

Today's Research on Aging

PROGRAM AND POLICY IMPLICATIONS

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Effects of Early Life on Elderly Health

Personal choices made earlier in life can have lasting effects on elderly health. Decisions about exercise, nutrition, smoking, and drinking behavior, as well as some less obvious choices such as pursuit of higher education, whether or not to marry, and which neighborhood to live in all have consequences much later in life. Not only can such choices in one's adult life affect elderly health, but so can characteristics of one's childhood.

The Behavioral and Social Research Program at the National Institute on Aging (NIA) supports analysis of the effects of early life on elderly health. Knowledge gained from these analyses can help design programs to improve the choices people make both for themselves and for their children. In this newsletter, we discuss both NIA-sponsored and other research about the effects of early life on adult and elderly health.

Mechanisms and Pathways

There are multiple and complex mechanisms and pathways through which conditions in early life (such as pregnancy, infancy, childhood, adolescence) may affect one's health as an adult. Parental health, especially the mother's health, plays an

important role in the health of the newborn, and may then affect adult health (Palloni 2006; Currie and Moretti 2007). Infections and inflammation in early life may contribute to explaining adult health (Crimmins and Finch 2006), and under certain conditions, exposure to poor nutrition and infectious diseases in early life or before birth or shortly afterward may negatively affect adult health (Doblhammer 2003; McEniry and Palloni, forthcoming; McEniry et al. 2008). Greater exposure of children to infectious diseases during the first year of life can lead to higher adult mortality (Bengtsson and Lindstrom 2003). Poor childhood health and adverse childhood socioeconomic conditions may also have direct and indirect negative impacts on adult health (Palloni 2006; Palloni et al. 2005; Case, Fertig, and Paxson 2005; Elo and Preston 1992; Luo and Waite 2005).

Not yet clear is the relative importance of these individual childhood factors in comparison with other factors such as adult risk behavior (smoking, drinking, exercising, diet) or adult education and income, which may also affect adult health (Palloni 2006; Herd, Goesling, and House 2007). In addition, we need to better understand the impact of larger societal events such as macroeconomic conditions or social policies experienced in childhood that may affect childhood risk factors. For example, during depressions or economic downturns, more women and children may suffer from poor living conditions, resulting in greater malnutrition and exposure to disease (van den Berg, Lindeboom, and Portrait 2006). Social policies experienced in some circumstances may also affect infant health and later adult health (Almond and Chay 2006). On the other hand, there is also evidence that the long-term effect of macroeconomic conditions experienced during childhood on adult health is inconsequential (Cutler, Deaton, and Lleras-Muney 2006; Cutler, Miller, and Norton 2007).

Finally, early life conditions manifest themselves differently across time and space. Thus, for some birth cohorts, date of birth or geographic location during childhood may be important in explaining adult health (Bengtsson and Lindstrom 2003; Catalano and Bruckner 2006; Ross and Mirowsky 2001) but only because they reflect poor early life circumstances that expose individuals to a higher risk of

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This review summarizes research related to the objectives of the National Institute on Aging, with emphasis on work conducted at the NIA demography centers. Our objective is to provide decisionmakers in government, business, and nongovernmental organizations with up-to-date scientific evidence relevant to policy debates and program design. These newsletters can be accessed at www.prb.org/TodaysResearch.aspx.

poor health. As societal conditions improved, the threat of poor nutrition and infectious diseases experienced during childhood has declined over time in many countries and birth cohorts are more likely to live longer (Catalano and Bruckner 2006). Nutritional status of children has thus improved because less energy is now expended in supporting a heightened immune response and more energy may be devoted to supporting growth and development (Palloni et al. 2005). For other countries, and indeed within some countries, however, addressing poor nutrition and infectious diseases along with poor socioeconomic conditions and poor childhood health continue to be important challenges that may very well help explain adult health.

Childhood Health

A large number of events and circumstances in childhood can affect elderly health. Anything from a traumatic experience such as the death of a family member, to a more chronic situation such as exposure to pollution or second-hand smoke as a child may eventually affect adult health and well-being. Researchers have mainly examined two aspects of childhood—early health and socioeconomic status—that may influence adult and elderly health.

According to one review of early research, an individual's date and place of birth appears to be persistently associated with risks of adult death in a wide variety of circumstances, and an individual's height—an indicator of nutritional and disease environment in childhood—has also been linked to adult mortality, especially from cardiovascular diseases (Elo and Preston 1992). For some diseases such as tuberculosis, an infection acquired in childhood may not manifest itself until much later. Other diseases attack an organ system, and the impairment creates a chronic weakness that can lead to death later in life. Cirrhosis, liver cancer, rheumatic heart disease, and respiratory infections and bronchitis are among diseases in the latter category.

Recent research indicates that, even when controlling for parents' incomes, educational attainment, and social status, adults who experienced poor health as children have significantly lower educational attainment, lower earnings, and poorer health compared with adults who did not experience poor health in their childhood (Case, Fertig, and Paxson 2005). This is somewhat consistent with earlier findings that poorer children enter adulthood in worse health and with less education than wealthier children. These results also lend support to a suggestion that childhood health, more so than adult economic status, is a key determinant of health in adulthood.

Using data from the 1998 Health and Retirement Study in the United States, researchers found that for six self-reported measures of physical, mental, and cognitive well-being, higher childhood socioeconomic status was strongly associated with better adult health outcomes (Luo and Waite 2005). There is also evidence that parental socioeconomic status affects child health and that child health relates to future educational and labor market outcomes (Currie 2009). These educational and labor market outcomes, as well as other factors affected by childhood socioeconomic status, can have lasting effects on adult and elderly health and well-being.

From a psychological or mental health perspective, however, some childhood experience of disadvantage may help a person develop a greater ability to cope with stressful events later in life (Copley and Williams 2006). On the other hand, recent research finds that mental health problems identified even once in childhood have an effect on schooling. Physical health problems in early childhood predict young adult health, but only if these health problems persist for multiple periods do they affect schooling and welfare participation (Currie et al., forthcoming).

Adolescence

Childhood and adolescent socioeconomic status influences preferences for smoking, drinking, educational attainment, and risk taking (Hayward and Gorman 2004). These behaviors and choices usually manifest during the adolescent years. The impact of these behaviors on health is thought to be additive over the life course and, as a result, affects elderly health (Palloni 2006).

Also, because the adolescent years are a time of drastic growth and puberty, diet during this time of life can have a major influence on health later in life. For example, approximately 40 percent of peak bone mass in girls is accumulated during their adolescent years (Weaver, Peacock, and Johnston 1999). While exercise, smoking behavior, and some other lifestyle choices affect bone acquisition, these do not compare to the importance of consuming adequate amounts of calcium. The development of a higher peak bone mass during the adolescent years protects against bone loss and osteoporosis in postmenopausal women. Retrospective studies of postmenopausal women in China reveal that bone density is positively associated with milk consumption in adolescent years. Most teenage girls do not achieve the recommended intake of calcium per day—a circumstance that may be related to their concern with body

image (Weaver, Peacock, and Johnston 1999). In a study of women who immigrated from Southeast Asia, Diane Lauderdale and her colleagues (2001) found the following characteristics of their lives before immigration predicted high bone mineral density later in life: more years of education, earlier age of menarche, lower height, and coastal birth (a proxy for seafood consumption).

Date of Birth

Evidence shows that as child mortality has fallen over time, so has adult mortality. Catalano and Bruckner (2006) suggest that as birth cohorts are exposed to fewer or less virulent infections, injuries, or traumas in childhood, these cohorts are more likely to live longer.

A comparison of black and white cohorts from the 1960s also indicates an effect of birth year. Black women born in the late 1960s have lower risk factor rates as adults and are much less likely to give birth to an infant with low birth weight than black women born in the early 1960s (Almond and Chay 2006). A similar comparison of white women born in the late 1960s to white women born in the early 1960s showed smaller differences consistent with the smaller improvement in white infant mortality rates in the 1960s relative to black infant mortality rates. Almond and Chay concluded that the social policies that led to the infant health improvements in the 1960s, such as Title VI of the 1964 Civil Rights Act, had long-run and intergenerational health benefits.

Socioeconomic Status

A disadvantaged background is often associated with poor childhood health, and poor childhood health adversely affects educational attainment and wealth accumulation as an adult, reproducing socioeconomic disadvantage (Haas 2006; Palloni 2006).

Using data from the Americans' Changing Lives Study (1986 through 2001/2002), Herd, Goesling, and House (2007) tested the effects of education and income on different stages of health problems and found that education is a stronger predictor than income of whether an individual develops health problems such as functional limitations or chronic conditions such as diabetes. Many economists believe that the mechanisms through which more education is correlated with better health show that more-educated people are better able to understand and use new health information and thus more likely to benefit from health care. Also, people with less education tend to exhibit more risky health behaviors, including

smoking, binge drinking, and lack of exercise. These behaviors have lasting effects on lifelong health.

Other researchers have found that early life education has a significant impact on cognitive performance in late life (Cagney and Lauderdale 2002). This effect may occur because educated people are more likely to be in contact with other educated people such as co-workers or spouses, thereby increasing mental stimulation. There is also some evidence that the association between education and health has become stronger in recent decades (Lauderdale 2001).

In a study of Californian births, Currie and Moretti (2007) find that mothers who were low birth-weight babies were more likely to have low birth-weight babies. This "transmission" of low birth weight occurred even more often among mothers in high-poverty zip codes. Low birth weight in turn was associated with lower socioeconomic status later in life and again, these effects were stronger for women born in high-poverty zip codes.

Location

An individual's education, income, and employment status have a greater effect on health than does living in a disadvantaged neighborhood. Nonetheless, individuals who live in disadvantaged neighborhoods seem to experience worse health as a result of the environment in which they live. Disadvantaged neighborhoods have high percentages of people living below poverty line, female-headed households, people who are not college educated, and low rates of homeownership. Living in a disadvantaged neighborhood does not affect health directly, but the stress, fear, and neighborhood disorder associated with these characteristics erode health. Fear and stress increase blood pressure and serum cholesterol, and may increase a person's risk of diabetes, stroke, and heart disease (Ross and Mirowsky 2001).

In addition to the effects of one's neighborhood, many health differences occur at the state and regional level. For example, there is geographic variation in the rates of hip fracture for elderly whites in the United States. Furthermore, where people lived early in their lives explains more about individual differences in hip fractures than where a person lived at the time of the actual hip fracture (Lauderdale, Thisted, and Goldberg 1998), but the relationship between the region or state of residence in early life and hip fracture risks in elderly life is unclear. Such factors may be directly related to geography through the amount of sunlight, weather, and altitude, or indirectly related through variation in the concentration of poverty, diet, or medical practices.

Conclusion

Numerous studies have found significant relationships between early life conditions and adult health and the probability of dying. Multiple, complex pathways and mechanisms may act independently or together to explain these relationships. Under certain conditions, parental health, exposure to poor nutrition or infections in early life, being born to parents in poverty, or experiencing poor childhood health may adversely affect adult health. Although these studies provide valuable insight into the impact of early life circumstances, there is still much not known about the conditions under which early life exposures are later manifested in poor adult health. In addition, ascertaining the relative importance of early life circumstances in determining death and illness as societal conditions change over time and the impact of macro-level social policies on early childhood experiences continues to be an important research endeavor.

References

- Douglas Almond and Kenneth Chay, "The Long-Run and Intergenerational Impact of Poor Infant Health: Evidence From Cohorts Born During the Civil Rights Era," presentation at the National Poverty Center, University of Michigan, February 2006, accessed online at www.npc.umich.edu/news/events/healtheffects_agenda/chay_npc_paper.pdf, on April 3, 2009.
- Tommy Bengtsson and Martin Lindstrom, "Airborne Infectious Diseases During Infancy and Mortality in Later Life in Southern Sweden, 1766-1894," *International Journal of Epidemiology* 32, no. 2 (2003): 286-94.
- Kathleen A. Cagney and Diane S. Lauderdale, "Education, Wealth and Cognitive Function in Later Life," *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences* 57, no. 2 (2002): P163-72.
- Anne Case, Angela Fertig, and Christina Paxson, "The Lasting Impact of Childhood Health and Circumstance," *Journal of Health Economics* 24, no. 2 (2005): 365-89.
- Ralph Catalano and Tim Bruckner, "Child Mortality and Cohort Life Span: A Test of Diminished Entelechy," *International Journal of Epidemiology* 35, no. 5 (2006): 1264-69.
- Leeda J. Copley and Kristi L. Williams, "The Effects of Childhood Disadvantage on Later-Life Health and Well-Being," paper presented at the annual meeting of the American Sociological Association, August 2006, accessed online at www.allacademic.com/meta/p103123_index.html, on July 19, 2008.
- Eileen M. Crimmins and Caleb E. Finch, "Infection, Inflammation, Height and Longevity," *PNAS* 103, no. 2 (2006): 498-503.
- Janet Currie and Enrico Moretti, "Biology as Destiny? Short- and Long-Run Determinants of Intergenerational Transmission of Birth Weight," *Journal of Labor Economics* 25, no. 2 (2007): 231-64.
- Janet Currie, "Healthy, Wealthy, and Wise: Socioeconomic Status, Poor Health in Childhood, and Human Capital Development," *Journal of Economic Literature* 47, no. 1 (2009): 87-122
- Janet Currie et al., "Child Health and Young Adult Outcomes," *Journal of Human Resources* (forthcoming).
- David Cutler, Angus Deaton, and Adriana Lleras-Muney, "The Determinants of Mortality," *Journal of Economic Perspectives* 20, no. 3 (2006): 97-120.
- David Cutler, Grant Miller, and Douglas Norton, "Evidence on Early-Life Income and Late-Life Health From America's Dust Bowl Era," *Proceedings of the National Academy of Sciences of the United States of America* 104, no. 33 (2007): 13244-49.
- Gabriele Doblhammer, "Commentary: Infectious Diseases During Infancy and Mortality in Later Life," *International Journal of Epidemiology* 32, no. 2 (2003): 294-95.
- Irma T. Elo and Sam H. Preston, "Effects of Early Life Conditions on Adult Mortality: A Review," *Population Index* 58, no. 2 (1992): 186-212.
- Steve Haas, "Health Selection and the Process of Social Stratification: The Effect of Childhood Health on Socioeconomic Attainment," *Journal of Health and Social Behavior* 47, no. 4 (2006): 339-54.
- Mark Hayward and Bridget K. Gorman, "The Long-Arm of Childhood: The Influence of Early-Life Social Conditions on Men's Mortality," *Demography* 41, no. 1 (2004): 87-107.
- Pamela Herd, Brian Goesling, and James S. House, "Socioeconomic Position and Health: The Differential Effects of Education versus Income on the Onset versus Progression of Health Problems," *Journal of Health and Social Behavior* 48, no. 3 (2007): 223-38.
- Diane S. Lauderdale, "Education and Survival in the United States: Birth Cohort, Period and Age Effects," *Demography* 38, no. 4 (2001): 551-61.
- Diane S. Lauderdale et al., "Life Course Predictors of Ultrasonic Heel Measurement in a Cross-Sectional Study of Immigrant Women From Southeast Asia," *American Journal of Epidemiology* 153, no. 6 (2001): 581-86.

Diane S. Lauderdale, Ronald A. Thisted, and Jack Goldberg, "Is Geographic Variation in Hip Fracture Rates Related to Current or Former Region of Residence?" *Epidemiology* 9, no. 6 (1998): 574-77.

Ye Luo and Linda J. Waite, "The Impact of Childhood and Adult SES on Physical, Mental, and Cognitive Well-Being in Later Life," *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences* 60, no. 2 (2005): S93-101.

Mary McEniry et al., "Early Life Exposure to Poor Nutrition and Infectious Diseases and its Effects on the Health of Older Puerto Rican Adults," *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences* 63, no. 6 (2008): S337-48.

Mary McEniry and Alberto Palloni, "Early Life Exposures and the Occurrence and Timing of Heart Disease Among the Older Adult Puerto Rican Population," *Demography* (forthcoming).

Alberto Palloni, "Reproducing Inequalities: Luck, Wallets, and the Enduring Effects of Childhood Health," *Demography* 43, no. 4 (2006): 587-615.

Alberto Palloni et al., "The Influence of Early Conditions on Health Status Among Elderly Puerto Ricans," *Social Biology* 52, no. 3-4 (2005): 132-63.

Catherine E. Ross and John Mirowsky, "Neighborhood Disadvantage, Disorder, and Health," *Journal of Health and Social Behavior* 42, no. 3 (2001): 258-76.

Gerard van den Berg, Maarten Lindeboom, and France Portrait, "Economic Conditions Early in Life and Individual Mortality," *American Economic Review* 96, no. 1 (2006): 290-302.

Connie M. Weaver, Munro Peacock, and Conrad Johnston Jr., "Adolescent Nutrition in the Prevention of Postmenopausal Osteoporosis," *Journal of Clinical Endocrinology & Metabolism* 84, no. 6 (1999): 1839-43.

The NIA Demography Centers

The National Institute on Aging supports 13 research centers on the demography and economics of aging, based at the University of California at Berkeley, the University of Chicago, Harvard University, the University of Michigan, the National Bureau of Economic Research, the University of North Carolina, the University of Pennsylvania, Pennsylvania State University, Princeton University, RAND Corporation, Stanford University, the University of Southern California/University of California at Los Angeles, and the University of Wisconsin.

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For More Information

Late Life Legacy of Very Early Life, Gabriele Doblhammer
www.demogr.mpg.de/books/drm/002/index.htm

Journal of Social Biology 52, no. 3-4 (2005)
www.soc.duke.edu/~socbio/socbio_2003through2006.htm

Military Service and Health Outcomes in Later Life
www.cpr.maxwell.syr.edu/research/military_service.htm



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popref@prb.org E-MAIL