SUBJECT: Heat Alerts and Response BOH07024 (City Wide)

RECOMMENDATION:

(a) That the heat advisory, warning, and alert system and relevant responses proposed in Report BOH07024, Heat Alerts and Response be adopted by the City of Hamilton effective immediately.

(b) That the Medical Officer of Health report back to the Board of Health annually on the numbers of heat events and costs of the City response.

EXECUTIVE SUMMARY:

In response to community concern, Public Health Services (PHS) has developed a protocol of heat advisories, heat warnings and heat alerts to be triggered by Hamilton-specific weather conditions and forecasts. For each of the three levels, public service messages and a City response plan have been developed.

This system of Hamilton-specific triggers and a plan for response replaces the previous system which comprised the issuing of a ‘heat alert’ whenever Toronto issued one and a faxed message to community partners informing them of the alert. Because weather and the built environment are not the same in Hamilton and Toronto, (Hamilton is generally cooler than Toronto and has a much smaller urban heat island effect which translates
BACKGROUND:

In 2006, PHS reviewed its heat alert protocol and identified a number of significant flaws, including the lack of evidence of modifiable impacts of heat on the health of people in Hamilton, the very low risk of direct heat-related mortality and morbidity in Hamilton, the use of Toronto’s heat alerts as a proxy for Hamilton, and the absence of a coordinated response following on the issuing of an alert. With no evidence of impact or benefit, the heat alert protocol was changed to direct all operators of Residential Care Facilities (RCF) to monitor for the effects of heat on their clients and to no longer issue public announcements of impending hot weather. Letters informing RCF operators and community partners of these changes were sent in June-July, 2006 (See letters in Appendix A and B). PHS staff were planning to review and revise further the heat alert protocol and response plan for 2007. In July 2006, members of the Board directed the Office of the Medical Officer of Health to return to the practice of issuing heat alerts when Toronto issued heat alerts, until the further review of the protocol and plan could be undertaken. As approved via Report PH06033, PHS staff undertook a process of community consultation, a review of health unit practices, and an investigation of the scientific evidence around heat and human health. PHS staff have also coordinated the proposed response plan developed collaboratively with other City departments.

Heat & Human Health

As reviewed in Report PH06033, the adverse health effects of heat arise from the interplay of physical activity level with heat and humidity conditions. As ambient temperature and relative humidity rise, the body’s natural cooling mechanisms may be overwhelmed. Some medications and medical conditions can increase this risk by altering the body’s response to heat.

In Hamilton, high temperatures and humidity are also associated with deteriorating air quality which makes respiratory and cardiac conditions worse. Deaths and hospital admissions attributable to poor air quality are estimated to be at least tens of times more than those attributable to the direct effects of high temperatures. Evidence from warmer jurisdictions points to the requirement for sustained (i.e. over several days and without significant night time cooling) high temperatures to produce adverse health effects.

PHS staff have requested death records from the Clerk’s office in order to investigate whether death rates increase with higher temperatures in Hamilton. Based on evidence from other jurisdictions in Ontario, a heat effect separate from the effects of poor air quality is not expected.

Heat Alert Protocol: Selecting a Trigger

Both Toronto and Peel Region use a proprietary model to determine whether to issue a heat alert. This model is managed at the University of Delaware and reportedly entails set-up costs in the region of $100,000. Due to local variation in weather conditions and air movement, Peel’s model considers three distinct areas: Mississauga, Brampton and
Caledon. As a result, the Peel MOH may issue an alert for some but not all of these municipalities.

As the Board agreed in accepting Report PH06033, an effective response to protect people in the City of Hamilton would logically be based on the weather and forecast conditions in Hamilton, not those in a nearby community. PHS staff have discussed the local conditions and what sorts of data may be available with Environment Canada and followed up with the Chief Medical Officer of Health (CMOH) about a province-wide approach.

The CMOH’s office has informed us that no provincial leadership or direction on heat alert triggers or response will be forthcoming. Within current resources, Environment Canada’s data on temperature and relative humidity, expressed as a ‘humidex’ reading, provide a reasonable basis for defining a trigger.

**Heat Alert Protocol: Developing Appropriate Responses**

An exhaustive review of heat alert systems, including responses, was recently completed by the Environmental Protection Agency (EPA) in the US. The report concludes that planning for extreme heat is essential if the proposed measures are to have any effect in reducing adverse human health effects of heat and humidity.

As Report PH06033 noted, programmatic responses to high temperatures face a difficult challenge because, even if the people at risk can be located, there is little consensus on effective measures to reduce health risks from high temperatures. Moving to a cooler indoor location, particularly one with air-conditioning, may provide some relief. As a result of this observation, some communities have set up ‘cooling centres’, but the use and impact of these appears minimal to modest at best. Furthermore, in a relatively low-density city like Hamilton, cooling centres, even if operated on a wide scale, will still require people to travel from their homes.

This challenge is illustrated by results from the City of Toronto. During 2005 - the hottest summer on record - Toronto had 24 heat alerts and 12000 people attended one of 4 cooling centres located in municipal service centres (i.e. pre-amalgamation city halls). Assuming 500 people per alert and applying a 20% rule of thumb to account for differences in population size, roughly 100 people would be expected to use cooling centres in Hamilton. These people would likely be spread across the City, making efficient siting of cooling centres near impossible.

**Heat Alert Protocol: Three-Stage Trigger & Response**

Based on our review of the evidence and a survey of Ontario health units, PHS is planning to implement a three-stage trigger and response system, as outlined in Table 1 below.
<table>
<thead>
<tr>
<th></th>
<th>Trigger</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat Advisory</td>
<td>One day with humidex expected to be greater than 40</td>
<td>Media Advisory regarding steps to protect from heat, review fan use</td>
</tr>
<tr>
<td>Heat Warning</td>
<td>More than one day with humidex expected to be greater than 40</td>
<td>Media Advisory as at ‘warning’ stage with additional advice to check on elderly neighbours, and consider air-conditioned public spaces (e.g. shopping malls, libraries) if home uncomfortably hot</td>
</tr>
<tr>
<td>Heat Alert</td>
<td>More than 3 days with humidex greater than 40 degrees or one or more days with humidex expected to be greater than 45 degrees</td>
<td>MOH to convene City Emergency Control Group to consider expected duration of heat alert and tailor response appropriately and to consider the likely contemporaneous issues associated with brown and black outs due to high energy consumption and the impact on City resources.</td>
</tr>
</tbody>
</table>

As part of the planning advised by the EPA and others, PHS and other City departments have been involved in developing a series of plans for the consideration of the ECG in the event that the heat alert stage is reached. These include provision for a cooling centre at a downtown location, extended hours for City swimming pools, and targeted outreach for populations known to be at high risk, particularly persons in RCFs.

In addition to these stage-specific measures, PHS will undertake a series of communication efforts in collaboration with CityHousing Hamilton to provide information about heat and its health effects to persons living in these locations. This will include information about personal protective measures, safe use of electric fans, and identification of nearby resources that may provide a cooler environment.

PHS currently has a policy to contact each RCF in the event that a heat advisory is issued.

**ANALYSIS/RATIONALE:**

Although there is no evidence of increased mortality or morbidity arising directly from heat in Hamilton, it is prudent, in an era of global warming and climate change, to have a
plan in place to respond to an extreme heat and humidity event. The proposed three-stage protocol culminating in ECG action provides a clear escalation of response and the flexibility to tailor a significant commitment of resources to the situation as it arises.

Because extreme heat and humidity also contribute to deteriorating air quality, it is important to consider how a response to heat, such as using buses as cooling centres parked outside apartment buildings, may have unintended adverse consequences on air quality. Given the very low rate of uptake of cooling centres in the Toronto experience, combined with the significantly smaller urban heat island and the relatively low population density in Hamilton, planning for a downtown cooling centre that is accessible by public transit provides a reasonable, equitable option should it be needed.

**ALTERNATIVES FOR CONSIDERATION:**

1. Continue 2006 approach

   This option is not recommended since there was no coordinated response and the trigger used for ‘heat alerts’ was for a community (Toronto) with different weather conditions and a different built environment

2. Do nothing

   This approach would leave the City at risk in the event of a period of extreme heat and humidity.

**FINANCIAL/STAFFING/LEGAL IMPLICATIONS:**

Should the ECG opt to implement some or all of the elements of the heat alert response, costs will be incurred for the extended operation of City facilities. Should the ECG being called become a recurring event, then costs will be built into future budgets.

**POLICIES AFFECTING PROPOSAL:**

The authority of the MOH to issue a ‘heat alert’ stems from customary practice and is not mentioned in either the *Health Protection and Promotion Act* or its accompanying regulations. Neither the Mandatory Health Programs and Services Guidelines (1997) nor the proposed Ontario Public Health Standards (2007) include mention of heat alert programs.

**RELEVANT CONSULTATION:**

The Seniors Liaison Committee was consulted in the preparation of this heat alert protocol.
In addition, all MOHs in Ontario were surveyed and discussions held with Halton, Peel, and Toronto health unit staff. Within the City, Community Services, Culture & Recreation, Housing and EMS all participated in the development of the protocol.

**CITY STRATEGIC COMMITMENT:**

Community Well-Being is enhanced.  ☑ Yes  ☐ No
The public are involved in the definition and development of local solutions.

Environmental Well-Being is enhanced.  ☑ Yes  ☐ No
Human health and safety are protected.

Economic Well-Being is enhanced.  ☐ Yes  ☑ No

Does the option you are recommending create value across all three bottom lines?  ☐ Yes  ☑ No

Do the options you are recommending make Hamilton a City of choice for high performance public servants?  ☐ Yes  ☑ No