



Exploring ownership of change and health equity implications in neighborhood change processes: A community-led approach to enhancing just climate resilience in Everett, MA

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ABSTRACT

Traditional planning processes have perpetuated the exclusion of historically marginalized communities, imposing vulnerability to climate (health) crises. We investigate how ownership of change fosters equitable climate resilience and community well-being through participatory action research. Our study highlights the detrimental effects of climate gentrification on community advocacy for climate security and health, negatively impacting well-being. We identify three key processes of ownership of change: ownership of social identity, development and decision-making processes, and knowledge. These approaches emphasize community-led solutions to counter climate health challenges and underscore the interdependence of social and environmental factors in mental health outcomes in climate-stressed communities.

1. Introduction

Past climate events like the 2017 hurricanes, Hurricane Harvey and Hurricane Maria, highlight the disproportionate impact of health and

climate risks on historically marginalized communities, especially lower-income communities, immigrant communities, and communities of color (García-López, 2018; Smiley et al., 2022). Despite the importance of critical infrastructures in climate emergencies, past

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prioritization of capital investments has led to the protection of economically privileged groups at the expense of historically marginalized groups (Bullard, 2008; Hendricks and Van Zandt, 2021). Climate change is increasing the frequency and duration of extreme weather events, further exacerbating health risks and environmental justice challenges already faced by historically marginalized groups.

Against these compounding injustices, urban planners and policy-makers see investments in neighborhood infrastructure, such as green resilient infrastructure, as strong candidates to support climate resilience and health by creating or improving amenities that adapt to changing climate conditions, reduce exposure to harmful air quality, improve walkability, and promote social cohesion (Baró et al., 2014; Bowen and Lynch, 2017; Jungman et al., 2023; Jennings and Bamkole, 2019; Nieuwenhuijsen, 2021; Shishegar, 2014). However, despite urban planning's role in shaping health through the built environment (Giles-Corti et al., 2022), traditional planning approaches to neighborhood infrastructure are increasingly criticized for contributing to unequal urban development processes that favor the health and safety of socially privileged groups (Apostolopoulou, 2023; Lees et al., 2015).

Uneven development has been shown to often displace historically marginalized communities from areas with newly integrated climate-adaptive infrastructure to more climate-insecure areas (Shokry et al., 2020). This process, known as "climate gentrification," presents a paradox where measures implemented to protect current residents from climate impacts and provide auxiliary health benefits are unlikely to benefit them (Anguelovski et al., 2019; Best et al., 2023; Keenan et al., 2018; Shokry et al., 2022). While elements of green gentrification can comprise climate gentrification – particularly evident in the development of green resilient infrastructure (GRI) – their distinction lies in their development intentions. Initiatives related to green gentrification often emphasize nature-based solutions and green infrastructure projects and the "green branding" associated with them, such as parks, greenways, urban agriculture, or restored shorelines (García-Lamarca et al., 2021). Meanwhile, climate gentrification initiatives focus on climate-adaptive features or protection from climate-induced risks extending beyond GRI or nature-based solutions to include climate-adaptive (or climate-resilient) housing, coastal developments, and floodplain developments, among other climate-adaptive grey infrastructures (Best and Jouzi, 2022; Best et al., 2023; Keenan et al., 2018). Climate gentrification also refers to spatial dynamics through which high-income residents move to climate-protected areas, which increases local land and property values, or their ability to upgrade and protect their homes in place (Anguelovski et al., 2019). Conversely, working-class groups are displaced to often more climate-exposed areas and are less able to protect themselves (Shokry et al., 2020). As a result, climate gentrification presents a paradox where measures implemented to protect current residents from climate impacts and provide auxiliary health benefits are unlikely to benefit them (Anguelovski et al., 2019; Shokry et al., 2022) and instead tend to economically benefit developers and land owners, who likely do not live in the community – extracting the social and health benefits for profit, or "green grabbing" (García-Lamarca et al., 2022). Moreover, gentrification-based pressures can result in other forms of displacement and dispossession, such as socio-cultural displacement and loss of public services and infrastructures (Anguelovski et al., 2021; Fullilove, 2001). This further harms community well-being through the erosion of social identity and the rupture of social support networks, ultimately forcing long-term residents to separate (Shaw and Hagemans, 2015; Tuttle, 2022; Wynne and Rogers, 2021).

Existing literature at the intersection of urban planning and health equity highlights the negative impacts of different drivers of (climate) gentrification on the health of historically marginalized groups, such as heightened stress, chronic anxiety, and poor sleep, arising from the persistent socioeconomic adversity associated with a higher cost of living and a constant risk of displacement (Anguelovski et al., 2019, 2021; Cole et al., 2021; Mehdipanah et al., 2018; Sánchez-Ledesma

et al., 2020; Smith et al., 2020; Triguero-Mas et al., 2021; Williams et al., 2021a). However, there remains a significant gap in understanding how communities effectively navigate neighborhood change in the context of both climate and gentrification risks and what factors enhance their mobilization to counter or mitigate related harmful health consequences. This study seeks to address this gap by using a Participatory Action Research (PAR) approach to examine how marginalized groups within a community perceive and experience the impact of neighborhood change (specifically, climate-adaptive infrastructure and development processes) on their health and well-being, as well as their approaches to reimagining these relationships.

In the sections that follow, we first discuss the health and well-being impacts of climate justice, infrastructures of care, placemaking and sense of place, and ownership of change. We will then introduce our case study of Everett, Massachusetts, and detail the PAR methodology utilized. Following this, we will present our qualitative findings on the nexus between neighborhood change and health and well-being, both experienced and envisioned by local communities from historically marginalized communities. Additionally, we will examine the role of ownership of change in mediating this relationship, while also discussing the broader implications of our research for the development of infrastructures of care, future placemaking initiatives, and the pursuit of just climate planning and health equity.

1.1. Climate justice and community infrastructures of care

The trend of historically marginalized groups' health most harmed by climate crises underscores the need for a more integrated and comprehensive approach to climate planning that centers on climate justice (Amorim-Maia et al., 2022). Climate justice strives for equitable distribution of the (health) benefits associated with reducing greenhouse gas emissions and implementing climate-adaptive infrastructures. These climate-adaptive interventions include— among others —heat-protective parks in historically disinvested neighborhoods to reduce the incidence of heat-related health emergencies (Alves and Mariano, 2018; Li et al., 2022). It also places considerable emphasis on addressing issues related to care, community, and well-being as critical forms of protection against climate impacts and as a means of supporting climate resilience (Ranganathan and Bratman, 2021; Schlosberg, 2012).

One such approach to climate justice is through enhancing the "urban infrastructure of care," or components of the urban environment that contribute to caring for the basic needs and well-being of communities (Binet et al., 2022a). Infrastructures of care play a vital role in cultivating a sense of community through care practices and "care collectives" that recognize community capacities for organizing their own spaces of relational care, where care is considered a "grounded everyday ethical practice" (Alam and Houston, 2020; De La Bellacasa, 2017; Williams, 2016). The concept of "caring with" between caregivers and care receivers sees caring as dynamic and dependent on multiple actors, or an ongoing process where many people work together (Tronto, 2013) – in this paper this caring relationship is situated between grass-roots organizations and historically marginalized community members towards the resilience and resistance of their neighborhood and city against gentrification, climate change, and displacement. As such, Alam and Houston (2020) propose infrastructures of care as potential catalysts to "open up possibilities of more public and open forms of caring as a way in which the community allocates responsibilities, ...[which] creates genuine concern for the maintenance and repair of the world". These communities and infrastructures of care are associated with a strong sense of community and community belonging (Binet et al., 2022a), which also explains a continued contestation of unequal development, gentrification, and its impacts on community ties; and is eventually also related to overall high life satisfaction (Carpiano and Hystad, 2011; Gattino et al., 2013; Prezza et al., 2001). Similarly, a stronger sense of community can help alleviate loneliness and isolation (Gattino et al., 2013; Glass, 2020; Prezza et al., 2001), which are linked

to higher risks of depression, as well as diabetes and cardiovascular diseases (Kitchen et al., 2012; Mushtaq et al., 2014). However, gentrification often undermines the infrastructures of care by imposing “care binds” – via rising housing costs (Binet et al., 2022a). Care binds result in unmet basic needs and limit one’s capacity to participate in care collectives or engage in essential caregiving activities for supporting dependents, fostering community bonds, and nurturing personal well-being (Binet et al., 2022a), ultimately eroding a community’s resilience to negative stressors, including climate impacts.

1.2. Sense of place and ownership of change

To effectively safeguard the caregiving activities and climate resilience of historically marginalized community members, interventions at the nexus of urban planning and public health necessitate the meaningful engagement of these communities in the (re)development of infrastructures of care (Broto et al., 2015; Chu et al., 2017; Goh, 2020). Urban placemaking is one such approach that partners with community members in designing the urban environment, such as parks and other public spaces to align with the needs of communities (Cilliers and Timmermans, 2014; Loroño-Leturiondo and Illingworth, 2023; Webb, 2014). Placemaking is “the process of transforming spaces into qualitative places by focusing on the social dimension of planning, linking meaning and function to the spaces” (Cilliers and Timmermans, 2014). In this sense “spaces, places, and buildings are more than just props in people’s lives; they are imbued with meaning and resonance, ...symboliz[ing] people’s personal histories” and an extension of people’s communities and wider culture (Cilliers and Timmermans, 2014). Placemaking thus fosters a sense of place or one’s emotional and cognitive attachment to a physical environment (Cartel et al., 2022; Ellery and Ellery, 2019). Placemaking is also related to place attachment, by encouraging individuals to care for a space (place keeping) and fight for a space aligned with community interests (place protecting) (Larson et al., 2018; Mattijssen et al., 2017). In return, when individuals feel attached to their physical environment, they can gain a stronger sense of security that reduces stress and anxiety (Eyles and Williams, 2008; Gattino et al., 2013; Scannell and Gifford, 2017). Furthermore, placemaking processes that unite historically marginalized groups can foster a sense of community belonging and collective efficacy or community power, often correlated with higher self-rated physical health and favorable mental health outcomes (Browning and Cagney, 2002; Butel and Braun, 2019; Rifkin, 2003). Urban placemaking is also closely intertwined with the visioning or (re)imagining of urban futures, particularly as it relates to the creation of inclusive, resilient, and socially just cities (Amirzadeh and Sharifi, 2024; Barry and Agyeman, 2020; Oscilowicz et al., 2023).

However, when neighborhood changes diverge from a community’s interests and result in unequal (re)development and gentrification, community members often experience a lack of agency over these changes or a lack of “ownership of change.” The concept of ownership of change, as conceptualized by Binet et al. (2022b), is a valuable framework for understanding the health equity implications of neighborhood change. Ownership of change explores the extent to which individuals feel a sense of empowerment over changes (socioeconomic, demographic, physical, etc.) in their neighborhood environments (Binet et al., 2022b). The relationship between increased agency over one’s environment and positive health outcomes suggests that the fundamental right to live in a healthy state is not universally recognized, or at least not equally prioritized by planning practitioners for all social groups. This realization highlights the systemic challenges associated with current exclusionary planning and policy paradigms where historically marginalized groups who are historically most vulnerable to health and climate risks are often excluded from related decision-making (Anguelovski, 2016; Phadke et al., 2015). This exclusion perpetuates existing structural inequities such as structural (anti-Black) racism, hostile immigration policies, unequal climate protection

and climate risk exposure, and targeted disinvestment of formal and informal infrastructures of care and (green) climate-adaptive resources and developments, which contribute to health and climate risks and further reinforce the marginalization of historically vulnerable groups (Adkins-Jackson et al., 2022; Bailey et al., 2017; Misra et al., 2021; Schuyler and Wenzel, 2022; Smith et al., 2022; Swope et al., 2022; Viruell-Fuentes et al., 2012; Williams et al., 2021b; Wilson, 2020).

2. Methods

2.1. Case selection

We, the authors – a mix of academic, practitioner, and community team members, explore the relationships between neighborhood change (implementation of climate-adaptive infrastructure and development processes), health equity, and ownership of change in an empirical study developed in the city of Everett, a Boston suburb in Eastern Massachusetts (Image 1). Over the decades, Everett has welcomed waves of immigrants from various parts of the world, including Southern Europe, Central America, Brazil, and Haiti, with 43.1% of residents being foreign-born (“U.S. Census Bureau QuickFacts,” 2020). However, the city faces significant issues with institutional racism and political representation (Neisloss, 2022a, 2022b). Everett’s history of redlining practices from the 1930s–1960s has left many areas of the city with high poverty rates and low property values, making Everett more vulnerable to gentrification-based displacement. Redlining refers to the systematic practice of denying or limiting financial services, such as loans or insurance, to residents of certain neighborhoods, typically based on their racial or ethnic composition resulting in lasting legacies of racial injustice (Rothstein, 2017; Ware, 2021).

The city is also increasingly vulnerable to climate-induced sea level rise and flooding and is highly affected by heat island effects (Image 2) (City of Everett Planning Department, 2019a, 2019b). Everett’s urban heat island effect – which poses significant public health risks for older adults, young children, and individuals with pre-existing health conditions – is primarily attributed to the prevalence of large industrial buildings (previously used as oil refineries, storage for liquified natural gas, and chemical plants by Monsanto), extensive parking lots, and the absence of green infrastructure like street trees and parks. The scarcity of green spaces exacerbates the health risks faced by lower-income communities and communities of color, who often encounter barriers to accessing public, shaded green areas (City of Everett Planning Department, 2019a) and suffer from higher respiratory issues (e.g., elevated rates of hospitalizations for asthma and chronic obstructive pulmonary disease) compared to the Massachusetts state average (Everett/Malden Collaborative for Community Health Improvement, 2020).

2.2. Heat, health, and housing workshop series

Our study is grounded in a community-led workshop series for historically marginalized community members to understand how climate change affects health and how to counter or mitigate these harms. The workshops were led and hosted by a partnership of local community organizations, specifically Everett Community Growers (ECG) and the Mystic River Watershed Association (MyRWA), supported by research partners from the Barcelona Laboratory for Urban Environmental Justice & Sustainability (BCNUEJ), and mentored by staff of the Healthy Neighborhoods Research Consortium (HNRC) (referred to as the workshop Planning Committee) (Fig. 1). The workshop series followed the Greater Boston Anti-Displacement Toolkit (referred to as the Toolkit from here forward) co-developed by community partners of the Healthy Neighborhood Study from Everett, Chelsea, and East Boston in 2019, including ECG (“Greater Boston Anti-Displacement Toolkit,” 2019).

Throughout workshop planning and facilitation, the workshop Planning Committee was mentored in PAR methods by the Healthy Neighborhoods Research Consortium (HNRC) – a network of

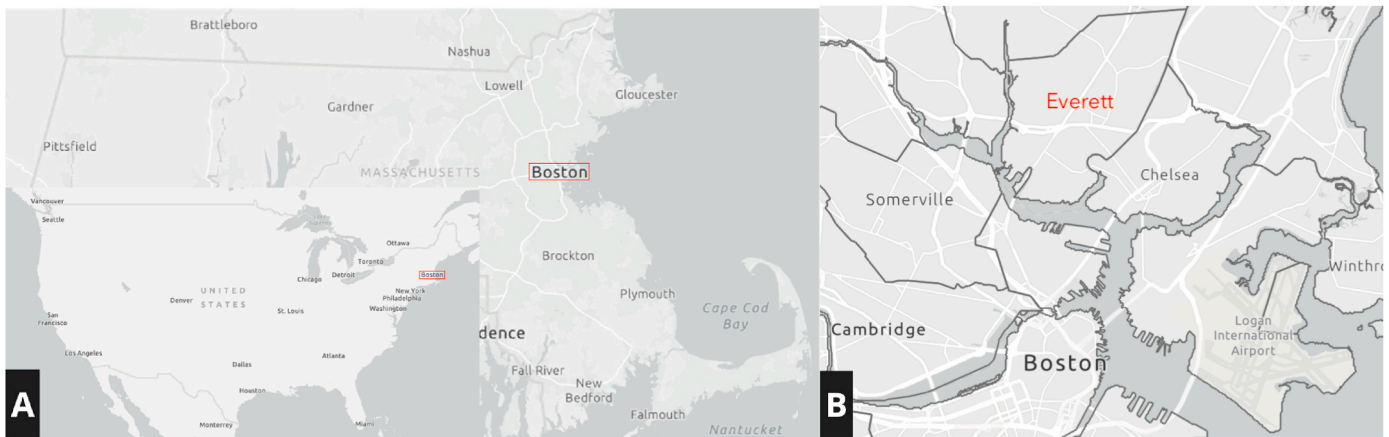


Image 1. A) Map depicting the capital and most populous city in the Commonwealth of Massachusetts. Boston is on the northeast coast of the United States and situated within a harbor (Boston Harbor) along the Atlantic Ocean. B) Location of Everett, MA in relationship to the capital, along the Mystic River.

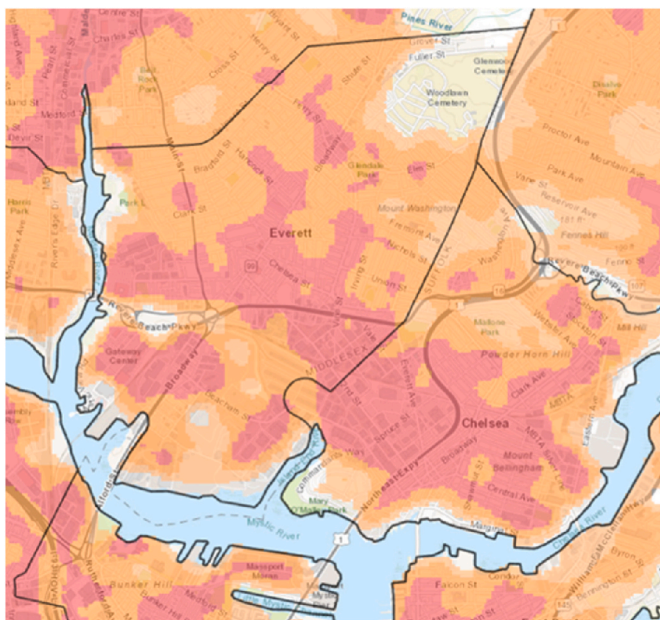


Image 2. Map depicting hot spots of land surface temperature in Everett, Massachusetts, and neighboring municipalities in the lower Mystic River watershed by the Trust for Public Land.

community-based organizations, resident researchers, and academic and government partners. The workshops were facilitated by a cohort of resident facilitators and the workshop Planning Committee. This workshop series received ethics approval from the Massachusetts Environmental Protection Agency (RFA22153).

2.3. Research approach

PAR centers on two key principles: 1) empowering people most impacted by a problem to be its primary solvers and 2) understanding complex problems by attempting to solve them. PAR includes people who are most impacted by a problem in all aspects of the research process – from data collection to analyzing findings to concrete actions – and values the community’s knowledge as equal to that of the researcher (Arcaya et al., 2018). This approach strengthens the research process by building trust and reciprocity in the community research team, which allows the research to adopt a more grounded analytical perspective that traditional qualitative methods could not otherwise achieve (Arcaya

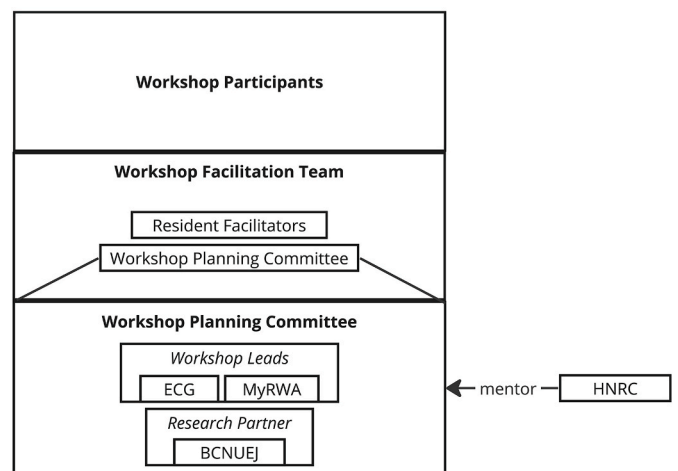


Fig. 1. Diagram illustrating the different groups and their respective roles in the implementation of the Toolkit workshops.

et al., 2018). Accordingly, PAR holds the potential to promote intersectional justice and health equity, which was important in the context of our research question.

Prior to the start of the workshop series, ECG promoted the workshop series at ECG events and distributed flyers at local establishments catering to working-class and immigrant communities. ECG pre-registered 11 residents to attend the workshop series through this method. Workshop attendance grew through snowball sampling (word-of-mouth) from participants, particularly those under 18 who encouraged their friends and adult family to attend. Attendance at the workshops remained open throughout the series, with the smallest attendance being 7 participants at Workshop 1 and the largest being 25 participants at Workshop 4. As a result, the demographic makeup of each workshop greatly varied: workshop participant ages ranged from 14 to 67 years (IQR 18–37 years); workshop participant racial background was reported as 41%–73% race other than White, workshop participants reported as 35%–54% Hispanic or Latinx/e often opting out or choosing ‘Other’ for racial background (for more detail, please refer to [Supplementary Table 1](#)¹). Workshops were primarily conducted in English with simultaneous, live interpretation available for participants

¹ Participants anonymously completed demographic surveys at each workshop without identification numbers, rendering it difficult to determine the demographic makeup for the entire series.

who preferred to communicate in Spanish.

2.4. Data collection

PAR data collection and analysis took place from August 2022 to January 2023 and included six workshops and one collaborative data analysis (CDA) (Binet et al., 2019). Workshop participants focused on the intersectional vulnerability of housing, displacement, heat, and health risks (Table 1). These themes were identified by ECG before researcher involvement in the project and emerged from growing concerns from observations of overlapping and compounding impacts of COVID-19, climate, and gentrification. Topic guides and workshop questions were modified by the workshop Planning Committee from the Toolkit described in 2.2 to match these selected themes of intersecting vulnerability. Qualitative data on each workshop was collected and recorded by the workshop Planning Committee, including notes from planning, detailed notes and observations from small and large group discussions, outputs from activities (maps, worksheets, etc.), and post-workshop debriefs. Many workshop participants did not consent to any form of audio or video recording of the workshop series as some

Table 1
Overview of each workshop purpose.

Workshop #	Workshop Purpose	Example Workshop Questions
1	To co-create a visual map of different systems of power and influence in the studied community.	<ul style="list-style-type: none"> • Why did you choose this way of presenting power and money? • How would you develop it further or go deeper? How would you use it?
2	To start asking questions and gathering data about the impact of heat, health, and housing (displacement) in the studied community.	<ul style="list-style-type: none"> • What are some issues your community is facing around extreme heat, housing, or health? • What questions do you have about these topics after our discussion? • Are there stories from your own experience that amplify, connect with, or contradict the data you've found?
3	To ground community stories with the data to also show how studied community experiences are part of bigger trends.	<ul style="list-style-type: none"> • What does it take to convince someone or a group of people? • What assumptions are decision-makers making? What alternative explanations do you need to disprove?
4	To evaluate which policies and strategies to consider adopting and advocating in the studied community.	<ul style="list-style-type: none"> • How have/can your policy ideas help our communities? • What or who is needed to advance these policies? • How would we adapt? What opportunities and barriers exist?
5	To propose model strategies and tactics that promote inclusive community engagement and stop harmful practices and policies that displace communities.	<ul style="list-style-type: none"> • What does community organizing mean to you? What ways do think you can organize members of your community? • What organizing strategies resonate with you? What is missing from our strategies?
6	To share stories about coming to—and fighting to stay in—the studied community and reflect on the successes of organizing against displacement.	<ul style="list-style-type: none"> • Take the time to reflect on your individual migration stories: Who are my people? How did I get here? What have I learned along the way? • Creating a shared story tree of the group: We came from ..., we've struggled with ... • How do you envision the future of your communities?

participants were concerned about being identified by authorities around their immigration status. As such, the direct quotes presented in this study were captured through detailed notetaking, with the direct quotes transcribed in the notes, or outputs from activities (primarily narratives from individual worksheets). While some workshop participants were more vocal than others in the larger group share back, workshops were structured around either an individual or small group activity to ensure all participants were engaged in the workshop. A member of the workshop Planning Committee collected the individual worksheets or took notes in the small group discussions. Workshops were held for 1.5–2 h every 2–3 weeks between August 11 and November 7, 2022, and participants were compensated.²

The CDA took place in January 2023 after the workshop series. The CDA process consisted of inviting workshop participants to link and interpret themes and issues from previous discussions, visually model these relationships, and make meaning out of the results. To prepare for the CDA session, the first author compiled and sorted workshop notes by identified themes (28 themes). Each theme was supported by 2–4 excerpts from the notes to present at the CDA. During the CDA, participants were first presented with this thematic data and asked to write down links or connections they noticed from the data themes (Fig. 2). Afterward, using these linked data themes, participants worked in small groups to model how urban development patterns impact heat, health, and housing, bringing the different assessments together (Fig. 3). Finally, participants used the developed models to identify the conditions needed to build a more climate-resilient and healthy Everett.

2.5. Data analysis

To organize the collected data from the workshop series and the CDA, the first author divided the whole data set into two categories based on the discussion focus. The first type of discussion encompassed the current lived experiences of neighborhood change and its impact on the health and well-being of participants. The second focused on innovative approaches to reimagining and transforming these relationships.

Subsequently, the first author carried out deductive coding to analyze the data within these categories, prioritizing three themes: 1) observed neighborhood changes (including climate-adaptive infrastructure and development processes), 2) ownership of change, and 3) health and well-being. These three themes were proactively selected to align with both the aims of ECG's funded project, focusing on climate-adaptive infrastructure and health and well-being, and the interests of the workshop Planning Committee, particularly gentrification (development processes) and empowerment of historically marginalized communities within these neighborhood changes (ownership of change). A deductive coding approach was chosen to capture these three themes from a broad set of recorded data, despite the Toolkit's original design not specifically targeting these themes. Using a deductive coding approach enabled the workshop Planning Committee to host a meaningful CDA, catering to workshop participants with limited experience in data analysis and supporting the goals of identifying directly applicable next steps in only 2 h.

As the first author developed a comprehensive model of the relationships between neighborhood change, ownership of change, and health and well-being, two additional themes were identified: 4) risk or protective factors (such as climate exposure and access to resources) and 5) place (including placemaking and displacement). Additionally, the first author inductively identified three core sub-themes from the ownership of change theme: ownership of social identity, ownership of the development and decision-making process, and ownership of knowledge.

² One Everett compensated pre-registered workshop participants \$500 for committing to and participating in at least 4 workshops, and \$50 per workshop for ad-hoc workshop participants and provided dinner to all.

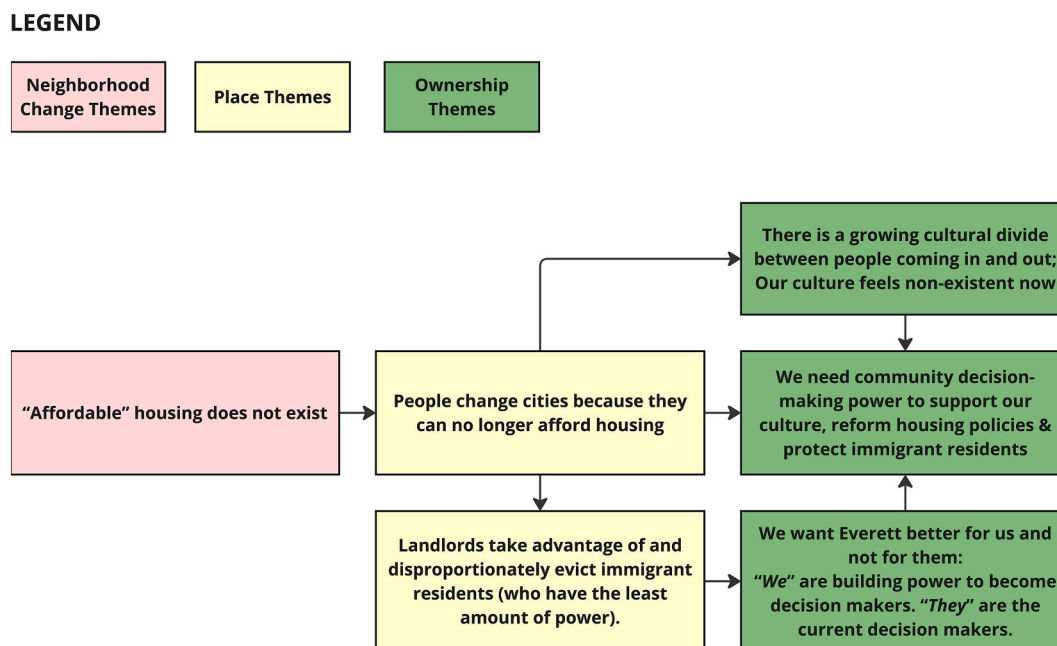


Fig. 2. Community linking of data excerpts and themes related to visible neighborhood change, place, and ownership completed during the CDA. Coding of themes applied after the CDA.

The first author presented the first data analysis in a CDA with the workshop Planning Committee. In this CDA, the workshop Planning Committee elaborated on these themes and sub-themes and established further connections between them, which was then used to build the study's overall results.

3. From community dispossession to community ownership

Findings show the relevant role of ownership of change as integral to building a cohesive and connected community and moving from the experienced (a) to the envisioned and reimagined (b) models of relationships between neighborhood change (implementation of climate-adaptive infrastructure and development processes) and health and wellbeing (Fig. 4).

3.1. Experiences of neighborhood change: dispossession of communities of care

The participants' experiences of neighborhood change can be delineated into three stages. Initially, communities become aware of the changes occurring within their neighborhood, such as the emergence of luxury housing for high-income residents and ongoing socioeconomic adversity that results in daily hardships (pink boxes in Fig. 4a). Subsequently, long-time residents begin to grasp the repercussions of these gentrification-based changes on their community's social identity, leading to sociocultural displacement, dispossession of communities of care, and even physical displacement (yellow boxes in Fig. 4a). These impacts are particularly severe as they draw attention to the enduring effects of environmental under-investment, exemplified by maladaptive parks and sparse tree coverage while contributing to existing maladaptation and unequal climate security. As a result, participants acknowledged the detrimental impact of all these factors on their mental health and well-being (blue boxes in Fig. 4a), which we detail below.

3.1.1. Noticing neighborhood changes at the intersection of climate and economic vulnerability

Primarily, workshop participants noticed neighborhood changes in housing-related impacts, notably the development of residential luxury

real estate changing the aesthetic cohesion and historic density of the neighborhood, "1–2 family houses are being sold and replaced by 6–8-unit homes. [These houses] Don't look like they belong." Participants also noted how housing changes related with changes in socioeconomic makeup, as "More people from outside [are] coming to Everett for luxury developments." To participants, this influx represented a threat of persistent, harmful neighborhood dismantlement and exclusion, where neighborhood changes are created at the community's expense for the benefit of wealthy newcomers, "Rich people are the ones who are living in the expensive buildings, and people with money want to attract people with more money to produce more money."

Participants also noticed economic-related changes with increased rent and cost of living, especially as the impacts of climate change are increasingly felt, including the prohibitive costs of air conditioning during extremely hot days and prohibitive costs of heating during extremely cold days, "Families can't stay in Everett because apartment prices are so high ... you have to earn a minimum of \$60K which is not feasible."

Further, in discussing issues with adapting to extremely hot days, participants noted the lack of "vegetation and trees" and maladaptive parks, specifically parks built with materials that attract heat, "the one with metal where kids can burn themselves in summer." This observation, exacerbated by the fact that few residents have access to a private yard (with or without cooling infrastructure), further stimulated the realization that the city lacked green infrastructure in general, "[we] need more parks and other kinds of 'green spaces' are needed."

3.1.2. Consequent harms to place and political representativeness

The impact of a fragmented socio-cultural identity, the influx of wealthy outsiders, and the resulting gentrification in Everett leads to community disruption and physical displacement. Moreover, with these neighborhood changes, the city has further stirred sociocultural displacement by re-branding cultural events: a prior festival 'Culture Fest,' meant to celebrate the city's cultural diversity, was renamed to 'City Fest.' The tensions between the local community and the wealthy "outsiders" are evident: "[There is a] Big cultural divide between people coming in and people going out." Participants also shared their detrimental experiences of the added pressures of rising rent beyond

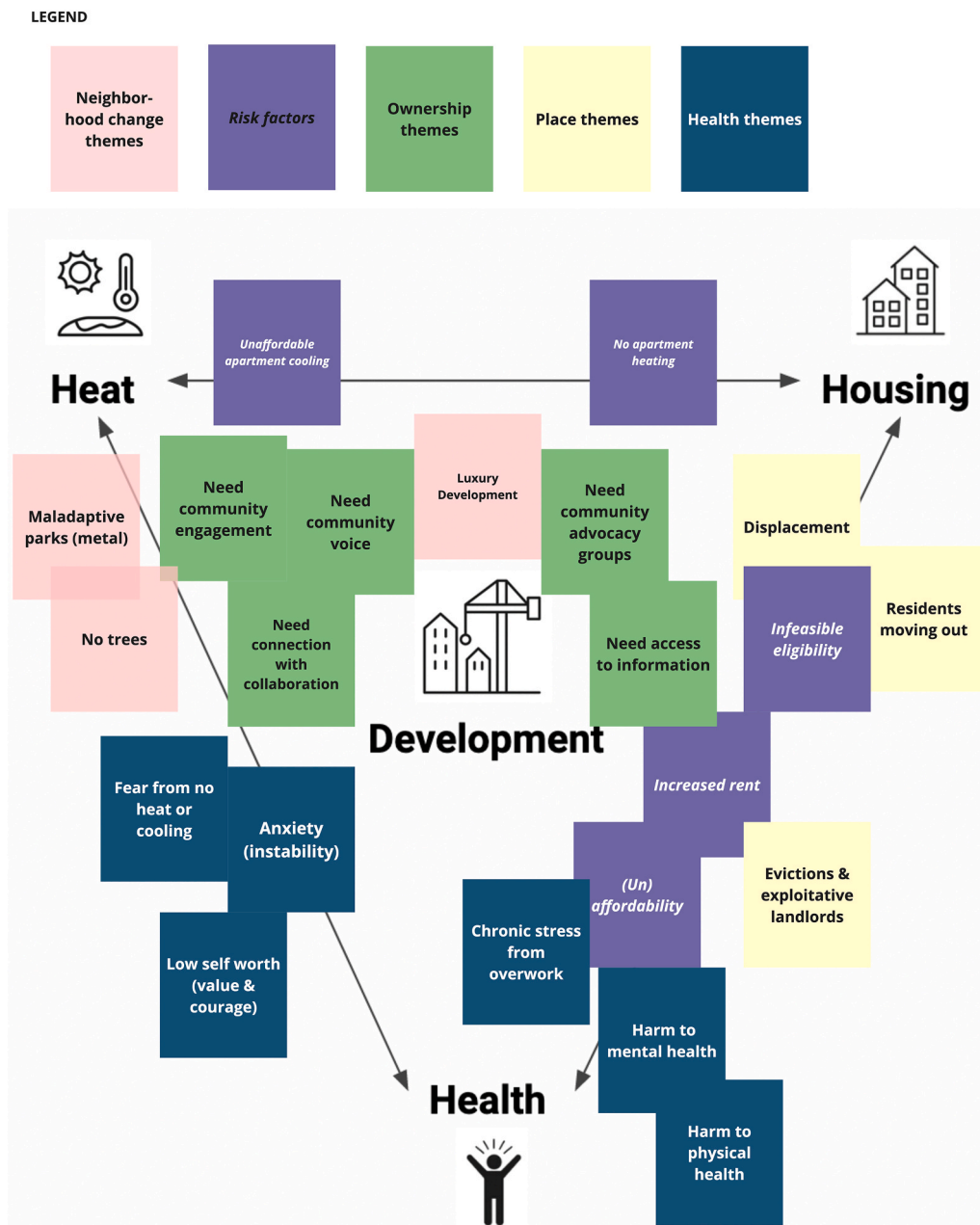


Fig. 3. Community modeling of the relationships between heat, health, and housing from visible neighborhood change (“development”) completed during the CDA. Coding of themes applied after the CDA.

affordability alone, particularly the deprivation of time with their families: “Parents work too much and can’t spend time with their children, and the money is still not enough.” Teens mirrored this sentiment stating, “We do not have time, we have loads of responsibilities on our plate like going to work to help our parents pay rent.”

Participants reported that not everyone who lives in Everett is perceived as a ‘community member,’ with new wealthy residents described as: “outsiders [that] move in.” However, the shared pressures of “tragedy and tough issues related to finance” seem to tie traditional community members and build a foundation of community solidarity, including with residents whom participants identified as “misplaced,” or members who no longer live in Everett due to physical displacement and who live outside of where their sense of place and sense of community is still located. Further, participants shared how the “mission to survive” in gentrified neighborhoods undermines one’s capacity to actively engage in local politics and civic activities. As one participant duly

acknowledged, “How can you create a community [if you] don’t have time to create a household? Can’t do it if residents are just making ends meet to stay alive.”

3.1.3. Development of anxious communities

Workshop participants readily mentioned harm to mental health from the culmination of gentrification-based pressures: “The problems with not affordable prices can cause anxiety.” In the instances that participants discussed the harms to physical health, such as chronic pain, fatigue, and weakened immune systems, these harms were framed as a direct impact of the chronic stresses from the deprivation of time and subsequent dispossession of communities of care: “Sometimes overwork stress[es] some people causing dangers in the health of the human body [to their physical health].”

Surprisingly, even when asked about the impacts of climate exposure, such as extremely hot and extremely cold days on health,

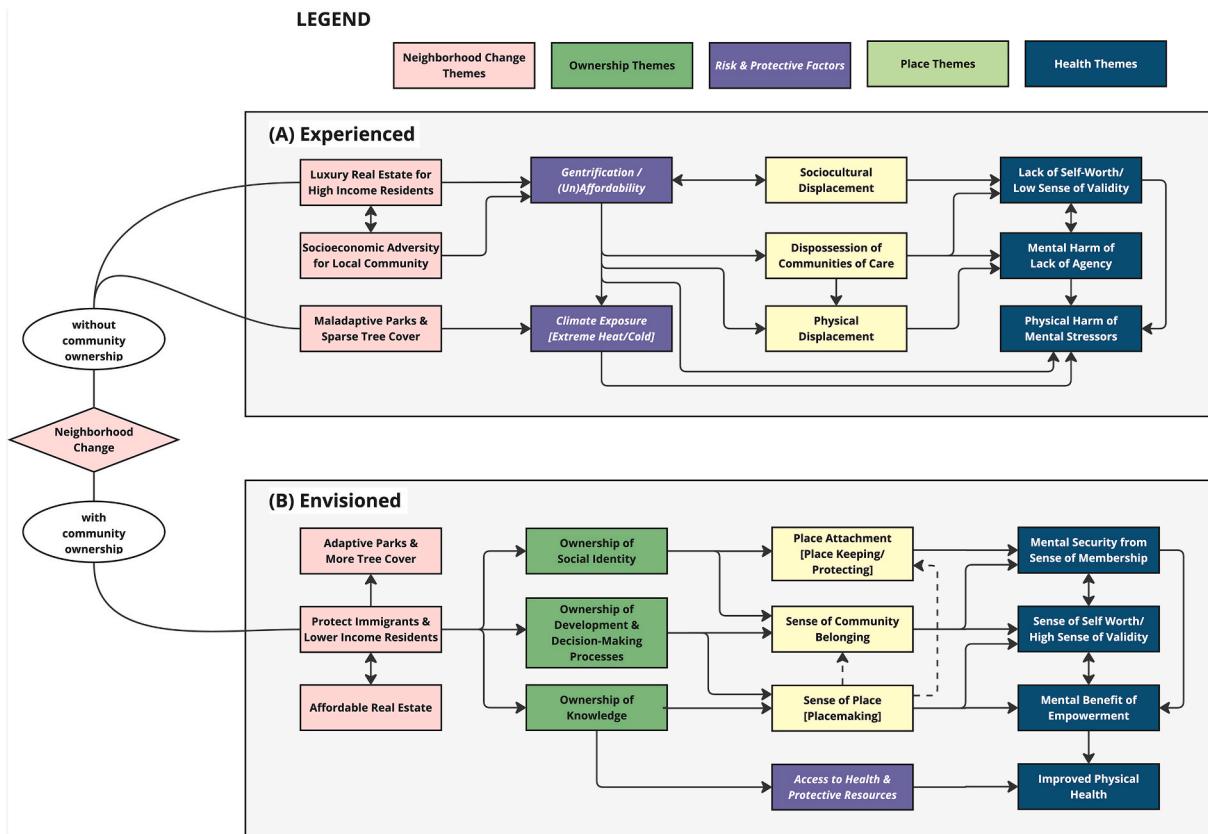


Fig. 4. (a) “Experienced”: Model of the perceived and experienced relationships between neighborhood change and health and wellbeing of historically marginalized groups. (b) “Envisioned”: A community reimagined model of the relationships between neighborhood change and health and well-being through the intervening variables of ownership of change.

participants emphasized that “unaffordable prices [for cooling and heating], can cause a bunch of problems like anxiety” and spoke about how to best strategize to lower their costs or keep their family members safe, rather than the impacts on their physical health. Further relating climate exposure to mental stressors, one participant added: “If you can’t find any affordable houses or apartments that has heaters in the residence to make you feel hot and protect from the cold, it can lead to a bunch of mental health issues and stress.”

The development of entire anxious communities impacted by gentrification, historic exposure to toxins, and climate impacts is intertwined with feelings of diminished self-worth and a sense of being undervalued. As one community member expressed, “Realizing that people are taking advantage of you because you’re not from America” which leads to a questioning of their own validity, especially when their lived experiences are dismissed by local leaders. As another community member stated, “Sometimes you don’t wanna say what happened to you in your life to people who don’t understand.”

3.2. Envisioned futures for neighborhood: toward ownership of change

In contrast with those negative, undermining experiences, participants reimagined the relationships between neighborhood changes and health primarily focusing on protecting historically marginalized communities most vulnerable to gentrification-based displacement and environmental health risks (pink boxes in Fig. 4b). Ownership of change (green boxes in Fig. 4b) plays an intervening role in the relationship between neighborhood changes and health by directly influencing place-based factors. Ownership of change is operationalized in three forms: ownership of social identity, ownership of knowledge, and ownership of development and decision-making processes. Ownership of social identity, or the ability to define the proverbial “us,” sets the

foundation for supporting community belonging and strengthens place attachment in place-keeping and place protection for community members (yellow boxes in Fig. 4b). Ownership of development and decision-making processes support a sense of community belonging through communities of advocacy and ultimately shape a sense of place through community-driven placemaking processes for community ownership. Finally, ownership of knowledge informs the community’s sense of place and ability for placemaking by using community data and expertise to make sense of the health and climate risks faced by the community and its needs. This integration of ownership of change fosters a sense of belonging and enhances mental security, thereby strengthening social and climate resilience for improved mental health (blue boxes in Fig. 4b), which we detail below.

3.2.1. Fueled by ownership of social identity and community power

Envisioned futures of neighborhood change primarily centered on protecting immigrant and working-class community members who currently live in Everett. These futures involve redefining the terms of affordable housing, since “[What most people describe as] affordable is a lie” and to “learn [about] and influence zoning laws” to protect marginalized community members’ right to the city, their homes, and community. Participants prioritized their direct and immediate ability to stay in place and protect family and community stability over climate-specific demands. However, these futures also include supporting the well-being of community members with adaptive parks and trees that provide refuge against extreme heat and extreme cold.

Participants expressed a recurring desire for “want[ing] Everett to be better for us,” adding, “It’s about it being affordable for everyone who’s here now.” Participants shared the importance of connection for the promotion of community: “We want to have community connection, [to] share our language ... promot[e] culture, support [each other]” and

the role of collaboration for “grow[ing] together.” Together, community connection and collaboration were seen as key ingredients to developing a sense of community belonging and creating a sense of community membership that helps buffer the ongoing unwanted neighborhood changes.

3.2.2. Upheld by ownership of development and decision-making processes

Within the dichotomy of us versus them, it was elaborated that “they” are the current decision makers, and “we” are building power to change this [power imbalance] so we become the decision-makers.” Participants were highly interested in learning from inter-neighborhood networks and city networks that shared similar demographic characteristics or social identities to build greater political power and advocacy. They viewed these networks as examples of inclusive and representative local political structures that could empower their own communities: “We can reunite and let them [policymakers] know that we want to be involved [in decision-making].”

Participants began to recognize the value of their experiences in bringing people together and shaping new ideas, stating: “Letting them know [our stories] can empower others [to participate].” Though participants feel ‘disempowered’ by the experiences of neighborhood changes, they recognize the power of community and the ‘dormant’ strength that lies within historically marginalized communities: “We want to remind them [elected officials] we have the power to keep them and kick them out.” The workshop structure seemed to support a newfound readiness to self-mobilize and be at the helm of more effective development planning and decision-making processes: “[We] need political advocacy to bring more voices to the table.”

3.2.3. Informed by ownership of knowledge

Workshop participants insisted that the focus should be first to understand what is happening in their community, such as community needs and norms, stating, “We want to know what concerns other community members and how to be able to know this information.” Only after this foundation of understanding is established, could they choose a climate-resilient neighborhood change strategy and negotiate placemaking for potential climate-adaptive greening: “You can’t develop a policy if you don’t fully know the problem.” This stance highlighted how community members do not wish to be told by “outsiders” of the problems. Instead, there is a desire for knowledge creation on socio-climate vulnerability that would originate and draw from the community, not that of outside “experts,” stating “We want to know what’s going on with ourselves, subjective to our own lived experiences.”

Further, workshop participants expressed a strong interest in accessing community-specific data, such as information on the detrimental effects of housing practices, the consequences of healthcare policies, and the rights related to climate protection. They recognized this data as a potential tool for empowerment, by contributing to a more informed understanding of their local context and a clearer sense of place. Participants shared they regret the timing of decisions and information sharing about their community and city. One community member mentioned: “We learn about things after they’re [already] happening,” mentioning that many of the local issues discussed in the workshops were not fully realized by participants as occurring on a systemic level. Participants also discussed an interest in sharing resources and information to connect community members to local information and services as supportive tools for community power and policy advocacy. Further discussing community education as a tactic to raise awareness and organize community “Community education is key to knowing what’s going on and how to get involved.”

3.2.4. Development of (Mentally) healthy communities

More broadly, the community’s visions for neighborhood change revolved around the potential for improved mental health, recognizing its positive effects on physical health and overall well-being. These

visions emerged in response to the compounding risks posed by exclusionary development, housing insecurity, and climate impacts. They emphasized the importance of a united and connected community as a protective factor, fostering a sense of belonging and mental security. The participants found validation and a sense of self-worth through supportive advocacy communities that shared their lived experiences. They acknowledged the empowering nature of being actively involved in shaping neighborhood changes that align with community needs and interests, with the belief that such involvement in local politics would counter the socioeconomic and climate pressures that contribute to their anxiety. Moreover, they recognized the significance of accessing health and protective resources to improve physical health: “We need better access to information. It’s a link to access needed resources. Both of which are currently missing.” Their call for accessible resources aligns with requests for planning reforms in housing and climate resilience that prioritize the health and well-being of historically marginalized communities.

4. Discussion

Our analysis expands upon Binet et al.’s (2022b) framework of ownership of change, specifically by highlighting the intervening role of ownership of change in moving from the experienced to the reimagined relationships between neighborhood change (implementation of climate-adaptive infrastructure and development processes) and health and wellbeing. Through our data collection and PAR approach, we identified three major processes of how ownership of change is operationalized: (a) Ownership of social identity or the agency of defining one’s community membership and protecting the proverbial “us,” where neighborhood changes reflect the community culture; (b) Ownership of development and decision-making processes or power to plan, design, and create public spaces and policies, where neighborhood changes protect historically marginalized communities and reflect their interests; (c) Ownership of knowledge or the control of what data is collected and the content of available information, where neighborhood changes are informed by indicators that are identified as important to the community and shared within the community in an accessible way. This also furthers other literature examining the role of different types of “ownership” in creating opportunities for continued and empowered conversation with “communities not previously engaged” in climate planning, impactful placemaking practices that assume the right to the city (and health) for racialized communities, Indigenous knowledge sovereignty, and meaningful development of urban futures, particularly in the creation of “Black spatial imaginaries” (Barry and Agyeman, 2020; Hawthorne, 2019; Latulippe and Klenk, 2020; Moser and Ekstrom, 2011; Ng, 2016; Nuñez Pedraza, 2019; Urson et al., 2022; Walden, 2021). We argue that these ownership of change components are critical to creating anti-climate gentrification and climate justice tools that support community mental health and well-being.

This novel perspective on ownership of change as supported and mediated by the support of different local nonprofit groups and partners ties together multiple social and environmental determinants of health in a climate-stressed community that leads to health inequities. Thus, our study affirms recent public health literature demonstrating the compounding health effects of low-paid work, long-term environmental hazards, and new (climate) gentrification stressors (Brulle and Pellow, 2006; Cole et al., 2021; Kezios et al., 2023; Kotsila and Anguelovski, 2023; Leigh and De Vogli, 2016). This study also aligns with recent climate justice literature, emphasizing the care of basic needs, such as housing and financial stability, and strengthening community networks and belonging as critical for long-term climate resilience (Henrique and Tschakert, 2021; Ranganathan and Bratman, 2021). Our study highlights the need to address and counter everyday threats, such as poverty, xenophobia, and racism, as integral components of climate resilience, rather than merely supplementary or complementary elements (Castán Broto et al., 2020; Shi and Moser, 2021). This is reflected in how climate

gentrification is understood by workshop participants as the development of climate-resilient infrastructure that contributes to displacement and undermines the capacity of the community to advocate and organize for their climate and health interests. Our analysis shows the need to see climate and gentrification as compounding factors among the multiple vulnerabilities and displacement pressures that threaten residents' right to the city and place-making and restrict the ability to secure infrastructures of care. As such, we argue that climate resilience efforts that attempt to isolate these variables and ignore the various forms of ownership of change will inevitably contribute to existing health inequities (Rouf and Wainwright, 2020; Schlosberg and Collins, 2014).

This further reflects how climate gentrification stressors exacerbate the contemporary "crisis of care," in which people's capacity to care for one another is overextended in unequal and unsustainable ways (Fraser, 2016). Without sufficient time to invest in community building, individuals are further removed from engaging in community issues related to their climate resilience interests and health concerns. This further relates to the importance of infrastructures of care proposed by Alam and Houston (2020): "To activate democracy, we propose a reworking of infrastructures [of care] by rethinking care itself as inhabited infrastructure, where equality, recognition and participation all can be expanded through the philosophical underpinning of caring with as life sustaining activities." These goals and vision are particularly relevant for communities double-impacted by climate change and gentrification. As such, future infrastructures of care require an urban environment that can enhance people's capacities to build community belonging and organize with the community over important issues that affect their health and well-being. For instance, this study underscores certain tools the community valued for "how to care" (De La Bellacasa, 2011) such as the significance of community education and supporting community brainstorming as a prerequisite for soliciting community feedback or identifying community-led solutions in planning, policy, or advocacy. It emphasizes the cultivation of community and community networks, achieved through communal meals to foster personal connection among attendees, open enrollment to bring friends and family, and offering childcare services to workshop participants with young children. Moreover, it stresses the necessity of compensating historically marginalized communities for their invaluable contributions, addressing the challenge of balancing civic engagements with other productive and reproductive labor commitments and recognizing participants for their expertise and deep-rooted local knowledge (Agyeman and Angus, 2003; Black et al., 2013; Oscilowicz et al., 2022; Rendon et al., 2021; Yeh, 2016).

Our study also furthers recent research that shows how socioeconomic adversity – evictions and long-standing inequities – can trigger the rise of political subjects (García-Lamarca, 2017; Hyra et al., 2019). Similarly, our study supports how historically marginalized groups join in solidarity to build collective power within co-constructed spaces (Eckenwiler, 2018; García-Lamarca, 2017; Oscilowicz et al., 2023). This further aligns with the desire to use collective power to advocate for the development of "infrastructures of community power" (Healthy Neighborhoods Study, 2022) that repair racialized inequities in the distribution of healthy community features that increase ownership of change for historically marginalized communities and enables residents to meet their priorities, climate, health, and otherwise.

4.1. Strengths and limitations

Consistent and reliable data collection can be challenging when engaging in community-organized research. As mentioned in our Methods, we did not receive consent to record conversations. To balance this, the research team supported detailed and systematic notetaking by a variety of notetakers to record each workshop's content. Participants completed demographic surveys at each workshop anonymously without identification numbers, rendering it difficult to determine the demographic makeup for the entire series. However, given the nature of

the study and the qualitative methodology used in the research – focused on historically marginalized communities with intersectional identities of class, race/ethnicity, and immigration status, the specifics of workshop demographics were not critical to our analysis process and findings. Finally, although this study is specific to the urban context of one community (Everett, MA) we believe that the socio-ecological dynamics experienced by historically marginalized groups – particularly those impacting health and well-being – echo those of many communities impacted by gentrification and climate change throughout the US.

This study's strengths lie in its use of PAR, which shifts the focus of analysis to prioritize workshop participants' perceived challenges with climate resilience and community health, instead of predetermined priorities set by researchers. This approach legitimizes and strengthens the importance of understanding climate and health struggles, particularly regarding issues of ownership, representation, and control. Specifically, PAR shifted the emphasis from what changes in a neighborhood matter for climate resilience and health to how these changes should occur and who has agency over them (Binet et al., 2022b). PAR fostered critical reflection guided by historically marginalized voices, accentuating relationships potentially missed in researcher-led studies. Our findings emphasize the interdependence of climate change, health, and housing as mutually reliant issues. This contribution furthers recent research in PAR that has used photovoice to demonstrate the relationships between gentrification-based neighborhood changes and health (Sánchez-Ledesma et al., 2020), feminist PAR (FPAR) approaches to organize for climate justice with women in Asian Global South countries (Godden et al., 2020), and PAR for developing "ecological wisdom" in climate resiliency planning in nearby Cambridge, Massachusetts (Douglas et al., 2018). This study – along with other PAR approaches to climate resiliency and health – stands in contrast to the typically isolated approach taken in practice that considers gentrification a separate concern from climate resilience and health.

4.2. Future directions

This research reaffirms the widely recognized notion in community-based studies that communities most affected by complex and pervasive problems, or "wicked problems," are best positioned to solve them. Therefore, further research using PAR is necessary to evaluate which policy or planning tools are most appropriate for fostering a sense of ownership of change. While various policy tools to combat gentrification for equitable and healthy green cities have been explored (Oscilowicz et al., 2022), their effectiveness individually and in combination is contingent on the specific local political context (feasibility) and alignment with the community's envisioned futures. Understanding how these policy tools can work together to tackle climate gentrification and health inequities will be crucial for developing effective strategies that address the intertwined nature of these issues.

4.3. Implications for practice

This study emphasizes PAR as a key process for prioritizing historically marginalized perspectives in climate resilience and health equity planning. By centering lived expertise, PAR has the potential to tie together seemingly disparate issues and (re)prioritize concerns, such as the mental health impacts of climate change, often overshadowed by the physical health aspects of climate impacts discussed in practice. This study also reinforces how participatory action approaches can train research and planning skills that empower local communities to lead their own solutions and support future action on community projects.

Furthermore, this study highlights the potential of operationalizing ownership of change as a planning tool. By integrating community ownership in planning practice, historically marginalized communities are empowered to address basic needs that protect their physical health and support their mental well-being. In turn, this foundation of care

upholds an urban socio-ecological environment for long-term climate resilience, by supporting communities currently least protected and most harmed by climate impacts (including health). The findings also underscore the importance of developing infrastructures of care within planning processes— by recognizing and compensating historically marginalized communities for their expert local knowledge –to foster a sense of community belonging and promote civic engagement (Agyeman and Angus, 2003; Black et al., 2013; Yeh, 2016).

The workshop participant cohort has continued as on a cohesive group, extending their collaboration beyond the initial workshop series. Along with ECG, they have applied for grant funding to continue developing the infrastructure of care among this new care collective. The group has since organized skills-learning workshops to further their understanding of topics introduced in the workshop series (e.g., zoning, urban development, food systems, and data literacy). They are now exploring the possibility of developing a community land trust through shared learnings from a community land trust in a neighboring municipality (Comunidades Enraizadas) and with the continued support and facilitation role of universities and researchers.

These implications demand a bold paradigm shift in urban practice and compel policymakers and practitioners to embrace community-owned approaches that empower historically marginalized communities, establish robust infrastructures of care, and amplify community power. By taking these decisive steps, cities and their organizational partners hold the transformative potential to cultivate truly equitable and resilient communities that confront the interdependent challenges of health, climate, and social justice head-on.

CRediT authorship contribution statement

Andréanne C. Breton-Carbonneau: Data curation, Formal analysis, Investigation, Methodology, Project administration, Visualization, Writing – original draft, Writing – review & editing, Conceptualization. **Isabelle Anguelovski:** Conceptualization, Formal analysis, Investigation, Methodology, Supervision, Writing – review & editing, Writing – original draft, Visualization. **Kathleen O'Brien:** Conceptualization, Funding acquisition, Methodology, Project administration, Resources, Writing – review & editing, Investigation, Visualization. **Mariangeli Echevarría-Ramos:** Conceptualization, Methodology, Project administration, Resources, Writing – review & editing, Investigation, Visualization. **Nicole Fina:** Conceptualization, Investigation, Methodology, Project administration, Resources, Writing – review & editing, Visualization. **Josée Genty:** Conceptualization, Investigation, Methodology, Resources, Visualization, Writing – review & editing, Project administration. **Andrew Seeder:** Conceptualization, Investigation, Methodology, Project administration, Resources, Visualization, Writing – review & editing. **Andrew Binet:** Conceptualization, Methodology, Resources, Visualization, Writing – review & editing. **Patrice C. Williams:** Conceptualization, Investigation, Methodology, Resources, Supervision, Writing – review & editing. **Helen VS. Cole:** Conceptualization, Investigation, Methodology, Supervision, Writing – original draft, Writing – review & editing, Visualization. **Margarita Triguero-Mas:** Conceptualization, Investigation, Methodology, Supervision, Visualization, Writing – original draft, Writing – review & editing, Formal analysis.

Declaration of interest

None.

Data availability

Data will be made available on request.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.healthplace.2024.103294>.

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