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Innovative Research Framework for Strengthening Health Care and Public Health Engagement in Neighborhood Change as a Social Determinant of Health

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Innovative Research Framework for Strengthening Health Care and Public Health Engagement in Neighborhood Change as a Social Determinant of Health

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Abstract

Background

Neighborhood change is a social determinant of health (SDOH) that has been associated with adverse health and increased health care utilization. The number of cities and neighborhoods undergoing intense gentrification, defined as an influx of wealthy populations into a working-class neighborhood, is not highly numerous. Public health and health systems are increasingly engaged with SDOH in community-level interventions. Pathways to study and affect NC-related health impacts are limited. This unfunded study provides a research framework to address concerns about financial investment, identifying population health needs, and community stakeholder engagement.

Methods

The authors conducted a cross-sectional pilot study in a highly gentrifying neighborhood in Washington, DC. They employed adapted and novel measures to gain insight into perspectives about NC and factors associated with poor health and high social vulnerability. The use of community and academic boards supported all phases of the research project. The methodological approaches of this study are discussed at length to benefit ease of adoption.

Discussion

Several features of this NC study, including lack of funding, use of random household sampling, tailoring of measures to neighborhood, and extensive engagement with a community advisory board distinguish it from other NC studies. This study is beneficial to public health and health systems interested in SDOH, while providing a pathway for compliance with federal requirements on community health need assessments.

Keywords

gentrification, community health, neighborhood change, public health liberation, community based participatory research, community advisory board

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Conflict of Interest Statement

The authors do not have any conflict of interest

Cover Page Footnote

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Kirsten Michelle Stoebenau, Felecia D. Williams, and Nathaniel Woodard.

ORIGINAL ARTICLE

Innovative Research Framework for Strengthening Health Care and Public Health Engagement in Neighborhood Change as a Social Determinant of Health

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Abstract

Background: Neighborhood change (NC) is a social determinant of health (SDOH) that has been associated with adverse health and increased health care utilization. The number of cities and neighborhoods undergoing intense gentrification, defined as an influx of wealthy populations into a working-class neighborhood, is not highly numerous. Public health and health systems are increasingly engaged with SDOH in community-level interventions. Pathways to study and affect NC-related health impacts are limited. This unfunded study provides a research framework to address concerns about financial investment, identifying population health needs, and community stakeholder engagement.

Methods: The authors conducted a cross-sectional pilot study in a highly gentrifying neighborhood in Washington, DC. They employed adapted and novel measures to gain insight into perspectives about NC and factors associated with poor health and high social vulnerability. The use of community and academic boards supported all phases of the research project. The methodological approaches of this study are discussed at length to benefit ease of adoption.

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1. Background

Neighborhood change (NC) can be associated with adverse health and increased health care utilization.^{1–4} Longitudinal study findings have shown a higher occurrence of emergency department visits, hospitalizations, and increased risks of poor mental health.^{1,5} Additional studies have found NC effects on self-reported health, higher risk of preterm birth, depression diagnosis, psychological distress, social marginalization, and negative health behaviors.^{2–4,6–11} Increased tension among

populations with differing residential tenures contribute to the social dimension of health effects.^{12–14} Black and low-income populations tend to have negative health impacts associated with NC.¹⁵

The term “gentrification” has been used frequently in the NC health literature, often described an influx of an affluent, more educated population into a low-income or working-class neighborhood.¹⁶ An operational definition of gentrification involving changes in home values and family income appears in major studies.^{17,18} The

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number of neighborhoods undergoing gentrification has doubled within the last thirty years.¹⁹ Some researchers have argued that seven cities account for half of the gentrification in the United States (US).¹⁸ Further, gentrification usually occurs in a limited number of neighborhoods within a city.^{16,20,21}

Gentrification health research (GHR) systematic reviews found little or no overall evidence that gentrification affects health outcomes uniformly across populations.^{15,22} These findings may be due to the lack of agreement in conceptual definition, inconsistent measurements, and differences in assessed outcomes.²³ Some GHR studies have found overall improvement in community health such as lowered risk of hypertension while others have shown increased anxiety and depression among children, greater hospitalization, and serious psychological distress.^{1,5,8,24}

Features of neighborhoods, such as health resources and NC, constitute social determinants of health (SDOH), defined as the “social factors leading to ill health and inequities”.²⁵ Medical care has only been shown to explain 10%–15% of preventable mortality in the US.²⁶ In a single city study, SDOH was associated with premature mortality rates ($R^2 = 0.63$; $P < .001$).²⁷ Health systems have historically underinvested in the SDOH, but that is increasingly changing.^{28,29} Addressing housing needs through eviction prevention and affordable housing construction is a common strategy.²⁹

There are calls for advancing GHR by improving health sector and public health engagement and intervention in NC-related health effects.^{1,15,22} This paper seeks to address several gaps in the study of NC – costs, accessibility, uptake of research for policy change, and innovative measurement development.^{1,23,30} We discuss the methodological approaches of a community-based GHR pilot study (“Project Southwest”) to strengthen health care and public health systems’ engagement with NC-related social determinants of health, which is a need that appears in the literature.^{1,31,32}

2. Methods

Project Southwest was a cross-sectional survey that was conducted in a gentrifying neighborhood in Washington, DC from September 2020 to February 2021. Our discussion will highlight the research aims, study area, use of academic and community advisory boards, sampling, recruitment, and measurement development. Defined as a pilot study due to novel measures and methods, Project Southwest sought to understand perspectives of NC and to

assess the association with NC and health, social vulnerabilities, and psychosocial measures. This inclusive study sought data from residents in the study area regardless of residential tenure or social vulnerability. Project Southwest utilized extensive community engagement to inform all aspects of the research process.

In Phase 1, households were surveyed via stratified random sampling for perspectives on neighborhood change and to assess factors associated with poor mental and physical health. Phase II included an identical survey, except that convenience sampling via email and social media recruitment was used, in addition to posting flyers in public locations (e.g., convenience stores, recreation center, and public library).

We previously described our methods in a reliability study.³³ G*Power, a software for conducting power analyses, was used to compute a required sample size ($n = 140$) based on estimated effect sizes of gentrification on self-reported health in previously published in the GHR literature.^{34,35} We conducted two types of sampling methods because Phase I may have not yielded a sufficient response rate for the study to be adequately powered. Survey respondents could complete the survey online or with phone-assisted administration. We collected data using Qualtrics (Qualtrics, Provo, UT). The University of Maryland Institutional Review Board (IRB) approved this study in August 2020 (#1559568-1).

2.1. Area of study

This study takes place in Washington, DC, which has experienced the most intense form of gentrification among US cities from 2000-2017.^{36,37} It is one of a handful of cities that account for half of gentrification in the US.¹⁸ At least 20,000 Black Americans were displaced between 2000 and 2013 while low-income populations were increasingly concentrated in many majority-minority areas.³⁸ Consistent with prior literature, Southwest's proximity to the central business district or downtown made it vulnerable to gentrification.³⁹ Within the Southwest 20024 zip code between 2010 and 2014–2018, the Black percentage declined from 55% to 43% while Whites' percentage increased from 34% to 48%.⁴⁰ As of 2021, the Black or African American population is 38% ($n = 5888$), as opposed to white population at 53% ($n = 8232$).⁴¹ The study area is characterized by three large public housing properties, approximately 900 units.⁴²

The study took place during a heightened period of policy change – revision to the city's

Comprehensive Plan. This Plan "affects everyone" in Washington, DC and establishes a "set priorities for the District's land use, public services, infrastructure, and capital investments" that directly affect the built environment.^{43,44}

2.2. Research aims

Project Southwest identified 29 multi-level aims – psychometric testing of adapted and novel measures, pilot study feasibility, data analysis including NC-related health risk factors, characteristics of subpopulations, educational benefits for trainees, and community and political engagement (Table 1). Given that household sampling is not a common GHR method within an unfunded and student- and community-led approach, the benefit of a comprehensive set of research aims sought to assess the quality and impact of this pilot study.

2.3. Sampling and recruitment

Eligibility criteria required participants to be 18 years of age or older and to reside in the study area, which was outlined on a map for computer-based respondents. Phase I was a household-level survey, meaning limited to one response per household.

Service members residing in a nearby military base were not considered part of the study population. Participants were excluded if they indicated living outside of the study area.

Phase I – We relied on a [LeadsPlease.com](https://www.leadsplease.com) dataset of addresses within the 20024 zip code – an in-kind donation.⁴⁸ This vendor aggregated address data from hundreds of sources. Prior to random sampling, researchers removed duplicate addresses and ineligible addresses within the 20024 zip code, but not within the study area. Due to budget constraints (i.e., unfunded), we were limited to a recruitment pool of 400 households.

We oversampled addresses within the two Census tracts containing public housing properties and more minority and low-income residents since these attributes were associated with lower response rates.⁴⁹ Sixty percent of the sample size derived from these tracts and forty percent from the two other Census tracts. Probability sampling was conducted at the household level using Stata for Phase I (StataCorp LLC, College Station, Texas). One adult member of the household was asked to complete the survey.

As the severity of the COVID-19 pandemic became clear by late March 2020, the University of Maryland Internal Review Board prohibited all in-

Table 1. "Project Southwest" short- and long-term research aims.

I. Psychometric Assessment: Aims I.1 – I.11
Develop measure and test the psychometric properties of the following scales associated with neighborhood change and health: 1) Mental health ¹ , 2) Physical health ¹ , 3) Anomie ² , 4) Ownership of Change ¹ , 6) Neighborhood Attachment ¹ , 7) Neighborhood Change (NC), 8) Neighborhood Change - overall impact (NCOI), 9) Neighborhood Change II (NCII), 10) Neighborhood Change Personal, Friend, or Family Impact (Impact Scale), 11) Heightened Perceptions of Neighborhood Change (HPNC)
II. Feasibility and Data Quality: Aims II.12 – II.16
12) Determine whether a low resource, non-incentivized, self-funded research study using mail solicitation can solicit adequate participation, 13) Determine whether it is feasible to mail 400 mail solicitations and follow ups to non-respondents, 14) Develop culturally tailored messaging in solicitation mailers and test whether different messaging affects response rates, 15) Assess whether low resource or limited self-funded research can result in quality, representative data, 16) Compare and contrast data quality from sampling methods
III. Descriptive Data Analysis: Aims III.17 – III.19
17) Describe descriptive statistics using adapted, modified, and novel scales (see Aim I.1 – I.10), 18) Estimate population parameters for scales (see Aim III.13), 19) Determine factors associated with perceptions and impact of neighborhood change
IV. Health: Aims IV.20 – IV.22
20,21) Determine the factors associated with poor physical and mental health based on demographic, income, attitudinal, and psychosocial measures, 22) Determine factors associated with increasing barriers to health care access
V. Group Differences: Aims V.23 – V.24
23) Determine whether there existed different neighborhood subpopulations based on demographic, income, attitudinal, and psychosocial measures, 24) Determine whether these subpopulations differed in perceptions about or impact of neighborhood change
VI. Educational Value: Aims V.25 – V.26
25) Identify educational value and learner benefits for primary investigator (PhD student) and research assistants, 26) Develop educational training model based on student-led study
VI. Community-Level: Aims VI.27
27) Increase public knowledge about survey results
VII. Policy: Aims VII.28-VII.29
28) Increase elected officials' knowledge about survey results, 29) Provide timely research data results to city council officials during heightened period of urban planning and equity discussions
1 We adapted these measures from the Healthy Neighborhoods Study (HNS) ⁴⁵
2 We adapted the anomie scale from Thursz and Srole ^{46,47}

person activities including recruitment and survey administration. Phase I mail solicitations included a letter from the research team and a second letter from the CAB co-chairs. The letter mentioned that the chairs were Southwest residents, fully participated in the project, and encouraged participation. The first round of mailers was sent between September 10 – October 3, 2020, directing recipients to visit the questionnaire URL or call a phone number for a phone interview. We activated a survey feature to prevent ballot stuffing. To track response rates, respondents were provided with a five-digit code. These codes were generated using an online random number generator. Respondents were asked to input their codes in the survey. The research team added labels to the back of envelopes to roughly two-thirds of the first reminders since the initial letters were plain white envelopes that could have been easily discarded. One label read, “SW Advisory Board encourages participation in this opportunity.” The other featured a college-aged Black American female student with the caption, “Support Student-led Research.”

A six-week hiatus on mailers took place due to the U.S. presidential election to minimize bias of external factors. Second reminders were sent to non-respondents in mid-November, roughly two weeks after the election. The research team and Advisory Board members improved messaging and imagery for follow-up requests by sending a postcard rather than a letter and by including images and people of the Southwest neighborhood.

Phase II – We used convenience sampling for Phase II, which was open to all who met the eligibility criteria. Participants were 18 years of age or older, had to reside in the 20024 zip code, and be a civilian. Solicitation to participate in Phase II was sent through multiple modalities. The official launch of Phase II was through an electronic newsletter (“Southwest Voice”) in the Southwest-Waterfront neighborhood in early December 2020.⁵⁰ CW founded this newspaper in 2019, which had approximately 800 subscribers at the time of the survey. Group pictures of Southwest residents appeared in the banner. Solicitation announcements were sent to local apartment complexes, as well as posted on a Southwest Facebook group with 850 members, Nextdoor, and business establishments. A public website was set up to provide additional information about the research project.⁵¹

3. Research team and advisory boards

Author (CW) is the principal investigator (PI) of the study. He was a second-year PhD student at the

time of the study and a long-time resident and highly engaged community leader in the Southwest neighborhood. He organized a community-based survey to fill a major gap in research about attitudes and psychosocial factors associated with NC. Our research did not yield any GHR study in which the PI is drawn from the affected gentrifying community.

To our understanding, there are six peer-reviewed studies on gentrification in Washington, DC.^{10,12–14,52,53} They have shown NC to be associated with social and economic marginalization, diminished sense of community, and increased social tension.^{10,52,53} None utilized random household surveys. Despite ongoing acute gentrification in Washington, DC, little is known about the association between gentrification and health in Washington, DC.^{17,18}

3.1. Academic Advisory Board

We formed an Academic Advisory Board (AAB) in April 2020 made up of three faculty members and two doctoral students in the University of Maryland School of Public Department of Behavioral and Community Health. An associate dean external to the university also participated on AAB. Authors NW and CK were AAB members. The AAB provided feedback on all aspects of the research, including study and survey design, theory supported methods of improving communication efforts with the priority population, and suggestions on recruitment. The AAB met in April and May 2021.

3.2. Community advisory board

In addition to an AAB, we formed a Community Advisory Board (CAB). Community advisory boards (CABs) are groups of community members with a shared set of interests, beliefs, membership, or affiliation. They are used to provide feedback to investigators on aspects of research design and implementation. Their leadership and advocacy function serve a vital role in community-based research (CBR) by voicing community perspectives and concerns.⁵⁴ CABs provide input throughout the research process.⁵⁵ The research team recruited nine CAB members through the PI's personal contacts. All CAB members lived in Southwest at the time of the study. Additional CAB member recruitment was conducted via posting on a neighborhood-based social media website. Prior survey experience was not required.

Of the nine members, three members had prior data collection and research experience, and two were residents in public housing properties. One member residing in public housing was actively engaged with recruiting and interviewing research study participant as their job function. Black Americans constituted fifty-five percent of CAB members. Women comprised seventy-eight percent of the Board.

Three CAB members (33%) had prior research experience in either formal survey administration or recruitment of study subjects. A major contribution of the CAB was its concerns about self-selection bias due to convenience sampling in the first meeting. Since the study was unfunded, it was initially intended to exclusively employ convenience sampling methods using in-person recruitment—an activity that the IRB prohibits shortly before application submission. At the CAB's prompting, the research team subsequently explored cost estimates for an address dataset to conduct random sampling. [LeadsPlease.com](#) provided a database with resident names and addresses in the study area as an in-kind donation from the vendor.⁴⁸

In addition, CAB members expressed concerns about readability given the study population's varying reading levels. It required, for example, that some questions based on GHR scales were reworded to be more inclusive and appropriate for the target population. In some cases, the CAB felt that questions were too leading or negatively worded, as with the Neighborhood Change and Gentrification Scale, so existing questions were balanced with more positive benefits of neighborhood change. At the CAB's request, a trigger warning preceded questions involving race and displacement, “Some readers may feel that the following questions are of a sensitive nature.” Based on the feedback from the CAB and AAB, a list of benefits was added to incentivize participations, along with the letter from the co-chairs that appeared in the Phase I initial solicitation. The CAB introduced new sections that had not appeared in the draft to include questions on health-seeking behavior when sick, barriers to health care, and perceptions of active public housing redevelopment. CAB members felt that plans to demolish public housing properties were part of the general gentrification schema in Southwest that would displace current residents.

3.3. Survey development

Project Southwest comprised a core research team (CW and two research assistants) that conducted a search of the GHR literature to identify survey

instruments. We relied on measures of physical and mental health, neighborhood attachment (NA) or connectedness and Ownership of Change (OOC) used in the Healthy Neighborhoods Study (HNS), a longitudinal study on the effects of neighborhood change on health in the metropolitan Boston area.⁴⁵ OOC has been associated with self-reported health in a GHR study.³⁴ In separate questions, we used single-item measures for self-reported physical and mental health, an approach shown to be valid in public health research.⁵⁶ In consultation with our advisory boards, we modified HNS scales on NA and OOC to improve interpretability and reduce complexity for a racially and educationally diverse community by eliminating matrix questions and simplifying language. We retained a survey on anomie conducted in Southwest during urban renewal, a historic period of NC precipitated by a federal community development program in the 1950s and 60s.^{47,57} Anomie is characterized as normlessness or rootlessness when shared beliefs and values are weakened.⁵⁸ The anomie scale was based on a validated scale developed by Leo Srole (1956).⁴⁶ The slight modification to the anomie scale changed pronouns to be more gender inclusive (e.g., from “he” to “he or she”).

Developed through academic and community engagement, the survey covered a wide-range of topics using indexes and single- and multi-item scales: household characteristics (type of housing, number in household, number of relatives, minor), housing history (homelessness, number of and reasons for moves, residential tenure), housing burden (likelihood of moving, reasons), neighborhood attachment, enjoyment of neighborhood features and assets, perceived intensity of neighborhood change, factors associated with NC, impact of NC, landlord behavior, perceived ownership of NC, anomie, financial security, income, self-rated physical and mental health, health-seeking behaviors when sick, and barriers to health care. The full survey has been previously published online.⁵⁰ In subsequent reliability, validity, and factor analyses for adapted and novel scales, these scales performed well.³³

3.4. Pilot-testing

We pilot-tested the survey among CAB and AAB members in May–June 2020. Our pilot survey was 113 items, measuring multiple constructs. Many items came from the literature as discussed above. The average completion rate was under 20 min, which was a conservative estimate since members were already familiar with the questions. We asked

participants to comment on survey length, challenging text, appropriateness for low-income and minority populations, and capturing psychosocial and health measures associated with neighborhood change. Members were divided on survey length: “survey length was a bit long,” and “length is okay.” There were no concerns about the appropriateness of the survey aside from clarifying some terms such as gentrification.

4. Discussion

This paper discussed the research approach for Project Southwest, a community-based study led by a student research team and community advisors drawn from the study area. Several features distinguish it from other GHR studies, including random household sampling, lack of funding, a PI from the gentrifying community, extensive community engagement, and novel measurement development, including tailoring to the neighborhood. This pilot study contributes to the scant literature on neighborhood change in Washington, DC. Previously published analyses have shown the feasibility of this research model and the quality of research measures used.³³ The number of respondents totaled 146 respondents from Phase I and II, exceeding the size needed for adequate power. As discussed in [Table 1](#), further research related to this dataset will assess risk factors for NC-related health and SDOH impact.

This study provides an approach for healthcare systems interested in SDOH interventions. As opposed to patient care, community-level strategies may be more effectual for improved population health given concerns about financial investment, unsupported increased healthcare utilization, scope creep, and clinical workforce disruption.³² While this study was achieved without funding, modest funding and staffing may improve response rates, may benefit knowledge of the SDOH landscape, and may provide community-informed knowledge of NC and its impact.

In addition, this framework could help meet community health needs assessment (CHNA) and implementation regulations under the Patient Protection and Affordable Care Act (ACA). The methods of Project Southwest support addressing social factors influencing health, receiving input from low-income and minority communities, methodological documentation, and an implementation strategy.⁵⁹ Evidence suggests that US nonprofit hospitals may not fully comply with CHNA regulations.⁶⁰ This study provides a feasible population health research framework.³³

5. Limitations

While this manuscript does not provide results from Project Southwest, a previously published study has shown an adequate sample for data analysis. For this pilot study to be replicated, further research into measures and study quality is needed. An important consideration is that the project began during the COVID-19 pandemic in 2020 and may not be replicable in future studies. We relied on convenience sampling in Phase II, which may have introduced self-selection bias. Subsequent manuscripts will assess study bias to reliably interpret results.

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Conflict of interest

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