



Meme Science, Pandemic Preparedness, and the Trajectory of Failure

Ross Upshur

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Abstract In this paper I analyse the implications of “flattening” the curve for long-term care residents in the Province of Ontario, Canada during the first wave of the SARS-CoV-2/COVID-19 pandemic. I then question what the role of healthcare systems are in the response to public health emergencies and problematize their status as entities in need of protection. The ethical implications of this are discussed in light of potential challenges raised by climate change.

Keywords Pandemic ethic · Duty to protect · Meme science · Health care systems

“I added an extra line to it,” says Harris. “Apparently, that made all of the difference.” That extra line was the dotted “healthcare system capacity” line. And to be clear, it was fully a theoretical invention. There is no telling whether, even with the proper amount of handwashing, we won’t overload our healthcare system with any given unique pandemic. He didn’t count beds or res-

pirators. He just drew the line. (Wilson 2020, “The Line,” ¶3)

Meme Science and Pandemic Preparedness

The COVID-19 pandemic has quite clearly transformed the landscape of our understanding of health systems. It is important that we pause and reflect on what has occurred. In this paper I would like to return to the first wave of COVID-19 and explore the implications of meme science, particularly the meme of flattening the curve.

Flattening the curve became a rallying cry early in the pandemic and its origins are instructive. The meme, according to one source (Wilson 2020), traces back to a document from the Center for Disease Control for Pandemic Preparedness (CDC 2007). In the report, a comparison of two influenza outbreak curves appear on a graph. One curve, representing the epidemic peak with no countermeasures has a steep vertical slope. The other curve has a lower peak to represent the hypothesized effective use of non-pharmaceutical interventions (CDC 2007, 18).

This graph was taken up by a health communications expert who then drew a hatched line across it. It was first released on March 8, 2020 and soon had millions of impressions on Twitter. As noted above, the creator of this, Drew Harris simply added an extra line to it. The

R. Upshur (✉)
Department of Family and Community Medicine
and Dalla Lana School of Public Health, University
of Toronto, Toronto, Canada
e-mail: ross.upshur@utoronto.ca

R. Upshur
Senior Scientist, Lunenfeld Tanenbaum Research Institute,
Sinai Health, Toronto, ON, Canada

extra line was a horizontal hatched line representing the hypothetical capacity of a healthcare system.

As noted, the origins of the idea of curve flattening come from a CDC report on pandemic preparedness in 2007. In that report, it states:

Each of the models generally suggests that a combination of targeted antiviral medications and NPIs can delay and flatten the epidemic peak, but the degree to which they reduce the overall size of the epidemic varies. Delay of the epidemic peak is critically important because it allows additional time for vaccine development and antiviral production. However, these models are not validated with empiric data and are subject to many limitations. (CDC 2007, 29)

It is worth noting from the outset that flattening the curve and the subsequent addition of the horizontal line were speculative, theoretically based and in no way supported by empirical evidence. It is also important to note that the addition of the hatched line seemed to indicate that preserving healthcare system capacity became a goal of pandemic preparedness. The bigger question relates to what comes under the umbrella of healthcare system capacity.

Pandemic Goal Setting

One of the key lessons coming from the COVID-19 pandemic is the failure to establish the overarching goals of the SARS-CoV-2/COVID-19 pandemic response. Goals shifted constantly during the pandemic, as noted by Smith et al.:

In the COVID-19 pandemic, there has been a lack of clarity as to whether the overarching goal has been to flatten the curve, protect the acute healthcare system, reduce morbidity and mortality, protect the health of disadvantaged communities, protect the most vulnerable to infection, minimize extreme poverty, mitigate economic loss or some combination of the above. Even if these were all possible goals for the pandemic response, more needs to be done to understand which goals should be prioritized over others and in what context and at what point in the response in addition to what justifies any proposed ranking. (Smith et al. 2021)

However, as noted in documents for pandemic influenza, which ought to have informed COVID-19 despite the differences between COVID-19 and influenza, the goals of pandemic response were clearly stated. In the 2007 CDC pandemic guidance, it states:

... the goals of the federal government's response to pandemic influenza are to limit the spread of a pandemic, mitigate disease, suffering and death, and sustain infrastructure and lessen the impact on the economy and the functioning of society ... in addition, an unmitigated severe pandemic would likely overwhelm our nation's critical healthcare services and impose significant stress on our nation's critical infrastructure. (CDC 2007, 7)

In this interpretation or framing of the goals of a pandemic response, the primary focus should be on human well-being by reducing transmission and preventing disease and death. Strain on healthcare services is anticipated but the protection of the healthcare services themselves, arguably, one of the key resources that any society has to respond to a pandemic, are not intended to be the primary beneficiary of protection from the plan.

The Canadian federal pandemic response plan, revised after the 2009 H1N1 outbreak and published just before the COVID-19 pandemic also states clear goals. They are twofold: to minimize serious illness and overall death and to minimize societal disruption. Minimizing serious illness and overall deaths has three subordinate points:

... to reduce the spread of infection through promotion of individual and community actions, non-pharmaceutical interventions such as isolation, quarantine, and health protection, protecting the population through the provision of pandemic vaccine and implementation of other public health measures and providing treatment and support for large numbers of persons while maintaining other essential care. (PHAC 2018, Section 3.1)

In other words, ensuring medical care was assumed to be a key part of the response. Maintaining continuity of care as a means of minimizing social disruption is an instrument of the response. Protecting and preserving the healthcare system itself is not a goal. I raise these points early on simply to highlight the

fact that meme science and the impact of social media quickly made protecting the healthcare system a key goal of pandemic response. This was aided by media reports from China and Italy in particular, and New York City showing vastly overwhelmed acute care systems, with images of overworked healthcare providers and desperately ill patients waiting for care. So, the conjunction of the prominent role social media and early reports of the impact of COVID-19 on health services led to a shift of perspectives and the preservation of the healthcare system surreptitiously emerged as a goal of pandemic response.

COVID-19 and the Experience of Long-Term Care in Canada

This subtle and unforeseen shift has several normative implications, which I would like to illustrate through the experience of long-term care in Canada, specifically the province of Ontario in the first wave of the COVID-19 pandemic. The addition of the hatched line representing health system capacity begs the question of what sectors of the health system are represented by the hatched line. Acute care? Emergency rooms? Primary and Community Care? It is remarkably unclear as there was no public discourse to encourage greater specificity.

It escaped notice that flattening the curve does not change the area under the curve. In fact, flattening the curve to fit under the hypothesized healthcare capacity line results in pushing the bulk of the response into the community over a prolonged period of time. Resources will be allocated in the pandemic response according to which components of the health system are contained in the definition of this healthcare capacity. For the most part, however, early in the pandemic response, the healthcare system seemed to be constituted by acute care and critical care. Components of community care such as primary care and in particular long-term care (LTC) clearly did not fall under the auspices of the system. As a consequence, in order to preserve surge capacity, hospitals in Ontario were emptied and the people who were decanted from hospital were typically older multimorbid adults and many were sent to long-term care facilities.

The SARS-CoV-2/COVID-19 pandemic occurred in the midst of a long-standing crisis in long-term

care in Ontario. In fact, numerous reports had documented the issues of substandard care, poor training of staff, staff demoralization, and many recommendations to improve care and standards had been repeatedly made. In the first wave of the pandemic, long-term care facilities in Canada had the highest mortality rate globally and residents of these facilities represented a disproportionate percentage of deaths. In Ontario, the largest province in Canada, the military was brought in to provide care and documented appalling conditions of the residents. The psychological toll on residents, family members, and staff were substantial. Certainly, one expects higher than population rates of mortality in the LTC context, but these rates should not have been accelerated by the pandemic.

Illustrative quotations from subsequent reports will indicate the severity of the issues and impact. The Ontario COVID-19 Science Advisory Table issued a report on COVID-19 in Ontario's long-term care homes (Stall et al. 2021). As they noted, Ontario long-term care residents accounted for 64.5 per cent of the province's COVID deaths, the highest proportion among OECD countries. One reason for the high mortality was a decrease in hospital admissions from LTC: "The findings of this analysis substantiate reports suggesting that hospitalizations for long-term care home residents with COVID-19 were low during the peak of the pandemic's first wave, which may have contributed to particularly high COVID-19 mortality in LTC homes" (Stall et al. 2021, 9). They also note that much of this was preventable if appropriate interventions were taken and resources allocated.

In fact, in a simulation where all multiple occupancy rooms were converted to single occupancy rooms, it was estimated that 31.4% of the infections and 30% of the deaths may have been prevented. However, in this scenario, an additional 29,871 new single occupancy rooms would have been required. (Stall et al. 2021, 16)

Another finding of this report is that the most important risk factors for the size of a COVID-19 outbreak and mortality are "for-profit status and crowding. For-profit homes have a higher proportion of older design standards and chain ownership and crowded homes and an increased number of residents per room and bathroom" (Stall et al. 2021, 16).

In a report sponsored by the Royal Society of Canada by Estabrooks and colleagues entitled “Restoring Trust COVID-19 and the Future of Long-Term Care in Canada,” the troubled history of long-term care is summarized and serves a stinging indictment:

... the poor conditions of care in nursing homes have with increasing frequency been given prominence over the last 50 years in more than 100 published reports. A quick search of this media for just the past 10 years yields 150 reports in Canada alone describing unacceptable and sometimes scandalous conditions experienced by our older adults in nursing homes. They all report similar findings, they all reflect our underlying outrage, they all make recommendations, they are all read, one or two actions are taken and then they all sit on a shelf. Nothing changes, not really, not fundamentally. (Estabrooks et al. 2020, 650–651)

They note that the COVID-19 pandemic

... has precipitated in the worst circumstances high level of physical, mental and emotional suffering for our older adults. Those unnecessarily lost lives had value. Those older adults deserved a good closing phase of their lives and a good death. We failed them, we broke the covenant, we have a duty, a responsibility and the ability to fix this, not just to fix the current communicable disease crisis but to fix the sector. That helped the crisis wreak such avoidable and tragic havoc. We can restore trust. (Estabrooks et al. 2020, 651)

The report demonstrates that pandemic response favoured acute care systems, hospital settings and that nearly all effort was diverted to create surge capacity in hospitals and intensive care units leaving most nursing homes unprepared. In some jurisdictions admitting older adults from long term care to acute care was suspended. In others discharged patients that had tested positive for COVID-19 were sent to LTC with substandard infection prevention protocols and some hospitals would not accept infected patients from long-term care settings. LTC’s experienced intense shortages of personal protective equipment (PPE). There was lack of support for teaching how to use PPE properly and a lack of understanding that PPE was essential for care in nursing homes. LTC’s

had difficulty maintaining staff and often there was no human resources available to provide infection control for housekeeping staff. There were preventable deaths occurring during COVID-19 related to lack of timely care, water, food, or basic hygiene.

The frail and highly vulnerable condition of older adults was a key issue. All pandemic plans have noted that older adults are at particularly high risk and therefore should have been a high priority for protection. Yet all of the actions taken seemed only to increase that risk with devastating consequences.

Public Health or Acute Care?

An additional irony is that in flattening the curve entailed reliance on public health measures. Early in the pandemic there was no effective medical countermeasures in the form of vaccines or medications. That public health measures and the public health system would be used to protect acute care under the flattening the curve approach is ironic because public health has been chronically underfunded, particularly in Canada, and receives a relatively small proportion of resources in comparison to acute care. Prior to the pandemic, initiatives were underway to reorganize public health with the resultant shrinking of the public health workforce. This would have left the province at greater risk for any other future public health emergency.

Ethical Issues

Numerous ethical issues arise from this sad tale. Quite clearly there was, in clinical terms, at the individual level, a failure in the duty to care and duty to protect the most vulnerable population. In fact, the flattening the curve approach may have set up the disaster that did occur with patients being decanted out of acute care into long-term care and not being able to return to acute care should they become ill. It was exacerbated by the absence of any staff education on infection prevention and control and a shortage of personal protective equipment. The consequences were predictable. This indicates that the hatched line of the health care system did not include those who live in long-term care facilities, which begs the question of what role the healthcare system plays in a

modern society and what care it can and should provide. If we accept that all living humans are of equal moral worth, it was quite clear that the interests of those who may require acute care or intensive care were not people resident in long-term care and consequently their worth was seen as diminished. They were systematically disadvantaged by being denied care or provided with substandard care in a situation where they already existed in a disadvantaged state.

It also represents a failure to uphold or meet the basic requirements of public health ethics. Gostin and Powers argue that public health rests on “the twin obligation to improve health and in improving health to do so by focusing on the needs of the most disadvantaged.” (Gostin and Powers 2006, 1054) The needs of the most disadvantaged were not addressed, in fact their condition was, by any standard, worsened. One measure of determining and evaluating pandemic response is that those who are most disadvantaged are not further disadvantaged by their experience of the pandemic. This has simply not been the case in Canada with the long-term care facilities.

However, this is only one example of how systematic disadvantage has played out during the pandemic. I would like to argue that the Ontario long-term care failure is simply a microcosm of a larger failure on the need to protect the most disadvantaged. It has been a global phenomenon. A recent study indicated that hoarding of vaccines by high-income countries likely resulted in a large number of preventable deaths, particularly in sub-Saharan Africa. The modelling data in this study indicate that “a more equitable approach to vaccine distribution over the course of 2021 would have reduced the level of global mortality associated with COVID-19 disease” (Moore et al. 2022, 2421). They further note further that “Our simulations provide strong analytical evidence to support the message that distributing vaccines across the globe proportional to need, rather than to wealth, can have beneficial effects for all” (Moore et al. 2022, 2417). Another study indicated that globally, the morbidity and mortality associated with the pandemic was disproportionately concentrated in populations of disadvantage such as populations with highly racialized populations or afflicted with poverty (McGowan and Bambra 2022). In other words, COVID-19 has exacerbated pre-existing health inequalities

with higher mortality and morbidity rates among the most socially disadvantaged. This is the case both within countries and between countries. The authors refer to the unequal nature of the pandemic resulting from a syndemic of COVID-19 and endemic inequalities in disease burden. However, sadly none of this is new. If one examines the history of public health going back to the dawn of the industrial society, it has ever been so. And despite concern for health equity and social justice in the twenty-first century, a major pandemic has merely echoed the past.

So How Do We Move Forward From This?

I concur with the Royal Society authors that the consequences of how COVID-19 has played out is a matter of choice. And we have chosen to neglect the frail elderly, neglect public health, neglect global health inequities, and the consequences are much the same as they have been since people have started to study and recognize the impacts of epidemics and pandemics on human populations. We ought not to be surprised by this. It is important to reflect on the extent to which bioethics could have a positive influence. Any potential influence may have limited impact as many of the decisions that affect the pre-existing social determinants of health are the responsibilities of nation states and are also subject to the forces of the commercial determinants of health and the play of fundamental causes. Much work will be required to remediate the situation if in fact there is any will to do so. All future pandemic plans will read as empty rhetoric if they reiterate the tropes of vulnerability of certain distinct populations without acknowledging the failures of this current pandemic.

This is important because, for all of the horrors that we have witnessed during the COVID-19 pandemic, it is far from being the worst-case scenario. Pandemic scenarios with much higher mortality rates have been predicted and there are clearly more viral pathogens with the capacity to significantly impact global health. We would be foolish not to expect another pandemic in the future. Infectious diseases are also not the only existential threat to human populations. Climate change is recognized as one of the

greatest threats to human health. A recently released Lancet report on the impact of climate change on global health makes the following point. It states,

... well-prepared health systems are essential to protect populations from the health impacts of climate change. However, global health systems have been drastically weakened by the effects of the COVID-19 pandemic and the funds available for climate action decreased in 239 of the 798 cities with health systems increasingly being affected by extreme weather events and supply chain disruptions.” (Lancet Countdown 2022 1622)

This is a very disturbing quotation. It rightly points out that the role of a health system is to prepare to protect populations from the health impacts of crises. However, quite clearly, COVID-19 has shown that health systems are fragile, flawed in design, in fact in need of protection themselves, and not the protective force that many people believe them to be. The recent trajectory of health systems post-pandemic does not inspire confidence. Concerted thinking is required before new hatched lines are drawn.

The challenges posed by climate change potentially dwarf those of COVID-19. We are at a point where we have to ask very serious questions about how we allocate resources and how we see the role of health systems. Also, we need to reflect on how we determine who is worthy of care under the auspices of a health system. But most importantly, we need to reaffirm our commitment and redouble our efforts to ensuring that those most likely to be harmed are in fact protected and specifically not harmed by those entrusted with the power to protect. The unintentional consequences of flattening the curve demonstrate how easily this can happen. It is a sad refrain that we see the same results occurring again and again. We have observed before that the only lesson we learn from pandemics is that we do not like to learn lessons and little in the SARS-CoV-2/COVID-19 pandemic has changed my mind in that regard (Upshur and Smith 2020).

Declarations

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