



# **The Long Arm of Childhood: The Influence of Early Life Conditions on Adult Morbidity & Mortality**

Mark D. Hayward, *Penn State University*

Collaborators: Debra Blackwell (NCHS), Eileen Crimmins (USC), Bridget Gorman (Rice University), & David Warner (Penn State University)

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## Studies on which today's talk is based

- 1. Hayward, Mark D., Eileen M. Crimmins, Toni Miles and Yu Yang. 2000. "The Significance of Socioeconomic Status in Explaining the Racial Gap in Chronic Health Conditions." *American Sociological Review* 65:910-930.  
[http://www.pop.psu.edu/~hayward/asr\\_2000.pdf](http://www.pop.psu.edu/~hayward/asr_2000.pdf)
- 2. Blackwell, Debra L., Mark D. Hayward, Eileen M. Crimmins. 2001. "Does Childhood Health Affect Chronic Morbidity in Later Life?" *Social Science and Medicine* 52:1269-1284. <http://www.pop.psu.edu/~hayward/ssm2001.pdf>
- 3. Hayward, Mark D., and Bridget Gorman. In press. "The Long Arm of Childhood: The Influence of Early-Life Social Conditions on Men's Mortality." *Demography*.  
[http://www.pop.psu.edu/~hayward/hayward\\_gorman\\_2003.pdf](http://www.pop.psu.edu/~hayward/hayward_gorman_2003.pdf)
- 4. Warner, David, and Mark D. Hayward. "A Life Course Model of Race Disparities in Men's Mortality: The Role of Childhood Social Conditions."  
[http://www.pop.psu.edu/~hayward/warner\\_hayward.pdf](http://www.pop.psu.edu/~hayward/warner_hayward.pdf)
- Other relevant studies are referenced at the end



# Social and economic conditions over the life course and chronic disease

- Mounting evidence that childhood circumstances have an enduring effect on chronic health conditions
  - Nutritional deficits
  - Exposure to infectious disease and environmental toxins
  - The *in utero* environment
  - Differential socialization towards risk taking and deferred gratification
  - Sense of autonomy and control over one's surroundings
- Large body of evidence showing that chronic diseases are also by-products of cumulative insults experienced during adulthood
- **However, the ways in which childhood conditions *combine* with adult conditions to influence chronic disease experience is unclear**

## Alternative pathways of childhood influence

- Directly and positively related to risk of adult health problems (a physiological “scarring” effect; effects on basic “personality” traits)
- Directly and negatively related to risk of adult health problems (an acquired immunity effect)
- Indirectly and positively associated with risk of adult problems (chains of risk)
  - childhood poverty gives rise to adult poverty, which, in turn, is primary cause of adult health problems)
  - Childhood family structure and family interaction patterns may have consequences for adult psychosocial adjustment which then affects health
- Indirectly and negatively associated with adult health problems (a selection process in which children in adverse circumstances “escape” because they are unusually robust and hence survive to older ages)



# Growing evidence of effects of early life infectious disease on CVD, cancer, diabetes-II, arthritis, and COPD

- Infectious disease associated with CVD through effect on autoimmune complexes and subsequent development of atherosclerotic lesions resulting in plaque accumulation
- Respiratory infections related to later lung diseases
- Infectious disease linked to musculoskeletal conditions because of lasting joint problems
- Infectious disease may affect some cancers thru interaction of vitamin metabolism and later life exposure to carcinogens
- **Are these types of associations detectable in (noisy) population-based data? Are these associations evident in the presence of strong SES and family gradients in health?**



## SES and other social conditions as fundamental causes of chronic disease

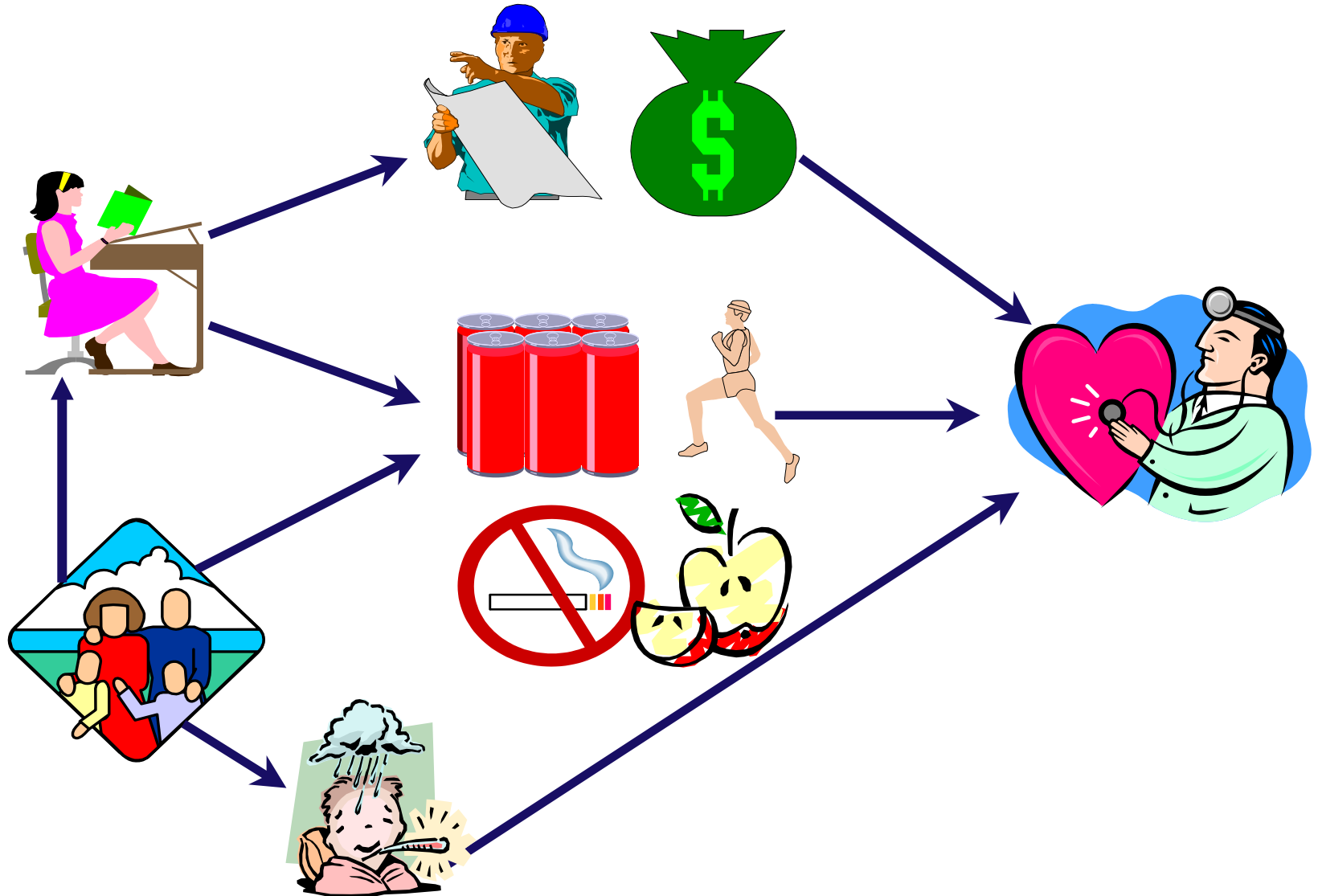
- SES is enduring over substantial segments of the life course
  - Lengthy exposure of social environmental factors that trigger regulatory parts of nervous system, the endocrine system, and other metabolic functions
  - lengthy exposure to a variety of noxious and possibly toxic stimuli
- SES influences ability to avoid noxious stimuli, including lifestyle behaviors
- Childhood SES conditions may play an important role in later life health owing to childhood being a sensitive period of growth and development
- ***Effects of SES experienced in childhood and adulthood are likely to be manifested across a range of chronic diseases although the mechanisms are multi-factorial.***



## Adult social and economic factors influencing chronic disease – the “usual suspects”

- Education
- Occupation - substantive complexity & autonomy, physical & environmental demands.
- Family income in mid- and late-life
- Household wealth
- Marriage
- Lifestyle
  - Alcohol consumption
  - Body mass
  - Cigarette smoking
- **Despite attention to these factors as determinants of adult health, debate continues with regard to: relative effects, non-linear associations, and selection and reciprocal effects**

# Life-course factors influencing adult health





## Data and measures for our studies of adult morbidity and mortality

- Mortality studies based on the National Longitudinal Survey of Older Men
  - 1966 – 1990 observation period
  - nationally representative sample of 5,020 men aged 45-59 in 1966
  - Analysis of mortality based on 2,346 deaths (87% of the total number of deaths)
- Morbidity study based on the HRS Wave 3 (1996) Module on Childhood Experiences
  - N=654
  - Approximately 95% of Rs were 55-65 years of age
  - Module Rs statistically similar to HRS sample except
    - Higher representation of whites and higher level of education (12.3 compared to 11.9 years)



## Measuring adult morbidity and mortality

- NLS: Death certificate information on timing and major cause of death obtained for 2,037 deaths out of a total of 2,693 deaths. Widows or proxies were also queried about the age and major cause of death. Analysis of total mortality based on 2,346 deaths
- HRS: Morbidity assessed using self-report measures based on physician diagnosis
  - Cancer (except skin)
  - Diabetes
  - Cardiovascular disease
  - Chronic obstructive pulmonary disease (e.g., emphysema)
  - Arthritis/rheumatism
  - Potential methodological issues pertaining to non-random underreporting of conditions



## HRS measures of childhood conditions

- 17% of Rs reported a major childhood health condition based on:
  - Ever missed one month or more of school due to health?
  - Restricted from participating in sports for 3+ months due to health?
  - Had to remain in bed for one month or more due to health?
- Rs classified into 3 health groups
  - Autoimmune conditions – (rheumatic fever, arthritis, asthma, or allergies)
  - Infectious disease
  - An incapacitating illness that was neither infectious nor autoimmune in nature
- Other measures: parental death, childhood living arrangements, parental occupational status, & height (a possible surrogate for childhood health problems).



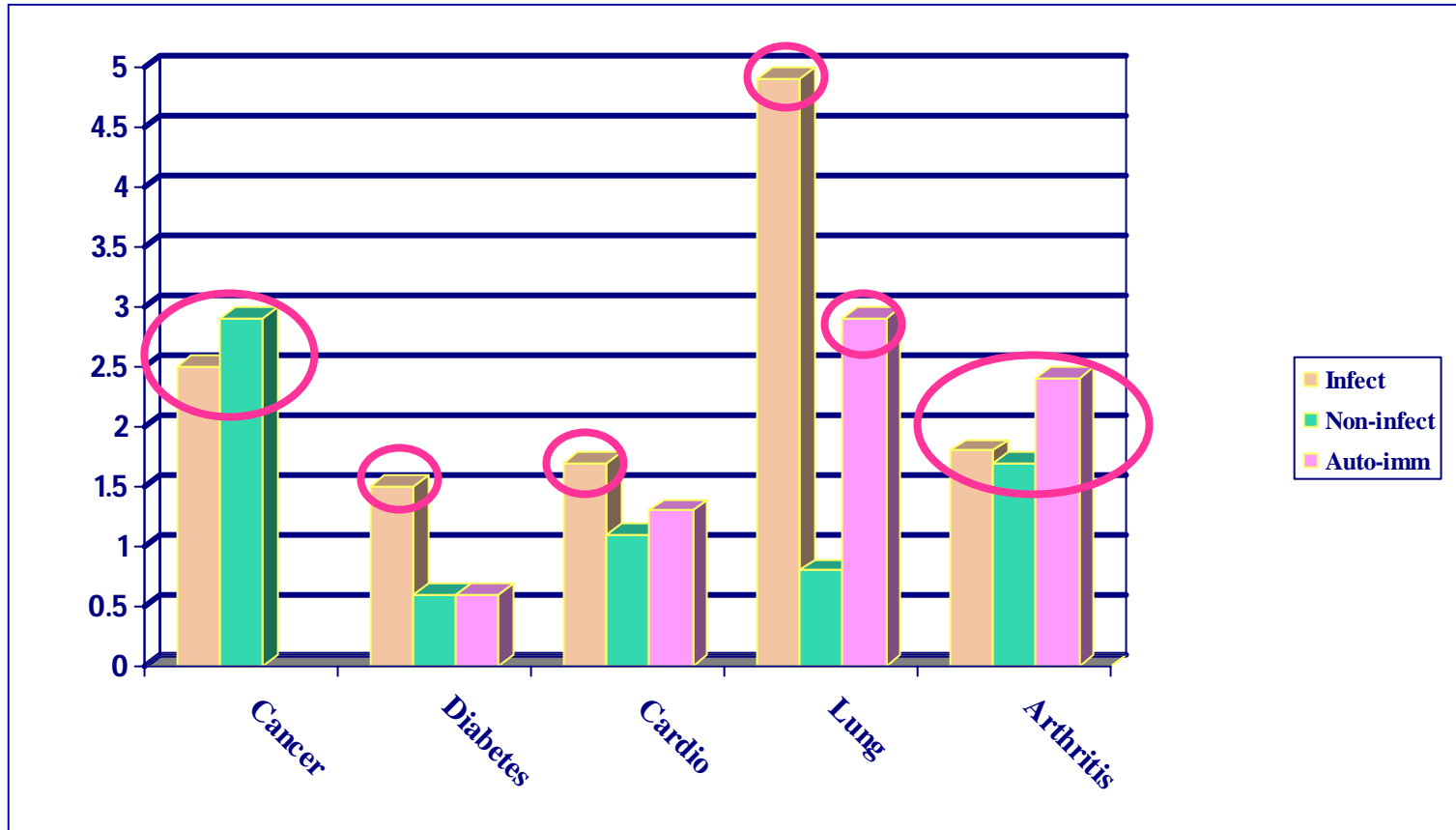
## **NLS measures of childhood circumstances (when respondent was age 15)**

- Occupation of household head
  - Professional, managerial, clerical, sales, crafts, operatives, HH service, service, farmer, farmer laborer, laborer, military
- Education of household head
- Family structure
  - F & M, F & SM, M & SF, F only, M only, Male relative, other, and on own
- Did mother work outside the home?
- Urban/rural residence
- Nativity
  - Foreign born?
  - One or both parents foreign born?



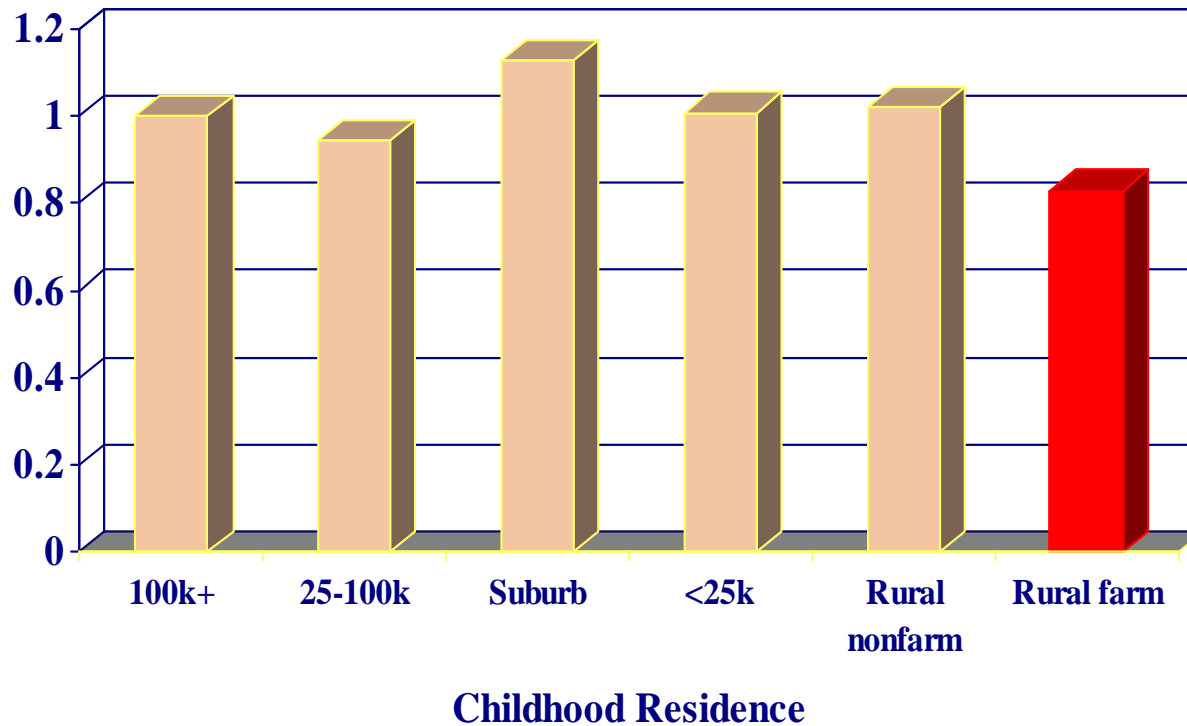
**Results: How are childhood conditions associated with adult morbidity and mortality?**

# Odds of Having a Chronic Condition by Childhood Health Condition – Health and Retirement Wave 3 Module



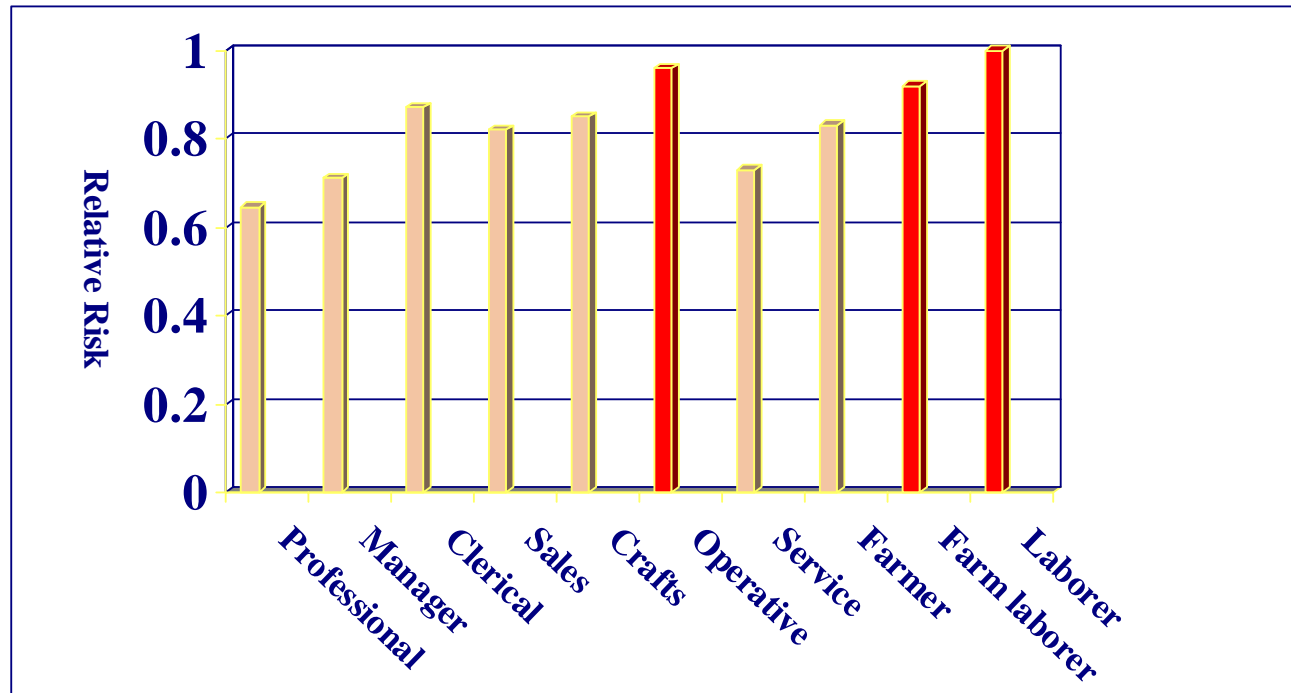
•Models control for sex, race, age, parental death, childhood living arrangements, parental occupational status, parental education, height, R's education, & R's wealth.

## Relative Risk of Death by Childhood Residence -- NLS



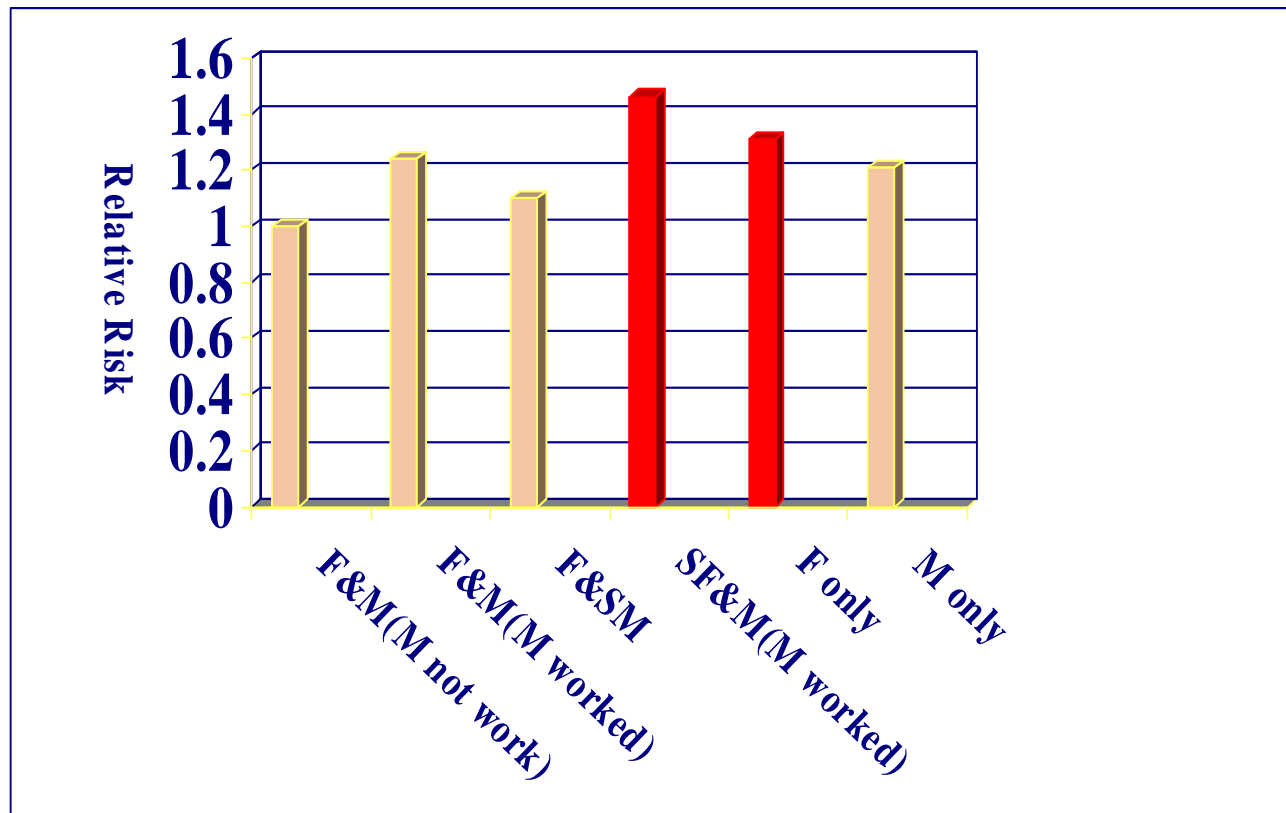
Control variables include age, education and occupation of household head, family structure, mother worked outside the home, and nativity

## Relative Risk of Death by Occupation of Household Head - NLS 1966-2000



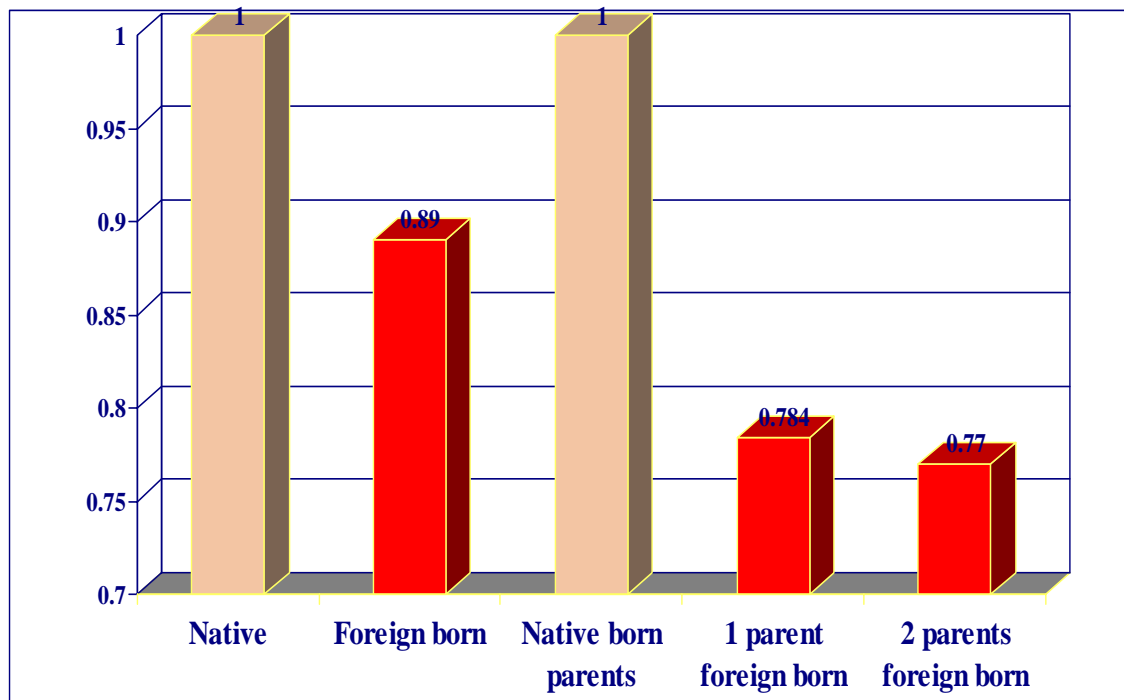
Control variables include age, education of household head, family structure, mother worked outside the home, nativity and urban/rural residence.

## Relative Risk of Death by Childhood Family Structure - NLS 1966-2000



Control variables include age, occupation and education of household head, nativity and urban/rural residence.

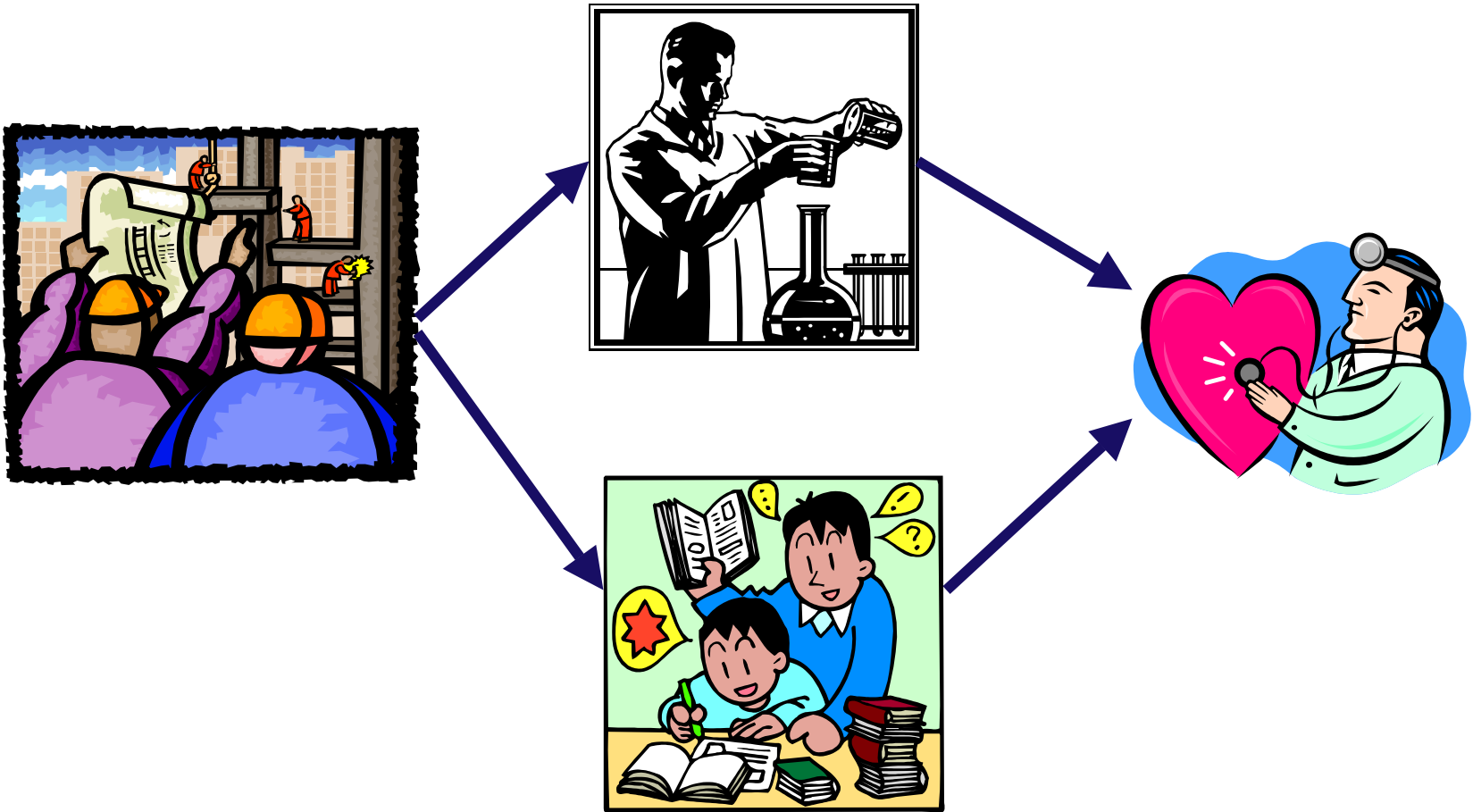
## Relative Risk of Death by Nativity of Respondent and Parents, Controlling for Other Childhood Circumstances – NLS 1966-2000



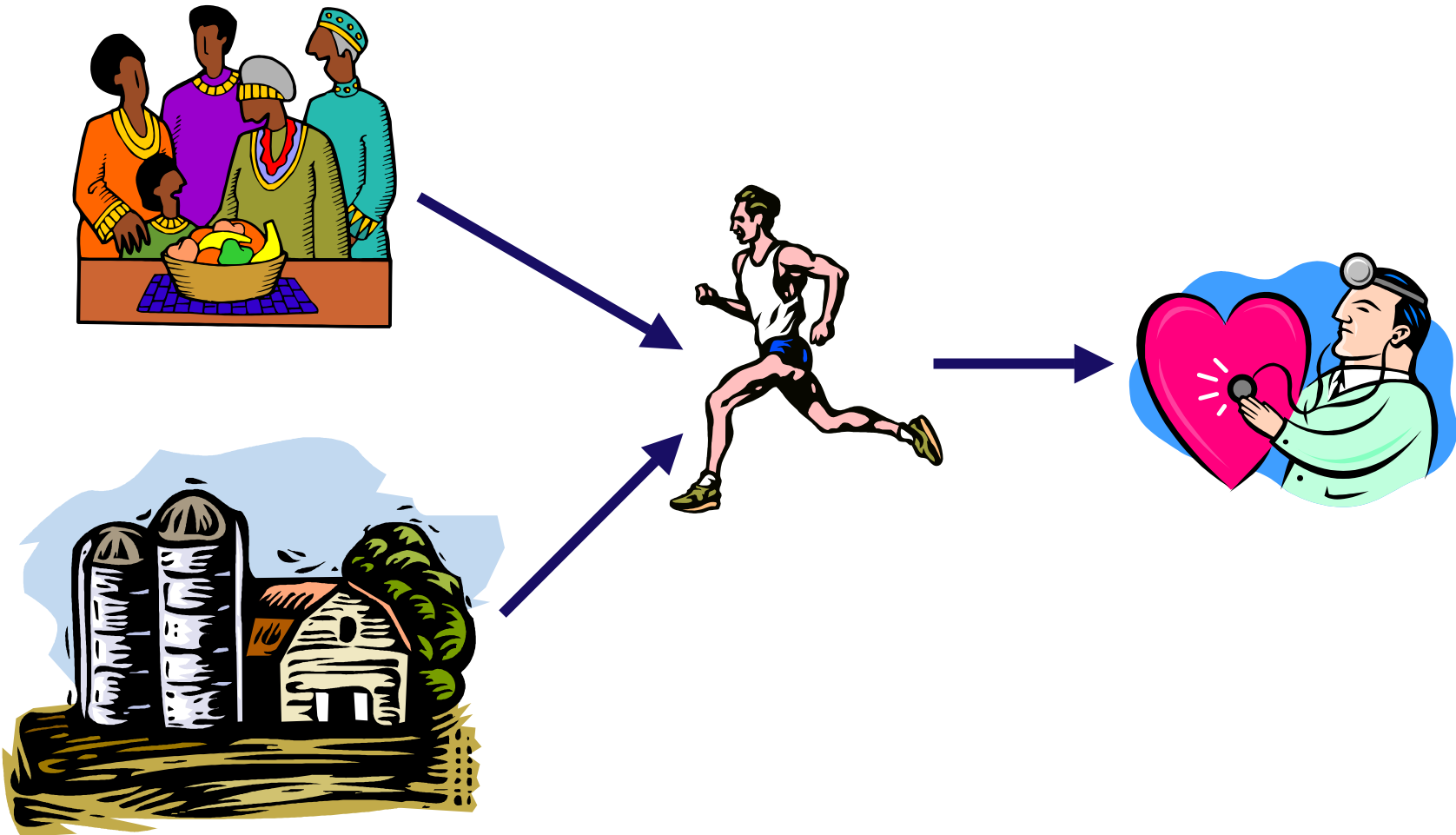
Control variables include age, occupation of HH, family structure, mother's work status, urban/rural residence, and education.

•Risk of death = 1.0 for native born persons and parents who are native born.

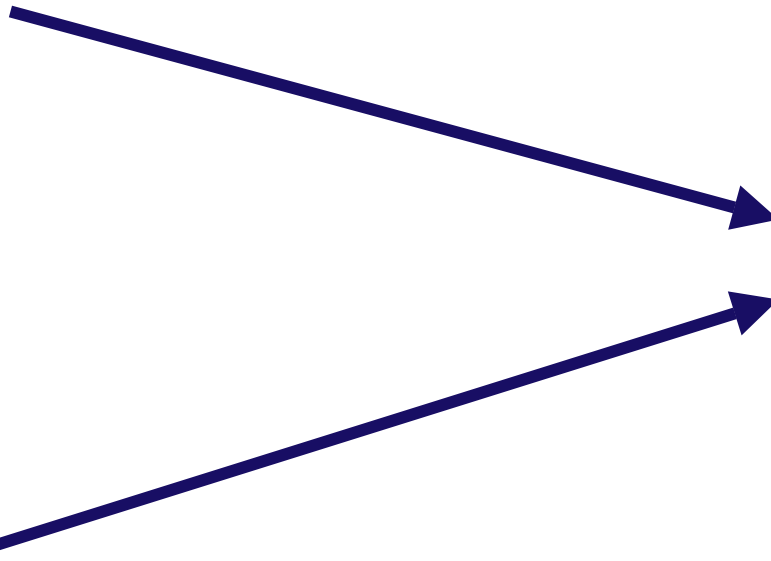
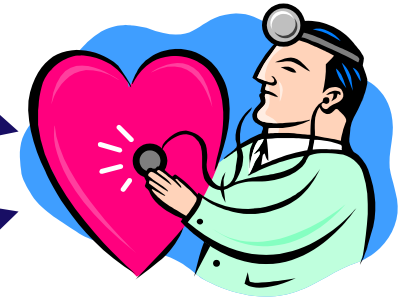
# What are the mechanisms through which childhood SES influences adult health?



# What are the mechanisms through which childhood family structure and rural/urban residence influence adult health?



# What are the ways that nativity and childhood disease experience influence adult health?





## What are the effects of adult social and economic when controlling for childhood circumstances?

- Adult mortality and morbidity are highest for men who:
  - Have less than 9 years of education
  - Are divorced or widowed
  - Are poor in terms of family income *and* asset wealth
  - Work in jobs lacking autonomy and creativity
  - Are obese or very underweight
  - Are teetotalers or heavy drinkers (5-6 drinks a day)
  - Are smokers
- **When childhood circumstances are *not* controlled, the results indicate that the effects of adult circumstances are robust and are not overestimated**



## **Caveats and thoughts about future research on the association between childhood and adult health**

- **Current research based on omnibus datasets not designed with the research task in mind**
  - Underreporting of childhood health problems (timing and specificity)
  - Concerns about memory of & appropriate metrics of childhood SES
  - Under-emphasis of family environment – family interactions, relationships, stressors, lifestyle preferences, & parenting
  - No attention to within and between family achievement processes and health experiences
  - Selection issues – who survives for inclusion in surveys of older persons' health
- **Research often equates morbidity and mortality.** Adult health problems typically reflect chronic disease processes in which factors such as childhood may differentially operate at different points in the process (e.g., the timing of disease onset, and the functional and mortality effects)
- **Theoretical frameworks relatively primitive and would benefit by considering non-linear and interdisciplinary relationships, e.g.,**
  - Do childhood illnesses have a greater impact on adult health under certain childhood conditions (e.g., poverty?)
  - Current theoretical issues need to be articulated with child and adolescent development concepts



## **Adult morbidity and mortality are a function of childhood conditions *and* adult SES and lifestyle**

- Risks of adult problems reflect accumulation of effects arising from adverse conditions over entire life course
  - Some effects of childhood are indirect – particularly the effects of family SES and family structure – chains of (social) risk
  - There is also evidence of long-term and enduring effects of childhood disease experience and (perhaps) nativity
  - Adult morbidity and mortality are not simply the outcome of adult life circumstances *or* childhood programming
- Ravages of childhood cannot be completely erased by advantaged conditions in adulthood. Childhood experiences often set up a cascading events over the life course that have dramatic effects on adult health
- Investing in children's health is sound policy both for individuals and societies. Individuals' survival is increased while the future societal burden of caring for the elderly is reduced



## Recent papers of note

- Costa, D.L. 2003. "Understanding mid-life and older age mortality declines: Evidence from Union Army veterans." *Journal of Econometrics* 112(1):175.
- Davey Smith, G., C. Hart, D. Hole, P. MacKinnon, C. Gillis, G. Watt, D. Blane, and V. Hawthorne. 1998. "Education and occupational social class: which is the more important indicator of mortality risk?" *J Epidemiol Community Health* 52(3):153-160.
- Galobardes, B., J.W. Lynch, and G. Davey Smith. 2004. "Childhood Socioeconomic Circumstances and Cause-Specific Mortality in Adulthood: Systematic Review and Interpretation." *Epidemiologic Reviews* 26:In press.
- Hart, C.L. and G. Davey Smith. 2003. "Relation between number of siblings and adult mortality and stroke risk: 25 year follow up of men in the Collaborative study." *J Epidemiol Community Health* 57(5):385-391.
- Okasha, M., P. McCarron, J. McEwen, J. Durnin, and G. Davey Smith. 2003. "Childhood social class and adulthood obesity: findings from the Glasgow Alumni Cohort." *J Epidemiol Community Health* 57(7):508-509.