

May 16, 2017
Board of Health
City Hall
Toronto, ON

RE: Reducing Vulnerability to Extreme Heat in the Community and at Home Report to the Board of Health - HL19.5

Dear Committee Members,

We support the Medical Officer of Health's recommendations which aim to reduce vulnerability to extreme heat in multi-unit residential buildings (MURBs), as outlined in the HL19.5 report. Research has shown that extreme temperatures will persist in the future, with the number of days exceeding 30°C tripling in the next thirty years. **Such trends will put increasing pressure in mitigating extreme temperature conditions indoors in a way that also helps meet the City of Toronto's greenhouse gas emission targets.**

We believe that allocating provincial and federal funding towards reducing indoor temperatures and improving comfort in MURBs is especially important, as is including provisions in the Ontario Building Code for passive cooling measures. Strategies in mitigating extreme indoor temperatures can include **envelope upgrades (window, overcladding), shading systems, ceiling fans, and incorporating cooling in central fresh air supply systems**. These types of passive strategies are also a way to improve building energy efficiency and can decrease reliance on air conditioning, easing a financial burden for thousands of vulnerable tenants.

This report focuses on extreme heat during the summer months, however, **our research has shown that extreme indoor temperatures can extend beyond the summer months**. Over the last two years TAF has monitored and analyzed the indoor environment across seven Toronto MURBs, gathering an unprecedented 20 million measurements of indoor conditions. Key findings from this study include:

- Average indoor temperatures during *the fall* were between 26°C to 28°C, with some units exceeding 30°C. Due to these extreme temperatures, indoor conditions were uncomfortable for over 50% of the time.
- Average indoor temperatures during *the summer* were between 28 °C to 29°C, resulting in uncomfortable conditions for over 60% of the time.
- Buildings were generally under-ventilated. Fresh air supply systems were 43% - 50% below code, while exhaust systems were 25% below code.

- Half of residents reported that they were bothered by odours from their neighbors every day, year round. Complaints of tobacco smoke from neighboring units were common.

We have found that **many of these buildings have significant challenges in providing a comfortable and healthy indoor environment**. We have also noted that **MURBs can experience extreme heat during the shoulder season (spring/summer) where the magnitude of overheating is similar to the summer**. Sustaining these high indoor temperatures for a longer portion of the year further increases the risk of heat-related illnesses for residents. As part of this work, we have addressed these building challenges through a series of energy retrofits and will continue to monitor conditions to quantify thermal comfort and air quality improvements.

In addition to recognizing the importance of reducing summertime indoor temperatures through building retrofits, **we recommend that the Board of Health also recognize a number of other prevalent health-related building challenges such as mitigating extreme heat during the shoulder season, addressing under ventilation, and minimizing transfer of odour and second-hand smoke between units**. All of these *Indoor Environmental Quality* deficiencies are intrinsically related to key energy systems in buildings. Energy efficiency retrofits can be used to achieve significant greenhouse gas emission reductions, however, they can also be designed to address the above mentioned challenges to improve indoor comfort and create a healthy environment for residents.

Achieving the ambitious climate change targets which have been set by all levels of government will require nothing less than a transformation of our building stock. This low carbon transformation offers an unparalleled opportunity to address a variety of health related problems in our building stock.

Sincerely,

Bryán Purcell
Director of Policy and Programs
The Atmospheric Fund

WHAT DOES INDOOR ENVIRONMENTAL QUALITY INCLUDE?



AREAS OF FOCUS

➤ **Thermal Comfort**

- How comfortable are units and are there seasonal differences?
- Is comfort influenced by building type?

➤ **Overheating**

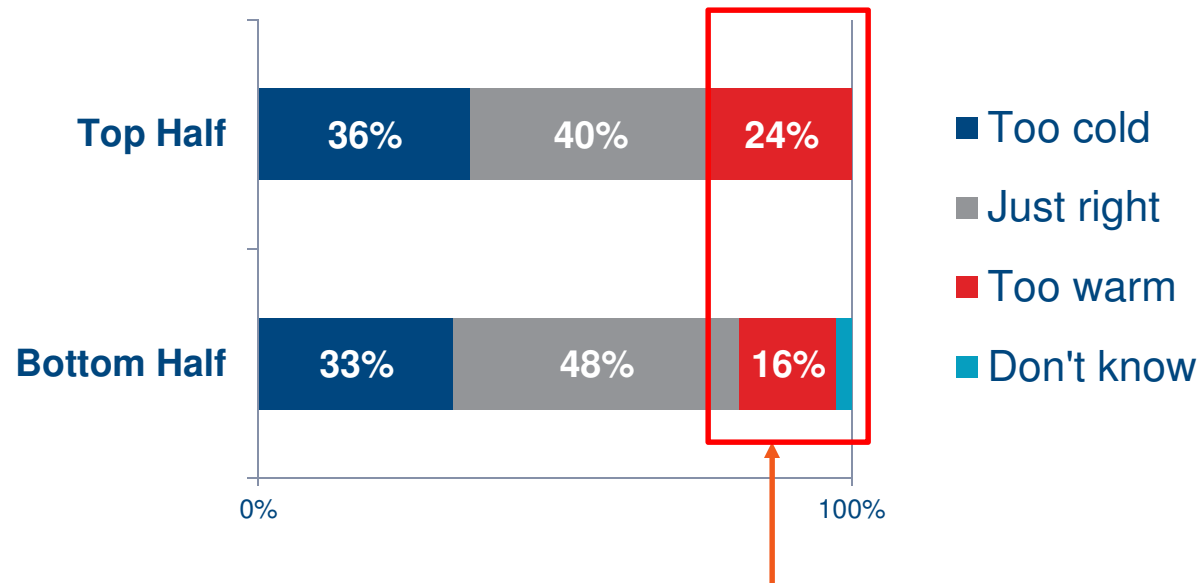
- When does overheating occur and how widespread is this problem?
- What are the energy implications?

➤ **Ventilation**

- What kind of ventilation and exhaust issues exist?

SURVEY DATA

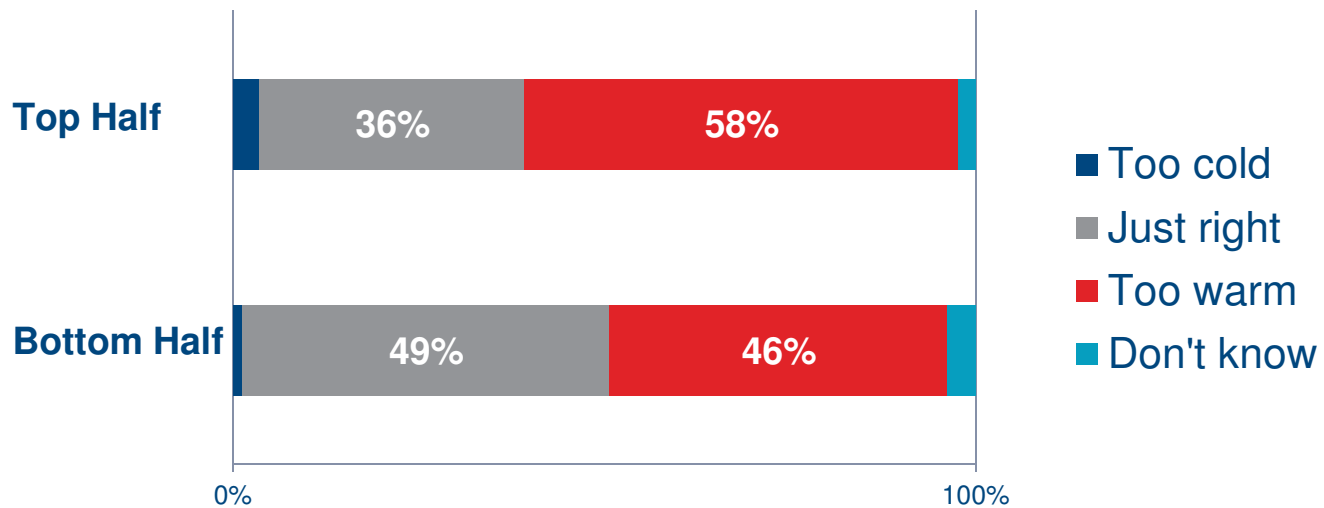
How comfortable are residents during the winter?



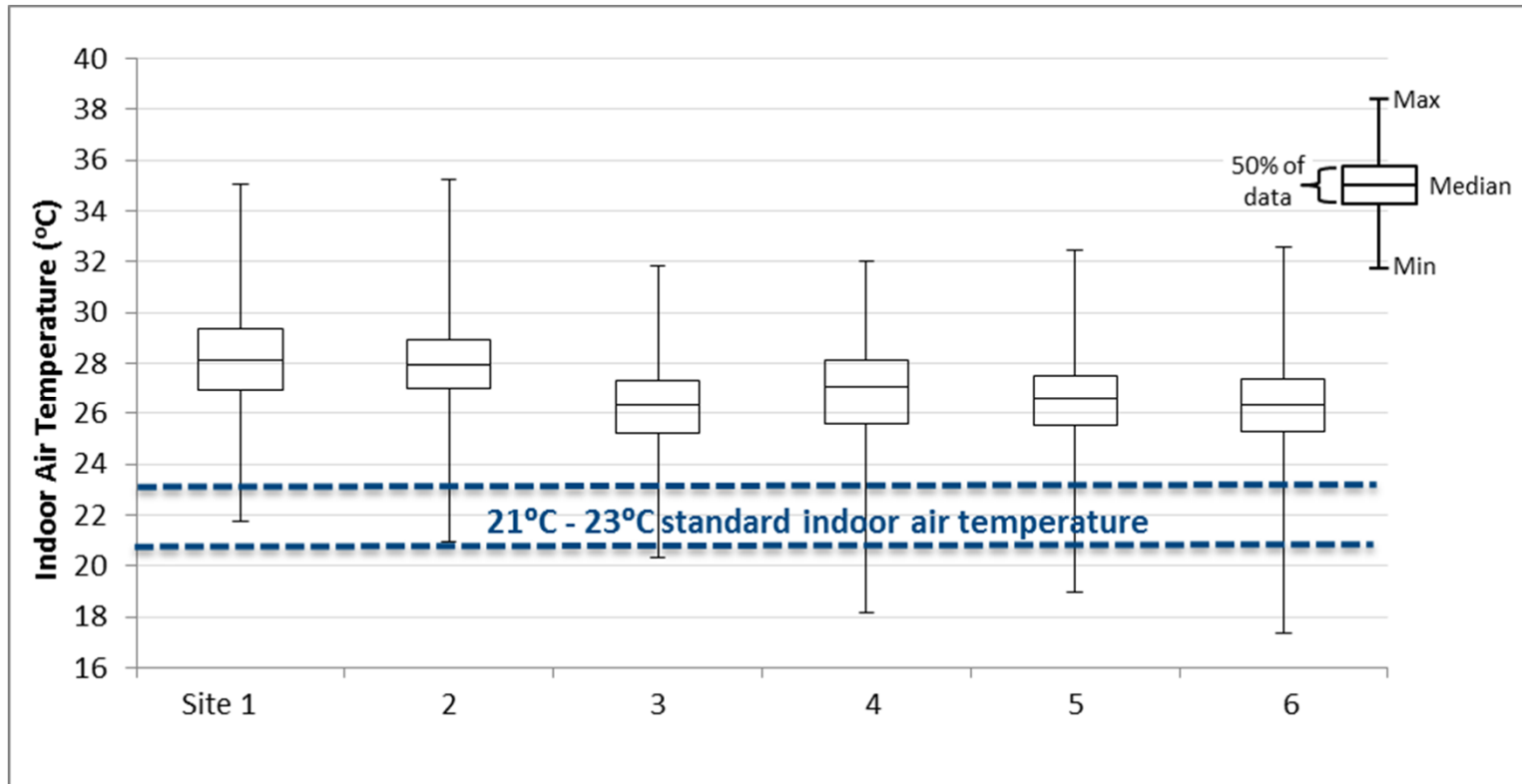
**All of these
residents
opened their
windows**

SURVEY DATA

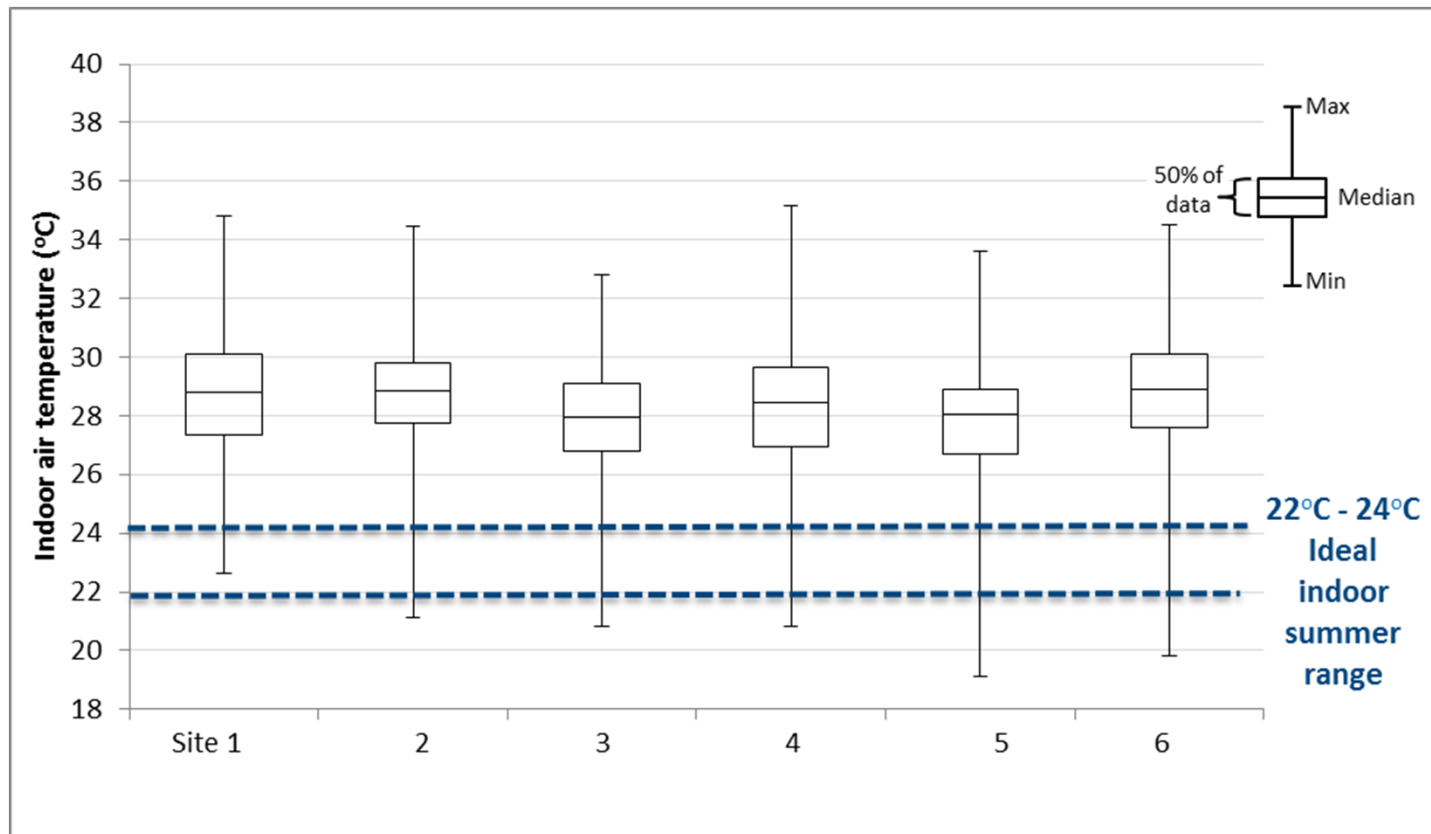
How comfortable are residents during the summer?



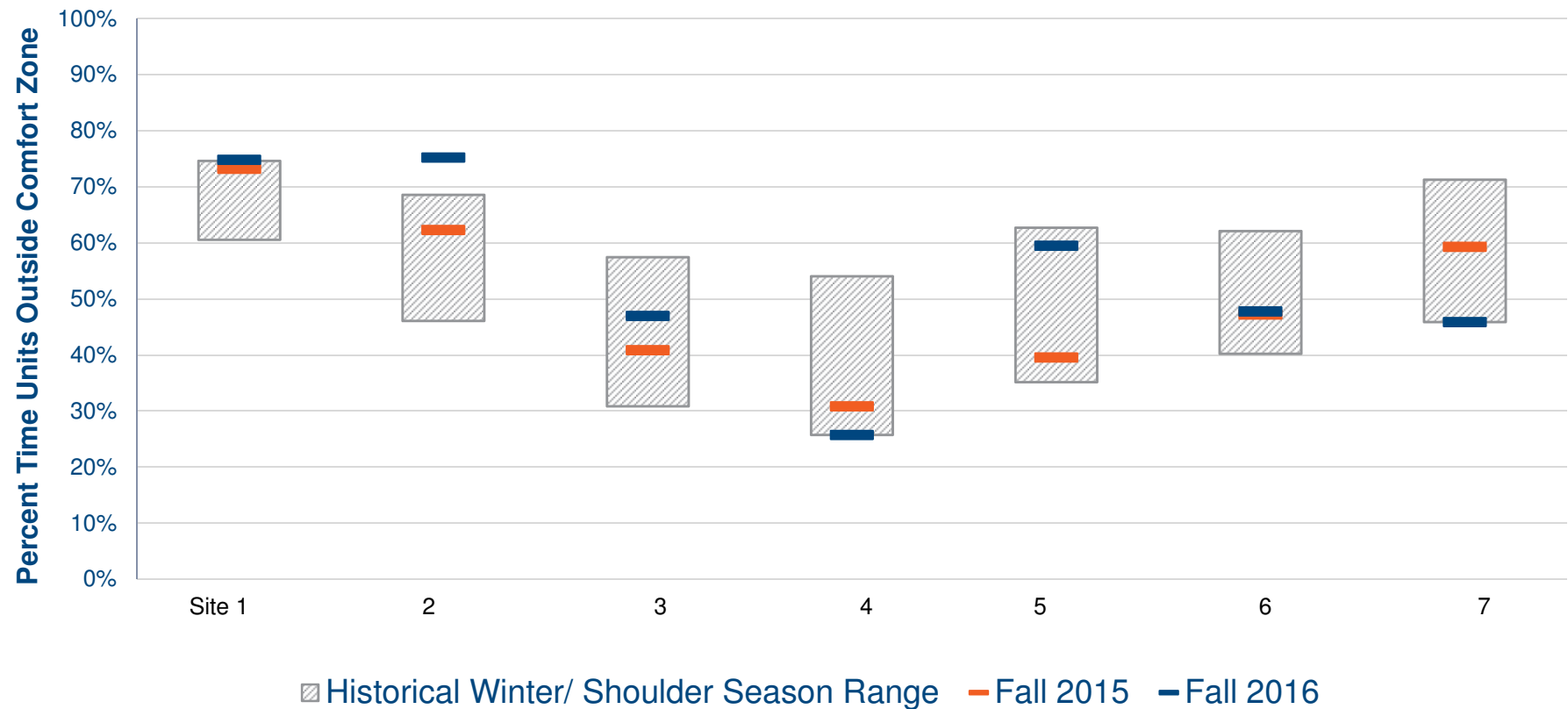
INDOOR AIR TEMPERATURES - FALL



INDOOR AIR TEMPERATURES - SUMMER



THERMAL DISCOMFORT



54% of time residents are uncomfortable during heating season

27°C average indoor temperatures during heating season