



# Circular logic and flawed modelling compromises non-pharmaceutical intervention article's conclusions

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## Abstract

Assessing the value of non-pharmaceutical interventions (NPIs) in response to coronavirus disease 2019 is a critical exercise to ensure optimal response to future pandemics. To be credible, evaluations should be impartial and rely on robust data and methodologies. Unfortunately, the assessment by Ogden *et al.* fails on all these accounts and instead further confounds the issue by reliance on models with incorrect underlying assumptions, circular reasoning and inappropriate assignment of causality. Ironically, instead of supporting the argument for NPIs, the authors detract from their argument by making unconvincing points supported by poor analysis.

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## Introduction

Canada's early response to coronavirus disease 2019 (COVID-19) was largely based on non-pharmaceutical interventions (NPIs)—school and business closures, stay at home orders, curfews, travel restrictions, mandatory public masking and quarantine—that were initially based on little or no evidence (1,2). These measures were not part of existing pandemic plans and, furthermore, they ignored the overarching principles of pandemic planning to “minimize serious illness and overall deaths” and “minimize societal disruption” (3). Subsequent publications evaluating NPIs have been observational and ecological with almost no high-quality science. Those randomized, cluster randomized trials and robust case-control studies that have been done show weak effects of most NPIs (4–6) while robust and growing literature demonstrate the counter-balancing adverse effects of NPIs (7–9). It is vitally important that we try to assess the effectiveness and the costs of each of these interventions dispassionately, based on real-world data. Unfortunately, the article “Counterfactuals of effects of vaccination and public health measures on COVID-19 cases in Canada: What could have happened?” by Ogden *et al.* (10) is superficial, deeply flawed and provides a disservice to the evaluation of these important issues.

## 1. Confusing case fatality rate with infection fatality rate and reported cases with total infections

The first paragraph claims that the infection fatality rate (IFR) early in the pandemic was 1%. An IFR of 1% is a massive overestimate—infection fatality rates were around 0.2% (11–13) prior to vaccination, and the less virulent Omicron variant has an estimated IFR of 0.006% (14). Instead, the number being quoted is closer to the case fatality rate. The error results from reporting 3.3 million cases (8% of the population), when in fact, this number is likely closer to 25 million (60% of the population) (15,16). This means that the authors were either unaware of the distinction between case and infection rates or were intentionally reporting them incorrectly. Either option is concerning and should have been corrected prior to publication.

## 2. Uncritical reliance on flawed and discredited mathematical models

In this article, Ogden *et al.* use a model (17) that presumes efficacy of NPIs to prove that NPIs have efficacy. This circular reasoning alone should have disqualified this article at the stage of peer review. If that were not enough, the authors project “almost a million deaths” in Canada, based on their model. Not



only would this be a rate fourteen times higher than that actually experienced in Sweden (18), it would also have required an IFR of at least 3%—at least an order of magnitude higher than evidence-based estimates pre-vaccine (13).

### 3. Attributing causality to temporal correlation where it fits its narrative but ignoring temporal correlations that do not

A brief look at the main graphic of the article (Figure 1) shows arrows that deviate from the vertical, with explanatory arrows off-set horizontally with little explanation as to why the specific distance or angle was chosen. There are also places where, despite no obvious change in stringency, case counts go up or down or there is no obvious temporal correlation between the measure and the change in cases. These are not scientifically valid data without strong numeric evaluation and justification.

### 4. Failure to consider other explanations

Population mortality rates in British Columbia were 2.5 times lower than Québec and lower than most other parts of the country, yet British Columbia had a lower stringency than most provinces (19); keeping schools open from June 2020 onwards. In fact, mortality data do not generally follow stringency indexes (6) and likely have complex explanations such as age structure (5), obesity rate (20), population density (21) and economic disparity (22).

### 5. Choosing inappropriate comparators

The authors choose to present specific countries—two isolated islands (New Zealand and Australia) and a country without functional land borders (South Korea)—whose outcomes were favourable early in the pandemic. However, substantial cultural, genetic, geographic and social differences may also explain lower impact early in the pandemic. The authors also conveniently forget that these countries have subsequently had massive outbreaks during the Omicron era. In fact, the heavy impact of the Omicron wave on Pacific Rim countries suggests that factors other than social choices played a role.

### 6. No consideration of the short and long-term costs of the interventions

Even if deemed effective in preventing disease, an honest evaluation of the impact of NPIs must also consider their costs. The British Columbia Centre for Disease Control has tracked some of these harms, which include extreme social isolation of seniors, worsening both their mental and physical health (23). For example, there was an increase in falls, which are linked with increased mortality (24). Another example is the marked increase in substance abuse in younger individuals such that overdoses were a much larger cause of death in this group than COVID-19 (25). This is also seen in the StatsCan mortality report (26), which documented an increase in non-COVID-19 deaths in Canadians under the age of 45 years. We are only beginning to understand

the impact of the delay in cancer diagnoses and its effect on mortality (27).

### 7. Failure to disclose important conflicts of interest

The authors of this article disclose no competing interests; however, two authors are senior scientists at the Public Health Agency of Canada (one is the Chief Public Health Officer for Canada) and four are directly employed by the federal government. As key leaders responsible for decision making, they can hardly be viewed as not having competing interests in the favourable evaluation of pandemic management.

### Conclusion

Canada and the world need rigorous analysis of the effectiveness and the costs of the NPIs used to try to control COVID-19 case-counts. This analysis must be disinterested and based on comprehensive data sets. Unfortunately, this article's failure to use real-world data, apply scientific rigour and dispassionately consider alternate hypotheses marks it as unscientific. The *Canada Communicable Disease Report* should not have accepted or published this study because of its lack of scientific merit and its obvious conflict of interest.

### Authors' statement

All authors contributed equally.

### Competing interests

Dr. Grant has received remuneration for expert testimony pertaining to COVID-19.

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## Response from the Editor-in-Chief

In this “Letter to the Editor”, Grant *et al.* have purported a “Failure to disclose important conflict of interest” in that the authors of this paper disclose no competing interests when such interests appear to be present.

As part of the editorial process, each author and co-author must submit the International Committee of Medical Journals Editors (ICMJE) Form for Disclosure of Potential Conflicts of Interest. If an author fails to comply with this rule, their name is removed from the author list and put in the “Acknowledgement” section at the end of the article. For this article, all seven authors provided their declaration and none of them had any relevant financial activities outside the submitted work, any patents, whether planned, pending or issued, that were broadly relevant to the work, and no other relationships, conditions, circumstances that present a potential conflict of interest beside being employees at the Public Health Agency of Canada.

As for Grant *et al.*'s comment “The *Canada Communicable Disease Report* should not have accepted or published this study because of its lack of scientific merit and its obvious conflict of interest”, the journal ensures scientific rigour through a double-blind review process and, specifically for this article, two reviewers from separate academic institutions provided their comments. Neither reviewer recommended that this study not be published.