

Human Heat Vulnerability and Strategies for Coping with Heat in Winnipeg, MB

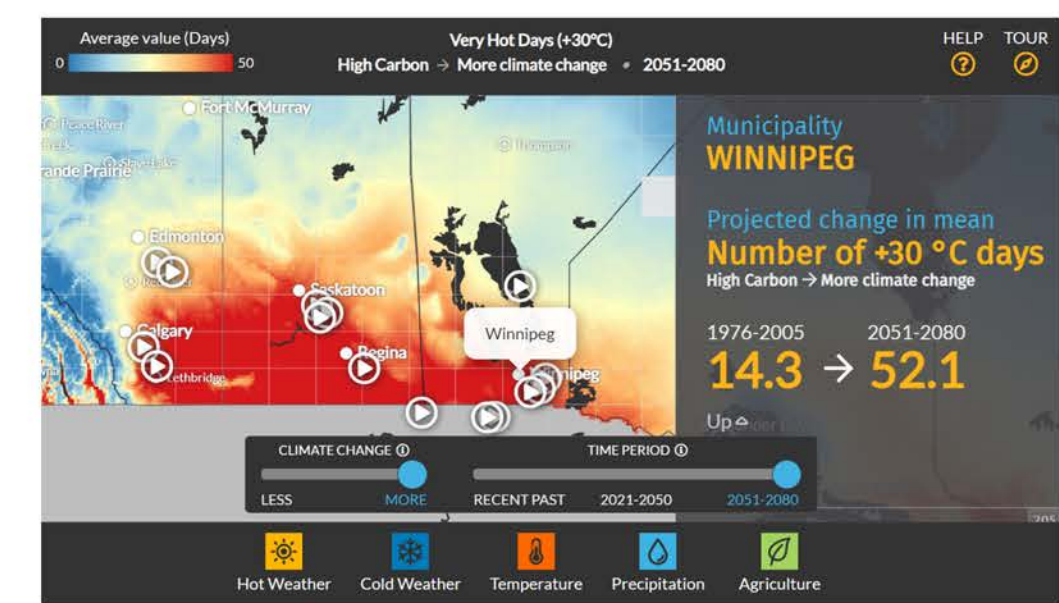
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Project Context

Heatwaves are becoming increasingly concerning around the world due to the global climate crisis. Cities are more vulnerable to the effects of heat because of the urban heat island effect, whereby the built environment absorbs and radiates more heat than natural areas, making urban areas feel as much as several degrees warmer than the surrounding environment.

Extreme heat poses a very real risk to public health. In 2018, a heatwave in Quebec killed over 90 people, many of whom were seniors living alone with no one checking on them. Heatwaves will only become more frequent and intense as climate change progresses.



Methods & Literature Review

Research Questions



What are the demographics and housing types and quality in areas of Winnipeg with more exposure to heat and in areas with less exposure to heat?



What strategies do people living in areas of Winnipeg with different levels of heat exposure use to cope with heat?



What are the implications of this research for climate-informed planning in Winnipeg?

The literature on heat vulnerability shows that trees and green space help protect people from heat, but are distributed inequitably in many cities. Studies show that marginalized groups are more likely to live in areas with less green space, due to historic discriminatory policy decisions. Demographics that can affect vulnerability include income, age, gender, disability, and race.

- There are three main types of coping strategies:
- Body-related:** wearing light clothing or using water for cooling
 - Home-protective:** using curtains, opening windows, or using a fan or air conditioning
 - Activity-related:** reducing and rescheduling physical activities (Kemen et al., 2021)

This research studied demographics and heat-related coping strategies in four Winnipeg neighbourhoods, selected based on income and surface temperature. The methods used were census data analysis (of 22 census tracts) and an online survey distributed by local community organizations and elected officials in the four neighbourhoods. A total of 64 surveys were collected.

	Higher Temperatures	Lower Temperatures
Higher Incomes	South St. Vital (n = 23)	River Heights (n = 24)
Lower Incomes	Downtown (n = 12)	North End (n = 5)

Findings & Discussion

The census data analysis involved collecting data on various demographics, including: age, gender, dwelling type, age of construction, housing tenure, household size, income, Indigenous identity, racialized identity, citizenship status, immigration history, and acceptable housing. This analysis showed several key differences between neighbourhoods of different incomes, as well as between neighbourhoods of similar incomes.

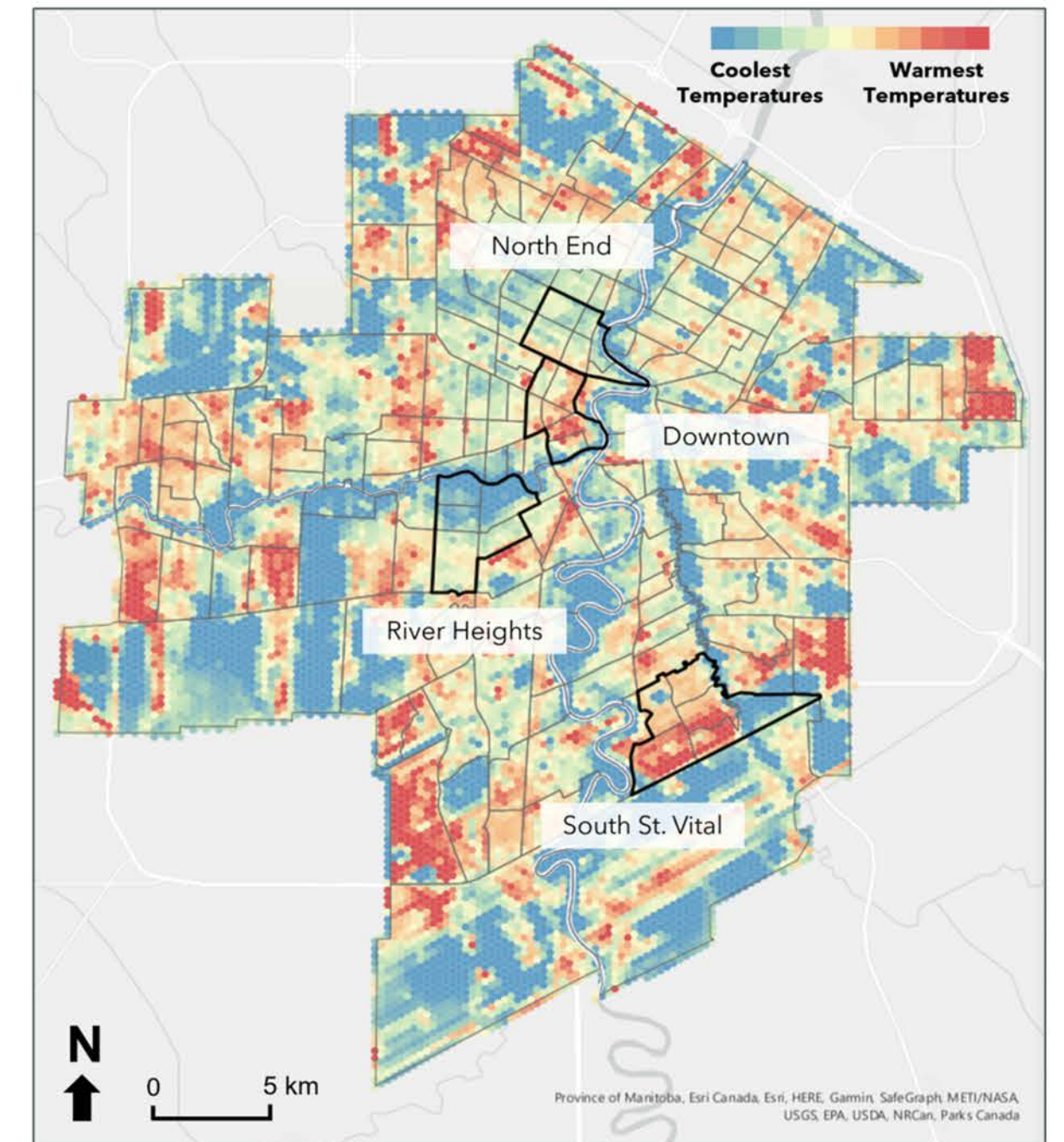
The literature shows that people living in multi-family dwellings tend to be more vulnerable to heat than single-family dwellings. Generally, River Heights and South St. Vital had more single-detached houses. Single-detached homes were less common in the lower income neighbourhoods. Duplexes were more common in the North End and apartment buildings were much more common in Downtown.

Older housing is often less insulated, which can make residents more vulnerable to heat. The age of construction across the study neighbourhoods was not related to income, with River Heights having the oldest housing stock, followed by the North End, Downtown, and South St. Vital with the newest construction.

Acceptable housing is a key indicator of housing quality meaning that a dwelling is adequate (reported by residents as not requiring any major repairs), affordable (having shelter costs equal to less than 30% of total before-tax household income), and suitable (with enough bedrooms for the size and composition of the household). In the higher income neighbourhoods, around 80% of housing is considered acceptable, while in the lower income neighbourhoods this is around 50%. People with inadequate housing are more vulnerable to extreme heat.

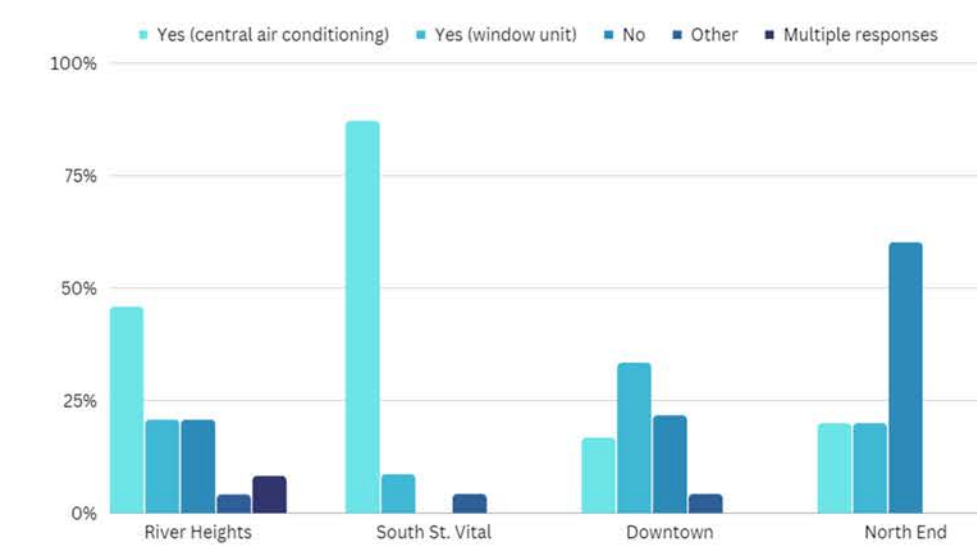
The literature says that people who identify as BIPOC (Black, Indigenous, People of Colour) are more likely to be vulnerable to heat. There are fewer Indigenous and racialized people living in River Heights and South St. Vital, whereas there are more Indigenous people living in the North End and more racialized people living Downtown.

Generally, the census data analysis shows that lower income neighbourhoods have a higher proportion of demographic groups that are considered to be more vulnerable to heat. The one exception to this is seniors, who are considered especially vulnerable, where the highest income neighbourhood has the largest proportion of seniors.



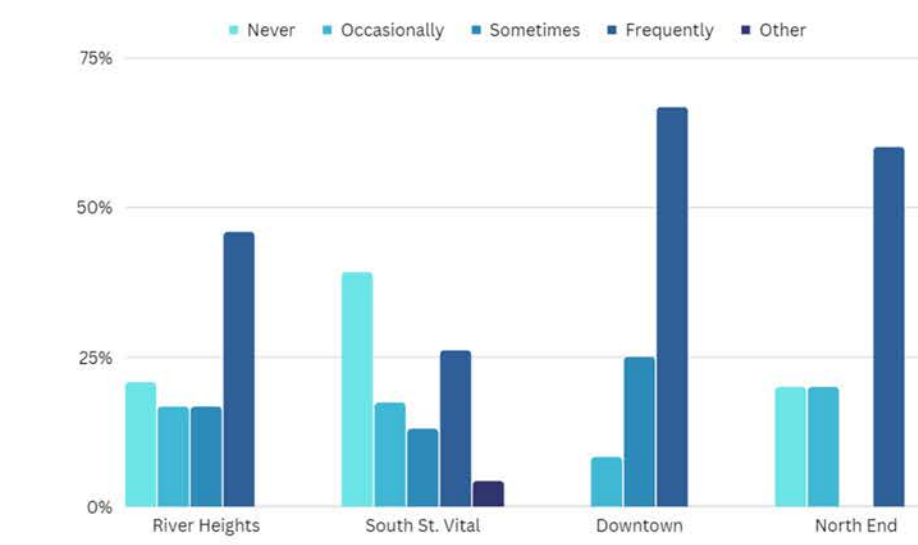
Air Conditioning

The survey showed that higher income neighbourhoods have more access to air conditioning, especially central air, compared to lower income neighbourhoods. South St. Vital has the largest proportion of people with access to air conditioning, likely due to its newer average age of construction.



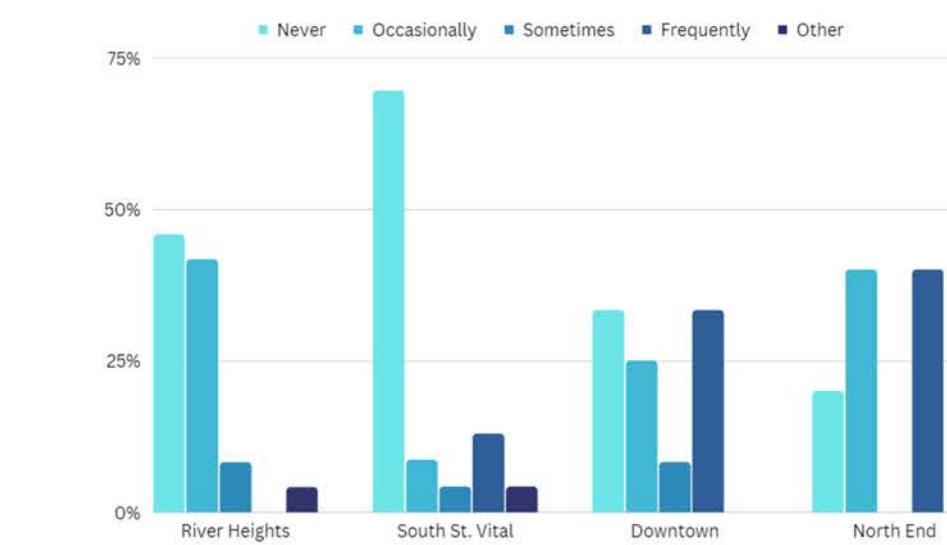
Using Fans for Cooling

Fans were a common way of coping across all neighbourhoods except for South St. Vital. River Heights has the highest income, but still had frequent fan use. This shows that fan use is more closely related to access to air conditioning, which is often but not always tied to income.



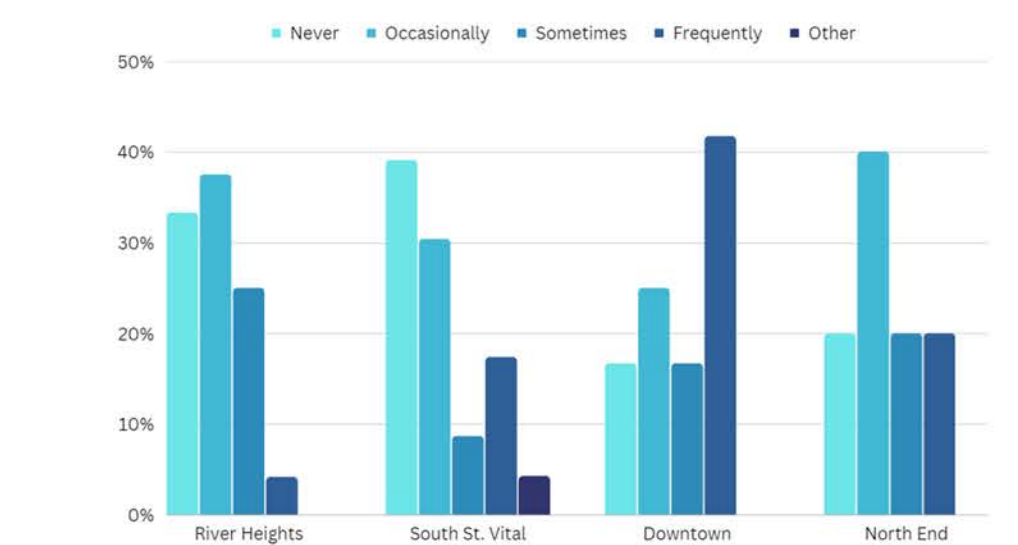
Using Water for Cooling

Using water for cooling was less common in River Heights and South St. Vital and a bit more common in Downtown and the North End. Those who use water for cooling commented about using cold baths and showers to cool off, as well as damp towels, ice packs, and swimming pools.



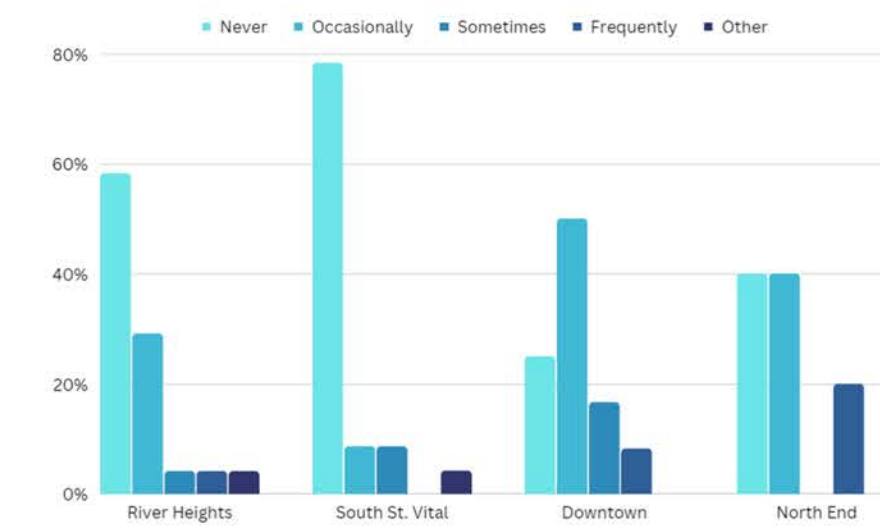
Trouble Sleeping Due to Heat

Trouble sleeping due to heat was clearly an issue for people living Downtown, while less so in the other neighbourhoods. This could be related to the number of apartment buildings Downtown, where warmer air might rise within the building and people might have less control over the temperature of their dwelling.



Leaving Home Due to Heat

Leaving home and going somewhere else to avoid heat was an infrequently used coping strategy across all neighbourhoods. This was slightly more common in Downtown and the North End, less so in River Heights, and least common in South St. Vital, likely due to more dwellings being air conditioned there.



Additional Coping Strategies

- Using curtains and opening/closing windows
- Scheduling activities to avoid the hottest parts of the day
- Wearing lighter and less clothing
- Using appliances like ovens less

Suggestions for the City of Winnipeg

- Protecting and enhancing the tree canopy
- Opening more cooling centres, pools, and splash pads for longer hours
- More public drinking water fountains
- Urban design interventions like more shaded areas, painting concrete to reflect heat, and more green space
- Policy interventions like reducing greenhouse gas emissions, subsidizing the cost of air conditioning, and updating building codes

Demographics and Vulnerability

The self-identified demographics of survey respondents were compared to their responses to the previous questions. Those who answered "frequently" most often were deemed to be more vulnerable to heat, while those who answered lower frequencies less so.

Based on this analysis, higher-risk groups among survey respondents include: renters, people living in apartment buildings, LGBTQ+ people, and Indigenous people. Moderate-risk groups include young adults and those who are disabled or chronically ill. Seniors and those who identify as BIPOC (Black, Indigenous, People of Colour) are recognized as higher risk in the literature, but in this research appear to be at lower risk. This is likely because all those who self-identified as BIPOC or the oldest age cohort (age 71+) live in the highest income neighbourhood (River Heights) and most have access to air conditioning.

Conclusions

Heat vulnerability is complicated to assess, with many intersecting factors. In Winnipeg, higher incomes and access to air conditioning appear to reduce vulnerability. Body-related and home-protective strategies are more commonly used than activity-related coping strategies.

Planners and policy-makers have an important role to play. More often than not, increased vulnerability to heat stems from systemic inequities, and so reducing inequality in all forms is key to making communities more resilient to heat going forward.