“military-industrial complex” has been superseded by an even larger “medical-biotechnology complex.”

If levels of health and gains in health in the United States were in any reasonable way commensurate with our burgeoning expenditures for medical care and insurance, one would expect us to have at least somewhat outstripped all nations in levels of population health. The situation is paradoxically quite to the contrary. Figures 1.2 to 1.5 show the trends in life expectancy both at birth and at age sixty-five for men and women over the same countries and a similar time period as in figure 1.1. With the slight exception of male life expectancy at birth (figure 1.2), in each and every case the United States in 1950 stood at or near the top among these five nations (and among all others as well). Yet by the most recent years for which data are available, the United States ended up below the four comparison nations (and below twenty to forty other nations as well, depending on how broad the comparison group is).

Especially notable and disturbing are the trends for American women,
Figure 1.2  Male Life Expectancy at Birth in the United States and Four Comparably Wealthy Nations, 1950–2011

Source: Author compilation based on UN Demographic Yearbook (1950) and OECD.Stat Extracts (1960–2011).

Figure 1.3  Female Life Expectancy at Birth in the United States and Four Comparably Wealthy Nations, 1950–2011

Source: Author compilation based on UN Demographic Yearbook (1950) and OECD.Stat Extracts (1960–2011).
Figure 1.4  Male Life Expectancy at Age Sixty-Five in the United States and Four Comparably Wealthy Nations, 1950–2011

Source: Author compilation based on UN Demographic Yearbook (1950) and OECD.Stat Extracts (1960–2011).

Figure 1.5  Female Life Expectancy at Age Sixty-Five in the United States and Four Comparably Wealthy Nations, 1950–2011

Source: Author compilation based on UN Demographic Yearbook (1950) and OECD.Stat Extracts (1960–2011).
other comparably developed countries. We do not yet understand the reasons for all of these changes in life expectancy, but they clearly go beyond smoking and even obesity. If such absolute declines in life expectancy come to characterize a majority and not just a minority of women, and if women’s life expectancy decreases to levels at or below men’s, it would be unprecedented in a highly developed nation. Previously, such a trend has been seen only in less-developed societies that have severely devalued women and limited their social position and opportunities. Even if absolute overall declines are largely avoided, the relative declines are disturbing enough.

Further evidence of America’s relative and even absolute declining levels of population health, both generally and for women, can be seen in figures 1.7 and 1.8, which graph levels of infant and maternal mortality for the same nations and for a similar time period as in figures 1.2 to 1.5 on life expectancy. Declines in infant and maternal mortality played a central role in the almost thirty-year increase in life expectancy in the twentieth century, especially up to 1950. By 1950, the United States had the lowest infant mortality rate (IMR) among the five countries in figure 1.7 (and among all but a handful of others with similarly low rates). Yet today it has the highest IMR compared to these five and more than thirty

Figure 1.6 Life Expectancy at Birth in the United States, by Years of Education at Age Twenty-Five, for White Females, 1990–2008

Figure 1.8 shows that the U.S. maternal mortality rate in 1970 was also in the lower range of rates among these same five nations (and among all others in the world). Since 1990, maternal mortality has risen steadily, and increasingly sharply, not only relative to all other highly developed countries but also absolutely and relative to many less-developed countries. Again, the reasons for this disturbing trend are just beginning to be investigated.

In sum, between 1950 and 1970, the United States was one of the top several nations in the percentage of GDP it spent on health, but we were hardly extraordinary among nations of the Organization for Economic Cooperation and Development (OECD), a consortium that now includes thirty-four of the world’s most-developed nations. Since 1970, however, we have become number one in health spending by an increasingly large margin. Paradoxically, America’s OECD rankings on many indicators of population health, which were already slipping by 1970, have steadily declined since the 1980s. Today the only OECD nations that consistently rank below the United States on indicators of population health are Mexico, Turkey, Hungary, and the Slovak Republic.
The Enigma: Why and How the Paradoxical Health Crisis Has Arisen

It remains an enigma as to why the United States has become mired in this paradoxical crisis of spending more and more on health care and insurance yet getting less and less return in terms of population health. How we can resolve this paradoxical crisis is even more puzzling. Something is woefully wrong with the picture of the United States revealed in figures 1.1 to 1.8, yet we seem incapable of even getting the picture into proper focus, much less making it right. Our understanding of the first element of the paradox, our increased spending, has grown as we have made efforts to, at a minimum, “bend the curve” of growth in health care and insurance spending and perhaps even reduce it. But the central enigma remains unresolved: how do we construct a health policy that dampens the increase in or even reduces spending on health care and insurance while also reversing the clear relative declines—and some absolute declines—in our levels of population health?

health care providers to hospitals, to producers of medical devices, technology, and drugs, to private health insurers (and perhaps even public ones in and of themselves)—we simply cannot expect currently envisaged reform efforts to greatly reduce unnecessary access to or provision of health care or to substantially limit the costs and expenditures associated with health care. The largely inexorable growth of health care spending in the United States over the last forty to fifty years, despite repeated efforts to control it through both broader and more focused health care
genic effects, respiratory cancer rates rose from the 1930s to the 1990s and have now begun a gradual but steady decline.

The clear evidence that smoking is a major risk factor for mortality spurred the development of still-growing fields of research into other health behaviors, or “lifestyles,” especially the roles of physical activity and moderate eating (and weight), and alcohol consumption in promoting health and preventing disease. The risk factor status of these behaviors gradually became accepted in biomedical and other scientific circles, leading to major public health and policy initiatives against smoking and eventually a range of other deleterious health behaviors, including obesity.

The range of risk factors grew to include more psychosocial risk factors, from chronic and acute stress to psychological dispositions to social relationships and supports. Perhaps most striking and consistent was the evidence from multiple Framingham-like prospective studies, as shown in figure 3.2, that social isolation, or a low level of social integration (relationships or ties), is associated, especially among men, with the same doubling of risk for mortality from all causes as cigarette smoking. Simi-
lar results were obtained for psychosocial stress and a number of psychological traits, dispositions, or “behavior patterns.”

How Psychosocial Factors “Get Under the Skin”

Beginning in the early part of the twentieth century and accelerating after World War II, theory and laboratory evidence were developed to explain how and why phenomena that seem purely social and psychological can induce major changes in key physiologic systems (nervous, endocrine, cardiovascular, and gastrointestinal), such as a rise in blood pressure or cholesterol. If prolonged, these changes can produce actual chronic disease—such as hypertension and its sequelae in cardiovascular and renal disease—and even death. Such psychophysiological theories of “stress” were later joined by the new field of psychoneuroimmunology, which showed and explained how psychosocial stressors and deprivations can depress or disrupt the operation of the immune system, increasing the risk of infectious and autoimmune diseases, perhaps even cancer.

Thus, a clear set of biological mechanisms and processes were docu-
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harder to establish definitively from historical data. McKeown stressed the role of improved nutrition in increasing host resistance to TB (and other diseases), as many more people are exposed to and even harbor the bacillus than ever succumb to the disease. Other analysts have focused on improvements in all aspects of living conditions—housing and clothing in addition to food—and on general sanitation and public health as also very plausible factors. All of these improvements were made possible by broader social, political, and economic development as well as by the development of biomedical science. All agree, however, that medical care played only a minority role in the dramatic declines in illness and death from infectious disease in Europe and North America in the nineteenth century and the first half of the twentieth century. The major determinants were some combination of social, economic, and environmental factors, and more recent data indicate the same for chronic disease.20

McKeown’s conclusion that modern biomedical science and practice may have accounted for as little as 10 to 20 percent of the dramatic improvement in life expectancy over the last two hundred to three hundred years has been borne out by other investigators. A careful analysis of the almost thirty-five-year increase in life expectancy in the United States during the twentieth century attributed only about five years (or 15 per-

Figure 3.3  Respiratory Tuberculosis: Mean Annual Death Rates in England and Wales (Standardized to 1901 Population), 1838–1960

Source: McKeown (1979, figure 8.1). © Princeton University Press (United States, Canada, Philippines, Mexico, and South America) and John Wiley and Sons (all other regions). Reprinted with permission.
than we should expect schools to be the sole or perhaps even primary producer of the outcomes we desire from education, considering that children are affected as much or more by what happens in their lives outside of school and before they even start school.

If we think logically about how health and illness are produced, we can readily see that medical care generally comes too little and too late in the process to be more than a minor factor in levels of population health. Figure 3.5 shows the factors that account for the development and onset of any disease, both chronic and acute or infectious, and conversely promote health or resistance to disease. People, like other organisms, are potential hosts to causes of disease because they live in an environment that exposes them to a range of potentially noxious “agents” from viruses and bacteria to environmental pollution and social stresses. They are similarly exposed to salutary agents—from fluoride and nutrients in drinking water and food to benign or supportive physical and social environments—that can promote their resistance as a host to the deleterious effects of potentially noxious agents, or even prevent their exposure to noxious agents in the first place. Individuals are also genetically more
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or less prone or resistant to various diseases, and those tendencies play a significant role in their individual health history. The role of genetics is very small, however, in variations of population health over time and place, because the variation over time and space in the genetic makeup of populations is small.

The medical system generally comes into play only after all of these forces have produced disease in some persons, who then seek treatment. At this point, biomedical science and practice can often take effective, and sometimes quite dramatic, measures to restore health or mitigate the effects of disease. With many chronic diseases, however, the disease process cannot be reversed or eliminated. Rather, it can only be managed more or less well depending on a variety of factors. Clinical practitioners are beginning to recognize this limitation of modern biomedical science. When I ask physicians why they are seeking additional training in the social, psychological, behavioral, and environmental determinants of health, as a growing number of them are doing, they often have the same response: while they and their colleagues can help to improve the health and functioning of the people who appear in their offices and clinics, they recognize that they could do much more by intervening at earlier “upstream” points to prevent the onset, or mitigate the severity, of the chronic and acute injuries and diseases that bring people into the medical system.

At the point when people seek medical care, as indicated in figure 3.6, clinical practitioners are usually trying to manage the further course of disease. Unfortunately, in too many cases, the medical system has little to offer; in others, the recourse is surgical and pharmacological treatments that are quite expensive, have only small to moderate therapeutic effects

Figure 3.5  Disease Onset as a Function of Environment, Agent, and Host

Genetic and Biological System

Environment

Agent

Host

Disease Onset

Resistance

Resistance

Prevalence and Virulence

Exposure

Source: Author’s compilation.
on average, and carry nontrivial risks of serious side effects that may be iatrogenic to some extent. For these and other reasons, many practitioners are frustrated by the limits on what they can do, as well as by the societal expectation that they will restore health to people whose life histories and living and working conditions have already overdetermined their downward health trajectory. Further, many practitioners are providing care today with decreasing levels of financial and other supports. If this situation is to change, we need to recall (as indicated in figure 3.7) Virchow’s 1848 insight that broad public policy, including but not limited to or primarily focused on our current biomedically based health and public

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**Figure 3.6  Medical Care and Disease Onset and Course**

Disease Onset → Disease Course → Limitations and Disability → Mortality

- Inoculation
- Treatment

*Source: Author’s compilation.*
health policy, is the ultimate and major determinant of levels of and changes in population health.

To implement such a broad public policy, we need a new demand-side approach to health and health policy that reduces the need to detect and treat disease by focusing much more on creating and sustaining health. In American society, there are both promising and discouraging trends to learn from and to build upon. Chapter 4 provides a framework for thinking about health in a demand-side framework and explores what we know about how and for whom health is currently being most successfully promoted and achieved, and whether and how we might extend these successes to more segments of our society.
shows the situation that characterized all known human populations for millenna up until about 10,000 years ago, when life was still, in the words of the British political philosopher Thomas Hobbes, “nasty, brutish, and short.” At that time, and for all prior human history, life expectancy was in the range of twenty-five to thirty years (at which age essentially 50 percent of those born in a given year had died). Thus, a sizable proportion of the population died at birth or in infancy and childhood from disease, malnutrition or starvation, or predation by animals or other humans. The same was true for many of their mothers and fathers by early adulthood, when women also frequently died due to complications of childbirth. Thus, for example, in the population of people born in the year 8000 BC with a life expectancy of twenty-five to thirty years, 50 percent had died by 7070 or 7075 BC. The remainder had better pros-
close they are to this biological maximum, or optimum. Hence, efforts to further improve health for those close to the biological optimum are likely to have a steeply declining marginal rate of return. In contrast, investments in individuals or groups that are currently furthest from the biological optimum have the highest potential marginal rates of return, not only for improving the health of those individuals and groups but also for improving overall population health.

Second, variations across individuals and population subgroups in life-course trajectories of health are neither random nor genetically fixed. Nor are they primarily a function of medical care, though that is a non-trivial contributing factor. Rather, these variations are mainly driven by varying patterns and conditions of life and work—from health behaviors to psychological dispositions to social and environmental conditions or exposures. Given similar genetic predispositions, people with more favorable conditions of life and work and the associated psychological dis-

Source: Stylized construction by author (see endnote 4).
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Figure 4.3  Death Rates Among U.S. Whites Age Twenty-Five to Sixty-Four, by Sex and Educational Level, 1960 and 1986

longitudinal, or prospective, study of the role of social, psychological, and behavioral factors in the maintenance of health and effective functioning over the adult life course. The study, which we named the Americans’ Changing Lives (ACL) study, began with a nationally representative (excluding Alaska and Hawaii) survey of 3,617 adults age twenty-five and older. We reinterviewed survivors in 1989, 1994, 2001–2002, and late 2011–early 2012, as described more fully in box 4.1.

When the 1986 survey became ready for analysis, we initially sought to explore the factors that contributed most to the maintenance of health and effective functioning over the life course. We examined how measures of health varied by age for different subgroups of the population, such as men versus women, blacks versus whites, smokers versus non-smokers, socially isolated versus socially integrated, and higher versus lower education or income. The strongest predictors by far of successful health maintenance (rectangularization and compression) and effective functioning over the life course were two indicators of socioeconomic position: education and income.

from early adulthood (age twenty-five to thirty-four) through later old age (eighty and older). In contrast, the most highly educated (college graduates or higher—the line with diamonds) manifested notable rectangularization and compression: they remained almost entirely free of limitations through their midfifties, then began to decline at increasingly greater rates over the remainder of the life course. The middle educational group (high school graduates with up to some college education—the line with squares) generally lay between these two groups.

Viewed another way, these data suggest that educational disparities in functional limitations vary over the life course, being small in early adulthood (the reproductive and child-rearing years, during which we have evolved to be at our most robust), increasingly larger over the adult working years, then smaller again as we become biologically frailer with age, until, in the words of John Maynard Keynes, “in the long run we all are dead.”

We and others have observed similar patterns of results for mortality, morbidity, and other measures of functional limitations. And we have seen similar patterns by income, though further analysis has suggested that education is more important in postponing the onset of health problems, while income is more important in slowing the progression of health problems once they occur, up to and including death.
risk factors and continue to do so even as the major diseases that cause health problems and the causal risk factors for them change over time.

We have seen historically that, at least since the early twentieth century, as a disease has emerged and increased in importance as a source of mortality or functional limitations and disability, it has developed an inverse relation with indicators of socioeconomic position. For example, at the beginning of the twentieth century, coronary heart disease was as common at upper socioeconomic levels as at lower ones, if not more so. By midcentury this relationship began to reverse, and by the end of the twentieth century heart disease, like most other major diseases, had become more common at lower socioeconomic levels than at upper ones. Similarly, major risk factors for heart disease and cancer, such as smoking cigarettes, eating a high-fat diet, or having a sedentary lifestyle (and hence problems like obesity), were more common at higher socioeconomic lev-

Figure 4.5 A Conceptual Framework for Understanding Social Inequalities in Health and Aging

Source: Adapted from House (2002, figure 5).
If it is exposure to these risk factors and others that explains the poorer health and life-course health trajectories of those in lower socioeconomic strata, then socioeconomic disparities should be greatly reduced if lower and higher socioeconomic strata were not to differ on such experiences and exposures. And this is exactly what we found, as shown in figure 4.8. The solid lines in figure 4.8 merely reproduce figure 4.4, and the dotted lines show what happens when we statistically adjust for a set of eleven psychosocial risk factors (including health behaviors, acute and chronic stress, social relationships, and psychological status or disposition) as well as income (which is heavily a function of education and was increasingly so over the course of the twentieth century). The dotted lines show that statistically equalizing the experience of and exposure to these risks across educational groups eliminates 80 to 90 percent of the twenty- to thirty-percentage-point educational disparities in freedom from functional limitations that we observed in figure 4.4 for the peak working years of the adult life course. That is, if lower-educated people had the same income and risk factor experience and exposure as the higher-educated, they would manifest levels of health and rectangularization and compression similar to levels for the higher-educated. About half of

Sources: House and Williams (2000, figure 2A). For hostility: Minnesota Multiphasic Personality Inventory (MMPI) Standardization Study.
the explanatory power comes from the better incomes earned by more-educated people and about half from the psychosocial and behavioral risk factors.\textsuperscript{18}

Relationships in figures 4.4 and 4.6 to 4.8 derive from cross-sectional (1986) data and thus are subject to concerns over the direction of causality. (Does socioeconomic position cause health, or vice versa?) Our early data also did not allow enough time to observe major changes in health, including substantial numbers of deaths. To compensate for the causal ambiguities we increasingly have focused on levels of education, which are determined and fixed relatively early in adult life and thus cannot be affected by later health.

Further Longitudinal Analysis

To further minimize these causal ambiguities and observe greater changes in health within individuals we extended the follow-up of our ACL survey through 1989 to 1994, 2001–2002, and now 2011–2012. The data through 1994 clearly established that both education and income as assessed in 1986 predicted mortality in the ACL sample between 1986 and
1994. The mortality risk of low education or low income proved much greater than the risk of any other single risk factor (for example, smoking). Consistent with our earlier findings, and with the cross-sectional, longitudinal, and prospective findings of others, socioeconomic disparities in health and the way health changes with age cannot be explained by any single risk factor or by a small set of risk factors. Even measures of a broad domain, like health behaviors (as indexed by smoking, drinking, weight or obesity, and physical activity) or stress (including both life events and chronic stress), can usually account for no more than 15 to 30 percent of the educational or income disparities in health. Our research and especially the research of others suggest that the same is true of medical care and insurance: that is, it is the greater experience of or exposure to virtually all health risk factors among people of lower socioeconomic position (as in figures 4.6, 4.7, and 4.8) that accounts for their lower levels of health and poorer life-course trajectories.¹⁹

In cross-sectional data, disparities in health and in the ways health changes with age appear quite similar by education and income. However, educational and income disparities manifest somewhat different properties and processes over time. In our data and that of others, education seems especially important in postponing the onset of health problems, while income is more important, both absolutely and relative to
blood pressure—from air pollution to the stress of physically or socially unsafe streets and homes.7

Figure 5.1 expands figure 4.5 (as largely indicated by shading) to indicate how and why race and ethnicity exert powerful negative effects on health not only via socioeconomic position but also via discrimination and segregation that can operate at any and all socioeconomic levels. We have the most evidence of such effects for African Americans, but researchers are increasingly documenting similar phenomena and outcomes in Latino and other populations of color.

It should be noted that minority populations of color also manifest adaptations that are beneficial and protective of their health. African
Figure 5.2  Male and Female Smoking Prevalence in the United States, 1900–2004

average than high-SEP white women, who are traditionally the thinnest group in the U.S. population. In contrast, young adult, lower-SEP, black women have manifested the greatest weight gain over the past three decades: their almost five-point increase, on average, in body mass index (BMI)—the scale used to classify the body size of the population—is large enough to move an individual from the “normal” range (BMI of 25 or less) to the “obese” range (BMI of 30 or more).

These differences can be graphically seen in figure 5.3, which shows, for the nationally representative Americans’ Changing Lives sample of the American population, the average BMI trajectories of low-income black women and high-income white men age twenty-five to thirty-nine in 1986 as they aged to become forty to fifty-four in 2001–2002. The BMI of the total population in this age range increased from 25 (normal
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more—and again, most clearly and consistently for men. If we adjust for multiple socioeconomic factors, racial differences are reduced even further and sometimes eliminated altogether. Thus, if race was not so consequential for socioeconomic opportunity in American society (and in other societies where race plays a large role in social life), racial differences in health would be much smaller and in some cases nonexistent.3

As is evident in table 5.1, however, small to moderate racial differences in health, and occasionally large ones, occur within levels of socioeconomic position, and they are usually larger at lower socioeconomic levels. Race influences more than socioeconomic position and can adversely affect health at any and all socioeconomic levels. Two factors seem especially important in understanding this independent health impact of race-ethnicity: racial discrimination and segregation.

### Table 5.1  U.S. Life Expectancy (in Years) at Age Forty-Five, by Family Income, Race, and Gender (1980 Dollars), 1979–1991

<table>
<thead>
<tr>
<th>Yearly Family Income</th>
<th>Females</th>
<th>Males</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>White</td>
<td>Black</td>
</tr>
<tr>
<td>All</td>
<td>36.3</td>
<td>32.6</td>
</tr>
<tr>
<td>Less than $10,000</td>
<td>35.8</td>
<td>32.7</td>
</tr>
<tr>
<td>Less than $10,000 to $14,999</td>
<td>37.4</td>
<td>33.5</td>
</tr>
<tr>
<td>Less than $15,000 to $24,999</td>
<td>37.8</td>
<td>36.3</td>
</tr>
<tr>
<td>$25,000 or more</td>
<td>38.5</td>
<td>36.5</td>
</tr>
</tbody>
</table>


The Role of Discrimination and Segregation

Most central is the existence and experience of *discrimination* based on race-ethnicity. Historically, discrimination has been a major determinant of the socioeconomic position of African Americans and other racial-ethnic groups, and it remains so today, though civil rights policies have gradually helped to weaken this link. However, discrimination, or the mere threat of it, is also a social phenomenon and experience that produces psychological threat and stress regardless of its impact on socioeconomic position.

A growing body of research has documented the impact of actual, threatened, and even anticipated discrimination on a wide range of so-
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Cigarettes and restrictions on advertising and places where people can smoke, increased availability of low-fat products and dietary guidelines (for high cholesterol), and promotion of physical activity by both the public and private sectors.

The modest decline in accidental deaths has been a function mainly of large declines in motor vehicle deaths, which have occurred even as the amount of driving has increased. Mainly owing to improvements in highway and motor vehicle design, laws mandating the use of seat belts and child safety restraints, and efforts to reduce drunk driving and improve driver training and regulation, especially of younger drivers, the decline in motor vehicle deaths per million miles driven has been very dramatic, from 5.5 in 1966 to 1.1 in 2010. The declines in influenza and pneumonia have been primarily attributable to improved vaccines and access to them, reminiscent of earlier declines in some infectious diseases.

In contrast to the other major causes of death, mortality rates for cancer, which has had the largest National Institutes of Health (NIH) research budget and a proliferation of new treatments, have declined only slightly and recently, and those declines largely reflect earlier detection. The greatest declines have been in respiratory cancer, a result of the decline in cigarette smoking (see figures 3.1 and 5.2).

Sources: Author compilation based on U.S. Census Bureau (2012) and Kochanek et al. (2011, table B).
or health-promoting behavior. Similarly, health-related private philanthropy, whether from individuals or foundations, is also heavily focused on biomedical research, though some research in the areas of social determinants and disparities in health has been developed, particularly at the Robert Wood Johnson Foundation.

Thus, one major component of a new demand-side approach to health policy must be a rebalancing of health research, moving it from its perpetual biomedical focus toward a greatly enhanced focus on social and behavioral determinants of health. Given the growing budgetary pressure on research spending in both the public and private sectors, funds from biomedical agendas may have to be reallocated to other agendas. Just as health care reform is promoting more cost-benefit analysis of medical care via comparative effectiveness research, a similar lens needs to be focused on the relative costs and benefits of all aspects of health research. Such a focus could lead to a reallocation of funds from biomedical research with low returns in terms of health outcomes toward health research—social, environmental, psychological, and behavioral as well as biomedical—with higher returns. This would include more funding for the kind of research reviewed in chapters 3 to 5 and for the basic

Sources: NIH, Office of Budget (various years) and NIH, Office of Behavioral and Social Sciences Research (2005, 2008).
Figure 7.1  The Effects of Education on Various Health Measures, by Single Year of Schooling

Source: Schoeni et al. (2008, figure 2.2).
Note: Marginal effects from logit regressions on education, controlling for race and gender. The shaded areas are 95 percent confidence levels for each coefficient. See text for explanation of marginal effects.
showed that the original introduction of SSI benefits eliminated a preexisting difference in health between those eligible for SSI and the more affluent elderly. A later study focused on variation over time in state supplements to federal SSI payments. Each $100-per-month increase in SSI predicted a 1.8-percentage-point decline (for example, from 38 percent to 36.2 percent) in the disability rate among the elderly in the bottom quartile of the income distribution. An increase of $500 per month would reduce disability by almost 10 percentage points—again, a very positive rate of return.16

Finally, Latin American countries, beginning with Mexico, have implemented large income support programs for the poor over the last two decades, with the goal of improving child and family health. Usually referred to as conditional cash transfer programs, they provide income supplements to the poor, usually on the condition that they ensure that their children receive preventive medical care and attend primary school. The programs have been randomly introduced over time into poor villages, creating an experimental comparison of villages that received ben-
problems (except suicide) vary procyclically with the state of the economy. That is, net of overall trends over time (for example, the general improvement in health and decline in mortality for the last 250 years or so), overall population health actually declines during economic expansions and improves during economic recessions and even depressions. This was true even for the Great Depression, as shown in figure 7.3.19

What could explain why population health improves during recessions when many individuals are experiencing job or income loss and consequent adverse health effects? And why does population health worsen during economic expansions, when fewer individuals suffer job and income loss and the job and income situations of many are improving? The answer appears to be that only a minority of the population (25 percent or fewer even in the Great Depression) are experiencing job or income loss at any point during an economic contraction, while the entire population is subjected to increased health risks from a variety of correlates or consequences of economic expansion. Most clearly and notably, traffic accidents and fatalities rise by 10 percent or so during expansions be-

Source: Tapia Granados and Diez Roux (2009, figure 1).
largely by improved funding of predominantly black schools in the South and North and secondarily by the effects of more blacks attending schools with whites.\textsuperscript{25}

Despite all these positive effects of de jure equalization of the positions of whites and blacks and blacks’ consequent access to better education, occupations, and incomes, blacks on average remain de facto segregated and unequal in terms of housing, schools, and jobs, as well as in the quality of the health care they receive, even with no apparent legal barriers to access.\textsuperscript{26} This appears to reflect persisting de facto or “institutional” discrimination, which can limit opportunities without clear overt discrimination. For example, a variety of housing, economic, and job policies and trends make it more likely that blacks will be concentrated in areas with poorer access to quality housing and schools, good public services, socioeconomic resources, healthful living conditions, and even medical care.\textsuperscript{27} Evidence suggests that this segregation and the stress levels associated with it explain a significant portion of the persisting racial differences in health.

For example, despite quite successful efforts to eliminate racial differences in awareness and treatment of high blood pressure, blacks continue to be more likely to have high blood pressure and to be less likely to have their blood pressure controlled by treatment. The persisting dif-

\begin{figure}[h]
\centering
\includegraphics[width=\linewidth]{figure7_4.png}
\caption{Change in Life Expectancy at Age Thirty-Five in the United States, 1955–1964 and 1965–1974}
\source{Schoeni et al. (2008, figure 6.7).}
\end{figure}
and those who utilize emergency rooms are more likely to be in poorer health (by a factor of 2:1) and to be socioeconomically or racial-ethnically disadvantaged (by a factor of about 1.5:1).\textsuperscript{8}

\textit{Lifetime Expenditures}

All the research just noted has been based on annual expenditures. Because health care expenditures are heavily concentrated toward the end of life, particularly the last year, what is true for average annual expenditures may not be true for lifetime health expenditures. Recent research on the effects of obesity (arguably a form of morbidity at its medium and higher levels, and certainly associated with significant morbidity, such as hypertension and diabetes) suggests that the sick (here the obese) have greater lifetime as well as annual health expenditures. Data on obesity at age fifty and older from the nationally representative Health and Retirement Survey (HRS) and a U.S. population projection model, based on the observed associations in HRS of obesity with sociodemographic factors, health, and health care spending, yield the results in figure 8.1. That figure shows how much more an obese person at each age will generate in total health care and Medicare costs over his or her life course compared to a non-obese person: people obese at age fifty are expected to have $15,000 more in lifetime health expenditures, people obese at age sixty

\begin{figure}
\centering
\includegraphics[width=\textwidth]{figure8.1.png}
\caption{The Marginal Effect of Becoming Obese at Baseline on Lifetime Health Care and Medicare Costs}
\label{fig:8.1}
\end{figure}

\textit{Source:} Bhattacharya and Sood (2011, figure 4).
come (SSI) benefits for disabled elderly ($12.06 billion). This all implies over $1 trillion in savings from currently projected total health expenditures, both public and private.

These estimates are likely to be conservative, for several reasons. First, they deal only with the population over age fifty. Although the majority of medical care expenditures occur in the last twenty to thirty years of life, there are still significant health issues under age fifty, such as accidents, congenital disorders in children, or pregnancy care, that are not reflected in figures 8.1 and 8.2. Second, health improvement grinds to a complete halt in 2030 under this scenario, and subsequently improvements in population health and reductions in health care expenditures become muted. It is more likely, however, that the forces generating health improvement would continue and perhaps even strengthen after

Figure 8.2  The Thirty-Year Impact on Government Spending of Improving the Health for U.S. Adults Age Fifty and Older in 2006 to the Average Level of Comparable European Nations

Notes: Health expenditures include Medicare and Medicaid. Social Security includes SSI and OASDI expenditures. Net fiscal impact is the revenue change minus the total expenditure change. Calculated using the microsimulation model.
2030. Third, the model improves health on only ten health risk or disease indicators—albeit a major ten—and leaves out a whole range of other factors that would affect health spending (such as cognitive or musculoskeletal problems).

**Does Better Health Reduce Health Care Spending?**

In sum, studies of annual health care expenditures and projections of lifetime trajectories of health care spending as a function of different levels of health at age fifty both indicate that a healthy population generates a substantially lower level of health care spending. The projection models
Figure 9.1  High School Graduation Rates for All and by Gender, Region, and Racial Ancestry, by Year of Twenty-First Birthday, United States, 1900–2000

Source: Fischer and Hout (2006, figure 2.2), from Integrated Public Use Microdata Series (IPUMS) data.
Notes: The data for the 1900 and 1910 cohorts contain too few Asian Americans to yield a reliable estimate.
Figure 9.2  College Graduation Rates for All and by Gender, Region, and Ancestry, by Year of Twenty-First Birthday, United States, 1900–2000

Source: Fischer and Hout (2006, figure 2.3), from IPUMS data.
Notes: The data for the 1900 and 1910 cohorts contain too few Asian Americans to yield a reliable estimate.
Understanding and Resolving America’s Paradoxical Crisis

**Figure 9.3  Educational Mobility Among Nonstudents Age Twenty-Five to Sixty-Four, by Country, 2012**

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<tr>
<th>Country</th>
<th>Upward Mobility</th>
<th>Downward Mobility</th>
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<td>Czech Republic</td>
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*Note:* Countries are ranked in descending order of proportion of adults with upward mobility with respect to the educational attainment of their parents.
Again, the strong growth in earnings over the first three-quarters of the century arguably had similar implications for health and health spending as the growth in education. The stagnation of earnings (in real dollars) as well as education that began in the 1970s have quite likely contributed importantly to the adverse trends in population health and
health spending since 1980. Tax policy—from decreases in the progressivity of taxes to the taxation of earnings at a higher rate than capital gains—reinforced these other trends.

Family incomes continued to rise, though more slowly after 1970 than before, and at greater rates for households in the top income quartile, again increasing economic inequality. Family income growth was better than the growth of earnings only because so many women were entering the labor force. Their labor force participation produced a sharp increase in total hours worked in two-person/married households after 1975, even households with children, as seen in figure 9.6. That two people in the household have essentially been doing three jobs (two in the paid labor force and one unpaid job in the household) since 1975 rather than the two jobs that were previously typical (one in the labor force, one in the household) may also be a factor contributing to the deterioration of gains in life expectancy, especially for women, since 1980.

In sum, rising levels of education and income undoubtedly played a
major role in the dramatic improvements in health and life expectancy over the first seven to eight decades of the twentieth century, probably much more so than the still-consequential improvements in the quantity and quality of health care and insurance over that period, as discussed in chapter 3. The rather abrupt halt of such increases, beginning in the 1970s and certainly since 1980, have arguably played a major role in the dramatic slowing of improvement in population health in America since 1980 and contributed to the dramatic increases in spending on health care and insurance.

This book makes the case that we can only resolve our paradoxical