Samantha Deshommes, Chief  
Regulatory Coordination Division, Office of Policy and Strategy  
U.S. Citizenship and Immigration Services  
Department of Homeland Security  
20 Massachusetts Avenue NW  
Washington, DC 20529-2140

Re: DHS Docket No. USCIS-2010-0012, RIN 1615-AA22, Comments in Response to  
Proposed Rulemaking: Inadmissibility on Public Charge Grounds

Dear Ms. Deshommes:

The Center for Health Policy and Law\(^1\) and the Center for Public Interest Advocacy and  
Collaboration ("CPIAC")\(^2\) at Northeastern University School of Law and Public Health  
Law Watch ("PHLW")\(^3\) appreciate the opportunity to submit comments regarding the  
proposed public charge regulations ("the Regulations" or "the Rule"), published by the  
Department of Homeland Security ("DHS" or "the Department") in the Federal Register  
on October 10, 2018.\(^4\)

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\(^1\) Center for Health Policy and Law, [https://www.northeastern.edu/law/academics/institutes/health-law/](https://www.northeastern.edu/law/academics/institutes/health-law/).
\(^2\) Center for Public Interest Advocacy and Collaboration,  
[https://www.northeastern.edu/law/academics/institutes/cpiac/index.html](https://www.northeastern.edu/law/academics/institutes/cpiac/index.html).
\(^3\) Public Health Law Watch,  
[https://www.publichealthlawwatch.org/](https://www.publichealthlawwatch.org/).
\(^4\) These comments have been prepared by the Center for Health Policy and Law, the Center for Public  
Interest Advocacy and Collaboration, and PHLW, and do not necessarily represent the views of  
Northeastern University School of Law, Northeastern University, or any individuals or institutions  
affiliated with either Center or PHLW.
The Center for Health Policy and Law provides a rich context for students and researchers interested in myriad health-related topics, including public health law, health and human rights, health governance, bioethics, and drug policy. Over the last several years, it has supported both research and public dialogue on a wide range of issues relating to the health of immigrants. CPIAC takes the lead in integrating the law school’s public interest mission into all facets of the student experience, while addressing broader social justice issues in the community, nation, and world. PHLW is a project of the George Consortium, a nationwide network of over sixty public health law scholars, academics, experts and practitioners who are dedicated to advancing public health through law.

Based on PHLW’s research and expertise on the law’s impact on public health, the Center for Health Policy and Law’s work on the intersections between health law and immigration, and CPIAC’s mission to support legal and social justice for our nation’s most vulnerable communities, we have deep concerns that the Regulations, if promulgated, will adversely affect the public’s health. Our work in public health law teaches us that law is a critical determinant of public health, and that laws and policies that negatively affect the health of discrete groups of individuals often reach more broadly, undermining the health of wider populations. By erecting significant barriers to non-citizens’ access to health insurance and other critical non-cash benefits, penalizing non-citizens for their medical diagnoses, and stigmatizing individuals with chronic health conditions, the Rule will reduce access to care, undermine prevention, strain the health care system, and exacerbate negative social determinants of health. In an unnecessary and misguided effort to enforce an unrealistic conception of self-sufficiency among immigrants, the proposed Rule overlooks the interconnectedness of human health, and disregards the many ways in which the Regulations will adversely affect the health of all U.S. residents. The comments below further explicate some of the Regulations’ adverse public health implications. Please note that all references are intended to be part of the record of these comments. To facilitate review, we include copies of the references that are not publicly available in the attached Appendix.

Barriers to Health Care

The 1996 Personal Responsibility and Work Opportunity Reconciliation Act (PROWRA) erected significant limitations on non-citizens’ access to federal means-tested health
benefits. PRWORA, however, also ensured that many classes of non-citizens were both qualified and eligible for federally-funded health benefits.\(^5\) It also permitted states to expand eligibility for publicly-funded programs.\(^6\) Since PRWORA, Congress has further broadened non-citizens’ eligibility for publicly-funded health benefits. For example, Sec. 214 of the Children’s Health Insurance Program Reauthorization Act expanded non-citizens’ eligibility for Medicaid and the Children’s Health Insurance Program (“CHIP”).\(^7\)

By adding Medicaid and Medicare Part D subsidies to the definition of public charge,\(^8\) and by treating the past receipt of these benefits as heavily-weighted negative factors in the public charge determination, the Rule would undercut the careful balance that Congress sought to achieve in these statutes, imposing significant new barriers to non-citizens’ ability to utilize the very health programs for which Congress specifically determined they would be eligible. These barriers will not simply affect non-citizens who are subject to the public charge determination; they will also undermine the health of many more immigrants as well as native-born citizens.

In its analysis of the proposed Rule, the Department concedes that research shows that “when eligibility rules change for public benefit programs there is evidence of a ‘chilling effect’ that discourages immigrants from using public benefit programs for which they are still eligible.”\(^9\) Nevertheless, the Department assumes only a 2.5 % disenrollment rate for public benefits programs, including health programs, based

\(^5\) The Department states that the primary benefit of the proposed Rule would be to ensure that non-citizens are self-sufficient. PRWORA codified self-sufficiency for immigrants as a goal, yet it explicitly provided that many non-citizens would be eligible for federal means-tested benefits, and that states could expand the class of non-citizens who are eligible for such benefits. In contrast to the Department, Congress understood that the receipt of certain benefits is not incompatible with self-sufficiency. See 8 U.S.C. § 1601 (stating that self-sufficiency is a goal of U.S. immigration law); 8 U.S.C. § 1621 (establishing qualification requirements and exceptions to those requirements for non-citizens); 8 U.S.C. § 1641 (defining non-citizens who are qualified for public benefits).

\(^6\) 8 U.S.C. § 1621(d).


\(^8\) The Department has sought comments as to whether the Children’s Health Insurance Program (CHIP) should also be included in the definition of public charge. All of the negative health impacts discussed below, particularly with respect to children, will be magnified if the definition is expanded to include CHIP. For a discussion of CHIP’s importance to children’s health, see Kaiser Family Foundation, The Impact of the Children’s Health Insurance Program (CHIP): What Does the Research Tell Us (July 2014), https://www.kff.org/medicaid/issue-brief/the-impact-of-the-childrens-health-insurance-program-chip-what-does-the-research-tell-us/.

solely on the number of persons who seek to adjust their status. This estimate completely ignores the far wider impact that is likely to occur as other non-citizens (including those who are exempt from the public charge determination) and native-born citizens in mixed status families dis-enroll in or forgo health benefits. Even before the proposed Regulations were published in the Federal Register, many immigrants chose not to enroll either themselves or their children in public programs out of fear of possible adverse immigration consequences. Research regarding the impact of PRWORA found a 25% disenrollment rate among children of foreign-born parents following that statute’s passage in 1996. In fact, many of the children who were dis-enrolled were citizens and not actually subject to PRWORA’s restrictions. There is no reason to believe that the Rule, which in contrast to PRWORA would create negative immigration consequences for the use of non-cash benefits, would have a less significant chilling effect.

Rates of disenrollment today similar to those that resulted from the enactment of PRWORA would lead to dramatic declines in health insurance coverage, with inevitable negative health consequences. Over 9.2 million children in the U.S. have at least one noncitizen parent, and 25.9 million people in the U.S. live in families with at least one non-citizen and an income under 250% of the federal poverty level. According to the Kaiser Family Foundation, between 2.1 million and 4.9 million Medicaid/CHIP enrollees could dis-enroll if the proposed rule leads to a disenrollment rate of between 15 to 35%. Notably, even if the final Rule continues to exclude CHIP in the definition

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14 Id.
of public charge, many parents may remove their children from CHIP because they may not know that their child’s coverage comes through CHIP as opposed to Medicaid, since over 60% of CHIP recipients are enrolled through their state’s Medicaid program.\textsuperscript{16} If the Department decides to include CHIP in the public charge determination, loss of coverage among children, including citizen children born to noncitizen parents, would likely be even greater.\textsuperscript{17}

The significant declines in health insurance coverage that are likely to result from the proposed Rule will have detrimental effects on the health and well-being of immigrants, citizen members of their families, and the broader public. For example, researchers have found that Medicaid coverage reduced the prevalence of undiagnosed depression by almost 50% and of untreated depression by almost 60%.\textsuperscript{18} Individuals who have access to Medicaid are also more likely to receive a flu shot.\textsuperscript{19} In addition, populations with increased access to Medicaid, as a result of the Medicaid expansion, have experienced “important clinical changes... including increased primary care visits, and improved blood pressure control and Pap testing rates, and improved self-reported health status.”\textsuperscript{20} Medicaid also plays an important role in treating patients with substance use disorders, which is especially critical now given the ongoing opioid crisis.\textsuperscript{21} These harms, of course, cannot be limited to immigrants who dis-enroll or even to their families. For example, unvaccinated individuals can spread the flu to strangers and untreated substance use disorders create significant costs and harms to the public writ


\textsuperscript{19} Robin Bloodworth, Jie Chen, Karoline Mortensen, Variation of Preventive Service Utilization by state Medicaid Coverage, Cost-Sharing, and Medicaid Expansion Status, 115 PREVENTIVE MEDICINE 97 (2018).

\textsuperscript{20} B.D. Sommers et al., Three Year Impacts of the Affordable Care Act: Improved Medical Care and Health Among Low-Income Adults, 36 HEALTH AFFAIRS 1119, 1119 (2017).

large. Likewise, individuals with hepatitis C, or indeed any communicable disease, can transmit their untreated disease to others.

Access to health insurance is especially important for pregnant women and children. Studies show that many women without insurance delay or lack access to prenatal care, which can in turn affect the long-term health of their children.22 Conversely, Medicaid expansion has been associated with declines in infant mortality.23 More broadly, the adoption of Medicaid has also been associated with lower levels of infant mortality, and decreased mortality throughout childhood and into adulthood.24 Children who have access to Medicaid have fewer school absences and are more likely to graduate from high school or college.25 Access to Medicaid in early life also leads to "statistically significant and meaningful improvements in adult life" and allows families to make other valuable investments in their children, helping to improve children’s socioeconomic status throughout life.26 Medicaid is thus an important tool for enabling the very self-sufficiency that the Rule seeks to promote. By chilling the use of Medicaid among children in mixed-status families, the Rule will inevitably hinder educational achievement and economic self-sufficiency among both immigrants and citizens, thereby undermining the very goals the Rule seeks to foster.

Deterring Prevention

In addition to reducing access to health insurance and the clinical health services it affords, the proposed Rule will undermine public health by penalizing the diagnosis of treatable health conditions. Under the proposed Regulations, the public charge

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25 Karina Wagnerman, Alisa Chester, and Joan Aiker, Medicaid is a Smart Investment in Children, Georgetown University Center for Children and Families (March 2017), http://ccf.georgetown.edu/2017/03/13/Medicaid-is-a-smart-investment-in-children/.
determination must consider the existence of a medical condition “that is likely to require extensive medical treatment.” Moreover, the diagnosis of “a medical condition that is likely to require extensive medical treatment or institutionalization or that will interfere with the alien’s ability to provide for him- or herself, attend school, or work” when the “alien is uninsured and has neither the prospect of obtaining private health insurance; or the financial resources to pay for reasonably foreseeable medical costs related to a medical condition” would serve as a heavily weighted negative factor. Notably, these provisions apply even if the medical condition is easily treatable, and if once treated, would not prevent the immigrant from working, attending school, or otherwise being an economically productive member of society.

By labeling the diagnosis of a treatable medical condition, in the absence of insurance, as a heavily weighted negative factor, the Rule will create an insidious “Catch 22.” Recommended medical tests, including tests for high blood pressure, diabetes, cancer or HIV/AIDS, could become dangerous traps. The conditions that may be diagnosed from such tests are often treatable or controllable, and with appropriate care, may not impede an individual’s ability to work, pay taxes, and be economically self-sufficient.

Nevertheless, under the Rule adverse immigration consequences may follow if the immigrant is diagnosed with such a medical condition, and such a diagnosis will be treated as a heavily weighted negative factor if the individual is uninsured and unlikely to have private insurance. As a result, immigrants may well conclude that they should avoid recommended medical screenings altogether. This de facto “pre-existing conditions” provision may result in easily treatable or controllable conditions going undetected until after they become symptomatic and more expensive to treat, an effect that is contrary to the federal health policies that emphasize prevention and the need to treat conditions early in order to improve health outcomes and reduce health costs.

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27 Proposed Sec. 212.22(b)(2).
28 Proposed Sec. 212.22(c)(1)(iv).
29 The comments to the proposed Regulations state that DHS would not consider employment-related health insurance for public employees to be private insurance. Inadmissibility on Public Charge Grounds, 83 Fed. Reg. 51189 (Oct. 10, 2018). They do not state whether the negative treatment given to non-private health insurance would extend beyond Medicaid and Medicare Part D to include other public programs, including those such as Medicare Parts A and B, which are not means-tested. If the Department were to consider additional programs beyond Medicaid and Medicare Part D as “non-private,” the chilling effect of the regulations, and the adverse health impact, would be even greater than described above.
The impact of this provision is especially troubling with respect to infectious diseases, such as HIV/AIDS. For over thirty years public health authorities have urged individuals to get tested for HIV in order to stop the transmission of the virus. By discouraging testing, the Rule would frustrate those efforts. In addition, by treating a HIV diagnosis in the absence of private insurance as a heavily weighted negative factor, the Rule would reinforce the stigma that surrounds HIV, signaling that individuals who are living with HIV are lacking in self-sufficiency and are unworthy of being in this country. This was precisely the stigma that the federal government sought to end when it repealed the travel ban on HIV-positive noncitizens in 2009.

The stigma created by the Regulations would not be limited to HIV/AIDS. Rather, it would extend to individuals living with other infections, such as Hepatitis C, or non-communicable medical conditions and disabilities, such as diabetes. Although the Department notes that disability will not be the sole factor considered in the totality of circumstances test, by considering disability, and labeling individuals who have chronic medical conditions that require extensive medical treatment as “public charges,” the Rule disregards Congress’ finding that “physical or mental disabilities in no way diminish a person’s right to fully participate in all aspects of society.” To the contrary, the Rule would signal that people with disabilities are lacking in self-sufficiency and are unwelcome in our nation. By so doing, the Rule will reduce

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33 Under the Americans with Disabilities Act, many chronic medical conditions constitute disabilities. See 42 U.S.C. § 12102.


people’s willingness to seek diagnosis and treatment, undermining the health of both citizens and noncitizens, and adding to the stigma and burden felt by all Americans with disabilities.

Harm to the Health Care System

The proposed Rule will also adversely affect the health care system by placing new strains on health care workers. In 2016, immigrants comprised 16% of the health care workforce. Twenty-four percent of less skilled health care workers, including home health aides and nursing home aides, are immigrants. Undoubtedly, many more health care workers live in mixed-status families.

Many health care workers, especially those who work in home health and nursing home settings, depend upon public benefits and thus may be adversely affected by the proposed Rule. For example, one third of home health aides rely on public benefits. If the Rule leads these workers to forgo health benefits, including Medicaid, they may experience more serious health problems, as they may be unable to pay for treatment. In turn, these workers may be less able to provide care for their vulnerable patients. At the same time, public charge determinations pursuant to this Rule may reduce the numbers of workers available to care for the aging U.S. population in the years to come.


39 Id.


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The Regulations will also create significant financial problems for safety-net hospitals and community health centers. More than 25% of visits to safety-net hospitals are covered by Medicaid. For hospitals, access to Medicaid is associated with improved financial performance, and a substantial reduction in closures. However as discussed above, the proposed Regulations are likely to cause significant dis-enrollments in Medicaid. Researchers have estimated that this may cost hospitals $17 billion a year in lost revenue. These losses, coupled with the increases in uncompensated care that may result as immigrants and members of their family lose coverage, increase the risk that hospitals will close or reduce services, adversely affecting all members of a hospital’s community, not only non-citizens who are directly impacted by the proposed rule.

The Regulations may have an ever greater impact on community health centers. In expansion states, Medicaid provides 48% of the revenue for community health centers; in non-expansion states, Medicaid provides 29% of their revenue. Researchers have estimated that dis-enrollment of only 50% of legal non-citizen patients from Medicaid as a result of the Rule could lead to community health centers losing $346 million, and the capacity to serve 295,000 fewer patients. The losses would be even greater if citizen family members also dis-enroll, as seems likely. Importantly, because community health centers serve all members of a community regardless of insurance or immigration status, the centers’ loss of revenue and concomitant reduction in services will not be limited to the non-citizens who are subject to the public charge rule. Rather, the ill effects will spread more broadly throughout the entire patient community. Thus,

at-home. Research by the Migration Policy Institute determined that 69% of current green-card holders have at least one negative factor under the proposed regulations, suggesting that the Rule may have a dramatic impact on future workers. See Randy Capps et al., Gauging the Impact of DHS’ Proposed Public-Charge Rule on U.S. Immigration, Migration Policy Institute (Nov. 2018), https://www.migrationpolicy.org/research/impact-dhs-public-charge-rule-immigration.
43 Richard C. Lidrooth et al., Understanding the Relationship between Medicaid Expansions and Hospital Closures, 37 HEALTH AFFAIRS 111 (2018).
44 Kim, supra note 41, at 5.
45 Id. at 4.
47 Id. at 5.
in an attempt to promote self-sufficiency among non-citizens, the regulations may increase the health vulnerability of citizens.

Social Determinants of Health

Decades of public health research have shown that the health of individuals and communities is determined not only by individual factors (biological and behavioral), but also by the social determinants of health ("SDOH"). According to the Centers for Disease Control and Prevention, "differences in health are striking in communities with poor SDOH such as unstable housing, low income, unsafe neighborhoods, or substandard education." By including housing supports and Supplemental Nutrition Assistance Program (SNAP) within the definition of public charge, and treating past use of such benefits as negative factors, the proposed Regulations will adversely affect critical SDOH, ultimately jeopardizing the health of both immigrants and citizens.49

Housing is an especially important SDOH. As Stuart Butler explains in the Journal of the American Medical Association, "housing difficulties are seen as comprising an important determinant in the underlying health condition of many families, and they often are a factor in acute episodes of illness. Poor living conditions can trigger such developments as respiratory problems and stress-related illness, and many falls and hospitalizations among elderly individuals result directly from unsafe housing." A person’s inability to afford housing is associated with increases in hypertension and arthritis, as well as non-adherence to prescription drugs due to cost-related problems.51 Lack of access to

49 The Regulations will further adversely affect the SDOH by expanding the extent to which receipt of cash assistance is considered a public charge. These comments, however, focus exclusively on the Regulations' dramatic departure from past practice by including non-cash benefits within the definition as public charges.

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affordable housing presents special difficulties to adults who are managing chronic
diseases.\footnote{Dana E. Keene, Monica Guo, Sascha Murillo, “That Wasn’t Really A Place to Worry About Diabetes”: Housing Access and Diabetes Self-Management Among Low-Income Adults, 197 Soc. Science & Medicine 72 (2018).}

Children are especially at risk from housing insecurity. There is, for example, a strong
link between overcrowding in housing and infectious diseases in children,\footnote{Tama Leventhal and Sandra Newman, Housing and Child Development, 32 CHILD AND YOUTH SERVICES REV. 1165, 1171 (2010).} and 40 % of childhood asthma may be linked to a child’s home environment.\footnote{B. Cameron Webb and Dayna Bowen Matthew, Housing: A Case for the Medicalization of Poverty, 46 J. L. MED. & ETHICS 589, 591 (2018).} Housing insecurity is also associated with exposure to child abuse and long-term physical and mental health problems among children.\footnote{Katie A. Ports et al., The Impact of Low-Income Housing Tax Credit on Children’s Health and Well-Being in Georgia, 93 CHILDREN AND YOUTH SERVICES REV. 390 (2018).}

Native-born children in mixed status families cannot be insulated from their families’
housing insecurity. Children will suffer from increased housing insecurity, and the
attendant ill health effects, if their parents forgo housing supports due to fear of the
public charge regulations. The probable chilling effect on immigrant families that are
not subject to the rule will extend the adverse effects even further.

Food insecurity is another critical SDOH. Access to healthy foods and appropriate
nutrition can prevent the onset of chronic health conditions, such as hypertension and
diabetes.\footnote{America’s Health Insurance Plans, Access to Healthy Foods: Social Determinants of Health (May 2018), https://www.ahip.org/wp-content/uploads/2018/05/HealthyFoods_IssueBrief_4.18_FINAL.pdf.} In particular, maternal food insecurity during pregnancy can lead to an
increased risk of birth defects.\footnote{Id.} Likewise, childhood food insecurity is linked to poor
The proposed Regulations will significantly reduce access to SNAP benefits among immigrants who are subject to the proposed regulations, as well as their family members and other who will dis-enroll or avoid enrollment due to the Rule’s chilling effect. Uncertainty among affected families as to whether the Special Supplemental Nutrition Program for Women, Infants, and Children (“WIC”) is included in the definition of public charge may also lead many pregnant women and new mothers to forgo those benefits, even though they are not actually included in the proposed Regulations. As the Department concedes, the proposed Rule may lead to increases in malnutrition among “breastfeeding women, infants, or children.” The results of these increases will be felt throughout children’s lifetimes, and across the nation as we face a generation of citizens whose health and well-being has been impaired by pre-natal and early childhood malnutrition.

Health is a Public Good

Research on the SDOH and public health more broadly demonstrates that health is a public good. The health of individuals depends largely upon the health of the communities in which they live and work. Conversely, the health of a community depends upon the health of the individuals that comprise it.

When it comes to health, self-sufficiency is an elusive and frequently counterproductive goal. The point is most obvious in the case of infectious disease. For example, many individuals who cannot be vaccinated because of age or health rely upon the herd immunity that develops when others are vaccinated. Likewise, individuals may become infected with antibiotic resistant infectious diseases when individuals who are infected fail to take their medications. When it comes to infectious diseases, our public health laws have always recognized our common vulnerability.

The same is largely true for non-communicable diseases. For example, the entire U.S. population is affected to some degree by the opioid crisis. In addition, the entire nation pays a price when unhealthy children grow up to be less productive members of the

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workforce. Notably, even well educated and affluent individuals may find that they require some assistance, even public benefits, when circumstances, age, and/or illness strike.

In the comments to the proposed Regulations, DHS does not deny the Rule’s deleterious public health ramifications. To the contrary, the Department admits that the Regulations could lead to worse health outcomes, increased use of emergency rooms, an increased prevalence of communicable diseases, increases in poverty and housing instability, and reduced productivity, among other ills. However, the Department does not attempt to quantify those costs, nor does it explain why the public’s health must be sacrificed in the pursuit of a self-sufficiency that simply cannot exist when it comes to health. Indeed, there is no justification for the dramatic and unprecedented changes that DHS proposes. Because these changes will bring untold harm to the nation’s health, we respectfully urge the Department to withdraw the proposed Rule.

Thank you for the opportunity to submit these comments. Please do not hesitate to contact us for further information.

Sincerely,

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\[63 \text{ Inadmissibility on Public Charge Grounds, 83 Fed. Reg. 51270 (Oct. 10, 2018).}\]
Appendix

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B. Cameron Webb and Dayna Bowen Matthew, *Housing: A Case for the Medicalization of Poverty*, 46 J. L. Med. & Ethics 589, 591 (2018)................................................................................................................ Pg. 54

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Variation of preventive service utilization by state Medicaid coverage, cost-sharing, and Medicaid expansion status

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A R T I C L E   I N F O
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Minority health
Healthcare disparities

A B S T R A C T
Preventive services can help reduce costs associated with chronic conditions. Medicaid beneficiaries have high rates of chronic conditions, but state Medicaid coverage and cost-sharing of preventive services varies widely. States that chose to expand Medicaid under the ACA were incentivized to cover recommended preventive services at no cost-sharing. This study evaluates whether state Medicaid policy and Medicaid expansion were associated with overall utilization, and disparities in utilization of preventive services among vulnerable populations.

We used Medicaid policy data from Kaiser Family Foundation and MEPS data (2009–2014, \( n = 15,610 \)), collected and analyzed in 2017. We used multivariable logistic regression, difference-in-differences, and difference-in-difference-in-differences models to examine the association between state Medicaid preventive service policy and Medicaid expansion on overall utilization, and disparities in utilization among race/ethnicity and income groups for blood pressure check, cholesterol screening, and flu shot.

Medicaid coverage of flu shot was significantly associated with utilization (\( p < 0.001 \)). Medicaid expansion significantly increased flu shot utilization among near-poor individuals (\( p < 0.01 \)), Asians, and Latinos and blood pressure screening among African Americans (\( p < 0.05 \)).

For flu shot, the ACA is reaching its target audience: those in the coverage gap between Medicaid and private insurance. Increasing access to preventive services may not be enough to increase utilization, especially for vulnerable populations and/or the previously uninsured. Focusing on provider adherence to preventive service guidelines and education around who is eligible for what service and when could help increase utilization of preventive services in the future.

1. Introduction

Healthcare accounted for 17.9% of GDP in 2016 (\textit{Centers for Medicare and Medicaid Services, 2018}), and 85% of health expenditures in 2013 were for chronic disease related illnesses (Thorpe et al., 2017). Preventive care has been considered as a cost-effective mechanism through which populations can detect illness at an early stage, prevent disease progression, and improve health care quality (\textit{Centers for Disease Control and Prevention, 2017}). Preventive care could also reduce health care costs in the long run (\textit{Centers for Disease Control and Prevention, 2017}). Two million life years could be potentially saved annually if preventive care had been more widely adopted (Maciosek et al., 2010).

Chronic disease rates among Medicaid beneficiaries are the highest compared to those of the privately insured (Smolen et al., 2014) and uninsured (\textit{Kaiser Commission on Medicaid and the Uninsured, 2012a}). It is reasonable to expect that access to timely preventive service utilization can help Medicaid beneficiaries with chronic diseases better prevent and manage their health conditions and improve quality of life (\textit{Government Accountability Office, 2009}).

Cost-sharing has been documented as a substantial barrier to healthcare access (Solanki and Schaufaller, 1999), especially for low-income individuals. Coverage and cost-sharing for preventive services varied significantly among state Medicaid programs in the era before the Affordable Care Act (ACA). In 2010, 14 of 48 states surveyed covered all recommended preventive services, and six states covered all services without cost-sharing (\textit{Kaiser Commission on Medicaid and the Uninsured, 2012b}).

The ACA aimed to increase preventive service coverage among Medicaid programs by providing an incentive of a one percentage point
increase in federal match rate for preventive care to any state that covers all recommended preventive services without cost-sharing (Gates et al., 2014). As of January 2013, eight of 40 states surveyed (including DC) covered all recommended preventive services, and four states covered all services with no cost-sharing (Gates et al., 2014).

The ACA also gave states the option to expand their Medicaid programs to all adults up to 138% Federal Poverty Level (FPL) beginning January 1, 2014 and stipulated that expansion plans must cover recommended preventive services at no cost-sharing. As of January 2018, 33 states, including DC, opted to expand their Medicaid programs (Kaiser Family Foundation, 2018). Previous Medicaid expansions were associated with an increase in preventive service utilization (Wright et al., 2016; Simon et al., 2017). Current evidence suggests that the ACA Medicaid expansion increased utilization of preventive services for low-income individuals in at least one southern state (Sommers et al., 2016) but did not increase utilization of preventive services for low-income individuals overall (Miller and Wherry, 2017).

This study aims to examine the variation of preventive service utilization and disparities of preventive service utilization under various Medicaid policies. We focus on two policy impacts: 1) Medicaid coverage and cost-sharing of preventive care if any; and 2) Medicaid expansion status under the ACA. Particularly, we examine the association between Medicaid expansion and preventive service utilization among vulnerable populations, including racial and ethnic minorities and low-income populations. We hypothesize that utilization of preventive services among Medicaid beneficiaries will be positively associated with Medicaid coverage of preventive services and negatively associated with cost-sharing. Next, we hypothesize that utilization of preventive services will increase in expansion states. Finally, we hypothesize that expansion will result in a reduction in disparities in utilization of preventive services among vulnerable populations.

2. Methods

2.1. Data sources

2.1.1. Medical Expenditure Panel Survey (MEPS)

We used individual-level data on preventive service utilization as well as demographic, socioeconomic, geographic (state identifiers), and health status and access variables from MEPS, a set of large-scale surveys that assesses healthcare services utilized by Americans (Agency for Healthcare Research and Quality, 2009).

2.1.2. Medicaid preventive services and expansion data

We used two Kaiser Family Foundation surveys of state Medicaid program coverage of cost-sharing of preventive services, in 2010 (48 states) (Kaiser Commission on Medicaid and the Uninsured, 2012b) and 2013 (39 states plus DC) (Gates et al., 2014). We also used Kaiser data on Medicaid expansion status on January 1, 2014 (see Table S1).

2.2. Measures

2.2.1. Dependent variables

We focused on three preventive services: 1) blood pressure check, 2) cholesterol check, and 3) flu shot. We used the United States Preventive Services Task Force (USPSTF) recommendations to develop these measures and identify eligible individuals. For each preventive service, we constructed an indicator variable (eligible but did not receive versus eligible and did receive).

2.2.2. Key independent variables

To examine whether state Medicaid coverage and cost-sharing of preventive services were associated with utilization rates, we constructed a state-level categorical policy variable (no state coverage, coverage with copay, and coverage without copay).

To examine whether Medicaid expansion affected utilization of preventive services, we constructed an interaction variable between a state-level indicator variable for Medicaid expansion status as of January 1, 2014 (not expanding versus expanding) and a post-expansion indicator variable (pre-expansion [2009–2013] versus post-expansion [2014]).

Lastly, to examine whether Medicaid expansion affected disparities in preventive service utilization among vulnerable populations, we constructed interaction terms between an expansion state indicator, a post-expansion indicator, and 1) race/ethnicity (non-Latino White, Black, Asian/Hawaiian/Pacific Islander, Latino, and other race), and 2) income as percent of FPL (poor [< 100% FPL], near poor [100%–124%], low-income [125–199%], and medium- and high-income [200 + %]).

2.2.3. Other independent variables

We controlled for demographic variables (age, sex, race and ethnicity, and marital status), socioeconomic status variables (education, employment, and income), health status variables (number of chronic conditions and self-reported health status), and geographic variables (US census region, metropolitan statistical area, and state). We also controlled for interview language and year of survey.

2.3. Study sample

The total sample included all individuals in MEPS 2009–2014 who reported continuous Medicaid coverage over the past year and were eligible for at least one of the three preventive services analyzed (n = 15,610). The USPSTF recommends that blood pressure screening be performed on all adults (n = 15,401) and cholesterol screening be performed on males beginning at age 35 and females beginning at age 45 (n = 7417) (United States Preventive Services Task Force, 2017). The Centers for Disease Control and Prevention (CDC) recommends that everyone has a flu shot annually (n = 15,320) (Grohskopf et al., 2016).

2.4. Statistical analysis

We first examined the proportions of those eligible for each service over all independent variables. Next, we examined the proportion of those eligible who received each service across all years to check for unadjusted linear trends in utilization rates. We then used multivariable logistic regression models to evaluate the association of Medicaid coverage and cost-sharing policy for each service, controlling for demographic, socioeconomic, geographic, and healthcare status variables, as well as state fixed effects. Since our Medicaid policy data were only for two years (2010 and 2013), we only used 2010 and 2013 MEPS data in this test.

Next, we examined the association between preventive service utilization and Medicaid expansion status pre-/post-expansion using MEPS 2009–2014. We used linear probability difference-in-differences models to evaluate the association of Medicaid expansion with utilization of each service. The first difference was the expansion status, and the second difference was pre-/post-expansion. Difference-in-differences models rely on the parallel trends assumption, which assumes the change in outcome in the control group is what would be expected in the treatment group, had the treatment not occurred. Previous studies examining the effect of Medicaid expansion on utilization of preventive services have used and tested this assumption (Simon et al., 2017; Sommers et al., 2016; Miller and Wherry, 2017).

Lastly, we used linear probability difference-in-difference-in-differences models to evaluate the effect of Medicaid expansion on disparities in preventive service utilization among vulnerable populations. We added a third difference to two separate models: race/ethnicity and income.

Data for this study were collected and analyzed in 2017. We used Stata 14 (StataCorp; College Station, Texas) to perform all analyses, and we used svi commands, which allow researchers to obtain population
estimates using complex survey design data.

3. Results

3.1. Population characteristics

Of those eligible, 87.69% received a blood pressure check, 84.83% received a cholesterol check, and 42.33% received a flu shot. Our sample was 43.18% White, 23.58% Black, 6.02% Asian/Hawaiian/Pacific Islander, 23.01% Latino, and 4.21% other race. Sixty-four percent were female, 25.32% were married, 62.35% had at least a high school degree, 97.07% were employed for at least one of the last 12 months, and 18.72% had medium or high incomes. Thirty-six percent reported excellent or good health, and 34.1% had no chronic conditions.

3.2. State Medicaid policy and utilization of preventive services (2010 and 2013)

3.2.1. Population characteristics

Approximately 70% of the sample lived in states where Medicaid covered preventive services with no copay (see Fig. 1), approximately 28% lived in states where Medicaid covered preventive services with copay, and approximately 2% lived in states where Medicaid did not cover preventive services.

3.2.2. Multivariable logistic regression results

Those in states where Medicaid covered flu shot (with and without copay) were significantly more likely to receive flu shot than those in states where Medicaid did not cover flu shot (see Table 1; ORs = 6.9 and 6.2, p < 0.001, respectively). We found no significant association of Medicaid policy with utilization of blood pressure check or cholesterol check.

3.3. Effect of Medicaid expansion on utilization of preventive services (2009–2013 vs. 2014)

3.3.1. Population characteristics

Utilization rates of each preventive service were mostly the same from 2009 to 2013 (see Fig. 2), but utilization of each service was significantly higher post-expansion (see Fig. 3). Those living in expansion states had significantly lower levels of blood pressure screening and cholesterol screening than those living in non-expansion states (see Fig. 4).

3.3.2. Difference-in-differences regression results

We observed no significant effects of Medicaid expansion on utilization of flu shot, blood pressure check, or cholesterol check (see Table 2). However, those surveyed post-expansion were significantly more likely to receive a flu shot (coef = 0.1, p < 0.05).

3.4. Effect of Medicaid expansion on utilization of preventive services among vulnerable populations (2009–2013 vs. 2014)

Medicaid expansion increased utilization of flu shot among near

![Fig. 1. Distribution of population by state Medicaid policies on preventive services.](image)

Source: Note: Data are from Kaiser Family Foundation and Medical Expenditure Panel Survey (MEPS; 2010 & 2013).

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Multivariable regression results - association between preventive service utilization and state Medicaid policy.</th>
</tr>
</thead>
<tbody>
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<tr>
<td>Covered, without copay</td>
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</tr>
<tr>
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<tr>
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<td>Ref</td>
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</table>

Notes: a. Data are from Medical Expenditure Panel Survey (2010 and 2013) and Kaiser Family Foundation; b. All results are presented as odds ratios; c. Boldface indicates statistical significance (*p < 0.05, **p < 0.01, ***p < 0.001).
Fig. 2. Utilization rates of preventive services among Medicaid beneficiaries by year. Source: Data are from Medical Expenditure Panel Survey (MEPS; 2009–2014).

Fig. 3. Utilization rates of preventive services among Medicaid beneficiaries pre- vs. post-Medicaid expansion. Notes: a. Data are from Medical Expenditure Panel Survey (MEPS; 2009–2014); b. *p < 0.05, **p < 0.01, ***p < 0.001.

Poor individuals (see Table 3; coef = 0.2, p < 0.01). Utilization rates significantly increased post-expansion for flu shots (coef = 0.1, p < 0.01), and near-poor individuals post-expansion were significantly more likely to receive cholesterol check (coef = 0.1, p < 0.05) and significantly less likely to receive flu shot (coef = −0.2, p < 0.05).

Medicaid expansion increased utilization of blood pressure check for Blacks (coef = 0.1, p < 0.01) and flu shots for Asians/Hawaiians/Pacific Islanders (coef = 0.4, p < 0.05) and Latinos (coef = 0.1, p < 0.05). Those who lived in expansion states post-expansion were significantly less likely to receive flu shot (coef = −0.1, p < 0.05), and Asians/Hawaiians/Pacific Islanders in expansion state post-expansion were significantly less likely to receive flu shot (coef = −0.2, p < 0.05).

4. Discussion

We hypothesized that those in states where Medicaid covered preventive services, with and without copay, would have higher utilization rates than those in states where Medicaid did not cover preventive services. Although unadjusted statistics show that utilization rates of all three preventive services were significantly higher post-expansion, difference-in-differences results controlling for individual characteristics showed no effect on utilization of flu shot, blood pressure check, or cholesterol check post-expansion.

The lack of association between Medicaid policy and utilization of these preventive services could be due to several reasons, all of which fit into Penchansky and Thomas’ definition of access. This definition posits that access is directly related to the “fit” between the patient and health care system, which can be further explained by five dimensions: availability, accessibility, accommodation, affordability, and acceptability (Penchansky and Thomas, 1981). First, Medicaid copays tend to be very small, so they may not be large enough to result in any significant difference in utilization rates (Centers for Medicare and Medicaid Services, n.d.-a). In addition, some preventive services are often available for free in the community at safety net clinics, community events, and even grocery stores.

Medicaid beneficiaries have also experienced increased wait times for appointments in expansions states after the expansion (Miller and Wherry, 2017). Additionally, states that chose to expand their Medicaid programs prior to the ACA expansion in 2014 reported that, although overall access to care increased, some barriers to access still remained, such as difficulty in enrolling and retaining low-income individuals due to factors such as transient housing and linguistic and cultural barriers (Sommers et al., 2013).

The loss of significant effects between unadjusted models and those controlling for individual characteristics suggests that there could be a significant interaction between expansion status, pre-/post-expansion, and at least one other control variable for these services. We explored these potential effects using difference-in-difference-in-differences models. Results suggested that, in terms of flu shots, Medicaid expansion is reaching the target audience – the near poor, whose incomes are between 100%–125% FPL. These individuals are in the coverage gap, those with incomes above the threshold necessary to qualify for Medicaid, but below the threshold to afford private insurance and/or qualify for the premium subsidies in the state exchanges (Garfield and Damico, 2012). Although widely available, the average cost of flu shot is approximately $30. For Medicaid beneficiaries, who typically have low incomes, $30 could be an access barrier.

Results suggested that Medicaid expansion did not have much effect on disparities in preventive services utilization among vulnerable populations. This could be because vulnerable populations have less knowledge of the expanded coverage options available through the ACA (Garcia Mosqueira et al., 2015). Many people who obtained
Table 2  
Differences in differences results - association between Medicaid expansion and preventive services utilization.

<table>
<thead>
<tr>
<th>Blood pressure check</th>
<th>Cholesterol check</th>
<th>Flu shot</th>
</tr>
</thead>
<tbody>
<tr>
<td>State Medicaid expansion status</td>
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<td></td>
</tr>
<tr>
<td>Non-expansion state</td>
<td>Ref</td>
<td>Ref</td>
</tr>
<tr>
<td>Expansion state</td>
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<td>−0.01</td>
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<td>Pre-expansion (2009–2013)</td>
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<td>Ref</td>
</tr>
<tr>
<td>Post-expansion (2014)</td>
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<td>0.04</td>
</tr>
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<td>Difference-in-differences estimate</td>
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<td></td>
</tr>
<tr>
<td>Expansion state + post-expansion (2014)</td>
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<td>−0.021</td>
</tr>
<tr>
<td>Age (in years)</td>
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<td>0.003***</td>
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<td>Ref</td>
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<td>Ref</td>
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<tr>
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Notes: a. Data are from Medical Expenditure Panel Survey (2009–2014) and Kaiser Family Foundation. b. Boldface indicates statistical significance (*p < 0.05, **p < 0.01, ***p < 0.001).

Table 3  
Differences in differences results - association between Medicaid expansion and preventive services utilization among vulnerable populations.

<table>
<thead>
<tr>
<th>Blood pressure check</th>
<th>Cholesterol check</th>
<th>Flu shot</th>
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<tr>
<td>Income</td>
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<td>−0.019</td>
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<tr>
<td>ACA expansion indicator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-expansion (2009–2013)</td>
<td>Ref</td>
<td>Ref</td>
</tr>
<tr>
<td>Post-expansion (2014)</td>
<td>0.022</td>
<td>0.033</td>
</tr>
<tr>
<td>Race and ethnicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>0.013</td>
<td>0.053</td>
</tr>
<tr>
<td>Asian, Hawaiian, Pacific Islander</td>
<td>−0.033</td>
<td>0.059</td>
</tr>
</tbody>
</table>

(continued on next page)
they are eligible for and when (Lantz et al., 2016). Additionally, changes in Medicaid physicians payments, similar to those mandated by the ACA, have not been found to have significant effects on meeting screening recommendations (Atherly and Mortensen, 2014). Finally, there are discrepancies in adherence to the USPSTF guidelines among physicians (Grol, 2001), meaning that it is not guaranteed that a patient will receive the recommended preventive services when they visit their provider.

5. Limitations

This study has several limitations. In terms of datasets, MEPS uses a cross-sectional design, which makes it impossible to observe longitudinal trends at the individual level. Since MEPS is an interview survey, the data are self-reported, which can lead to recall bias. Additionally, MEPS data were only available through 2014 at the time of this study, so there may not be enough post-ACA data to detect true effects. Lastly, the Kaiser survey of state Medicaid preventive service policies only asked the Medicaid programs whether they required a copay for each service, not the cost of the copay.

For our sample, we only included those who were enrolled in Medicaid continuously for the previous year, which greatly reduces the sample size. We chose this sample to avoid any contamination of effects that may be due to churning, or switching back and forth between different types of insurance and/or being uninsured. Finally, we assume that those in expansion states will have their preventive services covered without copay. However, those on Medicaid plans before January 1, 2014 may or may not have been grandfathered into this provision of the ACA, meaning there could be variation in Medicaid coverage of and copay for preventive services within each state.

Finally, we do not control for any type of moral hazard in our models. The concept of moral hazard refers to the tendency of individuals to overuse healthcare once insured, since they no longer have to pay costs out of pocket (Geyman, 2007). Ex-ante moral hazard, which refers to individuals being more likely to engage in risky health behavior once insured, since they will no longer be responsible for the full cost of care (Dave and Kaestner, 2009), could also affect our results. It is possible that individuals who are now insured under the ACA may exhibit ex-ante moral hazard and forgo receiving recommended preventive services, since they will not have to pay the full costs of any potentially subsequent preventable illnesses.

6. Conclusions

This study supports a common theme in health services research, which is that increased access to healthcare does not necessarily result in increased utilization of healthcare. Providing individuals with insurance coverage may not be enough to ensure that they are receiving the appropriate care. This is especially important when dealing with vulnerable populations, who typically have poorer health outcomes and could benefit from increased utilization of preventive services.

Results of this study suggest that focusing on improving health literacy could help improve utilization rates of preventive services, especially among vulnerable populations and those who were previously uninsured. Such efforts to increase awareness on chronic diseases and preventive services could help increase utilization of preventive services and potentially reduce the burden of chronic diseases in the future.

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ypmed.2018.08.020.

Conflict of interest statement

The authors declare there is no conflict of interest.

Acknowledgements

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References


Table 3 (continued)

<table>
<thead>
<tr>
<th>Blood pressure check</th>
<th>Cholesterol check</th>
<th>Flu shot</th>
</tr>
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<tr>
<td>Latino</td>
<td>0.029</td>
<td>0.923</td>
</tr>
<tr>
<td>Other race</td>
<td>0.03</td>
<td>0.978</td>
</tr>
<tr>
<td>Expansion × year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expansion state + post-expansion (2014)</td>
<td>0.044</td>
<td>0.002</td>
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<tr>
<td>Expansion × race</td>
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<td></td>
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<tr>
<td>Expansion state + Black</td>
<td>0.02</td>
<td>0.022</td>
</tr>
<tr>
<td>Expansion state + Asian, Hawaiian, Pacific Islander</td>
<td>0.023</td>
<td>0.000003</td>
</tr>
<tr>
<td>Expansion state + Latino</td>
<td>0.008</td>
<td>0.049</td>
</tr>
<tr>
<td>Expansion state + other race</td>
<td>0.024</td>
<td>0.075</td>
</tr>
<tr>
<td>Year × race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expansion state + Black (2014 × Black)</td>
<td>0.032</td>
<td>0.021</td>
</tr>
<tr>
<td>Expansion state + Asian, Hawaiian, Pacific Islander (2014 × Asian, Hawaiian, Pacific Islander)</td>
<td>0.049</td>
<td>0.024</td>
</tr>
<tr>
<td>Expansion state + Latino (2014 × Latino)</td>
<td>0.022</td>
<td>0.015</td>
</tr>
<tr>
<td>Expansion state + other race (2014 × other race)</td>
<td>0.005</td>
<td>0.095</td>
</tr>
</tbody>
</table>

Notes: a. Data are from Medical Expenditure Panel Survey (2009–2014) and Kaiser Family Foundation. b. Boldface indicates statistical significance (*p < 0.05, **p < 0.01, ***p < 0.001).
Lessons from early Medicaid expansions under health reform: interviews with Medicaid officials. Medicare Medicaid Rev. 3 (4) (pii: mmrr.003.04.a02).


Three-Year Impacts Of The Affordable Care Act: Improved Medical Care And Health Among Low-Income Adults

ABSTRACT

Major policy uncertainty continues to surround the Affordable Care Act (ACA) at both the state and federal levels. We assessed changes in health care use and self-reported health after three years of the ACA’s coverage expansion, using survey data collected from low-income adults through the end of 2016 in three states: Kentucky, which expanded Medicaid; Arkansas, which expanded private insurance to low-income adults using the federal Marketplace; and Texas, which did not expand coverage. We used a difference-in-differences model with a control group and an instrumental variables model to provide individual-level estimates of the effects of gaining insurance. By the end of 2016 the uninsurance rate in the two expansion states had dropped by more than 20 percentage points relative to the nonexpansion state. For uninsured people gaining coverage, this change was associated with a 41-percentage-point increase in having a usual source of care, a $337 reduction in annual out-of-pocket spending, significant increases in preventive health visits and glucose testing, and a 23-percentage-point increase in “excellent” self-reported health. Among adults with chronic conditions, we found improvements in affordability of care, regular care for those conditions, medication adherence, and self-reported health.

The Affordable Care Act (ACA) has produced the largest gains in insurance coverage in nearly fifty years, but the results of the 2016 election left it with an uncertain future. Although the initial attempt to partially repeal the law fell short in March 2017, a revised bill passed the House in early May, and Senate debate is pending. Estimates are that as many as twenty million Americans have obtained insurance under the ACA, with more than half via Medicaid and the remainder largely from health insurance Marketplaces. Meanwhile, several states that have not yet expanded Medicaid are in the midst of a renewed debate over this possibility. Understanding the impact of the ACA’s coverage expansion on medical care and health is critical to evaluating future policy efforts related to the law.

National studies of the full nonelderly population have detected improvements in trends in coverage, satisfaction with insurance, and access to care. Research specifically comparing populations in Medicaid expansion versus non-expansion states has shown important clinical changes for these populations, including increased primary care visits, improved blood pressure control and Pap testing rates, and improved self-reported health status. However, published analyses have been limited to using data from 2014 or 2015. Since insurance expansions extend their reach gradually, updated analyses with more recent data could provide valuable insights.

Meanwhile, patients with chronic medical...
conditions such as hypertension, depression, or diabetes may have the most to gain from coverage expansion. These conditions affect nearly half of all Americans—disproportionately those who have gained coverage under the ACA. Given the high costs of care for this group and the public health implications of these conditions, there is much policy interest in whether expanding coverage improves quality of care and health in this population.

Our objective was to assess ongoing changes in health care use and self-reported health among low-income adults, including those with chronic conditions, after three full years of the ACA’s coverage expansion. Using survey data from three states collected through the end of 2016, we provide timely evidence of the law’s ongoing impact on patient care.

**Study Data And Methods**

**STUDY DESIGN** We conducted a difference-in-differences analysis, which compares pre- versus post-expansion outcomes in two expansion states, with one non-expansion state as the control group. Our study states were Kentucky, which expanded coverage to low-income adults via Medicaid beginning in 2014; Arkansas, which used federal Medicaid funding to provide private insurance from the health insurance Marketplace to low-income adults beginning in 2014; and Texas, which did not expand coverage to low-income adults. Thus, our study captures elements of both private Marketplace insurance expansion and Medicaid expansion under the ACA; for brevity, we refer below to “ACA expansions” to describe Kentucky’s Medicaid expansion and Arkansas’s “private option” approach. In sensitivity analyses, we tested for differences between these two approaches.

We selected Texas as a comparison state for Kentucky and Arkansas because it is a nonexpansion state in the same census region that had a similarly restrictive set of Medicaid eligibility criteria before implementation of the ACA (Texas covered parents only up to 26 percent of poverty as of 2012, compared to 17 percent for Arkansas and 59 percent in Kentucky, versus the national median of 81 percent). Our study design relied on the assumption that if not for Medicaid expansion, trends in coverage and other outcomes would have been similar across these three states. Data from the Census Bureau show that coverage trends for our study population were similar in all three states during the period 2010–13 (see online Appendix Figure 1), offering support for this assumption.

For our primary difference-in-differences model, we identified the expansion effects separately for each year of expansion—2014, 2015, and 2016—all compared to the pre-expansion 2013 data. This approach allowed us to trace out differential changes over time. We also tested a model that pooled 2015–16 together to increase statistical power.

We then conducted an instrumental variables analysis, to estimate individual-level changes in health care outcomes for uninsured people who acquired coverage under the ACA. We repeated this analysis among the subset reporting at least one chronic condition. The instrumental variables approach uses a quasi-experimental source of variation in a key predictor to identify the treatment effect of that predictor; in our case, the variation was the state ACA expansion policy, and the key predictor of interest was having health insurance. This approach builds on the underlying quasi-experimental design of our difference-in-differences model but provides more directly interpretable estimates of patient-level outcomes, similar to the local average treatment effect estimated using an instrumental variables model in the Oregon Health Insurance Experiment. This approach does not change the causal inference for our study, which still relies on the assumption that in the absence of the ACA expansion, trends in our outcomes would have been similar in Texas and the expansion states.

One key assumption for an instrumental variables analysis is that the instrument has a significant relationship with the predictor of interest; here, the state expansion decisions clearly had large effects on insurance coverage. The other key assumption is that the instrument (state expansion) affects outcomes only via the predictor of interest (insurance coverage). While this seems plausible in our case, other potential aspects of coverage expansions might affect access to care and health, even among people who did not gain insurance. For instance, there could be positive spillovers of expansion via better funding to safety-net institutions, which would bias our instrumental variables estimates upward. There also could be negative spillovers via reduced health system capacity to care for populations that already had coverage when the expansions took place, which would have the opposite effect on our estimates. In addition, some people might not have gone from uninsured to insured but simply switched types of coverage because of expansion. These influences are likely swamped by the individual-level effects of gaining insurance, but they are nonetheless potential sources of bias.

**DATA** We contracted with a research firm to conduct a random-digit-dialing telephone survey from November to December each year, from 2013 to 2016. The survey sample contained US
Individual-level estimates indicate that people who gained coverage saw large, policy-relevant changes.

citizens ages 19–64, with family incomes below 138 percent of the federal poverty level—the ACA’s Medicaid expansion eligibility threshold. The survey was available in Spanish and English, and the sample included cellphone and landline users. Each year we recruited a new sample split equally across our three study states. Annual sample sizes ranged from 2,209 to 3,011, for an overall total of 10,885. The study was exempted from review by the Harvard T.H. Chan School of Public Health’s Institutional Review Board since the investigators had access to de-identified data only.

The overall response rate was 22 percent, which compares favorably to response rates of several other surveys that have been used to evaluate the ACA.22–24 Previous research demonstrates that the use of population weighting in random-digit-dialing telephone surveys can mitigate nonresponse bias and produce estimates similar to those from government surveys.25–27 Accordingly, our analyses were weighted to demographic targets for low-income adults in our study states based on age, sex, education, marital status, race/ethnicity, geographic region, population density, and cellphone use. Our survey has been previously validated against two large government-sponsored sources: the American Community Survey, conducted by the Census Bureau, and the Behavioral Risk Factor Surveillance System, conducted by the Centers for Disease Control and Prevention. In that validation, we compared estimates for low-income adults in our three study states for coverage and several measures of access to care in our survey and the government data sets. We found moderate-to-strong correlations and a range of absolute differences in estimates consistent with analogous differences between various federal surveys.9,22

**Statistical Analysis** For each outcome, we estimated a linear regression model including binary indicators for each year and state, plus interaction terms between “expansion state” and each post-expansion year (2014, 2015, and 2016). These interaction terms captured the changes attributable to coverage expansion for each year of the expansion, compared to the nonexpansion state. All models adjusted for age, sex, race/ethnicity, education, family size, income, urban versus rural residence, and state. Regression equations are in the Appendix Methods.17

Our study outcomes spanned seven domains: health insurance (uninsured, Medicaid, and private insurance, in which each individual was assigned a primary type of insurance [see the Appendix Methods],17 as well as any coverage changes within twelve months); access to care (having a personal doctor, usual location of care, difficulty obtaining primary care and specialty appointments, and reasons for emergency department [ED] use); affordability (skipping needed care or medications due to cost, trouble with medical bills, and medical out-of-pocket spending); utilization (outpatient, ED, and inpatient care in the prior twelve months); preventive care (receipt of a checkup, cholesterol test, or glucose test in the prior twelve months); quality of care (cholesterol and glucose testing for high-risk patients, regular care for chronic conditions, and self-rated quality of care); and health status (self-reported health on a five-point scale28 and a two-item depression score29).

We then examined the same outcomes (other than coverage) in an instrumental variables analysis. We used a two-stage least-squares regression,30 in which the first stage predicted the likelihood of a person having any health insurance as a function of state expansion decisions and the year, using the difference-in-differences model described above (see Appendix Table 1).17 The second stage then provided an estimate of the impact of gaining insurance from the ACA expansion on individual-level health care outcomes. This method also has the advantage of using all four years of data simultaneously to produce a single estimated policy effect from expansion.

We used Stata 14.0 for all analyses. All regression models used county-level robust clustered standard errors to account for the nonindependence of observations within the same state and county.

**Sensitivity and Subgroup Analyses** We repeated our instrumental variables analysis for the subset of respondents who reported having been diagnosed with any of nine chronic conditions: hypertension, coronary artery disease, stroke, asthma/chronic obstructive pulmonary disease (COPD), kidney disease, diabetes, depression, cancer (other than skin cancer), or substance abuse. We also tested whether the
prevalence of these conditions changed in association with expansion status.

We conducted several sensitivity analyses. We tested the impact of pooling 2015 and 2016 expansion state data together to increase statistical power. To account for multiple hypothesis testing within each domain or family of outcomes, we estimated "family-wise" $p$ values using a step-down bootstrapping approach similar to other recent analyses.\textsuperscript{11,31} We also tested a spatial correlation model described below.

Finally, we repeated our primary model with the expansion states divided into Kentucky’s Medicaid expansion versus Arkansas’s private option. This produced separate estimates for expansion effects in Arkansas and Kentucky.

\textbf{Limitations} Our analysis had several limitations. First, our study examined only three states. This means that our results might not generalize to the nation as a whole. It also affected our estimation of standard errors and the possibility of idiosyncratic changes in any given state exerting an outsize influence on our findings. In studies with a larger number of states, the use of state-clustered standard errors can limit this risk, but standard methods to estimate correlation within states are biased when there are only three states.\textsuperscript{32} Instead, we used county-level clustering to estimate standard errors as in our previous work with this data set,\textsuperscript{9} and we also present results using spatial correlation across counties similar to other health care analyses using small numbers of states.\textsuperscript{33} Our main findings were similar under both alternatives.

Second, as discussed earlier, the response rate for random-digit-dialing telephone surveys like ours is lower than that for government interview surveys. However, we believe that the trade-off of timeliness and the ability to design our own comprehensive survey outweighed those concerns, particularly given the previous validation of our survey instrument.\textsuperscript{9}

Other limitations are inherent to our study’s quasi-experimental design, which helps control for secular trends and takes advantage of a non-expansion state as a comparator but is still subject to unmeasured confounders that vary over time across states. Our instrumental variables analyses produced estimates with fairly wide confidence intervals, which means that the exact magnitudes of change should be interpreted cautiously. Finally, our data are all self-reported, which may be subject to errors in memory and other biases. However, our findings in several domains are consistent with ACA studies using nonsurvey data such as pharmacy claims,\textsuperscript{34,35} lab results,\textsuperscript{36} and community health center reports.\textsuperscript{8}

\textbf{Study Results} Exhibit 1 presents descriptive statistics by state for our full sample and for those with chronic conditions. Respondents in Texas were disproportionately Latino and urban compared to those in Arkansas and Kentucky. Chronic conditions affected 69 percent in Arkansas, 72 percent in Kentucky, and 55 percent in Texas. Changes in disease prevalence between 2013 and 2016 by state were nonsignificant for all but kidney disease, which showed a small decline in expansion states ($-2.2$ percentage points, $p = 0.06$) (Appendix Table 2).\textsuperscript{77} People with chronic conditions were older and less likely to be male or Latino. Among those with a condition, the mean number of conditions ranged from 2.0 to 2.3 by state, with depression, hypertension, asthma/COPD, and diabetes the most common (Exhibit 1).

Exhibit 2 presents the percentages of respondents in each state that were uninsured during the period 2013–16. The three states began with similar pre-ACA uninsurance rates of approximately 40 percent among low-income adults in 2013. The rate dropped steeply in 2014 in Kentucky and Arkansas and declined more gradually in 2015 and 2016. Meanwhile, the rate fell moderately in 2014 in Texas and then plateaued. By the end of the study period, the uninsurance rate was 7.4 percent in Kentucky, 11.7 percent in Arkansas, and 28.2 percent in Texas.

Exhibit 3 presents regression-based estimates for differential changes in our study outcomes, comparing expansion to nonexpansion states (Appendix Table 3 presents unadjusted mean values for each outcome in each year, by state).\textsuperscript{17} Compared to the nonexpansion state, the coverage expansion to low-income adults in the expansion states was associated with an increase in coverage of 14.0 percentage points in 2014, 22.9 percentage points in 2015, and 20.7 percentage points in 2016 (all $p < 0.01$). By 2016, in our main model, the expansions had led to signifi-
significant increases in multiple measures of access to care and affordability, including having a personal doctor and reductions in cost-related delays in both care and medication use. Expansion was associated with a decline in difficulty paying medical bills but an increase in difficulty obtaining appointments with specialists in 2016.

Exhibit 3 also presents changes in utilization and preventive care. Coverage expansion in the expansion states in 2015 and 2016 was associated with a significantly reduced likelihood of any ED visits and an increased likelihood of a check-up within the prior twelve months, but no significant changes in hospitalizations. Our two measures of clinical screening tests—glucose screening and cholesterol monitoring—significantly increased in association with coverage expansion in 2015 or 2016, respectively. Perceived quality of care showed some improvement in 2015 (for example, a reduction in “fair/poor quality of care”) that did not persist in 2016.

Finally, coverage expansion led to improvements in self-reported health (for “excellent,” \( p < 0.05 \) in 2015; for both “excellent” and “fair/poor,” \( p < 0.10 \) in 2016).

Appendix Tables 4 and 5 present sensitivity analyses for our difference-in-differences model.\(^{17}\) When we used bootstrapped family-wise \( p \) values that accounted for multiple variables within each domain of outcomes, we continued
to find significant changes in 2016 for outcomes related to coverage, access, affordability, and prevention ($p < 0.05$) and quality ($p < 0.10$), but not for utilization and self-reported health. Pooling 2015–16 data together strengthened the statistical significance of some 2016 findings such as private insurance gains, having a usual source of care, out-of-pocket spending, and excellent self-reported health; outcomes in five of seven domains were significant at $p < 0.05$ and in the other two at $p < 0.10$ using family-wise $p$ values. Difficulty obtaining an appointment to see a specialist was no longer significant in the pooled model. In models using spatially correlated standard errors, several estimates were affected by the lack of weighting (which was not feasible with this method), but overall this approach yielded precision similar to that of the main model, which provides support for our primary method using county-level clustering.

Exhibit 4 presents individual-level estimates of changes in these outcomes for patients acquiring coverage, using our instrumental variables model. For the full sample, we estimated that expansion led to significant changes, including a 41-percentage-point increase in having a usual source of care among those gaining coverage, a $337$ reduction in medical out-of-pocket spending, a 28-percentage-point reduction in the likelihood of any ED visits, and a 25-percentage-point increase in glucose testing. The proportion in excellent health increased by nearly 23 percentage points.

Exhibit 4 also shows instrumental variables results for adults with chronic conditions. While out-of-pocket spending and cholesterol and glucose testing among high-risk patients (those with diabetes, stroke, hypertension, or heart disease) did not change significantly, we otherwise found similar results for most outcomes as in the full sample, including a 51-percentage-point decrease in skipping medications because of cost and a 20-percentage-point increase in excellent health. In a question asked only of this subgroup, we estimated a 56-percentage-point increase in obtaining regular care for chronic conditions.

Comparisons of the 2016 effects of private (Arkansas) versus public (Kentucky) insurance approaches (Appendix Table 6) showed no significant differences for most outcomes. As expected, health insurance types differed, with more private coverage gains in Arkansas and more Medicaid in Kentucky. The only other significant difference was a greater decline in “fair/poor quality of care” in Arkansas compared to Kentucky. Both expansions were associated with significant improvements in numerous outcomes compared to Texas, including access to a personal doctor and medications, trouble with medical bills, checkups and cholesterol testing, and self-reported health.

Discussion
In our analysis of survey data from low-income adults in three states, we note three key contributions to the growing body of research on the ACA. First, we provide the earliest published estimates using data through the law’s third year of expansion (2016), allowing us to document the expansion’s changing impact on health care outcomes over time. Second, we use an instrumental variables model to produce individual-level estimates of the ACA’s coverage impacts, showing large improvements in self-reported health and other outcomes directly relevant to patients. Third, we document benefits in numerous previously unstudied outcomes for adults with chronic conditions—a vulnerable and high-cost population.

Our four years of data indicate that the ACA’s coverage expansion to low-income adults was associated with significant improvements in access to primary care and medications, affordability of care, preventive visits, screening tests, and self-reported health. Though coverage gains in the two expansion states were largest in the first two years, with little additional change in 2016, the time course was more variable for access and utilization measures. Some changes were present in 2014 or 2015, while other changes such
**EXHIBIT 3**

Year-by-year changes in health care outcomes after the Affordable Care Act’s coverage expansion in expansion states, compared to nonexpansion

<table>
<thead>
<tr>
<th>Outcome</th>
<th>2014 expansion</th>
<th>2015 expansion</th>
<th>2016 expansion</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>COVERAGE</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uninsured</td>
<td>−14.0***</td>
<td>−22.9***</td>
<td>−20.7***</td>
</tr>
<tr>
<td>Medicaid</td>
<td>9.5***</td>
<td>12.2***</td>
<td>17.6***</td>
</tr>
<tr>
<td>Private insurance</td>
<td>7.7***</td>
<td>8.5***</td>
<td>5.9*</td>
</tr>
<tr>
<td>Coverage change within past year</td>
<td>5.8*</td>
<td>1.2</td>
<td>1.9</td>
</tr>
<tr>
<td><strong>ACCESS TO CARE</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has a personal doctor</td>
<td>7.6*</td>
<td>12.1***</td>
<td>16.7***</td>
</tr>
<tr>
<td>Usual source of care*</td>
<td>3.8</td>
<td>10.4***</td>
<td>6.8</td>
</tr>
<tr>
<td>Trouble obtaining primary care appointment</td>
<td>3.6</td>
<td>0.1</td>
<td>2.1</td>
</tr>
<tr>
<td>Trouble obtaining specialist appointment</td>
<td>2.5</td>
<td>1.1</td>
<td>6.4***</td>
</tr>
<tr>
<td>ED is usual location of care*</td>
<td>−5.1*</td>
<td>−5.9***</td>
<td>−3.7</td>
</tr>
<tr>
<td>ED visit because office visit unavailable</td>
<td>4.9***</td>
<td>5.0*</td>
<td>3.5</td>
</tr>
<tr>
<td><strong>AFFORDABILITY</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost-related delay in care</td>
<td>−4.3</td>
<td>−18.4***</td>
<td>−12.8***</td>
</tr>
<tr>
<td>Skipped medication due to cost</td>
<td>−9.9***</td>
<td>−12.0***</td>
<td>−10.5***</td>
</tr>
<tr>
<td>Trouble paying medical bills</td>
<td>−8.9***</td>
<td>−14.1***</td>
<td>−10.9***</td>
</tr>
<tr>
<td>Annual out-of-pocket medical spending</td>
<td>−$33</td>
<td>−$88***</td>
<td>−$62*</td>
</tr>
<tr>
<td><strong>UTILIZATION</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any office visits in past year</td>
<td>2.3</td>
<td>2.7</td>
<td>4.3</td>
</tr>
<tr>
<td>Any ED visits in past year</td>
<td>−1.8</td>
<td>−5.8***</td>
<td>−6.6***</td>
</tr>
<tr>
<td>Number of office visits in past year</td>
<td>0.51</td>
<td>0.66***</td>
<td>0.60</td>
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<tr>
<td>Number of ED visits in past year</td>
<td>−0.12</td>
<td>−0.09</td>
<td>0.13</td>
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<tr>
<td>Any hospitalization in past year</td>
<td>−1.6</td>
<td>1.9</td>
<td>2.9</td>
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<tr>
<td><strong>PREVENTION</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Checkup in past year</td>
<td>6.9*</td>
<td>16.0***</td>
<td>11.1***</td>
</tr>
<tr>
<td>Cholesterol check in past year</td>
<td>−1.1</td>
<td>1.4</td>
<td>9.9***</td>
</tr>
<tr>
<td>Glucose check in past year</td>
<td>2.2</td>
<td>6.3***</td>
<td>4.3</td>
</tr>
<tr>
<td><strong>QUALITY OF CARE</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cholesterol check in high-risk patients*</td>
<td>2.3</td>
<td>1.1</td>
<td>2.7</td>
</tr>
<tr>
<td>Glucose check in those with diabetes*</td>
<td>4.5</td>
<td>11.1***</td>
<td>6.3</td>
</tr>
<tr>
<td>Regular care for chronic condition*</td>
<td>11.3***</td>
<td>11.5***</td>
<td>11.2***</td>
</tr>
<tr>
<td>Excellent quality of care</td>
<td>4.1</td>
<td>1.3</td>
<td>2.0</td>
</tr>
<tr>
<td>Fair/poor quality of care</td>
<td>−2.5</td>
<td>−7.3***</td>
<td>−2.3</td>
</tr>
<tr>
<td><strong>HEALTH STATUS</strong></td>
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<tr>
<td>Excellent self-reported health</td>
<td>2.4</td>
<td>5.0**</td>
<td>5.1*</td>
</tr>
<tr>
<td>Fair/poor self-reported health</td>
<td>0.6</td>
<td>−3.7</td>
<td>−6.0*</td>
</tr>
<tr>
<td>Positive depression screen (PHQ2 ≥2)*</td>
<td>2.0</td>
<td>−6.9*</td>
<td>−1.8</td>
</tr>
</tbody>
</table>

**SOURCE** Authors’ analysis of data from a telephone survey of US citizens ages 19-64, with family incomes below 138 percent of the federal poverty level, conducted each year from 2013 to 2016. **NOTES** The sample contained 10,885 adults (minus item nonresponse for each specific outcome), except where otherwise noted below. Results show differences-in-differences estimates for two expansion states (Arkansas and Kentucky) versus the nonexpansion state (Texas), by year. All analyses adjusted for sex, age, race/ethnicity, marital status, family size, education, income, urban versus rural residence, county annual unemployment rate, state, and year. All estimates are reported as percentage-point changes for binary outcomes, other than number of office and emergency department (ED) visits and out-of-pocket spending. Usual source of care was grouped into 3 categories: those reporting an office-based usual source of care, those without any usual source of care, and those using the ED as the usual source of care. *Sample limited to patients reporting heart disease, stroke, diabetes, or hypertension (n = 5,611). Sample limited to patients reporting a history of diabetes (n = 2,213). Sample limited to patients reporting at least one of the following conditions: hypertension, heart attack/coronary artery disease, stroke, asthma/chronic obstructive pulmonary disease (COPD), kidney disease, diabetes, depression, cancer, and substance abuse (n = 7,734) **PHQ2 is a two-item mental health screening questionnaire with total scores ranging from 0 to 6; see Note 29 in text. *p < 0.10 **p < 0.05 ***p < 0.01

as increased cholesterol testing and reduced fair/poor health did not become evident until 2016.

Individual-level estimates indicate that people who gained coverage saw large, policy-relevant changes. The average newly covered adult experienced savings of $337 per year in out-of-pocket medical spending, a 41-percentage-point increase in the likelihood of having a usual source of care, and a 23-percentage-point increase in
the likelihood of being in excellent health. The validity of these estimates is supported by their similarity to those from the instrumental variables analyses in the randomized Oregon Health Insurance Experiment, which showed an average reduction of $390 in medical debt, a 34-percentage-point increase in having an office-based usual source of care, and a 13-percentage-point change in the share reporting excellent, very good, or good health.31

These latter results are particularly noteworthy given policy interest in the ACA’s impact on health status. For context, prior research indicates that a self-reported health rating of fair or poor confers a mortality risk two to ten times higher than that of people in the healthiest category.28 Our finding of improved self-reported health is consistent with results in the Oregon study and other pre-ACA Medicaid expansions,27 though the evidence on similar changes under the ACA has been more mixed.6,10,11,38 In part, this likely reflects differences in sample frame and timing. Studies that have not found significant changes in self-reported health after the Medicaid expansion have typically used only one or two years of post-expansion data and have studied expansion-related coverage gains on the order of 3–8 percentage points.6,10,11,38 Here we assessed three full years of post-expansion data and studied a population experiencing a much larger coverage change of over 20 percentage points.

Adults with chronic conditions—often called “preexisting conditions” in the current policy debate—saw numerous improvements in both access to and quality of care, including more checkups, improved adherence to medications, higher rates of regular care for chronic disease, and—perhaps as a consequence of these changes—improved self-reported health. These findings build on a previous study using national data through 2014 that showed gains in two access measures for adults with chronic conditions (having a checkup and no cost-related delays in care).39 However, our study included a much richer set of outcomes and two additional years of data.

We detected an increased rate of difficulty obtaining specialist appointments in 2016 in the expansion states, particularly in Kentucky. This is consistent with a recent national study that found an increase in appointment wait times after expansion,7 as well as some studies showing greater barriers in Medicaid to specialty care than primary care.40 However, in part this may also reflect that patients without coverage are less likely to attempt to make appointments with specialists; thus, coverage expansion may increase the share who try but experience difficulties in doing so, even as their overall access to care has improved.

Our results also offer insights into alternative state approaches to coverage expansion. With increased interest under the Trump administra-
tion in state flexibility and innovation, we found that a private insurance expansion via Marketplace coverage (as in Arkansas) and a Medicaid expansion (as in Kentucky) produce similar benefits across most study outcomes. Consistent with prior comparisons, the results imply that coverage expansion is quite important for patients, but the type of coverage obtained is less critical.

**Conclusion**

Over three years of coverage expansion in two states, the ACA was associated with statistically significant and clinically relevant improvements for low-income adults’ access to care, use of preventive services, and self-reported health. Among those with chronic conditions, coverage expansion was linked to improved medication adherence, more regular communication with physicians, and improved perceived health status. As policy makers debate the ACA’s future and additional states consider whether to expand Medicaid, our findings demonstrate the benefits associated with coverage expansion for two particularly vulnerable populations: low-income adults and those with chronic conditions.

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**NOTES**

17. To access the Appendix, click on the Appendix link in the box to the right of the article online.
26. Daven M. Nonresponse rates are a problematic indicator of non-
Medicaid's lasting impressions: Population health and insurance at birth

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This article examines lasting mortality improvements associated with availability of Medicaid at time and place of birth. Using the US Vital Statistics (1959–2010), I exploit the variation in when each of the 50 states adopted Medicaid to estimate overall infant mortality improvements that coincided with Medicaid participation. 0.23 less infant deaths per 1000 live births was associated with states’ Medicaid implementation. Second, I find lasting associations between Medicaid and mortality improvements across the life-course. I build state-specific cohort life-tables and regress age-specific mortality on availability of Medicaid in their states at time of birth. Cohorts born after Medicaid adoption had lower mortality rates throughout childhood and into adulthood. Being born after Medicaid was associated with between 2.03 and 3.64 less deaths per 100,000 person-years in childhood and between 1.35 and 3.86 less deaths per 100,000 person-years in the thirties. The association between Medicaid at birth and mortality was the strongest in the oldest age group (36–40) in this study.

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Medicaid is often credited as one of the contributors to the rapid decline in infant mortality rates in the decade after 1965 (Corman and Grossman, 1985; Mason, 1991). Medicaid sought to improve infant health by increasing access to care, particularly for low-income groups that had disproportionately high mortality rates. Infant mortality in the United States declined 4.5 percent per year between 1965 and 1982 (Corman and Grossman, 1985). It has been fifty years since the first State began to offer Medicaid. This article examines the mortality of cohorts who were born into one of the largest policy changes in Twentieth Century.

A rise in living standards, better nutrition, public sanitation, clean water supply, and public health campaigns contributed to dramatic reductions in infant mortality rates in the United States during the first half of the Twentieth Century (Conrad and Crimmins-Gardner, 1978; Cutler and Miller, 2005; Deaton and Paxson, 2001; Ejo and Preston, 1996; Ewbank and Preston, 1990; Fogel, 2004; McKeown, 1976, 1979; Meeker, 1972; Preston and Haines, 1991; Szereter, 1988). After several decades of experiencing significant improvements, the year-to-year decline in infant mortality stalled to 0.5 percent by 1950 (Corman and Grossman, 1985).

Considerable national attention was focused on how infant health improvements in the US were lagging behind other developed nations (Committee on Maternal and Child Care, 1965; Falkner, 1969; Lee et al., 1980; Shapiro et al., 1968). Many efforts were made to improve prenatal and neonatal medical technology as well as to make services more accessible (Corman and Grossman, 1985). Medicaid, a public insurance program targeting low-income pregnant women and infants receiving assistance from Aid to Families with Dependent Children (AFDC), was created by Title XIX of the Social Security Act in 1965. The period beginning 1965 experienced twentieth century’s second surge of infant mortality decline (Grossman and Jacobowitz, 1981; Lee et al., 1980).

A large body of literature examining the effects of Medicaid on its recipients has emerged since the program’s inception (Baldwin et al., 1998; Braveman et al., 1993; Copeland and Meier, 1987; Currie and Grogger, 2002; Devaney et al., 1992; Goodman-Bacon, 2016; Guyer, 1990; Howell, 2001; Lykens and Jargowsky, 2002; Moss and Carver, 1998; Schor et al., 2007). However, relatively few studies examine Medicaid’s contribution to general population health and its longer-term consequences. In this paper, I examine states’ infant, childhood, and adult mortality associated with states’ Medicaid participation at time of birth. I exploit the variation in States’ timing of Medicaid adoption between 1966 and 1979 to address two research questions. (1) Was Medicaid associated with reductions in infant mortality at the population level? (2) Did states’ Medicaid

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participation at birth have lasting associations with mortality into adulthood? Macro-level views of the consequences of large-scale health care reforms are informative as the policies often influence individuals outside their immediate targeted population. And these health effects during early life may endure into adulthood. This paper follows birth cohorts over time to examine potential lasting mortality consequences associated with Medicaid.

1. Theory and literature

Population-level analyses of other high-income OECD countries show significant associations between infant mortality and the country’s health care system. Countries with publicly funded health care had lower infant mortality rates than similar countries whose health care services are generally private (Elola et al., 1995). National health care systems were associated with greater improvements in infant mortality after accounting for secular declines and changes in GDP (Macinko et al., 2004). Between 1970 and 1996, public health care systems were associated with over 3 less infant deaths per 1000 births in the United States. These publicly funded national health systems also attenuated the positive association between income inequality and infant mortality (Macinko et al., 2004).

In the United States, the introduction of the public health insurance program visibly improved insurance coverage and health care utilization. Prior to 1965, only half of low-income Americans had medical coverage (Copeland and Meier, 1987) and despite having poorer health than their wealthier counterparts, low-income individuals and families used fewer medical services (Copeland and Meier, 1987; Round et al., 1988; Wilensky and Berk, 1982). In particular, 88% of upper-income women reported seeing a physician during the first trimester of pregnancy compared to 58% of lower-income pregnant women (Andersen and Andersen, 1967; Copeland and Meier, 1987). By the late 1970s when most states had adopted Medicaid, 24 million Americans and over one third of people in households with incomes below 125% FPL received health insurance through Medicaid (Oberg and Polich, 1988; Wilensky and Berk, 1982). Medicaid specifically targeted low-income pregnant women and infants and their enrollee characteristics reflected this trait (Wilensky and Berk, 1982). Medicaid covered about three-quarters of low-income pregnant mothers and children under the age of 5, reducing the rate of uninsurance for these target groups to below the national average (Holahan and Zedlewski, 1991). By 1980, the low-income group was utilizing medical services (hospital stays and physician visits) at an equivalent rate as the higher-income groups (Copeland and Meier, 1987; Round et al., 1988; Wilensky and Berk, 1982).

Medicaid’s impact on its recipients is clear. Goodman-Bacon (2016) and Currie and Gruber (1996) find convincing evidence that Medicaid expansions in the 1980s contributed to reductions in infant mortality rates. Goodman-Bacon (2016)’s analysis exploited variations in states’ timing of Medicaid adoption and differences in shares of immediately eligible children throughout the 1960s and 1970s. He finds significant reductions in infant and child mortality associated with Medicaid especially among populations that were more likely to become eligible for public assistance. Currie and Gruber (1996) examined subsequent expansions of Medicaid in the 1980s. They standardized states’ Medicaid generosity by simulating the proportion of women who would be eligible from a nationally representative sample of 3000 women from the Current Population Survey each year. Their method allowed the authors to effectively isolate the effects of States’ extent of Medicaid expansions from the composition of their residents.

However, Medicaid may also have had spillover effects on women and infants who did not gain insurance coverage from the public program. Theories in diffusion suggest that as a greater proportion of women gain access to pre- and post-natal care, the health of all women would improve. Health knowledge spreads through interpersonal networks as well as institutional organizations (Barker, 1991; Tarde, 1962; Green et al., 2009). Interaction with peers, friends, and family as well as health care providers influence how individuals approach their health (Christakis and Fowler, 2007, 2009; Clanz et al., 2008). Social network effects on health behavior are not trivial. Groups of socially connected people quit smoking in concert at different times despite the already ‘generalized knowledge’ of smoking’s adverse effects on health (Christakis and Fowler, 2007). Medicaid connects more women with health care providers and encourages transfer of health knowledge from physicians to the public. As more women adopt good nutrition and refrain from risky health behaviors, the more likely they are to influence other women in their social networks, even those who always had access to health care services.

Increasing health insurance coverage through Medicaid can improve health care delivery for everybody, including those who were always insured. Rates of smoking fell from 16.6% to 6.2% per 1000. These infants and neonatal services may have increased when more women in the community gained health insurance. Adoption of Medicare (another public insurance program for people over 65) was associated with new hospital entries, increased adoption of cardiac technology, and increased medical spending on non-Medicare patients (Finkelstein, 2007). Also, improving coverage could have alleviated some of the increased risk and related mortality (Wherry and Meyer, 2016) among cohorts who were eligible for Medicaid during their childhoods.

These articles build up a longstanding literature that connects prenatal and early-life environment to later-life health outcomes. One of the most well-known of these studies finds a positive link between ischemic health disease mortality and infant mortality rates at the place and time of birth (Barker and Osmond, 1986). Their study suggests that early-life living conditions and nutrition (measured by local infant mortality rates) have long-term consequences well into adulthood even when they move to another region. Quasi-experimental studies also find poorer health outcomes among birth cohorts born during the 1918 Influenza Pandemic and the 1944 Dutch Famine relative to cohorts born immediately before or after these sudden deteriorations in living conditions (Almon, 2006; Roseboom et al., 2001). The literature is strongly suggestive of initial conditions at birth having long-lasting health consequences. Medicaid explicitly aims to improve prenatal health and birth outcomes. Thus, I expect these wide-spread efforts to translate into improved health throughout the life-course.

The first research question adds to the literature by examining the overall changes in infant mortality rate—recipients and non-recipients alike—associated with States’ Medicaid participation. The second part of this paper shows that cohorts who were born

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after their states adopted Medicaid had lower mortality in childhood and adulthood compared to cohorts born immediately prior to Medicaid.

Before delving into the analyses, I briefly describe the policy context of States’ Medicaid participation during the period after 1965. The program offered federal grants to states to provide health insurance to eligible persons. During the early years, the federal government gave considerable flexibility in when or whether each state could participate in the program. States that decided to participate had to provide coverage to recipients of Aid to Families with Dependent Children (AFDC) mostly, pregnant women and infants, and non-elderly disabled persons (Medicaid eligibility diverged from AFDC-eligibility in the 1980s). States began to participate in Medicaid quickly after the Title XIX of the Social Security Act in 1965. States in the Northeast were relatively early adopters of Medicaid. Pennsylvania and New York—the two largest states in this region—were among the first. The New England states followed in quick succession and New Jersey was the last to implement Medicaid in 1970. Infant mortality rates among the states in the Northeast in 1965 were far apart to each other, ranging between 22 and 23 deaths per 1000 live births. Infant mortality among states in the Midwest and West had greater variability. Utah had the lowest IMR at around 18 deaths per 1000 and Illinois had the highest at over 25 deaths per 1000. Most of these states adopted Medicaid prior to 1968. Southern states had higher rates of infant mortality on average. Mississippi’s infant mortality rates were exceptionally high at 40 deaths per 1000. The remaining states ranged between 22 and 31 deaths per 1000. The adoption of Medicaid in the South was evenly spread out across the years between 1966 and 1970.

States’ timing of Medicaid implementation was different from other public policies that the Johnson administration introduced to combat poverty in the 1960s and 1970s. The Food Stamp Act of 1964 was the other major initiative targeting welfare recipients (Medicaid eligibility diverged from AFDC-eligibility in the 1980s). The Food Stamp Program was implemented at the county-level and its implementation stretched out between 1961 and 1976. Thirty percent of the US population already had access to food stamps by the time the first states began to offer Medicaid in January 1966. About a quarter of the population gained access to each other, ranging after 1970 when all but two states had joined the Medicaid program. Furthermore, states’ Medicaid participation had little bearing on its counties’ food stamp participation start date. Most notably, most counties in New York, Oklahoma, and Massachusetts began to offer food stamps relatively late, despite being early adopters of Medicaid. Many counties in Texas and California did not offer food stamps until after 1970. Thus, the exact timing of Medicaid implementation appears exogenous to other prenatal and infant health policy initiatives that occurred during this period. DATA

Using the US Vital Statistics micro-data, I examine mortality patterns for birth cohorts born between 1959 and 1979—the 20-year period surrounding the introduction of Medicaid in 1965. I start my analysis in 1959 when Hawaii became the last state to join the US. I use the natality micro-data for births between 1959 and 1979 to calculate the number of births by year for each state. The data does not include births to US citizens outside the United States. To derive the state-age-specific mortality rates for cohorts born between 1959 and 1979, I use the mortality micro data from 1959 to 2010. Mortality data for New Jersey is missing for the years, 1962 and 1963. Mortality data for Hawaii is incomplete for prior to 1968 and is excluded from the analyses. In 1972, the US Vital Statistics contains only a 50 percent sample of death records. I have multiplied the number of deaths in 1972 by a factor of two in my analyses.

The analyses do not differentiate race. The US Vital Statistics changed the way it categorized race several times between 1968 and 2010. Prior to 1968, people were categorized as either white or non-white. After 1968, the non-white population was classified into sub-groups and people with Latin American heritage were separated from the white classification (up until the late 1960s, they were categorized as white). The changes in how the data classifies race make it difficult to compare minority groups across the years. In addition, the number of non-whites being born and dying in some states were so small that the age-specific mortality rates quickly became unreliable.

2. Analytic strategy

The main analyses exploit the variation in when States adopted Medicaid to estimate age-specific mortality improvements associated with Medicaid. Using the natality and mortality files, I create a life-table for each birth cohort in each state. These life-tables summarize the mortality experiences of cohorts born and living in each of the 50 states until age 40. I estimate changes in age-specific mortality rates associated with whether Medicaid was available in the state at time of birth. In these regression models, I control for secular declines in mortality with year fixed-effects. All regression models have panel-corrected standard errors and they also correct for heteroscedasticity. These corrections account for inter-dependent observations within states.

This framework takes advantage of states’ variation in the timing of Medicaid start. States’ baseline infant mortality in 1965 had no relation to when they joined the Medicaid program. Utah who had the lowest infant mortality rate adopted Medicaid at the same time as West Virginia who had the highest infant mortality. A low correlation coefficient across all states confirms that states’ infant mortality rates in 1965 did not determine its Medicaid participation.

Systematic migration of would-be mothers of healthy babies into states offering Medicaid is unlikely. Interstate migration flows of a demographic group that would produce the healthiest babies (college-educated persons between the ages 25 to 39) have no relations to States’ timing of Medicaid participation. California, an early adopter, and Florida, a late adopter, were among the top recipients of the young, college educated population in the late 1960s (Goworowska and Gardner, 2012). Young, single, college-educated people consistently out-migrated from Minnesota and Alabama despite one being an early Medicaid adopter and the other, a late adopter. Furthermore, the magnitudes of these flows are small. Thirteen percent of persons aged 25 to 39 moved to a different state between 1965 and 1970. Out of the thirteen percent, less than thirty percent were college educated people.

An increase in births in response to Medicaid availability may also undermine the analytical framework. While the number of births did go up during this period, the fertility rate of women aged 15 to 44 (general fertility rate) declined (Hamilton and Ventura, 2006). A more thorough examination of the natality files show no statistically significant changes in births associated with the availability of Medicaid in the mothers’ home states.

3. Results

Research Question 1: Is Medicaid associated with lower infant mortality rates?

I examine the change in infant mortality associated with States’ implementation of Medicaid to address my first research question. I calculate the infant mortality rate for each state and year between 1959 and 1979 as follows.
IMR<sub>st</sub> = Number of deaths for infants under age one residing in state s, in year y/1000 live births to mothers who are residents of state s, in year y.

Confirming prior studies (Corman and Grossman, 1985; Grossman and Jacobowitz, 1981; Lee et al., 1980) the national infant mortality rate shows an accelerated decline during the period after 1965. Mortality levels varied between states and regions (Southern states had relatively higher infant mortality) but this general pattern of decline was consistent throughout the nation.

Figs. 1 and 2 examine the mortality decline in relation to states’ Medicaid implementation dates. The graphs align the states’ infant mortality by their Medicaid start year. Fig. 1 descriptively shows faster improvements in infant mortality during the years after Medicaid relative to the years before Medicaid. At the national level, the rate of IMR decline appears to be about 2.5 times greater during the seven years following Medicaid than during the seven years leading up to the program’s implementation.

Fig. 2 shows the declines in infant mortality surrounding Medicaid for each of the four US regions. Greater change in the rate of decline after Medicaid is particularly pronounced for states in the Northeast and the Midwest.

Table 1 shows the estimated change in infant mortality associated with Medicaid. The first regression shows that states’ infant mortality was on average 0.23 deaths per 1000 less after Medicaid started as compared to the secular decline in infant mortality with year fixed-effects and accounting for interdependence within states. As expected, the magnitude of infant mortality decline associated with national public insurance in the United States is smaller than what has been observed among European countries (Macinko et al., 2004). However, this change in infant mortality is not negligible. An increase in 0.23 deaths per 1000 births in 1970 (3.7 million live births) would translate into almost 1100 more infant deaths.

Research Question 2: Did the availability of Medicaid at birth have lasting consequences on mortality throughout childhood and into adulthood?

I examine changes in mortality rates in five-year age groups between cohorts born before and cohorts born after Medicaid was implemented in their states at the time of their births. The oldest age group in this analysis is the 36 to 40 age period. I calculate age-specific mortality rates from life tables of cohorts born between 1959 and 1979. I then derive the mortality rates per 100,000 person-years lived for each five-year age period from each birth cohort.

\[ IMR_{s,0} = \frac{100,000 \times \text{deaths in state, s} \times \text{among people born in year, b whose age was between } x \text{ and } x+5}{\text{number of person-years lived in state, s} \times \text{by people born in year, b at ages } x \text{ and } x+5} \]

Unlike infant mortality, mortality for older age groups did not experience steady and constant declines throughout the 1960s and 70s. In fact, mortality rates appear to increase after 1970 for younger adults (Murphy et al., 2013). Mortality data ends in 2010 when the 1970 birth cohort is 40 years old. Constricted by data limitations and possible confounding effects from later mortality trends, I limit this section of the analysis to the 1959–1970 birth cohorts. All states except Arizona and Alaska had implemented Medicaid by the end of 1970.

In Table 2 I estimate the change in mortality rates (deaths per 100,000 person-years) associated with the availability of Medicaid in the state at time of birth. The regressions also include year fixed-effects with panel corrected standard errors and corrections for heteroscedasticity. Cohorts born after Medicaid implementation showed significant mortality improvements in all age groups except the 20s. Cohorts born after Medicaid adoption had lower mortality rates throughout childhood. Medicaid was associated with 2.03 less deaths per 100,000 person-years between ages 1 and 5. The mortality decline that coincided with Medicaid at birth increased to about 2.52 less per 100,000 person-years for the 11 to 15 age-period and to 3.64 less per 100,000 person-years for the 16

![Fig. 1. Logged ratio of infant mortality rate surrounding Medicaid start.](image_url)

Notes: Year 0 denotes the year prior to Medicaid adoption. Values are average logged ratio of states’ infant mortality rates relative to the year immediately prior to Medicaid implementation. Calculations are weighted by the number of births.
increasing thirties. Mortality driven by Medicaid model rates level. to 20 age-period. All of these coefficients are significant at the 0.001 level. The association between Medicaid at birth and mortality rates during the twenties is not as well defined. The regression model shows that mortality rates associated with the presence of Medicaid at birth is between −0.42 per 100,000 and 0.87 per 100,000 person-years during the 20 to 29 age-period. One explanation for these low coefficients is that the deaths from unintentional injury, homicide, and suicide are particularly high between ages 20 and 29. Mortality rates during this age-period are primarily driven by deaths from injury which may have limited connections to receiving health care in early life. The association between mortality rates and Medicaid at birth becomes stronger in the thirties. Cohorts born after Medicaid had 1.35 less deaths per 100,000 person-years in their early thirties and 3.86 less deaths per 100,000 person-years in their late thirties. HIV and cancer accounted for more deaths than homicide and suicide in the early thirties and cancer and heart disease emerged as two of the top three leading causes of death in the late thirties (CDC). The increasing association between mortality and Medicaid in older age-periods is expected. Prior studies on the consequences of poor health conditions in early life also show stronger outcomes in later adulthood (Almond, 2006; Barker and Osmond, 1986).

The population implications of these mortality declines attributed to Medicaid is not trivial. To illustrate the magnitude of these coefficients, I show how the 1970 birth cohort would look like without the mortality declines associated with Medicaid in these regression models. Table 3 presents the 1970 cohort’s under-40 mortality schedule with and without the changes in mortality attributed to Medicaid in Tables 1 and 2. The number of survivors at the beginning of each age group (lx) is based on the actual number of births in the United States in 1970. I apply the age-specific mortality rates with and without the estimated decline associated with Medicaid to the 1970 birth cohort and compare the resulting number of survivors at the end of age 40 in 2010. The coefficients attributed to Medicaid in these regression models amount to 3532 fewer people alive in 2010.3532 people represent a 1.7 percent increase in under-40 mortality for the 1970 cohort and 0.1 percent of all live births in the 1970.
4. Limitations

The first limitation is the analyses' use of state of residence at time of death to determine whether Medicaid was available at birth. The NCHS makes place of birth available only for mortality files between 1979 and 2004 and cannot provide data to create complete life-tables for cohorts born during the key period when Medicaid was rolled out across the states.

I derive age-specific death rates using actual number of deaths by year, age, and state against the cohort's corresponding number of births in the same state. These age-specific death rates inflate from deaths of persons born out-of-state and deflate when the net-migration of people born in those states are below zero. I compare the place of birth against places of death for people who died between 1979 and 2004 to evaluate the potential effects of migration on the results. Ninety five percent of infants who died before turning age one was born in the same state that they died in. This strong relationship between place of birth and death gradually decreases in older age-periods. Over seventy-five percent of children who died in the US were born in the same state. About sixty-two percent of deaths in young adulthood occurred in the states of their birth. Nevada, Wyoming, and New Hampshire were the top three states who had the greatest proportion of deaths by people who were born outside the state. Over 70 percent of deaths between 30 and 39 were from persons born outside of Nevada (the overall percent across all age groups was 48 percent). About fifty percent of younger adults who died in Wyoming and New Hampshire were born out-of-state. Fortunately, the combined deaths from these states made up about one percent of all under-40 deaths in the United States during this period. California, New York, Illinois, Pennsylvania, Texas, and Ohio—major contributors of under-40 deaths—all had relatively low percentage of deaths by people born out-of-state. The only problematic state was Florida. Florida contributed over five percent of under-40 deaths, thirty percent of which were from people born outside Florida. New York State was the largest state of origin. New York-born persons made up about five percent of under-40 deaths in Florida.

People who were born outside the United States also contributed to deaths in the analyses. Less than one percent of infant deaths were by foreign-born infants. The percentage of deaths by foreign-born increased to 5.8 in childhood and then to 11 percent in early adulthood. Mexico was the most common place of birth for foreign born people who died in the US particularly for deaths occurring between ages 16 and 30. California and New York had the largest proportion of deaths by persons born outside the 50 states at 36 and 14 percent respectively. migrations of people aged 30-39 by state of birth will likely dilute the changes in mortality associated with Medicaid at birth. It is unlikely that migration patterns coincided with the availability of Medicaid at a person's time and place of birth. Thus, the relationship between Medicaid and mortality in this paper, particularly for older age-periods, is likely to be a conservative estimate.

The analyses cannot account for all possible confounding events that occurred during the study period. Between-state differences in abortion laws and availability of family planning services may have

Table 1
State infant mortality regressed on timing of Medicaid participation.

<table>
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<td></td>
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<td>-10.565</td>
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<td></td>
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<td>-11.694</td>
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<td>1978</td>
<td>-12.020</td>
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<td>1979</td>
<td>-12.721</td>
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</tr>
<tr>
<td>Constant</td>
<td></td>
<td>26.011</td>
<td>0.886</td>
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Notes: Regression models have panel-corrected standard errors and are corrected for heteroscedasticity. Estimates are weighted by the number of births in each state during a given year. Data for New Jersey is missing for 1962 and 1963. Data for Hawaii is missing for years prior to 1968.

Table 2
States' mortality in five-year age groups regressed on Medicaid availability at birth.

<table>
<thead>
<tr>
<th>Age 1-5</th>
<th>Age 6-10</th>
<th>Age 11-15</th>
<th>Age 16-20</th>
<th>Age 21-25</th>
<th>Age 26-30</th>
<th>Age 31-35</th>
<th>Age 36-40</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medicaid (0/1)</td>
<td>-2.03</td>
<td>-2.60</td>
<td>-2.52</td>
<td>-3.64</td>
<td>-0.42</td>
<td>0.87</td>
<td>-1.35</td>
</tr>
</tbody>
</table>

Notes: Mortality is measured as number of deaths per 100,000 person-years lived in each five-year age range. Regression models have panel-corrected standard errors and corrections for heteroscedasticity. They are also weighted by birth cohort size. Analysis is limited to cohorts born prior to 1971. Data for New Jersey is missing for 1962 and 1963. Data for Hawaii is missing for years prior to 1968. All coefficients have p-values less than 0.001.
influenced the composition of infants born each state (Scrihmshaw, 1978). The Family Planning Services and Population Research Act under Title X increased federal funding for family planning services through Medicaid in 1972 and in 1973 abortion became legalized after the Supreme Court’s decision in Roe v. Wade. These efforts may have reduced the number of unhealthy pregnancies contributing to the decline in infant mortality after the mid-1970s.

Changes in states’ economic conditions would also have influenced infant mortality during the study period. In a sensitivity analysis, I categorized the fifty states into “high income growth” and “low income growth” groups. These groups were determined by calculating the slope of each state’s per capita personal income growth between 1960 and 1980 (data source: Bureau of Economic Analysis). Parallel difference-in-difference analyses stratified by income growth group confirm that the association between Medicaid and infant mortality decline holds for both low- and high-income growth states. The coefficient sizes were higher for low income growth states, however. This finding suggests that the overall effect of Medicaid may have been stronger in low income growth states where more residents were eligible for public insurance than high income growth states. The relationship between Medicaid and lowered life-course mortality also held consistently among high income growth states across all age groups but not among low income growth states suggesting that the ambiguity in the association between Medicaid at birth and mortality in the early adulthood in the main analyses is driven by the low income growth states.

This study is also limited by the length of its data. The 1970 birth cohort only reached age 40 in 2010 and mortality changes associated with Medicaid could only be examined at relatively young ages. Prior literature suggests that the effects of early-life health environment become more prominent at older ages when mortality rates increase. Similarly, the association between Medicaid availability at birth and adult mortality may become stronger in later years. In this paper, the oldest age-period (36–40) had the strongest association between Medicaid at birth and mortality.

Lastly, the analysis does not distinguish race. Medicaid would have had a greater effect on African Americans as a greater proportion of African American families were recipients of Aid to Families with Dependent Children and thus most likely to be eligible for Medicaid. The poor data quality for the non-white population in the 1950s and 1960s does not produce dependable results when the analyses are separated by race. Many states during this period had very few non-white births and even fewer deaths. Age-specific death rates quickly deteriorate into noisy trends for many smaller states. Furthermore, the NCHS changed the categorization of whites and non-whites several times during this period.

Medicaid likely had a greater influence on the non-white population. A greater proportion of African Americans would have been eligible for Medicaid as more African American families were receiving AFDC. Infant mortality among non-whites during this period was also substantially higher and increasing access to medical care may have had a greater impact on infant mortality.

5. Discussion

Faster declines in infant mortality accompanied the advent of Medicaid in the late 1960s. These improvements that coincided with the federal public insurance program were substantial and its link to population mortality remained significant for decades after its inception. This paper shows that significant declines in infant mortality coincided with states’ Medicaid adoption and cohorts who were born after Medicaid had lower mortality throughout their childhoods and adulthoods.

While Medicaid was only available to a subset of the population, changes in mortality were observed at the population level. It is likely to have directly improved the health of the neediest group and raised the average survival rate. It may also have had a positive health impact on women and infants at large by creating conduits for health knowledge to travel from researchers and physicians to the general public. As more women interacted with the medical system and changed their health beliefs and behavior, they reinforced the health knowledge of other women. Medicaid would have enhanced concurrent public health initiative and medical advance to reduce infant mortality. Combined, these factors lead to the large infant mortality improvements observed in the United States in the period after 1965.

The findings of this paper reiterate the significance of conditions in-utero and infancy on later-life health outcomes. Being born into a state with public health insurance had strong associations with mortality long after cohorts aged out of eligibility. The results find stronger associations between Medicaid at birth and mortality at ages where natural (non-injury) deaths were the leading causes. In the future, cohorts born between 1960 and 1970 will reach older ages where more people will die from natural causes such as heart disease and cancer than from injuries. I expect the relationship between Medicaid at birth and mortality to become stronger.

Acknowledgements

The author is grateful for the comments and feedback from Jason Schnittker, Michel Guillot, and Jere Behrman. This research received support from the Population Research Training Grant (NIH T32 HD007242) awarded to the Population Studies Center at the

Table 3

<table>
<thead>
<tr>
<th>x</th>
<th>n</th>
<th>With Medicaid</th>
<th>Without Medicaid</th>
</tr>
</thead>
<tbody>
<tr>
<td>lx</td>
<td>dx</td>
<td>nlx</td>
<td>nmx</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>3,176,156</td>
<td>3,679,418</td>
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<td>1</td>
<td>5</td>
<td>3,662,080</td>
<td>17,812,071</td>
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<td>6</td>
<td>5</td>
<td>3,681,148</td>
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<td>3,579,480</td>
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<td>26</td>
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<td>5</td>
<td>3,538,217</td>
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<td>41</td>
<td>5</td>
<td>3,507,601</td>
<td>3,504,068</td>
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</tbody>
</table>


Notes: Life tables use actual number of births in 1970 as the radix. Mortality rates are predicted values from regression results in Tables 1 and 2 nmx for the under 1 age group is the number of deaths per life birth. All other nmx values are calculated as the number of deaths per one person-year lived during the age-period.
References


Understanding The Relationship Between Medicaid Expansions And Hospital Closures

ABSTRACT Decisions by states about whether to expand Medicaid under the Affordable Care Act (ACA) have implications for hospitals’ financial health. We hypothesized that Medicaid expansion of eligibility for childless adults prevents hospital closures because increased Medicaid coverage for previously uninsured people reduces uncompensated care expenditures and strengthens hospitals’ financial position. We tested this hypothesis using data for the period 2008–16 on hospital closures and financial performance. We found that the ACA’s Medicaid expansion was associated with improved hospital financial performance and substantially lower likelihoods of closure, especially in rural markets and counties with large numbers of uninsured adults before Medicaid expansion. Future congressional efforts to reform Medicaid policy should consider the strong relationship between Medicaid coverage levels and the financial viability of hospitals. Our results imply that reverting to pre-ACA eligibility levels would lead to particularly large increases in rural hospital closures. Such closures could lead to reduced access to care and a loss of highly skilled jobs, which could have detrimental impacts on local economies.

Ongoing debates about the future of health care in the US and the Affordable Care Act (ACA) have focused on the impact of various elements of the ACA and proposed alternatives on people’s access to affordable health insurance coverage. Less attention has been paid to the implications of coverage changes on hospitals’ financial performance and sustainability.

Access to care is a fundamental element of the US health care system, and policy makers have long recognized the relationship between hospitals’ financial sustainability and patients’ access to hospital care. Policies that promote improved health insurance coverage, such as expansions of eligibility for Medicaid, lead to increased hospital revenue at the point of care because hospitals are reimbursed for care that would otherwise be uncompensated. Medicaid is the primary source of health insurance coverage for low-income Americans, and its role and structure figure prominently in the larger health care debate. Recent research has shown that the increase in the proportion of insured people in states that expanded Medicaid was about double the increase in nonexpansion states. The increase in coverage was particularly large among childless adults, the eligibility category targeted by the ACA expansion. Overall, increased coverage occurred with either little or no “crowd-out” of private coverage. Unsurprisingly, increased health insurance coverage has led to reduced expenditures on uninsured patients by hospitals in expansion states.

Evidence exists on the positive impact of Medicaid expansions on financial performance, but an important unanswered policy question is the
effect of Medicaid expansion decisions on hospital closures. This policy question has renewed importance as Congress continues to consider policies that could fundamentally change the federal government’s role in funding Medicaid and reduce the ability of states to cover low-income residents. Recent research has identified an increase in the rate of rural hospital closures in the period after the ACA but did not specifically model the impact of Medicaid expansion decisions. To our knowledge, the relationship between hospital closures and states’ Medicaid expansion decisions has not been analyzed with multiple years of postexpansion data. We sought to fill this gap.

In this study we hypothesized that hospitals in states that expanded Medicaid were less likely to close than hospitals in states that did not expand Medicaid. The primary mechanism underlying this hypothesis is that increased Medicaid coverage for previously uninsured people reduces spending on uncompensated care and strengthens hospitals’ financial position in expansion states. We tested this hypothesis by estimating the association between the ACA’s Medicaid expansion and hospital financial performance and closure.

**Study Data And Methods**

The analysis was limited to nonfederal, short-term, general and critical access hospitals in operation for at least one year in the period 2007–15. **Critical access hospital** is a designation given to rural hospitals by the Centers for Medicare and Medicaid Services (CMS) that allows them to receive more generous cost-based reimbursement from Medicare, with the goal of promoting access to inpatient care in rural areas.

Hospitals in states that expanded childless adults’ eligibility for Medicaid after 2014 were excluded from the analysis, to eliminate potential bias from Medicaid expansions related to concerns about hospital finances. Our primary specifications exclude a 2013–14 “washout” period that reflects the time period when enrollment related to the expansion was increasing but had not yet reached its full impact on uninsurance rates. In addition, hospital data are reported by fiscal year, which is different from calendar year. State-level Medicaid and Children’s Health Insurance Program (CHIP) income eligibility limits were collected for four income-based eligibility categories: adults with dependent children, childless adults, children (including those eligible for CHIP), and pregnant women.

**Hospital Data** We used the CMS Provider of Services file to identify potential hospital closures in the period 2008–16, based on Medicare provider IDs that were no longer operating because of either closure or merger/acquisition. From this set of hospitals, we verified actual hospital closures, defined as hospitals’ ceasing to deliver short-term general hospital services, from multiple sources.

Hospital financial outcomes were computed using CMS’s Healthcare Provider Cost Reporting Information System reports. Total margin is defined as total income divided by revenue; operating margin is net patient income divided by net patient revenue; and Medicaid and uncompensated care margin is defined using net income related to treatment of Medicaid and uninsured patients divided by the net revenue from treating these patients. Information about the latter became available for all hospitals beginning in 2011. This margin was included because it directly measures the financial benefit to hospitals when patients switch from no insurance to Medicaid. Net revenue included payments received from state and local governments’ indigent care programs and Medicaid but did not include disproportionate-share hospital (DSH) payments, because reliable data were not available at the hospital level. Revenues and expenses related to CHIP were not included in the calculation because these were unrelated to the ACA Medicaid expansion. The financial variables were trimmed at the first and ninety-ninth percentiles of the original distribution to prevent unrealistically large outliers from biasing our results.

Data on hospital ownership, teaching status, bed size (numbers of beds), critical access hospital status, rural location, and numbers of profitable and unprofitable services were drawn from the Healthcare Provider Cost Reporting Information System and the Provider of Services files. Profitable services included open heart surgery, cardiac catheterizations, chemotherapy, neurosurgery, and obstetrics. Unprofitable services included alcohol and drug services, burn care units, and psychiatric services (inpatient, outpatient, child, and adolescent, and emergency). Following previous literature, we defined a hospital as rural if it was in an area with a Rural-Urban Commuting Area code greater than 4 or if it was designated as a critical access hospital. Fiscal years that overlapped two calendar years were assigned to the calendar year that represented the majority of days within the fiscal year.

We calculated a Herfindahl-Hirschman Index to measure the competitiveness of local markets, defined using 2007 hospital referral regions. County-level per capita income and rates of uninsurance and unemployment were obtained from the Census Bureau.

**Statistical Methods** We computed the mean
We hypothesized that hospitals in states that expanded Medicaid were less likely to close than hospitals in states that did not.

level and pre- and postexpansion change over time of all outcomes and covariates in expansion and nonexpansion states. We tested the significance of changes over time and the difference between the changes in expansion and non-expansion states.

The association of ACA Medicaid expansions and the outcomes was estimated using a difference-in-differences specification. The specification included a dichotomous variable that equaled 1 if the hospital was in a state that expanded Medicaid in 2014 and 0 otherwise. A post variable that equaled 1 during the postexpansion period was interacted with the expansion state variable to measure the change in the outcome in expansion states relative to change in nonexpansion states. In other words, we estimated the difference between pre- and postexpansion changes in the outcomes experienced by hospital in expansion and nonexpansion states.

Outcomes were modeled as a function of hospital and market characteristics and the state Medicaid federal poverty level eligibility limits for children, parents, and pregnant women. We controlled for changes in eligibility for these categories, to isolate the impact of the ACA’s expansion of eligibility for childless adults. We modeled the probability of closure as a function of previous-year covariates to take into account the timing of the closure decision, which is generally made before the actual closure. In addition, the data were incomplete in the year of the closure, because the hospital was not in operation the entire year. The hospital closure model was estimated using logistic regression. The analyses of financial outcomes included hospital and year fixed effects, and the analysis of closures included year fixed effects. We performed sensitivity analyses of the closure models by estimating specifications that included the washout period (2013–14), included states that expanded Medicaid in 2015 or 2016, excluded states that expanded Medicaid before 2014, or included state random effects. We also estimated linear probability models that included either state fixed effects or random effects.

We also estimated a specification with actual Medicaid poverty-related eligibility levels for childless adults in place of the interaction between the “Post” period and “Expansion State” status (denoted as Post*Expansion State hereafter). This specification directly measured the association of childless adult eligibility levels with the probability of hospital closure.

We tested whether the association between Medicaid expansion and the outcomes varied depending on local uninsurance rates for adults measured in the period before expansion. This specification tested our hypothesis that hospitals in expansion states would experience substitution of uninsured patients for Medicaid patients. If this substitution was driving our results, the association of the expansion and each outcome would become stronger as the preexpansion rate of uninsurance increased. This was tested by adding pre-2014 local adult uninsurance rates to the specification and interacting it with the Expansion State, Post, and Post*Expansion State variables. We reported the percentage change in the probability of closure calculated with the marginal effect of the Post*Expansion State variable evaluated at local uninsurance rates ranging from 0 percent to 30 percent. All standard errors were clustered by state. To avoid the known problems of interaction terms in logistic models, we report the percentage change in the probability of closure that was calculated as the marginal effect divided by the closure probability.

The difference-in-differences results had a causal interpretation if a number of assumptions were satisfied. Most importantly, the decision to expand Medicaid must be exogenous (that is, not confounded). This would hold true if states decided to expand Medicaid without considering hospitals’ financial performance or viability. Hospitals in all states must be subject to “common shocks”—which implies that we needed to control for all relevant time-varying differences between hospital markets in expansion and non-expansion states. For example, we included median income and unemployment rates to control for differences in the local economy, and Medicaid eligibility levels for childless adults, children, and pregnant women to control for changes in poverty-related eligibility levels experienced in expansion and nonexpansion states during the study period. Finally, hospitals in nonexpansion states should be representative of hospitals in expansion states, to provide an estimate of what
would have occurred if Medicaid had not been expanded.

We performed tests of preexpansion parallel trends in expansion and nonexpansion states to test the validity of our assumptions. In the closure specification we also tested whether the adjusted mean probability of the closure in the pre-expansion period was the same in expansion and nonexpansion states because we estimated a nonlinear model. Finally, we tested whether the change in the covariates from the pre- to the post-expansion period was the same in expansion and nonexpansion states.

All analyses were conducted using Stata, version 14.2. This study was deemed exempt from review by an Inter-Institutional Review Board.

**Limitations** Our study had several limitations. First, we could not observe the timing of the information that was used by hospital executives to inform closure decisions.

Second, hospital fiscal years often do not correspond to calendar years. Thus, data representing fiscal years 2013 and 2014 might reflect a mix of data for the two calendar years. To minimize this potential bias, we excluded data during a washout period.

Third, the decision to expand Medicaid was not random. Although we controlled for potential confounders in our models, and the testable assumptions required for causal inference were satisfied, we cannot definitively assert causality.

### Study Results

States that did not expand Medicaid experienced a large increase (0.429 closures per 100 hospitals) from 2008–12 to 2015–16 in the unadjusted rate of closures (exhibit 1). In contrast, the closure rate decreased by 0.33 per 100 hospitals in expansion states. Total margins improved by 0.011, or about 33 percent, in expansion states; although the increase was more than the 0.005 increase in nonexpansion states, the difference-in-differences was not significant. However, the difference between the unadjusted change in the Medicaid and uncompensated care margins was quantitatively larger in expansion states than nonexpansion states and statistically significant.

### EXHIBIT 1

Summary statistics for states, by Medicaid expansion status and period

<table>
<thead>
<tr>
<th>Closures per 100 hospitals</th>
<th>Did not expand Medicaid (n = 14,549)</th>
<th>Expanded Medicaid (n = 15,548)</th>
<th>Difference-in-differences*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Financial Indicators</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total margin</td>
<td>0.03</td>
<td>0.04</td>
<td>0.005</td>
</tr>
<tr>
<td>Operating margin</td>
<td>-0.03</td>
<td>-0.04</td>
<td>-0.017***</td>
</tr>
<tr>
<td>Medicaid and uncompensated care margina</td>
<td>-0.80</td>
<td>-0.92</td>
<td>-0.12***</td>
</tr>
<tr>
<td><strong>Medicaid Eligibility Thresholdb</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adults with dependent children</td>
<td>59</td>
<td>44</td>
<td>-14.2***</td>
</tr>
<tr>
<td>Childless adults</td>
<td>0</td>
<td>6</td>
<td>6.1</td>
</tr>
<tr>
<td>Childrenc, d</td>
<td>215</td>
<td>234</td>
<td>19.2***</td>
</tr>
<tr>
<td>Pregnant women</td>
<td>185</td>
<td>202</td>
<td>17.1***</td>
</tr>
<tr>
<td><strong>Hospital Characteristics</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>0.57</td>
<td>0.56</td>
<td>-0.01</td>
</tr>
<tr>
<td>Teaching</td>
<td>0.16</td>
<td>0.17</td>
<td>0.01</td>
</tr>
<tr>
<td>For profit</td>
<td>0.21</td>
<td>0.21</td>
<td>0.01</td>
</tr>
<tr>
<td>Public</td>
<td>0.30</td>
<td>0.26</td>
<td>-0.04***</td>
</tr>
<tr>
<td>Critical access</td>
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<td>0.28</td>
<td>0.00</td>
</tr>
<tr>
<td>200 or more beds</td>
<td>0.26</td>
<td>0.26</td>
<td>0.00</td>
</tr>
<tr>
<td>100–199 beds</td>
<td>0.22</td>
<td>0.19</td>
<td>-0.03***</td>
</tr>
<tr>
<td>No. of unprofitable services</td>
<td>0.82</td>
<td>1.03</td>
<td>0.21***</td>
</tr>
<tr>
<td>No. of profitable services</td>
<td>1.34</td>
<td>1.75</td>
<td>0.41***</td>
</tr>
<tr>
<td><strong>Local-Market Characteristics</strong></td>
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<tr>
<td>Median income ($10,000s)</td>
<td>4.38</td>
<td>4.83</td>
<td>0.45***</td>
</tr>
<tr>
<td>Unemployment rate</td>
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</tr>
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<td>Herfindahl-Hirschman Index</td>
<td>0.16</td>
<td>0.17</td>
<td>0.02</td>
</tr>
</tbody>
</table>

**Source** Authors’ analysis of data from the Centers for Medicare and Medicaid Services, the Henry J. Kaiser Family Foundation, and the Census Bureau. **Notes** Standard errors were calculated with state clustering. Total, operating, and Medicaid and uncompensated care margins are defined in the text. *Change over time in states that expanded eligibility for Medicare versus change in states that did not. † Data were first available for 2011. ‡ Percent of federal poverty level. †+ Includes those eligible for the Children’s Health Insurance Program. *Proportion of hospitals. **p < 0.05 ***p < 0.01
The childless adults category saw the largest increase in eligibility thresholds in expansion states because childless adults were the focus of the ACA’s Medicaid expansion. After expansion, their eligibility threshold averaged 139 percent of poverty in those states, an increase of 136 percentage points. The changes in the other categories were higher in expansion than non-expansion states. Among these changes, the difference between changes in thresholds for adults with dependent children was significant, reflecting a 40.8-percentage-point increase in poverty-related eligibility in expansion states vis-a-vis nonexpansion states. The changes over time in hospital characteristics, such as teaching status and the numbers of profitable and unprofitable services, were similar regardless of expansion status. However, nonexpansion states tended to have more rural hospitals, fewer teaching hospitals, and more for-profit and public hospitals than expansion states did. The increase in market-area median income and the decrease in unemployment rates were similar in expansion and nonexpansion states. The differences-in-differences in the hospital characteristics were not significant, with the exception of the rural indicator—which reflected higher rates of rural hospital closures in nonexpansion states.

The annual unadjusted hospital closure rate, measured as the number of closures per 100 hospitals, declined in both expansion and non-expansion states as the United States emerged from the 2008–09 Great Recession (exhibit 2). Between 2010 and 2012, closure rates were nearly identical in the two groups of states. They began to diverge after 2012. This may be related to the June 2012 Supreme Court decision that made the Medicaid expansion optional for states. Beginning in July 2012, over the twelve to eighteen months following the Supreme Court decision, states announced whether or not they would participate in the 2014 expansion.

The large increase in closures in nonexpansion states in 2013 occurred at a time when DSH payments were expected to be phased out. From 2012 to 2013 the closure rate increased from about 0.45 to just over 0.90 closures per 100 hospitals in nonexpansion states, whereas the rate remained at about 0.45 in expansion states. After 2014, the closure rate in expansion states declined but remained relatively high in nonexpansion states.

Exhibit 3 displays odds ratios from the logit analysis of the probability of hospital closure. The association of the ACA Medicaid expansion and the probability of closure in the differences-in-differences specification was measured using the odds ratio of the Post*Expansion State interaction. In the full sample, hospitals in expansion states were over six times (OR: 0.155), or about

![Exhibit 2](https://example.com/exhibit2.png)

**Exhibit 2**

Unadjusted hospital closure rates by state Medicaid expansion status, 2008–16

**Source:** Authors’ analysis of data from the Centers for Medicare and Medicaid Services. **Note:** Closures were independently validated from multiple sources.
84 percent, less likely to close than hospitals in nonexpansion states. This reduction in closure probability remained significant in the rural and urban subsamples.

The results of the Medicaid eligibility threshold specifications were consistent with those of the difference-in-differences specification in the full sample and the rural subsample. An increase in childless adults’ Medicaid eligibility threshold of 100 percent of poverty made a hospital about 2.5 times (OR: 0.395) less likely to close than a hospital in a non-expansion state, with other factors held constant. However, in the urban hospital subsample, increasing childless adults’ Medicaid income eligibility did not have a significant effect. The coefficients for the other eligibility categories were not significant. All specifications satisfied the parallel trends assumption. The p values of the tests for preexpansion parallel trends are reported at the bottom of exhibit 3.

The odd ratios on the other covariates in the Medicaid eligibility threshold specifications were quite similar to those in the difference-in-differences specifications. For instance, for-profit hospitals were associated with a higher likelihood of closure than the reference category of nonprofit hospitals were, and an increase in the number of profitable services was associated with a significantly lower likelihood of closure in all specifications. Local-market characteristics also influenced the probability of closures. Higher local unemployment rates were associated with a higher probability of hospital closure in both the full sample and the rural hospital subsample in both specifications, whereas increased median income was associated with a reduced probability of urban hospital closure. The coefficient estimates and the results of the sensitivity analyses are in the online appendix.

Our results support the hypothesis that the expansion differentially affected hospitals in areas with high preexpansion uninsurance rates, with a greater effect in counties with higher preexpansion rates of uninsurance (exhibit 4). The estimates in each column reflect a different pre-

### Exhibit 3

<table>
<thead>
<tr>
<th>Odds ratios of hospital closure, states that expanded Medicaid versus those that did not</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Difference-in-differences specification</strong></td>
</tr>
<tr>
<td><strong>All</strong></td>
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<tr>
<td>Post*Expansion State</td>
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<tr>
<td>Expansion State</td>
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<td>Medicaid eligibility threshold</td>
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<td>Childless adults</td>
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<tr>
<td>Children</td>
</tr>
<tr>
<td>Pregnant women</td>
</tr>
<tr>
<td>Hospital characteristics</td>
</tr>
<tr>
<td>Rural</td>
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<tr>
<td>Teaching</td>
</tr>
<tr>
<td>For profit</td>
</tr>
<tr>
<td>Public</td>
</tr>
<tr>
<td>Critical access</td>
</tr>
<tr>
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<tr>
<td>100-199 beds</td>
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<td>Local-market characteristics</td>
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<td>Median income</td>
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<tr>
<td>Herfindahl-Hirschman Index</td>
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<tr>
<td>Constant</td>
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<tr>
<td>Preexpansion tests: parallel trends?</td>
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<tr>
<td>Adj. means equal?</td>
</tr>
<tr>
<td>Number of observations</td>
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<td>Number of hospitals</td>
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**Source** Authors’ analysis of data from the Centers for Medicare and Medicaid Services, the Henry J. Kaiser Family Foundation, and the Census Bureau. **Notes** Standard errors were calculated with state clustering. The odds ratios are approximately equivalent to relative risk ratios because closures are a low-probability event. See exhibit 4 for estimates of the percentage changes in probability of closure. Total, operating, and Medicaid and uncompensated care margins are defined in the text. *Includes those eligible for the Children’s Health Insurance Program.* **p < 0.05 ***p < 0.01
expansion uninsured rate that increases moving from left to right. Column 1 reports the percentage decrease in the probability of closure associated with the Medicaid expansion using the primary specification with no interactions previously reported in exhibit 3. The full results of these specifications are available in the appendix. Moving right from column 2, the percentage decrease in the probability of closure associated with the Medicaid expansion increased in magnitude and significance as county-level uninsured rates increased in all three samples. The “dose response” was particularly strong for rural hospitals. The increase in the relationship between adult uninsured rates and the association between the expansion and Medicaid and uninsured margins was particularly striking. While there was no difference between expansion and nonexpansion states in areas with uninsured rates of less than 10 percent, the estimates became significant and quantitatively larger as the uninsured rate increased above 10 percent.

Discussion
Our analysis of hospital closures in the period 2008–16 reveals that the ACA’s expansion of eligibility for Medicaid for childless adults was associated with significant reductions in the probability of hospital closures. The results reported in exhibits 3 and 4 were stronger for rural hospitals, which also experienced significantly improved total, operating, and Medicaid and uncompensated care margins related to the ACA’s Medicaid expansion. We posit that the primary mechanism that underlies the relationship between hospital closures and Medicaid expansions is the substitution of utilization by patients with Medicaid coverage for utilization by uninsured patients. The financial benefit from this shift in utilization improved hospitals’ financial margins and enabled them to remain in business. We also found that the financial benefits of the ACA’s Medicaid expansion, and corresponding decreased risk of closure, were greater for hospitals in areas with higher uninsured rates. This result, as reported in exhibit 4, was more pronounced for hospitals in rural areas. The finding that the relationship was stronger at hospitals in areas with higher uninsured rates strongly supports the link between hospitals’ financial viability and increased rates of health insurance coverage as a consequence of the ACA’s Medicaid expansion.

Our results echo other findings from the liter-
ature. For example, hospitals in expansion states were found to have significantly better financial performance in 2014 than hospitals in non-expansions states. For-profit hospitals are significantly more likely to close than nonprofit ones, reflecting their mission to maximize profits by closing instead of subsidizing unprofitable hospitals so that they can reallocate capital from unprofitable markets to more profitable markets or industries. Higher unemployment rates increase the probability of closure among rural hospitals. Critical access hospitals are less likely to close than other rural hospitals, as a result of relatively generous reimbursement under Medicare’s critical access hospital program. Rural hospitals have previously been shown to be at greater risk of closure compared to urban hospitals.

The characteristics of rural markets (for example, their low volume of patients and few private payers) as well as segments of urban markets served by safety-net hospitals (for example, their large numbers of medically indigent and Medicaid patients) may make it difficult for even an efficient hospital to survive. In such markets, the social benefit of access to an individual hospital potentially outweighs any efficiency gains related to its closure.

Governments at all levels have enacted policies that subsidize local hospitals. For example, counties and municipalities commonly subsidize, and in some cases bail out, safety-net hospitals that play a critical role in providing access to local patients. At the federal level, concerns about rural hospital closures in the late 1980s and early 1990s led Congress to preferentially reimburse hospitals that qualified for critical access status in the Balanced Budget Act of 1997. Medicare and Medicaid DSH payments were implemented in 1981 to offset the cost that hospitals incurred from treating large numbers of uninsured and Medicaid patients. All of these mechanisms support hospitals through direct transfers or preferential payments to eligible hospitals.

As other research has also shown, policies that increase insurance coverage by subsidizing premiums—through an ACA Marketplace or a Medicaid expansion—will also improve the financial health of hospitals that treat newly insured patients. This mechanism directly links the financial benefit of health insurance coverage to the hospital that provides the care. Reimbursement at the point of care is a substitute for government subsidies that flow directly to hospitals. This substitution was recognized in the original version of the ACA, which directed that DSH allotments be phased out because health insurance coverage rates were projected to increase. The targeted reduction in DSH allotments was delayed in subsequent legislation, in part because not all states chose to expand Medicaid.

If future policies are adopted that both eliminate the Medicaid expansion and lower health insurance coverage rates, our findings suggest that hospitals’ financial positions would suffer, leading to increased hospital closures. If policy makers repeal the ACA’s Medicaid expansion, many rural hospitals in expansion states will need additional subsidies to remain in operation. Policy alternatives include increased DSH payments, expansion of the critical access hospital program, and other mechanisms.

Although our results do not measure the effects of variation in DSH payments, hospital closures that occurred in 2013 and 2014 were made at the time when DSH payments were expected to be phased out—which might explain the uptick in closures in both expansion and non-expansion states. The Bipartisan Budget Act of 2013 and subsequent legislation has delayed the phasing out of DSH payments. Under the Medicare Access and CHIP Reauthorization Act of 2015, the phase-out began at the start of federal fiscal year 2018. It will need to be addressed in the context of policies that either change or repeal ACA’s Medicaid expansion.

When making decisions related to hospital subsidies and other forms of financial support, policy makers should also consider whether a hospital closure is harmful to patients. The effects of closure on access and patient welfare depend upon local hospital market structure and the degree to which local residents rely on the hospital for inpatient care. Research has shown that urban hospitals that close are often more inefficient or of poorer quality than their competitors. Closure may reflect the existence of more desirable alternatives that are valued more by local residents. In such cases, hospital closures are a sign that hospitals have been performing poorly. Closure can actually improve patient welfare, because patients who
would otherwise have gone to the closed hospital will be treated instead at better-managed hospitals. 26,28 However, virtually all closures will increase the travel time required for some patients to access hospital services. 30 This could lead to worse outcomes for patients with conditions for which the need for care is time sensitive. 31,32 In addition, hospitals are often major employers of local residents. The closure of a hospital results in the loss of well-paid, highly skilled jobs. Absent alternative employers, hospital closures will hasten the migration of well-paid skilled labor to larger cities. 33

Given the idiosyncratic circumstances related to hospital closures, whether to subsidize a hospital to keep it open is an empirical question that incorporates the trade-offs between access, quality, and efficiency. 26,34,35 Nonetheless, in rural areas with fewer hospitals, hospital closures are likely to have more serious consequences than in urban areas.

**Conclusion**

Our results shed light on some implications of current policy proposals being considered by the 115th Congress. A policy that eliminates the Medicaid expansion without a corresponding adjustment in DSH payments or other subsidies will likely result in an increase in hospital closures, especially in rural areas. If patients do not have access to other hospitals, as is the case in many rural markets, access to health care will suffer, regardless of whether a person has health insurance.
To access the appendix, click on the Details tab of the article online.


“That wasn’t really a place to worry about diabetes”: Housing access and diabetes self-management among low-income adults

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A R T I C L E   I N F O

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Housing affordability
Homelessness
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Diabetes

A B S T R A C T

Lack of affordable housing access represents a significant and growing problem for low-income households in the United States and these housing challenges may present barriers to the management of chronic diseases such as type 2 diabetes. In this qualitative study, we examined how both housing challenges and housing resources shaped diabetes self-management behaviors. We conducted semi-structured interviews with 40 low-income residents of one US city, New Haven, Connecticut, who had a diagnosis of type 2 diabetes and either resided in or qualified for subsidized housing. We purposively constructed our sample to include a range of housing experiences (subsidized, unsubsidized, homeless) and treatment regimes. We analyzed the data using grounded theory techniques of inductive coding and memo writing. Our findings suggest multiple ways that housing access can affect diabetes self-management with implications for blood glucose levels and future complications. Specifically, we describe the ways that housing access affected participants’ ability to: 1) prioritize their diabetes care, 2) establish and maintain diabetes routines, and 3) afford diabetes-related expenses. Together, our findings show how housing challenges increased the cost of adherence to diabetes management regimes such that inadequately housed individuals had to both invest and sacrifice more for the same outcomes. Our findings suggest that improved affordable housing access may represent an opportunity to improve outcomes and reduce socioeconomic disparities among those living with type 2 diabetes.

1. Introduction

The United States (US) is confronting a growing affordable housing crisis, presenting a significant challenge for many low-income households (Desmond, 2016). Rents have outstripped wages, and in the vast majority of the US, full-time workers earning the federal minimum wage cannot affordably rent a one bedroom apartment (Pattillo, 2013). Furthermore, only one-quarter of eligible US households receive rental subsidies that are designed to make housing affordable (Sard and Fischer, 2013). This lack of affordable housing subjects low-income US households to poor housing conditions, high housing costs, housing instability, and homelessness (Burgard et al., 2012; Desmond, 2016; Newman and Holupka, 2015). In turn, these housing challenges are likely to have significant health implications.

While extant research has examined associations between housing and health outcomes (Benfer and Gold, 2017; Shaw, 2004), less is known about the processes that connect housing access to health behaviors. Furthermore, less is known about how housing access may operate to shape the self-management of chronic health conditions in low-income populations. Socioeconomic disparities in chronic disease outcomes are well-documented in the US (Braveman et al., 2010; Phelan et al., 2010), and housing access may contribute to these disparities through a number of pathways including by affecting the way that these conditions are behaviorally managed.

Type 2 diabetes is one chronic condition that requires intensive self-management and is prevalent among low-income Americans, a population that is also likely to experience housing challenges (Lutfey and Freese, 2005). Not only is the incidence of diabetes associated with socioeconomic status, but complications from diabetes are more prevalent among individuals who have lower incomes or reside in higher poverty areas (Ludwig et al., 2011; Lutfey and Freese, 2005; Schoomten et al., 2007). For example, recent research finds that individuals from low-income areas in the state of California are ten times more likely than those from affluent areas to have a limb amputated as a result of their diabetes (Stevens et al., 2014).

Housing access may play a role in these disparate disease outcomes through its effect on self-management behaviors. Diabetes self-management behaviors are closely tied to blood glucose levels, which in

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turn predict diabetes-related complications (Lutfey and Freese, 2005). These diabetes-related behaviors are not inherent to the individual, but rather shaped by economic and social circumstances that constrain and support them (Weaver et al., 2014). In this sense, it is important to understand the contextual factors that affect self-management and ultimately diabetes outcomes. In this paper, we draw on qualitative data to examine the ways that housing functions in the lives of those living with type 2 diabetes to affect self-management behaviors. Beyond diabetes, our analyses speak to the role that housing may play in the production of chronic disease disparities.

1.1. Housing as a social determinant of health

Housing is a well-established social determinant of health (Shaw, 2004). Research has documented negative health effects associated with poor housing quality (Arku et al., 2011; Benfer and Gold, 2017), housing instability (Burgard et al., 2012), high housing costs (Nettleton and Burrows, 1998; Newman and Holupka, 2015; Pollack et al., 2010), the loss of housing associated with eviction or foreclosure (Desmond and Kimbro, 2015; Houle and Light, 2014; Ospuk et al., 2012), and homelessness (Shaw, 2004). In addition to documenting the health costs of housing challenges, recent research in the US suggests health benefits of improved housing access through rental subsidies that are provided by the federal government in the form of either subsidized public housing units or housing vouchers, both of which limit the recipient’s rent to 30% of their income. Waitlists for these subsidies average 2 years across the US (Fenelon et al., 2017) and research finds that US households who are waiting for subsidies experience more unhealthy housing conditions, food insecurity, and child health problems compared with subsidy recipients (March et al., 2009; Sharfstein et al., 2001). Providing further support for the health benefits of rental subsidies, a recent study compared subsidy recipients with those receiving subsidies two years later (individuals who were likely on a waitlist) and found that subsidized public housing residence was associated with better self-rated health and less psychological distress (Fenelon et al., 2017). These findings suggest that policy interventions designed to improve housing access may also have health benefits.

In addition to the overall significance of housing for health, some existing research suggests that housing challenges can present barriers to chronic disease management. For example, research suggests that among persons living with HIV/AIDS, access to housing (relative to homelessness) is associated with greater likelihood of engagement in care, higher medication adherence, and lower mortality, viral loads, and emergency department use (Aidala, 2005; Kidder et al., 2007). Moving beyond homelessness, Pollack et al. (2010) find that high housing costs are associated with increased odds of self-reported hypertension and medication non-adherence among both renters and homeowners. This work suggests that improvements in housing affordability may be a way to improve chronic disease self-management and outcomes, potentially leading to reduced health disparities and lower healthcare costs. However, more research is needed to understand the ways that housing access may facilitate chronic disease management behaviors.

1.2. Housing access and diabetes self-management

Individuals living with diabetes must carefully manage their blood glucose levels through medication, diet, exercise, glucose monitoring, and healthcare visits, and these behaviors may be shaped by housing contexts. From a psychosocial perspective, housing access may provide consistency, stability and a sense of security that facilitates prioritization of diabetes management. Research has described housing, or home, as a source of ontological security, or a feeling of well-being that arises from a sense of constancy in one’s social and material environment (Dupuis and Thorns, 1998; Kearns et al., 2000; Padgett, 2007). Some research also suggests that this sense of security can be an important resource for those managing chronic illness. For example, Padgett (2007) found that when homeless individuals with mental health conditions obtained apartments through a housing intervention, they developed a sense of control over their lives, and an ability to look beyond the day-to-day challenges of homelessness, towards future goals. Similarly, for those living with diabetes, housing access may provide an important foundation from which to prioritize diabetes to avoid long-term complications.

Housing and homes also provide a setting for routines that are important to the management of chronic illness. Research describes both the consistency of material and social environments, and also the sense of control that stable housing provides, as important contexts for daily routines (Dunn and Hayes, 2000; Dupuis and Thorns, 1998; Padgett, 2007). Individuals who lack housing, who experience housing instability, or whose housing situation is threatened by unaffordability or potential eviction, may have difficulty establishing and maintaining routines (Luginaah et al., 2010).

Housing access may also provide the material context and resources that are needed to manage diabetes. Individuals who are struggling with homelessness or unstable housing may lack places to store their medication, or the ability to prepare the foods that they need. Additionally, housing costs may compete with the costs of diabetes self-management, which can include medication, glucose testing equipment, nutritious food, exercise opportunities, and payments for medical care (Lutfey and Freese, 2005). Though individuals may be highly motivated to manage their diabetes, they may be preoccupied with housing needs that consume financial, time and emotional resources (Desmond, 2016). They may also prioritize housing payments over other expenses (Desmond, 2016; Keene et al., 2014).

Diabetes self-management can be labor and resource intensive, and lack of economic resources can exacerbate its challenges, increasing the cost of adherence to self-management regimes (Chaufan et al., 2012; Lutfey and Freese, 2005). For example, individuals who don’t have a car may spend more time traveling to their appointments on public transportation or may face longer wait times in clinics that serve low-income patients (Lutfey and Freese, 2005). Individuals living on tight budgets may also face greater tradeoffs when diabetes expenses compete with other material needs (Chaufan et al., 2012). Lack of housing may also increase this cost of adherence such that those who have limited housing access must both invest and sacrifice more to achieve the same outcomes.

Though few studies have examined the relationship between housing and diabetes self-management, a recent analysis found an association between better housing conditions and improved glucose control (Vijayaraghavan et al., 2017). However, more research is needed to examine the pathways that underlie this association. Seeking to address this gap in the literature, we draw on 40 semi-structured interviews, collected among low-income individuals diagnosed with type 2 diabetes and living in one US city, New Haven, CT. We examine how participants manage their diabetes in the context of their housing challenges and housing resources. Specifically, we examine how housing shapes 1) the prioritization of diabetes management, 2) the ability to establish and maintain diabetes routines, and 3) the ability to manage diabetes-related expenses.

2. Methods

2.1. Research setting: affordable housing access in New Haven, Connecticut

This study takes place in New Haven, Connecticut, a city with approximately 130,000 residents. While small, New Haven experiences many of the challenges that larger US cities face, including a shortage of affordable housing. Connecticut has the 8th highest housing wage (the wage needed to rent a 2-bedroom apartment spending no more than 30% of one’s income) in the US, and in 2015 a worker earning the state’s minimum wage would have to work 84 h per week to rent a one
bedroom apartment without spending more than 30% of their income on rent (National Low Income Housing Coalition, 2015). Given these high rents, subsidized housing represents an important component of New Haven’s affordable housing landscape. In fact, in 2014, in New Haven County, there were zero unsubsidized available units that would be affordable to low-income households earning less than 30% of the area’s median income (McDonald and Pething, 2014).

Housing subsidies in New Haven are provided through both state rental assistance vouchers and federal programs funded by the US Department of Housing and Urban Development (HUD) and managed by the local housing authority. These federal rental subsidies are provided in the form of both project-based units and tenant-based vouchers. Project-based housing consists primarily of public housing projects that are owned and operated by the local housing authority. Tenant-based assistance in the form of vouchers subsidizes the cost of private rental units such that the tenant pays 30% of their income. As in most US cities, these rental subsidies are highly sought after and in short supply (Sard and Fischer, 2013). In 2013, subsidized households in New Haven spent an average of 23 months on the public housing waitlists and 25 months on waitlists for vouchers (US Department of Housing and Urban Development, 2013).

2.2. Sampling and recruitment

We posted flyers throughout the New Haven community (at public libraries, the housing authority, bus stops, social service offices, and community-based organizations) to recruit 40 participants for qualitative interviews. Eligible participants were over age 24, diagnosed with type 2 diabetes and met the income criteria for subsidized housing eligibility. We used purposive sampling procedures to ensure diversity with respect to housing status and treatment regimes. Half of the sample lived in rent subsidized housing and 6 participants were homeless at the time of the interview. Twenty-six participants took insulin and all participants took either oral medications or insulin for their diabetes. Table 1 provides additional sample characteristics.

2.3. Data collection and analysis

We conducted semi-structured interviews between July 2016 and January 2017. We asked participants about challenges that they faced managing their diabetes, and resources and strategies that helped them. We also asked about their housing experiences and residential trajectories. Participants also completed close-ended questions about mental health, medications, and financial well-being. Interviews lasted 45 minutes to 2 hours and were audio recorded and transcribed verbatim. Participants were compensated $50.00. Seventeen interviews were conducted by the first author, 8 by the second author, and 15 by the third author. Data collection for this project was approved by the Yale University Institutional Review Board.

Following a grounded theory approach (Corbin and Strauss, 2014), our analysis was an ongoing, iterative process that co-occurred with data collection. We wrote thematic summaries after each interview and memos about developing concepts. Once interviews were completed, we used our memos and group discussion to collaboratively develop a codebook. The three authors and additional research assistants then applied this codebook to a small set of transcripts. We discussed inconsistencies between coders, redundancies, and the clarity of codes. We then revised the codebook and repeated this process three times before finalizing it. Using Dedoose, an on-line coding program, two coders independently applied the finalized codebook to each of the first 20 transcripts and resolved inconsistencies through discussion. The remaining 20 transcripts were coded by a single coder, though we continued to discuss coding questions in team meetings.

The first author extracted and reviewed coded excerpts for codes relating to housing and diabetes self-management, and reviewed full transcripts to contextualize these excerpts within participants’ broader narratives. Ongoing discussion among the authors throughout the analysis provided an opportunity to check our interpretations against each other’s and the data.

3. Findings

The sections below describe the ways that housing access a felted three primary aspects of participants’ diabetes self-management: diabetes prioritization, diabetes routinization, and diabetes-related expenses. Our discussion focuses not only on the challenges that inadequate housing posed to participants’ diabetes self-management, but also on the creative, but sometimes labor-intensive strategies that they employed to manage their diabetes despite these challenges. These strategies illustrate the added cost of adherence that housing challenges may impose for those living with type 2 diabetes.

3.1. Housing as a foundation to prioritize diabetes care

Participants described housing as a foundational need that when not adequately met, could prevent them from prioritizing their diabetes self-management, often despite strong motivation to avoid complications. For some participants, the immediate need for housing could take priority over the longer-term consequences of poor glucose control. Additionally, housing challenges could consume both emotional and physical resources that were needed to manage their health. Some participants described how without housing, they lacked a foundation from which to pursue their health goals.

Justice (age 47) provides an example of how housing challenges could interfere with the prioritization of diabetes self-management.

<table>
<thead>
<tr>
<th>Table 1</th>
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<tr>
<td>Other state benefits</td>
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</table>

* Medicaid provides health coverage to low-income adults and children and is jointly funded by the states and the federal government.

* Medicare is a federal program that provides health coverage for those who are over 65 or have a qualifying disability.
Justice was renting a room from a friend at the time of the interview, but had recently been homeless. He explained that he “overlooked” his diabetes while he was living on the streets. He was not experiencing complications at the time, and the more immediate challenges of finding a place to stay appeared more pressing than the potential long-term consequences of poor glucose control. He explained, “When I was homeless, it [diabetes] was very hard to manage it because I would not pick up my prescription. I would leave my bag somewhere because I didn’t want to walk around with it. It was just a lot of – it seemed like other things presented itself to be more important than that, so I just overlooked it. I was just thinking, ‘Well, I’m healthy.’”

Justice also explained that the day-to-day preoccupation with where he was going to sleep distracted him from diabetes-related priorities. He explained, “When a person is unmanageable, their health becomes unmanageable because they don’t pay attention to themselves. They’re more distracted about where I’m gonna live or where I’m gonna sleep or what I’m gonna do today. The person that is manageable that has structure has better control over that disease.”

Similarly, Melissa (age 43) described the challenges of prioritizing her diabetes after losing her home to foreclosure and subsequently experiencing a period of unstable housing, moving between her daughter’s place and a shelter. She explained, “You’re forgetting that because you’re in such a bad place in life, who wants to remember taking meds or going to the doctor?” So you’re missing the doctor’s appointment, you know? ... I see why so many people that live on the street probably don’t take care of their self because they’re probably so busy looking for a place to lay their head, how could they go to the darn doctor’s?” Like Justice, Melissa described how immediate housing concerns could interfere with the ability to look forward towards longer-term health goals.

For other participants, these immediate housing challenges consumed physical as well as emotional energy. For example, Garrett (age 47), who had been homeless for many years described how sleep deprivation associated with living on the street made it hard for him to prioritize his diabetes medication regime. He explained that when he had been up most of the night, catching what sleep he could on buses or at fast food restaurants, he was just too tired to make medication a priority. Similarly, John (age 30), described the exhaustion of homelessness that affected his medication adherence. He explained, “My body was getting no rest and then I felt like, what’s the point then? I felt like, at the time, what’s the point of getting the medicine if my body’s not getting to rest properly.”

In the phrase, “what’s the point,” John suggests that without having his basic need for shelter met, the management of his diabetes could seem almost futile. John described how his diabetes became much easier to prioritize when he obtained the subsidized apartment that he lived in at the time of the interview noting, “So now I try to deal with it better.”

Several participants described housing as a “bottom line” for managing their diabetes; it was a minimal need that must be met in order to pursue health goals, and also a platform from which these goals could develop. Justice explained, “So homelessness, it makes it worse for any person with any type of disease to manage because they don’t have the proper foundation to operate from.” Similarly, Myron (age 59), who had spent many years homeless before moving to a subsidized apartment explained that having housing was necessary to pursue self-improvement goals, including those related to diabetes. He noted, “People always say pull yourself up by your bootstraps. When you don’t have housing, you don’t have any bootstraps. There’s no way to pull yourself up.”

While participants described the challenges of consistently prioritizing diabetes while homeless or living in unstable housing, many still were highly motivated to avoid complications and protect their health. Several had witnessed diabetes complications among family and friends and were aware of the potential consequences of poor glucose management. For example, despite housing struggles that sometimes interfered with her medication adherence, Melissa, like many participants, took her diabetes seriously, attending diabetes education classes and extensively researching diabetes self-management. She explained, “I’m not playing around with my life because you can die from this if you don’t take care of yourself so who wants to die? I don’t wanna die a premature death because I wasn’t taking my meds, no.” This kind of motivation, as discussed below, often resulted in effortful attempts to adhere to diabetes regimes despite housing challenges.

3.2. Housing and diabetes routines

Participants described routinization as critical to diabetes self-management, with several noting that their diabetes care was “like brushing my teeth.” Kara (age 38), who lived in the same house for 6 years before moving to an apartment a few months prior to the interview, explained, “It just becomes routine. Just like when you get up in the morning and you brush your teeth, it just becomes part of my routine. It’s part of my routine. I get up. I brush my teeth. I check my sugar. I take my insulin.” Similarly, when asked if there were times that it was harder to manage his diabetes, Nate (age 51) replied, “Not at all. That’s part of my everyday routine. It’s almost like getting up, brushing your teeth, taking a shower, putting your clothes on. That’s how I look at it.” For many participants, housing played an important role in the establishment and maintenance of routines, providing participants with both a consistency of place that supported the routinization of health behaviors, and also control over their environment that affected both their diet and medication regimes. In contrast, for some participants who lacked housing, unpredictability and lack of environmental control served as barriers to consistently maintaining diabetes-related behaviors, and could also increase the costs of adherence.

For Regina (age 46), obtaining housing was critical to developing a diabetes routine. Regina had spent many years living on the street and more recently with her fiancé’s family until, about a year prior to the interview, she received a subsidized apartment in a public housing development. She described the significance of housing for her diabetes self-management, noting, “Then I found housing. I got housing, everything, my numbers, as far as my health, got back on track. I’m insulin-dependent. I have many medications that I take on a daily basis but since I’ve had housing, my diabetes changed. It went from up here to being down here in the right place.” In particular, she described how the spatial consistency of her apartment facilitated a more consistent diabetes medication regime by allowing her to store and take her medication in the same place each day. She explained, “That’s the first thing I do. I get up out that bed, I sit right there, I already have my medicine, the needles and everything set up.”

Similarly, Mike (age 60), who lived in a transitional shelter where he had his own room, described how having a consistent place to store his diabetes supplies facilitated his self-management routine. He explained, “But now it’s nice – I’ve got all my – now on my dresser drawer, everything that I need and I just take with me what I need for the day.”

For Mike, this consistency was a sharp contrast to when he was living in an emergency shelter and often unable to safely store his medications.

While Mike and Regina described benefits of having their diabetes supplies in one place, other participants described how routines could be disrupted when housing challenges interfered with this spatial consistency. For example, when Kara, after losing her job, had to move from her house of 6 years to a more affordable apartment, she described a temporary disruption in the routines that she had previously adhered to consistently. When asked if there was a time when it was hard to adhere to her medication regime, she responded, “Yeah, like last month because it was really stressful having to move.” In the disruption of the move, Kara did not consistently take her medication or monitor her blood sugar, and once passed out due to a “low spurt” (low blood sugar).

Myron described the challenges of checking his blood sugar in a homeless shelter where he did not have consistent access to his testing
equipment. He explained, “That was one of the things I didn't do also when I was at the shelter. My stuff was over there in the storage. Half the time I couldn't find my machine and stuff. It was buried in the rest of the stuff. Half the time I didn't check it. I'd go with what I felt like.” Myron’s description of having his testing equipment buried amongst his other belongings at a storage facility located many miles from where he was sleeping contrasts sharply with more stably housed participants who kept their medications at their bedside.

Myron kept his diabetes-related supplies in a storage facility because he felt he could not safely store them at the homeless shelter. This lack of environmental control is another way that housing challenges undermined participants' diabetes self-management routines. Like Myron, several other participants described the challenges of storing medication at homeless shelters. For example, Joe (age 61) explained, “You had to guard your clothes, so it wasn't like you had medication because if you left your stuff somewhere somebody went in your bag, your stuff's gone. Now you sick for real ... so that wasn't a place to really worry about diabetes.” Without the ability to store their medication safely, participants often did not have access to medication when they needed it.

Several participants described the particular challenges of storing insulin while homeless or staying in shelters. Without a place to store his insulin, Paul stopped taking it completely. He explained, “It's been tough. Oh, I'll started taking my medication again two days ago because, given my living situation, I can't carry around syringes, I can't carry around insulin; it has to be refrigerated. Even the oral medications it's hard to carry it around. If I have to stay at the shelter they don't -- anything that's left around gets stolen. So right now I'm just taking metformin.” Paul's example illustrates how a lack of environmental control associated with homelessness could have a significant impact on medication regimes.

In addition to medication challenges, housing affected dietary routines that were important to diabetes self-management. Some participants noted that stable housing provided them with control over their food environment, describing “home” as a dietary “safe zone” where they could follow dietary recommendations consistently. For example, Leonard (age 51), who lived in an unsubsidized studio apartment explained, “...when I'm at home, and I know what I have there, and I know what I can't eat, then it's not a big issue.”

The “safe” nature of home, had implications for individuals who did not have housing. For example, when Diana (age 49) and her husband's new apartment did not pass inspection and they had to spend a few weeks in a hotel, she was unable to prepare her own food and her blood sugar was “out of whack”. She explained, “...because you can't control really what you're eating because if you go into a fast food restaurant you don't know the ingredients they have in their food. But I had no choice but to eat it.”

While for Diana, this lack of housing was temporary, other participants described longer term challenges of controlling their diet without a home. For example, Regina described the challenges of eating well while living with her in-laws. She explained, “Not being in my own place, it was hard to try to fight my diabetes and stay healthy and stuff because when you're living with somebody else, it's almost like you have to eat whatever's being made and stuff. So that was kind of hard ‘cause you couldn't cook the things that you want, like healthy stuff”.

Homeless participants described having little control over their diets. For example, Tory (age 39) explained that the food provided in the homeless shelter was not conducive to managing diabetes. He explained, “I think it’s more harder when I was homeless because I said kitchens, the shelters, they feed you pasta. And if you out there all day and didn't eat nothing, you eat whatever they give you.” Here Tory emphasizes a lack of choice in his food environment that contrasts sharply with participants who carefully prepared their own meals.

John described the limited food options in the shelter as having a direct impact on his blood sugar. He explained, “It was hard 'cause the doctors didn't understand why my blood sugars were so high ... I didn't have a choice of the food I was eating. Like I just had to eat whatever they gave at the shelter. So they tried to work with me and to just get it down and they just told me that just use small little portions. But I was telling him like if I eat smaller portions I will be hungry ‘cause I know they only gave dinner at their shelter. So like for breakfast I had to get whatever I could get …. So they thought I was just like eating whatever, like I didn't care what I'm eating. I'm like, ‘I'm homeless and I got to get what I can get.’”

As John noted, in addition to not having access to the right foods, he also did not have control over when he ate. Though smaller and more frequent meals allow for better glucose control, John did not have the consistent access to food that would allow him to eat frequently.

Many participants were committed to following diet and medication routines, despite their housing challenges, and developed creative, and sometimes labor-intensive strategies in order to navigate the constraints of their environment. For example, participants described visiting multiple food pantries in order to secure food that was appropriate for a diabetic diet. Myron drove several miles to a storage facility each day in order to take his medications. Garrett and his providers worked out an arrangement with the pharmacy so that he could pick up smaller quantities of insulin, rather than a large box that he could not store. When Samson (age 54) was living in a San Francisco homeless shelter, prior to moving to New Haven, he woke up early so that he could take his medication in a park, rather than in the shelter that he did not consider clean or safe enough for taking injectable medications. He explained, “And I get up an hour earlier, I do what I have to do … and be out the door and be at your location where you consume your medication on time, as the bottle recommends what time you should take it. And that's what I started doing. I was proactive.” Samson's proactive behavior exemplifies participants' motivation to adhere to self-management regimes despite housing challenges. It also illustrates the added costs of this adherence in terms of time and energy, something that for many participants who were managing housing challenges, was already in short supply.

3.3. Housing and diabetes self-management expenses

For some participants, housing costs competed with diabetes-related expenses and posed barriers to self-management. For some, medication costs competed with rent payments. Even when medications and provider visits were fully covered by insurance, the high costs of a diabetic diet presented challenges for those managing high rents on limited budgets. Participants described having to make difficult trade-offs, forgoing one health-related need at the expense of another. Participants also described strategically navigating tight budgets in order to adhere to diabetes self-management regimes, despite high housing costs.

Liane (age 49) struggled to pay rent that consumed the majority of her monthly income. She had moved to her apartment after losing her home to foreclosure and was on the waitlist for a rental voucher. While many participants had virtually no healthcare expenses as a result of their coverage through Medicaid, a US federal and state program that provides health care coverage to low-income Americans, this was not the case for Liane who had insurance through Medicaid, a federal program for older and disabled adults. Liane described modest healthcare payments as competing with her rent and other financial demands. She explained “There are medications I can't get because I can't afford them. When I'm done paying my rent and making sure my son has food, I don't have extra $10. I don't. I have just enough to pay my bills.” She explained that she manages by juggling, “medication one month and food the next.” She also described the challenge of deciding where to invest limited funds. In reference to her $15 medication fee, she explained, “That's my extra gallon of milk or my extra loaf of bread. So do I get the food for the kid or do I get my medication so I can stay alive and take care of him? It's a toss-up.”

Other participants described the high cost of food that sometimes competed with housing expenses, or were beyond the reach of their
limited incomes. For example, Roxy, who paid $280 per month to stay with a friend, struggled to follow a diabetic diet on a tight budget. She explained, “...I only get $730.00 a month, and to live and to buy what I need, and then food, it’s hard to maintain the right diet. Yeah, because you can’t eat what you want whenever you want. You’ve got to buy a certain thing, and you’ve got to make that last all month, so that’s the hard part.” Several participants noted that their diet changed at the end of the month, when they ran out of funds. For example, Kara explained, “At the end of the month, I’m not eating the vegetables I’m supposed to be eating. I’m not eating the proteins that I’m supposed to be eating.”

Several participants employed labor intensive strategies to maximize limited budgets and acquire adequate nutrition despite rent burdens. They shopped in bulk and at discount grocery stores, and carefully planned food budgets. Melvin (age 54), was very careful about his diet, preparing all his own food, even bringing his own provisions to family gatherings. He tried to eat fish frequently and planned to spend the interview incentive on salmon. He noted that he would often find an odd job to pay for fish, explaining that he was “always hustling,” to eat well. This hustle exemplifies the commitment to eating well exhibited by many participants in the study, and also the added cost of adhering to this commitment given limited financial resources.

When high rents competed with diabetes expenses, participants noted that the rent often came first. For example, prior to receiving state funded rent assistance, Melvin struggled to make sure that rent was always paid. He explained, “It was hard because, number one, we wanted to make sure the rent was paid. Now it don’t make no difference having all this food and all this stuff when you ain’t got a place to stay.” Melvin prioritized his housing payments as a way to protect his health, because he considered housing to be a foundation for his self-care.

4. Discussion

Our findings suggest multiple ways that housing access can affect diabetes self-management, with implications for blood glucose levels and future complications. First, participants described how housing challenges associated with homelessness and instability consumed emotional resources and physical energy, interfering with their ability to prioritize their diabetes care. Participants noted that when housing needs were not met, they did not have a foundation from which to pursue longer term health goals related to their diabetes. Their descriptions echo Padgett’s (2007) findings that the provision of stable housing can allow those struggling with chronic illness (in her case mental health challenges) to begin to ask “what is next?” Like Padgett (2007) and others (Arkue et al., 2011; Dunn and Hayes, 2000; Dupuis and Thorns, 1998) participants also described a sense of consistency and control associated with stable housing, that supported the routinization of diabetes behaviors. Environmental consistency allowed participants to perform diabetes-related tasks in the same place each day. Participants who had their own apartments also described control over their food environment, facilitating adherence to diabetic diets. In contrast, participants who were homeless, who lived with family members, or who experienced instability, described a lack of control and consistency that interfered with both their diet and medication regimes. Finally, for some participants, high housing costs competed with diabetes related expenses, creating barriers to self-management. Notably, despite the housing challenges that participants faced, many went to great lengths to manage their diabetes. Some paid for food and medications on tight budgets, stretching the dollar or securing extra income through “hustles.” Some developed creative work-arounds for shelter policies that made it difficult to take medications. Others, struggling with high housing costs, navigated difficult tradeoffs, sacrificing one need at the expense of another. The efforts that participants made to manage their diabetes despite housing challenges represent what Luftey and Freese (2005) refer to as an added ‘cost of adherence’ that low-income individuals must pay for their diabetes self-management. Building on this prior work, our data suggest that inadequately housed individuals may have to both invest and sacrifice more for the same outcomes.

Though this paper provides important insight into the ways that housing intersects with diabetes self-management, it has some limitations. First, individuals who volunteered to participate in this study may be different than those who did not, meaning that our data do not contain a full range of experiences. Second, as with all interview studies, we rely on participants’ accounts of their behaviors, rather than observing them directly. To better capture participants’ actual behaviors and experiences, we focus our analysis and data collection on concrete examples that are more likely to be trustworthy than generalized statements (Weiss, 1998). Despite these limitations, our findings provide novel insight into the way that housing operates to affect diabetes self-management and can inform both policy and clinical practice.

4.1. Implications for policy and practice

Chauffan and Weitz (2009) note that social conditions are largely absent from the literature on diabetes self-management which focuses primarily on education and life-style modification. Our findings speak to the limitations of this individual approach, highlighting the role of social conditions that constrain or support self-management behaviors, and a need for attention to the policies that shape these conditions. In terms of healthcare policy, most participants received insurance coverage through Medicaid, a US state and federal insurance program for low-income households. This coverage reduced the cost of adherence, providing free medications and provider visits. While in Connecticut, Medicaid is widely available to low-income adults, eligibility, and resulting access to diabetes care, varies greatly across the US (Kaufman et al., 2015). For individuals without adequate insurance coverage, the challenges of managing diabetes may be substantially greater. However, while healthcare access was an important resource for participants, our findings suggest that lack of housing may create barriers to fully benefiting from this care.

Recent policy initiatives in the US have begun to consider housing interventions as ways to both improve health and the benefits of healthcare (Cassidy, 2016). For example, state governments have developed programs to provide supportive housing to high-cost patients who account for a large portion of public healthcare spending (Doran et al., 2013). Our findings suggest that beyond these high-cost patients, housing access may also help to improve the management of chronic conditions, and ultimately prevent patients from developing high-cost and life-threatening complications.

Our findings also suggest a need to address housing issues at the clinic level. Given its potentially significant role in shaping health behaviors, housing may be an important topic for providers to raise with their patients (Singh, 2016). Additionally, coordinated care efforts that can help diabetes patients manage social needs such as housing may offer an opportunity to improve diabetes outcomes. One example is the Medical Legal Partnership (MLP) model which seeks to address legal needs that undermine patients’ health by coordinating medical and legal services. MLPs can help patients access subsidies, avoid foreclosure or eviction, and secure disability benefits that are needed to support housing expenses (Sandel et al., 2010).

While legal assistance and other coordinated care may help some patients access housing that improves their health, these efforts do not address the profound shortage of affordable housing available to low-income Americans. Though more research is needed, our data suggest that access to rental subsidies can improve self-management, as several participants described the receipt of subsidized housing as turning points in their diabetes care. However, this potentially valuable resource is in short supply, with waitlists measured in years (Sard and Fischer, 2013). Expanding the federal rental subsidy program to cover all eligible households may offer an opportunity to address both housing and health needs, potentially reducing socioeconomic
disparities in chronic disease outcomes, as well as healthcare costs associated with preventable complications.

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Housing and child development

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ABSTRACT

This article presents a critical review of recent research on the role of housing in children’s development, including physical health; social, emotional, and behavioral outcomes; and schooling, achievement, and economic attainment. We focus on six features of housing that are central to housing policy and have generally received the most research attention: (1) physical housing quality; (2) crowding; (3) residential mobility; (4) homeownership; (5) subsidized housing; and (6) unaffordability. The strongest evidence is provided for the deleterious associations between environmental toxins/hazards and crowding with children’s health, and for residential mobility with children’s short-term academic, social and emotional problems. The findings on assisted housing are mixed, and homeownership and affordability are not linked to children’s outcomes. More methodologically rigorous and conceptually focused research is needed. Despite fundamental knowledge gaps, the results have implications for housing policies focused on homeownership, subsidies and land use regulations.

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1. Introduction

The recent foreclosure crisis has increased attention on housing policy, at least in part because housing problems, which used to be confined to low-income families, have reached up into the middle-class. Yet housing has always been, and remains, a particular challenge to many low-income families. In 2007, prior to the recent crisis, over half (56%) of households with children (i.e., 13 million children) in the lowest income quartile lived in families that spent more than half their income on housing (which is generally considered a severe financial burden), compared with only 17% of those in the second quartile, 7% in the third, and a mere 2% in the top quartile (Joint Center for Housing Studies, 2009). Residential mobility rates also vary greatly by income, with 23% of those below poverty moving within the last year compared with 10% of those at, or above, 150% of poverty (U.S. Census Bureau, 2009). And although physically inadequate housing has become increasingly rare in the United States, an estimated 13% of poor households with children live in such conditions compared with only 4% of those above poverty (Joint Center for Housing Studies, 2009).

It is plausible that the constrained housing choices confronting low-income families compound the developmental challenges already facing their children because of their poor economic status (Duncan & Brooks-Gunn, 1997; Brooks Gunn & Duncan, 1997). Thus, improving the housing conditions of low-income families could be a productive policy approach for promoting child well-being.

Unless we know whether and how housing conditions are associated with children’s outcomes, policy efforts directed at altering the housing circumstances of families, particularly low-income families, may be in vain. To address this concern, our paper presents a review of recent research on the role of housing in children’s development, including physical health; social, emotional, and behavioral outcomes; and schooling, achievement, and economic attainment. We focus on six features of housing that are central to housing policy and have generally received the most research attention: (1) physical housing quality; (2) crowding; (3) residential mobility; (4) homeownership; (5) subsidized housing; and (6) unaffordability. We deliberately exclude from our review other features of the full “housing bundle,” such as attributes of the neighborhood surrounding the dwelling, the characteristics of neighbors, and the amenities and services available in the community, because our concern is primarily with the housing unit itself.¹

We begin with a brief history of housing policy and its links to human development. This is followed by a discussion of current housing policies for low-income families. Next, we describe our conceptual framework for understanding how housing potentially influences children’s development, followed by a brief description of our methodology. Then we present the crux of the paper—a literature

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¹ Residential instability and housing unaffordability are not attributes of the dwelling unit itself, which is our main focus. We include them because they are both conceptually relevant to children’s development and clearly affect the housing unit choices families can make. Homelessness is also a housing issue that is important in the context of children’s development. It is not covered in this review because it has been covered elsewhere (e.g., Lewit & Baker, 1996).
review in which we distill both the features of housing that have demonstrated consistent associations with children's development and the specific outcomes examined. The final section summarizes the findings and provides directions for future research and policy recommendations.

2. Historical seeds of the link between housing and human development

Although rarely acknowledged, one motivation for government intervention in the housing sector is the belief that decent and affordable housing will yield social benefits, such as better health and greater educational attainment, for both residents—including children—and society at large. The notion that decent housing will improve residents' lives emerged in the late 19th and early 20th centuries, when teams of workers lived in squalid shacks in growing industrial cities, and inner-city slums housed growing numbers of immigrants and the very poor. Jacob Riis memorialized images of the inhuman living conditions of city slums in How the Other Half Lives: Studies Among the Tenements of New York (1890) (von Hoffman, 1998).

One point of view in the debates leading up to the first national policy of assisted housing in 1937 was that housing policy for the poor would fail unless it was designed to explicitly achieve the goal of promoting human development (e.g., Ford, 1936; Wood, 1982). The housing features thought to play a key role in moving toward this goal were primarily the physical attributes of the home such as its physical quality, safety, and privacy. Some voiced specific concerns about children's physical and psychological development, noting that if children's needs were ignored, their healthy development could suffer (e.g., Gray & Staples, 1928). Some observers even explicitly linked housing and living arrangements with children's education outcomes (e.g., Heimig, 1937). The connection between housing and human development was also advanced by those involved in the welfare system. Wilbur Cohen, the storied Secretary of what was then the U.S. Department of Health, Education and Welfare, captured this view in 1969, writing that "...[HEW is] committed to the premise that improved housing for welfare recipients is essential to the success of the entire social and rehabilitation program designed to move this group of poor people toward self-support, self-care, and a better quality of life." Yet housing is rarely if ever discussed in contemporary welfare-to-work debates, in contrast to energetic debates centered on the role of child care, health care, and transportation in promoting self-sufficiency.

3. Current housing policies for low-income families

Unlike other safety net programs such as food stamps and Medicaid, housing assistance for the poor is not an entitlement. As a result, only about one-quarter of income-eligible households receive any form of housing assistance (US Department of Housing and Urban Development 2005; Fischer and Sard, 2005). Waiting lists for assisted housing can exceed thousands of applicants in a local jurisdiction, and in areas where the demand for assisted housing is intense, these lists have been closed for years.

Government housing assistance programs for low-income families take two forms: (1) project-based assistance, which funds the construction or rehabilitation of housing units, and subsidizes income-eligible households who live in these developments; and (2) tenant-based assistance, which provides vouchers that can be used to rent housing in the private market. Project-based assistance consists of programs administered by HUD, such as the public housing program, and the Low-Income Housing Tax Credit (LIHTC) program, which falls under the U.S. Treasury Department. Under the LIHTC, investors in affordable housing developments receive tax credits applied to their federal income tax liability. HUD's project-based assisted programs have been dramatically reduced in the last decade, leaving the LIHTC as the main program that develops affordable housing. All assisted housing units must meet a set of housing quality standards, and rents typically cannot exceed a "fair market rent" (FMR) established for each housing market and currently set at the 40th percentile of market rents. In general, a tenant's out-of-pocket costs are set at 30% of that family's household income, and the subsidy pays the difference between this contribution and the unit's rent up to the FMR.

With the exception of the LIHTC, most assisted housing, be it project- or tenant-based, is administered by HUD but operated by local public housing authorities. The goal of these programs is to provide decent, safe, and affordable housing to income-eligible households, typically defined as having incomes below 50–80% of the local area median income. There are currently an estimated 1.2 million public housing units, 1.7 million privately owned, federally assisted housing units, and about 2 million voucher units (U.S. Department of Housing and Urban Development, 2008).

4. Theoretical perspectives on housing and child development

Housing has received growing attention from social scientists as a potentially important context for children's health and development (Evans, 2006; Newman, 2008; Northridge & Sclar, 2002; Shonkoff & Phillips, 2000). Much of the child development literature on the home environment has highlighted the objects, interactions, and experiences that are available to the child in the home (Bradley, 2002; Gottfried, 1984; Hart & Risley, 1995; Lareau, 2003), rather than features of the housing unit itself (see work by Evans and colleagues as a noted exception, e.g., Evans, Lepore, Shejwal, & Palsane, 1998). Most notably, Bradley and colleagues have generated a vast and compelling body of work using the Home Observation for Measurement of the Environment (HOME) (Bradley et al., 2000; Caldwell & Bradley, 1984) on the importance of stimulation and support available in the home for children's development (see Bradley, 2002, for review). Our focus, as noted, is on the dwelling unit itself as captured by the physical, financial, and psychological features of the home. The distinct policy ramifications of these two perspectives on the home—stimulation and support versus the dwelling itself—are substantial. An emphasis on support and stimulation would point to parenting as a key target for intervention, whereas targeting the physical and financial features falls within the purview of housing policy.

The six housing features that are the focus of this review are briefly defined here before we describe our conceptual model in more detail. Physical quality usually is measured by structural deficiencies, such as lack of plumbing and heat, and maintenance deficiencies, such as holes in the floor and broken steps. Such measures emulate building codes or the housing quality standards of assisted housing programs. Included here are specific environmental hazards or serious maintenance deficiencies such as lead paint, asbestos, cockroaches, dust mites, mice and rats. Crowding is typically assessed by the ratio of persons to rooms, with ratios greater than one considered overcrowded. This common research definition is intended to capture a lack of personal space or privacy, enforced intimate proximity to people in the home with communicable diseases, and potentially excessive social or external demands. Residential mobility refers to the frequency with which families move their residence, with frequent moves typically thought of as residential instability. Homeownership entails owning

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2 This section is based on Newman (2008).
3 This estimate refers to all housing assistance programs (including HUD and tax credits) and assumes an income eligibility cutoff of 80% of the area (typically county) median income.
4 The HOME includes a subscale on the physical home environment, with several items directly addressing the housing unit and others tapping upkeep of the unit.
rather than renting a home. **Subsidized housing**, as described in the previous section, connotes housing that government regulations require to be physically decent and financially affordable. Finally, **affordability** means shelter costs that are reasonably affordable to the family in question; this is commonly defined as housing for which the family has to devote no more than 30% of its household income.

Our theoretical model for linking these housing features to children’s development is framed broadly within an ecological perspective. Ecological models of human development (Bronfenbrenner & Morris, 1998; Lerner & Castellino, 2002) highlight the importance of the multiple social contexts in which children are embedded as central to their development. These contexts include proximal settings in which the child directly interacts, such as the home environment. The model also incorporates more distal contexts in which the child may directly interact, such as neighborhoods or schools, or may indirectly interact, such as parents’ work environments. Of particular significance to our conceptual framework is an emphasis on the ways in which multiple social contexts intersect or jointly influence children’s development.

Each of the six housing features we list is hypothesized to have direct effects on various domains of children’s development. However, in line with ecological models, housing features are also likely to intersect with other contexts that are important to the child, particularly the family, in indirectly influencing development. Fig. 1 represents a general conceptual framework of the relationship among key dimensions. Family sociodemographic characteristics, such as poverty (which is of central interest in this review), and macrolevel forces, such as discrimination, are hypothesized to have a direct influence on children’s housing features such as affordability and homeownership. These housing features, in turn, can directly impact children’s outcomes, or can operate indirectly through the family or other important extra-familial contexts of childhood, such as children’s schools, neighborhoods, and social networks. For instance, crowded housing may directly influence children because lack of personal space may facilitate the transmission of infection-based illnesses from one household member to another or may create excessive social demands that tax children’s emotional well-being. Crowded housing may also indirectly affect children by the extent to which it influences marital conflict. In addition, the association between housing features and children’s outcomes, be it direct or indirect, may vary by individual child characteristics. Thus, the association between housing quality and child health may differ for children of different ages: Because younger children spend more time inside the home compared with adolescents, we might expect a stronger association for young children than for adolescents.

The conceptual model builds on literature from different disciplines. We draw primarily from theoretical models of how family income and resources affect child well-being. These perspectives include the family stress model from developmental psychology (Conger, Ge, Elder & Simons, 1994; McLoyd, 1990), family investments models from economics (Becker 1981; Becker & Thomas 1986; Haveman & Wolfe 1994), and sociological research on maternal employment and family structure (Bianchi 2000; McLanahan & Sandefur 1994) as well as residential mobility (Astone & McLanahan 1994).

The family stress model (and its variants) postulates that the economic hardship associated with low income or job loss is associated with parental stress and depression and partner conflict, which, in turn, are associated with more inconsistent, unsupportive, harsh, and punitive parenting behavior. The resulting lower quality interactions between parent and child are associated with emotional and school problems for children (Conger, Patterson & Ge, 1995; Elder 1974; Elder & Caspi 1988; McLoyd, Jayaratne, Ceballo & Borquez, 1994). This model has been replicated across diverse families (Conger, Ge, Elder, Lorenz & Simons, 1994; Conger et al., 2002; McLoyd, 1990). The model may be applicable to housing if features of the home, such as poor physical quality, crowding, unaffordability, or instability, are manifestations of economic hardship or sources of family conflict. Related work by Evans and colleagues has highlighted the various ways in which housing may be stressful to its residents including children (Evans, 2003; Evans & English, 2002; Evans et al., 1998). From these perspectives, housing is likely to have primarily indirect effects on children via the family, particularly parental well-being and behavior.

The economics literature views income in terms of investments in children: income enables families to purchase services, material goods, and experiences that benefit child development (Becker, 1981; Becker & Thomas 1986; Haveman & Wolfe 1994; Mayer 1997). In several studies, Brooks-Gunn, Linver, and colleagues have tested this model against the family stress model and generally find that material resources are more beneficial for cognitive outcomes compared with social and emotional outcomes, at least among young children (Linver, Brooks-Gunn & Kohan, 2002; Yeung, Linver & Brooks-Gunn, 2002). In contrast to the family stress model in which all or most of the effect of economic resources on children’s well-being is mediated by parental behavior, the investments model posits direct effects on children. Moreover, the direction of these effects could be positive or negative. Specifically, if housing is construed as an investment via homeownership, high physical housing quality, and residential

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**Fig. 1.** Conceptual model of the role of housing in children’s development.
stability, the effects on child development are likely to be positive. In addition, if families are making an informed decision about how much they invest in housing, their decision might reflect in part their desire to “purchase” beneficial community and school attributes. On the other hand, if housing investments serve as a source of financial strain, as in the case of unaffordability, or material hardship, as in the case of crowding or low quality, the effects are likely to be negative based on the extensive literature on family poverty and material hardship and their links to adverse child well-being (Duncan & Brooks-Gunn, 1997; Iceland & Bauman, 2004; Newman & Massengill, 2006). However, it is possible that the benefits of living in a community with excellent schools, low crime rates, or other features that support healthy child development mitigate or even overwhelm the negative effects of the stress on families of a high housing cost burden.

The work on maternal employment and welfare (Bianchi 2000; Bianchi & Robinson, 1997; Chase-Lansdale et al., 2003) and on single parenthood (McLanahan & Sandefur 1994; Wu & Thomson 2001) raises the conceptualization of parental time and availability as central to child well-being. The underlying premise of research on these topics is that parental time and availability, which are a function of competing caregiver demands (e.g., work and family) and number of available caregivers (e.g., single- versus two-parent), affect children’s development at least partially through provision of support and supervision of children. Findings are mixed, however, about whether the quantity and quality of parental time use are associated with children’s well-being. There is some indication that adolescents may be more sensitive to parental availability than young children (Chase-Lansdale et al., 2003; Morris, Huston, Duncan, Crosby & Box, 2001). This framework may be applicable to several aspects of housing and involves primarily indirect effects, again via the family. Unaffordable or high quality housing, which may or may not entail homeownership, may result in parents working longer hours, thereby being less available to their children. Subsidized housing may increase parental time and availability by reducing the financial burden associated with housing costs, which necessitates long work hours.

Although we view residential mobility or stability in this paper as a separate dimension of housing, it may serve as an indirect path for almost all of the other housing features. This research highlights several ways in which children’s lives may be affected by residential moves, which suggest an indirect path to children’s development vis-à-vis extra-familial contexts including the community, school, and social networks (Astone & McLanahan 1994; McLanahan & Sandefur 1994). First, moves may alter the level of community resources available to children, such as quality schools and child care, availability of recreational and social programs, and neighborhood safety. Second, moving may alter children’s and parents’ social connections to their community by affecting close ties or social networks that provide emotional support and information about the broader community. The extent to which changes in community resources and social ties increase or decrease as a result of moving has implications for the long-term effects of moving on children’s development, even if the short-term effects are generally disruptive (Adams, 2004; Astone & McLanahan 1994; Pribesh & Downey, 1999). The housing feature with arguably the strongest connection to residential stability is homeownership. The current foreclosure crisis notwithstanding, homeownership typically provides greater security of occupancy because renters can have their leases terminated or can be evicted. In fact, the foreclosure crisis combined with concerns about the deleterious effects of forced moves has rekindled interest in alternative forms of housing tenure that facilitate stability of residence without the full array of burdens required by traditional homeownership (Newman, 2009). Further, particular forms of housing assistance, such as public housing, which is typically owned and operated by a quasi-governmental public housing authority, may provide greater residential stability than rental vouchers, which are used in the private rental market. Poor quality or severely crowded housing could increase residential instability, either because the family cannot sustain the potentially deleterious living conditions over the long term or because the dwelling is condemned. Finally, unaffordable housing could also trigger more frequent residential moves.

5. Methodology

This literature review on the influences of housing on children’s development focuses on research published in the last 25 years, though we reference earlier landmark studies. Studies included in the review were identified with the aid of a large number of search engines. These include: PsychINFO; PsycARTICLES; Psychological Index; ERIC; Academic Search Premier (which contains EconLit and International political science abstracts); Wilson Web (which contains Social Sciences Full Text); CSA Illumina (which contains CSA Sociological abstracts; CSA Worldwide political science abstracts; Sociology: A SAGE full-text collection); and Medline.

Because the objective of this review is to present evidence-based findings that meet basic standards of scientific rigor and are derived from samples whose generalizability properties can be identified, we include primarily quantitative studies of individual data collected through systematic sample surveys, but add insights gained from qualitative studies, as appropriate. Likewise, we exclude studies based on ecological data (i.e., aggregated data on individuals at some larger unit such as neighborhoods) as opposed to individual-level data. Relying on studies with individual data helps to avoid the ecological fallacy in which incorrect inferences about individuals are made on the basis of aggregated data.

To the extent possible, we only include studies that have at least modest statistical controls for child and family background characteristics, such as family income and race/ethnicity. Pre-existing differences likely exist between families with different housing features (e.g., homeowners versus renters), and these underlying differences may account for any observed associations between housing and children’s outcomes. Inclusion of statistical controls for child and family background characteristics helps to account for these pre-existing differences, though it still does not support causal inferences. This problem of pre-existing differences, often referred to as a selection problem or an omitted variable bias, is a serious threat in non-experimental studies where participants are not randomly assigned to different housing conditions. Because most housing research is non-experimental, the possibility of selection bias must be kept firmly in mind when interpreting findings.

6. Housing quality

A broad literature exists on the association between the physical adequacy and safety of the dwelling unit and child health and health-related outcomes and, to a much lesser extent, developmental outcomes such as achievement and social and emotional well-being (Krieger & Higgins 2002). With the exception of several intervention programs, many of which are relatively small (e.g., Brown et al., 2001; Lanphear et al., 1999; Lyons et al., 2007), the evidence for links between housing quality and children’s health and well-being comes largely from non-experimental studies of non-representative samples of low-income families (e.g., Evans, 2004). Much of the research on quality is descriptive and its generalizability is therefore unknown.

The literature on environmental exposures in the home and children’s health is vast. An extensive body of research shows an association between children’s asthma and poor air quality (e.g., smoke) and exposure to allergens (e.g., dust mites, cockroach, cat, and dog dander) (see a review by Wu & Takaro, 2007). Related research finds associations between the presence of dampness and mold and children’s poor respiratory health including asthma (see Fisk, Leigomez, & Mendell, 2007, for review and meta-analysis). Substantial
work links lead paint to neurological damage in young children, continued cognitive impairments into adolescence, and problems with impulsivity (Krieger & Higgins, 2002; Dilworth-Bart & Moore, 2006).

A number of studies explore associations between poor quality housing and childhood injuries (Evans & English, 2002; Krieger & Higgins, 2002). However, several of the studies were based on neighborhood measures of housing quality and not direct measures of children’s homes (O’Campo, Rao, Gielen, Royalty, & Wilson, 2000; Shenassa, Stubbendick, & Brown, 2004). For example, a study of hospital discharges for children under six years of age over a 10-year period in Illinois found that older housing (assessed at the zip code level) was associated with more burns and falls (Shenassa, Stubbendick, & Brown, 2004). But other studies fail to find an association between housing quality and children’s injury (Vaughan, Anderson, Agran, & Winn, 2004), which is consistent with a literature review of housing interventions to prevent childhood injuries (Lyons et al., 2007).

Beyond childhood injury, a study of families waiting for housing vouchers found that poor quality housing was associated with general ratings of children’s health as “fair” or “poor” and with limitations on activity (Sharfstein, Sandel, Kahn, & Bauchner, 2001). Finally, one study that examined long-term outcomes suggests that, after controlling for socioeconomic status, housing conditions during childhood may contribute to adult health status (Bedman, Gunnell, Davey-Smith, Frankel, 2001).

Limited research also bears on how housing quality may indirectly influence children’s development by means of the family. A qualitative study by Bartlett (1998) detailed how housing inadequacies limit opportunities for stimulating and supportive family interactions and create stress and conflict among family members. Likewise, parents in crowded homes, a condition that often co-occurs with poor quality housing, are less responsive and harsher than parents in less crowded housing conditions (Evans, 2001). Consistent with this work, Sandel and Wright (2007) have argued that the psychological stress associated with poor housing quality likely contributes to its association with adverse physical health outcomes, such as asthma.

Despite the sizable number of studies that find an association between housing quality and child development, of note is the striking number of studies that find no such association (e.g., Murray et al., 2007; Tavernier et al., 2006; Vaughan et al., 2004).

7. Housing crowding

A large majority of the research on crowded housing conditions centers on adults rather than children (Evans, 2003; Newman, 2008). The research base on crowding and children’s development, while scant, generally accounts for family background characteristics that likely co-occur with crowding, such as family socioeconomic conditions (e.g., Baker, Taylor, Henderson, & The ALSPAC Study Team, 1998; Conley, 2001). This work is exclusively non-experimental. Interestingly, despite the strong theoretical links to adverse psychological processes related to lack of personal space (Evans, 2003; Gove, Hughes & Galle, 1979), almost no research on children has focused on associations between crowding and social and emotional well-being in comparison with health and achievement or grade retention. It also bears noting that research on immigrant families who prefer “crowded” conditions raises questions about the conventional definition of crowding, although this work did not focus specifically on children’s outcomes (Myers, Baer & Choi, 1996).

Consistent with the notion that crowded living conditions serve as a vehicle for disease transmission (Gove, Hughes & Galle, 1979), a number of studies find a relationship between crowding and children’s poor physical health due to infection. For instance, crowded living conditions are associated with children’s respiratory problems (Baker et al., 1998; Mann, Wadsworth & Colley, 1992). Exposure to crowding during childhood is also associated with gastrointestinal problems in both the short and long term (Galpin, Walker & Dubiel, 1992; McCallion et al., 1996). Finally, crowded living conditions during childhood, typically viewed in the context of socioeconomic risk, have been linked with worse adult mortality (Coggon, Barker, Inskip & Wield, 1993).

Additional research finds associations between crowding and children’s schooling outcomes. A French study observed a link between overcrowded housing and repeating a grade in elementary and middle school (Goux & Maurin, 2005). Another study of young children in Head Start found that children in the most crowded living conditions had the most behavioral problems as rated by their preschool teachers (Maxwell, 1996). Finally, a study using data on a longitudinal, nationally representative sample of families reported that crowded living conditions during childhood were associated with lower levels of completed schooling by age 25 (Conley, 2001).

8. Housing mobility

A relatively large non-experimental literature exists on the association between housing mobility and a range of child and adolescent outcomes, from school achievement to social and emotional adjustment, though physical health has not been a primary focus (see Adam, 2004; Fauth, 2004; and Jelleyman and Spencer, 2008, for detailed reviews). Analyses have relied on a range of samples, from those that are nationally representative (e.g., Pribesh & Downey, 1999; Wood, Halfon, Scarlata, Newacheck & Nessim, 1993) to those that are small, homogenous groups of low-income families (e.g., Adam & Chase-Lansdale, 2002; Stoneman, Brody, Churchill, & Winn, 1999) in both cross-sectional and longitudinal contexts. We focus on studies of residential mobility, not school change, because of our interest in housing, though school change may be part of the residential mobility process (Swanson & Schneider, 1999).

Our distillation of this research is in line with extant reviews. Residential mobility has short-term negative associations with both children’s and adolescents’ school achievement and functioning (Pribesh & Downey, 1999; Simpson & Fowler, 1994; Wood et al., 1993). The long-term relationship between mobility and educational attainment also appears to be negative. Several studies find that moving is associated with lower educational attainment by late adolescence (Astone & McLanahan, 1994; Hagan, MacMillian, & Wheaton, 1996; Haveman, Wolfe, & Spaulding, 1991). However, one Canadian study suggests that the long-term relationship of mobility and high school completion may be positive (Hango, 2006). The author attributes this conflicting finding to the higher quality of the moves, which was sufficient to offset any potential negative short-term associations. Across these studies, residential mobility appears to be especially harmful for children from single- and step-parent families (Astone & McLanahan, 1994; Tucker, Marx, & Long, 1998).

For social and emotional outcomes, only short-term relationships have been examined. Moving has adverse associations with children’s and adolescents’ behavioral and adjustment problems (Adam & Chase-Lansdale, 2002; Hendershot, 1989; Simpson & Fowler, 1994; Wood et al., 1993). One study also reports that mobility increased the odds of female adolescents having sex (Stack, 1994). In addition, there is suggestive evidence that residential mobility has a negative association with both peer and sibling relations (Haynie, South, & Bose, 2006; Stoneman et al., 1999).

Across studies, there is some indication that the relationship between mobility and child outcomes may be nonlinear, with additional moves (or instability) being increasingly more detrimental than one or possibly even two moves. What remains unclear is the manner in which the negative effects of residential mobility operate on children’s development. One study explored social capital as a potential pathway of the association between residential mobility and declines in adolescent achievement and found that decreases in social
capital, assessed by students' and parents' connections to school and community, partially explained this relationship (Pribesh & Downey, 1999). On a related note, parental support has been shown to attenuate the negative association of residential mobility and the adjustment of middle school students (Hendershot, 1989), whereas lack of such support may exacerbate the adverse relationship between adjustment and mobility (Hagan, MacMillian & Wheaton, 1996).

9. Homeownership

Multiple well-designed and executed studies find that growing up in an owned rather than a rented home has a positive effect on a wide range of children's outcomes (e.g., Aaronson, 2000; Boehm & Schlottman, 1999; Conley, 2001; Green & White, 1997; Fogelman, Fox & Power, 1989; Boyle, 2002; Haurin, Parcel & Haurin 2000, 2002). All of these studies rely on national longitudinal data (e.g., the Panel Study of Income Dynamics [PSID], the National Longitudinal Survey of Youth [NLSY]), and a variety of statistical modeling approaches to tease out the “effect” of homeownership. Outcomes include better health (Fogelman et al., 1989), lower levels of child problem behavior (Boyle, 2002), greater math and reading achievement, fewer behavior problems (Haurin et al., 2002), lower high school dropout rates, fewer teen births (Green & White, 1997), more years of schooling by age 25 (Conley, 2001), and higher high school graduation rates (Aaronson, 2000).

A close reading of the handful of articles written since 2000, however, strongly questions the existence of a “homeownership effect.” For example, in Aaronson’s (2000) longitudinal analysis of the effect of homeownership on staying in school until age 17, the effect of homeownership disappears after instrumental variables are added to account for self-selection and for residential mobility. A similar scenario applies to the analysis by Galster, Marcotte, Mandell, & Augustine (2007), who examine several young adult outcomes such as graduating from high school and having a child before age 18. After controlling for mobility and instrumenting for self-selection, the statistically significant effects of homeownership vanish. Whereas Aaronson and Galster and colleagues rely solely on the PSID, Barker and Miller (2009) analyze multiple datasets including the NLSY, the decennial Census Public Use Micodata Sample, and the Early Childhood Longitudinal Study–Kindergarten Cohort. Based on multiple analyses of these different databases, their findings further weaken the case that homeownership per se has a positive effect on child outcomes. Finally, in their analysis of the PSID and its Child Development Supplements, using propensity score matching techniques to support causal modeling, Holupka and Newman (2010) find little evidence of homeownership effects on cognitive achievement, behavior problems, or health after accounting for self-selection through propensity score matching and subgroup analyses.

10. Subsidized housing

The literature on the relationship between subsidized housing and children’s outcomes is limited, but, for the most part, methodologically sound. Three studies examine children's physical health outcomes. In their study of welfare reform in Indiana, Lee, Beecroft, Khadduri and Patterson (2003) find that welfare families in public housing and those using housing vouchers are better able to afford medical care than comparable unassisted families that, on average, have much higher cost burdens. In their analysis of 1998–2003 data on children younger than three years collected in pediatric clinics and emergency departments in six states, Meyers et al. (2005) find that children in families receiving a rental housing subsidy were less likely to be underweight than children in families receiving no housing assistance. The researchers found no significant association with a health status rating of fair or poor by their caregiver, or with a history of hospitalization. Fertig and Reingold (2007) use the Fragile Families and Child Wellbeing data on children born between 1998 and 2000 collected in 20 large cities. Although several of their models show positive and significant associations between public housing and children's health as reported by mothers, the authors caution that these (and several other) results are sensitive to model specification. Two studies of self-sufficiency outcomes (e.g., educational attainment, work, and earnings) use different nationally representative sample survey data for different time periods but yield consistent results. Currie and Yelowitz (2000) use a combination of Current Population Survey data and Survey of Income and Program Participation data to study grade retention in a sample of 6–17-year-olds. Newmann and Harkness (2002) use 27 years of data from the PSID to analyze the long-term effects of public housing on young adults who lived in these settings between ages 10 and 16 primarily during the 1970s. Outcomes include educational attainment, work, and earnings after age 20. Surprising to many, both studies found that public housing children experienced better outcomes in both the short term and long term than their unassisted counterparts.

The most recent study of the effects of subsidized housing on children’s outcomes is the Welfare to Work Voucher experiment (WtWV) (Abt Associates, 2006). This experiment tested the effects of awarding housing vouchers to welfare recipients. In contrast to the public housing results of Currie and Yelowitz (2000) and Newmann and Harkness (2002), WtWV reports that within the five-year follow-up period there was “no evidence to support any particular pattern of effects on child outcomes” such as school performance and behavior problems. Since more than twice as many households receiving a voucher (the experimental group) moved to a different residence as did their non-voucher counterparts, the authors suggest that perhaps the disruption of moving overwhelmed any positive effect of the voucher (such as greater discretionary income or the better quality of the housing and the neighborhood).

11. Housing unaffordability

“Affordability” of any good or service is most often defined in one of two ways: an amount that does not undermine the consumer's ability to purchase basic necessities, or the amount paid for a good or service by the typical consumer. The housing field has adopted a particular rule of thumb that incorporates both of these definitions. Spending more than 30% of a household’s income on housing is considered “unaffordable.” Despite media attention devoted to the growing unaffordability of housing by low and moderate income families and the tone of certainty in the stories about the dire effects of unaffordability on children, this topic has been largely neglected by rigorous research. Part of the explanation is that the policy argument for making housing affordable is not a housing issue but an income issue. As such, it is similar to an income supplement. But in the real world of public policy, because the U.S. taxpayer prefers in-kind benefit programs such as housing assistance to untied cash grants, housing affordability is worthy of attention. The core policy question is whether living in unaffordable housing has deleterious effects on children’s development and well-being.

The first published study on this topic (Harkness & Newman, 2005) is an exploratory analysis that used data from a national cross-section survey, the National Survey of America’s Families, to examine a range of outcomes associated with high housing prices in the housing market (commonly defined as the metropolitan area) on 6–17-year olds in families with incomes below the poverty line.

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5 This analysis also relies on self-reported assisted housing receipt, which has been shown to be prone to error (e.g., Schroder & Martin, 1996).
6 That the voucher was reported to have no effect on housing quality and only a small positive effect on neighborhood quality may also have contributed to the absence of effects of the voucher on child well-being outcomes.
Outcomes included health, timely health care, behavior and emotional problems, food security, school engagement and advancement, behavior and emotional problems, and parental aggression and mental health. Because the common definition of housing affordability, the ratio of housing costs to income, raises endogeneity concerns (since the same attributes that lead families to spend a particular fraction of their income on housing may also affect their children's well-being), the analysis substituted a measure of housing prices in the housing market for the housing cost to income ratio measure. The findings revealed a range of favorable associations of affordable housing on older children (12–17 years), suggesting that the effects of affordability may be cumulative. Interestingly, for older children's schooling outcomes, the most positive associations between housing affordability occurred at the extremes, that is, in the most—and least—affordable housing markets.

A second study (Harkness, Newman & Holupka, 2009) is longitudinal, and is based on data from the PSID and two waves of its Child Development Supplement (1997 and 2002), and a measure of housing price, again used as an exogenous proxy measure of affordability. Although the goal of this research was to shed new light on whether the official poverty measure should be adjusted for geographic differences in the cost of living, and particularly the cost of housing, this was achieved by examining the core question of interest here, namely, the relationship of housing affordability to measures of child well-being. The results counter the common view that growing up in a high-priced housing market threatens children's well-being. For both poor and near poor samples, there are no negative associations between housing prices and children's health, behavior, or academic achievement at ages 5–17 years. Nor are there adverse effects on parents' well-being. More recently, this analysis has been replicated on a second database, the NLSY, and stress-tested in multiple ways (Holupka & Newman, 2009). Results remain the same: there is no evidence that unaffordable housing markets are associated with deleterious outcomes for poor and near poor children. These results are consistent with the view that because high-priced housing markets are likely to provide better schools, lower crime rates, and a range of amenities, these resources may counteract any negative effects on poor children of the high housing cost burdens on their parents.

12. Discussion

Our review sought to assess the current knowledge base on housing and children's development. We focused on six housing features—physical quality, crowding, mobility, homeownership, subsidized housing, and affordability—with potential links to child health and well-being. In this section, we highlight what we believe we know at this point from our review. We provide a discussion of methodological and conceptual issues that are raised by this review and that must be addressed to move the field forward. We end with some policy reflections.

12.1. Summary of findings

Some clear patterns emerged for each of the housing dimensions. (That there were also many hypothesized associations that failed to demonstrate consistent links underscores that most of the patterns we discuss here must be considered suggestive rather than definitive.) A brief summary of findings for each housing feature follows, which we link back to our conceptual model.

Given that housing quality entails the physical conditions of the unit, it is not surprising that it has been examined largely in terms of its direct associations with children's health. In general, the predominantly non-experimental research base on particular environmental hazards in the home has been methodologically sound in the sense of using longitudinal data with a rich set of controls and convincingly evaluated in comprehensive reviews and meta-analyses. Two primary findings emerge: (1) children's exposure to lead in the home is associated with short- and long-term cognitive deficits, and (2) exposure to poor air quality and allergens is associated with children's respiratory problems, notably asthma. However, samples are typically not representative so findings lack generalizability and more rigorous statistical techniques to account for omitted variable bias remain to be done. Studies attempting to link more general measures of housing quality to other child health outcomes, such as injury, have yielded more inconsistent findings, likely due at least in part to unreliable measures of housing quality and measures that may not be relevant to child development. In addition, research on housing quality and developmental outcomes such as achievement and adjustment is virtually non-existent. Though extant work has not tested for indirect effects, related evidence suggests that housing quality may indirectly influence children's development through the pathway of family stress.

Again, rigorous non-experimental (non-representative) studies suggest that crowded housing conditions are consistently associated with children's physical health, and, in particular, the transmission of infectious diseases. Three studies of variable quality also point to links between overcrowding and children's poor school-related outcomes. Like housing quality, studies have not considered associations between crowding and children's social and emotional outcomes, despite strong theoretical expectations regarding such links. The observed harmful effects of crowding are likely due to lack of personal space and privacy. Limited work indicates crowding has negative associations with parenting, which suggests a possible indirect route to children's outcomes in line with family stress models. Potential cultural differences in preferences for crowded housing raise questions about the generalizability of findings regarding adverse effects of crowding in light of recent and continuing demographic shifts in the U.S. population.

A large, empirically sound body of research on mobility using diverse samples (including nationally representative ones) indicates that moving, especially multiple times, has negative short-term associations with children's and adolescents' schooling and social and emotional outcomes. Three longitudinal studies based on nationally representative samples also reveal adverse long-term associations between residential mobility and adolescents' achievement (see Hango, 2006, as an exception), with no such comparable evidence for social, emotional, or physical well-being. In terms of indirect effects, several studies support the notion that the association between moving and children's development operates through extrafamilial contexts. In this work, access to social support and networks appears to play a role in explaining mobility-child development links.

Until roughly 2000, the scholarship on homeownership pointed to positive effects of owning a home rather than renting on a range of child outcomes from education to health and behavior. Plausible explanations for these beneficial effects, though largely untested, include several direct and indirect routes: (1) greater residential stability of owners; (2) lower student turnover in neighborhood schools—a secondary effect of greater residential stability of owners—resulting in better educational experiences for children since owned homes tend to cluster in the same neighborhood; (3) better quality of housing units that are owned versus rented since owners have greater financial incentive to recapture the value of any home investments when they sell their property; and (4) higher quality of neighborhoods surrounding owned versus rented dwellings, in part as a result of the cumulative effect of individual owners tending to the state of repair and upgrading of their residence. More recent work using techniques to address omitted variable bias and employing replication analyses, however, strongly suggests that self-selection rather than

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7 Housing prices are difficult to measure and none of the existing indices are ideal (see Holupka & Newman, 2010).
homeownership itself is driving these effects—that is, owners differ from renters in systematic ways that affect children’s outcomes. Subgroup analyses by such attributes as income, family stability, race and ethnicity may shed light on the black box of homeownership because of the significant heterogeneity of families, which undoubtedly affects housing choices and outcomes. The recent sub-prime mortgage crisis, which has hit lower-income borrowers particularly hard, also serves as a reminder that homeownership may have negative consequences for some families and children.

For subsidized housing, contrary to popular wisdom, two studies based on nationally representative samples find that living in public housing has short- and long-term positive associations with children’s and adolescents’ schooling and economic attainment (compared with children from low-income families who live in housing in the private market). In addition, three studies of variable quality report inconsistent associations between receiving housing assistance and favorable health-related outcomes. Studies linking housing subsidies to children’s social and emotional development are completely lacking. In studies finding positive associations for achievement and health, it is unclear which particular housing feature(s) is the source of the observed positive effects since housing subsidies are intended to provide a package of benefits: physically decent, uncrowded, and affordable housing. Public housing also may provide greater residential stability compared with other forms of assisted housing or lack of assistance for similarly poor families, which is another indirect means by which housing might be supportive of children’s development. Because the quality of neighborhoods surrounding public housing are reported to be worse than the quality of neighborhoods where comparably poor families live who do not receive housing assistance, these positive features of public housing—quality, affordability, lack of crowding, and possibly stability—appear to outweigh the costs of living in low-quality neighborhoods.

Finally, affordability is the least researched dimension of housing among the six features reviewed here. Findings from three studies—one cross-sectional and two longitudinal—of different national databases suggest that the benefits of high-priced markets for children’s development (e.g., better schools, lower crime rates, more recreational and social programs) across such outcomes as cognitive achievement and behavior may outweigh the burdens of families’ higher housing costs. The explanation for this pattern is unclear, as family stress processes do not appear to be at play. Unmeasured family attributes may account for these findings. The studies we reviewed used a measure of local housing prices in lieu of proportion of family income spent on housing to address concerns regarding these unmeasured attributes, but this may not be enough of an adjustment to remove potential bias.

12.2. Research directions

Although our review uncovered emerging patterns, we conclude by arguing, on largely methodological and conceptual grounds, that research to date on housing and children’s development is still in its relative infancy. We outline here our prescriptions for future research to move the field toward maturity.

In terms of measurement, our first recommendation is to reach consensus on a core set of housing measures that are relevant to the specific context of child development. For example, the American Housing Survey, the main database on housing in the U.S., uses measures that are important for housing policy but may not speak to issues central to child development. This goal might be achieved through a National Academy of Sciences expert panel, akin to the consensus conferences at the National Institutes of Health. Second, measurement of key dimensions varies widely across studies. A set of reliable and valid measures on the physical, financial, and psychological aspects of the home need to be refined. The HOME scale, which includes measures of stimulation and support, provides one model (Caldwell & Bradley, 1984). Finally, developing good housing measures will not build our knowledge base unless they are also incorporated into studies focused specifically on children’s development. Thus, longitudinal studies of children, particularly well-known public datasets, need to include reliable and valid measures of housing and on an ongoing basis. For example, the NLSY asks only about the receipt of housing subsidies—something that is not reliably reported—as well as whether the home is owned or rented, and housing debts. We call survey researchers to action to develop housing measures, test them, and incorporate them into future studies.

With respect to study design, a broad criticism of the housing literature, with some notable exceptions, is that much of the research is non-experimental and suffers from the typical pitfalls of such designs, including problems of omitted variable bias and self-selection (Newman, 2008). Methodologically, experiments are accepted as the best way to establish causality. That said, the complexity of housing effects requires multiple experimental and control groups, pushing the limits of this approach. For example, in the case of crowding, an experimental study should consider the dwelling unit’s square footage, layout, and construction quality in addition to the number of rooms and people. At this early point in our development of a better understanding of the relationship of between housing and child development, an investment in experimental studies seems premature until more complete and rigorous non-experimental studies are done.

But before developing measures and launching rich non-experimental studies, the critical first step is developing a theoretical framework to reflect more precisely the mechanisms through which housing is likely to affect children, youth, and families. We proposed a rudimentary conceptual model of housing and children’s development. That model, culled from related research on income, employment, and marital disruption, suggests ways in which housing may directly and indirectly influence children’s health and well-being. Our review provides limited indirect evidence for this model. But very few studies include measures of parents’ behavior and well-being or extra-familial contexts, all three of which play central roles in the proposed model. Only by building better theory will we build a stronger research base.

12.3. Policy reflections

Although the key theme of this review is that many even very fundamental knowledge gaps remain to be filled in our understanding of the role of housing in child development, we offer three tentative directions for housing policy. First, the most recent scholarship on homeownership raises strong counter-evidence to the consistent finding of prior research that homeownership has a strong and positive effect on a range of child outcomes. This finding is particularly provocative as we go to press, when the U.S. economy is attempting to recover from a dramatic foreclosure crisis. Although owners may enjoy other benefits, current research suggests that favorable effects on children may no longer be one of them. An important policy question is whether there are ways for policy to increase the benefits that have typically come with homeownership, such as stability and quality, without taking on the many challenges of actually owning a home.

Second, results on housing unaffordability do not conform to the conventional concerns of threats to children’s well-being either directly through material hardship or indirectly through family stress. Instead, they seem more consistent with the hypothesis of investing in well-endowed communities for their beneficial effects on children. More research is required to test this second hypothesis with direct measures of community endowments, and to examine the actual expenditures on children of low-income families living in affordable and unaffordable housing. Should research support the notion that
low-income children benefit from higher-priced housing markets, policies that give low-income families the option to live in such communities should be expanded.

The suggestive findings on housing quality and crowding and children’s health are relevant for the ongoing debate in the housing and urban policy field about reducing the burden of housing and land-use regulations. This broad umbrella subsumes minimum housing quality standards and building codes to protect physical health and safety. We would welcome a careful evaluation of whether the current set of standards is optimal and potential adjustment to standards and codes based on such a review. But we wish to emphasize that eliminating or reducing codes as part of a broad brush effort to lower housing prices and open up housing markets could prove extremely dangerous to child and family well-being.

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Housing: A Case for The Medicalization of Poverty

B. Cameron Webb and Dayna Bowen Matthew

Historically, it has been challenging to garner consensus around the notion of “medicalization.” With over 40 years of scholarship and no firm definition in place, it is safe to say that conceptually, medicalization has been quite polarizing. The term itself can engender fear and mistrust — or hope and anticipation. Applied to poverty, it bears the promise of a new paradigm for understanding and explaining illness, but also raises valid concerns over the creeping hegemony that is western biomedicine. In the end, the value and the impact of medicalization depend entirely on what is being medicalized, and for whom. While much has been written applying the concept to clinical perspectives on fertility, mental health, and obesity, this article takes a new look at the “what” and “who” of medicalization. We discuss the medicalization of poverty as a novel exploration of this concept and its application to the social determinants of health.

From our vantage points — that of lawyers and advocates for social justice but also as a clinician and a social scientist — we ask whether the medicalization framework is more a valuable construct or a wayward interpretation. Specifically, we explore questions about how the concept of medicalization does or does not serve to improve patient care and patient wellbeing. Does the greater consideration of poverty in the clinical setting tend to create greater opportunities for health, or are patients’ health better protected when we avoid transforming social risk factors into substrates for interventions that may presently be ill-suited for the clinical environment? Can the consideration of poverty inform improved delivery models which might lead, in turn, to better population outcomes? We consider the prospects for the increased medicalization of poverty in three parts. First, we explore the evolution of the concept of medicalization and changing perceptions of its promise and peril. Next, we describe an alternate interpretation of the concept that applies it to non-biologic risk factors of disease — namely the social determinants of health — and consider its impact on patient care. Finally, we look specifically at the challenge to find affordable, decent housing as a specific feature of being poor or

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near-poor, to examine how medicalizing poverty can affect the navigation of illness for some of society’s most vulnerable individuals. Poverty — and its impact on housing as an important social determinant of health — has no doubt influenced medical decision-making with increasing frequency. The question remains: are patients the better for it?

I. Evolution of the Concept of Medicalization

Many regard the term medicalization with suspicion. In fact, the meaning of this term has changed over time. For some, the term resurrects 16th century notions of the “unworthy poor,” who without medical pathology to explain their need, merit no public support or intervention. In this sense, medicalizing the human condition has merit and assists the poor in particular. With the Industrial Revolution at the turn of the 19th century, anti-medicalization schools of thought emerged, challenging the public’s uncritical worship of the medical system’s ability to eradicate pain or sickness. In this time of mechanistic miracles, modern medical society expropriated sickness and death, becoming in the process a “medical nemesis” to health itself. German philosopher, Ivan Illich, wrote in Medical Nemesis: The Exploration of Health that the “medical establishment has become a major threat to health.”

Illich advanced the overarching view of the healthcare system as a “medical Leviathan” in which medical professionals transform a normal human condition into disease. The result he termed “clinical iatrogenesis” — the process of medicalization that causes individuals to lose or cede control of the body to physicians and hospitals.

French philosopher Michel Foucault continued the medicalization critique in The Birth of a Clinic: An Archeology of Medical Perception. Foucault’s critique extended to analyzing power dynamics within social systems that contemporary sociologist Paul Starr would later call, “the medical-industrial complex.”

Foucault described the “medical gaze” as the medical professional’s way of selecting the biomedical aspects of patient narratives, and fitting them into a biomedical paradigm, while discarding non-biomedical information, unsuitable for doctor-oriented, rather than patient-oriented controls. In this view, medicalization operated to create an abusive power structure of control by physicians over patients.

Critics of the medicalization of the human condition have continued to dominate the discourse during the 21st Century. Some scholars continue to object to control over individual choice that medicalization implies. In Medicine as an Institution of Social Control, for example, Irving Kenneth Zola disparages the medical community’s absolute control over technology and consequent intrusions upon personal freedom. Zola argues medicine has become “a major institution of social control” that has “led us down the path of the reluctant reliance on the expert.” Similarly, Margaret Lock cites waves of medicalization that threaten “individual choice in connection with decisions relating to health and illness.”

In contrast, feminist scholars over the last two decades have been able to parse out further nuances, distinguishing “good” from “bad” medicalization as it affects social control over natural occurrences such as childbirth or instead empowers welfare-enhancing reforms. And one outspoken critic of neo-liberal policy abhors the medicalization framework because he believes it ignores the structural nature of problems in favor of constructing inadequate, individualized solutions to systemic problems.
By this view, admonitions to cease smoking, exercise more, and drink less crowd out attention to structural inequities that characterize the social determinants of poor health, and make adherence to individual-level recommendations to improve health behaviors nearly impossible. Perhaps the concepts most severe critic has been psychiatrist, Thomas Szasz, who famously said that he saw neither science nor medicine in the medicalization concept; instead, medicalization is regarded as a semantic social strategy that benefits some patients while harming others.12 Politicians are equally divided on the efficacy of medicalizing social problems. This divide manifests in public policy debates that surround contrasting views toward healthcare reform generally, and Medicaid policy specifically.13 For example, the Democratic party announced in the “Health and Safety” section of its 2016 party platform that “Democrats believe your zip code or census tract should not be a predictor of your health, which is why we will make health equity a central part of our commitment to revitalizing communities left behind.”14 In this view, health reform should address the disparate impact that social factors associated with one’s geographic neighborhood have on different populations. The Republican platform took a different approach: that “[t]o guarantee first-rate care for the needy, we propose to block grant Medicaid and other payments and to assist all patients, including those with pre-existing conditions, to obtain coverage in a robust consumer market.”15 The platform described Medicaid “[a]s the dominant force in the health market with regard to long-term care, births, and persons with mental illness, [making block grants] the next frontier of welfare reform.” The central characteristic of this position suggests that market forces best organize the priorities for health spending. The salient contrast in these visions for health reform is that while both Democrats and Republicans are focused on improving health for the neediest populations — children, low income families, people with disabilities — they have very different perspectives on whether social factors such as neighborhood conditions are a medical concern, or whether instead medical issues are those related to market distributed payments that cover biomedical conditions. That is to say that the two positions differ on the concept of medicalization. On one hand, Democrats medicalize social risk factors as part of a health reform platform, while on the other hand, Republicans medicalize markets to distribute health and health care.

Public health scholars, by contrast, regard “medicalization” as a scientific approach to promote and protect population health. Thomas Frieden’s effort to apply traditional public health tools to the HIV epidemic is an example.16 Frieden’s approach focuses on the epidemiologic trends revealed by surveillance, which he proposes to use to direct public health interventions, such as partner notification and increased access to antiretroviral treatment to control the disease. In essence, this brand of medicalization is a departure from the social debate that had focused on conflicting political influences; it turns the lens on the underlying disease in order to reduce the human and economic costs of HIV/AIDS, and focuses on the public health goals to prevent the deaths of thousands.

We regard Frieden’s public health approach to medicalization as an improvement over prior views. A scientific approach, focused on health outcomes, rather than a conceptual debate mired in relative status and position of stakeholders, is more likely to generate improvements in population health. Still, we propose here another interpretation of medicalization. Instead of medicalizing people (e.g. pregnant women) or conditions (pregnancy) or even the social position or views of stakeholders which can stymie effective treatment (e.g. HIV prevention or teenage pregnancy), we think the preferred conceptual framework is medicalization of the risk factors that contribute to diseases. More precisely, we propose a framework that medicalizes the condition of poverty, and the cluster of risk factors incident to poverty.

We use housing as an instructive exemplar to explain.
the preferred conceptual framework is medicalization of the risk factors that contribute to diseases. More precisely, we propose a framework that medicalizes the condition of poverty, and the cluster of risk factors incident to poverty. We use housing as an instructive exemplar to explain.

II. Why the Medicalization of Risk Factors

Medicalization is most appropriately a descriptive and operative framework to understand the comprehensive range of contributors that cause the need for medical care and intervention in the first place. Commonly, these “causes of the causes” of disease are called social determinants of health. By their very nature, incorporation of the social determinants of health into clinical settings results in the medicalization of these socially-created risk factors for poor health — that is, we use the clinical encounter as an opportune setting in which to identify and coordinate the address poverty-driven needs. There are many advantages to this approach. First, medicalization of risk factors represents a more accurate acknowledgement of the broad range of factors that contribute to healthy outcomes. Today, social and clinical scientists estimate that only 20% of health outcomes are determined by healthcare. In contrast, social determinants have far greater influence on health disparities than medical care alone. Differences in social and environmental factors account for an estimated 40% of health outcomes. Another 30% of health outcomes are related to health behaviors which occur within a social context, like alcohol consumption and smoking, and are therefore also susceptible to environmental influences. Of course, the causality versus selection debate has not been resolved and we may find that many poor health outcomes are only associated with, not the direct result of, substandard conditions. However, as well-designed studies finding an association between poor living and poor health continue to add up, the less credibly social scientists and policy-makers can ignore the causal inference. Therefore, we are willing to assume *arguendo* here that social determinants play a much larger role in predicting health outcomes than genetics or healthcare services.

A second advantage of medicalizing risk factors is the added incentive for increasingly integrated rather than fragmented and siloed health delivery. By appreciating the profound influence on biomedical outcomes that social risk factors have, medicalization can motivate clinical providers to seek alliances with social service providers to achieve better health outcomes. Third, medicalization of social risks creates a business case for blending and braiding various funding sources together in order to finance comprehensive health interventions that go beyond narrow “medically necessary” services defined by traditional payment structures. We will demonstrate the importance of medicalizing one social determinant — access to safe, decent, affordable housing — in order to demonstrate these advantages that may better help to achieve equitable health opportunities and outcomes. Housing, in particular, has been shown in a number of epidemiological studies, to be an important determinant of population health. The next section applies the “medicalization of risk factors” approach to standard housing, unaffordable housing, and the neighborhood conditions that accompany both.

III. Medicalization of Access to Decent Housing as a Social Risk Factor

The paradigmatic example of how poverty, housing, and health are related for an asthmatic child helps to situate the medicalization debate in context. Asthma disproportionately affects children living in poverty. Imagine a child who may, in fact, have regular access to high quality healthcare to obtain preventive services and to clinically treat asthma. Nevertheless, the child will most likely remain at risk and her asthma has a greater probability of continuing uncontrolled if she lives in poverty. This is because her home environment is more likely to be moldy, pest-infested, poorly heated, inadequately ventilated, and contaminated by lead. This child is at increased risk of finding that lead has contaminated the paint, plumbing, and water available to her, all of which have been associated with long-term, adverse impacts on mental health, neurological disorders, psychological, and behavioral dysfunction. The third National Health and Nutrition Examination Survey (NHANES) estimated that 40% of childhood asthma is related to children’s home environment. The dangers to this child’s health due to poverty most likely extend beyond the risk that her asthma persists or worsens. She is very likely to live within a community that suffers concentrated poverty, and therefore will face further health risks in addition. Buildings where low-income families reside are often unsafe for all residents. Every year, people are injured in homes that have structural and design defects, such as unstable stairwells associated with falls, electrical defects associated with burns and fires, or faulty furnaces that emit carbon monoxide — all defects that pose their own risks to health but that would be harmful to this child’s asthma as well.

Compounding matters, poverty brings with it exposure to neighborhood-level factors that could exacerbate asthma and other health problems. Poverty increases the odds that this asthmatic child lives in a neighborhood disproportionately burdened by social stressors such as violence. She is more likely to be
exposed to risk factors for pollution such as proximity to landfills, power plants, or interstate highways — all of which have been shown to adversely impact health. Poorer families live in neighborhoods with fewer markets that sell fresh, healthy food options, but with many more fast and convenience food outlets than wealthier neighborhoods. Poorer families live in neighborhoods with fewer safe options for outdoor exercise yet more deteriorated infrastructure. And poorer families live in neighborhoods with more exposure to unhealthy tobacco and alcohol marketing but less exposure to parks, open and green recreational spaces.

The health impacts of all these neighborhood deficits are especially pronounced if our asthmatic child lives in a racially as well as economically segregated community. Childhood asthma is closely associated with whether families occupy housing in segregated or integrated neighborhoods. Sociologists David Wil-

The enduring presence of segregated neighborhoods may be part of the reason that the lifetime asthma prevalence for white children remains much lower than for black children.

liams and Chiquita Collins argue this may be because segregation affects entire minority communities’ disparate exposure to jobs, education, crime, food, transportation, built environment (or manufactured structures in which our activity occurs), and pollution. Similarly, other researchers have found an association between segregated neighborhood conditions and poor mental health due to the stress of coping with perceived discrimination and messages of inequality. Public health researchers Carol Aneshensel and Clea Scuff, for example, have shown that both subjective neighborhood conditions (e.g., attractiveness, desirability) and objective ones (e.g., crime, blight) have an impact on adolescents’ mental health and health behavior. The enduring presence of segregated neighborhoods may be part of the reason that the lifetime asthma prevalence for white children remains much lower than for black children.

Poverty also has medical consequences related to housing affordability. Housing affordability is measured as a ratio: the share of a family’s total income that goes to purchase housing. A generally accepted convention says housing is affordable if a household spends less than 30% of its income on rent or mortgage payments. By contrast, when a household spends more than 30% of income on housing, they are said to be “cost burdened.” In the United States, nearly 19 million households spend more than 50% of income on housing; the overwhelming majority of these “severely cost burdened” households are low-income families and nearly 25% of them spend over 70% of their income on rent. Poor medical outcomes can be traced to the problem of unaffordable housing for poor families. Families living in poverty are more likely to make unhealthy spending trade-offs, purchasing cheaper or inferior food and forgoing healthcare in order to afford costly housing. These same households may save on housing expenses by combining households, contributing to the rise in “doubled-up” households — that is, households that have not only a head of household and his or her spouse or partner, but one or more additional adults, who might be an adult child, a parent, or an unrelated second family — and possibly to the crowded living conditions that contribute to the spread of chronic disease. The alternative for many families may be homelessness, which is certainly associated with chronic and acute health consequences. Indeed, one analyst has described the shortage of affordable housing as a “public health crisis.” The medicalization question, of course, is whether there is reason to justify translating the empirical associations between poverty, housing, and poor health reviewed here into a policy approach that reflects the associations between social risk factors and medical outcomes. In short, should we medicalize housing as a risk factor?

The framework we have suggested here implies medicalizing housing as a risk factor may help improve clinical outcomes for patients living in poverty for three reasons. First, medicalization offers an integrated and holistic conceptual approach to addressing medical problems that cannot be solved by clinical intervention alone. Second, medicalization of risk factors like substandard housing aligns otherwise disparate threads of information and resources to support evidence-based solutions to the complex health problems that vulnerable populations face. Third, medicalization of a social risk factor can help to identify partners to collaborate with healthcare providers, who need more tools at their disposal to accomplish the medical goals for patients. This is not a suggestion to further medicalize poverty. And this certainly is not a proposal to freight doctors with the responsibility to identify, screen for, and address all the social risk factors that affect their patients’ health outcomes. But it is an acknowledgment that poverty — and housing — are medicalized now and that medicalization offers
an opportunity to partner with healthcare providers to address very real human needs today. Perhaps the greatest contribution of the medicalization framework will be to enhance traditional, individualized patient care, with a view that includes the larger context of community and population health. The medicalization framework is an invitation to join previously siloed experts together for the purpose of constructing systemic interventions that tackle the “causes of the causes” of disease among the poor. These might include provider-informed housing redevelopment projects that allow hospitals to recover patients in stable settings, allow clinicians to treat patients who have the capacity to adhere to medical advice to “eat better and exercise,” and encourage providers to refer patients to behavioral health partners who, due to payment reforms that sustainably finance collaboration, can cooperate in treating traumatic injury due to racism and community violence.

IV. Conclusion

The medicalization of poverty began long ago, with the rising awareness of the correlation between poverty and poor health. The concept has thankfully shaken loose of its moorings in older visions of medicalization — medicalization of the human condition which led to an over-emphasis on biomedical endpoints rather than on root causes. Still, the transition of this reality from an understanding of poverty’s role in shaping the culture of health and health outcomes into a mechanism to improve patient outcomes has yet to be realized. Today, the insight is that poverty matters to health at the point of care, with providers using awareness of poverty and its impact on health as an adjunct to our medical interventions. But society has some distance to travel before providers are prepared to overcome the perils of medicalization in order to realize its promises. Much depends on beginning the paradigm shift at its root, that is, at the knowledge base. Medicalization of risk factors will become the standard of care when the research and training experienced by newer providers becomes the norm. In this way, we can choose to fully implement our knowledge of poverty’s impact on health.

Note

The authors have no conflicts to disclose.

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4. Illich, supra note 2.


41. Id.


45. H. D’Angelo et al., “Access to Food Source and Food Source Use are Associated with Healthy and Unhealthy Food Pur-
The impact of the low-income housing tax credit on children's health and wellbeing in Georgia

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A B S T R A C T

Housing instability is a risk factor for child abuse and neglect (CAN). Thus, policies that increase availability of affordable housing may reduce CAN rates. The Low Income Housing Tax Credit (LIHTC) program is the largest affordable housing policy initiative in the country. This study used fixed-effects models to estimate the relationship between LIHTC units and county-level CAN reports in Georgia from 2005 to 2015, controlling for county demographic characteristics. One-way fixed-effects models (including only county fixed-effects) demonstrated significant negative associations between number of LIHTC units and substantiated cases of CAN and total reports of sexual abuse. In two-way fixed-effects models (including county and year fixed-effects), LIHTC units were not associated with any of the outcomes. The findings are subject to limitations, including voluntary provision of CAN data, suppressed data for counties with < 10 CAN cases, and no assessment of the quality of LIHTC neighborhood. LIHTC may be a promising prevention strategy, but more research is needed.

1. Introduction

Child abuse and neglect (CAN) is a serious public health problem that affects hundreds of millions of children around the world (Hillis, Mercy, Amobi, & Kress, 2016; Pinheiro, 2006). CAN includes any act or series of acts of commission or omission by a parent or other caregiver (e.g., clergy, coach, teacher) that results in harm, potential for harm, or threat of harm to a child (Leeb, Paulozzi, Melanson, Simon, & Arias, 2008). Exposure to CAN has far-reaching impacts beyond a single person, time-period, or generation.

CAN is often associated with short-term health consequences, such as broken bones, bruises, and mental health concerns. However, the science of childhood adversity and toxic stress demonstrates strong associations between CAN and long-term health consequences, including changes in the physiological development of the nervous, endocrine, and immune systems, physical and mental health problems, engaging in unhealthy and unsafe behaviors, and limited life opportunities (e.g., education and poverty) (Felitti et al., 1998; Font & Maguire-Jack, 2016; Gilbert et al., 2015; Merrick et al., 2017; Metzler, Merrick, Klevens, Ports, & Ford, 2017). While addressing and treating exposure to CAN is important to prevent its associated negative health and life outcomes, it is imperative to prevent such violence from happening in the first place.

CAN affects children and families of all races, ethnicities, socioeconomic statuses (SES), and geographic boundaries, but some are at greater risk. Preventing CAN requires understanding why some children and families are at greater risk for exposure, as well as addressing risk and protective factors for abuse and neglect across all levels of the social ecology (i.e., individual, relational, community, and societal). For example, children living in families with a low SES have rates of child abuse and neglect that are five times higher than those of children living in families with a higher SES (Sedlak et al., 2010). Children in families with lower SES may experience additional risks for CAN because of their exposure to structural and social conditions that may be unsupportive of safe, stable, and nurturing relationships and environments – the essentials for healthy families and children (Centers for Disease Control and Prevention, 2014).

An important aspect of children’s physical environment is their home, and accordingly, safe, stable, and high quality housing is critical to helping families and children thrive. For children, stable housing may be particularly important for reducing their risk of abuse and neglect. Indeed, researchers have demonstrated associations between housing instability (i.e., variably defined as having difficulty paying rent, spending > 50% of household income on housing, frequent moves, overcrowding [Kushel, Gupta, Gee, & Hass, 2006]) and involvement in the child welfare system (Dworsky, 2014) and risk for exposure to child maltreatment (Patwardhan, Hurley, Thompson, Mason, & Ringle, 2017). Further, national estimates indicate that 16%
of intact families involved with child welfare are at risk of out-of-home placement because of inadequate housing (Fowler et al., 2013).

Directly, homelessness and lower quality housing conditions pose a risk to the health and safety of children and thus, child protective services (CPS) may pay greater attention to families experiencing housing instability (Cohen, Mulroy, Tull, White, & Crowley, 2004). Indirectly, stress associated with housing instability can exacerbate harsh parenting practices, increasing the risk for exposure to physical abuse, as well as limit parents’ ability to provide for their children’s needs, increasing the risk for exposure to neglect (Conger et al., 2002; Cowal, Shinn, Weitzman, Stojanovic, & Labay, 2002; Park, Ostler, & Fertig, 2015). Housing instability can also increase other household challenges, including mental health issues and substance abuse, known risk factors for CAN (Brook & McDonald, 2009; Fortson, Klevens, Merrick, Gilbert, & Alexander, 2016; Marsh, Ryan, Choi, & Testa, 2006). Finally, housing instability among low income children has been linked to increased attention problems, as well as internalizing and externalizing problems (Ziol-Guest & McKenna, 2014), which are also risk factors for abuse and neglect.

Child welfare agencies increasingly acknowledge the importance of housing stability for child wellbeing and have incorporated housing policies and programs into their interventions for families exposed to CAN (Cunningham & Bergamit, 2017). In addition, researchers have outlined the positive impact of policies and programs that provide greater housing security for families at risk of CAN (Fowler & Farrell, 2017; Samuels, 2017), and have demonstrated that providing permanent housing can result in marginal declines in CAN rates (Fowler & Schoeny, 2017). Indeed, a growing body of research has demonstrated that providing housing services to high risk families, in addition to other needed services, can reduce involvement with the child welfare system (Swann-Jackson, Tapper, & Fields, 2010), reduce risk of out-of-home placement (Fowler & Chavira, 2014), and promote the reunification of children (Rog, Henderson, & Greer, 2015).

The Family Unification Project (FUP), sponsored by the U.S. Department of Housing and Urban Development, is a program for families involved with the child welfare system and at risk of child placement because of inadequate housing (Fowler & Schoeny, 2015). In a randomized controlled trial of FUP in Chicago, half of FUP-eligible families (i.e., identified by child welfare caseworkers for inadequate housing) were assigned to housing case management services as usual, while the other half were assigned to receive permanent housing vouchers (i.e., FUP). Among families assigned to FUP, more stimulating home environments, less overcrowding, and greater housing stability were observed. This small, but growing, body of research highlights the potential impact of housing policies and programs on child abuse and neglect. However, the impact of housing policies as a primary prevention strategy for child abuse and neglect is unknown and remains a notable gap in the literature.

1.1. Low-income housing

Created by the Tax Reform Act of 1986 to address the shortage of affordable housing in the United States, the Low Income Housing Tax Credit (LIHTC) Program is the largest federal affordable housing production and preservation program in the country. LIHTCs are available in all 50 states, Washington DC, and Puerto Rico. Between 1987 and 2015, 2.97 million housing units were placed in service using the LIHTC program (U.S. Department of Housing and Urban Development, 2017a,b). LIHTCs are allocated to owners of qualified rental properties who reserve all or a portion of their units to low-income tenants. Typically, outside investors provide developers with initial funds in exchange for the tax credit. The tax credit covers either 30 or 70% of the present value of qualified costs incurred for developing or rehabilitating low-income units in rental housing developments. The 30% tax credit is given to projects that use tax-free bond financing or acquire existing buildings, while the 70% tax credit is provided for new construction or projects with no other subsidies (McClure, 1990). The credit is typically allocated over a 10-year period, which results in an annual LIHTC of either 4% (for 30% projects) or 9% (for 70% projects) for investors (McClure, 1990). Investors cannot claim the credit unless the development meets LIHTC requirements. To qualify for the LIHTC, at least 20% of the units must be occupied by individuals with income of 50% or less of the area median income, adjusted by family size, or 40% of the units must be occupied by individuals with income of 60% or less of the area median income, adjusted for family size (26 U.S. Code § 42) (Keightley, 2017). A “gross rents test” must also be met to qualify, which ensures that rents do not exceed 30% of the elected 50% or 60% of area median gross income, depending on which income test option the project elected (26 U.S. Code § 42) (Keightley, 2017). Given that the “gross rents test” considers only the area’s gross median income, rather than controlling for the share of income spent on rent, the LIHTC may not benefit all families in need, particularly those that are poor or very poor.

Each state’s Housing Finance Agency (HFA) typically carries out the administration of the tax credit program. States distribute LIHTC funds through Qualified Allocation Plans (QAPs). The QAPs set out the state’s eligibility priorities and criteria for awarding federal tax credits to housing properties. State QAPs involve a competitive process that prioritize projects that will serve the lowest income families and remain affordable for the longest period of time (Ellen, Horn, Kuai, Pazuniak, & Williams, 2015). Through the QAP process, prioritized units must remain affordable for 30 years and have pre-determined rent ceilings and rental units; however, some have noted that transitions are possible at year 15 (Abt Associates Inc et al., 2012).

The LIHTC program is intended to serve disadvantaged populations, and thus LIHTC developments may lead to an influx of low- and moderate-income residents into neighborhoods, which may contribute to changes in neighborhood characteristics. Neighbors may be concerned with the concentration of low-income households and perceived negative changes, such as social disorder (e.g., graffiti, loitering), reduced property values, and increased crime. However, LIHTC developments may also be an important resource for improving neighborhood conditions, including restoring dilapidated buildings, building on empty lots, upgrading the housing stock, and neighborhood revitalization. Moreover, LIHTC developments may increase access to affordable, stable, and quality housing for families, which may ultimately help children reach their full potential. We discuss the research that examines the associations between LIHTC and outcomes at the neighborhood level below.

1.2. Impact of LIHTC

Various studies have been conducted to examine the impact of LIHTC on a wide range of outcomes, including economic wellbeing, housing stability, and crime and violence, though findings have been mixed. For example, in Miami, LIHTC developments in high-poverty neighborhoods generated the most positive impacts on neighborhood economic wellbeing, while LIHTC developments in middle-class neighborhoods were less likely to demonstrate positive effects (Deng, 2011b). Despite popular opinion that “public housing” results in decay of surrounding communities, LIHTC developments have been found to positively influence property upkeep in nearby communities (Edmiston, 2015). Other work has demonstrated that affordable housing could be developed in an affluent community without increasing social disorganization, crime and taxes, and without decreasing property values (Albright, Derickson, & Massey, 2013). In New York City, significant and sustained positive spillover effects of subsidized housing have been observed (e.g., increased property values, increased tax revenue, and reduced blight) (Schwartz, Ellen, Voicu, & Schill, 2006). Conversely, some studies have demonstrated that LIHTC developments may destabilize neighborhoods by increasing turnover of owner-occupied households and depressing local median household income, especially
in higher-income areas (Baum-Snow & Marion, 2009; Woo, Jon, & Van Zandt, 2014). However, housing prices in declining and stable neighborhods or areas with high racial/ethnic minority populations have been found to appreciate with the addition of LIHTC developments (Baum-Snow & Marion, 2009; Diamond & McQuade, 2016).

The impact of the LIHTC program has been extended to other indicators of wellbeing. For instance, in Texas, rehabilitated LIHTC units positively influenced school performance in lower income areas (Di & Murdoch, 2013). Additionally, poverty rates have been found to decline in high-poverty neighborhoods after the completion of LIHTC developments, and in general, there is little evidence that the LIHTC program contributes to poverty concentration or residential segregation (Baum-Snow & Marion, 2009). The LIHTC program has been found to appreciate with the addition of LIHTC developments (Baum-Snow & Marion, 2009; Diamond & McQuade, 2016).

2. Method

2.1. Data sources

2.1.1. Department of Housing and Urban Development (HUD)

HUD maintains a database for all developments that receive tax credits through the LIHTC program (U.S. Department of Housing and Urban Development, 2017a, 2017b). For most LIHTC projects, HUD has data pertaining to location of the project, the year the project was placed in service, total number of units, total of low-income units, type of project (e.g., new construction, rehabilitation), target demographic (e.g., families, elderly), and other details of the project. For the purpose of this study, the number of low-income units were aggregated at the county level in Georgia to provide an estimate of available units per 10,000 residents per county from 2005 to 2015.

2.1.2. National Child Abuse and Neglect Data System

Data from the National Child Abuse and Neglect Data System (NCANDS) Child Files from 2005 through 2015 (National Data Archive on Child Abuse and Neglect, 2007–2017) were used to estimate the prevalence of child abuse and neglect among children 0–18 years across Georgia's counties by year. Some data used within this analysis were derived from National Data Archive on Child Abuse and Neglect (NDACAN) restricted data. These data were accessible through contractual arrangements with NDACAN, and are solely available through the Cornell Restricted Access Data Center. NCANDS data is voluntarily reported by Child Protective Services (CPS), and subsequently housed by the National Data Archive on Child Abuse and Neglect at Cornell University, with support from the Children's Bureau, an agency of the US Department of Health and Human Services. The NCANDS Child Files are composed of case-level data for each report of maltreatment by CPS in the United States. Alleged incidents of maltreatment are received and screened-in or out by CPS to determine if an investigation is needed. After the CPS investigation, a case may or may not be confirmed as maltreatment. Confirmed cases of maltreatment are considered substantiated. Some states identify cases as indicated, which means that they could not substantiate the case, but there was reason to suspect maltreatment or risk of maltreatment. In the present study, any report that was substantiated or indicated was considered a confirmed case of maltreatment. Total reported cases (i.e., all referrals that were screened-in for CPS investigation), total reported cases for each child maltreatment type (i.e., physical, emotional, and sexual abuse, and neglect), and confirmed cases per 1000 population were aggregated at the county level for each year.

2.1.3. Online Analytical Statistical Information System (OASIS)

Data regarding unintentional injuries for children aged 0–4 years were obtained from Georgia's Department of Public Health's Data Warehouse, OASIS (Georgia Department of Public Health, 2003). Specifically, emergency room visits for external causes (i.e., accidental shooting, falls, drowning, poisoning) for children aged 0–4 years per 1000 from 2005 to 2015 were aggregated at the county level. In addition, data for the following covariates were obtained from OASIS: percentages of the county population under 18 and over 65 years, percent of the county male population, and percentages of the county Non-Hispanic Black population and Hispanic population.

2.1.4. U.S. Census Bureau

US Census Bureau data (U.S. Census Bureau, 2017) was used to obtain information about county-level economic variables. Specifically, county median household income.

2.1.5. Data analysis

Descriptive statistics were reported on the low-income housing rental units per 10,000 residents, all covariates, and all outcome variables, including county rates of total reports of child maltreatment, physical abuse, emotional abuse, sexual abuse, and neglect, substantiated child maltreatment, and emergency room visits for unintentional injuries for children four years and younger from 2005 to 2015. A one-way fixed-effects model controlling for county effects and a two-way fixed-effects model controlling for both county and time effects were used to determine the associations between the number of low-income rental units and child maltreatment outcomes. In
compliance with National Data Archive on Child Abuse and Neglect’s data protection plan, data from counties with < 10 CAN cases were suppressed. Analyses were limited to counties with complete data to ensure a balanced panel dataset in each model. Missing data ranged from five counties for total reports to 116 counties for sexual abuse (as reported in the Table 2). All models controlled for the following covariates: median household income; percentages of the county population under 18 and over 65 years, respectively; percent of the county male population; and percentages of the county non-Hispanic black population and Hispanic population. These covariates reflect covariates used in previous evaluations of the LIHTC (see Freedman & Owens, 2011). Standard errors were clustered at the county level. All the analyses were conducted using Stata 14 (StataCorp, 2015).

3. Results

In Georgia, there are 159 counties. On average, there were 57.5 (SD = 43.5) low-income housing rental units per 10,000 residents per county (range: 0–262.7) between 2005 and 2015. There were, on average, 64.7 (SD = 33.9) total reports and 16.3 (SD = 9.8) confirmed cases of child maltreatment per 1000 population under age 18 years per county. The average total reports for specific types of maltreatment was 5.1 (SD = 2.7) for physical abuse, 29.0 (SD = 18.1) for neglect, 1.7 (SD = 1.2) for sexual abuse, and 6.0 (SD = 4.5) for psychological abuse per 1000 population under age 18 years per county. The average for emergency room visits per county for unintentional injuries visits for children aged 0–4 years was 407.1 (SD = 764.6) per 1000 under age 18 years per county. For additional descriptive details, see Table 1.

In the one-way fixed-effects model that controlled only for county effects, the number of low-income rental units was negatively associated with substantiated cases of child maltreatment (estimate = −0.051, SE = 0.024, p < .05), total reports of physical abuse (estimate = −0.028, SE = 0.012, p < .05) and total reports of sexual abuse (estimate = −0.027, SE = 0.008, p < .001), but not significantly associated with total reports, neglect, psychological abuse, or emergency room visits for unintentional injuries visits for children aged 0–4 years (see Table 2). When county-invariant time fixed-effects were controlled for in the two-way fixed-effects models, the previous associations no longer existed, suggesting that the number of low-income rental units was not significantly associated with any of the CAN or injury outcomes examined (see Table 2).

4. Discussion

Children and families need safe, affordable, stable, and quality housing to thrive. Indeed, housing instability, or the lack of safe, affordable, stable and quality housing, has been associated with risk of CAN (Conger et al., 2002; Cowal et al., 2002; Park et al., 2015; Patwardhan et al., 2017). Given these associations, the current study explored the potential impact of affordable housing through a tax credit on CAN rates across counties in Georgia. The LIHTC is the longest running, national production and preservation program for affordable housing, and thus has the potential to address housing needs for low-income families and reduce CAN. In the present study, we looked at the associations between the number of LIHTC units and CAN rates by Georgia counties from 2005 to 2015. Unfortunately, we were unable to discern significant associations between the number of low-income rental units and CAN rates after controlling for county-invariant time fixed-effects. Despite null findings, this study is an important contribution to the field of child abuse and neglect prevention as it provides a first step in addressing the intersections between housing and child wellbeing. Throughout the discussion, we outline important opportunities for future research and consideration, which may ultimately improve our understanding and implementation of comprehensive violence prevention strategies.

In our first model, considering only county fixed-effects, we found significant negative associations between the number of low-income rental units and confirmed cases of CAN and total reports of physical and sexual abuse. However, when county-invariant, time fixed-effects were controlled for in the two-way fixed-effects models, the previous associations no longer existed. This suggests that statewide factors (e.g., economic, social, political, and cultural changes) unaccounted for in the first model might have contributed to the associations between LIHTC units and CAN, and thus, the significant findings in the first, less rigorous model are likely a spurious effect. Future research that is more sensitive to nuanced associations between the number of LIHTC units and CAN while being mindful of place and time fixed-effects is needed to understand how and if the LIHTC is a promising CAN prevention strategy.

The LIHTC was not initially designed to reduce CAN rates, but other studies have shown that policies that improve housing conditions, such as LIHTC and other inclusionary housing policies, remain promising strategies to reduce violence and injury risk (Albright et al., 2013; Freedman & Owens, 2011). While we did not find a significant association between the number of LIHTC units and CAN, it is possible that the LIHTC has a more nuanced, indirect effect on CAN not measured in the present study. The LIHTC is the largest affordable housing program in the US, and thus, where LIHTC developments are placed has the potential to shape family and neighborhood conditions, security, and other factors related to CAN. Access to quality schools and child care, healthcare, green spaces, grocery stores, and public transportation, for example, may have a greater impact on how low-income housing affects children’s exposure to violence than simply the number of available units. Greater consideration of the way LIHTC is implemented and the context in which the low-income developments are placed is needed before the field fully understands the potential of housing policies as a promising CAN prevention strategy. For example, future research could explore how neighborhood attributes contribute to outcomes for children, families, and neighborhoods, which could improve our understanding of how the placement of LIHTC developments can maximize positive effects, while minimizing negative ones.

In Georgia, the QAP prioritizes projects placed in high-resource areas and awards points for applications that propose projects close to desirable neighborhood amenities, such as schools, grocery stores, green spaces, hospitals, and public transit (Georgia DCA, 2017). Points are also awarded for projects that include a community revitalization plan; bonus points are awarded if the development will be placed in a qualified census tract (QCT) in which at least 50% of households have incomes below 60% of the area median gross income (Georgia DCA, 2017). The two types of LIHTC, either 4% (for 30% projects) or 9% (for 70% projects), are awarded through different processes. While there are numerous 4% LIHTC available and awarded to projects that meet the

<table>
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<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
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<td>5.2</td>
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<td>Percent of People under 18</td>
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<tr>
<td>Percent of People over 65</td>
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<td>33.4</td>
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<td>Median Income (in thousand $)</td>
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<td>33.9</td>
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<td>Number of Substantiated Cases</td>
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<td>1.5</td>
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<td>Number of Psychological Abuse Reports</td>
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<td>4.5</td>
<td>0.3</td>
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</table>

* Per 1000 children aged 0–18 years.
** Per 1000 children aged 0–4 years.
requirements of the QAP, the number of 9% LIHTC are limited and awarded on a more competitive basis (Georgia DCA, 2017). Future evaluation of these important facets of policy implementation outlined in states’ QAPs may help to increase understanding of the direct and indirect influence that housing policies may have on CAN.

Another important consideration when examining the impact of affordable housing on CAN outcomes at the county level is whether the program is actually meeting the needs of families who seek safe and stable housing in a community. Waiting lists for low-income housing can be long, and a shortage of housing can lead to household overcrowding, which may contribute to risk for CAN. Thus, if a large number of families who are most in need of affordable housing do not have access to safe and stable housing in a county, it is not reasonable to expect the LIHTC to impact county rates of CAN, or for there to be any impact on other health indicators. Researchers could also consider information on the affordability of LIHTC units, such as the percentage of family income allocated to rent. Households are considered affordable if a family spends no > 30% of their income on rent. Because LIHTC unit rents are based on area medium income, it is possible that families pay > 30% of their income on rent despite the label of low-income housing. Subsequently, LIHTC may not improve housing affordability and stability for the families at greatest need. In sum, the LIHTC, alone, may not be enough to prevent CAN, especially if it is not as affordable as it is intended to be, or if it is in a neighborhood where other risks (e.g., violence, crime, concentrated poverty) still exist. Future research could better elucidate these associations.

Future studies may also wish to consider additional credits and subsidies available for low-income housing. In their analysis of 18 states, O’Regan and Horn (2013) found that > 40% of LIHTC units were rented to extremely low-income households, and that > 70% of these households were also receiving some form of additional rental assistance. These findings highlight the importance of the LIHTC program in providing housing to those with the greatest need for affordable housing, but that additional rental assistance is a part of the eq. (O’Regan and Horn, 2013). Furthermore, LIHTCs do not always cover the total cost of many projects, and as a result, developers and owners seek additional financial resources, including conventional mortgage loans provided by private lenders, alternative financing and grants from public or private sources, and state tax credits modeled after the federal provision. The combination of LIHTC, other financial resources, and rental assistance subsidies means that the costs and benefits of the LIHTC program are harder to isolate. As such, future studies are needed to understand the ways in which affordable housing developments draw upon multiple subsidies from different programs, which may influence housing location and affordability, as well as when and how LIHTC impacts CAN.

This study has several limitations that could be addressed to improve understanding of when and how LIHTC is effective in improving the conditions for children and families. In addition to the aforementioned considerations, this study was limited to counties in the state of Georgia, and subsequently, the findings reflect Georgia’s LIHTC developments, which may not be reflective of other states’ LIHTC programs. Comparisons across states or the US might provide additional detail about important policy implementation considerations. A significant limitation of the current study was the lack of outcome data at a more granular, census tract level. Outcome data aggregated at the county level may mask the true associations and limit the sensitivity of such analyses. Given that LIHTC developments are placed at the census tract level, future research with outcomes measured at the census tract may help clarify the potential relationship between affordable housing policies, such as the LIHTC, and health and wellbeing. Further, NCANDS data is voluntary to report and counties with less than ten cases were suppressed to protect the identities of individuals, and thus, some counties had missing data contributing to limitations with generalizability.

The magnitude and burden of CAN warrants additional exploration of policies and practices that promote the primary prevention of CAN, which may include housing policies, as part of a comprehensive strategy to reduce and eliminate CAN and its deleterious effects on the health and prosperity of people and communities. Prevention efforts that target individual behavior change, such as positive parenting strategies, are necessary, but policies implemented across communities or society have the potential to improve the conditions that families live, learn, work and play in, and have the potential for population-level impacts on health and wellbeing. The LIHTC is a long-standing national policy that has implications for families across the United States. Despite null findings, the lessons learned and shared from the current study provide opportunities to build the research that explores issues the cut across sectors (e.g., public health, justice, housing), as well as prevention strategies that create a context that is supportive of children and families. Importantly, one policy strategy alone is not enough to make significant reductions in CAN. Coordinated, multilevel strategies would be best to address the social and economic conditions that place children and families at risk for violence, and ultimately prevent violence (Porton et al., 2016). Future analyses that build from our preliminary study may uncover important aspects of the policy’s implementation that can elucidate the LIHTC’s impact on children’s exposure to violence, which could guide and shape how states and communities decide to implement the policy and promote health and wellbeing for everyone.
Acknowledgments

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Conflict of interest

None of the authors have a conflict of interest to report. None of the authors do not necessarily represent the official position of the Centers for Disease Control and Prevention.

References


The Health of Newcomers

*Immigration, Health Policy, and the Case for Global Solidarity*

Patricia Illingworth and Wendy E. Parmet
we have a definition of public good and global public good, let's see if health qualifies.

Health as a Public Good

In some quarters, health is viewed as a private good on the grounds that the primary beneficiary of health is the healthy individual. David Woodward and Richard Smith claim that "health per se is not a public good, either individually or nationally. One person's (or one country's) health status is a private good in the sense that he/she is the primary beneficiary of it. An individual's health remains primarily of benefit to that individual, although there may be some (positive or negative) externalities resulting from it, such as the exposure to others from a communicable disease." In addition, they claim that health should be viewed as a private good because it is achieved through excludable mechanisms such as vaccinations and condoms. Thus health is nonrivalrous, but excludable, and more closely akin to a club good (which is a public good that is nonrivalrous but excludable, such as cable television).

We call this the standard view. Arguments in support of the standard view are vulnerable. The economic perspective of man as isolated, opportunistic, and self-interested may underlie the standard view of health as a private good. However, if that world view is wrong, and people are by nature cooperative rather than competitive, flourishing when embedded in interdependent communities, the view that health is a private good is problematic.

Even the standard view acknowledges that health should sometimes be understood as a public good. When a communicable disease is prevented in one person, there are benefits for other people because their risk of infection is thereby reduced. Thus communicable diseases are nonrivalrous. Because communicable diseases count for about 26 percent of deaths and 30 percent of the global burden of disease, recognizing the public-good quality of health in this context is significant. For Woodward and Smith, eradication of a communicable disease is a pure public good: the benefits of eradication are neither excludable nor rivalrous. Even the standard view, which is predisposed to viewing health as a private good, accepts that health related to communicable diseases is a pure public good. We saw this in the case of smallpox. Its eradication
was a significant global public good. Although we can only speculate, had the United States not viewed the eradication of smallpox as a global public good, it might not have contributed $32 million to the global effort to eradicate it. Here countries acted in solidarity with much success for global health.

Health is clearly good for people who have the good fortune to be healthy. The question is whether health can also be understood as a public good. Our view is yes. Health is not only good for individuals, it is also good for society. Health is nonrivalrous in consumption since one person's good health doesn't diminish the health of another. Very often one person's health can contribute to the health of others. Health can also be nonexcludable. It can be difficult to exclude people from good and bad health. For example, widespread vaccinations carry with them the phenomenon of herd immunity. People who have not been vaccinated are protected by the vaccination of others. This is not to say that health does not also have private good dimensions. Some of the access goods for health are private: medicines and medical devices, for example. But the fact that some of the access goods for health are private (and excludable) does not show in and of itself that health is a private good. Grass seed, mulch, and soil are excludable, yet the green grass in a park is public.

The question of whether or not health is a public good is different from the question of whether the access goods for health are public or private. In this respect, our concern is different from the one raised by philosopher Onora O'Neill, who explores the question of whether there are "true public goods that bear on health" and is skeptical both of such goods and of their importance for public health. Unlike O'Neill, we argue that health itself is a global public good, and that this fact has important implications for health policy and for the health and wellbeing of newcomers.

The standard view has shortcomings. Although some access goods for health are excludable, others are not, or can only be excluded with considerable effort. For example, it has been shown that our place in a social network can impact our health and the health of others within the network. Obesity is a good example. In one study of 5,124 people, Nicholas Christakis and James Fowler observed clustering of obese people on a graph. The study found that the average obese person was more likely to
have obese friends, friends of friends, and friends of friends of friends. A similar effect was found for nonobese people. The researchers found that the obesity epidemic was multicentric—spreading from multiple locations. This suggests a couple of ways that obesity might spread, including imitation, encouraged by mirror neurons, and the spreading of norms, such as a norm about tolerable weight gain. There have been similar findings with respect to clustering and depression—a significant factor in global morbidity and mortality.

Mirror neurons give people the capacity to mirror the actions of others; they are one of the primary mechanisms human beings have to empathize with others and establish social ties with them. Neuroscientist Marco Iacoboni states, “It seems as if our brain is built for mirroring, and that only through mirroring—through the simulation in our brain of the felt experiences of other minds—do we deeply understand what other people are feeling.” In the case of obesity, people may mimic their obese social ties through mirror neurons.

The standard view focuses on the individual; it treats health as if it were a matter for only individuals. But this ignores public health and the health of populations. High rates of disease can devastate populations. The impact of HIV/AIDS in sub-Saharan Africa is a good example. The United Nations Programme on HIV/AIDS and the World Health Organization estimated in 2009 that there were 33 million people living worldwide with HIV/AIDS and that two-thirds of them lived in Africa, with an increasing number in rural communities. In addition, around 70 percent of new infections occurred in sub-Saharan Africa and about 70 percent of deaths from HIV/AIDS took place in sub-Saharan Africa. HIV/AIDS has reduced the workforce and agricultural outputs and has increased poverty. One of the adverse effects of HIV/AIDS at the population level has been with respect to the natural environment. For example, forests have been depleted as families turned to them for firewood to care for the sick and to make coffins. One study found that the loss of human capital because of HIV/AIDS has impaired preservation efforts of endangered species such as elephants. Absenteeism and reduction of available workers because of the impact of the disease on working-age people took its toll on the environment.

There are many other ways in which the HIV/AIDS epidemic in sub-Saharan Africa has impacted the well-being of the community, future
generations, and the environment. We can only begin to see this when we shift from seeing health as a private good, good only for individuals, and begin to recognize its public good dimensions. When the latter perspective is adopted, we can begin to appreciate how health is a public good with wide-ranging benefits for the community, the globe, and future generations. Although we would not deny that health can be viewed as a private good, there is no reason to think that it is only or primarily a private good.

As the examples of depression and obesity show, the role of social ties in health is not restricted to communicable diseases. Networks affect health even with noncommunicable diseases (NCDs). NCDs such as diabetes, cervical cancer, and stroke also afflict large numbers of people in developing countries, especially those living in urban slums. According to Thomas Bollyky: "The frequent onset of these diseases among younger populations consumes scarce health-care resources, saps labor from the work force and hinders economic development, and makes it harder for governments to address other threats, such as infectious diseases." 27

In some quarters, NCDs are thought to underscore the private nature of health insofar as they are related to lifestyle choices: diet, exercise, and alcohol and tobacco consumption. "But for" the choices of individuals, some argue, people would not have these illnesses. Setting aside the obvious role of genes and luck, individual lifestyle choices do not take place in a contextual vacuum but are influenced and shaped by context, what's on offer, so to speak. Richard Thaler and Cass Sunstein refer to this in terms of choice architecture. 28 The framing of individual choice is shaped by a variety of factors outside individuals, pushing them in various directions. In different words, Linda Fried concurs: "As these behavioral and environmental risks have been imported from developed to developing countries, and as we learn that community norms and social networks reinforce the uptake of adverse health behaviors, this puts into question whether, in fact, we should consider these risk factors and the resulting diseases 'non-communicable.'" 29 Put differently, diseases that are quintessentially associated with individual behavior, such as stroke and heart disease, are similar to communicable diseases because norms and networks that foster them are nonexcludable. Our health is affected by the health of other people in a multiplicity of ways,
and the health of one can affect the health of others. Thus, although the standard view depicts health as a private good because individuals are the primary beneficiaries, there are a number of reasons for thinking this is not the case. Health is certainly good for the person who has it, but whether the healthy individual is the primary beneficiary is a very complicated matter.

If people are connected to others, as most are, their health is very much a public matter. When we think about people embedded in communities, it is difficult to identify health benefits as primarily individual. Looked at from the perspective of people within a social context, health is often for the sake of others. Healthy parents are better able to support their families; healthy spouses are better partners; healthy neighbors share in creating a vibrant and safe community. When we think about people embedded in their communities, it is difficult to see why individuals would be the primary beneficiaries of health. Someone who is embedded in a network benefits a range of people in that network, and calculating the primary beneficiary is complex. For example, who the primary beneficiary of a good is may depend on how many people are affected, and who is in greatest need, among those who are affected. One very reasonable way to understand “primary beneficiary” is as the person who benefits the most from something. A loaf of bread means something very different to someone who is hungry than to someone who has just finished dinner in a five-star restaurant. When it comes to being a beneficiary, all individuals are not equal. Assuming that individuals are the primary beneficiaries of health reflects a particular philosophical worldview. Individuals can be most easily viewed as the primary beneficiaries of their health only when we are predisposed to view the world through the lens of individualism. Looked at through another lens, whereby individuals are not primarily economic, self-interested agents, but rather other-oriented, it is just as easy to view other people as the primary beneficiaries of health. Thus it is a mistake to agree with Woodward and Smith that health is a private good because the primary beneficiary is the healthy individual.