Robert Wood Johnson Foundation

ISSUE BRIEF #5

EXPLORING THE SOCIAL DETERMINANTS OF HEALTH

This issue brief, published in April 2011, is one in a series of 12 issue briefs on the social determinants of health. The series began as a product of the Robert Wood Johnson Foundation Commission to Build a Healthier America.

Education and Health

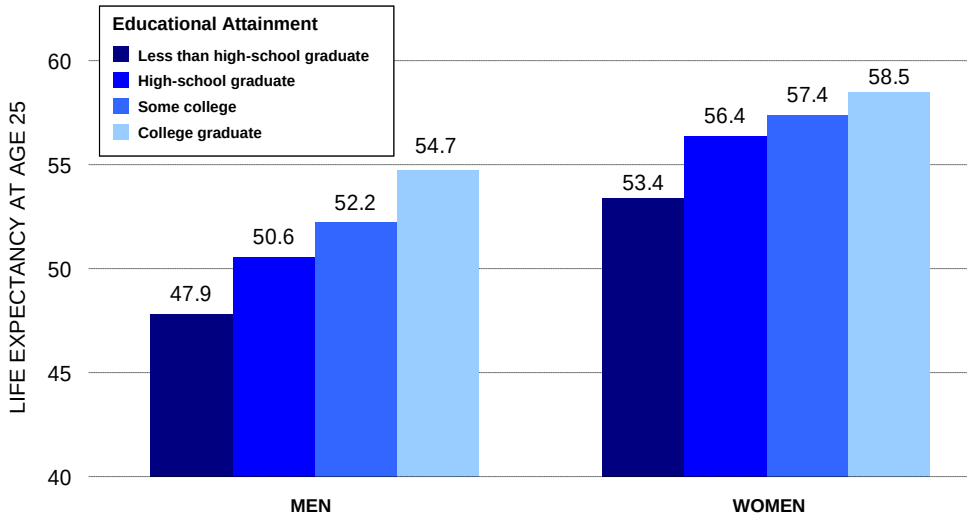
1. Introduction

Everyone knows that without a good education, prospects for a good job with good earnings are slim. Few people think of education as a crucial path to health, however. Yet a large body of evidence strongly—and, with very rare exceptions, consistently—links education with health, even when other factors like income are taken into account.[1-6] By "education" we mean educational attainment, or the years or level of overall schooling a person has, rather than instruction on specific health topics like hygiene, diet or exercise; while the quality of education also is important for health outcomes, this information is more difficult to measure and thus typically unavailable. People with more education are likely to live longer, to experience better health outcomes (Figures 1 & 2), and to practice health-promoting behaviors such as exercising regularly, refraining from smoking, and obtaining timely health care check-ups and screenings.[4, 7-9] Educational attainment among adults is linked with children's health as well, beginning early in life: babies of more-educated mothers are less likely to die before their first birthdays, and children of more-educated parents experience better health (Figures 3 & 4).

A large body of evidence links education with health, even when other factors like income are taken into account.

Education can influence health in many ways. This issue brief examines three major interrelated pathways through which educational attainment is linked with health: health knowledge and behaviors; employment and income; and social and psychological factors, including sense of control, social standing and social networks. In addition, this brief explores how educational attainment affects health across

generations, examining the links between parents' education—and the social and economic advantages it represents—and their children's health and social advantages, including opportunities for educational attainment.

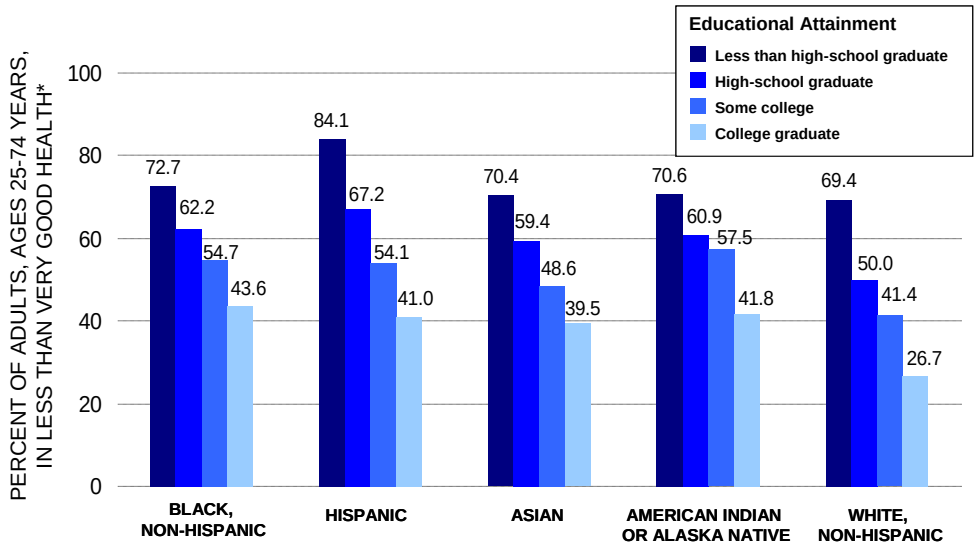


Source: National Longitudinal Mortality Study, 1988-1998.

† This chart describes the number of years that adults in different education groups can expect to live beyond age 25. For example, a 25-year-old man with only a high-school diploma can expect to live 50.6 more years and reach an age of 75.6 years.

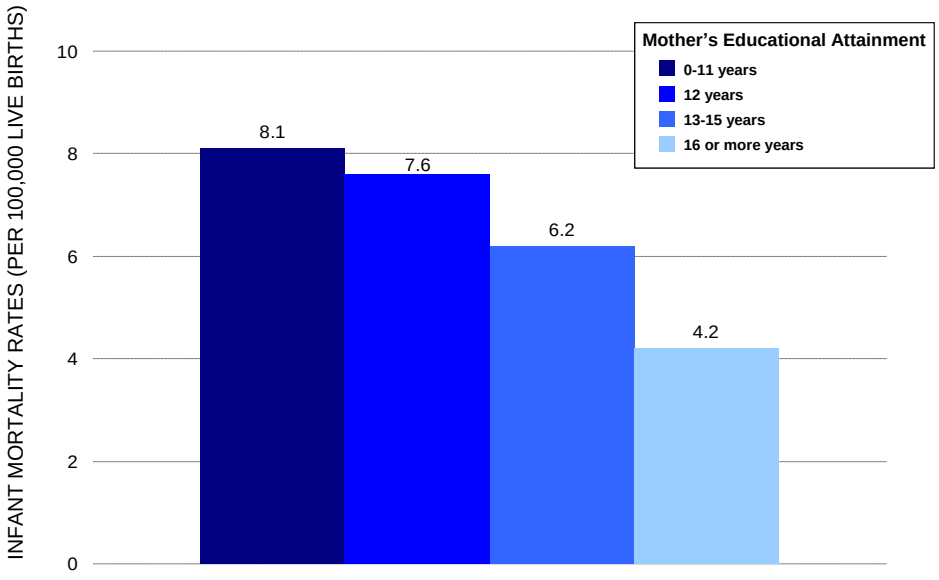
Figure 1. For both men and women, more education typically means longer life. [+] *College graduates can expect to live at least 5 years longer than individuals who have not finished high school.*

People with more education are likely to live longer and experience better health outcomes.



Source: Behavioral Risk Factor Surveillance System Survey Data, 2005-2007.
† Based on self-report and measured as poor, fair, good, very good or excellent.
* Age-adjusted.

Figure 2. Less education is linked with worse health. [+] *Across racial or ethnic groups, adults with greater educational attainment are less likely to rate their health as less than very good.*



Source: Matthews TJ, MacDorman MF. *Infant Mortality Statistics from the 2004 Period Linked Birth/Infant Death Dataset*. National Vital Statistics Reports, vol 55 no 15. Hyattsville, MD: National Center for Health Statistics, 2007.

Figure 3. Infant mortality rates vary by mother's education. *Babies born to mothers who have not finished high school are nearly twice as likely to die before their first birthdays as babies born to college graduates.*

Adults' educational attainment is linked with their children's health, beginning early in life.

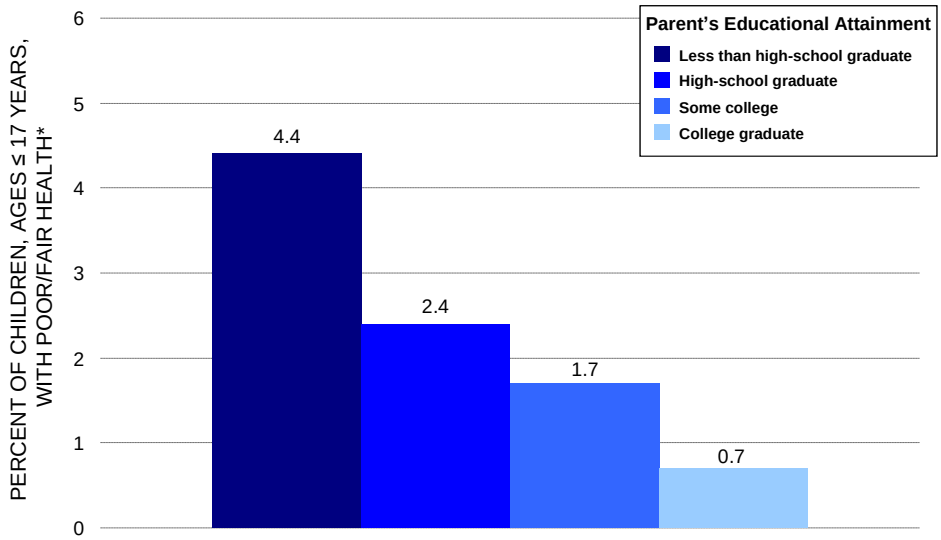


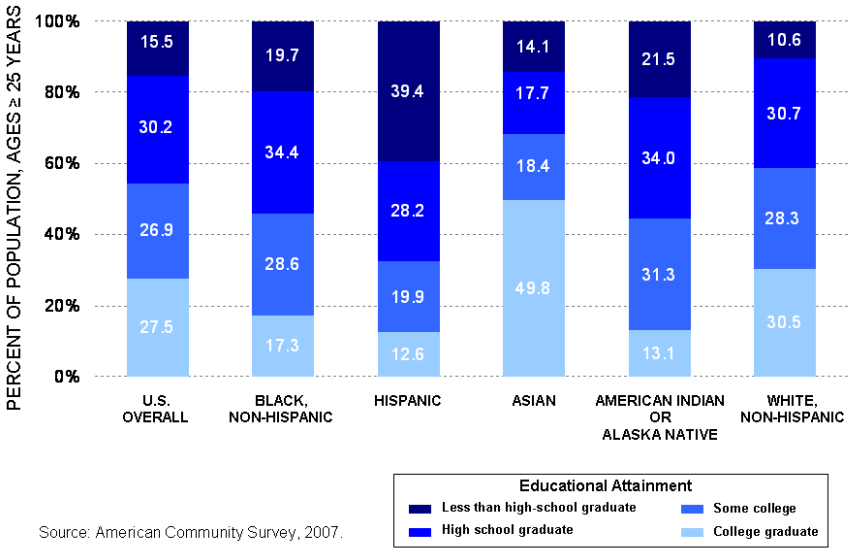
Figure 4. Parents' education is linked with children's health.[+] *Children whose parents have not finished high school are more than six times as likely to be in poor or fair health as children of college gradutes.*

Source: National Health Interview Survey, 2001-2005.
† Based on parental assessment and measured as poor, fair, good, very good or excellent.
* Age-adjusted.

LOW EDUCATIONAL ATTAINMENT IS A MAJOR PROBLEM IN THIS COUNTRY

In the United States overall, nearly 16 percent of adults ages 25 years and older have not completed high school, 30 percent have no schooling beyond high school, 27 percent have attended but not completed college, and 28 percent are college graduates (*Figure 5*). These overall percentages mask dramatic differences across racial or ethnic groups, however: for example, 50 percent of Asian and 31 percent of non-Hispanic white adults are college graduates, compared with 17 percent of non-Hispanic black and 13 percent of Hispanic and American Indian or Alaska Native adults.

Figure 5. Educational attainment among adults varies by racial or ethnic group.



Source: American Community Survey, 2007.

The United States is the only industrialized nation where young people currently are less likely than members of their parents' generation to be high-school graduates.

Approximately 30 percent of high-school freshmen in this country—and nearly half of all freshmen in school systems in the 50 largest U.S. cities—fail to graduate within four years.[10] The likelihood of dropping out increases with decreasing income. In 2007, for example, 17 percent of 16- to 24-year-olds from families in the lowest income quartile were not enrolled in high school and had not received a high-school credential, compared with 3 percent of those from families in the highest income quartile.[11] At the same time, college has become increasingly unaffordable for low- and middle-income families. For the 2007-2008 school year, net college costs for a family in the lowest income quintile represented 55 percent of median family income, compared with 33 percent, 25 percent, 16 percent and 9 percent, respectively, for families in successively higher income quintiles.[12] In response to budget constraints, at least 28 states cut funding for public colleges and universities and/or substantially increased college tuitions in their 2009 fiscal year budgets.[13]

The United States is the only industrialized nation where young people currently are less likely than members of their parents' generation to be high-school graduates.[14] Given the changing demography of the country and the escalating costs of college, bold action will be needed to meet President Obama's goal of having the highest proportion of college graduates in the world by 2020.

2. How does education influence health?

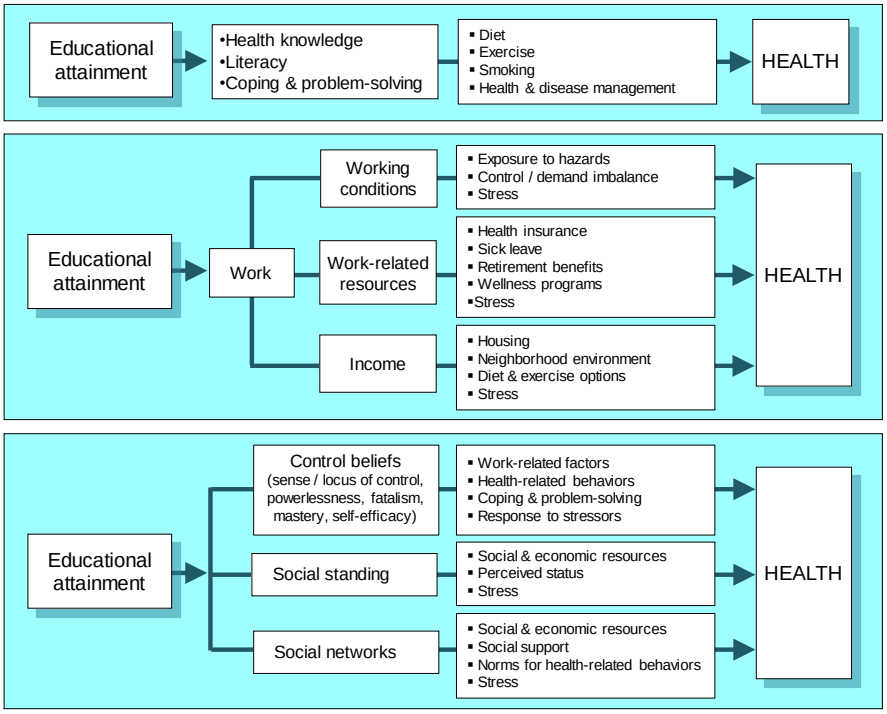


Figure 6. Education could affect health through many different pathways.

Researchers have found supporting evidence for each of the following interrelated pathways (Figure 6):

Education is linked with health through three major interrelated pathways: health knowledge and behaviors, employment and income, and social and psychological factors.

A. EDUCATION CAN LEAD TO IMPROVED HEALTH BY INCREASING HEALTH KNOWLEDGE AND HEALTHY BEHAVIORS

This is the pathway that many people think of first to explain the strong links between education and health. Education can increase people's knowledge, problem-solving, and coping skills, enabling them to make better-informed choices among the health-related options available for themselves and their families, including those related to obtaining and managing medical care.[4, 15-20] Greater educational attainment has been associated with health-promoting behaviors including increasing consumption of fruits and vegetables and other aspects of healthy eating, engaging in regular physical activity and refraining from smoking (Figure 7).[21-25] In addition, changes in health-related behaviors in response to new evidence, health advice and public health campaigns (about the risks of smoking, for example) tend to occur earlier among more-educated people.[4, 26]

As discussed in the section below on employment, more education is typically linked with higher-paying jobs providing the necessary income to live in neighborhoods that are less stressful, have stores with affordable healthy foods, and provide access to recreational facilities. In other words, people with more education are more likely to live in health-promoting environments that encourage and enable them to adopt and maintain healthy behaviors.

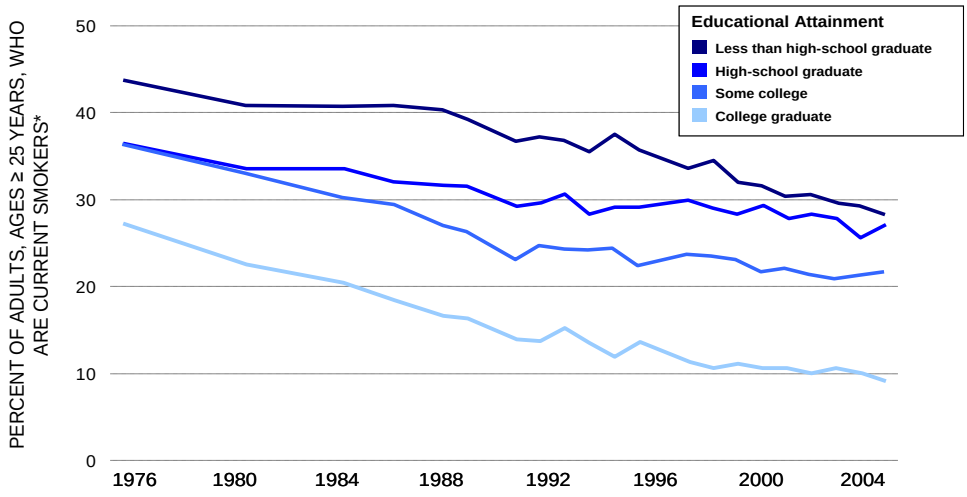


Figure 7. Persistent education gaps in smoking. *Education disparities in cigarette smoking have persisted over decades. While rates of smoking have declined in every education group, the gaps between college graduates and those with less education appear to have widened.*

Source: National Center on Health Statistics. *Health, United States, 2006 with Chartbook on Trends in the Health of Americans.* Hyattsville, MD.
*Age-adjusted.

The links between education and health through health knowledge and behaviors are likely to be explained at least in part by literacy.[27, 28] Low literacy is common in the United States (a 2003 survey found that 30 million or 14 percent of U.S. adults had literacy levels below the level needed to perform "simple and everyday" literacy activities), with higher prevalence among people with fewer years of education.[29] More specifically, average *health* literacy (i.e., the degree to which individuals have the capacity to obtain, process and understand basic health information and services needed to make appropriate health decisions and adhere to sometimes complex disease management protocols) increases with educational attainment. The proportion of American adults with "below basic" health literacy, for example, ranges from 3 percent of college graduates to 15 percent of high-school graduates and 49 percent of adults who have not completed high school.[29] Levels of health literacy in turn have been associated with self-reported overall health, which correlates strongly with objective clinical assessments:[30, 31] compared with adults who have adequate functional health literacy, adults with inadequate functional health literacy are more likely to rate their health as poor.[32]

More education generally means a greater likelihood of being employed at all, and of having a job with healthier working conditions, better employment-based benefits and higher wages.

B. GREATER EDUCATIONAL ATTAINMENT LEADS TO BETTER EMPLOYMENT OPPORTUNITIES AND HIGHER INCOME, WHICH ARE LINKED WITH BETTER HEALTH.

Education provides the knowledge and skills necessary for employment, which can shape health in many ways. More education generally means a greater likelihood of being employed at all, and of having a job with healthier working conditions, better employment-based benefits and higher wages (see the "Work and Health" issue brief in this series).

- *Education, unemployment, financial instability and health.* Americans with lower educational attainment are more likely to be affected by fluctuations in the economy. While current unemployment rates are higher now than in more than a quarter-century, increases in unemployment rates over the past year have been greatest for adults who have not completed high school—6.9 percentage points, compared with 2.2 percentage points for college graduates.[33] In June 2009,

unemployment rates were 15.5 percent for adults who had not graduated from high school, 9.8 percent for high-school graduates, 8.0 percent for those who had attended but not completed college, and 4.7 percent for college graduates.[33] These differences have major health implications; compared with their employed counterparts, people who are unemployed experience poorer health and higher mortality rates.[34-37]

- *Education, working conditions and health.* Workers with less formal education and training are more likely to hold lower-paying jobs with more occupational hazards, including environmental and chemical exposures (e.g., pesticides, asbestos) and poor working conditions (e.g., shift work with few breaks, potentially harmful tools) that put them at higher risk of injury and fatality.[38] Less-educated workers are also likely to experience more psychosocial stress at work[39-41]—for example, to have jobs that make high demands yet offer few opportunities for control and skill utilization. Such psychosocial aspects of work—including perceived balance between a worker's efforts and rewards, perceived justice and discrimination in the workplace, and social support among co-workers—have been shown to have both short- and longer-term impacts on health, particularly through pathways related to stress.
- *Education, work-related benefits and health.* Less-educated workers in lower-wage jobs also are less likely to have health-related benefits including paid sick and personal leave, workplace wellness programs, child and elder care resources, and retirement benefits, in addition to employer-sponsored health insurance. Although most Americans receive their health insurance through their jobs, not all workers have access to this benefit. Employers with lower-wage workers offer health insurance less frequently, and, even if employment-sponsored benefits are available, low-wage workers may be unable to afford the premiums, copayments or deductibles.[42, 43]
- *Education, income and health.* For the vast majority of Americans, employment is the sole or main source of income—a work-related resource that affects health through multiple well-documented direct and indirect pathways.[7] With limited exceptions, greater educational attainment generally corresponds with higher-paying employment. A recent study estimated that on average each additional year of schooling represents an 11 percent increase in income;[44] median yearly earnings in 2007 were $32,862 for a full-time year-round worker with only a high-school degree, $40,769 for a worker with some college, and $56,118 for a worker with a bachelor's degree.[45] These differences are particularly dramatic when compounded over a person's lifetime: lifetime earnings (in 1999 dollars, and based on a 40-year full-time work life) for adults who have graduated from high school but not attended college have been estimated at $1.2 million, compared with $2.1 million for those with bachelor's degrees and $4.4 million for those with post-baccalaureate professional degrees.[46]

Higher-paying jobs offer greater economic security and increased ability to accumulate wealth, enabling individuals to obtain health care when needed, to provide themselves and their families with more nutritious foods, and to live in safer and healthier homes and neighborhoods with supermarkets, parks and places to exercise[47, 48]—all of which can promote good health by making it easier to adopt and maintain healthy behaviors. Work-related income may also affect health through pathways involving stress. Lower-paid workers experience greater stress because they have fewer financial resources to cope both with everyday challenges, including child care and other family responsibilities, and with unexpected challenges such as illness.[7]

More education can lead to higher-paying jobs, which enable people to obtain health care when needed, provide themselves and their families with more nutritious foods, and live in safer and healthier homes and neighborhoods with supermarkets, parks and places to exercise—all of which can promote good health by making it easier to adopt and maintain healthy behaviors.

STRESS AND HEALTH

Much has been learned recently about physiologic pathways that help explain the links between education and health. Coping with the constant challenges of daily living—balancing the demands of work and family, for example—can be particularly stressful for people whose financial and social opportunities and resources have been limited by low educational attainment. Stressful experiences have been linked repeatedly with many adverse health outcomes across the life course, through physiological mechanisms including neuroendocrine, immune and vascular responses to stressors. Stress can trigger the body to release hormones and other substances that over time can damage immune defenses and vital organs. The physiologic chain of events can accelerate aging and lead to serious chronic illnesses including cardiovascular disease.[49]

C. EDUCATION IS LINKED WITH SOCIAL AND PSYCHOLOGICAL FACTORS THAT AFFECT HEALTH

Education is linked with social and psychological factors, including sense of control, social standing and social support. These factors can improve health through reducing stress, influencing health-related behaviors and providing practical and emotional support.

Social and psychological factors linked with education can influence health through pathways related to stress, health-related behaviors, and practical and emotional support.

- *Control beliefs.* Education may influence health by shaping people's sense of personal control—their perceptions of the extent to which they can influence their life circumstances. Several studies have concluded that more education confers a greater sense of personal control (or the related notions of mastery, self-efficacy and internal locus of control), which perhaps is not surprising given the influence of education on prospects for jobs and income. Higher levels of education have been observed to foster skills, habits and attitudes—such as problem-solving, purposefulness, self-directedness, perseverance and confidence—that contribute to people's expectations that their own actions and behaviors shape what happens to them. Lower levels of education, on the other hand, may lead to experiences that produce fatalism, a sense of powerlessness, or the belief that one's own efforts are less important than the influence of chance or powerful others when it comes to health or life outcomes. [50-53] Positive beliefs about personal control have been linked with health outcomes including higher levels of self-rated health, lower levels of physical impairment and decreased risk of chronic conditions; they also has been associated with health-related behaviors including smoking, alcohol consumption, physical activity and diet.[50, 51, 53-55] Sense of control may also influence health through job-related pathways, by affecting a person's job seeking and performance, for example.[56-58] It is important to note that an individual with a greater sense of control may also be more likely to achieve higher educational attainment, making it difficult to separate out the effects of sense of control and education on health.
- *Social standing.* Many experts believe that social standing is another important factor linking education with health. Along with income and occupation, educational attainment is an important determinant of where individuals rank within social hierarchies that reflect status and influence in societies. Greater educational attainment typically is associated with higher social standing, which in turn has been linked with better health status.[59] An individual's perception of where she or he ranks in a social hierarchy has been referred to as *subjective social status* and has been shown to powerfully predict health status even after controlling for conventional measures of socioeconomic status such as occupation, income and education.[60-62] While the pathways linking it to health are not well understood,

subjective social status may be a more comprehensive reflection of social and economic resources.[62]

- *Social networks.* Education may also be linked to health through its influence on social networks, which can be a source of both emotional support (having someone to turn to for comfort or advice) or practical support (having someone to turn to for practical or material help). Higher educational attainment, income and occupational status all have been associated with higher levels of social support.[63-65] Higher educational attainment increases a person's likelihood of having close friends on whom to rely and of experiencing greater family stability, including a stable and supportive marriage.[3] Formal educational settings may encourage the development of friendships and interpersonal skills; people with more education and related social advantages may also have more time and resources to maintain relationships and support friends emotionally and financially.[63, 66]

  Higher levels of social support have been linked with better physical and mental health outcomes.[67-70] People with more social contacts have lower mortality rates across multiple age groups and in both sexes, and disruptions in family stability have been linked with worse health among adults and poorer health behaviors and well-being among children.[3, 71-75] Social support can buffer the health-damaging effects of stress by reducing negative emotional and behavioral responses to stressful situations.[76, 77] Social relationships may also have beneficial health effects unrelated to stress:[70, 78] larger social networks can provide access to employment, housing and other opportunities and resources that influence health,[79-81] and behavior norms within social groups can influence health-related behaviors such as smoking, exercise and alcohol consumption.[69]

Parents' educational attainment is linked to their children's health and their children's educational attainment—both of which influence their children's health as adults.

3. Parents' education influences children's prospects for health during childhood and beyond

Parents' educational attainment is linked to their children's health and their children's educational attainment—both of which influence their children's health as adults.

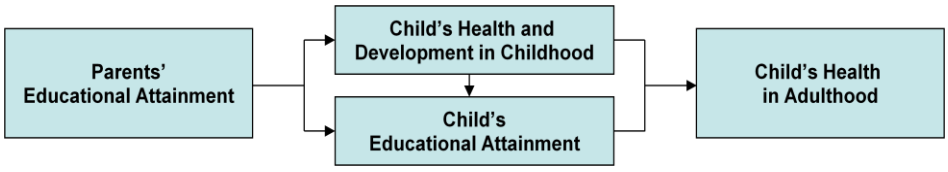


Figure 8. The impact of education on health crosses generations.

As illustrated in Figures 3 and 4, parents' education is strongly linked to their children's health and development.[82-85] Parents with lower educational attainment typically face greater obstacles—including lack of knowledge, skills, time, money and other resources—to creating healthy home environments and modeling healthy behaviors for their children. The quality of children's health and development in turn influences health later in life, through both direct and indirect pathways. A large body of research has consistently linked adverse effects on brain, cognitive and behavioral development early in life with important health outcomes later in life, including cardiovascular disease and stroke, hypertension, diabetes, obesity, smoking, drug use and depression—conditions that account for a major portion of preventable morbidity and premature

mortality in the United States. Healthy development in childhood can also affect health later in life through its association with greater academic achievement and educational attainment [86] (see the "Early Childhood Experiences and Health" issue brief in this series).

Parents' educational attainment can also shape children's prospects for healthy lives through links to children's educational attainment. Children's academic achievement is associated with parental education and related social and economic advantage; children with less-educated parents and lower-income families face greater obstacles to success in school and are less likely to go on to receive college educations (Figure 9).[44, 87-92] Parents' education levels can affect their children's education prospects both directly, through the kinds of support and resources parents are able to provide at home, and indirectly, through the quality of schools their children are likely to attend. Less-educated parents are less likely to have high educational expectations and to create stimulating and nurturing environments for their children;[93] in addition, they are more likely to live in lower-income neighborhoods in which schools may have insufficient resources. The level of educational attainment children eventually achieve affects their health as adults, through the same pathways experienced by their parents, and it also affects the health of their own children in turn—perpetuating a vicious intergenerational cycle of low educational attainment and poorer health.

The level of educational attainment children eventually achieve also affects the health of their own children—perpetuating a vicious intergenerational cycle of low educational attainment and poorer health.

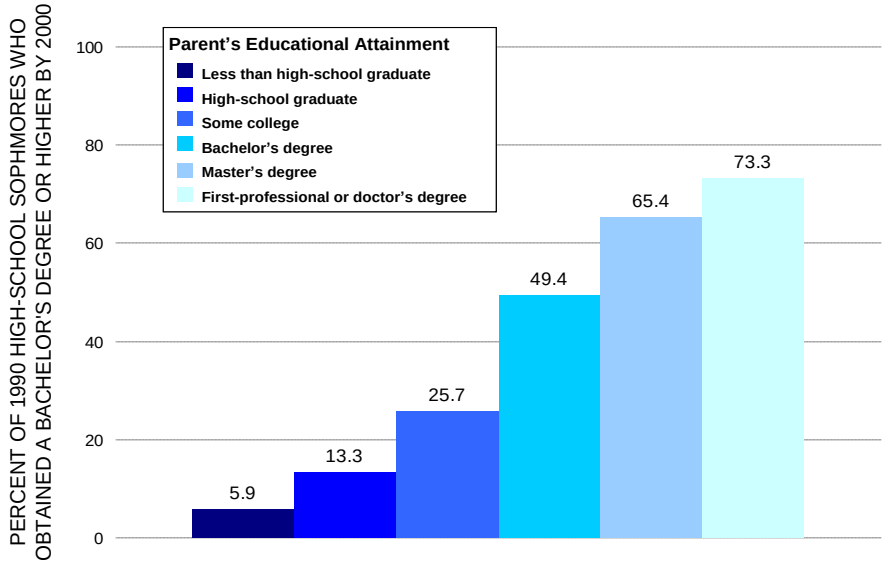


Figure 9. Children with less educated parents are less likely to succeed in school.

Source : Snyder TD, Dillow SA, Hoffman CM. *Digest of Education Statistics, 2006*. National Center for Education Statistics, Institute of Education Sciences, US Department of Education. Washington, DC: US Government Printing Office, 2007.

4. Improving health through education policies and programs

By providing the knowledge and skills necessary to fully participate in the labor force, education can be key in promoting social mobility and in breaking the cycle of intergenerational disadvantage and related health disparities.[44, 92] Investments to promote and increase educational attainment could have both human and economic benefits; for example, a recent analysis estimated that, if adult Americans who have not completed college experienced the lower death rates and better health of college graduates, the resulting improvements in health status and life expectancy would translate into potential gains estimated at more than $1 trillion annually.[7]

Current knowledge described in this brief indicates that one of the most effective strategies for reducing health disparities in this country could be to take steps to close the gaps in educational attainment. Reviewing specific policies and programs to increase educational attainment was beyond the scope of this brief, but more information can be obtained from the resources listed below.

By providing the knowledge and skills necessary to fully participate in the labor force, education can be key in promoting social mobility and in breaking the cycle of intergenerational disadvantage and related health disparities.

RESOURCES

- Achieve
  www.achieve.org
- Alliance for Excellent Education
  http://www.all4ed.org/
- The Annie E. Casey Foundation
  http://www.aecf.org/OurWork/Education.aspx
- Bill and Melinda Gates Foundation United States Program
  http://www.gatesfoundation.org/united-states/Pages/united-states-education-strategy.aspx
- Brown Center on Education Policy at Brookings
  http://www.brookings.edu/brown.aspx
- Center for Research on Education, Diversity and Excellence
  http://crede.berkeley.edu/
- Education Commission of the States
  http://www.ecs.org/
- The Education Trust
  http://www2.edtrust.org/edtrust/default
- Future of Children
  www.futureofchildren.org
- Lumina Foundation
  http://www.luminafoundation.org/
- Mathematica Policy Research, Inc.
  http://www.mathematica-mpr.com/education/
- National Assessment of Educational Progress
  http://www.nces.ed.gov/nationsreportcard/
- National Center for Education Statistics
  http://www.nces.ed.gov/
- National Center for Post-Secondary Improvement
  http://www.stanford.edu/group/ncpi/
- The National Center for Public Policy and Higher Education
  http://www.highereducation.org/index.shtml
- Promising Practices Network
  http://www.promisingpractices.net/
- RAND Education
  http://www.rand.org/education/
- U.S. Department of Education
  http://www.ed.gov/index.jhtml

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The Robert Wood Johnson Foundation focuses on the pressing health and health care issues facing our country. As the nation's largest philanthropy devoted exclusively to improving the health and health care of all Americans, the Foundation works with a diverse group of organizations and individuals to identify solutions and achieve comprehensive, meaningful and timely change. For 40 years, the Foundation has brought experience, commitment, and a rigorous, balanced approach to the problems that affect the health and health care of those it serves. When it comes to helping Americans lead healthier lives and get the care they need, the Foundation expects to make a difference in your lifetime.

ABOUT THE COMMISSION TO BUILD A HEALTHIER AMERICA

The Robert Wood Johnson Foundation Commission to Build a Healthier America was a national, independent, non-partisan group of leaders that released 10 recommendations to dramatically improve the health for all Americans. www.commissiononhealth.org

ABOUT THIS ISSUE BRIEF SERIES

This issue brief is one in a series of twelve on the social determinants of health. The series began as a product of the Robert Wood Johnson Foundation Commission to Build a Healthier America.

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PHOTOGRAPHY

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