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THERMAL COMFORT IN MULTI-UNIT SOCIAL HOUSING BUILDINGS

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ABSTRACT

Thermal comfort influences occupant health and perceptions of the indoor environment. It is particularly important for vulnerable populations, such as those who inhabit social housing, because they may be more sensitive and prone to illness when exposed to high or low temperatures. In this study, we evaluated hygrothermal conditions inside 70 social housing units in Toronto across seven buildings for a year. We found that all the buildings had a high prevalence of discomfort due to high heat in the summer, with some units spending most of the time above 28°C. This was indicative that there is insufficient cooling in the units. Further, we found that some units were over-heated during the winter season. Additionally, by analyzing carbon dioxide concentrations, we found that there was no evidence that the units were under-ventilated. Our results were compared to occupant surveys administered in the beginning of the study, and we found that there were discrepancies between the monitoring results and what occupants reported. In particular, there were several reports of under-heating in the winter prior to the monitoring period while the monitored data did not show evidence of under-heating, but this may be partially due to a mild winter in the monitored year. Older buildings may not be fit to withstand extreme heat events that some cities are experiencing and may be placing some of their occupants at risk for heat stresses. Planned energy retrofits are an opportunity to address thermal comfort concerns.

HIGHLIGHTS

- Investigation monitored hygrothermal conditions inside 70 social housing units for a year.
- Exposure to high temperatures is common, especially in the summer due to a lack of or inadequate cooling.
- The monitored year did not show evidence of under-heating, suggesting that the units are not too cold during the winter.
- The indoor CO₂ concentration data indicated that the units appeared to receive adequate levels of fresh outdoor air.

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