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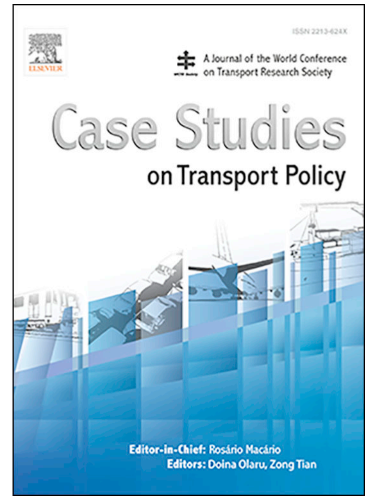

Crabgrass Confinement: Housing and Transportation Challenges of Low- and Moderate-Income Suburban Residents in the San Francisco Bay Area

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Crabgrass Confinement: Housing and Transportation Challenges of Low- and Moderate-Income Suburban Residents in the San Francisco Bay Area

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Abstract

The relationship between housing and transportation costs has been the focus of much research, with classic urban theory positing that housing costs decrease and commuting costs increase as households move away from city centers. The growing population of low and low-moderate (LMI) households in suburbs may be taking advantage of lower housing costs, though research shows that housing cost savings in suburbs are offset by higher transportation costs. Our research explores dimensions of housing and transportation cost burden on LMI households in Contra Costa County in the San Francisco Bay Area using qualitative data from online/in-person surveys (n=208) and interviews conducted in English and Spanish (n=25).

We found that housing burden is high, suggesting that LMI households choose to live in suburbs for diverse reasons, including rising rents and other requirements (e.g., credit score, rental history) in core cities, and desire for home ownership and a safer environment for children. Yet LMI suburban residents are still vulnerable to rising rents and housing instability in suburban areas. In addition to high housing costs, transportation costs are higher in suburbs due to longer commutes and higher reliance on personal vehicles. Car access is necessary, especially for households with young children. Reliance on cars becomes an issue as LMI households often encounter maintenance issues of used cars or inability to make car payments. When faced with lack of car ownership, households rely on social networks or public transit, and in some cases, forgo trips or relinquish their vehicles entirely. The lack of quality transportation alternatives in suburban contexts, as existing public transit services have long headways and are not well-suited to serving off-peak trips between suburban areas, leaves LMI households vulnerable.

Keywords: Suburbanization of poverty, transportation cost burden, transportation equity

1. Introduction

Classic urban theory posits that households treat housing and transportation as bundled goods, with households trading off housing and transportation costs under fixed income constraints (Alonso, 1964). Under a monocentric city model, this trade-off occurs as housing costs decrease and commuting costs increase further away from the city center or other major employment districts. Thus, households may choose to live in suburbs for lower rents, at the expense of higher transportation costs, or vice versa. The monocentric city model has been criticized as an oversimplification and subsequent research has shown that housing location choice is much more complicated, influenced by factors including school quality, crime rates, and household-level changes in income, job location, and lifecycle (Bayoh et al., 2006; Margo, 1992; Sanchez & Dawkins, 2001; South & Crowder, 1997). Nevertheless, research still shows the significant influence of transportation costs in housing location choice (Glaeser et al., 2008).

In the U.S., early suburban development was driven by households who could afford not only a new home but also the newest transportation technology of their times – rail, streetcars, and eventually automobiles (Jackson, 1985; LeRoy & Sonstelie, 1983; Warner, 1978). Suburban development was also supported through federal programs encouraging single-purpose zoning and heavily subsidized homeownership, though in many cases these programs were exclusionary and created racial and ethnic divides by restricting which households were allowed to buy homes (Rothstein, 2017). While some suburban locations have always been working class, many American suburbs were home to the middle class, especially those built post-WWII. By 2020, 80 percent of the U.S.'s 361 million population lived in an urban area, with 55 percent of the population living in a suburb (Pew Research Center, 2020). However, as the suburbs have expanded and their housing and infrastructure have aged, their demographics have shifted. Today, American suburbs are home to more low- and low-moderate-income (LMI) households than cities, and the fastest growing population of households in poverty is in the suburbs (Howell & Timberlake, 2014; Kneebone, 2019; Kneebone & Garr, 2010).

LMI households may be locating in suburban areas for cheaper housing costs, incurring higher transportation costs due to long commutes and greater reliance on car ownership. However, we hypothesize that the reality is more complex – that some LMI households seek lower housing costs while accepting high transportation costs, but other LMI households continue to face high housing cost burdens in suburban areas, in addition to high transportation costs. We further hypothesize that LMI suburban households face additional transportation barriers due to car dependency, use of older, less reliable vehicles, and the scarcity of alternative transportation options.

In this paper, we explore different dimensions of housing and transportation burden and transportation barriers for LMI suburban households in Contra Costa County, California, a predominantly suburban area on the Eastern edge of the San Francisco Bay Area. We conduct our analysis using online/in-person survey data collected February to May 2022 (n=208), and in-depth interview data in English and Spanish collected April to July 2022 (n=25). In the following sections, we summarize literature on housing and transportation costs and issues; describe the study methodology including background on case selection; present findings on housing and transportation cost burden; and conclude with discussion and policy strategies.

2. Literature review

The factors that enter into households' housing and transportation choices are myriad, but there is little doubt that both contribute heavily to household budgets; in 2021, the average U.S. household spent 34% of their budget on housing and 16% on transportation (U.S. Department of Transportation, Bureau of Transportation Statistics, n.d.). The importance of considering housing and transportation costs together has led to the development of location affordability indices and prompted the development of location efficient mortgage programs in the early 2000s that allowed households to borrow more money to purchase homes in transit-dense neighborhoods (Haas et al., 2016; Sanchez et al., 2007). Location efficient mortgages were premised on the idea that households in denser neighborhoods would spend less on transportation but analyses of these programs indicated that transportation cost savings in location efficient neighborhoods may have been overestimated (Chatman & Voorhoeve, 2010; Kaza et al., 2016; Tremoulet et al., 2016). Further, panel data from 2003 to 2013 show that households moving to more accessible neighborhoods did not significantly change their transportation expenditures, and that transportation expenditures are primarily driven by income and household characteristics, rather than location (Smart & Klein, 2018). Other research using panel data across different neighborhood types shows that transportation expenditures are lower in denser urban neighborhoods, regardless of household income level (Schouten, 2022). However, lower transportation costs in such areas are offset by higher housing costs, leaving overall housing and transportation cost burden unchanged.

Further complicating the issue, in suburban areas with low housing and employment density and few public transit services, LMI residents face transportation challenges outside of expenses. Despite earlier work positing that suburban job centers and regional multinucleation and job dispersion would moderate commute lengths (Anas et al., 1998; Cervero & Wu, 1998; Chatman, 2003, among others), recent analyses show that commute distance has grown for low-wage workers, likely a result of increasing numbers of low-wage workers in suburban areas (Blumenberg & King, 2019). Distances to other important destinations, such as grocery stores (Bastian & Napieralski, 2015) and healthcare facilities (Lazar & Davenport, 2018) also have been shown to be problematic in some suburbs.

The sprawling land use characteristics of the suburbs and limited alternate transportation options make travel by private vehicle a practical necessity for many residents. Researchers have found that car access allows low-income households to move to lower poverty neighborhoods, enables households to access employment, healthcare, shopping, childcare, and that lack of car access comes with a significant socioeconomic penalty (Jeon et al., 2018; King et al., 2022; Klein, 2020). Yet low-income and racial/ethnic minorities are more likely to be car-less or exhibit inconsistent car ownership. In California, 79% of zero-vehicle households did not own a car due to economic or physical (e.g., health/age related) constraints; these households were lower-income and more likely to be non-white compared to households with a car (Brown, 2017). Low-income households also tend to "churn" in and out of car ownership, experience frequent periods of carlessness due to maintenance or other issues (Klein & Smart, 2017)

Given the housing and transportation challenges many LMI suburban households face, the question remains: what are their reasons for locating in the suburbs, and what are the consequences for the households who do so? In this research, we used mixed-methods analysis in a case study of Contra Costa County to understand the housing decisions and transportation challenges of LMI suburban households. This research has timely implications to policy and planning as metropolitan regions across the U.S. grapple with increasing levels of poverty in suburban areas and LMI households face housing affordability and transportation accessibility barriers. In the next section, we describe the case selection and methodology in more detail.

3. Case Selection and Methodology

To select our case study area and study population, we reviewed policy documents and prior research on suburban poverty to identify our population of interest. We used U.S. Census data to identify high-poverty regions in the Bay Area. We then conducted an online/paper survey and selected 25 survey respondents for further in-depth interviews. Our methodology is summarized in Figure 1.

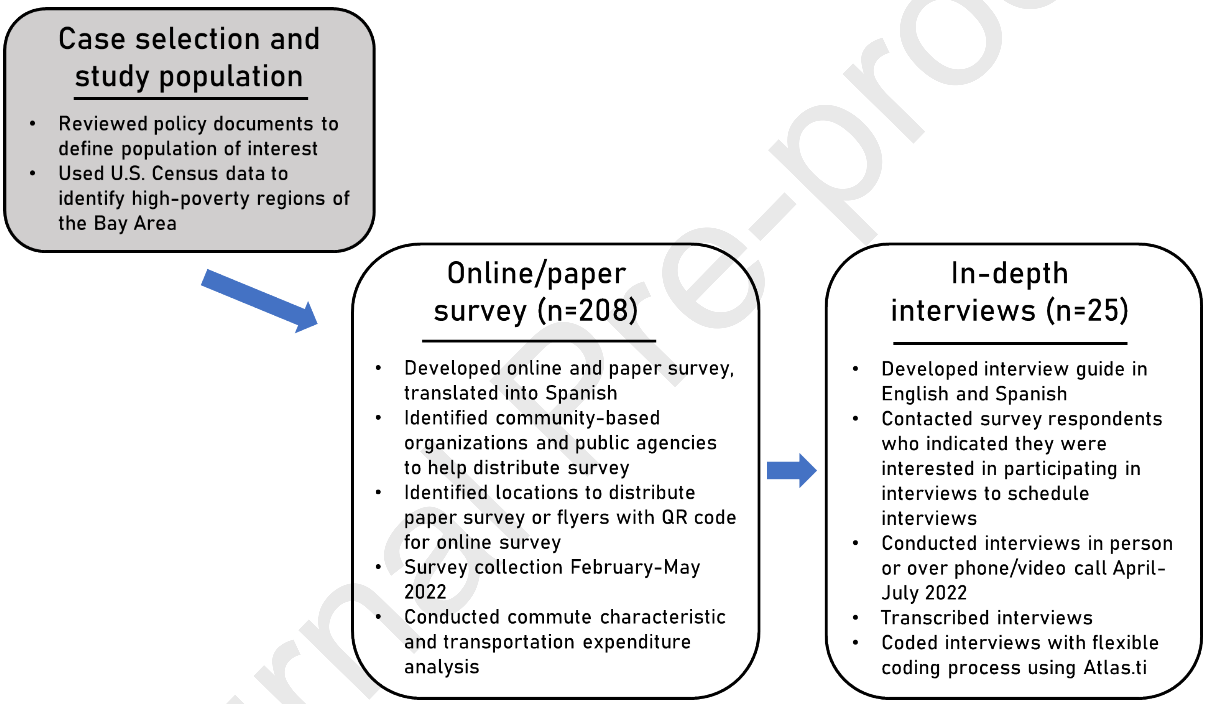

Figure 1: Methodology overview

3.1 Case selection and study population

Prior research has used a range of definitions to delineate urban and suburban areas (Airgood-Obrycki et al., 2020). In our research, we use a modified version of the urban/suburban designation from the Metropolitan Transportation Commission (MTC), the metropolitan planning organization (MPO) of the San Francisco Bay Area, which identifies core cities, suburbs, and rural areas based on population, employment, and transportation characteristics (Metropolitan Transportation Commission, 2014). We use this suburban/urban definition because it reflects the planning and policy priorities of our study region. MTC defines three core cities in the Bay Area: San Francisco, Oakland, and San Jose. We add Berkeley as a core city due to its population and employment density. We used U.S. Census data to identify suburban areas in the Bay Area with high poverty rates. We selected Contra Costa County as our study site, specifically the cities of Richmond, San Pablo, Antioch, Concord, and Pittsburg, which have high concentrations of poverty. For example, Richmond has a poverty rate of 13.4% (compared to 17.6% in Berkeley, 13.5% in Oakland, and 10.3% in San Francisco) (2021 ACS Five-Year Estimates).

We use the Department of Housing and Urban Development (HUD)'s definition of low-income households as those earning less than 80% of the Area Median Income (AMI). The AMI was $110,455 in Contra Costa County from the 2021 ACS Five-Year estimates so we use an income threshold of $75,000 to align with ACS income categories[1].We refer to these families as "low- and low-moderate-income" in recognition that a $75,000 income is above the 2019 U.S. median of $68,703, given that the Bay Area is a particularly high cost region (the AMI of the nine-county Bay Area was $120,475 in 2021). We also limit our study sample to individuals between the ages of 30 and 70. By excluding adults under the age of 30, we aim to remove college or graduate students and young adults whose LMI status is likely to be temporary, who may be receiving financial assistance from their family, and who may be moving more frequently compared to the general population. We exclude adults over the age of 70 to focus on individuals who are likely to be in the labor force and to omit those who may have established their home ownership and transportation bundle based on their incomes before retirement.

3.2 Background on Contra Costa County

Contra Costa County is the third largest of nine counties in the San Francisco Bay Area with a population of 1,161,643 (2021 ACS Five-Year Estimates). Contra Costa is shown in relation to other Bay Area counties in Figure 2. Figure 2 also shows the median household income in Contra Costa cities, which ranges from $74,260 in Richmond/San Pablo to $179,950 in Walnut Creek. The large variation in median household income reflects the enormous diversity of the county, which is home to a mixture of working-class suburbs centered around refineries (e.g., Richmond), postwar commuting suburbs around BART (e.g., Walnut Creek), and more recent suburbanization of farming towns in the late 1980s (e.g., Oakley).

[1] HUD adjusts this income threshold based on household size, with the 80% of AMI threshold being based on a family of four. In this research, we use the baseline 80% of AMI for simplicity.

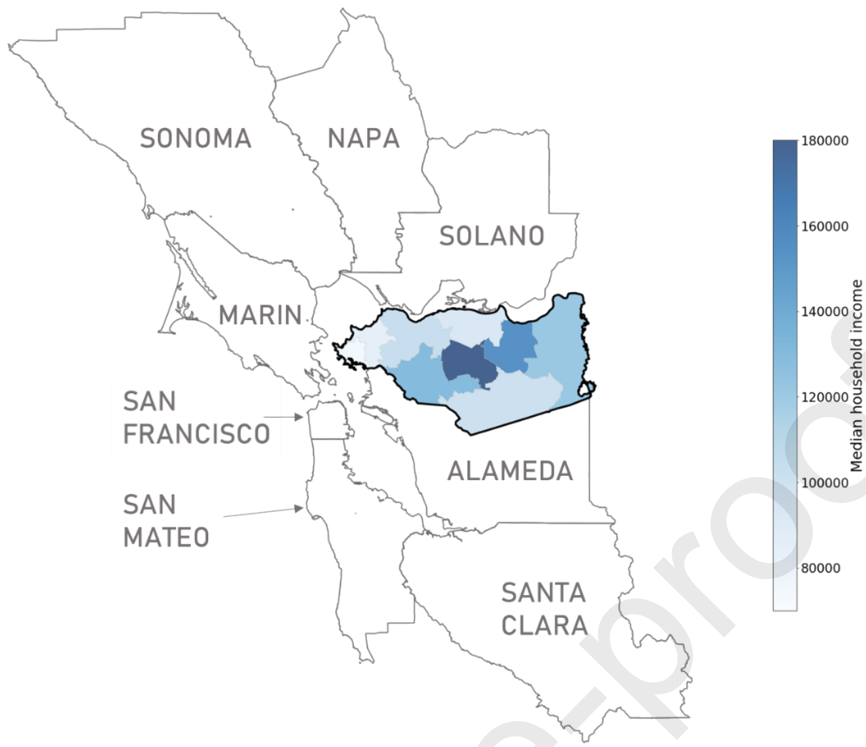

Figure 2: Median income of Contra Costa cities, 2021 ACS Five Year Estimates

Our study population of persons aged 30-70 with a household income of less than $75,000 is a unique subset of Contra Costa residents. The study population has a higher percentage of Hispanic/Latino (30% vs. 23% of the county) and Black/African American residents (12% vs. 9% of the county). Homeownership rates are also lower in the study population (47% vs. 55% of the county). Car ownership is similar (93% of study population has at least one car vs. 95% of the county).

Contra Costa County is served by a number of different public transit agencies including heavy rail (Bay Area Rapid Transit, or BART) and public bus (WestCAT, Tri Delta Transit, County Connection, and AC Transit). Average headways on BART are 15 minutes during peak period and 30 minutes off-peak. Frequency of bus service is much lower, especially for smaller bus agencies such as WestCAT and Tri Delta Transit, where headways range between 30 and 60 minutes, even during peak period.

3.3 Survey and interview recruitment and design

We distributed a 10- to 15-minute online and paper survey in English and Spanish from February to May 2022. The survey included screener questions on income, age, and current residence; only respondents with an income less than $75,000, between the ages of 30 and 70, and living in Contra Costa County were considered eligible. The survey contained 27 questions: six questions on housing (current residence, number of times moved in the past five years and where, whether respondent previously lived in a core city and reasons for leaving, factors prioritized during most recent move); three questions on transportation mode use (car access, reasons for lacking car access, and frequency of mode use); five questions on travel patterns (employment status, work location(s), days of week/times of day commuting, perceptions of ease of travel); and 13 demographics questions. We targeted cities with the highest poverty rates (Richmond, San Pablo, Concord, Pittsburg, and Antioch) to distribute the survey through a combination of in-person tabling events and flyers. In-person tabling events were held at high-volume destinations (BART stations and public libraries). We also distributed survey links through online channels (e.g., email lists, website posts) provided to us by community-based organizations, public transit agencies, and social services organizations serving high-poverty cities. Survey respondents each received a $10 gift card with an additional drawing with a 1 in 20 chance of receiving a $50 gift card. We received 208 survey responses (172 English, 38 Spanish). The geographic distribution of survey respondents is shown in Figure 3.

City	Respondents
Pittsburg & Concord (North/East)	46
Richmond & San Pablo	40
Antioch	33
Concord (West), Martinez & Pleasant Hill	21
Richmond (North), Hercules & El Cerrito	18
Concord (South) & Walnut Creek	12
Brentwood & Oakley	11
Walnut Creek (West), Lafayette, Orinda	4
San Ramon & Danville	1

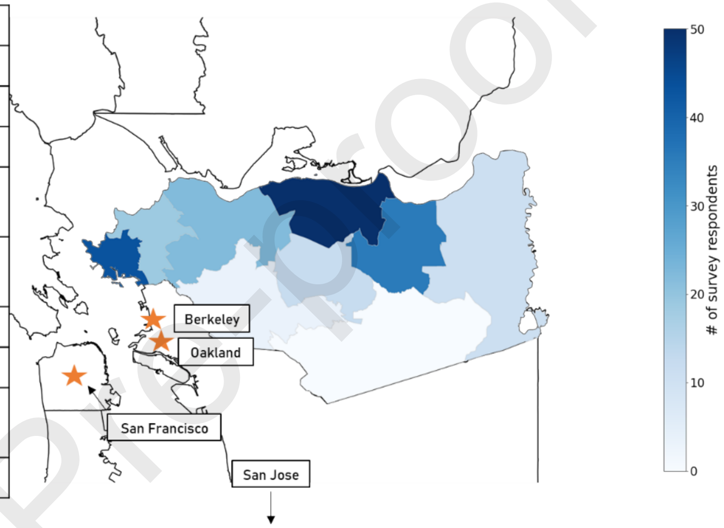

Figure 3: Survey respondent home locations

We selected 25 survey respondents with whom we conducted further in-depth semi-structured interviews from April-July 2022. These respondents represent a range of demographic, housing, and transportation characteristics (e.g., renters/owners, former residents of urban areas, car owners/non-car owners). We interviewed the majority of respondents in person, though we conducted phone and video interviews for six respondents who requested them. We conducted 16 interviews in English and nine interviews in Spanish. Using respondent survey data as a reference, we asked more detailed questions around factors prioritized when searching for housing, how housing search was conducted, current rent and rent changes, and housing challenges. For respondents who reported they had previously lived in a core city, we asked more questions around their decision to leave the core city and reasons for choosing to locate in a suburb. To understand travel patterns, we asked "grand tour" questions that prompted respondents to provide detailed accounts of their daily travel patterns, including trade-offs between transportation modes considered, and key destinations that interviewees need to reach. We also asked interviewees to estimate their monthly transportation expenditures with prompts for different cost components (e.g., public transit fare, car payment, insurance payments, gas, etc.). Interviewees each received a $50 gift card upon completion of the interview. We analyzed interview responses with the flexible coding process described in Deterding and Waters (2018) using the program Atlas.ti. We refer to interviewees throughout this article using pseudonyms to preserve anonymity.

3.4 Survey and interview analysis

In addition to descriptive statistics of survey responses and interview coding, we conducted analysis on commute characteristics and transportation expenditures.

We asked survey respondents to provide the nearest cross-streets to their home and primary work location. Out of the 113 respondents who were employed, 95 provided cross-street information, allowing us to estimate their commute time via different modes. We used the Google Maps API to estimate travel time and distance for public transit (including bus and rail) and driving during different commute periods. The Google Maps API has been used by other researchers to obtain accurate travel time estimations using historical traffic data and public transit schedules (Wang & Xu, 2011; Yan et al., 2019). The API also allows users to specify transit routing preferences (less walking or fewer transfers) and select different traffic models (best guess, pessimistic, or optimistic) to estimate driving time. In our analysis, we chose "fewer transfers" for our transit time estimation and the "best guess" traffic model for our driving time estimation.

To estimate transportation expenditures from survey respondents, we used data on commute characteristics and frequency of mode use from the survey, supplemented with data on travel trends from the 2017 National Household Travel Survey (NHTS), car ownership costs from the American Automobile Association (AAA), and public transit fares. NHTS data show that for Bay Area residents with a household income less than $75,000, commute miles are approximately 20-30% of total annual vehicle miles traveled (VMT). AAA releases estimates of driving expenses based on total annual VMT (*Your Driving Costs - 2020*, 2020). Households who drive 10,000, 15,000 and 20,000 miles spend 82, 64, and 55 cents per mile, respectively. We used NHTS and AAA data to estimate transportation expenses for drivers and used public transit fare data from the Bay Area to estimate public transit expenses. Out of 208 total survey respondents, 75 provided detailed enough information to complete these calculations.

To estimate transportation expenditures from interviewees, we used responses about monthly transportation expenses by mode and typical daily or weekly routine supplemented with data on gas prices, fuel economy, and driving distances. Table 1 shows excerpts from an interview with interviewee responses about their car type, job schedule, and car expenses. The most inconsistent answer is regarding gas expenses. The interviewer asked follow-up questions to attempt to clarify gas expenses. The segments in bold are used later in the calculations shown in Table 2.

Table 1: Interview excerpts

--- Interview excerpt 1 ---

Interviewer	*You said that you have a car, what kind of car is it?*

Respondent	I have a **Chevy Equinox, it's a 2006.**

--- Interview excerpt 2 ---

I	*Are you currently employed? And if so, what is your job?*
R	I'm in security for the Port of San Francisco. And then my side job is **working for Cruise over in San Francisco**. Yeah. So I do those little, troubleshoot those special little cars [*note: Cruise is an automated vehicle company*].
I	*How often would you say you're working for Cruise?*
R	That's my regular graveyard job for me. 10 to 6 every day.
I	*Every day?*
R	**Monday to Friday**.
I	*And about how many times will you take a security job?*
R	At least three times a week.

--- Interview excerpt 3 ---

I	*How much do you spend on your car every month in terms of gas, monthly car payment, insurance, that kind of stuff?*
R	About over $500. **My car insurance alone is like $226**. And then I'm usually putting like, maybe like $100 a week in my car because I have to drive to San Francisco every day, every other day
I	*$100 in gas a week?*
R	Yeah.

I	*And then how much is your car payment every month?*
R	**Car payment, like $209.**
I	*And about how many times do you fill up your gas tank every month? You said you fill up like $100 a week?*
R	I try to fill it up at least like three times a month, anytime I can because it's easier, once it's past the half line, it's easier to get back full versus having to fill it all the way back up, then that's more money.
I	*And about how much does it cost to fully fill up a tank for you?*
R	It went up, it was about 56 bucks for me. But now it went up to like, 67, 68 bucks.
I	*And so that affected your budget in terms of you needed to then work more?*
R	Yeah. And then it's like my job varies to where we might have a different place to respond to in San Francisco. So, and then toll, **toll went up to seven bucks.** That was a lot. So add that to the little piece of the pie too.

Table 2 shows an example of the transportation expense calculations based on data from the interviewee and our assumptions. This respondent and many other interviewees provided inconsistent estimates of gas expenses. We corrected for this by calculating the commute distance based on provided home and work location, interviewee's description of their weekly schedule, and information on the interviewee's car and fuel economy, which determines the minimum number of miles driven per week (as this does not account for non-work miles). Using these data, we estimate that the interviewee spends a minimum of $1,080 per month on transportation expenses. We use this methodology to estimate transportation expenses for all 25 interviewees.

Table 2: Transportation expenses calculation

Item	**Amount**	**Assumptions**
Car	$209/month	

payment		
Car insurance	$226/month	Approximately $2700/year – similar to other interviewee responses for cost of full coverage insurance
Miles driven	400 miles/week	40 miles one-way from Pittsburg (home) to San Francisco (Cruise headquarters), 5x/week Interviewee also takes private security jobs 3x/week in SF, assume these are negligible miles (driving within city limits)
Fuel economy	19 mpg	fueleconomy.gov for front-wheel drive 2006 Chevy Equinox
Gasoline prices	$6/gallon	Interview conducted April 2022. Average gas price taken from https://www.californiagasprices.com/retail_price_chart.aspx
Gas expenses	$505/month	
Toll	$140/month	$7/trip (toll only applied going into San Francisco) 20 trips per month
Total expenses	**$1,080/month**	

Using the housing and transportation expenditures calculated from survey and interview data, we categorize respondents according to their housing or transportation cost burden, defined as the housing or transportation expenditures as a portion of total household income. The Department of Housing and Urban Development (HUD)'s Location Affordability Index states that housing and transportation costs should consume about half of the average household budget and defines housing cost burden as households paying more than 30% of their income on housing. The 30% threshold is used by a number of agencies to identify cost burdened homeowners and renters and we use the same threshold in this research. Assuming that 30% of household budget is allocated to housing, we use 20% as the threshold for transportation cost burden.

4. Results

A summary of survey and interview respondent demographics is shown in Table 3.

Table 3: Summary of survey and interview demographics

Characteristic	**Survey Respondents**	**Interview Respondents**	**Characteristic**	**Survey Respondents**	**Interview Respondents**
Gender	N = 208	N = 25	Household income	N = 200	N = 25
Male	37%	20%	Less than $10,000	7%	8%
Female	62%	80%	$10,000 - $14,999	6%	8%
Non-binary	1.0%	0%	$15,000 - $24,999	11%	8%
			$25,000 - $34,999	25%	12%
Age	N = 191	N = 25	$35,000 - $49,999	19%	32%
30 – 34	24%	20%	$50,000 - $74,999	15%	20%
35 – 44	34%	44%	Prefer not to answer	16%	12%
45 – 54	21%	16%			
55 – 64	14%	20%	Household size	N = 197	N = 25
65 – 70	7%	0%	Average	3.2	3.4
Race/Ethnicity	N = 201	N = 25	Number of children	N = 208	N = 25
White/Caucasian	29%	8%	0	51%	28%
Hispanic or Latino	42%	68%	1	18%	20%

Black/African American	14%	20%	2	18%	24%
Asian	7%	4%	3 or more	13%	28%
Other	7%	0%			
			Education	N = 205	N = 25
Car ownership	N = 203	N = 25	Less than high school	14%	28%
No car	27%	16%	High school graduate	17%	20%
At least one car	73%	84%	Some college	19%	16%
			2-year college degree	14%	12%
Home ownership	N = 206	N = 25	4-year college degree	20%	16%
Own	18%	24%	Graduate degree	12%	4%
Rent	60%	64%			
Staying with friends/family	13%	12%	Employment	N = 208	N = 25
			Employed	60%	52%
Housing burdened	N = 127	N = 24	Transportation burdened	N = 75	N = 24
Yes	68%	50%	Yes	27%	42%

There was a high proportion of female and Hispanic/Latino survey and interview respondents, particularly interviewees. Most respondents own a car, though more than a quarter of survey respondents report not having access to a car. Rates of homeownership were higher for interviewees than survey respondents. More interviewees had children (72% of interviewees) and fewer interviewees were employed (52%) compared to survey respondents. Overall, the percentage of survey respondents and interviewees who were employed was low. We found that almost all interviewees who selected "not employed" in the survey identified as female and stated that they were homemakers or caretakers, with only a few interviewees saying they were retired or unemployed. Given the high percentage of survey respondents who identified as female, this could explain the high unemployment rate.

Survey respondents also moved frequently, with 26% of respondents moving once in the past five years and 37% moving two or more times. About one-third of survey respondents previously lived in a core city in the Bay Area and the majority of these respondents (51%) said that they left a core city because they wanted cheaper housing. Wanting to purchase a home (33%) and wanting better quality housing (30%) were also important factors in leaving a core city. However, only a small portion of survey respondents own their home (18%). These homeowners were less likely to be housing burdened than renters (71% of renters vs. 56% of homeowners) but more than half of homeowners still experience cost burden. Housing burdened homeowners tended to be lower income (i.e., earning less than $35,000) with a larger household size (2.8 members vs. 2.5 members for non-housing burdened homeowners). Overall, housing burden is still high in suburbs, as two-thirds of survey respondents and half of interviewees spend more than 30% of their household income on housing.

4.1 High housing burden indicates the draw of other factors in suburbs

Interviewees revealed more nuance behind decisions to locate in suburbs that showed the importance of pull factors, such as safety and good schools, even if these factors come at a greater housing expense. For example, Sandra grew up in Oakland and decided to move to Pittsburg seven years ago for cheaper rent. After rent increases, she now spends about a third of her income on rent, making her housing burdened once again. However, after spending some time in Pittsburg, safety is now the deciding factor for her and her children: "Oakland is like, really violent. And I mean, yeah, I could hang with them, but once I got out here [to Pittsburg] and started experiencing more of the neighborhoods, then I started knowing what might be suitable for what I'm trying to do, which is raise kids." In Concord, Sarah, a single mother of three children, was planning to move to a better school district where her rent would be almost double what she currently pays and take up about 50% of her income.

For Spanish-speaking interviewees, it was primarily push factors that led households to locate in suburbs, including lack of credit or rental history or not having a Social Security number, criteria that they reported as barriers to finding housing in core cities. In suburbs, interviewees either did not encounter these requirements or were able to circumvent them through family or social networks. For example, Alegria initially immigrated with her husband from Mexico to California to work on a ranch but after the owner passed away, they struggled to find an apartment closer to jobs in a core city because they did not have a rental history. Luckily, through family connections, they were able to move to San Pablo. Alegria said, "The owner of the apartment was my husband's cousin. He believed we could pay. We didn't give our credit, just our word. And it was this way he rented to us."

4.2 Strong social networks and longtime homeownership protect households from high housing burdens

In addition to helping LMI households find housing, some interviewees were able to escape rising rents and homelessness through their social networks. Mariela, in Richmond, and Elliot, in Antioch, were both unhoused before friends offered them reduced rent for rooms in an apartment. Similarly, Alejandro was able to rent a room in his friend's condo after getting out of federal custody, counting himself as lucky compared to others: "When you get out of custody, you don't know where to go. A lot of people end up in shelters, or they end up being homeless." Ella lost her home to foreclosure in Pittsburg but was able to move into an inherited house with her two kids, her sister, and niece. Lara is living with her husband and two kids in a house owned by her in-laws to save money to buy a house of their own. In some cases, relying on family connections for reduced housing costs came with its own challenges. Imani, her husband, and her husband's parents previously rented a house together in El Cerrito. After their first child was born, Imani left her job to take care of the baby. The family struggled to pay rent on one income for a year, after which her in-laws applied for affordable housing, were selected after four months on a waiting list, and the entire household of five moved into it. Now, the household of five is sharing a two-bedroom apartment, a housing situation that is much more crowded than their previous arrangement but that she thinks is worth the rent savings.

The other group of interviewees who were not housing burdened were longtime homeowners. These respondents tended to be older (i.e., over 45) and have incomes in the lower-middle range (i.e., between $50,000 and $75,000 per year.) All had purchased their homes more than ten years ago. Nevertheless, more than half of homeowners still experience cost burden and interviews revealed that homeownership is not entirely without its challenges. Some interviewees had experienced foreclosures that triggered long periods of housing insecurity and in some instances, homelessness, ultimately giving them a negative outlook on homeownership in the future. Beatriz, whose family lost their home in Bay Point during the market crash in 2008, said: "I just see owning a home as so complicated. I still have that feeling where it can be taken away, if the market crashes, because you still owe the bank for so long." Similarly, Elliot's family lost their home in Antioch in the early 2000s. Even though he only recently found stable housing, he has thought about homeownership again, but said he does not have the credit to even try and would still worry about making mortgage payments and potentially losing the house.

For housing burdened households, most of them renters, housing instability will continue to be an issue in the future, as the theme of rising rents was present in many interviews. Unlike cities like San Francisco and Oakland, most cities in Contra Costa County do not have rent control measures. Alegria, who rents a single-family home in San Pablo, saw her rent raised from $1,950 to $2,400 per month just before the COVID-19 pandemic in 2020. After this experience, she said: "I began to research, to be in advocacy, and I have realized how disastrous the situation is, because that is why there are families living on the street, and the fear is that I am next. Either you feed your kids or pay the rent." Her statement reflects the uncertainty caused by rising rents even in suburban areas.

Interviewees in other suburbs also expressed concerns about housing affordability and instability. Selina currently rents a home in Antioch, where she has lived for more than 12 years. However, she worries about her future: "If tomorrow the landlord asks for the house, we are thinking of where to live because there are no cheap rents anymore. Not an apartment with one bedroom and a kitchen, they are already worth $2,000 [per month] up here [in Antioch] and supposedly this was cheaper."

4.3 LMI households are not only contending with high housing cost burdens, but also face high transportation cost burdens, especially for households with one or more cars

Half of interviewees and 26% of survey respondents reported transportation expenditures that took up more than 20% of their income. Car ownership and long commutes were the major reasons for high transportation expenses.

Average monthly transportation expenditures for car owners ranged between $699 and $727 for interviewees and $673 and $980 for survey respondents. For non-car owners, monthly transportation expenses were between $148 and $172 for interviewees and $177 and $278 for survey respondents. Additional cars increased monthly car payment expenses and gas costs. Some non-car owners were also transportation cost burdened due to long commutes on public transit; cost burdened public transit commuters had an average commute distance of 30 miles, spending an average of $318 a month getting to work while non-cost burdened public transit commuters traveled an average of 14 miles to work and spent an average of $75 on transportation every month.

While transportation costs are higher for car owners, these costs are incurred because cars are shared between household members, while costs on public transit are incurred by a single commuter. We found that cars are used for many trips other than commuting and that households with higher transportation expenditures were likely to have young children. Among survey respondents, 11% of non-car owners have children while 63% of car owners have children. Children's transportation needs figure large in the decision to own a car for many of the parents. Sarah, a single mother in Concord with three kids under the age of ten, said that not having a car would limit the activities her kids could do, as well as limiting their social interactions with friends and family located outside of Concord. She also says that she uses her car as "…a big purse. I have extra clothes in there, I have snacks, towels, like, kids just make messes."

Reliance on car use in the suburbs means that high transportation costs are baked into the household budget, no matter the cost of gas, maintenance, or repairs. Angela and her partner share a car and carpool as a family from Richmond to San Francisco, dropping off their 13-year-old daughter at school in the city on the way to work. Angela's family's roots are in San Francisco and they only moved to Richmond because that is where they were able to afford homeownership. Now, having to drive back to the city every day for work and school, Angela said that high gas prices have become an unavoidable part of their budget: "I try to say, oh this is our budget, but it doesn't work out because even though gas prices went up, whatever it is, we still have to pay it. We're not going to say, oh we're not driving today because we're over our budget."

Another main contributor to high transportation costs for car owners is high insurance expenses. Based on average insurance estimates in Contra Costa County, the state minimum liability insurance would be \$50-\$75 per month. However, many interviewees reported paying for full coverage insurance (on average \$100-\$200 per month) because they could not tolerate losing their car in case of a serious collision. Clara, who lives in Richmond with her husband and three children, commented that she became convinced of the need for full coverage insurance after a drunk driver totaled her husband's car on the freeway: "We learned from the shock that the drunk driver person gave us, we should always have full coverage."

In addition to the financial impact of transportation on household budgets, commuting time was also significant, especially for individuals commuting to a core city. The average commute distance for survey respondents was 15.5 miles, while interviewees had a longer average commute of 19 miles. Respondents commuting to a core city had the longest commute distance (29.1 miles; 33% of respondents), suburb-to-suburb commuters traveled an average of 18.2 miles (29% of respondents, and commuters within the same suburb had the shortest commute distance (2.1 miles; 29% of respondents). We found that 37% survey respondents left for work during the weekday peak (7-10 am) and 21% left for work before 7 am. Almost half of survey respondents commute on weekends. Comparing travel times between driving and public transit, we found that commuters to core cities have the longest average travel time during the weekday peak (62 minutes via driving, 86 minutes via public transit). The disparity between driving and public transit time is largest for suburb-to-suburb commuters (35 minutes via driving, 75 minutes via public transit). Despite suburb-to-suburb commutes being almost 10 miles shorter than suburb-to-core-city commutes, the travel time on public transit is only 11 minutes shorter. One reason is the availability of rail transit for suburb-to-city commuters, a faster mode compared to the bus; 75% of suburb-to-suburb commuters can use BART for their commute vs. 91% of suburb-to-city commuters. Another reason is longer headways for public transit services in suburban areas; BART has a median headway of 15 minutes during the weekday morning peak compared to headways of 30 minutes on AC Transit routes that serve Contra Costa County and 60 minutes on Tri Delta Transit in eastern Contra Costa County.

4.4 Inconsistent car ownership and maintenance or reliability issues add on to stress around transportation expenses

In addition to high costs and travel times, we found additional stress caused by inconsistent car ownership and maintenance or reliability issues. Among survey respondents with a car, 33% reported that in the past year, their car was not able to be driven due to maintenance issues and 20% reported lacking car ownership for other reasons, indicating that among our population of LMI suburban residents, car access is not guaranteed, even for car owners.

Interviewees also experienced car maintenance issues, particularly interviewees with older cars (e.g., model year 2010 or older). Interviewees responded in one of four ways when their car was not functional: 1) borrowing a car or getting rides from friends or family; 2) using public transit; 3) limiting their trips; and 4) relinquishing their car. Borrowing a car or getting rides from friends and family was the most common response and shows the importance of both social networks and proximity to friends and family as a safety net to protect from unexpected maintenance issues and accidents. Ella, who currently lives in Pittsburg, was in a car accident and shared how she coped without a car: "I went years without a car. So I just went into that mode, like okay, time to look for rides, time to plan out every single place I'm going, how I'm going to get there…I don't have as much liberty."

Public transit was also a backup option when a car was not available. Alyssa commuted with BART and the bus between Pittsburg and San Francisco, a trip that took over an hour, until she saved enough money to get her car fixed. However, for some interviewees, public transit did not meet their travel needs, leading them to limiting their travel when they did not have access to a car. For example, Jennifer got behind on car payments during the COVID-19 pandemic and stopped driving from fear of her car being repossessed. While she was able to use public transit to get to and from work, she stopped visiting her mom in an assisted living facility in Vallejo because she was unable to make the trip on public transit. Emilia and her husband also avoided taking trips when their car was in the shop. She shared that they stayed at home for two days until the third day, when they needed to go out for work and church-related errands, and ended up needing to rent a car, which was very expensive.

As a last resort, some interviewees relinquished their cars entirely after maintenance and reliability issues. Elliot's car blew its engine and was too expensive to repair, which he said pushed him to learn how to use the bus for the first time. Since he lives and works in Antioch, he is able to make all his trips by bus. Mariela accumulated unpaid fix-it tickets on her car due to a broken headlight, which she had had for years. Although she was pulled over a few times, she was able to get away with a warning because she knew some of the police officers from working in security. Eventually, her car was towed, and after finding out it would cost over $2,000 to retrieve it, she said "no, you guys can keep it. But I cried. I cried. I was like, it has sentimental value!" After losing her car, she resorted to public transit, and said that she was thankful that her son was old enough to walk to school by himself.

We found that many interviewees experienced stress about the status of their vehicle or driver's license. For example, during the pandemic, both Jennifer and Sandra were unable to make car payments. Sandra shared: "You might get your car taken and once your car gets taken, that's like throwing a wrench into the program. Everything breaks down after that," referring to both the level of reliance she has on her car and her lack of alternate transportation options if something were to happen to it. Alegria, who is undocumented, was not able to get a driver's license until about six years ago, yet still drove without a license before that, reporting that she would drive in "terrible fear" and every time that she saw a police officer, she would pray they would not pull her over.

4.5 High housing and transportation expenses – is it worth it?

While a significant portion of survey and interview respondents experience high housing and transportation cost burdens, many interviewees shared positive experiences about living in the suburbs and having a car, indicating that these high costs are a burden they are willing to take on. In terms of housing, interviewees moved to suburbs in search of more tranquility and safety for their children, or for the possibility of homeownership which was unattainable in San Francisco and Oakland. For example, Sarah was concerned about exposing her children to an unsafe environment in Oakland and wanted to move somewhere more "family-oriented" with a "suburb-y feel." Concord was a happy medium where her children could play outside in parks, while still having close access to museums and cultural attractions in Oakland. Other families were seeking larger apartments for their children, with interviewees saying they moved to a larger apartment after the birth of an additional child; Emilia moved from a condo in San Leandro to a house in San Pablo to give her daughter a place to ride her bike and play in the yard.

Although car ownership was associated with higher transportation expenses, for interviewees, having a car meant freedom from public transit delays and relying on other people's schedules for rides. Alicia recalled: "I remember being younger, getting around on public transportation and walking everywhere, thinking, oh my God, I can't wait till I get a car. And I think I've been with a car ever since." Similarly, learning to drive and getting a car was a lifeline for Spanish-speaking immigrants. When she first immigrated to the U.S., Alegria said: "I lasted years not going out anywhere, only when my husband had the day off. He would take me to Mass or to errands once a week." Now that she knows how to drive, Alegria is able to be more involved in her kids' lives and is an active volunteer in her community. Before she got her license, Veronica relied on public transit, but one year it rained for weeks without stopping. Afraid that she and her daughter would catch a cold, her husband told her to stop taking her daughter to preschool. For Veronica, this was unacceptable: "I said, I have to learn to drive. It's not a justification that it's raining, for her not to go to school." These examples show how crucial car ownership was in allowing these women and their children to participate in school and other activities.

5. Discussion

Our survey and interview data show complex implications and reasons for high housing and transportation cost burden experienced by LMI suburban households. Escaping high housing costs in urban areas was one push factor leading to urban-suburban moves, though former urban residents were still housing burdened in suburbs. Additional push factors were strict rental requirements in urban areas that made renting in suburbs more feasible, especially for Latinx immigrants. Immigrants were able to find suburban housing more easily through social networks, in line with previous research on the importance of social networks as a safety net for low-income households (Carrillo et al., 2016).

While social connections helped some interviewees find housing, it also substantially reduced their housing options, constraining their housing search to cities or neighborhoods where they had friends or family. Interviewees also cited a significant financial burden associated with moving, as landlords often charge the first and last month's rent plus security deposit upon move in, thus, LMI households are constrained in where and how often they can move. As rents continue rising in suburban areas with fewer rent control measures, this puts already housing burdened LMI households under even more pressure to find affordable places to live. Yet for urban-suburban movers and long-term suburban households alike, the pull factors of suburbs – safety, space, good schools, and the possibility of homeownership – are worth enduring higher cost burdens, especially for households with children.

Two main groups of interviewees were immune to high housing costs – individuals with strong social networks and longtime homeowners. However, interviews with individuals saving on rent by living with friends or family revealed that their housing situation is anything from secure: Mariela, Elliot, and Alejandro, who were all classified as not housing burdened in our analysis, would have been unhoused in the absence of their social network. The 13% of survey respondents who selected that they were "staying with friends and family" reveals a population of LMI residents who could be in similar temporary living arrangements preventing them from being unhoused. While homeownership can protect moderate-income households from high housing costs and rising rents, lower income households that enter into homeownership are not always so lucky, as we found from interviewees who had faced foreclosure and years of housing insecurity as a result.

High housing cost burden for LMI suburban households was compounded by high transportation cost burden, especially for car owners. High transportation costs were not limited to car owners, as individuals who commuted long distances on public transit also incurred high transportation costs as a product of distance-based fares on BART. But for most households, cars were seen as a necessity, especially for households with young children, a fact that was reflected in high insurance expenses. Households pay for full coverage insurance, which is about twice the cost of state minimum liability insurance but protects car owners by providing coverage for damage incurred to their vehicle from an accident or other incidents that are out of their control (e.g., theft, fire). The potential risks of losing a car due to an accident compels car owners to pay higher rates for more insurance coverage; households can afford to spend an extra $75 per month for full coverage insurance but might not be able to spend thousands of dollars on repairs.

The high costs of car ownership are an unavoidable part of household budgeting and a price that LMI households are willing to pay. Particularly for households with young children, who we found had some of the highest transportation cost burdens, having a car lets kids be more involved in school and social activities, and in some cases, allowed kids to attend school at all. The car also means more flexibility to accommodate multiple differing schedules between siblings and has a use outside of transportation, for parents such as Sarah who use their car as a "big purse" to hold anything their children might need during the day.

We found that LMI households frequently went through periods where they lacked car access due to maintenance or reliability issues, in line with previous research showing that low-income households cycle in and out of car ownership more frequently (Klein & Smart, 2017). Strong social networks were the most common option that LMI households relied on when their car was unavailable, either through borrowing a car or asking for rides. However, relying on others for rides results in more inflexible travel times, a similar situation faced by those who used public transit as a backup when their car broke down. The lack of public transit options that can bring people where they need to go, at times when they need to travel, reduces the resiliency of LMI households in the inevitable situations when their car breaks down.

In light of these findings on high housing and transportation expenses, is living in the suburbs worth it for LMI households? The tranquility, safety, family-oriented nature of suburbs, having space for children to have their own bedroom and play outside were all things that survey respondents and interviewees wanted but were unable to find in urban areas. Yet interviewees were well aware of the threat of rising rents in the suburbs, with many having experienced or observed sudden rent increases. Car ownership, despite its high costs, was spoken about as a necessity and also as freedom from delays on public transit, being subject to public transit schedules, or reliant on friends or family for a ride. Interviewees with a car were able to involve themselves and their children in more social and school activities. However, car ownership could be tenuous and the lack of transportation alternatives in suburbs leaves LMI households vulnerable if and when their car breaks down. Overall, living in suburbs and owning a car offers

LMI households many benefits, and the challenges experienced through rising rents, housing instability, and transportation precarity could be addressed through policy strategies, which we discuss in the next section.

6. Conclusion, policy strategies, and next steps

Our research draws on qualitative survey and interview data to explore the implications of housing and transportation cost burden on LMI suburban households. We found that LMI suburban residents spend a large portion of their household income on both housing and transportation, similar to other research that has found that lower housing costs in suburban areas are offset by higher transportation costs (Schouten, 2022). In our research, we find that the safety, schools, space, and social networks of suburbs are among the reasons that LMI households choose to live there. Reliance on car use in the suburbs is a major driver of higher transportation costs and the car-centric nature of suburbs means that when the car breaks down, there are few public transit alternatives. However, car access was seen as a necessity, especially for households with young children, and enabled more involvement in the community.

There are policy strategies that local and state jurisdictions could employ to alleviate the housing and transportation challenges faced by LMI households in the suburbs. Even in the suburbs, LMI households are vulnerable to rising rents and housing instability. The California Tenant Protection Act of 2019 establishes rent caps and just cause for eviction statewide, but notably does not include single-family homes and condominiums, which are rented by many LMI households, especially in the suburbs. Local jurisdictions could step in to close these loopholes. For example, the city of Berkeley includes single-family homes in just cause eviction policy (*Good Cause & Other Local Requirements*, n.d.). Rent caps could similarly be extended to single-family homes and condos in cities that are especially heavily impacted by rising rents, such as Richmond.

Rental protections are only part of the solution since LMI households choose to live in suburbs for reasons other than housing costs, and it is important for housing supply to keep pace with demand. Local jurisdictions should recognize the need to encourage further multi-family housing development in suburban areas to accommodate the growing population of LMI households. Increasing housing density should be supplemented with other land use changes supporting mixed-use development, which could bring destinations such as grocery stores and schools closer to residents, potentially enabling them to complete these trips by walking or biking. At the same time, there are issues in core cities that, if addressed, could encourage more households to choose to live there. For example, LMI households in suburbs can find housing with more bedrooms for their children; housing policy in core cities could focus on providing more affordable housing units that are larger than studio or one-bedroom apartments. Similarly, addressing issues of crime and school quality could make cities more attractive places for LMI households.

In suburban areas, having a car improves accessibility and ability to participate in the community for LMI residents. At the same time, having a car is expensive, with high maintenance and insurance costs. California has some programs to mitigate these costs for LMI residents, including the California Low Cost Auto Insurance program, which provides minimum state liability coverage for an annual cost of $244-$966. However, there was no one among our respondents who took advantage of this program, despite many interviewees meeting the eligibility requirements. Instead, we found that interviewees felt they needed full coverage insurance due to the high consequences associated with losing their car in an accident. Programs that provide discounts on full coverage insurance would be more effective to reduce the costs of car ownership for LMI households.

To support LMI residents without a personal vehicle or with inconsistent vehicle ownership, public transit agencies should reconsider how they provide services in low-density suburban areas. Respondents commuting long distances on public transit have higher costs due to BART's distance-based fare policy. This could be addressed through expanding on programs such as Clipper START, which provides discounts on BART for households below 200% of the federal poverty line.

Agencies should also focus on how to better serve local, non-commute trips and trips taken during off-peak periods or weekends when transit services are extremely limited if they are available at all. Off-peak and weekend local services to support trips such as grocery shopping need attention as well, as this was the most common errand for which interviewees said that they required a personal vehicle. One potential strategy is flexible demand-responsive public transit services, such as public microtransit, which makes use of small vans or shuttles that pick up passengers when they request a ride through a mobile app, website, or call center. Two cities in our study area have microtransit programs or pilots (Tri MyRide in Antioch/Pittsburg/Bay Point and Richmond Moves in Richmond) which is a start to understanding how these services could better serve suburban residents.

6.1 Limitations and future research

As with many small-N studies drawing on qualitative methods, our research was designed to provide insights into the transportation and housing issues that LMI suburban residents face and importantly, the linkages between housing choices and transportation issues. The Contra Costa case presented here offers such insights, but future research could explore the housing choices and transportation accessibility in suburbs of other metropolitan areas or in exurban areas to see whether and to what extent the same issues arise. Additional studies could dig deeper into the factors leading to hardship with personal vehicle ownership.

Additionally, the COVID-19 pandemic has led to many households moving to more suburban areas during the pandemic. It is unclear how long these changes will persist, especially with changes to remote work. With housing costs already rising in suburban areas, increased demand for suburban lifestyles could further impact LMI suburban households. Future research could explore these continued changes to suburban regions. Finally, while it is important to highlight the housing and transportation issues that LMI households face, it is equally as critical to further investigate the efficacy of policy strategies to improve housing stability and transportation accessibility for these households. Future research could build on the policy strategies proposed in our research to determine what approaches are most effective. As the population of LMI households in suburbs only continues to grow, it is crucial that we continue to build our understanding of the unique barriers faced by these households and how to address them, in order to best design equitable housing, transportation, and land use policies that are responsive to the needs of this population.

7. Acknowledgements

[Redacted]

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Highlights

- Growing low-income suburban population has unique housing and transportation barriers
- These households, some moving from urban areas, continue to face housing instability
- Limited quality transportation options also leaves households vulnerable
- Local jurisdictions must recognize further need for multi-family housing in suburbs
- Similarly, public transit services must evolve to serve off-peak, non-commute trips

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