TORONTO STAFF REPORT

April 29, 2003

To: Board of Health

From: Dr. Sheela V. Basrur, Medical Officer of Health

Subject: Amendment of Building Codes to Reduce Hot Tap Water in Homes

Purpose:

To report on proposed amendments to the National Building Code and to the National Plumbing Code to reduce hot tap water in homes.

Financial Implications and Impact Statement:

There are no direct financial implications associated with this report for Toronto Public Health.

Recommendation:

It is recommended that this report be received for information.

Background:

Scald burns as a result of exposure to hot tap water are a serious problem for young children in Canada. The Canadian Commission on Building and Fire Codes has drafted amendments to the National Building Code and the National Plumbing Code to regulate hot tap water supply in residential dwellings at temperatures not higher than 49°C. The commission recently requested comments from all sectors on these proposed changes. Toronto Public Health provided written support for the proposed amendments (see Appendix 1). Ontario is currently undertaking a similar consultation process pertaining to the Ontario Building Code. Toronto Public Health has also provided written support at the provincial level (see Appendix 2). This report provides an overview of the issue and the proposed amendments to the National Building Code, the National Plumbing Code and the Ontario Building Code. This report has been prepared in consultation with Urban Development Services (UDS) staff and will be shared with the Commissioner of UDS.

Comments:

Over 300 children, elderly people and people with disabilities are treated in hospitals each year in Canada for hot tap water scalds. According to the Canadian Hospitals Injury Reporting and Prevention Program (CHIRPP), hot tap water scalds accounted for approximately 7% of all reported scald burns in 1999. Children under five years of age sustained three-quarters of these scalds, with children less than two years of age sustaining more than two-thirds of these injuries. Summary data from CHIRPP, for the years 1994 to 1998, indicate that tap water scalds to children, birth to age six years, occur most frequently in a child's own home with slightly more than half occurring in the bathroom. Almost 60% of these children required medical follow-up after initial treatment and more than one quarter were admitted to hospital. Almost three-quarters of those admitted to hospital were less than two years of age.

Safe Kids Canada, the national injury prevention program at the Hospital for Sick Children, estimates that tap water scald injuries cost more than $5 million annually in direct health care costs. This estimate does not include cost for skin grafts, physical therapy, counselling or supportive devices or aids required during recovery.

Current hot water heaters in Canada are typically set at 60°C. At this temperature, hot water burns human skin in 1 to 5 seconds. At temperatures above 54°C, children can burn in approximately one-fourth the time of adults. Reducing the temperature to 49°C will allow a person up to 10 minutes to escape a severe burn injury. A study assessing home hazards in the Borough of East York conducted in 1996 found a mean hot water temperature of 57.3°C in the homes of 449 families.

Proposed Amendments:

The current building and plumbing codes read: "Where a hot water supply is required by Article 9.31.4.3., equipment shall be installed that is capable of heating to at least 45°C but not above 60°C an adequate supply of service hot water for every dwelling unit."

The proposed amendment, effective in the 2005 edition of the codes, would add a new sentence to the existing code described above requiring "the maximum temperature of hot water supplied to each fixture in a residential occupancy shall not exceed 49°C." The current Building code already contains legislation requiring the temperature of hot water in showers not to exceed 49°C. The amendment is intended to affect construction of new single-family and multi-unit dwellings.

The National Building and Plumbing Codes are used by provinces as guidelines when setting provincial codes. The Canadian Commission on Building and Fire Codes recently concluded a period of public consultation on the proposed amendments. Ontario is currently undertaking a similar process to gather comments on the proposed changes at the provincial level. The provincial consultation process ends May 12, 2003.

Strategies to Achieve Water Temperature Reduction:

The following technical options are outlined in an Appendix to the proposed National Building Code.

(1) Adjusting the water heater temperature so that the temperature of water delivered to each fixture does not exceed 49°C. This option is more effective when the thermostat is pre-set at the factory.

(2) Using a master thermostatic mixing valve at the water heater. These devices are designed to control temperatures of hot water near the water heater. Manufacturers recommend annual maintenance, which may include a filter change. Manufacturers recommend these devices be used in combination with other point-of-use devices.

(3) Using a temperature-activated mixing valve at each fixture. These devices control the hot water temperature at the fixture (i.e. faucet) and usually need to be installed by a plumber.

In 1983, Washington State enacted legislation regulating domestic hot water temperature heaters to be pre-set at 49°C. Five years later, a significant reduction (50%) in the incidence and severity of scald injuries requiring admission to hospital was observed. However, there was no significant difference in mean hot water temperature between homes with hot water heaters installed pre-legislation versus those installed post-legislation (49.5°C versus 50°C). Although, overall mean hot water temperatures recorded post-legislation were significantly reduced from those recorded pre-legislation (61°C in 1977 versus 50°C in 1988). It is important to note that an educational campaign accompanied the enactment of the legislation. However, there is little evidence that education on its own reduces burn or scald injuries.

Effects from similar legislation in other states and Australia have not been documented in the literature.

Potential for Adverse Effects:

(1) Legionella

Some infection control experts have raised concerns that a lower hot water temperature in domestic storage tanks may increase the risk of exposure to legionella. In the State of Washington, there has not been an increase in legionella infection over the 20 years that legislation regulating hot water heater settings at 49°C has been in effect. Nor, have numbers of legionellosis increased nation-wide since manufacturers in the United States voluntarily began setting water heaters lower more than 10 years ago.

Health Canada, Healthy Environments and Consumer Safety Branch, and the Community and Hospital Infection Control Association of Canada (CHICA) have reviewed the data and literature pertaining to hot water temperature and legionella. Both organizations have concluded that pre-setting domestic hot water heaters to 49°C should not increase the risk of contracting

Legionnaire's disease in healthy individuals. However, in high risk populations (e.g. transplant recipients, patients with AIDS or end stage renal failure, patients on chemotherapy or corticosteroids, elderly patients with diabetes mellitus, COPD and cardiomyopathy) strategies to prevent legionella infection may need to be implemented. Both Health Canada and CHICA recommend a public education campaign that includes strategies for the prevention of legionellosis as part of the anti-hot-water scald campaign.

(2) Residential Carbon Monoxide Levels

Health Canada has identified a risk of increased carbon monoxide levels in homes with gas or oil-fired hot water tanks when the pre-set temperature is reduced. This results when there is flue gas condensation and corrosion of flues allowing for a release of carbon monoxide into residences. Health Canada recommends that this problem be addressed by the plumbing industry before implementing a reduction in pre-set temperatures.

Impact:

Those who will benefit the most from this legislation are children, the elderly and those persons with disabilities and peripheral sensory deficits.

Plumbing and building inspectors will have to check to make sure that the water is delivered to fixtures at 49°C.

There would be no cost increase to homeowners if the hot water tank is preset to deliver water to fixtures at 49°C. In fact, hot water heater manufacturers may save money, as they currently pay additional costs to have U.S.-made thermostats reset from 49°C to 60°C, the current default setting in Canada.

There is a cost if master mixing valves are used at the tank or devices are used at point of delivery. Each valve costs up to $100. Safe Kids Canada estimates the cost of installing master thermostatic mixing valves is about $300 to $500. Annual maintenance, as recommended by some manufacturers, will also have a cost impact for families.

However, Safe Kids Canada estimates that reducing hot water temperatures in homes will result in savings of 10% to 18% on a family's annual energy bill – in the range of $30 to $40 per year, possibly higher if energy costs rise.

In addition, there is the real potential for cost savings in both direct and indirect health care costs related to the treatment and rehabilitation of tap water scald burn patients.

<u>Conclusions</u>:

Over 300 children, elderly persons and persons with disabilities are treated in hospitals annually across Canada for burn injuries caused by hot tap water. Resulting injuries tend to be serious, and sometimes fatal. Hot tap water injuries are both predictable and preventable. There is some evidence to suggest that reducing hot water temperatures in residential homes could result in up to a 50% reduction in burn injury and severity. Legislation accompanied by public education can contribute to such a decrease.

Legislation promotes a more universal approach to preventing scald burn injuries. The first step in addressing scald burn injuries is to amend the National Building Code and the National Plumbing Code to require that hot tap water in homes is safeguarded at 49°C. These amendments, effective in 2005, only apply to the construction of new single-family homes and multi-unit dwellings. Once adopted, however, code changes at the national level provide an opportunity for the Province of Ontario to adopt and extend these legislative changes to include both new and existing dwellings.

Further advocacy work by Toronto Public Health staff, in collaboration with staff in other city departments, could extend the reach of the proposed national legislative amendments by developing municipal legislation that would apply to residences not included under the amendments. However, any prospective municipal legislation would need to be assessed from a cost-benefit perspective.

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Dr. Sheela V. Basrur
Medical Officer of Health

List of Attachments:

Appendix 1: Letter to the Canadian Commission on Building and Fire Codes
Appendix 2: Letter to Honourable David Young, Minister of Municipal Affairs and Housing

TORONTO

Dr. Sheela V. Basrur
Medical Officer of Health

Appendix 1

Community & Neighbourhood Services
Eric Gam, Commissioner

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April 11, 2003

Mr. John Archer, Secretary
Canadian Commission on Building and Fire Codes
Canadian Codes Center
National Research Council of Canada
1500 Montreal Road, Bldg M-23A
Ottawa ON K1A 0R6
Fax: (613) 952-4040

Dear Mr. Archer:

Re: Amendment of building codes to reduce hot tap water temperatures in homes

This letter is in support of the proposed changes under public review to section 9.31.6 of the National Building Code and Section 2.10.7 (1) of the National Plumbing Code to safeguard domestic hot tap water temperatures at 49°C. Adoption of these proposed code changes is an important step towards reducing hot tap water burn injuries in homes. There is some evidence to suggest that by reducing hot tap water temperatures to 49°C, the incidence and severity of scald burn injuries could be reduced by up to 50%.

Toronto Public Health has the mandate to prevent injuries for all those who live, work and play in the City of Toronto.

The proposed amendments will provide important safeguards for Canadians, especially children, elderly persons and people with disabilities. Severe scald burns can cause life long disability and death because water in homes is unnecessarily hot. Currently, the hot water temperature standard in Canadian homes is set at 60°C. This is the maximum domestic storage temperature allowed under the current National Building Code. When exposed to water of this temperature, human skin will burn in one to five seconds; children’s skin burns more quickly. These burn injuries are both predictable and preventable.

Over 300 children, elderly people and people with disabilities are treated in hospitals each year in Canada for hot tap water scalds. Data from the Canadian Hospitals Injury Reporting and Prevention Program (CHIRPP) indicates that scald burn injuries due to hot tap water account for approximately 7% of all scald burns. Children under five years of age account for three-quarters

of all tap water scalds, with children less than two years of age sustaining more than two-thirds of these injuries.
Some infection control experts have raised concerns regarding a reduction in hot water temperature and the risk of legionella infection in high-risk populations (e.g. persons with immune compromising conditions). I support the recommendation from Health Canada and the Community and Hospital Infection Control Association – Canada that a "public education campaign" regarding prevention of hot water scalds should include messages about prevention of legionellosis.

Health Canada has also identified a concern regarding the possible release of carbon monoxide into a home when there is a reduction in domestic hot water pre-set temperatures. I support Health Canada's recommendation that this concern be addressed by the plumbing industry prior to implementing a reduction in pre-set water temperatures.

I urge commission members to work towards adopting the proposed technical changes in the National Building Code and National Plumbing Code to protect the public health and safety of those most at risk for hot tap water injuries – our children, elderly persons and people with disabilities.

Yours truly,

Dr. Sheela V. Basrur
Medical Officer of Health

JF/dms

copy:
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Paula Dill, Commissioner, Urban Development Services
Liz Janzen, Regional Director – South, Toronto Public Health
Sue Makin, Regional Director – North, Toronto Public Health
Fran Scott, Director, Public Health Planning & Policy and Associate Medical Officer of Health
Barbara Yaffe, Director, Public Health, Communicable Disease & Associate Medical Officer of Health

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Appendix 2

Community & Neighbourhood Services
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April 28, 2003

The Honourable David Young
Minister of Municipal Affairs and Housing
17th Floor, 777 Bay Street
Toronto ON M5G 2E5

Dear Minister Young:

Re: Amendment of building codes to reduce hot tap water temperatures in homes

This letter is in support of the proposed changes under public review to sections 9.31.6 and 7.6.1.1 (5) of the Ontario Building Code to safeguard domestic hot tap water temperatures at 49°C. Adoption of these proposed code changes is an important step to reducing hot tap water burn injuries in homes. There is some evidence to suggest that by reducing hot tap water temperatures to 49°C, the incidence and severity of scald burn injuries could be reduced by up to 50%.

Toronto Public Health has a mandate to prevent injuries for all those who live, work and play in the City of Toronto.

The proposed amendments will provide important safeguards for Ontario's citizens, especially children, elderly persons and persons with disabilities. Severe scald burns can cause life long disability and death because water in homes is unnecessarily hot. Currently, hot water temperature in Canadian homes is typically set at 60°C. This is the maximum domestic storage temperature allowed under the current Ontario Building Code. When exposed to water of this temperature, human skin will burn in one to five seconds; children's skin burns more quickly. These burn injuries are both predictable and preventable.

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Health Canada has also identified a concern regarding the possible release of carbon monoxide into a home when there is a reduction in domestic hot water pre-set temperatures. I support Health Canada's recommendation that this concern be addressed by the plumbing industry prior to implementing a reduction in pre-set water temperatures.

I urge the Ministry of Municipal Affairs and Housing to adopt the proposed technical changes in the Ontario Building Code to protect the public health and safety of those most at risk for hot tap water injuries – our children, elderly persons and persons with disabilities.

Sincerely,

Dr. Sheela V. Basrur
Medical Officer of Health

Copy:
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