



RESEARCH REPORT

Urban Blight and Public Health

Addressing the Impact of Substandard Housing, Abandoned Buildings,
and Vacant Lots

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Since 2011, with generous support from the Ford Foundation, the Vacant Property Research Network (VPR Network) has brought people together to share knowledge and connections between academia and the field on the subject of vacancy, blight, and abandonment in cities. The VPR Network creates and supports partnerships between researchers, academic institutions, policy makers, and practitioners to define the magnitude and dimensions of blight, understand neighborhood change, and track the latest innovations to reclaim vacant properties and foster neighborhood revitalization, in such areas as real property information systems, strategic code enforcement, land banking, urban greening, and community development and planning. For more information about the network's research translation activities and resources, please explore www.vacantpropertyresearch.com.



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The Vacant Property Research Network’s (VPR Network’s) research and policy brief series bridges the traditional divide between research and practice by synthesizing the latest research on vacant properties through different disciplines and fields. Each report highlights relevant findings and explains the methods behind recent research so that practitioners and community leaders can better understand what the research says, what the research does not say, and how it might be relevant to these leaders’ respective initiatives to prevent, abate, and reclaim vacant properties. By understanding how current research may or may not apply to local efforts, we believe practitioners and policymakers will be better equipped to make effective decisions, improve policy and program implementation, and ultimately facilitate the regeneration of their communities. The initial series includes policy and research translation briefs on urban greening, neighborhood change, basics of blight, information systems, and strategic code enforcement. This ongoing effort in research translation was made possible with the support of the Ford Foundation.

Urban Blight and Public Health

We spend more than two-thirds of our time where we live, and the state of our homes and neighborhoods invariably affects our individual and family's well-being (Klepeis et al. 2001). Studies have shown that the conditions within our residences, the surrounding neighborhood, and the cost of housing affect our health (Braverman et al. 2011; National Center for Healthy Housing 2016; Shaw 2004).

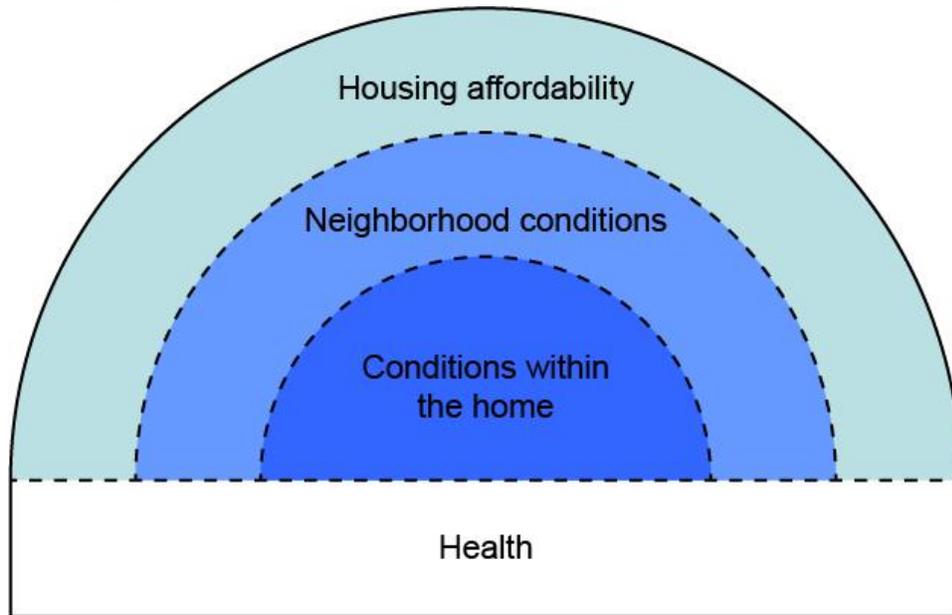
The quality of housing can contribute to general well-being or cause poor health. Exposure to poor indoor air quality, mold, lead, and rodent and cockroach infestations can lead to asthma and other respiratory illnesses, lead poisoning, learning and behavioral problems, and other serious health issues. Asthma is often cited as a key outcome of poor housing conditions. Mudarri and Fisk (2007) estimate that about 20 percent (4.6 million) of the 21.8 million people reported to have asthma in the United States can attribute their condition to dampness and mold exposure in their homes. They also calculate the national annual costs of asthma due to dampness and mold exposure in the home to be \$3.5 billion. Structural hazards and unsafe conditions can also result in physical injuries and mental stress.

The federal Healthy Homes Work Group¹ reports that millions of Americans suffer from poor housing conditions, including dilapidated structures; roofing problems; heating, plumbing, and electrical deficiencies; water leaks and intrusion; pests; damaged paint; and radon gas (US Department of Housing and Urban Development 2013).² Estimates suggest that more than 30 million housing units have significant physical or health hazards, such as dilapidated structures, poor heating, damaged plumbing, and lead pipes (Ross, Parsons, and Vallas 2016). The Healthy Homes Work Group notes further that substandard and inadequate housing disproportionately affects poor and low-income individuals, children, people of color, and people with disabilities and chronic medical conditions (US Department of Housing and Urban Development 2013). Studies have shown, for example, that poor children, particularly children of color living in dilapidated urban housing, have dangerously high blood lead levels that can lead to irreparable harm to their health and impede their development (Bashir 2002).

The proximity of our residence to our jobs, our children's schools, and public services and amenities, along with access to public transportation, also affects our health. The natural and built environment in our neighborhood can likewise determine our general well-being. Finally, access to affordable housing not only ensures that we have adequate shelter, but that we have enough left over after rent for other necessities such as food, utilities, and medical care. Figure 1 illustrates how these aspects of our lives are linked to health.

FIGURE 1

Housing Factors that Influence Health



Source: Braverman et al. (2011): Copyright 2011. Robert Wood Johnson Foundation. Used with permission from the Robert Wood Johnson Foundation.

This report highlights research about the effect of blight—substandard housing, abandoned buildings, and vacant lots—on the health of individuals and neighborhoods (box 1). It also presents initial findings on interventions designed to address the negative health impacts of blight. The report begins with an overview of the social determinants of health (SDOH), a conceptual framework put forth by the Centers for Disease Control and Prevention (CDC); focuses on housing as a key determinant of health studied by public health scholars; examines existing knowledge on the impact of substandard housing, abandoned buildings, and vacant lots on health; and reviews interventions to mitigate blight. The report concludes with a blend of policy, program, practice, and research recommendations that could be the catalyst for further collaborations among government officials, scholars, practitioners, and civic community leaders to prevent and abate substandard housing and vacant properties. These recommendations include the following:

1. Take comprehensive and coordinated place-based approaches to address blight and health.
2. Expand the application and use of health impact assessments.
3. Track and assess health outcomes from code enforcement and other policies and programs to prevent and abate substandard housing and vacant properties.

4. Enhance the capacity and expectations for stronger and more effective collaborations between community organizations and researchers.
5. Infuse public health into housing policies, codes, and practices.

BOX 1

What Is Urban Blight?

As documented in the VPR Network's 2015 national literature review, urban blight is a complex term with multiple dimensions, from litter and vacant lots to dilapidated structures and abandoned homes (VPR Network 2015). For this report, we focus on substandard housing, abandoned buildings, and vacant lots.

- **Substandard housing** refers to residential spaces with structural and other physical deficiencies that do not meet health and safety requirements, thereby endangering the health and safety of residents.
- **Abandoned buildings** refer to unoccupied homes and other properties that are in disrepair and pose a hazard to the health and well-being of the community.
- **Vacant lots** refer to neglected and empty parcels of land in a neighborhood that are used for dumping litter and other waste materials.

Overview of Social Determinants of Health

The quality of our lives is highly contingent on our environment—that is, where we live, work, and play. CDC has identified key environmental factors (SDOH) that affect our well-being. These factors are “conditions in the environments in which people are born, live, learn, work, play, worship, and age that affect a wide range of functioning, and quality-of-life outcomes and risks.”³

These environmental conditions are social, economic, and physical in nature and prevail in places where we live and work and where our children go to school. Examples of social and economic determinants include the availability of quality housing and local food markets, access to schools and jobs, the presence of transportation, and other socioeconomic factors. Examples of physical determinants include the natural and built environment, housing, worksites, schools, and physical barriers and hazards.

As part of its Healthy People 2020 Initiative, which seeks to “create social and physical environments that promote good health for all,” CDC has developed a framework, as shown in figure 2, that reflects five key SDOH areas:

- economic stability;
- education;
- social and community context;
- health and health care; and
- neighborhood and built environment.

Each of the five areas is operationalized and measured by a set of components or key issues. Economic stability includes poverty, employment, food security, and housing stability. Education includes high school graduation, enrollment in higher education, language and literacy, and early childhood education and development. Social and community context includes social cohesion, civic participation, discrimination, and incarceration. Health and health care include access to health care, access to primary care, and health literacy. Finally, neighborhood and built environment include access to healthy foods, quality of housing, crime and violence, and environmental conditions.

In this report, we focus on the fifth SDOH area—neighborhood and built environment—and hone in on housing and related environmental conditions, namely, substandard housing, abandoned buildings, and vacant lots. These issues are often the primary targets for participants in the vacant property field who work on community development and neighborhood revitalization initiatives. Policymakers and practitioners can apply SDOH’s holistic lens to identify interrelationships and connections across transitional program and policy silos. It can help them to implement and assess the public health impacts of their housing and community development programs, perhaps even help improve them, by illustrating how changes to housing and the built environment can affect the public health of residents.

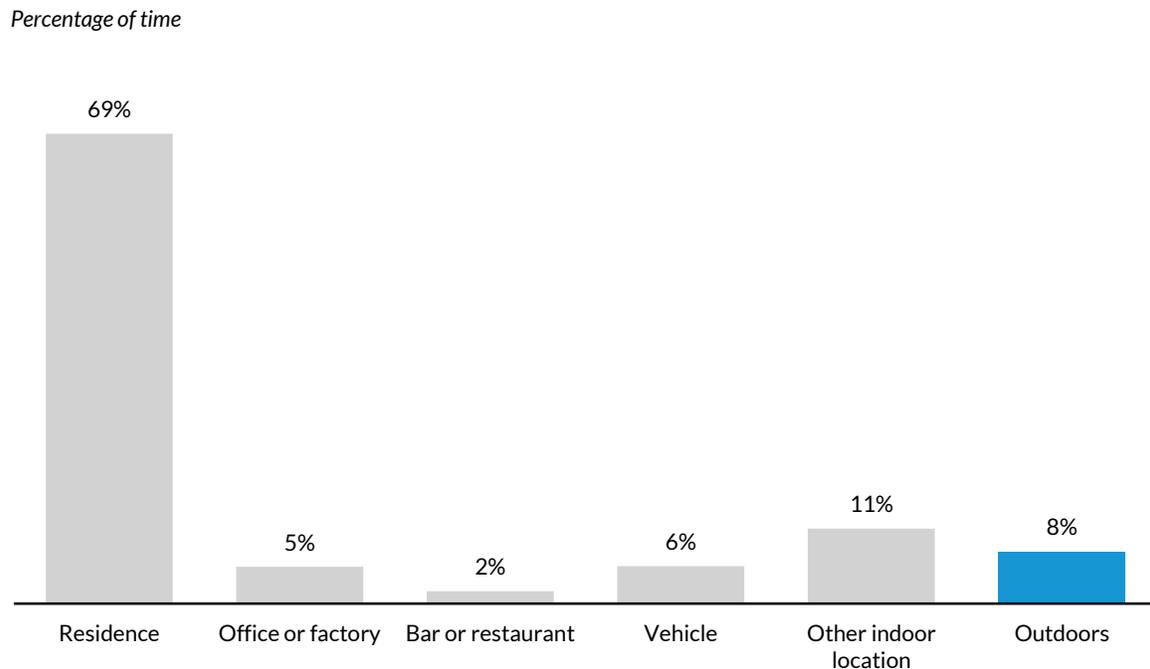
Housing and Health

Housing is a key social determinant of public health. The condition of our homes, from the indoor air we breathe to the tap water we drink, and the neighborhoods where we live, from green space to amenities, can lead to better or worse health outcomes. The Surgeon General explains,

Many factors influence health and safety in homes, including structural and safety aspects of the home (i.e., how the home is designed, constructed, and maintained; its physical characteristics; and the presence or absence of safety devices); quality of indoor air; water quality; chemicals; resident behavior; and the house’s immediate surroundings. The link between these housing features and illness and injury is clear and compelling. Homes’ structural and safety features can increase risk for injuries, elevate blood lead levels, and exacerbate other conditions. Poor indoor air quality contributes to cancers, cardiovascular disease, asthma, and other illnesses. Poor water quality can lead to gastrointestinal illness and a range of other conditions, including neurological effects and cancer. Some chemicals in and around the home can contribute to acute poisonings and other toxic effects. These issues are influenced both by the physical environment of the home and by the behavior of the people living in the home . . . The concept of healthy homes extends beyond the four walls of a dwelling to its surroundings—to the land immediately around the house, to adjacent structures and amenities (such as outbuildings, trees, and recreational equipment), and to the neighborhood setting. A house does not exist in isolation. US Department of Health and Human Services 2009

As depicted in figure 3, an analysis of the National Human Activity Pattern Survey (NHAPS)⁴ revealed that on average, we spend 69 percent of our time on any given day in our homes (Klepeis et al. 2001). Moreover, the greatest single expenditure for homeowners and renters is housing (Braverman et al. 2011; US Bureau of Labor Statistics 2012).

FIGURE 3
Average Percentage of Time NHAPS Respondents Spent in Six Locations in a Day



Source: Klepeis et al. 2001.

Note: People spent an average of 86.9 percent of their time indoors.

Impact of Blight on Health

Recent research supports the Surgeon General’s view by showing there is a correlation between housing and neighborhood conditions and the well-being of residents. Many of these public health studies focus on the impact of deleterious housing and neighborhood conditions on particular health outcomes (e.g., allergens and asthma or lead exposure and developmental and behavioral problems). Research on the effects of blight on public health is relatively recent, with many studies performed and published only within the last 10 to 15 years. Our scan of the literature (by no means exhaustive) identified approximately 40 articles and studies since 2000 that explore the relationships between blight and public health.

In this section, we explore public health studies and other academic articles that investigate public health impacts related to three primary types of blight: substandard housing, abandoned houses and buildings, and vacant lots. Some of the studies examined the impacts from individual properties; others explored the cumulative effect that an entire neighborhood with multiple blighted properties might have on the public health of its residents. Table 1 summarizes key findings from a few of these articles on housing and neighborhood conditions and health outcomes. Most of the studies in the table found a relationship or association between the condition of the substandard or vacant property and/or a policy or program intervention (e.g., greening vacant lots) and health outcomes.

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TABLE 1

Impact of Blight on Health

Conditions	Health impacts and outcomes
Living in substandard housing General household disrepair (e.g., broken windows, pests, leaks) Substandard conditions and/or foreclosed homes	Psychological behavior dysfunctions (Bashir 2002; Burdette, Hill, and Hale 2011) Lower literacy scores for pre-K children, higher risks of child maltreatment, residential instability, and elevated blood lead levels (Coulton, Fischer, et al. 2016)
Cold and damp interiors	Asthma, aches and pains, “nerves,” diarrhea, headaches, and fever. Children in particular are affected. (Krieger et al. 2000; Rauh, Chew, and Garfinkel 2002; Shaw 2004)
Cockroach and rodent infestation	Asthma (Rauh, Chew, and Garfinkel 2002; Sharfstein et al. 2001)
Lead paint and pipes	Neurological damage and impaired development, reduced IQ, negative cognitive and behavioral effects, (e.g., hyperactivity, increased aggression, learning disabilities, and behavioral problems) (Bashir 2002; Sharfstein et al. 2001; Shaw 2004)
Incorrect installation of heating and cooking appliances, poor ventilation, and the use of cooking stoves for heating	Exposure to carbon monoxide can cause headaches, nausea, dizziness, and convulsions; in higher doses, it can be fatal (Shaw 2004)
Radon (radioactive gas)	Cancer (Shaw 2004)
Noncompliant with Americans with Disabilities Act design or construction elements (e.g., stairs and doorways)	Exclude or enhance the ability of a person with disabilities to participate in the community (US Department of Health and Human Services 2009)
Living near vacant homes, abandoned buildings, and vacant lots Substandard housing and/or foreclosed homes Vacant lots and abandoned buildings	Lower literacy scores for pre-K children (Coulton, Fischer, et al. 2016) Violence, higher rates of chronic illness, stunted brain and physical development in children, mass retreat into unhealthy eating and exercise habits, breakdown of social networks and capital (Branas, Rubin, and Guo 2012; Garvin, Cannuscio, and Branas 2013; Morrissey 2016)
Boarded-up housing	Sexually transmitted diseases (e.g., gonorrhea), premature mortality, diabetes, homicide, and suicide (Cohen et al. 2003)

Research Design

In reviewing these findings, it is important to understand a little about their research design and methods to explain what the research really says and what it does not say. Several of these studies examined only one health impact, such as asthma or lead poisoning, within the context of a single place over a short period. Such studies offer a snapshot of how housing or property conditions influenced the health of the subjects they studied. Few studies look at multiple health impacts over time. Other researchers investigated an individual health impact on certain vulnerable populations (e.g., children, elderly, poor) at multiple properties or sites.

In addition to a study's design and context, research findings are shaped by the methods used by the researchers. Did they use qualitative methods, such as interviews, focus groups, and surveys, to assess people's perceptions of their living conditions, their neighborhood, and their health? Did they gather new data, or did they examine existing administrative data collected by public health agencies to extrapolate the potential public health impacts in a neighborhood? Some studies develop elaborate quantitative models to determine the correlation between blighted properties and adverse health impacts but might fall short of telling a full story.

Most social science and public health research findings identify contributing factors that appear to have some influence on or correlation to the outcome being studied; when these factors are present, the outcomes or responses or reactions are more likely to also happen or occur with a certain degree of confidence. Most of these studies do not prove direct causation, unless researchers do natural experiments or randomized controlled trials that more closely track the impacts over time from the intervention on one set of populations and then compare those populations with similar populations that did not receive the intervention. Randomized controlled trials can help isolate the primary drivers or causes of the outcome or result. However, these methods take substantial investments of time and resources.

Having a general understanding of research methods and how relevant studies are designed and conducted can help policymakers and practitioners to assess how transferable the results might be to another context, population, or place and what they can do to adapt them. A basic understanding can also improve the translation of research in support of different types of policy interventions. Vacant property policies and programs supported by research offer some evidence of how they may or may not affect public health. These concepts of evidence-based policymaking help improve government's overall effectiveness and efficiency.

SUBSTANDARD HOUSING

Over 5 million families (and 4 million children) are estimated to live in substandard housing (Bashir 2002). Substandard housing is not housing that is outdated or unattractive but housing that poses a public health and safety hazard to the well-being of its occupants and neighborhoods. Many state laws and local codes list housing conditions that pose threats to the health, safety, and general welfare of the occupants, such as lack of heat, infestations of insects and rodents, fire hazards, and mold, as well as structural conditions that could pose safety threats, such as boarded doors and windows.⁵

Researchers have documented that exposure to subpar housing conditions is not evenly distributed across populations. Low-income individuals and people of color, particularly those living in inner-city

environments, are disproportionately affected. Krieger and Higgins (2002) point out that African Americans and low-income people are 1.7 and 2.2 times more likely, respectively, to occupy homes with severe physical problems compared with the general population. Furthermore, low-income individuals are more likely to live in overcrowded homes.

Recent research also explains that many poor families are forced to live in substandard housing because a combination of poverty, lack of affordable housing, and local eviction systems contributes to a national decline of safe housing for poor Americans (Desmond 2015). As of 2015, 52 percent of families living at or below the poverty level spent at least 50 percent of their income on housing costs. These same families are at a much greater risk of being evicted as their incomes cannot keep pace with escalating rents as costs are passed on to renters. They are also more likely to go through an informal eviction process and thus turn to living in substandard housing given the difficulties resulting from previous evictions.

Over the years scholars have examined the health impacts of living in substandard housing. Below we list studies that identify a variety of substandard housing conditions often cited by state and local codes and their associated public health impacts.

- **Mental health and general household disrepair.** Leaky structures, broken plumbing, broken windows, and pests can lead to neurological disorders (Bashir 2002) and psychological and behavioral dysfunction (Bashir 2002; Burdette, Hill, and Hale 2011; Krieger and Higgins 2002), and they tax overall mental health (Egerter, Braverman, and Barclay 2011; Garvin et al. 2012; South et al. 2015). For example, in their analysis of longitudinal survey data, Burdette, Hill, and Hale (2011) established a correlation between household disrepair (e.g., leaky structures, broken plumbing, broken windows, and pests) and symptoms of distress.
- **Respiratory diseases and asthma.** Cold and damp interiors, which foster the growth of mold, fungi, and other microorganisms, can also lead to respiratory disease (e.g., asthma), aches and pains, diarrhea, headaches, and fever, especially in children (Bashir 2002; Krieger and Higgins 2002; Krieger et al. 2000; Rauh, Chew, and Garfinkel 2002; Rauh, Landrigan, and Claudio 2008; Sandel and Zotter 2000; Shaw 2004). Allergens from cockroach and rodent infestation have also been shown to cause asthma (Rauh, Chew, and Garfinkel 2002; Sharfstein et al. 2001). For instance, in their examination of cockroach allergen levels in 132 low-income Dominican and African American households with young children in New York City, Rauh, Chew, and Garfinkel (2002) found that indoor household allergen levels are positively associated with household disrepair.

- **Lead.** Often found in household paint and pipes, lead can result in neurological damage and impaired development, reduced IQ, and negative cognitive and behavioral effects such as hyperactivity, increased aggression, learning disabilities, and behavioral problems (Bashir 2002; Krieger and Higgins 2002; Sandel and Zotter 2000; Sharfstein et al. 2001; Shaw 2004).
- **Carbon monoxide.** Incorrect installation of heating and cooking appliances, poor ventilation, and the use of cooking stoves for heating can lead to carbon monoxide poisoning (i.e., headaches, nausea, dizziness, and convulsions), which in worst cases can be fatal (Bashir 2002; Shaw 2004).
- **Radon.** Exposure to radon (radioactive gas) from the soil and rock upon which houses are built can lead to cancer (Shaw 2004).

Researchers agree that children are the most affected by substandard housing. Children suffer adverse health outcomes stemming from the conditions outlined above (Bashir 2002; Coulton, Fischer, et al. 2016; Coulton, Richter, et al. 2016; Rauh, Chew, and Garfinkel 2002). Poor health outcomes negatively affect the cognitive and socioemotional development of children, and these children tend to score lower on school readiness and development assessments (Coulton, Fischer, et al. 2016).

BOX 2

Cleveland's Housing Crisis Leaves Lasting Imprint on Children

Case Western Reserve University researchers in Cleveland, OH, studied a cohort of children entering kindergarten (13,762 children) in the Cleveland Metropolitan School District between 2007 and 2010, the peak years of the mortgage foreclosure crisis in Cleveland. They wanted to identify how the subsequent housing insecurity and neighborhood instability affected children. Significant foreclosures, tax-delinquent properties, and unscrupulous real estate speculations were prevalent in many Cleveland neighborhoods. During the study period, the researchers found that substandard housing conditions contributed to lower literacy scores for children entering kindergarten. They also established that living in a home that is in poor condition or in foreclosure is associated with a higher risk for child maltreatment, residential instability, and elevated blood lead levels, all of which affect literacy scores. Mere proximity to distressed properties (within 500 feet) also lowered literacy scores for these Cleveland children entering kindergarten.

Based on their findings, the research team set forth three important policy implications. First, rehabilitating and rebuilding distressed housing in cities hit hard by the housing crisis can be a smart investment in the future of children. Without programs and policies to repair and maintain housing, particularly in low-income neighborhoods, more children will start school behind their peers. Second,

greater collaboration across agencies, such as school districts, municipal building and environmental health departments, early childhood programs, community development corporations, and housing providers, is necessary to address the housing, education, and related socioeconomic problems experienced by children in substandard housing. Finally, early-warning data systems that can track properties falling into disrepair should be established to help school districts and community-based organizations reach out to families and children and provide support and information, ideally before conditions reach crisis levels.

Source: Coulton, Fischer, et al. (2016).

ABANDONED BUILDINGS AND VACANT LOTS

Beyond substandard housing conditions, research also explains how neighborhood conditions influence the well-being of residents. Only in the last few years have public health researchers and advocates recognized that a person's zip code can do more to determine her health (e.g., life expectancy) than her own genetic code. For example, a study of obesity rates in Seattle, WA, found that disparities in obesity rates by ZIP code area were greater than disparities by income or race/ethnicity (Drewnowski, Rehm, and Solet 2007). In Atlanta, GA, life expectancy in nearby neighborhoods can dramatically change from 84 to 71 years even though the neighborhoods are only a few miles apart (Minyard et al. 2016). Thus, research confirms that neighborhoods can act as a major determinant of one's health as well as economic success.⁶ Several studies have focused on the racial disparities in health and health care that are influenced by living in a distressed neighborhood.⁷

Vacant and abandoned properties are one of the primary indicators of neighborhood-level distress. Researchers have long studied the negative impacts of abandoned buildings and vacant lots on public health and safety. The rubric of the "broken window theory" suggests that vacant properties and neighborhoods with persistent blight create a climate of social and psychological disorder that attracts criminal activity and violence and becomes a breeding ground for vermin (Branas et al. 2011). These factors have been shown to have deleterious effects on area residents, including mental distress (e.g., depression, elevated rates of intentional injury); higher rates of chronic illness (e.g., cardiovascular disease); sexually transmitted diseases (e.g., HIV, gonorrhea); stunted brain and physical development in children; and mass retreat of area residents into unhealthy eating and exercise habits.

For example, in research work that started in 55 New Orleans neighborhoods and expanded to an analysis of US Census data on 107 cities with over 150,000 residents, Cohen et al. (2003) confirmed that individuals who lived in deteriorated neighborhoods had higher rates of gonorrhea, premature death in general, and death from cardiovascular disease and homicide. Moreover, blight and violence

(or the perception of violence) have resulted in disinvestment in the affected communities (Krieger and Higgins 2002; Morrissey 2016; RAND 2005).

Scholars have also highlighted the breakdown in social capital—crucial to a community’s ability to organize and advocate for itself—that stems from abandoned buildings and vacant lots (Cohen et al. 2003; Garvin et al. 2012; Krieger and Higgins 2002; Morrissey 2016; RAND 2005). As social disorder grows and incivilities increase, residents tend to live and work in isolation and become less willing to step in and prevent crime (Sadler and Pruett 2015). For instance, Garvin and her colleagues conducted 50 interviews in Philadelphia, PA, about the impact of vacant land on community and individual health and safety. They learned that “vacant land was perceived to influence community well-being by decreasing residents’ control over neighborhood life, fracturing ties among neighbors, raising concerns about crime and safety, and exerting a negative financial strain on the community. Participants described the presence of any vacant land as overshadowing positive aspects of neighborhood life and undermining attempts to improve the image or overall success of the community” (Garvin et al. 2012, 417). In addition, Cohen and her research team learned that a neighborhood’s collective efficacy—the willingness to help out for the common good—is associated with lower rates of premature death and death from cardiovascular disease and homicide (Cohen et al. 2003; RAND 2005).

Moreover, poor conditions in homes and neighborhoods can have a compounding effect on the health and welfare of low-income individuals. Identifying and isolating a specific housing or neighborhood condition as the main cause or source of one or more negative health outcomes ignores the reality that many overlapping factors can affect the well-being of individuals. As Sandel and Zotter (2000) explain,

The health of many children who are living in poor conditions can be affected in more than one way: A girl whose asthma is triggered by living in a rodent- and cockroach-infested building may also be on the verge of homelessness, for example, or a boy with lead poisoning because of exposure to old paint may be at high risk for injuries because of other unsafe conditions in his home. Children also can be affected by where they live in ways that are not obvious. The girl from a family whose rent leaves little money for food may suffer from iron-deficiency anemia. The boy whose family is “doubled up” (living among family or friends) or moving frequently to avoid homelessness may be doing poorly in school because of his unstable home life. By asking about housing and knowing how to advocate for families living in poor conditions, pediatricians can detect and treat such problems early or help to prevent them.

Thus, it becomes critical to understand the dynamic interrelationship of factors that influence the built environment within a neighborhood and the families and residents who live within it. Policymakers, working with community development, housing, education, and social welfare organizations, should fashion holistic and comprehensive interventions that can simultaneously address

the challenges of the house, the neighborhood, and the people who live within the house and around it. In a 2015 VPR Network research and policy brief, Mallach explained some of the latest research on how neighborhoods evolve and change over time—the variables that can drive neighborhood change and how various policies and programs may or may not address these changes (Mallach 2015).

BOX 3

The Flint Water Crisis: Policy and Public Health Insights from the Interaction of Housing, Infrastructure, and Urban Planning

When the City of Flint, MI, switched its drinking water source to save money, state and local leaders failed to consider the public health impacts of their decision. The Flint water crisis gained national attention after outside public health researchers revealed that thousands of children had been exposed to drinking water with dangerously high levels of lead.^a Subsequent investigations have also identified malfeasance by government regulators and officials resulting in pending criminal prosecution by the Michigan Attorney General.

The crisis highlights the compounding and cumulative effects of blight and disinvestment and how lack of resources in older industrial cities with crumbling infrastructure puts low-income neighborhoods at greater risk. Professor Victoria Morckel (2017), University of Michigan at Flint, points to three fundamental policy and planning failures underlying Flint’s water crisis: (1) sustained job and population losses, (2) a general lack of regional planning, and (3) an inability to fund and maintain infrastructures. Together these three factors help explain why the water crisis in Flint was decades in the making and why federal and state government policy action is necessary for the public health and infrastructure problems confronting hundreds of legacy cities.

Beyond Flint, Morckel’s admonitions illustrate the complexities and plight of older industrial cities where policy neglect and concerns over fiscal policy can compound other community development problems and cause a citywide public health crisis. Thus, it becomes imperative for policymakers at all levels to understand the cumulative effects of decline, disinvestment, and blight common in legacy cities. Flint’s children, of course, are not the only ones endangered by lead and other contaminants in their homes and environment. The problem of lead exposure plagues many other cities such as Cleveland, OH; Atlantic City, NJ; and Philadelphia and Allentown, PA.

^a Graham, David A. “Who Poisoned Flint?” *The Atlantic*, January 22, 2016.

<http://www.theatlantic.com/politics/archive/2016/01/who-poisoned-flint/425454/>; Lin, Jeremy C. F., Jean Rutter, and Haeyoun Park. “Events That Led to Flint’s Water Crisis.” *New York Times*. http://www.nytimes.com/interactive/2016/01/21/us/flint-lead-water-timeline.html?_r=0.

Interventions to Mitigate Blight

Communities have a wide array of interventions to address the physical deterioration of housing and the public health and safety hazards posed by abandoned buildings and vacant lots. Some interventions seek to prevent properties from becoming substandard and abandoned, and others seek compliance with relevant regulatory codes and ordinances through various enforcement procedures. Local governments can eventually demolish buildings and homes that have been abandoned and pose imminent health and safety hazards. Existing research on blight interventions, however, suggests that some policies are working, but others are nascent with no tracked or reported outcomes. Much of the research on blight programs and policies tends to focus on economic results.

When investigating blight interventions, it becomes important to understand who is leading the intervention; the intervention's primary targets; when the intervention is used; and what policy, regulatory, administrative, and legal processes are used to deploy it. Within the vacant property field, public health is often a secondary policy driver for many of these interventions, such as housing inspection and code enforcement programs. Non-public-health actors and agencies, such as housing and code enforcement departments in collaboration with community development corporations and other nonprofits, often lead the program and policy interventions. Other public agencies may also be involved, from federal and state housing agencies down to public housing authorities, as well as housing and environmental courts.

Substandard Housing

Cities and other jurisdictions, including the federal government and nongovernment organizations, have relatively recently deployed policies to mitigate, and in some cases remediate, substandard housing. Some of these home-based interventions, such as the Healthy Homes and the Green and Healthy Homes Initiatives, focus on public education campaigns, home assessments, and trainings for tenants, property managers, and owners. Other policies, such as vouchers and subsidies for low- to moderate-income tenants, intervene further upstream on broader market drivers with the goal of using such financial incentives to enable tenants to seek better living conditions or ideally persuade owners to upgrade the habitability of their units.⁸

Today many communities have put in place specific prevention policies to address health hazards within housing units, such as lead poisoning prevention policies and smoke alarm legislation. Lead prevention policies have greatly reduced the exposure of children to lead, and smoke alarm laws have

decreased the number of fatal fires and fire deaths in the United States (US Department of Housing and Urban Development 2013).

HEALTH HOMES INITIATIVES

In 1999, the US Department of Housing and Urban Development (HUD) launched the Healthy Homes Initiative, which seeks to protect children and their families from housing-related health and safety hazards. The program takes a comprehensive and coordinated approach to dealing with multiple housing-related dangers (e.g., mold, lead, allergens, carbon monoxide, pesticides, structural hazards, and radon) that exist at the same time. Through the Healthy Homes Initiative, grants are given to research and demonstrate “low-cost, effective home hazard assessment and intervention methods” and to educate communities on how they can mitigate housing-related hazards.⁹

Some studies of the Healthy Homes Initiative grants have shown positive results and provide policymakers and researchers with new data.¹⁰ Krieger and his colleagues examined the effects of in-home asthma self-management support provided by community health workers with standard asthma education from clinic-based nurses as part of the Seattle–King County Healthy Homes II Project. The results of the randomized controlled trial involving 309 children with asthma living in low-income households showed a positive correlation between community health worker support and asthma education to the quality of life of caretakers and number of symptom-free days for children. The interventions were also related to decreases in the proportion of children who used urgent health services (Krieger et al. 2009). Rabito et al. (2007) analyzed data from home visits of children in the New Orleans Healthy Homes Initiative¹¹ to fill the data gap on the exposure of home allergens by asthmatic children in the Southern Gulf region of the United States. The group learned that asthmatic children in New Orleans, LA, are at high risk of exposure to multiple home allergens and that homes in their sample had higher levels of some allergens than homes in other inner-city sites.¹² Maring, Singer, and Shenassa (2011) examined the partnership between the Healthy Homes Initiative and Extension education programs that came out of an interagency agreement between HUD and the US Department of Agriculture to work together on outreach education related to Healthy Homes. They learned that Extension and public health entities can expand the audience for Healthy Homes programs through partnerships and collaborations.

CODE ENFORCEMENT PROGRAMS

Local government code enforcement programs are a common intervention that many communities use to address substandard living conditions in existing single- and multiple-family housing. Municipalities can use two types of code enforcement interventions against substandard housing: (1) regulatory

programs, such as rental licenses, point of sale, and/or vacant property registration ordinances, which establish processes for landlords to register their properties and for the city to conduct regular inspections and certification of properties; and (2) compliance and enforcement actions, which can include simple notices of violations, administrative penalties, and/or criminal or civil litigation. Often these compliance and enforcement actions happen after a tenant or neighborhood makes a complaint and when the housing inspector determines the properties are in violation with minimum standards of habitability set by local ordinances and state law.

Little research, however, has examined these common code enforcement actions and their potential public health impacts or outcomes. Nongovernmental organizations such as Change Lab Solutions have developed policy briefs that make the public health case for how code enforcement programs can design and implement regulatory programs and change existing approaches that integrate housing and public health objectives.¹³ As discussed in the next section, only a few studies have considered the economic and public health effects of code enforcement regulatory programs that were strategically enforced in middle-market neighborhoods.

Vacant Homes and Abandoned Buildings

Cities that have seen decades of decline and disinvestment face an endemic problem of how to address increasing inventories of vacant homes and abandoned buildings. Often these structures are in low-income neighborhoods. In the past decade, many older industrial legacy cities, such as Baltimore, Maryland; Cleveland and Youngstown, Ohio; and Detroit, Michigan, have launched initiatives and public campaigns to inventory, assess, and demolish thousands of vacant homes.¹⁴ In 2014, Detroit's Blight Removal Task Force, having determined that 50 percent of vacant properties in the city would need demolition, unveiled its strategic plan to address more than 80,000 derelict structures and vacant lots.¹⁵ In nearby Flint, the city's Blight Elimination Framework estimated the total costs at nearly \$100 million to remove and reclaim nearly 20,000 vacant and abandoned properties.¹⁶ And in 2013, the Mayor of South Bend, IN, called for "1,000 abandoned houses to be addressed within 1,000 days" through a combination of rehabilitation and demolition. The program's website touts that by the end of 1,000 days, 1,122 properties had been tackled, with nearly 40 percent repaired.¹⁷ As discussed below, the research on these and other vacant property policy interventions has primarily examined policy drivers and legal processes, along with estimates of the economic cost savings and financial or fiscal benefits. Only a handful of emerging studies look at the public health impacts of vacant home and abandoned building initiatives.

CODE ENFORCEMENT STRATEGIES

Several cities are experimenting with new code enforcement strategies against property owners to ensure they clean, secure, and rehabilitate their vacant properties or face potential administrative or judicial actions against them. Enforcing such ordinances can be challenging due to the lack of local government capacity to identify the number, location, and ownership of vacant properties. Even when the owner is known, tracking him or her down can prove to be impossible.¹⁸ Thus, a growing number of cities are doing block-by-block vacant property inventories and a few, such as Detroit and Cleveland, have robust real property information systems that track data and analyze vacant property trends (Lind 2016). Close to 2,000 local governments have adopted vacant property registration ordinances that establish special regulations for property owners and managers to register their vacant properties, pay filing fees, remove nuisance conditions, and keep them secured or face civil penalties and potential court action for noncompliance.¹⁹

In Philadelphia, the City's Department of Licenses and Inspections launched its Vacant Property Strategy in 2011 as part of the city's larger program for determining how vacant and abandoned properties are bought, sold, and maintained. The department started to enforce its long-standing "doors and windows" ordinances, which require owners to board and secure each opening on a vacant property or face civil penalties for each day the property is not secured. The department first identified and mapped approximately 25,000 vacant and abandoned structures, but it strategically targeted its enforcement to blocks with only an isolated or small number of vacant structures (i.e., neighborhood enforcement clusters). After further investigation identified the owners responsible for the properties, city inspectors issued violation notices that imposed penalties for each uncovered opening on the property. Given this strategic approach and the increased caseload, the city also worked with the courts to establish a special day for adjudicating owner appeals.²⁰

Early research on Philadelphia's targeted use of its doors and windows ordinance found an average increase in home sales prices of about 31 percent in those neighborhood clusters where the ordinance was enforced compared to a 1 percent increase for comparable properties.²¹ New tax delinquency rates remained relatively flat in the neighborhood enforcement clusters, but they rose steadily in the comparable neighborhoods. Using measures from a 2010 Philadelphia study on the cost of blight, the Reinvestment Fund estimated the potential financial impact from the doors and windows ordinance at \$74 million in increased property sales value from surrounding properties.

From a public health perspective Kondo et al. (2015) tested the effects of Philadelphia's doors and windows ordinance on the occurrence of crime and learned that building repairs were "significantly associated with citywide reductions in overall crimes, total assaults, gun assaults and nuisance crimes."

In addition, “building remediations were also significantly associated with reductions in violent gun crimes in one city section [and] building renovation permits were significantly associated with reductions in all crime classifications across multiple city sections.” The researchers argued that the doors and windows strategy offers “a relatively low-cost method of reducing certain crimes in and around abandoned buildings. Cities with an abundance of decaying and abandoned housing stock might consider some form of this structural change to their built environments as one strategy to enhance public safety” (Kondo et al. 2015).

Baltimore’s Vacants to Value is another initiative that strategically targets housing code enforcement actions to reclaim vacant properties in areas with steady interest from private investors and developers.²² City departments facilitate redevelopment by streamlining city disposition processes that transfer distressed properties to private redevelopers while also using data to focus code enforcement actions on vacant properties in the same designated block or area. The city’s innovation lies in the close coordination and communication between Baltimore’s housing and code enforcement agency and local housing developers and investors. This approach requires accurate, real-time assessments of the neighborhood housing conditions and market potential for each type of situation. The code enforcement action is then tailored to match the neighborhood’s market potential based on a neighborhood typology and in-depth market-value analysis. Early assessment of the Vacants to Value strategic approach found overall increases in vacant property rehabilitations and demolitions in the selected neighborhoods, but the city may have overstated the total numbers and impact (Jacobson 2015). No in-depth study has yet been published examining the potential public health impacts from Vacants to Value.

DEMOLITION, LAND BANKING, AND SMART DECLINE PLANNING

In communities with seriously dysfunctional real estate markets (weak demand and oversupply of vacant housing and buildings fueled by years of population loss and the recent economic and foreclosure crisis), thousands of properties have been abandoned, some for decades, and owners are often dead or cannot be found. Code enforcement strategies do not work effectively under these conditions (Lind and Schilling 2016), and consequently cities may have to take over the vacant properties. Considering these realities, several legacy cities have launched large-scale demolition programs to reduce oversupply, stabilize the market and population loss, and adjust their development footprint so it is more consistent with existing and projected population. Under the rubric of “smart decline” planning, urban planning scholars have begun to frame the parameters of this emerging model as they explore new approaches to urban planning and urban design.²³ Other researchers wonder about

the social justice implications of these alternative designs and developments (Dewar and Thomas 2013; Hummel 2014).

Land banks play a critical role in these demolition and planning initiatives (Keating 2013). As quasi-public agencies, land banks have legal powers to acquire vacant properties, often through expedited municipal tax foreclosure processes, and then reclaim and repurpose them working in close partnerships with community development organizations and nonprofit agencies (Fuji 2016). Over the past 40 years, land banks have evolved and expanded their frameworks, structures, and strategies to address vacant properties and urban blight (Heins and Abdelazim 2014). Several land banks, such as the Cuyahoga County Land Bank, have demolished hundreds of vacant properties in just the past three to four years thanks to recent infusions of federal and state demolition resources, primarily through the US Treasury's Troubled Asset Relief Program and Hardest Hit Fund.

Although the measurable impacts from these demolitions remain difficult to ascertain, recent research illustrates the short-term benefits accrued to adjacent or nearby properties, such as increases in property values and decreases in crime. In Cleveland, a study of demolitions indicated greater increases in home equity along with measurable decreases in rates of mortgage foreclosures in the more stable submarkets (Griswold et al. 2013). Results also showed that all housing submarkets had some benefits from the demolitions, although adjacent properties had higher returns on investment in stronger markets. A study by Dynamo Metrics (2015) found that demolition investment from the Hardest Hit Fund in selected areas of Detroit helped to stabilize those markets. Each demolition within Detroit's Hardest Hit Fund zones increased the value of occupied single-family homes within 500 feet by 4.2 percent. However, a mix of revitalization and reclamation strategies, including demolition, public asset sales, rehabilitation programs, and code enforcement within the Hardest Hit Fund zones increased property values by 13.8 percent.²⁴

Despite these positive signs, little research has examined the public health and safety impacts (positive and negative) that flow from these large-scale demolition initiatives. In a HUD-sponsored study of its Neighborhood Stabilization program, Spader, Schuetz, and Cortes (2016) evaluated the effect of demolition on crime rates in Chicago and Cleveland. Results showed a reduction in burglary and theft crimes within 250 feet of the demolition areas in Cleveland, but no changes were noted in crime rates in Chicago.

A recent health impact assessment (HIA) done on the demolition initiatives in Detroit offers a relatively new approach to examining potential public health costs and benefits (Coombe et al. 2015). A team from the University of Michigan's Detroit Community-Academic Urban Research Center engaged

community members around the implementation of two key policy interventions set forth in the Detroit Future City Framework Plan: decommissioning public services and infrastructure, such as city lighting; and large-scale demolition of primarily vacant homes. With respect to demolitions the Detroit HIA identified important public health trade-offs; for example, unprotected demolitions could result in increases in asthma and other illnesses, and blight removal could reduce the risks associated with hazardous buildings and crime. As part of its strategy the Detroit HIA discussed important implications for future implementation, such as the need for tailoring interventions for each designed zone, as neighborhood conditions and infrastructure vary considerably from neighborhood to neighborhood. The authors also stressed the need for meaningful community engagement with residents as such engagement can help reinvigorate social cohesion.

Vacant Lots

Along with abandoned buildings, many urban areas are dotted with vacant lots that can be safety and health hazards. Cities have employed similar strategies to contend with vacant lots: property acquisition, site clearance and demolition, and redevelopment. Given their instrumental role in acquiring and demolishing vacant and often tax-foreclosed properties, many land banks manage a variety of vacant lot and urban greening programs (Brown 2015), such as giving vacant lots to adjacent owners for minimal costs or assembling vacant lots for community gardens and urban farms.²⁵ Land banks and nonprofit community development corporations also partner with local residents and neighborhood groups to maintain vacant lots by mowing, weeding, and removing trash.²⁶

In collaboration with land banks and local government, university design centers and nonprofits have also played major roles by developing framework plans, urban design strategies, and pattern books for guiding community developers and homeowners in the creative reuse of vacant lots. Reimagining a More Sustainable Cleveland, led by Cleveland Neighborhood Progress and the Kent State Cleveland Land Collaborative, was perhaps the first program to publish a pattern book and then manage a vacant lot competition with grants of \$5,000 to community groups for testing examples from the pattern book.²⁷ Detroit Future City, the nonprofit charged with stewardship and implementation of the Detroit Future City Strategic Framework Plan, issued its online vacant lot pattern book and guidelines in 2016.²⁸ These plans and guides provide local officials and community organizations involved with revitalization with feasible examples of what urban greening is and how it can remediate eyesores and provide positive health and economic benefits.

More and more research continues to show that urban greening, the landscaping of urban spaces for the benefit of the community and the environment, can be an effective intervention for improving the well-being of residents, particularly through the reclamation and greening of vacant lots (Branas et al. 2011; Garvin et al. 2012; South et al. 2015). Recent research indicates that participants in land bank greening programs felt such programs were a motivating factor to help youth stay safe; they also noted increasing interest and actions by neighbors to better maintain their own properties adjacent to the vacant lots, and they thought the greening programs served as a source of rebuilding neighborhood and community pride.²⁹ Studies have also shown that the existence of these green spaces can reduce stress (South et al. 2015), lead to a decrease in number of crimes, and provide a perception of safety (Branas et al. 2011; Garvin, Cannuscio, and Branas 2013).

These recent studies build on the well-established literature that suggests availability of green spaces of all types can significantly contribute to an individual's physical as well as psychological well-being (Tzoulas et al. 2007). Social cohesion is another benefit from urban greening. A Chicago study found that residents living closer to common green spaces, in comparison with those who do not, tended to enjoy and engage in more social activities and know their neighborhoods (Kuo et al. 1998). Legacy cities are also greening vacant lots to address environmental problems such as stormwater runoff. A study of 52 vacant lots (former demolition sites) in Cleveland demonstrated that a properly designed and managed infiltration type of green infrastructure can have sufficient capacity for detention of average, annual rainfall volume. Improvement in demolition and maintenance rules and process, such as removal of superstructure debris, can also improve the water infiltration capacity of vacant lots (Shuster et al. 2014).

For more than 30 years, the Pennsylvania Horticultural Society has become the proving ground for much of the research about the socioeconomic, environmental, and public health benefits of urban greening (Schilling and Hodgson 2013). A cornerstone of the society's approach is greening vacant lots with park-like tree and grass plantings and installing modest spilt rail fences to improve the lots' visible appearance and signal community control. As of 2013, the society was involved in maintaining nearly 8,000 parcels of vacant land through its two primary initiatives, Philadelphia Green and Community LandCare. Community LandCare also works with 11 community groups to maintain about 2 million square feet (or 1,900 parcels) of land, which creates around 70 seasonable jobs (Schilling and Hodgson 2013). Several studies of the Pennsylvania Horticultural Society LandCare program shows that nearby property values increase. One neighborhood study examined homes immediately adjacent to the green lot and found they were worth 30 percent more than other homes in the same neighborhood (Wachter and Gillen 2006). Heckert and Mennis (2012) replicated this study citywide and found adjacent

property values increased by 11 percent. Beyond economic and property values, Heckert (2013) also found that more than 45,000 people of diverse racial and ethnic backgrounds and 16,000 households in the city now have access to green space within a half-mile of their residence thanks to the LandCare program.

In West Baltimore, urban greening has been used to clean up the area and provide employment to at-risk youth. The Clean and Green program, funded by the City of Baltimore and run by Bon Secours Community Works, employs up to eight young men a year as part of their landscape training program. Since the initiative's inception, more than 640 vacant lots have been converted into green spaces, 1.1 million square feet have been cleaned up, and 133 tons of waste have been removed (Morrissey 2016; Zuckerman 2013). As the executive director of Bon Secours Community works said, "Green spaces are a source of community pride, so much so that workers say drug dealers respect the effort and do not accost them or intrude on the area being cleaned up" (Morrissey 2016).

Observations and Recommendations

The research clearly establishes that housing and neighborhood conditions affect our health. **This report offers a glimpse into the emerging public health, policy, and planning research that examines how substandard housing, vacant homes and abandoned buildings, and vacant lots adversely affect the well-being of millions of families.** Scholars have documented the deleterious health impacts of specific conditions (e.g., cockroach and rodent allergens to asthma and lead poisoning to stunted development in children) and have extended their analysis beyond individual houses to surrounding neighborhoods. Government agencies have instituted policies and implemented interventions to address these and other negative health outcomes due to blight. Several programs seek to reduce the risks of exposure to harmful housing through public education and technical assistance, and other policies remediate harmful impacts through more direct actions, such as demolition of abandoned homes and the greening of vacant lots. However, more remains to be learned and done. Below we offer a blend of policy, practice, and research recommendations that could serve as catalysts for further collaborations among scholars, practitioners, and community leaders to make housing and neighborhoods healthier.

Take Comprehensive and Coordinated Place-Based Approaches to Address Blight and Health

Given blight's complexities, researchers, housing and public health officials, and policymakers should adopt place-based approaches when analyzing and addressing the impact of blight on health. Public health and housing studies typically take a medical or epidemiological approach in studying the health impacts of blight. That is, they focus on one outcome rather than factoring in the broader context and range of intervening factors. Policies and interventions also tend to target one or a limited number of health hazards. Branas and his colleagues rightfully argue that “programs that focus on places or structural changes, such as vacant lot greening, may have a greater influence on more people and for longer time periods than programs that focus only on individuals” (Branas et al. 2011, 1,296).

Insights from decades of place-based urban policies and programs offer important lessons for guiding interventions that address unhealthy housing and vacant properties. Urban Institute researchers have examined the long history of antipoverty initiatives that sought to address the problems of place, particularly in distressed neighborhoods with high concentrations of poverty. They have extracted a series of core principles for guiding place-based or place-conscious initiatives: (1) connect with citywide and regional opportunities and assets while expanding opportunities within target neighborhoods; (2) work both horizontally (e.g., by integrating efforts across policy domains within a neighborhood) and vertically (e.g., by engaging city, state, and federal policymakers and resources); (3) integrate the work of multiple organizations with complementary missions; (4) define, measure, and track progress to shared goals while continuously adapting and improving their strategies based on data; and (5) consider and plan for the challenges of residential mobility (Turner et al. 2014). Crime, safety, and public health should also be part of place-based policies (Ross, Parsons, and Vallas 2016). Thus, interventions that target neighborhood conditions must be part of any antipoverty portfolio, and the converse appears equally valid—interventions that attack vacant and abandoned properties and other deteriorations of the built environment should include an array of policies that address the socioeconomic challenges confronting individual residents and families, from homelessness to job training.

Understanding neighborhood dynamics becomes critical to effective place-based interventions and research about the intersection of the built environment and public health. Under the rubric of “neighborhood change,” social science researchers have been working for decades to identify patterns, create models, and assess various interventions that can stop neighborhood decline, facilitate stabilization, and perhaps serve as catalysts for revitalization (Mallach 2015). Understanding how neighborhood conditions, such as the spread of vacant homes and other socioeconomic variables, affect

individuals and neighborhoods over time becomes a critical issue for community development practitioners and could help public health researchers interested in how distressed neighborhoods influence the health of their residents.

Concurrently, government agencies and their community partners should take a more holistic approach to tackling the problems of blight and vacant properties. Local examples range from the Memphis Blight Charter and Steering Team³⁰ to Baltimore's Vacants to Value. Each of these initiatives exhibits collaboration across different sectors. HUD's comprehensive and coordinated approach in dealing with multiple housing-related dangers through its Healthy Homes Initiative is a good example of how to infuse public health into housing.³¹ As the Surgeon General argues,

A comprehensive, coordinated approach to healthy homes will result in the greatest public health impact. Directing resources toward a single disease or condition rather than working to improve the overall housing environment is inefficient and does not address residents' health and safety risks holistically . . . Because of economies of scale and more efficient use of human and other resources, a holistic approach can be less expensive than addressing problems individually. Finally, the holistic approach may enhance housing affordability both by reducing the costs associated with uncoordinated housing improvements and because one intervention may address two or more adverse health conditions. US Department of Health and Human Services 2009

Expand the Application and Use of Health Impact Assessments

An HIA can help foster place-based approaches and facilitate collaboration; it brings together scientific data, health expertise, and public input to identify the impact of proposed projects, policies, and programs on public health (National Center for Healthy Housing 2016). The National Academy of Sciences defines an HIA as "a systematic process that uses an array of data sources and analytic methods and considers input from stakeholders to determine the potential effects of a proposed policy, plan, program, or project on the health of a population and the distribution of those effects within the population. HIA provides recommendations on monitoring and managing those effects" (National Research Council 2013). HIAs traditionally examine the health impacts from proposed development projects or changes to development plans. However, HIAs can take different forms, such as strategic policy HIAs or rapid response HIAs.

HIAs seem well suited for integrating health into decisions about housing as they can help policymakers understand how housing influences existing health conditions and potential health consequences; support evidence-based policymaking; promote community engagement; and improve housing projects, policies, and programs (Morley, Fukuzawa, and Schwarz 2016). As part of the Pew

Charitable Trust's Health Impact Project, the National Center for Healthy Housing and the National Housing Conference performed a national inventory and review of 40 housing-related HIAs (National Center for Healthy Housing 2016). Twenty-nine of the HIAs involved housing and health as part of community development and redevelopment projects. The remaining 11 HIAs looked at special housing features or programs affecting housing. The report also outlined the different types of housing issues to which the HIA framework and process have been or could be applied, such as public housing, low-income housing tax credit programs, zoning, and land use policies, as well as code enforcement and housing inspection policies.

So far only a handful of HIAs have included substandard housing or vacant property policies and programs. For example, in Detroit, community members and researchers partnered to conduct an HIA to study the impact of demolitions as outlined by Detroit Future City, a multisector initiative launched to revitalize the city. The HIA explored the potential impact of the initiative on communities, particularly on less populated and more vulnerable neighborhoods, through changes in social networks and cohesion, blight remediation and safety, environmental conditions, population shifts, and other variables.³² With support from the Robert Wood Johnson Foundation's Interdisciplinary Research Leaders, in March 2017 Neighborhood Preservation, Inc. and the Urban Institute will undertake a two-year HIA in Memphis, TN, to examine the public health impacts from code enforcement interventions, such as inspections and prosecution, on substandard rental housing.³³

A major strength of the HIA process is engaging the community at risk in identifying problems and proposing solutions. Individuals who live in substandard housing and among abandoned buildings and vacant lots can share their lived experiences and provide insights that might otherwise be missed by outsiders studying the problem and suggesting solutions. Involving community members also wins their buy-in. Garvin and her associates point out that "in order for community-based solutions to be sustainable and accepted by target populations, community members must be engaged in both identifying local health problems and generating solutions" (Garvin et al. 2012, 413).

Track and Assess Health Outcomes from Code Enforcement and Other Vacant Property Policies and Programs

As the first responders to substandard housing and vacant properties, code enforcement programs can take several actions to remediate unhealthy housing and harmful neighborhood conditions. In most cases housing inspectors identify the code deficiencies and issue the owner or property manager a notice with time to comply and bring the property up to code. If the owner fails to make timely repairs

or ignores the notice, code officials can take legal action against the owner. Little research, however, has examined the range of public health benefits or results that flow from code enforcement programs, such as instituting a rental housing inspection program or filing administrative or judicial actions. Most of the current code enforcement research focuses on increases in property values and other socioeconomic results. Perhaps one theory of change or analysis could explore how different code enforcement actions can help reduce the risks of exposure to substandard property and vacant properties throughout a neighborhood, thereby decreasing incidents of crime and illnesses.

As discussed above, HIAs could be a good starting point to identify the range of health outcomes and to design more targeted research projects that could establish stronger links between certain types of code enforcement interventions and neighborhood health improvements. Such collaborative research partnerships could help communities to advance innovative policies, make code enforcement practices more effective, and increase cross-agency collaboration. After all, the legal and policy grounds for code enforcement actions are to protect public health, safety, and welfare (e.g., the state and local government police power), so policymakers could leverage such research that explains how these programs and policies further public health outcomes.

As the public health research demonstrates, a person's zip code is often the most important indicator of a person's health status. Thus, health disparities could be another important research and policy topic especially relevant for code enforcement programs as distressed neighborhoods with health disparities are often the same neighborhoods with concentrations of vacant homes and abandoned buildings. More cities and foundations are forming cross-sector initiatives to advance a variety of health interventions to change individual behaviors (Minyard et al. 2016). Code enforcement should become a larger part of a community's playbook to improve housing conditions, neighborhoods, and reduce health disparities. Research on its public health impact and influence could help expand and strengthen code enforcement programs.

Enhance the Capacity and Expectations for Collaboration between Community Organizations and Public Health Researchers

Given the inherent community context of blight and local administration of policy interventions, future research will demand close support from and engagement and collaboration with community-based organizations and local governments. Yet many of these community and local entities and institutions do not have the capacity or often the incentives to support public health and policy research that could help advance their policy interventions.

Researchers and practitioners often have different goals and expectations when it comes to blight, and consequently, they measure success differently. Research seeks to advance knowledge within a field or discipline and often seeks to answer narrow questions. Research often takes time (measured in years), especially if it involves tracking long-term individual- or neighborhood-level health outcomes or conducting more robust research methods such as randomized controlled trials. In comparison, practitioners typically measure success by the number of outputs—the number of notices issued, cases filed, buildings demolished, cases closed. Practitioners are often in triage mode in which they react to citizen complaints to investigate and then abate public health and safety hazards. After they demolish a vacant home, they move on to the next case, which could be in another neighborhood. More local governments are taking strategic approaches, such as Baltimore’s Vacants to Value, but code enforcement agencies often do not have sufficient data that researchers could use to measure short-term, and perhaps even long-term, health benefits and outcomes.

Considering these differences, community leaders, city officials, and researchers could benefit from opportunities to discuss and share their respective interests and experiences when doing this type of applied, community-driven research. Nonprofit organizations can play important roles by devising workshops, trainings, and guidelines for how to initiate, manage, and sustain more effective community-based research projects. For example, the Vacant Property Research Network facilitates regular meetings with practitioners and researchers around topics such as code enforcement, urban greening, and public health.³⁴ These dialogues help each side articulate its own position, but more importantly, they allow participants to hear and understand others’ perspectives. Principles of community participatory research can help researchers structure more meaningful and effective community partnerships.³⁵ The Robert Wood Johnson Foundation in 2016 launched its Interdisciplinary Research Fellowships program (<http://interdisciplinaryresearch-leaders.org/>), which requires each research team to have a community-based nonprofit organization as an equal partner. Researchers and the community partner then undergo extensive training about community participatory research and community organizing, and they have access to mentors to help guide this collaboration throughout the two-year research project.

Beyond managing expectations and relationships, community-based organizations often need additional resources and capacity to participate in research partnerships. Additional support from government agencies and national and local foundations can compensate community organizers and residents to fully engage in such projects. Local government officials also need resources to participate in such applied research. Another capacity challenge is the gathering of community data. Public health data linked to neighborhood change indicators are still difficult to obtain and remain a work in progress

in many jurisdictions. Thus, improving public health measures and indicators will be important to enhance our understanding about the systemic and structural impact of blight along with the tracking and documentation of the health impacts and outcomes from interventions taken by cities and other jurisdictions. Maring, Singer, and Shenassa (2011) argued, for instance, that data on HUD's Healthy Homes Initiative is hard to come by. Garvin, Cannuscio, and Branas (2013, 198) called for randomized controlled trials of urban greening projects "to provide the best evidence to urban planners and city officials interested in greening as a strategy to prevent violence."

Infuse Public Health into Housing Policy, Codes, and Practice

Housing and building codes came about as a direct result of public health reforms of the late 1800s and early 1900s to address infectious disease caused by tenement housing. Despite these historical roots, today housing and health functions are typically located in different departments and often in different local governments, which impedes their interactions and capabilities to undertake more comprehensive, place-based approaches. National organizations, such as the National League of Cities,³⁶ National Association of County and City Health Officials, and the American Public Health Association, have housing and health programs, resources, and working groups to help their members bridge these gaps. Our report offers several suggestions, such as expanding the use of HIAs, that could help infuse public health into housing policies and programs.

For housing and health agencies, the challenge is often how best to translate applied research into changes to housing plans, codes, programs, and practices. A good starting point for infusing health and housing are the links with local comprehensive land use plans, housing elements, and zoning codes. For example, the American Planning Association's Planning and Community Health Center published a toolkit for helping communities revise local plans and codes with public health in mind (Planning Advisory Service 2016). Some cities, such as Richmond, CA, have gained national attention for updating their citywide land use plan with a special community health element that covers a wide array of health goals and objectives (Richmond City Council 2012).

Beyond general plans and policies, however, it become important to consider how housing codes are written, interpreted, and administered to achieve the plans' vision. In their guidebook, *Up to Code*, Change Lab Solutions (2015) offers concrete examples and recommendations for code enforcement and public health officials on how to adopt a strong housing code with health at its center, train health and code enforcement inspectors, partner with community organizations, and promote cross-agency coordination. They also call for better evaluation of housing and code enforcement programs to

determine their impact on public health outcomes. Local governments also need to think more strategically by increasing collaboration across government agencies at all levels and between stakeholders from community groups, public health agencies, and private groups.

More applied research that explores housing through the SDOH lens would also help infuse health considerations into housing policy, codes, and practices. The federal Healthy Housing Working Group calls for more research on the medical, economic, and social costs caused by housing hazards collectively to help determine whether interventions that address them concurrently would be more efficient and cost-effective. The Robert Wood Johnson Foundation's Commission to Build a Healthier America recommended more federal funding for state and local research and the evaluation of housing and health demonstration projects and programs to better identify, assess, and control the multiple overlapping hazards that exist in homes (Pollack et al. 2008).

Emerging research also proposes a variety of new conceptual models and frameworks that consider the centrality of housing to public health. For example, Fukuzawa and Karnas (2015) suggest "a new framework that envisions housing as a platform for improving quality of life. This platform can be conceived as a multi-layered: as service delivery portal, as target for prevention, and as anchor for healthy neighborhoods. These layers are associated with different at-risk populations and different strategies for financing and policy action." They propose that philanthropy play a key role in "reconnecting the sectors through its capacity to build the evidence base, change the discourse about housing, foster policy change, and promote innovation."

Conclusion

Where we live matters. Substandard housing conditions can impede the physical and cognitive development of our children and can harm our general well-being. Abandoned structures and vacant lots in our neighborhoods can foster crime and strain social cohesion. We can learn from some of the interventions initiated by cities to mitigate and remediate the negative impact of blight. Moreover, more can be done, including taking a place-based approach to tackling blight; expanding the use of HIAs; learning from code enforcement and other policies; engaging the community in public health studies; and infusing health into codes, policies and practices.

Notes

1. The federal Healthy Homes Work Group includes the US Department of Housing and Urban Development, US Department of Energy, Centers for Disease Control, US Environmental Protection Agency, US Department of Agriculture, US Surgeon General, National Institute of Environmental Health Sciences, and National Institute of Standards and Technology. See “Federal Interagency Healthy Homes Work Group,” Green and Healthy Homes Initiatives, accessed March 21, 2017, <http://www.greenandhealthyhomes.org/policy-makers/federal-interagency-healthy-homes-work-group>.
2. Per the 2009 American Housing Survey, nearly six million households live with moderate to severe home health and safety hazards that place them at risk for illnesses and injuries including asthma, lead poisoning, falls, and respiratory illnesses. See “Federal Interagency Healthy Homes Work Group,” Green and Healthy Homes Initiatives.
3. “Social Determinants of Health,” Office of Disease Prevention and Health Promotion, accessed July 26, 2016, <https://www.healthypeople.gov/2020/topics-objectives/topic/social-determinants-of-health>.
4. NHAPS was a two-year probability-based telephone survey of US human activities sponsored by the US Environmental Protection Agency ($n = 9,386$). The primary purpose of NHAPS was to provide comprehensive and current pollutant exposure information over broad geographical and temporal scales.
5. For example, California State Housing Law, Section 17920.3 of the Health and Safety Code, establishes the property conditions for declaring a dwelling unit substandard and unfit for human habitation. See also the New Jersey Abandoned Property and Rehabilitation Act of 2002.
6. Justin Wolfers, “Growing Up in a Bad Neighborhood Does More Harm Than We Thought,” *New York Times*, March 25, 2016, <http://www.nytimes.com/2016/03/27/upshot/growing-up-in-a-bad-neighborhood-does-more-harm-than-we-thought.html>.
7. Andrea K. Walker, “Where you live can help determine your health, studies say,” *Baltimore Sun*, November 18, 2011, <http://www.baltimoresun.com/health/bs-hs-health-neighborhood-disparities-20111114-story.html>.
8. Recent research suggests that housing policies, such as providing housing vouchers, can provide access to higher-quality housing, which can lead to improved health outcomes (Chambers and Rosenbaum 2013; Lindberg et al. 2010).
9. “The Healthy Homes Program,” US Department of Housing and Urban Development, accessed August 8, 2016, http://portal.hud.gov/hudportal/HUD?src=/program_offices/healthy_homes/hhi.
10. Maring, Singer, and Shenassa (2011), however, have suggested that data on the impact of the Healthy Homes Initiative are difficult to capture.
11. The New Orleans Healthy Homes Initiative was a randomized intervention trial aimed at reducing allergen exposure, asthma morbidity, and lead burden in children ages 4 to 17 years living in inner-city New Orleans.
12. Rabito et al. (2007) compared their New Orleans sample to other samples in the Inner-City Asthma Study, which characterized the home environment of asthmatic children in seven low-income urban areas in the United States.
13. “Up to Code—Code Enforcement Strategies for Health Housing,” Change Lab Solutions, 2015, <http://www.changelabsolutions.org/news/using-code-enforcement-tool-public-health>.
14. As defined by the American Assembly and its partners, “Legacy cities are older, industrial urban areas that have experienced significant population and job loss, resulting in high residential vacancy and diminished service capacity and resources. Despite very real challenges, each city also has real assets—from strong cultural fabric and anchor institutions to abundant historic architecture and available land—that support their

ongoing initiatives to strengthen their communities. Legacy cities are mostly concentrated in the Midwest and Northeast, with the majority in the states of Ohio, Michigan, New York and Pennsylvania.” See <http://americanassembly.org/projects/legacy-cities-partnership>.

15. Cassie Owens, “A 341-Page Blight-Fighting Plan Requires a Lot of Teamwork,” *Next City*, June 5, 2015, <https://nextcity.org/daily/entry/detroit-blight-task-force-models-collaboration>; see also Detroit Blight Removal Task Force 2014.
16. Anna Clark, “Flint, Michigan Has an Ambitious New Plan to Fight Blight,” *Next City*, March 16, 2015, <https://nextcity.org/daily/entry/flint-michigan-blight-plan-cost-metrics>; see also, “Blight Elimination and Neighborhood Stabilization,” City of Flint, Michigan, accessed March 21, 2017, <https://www.cityofflint.com/planning-and-development/blight-elimination-and-neighborhood-stabilization/>.
17. “Vacant and Abandoned Properties Initiative,” City of South Bend, IN, accessed August 16, 2016, <https://www.southbendin.gov/government/content/vacant-abandoned-properties-initiative>.
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19. Safeguard Properties, a mortgage preservation firm, maintains a current database of such ordinances; “Property Registration,” Safeguard Properties, accessed September 21, 2016, http://www.safeguardproperties.com/Resources/Vacant_Property_Registration.aspx.
20. “Vacant Property Strategy,” City of Philadelphia, Department of Licenses and Inspections, accessed August 9, 2016, <http://www.phila.gov/li/aboutus/Pages/VacantPropertyStrategy.aspx>.
21. “Strategic Property Code Enforcement and Its Impacts on Surrounding Markets,” The Reinvestment Fund, August 2014, accessed September 20, 2016, <https://www.reinvestment.com/research-publications/strategic-property-code-enforcement-and-its-impacts-on-surrounding-markets/>.
22. “Vacants to Value,” City of Baltimore, MD, and Baltimore Housing, accessed September 21, 2016, <http://www.vacantstovalue.org/>.
23. “Smart decline planning” offers legacy cities a divergent framework that responds to their socioeconomic dynamics. In contrast, smart growth planning enables development in fast-growing communities. Building on the pioneering Youngstown 2020 comprehensive land use plan, smart decline’s policy goal is to develop new planning and urban design approaches that can adapt markets and the built environment to persistent abandonment. The expectation is that the city and the abandoned neighborhoods will not regain their peak population and must adjust their development footprint (Hollander and Németh 2010).
24. “Policy Brief: Detroit Blight Elimination Program Neighborhood Impact,” accessed March 21, 2017, <http://www.demolitionimpact.org/#thereport>.
25. Nicolas Esposito, “Urban Famers Look to Land Bank for Help Holding on to Property,” Hidden City Philadelphia, January 30, 2015, <http://hiddencityphila.org/2015/01/urban-farmers-look-to-land-bank-for-help-holding-on-to-property/>.
26. See “Youngstown Featured in EPA Vacant Land Studies,” Youngstown Neighborhood Development Corporation, October 15, 2015, <http://www.yndc.org/news-media/youngstown-featured-epa-vacant-land-case-studies>.
27. “Cleveland and Cuyahoga County, Ohio: A Resilient Region’s Responses to Reclaiming Vacant Properties,” 2014, Vacant Property Research Network, <http://vacantpropertyresearch.com/case-studies/>.
28. Detroit Future City (<http://dfc-lots.com/>); see also John Gallagher, “How 85,000 worms are helping vacant Detroit lots,” *Detroit Free Press*, October 4, 2015, <http://www.freep.com/story/money/business/michigan/2015/10/04/detroit-greening-worms-urban-development-revitalization-innovation/73155428/>.

29. Sadler and Pruett (2015) conducted intensive interviews with 33 community residents and reviewed reports by 54 unique neighborhood groups involved with the Genesee County Land Bank's Clean and Green maintenance program in Flint.
30. Joseph Schilling, "Lessons from Memphis's collaborative campaign against blight," *Urban Wire* (blog), Urban Institute, April 29, 2016, <http://www.urban.org/urban-wire/lessons-memphiss-collaborative-campaign-against-blight>; see also the Memphis Blight Elimination Charter's website, <http://memphisfightsblight.com/>.
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