RESOLUTION #8

Air Quality in Indoor Ice Arenas and Children's Health

Submitted by: Ontario Nurses for the Environment Interest Group (ONEIG)

WHEREAS ice resurfacing vehicles, depending on the source of fuel, emit by-products of combustion, carbon monoxide (CO), nitrogen dioxide (NO^2) and other byproducts, such as particulate matter, and dioxin. In the exposure setting, "Indoor air"[1], these substances have "well-established human and animal data of harm to pre-natal and or child health, with sufficient exposure"[1]; and

WHEREAS ice arenas are used by children of all ages, in different venues, from learning to skate programs, to figure skating training and competition, to pleasure skating and hockey games, for moderate and strenuous physical activity, which increases the breathing rate, and intake of oxygen by the participants, and exposure to contaminants of the indoor air; and

WHEREAS children have "greater exposure and vulnerability … to toxic substances as compared to adults: proportionality, behavior, physiology and metabolism" [1] and "sensitive stages"[1] of growing and developing organs and systems"[1], called "windows of vulnerability"[1];

THEREFORE BE IT RESOLVED that RNAO advocate, to the appropriate government jurisdictions, for decreasing the risk of exposure to CO, NO^2 and other combustion products, from ice re-surfacers in indoor ice arenas and facilities, by promoting effective monitoring of toxic air pollutants, and for increasing public awareness of the risks.

Background - Air Quality in Indoor Ice Arenas and Children's Health

Ice re-surfacers are machines and thus **"**produce exhaust gases and combustion products. These include carbon monoxide (CO) and nitrogen dioxide (NO^2), among others."2 and they "tend to stay at ice level".2 In the indoor ice arena setting, " inadequate ventilation may allow exhaust gases to collect indoors; it is possible for skaters to become ill. " 2 Children, who are smaller, are closer to the ice level, and thus, have "the greatest risk."2 It is possible for skaters to get sick " because they are breathing this air deeply and rapidly".2 "A child's body uses oxygen faster than an adult's"2, and children "are at greater risk of becoming ill from inhaling exhaust gases"2 People with existing respiratory problems such as asthma also have a higher risk of becoming ill. "2 The pollutants from combustion may have "additive and synergistic effects" 3, which "may represent a more serious health hazard than exposure to each pollutant, separately." 3 Research is needed to establish realistic standards for the potential high risk factors of combined concentrations of toxins in sporting …environments."3 The development of national standards and acceptable levels, especially in relation to children's health, "must take into account the possible interactive nature of these agents with other pollutants." 3 Even the single effects of the combustion by-products have "not been adequately investigated." 3 This is a concern because "[t]hese chemicals are very serious toxins." 3

"Carbon monoxide (CO) is a gas that forms whenever you burn fuel…" 4 "It is colorless, odorless and tasteless". 4, Carbon monoxide can cause health problems before people even notice it is present.""4 It affects the body as it "prevents blood from carrying oxygen throughout the body." 2 You can become ill and may eventually die if you continue to breathe enough CO." 2 "Illness associated with CO poisoning is probably greatly underreported. This may be due to the fact that the symptoms of CO poisoning are non-specific and may incorrectly be attributed to other causes." 3 **"Nitrogen dioxide** (NO^2) is a gas that is produced by cars".5 "NO^2 irritates the lungs, air passages and nose. Depending on the level of exposure, NO^2may cause inflammation of the lungs and in some cases, death." 2 "NO^2, which is heavier than most constituents of air, and would migrate towards the ice." 3 "The NO^2 concentrations would build in the lower breathing zone of the child, but much less so in that of an adult." 3 "[Y]ou can minimize its impact with proper ventilation."5

Children are not the same as adults. The unique differences of children "can contribute to children being more highly exposed to substances into the environment."1 "The first difference is proportions. 1 The same level of contamination … will deliver a proportionally higher amount to the body [of a child]… "1 "There are key physiological differences …. that make children more vulnerable to hazardous substances." 1 "The baseline rate of breathing for children speeds up often, because children tend to be more active…" 1 "Children tend to have a higher metabolic rate than adults." 1 "There is a large amount of evidence to support the theory of windows of vulnerability … in all children up to adolescence with regard to health risks from … air pollutants." 1

Ventilation is very important to health as it "helps to flush out any toxicants in indoor air and replenish oxygen levels." 1 "To assure that pollutant concentrations are below maximum limits, the [ventilation] systems must: (*a*) be continually working; (*b*) distribute air adequately to ventilate the entire arena; (*c*) be in a position to disperse and evacuate toxic gases." 3 "To have an effective arena ventilation system, regular corrective measures (maintenance, cleaning, system modification, etc) must be taken." 3 "North American health professionals have recently advocated the use of electric resurfacing machines as the means of eliminating the pollution problem in enclosed ice rinks."3 Exposure to "CO and NO^2 in enclosed ice arenas is a serious health hazard, [yet] no federal policies currently exist for any contaminants in ice arenas." 3

Limiting children's vulnerability to increased exposures to CO, NO^2 and other by products of combustion can be addressed by creating public awareness campaigns for the risks of exposure to CO and NO^2 in ice arenas, from ice re-surfacers and Strategizing and collaborating with stakeholders, for use of electric ice re-surfacers and up to date ventilation systems. 3

References

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