

# The Canadian-specific impact of COVID-19 on severe injuries from intentional violence, unintentional trauma and suicide-related causes

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**N**orth American life changed in March 2020 with the generationally unprecedented introduction of the coronavirus disease 2019 (COVID-19) pandemic. More specifically, confusion, misinformation and widespread fear dominated most of our thoughts as we raced back to our home hospitals in preparation for a new way of living and working — a way that none of us could have predicted. The subsequent changes to the scientific, economic, social, emotional and occupational aspects of our lives have not only undergone a seismic shift over the past year, but will also likely be altered forever in both positive and negative ways.

The specific effects of COVID-19 on the public health arenas that touch each of our surgical practices continue to be well documented and are ever changing.<sup>1</sup> One subspecialty at the intersection of many of these domains (medical, surgical, economic, social, scientific) is injury care and, therefore, trauma surgical services. Although anecdotal discussion among trauma care providers across Canada has been brisk and interesting, few concrete data have been published so far. Our American colleagues have recently presented an interesting single-centre account (and subsequent commentary) of the impact of COVID-19 on their local trauma epidemiology. More specifically, increases in intentional injury (especially gun violence) were noted in the background of fewer overall emergency department (ED) visits and nonintentional trauma cases.<sup>2</sup> Interestingly, the authors' explanations for this observation remain contentious (i.e., unprecedented social isolation policies v. other theories such as all-time record firearm sales in the United States). These findings are particularly intriguing to ponder given the traditional reality that most firearm-related deaths (66%) are due to suicide rather than homicide. Unfortunately, the literature has been void of suicide data to date.

In an effort to evaluate the impact of COVID-19-related social behaviours, economic realities and public health policies on severe injuries, we queried the trauma registry at the Foothills Medical Centre in Calgary, Canada, for the first 3 months following the declaration of a public health emergency in Alberta (March 15, 2020). To avoid comparisons biased by seasonal injury, these patients ( $n = 357$ ) were date-matched with a severely injured patient

cohort from the same seasonal timeframe a year earlier (after ensuring that the preceding year matched a 5-year typical patient distribution).<sup>3</sup> Interestingly, while the median patient age (50.1 v. 52.3 yr,  $p > 0.05$ ), Injury Severity Score (ISS; 19 v. 18,  $p > 0.05$ ) and rate of hemodynamic instability at presentation remained static, the number of severely injured female patients decreased dramatically (29.1% v. 21.0%,  $p = 0.012$ ). These observations reside in the context of fewer overall ED visits but similar severe polytrauma admissions (373 v. 357) over the same date range in the preceding year. While the overall number of severe injuries following both motor vehicle crashes and intentional violence (blunt assaults, stabbings, gunshots; 21.3% v. 22.7%,  $p = 0.651$ ) remained stable, the mechanistic composition changed substantially. More specifically, blunt assaults decreased dramatically (7.3% v. 3.4%,  $p = 0.020$ ), but penetrating trauma escalated (14.0% v. 19.6%,  $p = 0.045$ ). Furthermore, the increase in penetrating trauma was due to a uniform increase in gunshot wounds (16.0% of penetrating mechanisms v. 32.9%,  $p = 0.006$ ). Given that we did not observe a massive COVID-19-associated influx of new handguns into the Canadian population, as was noted in the United States, this observation is thought provoking.

The link between suicide and firearm misuse has been clear for decades. It is therefore interesting to reflect upon the observed stability in suicide attempts leading to severe injury in the initial COVID-19 era (4.8% v. 6.2%,  $p = 0.410$ ). These data do not incorporate prehospital suicide deaths and could certainly continue to change over time as the financial and social stresses of a prolonged COVID-19 public health lockdown reality accumulate and affect some of our most vulnerable citizens. Upon specific focus on violence and suicide attempts in females, it is apparent that while the number of women severely injured via assault, including blunt, stab and gunshot mechanisms, decreased substantially (5.6% v. 0.84%,  $p = 0.003$ ), the number of severe injuries from suicide attempts was unchanged. By evaluating the specific mechanisms of assault directed toward females, both blunt (2.0% v. 0.2%,  $p = 0.033$ ) and penetrating (3.6% v. 0.80%,  $p = 0.012$ ) mechanisms decreased. These are critical observations and the first of their kind in the COVID-19 context. Each of the many

potential mechanistic postulates deserves deep reflection and further study on a national platform. For example, although it is reassuring to note fewer severely injured patients presenting as a result of domestic violence (blunt and penetrating), perhaps the frequency of domestic violence below this injury threshold has increased substantially (i.e., fewer patients with “minor” injuries presenting to the ED because of quarantine policies). It must also be remembered that these trends apply only to patients who arrive alive at the hospital and have severe injuries (ISS  $\geq$  12). In other words, they do not include more minor injuries assessed by our nontrauma service ED colleagues. Similarly, although the observed stability in overall mortality for severely injured patients is comforting, this data set is blind to citizens who die within any context (intentional and unintentional mechanisms) before arrival at trauma centres.

It has become apparent that in the modern era of public health crises, COVID-19 has stretched our ability to predict, treat and cope with significant shifts in societal well-being. To better prepare for the next global pandemic or medical challenge, we require granular data analysis at a national level that is independent from conclusions made by our neighbours to the south (and other countries) and from the potential bias inherent within less remarkable preceding eras. Thankfully, this work on injury and suicide is currently being undertaken by the national CANUCS collaborative. With luck, these data will provide an even more nuanced and durable evaluation of pandemic-related issues such as overall trauma epidemiology, injury system preparation, suicide, intentional interpersonal violence (domestic and nondomestic), women’s health and gun violence prevention. It will be particularly interesting to see how the potentially variable nature of social experiences,

health care systems and economics<sup>4</sup> across Canadian provinces affects these issues. One would also expect that some of these narratives may change over time within the COVID-19 era itself. To achieve this goal, whether during a time of crisis or stability, sophisticated surveillance strategies must be developed and enhanced beyond trauma registries. Only via honest evaluation and preparation on both a national and local level can we be ready for the next global threat.

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