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Climate Change And The Built Environment For Asian Americans

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ABSTRACT

Although the relationship between climate change and the built environment is well-established, much less is known about the impact of this relationship on the health of Asian Americans. This study sought to identify available literature that discussed climate change and the built environment for Asian American populations. The majority of the 125 articles screened in (94%) were about Asian Americans and the built environment. Most (49%) articles used national level datasets or included multiple geographic regions, while others primarily represented the East and West Coasts. Nearly all (80%) of articles were published between 2010 and March 2023. Of the screened in articles, seven met all four criteria of interest: Asian Americans, built environment, climate change, and health, demonstrating a small body of literature on these topics from the databases sourced. Five of the seven articles were research studies (four on heat, one on access to green space), one was a zine, and the last was a commentary. More research is needed to better understand this relationship so that effective and sustainable adaptation and mitigation strategies can be implemented to support Asian Americans in their communities.

ACKNOWLEDGMENTS

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INTRODUCTION

Climate Change

We are in the midst of a climate crisis. According to the Intergovernmental Panel on Climate Change (IPCC), the Earth was 1.09 °C warmer between 2011-2020 than 1850-1900, and in the last 50 years, the global surface temperature has increased faster than in any other 50-year period over the last 2000 years (IPCC, 2023). Global greenhouse gas emissions continue to increase (IPCC, 2023). Greenhouse gases, such as carbon dioxide and methane, absorb and emit heat that get trapped within the lower atmosphere of the Earth, resulting in warmer Earth temperatures, accelerating the climate change process (Dzaugis et al., 2018). Although the Earth naturally cycles through periods of warming and cooling, the current period of global warming is almost entirely due to human activities (Dzaugis et al., 2018; IPCC, 2023).

Climate change results in adverse impacts to the world as we know it–for animals, humans, land, and bodies of water. It manifests in many ways, including extreme temperatures and increasing frequency and strength of climate hazards, such as storms, tropical cyclones, and wildfires. This paper focuses primarily on the impact of climate change on humans, which include increased spread and incidence of disease (e.g., infectious, water-borne, cardiovascular), displacement of populations and forced migration, negative impacts to mental health, malnutrition, and intergenerational effects (McMichael et al., 2006; Haines et al., 2006).

Some populations are considered vulnerable because they are likely to experience climate change differently than others. For example, children are more susceptible to climate change impacts than adults. They reside in diverse geographic locations all over the United States, are reliant on their parents/guardians during times of disaster and distress, and will continue to be exposed to developing and worsening climate change in the long term (Treichel, 2020). Their

developing bodies (e.g., smaller lung capacity) and lifestyle (e.g., spending more time outdoors than adults) increases their exposure to and concentration of air pollution. They also hold identities that intersect with other vulnerable populations, including being low-income, a person of color, an immigrant, and/or disabled person (Fuller et al., 2022).

Climate change is expected to further exacerbate existing social inequalities, which has led to the development of "climate justice." Climate justice recognizes the disproportionate impacts of climate change on various populations and aims to prioritize these communities in climate change action. It intersects racial, social, and environmental justice. The University of California Center for Climate Justice organizes climate justice-oriented solutions into six pillars: 1) Just Transition; 2) Social, Racial, and Environmental Justice; 3) Indigenous Climate Action; 4) Community Resilience and Adaptation; 5) Natural Climate Solutions; and 6) Climate Education and Engagement (University of California Center for Climate Justice, n.d.). Climate justice must be intersectional because climate change will continue to affect every aspect of our world and our lives, resulting in cascading consequences on our systems.

Climate change has already caused irreversible damage to the planet, and even if greenhouse gas emissions ceased entirely today, we would still experience the effects of climate change for decades (Hersher, 2021). Thus, it is crucial to swiftly implement adaptation and mitigation strategies at local, state, and federal levels to address climate change and support impacted communities. A multitude of communities, advocates, policymakers, researchers, and organizations are already working to address climate change on local and national levels.

The Built Environment

The built environment refers to the physical characteristics and components of where people live, including our neighborhoods, housing and buildings, parks and green spaces, infrastructure, and roads and sidewalks. The design of the built environment impacts population health and should be inclusive and intentional (Rundle et al., 2007; Heylighen et al., 2017). The neighborhoods we live in are largely products of residential segregation and a history of discriminatory housing and zoning policies. Redlining, a practice historically used by the Federal Housing Administration, explicitly refused home loans to Black people and others who lived near Black people (Madrigal, 2014). Although redlining was outlawed under the Fair Housing Act of 1968, the mortgage industry continued to discriminate against Black people and other people of color. Racial covenants are clauses in property deeds used to prevent non-White people from buying or occupying land. Although these clauses are technically outlawed under the Fair Housing Act of 1968, they remain present in nearly all states (Thompson et al., 2021).

Zoning laws are used by municipalities to determine where categories (e.g., residential, industrial, mixed-use) of land use go. Exclusionary zoning laws force restrictions on land use, can include mandatory parking requirements, minimum lot sizes, and prohibitions on multi-family housing, and have been used to discriminate against people of color (The White House, 2021; Rouse et al., 2021). People of color disproportionately live in neighborhoods near industrial areas and are exposed to noise pollution, adverse air quality, and hazardous and toxic substances (Maantay, 2001; Tessum et al., 2021). Explicit race-based zoning was banned in 1917, but cities continued to impose discriminatory zoning laws. For example, neighborhoods where Chinese American and Black American families lived were disproportionately more likely to be zoned for commercial use under Seattle's 1923 zoning laws (Rouse et al., 2021).

The built environment and climate change are closely intertwined. People will experience climate change differently based on where they reside and at all levels of the built environment, from buildings to neighborhoods to cities (Klinsky & Mavrogianni, 2020). For example, neighborhoods that were redlined in the 1930s are associated with less greenspace in 2010 (Nardone et al., 2021). Hoffman et al. (2020) found that redlined, urban areas were warmer than non-redlined areas. Climate change will affect regions of the United States in different ways, such as increased wildfires in California, extreme heat in the South, or flooding and heavy storms in the Midwest (Goss et al., 2020; U.S. EPA, n.d.-a; U.S. EPA, n.d.-b). Residents of neighborhoods affected by a climate hazard or that are becoming inhabitable may be forced to leave their homes and move to new areas (e.g., displacement, migration; Maldonado et al., 2013). These patterns of migration have led to concerns about climate gentrification, such as in Miami, Florida (Keenan et al., 2018).

As an example of the relationship between the built environment and climate change, for many of us, sidewalks are a ubiquitous part of our lives and neighborhoods. We use them for leisurely walks or as a mode of transportation. Sidewalks can increase levels of physical activity and improve health (Office of Disease Prevention and Health Promotion, 2020; Wei et al., 2020). However, not all sidewalks are created equal: some are too narrow, not accessible, in poor condition, and/or may not provide enough of a safe buffer from cars on the road. Researchers have found that living in a "disorderly neighborhood," such as one with broken curbs and sidewalks, can negatively impact the cognitive functioning of residents (Population Reference Bureau, 2017). Moreover, not all communities have or want sidewalks, which can create contentious political disputes within a neighborhood (Stodder, 2016). Regarding climate change, sidewalks are usually made from concrete, the production of which creates greenhouse gas emissions and further

contributes to climate change (U.S. EPA, 2022). Since concrete is an impervious material and absorbs heat, concrete sidewalks can contribute to the urban heat island effect and flooding (Eggers, 2021). To combat this, localities can implement green infrastructure strategies, such as using permeable pavements that can soak up precipitation and surface runoff (Moretti & Loprencipe, 2018).

There are several climate change mitigation and adaptation strategies that can be implemented in the built environment, including protected bike paths, bioswales, increased tree canopy, permeable pavement, and increased access to green spaces (Fazzare, 2021). However, some communities cannot make these modifications for their built environments, which may lead to increased susceptibility to the effects of climate change. For communities that can, green gentrification may emerge as a concern (Jelks et al., 2021; Rigolon & Németh, 2020).

The built environment encompasses where we live, play, and work, making it the place where we will likely experience the effects of climate change firsthand. It is a pivotal element that must be incorporated into climate change action. Communities need to be supported with implementing effective strategies to combat climate change in the built environment.

Asian Americans

As a population, Asian Americans are growing faster than any other racial and ethnic group in the United States (Budiman & Ruiz, 2021). They have faced discriminatory and exclusionary policies, such as the Chinese Exclusion Act of 1882, which banned Chinese laborers from immigrating to the United States and barred current Chinese immigrants from obtaining citizenship (Kusakawa, 2022; Luo, 2021). Later, the Immigration Act of 1924 prevented people from all Asian countries from immigrating to the United States (Luo, 2021). Asian Americans have also been impacted by residential segregation and housing discrimination. For example, research by Levy &

Aranda (2021) found that Asian Americans and Pacific Islanders (AAPI) were treated worse than Whites when searching for housing; they were told about and shown fewer properties for rent and sale than White people. These types of policies created segregated neighborhoods with high concentrations of Asian American residents, commonly referred to as "ethnic enclaves."

Asian Americans still face inequality, racism, and discrimination in their everyday lives. Asians Americans are now the most economically divided group in the U.S (Kochhar & Cilluffo, 2018). For example, in 2019, the median annual income for Indians was $119,000, while the median annual income for Burmese was $44,400 (Budiman & Ruiz, 2021). During the COVID-19 pandemic, employment declined by 8.2 percent for Asians, compared to a 7.3 percent decline in employment for the population overall (U.S. Bureau of Labor Statistics, 2021). With the COVID-19 pandemic came a rise in anti-Asian hate, including several brutal attacks on elderly Asian folks (Shanahan, 2022; Chin, 2021) and a callous mass shooting in Atlanta (Fausset et al., 2021).

For the purposes of this study and paper, I use the term "Asian American." Since this study focuses on climate change and the built environment in the United States for Asian populations living in the United States, I chose to use the term "Asian American" to distinguish the population of interest from Asian populations living outside of the United States. It is important to note that many people have concerns with the homogenization associated with the term "Asian American," which may misrepresent the population as a monolith with similar experiences, which is far from the truth (Zhou, 2021; Venkataramanan, 2022). Furthermore, not all people of Asian descent residing in the United States identify as Asian American. Some may identify solely as Asian, or by some other identifier. For more information, please see Ruiz et al. (2022).

Additionally, Asian Americans are often grouped with Pacific Islanders (i.e., AAPI) and Native Hawaiians (i.e., Asian American, Native Hawaiian, and Pacific Islander; AANHPI). Though this study is focused only on Asian Americans, studies referenced throughout may focus on or discuss AAPI or AANHPI communities. Similar to the criticism for the term "Asian American," there is also frustration with the umbrella terms "AAPI" and "AANHPI." Asians alone include 24 million people, representing at least 21 different ethnicities and more than 23 languages of Asian origin (U.S. Census Bureau, 2023; Monte & Shin, 2022).

In my studies and career as an Asian American woman, I often find myself wondering how Asian Americans experience and are affected by what we learn, discuss, and study. My experience is that much research focuses on disparities between Black and White populations. Few studies focus explicitly on the experiences of Asian American populations, including identifying existing disparities between this group and other racial/ethnic groups. Highlighted by Yee (2021) in an opinion-editorial for Scientific American, this lack of research about Asian American populations is due in part to explicit discrimination within the research community. For example, David Takeuchi, PhD, a professor at the University of Washington, received comments on a rejected grant proposal in which reviewers stated that challenges faced by Asian Americans are "not as bad as for Blacks and Latinos" (Yee, 2021).

Research studies have demonstrated a history of extraordinarily low funding for research and published articles about AAPIs. Đoàn' et al. (2019) found that studies funded by the National Institutes of Health between 1992 and 2018 focused on AAPIs were only 0.17 percent of the National Institutes of Health's total budget. Ghosh (2003) found that, between 1966 and 2000, only 0.01 percent of MEDLINE articles published mentioned AAPIs. Those that include Asian Americans as variables in datasets often fail to discuss the implications of their findings for Asian

Americans. This is not to say that research focusing on Asian Americans is not being done—there are researchers conducting this work—but there is much we do not know.

When overt racism and discrimination persist in the hands of powerful people who determine what research is funded and published, we are obstructed from studying and recognizing the experiences of Asian Americans. Lack of inclusion and representation of Asian Americans in research can further perpetuate the model minority myth, which positions Asian Americans as inherently successful, smart, wealthy, hard-working, and contributes to the notion that Asian Americans do not experience barriers and challenges that deserve attention and addressment. The better we understand and document the experiences of Asian Americans, the better practitioners, policymakers, and Asian American communities can implement effective and supportive initiatives in the United States.

Climate Change, the Built Environment, and Asian Americans

Asian Americans will be impacted by climate change, but it is not well-known exactly how they will be impacted (Limaye & Chang, 2021). During an internship in 2022, I supported a literature review of a white paper on how climate change will affect the health of AAPIs. We found it very difficult to find literature about this relationship. We do know that many Asian Americans consider themselves to be environmentalists and want to see federal policy action to address climate change (Ramakrishnan & Shah, 2017; Choi, 2021). The United States Environmental Protection Agency (U.S. EPA, 2021) reports that Asian Americans are "8% more likely than non-Asian individuals to currently live in areas with the highest projected increases in childhood asthma diagnoses with 2 °C of global warming." Grineski et al. (2017) found that Asian Americans experience substantial exposure to carcinogenic hazardous air pollutants. At least 10 of 11 basement-flooding deaths due to Hurricane Ida (August 2021) in New York City, New York were

Asian residents, demonstrating climate injustice for low-income Asians living in the United States who may be undocumented, and face language barriers and difficulty securing safe, affordable housing (Yam & Venkatraman, 2021).

Although we know that Asian Americans are affected by health disparities, the evidence base is still lacking and Asian Americans are not properly included or represented in data about health, poverty, and access to social services (Tran, 2018; Limaye & Chang, 2021). When Asian Americans are excluded from our health equity research and efforts, we are unable to take meaningful and educated action to better support the community and its distinct needs. This further perpetuates harm to Asian Americans by maintaining the model minority myth and stereotypes that Asian Americans do not experience racism or face substantial barriers to access, resulting in disparate outcomes. Based on what we know about the history of Asian Americans and some of their environmental exposures, we can hypothesize that they may experience climate change uniquely to other groups.

This Study

Climate change, the built environment, and the health of Asian Americans are clearly connected. The built environment impacts the health of populations and our relationship with climate change. We know that Asian Americans are impacted by climate change but that our evidence base about these effects and this relationship is lacking (Lien, 2022). For this study, I conducted a scoping review to explore what literature is available about how climate change and the built environment will affect Asian Americans. I hypothesized that there is a dearth of literature regarding these topics. This interdisciplinary research is needed to investigate the effects of climate change for Asian American populations so that we can better understand the connections between

these interrelated fields, and as a result, better understand how they interact to impact the health of Asian Americans.

METHODS

Article Search Process

I initially planned to conduct a systematic literature review, but after discussion with my thesis advisor and review of guidance regarding conducting a scoping review versus systematic literature review (Munn et al., 2018), I opted to conduct a scoping review. Scoping reviews are better suited for identifying gaps in the literature. My original intent for this study was not to assess the quality and rigor of available research studies but to see if it was possible to answer my questions regarding climate change and the built environment for Asian Americans. Before attempting to answer those questions, I needed to identify if relevant literature and data are available, thus, I conducted a scoping review.

To conduct the scoping review, I used the search terms presented in Table 1 to comprehensively search PubMed and Google Scholar for literature of interest. PubMed and Google Scholar were chosen for their accessibility and ease of replication. In addition to these two databases, I briefly searched through Articles+ and Academic Search Premier (EBSCOhost), but results presented several repeat articles, and I chose to stop searching due to timeline and capacity constraints. Articles identified from Articles+ were included. No articles were identified from EBSCOhost. Throughout the academic year, I also saved relevant articles from coursework into a folder to be reviewed during the screening process.

To determine the list of search terms, I brainstormed search terms related to climate change and the built environment, including "climate change," "housing," "neighborhoods," and "parks." All searches were conducted with "Asian American" as part of the keywords. In addition to the

rationale for the term "Asian American," discussed in the Introduction, "Asian American" also offered a concise term for database searching to increase search reach and identify papers focused on Asian people living in the United States.

After the initial search and meeting with my thesis advisors, I added three more search terms, indicated in Table 1 with a tilde (~). The "ethnic enclave" search was conducted in PubMed due to low results from the other PubMed searches. It was not conducted in Google Scholar due to time constraints since Google Scholar provided many more results. Quotation marks were used for phrases to ensure that databases retrieved results that only included the full phrase. For example, "Asian Americans" should yield results that only included "Asian Americans," as opposed to also including "Asian" or "American." This allows for more refined searching, typically producing fewer results to review. Searches were done exactly as presented in Table 1.

During the search process, I downloaded PDF versions of all seemingly relevant articles, which were organized into folders by database name, with subfolders for each search term. I maintained detailed notes on my search process throughout. All articles were entered into an Excel spreadsheet which included the categories included in Table 2.

Table 1

Scoping Review Search Terms by Database

	PubMed	Google Scholar	Articles+	EBSCO
"built environment" "Asian American"		X	X	X
climate change "Asian American"	X	X	X	X
"climate justice" "Asian Americans"	X	X	X	X
"disparities" "Asian American" ~	X	X		
"disparities" "climate change" "Asian American" ~	X	X		
"disparities" "environment" "Asian American" ~	X	X		
"environmental justice" "Asian Americans"	X	X		
"ethnic enclave" "health" "Asian American"	X			
"ethnic enclave" "health" "Asian Americans"	X			
housing "Asian American"	X	X		
neighborhood "Asian American"		X		
neighborhoods "Asian American"	X	X		
outdoor access "Asian American"	X	X		
"parks" "Asian American"	X	X		
"residential segregation" "Asian American"		X		

~ denotes second round of searching

Table 2

Scoping Review Screening Spreadsheet Categories

Category Name
Screened in/Screened out
Publication title
Publication year
Publication authors
Study conclusions
Study sample
Study geographic region
Study relevance/relationship to thesis
Asian population? (Yes/No)
Built environment? (Yes/No)
Climate change/Justice? (Yes/No)
Health (Yes/No)
Study strengths/weaknesses
Notes
Date Added

Article Screening Process

To screen the collected articles, I collated all found articles into one folder. I then eliminated duplicate articles and book chapters. I reviewed the titles and abstracts of the remaining articles. If the title and abstract were not clearly connected to the topics of interest, I searched for keywords in the document. For example, I searched for "climate," "health," "Asian," "built," "enviro," and "resid." Some words were truncated so the search would be comprehensive for similar terms. For example, searching "resid" would provide results for "residential, "resident," or "residences." If any of these terms were present in the article, I reviewed their mention for substance. Mere mention of "Asian" alone was not sufficient, such as one occurrence of "Asian" as a variable in a study's dataset. Through this review process, I indicated in my screening spreadsheet whether the paper substantively discussed concepts related to Asian Americans, the built environment, climate change and/or climate justice, and health.

Results did not need to focus only on the broader topic term but could discuss all related topics to the broader term. For example, built environment-related papers did not need to focus or discuss the "built environment," but could include discussion or focus on neighborhoods, housing, available green space/parks, and/or infrastructure. Similarly, studies did not need to focus on the Asian American population as a whole, but could focus on specific subpopulations (e.g., East Asian, Thai). Climate change could include focus on specific climate hazards, such as extreme heat or typhoons.

To be "screened in," the article had to have a "Yes" indication for either "Asian population" AND the "built environment" OR "Asian population" AND "climate change/justice." Articles that included "Asian population" AND "health" but not the "built environment" or "climate change/justice" were screened out. If not immediately clear whether the article should be screened

in or out, the article was set aside for later deliberation (indicated by "TBD" in the "Screened in/Screened out" column). After the conversation with my thesis advisors where we decided I would add the "disparities" search term (see Article Search Process), I followed this same screening process for additional articles found. However, this second stage was focused on identifying articles that met all four criteria: "Asian population," "built environment," AND "climate change/justice," AND "health." See Figure 1. for a depiction of the screening process decision flowchart.

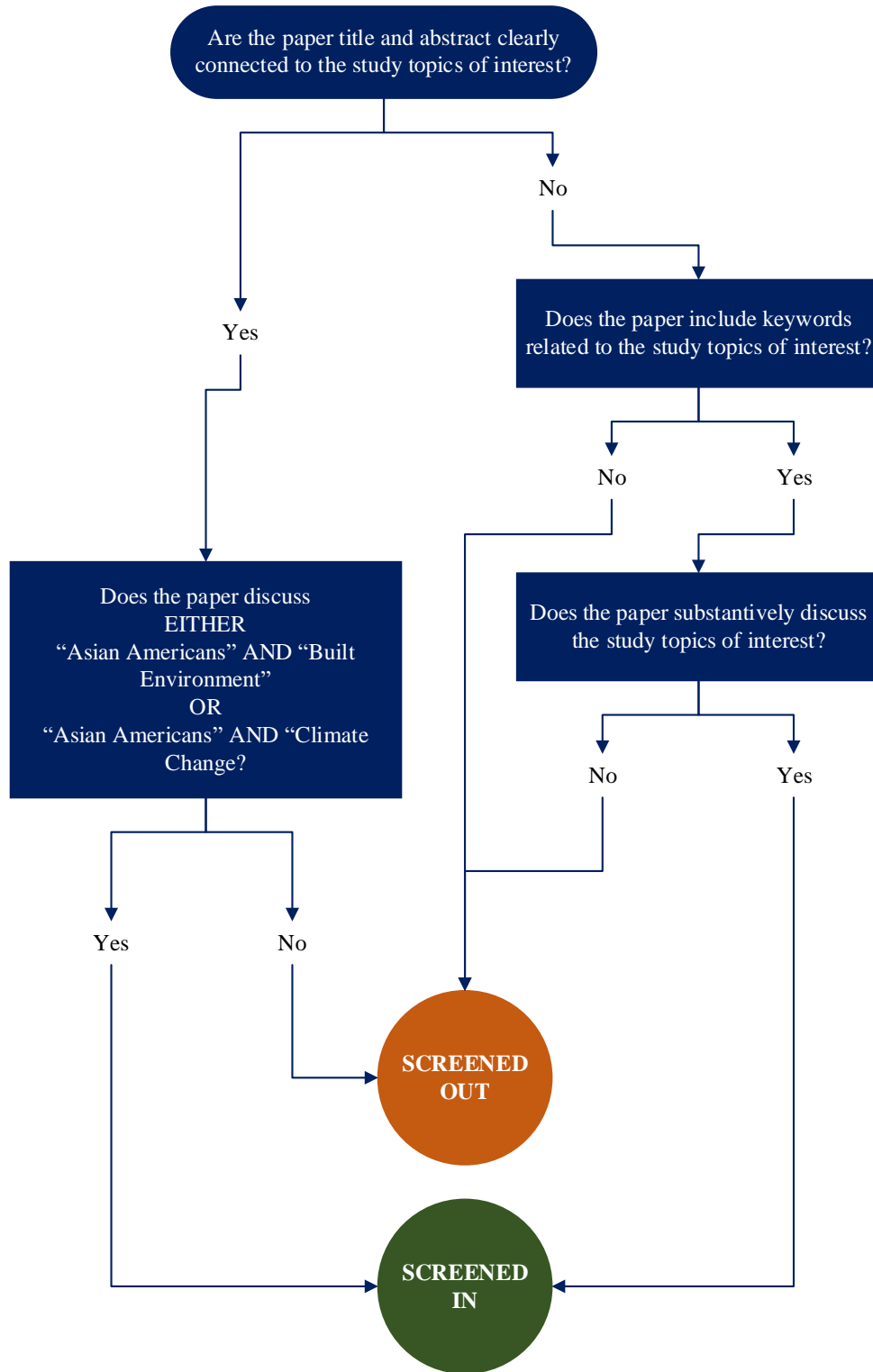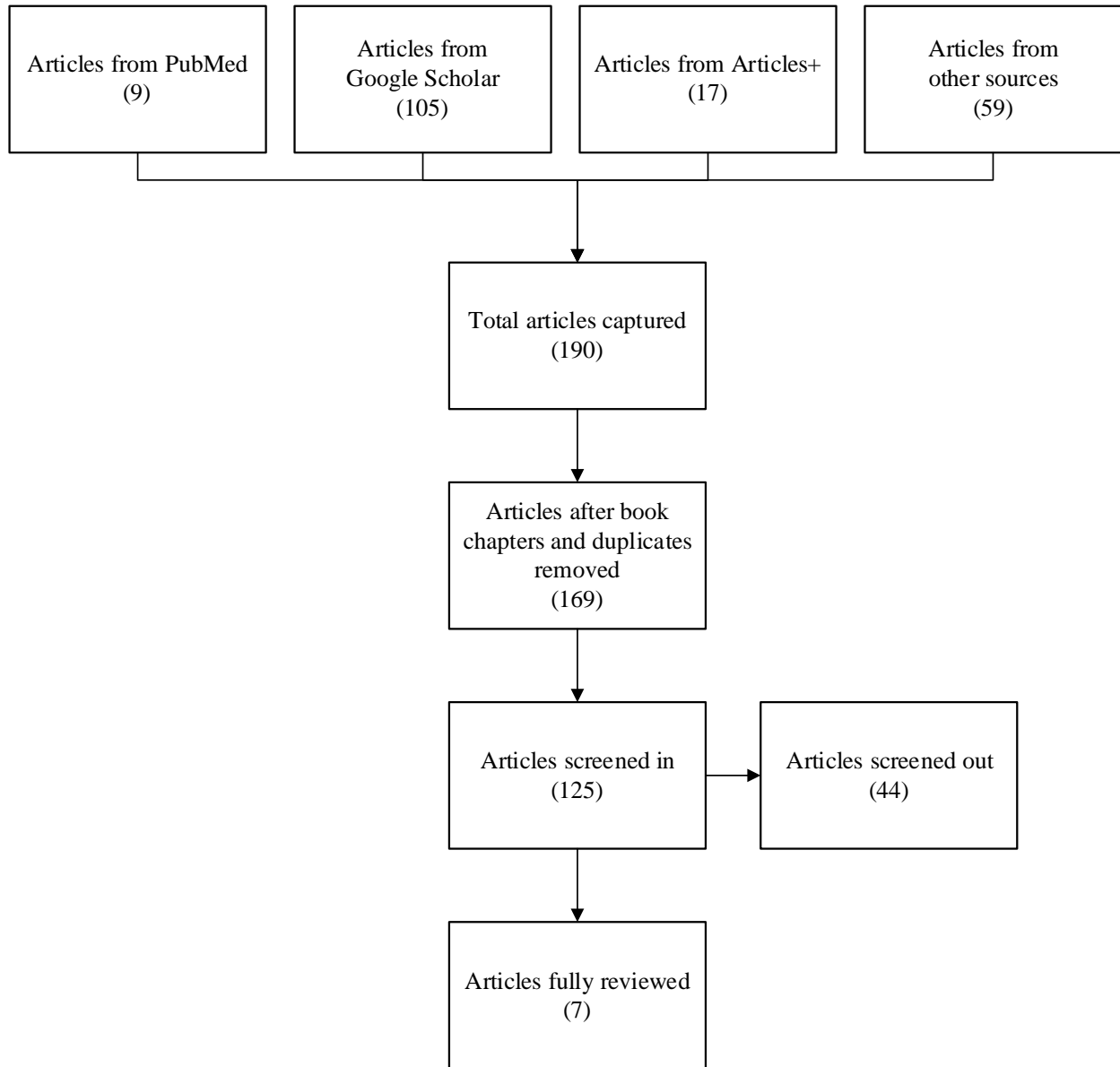**Figure 1**

Article Screening Decision Flowchart

Figure 2

Article Screening Flow Chart

RESULTS

Analysis of Articles Screened In

After eliminating duplicate articles and book chapters, I was left with 169 articles. Of these articles, I screened in 125 and screened out 44. Of the screened in articles, 117 (94%) discussed "Asian American" AND "Built Environment" and 18 (14%) discussed "Asian American" AND Climate Change/Justice." Eighty-eight (70%) discussed "Asian American" AND "Built Environment" AND "Health" and 13 (10%) discussed "Asian American" AND "Climate Change/Justice" AND "Health." Seven articles (6%) discussed all four topics: "Asian American" AND "Built Environment" AND "Climate Change/Justice" AND "Health." These findings are presented in Table 3 and Figure 3.

Table 3

Descriptive Results for Articles Screened In

	n	%
Total articles captured	169	
Number of articles screened in	125	
Number of articles screened out	44	
Number of articles about "Asian American"	125	100
Number of articles about "Asian American" AND "Built Environment"	117	94
Number of articles about "Asian American" AND "Built Environment" AND "Health"	88	70
Number of articles about "Asian American" AND "Climate Change/Justice"	18	14
Number of articles about "Asian American" AND "Climate Change/Justice" AND "Health"	13	10
Number of articles about "Asian American" AND "Built Environment" AND "Climate Change/Justice"	11	9
Number of articles about "Asian American" AND "Built Environment" AND "Climate Change/Justice" AND "Health"	7	6

Figure 3

Number of Articles Identified by Topic
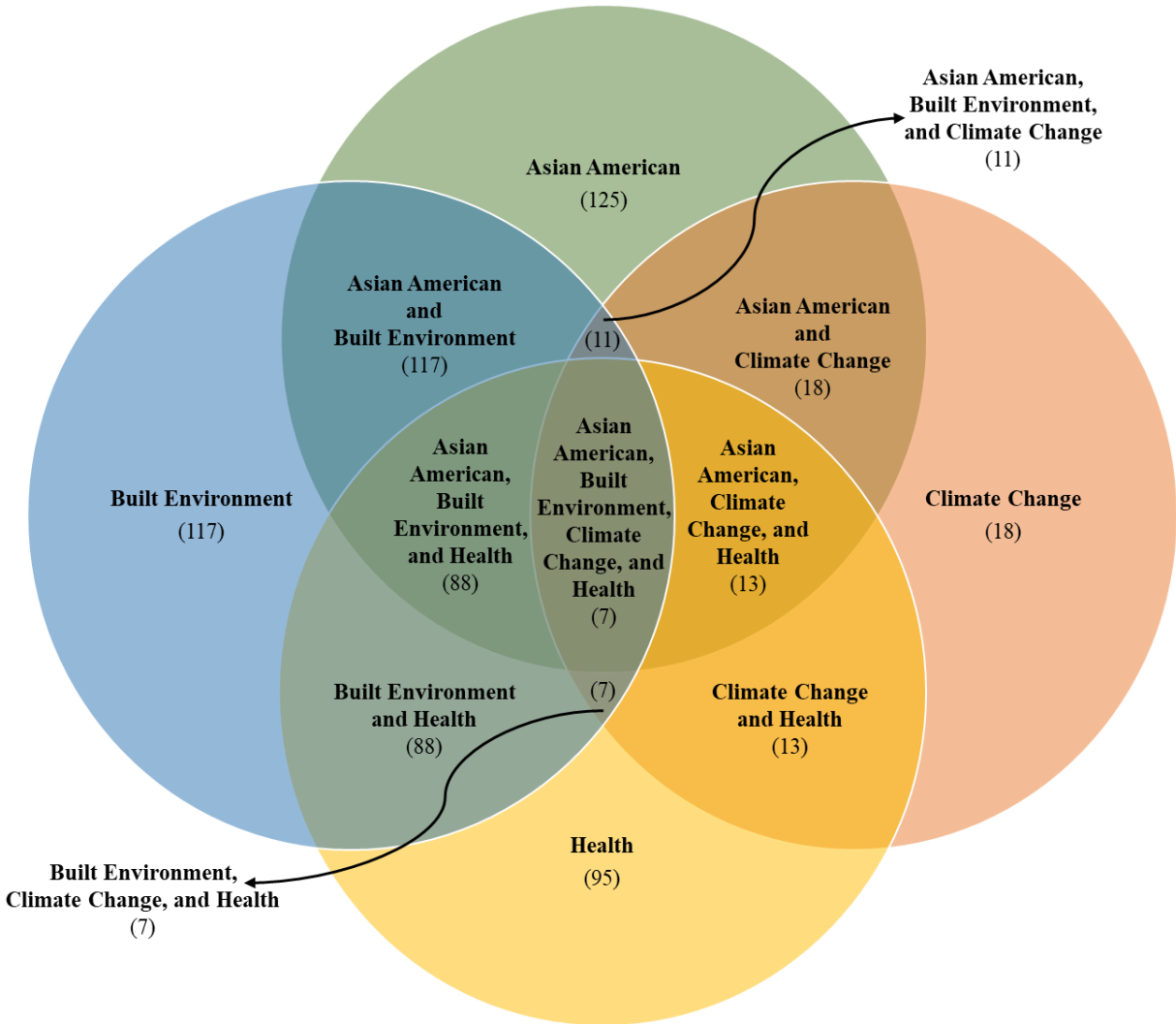
Articles screened in included peer-reviewed journals, law/policy review papers, commentary papers, non-peer review reports, theses/dissertations, and zines. Due to the overlapping nature of some of these types of articles, exact counts for each type of publication were not calculated. The large majority of screened in articles were published after 2000 (94%). Nearly half (49%) of the studies used national datasets representing the United States or multiple

cities within the United States. Location-specific studies were predominantly based on the East or West Coasts (e.g., California, New York). See Table 4 for more.

Table 4

Locations and Publication Years of Articles Screened In

Location	n	%
National or multiple U.S. cities	61	49
California (General, Los Angeles, Richmond, San Francisco)	24	19
New York (New York, General)	12	10
Texas (Austin, Houston)	6	5
Pennsylvania (Philadelphia)	4	3
Hawaii (General, Honolulu)	3	2
Washington D.C. Metropolitan Area	2	2
New Jersey	2	2
Washington (Seattle, King County)	2	2
Arizona (Phoenix)	1	1
Florida	1	1
Georgia (Atlanta)	1	1
Illinois (Chicago)	1	1
Louisiana (New Orleans)	1	1
Massachusetts (Boston)	1	1
Michigan	1	1
Some studies included multiple cities so totals might not sum to 125 or 100%.		
Publication Years	**n**	**%**
1980-1989	3	2
1990-1999	5	4
2000-2009	18	14
2010-2019	57	46
2020-Present	42	34

Research Synthesis

I conducted a high-level content analysis of the seven articles that met all four criteria of interest. Of the seven, five were research studies, one was a commentary, and one was a zine. For the seven articles, zero came from PubMed, two came from Google Scholar, two came from Articles+, and three came from non-database sources. All seven papers were published after 2010

and five used national-level samples or perspectives. Table 5 presents descriptive results for these seven articles.

Research Studies

Of the five research studies, four focused on heat and neighborhoods/residential segregation. Jesdale et al. (2013) explored the relationships between residential segregation and heat risk-related land cover (HRRLC), finding that "non-Hispanic Asians [were] 32% more likely… to live in HRRLC conditions compared with non-Hispanic Whites." Johnson (2022) assessed population-based disparities in urban heat exposure between 2003-2018 and found that areas with more Black, Hispanic, and Asian populations were associated with increases in surface urban heat island intensity; the opposite was found for White populations. Manware et al.'s (2022) analysis demonstrated that historically redlined communities were associated with increased vulnerability to heat. For the authors' calculated census tract level heat vulnerability index scores, the mean heat vulnerability index score was highest for non-Hispanic Black/African American populations, followed by Hispanic/Latino populations, Other races, and then Asian populations. Uejio et al.'s (2011)'s study on heat exposure and the built environment, socioeconomics, and neighborhood stability found fewer heat distress calls made in neighborhoods with a higher proportion of Asian American residents, compared to neighborhoods with higher proportions of Black and Hispanic residents.

The remaining article was about green space. Choi et al. (2020) examined access to different types of green space (i.e., street-level greenery, neighborhood parks, and large parks). They found that across 12 urban areas, racial/ethnic minority groups (e.g., Black, Asian, Latino/a) had significantly less street-level greenery available. Neighborhoods with larger percentages of non-Hispanic Asians had lower walking accessibility in neighborhood parks of varying sizes. Choi

et al. (2020) explicitly recognized that Asians are often left out of the environmental justice framework, despite evidence indicating they have greater health risk than non-Hispanic Whites.

Other Publications

The two other papers draw connections between Asian Americans, climate change and climate justice, and the built environment. Published in Asian American Policy Review, *Reclaim Our Power: Principles for utility justice in California* is a zine that includes comics illustrating Reclaim Our Power!'s ten core principles for a just energy transition (Fang & Lee, 2020). This publication provides an on-the-ground advocacy perspective regarding utility justice, environmental/climate justice, and connection to indirect and direct impacts for communities, demonstrating neighborhood-based community action. In *Acting Globally: Cultivating a thousand community solutions for climate justice*, Di Chiro (2011) discusses COP16 (an annual international climate conference) held in 2010, in Cancun, Mexico. The publication emphasizes the role of community-driven approaches to climate justice. The inclusion of Asian Americans is limited to a few examples, including Asian Communities for Reproductive Justice in Oakland, California and a mention of occupational environmental justice regarding working environments in industries that employ large numbers of Asian Americans (e.g., electronics manufacturing, nail salons).

Table 5

Descriptive Results for Final Seven Articles

Title	Author/s	Publication Year	Publication Type	Geographic Region	Publication Source
From XS to XL urban nature: Examining access to different types of green space using a 'just sustainabilities' framework	Choi et al.	2020	Journal Article	U.S.	Articles+
Reclaim Our Power: Principles for utility justice in California	Fang & Lee	2020	Zine	CA	Articles+
Acting Globally: cultivating a thousand community solutions for climate justice	Di Chiro	2011	Commentary Paper	Domestic/ International	Google Scholar
The racial/ethnic distribution of heat risk–related land cover in relation to residential segregation	Jesdale et al.	2013	Journal Article	U.S. (incl. PR)	Courses
Population-based disparities in U.S. urban heat exposure from 2003 to 2018	Johnson	2022	Journal Article	U.S.	Courses
Residential and race/ethnicity disparities in heat vulnerability in the United States	Manware et al.	2022	Journal Article	U.S.	Courses
Intra-urban societal vulnerability to extreme heat: The role of heat exposure and the built environment, socioeconomics, and neighborhood stability	Uejio et al.	2011	Journal Article	Philadelphia, PA; Phoenix, AZ	Google Scholar

DISCUSSION

As seen in Table 4, 80 percent of articles screened in were published between 2010 and March 2023, which is in line with the increasing urgency and relevance of climate change in mainstream discussions and research. Of the four topics of interest, only seven of the 125 articles screened in covered all topics of interest, indicating a small body of literature found from the sources included in the study. Based on the sources for the seven articles that met criteria, searches in PubMed and Google Scholar were less fruitful than the brief Articles+ search and articles sourced from my coursework. Comprehensive searches in other databases, including Articles+, might have produced more results related to the topics of interest.

The vast majority of articles screened in focused on Asian Americans, the built environment, and health, rather than climate change or climate justice for Asian Americans. This aligns with challenges faced during my internship, when we were conducting a literature review about the impacts of climate change for the health of Asian Americans. None of the seven articles were solely focused on Asian Americans, rather they only included substantive discussion of Asian Americans. Four of five research studies that met criteria of interest were focused on heat, signifying a need for research on the relationships between other climate hazards and Asian Americans' built environments, including what they have access to in their neighborhoods as it relates to climate change. When I conceptualized this study, I hoped to find research papers that explored specific components of the built environment, such as availability of green infrastructure or building materials used. Most studies screened in used neighborhoods as a geographic region for analysis, rather than delving into components of those neighborhoods that might have connections to climate change, similar to Choi et al. (2020).

Aside from the articles that used national datasets, nearly all articles screened in used samples of Asian Americans living on the East or West Coasts of the United States. Very few articles focused on populations living in the Midwest or the South. Although a smaller proportion of Asian Americans may live in the Midwest and South than on the East and West Coasts, there are noteworthy pockets of Asian American communities that could benefit from inclusion in a research sample, such as the Hmong population in Minnesota or the Vietnamese population in Louisiana (Budiman, 2021; Hiltner, 2018). This is especially important since different regions of the United States will experience different climate hazards related to climate change.

CONCLUSION

This scoping review sought to identify available literature that discussed climate change and the built environment for Asian American populations. Of the 125 screened in articles, seven met all four criteria of interest: Asian Americans, built environment, climate change, and health, demonstrating a small body of literature on these topics from the databases sourced.

Climate change will certainly affect Asian Americans, who are affected by their neighborhoods and other built environment factors. While the relationship between climate change and the built environment is well-established, it is still unclear how this relationship impacts Asian Americans. Climate change has already resulted in severe damage to ecosystems, communities, and human health. As the climate crisis continues and the effects of climate change persist, we must ensure that effective and sustainable adaptation and mitigation strategies are implemented to support Asian Americans in their neighborhoods. Research can support these endeavors by providing strong evidence to inform policy and program development and implementation.

Recommendations

Researchers should focus more on how Asian Americans will be affected by climate change in their own neighborhoods in the United States. Future research should focus on specific climate change-related hazards to understand their relationship with the built environment for Asian Americans. Similarly, disaggregated datasets that allow for stratified analyses for specific Asian subpopulations is crucial. Although many national-level datasets are publicly available (e.g., U.S. Census Data), and there have been a few largescale datasets specifically focused on Asian Americans (e.g., National Latino and Asian American Study, Midwest Longitudinal Study of Asian American Families), these data may not allow for rigorous analysis of Asian American subgroups (Alegria et al., 2004; Choi et al., n.d.). Researchers can circumvent this challenge by developing their own datasets for their regions and populations of interest. They can also utilize available localized (e.g., state-level) datasets that might offer more specific variables of interest and collect qualitative data to capture the firsthand perspectives and experiences of Asian Americans in their built environments.

Similarly, future research should also focus on specific climate change-related hazards to understand their relationship with the built environment for Asian Americans. This includes research focused on specific built environment factors, such as access to green space, availability and quality of sidewalks, and implementation of green infrastructure.

The more specific our research design and analyses, the better we can understand these relationships, which can be used to implement relevant and appropriate policies and programs for Asian Americans. Importantly, funding opportunities are needed to support and encourage researchers interested in this work. Communities and advocacy organizations are already working

to address climate change. Researchers, funders, and policymakers should support and engage with ongoing community-oriented and community-based efforts, rather than working in isolation.

Limitations

Findings for this study are limited due to selection of databases for review and selected search terms. Only two databases were thoroughly reviewed. Final results indicated that a comprehensive search of Articles+ likely would have produced more results, compared to PubMed. Future scoping reviews should be conducted using other databases. There may be a wealth of articles in another database, such as one focused on environmental health.

One major limitation of this scoping review regards the search terms chosen. Due to capacity and timeline constraints and since this is intended to serve as a preliminary scoping review, I opted for more general search terms (e.g., "climate change"). More specific terms would have been ideal, such as searching for specific climate hazards (e.g., flooding, extreme heat). Similarly, I searched for articles using "Asian American" to identify Asian populations based in the United States and discussed in papers. Again, more specific terms that reflect subpopulations within the broader Asian identity would have been more comprehensive (e.g., Taiwanese, Hmong, South Asian). This may have identified studies that conducted analyses about specific ethnicities or subgroups within the Asian population in the United States, providing a more detailed understanding. Another option would have been to search using both "Asian" and "United States" to identify studies focused on Asian populations based in the United States that did not use the full term "Asian American."

It is prudent to note that dataset limitations may prevent researchers from conducting stratified analyses within the Asian population. For example, due to low sample sizes and statistical power, U.S. Census data typically does not allow researchers to disaggregate Asian data by

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ethnicities. Low sample sizes may be due in part to reluctance to participate in research studies and surveys, such as for individuals who are undocumented, or due to language barriers for those who are non-Native English speakers. For more on the difficulties of polling Asian Americans, see Gao (2016).

Future studies should use specific search terms for the search process. In retrospect, it may have been fruitful to start more generally and search for studies using a term such as "race/ethnicity" or "racial/ethnic," especially in combination with "disparities," such as "racial/ethnic disparities." Studies may have included Asian Americans in these analyses.

Language changes over time. Phrases that were commonly used in 1995 may be rarely used in 2023. For example, the focus on justice (e.g., "climate justice) has become a more commonly used term in the last two decades. Thus, my choice of search terms represents my bias towards language used in the present day, and I may have missed papers published that used different terminology. Similarly, different fields use different terminology. For example, some professionals rarely use the term "built environment" while others use it often. Although I did search for terms related to the built environment (e.g., "neighborhood"), there are likely several terms I am not familiar with that would have yielded relevant results.

Finally, all work conducted for this thesis was done solely by the author, which likely introduced bias, especially for the searching and screening processes. A future study with multiple researchers would mitigate single-author biases.

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