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Consideration of Trade-offs Regarding COVID-19 Containment Measures in the United States: Implications for Canada

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Abstract

The economic stimulus package in the United States, which totalled $2.48 trillion, was designed to soften the economic impact of sweeping containment measures including shelter-in-place orders that were put in place to control the COVID-19 pandemic. In healthcare, interventions are rarely justified simply in terms of the number of lives saved but also in terms of a myriad of other trade-off factors including value-for-money or cost-effectiveness. The data suggest the incremental costs per life-year gained related to the economic shutdown can span a wide range depending on the baseline number of deaths in the absence of any containment measures. The results show that in the US, under no scenario for life-years gained does the stimulus package compare favourably to other healthcare interventions that have had favourable cost-effectiveness profiles. However, when comparing value-of-statistical-life-year (VSLY) threshold measures used in other sectors, it is plausible that the stimulus package could be viewed more favourably in the US.

Keywords: cost-effectiveness, economic stimulus, pandemic, COVID-19, trade-offs

INTRODUCTION

SARS-CoV-2 or COVID-19, a novel coronavirus, comes from a family of zoonotic viruses that can lead to severe respiratory symptoms. Past corona virus epidemics included Severe Acute Respiratory Syndrome or SARS-CoV resulting in 744 deaths and 8,098 cases worldwide and the Middle Eastern Respiratory Syndrome MERS in 2012 resulting in 862 deaths and 2,506 confirmed cases worldwide (NHS 2014; WHO 2020a). COVID-19 was first documented in China on December 31st 2019 with the first death on January 11, 2020. Since then, it has rapidly spread globally and on March 11, 2020, the World Health organization (WHO) officially declared a pandemic. The last pandemic was the H1N1 flu in 2009 that resulted in 400,000 deaths. As of April 14, 2021, there were 137 million cases and over 2.95 million deaths worldwide and 31 million confirmed cases including 557,000 deaths in the U.S. due to COVID-19. In Canada, there were 1.1M confirmed cases and 23,000 deaths (WHO, 2020b).

This highly-contagious spread of the virus has been unexpected and had left the global community unprepared. In an effort to control the spread, countries including US and Canada have put forward stringent containment measures (e.g. social distancing, travel restrictions and quarantine provisions) in an effort to collectively slow down the spread of the contagion. In the US, all foreign nationals who were in China within the past two weeks were banned from entering the US from January 31st, 2020. The first U.S. death was reported on February 7th in California followed by the more-often reported death in Washington on February 29th, 2020. Further travel restrictions were put in place when the US banned all travellers from 26 European countries on March 11th, 2020, and two days later, the U.S. declared the outbreak as a national emergency. By April 7th, 42 states had issued shelter-in-place orders with nearly 95% of Americans under lockdown. By April 20th, protestors started anti-lockdown rallies throughout the US and in many other jurisdictions (Mervosh, Lum and Swales 2020).

The instituted containment measures included lockdown and shelter-in-place orders, domestic and international travel restrictions, self-isolation, quarantine, closure or restriction of all nonessential businesses, school closures and limits on public gatherings. These have resulted in large economic consequences in the United States. The result is best exemplified by the contraction of the U.S. GDP by 4.8% during the first three months of 2020 – a contraction not seen since the 1930's Great Depression when the economy contracted by 13% in the wake of the stock market crash of 1929. U.S. unemployment increased to 14.7% by the end of April with a total of 33.5 million Americans filing for unemployment since March 13th when the state of emergency was declared (U.S. BLS 2020) These figures do not include the rise in underemployment owing to reduction in work-hours or increases in job-sharing. Many U.S. employees and their families also lost their health insurance coverage along with their loss of employment. There was and continues to be a particularly large impact on workers manning the frontlines of the restaurant, retail and transportation industries and an associated

likelihood of permanent job loss due to sudden structural changes in the economy. The impact also goes beyond the economy with school closures and its potential effects on students' educational trajectory and negative health impacts resulting from delayed elective surgeries and routine medical checkups including the inability for timely access to therapies and diagnostic tests and child vaccinations. Finally, there is the impact on mental health as the combination of the economic downturn, job losses, social isolation, stress and anxiety could have led to possible increases in rates of depression and in behaviors such as gambling, domestic violence, alcohol and drug addictions. In addition, those who had been treated in ICUs could have experienced some form of post-traumatic stress disorder and other physiological issues (McKie 2020).

Canada began containment measures on January 22nd, 2020 when the federal government implemented screening requirements for travellers returning from China. It then expanded screening requirements for travellers returning from affected areas to just ten specific airports and travellers were advised to self-isolate for 14 days. On March 18, Canada implemented a ban on foreign nationals from all countries and closed the Canada-U.S. border to all non-essential travel. Other containment measures were put in place included physical distancing and closure of all non-essential businesses. This resulted in massive shrinkage of the economy including a decrease in manufacturing sales by 9.2% in March, the lowest level since 2016 (Statistics Canada 2020). The COVID-19 Economic Response Plan or stimulus package was put forward on March 18 to counteract these economic impacts.

While a comparison of costs and life-years saved for the American stimulus package is analytically possible, the paucity of reliable age-sex category mortality for COVID-19 in Canada makes it only possible to surmise the value-for-money in Canada based on an analysis of the American package.

TRADE-OFF DECISIONS

In an effort to counteract the damage to the economy as a result of these containment measures, the US government put in place a massive, unprecedented stimulus package totalling approximately US$2.5 trillion. Even then, these packages merely provided stabilization rather than long-term stimulus; as a result, there has been growing public pressure to reopen the economy even though there is no evidence of a sustained levelling off of the pandemic. Information regarding the magnitude of trade-offs between economic effects and health effects become crucial to determining the path forward as governments consider both strategies to loosen the current lockdown and to determine further economic measures needed to manage the current crisis. Governments may have succumbed to pressure to reopen the economy prematurely prior to sustained reduction in new daily cases and without proper monitoring or testing capacity needed to avoid overwhelming hospital capacity in the coming months.

Trade-off decisions are not new to healthcare. When it comes to selecting optimal therapy for patients, trade-offs are an explicit part of all levels of decision-making. This includes decision-making at the bedside with or without patient involvement by the physician and decision-making by regulatory agencies to approve new interventions after weighing both efficacy and safety elements (Neumann, Sanders, and Russell, et al. 2016; US FDA 2019). Finally, some reimbursement agencies internationally evaluate cost-effectiveness of interventions to determine whether they provide reasonable value-for-money before making funding decisions on coverage and formulary inclusion. Interventions that do not meet the required threshold for value-for-money often can be denied approval for funding leading to reduced access to therapies.

METHODS

The economic impact of the pandemic will be computed in greater detail as complete data becomes available. However, there is value in assessing the value now as restrictions begin to ease and projections are consequently adjusted upward. One method of measuring trade-offs could be in the form of a simple cost-effectiveness analysis (CEA), calculated as the cost per life-year gained (Cost/LYG) from the containment measures adopted and in force through the end of April, 2020. In this regard, there are no scientifically rigorous standards regarding thresholds that represent good value-for-money from a societal perspective (Garber and Phelps 1997). Though current economic evaluation methods recommend evaluating therapies from a societal perspective, most CEA and associated methodologies have currently focussed on single interventions from a payer-perspective (Drummond, Sculpher, snf Torrance et al. 2005). Attempting to conduct these forms of analyses outside of clinical trial settings is challenging as the impacts to society are wide-ranging with too many unknowns in order to model effectively (Weatherly, Drummond and Claxton et al. 2009). However, if the model is defined by what is known currently, it is possible to perform a high-level analysis using concepts of cost-effectiveness especially given that the costs and outcomes are defined within a short time window.

In its basic form, cost-effectiveness is a form of analysis that compares the difference of costs and effects between an intervention and baseline standards. The incremental cost-effectiveness ratio (ICER) is therefore as follows:

$$\frac{(Health\ costs\ after\ intervention - Health\ costs\ prior\ to\ intervention)}{(Health\ status\ after\ intervention - Health\ status\ prior\ to\ intervention)}$$

For the purposes at hand in this paper, the intervention is considered to be the pandemic containment measures collectively in place and the changes in health status refers to reductions in premature mortality due to the shutdown (i.e. the difference between years of life lost relative to life expectancy

under the shutdown and no shutdown scenarios). Given that men and women have different life expectancies, the analysis calculates premature mortality for men and women by age bracket.

To calculate the change in life years lost due to the shutdown, it was assumed that the distribution of deaths across society by age bands would have been similar under a no shutdown scenario compared to what was observed under the economic shutdown. In these calculations, the midpoint of each age category is taken as the age of all those who died in that category except an age of 20 years was assigned for the first age bracket and 85 years for the final bracket. These ages were also attributed to the distribution overlaid on the different projections for a no-shutdown scenario. The reduction in life-years lost between the shut-down and no-shutdown scenarios--based on current remaining life-expectancies for males and females--produced the effects due to the shutdown (i.e., life-years gained under the shutdown).

In this regard, there will be a degree of uncertainty in estimating baseline projected deaths in the absence of a shutdown and other containment measures. Deaths from previous pandemics range from 50 million from the 1918 Spanish Flu pandemic to 400,000 from the most recent global pandemic, the 2009 H1N1 (WHO 2020c). The epidemiological model from Imperial College London used by the UK government estimated that between 2.18 million to 2.78 million deaths will occur in the US (using $R_0 = 3$) in the absence of any containment measures (Ferguson, Laydon and Nedjati- Gilani et al. 2020). Another projection from the University of Nebraska Medical Center estimated 480,000 deaths in the absence of any containment measures (Zoellner 2020). These estimates show the large range in potential mortality in the absence of containment strategies. To reflect a wider possible range given the uncertainty in baseline, the number of potential deaths used for baseline projections in the forgoing analysis ranged from 200,000 to 3 million. The extreme end cases were used to illustrate other possible scenarios though these were not based on currently published epidemiologic models.

To estimate premature mortality, projections of mortality under the shutdown need to be determined alongside the already discussed projections in the absence of a shutdown. The institute of Health Metric and Evaluation (IHME) projections favored by the Trump administration originally projected 73,433 deaths by August 4th, 2020 (IHME, 2020). This projection, made at the end of April 2020, did not account for the announced easing of restrictions and assumed social distancing measures remained in place until R_0* fell below one. This estimate with the overlay of age-sex category mortality will be used as a point estimate in estimating mortality experienced under the shutdown. The model has since been modified to project 134,475 deaths by August 4th, 2020 to reflect the relaxation of some of the measures in some U.S. states including the opening up of certain businesses and public spaces. Since the number of deaths

* R_0 is the measure of reproduction i.e. the average number of people who will contract COVID-19 from one infected person

and cases is continually increasing on a daily basis, this model uses a cut-off point of August 4th, 2020 when the IHME model suggests that deaths will plateau during the current wave had containment measures remained in place.

DATA

The largest impact from these pandemic containment strategies is on the economy. Containment measures have resulted in closures of businesses, both small and large corporations and air and land travel. Quantifying exact costs of the impact on the economy is challenging given the ongoing pandemic and its wide scope. The best proxy for costs associated with the pandemic containment measures is therefore the costs of the stimulus package that was put forward by the U.S. government in an effort to minimize the damage to corporations, small businesses, and recently unemployed individuals affected by the shutdown. Even though these measures might still be viewed as insufficient, they are the best quantifiable proxy for lost economic productivity at the present moment.

The stimulus package that was put in place on March 27th, 2020 totalled approximately $2 trillion, the largest emergency relief in US history through the CARES (*Coronavirus Aid, Relief, and Economic Security Act)* (U.S. Congress, 2020a). A further new $484 billion was passed through *Paycheck Protection Program and Health Care Enhancement Act*, also known as the 'COVID-19 3.5' relief package on April 21st, 2020 (U.S. Congress, 2020b). This complete package can be divided by type of recipient which includes individuals, small businesses, large corporations, local and state governments and various public services including hospitals, foodbanks, stockpiled equipment, child nutrition and veterans (Figure 1). The package also included the one-time $1,200 cash payment to all qualified Americans which technically represent a tax credit to offset future income taxes (U.S. Congress 2020a and 2020b). The detailed breakdown of the stimulus package is shown in Table 1 with a proportional breakdown illustrated in Figure 1.

--Insert Table 1 here—

--Insert Figure 1 here--

Mortality data shows the age distribution of pandemic-associated decedents (Table 2) with a gender distribution of 56.6% male to 43.4% female. The gradient of mortality shows that decedents have primarily fallen in the over age 65 category with higher proportion of deaths in males in the younger age brackets (NCHS 2020).

--Insert Table 2 here--

RESULTS

Using these data, we obtain high-level estimates for the cost per LYG based on seven different scenarios with different death projections (Table 3). The results show seven different scenarios that reflect different death projection ranges for the baseline case. The life-years gained from the baseline without containment measures is also shown in the table. The results show that as the projected number of deaths increases, the cost-effectiveness of the containment measures becomes more favourable i.e. providing better value-for money for US taxpayers. With cost-effectiveness ranging from $180,874 per life-year-gained for the high-end projection to $4,258,780 per life-year gained for the low-end death projection estimate.

--Insert Table 3 here—

The most commonly referred cost-effectiveness threshold in the US is $50,000 which was the cost-effectiveness of end-stage renal disease that was publicly-reimbursed by Medicare in the 1970s (Neumann, Cohen, and Weinstein 2014). Inflating this amount to present times would imply a threshold of $150,000 which is currently used to set a value-based price in many cases (Neumann, Cohen, and Weinstein 2014). Thresholds of up to $500,000 have also been referenced for rare diseases (Garrison, Jackson, and Paul et al. 2019). Outside of the health sector, thresholds may also be substantially higher (Brennan 2016; Hirth 2020).

Using the conventional threshold of $150K/LYG in the health care sector to establish favourable cost-effectiveness profiles, the results shown in Table 3 indicate that the shutdown measures are not cost-effective and hence do not represent good value-for-money. This contention is made by comparing the economic shutdown to other health care interventions and in relation to the number of life-years gained if the estimated number of deaths in the absence of containment measures would not have exceeded the high-end estimate of 3 million. However, experiences in other sectors outside of health should also be considered to make more definitive statements regarding value-for-money of the economic shutdown.

DISCUSSION

This paper helps to frame the advisability of whether a large economic stabilization program in the wake of a pandemic—such as that for COVID-19--represent good value-for-money. Rather than simply looking at the number of lives saved in comparison to what might be predicted in the absence of the shutdown, the framework attempts to compare the cost of the economic stabilizations interventions—as a proxy for the cost of the pandemic and ensuing shutdown—in relation to the number of life-years gained to standardize the measure of success with other life-saving investments that are made in the United States. For example, a study in California suggest that the State's shelter-in-place orders averted 1.4 COVID-19-related deaths per 100,000 population resulting in 763 fewer deaths by April 20th, 2020 for

that state; yet, the authors provide no standardized way to compare these results with other initiatives that save lives (McNichols, Sabia and Dave, 2020). The hope is that the evaluation undertaken herein will add an additional angle by which to evaluate the success of this enormous undertaking when all the data have been compiled and society has returned to a new normal state-of-affairs.

While widely used conventional cost-effectiveness thresholds in the health care sector suggest that containment strategies did not represent good value for money in the US, there is an alternative published literature in the area of the Value of a Statistical Life Year (VSLY) which may suggest otherwise. The question put forth in such literature is what value do we put on a life and a life-year? The answer largely depends on the venue with space exploration venues placing extremely high values on life at the level of millions of dollars per life-year based on the protections placed on manned space flight to ensure that astronauts return home safely (Brennan, 2016). More earth-bound estimates from 35 studies associated with heightened job-risks produce median thresholds of VSLY equivalent to US$428K/QALY (Hirth 2020). Environmental health protection such as the Superfund Program valuate VSLYs equivalent to over US$1M/QALY Even higher rates are used by the Consumer Product Safety Commission which applies a value per statistical life of US$8.7M (2014 figures) and US$9.6M (2016 figures) at the US Department of Transportation (CPSC 2018, USDOT, 2016). Thus, from a perspective of VSLY, it is entirely possible that the cost-effectiveness profile of the economic shutdown in the US was indeed favourable relative to VSLY estimates outside the health sector.

In the Canadian context, VSL was first estimated for public sector decision-making at $5.2 million CAD as of 1983 with further updates suggesting that this value is now over $6 million CAD with a VSLY of at least $276,000 CAD (Meng and Smith, 1990; Chestnut and De Civita, 2009; Quigley, 2018). This is consistent with comparisons made between the U.S. and Canada in terms of VSL suggesting that Canadian figures are approximately 30-40% lower than VSL values calculated for the United States (Alberini, Cropper and Krupnick, 2009).

There is also evidence that the shut-down may have actually produced a net cost-savings to society rather than involving a trade-off of dollars for lives saved. Nationally, it is estimated that Americans who contract COVID-19 over age 60 could lose an average between 153 to 222 days of life expectancy while those under 40 would lose an average of two weeks with the total value of VSL lost without containment measures in place of between $8 to $60 trillion (Wilson, 2020) If the estimates of the stimulus package of $2.48 trillion stand as a good proxy for the costs of the shut-down, then it would appear that this initiative actually produced $5.5 trillion in savings along with at least 583,000 life-years gained (See Table 3); that is, there was not actual trade-off but a net actual cost savings to society from saving lives. This result is consistent with the results of a recent draft working paper that estimated $5 trillion in net benefits from current containment initiatives (Thunstrom, Newbold and Finnoff et al.,. 2020).

Given both the highly contagious nature of COVID-19 and limits on testing for the virus, the low-end estimate for the total number of deaths may be a vast underestimate with many COVID-19 decedents remaining unidentified. In addition, beyond the cost of the stimulus package, there may be other cost considerations that include additional investments made by the federal government not contained in the stimulus package, investments and assistance made by state and municipal and city governments, non-profit organizations, charitable groups including foodbanks, other financial investments made directly by corporations, the deployment of the military to build temporary hospitals, and other services-in-kind and charitable funding from foundations and private citizens. The analysis also does not take into account the decreases in quality-of-life and morbidity associated with hospitalizations and shelter-in-place orders that may likely extend well-beyond the time perspective of this analysis and involve extensive often-unmeasured costs to the health care system particularly near the end of life (Dao, Godbout Fortin, 2014) There are other ramifications including mental and physical sequalae including benefits and costs associated with short- and long-term behavioural changes associated with the pandemic shock. Lastly, there is a large degree of uncertainty on the range of death forecasts given no intervention with an associated wide range of subsequent impacts upon society.

In Canada, cost-effectiveness is a consideration in--though not determinative of--decision-making. Given that the Canadian healthcare system provides universal coverage under a single-payer publicly funded system for hospital and physician services as well as some prescription drug services, decisions based on trade-offs are often made given limits on resources available. Further, decisions regarding initiatives in other sectors are also often subject to the lens of cost-effectiveness including the area of consumer safety and environmental concerns. The findings from the U.S. contained herein can help set out a framework to do similar analysis to determine if the current Canadian economic stimulus package totalling C$92 billion in direct support for individuals and businesses or $146 billion for the total estimated cost of the package is considered to be good value-for-money (Craig 2020, PBO 2020).

Canada has been using dynamic epidemiological models to predict how the pandemic unfolds over time. The Federal government refers to a model developed by the Public Health Agency of Canada to help inform policy. The model shows that in the absence of a containment strategy, the projected number of deaths will fall between 311,000 to 355,000 deaths due to the COVID-19 pandemic (Government of Canada 2020). This projection is similar to figures provided by Imperial College London showing 321,565 projected deaths (R_o=3) for Canada under a similar scenario (Ferguson, Laydon and Nedjati- Gilani et al. 2020). The latest publicly-released figures by the Canadian government at the end of April showed that with containment measures in place the curve would flatten at 3,883 deaths by May 5th, 2020 a figure that has since been surpassed (Government of Canada 2020). Further, age and sex information for those

dying of COVID-19 is incomplete (Cardoso and Weeks 2020). Without these critical publicly-available data, it is challenging to conduct similar evidence-based analysis for Canada at this time.

For the sake of comparing the particulars of the different stimulus packages, Table 4 provides the particular line items in the Canadian stimulus package—while different than the American package with more targetted funding—is of a similar magnitude relative to national GDP figures for both countries. Yet, with half the case counts and deaths per 100,000 population in comparison to the U.S.—owing perhaps to higher levels of adherence to social spacing guidelines and staying-at-home—the shutdown in Canada is likely to have produced larger gains in life-years per 100,000 population than the United States. As a result, the cost-effectiveness of the stimulus package is ostensibly more favourable than what was calculated in this paper for the United States (WHO 2020d; Google 2020; Leger 2020).

--Insert Table 4 here—

As the R_o trends downward and more high-quality data becomes available for each jurisdiction, it may be possible to conduct future research that focusses on the development of a population-based, long-term cost-effectiveness analysis from a societal perspective. A comprehensive analysis will enable the capture of both direct and indirect downstream costs including potential mortality effects of the economic downturn, health outcomes and quality of life (Ariizumi and Schirle 2012). Such increased detail will determine whether the containment measures that resulted in the economic downturn were too broad or narrow to achieve optimal value-for-money.

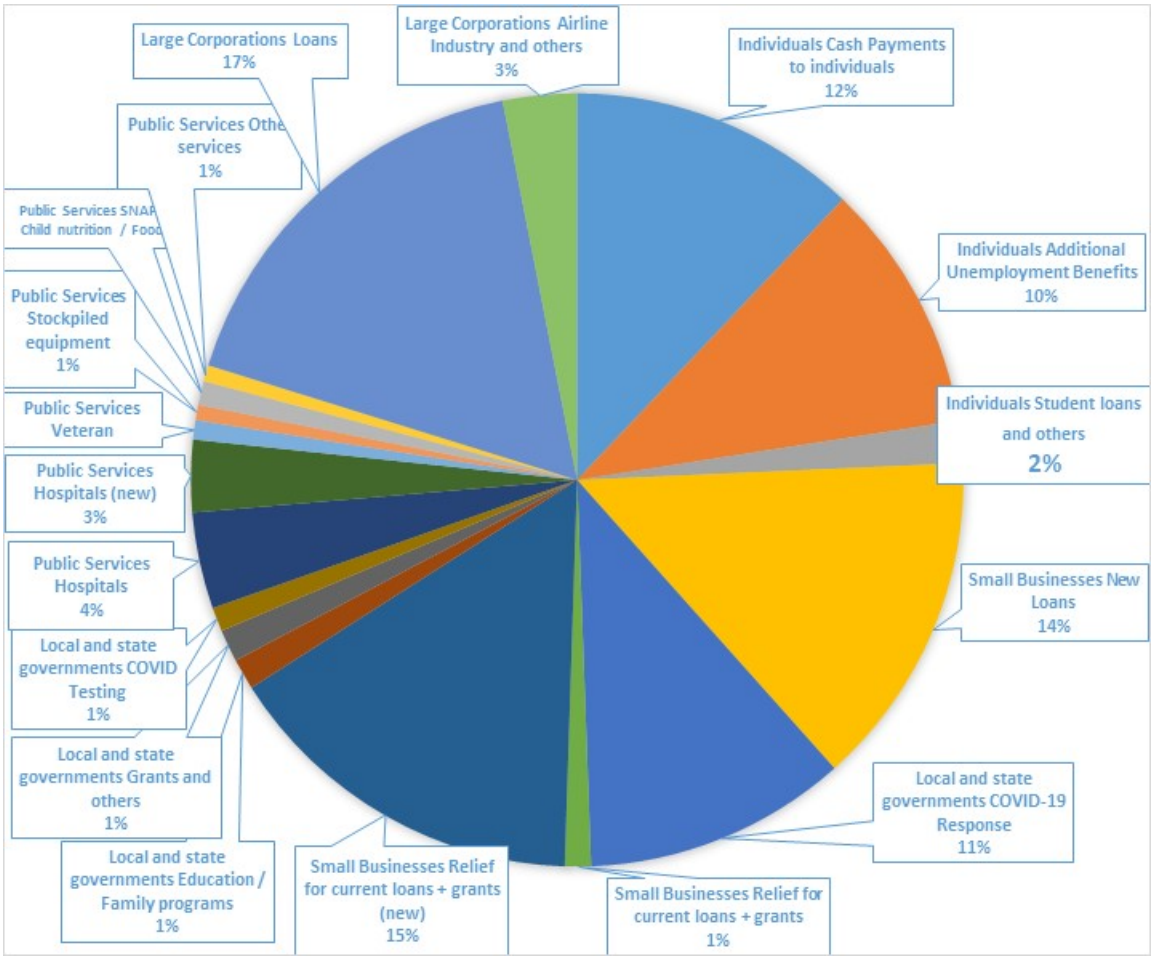
In the end, this analysis is focussed on the short-term and therefore not all costs and effects are included in this analysis. The large question is whether the magnitude of missing effects is larger than the magnitude of missing costs or vice versa. If the former, then it might be possible that the true value-for-money of the stimulus package might be substantially more favourable than what this analysis shows; however, if the latter is true, then the cost-effectiveness profile of the stimulus package may be even more unfavourable than what has been presented.

CONCLUSION

The economic stimulus package under the U.S. CARES Act (2020) and the subsequent U.S. Paycheck Protection Program and Health Care Enhancement Act (2020) is unprecedented in terms of its magnitude suggesting that the U.S. economic shutdown was also unprecedented in terms of its cost to the U.S. economy. There are a variety of ways to justify the US shutdown, not least of which was to avoid overwhelming the hospital sector in the U.S. which has experienced significant pressures in March and April, 2020. Other measures of justification are also warranted based on trying to compare the costs with the benefits in terms of life-years gained from the economic shutdown compared to a scenario of no containment efforts. Based on this criteria, it is unclear as to whether the economic shutdown was a

worthy endeavor depending on whether the shutdown was compared to interventions in the health sector or provisions that have been put in place to protect human life outside this sector. Given the wide-ranging impacts that this pandemic has had on American life, it would seem that the comparison should be made to experiences in multiple sectors rather than just the health sector, and on this basis it appears that the shutdown is likely to represent good value-for-money. The implications for Canada are that such a trade-off analysis would help to assess the value of the stimulus package in comparison to other policy interventions that the government has put forth over time. Better data from Canadian public health agencies would make such an analysis possible.

Figure 1: Combined Stimulus Package (CARES Act, 2020 & COVID-19 3.5 Package) Categories



Source: U.S. Congress. 2020

Table 1: Cost of Total Stimulus Package (US$ Billions)

Recipient	Description	Costs (US$B)
Individuals	Cash Payments to individuals	300.00
Individuals	Additional Unemployment Benefits	260.00
Individuals	Student loans and others	43.70
Small Businesses	New Loans	350.00
Local and state governments	COVID-19 Response	274.00
Small Businesses	Relief for current loans + grants	27.00
Small Businesses	Relief for current loans + grants (new)	384.00
Local and state governments	Education / Family programs	32.30
Local and state governments	Grants and others	33.50
Local and state governments	COVID Testing	25.00
Public Services	Hospitals	100.00
Public Services	Hospitals (new)	75.00
Public Services	Veteran	20.00
Public Services	Stockpiled equipment	16.00
Public Services	SNAP / Child nutrition / Food Banks	24.75
Public Services	Other services	16.90
Large Corporations	Loans	425.00
Large Corporations	Airline Industry and others	76.85
Costs (Total)		**2,484.00**

Source: U.S. Congress. 2020a and 2020b

Table 2: Demographic Distribution at Death due to COVID-19

Age Distribution (years)	<1-24	25-34	35-44	45-54	55-64	65-74	75-84	>=85
Male (56.6%)	0.16%	0.91%	2.42%	6.58%	14.92%	24.01%	27.54%	23.45%
Female (43.4%)	0.10%	0.52%	1.21%	3.34%	9.50%	18.11%	27.06%	40.16%
All	0.14%	0.75%	1.90%	5.17%	12.57%	21.45%	27.33%	30.71%

Source: National Center for Health Statistics. 2020

Table 3: Incremental Cost per Life-year Gained (LYG)
(Costs set at US$2.48 Trillion - cost of the U.S. stimulus package)

Scenarios	**Scenario 1**	**Scenario 2**	**Scenario 3**	**Scenario 4**	**Scenario 5**	**Scenario 6**	**Scenario 7**
	Projected Deaths: 200,000 Δ LYG: 583,266	Projected Deaths: 480,000 Δ LYG: 1,863,490	Projected Deaths: 750,000 Δ LYG: 3,178,487	Projected Deaths: 1,000,000 Δ LYG: 4,241,050	Projected Deaths: 2,180,000 Δ LYG: 9,655,154	Projected Deaths: 2,780,000 Δ LYG: 12,379,916	Projected Deaths: 3,000,000 Δ LYG: 13,733,304
Incremental Costs/ LYG	$4,258,780	$1,332,983	$781,504	$585,704	$257,006	$200,648	$180,874

Note: Δ LYG = change in life-years gained

Table 4: Costs of Stimulus Package in Canada ($Millions CAD)

Category ($ CAD millions)	2019-2020	2020-2021
Additional International Assistance	-	$110
Additional Lending Capacity for Farm Credit Canada (FCC)	-	-$96
COVID Reponse Fund: Funding for Provinces and Territories	$500	-
COVID Reponse Fund: Immediate Public Health Response	$25	$25
COVID Reponse Fund: Initial funding to the World Health Organization	-	$2
COVID Reponse Fund: International Assistance	-	$50
COVID Reponse Fund: Investing in Research	-	$275
COVID Reponse Fund: Personal Protective Equipment	-	$50
COVID Reponse Fund: Repatriation of Canadians	-	$7
COVID Reponse Fund: Sustained Communications and Public Education	-	$50
COVID Response Fund: Funding for preparedness in First Nations and Inuit Communi	-	$100
COVID Response Fund: Work Sharing Program	-	$125
Canada Emergency Business Account	-	$9,106
Canada Emergency Response Benefit (CERB)	-	$35,471
Canada Emergency Wage Subsidy (CEWS)	-	$75,975
Canada Student Emergency Benefit	-	$5,250
Canada Student Loan Payments	-	$159
Canada Student Loans	-	$1,296
Canada Student Service Grant	-	$912
Canadian Agricultural Partnership	-	$1
Co-Lending Program for Small and Medium Sized Enterprises	-	-$389
Deferral of Sales Tax Remittance and Customs Duty Payments until June	-	$92
Emergency Community Support Fund	-	$350
Emergency Support Fund for Cultural, Heritage and Sport Organizations	-	$500
Emissions Reduction Fund for the Oil and Gas Sector	-	$94
Enhanced Canada Child Benefit	-	$1,900
Enhanced GST Credit	-	$5,665
Extended Deadlines to File Income Tax Returns and Pay Income Taxes	-	$634
Funding for Food Banks and Local Food Organizations	$25	$75
Funding for Food System Firms that hire Temporary Foreign Workers	-	$50
Funding for Indigenous Businesses and Aboriginal Financial Institutions	-	$307
Funding for Orphan and Inactive Oil and Gas Wells Clean-Up, Alberta Orphan Well Association		
Funding for Orphan and Inactive Oil and Gas Wells Clean-Up, Government of Alberta	-	$1,000
Funding for Orphan and Inactive Oil and Gas Wells Clean-Up, Government of British (	-	$120
Funding for Orphan and Inactive Oil and Gas Wells Clean-Up, Government of Saskatc	-	$400
Funding for Personal Protective Equipment and Supplies	$200	$1,800
Funding for Seniors (United Way Canada)	$9	-
Funding for Women's Shelters and Sexual Assault Centres	-	$50
Funding for the Air Transportation Sector	$14	$123
Funding to Community Futures Network	-	$287
Funding to Digital Citizen Initiative's Digital Citizen Contribution Program	-	$3
Funding to Futupreneur Canada	-	$20
Funding to Nutrition North Canada	-	$25
Funding to Regional Development Agencies	-	$675
Funding to the Canada Food Inspection Agency	-	$20
Funding to the Industrial Research Assistance Program	-	$250
Funding to the Reaching Home Initiative	-	$158
Indigenous Community Support Fund	-	$305
Insured Mortgage Purchase Program (IMPP)	-$13	-$428
Loan Guarantee Program for Small and Medium Sized Enterprises (SMEs)	-	-$3
Lower RRIF Minimum Withdrawal	-	$505
Mental Health funding for Children and Youth (Kids Help Phone)	-	$8
National Medical and Research Strategy to combat COVID-19	-	$822
Non-repayable Support for Businesses in the Territories	-	$15
Temporary Business Wage Subsidy	-	$844
Transfers to Territorial Governments to Support Health and Social Services	-	$73
Transfers to Territorial Governments to Support Northern Air Carriers	-	$17
Waiving Part I Broadcasting Licence Fees and Providing Equivalent Funding to CRTC	-	$33
Youth Employment and Skills Development Programs	-	$728
Total	$760	$145,997

Source: Parliamentary Budget Office, 2020

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