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Estimates of wired glass injuries in school settings in Canada

Background

Wired glass is a type of glass that has been widely used in public buildings and schools. It has a wire mesh embedded which helps to prevent the spread of flames in a fire. However, this glass has been proven to be weaker than regular glass and possibly result in severe injuries when broken.

Estimates

The US has a national surveillance system known as the National Electronic Injury Surveillance System (NEISS) that captures detailed information surrounding injuries that report to emergency departments (ED). NEISS samples EDs across the US on a probability basis – meaning that the hospitals are chosen to reflect the population density and characteristics of the US population. Although not all EDs in the US are chosen, the ones that are included are chosen to be representative of US at large and give a good indication, on a proportional basis, of the nature of injuries that present to the ED in the US. Given the probability sample, it is possible to take the numbers from the database and weight them up according to the US population as a whole.

There is no directly comparable database in Canada in terms of a probability sample of ED departments. Instead Canada has the Canadian Hospitals Injuries Reporting and Prevention Program (CHIRPP) – an active surveillance system that also collected detailed information from the patient or caregiver on the circumstances surrounding injuries presenting to EDs from a sample of 11 pediatric and 6 general Canadian hospitals across Canada and is managed by the Public Health Agency of Canada. Importantly this database differs in that the participating hospitals are not selected on a probability basis, meaning they are not necessarily representative of the general Canadian population in terms of population density or the population served. CHIRPP contains most of the large pediatric hospitals in Canada and thus is more likely to be representative for children and youth compared to adults – although it is important to note that not all children and youth may present to these type hospitals depending on their geographic location and the circumstances of their injuries. When it comes to wired glass injuries in schools, these are more likely to occur in children and youth but it is not clear if they would specifically present to these hospitals or just go to their nearest hospital (perhaps depending of the nature of the injury). The other challenge is that detailed information on wired glass may not necessarily be included in the information captured in this database. In other words, a glass injury may be reported but unless the extra detail of the involvement wired glass is given, this information may have not been included as this is not a required data element. Therefore the wired glass injuries reported in such a database, or even more generally glass injuries in schools, is likely an underestimate and also not necessarily representative of the general Canadian population. It is important to emphasize that the information surrounding the nature of the injury may or may not include details related to glass, or type of glass. Given these limitations it is very difficult to extrapolate these estimates to the Canadian population to generate an overall estimate of the burden of wired glass injuries.

One approach to get an estimate for the potential burden of school-based glass injuries in Canada would be from using the numbers from NEISS and information provided regarding case reports of glass injuries collected in the US. The report written by Dr. Graitcer using NEISS glass injury estimates weighted for the US population has provided an estimate of the number of injuries due to glass lacerations (windows and doors) in school settings in the context of the prevalence of wired glass in school settings. This report cited approximately 4,754 total school glass injuries in the US per year (54% from glass doors and 46% from glass windows). Using the assumptions of the NEISS calculations one could estimate similar numbers for Canada based on

the rate of these injuries as a function of the population density in Canada for school-age children. In the US there are 4,754 glass injuries in school settings, which in the US results in an overall annual rate of 6.41 per 100,000 school-aged children. In Canada, the population of school-aged children is approximately 5,749,400 and applying the same rate as the US, Canada would expect up to 368 wired glass injuries in school settings each year (198 from glass doors and 171 from glass windows). Although, not specifically recorded as wired glass injuries, Dr. Graicer demonstrates that the majority of glass lacerations from windows and doors in school settings during that period likely were indeed likely involving wired glass. Further, this number is likely an underestimate given the reporting limitations in the US databases and coding information on wired glass (See Dr. Graitcer's report on limitations). Specifically, these injuries are not always directly coded as wired glass but Dr. Graitcer's report does provide justification as to why most are likely to involve wired glass. Further, these only represent reported injuries, so are likely the most serious, and do not include injuries that did not present to ED.

The CHIRPP database has only documented 23 reported cases of wired injuries in Canada over the past 25 years. This low number is likely due to the fact that specific coding on wired glass injuries are not required or may not be known at the time of reporting. In terms of glass injuries occurring in school settings the average annual number that were related to the more general classification of "glass" or "window" or "door" was approximately 485 among CHIRPP-participating hospitals, or over 12 thousand between 1990 and 2015 (According to PHAC). This number may include other window or door related injuries, and not necessarily are all related to broken glass. As mentioned the CHIRPP database is not representative of all hospitals in Canada and thus estimates from this database cannot be directly weighted to the total Canadian population. The population served by the CHIRPP participating hospitals is not known and therefore a national rate cannot be calculated.

Interpretive Cautions

An annual number of school-based wired glass injuries in Canada of up to 368 is based on the assumption that Canada would have similar numbers of school-based glass injuries as the US. There is no specific reason to believe that glass injuries in the US school settings would be significantly greater than Canada and thus this is likely a reasonable assumption. However, it is possible if building codes or school construction were significantly different between Canada and the US, resulting in more or less glass or wired glass overall, that this may challenge this assumption. The estimate of 368 injuries per year does not take into account geographical variation that may exist with respect to the distribution of wired glass or the distribution of school-aged children in Canada and represents an overall number. Finally, this estimate is contingent on the validity of the NEISS report provided by Dr Graitcer.

Regarding the CHIRPP data, the 23 wired glass injuries reported in 25 years in Canada is not proportionally weighted to the Canadian population and information on the involvement of wired glass injuries may not be recorded specifically and thus is very likely a significant underestimate. Furthermore, this number may not be representative given not all types of hospitals in Canada were included and the population covered by these hospitals is not known. An average annual estimate of 485 injuries in schools setting presenting to CHIRPP participating hospitals that had mention of windows or doors or glass could contain wired glass injuries, but will also cover other window and door injuries that are not related to glass lacerations.

Laura Rosella, PhD MHSc
Assistant Professor, Dalla Lana School of Public Health, University of Toronto
Health Sciences Bldg, 6th floor 155 College St., Toronto, Ontario M5T 3M7
Email: laura.rosella@utoronto.ca Phone: 416-978-6064