

Rethinking the Lockdown Groupthink

COVID-19: Rethinking the Lockdown Groupthink

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Abstract: The Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) has caused the Coronavirus Disease 2019 (COVID-19) worldwide pandemic in 2020. In response, most countries in the world implemented lockdowns, restricting their population's movements, work, education, gatherings, and general activities in attempt to 'flatten the curve' of COVID-19 cases. The public health goal of lockdowns was to save the population from COVID-19 cases and deaths, and to prevent overwhelming health care systems with COVID-19 patients. In this narrative review I explain why I changed my mind about supporting lockdowns. First, I explain how the initial modeling predictions induced fear and crowd-effects [i.e., groupthink]. Second, I summarize important information that has emerged relevant to the modeling, including about infection fatality rate, high-risk groups, herd immunity thresholds, and exit strategies. Third, I describe how reality started sinking in, with information on significant collateral damage due to the response to the pandemic, and information placing the number of deaths in context and perspective. Fourth, I present a cost-benefit analysis of the response to COVID-19 that finds lockdowns are far more harmful to public health than COVID-19 can be. I close with some suggestions for moving forward.

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Background

The Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) initially caused Coronavirus Disease 2019 (COVID-19) in China in December 2019, and has caused a worldwide pandemic in 2020. In response, most countries in the world implemented lockdowns, restricting their population's movements, work, education, gatherings, and general activities in attempt to 'flatten the curve' of COVID-19 cases. Even now, as the so-called 'second-wave' of COVID-19 cases is occurring, governments are considering and some implementing another lockdown to again 'flatten the curve'. The public health goal of lockdowns is to save the population from COVID-19 cases and deaths, and to prevent overwhelming health care systems with COVID-19 patients. I was a strong proponent of lockdowns when the pandemic was first declared.¹

In this narrative review I explain why I changed my mind. First, I explain how the initial modeling predictions induced fear and crowd-effects [i.e., groupthink]. Second, I summarize important information that has emerged relevant to the modeling. Third, I describe how reality started sinking in, with information on significant collateral damage from the response to the pandemic, and on the number of deaths in context. Fourth, I present a cost-benefit analysis of the response to COVID-19. I close with some suggestions for moving forward.

An important point must be emphasized. The COVID-19 pandemic has caused much morbidity and mortality. This morbidity and mortality have been, and continue to be, tragic.

I. The initial predictions induce fear

How it started: modelling

Early modeling made concerning predictions that induced fear (Table 1). Kissler et al. predicted the need for intermittent lockdowns occurring for a total of 75% of the time, even after July 2022, to avoid "overwhelming critical care capacity."²⁻⁴ In their discussion they wrote that the response "is likely to have profoundly negative economic, social, and educational consequences... We do not take a position on the advisability of these scenarios given the economic burden...."² On March 16, 2020, the Imperial College COVID-19 Response Team published modelling of the impact of non-pharmaceutical interventions (NPI) to reduce COVID-19 mortality and healthcare demand in the United States and United Kingdom.⁵ They wrote that suppression "needs to be in force for the majority [$>2/3$ of the time] of the 2 years of the simulation," without which there would be 510,000 deaths in Great Britain and 2.2 million deaths in the United States by mid-April, surpassing ICU demand by 30 times.⁵ In their discussion they wrote that "we do not consider the ethical or economic implications [page 4]... The social and economic effects of the measures which are needed to achieve this policy goal will be profound [page 16]...."⁵ The Imperial College COVID-19 Response Team extended this to the global impact of the pandemic on March 26, 2020,⁶ and estimated that without lockdowns there would be "7.0 billion infections and 40 million deaths globally this year."⁶ In their discussion they wrote "we do not consider the wider social and economic costs of suppression, which will be high and may be disproportionately so in lower income settings."⁶ In a later publication, this group modeled that "across 11 countries [in Europe], since the beginning of the epidemic [to May 4], 3,100,000 (2,800,000 – 3,500,000) deaths have been averted due to [NPI] interventions...."⁷ Another group similarly claimed that, in 5 countries [China, South Korea, Iran, France, US], NPIs "prevented or delayed [to April 6] on the order of 62 million confirmed cases."⁸

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How it took off: Crowd Effects [Groupthink]

There ensued a contagion of fear and policies across the world.^{9,10} Social media spread a growing sense of panic. Popular media focused on absolute numbers of COVID-19 cases and deaths independent of context. There was an appeal of group hysteria; “everyone got a break from their ambitions and other burdens carried in normal life”, and became united in crowds, which have a numbing effect.⁹ There was talk of “acting together against a common threat”, “about seeming to reduce risks of infection and deaths from this one particular disease, to the exclusion of all other health risks or other life concerns”, with virtue signaling to the crowd, of “something they love to hate and be seen to fight against.”⁹ A war effort analogy is apt, with the “unquestioning presumption that the cause is right, that the fight will be won, that naysayers and non-combatants [e.g., not wearing a mask] are basically traitors, and that there are technical solutions [e.g., vaccine and drugs] that will quickly overcome any apparent problem or collateral damage.”⁹ This was associated with a “disregard and disinterest on the part of individuals in the enormity of the collateral damage, either to their own kids, people in other countries, their own futures....”⁹

The NPIs spread to ~80% of OECD countries within a 2-week period in March 2020.¹¹ A main predictor of a country implementing NPIs was prior adoptions of a policy among spatially proximate countries, i.e., the number of earlier adopters in the same region.¹¹ Variables not predicting adoption of NPIs included the number of cases or deaths, population >65 years old, or hospital beds per capita in the country.¹¹ It seems we were all “stuck in this emotional elevation of COVID-19 deaths and suffering above everything else that could possibly matter.”¹² There was the unquestioned assumption that “there were and are no alternatives to extreme measures implemented on entire populations with little consideration of cost and consequences [externalities].”¹⁰ Even now, how a country ‘performed’ is measured by COVID-19 cases and deaths without denominators, without other causes of deaths considered, without considering overall population health trade-offs “that cannot be wished away” [e.g., the future of our children from lack of education and social interaction, and “changes to our wealth-generating capacity that has to pay for future policies”],⁹ and without considering how sustainable current policies are [protection is temporary and leaves us susceptible; “there is no exit from the pandemic; there is only an exit from the response to it”¹⁰]. All of this, even though in October 2019 the WHO published that for any future Influenza pandemic: travel-related measures are “unlikely to be successful... are likely to have prohibitive economic consequences”; “[measures] not recommended in any circumstances: contact tracing, quarantine of exposed individuals, border closure”; social distancing measures [closures of workplace, avoiding crowding and closing public areas] “can be highly disruptive, and the cost of these measures must be weighed against their potential impact”; and “border closures may be considered only by small island nations in severe pandemics... but must be weighed against potentially serious economic consequences.”¹³

Some of this crowd effect is related to cognitive biases, “the triumph of deeply human instincts over optimal policy.”¹⁴ Identifiable lives bias included the identifiable victim effect [we ignore hidden ‘statistical’ deaths reported at the population level], and identifiable cause effect [we prioritize efforts to save lives from a known cause even if more lives would be saved through alternative responses]. Present bias made us prefer immediate benefits to even larger benefits in the future [steps that would prevent more deaths over the longer term are less attractive].¹⁴⁻¹⁶ The proximity and vividness of COVID-19 cases (i.e., the favorability heuristic), and anchoring bias [we adhere to our initial hypothesis, and disregard evidence that disproves our favorite theory] affected our reasoning. We need to take an “effortful pause”, reflecting on aspects of the pandemic that don’t fit with our first impressions.¹⁷

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II. Important New Information Emerging*The Infection Fatality Rate (IFR)*

Based on seroprevalence data as of July 11, 2020, including up to 50 estimates from various areas in the world, Ioannidis found that the median IFR was 0.24% [range 0.00 to 1.31%].¹⁸ Among those <70 years old the median IFR was 0.04% [range 0.00 to 0.46%]. He estimated that for those <45 years old the IFR was almost 0%, 45-70 years old about 0.05-0.30%, and ≥70 years old ≥1%, rising to up to 25% for some frail elderly people in nursing homes.¹⁹ He estimated that at that point there were likely 150-300 million infections that had occurred in the world, not the reported 13 million, most being asymptomatic or mildly symptomatic.¹⁹

Even these numbers are most likely a large *over-estimate* of the IFR. First, in serosurveys the vulnerable [e.g., homeless, imprisoned, institutionalized, disadvantaged people], who have higher COVID-19 incidence, are more difficult to recruit. Second, there is likely a healthy volunteer bias in serosurveys studies. Third, and most importantly, there is a lack of sensitivity of serology.²⁰⁻²⁵ Many reports now document there is often a rapid loss of antibody in COVID-19 patients that were less severely ill.²⁰⁻²⁶ Moreover, at least 10% of COVID-19 patients never seroconvert, and many more may only develop a mucosal IgA response,^{27,28} or only a T-cell response [which may be the case in up to 50% of mild infections].^{29,30} Finally, most data come from unusual epicenters where “infection finds its way into killing predominantly elderly citizens” in nursing homes and hospitals,¹⁸ and where “[in Italy, Spain, France] an underfunded, understaffed, overstretched and increasingly privatized and fractured healthcare system contribute to higher mortality rates... [Lombardy] has long been an experimental site for healthcare privatization.”¹⁰

A serology-informed estimate of the IFR in Geneva, Switzerland put the IFR at: age 5-9 years 0.0016% (95% CrI 0, 0.019), 10-19 years 0.00032% (95% CrI 0, 0.0033), 20-49 years 0.0092% (95% CrI 0.0042, 0.016), 50-64 years 0.14% (95% CrI 0.096, 0.19), and age 65+ outside of assisted care facilities 2.7% (95% CrI 1.6, 4.6), for an overall population IFR 0.32% (95% CrI 0.17, 0.56).³¹ Similarly, a large study from France found an inflection point in IFR around the age of 70 years [see their Figure 2D].³²

High-risk groups

Ioannidis et al. analyzed reported deaths from epicenters, in 14 countries and 13 states in the United States, to June 17, 2020.³³ They found that in those age <65 years the relative risk of death was 30-100X lower in Europe and Canada, and 16-52X lower in the USA, compared to those ≥65 years old.³³ They estimated that those age 40-65 years old have double the risk of the overall <65 year old group, and females have 2X lower risk than males.³³ This is compatible with a steep inflection point in the IFR around the age of 70 years old. Older adults in nursing homes accounted for at least half of the COVID-19 deaths in Europe and North America, and over 80% in Canada.³⁴ In nursing homes the usual median survival is ~2.2 years, with a yearly mortality rate >30%, even without COVID-19.³⁵ Ioannidis et al estimated that the average daily risk of COVID-19 death for an individual <65 years old was equivalent to the risk from driving between 12-82 miles/day during the pandemic period, higher in the UK and 8 states [106-483 miles/day], and only 14 miles/day in Canada.³³

By far the most important risk factor is older age.³¹⁻³³ In the largest observational study I am aware of, the OpenSAFELY population in the UK, including over 17 million people with 10,900 COVID-19 deaths, compared to those age 50-59 years old, the Hazard Ratio for death from COVID-19 ranged from 0.06 for

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those age 18-39 years, to >10 for those age >80 years.³⁶ In comparison, even important co-morbidities such as severe obesity, uncontrolled diabetes, recent cancer, chronic respiratory or cardiac or kidney disease, and stroke or dementia rarely had HR approaching ≥ 2 .³⁶ Those co-morbidities with HR > 2, including hematological malignancy, severe chronic kidney disease, and organ transplant, affected only 0.3%, 0.5%, and 0.4% of the total population.³⁶

A rapid systematic review found that only age had a “consistent and high strength association with hospitalization and death from COVID-19... strongest in people older than 65 years...”³⁷ Other risk groups for mortality had either a low-moderate effect [obesity, diabetes mellites, male biological sex, ethnicity, hypertension, cardiovascular disease, COPD, asthma, kidney disease, cancer] and/or were inconsistently found to have an effect in the literature [obesity, diabetes mellites, pregnancy, ethnicity, hypertension, cardiovascular disease, COPD, kidney disease].³⁷ Even with these risk factors, the absolute risk may still be low, given the overall IFR in the population at that age.

An Aside: Is This Age Discrimination?

An objection may be that singling out the elderly as high risk is age discrimination. This is false on two counts. First, pointing out the truly high-risk group is the elderly is only emphasizing that this is the group that requires protection from severe COVID-19 outcomes. Second, as Singer has pointed out, “what medical treatment does, if successful, is prolong lives. Successfully treating a disease that kills children and young adults is, other things being equal, likely to lead to a greater prolongation, and thus do more good, than successfully treating a disease that kills people in the 70’s, 80’s, and 90’s.”³⁸ In fact, when we try to stay healthy “what we are trying to do is to live as long as we can, compatibly with having a positive quality of life for the years that remain to us. If life is a good, then, other things being equal, it is better to have more of it rather than less.”³⁸ We should count every quality adjusted life year equally, whether it is in the life of a teenager or a 90-year old.^{38,39}

Different from discrimination such as racism [“no one who is black was ever white”], in this case “everyone who is old was once young”, i.e., there is an impartial age-neutral perspective from which we can all see that it is in everyone’s interests to save the lives of younger people.³⁹ In a thought-experiment, Singer asks us to imagine that you have just become a parent, at some stage in your child’s life she is likely to be infected with a dangerous virus, and her chances of being infected and dying from the infection are the same in any year of her life. Now imagine that curative drug A, effective if <40 years old, and drug B, effective if >40 years old, are so costly that the government cannot afford both to be produced. Which drug should be produced? It is clearly contrary to your child’s interests to vote for drug B: this would increase her risk of dying before her 40th birthday; to improve her chances of living a longer life, we vote for drug A.³⁹

Veil of ignorance (VOI) reasoning is a widely respected and transparent standard for adjudicating claims of fairness. A fair distribution of resources is said to be one that people would choose out of self-interest, without knowing whom among those affected they will be: what would I want if I didn’t know who I was going to be? In an experimental study participants were asked to decide whether to give the last available ventilator in their hospital to the 65 year old who arrived first and is already being prepped for the ventilator, or the 25 year old who arrived moments later, assuming whoever is saved will live to age 80 years old. In the VOI condition, the participant was asked to “imagine that you have a 50% chance of being the older patient, and 50% the younger.”⁴⁰ Asked if “it is morally acceptable to give the last ventilator to the younger patient”, 67% in the VOI condition vs. 53% in control answered ‘yes’ (odds ratio 1.69; 95% CI 1.12, 2.57); compared to younger age participants (18-30 years), older participants

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(odds ratio 3.98) and middle age participants (odds ratio 2.02) were more likely to agree.⁴⁰ Asked if “you want the doctor to give the ventilator to the younger patient”, 77% answered ‘yes’, maximizing the number of life-years saved rather than the number of lives saved.⁴⁰

The Herd Immunity Threshold

The classical herd immunity level is calculated based on the basic reproduction number (R_0) as $(1 - 1/R_0)$, and is the proportion of the population that must be immune to a virus before the effective reproduction number (R_e) is <1 , and thus the virus cannot perpetuate itself in the population. This calculation assumes a homogeneously mixing population, where all are equally susceptible and infectious. For R_0 2.5, the threshold is ~60% of the population. However, the assumption is not valid, as there is heterogeneity in social mixing and connectivity, with higher and lower levels of activity and contacts. One model incorporating heterogeneity of social mixing found the threshold, for R_0 2.5, to be 43%, and likely lower as other heterogeneity in the population was not modelled [e.g., sizes of households, attending school or big workplaces, metropolitan versus rural location, protecting the elderly, etc.].⁴¹ A model that incorporated variation in connectivity compatible with other infectious diseases found that for R_0 3, the threshold is 10-25% of the population developing immunity.⁴² Another model that “fit epidemiological models with inbuilt distributions of susceptibility or exposure to SARS-CoV-2 outbreaks” calculated “herd immunity thresholds around 10-20% [because]... immunity induced by infection... [contrary to random vaccination] is naturally selective.”⁴³ In support of this heterogeneity, it is now known that there is overdispersion of transmission of SARS-CoV-2, with 80% of secondary infections arising from just ~10% of infected people.^{44,45,46}

An Aside: Sweden

It has been claimed that Sweden’s strategy of achieving herd immunity failed, with excess deaths and a suffering economy. However, that is not clear. First, cases and deaths fell consistently in later July/August, with deaths continuing at a very low level into October despite no lockdown.⁴⁷ Second, serosurveys in mid-July found 14.4% of the population may be seropositive; thus, with 5761 deaths as of August 1, in a population of 10.23 million, the crude IFR may have been 0.39%, and even lower considering the sensitivity of serology discussed above.⁴⁸ Early on, Sweden did not adequately protect those in nursing homes, a failing that also inflates the IFR. Third, in a globalized world, with entangled webs of supply, demand, and beliefs, “what we do here will devastate people not just here, but also elsewhere and everywhere.”⁴⁹ Compared to Denmark, with an economy heavily dependent on pharmaceuticals, Sweden’s recession looks bad. However, compared to the European Union, Sweden looks good; the European Commission forecasts a better 2020 economic result for Sweden (GDP -5.3%) than many other comparable European countries (e.g., France -10.6%, Finland -6.3%, Austria -7.1%, Germany -6.3%, Netherlands -6.8%, Italy -11.2%, Denmark -5.2%).⁵⁰

The Exit Strategy

Herd immunity appears to be the only exit from the response to COVID-19. This can be achieved naturally, or through vaccine. For the reasons given here, it is very possible that the lockdowns are only delaying the inevitable.

There are problems with the natural herd immunity approach involving waves of lockdowns. First, this will take years to occur, causing economic and social devastation; this also assumes immunity is long-lasting, without which it is more likely COVID-19 will be an annual occurrence.² Second, the less

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devastating test-trace-isolation/quarantine strategy seems not feasible. In the United States it was estimated that there would be a need to train an extra 100,000 public health workers, and to do >5 million SARS-CoV-2 tests per day, necessitating the building of many new very large testing factories.⁵¹ Countries would still need to keep borders closed and maintain physical distancing (e.g., no large events) in order to make contact tracing feasible; this would be for years, during which people may become very reluctant to be tested. Modeling suggests that to be successful, because pre-symptomatic individuals may account for 48-62% of transmission, contact tracing and quarantine would have to occur within 0.5 days for >75% of contacts, necessitating mobile app technology that has its own feasibility and ethical problems.⁵²⁻⁵⁴

Vaccine induced herd immunity involves many assumptions. First, there will be the discovery of an effective and safe vaccine that does not cause antibody-dependent (or other immune) enhancement; this, even though the problem in severe COVID-19 may be the host response, especially in the elderly and children.^{55,56} Second, the immune response will be durable, not last for only months, and have little immunosenescence [reduced response to vaccine with rapid decline of antibody levels] in the elderly.^{56,57} Third, that mass production and delivery of the vaccine will occur very soon, and be done equitably to all humans on Earth; otherwise, there is the risk of conflict, war, and terrorism in response to gross inequity in vaccine distribution. In response to the 2009 pandemic of H1N1 Influenza the United States achieved a weekly vaccination rate of only 1% of the population.⁵⁶ Vaccine refusers may include 30% of the population in North America, and if they have “increased contact rates relative to the rest of the population, vaccination alone may not be able to prevent an outbreak.”⁵⁶ There is already competition among high income countries, and likely crowding out of low-income countries that represent about half of the human population.⁵⁸

III. Reality Sinking In

Iatrogenic Collateral Harms: lockdown as a ‘drug’ with dangerous side-effects when its use is prolonged

The COVID-19 response has threatened to make, and likely has already made, several Sustainable Development Goals for the most vulnerable among us in low-income countries out of reach.⁵⁹⁻⁶¹ The numbers involved are staggering, and in the many millions (Table 2). The response has had major detrimental effects on childhood vaccination programs, education, sexual and reproductive health services, food security, poverty, maternal and under five mortality, and infectious disease mortality.⁵⁹⁻⁷² The effect on child and adolescent health will “set the stage for both individual prosperity and the future human capital of all societies.”⁷³ In high-income countries, the collateral damage has also been staggering (Table 3), affecting visits to emergency departments and primary care for acute (e.g., myocardial infarction, stroke) and ‘non-urgent’ (‘elective’ surgery, and cancer diagnosis and treatment) conditions, intimate partner violence, deaths of despair, and mental health.⁷⁴⁻⁸⁶ Of excess deaths occurring during the pandemic in high-income countries, 20-50% are not due to COVID-19.^{87,88} There was an unexplained 83% increase of 10,000 excess deaths from dementia in England/Wales in April, attributed to lack of social contact causing a deterioration in health and wellbeing of these patients.⁸⁹

Numbers in Context

Numbers without denominators and without context are deceiving. Some data in this section may put the COVID-19 pandemic numbers in perspective.

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Assuming all deaths *with* COVID-19 are deaths *from* COVID-19, in the USA as of August 22, 2020, COVID-19 was the cause of 9.24% of overall deaths; this means that >90% of deaths are not a focus of our attention (ETable 1, see Additional file 1).⁹⁰ Similarly, in Canada, COVID-19 was the cause of 5.96% of estimated deaths over the first 6 months of 2020, again meaning >94% of deaths are not a focus of our attention, and not being reported daily in the press as are COVID-19 deaths (ETable 2, see Additional file 1).^{91,92} A similar analysis in the UK found that, during 16 weeks of the pandemic, the risk of death was “equivalent to experiencing around 5 weeks extra ‘normal’ risk for those over [age] 55, decreasing steadily with age, to just 2 extra days for schoolchildren... [and in those] over 55 who are infected [detected cases] with COVID-19, the additional risk of dying is slightly more than the ‘normal’ risk of death from all other causes over one year.”⁹³

Across the world in 2019 there were 58,394,000 deaths, >4.87 million deaths/month and >159,983 deaths/day; COVID-19 deaths are shown relative to these underlying deaths in Table 4.^{94,95} The number of deaths is highly unequal, with far more deaths at earlier ages in low-income countries and Sub-Saharan Africa.⁹⁴ If all countries were to achieve the Sustainable Development Goal of Under 5 Mortality Rate <25 deaths/1000 by 2030, from the year 2015 this would avert 12.8 million deaths.⁹⁶ From 2000-2017, if all units had an Under 5 Mortality Rate that matched the best performing unit in each respective country, this would have averted 58% of deaths in those under 5 years, that is, 71.8 (68.5 to 74.9) million deaths.⁹⁷

Some causes of death in the world are given in Table 5; COVID-19 deaths (~3500/day up to September 4, 2020) are also shown.⁹⁸⁻¹¹⁰ For example, there are an estimated 4110 deaths/day from Tuberculosis,¹⁰⁰ 3699 deaths/day from motor vehicle collisions,⁹⁸ 21,918 deaths/day due to use of tobacco,⁹⁹ >3400 deaths/day from Under 5 cases of pneumonia or diarrhea,^{104,105} and 30,137 deaths per day from dietary risk factors.¹⁰⁶ The WHO has estimated that if all people would adopt a vegan diet this would avert 13.7 M (95% CI 7.9, 19.4) deaths by 2030.⁶³ Some of these deaths are preventable if we were to take appropriate action, and some we as a society have decided we are willing to accept in trade-off for our freedom and wellbeing.

IV. An Informed Cost-Benefit Analysis of Lockdowns

The Corona Dilemma

The economist Paul Frijters has asked us to consider “The Corona Dilemma” (Figure 1a and 1b) modelled after the so-called “Trolley Problem” in philosophy.¹¹¹ He asks us to imagine “you are the decision maker who can pull the lever on the train tracks to avoid the coming train from going straight.”¹¹¹ Our options are to divert the train or not. “If you do not divert the train – you are letting the virus rage unchecked [i.e., COVID-19 deaths].”¹¹¹ On the other hand, “if you pull the lever – the diverted train will put whole countries into isolation, destroying many international industries and thus affecting the livelihood of billions, which through reduced government services and general prosperity will cost tens of millions of lives [i.e., COVID-19 reaction].”¹¹¹ The world pulled the lever, and the unintended health consequences of these measures did not play a part in modelling or policy.

Cost-Benefit Analysis

Medical and Public Health experts are not expert in this type of analysis. Health resources are finite. We all take health risks to ensure a better future for ourselves, family, children, and society. “Wellbeing of the population is the ultimate goal of government.”^{112,113} To compare outcomes of policies we need a

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common single metric of measurement to weigh trade-offs and make rational decisions. The goal is to maximize the sum of years lived by the population, weighted by the health quality of those years [i.e., Quality Adjusted Life Years, QALY] or the wellbeing quality of those years [i.e., Wellbeing Years, WELLBY]. The QALY misses some important things that are valued by individuals, including joy, status, and things that give fulfillment like jobs. The WELLBY measures the value of anything that makes life enjoyable, and captures almost everything that is important to people. It is measured by life satisfaction, asking “overall, how satisfied are you with your life nowadays?” and rated on a Likert Scale from 0 [“not at all”] to 10 [“completely”]; the usual healthy level is ‘8’, and those indifferent between living on or not at all score ‘2’ – 1 regular year of happy life (1 QALY) is worth 6 WELLBY.^{112,113} Despite some limitations, cost and benefit should be measured in terms of human welfare in the form of length, quality, and wellbeing of lives, and “to make no assessment is just to make policy in a vacuum.”¹¹⁴

First, consider the benefits of lockdown, preventing COVID-19 deaths. Using the age distribution of deaths and comorbidities, in the UK the average person who died due to COVID-19 had 3-5 healthy years left to live; that is, 3-5 QALY, or 18-30 WELLBY.^{111,114} This number was even lower in Italy.¹¹¹ We can calculate that lockdowns ‘saved’: 50% infected to herd immunity X 0.3% IFR X 7.8 Billion people X 5 QALY lost per death = 11.7 million deaths, 58.5 million QALY, or 360 million WELLBY. The number is likely much lower than this for several reasons: it is likely <40% to herd immunity, the IFR is likely <0.24%, some deaths would occur even with lockdowns [that might prevent at most 70% of deaths; in Sweden it was estimated lockdown could have prevented one-third of deaths],¹¹⁵ with focus on retirement and nursing homes we might avoid many of the excess deaths, and we cannot stay locked down forever [if no ‘exit strategy’ exists, then lockdown is not really a ‘strategy’¹⁰]. A more realistic number is at least 2X lower, well fewer than 5.2 million deaths ‘saved’. It is also worth mentioning that the efficacy of lockdown has been questioned in several studies, reducing the benefit of lockdown potentially markedly further (ETable 3, see Additional file 1).¹¹⁶⁻¹¹⁹

Second, consider the costs of lockdown.^{111,120-122} An important point must be made here. We are not comparing COVID-19 deaths vs. economy as prosperity. Rather, it is COVID-19 deaths vs. recession deaths – it’s lives versus lives, as the economy is about lives. “It’s horrible either way... [we’re] advocating for the least people to die as possible.”¹²³

Expected costs of the recession in lives can be calculated based on two methods. One uses historical evidence of a strong long-run relation between government spending [economic development] and life expectancy.^{111,120-122} Government expenditures on healthcare, education, roads, sanitation, housing, nutrition, vaccines, safety, social security nets, clean energy, and other services determines the population wellbeing and life-expectancy.¹¹¹ If the public system is forced to spend less money on our children’s future, there are statistical lives lost [people will die in the years to come]. The social determinants of health, including conditions of early childhood, education, work, social circumstances of elders, community resilience (transportation, housing, security), and fairness (economic security) determine lifespan.¹²⁴ As a general rule, US\$10K/year GDP buys an additional 10 years of life, so in a life of 75 years, US\$750K buys 10 years in life expectancy = US\$75K/QALY.^{111,120-122} This is a maximum cost; in India US\$25K/QALY is appropriate [most effect occurs for vulnerable and marginalized groups].¹¹¹ The other method is based on government numbers that are used to estimate how much health and life expenditures buy. Since the lockdown is a government public health policy, “it is saving lives which is what the lockdown was for... we are treating decisions on how to face COVID-19 in the same way as decisions... are made about resources to apply to the treatment of cancer, heart disease, dementia, and diabetes.”¹¹⁴ Based on research on how costly it is to save people from illness (how government services maintain health), in the UK it is US\$20K/QALY, and using consumer willingness to pay it is

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US\$80K/QALY.¹¹¹⁻¹¹³ This again is a maximum cost, as this is for Western countries, who are at least 3X wealthier than the average country in the world; you can save a life in poor countries with US\$2-3K, and lives are saved more cheaply with the first few billions spent.^{111,125} It is estimated that in 2020-2021 the world economy will shrink by at least US\$8-9 trillion (about 6% of GDP), and this will take many years to recover (Figure 2).^{111,120,121,126,127} The loss in terms of GDP will be “easily US\$50 trillion over the coming decade”,^{111,120} with lockdowns ordering businesses and workplaces to stop functioning, ports closed, business bankruptcies, and resultant disrupted supply and demand chains.^{49,128,129} We can calculate that the recession resulting from lockdowns ‘cost’: US\$50 trillion X 40% as government expenditure ÷ US\$100K/QALY = 200 million QALY, or 1.2 billion WELLBY. This is an underestimate, and the actual figure is likely at least 12X higher for several reasons: the number US\$100K/QALY was used when it is far less than this for half the world population residing in low-income countries and may be much lower even in high-income countries, and a conservative estimate of world GDP loss during the pandemic was used, particularly if there is another prolonged period of lockdown.

Another cost of lockdown is the loneliness and anxiety effect on individuals. It is estimated that loneliness from isolation costs 0.5 WELLBY/person/year.^{112,113} If lockdowns last for 2 months to 4 billion people, this results in a cost of 333 million WELLBY.¹²⁰ The cost is likely far higher, as this assumes only 2 months of lockdown, and does not include the effect of loneliness on life-span (i.e., early mortality) and disease that occurs particularly to young people.¹³⁰⁻¹³⁶

The last cost considered here is the effect of unemployment. It is estimated that unemployment costs 0.7 WELLBY/unemployed person/year.^{112,113} Since it is estimated there will be 400 million additional unemployment years due to the lockdowns, the cost is 280 million WELLBY/year.¹²⁰ The cost is likely at least 3X higher, as recovery from unemployment will occur over several years, we do not consider the effect on wellbeing to the families of the unemployed, and we do not consider the effect on deaths of despair in young people or on loss of health insurance.

The effects of loneliness and unemployment on life-expectancy are not considered in the costs above, only the loss of life-satisfaction in WELLBYs. Recent literature has summarized the major effect of individual income, social network index (i.e., integration in a social network), and adverse childhood experiences on life-span, early mortality, risk of chronic diseases (including heart disease, diabetes, kidney disease, stroke, cancer, lung disease, Alzheimer’s, substance use, depression), and suicide rates.¹³⁰⁻¹³⁶ Recent financial difficulties, history of unemployment, lower life satisfaction, and history of food insecurity are associated with mortality in the United States.¹³¹ Social isolation is one of the top 3 risk factors for death due to cardiovascular disease, increases risk of death in the next decade by 25-30%, and “risks creating cohorts of individuals who are less socially functional.”¹³² Especially concerning are the effects on children during “the early years” of life, increasingly recognized as the period of greatest vulnerability to, and greatest return on investment from, preventing adverse long-term outcomes that can have lasting and profound impacts on future quality of life, education, earning potential, lifespan, and healthcare utilization.¹³³⁻¹³⁶ The early years of life are a critical period when a child’s brain develops from social interaction and experiences, thus providing the foundation for their entire future life potential. During the pandemic children are being exposed to increased intimate partner violence, family financial crises, disrupted education, an increasing achievement gap (i.e., low-income families who do not have access to computer, internet, space, food, and parental support cannot participate in online learning), loneliness, physical inactivity, lack of support services (e.g., school lunches, access to early childhood services and aids for those with disability), etc.^{66,67,81,84,137-139} These adverse childhood experiences have permanent impacts that cannot be compensated for by later improvements in social situations.

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The cost-benefit analysis is shown in Table 6, finding on balance the lockdowns cost a minimum of 5X more WELLBY than they save, and more realistically, cost 50-87X more. Importantly, this cost does *not* include the collateral damage discussed above [from disrupted healthcare services, disrupted education, famine, social unrest, violence, and suicide] nor the major effect of loneliness and unemployment on lifespan and disease. Frijters and Krekel have estimated that “the [infection] fatality rate should be about 7.8% to break-even and make a radical containment and eradication policy worthwhile, presuming that would actually eliminate the disease.”¹⁴⁰ A similar cost-benefit analysis for Canada is shown in ETable 4 (see Additional file 1), with the cost at least 10X higher for lockdowns than the benefit. A different analysis for Australia is shown in Table 7, estimating the minimum cost is 6.6X higher than the benefit of lockdown.¹⁴¹ Another cost-benefit analysis for the UK used National Institute for Health and Care Excellence guidelines for resource decisions, that 1 QALY should cost no more than US\$38.4K. Assuming lockdown could save up to 440K people [although more likely at most: 66.65 million population X 40% to herd immunity X 0.24% IFR = 64K people] of 5 QALY each, and a minimum GDP loss of 9% [i.e., assuming lost output comes back quickly, and not including any health costs of unemployment or disrupted education], “the economic costs of the lockdown... is far larger than annual total expenditure on the UK national health service... the benefits of that level of resources applied to health... would be expected to generate far more lives saved than is plausibly attributable to the lockdown in the UK... The cost per QALY saved of the lockdown looks to be far in excess... (often by a factor of 10 and more) of that considered acceptable for health treatments in the UK.”¹¹⁴ The authors estimated the benefit of easing restrictions for over the next 3 months outweighs the cost by 7.3-14.6X.¹¹⁴ “A cost-benefit analysis of 5 extra days at COVID-19 alert level 4” for New Zealand found that the cost in QALY was 94.9X higher than the benefit.¹⁴²

Objection: the economic recession would happen without lockdown

This is unlikely, particularly if the fear is appropriately controlled with clear communication on risk, numbers with denominators and context, and important trade-offs, as this information becomes available. The resources and attention should be directed towards protecting the most vulnerable (i.e., the elderly). The evidence for policy impact on total human welfare should be based on a wide range of expertise, including economists, and not only health experts. The CIDRAP group published suggestions for communication during a crisis, which included advice to not over-reassure (i.e., be realistic about the course post-lockdown – cases and deaths will climb), to express uncertainty (i.e., explain the difficult dilemmas and trade-offs, and why we choose which course; explain that the initial reaction was temporary, buying time to figure out next steps); to validate emotions (i.e., admit waves of disease will occur and there may be economic devastation); and to admit and apologize for errors (i.e., we must resurrect a devastated economy in order to save lives).¹⁴³

The severity of mandated lockdowns was directly linked with the severity of the economic collapse.^{114,141,144-148} These were direct commands to halt work, restrict travel, restrict the number of people inside dwellings, close factory floors, stay at home, etc. Economic activity, GDP loss, and unemployment were temporarily, within weeks, related to lockdown orders.¹⁴¹ There was a dramatic decline in employment, consumer spending, and economic outcomes largely accounted for by different degrees of restrictions in different countries.^{141,145,146} The consensus, for example by the Bank of England, the Reserve Bank of Australia, and the Organization for Economic Co-operation and Development, is that the economic recession is a result of the lockdowns.^{147,148,149}

Objection: consider the ‘long-haulers’

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The long-term effects of COVID-19 illness need to be studied and clarified. Much of the current information is based on anecdotes (i.e., single cases) in the press. It may be expected that survivors of ARDS due to COVID-19 will have significant quality of life sequelae similar to ICU survivors from other causes of ARDS.¹⁵⁰ It may also be expected that some survivors of COVID-19 that did not require hospitalization will have significant lingering symptoms for months similar to what occurs with other causes of community acquired pneumonia.¹⁵¹ The few studies reported to date do not well quantify the severity and duration of long-term symptoms such as fatigue, breathlessness, 'foggy thinking', etc., making it difficult to interpret the impact on cost-benefit analyses.¹⁵²⁻¹⁵⁶ In addition, these reports do not compare to contemporary controls during the pandemic, controls who are often experiencing social isolation, unemployment, and loneliness. For example, one survey of people without COVID-19 in the United States found a high prevalence of anxiety (25.5%), depressive (24.3%), and trauma and stressor related (26.3%) disorders, with 13.3% who started or increased substance use to cope, and 10.7% who seriously contemplated suicide in the last 30 days.¹⁵⁷ A survey in Australia found worse exercise (47.1%), mental wellbeing (41%), weight gain (38.9%), screen time (40-50%), and life satisfaction (down by an average of 13.9%) during the pandemic.¹⁵⁸ In Canada, 57% of children 15-17 years old reported their mental health was "somewhat worse" or "much worse" than it was prior to physical distancing measures during the pandemic.¹³⁷ Although there will likely be many 'long-haulers', the incidence, severity, and duration of long-term symptoms would need to be very high to change the cost-benefit balance. Given that at a generous minimum the cost-benefit balance is at least 5X against lockdowns, the sequelae of COVID-19 would need to cost well over 200 million QALY worldwide, and likely >10X that number, to make the cost-benefit analysis in need of reconsideration.

Objection: Low-income countries are particularly susceptible and need protection

The Imperial College COVID-19 Response Team modeled the effect on low-income countries.¹⁵⁹ These countries were hypothesized to be more susceptible to COVID-19 deaths, even with markedly lower population over age 65 years (about 3%), due to several factors: larger size of households [i.e., more homogeneous contact patterns], far fewer hospital and ICU beds, lower quality of health care, and unique co-morbidities [e.g., HIV in >1%, tuberculosis in >25%, and malnutrition in >30% of the population].¹⁵⁹ For suppression to have benefit, it was estimated to need to be in force 77% of the time [compared to 66% in high-income countries] over the 18 months of modeling [and "well beyond the time window of our simulations"].¹⁵⁹ However, modeling inputs were overestimated, with >90% of the population infected, and baseline IFR at in high-income countries 1.03%. Moreover, low-income countries are more vulnerable to lockdown adverse effects for several reasons: lower ability to work from home, more household based transmission (when confined to home), economic vulnerability [a higher degree of informal labor markets, and marginal capacity to provide support for ensuring livelihoods], slower build-up of herd immunity [given limited health care capacity], little testing capacity, wider health risks from diverting all attention to a single disease, and future health system failure once suppression measures are lifted (also see Table 1).^{159,160} The effects of a recession on government spending is magnified when this spending was already insufficient to improve the social determinants of health. Of interest, serosurveys in Africa indicate a very low IFR; for example, in Kenyan blood donors 5% were seropositive yet the country reported only 100 deaths, in Bantyre, Malawi, a serosurvey found 12.3% of healthcare workers were seropositive yet only 17 deaths were reported, and in two cities in Mozambique seropositivity was 3% and 10% yet only 16 deaths were reported.¹⁶¹ It is extremely likely the cost-benefit analysis is even more against lockdown in low-income countries for these reasons.

V. What to do now: change the trolley track

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Other calls for a change in response priorities

Several other groups and individuals have made calls for a change in COVID-19 response priorities (Table 8).¹⁶²⁻¹⁶⁹ In an open letter on July 6, 2020, to the Prime Minister and Premiers of Canada signed by many former deputy ministers of health, chief public health officers, and medical deans, the authors called for “A Balanced Response.”¹⁶² They write that the current approach “carries significant risks to overall population health and threatens to increase inequalities... Aiming to prevent or contain every case of COVID-19 is simply no longer sustainable...”¹⁶² In an open letter to the National Cabinet in Australia signed by many economists and medical experts with the Australian Institute for Progress, the authors make similar points.¹⁶³ They write that “to analyze the COVID-19 effect it is necessary to understand it as shortening life. But the lockdowns and the panic have also had a cost in shortening life for others.”¹⁶³ Ioannidis called for evidence to guide policy, noting many of the collateral and recession effects discussed above.¹⁶⁴⁻¹⁶⁷ “Shutdowns are an extreme measure. We know very well that they cause tremendous harm.”¹⁶⁵ A resignation letter by an economist in the Australian Treasury wrote that “the pandemic policies being pursued in Australia... are having hugely adverse economic, social and health effects... The need for good policy process does not disappear just because we face a public health crisis...”¹⁶⁸ The “Great Barrington Declaration” written on October 4, 2020, by infectious disease epidemiologists and public health scientists recommends “Focused Protection.”¹⁶⁹ The declaration writes that “current lockdown policies are producing devastating effects on short and long-term public health... leading to greater excess mortality in years to come...”¹⁶⁹

Some suggestions: What can we do?

1. Focus on protecting those at high risk: a risk-tailored, population-specific response.¹⁷⁰ This starts with better public understanding of the risks and trade-offs involved.¹⁴³ Protection should focus on high-risk groups: those hospitalized [e.g., prevent nosocomial infection],¹⁶⁵ in nursing homes [e.g., staff work in only one facility, adequate personal protective equipment supply, more staff, equitable pay],¹⁷¹ prisons, homeless shelters, and certain demographics [e.g., age ≥ 70 years, those with multiple severe co-morbidities].¹⁷⁰ There should be investment in improving the social determinants of health [e.g., “invest in strategies that address health inequities and better serve the elderly, people experiencing homelessness, and those living with limited means”].^{124,170,172} Don’t lock everyone down, regardless of their individual risk, as this will cause more harm than benefit.¹⁶⁵

2. Open schools for children:^{66,173} children have very low morbidity and mortality from COVID-19,¹⁷⁴ and, especially those ≤ 10 years old, are less likely to be infected by SARS-CoV-2^{44,175} and have a low likelihood to be the source of transmission of SARS-CoV-2.^{138,176} Children account for 1.9% of confirmed cases worldwide.¹⁷⁴ School closures don’t seem to have an impact on community outbreaks.¹³⁸ We need to educate parents and teachers regarding their low risk, and focus teachers with greater vulnerability due to age or multiple co-morbidity on remote learning. Until schools open, education is lacking especially for those with the fewest opportunities, worsening social disparities that education systems are intended to level. Similarly, allow visitation in children’s hospitals and pediatric long-term care facilities, where the risk even with co-morbidities is so low as to not warrant the tragedy of sacrificing our most vulnerable in the false hope of protecting them.^{33,36,37,138}

3. Build back better: maybe we have learned that the “government can intervene decisively once the scale of an emergency is [or seems] clear and public support is present.”¹⁷⁷ Maybe we can “recalibrate our sense of omnipotence,” seeing the ability of ‘natural’ forces to shock the global economy.¹⁷¹ Maybe we can tip “energy and industrial systems towards newer, cleaner, and ultimately cheaper modes of

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production that become impossible to outcompete.”¹⁷⁷ This would involve investment in clean technologies [e.g., renewable energy, green construction, natural capital, carbon capture and storage technologies], and conditional [on measurable transition] bailouts. This is because climate change, like the COVID-19 response, will involve market failures, externalities, international cooperation, and political leadership: the devastation is just in slow motion and far graver.

VI. Conclusion

“The destruction of lives and livelihoods in the name of survival will haunt us for decades.”¹⁰ The decisions we made entailed “trade-offs that cannot be wished away.”¹⁰ The most affected by the pandemic response are “the poor, the marginalized, and the vulnerable,” while we in high-income countries have shifted “negative effects... to places where they are less visible and presumably less serious.”¹⁰ We must open up society to save many more lives than we can by attempting to avoid every case (or even most cases) of COVID-19. It is past time to take an effortful pause, calibrate our response to the true risk, make rational cost-benefit analyses of the trade-offs, and end the lockdown groupthink.

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Declarations**Ethics approval and consent to participate:** Not applicable**Consent for publication:** Not applicable**Availability of data and materials:** All data generated or analysed during this study are included in this published article (and its supplementary information file).**Competing interests:** The author declares that he has no competing interests.**Funding:** none**Author's contributions:** ARJ wrote the manuscript, and approved the final version.**Acknowledgements:** Not applicable**Figure Titles and Legends****Figure 1a.** The Trolley Dilemma using numbers compatible with the Corona Dilemma.

Legend: Modified with permission from Frijters P, reference 111.

Figure 1b. The Corona Dilemma choices explicitly explained.

Legend: Modified with permission from Frijters P, reference 111.

Figure 2. Explanation of how acute GDP loss of 6-7% will accumulate over the decade to a loss of at least US\$50 trillion.Legend: Reproduced with permission from Frijters P [Personal Communication]. **Additional Files****Additional file 1.pdf****Title: ETables**

ETable 1. Total and COVID-19 deaths in the USA, as of August 22, 2020

ETable 2. COVID-19 deaths in Canada as of August 30, 2020 compared to deaths in 2018.

ETable 3. Studies suggesting that the efficacy of nonpharmaceutical interventions to prevent spread of COVID-19 are not as high as some predicted.

ETable 4. Cost-benefit analysis in WELLBYs for Canada's response to COVID-19.

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References

1. Kumar A, Qureshi S, Reynolds S, Light RB, Sligl W, Bates A, et al. Opinion: All levels of government must take decision, co-ordinated action now – before it's too late: a group of physicians trained in both infectious diseases and critical care medicine discuss what Canadian governments must do to prevent this country from finding itself in a similar situation to what Italy and Spain are experiencing. The National Post March 17, 2020. <https://nationalpost.com/opinion/opinion-all-levels-of-government-must-take-decisive-co-ordinated-action-now-before-its-too-late>. Accessed 11 October 2020.
2. Kissler SM, Tedijanto C, Goldstein E, Grad YH, Lipsitch M. Projecting the transmission dynamics of SARS-CoV-2 through the postpandemic period. Science 2020;368:860-868.
3. Kissler SM, Tedijanto C, Goldstein E, Grad YH, Lipsitch M. Projecting the transmission dynamics of SARS-CoV-2 through the post-pandemic period. doi: <https://doi.org/10.1101/2020.03.04.20031112>. medRxiv preprint March 6, 2020. <https://www.medrxiv.org/content/10.1101/2020.03.04.20031112v1>. Accessed 11 October 2020.
4. Kissler SM, Tedijanto C, Lipsitch M, Grad Y. Social distancing strategies for curbing the COVID-19 epidemic. Doi: <https://doi.org/10.1101/2020.03.22.20041079> medRxiv preprint March 24, 2020. <https://www.medrxiv.org/content/10.1101/2020.03.22.20041079v1>. Accessed 11 October 2020.
5. Ferguson NM, Laydon D, Nedjati-Gilani G, Imai N, Ainslie K, Baguelin M, et al., on behalf of the Imperial College COVID-19 Response Team. Report 9: Impact of non-pharmaceutical interventions (NPIs) to reduce COVID-19 mortality and healthcare demand. 16 March 2020. <https://www.imperial.ac.uk/mrc-global-infectious-disease-analysis/covid-19/report-9-impact-of-npis-on-covid-19/>. Accessed 11 October 2020
6. Walker PGT, Whittaker C, Watson O, Baguelin M, Ainslie KEC, Bhatia S, et al., on behalf of the Imperial College COVID-19 Response Team. Report 12: The global impact of COVID-19 and strategies for mitigation and suppression. 26 March 2020. <https://www.imperial.ac.uk/media/imperial-college/medicine/sph/ide/gida-fellowships/Imperial-College-COVID19-Global-Impact-26-03-2020v2.pdf>. Accessed 11 October 2020.
7. Flaxman S, Mishra S, Gandy A, Unwin HJT, Mellan TA, Coupland H, et al. Estimating the effects of non-pharmaceutical interventions on COVID-19 in Europe. Nature 2020;584:257-261.
8. Hsiang S, Allen D, Annan-Phan S, Bell K, Bolliger I, Chong T, et al. The effect of large-scale anti-contagion policies on the COVID-19 pandemic. Nature 2020;584:262-267.
9. Frijters P. What kind of crowd are we now seeing? The 5 surprises in this pandemic. Club Troppo June 17, 2020. <https://clubtroppo.com.au/2020/06/17/what-kind-of-crowd-are-we-now-seeing-the-5-surprises-in-this-pandemic/>. Accessed 11 October 2020.
10. Caduff C. What went wrong: Corona and the world after the full stop. Medical Anthropology Quarterly 2020; doi: 10.1111/maq.12599 <https://anthrosource.onlinelibrary.wiley.com/doi/epdf/10.1111/maq.12599>. Accessed 11 October 2020.
11. Sebhatu A, Wennberg K, Arora-Jonsson S, Lindberg SI. Explaining the homogeneous diffusion of COVID-19 nonpharmaceutical interventions across heterogeneous countries. PNAS 2020;117(35):21201-21208.
12. Foster G, in: Irvine J. Are the costs of lockdown worth the pain? Economists weigh in, The Sydney Morning Herald August 8 2020 <https://www.smh.com.au/business/the-economy/are-the-costs-of-lockdown-worth-the-pain-economists-weigh-in-20200807-p55jpk.html>. Accessed 11 October 2020.
13. World Health Organization. Non-pharmaceutical public health measures for mitigating the risk and impact of epidemic and pandemic influenza. 2019. Licence: CC BY-NC-SA 2.0IGO. <https://apps.who.int/iris/bitstream/handle/10665/329438/9789241516839-eng.pdf?ua=1>. Accessed 11 October 2020.
14. Halpern SD, Truog RD, Miller FG. Cognitive bias and public health policy during the COVID-19 pandemic. JAMA 2020;324:337-338.

Rethinking the Lockdown Groupthink

15. Halpern SD, Miller FG. The urge to build more intensive care unit beds and ventilators: intuitive but errant. *Ann Internal Med* 2020;173L302-303.
16. Singer P, Plant M. When will the pandemic cure be worse than the disease? Project Syndicate April 6, 2020 <https://www.project-syndicate.org/commentary/when-will-lockdowns-be-worse-than-covid19-by-peter-singer-and-michael-plant-2020-04?barrier=accesspaylog>. Accessed 11 October 2020.
17. Restrepo D, Armstrong KA, Metlay JP. Annals clinical decision making: avoiding cognitive errors in clinical decision making. *Ann Internal Med* 2020;172(11):747-751.
18. Ioannidis JPA. The infection fatality rate of COVID-19 inferred from seroprevalence data. medRxiv preprint July 14, 2020. [https://www.medrxiv.org/content/10.1101/2020.05.13.20101253#:~:text=Seroprevalence%20estimates%20ranged%20from%200.222,0.27%25%20\(corrected%200.24%25\)](https://www.medrxiv.org/content/10.1101/2020.05.13.20101253v3#:~:text=Seroprevalence%20estimates%20ranged%20from%200.222,0.27%25%20(corrected%200.24%25)). Accessed 11 October 2020.
19. Claus P. Up to 300 million people may be infected by Covid-19, Stanford Guru John Ioannidis says. *Greek USA Reporter* June 27, 2020. <https://usa.greekreporter.com/2020/06/27/up-to-300-million-people-may-be-infected-by-covid-19-stanford-guru-john-ioannidis-says/>. Accessed 11 October 2020.
20. Long QX, Tang XJ, Shi QL, Li Q, Deng HJ, Yuan J, et al. Clinical and immunological assessment of asymptomatic SARS-CoV-2 infections. *Nature Medicine* 2020;26(8):1200-1204.
21. Ibarrondo FJ, Fulcher JA, Goodman-Meza D, Elliott J, Hofmann C, Hausner MA, et al. Rapid decay of anti-SARS-CoV-2 antibodies in persons with mild Covid-19. *NEJM* 2020;383:1085-1087.
22. Seow J, Graham C, Merrick B, Acors S, Steel KJA, Hemmings O, et al. Longitudinal evaluation and decline in antibody responses in SARS-CoV-2 infection. medRxiv preprint July 11, 2020. <https://www.medrxiv.org/content/10.1101/2020.07.09.20148429v1>. Accessed 11 October 2020.
23. Bastos ML, Tavaziva G, Abidi SK, Campbell JR, Haraoui LP, Johnston JC, et al. Diagnostic accuracy of serological tests for covid-19: systematic review and meta-analysis. *BMJ* 2020;370:m2516.
24. Robbiani DF, Gaebler C, Muecksch F, Lorenzi JCC, Wang Z, Cho A, et al. Convergent antibody responses to SARS-CoV-2 in convalescent individuals. *Nature* 2020;584:437-442.
25. Burgess S, Ponsford MJ, Gill D. Are we underestimating seroprevalence of SARS-CoV-2? Current antibody tests fail to identify people who had mild infections. *BMJ* 2020;370:m3364.
26. Prevost J, Gasser R, Beaudoin-Bussieres G, Richard J, Duerr R, Laumaea A, et al. Cross-sectional evaluation of humoral responses against SARS-CoV-2 Spike. *Cell Reports Medicine* 2020; doi: <https://doi.org/10.1016/j.xcrm.2020.100126>.
27. Faustini SE, Jossi SE, Perez-Toledo M, et al. Detection of antibodies to the SARS-CoV-2 spike glycoprotein in both serum and saliva enhances detection of infection. medRxiv preprint June 18, 2020. DOI: <https://doi.org/10.1101/2020.06.16.20133025>. <https://www.medrxiv.org/content/10.1101/2020.06.16.20133025v1>. Accessed 11 October 2020.
28. Cervia C, Nilsson J, Zurbuchen Y, Valaperti A, Schreiner J, Wolfensberger A, et al. Systemic and mucosal antibody secretion specific to SARS-CoV-2 during mild versus severe COVID-19. bioRxiv preprint May 23, 2020. <https://www.biorxiv.org/content/10.1101/2020.05.21.108308v1>. Accessed 11 October 2020.
29. Gallais F, Velay A, Wendling MJ, Nazon C, Partisani M, Sibilia J, et al. Intrafamilial exposure to SARS-CoV-2 induces cellular immune response without seroconversion. medRxiv preprint June 22, 2020. <https://www.medrxiv.org/content/10.1101/2020.06.21.20132449v1>. Accessed 11 October 2020.
30. Sekine T, Perez-Potti A, Rivera-Ballesteros O, Stralin K, Gorin JP, Olsson A, et al., for the Karolinska COVID-19 Study Group. Robust T cell immunity in convalescent individuals with asymptomatic or mild COVID-19. *Cell* 2020;183(1):158-168.e14.
31. Perez-Saez J, Lauer SA, Kaiser L, Regard S, Delaporte E, Guessous I, et al. Serology-informed estimates of SARS-CoV-2 infection fatality risk in Geneva, Switzerland. *Lancet Infect Dis* 2020; Online July 14, 2020. DOI: [https://doi.org/10.1016/S1473-3099\(20\)30584-3](https://doi.org/10.1016/S1473-3099(20)30584-3)

Rethinking the Lockdown Groupthink

32. Salje H, Kiem CT, Lefrancq N, Courtejoie N, Bosetti P, Paireau J, et al. Estimating the burden of SARS-CoV-2 in France. *Science* 2020;369:208-211.
33. Ioannidis JPA, Axfors C, Contopoulos-Ioannidis DG. Population-level COVID-19 mortality risk for non-elderly individuals overall and for non-elderly individuals without underlying disease in pandemic epicenters. *Environmental Research* 2020;188:109890.
34. Coletta A. Canada's nursing home crisis: 81 percent of coronavirus deaths are in long-term care facilities. *The Washington Post* May 18, 2020. https://www.washingtonpost.com/world/the_americas/coronavirus-canada-long-term-care-nursing-homes/2020/05/18/01494ad4-947f-11ea-87a3-22d324235636_story.html. Accessed 11 October 2020.
35. Vossius C, Selbaek G, Benth JS, Bergh S. Mortality in nursing home residents: a longitudinal study over three years. *PLoS One* 2018;13(9):e0203489.
36. Williamson EJ, Walker AJ, Bhaskaran K, Bacon S, Bates C, Morton CE, et al. Factors associated with COVID-19-related death using OpenSAFELY. *Nature* 2020;584:430-436.
37. Erdman R, NcRae A, MacKay E, Hicks A, Norris C, Saini V, et al. COVID-19 Scientific Advisory Group Rapid Evidence Report. Topic: What risk factors (such as age, medical conditions, or lifestyle factors) are associated with the development of severe outcomes in COVID-19? Alberta Health Services, COVID-19 Scientific Advisory Group. <https://www.albertahealthservices.ca/assets/info/ppih/if-ppih-covid-19-sag-risk-factors-for-severe-covid-19-outcomes-rapid-review.pdf>. Accessed 11 October 2020.
38. Singer P. Is age discrimination acceptable? Project Syndicate June 10, 2020 <https://www.project-syndicate.org/commentary/when-is-age-discrimination-acceptable-by-peter-singer-2020-06?barrier=accesspaylog>. Accessed 11 October 2020.
39. Singer P, Winkett L The duel: is it more important to save younger lives. *Prospect* May 4, 2020. <https://www.prospectmagazine.co.uk/magazine/the-duel-is-it-more-important-to-save-younger-lives-peter-singer-debate-coronavirus-medicine-ethics-philosophy>. Accessed 11 October 2020.
40. Huang K, Bernhard R, Barak-Corren N, Bazerman M, Greene JD. Veil-of-Ignorance reasoning favors allocating resources to younger patients during the COVID-19 crisis. *PsyArXiv preprint* May 27, 2020. [file:///C:/Users/My-PC/Downloads/VOI-COVID-19-Manuscript-0520%20\(1\).pdf](file:///C:/Users/My-PC/Downloads/VOI-COVID-19-Manuscript-0520%20(1).pdf). Accessed 11 October 2020.
41. Britton T, Ball F, Trapman P. A mathematical model reveals the influence of population heterogeneity on herd immunity to SARS-CoV-2. *Science* 2020;369(6505):846-849.
42. Gomes MGM, Corder RM, King JG, Langwig KE, Souto-Maior C, Carneiro J, et al. Individual variation in susceptibility or exposure to SARS-CoV-2 lowers the herd immunity threshold. *medRxiv preprint* May 21, 2020. Doi: <https://doi.org/10.1101/2020.04.27.20081893>. <https://www.medrxiv.org/content/10.1101/2020.04.27.20081893v3>. Accessed 11 October 2020.
43. Aguas R, Corder RM, King JG, Goncalves G, Ferreira MU, Gomes MGM. Herd immunity thresholds for SARS-CoV-2 estimated from unfolding epidemics. *medRxiv preprint* August 31, 2020. <https://www.medrxiv.org/content/10.1101/2020.07.23.20160762v2.full.pdf>. Accessed 11 October 2020.
44. Meyerowitz EA, Richterman A, Gandhi RT, Sax PE. Transmission of SARS-CoV-2: a review of viral, host, and environmental factors. *Ann Internal Med* 2020; <https://doi.org/10.7326/M20-5008>.
45. Adam D. The limits of R. *Nature* 2020;583:346-348.
46. Althouse BM, Wenger EA, Miller JC, Scarpino SV, Allard A, Hebert-Dufresne L, Hu H. Stochasticity and heterogeneity in the transmission dynamics of SARS-CoV-2. *arXiv.org preprint* May 27, 2020. <https://arxiv.org/abs/2005.13689>. Accessed 10 October 2020.
47. Worldometer Oct 02, 2020. <https://www.worldometers.info/coronavirus/country/sweden/>. Accessed 2 October 2020.
48. 14% of coronavirus antibody tests positive in Sweden in July. *The Local*. July 23, 2020. <https://www.thelocal.se/20200723/14-of-antibody-tests-positive-in-sweden>. Accessed 11 October 2020.

Rethinking the Lockdown Groupthink

49. Baldwin R, di Mauro BW. Introduction. In: Baldwin R, DiMauro BW, editors. Economics in the Time of COVID-19. A CEPR (Center for Economic Policy Research) Press VoxEU.org eBook; 2020. p. 1-31. <https://cepr.org/sites/default/files/news/COVID-19.pdf>. Accessed 11 October 2020.
50. Foster G. Material that further addresses themes of questions at Professor Gigi Foster's PAEC testimony on Covid-19, August 12, 2020. [https://parliament.vic.gov.au/images/stories/committees/paec/COVID-19 Inquiry/Tabled Documents Round 2/PAEC Foster othermatters.pdf](https://parliament.vic.gov.au/images/stories/committees/paec/COVID-19%20Inquiry/Tabled%20Documents%20Round%202/PAEC%20Foster%20othermatters.pdf). Based on: https://ec.europa.eu/info/business-economy-euro/economic-performance-and-forecasts/economic-performance-country_en. Accessed 11 October 2020.
51. Allen D, Block S, Cohen J, Eckersley P, Eifler M, Gostin L, et al., for the Edmond J. Safra Center for Ethics at Harvard University. Roadmap to pandemic resilience: massive scale testing, tracing, and supported isolation (TTSI) as the Path to Pandemic Resilience for a Free Society. 2020, April 20. https://ethics.harvard.edu/files/center-for-ethics/files/roadmaptopandemicresilience_updated_4.20.20_1.pdf. Accessed 11 October 2020.
52. Ferretti L, Wymant C, Kendall M, Zhao L, Nurtay A, Abeler-Dorner L, et al. Quantifying SARS-CoV-2 transmission suggests epidemic control with digital contact tracing. *Science* 2020;368(6491):eabb6939.
53. Peak CM, Kahn R, Grad Y, Childs LM, Li R, Lipsitch M, Buckee CO. Individual quarantine versus active monitoring of contacts for the mitigation of COVID-19: a modelling study. *Lancet Infect Dis* 2020;20:1025-1033.
54. Moghadas SM, Fitzpatrick MC, Sah P, Pandey A, Shoukat A, Singer BH, Galvani AP. The implications of silent transmission for the control of COVID-19 outbreaks. *PNAS* 2020;117(30):17513-17515.
55. Arvin AM, Fink K, Schmid MA, Cathcart A, Spreafico R, Havenar-Daughton C, et al. A perspective on potential antibody-dependent enhancement of SARS-CoV-2. *Nature* 2020;584:353-364.
56. Saad-Roy CM, Wagner CE, Baker RE, Morris SE, Farrar J, Graham AL, et al. Immune life history, vaccination, and the dynamics of SARS-CoV-2 over the next 5 years. *Science* 2020; doi: 10.1126/science.abd7343
57. Grubeck-Loebenstien B, Bella SD, Iorio AM, Michel JP, Pawelec G, Solana R. Immunosenescence and vaccine failure in the elderly. *Aging Clin Exp Res* 2009;21(3):201-209.
58. Callaway E. The unequal scramble for Coronavirus vaccines. *Nature* 2020;584:506-507.
59. Time to revise the Sustainable Development Goals. *Nature* 2020;583:331-332.
60. Naidoo R, Fisher B. Reset Sustainable Development Goals for a pandemic world. *Nature* 2020;583:198-201.
61. The United Nations. The Sustainable Development Goals Report 2020. <https://unstats.un.org/sdgs/report/2020/The-Sustainable-Development-Goals-Report-2020.pdf>. Accessed 11 October 2020.
62. Hoffman J, Maclean R. Slowing the Coronavirus is speeding the spread of other diseases. *The New York Times* June 14, 2020. <https://www.nytimes.com/2020/06/14/health/coronavirus-vaccines-measles.html>. Accessed 11 October 2020.
63. FAO, IFAD, UNICEF, WFP and WHO. The state of food security and nutrition in the world 2020. Transforming food systems for affordable health diets. Rome, FAO. 2020. <http://www.fao.org/3/ca9692en/CA9692EN.pdf>. Accessed 11 October 2020.
64. Laborde D, Martin W, Swinnen J, Vos R. COVID-19 risks to global food security. *Science* 2020;369(6503):500-502.
65. Chanchlani N, Buchanan F, Gill PJ. Addressing the indirect effects of COVID-19 on the health of children and young people. *CMAJ* 2020;192(32):e921-e927.
66. Silverman M, Sibbald R, Stranges S. Ethics of COVID-19-related school closures. *Can J Public Health* 2020;111(4):462-465.

Rethinking the Lockdown Groupthink

67. Robertson T, Carter ED, Chou VB, Stegmuller AR, Jackson BD, Tam Y, et al. Early estimates of the indirect effects of the COVID-19 pandemic on maternal and child mortality in low-income and middle-income countries: a modelling study. *Lancet Glob Health* 2020;8(7):e901-e908.
68. Sherrard-Smith E, Hogan AB, Hamlet A, Watson O, Whittaker C, Winskill P, et al., for the Imperial College COVID-19 Response Team. Report 18: The potential public health impact of COVID-19 on malaria in Africa. May 1, 2020 <https://www.imperial.ac.uk/mrc-global-infectious-disease-analysis/covid-19/report-18-malaria/>. Accessed 11 October 2020.
69. World Health Organization. The potential impact of health service disruptions on the burden of malaria: a modelling analysis for countries in sub-Saharan Africa. Geneva: World Health Organization; 2020. Licence: CC BY-NC-SA 2.0 IGO. [file:///C:/Users/My-PC/Downloads/9789240004641-eng%20\(1\).pdf](file:///C:/Users/My-PC/Downloads/9789240004641-eng%20(1).pdf). Accessed 11 October 2020.
70. Stop TB Partnership. The potential impact of the COVID-19 response on Tuberculosis in high-burden countries: a modelling analysis. 2020. http://www.stoptb.org/assets/documents/news/Modeling%20Report_1%20May%202020_FINAL.pdf. Accessed 11 October 2020.
71. Jewell BL, Mudimu E, Stover J, ten Brink D, Phillips AN, Smith JA, et al., for the HIV Modelling Consortium. Potential effects of disruption to HIV programmes in sub-Saharan Africa caused by COVID-19: results from multiple mathematical models. *Lancet HIV* 2020;7:e629-e640.
72. Karim QA, Karim SSA. COVID-19 affects HIV and tuberculosis care. *Science* 2020;369(6502):366-368.
73. GBD 2017 Child and Adolescent Health Collaborators. Disease, Injuries, and Risk Factors in child and adolescent health, 1990 to 2017: findings from the Global Burden of Diseases, Injuries, and Risk Factors 2017 study. *JAMA Pediatrics* 2019;173(6):e190337.
74. Rosenbaum L. The untold toll – the pandemic’s effects on patients without Covid-19. *NEJM* 2020;382:2368-2371.
75. Solomon MD, McNulty EJ, Rana S, Leong TK, Lee C, Sung SH, et al. The COVID-19 pandemic and the incidence of acute myocardial infarction. *NEJM* 2020;383:691-693.
76. Sud A, Jones ME, Broggio J, Loveday C, Torr B, Garrett A, et al. Collateral damage: the impact on outcomes from cancer surgery of the COVID-19 pandemic. *Annals Oncology* 2020;31(8):P1065-1074.
77. Kaufman HW, Chen Z, Niles J, Fesko Y. Changes in the numbers of US patients with newly identified cancer before and during the Coronavirus Disease 2019 (COVID-19) pandemic. *JAMA Netw Open* 2020;3(8):e2017267.
78. Urbach DR, Martin D. Confronting the COVID-19 surgery crisis: time for transformational change. *CMAJ* 2020;192(21):E585-E586.
79. Zyznian JZ. Tallying the toll of excess deaths from COVID-19. *JAMA Health Forum* 2020;1(7):e200832.
80. UNFPA. Impact of the COVID-19 pandemic on family planning and ending gender-based violence, female genital mutilation and child marriage. Interim Technical Note 27 April 2020. https://www.unfpa.org/sites/default/files/resource-pdf/COVID-19_impact_brief_for_UNFPA_24_April_2020_1.pdf. Accessed 11 October 2020.
81. Roesch E, Amin A, Gupta J, Garcia-Moreno C. Violence against women during covid-19 pandemic restrictions. *BMJ* 2020;369:m1712.
82. Petterson S, Westfall JM, Miller BF. Projected deaths of despair during the Coronavirus recession. Well Being Trust May 8, 2020. WellbeingTrust.org. https://wellbeingtrust.org/wp-content/uploads/2020/05/WBT_Deaths-of-Despair_COVID-19-FINAL-FINAL.pdf. Accessed 11 October 2020.
83. Stanley M. Why the increase in domestic violence during COVID-19? *Psychology Today* May 9, 2020. <https://www.psychologytoday.com/ca/blog/making-sense-chaos/202005/why-the-increase-in-domestic-violence-during-covid-19>. Accessed 11 October 2020.

Rethinking the Lockdown Groupthink

84. Bradley NL, DiPasquale AM, Dillabough K, Schneider PS. Health care practitioners' responsibility to address intimate partner violence related to the COVID-19 pandemic. *CMAJ* 2020;192(22):E609-E610.
85. Moser DA, Glaus J, Frangou S, Schechter DS. Years of life lost due to the psychosocial consequences of COVID-19 mitigation strategies based on Swiss data. *Eur Psychiatry* 2020;63(1):e58.
86. Meredith JW, High KP, Freischlag JA. Preserving elective surgeries in the COVID-19 pandemic and the future. *JAMA* 2020; doi:10.1001/jama.2020.19594.
87. Docherty K, Butt J, de Boer R, Dewan P, Koeber L, Maggioni A, et al. Excess deaths during the Covid-19 pandemic: an international comparison. medRxiv preprint May 13, 2020. DOI: <https://doi.org/10.1101/2020.04.21.20073114>.
<https://www.medrxiv.org/content/10.1101/2020.04.21.20073114v3>. Accessed 11 October 2020.
88. Postill G, Murray R, Wilton A, Wells RA, Sirbu R, Daley MJ, Rosella LC. An analysis of mortality in Ontario using cremation data: rise in cremations during the COVID-19 pandemic. medRxiv preprint August 28, 2020. DOI: <https://doi.org/10.1101/2020.07.22.20159913>.
<https://www.medrxiv.org/content/10.1101/2020.07.22.20159913v3>. Accessed 11 October 2020.
89. Devlin H. Extra 10,000 dementia deaths in England and Wales in April. *The Guardian* June 5, 2020. <https://www.theguardian.com/world/2020/jun/05/covid-19-causing-10000-dementia-deaths-beyond-infections-research-says>. Accessed 11 October 2020.
90. Centers for Disease Control and Prevention. Weekly updates by select demographics and geographical characteristics: provisional death counts for Coronavirus Disease 2019 (COVID-19). https://www.cdc.gov/nchs/nvss/vsrr/covid_weekly/index.htm. Accessed 10 October 2020.
91. Statistics Canada. Deaths and mortality rates, by age group. <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1310071001>. Accessed 10 October 2020.
92. Government of Canada. Coronavirus disease 2019 (COVID-19): epidemiology update. <https://health-infobase.canada.ca/covid-19/epidemiological-summary-covid-19-cases.html>. Accessed 10 October 2020.
93. Spiegelhalter D. Use of "normal" risk to improve understanding of dangers of covid-19. *BMJ* 2020;370:m3259.
94. United Nations, Department of Economic and Social Affairs, Population Division. World Mortality 2019: Data Booklet (ST/ESA/SER.A/436). <https://www.un.org/en/development/desa/population/publications/pdf/mortality/WMR2019/WorldMortality2019DataBooklet.pdf>. Accessed 10 October 2020.
95. World Health Organization. Coronavirus disease (COVID-19) weekly epidemiological update and weekly operational update: situation reports. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports>. Accessed 11 October 2020.
96. You D, Hug L, Ejdemyr S, Idele P, Hogan D, Mathers C, et al. Global, regional, and national levels and trends in under-5 mortality between 1990 and 2015, with scenario-based projections to 2030: a systematic analysis by the UN Inter-agency Group for Child Mortality Estimation. *Lancet* 2015;386(10010):2275-2286.
97. Burstein R, Henry NJ, Collison ML, Marczak LB, Sligar A, Watson S, et al. Mapping 123 million neonatal, infant and child deaths between 2000 and 2017. *Nature* 2019;574:353-358.
98. Centers for Disease Control and Prevention, National Center for Injury Prevention and Control. Road traffic injuries and deaths – a global problem. Dec 18, 2019. <https://www.cdc.gov/injury/features/global-road-safety/index.html#:~:text=Each%20year%2C%201.35%20million%20people,on%20roadways%20around%20the%20world.&text=Every%20day%2C%20almost%203%2C700%20people,pedestrians%2C%20motorcyclists%2C%20and%20cyclists>. Accessed 11 October 2020.
99. World Health Organization. Tobacco. 27 May 2020. <https://www.who.int/news-room/fact-sheets/detail/tobacco>. Accessed 11 October 2020.

Rethinking the Lockdown Groupthink

100. Global tuberculosis report 2019. Geneva: World Health Organization; 2019. Licence: CCBY-NC-SA3.01GO. <https://apps.who.int/iris/bitstream/handle/10665/329368/9789241565714-eng.pdf?ua=1>. Accessed 11 October 2020.
101. Centers for Disease Control and Prevention. Malaria's Impact Worldwide. Feb 25, 2020. https://www.cdc.gov/malaria/malaria_worldwide/impact.html. Accessed 11 October 2020.
102. World Health Organization. More than 140,000 die from measles as cases surge worldwide. Press Release 5 Dec 2019. <https://www.who.int/news-room/detail/05-12-2019-more-than-140-000-die-from-measles-as-cases-surge-worldwide>. Accessed 11 October 2020.
103. UNAIDS. Global HIV & AIDS statistics – 2020 fact sheet. <https://www.unaids.org/en/resources/fact-sheet>. Accessed 11 October 2020.
104. GBD 2017 Diarrhoeal Disease Collaborators. Quantifying the risks and interventions that have affected the burden of diarrhoea among children younger than 5 years: an analysis of the Global Burden of Disease Study 2017. *Lancet Infect Dis* 2020;20(1):37-59.
105. GBD 2017 Lower Respiratory Infections Collaborators. Quantifying the risks and interventions that have affected the burden of respiratory infections among children younger than 5 years: an analysis for the Global Burden of Disease Study 2017. *Lancet Infect Dis* 2020;20(1):60-79.
106. GBD 2017 Diet Collaborators. Health effects of dietary risks in 195 countries, 1990-2017: a systematic analysis for the Global Burden of Disease Study 2017. *Lancet* 2019;393(10184):1958-1972.
107. Paget J, Spreuwenberg P, Charu V, Taylor RJ, Iuliano AD, Bresee J, et al. Global mortality associated with seasonal influenza epidemics: new burden estimates and predictors from the GLaMOR Project. *J Glob Health* 2019;9(2):020421.
108. Wong JY, Kelly H, Ip DKM, Wu JT, Leung GM, Cowling BJ. Case fatality risk of influenza A (H1N1pdm09): a systematic review. *Epidemiology* 2013;24(6):830-841.
109. Wang X, Li Y, O'Brien KL, Madhi SA, Widdowson MA, Byass P, et al. Global burden of respiratory infections associated with seasonal influenza in children under 5 years in 2018: a systematic review and modelling study. *Lancet Glob Health* 2020;8(4):e497-e510.
110. Viboud C, Simonsen L, Fuentes R, Flores J, Miller MA, Chowell G. Global mortality impact of the 1957-1959 Influenza pandemic. *J Infect Dis* 2016;213:738-745.
111. Frijters P. The Corona Dilemma. Club Troppo. March 21, 2020. Available online at: <https://clubtrotto.com.au/2020/03/21/the-corona-dilemma/>. Accessed 11 October 2020.
112. Frijters P, Clark AE, Krekel C, Layard R. A happy choice: wellbeing as the goal of government. *Behavioural Public Policy* 2020;4(2):126-165.
113. Frijters P, Krekel C. Chapter 1: the case for wellbeing as the goal of government in the context of constraints on policy-making. In: *A handbook for Wellbeing Policy-Making: history, theory, measurement, implementation, and examples*. Oxford University Press, forthcoming 2020.
114. Miles D, Stedman M, Heald A. Living with Covid-19: balancing costs against benefits in the face of the virus. *National Institute Economic Review* 2020;253:R60-R76. <https://www.cambridge.org/core/journals/national-institute-economic-review/article/living-with-covid19-balancing-costs-against-benefits-in-the-face-of-the-virus/C1D46F6A3118D0360CDAB7A08E94ED22>. Accessed 11 October 2020.
115. Born B, Dietrich A, Muller GJ. The lockdown effect – a counterfactual for Sweden. Center for Economic Policy Research Discussion Papers 14744 July 2020.
116. Luskin DL. The failed experiment of Covid lockdowns: new data suggest that social distancing and reopening haven't determined the spread. *Wall Street Journal (Opinion)* September 2, 2020.
117. Atkeson A, Kopecky K, Zha T. Four stylized facts about COVID-19. National Bureau of Economic Research (NBER) Working Paper No. 27719. August 2020. <https://www.nber.org/papers/w27719.pdf>. Accessed 11 October 2020.

Rethinking the Lockdown Groupthink

118. Chaudhry R, Dranitsaris G, Mubashir T, Bartoszko J, Riazi S. A country level analysis measuring the impact of government actions, country preparedness and socioeconomic factors on COVID-19 mortality and related health outcomes. *EclinicalMedicine* 2020;25:100464.
119. Wood SN. Did COVID-19 infections decline before UK lockdown? arXiv preprint Sept 17, 2020. <https://arxiv.org/abs/2005.02090>. Accessed 11 October 2020.
120. Frijters P. On Corona/Covid-19, herd immunity, and WELLBY tradeoffs – key predictions and numbers. Club Troppo May 14, 2020. <https://clubtroppo.com.au/2020/05/14/on-corona-covid-19-herd-immunity-and-wellby-tradeoffs-key-predictions-and-numbers/>. Accessed 11 October 2020.
121. Frijters P. Has the Coronavirus panic cost us at least 10 million lives already? Club Troppo March 18, 2020. <https://clubtroppo.com.au/2020/03/18/has-the-coronavirus-panic-cost-us-at-least-10-million-lives-already/>. Accessed 11 October 2020.
122. Frijters P. COVID strategies for Australia: herd immunity or quarantine land? May 28, 2020. <https://clubtroppo.com.au/2020/05/28/covid-strategies-for-australia-herd-immunity-options-or-quarantine-land/>. Accessed 11 October 2020.
123. Johnson P. Heated Q+A discussion sees economist Gigi Foster deny she is ‘advocating for people to die’. ABC News 27 July 2020. <https://www.abc.net.au/news/2020-07-28/gigi-foster-accused-advocating-for-covid-19-deaths-q+a/12497442>. Accessed 11 October 2020.
124. Berwick DM. The moral determinants of health. *JAMA* 2020;324(3):225-226.
125. Singer P. *The Life You Can Save*. Random House Trade Paperbacks. 2010.
126. Corcoran T. The price of life: lockdown costs are real. But are the benefits? *Financial Post* May 15, 2020. <https://financialpost.com/opinion/terence-corcoran-the-price-of-life-lockdown-costs-are-real-but-are-the-benefits>. Accessed 11 October 2020.
127. Sullivan R, Chalkidou K. Urgent call for an Exit Plan: the economic and social consequences of responses to COVID-19 pandemic. Center for Global Development March 31, 2020. <https://www.cgdev.org/blog/urgent-call-exit-plan-economic-and-social-consequences-responses-covid-19-pandemic>. Accessed 11 October 2020.
128. Fernandes N. Economic effects of coronavirus outbreak (COVID-19) on the world economy. April 2020. IESE Business School Spain. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3557504. Accessed 11 October 2020.
129. Bartik AW, Bertrand M, Cullen Z, Glaeser EL, Luca M, Stanton C. The impact of COVID-19 on small business outcomes and expectations. *PNAS* 2020;117(30):17656-17666.
130. Snyder-Mackler N, Burger JR, Gaydos L, Belsky DW, Noppert GA, Campos FA, et al. Social determinants of health and survival in humans and other animals. *Science* 2020;368:eaax9553.
131. Puterman E, Weiss J, Hives BA, Gemmill A, Karasek D, Mendes WB, Rehkopf DH. Predicting mortality from 57 economic, behavioral, social, and psychological factors. *PNAS* 2020;117(28):16273-16282.
132. Bzdok D, Dunbar RIM. The neurobiology of social distance. *Trends in Cognitive Sciences* 2020;24(9):717-733.
133. Johnson SB, Riley AW, Granger DA, Riis J. The science of early life toxic stress for pediatric practice and advocacy. *Pediatrics* 2013;131:319-327.
134. Garner AS, Shonkoff JP, Committee on Psychosocial Aspects of Child and Family Health, Committee on Early Childhood, Adoption, and Dependent Care, Section on Developmental and Behavioral Pediatrics. Early childhood adversity, toxic stress, and the role of the pediatrician translating developmental science into lifelong health. *Pediatrics* 2012;129:e224-e231.
135. Campbell F, Conti G, Heckman JJ, Moon SH, Pinto R, Pungello E, Pan Y. Early childhood investments substantially boost adult health. *Science* 2014;343:1478-1485.
136. Walhovd KB, Krogsrud SK, Amlien IK, Bartsch H, Bjornerud A, Due-Tonnessen P, et al. Neurodevelopment origins of lifespan changes in brain and cognition. *PNAS* 2016;113:9357-9362.

Rethinking the Lockdown Groupthink

137. Raising Canada 2020. Top 10 threats to childhood in Canada and the impact of COVID-19. Children First Canada, O'Brien Institute for Public Health, Alberta Children's Hospital Research Institute. <https://static1.squarespace.com/static/5669d2da9c9adb69fb2f8d32e/t/5f51503d5ceab254db134729/1599164484483/Raising+Canada+Report+Final+Sept.pdf>. Accessed 11 October 2020.
138. Carroll A, Hicks A, Saxinger L. COVID-19 Scientific Advisory Group Rapid Evidence Report. Topic: What role might children play in community SARS-CoV-2 transmission? What measures might mitigate potential additional risk of transmission of COVID-19 related to school and daycare reopening? Alberta Health Services, COVID-19 Scientific Advisory Group August 7, 2020. <https://www.albertahealthservices.ca/assets/info/ppih/if-ppih-covid-19-sag-role-of-children-in-community-transmission-rapid-review.pdf>. Accessed 11 October 2020.
139. The education revolution must be equalized. *Nature* 2020;585:482.
140. Frijters P, Krekel C. Chapter 5: Applying wellbeing insights to existing policy evaluations and appraisals. In: A handbook for Wellbeing Policy-Making: history, theory, measurement, implementation, and examples. Oxford University Press, forthcoming 2020.
141. Foster G. Cost-benefit analysis executive summary. Presented to Victorian Parliament in Australia. August 2020. [https://parliament.vic.gov.au/images/stories/committees/paec/COVID-19 Inquiry/Tabled Documents Round 2/CBA Covid Gigi Foster.pdf](https://parliament.vic.gov.au/images/stories/committees/paec/COVID-19%20Inquiry/Tabled%20Documents%20Round%202/CBA%20Covid%20Gigi%20Foster.pdf). Accessed 11 October 2020.
142. Heatley D. A cost benefit analysis of 5 extra days at COVID-19 alert level 4. New Zealand Productivity Commission. <https://www.productivity.govt.nz/assets/Documents/cost-benefit-analysis-covid-alert-4/92193c37f4/A-cost-benefit-analysis-of-5-extra-days-at-COVID-19-at-alert-level-4.pdf>. Accessed 10 October 2020.
143. Sandman PM, Lanard J. COVID-19: The CIDRAP (Center for Infectious Disease Research and Policy, University of Minnesota) Viewpoint. Part 2: Effective COVID-19 crisis communication. May 6, 2020. <https://www.cidrap.umn.edu/sites/default/files/public/downloads/cidrap-covid19-viewpoint-part2.pdf>. Accessed 10 October 2020.
144. Deb P, Furceri D, Ostry JD, Tawk N. The economic effects of Covid-19 containment measures. *COVID Economics*, CEPR 2020;24:32-75. <https://cepr.org/sites/default/files/news/CovidEconomics24.pdf#Paper2>. Accessed 10 October 2020.
145. Bonadio B, Huo Z, Levchenko AA, Pandalai-Nayar N. Global Supply Chains in the Pandemic. NBER Working Paper 27224, May 2020. National Bureau of Economic Research Inc. <https://www.nber.org/papers/w27224.pdf>. Accessed 10 October 2020.
146. Coibion O, Gorodnichenko Y, Weber M. The cost of the COVID-19 crisis: Lockdowns, macroeconomic expectations, and consumer spending. IZA Institute of Labor Economics Discussion Paper, *COVID Economics* 2020; IZA DP No. 13224. <http://ftp.iza.org/dp13224.pdf>. Accessed 10 October 2020.
147. Bank of England May Monetary Policy Report. <https://www.bankofengland.co.uk/-/media/boe/files/monetary-policy-report/2020/may/monetary-policy-report-may-2020>. See Pages 6-7 and Table 1A. Accessed 10 October 2020.
148. Reserve Bank of Australia Projections. Statement on Monetary Policy – May 2020 6. Economic Outlook. <https://www.rba.gov.au/publications/smp/2020/may/economic-outlook.html>. Accessed 9 October 2020.
149. OECD. Evaluating the initial impact of COVID-19 containment measures on economic activity. OECD.org June 10, 2020. <https://www.oecd.org/coronavirus/policy-responses/evaluating-the-initial-impact-of-covid-19-containment-measures-on-economic-activity-b1f6b68b/>. Accessed 10 October 2020.
150. Herridge MS. Fifty Years of Research in ARDS: Long-term follow-up after Acute Respiratory Distress Syndrome. Insights for managing medical complexity after critical illness. *Am J Respir Crit Care Med* 2017;196(11):1380-1384.

Rethinking the Lockdown Groupthink

151. Girard TD, Self WH, Edwards KM, Grijalva CG, Zhu Y, Williams DJ, et al. Long-term cognitive impairment after hospitalization for community-acquired pneumonia: a prospective study. *J Gen Intern Med* 2018;33(6):929-935.
152. Halpin SJ, McIvor C, Whyatt G, Adams A, Harvey O, McLean L, et al. Postdischarge symptoms and rehabilitation needs in survivors of COVID-19 infection: a cross-sectional evaluation. *J Med Virology* 2020. DOI: 10.1002.jmv.26368
153. Garrigues E, Janvier P, Kherabi Y, Le Bot A, Hamon A, Gouze H, et al. Post-discharge persistent symptoms and health-related quality of life after hospitalization for COVID-19. *J Infection* 2020 DOI: <https://doi.org/10.1016/j.jinf.2020.08.029>
154. Carfi A, Bernabei R, Landi F. Persistent symptoms in patients after acute COVID-19. *JAMA* 2020;324:603-605.
155. Tenforde MW, Kim SS, Lindsell CJ, Rose EB, Shapiro NI, Files DC, et al. Symptom duration and risk factors for delayed return to usual health among outpatients with COVID-19 in a multistate health care systems network – United States, March – June 2020. *MMWR* 69(30):993-998.
156. Arnold DT, Hamilton FW, Milne A, Morley A, Viner J, Atwood M, et al. Patient outcomes after hospitalisation with COVID-19 and implications for follow-up: results from a prospective UK cohort. medRxiv preprint August 14, 2020. <https://www.medrxiv.org/content/10.1101/2020.08.12.20173526v1>. Accessed 10 October 2020.
157. Czeisler ME, Lane RI, Petrosky E, Wiley JF, Christensen A, Njai R, et al. Mental health, substance use, and suicidal ideation during the COVID-19 pandemic – United States, June 24-30, 2020. *MMWR* 2020;69(32):1049-1057.
158. Brindal E. A wellbeing survey of CSIRO Total Wellbeing Diet database during the COVID-19 pandemic. Commonwealth Scientific and Industrial Research Organization (CSIRO) Australia's National Science Agency 2020. [file:///C:/Users/My-PC/Downloads/COVID-Survey-Summary-of-Results-June-2020%20\(7\).pdf](file:///C:/Users/My-PC/Downloads/COVID-Survey-Summary-of-Results-June-2020%20(7).pdf). Accessed 11 October 2020.
159. Walker PGT, Whittaker C, Watson OJ, Baguelin M, Winskill P, Hamlet A, et al. The impact of COVID-19 and strategies for mitigation and suppression in low- and middle-income countries. *Science* 2020;369:413-422.
160. Sethi R, Siddarth D, Holland A, Archibong B, Annan F, Somanathan R, Cardenas JC. COVID-19 Rapid Response Impact Initiative. White Paper 11: Towards Global Pandemic Resilience. Edmond J Safra Center for Ethics April 23, 2020. <https://ethics.harvard.edu/files/center-for-ethics/files/safracenterforethicswhitepaper11d.pdf>. Accessed 10 October 2020.
161. Nordling L. Africa's pandemic puzzle: why so few cases and deaths? *Science* 2020;369(6505):756-757.
162. Bell R, Butler-Jones D, Clinton J, Closson T, Davidson J, Fulford M, et al. Dealing with COVID-19: an open letter to Canada's prime minister and provincial and territorial premiers. July 9, 2020. <https://healthydebate.ca/opinions/an-open-letter-to-pm-covid19>. Accessed 11 October 2020.
163. Newman C, McFarlane I, Frijters P, Foster G, Swan P, Zimmerman A, et al. Open up our country – sign the open letter: To The National Cabinet. <https://aip.asn.au/2020/06/open-up-our-country-sign-the-open-letter/>. Accessed 11 October 2020.
164. Melnick E, Ioannidis J. Should governments continue lockdown to slow the spread of covid-19? *BMJ* 2020;369:m1924.
165. Ioannidis J. Another shutdown would do more harm than good. *National Post* August 15, 2020. <https://nationalpost.com/opinion/john-ioannidis-another-shutdown-would-do-more-harm-than-good>. Accessed 11 October 2020.
166. Jha S. Commentary: John Ioannidis explains his COVID views. *Medscape Infectious Diseases*. July 15, 2020. <https://www.medscape.com/viewarticle/933977>. Accessed 11 October 2020.

Rethinking the Lockdown Groupthink

167. Ioannidis JPA. The totality of the evidence. Boston Review. May 26, 2020. <http://bostonreview.net/science-nature/john-p-ioannidis-totality-evidence>. Accessed 11 October 2020.
168. Sabhlok S. Why I quit rather than be silenced: Vic Treasury insider. Financial Review Sept 16, 2020. <https://www.afr.com/policy/economy/victoria-has-locked-itself-into-a-lockdown-blunder-20200916-p55w1z>. Accessed 10 October 2020.
169. Kullforff M, Gupta S, Bhattacharya J, et al. Great Barrington Declaration. October 4, 2020. <https://gbdeclaration.org/>. Accessed 11 October 2020.
170. Mishra S, Kwong JC, Chan AK, Baral SD. Understanding heterogeneity to inform the public health response to COVID-19 in Canada. CMAJ 2020;192(25):e684-e685.
171. Holroyd-Leduc JM, Laupacis A. Continuing care and COVID-19: a Canadian tragedy that must not be allowed to happen again. CMAJ 2020;192(23):e632-e633.
172. Williams DR, Cooper LA. COVID-19 and health equity – a new kind of “herd immunity.” JAMA 2020;323(24):2478-2480.
173. Esposito S, Principi N. School closure during the Coronavirus Disease 2019 (COVID-19) pandemic: an effective intervention at the Global level? JAMA Pediatr. May 13, 2020 DOI: <https://doi.org/10.1001/jamapediatrics.2020.1892>.
174. Forbes MB, Mehta K, Kumar K, Lu J, Le Saux N, Sampson M, Robinson J. COVID-19 infection in children: estimating pediatric morbidity and mortality. medRxiv preprint May 8, 2020. DOI: <https://doi.org/10.1101/2020.05.05.20091751>. <https://www.medrxiv.org/content/10.1101/2020.05.05.20091751v1>. Accessed 11 October 2020.
175. Davies NG, Klepac P, Liu Y, Prem K, Jit M, CMMID COVID-19 working group and Eggo RM. Age-dependent effects in the transmission and control of COVID-19 epidemics. Nature Med 2020;26:1205-1211.
176. The National Collaborating Centre for Methods and Tools. Rapid Review Update 6: What is the specific role of daycares and schools in COVID-19 transmission. Sept 14, 2020. <https://www.nccmt.ca/uploads/media/media/0001/02/98cc589e2c1db4996ba0cb5d52daef448b175f24.pdf>. Accessed 11 October 2020.
177. Hepburn C, O’Callaghan B, Stern N, Stiglitz J, Zenghelis D. Will COVID-19 fiscal recovery packages accelerate or retard progress on climate change? Oxford Review of Economic Policy May 8, 2020; Smith School Working Paper No. 20-02. ISSN 2732-4214 (Online). <https://www.smithschool.ox.ac.uk/publications/wpapers/workingpaper20-02.pdf>. Accessed 11 October 2020.

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Table 1. Initial modeling predictions that induced fear and crowd-effects

Reference	Statements and Predictions from the modeling
Kissler et al. ²⁻⁴	“prolonged or intermittent social distancing may be necessary into 2022 [to avoid overwhelming critical care capacity]... expanded critical care capacity... would improve the success of intermittent distancing and hasten the acquisition of herd immunity”
	“projected that recurrent wintertime outbreaks of SARS-CoV-2 will probably occur after the initial, most severe pandemic wave [if immunity wanes over 40 weeks]”
	With a baseline reproductive number (Ro) 2.5, no seasonality to viral transmission, and the current intensive care capacity of the USA they projected the need for intermittent lockdowns occurring for a total of 75% of the time, even after July 2022.
Imperial College modeling of non-pharmaceutical interventions in USA and UK ⁵	“suppression [effective reproductive number (Re)<1] will minimally require a combination of social distancing of the entire population, home isolation of cases and household quarantine of their family members. This may need to be supplemented by school and university closures... [and] Will need to be maintained until a vaccine becomes available.”
	“we show that intermittent social distancing – triggered by trends in disease surveillance – may allow interventions to be relaxed temporarily in relative short time windows....[Suppression] needs to be in force for the majority [>2/3 of the time] of the 2 years of the simulation.”
	The modeling assumed an IFR of 0.9%, hospitalization rate of 4.4%, and that 81% of the population would be infected before herd immunity, resulting in 510,000 deaths in Great Britain and 2.2 million deaths in the United States by mid-April, surpassing ICU demand by 30X, if lockdowns did not occur.
Imperial College modeling of non-pharmaceutical interventions globally ⁶	“we estimate that in the absence of interventions, COVID-19 would have resulted in 7.0 billion infections and 40 million deaths globally this year... healthcare demand can only be kept within manageable levels through the rapid adoption of public health measures... to suppress transmission... sustained, then 38.7 million lives could be saved.”
	“[Suppression] will need to be maintained in some manner until vaccines or effective treatments become available.”
Imperial College estimate of lives saved so far in Europe ⁷	Used a “model [that] calculates backwards [infections] from observed deaths... [and] relies on fixed estimates of some epidemiological parameters [Ro 3.8; attack rates in different age groups from 60-99%; infection fatality rate in different countries of 0.91-1.26%]....”
	Concluded that “we find, across 11 countries [in Europe], since the beginning of the epidemic [to May 4], 3,100,000 (2,800,000 – 3,500,000) deaths have been averted due to [NPI] interventions....”
Hsiang et al. ⁸	In 5 countries [China, South Korea, Iran, France, US], using “reduced-form economic methods”, NPIs “prevented or delayed [to April 6] on the order of 62 million confirmed cases, corresponding to averting roughly 530 million total infections... we estimate that all policies combined slowed the average growth rate of infections [from 43%/day, a doubling time ~2 days] by -0.252 per day....”

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Table 2. Some effects of the COVID-19 response that put Sustainable Development Goals out of reach.

Sustainable Development Goal	Effect of COVID-19 Response: some details
Childhood vaccination	Programs stalled in 70 countries [Measles, Diphtheria, Cholera, Polio]
Education	School closures: 90% of students (1.57 Billion) kept out of school <u>-Early primary grades are most vulnerable, with effects into adulthood</u> : effects on outcomes of intelligence, teen pregnancy, illicit drug use, graduation rates, employment rates and earnings, arrest rates, hypertension, diabetes mellites, depression <u>-Not just education affected</u> : school closures have effects on food insecurity, loss of a place of safety, less physical activity, lost social interactions, lost support services for developmental difficulties, economic effects on families
Sexual and reproductive health services	Lack of access: estimated ~2.7 Million extra unsafe abortions For every 3 months of lockdown: estimated 2 Million more lack access to contraception, and over 6 months, 7 Million additional unintended pregnancies
Food security	Hunger pandemic: undernourished estimated to increase 83-132 Million (>225,000/day) - <u>from disrupted food supply chains</u> [labor mobility, food transport, planting seasons] and access to food [loss of jobs and incomes, price increases]
End poverty	Extreme poverty (living on <US\$1.90/day): estimated to increase >70 Million - <u>Lost “ladders of opportunity”</u> and social determinants of health
Reduce maternal and U5M	Estimated increase of 1.16 Million children (U5M) and 56,700 maternal deaths, if essential RMNCH services are disrupted (coverage reduction 39-52%) for 6 months in 118 LMIC - <u>mostly (~60%) due to affected childhood interventions</u> [wasting, antibiotics, ORS for diarrhea]; and childbirth interventions [uterotonics, antibiotics, anticonvulsants, clean birth]
Infectious Disease Mortality	Tuberculosis: in moderate and severe scenario, projected excess deaths (mostly from reduced timely diagnosis and treatment) 342,000-1.36 Million over 5 years (an increase of 4-16%) Malaria: in moderate and severe scenario, projected excess deaths (mostly from delayed net campaigns and treatment) 203,000 to 415,000 over 1 year (an increase of 52-107%, with most deaths in children <5yo). HIV: in moderate projected excess deaths (mostly due to access to antiretrovirals) 296,000 (range 229,000-420,000) in Sub-Saharan Africa over 1 year (an increase of 63%). Also would increase mother to child transmission by 1.6 times.

LMIC: low- and middle-income countries; ORS: oral rehydration solution; RMNCH: Reproductive Maternal Newborn and Child Health; U5M: under 5 mortality.

References: 59-72

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Table 3. Some effects of the COVID-19 response on public health in mostly high-income countries.

Effect of COVID-19 Response	Some Details
Delayed/avoided/disrupted medical care	<p>Visits to emergency departments for myocardial infarction or stroke declined in USA by ≥ 20-48%</p> <p>Delayed cancer care and 'non-urgent' procedures</p> <p>-weekly presentations with cancer diagnoses down 46% in USA and UK</p> <p>-90% reduction in non-cancer surgeries in Ontario in March/April</p> <p>-surgery backlog in Ontario March 15 to June 13: 148,000; clearance time estimated to take 84 weeks</p> <p>Of excess deaths in high-income countries during pandemic, 20-50% are <i>not</i> from COVID-19</p> <p>Unexplained 83% increase (10,000 excess) deaths from dementia in England/Wales in April [lack of social contact causing a deterioration in health and wellbeing]</p>
Violence against women [household stress; disrupted livelihoods, social/protective networks, support services]	<p>Intimate Partner Violence: estimated effect from 3 months lockdown is 20% increase [>15 Million additional cases]</p> <p>Female Genital Mutilation: 2 Million more cases over next decade</p> <p>Child Marriages: 13 Million more cases over next decade</p> <p>Increased police reports [France, UK, Ontario] and support line calls [China, Italy, Spain, Vancouver, Alberta] by 20-50%</p>
Deaths of despair [related to unemployment, and due to drugs, alcohol, and suicide]	<p>In USA alone: 68,000 (from 27,000 – 154,000) suicide deaths predicted</p> <p>Mental Health effects of 3 months [suicide, depression, alcohol use disorder, childhood trauma due to domestic violence, changes in marital status, social isolation]: Years of Life Lost in USA 67.58 Million, Canada 7.79 Million, UK 13.62 Million, etc.</p>

References: 74-89

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Table 4. World mortality data 2019, with COVID-19 mortality to Sept 4 in 2020 for comparison.

Region	Annual deaths in thousands (per day)	Infant mortality Rate/1000	Under 5yo mortality Rate/1000 (% of deaths)	Age 15-60 mortality Rate/1000 (% of deaths)	Age 65+ (% of deaths)
World	58,394 (160)	28	38 (10%)	140 (32%)	(57%)
COVID-19 on Sept 4, 2020	865 (3.5)	(0%)	(0.06%)	(26%)	(74%)
High-income	11,161	4	5 (1%)	81 (19%)	(80%)
Middle-income	41,551	27	35 (9%)	144 (36%)	(55%)
Low-income	5,665	46	68 (31%)	234 (42%)	(27%)
Sub-Saharan Africa	9,052	49	74 (31%)	281 (46%)	(23%)
Canada	291	4	5 (1%)	62 (17%)	(82%)

References: 94,95. Effect of COVID-19 is in bold for emphasis.

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Table 5. Selected causes of death in the world, with deaths per year and day, compared to COVID-19 in 2020.

Cause of death	Deaths/year (/day)	Case Fatality Rate	Age Group predominant
COVID-19 on Sept 4, 2020	864,618 (3500)	0.24%	≥65-70 years old
Malaria	405,000 (1110)	0.2%	Children
Tuberculosis	1,500,000 (4110)	<15%	-
Measles	140,000 (384)	1.46%	Children
Influenza	389,213 (range 294-518K) ^a	0.01-0.02% for pH1N1	Children 34,800 [13-97K], and ≥65 years old. Respiratory deaths only
HIV	690,000 (1890)	-	Access to treatment for 67%
Motor Vehicle Collisions	1,350,000 (3699)	-	Young 5-29 years old, mostly in Low- to Middle-Income Countries
Tobacco	>8,000,000 (21918)	-	-
Childhood (U5M) pneumonia	808,920 (2216)	-	<5 years old
Childhood (U5M) diarrhea	533,768 (1462)	0.08% U5M	<5 years old
Dietary risk factors	11,000,000 (30137)	-	-

a. The 1957-1959 Influenza pandemic, when the world population was 2.87 billion, was estimated to cause 4 deaths/10,000 population totaling 1.1 million excess deaths due to respiratory disease, with the greatest excess mortality in school-aged children and young adults. If COVID-19 is of similar severity, given the world population of 7.8 billion, we would expect ~3 Million deaths, mostly in the elderly.¹¹⁰

K: thousands; U5M: under 5 mortality. Effect of COVID-19 in bold for emphasis. References: 98-110

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Table 6. Cost-Benefit analysis in WELLBYs for the world's response to COVID-19

Factor in World	Benefit	Cost
COVID-19 deaths	360M WELLBY	-
Recession	-	1.2B WELLBY
Unemployment	-	280M WELLBY
Loneliness	-	333M WELLBY
Disrupted health services, disrupted education, famine, social unrest, violence, suicide	-	Not counted
TOTAL	360M WELLBY	1.813B WELLBY
BALANCE		5X [minimum]-87X [maximum]

B: Billion; M: Million; WELLBY: wellbeing years. See text for details of the calculations.

Maximum: benefit reduced in half; recession effect increased 12X, unemployment effect increased 3X, and still not counting the disruption of health services, education, life-span effects of loneliness, etc.

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Table 7. Cost-benefit analysis in Quality Adjusted Life Years for Australia's response to COVID-19

Consideration	Cost/month	Benefit overall	Comment
Wellbeing (immediate)	83,333 QALY	-	Attributes half of reduction (of 0.5 WELLBY) to lockdown
Reduced economic activity (government services)	25,812 QALY	-	Attributes half of yearly 6% loss in GDP to lockdown, and only government expenditure (not private) buys welfare (36% of GDP), at \$100,000/QALY
Increased suicides	600 QALY	-	Expected to rise 25% over next 5 years, and attributes only 40% of this to lockdown
Disrupted non-university schooling	740 QALY	-	Foregone wages of children: each year of schooling yields approximately 9% more future earnings; assumes 80-90% equivalence of disrupted to normal school days
Disrupted health services, future mental stress and violence	-	-	Not included. Also does not consider bad habits inculcated (reduced physical activity, increased weight gain (for 40%), increased alcohol intake)
Reduced COVID-19 deaths		50,000 QALY	This is for lockdown 'ad infinitum' (not per month); 0.04% of population saved
Total over 3 months of lockdown	331,485 QALY	50,000 QALY	Minimum cost is 6.6X any benefit

QALY: Quality Adjusted Life Years; WELLBY: Wellbeing Years. Reference: 141

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Table 8. Other calls for a change in COVID-19 response priorities

Reference	Content of the call for adjusting COVID-19 response priorities
Open letter on July 6, 2020, to the Prime Minister and Premiers of Canada ¹⁶²	The current approach “carries significant risks to overall population health and threatens to increase inequalities... Aiming to prevent or contain every case of COVID-19 is simply no longer sustainable... We need to accept that COVID-19 will be with us for some time and to find ways to deal with it.”
	The response risks “significantly harming our children, particularly the very young, by affecting their development, with life-long consequences in terms of education, skills development, income and overall health.”
	Suggest that we need “to focus on preventing deaths and serious illness by protecting the vulnerable while enabling society to function and thrive... While there is hope for a vaccine to be developed soon, we must be realistic about the time... We need to accept that there will be cases and outbreaks of COVID-19.”
	“Canadians have developed a fear of COVID-19. Going forward they have to be supported in understanding their true level of risk... while getting on with their lives – back to work, back to school, back to healthy lives and vibrant, active communities....”
	COVID-19 “is not the only nor the most important challenge to the health of people in Canada... The fundamental determinants of health – education, employment, social connection and medical and dental care – must take priority...”
Open letter to National Cabinet of Australia ¹⁶³	“exposure to COVID-19 is only temporarily avoidable”; “to analyze the COVID-19 effect it is necessary to understand it as shortening life. But the lockdowns and the panic have also had a cost in shortening life for others.”
	Some of these costs include that the lockdown: “will decrease national income... and this will have a measurable effect on the length of the average lifespan”, “[has] disrupted normal health services... estimated an increase in cancer deaths over the next 12 months of 20%”, [and will cause] future suicides by the unemployed and others whose lives have been ruined.”
	Urge for “a cost-benefit analysis, including lives saved versus lives lost, both directly and consequentially... [and] weekly or daily non-epidemic death figures should be posted as well as deaths from the epidemic...”
Ioannidis, JPA ¹⁶⁴⁻¹⁶⁷	Called for evidence to guide policy, noting many of the collateral and recession effects discussed above.
	“Shutdowns are an extreme measure. We know very well that they cause tremendous harm.”
Resignation letter by economist in Victorian Treasury ¹⁶⁸	“the pandemic policies being pursued in Australia... are having hugely adverse economic, social and health effects... The need for good policy process does not disappear just because we face a public health crisis... the elderly are many times more vulnerable to a serious outcome than the young. It was necessary, therefore, to work out a targeted age-based strategy... The direct and indirect costs imposed by regulatory approaches may not be... immediately obvious. Risk regulation that is poorly targeted or costly will divert resources from other priorities... needed to commission a cost-benefit analysis of alternative policy options....”

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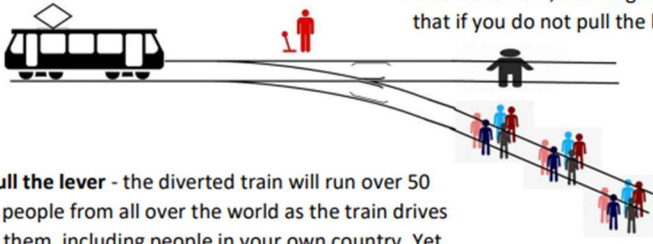
	Governments should have realized “they are hostage to chronic groupthink and actively sought alternative advice... instead of performing its taxpayer-funded duty of providing forthright analysis of alternatives... can (even now) be managed by isolating the elderly and taking a range of voluntary, innovative measures.”
The Great Barrington Declaration ¹⁶⁹	“current lockdown policies are producing devastating effects on short and long-term public health... leading to greater excess mortality in years to come... keeping students out of school is a grave injustice... The most compassionate approach that balances the risks and benefits of reaching herd immunity, is to allow those who are at minimal risk of death to live their lives normally to build up immunity to the virus through natural infection, while better protecting those who are at highest risk.”

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Figure 1a and 1b

The Corona Dilemma

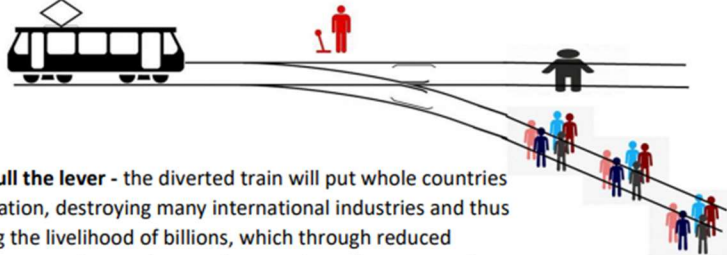
If you do not divert the train - one person, John, will get run over. He is elderly and suffering from many diseases. You know him personally and all his friends and family are watching you. They are all shouting at you to divert the train, claiming it is the moral and safe thing to do. You know that if you do not pull the lever, your life in the society you live in is over.



If you pull the lever - the diverted train will run over 50 random people from all over the world as the train drives through them, including people in your own country. Yet these people and their friends won't know where the train came from that hit them.

The Corona Dilemma

If you do not divert the train -you are letting the virus rage unchecked (**COVID deaths**).

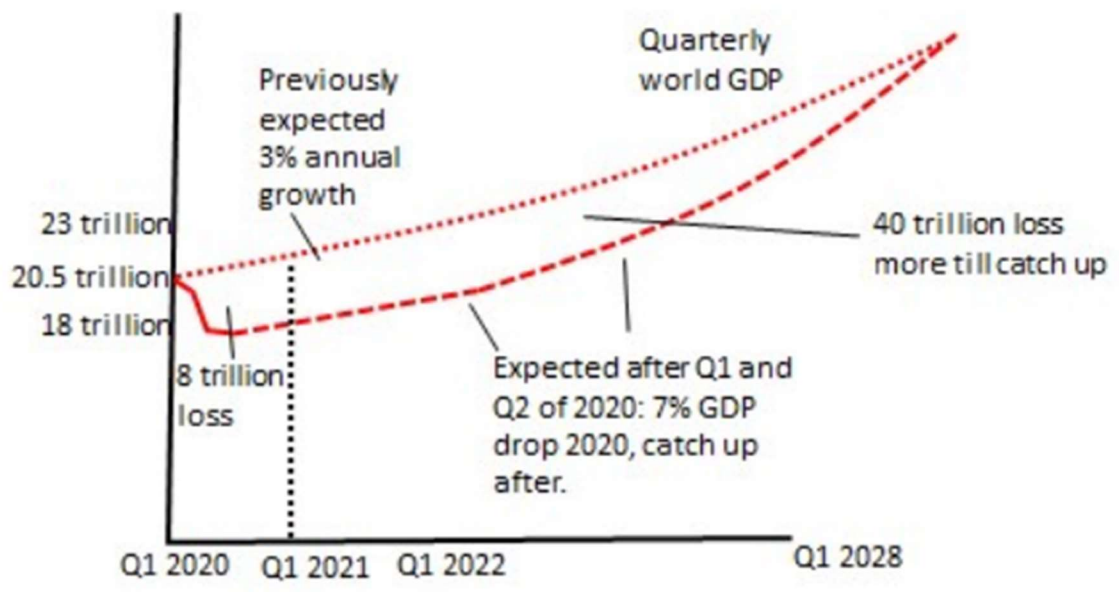


If you pull the lever - the diverted train will put whole countries into isolation, destroying many international industries and thus affecting the livelihood of billions, which through reduced government services and general prosperity will cost tens of millions of lives (**COVID reaction**).

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Figure 2

Previously projected GDP and later projected GDP: one-year loss versus cumulative loss



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ETable 1. Total and COVID-19 deaths in the USA, as of August 22, 2020.

Age group	COVID deaths in 6 months to Aug 22	Deaths from all causes to Aug 22	COVID as % of deaths in 2020
0-14	57	14679	0.39%
15-24	280	18594	1.51%
25-44	4558	93066	4.90%
45-54	8648	100926	8.57%
55-64	20655	231983	8.90%
65-74	34980	351806	9.94%
75-84	43392	430582	10.08%
85+	51710	537185	9.63%
TOTAL	164280	1778821	9.24%

Assumes all deaths *with* COVID-19 are deaths *from* COVID-19.

Reference: 90

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ETable 2. COVID-19 deaths in Canada as of August 30, 2020 compared to deaths in 2018.

Age group	COVID deaths in 6 months of 2020	Deaths in all of 2018	COVID as % of deaths over 6 months of 2020
0-19	1	3092	0.06%
20-29	9	3273	0.55%
30-39	15	4455	0.67%
40-49	50	7287	1.35%
50-59	211	19959	2.07%
60-69	651	40231	3.13%
70-79	1635	60143	5.16%
80+	6420	146266	8.07%
TOTAL	8992	283706	5.96%

In 2018 there were 23642 deaths/month and 777 deaths/day in Canada.

References: 91,92

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ETable 3. Studies suggesting that the efficacy of nonpharmaceutical interventions to prevent spread of COVID-19 are not as high as some predicted.

Study	Details of efficacy of non-pharmaceutical intervention
Luskin DL ¹¹⁰	Using “highly detailed anonymized cellphone tracking data provided by Google... tabulated by the University of Maryland’s Transportation Institute into a ‘social distancing index’”, it was found that lockdown severity correlated with a greater spread of the virus, even when excluding states with the heaviest caseloads, and not with population density, age, ethnicity, prevalence of nursing homes, or general health, suggesting that “[heavy] lockdowns probably didn’t help.”
	This analysis also found that states that subsequently opened-up the most tended to have the lightest caseloads, suggesting that “opening up [a lot] didn’t hurt.”
Atkeson A, et al. ¹¹¹	An analysis across 23 countries and 25 states each with >1000 deaths by July 22 found that the growth rates of daily deaths from COVID-19 fell rapidly [from a wide range of initially high levels - doubling every 2-3 days] within the first 30 days after each region reached 25 cumulative deaths, and has hovered around zero or slightly below since.
	Epidemiological models found that this implied both the Re and transmission rates fell rapidly from widely dispersed initial levels [Re≥3], and the Re has hovered around 1 after the first 30 days of the epidemic virtually everywhere in the world.
	The authors suggest that there must be “an omitted variable bias” accounting for this finding [and similar findings in previous pandemics], that the role of region-specific NPI’s implemented in the early phase of the pandemic is likely overstated, and that the removal of lockdown policies has had little effect on transmission rates.
Chaudhry R, et al. ¹¹²	A study using data from the top 50 countries ranked by number of cases found that “rapid border closures, full lockdowns, and wide-spread testing were not associated with COVID-19 mortality per million people.”
Wood SN ¹¹³	A mathematical model using “a Bayesian inverse problem approach applied to UK data on COVID-19 deaths and the disease duration distribution” suggested that “infections were in decline before the full UK lockdown (March 24), and that infections in Sweden started to decline only a day or two later.”

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ETable 4. Cost-benefit analysis in WELLBYs for Canada's response to COVID-19

Factor in Canada	Benefit per month	Cost per month
COVID-19 deaths	37.59M X 0.5 for herd X 0.003 IFR X 5 QALY/ 12 months = 23,494 QALY = 140,963 WELLBY	-
Recession	-	(1.713T GDP/12 months X 0.15 GDP loss X 0.4 government spending)/100K = 85,650 QALY = 513,900 WELLBY
Unemployment	-	2M X 0.7/12 months = 116,667 WELLBY
Loneliness (if we end half of lockdown)	-	37.59M/2 X 0.5/12 months = 783,125 WELLBY
Disrupted health services, disrupted education	-	Not counted
TOTAL	0.141M WELLBY	1.41M WELLBY
BALANCE		10X [minimum]

IFR: infection fatality rate; K: thousands; M: Million; QALY: quality adjusted life years; WELLBY: wellbeing years