



Health Outcomes of Gentrification: A Survey of Community Health

Needs Assessments Across the U.S.

by

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Abstract

In the last three decades, increased acknowledgement of the potential harms of gentrification have led to more study of its potential impacts on health and wellbeing for existing residents. This thesis aims to summarize and evaluate the potential health effects of gentrification as suggested by the literature consensus and compare these findings to perceptions within the public health establishment, as represented by joint Community Health Needs Assessments from forty-seven geographically diverse metropolitan areas. Content analysis of selected CHNAs revealed low rates of inclusion of gentrification-related language, even among cities experiencing intense gentrification. This lack of gentrification language stood in contrast to the broad inclusion of housing as an important social determinant of health among CHNAs. Further research is necessary to determine what effects gentrification may have with respect to community health relative to the effects of rising housing costs alone.

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Introduction

In the United States it is a poorly kept secret that where a person lives, at scales as broad as state of residence or the city block they were raised on, can have a significant impact on their health (B. Kim et al., 2023). Contemporary research within public health provides modest evidence that controlling for other factors, there is a causal effect of place on health and life expectancy (Deryugina & Molitor, 2021). Further, while place-based disparities of life expectancy in Europe generally fall along country borders, in the United States much of this variation can be observed within each state's jurisdictions (Deryugina & Molitor). There are significant disparities of health even among zip codes within the same city (Ducharme & Wolfson, 2019). The built environment of individuals has been shown to be an immutable determinant of health, enough so that housing is a strongly recommended section of IRS-mandated analyses of communities as part of their Community Health Assessments (Rosenbaum, 2013). The healthcare community has reached robust consensus regarding the links between housing and health outcomes, especially with respect to people experiencing homelessness (Baxter et al., 2019) or living in unsafe dwellings (Marmot et al., 2014), accompanied with the additional risks and stress that overextending finances to afford housing may place on individual health (Hernández, 2016).

Meanwhile, the fields of public policy and urban planning acknowledge that gentrification can put long-time residents at increased risk of becoming unhoused* (Bhavsar et

*Many academics and activists within the housing justice movement have made an intentional switch in language regarding the experience of lacking consistent, stable, safe shelter. There are many good reasons to move away from the phraseology of "homelessness." The housing justice organization *Unhoused* explains that "the label of 'homeless' has derogatory connotations...implies that one is less than, and...undermines self-esteem and progressive change" (Bhanot & Seth, 2020). Both literature sources and CHNAs quoted include the terms "homeless" and "homelessness." The terms "homeless" and "unhoused" will be used interchangeably within this thesis for clarity.

al., 2020), being displaced to poorer neighborhoods and lower-quality housing (Desmond & Kimbro, 2015; Ding et al., 2016), and can increase the cost burden of housing as housing prices increase rapidly (Bhavsar et al., 2020). Furthermore, public health research has shown potential harms of gentrification unrelated to rising home prices, such as the loss of community leading to social isolation and stress (Croff et al., 2021; Fullilove et al., 2016; Tran et al., 2020). Therefore, it is unsurprising that there is a growing understanding among public health experts that gentrification can be both directly and indirectly detrimental to the health of affected communities (Bhavsar et al., 2020).

In order to maintain their status as tax exempt organizations, charitable hospitals must conduct a Community Health Needs Assessment (CHNA) every three years which must be made “widely available to the public” (Internal Revenue Service, 2022). CHNAs can serve as relatively uniform subjects for analysis across cities in multiple states, due to the nature of the statutes and precedents surrounding them. CHNAs can also be expected to reflect relatively current perspectives of public health concerns because of the triannual reporting requirement.

Often, to foster collaboration and to avoid the unnecessary costs of producing repetitive plans from multiple hospital systems, a coalition is formed within a metropolitan area to produce a single needs assessment for that city or region. As described by Charlotte’s 2019 CHNA, the benefits of a so-called “joint CHNA” include “eliminat[ing] question fatigue among community members by consolidating conversations, publicly declar[ing] a foundation for [their] shared work, and exchang[ing] duplication of efforts for efficiency, collaboration, and collective impact” (*Mecklenburg County*, 2019). Research demonstrates that joint CHNAs may improve coordination of community-wide health improvement efforts between hospitals and Local Health Departments (Carlton & Singh, 2018). They also may encourage hospital investment in

community health improvement activities (Carlton & Singh, 2018). Communities that have developed joint CHNAs are ideal for comparison because comparing joint CHNAs circumvents the need to select a single representative CHNA for a metropolitan area from among many. Furthermore, joint CHNAs very often include the local public health agency as a contributing partner.

CHNAs typically use a social determinants of health model for community analysis, with housing included as one of the primary determinants (US Department of Health and Human Services: Office of Disease Prevention and Health Promotion, n.d.). CHNAs are also valuable resources for study because many include responses from community health surveys that were distributed to residents in their communities. Joint CHNAs are particularly useful for comparison because they represent a united vision of a given community, rather than an individual hospital's perspective. Also, because they are often made in partnership with local health departments, joint CHNAs may be more inclined to address larger public policy concerns that an individual hospital may have no way of addressing on their own.

This thesis aims to synthesize present research in public health and urban planning regarding gentrification's impact on the health of existing residents across North American and European cities. These findings are then compared to a sample of collaborative joint CHNAs published in the last five years in cities experiencing punctuated gentrification, with the goal of determining whether gentrification has garnered the attention of the healthcare establishment as a distinguishable concern for public health worth addressing in the assessment of the health challenges facing a community.

Acknowledging the limited research directly linking gentrification to health effects, it was anticipated that, even in cities facing substantial amounts of gentrification, hospital systems would be unlikely to concretely classify it as deleterious to public health, if addressing it at all.

Literature Review: Gentrification and Health Outcomes

The negative health outcomes of gentrification may be understood as indirectly or directly associated with gentrification. *Indirect* health outcomes can be understood as negative health outcomes associated with corequisite or subsequent factors of gentrification, such as increased property values, displacement, and risk of displacement. Gentrification is a concept with an abundance of definitions, and therefore any study attempting to measure the relationship between gentrification and a given health outcome must always either explicitly provide their own definition or implicitly create one when they classify a neighborhood as gentrifying. The most common method for classification, used by the CDC as well as most quantitative studies on the subject, defines gentrification as the “transformation of neighborhoods from low value to high value” (Center for Disease Control, 2009). However, the language of gentrification usually also connotes a meaning beyond an indifferent rise in property values. There is often a racialized component of gentrification, and the threat of gentrification is often associated with an influx of white, higher-income college-educated professionals into lower-income communities of color that have historically seen a lack of investment (Bhavsar et al., 2020). Furthermore, because the concepts of gentrification and displacement can be often regarded as inseparable, gentrification is occasionally measured by the level of displacement of existing residents (Bhavsar et al., 2020). This kind of measurement can be more difficult to accomplish, especially when researching the level of gentrification at large scales across multiple cities. Hence, the reliance on longitudinal

census data on median income. Deferring to the CDC's historic definition of gentrification, given its pertinence to US Hospital Systems,

Gentrification is often defined as the transformation of neighborhoods from low value to high value. This change has the potential to cause displacement of long-time residents and businesses. Displacement happens when long-time or original neighborhood residents move from a gentrified area because of higher rents, mortgages, and property taxes. (Center for Disease Control, 2009)

In this case, gentrification and displacement are assigned as separate but related phenomena.

Displacement of residents is treated as a potential consequence of gentrification, rather than as a condition for classifying a neighborhood as gentrifying.

A hypothetical *direct* health outcome of gentrification might be understood as a health outcome of gentrification that is unique to the phenomenon of “gentrification” distinct from the covariates of a gentrifying neighborhood. That is, a health outcome that cannot be attributed solely to factors such as increased housing prices or forced displacement. Because factors such as housing value are inseparable from downstream effects of increased cost burden, housing instability, or risk of eviction, a direct health outcome of gentrification is difficult to conceive of theoretically or demonstrate empirically. However, through the described comorbidities of gentrification and the subsequent effects, it is possible to establish pathways through which gentrification can have a measurable and significant impact on community health.

Housing affordability is frequently cited as a concern for public health and wellbeing. A cost-burdened household is defined as a household which spends greater than 30% of monthly income on housing expenses (Housing and Urban Development, 2011). The US Department of Health reports that cost-burdened households be associated with an increased risk of negative health outcomes (US Department of Health and Human Services: Office of Disease Prevention and Health Promotion, n.d.). Gentrification is typically defined as an increase in property values within a neighborhood, and this rise in property value leads to an increase in rent for residents

without public intervention (Walser, 2018). This growing lack of affordable housing can be linked to a number of health concerns. High rents may force households to cut back on critical basic needs in impactful and lasting ways, including food, clothing, and health care visits (Jovanna Rosen et al., 2019). Housing presents a fixed monthly cost in the form of rent, and so will often take priority over other expenditures, including nutritious food (Jovanna Rosen et al., 2019). Food insecurity in turn can be associated with negative health outcomes (*Reduce Household Food Insecurity and Hunger*, n.d.), including higher rates of cardiovascular diseases and diabetes (Sun et al., 2020), and lower muscle tone in young children (Gallegos et al., 2021). Food insecurity has been attributed to both higher all-cause and higher cardiovascular mortality (Sun et al., 2020). Further, higher rent burdens may be associated with “worse self-reported health conditions and a higher likelihood to postpone medical services for financial reasons” (Meltzer & Schwartz, 2016). This negative relationship is particularly strong among households spending over 50% of their income on housing, sometimes referred to as “severely cost burdened households” (Meltzer & Schwartz, 2016). Severe maternal morbidity may also increase in neighborhoods with higher rent burdens (Muchomba et al., 2022).

A lack of affordable housing can also worsen mental health outcomes for residents, including the stress of a high rent burden (Denary et al., 2021) or anxiety about eviction (Acharya et al., 2022). Those receiving housing assistance benefits have been shown to have significantly lower levels of psychological distress than those still on waiting lists (Denary et al., 2021), further demonstrating the impact that a lack of affordable housing can have on a person’s mental health. A recent study of mothers and caregivers in New York City revealed that housing cost burden among mothers and other female primary caregivers has a statistically significant association with meeting symptoms of depression (Elliott et al., 2021). In a quantitative analysis

of self-reported health of Michigan residents in the years following the great recession, merely falling behind in rent or mortgage payments had a significant impact on the chance a respondent had experienced an anxiety attack in the period of study (Burgard et al., 2012).

Another characteristic of gentrifying areas is the displacement of long-time residents, whether through forced evictions, inability to pay higher prices for housing, or in response to a loss of cultural connections (Bhavsar et al., 2020). Displacement and housing instability have also been associated with a number of deleterious health outcomes. Eviction specifically has many severe health risks, including through the pathway of greatly increasing the likelihood of becoming unhoused (Desmond & Kimbro, 2015). People experiencing a lack of reliable shelter are at greater risk for suicide, drug abuse, severe mental illness, and food insecurity (Schanzer et al., 2007). Emergency department utilization increases, and mortality is greatly increased for those who are or have experienced homelessness (Herbert et al., 2015). Those who experienced homelessness as children are also at higher risk for adverse physical and behavioral health outcomes later in life (Monnat & Chandler, 2015). Eviction can also be harmful when it does not result in homelessness. Recently evicted mothers have statistically significant greater likelihoods of depression (Desmond & Kimbro, 2015). A history of eviction can also make it harder for households to find other housing in the future, contributing to housing instability (Pappoe, 2023).

“Unforced displacement” may be defined as displacement not due to eviction. This form of displacement may be more common following gentrification, despite being harder to quantify and study (Elliott-Cooper et al., 2020). The primary challenge is identifying those who would have moved for other reasons in the absence of gentrification. That said, there have been many studies that have measured the potential relationships between displacement and health outcomes. In the Michigan recession study, there was a significant increase in chance of

depression and chance of anxiety attack if an individual moved in last three years due to inability to afford past housing (Burgard et al., 2012). It is important to note that in the same study multiple moves that were not due to inability to afford housing did not have a significant effect. However, other studies have demonstrated that housing mobility at an early age, especially more than 2 moves before the age of two, may have a detrimental effect on mental health later in childhood (Rumbold et al., 2012).

Cultural displacement is arguably the pathway of gentrification that has a more distinguishable effect on health than the other factors such as rising housing costs. Mindi Fullilove described “root shock” as “the psychological trauma of the economic, social and emotional coercion of gentrification-led displacement,” (Fullilove et al., 2016) suggesting a negative outcome intrinsically linked to the process of gentrification. This aspect of gentrification that places it apart from impersonal *increasing property value* can also be described as a cultural shift as the neighborhood character changes to accommodate a younger, whiter, more professional class of residents (Bhavsar et al., 2020). This kind of social change can lead to a feeling of loss among long-time residents, as businesses close and neighbors move away (Croff et al., 2021). There is less empirical research dedicated to the social effects of gentrification on health outcomes, which is understandable given the challenge of quantifying cultural change or loss of community (Firth et al., 2020). One variable of study is the impact of severed social networks following gentrification. A meta-analysis of gentrification research demonstrated that there is a “significant amount of research linking gentrification to psychosocial stress due to severed social networks” (Mehdipanah et al., 2018). Social research by Croff and others in older black communities in Portland found that physical displacement strained social networks, diminishing intergenerational neighborhood ties that supported aging in place (Croff et

al., 2021). The study also found that displacement weakened the sense of social cohesion and belonging and induced race-related stressful interactions with new residents both in original and relocation neighborhoods (Croff et al., 2021). It is worth noting that as studies grow more specific and nuanced in their understanding of gentrification, they may also become less generalizable to other neighborhoods and cities.

Beyond the impacts of gentrification-induced displacement itself, when long-time residents are displaced by gentrification research shows that they tend to move to neighborhoods with lower incomes than the profile of their original neighborhood before gentrification (Ding et al., 2016). This consequence of gentrification was described as early as Marcuse in 1986, when he observed the potential multiplying effects of gentrification on adjacent neighborhoods, as low-income renters are pushed into surrounding neighborhoods, thus increasing rent pressures in those markets as well (Marcuse, 1986). However, moving into poorer neighborhoods also means displaced residents often are moving into poorer-quality housing (Ding et al., 2016). One study of adults who lived in gentrifying NYC neighborhoods in 2006 demonstrated that those who moved to non-gentrifying, poor neighborhoods had a greater number of ED visits, hospitalizations, and mental health-related visits for about 5 years after displacement (Lim et al., 2017). Substandard housing conditions can be attributed to many adverse health outcomes, many of which were outlined in the World Health Association (WHO) report on social determinants of health in Europe (Marmot et al., 2014). These include:

- Asthma, from mold, dampness, and second-hand smoke inhalation.
- Lead poisoning from domestic pipes.
- Avoidable injury and death from lack of smoke detectors
- Excess winter mortality from lack of interior heat.
- Carbon Monoxide Inhalation, which can cause headache, nausea, cardiovascular ischemia /insufficiency, seizures, coma, loss of consciousness, and death.
- Lung cancer, from radon exposure.
- Hypertension, from traffic noise.

- Tuberculosis, from crowding.
- Respiratory diseases, from indoor solid fuel use. †

Living in substandard housing has also been associated with higher cortisol levels in infants, which may be associated with other health problems in later life (Blair et al., 2011). Although the crisis of substandard housing extends well beyond its result following gentrification, the elevated chance of living in substandard housing following gentrification-induced displacement describes another pathway for gentrification to impact health.

The preceding studies demonstrate observed health outcomes with respect to the effects or corequisites of gentrification. Because gentrification is a complex issue without a concrete definition, it is hard to study the direct impact of gentrification. It is unclear whether, for example, there is a difference in character to the effects of displacement due to gentrification as opposed to individual financial shocks, such as job losses. More boldly, it is unclear whether there is a difference in character to the effects of higher rent burdens due to gentrification relative to other potential factors that can increase housing prices in a given area. For example, in the last five years the Boise, Idaho region has experienced significant in-migration and rising property, but that is hard to map the language of gentrification onto (Barnhill, 2020). Instead, a new term has arisen in the west. “Californiafication,” is described as smaller cities such as Reno, NV, Spokane, WA, and Boise experiencing an influx of golden-staters priced out by California’s high housing prices (Sisson, 2019). Of course, each context has unique health concerns, and every city has different challenges and assets. It is difficult, therefore, to generalize the results of any study purporting to link gentrification itself to specific health outcomes from one community to another. Certainly, there do appear to be unique challenges associated with a neighborhood-level

†Table A in Supplementary Information.

shift in housing cost when compared to personal economic shocks such as job losses, or national economic shocks such as recessions.

The literature also suggests that there may be the potential for health outcomes to improve within gentrifying neighborhoods, especially when intentional steps are taken to ensure resident stability (Cole et al., 2023). In gentrifying neighborhoods, additional public or private investment may result in increased open space or proximity to urban trails. Increased access to open space and opportunities for physical activity have been shown to lead to improved health outcomes in many meta-analyses within public health literature (Sallis et al., 2015).

However, it is important to note that proximity alone may not lead to utilization. Although greater exposure to active green space is associated with lower odds of fair or poor self-reported health and residents in gentrifying areas seem to benefit from increased access to green space, within gentrifying areas, “only those with high incomes or high education benefitted from increased green space” (Cole et al., 2019). Another example of what is sometimes referred to as “greentrification” (Quinton et al., 2022) is brownfield redevelopment, often heralded as an important step to repairing environmental injustice affecting low-income areas (Davies, 1999). Again, although the removal of harmful toxins and improvement of the built environment should be beneficial to public wellbeing, brownfield redevelopment has been linked to displacement effects (Essoka, 2010). It is important that when considering projects to increase urban green space, the potential gentrifying effects are carefully considered and their mitigation is intentional, including community input (Essoka, 2010; E. J. Kim & Miller, 2017; Lim et al., 2017; Meenar et al., 2019).

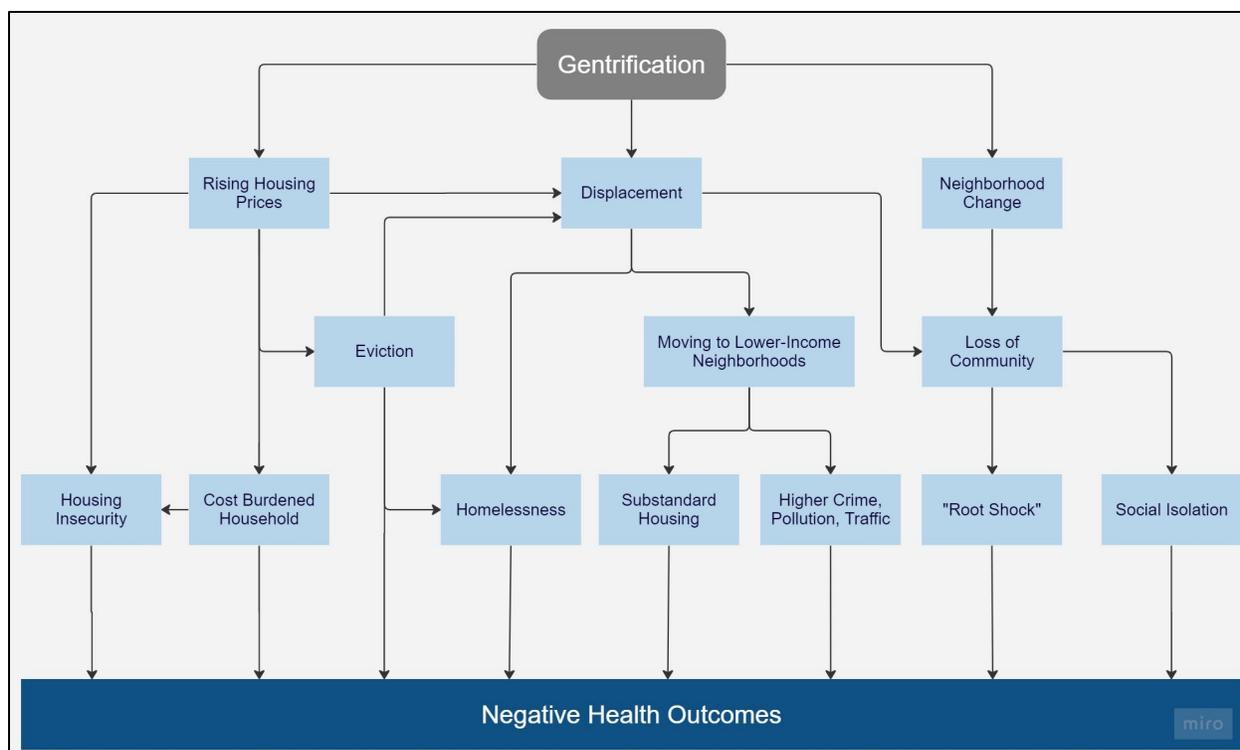


Figure 1. Literature model of gentrification, showing the pathways through which gentrification leads to adverse health outcomes. Source: Author.

Figure 1 presents a hypothetical network model of the pathways through which gentrification may negatively impact health as summarized from the literature. Although there might be negative health outcomes directly attributable to gentrification, the most evident causal pathways flow through the corequisites and consequences of a gentrifying neighborhood. Primarily, gentrification can be seen to affect health through three pathways: Rising Housing Prices, Risk of Displacement, and Neighborhood Change, although these are not exhaustive nor exclusive from one another. As can be seen in Figure 1, the pathways may overlap or intertwine. Although not shown in the model, the literature has mixed evidence for potential health benefits of gentrification, especially for residents who can stay. This model will be helpful to contrast the model that can be developed from the content-analysis of CHNAs.

Methods

Following a case selection, content analysis was used to identify trends among CHNAs. Analytical coding methods were adapted from Fischer et al., 2018 and are comparable to Burns et al. 2023.

Study Sample

The data for this study came from a sampling of joint Community Health Needs Assessments (CHNAs) from a diverse selection of metropolitan areas across the United States released between 2019-2022. CHNAs were selected for inclusion based on a few key selection criteria.

In order to establish which cities may be considered as experiencing elevated levels of comparison, cities were ranked based on the results of three national reports measuring the level of gentrification in cities. Two of these reports were published by the National Community Reinvestment Coalition, in 2020 and 2019, respectively. The third was published in 2015 by *Governing*. In all cases, the studies utilized census tract data, comparing the socioeconomic characteristics of residents during a baseline period to a period of interest.

The 2020 NCRC gentrification study evaluated the percentage of eligible census tracts in a given city experiencing gentrification between 2014 and 2017 (Richardson et al., 2020). Cities with 20% or more gentrifying tracts as measured in this report were assigned a score of 3, as shown in Table 1. Because this study was the most current, it was given the most weight.

The 2019 NCRC report used similar methodology but compared tracts between 2000 and 2013 to determine the most intensely gentrifying cities. Cities with a 15% or higher were assigned a score of 1.

Scoring Criteria			
	3	2	1
NCRC 2020 Report: % Eligible Tracks Gentrifying Between 2013-2017	Over 20% (Top 5)	Over 5% (Top 20)	-
NCRC 2019 Report: % Eligible Tracks Gentrifying Between 2000-2013	-	-	Over 15% (Top 20)
Governing Report: % Center City Tracks Gentrifying Btwn 2000-2013	-	Over 50% (Top 4)	Over 20% (Top 20)

Table 1. Scoring Criteria for Case Inclusion

The *Governing* gentrification study used slightly different methodology and measured the percentage tracks in central cities gentrifying between 2000-2013. Cities with 50% or more gentrifying tracks scored a 2, and 20% of more scored a 1.

Inclusion/Grouping Criteria	
Group A Cities	Total Score 3-5
Group B Cities	Total Score 1-2
Group C Cities	Not Listed

Table 2. Grouping Criteria for Case Inclusion

As shown in Table 2, following each city's grading, cities that scored a 3 or higher were categorized within group A, and cities that scored a 1 or 2 were placed in group B. At this point, the next step was determining the availability of joint CHNAs for the cities selected thus far, at which point two group A cities and six group B cities were excluded for lack of availability. For the most part, these cities were excluded because they did not conduct a joint CHNA. At this point, as presented in Table 3, twenty-four case CHNAs had been selected between groups A (14 cities) and B (10 cities). A third group, group C (23 cities), was formed from other large or mid-sized cities which did not meet the criteria for group A or B, prioritizing geographic diversity. A

map of all of the selected cities (excluding Anchorage and Honolulu) is included as Figure 2.

Group A Cities	Group B Cities	Group C Cities
Austin, TX	Albuquerque, NM	Anchorage, AK
Boston, MA	Charlotte, NC	Baton Rouge, LA
Denver, CO	Honolulu, HI	Bergen County, NJ
Miami-Dade, FL	Jacksonville, FL	Boise, ID
Minneapolis, MN	Long Beach, CA	Buffalo, NY
New Orleans, LA	Nashville, TN	Cleveland, OH
New York City, NY	Omaha, NE	Des Moines, IA
Oakland, CA	Phoenix, AZ	Fort Wayne, ID
Philadelphia, PA	San Jose, CA	Grand Rapids, MI
Portland, OR	Virginia Beach, VA	Jasper, IA
San Diego, CA		Kansas City, MO
San Francisco, CA		Las Vegas, NV
Seattle, WA		Lincoln, NE
Washington D.C.		Memphis, TN
		Milwaukee, WI
		Oklahoma City, OK
		Providence, RI
		Raleigh, NC
		San Antonio, TX
		Sioux Falls, SD
		Spokane, WA
		Tucson, AZ
		Wichita, KS
		Worcester, MA

Table 3. City Groupings following Availability



Figure 2. Geographic Distribution of Included Cases. Made with Google MyMaps.

In compliance with federal requirements, hospitals are required to make these documents publicly available. Copies of CHNAs were downloaded from hospital, nonprofit, or government department websites between October 2022 and March 2023 for each of the areas where joint CHNAs were produced. The final sample of locations for which joint CHNAs were identified totals forty-seven. Because the most recent joint CHNA available from each city was used, and CHNA cycles vary depending on when each hospital conducted its first CHNA following the 2014 ACA requirement, CHNAs included in this sample range in date from 2019 to 2022.

Data Extraction

During the initial open coding process, CHNAs were evaluated for the inclusion of thirty concepts. Thirteen concepts were related to gentrification and related topics such as affordable housing and homelessness. The remaining concepts were more traditionally considered health topics such as Hypertension, Asthma, and Mental Health, along with other social determinants of health such as Crime/Violence and Social Isolation. A complete sample coding table is available as Table B within supplementary information.

Among the first category, coded concepts were assigned a binary “YES/NO” variable recording whether they were mentioned within the CHNA. If the concept was included, it was then assigned a value on a scale of 1-6 recording the *depth* of the inclusion (Krippendorff, 2019). The depth rubric used is provided in Table 4, ranging from a 1 (included as a single word referencing the concept as part of a larger list) to a 6 (an entire chapter of the CHNA dedicated to the concept). This variable aimed to address a limitation among some analytical coding studies in which the intensity of discussion of a given concept is neglected (Fischer et al., 2018).

Depth Rubric	
1	Mention of the concept is included once within the document as a single word, as part of a list or without further elaboration
2	Reference is made to the concept on 1-3 occasions, although the concept is reduced to a single word and not further explored
3	The discussion of the concept spans 2 or more consecutive sentences
4	The discussion of the concept extends for a paragraph, or 4 or more sentences.
5	A section of the document is dedicated to the concept, as evidenced by a sub-heading or mention in a table of contents
6	A chapter of the document is dedicated to the concept, as evidenced by a chapter title and inclusion in a table of contents OR multiple sections are dedicated to the concept

Table 4. Depth Coding Rubric

While *depth* was also captured for the subjects in the second category (health subjects such as asthma or active living), the more important secondary variable in these cases was *relation*. As before, CHNAs were scanned for the coded concepts, and assigned a binary “YES/NO” variable for whether they were mentioned within the CHNA. If a concept was included, the *relation* variable tracked whether the health concept was discussed with any relation to gentrification and housing. This type of secondary variable is comparable to that used in Burns et al (2023). Unlike *depth*, although numeric codes were assigned, this variable is not a scale and the numeric codes do not represent increasing levels of relation. The numeric codes assigned to the relation variable, as listed in Table 5, are shorthand for which housing topic (if any) the health subject may have been related back to. This most often took the form of the health topic directly being mentioned during the housing section of the CHNA. In some cases, this could take the form of the mention of a housing topic within another section of the CHNA.

Relation Rubric	
1	The concept is not mentioned within the context of housing
2	The concept is mentioned with relation to homelessness
3	The concept is mentioned in relation to high cost of housing, cost burden, or affordable housing
4	The concept is mentioned in relation to quality of housing
5	The concept is mentioned in relation to the concepts "gentrification," "displacement," or similar phrasing
6	The concept is mentioned in relation to housing instability
9	Relatedness does not make sense for this subject, because this concept is de-facto related to housing

Table 5. Relation Coding Rubric

In addition, a few lines of the coding rubric were dedicated to specific measures of the intensity of discussion of housing issues in a CHNA. Specifically, whether the CHNA included

data about cost-burdened households, percentage of households with substandard housing conditions, and data about gentrifying census tracts.

Due to time limitations, in the transition from open coding (Berg, 2007) of the first ten CHNAs to a scalable undertaking to comb through 47 CHNAs, if the CHNA did not include any mention of the gentrification or displacement concepts, it was not coded any further. However, an observable trend had emerged at this point in the content analysis process.

Data Analysis

Key variables, such as the binary inclusion of the term gentrification throughout the CHNA, were summarized for their occurrence or average value within each grouping. However, the conclusions drawn from the content analysis were primarily qualitative.

Results and Discussion

The majority of CHNAs across all groups (A-C) include a section or subsection about housing as a social determinant of health. The most common housing concerns mentioned are a lack of affordable housing contributing to many cost-burdened households, and lack of quality housing conditions that leads to poorer health outcomes such as higher rates of respiratory diseases. Some CHNAs include rankings of community health concerns, in which housing is often ranked first or second. In many cases, such as in Oakland (2022) and New Orleans (2021), housing ranks second only behind mental/behavioral health. It is abundantly clear from a survey of CHNAs that regardless of measurable gentrification[‡] within a region, affordable housing remains a pressing concern for residents, including with regards to their health. “Safe, Stable,

[‡] Measurable gentrification as established by national reports by Governing and NCRC.

Affordable Housing” is a commonly repeated phrase across multiple plans, and some version of this language is typically used to label a housing-related priority within a given CHNA. The survey of CHNAs shows a strong consensus among health systems that access to safe and affordable housing is a priority to ensuring good health outcomes for residents.

Despite worries about both safe and affordable housing, they are unlikely to relate these issues as connected to one another, even when including them within the same clause. For example, Boise ID does not use the word gentrification in its joint CHNA, but it does address concerns of displacement due to rising home values related to in-migration (2020). In the section regarding substandard housing conditions, no potential link to this displacement is addressed. Throughout all of the assessments, no association between substandard housing and lack of affordable housing is made. That is, a lack of affordable housing is never cited as a reason for people moving to the very built environments billed as detrimental within the same CHNA. This is despite research showing that when residents are displaced from their housing due to rising prices, they are more likely to move to worse housing conditions (Ding et al., 2016).

The risks of displacement cited by CHNAs are usually limited to concerns about the increased risk of homelessness following displacement. That said, some standouts do go further. While the association between displacement and moving to lower quality housing was not mentioned in any CHNA, King County’s joint CHNA mentioned the need for additional support for displaced residents who were pushed into suburbs (2021). This is in line with research showing that when low-income households are displaced from city centers to suburbs, they may not have the ability to access similar services or programs that are common in cities to help residents in need, such as food pantries or community clinics (Gordon, 2014). They may also

have less access to public transit options (Dreier, 2004). Austin’s CHNA (2022) also makes mention of low-income urban residents being displaced to rural areas.

The most striking finding from the content analysis is the relative absence of the term “gentrification.” Even among Group A cities, those expected to have the most intense gentrification, only 57% of CHNAs include the word gentrification at least once throughout. Adding Washington D.C.’s CHNA, which never uses the word gentrification, but discusses “displacement” in a parallel way, only 64% of Group A cities make mention of the concept in their CHNA, with an average depth of 2.8 among the cities that did. In some of these cities, gentrification is only mentioned within quotes from community survey participants, or with reference to concerns raised by community members. For example, the Long Beach 2022 CHNA, one of two Group B cities that mention the subject, includes only one instance of the word gentrification, and it is part a quotation from a focus group participant.

‘Housing insecurity is a huge issue. Gentrification is happening all over and rents are skyrocketing. I can’t afford to pay for all my medical bills and now I can’t afford rent.’
- Focus group participant (p. 34)

In this way, concerns of gentrification are positioned as normative statements throughout most CHNAs that include them. In contrast, affordable housing and quality housing were typically discussed as positive statements—that is, objective concerns borne out from the data rather than concerns raised by community members alone. Austin, Boston, New York City, Portland, and Philadelphia stand out among the cities surveyed as including more than just a couple of sentences including the concept.

Austin’s 2022 CHNA includes a footnote with the first use of “gentrification,” providing a definition of the term with a citation to the CDC Healthy Cities definition. The term was used in three different quotes from community leaders and survey respondents included in the CHNA,

and also used in an assessment of homelessness risk in census tracts. NYC cites Rolfe 2020 on multiple occasions, regarding housing social determinants of health, and relates these concerns with the rising cost of living, occasionally labelled as “gentrification.” Within a health priority regarding neighborhood conditions, Philadelphia’s 2022 CHNA included the following bullet point:

Rapid gentrification of some historically low-income neighborhoods creates risk of displacement and housing insecurity, and further racial segregation. (p. 13)

Portland ranks highest for depth on the subject of gentrification, and Portland’s 2022 CHNA contained an entire subsection titled “Cultural Displacement due to Gentrification.” It is worth noting that all five of these CHNAs which scored a three or higher for depth of inclusion were released in 2022. However, just as many group A cities with joint CHNAs released in 2022 did not make *any* mention of gentrification, including Oakland, San Fransisco, Miami, and Washington D.C. Furthermore, there is no clear justification why release year would make a significant impact between 2021 to 2022, given the decades-long reckoning in many of these cities.

Portland notwithstanding, in every CHNA surveyed, and especially those scoring a two or lower for depth on the subject, gentrification is primarily associated with the concern of affordable housing. As mentioned, in most CHNAs (all except Seattle and Austin) there is not a concern raised about where residents are being displaced, including with regards to neighborhood quality or housing quality.

Through content-analysis of the surveyed CHNAs, it was possible to develop a visualization of the model of gentrification’s impact on health that seems to prevail, shown in Figure 3. In this case, the terminology of gentrification itself may not be included within the model at all. Rising housing prices and harmful built environment may individually contribute to

worse health outcomes, but a link between them is not made. Where gentrification is included, it is only associated with rising housing prices, making most plans that mention gentrification largely indistinguishable from those that do not. Of course, there are some exceptions, as discussed, most prominently Portland's 2022 CHNA which included discussion of the potential losses of community from gentrification. However, by and large, loss of community and moving to more greatly disadvantaged neighborhoods are missing steps within this model. Gentrification is mentioned in eleven CHNAs, often as an individual use of the word within a longer list of concerns or part of a quotation. To compare, rising housing prices and a lack of affordable housing are discussed in 46 out of 47.

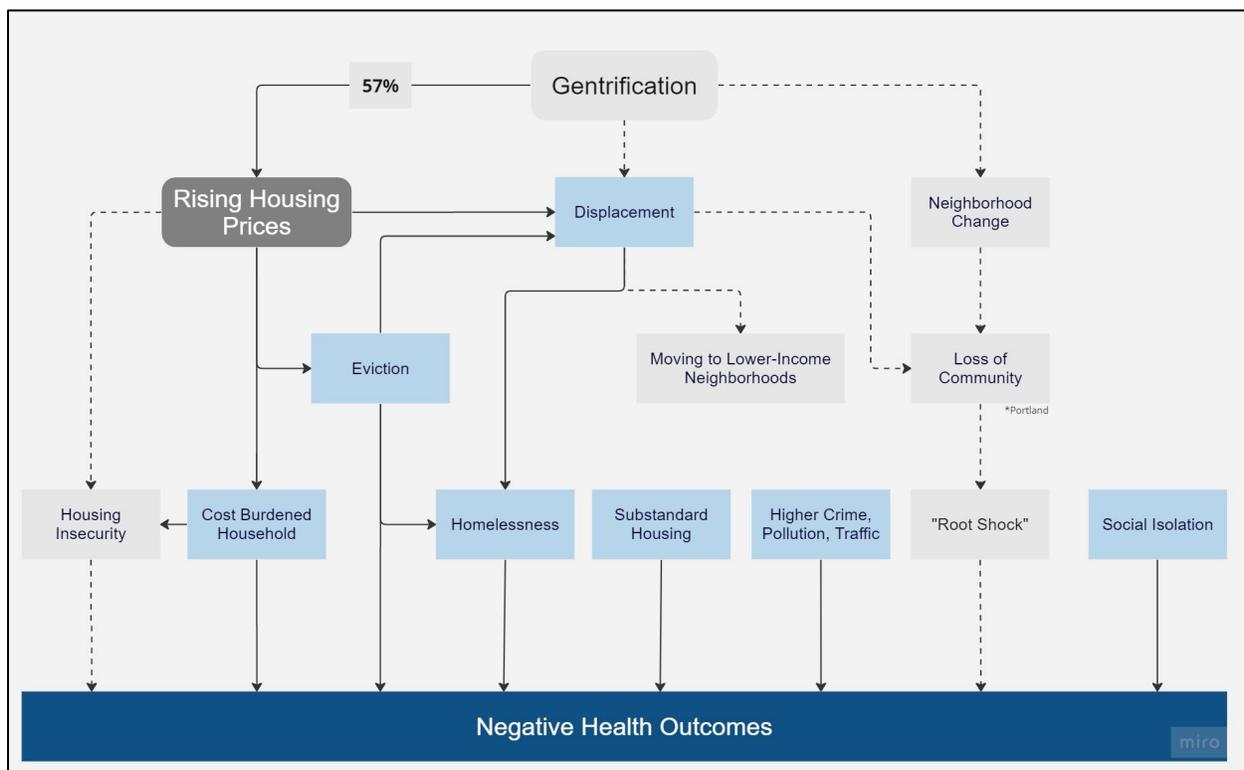


Figure 3. CHNA Model of Gentrification, showing the pathways through which gentrification leads to adverse health outcomes. Source: Author.

It is also worth noting that CHNAs will usually cite sources linking high-cost burden or unsafe housing condition to poor health outcomes, rarely using their own research as evidence for these links. However, which cities choose to include which connections this may have some

significance to the communities they serve, especially because the CHNAs rely heavily on community input for prioritizing health needs.

It might be speculated that, as creatures of government and hospital system collaboration, CHNAs may be avoiding the terminology of gentrification to steer clear from controversy. However, for most CHNAs, it appears that an omission of gentrification is not done out of an avoidance for controversy or social justice. Many CHNAs, such as Pima County's (2021), do not refer to gentrification or residential displacement, but do have sections dedicated to the health impacts of racism and discrimination. Spokane County's CHNA does not discuss gentrification or displacement but cites racism and discrimination as reasons residents have difficulty finding safe housing (2022).

Another Group C city at reported risk of "Californiafication," Boise, Idaho, does not use the word gentrification in its CHNA, but it does address concerns of displacement due to rising home values related to in-migration (2020). In this case, the existing residents of Boise and the surrounding region are mostly white, and specific neighborhoods do not seem to be targeted for investment as is often the case with cases of gentrification in urban areas. Despite average housing prices rapidly increasing, previous conditions and the lack of the cultural factors of gentrification may make the term unsuitable.

Lastly, many of these CHNAs were released in 2020 or 2021 and the ongoing COVID-19 pandemic can be a large presence. Pandemic concerns are often related to housing concerns, especially as related to the danger of overcrowding. For example, in Oakland's 2020 CHNA:

According to focus group participants, many Alameda County residents living on the edge of homelessness have been pushed into overcrowded living conditions. They believe this led to increased transmission of the COVID-19 virus. (p. 19)

There is no lack of concern for the consequences of rising housing prices among hospital systems included in the survey. Furthermore, affordable housing is a concern among health

systems, regardless of the amount of gentrification in a city as measured by the sorting studies used for grouping. However, the term “gentrification” is not used consistently.

Conclusion

A limitation of this study design was the ability to assess the reliability or validity of content analysis methods used. As the sole investigator and coder, there was no measure to test for bias or validity in the coding. As Tinsley and Weiss (1975) note, it is important to demonstrate that the “obtained ratings are not the idiosyncratic results of one rater’s subjective judgment.” If the principal investigator does all of the coding, a reliability check with a second coder is needed to ensure a valid study (Evans, 1996). To limit the impact of this shortcoming in the content analysis, the most objective coding performed—that is, the binary exclusion or inclusion of words and phrases most associated with gentrification—was given the most consideration in quantitative analysis. The prevailing absence of gentrification or similar phrases throughout the surveyed CHNAs made it possible to be thorough; in all cases that these concepts were discussed, there was not a direct association to observed health outcomes.

Further study is necessary to isolate the variables of gentrification that may lead to worse health outcomes. There is a consensus in the literature and among health systems that rising housing prices can lead to worse health outcomes for residents. However, as demonstrated in the review, gentrification has more consequences on health outcomes than the rise in housing prices alone. CHNAs make the link between increased cost of living and housing prices, and some have made the link between gentrification and an increased cost of living. However, there is less discussion of 1) the displacement effects leading to residents living in poorer built environs, 2) a link between the loss of community attributed to gentrification and reduced health outcomes, or 3) the psychological impact of housing insecurity that often accompanies gentrification.

There is an acknowledgement among many medical professionals that patient care may be improved by treating the whole patient rather than their diseases or symptoms. There is a parallel need in public health to treat the root causes for health outcomes rather than mitigating poor outcomes as they arise. This link between social determinants and health outcomes was brought to an unquestionable awareness in the months following the emergence of the SARS-Cov-2 virus in the United States, as the racial disparities in morbidity were brought to centerstage for many (Marya & Patel, 2021). The findings of this content analysis reveal a need for deeper resolution of the root causes for health inequities among public health systems. As attested by Dayna Bowen Matthew in *Just Health*, “the secondary effects of residential segregation will only be eradicated when we disrupt structural racism as a root cause” (Matthew, 2022). Researching both the positive and negative influences of gentrification on neighborhood and individual health will hopefully yield more comprehensive approaches to public health initiatives, including knowing what communities should prioritize when establishing potential community benefit agreements. Initiatives to improve population health can only be enhanced by a deeper understanding of the pathways that lead to health inequity, and a more systemic approach to remedy the outcomes from the source.

Bibliography

2019 Mecklenburg County Community Health Assessment. (2019). Mecklenburg County Public Health.

<https://www.mecknc.gov/HealthDepartment/HealthStatistics/Documents/Mecklenburg%20CHA%202019.pdf>

2022 Community Health Assessment. (2022). Austin Public Health.

https://www.austintexas.gov/sites/default/files/files/Health/Austin%202022%20CHA_050622_FINAL_Corrected.pdf

2022 Community Health Needs Assessment. (2022). UCSF Benioff Children's Hospital Oakland.

[https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwipw7HE8-H-](https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwipw7HE8-H-AhWZkIkEHU1nCCYQFnoECA4QAQ&url=https%3A%2F%2Fwww.ucsfbenioffchildrens.org%2F-%2Fmedia%2Fproject%2Fucsfbch%2Fpdf%2Fcommunity-health-needs-assessment-2022.pdf&usg=AOvVaw1PnGsKIDJw6MtgEsxWl83f)

[AhWZkIkEHU1nCCYQFnoECA4QAQ&url=https%3A%2F%2Fwww.ucsfbenioffchildrens.org%2F-%2Fmedia%2Fproject%2Fucsfbch%2Fpdf%2Fcommunity-health-needs-assessment-2022.pdf&usg=AOvVaw1PnGsKIDJw6MtgEsxWl83f](https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwipw7HE8-H-AhWZkIkEHU1nCCYQFnoECA4QAQ&url=https%3A%2F%2Fwww.ucsfbenioffchildrens.org%2F-%2Fmedia%2Fproject%2Fucsfbch%2Fpdf%2Fcommunity-health-needs-assessment-2022.pdf&usg=AOvVaw1PnGsKIDJw6MtgEsxWl83f)

Acharya, B., Bhatta, D., & Dhakal, C. (2022). The risk of eviction and the mental health outcomes among the US adults. *Preventive Medicine Reports*, 29, 101981.

<https://doi.org/10.1016/j.pmedr.2022.101981>

Barnhill, F. (Director). (2020). Affordability And Planning For Future Growth In Canyon County.

In *Growing Pains*. Boise State Public Radio.
<https://www.boisestatepublicradio.org/show/idaho-matters/2020-09-28/growing-pains-affordability-and-planning-for-future-growth-in-canyon-county>

Baxter, A. J., Tweed, E. J., Katikireddi, S. V., & Thomson, H. (2019). Effects of Housing First approaches on health and well-being of adults who are homeless or at risk of homelessness:

- Systematic review and meta-analysis of randomised controlled trials. *Journal of Epidemiology and Community Health*, 73(5), 379–387. <https://doi.org/10.1136/jech-2018-210981>
- Berg, B. (2007). An Introduction to Content Analysis. In *Qualitative Research Methods for the Social Sciences*.
- Bhanot, V., & Seth, A. (2020). *Why Unhoused? Unhoused Technologies*. <https://www.unhoused.org/overview>
- Bhavsar, N. A., Kumar, M., & Richman, L. (2020). Defining gentrification for epidemiologic research: A systematic review. *Plos One*, 15(5), e0233361. <https://doi.org/10.1371/journal.pone.0233361>
- Blair, C., Raver, C. C., Granger, D., Mills-Koonce, R., Hibel, L., & Investigators, T. F. L. P. K. (2011). Allostatic and allostatic load in the context of poverty in early childhood. *Development and Psychopathology*, 23(3), 845–857. <https://doi.org/10.1017/S0954579411000344>
- Braubach, M., Jacobs, D. E., & Ormandy, D. (2011). *Environmental burden of disease associated with inadequate housing. Copenhagen, WHO Regional Office for Europe, 2011*. WHO.
- Burgard, S. A., Seefeldt, K. S., & Zelner, S. (2012). Housing instability and health: Findings from the Michigan recession and recovery study. *Social Science & Medicine*, 75(12), 2215–2224. <https://doi.org/10.1016/j.socscimed.2012.08.020>
- Carlton, E. L., & Singh, S. R. (2018). Joint Community Health Needs Assessments as a Path for Coordinating Community-Wide Health Improvement Efforts Between Hospitals and Local Health Departments. *American Journal of Public Health*, 108(5), 676–682. <https://doi.org/10.2105/AJPH.2018.304339>

- Cole, H. V. S., Anguelovski, I., Triguero-Mas, M., Mehdipanah, R., & Arcaya, M. (2023). Promoting Health Equity Through Preventing or Mitigating the Effects of Gentrification: A Theoretical and Methodological Guide. *Annual Review of Public Health, 44*(1), 193–211. <https://doi.org/10.1146/annurev-publhealth-071521-113810>
- Cole, H. V. S., Triguero-Mas, M., Connolly, J. J. T., & Anguelovski, I. (2019). Determining the health benefits of green space: Does gentrification matter? *Health & Place, 57*, 1–11. <https://doi.org/10.1016/j.healthplace.2019.02.001>
- Community Health Needs Assessment*. (2020b). Saint Alphonsus Regional Medical Center. <https://www.saintalphonsus.org/assets/documents/chna/boise/chna-boise-2020.pdf>
- Community Health Needs Assessment*. (2020a). University of New Mexico Health System. https://unmhealth.org/about/_files/unmh-chna-2020-04-01.pdf
- Community Health Needs Assessment*. (2021). Pima County Health Department. <https://www.healthypima.com/community-health-needs-assessments>
- Community Health Needs Assessment*. (2022b). Providence Portland Medical Center.
- Community Health Needs Assessment*. (2022a). Long Beach CHNA Collaborative. <https://www.dignityhealth.org/content/dam/dignity-health/pdfs/chna/2022-chna/st-mary-medical-center-lb-chna-22.pdf>
- Community Health Needs Assessment*. (2022c). NYC Health + Hospitals. <https://hhinternet.blob.core.windows.net/uploads/2022/07/community-health-needs-assessment-2022.pdf>
- Croff, R., Hedmann, M., & Barnes, L. L. (2021). Whitest City in America: A Smaller Black Community's Experience of Gentrification, Displacement, and Aging in Place. *Gerontologist, 61*(8), 1254–1265. <https://doi.org/10.1093/geront/gnab041>

- Davies, L. L. (1999). Working Toward a Common Goal: Three Case Studies of Brownfields Redevelopment in Environmental Justice Communities Notes. *Stanford Environmental Law Journal*, 18(2), 285–332.
- Denary, W., Fenelon, A., Schlesinger, P., Purtle, J., Blankenship, K. M., & Keene, D. E. (2021). Does rental assistance improve mental health? Insights from a longitudinal cohort study. *Social Science & Medicine* (1982), 282, 114100. <https://doi.org/10.1016/j.socscimed.2021.114100>
- Deryugina, T., & Molitor, D. (2021). The Causal Effects of Place on Health and Longevity. *The Journal of Economic Perspectives*, 35(4), 147–170.
- Desmond, M., & Kimbro, R. T. (2015). Eviction's Fallout: Housing, Hardship, and Health. *Social Forces*, 94(1), 295–324. <https://doi.org/10.1093/sf/sov044>
- Ding, L., Hwang, J., & Divringi, E. (2016). Gentrification and residential mobility in Philadelphia. *Regional Science and Urban Economics*, 61, 38–51. <https://doi.org/10.1016/j.regsciurbeco.2016.09.004>
- Dreier, P. (2004). Poverty in the Suburbs. *Nation*, 279(8), 6–7.
- Ducharme, J., & Wolfson, E. (2019). Does ZIP Code Equal Life Expectancy? *TIME Magazine*, 194(2), 8–8.
- Elliott, S., West, S. M., & Castro, A. B. (2021). Rent Burden and Depression Among Mothers: An Analysis of Primary Caregiver Outcomes. *Journal of Policy Practice and Research*, 2(4), 285–300. <https://doi.org/10.1007/s42972-021-00040-3>
- Elliott-Cooper, A., Hubbard, P., & Lees, L. (2020). Moving beyond Marcuse: Gentrification, displacement and the violence of un-homing. *Progress in Human Geography*, 44(3), 492–509. <https://doi.org/10.1177/0309132519830511>

- Essoka, J. D. (2010). The Gentrifying Effects of Brownfields Redevelopment. *Western Journal of Black Studies*, 34(3), 299–315.
- Firth, C. L., Fuller, D., Wasfi, R., Kestens, Y., & Winters, M. (2020). Causally speaking: Challenges in measuring gentrification for population health research in the United States and Canada. *Health & Place*, 63, 102350. <https://doi.org/10.1016/j.healthplace.2020.102350>
- Fischer, K. R., Schwimmer, H., Purtle, J., Roman, D., Cosgrove, S., Current, J. J., & Greene, M. B. (2018). A Content Analysis of Hospitals' Community Health Needs Assessments in the Most Violent U.S. Cities. *Journal of Community Health*, 43(2), 259–262. <https://doi.org/10.1007/s10900-017-0413-9>
- Fullilove, M. T., Peterson, C. F., & Bassett, M. T. (2016). *Root Shock: How Tearing up City Neighborhoods Hurts America, and What We Can Do about It*. New Village Press. <http://ebookcentral.proquest.com/lib/uva/detail.action?docID=5253420>
- Gallegos, D., Eivers, A., Sondergeld, P., & Pattinson, C. (2021). Food Insecurity and Child Development: A State-of-the-Art Review. *International Journal of Environmental Research and Public Health*, 18(17), 8990. <https://doi.org/10.3390/ijerph18178990>
- Glossary of Terms to Affordable Housing*. (2011). HUD Archives. <https://archives.hud.gov/local/nv/goodstories/2006-04-06glos.cfm>
- Gordon, C. (2014). Patchwork Metropolis: Fragmented Governance and Urban Decline in Greater St. Louis. *Saint Louis University Public Law Review*, 34(1), 51–70.
- Health Effects of Gentrification*. (2009, October 15). CDC Healthy Places. <https://www.cdc.gov/healthypaces/healthtopics/gentrification.htm>

- Herbert, C. W., Morenoff, J. D., & Harding, D. J. (2015). Homelessness and Housing Insecurity Among Former Prisoners. *RSF: The Russell Sage Foundation Journal of the Social Sciences*, 1(2), 44–79. <https://doi.org/10.7758/RSF.2015.1.2.04>
- Hernández, D. (2016). Affording Housing at the Expense of Health: Exploring the Housing and Neighborhood Strategies of Poor Families. *Journal of Family Issues*, 37(7), 921–946. <https://doi.org/10.1177/0192513X14530970>
- Internal Revenue Service. (2022, July 15). *Community Health Needs Assessment for Charitable Hospital Organizations—Section 501(r)(3)*. Internal Revenue Service. <https://www.irs.gov/charities-non-profits/community-health-needs-assessment-for-charitable-hospital-organizations-section-501r3>
- Jovanna Rosen, Sean Angst, & Soledad De Gregorio. (2019). *Rent Burden: How do Renters Cope with Unaffordability?* University of Southern California. <https://socialinnovation.usc.edu/rent-burden/>
- Kim, B., Spoer, B. R., Titus, A. R., Chen, A., Thurston, G. D., Gourevitch, M. N., & Thorpe, L. E. (2023). Life Expectancy and Built Environments in the U.S.: A Multilevel Analysis. *American Journal of Preventive Medicine*, 64(4), 468–476. <https://doi.org/10.1016/j.amepre.2022.10.008>
- Kim, E. J., & Miller, P. (2017). Residents’ perception of local brownfields in rail corridor area in the City of Roanoke: The effect of people’s preconception and health concerns factors. *Journal of Environmental Planning & Management*, 60(5), 862–882. <https://doi.org/10.1080/09640568.2016.1182898>
- King County Community Health Needs Assessment* (p. 131). (2022). King County Hospitals for a Healthier Community.

- Krippendorff, K. (2019). *Content Analysis: An Introduction to Its Methodology*. SAGE Publications, Inc. <https://doi.org/10.4135/9781071878781>
- Lim, S., Chan, P. Y., Walters, S., Culp, G., Huynh, M., & Gould, L. H. (2017). Impact of residential displacement on healthcare access and mental health among original residents of gentrifying neighborhoods in New York City. *PLOS ONE*, *12*(12), e0190139. <https://doi.org/10.1371/journal.pone.0190139>
- Marcuse, P. (1986). Abandonment, gentrification, and displacement: The linkages in New York City. In *Gentrification of the City* (pp. 153–177). Routledge.
- Maris Brummel. (2020). *Community Health Needs Assessment*. Kent County Health Department. <https://accesskent.com/Health/CHNA/pdf/FINAL-2020-CHNA-REPORT.pdf>
- Marmot, M., World Health Organization, & UCL Institute of Health Equity (Eds.). (2014). *Review of social determinants and the health divide in the WHO European Region: Final report*. World Health Organization, Regional Office for Europe.
- Marya, R., & Patel, R. (2021). *Inflamed: Deep Medicine and the Anatomy of Injustice*. Picador.
- Matthew, D. B. (2022). *Just Health: Treating Structural Racism to Heal America*. New York University Press.
- Meenar, M., Howell, J. P., & Hachadorian, J. (2019). Economic, ecological, and equity dimensions of brownfield redevelopment plans for environmental justice communities in the USA. *Local Environment*, *24*(9), 901–915. <https://doi.org/10.1080/13549839.2019.1652803>
- Mehdipanah, R., Marra, G., Melis, G., & Gelormino, E. (2018). Urban renewal, gentrification and health equity: A realist perspective. *European Journal of Public Health*, *28*(2), 243–248. <https://doi.org/10.1093/eurpub/ckx202>

- Meltzer, R., & Schwartz, A. (2016). Housing Affordability and Health: Evidence From New York City. *Housing Policy Debate*, 26(1), 80–104.
<https://doi.org/10.1080/10511482.2015.1020321>
- Monnat, S. M., & Chandler, R. F. (2015). Long Term Physical Health Consequences of Adverse Childhood Experiences. *The Sociological Quarterly*, 56(4), 723–752.
<https://doi.org/10.1111/tsq.12107>
- Muchomba, F. M., Teitler, J., & Reichman, N. E. (2022). Association Between Housing Affordability and Severe Maternal Morbidity. *JAMA Network Open*, 5(11), e2243225.
<https://doi.org/10.1001/jamanetworkopen.2022.43225>
- Neighborhood and Built Environment*. (n.d.). Healthy People 2030. Retrieved April 21, 2023, from <https://health.gov/healthypeople/objectives-and-data/browse-objectives/neighborhood-and-built-environment>
- Pappoe, Y. N. A. (2023). The Scarlet Letter “E”: How Tenancy Screening Policies Exacerbate Housing Inequity for Evicted Black Women. *Boston University Law Review*, 103(1), 269–310.
- Quinton, J., Nesbitt, L., & Sax, D. (2022). How well do we know green gentrification? A systematic review of the methods. *Progress in Human Geography*, 46(4), 960–987.
<https://doi.org/10.1177/03091325221104478>
- Reduce household food insecurity and hunger*. (n.d.). Healthy People 2030. Retrieved May 3, 2023, from <https://health.gov/healthypeople/objectives-and-data/browse-objectives/nutrition-and-healthy-eating/reduce-household-food-insecurity-and-hunger-nws-01>

- Richardson, J., Mitchell, B., & Edlebi, J. (2020). *Gentrification and Disinvestment 2020*. Nation Community Reinvestment Coalition. <https://ncrc.org/gentrification20/>
- Riffe, A., Bannon, B., Wrenn, D., Rosengrant, M., Abella, N., Rodgers, S., Noyes, E., Sherls-Jones, J., Clements-Sampson, S., & Agyemang, S. (2022). *Spokane County Community Health Needs Assessment*. Spokane Regional Health District.
- Rosenbaum, S. (2013). *Principles to Consider for the Implementation of a Community Health Needs Assessment Process*. The George Washington University.
- Rumbold, A. R., Giles, L. C., Whitrow, M. J., Steele, E. J., Davies, C. E., Davies, M. J., & Moore, V. M. (2012). The effects of house moves during early childhood on child mental health at age 9 years. *BMC Public Health, 12*(1), 583. <https://doi.org/10.1186/1471-2458-12-583>
- Sallis, J. F., Spoon, C., Cavill, N., Engelberg, J. K., Gebel, K., Parker, M., Thornton, C. M., Lou, D., Wilson, A. L., Cutter, C. L., & Ding, D. (2015). Co-benefits of designing communities for active living: An exploration of literature. *The International Journal of Behavioral Nutrition and Physical Activity, 12*, 30. <https://doi.org/10.1186/s12966-015-0188-2>
- Schanzer, B., Dominguez, B., Shrout, P. E., & Caton, C. L. M. (2007). Homelessness, Health Status, and Health Care Use. *American Journal of Public Health, 97*(3), 464–469. <https://doi.org/10.2105/AJPH.2005.076190>
- Sisson, P. (2019, January 22). *As Boise booms, a city faces the curse of 'Californiacation.'* Curbed. <https://archive.curbed.com/2019/1/22/18193112/boise-real-estate-housing-downtown>
- Southeastern Pennsylvania Community Health Needs Assessment*. (2022). Penn Medicine. <https://www.pennmedicine.org/-/media/documents%20and%20audio/annual%20reports/community/2022%20rchnapennmedicine.ashx?la=en>

- Sun, Y., Liu, B., Rong, S., Du, Y., Xu, G., Snetselaar, L. G., Wallace, R. B., & Bao, W. (2020). Food Insecurity Is Associated With Cardiovascular and All-Cause Mortality Among Adults in the United States. *Journal of the American Heart Association: Cardiovascular and Cerebrovascular Disease*, 9(19), e014629. <https://doi.org/10.1161/JAHA.119.014629>
- Tinsley, H. E., & Weiss, D. J. (1975). Interrater reliability and agreement of subjective judgments. *Journal of Counseling Psychology*, 22, 358–376. <https://doi.org/10.1037/h0076640>
- Tran, L. D., Rice, T. H., Ong, P. M., Banerjee, S., Liou, J., & Ponce, N. A. (2020). Impact of gentrification on adult mental health. *Health Services Research*, 55(3), 432–444. <https://doi.org/10.1111/1475-6773.13264>
- Walser, M. (2018). Putting the Brakes on Rent Increases: How the United States Could Implement German Anti-Gentrification Laws without Running Afoul of the Takings Clause. *Wisconsin International Law Journal*, 36(1), 186–iv.

Supplementary Information

Table ES.1

Poor quality of the built environment affects health: summary of exposure, population-attributable fraction from inadequate housing conditions

Source: Braubach et al. (30).

Exposure	Health outcomes	Exposure–risk relationship	Population-attributable fraction (%)
Mould	Asthma deaths and DALYs ^a in children (0–14 years)	RR ^b = 2.4	12.3
Dampness	Asthma deaths and DALYs in children (0–14 years)	RR = 2.2	15.3
Lack of window guards	Injury deaths and DALYs in children (0–14 years)	RR = 2.0	33–47
Lack of smoke detectors	Injury deaths and DALYs (all ages)	RR = 2.0	2–50
Crowding	Tuberculosis	RR = 1.5	4.8
Indoor cold	Excess winter mortality	0.15% increased mortality per °C	30
Traffic noise	Ischaemic heart disease, including myocardial infarction	RR = 1.17 per 10 dB(A)	2.9
Radon	Lung cancer	RR = 1.08 per 100 Bq/m ³	2–12
Residential second-hand smoke	Lower respiratory infections, asthma, heart disease and lung cancer	Risk estimates range from 1.2 to 2.0; OR ^c = 4.4	Estimates range from 0.6% to 23%
Lead	Mental retardation, cardiovascular disease, behavioural problems	Case fatality rate 3%	66
Indoor carbon monoxide	Headache, nausea, cardiovascular ischaemia/insufficiency, seizures, coma, loss of consciousness, death	DNS/PNS ^d incidence 3–40%	50–64
Formaldehyde	Lower respiratory symptoms in children	OR = 1.4	3.7
Indoor solid fuel use	COPD ^e , ALRI ^f , lung cancer	RR = 1.5–3.2	6–15

^a DALYs: disability-adjusted life-years

^b RR: relative risk

^c OR: odds ratio

^d DNS/PNS: delayed or persistent neurocognitive sequelae

^e COPD: chronic obstructive pulmonary disease

^f ALRI: acute lower respiratory infection

Table A. Negative Health Outcomes of Substandard Housing
Source: Data from Braubach et al., 2011, as presented in 2014 Marmot WHO document

<u>Housing Concepts</u>
Gentrification
Displacement
Housing Affordability
Rent Burden/Cost Burden
Neighborhood Change
Homeless/Houseless
Substandard Housing
Safe Housing
Eviction
Social Determinants of Health
Housing Instability
Overcrowding
<u>Health Concepts</u>
Health Equity
Crime/Violence
Mental Health
Cardiovascular Disease
Hypertension
Asthma
Lung Cancer
Food Insecurity
Aging in Place
Access to Healthcare
Access to Open Space/Parks
Active Living
The Built Environment
Social Isolation/Connectivity
<u>Prioritization of Housing Element</u>
Data about gentrification or related concept of neighborhood change
Data about substandard housing
Data about affordable housing
Statistics of cost burden of housing/percentage of income spent on housing

Table B. Open Coding Concepts