

# COVID-19 A Multidisciplinary Vision Dynamic Briefing

Generated 10 February 2021 for Marco Antonio Gonzalez



### **COVID-19 A Multidisciplinary Vision**

Last review on Wed 10 February 2021

#### About

This dynamic briefing draws on the collective intelligence of the Forum network to explore the key trends, interconnections and interdependencies between industry, regional and global issues. In the briefing, you will find a visual representation of this topic (Transformation Map – interactive version available online via intelligence.weforum.org), an overview and the key trends affecting it, along with summaries and links to the latest research and analysis on each of the trends. Briefings for countries also include the relevant data from the Forum's benchmarking indices. The content is continuously updated with the latest thinking of leaders and experts from across the Forum network, and with insights from Forum meetings, projects communities and activities.



### **Executive summary**

The SARS-CoV-2 (COVID-19) Pandemic must be approached under a multidisciplinary health vision for a perfect understanding of the global health problem it generates.

The virus and the pathologies it causes, the use of medical biotechnology for the rapid development of effective and safe vaccines, the resolution of the logistical problem of production and distribution, the public policies of governance of the Pandemic and the response of the health authorities are the basis for designing a dynamic map that helps us understand what we are up against and draw a symmetric solution.

#### 1. Medical Biotechnology

Ageing populations and people with genetically-inherited diseases can benefit from gene editing, but there are ethical concerns.

#### 2. Public Policy, Governance and COVID-19

Adequate government support for those most affected will be necessary to mitigate the pandemic.

## 3. Public Health Response and Health Care Impacts

COVID-19 has drawn a line under the fragility of many public health systems.

#### 4. The Virus and the Disease

SARS-CoV-2 was detected in late 2019, and the spread of COVID-19 soon followed.

#### 5. Developing and Distributing Vaccines

Issues related to an equitable distribution to the most vulnerable will likely become more prominent.

Ageing populations and people with genetically-inherited diseases can benefit from gene editing, but there are ethical concerns

Medical biotechnology is a rapidly developing means to rejuvenate the elderly and regenerate ageing or diseased organs - a potentially helpful development for the many countries with greying populations (nearly 8.7% of the global population was aged 65 or older by 2017, up from 6.7% in 1997, according to World Bank data). The use of "induced pluripotent" stem cells, which do not have to be derived from human embryos, has shown promise for regenerating an injured heart (while avoiding the ethical issues tied to the use of human embryonic stem cells), for example. Biotechnology tools are also being used for the diagnosis and treatment of human disease in a personalized way. We are currently able to modulate each layer of biology, from genes to proteins and cells. When it comes to the immunological treatment of cancer, the clinical development of protein- or antibody-based therapeutics is advancing, and the range of biological targets is expanding. In addition, genetically modified immune cells are being developed as immunooncology drugs, including chimeric antigen receptor (CAR)-T cells and T-cell receptor (TCR)-transduced T cells.

Regenerative medicine will be accelerated by gene-editing technology. CRISPR-Cas9, for example, enables the direct modification of genes in the interest of preventing and treating disease - though there are significant ethical issues related to altering the human genome in ways that will be passed from one generation to the next (a Chinese scientist stunned the world in 2018 when it was revealed that he had engineered the world's first gene-edited babies in a bid to make them resistant to their father's HIV infection). Tissue engineering has also evolved, thanks to organoid (a miniaturized organ produced in vitro) technology, novel biomaterials, and 3D printing. In general, a more personalized application of medical biotechnology is necessary, to enhance therapeutic efficacy and minimize unwanted side effects. And, the most important personal factor is the genome - in terms of genetic and acquired diseases. Integrating genome information into medical data is an important component of precision medicine, and is being aided by artificial intelligence. Personalized cancer vaccines, and drug tests using surrogates, are also major elements of precision medicine.

Related insight areas: Global Risks, Values, Healthcare Delivery, Precision Medicine, Innovation, Ageing, Vaccination, Global Health, 3D Printing



#### Scientific American Is It Safe to Delay a Second COVID

Vaccine Dose? 10 February 2021

Vaccine shortages and distribution delays are hampering efforts to curb the SARS-CoV-2 pandemic. So some scientists have suggested postponing the second shots of two-dose vaccines to make more available for people to get their first doses.



#### Ecole Polytechnique Fédérale de Lausanne Genes that dance to the circadian rhythm

09 February 2021

Scientists at EPFL have made breakthrough discoveries on the circadian clock and how it affects gene expression. Some of the findings suggest a biological underpinning for different behaviors in people, such as morning people, nappers, evening people, night owls etc. In 2017, the Nobel Prize in Physiology or Medicine went to three scientists who uncovered the molecular mechanisms that control the circadian rhythm, otherwise known as the "wake-sleep" cycle. To carry out their work, the scientists used the common fruit fly Drosophila melanogaster , making this the sixth Nobel to be awarded to research involving it. Fruitful fruit flies Life scientists have been using Drosophila for over a century now. First proposed by entomologist Charles W. Woodworth as a model organism, its use in research was pioneered by geneticist Thomas H.



### London School of Economics and Political Science

#### Vaccines and patents: how selfinterest and artificial scarcity weaken human solidarity

09 February 2021

We are living through a humanitarian crisis, yet design faults in intellectual property mechanisms and a faith-based approach to patents is steering governments into what the WHO has called 'a catastrophic moral failing', writes Siva Thambisetty. To explain patents and vaccines in the context of recent developments we need larger frameworks that are not contingent ... Continued.



#### The Science Breaker Diagnosing cancer by microbial signatures 03 February 2021

Cancer tissues are often thought to be sterile entities in the human body, exempt from the influence of our microbial cohabitants. To test this theory, we examined genetic information from patients' tumors and blood and discovered cancer-specific microbial communities among more than 30 cancer types. This study proposes a new class of microbialbased cancer diagnostics.



#### World Health Organization

The road to a COVID-19 vaccine 01 February 2021

Developing a vaccine is a long road full of checkpoints. Each phase designed to make sure it is both effective and safe. But with the whole world struggling to contain a pandemic, and unprecedented amounts of funding available, the road to finding the COVID-19 vaccine looks more like this.



#### McGill Reporter

LSD may offer viable treatment for certain mental disorders 29 January 2021

McGill study a step in understanding the mechanism of psychedelics' impact on brain and potential for therapeutic use The post LSD may offer viable treatment for certain mental disorders appeared first on McGill Reporter.



#### The Science Breaker

The Trojan mosquito: an in-house parasite defends against malaria 26 January 2021

Malaria is a life-threatening tropical disease globally spreading out, and scientists have been seeking an effective way to control its prevalence. Here, we propose an innovative approach that prevents disease transmission by infecting mosquitoes with a newly found beneficial parasite.

### **Public Policy, Governance and COVID-19**

### Adequate government support for those most affected will be necessary to mitigate the pandemic

Effective public policy and governance are critical during largescale emergencies for managing response measures and mitigating impacts. When it comes to health emergencies like outbreaks or pandemics, saving lives, preventing illness, and protecting the health of economies requires mounting a rapid and sufficiently-resourced public health response. Bolstering health care systems and resources, implementing necessary financial and social support (with a particular focus on the most vulnerable populations), and funding the development and distribution of medical countermeasures for long-term management of the crisis all play a role. To achieve this in the face of an unfamiliar new virus, these measures must be supported by policies and laws that help reduce transmission and prevent the overwhelming of public health systems until vaccines and therapeutics become widely available to prevent and treat the disease. Officials in Wuhan, China, for example the location of the first detection of COVID-19 - implemented a drastic lockdown in January 2020 that included prohibition of travel in and out of the city and restricted residents to their homes. This was imitated with varying degrees of severity in other locations as they, too, confronted the pandemic.

The term "lockdown" has been used to describe a broad range of measures around the world - including restrictions of differing scope and stringency, various levels of enforcement, and very different amounts of socio-economic support provided for the people most affected. The evidence is still being established for which laws and policies (and in what context) are the most effective for reducing transmission - and also the least restrictive necessary to protect public health. However, it is evident that a combination of restrictions, tailored to circumstances, is needed to prevent transmission. These restrictions must be coupled with paid sick leave, mechanisms to provide childcare, financial support to redress disproportionate impacts on the vulnerable (including frontline workers), and social distancing measures that everyone is able to adhere to as best as possible. Access to testing and treatment without incurring a financial burden can help ensure not only a strong COVID-19 response, but also address underlying inequalities and the disproportionate impacts of the disease on historically-marginalized populations. The broad application of these types of policies, and broad government support for those most impacted, will be key for the mitigation and long-term management of this pandemic.

Related insight areas: Justice and Law, Healthcare Delivery, Infrastructure, Taxation, Digital Economy and New Value Creation, Public Finance and Social Protection, Financial and Monetary Systems, Systemic Racism, Global Governance, Agile Governance, Peace and Resilience, Inclusive Design



Harvard Kennedy School – Journalist's Resource 6 tips for covering COVID-19 vaccine hesitancy 09 February 2021

The COVID-19 vaccine rollout has highlighted a segment of the population that previously didn't get much press: vaccinehesitant individuals. The post 6 tips for covering COVID-19 vaccine hesitancy appeared first on Journalist's Resource .

#### Asian Development Bank

COVID-19 Impact on Micro, Small, and Medium-Sized Enterprises under the Lockdown: Evidence from a Rapid Survey in the Philippines 08 February 2021

The novel coronavirus disease, COVID-19, has brought significant change to people's lives and business activities nationally, regionally, and globally. The Philippines took swift action-including enhanced community quarantine (ECQ)-to contain the pandemic and launched an emergency subsidy program with massive public spending to support disrupted households and businesses. The strict lockdown ran from mid-March to the end of May 2020 in the national capital region and high-risk provinces, causing huge economic losses. Six months after the March lockdown, the Philippine economy has moved to the recovery stage, but micro, small, and medium-sized enterprises (MSMEs) are continuing to confront a sharp drop in demand and revenue.

#### Imperial College London

Exposure to misinformation could make people refuse a COVID-19 vaccine

05 February 2021

Exposure to online misinformation about COVID-19 vaccines could reduce vaccine uptake, threatening the goal of herd immunity.



#### Center for Global Development

Five Factors that Drive Successful Large-Scale Vaccine Distribution 04 February 2021

Five key operational levers and choices determine how fast countries are able to roll out the COVID-19 vaccine. Ideally, someone at the national level makes these decisions, but this hasn't always been easy in multi-level government systems.



#### World Bank

Global Economy: Reversing the Scars of COVID-19 Towards a Robust, Sustainable, and Equitable Growth 01 February 2021

The COVID-19 pandemic has caused major disruptions in the global economy that could have lasting adverse effects. If history is any guide, the global economy is heading for a decade of growth disappointments. Uncertainty about the post-pandemic economic landscape and policies has discouraged investment; disruptions to education have slowed human capital accumulation; concerns about the viability of global value chains and the course of the pandemic have weighed on trade and tourism. In the context of weak fiscal positions and elevated debt, institutional reforms to spur growth will be particularly important. A comprehensive policy effort is needed to rekindle robust, sustainable, and equitable growth.



#### IOM - UN Migration

IOM Director General calls for migrants to be included in COVID-19 vaccination plans 01 February 2021

IOM Director General António Vitorino urges governments to respect the fundamental right of health care and ensure that migrants, refugees, and internally displaced people are fully included in the COVID-19 vaccination plans, irrespective of their legal status.



#### Harvard Business School Working Knowledge How Influencers, Celebrities, and FOMO Can Win Over Vaccine Skeptics 29 January 2021

Drawing from product innovation theory, Rohit Deshpandé and colleagues offer three recommendations to speed adoption of COVID-19 vaccines.

#### COVID-19 has drawn a line under the fragility of many public health systems

Adequately responding to COVID-19 requires sufficientlyresourced public health systems that can test people rapidly and accurately, contact trace, guarantine contacts of the infected, isolate cases, and provide support for those in need. In the absence of approved and widely-available vaccines, and with many treatments still being tested, our current responses to COVID-19 depend heavily on interventions designed to reduce transmission of the coronavirus that causes the disease - such as physical distancing, widespread mask use, regular handwashing, ventilation, and surface cleaning. However, given the potential for rapid exponential transmission of the SARS-CoV-2 coronavirus, public health systems - and health care systems more broadly - can be quickly overwhelmed. While mild and asymptomatic cases generally do not require hospitalization, active community transmission and more severe cases of COVID-19 have placed significant demand on the resources available to hospitals and intensive care units including beds, equipment, and health care workers. While reducing transmission can reduce the impact on hospitals, that has been shown to require a public health system that can test in large numbers, contact trace, and provide other necessary preventive measures.

Still, even these preventive public health strategies can be overwhelmed if community transmission of the coronavirus spikes. In early recognition of this fact, the term "flattening the curve" quickly inserted itself into mainstream discourse during the early days of the pandemic - as a means to describe what was necessary to sustain health systems and maintain public health. Awareness of this necessity also spurred the implementation of control measures such as bans on mass gatherings, mandates for the widespread use of masks (following some early confusion as more was being learned about transmission), and - where the pandemic has threatened to run rampant - the implementation of lockdowns often coupled with social and economic support for workers and employers. As more is understood about the long-term health impacts of COVID-19, we can more accurately forecast future demands on health care systems and hospitals. Even when vaccines (presumably) become widely available, it will take some time for full distribution to high-risk communities and broader populations. Until then, non-pharmaceutical interventions will be necessary to save lives, reduce illness, and avoid overwhelmed health systems.

Related insight areas: Future of Health and Healthcare, Digital Identity, Pandemic Preparedness and Response, Civic Participation, The Great Reset, Global Governance, Vaccination, Agile Governance, Taxation, Humanitarian Action, Financial and Monetary Systems, Healthcare Delivery



#### UN Women

Women in science who are making a difference during the pandemic 09 February 2021

This 11 February, we're celebrating International Day of Women and Girls in Science by highlighting just some of the women and girls around the world who have made tremendous contributions during the ongoing crisis.



#### Australian Strategic Policy Institute

China and India tussle online over vaccine diplomacy

08 February 2021

China and India are using the inoculation drive against Covid-19 as part of their diplomatic efforts to shore up global and regional ties—and they aren't the only ones.



#### Project Syndicate

Solving the Prison Dilemma of COVID-19

05 February 2021

Congested prisons with poor sanitation and overstretched medical facilities are hotbeds of infectious diseases such as COVID-19. Policymakers in Malaysia and elsewhere should couple immediate prisoner releases to reduce overcrowding with coordinated training and support programs to prevent recidivism.



#### RAND Corporation

Telehealth Use Among Safety-Net Organizations in California During the COVID-19 Pandemic

04 February 2021

During the COVID-19 pandemic, visit volume at a sample of FQHCs declined modestly for primary care visits and remained stable for behavioral health visits because telehealth visits replaced in-person visits.



Center for Global Development What Lessons Can Other Countries Learn from the UK Reaching 100,000

COVID-19 Deaths?

The UK example has some key lessons for all countries (including the UK itself) who are considering how to improve their current response, and how to "build back better" and prepare for future pandemics.



#### FiveThirtyEight

How Biden's Response To The Pandemic Is Different From Trump's 01 February 2021

In this installment of the FiveThirtyEight Politics podcast, Anna Maria Barry-Jester of Kaiser Health News joins the crew to compare President Biden's response to the pandemic with that of former President Trump. They also discuss a recent poll showing that if Trump were to start a new "Patriot Party," it would have significant draw among Republican voters.



#### World Health Organization COVID-19 virus variants and transmission

01 February 2021

#### SARS-CoV-2 was detected in late 2019, and the spread of COVID-19 soon followed

Not long after it was first detected in late 2019, the coronavirus SARS-CoV-2 was having an overwhelming global impact. Coronaviruses are a class of respiratory viruses that have caused everything from the common cold to Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS). Humans are infected by exposure to the virus in respiratory liquid particles, from tiny aerosols less than 0.0005 centimetres in size to larger droplets. These can be spread when an infected person coughs, sneezes, sings, speaks, or even just breathes heavily (current evidence indicates that the primary form of transmission is through respiratory droplets between people in close contact). Aerosols may cause transmission particularly in crowded and confined settings with inadequate ventilation, where people remain for extended periods of time or engage in activities more likely to result in exposure. In addition, infected people may transmit the virus to surfaces - which can then infect others if they touch the same contaminated surface and then touch their eyes, nose, and mouth without first washing their hands. In any case, the virus is highly contagious; on average, each infection will infect more than two additional people.

This rate of additional infections depends heavily on behaviour. Super-spreading events, where one infected person transmits the virus to many more people than is average, have been a significant driver of the disease caused by the virus: COVID-19. The disease causes a wide range of clinical symptoms including shortness of breath or difficulty breathing, fatigue, fever, malaise, and loss of sense of taste or smell. Symptoms typically begin within a week of exposure, but may take up to 14 days to appear. The virus can be transmitted in the pre-symptomatic stage before people know they are infected; current evidence suggests that about 20% of infected individuals will not experience identifiable symptoms but may still be able to transmit the virus to others. People who are even potentially exposed to SARS-CoV-2 infection should guarantine for two weeks. If symptoms do appear, one will typically no longer be able to transmit to others 10 days after symptoms resolve. Evidence regarding impacts that linger after the disease is still being gathered - though some people may have persistent issues ("long Covid") including widespread organ damage (particularly to the lungs), lasting cognitive impairment, and severe fatigue.

Related insight areas: Vaccination, Future of Media, Entertainment and Sport, Global Governance, Agile Governance, Mental Health, Global Health, Ageing, Values, Retail, Consumer Goods and Lifestyle, Healthcare Delivery, Public Finance and Social Protection, Behavioural Sciences



#### The Conversation

COVID vaccines: rich countries have bought more than they need – here's how they could be redistributed

09 February 2021

In a number of wealthy countries, the number of COVID-19 vaccines ordered vastly exceeds what's needed, while many poorer countries will have to wait – possibly for years – for vaccines to become widely available.



#### Imperial College London

Imperial's Covid outbreak tool projects vaccine impact around world

08 February 2021

Imperial's coronavirus outbreak tool has been updated to project the impact of vaccine programmes in all countries.



Centre for European Policy Studies (CEPS) Vaccines: Where are we now? 04 February 2021

The EU's procurement strategy is clearly failing. A major supplier, AstraZeneca, has just announced major delays in its delivery schedule while the pandemic continues unabated. But this is not the only case of delays in vaccine delivery: other companies have also announced that they will not be able to stick to their schedules.



Global Investigative Journalism Network How to Investigate COVID-19 Vaccine Contracts

04 February 2021

Contracts to buy COVID-19 vaccines are being kept largely confidential by the global purchasing entity started by the World Health Organization and by national governments. Here GIJN's Toby McIntosh offers a guide to reporting on the creation and delivery of COVID-19 vaccines and combating government secrecy at both the international and national levels.



#### STAT

Disadvantage indices can help achieve equity in vaccine allocation 01 February 2021

Policymakers have wrestled for months with how to fairly prioritize populations for Covid-19 vaccines. Even as vaccines are being rolled out, there's little agreement on the exact sequence of priority groups. Allocation frameworks vary across states, continue to be revised , and, in apparent disagreement with current federal guidance , the Biden-Harris administration announced that its national Covid-19 strategy will open up previously established priority groups. Amid the flux, equity must remain constant. While states may vary in how they organize the sequences of priority groups, within each group they should ensure that better-off and worse-off groups are equally likely to be vaccinated.

#### VoxEU



What we can learn about economics from professional sport during Covid-19

31 January 2021

Professional sport has experienced severe shocks from Covid-19, creating natural experiments. These have provided partial answers to a number of questions, including how airborne viruses may spread in crowds; how crowds respond to the risks and news of infection; how the absence of crowds may affect social pressure and decisions; and how quickly betting markets respond to new information. This column reviews the evidence and advises how research in the economics of sport could continue to be most valuable to policymakers.



#### Project Syndicate

The Problem with the COVID Convergence

28 January 2021

One of the most surprising global trends to appear during the COVID-19 pandemic is a reduction of inequality across countries, owing to the disproportionate effects of the virus on richer countries. Unfortunately, there is little to celebrate when convergence reflects losses at the top instead of gains at the bottom.

### **Developing and Distributing Vaccines**

Issues related to an equitable distribution to the most vulnerable will likely become more prominent

When COVID-19 began spreading, the global health community and pharmaceutical industry launched a sweeping effort to identify, develop, and manufacture a vaccine. Safe, effective, widely-distributed and widely-administered vaccines will be key for a potential return to day-to-day normalcy. As with any new disease, there was no vaccine for COVID-19 when it emerged and despite the SARS and MERS epidemics, and warnings about the pandemic potential of a novel coronavirus, the work on vaccines had to start from scratch. Vaccines generally require years to develop and obtain approval, though the broad push for a COVID-19 vaccine has been relatively rapid. The testing and approval process is always critical, and as of late November 2020 there were 55 coronavirus vaccines in clinical trials on humans, and 13 had reached the final stage of testing. Meanwhile three vaccines had shown positive results from latestage trials, including two based on mRNA technology and one using a viral vector. The two mRNA vaccines are made by BioNTech-Pfizer and Moderna. The other, developed by Oxford and AstraZeneca, does not require freezer storage - which could make its storage and transport easier, and boost global accessibility.

It is hoped that initial vaccines might become available for distribution as early as January 2021, with more widespread vaccination potentially becoming available at some point in the first part of the year. Operational considerations for the distribution of vaccines and their administration will be critical. Early messaging to the public about the safety of vaccination will also be necessary in order to build confidence; this is particularly crucial for ensuring that enough of the population is vaccinated to reach sufficient levels of protection. Early preparation will be crucial, in order to adequately support the practical requirements of distributing vaccines once available particularly since it is likely that more than one dose (and potentially very-low temperature storage) will be required. Ensuring auxiliary supplies are available like syringes and bandages will also be key as supply chains may be strained. Public officials had begun planning for prioritizing specific populations in many places by early December 2020, given that initial supplies will likely be limited. Issues around equitable distribution to those most in need will be prominent - and a system to track administered vaccines, especially if more than one dose is required, will be imperative.

Related insight areas: Healthcare Delivery, Future of Health and Healthcare, Biotechnology, Human Rights, Future of Media, Entertainment and Sport, Innovation, Vaccination, Global Health, Insurance, Inclusive Design, Global Governance, Justice and Law



Project Syndicate The COVID Revolution 09 February 2021

The COVID-19 pandemic has highlighted the need to revitalize postwar institutions, address shortcomings in democratic governance, and launch a global attack on the virus. Ending the pandemic and building a better future will, above all, require the world to develop new norms to replace worn-out, insular beliefs.



#### Science Daily

Climate change may have driven the emergence of SARS-CoV-2

05 February 2021

A new study published today in the journal Science of the Total Environment has revealed large-scale changes in the type of vegetation in the southern Chinese Yunnan province, and adjacent regions in Myanmar and Laos, over the last century. Climatic changes including increases in temperature, sunlight, and atmospheric carbon dioxide -- which affect the growth of plants and trees -- have changed natural habitats from tropical shrubland to tropical savannah and deciduous woodland. This created a suitable environment for many bat species that predominantly live in forests.



The New Humanitarian Tracking the coronavirus pandemic and vaccine rollouts 04 February 2021

Updated data and maps tracking COVID-19 developments plus the latest on vaccine rollouts in humanitarian emergencies.



### VoxEU

Family ties and pandemics: Evidence from Covid-19

04 February 2021

It was clear from early on in the Covid-19 pandemic that combatting it would require governments to monitor mass transit, schools, workplaces, and large public events. Less appreciated was the role played by social capital and family ties in the spread of the virus. This column provides an empirical analysis demonstrating a robust positive relationship between family ties and the contagion rate across the world. Death rates, by contrast, are not affected by family ties or other social factors, but by structural variables - from geography and GDP to median age and available hospital beds.



#### London School of Economics and Political Science

Anneliese Dodds: The three core elements of a better, more integrated health and economic response to COVID-19

01 February 2021

The UK government has often both spoken and acted as if the health and economic aspects of the coronavirus crisis must be traded off against one another. They would have it that the more people's health is prioritised, the greater the hit to the economy, and vice versa. Yet, nearly a year on from the outbreak of COVID-19 here in the UK, two bleak facts stand out about our country's performance: we have had the highest total number of deaths in Europe and suffered the worst recession of any major economy. .

#### **RAND** Corporation

A Comparison of National and International Approaches to COVID-**19-Related Measures** 

29 January 2021

The authors evaluate the comparability of commonly used COVID-19 measures within the United States and across countries, and make recommendations for the use and development of measures that would allow for more standardized and valid comparisons.



#### VoxFU Deaths of despair and the incidence of excess mortality in 2020

28 January 2021

The spread of COVID-19 in the US has prompted extraordinary steps by individuals and institutions to limit infections. Some worry that 'the cure is worse than the disease' and these measures may lead to an increase in deaths of despair. Using data from the US, this column estimates how many non-COVID-19 excess deaths have occurred during the pandemic. Mortality in 2020 significantly exceeds the total of official COVID-19 deaths and a normal number of deaths from other causes. Certain characteristics suggest the excess are deaths of despair. Social isolation may be part of the mechanism that turns a pandemic into a wave of deaths of despair; further studies are needed to show if that is the case and how.

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#### Acknowledgements

- Cover and selected images throughout supplied by Reuters.
- Some URLs have been shortened for readability. Please follow the URL given to visit the source of the article. A full URL can be provided on request.

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