Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Childhood injury and injury prevention during COVID-19 lockdown – stay home, stay safe?

The direct effects of the COVID-19 pandemic can be measured in tens of millions of infections, and millions of deaths worldwide. Beyond this, the long-term health burden of COVID-19 infections remains to be seen and is expected to be substantial. Indirectly, the pandemic has caused unprecedented social and economic upheaval; in part, this is a consequence of 'lockdown' measures introduced by local and national governments to limit the spread of COVID-19 [1].

Australian state governments first imposed COVID-19 lockdowns in late March 2020. By early May, however, these restrictions were progressively relaxed as the 'first wave' of Australian COVID-19 cases abated. The state of Victoria later uniquely experienced a second spike of cases from late June. In response to this 'second wave', the Victorian government rapidly re-instated and tightened social restrictions. This would become one of the longest and strictest lockdowns in a high-income democracy to date, lasting more than 100 days until late October. Lockdown features included school closures for an entire term, a five kilometre restriction on movement from one's home, a 'ring of steel' restricting movement into and out of metropolitan Melbourne and overnight curfews.

These social restrictions radically changed our daily lives, which were increasingly reframed around the now familiar public health mantra: **stay home, stay safe**. Here, 'safe' was clearly - and appropriately - related to virus spread and infection. However, even from the first weeks of lockdown many of us were asking questions about the impact COVID-19 restrictions would have on another kind of 'safety'… *safety from injury, particularly for children*. On the upside, we would be spending less time on the roads (where many serious childhood injuries occur). However, on the downside we would also be spending more time at home (where many, if not most Australian childhood injuries occur) with predictably more stress on the family unit, reduced access to social supports and concerns about increasing family violence [2,3].

In response to similar concerns worldwide, it is unsurprising that several groups have measured the incidence of childhood injury during their respective COVID-19 waves and periods of social restriction. These reports varied with respect to whether childhood injury was seen to increase or decrease under lockdown, as well as the observed patterns of injury being attributed to the pandemic [4-12]. These variations may reflect true differences in the experience of injury - and lockdown - between populations, but may also be a product of incomplete sampling, small dataset sizes and methodological differences; some studies have only compared 2020 data to a single year's earlier data, while others have only evaluated a severely injured subset of patients. Also, several studies provided little or no statistical data around observed changes, making generalisability and inferences difficult.

Returning to Victoria, The Royal Children's Hospital Melbourne (RCH) is the sole paediatric major trauma service and state-wide paediatric burns service. As such, RCH was ideally placed to recognise and respond to changes in paediatric trauma presentations during our prolonged and different lockdown experience. We evaluated almost 4,000 injured children who were admitted to RCH *either* during Victoria's first and second lockdowns, *or* during periods corresponding to the lockdown dates in the preceding three years.

Paediatric trauma admissions were reduced by 15% during the first Victorian lockdown, but returned to pre-pandemic levels during second lockdown. More striking, then, was the significantly different nature of paediatric trauma presentations under COVID-19 lockdown. Significantly more 'locked down' Victorian children presented with bicycle and motorbike injury - this speaks simply to the uptake of an hourly 'exercise' provision of Victorian lockdown - as well as substantially more children with severe burns. Given the widespread cancellation of competitive sport for children during lockdown, sporting injuries were unsurprisingly and consistently reduced. We expected to see significant reductions in motor vehicle occupant and pedestrian injuries, but this was only apparent during the second lockdown.

Increased demand for ICU was a standout feature of paediatric trauma in Victoria during lockdown; this speaks to the severity of our injury presentations. Although overall hospital bed days and operative requirements for injured children did not differ compared with previous years, ICU bed days *doubled*. Indeed, RCH paediatric trauma patients admitted under lockdown were 50% more likely to be admitted to ICU. Much of this increase can be attributed to an upsetting influx of severe burns, with ICU occupancy for burns increased seven-fold during the lockdown periods. The management of critical respiratory patients and severely injured patients must be able to occur simultaneously [13], so it is fortunate that COVID-19 did not result in large numbers of severely ill children to be managed in scarce paediatric ICU beds. In addition, burns were the only injury subgroup we found to be more likely to

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require surgery during lockdown, when compared with our trauma patient experiences of 2017-2019.

As for *staying home* to *stay safe*… our concerns that Victorian children spending more time at home might result in more injuries sustained at home appeared to be justified. In real terms, the number of children admitted to RCH with injuries sustained at home increased by 40% under COVID-19 lockdown when compared with previous years.

So, were our observed increases in home injuries and other specific injury presentations under lockdown the inevitable, mathematical consequence of increased exposure of Victorian children to moments of danger so common in our homes? If so, does this burden of childhood injury challenge the 'stay home, stay safe' messaging? We would argue strongly *against* both assertions. Firstly, injury is preventable and not inevitable. Secondly, staying home during COVID-19 lockdown was a successful and life-saving strategy.

If there was fault, it was in our failure to recognise that both COVID-19 and injury risks were at play, and hence to act to make homes safer than ever before to prevent childhood injuries. Put another way, our failure was in applying an exclusively COVID-19 lens to the couplet of 'stay home, stay safe' - seeing this simply as *one* action (stay home) coupled with its consequence (stay safe). A better perspective, inclusive of injury prevention, would have been to re-purpose 'stay home, stay safe' as a call to *two* actions of shared and complementary importance. This could have encouraged more families to scrutinise and change their home environments, actively reducing danger and avoiding injuries. Indeed, we and others involved in injury care and prevention engaged mainstream and social media at various times during 2020 to promote injury prevention along these lines - albeit reactively in the face of alarming rates of some injuries, particularly flame burns [14-17]. The volume and nature of trauma we observed during our first and second lockdowns make it clear that such warnings went sadly unheeded or unheard by some. Hopefully, however, many more injuries were prevented by safer decisions from those more receptive to the safety messaging.

Why were the reduced rates of paediatric trauma during the first Victorian lockdown not sustained into the second? This is a complex matter, with many moving and competing factors in a highly novel environment. This notwithstanding, we propose that 'lockdown fatigue', peculiar to Victoria with its higher second wave and consequent extended lockdown, will have played an important role. Lockdown fatigue may have negatively impacted paediatric trauma epidemiology in at least four ways. Firstly, waning parental supervision as days of lockdown became weeks and months might have contributed to increased injuries for children in the home environment. Secondly, Victorian children enjoy active lifestyles, with a favourable year-round climate and high levels of participation in organised sports [18]. As such, increased restlessness or 'cabin fever' might have promoted risk-taking, as children and adults looked to 'escape' outside or discovered increasingly inventive distractions inside the home; this may have contributed to our observed bicycle and motorbike injuries. Thirdly, given the relationship between socioeconomic disadvantage and childhood injury risk [19], it is possible that an escalating financial burden on many Victorian families from sustained lockdown may have contributed adversely to the risk and rates of injury for these children. Finally, we are concerned that our community perception of risk may have fundamentally changed under the relentless distraction and glare of the COVID-19 pandemic. In the past year, our concept of 'risk' has been dominated by new pressures on hygiene safety, person proximity and mask wearing. This may have displaced or distracted children and adults away from old and ever-present injury risks, and the importance of injury prevention through evidence-based interventions like falls safety, supervision in the kitchen and bike helmet wearing.

So, where to now? What impact will children returning to unrestricted activities outside and beyond their home have on injury rates post-lockdown - for example, as they rediscover sports fields and family days out with renewed enthusiasm? This dilemma will be lived out across the world, as will the challenges of championing safety. It is right that parents and health advocates enable children to reclaim a healthy and active life with restored levels of social normalcy, but with a heed to and not instead of safety. The COVID-19 pandemic and its reach into our, and our children's lives is far from behind us. It remains vital to retain a focus on the importance of childhood injury prevention as we stay home *and* stay safe, or hopefully venture safely further afield.

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