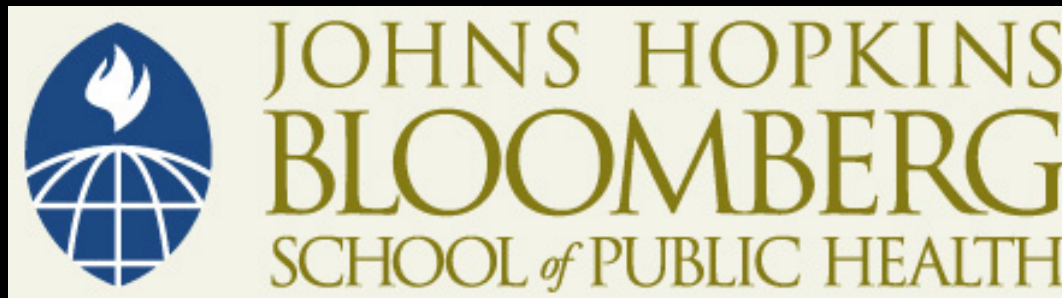


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Biological and Clinical Aspects of Aging



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Let's Think About...

- What aging is
 - Physiological changes of aging
 - Normal, usual, successful aging
 - What is frail?
- Chronic conditions
- Policy implications

What is Aging?

Politics, funding, industry

Normal Physiologic
Outcome

- Wear and tear
- Part of living and being

Pathologic
Outcome

- Cumulative interplay of diseases – influence of genes, environment, & time



What is Aging?

- Aging is a process that converts fit adults into frailer adults with progressively diminished reserves and increased vulnerability to illness, injury, and death
- Occurs at all levels:
 - Molecule to cell to organ to organism
- Inevitable and universal
- All organisms have finite life span

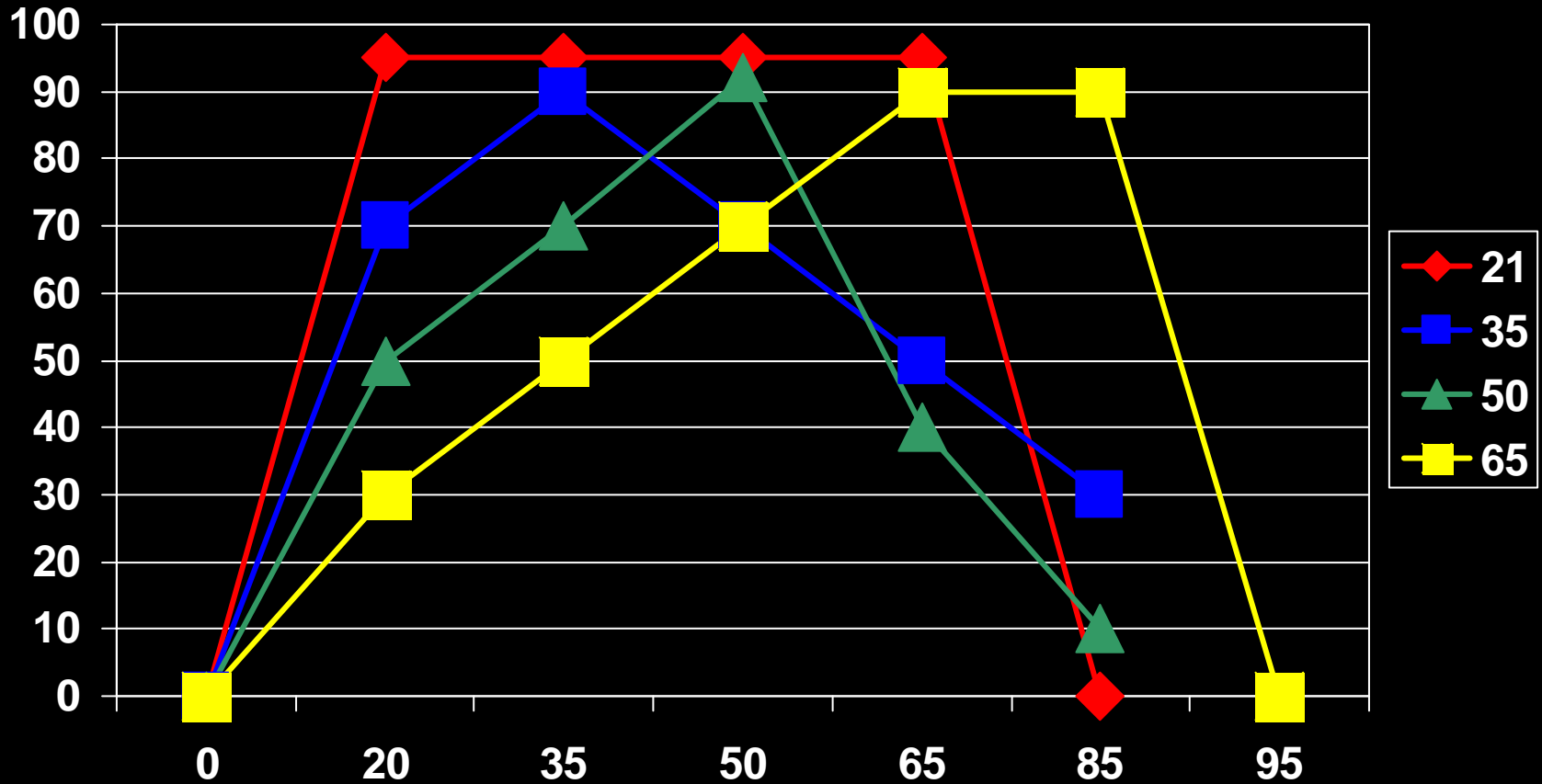
Normal Aging

- Universal age related changes
 - Puberty
 - Menopause
 - Death
- Loss of *homeostatic* reserve - loss of ability to buffer insults

Quiz

- What birthday should you celebrate to recognize that you are now “over the hill?”
 - a. 21?
 - b. 35?
 - c. 50?
 - d. 65?
 - e. 80?

Which Birthday to Celebrate?

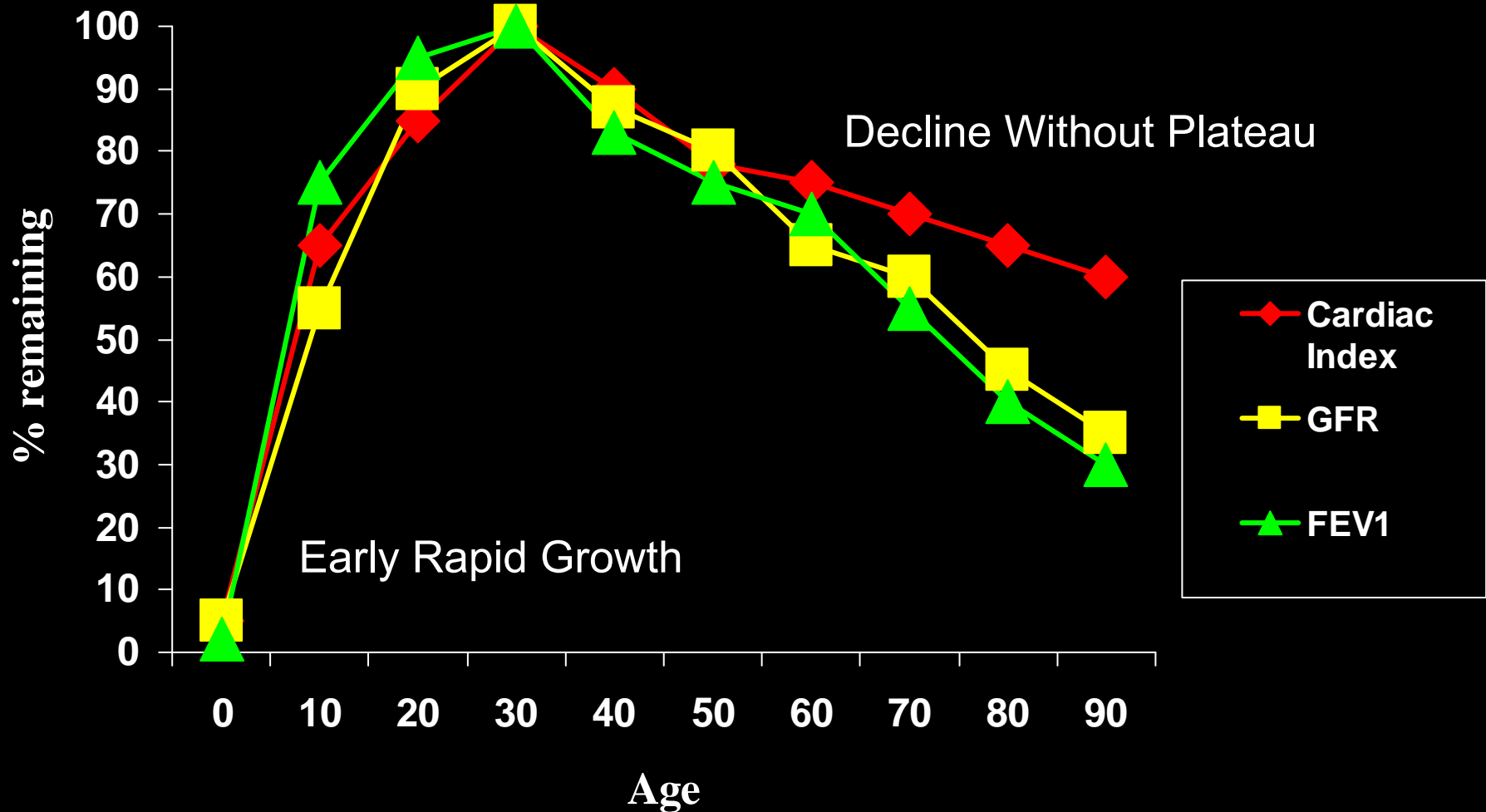




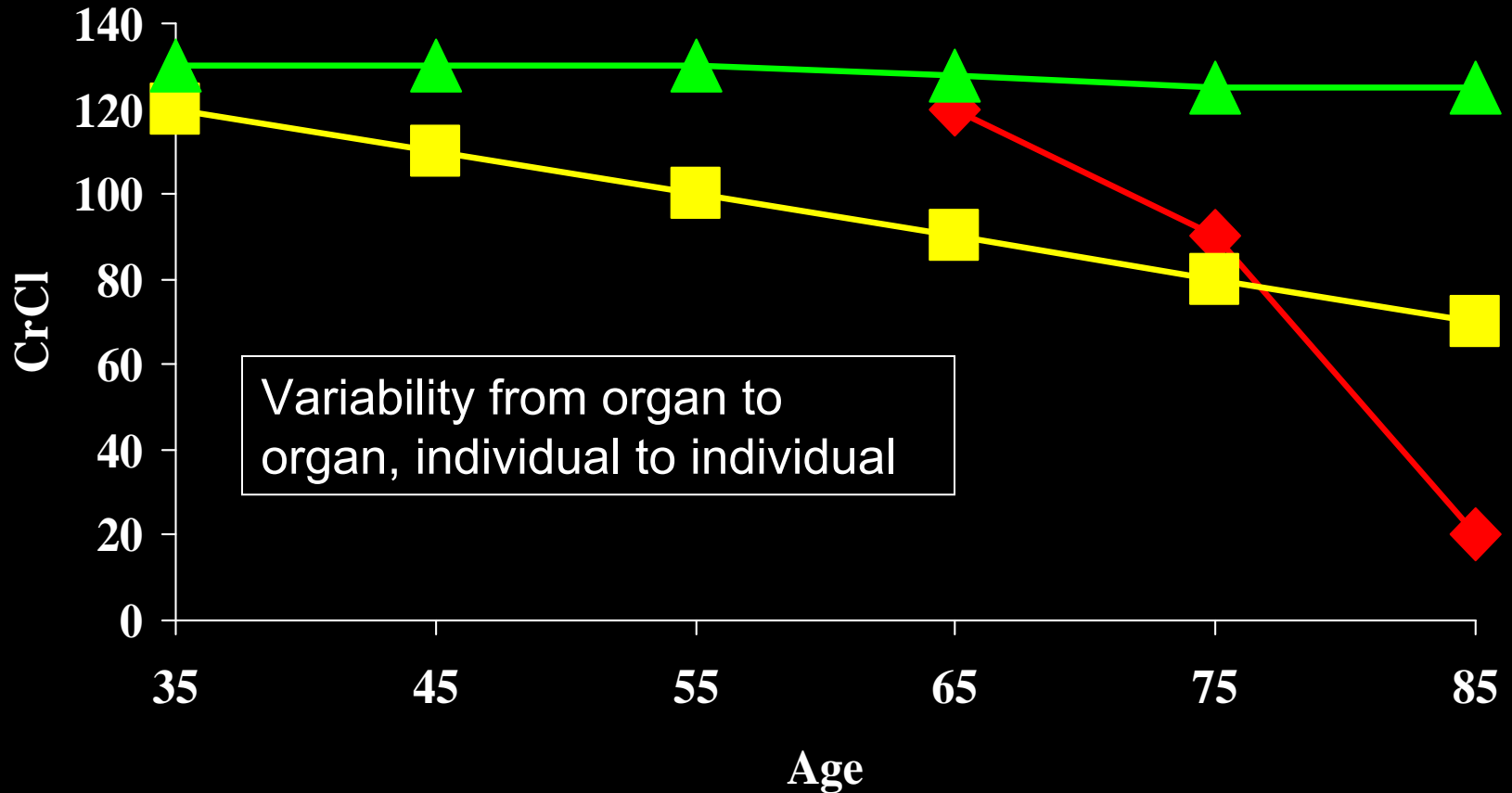
Usual Aging

Age-related changes that commonly occur –
not necessarily universal or age determined

Features of Usual Aging



Features of Usual Aging – Variability in Decline





Implications of Usual Aging

- Increased differentiation and variation between and within individuals – central feature of aging
- Atypical presentations of disease
- However, aging is influenced significantly by lifestyle circumstances
 - smoking, exercise, nutrition, SES
- Increased vulnerability to stressors



Usual Aging - Limitations

- Implication of harmlessness or unmodifiability
 - “What do you expect at your age...”
 - “What should I expect at my age...”

Successful Aging

- Meaning unclear
 - Beyond health and longevity
 - Capacity to function across many domains – cognitive, social, emotional
- Influence of other factors
 - MacArthur studies: importance of exercise, social network, social support, and income



What is Frail?

- Increased vulnerability
- More than disease, more than just disability
- Critical to define for research and for health planning needs

One Research Definition of Frail

- Clinical syndrome (≥ 3 factors):
 - unintentional weight loss (>10 lb yr)
 - weakness - grip strength
 - slow walking speed
 - self report exhaustion
 - low physical activity
- Prevalence in community 7%, 4 year incidence 7%
- \uparrow with age, women, AA, low educ & income, comorbidity, and disability
- Overlap, but not concordance in frailty, comorbidity, disability
- Predicts falls, disability, hospitalization, death

Process of Aging - Quiz

- What has happened to the average and maximum life span over the last century?
 - A. Increased average, increased maximum
 - B. Increased average, decreased maximum
 - C. Increased average, unchanged maximum



Jeanne Calment, died age 122



Survival Curves - Max and Mean Survival

