TORONTO

STAFF REPORT
ACTION REQUIRED

Reducing Health Risk from Extreme Heat in Apartment Buildings

Date:	June 11, 2015
To:	Board of Health
From:	Medical Officer of Health
Wards:	All
Reference Number:	

SUMMARY

The purpose of this report is to identify potential strategies to reduce health risk to vulnerable populations from exposure to extreme heat in multi-unit residential buildings. The populations that are most vulnerable to extreme heat are young children, the elderly, those with pre-existing illnesses and those who are socially isolated.

This report outlines options to increase access to cooling during extreme heat for tenants of apartment buildings that do not have air conditioning. The long-term goal is to have safe, comfortable temperatures in all apartment building units. Given the substantial barriers to achieving this in the short term, Toronto Public Health (TPH) recommends an interim strategy of ensuring tenants have access to cooling on-site at their building. In the short term, options considered potentially feasible include requiring on-site cooling centres for existing multi-unit residential buildings and encouraging building retrofits that enhance cooling. TPH recommends consultation with tenants, landlords and other stakeholders to investigate the feasibility of the recommended strategies.

RECOMMENDATIONS

The Medical Officer of Health recommends that:

1. The Medical Officer of Health collaborate with the Executive Director of Municipal Licensing and Standards, Chief Building Official, Chief Planner, Executive Director of Social Development, Finance and Administration, Chief Executive Officer of Toronto Community Housing Corporation, the City Solicitor and community stakeholders, including apartment property owners and tenants, to assess the feasibility of:

a. Setting mandatory requirements, for existing multi-unit residential buildings without active cooling in each unit, to provide on-site cooling centre(s) inside and/or outside of the building that meet minimum requirements including capacity, physical features of the space and tenant notification; and

b. Establishing a temperature related threshold beyond which action must be taken by building owners/property managers to provide access to the on-site cooling centre(s).

2. The Medical Officer of Health collaborate with the Executive Director of Municipal Licensing and Standards, the Executive Director of Social Development, Finance and Administration, the Chief Building Official and the Chief Corporate Officer, to develop and provide guidance to owners, property managers, operators and tenants of existing multi-unit residential buildings on leading practices to maximize passive cooling and minimize the need for air conditioning.

3. The Medical Officer of Health collaborate with the Chief Building Official to request that the Ministry of Municipal Affairs and Housing consider amendments to the Ontario Building Code to mitigate the impacts of extreme heat in multi-unit residential buildings, including setting requirements for new multi-unit residential buildings to incorporate equipment or building features that provide the capacity (active or passive) to cool individual residential units.

Financial Impact

The recommendations have no financial impact beyond what has already been approved in the current year's budget.

DECISION HISTORY

Reports to the Board of Health have outlined the health impacts of extreme heat in vulnerable populations including those who live in apartment buildings without air conditioning.

On July 26, 2011, the Board of Health adopted the report, "*Protecting Vulnerable People from Health Impacts of Extreme Heat*", that described the need for access to cooling for tenants in high-rise apartments and advocated for policy options at the provincial and local levels.
http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2011.HL6.3

On June 30, 2014, the Board of Health adopted the report, "*Strategies to Prevent Heat Related Illness and Deaths from Extreme Heat Emergencies*", which outlined strategies to prevent, prepare for and respond to a heat emergency. The report identified the need for further exploration of regulations and policies to support access to cooling spaces through discussions at a Municipal Roundtable in collaboration with Municipal Licensing and Standards Division.
http://www.toronto.ca/legdocs/mmis/2014/hl/bgrd/backgroundfile-70709.pdf

ISSUE BACKGROUND

Extreme Heat in Apartment Buildings

In Toronto, there are almost 1,200 older apartment towers (built between 1945 and 1984) with eight or more storeys. These buildings are home to roughly 500,000 people[1]. Many of these buildings are located in clusters, the largest of which contain over 10,000 households[2]. The majority of older apartment buildings do not have central air conditioning. Maps of heat vulnerability in Toronto completed by TPH in 2011 show that locations of high vulnerability often coincide with clusters of large apartment buildings built prior to 1986.

The impacts of heat are disproportionately borne by frail, elderly and isolated people. People experiencing low incomes are at higher risk of heat impacts, likely due to poorer quality housing, limited access to air conditioning, and the increased likelihood that they suffer from pre-existing illness[3].

The health impacts of extreme heat include heat stress, heat stroke, morbidity and mortality. People who experience high temperatures for prolonged periods, or are sensitive to heat, are the most vulnerable. In Western Europe in 2003, heat waves of exceptional intensity and duration were associated with 70,000 premature deaths[4]. In 1995, a Chicago heat wave was associated with at least 700 premature deaths[5]. A heat wave in California in 2006 was associated with an estimated 655 premature deaths[6]. At the time of writing of this report, over 1,400 deaths had been attributed to an ongoing heat wave in India[7].

Toronto can expect an almost five-fold increase in three-day heat waves and an increased risk of more severe or prolonged heat events by 2050[8], as a result of climate change. It is estimated that current heat conditions contribute to an average of 120 premature deaths per year in Toronto. Average annual heat-related deaths could double by 2050 and triple by 2080[9].

The danger of prolonged heat events is also increased by the fact that indoor temperatures tend to climb with each hot day, in the absence of a mechanical cooling system. This is significant because heat-related mortality increases with the duration of heat waves[10], and when night time temperatures are high[11].

People spend most of their time indoors, and this can be particularly true for the elderly and those who are chronically ill or socially isolated. As such, total exposures to heat are largely determined by indoor temperatures[12].

Hot weather's influence on indoor temperature is exacerbated or moderated by factors such as building characteristics (building materials, orientation and number of windows), and by neighbourhood characteristics. The presence of dark, heat-absorbing surfaces such as buildings and streets, the presence of heat sources such as vehicles, and the absence of trees and green space create a hotter local environment. This phenomenon is called the urban heat island effect. The urban heat island effect is most pronounced

during the night and early morning[13] and is common around residential apartments in dense urban areas. While it usually cools down outdoors at night, indoor temperatures can stay elevated, denying residents the opportunity for night time cooling[14].

In Montreal in 2005, the average maximum indoor temperature measured in apartment buildings was 34.4°C, or 2.1 degrees greater than the average maximum outdoor temperature. The average indoor temperature was 26.7°C, or four degrees higher than the average outdoor temperature[12]. In a study of dwellings (both houses and apartments) in New York City, the 90th percentile average indoor temperature was 2.8°C higher than the corresponding outdoor value[15]. Buildings tend to accumulate heat and have difficulty shedding excess heat.

TPH Inspectors measured indoor temperatures at site visits to Toronto rooming houses during Extreme Heat Alerts over 2010 to 2013. The buildings are generally two to three storeys tall. The average of these indoor, daytime temperature measurements was 34°C. This was roughly equivalent to the average daily maximum temperature outdoors. The indoor measurements ranged from 32°C to 39°C. These measurements indicate that temperatures inside Toronto rooming houses can be extremely high.

Cooling in Apartment Buildings

According to a 2010 TPH survey, 15 percent of Toronto residents do not have air conditioning in their home. In the group with the lowest household income, 35 percent of respondents indicated they do not have air conditioning in the home. Residents without air-conditioning are more likely to be born in another country, rent their dwelling, live in an apartment building, live in community housing or have a low income[3]. Air conditioning prevents exposure to extreme heat, and is one way to protect against heat-related illness and mortality[16].

Tenants of apartment buildings without central air conditioning face several challenges in keeping their units cool. Apartments have limited natural ventilation because most windows are restricted from opening more than ten centimetres to protect children from falling out. Retrofitting existing buildings with central air conditioning is expensive and can entail significant building alteration and disruption. Window air conditioners place a strain on building electrical usage and operating costs. Landlords may require that window air conditioners be installed or inspected by a third party. A landlord can request that a window air conditioner be removed if he or she is not satisfied the unit is installed safely. Some landlords prohibit tenants from having window air conditioners.

Landlords are required to provide heat so that a minimum air temperature of 21°C is maintained from September 15 to June 1 irrespective of outdoor temperature. Heat alerts have been called during this time in past years. Municipal Licensing and Standards (MLS) is reviewing the requirement in Municipal Code Chapter 497, Heating, to provide heat within this date range. These and other barriers mean that ensuring access to cooling in apartment buildings that do not have air conditioning is an important but complex undertaking.

COMMENTS

Exploring Strategies to Address Extreme Heat in Apartment Buildings

TPH explored strategies to reduce risk from extreme heat in apartment buildings through a jurisdictional review and research into technology options, and discussions with experts at a municipal roundtable.

Jurisdictional review and technology options to address heat in apartments

TPH commissioned research on strategies being used in other jurisdictions to manage extreme heat in older apartment buildings that do not have air conditioning. Interviews with cities in North America and Europe and a scan of the literature were completed. The research report is available on the Toronto Public Health website: www.toronto.ca/health.

Most of the cities interviewed have one or two targeted heat-reduction projects where they are focusing their efforts:

- Vancouver is piloting a cool roof project and an outdoor cooling station;
- Windsor is building a park shading and cooling program;
- New York City is coating rooftops white through its CoolRoofs program;
- Boston has recently created a Climate Change Preparedness and Resiliency Checklist to assess redevelopment projects;
- Denver uses modern air conditioning technology and ceiling fans throughout its social housing complexes;
- London, UK completed a climate change demonstration project that involved a holistic retrofit of a social housing complex.

Eight key strategy options were identified through the literature and jurisdictional review as potentially promising for managing extreme heat in Toronto apartment buildings (Table 1).

Table 1. Types of strategies for managing extreme heat in apartment buildings that do not have air conditioning

Strategy type	Strategy examples
Active cooling	Window air conditioner Portable air conditioner Ductless air conditioner
Weatherization and insulation	Roof insulation Cladding on exterior of walls
Increasing air circulation	Ceiling fans Portable fans
Reducing solar gain through windows	Window blinds Window films Energy efficient double- or triple-glazed windows
Increasing natural ventilation	Window that opens wide, with protective guard Window that opens high up to prevent falls
Cooling/green/reflective external surfaces	Cool roofs (roof painted white or reflective roofing) Green roofs (roof planted with vegetation) Reflective cladding
Minimizing heat generated inside apartment	Tenant engagement on unplugging electronics, cooking methods that generate less heat, using exhaust fans Building owner engagement on operable exhaust fans
Cooling on-site of building	Access to shared, cooling space indoors during extreme heat Access to shaded, treed outdoor cooling space at grade

Technology options for cooling

The research demonstrated that there are multiple strategies for managing extreme heat in apartment buildings. Many of those identified are technology options. Some are relatively low cost and could be implemented quickly, while others require longer-term planning and financing.

Technology options include minor retrofits to achieve cooling such as adding blinds, window films, and attractive grates on existing windows to allow them to open while preventing falls. Another option is coating the roof with a pale or reflective material to reduce the amount of solar energy that enters the building. Air conditioning in individual units is an option, but raises concerns about affordability for some tenants, exacerbating the urban heat island effect, and environmental sustainability. Major retrofits include roof and wall insulation, cladding, window replacement with energy efficient double- or triple-glazing and new types of windows with cooling features, such as those that open wide up high, out of reach of children.

Some options, such as window blinds and portable fans are within the control of individual tenants. Other options, for instance painting roofs white, exterior cladding or installing/repairing kitchen exhaust fans, are within the control of the building owner.

Building age is an important factor when considering retrofits. Many of Toronto's apartment buildings without air conditioning were built between roughly 1945 and 1984. This presents an opportunity, as many of these buildings have systems, such as the windows, roofing system or building envelope, that have reached the end of their useful lives and require replacement. Property owners could consider a variety of options that enhance cooling when replacing or refurbishing these systems. As described elsewhere in this report, financing programs are currently available to support building improvements, but these programs are limited in scope and the level of funding available.

A cool roof is a roofing system that reflects the sun's rays and reduces heat build-up in the top floors of a building. A cool roof can be either a coating applied over an existing roof system or a new waterproofing membrane. A green roof is a roof surface that supports the growth of vegetation over a substantial portion of its surface. It is made up of a waterproof membrane, drainage layer, soil and plants. Green roofs help to reduce the urban heat island effect and associated energy consumption, manage stormwater runoff and cool the top floors of buildings.

New York City has an extensive cooling program where roofs are painted with white sealant by teams of volunteers. Vancouver is also planning to pilot cool roofs painted white. Toronto has green roof and cool roof programs in place.

Toronto's Green Roof bylaw requires green roofs on new commercial, institutional, residential and industrial development above a specified size. Industrial buildings may substitute a roof that uses cool roofing materials for 100% of the available roof space. The Toronto Green Standard, section AQ 5.1, Green and Cool Roofs, sets out requirements and options related to roofs, for all new construction.

Existing buildings such as apartment buildings can benefit from green or cool roofs. However, there may be limitations in these buildings, such as the amount of roof space taken up by mechanical equipment, or a gravel roofing system. Toronto's Eco-Roof Incentive Program provides grants to assist building owners to install green or cool roofs. Since 2009, the program successfully supported the installation of over 140 eco-roofs (106 cool roofs and 36 green roofs completed) and helped to establish over 280,000 m^2 of eco-roof space (equivalent to 47 football fields).

Engagement and policy options for cooling

Some options focus on engagement or policy approaches rather than technologies. These include tenant engagement on minimizing heat generated in the apartment from equipment and activities. This approach would be beneficial in combination with any of the other options.

Another approach is providing tenants with access to shared, cooled space inside or outside during extreme heat. An on-site cooling space would provide a convenient place for tenants to get relief from a hot apartment and lower their body temperature.

Outdoor cooling spaces add value by creating or enhancing a green, treed space in which members of the community can interact, contributing to social cohesion. Increased tree cover would provide shade for residents, potentially help cool the lower floors of the building if sited nearby, and help reduce the urban heat island effect[17]. The Toronto Shade Guidelines describe the many health benefits of shade and techniques for providing shade in different settings.

The City of Windsor, Ontario, is designing and building public, city-owned spaces to provide cooling, using shade structures and trees. The City has draft policies for shade coverage, and parks built recently have shade structures. When it is established, Windsor's parks master plan will introduce policies regarding temperature and shade, and the plan will set targets for neighborhood shade coverage. A splash pad network is being installed throughout the city parks that will include accessibility considerations, the needs of homeless people and cooling for all ages during hot weather.

The City of Vancouver is working with British Columbia Social Housing and the Vancouver Parks Board to explore creating an outdoor cooling parklet that has shaded seating and a drinking water fountain. It would be located in an area with limited tree cover, high surface temperatures and a high concentration of vulnerable people. The potential site is located in the Downtown Eastside, an area with a high homeless population and rooming houses that lack amenity space. The cooling parklet is being explored as a pilot project and will be monitored closely to determine how well it is used and how effective it is at reducing the ground level temperature. It is intended to be part of an overall cooling network, in which the City will plant new street trees in neighbourhoods that currently lack tree canopy and have high vulnerability to extreme heat. If successful, the cooling parklet approach could be applied in other similar locations.

Green spaces on private or public land that are safe, shaded, comfortable and vibrant, and have seating and shade trees, provide multiple benefits. Water features further enhance the space. These approaches could be adapted to provide relief from the heat on apartment building sites.

Municipal Roundtable

TPH and MLS hosted a roundtable event in March 2015 with experts to discuss strategies to reduce extreme heat in apartment buildings. Participants considered the findings of the research on technology options and discussed strategies, barriers and engagement of tenants and building owners. Participants included three levels of government, City agencies, health organizations, utilities, property management companies, tenants' representatives, engineers and architects.

The following are the key findings of the municipal roundtable:

- A combination of approaches is required, including low-cost options for near-term implementation and more substantive retrofits for long-term planning;
- For technology options, a building-by-building approach is required, as solutions may differ based on building age and other factors. For instance, the different faces of high-rise buildings get varying amounts of sun and may require different approaches;
- Many systems in older apartment buildings may be at the end of their useful life and require replacement. This presents an opportunity to retrofit with better technology. For instance, buildings that are due for window replacements should replace old windows with a technology that provides better cooling and energy efficiency;
- Cost of retrofits is a barrier, but there are limited innovative financial mechanisms available and could be promoted;
- Cooling retrofits and access to cooling would have to be required or incentivized as they are unlikely to be widely adopted on a voluntary basis;
- Shared cool space can help build relationships among tenants and would be more feasible than cooling an entire building;
- Safe, vibrant, comfortable, treed green spaces provide multiple benefits in a dense, urban environment;
- When identifying options, there is a need to consider solutions that work during power outages and the impact of options during all seasons;
- Opportunities to incorporate cooling options during the construction of new buildings should be considered;
- Many tenants and landlords would benefit from more information on cooling options and how the options could be implemented, as well as more communication between landlords and tenants;
- Consideration should be given to providing air conditioning to tenants with a medical need.

Potential Approaches to Address Extreme Heat in Existing Apartment Buildings

Based on the research to date, TPH has identified potential strategies to manage extreme heat in existing apartment buildings. For the purpose of this report, apartment buildings are defined as residential buildings with four or more storeys where units are rented by the occupants. This definition does not include condominium buildings. The number of storeys was based on the categories in the Ontario Building Code and in the Toronto Green Standard.

The long-term goal is to have safe, comfortable temperatures in all apartment building units. Given the substantial barriers to achieving this in the short term, Toronto Public Health (TPH) recommends an interim strategy of ensuring tenants have access to cooling on-site at their building.

Access to cooling space

The United Way, in its Poverty by Postal Code report, called upon the City to expand its work with property owners and tenants to implement "approaches to help keep tenants safe during summer heat alerts, including opening up community space inside buildings for use as 'cooling stations'"[18].

This model already exists in Ontario long-term care homes. Ontario Regulation 79/10 under the Long-Term Care Homes Act specifies that the facility operator, "shall ensure that, if central air conditioning is not available in the home, the home has at least one separate designated cooling area for every 40 residents" (Section 20). The entire population in a long-term care home is made up of highly vulnerable people who are elderly, likely have pre-existing health conditions and infrequently leave the building. In contrast, highly vulnerable people who infrequently leave the building make up only a fraction of the population living in most Toronto apartment buildings. While one cooling space may be required for every 40 residents in a long-term care home, one cooling space would presumably serve a much larger group of residents in a general apartment building.

In the summer of 2010, Toronto Public Health collaborated with Toronto's Tower Renewal program on a “cool room” pilot project in a privately owned high-rise building without central air conditioning. The majority of residents (59%) did not have air conditioners in their homes. A cooling room was set up in collaboration with the landlord who purchased and installed an air conditioner. Residents indicated some support for the cool room, with modifications such as having more social activities available to tenants in the room. They also wanted more cooling on-site through central air conditioning and more shade and seating outside. Most residents said they get relief from the heat by going to a park or a shopping mall.

One approach to managing excessive heat in apartments is to require owners of apartment buildings to provide tenants with access to a shared, cooling space on the building property. During hot weather, tenants would have access to a nearby space in which to find relief from the heat and lower their body temperature. A shared cooling space could be inside the building, outside of the building on-site, or a combination of both, depending on the availability of space and other considerations. There is a need for a flexible approach that achieves the goal of reducing the health risk from extreme heat while also being feasible for a wide variety of building types and sites.

An indoor cooling space would need to be safe, cooled, and meet minimum requirements including capacity, physical features of the space and tenant notification. An outdoor cooling space would need to meet the same requirements and be shaded. It could make use of green space and trees for shade. A splash pad, where feasible, could provide additional cooling and could draw more people to make use of the outdoor cooling station.

A Heat Alert issued by the Medical Officer of Health could be used as a threshold for requiring apartment building owners and property managers to provide tenants with access to a shared, cool space on-site of the building. Heat Alerts are issued based on

outdoor temperature and humidity. The relationship between the temperature outside, and the temperature inside buildings without air conditioning, provides the rationale for using Heat Alerts as a threshold for action to manage extreme heat indoors. Essentially, outdoor temperature would be used as a proxy for indoor temperature and heat exposures in buildings that do not have air conditioning. As described, when it is hot outdoors, it is hot inside buildings without air conditioning, and potentially hotter, and there is a need to reduce the risk of heat-related illness at these times.

The requirement to provide a shared indoor and/or outdoor cooling space could also be applied to rooming houses. Rooming houses are defined by Municipal Licensing and Standards (MLS) as houses, apartments or buildings where four or more people that pay individual rent share a kitchen and/or washroom.

These residences house many vulnerable people, including seniors living alone and those on low incomes, who would benefit from access to a cooling space. In 2015, MLS and City Planning are conducting a Rooming House Review. MLS and City Planning are aware of the issue of extreme heat in rooming houses and could include a requirement for rooming houses without active cooling in each unit, to provide on-site cooling centre(s). The requirement would need to incorporate flexibility to accommodate the space available at various types of rooming houses and sites.

Access to cooling during extreme heat events with a power outage is a concern, particularly for residents of high-rise buildings. This is especially an issue for those who have mobility or cognitive impairments, or those who care for young children or people who are less mobile. Toronto Building and the Environment and Energy Division are conducting research on back-up power for multi-unit residential buildings during a power outage. The provision of back-up power in high-rise buildings for the purpose of cooling a common space needs to be considered.

Temperature standard for apartment buildings

TPH considered whether a maximum temperature for apartment units is needed and, if so, what would be an appropriate temperature. The appropriate maximum temperature for health depends on many factors including activity level, duration of exposure to a given temperature, humidity and an individual's physiology, age, medical condition and sensitivity to heat[19].

However, the data are insufficient at this time to determine the temperature at which a maximum heat standard would be set, based on a health rationale[19]. The jurisdictional scan identified no cities that have set an indoor, residential maximum heat standard. However, in April 2015 the Mayor of New York City committed to proposing that the city's Board of Health amend the health code to establish maximum allowable temperatures in residential facilities and supportive housing for vulnerable people to protect against heat-related illness[20].

City of Toronto bylaws set minimum and maximum temperatures for apartments with air conditioning. Municipal Code Chapter 497, Heating, requires that landlords provide heat

and maintain a minimum temperature of 21^{o}C during the fall, winter and spring (September 15 to June 1), where the tenant does not control the heating (section 497-2). Chapter 629, Property Standards, requires that where air conditioning systems are provided, they shall be operated to maintain a maximum temperature of 26^{o}C during the summer (June 2 to September 14) (section 629-38, F). It should be noted that these temperature standards are comfort-based. It should also be noted that MLS is reviewing the current time periods and temperature standards in the bylaws and will be reporting to Licensing and Standards Committee at a future date.

The Toronto Atmospheric Fund (TAF) is measuring suite temperature, mean radiant temperature and other indoor air quality parameters in 74 apartments across seven TCHC buildings. This research will provide further insight into the actual temperatures inside apartment buildings in Toronto. City staff will continue to monitor science and policy related to maximum temperatures standards in the multi-unit residential sector.

Outreach to owners and landlords

Many benefits result from building retrofits that cool existing apartment buildings while minimizing air conditioning demand, environmental impacts and cost to tenants and landlords. Co-benefits include improving tenant comfort, increasing the desirability of a building and reducing building operating costs. Retrofits can increase the longevity of building systems and improve the overall state of repair of a building. TPH intends to work with other City divisions that have existing relationships with apartment building owners and make available information on retrofit technologies and approaches to cooling existing buildings. There is an opportunity to coordinate outreach to landlords through the Tower and Neighbourhood Revitalization STEP Program which provides building assessments and strategic improvement action plans.

Innovative financing programs for energy efficiency retrofits are currently available to alleviate cost pressure on landlord and tenants. The High-rise Retrofit Improvement Support Program (Hi-RIS), managed by the Tower and Neighbourhood Revitalization unit in Social Development, Finance and Administration Division, provides financing for apartment buildings. The program supports retrofit building envelope improvements, and mechanical systems improvements including lighting and water conservation improvements. TAF's Energy Savings Performance Agreement (ESPA) provides funding and support for energy efficiency measures for apartment buildings. As mentioned above, grants to assist building owners with green roofs or cool roofs are also available through the City of Toronto's Eco-roof Incentive Program. These programs, although currently limited in scope and time-limited, support building retrofits that aid building cooling and other building-condition improvements.

Outreach to tenants

TPH, in collaboration with the Environment and Energy Division, will engage tenants and associated community groups on preventative actions that they can take to reduce extreme heat illnesses and deaths. Tenants have limited control over the temperature in their apartments. TPH will promote the actions that are within their control to reduce sources of heat, cool their apartments and protect themselves from heat-related illness.

TPH staff engage tenants and community organizations on a regular basis in apartment neighbourhoods across the city with the aim of increasing community capacity and addressing health inequities. TPH will build on these relationships to engage tenants on the issue of heat and health.

Resources are currently available to assist residents. For instance, Toronto Hydro provides an *Energy Conservation Handbook* which includes tips that apartment residents can use to reduce energy use, and many of these tips would also reduce heat generated in an apartment.

The Office of Emergency Management's new guide, *Get Emergency Ready: High-rise Living*, provides guidance on how high-rise residents can protect themselves, their loved ones and their property in the event of an emergency such as an extreme heat event with a power outage.

Potential Approaches to Address Extreme Heat during Construction of New Apartment Buildings

Many older apartment buildings without air conditioning face significant overheating problems. To avoid perpetuating this problem in new building stock, it would be beneficial for each unit in new, multi-unit buildings to have the capacity for cooling. This cooling could be active (i.e. air conditioning) or passive (e.g. natural ventilation, reflective exterior surfaces, windows that reduce solar heat gain, etc.), or a combination.

The Province of Ontario administers the Ontario Building Code, which is enforced by municipalities. The Ontario Building Code needs to be reviewed to address the impacts of climate change on buildings. The Medical Office of Health, in collaboration with Toronto's Chief Building Official, could request that the Province look for opportunities, through a review of the Building Code, to consider extreme heat as part of the analysis of climate change and resilience in the Building Code.

Potential strategies for addressing the risk from extreme heat in apartment buildings include requiring on-site cooling centres for existing multi-unit residential buildings and encouraging building retrofits that enhance cooling. TPH recommends consultation with tenants, landlords and other stakeholders to investigate the feasibility and logistics of implementing the cooling strategies as well as the legal and social considerations.

CONTACT

Carol Mee
Manager, Healthy Public Policy
Toronto Public Health
Phone: 416-338-8098
Email: cmee@toronto.ca

Monica Campbell
Director, Healthy Public Policy
Toronto Public Health
Phone: 416-338-0661
Email: mcampbe2@toronto.ca

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Dr. David McKeown
Medical Officer of Health

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