

EXPERT REPORT OF DENIS RANCOURT, PHD

OUTDOOR TRANSMISSION, EFFICACY OF MASKS, GRAVITY OF THE DECLARED PANDEMIC

Denis Rancourt, *PhD*

Researcher, Ontario Civil Liberties Association (ocla.ca)

<https://denisrancourt.ca/>

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I was asked to produce this expert report for a constitutional case before a court in the province of Manitoba, Canada.

I was asked:

- Do viral respiratory diseases transmit outdoors?
- Do face masks prevent transmission of viral respiratory diseases?
- What was the gravity of the declared COVID-19 pandemic in Canada, and in Manitoba?

My own first draft for the report, which starts on the next page, provides my best answers, on 20 March 2022. I'm making it public to benefit from reader feedback and suggestions.

I myself benefitted from the work of Joseph Hickey, PhD, in his detailed appeal of the vaccine mandates: <https://ocla.ca/data-scientist-files-internal-appeal-of-bank-of-canadas-mandatory-vaccination-policy/>

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Re: [...] (Applicant), Manitoba Provincial Court [Canada]

Prepared for the Court, at the request of [...], Counsel for the Applicant

20 March 2022

(Draft)

Relevant Expertise of Denis Rancourt

I am an internationally recognized interdisciplinary scientist, with 4 decades of advanced research experience in several areas of science, which are fundamental to understanding COVID-19 problems.

I was a tenured Full Professor of Physics at the University of Ottawa, and head of an interdisciplinary laboratory, with a research cross-appointment in Earth Sciences. Before that, I worked as a researcher in prestigious Chemistry (France) and Physics (The Netherlands) laboratories in Europe. My PhD in physics is from the University of Toronto (1984).

Several of the graduate students and post-doctoral fellows that I supervised over the years went on to become professors and researchers in different areas of science and technology, in North America and Europe.

In critically assessing scientific reports and articles in relation to COVID-19, my personal knowledge and ability to evaluate the facts, concepts and methods are grounded in my education and experience, as follows:

- i. *Regarding environmental nanoparticles.* Viral respiratory diseases are transmitted by the smallest size-fraction of virion-laden aerosol particles, which are reactive environmental nanoparticles. Therefore, the chemical and physical stabilities and transport properties of these aerosol particles are the foundation of the dominant contagion mechanism through air. My extensive work on reactive environmental nanoparticles is internationally recognized, and includes: precipitation and growth, surface reactivity, agglomeration, surface charging, phase transformation, settling and

sedimentation, and reactive dissolution. In addition, I have taught the relevant fluid dynamics (air is a compressible fluid), and gravitational settling at the university level, and I have done industrial-application research on the technology of filtration (face masks are filters).

- ii. *Regarding molecular science, molecular dynamics, and surface complexation.* I am an expert in molecular structures, reactions, and dynamics, including molecular complexation to biotic and abiotic surfaces. These processes are the basis of viral attachment, antigen attachment, molecular replication, attachment to mask fibers, particle charging, mass-loss and growth in aerosol particles, and all such phenomena involved in viral transmission and infection, and in protection measures. I taught quantum mechanics at the advanced university level for many years, which is the fundamental theory of atoms, molecules and substances; and in my published research I advanced X-ray diffraction theory and methodology for characterizing small material particles.
- iii. *Regarding statistical analysis methods.* Statistical analysis of scientific studies, including robust error propagation analysis and robust estimates of bias, sets the limit of what reliably can be inferred from any observational study, including randomized controlled trials in medicine, and including field measurements during epidemics. I am an expert in error analysis and statistical analysis of complex data, at the research level in many areas of science. Statistical analysis methods are the basis of medical research.
- iv. *Regarding mathematical modelling.* Much of epidemiology is based on mathematical models of disease transmission and evolution in the population. I have research-level knowledge and experience with predictive and exploratory mathematical models and simulation methods. I have expert knowledge related to parameter uncertainties and parameter dependencies in such models. For example, my 2006 co-authored model of biogeochemical cycling of nutrients in lakes is highly cited (from my laboratory, lead researcher). I have recently made extensive simulations of epidemiological dynamics, using standard compartmental models and new models, in order to evaluate the utility and limits of modelling disease propagation.
- v. *Regarding measurement methods.* In science there are five main categories of measurement methods: (1) spectroscopy (including nuclear, electronic and vibrational spectroscopies), (2) imaging (including optical and electron microscopies, and resonance imaging), (3) diffraction (including X-ray and neutron diffractions, used to elaborate molecular, defect and magnetic structures), (4) transport measurements (including reaction rates, energy transfers, and conductivities), and (5) physical property measurements (including specific density, thermal capacities, stress response, material fatigue...). I have taught these measurement methods in an interdisciplinary graduate course that I developed and gave to graduate (M.Sc. and Ph.D.) students of physics, biology, chemistry, geology, and engineering for many years. I have made fundamental

discoveries and advances in areas of spectroscopy, diffraction, magnetometry, and microscopy, which have been published in leading scientific journals and presented at international conferences. I know measurement science, the basis of all sciences, at the highest level.

My research into COVID-19 matters is on-going, involving active collaborations with researchers in Canada, Europe and the USA (Harvard University).

My recent reports and articles relevant to COVID-19 problems include the following:¹

79. **D.G. Rancourt.** “Masks Don't Work - A review of science relevant to COVID-19 social policy”. *ResearchGate*, 11 April 2020 (13 pages), DOI: 10.13140/RG.2.2.14320.40967/1. Also published at: *viXra.org*, *River Cities' Reader*. Article debated at *Digi-Debates* “The Face Mask Debate”, <https://youtu.be/AQyLFdoeUNk>.
80. **D.G. Rancourt.** “Criticism of Government Response to COVID-19 in Canada”. Ontario Civil Liberties Association, 18 April 2020 (13 pages), OCLA Report 2020-1 | April 2020, <https://ocla.ca/wp-content/uploads/2014/01/OCLA-Report-2020-1-Criticism-of-Government-Response-to-COVID19.pdf>
81. **D.G. Rancourt.** “All-cause mortality during COVID-19 — No plague and a likely signature of mass homicide by government response”. *ResearchGate*, 2 June 2020 (26 pages), DOI: 10.13140/RG.2.2.24350.77125. [Article featured at *doctors4covidethics.org*.]
82. **D.G. Rancourt.** “Face masks, lies, damn lies, and public health officials: ‘A growing body of evidence’”. *ResearchGate*, 3 August 2020 (36 pages), DOI: 10.13140/RG.2.2.25042.58569.
83. **D.G. Rancourt.** “Evaluation of the virulence of SARS-CoV-2 in France, from all-cause mortality 1946-2020”. *ResearchGate*, 20 August 2020 (38 pages), DOI: 10.13140/RG.2.2.16836.65920/1.
84. **D.G. Rancourt.** “Measures do not prevent deaths, transmission is not by contact, masks provide no benefit, vaccines are inherently dangerous: Review update of recent science relevant to COVID-19 policy”. *ResearchGate*, 28 December 2020 (26 pages), DOI: 10.13140/RG.2.2.21706.18885.
85. **D.G. Rancourt.** “Analysis of the scientific basis for Ontario, Canada’s mandatory face masking and physical distancing law, 2020”. Ontario Civil Liberties Association, 6 February 2021 (24 pages), OCLA Report 2021-1 | February 2021, <https://ocla.ca/wp-content/uploads/2021/02/OCLA-Report-2021-1-4th-science-review-for-covid-policy-Reg-364-20-7f.pdf>
86. **D.G. Rancourt.** “Review of scientific reports of harms caused by face masks, up to February 2021”. *ResearchGate*, 22 February 2021 (25 pages), DOI: 10.13140/RG.2.2.14294.37448. Also published at *sherbournesite.org*.
88. **D.G. Rancourt, M. Baudin, J. Mercier.** “Analysis of all-cause mortality by week in Canada 2010-2021, by province, age and sex: There was no COVID-19 pandemic, and there is strong evidence of response-caused deaths in the most elderly and in young males”. *ResearchGate*, 6 August 2021 (63 pages), DOI:10.13140/RG.2.2.14929.45921.

¹ Numbering following my CV, March 2022

89. **D.G. Rancourt.** “Do Face Masks Reduce COVID-19 Spread in Bangladesh? Are the Abaluck et al. Results Reliable?” *Global Research*, 20 September 2021 (23 pages), <https://www.globalresearch.ca/do-face-masks-reduce-covid-19-spread-bangladesh-abaluck-et-al-results-reliable/5756323?pdf=5756323> [Article featured at *doctors4covidethics.org*.]
90. **D.G. Rancourt**, M. Baudin, J. Mercier. “Nature of the COVID-era public health disaster in the USA, from all-cause mortality and socio-geo-economic and climatic data”. *ResearchGate*, 25 October 2021 (171 pages), DOI:10.13140/RG.2.2.11570.32962.
91. J. Hickey, **D.G. Rancourt.** “Nature of the toxicity of the COVID 19 vaccines in the USA”. Ontario Civil Liberties Association, 9 February 2022 (14 pages), OCLA Report 2022-1 (ver. 1) | 9 February 2022, <https://ocla.ca/wp-content/uploads/2022/02/OCLA-Report-2022-1-v1.pdf>

My recent invited talks at international conferences regarding COVID-19 include the following:

30. **D.G. Rancourt.** “From Masking to Mortality Rates: COVID-19 and What the Science Tells Us”. Invited plenary speaker in the session: “Show Us the Science”, National Vaccine Information Center (NVIC)'s Fifth International Public Conference on Vaccination (3 days in October 2020), 16 October 2020 (39 minutes).
31. **D.G. Rancourt.** “The False Pandemic”. Invited plenary talk at: Gold Standard Covid Science in Practice: An Interdisciplinary Symposium (2 days, >20 speakers), 29 July 2021 (20 minutes), organized by Doctors for Covid Ethics, hosted by UK Column.

Do viral respiratory diseases transmit outdoors?

When scientific studies are designed to detect transmission outdoors, what do they find?

At the time of this writing, outdoor transmission of any viral respiratory disease has never been confirmed in a controlled scientific study.

However, outdoor transmission can be inferred in uncontrolled settings in observational studies that do not exclude the possibility of the assigned outdoor transmissions having occurred indoors.

The 2020 systematic review by Bulfone et al.,² including SARS-CoV-2 (COVID-19), identified some 10,912 published studies that examined human to human transmission of any viral

² 2020--Bulfone : Tommaso Celeste Bulfone, Mohsen Malekinejad, George W Rutherford, Nooshin Razani, “**Outdoor Transmission of SARS-CoV-2 and Other Respiratory Viruses: A Systematic Review**”. *The Journal of Infectious Diseases*, 2020;, jiaa742, <https://doi.org/10.1093/infdis/jiaa742> (cited more than 150 times)

respiratory disease. Of these, only seven studies met the quality threshold requirement of Bulfone et al. and reported events of outdoor-environment transmission (their Table 1), in uncontrolled observational studies (in which indoor meetings during the outdoor events were not controlled).

The reported fractions of assigned outdoor transmission events in each of the seven studies retained by Bulfone et al. were (5 of the 7 studies were for COVID-19):

2/7324
4/103
5.6/110 (av.)
1/7
95/10926
0/3
28/820 (deaths, sleeping in hammocks outside, 1918)

Here, a said fraction is the number of assigned outdoor transmission events over the total number of transmission events included in the particular study.

Therefore, the studies to date provide conclusive evidence that outdoor transmission must be rare if it exists. Bulfone et al. estimate the risk of indoor transmission to be at least (since indoor transmission was not excluded) 18.7 times that of outdoor transmission, in crowded outdoor settings of prolonged proximity. In other words, the risk of outdoor “infectious contact” is at most 0.05 times that of indoor infectious contact, for otherwise comparable transmission circumstances, which is an upper limit based on the available science.

In conclusion, there is no reason, based on empirical and reliable data, to presume that transmission of COVID-19 can occur in the outdoor environment. Furthermore, there has never been a conclusive observation of even a single event of such a phenomenon.

Despite the actual science, some might be tempted to point the finger at large outdoor gatherings as potential sources of epidemic surges. In this regard, Cevik et al.³ in 2021 correctly reviewed the relevant science for COVID-19:

[N]o confirmed sizeable covid-19 clusters or “superspreader” events have been outdoors-only.[refs]

While the Sturgis Rally in South Dakota or the Rose Garden outbreak at the White House are frequently cited as evidence for outdoor-only superspreading events, these events had sustained and multi-day indoor

³ 2021--Cevik : Cevik et al. in: Javid B, Bassler D, Bryant M B, Cevik M, Tufekci Z, Baral S et al. “Should masks be worn outdoors?” *BMJ* 2021; 373 :n1036 doi:10.1136/bmj.n1036 - <https://www.bmj.com/content/373/bmj.n1036.full>

components. For instance, epidemiological investigation of the Sturgis Rally found cases linked to restaurants and workplaces.[ref]

Consistent with the low concentration of SARS-CoV-2 in outdoor air due to natural ventilation, outdoor transmission contributes very little to covid-19 epidemics.[ref]

Do face masks reduce transmission?

When scientific studies are designed to detect a reduced risk of transmission from wearing a face mask, what do they find?

Many medical interventions or treatments (including face masks) have a small average effect and a large person-to-person variation in effect, which is much larger than the said small average effect.

In these circumstances, those interested in promoting the sought beneficial effect often direct our attention to the calculated average benefit per person and downplay or do not mention the large person-to-person spread of results, which can extend into negative outcomes (harm rather than benefit, for some or many subjects). They often misleadingly present optimistically estimated statistical errors on the calculated average effect, while not comparing the magnitude of the calculated average to the person-to-person spread (standard deviation) of effects (or outcomes).

Leaving aside these common machinations in the practice, if one is intent on showing a positive average benefit of a medical intervention in such circumstances, then the accepted scientific methodology is to perform a randomized controlled trial (an “RCT”).

An RCT is designed to detect a small average benefit in a large spectrum of person-to-person differences of response to the medical intervention. This is a difficult goal, in practice, because the large spectrum of individual responses to the medical intervention necessarily implies that the value of the sought average response will be both susceptible to and sensitive to many different known, unknown and anticipated sources of bias.

The basic methodology of an RCT is to use both an intervention group and a control (or placebo) group of comparable subjects, and to use blinding in applying the medical intervention. It is then hoped to get a valid and meaningful average effect by selecting membership for the two groups by a truly random process, by using groups that are sufficiently

large to produce a sufficiently small calculated error on the average effect, and by controlling against as many of the anticipated sources of bias as possible.

With face mask wearing, blinding is not possible because the mask is visible and is an interference, and there is the additional difficulty that the outcome (infection of an individual) must be validated by a reliable measurement method. That is, it must be a “verified outcome”. One cannot, for example, rely solely of self-reported symptoms, without clinical evaluation or laboratory measurement.

Therefore, in practice, the only admitted acceptable way to reliably evaluate the efficacy of face masks for reducing transmission of any viral respiratory disease, including COVID-19, is to perform an RCT with verified outcome. It is difficult enough to do this. By comparison so-called field or observational studies of face mask efficacy are not policy-grade studies, and must be considered unreliable, unusable for guiding policy decisions, and certainly of no scientific value for elucidating the phenomenon of transmission.

There have been more than 10 RCTs with verified outcome aimed at assessing face mask efficacy in reducing transmission, published in scientific journals, and these, in turn, have been reviewed by many scientific authors, in so-called systematic reviews and meta-analyses. Each and every one of these RCTs with verified outcome showed that any advantage from mask wearing was not statistically significant. I have elaborated this current state of the science in several articles and reports about masks.^{4 5 6 7 8}

This means that any beneficial effect of reducing transmission using face masks is too small to be detected; in more than 10 high-quality (policy grade) scientific studies designed to detect such an effect, in the absence of bias. The small size of any beneficial effect is proven by these experiments, and no statistically meaningful net benefit has been found.

⁴ (79) D.G. Rancourt. “Masks Don't Work - A review of science relevant to COVID-19 social policy”. *ResearchGate*, 11 April 2020 (13 pages), DOI: 10.13140/RG.2.2.14320.40967/1. (cited 9 times in GoogleScholar) - <https://archive.ph/RuA5z>

⁵ (82) D.G. Rancourt. “Face masks, lies, damn lies, and public health officials: ‘A growing body of evidence’”. *ResearchGate*, 3 August 2020 (36 pages), DOI: 10.13140/RG.2.2.25042.58569. - <https://archive.ph/BjUhb>

⁶ (84) D.G. Rancourt. “Measures do not prevent deaths, transmission is not by contact, masks provide no benefit, vaccines are inherently dangerous: Review update of recent science relevant to COVID-19 policy”. *ResearchGate*, 28 December 2020 (26 pages), DOI: 10.13140/RG.2.2.21706.18885. - <https://archive.ph/F5xqy>

⁷ (85) D.G. Rancourt. “Analysis of the scientific basis for Ontario, Canada’s mandatory face masking and physical distancing law, 2020”. Ontario Civil Liberties Association, 6 February 2021 (24 pages), OCLA Report 2021-1 | February 2021, <https://ocla.ca/wp-content/uploads/2021/02/OCLA-Report-2021-1-4th-science-review-for-covid-policy-Reg-364-20-7f.pdf>

⁸ (86) D.G. Rancourt. “Review of scientific reports of harms caused by face masks, up to February 2021”. *ResearchGate*, 22 February 2021 (25 pages), DOI: 10.13140/RG.2.2.14294.37448. - <https://archive.ph/OL5ji>

A recent study by Abaluck et al.,⁹ first published online, then in *Science*, was a “cluster randomised trial” (randomizing the selection of participating villages), and claimed to find a large benefit from mask wearing in Bangladesh, in paradoxical contradiction to the results from all the RCTs with verified outcome, including those specifically for COVID-19. However, I have shown that the conclusions of Abaluck et al. are not valid because the study design and execution suffer from several fatal flaws.¹⁰ Several other scientists have also, later, been critical of the work of Abaluck et al., although somewhat less incisively, for example.^{11 12 13}

Wang is correctly critical of Abaluck et al., in stating:¹²

[...] It is clear that if random-effects models were used, none of the treatment effects is statistically significant. This is not to say which modelling approach is 'correct' as it is difficult to be absolutely certain. The point is readers should be careful when interpreting the results as the true effects may be very small, making the results sensitive to the modelling approach that happens to be used. [...]

Finally, the cost-benefit analysis seems flawed. As pointed out by Allen (2021), a common mistake of cost-benefit analyses during the pandemic is using different standards for estimating costs and benefits ("comparing apples to oranges"). In this case, the benefit was measured using the value of a statistical life; while cost is measured purely using financial/economic costs. For a fair comparison, the benefits and costs should be measured similarly. It is well documented that wearing masks leads to a range of side effects (Jacobs et al., 2009; Kisielinski et al., 2021), which reduce the quality of life, and in turn value of a life. In addition, considerable costs are external costs such as environmental impact which are not accounted for. [...]

[emphasis added]

⁹ Abaluck et al. “Impact of community masking on COVID-19: A cluster-randomized trial in Bangladesh”. *SCIENCE* • 2 Dec 2021 • Vol 375, Issue 6577 • DOI: 10.1126/science.abi9069 -

<https://www.science.org/doi/10.1126/science.abi9069>

¹⁰ (89) D.G. Rancourt. “Do Face Masks Reduce COVID-19 Spread in Bangladesh? Are the Abaluck et al. Results Reliable?” *Global Research*, 20 September 2021 (23 pages), <https://www.globalresearch.ca/do-face-masks-reduce-covid-19-spread-bangladesh-abaluck-et-al-results-reliable/5756323?pdf=5756323>

¹¹ Chikina et al. “A note on sampling biases in the Bangladesh mask trial”. *arXiv*, 2 December 2021 (8 pages), <https://doi.org/10.48550/arXiv.2112.01296>

¹² C. Wang. “Important study but results sensitive to modelling approaches”. *Science*, 21 February 2022, eLetters at: <https://www.science.org/doi/10.1126/science.abi9069>

¹³ A. Raudasoja. “The Bangladesh trial does not provide adaptable evidence for decision makers”. *Science*, 27 January 2022, eLetters at: <https://www.science.org/doi/10.1126/science.abi9069>

This means that the Abaluck et al. results are not statistically meaningful, on their face, without even looking at fatal design flaws, since an equally valid, arguably better, statistical analysis method reduces their effect to a null result.

Wang also importantly points out that the harms from masks were not considered or evaluated by Abaluck et al., thus making the purported cost-benefit analysis meaningless. This is a feature of virtually all studies reporting a benefit from mask wearing: the harms are never duly considered.

In fact, to my knowledge, no government agency or research group has made a proper cost-benefit investigation that includes an examination of mask harms, whereas the risks and observations of these harms are significant.^{8 14 15 16}

This means that, in the present state of knowledge, more than 10 policy-grade studies have not detected any benefit from face mask use regarding transmission of viral respiratory disease, whereas significant harms are indicated and have not been duly considered in studies used to support policy decisions.

In my view, it is not reasonable to expect that future policy-grade studies will show large benefits that would outweigh the costs and harms of masks, overturning the established results from the existing studies. The small size of the effect can be considered proven.

I end this section by mentioning that many field or observational studies attempt to draw conclusions from comparisons of regional (or national) masking mandates or practice and regional (or national) COVID-19 new case counts (i.e., counts of positive test results). Those studies will always be tenuous. One of the many problems in such studies is that case counts are generally unreliable due to both false positives and non-uniform patterns of testing. One way to avoid this particular problem is to measure all-cause mortality,¹⁷ rather than cases, in relation to masking mandates or practice. De Giorgi et al.¹⁸ examined cantons in Switzerland in this way. They found:

In our main Difference-in-Differences model, the face-mask mandate was associated with a 0.3% reduction in all-cause mortality (95% CI: -

¹⁴ K. Kisielinski et al. "Is a Mask That Covers the Mouth and Nose Free from Undesirable Side Effects in Everyday Use and Free of Potential Hazards?" *International Journal of Environmental Research and Public Health*. 2021; 18(8):4344. <https://doi.org/10.3390/ijerph18084344> (cited 46 times at GoogleScholar)

¹⁵ P. Sukul et al. "Adverse effects of COVID-protective face-masks and wearing durations onto respiratory-haemodynamic physiology and exhaled breath constituents". ResearchSquare, 28 September 2021. DOI: 10.21203/rs.3.rs-930030/v1 - <https://www.researchsquare.com/article/rs-930030/v1>

¹⁶ K. Kisielinski et al. "Possible toxicity of chronic carbon dioxide exposure associated with mask use, particularly in pregnant women, children and adolescents – a scoping review". *ResearchSquare*, 6 January 2022 (31 pages), DOI: <https://doi.org/10.21203/rs.3.rs-1233423/v1>

¹⁷ I explain and define "all-cause mortality" (ACM) below. Basically, it is mortality for all causes of death; that is, counted deaths of individual persons irrespective of cause of death.

¹⁸ De Giorgi et al. "The Impact of Face-Mask Mandates on All-Cause Mortality in Switzerland: A Quasi-Experimental Study". *Semantic Scholar*, 2021 (24 pages), <https://iceanet.org/wp-content/uploads/2021/11/De-Giorgi.pdf>

3.4% to 2.7%; $p=0.818$). This small non-significant effect was confirmed in the event-study approach and a variety of robustness checks. We did not find any evidence for substantial effect heterogeneity by sex, age, or time since implementation of the policy. Neither did we identify significant effects of the face-mask mandate on COVID-19 cases and deaths.

This means that we can be somewhat certain that masks do not measurably prevent deaths (not even assigned COVID-19 deaths, here) in conditions like those during COVID-19 in Switzerland in 2020. The opposite would be surprising given the policy-grade studies discussed above, which conclusively show a null effect.

Does the gravity of the declared pandemic justify the response?

Death is always political.

Can the gravity of a death-causing epidemic be rigorously evaluated, while circumventing all the political bias that accompanies analysis?

The answer is yes.

Measuring death itself — irrespective of attributing cause of death and of identifying infections and comorbidities (multiple contributing causes) — circumvents both unavoidable uncertainty and susceptibility to bias (both structural and political).

In this way, all-cause mortality (ACM) by time (day, week, year) is the most reliable data for detecting true catastrophic events causing death, and for gauging the population-level impact of any surge in deaths from any cause. ACM by time can also be discerned (filtered) by age group, by sex, and by jurisdiction (country, state, province, county, city) of the deaths.

ACM was the original basis of the emerging modern science of epidemiology, and remains its most powerful tool, in comparisons to human conflict, living condition, environmental, professional practice, cultural, catastrophic, geotectonic, climatic and other circumstances.

Therefore, let us directly examine ACM by time (week) for Canada (all ages, both sexes), and compare it to the same for the USA. This data is straightforward to ascertain. There is no technological or scientific uncertainty in determining that a death has occurred, and death statistics are one of the most reliable population statistics in a modern society like Canada.

Figure 1, below shows the number of deaths per week, of all causes, (ACM/w) in Canada (blue lines in Figure 1a and Figure 1b) and in the USA, divided by 10 (orange line in Figure 1b). The x-axes range from September 30, 2013, to January 31, 2022, and the yearly tick-marks indicated on the x-axes correspond to January 1st for each year.

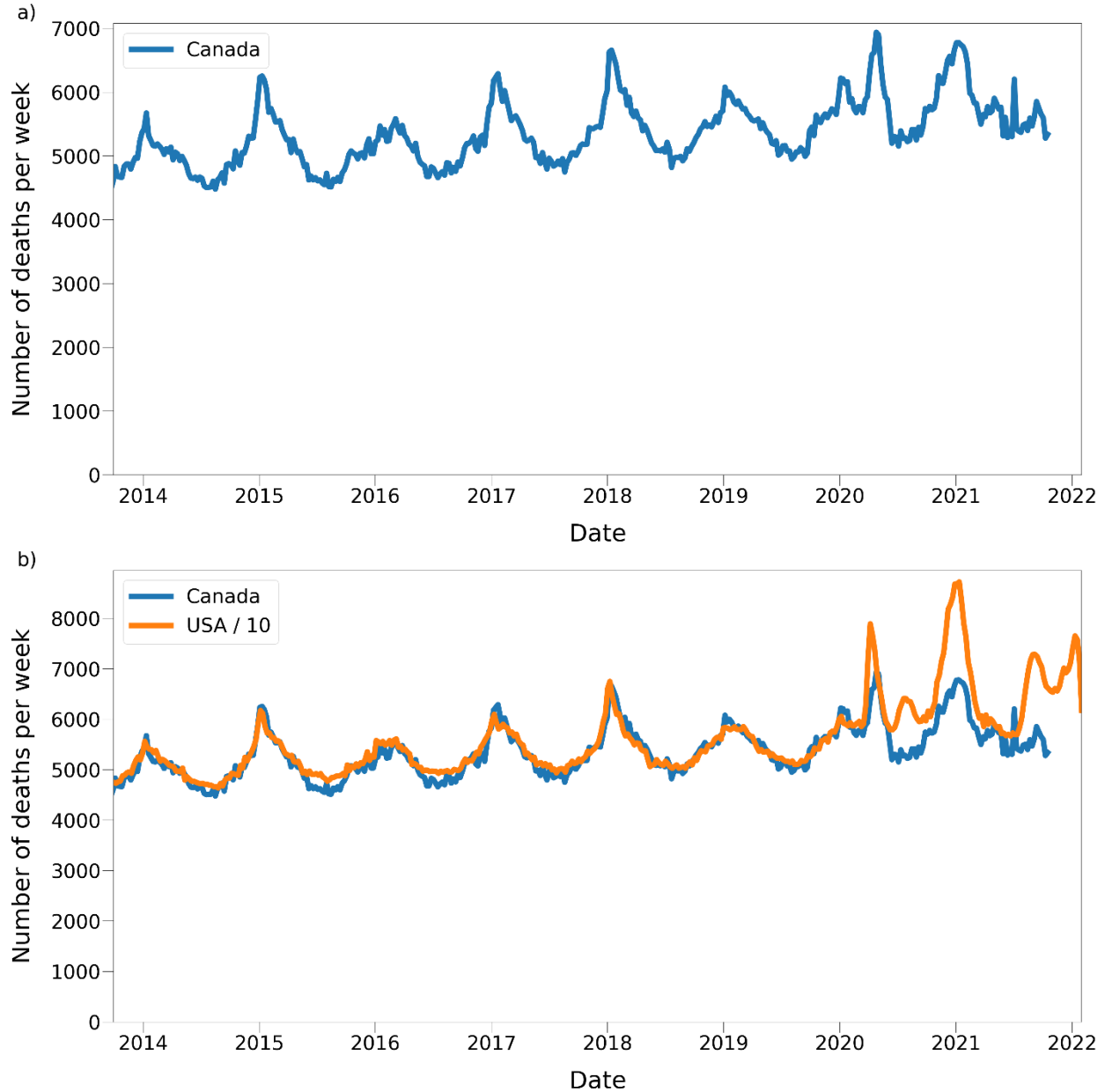


Figure 1: ACM/w (a) in Canada, (b) in Canada, and in the USA (divided by 10). X-axis ticks are located at January 1st of the year. Canadian data is from Statistics Canada,¹⁹ USA data is from the CDC.²⁰ Note that the y-scales start at zero.

¹⁹ Statistics Canada, "Provisional weekly death counts, by age group and sex", <https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=1310076801>.

In the years before 2020, in both countries, there is a regular annual cycle in the number of deaths per week (ACM/w), with winter peaks and summer troughs. This is a universal pattern in all mid-latitude Northern Hemisphere countries, which has always been observed since mortality by time data has been examined, first by Quetelet,²¹ and for example.²² The pattern is reversed in the Southern Hemisphere, which has its summer during our winter.

The additional deaths during the winter months compared to the summer trough levels (“excess deaths”) are predominantly due to deaths of elderly people and are postulated (in a dominant scientific view) to be driven by viral respiratory illnesses including influenza, especially during presumed viral respiratory disease pandemic conditions, and associated co-morbidities (esp. bacterial pneumonia and heart conditions). For example, Fowler et al. put it this way:²³

The immediate cause of most excess winter death is cardiovascular or respiratory diseases including seasonal respiratory infections, particularly in older people and those with chronic health problems.[refs]

Main conclusion from ACM/w for Canada

Figure 1a shows that there is overall no exceptional change in the number of deaths per winter or per year in Canada in the period after 1 January 2020, as compared to the period leading up to 1 January 2020; that there is no significant increase in deaths per year, compared to the recent historic trend, during the COVID-19 period.

That is, the last two “winter peaks” of deaths in Figure 1a (centred on the winter of 2020 and the winter of 2021) each correspond to approximately the same number of excess deaths as do each of the winter peaks from 2014 through 2019, and the deaths per week in the summer

²⁰ CDC, “Pneumonia and influenza mortality surveillance from the National Center for Health Statistics Monitoring System”, <https://gis.cdc.gov/grasp/fluview/mortality.html>.

²¹ A. Quetelet. “*De l'influence des saisons sur la mortalité aux différents âges dans la Belgique*” (book). Bruxelles : M. Hayez, imprimeur de l'Académie royale (1838), 60 pages - <https://archive.org/details/39002086471654.med.yale.edu/mode/1up>

²² W.A. Guy and M.B. Cantab. “An Attempt to Determine the Influence of the Seasons and Weather on Sickness and Mortality.” *Journal of the Statistical Society of London*, vol. 6, no. 2, [Royal Statistical Society, Wiley], 1843, pp. 133–50, <https://doi.org/10.2307/2337869>; W.A. Guy. “On the Annual Fluctuations in the Number of Deaths from Various Diseases, Compared with Like Fluctuations in Crime, and in Other Events Within and Beyond the Control of the Human Will.” *Journal of the Statistical Society of London*, vol. 21, no. 1, [Royal Statistical Society, Wiley], 1858, pp. 52–86, <https://doi.org/10.2307/2338211>.

²³ T. Fowler et al. “Excess Winter Deaths in Europe: a multi-country descriptive analysis”. *European Journal of Public Health*, Volume 25, Issue 2, April 2015, Pages 339–345, <https://doi.org/10.1093/eurpub/cku073>

troughs in the summers of 2020 and 2021 essentially follow the increasing linear trend of summer trough levels that spans all the data shown in the figure.

Anomalies in the ACM/w for Canada

The largest abnormal distinct feature of the post-January 2020 part of the deaths per week data in Figure 1a is the presence of a second, late-winter peak starting in March of 2020. This peak occurs immediately after the World Health Organization (WHO) declaration of the COVID-19 pandemic on March 11, 2020, and we have shown that it has features that are incompatible with the spread of a novel virus in a population without prior immunity, namely:^{24 25 26}

- Its sharpness, with a full-width at half-maximum of only approximately 4 weeks;
- Its lateness in the infectious-season cycle, surging after week-11 of 2020, which is unprecedented for any large sharp-peak feature;
- The synchronicity of the onset of its surge, across continents, and immediately following the WHO declaration of the pandemic;
- Its USA state-to-state absence or presence for the same viral ecology on the same territory, being correlated with nursing home events and government actions rather than any known viral strain discernment.

Two more anomalies occur in the ACM/w data for Canada (Figure 1a), which are worthy of mention.

The first is an extremely sharp peak (~1 week) centered on week-26 (~3 July) of 2021. This peak occurs only in the province of British Columbia and corresponds to a known record-breaking heat wave that occurred at that time on the mid-latitude West coast of North America, and is also seen and thus explained in the USA states of Washington and Oregon. We have previously outlined this in some detail.²⁶ That this heat-wave mortality feature occurs only in British Columbia in Canada is illustrated in Figure 2, which shows ACM/w for different provinces.

²⁴ (81) D.G. Rancourt. "All-cause mortality during COVID-19 — No plague and a likely signature of mass homicide by government response". *ResearchGate*, 2 June 2020 (26 pages), DOI: 10.13140/RG.2.2.24350.77125. - <https://archive.ph/PXhsg>

²⁵ (83) D.G. Rancourt. "Evaluation of the virulence of SARS-CoV-2 in France, from all-cause mortality 1946-2020". *ResearchGate*, 20 August 2020 (38 pages), DOI: 10.13140/RG.2.2.16836.65920/1. - <http://dx.doi.org/10.13140/RG.2.2.16836.65920/1>

²⁶ (90) D.G. Rancourt, M. Baudin, J. Mercier. "Nature of the COVID-era public health disaster in the USA, from all-cause mortality and socio-geo-economic and climatic data". *ResearchGate*, 25 October 2021 (171 pages), DOI:10.13140/RG.2.2.11570.32962. <http://dx.doi.org/10.13140/RG.2.2.11570.32962>

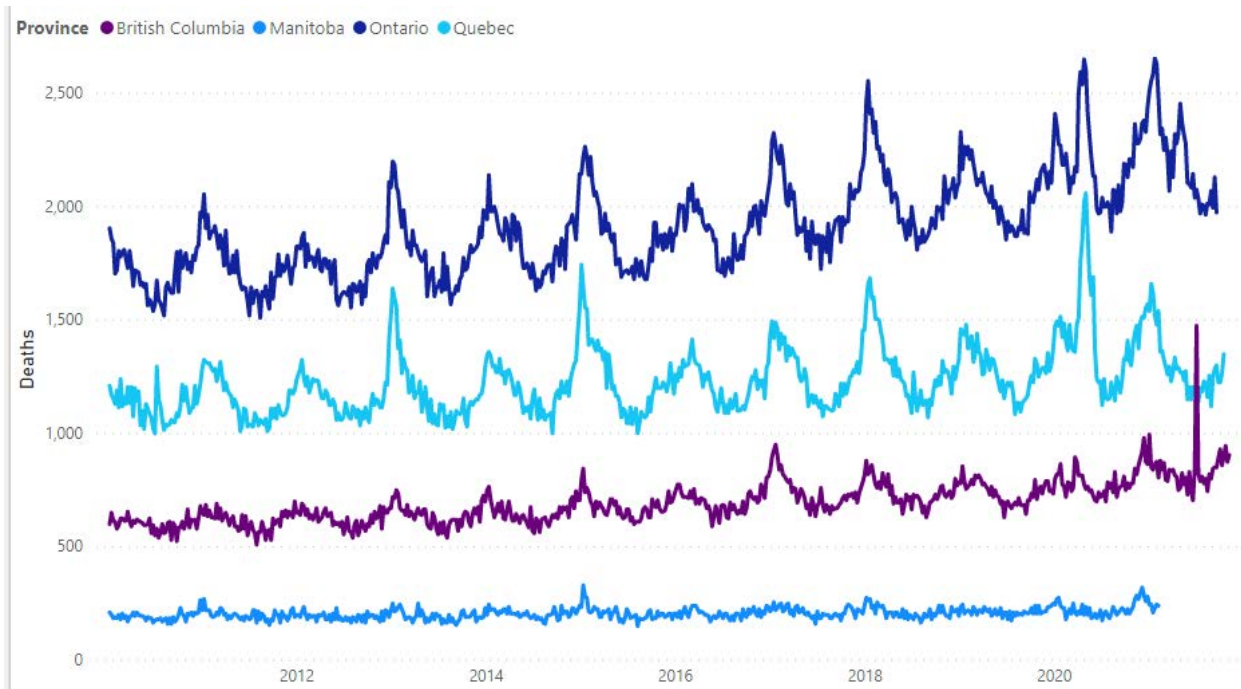


Figure 2: ACM/w for (top to bottom) Ontario, Quebec, British Columbia and Manitoba, 2010-2021, on the same y-scale that starts at zero. The heat-wave peak is present only in BC, centered on week-26 (~3 July) of 2021.

The second additional notable anomalous feature in the ACM/w for Canada (Figure 1a) is a smaller emergent peak in the spring-2021, which follows the main winter peak of 2021, and then drops suddenly to the summer trough value of mortality, after week-20 (~22 May) of 2021. This anomalous spring-2021 feature is predominantly due to a peak of deaths occurring in Ontario, which can be seen in Figure 2, and which is illustrated further in Figure 3, in which week-20 of 2021 is flagged.

The Ontario source of the said anomalous spring-2021 feature is illustrated in more detail in Figure 4, which shows ACM/w for Ontario, on expanded y-axis scales, for all ages and for the age groups 85+ years, 65-84 years, and 45-64 years; and week-20 of 2021 is flagged in each panel. The age dependence of the magnitude of mortality in the said anomalous spring-2021 feature for Ontario (Figure 4) is incompatible with the known strongly exponential age-dependence of COVID-19 mortality.^{27 28 29} The said anomalous spring-2021 feature cannot predominantly be due to COVID-19.

²⁷ J.R. Goldstein and R.D. Lee. “Demographic perspectives on the mortality of COVID-19 and other epidemics”. *PNAS* | September 8, 2020 | vol. 117 | no. 36 | 22035–22041 | <https://doi.org/10.1073/pnas.2006392117> (esp. their Fig. 1)

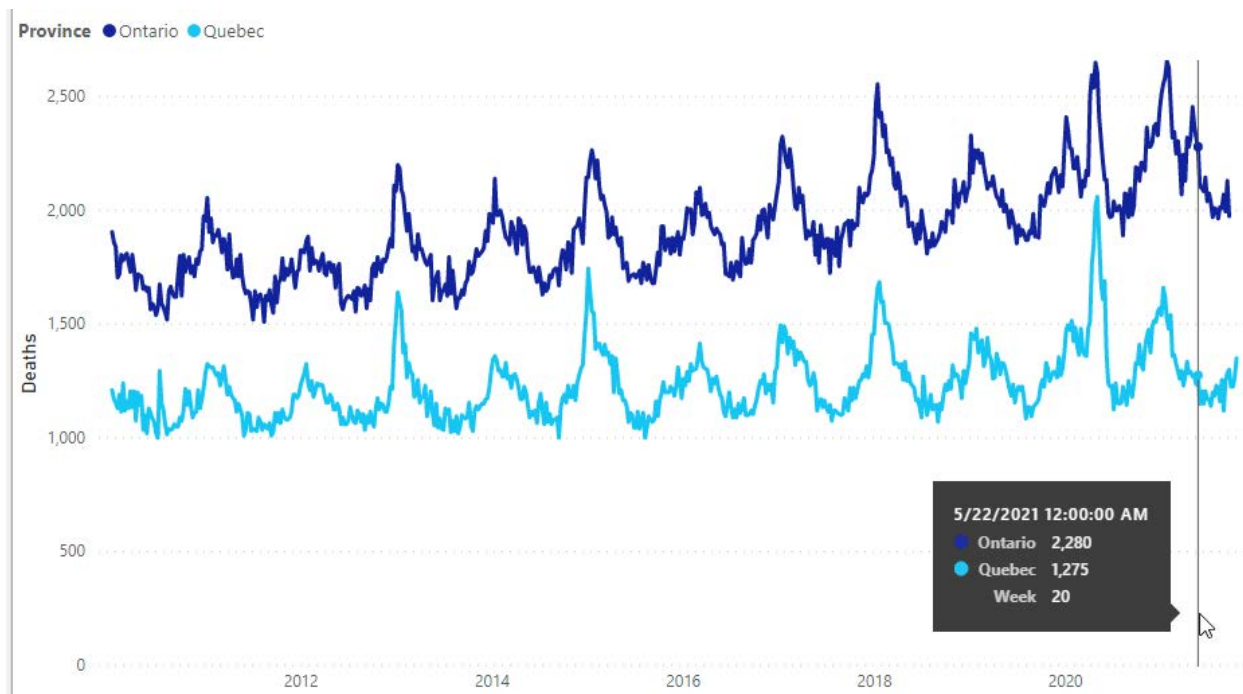
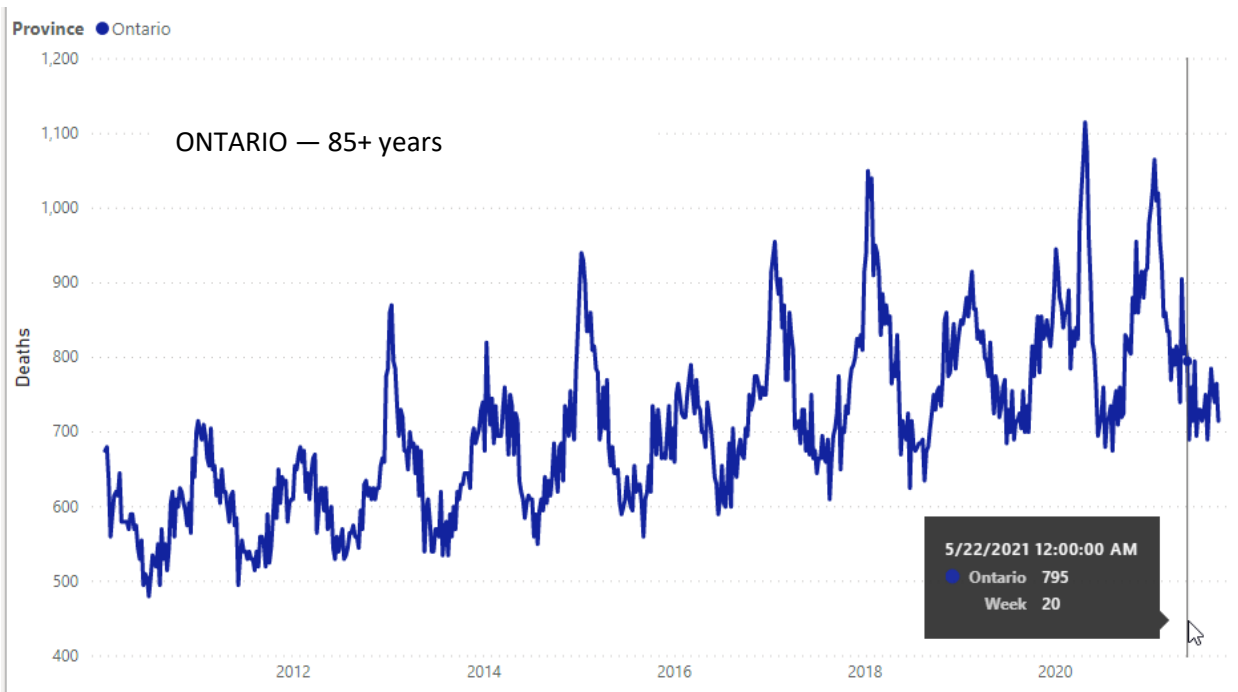
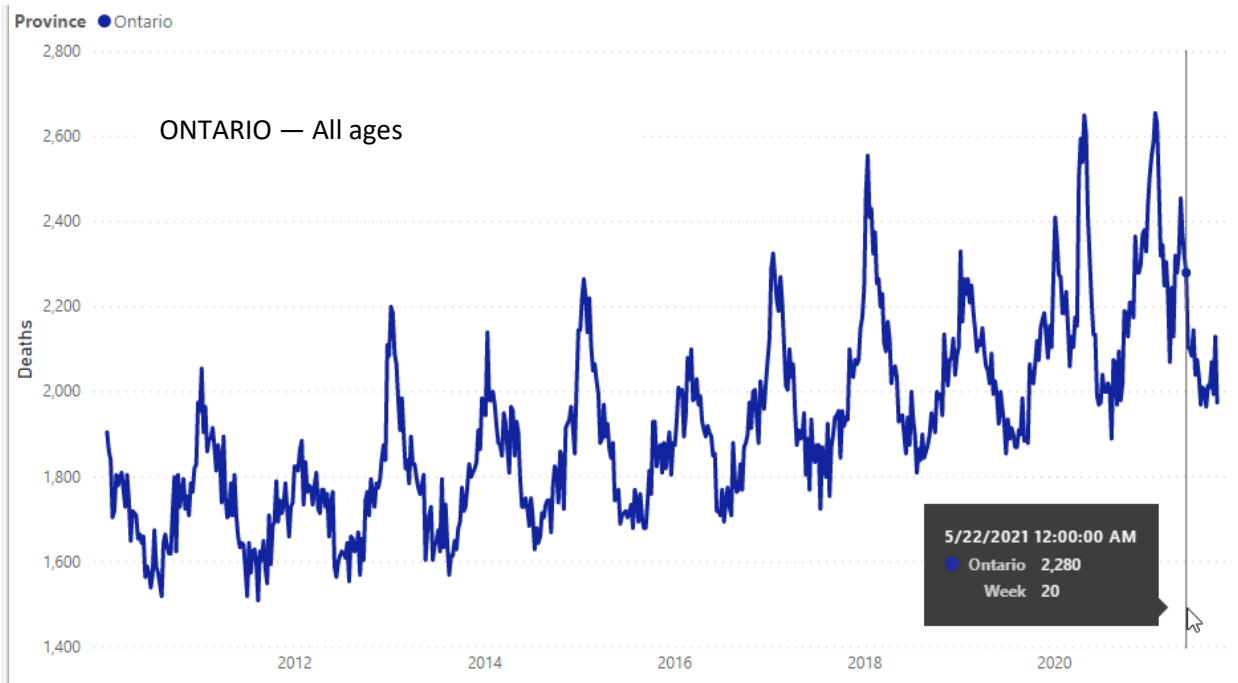


Figure 3: ACM/w for (top to bottom) Ontario and Quebec, 2010-2021. Week-20 of 2021 is indicated by the vertical line.

The next four panels are Figure 4:

²⁸ R. Omori et al. “The age distribution of mortality from novel coronavirus disease (COVID-19) suggests no large difference of susceptibility by age”. *Nature (Sci Rep)* 10, 16642 (2020). <https://doi.org/10.1038/s41598-020-73777-8> (esp. their Figure 1)

²⁹ C.Z. Guilmoto. “An alternative estimation of the death toll of the Covid-19 pandemic in India”. *PLOS ONE*, February 16, 2022, <https://doi.org/10.1371/journal.pone.0263187> (esp. their Appendix S1)



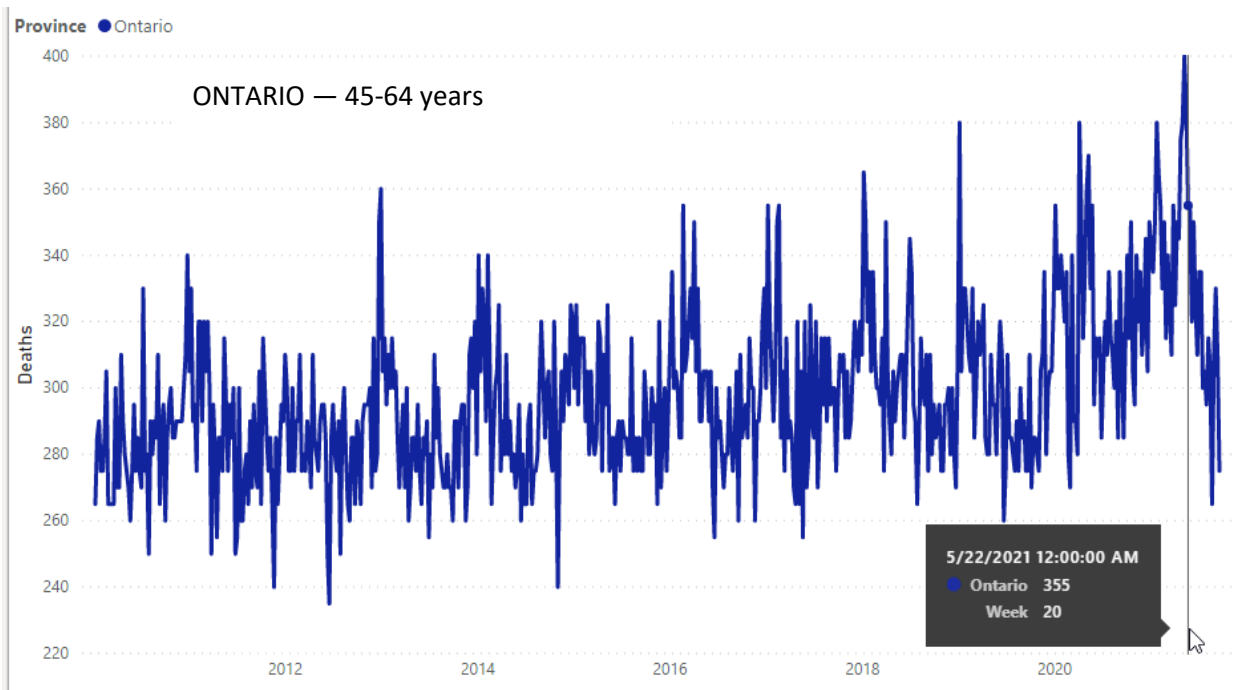
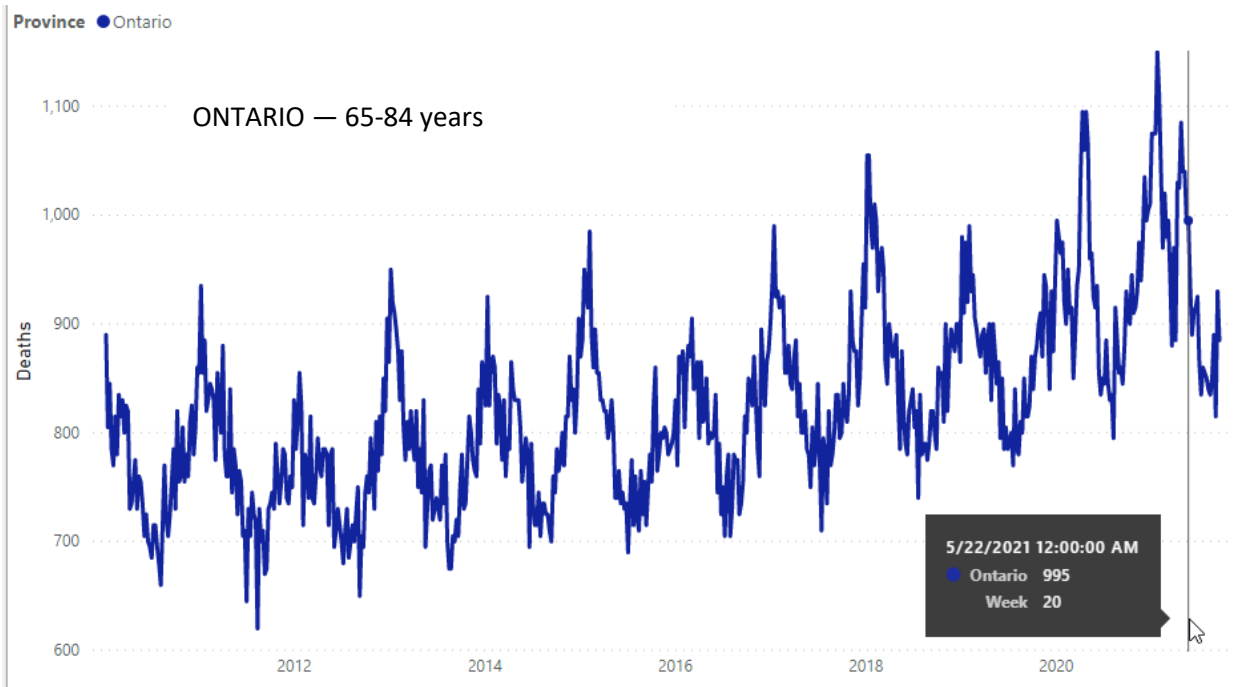


Figure 4: ACM/w for Ontario, 2010-2021, for all ages (top panel), and for the age groups 85+ years (2nd from top panel), 65-84 years (3rd from top panel) and 45-64 years (bottom panel). All four panels have the same x-axis and different y-axis scales. Week-20 of 2021 is flagged in each panel.

I interpret the spring-2021 Ontario mortality peak (Figures 3 and 4) as having been caused by the extended stay-at-home orders and lockdown measures applied against Ontario residents and residents of Toronto in particular, which were aggressive and the longest in Canada at that time.³⁰ Media investigations reported these orders to have been political, chaotic, and exceptionally severe. The stay-at-home order was extended several times²⁷ and finally ended on 2 June 2021,³¹ which coincides with the said sudden drop in mortality for Canada, occurring after week-20 of 2021.

Necessary comparison to ACM/w for the USA

In general, in my research on ACM during the COVID-19 period, every time I have seen an anomaly compared to the recent historic decadal or more trend, when it is not due to a summer heat wave, it can be understood mechanistically as arising from the drastic measures or medical and health protocols imposed in specific jurisdictions and on specific institutions (hospitals and care homes). Whereas, it is a premise of infectious disease epidemiology that pandemic viral respiratory disease spread does not stop at political or jurisdictional boundaries.

For example, in contrast to the data for Canada, the number of deaths per week in the USA (Figure 1b) shows a pattern that is qualitatively and quantitatively different in the period after February 2020 compared to the period leading up to March 2020. Main features of the post-February 2020 all-cause mortality by week in the USA are as follows:²⁶

- Beginning immediately following the WHO declaration of a pandemic on March 11, 2020, there is a large peak in deaths that lasts approximately three months.
- The number of deaths per week does not descend to the summer baseline in the summer of 2020, and instead there is a broad mid-summer peak (approximately mid-June to mid-September) that is unprecedented in epidemiological records.
- There is an exceptionally large peak spanning approximately late-September 2020 to mid-March 2021.
- There is an anomalous (unprecedented) late summer-2021 upsurge in deaths followed by a relatively small decrease and then a late autumn-2021 upsurge in deaths.

³⁰ T. Lawson et al. (McCarthy-Tétrault law firm). "COVID-19: Emergency Measures Tracker", 17 March 2022 - <https://www.mccarthy.ca/en/insights/articles/covid-19-emergency-measures-tracker>

³¹ Ontario government News Release, 13 May 2021, "Ontario Extending Stay-at-Home Order Until June 2" - <https://news.ontario.ca/en/release/1000124/ontario-extending-stay-at-home-order-until-june-2> (accessed 18 March 2022).

- The number of deaths per week again does not descend to the summer baseline, in the summer of 2021. There were no “epidemiological summers” in the USA in 2020 and 2021.

Therefore, the temporal evolution of the number of all-cause deaths per week was highly correlated between the two countries up to March 2020, but then diverged immediately following the WHO declaration of a pandemic on March 11, 2020, with the USA deaths per week rising to exceptionally high values and having little resemblance to the historic seasonal trend of the last decade or so.

The dramatic increase in above-trend all-cause deaths in the USA starting March 11, 2020, and extending throughout the COVID-19 period is unique in magnitude among Western nations,^{26 32} and corresponds to 1 million excess deaths up to 31 January 2022. We have explained this by the fact that the USA has:²⁶

- a large proportion of the population having fragile health, correlated to state-wise poverty, obesity, prescriptions of antibiotics, diabetes, and so forth,
- climatic conditions in the southern states (high average temperatures in the summer) that impose a large thermal stress, especially affecting fragile individuals,³³
- strict lockdown policies causing social isolation, psychological stress, and reduced ability to relieve thermal stress.

We concluded that the COVID-period excess mortality in the USA was not caused by any special viral respiratory disease acting in a typical advanced Western nation:²⁶

We infer that persistent chronic psychological stress induced by the long-lasting government-imposed societal and economic transformations during the COVID-era converted the existing societal (poverty), public-health (obesity) and hot-climate risk factors into deadly agents, largely acting together, with devastating population-level consequences against large pools of vulnerable and disadvantaged residents of the USA, far above preexisting pre-COVID-era mortality in those pools. We also find a large COVID-era USA pneumonia epidemic [reported in CDC mortality data] that is not mentioned in the media or significantly in the scientific literature, which was not adequately addressed [prescriptions of antibiotics were reduced by half nation-wide].

³² R.F. Kennedy Jr., “The Real Anthony Fauci: Bill Gates, Big Pharma, and the Global War on Democracy and Public Health”, Skyhorse Publishing (New York, 2021), at pgs. xviii-xix.

³³ J.F. Clarke, “Some effects of the urban structure on heat mortality”, *Env. Res.* 5 (1972) 93-104, <https://www.sciencedirect.com/science/article/abs/pii/0013935172900230>.

Regarding the said large “COVID-era USA pneumonia epidemic” that occurred, viral respiratory infections are known to be strong precursors of bacterial pneumonia,³⁴ which is lethal if untreated.

Our conclusion — that the large excess mortality in the USA was not primarily or largely caused by COVID-19 — is supported by several medical reports and studies, as follows:

1. A *BMJ* study by Woolf et al. found a much larger decrease in life expectancy in the USA between 2018 and 2020 compared to other high income nations:³⁵

Between 2010 and 2018, the gap in life expectancy between the US and the peer country average increased from 1.88 years (78.66 v 80.54 years, respectively) to 3.05 years (78.74 v 81.78 years). Between 2018 and 2020, life expectancy in the US decreased by 1.87 years (to 76.87 years), 8.5 times the average decrease in peer countries (0.22 years), widening the gap to 4.69 years. Life expectancy in the US decreased disproportionately among racial and ethnic minority groups between 2018 and 2020, declining by 3.88, 3.25, and 1.36 years in Hispanic, non-Hispanic Black, and non-Hispanic White populations, respectively. In Hispanic and non-Hispanic Black populations, reductions in life expectancy were 18 and 15 times the average in peer countries, respectively. Progress since 2010 in reducing the gap in life expectancy in the US between Black and White people was erased in 2018-20; life expectancy in Black men reached its lowest level since 1998 (67.73 years), and the longstanding Hispanic life expectancy advantage almost disappeared. [emphasis added]

2. 93,000 people died in the USA of overdoses in 2020 (a 30% increase compared to 2019).³⁶
3. “During 2020, the proportion of mental health-related emergency department (ED) visits among adolescents aged 12-17 years increased 31% compared with that during 2019.”³⁷

³⁴ S. Hanada et al. “Respiratory Viral Infection-Induced Microbiome Alterations and Secondary Bacterial Pneumonia”. *Frontiers in Immunology*, 16 November 2018 | Volume 9 | Article 2640 | (15 pages) | <https://doi.org/10.3389/fimmu.2018.02640> (Review Article)

³⁵ S.H. Woolf et al., “Effect of the covid-19 pandemic in 2020 on life expectancy across populations in the USA and other high income countries: simulations of provisional mortality data”, *BMJ* 373 (2021) n1343, <https://doi.org/10.1136/bmj.n1343>.

³⁶ B. Chappell, “Drug Overdoses Killed A Record Number Of Americans In 2020, Jumping By Nearly 30%”, 14 July 2021, *NPR*, <https://www.npr.org/2021/07/14/1016029270/drug-overdoses-killed-a-record-number-of-americans-in-2020-jumping-by-nearly-30>.

4. “The increases in drug overdose deaths appear to have accelerated during the COVID-19 pandemic. [...] Synthetic opioids are the primary driver of the increases in overdose deaths. The 12-month count of synthetic opioid deaths increased 38.4% from the 12-months ending in June 2019 compared with the 12-months ending in May 2020 (fig).”³⁸
5. Mental health problems, including suicidal ideation, increased significantly after March 2020:³⁹

Elevated levels of adverse mental health conditions, substance use, and suicidal ideation were reported by adults in the United States in June 2020. The prevalence of symptoms of anxiety disorder was approximately three times those reported in the second quarter of 2019 (25.5% versus 8.1%), and prevalence of depressive disorder was approximately four times that reported in the second quarter of 2019 (24.3% versus 6.5%) (ref). However, given the methodological differences and potential unknown biases in survey designs, this analysis might not be directly comparable with data reported on anxiety and depression disorders in 2019 (ref). Approximately one quarter of respondents reported symptoms of a TSRD related to the pandemic, and approximately one in 10 reported that they started or increased substance use because of COVID-19. Suicidal ideation was also elevated; approximately twice as many respondents reported serious consideration of suicide in the previous 30 days than did adults in the United States in 2018, referring to the previous 12 months (10.7% versus 4.3%) (ref). [reference numbers removed]

³⁷ E. Yard et al., “Emergency Department Visits for Suspected Suicide Attempts Among Persons Aged 12–25 Years Before and During the COVID-19 Pandemic — United States, January 2019–May 2021”, *Morb Mort Week Rep* 70 (2021) 888-894, <https://www.cdc.gov/mmwr/volumes/70/wr/mm7024e1.htm>.

³⁸ CDC Health Alert Network, “Increase in Fatal Drug Overdoses Across the United States Driven by Synthetic Opioids Before and During the COVID-19 Pandemic”, 17 December 2020, <https://emergency.cdc.gov/han/2020/han00438.asp>.

³⁹ M.E. Czeisler, “Mental Health, Substance Use, and Suicidal Ideation During the COVID-19 Pandemic — United States, June 24–30, 2020”, *Morb Mort Week Rep*, 69 (2020) 1049-1057, <https://www.cdc.gov/mmwr/volumes/69/wr/mm6932a1.htm>.

Conclusion from the comparison between Canada and the USA

Indeed, if one were to accept the media and CDC-promoted interpretation that virtually all excess mortality in the COVID-19 period in the USA is due simply and directly to COVID-19, then one has to explain how the presumed virulent pandemic pathogen, which caused 1 million excess deaths in the USA, did not cross the 3,000 km border into Canada, where there are virtually no excess deaths in the COVID-19 period (Figure 1). In proportion to population, there would have been approximately 100,000 excess deaths in the COVID-19 period in Canada. Nothing like that occurred (Figure 1).

Main conclusion regarding gravity of the declared pandemic

Given the above, two conclusions impose themselves:

1. Deaths “from COVID-19” cannot be analysed in terms of a viral respiratory disease pandemic, COVID-19 or otherwise, in that socio-economic characteristics and jurisdictional regulatory and institutional responses are determinative.
2. There was no extraordinary health emergency in Canada, which caused anomalous winter or yearly excess mortality in the COVID-19 period, although features suggesting negative impact of jurisdictional regulatory and institutional responses are apparent.

The case of the Canadian province of Manitoba

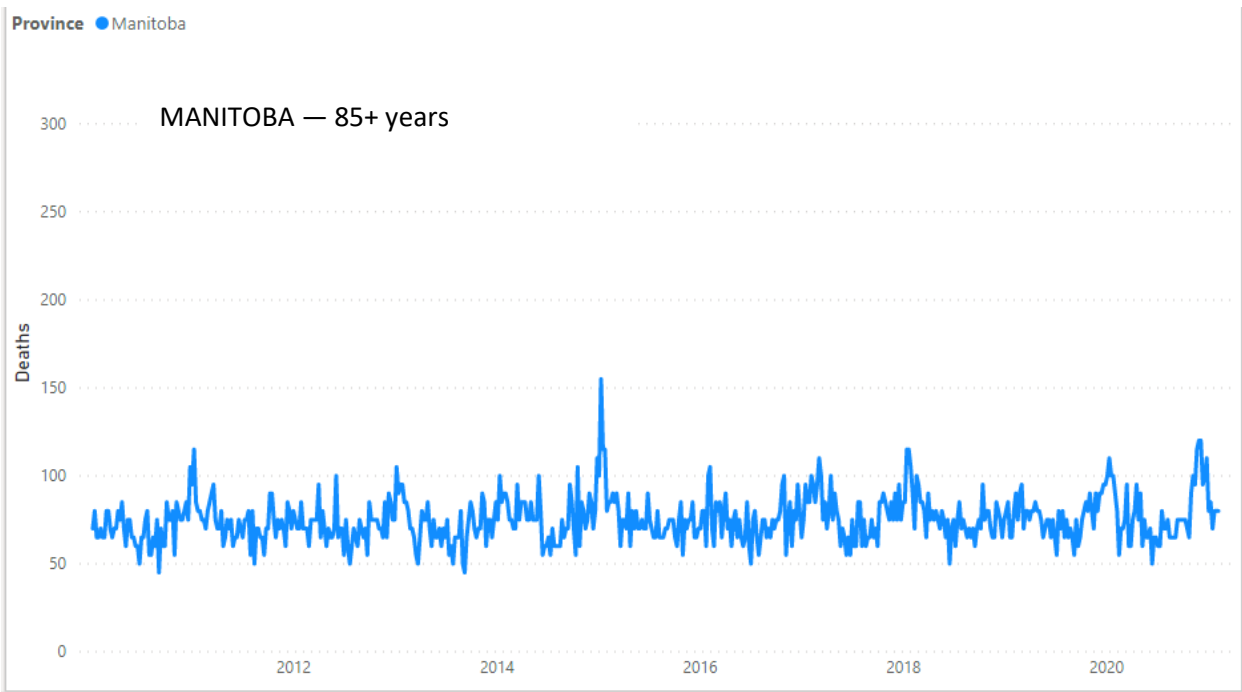
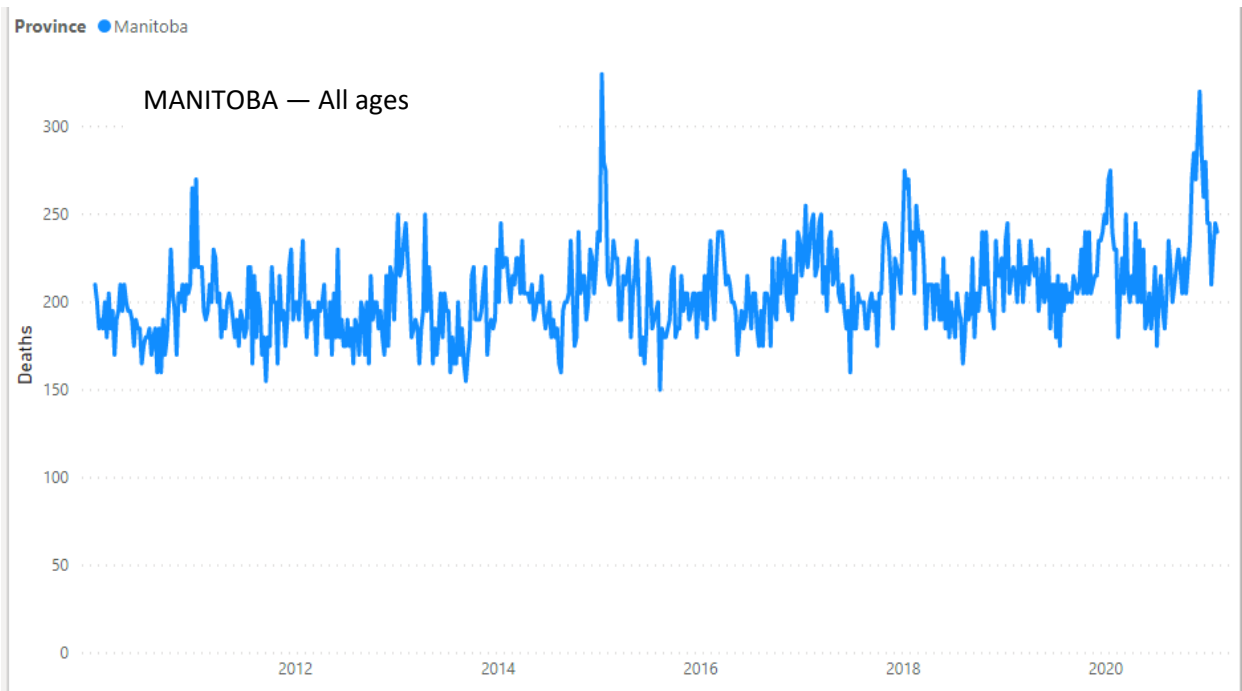
Next, I examine the case of Manitoba in more detail, which is the case at hand.

Was there an extraordinary health emergency in Manitoba, which caused anomalously large excess mortality in the COVID-19 period? In particular, which can be ascribed to COVID-19?

The answer, like for Canada, is “no”, as follows.

Figure 5 shows the presently available ACM/w for Manitoba,⁴⁰ for all ages (top panel), and for the age groups 85+ years (middle panel) and 65-84 years (bottom panel):

⁴⁰ Statistics Canada, as per above.



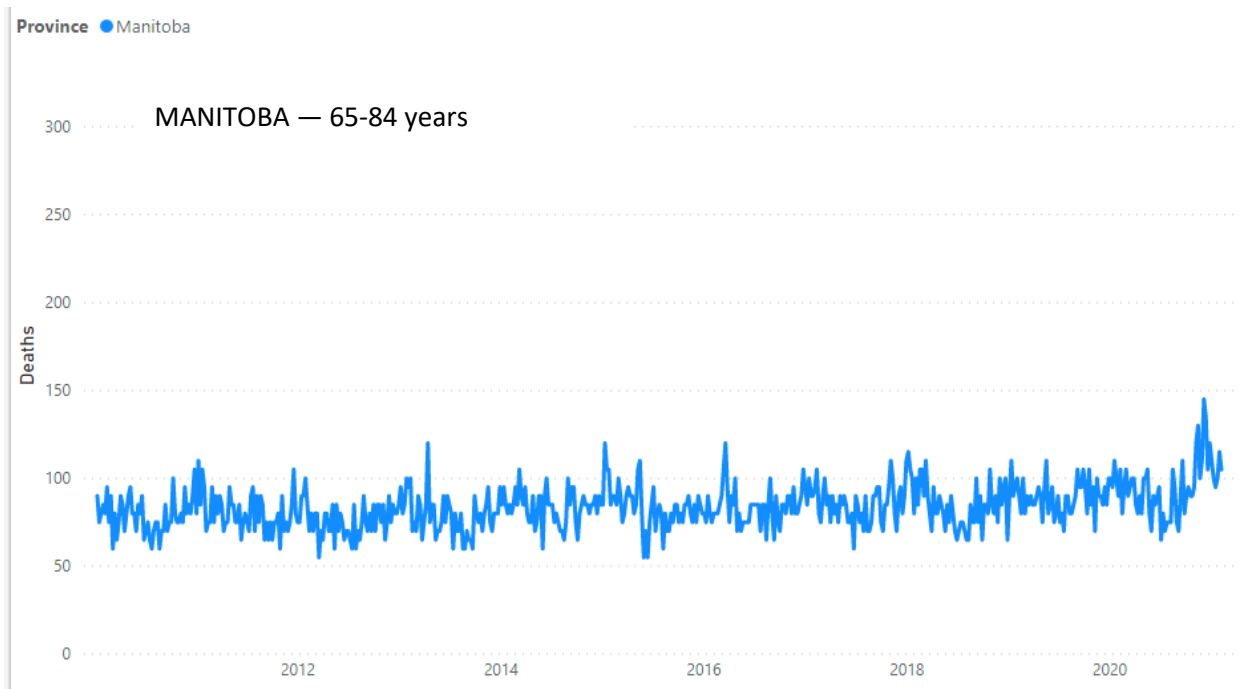


Figure 5: ACM/w for Manitoba, 2010-2021, for all ages (top panel), and for the age groups 85+ years (middle panel) and 65-84 years (bottom panel). All three panels have the same x-axis and y-axis scales.

I make the following observations.

First, unlike for Ontario and Quebec (Figure 2), there is no second, late-winter peak starting in March of 2020 and occurring immediately after the WHO declaration of the COVID-19 pandemic on 11 March 2020. There is no such peak whatsoever for Manitoba. Nothing in ACM/w can be taken to indicate the start of any pandemic in Manitoba, in the entirety of 2020.

This is significant because a main reason used to justify imposing or maintaining health measures in many jurisdictions was a large number of deaths occurring for a few months following 11 March 2020. Nonetheless, Manitoba declared a provincial state of emergency on 20 March 2020.³⁰

The only COVID-19 period anomaly that is detected in ACM/w for Manitoba is a moderate extra increase in mortality in the January-2021 winter, starting at the end of October 2020 (Figure 5). This increase does not equate or surpass the January-2015 winter peak mortality maximum per week, except in the 65-84 years age group (Figure 5).

The said moderate extra increase in mortality in the January-2021 winter for Manitoba cannot predominantly be due to COVID-19 because its age dependence (Figure 5) is incompatible with the known strongly exponential age-dependence of COVID-19 mortality.^{27 28 29}

I interpret the said moderate extra increase in mortality in the January-2021 winter for Manitoba (Figure 5) as arising from the harsh and sustained provincial state-of-emergency measures, including the following increases in measures that were enacted in the relevant period:³⁰

- **November 17, 2020:** Premier Brian Pallister announced that the province has signed a contract with G4S Canada to boost COVID-19 public health order enforcement efforts ([link](#)).
- **November 10, 2020:** The Premier and Chief Public Health Officer announced that the entire province will move to the Critical level (red) on the #Restart MB Pandemic Response System ([link](#)).
- **October 30, 2020:** The Chief Public Health Officer announced multiple province-wide changes to the #Restart MB Pandemic Response System. These changes will take effect November 2, 2020 ([link](#)).
- **October 23, 2020:** The Government of Manitoba has authorized municipal bylaw enforcement officers to enforce public health orders ([link](#)).
- **October 21, 2020:** The Government of Manitoba announced that fines will be increasing for those who fail to comply with public health and emergency orders ([link](#)).
- **August 12, 2020:** The Government of Manitoba extended the state of emergency for a period of 30 days ([link](#)).
- **July 14, 2020:** The Government of Manitoba will extend the province wide state of emergency under *The Emergency Measures Act* beginning July 14, 2020 for a period of 30 days ([link](#)).

[screen capture from³⁰]

For example, the fines that were increased just prior to the end-of-October increase in mortality (Figure 5) on 21 October 2020 “for those who fail to comply with public health and emergency orders” became “the second highest such fine level in Canada” for individuals.⁴¹

⁴¹ News Release - Manitoba, October 21, 2020: "PROVINCE TAKING ACTION TO REINFORCE PUBLIC HEALTH ORDERS". - <https://news.gov.mb.ca/news/index.html?item=49446&posted=2020-10-21>

Conclusion for Manitoba

The conclusion for Manitoba is the same as for Canada: there was no extraordinary health emergency in Manitoba, which caused anomalously large excess mortality in the COVID-19 period (Figures 2 and 5).

There was nothing concrete occurring in the province, for the entirety of 2020, that could reasonably have triggered Manitoba to initiate its extended provincial state-of-emergency measures on 20 March 2020, and to maintain them.

There is evidence in ACM/w that Manitoba's state-of-emergency measures may have caused as many as approximately 900 excess deaths in November 2020 through January 2021, especially in the 65+ years ages (Figure 5), following increased severity of extended provincial state-of-emergency measures.

For comparison, the ~1 week June-July 2021 heat wave in BC caused approximately 780 deaths (Figure 2).

ALL OF WHICH IS RESPECTFULLY SUBMITTED, **DRAFT**, 20 MARCH 2022

[signature]

DENIS RANCOURT, PhD
Expert for the Applicant