Healthy Neighborhoods for a Healthy Detroit

Health Impact Assessment of the Strategic Framework to Regenerate Detroit

MAIN REPORT

DETROIT URC
COMMUNITY - ACADEMIC URBAN RESEARCH CENTER

D-HIA Steering Committee

Chris M. Coombe	University of Michigan School of Public Health
Margaret Dewar	University of Michigan Urban and Regional Planning Program
Barbara A. Israel	University of Michigan School of Public Health
Kurt Metzger	Data Driven Detroit, Director Emeritus
Alisha Opperman*	Eastside Community Network, LEAP (formerly Warren/Conner Development Coalition)
Angela G. Reyes	Detroit Hispanic Development Corporation
Amy J. Schulz	University of Michigan School of Public Health
Leseliey Welch*	Institute for Population Health
Chinwe Obianwu*	Institute for Population Health
Donele Wilkins	Green Door Initiative
Guy O. Williams	Detroiters Working for Environmental Justice

* Formerly affiliated with the organization listed

Technical Advisor: Ben Cave, Ben Cave Associates Ltd.

Report Authored by: Chris M. Coombe, Danielle Jacobs, Barbara A. Israel, Amy J. Schulz, and Ben Cave

Policy Specialists: Angela G. Reyes, Donele Wilkins

Project Team Technical Contributors: Danielle Jacobs, Arielle Fleisher, Nelson Saldana, Ricardo Felix de Majo, Samantha Kreklau, Megha Shah, Enesha Cobb, Chelsea Harmell, Maren Spolum, Stacey Matlen

Funding Partners: D-HIA was supported by a grant from the Health Impact Project, a collaboration of the Robert Wood Johnson Foundation and The Pew Charitable Trusts (Funder), and by a grant from the University of Michigan Center for Advancing Research and Solutions for Society (CARSS). The views expressed are those of the authors and do not necessarily reflect the views of The Pew Charitable Trusts or the Robert Wood Johnson Foundation (Funder).

Contact Details: Chris Coombe (734) 763-9236 ccoombe@umich.edu

D-HIA is a project of the Detroit Community-Academic Urban Research Center.
The full report can be found at http://www.detroiturc.org/affiliated-partners/hia-detroit.html.

2015

Contents

List of figures

List of tables

Abbreviations and acronyms

BRTF ..... Detroit Blight Removal Task Force
CBPR ..... Community-Based Participatory Research
DFC ..... Detroit Future City
D-HIA ..... Detroit Health Impact Assessment
DWP ..... Detroit Works Project
Detroit URC ..... Detroit Community-Academic Urban Research Center
HIA ..... Health Impact Assessment
HV ..... High Vacancy
MV ..... Moderate Vacancy
LV ..... Low Vacancy
SC ..... D-HIA Steering Committee
SF ..... Strategic Framework
SRA, SR ..... Strategic Renewal Approach
WHO ..... World Health Organization

Definitions

Blight: Detroit's definition of blighted and abandoned is any property characterized as open, dangerous, and vacant.

1 Executive summary

Neighborhoods are the fabric that binds our city together.
Detroit will not move forward unless we have strong neighborhoods here that are thriving.[1]

Ken Cockrel, former Mayor and Detroit City Council Member;
former Executive Director of Detroit Future City

1.1 Context

Detroit has a long, rich history of innovation, hard work, and distinctive neighborhoods. However, like many older cities, Detroit has experienced substantial loss of jobs and population, resulting in widespread vacancy and blight in historically vibrant neighborhoods. To address these challenges, the Detroit Future City (DFC) strategic framework was developed to guide land use planning for the future of Detroit. Released in January, 2013, DFC was intended as a shared vision for Detroit's future over the next 50 years, "providing a path forward to realize the aspirations of an entire city." [2]

A key strategy of DFC is to focus city systems resources—such as lighting, sewage, streets, blight removal—on stabilizing the most populated areas of the city, while phasing out city service and infrastructure renewal in the least residential populated areas. This is referred to as *Strategic Renewal*. Functioning city systems are an urgent concern for all residents, and essential to the livability of neighborhoods. Decisions about how DFC Strategic Renewal is implemented in its first five years, particularly for the 90,000 people living in the least populated areas of the city, will affect how the vision of a vibrant city for all residents is realized over the long-term.

Health impact assessment (HIA) is a systematic process to evaluate the potential effects – both beneficial and detrimental – of a proposed program, plan, or policy on the health of a population. HIA engages multiple stakeholders, and provides recommendations to manage those effects to maximize health and promote equity. [3]

Healthy Neighborhoods for a Healthy Detroit (D-HIA) is a collaborative, multidisciplinary partnership that carried out an HIA from 2012-2015 to look at how implementation of DFC Strategic Renewal of infrastructure, street lighting, and blight removal/demolition may affect residents of Detroit's most vacant neighborhoods, and to recommend ways to promote residents' health. D-HIA partners included health and human service organizations, academic researchers, and data specialists.

While the overall benefit of renewing infrastructure in low vacancy neighborhoods was evident, of particular interest to the D-HIA Steering Committee was the potential impact of the strategy on the *high vacancy* neighborhoods and the people who live there. Thus, D-HIA focused on the 90,000 people living in high vacancy neighborhoods, of whom 30% are children, 36% live alone, and 57% have a household income of less than $25,000. D-HIA looked closely at potential positive and negative impacts of DFC implementation on four key health determinants: neighborhood stability and integrity; neighborhood safety; environmental conditions; and displacement, relocation, and

[1] Lawrence 2014.
[2] Detroit Future City 2013.
[3] National Research Council (US) Committee on Health Impact Assessment 2011.

gentrification. Potential health impacts include heart disease, violence, asthma, lead poisoning, cancer, and mental health. The full report describes the objectives and methods used to carry out the HIA, key findings, and recommendations for protecting health of neighborhoods and the people who live there. It also considers lessons learned for integrating health and equity into planning for revitalizing shrinking cities.

1.2 Focus of the HIA

In 2012, D-HIA formally began carrying out a strategic health impact assessment of an overarching plan to regenerate Detroit, which evolved over several years from the Detroit Works Project (DWP) to DWP Long Range Planning to the Detroit Future City Strategic Framework (DFC) which was released in January 2013. Because DFC is not a specific plan but rather a guiding framework, the HIA of the overall DFC approach is strategic. A strategic HIA differs from a standard HIA in that it informs a broad approach or proposal rather than a specific decision. A strategic HIA helps stakeholders understand and respond to health-related questions regarding a proposal or policy, and provides a framework to guide assessments and decisions for specific projects.

This HIA examined the potential health impacts of the overarching DFC strategy to renew infrastructure and city services differently by framework zones, that is, the current vacancy conditions of neighborhoods defined as high, moderate, and low. Under Strategic Renewal, infrastructure and services in high vacancy (HV) neighborhoods would be maintained at the current level, reduced, or decommissioned over time.

The D-HIA Steering Committee also focused closely on two elements of city systems – public lighting and blight removal/demolition – that were high priority for residents and for which plans were being rapidly developed. When the DFC was released in January 2013, there was not an implementation plan, funding, or authority for those two areas. That changed during the three years in which this HIA was conducted, and the assessment was adapted accordingly. A subsequent citywide lighting plan was developed for implementation through the end of 2016, while demolition planning and implementation is ongoing. This HIA provides a snapshot of the potential impact of the proposals and plans being carried out when the report was prepared, and provides an opportunity to inform decisions about how and where the DFC is implemented, particularly in the first five years.

1.3 HIA Process and Methodology

The HIA was conducted from 2012 through 2015 by D-HIA, an affiliated partnership of the Detroit Urban Research Center. The D-HIA Steering Committee (SC), composed of ten community and academic partners and guided by an expert HIA consultant, provided in-depth direction and expert consultation (see title page for list of partners). D-HIA SC members are leaders in their fields and have been engaged in citywide and neighborhood-based planning initiatives for years. A core team of project staff carried out the literature review, collected and analyzed data, and wrote the report with guidance from SC members and other experts.

Screening and Scoping: Based on an initial literature review, D-HIA developed a conceptual framework of the health impacts of city services and infrastructure to guide the HIA. The resulting pathway diagram was refined based on an extensive literature review, and initially focused on three broad determinants of health: neighborhood stability and integrity; neighborhood safety; and

environmental conditions. The HIA further looked at the potential impacts of a fourth determinant—displacement, relocation, and gentrification—on residents who stay and those who leave.

Assessment: To understand how DFC Strategic Renewal would impact the key neighborhood determinants of health and thus the health of residents of the high vacancy zone, the project carried out the following activities as part of the Assessment phase.

- Analyzed relevant DFC elements and how and where they were being implemented.
- Created a profile of existing conditions in the HV zone and other areas of Detroit for comparison.
- Gathered information through a more in-depth literature review and consultation with a wide range of community experts.
- Analyzed on a strategic level what impacts might be expected based on the evidence available.

Monitoring and Evaluation: The HIA recommended a number of strategies to be used by existing entities (e.g., DFC, city government, the local health department, community-based organizations and planning initiatives) to monitor and evaluate the potential impacts of DFC implementation. D-HIA SC members are involved in these entities and will continue to integrate the HIA in their work.

Recommendations: Throughout the process, the D-HIA Steering Committee gathered information about strategies being explored by community initiatives in Detroit and elsewhere, as well as from the literature. Best practices in equitable development, regeneration, and demolition were evaluated to generate priority recommendations to address potential health impacts of Strategic Renewal, public lighting, and blight removal/demolition implementation.

Appendix B in the separate *Appendices* report provides a more detailed description of D-HIA process and methods, including the role of the D-HIA Steering Committee, community engagement, and how the HIA was carried out at each step of the HIA process.

1.4 Summary of Key Findings: Potential Impacts

Under DFC Strategic Renewal, infrastructure and services in the HV zone would be maintained at the current level, reduced, or decommissioned over time. This assessment was strategic and qualitative, representing D-HIA's best estimate of what impacts to expect based on the available evidence from the literature, overall characteristics of the HV zone, consultation with local experts, and the deep and long-term knowledge of Detroit among the SC members.

The HIA analyzed potential impacts of Strategic Renewal in HV areas at three levels – neighborhood, intermediate (individual, household), and health outcomes. Potential positive and negative impacts were identified. Potential impacts depend on existing conditions in a neighborhood, whether individuals remain or relocate, and whether they move to improved or worse circumstances. The following is a summary of key findings in each impact area.

1.4.1 Neighborhood Stability and Integrity Impacts

DFC Strategic Renewal will change the social fabric of Detroit's neighborhoods and the related built environment. These currently support and sustain communities to different extents in different neighborhoods, and are fundamental to the functioning of a community. Factors such as the length

of time people have lived in a neighborhood, the density and proximity of neighbors, social networks and support, social cohesion, and the collective ability to get things done – important determinants of neighborhood stability and health – will be impacted by further decline of infrastructure.

Potential adverse impacts: disruption of social ties and depletion of resources as needs increase, population declines, and neighbors relocate outside the neighborhood; increased financial stress; further loss of population. Potential health impacts include increased mortality, heart disease, and violence, and decline in mental health.

Potential beneficial impacts: mobilization of residents to improve conditions and provide mutual support; strengthened social ties, reduced isolation, and increased social cohesion due to community organization; and individuals who are detrimental to social fabric may leave the neighborhood. Potential health impacts include the same as well as improved physical and mental health, neighborhood safety.

1.4.2 Neighborhood Safety Impacts

The physical and social conditions of Detroit's neighborhoods are important for the safety of all residents. Given the current conditions in Detroit's most distressed neighborhoods, the HIA focused on the ways in which DFC Strategic Renewal will change unsafe conditions, such as vacancy, blight, and crime.

Potential adverse impacts: increased stress, fear of crime, crime, population loss; decreased social cohesion, physical activity, school attendance, and financial security. Potential health impacts include increased violence (including homicides), mortality, injuries, and heart disease, and decreased child well-being and mental health.

Potential beneficial impacts: increased social cohesion and physical activity if residents organize for self-protection.

1.4.3 Environmental Conditions Impacts

DFC Strategic Renewal will change the quality of the physical environment, such as air, water, and soil, that impact health. Basic infrastructure and environmental conditions in HV neighborhoods are now highly compromised. SR will also change environmental conditions related to the built environment that impact health, such as condition of the housing stock as it relates to environmental exposures.

Potential adverse impacts: exposure to infrastructure-related contaminants in air, soil and water, including carcinogens, lead, bacteria, and other pathogens (sewage overflows); uninhabitable housing from flooding, lack of electricity, and fires; resultant displacement, homelessness, and reduced financial resources; reduced property values. Potential health impacts include: increased risk of mortality, heart disease, asthma, injuries, mental health disorders, and cancer; adverse birth (low birthweight) and child outcomes, (such as poorer mental development, school performance).

Potential beneficial impacts: None identified (also see Demolition, 1.4.6).

1.4.4 Displacement, Relocation, and Gentrification Impacts

DFC Strategic Renewal implementation will impact three interrelated effects and processes of neighborhood change—displacement, relocation, and gentrification. Displacement and relocation

refer to the movement or removal of residents or businesses from a home or neighborhood. Gentrification is the process by which higher income households and businesses replace lower income residents and local small businesses of an area, changing the character of the neighborhood over time.

For those who relocate, the impacts on health depend on whether relocation is voluntary or involuntary, and whether individuals move to housing and neighborhood conditions that are better, worse, or the same, or become homeless.

Potential adverse impacts of displacement and relocation: loss of supportive social networks; stress and cost of relocation; increased housing and living costs; school and job impacts; increased risk for homelessness, substandard housing, and overcrowding. Potential health impacts include: increased stress, mortality, chronic disease, youth suicide, and infant mortality; poorer child and youth well-being, mental health; impacts of homelessness including exacerbation of existing poor physical and mental health conditions and increased hospitalizations. Health effects for all groups are more adverse when the relocation is forced or involuntary (e.g., foreclosure, eviction, inhabitability).

Potential impact of relocation to same or worsened circumstances: same as above or magnified.

Potential beneficial impacts of relocation to improved circumstances: expanded social ties or ties with improved resources and fewer demands; improved safety and environmental conditions; access to resources and amenities; reduced exposure to damaging physical and social environments.

Gentrification impacts on longtime residents include the adverse and beneficial impacts of displacement and relocation described above. Below are additional impacts.

Potential adverse impacts of gentrification: financial stress due to increased costs; neighborhood instability and risk of eviction and displacement; isolation, tension, and discrimination related to racial and economic differences between newcomers and longtime residents; inequitable benefits of regeneration.

Potential beneficial impacts of gentrification: improved physical and social environments, increased amenities and services, job opportunities, and greater economic and racial mix in the area as a whole.

1.4.5 Public Lighting Delayed/Limited Renewal Impacts

DFC Strategic Renewal changes to public lighting were considered in the context of the Public Lighting Authority 2014-16 public lighting plan. The following are the potential impacts of limited or delayed renewal of public lighting in HV areas, while lighting is being renewed in surrounding areas.

Potential impacts: the same impacts as those due to overall Strategic Renewal, described above. In addition, HV areas with delayed or no lighting improvements may experience crime migration from areas that are now lighted.

1.4.6 Demolition/Blight Removal Impacts

DFC Strategic Renewal changes if, where, and how demolition is used to remove blight in HV areas. SR impacts were further considered in the context of the 2014 Blight Removal Task Force Plan for demolition and blight removal. The following are the potential impacts of two types of

implementation proposed when the HIA was conducted: minimal or no demolition in HV neighborhoods, and unprotected demolition in HV areas.

Potential adverse impacts: Proposed minimal or no demolition is predicted to have the same impacts described above for the overall plan. Unprotected demolition may result in increase in asthma and possible increase in illnesses associated with other environmental contaminants (e.g., lead, asbestos), including lead poisoning and cancer.

Potential beneficial impacts: None identified for no blight removal. Benefits of demolition without protections include: reduced hazardous buildings, injuries, fear of crime, and some types of crime; increased availability of land for other uses (with potential positive and negative impacts).

Summary of Impacts

The findings of the health impact assessment are summarized in Table 1 below. Each health outcome is followed by determinants of health for that outcome; potential impacts of Strategic Renewal, public lighting, and demolition proposals; whether the effect on health is negative or positive and the extent of the impact; the likelihood of the health effect; how strong the evidence is; and particularly vulnerable groups (see Key at the bottom of the table for criteria).

Table 1: Summary of Findings: Health Impact Analysis of DFC Strategic Renewal in High Vacancy Neighborhoods

Health Outcomes	Determinants/Intermediate Impacts	DFC Proposal [4]	Health Impact[5]	Likelihood[6]	Evidence[7]	Vulnerable Groups
Mortality (various)	Crime, stress, social and physical environment exposures	1, 2, 3	▲▲	Likely	•••	Youth
Chronic diseases	Stress, air pollution, financial status Social support	1, 2, 3	▲▲	Likely	•••	
Heart disease	Stress, air pollution, lead, maternal lifetime exposures Existing social support and social networks	1, 2, 3	▲▲ =	Likely	•••	Elderly
Asthma, other Respiratory diseases	Air quality Housing condition Demolition dust fall	1, 3	= ▲	Possible	••	
Cancers (Lung, colorectal, breast, prostate)	Environmental exposures Food access	1, 3	=	Uncertain	?	
Injuries	Lighting Environmental conditions	1, 2, 3	= ▲	Possible	•	Elderly, women and girls
Mental health	Stress, crime, stability + poverty, vacancy, blight, financial insecurity, low social support	1, 2, 3	▲▲	Likely	•••	
Homelessness	Financial stress Foreclosure Fire and blight	1, 2, 3	▲	Possible	•	
Homicides	Crime, blight	1, 2, 3	▲	Likely	•••	Youth, young men of color
Youth death rate	Crime, stress, social and physical environments, employment	1, 2, 3	▲▲	Likely	•••	Young men of color
Lead poisoning	Unprotected demolition Old housing in poor condition removed	1, 3	= ▲ ▼	Likely, Uncertain	••	Children, fetus (low birthweight)
Low birth weight (infant mortality)	Stress, air pollution, lead, maternal lifetime social/economic/environmental factors, social support	1, 2, 3	▲	Possible	•••	African Americans

[4] 1 – Overall Strategic Renewal Implementation in HV Neighborhoods; 2 – Public Lighting Installation in HV zone as Last Priority; 3 – Demolition in HV zone No/Low priority, and Unprotected demolition

[5] Direction: ▲ Increase health outcome; ▼Decrease health outcome Extent of Health Impact: ▲▲▲Severe impact; ▲▲Moderate impact; ▲ Small impact; ? Uncertain; = No impact

[6] Likelihood of Impact: Likely; Possible; Unlikely; Uncertain

[7] Strength/Quality of Evidence: ••• many strong studies; •• 1-2 good studies; • no studies but generally consistent with principles of public health

1.5 Implications of the HIA Findings for Future Implementation and Decision Making to Regenerate Detroit

Basic infrastructure and city services are now highly compromised and will continue to be detrimental to health without improvements. Overall current conditions in the High Vacancy zone include deteriorated infrastructure and reduced city services that are compromising residents' physical and mental health. Rates of poor health in the HV area are the highest in the city and substantially higher than state and national rates. The proposal to maintain basic living conditions as they are is likely to have detrimental health impacts on HV residents. This may have an adverse impact on the city as a whole because of the number of people affected and the magnitude of the effects. It has adverse effects on vulnerable groups and further implications for increasing economic and racial inequities.

Existing communities have strengths and resources that buffer the impacts of challenging conditions. Resources among people living in the HV zone include long term relationships to the city and their neighborhood, social ties and networks, strong community institutions, cultural identity, and a history of activism to improve neighborhoods and resist unfairness. This may be particularly important for immigrant communities, and African Americans who experience the legacy of race-based residential segregation and other types of structural discrimination.

Individual neighborhoods within the HV zone differ substantially, indicating a need for customized strategies and resident involvement in decision-making. There is a great deal of variation among HV neighborhoods, both in regards to specific neighborhood environments and the people who live there. The application of assessment findings to the specific circumstances of different areas will maximize potential health benefits and minimize the adverse effects of the Strategic Renewal proposal. Detroit's people and communities have important information relevant to the neighborhoods they live in that is not available from other data sources. Further, Detroiters' strengths and ingenuity are essential resources to build a vibrant and distinctive future.

Current decisions on infrastructure and services and how they are implemented in the short term will impact the future trajectory of neighborhoods, and the health of all Detroit residents. Currently, there are at least three types of neighborhood change taking place in areas within the HV zone– continued disinvestment, community-based planning, and gentrification. The HIA looked at potential health impacts under each these neighborhood conditions over the first five years of Detroit Future City implementation (2013 – 2018) and the potential impacts on the trajectory of the neighborhood.

1 – Continued Vacancy and Population Loss. Some HV residential areas that have experienced extreme levels of disinvestment, poor infrastructure and services, population loss, and vacancy may not currently have the conditions or resources needed to influence the future of the area. Without basic protections and increased investments, residents may be unable to relocate or may want to stay in their homes, yet have little influence over the trajectory of the neighborhood. Potential impacts include: declining property values and worsening of housing conditions for both renters and homeowners; increased stress, fear, and desire to leave the neighborhood; decreased stability and sense of community; and further disruption of social networks. Potential health impacts include detrimental effects on a range of physical and mental health conditions.

2 – Community-Based Planning and Investment. Some HV areas are engaged in community-driven planning. Evidence suggests that resident involvement in planning and redevelopment can benefit health, build community control, and move regeneration forward. Potential beneficial impacts to the community include: improvements in the social fabric such as community cohesion, pride, collective efficacy, and strengthened social networks; change in economic investment, stabilization of property values, and increased amenities; and increased community capacity, control, and equity. Potential detrimental impacts include increased commitment of time and resources, stress, and burden from residents carrying the load of planning, development, and fundraising to improve basic conditions of their city. Potential beneficial health impacts include stabilized or improved physical and mental health.

3 – Gentrification and Displacement. Some areas may be experiencing gentrification currently or in the near future. Gentrification is the influx of higher income residents and businesses into an area with consequent displacement of existing longtime residents and businesses. Displacement can be active or passive over short or longer periods of time, and is substantially influenced by development policies and practices. Potential beneficial impacts on existing residents include improved physical and social environments, increased amenities and services, and increased economic and racial mix in the area as a whole in the short term. These impacts may result in related physical and mental health improvements. Potential detrimental effects on existing residents include: financial stress from higher costs such as housing, services, and amenities; increase in evictions; displacement or relocation of local, affordable, culturally-based services and businesses; increased tension and discrimination related to differences between newcomers and longtime residents; loss of protective community cultural, ethnic, and racial identity and social fabric; increased racial and economic segregation in the long term; and inequitable distribution of the benefits of regeneration.

These three types of neighborhood change are neither mutually exclusive nor inevitable. How DFC is implemented in its first five years will determine the extent to which the inclusive long-term vision of improved quality of life in Detroit will include those who live in neighborhoods most heavily impacted by historical disinvestment and current-day challenges.

Monitoring neighborhood change and evaluating the health impacts on residents is essential to ensure that regeneration strategies are beneficial to residents of neighborhoods with high vacancy.

1.6 Recommendations for Regeneration to Promote Health and Equity

The extent to which Strategic Renewal is detrimental or beneficial to health depends on the extent to which: basic city systems conditions are restored or maintained; financial, health and social supports are put in place for remaining residents; resources are available to assist those who are displaced or who choose to relocate; the community is engaged in redevelopment planning and decision making; and policies are put in place to prevent and mitigate the effects of involuntary displacement and gentrification.

Based on findings from the HIA and best practices used elsewhere, the D-HIA Steering Committee developed the following recommendations to address the potential health impacts of the Strategic Renewal approach to regeneration. The aim of these recommendations is to inform decision-making in order to maximize the potential health benefits and minimize or mitigate the adverse health

effects of plans to address infrastructure and city systems in Detroit's highest vacancy neighborhoods, and to promote equity. (See Section 7 for a more detailed description of recommendations, including specific policies and proposals for each.)

1. Establish community-driven neighborhood planning (CDP) in decision-making by the City, by foundations, and by private investors, to ensure that high vacancy (HV) neighborhoods with strong community organizations have opportunities to retain and regenerate residential areas.

2. Ensure that all neighborhoods have basic service level of infrastructure and city systems. Define core service level for all HV neighborhoods and target services by "hot spots" or vulnerability - crime, lighting, environmental, health, demographic data, and vulnerable groups - rather than by zone or ZIP code, to reduce immediate health risks.

3. Provide targeted safety, financial, and social service interventions to support residents of HV neighborhoods that continue to experience substantial decline.

4. Ensure that current residents and businesses in or serving HV areas benefit from regeneration opportunities, to reduce economic insecurity and ensure that potential benefits and burdens of revitalization are equitably distributed.

5. Adopt, implement, monitor, and enforce "responsible demolition" standards for both public and private demolition, including HV neighborhoods where people live.

6. Ensure that temporary and future vacant land use post-demolition contributes to community health and safety.

7. Require that large scale land purchases and development proposals include plans and resources that promote healthy neighborhoods and equity for existing and future residents.

8. Establish protections that consider the value of neighborhood legacy and community identity in decisions that affect the future of communities.

9. Anticipate gentrification, prevent involuntary displacement, mitigate negative impacts and ensure benefits to existing neighborhoods from revitalization.

10. Preserve, restore, and produce affordable housing, and enact protections for both homeowners and renters.

11. Use public assets for public good, and ensure that the value of previous public investment is factored into land disposition.

12. Secure ongoing revenues to support sustainable and health promoting local ownership and development.

13. Establish regional agreements to ensure access to local area health data at no cost for assessment and monitoring purposes.

While it is imperative that the current crisis of deteriorated infrastructure, abandoned buildings and unlit streets be addressed, the approach to regeneration that concentrates investments in stable neighborhoods alone will not address the deeply rooted structural issues that have caused so much

of Detroit to become a “high vacancy zone.” With focused attention to the potential health and equity impacts of renewal strategies, decisions in the current period may help to achieve the longer-term goals of a sustainable vibrant city that benefits all residents.

2 Introduction and Background to the HIA

2.1 Components of this Report

This report is written for community members, planners, advocates, and decision makers to identify the connections between long term revitalization strategies and short term implementation decisions, the health of Detroit residents, and the longer term impacts on neighborhoods and equity. The report can also inform future city, private, and philanthropic decisions regarding other elements of DFC and future proposed projects. The HIA further presents a methodology for analyzing planning proposals with community leadership. The report is made up of the following components:

- *Background*, which details the global phenomenon of "shrinking cities," the history of Detroit as it relates to the development of the DFC, and an overview of the Strategic Framework.
- *Process and Methodology*, in which the HIA process is described, including the steps of the HIA, data used, and research methods.
- *Current Conditions,* which provides profiles of the demographic, neighborhood, and health characteristics of the framework zones.
- *Proposal Analysis of Strategic Renewal*, which describes the aspects of DFC implementation that are addressed by the HIA, and implications for long-term impacts on Detroit, particularly high vacancy areas.
- *Assessment*, in which the existing conditions and potential health impacts of infrastructure proposal on the HV neighborhoods are detailed and analyzed by the priority impact areas.
- *Priority Recommendations*, based on available evidence and identified in response to the assessment findings as highly important to protect health of HV neighborhoods and those who live there.
- *Monitoring and Evaluation Plan*, which identifies process and indicators to monitor the actual impacts on HV areas of implementing the DFC Strategic Renewal approach and lighting and demolition plans.

Additional supporting materials referenced in the main report are in the *Appendices* in a separate document.

2.2 Objectives of the HIA

Health impact assessment (HIA), as defined by the National Research Council, is:

… 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 the effects within the population. HIA provides recommendations on monitoring and managing those effects.[8]

HIA is a practical and effective means to inform a policy or project before it is enacted or implemented, and may be particularly useful for planning related to complex land use and development decisions. An important outcome of HIA is engagement of a wide range of stakeholders in the process, including decision-makers, to build ongoing, sustainable relationships across sectors and disciplines to ensure that health is considered in all policies.

[8] National Research Council (US) Committee on Health Impact Assessment 2011.

The objectives of this HIA were to assess the health impact of the DFC realignment of city services and infrastructure on people living in those areas with the highest vacancy, provide recommendations for implementation particularly during the first five years in order to maximize health benefits and minimize adverse health effects and associated costs, and enhance capacity to incorporate HIA into current and future decision making in Detroit. The main questions addressed by the HIA are:

- How would implementation of DFC city services/infrastructure realignment affect the **stability and integrity** of high vacancy neighborhoods and the health of people who live there?
- How would the proposal affect the **safety** of high vacancy neighborhoods, and the health of those who live there?
- How would the proposal affect residents' exposure to **environmental conditions** such as the quality of air, land, and water?
- What are the impacts **of displacement and relocation** on those who move out of high vacancy neighborhoods? How would the proposal contribute to **gentrification**?
- What are the effects on **vulnerable groups and health equity**?

2.3 Background, Context, and Rationale of D-HIA

Healthy Neighborhoods for a Healthy Detroit (D-HIA) is a collaborative, multidisciplinary partnership that conducted an HIA from 2012 to 2015 to inform implementation of the Detroit Future City (DFC) strategic framework that was released in 2013 (www.detroitfuturecity.org). Developed to address challenges associated with reduced population and revenues, the DFC is intended to guide both public and philanthropic decisions on economic growth, land use, neighborhoods, and city systems. The HIA focused on implementation of the City Systems element of the DFC, particularly in the first five years.

The City Systems element addresses how essential infrastructure and services related to basics such as water, waste, energy, lighting, and roads are delivered to residents throughout the city. City systems are the foundations of all neighborhoods, and are central to the health and well-being of people living in cities. An overarching strategy of the DFC is to realign/redistribute city service and infrastructure investments—such as street lighting, electricity, waste, roads, and blight reduction—toward more populated parts of the city while reducing capacity in high vacancy areas. The level and types of services (e.g., upgrade, maintain, reduce, or decommission) would depend on whether an area is targeted for growth, stabilization, or change to non-residential land use. A further aspect of city systems is a large-scale demolition and pilot deconstruction program. This broad strategy is termed *Strategic Renewal*.

The D-HIA addressed the potential health impacts of the overall DFC Strategic Renewal approach, with a closer look at public lighting and blight/demolition strategy, for the approximately 90,000 people living in high vacancy Detroit neighborhoods. The HIA focused on the plan's impact on neighborhood conditions that are key *determinants of health*: neighborhood stability and integrity; safety; environmental conditions; and displacement , relocation, and gentrification. Health impacts on both intermediate (e.g., stress, physical activity, homelessness) and end-point physical and mental health outcomes (e.g., mortality, cardiovascular disease, violence, asthma, cancer) were examined. Those groups that are particularly vulnerable to the impact of infrastructure changes include low income people, children, and the elderly, and the HIA further looked at issues of equity.

D-HIA was guided and carried out by an 11-member Steering Committee (SC), which included diverse expertise, knowledge, relationships, and leadership. Steering Committee members are described in more detail in Appendix B, and represent the following organizations:

Table 2: D-HIA Partner Organizations

Organization	Sector / Expertise
Data Driven Detroit, Director Emeritus	Data
Detroit Hispanic Development Corporation	Community-based organization
Detroiters Working for Environmental Justice	Community-based organization Environment
Eastside Community Network (formerly Warren/Conner Development Coalition)	Community-based organization Neighborhood-based land use planning
Green Door Initiative	Community-based organization Environment; job development
Institute for Population Health	Healthcare, public health
University of Michigan School of Public Health	Academic Public health
University of Michigan Urban and Regional Planning Program	Academic Urban planning
Ben Cave Associates Ltd	HIA Technical Assistance provider

A project of the Detroit Community-Academic Urban Research Center (Detroit URC www.detroiturc.org), D-HIA followed community-based participatory research (CBPR) principles to ensure meaningful participation of affected stakeholders in every phase. The D-HIA SC and Detroit URC partners have longstanding relationships with community organizations, policymakers, city and state officials, funders, and businesses, and several partners were and continue to be actively engaged in aspects of the DFC. D-HIA has been engaged with these entities throughout.

2.3.1 "Shrinking Cities" and Detroit

Over the last half-century, many urban areas in the U.S. have experienced mass relocation of jobs and population to the suburbs, and subsequent disinvestment in the core cities. As a result of decades of policies and discriminatory practices and the more recent foreclosure crisis, many cities have experienced heightened racial segregation, concentrated poverty, high rates of vacancy and blight, and displacement of longtime residents—characteristics associated with chronic stress and poor health outcomes that are disproportionally experienced by already vulnerable populations. This process been well-documented in Detroit and elsewhere,[9,10,11] both in academic literature and in news media. But although shrinking cities is a global phenomenon, until recently there have been few urban planning models to address population loss rather than growth, or strategies to address widespread vacancy with attention to those who live in the most distressed neighborhoods.[12]

[9] Wallace and Wallace 1998.
[10] Farley, Danziger, and Holzer 2000; Fullilove 2005.
[11] Fullilove 2005.
[12] Dewar and Thomas 2013.

Detroit was historically a prosperous industrial city. At its population peak of 1.8 million residents in 1950, Detroit had over a hundred distinct neighborhoods, each with a unique historic, cultural, and political identity. However, driven by postwar deindustrialization and racially discriminatory policies, many neighborhoods were eliminated or severely diminished through interstate freeways, intentional displacement and demolition of 1960's Urban Renewal, redlining, and population loss. Racial and economic segregation have been major drivers and results of this process.[13]

These trends contributed to the current demographic composition of the city, with a population now below 700,000 that is 82% African American, 7% Latino, and 11% White. Detroit has the highest child poverty rate among the 50 largest cities in the US, with 53.6% of children under age 18 living at or below the federal poverty line in 2010 (American Community Survey). (See Appendices F and G for a detailed population profile). Detroit also has a long history of community organization, political action, and proud determination to address the challenges it faces.

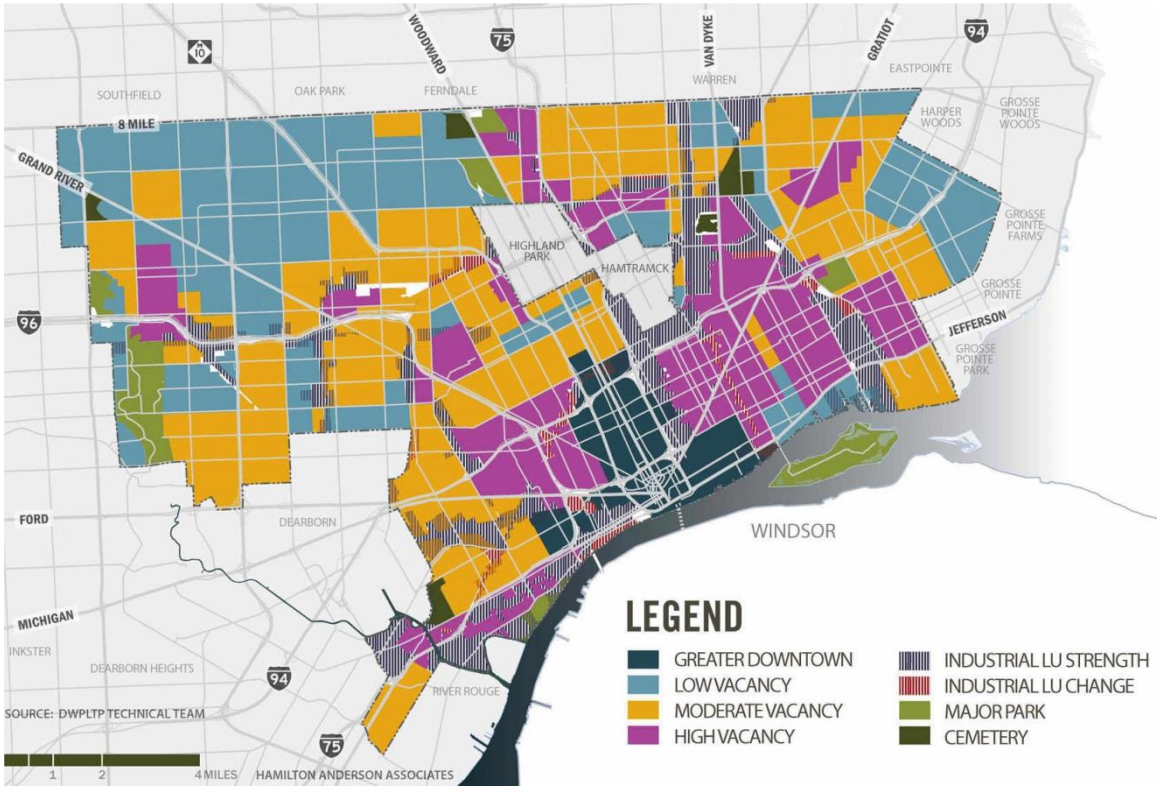
2.3.2 What is Detroit Future City?

In 2010 with Detroit on the verge of bankruptcy and many neighborhoods not being sustained by the city,[14] the Detroit Works Project (DWP) was initiated by then-mayor Dave Bing with the purpose to "rightsize" Detroit, and to "create a shared, achievable vision for Detroit's future to guide improving the economic, social, and environmental landscape of the city." DWP evolved with major investment by philanthropists into a planning process that resulted in *Detroit Future City (DFC) Strategic Framework*, released in January, 2013.[15] The DFC Strategic Framework is a 347 page land use planning document to guide the long term redevelopment of Detroit. It outlines detailed recommendations for transforming Detroit's land use policies and codes over the next fifty years.[16]

The overarching strategy of the DFC is to align decision-making with current conditions (i.e., population density, vacancy, and market conditions) and projected future uses as proposed in the report. To this end, the city was mapped into three Framework Zones that classify residential neighborhoods (defined by census block) as high, moderate or low vacancy, primarily based on current levels of land and building vacancy (see Figure 1). A fourth zone that also includes residential areas, *Greater Downtown*, was created based on its role as a commercial core and was not classified by vacancy. These Framework Zones are intended to guide public, private, and philanthropic investment and development decisions. A central premise of the Strategic Framework is that resources should be prioritized toward stabilizing those residential areas with the lowest vacancy. D-HIA focuses on the future of Detroit residential neighborhoods, particularly those designated as high vacancy (HV).

[13] Sugrue 1996.
[14] Detroit Blight Removal Task Force 2014.
[15] Detroit Future City 2013.
[16] Detroit Future City 2012.

Figure 1: DFC Framework Zones



SOURCE: DWPLTP Technical Team. Detroit Future City, p. 22.

Although Detroit had almost a third fewer inhabitants in 2013 than in 1950, Detroit's current population density of 4,955 people per square mile is still greater than many major U.S. cities.[17] Detroit ranks 69th in density among nearly 300 US cities with more than 100,000 people, with a population density greater than that of Las Vegas, Denver, Phoenix, and Portland, Oregon.[18] Thus many Detroiters questioned whether there is a need to "rightsize" Detroit, which is reminiscent of large-scale clearance of land and displacement of African American and ethnic communities to build freeways in the 1950s and during urban renewal in the 1960s. Consideration of where investments are made across the city will determine the extent to which regeneration benefits all residents and neighborhoods, as called for in DFC's vision.

A number of community initiatives have been at the forefront of rethinking and rebuilding Detroit neighborhoods based on community driven planning. On the other hand, many residents are concerned that as in the past, some neighborhoods will be eliminated without adequate consideration of the social and historical importance of these neighborhoods, whether by urban-renewal-type demolition and razing, or by continued benign neglect. Still others worry that increased desirability from investment and improvements in some areas will increase costs so that current residents will be priced out of their homes and small businesses through a process of gentrification.

[17] Nowakowski 2015.
[18] National Geographic 2015.

2.3.3 Rationale for the HIA

The implementation phase of DFC began in 2014. The framework includes policy recommendations, pilot projects, and strategies for government, non-profit, and private sectors. Aims are specified at 5, 10, 20, and 50 year time points. A central concern of D-HIA is that decisions about how and where DFC is implemented in the first five years will have a lasting impact on the city. Without adequately addressing the potential impacts on residents of all neighborhoods, including those considered high vacancy, the longer-term goal that all people currently living in Detroit are able to continue living there and thrive, may be in jeopardy. How DFC is implemented in the short term has the potential to reduce or to increase inequity, improve or impair health of Detroit residents, especially in neighborhoods that are the most historically disinvested. The HIA provides an opportunity to inform these short term decisions in order to maximize health benefits and equity.

Since DFC's release in 2013, there have been substantial changes in Detroit – changes in governance (emergency financial manager, new mayor, district elections), economic conditions (bankruptcy and its resolution), and intervening actions and investments by philanthropy, the state, and federal governments (e.g., demolition funding). However, the central issue of the HIA remains crucial. Essential efforts to stabilize and maintain moderate and low vacancy neighborhoods must be accomplished while simultaneously addressing impacts on the high vacancy neighborhoods and the approximately 90,000 people who live there (Table 3). The HIA examines the potential health impacts of ongoing disinvestment in high vacancy neighborhoods for their residents.

2.4 HIA Values and Steps

HIA is based on four values that link the HIA to its policy environment and that are consistent with the guiding principles of the Detroit URC and the partners involved with conducting this HIA[19,20,21]:

- **Democracy –** allowing people to participate in the development and implementation of policies, programs or projects that may impact on their lives.
- **Equity –** HIA assesses the distribution of impacts from a proposal on the whole population, with a particular reference to how the proposal will affect vulnerable people (in terms of age, gender, ethnic background and socio-economic status).
- **Sustainable development –** that both short and long term impacts are considered, along with obvious and less obvious impacts.
- **Ethical use of evidence –** the best available quantitative and qualitative evidence must be identified and used in the assessment. A wide variety of evidence should be collected using the best possible methods.

An HIA contains six important steps:[22]

1. Screening- determine whether an HIA is needed and likely to be useful;
2. Scoping- in consultation with stakeholders, develop a plan for the HIA, including the identification of potential health risks and benefits;

[19] World Impact Assessment (HIA) 2014.
[20] Quigley et al. 2006.
[21] World Health Organization 1999.
[22] National Research Council (US) Committee on Health Impact Assessment 2011.

3. Assessment- describe the baseline health of affected communities and assess the potential impacts of the decision;
4. Recommendations- develop practical solutions that can be implemented within the political, economic or technical limitations of the project or policy being assessed;
5. Reporting- disseminate the findings to decision makers, affected communities and other stakeholders; and
6. Monitoring and Evaluation- monitor the changes in health or health risk factors and evaluate the efficacy of the measures that are implemented and the HIA process as a whole.[23]

The methods D-HIA used for each of these steps are described in detail in Appendix B.

2.5 Social determinants of health

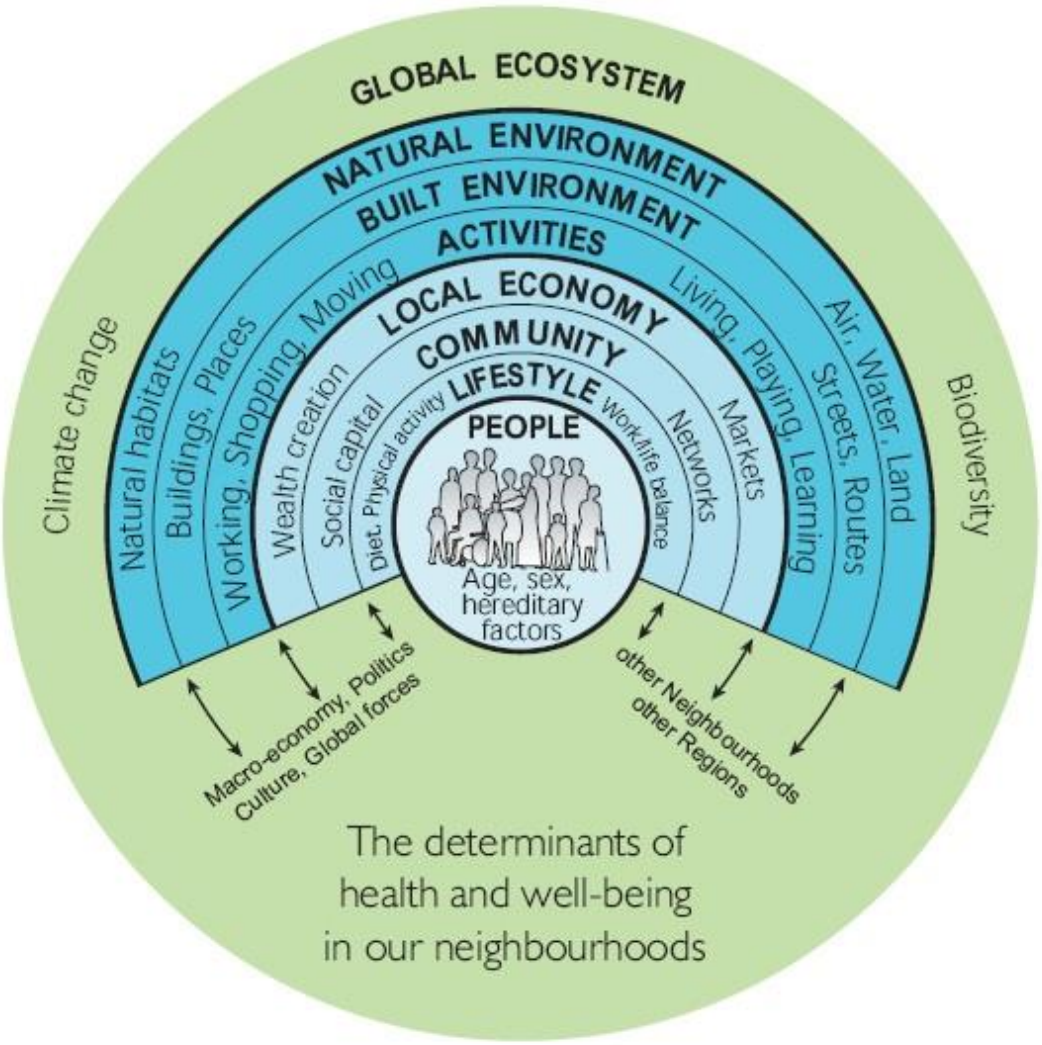
Factors that have an important influence on the health of a population are called determinants of health. Figure 2 sets out in bold the main determinants of health (global ecosystems; natural environment; built environment; activities; local economy; community; lifestyle; and people). Each area is composed of a number of component determinants of health. It is the combination and interaction between these factors that contribute to the health of a population.

D-HIA used such a social determinants of health (SDOH) approach to develop a conceptual model of pathways through which city services and infrastructure impact determinants of health at different levels. The relative importance of, and interrelationships between, the different determinants in the context of the DFC were considered during the HIA screening. These considerations were used to guide a more in-depth literature review, and during scoping, to further focus the research questions to assess health impacts. The scoping stage looked at different elements of DFC proposals (e.g., framework zones, Strategic Renewal, demolition strategy) to identify where they may influence the determinants of health and thus give rise to potentially significant health effects. The resulting conceptual model is presented in Figure 2.

Many factors combine together to affect the health of individuals and communities. Whether people are healthy or not, is determined by their circumstances and environment. To a large extent, factors such as where we live, the state of our environment, genetics, our income and education level, and our relationships with friends and family all have considerable impacts on health, whereas the more commonly considered factors such as access and use of health care services often have less of an impact. (World Health Organization (WHO) website).

[23] The Pew Charitable Trusts 2014.

Figure 2: The Main Determinants of Health



[24]

[24] Barton and Grant 2006.

3 Process and Methodology

The HIA was conducted from 2012 through 2015 by D-HIA, an affiliated partnership of the Detroit Urban Research Center. D-HIA used a systematic, evidence-based method for considering health in the DFC, while strengthening cross-sector relationships and capacity for including health in future decision-making for Detroit. D-HIA followed international methods and standards of HIA, described in sections 2.2 and 2.4. See Appendix B for a more detailed description of the D-HIA Steering Committee and how the HIA was carried out at each of the six steps of the HIA process described briefly here.

3.1 D-HIA Steering Committee and Community Consultation

Healthy Neighborhoods for a Healthy Detroit, D-HIA began in 2011 when a small group of community leaders and academic partners of the Detroit URC and an international HIA expert met to explore how HIA could inform the massive decisions facing Detroit. A broader 11-member D-HIA Steering Committee (SC) was subsequently formed to lead the project, providing in-depth direction and expert consultation across multiple disciplines, communities, and sectors. A core team of project staff carried out the literature review, collected and analyzed data, and wrote the report with guidance from SC members and other experts.

The D-HIA Steering Committee provided multidirectional links between the DFC, neighborhoods, policymakers, and other key stakeholders, and was a significant source of data for the HIA. Informal consultation with stakeholders provided information at all stages of the HIA. D-HIA held a two-day capacity-building/planning workshop in May of 2013 at which city officials, planners, data experts, DFC staff, academics, and representatives of the health department and community-based organizations discussed and provided input on the HIA. SC members met with a number of individuals and organizations to gather input and get feedback on findings and recommendations as they developed (see Appendix C, Stakeholder Engagement List).

Two SC members were Process Leaders for DFC and subsequently appointed to the DFC Implementation Steering Committee. In that capacity, they communicated about the HIA in multiple venues over the term of the project and continue to do so to disseminate the HIA and advance the recommendations. In addition, D-HIA SC members attended many citywide and local Community Forums and meetings both of DWP/DFC and other community initiatives and organizations relevant to the HIA. These included events by Lower Eastside Action Plan (LEAP), Community Development Advocates of Detroit (CDAD), Michigan Community Resources, and The Skillman Foundation. See Appendix B for a detailed description of the Steering Committee and community consultation.

3.2 Screening and Scoping

Steering Committee members researched a number of proposals being considered, met with city and community leaders, and used a screening tool to determine the need for and value of conducting an HIA. In early 2012, the group decided to conduct a strategic HIA of the overarching Detroit Works Project proposal to shrink or “rightsize” Detroit, as this overarching framework would impact all future decision-making regarding land use in Detroit. Based on an initial literature review, the group developed a conceptual pathway model delineating potential health impacts of reducing or eliminating city services and infrastructure in areas with higher vacancy. The pathway diagram guided discussions that helped the SC to further narrow and refine the focus of the HIA on a subset

of pathways to address. A more extensive literature review was conducted specifically on public lighting and blight removal/demolition because those issues were identified by residents as priority issues related to safety. The SC further focused the scope of the HIA on three broad neighborhood level determinants of health and key components within them: neighborhood stability and integrity; neighborhood safety; and environmental conditions. The HIA further looked at the potential impacts of displacement, relocation, and gentrification, and developed scenarios based on whether residents stay or leave. The final pathway model is presented in Figure 9 in the section 6 Assessment.

Guided by the pathway model, a list of specific sub-questions in each of the above domains (Appendix D) were developed and used to create a draft scoping matrix of health impacts at neighborhood and individual levels, indicators, and sources of data. The Steering Committee discussed these questions to further narrow the scope of the assessment. Due to the complex and changing environment of Detroit and the structure of DFC, scoping was an iterative process that continued during assessment. The scope additionally focused on the implications of DFC on public lighting and blight removal/demolition, which were further specified after DFC was released. DFC implementation plans continued to evolve throughout the 3 years during which the HIA was conducted.

The scoping phase included analysis of the proposed areas and populations impacted, potential health impacts, research questions, potential data sources and analytic methods, and plans for community engagement, communications, and monitoring. Because the initial DWP proposal was not clearly defined, the scoping and assessment steps overlapped as DWP evolved into the Detroit Works Project Long Range Planning, and finally in the DFC strategic framework plan released in January of 2013.

3.3 Assessment

To understand how the DFC Strategic Renewal approach would impact the key neighborhood determinants identified in the scoping process of the HIA and thus the health of residents of the high vacancy zone, the project carried out the following activities as part of the Assessment phase. The D-HIA team analyzed the relevant DFC elements and how and where implementation was proposed or being carried out. We conducted an extensive literature review to identify and prioritize health effects to be assessed. This literature review also served to further specify the pathway model for the overarching strategy as well as the pathways linking lighting and demolition to health. DFC provided spatial boundary data of DFC framework zones to D-HIA in early 2013 so we could develop a profile of existing neighborhood conditions and health status of the population and particular groups by framework zone (see Appendix E for sources of data). Because most health data is not available at the level needed for analysis by zone (census block groups), the team relied heavily on the best available evidence and findings in the literature to assess potential health impacts. The Steering Committee also considered evidence from a range of sources, including consultation with decision makers, community surveys and forums, and their own extensive knowledge, experience, and research. Potential health impacts were characterized according to their importance (direction and extent), likelihood, and strength of evidence. Findings from the assessment are summarized in Table 10,

Table 11, Table 12, and Table 13.

3.4 Recommendations

Throughout the process, policies and practices related to the focus of the HIA and the changes taking place in Detroit were identified. The SC gathered information about strategies being explored by community initiatives in Detroit and elsewhere, as well as from the literature. Best practices in, for example, equitable development, regeneration, and demolition, were evaluated to come up with priority recommendations to address potential health impacts of the overall Strategic Renewal approach, as well as for the specific public lighting and blight removal/demolition implementation that began during the HIA process. An evidence-based inventory was compiled, and the Steering Committee prioritized a set of recommendations for mitigating the negative impacts and maximizing potential health benefits for Detroit residents and neighborhoods, particularly those in HV areas. These initial recommendations were discussed and revised at subsequent meetings until there was consensus among the SC regarding them, and members of the team were convinced that there was adequate empirical data to support each. The final recommendations are at the end of the report in section 7.

A detailed description of HIA Methods and Data can be found in Appendices B and E.

3.5 Monitoring and Evaluation

The HIA recommendations included a number of strategies to be used by existing entities (e.g., DFC, City government, the local health department, community-based organizations and planning initiatives such as LEAP) to monitor and evaluate the potential impacts of DFC implementation and the extent to which the HIA recommendations are adopted. D-HIA SC and Detroit URC Board members are involved in these entities and will continue to integrate the HIA in their work. Further, D-HIA will identify organizations and initiatives with the means and/or responsibility to monitor recommendations and longer-term health and equity outcomes moving forward.

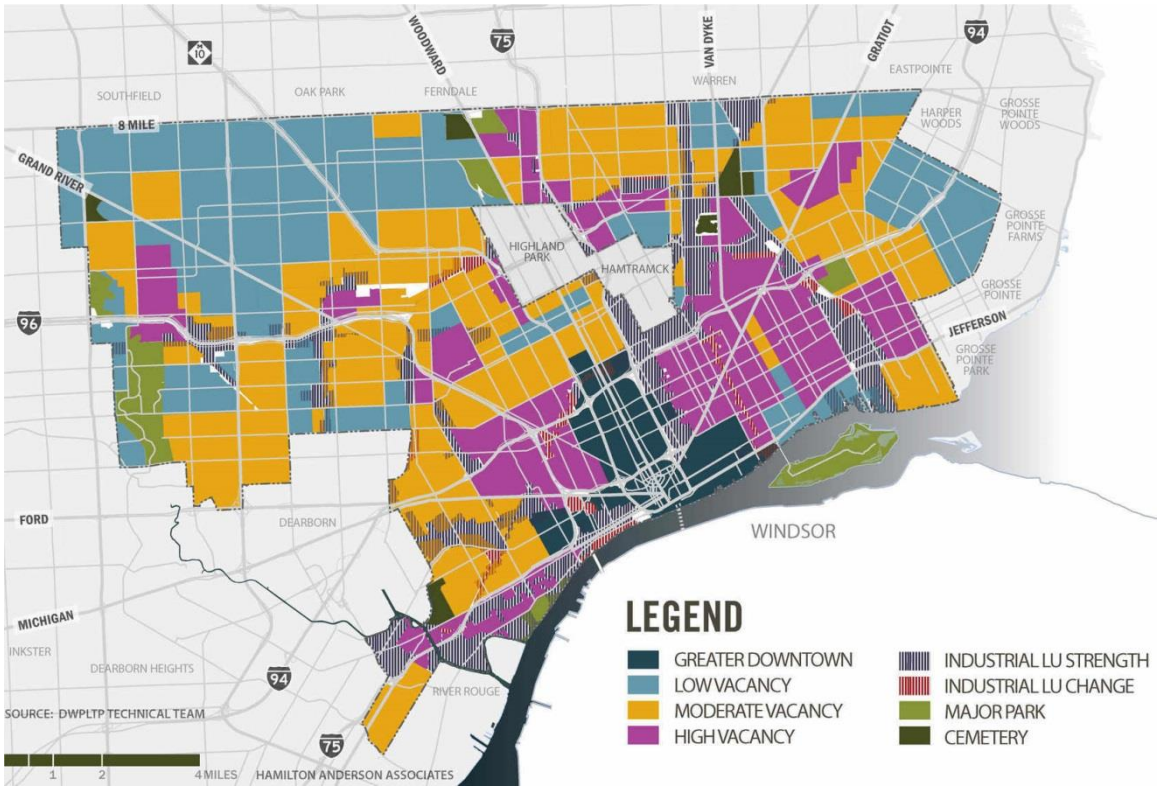
4 Current Conditions: Geographic, Sociodemographic, and Health Characteristics of the DFC High Vacancy Zone

This section provides a geographic description as well as summary profiles of baseline conditions in the neighborhoods included in the High Vacancy Zone along three dimensions: neighborhood residential structure, sociodemographic characteristics, and health status. Because DFC is a citywide framework, we provide data on all three zones and citywide for comparison. See Appendices F and G for more detailed data.

4.1 Geographic Area and Residential Character

The focus area of the HIA is the DFC High Vacancy Zone, shown on the DFC map below in purple (Figure 3: DFC Framework Zones). The three zones – high vacancy, moderate vacancy, and low vacancy – roughly correspond to historic "residential security" areas initially created in 1939 to guide lending and investment practices and policies. This practice, now known as "redlining," reinforced race-based residential segregation by designating areas in which banks would deny loans. This suggests that the current conditions in the DFC framework zones were patterned over 70 years ago. This issue is described and analyzed in more detail in Section 6 Assessment below.

Figure 3: DFC Framework Zones



SOURCE: DWPLTP Technical Team. Detroit Future City, p. 22.

Zones were created as a composite of census blocks classified according to several indicators of current and anticipated vacancy. As Figure 3 illustrates, each zone is not a contiguous area within the

city. Rather, a community-defined "neighborhood" may contain areas classified in more than one vacancy zone. Further, within each zone, neighborhoods can vary substantially. For example, one HV block may have no houses while the neighboring block may have occupied homes on half the parcels (see the photo in Figure 4). Thus the "current conditions" profiles presented here are an average within the entire zone and provide a snapshot in time within a rapidly changing environment. See Appendices B and E for more detailed description of data and methods.

Figure 4: Aerial Photo of Wide Variation in Vacancy by Block, Eastside Detroit

Source: Wayne State University CURES presentation, NIEHS COEC meeting, September 16, 2014.

The HV zone is defined as a composite of those residential neighborhoods in Detroit with high rates of vacant land and unoccupied housing.[25] HV neighborhoods make up 17% of the city's total land area, and, when the framework zones were established, had on average 30% housing vacancy and 58% parcel vacancy. 39% of all lots were vacant and publicly owned, primarily due to foreclosures and tax reversion.

Overall in the HV zone 70% of the homes are occupied, and of those, 44% are owner occupied. The median home value is $48,800 compared to $80,700 in the low vacancy zone and $66,150 citywide.

HV neighborhoods are home to over 90,000 residents, comprising 13% of Detroit's population. Although many blocks included in the HV zone are now uninhabited, others still retain their residential character. The HV population density is 3,621 people per square mile, which is comparable to the density of many cities of similar size and population, including Atlanta and

[25] Detroit Future City 2013.

Houston. A distinguishing characteristic, however, is that Detroit neighborhoods now classified as high vacancy were once densely populated with small homes, many of which are now gone. The resulting patchwork of residential structures varies by block, with sturdy homes interspersed with vacant houses and lots. In addition, many neighborhoods in which people are living have experienced decades of structural neglect, including deteriorated city services/infrastructure such as lighting, sewers, and streets, illegal dumping, and arson. The previous photo that was taken on the eastside illustrates the wide variation of housing character among HV blocks (Figure 4).

The HV zone contains two large, relatively contiguous areas with distinct history, identity, and demographic and environmental contexts – on the southwest and east sides – as well as several smaller distinct communities. Strong, vibrant community organizations have been actively engaged in planning and revitalizing within these communities.

Table 3 compares the area and housing characteristics of the three residential zones and citywide.

Table 3: Neighborhood Characteristics

Neighborhood Characteristics				
	High Vacancy	**Moderate Vacancy**	**Low Vacancy**	**Detroit**
% of city's total land area	17%	33%	26%	*
Population density/ residents per sq. mi.	3621	6777	6822	5321
Vacant housing units %	30%	26%	17%	23%
#	14,695	41,631	20,020	83,577
% vacant lots	58%	22%	7%	36%
% lots that are vacant and publicly owned	39%	15%	3%	
Owner-occupied housing	44%	51%	63%	51%
Renter-occupied housing	56%	49%	37%	49%
Median housing value (2010)	$48,800	$63,650	$80,700	$66,150

Source: Detroit Future City, December 2012. Detroit Strategic Framework Plan, pp. 108-9. Census 2010 and American Community Survey 2007-2011 (Compiled by Data Driven Detroit, Kurt Metzger).

*The remaining 24% is composed of non-residential uses, such as industrial, parks, cemeteries.

4.2 Demographic and Socioeconomic Profile

The demographic characteristics of residents of the HV zone are similar to those of Detroit as a whole. However, there are notable differences between the three zones in race, ethnicity, and age composition (see Table 4). The HV zone is 87% AA compared to 79% in the MV and 90% in the LV

zone. HV neighborhoods are comprised of just 7% Latinos, compared to 11% of MV and just 1% of LV neighborhoods. The moderate vacancy zone is the most racially and ethnically diverse, has a somewhat younger population, and is home to the largest Latino population among the framework zones (11%). The vast majority of Latinos, 88%, live in the MV and HV zones combined (see Appendix G for additional data not displayed here).

Table 4: Demographics

Demographics				
	High Vacancy	**Moderate Vacancy**	**Low Vacancy**	**Detroit**
Total Population	94,696	333,269	265,587	742,558
% Detroit Population	13%	45%	36%	__
Black/African American (non-Hispanic)	87%	79%	90%	83%
White (non-Hispanic)	8%	13%	6%	10%
Hispanic/Latino	7%	11%	1%	6%
Under 5 years	7%	8%	6%	7%
Under 19 years	30%	33%	29%	30%
65 years and older	12%	10%	13%	11%
Householders living alone	36%	30%	31%	34%

Source: Census 2010 and American Community Survey 2007-2011. Compiled by Data Driven Detroit, Kurt Metzger.

To ensure that different types of data (e.g., health, demographic) are temporally congruent for calculating rates and statistics, the HIA used population data from both the American Community Survey (2007-2011) and 2010 Census. Hence the total population numbers here are greater than those from the 2010 Census alone.

Children and elderly may be particularly vulnerable to conditions of vacancy and infrastructure. While the percentages of children and elderly are similar across zones, the number of children and elderly people impacted by conditions in the HV zone is substantial. High vacancy neighborhoods are home to 6,740 children under 5 years of age and 11,501 people age 65 and older. The MV zone has the highest percentage of young children and youth under 19. In addition, there are 12,603 householders in the HV who live alone, and thus may be more vulnerable to impacts of declining infrastructure due to isolation. People living alone make up 36% of households in HV zones, which is substantially higher than the national average of 27%.

Socioeconomic status is one of the most powerful predictors of health, determining access to resources and opportunities as well as exposure to risks. The HV zone has the highest levels of

poverty and economic disadvantage. The median household income in 2010 was $20,514, which is less than half that of Michigan ($46,692) and only 40% of the US median income of $49,445. A majority of HV households have extremely low incomes and are near or below the poverty line. Nearly 20,000 households had incomes under $25,000. Educational attainment level in the HV zone is below that of Detroit and the US, with 31% of HV residents having less than a high school diploma compared to 14% nationwide and 23% in the city, putting residents at substantial risk of low income and poorer health.

Table 5: Socioeconomic Status by Framework Zone

Socioeconomic Status by Framework Zone				
	High Vacancy	**Moderate Vacancy**	**Low Vacancy**	**Detroit**
Median household income	$20,514	$26,181	$36,338	$28,173
% Households with income less than $25,000	57%	48%	36%	45%
% below poverty level	47%	39%	27%	36%
% adults with less than high school diploma	31%	27%	16%	23%

Source: Census 2010 and American Community Survey 2007-2011. Compiled by Data Driven Detroit, Kurt Metzger.

A more detailed table of population statistics that also includes the Greater Downtown zone can be found in Appendix G.

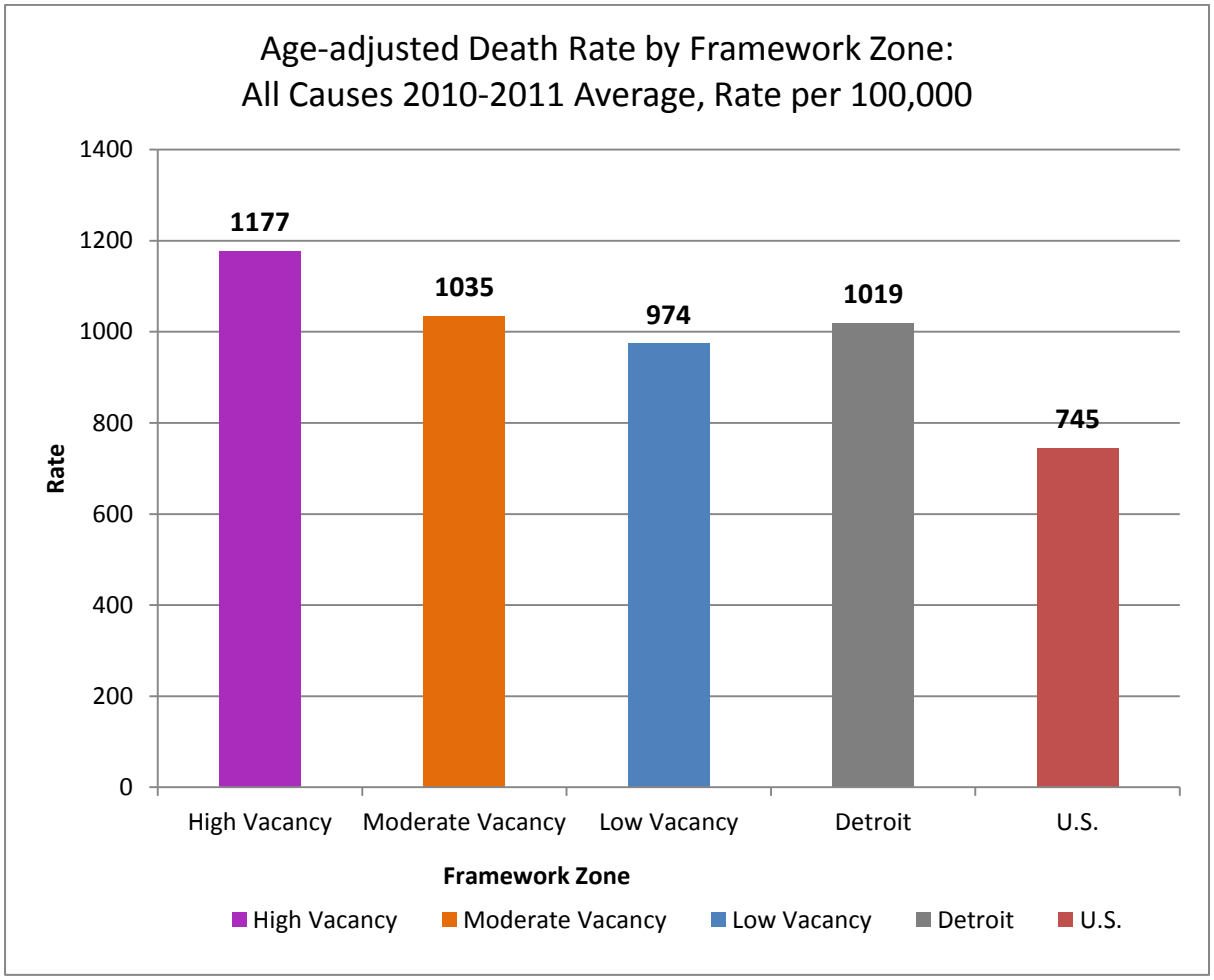
4.3 Health Profile

Neighborhoods in the HV zone experience poorer health status overall compared to other zones, Detroit as a whole, and nationwide. However, most data on health status (morbidity) are available only at the zip code level, which does not correspond to framework zones (Appendix B, Figure 1). Thus, this profile of current health conditions for the HV zones contains primarily health outcomes for which the project was able to access census block group level data for all of Detroit: mortality, childhood lead poisoning, and cancer incidence. Rates of asthma and mental health hospitalizations, which are particularly relevant to the HIA, are provided by zip code only in Appendix F Tables 11 and 13 to provide an indication of health across larger areas of Detroit. When comparing health status to state and national levels, it is important to consider the racial and economic composition of the areas compared to Detroit. Substantial health inequities exist for most indicators of health based on race and income.

Mortality

The HV zone has the highest all-cause mortality rate among the three zones, with 1177 deaths per 100,000 compared to 974 in the low vacancy zone. The HV mortality rate is *more than one and a half times the national rate* of 745 deaths per 100,000, as shown in Figure 5.

Figure 5: Age-Adjusted Death Rate by Framework Zone: All Causes



Source: Michigan Department of Community Health, Division for Vital Records and Health Statistics; CDC National Center for Health Statistics, National Vital Statistics System (2011).[26] Age-adjusted rates are calculated using the direct method of standardization with the U.S. 2000 standard population.

Further, the mortality rate is higher in the HV zone compared to citywide for all five leading causes of death (Table 5), and substantially higher than national rates except for chronic lower respiratory disease (CLRD), which is the same. Individual causes of death are further described below. See Appendix E for bar graphs that compare rates by zone for each cause of death.

[26] Hovert and Xu 2012.

Table 6: Death Rates per 100,000 by Vacancy Zone (2010-2011 average, age-adjusted)

Cause of Death	High Vacancy	Moderate Vacancy	Low Vacancy	National
All Causes	1177	1035	974	745
Heart disease	376	281	318	176
Cancer	226	215	218	171
Stroke	66	52	48	38
Accidents/unintentional injury	55	35	42	38
Chronic lower respiratory	42	35	37	42
Youth 10-24 years old (homicide, suicide, accidents combined)	23	16	17	
Youth 15-24 years old (homicide, suicide, accidents combined)	19	15	16	

Source: Michigan Department of Community Health, Division for Vital Records and Health Statistics; CDC National Center for Health Statistics, National Vital Statistics System (2011).[27]

Heart Disease Mortality

Heart disease and the factors that contribute to it vary substantially across geographic areas of Detroit as well as by zone. The HV zone had an age-adjusted heart disease death rate of 376 deaths per 100,000 people, which is substantially higher than other zones and over twice the national rate of 176 deaths per 100,000.

Chronic Lower Respiratory Disease, including Asthma

Chronic lower respiratory disease (CLRD) includes asthma, bronchitis, and chronic obstructive pulmonary disease (COPD). It is the only leading cause of death for which rates among Whites exceeds that of African Americans, due in part to higher rates of smoking-related COPD. CLRD is the fifth leading cause of death in Detroit and the fourth leading cause of death nationally. The HV zone has the highest CLRD death rate compared to the other framework zones, with 42 deaths per 100,000 people, which is the same as national death rate but higher than the national death rate for African Americans.

Asthma is a chronic inflammatory disorder of the airways that accounts for a quarter of all emergency room visits in the US each year and is the most common chronic condition among children. Asthma is known to be associated with air pollutants.[28] Between 2008 – 2010, Detroit's asthma hospitalization rate was more than triple the national rate. The asthma hospitalization rate for Detroit in 2012 was 43.9 per 10,000[29] – over three times the statewide rate of 13.7 per 10,000. Because asthma morbidity data are only publicly available by ZIP code, we are unable to present or

[27] Ibid.
[28] Li et al. 2011.
[29] Division for Vital Records and Health Statistics n.d.

estimate by vacancy zones, which are determined by census block groups. Table 9 in Appendix E shows the asthma hospitalization rate among the total population (per 10,000) by Detroit ZIP codes.

Cancer

The cancer death rate of 226 per 100,000 in HV areas is comparable to that in other zones, and is nearly a third higher than the national rate of 175. The overall incidence of cancers is lowest in the HV zone; however, the incidence by zone varies substantially by site of cancer. The high vacancy zone has the highest rate of lung and bronchus cancer and the lowest rate of other cancers compared to the other framework zones. Table 7 shows the numbers of invasive cancer cases and incidence rates for the leading causes of cancer between 2006 and 2009 by framework zone.

Table 7: Cancer Incidence: Number and Rate of Invasive Cancers by Framework Zone

Numbers of Invasive Cancer Cases and Age-Adjusted Incidence Rates for Leading Causes of Cancer by Zone Detroit Area Residents, 2006-2009

	High Vacancy		Moderate Vacancy		Low Vacancy		Combined 3 Zones	
Primary Site	Number	Rate	Number	Rate	Number	Rate	Number	Rate
Lung & Bronchus	333	86.7	888	74.2	711	63.0	1932	71.4
Prostate Gland	262	66.9	852	71.0	1003	82.2	2117	75.3
Breast	170	43.4	657	54.4	666	57.4	1493	53.6
Colorectal	174	44.7	614	52.1	526	45.4	1314	48.2
All Sites	1612	413	5313	440	4887	423	11812	428

Date : November 14, 2014

Age-adjusted rates are computed by the direct method, and are age-adjusted to the 2000 U.S. standard population. Rates are per 100,000 population in the specified group.

Source : Michigan Resident Cancer Incidence File. Includes cases diagnosed in 2006 - 2009 and processed by the Michigan Department of Community Health, Division for Vital Records and Health Statistics by November 20, 2013.

Stroke Mortality

The high vacancy zone has the highest rate of stoke death compared to the other framework zones, with 66 deaths per 100,000 people for years 2010-2011. All 3 zones exceed the national stroke death rate of 38.5 for those years.

Homicide Mortality

The homicide death rate is the proportion of the population for whom the cause of death is homicide. People living in HV zones die from homicide at staggering rates. At 60 per 100,000 population, the homicide death rate for HV residents is more than ten times the national rate of 5 and 60% higher than the citywide rate of 45 per 100,000 population. This differs from the homicide

crime rate, which refers to location in which homicides occur. These two measures of homicide are described in more detail in Assessment of Neighborhood Safety, section 6.5.1.

Childhood Lead Poisoning

Detroit had more than half of the state's total share of childhood lead poisoning cases in 2012[30]. Although the percent of Detroit's children with lead poisoning is declining, so is the percentage of young children being tested, with fewer than half of children tested each year (see Table 10 in Appendix E for numbers of children tested by zone). The highest rates of lead poisoning are found among children living in the high vacancy areas. Between 2010 - 2013 an average of 28.5% of children under age 6 living in HV areas who were tested had lead poisoning (BLL>5 µg/dL). This is over three times the rate of those in the Low vacancy zone, and *nearly ten times the national rate*.

Table 8: Childhood Lead Poisoning by Framework Zone (2010-2013)

Lead Poisoning					
	High Vacancy	**Moderate Vacancy**	**Low Vacancy**	**Detroit**	**National**
Lead poisoning under age 6 (BLL>5) *% of those tested*	28.5%	17.7%	9.7%	16%	3%

Source: MDCH Data Warehouse, Lead Specimen table 4 year running average.

[30] Michigan Department of Health & Human Services 2013.

5 Proposal Analysis: DFC Strategic Renewal of City Systems by Framework Zones

5.1 Overall Focus of the HIA

Two interrelated elements within the Detroit Future City 2012 Strategic Framework Plan form the overall focus of the strategic HIA:

- the *Framework Zones*, which indicate where to prioritize resources in the city (Figure 1[31]); and
- the *Strategic Renewal Approach to City Systems* element of DFC, which addresses where and how services are delivered throughout the city, and how the infrastructure networks that carry the city's water, waste, energy, and transportation will be managed and reformed/resized.

The implementation and consequent impact of the proposed Strategic Renewal Approach to City Systems on different geographic areas of Detroit by framework zones – high, moderate, and low vacancy – is projected for five, ten, and twenty year periods. D-HIA addresses the potential health impacts of implementing the Strategic Renewal approach during the first five year period, particularly for the 90,000 people living in the high vacancy framework zone.

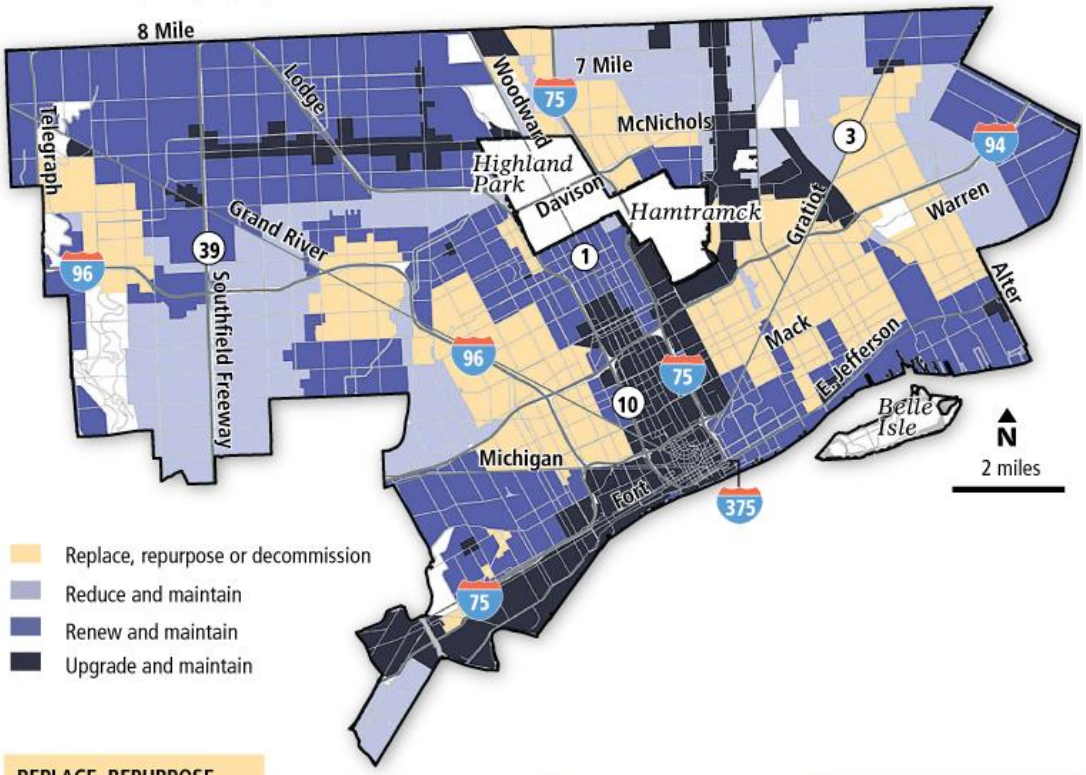
During the Scoping process, the D-HIA Steering Committee identified two specific key aspects of infrastructure and city services that are ongoing major concerns in Detroit – lack of street lights and dangerous blighted buildings. The literature review provided substantial evidence of the impacts of both lighting and blight on health through the pathways of neighborhood integrity, public safety, and environmental contamination. In addition, while the HIA was underway new initiatives were implemented to address these issues citywide – the Public Lighting Authority, substantial state and federal funding for demolition, and the Blight Task Force. Thus, in addition to the overall strategic assessment, the SC decided to carry out a more focused impact assessment on each of the two areas described in the following sections.

The DFC City Systems Element proposes to redistribute city service and infrastructure investments—such as street lighting, electricity, waste, roads, and blight reduction—to stabilize and enhance more populated parts of the city, reducing capacity in lower population areas classified as the high vacancy zone. The level and types of services (e.g., upgrade, maintain, reduce, or decommission) would depend on whether an area is targeted for growth, stabilization, or change to non-residential land use by the end of the 20-year time period, as shown in Figure 6. Thus, the DFC framework projects that most current HV neighborhoods would no longer be residential in 20 years, and proposes to carry out current city systems accordingly.

[31] Detroit Future City 2013.

Figure 6: DFC Strategic Renewal Approach to City Systems: Year 20[32]

The Detroit Future City plan contains the following map for winding down or ramping up city services and investment in parts of Detroit in coming decades. The city's lowest-density neighborhoods are slated for "replace, repurpose or decommission."



REPLACE, REPURPOSE OR DECOMMISSION	REDUCE AND MAINTAIN	RENEW AND MAINTAIN	UPGRADE AND MAINTAIN
▮ **Service level:** Basic service level but quality declining over time ▮ **Actions:** Planned maintenance to extend current systems	▮ **Service level:** Core service level but for a smaller number of residents, as they will likely not regain their original number of residents in the future ▮ **Actions:** Maintain and undertake scheduled renewal at lower capacity ▮ **Outcomes:** Area continues as viable neighborhood with lower capacity	▮ **Service level:** Core service level at the same or better quality ▮ **Actions:** Fully maintain and renew at current level or upgrade if required ▮ **Outcomes:** Viable neighborhood with same or increased capacity	▮ **Service level:** Improved service level maintained at better quality ▮ **Actions:** Fully maintain and under-take renewal or upgrade as required ▮ **Outcomes:** Improved neighborhood with increased capacity and resilience

SOURCE: Detroit Future City

MOSES HARRIS/DETROIT FREE PRESS

5.2 Proposal Analysis: Public Lighting Renewal

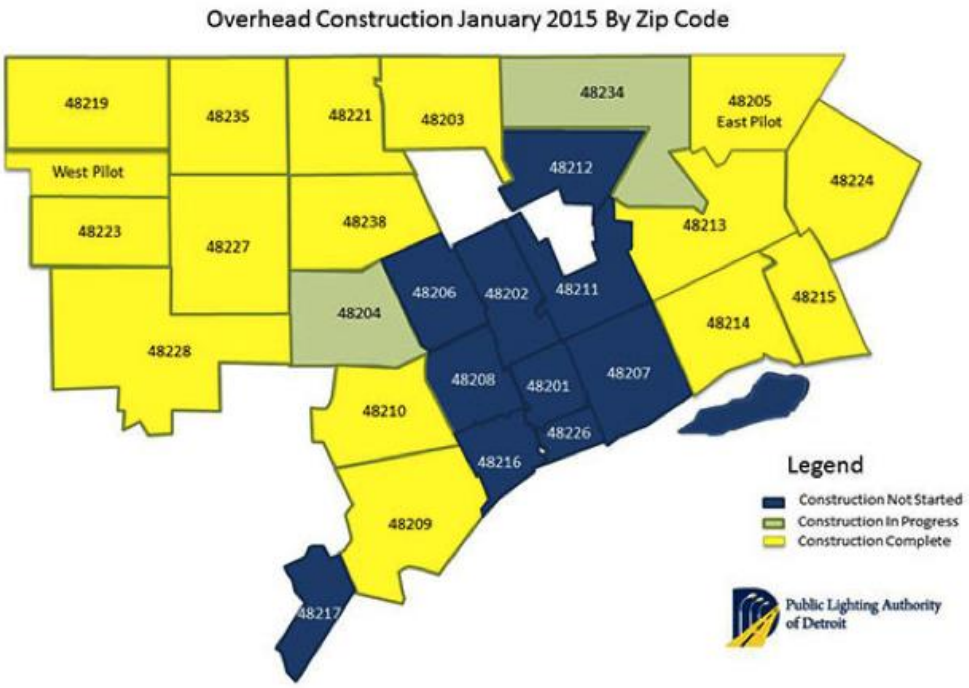
When DFC was released in January 2013, Detroit's street lighting system was in a state of disrepair. While data was difficult to secure, an estimated 60% of the existing 88,000 street lights in Detroit were not working due to reduced funding for maintenance and repairs, aging infrastructure, bulb outages, copper theft, and vandalism. In February 2013, the Public Lighting Authority (PLA) was established to "improve, modernize, and maintain all street lights in the City of Detroit with brighter,

[32] Ibid.

more reliable, more energy efficient lights." The original goal was to install energy efficient lights on every corner and a streetlamp in the middle of any block longer than 300 feet.[33] In addition, new lamps are designed to discourage copper theft. The PLA planned to install lights by ZIP code, with all neighborhoods to be completed by end of 2015 and all major thoroughfares to be relighted by the end of 2016. The plan did not make a distinction between framework zones, but refers to lighting those neighborhoods that are residential. The map in Figure 7 shows progress by area.

Detroit has thousands of alleys, and only 12,000 of the 20,000 alley lights were working as of the end of 2014. The PLA plan is to remove nonworking alley lights and allow the remaining alley lights to burn out, at which point the PLA will remove them. When an alley light burns out, residents will be offered the option to pay $17 per month to replace and continue the light.

Figure 7: Public Lighting Authority Construction Plan by January 2015[34]



5.3 Proposal Analysis: Demolition and Blight Removal

During the HIA scoping phase, the Detroit Works Project included a pilot project to address blighted properties differently by zone. DFC Strategic Renewal proposed that limited resources for blight removal be used for demolition in the LV areas for stabilization. The blight strategy for HV areas was to secure vacant properties. Further, most funding for demolition was restricted to areas that fit certain criteria for stabilization.

[33] Public Lighting Authority of Detroit 2015b.
[34] Public Lighting Authority of Detroit 2015a.

However, citywide there was no systematic plan, proposal, or funding for addressing the enormous problem of blighted and vacant buildings. There was a widespread call for demolitions, but little attention to the potential health impacts. Further, city demolition practices followed traditional standards that did not include adequate health and environmental protections. The D-HIA SC decided to address this need by doing a more focused analysis in the HIA on blight removal strategies and demolition. The initial literature review for the HIA found substantial evidence that the presence of blighted buildings, the process of demolition, and the condition of vacant land after blight removal have substantial impacts on the neighborhoods and consequent impacts on health.

As the HIA was underway, a number of plans and initiatives were established very quickly to demolish vacant buildings in targeted areas. In early 2013, $10 million of demolition funding was granted by the state to target urban renewal around schools in six focus areas. In August of 2013, the U.S. Department of Treasury awarded the city $52.2 million to fund the demolition of more blighted buildings throughout the city in targeted lower vacancy areas. Over the following months, plans and authority for addressing blight through demolition passed through several public and state authorities, with various calls to loosen or tighten permitting processes and environmental regulation, oversight, and enforcement.

In September 2013, the Blight Removal Task Force (BRTF) was commissioned to develop an implementation plan to remove blighted buildings and clear blighted, vacant land in Detroit as fast as possible using an environmentally-friendly approach. The Task Force brought together private, philanthropic, nonprofit, federal, and state partners to work with the city to determine if structures are blighted (defined as “open, dangerous, or vacant”) and recommend plans for cleared land (Detroit Blight Removal Task Force, 2013). In 2014 a survey of the conditions of all parcels in the city was carried out and mapped, and the BRTF issued a comprehensive report that included procedures for safe demolition (http://report.timetoendblight.org/).[35]

Soon after he took office in 2014, Detroit Mayor Michael Duggan gave substantial authority to the Detroit Land Bank Authority to sell, auction, or demolish vacant properties that were transferred from the Michigan Land Bank Authority to city ownership. Recognizing the enormous complexity of the issue, the mayor subsequently put together a team under the Detroit Building Authority to work closely with the health department and EPA to develop standards and practices for conducting responsible demolitions.

[35] Detroit Blight Removal Task Force 2014.

6 Assessment

To understand how the DFC Strategic Renewal (SR) approach to city systems would impact HV neighborhoods and thus the health of those living there, the assessment phase of the HIA was carried out at two levels. First, we looked at the potential health impacts of the overarching Strategic Renewal approach to city systems based on framework zone classification (i.e., vacancy level). Then the HIA focused in more closely on two specific areas within the Strategic Renewal approach – public lighting replacement and blight removal through widespread demolition.

This section details the assessment of the overall Strategic Renewal of City Systems, followed by analysis of two specific DFC strategies – Public Lighting Renewal and Demolition for Blight Removal. Within each area, the assessment was focused on the four priority Neighborhood Impact areas described above: neighborhood stability and integrity; neighborhood safety; environmental conditions; and displacement, relocation, and gentrification.

First we present the overall pathway model, followed by findings from the literature review. For each of the three proposals that were assessed (overarching SR, public lighting, and demolition), we present the following:

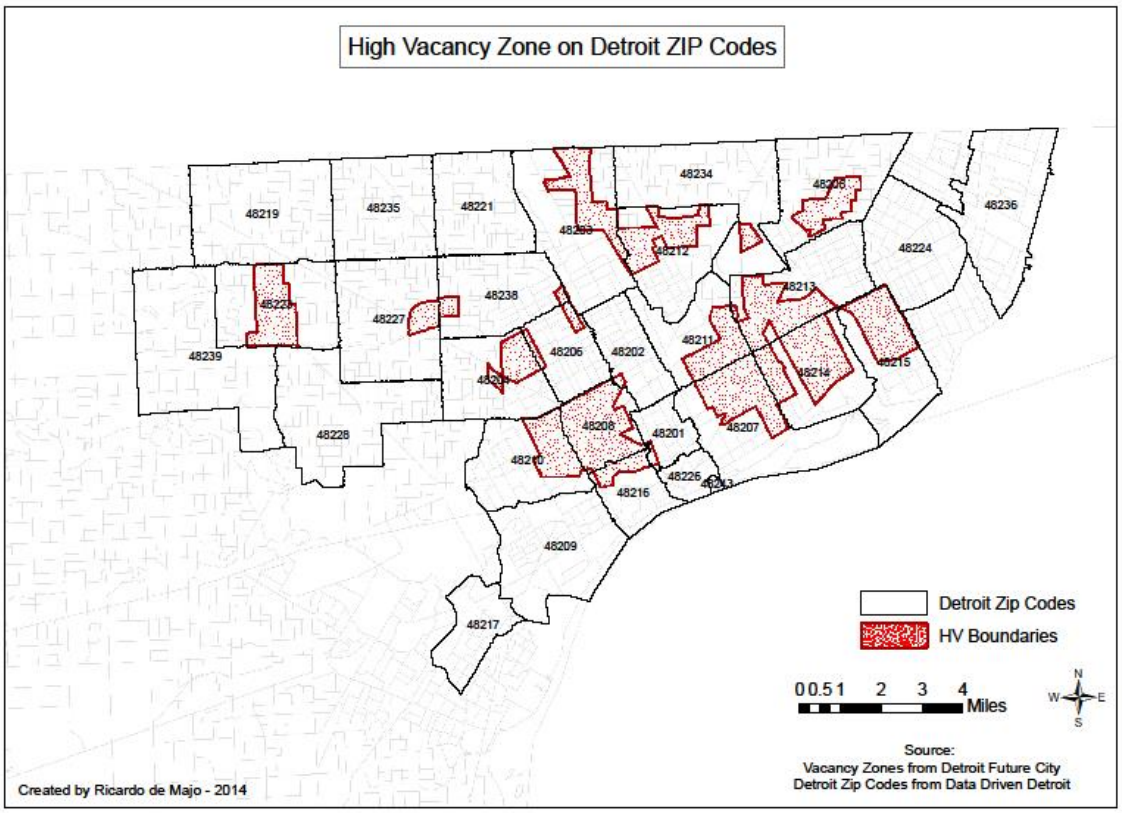
1. Overview and pathways;
2. Existing conditions;
3. Potential Impacts analysis; and
4. Summary table of key findings.

In the final section, we present a summary and discussion of findings, provide a model of how impacts may differ under *three different scenarios or trajectories* of high vacancy neighborhoods as illustrated in Figure 21: Continued Vacancy and Population Loss, Community-Based Planning and Investment, and Gentrification/Displacement.

A Note about Health Data and Impact Analysis

As described in section 4.3 Health Profile, a particular challenge of carrying out impact analysis in this HIA was the limited availability of health data at the geographic level of vacancy zones. Most data on health status (morbidity) were available only at the zip code level, which does not reliably correspond to framework zones. The map in Figure 8 overlays the HV zone onto Detroit zip codes, showing the limited extent of correspondence. Thus, the assessment is strategic and qualitative, representing our best estimate of what impacts to expect based on the available evidence from the literature, overall characteristics of the HV zone, consultation with local experts, and the deep and long-term knowledge of Detroit among the SC members.

Figure 8: Detroit ZIP Codes and High Vacancy Zone



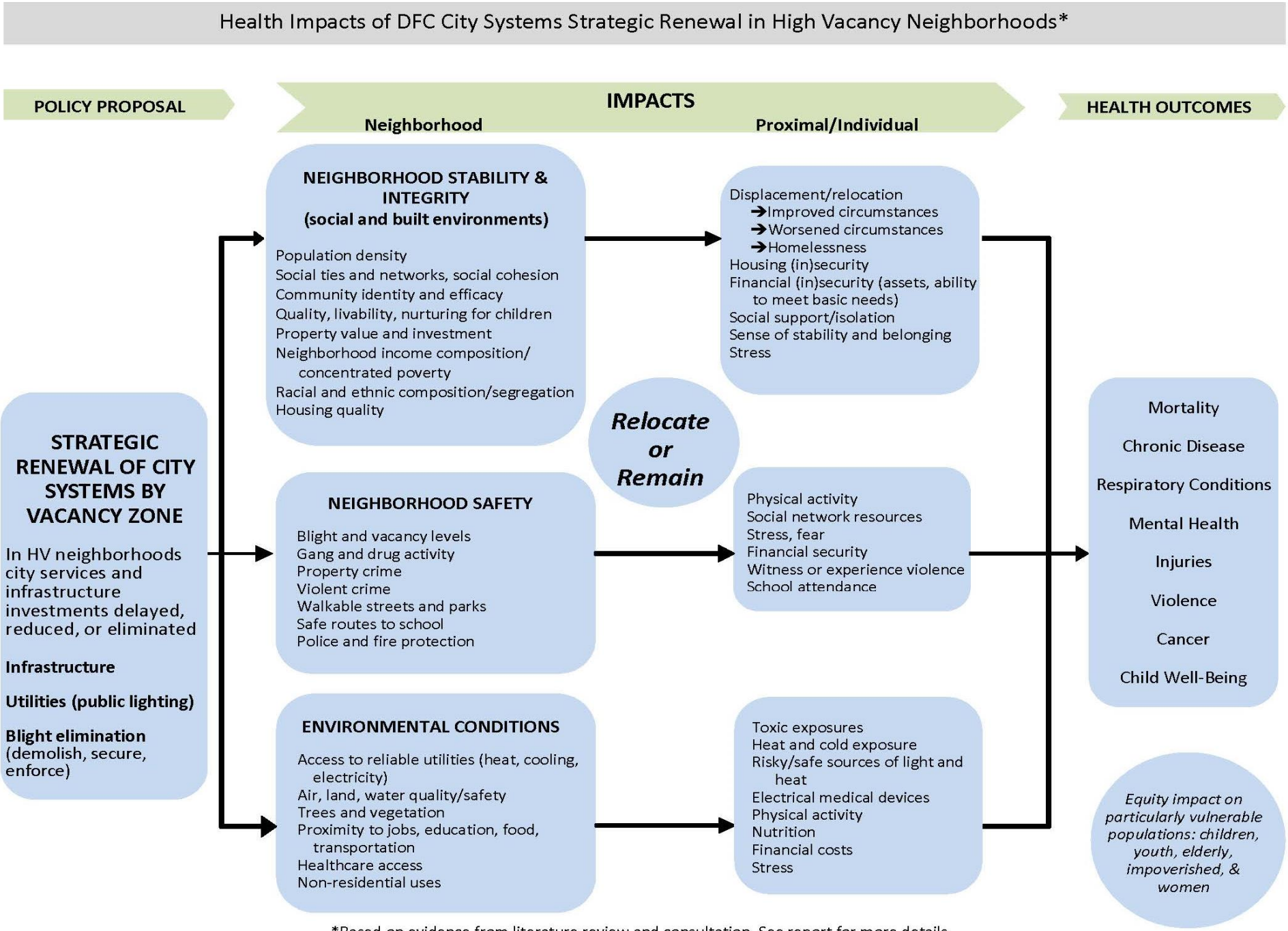
6.1 Pathway Model to Guide the HIA: Potential Health Impacts of Strategic Renewal of City Systems (Infrastructure and City Services)

The DFC City Strategic Renewal proposes to redistribute city service and infrastructure resources — such as street lighting, electricity, waste, roads, and blight reduction—to stabilize and enhance more populated parts of the city while reducing capacity in less densely populated areas. The level and types of services (e.g., upgrade, maintain, reduce, or decommission) depend on whether an area is targeted for growth, stabilization, or change to non-residential land use. The HV zone is projected to be primarily non-residential in 20 years.

The overall strategic HIA focused on the potential effects on the high vacancy neighborhoods of allocating finite resources toward the most populated neighborhoods and reducing or eliminating investment in those areas most heavily impacted by blight and disinvestment. City systems are the foundations of all neighborhoods, and are central to the health and well-being of residents. Based on a preliminary literature review and discussion among SC members, the HIA drew upon established pathways and existing evidence that link city services and infrastructure to intermediate determinants of health and ultimately to health outcomes to develop a pathway model to guide the HIA. The pathway model in Figure 9 illustrates these linkages, and maps out the pathways through which the DFC framework may influence neighborhoods with implications for health. Drawing on this figure and their own analyses of the complex context and existing conditions in Detroit, the Steering Committee prioritized four broad domains of neighborhood level determinants of health on which to focus the HIA. The final model is based on a review of the existing evidence base and consultation among community and academic partners (see section 6.2

Key Findings from the Literature Review and Appendix G for the full Literature Review).

Figure 9: Health Impacts of DFC City Systems Strategic Renewal in High Vacancy (HV) Neighborhoods



*Based on evidence from literature review and consultation. See report for more details.

The *Neighborhood Level Impacts* on the left side of the pathway are constellations of interrelated factors that are important to the health of neighborhoods and the people who live there:

- **Neighborhood Stability and Integrity** refers to the social fabric of the neighborhood and the related built environment that supports and sustains a community. Some refer to these factors as "livability." It includes the density and proximity of neighbors, social networks and support, social cohesion, the collective ability to get things done, and how long people have lived there.
- **Neighborhood Safety** refers to the physical and social conditions that affect safety of residents. Given the current conditions in Detroit's most distressed neighborhoods, the HIA focused on unsafe conditions, such as vacancy, blight, and crime.
- **Environmental Conditions** refers to the quality of the physical environment, such as air, water, and soil, and includes features of the built environment that impact health, such as the condition of housing stock and how that relates to environmental exposures.
- **Displacement, Relocation, and Gentrification** refers to three interrelated effects and processes of neighborhood change that result in changes in the make-up of neighborhoods. Displacement and relocation refer to the movement or removal of residents or businesses from a home or neighborhood, typically due to changing housing and economic conditions such as redevelopment, or, conversely, from foreclosures and continuing disinvestment. Gentrification is the process by which higher income households displace lower income residents of an area, changing the character of the neighborhood.

Moving from left to the right on the pathway in Figure 9 , the DFC *Policy Proposal* leads to *Neighborhood Impacts* that affect health of the individuals who live there through the set of intermediate *Proximal/Individual Impacts*. Neighborhood impacts on individuals will differ depending on whether people *Relocate or Remain* and where people currently live. Displacement and relocation is both a neighborhood and individual impact, and differs based on whether or not it is voluntary. Intermediate impacts at the individual and household level in turn result in *Health Outcomes*, on the far right of the pathway. Although the arrows in the pathway are shown as one-directional, impacts at multiple levels interact and further change both the ongoing neighborhood conditions and those who live there, thus creating feedback loops not illustrated here.

The HIA further addressed whether some groups are particularly *vulnerable* to impacts in these domains either separately (e.g., children, elderly, impoverished) or cumulatively (e.g., children with asthma, pregnant women who are poor, elderly living alone), and whether those effects further contribute to inequities.

During the scoping process, the SC decided to focus on a subset of factors in the pathway model that were not being adequately addressed in the planning process, so that the HIA could provide important information to inform implementation decision making. These are highlighted in the literature review that follows the pathway diagram.

6.2 Key Findings from the Literature Review

The purpose of the literature review in health impact assessment is to identify and evaluate the existing evidence base to assess potential health effects of the proposal. The literature review provides evidence to identify pathways through which the proposal may affect health, to assess the likelihood and strength of potential impacts, and to make recommendations on ways to minimize adverse and maximize beneficial impacts. This HIA was based on an extensive review of the published evidence that links the provision of city systems and infrastructure to four main neighborhood determinants of health and ultimately health. The review begins with infrastructure and city services, then addresses the four central research questions of the HIA at the neighborhood-level, as detailed in the pathway model: neighborhood stability and integrity; neighborhood safety; environmental conditions and exposures; and displacement, relocation, and gentrification. In addition, we take a closer look at two aspects of infrastructure/city services – public lighting, and demolition as blight elimination strategy.

This section provides a summary listing of key findings from the literature review. Each summary point is based on evidence from multiple studies which are described in more detail and cited in the full literature review provided in Appendix H. The relevant section number within Appendix H is provided for each determinant at the end of the introductory description.

6.2.1 Infrastructure and City Services

Infrastructure and City Services refers to the fundamental facilities and systems that sustain the physical functioning of a city. The basic infrastructure and public services that a city provides (e.g., power, water, sanitation, roads, lighting) are the foundations of urban neighborhoods and have a profound impact on health. Lack of access to basic needs such as water, electricity, and heat, are defining characteristics of substandard and unstable housing conditions, and hence have a substantial health impact on day to day life of people and the neighborhoods in which they live. (See Appendix H section 1)

6.2.1.1 Summary of Key Findings

- City services and infrastructure form the most basic preventive interventions against disease and the promotion of population-wide health.
- There is substantial evidence that infrastructure and city services have direct and indirect impacts on health and well-being, including: mortality, heart disease, asthma, injuries, mental health, cancer, and child well-being.
- The quality, quantity, and diversity of institutions that address needs and support accomplishment of daily routine activities are important for health.
- Neighborhoods with high poverty suffer from inadequate access and quality of city services.
- Spending and services are more likely to be cut in poor neighborhoods leading to declines in urban infrastructure, the physical environment, and quality of life that are known to impact health adversely in those neighborhoods.

- Inadequate or poor city services, including street maintenance and waste removal, are usually associated with neighborhoods characterized by high residential turnover, poverty, and high percentages of minorities.
- Homes in locations with perceived health or environmental risks have consistently maintained lower property values.
- Increased financial burden from energy costs leads to trade-offs on expenditures for food, health care, and rent, and use of dangerous alternative heat sources such as ovens.
- Engaging community members in advance of land use projects can help planners identify public infrastructure concerns and needs.

6.2.2 Neighborhood Stability and Integrity

Neighborhood Stability and Integrity refers to the social fabric of the neighborhood and the related built environment that supports and sustains a community. Some refer to these factors as "livability." It includes social networks and support, social cohesion, the collective ability to get things done, how long people have lived there (stability), and the density and proximity of neighbors. The literature was reviewed in the following domains: social networks, social support, social isolation, and social capital; community identity and sense of community; social cohesion; collective efficacy and community control; and neighborhood stability, population density, and population loss. Adverse aspects of the social environment that affect neighborhood safety, such as violence, crime, and discrimination, were included in the neighborhood safety pathway for carrying out the HIA. (See Appendix H section 2.)

6.2.2.1 Summary of Key Findings

Social Networks, Cohesion, and Collective Efficacy

- High levels of social support and social networks are positively associated with multiple health outcomes, and individuals with poor social ties are at increased risk for poor physical and mental health.
- Social ties and networks can also be detrimental to health by: exposure to stress, conflict, and disease; normalizing adverse health behaviors such as substance abuse and poor eating habits; depleting emotional and material resources in the care of others; or reinforcing powerlessness and dependency.
- Residents of communities with high levels of collective efficacy, that is, a belief in the group's ability to take action to achieve a common end, live longer and are healthier physically and mentally.
- Collective efficacy consistently has the strongest relationship to health compared to other aspects of neighborhoods.
- Collective efficacy can be undermined due to high crime rates, vandalism, and high levels of physical disorder such as litter and graffiti.
- Community participation in social and political decision-making is associated with increased collective efficacy and social cohesion, improved safety/security, improved housing adequacy, secure livelihoods, access to health care, limited exposure to occupational hazards, and improved environmental quality.

- Taken together, social networks, social cohesion, collective efficacy, and community identity are tightly interwoven determinants of health that are each affected by neighborhood level structural determinants such as poverty.
- Sense of community, community resilience, and place attachment promote successful community redevelopment.
- Engaging community members in advance of land use projects can help planners identify public infrastructure concerns and needs.
- Land use policies have the potential to harm social cohesion if displacement or "actions that indirectly lead to neighborhood disinvestment" are allowed to happen.

Stability and Population Density

- Residential stability at both individual and neighborhoods levels is associated with better physical and mental health, but may be detrimental to health in low-income neighborhoods with few affluent or middle-income households.
- Density can potentially increase social interaction. Places of contact increase opportunities for social interaction thereby strengthening social ties and networks. Conversely, the loss of public spaces is associated with declines in social capital.
- Spatial clustering has been found to promote walking and bicycling and to increase frequency of visits to places that promote social interaction. Research also links walkable neighborhoods, access to retail, and short commutes to better physical, mental, and social health.
- Land use patterns that encourage neighborhood interaction and a sense of community have been shown not only to reduce crime, but also to create a sense of community safety and security.
- Travel time and access to transportation affect access to health care for vulnerable populations such as the elderly, disabled, teens, and low-income families.
- There is a gap in the literature of studies that link reduction in utilities with neighborhood stability and density.

6.2.3 Neighborhood Safety

Neighborhood Safety refers to the physical and social conditions that affect public safety of an area, and the potential health impacts of those conditions. Given the current conditions in the HV neighborhoods, the HIA focused on the impact of reduced/limited infrastructure on *unsafe conditions*, in particular blight and vacancy, violent crime, and fear of crime. These conditions have a cumulative effect which may not be adequately captured in the literature. Evidence of the health impact of neighborhood safety that is specifically related to public lighting and demolition is summarized in more detail in each of those sections below (6.2.6 and 6.2.7). (See Appendix H section 3.)

6.2.3.1 Summary of Key Findings

- Neighborhoods experiencing disproportionate foreclosure are subject to increasing blight and subsequent decline in property values, as current residents are evicted and properties are left vacant and vulnerable to vandalism, stripping, and arson.
- Blight and vacancy levels are associated with increased fear of crime, poor physical and mental health outcomes, and decreased physical activity.
- A Detroit study found that middle-aged and older adults who live in neighborhoods with a poor physical environment (e.g., poor house upkeep, vacant lots, air pollution, litter) reported less physical activity than younger residents in the same poor environment.

- Increased fear of crime is consistently associated with poorer conditions in the physical environment. Factors in the social environment such as social cohesion are associated with less fear of crime.
- Living in neighborhoods with high rates of crime is associated with negative mental health outcomes, including depression, post-traumatic stress disorder, and substance abuse.
- Violent crime and fear of crime are associated with negative mental and physical health impacts, including obesity, high blood pressure, and increased risk for cardiovascular disease.
- Studies of increased lighting show increased perceptions of safety, but mixed effects on crime rates.
- There is mixed evidence for an association between the presence of blight and abandoned properties and increase in different types of crime (violence, drug activity, property crime).
- Greater tree canopy correlates with reduced crime rates.

6.2.4 Environmental Conditions

Environmental Conditions refers to the physical environment, such as air, water, and soil, and also includes features of the built environment that impact health, such as the condition of housing stock and its relation to environmental contamination. During the scoping process, the HIA focused in on the pathways related to blighted buildings, demolition as a strategy to remove them, and vacant land (both before and after demolition). Literature findings on the effects of demolition on the physical environment and health through exposure to contaminants in soil, air, and water are in section 6.2.7 on Demolition. The condition, extent, and use of vacant land also contribute to climate change-related health impacts. (See Appendix H section 4.)

6.2.4.1 Summary of Key Findings

- Environmental issues that impact health include the number of brownfield sites, the high metal content in the soil, elevated lead exposure, especially in children and high rates of asthma associated with identified air toxins and particles that are emitted by automotive (e.g., diesel) and industrial sources.
- Environmental air quality is associated with multiple health outcomes, including asthma, cardiovascular disease, and hypertension.
- The majority of schools in the two most polluted deciles of Michigan were located in the more polluted parts of their respective school districts, compounding the pollution burdens for students attending those schools.
- Schools located in the areas of highest toxic air concentration were more likely to have students with lower attendance rates and scores on achievement tests.
- Due to climate change, there is a projected increase in extreme heat events which can result in heat-related mortalities. Elderly, infirm, young children, and low-income populations are most vulnerable to heat waves.
- Trees and vegetation offer protection against extreme heat events; increase oxygen production and reduce levels of smog, thereby improving air quality; and improve water quality and storm water management and flood control.
- Living in areas with high levels of greenery is associated with increased physical activity and lower rates of obesity.

6.2.5 Displacement, Relocation, and Gentrification

Displacement, Relocation, and Gentrification refers to three interrelated effects and processes of neighborhood change that result in changes in the make-up of the neighborhood. Displacement and

relocation refer to the movement or removal of residents or businesses from a home or neighborhood, typically due to changing housing and economic conditions such as redevelopment, or, conversely, from widespread foreclosures and continuing disinvestment. Gentrification is "the process by which higher income households displace lower income residents of a neighborhood, changing the essential character and flavor of that neighborhood"[36]. Increasing property values and higher costs of living and doing business can result in displacement of original residents. Those displaced are primarily renters, elderly, and people of color. The level and type of investments in infrastructure and city services can impact the quality of neighborhoods, driving the process of either gentrification or further decline, both of which can result in displacement of existing residents. The impacts of relocation on health and well-being depend on whether it is voluntary or involuntary, and have different implications for those being relocated, those who remain, and those who live in the areas where people move to. (See Appendix H section 5.)

6.2.5.1 Summary of Key Findings

Displacement and Relocation

- Relocation and involuntary displacement can cause or contribute to mental stress, loss of supportive social networks, costly school and job relocations, and increased risk for homelessness, substandard housing and overcrowding. Health effects are more adverse when the relocation is forced.
- Effects of displacement on social networks include changes in residents' contact information; creating physical distance; diminishing face-to-face interactions of neighbors, taking away informal childcare or transportation arrangements among neighbors; and moving residents away from supportive services like food pantries, job training services, and youth programs.
- Inadequate services and infrastructure (e.g., water, heat) and displacement may put residents at risk for homelessness, which is associated with poor health outcomes as well as increased emergency care and hospital utilization.
- Widespread foreclosures are a major contributor to displacement, instability, vacancy, and blight. More than one-in-three homes in Detroit were foreclosed from 2005 - 2014.
- Studies on the effects of foreclosures include: financial instability and lasting impacts on wealth that could potentially affect multiple generations; adverse health outcomes due to instability following removal/eviction and the disruption of a community's social ties and access to key institutions; and homelessness.
- Hard-to-house populations including the elderly, large families, people with disabilities, those who have been arrested or incarcerated, and have poor credit histories, are particularly vulnerable to homelessness and housing insecurity.
- Increased mobility at childhood (moving 3 or more times by the age of 7) was strongly associated with adverse childhood events such as abuse, neglect, household dysfunction, smoking, suicide. Odds of health risks for adolescents with high mobility during childhood ranged from a 1.3 times higher risk for smoking to a 2.5 times higher risk for suicide.
- Increased mobility in childhood resulted in a 36% increased risk of developing depression, and was correlated with academic delay, school suspensions, emotional and behavioral problems.
- Neighborhood change can be stressful for long-time residents who feel unable to control the events surrounding them which can have negative mental and physical health repercussions.

[36] Kennedy and Leonard 2001.

- One HIA found that land use policies have the potential to harm social cohesion if displacement or "actions that indirectly lead to neighborhood disinvestment" are allowed to happen.
- In national tracking studies of public housing residents relocated from redevelopment sites, fewer than 10% had returned to newly remodeled housing.
- Programs to relocate public housing residents from high poverty neighborhoods (MTO) or to revitalize public housing through demolition (HOPE VI) have shown mixed or little social and health benefit.
- There is mixed and conflicting evidence of the health effects of housing improvements, such as rehousing and area regeneration, on health and social outcomes. Benefits of improved housing and neighborhoods may be counteracted by disruption of social networks and other detrimental effects of relocation.
- Disruption of social networks and detrimental effects of relocation may counteract benefits of improved housing conditions.

Gentrification

- Influx of economically stable households may stimulate improvements that have beneficial effects for those who currently live there, including improved infrastructure, health-promoting resources, and amenities.
- Gentrification can negatively impact health by increased cost-burden on both households who remain, who may experience higher rents or taxes as property values increase, and on those who move out, such as relocation costs.
- Increased expenses for current residents (e.g., higher cost for rents, property taxes, local amenities and services) can result in financially burdened individuals forgoing medical care that can lead to negative health outcomes.
- Gentrification can exacerbate racial segregation and discrimination in the housing market.
- Black/African American households who are displaced are more likely to end up in lower-income neighborhoods with fewer health-promoting resources and/or lower quality amenities than the neighborhood they left.
- As more lower-income residents get displaced, the concentration of poverty in other areas becomes more likely.
- Specific neighborhoods and the city as a whole may experience change of historical, cultural, and racial character and identity as a result of gentrification.
- Heightened tensions between old and new residents may result from and exacerbate inequities.

As previously described, the Steering Committee decided during scoping that in addition to the overall health impact assessment of the DFC Strategic Renewal approach, the HIA would take a more focused look at two more specific proposals being implemented - Public Lighting and Demolition as Blight Removal Strategy. Thus, a more detailed literature review was conducted on those two areas, and key findings are summarized next.

6.2.6 Public Lighting

Public Lighting refers to a city's street lighting system. Public street lighting serves as an important contribution to neighborhood safety as well as a determinant of health. A large evidence base indicates that increased lighting is associated with improved safety perceptions,[37,38,39] fewer police

[37] Haans and de Kort 2012.
[38] Herbert and Davidson 1994.

calls,[40] increased nighttime foot traffic,[41] and an increase in community pride and confidence.[42] These improvements in neighborhood safety have positive health impacts, such as increased physical activity, greater social interaction, and a reduction in fear, which can lead to lower obesity rates and improved mental health. Without appropriate lighting, neighborhoods are vulnerable to reduced neighborhood safety and negative health impacts. (See Appendix H section 6.)

6.2.6.1 *Summary of Key Findings*

- Presence of street lighting is consistently associated with overall perceptions of safety, and has been associated with fewer police calls and increased community pride and confidence.
- Increased lighting led to reduced fear of being robbed or attacked, and to more walking outside, particularly among young and elderly women.
- Pedestrian scale lighting improves pedestrian safety and quality.
- Both stationary and walking pedestrians felt safer when light was in their immediate surroundings as opposed to the road ahead, and when they noted many possibilities for escape.
- Improved public lighting is a sign of community investment and of neighborhood stability, which can lead to increased feelings of community pride.
- Little research has documented the effects of a reduction in public lighting.
- The evidence is mixed that more public lighting will reduce crime.

6.2.7 Demolition as Blight Removal Strategy

Demolition as Blight Removal Strategy refers to the widespread use of demolition as the means to address blight and vacant houses, either singly or across an entire area. Large-scale demolition has historically been used in urban renewal to clear areas for new development. Other strategies to address blight include selective demolition of uninhabitable buildings only, deconstruction, and renovation, historic preservation, and building relocation. The literature review focused on health impacts of demolition related to the social environment, relocation and displacement, neighborhood safety, exposure to environmental pollutants both from existing housing stock and the process of demolition, and changes in land use and socioeconomic structure of an area. (See Appendix H section 7.)

6.2.7.1 *Summary of Key Findings*

- Blight and vacant land are associated with trash build-up and unsanitary conditions, stray animals, increased violence, drug activity, and fear, and contribute to poor physical and mental health outcomes.
- Living in substandard housing is associated with negative physical and mental health outcomes in children and adults.
- Demolitions are associated with increases in lead dust fall, higher blood lead levels in children, and release of other contaminants into air and soil (e.g., mercury, asbestos).
- Large amounts of lead-contaminated dust are generated from housing demolition, but can be controlled using dust suppression and other practices ("responsible demolition") to protect the public health.
- Widespread demolition has contributed to racial segregation and disruption of social networks.

---

[39] Painter 1996.
[40] Quinet and Nunn 1998.
[41] Herbert and Davidson 1994.
[42] Farrington and Welsh 2002.

- Few studies have examined whether demolition affects the mental and physical health of residents living near the demolition process.
- There is a lack of research on the social and health impacts of demolition rather than focusing on the physical risks of abandoned and vacant housing.
- One study found community concerns about lack of notification, safety, risks from resulting vacant land, the impact of demolition rather than rebuilding, and community involvement in planning and decision-making.
- Widespread demolition can result in large areas without tree canopy; unmaintained growth of weeds can contribute to seasonal allergies.
- Trees and vegetation offer protection against extreme heat events; increase oxygen production and reduce levels of smog, thereby improving air quality; improve water quality; and aid in storm water management and flood control.
- Tree canopy correlates with reduced crime rates.
- Demolition projects are associated with a spatial migration of crime.

In the next step of the assessment, for each of the main determinants of health that are the focus of the HIA we provide **existing conditions** information followed by an evaluation of **potential impacts**. Existing conditions data include baseline health and population characteristics, as well as neighborhood conditions relevant to predicting potential health impacts of DFC SR related to the priority determinants. These data are from section 4 Current Conditions profiles, the separate *Appendices* document, or as cited in the description of existing conditions below.

Potential impacts were evaluated using existing conditions data, evidence from the literature review, theory, community expertise, and analysis by the D-HIA Steering Committee.

6.3 Assessment: Infrastructure and City Services

6.3.1 Existing Conditions

- City systems throughout Detroit are aged and in poor repair, including energy, lighting, water, sewage, and streets.
- 47% of HV residents live below the poverty line, and 57% of households have incomes under $25,000.
- HV areas have high rates of poor health outcomes that are associated with infrastructure-related stressors.

6.3.2 Potential Impacts

***Health Impact*:** There is substantial evidence that infrastructure and city services have direct and indirect impacts on health and well-being, mortality, heart disease, asthma, injuries, mental health, cancer, and child well-being. Aging infrastructure exposes residents to contamination through air, soil, and water, including carcinogens, lead, bacteria (sewage overflow), and other pathogens.

Further reductions in amount or quality of services can be expected to contribute to uninhabitable housing, such as from flooding, lack of electricity, and spread of fire. The HV neighborhoods have high rates of poverty and poor health conditions, thus magnifying the impact for those with few resources with which to address them. In addition, some programs to address deteriorated housing, such as home repair funds for low-income homeowners and demolition funding, were restricted to lower vacancy areas in order to stabilize them. Thus, there is strong evidence to predict that further reducing city systems investments in the HV zone will have a detrimental impact on residents' mental and physical health.

DFC has projected the HV zone to become non-residential over the next two decades. There are no plans to address what is to become of the 90,000 people currently living there as this transition takes place. 44% of HV residents own their own homes and can be predicted to incur financial stress from decrease in property value and difficulty selling their home should they decide to relocate. For those who decide to and are able to move, relocation is expected to have both negative and positive impacts, which are further discussed in section 6.7.

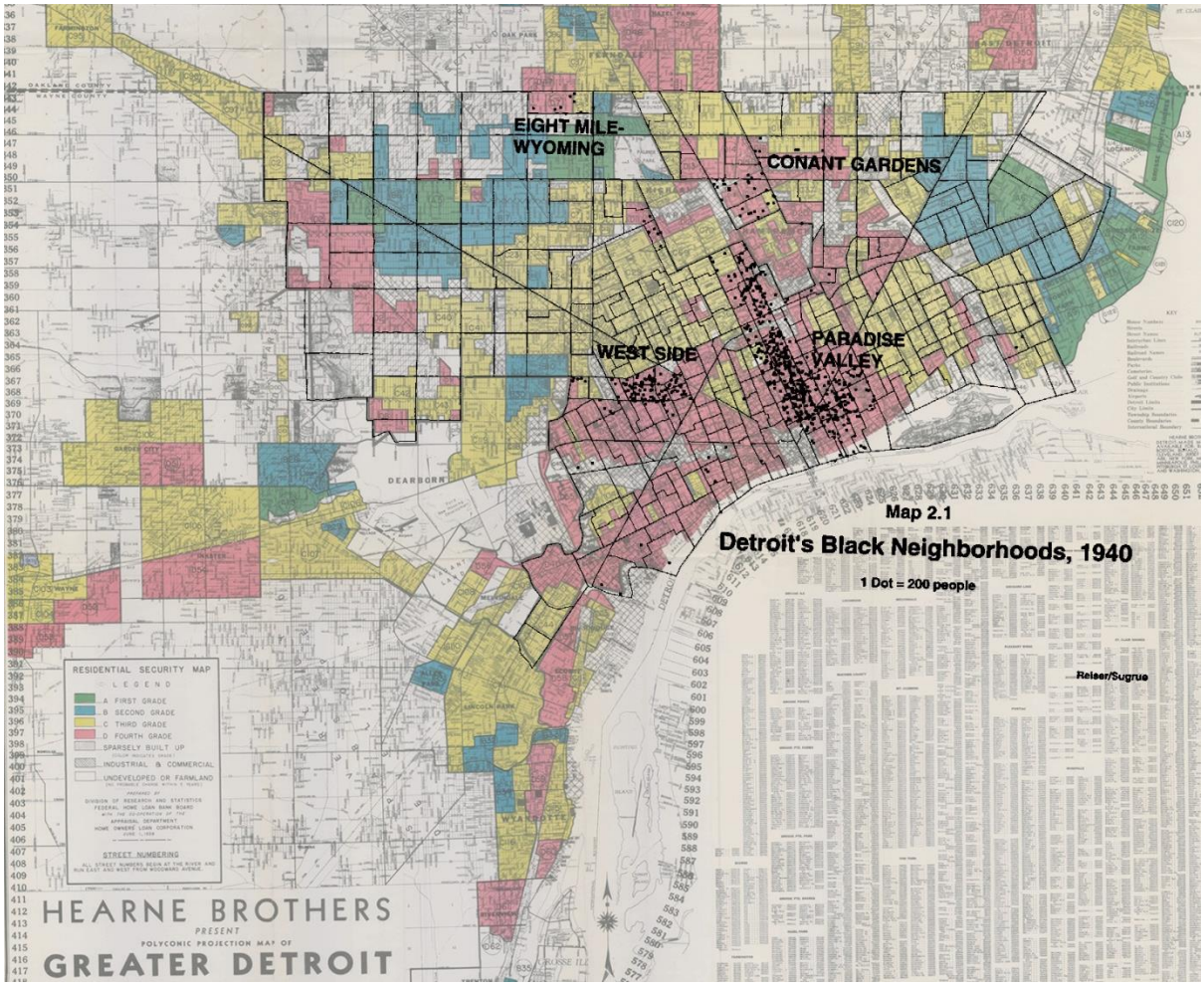
Equity Impact: Groups are likely to be disproportionately impacted are elderly, low-income, children, youth, and women. In addition, all Detroit residents are levied taxes for which they expect to receive adequate city services. Differential provision of these services across neighborhoods reflects an inequitable allocation of supported infrastructure across neighborhoods.

Further, there may be generational impacts of loss of wealth (through homeownership) particularly for African Americans and Latinos (due to racial segregation) and low-income homeowners. The DFC framework map of vacancy across Detroit closely mirrors a 1939 map that guided investment decisions at that time linking housing discrimination, racial and economic segregation, redlining, and disinvestment. The Residential Security Map by the Federal Home Loan Bank Board determined where home loans would be made and to whom. The impact on African Americans can be seen with an overlay of Black neighborhoods in 1940 (Figure 10).[43] In 1940, the population of Detroit was 1.6 million, with 9% African American and 90% non-Hispanic white[44]. Twenty percent of the population

[43] Szewczyk 2014.
[44] Gibson and Jung 2005.

was foreign-born. The map suggests that policies regarding neighborhood investments have enduring effects.

Figure 10: 1939 Redlining Map and 1940 Black Population[45]



Sources: Residential Security Map, Federal Home Loan Bank Board and the Home Owners' Loan Corporation, 1939[46]; Sugrue, 2005.[47]

[45] Szewczyk 2014.
[46] Hearne Brothers 1939.
[47] Sugrue 1996.

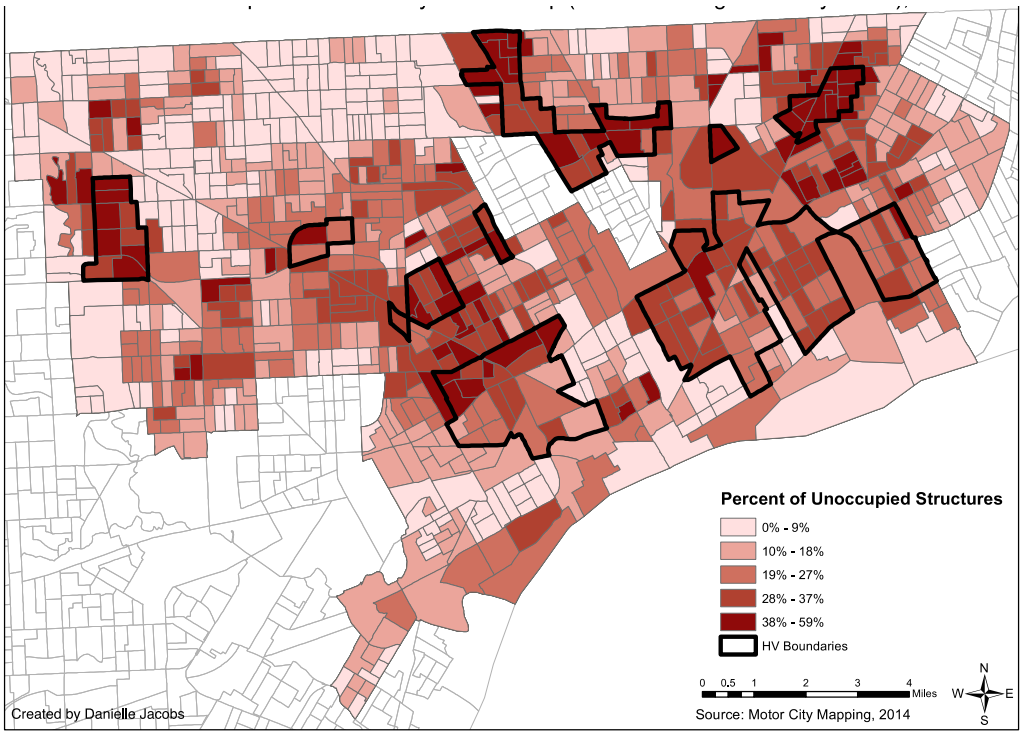
6.4 Assessment: Neighborhood Stability and Integrity

6.4.1 Existing Conditions

- HV neighborhoods have high structural vacancy with 58% of parcels vacant; however, 70% of homes are occupied.
- 44% of homes in HV are owner-occupied.
- 36% of HV householders live alone.
- Social ties were listed highest among reasons for not moving and what people liked most about their neighborhood, in a 2012 survey of 3,002 residents of the Lower Eastside, which is the largest contiguous HV zone. [48]
- In the same survey, 37% said they would not consider moving. Of those willing to move, 20% said they would move to a neighborhood close to where they live now.
- Widespread foreclosure is a major contributor to instability, displacement, vacancy, and blight. There were 139,000 foreclosures in Detroit from 2005 – 2014, representing more than one-in-three homes.[49]
- 35,000 Detroit properties were at risk of foreclosure in 2015.[50]
- Community-based planning/advocacy organizations in Detroit have carried out research, influenced planning decisions and processes, secured resources for improvements, and built community cohesion and strength.

The HV zone is defined by having the highest structural vacancy in the city. While overall 70% of existing houses are occupied, the photo presented earlier in Figure 4 and the map below (Figure 11) show that within an area designated broadly as HV, there are blocks in which there are a number of lived-in homes in the midst of other more vacant blocks.

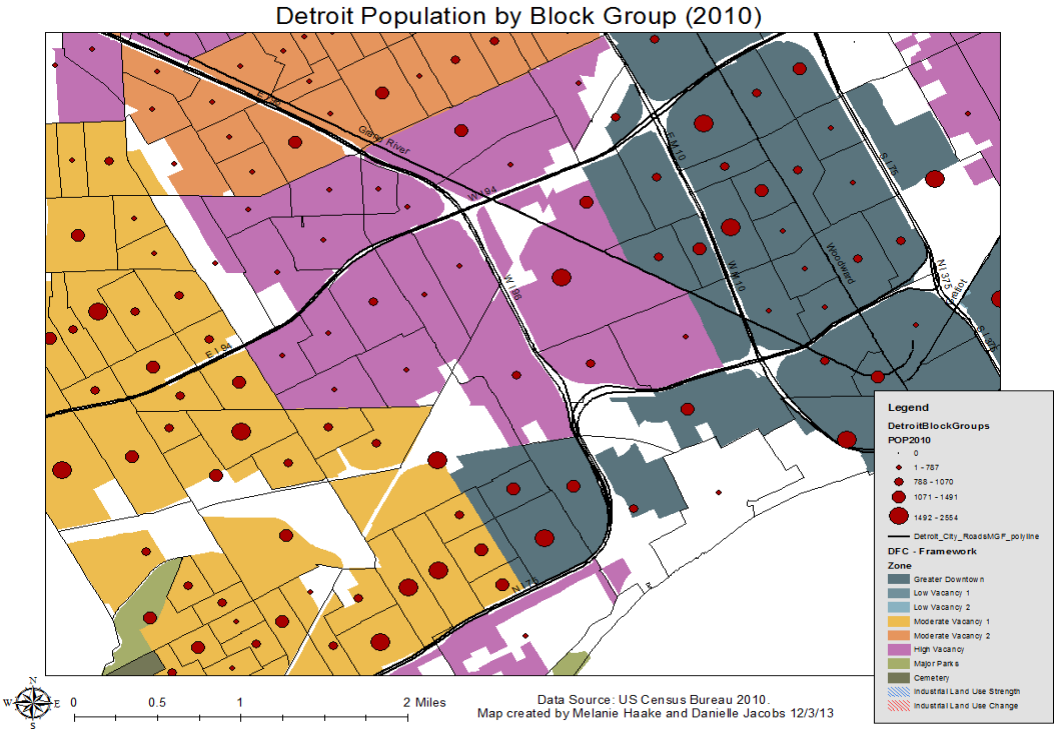
Figure 11: Percent of Unoccupied Structures by Block Group in Detroit, 2014



[48] Tigan and Ruth 2012.
[49] Rodriguez and Cooper 2015.
[50] Ibid.

While overall population density across the HV zone is comparable to many stable cities, density varies considerably between neighborhoods, as shown here in a close-up of parts of Southwest and Greater Downtown (Figure 12) (a citywide density map is in Appendix F, Figure 10). The number of people who live in a given block and how close they are to neighbors varies greatly.

Figure 12: Detroit Population Density by DFC Zones, Southwest and Downtown



The character, community identity, and social fabric of relationships also vary between neighborhoods. Some areas are highly isolated and distressed, so that residents may be unable to collectively affect their neighborhood.[51] However, many neighborhoods have a long history of relatives and friends living close by, have active block clubs and churches, and/or have well-organized community planning organizations.

The social fabric within specific neighborhoods varies substantially within the HV zone, and limited data are available at the level of zones. Several surveys of Detroit residents provide data on perceptions of their neighborhoods and attitudes toward moving (See Tables 12 and 13 in Appendix F). In a perception survey of 3,002 residents of the Lower Eastside,[52] which is primarily HV, social ties and relationships were listed highest among possible responses in a number of questions including:

- Reason for not moving: I have great friends here and strong ties to the community (29%)
- Like most about your neighborhood: sense of community (22%)
- Amenity ranking (for relocation)
  - a more stable neighborhood that is better than the one I live in now (37%)
  - a neighborhood where I already know people (21%)

[51] National Geographic 2015.
[52] Tigan and Ruth 2012.

Detroit has a strong history of community organization and there are longstanding neighborhoods-based organizations that are engaged in or driving revitalization in or near HV areas, particularly in Southwest (e.g., Detroit Hispanic Development Corporation, Southwest Community Benefits Association) and the Eastside (e.g., Eastside Community Network, Lower Eastside Action Planning).

6.4.2 Potential Impacts

Social ties, community cohesion, and collective efficacy are beneficial to health of both the neighborhood and the individuals who live there. Some aspects of the social environment are detrimental to health, for example placing heavy demands on support networks, depleting resources, or reinforcing norms that are unhealthy. Evidence suggests that the social-related health benefits of stable neighborhoods can erode with increasing numbers of vacant properties, contributing to social isolation of remaining residents.

It is likely that the explicit planned lack of investment of SR and a 20 year projection of non-residential use will lead to further physical deterioration and economic decline for home and business owners, prompting those who can move out to do so. Further economic stress is likely to result in more foreclosures, which are a major cause of eviction and abandonment in Detroit with substantial negative health effects. Further disinvestment in infrastructure through Strategic Renewal is predicted to disrupt ties and deplete resources as demands increase, population declines, and neighbors relocate outside the neighborhood. Potential detrimental health impacts include increased mortality, heart disease, violence, and decreased mental health.

Depending on the extent to which the existing social fabric is supported and fostered, residents who remain may experience beneficial health effects if they are able to maintain local social networks and support. The ability to maintain local networks may be contingent upon the extent to which network members remain in place or relocate to other neighborhoods, as well as their access to transportation or other means to maintain network connections. To the extent that local networks are maintained, there may be steady or beneficial effects on health. In addition, neighborhoods that have community organizations and planning initiatives can support a sense of community and collective efficacy among residents that has beneficial health effects. Community organization both buffers against and mitigates stressful conditions through services and programs, and can also improve conditions by engaging residents in developing and carrying out plans to regenerate their neighborhoods. Open spaces provide opportunities for transforming historically disinvested areas into uses that provide health and economic benefits to existing residents, if they have adequate supports to address current risks and assurance that they will receive a fair share return, for example through community benefits agreements. Otherwise, we predict that there will be heightened distrust of leadership (government, business/developers, and philanthropy), tensions between old and new residents, and increase of race-based discrimination and conflict, for example at the regional and state policy level (e.g., preemption laws).[53]

[53] Levin 1980.

Evidence suggests that resident involvement in planning and redevelopment can benefit health, build community control, and move regeneration forward. In Detroit there is strong evidence that community-based planning efforts in HV areas are influencing regeneration planning, as well as making specific impacts on health determinants and outcomes. Several examples are the Lower Eastside Action Plan (LEAP, a program of Eastside Community Network), the Southwest Detroit Community Benefits Coalition (SDCBC), and Detroit Hispanic Development Corporation (DHDC). This process is described in more detail in 6.11 Types of Neighborhood Change and Potential Impacts.

For those who relocate, the impacts on health depend on whether individuals move to housing and neighborhood conditions that are better, worse, or the same. Further, some may become homeless. Homelessness has substantial negative impacts on child, youth, and adult physical and mental health. Predicted health benefits of improved circumstances include: expanded social ties or ties with improved resources and fewer demands; access to resources and amenities; and reduced exposure to damaging physical and social environments.

6.5 Assessment: Neighborhood Safety

6.5.1 Existing Conditions

- HV neighborhoods have high levels of blight, vacancy, and deteriorated sidewalks, which contribute to less walking and physical activity.
- Citywide polls and surveys of people living in Detroit consistently show crime, fear of crime, and safety as their greatest concerns and the biggest reason to consider moving.
- Accidents or unintentional injuries are the fourth leading cause of death in Detroit. The HV zone has the highest rate at 55 per 100,000 which is 45% higher than the US rate of 38.
- The homicide mortality rate, also referred to as the homicide *victimization rate,* in the HV zone is 60 per 100,000 population, which is over 10 times the national rate.
- The homicide *crime rate*, that is, homicide that occurs in the HV neighborhoods, is 93 per 100,000 population, compared to 49 citywide and 4.5 nationally.
- Youth are particularly vulnerable to neighborhood safety, with high rates of violent deaths. Among youth 10-24 years old, the death rate from homicide, suicide, and accidents combined is 23 per 100,000 compared to 16 and 17 in MV and LV zones respectively.
- Rates of both violent and property crimes are significantly higher in HV than in other zones, however there is mixed evidence on the relationship between different types of crime and blight/vacancy.

There is a high perception of crime and fear of crime in Detroit, observed anecdotally and in periodic surveys published in the media. In a 2012 random sample telephone survey of 800 Detroit residents, 49 percent of respondents said that crime and safety is the single biggest challenge they face every day living in Detroit. In the same survey, nearly half said they feel very or somewhat unsafe in their neighborhood (Appendix E Figure 12).[54]

Safety fears are greater among women and those with lower incomes: 53 percent of women feel unsafe, compared to 43 percent of men. Fifty percent or more feel unsafe in households with incomes at $50,000 or below, compared to about one-third of those making $75,000 or more.

[54] MacDonald 2012.

Both violent and property crimes occur at highest rates in the HV zone. The homicide crime rate, that is, the extent to which people are murdered in HV neighborhoods, is nearly twice the citywide rate, and *twenty times* the national homicide rate of 4.5 per 100,000.

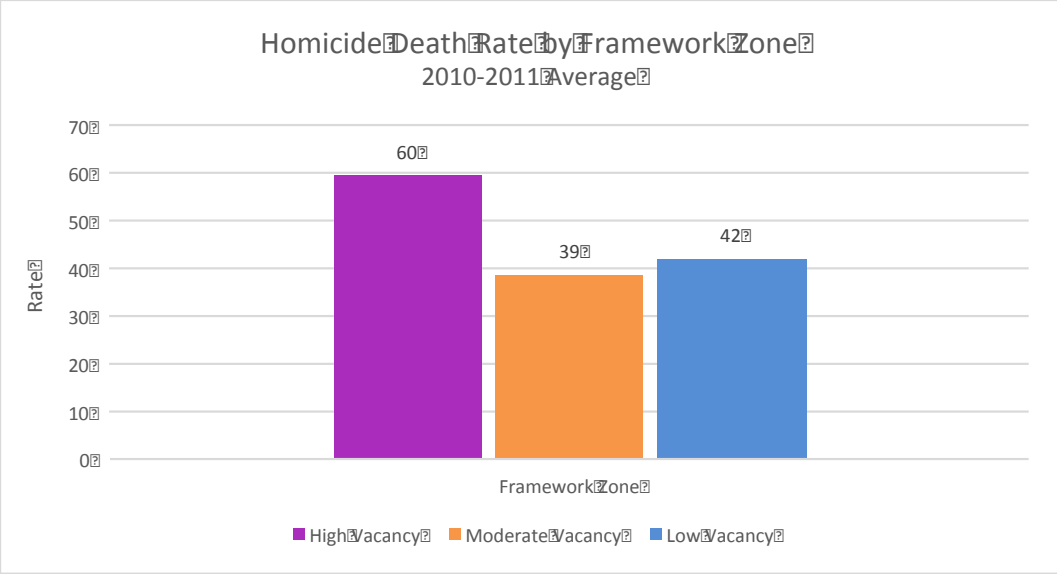
Table 9: Detroit Homicide Crime Rate by DFC Zones

Detroit Homicide Rate by DFC Zones (2008-2012 ave.)	
DFC ZONE	Homicide Rate per 100,000
High Vacancy	93
Moderate Vacancy	50
Low Vacancy	37
Detroit	49

Source:
Population data is from ACS 2008-2012
Homicide data is from Detroit Police Department
Accessed at: http://detroitdata.org/dataset/detroit-homicides (2012)

A different indicator of crime is the homicide death rate, which is the proportion of the population for whom the cause of death is homicide. This is also referred to as the *homicide victimization rate* to differentiate it from the homicide crime rate (murder rate), described above. People living in HV zones die from homicide at staggering rates. At 60 per 100,000 population, the homicide victimization rate for HV residents is more than ten times the national rate of 5 and 60% higher than the citywide rate of 45 per 100,000 population, shown in Figure 13.

Figure 13: Homicide Death Rate by Framework Zone



Source: Michigan Department of Community Health, Division for Vital Records and Health Statistics; CDC National Center for Health Statistics, National Vital Statistics System (2011).[55]

Note: Rates are per 100,000 of population. Age-adjusted rates are calculated using the direct method of standardization with the U.S. 2000 standard population.

[55] Hovert and Xu 2012.

6.5.2 Potential Impacts

There is strong evidence that blight and vacancy levels are associated with increased fear of crime, poor physical and mental health outcomes, and decreased physical activity. Inadequate public lighting, poor maintenance of streets and sidewalks, and lack of investment in securing vacant properties can contribute to crime and injuries. These cumulative impacts are likely to exacerbate the existing safety risks, increasing the rates of injuries in HV areas moving forward.

It is likely that residents who remain in HV neighborhoods will continue to experience significantly higher rates of crime and injury than those who live in HV and MV neighborhoods (see Table 15 in Appendix F). Crime rates may increase in HV neighborhoods as disinvestment and abandonment continues, as suggested by research conducted by Raleigh and Galster (2013)[56]. In a citywide study of the dynamic relationship between abandonment (blight), disinvestment (vacancy), violent crime, and property crime, they found mixed results. Using data from the first quarter of the 2010, they found that separately vacancy and abandonment each contribute to violent crime to the same extent, and concluded that removing all vacant buildings would be a more effective anticrime strategy than focusing on blight alone. However, based on the current rate of declining population and the sheer number of vacant houses – many of which can be rehabilitated, we predict that a strategy of demolition of all vacant houses would further decrease neighborhood stability and integrity, increase social isolation, and have a negative impact on health.

We were not able to carry out the same analyses in the HV zone because of small numbers, but expect that violent crime will continue or increase unless there is a more aggressive effort to secure vacant and/or remove blighted buildings. Violent crimes are associated with mental health outcomes for both victims and those who witness or live in the vicinity of crime, including PTSD, depression, substance abuse, and other mental and physical health outcomes. Youth are particularly vulnerable to safety, with high rates of violent deaths (homicide, suicide, and accidents combined).

As DFC and funding priorities for demolition are concentrated in low vacancy areas, we would expect that dangerous buildings will continue to pose threats to safety in HV areas. If proposals to secure vacant buildings are carried out, there will be reduced health risks. To the extent that demolition occurs, some safety hazards will be removed. The degree of protection with which demolitions are carried out will influence the extent to which nearby residents will be exposed to environmental contaminants (e.g., lead, asbestos).

We expect that high rates of crime in HV neighborhoods will prompt more residents to relocate if they are able. Based on current lower rates of violent and property crimes in MV and LV neighborhoods, we can predict that HV residents who relocate to those neighborhoods will experience or witness fewer violent crimes, with corresponding health benefits. Given the exceptionally high rates of homicide deaths, the size of the impact could be substantial. Due to strategic investments in low vacancy neighborhoods, we would further expect the crime rate to decline in those areas. However, there is some evidence that influx of new residents may have either beneficial or detrimental effects on the neighborhoods.

Women and girls, children, youth, elderly, and low-income families with children are particularly vulnerable to the negative health impacts of unsafe neighborhoods.

[56] Raleigh and Galster 2013.

6.6 Assessment: Environmental Conditions

6.6.1 Existing Conditions

- Aging infrastructure exposes residents to contamination through air, soil, and water, including carcinogens, lead, bacteria (from sewage overflow), and other pathogens.
- A detailed survey of randomly selected homes in Detroit found that 62% have at least one high risk hazard. Of these, 4.2 % have three or more risk hazards.
- There are 6,740 children under age 5 living in the HV zone.
- Among children under age 6 in HV zone who were tested for lead from 2010 - 2013, 28.5% had lead poisoning (elevated blood lead levels).
- Children are particularly vulnerable to adverse health effects associated with exposure to air pollutants.
- The HV zone has the highest rates of diseases associated with air quality per 100,00 population:
    - heart disease mortality – 376 compared to 176 nationally;
    - lung and bronchus cancer incidence – 88 compared to 63 in the low vacancy zone;
    - chronic lower respiratory disease mortality rate – 42 compared to 35 MV and 37 LV.

6.6.2 Potential Impacts

There is strong evidence that aging infrastructure contributes to neighborhood environmental conditions that negatively impact health, and will have increasing impacts as a result of climate change. There are differences across areas of the city in exposure to airborne, waterborne, and soil pollutants. Therefore, the potential impacts will depend on where an individual is living. In many HV areas there are multiple environmental exposures that will result in cumulative impacts, which are currently under study in Detroit. For those who relocate, moving into or out of areas with greater or lesser degrees of pollution will have implications for exposures to environmental toxins. It is difficult to assess where households will move in relation to environmental pollutants, with particular attention to vulnerable groups (e.g., elderly, children) and to communities or groups who bear the highest burdens (e.g., income, race/ethnicity). In addition, implementation of DFC will entail large scale demolitions.

Existing evidence suggests that a high proportion of HV residents are at risk of adverse health effects from living in older houses with risk hazards (e.g., faulty electrical wiring, sewage overflows, lead in paint and pipes, asbestos, mold). A substantial proportion of the housing stock in HV zones contains hazards to those living in them and to the surrounding environment. Unsafe housing contributes to lead poisoning, asthma, allergies, burns, and falls. A study in Detroit found that high blood levels before age 6 were strongly associated with poor academic achievement[57]. A detailed survey of 500 randomly selected homes in Detroit found that 62% have at least one high risk hazard[58]. Of these, 4.2 % have three or more risk hazards. Based on these results, the study estimated that citywide nearly 50,000 households with children living in them have one or more major hazards, putting them at daily risk of death, injury, illness, and loss of mental capacity.

Both demolition and removing/mitigating hazards in housing may have negative impacts on health if contaminants are released into the environment and expose residents, workers, and neighbors to

[57] Zhang et al. 2013.
[58] Drawing Detroit 2015.

health hazards. If protective measures and methods are used, however, there will be a positive impact on health for those who live there by removing unhealthy conditions in homes.

While demolition can have a beneficial impact on health by removing unsafe housing stock, how and where demolition debris is disposed of and use of the property after demolition have impacts on the environment that will impact health. There is further long term health risk of negative health impacts if the contaminants released are not properly contained or disposed, and remain in the soil and water. Climate change-related flooding of aged infrastructure may exacerbate spillover of contaminants into other areas and waterways.

Overall, there is substantial evidence that strategic lack of renewal of infrastructure in HV neighborhoods will have a negative effect on environmental conditions associated with health. The impact of housing stock depends on if, how, and where demolition occurs. Among those who leave, there is not sufficient evidence to predict where they will relocate to, thus we can expect there to be either positive or negative health effects on those who leave. Demolition is further described in section 6.9.

6.7 Assessment: Displacement, Relocation, and Gentrification

6.7.1 Existing Conditions

- Foreclosure is a major source of displacement in Detroit, with an estimated 35,000 properties at risk of foreclosure in 2015.
- Of the estimated 30,000 tax foreclosed houses listed to be sold at auction in fall 2015, a third were currently occupied.
- 66% of households in HV areas are renters and thus vulnerable to displacement.
- The median home value is $48,800 compared to $80,700 in the low vacancy zone and $66,150 citywide.
- HV zone has high level of poverty and economic disadvantage: median household income is $20, 514, with nearly half of households below the poverty line.
- HV neighborhoods have a high rate of violent death (homicide, suicide, and accidents combined) among youth 10-24 years old. Moving several times during childhood increases suicide risk.
- The infant mortality rate in Detroit was 13.4 per 1000 births in 2013.
- Corktown's median home value increased 26% from 2000 to 2013, an indicator of gentrification.[59]

Widespread foreclosure is a major contributor to displacement, relocation, instability, vacancy, and blight. There were 139,000 foreclosures in Detroit from 2005 – 2014, representing more than one-in-three homes. Half of the Detroit properties that went into foreclosure due to mortgage default during that time are now demolished or blighted. 35,000 Detroit properties were at risk of foreclosure in 2015. Of the estimated 30,000 tax foreclosed houses listed to be sold at auction in fall 2015, a third were currently occupied.[60]

6.7.2 Potential Impacts

The potential impacts of DFC Strategic Renewal on displacement and relocation are influenced by the foreclosure crisis in Detroit. The magnitude of foreclosures in Detroit plays a major role in current and future conditions, both by further reducing tax base available for infrastructure and by increasing numbers of vacant and blighted properties. Foreclosures both exacerbate and are impacted by SR, posing a substantial ongoing risk of displacement of residents in HV neighborhoods.

Diminishing services and deteriorating infrastructure over time may result in displacement and relocation of residents to other neighborhoods. Relocation may be beneficial or detrimental to health depending on the circumstances of leaving (voluntary or involuntary) and depending on the conditions of the neighborhood they move from and the place they move to. Displacement and relocation affect those being relocated, those who remain, and those who live in the areas to which people relocate. Some of the impacts have been discussed in the previous sections.

Potential adverse impacts of displacement and relocation

Evidence suggests that displacement and relocation can cause or contribute to: mental stress; loss of supportive social networks; costly school and job relocations; increased risk for homelessness, substandard housing and overcrowding; exposure to environmental conditions such as air quality

[59] Daily Detroit Staff 2015, 7.
[60] Rodriguez and Cooper 2015.

that may have health benefits or risks. Health effects are more adverse when the relocation is forced.

Deteriorating infrastructure may force residents out of their current neighborhoods and housing through flooding, fire, and electrical outages. Climate change exacerbates these risks and places a disproportionate burden on low income neighborhoods.

Displacement of residents from their homes puts families at risk for homelessness.[61] Prolonged periods of homelessness are associated with increased emergency department utilization and hospital admissions.[62] Additionally, residents may move to poorer housing in neighborhoods with fewer community resources. This could lead to poor access to heat, cooling, electricity, food, land safety, and poor air quality. These exposures can lead to increases in disease burden experienced by residents. They may experience dust exposure from demolitions, increase in rodent burden, crime, accidents, injury, stress, fear, and social isolation, and subsequently more use of healthcare services.

The process of relocating can be detrimental to health. Challenges include finding a place to live, placing strains on family ties, incurring relocation costs (moving, deposits), and increased household costs. Loss of income and increased expenses are associated with forgoing of medical care, including medical visits, preventive services, and medication/health supplies.

Displacement and relocation have disproportionate health impacts on *vulnerable groups*, including elderly, children, those on fixed incomes, low-income, and disabled. Replacement housing for these groups can be particularly challenging due to lack of accessibility, discrimination, and school proximity. Those at highest risk of foreclosure are elderly and those with young children. 80% of those foreclosed have faced a severe hardship in the past year such as medical problems and job loss.

Relocation may have particularly detrimental effects on children and youth. There is strong evidence that frequent moving during childhood (three or more times) has detrimental effects on mental, psychological, and physical health, as well as on educational outcomes, school attendance, and social relationships. Adolescents who moved several times during childhood had a 2.5 times higher risk for suicide. HV neighborhoods have a high rate of violent death (homicide, suicide, and accidents combined) among youth 10-24 years old.

Relocation may further impact the neighborhoods being left and those being entered. Homeowners leaving HV neighborhoods may have difficulty selling or receive lower value for their home, and then encounter higher prices if they move to MV or LV neighborhoods in the city. Thus, it is likely the will experience a net loss in the home quality they are able to purchase.

Displacement may lead to a loss of usual sources of medical care and increased emergency or urgent care use. Non-English speaking and ethnic populations could experience a disproportionately negative impact if they lose access to culturally competent medical care.

[61] Fertig and Reingold 2007.
[62] Hahn et al. 2006.

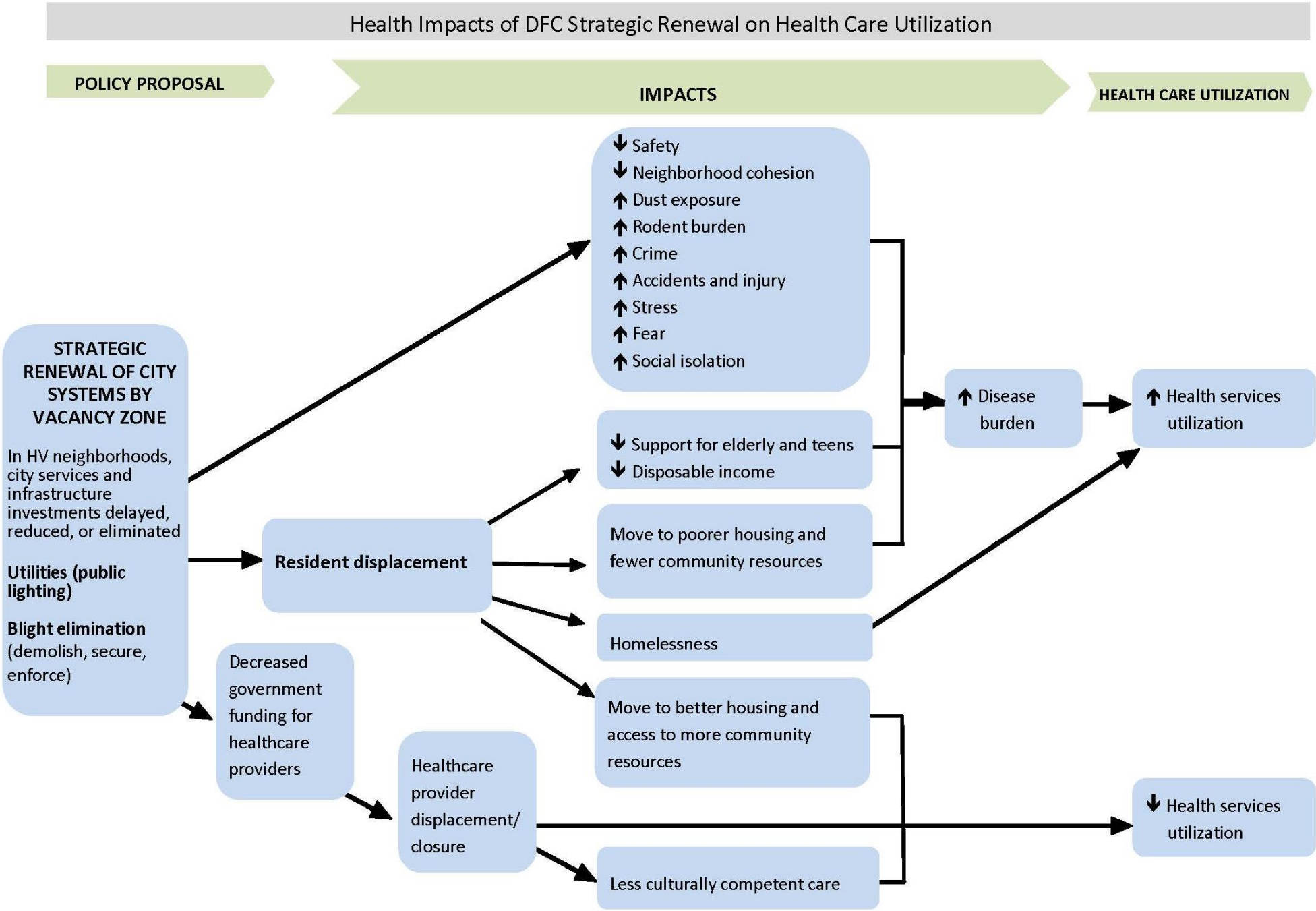
Potential health benefits of relocation

Those moving to areas with improved safety and environmental conditions, such as reliable lighting and greener built environments, would be likely to be more physically active with improvements in mental and physical health, including cardiovascular disease, asthma, and diabetes. Residents may relocate to neighborhoods with better neighborhood cohesion, stability and housing, thus decreasing crime, fear, injuries, and accidents.

Relocation could improve access to care if there are more health resources in their new neighborhoods. Relocated residents may experience an ease of finding needed healthcare services leading to a decrease in emergency and urgent care use, and an increase in primary care use.

The following pathway diagram, Figure 14: Health Impacts of DFC Strategic Renewal on Healthcare Utilization, illustrates how displacement may affect health through access to health services.

Figure 14: Health Impacts of DFC Strategic Renewal on Healthcare Utilization



Potential Impacts of Gentrification

Gentrification is the process by which higher income households and businesses displace lower income residents of an area, changing the character of the neighborhood. There is evidence of gentrification occurring in some areas of Detroit and it is likely that it will continue. Gentrification impacts health primarily through displacement of longtime residents, as described above.

Gentrification has both positive and negative effects on long term residents. Residents can benefit from improved neighborhood conditions, including reduced blight, better quantity and quality of amenities and resources, and reduced stigma. Rising property values may restore value to homeowners that was lost during earlier declines.

However, increasing property values can result in higher property taxes and costs of living and doing business that can result in displacement of original residents who are on fixed or low incomes or small businesses. Those particularly vulnerable to displacement are renters, elderly, and people of color.

There is mixed evidence on the health impacts of planned regeneration. Investments in the areas can lead to large increases in property values and loss of the existing community. Research has found that redevelopment can raise rents, forcing original residents to spend too much of their income on housing or live in substandard or overcrowded conditions in order to remain [63]. Other challenges caused by displacement include attempting to find housing under limited financial resources and a discriminatory rental market [64]. As more lower-income residents get displaced, the concentration of poverty in other areas becomes more likely.

Revitalization investments have the potential to support existing residents and businesses, stabilize neighborhoods, and reduce racial and economic equity. Such investments are also used to attract new people and businesses in order to increase population and revenues. If investments are prioritized toward the latter, the improvements will disproportionately benefit more affluent and typically white newcomers, widening health inequities by income and race. In a study of Race and Revitalization in Detroit, a total of 818 individuals were identified from fellowship programs, business incubators, universities, foundations, and other "innovation" programs. Across all of the programs 69.2% of individuals were classified as White and only 23.7% as Black (1.6% Latino, 4.8% Asian, 0.7% Arab) http://detroitdata.org/dataset/race-and-revitalization-in-detroit.

At the neighborhood and city level, gentrification may have beneficial effects by reducing stigma of an area or detrimental effects through loss of community identity. If gentrification occurs in some areas and HV neighborhoods experience continued infrastructure decline, racial and economic gaps will widen citywide. Many neighborhoods have a history and cultural identity that is part of the broader fabric of a city and racial group. The existing character and make-up of communities can be

[63] Ellen, Mijanovich, and Dillman 2001; Haas et al. 2006; Lipman 2006.
[64] Human Impact Partners, Advancement Project, and National People's Action 2012.

lost, changed, replaced through loss of people and identify (typically racial and ethnic), cultural appropriate, renaming, and redefinition.

As investment in other areas of Detroit increases housing costs in those areas, newcomers seek less expensive housing elsewhere including HV neighborhoods. This drives up property values and increases population, which has beneficial effects of stabilizing the area from population loss and bringing more economically stable residents. This can benefit existing HV homeowners by restoring value in their homes. This can also be detrimental to residents by increasing property taxes and pricing homes out of reach for other HV residents who need to relocate. This is happening in several parts of Detroit, most notably downtown area, Southwest Detroit, and Eastern Market.

Summary of Potential Health Impacts of Overall Strategic Renewal of City Systems

Sections 6.3 to 6.7 assessed the impacts of the overarching topic of the HIA, the Strategic Renewal of city systems. Prior to summarizing the findings of this assessment, the assessments of *Public Lighting* and *Demolition* will be presented. A summary of all of the findings will be presented in 6.10.

6.8 Assessment of Public Lighting Strategy

6.8.1 Overview and Pathways

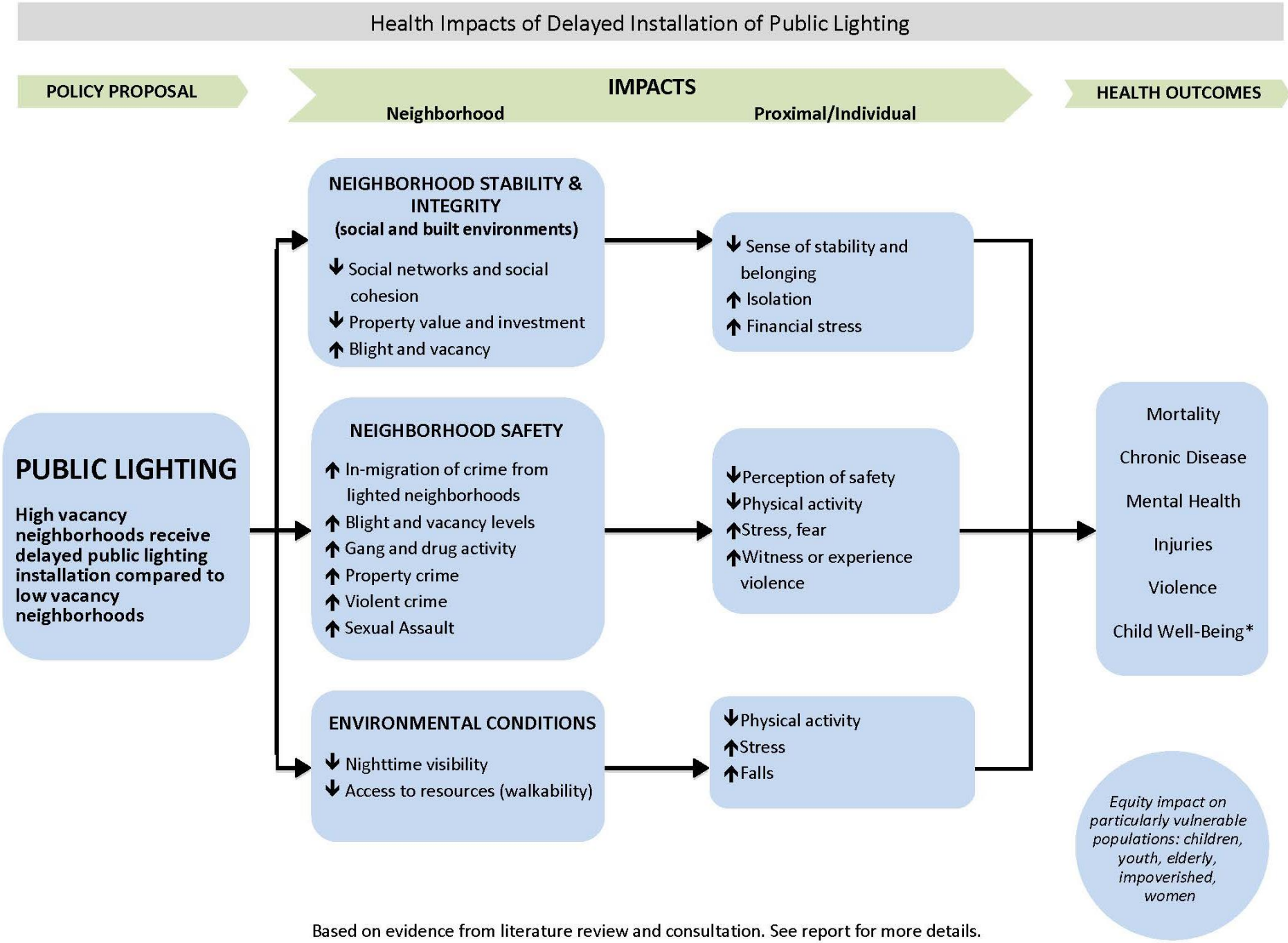
"How can we think about the future if our street lights don't work today?"
--Detroit Resident, 2012

DFC Strategic Renewal proposed that public lighting in the HV zone be reduced and maintained at a basic or declining rate, and/or decommissioned. Thus the HIA initially focused research questions and literature review on evaluating the impact of further reducing a lighting system that was already only half functioning. Subsequently, the policy proposal for the HIA changed. The Public Lighting Authority (PLA) was established to replace public lighting in the city with a new system that would provide lighting to all neighborhoods in the city by the end of 2016. Citywide improvement was scheduled by zip code rather than vacancy.

This change occurred mid-way through the HIA, necessitating a change in the HIA. Because there was uncertainty about how "all" neighborhoods would be defined and whether very high vacancy neighborhoods would be lighted adequately, we modified the assessment to examine the impacts of delayed lighting in HV neighborhoods that were later on the schedule, and the proposal to decommission all alley lights. The initial DFC proposal still shapes the assessment, however.

The diagram below maps out the pathways from left to right, based on existing evidence. HV neighborhoods receiving *delayed lighting installation* compared to the LV and MV neighborhoods, particularly those in surrounding areas, would impact *neighborhoods* through changes in neighborhood stability and integrity, neighborhood safety; *individuals* through intermediate effects; and ultimately *health outcomes*.

Figure 15: Health Impacts of Delayed Public Lighting Installation on High Vacancy Neighborhoods



Based on evidence from literature review and consultation. See report for more details.
* Child well-being includes low birth weight, learning, and school completion

6.8.2 Existing Conditions

- With only half of street lights working in 2013, public lighting has been a major concern of Detroit residents for decades.
- Lighting renewal in Detroit is being implemented by zip codes.
- 75% of HV homes are within 50 feet of an alley that will not be lit.

6.8.3 Potential Impacts

Increase in Accidents, Crime, and Social Isolation

A reduction in street lighting is thought to negatively affect the actual and perceived safety of a neighborhood. Little evidence exists, however, to document these effects. A case study of public lighting in Wales documents stakeholders' reaction to a reduction of public lighting. There, the local authorities introduced a new policy to limit street lighting at night due to environmental and financial reasons. Many stakeholders, including public health practitioners, sustainable development leaders, and community representatives suggested that reducing the lighting will increase road and pedestrian accidents, actual crime, social isolation, and decrease perceived community safety, physical activity, and social cohesion. Furthermore, authors suggested that a reduction of street lighting in deprived areas may lead to disproportionate increases in crimes such as drug dealing, anti-social behavior, and knife crime.[65] Unfortunately, little research has studied the actual effects of a reduction in street lighting, and has instead focused on the impacts of an increase in street lighting.

The health impacts of the overarching SR approach, described above, also apply to the public lighting scenario. Here we describe health impacts specific to public lighting. The Detroit Public Lighting Authority's plan to install LED lighting throughout all of Detroit by the end of 2015 will result in a positive overall impact for Detroit. However, as the installation will occur on a ZIP code by ZIP code as Figure 7 shows, some high vacancy neighborhoods will experience less lit streets while other ZIP codes will have already received new lighting. The lag may be up to a year. The potential health impact of being last priority will contribute to overall decline in HV neighborhoods during the time in which other areas receive improvements. This may be particularly detrimental in high crime areas.

There is also potential for violent and property crime to migrate from newly relighted areas into less lit areas, but no substantial evidence supports or refutes this hypothesis.

In addition, there is uncertainty as to whether all HV neighborhoods will receive the lighting implementation, as the implementation plan states that it will be carried out in "occupied" areas. It would be important to determine what criteria the PLA is using for occupied and to monitor crime rates and health outcomes accordingly.

As the literature focuses more on the effects of increased lighting as opposed to decreased lighting, we can predict that HV residents who relocate to better-lit areas will have a better perception of safety, especially for women and the elderly, will increase their physical activity, and will have increased community pride.

Currently, 75% of HV residences are within 50 feet of an alley that will not be lighted, and if residents want alley lighting near their residence, they must pay $17 a month. We lack data that

[65] Wales Health Impact Assessment Support Unit 2009.

draws a link specifically between alley lighting and health impacts, so it is difficult to estimate the health impact of a lack of alley lighting. It is also unclear to what extent residents value alley lighting, and if they value it as much as public lighting on the sidewalks and in front of their homes. What is clear, though, is that requiring a monthly payment of $17 to receive alley lighting places a larger burden HV neighborhoods since their median household income is between $6,000 and $16,000 lower than MV and LV neighborhoods.

6.8.4 Summary of Potential Impacts of Public Lighting Renewal Implementation

The following table summarizes the potential impacts of the lighting renewal plan on the determinants of health, under the assumption that public lighting will be replaced in HV neighborhoods in a timely manner and with coverage of all neighborhoods. The summary of findings includes the direction and extent of the impact, the likelihood of the effect, the strength of the evidence, and vulnerable groups.

HV neighborhoods within zip codes that have already received lighting renewal are likely to experience greater perception of safety that results in more walking and physical activity, social cohesion, and fewer injuries. Delayed renewal of public lighting in areas with high rates of crime and injuries will likely have short-term negative health impacts on residents living in HV neighborhoods.

We can reasonably predict that residents remaining in the HV neighborhoods without adequate public lighting will not have as high perceptions of safety as do those living in well-lit neighborhoods, will be less physically active, and will have less community pride in the period during which they are without lighting. However, in areas that continue to have lack of lighting due to definitions that exclude some areas as not sufficiently occupied or darkened alleyways, we would expect health outcomes to stay the same or worsen. Monitoring health and safety outcomes would enable implementation to be carried out to maximize benefits and minimize detrimental effects such as possible crime migration.

Table 10: Health Impacts of Public Lighting Renewal in all HV Areas

Health Impacts of Public Lighting Replaced in HV Neighborhoods				
Health Outcome/Determinant	**Direction and Extent***	**Likelihood****	**Quality of Evidence*****	**Vulnerable Groups**
Crime	?	Uncertain	•	Youth, girls, elderly
Crime migration from lit areas to unlit areas	?	Possible	•	
Perception of safety	▲▲▲	Likely	•••	Women and the elderly living in areas receiving new public lighting
Nighttime walking	▲▲▲	Possible	••	Women, elderly
Injuries	▲	Possible	•	Elderly
Community cohesion, social networks	▲▲	Possible	••	Unclear if differential effect
Financial stress from additional alley light cost	▲▲	Possible	•	Low-income households

*Direction and Extent of Health Impact: ▲▲▲Severe impact; ▲▲Moderate impact; ▲Small impact; ? Uncertain; = No impact

**Likelihood of Impact: Likely; Possible; Unlikely; Uncertain

***Strength/Quality of Evidence: ••• many strong studies; •• 1-2 good studies; • no studies but consistent with principles of public health.

6.9 Assessment of Demolition as Blight Removal Strategy

6.9.1 Overview and Pathways

The initial DWP plan called for large-scale demolition of entire areas identified as "long-term decline and no market." DFC subsequently called for demolition to be prioritized on the basis of stabilizing neighborhoods, what framework zone the property is in, and long range economic and land use goals. The HIA looked at two aspects of DFC strategy regarding demolition for blight removal. First, we looked at impact of not carrying out demolition in HV areas in order to focus on carrying out demolitions in MV and LV neighborhoods. The HIA further considered the strategy of using demolition as the primary means of removing blight. Second, the HIA looked at the impact of carrying out some demolition in HV areas but unprotected, that is, using conventional methods rather than methods aimed at maximizing safety and minimizing environmental contamination, which are more costly. A separate diagram shows the pathways for each of the two proposals.

The two diagrams below map out the pathways from left to right for no demolition and for unprotected demolition. Based on existing evidence, demolition in the HV zone would impact neighborhoods through neighborhood stability, safety, and environment conditions as delineated in the pathways. These neighborhood conditions impact individuals through the intermediate pathways, and result in health outcomes.

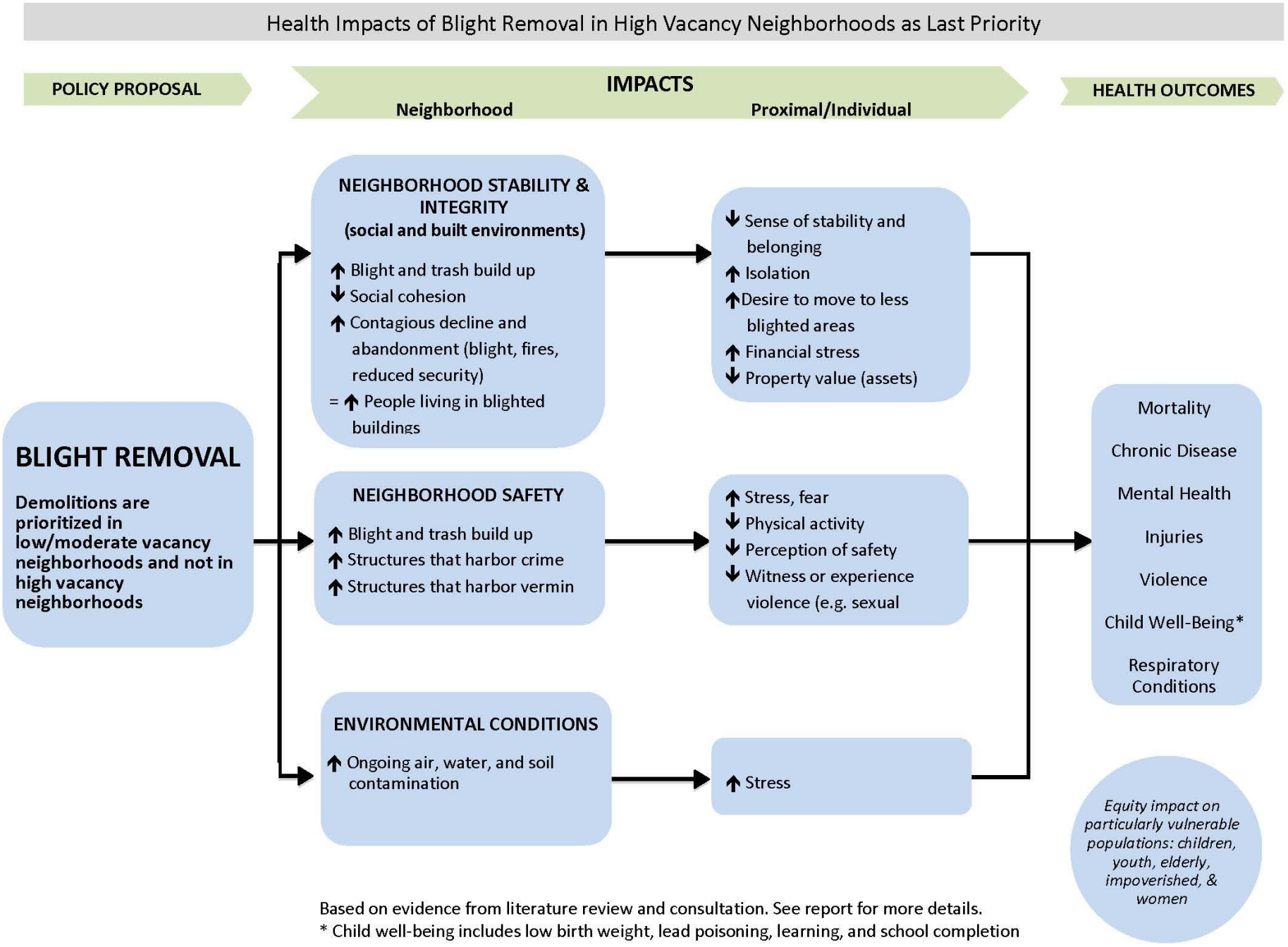
These impacts are analyzed in the following section. Some health impacts of demolition have been described in preceding sections, and we will summarize those findings here where relevant.

An important consideration in this assessment is how blight is defined within the context of using demolition as the principal strategy to remove blight. The City of Detroit defines blight as any property that is "open, dangerous, and vacant." Blighted, vacant, and abandoned are terms often used synonymously in the Detroit context. The Blight Removal Task Force (BRTF) was convened in 2013 "to develop a detailed implementation plan to remove every blighted structure and clear every blighted vacant lot in the City of Detroit as quickly as possible using an environmentally-conscious approach." [66] BRTF identified blighted properties citywide using a number of different indicators. Within this definition, buildings that are potentially inhabitable can be classified as blight.

In Baltimore, a city with high vacancy that has been a model of practicing "responsible demolition, the city building code defines residences as vacant only if they are uninhabitable, not if they are merely unoccupied[67]. By comparison, Dewar and Thomas (2013) characterize properties in terms of "abandonment," defined as "when the owner stops taking responsibility for it." Areas of abandonment include large percentages of vacancies which "jeopardize the quality of life for remaining residents."[68]

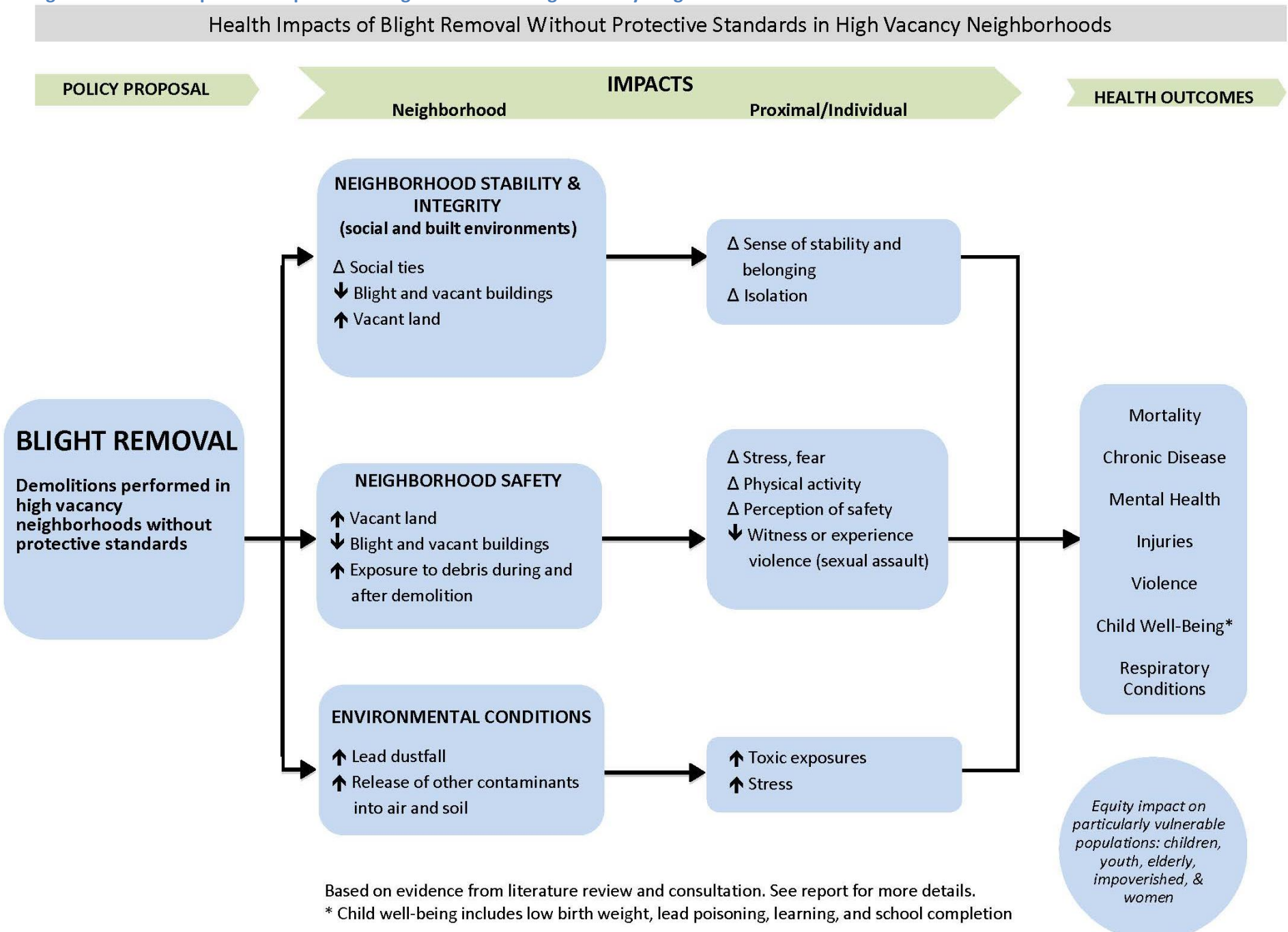
[66] Detroit Blight Removal Task Force 2014.
[67] U.S. Government Accountability Office 2011.
[68] Dewar and Thomas 2013, 3–4.

Figure 16: Health Impacts of Blight Removal Prioritization in Low/Moderate Vacancy Neighborhoods



Based on evidence from literature review and consultation. See report for more details.
* Child well-being includes low birth weight, lead poisoning, learning, and school completion

Figure 17: Health Impacts of Unprotected Blight Removal in High Vacancy Neighborhoods



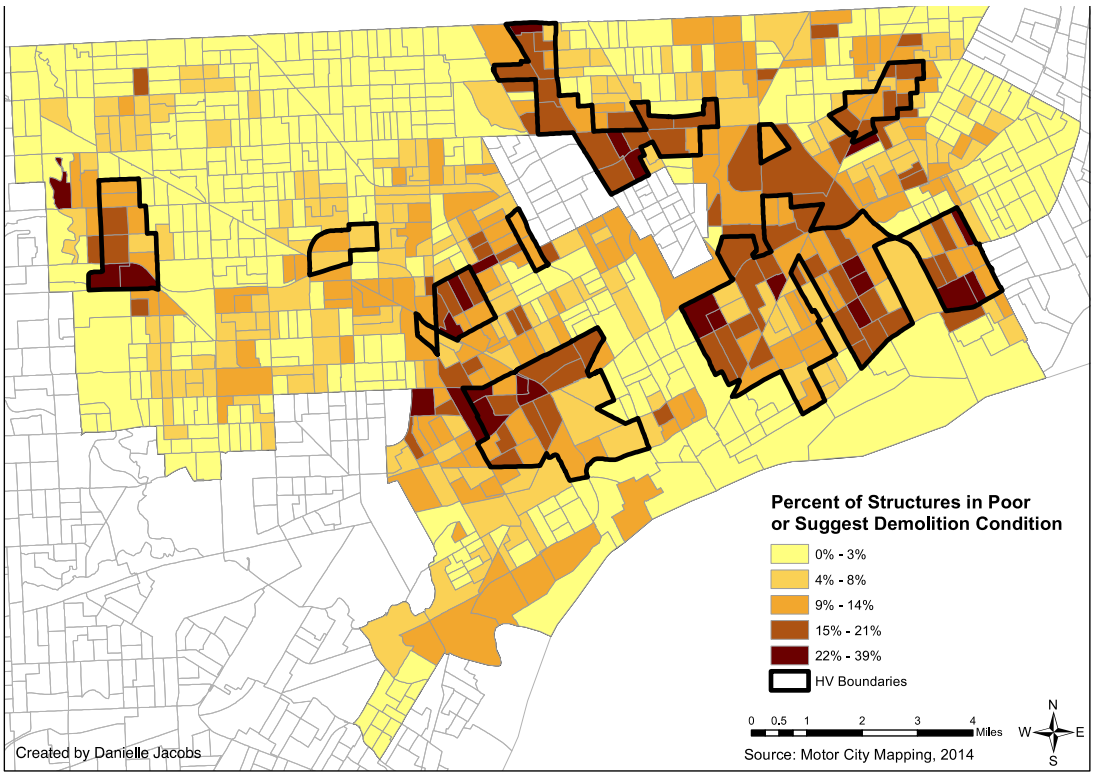
Based on evidence from literature review and consultation. See report for more details.
* Child well-being includes low birth weight, lead poisoning, learning, and school completion

6.9.2 Existing Conditions

- 14% of structures in the HV zone are in poor condition or demolish condition.
- The HV zone has the highest rates of violent and property crime compared to other areas.
- 28.5% of children under age 6 who were tested had elevated blood lead levels.
- The HV zone has a heart disease death rate of 376 deaths per 100,000 people – nearly twice the national average.
- 55% of lots are vacant

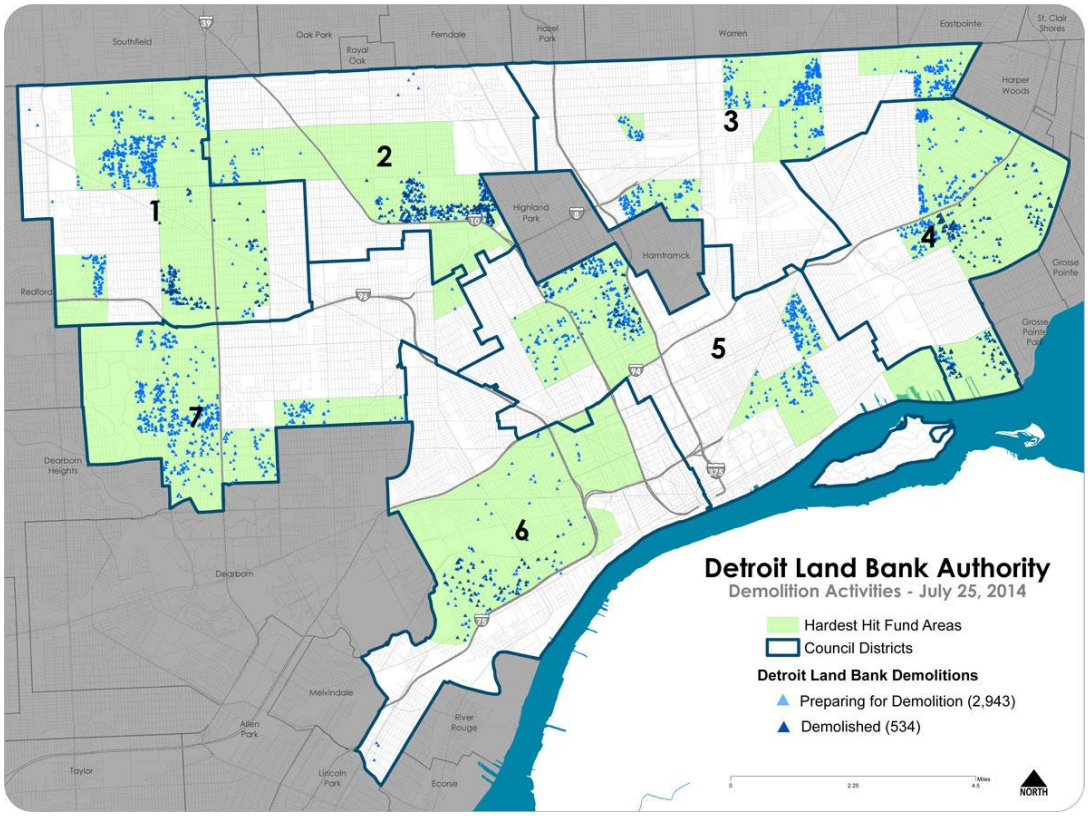
On average, 14% of structures in the HV zone are in poor condition or suggested for demolition (see Figure 3 in Appendix F). By numbers, this is four times as many blighted buildings as in the low vacancy zone. Among neighborhoods that are high vacancy, there is a lot of variation in the proportion and number of blighted buildings, as shown in the map in Figure 18.

Figure 18: Percent of Structures in Poor or Suggest Demolition Condition by Block Group in Detroit, 2014



Most funding for demolition is from the Hardest Hit Fund and is restricted to specific areas with relatively low vacancy, in order to do targeted stabilization of “strong market” neighborhoods (higher property values, less structural vacancy). These are the green areas in Figure 19.

Figure 19: Priority Demolition Areas, Hardest Hit Fund



Source: Detroit Land Bank Authority Accessed 9-20-15.
https://detroitography.files.wordpress.com/2014/08/hhf_demos_pubicmap_7_29.jpg

6.9.3 Potential Impacts

The presence of blighted and abandoned properties is associated with poor physical and mental health, less physical activity, reduced social cohesion, increased fear and perception of crime, some types of crimes, and injuries. Thus we would expect that removing blight would result in improvements in health. Further, demolition is beneficial to health by removing substandard and contaminated housing stock. However, how and where demolitions are carried out affect exposure of residents and workers to associated physical contaminants released during demolition.

There are risks of negative health impacts to the *environment* if the contaminants released are not properly disposed of or contained, and remain in the soil and water. Flooding related to climate change may exacerbate spillover of contaminants into other areas and waterways. As described in the Environment section, removing or mitigating hazards in housing may have a negative impact on health if contaminants are released into the environment and expose residents, workers, and neighbors to health hazards. If protective measures and methods are used, however, there will be a positive impact on health for those who live there by removing unhealthy conditions in homes.

There are a number of evidence-based interventions that can effectively remediate and reduce housing hazards such as lead (from paint and water pipes), humidity, and mold[69]. Demolition removes contaminated housing stock. However, how and where demolitions are carried out affect

[69] Thomson, Petticrew, and Douglas 2003.

exposure of residents and workers to associated physical contaminants released during demolition. There is further long term health risk of negative impacts on health due to exposure to contaminated environments over time.

Given the extent of severely blighted buildings in HV neighborhoods, large numbers of demolitions will be necessary, regardless of future land use plans.

Mental and emotional health outcomes include anxiety, social isolation, depression, and sleep disruption. Physical health outcomes include: lead poisoning (infants and children); toxic health exposure to mercury, asbestos, and other contaminants; and occupational health hazards for demolition workers. Impacts on health at the community level include: strangers in community (even if workers are hired from within the community); traffic disruptions due to construction: Increased racial segregation; and forced displacement from buildings owned by residents who are unaware of demolition plans or who do not wish for buildings to be demolished.

As Detroit's plan is to focus blight removal on more stable neighborhoods first, the HV neighborhoods will not receive the same amount of attention to blight as other neighborhoods. As shown above in Figure 18, HV neighborhoods contain the highest proportion of structures in either "poor" or "suggested demolition" condition. Based on evidence in the literature that neighborhoods with more blight are associated with less physical activity among its residents, we predict that as long as blight is not removed in HV neighborhoods, residents living in HV neighborhoods will engage in less physical activity than residents living in other areas of Detroit. In addition, there is some evidence that blight is associated with negative mental health outcomes such as sadness, depression, and anxiety, so we cautiously predict that HV residents will suffer from poorer mental health outcomes than residents of other vacancy zones.

Clearing vegetation and cutting down trees can have beneficial effects by increasing visibility and removing hidden places where crime can occur. Removing all vegetation, particularly in areas of widespread demolition such as occurred in the Eastern Market area under the short-lived Blight Authority (see the photo in **Error! Reference source not found.**), can have negative effects on the nvironment. Trees and vegetation offer protection against extreme heat events; increase oxygen production and reduce levels of smog, thereby improving air quality; and improve water quality and storm water management and flood control.

Figure 20: Demolition and Vegetation Clearing of 10-Block Area 2013

Source: Bill Pulte, Detroit Blight Authority.
http://www.mlive.com/news/detroit/index.ssf/2013/02/aerial_photos_give_before-and-.html.

6.9.4 Summary of Potential Impacts of Demolition/Blight Removal Strategy in High Vacancy Neighborhoods

The following two tables summarize the potential impacts of the DFC demolition/blight removal plan on health outcomes. The summary of findings includes the direction and extent of the impact, the likelihood of the effect, the strength of the evidence, and vulnerable groups.

The first proposal, summarized in

Table 11, assumes that there will be few or no demolitions in the HV zone due to prioritization of funds to the other zones. There are currently no alternative blight removal strategies proposed at the scale necessary to impact the number of bighted buildings in the zone. In other words, blighted buildings would remain in the neighborhoods.

Table 11: Health Impacts of Blight Removal Prioritization in LV and MV Neighborhoods for HV Residents

Health Impacts of Limited/No Demolition in HV Neighborhoods (Low Priority)				
Health Outcome/Determinant	**Direction and Extent***	**Likelihood****	**Quality of Evidence*****	**Vulnerable Groups**
Physical activity	▼▼	likely	•••	Girls, elderly
Anxiety and depression	▲▲	possible	••	Low-income
Lead poisoning from dust fall	=	likely	•••	Children
Lead poisoning from removal of poor housing	= ▲▲	likely	•••	Children
Asthma and respiratory illness	= ▲	likely	••	Children, elderly
Injuries	▲▲	likely	•	Children
Violent crime	▲▲▲	possible	••	Youth, girls
Property crime	▲▲	uncertain	••	Unknown
Perception of safety	▲▲▲	likely	••	Women, girls, elderly

*Direction: ▲Increase in Health Outcome/Determinant; ▼ Decrease in Health Outcome/Determinant.
Extent of Health Impact: ▲▲▲Severe impact; ▲▲Moderate impact; ▲Small impact; ?Uncertain; = No impact
**Likelihood of Impact: Likely; Possible; Unlikely; Uncertain
***Strength/Quality of Evidence: ••• many strong studies; •• 1-2 good studies; • no studies but consistent with principles of public health.

We can reasonably predict that the negative health impacts of being exposed to blighted buildings would continue or worsen. These include lack of physical activity, anxiety and depression, and injuries. We would expect crime to increase as further buildings become blighted from increased numbers of vacant houses due to foreclosure and relocation, and the contagious effects of abandonment. Those living in blighted homes would continue to experience lead poisoning, asthma, and other conditions associated with poor housing.

Those groups who are particularly vulnerable to lack of demolition include children, elderly, youth, and low-income people. These groups are likely to have multiple impacts. Combined with high rates of illness and low economic resources among HV residents, there are likely to be cumulative effects.

The second proposal, summarized in Table 12, assumes that demolition that is carried out in HV areas will use traditional methods without the more costly protections of “responsible demolition” procedures.

Table 12: Health Impacts of Traditional (Unprotected) Demolition

Health Impacts of Traditional Demolition (Unprotected)				
Health Outcome/Determinant	**Direction and Extent***	**Likelihood****	**Quality of Evidence*****	**Vulnerable Groups**
Physical activity	▲	likely	•••	
Anxiety and depression	▼▼	possible	••	Low-income
Lead poisoning from dust fall	▲▲	likely	••	Children, pregnant women
Lead poisoning from removal of poor housing	▼▼	possible	•••	Children
Asthma and respiratory illness	▲	possible	•	Children, elderly
Injuries during demolition Injuries after demolition	▲ ▼	possible possible	•	Children
Violent crime	▼▼	possible	••	Youth, girls
Property crime	?	uncertain	•	Unknown
Perception of safety	▲▲▲	possible	••	Girls,women

*Direction: ▲Increase in Health Outcome/Determinant; ▼ Decrease in Health Outcome/Determinant.
Extent of Health Impact: ▲▲▲Severe impact; ▲▲Moderate impact; ▲Small impact; ?Uncertain; = No impact
**Likelihood of Impact: Likely; Possible; Unlikely; Uncertain
***Strength/Quality of Evidence: ••• many strong studies; •• 1-2 good studies; • no studies but consistent with principles of public health.

We can reasonably predict that residents will experience health benefits of being exposed to less blight, counter to the results described above. These include a small increase in physical activity, improved perceptions of safety, and somewhat reduced anxiety, depression, and injuries. We would expect some decrease in crime as the number and concentration of blighted buildings stay the same or decline, but the evidence is mixed. Youth, girls, and women would particularly benefit because of their vulnerability to crime, violence, and perceived lack of safety.

Although there may be reductions in lead poisoning, asthma, and other conditions among those who were previously living in the blighted buildings, the number of people affected would be small. Their health is likely to worsen as they are displaced and are affected by the impacts of relocation and possibility of becoming homeless or rehoused in similar blighted buildings.

We would predict that the process of unprotected demolition would be detrimental to health, including increase in asthma and lead poisoning from dust fall, and injuries during demolition.

Those groups who are particularly vulnerable to negative effects of unprotected demolition include children, pregnant women, and those with chronic diseases. These groups are likely to have multiple impacts. Combined with high rates of illness and low economic resources among HV residents, there are likely to be cumulative effects, particularly due to the effects of poor air quality on chronic diseases.

6.10 Summary of Assessment Findings

This section presents a summary of the findings of the health impact assessment. Table 13 summarizes the potential impacts of the DFC Strategic Renewal of infrastructure and city services in the HV zone, including impacts of lighting and demolition proposals.

The summary of findings is organized by health outcome followed by the determinants of health on the pathway for each health outcome. The table delineates the potential impacts of the three proposals, the direction and extent of the impact, the likelihood of the effect, the strength of the evidence, and vulnerable groups (see Key at the bottom of the table for criteria).

Due to the high degree of uncertainty, we did not try to predict the extent to which residents will remain or relocate, and where they will move from or to. However, we incorporated the health implications of these considerations into each section. Given continuing population loss in some areas and potential gentrification in others, this is an important consideration to be addressed both citywide and in localized community-based planning.

Table 13: Summary of Findings: Health Impact Analysis of DFC Strategic Renewal in High Vacancy Neighborhoods

Health Outcomes	Determinants/Intermediate Impacts	DFC Proposal [70]	Health Impact[71]	Likelihood[72]	Evidence[73]	Vulnerable Groups
Mortality (various)	Crime, stress, social and physical environment exposures	1, 2, 3	▲▲	Likely	•••	Youth
Chronic diseases	Stress, air pollution, financial status Social support	1, 2, 3	▲▲	Likely	•••	
Heart disease	Stress, air pollution, lead, maternal lifetime exposures Existing social support and social networks	1, 2, 3	▲▲ =	Likely	•••	Elderly
Asthma, other Respiratory diseases	Air quality Housing condition Demolition dust fall	1, 3	= ▲	Possible	••	
Cancers (Lung, colorectal, breast, prostate)	Environmental exposures Food access	1, 3	=	Uncertain	?	
Injuries	Lighting Environmental conditions	1, 2, 3	= ▲	Possible	•	Elderly, women and girls
Mental health	Stress, crime, stability + poverty, vacancy, blight, financial insecurity, low social support	1, 2, 3	▲▲	Likely	•••	
Homelessness	Financial stress Foreclosure Fire and blight	1, 2, 3	▲	Possible	•	
Homicides	Crime, blight	1, 2, 3	▲	Likely	•••	Youth, young men of color
Youth death rate	Crime, stress, social and physical environments, employment	1, 2, 3	▲▲	Likely	•••	Young men of color
Lead poisoning	Unprotected demolition Old housing in poor condition removed	1, 3	= ▲ ▼	Likely, Uncertain	••	Children, fetus (low birthweight)
Low birth weight (infant mortality)	Stress, air pollution, lead, maternal lifetime social/economic/environmental factors, social support	1, 2, 3	▲	Possible	•••	African Americans

[70] 1 – Overall Strategic Renewal Implementation in HV Neighborhoods; 2 – Public Lighting Installation in HV zone as Last Priority; 3 – Demolition in HV zone No/Low priority, and Unprotected demolition

[71] Direction: ▲ Increase health outcome; ▼Decrease health outcome Extent of Health Impact: ▲▲▲Severe impact; ▲▲Moderate impact; ▲ Small impact; ? Uncertain; = No impact

[72] Likelihood of Impact: Likely; Possible; Unlikely; Uncertain

[73] Strength/Quality of Evidence: ••• many strong studies; •• 1-2 good studies; • no studies but consistent with principles of public health.

Summary of Health Impact Analysis

As shown in the summary table, the Strategic Renewal approach for HV neighborhoods is likely to have both adverse and beneficial effects on health outcomes for residents.

Overall, however, Strategic Renewal as proposed for the HV zone is likely to result in worsening physical and social environments, as described above, contributing to adverse health effects in high vacancy areas. *Likely* health impacts include: moderate increases in mortality, cardiovascular disease, violent deaths among youth, and mental illnesses; small increases in homicides and low birth weight. *Possible* health impacts include a small increase in asthma, injuries, and homelessness.

Public lighting delay is predicted to have the same potential impacts as above. In addition, possible crime spillover may result in increased violence.

Proposed minimal or no demolition is predicted to have the same impacts described above for the overall plan. Some demolition but unprotected may result in a small increase in asthma and possible increase in illnesses associated with other environmental contaminants, including lead poisoning and cancer. Potential beneficial impacts of demolition (regardless of method) include a possible decrease in crime, injuries, and lead poisoning by removing unsafe housing from the neighborhood.

To the extent that Strategic Renewal results in displacement and relocation of residents, the potential impacts would depend on where residents move from and to. If they move to the same or worsened circumstances, the potential health impacts would be the same as above or exacerbated by reduced or strained social networks and increased stress and costs of relocation. For those who move to improved circumstances, we would expect beneficial impacts related to improved physical environment, reduced crime, and potential exposure to health-promoting norms and resources. However, the potential benefits of relocation may be offset by adverse effects from reduced social support networks and increased costs.

Overall, we would expect the magnitude of the adverse impacts at the population level to be high, given the existing high rates of poor health outcomes and lower income and resources to mitigate the impacts, as well as the relatively large numbers of individuals currently living in HV neighborhoods. Those groups who may be particularly vulnerable to overall impacts include impoverished individuals and households, children, youth, elderly, and pregnant women.

Discussion and Implications of Assessment Findings

Basic infrastructure and city services are now highly compromised and will continue to be detrimental to health without improvements. Neighborhoods in the HV zone have experienced lack of infrastructure and city service investments over decades. As a result, current conditions in many neighborhoods are compromising residents' physical and mental health. Overall, the HV area has rates of poor health that are the highest in the city and substantially higher than state and national rates. Thus, a policy decision to not improve basic living conditions at the level of infrastructure in the HV zone can have detrimental impacts across the city by exacerbating current conditions caused by previous disinvestment. It has further implications for equity now and in the future.

Existing communities also have strengths and resources that buffer the impacts of challenging conditions, including long term relationships to the city and their neighborhood, social ties and

networks, strong community institutions, cultural identity, and a history of activism to improve neighborhoods and resist unfairness. This may be particularly important for immigrant communities, and African Americans who experience the legacy of race-based residential segregation and other types of structural discrimination.

Individual neighborhoods within the HV zone differ substantially, indicating a need for customized strategies and resident involvement in decision-making. There is a great deal of variation among neighborhoods, both in regards to specific neighborhood environments and the people who live there. Detroit's people and communities have important information relevant to the neighborhoods they live in that is not available from other data sources. Thus, the assessment findings need to be applied to the specific circumstances of different areas in order to maximize potential health benefits and minimize the adverse effects of the Strategic Renewal proposal. For example, 88% of the Latino population lives in moderate and high vacancy zones, and thus may be disproportionately left out of the benefits of targeted investments in low vacancy neighborhoods. Further, Detroiters' strengths and ingenuity are essential resources to build a vibrant and distinctive future.

The level and type of investments in infrastructure and city services can impact the quality of neighborhoods, driving a process toward further decline or gentrification, both of which can result in displacement of existing residents. While there may be some beneficial aspects of severely challenged neighborhoods becoming non-residential, there is little evidence of the impact on those who remain or are gradually displaced as areas with reduced infrastructure become increasingly uninhabitable. DFC states that no one will be left without basic services, and substantial efforts are underway to increase lighting throughout the city. However, the DFC plan includes few strategies for assisting the 90,000 people currently living in high vacancy areas.

For HV neighborhoods that are experiencing targeted private investment or that adjoin such areas, increasing property values and higher costs of living and doing business can result in displacement of original residents. Those displaced are primarily renters, elderly, disabled persons, and people of color.

In summary, while it is imperative that the current crisis of deteriorated infrastructure, abandoned buildings and unlit streets be addressed, the approach to regeneration that concentrates investments in stable areas alone will not address the deeply rooted structural issues that have caused many historically vibrant neighborhoods of Detroit to become a "high vacancy zone." With focused attention to the potential health impacts in HV areas as detailed in this HIA, decisions in the current period may help to achieve the longer-term goals of a sustainable vibrant city that benefits all residents.

6.11 Types of Neighborhood Change and Potential Health Impacts

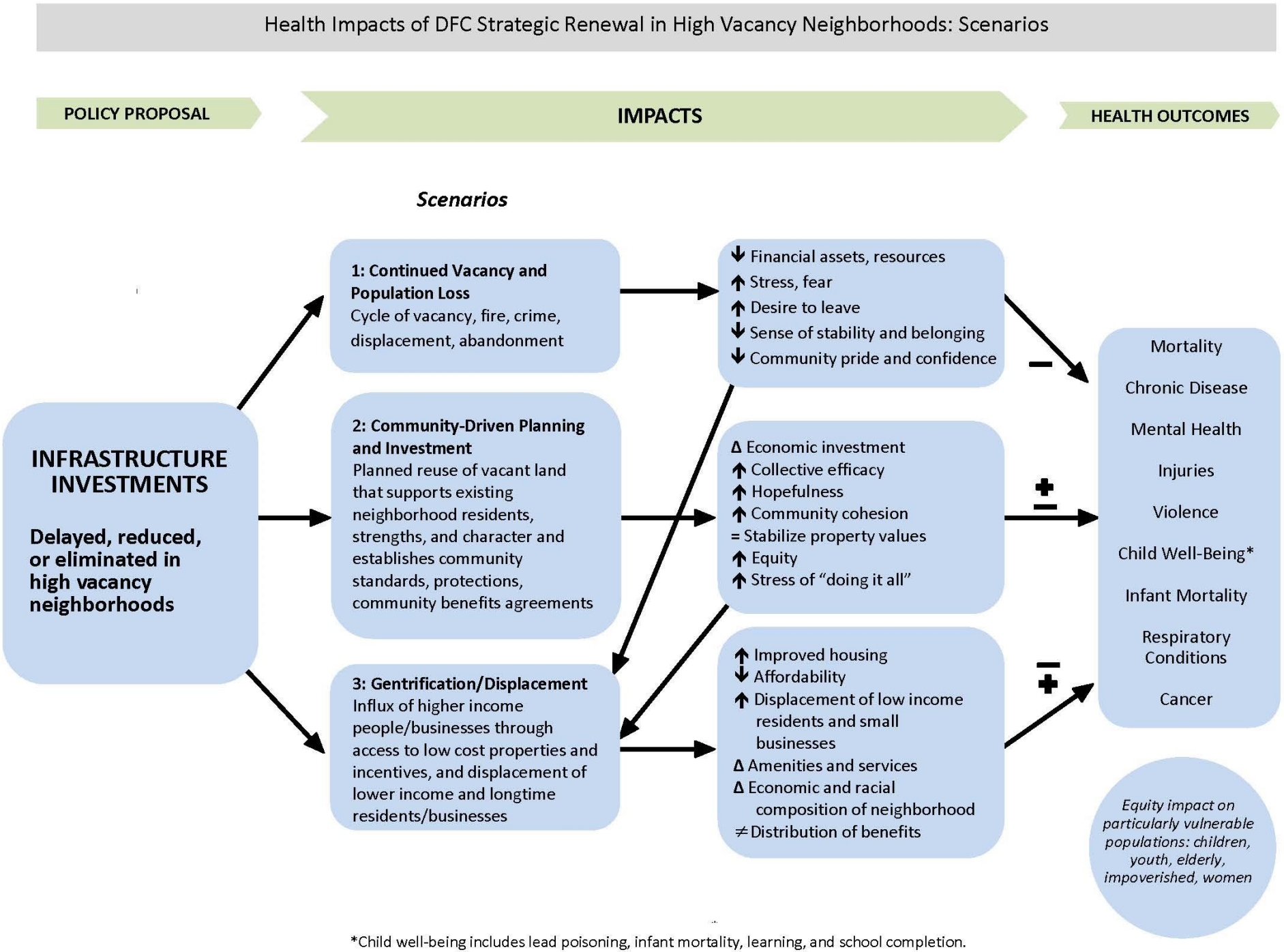
This final part of section 6 Assessment looks at how health impacts are likely to differ under three different types of neighborhood/community change currently taking place in neighborhoods within the HV zone. *Neighborhood change* refers to collective and social processes occurring within a community in response to current conditions and regeneration efforts. While the HIA focuses on impacts of DFC because of its scope and aim to guide future decision-making (public, private, and philanthropic), there are multiple regeneration efforts occurring simultaneously.

The HIA Steering Committee identified three types of change that are currently taking place in different areas of Detroit and to different degrees that are both in response to current conditions and influence the trajectory of the neighborhood.

1. Continued Vacancy and Population Loss
2. Community-Based Planning and Investment
3. Gentrification/Displacement

The potential impacts of these three types of change of high vacancy neighborhoods are illustrated in the conceptual model in Figure 21.

Figure 21: Neighborhood Change Types and Potential Health Impacts of DFC Strategic Renewal



*Child well-being includes lead poisoning, infant mortality, learning, and school completion.

1: Continued Vacancy and Population Loss

Some HV residential areas that have experienced extreme levels of disinvestment, poor infrastructure and services, population loss, and vacancy may not currently have the conditions necessary to enable or support residents to influence the future of the area. High rates of crime, large distances between homes, and presence of dangerous buildings may contribute to fear, social isolation, low social cohesion, and lack of influence over decision-makers. Such neighborhoods are likely to be stigmatized causing further abandonment by institutions and service-providers, such as lower response rates by police, fire, and utilities to emergency calls from residents. Without basic protections and increased investments, residents may be unable to relocate or may want to stay in their homes, yet have little influence over the trajectory of the neighborhood.

The potential impacts include: declining property values and worsening of housing conditions for both renters and homeowners; increased stress, fear, and desire to leave the neighborhood; decreased sense of community, stability; and further disruption of social networks. Potential health impacts include detrimental effects on physical and mental health.

2: Community-Based Planning and Investment

Some HV areas are engaged in organized community-driven planning. Evidence suggests that resident involvement in planning and redevelopment can benefit health, build community control, and move regeneration forward. Potential beneficial impacts include: improvements in the social fabric such as community cohesion, pride, collective efficacy, strengthened social networks; change in economic investment, stabilization of property values, increased amenities; and increased community capacity, control, and equity. Potential detrimental impacts include increased commitment of time and resources, stress, and burden from residents carrying the load of planning, development, and fundraising to improve basic conditions of their city. Potential health impacts include stabilization or improvements in physical and mental health. If collective efforts are unsuccessful or excessively burdensome, we predict both positive and negative impacts, depending on the resilience of the neighborhood and individuals.

In Detroit there is strong evidence that community-based planning efforts in HV areas are influencing regeneration planning, as well as making specific impacts on health determinants and outcomes. Several examples are the Lower Eastside Action Plan (LEAP, a program of Eastside Community Network), the Southwest Detroit Community Benefits Coalition (SDCBC), and Detroit Hispanic Development Corporation (DHDC). LEAP was established before DWP/DFC as a community-driven planning effort “to engage people in a process to transform vacant land and property into uses that improve the quality of life in our neighborhoods and surrounding areas.” DFC later adopted and promoted the LEAP model to foster similar efforts elsewhere in Detroit. The mission of the SDCBC is to ensure that the interests of community residents, businesses and community-based organizations are recognized and protected in public and private development projects in the community. They play a lead role in advocating for community benefits agreement policies. DHDC is rooted in the Latino community and plays a central role in local and citywide policy and planning initiatives to bring about equitable development, including community leadership to DFC.

3: Gentrification/Displacement

Some areas are currently experiencing or may be likely to experience gentrification in the near future. Gentrification is the influx of higher income residents and businesses into an area with consequent displacement of existing longtime residents and businesses. Displacement can be active or passive over short or longer periods of time, and is substantially influenced by development policies and practices. It is typically driven by access to low-cost properties and incentives, often made available through regeneration/redevelopment initiatives. As shown in the conceptual model in Figure 21, the first two neighborhood change scenarios/trajectories may lead to gentrification. Potential beneficial impacts on existing residents include improved physical and social environments, increased the amenities and services in the neighborhood, and greater economic and racial mix initially. These impacts may result in related physical and mental health improvements. The area is likely to continue to change, becoming increasingly white and higher income over time, resulting in potential detrimental effects of racial segregation on people of color and low income residents. Potential detrimental impacts on existing residents include: financial stress from higher costs such as housing, services, and amenities; increase in evictions; displacement or relocation of local, affordable, cultural-based services and businesses; increased tension and discrimination related to differences between longtime residents and newcomers (higher income, whiter, and younger); loss of protective community cultural, ethnic, and racial identity and social fabric; increased racial and economic segregation in the long term; and inequity in distribution of the benefits of regeneration.

Summary

These three types of neighborhood change are neither mutually exclusive nor inevitable. How DFC and related regeneration plans are implemented in its first five years will determine the extent to which the inclusive vision of improved quality of life in Detroit will include those who live in neighborhoods most heavily impacted by historical disinvestment and current-day challenges. With focused attention to the potential health impacts in HV areas, these decisions may help to achieve the longer-term goals of a sustainable vibrant city that benefits all residents. The following section presents recommendations to achieve these goals.

7 Recommendations

Neighborhoods are the fabric that binds our city together.
Detroit will not move forward unless we have strong neighborhoods here that are thriving.[74]

Ken Cockrel, former Mayor and Detroit City Council Member;
former Executive Director of Detroit Future City

The HIA was carried out during a period of continuously shifting economic and political environments. While some aspects of Detroit neighborhoods are changing rapidly, the underlying conditions are ongoing and persistent. For example, both the Detroit Public Lighting Authority and the Blight Removal Task Force were established and funded since the HIA began, changing the approach to decades old issues in only a few years. While new demolition policies and practices have been developed and funded, thousands more homes have become vacant due to foreclosure. Some of the potential recommendations developed earlier in the process have already been incorporated into different aspects of planning in Detroit.

The recommendations presented here were developed for the DFC and other decision makers to consider for implementation of the Strategic Framework approach of prioritizing resources by vacancy zone. Recommendations regarding public lighting and blight removal/demolition were developed for consideration by the entities charged with carrying out those efforts, and to inform overall planning for the future of Detroit. Because citywide planning and implementation of regeneration efforts are interrelated, the recommendations are presented together as one set of overarching recommended policies and practices.

Recommendations were collected throughout the different phases of the HIA process, and informed by community forums related to DFC, the literature review, assessment findings, best practices being tested elsewhere, proposals from other community-driven initiatives (described at the end of this section), and substantial input and feedback by the Steering Committee. Criteria for selecting recommendations included impact, feasibility, and priority. Based on the HIA analysis, the D-HIA Steering Committee developed the following recommendations to address the potential health impacts of implementation of DFC. The aim of these recommendations is to inform decision-making in order to maximize the potential health benefits and minimize or mitigate the adverse health effects of plans to address infrastructure and city systems in Detroit's highest vacancy neighborhoods.

1. **Establish community-driven neighborhood planning** (CDP) in decision-making by the City, by foundations, and by private investors, to ensure that HV neighborhoods with strong community organization have opportunities to retain and regenerate residential areas.
   1.1. Adopt a transparent process that requires resident participation in infrastructure planning and major development approval, for example, through the district Community Advisory Councils (CACs).
   1.2. Identify ongoing resources for community-driven planning initiatives, including financial support and capacity building (e.g., a community trust funded by investors of development projects). Recognize that capacity varies by neighborhood, and direct city Department of Neighborhoods to develop strategies to ensure that unorganized neighborhoods have a voice.

[74] Lawrence 2014.

1.3. Establish the use of CDP tools and frameworks as standard procedure to engage residents in city planning, such as CDAD framework, Detroit Community Planning Guidebook, and group planning and data sharing spaces such as WDWOT Site Control https://sitecontrol.us/

1.4. Require community representation on decision-making boards, task forces, and authorities for infrastructure planning, oversight, and implementation, and provide training opportunities to strengthen capacity for effective participation.

2. Ensure that all neighborhoods have basic service level of infrastructure and city systems.
Define core service level for all high vacancy neighborhoods. Further target renewal/maintenance or core services by identification of "hot spots" or vulnerability - crime, lighting, environmental, health, demographic data, and vulnerable groups - rather than by zone or ZIP code, to reduce immediate health risks.

2.1. Install public lighting improvements concurrently for high, moderate, and low vacancy neighborhoods, within ZIP codes. Fund additional lighting installations by turning off lights in commercial and public buildings overnight[75].

2.2. Upgrade and maintain sufficient public lighting for public safety now, particularly in high crime areas and based on vulnerable groups, rather than by ZIP code which leaves most HV areas for last. Increase police protection in areas where public lighting installation is delayed.

2.3. Provide basic level of publicly funded lighting in alleys based on proximity to homes, other street lighting, and crime. Eliminate proposed charge to homeowners for alley lights.

2.4. Increase police protection in high crime areas adjacent to where lighting upgrades and blight clearance have occurred.

2.5. Target blight prevention and removal strategies in HV areas based on vulnerable groups, crime rate, and proximity to schools.

2.6. Upgrade public lighting to a durable, resource-efficient system to maintain safer streets and neighborhoods.

3. Provide targeted safety, financial, and social service interventions to support residents of HV neighborhoods that continue to experience substantial decline.

3.1. Secure resources to support residents through community benefits agreements and targeted safety interventions (lighting, lot greening, safe transportation to school, and policing to prevent gang and crime migration).

3.2. Provide targeted mental health, social services, and youth programs to residents of the most distressed neighborhoods.

3.3. For those who want to or must relocate, ensure adequate housing and reduce financial burden through, for example, foreclosure assistance, property tax forgiveness, housing swaps, co-ops, income-restricted affordable units in new development.

3.4. Establish block clubs throughout the city to reduce isolation and enhance safety, social support, and community organization for those remaining and those moving to new areas.

[75] Simkhovich, Kleinman, and Kloner 2008.

4. **Ensure that current residents and businesses in or serving HV areas benefit from regeneration opportunities, to reduce economic insecurity and ensure that potential benefits and burdens of revitalization are equitably distributed.**
    4.1. Require long- and short-term community benefits as a condition of large-scale development in exchange for public subsidies or incentives (e.g., anti-displacement ordinance, land trusts, and tenant cooperatives).
    4.2. Create/require job and training opportunities for low-income residents in development and regeneration projects across the city (businesses, construction, demolition, deconstruction), and include occupational safety protections. Identify barriers to eligibility (e.g., literacy and math skills) and link existing remedial programs to training programs.
    4.3. Require that existing businesses and residents have equal or preferred access to new investments, incentives, and capacity building programs.
    4.4. Provide preferential loans to, and investment in, existing local and minority owned small businesses.

5. **Adopt, implement, monitor, and enforce "responsible demolition" standards for both public and private demolition, including HV neighborhoods where people live**.
    5.1. Identify areas with social and physical environmental conditions that require additional mitigation or remediation (e.g., near schools, where there are existing high levels of air-soil-water contamination).
    5.2. Involve community residents in planning and decision-making before, during, and after demolition.
    5.3. Clearly communicate demolition plan and implementation, and provide information and supports for people to protect themselves and their children.
    5.4. Minimize demolition waste through aggressive deconstruction. Maximize waste diversion through salvage, reuse, and recycling.

6. **Ensure that temporary and future vacant land use post-demolition contributes to community health and safety**.
    6.1. Secure resources for lot greening and maintenance to reduce stress and improve safety and stability.
    6.2. Ensure nearby residents the opportunity and incentives to buy vacant property without lengthy, burdensome procedures.
    6.3. Incorporate healthy, safe, and sustainable neighborhood design into land use plans.

7. **Require that large scale land purchases and development proposals include plans and resources that promote health equity for existing and future residents.**
    7.1. Establish sustainable and healthy review requirements as part of disposition and approval process.
    7.2. Mandate health impact assessment.
    7.3. Require assessment of impacts on city infrastructure (e.g., storm runoff and sanitary sewer capacity, electrical capacity).
    7.4. Conduct an economic analysis of the infrastructure costs of the project and develop a cost-sharing agreement between the developer and the city.
    7.5. Consult with community residents through CACs to develop specific supports for existing residents and businesses (community benefits agreement).

8. **Establish protections that consider the value of neighborhood legacy and community identity in decisions that affect the future of communities.**
   8.1. Secure opportunity financing through Community Development Financing Institutions for healthy, equitable community/economic development of historic neighborhoods that are outside the downtown core and in high vacancy areas.

   8.2. Restore business districts in historic HV neighborhoods.

9. **Anticipate gentrification, prevent involuntary displacement, mitigate negative impacts, and ensure benefits to existing neighborhoods from revitalization.**
   9.1. Track and monitor investments (e.g., fellowship programs, business incubators, and other "innovation" programs and change in neighborhoods (e.g., home sales, property values, population, income) by race and ethnicity, residents or newcomers, and geographic area to address equity).

   9.2. Monitor code enforcement to ensure that it is not being used to displace low-income or racial/ethnic communities.

10. **Preserve, restore, and produce affordable housing.**
   10.1. Renovate intact homes rather than demolish and provide ownership options through sweat equity and house trades.
   10.2. Enact inclusionary zoning, condominium conversion, and low-income housing replacement ordinances.

   10.3. Protect renters through required relocation payments, community benefits agreements, and enforcement of habitability codes.

   10.4. Maintain owner-occupied housing of low-income residents by restoring HV eligibility for loans and repair programs, and establishing tax deferral and tax “circuit breaker” programs.

11. **Use public assets for public good, and ensure that the value of previous public investment is factored into land disposition.**
   11.1. Ensure that city-owned land and school buildings be considered for community uses prior to disposition to the private sector; establish a mechanism to assure that a portion of revenues from selling public assets are used for public good.

   11.2. Provide equitable access for residents to purchase land/property.

   11.3. Establish a community land trust to preserve long-term housing affordability and ensure community stewardship of land.

12. **Secure ongoing revenues to support sustainable and health promoting local ownership and development.**
   12.1. Establish a state Community Investment Tax Credit (CITC) for contributions from individuals and businesses that fund local projects by nonprofits and CDCs.

   12.2. Promote regional infrastructure and financing.

13. **Establish regional agreements to ensure access to local area health data at no cost for assessment and monitoring purposes.**

There are a number of community-based planning efforts carried out by D-HIA partner organizations that address many of the issues raised in this HIA. Some of the recommendations were drawn from those excellent efforts. They include *LEAP Standards for Blight Elimination* http://ecn-

detroit.org/wp-content/uploads/2014/09/LEAP_BlightEliminationStandards.pdf and the *Detroit Environmental Agenda* http://detroitenv.org/ . Blight and demolition recommendations are adapted from The East Baltimore Revitalization Initiative's *Responsible Demolition: A Baltimore Case Study with National Implications* (2011).[76]

[76] Annie E. Casey Foundation 2011.

8 Monitoring and Evaluation

Monitoring the impacts of DFC implementation is critical to evaluate the health impact on residents, neighborhoods, and the city as a whole. The effect of DFC City Systems on each of the four intermediate impact areas (stability and integrity, neighborhood safety, environmental exposures, displacement/relocation/gentrification) are particularly critical to monitor in order evaluate the extent to which DFC is carrying out its mission to enhance quality of life for all Detroiters.

The HIA recommendations include a number of strategies to be used by existing entities (e.g., DFC, City government, the local health department, community-based organizations and planning initiatives such as LEAP) to monitor and evaluate the potential impacts of DFC implementation and the extent to which the HIA recommendations are adopted. D-HIA SC and Detroit URC Board members are involved in these entities and will continue to integrate the HIA in their work. Further, D-HIA will identify organizations and initiatives with the means and/or responsibility to monitor recommendations and longer-term health and equity outcomes moving forward.

Ongoing monitoring of the health status of residents in the HV neighborhoods can also be used by partner organizations and institutions to see the extent to which the predictions of the HIA were accurate, and to see if the health or health promoting conditions of the community have improved.

For example, seven SC members are on the Stakeholder Advisory Board of an environmental health sciences center that is involved in multiple issues relevant to the HIA. In particular, the center provided funding and support for a project to monitor the health impacts of demolition in low vacancy areas of Detroit by the Blight Elimination Project. This analysis aims to immediately influence City blight elimination procedures and strategies, and to provide meaningful information regarding whether and what type of public health impacts may be associated with these demolition practices.

A number of standard methods have been established for monitoring the process of gentrification and displacement[77] and equitable development. The D-HIA SC will identify what other organizations are monitoring or poised to monitor these conditions (e.g., funders, development initiatives), and explore means to integrate HIA findings and D-HIA partners into the monitoring process.

Dissemination and Advocating Adoption

D-HIA and Detroit URC partners have longstanding relationships with community organizations, policymakers, city and state officials, funders, and businesses, and will disseminate the HIA report widely through these networks in accessible formats, including fact sheets/briefs aimed at different audiences, and posting of the report on the Detroit URC website. The Community Policy Specialists will facilitate widespread dissemination and meet with key stakeholders and decision-makers and advocate adoption. All partners will identify strategies to advance implementation of recommendations. Throughout, we will enhance community and academic partners' capacity to use HIA and strengthen cross-sector collaboration.

[77] Causa Justa::Just Cause 2015.

9 Conclusion

This health impact assessment was carried out during a time of tremendous change in Detroit. Economic and political environments have shifted dramatically – as Detroit went through bankruptcy, change in political leadership and the structure of city government, and sudden attention (including funding and investment) at state, federal, and international levels. However, while some aspects of Detroit neighborhoods are changing rapidly, the underlying conditions are ongoing and persistent. Even as new demolition policies and practices have been developed and funded, tens of thousands more homes have become vacant due to foreclosure. Some of the potential recommendations developed earlier in the process have already been incorporated into different aspects of planning in Detroit. Most, however, will remain timely and relevant moving into the future.

The information in this HIA is for community residents, city government, planners, funders, developers, researchers, policy-makers, community-based organizations, and advocates. The HIA is intended to inform further implementation of DFC and application of the DFC framework to regeneration planning in Detroit, including infrastructure renewal, basic services, public lighting restoration, and blight removal and demolition. While Detroit Future City may be replaced by other plans, proposals, and frameworks, the findings of this HIA will remain relevant to ensure that regeneration contributes to health and equity for all Detroiters.

Although an HIA report is inherently a snapshot in time, the HIA process itself can benefit future planning and decision-making – and ultimately improve health, well-being and equity in Detroit. These ongoing benefits of the HIA include: detailed information about the make-up, conditions, and health of the area defined as High Vacancy; a substantial review of the existing evidence of the impact of city systems and regeneration on health; new and strengthened relationships between the many individuals, organizations, and sectors involved in this HIA; enhanced capacity to use HIA to inform decisions at the city and local levels; and a body of recommendations on ways to minimize or mitigate potential negative impacts and maximize the potential benefits to health and well-being.

10 References

Annie E. Casey Foundation. 2011. Responsible Demolition: A Baltimore Case Study with National Implications.

Barton, H., and M. Grant. 2006. A health map for the local human habitat. *J R Soc Promot Health* 126 (6): 252–3.

Causa Justa::Just Cause. 2015. *Development without displacement: resisting gentrification in the Bay Area*. Alameda County Public Health Department. Available from <http://cjjc.org/en/publications/reports/item/1421-development-without-displacement-resisting-gentrification-in-the-bay-area>.

Daily Detroit Staff. 2015. These 7 Places Where The Data Says Detroit is Gentrifying May Surprise You. *William Brundage*. Available from <http://williambrundage.com/2015/02/24/these-7-places-where-the-data-says-detroit-is-gentrifying-may-surprise-you/>.

Detroit Blight Removal Task Force. 2014. Detroit Blight Removal Task Force Plan. Available from <http://report.timetoendblight.org>.

Detroit Future City. 2013. *2012 Detroit Strategic Framework Plan*. Detroit, MI: Inland Press. Available from <http://detroitfuturecity.com/wp-content/uploads/2014/12/DFC_Full_2nd.pdf>.

Detroit Future City. 2012. Detroit Future City. Available from <http://www.detroitfuturecity.com>.

Dewar, Margaret E., and June Manning. Thomas. 2013. *The city after abandonment*. The city in the twenty-first century. Philadelphia: University of Pennsylvania Press.

Division for Vital Records and Health Statistics. n.d. *Michigan Resident Inpatient Files*. Michigan Department of Community Health.

Drawing Detroit. 2015. Refocusing Housing Policy in Detroit: Moving to Healthy Housing. *Drawing Detroit*. Available from <http://www.drawingdetroit.com/refocusing-housing-policy-in-detroit-moving-to-healthy-housing/>.

Ellen, Ingrid Gould, Tod Mijanovich, and Keri-Nicole Dillman. 2001. Neighborhood Effects on Health: Exploring the Links and Assessing the Evidence. *Journal of Urban Affairs* 23 (3-4): 391–408.

Farley, R., S. Danziger, and H. Holzer. 2000. *Detroit Divided*. New York, New York: Russell Sage Foundation.

Farrington, David P., and Brandon C. Welsh. 2002. Effects of improved street lighting on crime: a systematic review. Home Office Research, Development and Statistics Directorate.

Fertig, Angela R, and David A Reingold. 2007. Public housing, health and health behaviors: is there a connection? *Journal of policy analysis and management: [the journal of the Association for Public Policy Analysis and Management]* 26 (4): 831–859.

Fullilove, M. 2005. *Root Shock: How Tearing Up City Neighborhoods Hurts America, and What We Can Do About It*. New York, New York: One World/Ballantine.

Gibson, C., and K. Jung. 2005. *Table 23. Michigan - Race and Hispanic Origin for Selected Large Cities and Other Places: Earliest Census to 1990*. U.S. Census Bureau. Available from <https://www.census.gov/population/www/documentation/twps0076/MItab.pdf>.

Haans, Antal, and Yvonne A. W. de Kort. 2012. Light distribution in dynamic street lighting: Two experimental studies on its effects on perceived safety, prospect, concealment, and escape. *Journal of Environmental Psychology* 32 (4): 342–352.

Haas, Peter M., Carrie Makarewicz, Albert Benedict, Thomas W. Sanchez, and Casey J. Dawkins. 2006. *Housing & Transportation Cost Trade-offs and Burdens of Working Households in 28 Metros*.

Hahn, Judith A, Margot B Kushel, David R Bangsberg, Elise Riley, and Andrew R Moss. 2006. BRIEF REPORT: the aging of the homeless population: fourteen-year trends in San Francisco. *Journal of general internal medicine* 21 (7): 775–778.

Hearne Brothers. 1939. Polyconic Projection Map of Greater Detroit. Detroit, MI: Hearne Brothers. Available from <https://detroitography.files.wordpress.com/2014/12/detroitholc-med_2000.png>.
Herbert, David, and Norman Davidson. 1994. Modifying the built environment: the impact of improved street lighting. *Geoforum* 25 (3): 339–350.
Hovert, D.L., and J.Q. Xu. 2012. *Deaths: Preliminary data for 2011*. National vital statistics reports. Hyattsville, MD: National Center for Health Statistics.
Human Impact Partners, Advancement Project, and National People's Action. 2012. The Rental Assitance Demonstration Project: A Health Impact Assessment.
Kennedy, M., and P. Leonard. 2001. Dealing with Neighborhood Change: A Primer on Gentrification and Policy Choices. PolicyLink. Available from <http://www.policylink.org/sites/default/files/DealingWithGentrification_final.pdf>.
Lawrence, Eric D. 2014. Neighborhoods Summit seeks to bust blight, improve city. *Detroit Free Press*. Detroit, MI. Available from <http://www.freep.com/story/news/local/michigan/detroit/2014/11/01/neighborhoods-summit-seeks-improve-detroit/18344053/>.
Levin, Marc. 1980. Neighborhood Development and the Displacement of the Elderly. *Urban Law Annual* 18.
Lipman, Barbara J. 2006. A Heavy Load: The Combined Housing and Transportation Burdens of WOrking Families. Center for Housing Policy.
Li, S., S. Batterman, E. Wasilevich, R. Wahl, J. Wirth, F.C. Su, and B. Mukherjee. 2011. Association of daily asthma emergency department visits and hospital admissions with ambient air pollutants among the pediatric Medicaid population in Detroit: time-series and time-stratified case-crossover analyses with threshold effects. *Environ Res* 111 (8): 1137–47.
MacDonald, C. 2012. Poll: Crime drives Detroiters out; 40% expect to leave within 5 years. *The Detroit News*. Detroit, MI. Available from <http://www.detroitnews.com/article/20121009/metro01/210090369>.
Michigan Department of Health & Human Services. 2013. *2012 Annual Data Report on Blood Lead Levels of Children in Michigan*. Government. Michigan. Available from <https://www.michigan.gov/documents/mdch/2012AnnualDataReportOnBloodLeadLevels_419508_7.pdf>.
National Geographic. 2015. Rethinking Detroit. *National Geographic*. Available from <http://www.nationalgeographic.com/taking-back-detroit/explore-detroit.html>.
National Research Council (US) Committee on Health Impact Assessment. 2011. *Improving Health in the United States: The Role of Health Impact Assessment.* Washington, D.C.: National Academies Press.
Nowakowski, K. 2015. These Charts Show That Detroit Is Surprisingly Crowded. *National Geographic*. Available from <http://news.nationalgeographic.com/2015/04/150424-detroit-cities-population-density-charts/>.
Painter, Kate. 1996. The influence of street lighting improvements on crime, fear and pedestrian street use, after dark. *Landscape and Urban Planning* 35 (2–3): 193–201.
Public Lighting Authority of Detroit. 2015a. Scheduled Construction. *Public Lighting Authority of Detroit*. Available from <http://www.pladetroit.org/public-lighting-plan-for-detroit/map/scheduled-construction/>.
Public Lighting Authority of Detroit. 2015b. The Public Lighting Authority of Detroit. Available from <http://www.pladetroit.org/>.
Quigley, R., L. den Broeder, P. Furu, A. Bond, B. Cave, and R. Bos. 2006. Health Impact Assessment: International Best Practice Principles. Fargo: International Association for Impact Assessment. Available from <http://www.iaia.org/publicdocuments/special-publications/SP5.pdf>.

Quinet, Kenna Davis, and Samuel Nunn. 1998. Illuminating Crime The Impact of Street Lighting on Calls for Police Service. *Evaluation Review* 22 (6): 751–779.
Raleigh, E., and G. Galster. 2013. Neighborhood Disinvestment, Abandonment and Crime Dynamics. San Francisco.
Rodriguez, N., and J. Cooper. 2015. After Detroit bankruptcy: Tax foreclosures threaten 30,000 residents. *World Socialist Web Site*. Available from <https://www.wsws.org/en/articles/2015/09/07/fore-s07.html>.
Simkhovich, B. Z., M. T. Kleinman, and R. A. Kloner. 2008. Air Pollution and Cardiovascular Injury: Epidemiology, Toxicology, and Mechanisms. *J Am Coll Cardiol* 52 (9): 719–26.
Sugrue, T. J. 1996. *The Origins of the Urban Crisis: Race and Inequality in Postwar Detroit*. Princeton, N.J.: Princeton University Press. Available from <http://quod.lib.umich.edu/cgi/t/text/text-idx?c=acls;idno=heb00082>.
Szewczyk, P. 2014. Detroit Redlining Map 1939 and black neighborhoods in 1940. Available from <http://detroitography.com/2014/12/10/detroit-redlining-map-1939/>.
The Pew Charitable Trusts. 2014. The HIA Process. *The Pew Charitable Trusts*. Available from <www.pewtrusts.org/en/about/news-room/news/2014/08/28/the-hia-process>.
Thomson, H, M Petticrew, and M Douglas. 2003. Health impact assessment of housing improvements: incorporating research evidence. *Journal of Epidemiology and Community Health* 57 (1): 11–16.
Tigan, Jane, and Naomi Ruth. 2012. *LEAP Preception Survey Results*. LEAP Detroit. Available from <https://docs.google.com/viewer?a=v&pid=sites&srcid=ZGVmYXVsdGRvbWFpbnxsZWFwZGV0cm9pdHxneDo5ZWNlYmNmZTg1N2FmNGU>.
U.S. Government Accountability Office. 2011. *Vacant Properties: Growing Number Increases Communities' Costs and Challenges*. Available from <http://www.gao.gov/assets/590/586089.pdf>.
Wales Health Impact Assessment Support Unit. 2009. Dousing of Street Lighting in Wales-Impacts on Health and Wellbeing.
Wallace, Deborah, and Rodrick Wallace. 1998. *A plague on your houses: how New York was burned down and national public health crumbled*. Verso.
World Health Organization. 1999. *Health impact assessment: main concepts and suggested approach*. Gothenburg consensus paper. Brussels: European Centre for Healthy Policy, WHO Regional Office for Europe. Available from <http://www.who.int/hia/about/why/en/>.
World Impact Assessment (HIA). 2014. Health Impact Assessment (HIA). *World Health Organization*. Available from <http://www.who.int/hia/about/why/en/>.
Zhang, Nanhua, Harolyn W. Baker, Margaret Tufts, Randall E. Raymond, Hamisu Salihu, and Michael R. Elliott. 2013. Early Childhood Lead Exposure and Academic Achievement: Evidence From Detroit Public Schools, 2008-2010. *American Journal of Public Health* 103 (3): E72–E77.