

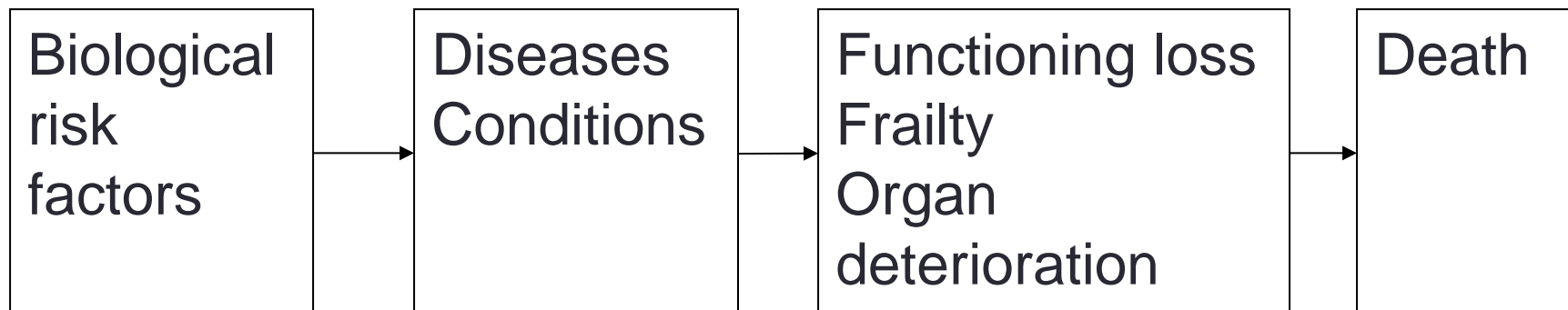
CHANGE OVER TIME IN THE MORBIDITY PROCESS

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REVES 2013

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The Morbidity Process



Crimmins et al. 2010. Biodemography: New Approaches to Understanding Trends and Differences in Population Health and Mortality. Demography, 47S: S41-S64.

Death Rates in United States

- High relative to other countries – and getting relatively worse
- Relative mortality of females has deteriorated more than males
- Female death rates at older ages have not declined much over recent years

Time change in Process Leading to Death

- Prevalence of health problems in each health dimension at multiple time points
- Progression or the link between dimensions at multiple time points
- Differences by gender

Data

- **National Health And Nutrition Examination Survey –**
 - **1989-1994, 1999-2002, 2007-2010**
 - **40+ age group – fasted, death info**
 - **N = Time 1- 3,366 – Time 2 - 1,926**
N = Time 3 – 2,752 (Death info is not considered)
- **Biological Risk** -Measured high risk levels 9 indicators –
SBP, DBP, Obese, CRP, Glycosylated Hemoglobin, HDL
Cholesterol, Total Cholesterol, LDL, Triglycerides
- **Chronic Diseases – 5**
 - **diabetes, stroke, heart disease, heart attack, and cancer (except skin)**

Data (con't)

- **Frailty** – ADL disability - 4 items - difficulty walking from room to room on same level, difficulty getting in and out of bed, difficulty eating, and difficulty dressing.
- IADL disability - 3 items - difficulty doing chores around the house, difficulty preparing own meals, and difficulty managing money .
- Mobility disability- 2 items - difficulty walking a quarter of a mile, and difficulty walking up 10 steps without rest.
- Functional limitations - 3 items - difficulty stooping, crouching or kneeling; difficulty lifting or carrying 10 pounds; and difficulty standing from an armless chair.

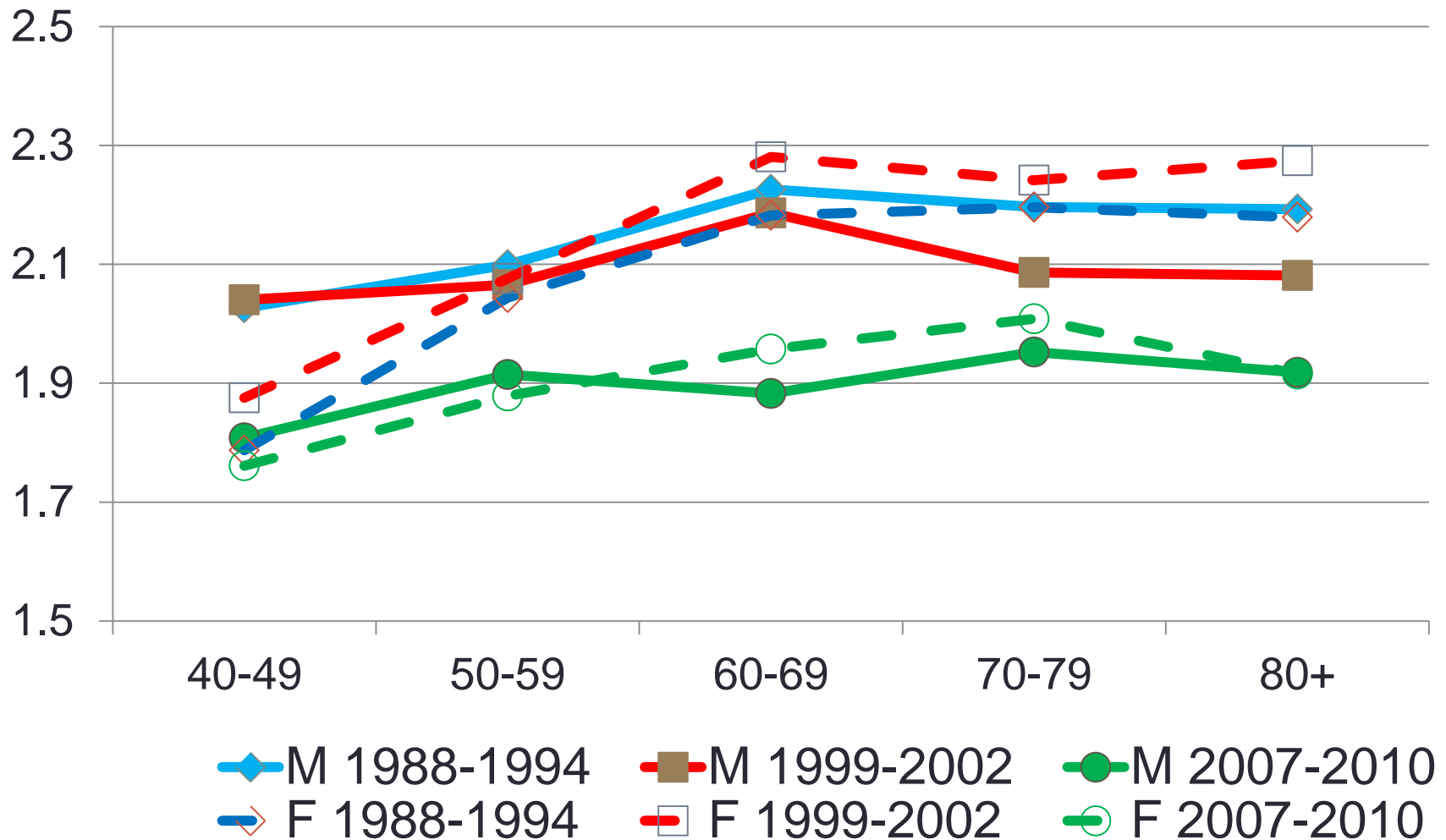
Death

- **-4 years after interview for first two cohorts**

Biological Risk

- First Date –
 - Biological risk was higher among men until old age – then equal for men and women at later ages
- Next Date -
 - Some decrease for men – Some increase for women –
 - Gender cross over at younger age – at subsequent ages risk for women exceeded that of men
- Most recent date
 - Large recent decline in risk for both sexes; all ages except young (40-49) women
- Gender differences in age-specific biological risk largely eliminated

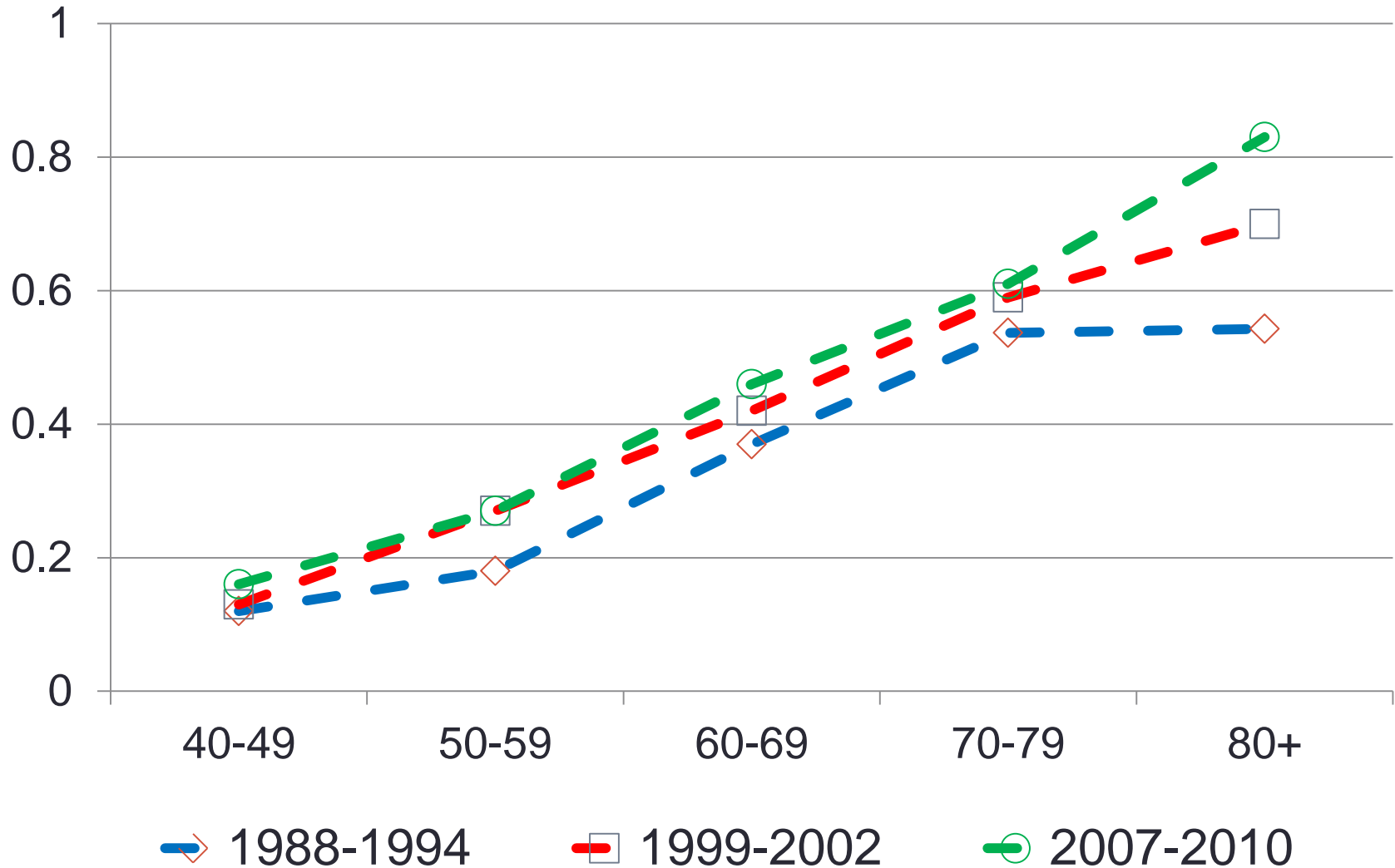
Mean Number of High-Risk Cardiovascular Risk Factors by Sex and Age: NHANES 1988-1994, 1999-2002, 2007-2010



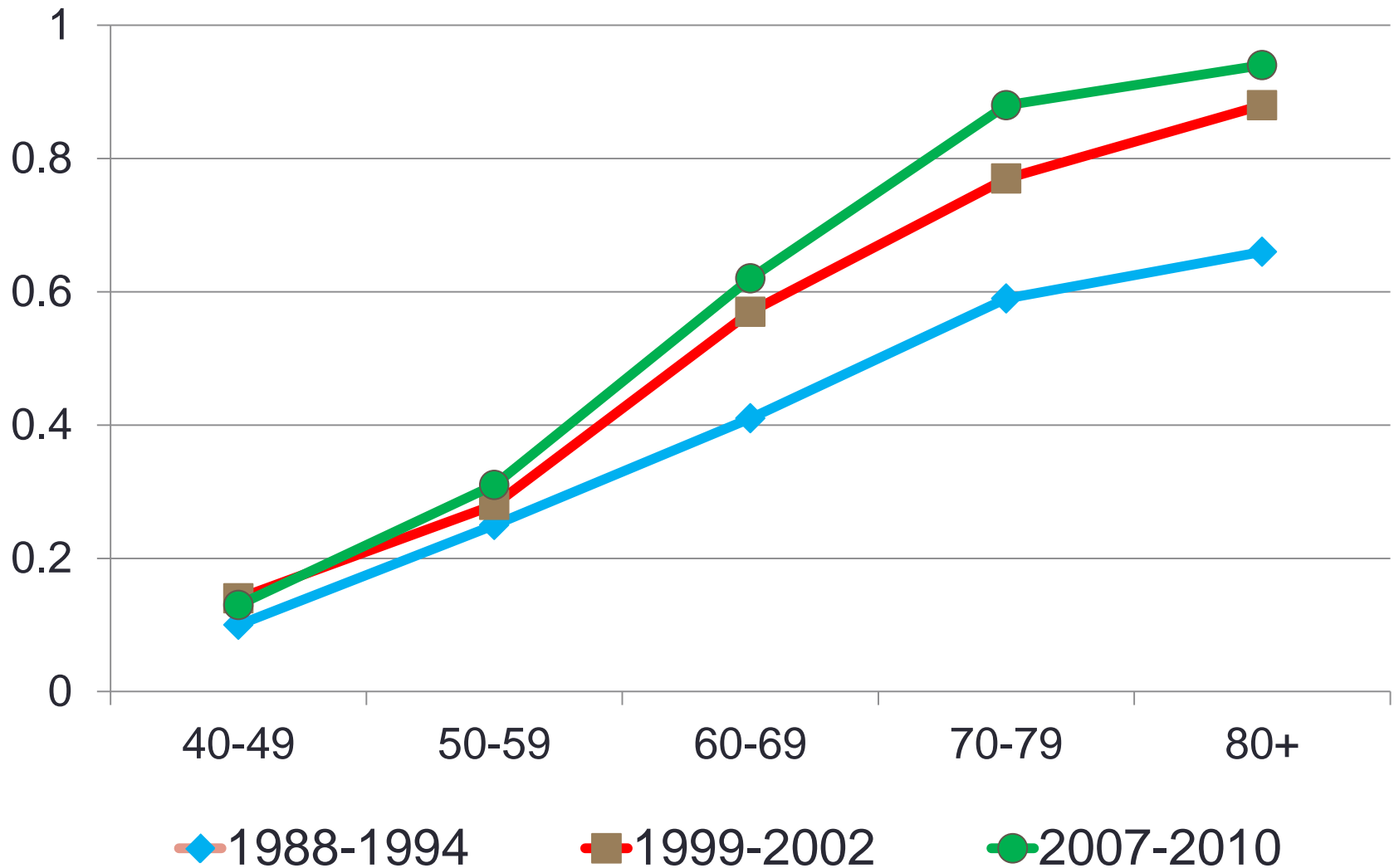
Diseases

- Mean Number of Diseases
 - Range 0-4
- Increased over time – for both men and women
- Difference between men and women widening

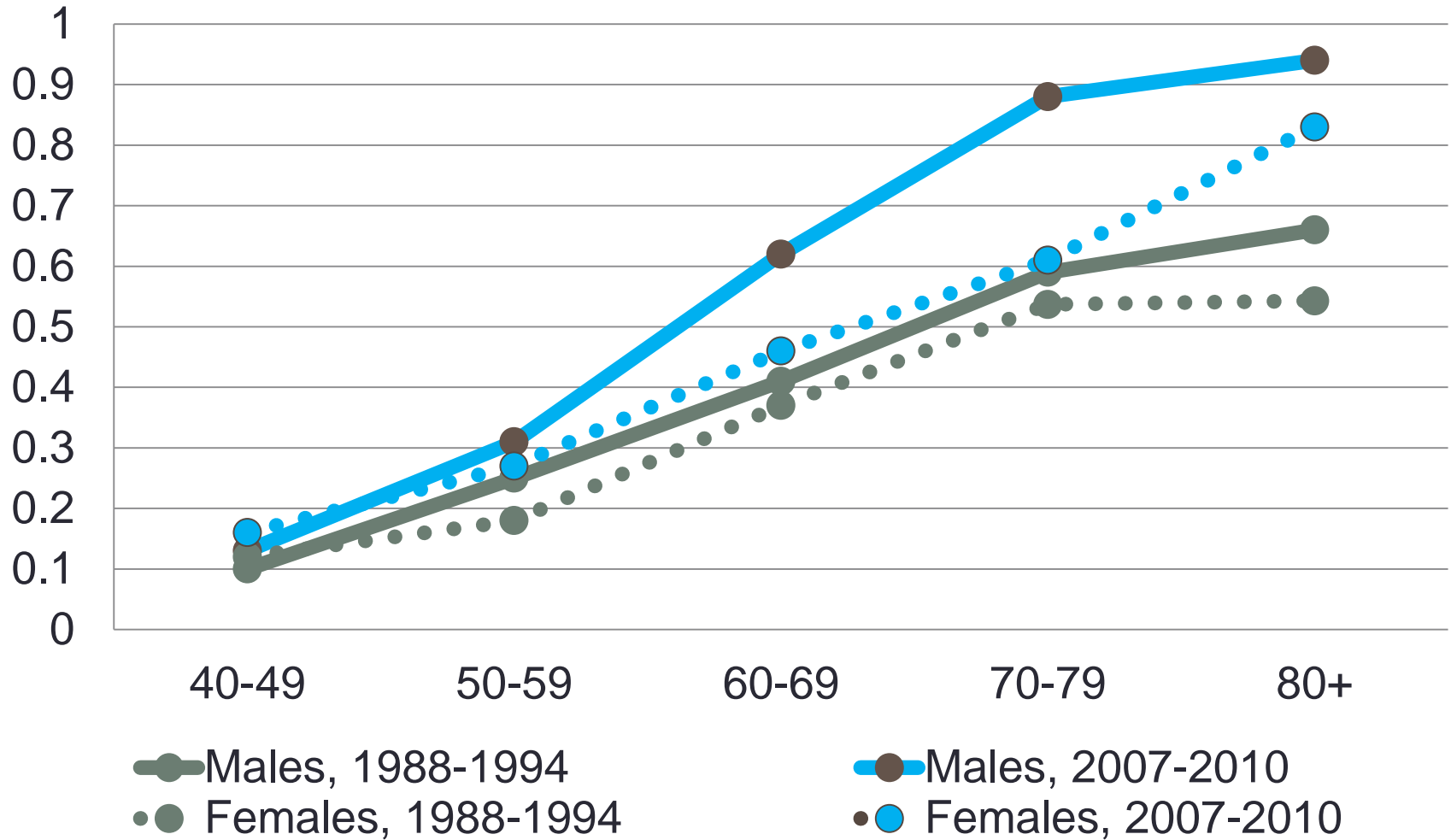
Mean Number of Diseases, Females: NHANES 1988-1994, 1999-2002, 2007-2010



Mean Number of Diseases Males: NHANES 1988-1994, 1999-2002, 2007-2010



- Gender Difference - Mean Number of Diseases: NHANES 1988-1994, 2007-2010



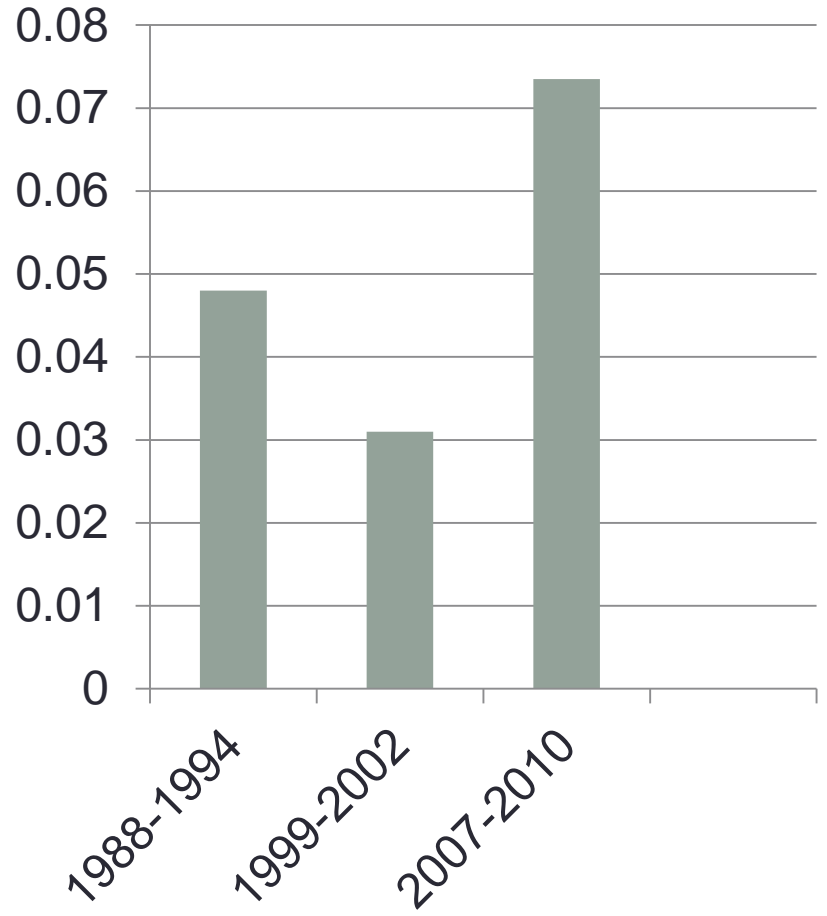
Trends in disease presence for specific Diseases

- Increase in
 - Diabetes – Increase
 - Cancer - Increase women after 60s, Men slight increase up to old age
- Stroke – Not much change
- Heart Disease
 - Women, decrease older ages
 - Men, some increase old age

What is link between biological risk score and disease

- Number of diseases
 - OLS Regression at 3 time periods
 - Age, age2, gender, # high risk level biorisk factors

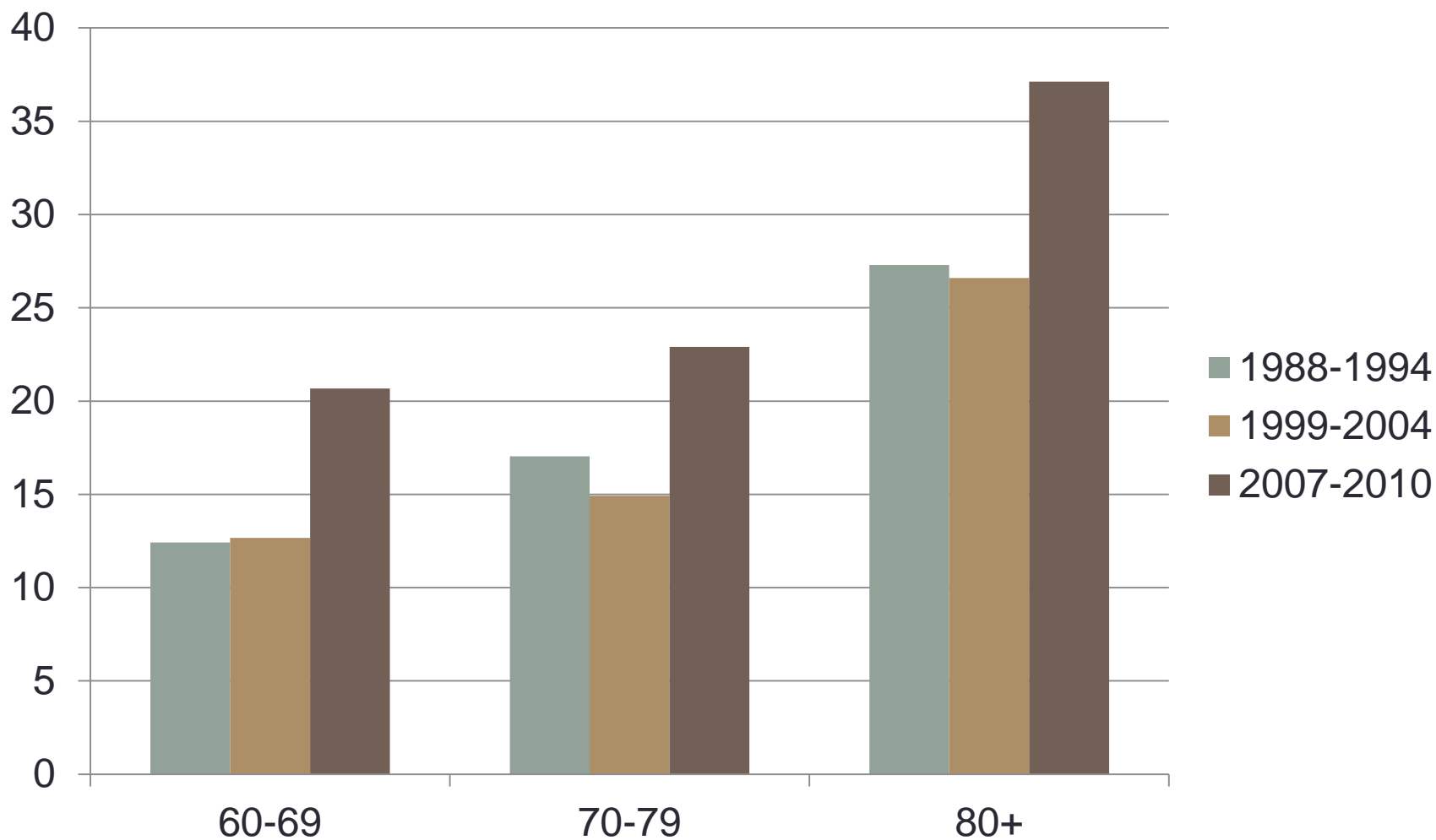
Regression Coefficient: Association of increase of 1 in Biological Risk on Number of diseases: OLS Coefficients 3 time periods (both sexes)



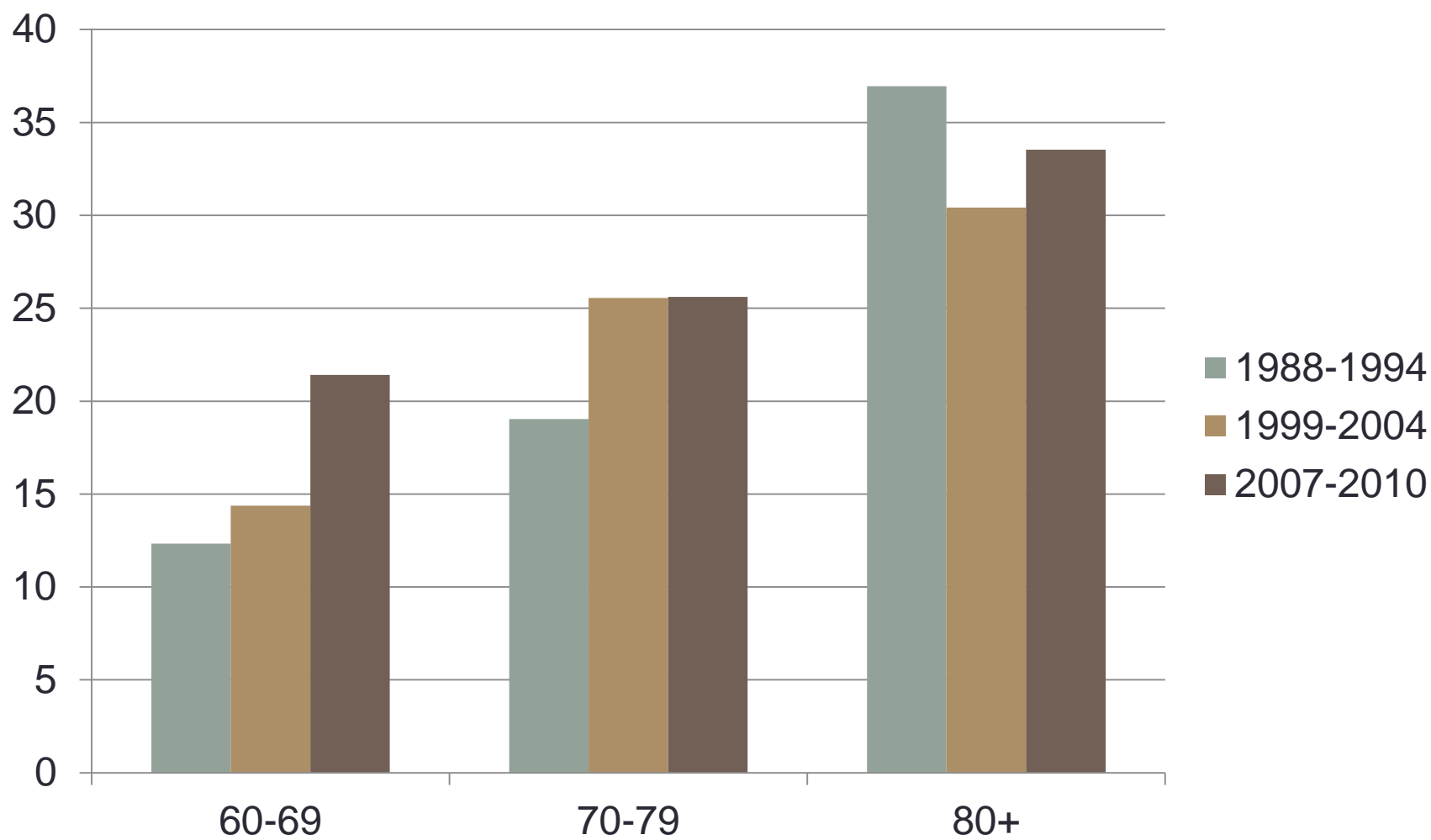
Functioning, Mobility, ADL and IADL ability

- Time trend differs by age
 - Some worsening young
 - Some improvement old
- Time trend by gender
 - More worsening for older men

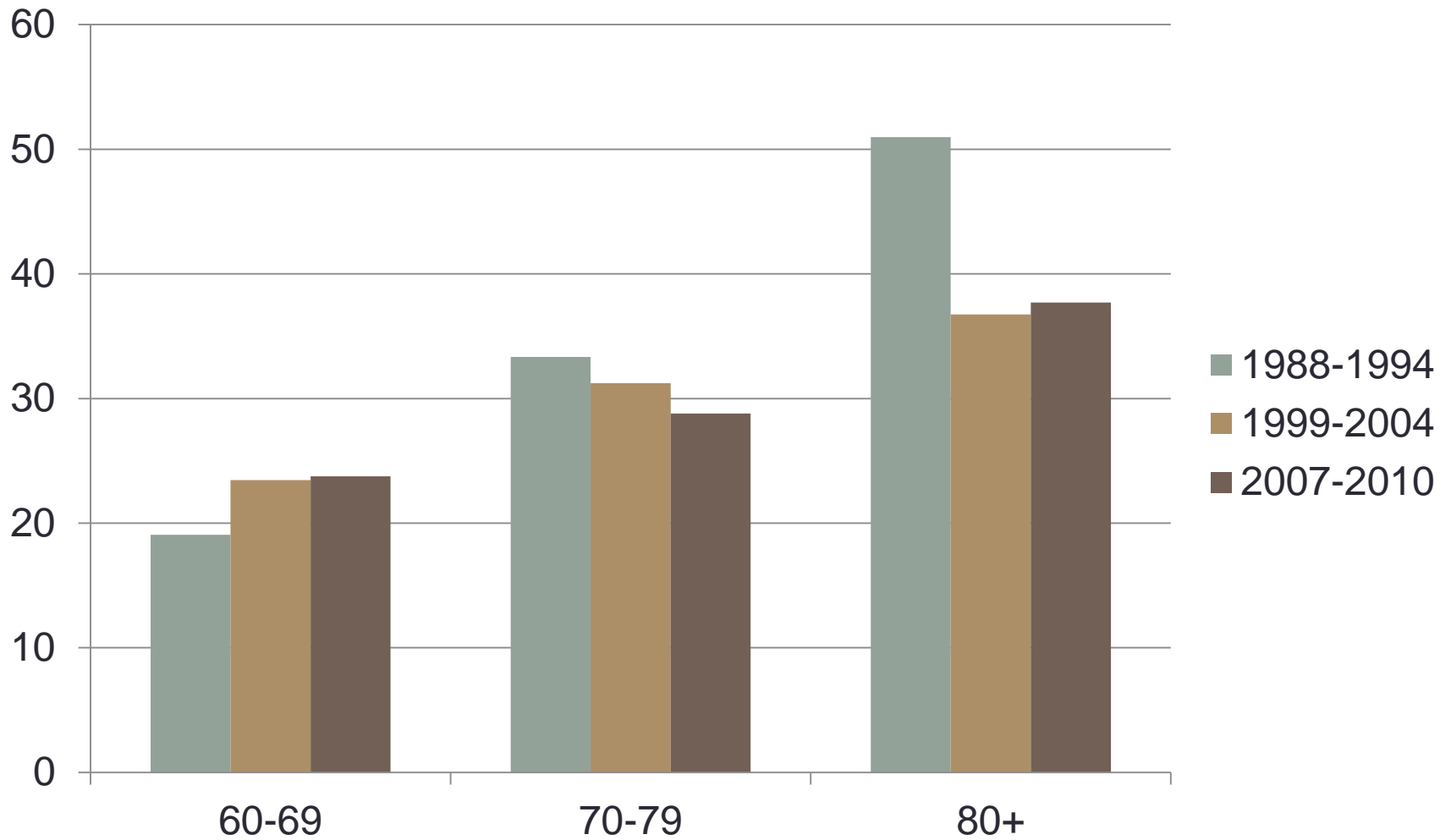
ADL Difficulty: NHANES



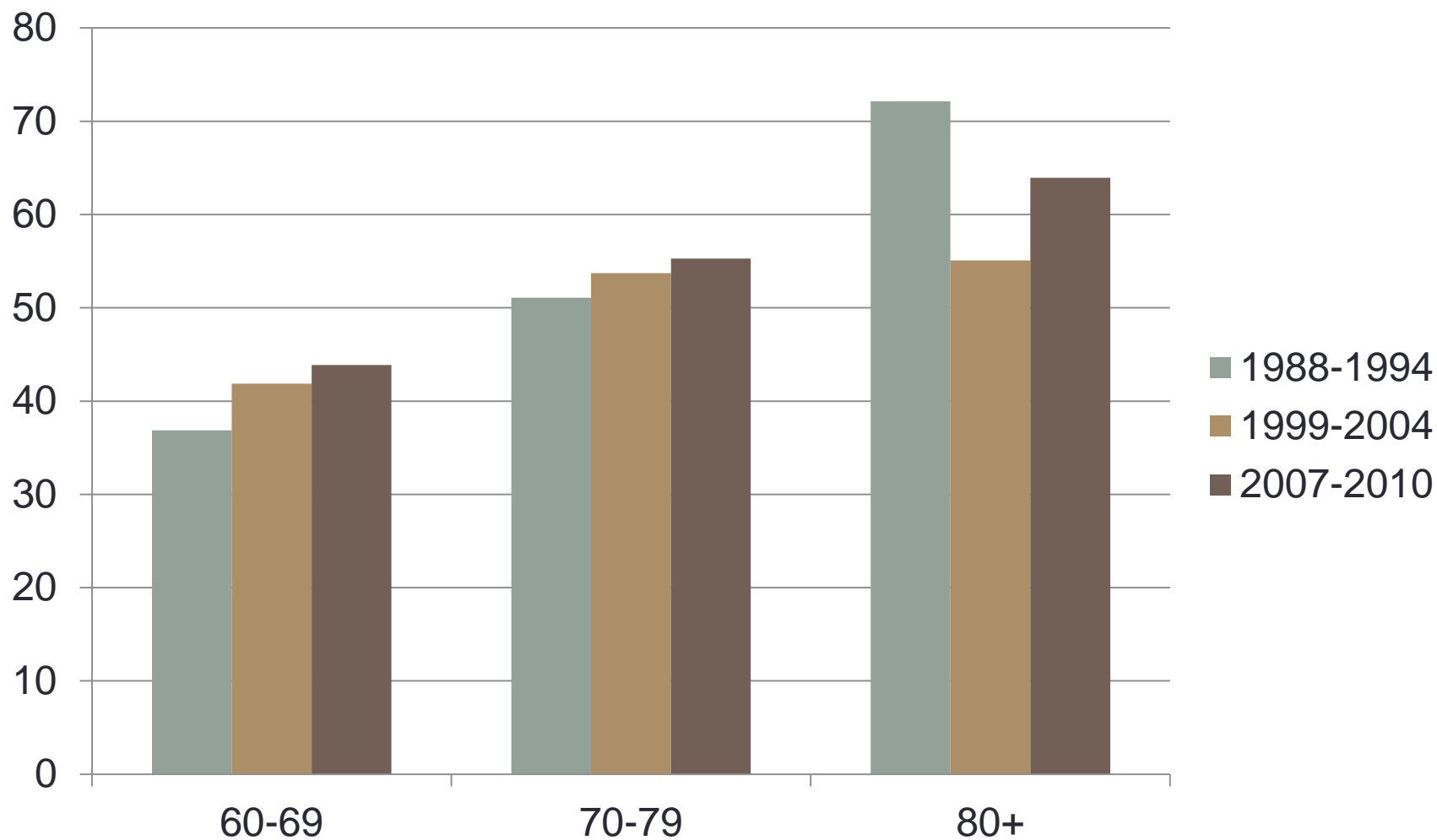
IADL Difficulty



Mobility Difficulty: NHANES



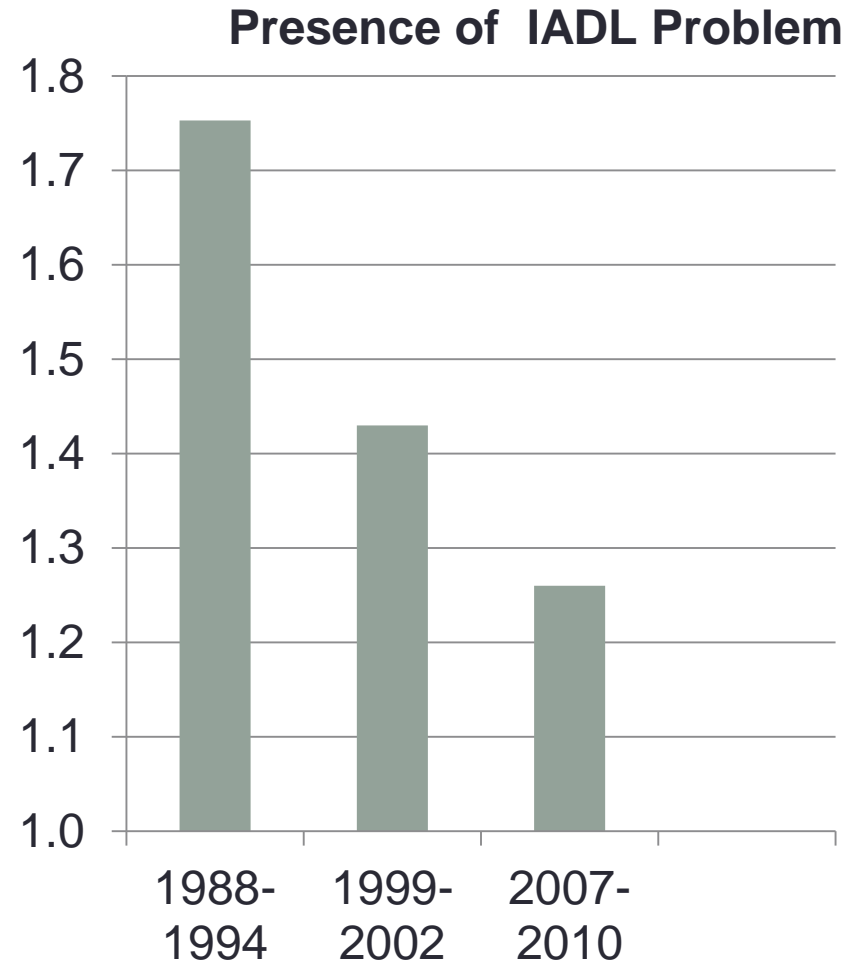
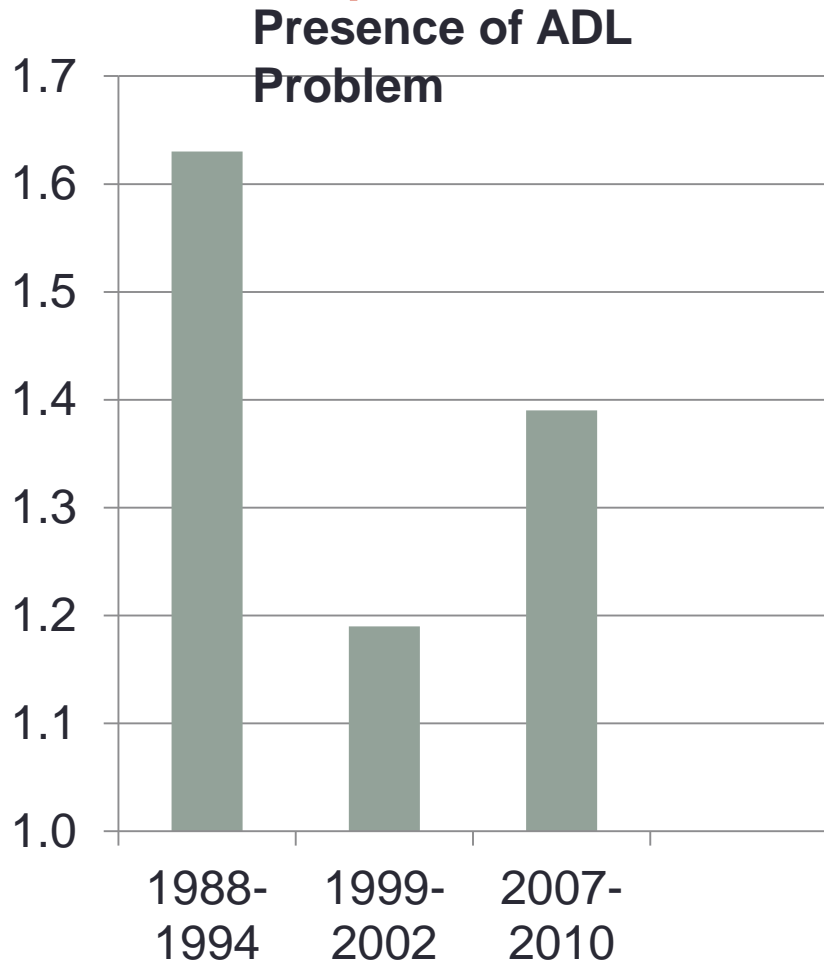
Functional Limitation: NHANES



Association of Disease and Functioning Loss, Disability

- Change over time
 - Generally smaller relative effect

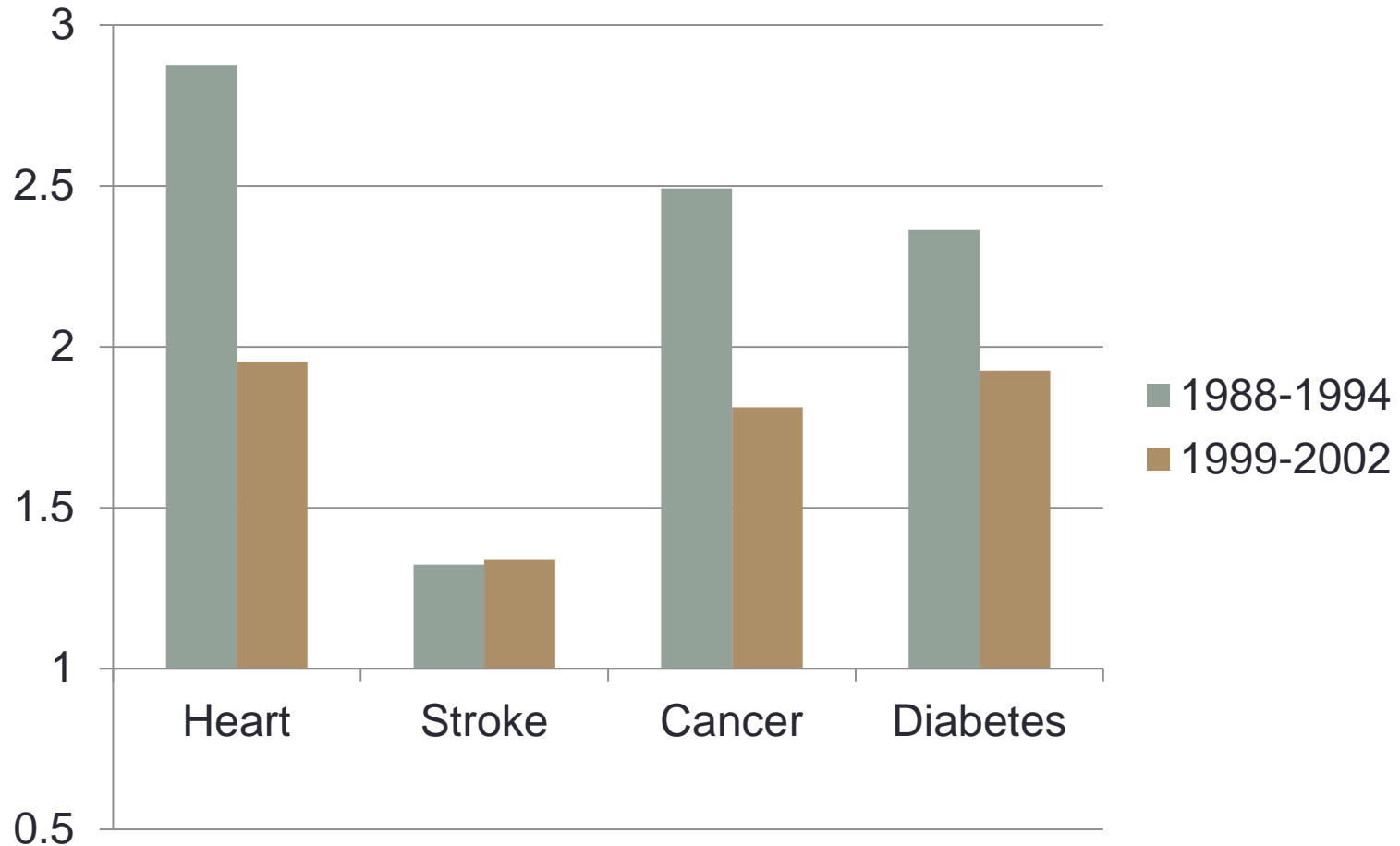
Association # Diseases with ADL and IADL Difficulty: OR 3 time periods



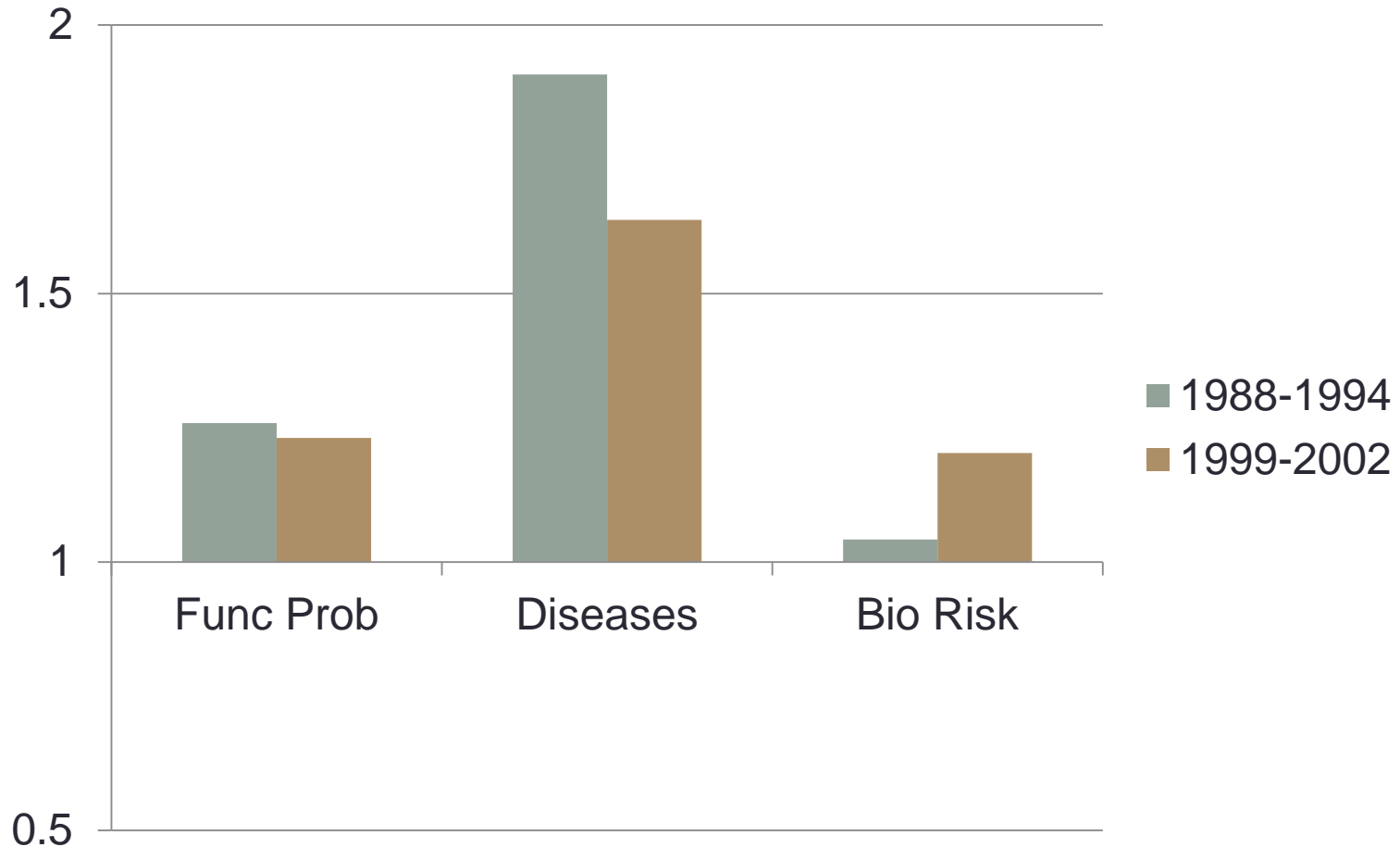
Mortality

- Mortality –
 - 4 years after interview
 - 2 time periods – 1988-1994, 1999- 2002
 - No mortality for most recent time period
- Lifereg – Age, age^2 , sex
 - Presence of disease, bio risk, functioning problems

Relative likelihood of Death for Person with Disease (compared to not having disease): 2 time points



Relative Likelihood of Death (OR) - Number of types of functioning problems, Number of Diseases, Number of Biorisk Factors: 2 time points



Sum: Changes in morbidity process

- Biological Risk declined
- Diseases increased
- More functioning problems
- Link of biological risk to disease got stronger, to death stronger
- Diseases less linked to functioning problems, Death rates lower for some diseases
- Not much change in link between functioning problems and death

Changes for males and females - similar