Journal of Military and Strategic Studies

VOLUME 21, ISSUE 3

From the Great Influenza to COVID-19: Epidemics of Scale through a Historical Lens.

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Introduction

Considering that affliction is the source of all medical history and health is the backbone of social history, many historians have found a new sense of relevance in their research since the beginning of the 2019 global epidemic.[1] As SARS-CoV-2 (severe acute respiratory syndrome coronavirus two) has dodged local, regional, and international containment efforts and established itself as a world pandemic, healthcare professionals, journalists, politicians, and others have approached historians to inquire what lessons prior epidemics offer to evaluate the present calamity.[2] Historical perspectives are crucial to understanding the complex interaction of socio-economic and biological forces that constitute epidemic disease, like the COVID-19 (coronavirus

[1] The SARS-CoV-2 epidemic began as early as September 2019, as an Italian study of stored blood samples from participants in the prospective lung cancer screening trial showed: Giovanni Apolone et al., "Unexpected Detection of SARS-CoV-2 Antibodies in the Prepandemic Period in Italy," *Tumori* 107, no. 5 (11 November 2020): pp. 446-451.

[2] For a discussion on whether history has lessons, see Elena Zocchi and Giuseppe Terrazzano, "COVID-19: Why Not Learn from the Past?" *Frontiers of Medicine* 15, no.5 (31 August 2021): pp. 776-781; David S. Jones, "COVID-19, History, and Humility," *Centaurus* 62, no. 2 (2020): pp. 370-380; Robert Peckham, "COVID-19 and the Anti-lessons of History," *Lancet* 395, no. 10227 (14 March 2020): pp. 850-851.

ISSN : 1488-559X

disease 2019), and comparative analyses of epidemics together with collective responses to them at different times and in different contexts have a potential to characterize these multidimensional realities adequately. It can be enlightening to critically assess the interests these analytical historical accounts serve, the messages they project, and the features they hide from sight. This is what I attempt to accomplish here: connect the past and present of some epidemic crises by exploring a number of their complex effects since the twentieth century.

Until recently, the emergence of a pandemic has often been treated as a rather implausible development in modern times. COVID-19 seems to be an exception to this trend after many months of crisis across the world. This somewhat explains why large numbers of people have appeared to face with a degree of equanimity, or even some acceptance, situations where the origins of crises and society's ways out of them require rigorous investigation and evidence-informed decision-making. Granted that science as a systematic method-based cooperative inquiry has become central to our culture, why have scientists specializing in epidemiology and virology had so little impact in safeguarding public health?[3] One may suggest that having identified a significant pressing issue, such as COVID-19, the next steps should be the allocation of resources to deal with it comprehensively, including detection and prevention of consequences related to the calamity. In Canada, despite the national expenditure of billions of dollars on the COVID-19 crisis, the fourth wave of this pandemic continued to wreak havoc on parts of the country, especially in Alberta and Saskatchewan.[4] It is evident that the social meanings of and collective responses to the epidemic nationally are as relevant as the pathogens and carriers in producing the devastating effects that this pandemic has had on our lives.

[3] To have a perception of this phenomenon, watch the University of Calgary O'Brien Institute interdisciplinary seminar "Is airborne transmission an important and mitigable aspect of the COVID-19 pandemic?" presented by Dr. John Conly, Dr. David N. Fisman, Dr. Kim Prather, https://www.youtube.com/watch?v=2mh0BXX2Gr8, 9 April 2021.

[4] See the Government of Canada's "Budget 2021: A Recovery Plan for Jobs, Growth, and Resilience," Figure 1.1
Major Federal Investments to Fight COVID-19, p.61, https://www.budget.gc.ca/2021/home-accueil-en.html (accessed 13 October 2021).

Historical Socio-Economic and Medico-Scientific Responses

One might be tempted to think that the COVID-19 pandemic has no analogues historically, so it may be futile to draw parallels. Paradoxically, even the past forty years have increasingly exposed the global public health and economic stability to emerging infectious pathogens with epidemic potential. Acquired Immune Deficiency Syndrome (AIDS), severe acute respiratory syndrome (SARS), Middle East respiratory syndrome (MERS), a series of influenza strains, Ebola, and now SARS-CoV-2, each has been the virulent pandemic threat of their time.[5] Quick comparisons between this COVID-19 epidemic and earlier ones cannot provide the guidance we need, but in times of scientific uncertainty, the past is what our experiences and responses are anchored on. Thus, it is worthwhile to trace how socio-economic and medico-scientific responses to epidemics have been arrayed along with understandings of urgency and permanency, which likewise shift through interactions in the course of epidemic experience. By examining the sequence of epidemic events across time and various diseases, the historian interprets the past, integrating it in a structured system of knowledge to which others can relate. Historical accounts of earlier epidemics – plague, poliomyelitis, cholera, yellow fever, diphtheria, typhus, and others – could provide an intriguing window into the ways people conceptualized and experienced the disease in certain spatial and temporal contexts.[6]

In the twentieth century, the Great Influenza epidemic of 1918-1920, the most disastrous pandemic as measured by the absolute numbers felled (estimated at least

[5] Explore the historical collections of the National Library of Medicine (NLM), especially on scholarship about the history of epidemics, https://circulatingnow.nlm.nih.gov/2020/12/17/nlm-collections-tour-epidemics/ (accessed 26 October 2021). See also Nicholas LePan and Harrison Schell, "Visualizing the History of Pandemics," 14 March 2020, https://www.visualcapitalist.com/history-of-pandemics-deadliest/

[6] For an extensive historiography on epidemics, consult Mark Davis and Davina Lohm, *Pandemics, Publics, and Narrative* (New York, NY: Oxford University Press, 2020); Mitchell Hammond, *Epidemics and the Modern World* (Toronto: University of Toronto Press, 2020); Frank M. Snowden, *Epidemics and Society* (New Haven: Yale University Press, 2019); Samuel Cohn, *Epidemics: Hate and Compassion from the Plague of Athens to AIDS* (Oxford: Oxford University Press, 2018); Sheldon Watts, *Epidemics and History: Disease, Power and Imperialism* (New Haven, Conn.: Yale University Press, 1999); Charles Rosenberg and Janet Golden, eds., *Framing Disease: Studies in Cultural History* (New Brunswick, N.J.: Rutgers University Press, 1992); Terence Ranger and Paul Slack, eds., *Epidemics and Ideas: Essays on the Historical Perception of Pestilence* (Cambridge: Cambridge University Press, 1992); William McNeil, *Plagues and Peoples* (New York: Anchor Books, 1977).

twenty million fatalities), may serve as a meaningful comparison to the ongoing COVID-19 pandemic, the death toll of which reached approximately five million people as of November 2021.[7] Notwithstanding its context of World War I and chauvinistic propaganda smeared across media worldwide, the Great Influenza pandemic spurred waves of volunteerism and cooperative effort which readily crossed frontiers and were of a magnitude hardly ever witnessed thereafter. Given that the scientific-medical community at the time had no idea about the pathogen responsible for the virulent and highly contagious form of illness, healthcare professionals and researchers faced an uphill battle to find either a diagnostic test and/or a treatment for the causative agent. Long after the pandemic ended, the quest for the Great Influenza pathogen continued until the 1930s, when three British researchers – Wilson Smith, Christopher Andrewes, and Patrick Laidlaw – identified influenza viruses experimentally in laboratory animals.[8] As Charles Rosenberg, a medical historian, aptly put it, "In some ways, a disease does not exist until we have agreed that it does, by perceiving, naming, and responding to it."[9] It could be argued that people became aware of the flu's existence when the researchers isolated the pathogen and demonstrated that it could cause infection in animals and humans.

From a historical perspective, the biology of pathogens and hosts does not explain the causes and effects of epidemics fully. Pre-existing economic conditions, social relations, and political institutions have a significant impact on who is most at risk of exposure, of developing the disease, and of suffering from severe short- or even long-term consequences. Also, epidemics along with public responses to them are capable of altering social relations, economic conditions, and political institutions. For example, the repercussions of the Great Influenza pandemic in Canada involved both socio-economic and political changes.

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[7] Centers for Disease Control and Prevention, National Center for Immunization and Respiratory Diseases, Elisha Hall, "Influenza," https://www.cdc.gov/vaccines/pubs/pinkbook/flu.html; COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU), https://coronavirus.jhu.edu/map.html (accessed 27 October 2021).

[8] Rae-Ellen Kavey and Allison Kavey, *Viral Pandemics: from Smallpox to COVID-19* (Abingdon, Oxon; New York, NY: Routledge, 2021): pp. 4-7.

[9] Charles Rosenberg, *Explaining Epidemics and Other Studies in the History of Medicine* (Cambridge: Cambridge University Press, 1992), p. 305.

In 1919, Canadian national leaders were anxious to enact public health legislation regulating the course of action in epidemic emergencies. They reasoned that the propagation of prophylactic measures in the country should be predicated on a doctrine of avoidable disease.[10] The latter meant that it was possible to prevent an epidemic by reporting all potentially high-risk cases to physicians. Health authorities determined the severity of illness and estimated the number of afflicted individuals, which in turn protected the healthy people. As a result, public regulations were enacted that penalized medical officers who failed to report an outbreak of epidemic disease among patients in their constituency.[11] This created an administrative hierarchy of responsibilities for public health maintenance.[12] The legislation provided for the empowerment of local health boards to regulate sanitary conditions, and for bureaus of statistics, financed by the government with the stipulation that policies of the provincial agency were strictly adhered to. This healthcare model gradually became adopted by most Canadian provinces.[13] Thus, epidemic disease was a powerful driver that propelled rapid sanitary reforms in Canada.

The Great Influenza possibly had a role in accelerating the creation of a Federal Department of Public Health.[14] Following a period of public criticism, political apathy, and professional inaction in a time of epidemic crisis, Canadian society responded by forming the agency that could make up for existent deficiencies in healthcare. With the Federal Department of Public Health emerging on a national scale, three levels of government introduced a more coherent system of managing future epidemics by coordinated efforts, feedback mechanisms, surveillance, and organization of community interventions.[15] The Dominion Council of Health (DCH) was founded to complement this promising development. The DCH served as an advisory body that

[10] Dorothy A. Porter, ed., *The History of Public Health and the Modern State* (Amsterdam: Rodopi, 1994), pp. 119-164.
[11] Christopher Rutty and Sue C. Sullivan, *This Is Public Health: A Canadian History* (Ottawa: The Canadian Public Health Association, 2010), pp. 1.10-1.11.
[12] Ibid., pp. 1.3-1.9.
[13] Ibid., p. 1.8.
[14] Mark Humphries, *The Last Plague: Spanish Influenza and the Politics of Public Health in Canada* (Toronto: University of Toronto Press, 2013), pp. 168-169. The bill on the Department's formation was approved by the Royal Assent on 6 June 1919.
[15] Ibid., p. 178.

provided a forum for discussing input from almost all stakeholders in public health.[16] A symbol of the new order was the involvement of universities "representing academic and scientific expertise in medicine, public health and laboratory research."[17] Therefore, medical academics were provided with opportunities to reshape healthcare policies so that they adhered to the emerging principles of scientific medicine.[18]

The two-agency organization that facilitated standardization and classification within the scientific-medical domain was no less consequential. Federal commitments to invest in uniform health programs countrywide played a considerable part. The Federal Department of Public Health provided grants-in-aid to the provinces to ensure strict conformity to collegially agreed-on courses of action.[19] For instance, a public health infrastructure enhancement took priority after a general assessment of key operational capacities. Large projects to build more testing laboratories and all-purpose hospitals got underway in the 1920s.[20] The Federal Department of Public Health and the DCH engaged in collecting vital statistics and classifying diseases according to a prearranged scheme. In the early 1920s, provincial authorities started assembling numbers on mortality by causes of death – categorized by chronic conditions, communicable diseases, degenerative ills, and others – keeping to a uniform system.[21] Interestingly enough, 1921 saw the initiation of work on the first all-Canadian annual report on vital statistics. A century later, our *trust in numbers* has continued to facilitate

[16] Chaired by the federal Deputy Minister of Health, the Council comprised "the provincial chief officers of health, and five appointed members, including representatives from organized labour, women's groups, social service agencies, agriculture, and universities." See Rutty and Sullivan, *This is Public Health: A Canadian History*, p. 2.19.
[17] Ibid., p. 3.2.
[18] For a discussion on seemingly unavoidable tension between scientific medicine and clinical practice, consult Steve Sturdy, "Looking for Trouble: Medical Science and Clinical Practice in the Historiography of Modern Medicine," *Social History of Medicine*, 24, no.3 (2011): pp. 739-757.
[19] Jay Cassel, "Public Health in Canada," in *The History of Public Health and the Modern State*, ed. Dorothy A. Porter (Amsterdam: Rodopi, 1994), p. 290.
[20] Ibid., p. 293.
[21] Canada Dominion Bureau of Statistics (CDBS), *Vital Statistics 1921: First Annual Report* (Ottawa: F.A. Acland, 1923), pp. 126-133.

determining not only the courses of action during the pandemic but also a lot of our activities on both individual and collective levels.[22]

It is one thing to collect statistics and form data sets, but it is quite a different enterprise to analyze those sets, evaluate them critically, and draw reasonable conclusions. Available evidence suggests that both the Great Influenza and COVID-19 epidemic gained momentum owing to a world of rapid movement of people and things. In 1918-1920, those massive movements were inevitable due to the impact of World War I and, a century later, international air transportation along with complex supply chains connecting most countries in the world enabled the SARS-CoV-2 to spread across the globe. To what extent are these two pandemics in some ways similar in their social perception and impact yet necessarily different? These pandemics have prompted us to evaluate risks in decision-making and to update our beliefs in the light of fresh information. Clearly, public health measures and the application of statistics to epidemic variables are among similarities.[23] Techno-scientific advances in managing the pandemic in the twenty-first century constitute a significant difference.

The Role of Technological Advances in Managing Pandemics

There is no denying that technology has substantially enhanced our capacity to collate scientific-medical data and uncover clues to intractable puzzles. One of the latter has been the origin of SARS-CoV-2, which several expert panels have continued to explore since May 2020.[24] Certainly, the origin implies not only what caused the COVID-19 pandemic, but also when and how it started. A recent Canadian study, using large-scale genomic sequencing data on SARS-CoV-2 and statistical number-crunching

[22] Theodore Porter, *Trust in Numbers: The Pursuit of Objectivity in Science and Public Life* (Princeton, N.J.: Princeton University Press, 1995).
[23] Thomas Ewing, "Revealing Data: Dr. James Herrick and the 1918 Influenza pandemic," 9 June 2020, https://circulatingnow.nlm.nih.gov/2020/06/09/revealing-data-dr-james-herrick-and-the-1918-influenza-epidemic/
[24] Kai Kupferschmidt, "'Politics was Always in the Room.' WHO mission chief reflects on China trip seeking COVID-19's Origin," *Science*, 14 February 2021, https://www-science-org.ezproxy.lib.ucalgary.ca/content/article/politics-was-always-room-who-mission-chief-reflects-china-trip-seeking-covid-19-s

software, has revealed that the epidemic of SARS-CoV-2 began in July-August 2019.[25] Even though rigorously researched, this finding needs further confirmation from the evidence of SARS-CoV-2 biomarkers in human samples. A group of Italian scientists performed retrospective analyses of hundreds of human plasma samples which suggested that SARS-CoV-2 circulated among individuals in most regions of Italy at least three months before the first official reports came from the Chinese authorities in late December 2019.[26] This study became possible owing to the availability of long-term repositories of blood products, molecular analyses with the reverse transcription polymerase chain reaction (RT-PCR), and the creation of SARS-CoV-2 antibodies through genetic engineering. Indeed, the above technological innovations made a difference. To what extent some other techno-scientific advances might have created potential pathways for the virus to be introduced into the human population? This is another highly debated aspect of the origin of SARS-CoV-2, which boils down to three hypotheses: a lab-leak accident, a direct introduction from animal hosts, or some combination of the two. A brief retrospect to the genetic revolution might cast some light on this issue.

Now and again, scientific and public debates about the proliferation of genetic engineering of organisms have caused perplexity. For decades, genetically modified organisms (GMOs) have inconspicuously entered agriculture, the environment, and medicine. Scientists have tried to ameliorate and enhance useful features of living matter. Their curiosity and good intentions have been rewarded with techno-scientific inventions – canola, aquaculture salmon, vaccines, etc., however, any research is a trial-and-error continuity, so some inadvertent acts may happen which might generate unexpected harms along the way.[27] Reflecting on the legacies of the 1975 Asilomar conference on recombinant DNA research, social scientist Sheila Jasanoff has argued

[25]Xuhua Xia, "Dating the Common Ancestor from an NCBI Tree of 83688 High-Quality and Full-Length SARS-CoV-2 Genomes," *Viruses* 13, no. 1790 (2021): pp. 1-16.
[26] Giovanni Apolone et al., "Unexpected Detection."
[27] Theresa Phillips, "Genetically modified organisms (GMOs): Transgenic crops and recombinant DNA technology," *Nature Education* 1, no.1 (2008): p. 213. Julia M. Diaz, and Judith L. Fridovich-Keil, "genetically modified organism," *Encyclopedia Britannica*, 1 May 2021, https://www.britannica.com/science/genetically-modified-organism Accessed 30 October 2021. Paul Offit, *You Bet Your Life: From Blood Transfusions to Mass Vaccination, the Long and Risky History of Medical Innovation* (New York, N.Y.: Basic Books, 2021).

that confining some normative questions about socially important issues to expert groups not open to democratic deliberation could become problematic over time. As she has asserted, "Leading molecular biologists met in 1975 [...] to discuss how GMOs, including dangerous pathogens never before seen in nature, might be kept from accidentally escaping from the laboratory and harming human health or the environment. The conference participants knew from their own lab work that accidental releases happen, and they tried through policy to contain the predictable risks of a known hazard."[28] Further discussions on the perils and the promises of technology in the imagined future involved the questions of ethics and economics.

The pharmaceutical industry became interested in the patenting of genetic sequences and GMOs to obtain monopolies for developing and producing specific goods. In 1980, the US Supreme Court ruled in the precedent-setting case *Diamond v. Chakrabarty* that a genetically modified bacterium was patent-eligible. This meant that similar patents could encompass "anything new under the sun," including living organisms.[29] According to historians Mario Biagioli and Alain Pottage, "Chakrabarty was found to have modified the bacterium he was seeking to patent to such an extent that it was no longer a product of nature (a discovery) but a human artifact (an invention)."[30] Over the next decades, a trend emerged that legitimated the expansion of patent protections to the products of genetic engineering: bacteria, viruses, and other microorganisms. Potentially risky pathogen research drew close attention to this "remaking nature" claims, since several epidemic outbreaks posed considerable threats to the health and lives of millions of people, including those who sponsored some of these investigations through publicly funded agencies.[31]

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[28] Sheila Jasanoff, *The Ethics of Invention: Technology and the Human Future* (New York and London: W.W. Norton & Company, 2016), p. 96.

[29] Daniel Kevles, "Ananda Chakrabarty Wins a Patent: Biotechnology, Law, and Society, 1972-1980," *Historical Studies in the Physical and Biological Sciences* 25 (1994): pp. 111-135.

[30] Mario Biagioli and Alain Pottage, "Patenting Personalized Medicine: Molecules, Information, and the Body,"*Osiris* 36 (2021): pp. 225-226.

[31] Jocelyn Kaiser, "Was NIH-funded work on MERS virus in China too risky? Science examines the controversy," *Science*, 27 October 2021, https://www.science.org/content/article/was-nih-funded-work-mers-virus-china-too-risky-science-examines-controversy?utm_campaign=news_weekly_2021-10-29&et_rid=34982024&et_cid=3977615

In view of the SARS-CoV-2 pandemic, there has been a long-standing international controversy on the competing origin theories for the pathogen: whether a natural spillover of a virus was the trigger or whether laboratory studies might have played a role.[32] If we consider the above court judgement about the discovery as a product of nature and the invention as a human artifact, then a coronavirus discovered in bats and substantially modified in the laboratory could be categorized as a genetically engineered product, which could be patentable and further utilized for research purposes. Recent articles in *Science* have revealed that investigations involving genetic modifications of coronaviruses (including SARS-CoV) and other pathogens had been conducted for years prior to the current pandemic.[33] Moreover, a comprehensive comparative study of the genetic composition of the novel coronavirus has strongly suggested that "SARS-CoV-2 could not only be a chimera virus resulting from recombination of the bat RaTG13 and Guangdong pangolin coronaviruses but also a close relative of the bat CoV ZC45 and ZXC21 strains."[34] Chimeras in Greek mythology signify monsters with a lion's head, a goat's body, and a serpent's tail. Chimeras have not been found to exist in nature, which means that humans have created SARS-CoV-2 by genetically re-combining several parts of naturally occurring viruses. As Sheila Jasanoff has rightly observed, "… imagined futures do not correspond well to the institutional realities of knowledge flow and responsibility."[35] It stands to reason that no institution and no country will ever assume even an indirect responsibility for millions of humans killed and seriously harmed by SARS-CoV-2.

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[32] Kai Kupferschmidt, "WHO unveils new 26-member panel to restart study of the pandemic's origins," *Science*, 13 October 2021, https://www.science.org/content/article/who-unveils-new-26-member-panel-restart-study-pandemic-s-origins?utm_campaign=news_daily_2021-10-13&et_rid=687147840&et_cid=3956341&

[33] Jocelyn Kaiser, "NIH says grantee failed to report experiment in Wuhan that created a bat virus that made mice sicker," *Science*, 21 October 2021, https://www.science.org/content/article/nih-says-grantee-failed-report-experiment-wuhan-created-bat-virus-made-mice-sicker?utm_campaign=news_daily_2021-10-22&et_rid=687147840&et_cid=3968896& ; Jon Cohen, "Fights over confidentiality pledge and conflicts of interest tore apart COVID-19 origin probe," *Science*, 18 October 2021, https://www-science-org.ezproxy.lib.ucalgary.ca/content/article/fights-over-confidentiality-pledge-and-conflicts-interest-tore-apart-covid-19-origin-probe

[34] Vladimir Makarenkov, Mazoure, B., Rabusseau, G. et al. "Horizontal gene transfer and recombination analysis of SARS-CoV-2 genes helps discover its close relatives and shed light on its origin," *BMC Ecology and Evolution* 21, no.5 (2021): p. 14, https://bmcecolevol.biomedcentral.com/articles/10.1186/s12862-020-01732-2

[35] Sheila Jasanoff, *The Ethics of Invention* (2016)..

At the same time, the knowledge flow about pathogens of epidemic potential has generated a wealth of ideas and technological fixes to prevent viruses from multiplying in human bodies. The major outcome of this was vaccine development. As Anthony Fauci, director of the US National Institute of Allergy and Infectious Diseases (NIH), put it, the development of several efficient vaccines against a previously unknown viral pathogen was "unprecedented in the history of vaccinology."[36] In fact, Fauci has succinctly explained that this achievement became a reality thanks to other developments preceding the identification of SARS-CoV-2 by at least a decade. In his view, "when timelines for other vaccines are measured in years if not decades […] concern about this truncated [12 months] timeline has contributed in part to the hesitancy in accepting these vaccines."[37] Indeed, earlier vaccine development programs for other pathogens, such as HIV, MERS, and SARS have facilitated the utilization of highly adaptable vaccine platforms (e.g. mRNA) and the adaptation of structural biology tools to design agents that stimulate the immune system, so-called immunogens. This information should have been widely distributed by public health authorities before the mass vaccination campaign and may have dispelled some of the doubts of people who have been ill-informed about the state of emergency and the pandemic. In the age of social media, decentralized journalism, and delegitimized expertise, many people have struggled to sort evidence from rumor and argument from opinion.[38] Public trust in health agencies has declined because of poor communication from many governments and their diverse pandemic policies. They have not managed to explain adequately what is known about SARS-CoV-2 and what is not, and what has been done to find out the unknowns. This has paved the way for disagreements on masks, lockdowns, and vaccines as preventive measures. Without looking back, one cannot realize how political leadership and community attitudes have brought about the current situation, to say nothing of navigating our way out of the pandemic.

[36] Anthony S. Fauci, "The story behind COVID-19 vaccines," *Science* 372 (6538): p. 109.
[37] Ibid.
[38] For an argument why democratic societies need to learn how to value science in this new age of uncertainty, see Harry Collins and Robert Evans, *Why Democracies Need Science* (Cambridge, UK: Polity Press, 2017).

Concluding Remarks

Protracted feuds about the relative power of provinces in healthcare governance and the proper role of the federal government in Canada have been on full display in the disorganized COVID-19 response. Large holes in our social fabric have been exposed in new ways as the pandemic has spread rapidly. It is evident that the association of pandemics with a finite and clear trajectory is limiting since the persistence of accumulated risks related to it deepens social vulnerabilities. For example, failure to recognize the disease load associated with persistent symptoms of COVID-19, the so-called *Long Covid*, may lead to an unnecessary societal health burden in the long run. Another long-term consequence relates to overwhelmed healthcare systems that have treated significantly fewer patients with other medical conditions because public health agencies have shifted resources to fighting COVID-19. A considerable number of cancer patients and people suffering from cardiovascular diseases have remained largely untreated, so the impact of the COVID-19 pandemic has been more extensive than commonly admitted. By framing the COVID-19 pandemic as a crisis and comparing it with other epidemics in the past I have tried to convey an idea of historical analysis as a hermeneutic method useful to make sense of the present. Through incorporating COVID-19 into a larger narrative of past pandemics that have been overcome, the historian hopes that fear of the unknown will subside and cautious optimism in the resolution of the crisis will return.[39] The novel COVID-19 has brought new threats into the world, but it has also introduced the potential to re-work and re-envisage the old ways of being.

[39] Jeremy Greene and Dora Vargha, "How Epidemics End," *Boston Review* (2020), http://bostonreview.net/science-nature/jeremy-greene-dora-vargha-how-epidemics-end