



Causes, consequences and health impacts of gentrification in the Global North: a conceptual framework

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Abstract

We aimed to create a theoretical framework to understand how neighborhood gentrification may impact urban health and health equity, taking into account perspectives and evidence from multiple disciplines. In addition to reviewing the literature and harnessing our own experience and expertise, we elicited input from researchers, activists and professionals from multiple fields using an eDelphi process, determined the agreements and disagreements between respondents on the causes, consequences, and health impacts of gentrification. Respondents agreed that neighborhood gentrification has important implications for mental health and on many of the causes and consequences of gentrification but reached less agreement on the pathways by which gentrification may affect health and the specific health outcomes that may be affected. Finally, we generated an evidence-informed conceptual framework taking into account the input from the eDelphi process. Here we present this conceptual framework for understanding the relationship between gentrification and health and discuss a future research agenda for this emerging theme in public health research.

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1 Introduction

Gentrification refers to the neighborhood change process through which the demographic, real estate, and business characteristics of a place transition towards a more educated, wealthy and whiter population, able to afford new or renovated expensive homes while also fomenting new cultural and consumption practices (Lees et al., 2015a, 2015b; Smith, 1982, 1996). Much research focuses on the experiences of long-term residents of gentrifying neighborhoods, particularly marginalized residents including ethnic/racial minorities or those with lower socioeconomic status (SES), and its impacts on their livelihoods and social outcomes. Gentrification has been debated and researched in the social sciences since it was coined by Ruth Glass in 1964 (Brown-Saracino, 2010). Meanwhile, public health studies focusing on neighborhood environments and their relationship to health—conceptualizing such environments as social determinants of health—have largely relied on static measurements such as neighborhood-level poverty, segregation, or racial composition. Gentrification only has only recently gained attention in public health research, responding in part to growing public concern as this process becomes more widespread and acute in cities worldwide. A growing body of literature demonstrates the relevance of gentrification for the study of neighborhood effects on health, with a primary focus on urban areas in Global North countries (Bhavsar et al., 2020; Schnake-Mahl et al., 2020; Tulier et al., 2019).

However, public health researchers continue to face challenges studying gentrification due to the complexities associated with variations in measuring gentrification (Bhavsar et al., 2020; Firth et al., 2020; Mujahid et al., 2019; Schnake-Mahl et al., 2020; Tulier et al., 2019), and the unresolved debates about the causes and consequences of gentrification that may be linked to health, leading to important implications for study design, hypothesis building and intervention planning (Cole, 2020). In fact, few public health studies provide a theoretical framework on which analyses are based (Schnake-Mahl et al., 2020). To begin addressing some of these complexities, we developed a conceptual framework for understanding the relationship between gentrification and health in the Global North, informed by the existing literature and input of diverse academic and other experts.

1.1 Literature review

Gentrification generally refers to commercial, demographic and real estate price changes due to local, national, or global investments geared towards higher income and white residents (Brown-Saracino, 2009; Cocola-Gant, 2018; Lees & Ley, 2008; Lees et al., 2015a, 2015b). In quantitative research, such as the majority of public health studies to date, gentrification tends to be estimated for small geographic areas using census or other publicly available data (Glick, 2008; Hammel & Wylie, 1996; Zook et al., 2019). Researchers measure changes over time in multiple variables (separately, or by constructing an index measure) such as: median income, percentage of residents with a university or higher level of education, white residents, and housing prices (Atkinson & Bridge, 2005; Freeman & Braconi, 2007). They then compare these changes to city-wide average changes and consider gentrification to be occurring where increases in these variables in small areas (an estimation of neighborhoods) is greater than changes in the city-wide averages of the same

variables. A variety of drivers of gentrification, often conceptualized as “demand-side” or “supply-side” drivers, have been identified, including: an influx of artists (Cameron & Coaffee, 2006), commercial revitalization (Summers, 2019), movement of white professionals (Hyra, 2017; Tissot, 2015), physical proximity of the neighborhood to affluent areas and economic amenities (Ley, 1986), a gap between existing and potential ground rent (Smith, 1979, 1987), urban renewal and policies intended to decrease the availability of public housing (Lees & Ferreri, 2016; Visser & Kotze, 2008) and global competition for resources (Lees et al., 2016; Wyly, 2015).

1.2 Relationship between gentrification and health- findings to date

Research documenting the relationship between gentrification and health is growing but still scarce, in part due to the methodological challenges measuring and conceptualizing gentrification as an epidemiological exposure due to variations in its definition, difficulty accessing the appropriate data at the appropriate geographic scale and times, and difficulty tracking mobile populations especially those at risk for displacement. Thus, the literature on gentrification and health has primarily adopted cross-sectional designs that exclude displaced residents, include a highly selective sample, or covers time or geographic scales chosen for practical rather than theoretical reasons (Firth et al., 2020; Tulier et al., 2019). Importantly, few epidemiologic or other public health studies engage with theoretical explanations for the relationships being tested, or for the measures of outcomes or exposures included in the study. This limitation may limit the generalizability, relevance or validity of results.

The results of quantitative studies on the relationship between gentrification and health, most commonly using a self-reported general health measure, often reveal weak, or mixed associations, especially when accounting for additional neighborhood or social characteristics. For example, Barton et al. found that gentrification is related to worse self-rated physical and mental health, but these associations disappear after adjustment for neighborhood collective resources and other neighborhood measures (Barton et al., 2022). Another study found that longer residence in a gentrifying neighborhood is actually associated with better self-reported health, without variation by race/ethnicity (Agbai, 2021). However, this study lacked the follow-up data to show among those no longer living in the neighborhood, which may have resulted in a selection bias—that is those who might have been negatively affected by gentrification may be those who were displaced or willingly moved away from the neighborhood rather than those who stayed. Meanwhile, others have shown gentrification, or displacement from gentrified neighborhoods, to be associated with asthma- and mental-health related emergency department visits (Henson et al., 2021; Lim et al., 2017).

Much of the existing literature analyses the health of all residents, including gentrifiers, rather than considering the possibility that gentrification may have a different effect for different population groups—leading to potentially exacerbated health inequities. Meanwhile, some existing research highlights differences in the effect of gentrification by race/ethnicity, SES and/or length of residency in the neighborhood, showing in general that the health effects of gentrification may be beneficial for dominant racial or class groups while harming those of racialized minorities or lower SES (Gibbons & Barton, 2016; Huynh & Maroko, 2013). Additionally, marginalized groups are more likely to be displaced from gentrifying neighborhoods, often moving to areas with potentially worse social and physical conditions—thus in addition to displacement itself, these residents also experience the

negative health impacts associated with living in disadvantaged neighborhoods (Duncan & Kawachi, 2018).

Several systematic reviews conducted in the past five years have revealed few studies (between 6 and 36 of thousands of screened articles) which directly analyze the relationship between gentrification and health (Bhavsar et al., 2020; Schnake-Mahl et al., 2020; Smith et al., 2020; Tulier et al., 2019), with varying results. For example, one review suggested that while overall associations between gentrification and health were largely null, gentrification was associated with worse health among Black populations in particular (Smith et al., 2020). Another concluded mixed positive, negative and null associations (Schnake-Mahl et al., 2020). A third found similar results, highlighting that gentrification appears not to have a uniform effect across different population groups, with those in more marginalized groups such as the elderly and Black residents affected more than younger, white residents (Bhavsar et al., 2020).

1.3 Frameworks for the relationship between gentrification and health

Hypothesized pathways by which exposure to gentrification may affect health among those remaining in gentrifying neighborhoods which have been identified or tested in past research include: increased housing insecurity (Sánchez-Ledesma et al., 2020); changes in the institutional-level determinants of health such as school quality, access to healthy and affordable food and access to quality healthcare (Anguelovski, 2015; Cole et al., 2019; Lim et al., 2017); changes to the neighborhood social environment including social networks (Sánchez-Ledesma et al., 2020); changes to patterns of neighborhood violence or other security issues (Papachristos et al., 2011; Sánchez-Ledesma et al., 2020; Smith, 2014); and changes to the built environment such as decreased traffic safety (González et al., 2019). These neighborhood changes may impact an individual's mental and physical health via changes in dietary patterns, physical activity, drug and alcohol use (Izenberg et al., 2018a, 2018b), healthcare-seeking behavior, and increases in stress, trauma, and fear (Anguelovski et al., 2019). As mentioned above, several studies point to the importance of the differential effect gentrification may have on health between different social groups, where marginalized groups may be more likely to suffer from the negative health effects of gentrification compared to more privileged groups, those which may be conceptualized as "gentrifiers". Only three studies—two qualitative analysis with data from multiple cities, and one systematic review have attempted to present a conceptual framework linking gentrification and health (Anguelovski et al., 2019, 2021; Bhavsar et al., 2020). However, both start from the point of existing gentrification processes, and follow the pathways which may link gentrification to health, but do not include an understanding of the potential causes of gentrification, which is important if the ultimate goal is to prevent or mitigate the negative or inequitable social and health-related consequences of gentrification.

2 Methods

To supplement our own review and analysis of the literature and expertise, we employed an e-Delphi process (McMillan et al., 2016) via two progressive online surveys (Cole et al., 2013) to capture expert opinions with the goal of developing a conceptual framework examining the relationship between gentrification and health. We chose the e-Delphi method due to its suitability for building consensus among experts where a certain amount

of disagreement is expected (McMillan et al., 2016), such as the case with understanding how and whom gentrification affects. The Delphi method, and particularly the eDelphi method also offers a high level of anonymity (Donohoe et al., 2013), which may produce more valid results in the case of disagreement especially, and also reduces the need of the facilitator to manage the balance of participation when there may be more dominant group participants (McMillan et al., 2016).

The eDelphi process that we followed is detailed in Fig. 1. We purposively recruited experts working in the Global North using our own networks and requesting suggestions for additional potential participants from the initial group. For academic researchers we included social science (urban planning, geography, and others) and public health researchers whose work is related to gentrification. For activists we included those who advocate for housing justice or related rights in areas experiencing gentrification. For professionals we included public health practitioners working on housing and/or public health. We limited experts to English- or Spanish-speaking individuals.

The process included two rounds of surveys. The first, which was sent to 83 potential respondents in the spring of 2019, consisted of open-ended questions regarding the definition of gentrification (providing the basic definition “Gentrification is a process that is characterized by a shift in the population of a neighborhood toward having more residents of a higher socioeconomic status.” and asking participants to make any needed additions/changes), and to describe the causes, consequences, mechanisms and health impacts of gentrification.

The second survey, which was emailed to all participants who completed round one in the winter of 2019/2020, included 97 items grouped into the same categories, that were derived from the responses from the first survey. The purpose of the second survey was to test consensus on the initial round 1 responses. For the gentrification definition, respondents were asked to check off which of the phrases (from a list of all the suggestions provided in round 1) they felt should be added to the initial basic definition. They were then asked to rank, on a scale of 1–5, how important it is from their

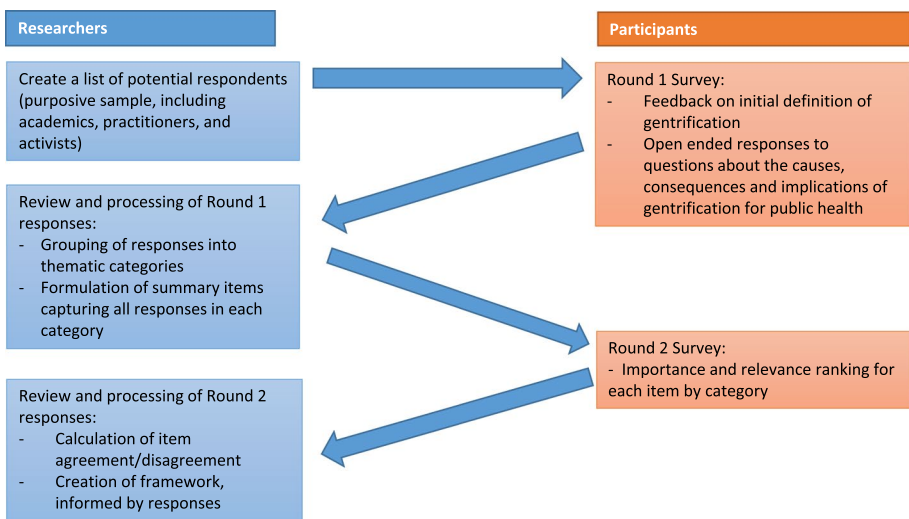


Fig. 1 The eDelphi process

perspective that all studies of gentrification and health be based on a single consistent definition. For each of the following sections (causes, consequences, health effects, and mechanisms), we clustered round 1 responses into thematic sub-group headings and asked respondents to rank each item on (1) importance and (2) relevance, on a scale of 1–5 with 5 indicating very important or relevant. A final open-ended question in each section asked respondents if they felt any of the items should be omitted or modified. In a final section, we asked respondents which population groups they felt are most impacted by gentrification.

Results from the second survey were analyzed using Stata version 14, using methods by Zhao and colleagues to calculate agreement between respondents for each item (Zhao et al., 2015). First, we calculated the mean importance and relevance score for each item. We then calculated a composite score for each item using the formula to account for both importance and relevance: $\text{Composite} = (\text{Importance} * 0.6) + (\text{Relevance} * 0.4)$. Thus, mean importance, mean relevance and mean composite scores were on a scale of 1 to 5 with 5 indicating greater importance and/or relevance. To assess the extent to which respondents agreed on each item, we calculated the coefficient of variance of the composite score for each item: $\text{Coefficient of variance} = (\text{standard deviation of composite score} / \text{mean composite score})$. We considered items to be important, relevant, and agreed upon if the mean composite score was 3.5 or greater and if the coefficient of variance was less than 0.25. Conversely, items with a composite score less than 3 and a coefficient of variance of less than 0.25 were considered not important and relevant by respondents. We also identified items where respondents strongly disagreed on importance and/or relevance as those where coefficients of variance were greater than 0.45. To draft the health and gentrification conceptual framework, we considered items of greater importance, relevance and a high agreement level.

In addition, the conceptual framework is further informed by our review of the literature and by our own experience. The authors include researchers with advanced training in public health, and additional training in the social sciences, who work as researchers in academia or in a local health department or regional health agency. Collectively, we have focused our research within the field of public health on topics relating to health equity, the health effects of housing, environmental epidemiology, and the social determinants of health.

3 Results

A total of 22 respondents participated in the first round from North America, Europe and Australia (see Table 1). Most respondents were academic researchers working in the social sciences (50.0%), followed by public health researchers (31.8%), a combination of public health and social science academics (9.1%), activists (4.5%) and a combination of both social sciences academics and activist (4.5%). After reviewing and combining similar responses the following additions were made: 8 to the definition, 19 to causes, 31 to consequences, 16 to mechanisms, 12 to health outcomes, and 11 to population groups. A total of 10 participants (60.0% female; 40.0% male) completed the round 2 survey including: four public health researchers and six researchers from other fields.

Table 1 Study respondent demographics (N=22)

Age	% (n)
25–34 years	13.6% (3)
35–44 years	36.4% (8)
45–54 years	31.8% (7)
55–64 years	4.5% (1)
65+ years	0
No response	13.6% (3)
Gender	
Female	36.4% (8)
Male	54.5% (12)
Other	4.5% (1)
No response	4.5% (1)
Field	
Academic researcher- social sciences	50.0% (11)
Academic researcher- public health	31.8% (7)
Academic researcher- public health and social science	9.1% (2)
Activist	4.5% (1)
No response	4.5% (1)
Time working in field	
Less than 1 year	9.1% (2)
1–3 years	22.3% (5)
4–10 years	40.9% (9)
More than 10 years	13.6% (3)
No response	13.6% (3)

3.1 Definition of gentrification

There were three items suggested as essential elements of the gentrification definition: shift in population in gentrifying neighborhood- more residents of a higher SES (87% agreement); rising costs of housing (87% agreement); and substitution or expulsion of lower SES or minority residents (73% agreement). Respondents agreed that having a stable gentrification definition across time and context is only moderately important (mean = 3) but relevant (mean = 3.73).

3.2 Causes and consequences of gentrification, mechanisms and health outcomes

Causes mentioned by and later agreed upon by respondents as being both highly important and relevant are presented in Table 2; consequences in Table 3; and mechanisms and outcomes in Table 4. Although only one health outcome (mental health) was consistently ranked by experts as both important and relevant. In each category, there were several items which returned a very high level of disagreement between respondents on importance, relevance or both (where variance coefficients were greater than 0.45; Table 5).

Respondents generally agreed on the importance and relevance of exposure to gentrification for the health of the following populations: long-term residents, residents displaced from gentrifying neighborhoods, residents living in rented housing, single-parent families,

Table 2 Suggested causes reaching significant and moderate agreement among respondents

Item	Mean Importance	Mean Relevance	Overall Score	Coefficient of Variance
<i>Economic approach/production/supply</i>				
Rise of neoliberalism (privatization, reduction of state's capacity, hyper-commodification of life). ⁺	3.77	3.77	3.77	0.2823
Targeted public sector policies which could foster gentrification (e.g. local economic development tools, tax incentives, etc.).*	4.00	4.15	4.06	0.1613
Lucrative investment potential (in high risk neighborhoods or impoverished neighborhoods). ⁺	3.69	3.77	3.72	0.2664
Property owners forcing out lower-status/income tenants, by increasing rents, eviction, or lack of maintenance.*	3.77	3.85	3.80	0.2334
<i>Housing system dynamics</i>				
Shortage of affordable housing stock. ⁺	4.08	4.08	4.08	0.2735
Shortage of public or social housing stock.*	4.31	4.31	4.31	0.1308
Lack of public policies which address housing insecurity (e.g. strengthen social housing, tenant protections, rent control or regulation, etc.).*	4.38	4.31	4.35	0.1490
<i>Urban renewal process</i>				
Urban renewal processes which enhance neighborhood amenities and physical environment.*	3.77	4.00	3.86	0.2339
<i>Cultural approach/demand</i>				
Consumer demand: Middle class moving into lower income areas for more affordable rent. ⁺	3.62	3.62	3.62	0.2861
Consumer demand: Middle class looking for better locations in terms of transport, jobs, or other amenities.*	3.62	3.92	3.62	0.1975
<i>Social Inequalities</i>				
Social inequalities between groups (class, race, gender, etc.) which lead to an unequal access to the city.*	4.69	4.54	4.63	0.1257

*Indicates items with high relevance and importance and agreement (coefficient of variance < 0.25)

⁺Items showing high relevance and importance and a trend toward agreement (coefficient of variance < 0.30)

Table 3 Suggested consequences reaching significant and moderate agreement among respondents

Item	Mean importance	Mean relevance	Overall score	Coefficient of variance
<i>Changes in sociodemographic composition of the neighborhood</i>				
Increase in more educated and wealthier population of gentrified neighborhoods. *	4.33	4.58	4.43	0.1167
Socioeconomic segregation: Gentrified neighborhoods become areas for advantaged groups, displacing disadvantaged groups to other areas of the city.*	4.33	4.00	4.20	0.1839
<i>Changes in physical environment, amenities and businesses</i>				
Physical improvements of neighborhood environments (new parks, less physical disorder/trash, more attractive streetscapes, bike and pedestrian infrastructure, etc.).*	3.92	3.83	3.88	0.2077
Improvement of neighborhood amenities (e.g. transport infrastructure, services, etc.).*	3.92	3.83	3.88	0.1843
New businesses or a different mix of businesses that may cater to a higher income/higher education group. This includes stores for those with more disposable income such as coffee shops, organic markets, etc. (economic growth).*	3.92	3.92	3.92	0.2116
<i>Changes in cost of living and economic consequences</i>				
Increase cost of daily activities such as food, heating/energy, transportation, clothes, entertainment, health resources, etc. *	4.25	4.17	4.22	0.2173
Increase in housing costs (rent, taxes).*	5.00	5.00	5.00	0.0000
Increase in neighborhood property value. *	4.25	4.17	4.22	0.2456
<i>Displacement</i>				
Long-term residents (generally from lower SES) are forced to leave the neighborhood because they cannot afford it.*	4.58	4.50	4.55	0.1646
<i>Loss of social networks</i>				
Decrease in social cohesion/support of those long-term residents who remain in the gentrified neighborhood.*	4.00	4.25	4.10	0.2022
Loss of social network of those long-term residents who are forced to leave the neighborhood. *	4.00	4.17	4.07	0.1734
Loss of base/support for place-based institutions (e.g. neighborhood associations, sports or cultural organizations, etc.).*	4.08	4.17	4.12	0.1937
<i>Psychological consequences</i>				
Decrease in sense of belonging and feeling of loss of identity among long-term residents (generally from lower SES) who remain in the gentrified neighborhood.*	4.08	4.17	4.12	0.2197

Table 3 (continued)

Item	Mean importance	Mean relevance	Overall score	Coefficient of variance
Emergence of fear, uncertainty and stress among long-term residents (generally from lower SES) who remain in the gentrified neighborhood.*	4.25	4.33	4.28	0.1752
<i>Housing insecurity</i>				
Increased housing insecurity among some long-term low-income residents of the gentrifying neighborhood.*	4.83	4.67	4.77	0.0993
<i>Increase in individual and contextual social inequalities</i>				
Increase in SES inequalities across the city between social groups and areas (e.g. economic growth of gentrifying neighborhood and decline of other parts of the city).*	3.83	3.83	3.83	0.2178
Increase in SES inequality within gentrifying neighborhoods.†	3.83	3.83	3.83	0.2983

*Indicates items with high relevance and importance and agreement (coefficient of variance < 0.25)

†Items showing high relevance and importance and a trend toward agreement (coefficient of variance < 0.30)

Table 4 Suggested health outcomes and mechanisms reaching significant and moderate agreement among respondents

Item	Mean importance	Mean relevance	Overall score	Coefficient of variance
Mechanisms				
Neighborhood quality and amenities				
Exclusion from new, better quality amenities and services for long-term and/or lower-income residents leads to worse health outcomes among these groups and greater inequality.*	4.00	4.10	4.04	0.2236
Housing and economic conditions				
Stress caused by increased housing costs and lack of access to affordable housing leads to worse health outcomes.*	4.70	4.80	4.74	0.0913
Improved quality of housing.+	3.80	3.70	3.76	0.2745
Rising cost of living leads to stress among lower-income residents, causing worse health outcomes.*	4.70	4.70	4.70	0.1028
Social and cultural mechanisms				
Loss of social networks or social cohesion as long-term residents leave the neighborhood.+	4.10	4.20	4.14	0.2567
Loss of neighborhood cultural identity as new residents and new types of businesses replace traditional ones, leading to worse health outcomes.+	3.60	3.80	3.68	0.2935
Psychosocial				
Residents at risk of displacement face increasing fear and trauma.*	4.30	4.30	4.30	0.2206
Health outcomes				
Mental health				
Negative effects on mental health (e.g. depression and anxiety) on those original residents who remain in the gentrified neighborhood (generally from lower SES).*	4.25	4.25	4.25	0.2038

*Indicates items with high relevance and importance and agreement (variation coefficient < 0.25)

+Items showing high relevance and importance and a trend toward agreement (variation coefficient < 0.30)

Table 5 Items from each category with substantial disagreement between respondents on level of importance and relevance

Item	Mean Importance	Mean Relevance	Overall Score	Variance Coefficient
Consequences				
If gentrification is delivered well, can result in better social integration and opportunity for local residents	2.75	3.00	2.85	0.5535
Gentrification can help break the cycle of entrenched, intergenerational poverty	2.33	2.08	2.23	0.5478
Newcomers moving into the neighborhood can access more affordable housing, allowing for higher quality of life	2.67	3.33	2.93	0.4581
Long-term environmental harm. Both from environmental harms inherent to development/construction, and from higher-consumption lifestyles of affluent in-movers	2.58	2.42	2.52	0.4750
Increase in noise due to tourism, parties and night life	2.67	2.75	2.70	0.4878
Gentrification could lead to less safe neighborhood due to the effects of mass tourism	2.17	2.17	2.17	0.5144
More privileged residents are more likely to engage in classism, racism, homophobia, transphobia and other oppressions than previous residents were. There may even be a rise in certain hate crimes	2.67	2.75	2.70	0.5637
Mechanisms				
Reduced traffic as pedestrianized areas are increased	3.10	3.20	3.14	0.4952
Increase in noise due to changes in business and increasing popularity of neighborhood	2.40	2.40	2.40	0.4985
Increased access to health care as higher-income residents move in, creating greater economic opportunities for health care providers	2.80	2.80	2.80	0.4868
Less use of preventive health care as health care providers are over-burdened with new residents and may face funding cuts	2.10	2.00	2.06	0.5299
Health Outcomes				
Increased access to health care as higher-income residents move in, creating greater economic opportunities for health care providers	2.80	2.80	2.80	0.4868
Less use of preventive health care as health care providers are over-burdened with new residents and may face funding cuts	2.10	2.00	2.06	0.5299
Increased likelihood of respiratory illnesses due to air pollution (e.g. air pollution related to building construction)	2.64	2.73	2.67	0.4989
Increasing risk of consumption of drugs and alcohol among lower SES groups who remain in gentrifying neighborhood	2.55	2.64	2.58	0.4654
Increasing risk of consumption of drugs and alcohol among all residents of gentrifying neighborhoods	2.09	2.00	2.05	0.4751

Table 5 (continued)

Item	Mean Importance	Mean Relevance	Overall Score	Variance Coefficient
Improved access to health care	2.45	2.55	2.49	0.4618
Less access to health care among those in socially disadvantaged groups	2.64	2.73	2.67	0.4795

elderly, racial and ethnic minorities and/or immigrant groups, and residents with low SES (low levels of education and income). A high level of disagreement was revealed on the importance of relevance for new residents (e.g. “gentrifiers”).

3.3 Conceptual framework

We designed the conceptual framework using the information gathered via the eDelphi process, as well as input from related published literature and our own expertise. We arranged the basic themes agreed upon by eDelphi respondents as both important and relevant (see Tables 2 through 5 and above) to form a conceptual framework (Fig. 2), inspired by the general structure of the conceptual framework for action on the social determinants of health proposed by World Health Organization (Solar & Irwin, 2010). At the macro level, gentrification is caused by structural determinants of health defined as political and economic systems, as well as contributing social and cultural factors which reflect the social hierarchy of society. At this level, the supply/production approach (related to privatization, reduction of the state capacity, hyper-commodification of life, policies to increase lucrative investment potential, and others) and the demand/cultural approach (related to consumer preferences such as more affordable rent attracting the middle class or good locations in terms of jobs, transport, or other amenities) influence both housing systems (the housing market and housing policy) and urban renewal.

These four dimensions also determine unequal effects of gentrification across territories. Gentrification may lead to consequences which affect individuals (such as the increase in housing costs and others costs of living) and neighborhoods (such as changes in sociodemographic composition, the physical environment, and amenities and types of businesses). These consequences are intermediate determinants of health and contribute to health inequities through various mechanisms such as exclusion from benefiting from new amenities;

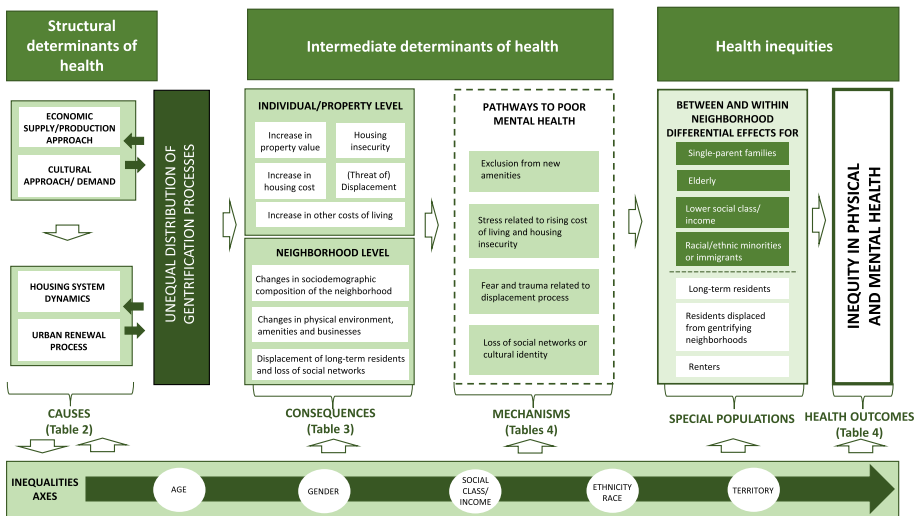


Fig. 2 Conceptual framework for understanding how the causes and consequences of neighborhood gentrification lead to inequity in mental health outcomes (see Tables 2 through 4 for details on causes, consequences, and mechanisms and health outcomes respectively)

stress related to rising cost of living and housing insecurity; fear and trauma related to risk for displacement; and loss of social networks or cultural identity. The resulting health effects manifest themselves more intensely among certain populations in terms of sociodemographic characteristics (i.e. single-parent families, elderly, lower social classes and racial/ethnic minorities or immigrants) and residential characteristics (long-term residents who are affected by neighborhood changes, residents displaced from gentrifying neighborhoods and renters) which lead to mental health inequities, disproportionately affecting certain groups. In addition to the social inequity dimensions that exist between and within neighborhoods resulting in mental health inequities, these axes also play a role throughout the gentrification process. The inequality axes which include factors like age, gender, social class, race/ethnicity and territory (accounting for differences for example in the geographic distribution of resources), contribute to the differences in power and access to resources between social groups impacting the causes, consequences and mechanisms that ultimately result in health inequities.

4 Discussion

We developed a conceptual framework to inform emerging research on the health effects of gentrification. As Schnake-Mahl and colleagues found, the majority of existing studies relating gentrification to health did not base their study design or analysis on any given theoretical framework (Schnake-Mahl et al., 2020). Furthermore, we found significant disagreement between respondents on the consequences of gentrification, the mechanisms by which gentrification affects health and the specific health outcomes that may be affected, indicating that using an explicit conceptual framework to guide research on this topic is particularly important. Such disagreement highlights the need to use a more explicit theoretical framework to design studies on this topic to ultimately build stronger and more consistent evidence to support claims about the health effects of gentrification as well as to guide policies and programs aimed at reducing health inequities. An earlier conceptual model developed by Bhavsar and colleagues, based on published research, and by Anguelovski and colleagues, based on a qualitative study, depict several pathways linking gentrification to health outcomes (Anguelovski et al., 2021; Bhavsar et al., 2020). We build on these models by including the importance of the causes and consequences of gentrification, in addition to the mechanisms by which gentrification is linked to health, in conceptualizing research studies on this topic and by emphasizing health equity, rather than outcomes alone.

The information gathered from a diverse group of experts via an eDelphi survey process enriched our own analysis of the literature and experience. For instance, diverging from past calls to standardize the definitions and operationalization of the construct of gentrification in comparing studies of gentrification and health or social determinants of health (Bhavsar et al., 2020; Schnake-Mahl et al., 2020; Tulier et al., 2019), our respondents agreed that maintaining a consistent definition of gentrification was *not* essential for studying the health effects of gentrification. Insisting on consistent definitions and measurements across studies and contexts may jeopardize researchers' abilities to produce meaningful results due to the variation in contexts and instantiations of gentrification by country, region or city, and differences in relevant histories of uneven urban development—those contexts leading to neighborhoods being vulnerable to gentrification (Cole, 2020; Pearsall, 2010).

Alternatively, the importance and relevance of rising living costs and housing insecurity emerged as a strong pathway by which gentrification affects health as observed in the literature and among respondents. In fact, prior evidence shows that housing insecurity is an important determinant of poor population health (Downing, 2016; Tsai, 2015; Vásquez-Vera et al., 2017), and in areas where affordable housing is limited, gentrification has had detrimental effects on health of long-term residents (Hyra et al., 2019). During early stages of gentrification, long-term residents may experience stressors associated with rising property values that can drive up property taxes and rental costs (Atkinson et al., 2011). As gentrification continues, while some residents may be priced out due to increasing housing costs, others may experience eviction threats from landlords looking to benefit from the areas growing popularity and increased rents (Chum, 2015; Lanionu, 2019). Additionally, housing insecurity may threaten established social networks through different pathways, which, in turn, may result in long-term residents feeling alienated or excluded (Davidson & Lees, 2010; Sánchez-Ledesma et al., 2020).

Considering the evidence linking physical health outcomes to gentrification, we included both physical and mental health equity in our model. Interestingly, respondents only reached consensus about negative effects on mental health, which has been less present in the existing published literature (for exceptions, see Sánchez-Ledesma et al., 2020; Smith et al., 2018; Tran et al., 2020)). In fact, respondents did not mention several mechanisms which have already been studied in past empirical research on the health effects of gentrification, such as the link with greater binge-drinking among newer residents (Izenberg et al., 2018a, 2018b) or the association between gentrification-related displacement and healthcare access or utilization (Lim et al., 2017). Also, some outcomes which have been linked to gentrification in past research such as general self-rated health (Cole et al., 2019; Gibbons & Barton, 2016; Izenberg et al., 2018a, 2018b) and low-birth weight (Huynh & Maroko, 2013), did not appear in responses. As respondents came from diverse fields, it could be that the majority were not aware of these empirical studies or that they are not convinced by published work so far. Another reason for this limited discussion on health effects may be the difficulties of capturing long-term effects of gentrification and accounting for the multiple confounding variables within neighborhood settings.

Limitations of this study, and the eDelphi method in general, include potential sampling and response biases, and a potential lack of objectivity in responses. The e-Delphi method consists of identifying and inviting experts in the subject matter of interest with the objective of building consensus. This method has no fixed rules for determining the optimal number of rounds or sample size, thus unlike in a typical quantitative study representation is not determined by calculating a specific sample size based on the target population and characteristics. However, according to the literature from multiple fields in which e-Delphi studies have been published, the sample can range significantly (from 6 to hundreds of participants involved in past published studies) and no set method for determining an appropriate sample size has been suggested (Crane et al., 2016; Vogel et al., 2019). Additionally, multiple e-Delphi studies, have been conducted with 20–28 expert participants (Pinnock et al., 2015; Wong et al., 2016) including ones focused on recruiting international and regional experts (Bagnasco et al., 2022; Schols et al., 2018). We acknowledge the low response rate particularly in the second round may limit the objectivity of the final results, as such we attempted to increase the response rate by sending multiple reminder emails but response remained low, in part perhaps due to the fact that the COVID-19 pandemic caused significant disruption across all parts of the globe during the course of the collection of data. However, although our survey had a low response and retention rate, perhaps due to the length and complexity of the final survey, on most items, respondents clearly

agreed or clearly disagreed, concluding that our results were quite relevant to supplement our own literature review. Furthermore, our expert panel was purposefully formed to include representatives from different fields working at the intersection of gentrification of health, with the understanding that these experts would differ in their approach and emphases (differences that are indeed visible in the data), the e-Delphi approach was chosen so that consensus could be reached. Of those who completed the final survey, the respondents were equally divided between researchers from the public health field, and those from other social science fields, which complemented our own backgrounds in environmental and social epidemiology, public health, and social medicine, well.

Unfortunately, we did not have any activists who completed all surveys, although many researchers straddle the fields of research and activism and may identify as both. We relied on a convenience sample based on our own networks and online research, thus we acknowledge that the survey results are not an exhaustive representation of expert opinions. Still, the variety of responses indicate that the sample indeed include a variety of backgrounds and orientations in gentrification research. Future research should also incorporate the emic knowledge and experience of residents of gentrifying neighborhoods themselves, who form a crucial group of stakeholders with essential expertise necessary to understand and address the pressure relating to gentrification on a local scale (Jacques-Aviñó et al., 2020).

4.1 Setting a gentrification and health research agenda

The disagreements that arose among respondents point to the need for more research on this topic. Following a long-lasting debate among gentrification scholars (Schnake-Mahl et al., 2020), one area of substantial disagreement related to the basic outlook of whether or not long-term or low-income residents of gentrifying neighborhoods may benefit from gentrification via access to better quality resources or long-term economic gains—up to the possibility of emerging from the entrenchment of intergenerational poverty. Such questions have been incorporated in the study design and hypotheses of past research on gentrification and health, particularly those studies investigating such relationships among specific sub-populations only (Dragan et al., 2019) and studies that test for interaction by sociodemographic group (Cole et al., 2019; Gibbons & Barton, 2016; Huynh & Maroko, 2013). However, so far long-term impacts have been allusive to traditional epidemiological designs due to the difficulty in following respondents over long periods or the complexity of incorporating non-static depictions of neighborhood dynamics. For instance, studies on neighborhoods and health utilizing a life-course approach often rely on the assumption that neighborhood SES remains stable over time, which may not be the case if neighborhoods are also changing including being gentrified. Furthermore, many studies on neighborhood health effects focus on the effects of poverty, often ignoring middle class residents who may also experience health effects of neighborhood environments, or changes such as gentrification.

Specific areas of research needed suggested by our results follow well from past research in environmental justice and environmental gentrification, environmental epidemiology and neighborhoods and health. Specifically, in several instances the environmental or physical changes which some associate with gentrification (i.e., construction, pollution, noise and long-term environmental harm) were mentioned by respondents but agreement on these items was not achieved. These same pathways have been suggested or studied in relating neighborhood environments to physical or mental health outcomes, but often not in relation to neighborhood changes such as gentrification. This follows from past calls for

research into the complex relationships between the physical and social changes related to urban renewal, gentrification and health (Cole et al., 2021; Mehdipanah et al., 2015).

4.2 Social and policy implications

A more robust understanding of the processes by which gentrification may be relevant for health and health equity also has important social and policy implications. Health has been at the forefront of many policy and planning frameworks such as those driven by “Health in all Policies” or approaches for “Healthy Cities”. These policy frameworks are informed by an understanding of the broad social determinants of health, which include social processes such as gentrification. However, they do not often consider the potential (unintended) consequences of such efforts. For instance, the link between developing new green spaces and other new amenities—which are primarily understood to be beneficial for health in multiple ways—and gentrification (Cole et al., 2017, 2019). Understanding the links between the causes, consequences, and ultimately the health and health equity effects of gentrification, could inform new policies and programs designed to prevent gentrification, or mitigate the negative impacts of gentrification when it does occur. For instance, rent control policies and land trusts, among others, have been suggested to potentially prevent gentrification, while initiatives such as the right to stay approach to prioritizing the needs of long-time residents of gentrifying neighborhoods may help to prevent gentrification-driven displacement of marginalized populations, which may ultimately improve the health of these groups. Such policies could also be implemented alongside planning initiatives for urban renewal and development intended to improve amenities and living conditions, and therefore health (Oscilowicz et al., 2022). Theoretically-backed research based on an existing conceptual model such as the one we present here could result in policy-relevant research which could inform such initiatives.

5 Conclusion

We present a conceptual model linking gentrification and health (equity) synthesized from existing literature and an eDelphi survey of experts from multiple fields. As public health researchers and practitioners increasingly recognize the importance of social and political processes such as gentrification for understanding the root causes and social determinants of health and health equity, research designed to test the relationship between gentrification and health and the potential mechanisms for this relationship should be informed by theoretical models explaining why such a relationship exists. Such study designs, which necessarily lie at the conflux of multiple fields, could produce results which are policy-relevant and therefore have a potential to produce greater social impact—including the promotion of improved mental and physical health and greater health equity among those living in neighborhoods experiencing, threatened to experience, gentrification.

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Declarations

Conflict of interests The authors have no competing interests to report.

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