April 20,2015

Leading Causes Of Death age >65

4

Factors Showing Increased Independent Relative Risks for 16 year Mortality: Cardiovascular Health Study

Organ Failure or Surrogate:
- Congestive Heart Failure
- High Serum Creatinine
- Low FVC

Reduced Perfusion:
- Major EKG Change
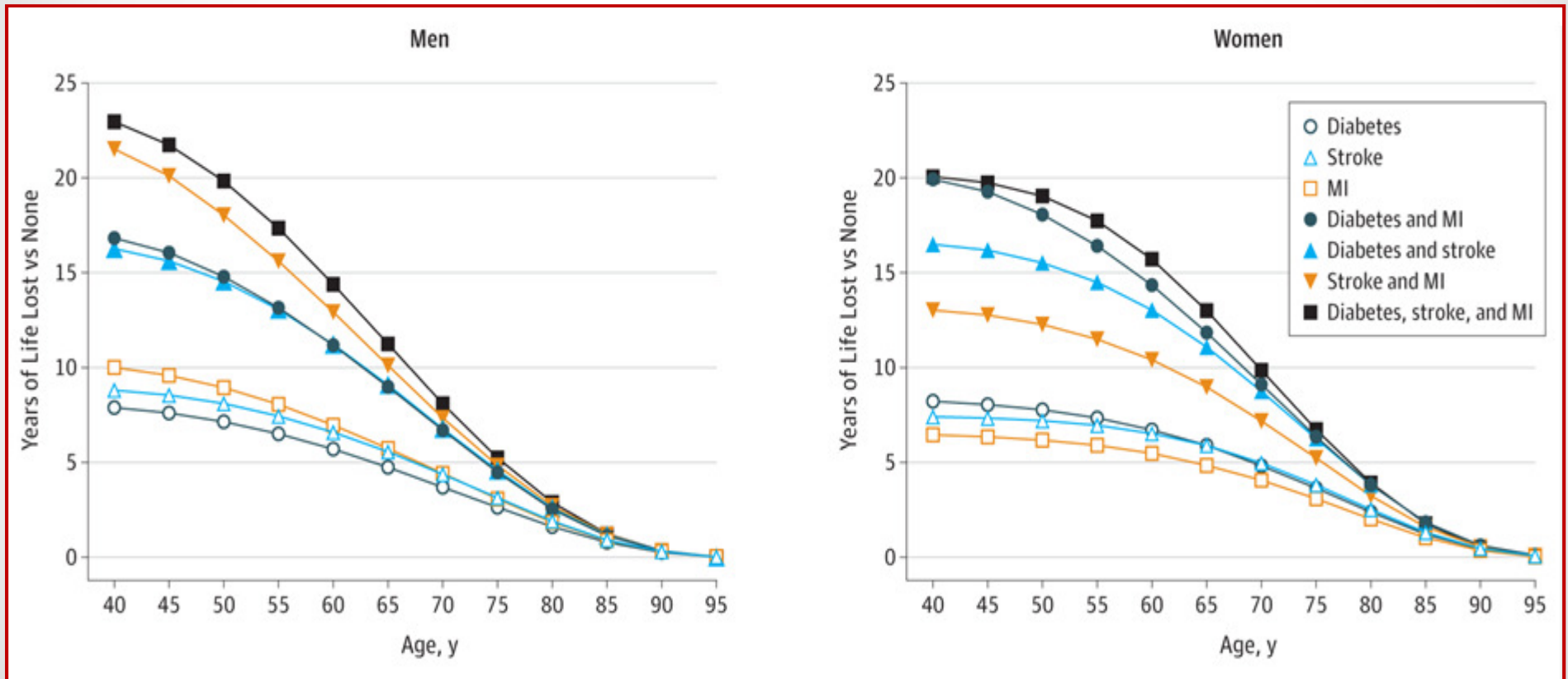- Internal Carotid Stenosis
- High Brachial and Low Tibial SBP

Increased Probability of Failure to Thrive:
- Self rated health
- Low weight
- Reduced Exercise Levels
- (Difficulty with IADL)
- Low Cognitive Function
- Low Serum Albumin
- Low IL6 (interleukin-6)

High Risk Factor Profile / Multiple Risks:
- High Fasting Glucose (>130)
- Smoking (50+ pack yrs)
- APOE ε4 allele

Newman A. B et al., Total and Cause-Specific Mortality in the Cardiovascular Health Study. J.Gerontol A Biol. Sci .Med. Sci. 2009; 64 (12): 1251–61

Diabetes, Stroke and MI & Yrs of Life Lost

Heterogeneity In Aging
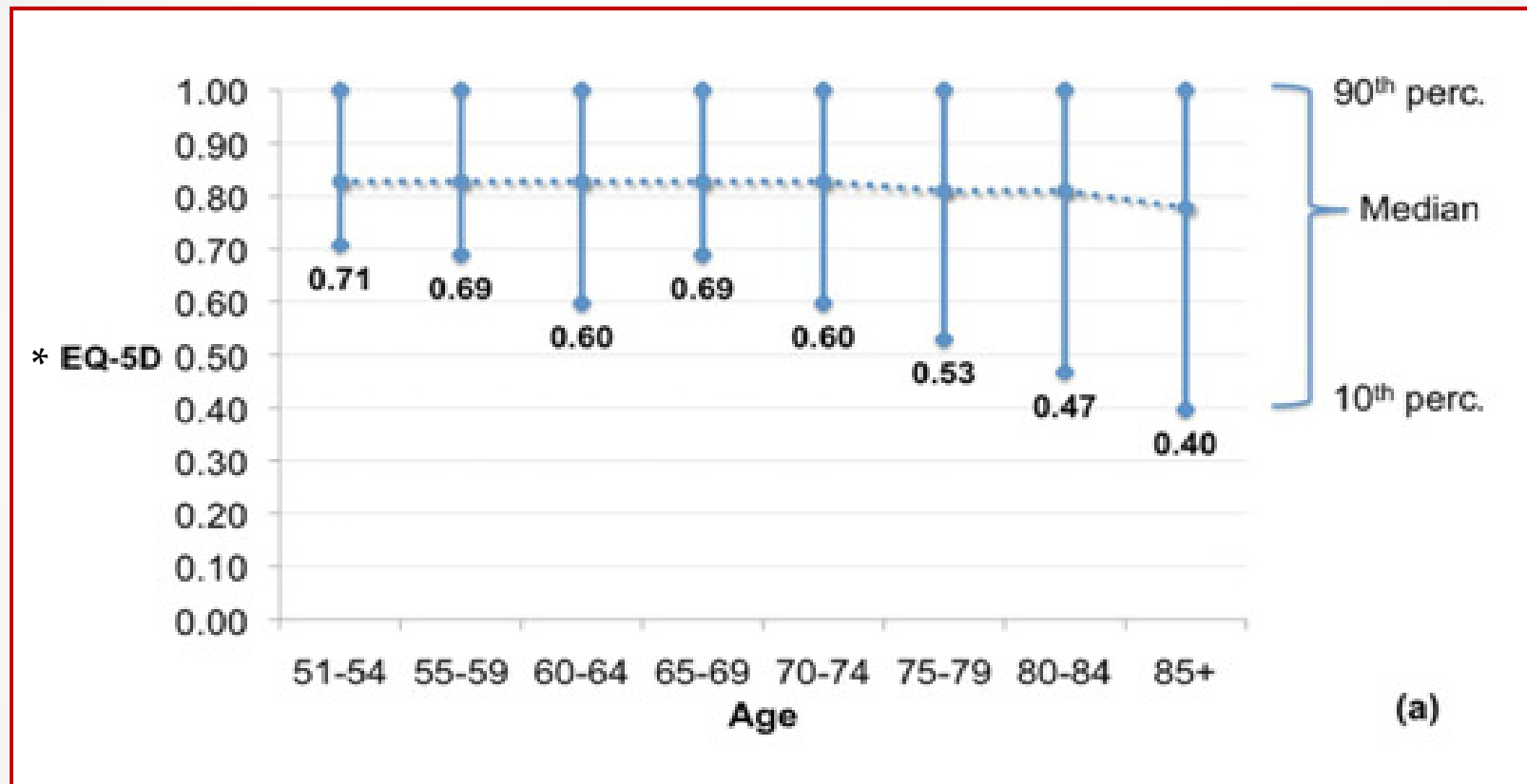
*Measures: mobility, self care, ability to perform usual activities, pain/discomfort and anxiety/depression

Adapted from: David J. Lowsky et al. J Gerontol A Biol Sci Med Sci 2014;69:640-649

Failure to Thrive: Disability

Advanced ADL (AADL)

Work
Travel
Volunteering
Community Involvement

Instrumental ADL (IADL)

Telephone use - Meal preparation

Shopping - Housework - Medication use

Finances - Driving

Basic ADL (ADL)

Feeding - Toileting - Bathing - Transferring - Mobility - Dressing
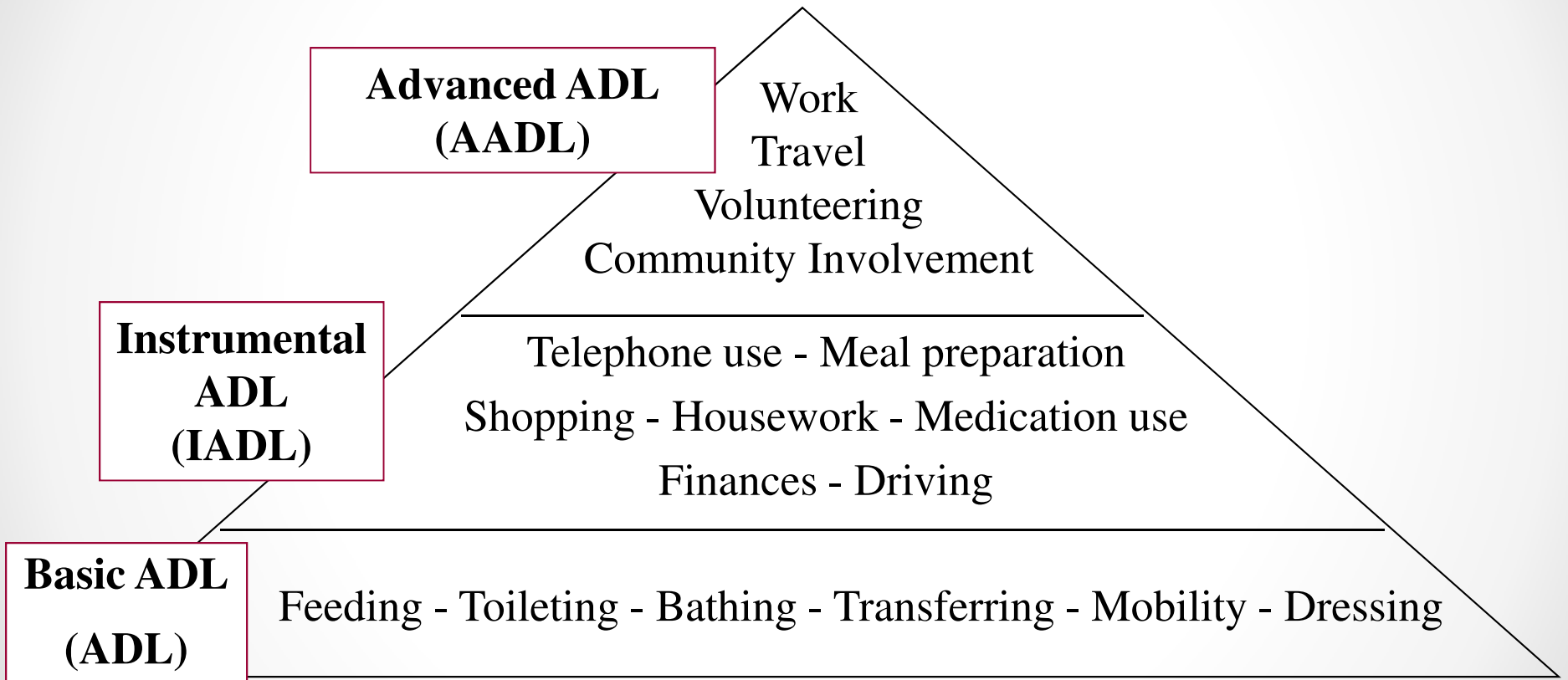
Failure to Thrive in Elderly Adults

Sarkisian CA et al, Ann Intern Med 1996;124:1072
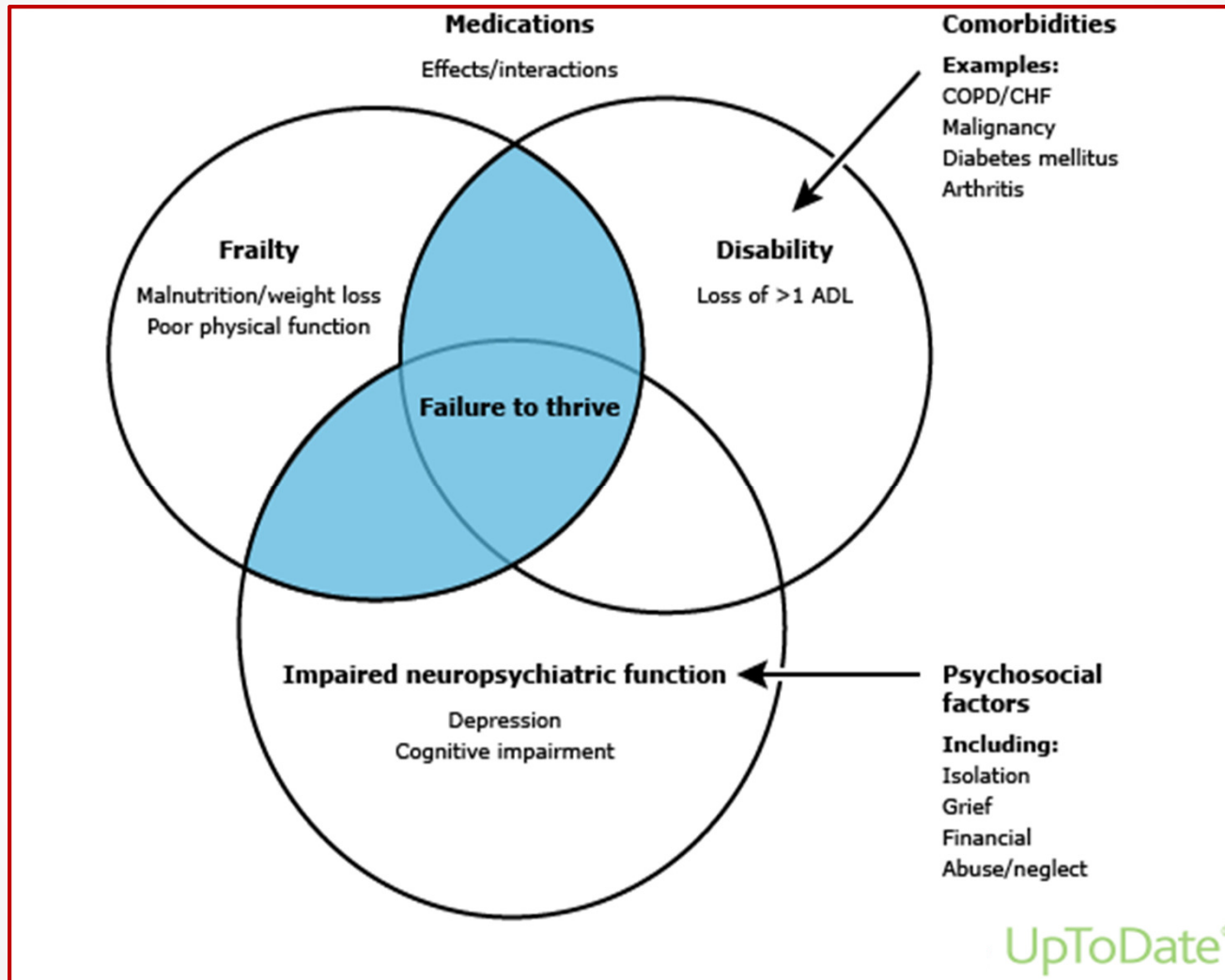
Mortality & Functional Decline Comparing Multi-morbidity & Disability

	HR for functional decline	95% CI	HR for death	95% CI
*Age				
85+ vs. 77–84 yrs	2.5	1.6–4.0	1.8	1.5–2.3
Gender				
Female versus male	1.0	0.6–1.7	0.6	0.5–0.8
Education				
2–7 vs. 8+ years	0.7	0.4–1.0	1.4	1.1–1.7
Chronic conditions				
No chronic morbidity and no disability	1		1	
Chronic morbidity and no disability	1.7	0.7–4.1	2.3	1.5–3.7
Chronic morbidity with disability	1.7	0.4–8.4	8.1	4.8–13.7
Chronic multimorbidity and no disability	3.3	1.5–7.4	2.5	1.6–3.8
Chronic multimorbidity with disability	9.9	3.6–27.3	7.7	4.7–12.6

"Disability increased with the number of medical impairments

Mortality increased with the degree of disability"

Note: age groups

Marengoni A et al., J Int Med 2009; 265(2): 288-95

Case Studies

• • •

75 Year Old Female

Med Hx
- Treated BP and lipids
- Diabetes
- Depression/anxiety
- Former smoker quit 2000- 60 pack/yr

Meds
- HCTZ 50 mg PRN edema
- Lisinopril (Zestril) 20 mg/day
- Metformin (Glucophage) 850 mg bid
- Citalopram (Celexa) 20 mg/day
- Zolpidem tartrate (Ambien) for sleep PRN

FH
- Father died MI age 58
- Mother deceased age 93 CVA
- Brother age 81 & sister age 85 living
- Children age 34 and 39

Paramedical
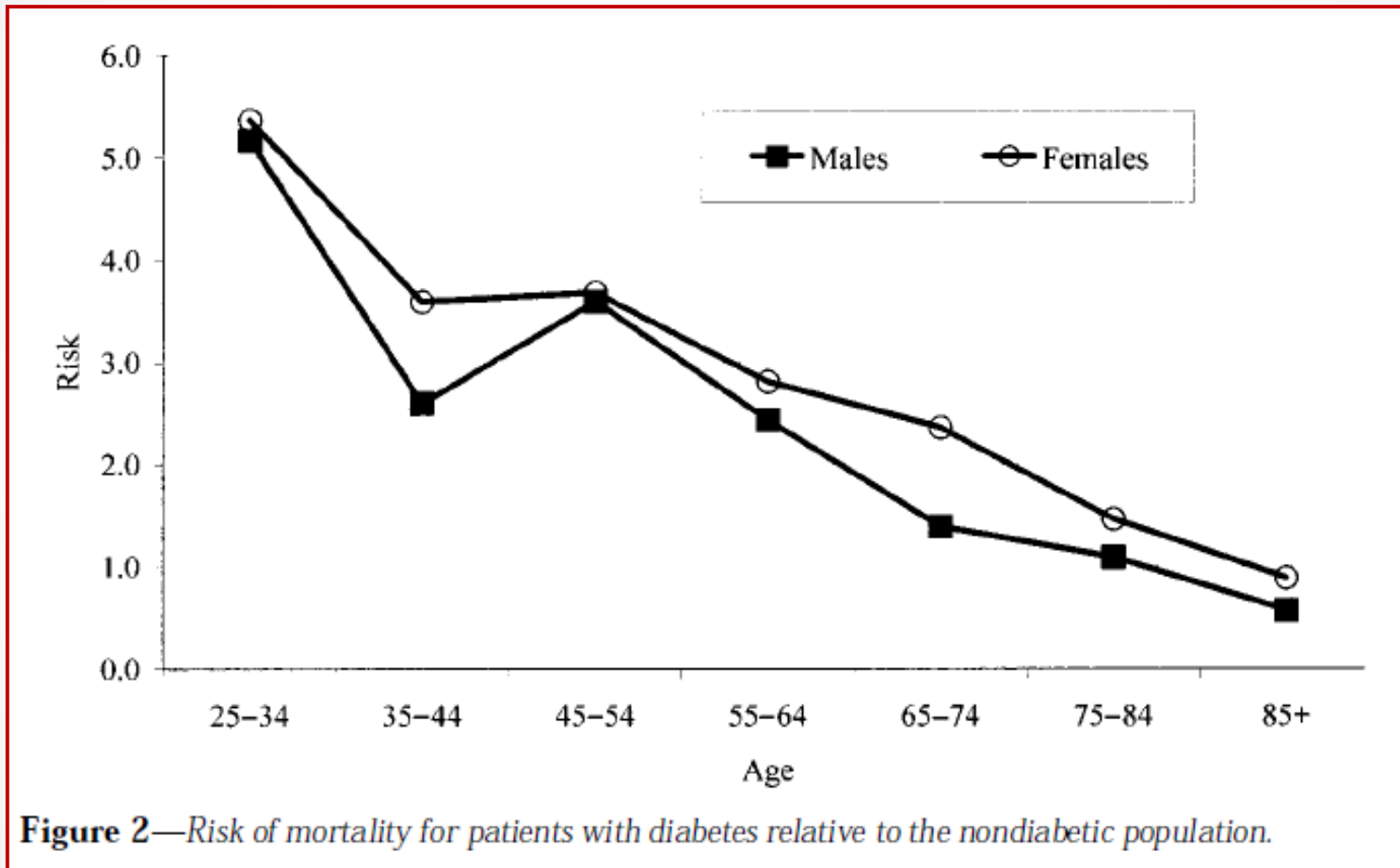- BP 160/80
- 5'2" 99 lbs BMI 18

Senior Assessment
- DWR 6/10
- G&G 11 seconds
- Exercise
  - member of a bicycle club with husband
  - yoga classes 3/wk
- Volunteers as reader for elementary children
- Falls slipped on ice and broke ulna 2 years ago

Lab
- Cholesterol 220 mg/dL (5.7 mmol/L) HDL 60 mg/dL (1.6 mmol/L)
- Serum creatinine 0.9mg/dl (79.6 mmol/L)
- Albumin 3.4 g/L with nl 3.5+
- Glucose 102 mg/dL (5.7mmol/L) and A1C 7.2

Do any of these impairments worry you?

Diabetes Mortality and Age

Figure 2—Risk of mortality for patients with diabetes relative to the nondiabetic population.

Morgan C et al., Diabetes Care 2000; 23:1103–7

Impact of Psychiatric Disorders on Elderly Mortality

- Late life severe depression and mortality[1]
  - Men
    - Not using antidepressants HR 1.8
    - Using antidepressants HR 5.3
  - Women
    - Not using antidepressants HR 1.8
    - Using antidepressants HR 0.8

- Suicide: 17th leading cause of death age 65+ (7,215 deaths 2013)[2]

- Bipolar: 4 X suicide risk-associated with previous attempts and hopelessness[3]

[1]Ryan J et al, Brittish Journal of Psychiatry 2008; 192:12
[2] source: CDC http://webappa.cdc.gov/cgi-bin/broker.exe (accessed July 7,2015)
[3]Marangell LB et al, Bipolar Disord 2006; 8:566

14

Lung Cancer Risk by Smoking Status

	Smoking category				
	Heavy smokers	Reducers	Light smokers	Ex-smokers	Never smokers
Adjusted hazard ratio* (95% CI)	1.00	0.73 (0.54-0.98)	0.44 (0.35-0.56)	0.17 (0.13-0.23)	0.09 (0.06-0.13)

Heavy smokers: ≥15 cigarettes or equivalent tobacco per day.
Reducers: Heavy smokers who decreased by ≥50 percent.
Light smokers: 1 to 14 cigarettes or equivalent tobacco per day.
* Multivariate analysis adjusted for sex, cohort of origin, inhalation habits (yes/no), tobacco type (cigarettes, cigars/pipe/cheroots, mixed), and years as smokers (continuous).

UpToDate®

Godfredson N et al. Effect of smoking reduction on lung cancer. JAMA; 294:1505

75 Year Old Female

Med Hx
- Treated BP and lipids
- Diabetes
- Depression/anxiety
- Former smoker quit 2000- 60 pack/yr

Meds
- **HCTZ 50 mg PRN edema**
- **Lisinopril (Zestril) 20 mg/day**
- **Metformin (Glucophage) 850 mg bid**
- **Citalopram (Celexa) 20 mg/day**
- **Zolpidem tartrate (Ambien) for sleep PRN**

FH
- Father died MI age 58
- Mother deceased age 93 CVA
- Brother age 81 & sister age 85 living
- Children age 34 and 39

Paramedical
- BP 160/80
- 5'2" 99 lbs BMI 18

Senior Assessment
- DWR 6/10
- G&G 11 seconds
- Exercise
  - member of a bicycle club with husband
  - yoga classes 3/wk
- Volunteers as reader for elementary children
- Falls slipped on ice and broke ulna 2 years ago

Lab
- Cholesterol 220 mg/dL (5.7 mmol/L) HDL 60 mg/dL (1.6 mmol/L)
- Serum creatinine 0.9mg/dl (79.6 mmol/L)
- Albumin 3.4 g/L with nl 3.5+
- Glucose 102 mg/dL (5.7mmol/L) and A1C 7.2

Is there anything notable about the medications?

Rates of Emergency Hospitalizations for Adverse Drug Effects Older Age 2007-2009

Budnitz MD et al N Engl J Med 2011;365:2002

75 Year Old Female

Med Hx

- o Treated BP and lipids
- o Diabetes
- o Depression/anxiety
- o Former smoker quit 2000- 60 pack/yr

Meds

- o HCTZ 50 mg PRN edema
- o Lisinopril (Zestril) 20 mg/day
- o Metformin (Glucophage) 850 mg bid
- o Citalopram (Celexa) 20 mg/day
- o Zolpidem tartrate (Ambien) for sleep PRN

FH

- o **Father died MI age 58**
- o **Mother deceased age 93 CVA**
- o **Brother age 81 & sister age 85 living**
- o **Children age 34 and 39**

Paramedical

- o BP 160/80
- o 5'2" 99 lbs BMI 18

Senior Assessment

- DWR 6/10
- G&G 11 seconds
- Exercise
  - o member of a bicycle club with husband
  - o yoga classes 3/wk
- Volunteers as reader for elementary children
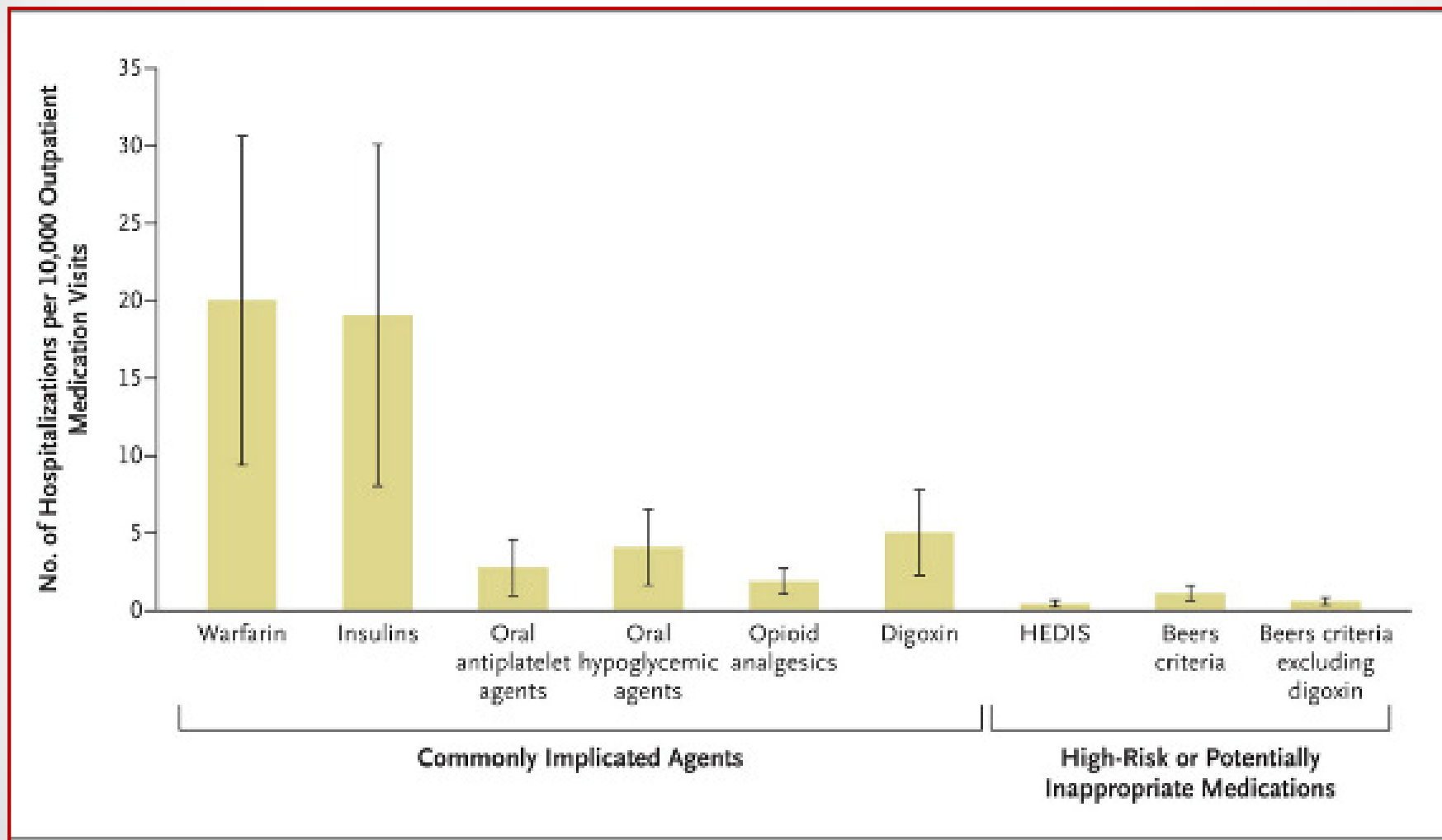- Falls slipped on ice and broke ulna 2 years ago

Lab

- Cholesterol 220 mg/dL (5.7 mmol/L) HDL 60 mg/dL (1.6 mmol/L)
- Serum creatinine 0.9mg/dl (79.6 mmol/L)
- Albumin 3.4 g/L with nl 3.5+
- Glucose 102 mg/dL (5.7mmol/L) and A1C 7.2

What stands out in the FH?

Family History and Longevity

- ~50% of centenarian's siblings, parents or grandparents survive to very old age[1]

- Women with last child >age 33 years 2X odds for living to the top 5th % of their birth cohorts[2]

[1] Perls TT et al, Proc Natl Acad Sci USA 2002;99:8442
[2] Sun F et al, Menopause 2015;22:26

75 Year Old Female

Med Hx
- Treated BP and lipids
- Diabetes
- Depression/anxiety
- Former smoker quit 2000- 60 pack/yr

Meds
- HCTZ 50 mg PRN edema
- Lisinopril (Zestril) 20 mg/day
- Metformin (Glucophage) 850 mg bid
- Citalopram (Celexa) 20 mg/day
- Zolpidem tartrate (Ambien) for sleep PRN

FH
- Father died MI age 58
- Mother deceased age 93 CVA
- Brother age 81 & sister age 85 living
- Children age 34 and 39

Paramedical
- **BP 160/80**
- **5'2" 99 lbs BMI 18**

Senior Assessment
- DWR 6/10
- G&G 11 seconds
- Exercise
  - member of a bicycle club with husband
  - yoga classes 3/wk
- Volunteers as reader for elementary children
- Falls slipped on ice and broke ulna 2 years ago

Lab
- Cholesterol 220 mg/dL (5.7 mmol/L) HDL 60 mg/dL (1.6 mmol/L)
- Serum creatinine 0.9mg/dl (79.6 mmol/L)
- Albumin 3.4 g/L with nl 3.5+
- Glucose 102 mg/dL (5.7mmol/L) and A1C 7.2

Paramedical: red flags?

CHD Mortality Related to BP and Age
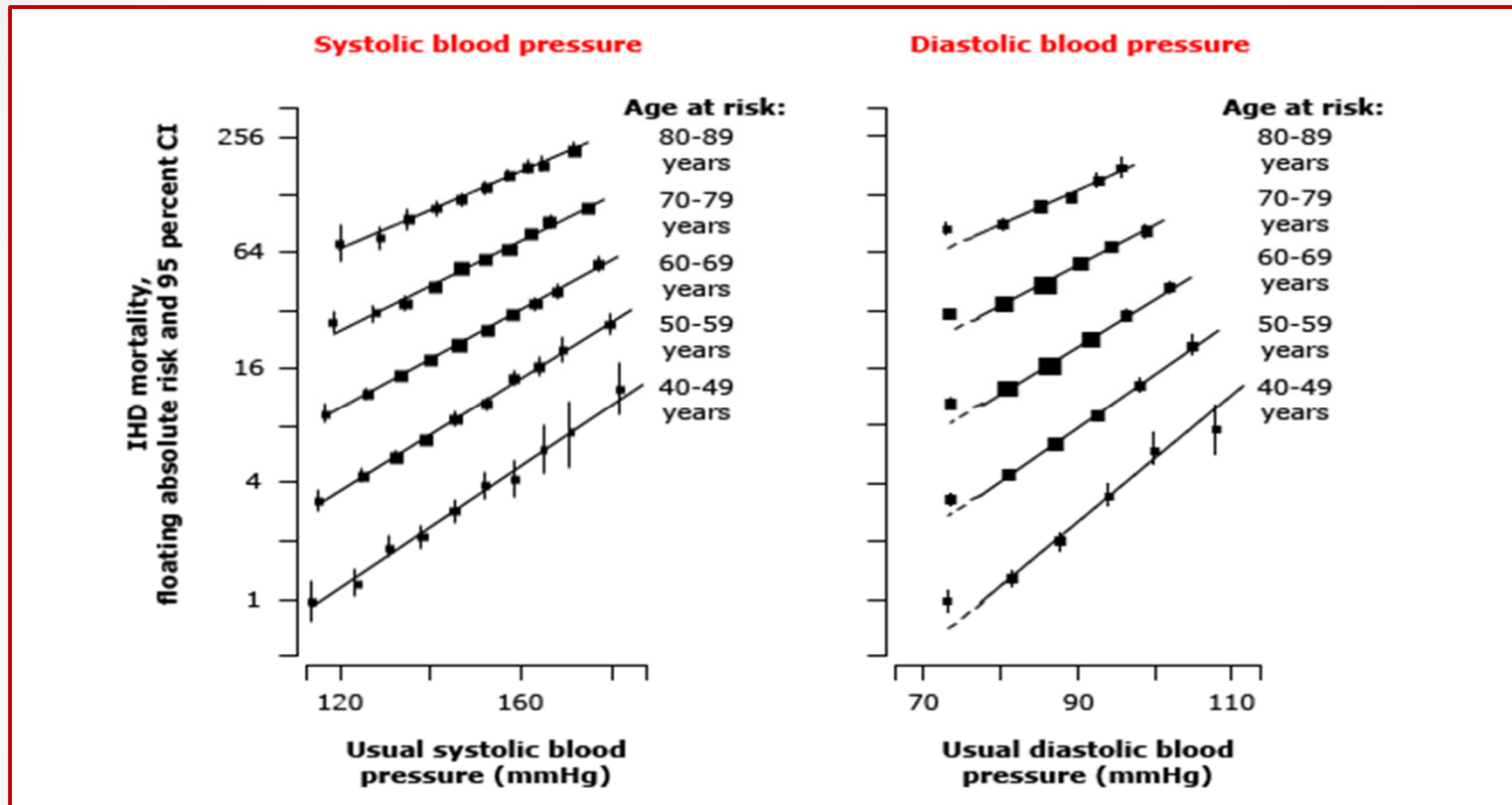
Coronary heart disease (CHD) mortality rate, pictured on a log scale with 95 percent confidence intervals, in each decade of age in relation to the estimated usual systolic and diastolic blood pressure at the start of that decade. CHD mortality increases with both higher pressures and older ages. For diastolic pressure, each age-specific regression line ignores the left-hand point (ie, at slightly less than 75 mmHg) for which the risk lies significantly above the fitted regression line (as indicated by the broken line below 75 mmHg).

Data from: Prospective Studies Collaboration, Lancet 202; 360:1903

21

BMI & All Cause Mortality
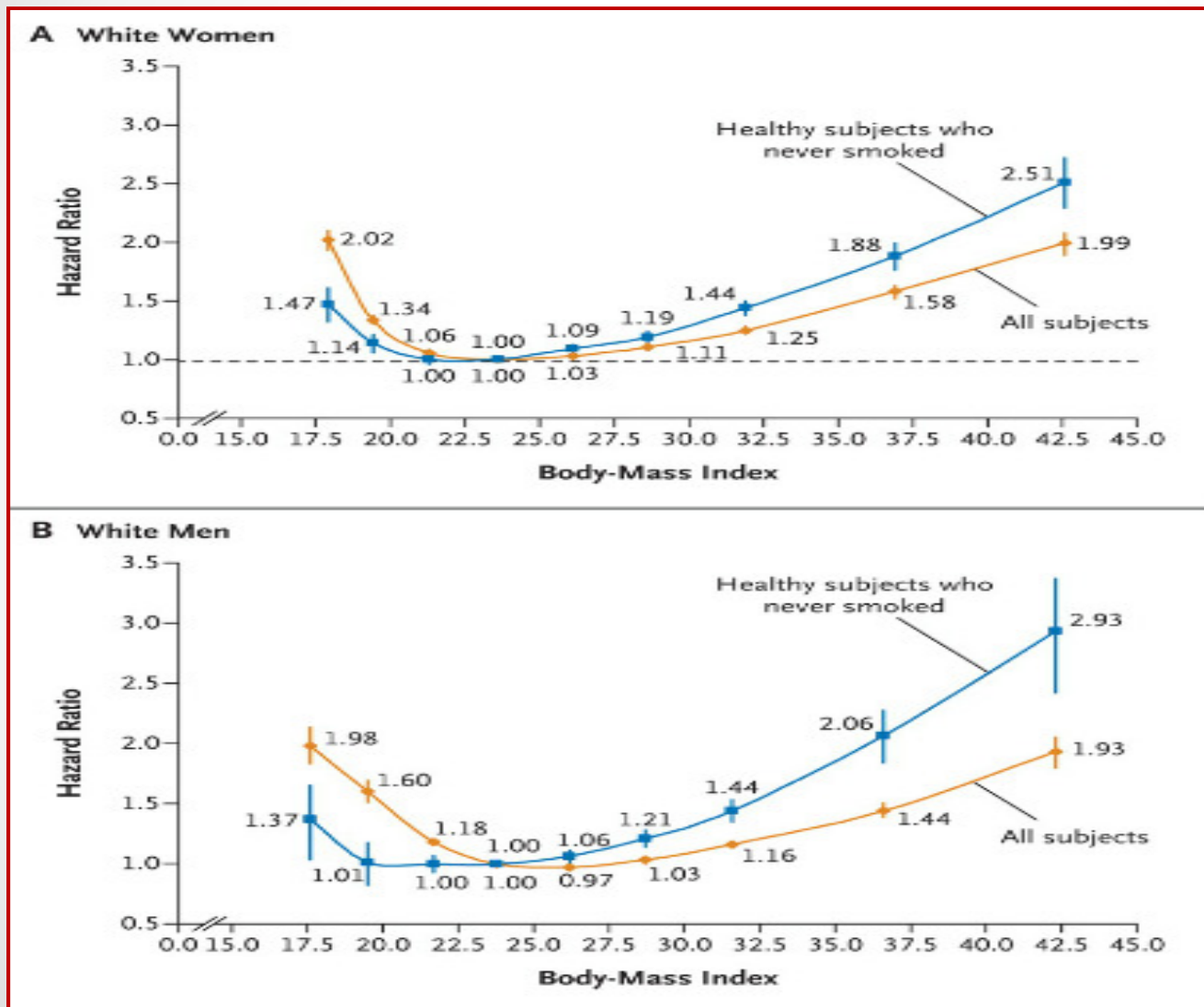
Subjects were deemed healthy if they had no cancer or heart disease at baseline

Hazard ratios were:
- Calculated with use of age as the underlining time scale

- Stratified by study and

- Adjusted for;
  alcohol intake, educational level, marital status, and overall physical activity

Berrington -de Gonzalez A, N Engl J Med 2010;363:2211

75 Year Old Female

Med Hx
- o Treated BP and lipids
- o Diabetes
- o Depression/anxiety
- o Former smoker quit 2000- 60 pack/yr

Meds
- o HCTZ 50 mg PRN edema
- o Lisinopril (Zestril) 20 mg/day
- o Metformin (Glucophage) 850 mg bid
- o Citalopram (Celexa) 20 mg/day
- o Zolpidem tartrate (Ambien) for sleep PRN

FH
- o Father died MI age 58
- o Mother deceased age 93 CVA
- o Brother age 81 & sister age 85 living
- o Children age 34 and 39

Paramedical
- o BP 160/80
- o 5'2" 99 lbs BMI 18

Senior Assessment
- **DWR 6/10**
- **G&G 11 seconds**
- **Exercise**
  - o **member of a bicycle club with husband**
  - o **yoga classes 3/wk**
- **Volunteers as reader for elementary children**
- **Falls slipped on ice and broke ulna 2 years ago**

Lab
- Cholesterol 220 mg/dL (5.7 mmol/L) HDL 60 mg/dL (1.6 mmol/L)
- Serum creatinine 0.9mg/dl (79.6 mmol/L)
- Albumin 3.4 g/L with nl 3.5+
- Glucose 102 mg/dL (5.7mmol/L) and A1C 7.2

Senior Assessment: What are favorable and unfavorable features?

Falls Age ≥65

- Leading cause of fatal and nonfatal injuries[1]

- 33% age ≥65 community dwelling fall each year[2]

- Long lie
  - mortality up to 50% at 6 months
  - associated with serious injuries, admission to hospital, and subsequent long term car[e3]

[1]National Center for Injury Prevention (WISQARS) accessed on line Mar 18, 2015
[2]Tromp AM et al, J Clin Epidemiol 2001;54:837
[3] Fleming J et al, BMJ. 2008;337:a2227

75 Year Old Female

Med Hx
- Treated BP and lipids
- Diabetes
- Depression/anxiety
- Former smoker quit 2000- 60 pack/yr

Meds
- HCTZ 50 mg PRN edema
- Lisinopril (Zestril) 20 mg/day
- Metformin (Glucophage) 850 mg bid
- Citalopram (Celexa) 20 mg/day
- Zolpidem tartrate (Ambien) for sleep PRN

FH
- Father died MI age 58
- Mother deceased age 93 CVA
- Brother age 81 & sister age 85 living
- Children age 34 and 39

Paramedical
- BP 160/80
- 5'2" 99 lbs BMI 18

Senior Assessment
- DWR 6/10
- G&G 11 seconds
- Exercise
  - member of a bicycle club with husband
  - yoga classes 3/wk
- Volunteers as reader for elementary children
- Falls slipped on ice and broke ulna 2 years ago

Lab
- **Cholesterol 220 mg/dL (5.7 mmol/L) HDL 60 mg/dL (1.6 mmol/L)**
- **Serum creatinine 0.9mg/dl (79.6 mmol/L)**
- **Albumin 3.4 g/L with nl 3.5+**
- **Glucose 102 mg/dL (5.7mmol/L) and A1C 7.2**

Any concerns with the Labs?

Lab - Cardiovascular Health Study

Favorable factors:

- Creatinine <1.5   HR 0.57
- Hemoglobin >11gm/dl   HR 0.41
- Albumin >3.5   HR 0.63

Not statistically significant:

- TC/HDL <6
- CRP<1

Krause K, J Insur. Med 2004; 36:194

Physical Disability and Serum Albumin Predict Mortality

Women > 71 years

RR Mortality

12.5

8.9

6.6

5.1

6.7

5.3

3.8

2.2

2.2

2.7

2.0

2.`6

1.4

1.2

1.0

ADL Disability
Mobility Disability
No disability

<3.5   3.5-3.8   >3.8-4.1   >4.1-4.3   >4.3
Serum Albumin Level – gm/dl

Corti: JAMA 1994;272:1036-1042
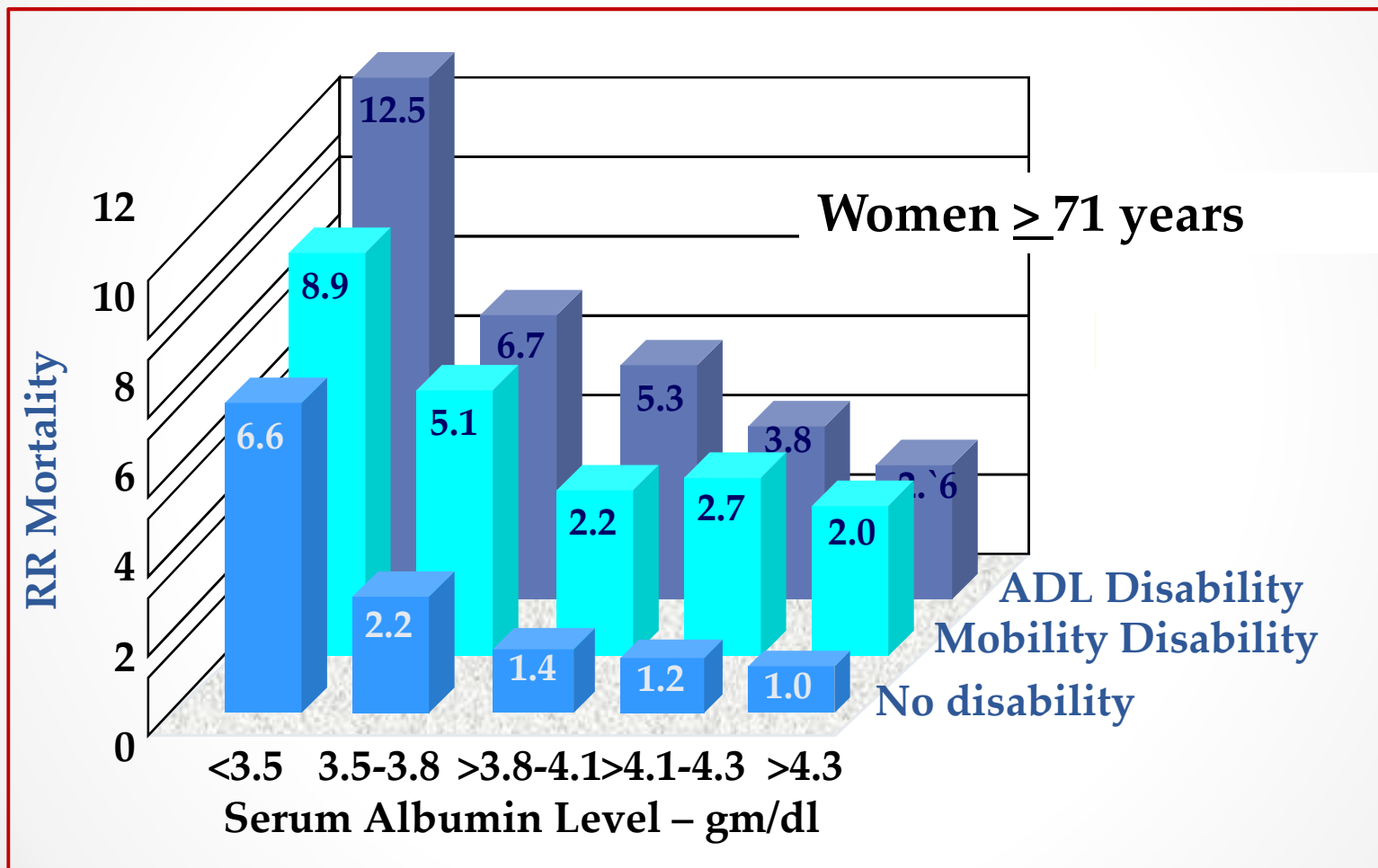
3 Years Later @ 78yr Claims on LTC Rider

- **Notice of Claim:**
  - o Mother is having cognitive issues.
  - o Diagnosed with memory loss in March when in skilled nursing facility for rehabilitation after a R. ankle fracture in January.
  - o Home at ILF with friends and family assisting since May.
  - o Has good and bad days. Not safe at home alone.

- **RN assessment at home**:
  - o Antalgic gait with aide (cane or walker) but independent in ADLs
  - o IADL help with finances, transportation, medication management
  - o Cognitive assessment: MMSE 27/30 (9/10 orientation, 3/5 serial 7's)
    Easily overwhelmed. Difficulty concentrating. Confused at times.

- **Attending physician claim form:**
  - o Mild cognitive impairment needs supervision for medication management

Does mother have cognitive issues?
How accurate is the cognitive test - MMSE?
How does it compare to her DWR of 6/10 at UW?

Reported Sensitivity and Specificity Rates

Cognitive Screening Test		Sensitivity	Specificity
ACE-R [2,3]	2006	84-94% D	89-100% D
Clock Draw[3]	1966	85-87%	83-86%
DWR		89-96%	98-100%
EMST[1]	2005	96% MCI & D	91% MCI 99% D
MCAS[2] (dementia)	1999	97.50%	98.45%
Mini-cog[2,3]	2000	76-99% D	89-93% D
MMSE[2,3]	1975	69-91% D	87-99% D
MoCa[3]	2005	90% MCI 100% D	87%

1. Shankle WR et al. *PNAS* 2005;102:4919.

2. Cullen B et al. A review of screening test for cognitive impairment: Neurol Neurosurg Psychiatry 2007;78:790–799. doi: 10.1136/jnnp.2006.095414

3. Ismail Z et al. Brief cognitive screening instruments: An update: Int J Geriatr Psychiatry 2010; 25: 111–120
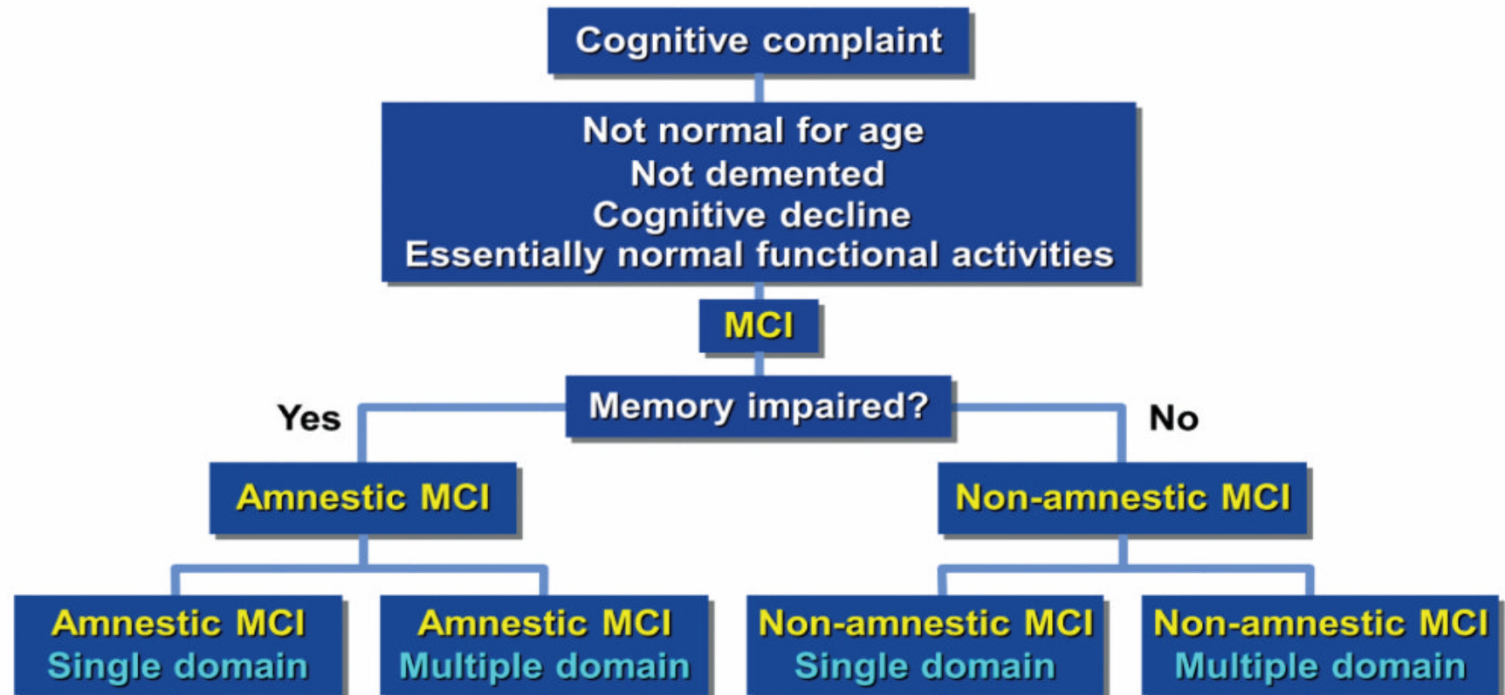
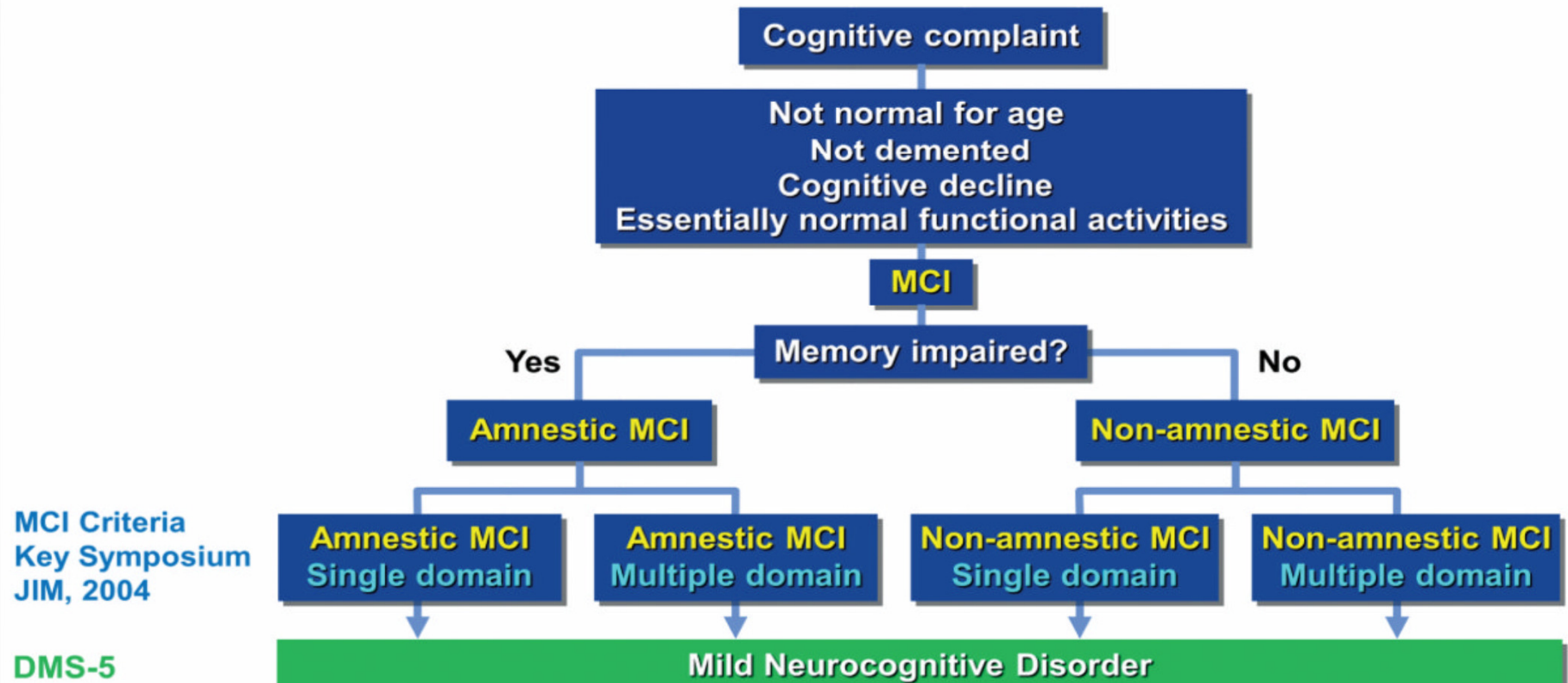MCI Criteria – beyond controversies, towards a consensus: report of the
International Working Group on Mild Cognitive Impairment
Published in the Journal of Internal Medicine Volume 256, Issue 3, pages 240-246 Sept 2004

The principle cognitive impairment can be amnestic, single non-memory domain or multiple domains

Different evolutionary pathways: Neurodegenerative; Ischemia; Trauma; Metabolic Disturbance; Psychiatric

Mild Cognitive Impairment

Cognitive complaint

Not normal for age
Not demented
Cognitive decline
Essentially normal functional activities

MCI

Memory impaired?

Yes — **Amnestic MCI**

No — **Non-amnestic MCI**

MCI Criteria Key Symposium JIM, 2004

| Amnestic MCI Single domain | Amnestic MCI Multiple domain | Non-amnestic MCI Single domain | Non-amnestic MCI Multiple domain |

DMS-5

Mild Neurocognitive Disorder

The DSM-5 criteria for mild NCD are essentially the same as the Key Symposium criteria and encompass a-MCI and na-MCI

Petersen RC et al. Mild cognitive impairment: a concept in evolution. J. Int Medicine, 2014, 275; 214–228
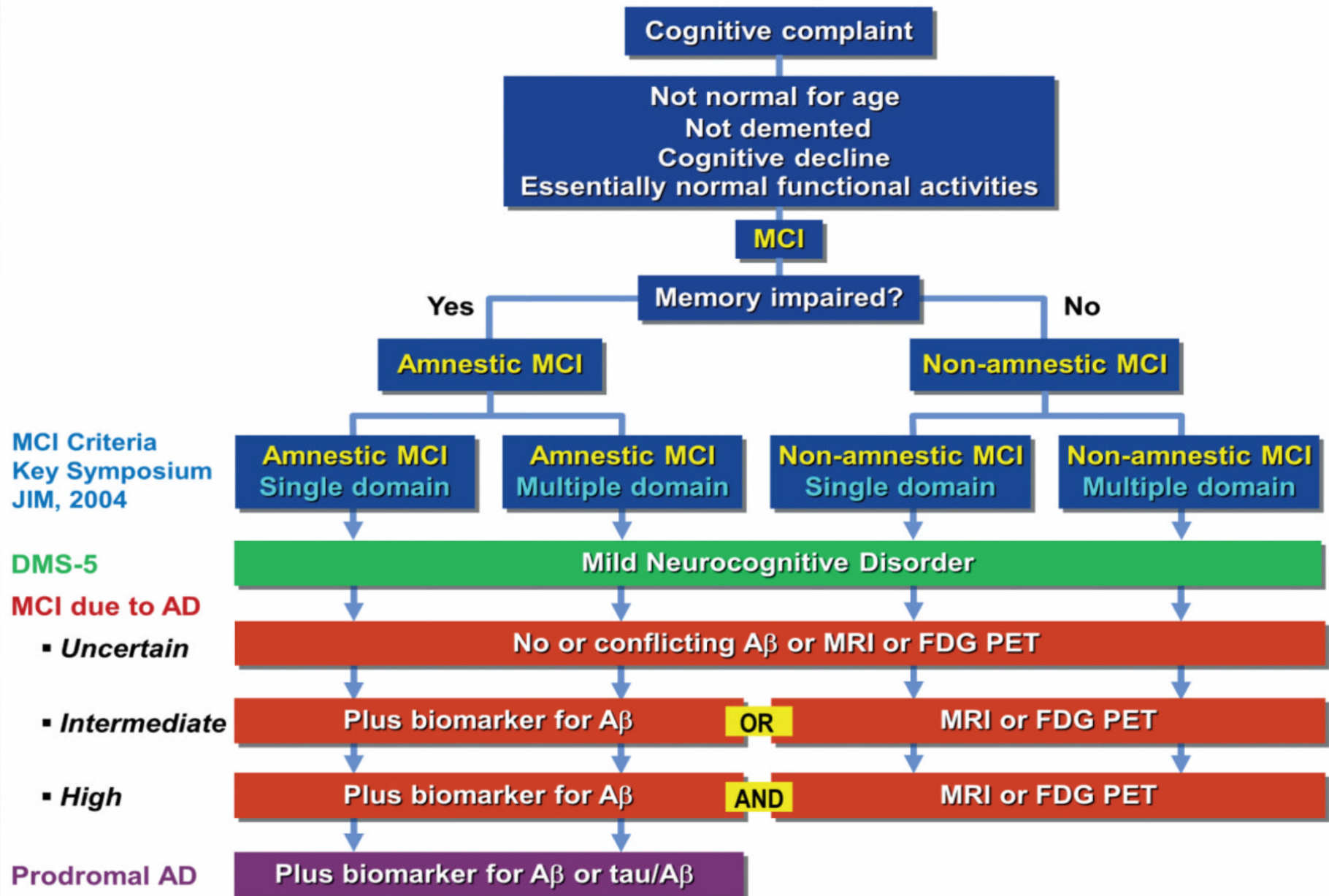
31
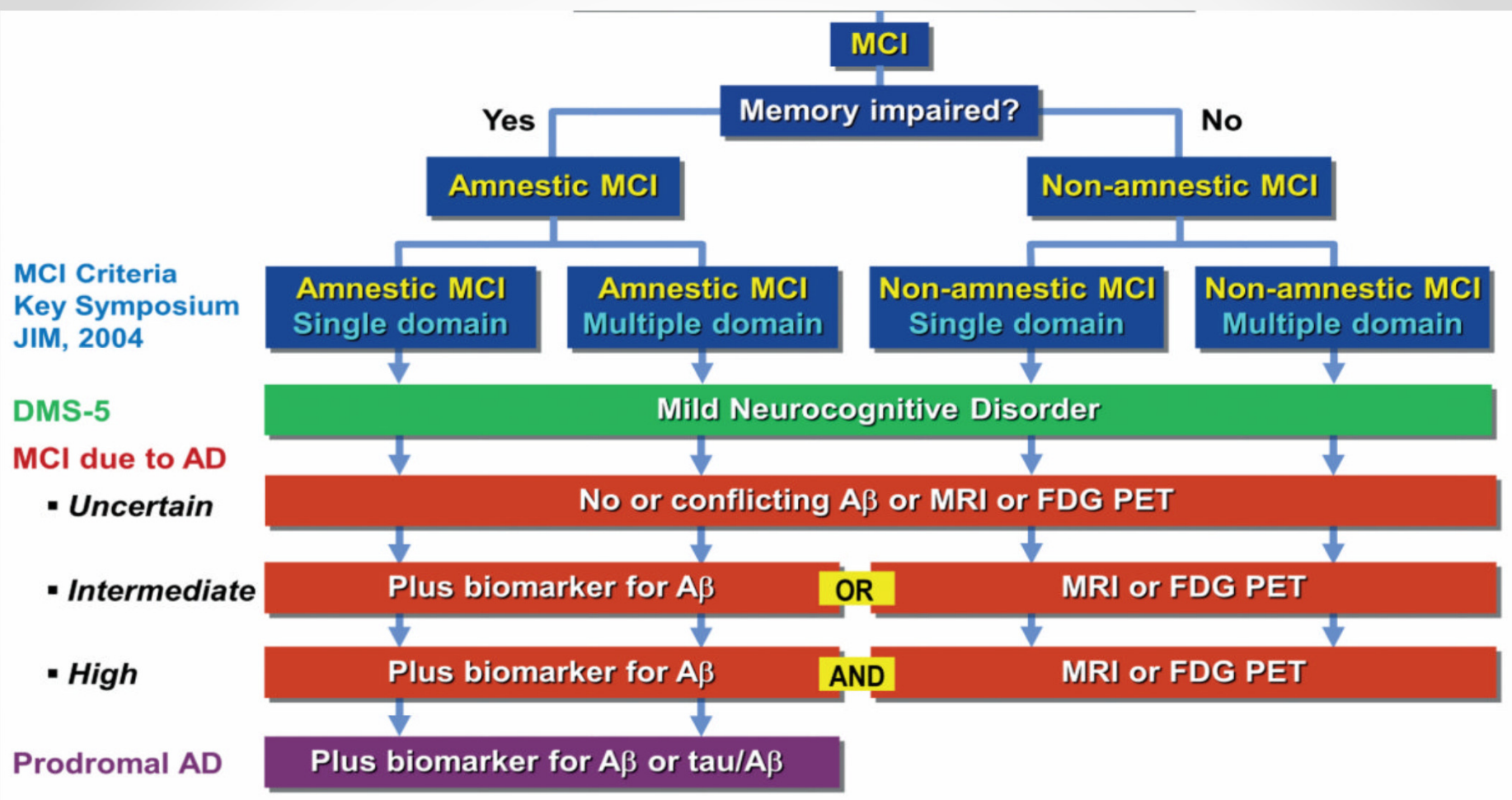
The diagnosis of mild cognitive impairment due to Alzheimer's disease: recommendations from the National Institute on Aging-Alzheimer's Association workgroups on diagnostic guidelines for Alzheimer's disease. Alzheimers Dementia. 2011; 270-9

Integrates clinical criteria with biomarker and imaging to portend Alzheimer's Disease

- Petersen RC et al. Mild cognitive impairment: a concept in evolution. J. Int Medicine, 2014, 275; 214–228

Mild Cognitive Impairment

Cognitive complaint

**Not normal for age
Not demented
Cognitive decline
Essentially normal functional activities**

MCI

Memory impaired?

Yes — No

Amnestic MCI | **Non-amnestic MCI**

**MCI Criteria
Key Symposium
JIM, 2004**

| **Amnestic MCI** Single domain | **Amnestic MCI** Multiple domain | **Non-amnestic MCI** Single domain | **Non-amnestic MCI** Multiple domain |

DMS-5 — **Mild Neurocognitive Disorder**

MCI due to AD

- *Uncertain* — No or conflicting Aβ or MRI or FDG PET

- *Intermediate* — Plus biomarker for Aβ **OR** MRI or FDG PET

- *High* — Plus biomarker for Aβ **AND** MRI or FDG PET

Prodromal AD — Plus biomarker for Aβ or tau/Aβ

Updated medical records outline changes since underwriting – 3yrs prior

New Since UW

- **2013**
  - o Diabetic neuropathy
  - o Chronic pain – legs, left wrist
  - o Urge incontinence

  - o New Meds - added to old
    - Lyrica 75mg bid
    - Oxycodone 5mg 1-2 q4-6h prn
  - o FH   Spouse died

- **2015**
  - o January fractured R. ankle
  - o Memory loss diagnosed in skilled nursing facility in March

Does the medical record support the physician's assertion that the insured has mild cognitive impairment and needs supervision?

Any clues of what might be causing the impairment?

Clinical Aspects of Cognitive Impairment

	Cognitive decline (Aging)	Depression	MCI	Dementia
Worry about forgetfulness	common	very common	usual	possible, early stage
Family concerns	absent	lack of motivation and mood disturbance	common	always present
Measurable memory impairment	semantic memory preserved, long-term memory impaired	common	obligatory: 2004 definition, amnestic subtype	marked
Disturbances in other cognitive domains	impaired attention and speed of cognitive performance	generalized complaint of inadequate performance ability	subtype dependent: deficits of language, planning, spatial perception	marked, with impairment in activities of daily living
Sensory disturbances	sometimes mild visual and auditory impairment	age-associated	frequent, impaired identification of odors	usual
Functional impairment	none	present if severe	no ADL/IADL impairment	present
Behavioural abnormalities	none	inhibition or agitation frequent	often, brooding and/or depressed mood	usually agitation, depressed mood, anxiety, apathy
Brain imaging abnormalities	age-associated; changes often, white-matter lesions	age-associated changes; often, white-matter lesions	mild mesial temporal atrophy, white-matter lesions	common: atrophy; marked white- matter lesions

35

DSM-5 Criteria for:
Major Neurocognitive Disorder *(Dementia)*

A. Evidence of significant cognitive decline from a previous level of performance in one or more cognitive domains*:

- Learning and memory

- Language

- Executive function

- Complex attention

- Perceptual-motor

- Social cognition

B. The cognitive deficits interfere with independence in everyday activities. At a minimum, assistance should be required with complex instrumental activities of daily living, such as paying bills or managing medications.

C. The cognitive deficits do not occur exclusively in the context of a delirium

D. The cognitive deficits are not better explained by another mental disorder (eg, major depressive disorder, schizophrenia)

DSM: diagnostic and statistical manual.

* Evidence of decline is based on: Concern of the individual, a knowledgeable informant, or the clinician that there has been a significant decline in cognitive function; and a substantial impairment in cognitive performance, preferably documented by standardized neuropsychological testing or, in its absence, another quantified clinical assessment.

UpToDate®

Appendix

CVS Risk Factors

Hippisley-Cox J; et al., BMJ. 2008; 336(7659):1475-82
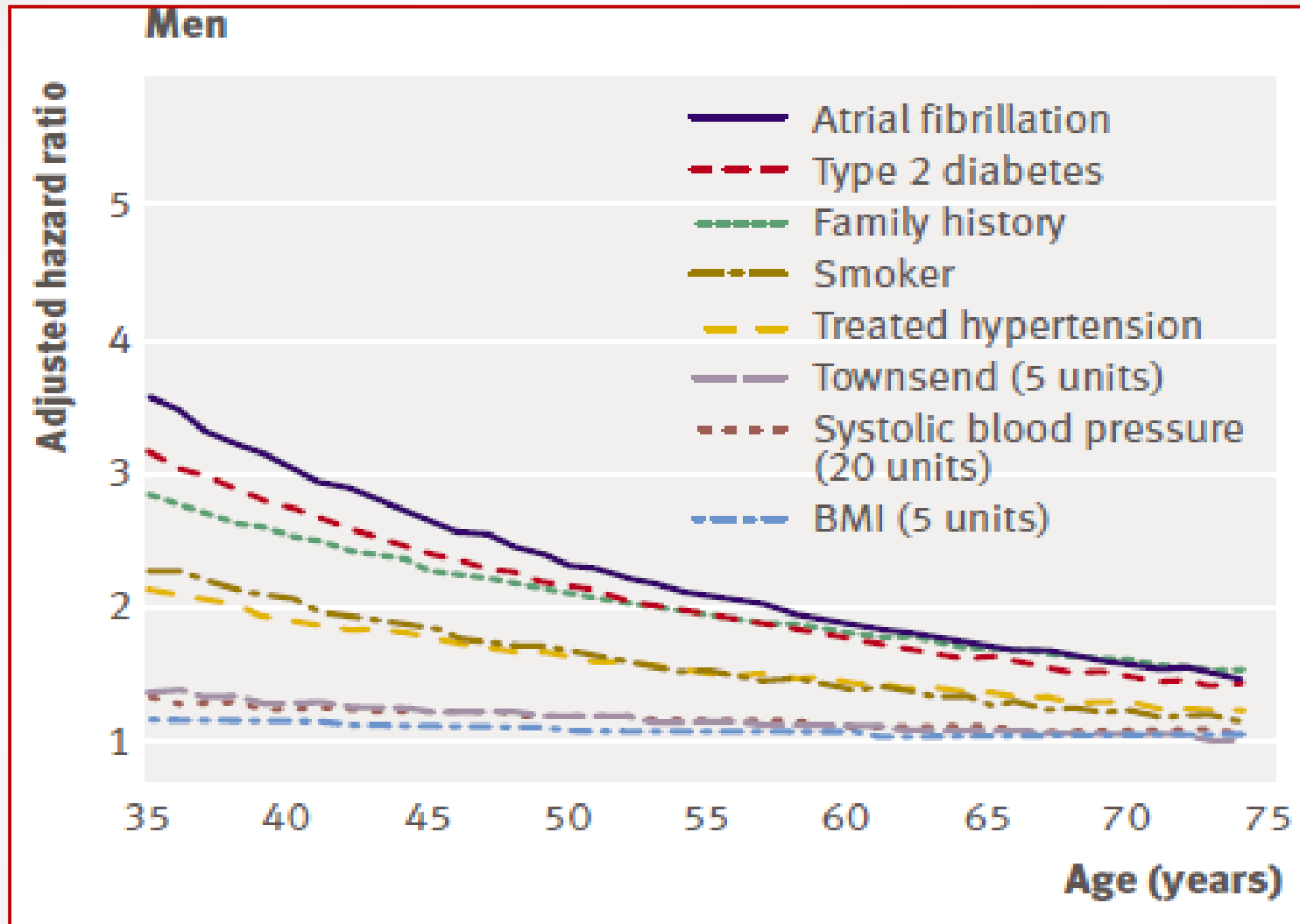
NT-proBNP and Mortality

CLARK ET AL—NT-PROBNP PREDICTS MORTALITY IN INSURANCE APPLICANTS

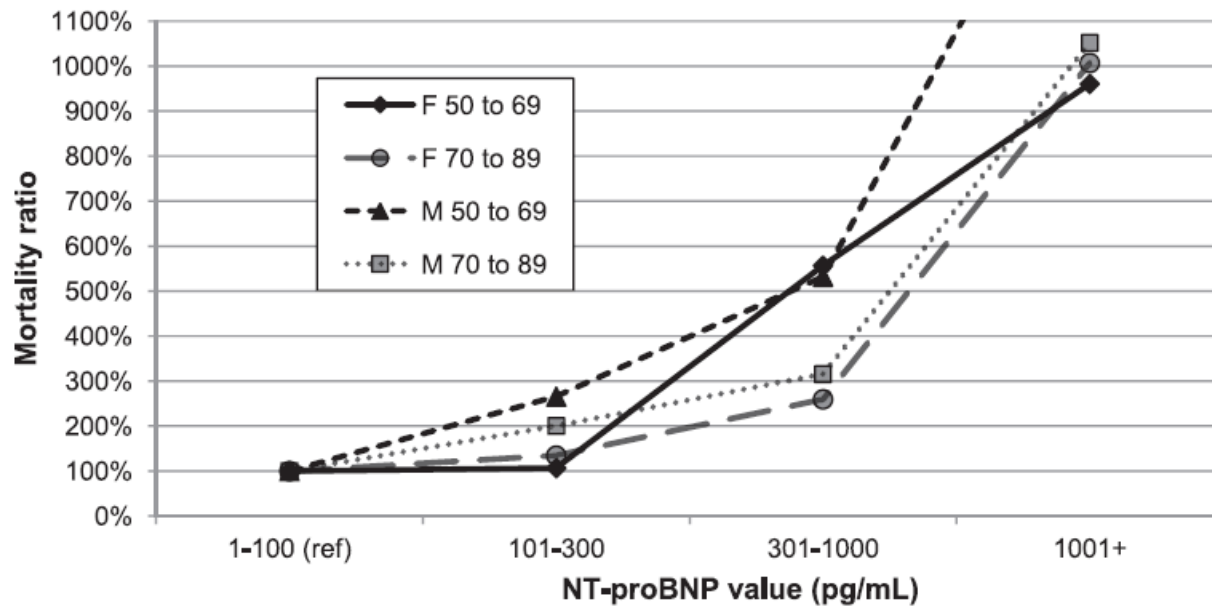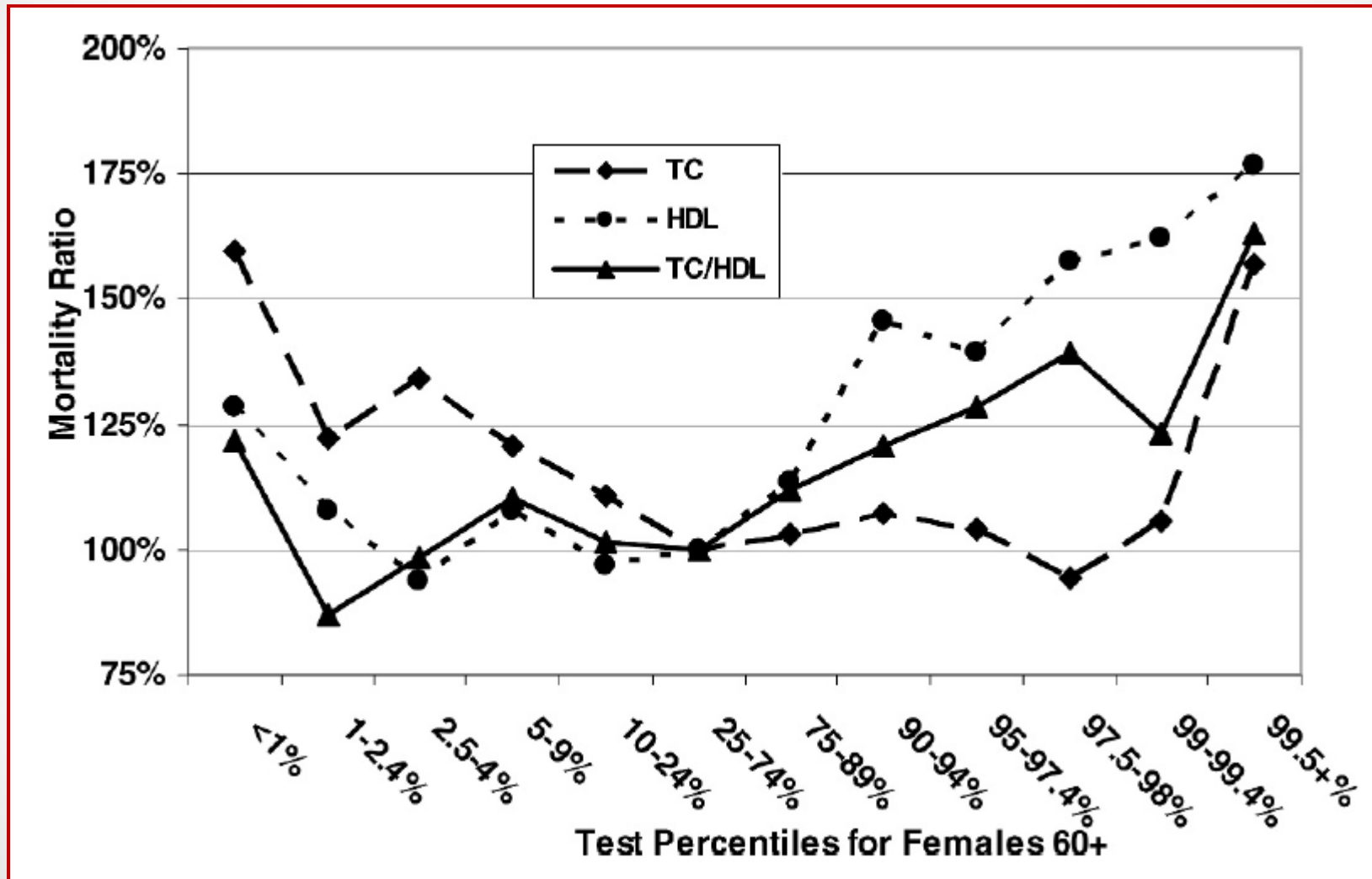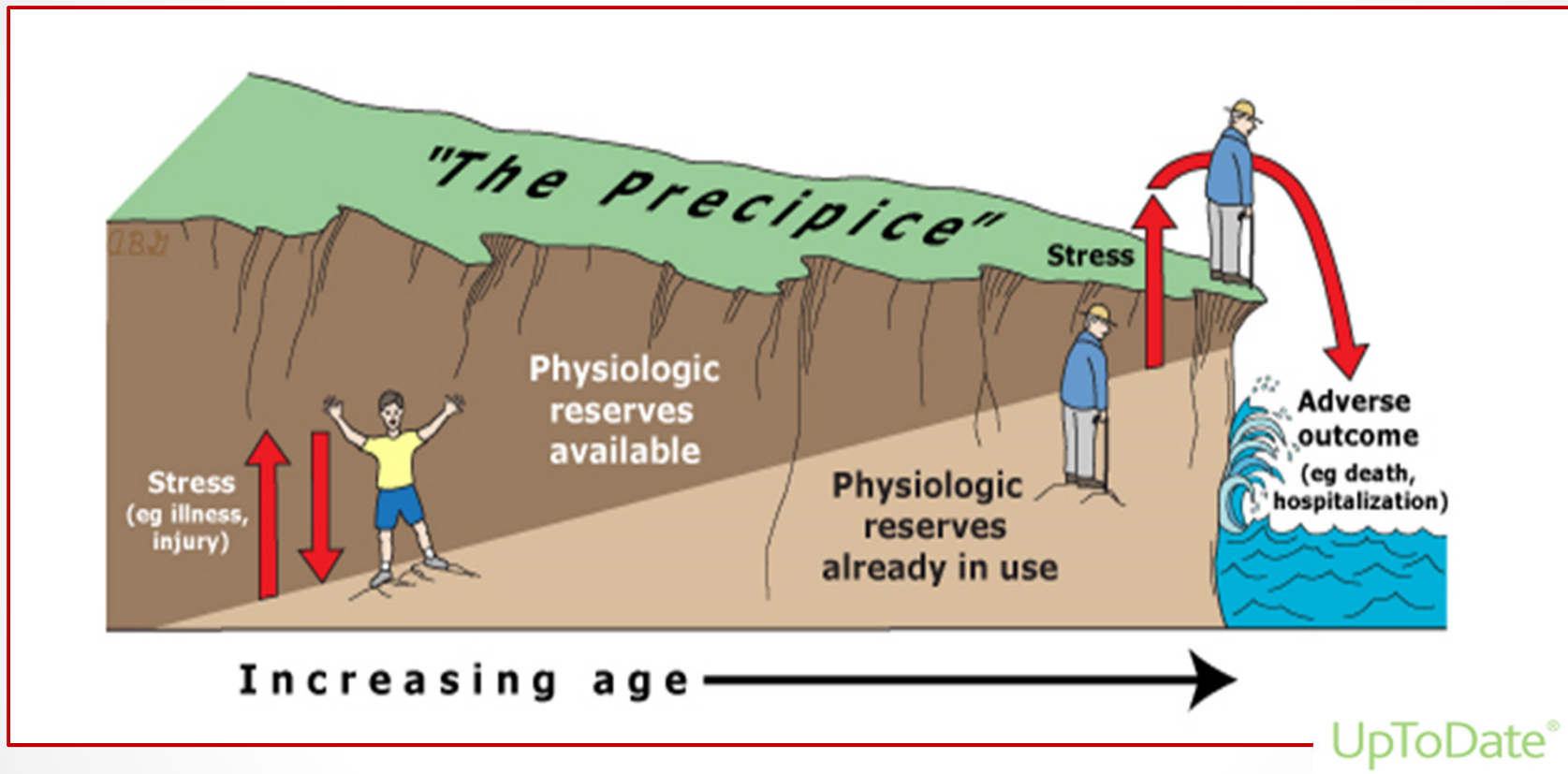**Figure.** *Mortality Ratios for NT-proBNP Values for Those Denying a History of Heart Disease, Split by Age and Sex*

Clark M et al, J Insur Med 2014;44:7

Cholesterol

Fulks M et al, J Insur Med. 2009;41:244

40

Homeostenosis

Based on information from: Taffet GE. Physiology of aging. In: Cassel CK, Leipzig RM et al. Geriatric Medicine: An Evidence-Based Approach, 4th ed. New Your, Springer 2003

Suicide Risk by Age, Race and Gender 2007

- Source: http://www.cdc.gov/injury/wisqars/leading_causes_death.html (accessed July 7, 2015)