

Valuing mortality related consequences of Pandemic against public health measures taken during the Pandemic

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ABSTRACT

Investment by governments in public health provisions are crucial to meeting United Nations Sustainable Development Goal (SDG) 3 – good health and wellbeing. Reduction of mortality and morbidity during a Pandemic has the co-benefits of disease prevention across a broad spectrum of infectious diseases, lessens productivity losses, preserves business assets, function and capability, and prevents worker displacement. To enhance the potential acceptability of mitigation measures to protect lives and livelihoods in future pandemics the value of protection of human capital by lowering mortality during the pandemic phase is highlighted in this paper.

Consideration of the new transitioning phase out of the Pandemic of several countries to examine the impact of mortality against their GDP over the course of the Pandemic to date (Jan 2020 to April 2022). The loss of life due to COVID 19 is measured in terms of the value of a statistical life according to the size of the economy of the country concerned. Adaptation should be a central part of national public health strategies, encompassing mitigation of future risk and transition risk management. The importance of public health measures to position a country to adapt to risks and move forward into a post-pandemic world is examined.

Background

United Nations Sustainable Development Goal 3 – Good Health and Well-Being¹ highlights that ensuring healthy lives and promoting well-being at all stages is essential to sustainable development. More efforts are needed to fully eradicate a wide range of diseases and address many persistent and emerging health issues. By focusing on providing more efficient funding of health systems, improved sanitation and hygiene, and increased access to physicians, significant progress can be made in helping save the lives of millions. Health emergencies such as COVID-19 pose a global risk and have shown the critical need for preparedness. The United Nations Development Programme highlighted huge disparities in countries' ability to cope with and recover from the COVID-19 crisis. The pandemic provides a watershed moment for health emergency preparedness and for investment in critical 21st century public services.

The COVID -19 pandemic cost burden of disease and worldwide impact on health systems, has exposed the lack of primary health care, accessibility of care and the need for basic service provision of food, accommodation and public health oversight.

¹ [Sustainable Development Goals \(SDG 3\) | United Nations Western Europe \(unric.org\)](https://www.unric.org/en/sustainable-development-goals/sdg-3)

The impact of the restrictions imposed by governments on the freedom of choice of individuals to conduct their lives and interact with others has led to a loss of social cohesion and breakdown of trust.

The virus or another could mutate into a new form; anywhere from losing its capability to infect humans to becoming highly virulent and more transmissible. Other diseases of viral, bacterial, protozoan, fungal or other origin could emerge in the face of the pressures of population expansion, climate change, conflict/war, economic sanctions or economic upheaval.

The decision being made by governments now is how to restore confidence with business wanting to have freedoms to hire labour anywhere in the world and the freedom of association to open retail markets, sports events and hospitality. Willingness-to-pay to avoid deaths altogether by eliminating COVID is being scaled down to public health measures such as vaccination, access to health services and support in the event of exposure and infection. However, China is still proceeding with an elimination strategy.

In New Zealand the elimination strategy has been scaled back from the end of March 2022 by scaling the traffic light system to orange alert and opening the borders slowly. The foot traffic in town and the attendance at events has not picked up immediately. People who have benefited from not being exposed to Covid or being exposed but protected by merit of vaccination are disinclined to travel (particularly by air), go back into the community to shopping centres, to restaurants and entertainment venues. Many are very concerned that by dropping border measures will lead to the current variant of the virus and any new variants being brought into NZ without restraint.

As the Omicron variant circulates in the community education, health services and businesses are under strain, but not to the extent that would have occurred prior to vaccination and the fact the Omicron variant is not as virulent as the first coronavirus SARS-CoV-2 in late 2019 or the Delta variant that emerged later in 2020.

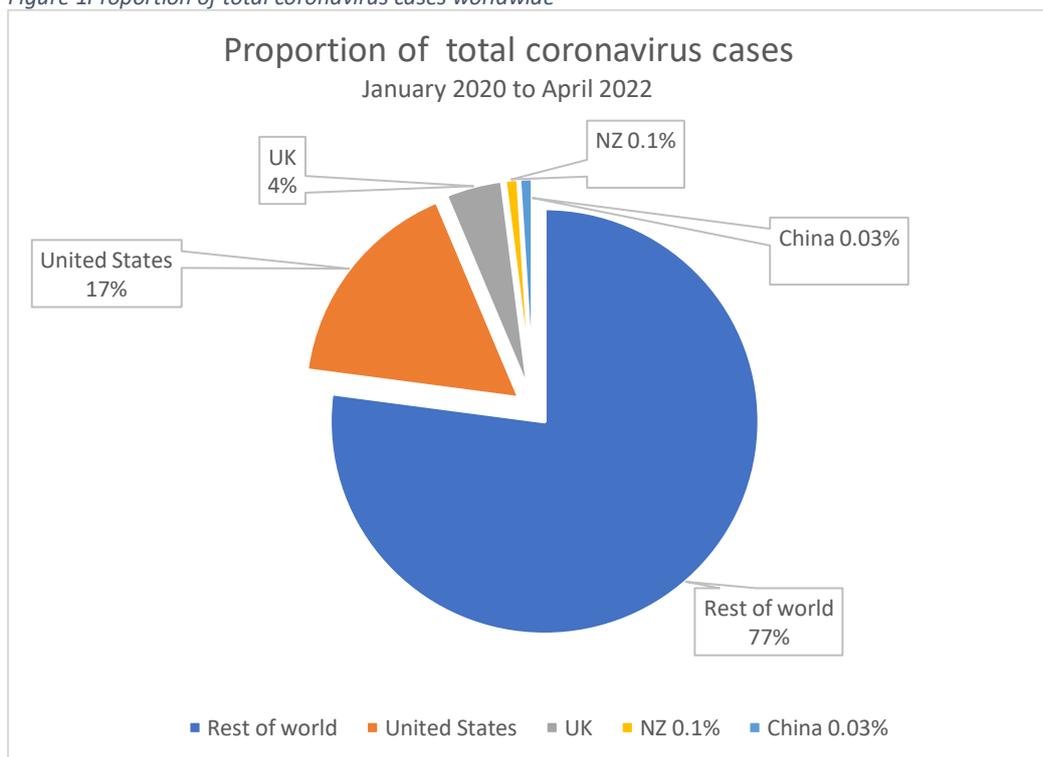
Impact on society

- (1) Pre-existing social disadvantages have been brought to light during the first phase of the pandemic – homelessness, low wages, job security, security of tenure.
- (2) Measures to prevent the disease circulating in the community led to personal sacrifice, isolation, and anxiety by some that government edicts forced them to accept preventative measures such as masks and vaccines that they thought might have unintended consequences on their health – that it wasn't proven that these measures would not be worse for them than the contagion itself. *'Even with the availability of economic and other supports, there is a limit to the public tolerance of these measures that are known to disrupt societal routines and functioning'*. However, if no preventative measures were mandated and the health system engaged only with those who become infected at the rate this occurs in a pandemic societal routines and functioning will be seriously disrupted.
- (3) A number of authors have argued that mandated public health measures had no impact on controlling the disease and that the economic burden of quarantining and special measures caused greater damage (Gibson, 2022). As the pandemic progresses services for preventable diseases, curable conditions, chronic illness and general health check-ups become constrained.
- (4) Loss of large numbers of people from the economy in a short period of time has been analysed following war. Ursula von der Leyen president of the European Commission in her address at the World Economic Forum (Davos 2022) on 24 May 2022 highlighted that the war in the Ukraine was treating millions of people as faceless populations to be moved or

controlled, disrupting their social norms completely. A study co-authored by Massey University war historian Professor Glyn Harper highlighted the long term disadvantages wrought on society by losses to NZ in the first world war hindered the potential of the country to move forward (Wilson et al., 2018). Similarly with the losses to the USA in World War II (Haltiwanger, 2021).

- (5) Microbiologists and policy makers have made the point that mandating of public health measures needs to be part of the first response to pandemics to prevent loss of life and enable business continuity and lessen productivity losses (Wilson, Boyd, Kvalsvig, Chambers, & Baker, 2020).
- (6) The country cases distribution has remained the same with the United States, one of world's wealthiest nations, still leading the pack with the highest proportion of cases. The key difference being that United States has a private health system in which the cost of getting medical services is prohibitively high, one of the highest worldwide. Medical bills in the US are the single largest cause of bankruptcy. US is ranked lowest in the Organisation of Economic Cooperation and Development (OECD) in terms of efficiency, equity and healthiness of citizens lives. COVID-19 raised the question in the US is health care an essential national resource that warrants secure financing beyond what the fee-for-service system offers. The estimated cost of 34 trillion to provide health insurance for all Americans over the course of 10 years is less than the accumulating value of lives lost during the pandemic.

Figure 1 Proportion of total coronavirus cases worldwide²



² [Coronavirus Graphs: Worldwide Cases and Deaths - Worldometer \(worldometers.info\)](https://www.worldometers.info/coronavirus/) Data downloaded on 2 April 2022.

The purpose of this paper is to examine how the public health trajectories countries followed may have impacted the economic outcome.

Health systems

To minimise the impact of the crisis countries had to implement policies targeted at the most disadvantaged groups in society, while navigating the implementation challenges in mitigating health impacts of the crisis. A whole of society approach is needed (Salama, 2022).

Comparing health systems using 1 April 2022 figures of percentage cases, and 20 June figures of deaths per million. And vaccinations by Country ³ in terms of percentage of total population fully vaccinated for COVID-19.

Figure 2 Public health systems, measures taken and outcomes

UNITED STATES	NEW ZEALAND
<p>NO MANDATED PUBLIC HEALTH CRITERIA FOR CONTAINMENT</p> <p>Palliative care, wait for vaccination and viral therapy</p> <p>Privately owned providers, health insurance</p> <p>UNITED STATES 17% cases</p> <p>Deaths per million = 3,101/m</p> <p>Fully vaccinated = 67%</p>	<p>ELIMINATION scaled down</p> <p>Lockdown and border control, followed by vaccination, easing restrictions at beginning of 2022</p> <p>National Health System, universal coverage</p> <p>NEW ZEALAND 0.1% cases</p> <p>Deaths per million = 266/m</p> <p>Fully vaccinated = 84%</p>
CHINA	UNITED KINGDOM
<p>ELIMINATION</p> <p>Ongoing policy since Jan 2020 including during Beijing Winter Olympics February 2022 of Isolation, vaccination</p> <p>Government supported medical insurance, not mandated</p> <p>0.03% cases</p> <p>Deaths per million = 4/m</p> <p>Fully vaccinated = 90%</p>	<p>MITIGATE</p> <p>Partial lockdowns, slow and intermittent adoption of public health criteria & vaccination</p> <p>National Health System, universal coverage</p> <p>4% cases</p> <p>Deaths per million = 813/m</p> <p>Fully vaccinated = 75%</p>

ECONOMICS

Economic consideration of four countries: United States of America, UK, China and New Zealand is undertaken, comparing the total wealth of each country and the loss incurred by loss of life (mortality) during the pandemic with the health systems of each country.

Valuing human life – statistical value of life (VSL)

I have chosen to use a monetary approach valuing life relative to the wealth of each economy rather than disability adjusted life years for the following reason. For the purposes of determining action

³ from New York Times [Covid World Vaccination Tracker - The New York Times \(nytimes.com\)](https://www.nytimes.com/interactive/2022/covid19/vaccination-tracker.html) 20 June 2022

during a rising pandemic it is not appropriate to place greater or lesser value on any life. Response is about reducing the immediate hazard by reducing exposure. There is a moral hazard in terms of a pandemic in rating a life by potential value to the future, when each person infected, no matter what age they are, presents a risk to any other person they are in contact with. Also, by valuing one life in terms of life years against another could lead to discrimination in decision making and not the all-encompassing approach needed to respond in a pandemic.

A pandemic is a disaster and is conceptualised by hazard, exposure, vulnerability and risk (Noy, Doan, & Taupo, 2020). Some authors have stated that VSL makes comparison across countries difficult (Noy & Doan, 2021). However, VSL can be estimated relative to each country’s wealth, the size of the respective economies.

VSL in NZ can be taken from the Ministry of Transport study ‘Social cost of road crashes and injuries 2020 update’ VOSL of \$4.42m NZD at June 2020 which corresponds to \$4.8m NZD in quarter 1 2022 (Transport, 2021).

An estimate of VSL for China of RMB 5m is taken from “Willingness to pay to reduce health risks related to air quality, Huang et al 2017” (Huang, Andersson, & Zhang, 2017).

An estimate of VSL in United Kingdom EU 2.1m from “Can Property Values Capture Changes in Environmental Health Risks? Evidence from a Stated Preference Study in Italy and the United Kingdom, Guignet et al 2015” (Guignet & Alberine, 2015).

And for United States from US Department of Transportation VSL recommendation for 2021 of USD 11.8m (Transportation, 2021).

Economic comparison between countries using VSL

The wealth of each economy in 1st quarter 2022, the mortality wrought by COVID19 from January 2020 to April 2022 is weighted proportionately relative to each country’s wealth (W. Economics, 2022) using international dollars⁴. The GDP for each country is then compared.

Figure 3 Impact to economy of COVID-19 mortality from January 2020 to April 2022

Country	Population~	Percent world population	Cases	Mortality	Percentage cases
WORLD^	7,890,000,000,000	100%	491,090,196	6,181,499	
US	334,749,957	4.3%	81,850,811	1,011,429	17%
UK	68,574,474	0.86%	21,210,758	168,275	4%
NZ	5,002,100	0.06%	659,175	299	0.1%
China	1,439,323,776	18.2%	151,103	4,638	0.03%

Country	Size of economy int \$	VSL in USD	In country \$	VSL loss to economy	Percentage loss
US	\$ 22,522,190,000,000	\$11,800,000	USD	\$11,934,862,200,000	52.99%
UK	\$ 3,400,700,000,000	\$2,243,080	2.1m EU	\$377,454,287,000	11.10%
NZ	\$ 252,790,000,000	\$3,092,160	4.8m NZD	\$924,555,840	0.37%
China	\$ 30,290,020,000,000	\$792,350	5.3m RMB	\$3,674,919,300	0.01%

⁴ [What is an “international dollar”? – World Bank Data Help Desk](#) comparable amount of goods and services a U. S. dollar would buy in the United States

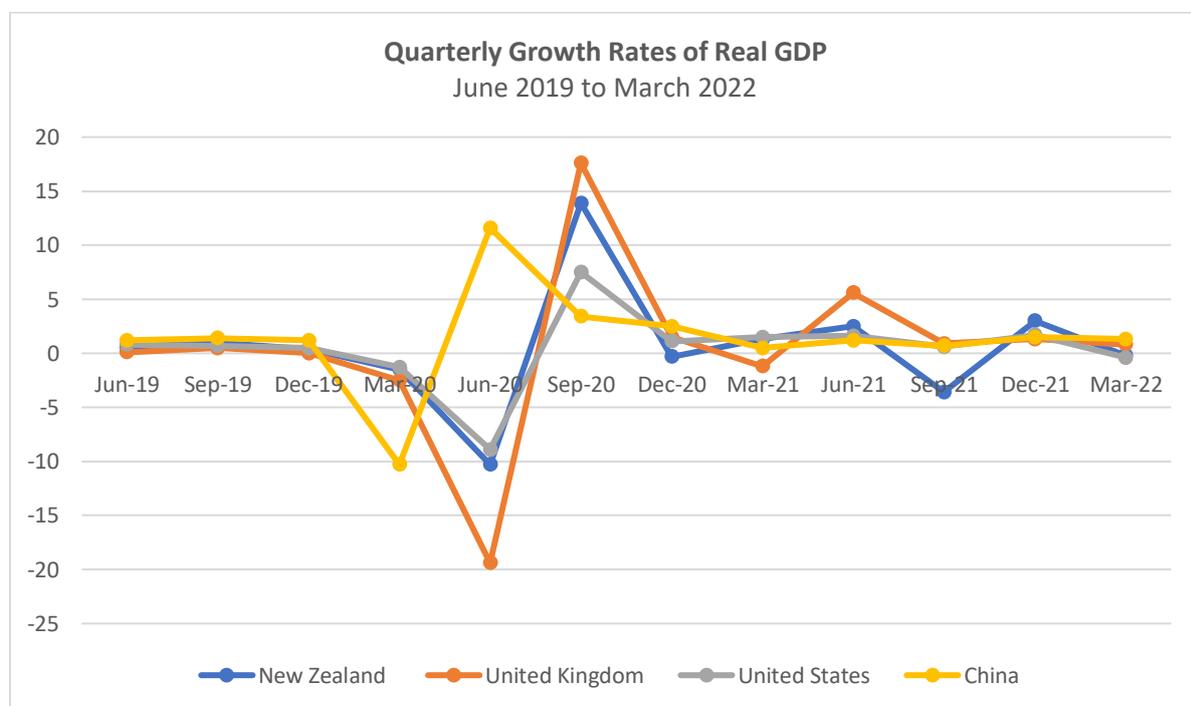
Values for size of economy were taken from <https://worldeconomics.com/Country-Size/China.aspx> World Economics. GDP (Purchasing Power Parity, int\$, Billions): All Countries 2021 values.

Noting that in March 2022 wealth of US in terms of GDP is reported as lowering to 19.73 Trillion USD, indicating that the economy has contracted (T. ECONOMICS, 2022).

Global growth is expected to decelerate markedly in 2022, from 5.5% to 4.1% according to the World Bank. This reflects the continued disruption caused by COVID-19, as well as supply bottlenecks.

The following graph of Gross Domestic Product quarter on quarter growth indicate the impact of the COVID-19 epidemic on each economy as of 16 April 2022 for New Zealand [Gross domestic product: March 2022 quarter | Stats NZ](#)) and for US and China from OECD [Quarterly National Accounts : Quarterly Growth Rates of real GDP \(oecd.org\)](#) and for UK from [Gross Domestic Product: Quarter on Quarter growth: CVM SA % - Office for National Statistics \(ons.gov.uk\)](#)

Figure 4 Quarterly growth rates of real GDP

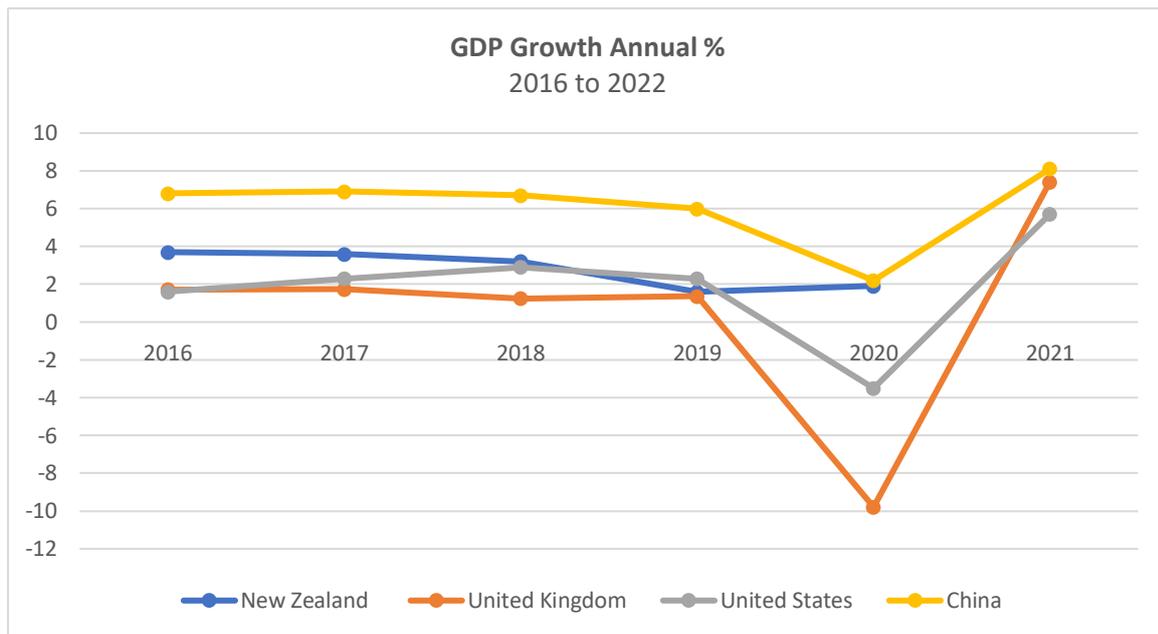


The quarterly GDP graphs demonstrate the immediate impact of the pandemic are all very similar with a spontaneous drop in GDP in the quarter following introduction of the virus into a society.

At the commencement of the pandemic the public and businesses were fearful that public health restrictions would have a negative effect on businesses. IMF in its Economic Report 2022 states that although contact-sensitive industries such as hospitality and tourism have been impacted other businesses have come through well with adjustments and adaptations.

One of the main findings in the OECD Economic Survey of New Zealand was that the New Zealand economy recovered quickly from the COVID-19 shock thanks to effective virus containment and measures to protect jobs and incomes (OECD, 2022b).

Figure 5 GDP Growth Annual percentage comparison between New Zealand, United Kingdom, United States and China



This graph demonstrates a steadier GDP⁵ growth course for the countries (New Zealand and China) which applied or are still applying in the case of China elimination strategy [no 2021 year data sourced for NZ]. The OECD New Zealand Economic Snapshot Economic Forecast Summary (June 2022) states after reaching 5% real GDP in 2021 the economic growth will remain slow but remain solid as pent-up demand during the surge of COVID-19 infections in early 2022 is unleashed and gradual reopening of the border allows the tourism sector to recover (OECD, 2022a).

The percentage losses based on VSL for each of the four economies could be likened to the virus pulling a plug out of a bath filling up with GDP growth. The VSL is the value of the lives permanently lost from the volume of the GDP growth in the bath. The greater the unrecoverable volume lost due to pandemic the more the tap must be turned up to maintain, let alone increase the GDP growth.

Zweig *et al* noted that implementing a specific package of quarantine and isolation, school closures, household confinement and the limiting of social gathering early and stringently was observed to coincide with lower case counts and transmission durations in Vietnam, Zimbabwe, New Zealand, South Korea, Ethiopia and Kazakhstan (Zweig *et al.*, 2021). The authors noted that by comparison the United States has the (and still does have) the highest global, cumulative COVID-19 case and death count and that a country's wealth appears to be less important in controlling the pandemic. What counts is taking rapid, centralised and consistent public health action.

NEW ZEALAND'S RESPONSE

The question is with an incoming disease with no known cure or vaccine and identified by WHO as a pandemic should the first concern be to protect citizens from disease, or protect disruption of business activities?

The public health action of level 4 lockdown taken by the New Zealand government was supported by knowledge that the exponential growth curves of transmission/infection induced by a pandemic would cause high loss of lives and disruption of services. New Zealand undertook quick action to

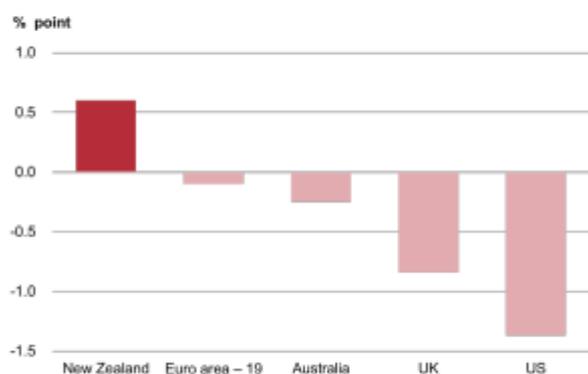
⁵ 2016-2020 sourced from World Bank, 2021 from other sources

contain the disease by locking down the borders and restricting movement of all but essential workers to maintain economic activity.

In taking this approach the Budget 2022 [B2 Wellbeing Budget 2022 - A Secure Future - 19 May 2022 \(treasury.govt.nz\)](#) reports that unemployment fell to a record low level of 3.2 percent in December 2021 quarter and held at that level in the March 2022 quarter (p58). The labour force participation rate increased from its pre-pandemic level to 71.1 percent in the December 2021 quarter (p59). This contrasts with the United States and the United Kingdom where labour force participation has remained down on its pre-crisis levels. Figure 4 Budget 2022

Figure 6 From New Zealand Wellbeing Budget 2022, labour force participation

Figure 4 – Change in labour force participation rate between December 2019 and 2021 quarter



Source: OECD

In the third year of the pandemic New Zealand with vaccination of 87% of the population. The Ministry of Health has scaled back response in 2022 to a Minimisation and Protection Strategy. [COVID-19: Minimisation and protection strategy for Aotearoa New Zealand | Ministry of Health NZ](#)

The aim is to keep the spread of COVID-19 as low as possible so while there will be some level of cases in the community on an ongoing basis, the Ministry of Health will work to contain and control any outbreaks, and if possible, stamp them out. People are protected by continuing vaccination (free), supported by active public health measures including testing, isolation and contact tracing.

Self-management, rapid antigen test (RAT) self-diagnosis, reporting positive and follow up with digital technology, self-notification to close contacts, and wraparound health and welfare support to ensure wellbeing and recovery or access to further public health services including ICU if needed.

[Omicron in the community: what this means for you | Ministry of Health NZ](#)

NZ Budget 2021 [Budget at a Glance - Budget 2021 - 20 May 2021 \(treasury.govt.nz\)](#) included the COVID-19 Response and Recovery Fund (CRRF) \$62.1b is cross-sectoral including finance, tertiary education, building and construction, transport, education, housing and urban development, business science and innovation, health, revenue and social development and 'other' plus 'unallocated of \$5.1b to cover for further outbreaks' which did occur with Omicron variant impacting since December 2021, peaking in Feb/Mar 2022.

Sick leave is critical as a containment measure for disease and recovery. In some countries, for example USA, there are no sick leave requirements built into contracts. Note that from 24 July 2021

employees minimum sick leave entitlements increased from 5 to 10 days per year in New Zealand. [Sick leave entitlements » Employment New Zealand.](#)

As the response to COVID-19 evolved and the economy recovered the CRFF was closed in NZ Wellbeing Budget 2022. The strong bounce-back from the initial shock associated with COVID-19 put New Zealand in a strong position to deal with any further disruption associated with the impact of the Omicron outbreak. Export prices remain high, demand for exports is solid, unemployment is at a record low and the opening of the border in 2022 is expected to ease market restraints and boost tourism sector incomes as New Zealand connects with the rest of the world.

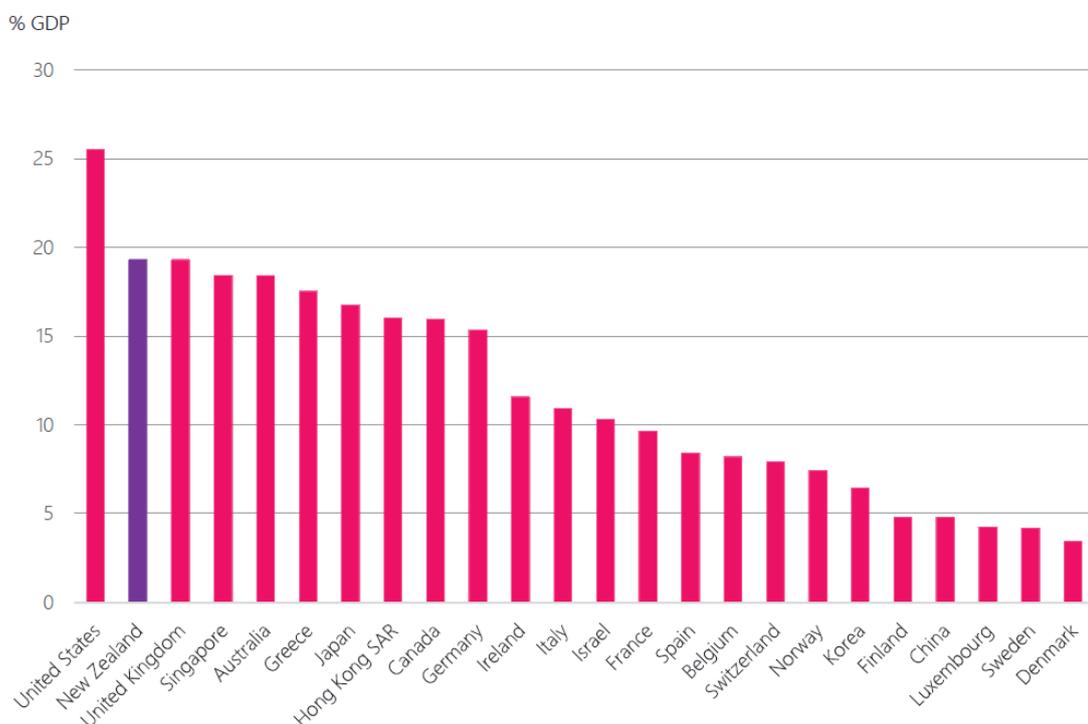
The actions taken by New Zealand since 2020 were aptly summarised in Adrian Orr’s speech in February 2022 (Orr, 2022) describing the alternative policy tools that were applied by the NZ Reserve Bank.

Our monetary stimulus was, over time accompanied by significant government spending and investment (fiscal stimulus) to support people and businesses, equivalent to around 20 percent of GDP (ref 8 ...)

The Government’s fiscal response was one of the highest levels of direct fiscal support across advanced economies outside the United States (see figure 1) (ref 9...).

The combined health and economic response of New Zealand, to date, has been ranked as one of the most effective across a wide range of countries.

Figure 1 - COVID-19 additional spending/foregone revenue by country (to October 2021)

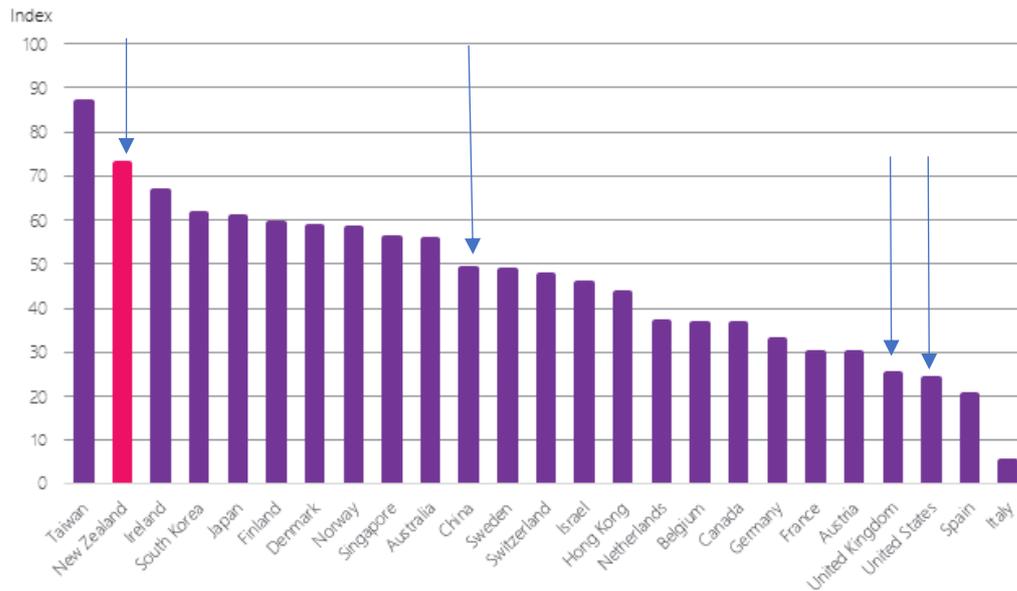


Source: IMF Database of Fiscal Policy Responses to COVID-19 (to October 2021)

Figure 1 from Adrian Orr’s address shows that the revenue expenditure in terms of spending/forgone revenue was highest for USA for the least return in terms of ameliorating the pandemic.

Further in Adrian Orr’s address is figure 2 taken from several sources, Blavatnik School at Oxford, calculation from the Economist, and ‘Landfall Strategy’ which shows the effectiveness of the responses taking into account cumulative excess deaths per capita over the Covid period and comparing GDP performance 2019 to 2020.

Figure 2: Landfall Strategy COVID-19 Performance Index



Note: The index is an equally weighted index of (1) the average level of Covid restrictions stringency (over the full Covid period) taken from the Blavatnik School at Oxford; (2) the cumulative excess deaths per capita over the Covid period (a calculation from the Economist); and (3) cumulative GDP performance since Q1 2020 (compared to full year GDP in 2019). Source: Landfall Strategy.

A better overall outcome has been achieved by New Zealand and other countries which took a more mandated public health approach. This is also supported by the fact that only three countries NZ, Taiwan and Finland saw life expectancy increase during the COVID-19 pandemic over 2020 and 2021. The US life expectancy rate dropped by 2 years over the same time (Spoonley, 2022).

ADAPTATION

Transition phase involves implementation of contingencies to manage the disease like other common infectious diseases. Governments would hopefully embrace a new commitment to reduce the prevalence of infectious diseases in general given that actions undertaken during the pandemic phase were seen to have significant impact on the reduction of other infectious diseases as well.

The objective is to achieve ongoing control of the health impact of COVID and other emerging infectious diseases while minimizing societal disruption.

Baseline level of transmission, as well as the impact of resurgences although the frequency of timing of resurgences is unknown. There is ongoing potential for emergence of new variants or completely new disease challenges.

It is impossible to predict what disease transmission scenarios any country may face in the coming 12 months.

To diminish the impact of COVID19 several things must be undertaken:

- (1) Societal needs must be better understood. The value of every human life and the impact to society of sudden loss in a pandemic or other catastrophic event needs to be factored into decision making.
- (2) Full consideration of the capability of the health system (Crampton, D., & Cotter, 2020) including access to health care, utilisation of community resources including indigenous perspectives.
- (3) Developing regulatory response platform that does not press people out of their jobs, or force people to make decision regarding their health. Enhancing public understanding of health vaccine mandates, mask wearing and hygiene.
- (4) Better understanding of the infrastructure that has contributed to the spread of disease. For example, close proximity seating on aeroplanes, how viruses circulate in closed environments such as aeroplanes, cruise ships, apartment buildings, concourses. And the conveyance of virus on particulate matter in the atmosphere and longevity of viruses on surfaces such as stair rails, door handles, touch screens and inside ventilation systems
- (5) Better understanding of exposure risks including air pollution, carriage of viruses on particles and more complex dispersion scenarios in the atmosphere.
- (6) Better appreciation of the imminent danger posed by other viruses.
- (7) Factoring in the exhausted public health workforce and risk of resurgence of a new variant.
- (8) Improving resilience by improved mathematical modelling, and communications to foster confidence and uptake of public health measures. Owning the problem together.

Forward planning will include ongoing surveillance and readiness for resurgence of COVID or other transmissible disease. Identifying scalable border measures in the case of resurgence. As international and domestic context shifts there must be capacity to adapt border and travel conditions mindful of the restrictions that will be imposed by other countries

Initiatives to address human resource and infrastructure needs are needed. Health infrastructure has been seriously neglected for decades. New Zealand Budget 2022 has committed 11.1 billion to health systems. The government has already been upgrading hospitals throughout New Zealand and has prioritised extra theatres and emergency facilities for specifically for the COVID pandemic but thinking ahead for other transmissible disease scenarios is needed.

At a practical level individual public health measures include actions people can take to protect themselves and others. This includes wearing masks, physical distancing, improving indoor ventilation, washing hands, coughing into elbow, being aware of symptoms, undertaking RAT, isolating and seeking help by contacting the nearest medical centre or health service at the earliest stage. Limiting movements, reducing contacts.

New Zealand needs a means of contacting every New Zealander and assessing their living circumstances and adapting a health programme to their needs. This is undertaken by the Salvation Army and other community groups such as DCM. COVID-19 showed that improvements could be

made in this area to ensure support for every member of society in terms of both health and income.

Another priority is catching up with the backlog of public health activities, TB screening, other vaccines, health and wellbeing of people including ensuring access to food, childhood immunisations, maternity programmes, elimination strategy for family violence, education, housing, transport and opening work opportunities for those of working age.

Health programmes and new initiatives such as free visits to General Practitioners are now being delivered in South Auckland to mitigate the surges in demand for hospital resources at Middlemore Hospital.

Delayed child-development and skills acquisition by young adults due to lack of teaching over the past two years and into a third year now. Instating measures to make up for this educational loss, which may include extending schooling at all levels (pre-school to tertiary) to gain ground is a priority for all countries.

Support for all people in terms of the stress everyone has had to bear in terms of risk to life, forced changes in work patterns and location of work, or expulsion from work due to business failure during the epidemic or persons not meeting set vaccination requirements for the occupation concerned.

Ongoing pandemic readiness must include the ability to make rapid risk based decisions bearing in mind the potential loss of life and measures that can be immediately taken to avert this. This can be assisted by including the value of life according to size of the economy. Such an approach has been recommended by IMF for purposes of risk mitigation for climate change (Fund, 2022).

CONCLUSION

The key difference in outcomes in the third year of the pandemic appears to be the nature of (1) the vigour of initial response to reduce opportunity for transmission (an elimination approach) and (2) the health system in the country, the ability of people to access medical care and delivery of services. The impact on business was not as great as initially feared, instead was similar to a natural disaster in terms of impact on certain businesses (e.g., hospitality) due to loss of patronage. These circumstances compare with impact on tourist operators and businesses following the 2016 Kaikoura earthquake or Whakaari/White Island eruption in 2019. Recovery from such circumstances is slow.

It is the impact of sudden and ongoing loss of lives in a pandemic on the total economy that is emphasised in this paper. The New Zealand the government responded to an unprecedented health and economic crisis by protecting lives and livelihoods through the course of the pandemic. The economic management throughout the pandemic contributed to a strong economic recovery following the deep contraction that occurred more deeply and suddenly than that experienced during the Global Financial Crisis (GFC). The government support of businesses and workers contributed to a much stronger economic bounce back from COVID-19.

A pre-determined solution with business given the top priority would have the consequence of considerably more lives lost and a less effective response in terms of money invested in both public health measures and business continuity. A focus on protecting lives and success of investment like the wage subsidy, Resurgence Support Payments for business and Jobs for Nature programme meant more New Zealanders remained connected to their jobs during the crisis. In the case of New

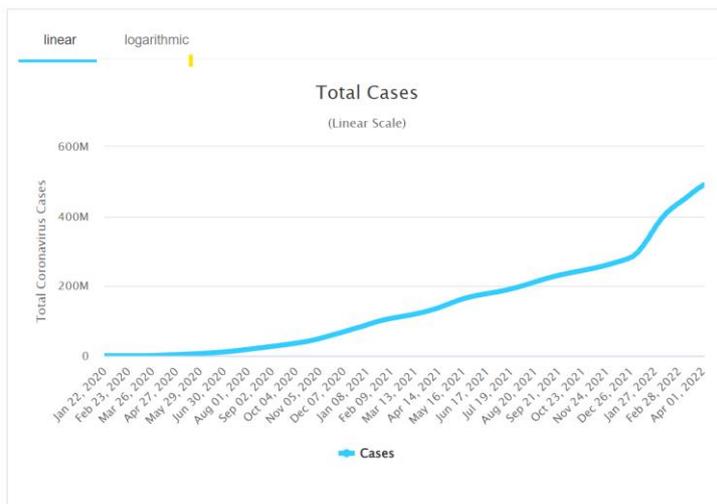
Zealand while the Government’s fiscal response to the pandemic led to higher net debt and created periods of operating deficits, it has led to a stronger than-expected economic recovery.

The comparison of USA, New Zealand, UK and China economies demonstrates the relative cost of loss of life during the pandemic and the effectiveness of health systems and legislation to reduce the loss of life. An estimation of the percentage of value of lives lost (VSL) to the total wealth of the economy could inform further investment in public health and motivate strong public health initiatives early into a pandemic for the benefit of longer term economic recovery.

APPENDIX Graphs April 2022

Total Cases (worldwide)

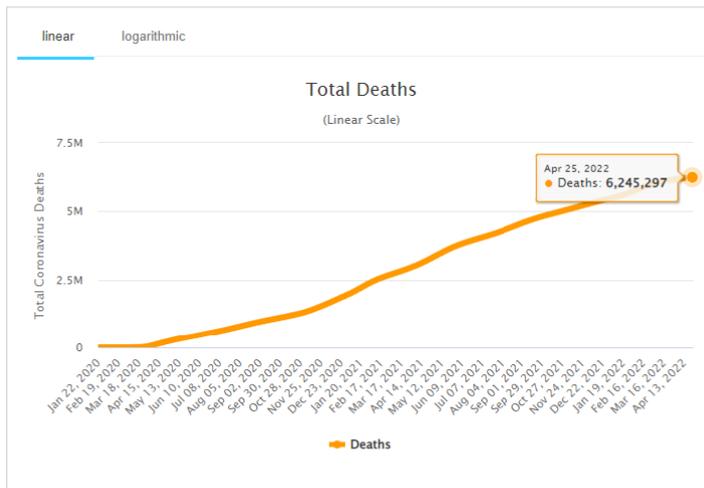
"Total Cases" = total cumulative count (491,090,196). This figure includes deaths and recovered or discharged patients (cases with an outcome).



Source: Worldometer - www.worldometers.info

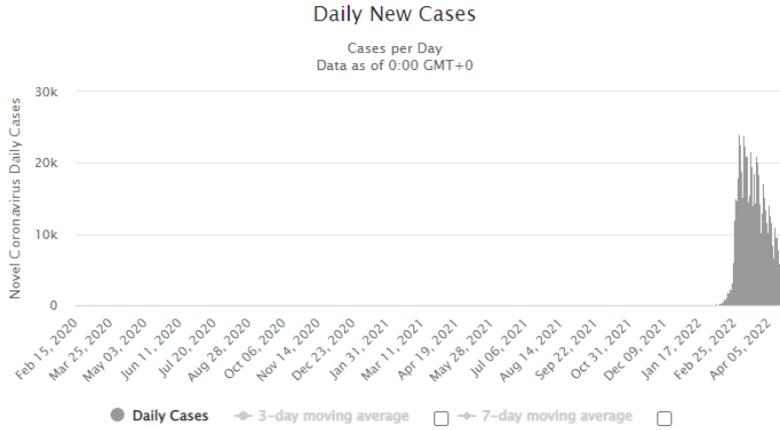
Total deaths (worldwide)

Total Deaths

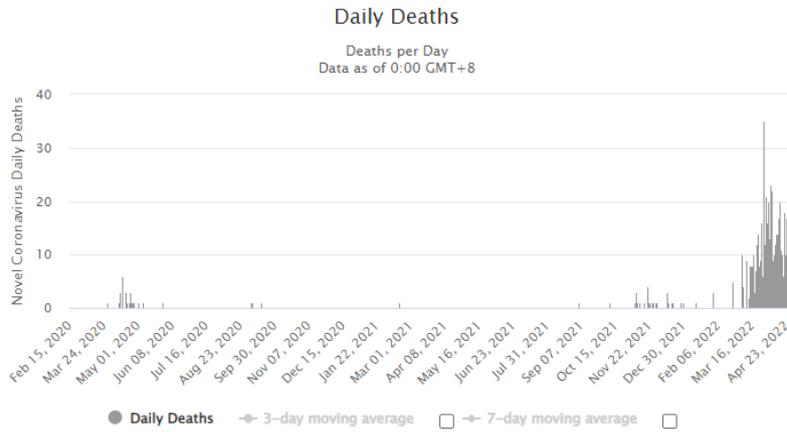


Source: Worldometer - www.worldometers.info

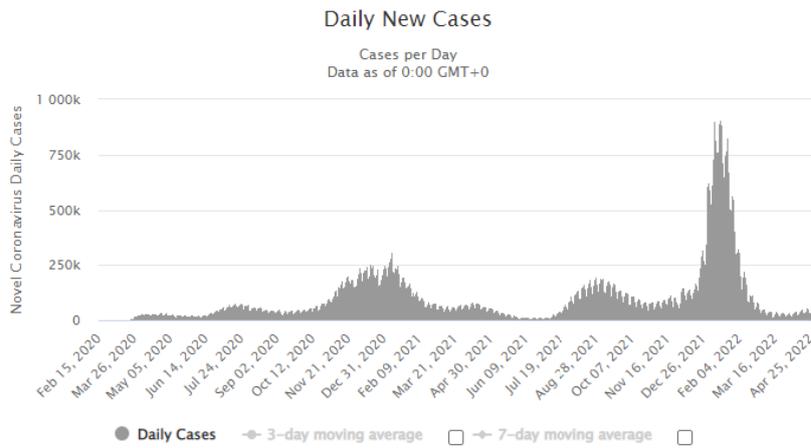
Daily New Cases in New Zealand



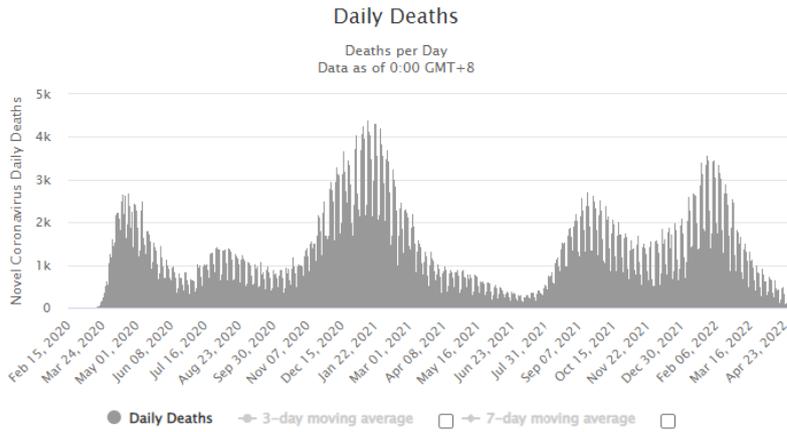
Daily New Deaths in New Zealand



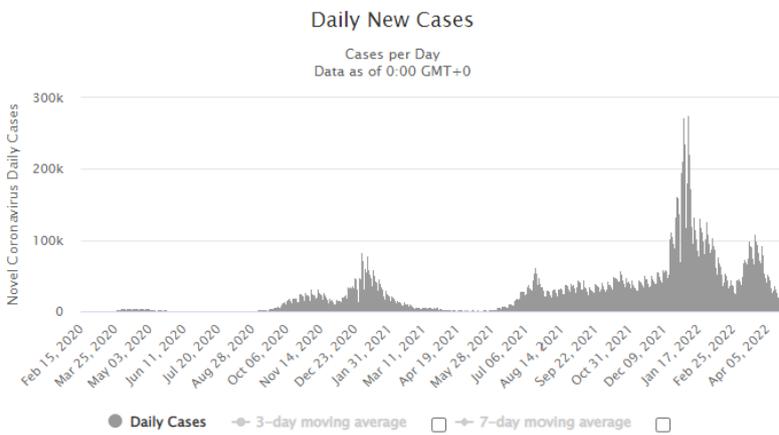
Daily New Cases in the United States



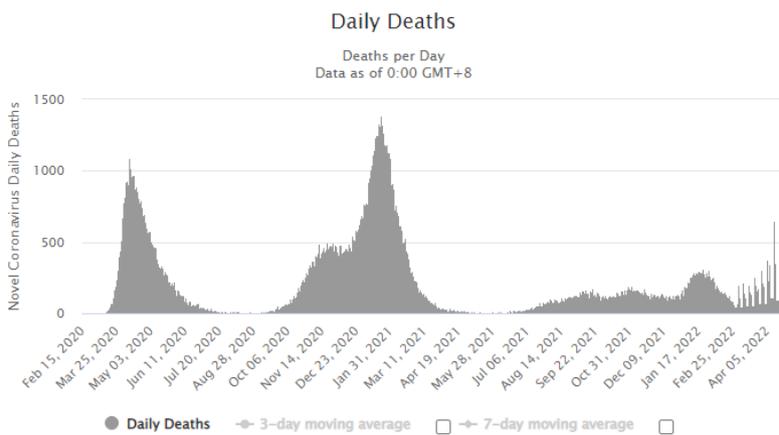
Daily New Deaths in the United States



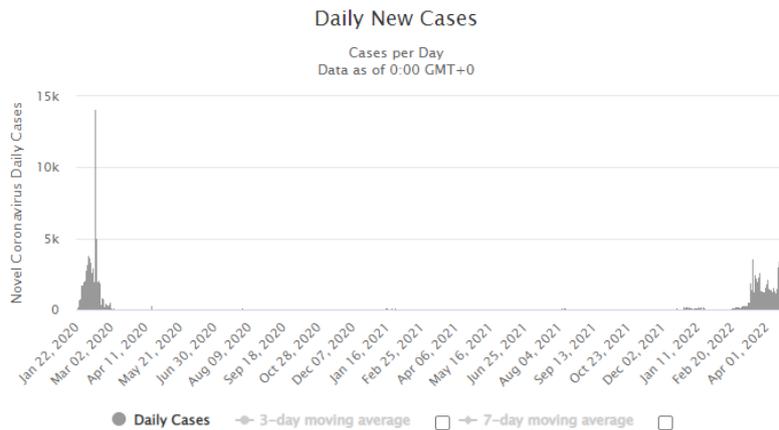
Daily New Cases in the United Kingdom



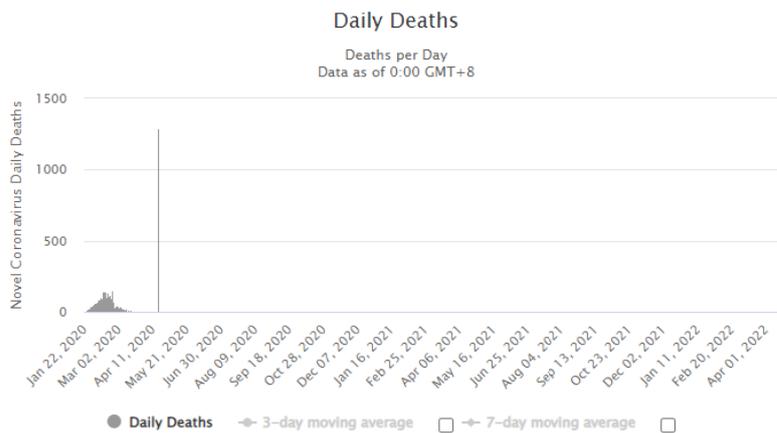
Daily New Deaths in the United Kingdom



Daily New Cases in China



Daily New Deaths in China



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