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# MEDICINE IN TIMES OF CRISES

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## Featured

**Capturing the Data Moment:** Effective Public Health Communication in a Pandemic

**Suicide During COVID-19:** Myths, Realities and Lessons Learned

THE UNIVERSITY OF BRITISH COLUMBIA

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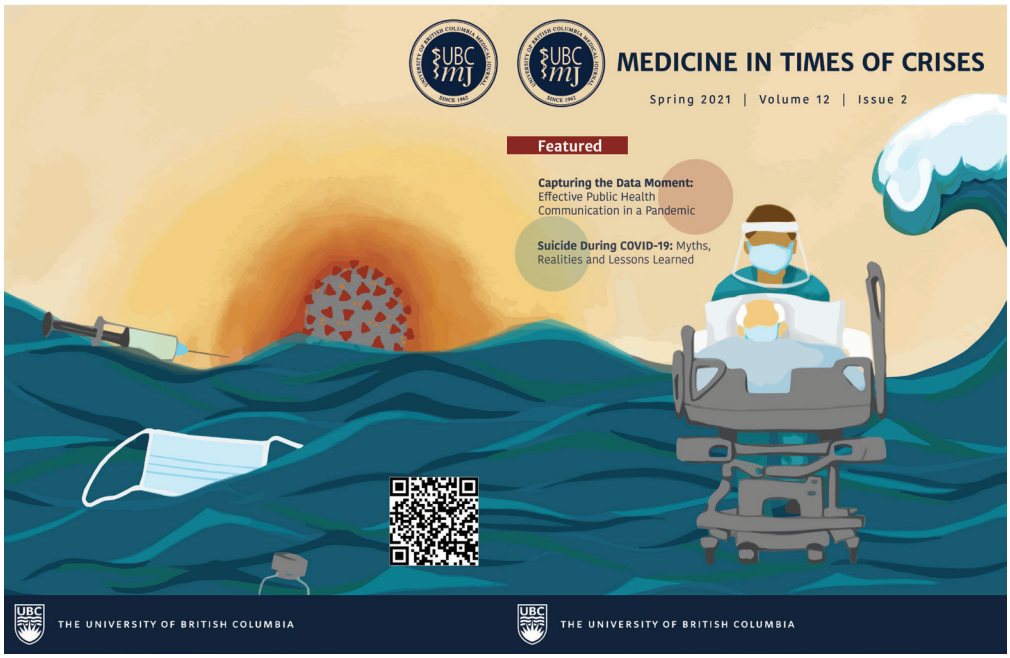
# On the cover




In this issue, we explore medicine in relation to significant local and global crises including the COVID-19 pandemic, the opioid crisis, and climate change. For our cover, we chose to represent these crises as waves. On the front cover, the single large impending wave evokes fear of an immediate threat, whereas on the back cover, the calm water ushers in optimism and innovation. While 2020 was a year full of many challenges, we hope this issue offers a chance to reflect on what we have learned, so that we can be prepared for what is to come.

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NEWS AND LETTERS

# Medicine in times of crises

Olivia Tsai[1], Emma Finlayson-Trick[1]
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The current pandemic has drawn comparisons to some of the worst health crises in recorded history.[1–3] Indeed, it has been a long time since a health emergency of such tremendous scale has affected so many nations. The past year has precipitated a stark reality check: even armed with our current-day arsenal of scientific knowledge, scientists and physicians can still be caught off-guard. The widespread lockdown in Canada and many parts of the world last spring, which has since been re-enacted in many areas during subsequent waves of the pandemic, marked a drastic change in daily routine and was widely acknowledged as a truly alien time. For even the least affected here in British Columbia, this meant staying at home as many classes and jobs transitioned online. For countless others, this pandemic has led to the heartbreaking loss of jobs, financial stability, and the lives of loved ones.

The Johns Hopkins University coronavirus disease 2019 (COVID-19) Data Repository keeps close tabs on global cases and deaths in the countries that have been affected by the virus so far.[4] Around the time of this writing in early April 2021, global cases have reached more than 130 million, with 75 million individuals having recovered and deaths climbing past 2.8 million.[5] When compared to these numbers, other pandemics of the last two decades, despite rightfully raising alarm during their own time, have been much smaller in scale. The 2009 H1N1 influenza, for instance, caused understandable panic when it was declared the first flu pandemic in 40 years. Primarily affecting younger people, it caused an estimated upper limit of 575,400 deaths worldwide—no match to the current casualties attributed to COVID-19.[6] The 2013–2016 West African Ebola pandemic, with terrifying case fatality rates averaging as high as 70%, was declared an emergency of international concern by the World Health Organization.[7] Even so, with 28,646 cases and 11,323 reported deaths, it remained relatively contained.[8] The SARS outbreak in the early 2000s, caused by another member of the coronavirus family, also followed a less destructive trajectory, affecting 8,098 individuals and causing 774 deaths before it was brought under control.[9]

Globally, governments and institutions have addressed this pandemic in different ways, with vastly contrasting lockdown restrictions, healthcare utilization, and treatment strategies.[10] Given the many knowledge gaps at the beginning of the pandemic, it is not surprising that countries have faced challenges in terms of managing case numbers, staying updated on the science, and communicating information to the public. The Canadian government, for instance, was criticized by some for initially discouraging the public from wearing masks.[11,12] A reasonable argument is that so-perceived "inconsistencies" during such a time are inevitable, as quickly changing information dictates new policies and best practices.[10] What has been declared more concerning are the exhibits of politically motivated denialism and lack of regard for evidence-based medicine that have received widespread news coverage.[13–16] These behaviours have contributed to public misunderstanding and harmed attempts to implement widespread mitigation strategies.[17,18] This is especially inexcusable as the impacts of the virus have been found to disproportionately harm society's most vulnerable, with lower socioeconomic status being linked to higher rates of exposure to COVID-19 and higher rates of mortality with infection.[19–21] This pandemic serves as yet another reminder that keeping people healthy is a complex endeavor that often happens outside the realm of traditional healthcare and is influenced by everything from governmental policy-making to public opinion and information dissemination.

In this issue, we have invited authors to reflect on the wide-reaching impact of the current crisis on individuals, institutions, and society as a whole. With so much at stake, swift delivery of information to the public has proved vital. Our first feature article, by data visualization expert Martin Krzywinski, highlights some of the common missteps that can occur when conveying epidemiological data. Krzywinski points out crucial points of consideration when creating figures and graphs with the goal of educating the public. Our second feature article, by child and adolescent psychiatrist Dr. Tyler Black, delves into some of the myths surrounding suicide during COVID-19. While fears of increased suicide rates sparked media attention at the beginning of the pandemic, the data collected during the past year have not shown any elevation in suicide rates. While this brings us comfort, Dr. Black argues there is still an existing need for faster and more granular suicide reporting strategies moving forward so researchers and policymakers can act quickly to provide support to those who need it the most.

While the pandemic has been indisputably devastating, it has remarkably spurred much-needed innovation and collaboration in a variety of domains, leading to the fastest development of a vaccine in recorded history.[22] Notably, this breakthrough is also the first example of an mRNA-based vaccine, which has been under research for decades but has never shown success in large-scale trials prior to this.[23] In placebo-controlled trials, two doses of the vaccine candidates of Moderna and Pfizer-BioNTech were found to have an efficacy of 94-95% in preventing COVID-19 illness, abolishing severe presentations of the disease with few recorded side effects.[24,25] Canada has approved both mRNA vaccines as well as the adenovirus-based AstraZeneca and Janssen vaccines. The first round of vaccinations began December 14, 2020 and continues to this day.[26] With this news comes tentative triumph and some expected wariness. The coming months will bring many expected challenges as cases continue to grow in Canada. Even so, with well-modulated optimism, we anticipate a slow return to normality as we reach the light at the end of this particularly long tunnel.

## Conflict of interest

The authors have declared no conflict of interest.

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# Capturing the data moment: Effective public health communication in a pandemic

Martin Krzywinski[1]
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## Introduction

The crisis of the COVID-19 pandemic has created a demand for communication of epidemiological concepts, modelling and data that is clear and accessible to the layperson. Illustrations and information graphics from public health organizations and governments, such as Figure 1A,[1] play a central role in educating, preparing and updating the public on the nature and evolution of the pandemic. More detailed views of data, such as Figure 2A,[2] provide public updates to the latest projections. Lack of accuracy and clarity in such figures impedes timely delivery of critical (potentially life-saving) concepts, leaving the public uninformed (or misinformed), unprepared and perpetually surprised (or incredulous) in the face of a rapidly evolving pandemic.

In written communication, clarity is achieved by conforming to lexical, syntactic and semantic rules – the right words in the right form and order to create a specific message. Graphical communication is subject to similar principles,[3] but they are more subtle and less often taught. Departure from these principles can create a graphical analogue of an ungrammatical sentence and result in ambiguity and confusion. But unlike in language, ambiguity in a graphic is harder to spot – the viewer may misjudge proportions, miss the trend and fail to gain the intended insight, all without realizing that the problem lies with the graphic and not themselves. These complications can be avoided by following the rules of grouping,[4,5] encoding,[6] colour,[7-9] shape,[10] typography[11,12] and label placement,[13] which are relatively easy to apply. Familiarity with these rules is a prerequisite for controlling emphasis, which can only be achieved when visual salience (what stands out) closely reflects hierarchy of pertinence (what is important).[14,15] The goal of visual emphasis is to highlight importance (the viewer will generally not know ahead of time what is important) and to influence where the eye will fall first. With appropriate emphasis, the right message can be delivered even to viewers who look briefly.

Good use of visual emphasis is exemplified in multi-panel medical illustrations that serially depict a surgical procedure. Typically, each panel will use composition, proportions and colour to establish a point of focus. Maintaining continuity of space (proportion, layering and colour) and time (change between panels and implied movement within a panel) across panels creates story arcs that culminate in "surgical moments" (key steps in the surgery).

Analogously, data graphics can be viewed as a series of elements that hinge on a "data moment". In the area of public health, these are trends or inflections in the data that speak to outcomes and common public concerns without distortion of important quantities or proportions. Let's explore the design of two widely circulated figures, identify their data moment and assess how well it is captured, ask how well they capture the data moment and identify common structural and thematic missteps.

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## Case 1: The Misleading Proportion

Figure 1A was presented during one of the first White House Coronavirus Task Force press conferences[1] and was one of the first "data figures" generated by the Task Force. It was quickly picked up by news outlets such as Washington Post,[16] NBC News,[17] Boston Globe,[18] Axios[19] and even Psychology Today.[20] The figure shows two projected COVID-19 pandemic scenarios. The tall and narrow curve represents the evolution of daily case counts without interventions such as mask wearing and social distancing. The shorter and flatter curve contrasts the mitigation (decrease) in daily cases if these interventions were to be in place. Also included on the figure are death projections associated with each scenario. Unfortunately, this graphic not only reproduces poorly in print but is neither qualitatively or quantitatively accurate: the shape, size and position of the curves bears no relationship to how actual epidemics evolve and their relative areas are substantially out of proportion to the projected reduction in deaths.

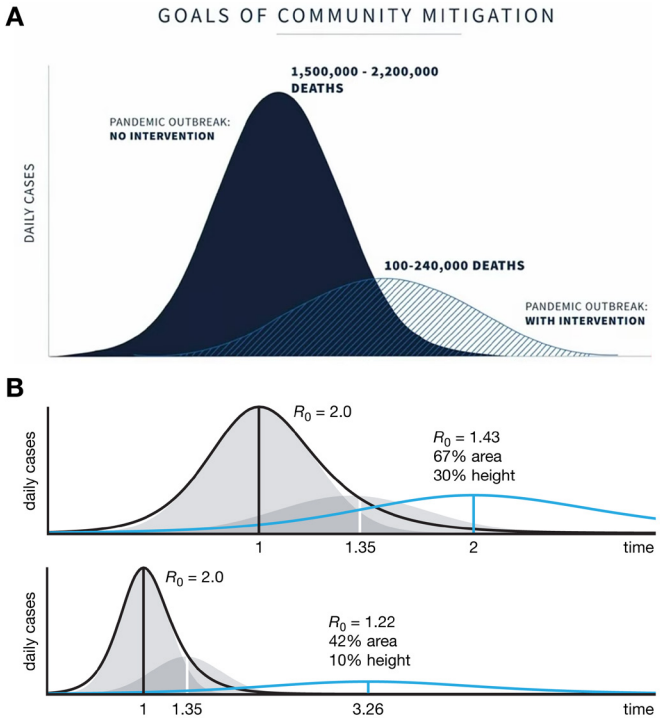


**Figure 1 |** Graphical summaries of critical public health data must be qualitatively and quantitatively accurate. (A) Shapes, proportions and positions of both curves (small curve is barely visible and has 42% area, 30% height and 44% peak shift) are misleading and embody neither the relative difference in stated projected deaths shown (roughly a 90% decrease) nor the temporal evolution and peak position of an epidemic with such projections. The original color scheme obscures the overlap between the curves. From[1]. (B) More realistic curves computed from scenarios of a SIR model[21] with unmitigated $R_0$ = 2 and mitigated $R_0$ to match the relative heights ($R_0$ = 1.43, top) and areas ($R_0$ = 1.22, bottom) of the original curves (shown in light grey). Peak times are shown in time units relative to the position of the first curve.

First, the curves are shown as normal distributions, which do not reflect that epidemics (even idealized ones) evolve with a rise that is faster than their decline – the "quality of quantity" in this figure is unfaithful to reality. Second, the only way to reconcile the area of the

mitigated curve with a ~90% projected reduction in deaths is to assume a concomitant 75% decline in case fatality. Third, the width and position of the mitigated curve is very unrealistic and implies that intervention (which slows the spread of the disease) can lower cases (which is true) without substantially lengthening the duration of the epidemic (which is not true). To achieve the implied level of mitigation, the duration of the intervention needs to be much longer than suggested by the graphic. Flattening the curve substantially delays its peak – this is the figure's data moment.

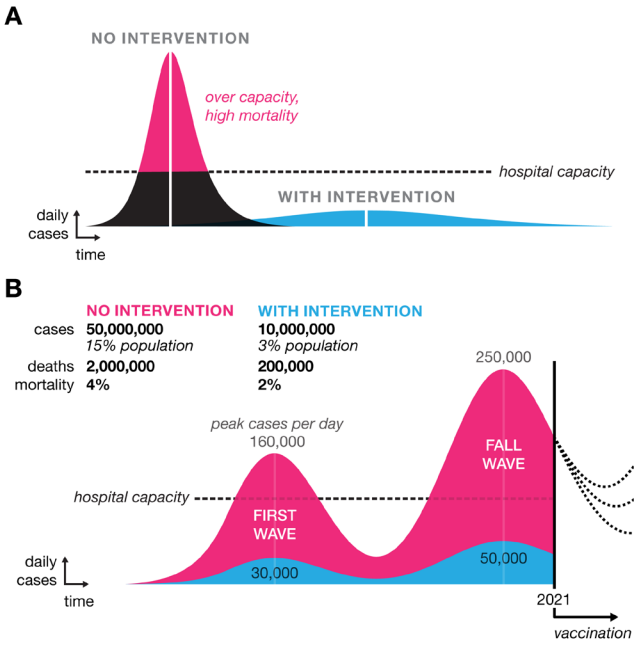


**Figure 2** | Graphical summaries of critical public health data must capture essential concepts. (A) A redesign of Figure 1A showing epidemic evolution in the critical context of hospital capacity. The mitigated curve corresponds to a SIR model with $R_0$ = 1.27 with 50% area, 15% maximum and peak delay of 2.76. (B) A more realistic projection of the evolution of the epidemic until a vaccine becomes available. Areas under the curve match the death projections (assumed to be for 2020) in Figure 1A. Curve shapes are rudimentary (based on three SIR models) and peak ratios are arbitrary (fall wave is larger). The hospital capacity is arbitrarily chosen to support hospitalization rate and duration requirements for 100,000 cases per day.

Let's look at what actual epidemic profiles might look like if we wish to more accurately reflect the epidemic timeline and maintain the relative proportions of heights or areas in Figure 1A. For this, we'll use the SIR model,[21] which is the simplest model of disease spread. A key parameter in the SIR model is the basic reproduction number, $R_0$, which represents the expected number of secondary cases caused by a single primary infected individual introduced into a population with no prior immunity. The spread of an epidemic can be mitigated by lowering the $R_0$ by reducing either contact rate (by full or partial isolation) and/or the probability of infection on contact (wearing masks), among other measures. Realistic modelling of epidemics is much more complicated, but the SIR model is justifiable as a first approximation (Figure 1B).

The SIR curves reflect that case numbers are not symmetric about their maximum — they show a relatively fast rise and a slow decline and this asymmetry is more pronounced for higher $R_0$. Importantly, they realistically show that scenarios with fewer cases have their case peak substantially delayed. For example, if our aim is to have a mitigated curve at a 30% relative height to the unmitigated one (matching the proportions of heights in Figure 1A) the corresponding $R_0$ is 1.43 (a ~30% reduction in contact rate from $R_0$ = 2). The curve is not only broader but its maximum is now at $t$ = 2 as opposed to $t$ = 1.35 (arbitrary time units normalized to peak of unmitigated curve) and has 67% of the area of the unmitigated curve. If we wish to match areas (which correspond to the total cases), we'd need an $R_0$ = 1.22 (~40% reduction in contact rate), in which case the curve would have 10% of the height and a peak at $t$= 3.26 – an even more substantial delay. Without accelerating the time scale at which the infection spreads (the time between successive cases in the chain of transmission), mitigation cannot achieve the combination of height, area and peak shift Figure 1A.

Figure 2 presents two alternatives to Figure 1A that are shown in context of hospital capacity to emphasize that higher mortality is expected if the burden on hospitals exceeds this capacity. Figure 2A does not (and should not) include the quantitative projections from Figure 1A because it follows the full course of an idealized epidemic. With a virus as contagious as COVID-19, it is in the best interest of public health that the epidemic is shut down by developing immunity through vaccination, with mitigation being a stop-gap measure to minimize cases until a vaccination becomes available. Figure 2B incorporates this as its data moment, which speaks to how and when the epidemic will end: an "acceptable" outcome is one in which daily cases do not peak above hospital capacity and where only a small fraction of the population will be infected (likely over multiple waves), with interventions in place until a vaccination is available. The two scenarios in Figure 2B are not shifted in time because the emphasis is on the height difference of seasonal peaks. Whereas the message of Figure 2A is that mitigation will delay the peak over the full course of an idealized epidemic (without considering any seasonal fluctuations), the key message of Figure 2B is that we expect a cases to fall as mitigation effects are enacted in spring and summer but we expect a fall/winter peak regardless of the degree of mitigation.

With so many shortcomings, we are left to (uncomfortably) wonder how Figure 1A could have passed expert vetting and been published at an event with such high exposure. Is it a question of design and style? Was the slide (and curves) constrained by space, colour branding or other formatting considerations? Or, is it a question of complexity? Could it be that a realistic depiction of pandemic evolution in cases and time would over-complicate the figure, increase the cognitive load and ultimately be counterproductive to delivering the message of "flattening the curve"?

The first question is much easier to answer. We cannot justify the graphic by invoking design sense because it fails to meet basic design criteria: legibility (smaller curve is nearly invisible), consistency (1,500,000 - 2,200,000 vs. 100-240,000, note the presence of space around the hyphen in the first range and the missing ,000 in the start of the second range) and typography (an en-dash is used for ranges, not a hyphen, placement of labels is questionable). We also cannot use availability of space as an excuse because the slide's 4:3 aspect ratio did not make full use of the 16:9 screen it was displayed on during the briefing.

The question of complexity is more difficult to answer and requires that we exercise judgment (what is sufficient?) and data ethics (what is necessary?). Here, there are two considerations: shape and relative size and position of the curves. There is no disadvantage of using a more realistic shape – it's not significantly more complicated and the difference is likely to be missed by non-experts anyway. There is, however, great advantage to using a realistic shape – it will bolster confidence in the scientific community that the communication materials were created under the guidance of health experts (not merely marketing material) and that the modelling process is sound. Given the inconsistencies

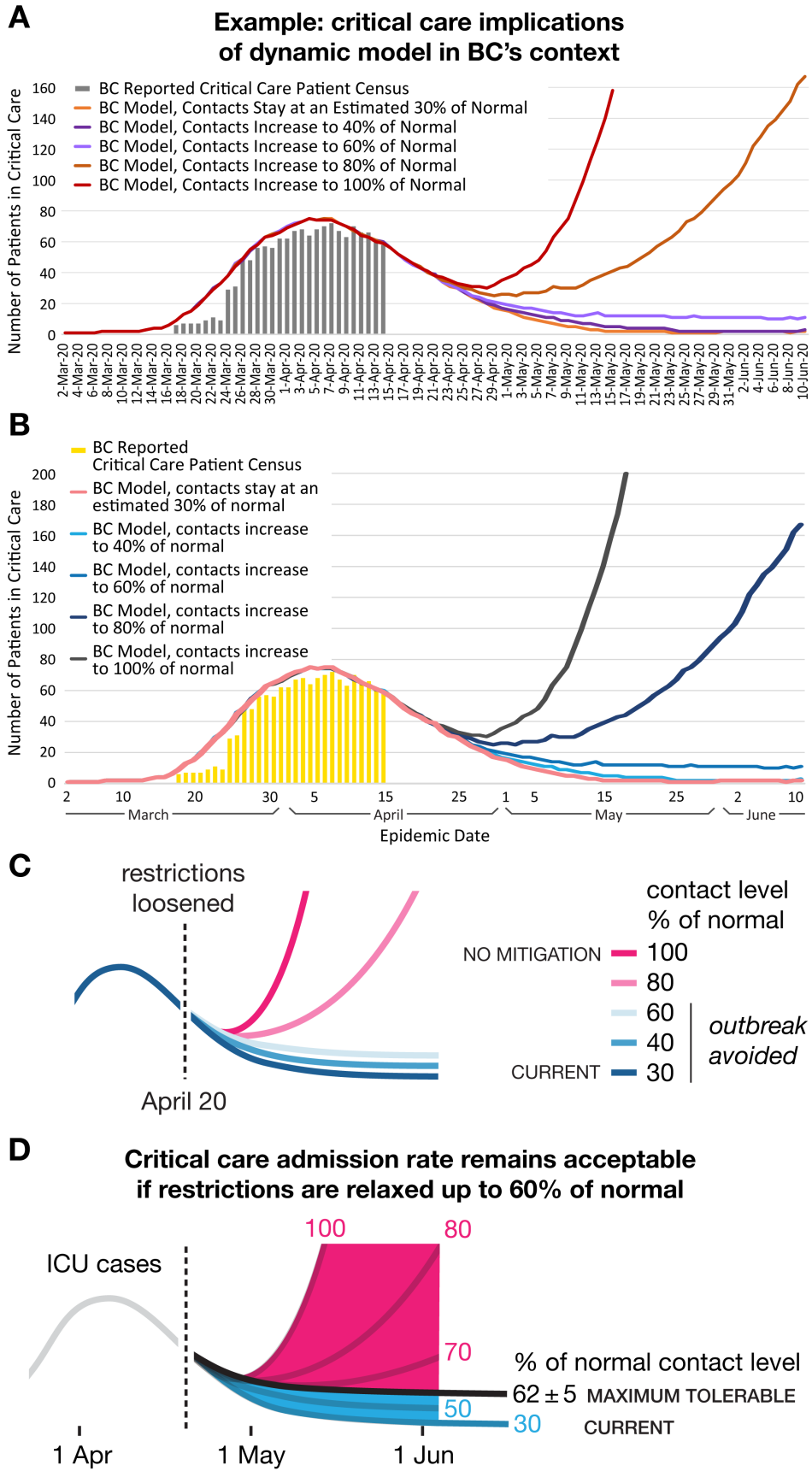


**Figure 3 |** The design of a data graphic must be built around the "data moment": what is the maximum tolerable decrease in restrictions? (A) The "digital version"[2] of the impact of various levels of contact restrictions on ICU admissions. (B) The "broadcast version"[23] of (A). Sizes of elements in (A) and (B) have been slightly adjusted for legibility, fit and equal scale. (C) A colour scheme for projections that clearly categorizes the outcomes. Blue turns to magenta at the inflection point where outcomes are unacceptable. (D) A redesign of (A) that is built around the data moment, which is shown as a strong boundary between acceptable (blue) and unacceptable (magenta) outcomes.

between proportions and quantities on the slide, we're left to wonder how much diligence was applied to its creation – always ensure that the math is right even if you don't expect it to be checked. There is also no disadvantage to having the smaller curve more realistically shifted in time – there is plenty of room on the display and visibility can be ensured by using a solid high-contrast colours. While it's acceptable that some of these features are shown approximately (making full use of space), it's not acceptable that all features are shown incorrectly: "Everything should be made as simple as possible, but no simpler." (commonly attributed to Einstein).


**Figure 4** | Good Gestalt can be identified by applying a blur filter, which preserves top-level layout, alignment and colours while fading the details. Elements that remain visible should reflect key themes. (A) Blurred versions (without text) of Figures 1A,2B. In the redesign, use of solid fill and hue contrast preserves visibility of both scenarios. (B) Blurred versions (without text) of Figures 3A,D. The distinction between desirable and undesirable outcomes is preserved, as is the time point at which projections begin.

## Case 2: The Untold Story

Figure 3A was prepared by the British Columbia Center for Disease Control and was presented on April 17[2] as part of a monthly series of COVID-19 epidemiology and modelling presentations.[22] The figure shows the number of projected ICU cases over time from five models that incorporate progressively looser social distancing restrictions.

This figure is quantitatively accurate and all of its elements are necessary but it does not emphasize the data moment: the estimate of how far restrictions can be loosened without a sharp rise in ICU cases. It takes some time to work out (a) what is being shown, (b) cross-reference the line plots with the legend, which is wordy and repetitive, and (c) visually interpolate that the ICU cases begin to show an upward trend at about 65% of normal contact rate. This long process of discovery of the data moment (the inflection of case increase at 65% contact) can be short-circuited by framing the data in the context of the key question or hypothesis. The adage to "just show the data and let the reader reach their own conclusions" might apply when you wish to take the viewer on a journey to explore competing and equally valid interpretations (extremely challenging to achieve on a single slide unless you have the time and a good narrative), but not when there is a single point to be (quickly) made.

In an alternative published version of the figure (Figure 3B),[23] the colour palette is completely different and the line plots are now layered in reverse order (the 30% pink curve sits on top of all others whereas in Figure 3A the 100% dark red curve is on top). Subtle differences between the two versions in text formatting and line breaks in the legend text greatly impact how quickly legend and its key element (contact percent) can be parsed. In Figure 3A, each legend item is one line and the contact percent values align along a vertical line, making it easy to see that legend text are nearly identical except for contact values. In Figure 3B, because text is wrapped, it takes more time to glean these similarities and differences. The value in adhering to typographical rules of alignment, spacing and line breaks[11,12] cannot be overstated – well-formatted text can provide strong support for the layout of the figure (using spacing) and emphasize which quantities are to be compared (using alignment).

What is the source of these shortcomings and what is the remedy? The differences between the two versions suggest that they are a product of default software settings – possibly due to a combination of tight timelines and unfamiliarity with how these settings impact perception. For example, the colour scheme is extremely unintuitive: a continuous blue colour palette of Figure 3B for the degree of loosening restrictions, pink reserved for the current level of restriction and dark grey showing the most undesirable outcome of no restriction. Blue is typically associated with positive outcomes, red with negatives ones and grey (in the presence of colour) with a baseline (or control) scenario.[24] While in some cases encoding a continuous or ordinal variable with shades of a single hue is exactly the right approach,[6] in this case it is better to use hue to group the class of outcomes (acceptable/unacceptable) and then use shade within the class to indicate the magnitude (Figure 3C).

Figure 3D provides an alternative that captures the data moment – the maximum tolerable decrease in restriction – and maintains focus on it by moving all labels from the legend to near their corresponding curves. The vague title is replaced with one that embodies the conclusion and the strong red/blue contrast immediately draws the eye to the black curve, which is the key inflection point for contact levels and divides the plot into regions of desirable and undesirable outcomes. Note how the "maximum tolerable" and "current" labels (and their corresponding values) are aligned to quickly identify the baseline (which could only be inferred in Figures 3A,B by parsing "contacts stay at an estimated 30% of normal"). Label ticks on the time axis are monthly – sufficient but not distracting.

For a figure to have strong emphasis on the data moment, it must have good Gestalt.[4,5] This can be quickly tested by applying a blur filter (Figure 4), which reveals the large-scale features of the image and roughly simulates what the viewer will see pre-attentively (first 200–250 ms of viewing).[25] Figures with strong grouping (either by space or similarity, such as colour) and figure/ground contrast will create a strong pre-attentive signal. If this signal aligns closely to the pertinent themes and goals of the figure, the viewer will not need to backtrack from their initial impression.

## Conclusion

The public has a poor understanding of science, which is seen as an outcome rather than a process and misattributed with an air of exactitude. Updated projections from new observations are misinterpreted (hence distrusted) as science "changing its mind", though it's merely "minding its change". To address this misconception, scientific communication must discourage thinking that models are either right or wrong and encourage a more nuanced view that "*all models are wrong but some are useful*" [commonly attributed to George Box]. In graphical communication, this perspective can be approached through mindful design – map pertinence to salience with minimum of fuss: anticipate key questions, answer them, then stop. Do not mislead the viewer into a false sense of proportions or timescale, or imply relationships or certainty that do not exist.

During a public health crisis, figures from authoritative data and policy sources will naturally fill the information vacuum, which is at risk of expanding when messaging is slapdash, muddled or inconsistent. The

consequences can be tragic: an erosion of trust, poor compliance to guidelines, more cases and more deaths.

## Conflict of interest

The author has declared no conflict of interest.

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# Suicide during COVID-19: Myths, realities and lessons learned

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## Introduction

Suicide is a challenging health concern, as worldwide approximately 800,000 people per year die of suicide, and it ranks amongst the top causes of death in young people.[1,2] Causes of suicide are multifactored and it is clear that various societal and environmental factors may affect suicide rates. This can be demonstrated by the significant variability in national suicide rates across the world, variable ratios of male-to-female suicide deaths rates, and evidence that racism against Indigenous people worldwide contributes to disproportionately higher suicide rates.[3,4]

The SARS-Cov-2 pandemic is a significant global challenge that, at the time of this writing, has infected 92 million people with the COVID-19 virus and caused almost 2 million deaths worldwide.[5] While the definitive story of mental health outcomes, like many other pandemic related outcomes, has yet to be written, one narrative has to date dominated both the academic literature and popular media: the prediction of a "tsunami" of suicides during the pandemic.[6,7] A google news search currently returned 6,350 news results for the combined phrases "tsunami of mental health" and "COVID." Evoking the image of an impossible-to-stop gargantuan increase of suicides, these articles and societal beliefs have influenced political and economic agendas.

## Is a Tsunami of Suicide a likely outcome?

It is important to note that an increase of suicides during the pandemic is not inevitable, and that the potential impact of the pandemic on many health outcomes, including suicide may be mitigated by various health and economic policies and personal activities.[8] Many of the early published COVID-19 suicide articles relied on non-pandemic derived correlations between employment rates and suicide and extrapolated from that a substantive increase in individuals dying by suicide.[9] This simplistic analysis not only demonstrates an ecological fallacy (a formal fallacy in which inferences about individuals are deduced from inferences about the group), but also because of the low yet positive correlation of unemployment rates with suicide rates, there will be tremendous variance along the linear prediction. As well, this superficial view of suicide neglects important variables, such as the importance of austerity vs. support models, and available suicide prevention strategies.[10] As well, there is a phenomenon called the "pulling together effect" that these predictions do not address. As the name implies, this impact occurs during times of social connectedness (such as family celebrations) or crises requiring social and humanitarian supports (such as floods).[11] Reaching out to each other, becoming more charitable, offering kindness and generosity, and greater social awareness of impact on others are all components of this effect. Finally, great caution must be taken in extrapolations from historical data (such as the impact of past epidemics on suicide) and from data obtained from one jurisdiction applied to another that may be culturally or economically different.

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## Worldwide, 2020 Suicide Rates are generally entirely average

Suicide rates are expressed in a metric: suicides per 100,000 person-years. A person-year reflects the population and length of time studied, such that 1 person studied for 100 years would be reported as 100 person-years, while 100 people studied for 1 year would be 100 person-years as well. Although this requires the denominator of the population to be known or estimated, this metric allows for direct comparisons of suicide.[12] Typically, suicide rates are reported by health authorities with a significant lag, varying between a few months to two years. Because of the pandemic and the increased concerns of excess death, many jurisdictions have reported partial 2020 rates of suicide. Interpreting these numbers requires a sound statistical foundation, as two statistical issues become extremely important when comparing a rate during a period of time (e.g., spring 2020 after the pandemic started) to another period (e.g., spring 2019):

- Variance – suicide generally has a low incidence, with a worldwide rate of approximately 10 to 12 per 100,000 person-year.[1] Because of this, an increase of a few suicide events can be interpreted as alarming in a small or subset population, yet be entirely within the expected variance for the entire population in that area and period of time.
- Seasonality – suicide rates are not equal throughout the year. Typically, winter rates are lower than spring rates.[ ] Because of this, comparison from December or January to March increases the chance of reporting a Type I error.

Fortunately, these important statistical principles can be accounted for through data analysis and visualization. The results of three selected jurisdictions (British Columbia, Japan, and Victoria, Australia) are summarized in Figure 1 using a standard reporting method, accounting for historical variance and seasonality.[14,15,16] As can be seen, when suicide numbers are converted into rates, the rates of 2020 do not demonstrate significant elevation compared to previous years. Multiple jurisdictions have reported data showing similar results, including England, Sweden, Norway, Australia, New Zealand, and many American states (e.g., Utah, Maryland, Massachusetts, and Arizona).[17]

## Canadian Provinces Have Reported Lower Suicide Rates in 2020

To date, all four Canadian provinces (British Columbia, Alberta, Saskatchewan, and Nova Scotia) that have reported suicide data have shown significant decreases in suicide rates in 2020.[18,19,20,21] These results are summarized in Table 1, with the combined suicide rate change being -12% compared to 2019.

## Conclusion

Contrary to hyperbolic early predictions about an expected tsunami of suicides which gained media prominence in Canada, the available evidence shows that there has actually been a decrease in suicide rates. Not only has there to date been no suicide tsunami, there has not even been an increase in rates of suicide in Canada. The sky has not been falling!

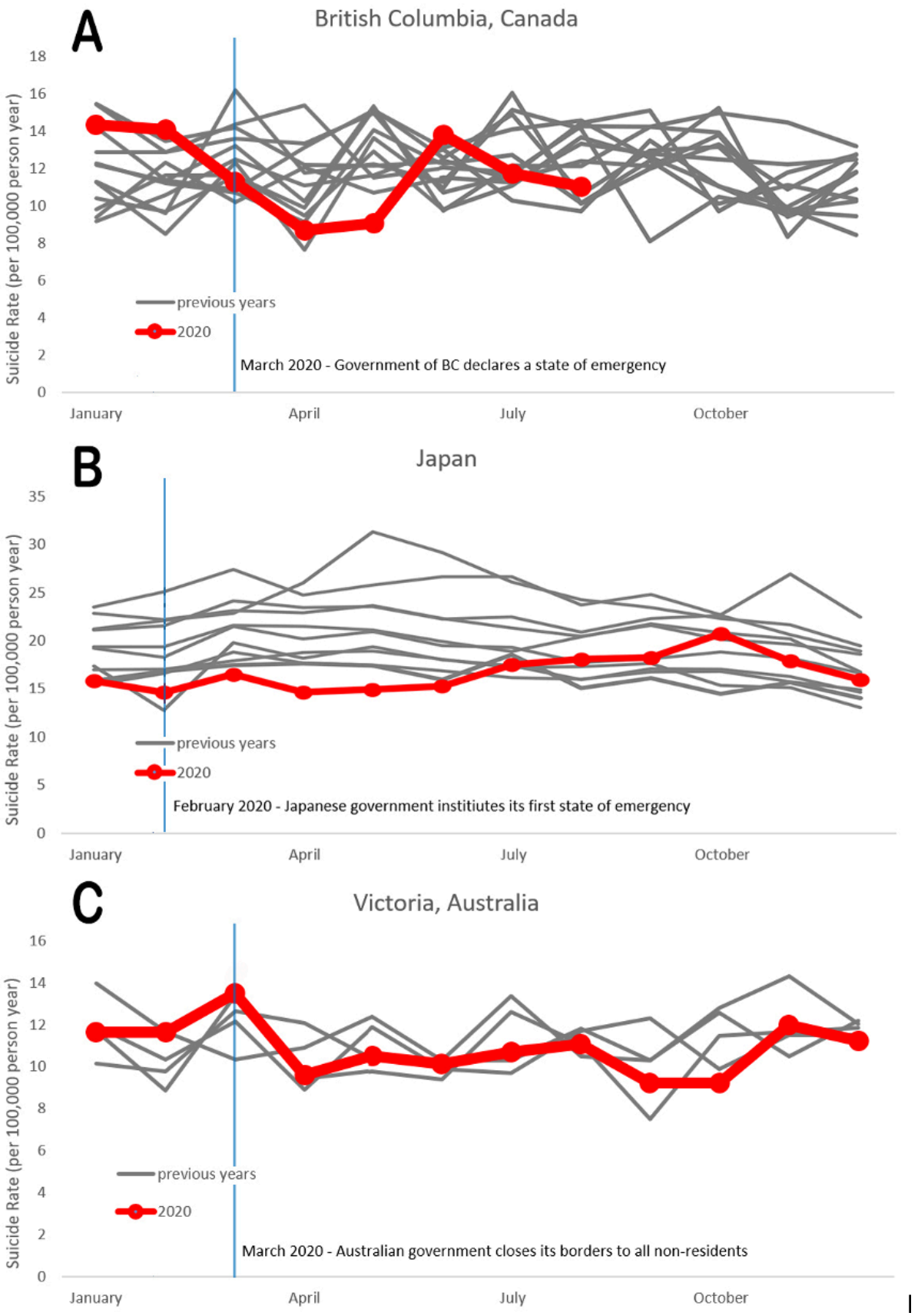


**Figure 1 |** Time series of suicide rates for three jurisdictions (A. British Columbia, Canada; B. Japan; C: Victoria, Australia) highlighting the 2020 rates compared to previously available years. The blue arrows represent the unofficial "start" of the coronavirus pandemic, as characterized by the jurisdiction's first significant official action to combat the spread of infection.

**Table 1** | Suicide Rate Changes in 2020 vs 2019 in Three Canadian Provinces

| | | 2019 | 2020 | |
|---|---|---|---|---|
| **Province** | **Months** | **Suicides / Person-Years* (Rate / 100k Person-Years)** | **Suicides / Person-Years (Rate / 100k Person-Years)** | **Change** |
| British Columbia | Jan–Aug | 439 / 3,389,321 (13.0) | 413 / 3,431,448 (12.0) | -7.1% |
| Alberta | Jan–Nov | 495 / 3,632,753 (13.6) | 466 / 3,684,987 (12.7) | -7.2% |
| Saskatchewan | Jan–Dec | 206 / 1,172,302 (17.6) | 134 / 1,178,681 (11.4) | -35.3% |
| Nova Scotia | Jan–Sep | 101 / 725,318 (13.9) | 93 / 733,175 (12.7) | -8.9% |
| **Total** | | **1,241 / 8,919,694 (13.9)** | **1,106 / 9,028,201 (12.3)** | **-11.9%** |

*Population Estimates from Statistics Canada. Table 17-10-0005-01

However, it is important not to take too much comfort in this finding. First, it is unknown if this trend will continue as the pandemic persists. Second, the data is not granular enough to help us make informed intervention choices. For example, much evidence in multiple health related domains are showing that the pandemic is disproportionately affecting marginalized, racialized, and chronically ill people.[22] But, the existing suicide rate data are not able to tell us if the suicides that are occurring are disproportionally clustered in those who are most disadvantaged. This data inadequacy needs to change in order to better disaggregate the impact of suicide in different populations. Suicide data reporting strategies also need to change, so that standardized real time data are available to policy makers and researchers. Getting the data needed months to years after the events have occurred is not useful for informing decisions that need to be made now.

It is only through the application of better data collection and analysis actions that the robust and valid information needed to guide and evaluate our health and economic related policies and interventions as those relate to suicide will be available. There is still much to be done, but what will be most useful depends on how well our deliberations will be informed with best available data. Investment in improving this would likely bring us measurable returns.

## Conflict of interest

The authors have declared no conflict of interest.

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# Impact of sharing laboratory test costs and required blood volumes on resident test ordering

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## Abstract

**Background and purpose:** A significant proportion of inpatient laboratory testing is unwarranted and can lower quality of care, increase healthcare expenditures, and contribute to unnecessary investigations with their attendant comorbidities. This study investigates the relationship between providing information about costs and patient impact of laboratory testing and resident ordering habits.

**Methods:** Two independent 4-week Internal Medicine resident blocks were studied. After two weeks, cost and blood volume information were distributed to residents during a 10-minute intervention. Pre- and post-intervention resident surveys measuring the importance and influence of the intervention information were conducted. The daily number of blood collections and tests ordered, normalized to patient admission volumes, were analyzed by interrupted time-series analysis.

**Results:** There was no significant effect of the intervention on resident test ordering. Despite this, 74% (N=34) and 63% (N=29) of pre-intervention responses predicted that cost and blood volume information, respectively, would impact their ordering. All post-intervention responses (N=46) stated that these factors had influenced their ordering. Residents were unaware of the intervention information beforehand and demonstrated limited retention.

**Conclusions:** This study design illustrates a disparity between observed resident test ordering habits and their beliefs that the intervention altered their ordering practices. Education on cost and blood volumes by distribution of pamphlets did not influence resident test ordering, demonstrating that interventions to reduce non-specific test ordering should utilize an alternative educational approach.

**Keywords:** Inappropriate testing, medical education, diagnostic stewardship, resident education.

## Introduction

Considerable attention has been paid to the rising cost of providing health care, which has been increasing more quickly than can be explained by population growth and ageing.[1] Canada's healthcare spending per capita is among the highest internationally, with $264.4 billion (11.4% of Canada's GDP) spent in 2019.[2] Of all medical activities, laboratory testing occurs in the highest volume and is increasing disproportionately relative to other activities.[3] In British Columbia alone, annual laboratory test expenditure has increased by over $150 million between 2002 and 2012.[4,5]

The volume of blood removed from patients is an important consideration, as overutilization of laboratory tests may cause or worsen anemia and contribute to inpatient morbidity and mortality.[6,7] Other impacts of laboratory overuse include increased waste, delays, and inaccurate interpretation of results.[8,9] While many laboratory tests add value to patient care, there has been growing attention to tests that are performed without clear clinical indication, which is estimated to be as many as 43.9% of tests.[10] Recently, these tests have been targeted by campaigns such as Choosing Wisely® Canada for reducing costs without negatively affecting the quality of care.

Physician test-ordering patterns have been shown to be physician dependent and in many cases, are minimally impacted by test utilization management systems.[11–13] Previous studies have found that a physician's ordering habits are primarily influenced by their residency training, and that resource overutilization by residents exceeds that of practicing physicians; developing conscientious resident test ordering habits could optimize both current and future healthcare spending.[14–17]

As the cost of laboratory tests is generally unknown to those who order them, many investigations have studied the effect of sharing this information with physicians and residents, demonstrating a reduction in test overutilization.[18–25] Minerowicz et al. (2015) showed that an intervention outlining test costs and the adverse effects of phlebotomy, followed by weekly feedback, demonstrated a 21% net reduction in Internal Medicine residents' test orders. Previous successful interventions almost exclusively included costly and labour intensive aspects such as multi-stage interventions, weekly audits, and test cost display software, which may limit their integration into other clinical settings.[20–25] The success of these interventions are generally attributed to the information learned by the residents rather than the accompanying management systems. However, there is the possibility that management systems themselves may contribute to the success of the interventions.

This study investigates the efficacy of a low-cost and easily implementable method to influence more specific resident laboratory test ordering. Our method consists of a 10-minute intervention where digital and hardcopy pamphlets are distributed, outlining costs and blood volumes required to perform common laboratory tests. Since cost transparency has been previously cited for influencing resident ordering behaviour, our method, which does not include a management system, attempts to make clear the role of cost transparency in promoting conscientious resident test ordering. While the literature suggests that interventions without management systems are often less successful, we expect our intervention to be effective if the residents perceive cost information as relevant to test ordering.[26] This is because the perceived relevance of information has been shown to guide behaviour and learning.[27]

## Materials and Methods

### Design Overview

Two four-week Internal Medicine resident blocks were studied (study periods 1 & 2), with the pre-intervention survey (Supplemental Item A) and intervention being performed after a two-week control period. At the end of each block, a post-intervention survey (Supplemental Item B)

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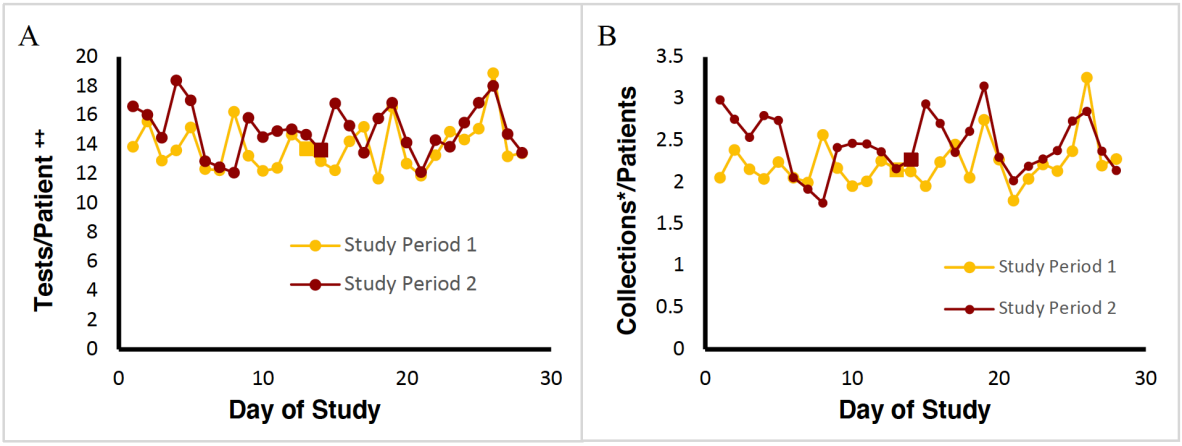


**Figure 1 | Trends in Resident Ordering Rates and Blood Collection Rates.** Square data points indicate intervention date. All lags of the interrupted time series analysis are white noise. [A] Daily resident ordering rate means increased from pre- to post-intervention in both study period 1 (SP1) (+0.32) and study period 2 (SP2) (+0.18). SP1 and SP2 had no significant change in level (SP1: estimate = -0.28 and p = 0.23, SP2: estimate = 1.29 and p = 0.093) or trend (SP1: estimate = 0.17 tests/patients per day and p = 0.07, SP2: estimate = 0.08 tests/patients per day and p = 0.17). [B] Daily collection rate means increased both pre- and post-intervention in period 1 (+0.12) and period 2 (+0.09). SP1 had no significant change in level (estimate = 0.008, p = 0.8338) or trend (estimate = 0.015 collections/patients per day, p = 0.06). SP2 had an increase in level (estimate = 1.36, p < 0.001), but no change in trend (estimate = 0.003 collections/patient per day, p = 0.81).

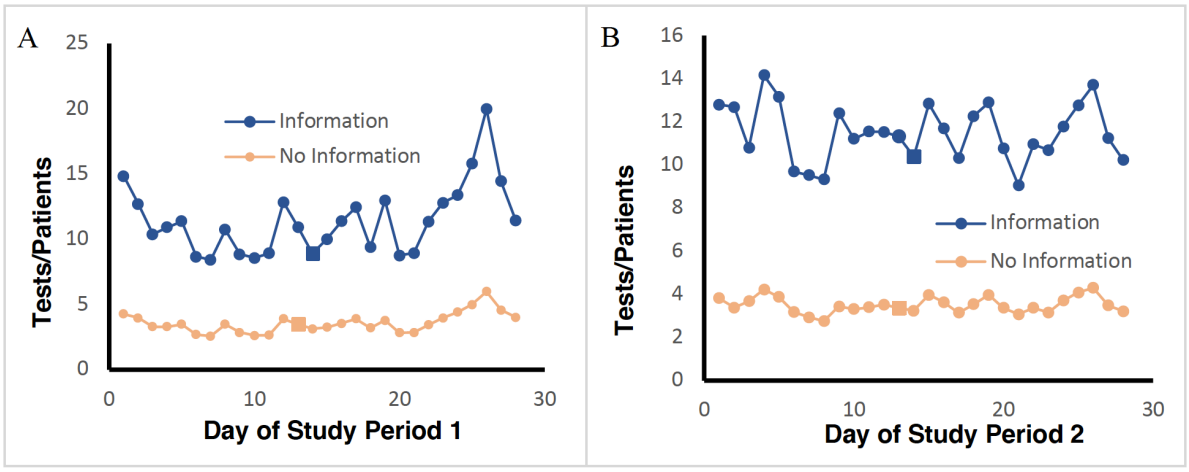


**Figure 2 | Daily resident ordering rates for tests where information was and was not provided.** [A] SP1 means increased for tests with (+1.51) and without information (+0.58). The tests with provided information had no significant change in level (estimate = -0.29, p = 0.72), or trend (estimate = 0.45 test/patient per day, p = 0.052). Tests without provided information had no significant change in level (estimate = -0.02, p = 0.91) and an increase of 0.12 tests/patients per day (p=0.01) in trend. [B] SP2 means increased for tests with (+0.04) and without information (+0.13). The tests with provided information had no significant change in level (estimate = 0.84, p= 0.14) or trend (estimate = 0.046 tests/patients per day, p = 0.31). Tests without provided information had a change in level (estimate = 0.36, p = 0.03 and no significant change in trend (estimate = 0.02, p = 0.28).

++ total number of patients ranged from 61 (in period 2) to 108 (in period 2), whereas total tests ranged from 1004 (in period 1) to 1654 (in period 2).
*total number of collections ranged from 163 (in period 1) to 266 (in both periods).

was distributed via email. All tests ordered for inpatients under the care of these residents were recorded daily. Age and gender of all the patients for whom residents ordered tests were recorded pre- and post-intervention. Test ordering rates were provided to residents. All other patient factors influencing test ordering were assumed to remain constant. This study was granted ethical approval by the UBC-PHC Research Ethics Board.

### Setting and Participants

Internal Medicine residency blocks at St. Paul's Hospital generally include about 20 residents divided into five groups, each under the leadership of a practicing physician. The study population included two resident blocks that were arbitrarily selected. During the interventions held for these two blocks, resident consent (N=46) was obtained through a consent form acting as the first page of the digital resident surveys. Resident participation was anonymous. All residents of the block were provided with the same information because the residents do not practice separately, and educational information is transferred between them.

### Intervention Description and Resident Survey

An intervention was held two weeks after the start of each block. The intervention was initiated with a pre-intervention survey. Following this, a pamphlet containing information about the costs and blood volumes required to perform 32 common laboratory tests was distributed physically and digitally. The information in the pamphlets was described and residents were told that the intervention was only for educational merit. At the end of the 4-week resident blocks, a post-intervention survey was emailed to the residents. We created original pre- and post-intervention surveys, which gathered responses on a 5-point scale. Both pre- and post-intervention surveys asked questions about the residents' perception of the influence of various factors on their test ordering, the impact that our intervention would make and have made on their ordering habits and the residents' knowledge of the intervention information.

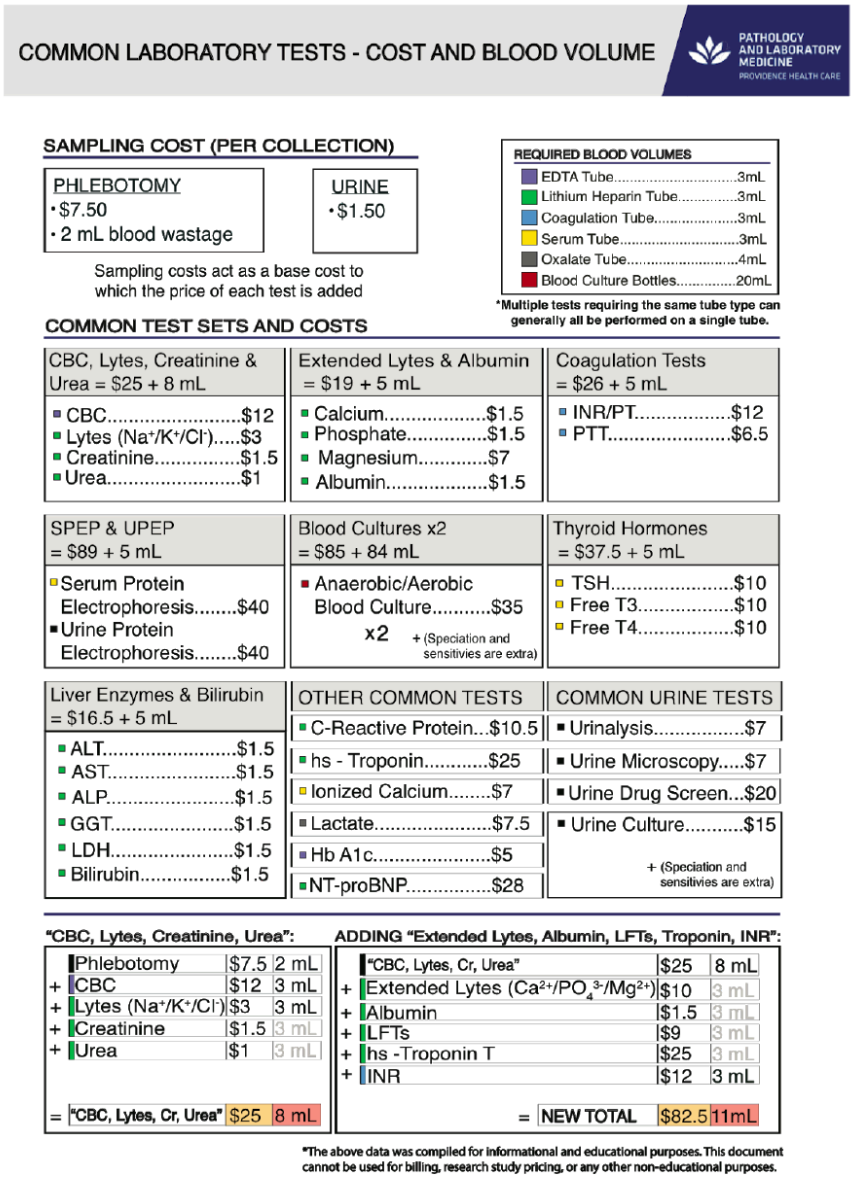


**Figure 3 | Intervention Pamphlet.** Pamphlet distributed both online (URL) and physically during resident interventions.

## Data Collection and Statistics

The primary outcomes measured were the daily resident ordering rate (total tests ordered per total patients each day) and daily blood collection rate (total blood collections per total patients each day). An interrupted time-series analysis was used to determine the significance of the change in level and trends between pre- and post-intervention periods. As 16 tests were performed, the Bonferroni correction was used to determine an adjusted p-value of 0.00313.

## Results

Age and sex distribution showed no significant difference in the pre- and post-intervention patient populations. There was an insubstantial change in the level and the trend of daily resident ordering and collection rates following intervention in either cohort as illustrated by Figure 1. Similarly, limited evidence was found to suggest a difference in the trends of resident ordering rate between tests for which we provided information versus tests for which we did not provide information (Figure 2). There was a significant change in the level of blood collections in the second study period. In both periods, we also observed increases in trend and level that were near-significant ($p = 0.01$ and $p = 0.03$, respectively) in the number of tests for which information was not provided.

Between the two resident cohorts, 100% (46/46) completed the pre-intervention survey and 65% (307/46) completed the post-intervention survey (Table 1). When asked to recall the monetary (4 CAD) and blood cost (8 mL) of an example order: CBC, electrolytes, and creatinine, the residents demonstrated incomplete retention, as shown in Table 1 [A]. Both cohorts on average ranked test cost and blood volume information as the lowest two factors influencing their test ordering and ranked the influence of senior-coworkers relatively high (Table 1 [C]).

The survey results also demonstrate a disconnect with the resident ordering and blood collection rates results. A majority of pre-intervention respondents indicated that residents thought it would be likely that test cost information would affect ordering (Table 1 [D]). In light of the results, it is notable that all residents' survey responses from both cohorts indicated that the intervention information influenced their ordering (N=30), as seen in Table 1 [B].

**Table 1 | Resident Survey Responses Pre- and Post- Intervention.** Outlined responses to resident survey. [A] Resident estimates of the monetary and blood costs of the example order: CBC, electrolytes, and creatinine (actual monetary cost: 24 CAD; actual blood cost: 8 mL). [B] Whether or not residents agree that they order tests for reasons other than clinical indication pre- and post-intervention. [C] Weighted mean of factor (ranked: 1 to 6) as ranked between 6 factors for the extent to which they influence test ordering, 6 being the most influential. [D] How likely residents believe test cost and blood volume information will (pre-intervention) and to what extent did (post intervention) knowing cost and blood volume information impact the resident's test ordering practices.

| | | First Cohort | | Second Cohort | |
|---|---|---|---|---|---|
| | | Pre-intervention (N=20) | Post-Intervention (N=14) | Pre-Intervention (N=26) | Post-Intervention (N=16) |
| A | **Average Estimated cost ($)** | 17 | 22 | 25 | 27 |
| | **Average Estimated Blood Volume Required (mL)** | 33 | 15 | 19 | 19 |
| B | Agree | 10 (50%) | 7 (50%) | 11 (42%) | 7 (44%) |
| | Disagree | 8 (40%) | 1 (7%) | 11 (42%) | 8 (50%) |
| | Neither | 2 (10%) | 6 (43%) | 4 (16%) | 1 (6%) |
| C | Test Cost | 2.40 | 1.86 | 2.77 | 2.19 |
| | Blood Volume | 2.44 | 1.77 | 2.33 | 2.75 |
| | Senior Co-workers' influence | 3.96 | 4.07 | 5.04 | 5.25 |
| D | **Impact from Cost Information** | 11 (55%) | 14 (100%) | 23 (88%) | 16 (100%) |
| | Very Likely / Great Extent | 1 (5%) | 2 (14%) | 3 (12%) | 4 (25%) |
| | Likely / Moderate Extent | 10 (45%) | 9 (64%) | 20 (77%) | 10 (62%) |
| | Small Extent | - | 4 (22%) | - | 2 (13%) |
| | **Impact from Blood Volume Information** | 12 (60%) | 14 (100%) | 17 (65%) | 16 (100%) |
| | Very Likely / Great Extent | 2 (10%) | 2 (14%) | 2 (8%) | 2 (13%) |
| | Likely / Moderate Extent | 10 (50%) | 6 (43%) | 15 (58%) | 9 (56%) |
| | Small Extent | - | 6 (43%) | - | 5 (31%) |

## Discussion

Our intervention was not effective in reducing non-specific ordering practices. This was an unexpected finding as pre-intervention responses agreed with a study by Sedrak et al. (2016) suggesting that residents attribute unnecessary test ordering to lack of cost transparency. The results might be due to the delivery method used. Other methods such as displaying costs directly on requisition forms may have increased resident awareness of intervention information.[22]

The finding that blood volumes had been ranked to be less influential than test costs and other factors is a notable result given that the amount of blood required for tests is directly relevant to the quality of patient care. It is possible that interventions, which clearly outline the direct influence of blood collections on patient care and how residents can order tests to minimize blood collections may make a more considerable impact on resident ordering than simply educating about the volumes required. The insignificant change in blood collection may be related to the resident's pre-intervention overestimation of the blood needed to perform tests, leading them to believe the effect of blood volumes are small.

In contradiction to the observed outcome, the residents believed that their test ordering practices changed following exposure to test cost and blood volume information. Additionally, some residents commented that the information was "helpful to avoid needless blood collections." These findings imply that the role of blood volume and test cost information knowledge as a factor by itself for influencing more specific test ordering may be over-emphasized, both by previously surveyed residents and by previously studied interventions.[20–25]

The findings of our study are an important addition to the literature on the efficacy of using cost transparency to reduce unwarranted resident test ordering. Previously, there has been limited attention to blood volumes as a factor for influencing resident ordering. While the findings of our study suggest that dissemination

of blood volume information is not effective in altering ordering habits, other methods for sharing this information may be more effective. Another notable finding in our study is the contradiction between the perceived and actual effect of cost transparency. Although Internal Medicine residents have been shown to believe that their over-ordering is due to a lack of cost transparency, knowledge of costs by itself appears not to be enough to influence test ordering.[28] This leads us to hypothesize that previously successful methods are primarily due to management systems such as performance feedback, prompting on requisition forms, or periodic interventions.[29] We further hypothesize that management systems are necessary for educational interventions to improve conscientious resident test ordering.[29] This is supported by other studies, which show that while education by itself did not elicit change in resident ordering, chart review and cost audits by authority figures have.[30,31] Our survey results also support the idea that other factors take precedence over cost transparency. In the survey, the residents ranked the influence of senior physicians and hospital culture higher than cost and blood volume information as influences on their ordering. While many recent studies have concluded that cost transparency impacts resident ordering, there have been previous studies that align with our result showing that some educational topics yield a limited change in ordering habits for physicians.[32–35]

## Limitations and future directions

The ordering habits observed in this study are unlikely to be fully representative of all Internal Medicine residency settings as the study periods were only replicated twice with small resident cohorts in a single institution. This study also lacks a control group of residents who were not exposed to the intervention. Our analysis may be influenced by our assumption that resident ordering rates and blood collection rates directly relate to the volume of tests ordered. It would have been advantageous to link resident ordering habit data to the survey responses to allow a mixed effect model.

Given the limited influence of our intervention, future studies should explore the influence of hospital culture and the frequency of intervention on resident ordering habits. It would be of interest to clearly distinguish whether the success of past interventions was due to the information distribution medium or the frequency of distribution.

## Conclusion

Our results suggest that one-time pamphlet education intervention on test costs and blood ordering habits has a perceived effect but no significant impact on actual test ordering habits of Internal Medicine residents. It is likely that cost transparency interventions successful in influencing resident test ordering also require reiterative emphasis or management systems to be effective. The outcome of this study suggests that management activities such as performance feedback, prompting on requisition forms, or periodic interventions appear to be necessary for meaningful differences in resident test ordering.

## Lessons for Practice

1. Activities to decrease unnecessary testing appear more likely to be effective if there is an additional system in place to periodically prompt or keep residents accountable.
2. When using education as a means to prompt more specific resident test ordering, an educational medium that is recursive may be more effective.
3. Education may be more effective with a focus on outlining the influence on patient care (patient harm, wait times, etc.) and encouraging conscientious hospital culture rather than surface-level costs.

## Conflict of interest

The authors have declared no conflict of interest.

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# Brains on Canvas: Visual art as a tool for stress reduction in medical students

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## Introduction

Medical training strives to create well-balanced, knowledgeable, and empathetic doctors.[1] Various medical schools have attempted to integrate art-based components into medical curriculum as an alternative way to teach self-reflection,[2,3,4] mindfulness,[5] or clinical observation skills.[6,7] Research suggests increased stress amongst health care practitioners and medical/nursing students, which may lead to mental health issues such as anxiety and depression.[8,9] Art making activities have been shown to be an effective tool in reducing stress.[10] For example, a study involving family caregivers tested the effects of a creative arts intervention on mental health and showed significantly reduced stress, anxiety, and increased positive emotions.[11] This intervention included giving caregivers the supplies to create visual art projects such as painting and drawings at the bedside, as well as examples of art pieces that they could replicate. Similar research has since been done with nursing students,[12] nursing staff,[13] and end-of-life care workers.[14] As medical students face high rates of stress and burnout,[15] they may also be a benefit from structured art interventions directed at improving mental health.[4,16] Emerging evidence of how the creation of art by medical students can improve mental health has demonstrated that art can lead to a sense of personal growth and development, enhanced sense of community, and awareness of humanistic values in medicine.[4] Our mixed methods research project entitled "Brains on Canvas" explores whether visual art expression activities can be used by medical students to reduce stress.

## Methods

We hosted a three-hour art expression event with pre-clerkship medical students, which took place after final exams during the first year Flexible Enhanced Learning course. Ethics approvals were obtained from Behavioral Research Ethics Board (BREB) and UBC Faculty of Medicine Research Access Committee (RAC). Students were recruited through posters, social media, and email. Sixteen 1st and 2nd year students were provided with acrylic and watercolour paints, drawing utensils, and magazines for creating collages. They were given examples of artwork and instructions for recreating the pieces. These activities were created based on similar research involving visual art interventions and through consultation with an art therapist.[11,13,17,18] The participants completed 23-question total pre- and post- session surveys delivered on arrival to the event and at departure. The survey questions were developed for this study, and students were also asked to rate their perceived stress levels before and after the session. Key themes were highlighted using thematic analysis, which is a method for analysing qualitative data that involves coding data to bring forth the prominent themes.

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## Results

When the students were asked to rate their perceived stress levels before intervention, after the intervention, and in medical school, there was a strong self-reported reduction of stress by -4.4 points on a ten-point Likert scale (p=0.00055, N=16) (Fig 1.).

Using the question "In what ways do you think making art might make you (or anyone else) feel better or healthier?" we aimed to capture the student's impressions of art benefit (if any); 56% (N=16) recognized art as a source of distraction or stress relief: "*by allowing you to focus on a task and get your mind off stressful things*"; "*connecting with myself and being creative makes me feel calmer and less stressed*" and 44% (N=16) noted that it plays a role in emotional expression: "*it can be a very subjectively-interpreted but cathartic means of expression*".

We asked students to comment on the benefits of the session (Fig 2) and how it made them feel; the majority had positive responses (i.e., happy, relaxed, fun, settled, peaceful). When asked whether there were benefits of participating in a structured art session, 93.75% (N=16) of students responded yes. Of these students, the main benefits perceived by students were dedicated time and resources to produce art (40% (N=16)), opportunity for socialization with peers (33.3 (N=16)), and self-reflection (26.67 (N=16)).

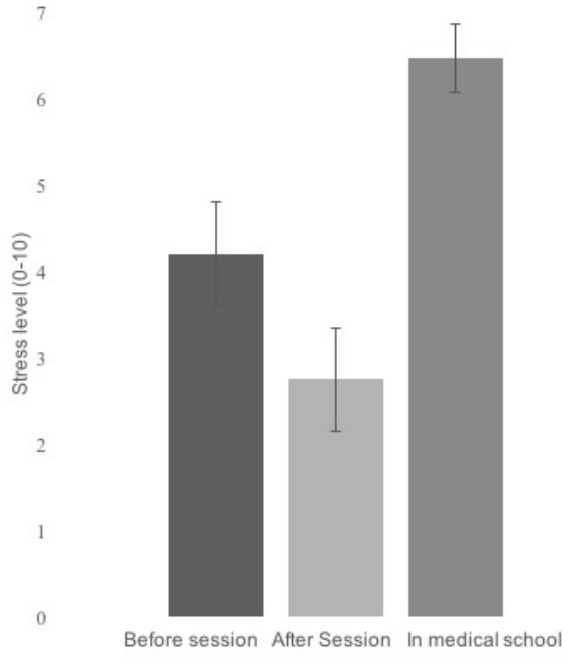


**Figure 1** | The stress levels reported by medical students ranked on a scale of 0 to 10 (0=no stress, 10=extremely stressed) at the beginning of the art expression session, after the session, as well as the average stress level in medical school (p=0.00055, N=16). Error bars represent standard error.

## Discussion

This study showed a decrease in the self-reported stress levels in our participants following the visual art activity intervention. Most students were able to identify benefits of engaging in visual arts in terms of stress

relief, relaxation, and dedicated time to work on a task. The social aspect of the event was also seen as a benefit. This result is consistent with literature that shows fostering social connections with peers may reduce stress.[19,20]

Art has also been shown to heighten self-reflection skills and students in our session felt that art may contribute to better health by being a tool for emotional expression.[4] However, some students experienced initial stress and hesitancies associated with learning a new task. This is interesting because some literature shows that medical student may have an intolerance to uncertainty and social comparisons are often perceived as a stressor.[21,22]

During the session, the participants identified structured art as an effective tool for stress relief, however this study was limited by the small sample size and the fact that students were self-selected for the study. The curriculum at UBC has accepted art into parts of the program as a tool for self-reflection, therefore future research could include repeated art night sessions involving all 4 years of students to better measure and assess the self-perceived stress reduction effect and gauge whether this is something that all medical students perceive as valuable.

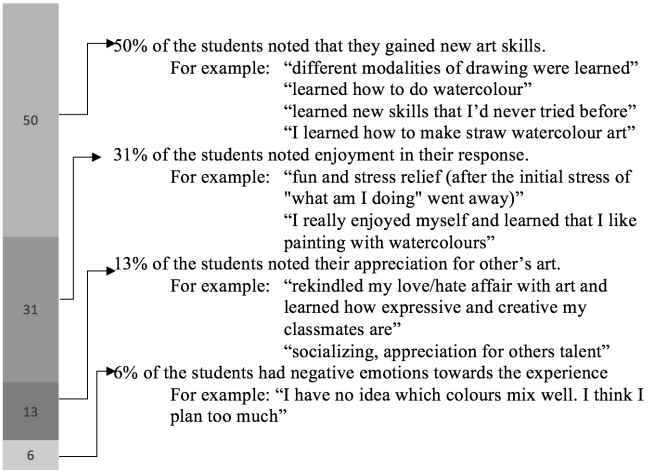


**Figure 2** | Medical student responses when asked what they gained from the structured art session.

## Conclusion

It is important for health care workers and students to be provided with tools to reduce stress, which is often associated with poor mental health.[8,9] Our "Brains on Canvas" event showed that a structured, peer led session dedicated to art-based activities can reduce the self-perceived stress in pre-clinical medical students.

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## Conflict of interest

The authors have declared no conflict of interest.

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# Addressing social and emotional aspects of providing healthcare using Schwartz Rounds as an example

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## Abstract

The social and emotional aspects of providing health care frequently challenge healthcare workers, and avenues to address these stressors are important. Social and emotional stressors can burden healthcare workers in both their personal and professional lives and impact the quality of patient care. Growing evidence suggests that staff support programs that promote the open discussion of these issues improve the well-being of all participants. Creating the opportunity for staff to learn from each other and support each other through their shared experiences helps compassion return to the forefront of healthcare. In this paper, we review the importance of addressing the social and emotional aspects of providing health care. We draw on evidence from the literature to discuss a program with potential to address this need: Schwartz Rounds. Feedback suggests Schwartz Rounds have provided healthcare workers with improved insight into the perspectives and experiences of their co-workers, including clinical and non-clinical staff. These findings suggest that healthcare workers need and value supports that address the social and emotional challenges innate to their work. Such opportunities should be encouraged by healthcare institutions and sought out by healthcare workers and support staff.

## Emotional and social aspects of providing care

The social and emotional aspects of healthcare are a result of human compassion and the sharing of difficult experiences. These aspects are part of what make healthcare professions rewarding. However, there is significant emotional, physical, and psychological labour in caring for those who are suffering.[1,2] Healthcare providers are present for some of the most emotionally challenging and vulnerable moments in the life of a patient and their family members. They carry great responsibility, face ethical dilemmas, and work through loss, tragedy, anxiety, distress, and surprise.[3] Healthcare workers experience cognitive dissonance when they have to suppress certain emotions and portray others.[2] As a result, social and emotional stressors often burden healthcare workers in both their professional and personal lives.

The ability of healthcare workers to provide appropriate compassion to those they care for is often challenged, and this can lead to significant distress as compassion is an ideal that brings many people into healthcare. Compassion has been defined as a "deep awareness of the suffering of another coupled with the wish to relieve it".[4] It is thought to be a critical component of providing care, yet one that is eroded by the social, emotional, and efficiency stressors placed on healthcare workers.[5] "Compassion fatigue" is a term used to describe the strain on empathy that many healthcare workers experience as a result of demanding working conditions.[1] The importance of self-care and awareness has been emphasized in the literature and described as a method of protecting oneself against work-related stressors. In turn, self-care and awareness help return compassion to its rightful place, at the heart of caregiving.[6]

Moral injury is a term originally used to describe the psychological distress that war veterans develop as a result of "perpetrating, failing to prevent, or bearing witness to acts that transgress deeply held moral beliefs and expectations".[7] This phenomenon has been described in healthcare workers in the context of being unable to provide high-quality care to those who need it.[8] This concept is particularly relevant during the COVID-19 pandemic where healthcare workers in many regions have been forced to make difficult decisions regarding patient care due to limited availability of resources. Distress resulting from such situations can be minimized by discussing the social and emotional challenges that arise when caring for patients.[9]

Studies typically report that between one quarter and one third of all healthcare workers have degrees of psychological distress sufficient to warrant clinical intervention.[10] In Canada, approximately 45% of healthcare workers suffer from high degrees of work-related stress compared to 31% of the general workforce.[11] The 2018 Canadian Medical Association National Physician Health Survey found that 30% of surveyed physicians reported overall burnout and 26% reported high emotional exhaustion.[1,12] In a Canadian Broadcasting Corporation (CBC) survey of over 4500 Canadian nurses, over 40% reported burnout.[1,13,14] Despite a large portion of the stress being attributable to emotional and social aspects of their work, most healthcare staff have little to no support in these regards.[1,3,10,15]

Compassion fatigue has been shown to decrease the quality of patient care and lead to worse patient outcomes.[1] Various studies support the notion that healthcare worker well-being directly affects the quality of patient care. In support of this, it has been shown that organizations that adopt support programs for their staff notice an associated improvement in the quality of patient care.[5,10,16,17]

## Support programs for healthcare workers

Healthcare workers may seek support from a variety of online resources. In British Columbia (BC), Care for Caregivers was established in response to the COVID-19 pandemic to provide support for healthcare workers.[18] Inspired by the stressors of COVID-19, it offers a diverse database of workshops, coping tips, and web resources that have been established as valuable tools. Another resource is the Physician Health Program of BC, which is an independent service that offers a 24-hour confidential helpline to support BC physicians, residents, and medical students.

The literature describes various institutional interventions including reflective practice groups, resilience training, psychosocial intervention training, peer-supported storytelling, mindfulness-based stress reduction, critical incident stress debriefing, caregiver support programs, clinical and restorative supervision, Balint groups, after action review, action learning sets, and Schwartz Rounds (otherwise known as

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Rounds).[16]

Of those described, Rounds are considered unique as they are a forum that is open to both clinical and non-clinical staff. Examples of non-clinical staff members include managers, administrators, porters, and cleaning staff. It is well-known that clinical staff pay steep emotional tolls.[15] However it is often forgotten that the prevalence of psychological morbidity has been proven to be high in non-clinical staff as well.[10]

## Schwartz Rounds: premise and structure

Schwartz Rounds is a social and emotional support program which was created in 1995 by the Schwartz Center, an international organization that supports hundreds of thousands of healthcare professionals across all disciplines by providing them with research-based strategies and tools to sustain cultures of compassion. Rounds give healthcare workers regularly scheduled time to openly discuss the social and emotional issues they have faced while providing care. This program is based on the idea that having greater insight into your own responses and feelings allows you to make stronger connections with patients and colleagues. Rounds begin with panelists briefly sharing their experiences on an identified case or topic. The audience is then invited to share their thoughts on the presented topic and related issues. The sessions are typically held monthly and are facilitated by two staff members who are trained by the Schwartz Centre.[5,10,15,19,20] Panelists and audience members are from diverse disciplines and include both clinical and non-clinical staff.[5,10,19,20] Rounds provide staff with the opportunity to openly express their emotions, which is something healthcare often explicitly discourages.[1]

Features that set Rounds apart from many other supports include being open to clinical and non-clinical staff and having no expectations with regard to verbal contributions by participants. Continuity is another distinguishing feature of Rounds, as many of the other interventions involve only one session. As well, Rounds are unique in that the discussions are steered away from problem solving, so as to prevent a focus on clinical decision-making.[5,10,16]

## Schwartz Rounds: benefits and limitations

Caregivers who have participated in Rounds have reported improved teamwork, decreased feelings of stress and isolation, increased insight into the social and emotional aspects of patient care, and increased feelings of compassion towards patients.[1,5,15,19] In fact, Maben et al. found that psychological distress amongst regular Rounds attendees was halved while that amongst those who did not attend was unchanged over the same period of time.[16] Non-clinical and clinical staff have shown the same response to Rounds, suggesting that the benefit is not background-specific.[1,5,15] There is also a speculated "ripple effect" whereby Rounds may provide additional benefit to staff after the sessions conclude, as participants are more inclined to discuss similar topics on their own.[1]

In a 2018 systematic review comparing Rounds and the other institutional interventions mentioned above, it was found that the quality of evidence for each and every intervention was not sufficient to suggest that any of them are superior to the others. That said, it was recommended that system approaches are more beneficial than individual approaches when addressing staff well-being.[10]

During the COVID-19 pandemic, Rounds have been suggested as a tool for healthcare institutions to address moral injury and manage stress levels.[9,21] While rates of burnout among healthcare workers are exceptionally high, it is important to acknowledge the emotional tolls associated with working on the front lines and provide opportunities for social support.

There is no existing literature that discusses negative aspects of Rounds, however there are some known limitations associated with facilitating them. The training required to become a Rounds facilitator requires funding and time that may not be available in every healthcare setting.

The purpose of this review was to use Rounds as an example of a support program that gives staff the opportunity to use their similar experiences to support and learn from one another. Programs like these help staff find shared strength in difficult situations. It is important to acknowledge that everyone working in a healthcare setting experiences emotional stress and should have a safe space for open discussion and reflection.

## Conclusion

It is clear that healthcare staff value having a place where they can reflect and connect to one another by sharing their experiences. Rounds are an example of a medium for collective reflection that has led to a variety of benefits for staff, patients, and healthcare organizations. Providing accessible and evidence-based support for healthcare staff to help them cope with the emotional and social challenges inherent to their professions should be prioritized. These challenges have been shown to affect both clinical and non-clinical staff, and there is benefit to addressing them together, as a healthcare team. To improve self-care and enhance compassion in medicine, staff should consider any support available to them and be open to discussing the social and emotional difficulties they encounter. For their own benefit, the benefit of their colleagues, and the benefit of their patients, healthcare workers should seek out and participate in opportunities that allow them to share their healthcare experiences.

## Conflict of interest

The authors have declared no conflict of interest.

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# When patients lie: Factitious disorder in the family practice setting

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## Abstract

Factitious disorder (FD) is a psychiatric disorder where one consciously falsifies or induces illness in the absence of any obvious external reward. Patients with FD utilize the healthcare system frequently and family physicians, at the center of these patients' care, are well-positioned to recognize the disorder and mitigate some of its risks.

Patients with FD report falsifying illness as a way to gain care and concern for others, or to cope with anxiety or low self esteem. Key features that suggest FD are inconsistencies in the patient's clinical presentation, high disease recurrence, and a strong patient interest in undergoing invasive testing or procedures.

The consequences of FD going unrecognized can include harm to the patient, danger to others if the patient is inducing illness in someone in their care, physician stress and burnout, unnecessary costs to the medical system, and medicolegal risks. If the family physician suspects FD, they should investigate for organic causes of the patient's symptoms and meticulously document inconsistencies. Consultation with a psychiatrist about the family physician's suspicions for FD should always occur before the diagnosis is made. There is currently no well-established treatment approach for FD, but there is evidence for the use of psychiatric medications and psychotherapy.


## Introduction

Factitious disorder (FD) was first named Munchausen syndrome in 1951. Doctor Richard Asher wrote about the disorder and named it after Baron Munchausen, an ex-army officer from the eighteenth century who was known for his wildly exaggerated stories about his adventures in the military.[1]

Now called factitious disorder imposed on the self, FD is a psychiatric disorder that involves a patient falsifying or inducing their own illness in the absence of any clear external incentive.[2]

Alternatively, factitious disorder imposed on another (FDIA) involves a caregiver inducing illness in a victim.[2] This has been known historically as Munchausen's by proxy. FDIA has been the subject of fascination and horror over the years. The film *The Sixth Sense*, and television series *The Act* and *Sharp Objects* have all brought FDIA to the mainstream.[3,4]

Although the prevalence in the general population is relatively low, patients with FD are frequent users of the healthcare system. As such, it behooves physicians in all areas of healthcare to be aware of this disorder in their practice.

FD differs from malingering. Malingering involves feigning or exaggerating illness or injury in order to acquire external rewards, such as time off work, financial gain, discharge from military service, etc. Distinguishing between the two can be difficult, as it requires the physician to determine the patient's motivations, which may not be possible in many cases.[5]

For epidemiology related to FD, please refer to Table 1. One striking trend among people diagnosed with FD regards employment. Half of patients with FD work in healthcare, most commonly as nurses. It is unusual to find such a prominent employment trend in any one diagnostic category of patients.[7,8] A speculated reason for this trend is healthcare workers have access to information and supplies. Someone with extensive knowledge of disease would likely find it easier to convincingly feign illness, since they may know the common presentations for a variety of diseases. It has also been postulated that patients with FD may seek out training or employment in healthcare professions due to a fascination with healthcare, disease, and injury.[9,10] Reasons for this trend in employment have not yet been well-elucidated and may be the subject of future research.

## Motivation

Motivations for FD discussed in the literature rely on patient self-reports. However, given that patients with FD generally avoid psychiatric services and can be reluctant to disclose their motivations, a comprehensive explanation of motivation would be speculative or theoretical at best.[11,12,13] Patients with FD may feign illness in order to receive care, attention, and concern from others. For some patients, falsifying illness has been likened to an addiction. Some parents with FDIA encourage their children to feign illness throughout their childhood. This habit can then carry into adulthood, resulting in the once-child-victim developing FD.

Other self-reported motivations include a feeling of having control over one's own body, escaping overwhelming social expectations, coping with stress or low self-esteem, and many others.[11,12,13]

## Presentation

There are innumerable ways that FD patients can initially present to a hospital or clinic. While some patients with FD only describe symptoms, 59% of FD patients will induce symptoms, making the deception more difficult to detect.[9] When it comes to recognizing a potential case of FD, there is no specific cluster of signs and symptoms that a patient may present with. Rather, all available information must be taken into consideration, including clinical presentation, patient history, and patient behaviour.[14] For key features and clinical presentation of FD, please refer to Table 2.

## The consequences of factitious disorder

The morbidity caused by iatrogenic harm to the patient with FD is high. Patients with FD have been permanently disfigured, disabled, and even killed from unnecessary medications, invasive testing, and surgeries.[15,16] Harm to self is a major concern. Patients with FD who induce medical illness in themselves may miscalculate the risk of inducing certain symptoms, or they may seek out serious health consequences intentionally. For example, someone attempting to create a localized infection can unintentionally develop a life-threatening sepsis. Alternatively, the patient may act with the goal of developing life-threatening symptoms and garnering more concern and care.[14,16]

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In the case of FDIA, the concern is harm to others. The physician should be aware that some caregivers intentionally induce illness in children or vulnerable adults in their care. Such actions constitute medical abuse and have resulted in hospitalizations, permanent disabilities, and the fatalities of victims.[15,17]

**Table 1** | Epidemiology of Factitious Disorder.

| | | |
|---|---|---|
| **Prevalence** | Pediatrics | 0.5–2.0% |
| | Adults | 0.5–2.0%[6,7] |
| **Gender** | Female | 65% |
| | Male | 35%[6,7] |
| **Psychiatric comorbidities** | Overall prevalence | 46.5%[6] |
| | Prevalence of personality disorders | 20%[6] |
| | Prevalence of depressive disorders | 18%[6] |

The harm to physicians can be significant as well. If unaware of the presence of FD in their patient, the physician may experience stress as they struggle to determine the cause of the patient's mysterious illness. If the physician suspects FD, they may feel frustrated and angry about their time being wasted by the patient. This can contribute to loss of job satisfaction and burnout.[14,18]

Legal costs exist for healthcare providers and the insurance companies that protect them. Patients may sue over neglect, malpractice, or poor standard of care. This may be pursued in an attempt to prove the severity of their "illness" to family and friends.[16,19]

Finally, the cost to the medical system is another area of concern. Costs arise from unnecessary investigations, procedures, and surgeries. In an extreme case, an individual with FD was determined to have amassed medical bills exceeding one million U.S. dollars.[18,19]

**Table 2** | Key features of Factitious Disorder.

| Clinical Presentation | Patient History | Patient Behaviour |
|---|---|---|
| Atypical presentation[6,14] | History is dramatic but unlikely[7,12,14] | Refusing access to past medical records[6] |
| Treatment failure or high disease recurrence[9] | History is inconsistent with investigations[7,12,14] | Seeking out invasive testing[6,8,14] |
| Symptoms worsen after negative test results[6,9] | History unusually long and confusing[14] | Unusual knowledge of medical language[7,14] |
| Evidence of self-induced injury (skin lesions appear self-inflicted, unexpected organisms in body fluid/wound cultures, patient witnessed injuring self)[7,9,12,14] | Extensive medical contact in different communities[6,14] | Patient adamantly declines referral to psychiatric services[6,13] |

## Diagnosis

Diagnosis can prove extremely challenging in the absence of objective evidence, such as witnessing the patient intentionally causing self-injury. Diagnosis requires intense scrutiny of medical records. If the physician believes it is necessary to access past medical records without consent, in order to prevent harm to the patient, the physician must inform their governing body prior to doing so.[12,20,21]

Including a diagnosis of FD in a patient's medical records can prevent the patient from receiving quality medical care for genuine health issues. Once evidence for the disorder has been obtained, it is highly recommended that the physician consults a psychiatrist prior to making the diagnosis.[15,20,21]

## Management

In a GP office, the following steps can be taken when working with a patient with suspected FD:

1. **Investigate for organic causes:** It must be reasonably determined that the patient's symptoms are not an unusual presentation of an organic disease. Consulting with a colleague to ensure nothing major is being missed can be helpful.[15,17,18] Certainly the presence of FD does not preclude a patient from developing genuine health conditions, so suspicion of FD should not be a reason to avoid working up a patient for new or changing complaints.[6,15,21]
2. **Treat any underlying psychiatric disorders:** Given the high incidence of depression and other psychiatric disorders in patients with FD, it is important to recognize and treat these underlying disorders. Using an interdisciplinary biopsychosocial approach and including counsellors or social workers in the patient's care, as appropriate, can support the patient's emotional and psychological health.[22,23]
3. **Documentation:** Meticulous documentation is key. Documenting inconsistencies and other key features that a patient demonstrates is extremely important. This can be helpful for supporting the diagnosis of FD and serves to protect the family physician in case of any future medicolegal involvement with the patient.[12,24]
4. **Sympathetic, yet clear limit-setting:** Some family physicians may limit the patient to agreed upon regular appointments (i.e., one appointment per two-week period). FD patients can be extremely persistent in their quest for invasive medical testing. It is important for physicians to determine what is reasonable, and to be firm in how many investigations and specialist referrals they will pursue.[12,21]
5. **Compassionate approach:** For reasons that are complex and unique to each patient, assuming the sick role allows them an emotional fulfilment that they are otherwise unable to attain. These patients are still sick, but they are usually not sick with the problem they present with. FD is a serious psychiatric condition that can and does result in permanent health consequences or death for the patient. It is important to note that many patients can, and do, recover from FD with consistent and supportive care.[11,15]
6. **Mandatory reporting:** In the case of FDIA, concern for or evidence of child medical abuse or the medical abuse of a vulnerable adult must be reported to the appropriate governmental agency.

## Treatment

Treatment of FD can be challenging. First, the family physician needs to determine whether or not they want to confront the patient regarding their suspicions. The evidence for this is mixed. Supportive confrontation is effective for some patients. However, it carries risk as the patient can increase their self-injurious behaviour in response, file a complaint, or initiate a lawsuit. If confrontation is desired, consultation with a psychiatrist prior to discussing concerns with the patient is imperative.[17,22,25]

Review of the literature has found a distinct lack of evidence-based treatment recommendations for patients with FD. Treatment research is mainly limited to case studies, some of which have identified success

with different forms of psychotherapy (dialectical behavioural therapy and psychodynamic therapy), as well as pharmacologic management of underlying psychiatric comorbidities. A positive therapeutic alliance with the care provider is central to successful outcomes.[23,25,26]

Despite having a prevalence similar to schizophrenia, FD is a comparatively under researched disorder. The current lack of evidence may partially be related to difficulty engaging FD patients with psychiatric services. With studies of FD conferring high dropout rates, recruiting research participants to engage consistently with randomized control trials or long-term studies could prove challenging. More research will be needed in this area to identify what strategies are most effective for patients living with FD.[25,26,27]

## Conclusion

FD is the physical manifestation of the emotional needs of a patient. The differential diagnosis includes an organic disorder, malingering, or another psychiatric disorder. Recognition of the disorder requires attention to inconsistencies in patient presentation, behaviour, history, and investigations. A compassionate, supportive approach that recognizes the emotional suffering of the patient with FD, has the potential to improve, or even save, the patient or victim's life. Boundaries can help prevent harm to the patient, physician, and healthcare system. While case studies have demonstrated some success in treating patients with FD with medications and psychotherapy, there is currently a lack of robust evidence supporting any specific treatment approach. More research is required in this area.

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## Conflict of interest

The authors have declared no conflict of interest.

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# Post-extubation stridor resulting from chronic laryngeal edema following radiotherapy

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## Abstract

Reliably predicting which patients may have a difficult airway is a cornerstone of airway management by physicians. Radiotherapy to the airway can lead to short- and long-term side effects such as future difficult intubation, chronic laryngeal edema, and post-extubation respiratory complications. We present the case of a 76-year-old man with chronic laryngeal edema secondary to a remote history of neck radiation for laryngeal carcinoma who presented to the emergency department with community-acquired pneumonia requiring mechanical ventilation. Although the patient's respiratory status improved after several days of mechanical ventilation, he failed several extubation attempts due to upper airway obstruction secondary to edema and required a tracheostomy. This case highlights the crucial but often overlooked long-term complications of neck radiotherapy.


## Introduction

Squamous cell carcinoma is the most common type of laryngeal cancer.[1] Radiotherapy, alone or in combination with chemotherapy or surgery, remains the mainstay of therapy for laryngeal cancer. Radiotherapy of the neck can lead to both acute and chronic soft tissue damage, resulting in swallowing dysfunction, speech difficulties, and laryngeal edema.[2] In addition, swallowing dysfunction has been shown to increase the risk of aspiration pneumonia.[3,4] Radiotherapy also introduces several risk factors for difficult intubation, such as reduced mouth opening and changes to the anatomy of neck structures.[5,6] However, the link between neck radiotherapy and airway obstruction after extubation is largely understudied.[7]

Post-extubation airway obstruction can present as post-extubation stridor (PES), which is a common problem in the intensive care unit (ICU), affecting up to 26% of extubated patients.[8] Like all extrathoracic airway obstructions, PES presents with inspiratory wheeze and typically reflects an airway narrowing of >50%.[8] Risk factors for PES include duration of intubation (>36 hrs), severity of illness, female sex, tube size, cuff pressure, and traumatic or difficult intubation.[8,9] Estimating the likelihood of PES is important in order to stratify patients and identify those who would require reintubation, which is associated with significant morbidity and mortality.[10]

We describe a case of community-acquired pneumonia complicated by chronic post-radiation lymphedema leading to two instances of PES, ultimately requiring tracheostomy.

## Case Report

A 76-year-old man presented to the emergency department with a two-week history of dyspnea and cough. His past medical history was significant for a T2N0 squamous cell carcinoma of the vocal cords that was treated with definitive radiotherapy eight years ago. He was considered cancer-free at presentation and was followed by ear, nose, and throat (ENT) surgery in the community for persistent supraglottic edema and hoarseness. The patient also had a five-year history of gastroesophageal reflux disease complicated by Barrett's esophagus as shown on several surveillance gastroscopies.

On arrival to the emergency department, the patient's vitals were: HR 127, RR 40, BP 120/55, T 37.2 °C, and SpO2 80% on room air that improved to 89% on a non-rebreather mask at 15 L/min. Key lab work on presentation showed a white blood cell count of 17.0 x $10^9$ (normal 3.5–10.5 x $10^9$), lactate 5.4 mmol/L (normal 0.7–2.1 mmol/L), VBG pH 7.41 (normal 7.33–7.44), pCO2 33 mmHg (normal 41–51 mmHg), and HCO3 21 mmol/L (normal 21–30 mmol/L). Initial chest X-ray revealed right middle and lower lobe consolidation. A computed tomography (CT) angiogram showed no evidence of pulmonary embolism. Due to his previous history of laryngeal cancer and radiotherapy, he was deemed to have a difficult airway and was referred to the anesthesia team for airway management. He was intubated in the operating theatre with an 8.0 mm endotracheal tube via awake video laryngoscopy. Intubation was atraumatic, achieved with one attempt, and airway distortion was not seen.

The patient was started on ceftriaxone 2000 mg IV daily, azithromycin 500 mg IV daily, and a five-day course of prednisone 50 mg PO daily. Five days later, the patient was weaned from the ventilator and extubated. Several hours following extubation, he developed stridor and was in acute respiratory distress. A two-day trial of dexamethasone 8 mg IV three times daily, salbutamol 200–400 mcg metered dose inhaler, and epinephrine 2.5 mg nebulized were given as needed but with minimal improvement. The anesthesia team was alerted and the patient underwent awake fibre optic intubation with a 7.0 mm endotracheal tube, which showed supraglottic edema. Two days later, a cuff-leak test suggested absence of an upper airway obstruction. The patient was weaned from the ventilator and extubated again with an airway exchange catheter in place for several hours, as suggested by the Difficult Airway Society Guidelines.[6] However, he again developed stridor and was reintubated over the airway exchanger. ENT was consulted and evaluation by endoscopy revealed diffuse supraglottic edema, later confirmed by a CT neck. A decision for a surgical airway was made and he was brought back to the operating theatre for tracheostomy under general anesthesia. Prior to discharge, a barium swallow showed evidence of aspiration. The patient was discharged subsequently with tracheostomy *in situ*.

## Discussion

This case report demonstrates two coexisting complications of radiotherapy. The patient likely suffered from swallowing dysfunction causing aspiration pneumonia, which required intubation and ventilation, as well as chronic laryngeal edema exacerbated by prolonged intubation.

Complications from radiotherapy are often acute following treatment; however, complications have been described up to ten years

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after treatment.[11] Soft tissue damage and fibrosis often lead to swallowing dysfunction, which may predispose the patient to aspiration pneumonia. Patients who receive radiotherapy for laryngeal carcinomas have a 23.8% five-year risk of aspiration pneumonia.[3]

Laryngeal edema is another common complication of head and neck radiotherapy, affecting 75% of patients three months after treatment.[2] Risk factors for laryngeal edema after radiotherapy include severity of disease, radiation dose, surgery, infection, and obesity.[2,12] Management of this complication has been derived primarily from treatments for lymphedema of the extremities, thus airway-specific outcomes (e.g., the duration of the peri-extubation period) are not addressed.[13] The mainstay of therapy includes manual lymph drainage, oral selenium, and surgery. While oral selenium has been shown to reduce the risk of tracheostomy in some cohorts by 65%, this has not been studied in acute presentations such as in the presented case, and would be contraindicated in NPO patients.[12] Similarly, manual and surgical manipulation of laryngeal edema in acutely presenting patients is unstudied but would likely lead to further complications.

The cuff-leak test can help predict acute laryngeal edema following extubation.[14-16] To perform the cuff-leak test, the cuff of the endotracheal tube is deflated while it is in situ. Air movement around the endotracheal tube suggests the absence of an obstruction. However, the diagnostic utility of the cuff-leak test depends greatly on the pretest probability of PES—the majority of diagnostic value coming from high-risk patients.[17] In the absence of a cuff-leak, administration of steroids four hours prior to extubation reduces the risk of reintubation by 11.2% and PES by 21.1% by reducing soft tissue swelling.[17] In this case, the patient did have a cuff-leak test indicating absence of obstruction and already received multiple courses of steroids, yet still ultimately required tracheostomy.

As the literature currently stands, there is no gold standard prevention and treatment for upper airway obstruction compounded by previous radiotherapy as seen in this case. While steroids and epinephrine were used, they did not alleviate the airway obstruction. Multiple attempts and traumatic airway manipulation can also lead to soft tissue swelling; however, the initial intubation on admission was described as a single attempt and atraumatic. Timing for extubation might also impact outcomes, as duration of intubation is an independent risk factor for post-extubation stridor.[9] However, this patient was intubated for five days before the first trial of extubation, which is not considered excessively long by ICU standards.

Finally, determining the timing of tracheostomy for intubated patients remains an area of debate. "Early tracheostomy," defined in the literature as between 7 and 14 days, has been shown to reduce the rate of laryngeal damage, hospital-acquired pneumonia, and acute respiratory distress syndrome, as well as the duration of mechanical ventilation and ICU stay.[18–20] ICU guidelines suggest contemplating a tracheostomy in patients who have been intubated for over two weeks or during the first week if the patient is not likely to be extubated. The intent behind these guidelines is to prevent the common side effects of tissue necrosis and tracheal stenosis. This patient was weaned from the ventilator in five days and was initially not considered for early tracheostomy. Given the risk of each trial of extubation, patient harm may be avoided by prioritizing tracheostomy in this unique demographic.

## Conclusion

In summary, patients who receive head and neck radiotherapy may have chronic complications such as laryngeal edema for years after treatment. They may not be symptomatic until their airway is further manipulated, resulting in more edema causing upper airway obstruction. Recognition of the risk factors for PES and a high index of suspicion is warranted in airway management in this group of patients. When in doubt, elective tracheostomy may arguably be considered as part of the weaning protocol, while acknowledging that tracheostomy has its own set of complications.

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## Conflict of interest

The authors have declared no conflict of interest.

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# Telemedicine use for treatment of opioid use disorder and other comorbidities during COVID-19: A case study

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## Abstract

The COVID-19 pandemic has led to the rapid integration of telemedicine (TM) services within existing healthcare frameworks worldwide. The objective of this case report is to highlight the role of TM as a valuable adjunct to in-person care, with a focus on clinical outcomes associated with telemedical assessments and its potential to provide accessible healthcare to marginalized populations. We interviewed a 51-year-old male patient at Crosstown Clinic in Vancouver's Downtown Eastside, where he receives injectable opioid agonist therapy (iOAT) for the treatment of opioid use disorder (OUD), as well as care for multiple sclerosis (MS) and Hepatitis C (HCV). The patient presented with several days of diplopia during the COVID-19 pandemic, prompting an urgent TM appointment with neuro-ophthalmology. A sixth nerve palsy was identified by virtual physical exam, leading to the initiation of high dose oral prednisone and urgent MRI, which identified a new lesion adjacent to the left optic nerve. The patient described several advantages of TM compared to in-person visits, including greater flexibility in arranging appointment times, and similar quality of physician assessment and care. Existing TM research demonstrates a reduction in disease transmission associated with in person visits, as well as decreased financial and opportunity cost to patients. TM also shows non-inferior outcomes compared to in person visits for patients undergoing treatment for MS and HCV, and has some benefits in substance use disorder management. The growing body of evidence surrounding TM related outcomes and benefits to patients suggest a role for telemedical services in the delivery of effective and accessible healthcare.

## Patient background

A 51 year-old male with a history of multiple sclerosis (MS), chronic Hepatitis C (HCV), and Opioid Use Disorder (OUD) presented to Vancouver's Crosstown Clinic in the midst of the COVID-19 pandemic with a several-day history of diplopia. At the time of interview the patient had been receiving injectable opioid agonist therapy (iOAT) at Crosstown for nine years and was in sustained remission from OUD. Crosstown Clinic consists of an interdisciplinary team of addiction specialists and is the first North American clinic to offer "medical grade heroin (diacetylmorphine) and legal analgesic hydromorphone under a supervised setting".[1] The patient was diagnosed with relapsing-remitting MS 20 years previously via magnetic resonance imaging (MRI) following an episode of sudden onset left hemiplegia and had since been symptom free. Given his MS history, and with concerns around in person appointments due to COVID-19, an urgent telemedicine (TM) assessment was arranged and performed at Crosstown Clinic via Zoom video call by a neuro-ophthalmologist from the University of British Columbia (UBC) Centre for Brain Health.

## Patient experience with telemedicine

Virtual cranial nerve examination, in which the physician assessed extraocular movement with the patient seated directly facing the camera, identified a left sixth nerve palsy. An urgent MRI was ordered which demonstrated a new lesion adjacent to the left optic nerve, and the patient was prescribed a three day course of high-dose oral prednisone. The patient's symptoms did not respond to steroid treatment, and at the time of interview he was awaiting in person ophthalmology assessment and spinal MRI. The patient identified several advantages of assessment via TM. He was not required to travel from his home in the Downtown Eastside to UBC for assessment, allowing greater flexibility in appointment scheduling. The assessing specialist was able to see him within a week, and the patient believes this was due to the virtual nature of the appointment. He did not feel that the quality of assessment was diminished by his virtual physical examination. He noted the circumstances under which he would have preferred an in-person visit include: when experiencing acutely distressing symptoms (e.g. severe pain), undergoing medication changes, and when there are expectations of thorough discussion or baseline physical assessments. Overall, the patient stated that he would use TM again.

## Patient engagement with Crosstown Clinic

The patient went on to describe the role of Crosstown Clinic in coordinating care for his health conditions, and the benefits of the iOAT program both in managing addiction and reducing his comorbid health burden. He first sought treatment for opioid use disorder in his early twenties, when opioid agonist treatment (OAT) with oral methadone was the only available option. Unfortunately, the patient developed severe hot flashes as his methadone dose was up titrated, ultimately leading to medication cessation. Several trials of OAT with oral buprenorphine/naloxone were attempted once this option became available. The patient found this treatment less effective in controlling cravings, and with ongoing OUD as well as the undesirable side effects of oral methadone, the patient continued the intermittent use of illicit opioids. He then enrolled in the initial cohort of Crosstown Clinic's iOAT program nine years ago and remains in the program to this day.

Two formulations for injectable OAT are offered at Crosstown Clinic: diacetylmorphine and hydromorphone. The patient initially started on diacetylmorphine, which produced a "pins and needles" sensation requiring diphenhydramine to control. He was switched to, and remains on, injectable hydromorphone. His current treatment is 170 mg hydromorphone each morning and 200 mg hydromorphone each evening. This dose controls the patient's cravings and has facilitated cessation of illicit opioid use.

Beyond the impact of iOAT in treating the patient's OUD, he describes several additional ways in which the program has benefited him. Primarily, he can now redirect the time and energy spent procuring

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substances, which he describes left him feeling worn down, to other areas of his life. He has abstained from alcohol for the past three years and reduced tobacco consumption from one pack to a half pack per day. The patient was diagnosed with HCV through Crosstown Clinic after initiating iOAT, and with the development of novel antiviral therapies he is now pursuing curative treatment. Since developing diplopia, the patient has been connected with cross-disciplinary MS care. The patient emphasized that the services provided by Crosstown Clinic have been instrumental in effectively managing his various healthcare needs.

## Benefits of telemedicine services and implementation

Over the course of the COVID-19 pandemic, TM has emerged as a critical adjunct to in person primary care, eliminating the risk of viral transmission inherent in clinical settings and preserving personal protective equipment.[2,3] COVID-19 has demonstrated the following: many outpatient visits can be effectively managed from a distance via TM; the infrastructure for TM is widely available and can be rapidly established; there is little practitioner or patient resistance; and it is feasible for governments to relax restrictive regulations to ensure its effective deployment.[4] TM use among physicians is amidst a surge, with 48% of physicians reporting TM as part of their practice in 2020, up from 18% in 2018.[5]

The emerging body of evidence surrounding TM suggests non-inferiority in clinical outcomes for a variety of conditions and patient populations. Patients receiving TM check ins over the course of direct-acting antiviral treatment for HCV achieved similar sustained virologic response or "cure" rates compared to those receiving in-person care,[6,7] providing evidence for TM as a potential tool in HCV management. It is also notable that prior engagement with an iOAT program has been shown to facilitate the initiation of HCV treatment,[8] as was the case for the patient interviewed. Among patients with MS, TM assessments have shown to reliably determine neurological impairment via the Kurtzke Expanded Disability Status Scale.[9] 86% of patient receiving MS care via TM felt their clinical goals were met during individual appointments, and 96% reported overall satisfaction with the care they received.[10] In these populations, TM has been shown to reduce costs inherent with in person care, such as lost wages and commuting costs such as parking, gas, airfare, and accommodations.[10,11] Additionally, it was found to improve relationships with primary care providers.[10,11]

## Telemedicine in vulnerable populations

The effectiveness of iOAT is well established among individuals otherwise not engaged with or underserved by the healthcare system.[12,13] The Study to Assess Long Term Opioid Maintenance Effectiveness demonstrated non-inferiority in reduction of injectable street opioid use and illegal activities between hydromorphone and injectable diacetylmorphine for individuals not benefiting from OAT.[14] In this case study, the patient's engagement with Crosstown's iOAT program resulted in not only the cessation of illicit opioid use but has facilitated care for each of his complex and intersecting comorbidities. Particularly, the use of TM in the care of a patient undergoing treatment for OUD allowed accessible and timely neuro ophthalmological assessment of symptoms consistent with an MS relapse. Effective treatment of conditions such as OUD require regular follow up and a strong therapeutic alliance,[15] and TM offers a low barrier means of maintaining engagement with the healthcare system. Many physicians in the United States have transitioned at least in part to TM-based OUD treatment strategies,[16] suggesting a role for TM in the care of marginalized populations. Despite certain challenges not yet addressed with this care model, these patients commented on TM's increased access and convenience, and physicians noted reduced "no show" rates.[16]

## Challenges in telemedicine use and implementation

Several potential drawbacks of TM have been identified in the literature. Developing adequate provider patient rapport is a concern in an "artificial" encounter, particularly with new patients and in assessing conditions such as OUD, which can be emotionally charged.[15,17] Despite evidence that TM may reduce healthcare-related expenses for patients,[18] ensuring access to stable internet connection of adequate speed and quality is of particular concern among patients of lower socioeconomic status. Technological literacy may present a barrier for elderly populations, as evidenced by a 2017 survey citing the average age of telemedicine users in British Columbia as 31.4 years old.[19] Integrating TM within existing healthcare structures will require cooperation between provincial, national, and international medical communities as well as between the medical community and national governments. Standards of assessment/treatment continue to be developed in order to maintain patient safety.[20] Although British Columbia has updated TM billing procedures for physicians, these are not yet uniform or established throughout North America.[21] Despite these challenges, the literature suggests that TM is providing value in engaging and retaining patients within the healthcare system while improving access to care, and with evidence for non-inferiority in clinical outcomes when incorporated into treatment models for a variety of conditions.

## Conclusion

Many Canadians are affected by disparities in social determinants of health, such as income and social status, health behaviours, and employment,[22] and often face many individual and structural barriers to accessing specialized medical care. There have been multiple challenges in the rapid implementation of telemedical services in response to COVID-19, particularly in domains associated with interpersonal connection between patient and provider, equitable access for all patient demographics, and the incorporation of this system uniformly into individual practices and health authorities. Despite these challenges, TM's unprecedented expansion provides us with not only a powerful tool in delivering care to patients, but with the ability to connect and engage with those who may have otherwise fallen through the cracks of the healthcare system, and to ultimately improve their health outcomes and quality of life.

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## Conflict of interest

The authors have declared no conflict of interest.

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# Access to cancer radiotherapy: The effects of geography and rurality on patient choice of treatment

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## Abstract

Access to healthcare remains an issue affecting various populations within the Canadian healthcare system. One of these populations includes patients residing in geographical areas at a greater distance from healthcare facilities. For patients with cancer, a barrier is created by the increased travel time associated with residing at a greater distance from a facility offering radiation therapy. This barrier may cause patients with cancer to consider more invasive treatment options in order to alleviate the burden imposed by travel. Further research into this barrier has the potential to provide information to mitigate the effects on patient choice of cancer treatment.


The Canada Health Act is built upon five pillars: public administration, comprehensiveness, universality, portability, and accessibility.[1] Specific to the pillar of accessibility, the act states that "continued access to quality health care without financial or other barriers will be critical to maintaining and improving the health and well-being of Canadians."[2] However, access to health care services, including radiation therapy, is one pillar that has been noted to differ between geographical regions.

Radiation therapy is required in the treatment of more than 50% of patients with cancer; however, studies have shown this resource to be an underutilized treatment option.[3] Additionally, radiation therapy is a curative treatment modality for certain patients with cancer, has the ability to decrease cancer recurrence, increases survival, allows for organ preservation, and improves quality of life.[4-6] Currently in British Columbia (BC), radiation therapy is available in six locations: Abbotsford, Kelowna, Prince George, Surrey, Vancouver, and Victoria.[7]

For patients residing at a greater distance from a treatment centre, geography has the potential to create a unique set of challenges.[8] These challenges stem from an array of sources, including travel time to the treatment facility and season of diagnosis.[5,8] Furthermore, these challenges have the potential to impact not only where a patient receives cancer treatment, but also the type of treatment that they are most likely to receive.[9,10]

Due to the requirement of specialized equipment and highly trained staff, radiation therapy is only available in a limited number of treatment centres in most jurisdictions.[11] For patients undergoing radiation therapy, this often involves approximately twenty return trips to the treatment facility, or bearing the additional costs of staying in nearby accommodations.[12] A Canadian study found that within one year of diagnosis, utilization rates of radiation therapy decreased after approximately two hours of travel time to the treatment facility.[8] The degree of decrease in utilization after the two hour travel time point varied by cancer type; however, this time frame seemed to contribute to the decision-making process for patients.[8]

In terms of patient choice of treatment, distance to treatment facility has been shown to play a role as an influential factor.[10] This factor compounds the finding that convenience and financial considerations influence where patients with cancer are more likely to receive treatment, and consequently which treatment they are more likely to receive.[12] In women with early stage breast cancer who qualify for breast-conserving surgery with adjuvant radiotherapy, a longer travel time to the radiotherapy facility is associated with higher rates of mastectomies, a more invasive surgery.[10] The choice of radiation therapy with breast-conserving surgery over a mastectomy would allow for organ preservation in these patients.[10] Similarly, patients defined as rural, based on their commuting information, with early stage laryngeal cancer are less likely to receive radiotherapy as their primary treatment than urban patients and instead receive higher rates of surgery.[12] Although survival outcomes are similar between the two methods of treatment, the use of radiotherapy rather than surgery in this situation would allow for preservation of the larynx and speech.[12] In this case, primary treatment with surgery consists of a short stay in hospital, while radiotherapy often involves numerous return trips to the treatment facility.[12]

Another unique obstacle encountered by patients diagnosed with cancer, and residing at a greater distance from a treatment facility, is the effect of the weather and season on their ability to access health care.[5] It has been observed that women diagnosed with breast cancer in the winter months who reside further from their treatment facility are less likely to receive post-breast conserving surgery radiotherapy, potentially placing them at an increased risk of recurrence.[5] This is simply one example of a challenge that exacerbates the initial barrier of travelling for cancer treatment.

One of the primary purposes of building cancer centres is to provide a centre for radiotherapy where radiation oncologists, physicists, radiation therapists, radiation therapy service technicians, and other personnel are all required to offer a unique service.[13] The smallest BC Cancer Centre cost approximately 100 million dollars to build, not to mention the ongoing operating costs and salary requirements.[14] This figure demonstrates the substantial cost required to build many smaller centres in locations at greater distances from the current treatment facilities.

Travel and financial strains are almost inevitable for patients requiring radiation therapy and residing at a greater distance from a treatment centre. Current supports in place with the goal of easing the associated burdens include satellite clinics in communities at a great distance from cancer centres, virtual health, and general practitioner (GP) oncologists administering chemotherapy.[15-17]

The developments made to date in making cancer treatments more accessible for patients residing at a greater distance from cancer treatment centres highlights the value in learning about barriers

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that impede access to care for these groups. When planning for the development of new facilities or treatment programs, the barrier created by the distance to treatment facility should be strongly considered. It is critical to remember that the geographical barriers faced by patients may also be compounded by other factors, creating additional considerations when approaching this issue.

Further research into barriers impeding access to care in communities at a great distance from cancer centres would provide valuable information that may be used to mitigate the effects of these barriers in the future. This would potentially allow for the removal of the limitations of geography in choice of treatment and improve the pillar of accessibility to health care in Canada.

## Conflict of interest

The authors have declared no conflict of interest.

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# Dialogue in dermatology: The importance of diverse representation

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## Abstract

Systemic racism is a long-standing health crisis and current events have invigorated discussion and accountable curricular change. One example is the inclusion of a broader range of skin colours in dermatology training materials. Dermatological conditions represented predominantly on lighter skin overlook phenotypic differences encountered in medical practice, contributing to underrecognized and undertreated dermatological disease for people of colour. Recognizing the diversity of dermatological presentations across different skin colours should be a physician competency, especially as Canada becomes increasingly diverse. Diversifying dermatology training resources is one necessary step for better equipping future physicians to provide quality care and improve health outcomes.


## Introduction

A common perception among Canadian medical students is the paucity of dermatology content in undergraduate training relative to the frequency and diversity with which dermatological conditions present in medical practice. Skin science is typically mentioned tangentially, and teaching materials problematically default to white skin to depict pathology. Although the University of British Columbia (UBC) is a leader among Canadian schools for delivering the most hours of formal dermatology training and mandating clinical experiences,[1] we found significant room for increased representation of skin colour in dermatology teaching materials. Teaching time aside, our dermatology curriculum needs educational resources that better represent the broad range of skin colours and pathology we will be asked to assess and treat as physicians.

These initial years of medical training provide students with foundational concepts and frameworks to begin building professional competencies. However, insufficient discussion around the diversity of dermatologic presentations can leave knowledge gaps that are easily overlooked. Clinical experiences, where formally organized by medical schools or otherwise encountered by trainees, may only fill a fraction of these knowledge gaps. Additionally, clinical experiences are more meaningful if the right mental frameworks have already been established. The downstream consequences of insufficient training in dermatology may include underconfident assessment, unmet patient needs, excess referrals and biopsies, and strains on healthcare resources, for which ongoing physician training is just one piece of the solution.[2] A recent review commissioned by the Royal College of Physicians and Surgeons of Canada agreed that an insufficient amount of curricular time is currently allocated to dermatology content and they recommended advocacy by professional dermatology societies to expand competencies in undergraduate and postgraduate medical education.[3] Although the need to expand dermatology training is well recognized, another important issue in the currently compressed curriculum is the lack of representation of skin colour as a broad range and disease phenotypes as a diverse set.

## Dermatological Diversity and Outcomes

There exists a diversity of presentations of clinical signs and dermatological conditions for different colours of skin and ethnic groups, yet classic Eurocentric descriptions used in medical training often overlook these differences. For instance, atopic dermatitis (AD) is taught as a pruritic, erythematous plaque with fine scaling on flexural surfaces of lighter skin, but literature has recognized that African and Asian populations can present with extensor rather than flexural involvement, as well as greater pruritus and lchenification.[4] Erythema, a key feature for AD and numerous other skin conditions, can appear violaceous or not at all on darker skin.[4,5] Other pertinent differences in clinical presentations exist for psoriasis,[5,6] acne,[7] skin cancers,[8] and other common dermatological conditions which future physicians will be asked to recognize and treat.[9-11] The pattern recognition skills which students develop by studying images of predominantly lighter skin tones are inadequate to recognize the true diversity of clinical presentations. This training paradigm renders real consequences for health outcomes among people of colour (POC).

POC are more likely to experience diagnostic delays and avoidable sequelae of dermatological disease likely due in part to the underappreciated phenotypic diversity of dermatological presentations. Population-based studies in the US and UK have shown higher prevalence, greater severity, and more medical attention being sought for AD among children with African ancestry compared to those of European ancestry.[4] The combination of healthcare under-utilization by African populations, influenced by long-standing racism, distrust in healthcare, and lack of "classic" erythema at initial presentation likely contribute to advanced disease at diagnosis, requiring dermatology referral.[4] Acral lentiginous melanoma, known to predominantly affect Black populations, is typically diagnosed at more advanced stages with poorer prognosis likely due to a lack of awareness for this disease.[12] In the case of Lyme disease, infection with Borrelia burgdorferi is recognized earlier as erythema migrans in White Americans and later as arthritis in Black Americans,[13] possibly due to the strikingly different appearance of erythema migrans on lighter versus darker skin.[14] By 2031 nearly half of second-generation Canadians will be of a visible minority,[15] thus correctly recognizing and appropriately treating dermatological disease in all people regardless of skin colour should be considered an increasingly important physician competency. To this effect, the Royal College recognizes that future resident trainees in dermatology need greater exposure to diverse populations,[3] a principle which arguably holds true for undergraduate dermatology training and medical education more broadly.

## Current Efforts

As a microcosm of ongoing dialogue and accountable reform in medicine, curricular updates in Canadian schools are necessary to better represent and teach the dermatological diversity of varied skin colours. With momentum from the Black Lives Matter movement, topics such as systemic racism and representation in medicine are

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increasingly discussed. Advocates across the country including student leaders, dermatologists, and faculty are taking initiative and lending insight on where more racial inclusion is needed in dermatology training. For instance, Canadian medical students are communicating and collaborating over social media to share resources between schools and accelerate curricular change. Some actionable ideas which medical faculties can adopt to promote diversity in dermatology include presenting more images of the same conditions on dark skin tones, delivering lectures on underappreciated dermatological conditions affecting POC, and hosting patient-led sessions discussing lived experiences of POC with dermatological disease. Likewise, many professional societies such as Skin of Color Society (skinofcolorsociety.org) are advocating and educating health care providers on dermatologic health issues for skin of colour.

## Conclusion

Here at UBC, many faculty members recognize the need for diversity and have heard student voices advocating for educational reform to promote greater curricular diversity and change. These individual efforts alongside the efforts of program directors, clinical professors, and other student groups, including the UBC Medicine Social Justice club and the Black Medical Student Association of Canada, are all drivers for curricular change. Longitudinal dialogue will be crucial to address current gaps in dermatology training and remedy downstream health inequities. With faculty receptive to student advocacy, we are optimistic about future steps towards a more diversified dermatology curriculum at UBC that better equips future physicians to provide quality medical care to all Canadians.

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# Injectable opioid agonist therapy in British Columbia: An effective treatment with persistent barriers

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## Abstract

The opioid overdose crisis in Canada has dramatically worsened during the current COVID-19 pandemic. People who use opioids are dying at unprecedented rates, and a rapid expansion of available treatments for opioid use disorder (OUD) is needed. Injectable opioid agonist therapy (iOAT) is an evidence-based treatment for OUD with a superior retention rate. However, iOAT is currently only available in seven specialized clinics across British Columbia, and many people who may benefit from iOAT cannot access it. In this commentary paper, we discuss evidence behind iOAT, outline barriers preventing greater access, and make suggestions around how to improve access to iOAT.

Illicit drug overdose deaths have been escalating in Canada, particularly in British Columbia, for the past two decades; however, during the recent COVID-19 pandemic, the overdose death count has been record-breaking.[1,2] Prior to the pandemic, British Columbia's high rates of fatal overdose were attributed primarily to widespread contamination of the illicit opioid supply with the highly potent synthetic opioids fentanyl and carfentanil, as well as other drugs such as benzodiazepines.[3] The COVID-19 pandemic has further exacerbated this crisis. People who use drugs in British Columbia report that the pandemic has been accompanied by a breakdown of support services and safety resources, as well as a dramatic increase in the price of illicit substances.[4] Increasingly high rates of fatal overdose reflect an urgent need for the widespread implementation of effective strategies to reduce the harms associated with opioid use disorder (OUD). An evidence-based treatment strategy that has the potential for expansion in British Columbia is injectable opioid agonist therapy (iOAT). There is strong evidence to support iOAT as a valuable part of the range of treatment options for OUD, but financial and regulatory barriers continue to limit its use in British Columbia.

## Oral Opioid Agonist Therapy

Opioid agonist therapy (OAT) is an evidence-based treatment for OUD that mitigates opioid withdrawal symptoms and reduces many of the negative health and socioeconomic outcomes associated with illicit opioid use.[5-9] Guidelines at both provincial and national levels recommend buprenorphine/naloxone (Suboxone) as the preferred first-line treatment for OUD.[7,10] Oral methadone and slow-release oral morphine (Kadian) are recommended when first-line treatment is unsuccessful.[7,10] However, benefits are limited by poor retention, as an estimated average of 50–70% of patients started on oral OAT in British Columbia will discontinue treatment within 12 months.[11,12] There are various reasons why a patient may discontinue oral OAT, including an array of side effects and the limited efficacy of currently available oral medications in preventing craving and withdrawal.[7] Existing research emphasizes the need for diversification of treatment options in order to achieve optimal levels of retention in care.

## Evidence for iOAT

Alternative therapies are essential to reducing adverse health outcomes for patients whose treatment needs are not met by oral OAT.[5] In this context, iOAT has emerged as an evidence-based treatment option. In 2009, The North American Opiate Medication Initiative (NAOMI) Randomized Control Trial found that the 12-month retention rate for injectable diacetylmorphine (medical-grade heroin) was 87.8% vs 54.1% for oral methadone.[13] Furthermore, the Study to Assess Longer-term Opioid Medication Effectiveness (SALOME) trial found that injectable hydromorphone was non-inferior to diacetylmorphine in terms of retention rates.[14] Retention in opioid agonist treatment has been linked to improved overall health, quality of life, and social functioning, as well as a reduction of illicit opioid use, criminalization, and mortality.[15,16] There is now a strong body of evidence supporting iOAT as a highly effective for treatment of severe refractory OUD, which has prompted the development of clinical practice standards for its use. Currently, hydromorphone and diacetylmorphine iOAT are both available in British Columbia and as of March 2020, 136 patients in the province were being prescribed diacetylmorphine, and 120 were being prescribed hydromorphone for iOAT.[17] However, many other patients who meet eligibility criteria for iOAT are not able to access it.

## Barriers to Accessing iOAT

One significant barrier to providing iOAT to eligible patients is the absence of sustainable support for the expansion of clinics, particularly outside of urban centers. To date, there are only seven clinics that prescribe iOAT in British Columbia including four in Vancouver, one in Surrey, one in Victoria, and one in Kelowna. iOAT clinic patients self-administer their medication 2–3 times daily under the direct supervision of a registered nurse or physician. Clinics typically also employ interdisciplinary teams to offer support such as social work, counselling, psychiatry, and housing and employment assistance.[7] Although this means that comprehensive iOAT clinics usually involve higher up-front operational costs, there is evidence supporting the efficacy and cost-effectiveness of establishing long-term, stable funding for a larger number of iOAT clinics across British Columbia as patients report wide-ranging benefits from the resources and therapeutic relationship-building that regular clinic attendance facilitates.[18]

Financial and regulatory barriers also limit the number of people who can access iOAT. Cost-benefit analyses show that iOAT is more cost-effective than oral OAT due to reduction in overdose, hospitalization, crime, and incarceration, with the highest savings seen in law enforcement costs.[14-16] One Canadian study quoted a savings of 12% when comparing overall societal costs of diacetylmorphine to methadone.[19] However, funding programs in British Columbia do not consider injectable hydromorphone to be a cost-effective treatment for OUD and require that prescribing physicians apply for Special Authority

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for this medication. Furthermore, diacetylmorphine is only available in Canada through the federal List of Drugs for an Urgent Public Health Need pathway, which allows the importation of drugs not yet approved by Health Canada only under exceptional circumstances.[20] Domestic production of diacetylmorphine is currently restricted despite good evidence for its safety and efficacy, with Canada's diacetylmorphine supply imported from Switzerland, making it expensive and complicated to obtain.

## Future Directions

Dismantling the barriers discussed above will be crucial to improve access to evidence-based treatment for OUD. Essential to this will also be the establishment of sustainable funding, both for the expansion of comprehensive iOAT clinics, and for lower-barrier options for delivery of pharmacy-grade injectable opioids. Expanding supervised treatment to general practice primary care clinics and pharmacies could further reduce the need for new infrastructure, be implemented quickly in rural areas, and support continuity of care.[21] Evaluation of the safety and efficacy of these delivery strategies is an important area for future work. Beyond this, it is relevant to explore the possibility of non-witnessed consumption, with research needed to assess how much the risk of diversion and overdose differs between patients on oral OAT and those on iOAT. Barriers to accessing medication can also be addressed by making injectable hydromorphone and diacetylmorphine available through BC PharmaCare without the need for Special Authority. On a national level, collaboration between provincial health ministries and the pharmaceutical industry will be necessary to secure the assignment of a Drug Identification Number (DIN) to diacetylmorphine for domestic production. It is also important to consider that although the expansion of iOAT is currently limited to diacetylmorphine and hydromorphone, expanding infrastructure would also facilitate exploration of other injectable opioid agonists as the landscape of illicit substance use continues to evolve.

## Final Thoughts

The members of society who are already most marginalized often face disproportionately severe adverse outcomes in times of crisis. People who use opioids in British Columbia have a long history of marginalization, which has increasingly manifested in preventable overdose deaths due to enforced reliance on a highly toxic, illicit drug supply. The opioid overdose crisis has been further exacerbated by the overlapping global health crisis posed by COVID-19, with people who use opioids dying at an unprecedented rate.[2] There is a clear and immediate need for expansion of effective treatment for OUD and increasing access to safe injectable opioids in the form of iOAT is essential to limiting further avoidable death. However, beyond the responsibility to provide evidence-based, life-saving care, it is also the responsibility of healthcare providers to advocate on behalf of patients. Ultimately, it is important to heed the voices of people most affected by this crisis and support them in their call for the establishment of an uncontaminated supply for all people who use opioids.[23,24]

## Conflict of interest

The authors have declared no conflict of interest.

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# The application of healthcare quality improvement methods during times of crises

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## Abstract

The Coronavirus Disease-2019 (COVID-19) pandemic is forcing rapid changes in health policies and processes, along with the questioning of assumptions. A hallmark of quality improvement (QI) methodology is repeated small-scale tests of process changes by frequent Plan-Do-Study-Act (PDSA) cycles, but how should QI be performed in times of crises? The pandemic dramatizes the need for "learning health systems" with new ways of learning faster and better. We argue that QI has a vital role in crises, alongside rapid research, but assessment of the aspects of QI that may require adaptation is also necessary within a rapidly changing context.


## COVID-19

In the midst of a global pandemic, how can we deliver high quality, timely, and safe care to patients while keeping ourselves safe? Presently, to accommodate new demands placed on the system, hospitals have modified their daily operational strategies, such as postponing elective surgeries and procedures to maximize the number of empty beds and implementing new disinfection policies and procedures to help limit potential viral transmission.[1,2] Additionally, public health officers are frequently adapting policies to the ebb and flow of the incidence of COVID-19 cases, implementing targeted lockdown restrictions, social distancing, and case contact tracing.[3] In the face of limited evidence, the emergence of novel problems limits the applicability of current guidelines and calls for quality improvement (QI) methodology.

## What is QI?

QI methodology involves systematic, continuous data-driven testing that can facilitate rapid and measurable improvements in patient care and healthcare systems.[4] This approach focuses on systems rather than individuals within the system and seeks to optimize outcomes while improving efficiency and reducing costs.[5] Participants in QI projects include the healthcare staff, hospital leadership, researchers, and patients in a single organization or setting. [6] QI involves small-scale trials of changes, following the Plan-Do-Study-Act (PDSA) cycle framework (Figure 1).[7] Results from one test immediately inform the next cycle and support changes in clinical practice. Other QI tools include checklists, fishbone diagrams, driver diagrams, and Pareto charts.[8] Compared to research studies, results from QI studies are typically less generalizable because findings are institution-specific.[4] They focus on processes—implementation of knowledge in a certain facility or local healthcare system, whereas research produces new knowledge, particularly on outcomes that are intended to be generalizable (Table 1).[9] Lastly, QI projects usually incur minimal risk to subjects and require less meticulous review by research ethics boards.[4]

## QI during the COVID-19 pandemic

Applying QI methodology during a pandemic facilitates more rapid learning compared to haphazard learning from less structured trial-and-error experiences. By quantifying processes that otherwise would go unmeasured, QI reveals what parts of a system are working effectively and what parts need process changes. QI sheds light on process steps in the causal pathway that might otherwise remain invisible. Process metrics in the pandemic response include compliance with social distancing, mask-wearing, hand hygiene, and opened windows for air exchange. Measuring unintended consequences ("balancing measures") is also part of QI methodology. For example, when discharging patients early from the intensive care unit to make beds available for incoming COVID-19 patients, a balancing measure is the ICU readmission rate, which is associated with high mortality.[10]

To those unfamiliar with QI, the idea of doing additional data collection and review during times of crises may sound daunting. However, QI methods can be simple and easily adapted to any clinical setting. A few studies have been published demonstrating just how quickly QI methodology can be implemented during the COVID-19 pandemic.[11-13] In one study, researchers at the Royal National Orthopaedic Hospital in the United Kingdom undertook QI to transfer the majority of its consultations virtually (virtual consultations, VC) to reduce the number of face-to-face visits.[11] Their goal was to

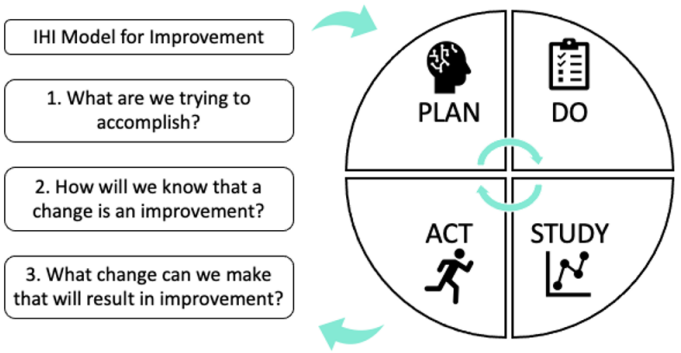


**Figure 1** | PDSA cycles in quality improvement.[7] (adapted)
In a PDSA cycle, the first phase ("plan") involves planning a test of change. In this phase, QI personnel plan how they will collect the data, they state their objectives and questions, and they make predictions. Secondly, QI personnel carry out ("do") a test of that change on a small scale. Here, they document problems and unexpected observations encountered and begin to analyze the data. Thirdly, QI personnel study and observe the results of their change. In this phase, they study and analyze the collected data, compare the data to their predictions, and summarize and reflect on what they have learned. Lastly, QI personnel act based on the learning of their results. The last phase is all about refinement, that is, tweaking the test of change based on what the QI personnel have learned. In the final "Act" phase, QI personnel also plan the next PDSA. Abbreviations: IHI, Institute for Healthcare Improvement; PDSA, Plan-Do-Study-Act.

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**Table 1** | Comparison of quality improvement, research and policy change. [9] (adapted)

| Aspect | Policy change, monitoring | QI, improvement culture | Rapid research |
|---|---|---|---|
| **Participation** | Led by authorities, experts | Everyone, with some training | Experts, volunteers |
| **Scale** | Big organizations, regions | Small local implementation | Large sample sizes |
| **Prior Evidence** | Proven, believed effective | Local effectiveness unsure | Efficacy unproven |
| **Metrics** | Existing metrics, e.g. deaths | New data on processes | Health outcomes |
| **Tools** | Databases, tracking system | Apps, checklists, charts | Clinical trial tools |
| **Timeliness** | Sudden, infrequent change | Quick cycles: days, weeks | Weeks to months |
| **Examples** | Lockdowns, mask rules | Tracking, testing, isolating | Drug, vaccine trials |
| **Generalization** | No intention to generalize | Lessons for similar settings | High generalizability |

Abbreviation: QI, quality improvement.

have 80% of consultations conducted virtually within three weeks. To do this, they implemented 36 PDSA cycles over a span of three weeks. PDSA cycles were undertaken by QI personnel to simultaneously change administrative processes, train clinicians, install technical infrastructure, redesign clinical pathways, and optimize patient and clinician experiences. The PDSA cycles were coordinated via daily group teleconference meetings, and by the second week, study researchers had achieved the 80% VC goal.

Another example of how QI can be implemented during pandemics emerged out of George Washington University Hospital, where QI methods were applied to reduce the risk of clinicians inhaling coronavirus particles during intubations.[12] With an intubation safety checklist, safety officers monitored the use of eight types of personal protective equipment (PPE), along with reasons for improper use. Post-procedure feedback was collected using a text-messaging template and electronic medical record note template, and results were reviewed in weekly multidisciplinary meetings. Over four weeks and 68 intubations of COVID-19 patients, the study ensured high compliance with PPE protocols and quick identification of process deficiencies.

Lastly, at the Cincinnati Children's Hospital, QI was used to implement COVID-19 temperature screening stations for visitors and employees entering the hospital.[13] PDSA cycles were used to optimize key elements, such as screening station layouts, social distancing, and station signage, whereas run charts were used to quantify the proportion of functional stations. For each intervention, researchers made a test of change and hand-collected data from observations. After the intervention was adapted, it was scaled up to over 50% of the screening stations in the hospital within two weeks. During this time, a PDSA cycle was performed every day at every screening station in the hospital. After 20 days of rapid testing, the hospital had 100% of its stations fully functional.

## Limitations of QI during pandemics

While there is evidence suggesting that QI is feasible and can be performed during the COVID-19 pandemic, the drawbacks of performing QI during times of crises should also be considered prior to being undertaken. For example, when the context is rapidly changing, the generalizability of results from one month to the next can be less valid. Additionally, reassignment of team members to other areas of the hospital or barring non-essential workers from the hospital altogether can make QI more difficult. For example, in the study from George Washington University Hospital, medical students were barred from the hospital and lost remote access to electronic medical records for two weeks.[12] The accelerated data collection in QI can result in compromises in the quality and quantity of measurements, the formality of PDSA cycles, and the accuracy of findings. For instance, in the United Kingdom study, the researchers admitted that the rapid pace of implementation resulted in missing data that had to be manually collected later.[11] Lastly, at the Cincinnati Children's Hospital, the hospital "leveraged existing quality improvement expertise" to conduct its study, suggesting that in smaller centers, a lack of personnel trained in QI methodology may also be a consideration when deciding to undertake QI.[13]

## Conclusions

QI methodology is applicable during times of crises. It is a reliable, adaptable framework that can change with the dynamic nature of the pandemic. However, the strategy shifts from driving incremental improvements in slow-to-change systems to organizing responses to large changes driven by the crisis. If circumstances preclude a formal QI study, informal use of checklists and the "PDSA mindset" can help with change management.

## Conflict of interest

Alessandro Cau is an executive member of the Institute for Healthcare Improvement (IHI) Open School UBC Chapter. Jenna Smith-Forrester is a former president of the IHI Open School UBC Chapter and continues to mentor IHI chapters across Canada. Malcolm Maclure is a faculty sponsor for the IHI Open School UBC Chapter.

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# Role of a medical student initiative in supporting homeless and precariously housed populations

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## Abstract

Homeless and precariously housed populations experience medical needs that are exacerbated by social marginalization and public health crises. Medical students have been shown to effectively serve vulnerable populations while improving their clinical and advocacy skills in student-run clinics across Canada. In response to the needs of stakeholders based in downtown Vancouver, a novel student-driven initiative is being developed with community partners to support the wellbeing of homeless and precariously housed individuals while empowering a future generation of physicians to address the constantly evolving health needs of underprivileged British Columbians.


## Introduction

As health disparities in Canada increase,[1,2] there is a progressively urgent need for healthcare services and system solutions. Individuals that are homeless or precariously housed are particularly disadvantaged,[3] and thus creative approaches beginning in early healthcare education are warranted. In this paper, we describe some of the unmet health needs of homeless and precariously housed populations, and provide evidence that medical students are well-positioned to serve this population under academic supervision. We also present an in-progress student-driven initiative co-designed with community partners that would support individuals in downtown Vancouver while building greater capacity in future physicians to address the health needs of vulnerable populations.

## Health Needs of Vulnerable Populations

Populations that experience homelessness or precarious housing have high rates of mental illness and chronic medical conditions,[3-5] and research shows that these health challenges interact to form specific needs.[6] For example, individuals living with diabetes are more likely to suffer from related complications if they have comorbid schizophrenia.[7,8] Additionally, a study of homeless populations in multiple Canadian cities found that the high rates of chronic conditions are associated with a lack of healthcare access and high treatment costs.[9] Barriers to care also include stigma, racism, and poor trust in the healthcare system.[10-12] Consequently, addressing both health conditions and social factors is essential to improving wellbeing in these populations.

At present, individuals who are homeless or precariously housed are particularly vulnerable to two public health emergencies: the opioid crisis and the COVID-19 pandemic.[13,14] Regarding the COVID-19 pandemic in particular, social distancing has limited the amount of resources available (e.g., harm reduction services), and multimorbidities render individuals more susceptible to the complications of COVID-19.[15]

Overall, the factors of decreased mental or physical capacity to seek care, limited resources, and social marginalization lead to urgent health needs and mortality rates higher than that of the general population.[16,17] With the added burden of the present dual public health emergencies, innovative solutions are now needed more than ever to support individuals who are homeless or precariously housed.

## Building Capacity in Medical Students

Given the health needs described above, it is essential to prepare future physicians to serve homeless and precariously housed populations in British Columbia (BC). In support of this, the University of British Columbia (UBC) Faculty of Medicine (FoM) affirmed that curriculum content must be tailored to the needs of the province.[18] The FoM also made commitments to prioritizing patients and the public, and to addressing health inequities.[19]

Experiential learning experiences have been shown to provide students with the skills needed to work with and advocate for vulnerable populations.[20] Socially marginalized populations will comprise a portion of future doctors' patients, and thus learning to support and build patient-provider relationships with members of this population in a community setting is an important component of medical education.

## Benefit of Student-Run Clinics

The "Student-Run Clinic" is an evidence-based model that places students under professional supervision in the community to serve underprivileged populations, such as groups that experience homelessness and precarious housing.[21] Research shows that because medical students can spend more time with each patient and consequently build trusting relationships,[22] medical students participating in student-run clinics can contribute significantly to the management of chronic disorders such as mental illness, dyslipidemia, diabetes, and hypertension.[23-25] Students can also provide meaningful referrals to community social and health resources, lifestyle management guidance, basic medical information, and basic screenings (e.g., blood pressure, body mass index [BMI], mood).[26,27] Overall, by helping manage chronic conditions, student-run clinics can help diminish suffering in society's most vulnerable members both during and after public health crises.[28]

Additionally, student-run clinics effectively help students advocate for patients through navigating system-based practices such as resource allocation, interdisciplinary collaboration, and monitoring and delivery of quality care.[20,29] Furthermore, participating in student-run clinics can empower students to enact positive change by participating in research, fundraising, and lobbying activities for more equitable care at multiple administrative levels.[29]

Various forms of student-run clinics exist around the world, each offering a range of services under the supervision of physicians.[30-33] There are currently eight in Canada that collaborate with each other as part of the Student Run Clinic Association (SRCA).[34] While there are presently none in BC, the SRCA provides an avenue for Canadian medical students to continuously learn from one another.

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## Formation of a UBC Student-Driven Community Health Initiative

A community-based student-driven health initiative at UBC is currently a work-in-progress. The initiative stems from a formal needs assessment and request from the leadership of Coast Mental Health (CMH), a non-profit organization that provides social services to a homeless and precariously housed population across Metro Vancouver. The initiative is also being developed with other stakeholders, including UBC FoM faculty members, physicians, and medical students both from UBC and across Canada through the SRCA.

Together, our team of students, physicians, CMH administrators, and persons with lived experience (i.e., those who access CMH resources) formed the following mission statement: First, to improve chronic disease management for individuals that experience homelessness or precarious housing, and second, to provide medical students with an experiential learning opportunity to serve a vulnerable population. To achieve this, the initiative would offer a variety of public health and primary care services, including medical literacy and lifestyle management workshops, as well as medical care to help manage metabolic syndrome and mental illness. These services would be provided by trained medical student volunteers under the supervision of UBC FoM clinical faculty using a trauma-informed and patient-centred approach.[35,36] The diverse leadership team would continually evaluate the initiative in order to ensure that the mission statement goals remain relevant and met, as well as to maintain financial sustainability.

## Conclusion

As BC faces growing health disparities, managing chronic conditions in individuals who are homeless or precariously housed has become increasingly urgent. Based on prior research, student-driven care of vulnerable populations developed with community partners can contribute to addressing unmet health needs. Ultimately, our goal is to help alleviate health-related suffering during public health emergencies and beyond through the creation of healthcare and medical education infrastructure with and for our future patients.

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## Conflict of interest

The authors have declared no conflict of interest.

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# Helping medical students adapt to a changing planet

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## Abstract

Climate change is a critical health issue for the 21st century. Degradation of our environment along with a warming planet is rapidly altering the way we provide care in British Columbia (B.C.). To address this challenge, it is vital to prepare medical trainees of today for a future where the health effects of climate change will become much more significant. Here, we discuss the necessity of integrating planetary health—an emerging field focused on the human health impacts of climate change—into the medical curriculum, outline current progress and obstacles in achieving this task, and present a framework in support of this initiative.


## Introduction

Climate change poses a growing health threat, with effects now extending across B.C. In the past century, the average annual temperature of the province increased by 1.4 °C;[1] by 2050, B.C. may experience a total temperature rise of 2.7 °C.[2] Such drastic temperature changes produce deleterious consequences across most dimensions of human health and pervasive impacts on the province's healthcare infrastructure.[3]

B.C.'s 2019 Preliminary Strategic Climate Risk Assessment outlines 15 risk events driven by climate change and temperature rise; of which, severe wildfire season, seasonal water shortage, and heat are three high-risk events facing the province.[3] While every event presents dire health impacts, the resulting mortality and morbidity effects will not be evenly distributed across the province, nor the population. Vulnerable communities and those with pre-existing medical conditions will encounter marked adversity. By way of illustration, Table 1 outlines how B.C.'s epidemiology may be impacted by three high-risk climate events.

The scope of the health effects of climate change for B.C. is extensive. As the health of our province is increasingly vulnerable to the changing environmental conditions, it is crucial to prepare our future physicians to meet these coming changes by integrating planetary health into the medical curriculum.

## Medical Education & Climate Change

Medical educators have the professional duty to serve the growing needs of their learners and the evolving health requirements of society. In recognition of the health impacts of climate change, the International Federation of Medical Students' Associations (IFMSA) has called for widespread integration of climate change into the undergraduate medical curricula.[4]

Though many schools have begun this process, significant gaps remain worldwide.[5] In Canada, a national taskforce assembled by the Canadian Federation of Medical Students (CFMS), entitled the CFMS Health and Environment Adaptive Response Task Force, assessed the availability of medical teaching on climate and environmental topics over past academic years.[6] From their recent report, every Canadian medical school has not "adequately addressed the urgent need for training" related to climate change.[6]

For the University of British Columbia (UBC), the report indicates many opportunities for improvement with didactic and case-based teaching. Our own search of curricular objectives in the 2018–19 pre-clerkship curriculum, with the help of UBC MedIT, revealed no planetary health content. As over 90% of UBC medical students are residents of the province,[7] there is a high likelihood that many graduates intend on staying and practicing medicine in B.C.[8] Knowing this, a widespread planetary health curriculum becomes a necessity to prepare the future physicians of B.C. for the changing epidemiology imposed by climate change.

## What are the Current Obstacles?

The addition of any curricular topics for medical students is a challenging task. A 2018 article entitled "Are medical schools keeping up with the times?" outlines various barriers preventing medical schools from addressing emerging health issues, which are further discussed below.[9]

First, any added curricular content must be sound and current, as stipulated by the Committee on Accreditation of Canadian Medical Schools (CACMS).[10] However, emerging topics in medicine may lack up-to-date guidelines with expert consensus. Unlike established segments of medicine, the specifics of climate change with regards to its impacts on health for the future remain uncertain. The magnitude and pattern of environmental degradation over prescribed geographical regions are variable; much of the potential health risks are determined by the extent to which we reduce our emissions in the coming decades.[11]

A perhaps greater obstacle is the inability of many medical schools to devote significant attention to climate change in an already-packed curriculum. Nationally, medical schools must meet standardized competency requirements to maintain their educational license. Planetary health, a topic that is currently not included in the accreditation criteria of CACMS,[10] may not be seen as having equal importance in the face of other competing educational needs.

## A Framework to Planetary Education

In recognition of an accelerating need for planetary education, we outline an approach tailored for the existing medical curriculum in B.C. to instigate future teaching on climate change and health.

First, the unknowns of planetary health should be stated, not left entirely unexplored. The complex nature between climate change and health needs to be embraced with well-structured objectives tackling elements of planetary health. Many health experts provincially and globally are now coalescing around this topic, with growing funding being given to climate change health research. For example, the Lancet Countdown on Health and Climate Change presents a yearly evidence-based report on how the specifics of human wellbeing is impacted.[11] Meanwhile, B.C.'s Ministry of Environment and Climate Change strategy continues to publish up-to-date reports detailing the health risks for the province.[2] Presenting these resources early in medical training encourages self-learning opportunities for students to develop expertise in planetary health.

Second, instead of changing a crowded medical infrastructure

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**Table 1** | How climate change may affect BC's prevalent health conditions

| | Severe Wildfire Season | | Seasonal Water Shortages | | Heat Waves | |
|---|---|---|---|---|---|---|
| | Potential Health Impacts | Epidemiological Example | Potential Health Impacts | Epidemiological Example | Potential Health Impacts | Epidemiological Example |
| **Asthma & Chronic Obstructive Pulmonary Disease (COPD)** | Patients with asthma and COPD are vulnerable to exacerbations and severe respiratory symptoms arising from wildfire air pollutants[12,13] | Smoke in fire-affected BC regions is associated with a significant increase in physician visits[12] and salbutamol dispensation[13] for patients with asthma and COPD | When rainfall is scarce, airborne dust, pollen, and contaminants remain in the air for longer, worsening existing respiratory illnesses[14] | In 2012, during a 15-day period of water shortage in Nebraska, the rate of asthma diagnosis increased by 1.23 times compared to the same time period in 2011[15] | Exposure to heat waves exacerbates respiratory symptoms for two possible reasons: (1) warm/humid air triggers broncho-constriction,[16] and (2) pollutants remain in the air with higher temperatures[17] | Between 1991-2004 in New York City, hospital admissions increased for COPD (7.6%) and asthma (3.5%) for each day with temperatures at least 1 °C above an average set threshold (29–36°C)[17] |
| **Diabetes Mellitus** | Diabetic patients are susceptible to cardiovascular damage with airborne particles (PM10) from wildfires[18] | A study in four US cities found that elevated PM10 concentrations increased hospital cardiovascular admissions in diabetic vs. non-diabetic subjects under age 75[18] | While seasonal water shortages are unlikely to restrict drinking water access, physicians must be aware of the already-existing dehydration risk for patients on SGLT2 inhibitors[19] | None available | Patients with diabetes are at risk for heat-related illness because of an impaired capacity to dissipate heat from diminished blood flow to the skin[18] | During the 1995 Chicago heat wave, hospital admissions for individuals with diabetes (Type 1 and 2) increased by 30% compared to baseline[20] |
| **Ischemic Heart Disease** | PM2.5 from wildfire is associated with heart attacks for all adults, particularly for those over age 65[21] | Wildfires between 2006–07 in Victoria, Australia resulted in a 6.98% increase in out-of-hospital cardiac arrest[22] | Drought-like condition is an environmental stressor that can exacerbate existing cardiac disease[22,23] | In US counties where seasonal water shortages are uncommon, cardiovascular disease risk increased during unexpected drought conditions[22,23] | Heat waves are associated with an excess of cardiovascular mortality, likely from an increased work required to maintain thermoregulation[24] | A 2016 systematic review found that hospitalizations due to cardiovascular causes increased up to 2.2% during historical heat waves in the United States[24] |
| **Mood Disorders** | Wildfire exposure and subsequent displacement is a known psychological stressor that leads to conditions such as depression, anxiety, and PTSD[25] | Youth displaced from 2016 Fort McMurray wildfires reported higher rates of anxiety, depression, PTSD, and substance-use disorder compared to those exposed to the same event but were not displaced[25] | The economic loss related to drought can lead to higher levels of distress, in addition to the sense of loss related to environmental degradation[26] | An increase in the drought severity index saw a 15% increase in deaths by suicide among working age men in rural Australia between 1970-2007[27] | Extreme heat events increase rate of anxiety, depression, and suicide rate (particularly among those with a past psychiatric history)[28] | During heat waves between 1950–84, New York psychiatric hospitals experienced a large increase in the number of deaths, which doubled to that of the general population[28] |
| **Infectious Disease** | Exposure to fine particulate matter can raise the susceptibility to infection due to impaired respiratory clearance[29] | During the 2003 California wildfires, higher levels of PM2.5, was associated with a 6.4% increase in rates of pneumonia admissions[29] | Water shortages can lead to an increased use of unsafe water sources for drinking and sanitation purposes | None available | Warmer ambient temperature enhances the survival of pathogens in the environment[30] | Campylobacter and Salmonella are more prevalent during summer months and during warm periods[30] |

entirely, planetary health should be integrated throughout the curriculum. Many medical topics affected by climate change (see Prevalent Conditions in Table 1) already exist within the curriculum; now, they need to be broadened with discussions on climate change. Lecturers can invite patients affected by climate change to discuss their lived experience, emulating how some classes are currently structured for topics such as mental health, addiction, and LGBTQ+ issues. Case-based learning presents an added opportunity to integrate planetary health into specific patient scenarios (e.g., asthma and wildfires). This consistent and distributed approach enhances students' capacity for learning and engagement.

Ultimately, accrediting bodies for undergraduate medical education should determine core planetary health competencies applicable across Canada. A reliance on proactive curricular changes from individual schools may not be enough. Canadian medical schools can begin by establishing a channel of communication between curricular leads. This collaborative process can then be used to share evidence-based resources, help identify national lecture objectives, and accelerate the accrediting process.

## Conclusion

While the extent of the challenge posed by climate change for B.C. is broad, integrating planetary health into the medical curriculum in a clear, consistent, and collaborative manner will provide an opportunity for the province to become a leader in this domain, and help protect the health of British Columbians for decades to come.

## Conflict of interest

The authors have declared no conflicts of interest.

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# Universal contraception: A basic human right

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## Abstract

British Columbians lack basic pharmaceutical coverage for contraceptives, despite the World Health Organization deeming contraceptives as essential. There are a wide range of barriers that may limit Canadians' access to contraception, including costs, attitudes of providers, inadequate sexual education, administrative barriers, and travel. Given that contraception is lifesaving and a fundamental component of reproductive health care, it is imperative for the provincial government to make a comprehensive provision of no-cost prescription contraception. This commentary explores universal coverage of contraception, public education campaigns, and a task-shifting model to promote equity in the realm of reproductive health care.

## An Overview: The Current Landscape in British Columbia (B.C.)

The Government of British Columbia (B.C.) has made significant strides towards making prescription medications more affordable. However, many B.C. residents still lack basic pharmaceutical coverage for contraceptives, which have been deemed as essential by the World Health Organization (WHO).[1] In 2012, the WHO recognized access to contraception and family planning options as a basic human right.[2]

The majority of British Columbians are eligible for coverage under a class of Pharmacare called, "Fair Pharmacare". This is an income-based plan requiring a deductible to be paid out of pocket before 70% of eligible prescription costs, including prescription contraceptives, are covered by the B.C. government. A medical prescription is currently required to access subdermal implants, copper and hormonal intrauterine devices (IUDs), oral contraceptive pills (OCPs), and non-oral forms of hormone delivery (intravaginal rings, patches, injections, etc.).

Though many forms of contraception are available in B.C., both the Society of Obstetricians and Gynecologists of Canada (SOGC)[3] and the Canadian Paediatric Society (CPS)[4] recommend the use of long-acting reversible contraception (LARC), such as subdermal implants and hormonal or copper IUDs. The recommendation is due to their ease of use, high efficacy and in turn cost-effectiveness at preventing pregnancy, and less frequent administrations. Furthermore, LARCs are shown to be 20 times more effective than birth control pills, the patch, or the ring.[5] These benefits have led to LARCs being the preferred form of contraception among the general public.[5]

## Barriers To Access

There are a wide range of barriers that may limit Canadians' access to contraception, including: costs, attitudes of providers, inadequate sexual education, administrative barriers, and travel. In a comprehensive study on the barriers facing Canadians who wish to avoid pregnancy, cost was cited as the most important barrier to obtaining contraceptives.[6] A contraceptive implant costs approximately $300, an IUD can cost up to $380, OCPs can cost $20 per month, and hormone injections can cost as much as $180 annually in B.C. As a result, a vast number of residents use less effective types of contraception or simply go without.[7] Advocates and experts in the field, including the SOGC[8] and the CPS[4], have called for expanding the coverage of contraceptives to address this barrier.

Lack of education regarding sexual health is also a significant barrier. Although schools are a cornerstone for disseminating information regarding family planning, sexual health education is inconsistent, due to the vague and flexible nature of the provincial health education curriculum.[6] An unfortunate consequence of this has been the presence of knowledge gaps regarding the efficacy and long-term effects of hormonal contraception and IUDs.[6]

More recently, access to service points have been particularly limited in the face of the COVID-19 pandemic. Non-urgent services, such as IUD insertion and removal procedures, have been difficult to access due to limited staff and long service wait-times.[9] Booking appointments with physicians regarding consultation and prescription of other forms of contraception has also been challenging. Pandemic conditions have thus further highlighted the need for access to subsidized universal contraception.[10]

Eliminating the barriers to contraception empowers people, provides equality, promotes favourable health outcomes, and saves public funds. The presence of these barriers, among many others, is a multidimensional issue that contributes to an increased number of unplanned pregnancies, costing the Canadian healthcare system up to $320 million annually.[8] Within B.C., a cost-benefit analysis conducted by Options for Sexual Health in 2010, estimates that the government could save $95 million annually if universal access to prescription contraception was fully subsidized.[11] More importantly, the consequences associated with unplanned pregnancy transcend the financial burden on the healthcare system. There are life-long social, emotional, and economic ramifications for parents and children that significantly diminish their quality of life.[8]

## Task-Shifting as a Solution

The WHO defines task-shifting as "a process of delegation or rational distribution of tasks among health workforce teams".[1] Non-physician healthcare workers are underutilized in the Canadian healthcare system, making task-shifting an ideal avenue to better utilize pre-existing healthcare infrastructure.[6] The SOGC 2015 consensus statement outlines that it is both safe and feasible for allied health workers (midwives, registered nurses, nurse practitioners, and pharmacists) to provide contraceptive care. The SOGC also calls for healthcare jurisdictions to engage in task-shifting initiatives and expanded scope of practice for non-physician healthcare providers.[8]

In Canada, hormonal contraceptives can only be obtained through a prescription from a physician, nurse practitioner, or midwife.[6] This creates gaps in availability of contraception, particularly in under-serviced rural and remote regions where there is often a lack of these providers.

Quebec has adopted an efficacious task-shifting policy for contraceptive care. In 2007, the Collaborative Agreement in Hormonal Contraception (CAHC) was implemented, allowing trained nurses and pharmacists to start women on hormonal contraception (oral pill,

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patch, ring, or injectable) for one year without a medical consult. The outcomes of task-shifting in Quebec have been significant: between 2004 and 2011, abortion rates have decreased by 24% among women 15-19 years of age and 15% among women 20-24 years of age.[12] Furthermore, the birth rate among teens 15-19 years of age decreased by 15%.[12] Unfortunately, the B.C. Health Ministry has not engaged in broad-based consultation to allow other health care practitioners to prescribe or administer contraception.

## What we Propose

In 2020, the Select Standing Committee on Finance and Government Services recommended the government to 'explore the provision of free contraception in a targeted and incremental manner'.[13] However, no-cost contraception was ultimately not included in the budget. Due in part to various advocacy campaigns garnering more attention to this issue, the committee upgraded their evaluation on August 21, 2021, recommending to provide free prescription contraception for all people in B.C..[13]

Given that contraception is lifesaving and a fundamental component of reproductive healthcare, it is imperative for the B.C. Government to make the provision of no-cost prescription contraception in the 2021 budget as comprehensive as possible. Considering the barriers identified, the following steps are recommended:

- A provincially funded universal coverage of contraception, including at least subdermal implants and IUDs, under the B.C. PharmaCare program.
- Annual investment in public education and advertisement campaigns regarding the availability and efficacy of contraception.
- Implementation of a task-shifting model, in conjunction with the College of Physicians and Surgeons and other health professional regulators in B.C., allowing allied healthcare professionals to prescribe all forms of reversible contraception.

## Conflict of interest

The authors have declared no conflicts of interest.

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# How COVID-19 changed the landscape of medical school admissions

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## Abstract

North American medical school admissions were not immune to the unprecedented arrival of coronavirus disease 2019 (COVID-19), which necessitated a series of adaptations to the admissions process, including changes to the Medical College Admissions Test and the medical school interview. Some of these changes may even outlast the COVID-19 pandemic to provide longstanding benefit to prospective students. This commentary summarizes the challenges and adaptions of the 2019/2020 application cycle. It also provides a critical yet optimistic view of how COVID-19 may shape the future of aspiring medical students.


## Introduction

Like many of my classmates, I cried when I got into medical school. Successful applicants must often dedicate years of their lives achieving academic success, volunteering in the community, and excelling in leadership roles to prove their worth to a medical admissions team. Furthermore, many of these aspiring students must then write the Medical College Admissions Test (MCAT), a standardized examination that assesses their knowledge of foundational science and reading comprehension. To top it off, they will undergo a stressful admissions interview often in the form of a Multiple Mini Interview (MMI). Only then will a fraction of pre-medical students receive the ever-so-coveted acceptance email.

As coronavirus disease 2019 (COVID-19) arrived in North America last Spring, both applicants and admissions teams of the 2019/2020 cycle were left scrambling to adapt to new social distancing restrictions and policies. With the current spread of the global pandemic, the road to medical school has been significantly transformed, in some ways certainly worse, but others potentially better.

## A mandatory in-person MCAT

As the first wave of COVID-19 started to ease off in May 2020, standardized tests such as the Generalized Record Examinations (GRE), the Test of English as a Foreign Language (TOEFL), and the Law School Admission Test (LSAT) were transitioning to an online format to adhere to appropriate social distancing restrictions. The MCAT, however, made no such effort to transition online.

At this time, the Association of American Medical Colleges (AAMC) is currently running in-person examinations for small groups in which both examiners and examinees are required to wear face masks and maintain adequate social distancing. Additionally, the MCAT was also reduced from a 7 hour 30 minute exam to a 5 hour 45 minute exam.[1] Dr. David J. Skorton, president of the AAMC, made a statement to the New York Times announcing that the MCAT could not be moved online due to concerns of security and equity for examinees who do not have high speed internet access.[2] Skorton also commented that "if you're going into medicine, you're going to go into a profession where there is no way to eliminate risk."[2]

The decision not to transition the MCAT online raises several issues. The security concerns are conceivable; there is always the potential for a misguided student to use external resources to assist in their exam taking, perhaps by even employing the assistance of a third-party. However, online exam software, such as ExamMonitor (ExamSoft), which utilize a student's webcam to track irregularities in eye movement, could potentially be used to counter such behaviour.

To Skorton's second point, the medical profession is indeed an occupation that requires a tolerance for constant risk of disease transmission. However, according to a report by the New York Times, examinees taking the COVID-19-era MCAT have complained of poor social distancing practices by AAMC officials at testing centres, with some students testing positive for COVID-19 following writing the MCAT.[2] No reports have been made about COVID-19 exposure at Canadian testing sites yet. A career in a clinical setting would include resources to mitigate possible exposure, like appropriate personal protective equipment, currently not afforded at MCAT testing sites. Another consideration could be the undue pressure an MCAT-writer could face if they are in contact with a vulnerable population, such as an elderly family member. In light of these potential risks, some programs, including the Stanford Medical School, have completely waived the necessity of the MCAT from this year's selection process.[3] If COVID-19 continues to persist past the 2020/2021 application cycle, then perhaps the AAMC will make efforts to adopt a remote test taking methodology.

## Virtual interview triumphs and tribulations

Aside from some notable exceptions, the majority of medical school interviews at Canadian universities scheduled during the first wave of COVID-19 were transferred to an online format. The University of British Columbia, which had its 2019/2020 interviews take place in-person pre-COVID-19, has since announced that it will transition to a virtual MMI format for the 2020/2021 application cycle.[4] This switch was perhaps to the chagrin of pre-medical students who had prepared specifically for an in-person interview and were looking forward to visiting their potential future school.

Despite the initial effects of this unprecedented change, virtual interviews may present several benefits that could even outlast the COVID-19 pandemic. The access to a video conferencing device with sufficient internet capabilities is likely no longer a large concern in the modern age, as these requirements are as ubiquitous as they are necessary for post-secondary education. Financially speaking, a transition to a virtual MMI format could be advantageous to both admissions committees and students alike. Creating a secure, equitable, yet fluid online interviewing system would certainly be an investment for medical programs; however, once established, this system could save on extraneous costs such as facility bookings or invigilator hiring and training. From the students' perspective, interviews conducted in the

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comfort of one's own home would save on travel costs, especially for students who have interviews out-of-province.

At the University of Toronto, rather than have live online interviews, students' responses to interview prompts were video recorded and later evaluated.[5] Theoretically, using video recorded interviews could allow a school to hire fewer evaluators to assess applicants. For example, one evaluator could assess all the applicants for one particular MMI station. A substantial amount of work would be given to these evaluators, but in theory this would essentially eliminate all inter-rater variability that exists in current MMI practices with multiple evaluators for a single station.

Ironically, the Michael G. DeGroote School of Medicine at McMaster University, innovator of the MMI format, was the most extreme exception to the virtual interview switch. The admissions committee made the executive decision to cancel all MMIs for their 552 scheduled interviewees and instead select purely based on file review.[6] Out of the 552, the top 100 were granted automatic admission to the program, while the remaining 103 were selected based on lottery. The committee argued that, statistically speaking, the top 100 pre-ranked students in the past have had a 70-76% chance of receiving an acceptance, while the top 552 overall selected for interview had a roughly 50% chance. While this method may have been a statistically "fair" way to select applicants, it certainly removed the locus of control from eager students. Furthermore, this selection method inherently discriminated against applicants that received lower file-review scores but would have excelled in the MMI. McMaster has not yet revealed their interviewing plans for the 2020/2021 cycle at this time of writing, but I suspect McMaster will return to their MMI-ways (either virtually or hopefully in-person) to assuage the anxiety of applicants.

## Final Thoughts

Great innovation and times of crisis often go hand in hand. The advent of COVID-19 has brought about much uncertainty and significant change. However, if a potential outcome of this pandemic is a more effective, more efficient, means of selecting future doctors, then perhaps there is a silver lining to look forward to. Regardless of these admission changes, the tears of excitement and joy shed upon opening an acceptance email will remain unchanged.

## Conflict of interest

The author has declared no conflict of interest.

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# Making climate change part of our conversations with patients

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## Abstract

As forest fires continue to surge in frequency and scope across western North America, physicians will increasingly see respiratory symptoms that are attributable to climate change. The current commentary discusses the utility of identifying climate change as a contributing determinant of respiratory symptoms and the role of physicians in highlighting health as a central issue in climate change.


In September 2020, southern British Columbia experienced the worst air quality it had seen in over a decade as 5 million acres of smoke from burning forest in Washington, Oregon, and California poured into the province.[1] In Victoria and Vancouver, the largest cities in B.C., the change was impossible to ignore. The sky was a gray-yellow haze, the sun a faded orange circle, and the air smelled faintly of smoke. In a matter of days, the Air Quality Index for Vancouver shot up to over 250, the worst of any city globally.[2]

Extensive environmental research has recognized that increasing forest fires are a direct result of climate change.[3-5] Rising global temperatures trigger spikes in fire activity, particularly in the western United States and Canada, where the annual fire season has become longer and more than doubled its affected area since 1984.[6]

At the same time, health research has linked forest fires to exacerbations in chronic lung diseases, including asthma and chronic obstructive pulmonary disease (COPD).[7-10] COPD and asthma affect approximately 2 and 4 million Canadians, respectively.[11] In Canada, asthma is one of the leading causes of youth hospitalizations, while COPD is the fifth leading cause of mortality.[12,13] Emergencies in both conditions, as well as exacerbation of symptoms such as shortness of breath, coughing, wheezing, and chest tightness, have been linked to biomass smoke exposure from forest fires.[7-10] One study found that following San Diego forest fires in 2007, hospitalizations due to respiratory diagnoses increased by 34% while those for asthma increased by 112%.[14] Another review reported that from 2008–2012, forest fires in the western United States resulted in up to 8,500 excess respiratory hospital admissions per year.[15] Short-term smoke exposure was associated with 1,800 premature deaths, while long-term smoke exposure was associated with up to 25,000 premature deaths annually. In British Columbia, one population-based study similarly found that forest fire smoke exposure from July to September 2003 increased the risk of all respiratory-related physician visits, asthma-specific visits, and respiratory hospital admissions.[16]

In medical education and guidelines around chronic lung disease, "air pollution" is consistently listed as a risk factor for asthma- and COPD-related emergencies.[17-19] When a patient asks why they experience a sudden onset of symptoms, this may be part of the explanation provided by their physician. Yet, whether in the context of prevention or treatment, climate change rarely enters the conversation. This is despite available resources for discussing climate change with patients, such as the ecoAmerica guide, "Let's Talk Health and Climate".[20] Perhaps the simplest and most straightforward guide for these conversations, however, comes from a 2019 NPR article, "Has your doctor talked to you about climate change?", which chronicles how one physician plainly articulates to patients how climate change is a factor in their respiratory symptoms.[21] Often, the task is as simple as explaining that the overall trend of hotter summers, increasing forest fires, and longer allergy seasons is due to climate change. When any of these factors worsen patients' symptoms, climate change is the culprit.

Still, a number of good reasons may account for the absence of the phrase "climate change" in doctors' offices. As a factor which cannot be directly altered by individual patients, discussion of climate change may induce feelings of helplessness or anxiety. Physician time is limited, and conversations around climate change may be cumbersome. The introduction of climate change as a subject may make some patients uncomfortable due to its political connotations, and risk hurting the physician-patient relationship.

Yet, as forest fires and other climate change-fueled disasters continue to increase, physicians will see a corresponding rise of negative health effects in their patients. Physicians are uniquely positioned to observe these changes and have an ever-growing social responsibility to speak out about them. Further, physicians are viewed as trustworthy sources of knowledge, and perhaps the most reputable source to highlight the complex environmental realities which underlie respiratory symptoms. Identifying climate change as a contributing determinant of respiratory health serves to highlight a critical and underappreciated truth: climate change is not only an ecologic problem, but it is also a health problem which ultimately impacts individual people and their families. Policies that aim to address climate change are also those that address people's health. With time, physicians will inevitably witness the increasing health effects of climate change. It is only a matter of whether they call it by its name.

## Conflict of interest

The author has declared no conflict of interest.

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# The impact of COVID-19 in Canada on surgical waitlists and mitigation strategies moving forward

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## Abstract

The coronavirus disease 2019 (COVID-19) pandemic has dramatically increased surgical wait times in Canada. Without an improvement on the strategies used to manage surgical waitlists, the health of patients and healthcare providers may suffer. Current solutions to mitigate the increased duration of surgical waitlists include improving hospital efficiency by increasing surgical infrastructure and staff support. Moving forward, a novel single-entry model with team-based care wherein patients are diverted to the first available subspecialty surgeon and followed by a team of surgeons may help to reduce the backlog of surgeries due to COVID-19 shutdowns, provided that health authorities support physicians and staff with sufficient resources. The COVID-19 pandemic also presents governments and health authorities with an opportunity to conduct research on how to best respond to future challenges to the healthcare system.

In Canada, the number of elective surgeries being performed has drastically decreased due to service closures in response to the coronavirus disease 2019 (COVID-19) pandemic. Provincially, health authorities saw up to a 90% reduction in non cancer related surgeries in April/May 2020 relative to the prior year.[1] In British Columbia, this equated to 30,248 surgeries.[2] While the data for Canada is not readily available, a global study suggested that a median of 45 weeks in which operating rooms work at 20% increased volume is required to resolve the backlog created by the first 12 weeks of COVID-19 surgical cancellations alone.[3] Overall, the strain on surgical services created by the COVID-19 pandemic highlights the requirement for a more equitable and resource-dependent model to address the healthcare needs of Canadians. This commentary will outline pertinent psychosocial considerations related to increased surgical wait times, including helping patients deal with waiting and surgeon wellbeing. This commentary will also provide strategies to mitigate patient wait times moving forward such as increases in hospital infrastructure, and changes to the current patient intake and triage pathways including the use of a single-entry model with team-based care.

In general, surgical triage is dependent on coordination between health authorities, surgeons, and patients. Traditionally, surgical waitlists are managed on a first-in, first-out basis overlaid by patient-specific triage wherein health authorities have established target surgery-specific wait times.[2] For example, a patient receiving an elective surgery will first meet with the surgeon to which they have been referred. Following their assessment of the patient, surgeons then have the autonomy to reorder their waitlist to accommodate the patient's symptom burden or risk of adverse events.[4] The surgical wait times can also be dependent on the type and urgency of surgery, the capacity of hospitals, and the number of patients on an individual surgeon's waitlist.[5] The traditional triaging approach has limited research surrounding its efficacy to mitigate waitlists. Moreover, the healthcare burden of the novel COVID-19 pandemic is not fully understood, thus placing government and health authorities in a position of uncertainty moving forward with their guidelines. As a first step, the current trends in delayed surgeries should be studied to provide evidence-based guidelines to mitigate potential future stresses on the healthcare system that could also exacerbate surgical wait times.

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A suggested model of improvement to the current surgical triage method is the single-entry model with team-based care.[1] The single-entry model addresses extended waitlists by creating a single queue that directs each patient to the next available subspecialty surgeon based on their priority in line. Team-based care is an extension on the single-entry model wherein a team of surgeons is responsible for the patient's operative and post-operative care to improve efficiency.[1] Team-based care has been suggested to be superior to individual care such that team-based care provides the opportunity for standardized decision-making and cooperation for complex cases.[6] In Canada, single-entry models have been previously implemented in some obstetric, cardiac, joint replacement, and cancer surgery groups but not yet studied.[6,7] Elsewhere, single-entry models have yielded widely positive responses.[3] For example, the Sunnybrook Health Sciences Odette Cancer Center in Toronto has begun to implement a similar model wherein patient referrals are first reviewed by medical, radiation, and surgical oncologists.[8] Cooperatively, the specialists at this center have developed a formalized system to accommodate disease progression or unmet patient needs. Altogether, the single-entry model presents a method to expedite surgical wait times without detriment to patient care.

In the Fall of 2020, health authorities began to re-establish full time surgical services using the traditional triage model. In British Columbia, the current strategy to manage extended waitlists intends to "minimize productivity loss" by hiring more nurses, healthcare providers, and support staff to expand operating room hours.[9-11] An increase in operating room efficiency was also suggested following the 2003 SARS outbreak in Ontario with positive results.[8] Moreover, private operating rooms with public funding partnerships have also been suggested to mitigate space and resource limitations.[2] While this resource-dependent model may benefit people burdened by the economic downturn, it presents surgeons with the challenge of working an increased number of hours. As such, it is important to provide these physicians with clinical support and mental health resources to prevent potential burnout.[12,13] Such support should be specific to surgical specialty and subspecialty in an effort to maximize resource efficacy. With extended operating time, there still exists a role for the single-entry model to triage the most urgent cases.

Lastly, long surgical wait times are not novel to Canadian healthcare. However, due to the COVID-19 pandemic time-sensitive surgeries are being further delayed.[1] These delayed surgical interventions can place Canadians at risk of disease progression or complication.[8,14,15]

Less obviously, delayed surgeries can also harm patients' mental health by contributing to or exacerbating chronic pain, reducing their quality of life, or making them unable to return to work resulting in significant financial burden.[16] Wiseman et al. have suggested that surgical teams could screen their patients' mental health to inform patient prioritization or alternative treatment strategies.[16] Such alternative treatments would include additional assessments or interventions that do not require operating rooms and time but could improve symptom relief or quality of life. The authors argue that improved communication between patients and healthcare providers and shared decision making would ameliorate patient mental health while awaiting surgery.[16] The previously discussed research on the efficacy of surgical triaging should also be disseminated broadly to help align patient expectations with resource limitations.

While elective surgeries that have been delayed for many patients were labelled as non-urgent, they are still crucial to the quality of life for many patients. Consequently, these patients should be provided with support and additional assessment, and treatment where applicable. Increased hospital infrastructure and the single-entry model with team-based care may help to reduce the backlog of surgeries due to COVID-19 shutdowns, provided that health authorities support physicians and staff with sufficient resources.

## Conflict of interest

The author has declared no conflict of interest.

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# The impact of limiting family visits in long-term care during the COVID-19 pandemic in British Columbia

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## Abstract

British Columbia restricted visitations to long-term care (LTC) homes to reduce the risk of outbreaks during the coronavirus disease 2019 (COVID-19) pandemic. However, visitors can often play an integral role in maintaining the wellbeing of residents, and restricting can lead to social isolation, worsening physical and mental health, as well as reduced care received among residents. We need to better understand the impact of COVID-19 and restriction policies on LTC residents, including measures such as social visits and technology assistance. A compassionate and humanistic approach is needed to balance infection control with the quality of life of LTC residents.


## Introduction

As of November 2020, more than 353,000 people in Canada have been infected with severe acute respiratory syndrome coronavirus virus 2 (SARS-CoV-2), the virus responsible for the coronavirus disease 2019 (COVID-19) pandemic.[1] Canada's healthcare systems have been heavily tested in their ability to protect against COVID-19, with long-term care (LTC) homes being particularly vulnerable to deadly outbreaks. In British Columbia, LTC-related deaths have accounted for over 65% of all deaths attributed to COVID-19 infection so far.[2] Residents of LTC homes are at higher risk for symptomatic COVID-19 infections and mortality due to their frailty and comorbidities.[3] As such, the British Columbia Center for Disease Control (BCCDC) mandated visitation restrictions in LTC homes to reduce the risk of transmission. This was a key measure of prevention early in the pandemic that lowered LTC-related COVID-19 infection rates and mortality.[4] However, there was also a significant negative impact due to reduced social interactions.[4]

## The Role of Family in LTC Homes

During pre-pandemic times, visits from families and loved ones were often regular occurrences that played a key role in the lives of LTC residents.[5] Increased social support from children and spouses may reduce LTC residents' risk for depression and improve their overall well-being.[6-8] Family visits may also facilitate increased involvement in socialization activities, including outdoor excursions, which can confer additional benefits on their mental health.[7] For residents with dementia, which represent 64% of the LTC population in British Columbia,[9] the presence of loved ones can help with reorientation, reduce distress and/or resistance to care, and improve daily participation.[10]

In addition, families may also participate in the care of residents in collaboration with LTC staff.[5] While LTC care staff are present to provide essential clinical and daily care for the residents,[11] family members often aid in activities of daily living such as grooming, dressing, and feeding as a way of spending time together.[12] Family members are also a valuable source of information; they can bridge language and cultural barriers for residents, provide insight into resident preferences, and act as a basis of stability in settings with high levels of staff turnover.[13] Loved ones offer residents a connection to "the outside world", their self-identity, and personal beliefs.[14]

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## Visitation restrictions to LTC homes in British Columbia during COVID-19

When the COVID-19 pandemic was declared by the World Health Organization in March 2020, non-essential visitors were restricted from LTC homes by the BCCDC. Only visits for compassionate care (i.e., critical illness, palliative, hospice, end-of-life care, and medical assistance in dying) and family members who routinely provide feeding, mobility, or communication support received permission to visit with approval from the Health Authority and home staff.[15,16] As a result, the majority of LTC residents did not receive any visitors under these regulations. In June 2020, BCCDC created guidelines for LTC homes to allow social visits, where each resident was allowed to be visited by a single designated visitor through scheduled appointments, given that the home had no active outbreaks of COVID-19 and was adequately staffed to carry out the visit protocol.[16] To help manage visitation, the British Columbia Ministry of Health announced additional funding support of $160 million to hire up to three new staff members per home.[17]

In August 2020, all LTC homes had submitted protocols to allow social visits.[17,18] The protocols' location of social visits varied based on the LTC homes, although the preference was outdoors if possible.[16] Visitation experiences have been described by family members as "sitting 3 to 5 feet apart at different ends of a table with a big plastic shield in-between".[19] BCCDC safety precautions for all visitors required no walking within the designated area, no physical contact, and training provided for hand hygiene and face-masking.[16]

## The impact of visitation restrictions on LTC resident wellbeing

So far, accounts from patients and families have described concerns of social isolation, depression, and physical and cognitive decline.[20-24] In other parts of Canada, governmental inquiry into residents' experiences during COVID-19 have elicited stories of anguish due to loneliness.[25] Isolation has been especially difficult for patients with dementia who had relied on family members to understand their daily lives and connect with past memories.[23] Studies published prior to the COVID-19 pandemic had shown that loneliness and social isolation in LTC residents is a risk factor for poor health outcomes including depression, anxiety, malnourishment, and worsening dementia.[26-28] As well, since families are no longer present to assist in parts of the daily care of residents, restricting visitations contributed towards the significantly increased workload of LTC care staff during the pandemic.[29] All these effects are also compounded by the loneliness and decreased access to care caused by the cancellation of group activities and communal dining, decreased interaction with staff, and advanced isolation protocols in

homes with active cases.[16,22,30]

To help ameliorate social isolation in LTC, the Connecting for Compassion initiative from the University of British Columbia (UBC) delivered iPads with video-conferencing programs to LTC homes across the province.[22,31] Residents were able to have dedicated devices to connect with loved ones, student volunteers, and music performances from the UBC School of Music.[22,31] During pre-pandemic times, video-conferencing had been regarded as a positive but unfamiliar tool in lieu of in-person visits in LTC.[32] There is now an increased need for both studies on the impact of video-conferencing on health outcomes[33] and studies investigating the features needed for successful implementation in a LTC setting, especially under pandemic circumstances.[34] In particular for British Columbia, remote communities with limited internet coverage will find it difficult to meet the need for high-speed connections for effective video-conferencing.[22]

## Conclusion

Residents who live in LTC homes are often in the final part of their life's journey,[9] and any prolonged period of social isolation and loneliness during the pandemic can have significant negative impact. It is clear that restricted visitations in LTC homes contributed greatly to limit COVID-19 outbreaks,[4,22,29] however, research is needed on the policies' effects on resident wellbeing and the efficacy of measures taken to address social isolation. A compassionate and humanistic approach is needed to balance infection prevention and control with quality of life of older adults in LTC homes.

## Conflict of interest

The authors have declared no conflicts of interest.

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# A tale of two emergencies: Managing an overdose crisis during a pandemic

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On March 17, 2020, B.C.'s Provincial Health Officer, Dr. Bonnie Henry, stood behind her signature wooden podium and declared a provincial public health emergency to help prevent the spread of COVID-19, representing only the second time such a declaration has ever been made in the province. Almost exactly four years earlier, the Provincial Health Officer at the time, Dr. Perry Kendall, stood behind the same podium and announced the province's first-ever public health emergency: the opioid overdose crisis.[1] Since then, over 6000 British Columbians have died from illicit drug overdoses—more than suicides, car crashes, homicides, and COVID-19 combined.[2] The overdose deaths are largely attributable to fentanyl, which has been detected in every illicit drug tested by Health Canada except cannabis and was implicated in 87 percent of overdose deaths in 2019 versus only five percent in 2012.[2,3] The provincial government responded in September 2017 by pledging $322 million over the next three years to facilitate improvements to mental health and addictions services, while also launching the Overdose Emergency Response Centre (OREC) to help better identify and support people at risk of overdose.[1] Municipal governments have also played crucial roles, particularly in the overdose epicentre, Vancouver,[2] which has taken action to mitigate substance-related harms long before the overdose crisis emergency was announced. Along with adopting the "four pillars" drug strategy, which includes prevention, harm-reduction, treatment, and enforcement, in the late 1990s,[4] Vancouver made international headlines in 2003 when it opened North America's first legal supervised drug injection site, Insite. The safe injection site has since prevented over 6000 overdoses without a single death and led to several millions of dollars in net savings since opening.[5–7]

Despite the province's strategic approach to the overdose epidemic, annual overdose deaths in B.C. continued to rise. Trends started to improve in 2019, with a nearly 40% drop in overdose deaths compared to the year prior. This promising turn continued until March 2020, when the COVID-19 public health emergency was declared, at which point overdose deaths took an unprecedented spike. According to experts, the necessary precautions to prevent the spread of COVID-19 largely contributed to this abrupt rise, with May, June, and July having each consecutively broken the provincial record for monthly overdose deaths at approximately six deaths per day.[2] Physical distancing measures, for example, led to a higher proportion of people using substances and dying alone.[8] Similarly, restricted access to provincial overdose prevention and supervised consumption sites resulted in a precipitous drop in overall attendance from nearly 70,000 monthly visits in January 2020 to only 30,000 in April.[9] International border closures have also contributed to the observed trends. As inexperienced local drug traffickers attempt to keep up with a high demand among less competition, the drug supply has consequently become more contaminated and unpredictable. In fact, overdoses involving "extreme" fentanyl concentrations have nearly doubled in the months since lockdown began.[2,8] Others have speculated over the contribution of the Canada Emergency Response Benefit (CERB) in fueling the opioid crisis by providing readily available cash with few questions asked, although the effect size of this relationship has yet to be quantified.[10]

According to experts, two key strategies are necessary to reduce overdose deaths: decriminalising the personal possession of illicit substances and establishing a supply of safer prescribed alternatives. Regarding the former, advocates argue that decriminalisation is far superior to the current prohibition-based system, which perpetuates the lucrative illegal drug market, incarcerates non-violent and low-level offenders, incurs significant economic costs, and, at its very core, frames substance use as a criminal issue rather than a health issue.[11] Conversely, decriminalisation would mitigate these harms and allow for the redistribution of resources towards criminal and drug-trafficking operations. Backed by a growing body of evidence,[12] decriminalisation has gained widespread support from experts and leaders across the province and country, including Dr. Bonnie Henry, B.C. Premier John Horgan, the Canadian Association of Chiefs of Police, and Canada's Chief Public Health Officer, Dr. Theresa Tam.[11,13] Experts have also proposed a regulated and controlled heroin market, such as with "heroin compassion clubs," whereby members who use illicit opioids are provided with safe and affordable access to pharmaceutical grade heroin and a range of public health and addiction treatment services.[14] Despite the widespread support for decriminalisation, the federal government has yet to enact such policies. However, the Public Prosecution Service of Canada updated federal guidelines in August 2020 to restrict the prosecution of drug possession charges to extreme cases, such as those involving public safety or the safety of children.[15]

Instead, the federal government has chosen to focus efforts on the second of the two strategies: improving access to a safer supply of prescribed alternatives, including a nearly $600,000 investment in a safe supply pilot project in Toronto in August 2020.[16] It has been B.C., however, that has taken the largest strides on this front. In March of this year, the B.C. Centre on Substance Use released interim clinical guidelines that expanded the repertoire of treatment options available to patients at increased risk of both COVID-19 and overdose while also expanding options for telehealth visits and home delivery of prescriptions.[17] Despite these measures, it became clear in following months that the program had fallen short of its initial expectations, in part due to a reluctance of physicians to prescribe medications like hydromorphone and morphine to people who actively use substances.[18] In September 2020, Dr. Bonnie Henry acknowledged these hurdles and subsequently announced a dramatic expansion to the program's eligibility criteria to include nearly anyone who uses illicit substances, even intermittently. Dr. Henry also released a public health order allowing registered nurses and registered psychiatric nurses to independently diagnose and treat substance use disorders with safer pharmaceutical alternatives.[19,20] Together, these changes represent the largest provincial

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effort to date in addressing the overdose crisis. It is hoped that this expansion will facilitate improved access to injectable alternatives, such as medical grade heroin (diacetylmorphine) or hydromorphone, both of which were approved by Health Canada in 2019 for use in severe opioid use disorder refractory to standard opioid agonist therapy but have since faced substantial barriers limiting their implementation.[21] Aside from harm reduction measures, experts also recognize the importance of primary prevention in mitigating ongoing opioid-related harms and addressing the increasing prevalence of opioid use disorder. This aim is well-supported by a body of evidence demonstrating the limited clinical efficacy and dose-dependent risk of serious harm from inappropriately prescribed opioids.[22,23] However, while the problematic prescription of opioids for chronic noncancer pain is acknowledged to have been one of the key precipitants of the ongoing opioid epidemic,[24,25] recent data has revealed that prescription opioids were implicated in only two percent of overall overdose deaths in B.C. from 2015 to 2017.[26] Accordingly, experts agree that deprescribing patterns, although crucial, are not alone sufficient in addressing the overdose crisis.[27]

Canadians are undeniably living in historic and unprecedented times. Despite national and provincial efforts, people continue to die every day from illicit drug overdoses, with the COVID-19 pandemic substantially contributing to these record-breaking statistics. Going forward, decisive action and unwavering advocacy are desperately needed to ameliorate these continued devastating losses. In the meantime, the province must continue to trudge forward in the difficult uphill journey against two of the most pressing public health threats in recent history.

## Conflict of interest

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# When two health emergencies cross paths: Current developments in the opioid epidemic in British Columbia

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In September 2020, BBC News reported that the opioid epidemic in British Columbia (B.C.) had become a growing concern amidst the COVID-19 pandemic.[1] Alarmingly, the article states that "deaths from illicit drugs continue to eclipse deaths from homicides, suicides, car crashes, and COVID-19, combined." Indeed, opioid overdoses in British Columbia have been an issue since the early 1990s, and a public health emergency was declared in 2016.[2] This year, B.C.'s coroner service reported that between January 1 and September 30, 2020, there were 1202 total deaths as a result of opioid overdoses in B.C., an all-time high compared to 761 total deaths by this date in 2019.[3] This is a disturbing trend which may continue to worsen as the COVID-19 pandemic passes its second wave. It is prudent, therefore, to review the current state of the opioid epidemic and the ways in which the province is addressing it.

Prior to the COVID-19 pandemic, harm reduction efforts to combat the opioid crisis included the distribution of take-home naloxone (THN) kits, opioid agonist therapy (OAT) such as the first-line drug combination buprenorphine/naloxone (Suboxone), and creation of overdose prevention service/supervised consumption service sites (OPS/SCS).[4] It is estimated that the combined effect of these interventions prevented 3,030 opioid-related deaths between April 2016 and December 2017.[2] Yet, during the COVID-19 pandemic from May to July this year, the monthly mortality rose to a high of 185 in June, surpassing the previous single month mortality record of 161 deaths in December 2016.[3] Users of opioids are increasingly resorting to toxic illicit drugs contaminated with fatal doses of fentanyl.[1] Among the possible contributing factors are barriers to obtaining safer prescription opioids, such as reduced prescribing and more careful screening processes by physicians.[5–7] Additionally, travel restrictions have impacted illegal drug trade which may be leading to overreliance on an adulterated local supply.[8] Moreover, the financial hardships and feelings of isolation, anxiety, and depression stemming from the pandemic may have increased the risk of unsafe usage of opioids.[9]

In light of these dire circumstances, physician and public health expert Mark Tyndall has proposed the implementation of a "safe supply" model with fewer restrictions as an alternative to illegal drugs.[5] This model offers daily-dispensed prescription opioids which may be consumed with or without supervision. Addiction experts, however, warn that safe supply is prone to diversion as in the case of illicit diverted hydromorphone.[10] There is also the issue of complications such as infection and clot formation resulting from self-administered intravenous opioids.[6] Nevertheless, in March this year, the B.C. government introduced a safe supply program.[7] This allowed wider access to a legal take-home opioid supply for those with a history of ongoing opioid use disorder (OUD) and those at high risk of COVID-19 infection, opioid withdrawal, and opioid overdose.[11] In an effort to further improve access, the province recently granted authority to nurses to prescribe alternative opioids and has expanded the eligibility criteria for a take-home supply to include those with intermittent opioid usage.[12,13]

It should be noted that apart from safe supply there are further harm reduction measures being implemented in B.C. This includes $10.5 million of funding to open 17 new supervised opioid injection sites and 12 new supervised opioid inhalation sites.[14] There is also a plan to double treatment beds for youth substance-use and withdrawal management.[15] Moreover, Vancouver Coastal Health is offering a new drug checking service in the form of fentanyl strips which allow people to check for contaminants in their substances.[16] As for currently existing services, the B.C. Center for Disease Control lists THN kits, peer support groups, needle distribution programs, OAT, and OPS/SCS sites among the services it provides.[17] While OPS/SCS sites experienced a sharp decline in attendance in March after announcement of the pandemic, there appears to be a slow upwards returning trend.[18]

Ultimately, the federal government can enact changes that may greatly influence opioid mortality, and at the forefront of this discussion is opioid decriminalization. Provincial support for decriminalization was endorsed in the summer of 2020 by the Canadian Association of Chiefs of Police, B.C. Premier John Horgan, and B.C.'s provincial health officer Dr. Bonnie Henry.[19] Federal government officials, however, continue to dismiss the idea.[20] Prime Minister Trudeau emphasizes that decriminalization is not a "silver bullet" solution to the overdose crisis and that his government is prioritizing other options such as access to a safe supply of opioids.[20] In addition, critics of decriminalization argue that it would introduce opioids to a wider, more susceptible demographic and further burden an already overwhelmed healthcare system.[21] Proponents of decriminalization, meanwhile, propose that it is the most effective policy change when combined with initiatives like safe supply, whereas the prohibition approach is costly and directly contributes to exposure to higher risk illicit substances.[5,22] Moreover, countries like Portugal, which decriminalized opioids in 2001, present a compelling argument. One study assessing the impact of decriminalization in Portugal determined that it led to reduced consumption of illicit drugs, reduced burden on the criminal justice system, increased utilization of drug treatment programs, reduced mortality rates from opioids, and reduced social stigma against those with OUD.[23] However, the study also reported that it was impossible to attribute these benefits solely to decriminalization due to insufficient data, absence of a control, presence of other harm reduction services, and inconsistencies with national implementation of decriminalization. Therefore, extensions of these findings to the situation in B.C. must be made with caution.

The impact of COVID-19 on the opioid epidemic as well as the general population has been devastating. Experts agree that the key to resolving the opioid epidemic is initiating and monitoring patients on alternative opioids with the flexibility and convenience to take medication home for OUD treatment.[24] Improved funding and increased access to prescription opioids are allowing those with OUD to obtain a safe supply during the pandemic in B.C. This change may be worth continuing post-pandemic, and research in the coming months

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may further elucidate its benefits and harms. Though decriminalization remains a controversial solution presently, the provincial government of B.C. appears to be moving in the right direction towards averting the opioid crisis.

## Conflict of interest

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# Post-COVID-19 Recovery: The chronic symptoms of SARS-CoV-2 infection

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The coronavirus disease 2019 (COVID-19) was declared a global pandemic by the World Health Organization (WHO) on March 11, 2020.[1] In the following months, there was increased recognition of the potential long-term health effects that resulted from contracting severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the virus that causes COVID-19. The majority of patients infected with SARS-CoV-2 develop an acute disease characterized by mild or moderate symptoms, including fever, cough, and dyspnea, which resolve in 2 weeks and are usually managed in an outpatient setting.[2,3] Less commonly, patients may develop more severe or critical symptoms, including respiratory distress or respiratory failure, which may require hospitalization and can take 3–6 weeks to resolve.[2,4] However, there have also been reports of patients experiencing a chronic form of COVID-19, with persisting health effects that linger for months following symptom onset.[5–7] Also referred to as "long COVID" or "post-COVID syndrome", patients who have this prolonged illness following COVID-19 may experience a broad range of symptoms such as chronic fatigue, cough, dyspnea, chest pain, palpitations, and confusion.[6,8] With few studies examining the long-term health consequences of COVID-19, researchers and physicians do not have a complete understanding of why certain patients suffer from the prolonged illness, which patients are the most susceptible, and how to treat these patients effectively.[9] This article aims to outline the prevalence and proposed pathophysiology of post-COVID-19 illness, current clinical guidelines, approaches to management, and the need for further research for better support of affected patients.

As of December 2020, few published preliminary studies have evaluated the proportion of patients with persistent COVID-19 symptoms. One study reported that 125 of 143 patients (87%) hospitalized for COVID-19 reported still experiencing COVID-19-related symptoms 60 days after disease onset. Fatigue (53%), dyspnea (43%), joint pain (27%), and chest pain (22%) were among the most frequently reported symptoms.[5] While the prevalence of long-term symptom persistence in COVID-19 patients is variable between studies, it is clear that some patients experience prolonged symptoms weeks to months after initial infection, with fatigue being one of the most prevailing. As well, the exact patient-specific risk factors associated with symptom persistence remain unclear. One study found that the severity of post-COVID-19 symptoms may be related to the severity of the initial COVID-19 infection and presence of preexisting comorbidities,[7] although persisting symptoms have also been reported in patients without severe disease or comorbidities.[5,8]

The pathophysiology underlying post-COVID-19 illness is unknown, but hypotheses involving long-term tissue damage have been proposed based on the multisystemic nature of COVID-19. SARS-CoV-2 enters cells by binding to the angiotensin-converting enzyme 2 (ACE2) receptor, which is expressed by cells in the lungs, heart, kidneys, and intestines, allowing SARS-CoV-2 to infect multiple organ systems.[10] Postmortem examinations of COVID-19 patients found evidence of diffuse alveolar damage, thrombosis of pulmonary vessels, and cytokine storm-induced pulmonary fibrosis.[11–13] One hypothesis is that a similar but milder pathology is occurring in patients who have survived and are recovering from COVID-19, and that this organ damage is causing prolonged symptoms. Supporting this, a follow-up study of COVID-19 patients 30 days after hospital discharge determined that 31 out of 57 patients (54%) had pulmonary CT abnormalities, which included patchy ground-glass opacity and pulmonary fibrosis.[14] Furthermore, up to 20–30% of hospitalized COVID-19 patients have some form of myocardial involvement.[15] One study using cardiovascular magnetic resonance (CMR) imaging showed that 60 out of 100 patients (60%) who recently recovered from COVID-19 had active myocardial inflammation, and that this was independent of the severity of the acute illness.[16] It is plausible that this tissue damage caused by COVID-19 may underly certain prolonged symptoms of post-COVID-19 illness. However, more research is needed to understand this mechanism, and to determine how long-lasting this systemic damage is and whether it is reversible. Although relatively rare, long-term symptoms following COVID-19 infection may also be due to a reinfection. This has been recorded in a few case reports and may be associated with mutations in the spike protein of SARS-CoV-2.[17–19] Finally, lingering symptoms in some patients may be due to the adverse effects of treatment, such as ICU interventions and the use of hydroxychloroquine or azithromycin, or other unknown etiologies.[20,21]

As highlighted, there is a need for more research on post-COVID-19 illness, particularly its causes, epidemiology, treatment, and potential consequences, to help guide the management of patients. As of December 2020, there are no formal clinical guidelines in Canada or the United States for the treatment of prolonged symptoms from COVID-19 infection. An interim guide published by the Royal Australian College of General Practitioners (RACGP) recommends tailoring the management of post-COVID-19 illness to the individual by providing supportive measures for specific symptoms, considering possible alternative causes, excluding and preventing serious complications, and optimizing the management of chronic conditions.[22] While the Australian guidelines may be generalizable to the clinical care of COVID-19 recovery in British Columbia, there are currently no formal provincial guidelines on the management of post-COVID-19 illness. However, there are initiatives and research efforts underway to determine what the best practices and appropriate clinical pathways for recovery are. One of these initiatives is a post-COVID-19 recovery clinic that recently opened at St Paul's Hospital, created in collaboration between Providence Health Care, Vancouver Coastal Health, and Fraser Health Authority.[23] This clinic aims to use a multidisciplinary approach to provide specialized healthcare and education for patients recovering from COVID-19.[24] The clinical care of patients is combined with the collection of important research data through questionnaires,

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CT imaging, tissue samples, and blood samples, to develop a better understanding of post-COVID-19 illness.[24]

## Conflict of interest

The author has declared no conflict of interest.

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