

# Neighborhood and Life Chances

---

How Place Matters in Modern America

Edited by

Harriet B. Newburger,

Eugenie L. Birch, and Susan M. Wachter

**PENN**

UNIVERSITY OF PENNSYLVANIA PRESS

PHILADELPHIA

Copyright © 2010 University of Pennsylvania Press

All rights reserved. Except for brief quotations used for purposes of review or scholarly citation, none of this book may be reproduced in any form by any means without written permission from the publisher.

Published by  
University of Pennsylvania Press  
Philadelphia, Pennsylvania 19104-4112

Printed in the United States of America on acid-free paper  
10 9 8 7 6 5 4 3 2 1

Library of Congress Cataloging-in-Publication Data

Neighborhood and life chances : how place matters in modern America / edited by Harriet B. Newburger, Eugenie L. Birch, and Susan M. Wachter.

p. cm.— (The city in the 21st century)

Includes bibliographical references and index.

ISBN 978-0-8122-4258-4 (hardcover : alk. paper)

1. Cities and towns—United States. 2. Neighborhoods—United States. 3. Place (Philosophy) I. Newburger, Harriet. II. Birch, Eugenie Ladner. III. Wachter, Susan M.

HT123.N355 2010

304.2'30973—dc22

2010004564

## Contents

---

List of Abbreviations	000
Preface	
Eugenie L. Birch, Harriet B. Newburger, and Susan L. Wachter	000
 <b>Part I. People and Places: Health, Education, and Safety</b>	
Chapter 1. Health and Residential Location	
Janet Currie	000
Chapter 2. The Place of Race in Health Disparities: How Family Background and Neighborhood Conditions in Childhood Impact Later-Life Health	
Rucker C. Johnson	000
Chapter 3. Improving Educational Outcomes for Poor Children	
Brian A. Jacob and Jens Ludwig	000
Chapter 4. Before or After the Bell? School Context and Neighborhood Effects on Student Achievement	
Paul A. Jargowsky and Mohamed El Komi	000
Chapter 5. Neighborhoods, Social Interactions and Crime: What Does the Evidence Show?	
Steven Raphael and Michael A. Stoll	000
Chapter 6. Daily Activities and Violence in Community Landscapes	
Douglas J. Wiebe and Charles C. Branas	000
 <b>Part II. Geographies of Opportunity</b>	
Chapter 7. Exploring Changes in Low-Income Neighborhoods in the 1990s	
Ingrid Gould Ellen and Katherine O'Regan	000

vi Contents

Chapter 8. Reinventing Older Communities Through Mixed-Income Development: What Are We Learning from Chicago's Public Housing Transformation?  
Mark L. Joseph 000

Chapter 9. Reinventing Older Communities: Does Place Matter?  
Janet Rothenberg Pack 000

**Part III. Moving People out of Poverty**

Chapter 10. An Overview of Moving to Opportunity: A Random Assignment Housing Mobility Study in Five U.S. Cities  
Lisa A. Gennetian, Lisa Sanbonmatsu, and Jens Ludwig 000

Chapter 11. How Does Leaving High Poverty Neighborhoods Affect the Employment Prospects of Low-Income Mothers and Youth? Evidence from the Moving to Opportunity Experiment  
Xavier de Souza Briggs, Elizabeth Cove, Cynthia Duarte, and Margery Austin Turner 000

Chapter 12. Teens, Mental Health, and Moving to Opportunity  
Susan Clampet-Lundquist 000

Chapter 13. Changing the Geography of Opportunity by Helping Poor Households Move out of Concentrated Poverty: Neighborhood Effects and Policy Design  
George Galster 000

**Part IV. Segregation: The Power of Place**

Chapter 14. Are Mixed Neighborhoods Always Unstable? Two-Sided and One-Sided Tipping  
David Card, Alexandre Mas, and Jesse Rothstein 000

Chapter 15. Preferences for Hispanic Neighborhoods  
Fernando Ferreria 000

Chapter 16. Increasing Diversity and the Future of U.S. Housing Segregation  
Robert DeFina and Lance Hannon 000

Chapter 17. Understanding Racial Segregation: What Is Known About the Effect of Housing Discrimination?  
Stephen L. Ross 000

	Contents	vii
Notes		000
Bibliography		000
List of Contributors		000
Acknowledgments		000

## Chapter 2

# The Place of Race in Health Disparities How Family Background and Neighborhood Conditions in Childhood Impact Later-Life Health

---

Rucker C. Johnson

Health is distributed unevenly, following a gradient that is a function of socioeconomic advantage and mirrors the pattern of neighborhood disadvantage. Among the steepest of such gradients is that of the United States, where there are large differences across people on measures of neighborhood environments, early childhood experiences, education, income, and housing quality.

Persistent residential segregation of poor and minority populations has spurred a growing number of studies that investigate the effects of community background on a variety of socioeconomic outcomes. However, the role of the physical and socioeconomic neighborhood in contributing to health disparities has been relatively unexplored. Analyses of health disparities have instead focused largely on individual- and family-level determinants of health outcomes. Over the past decade, however, we have witnessed a renewed research and policy interest and recognition of the salience of nonmedical determinants of health, especially the socioeconomic determinants of health that derive from differential neighborhood quality (Schoeni et al. 2008). Previous research has shown that such individual health behaviors as cigarette smoking, alcohol use, diet, and exercise explain a relatively small amount of race and socioeconomic differences in health status (Lantz et al. 2001), but it leaves open the question of the importance of parental socioeconomic status via its effect on access to neighborhood amenities.

This chapter reports on recent research by the author on the influence of neighborhood conditions on health over the life course, with a particular focus on how childhood neighborhoods affect health later in life. In this research I take the perspective that disadvantaged neighbor-

hood exposures may both accumulate and beget future exposures due to links between neighborhood characteristics and the socioeconomic mobility process. In particular, in the United States, there are substantial racial differences in the incidence and persistence of exposure to high-poverty neighborhoods (Johnson 2008b). Moreover, in terms of health, blacks can expect to live six fewer years than whites, and can expect to live more years with chronic health problems (Hayward and Heron 1999), with most of the black-white difference in life expectancy stemming from racial differences in mortality rates prior to age 65. Racial disparities in neighborhood exposures, in childhood and adulthood, and the relationship between these disparities and those in health provide an important backdrop and motivation for this inquiry.

Stressful neighborhood conditions due to high poverty rates, crime, violence, and weaker sources of social support may lead to increased risk of high blood pressure and accelerated rates of health deterioration more generally. There are well-known differences across neighborhoods in the amount of perceived safety; availability and quality of public spaces and recreational facilities; tobacco advertising; liquor stores; and availability and cost of nutritious foods. The empirical question is whether differences across neighborhoods in the prevalence of particular health conditions do in fact reflect causal processes operating over the life course. Given the known lengthy latency periods before most health effects manifest (e.g., hypertension), it is important to examine whether later-life racial health disparities are rooted in early-life childhood circumstances. It is also important to examine whether racial differences in adult health status are the result of a long-term cumulative process of socioeconomic environmental exposures over the life cycle. The selected studies highlighted in this chapter seek to identify causal influences on the life cycle trajectory of health inequality using innovative research designs to separate causal impacts of neighborhoods from correlations arising from familial selection into neighborhoods.

The typical analytical approach used in neighborhood studies is to regress individual level outcomes such as health on neighborhood-level factors such as census tract mean income, poverty rates, or rates of single motherhood. But attempts to estimate causal effects of neighborhood context have faced well-documented challenges. The problem of endogeneity of residential location (in the form of "selection bias") has received perhaps the most attention in the literature (Manski 1993) and is a paramount concern because families choose where to live in part based on the characteristics they value. Thus, families who care more about investing in health-promoting activities may be less likely to choose to reside in a community with a poor health care system or high

pollution. Many of the multidimensional aspects that influence residential location decisions are cannot be easily measured, which makes it particularly difficult to disentangle the causal influences of a child's family, school, and neighborhood. Few studies have used convincing identification strategies to overcome this challenge, exceptions being experimental evaluations such as Katz, Kling, and Liebman (2001) and Leventhal and Brooks-Gunn (2000). (See Gennetian et al. in this volume.)

Other challenges also complicate attempts to examine causal effects of neighborhood context. One such challenge is the difficulty of obtaining accurate measures of neighborhood characteristics. Another problematic characteristic of many neighborhood studies is that they examine the relationship between contemporaneous health and neighborhood conditions without regard to changing circumstances during the life cycle or the persistence of exposure to neighborhood conditions. If exposure to neighborhood conditions at an earlier stage of the life cycle influences current health but is not accounted for, then the estimated relationship between contemporaneous neighborhoods and health may be misleading. Finally, causality between economic and health status runs in both directions in adulthood and has proven notoriously difficult to sort out empirically (Adda, Chandoln, and Marmot 2003). By focusing on childhood socioeconomic conditions, we can more easily identify causal impacts on subsequent health because reverse causality is a relatively minor concern (i.e., poor child health is not a significant factor in most cases that leads to low parental income or neighborhood disadvantage).

The studies highlighted in this chapter employ a different approach than those typically used to address these challenges by exploiting a unique feature of the Panel Study of Income Dynamics (PSID). Specifically, the initial PSID sample in 1968 was highly clustered, with most original sample families having several other sample families living on the same block and who were subsequently followed over significant shares of the life course. This allows one to compare the similarity in adulthood health outcomes between siblings who grew up together versus unrelated individuals who grew up in the same narrowly defined neighborhood.

Estimating the overall scope of any such causal links of neighborhood environments is of substantial policy importance because the residential locations of both the poor and the affluent are influenced by public policies related to crime, subsidized housing, zoning, tax subsidies for home ownership, and school districting, among other things. Moreover, understanding how the effects of neighborhood conditions differ over the life cycle is critical to helping policymakers develop interventions



(e.g., early childhood interventions or targeted policies for the geographic deconcentration of the poor) that build a bridge between childhood and early adulthood for impoverished families, so that fewer individuals arrive at the doorstep of retirement with accumulated exposures that are irreversible.

In the next section, I provide an overview of the ways that neighborhoods, as well as families, may directly and indirectly affect an individual's health trajectory in adulthood and then summarize previous research on a number of topics relevant to my research. The third section lays out the methodological hurdles in estimating causal effects of neighborhood conditions, while the fourth summarizes recent research findings using innovative approaches that address these methodological challenges across a range of health outcomes over the life course. The final section discusses the policy implications and interventions that show the most promise to promote population health in order to build a more comprehensive and efficient health system.

### **Why Might Neighborhood and Family Background Matter?**

Family background can have direct effects on health status over the life course through several mechanisms. Transmission of genetic traits from parents to children clearly plays an important role. Parental socioeconomic and demographic characteristics most likely influence children's health status (Case, Lubotsky, and Paxson 2002), which in turn carries through to health status in adulthood. The transmission of health lifestyle orientation—eating habits, or exercise and smoking behaviors, for example—across generations may also translate into disparities in adult health.

Similarly, it has been hypothesized that neighborhood background can have direct effects on health. Childhood neighborhood factors such as water and air quality, sanitation, pollution and environmental toxins, crime, health care and social services, and public schools most likely have some influence on childhood health. Health lifestyle orientation may have a neighborhood component as well, with peer groups and role models within communities or neighborhoods influencing children's opportunities and preferences (Johnson 2007).

Perhaps equally or more important for health dynamics, both neighborhood and family background may indirectly affect health over the life course through their effects on the socioeconomic mobility process. The degree of socioeconomic mobility has direct connections to the resemblance of an individual's childhood and adult family characteris-

tics, such as income and education, which may in turn affect health. Since economic status is a major determinant of residential choice, persistence in economic status is likely to lead to persistence in neighborhood quality as well; that is, the lower the economic mobility, the greater the correlation between childhood and adult neighborhood characteristics.

### **Previous Research**

My recent research on the ways in which family and neighborhood background may affect health over the life course integrates a number of strands in the existing literature, including the life course perspective on health, the impact of stress on long-term health, the health effects of residential segregation, and the relationship between neighborhood conditions and intergenerational mobility. Each of these strands is briefly discussed below.

#### **Life Course Perspective on Health**

Research has shown that socioeconomic status and health status are highly correlated. This strong association holds for a variety of health status measures, is true in countries with varying levels of economic development and government-sponsored medical care, and has existed as far back in time as data are available. The association also holds across the entire life course, although the gap appears to widen with age through about age 60, and then declines (Smith 2004).

It is most likely the case that health causally affects economic status and economic status causally affects health, although the magnitude of each effect is uncertain (Smith 1999). If causality runs in both directions, then a life course model would imply that health problems early in life could affect health later in life because the problem is chronic, because the health shock damaged health stock making it more susceptible to deterioration later in life, and also because the health problem affects socioeconomic outcomes such as education which in turn influences health later in life (Kuh and Wadsworth 1993).

#### **Impact of Stress on Health**

Emerging research has sought to identify whether and how early-life differences in exposures to stressful life conditions get under the skin. There are compelling theoretical reasons to expect chronic stress linked to neighborhood environments to influence health trajectories. Recent

findings in neuroscience demonstrate that prolonged exposure to stress hormones (e.g., cortisol) can suppress the body's immune response and cause greater vulnerability to chronic health conditions. Early life experiences of toxic stress, even in the womb, may have profound implications for later life health (Aizer, Stroud, and Buka 2008; Johnson and Schoeni 2007). Other research indicates that early-life risk factors compound over the life cycle—often-cited examples of the adaptive cost of stress-induced wear and tear (“weathering”) include pushing the endocrine system toward diabetes or the cardiovascular system toward coronary artery disease and hypertension (Halfon and Hochstein 2002). Blacks appear to face more stress than comparable whites (Geronimus et al. 2006; Cohen et al. 2006), as evidenced in studies that document higher cortisol levels among blacks even after accounting for family income (DeSantis et al. 2007).

Recent findings in neuroscience also indicate that developmental health trajectories can be altered more readily during sensitive periods of rapid developmental change than during other periods. Heckman (2007) emphasized that “common developmental processes are at work where some cognitive and non-cognitive skills and health capabilities at one stage in childhood cross-fertilize the productivity of investment at later stages.” Research evidence from this field increasingly supports the notion that the greatest opportunities to invest in health occur during the first twenty years of life. This suggests a need to shift some of the emphasis on treatment in later stages of disease toward the promotion of earlier, more effective prevention and an investment-oriented approach to health spending targeted to its most productive uses.

#### Metropolitan Form: Segregation and Fragmentation

No consensus among researchers has been reached on the assessment of the role of neighborhood quality versus overall residential segregation patterns in contributing to racial health disparities. Prior work has uncovered puzzling issues about the role of race in explaining spatial differences in morbidity and mortality that have yet to be resolved. In particular, people die younger in cities and states that are more segregated and have a higher fraction of African Americans in their populations; not only do blacks die younger than whites, but *both* blacks and whites die younger in places where the population is more heavily black and segregated (Deaton and Lubotsky 2002).

Hart et al. (1998) showed that metropolitan areas characterized by metropolitan governance had lower black mortality rates than areas characterized by municipal fragmentation and that housing segregation mediated the effect of metropolitan governance on black male mortal-

ity. Previous research has shown that fragmented local governance structures lead to greater black-white residential segregation within U.S. metropolitan areas.

#### Intergenerational Mobility

Research indicates that socioeconomic mobility tends to be lower among blacks than whites. Poor black children are less likely to escape poverty than poor white children (Bhattacharya and Mazumder 2007). In particular, Hertz (2005) found that 17 percent of whites in the bottom decile of family income remain there as adults compared to 42 percent of black children.

With a few exceptions, the role of neighborhood factors in contributing to this difference has received little attention in the literature. Intergenerational mobility literature has focused almost exclusively on cognitive skills and investments in education in understanding the process behind intergeneration persistence in economic status. Even in this work, however, the mechanisms by which effects are transmitted has not been identified.

One paper that *does* consider the role of neighborhoods on intergenerational mobility is that of Card and Rothstein (2006); they argued that differences in childhood neighborhood conditions and school quality may contribute to the lower rates of socioeconomic mobility observed among blacks. More recently, Johnson (2008b) has examined the relationship between residential and socioeconomic mobility. Johnson documented significantly higher rates of persistent exposures to poor neighborhoods from childhood through midlife among blacks. In particular, this work, using nationally representative data, shows that among cohorts born between 1951 and 1970, the average black child spent about one-fourth of his or her childhood years in high-poverty neighborhoods (i.e., neighborhood poverty rates in excess of 30 percent), and about one-third of the early to mid-adulthood years (ages 30–50) in high-poverty neighborhoods, while only roughly 15 percent of these adult years were lived in low-poverty neighborhoods (i.e., less than 10 percent of households in poverty). In addition, Johnson (2008b) demonstrated that childhood neighborhood poverty and related dimensions of childhood neighborhood disadvantage significantly influence mobility prospects and explain part of black-white differences in rates of upward mobility from poor families.

#### Methodological Challenges in Estimating Neighborhood Effects

The primary methodological challenge in estimating the causal effects of neighborhoods on health status is that unobserved factors that affect

health may also be correlated with neighborhood factors, leading to biased estimates of neighborhood effects. This can arise from the self-selection associated with residential location. Namely, individuals and families choose where they live based on the characteristics they value (Tiebout 1956), although constraints such as racial discrimination and exclusionary zoning may be placed on that decision. In this context, families and individuals who care more about their health will be less likely to choose to live in an area with high crime, pollution, or a poor health care system; that is, they will tend to self-select into neighborhoods with “health-promoting” characteristics. In turn, if we observe that children who live in areas that score highly on health-promoting characteristics have better health than children who do not, it is difficult to determine the extent to which this is due to neighborhood characteristics and the extent to which it reflects their parents putting a high value on good health and taking a range of actions to foster it. This task is made particularly difficult because we do not actually observe the value that different households put on good health. Oakes (2004) argued that the lack of attention to the issue of self-selection in neighborhood choice implies that the resulting estimates of neighborhood effects “will always be wrong” (p. 1941).

The most powerful way to address self-selection is through a randomized trial of the type used in the MTO demonstration, where an experimental design is used to estimate the effects of offering housing assistance that allows individuals to move out of low-income neighborhoods (see Gennetian et al. in this volume). Evidence from two sites—Boston and New York—demonstrates that MTO had beneficial effects on the health of children and adults (Katz, Kling, and Liebman 2001; Leventhal and Brooks-Gunn 2000).

But research that can draw on an experimental design is rare. In turn, most studies have attempted to address self-selection using nonexperimental methods. The most common approach is the use of instrumental variable techniques (e.g., Evans, Oates, and Schwab 1992; Case and Katz 1991), where the exclusion restrictions are tenuous. An alternative non-experimental approach is comparing siblings who have been raised in different neighborhoods at different ages because their parents have moved (Aaronson 1998; Plotnick and Hoffman 1999). But this approach is not satisfying either, because the key assumption is that the family effect is fixed, not time-varying. If, for example, families’ preferences change as their children get older, and they become more interested in living in neighborhoods that are less risky for their children’s health, then they might move to neighborhoods with less crime or pollution, which may in turn lead to better health outcomes for their kids. But if the underlying change in their preferences toward health outcomes not

only caused them to change neighborhoods but also to spend more time encouraging their children to practice good health behaviors, then the neighborhood “effect” might actually be representing all of these other factors and not the true causal effects of neighborhoods per se.

The typical methods by which economists solve endogeneity problems are particularly ill suited for examining the question of whether and how neighborhood socioeconomic features influence long-run health trajectories. Difficulties in measuring neighborhood characteristics also become especially problematic when addressing this question. If health outcomes are a product of cumulative exposures to advantaged/disadvantaged environments spanning decades or exhibit long latent periods before problems manifest, as is hypothesized here, the connection between current neighborhood and current health may say little about the overall influence of neighborhood factors over the life cycle. As well, it may be important to conceptualize neighborhood effects as cumulative and variable over the life course as opposed to isolated and unchanging. Because most methods for overcoming endogenous neighborhood choice are based on small, short-run changes in the neighborhood environment, these approaches might be limited to uncovering effects only for rapidly responding intermediate outcomes such as health behaviors (e.g., smoking/drinking, exercise/diet). An additional issue is that neighborhood variables of the underlying neighborhood feature of interest are notoriously measured with a great deal of error. The neighborhood attributes of interest change slowly over time, so most year-to-year variations in the characteristic are comprised of measurement error.

### Summary of New Evidence

I have recently conducted a series of studies that employ an empirical strategy that largely sidesteps the pitfalls of neighborhood studies in confronting the endogeneity of residential location by exploiting unique features of the Panel Study of Income Dynamics (PSID). The PSID is the longest-running nationally representative longitudinal study of the United States, spanning 1968–2005. These studies are among the first to use nationally representative data from the United States to analyze the persistence in neighborhood quality over the life course and investigate its health consequences later in life. The analysis utilizes the PSID, spanning nearly four decades, and follows two study samples: a cohort born between 1951 and 1970 from childhood through midlife, and older cohorts born between 1920 and 1949 followed from young to mid-adulthood through late life. I examine several different health out-

comes, including self-assessed health status, risky health behaviors and risk preference formation in childhood, the onset of health-limiting conditions, the onset of hypertension, and mortality.

The research findings that emerge from this array of health outcomes at different stages of the life cycle provide corroborating evidence on the role of neighborhood environments over the life course on health. The consistency of findings across the study samples and health outcomes at different stages of the life course paints a cohesive portrait of the influence of neighborhood disadvantage earlier in the life cycle on health later in life.

#### Key Features of the Empirical Approach

The first goal of the analysis is focused on an overall assessment of the relative contributions of individual, childhood family, and neighborhood effects on health in childhood and early to mid-adulthood. A key to the empirical strategy and research design employed is that the initial PSID sample in 1968 was highly clustered, with most PSID families having several other sample families living on the same block. This survey design allows a comparison of the similarity in health from childhood through midlife between siblings versus unrelated individuals who grew up in the same neighborhood (using the younger cohort sample), and also allows us to compare the similarity in late-life health between spouses, versus unrelated individuals who were living in the same narrowly defined neighborhood during their young adult years (using the older cohort sample). This approach avoids the difficulty of defining neighborhood quality and instead compares sibling correlations with neighbor correlations, placing an upper bound on the neighborhood influence and allowing a comparison of the relative magnitudes of child neighborhood versus family effects.

The intuition behind this strategy is that if family background and residential community are important determinants of health outcomes, there will be a strong correlation between siblings in their health outcomes, as compared to two arbitrarily chosen individuals. Sibling correlations in health outcomes reflect the influence of all family and neighborhood background factors shared by siblings—measured and unmeasured—that may have an impact on health outcomes, such as the socioeconomic status of parents, genetic traits, and family structure, as well as neighborhood quality. And, if the neighborhood where the child grew up is important, it will show up as a strong correlation between *neighboring* children's subsequent health outcomes.

The overarching logic of the analytic approach is that if the neighbor correlations prove to be substantial, then that provides greater rationale

for the further investigation of which neighborhood features matter and explain the lasting importance of childhood neighborhood conditions. Upon discovering substantial child neighbor correlations in adult health outcomes, I analyze the relative contribution of a rich array of measured individual, family, and neighborhood covariates to the total variation from each of these three components and test hypotheses about the effects of specific characteristics of families and neighborhoods.

The comparison of sibling and child neighbor correlations in adult health, and the comparisons between spousal and adult neighbor correlations in late-life health, allow an assessment of the relative magnitudes of the effects of the childhood neighborhood and family environments on adult health, as well as an assessment of the effects of neighborhood environment in adulthood versus family characteristics in adulthood. The findings are based on the estimation of four-level hierarchical random effects models of various dimensions of health.

There are four primary reasons why the approach taken in this work may be able to detect neighborhood effects in ways previous studies have been unable to do. First, in contrast to the experimental evidence and previous observational studies, the analysis examines effects over a much longer time horizon, using data over the life course spanning nearly four decades. This is particularly important for most health outcomes, as there is likely a long lag between poor neighborhood quality and the manifestation of health effects. Second, instead of focusing on contemporaneous neighborhood effects, I analyze the lasting effects of neighborhood environments earlier in the life cycle, which include cumulative exposure to neighborhood conditions that may vary over the life cycle. Third, I use the census block as the definition of neighborhood, which comprises a much smaller geographic area than previous studies utilize. Finally, I use estimates of neighbor correlations as an omnibus measure of the potential effects of neighborhood quality (including unmeasured characteristics), rather than initially focusing the analysis on particular observable neighborhood attributes.

Two unique aspects of the project findings include the relationship between cumulative neighborhood exposures over the life course and later-life health and the role of neighborhood environments in contributing to socioeconomic and racial health disparities. The innovative research design and unique measures collected on aspects of neighborhood physical, service, and social environments—including neighborhood poverty and crime, income and education, county per-pupil school expenditures, birth weight and health insurance, race and residential segregation, health behaviors, housing quality, and connectedness to informal sources of support—help illuminate what lies along the chain of causation from poverty to health outcomes over the life course.



Below, I summarize key findings that emerge from these studies by life cycle stage.

#### Key Findings

First, the overall scope of childhood family and neighborhood influences on health implied by the estimated sibling and child neighbor correlations in health outcomes over the life course is substantial. The results show that sibling correlations in general health status are roughly 0.6 through at least the first fifty years of life—suggesting that three-fifths of adult health disparities may be attributable to family and neighborhood background. I also find childhood neighbor correlations in adult health that are substantial (net of the similarity arising from similar observable family characteristics). The results suggest that disparities in neighborhood background account for between one-third and 40 percent of the variation in health status in midlife. The estimates indicate that a child who grows up in a neighborhood at the tenth percentile of the neighborhood quality distribution has roughly a 0.3 chance of falling in the bottom decile of the adult health distribution and has only a 0.15 chance of rising above the median.

The overall scale of both childhood family and neighborhood factors on health through midlife (implied by the sibling and child neighbor correlations in health) provided the impetus for further investigation of what aspects of childhood family and neighborhood features influence subsequent health trajectories and explain their lasting impacts. The full set of findings from this inquiry is reported in Johnson (2007), and summarized below.

#### *What Aspects of Childhood Neighborhood and Family Socioeconomic Status Matter?*

The results indicate that the composite neighborhood effects reflected in the significant child neighbor correlations in adult health appear to emanate both from the direct effects of neighborhood quality during childhood on child health, which may carry over into adulthood, and from indirect effects via the economic mobility process. Differences in developmental health trajectories explain much of the variance in the nature and rate of later declines in health.

The socioeconomic gradient in health is not fully accounted for by differentials in education, access to health care, or health behaviors; and childhood neighborhood conditions play a role in explaining the steepening of the gradient through midlife, indicating the lasting importance of childhood conditions. Significant child health and adult health status differences are associated with child and family characteris-

tics, including parental income and education, parental expectations for child achievement, child health insurance coverage, birth weight, and parental health status, and with child neighborhood characteristics, including child neighborhood poverty and crime, racial composition and childhood residential segregation, school district per-pupil spending, and neighborhood housing quality. Child neighborhood poverty was found to be the single most salient neighborhood characteristic that influenced the subsequent health trajectory. The results reveal several patterns: (1) children growing up in poverty experience significantly higher rates of problematic health throughout life; (2) exposure to concentrated neighborhood poverty during childhood and cumulative exposure through midlife is highly predictive of adult health status problems at midlife; and (3) the socioeconomic gradient in health appears to widen over the life course, as the health deterioration rate is more rapid in adulthood among those who grew up in more disadvantaged child neighborhood and family environments. The results also reveal substantial persistence in health status across generations that is linked in part to low intergenerational economic mobility.

The results indicate that exposure to concentrated neighborhood poverty over the life course has significant deleterious impacts on later-life health, with the size of the effects varying with age. The largest neighborhood effects were identified during childhood and to some degree in young adulthood, with a far lesser role for contemporaneous neighborhood exposures in contemporaneous health outcomes. The widely discussed correlation between contemporaneous neighborhood conditions in adulthood and adult health status arises mostly because it is *lifetime neighborhood exposures* that have cumulative effects on health and mortality risk, and lifetime neighborhood quality and family resources are strongly positively related to contemporaneous neighborhood environments in adulthood. Most health outcomes are a product of cumulative exposures to advantaged/disadvantaged environments spanning decades or exhibit long latent periods before problems manifest. Therefore, the connection between current neighborhood and current health says relatively little about the overall influence of neighborhood factors over the life cycle. These research findings also point more generally to the importance of conceptualizing neighborhood effects as cumulative and variable over the life course as opposed to isolated and unchanging.

#### *Causality Versus Selection Bias*

Conditions of persistent exposures to disadvantaged neighborhoods, particularly high-poverty neighborhoods, appear to be responsible to a

significant degree for the patterns of accelerated health deterioration and the socioeconomic gradient. Is this causal inference justified, or does it reflect selection bias? While there is no single perfect solution to address the endogeneity of residential location, there are ways to determine if selection bias is driving the results. The fact that the effect of concentrated neighborhood poverty is weaker when the duration of exposure is brief and parents know few of their neighbors suggests that selection bias is not driving these results. If effects simply represented unmeasured family factors, then the number of years in the neighborhood and the number of neighbors known by name should not be associated with the strength of these effects. But that is not the case here.

To probe the robustness of a causal inference, I also employed a novel empirical approach, recently proposed by Altonji, Elder, and Taber (2005), to gauge how sensitive estimates of the effects of neighborhood poverty are to selection on unobserved variables. The results reveal that even a large amount of selection on unobservable factors does not eliminate the significant effect of neighborhood poverty on health status later in life.

*Toward Understanding Sources of Adult Racial Health Disparities*

Another important contribution of my work is its systematic analysis of the evolution of racial health disparities over the life course and its attempt to explain the level of sibling and neighbor correlations and the way that these correlations evolve with age. In the results reported in Johnson (2007), general health status in childhood and adulthood through midlife is the key outcome analyzed, while the likelihood of onset of hypertension in adulthood is the health condition analyzed in Johnson (2008a). Both studies found that racial differences in adult health can be accounted for by childhood family and neighborhood factors, while contemporaneous adult economic factors account for relatively little of this gap.

Findings on hypertension are of particular interest because it is a major risk factor for heart disease and stroke, the leading causes of death in the United States. Blacks' higher prevalence of cardiovascular disease-related risk factors account for more than half of the racial disparity in longevity (Barghaus et al. 2007), with hypertension the leading culprit. I found that childhood neighborhood poverty and its attendant stressors play an influential role in shaping risks of onset of hypertension in middle age. Other notable neighborhood factors that were shown to influence risks of onset of hypertension in adulthood include childhood neighborhood crime exposure and county per-pupil school expenditures; notable child and family background factors include birth weight, parental health status, and parental socioeconomic status. These effects

appear linked, in part, to low intergenerational economic mobility, particularly among blacks. The results indicate that racial differences in these early-life neighborhood conditions and family background characteristics play a significant role in explaining racial disparities in hypertension through at least age 50, while contemporaneous economic factors account for relatively little of the racial disparities in this health condition in adulthood. Findings such as these facilitate the identification of the antecedents of health at midlife and provide us with a better understanding of the early risk factors for health decline among older adults.

#### *Mid- to Late-Life Health*

The focus to this point has been on childhood to midlife. Johnson, Schoeni, and Rogowski (2008) and Johnson (2008c) sought to identify origins of health disparities at older ages, again with emphasis on the influence of the neighborhood environment and residential segregation. The results show that black men have a 79 percent higher mortality hazard in mid- to late life, relative to white men. The black-white gap in mortality risk is cut by about half after inclusion of controls for childhood and young adult family socioeconomic factors, including income, educational attainment, health insurance coverage, and to a lesser extent health behaviors. Furthermore, the study found that racial differences in longevity can be fully accounted for by childhood and young adult family *and* neighborhood socioeconomic factors, particularly neighborhood poverty and crime. The results highlight the significant role of neighborhood poverty in shaping adult mortality risks. I found that living in a high-poverty neighborhood during young adulthood increases subsequent mortality risks by 56 percent, relative to living in a low-poverty neighborhood.

The results demonstrate that the average health status of a 55-year-old who lived in a high-poverty neighborhood during young adulthood is roughly at the same level of health as a 70-year-old who lived in a low-poverty neighborhood during young adulthood. The implied difference in the rates of health deterioration by neighborhood poverty status is on par with the effect size of the well-known college-high school education gradient in health status. The study thus highlights substantial race differences in the incidence and duration of exposure to concentrated poverty over the life course with grave health consequences. The work also reveals high rates of immobility from poor neighborhoods over the life course, especially among African Americans.

### Policy Implications and Directions for Future Research

The US leads the world as the most technologically advanced in clinical research and medical practice. We spend more on medical care than any other nation (now more than 16 percent of GDP), but our health system produces inferior health outcomes relative to many other developed countries. The performance gaps in our current system include: (1) the more than 45 million uninsured; (2) escalating medical costs; (3) the highly variable quality of health care; and (4) the failure to invest in measures to promote long-term health.

As emphasized by Chernichovsky and Liebowitz (2008), the singular focus on expanding health insurance ignores the necessity to design a health system that integrates preventive care and population-wide health initiatives over the life course. There remains a significant imbalance between resources devoted to public and population health with those spent on personal medical care. For example, 95 percent of the trillion dollars we spend on health goes to direct medical care services, while just 5 percent is allocated to population-wide health improvement (McGinnis, Williams-Russo, and Knickman 2002). It has been estimated that 10–15 percent of preventable mortality could be averted by better availability and higher quality of medical care. This suggests that a more substantial share of deaths may be caused by exposures (and behaviors formed) earlier in life that could be modified by preventive interventions.

If we want to expand our investments in promoting health, thereby reducing the demand for spending to restore health, what types of public policy interventions show the most promise, and at what stage of the life cycle? There may be critical periods early in life that represent windows of opportunity to affect neighborhood conditions that can have a profound impact on economic mobility patterns and health later in life. The research discussed here tests for differential effects of socioeconomic neighborhood conditions by life cycle stage, and the results highlight childhood as a critical period, in part because it sets the stage for a socioeconomic mobility process that has far-reaching impacts on later-life health.

Current health policies, however, do not reflect the implications of these research findings. From a public policy perspective, we have allowed a mismatch to develop between the opportunity for positively influencing an individual's healthy development during childhood, when this development is most malleable, and the other public investments we make in health services in later-stage adulthood. Overall, U.S. health policy has traditionally taken a rehabilitative approach that

includes an emphasis on programs aimed at increasing access to health insurance and medical care services, rather than a preventive approach that might be more likely to incorporate consideration of childhood neighborhood conditions. In short, we have traditionally appealed to medical care access to remedy what disadvantaged neighborhood and family environments produce.

In contrast, the research findings underscore the potential for targeting neighborhood conditions as a means of improving population health and confronting health inequality. A shift in resources from expanding health care delivery expenditures for individuals at later ages to targeting disadvantaged neighborhoods at earlier stages of the life course may be a promising (and cost-effective) avenue for increasing population health and reducing racial/ethnic disparities.

Future research findings must help advance our understanding of the optimal ways to allocate resources between family-focused access to medical care and alternative policy programs that improve population health and reduce health disparities, including some that are not traditionally thought of as health programs. It is critical to examine whether society allocates resources in an optimal way across different health-improving policy levers. Unless the government spends in such a way that the marginal benefit (health improvement achieved from the last dollar spent) is the same for each activity, society will not be promoting population health in the most cost-effective manner. Neighborhoods research has promise to yield new insights that may point to reallocating resources toward approaches with higher payoffs, which may increase health for a given level of expenditure.

### **Housing and Income Policies Are Health Policies**

Promoting good health cannot be the purview of the health care system alone. Many prevention initiatives depend upon policy changes that are outside the traditional health policy domain. There is a need, for purposes of targeting efficiency, to understand the geography of health, and there is also a need to assess health impacts of policies outside of the health care sector (e.g., road building, the built environment, environmental toxins).

It is particularly important to understand how housing policy affects health. Federal, state, and local governments intervene in the housing market by providing, subsidizing, or constraining the purchase, location, or rental of housing in a variety of ways, including tax policy, zoning law, and the provision of housing for low-income families. Evaluation of housing policy on health has focused on factors related to

the built physical environment (such as exposure to lead and air pollution). However, less attention has been paid to how housing policy affects health through its effects on socioeconomic neighborhood conditions.

Housing mobility programs and demonstrations (e.g., the Yonkers scattered site public housing program), implemented for their potential impacts on racial and economic desegregation, have received far less attention for their potential longer-run (unintended) beneficial health effects. In the case of mixed-income housing policies, mixed-income developments have been shown to help alleviate the geographic concentration of urban poverty, but the verdict is still out on the potential for mixed-income housing development as a means of helping lift families in U.S. inner cities out of poverty and improving their future health trajectories. We are particularly interested in trying to better articulate the possible health impacts of mixed-income developments on low-income families. Why do we expect mixed-income neighborhood development to promote health, a higher quality of life, and upward mobility for low-income families? How might specifying our expectations for the benefits of this strategy more clearly inform current policy debates on how best to invest in health for disadvantaged families?

Future research should work toward providing an empirical assessment of whether our current policy of increased reliance on medical interventions at later ages and declining spending on housing and social welfare programs that come into play at earlier stages of the life cycle is the best way to spend our health-promoting dollars. Targeted housing and income-support policy for the poor to reduce highly concentrated poverty may be more cost-effective, at prevailing levels of expenditure, for improving population health than spending the same amount of funds on a (weak) health care delivery system.

How big are the health effects of income-support and housing policy targeted toward childhood conditions compared with effects of explicit health interventions? Future work should evaluate the cost and health-improving potential of housing and income-support programs. Further, it should attempt to set forth conditions under which a shift in resources from expanding health care delivery expenditures at later ages to targeting disadvantaged families and neighborhoods at earlier stages of the life course would lead to an increase in population health and reduction in racial/ethnic health disparities.

A policy that is based on evidence from research on the social determinants of health and that integrates housing and income-support policies at various stages of the life cycle would not just strengthen overall health status and the stock of human capital but may also improve educational attainments, reduce income inequality, and promote economic

growth. If we really want to reduce the economic and social costs of health disparities, then we must confront its early roots. This chapter has summarized the accumulating research evidence underscoring the role of childhood family and neighborhood conditions.

In order to provide more specific policy prescriptions, we need a better understanding of the pathways through which neighborhoods and families affect health. We must recognize that policies that operate through access to medical care such as health insurance coverage, policies that operate primarily through family income such as Earned Income Tax Credits and minimum wages, and policies that work at the neighborhood level through improving the quality of neighborhoods, housing, local hospitals, and schools in inner cities operate through different pathways and may influence health outcomes in different ways. And as we must also recognize that even when we narrow our focus to neighborhood influences on health, peer group effects, role model effects, and the multilayered interaction of family and community factors represent distinct influences under the umbrella of neighborhood effects, and each has different policy implications. Disentangling the causal sources of neighborhood effects is extremely difficult (Manski 1993; Moffitt 1998), but the attempt to understand the mechanisms of why neighborhoods matter is an important area for future research.