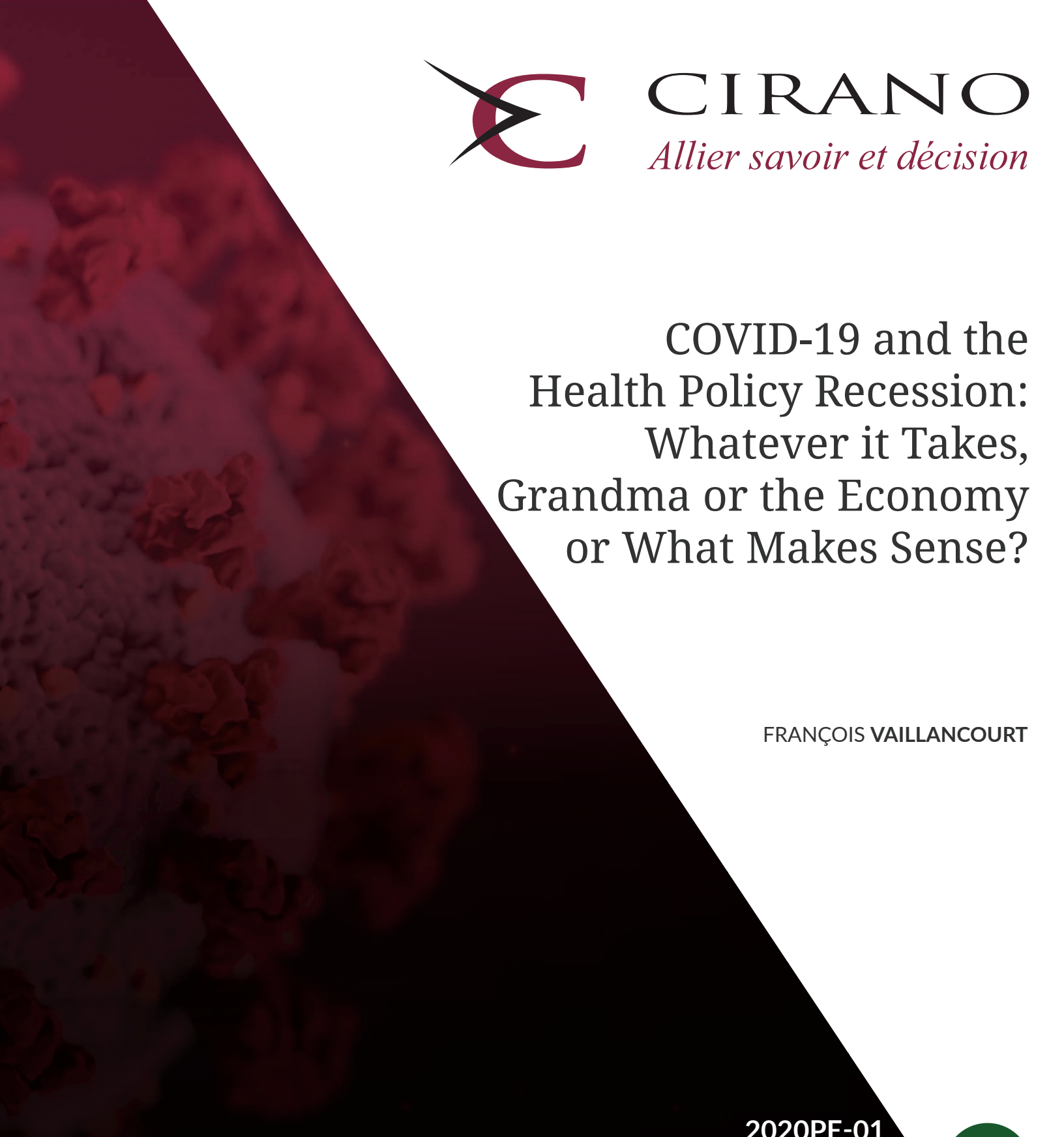

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COVID-19 and the Health Policy Recession: Whatever it Takes, Grandma or the Economy or What Makes Sense?[1]

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Introduction

Various Canadian politicians and some analysts argue that we should do “whatever it takes’’ to save lives threatened by the COVID-19 epidemic. A few politicians, here and in the USA, have put forward that one should sacrifice older people for the ‘economy’. The first proposal is understandable as a spontaneous reaction to the pain and suffering caused by COVID-19. However, this proposal is an inefficient and inequitable policy choice if governments mean that we should value the lives of those threatened by COVID-19 more than the lives of those endangered by usual diseases such as cancer or diabetes. The second proposal is not the choice one is faced with. To justify these two statements, we: 1) summarize the intervention plan; 2) present the number of individuals at risk; 3) discuss the use of *quality adjusted live years* (QALY to assess health innovations; 4) present the number, age distribution and expected QALYs of lives saved from COVID-19; 5) value these QALYs; 6) and derive from this an amount of resources to allocate to this epidemic that makes sense given that we value years lived equally and equitably across all diseases and over time.

1. The intervention plan

The current intervention plan has two components. One is a health policy driven recession (HP recession) resulting from shutting down some businesses to generate social distancing and thus lower transmission at a given point in time. The other is the shifting of health system resources away from treating other illnesses (postponing operations, stopping medical appointments…) towards the support through respiratory assistance of current and future COVID-19 patients with thus both active and idle capacity. An HP recession is a new form of medical intervention for an illness similar to any other innovation in health economics. Its appropriateness should be assessed using the same criterion as that used for a new medication or surgical procedure.

2. How many at risk

The total population of Canada can be estimated at 38 million people on January 1sr 2020[2]. The population death rate resulting from COVID-19 is not known exactly at this time. As a consequence, one needs to use estimations of the number of expected deaths that implicitly or explicitly use various death rates. We are aware of three simulations that yield information on the number of expected deaths. A Canada wide simulation[3] indicates that a 5% infection rate of the population results in 22 000 deaths; extrapolating, a 100% infection rate would mean 440 000 deaths or a 1,15% population mortality rate, not far from the 1% often mentioned in public discourse. That simulation stops at an 80% infection rate presumably because of herd immunity and thus implicitly 352 000 deaths. An Ontario simulation[4] puts forward 100 000 deaths in that province; since it represents 38% of the population of Canada, one can infer from these 265 000 deaths at the Canadian level, a 0,7% population mortality rate. An older Imperial College simulation[5] projects 326 000 deaths without mitigation for Canada with a 90% infection rate. This is about a 0,9% population death rate. In what follows we use 310 000 deaths, the (rounded) average of the two April 2020 numbers, as the expected number of deaths from an uncontrolled epidemic.

3. Assessing the value of medical innovation

The most common way to decide to fund or not a new medical procedure is to compare its costs to its yield, with the later measured in QALYs that are given a $ value. Thus, a QALY is measured in years, taking into account the overall health of the concerned individuals; for example, gaining one extra year of life while paralysed is thus worth less than one extra year if fully mobile. QALYs are a concept that came to the fore in the 1970s[6]. This is done in Canada by the Canadian Agency for Drugs and Technologies in Health (CADTH) and in the United Kingdom by the National Institute for Health and Clinical Excellence (NICE). QALYs are used and not the statistical value of life for various reasons. A key one is that the value of a new treatment will depend on how long it will benefit its recipient for a given quality of life. Treatments targeting younger individuals are likely to yield more QALYs than those aimed at the older population. QALYs are argued by some to be unethical since they lead to different decisions by age groups. However, in a world where resources are not infinite, one needs to measure outcomes and to allocate resources where they generate the greatest gain in welfare for society. QALYs can also be used to help in shifting health resources between various types of activities such as allocating resources for COVID-19 patients and thus removing them from other patients (cancer…) although this is a less common use.

4. Gains in QALYs

What is the expected gain in QALY from the HP recession? Does it simply spread out the inevitable deaths or does it reduce them by giving better access to more ventilators in May-June 2020 and perhaps to new treatments in the summer/fall of 2020? This is not clear in the public health literature. We do not by how much

hospital care that mainly gives access to a better flow of oxygen reduces the death rate compared to not receiving this help. If the current intervention plan simply spreads an unchanged number of COVID-19 deaths over a longer time period say going from 3 to 15 months for a mean gain of six months of life, then we gain roughly 0.45 QALY per delayed deaths[7]. Multiplying this by 310 000 deaths yields 145 000 QALY if treatment does not improve over that period and the shift of health resources has no impact on outcomes.

What happens if we save lives because of hospitalisation or new treatments becoming available? Then it depends on the number and age distribution of the lives saved. The number of lives saved is hard to establish. The Ontario simulation shows an important gain (mid-point of interval) of 91 000 lives saved; for Canada this extrapolates to 280 000 lives. The Imperial college scenarios are of the order of 150 000 lives saved. We use the average of 215 000; this equal to 2/3rds of our estimation of endangered lives as the outcome of the HP recession and re-allocated health resources.

The distribution of COVID-19 deaths in Canada, the life expectancy and mean QALY by age group and the simulated total QALYs gained by age group as a result the policy intervention are presented in Table 1.

Given the expected impact of the intervention plan, the age distribution of the deaths, the life expectancy of the dead and the QALYs associated with various ages, the HP recession and reallocated health resources intervention yields a total of 1 850 million QALYs.

5. QALYs in $

The value of a QALY in Canada is not set in law but various documents indicate that values in the 30 000-100 000$ range are plausible; a recent federal government paper puts forward 60 000$[8]. Using 60 000$ yields 9 billion$ of gain from postponement with no treatment gains and 115 billion$ if postponement improves treatment options. This number depends mainly on the total number of lives saved and on the value of QALYs. A reasonable range for this amount is 75 -175 billion $: 75 billion if the number of deaths is 25% lower than we assume and 175 billion obtained by increasing both the value of a QALY and the number of deaths avoided by 25%.

Table 1: Calculations of potential gain in QALYs from the HP recession and the health resources reallocation, Canada, April 2020 estimation

Age	20-39	40-59	60-79	80+	total
% of deaths by group (1)	1	6	31	62	100%
Number of deaths avoided (2)	2 150	12 900	66 650	133 300	215 000
Life expectancy by age group (3)	48	29	13	6	n.a.
Number of years gained (4)	103 200	374 100	866 450	799 800	2 143 500
Mean QALY by age group (5)	0,947	0,919	0,918	0,77	na
QALYs gained (6)	97 730	343 798	795 401	615 846	1 852 775

Sources: see note[9]

Note we carry out the following calculations:
Predicted total number of deaths (215 000) X distribution by age group (1) = (2) Number of deaths avoided
(2) X life expectancy of the age group (3) = (4) years gained
(4) X mean QALY by age group (5) = (6) QALYs gained

6. What resources can we fairly allocate to the HP recession[10]?

Canada's GDP was 2 000 billion$ in 2019. In the first case with spaced out but unchanged total deaths then the restrictive measures already put in place that leads to the HP recession are too costly given the benefits and they should be abandoned. If we will save lives, then a maximum drop of 10% of annual GDP worth 200 billion$ makes sense11. Note that the redistributive issue of who pays for the current income/job support measures is not relevant as such in assessing the resource cost of the HP recession intervention.

The 200 billion number neglects the following points. First, there are QALY losses for those individuals affected by the HP recession be it from domestic violence, depression and so on. Second, there are QALY gains associated with reduced economic activity such as less road accidents or pollution driven illnesses. Third, QALY losses resulting from resource reallocation leading to non-treatment (due to either missing resources or individuals not seeking treatment because of their fear of interacting with health institutions) or insufficient treatment of non COVID-19 conditions. Estimations of the loss in QALYs resulting from these items are not available nor easily calculated. There is also both gains and losses in welfare resulting from spending more time at home with one's immediate family while interacting less socially with other family members, relatives and friends that are not

known and thus not accounted for. Finally there is a requirement of extra time (queues) and attention (hand washing, masks…) to carry out routine tasks such as shopping (food, medication…) and, for some at least, a general feeling of dread (the end of the world is nigh!) that can also reduce welfare.

More generally, one should make choices to optimize the use of the available COVID-19 support capacity that has been mobilized or reduce it. In economic terms, one should equalize the return in QALYs of resources allocated between COVID-19 and other diseases. With this in mind, one should not unduly expose scarce medical resources such as GPs and specialists to risks to save a few patients in a short period. Health care in the next ten years will need the input of these health workers especially if COVID-19, like other epidemics such as SARS, leaves sequels in patients and health professionals.

Conclusion

Returning to the title of this paper one can conclude that whatever it *takes makes* no sense as a policy response. The choice is not between *grandma and the economy*; the real choices are, on one hand, between COVID-19 cases and non COVID-19 cases in 2020-2021 and, on the other, between current patients now and in the future. Overspending real resources as measured by the drop in GDP on COVID-19 will result on underspending somewhere else. Risking the health/lives of health professionals can have long lasting effects. One must allocate resources fairly between types of patients and between generations of individuals. There is no reason to value differently the QALYs associated with COVID-19 than those associated with other illnesses.

It is not clear why COVID-19 is attracting such attention by politicians or the media (traditional or social). Perhaps this happens because it is a new disease, named a pandemic. One should be careful not to miss the whole health picture because of this. The choice is not between the economy and the people; the choice is how to allocate limited resources fairly between individuals with health issues. Public health experts should tell us what works and at what cost while policy makers should use this information to make choices that *make sense*.

NOTES

[1] I thank colleagues, family and friends who read a first draft of this paper.
[2] Last official number is 37 589 262 as of July 1st 2019. Source: Statistics Canada. Table 17-10-0005-01 Population estimates on July 1st, by age and sex.
[3] *COVID-19 in Canada: Using data and modelling to inform public health action*09/04/2020 Public Health Canada, p15 https://www.canada.ca/content/dam/phac-aspc/documents/services/diseases/2019-novel-coronavirus-infection/using-data-modelling-inform-eng.pdf.
[4] COVID-19 Modelling 3/04/2020 https://files.ontario.ca/po-covid-19-technical-briefing-en-2020-04-03.pdf.
[5] Excel worksheet appendix to Report 12: The Global Impact of COVID-19 and Strategies for Mitigation and Suppression 26/03/2020).

[6] See for example *Where Now for Saving Lives?*by Richard Zeckhauser and Donald Shepard Law and Contemporary Problem vol 40.4 p5-45 https://scholarship.law.duke.edu/cgi/viewcontent.cgi?referer=https://en.wikipedia.org/&httpsredir=1&article=3493&context=lcp.

[7] The median QALY for Canada's population can inferred as equal to 0,93. We thus compute 310 000 X 0,5X 0,93=0,45 (rounded) ''Age- and sex-specific Canadian utility norms, based on the 2013–2014 Canadian Community Health Survey'' by Jason R. Guertin, David Feeny and Jean-Eric Tarride *CMAJ* 2018 February 12;190:E155-61. https://www.cmaj.ca/content/cmaj/190/6/E155.full.pdfOne finds a similar value in ''Quebec Health-Related Quality-of-Life Population Norms Using the EQ-5D-5L: Decomposition by Sociodemographic Data and Health Problems'' by T Poder, N.Carrier and C. Kouakou *Value in Health* Volume 23, Issue 2, February 2020, Pages 251-259.

[8] Backgrounder PMPRB Draft Guidelines Consultation 2019 https://www.canada.ca/en/patented-medicine-prices-review/services/consultations/draft-guidelines.html.

[9] Sources:

Total number of deaths: see text discussion.

% of deaths: Public Health Canada *Coronavirus Disease 2019 (COVID-19)*. *DAILY EPIDEMIOLOGY UPDATE* 14/04/2020https://www.canada.ca/content/dam/phac-aspc/documents/services/diseases/2019-novel-coronavirus-infection/surv-covid19-epi-update-eng.pdf.

Life expectancy: Statistics Canada. Table 39-10-0007-01 *Life expectancy and other elements of the life table, Canada and provinces.* We use the life expectancy at ages 35 (for those aged less than 40), 55(for the 40-59), 75(for the 60-79) and 87(for the 80+). We do not use the median life expectancy of the age group given detailed information on the age distribution of deaths available in various sources that shows a skew towards higher age at death within the age intervals available to us. For example in Québec 40% of deaths in the 80+ age group were aged 90+ https://www.inspq.qc.ca/covid-19/donneesApril 15th data.

Mean QALY by age: We use information from ''Age- and sex-specific Canadian utility norms, based on the 2013–2014 Canadian Community Health Survey'' by Jason R. Guertin, David Feeny and Jean-Eric Tarride *CMAJ* 2018 February 12; 190:E 155-61. https://www.cmaj.ca/content/cmaj/190/6/E155.full.pdf.

[10] The reallocation of health resources is costless as such in terms of GDP or spending.

[11] The IMF projects a recession of 6,2% for Canada or 120 billion for 2020 https://blogs.imf.org/2020/04/14/the-great-lockdown-worst-economic-downturn-since-the-great-depression/.