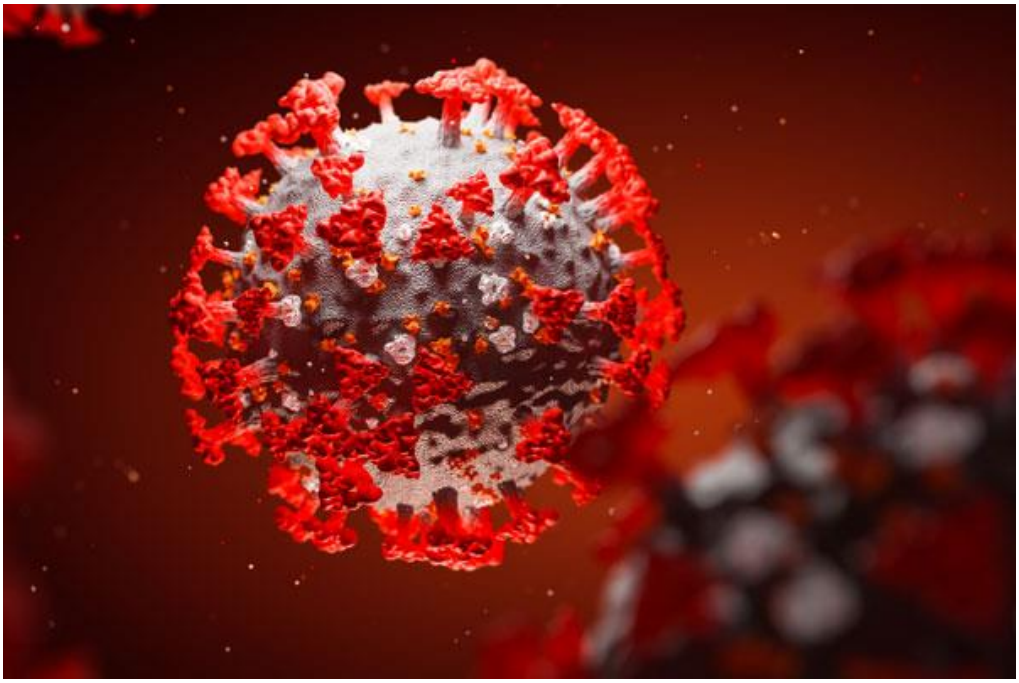
The Millennium Project

THREE FUTURES OF THE COVID-19 PANDEMIC IN THE UNITED STATES JANUARY 1, 2022

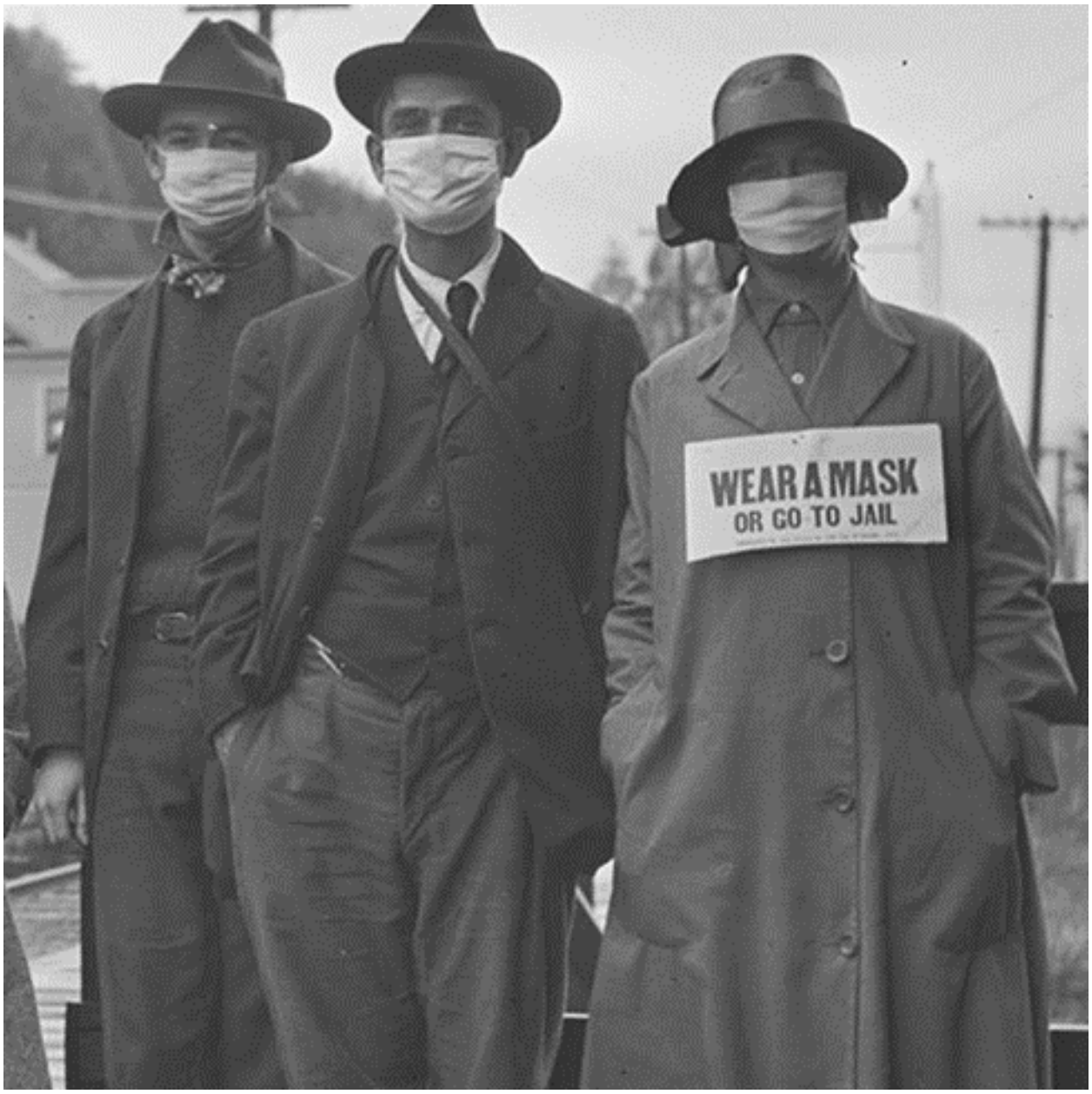
Implications for all of us



Source: National Human Genome Research Institute, US National Institute of Health

A report by
The Millennium Project Covid Scenarios Team

October 2020



Spanish Flu Pandemic 1918

“Let us not be blind to our differences -- but let us also direct attention to our common interests and to the means by which those differences can be resolved. And if we cannot end our differences, at least we can help make the world safe for diversity. For, in the final analysis, our most common link is that we all inhabit this small planet. We all breathe the same air. We all cherish our children's future. And we are all mortal.”

- John F. Kennedy

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INTRODUCTION

The Millennium Project warned that, “Increasing mass migrations and international travel spread disease more rapidly than in the past; increasing urbanization and population density accelerate and intensify the capacity to bring life as we know it to a grinding halt.” ***1997 State of the Future***.

Michael Kleeman of the American Red Cross asked The Millennium Project to write COVID-19 scenarios for the United States saying: “We are so focused on what we have to do today to respond to the COVID-19 pandemic that we don’t have time to think 12 to 18 months down the road, but someone has to. We need to integrate the future possibilities into our planning.” Without any promise of funds, the scenario team was quickly assembled and began to work.

Members of the COVID-19 Scenarios Team were:

- Banning Garrett, strategic policy analyst and consultant, Scenario 3
- Elizabeth Florescu, The Millennium Project Director of Research, Scenario 2, and report production
- Jerome Glenn, team leader, The Millennium Project CEO, Scenario 1
- Theodore Gordon, co-founder of The Millennium Project, Scenario 2
- Jay Herson, Biostatistics, Johns Hopkins Bloomberg School of Public Health, Scenario 1
- Michael Kleeman, American Red Cross and other frontline Covid related issues, input to all the scenarios
- Liza Loop, Founder LO*OP Center, general input for all scenario and report editing
- Paul Saffo, futurist and author, Scenario 3
- Alfred Watkins, Executive Chairman, Global Innovation Summit, economic input to all the scenarios with special attention to Scenario 2

The scenarios study methodology consisted of several elements:

1. Intensive scanning of COVID-19 research, professional journal and public articles, and other scenarios that were shared among the team and discussed at weekly meetings. This helped to develop a characteristics matrix for the scenarios, as well as to identify key questions to be addressed through Real-time Delphi[1] (RTD) questionnaires and find relevant experts to be invited to the panels.

2. Five Real-Time Delphi (RTD) studies collected judgments from experts in specific fields: health care, disaster relief, economics, international relations, politics, security, and futurists for input to the scenarios. The five RTDs were:

RTD 1: US Medical/Health Issues

RTD 2: US Socio-Economic Implications

RTD 3: International Medical/Health Issues

RTD 4: International Socio-Economic Implications

RTD 5: Variables for a State of State of the Pandemic Index

The results of the first four RTDs are available in Appendix B of this report.

3. The results of the RTDs were distilled and used by the scenario team as input for writing the initial drafts of the three scenarios.

4. Initial drafts were circulated and discussed among the team members for additional inputs and consistency checks.

5. The re-drafted scenarios were then submitted for peer review. The feedbacks were integrated in the scenario versions available in this report. The reviewers of the scenarios were:

Scenario 1:Clem Bezold, James Boyd, Dennis Bushnell, Greg Folkers, Karen Herrera-Ferrá, Bill Hajdu, James Hochschwender, Hans Khoe, Michael Kleeman, Tricia Lustig, Mike Marien, Michael McDonald, and Max Rudolph.

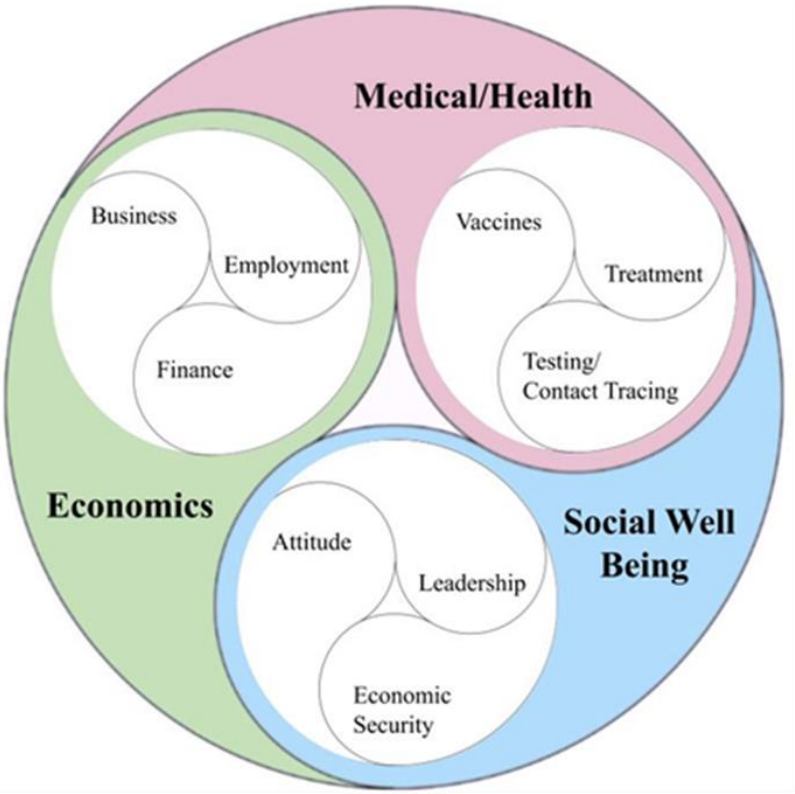
Scenario 2:Kenneth Allen, Clem Bezold, Jose Cordeiro, Nadezhda Gaponenko, Jerome Glenn, Brock Hinzmann, James Hochschwender, Michael Kleeman, Mike Marien, and Max Rudolph.

Scenario 3: Clem Bezold, Jay Herson, James Hochschwender, Mike Marien, Czeslaw Mesjasz, Barry Minkin, and Ron Ridker.

The Millennium Project Interns who conducted research for this report were James Boyd, Megan Cansfield, Hans Khoe, Olivia Peterson, Andrea Sapal, Radhika Sikhakhane, Justin Smith-Hoopes, and Sai Velaga.

In parallel with the scenarios work, a unique State of the Pandemic Index (SOPI) was suggested by Jay Herson and designed by Ted Gordon based on the model of the State of the Future Index computed by The Millennium Project since 2000.[2] Judgments and suggestions about the variables to be included in the SOPI were collected through RTD 5. The development of SOPI is still in progress and will be the focus of a subsequent report.

It was decided from the beginning that the COVID-19 scenarios should not just focus on the disease, but present the larger picture of the effect of the pandemic on societal dynamics. A graphic representation of the main elements and their interactions as they are integrated in the scenarios could look like the following:



Feedback on the scenarios and this work in general are welcome at: info@millennium-project.org. And a good survey of related research is available at https://securesustain.org/covid-19-reports/[3]

Executive Summary

We are so overloaded with information coming in all directions from medical experts, economic analysts, politicians, public health officials, and media pundits, that it is difficult to get a coherent picture of possible future directions of the COVID-19 pandemic.

When can we get back to normal? Will the vaccines end the pandemic? Will the virus spread further in Latin America, Africa, and Southern Asia before coming back to the United States with mutations that will make previous treatments and vaccines less effective? Will global leadership emerge to manage the global pandemic? Will the world recession become a depression? Will this global "time out" lead to social, economic, and institutional innovations just as World War II lead to the United Nations and other international institutions and reforms?

These and other uncertainties are organized and assessed through three scenarios. A scenario is a story that connects the present to a future condition with plausible cause and effect links, events, and decisions throughout the narrative. The scenarios were produced with input from four Real-time Delphi questionnaires that focused on US and international health and socio-economic developments, plus a fifth RTD that assessed potential variables for computing a State of the Pandemic Index. The expert panels were composed of 256 medical doctors, public health professionals, emergency relief staff, economists, and futurists. The scenarios are:

1. ***America Endures***– baseline, surprise free, both good and bad decisions, and mix of elements from scenarios 2 and 3.
2. ***Depression, Hubris, and Discord***– plausible negative scenario, bad decisions, with social and political discord
3. ***Things went Right!*** – plausible positive scenario, with good decisions, responsible citizenry, and rising social cohesion

The COVID-19 pandemic presents fundamental challenges to all elements of our society. Understanding how this complex event will unfold, the cause-effect links, and the impacts on our lives will be critical to creating effective responses.

The following are distillations of the more complete scenarios later in this report:

Scenario 1: America Endures

We have learned that pinning all our hopes on a COVID-19 vaccine was unwise. With only an average vaccine efficacy of 55% and only 55% of the population getting vaccinated by January 2022, herd immunity has not yet been achieved and in the US, the disease is not going away soon. We are learning how to manage it as we have with other chronic problems like AIDS. The pandemic has accelerated the implementation of tele-everything and applications of artificial intelligence.

This scenario contains sections on vaccines, treatments, testing, contact tracing, local community actions, hospital malaise, lower-income countries, periodic and partial lockdowns, economic impacts, and international collaboration.

The recession in the United States looks like it will lead to depressions in many parts of the world. Per capita income has fallen worldwide, and inequalities have increased. The political will to continue the financial support for business, unemployment, and state budgets has been irregular. As a result, public health and medical resources lurched back and forth as COVID-19 continued to surge and re-emerge as the Northern Hemisphere entered the flu season for the second time during the pandemic in this 2021/2022 season.

Fires in the West, hurricanes in the South and East, and food shortages across America have stretched disaster personnel and resources beyond public appreciation. As a result, there are continuing gaps among emergency service delivery, donors, and the needs of first responders and other volunteers. This had led to increased social stress, slower recovery from disasters, and a breakdown in trust between citizens and their first and second line responders.

The persistence of the pandemic has depressed much of the nation both psychologically and financially, until the national recovery acts began to improve COVID-19 coordination, economic recovery, and American morale. America has endured through the dismal drumbeat of disease, death, and economic decline, and is now expected to emerge better prepared, with countless innovations to address this and future pandemics.

For the first time in history, the whole world has had a simultaneous “time out” which stopped business as usual, slowed the pace of life, and gave time for many to re-think… everything from the meaning of work to the purpose of education and priorities in life. A sense of local community has returned with a renewed emphasis on local resilience and global solidarity may have increased. The need for international collaboration to address

the next pandemic is understood today, as is the need for personal responsibility for wearing masks, physical distancing, hand washing, and using tracing apps. Like the 1918 Spanish flu virus which eventually faded into the seasonal H1N1 flu, so too the SARS-CoV-2 virus that causes COVID-19 will fade into a less-fatal disease as we develop resistance, vaccines improve, and immunity spreads.

Attention now turns to improving the American health insurance system moving the nation closer to universal coverage. Military and public health planners draw lessons for addressing future biological warfare possibilities and begin to understand how global warming is changing the world pattern of disease. America has endured.

Scenario 2: Depression, Hubris, and Discord

This scenario reviews the past 2 years, presenting the shortfalls of a coherent and timely strategy to address the pandemic and speculates about the potential developments for the coming year.

Given the delay in acknowledging the threats of the pandemic, there were no coherent strategies or policies to address them. The measures taken by some states and local governments came too late. As a result, by the beginning of 2022 some 600,000 people have died of COVID-19 in the US and hundreds of thousands more have died from indirect consequences of the pandemic. At its peak, the number of new identified infections reached 70,000 per day. The US continues topping the list of countries with the highest number of deaths and most countries closed their borders to US citizens.

Many of the early assumptions about COVID-19 have proved to be naive and the long-term consequence of being infected and “cured” are just beginning to be discovered. Despite efforts around the world, there are no hopes for a proven and effective vaccine anytime soon. Many uncertainties remain, complicating the strategies that rely on both infection-tracking and slowing the speed of virus mutation.

The medical problems were serious, but the policies established in an attempt to contain the virus took their toll as well. ICU’s were out of space and equipment, and hospitals and cities were bidding against each other to obtain equipment. Initial equivocation surrounding the value of masks undoubtedly caused some of the deaths.

The lack of clear strategies also led to a social and economic disaster; inflation has increased to almost 10%, businesses—small and large—went bankrupt, and a “K” shaped recovery is widening the gap between those winning in the stock market and those who increasingly suffer the consequences of the pandemic. Even the optimists do

not expect GDP to return to pre-COVID levels before the end of 2023. Some 40 million people in America were at risk of losing their homes with disproportionate effect on certain race and ethnic groups.

As 2022 begins, public disquietude is rumbling, and crime and suicides stay at uncomfortably high levels everywhere. The number of people moving from areas of high infection to areas where conditions appear to be better is increasing and some states ban free movement of people. Violence increases and the deployment of troops and the possibility of martial law to maintain order are considered by many people to be a threat to freedom. Others view the troop deployments to be common sense, essential public safety measures. Additionally, the threat of terrorist or other criminal groups acquiring the virus and deploying it to attain certain goals is increasing.

The compounding effect with other disasters heightened food, shelter and other insecurities. National rationing of some commodities might be established and operate much as during WWII. The long lines at food banks and unemployment offices are getting even longer. The demand for assistance from support organizations such as the Red Cross reaches all-time high. However, with shrinking donations and fewer volunteers, their resources are being ever more stretched.

Proposals to fix things and get society back to where it was in 2019 abound, but some people are distrustful and see them as bailouts, favoring the rich or the undeserving poor, the very people they hold responsible for their dilemma in the first place. We don't even have a silver lining in mind; the best we can hope for is learning to live with it.

Scenario 3: Things Went Right!

Looking back to the depths of the pandemic in mid-2020, it is astonishing to think that all the elements of the eventual recovery were known and available even before the virus began its run in early January 2020. Yet the virus burned through the population in 2020 because of failure to take effective measures in the first weeks of the pandemic and the continued uncoordinated response through the balance of 2020, compounded by virus denial, lack of central leadership, and politicization of the pandemic that actively frustrated efforts by public health professionals to craft and deploy effective strategies.[4]

In the end, we belatedly threw the kitchen sink at the problem; and it worked. The pandemic was brought down by a combination of tried and true public health measures, gradually rising public acceptance of new behavioral norms, and crucially, a new administration focused on creating a "whole-of-government" effort that pulled together all the elements necessary to effectively manage the COVID-19 threat. This

governmental response included stepped up coordination of city and state governments with each other and with the federal government.

The turning point came in early 2021 when COVID-19 deaths topped 500,000 and a shell-shocked and weary nation was ready to grudgingly coalesce around the new administration's science and policy-driven plan to finally overcome the pandemic. Recognizing that full deployment of a vaccine still lay in the future, the plan focused on coordinating once-independent efforts in a manner that ensured maximal positive effect. Simply put, the politicians stepped back, the vastly outnumbered skeptics fell silent, and the policy and public health experts were finally able to work undisturbed.

This in turn created a context in which we were able to make the most of the medical innovations that eventually arrived. Vaccines were developed and did make a big difference, but relieved leaders quietly chalked up their success to the all-important coordination that slowed the contagion and allowed them to make the most with the tools they had at hand.

Lessons learned led to several long-term benefits. The US began to return to a posture of international collaboration and coordination with entities, including the EU, China the World Health Organization. And most importantly, there was a general appreciation that one single factor mattered more than any other: social cohesion. We are emerging from this crisis with greater appreciation that increased social cohesion is essential to fending off not only the next virus outbreak, but to solving the myriad other problems facing us in the century.

Endnotes

[1]The Real-Time Delphi is a futures research methodology for gathering expert opinion on specific topics. The responses are updated as entered (in real-time) and are visible to all the participants. For more information see: http://www.millennium-project.org/publications-2/futures-research-methodology-version-3-0/

[2]State of the Future Index http://www.millennium-project.org/state-of-the-future-index/ Retrieved October 9, 2020

[3] Michael Marien, "COVID-19 Reports: What Experts Expect and Propose" (10 Oct 2020, 16p; 66 reports in seven categories with Highlights and Organization Index)

[4]NAS and NAM Presidents Alarmed By Political Interference in Science Amid Pandemic, statement, September 24, 2020, https://www.nationalacademies.org/news/2020/09/nas-and-nam-presidents-alarmed-by-political-interference-in-science-amid-pandemic. Retrieved October 8, 2020

THE SCENARIOS

Scenario 1: America Endures

By Jerome C. Glenn, The Millennium Project
with Jay Herson, Johns Hopkins Bloomberg School of Public Health

We have learned that COVID-19 is not going away soon. We are learning how to manage it as we have with other long-range health issues like AIDS. It has accelerated the implementation of tele-everything and applications of artificial intelligence (AI). The global "time-out" has given many the opportunity to re-think… everything from the meaning of work to the purpose of education and priorities in life. What will evolve is too soon to say. But the international discussions for the Global New Deal may actually improve the prospects for humanity.

Meanwhile, the recession in the United States looks like it will lead to depressions in many parts of the world. Per capita income has fallen worldwide, and inequalities have increased. The political will to continue the financial support for business, unemployment, and state budgets has been irregular. As a result, public health and medical resources lurched back and forth as COVID-19 continued to surge and re-emerge as the Northern Hemisphere entered the flu season for the second time during the pandemic this 2021/2022 season. Fires in the West, hurricanes in the South and East, and food shortages across America have stretched disaster personnel and resources beyond public appreciation. As a result, there are continuing gaps among emergency service delivery, donors, and the needs of first responders and other volunteers. This had led to increased social stress, slower recovery from disasters, and a breakdown in trust between citizens and their first- and second-line responders.

The persistence of the pandemic and periodic lockdowns has depressed much of the nation both psychologically and financially. More Americans have died of COVID-19 over the past two years than died during World War II. Many desperate people were resorting to protests and riots across the country until the national recovery act began to improve coordination to address the pandemic, economic recovery, and American morale. This made it possible to see the light at the end of the tunnel. America has endured through the dismal drumbeat of economic numbers and more than 500,000 COVID-19-related deaths. The nation is now expected to emerge better prepared, with countless innovations to address future pandemics. Many heartwarming stories of local self-organizing groups helping their neighbors continue to fill the news.

More Rough Choppy Waters than Distinct Waves

It was unfortunate that governors and other leaders opened their economies too early during May and June of 2020. Restaurants, sporting events, and other public gathering managers did enforce physical distancing at first, but then overconfidence took hold. As a result, the virus continued to spread during the summer of 2020.The summer was supposed to be the low point of new cases, but the number of new cases turned out to be higher than recorded for the spring and continued to grow into the fall of 2020 with even the President and While House staff getting COVID-19. As a result, some mask-resisters and vaccine-deniers began to re-think their positions and have come around to act more responsibly. Nevertheless, the disinformation “infodemic” from domestic and foreign sources continues to amplify domestic ignorance.

It was very difficult to manage the pandemic because 40% of infected people had no obvious symptoms. Such healthy, asymptomatic people were unknowingly infecting others. Many schools, universities, and businesses that opened in the fall of 2020 without meeting the health benchmarks[5] had to close down quickly and retreat to online teaching and operations due to new surges of infections often from asymptomatic virus carriers.

The new administration and Congress initiated a series of national recovery acts with continued financial support that has reduced unemployment, increased business recovery, provided massive online training, and established the National Service Corps. It also re-established the pandemic unit at the National Security Council and established the Pandemic National Command in the Department of Homeland Security. These were supported by an improved interagency early warning system at the CDC. This included the National Pandemic Online Platform with the national COVID-19 registry, and dedicated infrastructure for clinical trials with trained professionals (both government and private sector) on call for speedy implementation. Additionally, the AI platform developed by the DoD Rapid Reaction Technology Office enables rapid agent-based modeling of unique situations like COVID-19 (as well as biological warfare) for fast prevention and response actions. The platform also includes interaction with self-organizing local community groups that is reinforcing self-reliance and personal responsibility. As a result, the National Platform is helping to coordinate national, state, and local resources for rapid, low cost testing, contact tracing, isolation, improving treatment, better PPE, and other supply and equipment enhancements. It also includes a system for deployment of volunteer personnel trusted within the most vulnerable and affected communities. Hence, this time the impact of the new surges of outbreaks of the disease should be under better control than observed during the past two years. America now faces the New Year with more confidence.

Vaccinations

Pinning all our hopes on a vaccine that would stop the pandemic was unwise. The many approaches to developing a vaccine were helpful to create a portfolio of vaccines (different ones for different demographics), but, on average, they were only 55% effective and some required a second injection. Since only 55% of the public has been vaccinated so far, we have not reached herd immunity, which requires approximately 70% of the public to be immune. As several vaccine candidates approached approval, there was considerable confusion and misinformation about which vaccine was best for different demographic groups. Decisions about avoiding one vaccine to wait for another brought tension to many because of the uncertainty if—and when—the new vaccine would be approved, immunity duration, and distribution strategy.

Since one third of Americans said they would not take the vaccine, DHHS and others paid PR firms that created memes like “Get vaccinated to Make America Great Again” and “Vaccination saves the Nation” that had some impact over the summer and fall of 2021, and reduced the anti-vaccination mindset down to about 20%. Others created online platforms to identify and counter misleading and malicious information such as rumor of a little girl who developed a neurological disorder. As it became clear that sometimes there were lasting effects of the virus on the lungs, heart, and other organs—even for mild cases—more anti-vaccine views began to change. Most school districts and employers required a vaccination. Public contact firms like airlines, supermarkets and fast food chains saw this as a competitive advantage. The Supreme Court will be ruling on whether states that required vaccinations can ban people from states that do not require vaccinations from entering their states. Stock prices of driverless trucking companies have skyrocketed.

Operation Warp Speed’s gamble—that funded the manufacture of vaccines in large quantities and filled vials for shipping without even knowing whether their vaccines were effective or would be approved—paid off. As vaccines by Johnson & Johnson, AstraZeneca, Merck, Moderna, Pfizer, and Novavax were approved, distribution was achieved with unprecedented speed. However, the need to scale manufacturing caused supply delays in critical components for the vaccines (e.g., medical glass) delaying deployment. To address the shortage of vials, the global nonprofit Coalition for Epidemic Preparedness Innovations (CEPI) bought 100 million vials from the Italian manufacturer Stevvanto. Each vial can hold 20 doses; hence, this is enough for 2 billion injections. The international target of 5.6 billion people vaccinated twice to manage the pandemic required the production and use of 11 billion individual doses. The EC purchased enough doses for its 446 million citizens and to donate some to lower and middle income countries. Gavi[6] with WHO is also contributing to the 92 low- and middle-

income countries. The US government purchased and distributed over 600 million doses.[7] Some US insurance companies gave discounts on premium payments for those that got vaccinated.

However, prior to all this progress, the US public was in serious limbo; premature hype about how fast a vaccine would end the pandemic, led some to despair and others to become increasingly angry as periodic lockdowns occurred as a result of COVID-19 flare-ups. Some people much further down the vaccine priorities list became impatient, having been told that it might be nearly a year before they would be getting the vaccination. As a result, they became desperate and were easily seduced by the online lure of counterfeit vaccines. These people thought they were immune, but many ended up infected with COVID-19. This reinforced anti-vaccine hysteria. Nevertheless, most accepted the priority list for getting the vaccines as: 1) hospital staff and related employees; 2) those over 65 years old; 3) frontline essential employees such as food delivery supply chain workers (from farm to consumer), utilities employees (water, gas, electricity), garbage, police, fire fighters, active military, and postal workers; 4) public schoolteachers; 5) commercial delivery personnel; and 6) others at risk.

Although the mass vaccine campaigns in the US and around the world began in earnest in the spring of 2021, it was not until a new self-administered vaccine was approved in July, 2021, that there was a light at the end of the pandemic tunnel. The self-vaccination by a Band-Aid-like patch with 100-400 tiny dissolving needles made everything easier and faster. Decentralized international production has made issues of distribution less contentious. This is increasing the global vaccinated population. Hence, the planet is on course to achieve the international vaccination target of 5.6 billion vaccinated twice assuming the second return of the virus from Latin America, Africa, and South Asia does not mutate enough in 2022 to make the vaccines less effective.

Treatments

Hospitals struggled with combinations of convalescent serum of antibodies, remdesivir, and related drugs to shorten patients' hospital stays. Laboratory-created monoclonal antibodies proved very effective against Ebola and are now proving very effective for early treatment and prevention of COVID-19, but are expensive to produce. Nitric oxide has also proven effective.[8] The heroic efforts of the American Red Cross volunteers who convinced people who had tested positive for antibodies to give blood, helped to hold the line against further devastation. The FDA-pre-approval of a blood test for compassionate use did help find people with potential immunity; however, reliability was in question and not all treatments succeeded. The massive production of monoclonal

antibodies, remdesivir, dexamethasone, and other steroid drugs, and convalescent plasma not only reduced the death rates, they also reduced the ethical, racial, and international tensions that developed when these treatments were in short supply.

However, these treatments are less effective for patients in the US who were infected by some viruses returning from Latin America, Africa, and Southern Asia during fall of 2021. These viruses have mutated enough that modified treatments are being explored. Fortunately, the overall situation was such that enough people returned to work sooner, preventing what could have been a continuing recession leading into a depression.

Improvements in heating, ventilation, and air conditioning (HVAC) systems with ionization technology helped to reassure the public that returning to work was reasonably safe in those buildings that had upgraded their filtration systems. The installation of such high-efficiency filters in many schools across the nation also encouraged parents to let their children return to classrooms. This national HVAC upgrade is expected to help improve Americans' health in general.

SARS-CoV-2 Virus Testing

The virus testing requirement became enormous! Some universities with in-person classes now require students to be tested twice a week. With 36 weeks per academic year, a university with 10,000 students would require 720,000 tests per year. This was clearly impossible using the nasal swabs with results available in 3-5 days and with shortage of testing kits becoming critical; and even with National Guard in some states helping to pack test kits, it was not enough. Pooling tests has increased the number of people tested and lowered cost (e.g., all students in an elementary school class put their saliva in one test; if positive, all students are sent home for quarantine; if negative, all stay in school); but this was still not enough.

The airlines got many passengers back by using the BinaxNOW test because it took 15 minutes and required no equipment to read the results. But what really saved the day, were the quick saliva tests with a thin strip of paper.[9] They gave accurate results and became publicly available for a $1/test paper strip in June 2021. These tests are now used by millions at home and have enabled restaurants to expand services and many returned to pre-COVID-19 seating with improved HVAC ionization filtering. The effects of false negatives and positives were controlled with repeated testing. This was good enough to show the spread or retreat of the disease and where contact tracking was needed. Since 40% of all those infected show no symptoms, but are contagious, it is wise to test as much of the general public as possible. Multiple mobile telephone

apps, associated with self-testing, gave financial incentives for sending the results to health officials and contact tracking systems.

Testing and proof of results has become a new way of life for many in America. People brushed their teeth in the morning and spit on the test slip and repeated the same in the evening. It just became a daily routine. From airlines to visiting the Smithsonian Institution, or Disneyland, testing and results are just as important as an entry ticket. Some protested and still do today, but most schools, theaters, museums, and sports arenas still require test results. This is beginning to turn around the long nightmare.

With so many virus carriers without obvious symptoms and with the paper tests not always available, personal mobile phone apps were developed for retina imaging and smell tests to detect any changes that could mean one had become infected.[10]

Since many employers required periodic test results as a condition for returning to the workplace, some desperate for income and who needed to return to their workplace, resorted to counterfeit test results to get back to work. Both viral and antibody counterfeit results are available from online sources. It is estimated that 17% of test results presented to employers are counterfeit.

Post-Disease Antibody Testing

The presence of antibodies does not guarantee immunity. Of course, it is far better than the contrary, but some people with positive antibody levels have contracted COVID-19 again. Some of those who recovered from COVID-19 continued with a low-level infection that re-emerges later. The antibody testing became less necessary as the numbers of vaccinations increased.

FDA-approved blood tests were used to find as many people with potential immunity as possible. Use of plasma from such recovered persons did speed up the initial efforts, but reliability was in question. Antigen tests conducted at point-of-care did produce results in 15 minutes, but production of devices to read the results did not keep up with demand. The e25 is the fastest at-home test, but it only caught 50% of positives and 90% of negatives. This did engender a sense of false security that caused people to be lax in personal protection such as hand washing, masking, and physical/social distancing.

Although some used self-administered tests purchased online as early as January 2021, the FDA-approved self-tests were not available until April 2021. The government

still covers the cost of the tests for critical employees, and insurance covers the insured, but that leaves 20 million in the US who are uninsured or working for companies that do not cover the costs. This did tend to create some social division between those with confirmed anti-bodies and those without, leading to a black market for test results. And the series of liability issues are still being litigated.

Contact Tracing

During the early spread of the pandemic, funding and capacity for real on-the-ground contact tracing was embarrassingly absent compared to East Asia. There, use of tracer apps, AI models, and community use of the apps was far more advanced compared to the United States, where many considered this as an invasion of privacy.

Since this disease spread too fast for traditional contact tracing, mobile phone apps developed by Apple and Google were used after being successfully introduced in Japan and the US public was reassured that temporary codes rather than names would be used and that the data was fully deleted after use. This increased contact tracking from less than 35% to over 50% of potentially infected people. Unfortunately, the percent of those who actually quarantined was probably closer to 10-15%, because contacts demanded testing before voluntarily quarantining and most of the tests were negative. The self-testing app automatically transmitted the test results to health officials and gave financial incentives and calls to patriotism for their use. It also monitored location to help manage quarantines as needed. Today the rate of contact tracing has increased since the number of new cases is lower and social acceptance of tracing has improved.

Although the contact tracing apps have made a major difference, nearly 100,000 contact tracking personnel were still needed for the United States. But only about 41,000 were reported available in 2020 (this number was likely under reported since nine states did not report, and some states did not count county and local staff). The difference was made up by thousands of local, state, and national voluntary groups, State National Guards, returned Peace Corps Volunteers, local health center staff, and some U.S. Army health personnel. American Red Cross volunteers were so desperately needed for blood drives that they could not be spared for contact tracing. About 10% of the time, when contact tracers visited those who were sick or in quarantine, they were asked to help out on other matters, like picking up food ordered online so that quarantine rules would not be broken, or helping people apply to Medicare and Medicaid.

The good advice from the National Academies of Science[11] to improve contact tracing was widely circulated and is believed to have increased the public's cooperation. It advised public health officials to provide advanced notice, partner with trusted sponsors, offer relevant incentives, enhance interviewers' skills, develop messaging that appealed to the publics' motivations, and accept partial information from interviewees.

Now that vaccines are available, the pressure for testing, contact tracing, and quarantining is less intense.

Local Communities: Where the Rubber hits the Road

Local community leaders created community resilience committees[12] across America to counter the spread of the disease, distribute food, and provide psychological counseling. Mesh networks and new LEO satellite networks are used in communities without regular internet access to allow these systems to be ubiquitous. Some implemented local online social determinants of health/medical health reporting systems connected with other communities to help identify the needs of their citizens. These enable the synthesis of data at the zip code level to improve situational awareness and to speed responses to social as well as medical needs.[13] These interconnected systems then feed State and Federal systems to improve decision making by having accurate hyper-local information.

Such local early detection and response systems allowed for predictive analytics to identify hot spots, improve resource deployment, and minimize waste. The systems enabled all users to receive a daily message asking how they feel and what worries them. This made it easier for local communities to track the disease and its broader impacts and "ground truth" the national situation. These radically improved the information to respond to the disease, with visibility from the local to the national seeing the same, more timely and accurate data. This enabled the communities to flatten potential curves and stamp out resurgence of the pandemic.[14]

Hospital Malaise

After the official unemployment peaked at round 23 million (total jobless may have reached 45 million at one point), and GDP fell by a third in the second quarter of 2020, financial support for hospital resources were drained as the 2020-2021 flu season approached. During this first year there were not enough PPEs, beds, and good

treatment options. Hospital staff were emotionally depressed and near despair surrounded by patients on ventilators, daily deaths, and temporary morgues.

On top of all their other concerns, some hospital staff recognized they are contributing to a massive new form of ocean pollution with plastic gloves, face shields, masks, and gowns. There were probably more near breaking points than we will ever know. Hundreds if not thousands of hospitals were near collapse. Hospitals responded by pausing nonessential surgery, and paying for psychological counseling, childcare, temporary shelter, and sick leave for employees who tested positive (whether they contracted COVID-19 on the job or elsewhere).

Hospitals had the burden of managing two hospital systems: COVID-19 and non-COVID-19. Ethics triage committees were used so individual clinicians didn't have the daily emotional burden of decision making. DOD medical personal and support staff were deployed to overstretched hospitals. Many rural hospitals, on the brink of financial collapse before the pandemic, were devastated by COVID-19. Some were kept barely open by federal and state support, while others had to close.

The two flu seasons compounded the hospitals' problems, but not as badly as originally expected by the CDC, since the methods of COVID-19 prevention likely also worked to reduce the number of flu infections. Nevertheless, hospital staff was stressed again during this second flu season of 2021 caring for the new surges of COVID-19 cases. But this time legions of volunteer, on-call psychologists made it possible for hospital staff to "keep on keeping on" and hospital staff were augmented by more medical students, retirees and other volunteers from among the unemployed. Increased use of robots and AI reduced contact with infected patients and the environment. Many of the 7,000 Peace Corps Volunteers evacuated from overseas back to the United States at the beginning of the pandemic have also been volunteering in many areas from hospital aides to contact tracing and blood drive support. The success of Florida's use of U.S. Army Reserve units assisting some local hospitals has led other states to do the same.

Treatments such as monoclonal antibodies, remdesivir, convalescent plasma, dexamethasone, and other steroid drugs have lessened the hospital load. Hospitals improved their ICU management including how to integrate new doctors and nurses, and made plans for emotional support in addition to the tele-psychologists. Hence, fewer hospitals were near collapse this time. Supplies of face shields, hand wipes, and non-surgical gowns poured into hospitals across the nation. Over 70,000 members of the Open Source COVID-19 Medical Supplies Facebook group shared software for 3D printing of face shields, masks that can be sanitized between usage, ventilator designs,

and other medical supplies. All this reduced production costs and delivery time since production was localized for many hospitals.

These do-it-yourself volunteers also provide protective equipment, usually at no cost, for the general public as well. New software applications cut hospital paperwork time, improved accuracy, and sped testing feedback, patient registration, and screening of transferred health care workers. Hospitals continued to require commercially produced, disposable PPEs; but reduced demand and hoarding, combined with ramped up factory output, kept supply adequate and prices manageable.

The nation mourns the death of over 1,500 healthcare workers who died of COVID-19 and countless events around the nation have given thanks and saluted the surviving staff as national heroes.

Lower Income Countries

The World Bank Group, regional banks, and the IMF have renegotiated loans for lower- and middle-income countries to free-up their ability to fight the pandemic. This was a combination of some loan forgiveness and suspension of debt service payments. And although the G-20 agreed to suspend some debt in lower income countries and provide over $14 billion to help fight the pandemic, the virus still returned from Latin America, Africa, and South Asia to the US during the fall of 2020 and winter of 2021. This first COVID-19 wave in the Southern Hemisphere surpassed most of the impacts of many regions in the Northern Hemisphere. Social distancing for those in the informal economy is very difficult and hand washing is not possible in the poorest areas where the majority of households do not have running water. Much of the developing world does not have face masks, sufficient healthcare capacity, and lives in densely populated areas. All this made large-scale outbreaks inevitable.

However, the second wave in these poorer regions in 2021 turned out to be even worse than expected and was compounded by increased famine, due to global warming droughts, and periodic lockdowns disrupting agriculture and supply chains. Transmission to rural areas took more time than the initial spread through urban areas. The devastation of medical, health, and financial resources during the first wave left these regions exposed to the virus with inadequate defense. Income from exports, tourism, and remittances was nearly gone. In addition to the depletion of their domestic financial resources, foreign aid was also depleted during the first wave.

As the second wave approached, hospital staff had been reduced by at least one third due to COVID-19 deaths, exhaustion, resignations, emotional problems, and migration. As a result, the growth and mutation of SARS-CoV-2 in Latin America, Africa, and Southern Asia during the summers of 2020 and 2021 returned to the US worse than previously expected.

These two waves have led to new mutations in the virus, which will require new research for treatments and vaccine efficacy as these viruses return north in the New Year of 2022. Fortunately, the DHHS in coordination with other government departments are linking changes in the genetic sequence of the returning viruses with patients' demographics and associated disease severity, treatments, and complications, making it possible for NIH to determine which mutations should receive greater attention.

Lockdowns 2.0, Public Morale, Social Despair, and Resilience

The periodic COVID-19 surges and re-lockdowns further depressed the economy and public morale and increased desperation for many with no money left to pay the bills. This fueled massive but relatively quiet discontent and general malaise. With Congress lurching from one economic package to the next, uncertainty became the order of the day. The COVID-19 infodemic and foreign infowarfare fanned the flames of anxiety for many. Mental health issues, spousal and child abuse, alcoholism, and other negative consequences in the home rose with each passing month.

Massive numbers of tele-psychologist volunteers have helped to reduce what might have been much worse. Public schools and universities that opened for in-person classes had to go back to online-only classes as new cases began to spread. Online educational services flourished but public morale was tired of juggling work and childcare.

As unemployment ground on month after month, the number of homeless increased from 500,000 before the pandemic to nearly one million today. Social protests and unrest flared up where vaccines and hospital therapy needs were not met. Burglaries have increased as people become desperate with no money in their pockets and children to feed. Social movements, including the homeless, were both violent and peaceful triggering a new self-reliance movement. Small resilient communities have sprung up across the country to counter the growing paralysis, suicide, and loss of social cohesion. Although the socio-economic picture was grim, it triggered a broad range of new movements for a more positive future, through new financial investments,

national service, and community high-tech hubs and food delivery systems for greater local self-reliance.

We are learning to synchronize intermittent lockdowns as was done in Europe during their first year of the pandemic. This required half as many lockdown periods while dramatically cutting community transmission in much of Europe. Since the US did not have such national coordination during the first year of the pandemic, lockdowns were sporadic. Since the political gridlock delayed another round of economic stimulus in the fall of 2020, the economy did not recover as some politicians promised and unemployment increased again. It wasn't until the spring of 2021 that the programs of the new administration began to cheer up America and blunted the economic decline. Even the Consumer Confidence Index increased from 82.5 in December 2020 to 87 by June 2021 and now is 91. The country is coming out of the malaise.

Economic Impacts

It was believed by too many that once the vaccines arrived, the economy would quickly recover, but the cascading problems in supply chains, sporadic lockdowns, and the realization that the vaccines were only 55% effective have made the recovery irregular. Some people are doing very well, while half of American's households[15] are not making ends meet. Consumer spending dropped 70% over the past two years for those families making less than $100,000 per year.

The economic problems that existed before the pandemic have not gone away and have grown worse as we enter the New Year of 2022: the concentration of wealth is increasing, income gaps are widening, employment-less economic growth continues, and AI and other advanced technologies are creating more unemployment than international trade agreements. The great stock market correction added further fears among the more affluent.

Nevertheless, tele-everything and AI applications are accelerating around the world. Fortunately, central bankers in higher income countries usually stepped in to provide financial support for government budgets as needed to address both the economic and health impacts of COVID-19. Development Financial Institutions (DFIs) have also increased their lending significantly to offset the consequences of COVID-19 in lower-income countries. Governments that have the borrowing means also provided economic relief to citizens, since many not being able to work from their homes would have otherwise starved.

NGOs in middle- and higher-income countries connected farm surplus produce (due to low sales to restaurants, hotels, and schools) to food relief systems to feed those in more desperate situations. The US government also purchased produce and other foods for distribution by NGOs that eased both the fears of citizens and protected farmers and ranchers from financial ruin. But lower-income countries, already dependent on the United Nations World Food Program before the pandemic, are having increases in malnutrition and starvation even with the help of DFIs.

Federal, state, and municipal tax revenues fell dramatically across the US. Although the federal government can have deficit spending, states and cities cannot. Since they are constitutionally mandated to balance their budgets, massive cuts were made while trying to address the full range of pandemic impacts. Even state hospital staff and public health programs were cut. On top of all the other economic problems, there was a building anxiety about the sub-prime business loans that could cause another financial meltdown like the sub-prime housing loans in 2008.

Questionable business start-up plans were accepted by banks and loans were made before the pandemic, many of which have become financial disasters. These so-called “zombie companies” were at least temporarily propped up by government financial intervention, especially from the Federal Reserve, and credit company innovations, flexibility, and patience. Congress agreed to preserve the stability of much of the financial system, but not the shareholders and senior employees. This proves the old adage that “a rolling loan gathers no loss” at least in the short run. But the long-term threat to financial stability of such sub-prime lending is still there and nobody is quite certain how this ticking time bomb will be defused safely.

Meanwhile, the Federal deficit has increased by $10 trillion over the past two years. Although the GDP decreased about a third in the second quarter of 2020, it fell only 6% for the whole year. GDP recovered a bit in 2021 growing at 1.63% and many believe it could pass 4% in 2022. Hence, the US might avoid a depression, even though much of the world may not. Over 700 million more people fell back into extreme poverty worldwide. Annualized inflation in October 2020 was just under 1%, grew to 1.3% in April 2021, and 2.1% in December 2021. Although inflation is low now, many quietly talk of the potential of massive inflation (which will erode the real value of federal debt) and stagflation as the $10 trillion of deficit spending over the past two years will have its future impacts.

However, as we enter 2022, the data are beginning to show that the worst is behind us. The jobless rate (not just those receiving unemployment insurance) improved from 14% in October 2020, to 10% in April 2021, and 9% in December 2021. However, these

gains were difficult to sustain as many small businesses closed permanently, many large corporations converted temporary furloughs into permanent job cuts, and state and local governments were unable to reverse much of their legally-mandated spending cuts. Many people have taken pay cuts to keep their jobs and healthcare. Some have resorted to job sharing and shorter hours.

The national recovery acts are reducing unemployment with investments into the aging infrastructure and massive online training to prevent short-term unemployment from becoming long-term. The new National Service Corps is beginning to take effect adding labor to infrastructure improvements, renewable energy, local delivery systems, AI applications, online business support systems, work-at-home entrepreneurialism, tele-education, tele-training, tele-medicine, and tele-everything. Conversations about universal basic income continue, as people consider future pandemics, financial crises, and technological unemployment.

Most of Google's 200,000 or so employees continue to work from home and Twitter has told staff they can stay home permanently. As the economy restructured for increased work-at-home (estimated to be 20%) and AI/robotics continued to replace repetitive human labor, fewer employees were needed per unit of production and services. Futurists had warned about this for years, but the pandemic sped decision making in this direction. Tele-everything was becoming the aspirational norm as more people accepted online purchasing, online entertainment, and online education. New businesses accepted the online model. Creative solutions for unused office space included local community business start-ups, art and 3-D printing studios, computer support, and low-income housing. America's innovative spirit continues.

International Collaboration

When the world accumulative total of COVID-19 deaths reached 3 million by mid-2021, the US began to lead in creating the global strategy to address the pandemic in cooperation with the G-7, G-20, WHO, UNICEF, and other international organizations. Building on the United Kingdom's announcement of a long-term, 5-point, global pandemic plan[16] at the 75th General Assembly of the UN, the US worked with the UK's G-7 Presidency in 2021, to avoid the bidding wars and hoarding that had aggravated long-held resentments during 2020.

The WHO global collective intelligence system provided detailed global/local situational analysis and action-feedback that served government, business, and the general public to be effective in reducing COVID-19. It now keeps track of numerous COVID-19

pandemic variables from most countries, and scientific research on the virus, human immunologic response, genetics, and mutations. It also is doing the same for medical products, manufacturing quality standards, and delivery. It has helped to refine the number of models to understand risks and hence inform readiness. In addition to quickly alerting national leaders on emerging policy issues, most important of all, it is making it clear to the general public what is working and what is not.[17]

One analysis showed that spending $260 billion over ten years could substantially reduce the chances of another pandemic like COVID-19. If the global economic damage is about $11.5 trillion, then the study claims that just 2% of that could prevent it happening again.[18] It remains to be seen if the world community will act on this insight.

New Year's Day 2022

It has been an interesting couple of years since the pandemic began. The first time in history, the whole world has had a simultaneous "time out" which stopped business as usual, slowed the pace of life, and gave time for many to re-think… everything. A sense of local community has returned, and global solidarity may have increased. Granted, there are still those who are more convinced that building walls is wiser than building bridges of solidarity and stewardship, but they seem to have receded in influence.

International collaboration to address the next pandemic is understood today, as is the need for personal responsibility for wearing masks, safe distancing, hand washing, and using tracing apps. Even those with poor diets and little exercise have begun to realize that they are at extreme risk if the pandemic persists. As a result, junk food sales have begun to fall, exercise clubs have grown, and both plant-based and cell-based meat are becoming more popular.

Like the 1918 Spanish flu virus eventually faded into the seasonal H1N1 flu, so too the SARS-CoV-2 virus that causes COVID-19 will fade into a less-fatal disease as we develop resistance, vaccines improve, and immunity spreads. Attention now turns to improving the American health insurance system moving the nation closer to universal coverage; and military and public health planners draw lessons for addressing future biological warfare possibilities and how global warming is changing the world pattern of disease. America has endured.

Endnotes

[5] New cases per 100,000 in the county should be below 100 for two consecutive weeks, schools should only open in a limited capacity when positivity rate in the county falls below 7%, and schools should only open if COVID-19-19-related hospital visits in the county fall under 10%.

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[13]HHS Office of the Chief Technology Officer and Center for Open Data Enterprise, Social Determinants of Health platformhttps://sdoh4covid.crowdicity.com/ Retrieved October 7, 2020

[14]Community Indicators Dashboard http://www.ghrconnects.org/tiles/COVID19 Retrieved October 8, 2020

[15] The Impact of Coronavirus on Household in Major U.S. Cities https://media.npr.org/assets/img/2020/09/08/cities-report-090920-final.pdf. Retrieved October 7, 2020

[16] UK Prime Minister Boris Johnson in his address at the UN General Assembly suggested one global strategy rather than 193 separate campaignsto address the pandemic, based on a five points plan: 1) A worldwide network of “zoonotic research hubs” to identify dangerous animal pathogens before they cross the species barrier and infect human beings; 2) The development of a worldwide manufacturing capacity for treatments and vaccines, to be held ready to deploy against emerging threats; 3) A global pandemic early warning system, using health data-sharing agreements covering every country; 4) Global protocols for a future health emergency, covering everything from information sharing to PPE supplies; and 5) Reducing trade barriers which have impeded the coronavirus response, such as export controls on key

supplies like soap http://webtv.un.org/search/united-kingdom-prime-minister-addresses-general-debate-75th-session/6194813570001/?term=&lan=english&cat=75th%20Session&page=7. Retrieved October 8, 2020

[17] COVID-19: the rise of a global collective intelligence https://theconversation.com/COVID-19-the-rise-of-a-global-collective-intelligence-135738. Retrieved October 7, 2020

[18]"Preventing the next pandemic. How $30 billion can prevent the next COVID-19", Science Daily, July 23, 2020. https://www.sciencedaily.com/releases/2020/07/200723172208.htm. Retrieved October 6, 2020

Scenario 2: Depression, Hubris, and Discord

By Theodore Gordon, The Millennium Project
with Elizabeth Florescu, The Millennium Project
and contributions from Al Watkins, Chairman, Global Solutions Summit

Ladies and Gentlemen,

I appreciate your time and attention at this webinar. As explained in the invitation, this session will focus on the outlook for continuation of the Great Plague of 2020, an appropriate topic as we kick off the New Year of 2022. The plague has been in full flame for almost two years; we will cover some of the depressing economic and medical numbers that describe the dimensions of the calamity and their outlook. Is there any reason for optimism as we look forward to the coming year?

Please feel free to ask questions or interject comments at any time; just press the interrupt button on the lower right of your screen to get my attention.

How did it all begin…

As we look back over the rutted road leading from the plague's start in January 2020 to the present, January 1st, 2022, we see that there was common agreement about some important aspects of the disease, COVID-19, this pneumonia-like disease caused by an infection of a virus called SARS-CoV-2, a coronavirus from the same family as SARS, MERS, and the common cold.[19] Even at this late date, not everyone agrees with the story of how the virus found its way into humans. One explanation is that it jumped species from bats to humans who purchased tainted bat-meat in a wet market[20] in Wuhan, China, in late 2019. But there is a lingering suspicion that it escaped through an accident at the Wuhan Institute of Virology (WIV) which is located near the market. That explanation has been vigorously denied by scientists at the laboratory[21] and by others elsewhere, but the suspicion was firmly anchored by a Chinese report that four of the five people who originally contracted COVID-19 had no links to the market.[22]

Question from the audience: Sir, we know all of this. Why not just get on with it?
Answer from speaker: Please bear with me. I want to make sure we start with the same basic understanding of what's known, what's assumed, and what's probably false news. Then we can talk about where we seem to be heading.

Remarkably, the story about the Wuhan Institute was promoted by President Trump without clear evidence, at a pre-election news conference.[23] The President, until the end of his term, still called SARS-CoV-2, “the Chinese virus.” China responded by suggesting that the US military might have brought the corona virus to Wuhan.[24] But China’s rejection[25] of calls for an independent international investigation into the origin of the virus further planted seeds of distrust.

The social media boiled with conspiracy theories, including a suggestion that the virus was an escaped bio-weapon. Blame-shifting and lack of confidence in official explanations undermined international collaboration to address the crises and eliminated any chance of cooperative research that might have lessened the awful impacts of the pandemic. It might also impact future international engagements and strategies to address future global epidemics or global emergencies.

Immunization Highly Questionable

There will be no rescue by a proven and effective vaccine anytime soon; almost certainly not this year. Manufacturing a vaccine that assures immunity against a mutating and unpredictable target has proven to be more difficult than optimists thought. Dual, maybe triple, annual injections may be required. Establishing equitable means of distribution to over 7 billion people remains an unsolved problem[26], further confounded by the need to keep the vaccines at very cold temperatures during shipment and storage (-50^{o}C).The time period during which infected people can infect is still uncertain but seems to be as long as one month, which complicates strategies that rely on both infection-tracking and speed of virus mutation in the wild. Another complication: we know now that asymptomatic carriers, including children, can indeed infect others.

One after another, hopes for a certain, quick reprieve have been lost. No, hot temperatures of the summer did not slow the rise in cases. No, young people were not immune to the disease. No, people who were asymptomatic could still be carriers of the virus. No, it would not go away on its own like a common cold as President Trump had suggested. No, flu shots did not protect against SARS-CoV-2. No, neither Chloroquine nor oleander leaves were a quick fix. And no, infection and recovery did not guarantee immunity (we have evidence that some people who have had the disease once and recovered, can be re-infected)[27].

Question from the audience: How come there isn’t yet a globally accepted vaccine? There have been claims of one since the summer of 2020.

Answer from the speaker: Yes, indeed. By September 2020, the WHO had record of some 40 candidate vaccines for the COVID-19 virus[28]. Promises were high.

In the US, four COVID-19 vaccine candidates were in phase 3 clinical testing by September 2020; "an unprecedented feat for the scientific community made possible by decades of progress in vaccine technology and a coordinated, strategic approach across government, industry and academia," as stated by NIAID Director Anthony S. Fauci.[29] In August 2020, Russia became the first country in the world to approve what they called the Sputnik V vaccine[30] against SARS-CoV-2 (COVID-19), although without even starting phase 3 trials. Meantime, China has been administering experimental coronavirus vaccines since July 2020, under an emergency use program approved by the Chinese government and supported by the WHO[31]. Hundreds of thousands of people were administered the vaccine before it proved safe in clinical trials.

Also, even if a vaccine were found, we still have not faced up to the problem of distribution. Who gets it first? The country of origin, of discovery? The elderly who have a shorter time left or the young with their lives ahead? And within a country, politicians, social leaders, or front-line and emergency workers? Those that can afford it? Should priority be determined by state legislators? Without revealing their sources, some high price, exclusive "country clubs" have been formed that offer vaccinations as an incentive to membership. There are bidding wars for vaccines that have not yet been proven, among states and countries just as there are for PPE's and ventilators when they are in short supply.

Even that isn't the worst of it. In all battles there is a complex interplay between developing offensive weapons and creation of defensive responses. To understand and defeat the virus, some scientists studying the genetic structure of the virus found it was mutating faster than we could develop vaccines to fight it. One team at the Eastern Institute for Evolution, after reviewing 15,000 virus genomes from sequencing efforts of contributing laboratories, concluded that the virus was changing through natural selection, not the usual random process and was reproducing versions that could evade the last vaccine thought to be effective. The report said, "In the case of SARS-CoV-2, mutation may well not be a random process as is common in such cases but rather a response to human efforts to degrade the virus."[32] Some people think the virus has acquired the uncanny ability to mutate just far enough away from its previous structure to fool the last vaccine. If this is true, we face a very formidable and intelligent enemy.

Many people seemed to have the attitude that eventually everyone will get infected and they would either survive and have immunity for the rest of their lives or die. "That's the way nature works," they argued, but they were wrong about immunity. The data show

that permanent immunity is not a guaranteed outcome of the infection. Immunity apparently lasts for a few months (like the common cold), not for lifetimes (like measles). Hundreds of people have caught the disease more than once. This reality has doomed the idea of “immunity passports” and the transfer of immunity through serological transfer of plasma-derived antibodies.

No Rudder: Confusion and Suffering

Had we recognized the threat and begun isolating the infected people as anticipated in an Obama-era pandemic response plan, things would surely have been different now. The pandemic has exacerbated existing geopolitical tensions, and intensified nationalism and anti-establishment trends. It has created a worldwide economic, humanitarian, and health disaster. There were few cohesive lockdown policies for countries or even for regions within countries, let alone international coordination. Even the EU, despite its efforts, only used a color-coded map to show infection levels and travel restrictions.[33] Residents of the US were—and still are—banned from entering most European countries. After September 2020, when the number of cases began increasing again (in the EU it was even worse than the March peak[34]), several countries followed the example of Israel[35], reinstating complete lockdowns.

After 2 years since that first domestic infection[36], 600,000 people have died of COVID-19 so far in the US alone,[37] and hundreds of thousands more from indirect consequences of the pandemic; a tragic number, but probably inevitable, given our inability to organize a decisive response. To put it in perspective, 600,000 deaths is 200 times larger than the number of people killed in the 2001 terrorist attack on the World Trade Center and is more than the number of US soldiers killed in WW1, WW2, and the Korean war combined. At the pandemic’s peak, refrigerated trucks were in demand to hold the dead bodies.

The crisis was poorly handled from the beginning, although we did have plans and had been warned. The Director of National Intelligence said in the 2019 Worldwide Threat Assessment that there could be a pandemic leading to massive numbers of deaths and severe impact on the world economy[38]. A National Biodefense Strategy existed which stressed the need for preparedness and bio surveillance[39]. A 2017 *Time* magazine article said a pandemic could strike everywhere at once and even the best hospitals would rapidly run out of beds and ventilators.[40] A 2016 article in the *Democracy Journal* discussed a health catastrophe of massive proportions involving more than 1 million deaths.[41][42]

Yet by the end of 2020, there were over 11 million confirmed COVID-19 cases and more than 300,000 deaths in the US[43]; the highest globally. And, as Federal Reserve Bank Chairman Jerome Powell said, “The burden of a downturn has not fallen equally on all Americans, instead those least able to withstand the downturn have been affected most.”[44] Thus, race and ethnicity became risk factors, given to underlying conditions due to socioeconomic status, access to health care, and working environments. While the death toll was higher for non-Hispanic white people[45], the ratio of cases was more than double for Black or African American and Hispanic people compared to white, non-Hispanic persons.[46] This disparity is thought by some sociologists as being at least partially responsible for the increasing racial tensions of the time.

The failure to have a national coordinated response resulted in lack of essential equipment at hospitals, sporadic shortages of medical supplies and personnel, when there should have been certainty and clear direction. Emergency rooms ran out of supplies; states were bidding against each other to obtain protective clothing for their medical staffs and ventilators for their sickest patients.

Cities and states were let go their own way in responding to the threat of the pandemic, and the initial equivocation surrounding the value of masks undoubtedly caused more deaths. Some authorities said masks would be helpful, while others publicly doubted that advice. It was an important sign of the disintegration to come.

Even in the run up to the November 2020 election, the President was often not wearing a mask in public appearances; apparently, to appear vigorous, but this was hardly the way to encourage the population at large to do otherwise.[47] And it will remain a matter of wonder that the President touted Chloroquine for use in COVID-19 treatment. Chloroquine is an anti-malaria drug, found by the FDA to be useless against COVID-19. The President also suggested that direct injection of a sanitizer into the blood stream might be prophylactic against the disease and that the toxin, Oleandrin, could cure COVID-19. Memorial Slone Kettering warns that the consumption of even small quantities of Oleandrin may be fatal.[48] The President later called these cockamamie therapies a joke. But some people took them seriously and died.

Question from the audience: Don’t you think this is an example of FAKE NEWS? Surely, President Trump, who could have called upon any scientific body in the nation (NIH, CDC, NAS, NSF, DARPA) for advice, wouldn’t have been so misleading.
Answer from speaker: I was there and can assure you the President really did say those things.

As the spread and consequences of the pandemic became apparent in the first half of 2020, some cities and states tried to control the spread through voluntary isolation and shut down their economies, requiring closure of some businesses where people tended to congregate, curtailing travel, and imposing self-quarantine. Congregating in gyms, bars, theaters, and schools was prohibited in some places, but not others. But these first actions were six weeks too late.

Return to school in the Fall of 2020 was also chaotic and sporadic; a "do it yourself" social experiment. More than one teacher's union and student group said they felt like guinea pigs. Teachers, aware of the threat posed by congregating, went on strike in half a dozen cities. Many fewer foreign students came to the US and even the enrollment of Americans decreased, triggering an unprecedented crisis in academia.

Distrust and Despair

The general situation across the country was disastrous; it has been considered "the biggest governance failure in modern US history."[49] The social and economic effects have been huge. By spring 2020, people who were staying at home were not buying, and people who would have been manufacturing and selling those things that were not being bought were out of work. Unemployment rose from a level of 3.6% in January 2020, to 14.7% by April and has remained above 10% until now. Why so stubbornly high? Small business closings and corporate bankruptcies meant there were no jobs for laid-off workers (mostly service workers) to go back to. State and local government employment was cut in an effort to limit deficits. Finally, government loan programs that required borrowers to keep employees on the payroll if they wanted to be eligible for debt forgiveness, ended. Hence, the number of jobless was much higher than the "official" unemployment numbers, which do not include those who lost their jobs but do not qualify for unemployment, nor those who were out of work for a longer time and gave up their search. Others were happy to find part-time work.

Bankruptcy statistics were also skewed. Many small businesses were in deep trouble and, under more ordinary circumstances, would have "gone under." These were known as zombie companies—walking dead—buoyed by bank and government loans that could never be repaid. Banks with weak balance sheets couldn't afford the losses that would be associated with liquidating zombie companies, so they made new loans, encouraged by near zero interest rates and public policies calling for forbearance in view of the pandemic. Their hope was that the problem would miraculously disappear along with COVID-19, or, at very least, that they could postpone the day of reckoning until someone else would inherit the mess.[50]

The GDP in the second quarter of 2020 declined sharply at an annual rate of 32.9%[51] and today we are still in the shadow of that decline. As lockdowns temporarily eased, optimists in the Office of Management and Budget projected a third and fourth quarter 2020 rebound. President Trump, the lead optimist, said the economy was poised to "take off like a rocket-ship"[52]. However, businesses, small and large went bankrupt. Famous names were on the lists of the ailing corporations: Hertz, JC Penney, J. Crew, Neiman Marcus, to name a few; but so were thousands of smaller companies important to their out-of-work employees and owners. Travel agencies, train, air and sea carriers were closing down or reduced activity to almost null. In August 2020, the NY Fed warned that 28% of publicly listed companies on US stock markets weren't generating enough cash flow to pay interest on their outstanding loans.[53] In addition, many small businesses simply went out of business, without a whimper. Economists talk about a "K" shaped recovery with the upper right side of the K representing those happy with the stock market and doing quite well working at home, and the lower right, those subsisting, short of cash, food, and hope.

Today we're trying to open up economies and schools again, but students, teachers, customers and owners of businesses where people might come together are wary. Again, propinquity in the pursuit of education (kindergarten through doctorates), fun (college parties, holidays), or normal profits (restaurants, theaters) have led to more infections and deaths. As you know, many lockdowns were re-imposed and the fourth quarter of 2020 as well as the entire year 2021, have been dismal. Now even the optimists do not expect GDP to return to pre-COVID-19 levels before the end of 2023.

Financial Derailing

Early in 2020, when the pandemic was beginning to sicken and kill people, the Federal Reserve took action through an unprecedented variety of asset purchases amounting to some $3 trillion dollars and the Congress authorized an additional $3.7 trillion of COVID-19 relief measures. Altogether, the commitments amounted to an astounding 7 trillion dollars[54], an amount that is on the order of one third of the US annual GDP and is equal to the sum of the GDP of Japan and Germany.

Question from the audience: Excuse me, did you say "TRILLION?" Where did it all come from?
Answer from speaker: Right, with a capital "T". Increasing liquidity was the name of the game. So, you ask, where did all that money come from? The answer economists give is that through the magic of Ponzi-like reasoning we simply expanded our debt and

financed the expansion through money creation by the Federal Reserve Bank. This accounts for the counter-intuitive rise in the stock market to new records every other week while the GDP stayed at record lows. That "the rich get richer" and the rest suffer is clear from the painfully obvious dichotomy between the high stock market and the lagging economy in which many people, formerly in the middle class have moved into the ranks of the poor. This dichotomy has inflamed racial tensions; mobs chant "Give us this day our daily bread."

The econo-optimists (there were a few) reasoned that borrowing money against the future would allow the country to pay off debt with less valuable dollars; so it was a no-brainer to encourage inflationary policies, particularly when these policies also inflate the stock market. On the other hand, the econo-pessimists argued that inflation means price growth and when people are out of work, price growth is hardly a welcome development. Inflation began its inexorable rise in early 2021. Well, inflation which was running about 3% annually in 2019, at the end of 2021 ran at 9.5%. Food, housing, transportation, all cost more, not a pleasant situation when unemployment is high (frequent peaks to 12%) and wages are stagnant. Stagflation of the 1970's has been reborn. One result is that the dollar has continued to depreciate. Its replacement by other currencies as the global reserve currency may be happening as we watch.

The COVID-19 relief packages passed by Congress in the spring of 2020 were effective while they were in force, but those programs expired a year ago and nothing has filled the gaps. There was little appetite on either side of the aisle for spending more than the $7 trillion. Looking ahead, unprecedented financial collapse may be the main feature of the economy of 2022. State and local governments are cutting back or eliminating services, garbage is piling up, "nice to have" programs like green energy are being set aside. Corporate and municipal bond defaults are rising. Pension funds are failing and many have given notice that they will be hard pressed to meet their obligations in 2022. There is a persistent rumor that China will soon begin selling its US bonds.

Question from the audience: Why? Lousy programs? Lousy execution?
Answer from the speaker: The 2020 programs had all been financial—pay laid-off workers, pay small businesses to keep employees who didn't have enough work, delay taxation. Such programs had to be temporary, had to sunset. What we needed were programs like Franklin Roosevelt established in the Great Depression such as the Civilian Conservation Corps or the Works Project Administration that hired people to build things. There was a lot of talk about new programs to rebuild the country's infrastructure and expanded public service programs such as training unemployed volunteers to fight wild fires, but there was not much public enthusiasm for either while

the pandemic was still killing people. The proposed programs were pie in the sky and didn't seem likely to work with masks and social distancing rules still in place.

By the end of 2022, GDP, employment, and consumer spending will probably remain below January 2020 levels by double digits. The vicious cycle of depression and inflation feeds on itself. Many private schools and businesses that closed during the spring of 2020 will not have reopened. The great die-off of theaters, malls, bars, restaurants, barber shops, hotels, gift shops, shoe stores, candy stores, flower shops, pizza places, take-outs, and bowling alleys promises to continue. But note that in the midst of this economic chaos some sectors will likely have benefited (such as social media, freight, and logistics), and many investors expect the stock market to continue rise to occasional new highs.

Airlines and ocean shipping companies will have been effectively nationalized. Some foods will be added to the list of shortages because of sidelined workers, contaminated manufacturing plants, and supply problems. National rationing of some commodities will be well established and operating much as it did in WWII; the long lines at food banks and unemployment offices will be even longer.

Economic recovery programs will not work as they did in 2020. Liquidity, abundant two years ago because of massive government lending and debt forgiveness programs, will be, once again, very tight. Proposals to fix things and get us back to where we were in 2019 will abound, but people will remain distrustful and see them as bail-outs, favoring the rich, the very people they hold responsible for their dilemma.

Question from the audience: Why did government lending work then and not now? Answer from the speaker: We seem to have lost our appetite for printing more money, not entirely surprising, since the deficits have reached levels that used to be considered astronomical, the inflation rate is climbing, and the value of the dollar is dropping fast.

Hard-pressed companies and households will have difficulty getting credit in 2022 because they will simply no longer be creditworthy. Banks will be under continuous pressure, pension funds especially underfunded municipal and state funds will fail to deliver on their promises. Many bonds issued by corporations, states, and cities willed fault, leaving those counting on the interest for income on the road to poverty. Homelessness will have doubled.

Increasing Insecurity

Those most vulnerable to this kind of economic shock are, as always, on the bottom rungs of the employment ladder. However, something new and ominous is now in the mix: middle income people have joined the food lines; a mark of continuing unemployment, inflation, and growing food scarcity. By mid-2020, an estimated 19 million children—1 in 4 children—lived in a household that wasn't getting enough to eat, was behind on rent or mortgage payments, or both.[55] Food insecurity affected some 30% of US households with children[56]. Malnutrition continues to be visible everywhere even now, at the beginning of 2022. On the streets of some big cities and particularly in the migrant and refugee camps at national borders, children are wasting, a condition that manifests in spindly limbs and distended bellies, and for some, dying glassy-eyed, passive deaths.

People continued to lose their jobs. Those who couldn't work at home have lost employment at twice the rate of the labor force as a whole. And consider this: when programs that prevented evictions and foreclosures ended earlier in 2021, some 40 million people in America were at risk of losing their homes[57]; in California, 80% of them were Black or Latino.[58]

Not only do we have these intertwined medical and economic problems, but hurricanes in the fall of 2020 hit South and East of the US with unexpected vigor. Many places in mid-country that were spared from the worst of the hurricane winds, suffered from 100-year record flooding and from a string of powerful tornadoes. Fires blackened the West. Even so, perhaps the worst happened elsewhere in the world: agricultural fields in Africa were under attack from thick clouds of vigorous locusts. Starvation loomed for adults and children in poorer countries where production of food diminished because of xenophobic trade policies, isolation of workers, closed markets, and other factors[59]; and because of this lack of supply, prices spiked. The pandemic affected food security throughout the world, including our own; the number of homeless—mostly black and brown—increased by 50%.

Rising Violence

Increasing inflation, poverty, and death are only some of the tragic coincidences of 2021 when tragedies piled on one another. Police brutality has continued to be a focus of public attention. The deployment of troops in 2020 by the Department of Homeland Security and the National Guard to quell urban riots is a practice that has continued and

is seen by some as the foreshadow of fascism. The possibility that martial law could be imposed to maintain order is still considered by many people to be a threat to freedom.

Question from the audience: Do you think there is a connection between the pandemic and the rise in violence we saw in 2020/21?
Answer from speaker: Yes indeed. There are remarkable parallels between our situation and the Black Plague in Europe of the 14th to 17th centuries. Public health historians have pointed out there were rules for quarantine of 40 days that, when violated brought stiff punishment, plague orders that closed theaters and taverns, manipulation of death statistics for political purposes, mob revolts against restrictions, burning of public buildings, high rents, corruption, movement to the countryside by those that could afford it and resentment from those that could not.[60] Sounds like today.

The overlap between political views, medical realities, adverse economic conditions, and perceived individual responsibility led to violent civil conflicts last year: by one estimate (contested, of course) some 250,000 people have been officially detained and 1,200,000 have been involved in the 2021 protests. We have become used to seeing troops in some cities trying to restore order. The languages of the opposing groups are heard but not understood: one cannot help but being reminded of the Biblical plagues.

On another front, the pandemic has opened new avenues of mischief for terrorists. The Japanese group Aum Shinrikyo—formerly declared a terrorist organization—carried out the deadly Tokyo subway attack in 1995 using a sarin aerosol produced in a home-grown bio-weapon lab. Anti-terrorist agencies are now quite alert to an encore in which other groups, singly or in concert, harvest SARS-CoV-2 viruses (or just the information about their DNA structure) for use in similar bio-weapons. Since the scientific community generally endorses transparency and the virus's code is now widely known and there are billions, perhaps trillions, of virus samples stored or awaiting disposal, unguarded around the world, the threat of the possible theft of lethal coronaviruses cannot be easily dismissed and will form a focus for counter-terrorism in 2022. It would be easy enough to keep the virus potent in a sequential series of volunteers, able to re-introduce it once again to a recovering world. If this were to happen, the infection rate could increase by 10-20% globally, triggering an even greater turmoil than the one in which we are now.

As we begin 2022, public disquietude is rumbling everywhere. Finger pointing and attempts to escape responsibility are a certainty. The number of people moving from areas of high infection to areas where conditions appear to be better will probably peak this year. These new domestic migrants are often not welcome. This year, people might no longer be able to move freely from state to state because of quarantine

requirements; an out-of-state license on your car will provoke police stops. Sales of guns and bulletproof vests started to rise two years ago and will remain 100% above pre-COVID-19 levels. Crime and suicides will stay up; and some well-publicized attempts to control social media content will be implemented, to quell rumors and to help distinguish between what's true and what's not.

To top it off, our society seems to have segmented into a number of real or imagined gangs, believing and behaving according to the gang rules. There is the far-right conspiracy theory still making the social media rounds, known as QAnon, that holds there is a secret "Deep State" organization largely composed of rich Democrats that President Trump will arrest one day and send to Guantanamo[61]; the FBI, in an internal memo, declared it a terrorist organization.[62]

Widening Political Discord

Democrats and Republicans are diametrically opposed in beliefs and any reconciliation seems unlikely. In the fall of 2020, before the election, polls among all nationally registered voters showed that 62% thought things were going badly and 38% thought things were going well in dealing with the novel coronavirus. But among Republicans, only 27% thought they were going badly and 73% said they thought things were going well.[63] Anti-vaccine views overwhelmed Facebook a year ago: polls then showed only 50% were committed to taking a vaccine when one became available and that "communities most at risk from the virus were also the most leery: among black people, who account for nearly one-quarter of US COVID-19 deaths, 40% said they wouldn't get a vaccine."[64] There were groups that felt the high death rates were a reflection of nature's business-as-usual way of trimming life in the world; anti-maskers and anti-lockdowners said, "My body, my choice".

There is suspicion that heavy-handed political pressure influenced the advice and regulations from respected public health institutions in the months before the 2020 elections. Two episodes are egregious examples: in late August 2020, the FDA issued an emergency approval for convalescent plasma without having results of a randomized placebo-controlled trial. They have a survey of people who have had the plasma treatment recently. Apparently, under the President's pressure, the FDA found a subgroup of patients that had a 35% lower mortality than the overall population. They never defined this subgroup but the statement was used to bolster their claim that an effective treatment was around the corner. Secondly, at almost the same time, CDC changed their guidelines to say that some people without symptoms may not need to be tested, even if they've been in close contact with a person known to have the virus.[65]

Scientists have been urging more testing, not less, so the virus can be traced and spreading stopped. New testing strategies such as "find and isolate the superspreaders" are being explored. But the holy grail of tests is a cheap (free), non- invasive, and adequately effective saliva test that has always seemed to be just around the corner.[66] In 2020, until the President and a number of members of his staff came down with COVID-19, the Administration had discouraged testing, to avoid showing an increase in the number of cases, which then was not good politics.

The President used the episode of his infection and apparent recovery as a demonstration that a "cure" is possible. Much to the consternation of public health officials, he tweeted "Don't be afraid of COVID-19… don't let it dominate your life."[67] This despite the death toll of 210,000 at the time. Yet we won't know the consequences of his encounter with COVID-19 for many years.

Long-term Consequences

At the present, New Year of 2022, the long- term consequence of being infected and "cured" are just beginning to be discovered and there is probably a lot more to learn. At this point, the consequences include heart disease, intellectual impairment, so-called brain fog as well as shortness of breath, arrhythmias, joint pains, fatigue, hypertension, and impairment of the kidneys and the immune systems.[68] [69]. For example, the possibility exists of long term damage to a person's nervous system or birth defects of the sort experienced in the wake of Thalidomide[70]; we know that pregnant mothers are more susceptible to the virus and in some cases can pass COVID-19 to their unborn children.[71] Many of our early assumptions about COVID-19 have proved to be naive.

Question from the audience: We appreciate all your inputs, but did you consult experts in specific areas, to see their opinion on what might be likely to come?
Answer from the speaker: Yes, of course I did. That's the focus of this final section of my presentation. I plan to describe where the country seems to be heading in 2022 based on a compilation of my research of myriad articles—scientific and popular—dealing with this topic, and a specialty highly-focused Real-Time Delphi[72] study run among economists and public health experts seeking opinions about what to expect. Let me remind you: please ask questions as they occur to you.

Now, at the beginning of 2022, different states are reaching for "normalcy" by reopening as soon as a drop in positivity rate of COVID-19 tests offers a glimmer of hope. We don't have a second or third wave, as was the case with the 1918 Spanish flu; we have one continuous spectrum of infection, rising and waning as the virus finds new victims.

As a society, we seem to have not learned or have forgotten the lessons of the 1918 Spanish Flu: that cities which reopen too soon actually recover more slowly than cities that stay locked down longer. But people are tired of isolation, hungry for freedom. This attitude even has a name: “COVID-19 fatigue.”

Some sources use models that project a continuing average death rate of “only” 750 per day as the disease invades sparsely populated regions of the country and reinfections increase deaths in cities that seek to return to normal too soon, which, if the models are correct, means that the US might see a total of more than 750,000 deaths by the end of 2022. Clearly, the threat of this virus and its mutated cousins will be with us for many years. Time and repetition dull our shock; COVID-19 deaths are becoming normal, one more disease on lists of the causes of death in the US. COVID-19 is now number three, exceeded only by heart disease and cancer.

We are late to recognize this possibility, but have begun to organize the science infrastructure required for a genetic defense strategy (GDS). The Department of Health and Human Services Office for Preparedness and Response, the Office of Science and Technology Policy, the National Academies of Science, Engineering, and Medicine, have been tasked with designing a tracking system for viruses of the sort presently attacking us.[73] China, Russia, and North Korea have opted out of joining the US genetic defense strategy (GDS) and established their own GDS claiming that the West is simply using this institution to develop bio-weapons and manipulating virus genes to attack key people of given races or even races as a whole.

In her opening press conference, the new GDS Director, Josephine King said, “We have been worried about the possibility of “little green men” coming from outer space to invade the earth, when all the while the invaders have been here and they are not little green men after all. They are not living in the sense that you and I mean; they are inert but adaptive, and they are—as we feared—effective killers. They are invisible and surround us. They plot to kill us and have demonstrated their ability to do so. They try to outwit us and have to some degree, but without intelligence and forethought that we attribute to human planning.”[a]

Fake cures like lanyards and necklaces named “Virus Shut Out” and “Air Doctor” now being sold in convenience stores, will continue to abound[74]. Masks will be legally required almost everywhere; by year’s end they will have become somewhat of a fashion statement: bunny faces, Frankenstein, Jefferson. Charlatans and snake oil salesmen will have a field day.

[a]This is not real.

Question from the audience: Well, the situation seems very critical. What's the answer? Answer from the speaker: I wish I had the answer. We know that philanthropic donations to organizations like UNICEF and the Red Cross are way down just when the need for their services is increasing as never before. Lockdown centers (don't call them concentration camps) have been created to hold infected persons, legally, even against their will, as was the case in earlier times for cholera, smallpox, tuberculous, and leprosy. Such cordon sanitaires *were enforced by the Chinese against Wuhan and later Hubei Province which has 60 million people. Migrants are blocked from entering the US, with much more public support now. People, even children, found to be super-spreaders through sampling of anti-bodies in their blood, will continue to be legally required to wear an "S" badge on their outermost garment, distastefully reminiscent of the Nazi's requiring Jews to wear the Star of David.*

Where does it all lead? Social media pessimists talk revolution. Politicians threaten martial law. We don't even have a silver lining in mind, an outcome we can hope for, other than survival and returning to the past. We are beginning to understand that the virus will never be eliminated; the best we can hope for is learning to live with it. In the end, we appear to be insignificant players in a Brownian-buffeted universe, suffering from inexorable entropic creep toward chaos, battling forces that would do us in, leaving us with little more than a minor chance for a short-lived minor victory.

Take care and stay safe!

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Scenario 3: Things went Right!

By Banning Garrett, Independent Strategic Policy Analyst
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You can always count on Americans to do the right thing--
after first having exhausted all possible alternatives.
- attributed to Winston Churchill

Looking back from January 1, 2022:

Looking back to the depths of the pandemic in mid-2020, it is astonishing to think that all the elements of the eventual recovery were known and available even before the virus began its run in early January 2020. Yet the virus burned through the population in 2020 because of failure to take effective measures in the first weeks of the pandemic and the continued uncoordinated response through the balance of 2020, compounded by virus denial, lack of central leadership, and politicization of the pandemic that actively frustrated efforts by public health professionals to craft and implement effective strategies.[75]

In the end, we belatedly threw the kitchen sink at the problem; and it worked. The pandemic was brought down by a combination of tried and true public health measures, gradually rising public acceptance of new behavioral norms, and crucially, a new administration focused on creating a “whole-of-government” effort that pulled together all the elements necessary to effectively manage the COVID-19 threat. This governmental response included stepped up coordination of city and state governments with each other and with the federal government.

The turning point came in early 2021 when COVID-19 deaths topped 500,000 and a shell-shocked and weary nation was ready to grudgingly coalesce around the new administration’s science and policy-driven plan to finally overcome the pandemic. Recognizing that full deployment of a vaccine still lay in the future, the plan focused on coordinating once-independent efforts in a manner that ensured maximal positive effect. Simply put, the politicians stepped back, the vastly outnumbered skeptics fell silent, and the policy and public health experts were finally able to work undisturbed.

This in turn created a context in which we were able to make the most of the medical innovations that eventually arrived. Vaccines were developed and did make a big difference, but relieved leaders quietly chalked up their success to the all-important coordination that slowed the contagion and allowed them to make the most with the tools they had at hand.

Elements came together to deliver the positive result

By the New Year Day of 2022, events finally turned favorable. This optimistic outcome was not the result of a sudden health care breakthrough. Rather, it emerged from an outbreak of common sense at all levels of society that allowed the most to be made of well-established public health practices through coordination at all levels of government and with the full participation of an engaged public.

There were important innovations, particularly in the areas of testing, vaccines and therapies, but the successful deployment of these innovations depended heavily on the larger climate of cooperation. The pandemic was subdued not by silver bullets, or even silver buckshot. It was brought under control by an emergent climate of social cohesion that allowed public health professionals to make the most of all the tools at their disposal.

The virus is not gone, but it has receded into the endemic background. And when it or another virus emerges, a sadder but wiser society will remember the lessons learned since January 2020 and respond more effectively.

The new administration gets serious about prior lessons and present-tense coordination

While coping with a pandemic is undoubtedly one of the most difficult and complicated challenges a society—and the world—can face,[76] the new administration drew on the work of experts in the government who had seen the pandemic coming and had prepared for its eventuality. Playbooks prepared by the previous Bush and Obama administrations were dusted off and applied.[77] [78] The new administration moved quickly to reconstitute the pandemic preparedness group in the National Security Council and created a new pandemic policy team to directly advise the public led by senior scientists from the CDC, the FDA, and the NIAID of the NIH. And of course, the new administration installed a no-nonsense slate of skilled managers and policy experts in all of the Federal agencies.

Mayors and Governors lean in
Many of the nation's mayors and governors were early leaders in community virus response. Some even managed to develop regional coordination plans with their neighbors, but their efforts were blunted by the lack of leadership at the national level during 2020. With the dramatic shift in response by the Federal government in 2021, state and local leaders moved quickly to establish the longed-for coordination between their jurisdictions and the Feds, with dramatic positive results.

A weary nation trades politics for collaboration and normalizes virus-related behavior

A year of suffering through the initial uncoordinated virus response conditioned the public to recognize their deep interdependence, embrace common-sense mitigation steps, and integrate behaviors like social distancing, hand washing, and mask-wearing into ordinary daily life. It admittedly was slow and grudging. Even the President's hospitalization in October initially only deepened the public divide, but the steady press of bad news over the following months finally brought forth a consensus. We still haven't figured out what will replace the handshake, but at least everyone is having fun with elbow bumps, Namaste bows and Star Trek Vulcan greetings!

Aggressive anti-masking behavior is considered as anti-social
Virus skeptics and anti-vaxxers didn't go away, but they quickly learned that their militant acts of denial would get them shunned and increasingly escorted out of public places from restaurants to movie theaters. For its part, the public quickly learned that direct confrontation was risky, and turned to subtler ways to deflate and embarrass the occasional unmasked person, such as collectively booing, moving away en masse from a violator, or collectively blocking an outnumbered anti-masker's attempts to enter a venue.

Viral fashion becomes a thing
A subtler consequence was the integration of basic virus hygiene into everyday fashion. Masks became fashion accessories, from matched coverings on fashion runways to geeky techno-masking popular with the Silicon Valley set. This further encouraged containment measures as individuals came to see masks as affirmative statements of their commitment to the protection of fellow citizens.

Social cohesion is an unexpected outcome
The pandemic was turned by a combination of many factors, but growing social cohesion was the latticework that pulled those disparate elements together and made them work in concert. Especially crucial in this effort were increased public trust of scientists and national guidelines and determined leadership by local officials, especially mayors throughout “red” as well as “blue” states.

The pandemic reshapes spaces—with some technology help

Deeper understandings of virus behavior led to redesign of public spaces, making previously prohibited social gatherings possible with positive economic effects.

Retail, dining and entertainment are reinvented --and return
The improvised public spaces created early in the pandemic like sidewalk restaurant patios were quickly replaced by more permanent solutions as architects and engineers redesigned restaurant, retail and entertainment venues with transmission mitigation in mind. The combination of clever design with advances to HVAC and other building systems meant the spaces were welcoming and without any hint of virus fretting. The public responded with enthusiasm with perceptible effects on the retail economy.

Offices don't disappear—they are transformed
The shift to remote work became permanent for many white-collar workers, but with this came a recognition that office space remains essential to effective business operations. The same combinations of technology and design applied to retail, dining and entertainment are applied to offices and collective work resumes. The unexpected benefit is that the workspace has been transformed into a richer ecology of work spaces: companies now have greater flexibility than ever in combining remote and in-person work in the service of business effectiveness.

Vaccines finally arrive—with a surprise

After early disappointments, the bio-pharma industry simultaneously produced several low-cost vaccines that were so obviously effective and safe that all received accelerated FDA approval. Discounted and royalty-free rights to manufacture several of the vaccines were granted to companies across the globe, resulting in a massive vaccination effort, funded largely by the US, China, the EU, and Japan and spearheaded by the WHO, which had received renewed American support. Fortunately, several corporations took great financial risks and began massive production of the vaccines even before approval, so the vaccine was ready even before the funding was turned on.

One vaccine was orally administered, flummoxing anti-vaxxers
The fact that one of the vaccines was administered without an injection proved a crucial factor for wide public acceptance. Previously the public equated "Vaccine" with needles and injections. A nasally administered vaccine seemed no different than using popular over-the-counter cold and allergy medicines and public anxieties all but disappeared. A

tiny minority of hard core anti-vaxxers held out, but the public at large embraced the therapy resulting in far greater vaccination rates than previously expected.

Effective therapies reduced infection severity and mortality

The medical community quickly began sharing lessons learned early in the outbreak. This yielded steady therapeutic improvements which matured into a multi-pronged regimen easily tailored to individual cases. Hopes that specific drugs might prove to be a miracle cure never panned out, but several found a place as useful tools in the therapeutic toolbox, particularly when coupled with other treatments. The result was both diminished mortality rates and diminished severity of symptoms for all but a small percentage of those infected with the virus.

Hospitals recover their equilibrium: better prepared, fewer hospitalizations

As other measures blunted the number of infections and new therapies and regimens reduced the need for hospitalization, the strain on hospital capacity was relieved, allowing for both greater staff attention for severe COVID-19 patients as well as resumption of other hospital functions, especially elective surgeries and life-extending treatments such as chemotherapy and dialysis. After months and months on the learning curve, the virus response moved beyond merely being "the new normal" and is now solidly integrated into routine hospital operations.

A spur for Hospital innovations
Along with lower infection rates and much better understood treatment options, the tech sector delivered on important technology amplifiers, including cleaning and logistics robots, which help minimize infection risk and allow the shifting of human personnel to other duties. Other technology interventions, including new telemedicine systems and sensors have greatly expanded (with the help of insurers) the access points for patients to interact with the health care system.

And a coming health system transformation?
Looking ahead, it is clear that we are in the early stages of a top-to-bottom review of the US health care system. Before the pandemic, experts lamented that the US system was the most expensive in the world and only the 15th ranked system globally for quality. As the pandemic began to wane, the consensus emerged around the system being pointlessly lethal to medical responders as well as the public at large. An historic pattern of neglecting public health, inadequately addressing preventative medicine and overly rigid control of accreditation were all identified as factors that must be changed. It is still

early in this process but there is a growing sense that we are on the verge of recreating the system to be more efficient, less costly and, above all, deliver better health results.

Antibody testing and immunity more effective than expected—and a testing game-changer emerges

Antibody testing hasn't undergone a revolution but the arrival of fully automated cartridge-based diagnostic devices greatly improved test availability at significantly lower cost. A happy development was clear clinical evidence that prior infection confers a higher level immunity to the virus than anticipated in late 2020. This finding in turn spurred the further deployment of automated testing, providing health professionals with better historic infection data, and employers and workers with confidence regarding who can safely return to work.

And a testing game-changer

Testing steadily improved on both the PCR and serological fronts, but the big surprise was the development of a low-cost, paper-based test employing lateral-flow technology similar to consumer pregnancy tests. The test modality meant no painful nasal swabs, and low-cost self-administration meant that the testing regimen moved from scarce one-off testing to a more abundant environment of regular re-testing in homes, offices and clinics.

The paper test of course is not as accurate as a lab-based test, but it quickly took its place as a front-line resource. This dramatically increased the ability to catch new outbreaks early and quench them before they grew. More importantly, the easy test availability did much to help lower fear and uncertainty among the public, thus boosting a return to some sense of normal, pre-pandemic economic and social behavior.

Contact tracing expands its impact—goes high-tech

The effects of several super-spreader events like the motorcycle rally in Sturgis proved a powerful incentive encouraging public acceptance of contact tracing. Vaccine availability and the prospect that antigen evidence of prior infection could be a "golden ticket" for employability further contributed to public support and enthusiasm for effective contact tracing. Faster testing also helped by shortening the time lag between infection and detection, making the tracers' jobs easier. And the combination of increased tracing budgets and otherwise unemployed workers available to work as tracers meant that contact rapidly gained traction.

Powerful tools for tracers - and a consumer app

A Silicon Valley industry partnership initiated a program in spring 2020 to create a robust applications platform that allowed smartphone users to opt into a powerful contact tracing system. The system's guarantee of privacy, plus its gamified interface led to rapid public uptake. The resulting volume of data allowed developers to add in AI-based predictive capability, making the system even more powerful. This allowed developers to fuse the consumer system with existing contact tracing efforts, creating an expanded surveillance system that fused AI-based pattern analysis with a Bloomberg-funded tablet-based app platform that was put into the hands of unemployed gig workers retrained as contact tracers.

The virus proved to be (mostly) well-behaved

Fears of COVID-19 undergoing flu-like mutations proved unfounded. Mutations have been minimal, well within what is expected of a virus in broad spread. The result is a growing sense among experts that control was within reach, the virus was unlikely to slip beyond the reach of a seasonally adjusted vaccine or, more importantly, beyond the protection of infection-conferred immunity. This has another important implication: slowly mutating viruses in community spread tend to mutate towards less virulence.

Surfing the second wave

The expected echo outbreak in winter of 2020/2021 arrived later than expected and with much smaller effect thanks to the other factors mentioned above. Specifically, lateral flow testing greatly improved early detection which, coupled with broadly deployed contact tracing, meant that outbreaks were quickly caught and suppressed. The deployment of nasal-dosed vaccines meant that the population of available hosts was shrinking, thus creating ever-wider firebreaks to viral spread. Overall, the blunted second and third waves were evidence of the most important factor of all: the amplifying effect of a shocked nation demonstrating self-discipline and social cohesion in response to the challenge.

Borderless coordination for a borderless virus

The new administration recognized the critical importance of international cooperation in combating the virus and in early 2021, worked to re-establish international arrangements suspended in 2020. Frayed relationships were repaired and upgraded with international organizations, including the WHO, UN, G-7, EU, and with other US allies.

An emerging US-EU-China partnership pays off
The US restarted coordination with the European Union and China, with a focus on the development and global distribution of vaccines and medical equipment. This paid off once vaccines were available, especially the one-dose nasal spray that could be cheaply and relatively easily distributed and used around the world. Millions of people were recruited around the world to vaccinate billions of people, from city slums to remote villages. Most of this would have been impossible if the only vaccines were mRNA vaccines that required extensive cold-chain refrigeration on dry ice, which would have been virtually impossible in most parts of the developing world.

Not quite the 21st century Marshall Plan, but...
Against this backdrop, there was talk of how, in prior crises, the US stepped up to help the global order recover, especially after World War II with the Marshall Plan and the period of global institution-building resulting in the creation of entities like the UN, the World Bank and the WHO. It is a far different world today, but echoes of that time remain. Buoyed by public opinion and a desire to demonstrate that America is prepared to lead again, the US catalyzed a multi-national effort of coordinated decentralized production and distribution of vaccines and therapies. US-China recriminations and zero-sum competition were surprisingly muted as was the feared effort by rich countries to hoard the vaccine.

Economy begins to recover as unemployment declines

This is another area where the interaction of factors had a dramatic second order effect. Testing and contact tracing held down incidents of infection, while antigen tests and a comparatively stable virus genome paid off in a growing workforce of immune workers. An intangible factor was the greater social cohesion, which translated into public confidence in the economy and stepped up investment and growth. The recovery remains a long road, but the numbers so far are encouraging.

Repairing the economic damage...
In early 2021, it was obvious that the economic consequences remained nothing short of dire. Tens of thousands of small businesses had gone bankrupt and millions of workers remain unemployed. Private and commercial renters' inability to pay led to many landlords unable to service their mortgages, which in turn strained banks. And collapsing tax revenues had forced draconian spending reductions on essential services from police and fire protection to education and housing support.

The tide began to turn in early 2021 as the new Administration and Congress collaborated on a $5 trillion pandemic relief and economic recovery package that

included a mortgage arrears clearance program, a low interest mortgage refinancing program, and a $600/week supplemental unemployment insurance program. Crucially, the package also included a 21st Century public works jobs program focused on infrastructure reconstruction, smart-cities initiatives, expansion of child care support and public health services, and green energy and conservation programs.

Though the measures have been in place for less than a year, their effect is already being felt in greater market and business confidence. Looking ahead from January 2022, the economic bottom seems to be behind us with economic recovery well underway.

The lurking debt monster...
The new Administration and Congress arrived with the realization that the burgeoning national debt could kill the recovery in its cradle. A bipartisan working group set to work on a realistically updated tax code and increased US engagement in international efforts to coordinate tax systems.

Looking back and looking ahead: determined to do better next time!

The country (and the planet) are not out of the woods yet, but the trend line is far more positive than anyone dared to imagine amidst the deepening discord of late 2020. A mutating COVID-19 virus will likely become endemic in the same way flu did a century earlier, but like the flu, both experts and the public are now confident that it can be managed without the extreme measures of the past two years. A pleasant surprise, however, is that even as we continue to wrestle with the current pandemic, the atmosphere of coordination and ever more positive public sentiment is leading to a growing resolve to do better.

Looking back on the rocky road to finally turning the corner on the pandemic, many political and business leaders pointed to key lessons, including political leaders' need to prioritize scientific evidence and advice and to maintain and rapidly implement robust plans for such contingencies; the essential requirement of close coordination with all levels of government and society, and striving for a "whole-of-nation," unified response to such a crisis that puts aside partisan differences and rivalries for the public good. Many leaders acknowledged that perhaps the even more important challenge was building and nurturing trust between leaders and citizens and among citizens themselves.

A return to a new globalism

Not only the country, but the world has recognized that collective steps must be taken to be prepared for the next outbreak. Of course, this is what experts and public intellectuals have advocated for decades, but after the close call of 2020, perhaps the fortuitous combination of factors has left the US—and the international community—better prepared to anticipate and respond to the next virus outbreak. Globally, many political leaders and publics have recognized that a global pandemic is no longer a theoretical possibility or an unthinkable repeat of the Spanish flu that spread around the world a century ago.

Cooperation over competition

American leaders especially have emphasized the need to put cooperation on global threats, including climate change as well as pandemics, ahead of geopolitical and economic conflict and rivalry. They acknowledged that this would be a difficult and ongoing challenge that would require a long-term commitment to rebuilding and strengthening the sinews of international cooperation—and that the United States would need to play a key leadership role in this effort, including leading by example.

Belated recognition of <u>the</u> missing critical factor: Social Cohesion

Reflecting on the ultimate causes of how a local virus escaped to become a destructive pandemic, there is new appreciation of a critical factor: social cohesion. The fragmentation caused by two decades of social media have thrust us into a world of suspicion, superstition and paranoia.

If there is a silver lining to this pandemic, it is that it reminded us all of our deep interdependence. Sadder but wiser, we are emerging from this crisis with greater appreciation that increased social cohesion is essential to fending off not only the next virus outbreak but to solving the myriad other problems facing us in this century.

Endnotes

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"Absolutely nothing that has happened has been a surprise. We saw it coming. Not only did we see it, we ran the models and the gaming exercises. We had every bit of the structure in place. We've been talking about a biohazard risk like this for years. Anyone who says we did not see this coming has their head in the sand, or is lying through their teeth.'" James Giordano, to James Fallows. Ibid.

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Conclusions

The most underlying conclusion is the difference between the worlds depicted in the three scenarios; much greater than usual. Whether we achieve one or the other, or something in between, will be determined by some small (but important) factors in over the next few months. Many of those factors have to do with national and local policies and leadership, as well as public actions and human behavior such as wearing masks, physical distancing, hand washing, and avoiding indoor crowds.

Following are some factors identified as being of potential impact in the move between Scenario 1 America Endures (baseline), Scenario 2 Depression (pessimistic), and Scenario 3 Things went Right (optimistic).

Factors that might move the United States from Scenario 1 (baseline) to 2 (pessimistic):

- opening too fast continues
- immunity is not reliable—it fades, and the virus mutates
- The number of infections in Africa, Latin America, and South Asia increase massively
- social trust breaks down
- economic stimulus packages are too small and not long enough.

Factors that can move the United States from scenario 1 (baseline) to 3 (optimistic)

- implementation of a whole-of-nation COVID-19 strategy
- reliable, fast, at-home tests become available
- good contact tracing and quarantine are observed
- immunity is reliable, and the virus mutations are insignificant
- FDA-approved treatments that are more effective and are mass produced
- FDA-approved vaccines with efficacy over 65% are taken by 80% of the public.

Vaccines will not end the pandemic soon even if they are safe and effective as they will take many months to be manufactured and widely distributed.

The worst may be yet to come: the greatest health, financial, economic, social, and psychological impacts likely lie ahead. Even in the best case scenario, the damages from the events of 2020-2021 are likely to linger for at least several more years.

Remember history when Europeans first came to the “new world” in the 16th century, and when in the 18th and 19th centuries European explorers came to the Pacific islands? The original inhabitants had no natural immunities to diseases that the foreigners

brought. This unleashed massive, deadly epidemics. The situation is now parallel on a global scale: no one has a natural immunity to COVID.

Key implications emerging from the scenarios

The implications identified for each scenario could help improve understanding the potential consequences in setting policies and designing strategies. Some common key implications include:

- Until the virus is captured everywhere (as in the case of smallpox), no country can be sure the pandemic has been overcome.
- Freedoms will be compromised in the battle against the virus: freedom to congregate, freedom to move across state lines.
- Inventions are needed: a spray that makes the virus visible, and a 1 cent, 1 second test.
- Social marketing programs designed to affect behavior (e.g. as in distracted driving, anti-smoking, etc.) are yet to be implemented.

Scenario 1: *America Endures*

- Don’t pin all our hopes on a vaccine to get back to normal; we may not reach herd immunity for years.
- There will not be enough money for hospitals, especially rural hospitals.
- ARC (American Red Cross), and other public health, academic, and disaster response actors should collaborate with CDC, NIH, DHS, DHHS to re-create the pandemic unit at the National Security Council and create a national pandemic register with a collective intelligence system of what is working and what is not.
- ARC volunteers should make a major effort to get those who have tested positive for the antibodies to give blood to produce convalescent plasma.
- The need for food distribution is likely to be greater than currently anticipated; ARC and other relief organizations should expand their food distribution activities with partners such as World Central Kitchen.
- The current pandemic should be studied to know for how long the public will tolerate lockdowns and related restrictions and at what level, and pandemics in the future are still likely.
- There will be a critical need to control counterfeit tests, vaccines, and treatments.

Scenario 2: *Depression, Hubris, and Discord*

- There is a growing, unsavory linkage between politics, public health, “gang” creed, and social norms.
- In the coming economic environment, philanthropic donations may decrease significantly, while demand for relief services grows due to rising poverty.
- Since infections and social distancing will continue, American Red Cross shelters will have to remain available and perhaps redesigned and be resized to accommodate simultaneous disasters.
- If anti-bodies derived from blood plasma of recovered COVID-19 patients are used in vaccine production, testing and collection tasks may increase significantly.
- Since virus-rich blood samples could conceivably be weaponized by terrorists or in the production of vaccines, serological data and stores must be closely guarded.
- The relief loads on ARC imposed by the pandemic are additive to those of other disasters. A risk study should be performed to reach an understanding of the requirements that various combinations of disasters may impose on ARC’s need to provide shelters and logistical supplies.
- Migration from areas with high infection rates to areas of lower rates causes uncertainty in location, number, and types of populations in need of assistance.
- Inflation rates may eventually become high and conventional investment instruments may no longer be appropriate.
- Required support for the homeless will grow greatly.
- Because of public frustration and anger, some institutions will come under attack; all should consider their own security measures as well as their suppliers.
- Vaccines will not end the pandemic immediately and maybe not ever.
- The simultaneous impacts of the pandemic and another emergency (fires, floods, earthquakes, riots, etc.) will be greater than the sum of the emergencies considered alone.
- The consequences of the pandemic intensify the gaps between rich and poor, and also between workers who can work from home and blue-collar workers who must report to work.
- People at the lower rungs of the employment and social ladder will feel the worst impacts.
- The fact that health consequences are worse for elderly may result in age discrimination.

Scenario 3: *Things Went Right!*

- The best possible outcome requires effective national leadership and critical steps, especially wearing masks, social distancing, limiting indoor gatherings, implemented nationwide. It also requires close coordination of mayors and state officials with the Federal government and building trust in scientific and health institutions and experts.
- Social cohesion is the single most important success factor. If there is an optimistic outcome to the current pandemic, it will be because of an increase in public trust and social cohesion. Social cohesion is at once the glue and amplifier that makes all the other response elements more effective, so there is long-term work to improve levels of social cohesion before the next pandemic arrives.
- Institution building for public health systems is critical. Atrophied public health systems must be rebuilt to become the first line of detection and defense against future virus outbreaks. This included a return to aggressive pre-planning and simulations encompassing the full range of possible future pandemics.
- Viruses ignore borders; so must planning and response. Robust international collaboration and coordination will be essential to future virus outbreak responses. We doubt that the current pandemic will be sufficient motivation to stimulate this collaboration; so, we must look for something that will. What is the 21st century equivalent of the impact seeing the first picture of the whole Earth from space in 1966?
- Planning for a future of endemic viruses is necessary. COVID didn't disappear, but simply retreated into the endemic background pool of other once-dread viruses. This ever-growing endemic virus pool will require entirely new strategies to manage. This will also lead to the redesign of cultural habits (what replaces handshakes?) as well as public and private infrastructure.
- Repairing the economy is a decade-scale task. Americans in particular tend to declare premature victory and walk away before a task is truly complete. We expect this will happen with the ongoing virus response, but the temptation will be even more severe with regard to the battered pandemic-battered economy.

Shortages: Where United States in not ready between now and January 2022

- Contact tracing personnel
- Food supply
- Treatment/drugs supply and IUC supplies in general
- PPE supply chains
- Medical glass when vaccine available and freezing units for delivery
- Financial resources

Note: China controls much of these with trade war in the background.

Wild Cards

Wildcards are low (under 5%) or uncertain probability events, which, if they should happen are dramatic game-changers. Here are several wildcards to contemplate within the context of each scenario:

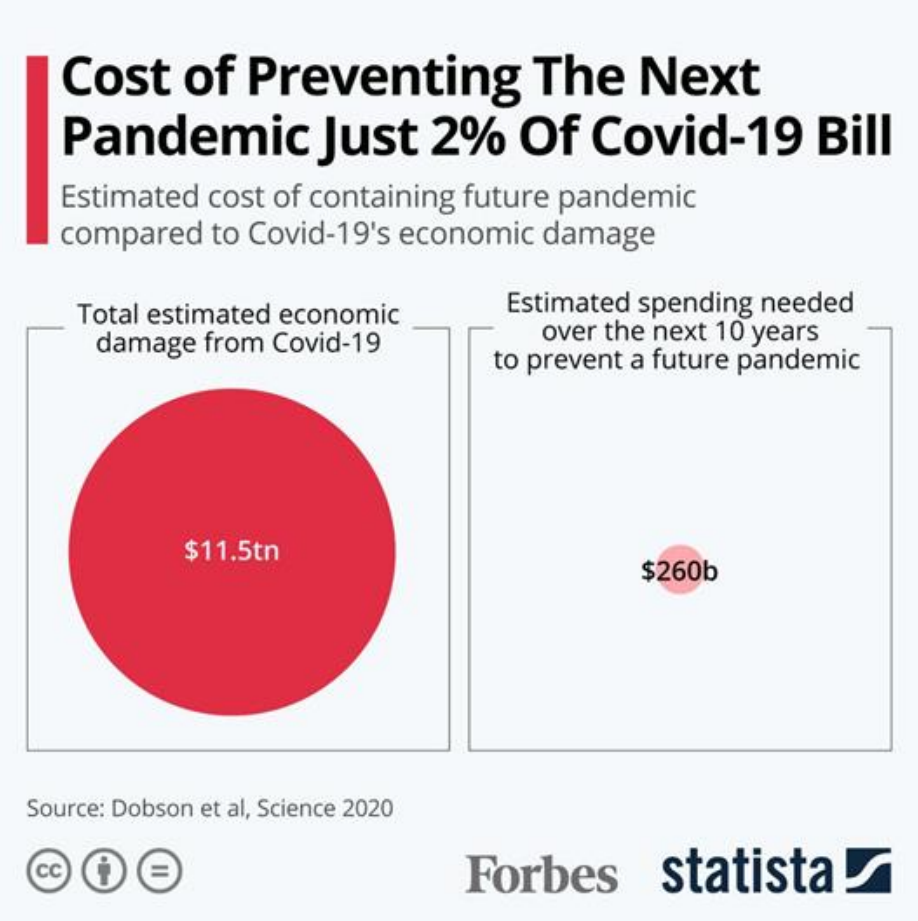
- Massive dissemination of counterfeit testing kits, vaccines and medicines by organized crime furthers the spread of COVID-19 mostly in Africa increasing mutations and making the current crop of vaccines nearly irrelevant.
- War breaks out interrupting supply chains for PPEs and vaccines.
- XPRIZE delivers a miracle! The XPRIZE Foundation has listed several challenges, with the most prominent being a $5 million prize to develop a scalable faster/cheap/easy to use COVID-19 test. Well, it arrived!
- COVID vaccines cure the common cold! COVID-19 is a coronavirus just like the cold virus. And in theory we could have a cold vaccine, but because the cold virus mutates so quickly, there is little profit in creating a vaccine for the common cold. However, the vast effort to come up with a COVID-19 vaccine and the realization that the vaccine would likely require booster shots caused the pharmas to conclude that the obvious sensible option was to include an annual cold vaccine in the COVID vaccination package.
- The public loves their scientific elites! Scientists become celebrities! Anthony Fauci becomes the head of Health and Human Services by public acclaim.
- Vaccine insurance becomes a thing. Never ones to miss an opportunity, insurance companies begin to offer insurance against the possible negative effects of COVID

vaccines. They position this as a public service, but of course they have made the cold hard calculation that they will never have to pay out. But to their surprise, they are faced with high number of claims, not from people with actual symptoms, but by the worried well who are convinced that the vaccine caused any number of subtle problems.

- And an emergent wildcard: The event that precipitated the transformational change was President Trump's induced coma and members of his family hospitalized as well as several aides in quarantine, a shocked nation coalesced around a science and policy-driven plan to overcome the pandemic.

This leaves us with the sense that the uncertainties ahead are even greater than generally anticipated. We hope the three scenarios that have organized these uncertainties will prove useful for planning and for a more coherent public understanding of the pandemic's future possibilities.

Will we apply the lessons of prevention and preparation from the COVID-19? The graph below shows the dramatic economic impact, if we do learn these lessons.



Appendices

Appendix A: Participants in the study

The authors want to thank all those who contributed their views to the scenarios. Special thanks go to the reviewers of the draft scenarios –listed in the Introduction-- and to the participants in the Real-time Delphi studies.

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The following people participated in at least one of the four Real-time Delphi studies conducted as part of this work. Not all participants identified their primary institutional affiliation. Their contributions are highly appreciated.

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Appendix B: Results of the Real-time Delphi Studies

Note: The results of RTD 5 will be presented in a subsequent report dedicated to the State of the Pandemic Index (SOPI).

RTD 1: US Medical/Health Issues

1.1 When do you think FDA-approved treatments that shorten hospital stays for most Covid-19 patients will be available?

Date	Number of responses
August, 2020	3
October, 2020	2
December, 2020	8
February, 2021	9
April, 2021	11

1.2 Comments and consequences:

The massive production of Remdesivir, dexamethesanone, and convalascent plasma not only reduced the death rates, they also reduced the ethical, racial, and international tensions when supplies were low.

First treatment will be in the form of a standardized therapy protocol aggregating the combined best practices. Second wave will be augmenting this (hopefully) with new drug therapies. Might even be hydroqtho the uncertainty re it remains high. Primary consequence, begins to control the pandemic; secondary: gets people back to work earlier; tertiary: prevents a depression.

2.1 When do you estimate there will be at least 10 million people self-tested by FDA approved procedure at home use for the presence of SARS-CoV-2?

Date	Number of responses
August, 2020	2
October, 2020	4
December, 2020	8
February, 2021	5
April, 2021	10

Although some used self-administered tests by January 2021, FDA approved self-tests with accurate sensitivity and specificity was not available until April, 2021. This is unlikely to happen in the next couple of years - too many caveats and potential liability issues.

2.2 Comments and Consequences

Employers require periodic test results as a condition of employment; counterfeiting test results becomes a black market favorite; racial and income disparities create social tensions. Some venues require valid test results as a condition of entry. Asset to contact tracing. First self-tests will begin to arrive in summer 2020. These are likely to be serological antibody tests, not tests for active virus.

Insurance covered, and government provided for critical employees such as teachers, nurses, social work, doctors. Also, test-retest options have to be considered…The public will embrace a self-test - especially prior to the holidays when they will want to travel and see family. A self-test may be difficult to report findings and not allow for proper contact tracing or flare up tracking…To develop a test to detect a specific active infection requires rigorous research (and has to be financially accessible for consumers). Additionally, self-testing adds other caveats: 1) post-production and delivery: storage conditions, handling of commercial premises, handling and proper use of users; and 2) Host conditions: health status, concomitant pathologies, pharmacological interactions/reactions, age, gender, genetics, ethnicity, etc… There will never truly be a reliable self-test; People will get inaccurate information; a vaccine will eliminate the driving need for this… IF this were to happen in a realistic manner, consequences would be significant: it could lead to actual real-time identification and tracing of each and every case. Secondary consequences might be unintended 'enforced' quarantine of those testing positive (electronically monitored) - this includes

automatic transmission (not at the user's discretion) of test results. Tis would create a feedback loop resulting in hesitation to use the home-based tests, as one may be put under State quarantine before you know.

One dimension to be considered: the participation by the medical clinical professions - physician-patient confidentiality may play out differently than 'legal' obligation and protection standards…Given that there are already a half dozen test kits approved by the FDA under an EUA, this is already well under way; however, as the accuracy of such tests improves, the number of approved test sources will decline as the EUA is lifted. If the manufacturers of the new more rigorous tests can keep up production, and get the price under $100USD so the insurance companies don't balk at the rapidly rising cumulative cost of testing, then this date should be achievable. Insurance coverage (or employer coverage), however, is eventually going to be the rate limiter on how many people can even access the tests, with those in lower socioeconomic brackets lagging in use of such kits…Self-test applications are being processed now by FDA…Tests are likely to be of less-than-perfect accuracy. May engender a sense of false security that will cause people to be lax in personal protection such as masking, social distance etc

3.1 When will antibody tests be available that are low cost, self-administered and are more than 90% reliable? When do you estimate that antibody blood tests will be reliable enough to be accepted for health official certification that is used for people to go back to work?

Date	Number of responses
August, 2020	1
September, 2020	4
October, 2020	5
November, 2020	3
December, 2020	17

Pressure economic recovery; actual value added likely to be more like a "sense of security" measure… Even December 2021 is unlikely to see fully reliable serological tests. My guess is 2024, likely from Australia (via-a-vis their RDT experience over time)…JG: FDA fast tracks approval for COVID-19 antibody test developed in Rochester April (reliability?)…It is not yet clear whether presence of antibodies preclude transmission…difficult to say, depending on a potential genetic drift of virus & as well as question of reinfection and potential cross-reactions with other viruses & bacteria etc…The big uncertainty isn't the test per se, but whether the presence of an antibody means the individual can't be reinfected.

3.2 Comments and consequences:

Antibody passports required for some public events, theaters, ball games, etc. Counterfeit results abound. Age, race, class discrimination…gets more people back to work, should help find people to give blood for treating others, but may lead to black market or counterfeit tests…issue is not the test per se, but whether test results actually indicate immunity…Self-administered serum tests are hard and many people will not want to use them. It would need to be different than most in use today. AImost all self-tests, other diabetes, use urine or non-blood samples…We might move this up to September IF the testing were to be done at a POC or workplace…Low price, ideally provided by GOV, and good sensitivity / specificity…This answer applies only for the 'accepted for health official certification'. Please note that the standard is (1) subjective and (2) pragmatic. The '90% reliable' criterion requires a denominator for 'ground truth' and criteria for that determination will be a subjective and pragmatic decision. Given the apparent weak inferential links between antibody titers and signs/symptoms/infectiousness, a multiple test strategy (several negative tests a short interval) may be advisable for efficacy…With colleges resuming on campus in many states there will be concentrated populations who would be terrific test grounds; uncertain length of time of antibody protection.

How frequently would you need to take the test…a health official certification through a self-administered test, brings more caveats: post-production and delivery: storage conditions, handling of commercial premises, handling and proper use of users; will this be used as the intended "immunity passport"? are we sure we want to issue a document based on a "plausible" biological status? are we considering the social discriminatory reaction? would this test be mandatory? would this have implications in minority groups? migrants, refugees? who will have to pay for this test, the employer or employee?... Never - because antibody levels vary over time, do not stay in the protective range for a long enough period of time, and will not be the primary means of nature protection in the end…I agree with the observation that this might never happen. This picture would change the moment a reliable and effective -and widely available- vaccine would come along (September 2021?)…Also not clear there's a coordinated strategy to achieve such a result…While cost, ease of use, and reliability are important, we don’t yet know enough about the immunity conferred by those antibodies, how long they last. So there might not even be a practical use for such tests if titers rapidly drop off. This could even lead to a long-shot Gattaca type scenario where a black market emerges for "good" tests to present to one's employer…This may never happen for multiple reasons. Like how long would the immunity last even if the test were good at the time given. Also especially the USA might not want the government making want two classes of people…I don't really think they will be available as self-admin and 90+%

reliable by Dec, but that's the longest date you have…Answer: This will occur fairly soon…Reliable is a relative term. We do not yet know if being antibody-positive protects you.

4.1 When will vaccinations for Covid-19 be available? When do you estimate that at least 65% of the US population will be vaccinated with an FDA approved vaccine for Covid-19 that is at least 70% efficacious?

Date	Number of responses
January - June 2021	4
July - December 2021	4
January - June 2022	6
July - December 2022	7
January - June 2023	2
July - December 2023	4
Later	3

US government is providing funding to five organizations that are already making good progress toward the vaccine…Explanation: Administration of vaccine to 65% may be achievable in adults. Given the elevated level of perceived threat, a 20% increment over influenza vaccine coverage may be feasible. However, 70% efficacy may not be realistic…65% is a big number and correspondingly enforced Vaccination big issue, that also will require antibody passports. side-effects, long term consequences unknown & raises question of accountability and revaccination as a consequence of a potential genetic drift and different genotype-phenotype interaction…Anthony Fauci was quoted by the New York Times as saying, “by the beginning of 2021 we hope to have a couple of hundred million doses." That would be enough (66%) for herd immunity... anti-vaccine folks may make it hard to get to the 65% mark.

4.2 Comments and consequences

One or more vaccines with ~70% VE will be available early 2021; it will take a year or more to achieve good coverage...Ethical issue as long as supply is short and demand is high. Compulsory administration is conceivable if herd immunity is not otherwise obtained…keep a close eye on the EU grant process, the ACT program and the GAVI dimensions…Among the biggest challenges might be to "sustain" the production and sustainability of vaccine production in a public/private global partnership manner. AMC pricing could and should play a large role…The long wait for a vaccination will include

regional flare ups of the virus. Mental health issues, spousal and child abuse, alcoholism, and other negative consequences in the home will rise with each passing month…Efficacy for how long? …debate over priorities of distribution; prioritizing health care workers, critical infrastructure workers, and the most vulnerable. The classification of those last two groups, as well as dealing with the issue of economic privilege, will be at the center of the debate; universal health access is the core of the problem…we need to start now: space can be leased, refrigerators and freezers can be brought, vials can be purchased, shipping routes can be worked out, and skilled workers can be hired…The efficacy goal may be unrealistic; it certainly exceeds the influenza vaccine estimates from the CDC https://www.cdc.gov/flu/vaccines-work/vaccineeffect.htm...National and international travel restrictions will have to be in place until herd immunity is achieved… the question of how long it works will be uncertain until time passes; hence, distancing and other protective measures will be needed to limit infection and hospitals and other medical settings will continue to be seen as risky places to visit.

Ends pandemic, begins economic recovery, and hopefully we won't forget too fast need for better preparations. 70% efficacious is unlikely.

5. How many people will die from Covid-19 in the United States by the dates shown?

5.1 What is the highest number of people likely to die of Covid-19 in the US cumulatively by March, 2021

Estimated Number of Deaths	Number of responses
25,000 - 150,000	2
150,000 - 175,000	9
175,000 or more	18

Huge impulse to return to "normal", distrust government, believe rumors. !75 million may be too low… false sense of security will lead to more flareups…Death rate will reduce due to therapies. Infection rate will decrease due to awareness and modified behaviors…Current deaths are at 125k with the strictest quarantine procedures we are likely to have; we have yet to see 2nd, 3rd wave…

5.2 What is the lowest number of people likely to die of Covid-19 in the US cumulatively by March, 2021

Estimated Number of Deaths	Number of responses
125,000 - 150,000	10
150,000 - 175,000	5
175,000 or more	13

Social risk perception is low, reinforced by the contradictory information from authorities (Trump vs Fauci)…waves of the virus will spike in rolling geographies and communities…Current deaths are at 125k with the strictest quarantine procedures we are likely to have; we have yet to see 2nd, 3rd wave

5.3 What is the highest number of people likely to die of Covid-19 in the US cumulatively by March, 2022

Estimated Number of Deaths	Number of responses
150,000 -175,000	2
175,00 - 200,000	5
200,000 or more	21

increasing erroneous communitarian behavioral interaction, the poor governmental strategies, the lack of successful medical treatments/vaccines make almost impossible to think that numbers will be below 200,000; similar comments on 2nd and 3rd waves

5.4 What is the lowest number of people likely to die of Covid-19 in the US cumulatively by March, 2022

Estimated Number of Deaths	Number of responses
150,000 - 175,000	10
175,000 - 200,000	5
200,000 or more	13

Same concerns as previous answers… Probably over 1 million: If 50% will eventually get it in the US, that is 150+ million, if 1% die, that is 1.5 million people.

5.5 Additional comments:

Still lower than the 1918 flu pandemic…The trade-offs, unspoken at the macro- and national level, decide that the costs are not worth the loss of the benefits, majority will no longer care about excess mortality of the weaker, more vulnerable and older generations, as long as the stronger (and younger) generations can "enjoy their lifestyles unrestricted, under the guise and arguments of human rights. It is ironic that at a time of demonstrations for anti-discrimination and black lives matter, the collective value of life is actually diminished. Repeated comments from 5.1-5.4…Further mutations in the virus might increase or decrease its mortality rate over these time periods…We need COVID adjusted mortality not a COVID mortality…fall/winter will be difficult (indoor-outdoor behavior, pneumonia, influenza, socioeconomic situation, mental health & depression)…It feels like we are narrowing the cone of uncertainty bet highest and lowest estimates…Your options are wildly optimistic.

6. Will there be a clear Second Wave of the Covid-19 infection?

6.1 Will there be a clear Covid-19 Second Wave (incidence at least tripled that of August 2020 to November 2020?

Estimate	Number of responses
Certain	4
Very likely	9
50-50 chance	8
Not likely	4
Will not happen	1

It's already happening in flareups in TX and FL. Different communities will flare up at different times.

6.2 Comments and consequences

Not enough is known about the seasonality and periodicity of C19. The current incidence development and mortality rates in Sub-Saharan Africa, Latin-America and South Asia remain unclear as to seasonality determination. I expect a similar recurrence, but at a much larger global level, as the Ebola recurrences. When a vaccine is developed and actually available, the course of infection may do the same as Ebola does across Africa (with a vaccine developed and available)…social distancing in vulnerable populations currently difficult due to protests, numbers will presumably

rise…Social distancing and summer weather will suppress cases but these will expand in the fall…August incidences will be higher than expected, the mass demonstrations about George Floyd should cause spikes throughout the summer.

6.3 No clear second wave, because infections will continue on in irregular outbreaks until a vaccine is available.

Estimate	Number of responses
Certain	4
Very likely	8
50-50 chance	10
Not likely	3
Will not happen	0

Irregular outbreaks haven't stopped, If there is NO clear second wave, most global populations and globalization patterns will return to pre-pandemic levels. Never underestimate the power of collective amnesia - and pretty fast at that…Experience with similar viruses in the past… The difference might just be semantic because the increased infection among demonstrators will muddy the line between a clear 2nd wave and irregular outbreaks

6.4 Comments and consequences:

We have to address first wave and not assume that this virus will follow pattern of 1918-1920 flu…Many attempts to correlate "bumps" in infections and death with 7-14 day prior events…Violence against people who do not comply with regs. And the opposite: NON COMPLIANCE AS A SIGN OF MACHISMO AND "FREEDOM"…if a second wave and subsequent waves were to occur with a somewhat mutated C19 virus (e.g. with much higher fatality rates [say, 50-60%]- unlikely in my view, but technically certainly possible -see the 1918 second influenza wave, as well as the evolution of the different Ebola, Lassa and Marburg viruses), then the global health and medical care system, as well as its constituent parts as pharmaceutical industry, medical technology, health insurance and clinical systems would collapse at a faster rate than currently anticipated. As has been shown in several countries, even a first wave made very clear the Unpreparedness and weaknesses of institutions such as the U.S. CDC and FDA, the U.K.'s NHS, the Swedish global health community, including Karolinska, etc. It may be of interest to create scenarios under such circumstances and show what it would mean for local hospitals, clinics, and especially HRH - likely wiped out to a significant degree,

making all the other facilities moot, as there wouldn't be any health care workers any more. For the other Panel this might be an interesting exercise to analyze the potential consequences of such a scenario for the re-ordering of world power structures and emerging economies…containment efforts have failed, social anger, crisis and protests are increasing. Health system has failed…The political pressure for restoration of the economy will drive pockets of resurgence, which could then lead to continuous, irregular outbreaks in countries / regions that have very low barriers to travel, without an universal health access… 1) regular outbreaks that are manageable in health system without changing business as usual; 2) We have to define the level of tolerance that more opening of the economy will entail. If 50% open means 3-5% get infected and 100% means 8% get infected than opening up makes sense; if 1000% raises the rate to 24% team to does not; 3) if there is no bump in infection rate in places that had large demonstrations then everything (theaters, airlines, restaurants, and sporting events) can go to 100%.; but if there is a bump then perhaps limiting social gathering size might need to be enforced…Continuous debate about what is the proper level of mitigation. New definitions of "essential"…Regional / local outbreaks likely due to social interaction & travel (hammer & dance)…continued spikes throughout the Summer due to demonstrations and poor management of opening procedures, will drain hospital staff with less rest than expected, and social fatigue could lead to more violence in the fall/winter flu season.

That's pretty much my point --- it's not waves, it is brushfires all over the USA at different times, for years until vaccination is accomplished...if it is

7. How much testing, contact tracing and isolation will be accomplished?

7.1 What percent of those found positive for the virus will have their contacts traced, tested, and put in 14-day quarantine by December 31, 2020?

Mean	Min	Max	Median	Std deviation
35.98	6	65	35	16.731

Money and capacity for real on-the ground contact tracing is absent almost everywhere in USA… unwillingness of the younger and stronger generations or sub-constituencies to further accept restrictions vis-a-vis their behavior and 'rights', and the limited ability of both civil health authorities and professional organizations and technical agencies to actually deliver (ref. both CDC and FDA failings in February and March and their subsequent relative weakening). Compare the follow-up tracing contact models of East-

Asia with those in the U.S. and the EU: very different in terms of rigor and coverage, with the U.S. and EU models on the weaker scientific and implementation capacity side (incl. tracer apps, AI models and community acceptance)…U.S. chaos of reopening as of June 2020 seems likely to make a hash of contact tracing efforts--also with regard to the protests which, though absolutely necessary, will also make it harder…dependent on tracing app…depends on human tracers, seems like there will not be enough, unless a massive program of volunteers to augment employed tracers, even with computer apps. But with the apps notifying contacts to self-test will help, but would they voluntarily quarantine?

7.2 Comments and consequences:

Congressional act requiring use of certified apps…Assuming that there will be only very limited testing, contact tracing and quarantine levels, as I argued, any primary, secondary or tertiary consequences would depend on the occurrence of a second or third or subsequent wave. See the comments given for Question 6: if no second wave: collective amnesia and business as usual, if second wave: some improved performance by the health care system and better preparedness and especially clinical management, but equally with already some reordering of trade and travel structures at a global and regional level; and if subsequent waves (without the introduction of vaccines), then you get a doomsday scenario where also the health care system will fail dramatically, especially HRH. Now, in case a reasonably successful vaccine would actually see the light of day, then all this would change and the pandemic and C19 would likely go either the way of influenza (with annual immunizations) or the way of diphtheria (once fully immunized, for life) and all the vaccination effectiveness rates in between.

This depends heavily on national, sub-national, and local public health capacities. In the US, these core capacities have been decimated over the last two decades; although some states have hired surge workers, that surge workforce cannot be kept in standby indefinitely. In the US, the civil liberty demands for privacy will drive counter-productive behaviors in which contacts are not volunteered; we are also already seeing the debate about use of cell phone location tracking being used to assist in contact tracing. Short of the use of invasive technologies, this number will never reach 100…Even with high tech approaches, can't expect it to be more than 50% effective…Increased poverty, inflation, reduction in industrial growth…Likely less availability of Agriculture work force, leading to reduction in Agri Products thereafter shortage of food item and inflation all across…For this you need 3 things to be successful 1) tracing 2) testing 3) quarantining, had to win on all 3 especially the last: 1) Contract traced 50%; 2) Quarantine - less than 10% …Herd immunity not reached. Schools closed, theaters closed, unemployment increases, public health services will have to be scaled up…As the first wave recedes,

then it will buy time for tracers to reply and be more effective, so cumulative rate will increase over time as a combination of reduced # of cases to trace and social acceptance of tracing…the lower rates makes the pandemic last longer, continuing economic impacts and social fatigue, and related mental problems…

Most places haven't even hired contact tracers yet

8.1 If you have other thoughts about strategies for dealing with or impacts of the Covid-19 pandemic

The dichotomy between the collective interest (East Asian culture) and individual interests ('Western' culture) is evident: democracy values and human rights perspectives, including 'freedom' rights, in effect take precedence in the EU and U.S. over the collective interest of the country or nation as a whole, at the explicit expense of over half-a-million deaths (July 1, 2020). [JG comment, Iran is not individualistic and is not doing well, same with Russia. Canada is individualistic but doing well, the US liberal elites are following the rules, while Trumpers less so; hence, the distinction may be moral civic social responsibly consciousness.]. This essentially is allowing the luxury of affluence and personal freedom to drive hundreds of thousands to their deaths (remember, Taiwan and Vietnam basically have zero deaths so far). 'Quarantine' as a concept seems to have gotten lost in the process - i.e. an emergency situation during which all 'personal' rights are temporarily suspended "in your own and society's interest". Interestingly, the political far-left (human rights are paramount) and the political far-right (personal freedom is paramount) seem to come together here, with reasonable middle-ground strategies and public policy gone missing. I suggest 2 approaches in this respect: (a) develop in-depth scenarios that cover the full spectrum of both, with specified ranges of consequences in terms of freedom limitations and human rights limitations and subsequent estimated premature mortality rates (upper limit for the global population as a whole likely around 1 billion (yes 1000 million) deaths. Developing gliding scales of 'limitations' versus COVID-19 prevention, treatment (using current upgraded clinical knowledge + healthcare limitations by country & region) correlated by outcome may yield informative and clarifying options for both policy-makers and clinical managers. And (b) macro long-range scenarios with the same parameters but set against potential or likely risks (from high-probability-low-impact events to low-probability-high-impact events), such as climate change variations, bio-hazards (including new pathogens that may have similar transmissibility as COVID-19 but with a case-fatality rate of 75%) and uncontrolled/out-of-control AI.

Since several scenarios exist which allow for the suspension of both freedom and human rights in the interest of survival (e.g. the nuclear war scenarios and game theories of Thomas Schelling, Nobel 2009), these may serve as guidance…Health is a human right. Global inequity is already evident, and this gap has been expanded during the pandemic. Efforts should not only be concentrated towards one country, cross-border cooperation and global aid could be explicitly part of this project…Another important area, is the mental health unknown impact…Would highlight importance of considering mental health impacts of both COVID risk and lockdown approaches. Heightened distress secondary to strict lockdown may affect overall infection trajectory due to (for example) diminishing population level willingness to abide by re-implementation of lockdown measures once lifted (or not lifted). I have observed this clinically, particularly in the young where personal risk from potential COVID infection is low and mental health effects of ongoing lockdown can be high. These are challenging to model and may vary by locale…Addressing scientific literacy could help improve compliance with interventions that are currently not being followed. Likewise, addressing the health security (of not just the USA but the international community) can only be achieved by building and sustaining basic public health capacities - the system is only as strong as its weakest link…universal health access, free admission to the hospital care, the federal investment in the public health facilities…

Help each other, Save yourself, Take care, Do not close eyes for others, Deferred payments of loan (International and national), May waive off loans of poor nations, Feed people of low lined countries…

Unless we properly fund a civil society-driven Resilient American Communities COVID-19 Initiative in high risk communities in all 50 states that creates bottom up COVID-19 resilience, we will continue to experience extreme impacts on personal health, health systems, economic systems, and social infrastructures in the US…You should look at Safe2 as an alternative to lockdowns, treatments, and vaccines as the main approaches to managing transmission of SARS-CoV-2. Here are several Safe2 web-based resources (all are short except the Slide Deck): - Web Site, - 3min Intro Video, - Mockup Prototype, - On-Phone Demo, - Slide Deck, - Safe2Shelter Infosheet, - Safe2 Protocol (technical resource)…Strategies need to deal with social and economic disparities; health care and quality education available; likely a guaranteed basic income… 1) We really need to invest in examine natural protection from T-cells and other immune response beyond immunoglobulins. As many as 40-50% of Americans may be at NO risk of ever getting infected. This affects economic and medical policy, vaccine distribution, etc.; 2) Stage 3 trials for all vaccines should include millions of individuals and need to be distributed outside the area/city where the vaccine is developed…Uniform national strategy is needed…

The social security and healthcare system in the US has to be restructured, unemployment insurance & short time work…Public service announcements for people: 1) to give blood who test positive for antibodies; 2) to volunteer as contact tracers; 3) use self-tests for the virus and report results; 4) create much more serious national Pandemic security preparedness system(s); and 5) strength the WHO with WTO-like and IAEA-like governance and enforcement powers.

8.2 Additional Comments:

Do infection rates differ between Democrats and Republicans? Why? Could this affect the election?...

Balanced major global "education" campaign as to the 'nature' of quarantine, the potential inevitability of reduced standards of living in the wake of major pandemics and other biomedical or -hazard risk factors if and when managed wrongly by public policy, the relativity of human rights and freedom values over time in the face of existential threats (the 'universal' human rights covenants can be universal distributional aspirations across the world, but cannot be 'in time') and the importance of the distinction between "I"llness and "We"llness. In this context public and private education (including the engagements of universities globally) should highlight analysis of contrarian societies (e.g. the U.S., Afghanistan, Myanmar, PNG, Pakistan, South Sudan, etc.) where differences in opinion and personal interests are settled by the courts, "suing" is the standard norm and conflict/violence is an accepted means) versus compromise or cohesive societies (where conflict and courts play a limited role). Examples to illustrate the effects could include hostilities and attacks on health care workers versus recognition of their essential role to address the exceptional circumstances under a pandemic and return society to its earlier 'normal'. Finally, the current pandemic global architecture (PEF, WHO IHRs, GPMB, etc.) will need a complete overhaul - proposals to initiate global negotiations for this launched by a joint effort by the EU, U.S., China, India and Russia would be most appropriate (or by the G-20+WEF and similar); these should be conceived of as similar in nature to the nuclear-weapons Treaties, such as SALT I & II, INF, etc. Whether the U.N. should play a role in this should be subject to scenario analysis - personally I would think 'yes', but other modalities may be more effective.

GLOBAL intensive educational approaches for society, government and other stakeholders. Highlighting the importance of human rights (health) and public health ethics. The WHO, governments, society and health systems failed. Strategies need to include ALL. from top to bottom and from bottom to top… I register the general reluctance to say that the market system applied to healthcare has failed dramatically

worldwide and in particular in the USA it has killed more than all the wars fought since the end of the Second World War…I'm sending an email to Jerome Glenn describing my Rebooting America program to get people safely back to work…My guess is that estimates for most of these issues will be changing continually for most of the respondents, so it might be useful to ask them to revisit the RTD, perhaps every two months…The WHO has to be remodeled so as to fit the needs and demands of international biosecurity & public health taking ethical considerations into account, but dismantling not an option…a wildcard: the military lab escape conspiracy theory seems on the retreat. But perhaps nefarious actors will cause the theory to resurge in order to shift public opinion against china in the US.

RTD 2: US Socio-Economic Implications

1. U.S. Unemployment rate (%)

1.1 What do you estimate the October, 2020 U.S. unemployment rate to be?

Number of responses: 30

Estimates:

Highest: 17.73%

Lowest: 9.22%

Most likely: 12.61%

Most businesses will only rehire a portion of their workers or will not need as many to telework…BUT it's also likely Oct will see a market crash & more layoffs…Even if there is a second wave, I expect various states and local governments will handle it better and manage to avoid a complete lockdown. Even without a second wave, I expect a slow and cautious return to employment and a permanent loss of many jobs…The question should be about "jobless people", which will be much higher than unemployed. Many people who used to have a revenue before the lock-down lost it and do not qualify for unemployment…Depends on discipline of general public in not spreading the coronavirus as reopening gets underway. Also, depends on the BLS fixing its miscalculation error, and if Trump spins the numbers before the election.

1.2 What do you estimate the April, 2021 U.S. unemployment rate to be?

Number of responses: 29

Estimates:

Highest: 15.11%

Lowest: 6.71%

Most likely: 9.85%

Depends on whether we can successfully control the second wave of the virus…on whether there are strict lockdowns again in fall/winter…The economy will take several years to recover…Regardless of US election, 2021 will be politically traumatic. The probability of extended recession is quite high. There will be voluntarily low labor force

participation…not clear to me how unemployment plays out if Democrats win - depends on Senate majority party. My high number assumes Republicans maintain control of Senate and have no clue how to respond, doubling down on losing solutions…Highly dependent on success in finding an effective vaccine…and treatment…as well as discipline of government policies and the population until that occurs…If no significant second wave, economy should be seeing progress by Spring…Also, it depends upon the current rate of spread of coronavirus globally, as that will affect the amount of travel, both domestically and internationally. Many SMEs going entirely out of business will have a lasting impact on unemployment…Absent some dramatic surprise, the economy will adapt to the new realities imposed by the pandemic. "New normal" is a term that deserves to be retired, but it captures the sense of this.

1.3 What do you estimate the October, 2021 U.S. unemployment rate to be?

Number of responses: 28

Estimates:

Highest: 13.58%

Lowest: 5.78%

Most likely: 8.75%

It is likely that by October 2021 we will have a vaccine or some therapeutics in place, so the economy will be growing at pre-pandemic levels…The economy will take several years to recover…The labor market is likely to recover since there is little choice for people but to work given that any fiscal support will long be over by then…US dollar (monetary) crisis that follows the economic disorder. A new economic order will necessarily evolve…most likely starting to get back to normal, but extremes could be really ugly. don't see good scenario happening…depends on medical/health solutions and potential disruptions in supply chains and trade relationships…A "new normal" will have come into effect and vaccines and effective treatments should be becoming broadly available. This will allow for resumption of most economic activities with some continued exercise of social distancing, continued widespread but less than before WFH helping to reduce potential spreading in crowded workspaces. Lingering effects of large scale SME and large business failures will continue, only partially offset by new jobs in e-commerce and other emerging business sectors

1.4 Comments and consequences:

Primary consequence: increase in the poverty rate if the government does not support the economy through congressional action. Secondary and tertiary: increase in income

inequality and political instability…With no second wave and pre-election job creation (and false official statistics) unemployment could drop a bit by October 2020. The current bounce in COVID cases -- and worse, a second wave -- would add significantly to unemployment rolls over the next nine months. Government jobs programs after a possible Democrat victory in Nov 2020 could lower unemployment, but at the cost of rising debt. Worth noting is that highest unemployment rates will be among the under-skilled and personal services workers. Cannot ignore the potential impact of rising unemployment on discontent. Worst case is an era of class friction and possible riots…

depends on fiscal support in the US, bankruptcies of businesses and finding of vaccine and treatment…The demand for consumer goods will go down but household debt and bankruptcy will go up. Real state both commercial and residential will be affected. Many small businesses will close and large businesses will downsize…Covid-19 is not the cause of macro-economic dislocation, the crash of the Fed-based credit markets in March preceded the knockdowns by a week. There was a $4T bailout that nobody noticed. People have ignored that we are already in a bailout economy, that won't last… some jobs that support small business formation and new emerging types of businesses will uptick. Many small businesses will finally acquire an online presence. Many new jobs will emerge in local delivery and the manufacture of vehicles and equipment that support local delivery. In health and eldercare, telemedicine will uptick for both urban and rural areas. A need will arise for skills qualification and certification of all kinds.

Unemployment will continue at a fairly high rate given that many small business, such are those in strip centers, are likely to have closed by the end of 2020, if not sooner…

Levels prior to the crisis will not recover. The continuity of strategies to support the economy and social protection of people will be key for two years…Primary - deficits, confidence; secondary: food security, homeless, bankruptcy spikes (business, individual); and tertiary: depression…

Work at home will create new/additional jobs to support it. The worst of impacts on bank loan portfolios should be manifesting [JG: subprime business loans a new crisis coming up], which could have a compounding effect on limiting credit availability and therefore, employment generation/regeneration in the SME sectors. Automation will continue to reduce jobs in public interfacing businesses, which will only be partially offset by new IT jobs in those and other industries. Employment could be improved national state and local governments to support for training teachers and other educational workers, as well as medical workers, thus creating at least temporary employment opportunities in the short and medium term. By 2020 immigration reform will be in increasing demand as skilled labor is less and less available in the American workforce. Private business, as it has done in the past, might step in to help address there gap in skills training or retraining of the American workforce as part of the transition to a more digital future.

Secondary consequences could include: Further weakening of the healthcare systems across the US because of people's inability to pay for it and burnout of overworked and underpaid healthier staff, thus adding further burden to alternative healthcare facilities including the Red Cross; Further reduction in revenues for not-for-profit organizations, including private schools, universities, and charities. Tertiary consequences could include increasing numbers of people falling into poverty, out of social safety nets and into despair with increasing rates of suicide, homelessness, petty crime, and social unrest.

A primary consequence: financial help to businesses and jobless people to help them get through. This would increase the national deficit and lead to a tertiary consequence: inflation. A secondary consequence: the Administration might consider incentives to get more businesses to return to the US…The central question is to what degree the economy retains dynamism and adaptability. So far the answer has been a surprising yes. Large corporates do well and small business gets hammered… increased chance of new Administration in Washington will revamp World Order…Increased homelessness…Government considering schemes like CCC…Racial tensions growing …National guaranteed minimum income...Universal healthcare…New taxes on corporations that reduce employment…Government bounties for increasing employment…some slogans "The job of business is to provide employment" and “No new robots; no new automation. Increasing productivity is seen as socially destructive. …The combination of depression level unemployment, continued pandemic, disinformation from foreign and domestic sources, political campaigns, and renewed civil rights movement is likely to create new waves of social discord leading to new leadership and the possibility of a American renewal movement. Meanwhile, food supply is likely to decrease…Assumes Biden will be president in 2021 and Democrats will control both houses.

2. Real U.S. GDP growth rate (%)

2.1 What do you estimate the 2020 U.S. GDP growth rate (% year over year) to be?

Number of responses: 26

Estimates:

Highest -1.56%

Lowest -7.48%

Most likely -4.08%

The fall quarter will be critical to understand whether we are in the recovery path. If we face a second wave with lockdown orders, and many business failures, the economy will have large negative growth rates…Despite the stock market resilience, there will be negative growth this year…Stock markets can still rise while GDP falls. Digital tech does not always add to GDP. So it might be a confusing trend. I expect an overall low GDP…Some rebound is likely in the summer, but current market optimism seems unfounded. Disruptions from Coronavirus will be somewhat extended and exacerbated by social unrest from protests…there will be lasting effects of the failure of may SMEs, whose production and employment will therefore, not be available for the rest of 2020.

2.2 What do you estimate the 2021 U.S. GDP growth rate (% year over year) to be?

Number of responses: 25

Estimates:

Highest: 3.73%

Lowest: -1.08%

Most likely: 1.63%

It will take time for the global economy to recover and the US will continue to be affected by negative or low growth…Depends on Covid vaccine and treatments, provision of additional fiscal stimulus, further supportive measures by the FED and other major central banks, and containing the viral rampage through emerging marketsand 2020 presidential election…Because of the negative figures for 2020, it will be easier to achieve more positive figures on that smaller base in 2021. There are also a number of newer businesses that will be ramping up production like AR, AI, space, e-commerce that will add to the rebound of the travel and leisure industries, restaurants and other food businesses, and large and small scale manufacturing and services.

2.3 What do you estimate the 2022 U.S. GDP growth rate (% year over year) to be?

Number of responses: 25

Estimates:

Highest: 3.7%

Lowest: 0.15

Most likely: 2%

Real growth will take several years to return…Growth should go back to long run trend but 2022 may be optimistic forecast…Its very likely there will be a secular depression,

or at least very low growth, with high inflation after all the stimulus wears off and must be paid…The bounce in 2021 from the negative growth of 2020, will have begun to run its course and therefore, growth will diminish proportionately but still include some recovery growth, keeping it above recent historical levels…If recovery is delayed until mid-2021, big gains will be in late 2021 or 1st half 2022…Depends on whether public re-enters as consumers or stay at home, and of course availability and acceptance of a vaccine.

2.4 Comments and consequences:

Over the short term, the uncertainty about rising COVID cases will stifle private and corporate expenditures. The big unknown is whether government will have the appetite before and/or after the election to fund more corporate bailouts and unemployment benefits. If GDP growth tanks in 2020, it wouldn't take much for there to be relatively high GDP growth (year over year) in 2021. Growth could be fueled by pent-up consumer demand, government spending, and the capital expenditure necessary for businesses to reinvest or reinvent…answer is based on trajectory of COVID cases, bankruptcies and change in consumption patterns…The US economy will recover slowly but the long-term effects of the global turndown will persist for much longer and will have an impact on the US…The larger impact is the fragile foundation for the market economy. The second order effects will include fewer workers in all businesses, and more working from home in temp contracts. The commercial real estate market is likely to stay dead for years, leading to 3rd order effect of people leaving cities and real estate values declining. The loss of wealth effect will be brutal. Stimulus or UBI [universal basic income] cannot help much because this will be a real economy problem. Another 3rd order is that local economies will form, and that's perhaps the way out...Some people assert the days of 3% growth are permanently behind us in the US and Europe; that China and India, having the largest populations and the right stimulus, will continue to lead global growth rates. Political instability in the US could reduce economic growth, but replacing the aging infrastructure with new products and technology could also be a source of big growth… After 2022, (absent another shock) the pattern will revert towards historic patterns…Impact on food supply, children's education and socialization…Without a quick recovery, new entrants to the workforce may suffer career-long adverse consequences. The pace of globalization may be arrested…Trade frictions will persist. Migration of human capital in pursuit of better educational and work opportunities may be dampened. More rapid transition from face-to-face to online interfaces. Potential mass extinction event for large brick-and-mortar retailers and movie theatres…US dollar is no longer the world leader…Near term question is 2020 3rd quarter - any growth depends on total cases flat to down from July

onward and no further lock down. Wild card in all is a second wave of virus but no lock down or stay at home.

There will be lasting effects of the failure of many SMEs and larger businesses, whose production and employment will therefore, not be available for the rest of 2020 and which will dampen consumer demand in fourth quarter, which is so important for so many retail businesses. But pent up demand will continue to reemerge in late 2020 and throughout 2021. In 2022, new opportunities like shifts in supply chain production from China to domestic suppliers will start to accelerate, supporting the continued US GDP growth at above recent history levels. A caveat to that is of course, what will be happening internationally. If there is continued widespread unrest resulting from the dire economic effects of COVID-19 pandemic on emerging economies, this could adversely impact the availability for funding to support economic growth.

3. U.S. Inflation rate (%) 12-month percent change in Consumer Price Index (CPI) for All Urban Consumers (CPI-U), not seasonally adjusted.

3.1 What do you estimate the October, 2020 U.S. inflation rate to be?

Number of responses: 24

Estimates:
Highest: 1.97%
Lowest: -0.35%
Most likely: 0.66%

The FED will keep interest rates close to zero for the foreseeable future…Oil prices and food at home is likely to rise…We are still in a secular deflation which is why stimulus bailouts have not led to inflation. Yet. Oil is down because of demand destruction…

Between the previous tax cut and the recent rounds of stimulus, a lot of extra cash has been pumped into the money supply. The more of it that remains inside the US, the greater the pressure on inflation…it is possible that by October, energy prices will be rising while food prices will continue to rise as will housing prices. Unless, there is a second lockdown, in which case inflation could be negative.

3.2 What do you estimate the April, 2021 U.S. inflation rate to be?

Number of responses: 24

Estimates:

Highest: 2.92%

Lowest: 0.39%

Most likely: 1.31%

The FED will keep interest rates down…Inflation will move back up as demand recovers…There could be a trend up by 2021, but nothing major, deflation and then stagflation…I believe that there will be a big swing to inflation…For just the month of April 2021, the inflation rate should be getting beyond the immediate effects of the pandemic and economic lockdown, and companies may still be in the mode of discounting services costs in order to rebuild demand.

3.3 What do you estimate the October, 2021 U.S. inflation rate to be?

Number of responses: 24

Estimates:

Highest: 4.13%

Lowest: 1.03%

Most likely: 2.11%

The FED will keep interest rates down…If the US economy makes a comeback and there is demand for investment in the global emerging economies, we could export some of our inflation, as we did after WWII…There will be lingering effects of failed businesses and unemployment that will continue to limit consumer demand growth, and therefore inflation. However, as supply chains begin to shift more back to domestic, which could add some supply driven inflation…This is when the effect of all that economy boosting pandemic funding will begin to kick in. I see increasing inflation even though consumer spending is way down. Used to be called stagflation. Possible because there will be great incentive for government to print money and pay back its huge debts in cheaper dollars…The Fed will be out of means for controlling inflation by 2021.

3.4 Comments and consequences:

Fed is discredited as new financial instruments try to keep up with increasing inflation …a need will exist for proper tax policy and management by the Federal Reserve to anticipate a rise in inflation and to control it. "Tax the rich" is not a good strategy, as such, but there will be a need to adjust taxes and monitor money supply closely… deflation is a long-term wildcard…Primary effects: The lingering global effects of COVID-19 will continue to keep unemployment high and thereby dampen consumer demand. Secondary effect: social malaise with it social and economic consequence will result from COVID-19 taking longer than people expected.Tertiary consequence: However, given the other pandemic of police mistreatment of blacks, what could revert that malaise would be the beginnings of a more significant social reengineering that could invigorate the economy as optimism about advances on the social front generates optimism about future economic prospects, thus contributing to the beginnings of a return to inflation.

When inflation does resume, it will be as a result of the blowback from the monetary intervention into bond and primary markets. With financial assets overpriced based on a false underlying denominator, a longer-term decline in financials is to be expected. With markets flat or declining by 2021, inflation will rise as US dollar assets will be dumped and sent home to the US. 3rd order effect will be multipolar world order and the dollar could crash…In the near term, inflation rates are 0, oil prices are low, government liquidity high, and consumer spending depressed. Shortages would be the most likely pressure on inflation. Over the longer term, inflation rates only likely to rise. Growth in energy demand possibly tempered by a new focus on local supply chains…Inflation similar to Real GDP growth and unemployment is dependent on how much the economy reopens and how comfortable people are resuming normal activities. Also, the development of a vaccine is crucial to those two points mentioned above. I am not concerned about the large injection of reserves via monetary policy causing inflation since inflation expectations are well anchored…No major risk of inflation -- Given economic conditions and virus fears, consumers will err on the side of saving, not spending. This is big challenge for retail and economy. Fed pays interest on bank reserves so cash will sit in the banks. Possible Black Swan that would point to higher inflation include oil crisis with price >$100 or a war.

4. How long will it take for the US economy to recover?

4.1 How many quarters from June 30, 2020 will it take for US GDP to pass the 4th Quarter 2019 GDP?

Number of responses: 24

Estimates:

Fewest: 5.9

Greatest: 15.45

Most likely: 8.78

It will depend on vaccine and therapeutics developments. The shape of the recovery will be more likely U-shaped…The effects of COVID-19 are global and the recovery in the rest of the world will continue to affect the US economy…The Covid situation is almost immaterial, as economies will not stay shut down. The mortality of the virus is actually around .4% and the media treats infections as if they were deaths. This level of fear cannot last forever. The underlying debt system has become unworkable and will result in system-level problems…Longer than most people think. Recovery will be long and tiresome…the recovery will begin to accelerate form that point the vaccine is available…

continued social upheaval without political change and workable solutions coming to police mistreatment of blacks and other minorities could exacerbate the GDP decline and further extend the time it takes for full recovery to Q4 2019 level of GDP by as much as a year or more…pure guessing here. Nature of work, availability of vaccine, who's president all game changers…Availability of a vaccine is one thing, getting enough vaccinated to affect the economy is another. First to get the vaccine will be medical and related staff, then older folks, and on, and on until we get 65% or more immunized. Anti-vaccine people and foreign infowar games may delay getting enough vaccinated to achieve herd immunity…I am optimistic that a good vaccine will be available by the end of 2020. This implies a strong rebound in the economy and, combined with technology growth, a catchup to previous levels of GDP around Q3 of 2021.

4.2 Comments and consequences:

The election will matter to the path of the economy. So will consumers feelings about resuming activities. I agree that the economy will not shut down to the same degree it did in the spring but there may be some constraints on how much businesses can be

open and at what capacity…Recovery will be uneven across industries, some will take longer, and others perhaps will never recover…the notion of "recovery" itself must be questioned, if the USD endures a currency market crash, we might not ever see a normal growth until manufacturing returns to the US and if the Fed is bought out by the US Treasury…Rise of the far right, social discord, political focus on the income gap. Is revolution in the cards? If Trump wins the election will military remain loyal? If Trump loses the election will he leave office peacefully?..."Recovered" is a better word for what this question is asking for, since recovery is a process that begins with the end of a recession, which could be Q3 of 2020 given the huge drop in Q2 2020. The recovery rate will depend on several factors. First, how well people adhere to social distancing and other mitigation practices with reopening of businesses, sporting, music, theater and other public events (including the November election) will determine how much of a second wave of COVID-19 cases and deaths there will be, and whether another major lockdown will be needed. Second, how quickly a vaccine is developed. And third, how quickly workable solutions to the social unrest are developed and begin to be enacted.

Primary consequences of delays to economic recovery include: increasing numbers of business failures; continued high unemployment; need for additional governmental stimulus packages better focused on not employed workers, private small businesses, and targeted business sectors that won't survive without it; and increased pressure on social services including healthcare as revenue streams continue contraction. Secondary consequences include: slowed economic recovery; exacerbated social unrest; political fallout in November election (change of regime with the uncertainties of the consequences of that on businesses and the economy; and extended and exacerbated social unrest. Tertiary consequences include: failing cities and states; increased stock and bond market turbulence; increasing numbers of hospital bankruptcies; increased pressure on charities to fill gaps in social services until full recovery is achieved…the whole concept of work is going to change after the full reopening and I'm not at all sure what it is going to look like…The US economy might recover, but the living standard of the many might take longer.

My gut tells me that there is an underlying dynamism - the economy just wants to bounce back. But my greatest uncertainty is whether it is yet another jobless recovery, which would suggest increasing social turmoil.With an extended period of possible slow growth: higher crime rate; increased drug use; elevated suicide rate; slower human capital development; intensification of tensions between political ideologies; and sustained high unemployment rate…"recovery" means number of quarters with negative GDP, not time until GDP sets a new peak. Previous GDP peak was 2019-4th Qtr. Primary consequences: unemployment, limited discretionary income and spending hurt business, continued pressure on local and state government budgets. Secondary - investment in health care, commercial real estate and some infrastructure. Expanded

student loan programs, economic pressure on higher education. Tertiary -- funding pressures on pensions, personal savings and 401-k plans…Biden is likely to win who is planning for a new New Deal that should shorten the recovery, but if Trump wins the social malaise will increase furthering the likelihood of depression…

COVID-19 would appear to have more severe and longer lasting economic ramifications than the 2008 housing crisis. We might experience an even greater rift this time between Wall St. and Main St.or, as someone said, this might be a rich man's recovery. No matter how long it takes to recover, the new economy will be restructured to include more remote work, less travel, more of a depression mentality of insecurity, more saving. Even as GDP recovers, there will be some big losers and painful adjustments.

5. Conference Board Consumer Confidence Index (U.S.)

5.1 What could the Index be in December, 2020?

Number of responses: 21

Estimates:
Highest: 88.85
Lowest: 72.78
Most likely: 82.53

Consumer sentiment, even with present unemployment, remains high and it is likely to continue…This is a proprietary index that is not publicly available, so I do not feel comfortable forecasting it. The University of Michigan Consumer Sentiment index would be a better choice.

5.2 What could the Index be in March, 2021?

Number of responses: 20

Estimates:
Highest 90.09
Lowest 75.09
Most likely 83.91

The availability of a COVID-19 vaccine will keep consumer sentiment high…Wild swing depending on election outcome

5.3 What could the Index be in June, 2021?

Number of responses: 18

Estimates:

Highest: 93.55

Lowest: 78.22

Most likely: 87

Lower unemployment as the economy gradually recovers will keep consumer sentiment high.

5.4 Comments and consequences:

Maybe the data are being falsified…Consumer confidence will come back quickly, initially, and depending on the elections. If the country is still being torn apart by political divisions, and that has a depressing effect on the psyche, it will be reflected in a low confidence level. If social and political fixes are in sight and the economy appears to be coming back quickly, confidence will be high. In 1985, weren't we coming out of a recession? Venture capital was expanding rapidly and expectations for personal computing and medical breakthroughs were high. We could see that kind of resurgence again…American consumers are for the most part optimistic and as they are able to move about and return to work and school will remain optimistic…Really depends on the election outcome - not just the outcome but the degree of outcome uncertainty…

Consumers will be slow to return to normal. Psychological impact of COVID-19 will be generation changing, with consumers aware of the fragility of health, finances, and their government's ability to protect them. Add to this growing awareness of racial inequities and global warming, and we might have a permanently worried generation…Primary: consumer spending; secondary: savings behaviors, sales of cars and houses; tertiary: voting…Depends on the virus, the rolling cascade of political and economic consequences of the pandemic.

6. Number of homeless people in the U.S.

6.1 How many homeless in the U.S. by October, 2020?

Number of responses: 21

Estimates:

Highest 1.4 million

Lowest 557,333

Most likely 725,000.

Without specific interventions the number of homeless will increase significantly…The figures will remain about the same as the economy recovers…This is likely to get bad quickly…Things will worse before they get better…This number is very badly measured in the best of times and there are no official statistics on it.

6.2 How many homeless in the U.S. by April, 2021?

Number of responses: 19

Estimates:

Highest 1,065,833

Lowest 565,423

Most likely – entry error (1,326,666)

Government support will wane and low interest rates may put pressure on home prices in some markets. But there could also be relocation of people who are facing a housing crisis…While the economy will be recovering from the second wave of COVID-19, it will not have recovered enough to begin lowering the number of homeless added by the pandemic…Moderate increase as the economy recovers…Still getting worse.

6.3 How many homeless in the U.S. by October, 2021?

Number of responses: 19

Estimates:

Highest 1,094,545

Lowest 523,750

Most likely 750,000

Economic recovery and a new administration will introduce programs to chip away at the number of homeless in the US. But it will take some time for significant progress to be made on that front given lingering unemployment from the pandemic…Steady at lower levels as the economy improves.

6.4 Comment and consequences:

Landlords' and mortgage companies will increasingly require payments; hence, increasing the numbers of homeless. This might be offset if the government introduces employment programs like national service to absorb some of the seriously unemployed in sectors the hardest hit by the pandemic…Some people will lose their houses in the initial stages but this will not increase the homeless in significant numbers…It depends on what's considered "homeless". There will be a very high numbered of under-housed. Our ability to measure the number will be challenged during the pandemic and the unusual living arrangements many will have by then…There are many more people than we already know, who are on the verge of homelessness, living in motor homes and campers on city streets, employed part time and as contractors, who will get pushed over the edge in this pandemic. This is especially true in the high-tech employment area, where over half the employees at some of the largest companies are on contract. This sort of hidden homelessness will become more obvious in the near term, but could also recover with a booming economy.

The financial resources to help the homeless will have been depleted, the continued unemployment and draining of financial support of the unemployed will increase human despair and potential social movements among the homeless that could be violent and/or trigger a new self-reliance portion of the population…Very dependent on who is president and who controls congress…Government programs might include: mandatory service in military or Peace Corps, or new urban corps…This number is very badly measured in the best of times and there are no official statistics on it…If government programs to limit eviction and/or to increase unemployment checks are suspended, then homelessness will increase. A small upside of a move to suburbia for work-from-home employees might be lower inner city housing costs.

7. What will the dollar value of monthly US Exports be?

7.1 What will the dollar value of monthly US exports be in July, 2020? (Please answer in three digits for billions)

Number of responses: 21

Estimates:

Highest 128.28

Lowest 107

Most likely – mis-entry (845.53)

The rapidly increasing spread of the virus globally will impact exports in the current quarter in addition to the impacts from lower orders in the 2nd quarter. Trade tensions with China and Mexico will reinforce this decline in exports trend…Trade tensions still exist and it is hard to know how 2nd waves of the virus may affect countries (e.g. lockdowns)…Depends on progress of the global recovery…Trade will be constrained by pandemic, arguments with China and Mexico, reduced demand for our products worldwide

7.2 What will the dollar value of monthly US exports be in January 2021? (Please answer in three digits for billions)

Number of responses: 20

Estimates:

Highest: (mis-entry (1088))

Lowest: 108.69

Most likely: 124.64

If Biden wins, trade exports will uptick early next year, but not robustly because of lingering unemployment and distrust of rosy forecasts…slow global recovery

7.3 What will the dollar value of monthly US exports be in July, 2021? (Please answer in three digits for billions)

Number of responses: 20

Estimates:

Highest 142.38

Lowest 111

Most likely 128.35

Agree that this depends on who is elected but it also will be affected by a slow global recovery…Depending upon who is elected in November, there will either be continued trade tensions with China and possibly with Mexico as well, which combined with the impetus for increased domestic production to reduce external supply chain dependence, will keep exports from growing by this date…Not only will our economy still be struggling, but potential overseas customers will still be in pandemic trouble.

7.4 Comments and consequences:

Could result in revitalized role of the US role in world…depends on 2020 elections and the overall international political environment. There is no economic reason that trade should not recover and uptick, but a continuing trend toward isolationism will hurt exports of US goods and services into the high-growth regions of the globe. US companies could be hurt by a trade war with China all across southern Asia, Africa, and Eastern Europe, not just in goods exported directly to China. China as a leader could also affect trade policies in many other countries...Long term depends strongly on China/U.S. relations. Therefore, very dependent on who is president. Better under Biden…A near-wildcard: the lesson regard the risks of offshoring will be thoroughly learned and a mix of government policy and business initiative will boost US manufacturing…The economic aftereffects of COVID-19 will still be having an impact on global GDP and thereby on demand for US exports. However, pent up demand may drive exports temporarily up. A secondary effect of increasing US employment in manufacturing will not yet have occurred, though it will be in the process of developing.

8.1 Other thoughts about strategies for addressing the socio-economic impacts of the COVID-19 pandemic:

Growth of tele-everything and increased applications of AI will change employment modes for many…Itis almost-certain that there will be a flare-up of the pandemic this Fall which will approach or exceed the original (as did the 1918 flu) numbers across the board will look quite a bit worse…Federal programs have to be enacted after July 31st…State and local governments need aid from the federal government… Establish a flexible basic income that is tied up to the state of the economy…Broad band investments to bring the internet to rural and disadvantaged communities…Protection of the food supply…Decarseration (early discharge of prisoners from jails).

Pandemic promotes isolationism…The economic foundation has never been worse. Households are in high debt (including pricey homes) with low wage growth, financial assets are held up by Fed interventions (remember when the PPT used to be a conspiracy theory?), the Bretton Woods II era is crumbling quickly with loss of faith in the dollar (State Dept. is not helping by forcing Russia & China together, who will gladly incorporate all non-aligned central banks). And when small businesses are driven away, optimism takes a long time to return. It will be red in tooth and claw (civil disorder), and a time when the Leviathan rules (martial law is quite possible)…As many have commented, the COVID-19 pandemic and social and political response has revealed many other weaknesses in the American system of protection of libertarian rights without having a sense of social responsibilities. This includes lack of equal access to education, nutrition and healthcare, and long-term environmental protection. If this is the way we handle a pandemic, we can only imagine how we will handle bigger long-term systemic problems. We need to find some common ground, literally and figuratively. As ever larger percentages of the population lives in cities and in technological isolation there will be a further loss of connection that Zooming won't make up for.

8.2 Additional comments:

The pandemic has exposed a number of weaknesses of the American model of democracy and federation of states. The excessive influence of politics in strategic response to the pandemic, with the resultant inappropriate wide range of responses from head-in-the-sand ignorant to science and experience-based strategies, with economic assistance packages that perhaps best served those least needing them and disincentivized some people getting what work they could, exposed the need for more consistent medical strategies, and more well thought out economic support strategies. A new approach in how we identify and elect our leaders is badly needed to wrest our democracy from the hands of professional politicians and put it back in to the hands of

citizens serving for a period time to represent their constituencies but with the view of the great good for the country and world as a whole in mind. Hopefully a process will emerge of a society-wide discussion about race, inequities, diversity, self-centered decision making versus multiple viewpoint decisions, competition rather than cooperation amongst states and nations, material accumulation as a substitute for self-actualization, and what is "education" versus mass cultural indoctrination.

If memory serves me, I stayed at a Red Cross day care center as a kid. I've also known a few Red Cross volunteers, who responded selflessly all the year around, regardless of their belief system. Many people are proposing the need for an alternative national service requirement for all citizens, as a way to learn civic responsibility and as a way to connect people on some basis other than religion or fighting in shooting wars. National service programs have come and gone under various Presidential initiatives. Perhaps there is something more permanent we can find.

Although the economic picture is pretty grim, it should trigger new human movements for a more positive future…Very much of the US recovery depends of the geopolitical dynamism. If it won't balance its economic deficit with China and won't slow down the Chinese expansion -- economic, political, military, and strategic alike -- its own recovery will be slower, if at all…Lockdowns are slowing food supply, and restaurants, hotels, and schools have reduced food demand…Consider further consequences: reflection on nature of 21st century capitalism; pace of globalization; Income/wealth distribution concerns; higher government deficits augur increased default risk, especially for emergency economies; durability of Eurozone; post-Brexit status of U.K.; possible diminished status of U.S. dollar; effects of tilt in some nations toward populism, nationalism; re-sculpting global financial system, especially via fintech; effects on global climate change remediation…Political leadership must be honest and take responsibility. Compare the reception to Andrew Cuomo in NY to the president. Progress -- and more importantly the incidence of disasters -- between now and November will affect the election and the election outcome will affect the future. Consider what 1933 if Herbert Hoover had been re-elected in 1932.

RTD 3: International Medical/Health Issues

1. Possible mutations of SARS-CoV-2 virus making some COVID-19 treatments and vaccine research less effective?

1.2 Could the SARS-CoV-2 virus mutate in the next 6 months, as the COVID-19 pandemic spreads in Africa, Latin America, and Southern Asia making some treatments and vaccine research less effective?

Number of responses: 48

Estimates:
Inevitable: 7
Very likely: 12
Possible: 24
Not likely: 3
Impossible: 0

A mutation can be more infectious, but similar disease burden, it could be more or less serious, i.e. even conducive to treatments and vaccine effectiveness…SARS-COV-2 already had minor mutations during the past six months, but no implications for transmissibility and clinical severity. It is likely though that some significant mutation may be observed on annual basis like influenza...RNA viruses are prone to mutation but more likely to weaker version…Scripps Research Institute report suggesting a mutation ("D614G") has increased the infection rate of the virus. The greater the number of people infected, the higher the likelihood of further mutations as it moves around the world…defining vaccines for mutations will be easier…Africa and South Asia informal economy having to be mobile, often in crowded places, the virus should eventually replicate faster increasing the odds of a serious mutation…Is it possible that it mutates into one more amenable to treatment.

1.2 Comments and consequences:

If the mutations are significant enough to invalidate the research and development of vaccines now underway, then then the pandemic continues longer, moving the world recession into a global depression, further affecting health, and increasing poverty…

Vaccination has to be adapted to new hotspots…A new lockdown and/or weaker controlling measures are expected. Secondary consequences would imply economic

slowdown and further exploitation of smartworking and other practical solutions to be active in the lockdown. Tertiary consequences would drive deep changes in human behavior, such as reduced social contact, in the longer term…The likelihood of mutations increases the need for many different approaches in parallel. Another consequence is the greater importance of using tracking and tracing approach, rather than relying on a vaccine…serious mutations would lead to new crises and lockdowns… Secondary or tertiary effects are either increased attention to medical science or increased criticism… future mutations could prolong the pandemic's impact even after the virus itself has become manageable… due to the fast drop in antibodies, vaccinations would need to be repeated probably annually. If there should appear potent mutations, than it may be necessary to develop adapted vaccines on a regular basis, as is the practice with influenza…treatments and vaccines will be necessary in Africa, Asia, and Latin America to reduce spread and hence mutations…New mutations will be produced similarly to the flu ones. Being based on the virus vaccines procedure, futures COVID-19 mutations vaccines procedures will be similarly to classic flu vaccines ones… if serious mutations then collapse in the economy in many countries, fear and mental psychoses, and uncertainty in public policies…It's an issue that has been considered when a plan to design the best and effective vaccine to prevent the disease…In addition to less effective treatments, if it seriously mutates, we may also see a more aggressive and infectious virus. It's unlikely that we will see the same multi-billion dollar world wide effort in developing a vaccine for a mutated virus that only effects the south…The slow and mild G614 mutation is good news for vaccine development and may have less real-world impact. While the mutation may possibly increase transmission rate, there is no evidence yet that coronavirus infections are more severe or more lethal.

2. Will there be global leadership to address the COVID-12 pandemic?

2.1 Will the G-20 (with China or US leading) and/or the World Health Organization take leadership to prevent "every country for itself" as the state governments in the US had to fight among themselves for equipment?

Number of responses: 48

Estimates:

Inevitable: 1

Very likely: 12

Possible: 18

Not likely: 15

Impossible: 1

The pandemic seems to trigger more nationalist and egoistic reflexes around the world…There is still some global leadership now - WHO has been playing a key technical and coordinating role, Europe has somehow stepped up to play the fundraising role for WHO that US has traditionally assumed. China is increasing its influence, but they still cannot be described as a leader in terms of convening, agenda setting, and even funding (US and Europe are still biggest contributors). We can only be cautiously optimistic that the outcome of the US elections in November will result in leadership change and eventual return of US to the global leadership table…The current US leadership has failed while China has not shown to be a true collaborator… depends on the outcome of the U.S. Presidential election…Don't see China in the position to collaborate in a positive way. I am convinced, that up to date, that China has not given all the available information…If Trump remains in charge in 2021 and beyond, it makes international cooperation harder, though still not impossible - China would be wise to seize the opportunity to take more of an international leadership role.

…Science is not considered as a "common good". Economic and political interest may seriously damage the G20 or WHO cooperation schemes… if there is not a common line for every country, we won't be able to eradicate the virus…A coordinated plan of actions would be possible, even if G-20 and WHO do not effectively hold enough power to impose it. A non-conflicting coordination is actually only possible by the wide availability of DPIs, therapies and eventually vaccine…It is likely Trump will be defeated in November, hence new US leadership will begin after inauguration in mid-January 2021 playing the rolls it did during SARS and Ebola with improved collaboration with China and returning to WHO.

2.2 Comments and consequences:

Successful cooperation, if achieved, could pave the way to better cooperation in coping with climate change and other pressing issues…the new President will not take office until mid-January, 2021, the first wave in Africa, South Asia, and Latin America (June-September, 2020) will get little support. With the new US President, collaboration with China and the G-20 should improve management treatment and vaccine production and distribution. Without international agreements reached soon, bidding wars seem likely. In the meantime, the EU and OECD will have to lead…Primary consequences more flexible application of controlling measures for social contacting; secondary consequences smoother slowdown of economy and less social contrasts; and tertiary consequences would drive stronger support for global institutions and an easier path to governments' coordination for future relevant issues… in case Trump manages to hold onto power as US President, the international medical cooperation against Covid-19 will involve participation from US cities or states, rather than the country as a whole. This

will require some changes in how the WHO or related bodies currently operate, but there would be considerable pressure in favor of such changes…global leadership will be the only possible solution for avoiding the havoc… local differences in approach are likely to remain…WHO addresses relevant information and recommendations, G-20 can deliver a coordinated strategy but those are not intended as enforcing rules…vaccine for any pandemic is world heritage…It is unlikely the USA collaborate at a time of elections and in the western world, science has been administered as a profit center and not as a common goods. Reversely if China finds the vaccine first it might be used as a diplomatic tool to reverse global influence of the USA… without global leadership we will see stronger nationalism, leading to mistrust for politicians, and then demonstrations in many countries… WHO has already shown its inability to be independent of China https://www.newsweek.com/who-must-drop-its-pro-beijing-goodwill-ambassador-opinion-1504961also, consider that countries were already trending towards greater isolationism prior to the pandemic…Cooperation among nations is required for an integrated, complex, leadership response. COVID-19 is global, thus requires a systemic approach in decision-making. The US' lack of preparation and inability to use technology, despite being the richest country, cost human and economic losses that could have been minimized… countries agree that WHO is needed for improving global health and tackling global health crises such as COVID-19. Without WHO, we would have been in a much worse state now. There was still no WHO when the 1918 Spanish flu pandemic happened - and the efforts were fragmented and outcomes dismal.

3. International production and distribution of COVID-19 vaccine(s)

3.1 If a vaccine is created, can its production and distribution be organized in a way that largely avoids conflicts and black market abuses?

Number of responses: 47

Estimates:

Inevitable: 4

Very likely: 17

Possible: 16

Not likely: 7

Impossible: 1

Contracts and agreements among developers, producers and governments of different nations (such as the one among Oxford University, Jenner Institute, AstraZeneca and governments of France, Germany, Italy and Netherlands) are already in place. BMGF

already funded part of it…While the vaccine production sector is a complex system, today there is general consensus even among profit-oriented pharmaceutical companies that COVID-19 is a different kind of vaccine-preventable disease that requires global solidarity. This change of view towards this particular type of vaccine comes from the recognition that this virus doesn't care whether a country is rich or poor, and that the presence of an outbreak anywhere is a threat to global security everywhere. Hence, this vaccine cannot be too expensive and cannot be made available to a select few…High-income countries that had supported the research financially will receive the vaccine sooner than in low-income countries; this could drive black-market and counterfeit problems…It would take substantial coordination among nations, the likes of which we have not seen since the Second World War…It depends on whether international relationships become increasingly dysfunctional in the next 9-18 months. Companies and institutions that currently act in responsible ways may feel less inclined to do so, if they perceive the world has become much more "dog eats dog". Our civilization instincts aren't as deep as we sometimes like to think they are…When governments lie, as China's did in this case, it is almost impossible…It is absolutely necessary, especially under WHO management…A "whole-of-world" effort is likely to create several vaccines making production more decentralized; however, preventing counterfeit vaccines will be difficult.

3.2 Comments and consequences:

It is the fairest and most logical solution for the world…Without global leadership, this would be impossible…The political risk is very high if vaccines are not distributed free for all people; there would be more deaths, unemployment and poverty...If production can be decentralized for local production and distribution preventing bottlenecks, then international collaboration will necessary for quality control and avoiding counterfeit and black market activities. If it is developed in one location, efforts for decentralized production will be needed to prevent conflicts over ethics… Since it will be subsidized, the cost will be too low to be interesting to counterfeit for black markets [JG: however, areas that will get it last, may have black markets, not for cost issues but timing issues]…make a public example, quickly and clearly, of any instances of black market abuses of vaccines and prioritize those vaccines which can be delivered most cheaply at scale (other things being equal) to reduce the incentives for black market operators…America first policy, so that the poorer countries cannot afford buying vaccines on the world market…global distribution to avoid conflict is a remote possibility for the current global environmental ethics…If abuses are not avoided, we risk that many world places, especially Africa and South Asia, won't have the vaccine and pandemic won't be defeated; and hence, continues new spreading… if distribution is well controlled and effective policies/laws made on the same so that offenders can be

taken to court of law and very harsh judgement inflicted on them…So for 50% in the US are willing to be vaccinated. Who will guarantee safety of fast-tracked vaccines? Will countries band together creating clubs of vaccinated places that will bar unvaccinated places from entering?...how to prioritize dosing within a country, to distribute vaccine fairly to all nations, to ensure affordability, and to overcome vaccine hesitancy and misinformation campaigns. International collaboration is critical…planned phasing of vaccine distribution should be based on risk, not capacity to pay…

4. Pandemic Global Early Warning System to identify and resolve supply chain gaps that affect readiness.

4.1 Within three years, will a global early warning system be established that is able to provide early alerts to avoid and resolve supply chain gaps that affect pandemic readiness (personnel, PPEs, testing equipment, etc.?)

Number of responses: 48

Estimates:
Inevitable: 5
Very likely: 18
Possible: 15
Not likely: 9
Impossible: 0

COVID-19 is a wake-up call for the global health community that investments in pandemic prevention, including early warning and surveillance systems, are inevitable and non-negotiable. While understandably the current focus is on the immediate response, it is critical that the importance of pandemic prevention is not missed in the COVID-19 discourse… The pressure to create or vastly improve such an early warning system will grow until it is established…Will become a high priority for governments; society will demand it…as long as many are shocked, there is pressure to create the warning system… Having such a system in place would appear to be common sense, but, with the US leaving the WHO, the set-up of such a system becomes less likely, although not impossible. Funding and implementation could be hampered by the economic calamities caused by the pandemic… there's a clear rational case for such a global early warning system. But there's no guarantee that rational decision-making will prevail. Instead, we could see an increase in irrationality worldwide.

4.2 Comments and consequences:

A pandemic brings many interconnected systems into play - public health, economic, social, environmental, technology, and many others. A global warning system is the best way to build long-term strategies to address supply chain gaps and readiness… a must in a hyper-connected world…Since future pandemics will occur, establishing a serious early warning system that identifies readiness gaps and helps address them, will be necessary if we want civilization to progress…A strong, robust, and integrated global early warning and disease surveillance system will not only help in early detection and prevention of potential outbreaks - but also ensure an increased sense of security and enhance the confidence of people, businesses, and governments to lead normal lives in a global environment of increased risk of infectious disease outbreaks…

Consequences of warning are many false alarms, hysteric populations getting more and more nervous, leading to instabilities in policies, economy, and social life…Large reliance on global EWS leads to overconfidence and forgetting that it is only based on limited key performance indicators…Not on a global scale, but maybe nationally…We need to find the most effective ways to convince as many people as possible that, regardless of their partisan convictions, they ought to be supporting the creation of this kind of early warning system… This will help avoid mass death toll, smoother impact on economy, and re-establish role of WHO…There will be cascading consequences that will only lead to an improvement dealing with pandemics… Big Data Analytics and AI will increase the power of WHO.

5. Reliable data regarding international impacts on individual nations.

5.1 Will reliable, timely, and common standard protocols for data be established and managed effectively enough to improve planning regarding international impacts on individual nations?

Number of responses: 48

Estimates:

Inevitable: 1

Very likely: 15

Possible: 21

Not likely: 9

Not possible: 0

Answer: Possible

Countries have no choice but to establish such standard protocols in order to enhance evidence-informed planning and decision-making for mitigating the international impacts of COVID-19 on individual nations… Inefficiency in data collection and reporting has resulted in delayed and/or inadequate public health approach…Some countries will fake data to make their situation appear less dire than it really is…There is a lot of data sharing internationally and also via the WHO. But the system is still too slow to adequately rein in a quick spreading pandemic. The recent progress of the FAO's system for gathering reports about animal diseases could be a signal that this may be less true in the future also for human diseases… WHO should take the lead and define standards for data pick-up and analysis.

5.2 Comments and consequences:

It surely is a precondition to well-coordinated policy and action… should be done ASAP…Only way to plan, without it the pandemic will continue and the economies will fall further…otherwise, a state of global information chaos and science uncertainties prevail…re-establishes role of WHO…considered too the "normal" body temperature can vary among geographies/men-women, the demographic curve may be more relevant for some countries, depression related to isolation can become an emerging matter in developed countries…Learning from experience identifies best practices leads to global consensus…The science is still moving too quickly. Some things might be standardized, like PPE others will not - I think there is still disagreement as to assess the status of a country's outbreak as a function of per capita or in terms of absolute numbers. But see this American effort https://www.covidlocal.org/ …South Korea used early metrics and robust data to build its public health strategy and was able to curb the spread of the virus early. Absence of good data in other countries has created weaker public health strategies and less effective response…It will also help the scientific community generate new knowledge that can inform our management of future pandemics.

6. Global Counterfeit Covid-19 medical supplies.

6.1 Between now and 2022, what percent of all PPEs in the world will be counterfeit that does not work?

Estimates:
Highest: 42%
Lowest: 15%
Most likely: 29%

PPE is easy to counterfeit and producing high-quality PPE seems to be not as easy as one might think. Many companies in Europe that shifted resources to producing PPE actually failed in producing the desired quality…We will surely have counterfeit PPEs but I'm more optimistic that because of the urgency and intensity of this health crisis, there will be stricter rules and more responsible production of PPEs and the citizens will be more scrutinizing of PPE quality as it is vital for infection control.

6.2 Between now and 2022, what percent of all treatments for COVID-19 in the world will be counterfeit that does not work?

Estimates:
Highest: 42.5%
Lowest: 14%
Most likely: 27%

6.3 Comments and consequences:

Pressure for more serious collaboration among Interpol, WHO, UN Crime and Drugs agency, US & China's CDCs, satellite and other surveillance systems, and national police systems will increase. If this does not improve, then the pandemic continues increasing poverty…supplies will be cheap, at controlled prices, market for those supplies won't be particularly profitable, people will maintain a minimum supply of devices (i.e. masks, gloves and disinfectants) at home…Given the fact that even governments prescribe ineffective PPE, I have little hope that the market will do better…Many states will not be autonomous in production others will not have the money to buy them…Avoiding counterfeit through storage and its public management, black market can be avoided…greedy people wanting to get rich regardless of the consequences…What does counterfeit mean in PPE outside of N95 masks?...lack of national/international policing will propagate counterfeit PPEs and/or treatments.

7. International COVID-19 assistance by the United States.

7.1 Between now and 2023, will the US be the largest provider of medical and financial support for the lower income countries?

Number of responses: 47

Estimates:
Absolutely yes: 3
Very likely: 3
Likely: 13
Not likely: 23
Absolutely not: 3

Only with a new president in 2021…US will still be the biggest financier but the magnitude may be less than what they used to give. It may slightly increase if Trump gets voted out in November, although the increase will not be dramatic unless the US is able to further suppress the infection and graduate from being the epicenter…enough policy push coming from Congress to support international programs even assuming a Trump reelection and a finalization of the withdrawal from the WHO…It's likely that Trump will be out of office well before 2023, so, yes, it's likely that the US will take up this leadership role again. But by no means certain…America first, no support without a deal…Most probably China will

7.2 Comments and consequences:

Much of the developing world does not have not have face masks, access to clean water, sufficient healthcare, live in densely populated areas, marking large-scale outbreaks inevitable - more likely on the second wave since it will take time to get to many of the parts of the poorer countries; hence, the second wave from the developing world should have an impact on the third wave in the North. Hence, it would be wise for the US help developing world as fast as possible…the world is loosing the first donor, new powers come in, new geopolitical situations in the different regions…The US will struggle to support itself… China will ultimately get predominant share of medical support, given their larger personnel availability, WHO will regain control of pandemics recovery management and in many countries special task forces will be made ready and available in case of need…The rest of the world has to start working on a "Plan B" to cope with the US increasingly withdrawing from world affairs. A repetition must be avoided of the international downward spiral after the US Senate in 1919 rejected President Woodrow Wilson's plans for US involvement in a post-WW1 world order...As the biggest economy and most powerful nation military-wise, US and its leadership will

be critical for sustaining global efforts to control the pandemic. It will be much more difficult if US totally gets out of the picture (which I think is unlikely - because of the huge private sector contribution and the idea that national security depends on other countries' security)…Depends on who wins the next elections…an effective lower income countries management could be made under the WHO (the only one), who should lead the support…Government coalitions, like the one supported by Europeans, and large foundations are more likely to help globally…Collaboration among the G20 can also provide support for lower income countries, such as the vaccine and PPEs, for example…China is more organized, EU is more democratic, US has greatest income gaps, not possible to bring them to the same platform…Being a high powered country and sensitive to the problems of the other parts of the world in particular lower and middle income countries, it is likely medical and financial support will be given by US.

8. International Effects on the US Pandemic:

Lack of US-China collaboration, mutated virus making some treatments and vaccines less effective, hospitals collapse in many poorer regions of the world making the pandemic larger. Much of the developing world does not have not have face masks, access to clean water, sufficient healthcare, live in densely populated areas, marking large-scale outbreaks inevitable - more likely on the second wave since it will take time to get to many of the parts of the poorer countries; hence, the second wave from the developing world should have an impact on the third wave in the North…In spite of its faulty (and guilty) management of the pandemic response, China will remain the major producer of individual protection devices because of its lowest labor cost. Hence, the availability of mass supply from China will affect US balance of trade.

Chinese monopoly over some critical materials needed for testing, care, etc.

Lack of honest reporting by countries with critically high number of cases.

Increased travel to and from China.

There could be major complications arising from adverse reactions around the world to the pandemic, the lockdown, the economic depression, and to crises in national confidence in current political leaders. It could be like "the shot heard round the world" from Sarajevo in June 1914 (the assassination of Archduke Franz Ferdinand) in terms of unintended rampant escalation. Consider problems in North Korea, or in Iran, if local management of the complications fail. Consider the possibility that China calculates that the rest of the world is distracted, and takes more forceful steps towards Hong Kong or Taiwan. Consider if Donald Trump, fearing electoral defeat, embarks on overseas adventuring, to try to increase his popularity. And consider if any of these steps involve

miscalculations. Also consider new rounds of hostile finger-pointing if a horrible second wave of the outbreak is believed to be caused by self-serving or myopic actions by an overseas government. And consider the reactions of US businesses or other organisations if their prosperity is ruined because overseas customers or partners no longer want to interact with the US (seeing it as a hotspot of contamination).

The USA is a very large and open country with the most international links globally, and also very decentralized internally, so the risks are continuously very much higher in the USA than elsewhere!...The role of China…The next President and US world leadership and moral authority…The power of the right wing extreme…Communism…Tourism will decrease, business will decrease if there is no financial support, fewer want to go to the US…US-China relations…the change of the President and the racial revolt…economic slowdown, upcoming social needs, re-think entertainment industry, and tourism crisis…Less international willingness to cooperate with the US on health (and potentially other) issues is a likely risk if the US' current policy route of withdrawing from the WHO remains in effect…Should the economic fall-out would also have a drastic impact on the resource availability of health systems and local, state and federal governments in the US. This could worsen the COVID-19 situation even further. Societal challenges from political polarization, unemployment and fake news/ conspiracy theories might cause serious disruptions. This situation could also be fostered by governments and intelligence agencies unfriendly to the US…Strengthening vulnerabilities particularly in the food production and supply system.

Changes in immigration policies (hard-line immigration), travel policy, China's response to COVID-19 and relationship with UN/WHO, and the election…Restrictions on travelling, foreign students, and International trade…I am very pessimistic because we had all the information to create a structure to prevent a pandemic like this, but no one built it…Will Russia and China start flexing their muscles seeing a weaker US?...The coronavirus pandemic exposed US' over-reliance on China and other countries for production of essential drugs. US recognized the need to take control of its supply chain and rely less on foreign countries for critical drugs. China is one of the countries that invests in U.S. pharmaceutical industry…The greatest impact will come from the economic recession that the COVID-19 response is generating. The epidemic of joblessness will worsen socioeconomic inequality, which will then present new challenges to governments, including potentially societal unrest. Countries will need to make sure we do not reach that phase.

RTD 4: International Socio-Economic Implications

1.1 What do you estimate the 2020 World GDP growth rate (% year over year) to be?

Number of responses: 140

Estimates:

	Mean		Min	Max		Median	Count	Std
Highest %	-1.34	-	15	30	-	1	99	6.32
Lowest %	-7.01		-30	10		-6.25	114	6.8
Most likely %	-3.84		-20	16		-3.5	107	4.59

The situation has caught the world unawares and the dislocation will be profound… This is worse than Great Recession 2009, but not yet as bad as the Great Depression of 1929-1932…because S&T is better now…COVID-19 and digital transformation will undo much of the development gains of the last decades…Although drastic losses in some sectors like airlines, luxury, and tourismhave occurred, growth and new technologies for other sectors like health, information technology, construction, and R&D is occurring…inertia will carry 2020…the diversity of the global economy may alleviate the impact… most countries we can live with it, private consumption has been postponed and will bounce back… The recovery rate will now be accelerated due to new and more agile ways of resolving the challenges and ensuring that the economy can reach a level of facing a new pandemic with health and economic forecast

Quick global recovery is not going to materialize because of the different policies in different countries…There is going to be a long tail especially since the engine of world economic growth has been the new middle classes in Asia most of whom do not have a safety net and will not easily recover from the after effects of Covid-19…China will start to recover, but effects of present paralysis of the economy will draw down overall growth… One or more major Western banks will default in the second wave. Bailout may prevent further damage to financial markets. Covid will cause major economic damage in South America… Developing world now lacks markets exacerbated by supply chain disruptions worldwide… Achieving balance between supply and demand will be difficult

Major near term downturn is likely… it is worse than most expect… Lack of leadership leads to collapse and panic…Countries and strict measures are worsening the disease effects itself… Uncertainty tends to slow down investment…The spread & evolution of the pandemic globally and countries differing responses to it are still evolving. Overall, there is an impatience with how long it is actually going to take for the pandemic to be fully brought under control, which will cause some over-reactions in some economies and less so in others. The worst is yet to come.

1.2 What do you estimate the 2021 World GDP growth rate (% year over year) to be?

Number of responses: 136

	Estimates: Mean	Min	Max	Median	Count	Std
Highest	2.76	-15	30	2	96	6.03
Lowest	-2.51	-44	20	-1	106	7.03
Most likely	0.19	-27	15	1	102	4.9

There will not be a "Second Wave," just a continuation of the one we are already in rolling through the world. North American economy will start to stabilize in spite of Social Unrest…While the global COVID-19 spread will continue through the rest of 2020, it will take well into 2021 before vaccines and effective treatments are widespread enough to turn the global tide of the pandemic before the 2nd Q of 2021. So negative growth could continue into that Q. After that, the economic recovery will build up, because of pent up demand and because of lower base numbers… Relevant factor for 2021 will be the result of the presidential election in the US…This will be a transition year so only slight increase in growth…tensions between US and China will affect commerce...the recovery will be slow with serious social consequences…COVID-19 and digital transformation will undo much of the development gains of the last decades… Bigger economies arrives positive recovery rates but undeveloped ones remain in a negative score amid 2021… Poor policy responses and the likelihood of second and third waves of the virus, combined with lack of universal vaccines, will likely lead low numbers…Until a vaccine is available quickly the situation will continue to deteriorate… very few nations will have recovered by end 2021…With tax reform and corrections, it will take time to steady the boat…Economy rebounds as therapies are employed.

People will be sacrificed to advance economic interests and increase herd immunity…There will be a second wave in the US, as a result of the unwillingness of the

present national leadership to take a measured approach to social distancing and thus moving too fast in opening up the lock down… The global economy will have a slow recover with some growth in 2021…a return to normalcy is going to take longer than expected… We will hit bottom, China is likely to drag the world economy down; the post-US Presidential election period should see the US economy stabilize somewhat… US or China will have continued small outbreaks mostly contained. China will do a better job than Western Countries, driving a relative recovery.

1.3 What do you estimate the 2022 World GDP growth rate (% year over year) to be?

Number of responses: 133

	Estimates: Mean	Min	Max	Median	Count	Std
Highest	4.31	-3	25	3	95	3.96
Lowest	-0.52	-20	8	0	98	4.06
Most likely	1.88	-10	10	2	101	2.94

COVID will remain with us for a number of years. Current Globalization paradigm will give way to a more "regional" form of Globalism. Shortened more efficient supply chains will be solidifying. Still less money for foreign aid as all advanced nations use resources to rebuild their own economies…The full recovery phase will be in 2022 with the structural modifications of the globalization process, defining new differences between countries that join the 4th Industrial Revolution and generate a platform of SMEs suited to the demand for high-tech and quality inputs…Agree that COVID and its relatives will continue to persist and evolve and that past globalization will shift to regional economic dynamics…2022 will continue the recovery started in 2021, with some improvement of the growth, although it will continue its slow rates… GDP jump in 2021 will not be matched by a similar jump in 2022… The countries that turned to external debt to cope with investment in the 2020 crisis are now beginning to pay their commitments and interests, resulting in no surplus for investment. The local economy will recover very slowly… Investment in health, people and infrastructure will slow economic recovery

Prolonged recession or stagnation is likely with some countries managing better than others…Effects of pandemic on overall growth will be joined by world financial crisis…

World conditions might improve, unless a new crisis looms ahead… New economic model based on Blockchain and crypto economy will grow…Starting to come out of the

abyss - innovation ramping up while globalization solidifies inevitably…Back to normal - wearing masks.

1.4 Comments and consequences:

Near term downturn will be followed by major upturn, then back to normal growth as therapies are developed and delivered…2020 shock, 2021 rally, 2022 reset…The intense focus on new therapy development will lead to new biological technologies, and then to better healthcare worldwide…While the US and Europe and Asia will be most adversely affected by the pandemic economically in 2020, other parts of the world will experience the worst of it in 2021… International consequences affecting global GDP will include: continued restricted trade, continued reduced tourism, and dislocations due to bankruptcies/business closings…Greater impact than the great depression especially since the population then was about 2 billion and now over 7.7 billion, AND more of the developing world is more monetized…People will adjust their spending to avoid unnecessary expenditures which will slow the recovery and businesses will face many uncertainties; hence, inequalities will grow leading to some social unrests…Continued unemployment will lead to unrest, violent clashes, and new conflicts in highly affected low-income countries… Much depends on whether lockdowns follow any second wave of Covid…Social unrest in advanced countries will continue to increase over how governments have responded to the Pandemic. Overall consumer Demand except for essentials in those economies will continue to decrease over next 3 years. Less money will be available for aid to the developing world from OECD, North America, South America and China. Potential for Regional wars could increase… Trade routes, trade agreements and nationalism will continue to shape economies and society…It may take 9 to 10 years before those who fall below the poverty line will recover to pre-Covid-19 levels. This affects population health and growth rates exacerbating inequality… Global warming, other natural disasters, and migrations make recovery difficult…The next 3 years will be turbulent, with spotty recoveries across the globe…This could eventually bring a paradigm shift, changing in the economic dynamics. Food security may lead and luxury may not be that important. Investment in risks would be a story and values other than money will be prime…major efforts will be needed to address potential large-scale starvation.

Acceleration of transition to digital economy will create many new jobs in the digital space while causing loss of jobs in restaurants, travel and hospitality services, retail shops, commercial real estate, etc…Governments will need to offset some of those jobs losses with infrastructure building jobs to avoid social unrest on top of what is already building from the pandemic and BLM movement. Medical systems in more affluent countries will become overwhelmed in 2020 and 2021 by the pandemic and will need

serious rebuilding both physical and staffing. Lower GDP growth rates could limit funding available for that rebuilding medical systems. This will in turn further accelerates the push to remote digital medical services globally. Demand for humanitarian assistance will increase dramatically in 2020 and into 2021 until the pandemic is brought under control with vaccines and treatments. Social unrest will rise dramatically wherever those needs are not met. Police brutality and inequality resistance will continue adding to the challenges of the COVID-19 pandemic, and unless viable policy changes are inclusively developed, will exacerbate the social unrest arising from the pandemic itself. This all could have further negative consequences on GDP growth rates… Most important is USA commercial deficit, dollar pattern, and quantitative easing increase…Rise of negative counterforces seeking scapegoats for the pandemic.

New forms of production and services will slowly start to substitute traditional ones with NTs (Next Technologies)... Robotics and automation to reduce human contact could grow in wake of pandemic but must benefit laborers lost jobs/wages economically… Fourth Industrial Revolution technologies start to emerge and synergize in practice… increased impetus to replace workers with robots and artificial intelligence…More tele-technology, less pollution… I expect a very quick rebound…we will have a V-shaped recovery with already some growth next year (most likely)… As the world adjusts to a Post Covid word, society is better adjusted and governments are better prepared… Cutting operating costs in the public and private sectors will lead to greater efficiencies and incomes by 2022… If leaders can model good behavior, the people will strive to pull the world out of the ashes.

There is so much uncertainty that these are no more than guesses. I am not sure that aggregate figures of this nature are that meaningful in the current situation because they give a quantitative value to what is exchanged, but say nothing about the wider context of the world in which these activities are taking place. There is also the implication that after the initial depression at some point things will permanently recover, whereas I fear that there may be repeated attempts to come out of lockdowns too quickly followed by further recurrences of the virus and a creeping deterioration over a lengthy period… We still don't know a lot and if immunity is not sustained we might be facing terrible scenarios…Lower income per family means less travel leading to more stress…This could eventually bring a paradigm shift, changing economic dynamics for better human values.

2.1 Will the world recession turn into a world depression?

Number of responses: 134

Estimates	Number of responses:
Absolutely yes:	9
Most likely:	36
50-50 chance:	51
Not likely:	31
Absolutely not:	2

Richer economics are not likely to go into depression, but poorer economics are more likely to fall into depression…Global GDP will contract into 2021, but once vaccines and treatments are broadly available, pent up demand will drive initial GDP growth in 2021 despite increased levels of poverty, unemployment, widespread business closings, bankruptcies, restrictions to travel and trade, and political uncertainties. Development Financial Institutions (DFIs) and major governments will not hesitate to inject financial stimulations to maintain and revive economies and prevent a depression from happening… New therapies and biological technologies will avert economic disaster and promote long-term wellbeing…Some economic sectors are resilient and can survive the crisis, and some are growing during the crisis. These sectors may balance the negative impact on other sectors. This may prevent the turn into a world depression… Increased prevention measures and possible herd immunity will prevent depression… The more we keep people at home, longer the recession… We need to stop confining young people and start returning to activity, meanwhile we accelerate vaccines and medical treatments… recovery in next year will be visible.

Unemployment has been higher than the great depression, we have resilience today, but COVID pandemic going through Africa, Southern Asia, and Latin America could take longer to spread but total effect should be greater than Europe and North America hence making the recovery longer… The way out of the pandemic is uncertain; the damage to the economy and employment is high, but particularly in certain highly labor-intensive service sectors; definitive closure of companies and a drop in aggregate demand can damage consumption, investment and prevent meeting financial commitments… Governments have seen a sharp deterioration in their accounts and the monetary authorities are making great efforts to keep interest rates low. Global saving is likely to decline, limiting action by central banks. For this reason, the path that the economy will follow is not yet resolved, whether to a sustainable recovery or a deepening of the economic damage...Sustained unemployment, especially in middle-income trapped countries, as the US and others onshore production away from developing economies. Military tensions will rise, both to continued erratic behavior of North Korea, and due to China's expanding blue water navy.

The answer is likely to be psychological as much as anything. Confidence has been shaken. Interests rates in major countries such as Japan and the USA being close to zero. Throw in structural problems in China. We're in a race. S&T is promising almost utopian improvements such as unlimited, cheap energy and the end of disease. On the other hand governance around the world has not demonstrated the degree of complex thinking required to successfully deal with at least half of the factors monitored by The Millennium Project. I say right now the world teeters on a dystopian/utopian future in the second half of this century, perhaps beginning sooner… Resilience is our way: re-conversion and new services and products. I fear the business as usual behavior more than depression, though, because that won't address unavoidable increasing unemployment.

Depends on the new world order and how it will evolve… Global leaders of today do not appear to have the ingenuity and toughness to lead us out of this…China-US relationship is a large determinant of global economic performance. US leadership is essential… Developing economies have little or no safety net making it very difficult to improve their conditions.

2.2 Comments and consequences:

There will be significant economic dislocation with many permanent job losses, so leaders will provide whatever stimuli necessary to prevent the current recession from growing into a depression. The current low price of debt makes that decision all the easier. With that finance, there will be plenty of options for creating jobs, though the case will not be the same in lower income countries, which could actually, without foreign assistance, fall into depression for some years to come…We are much better informed about financial systems and how to manage them…We could see the pandemic and economic impacts as a shock to be overcome returning to old normal or as a signal that significant investment needs to be made in reshaping the functioning of human civilization with values that both enhance the quality of life on earth for all beings and the creation of renewable added value.

Structural changes in the US economy due to Covid leading to sustained unemployment will spread to the rest of the world. In less developed countries governments will be unable to intervene and economic consequences will be greater. Massive government debt defaults may trigger some kind of chain reaction…We are almost in a depression understood as a sustained recession. Cumulative effects will prevent quick recovery.… Social unrest will increase globally through at least 2020, which could lead to political opportunism that could work against economic recovery in some countries. If the causes of that social unrest are not adequately addressed, it could extend the recession

globally. A positive consequence could be increased pressure to make shifts in economic policy that will reduce economic inequality, advance the structuring of a global corporate tax system that will close the loopholes that currently allow platform businesses and digital services to avoid cooperate taxes almost entirely, thus limiting funding available to governments to meet the infrastructure and social services needs of their populations…The pandemic exposed the weakness of global supply chains and while it will take longer than a couple of years for global companies to reallocate production sources, actions will be taken towards that will begin to affect employment trends towards alternative countries or repatriated production… Increasing competition between China and the USA could worsen economies with trade and industrial production pushing volatility worldwide. This could lead to a rise of second-tier economies such as India and South Africa, who will become more independent from the Big 2… Since the pandemic affects the regions with time differences. The economic recovery will be first in Asia, then Europe, then North America, then Latin America and finally Africa, with which the Asian reactivation will compensate for the rest, avoiding the depression.

Today there is intense focus on new therapy development to avert economic disaster; hence, new biological technologies will emerge which address many health issues, promoting economic growth. As a result better healthcare worldwide supports global wellbeing and economic innovation…An unprecedented effort to shift away from fossil fuels toward renewable energy, efficiency, regenerative agriculture, and other positive goals is the one development that might mobilize enough investment to rapidly restore growth and jobs… Economies that run on necessities will benefit; economies more on luxury will have to think about change. Human perceptions are being changed and now thinking of needs rather wants...Rich countries complain too much, the poor complain the least. Car producers should not change models every year alternatives for a sustainable life have to be found.

Business as usual behavior is more likely, and that could lead to massive unemployment if not addressed… This can cause increase in crimes and other illegal activities. Cyber-crimes can be new challenge in the future…Structural issues are not addressed…There's no sign of any coordinated global response as yet…US Leadership is essential to global emergence of GDP recovery and growth. Re-institutionalizing global institutions (IMF, WB, NATO, WHO etc.) is critical to global forward movement and avoidance of stress and conflict… Poorer nations will do badly, but the US will be worst and will permanently lose its leadership in most areas… South to south trade will grow… A 2.0 multilateralism associated with middle powers access "know how" to enhance their development. The levels of autonomy and long-term roadmap will be crucial to balance the recovery, the digital economy and the geostrategic imperatives imposed by the powers, including India… The system was built on a corrupt foundation.

Having it disrupted and replaced with a more open, just set of practices, policies and procedures will lead to a transformative orderly future. Or rebuilding on the same old roads will lead to predatory nations looting the vulnerable for resources without proper compensation or sharing… Unprecedented economic downturn in 2020 leading to a global depression lasting for a few years… It may be politically unwise to call it a depression if we want stock markets to be reassured and go into positive territory… Governments should liberate the population under 65 and keep those over 65 confined to speed up the recovery… Global GDP is unlikely to fall by 10%, but a deep recession could last for 3 or more years…this could lead to political instability, riots, famine and wars… Fear of resurgence of the pandemic will drive start-term activities at a subdued level… Same factors exist like the great depress of 1930s and great recession of 2008-2009 and maybe worse…Slipping into a depression would make the world even more vulnerable to another "novel" virus… Fiscal policy will not be enough to complement a monetary policy that is coming to an end (ECB & FR balance sheets are already above the limit)… There is a genuine leadership crises. The most important aspect which is being ignored are the challenges that would arise as a result of mental health issues. This is to say, that to classify the world in the context of recession or depression is a thing of the past. What is critical is to reorient our understanding of the world in the realm of wellbeing.

3.1 What do you estimate the 2020 global trade growth rate (% year over year) to be?

Number of responses: 120

	Estimates:					
	Mean	Min	Max	Median	Count	Std
Highest	-1.11	-30	30	0	79	8.18
Lowest		-8.37	-75	50	-5 86	14.88
Most likely		-3.68	-30	22	-3.25 84	7.67

Reduced production and consumption has already reduced trade globally in 2020 in spite of government and development financial institutions (DFIs) stimulus packages, and the worst of the pandemic is not yet over, so some additional retraction in trade is possible this year… This situation has exposed structural weakness in the fields of finance, supply chains, societal & personal resilience to crisis, government bureaucracy, and International organizations and domestic political structures. Work on overhauling

these deficiencies is beginning…We see already a decline in world trade, pessimistic scenarios (like ARUP pessimistic scenario) assume a decline of about 20%... Populism and nationalism constrain trade growth as well as lack of the Trans Pacific International Conference and the Trans-Pacific Partnership… Pandemic, anti-everyone except Russia defeats US leadership role. European Union, anti-immigrant movement attitudes dampen global trade.

The commercial impact, exchanges, trade restrictions and mistrust between state and private actors define a year of considerable decline in trade. This is also supported by the difficulty in controlling infections and outbreaks…Less tourism, more national trade barriers…Productive activity is concentrated in local spaces and with limitations on international ones… Local essential products would be preferred.

3.2 What do you estimate the 2021 global trade growth rate (% year over year) to be?

Number of responses: 120

	Estimates:					
	Mean	Min	Max	Median	Count	Std
Highest	3.88	-15	30	3	78	6.9
Lowest	-1.99	-44	26	-1	84	8.41
Most likely	1.17	-27	25	2	83	6

Pandemic will only be peaking in Africa in 2021, while declining elsewhere. But the economic effects, including trade, will last well into 2021. However, because of the drop in trade in 2020, there will be a modest rise in trade in 2021, but not enough to reach 2019 levels…Geostrategic mistrust by the Arctic, Middle East, Asia (North Korea), China Sea, the role of the Indian will be some of the factors that will influence a slower recovery than proposed by economists. The post-pandemic will be defined more by geostrategic issues with a direct impact on trade relations…With regime changes around the world, it's possible to begin the climb out of the global malaise. However, pandemic treatment or a 'cure,' will make or break trade growth…US re-engaging in multilateral trade agreements… Growth rate will remain positive, but sluggish as people deal with fears of pandemics… Slight improvement as the time passes. People will again start looking for better products and restart of global demand and trade… New trade rules will slowly evolve and governments will take time to adopt them… Assuming a quick V-shaped recovery, the losses of 2020 will be regained in 2021, but trade will

not grow in 2021…Big bounce as the pent up demand is released… Trade returns to normal as virus is brought under control.

3.3 What do you estimate the 2022 global trade growth rate (% year over year) to be?

Number of responses: 119

	Estimates: Mean	Min	Max	Median	Count	Std
Highest	5.97	-6	40	5	79	6.94
Lowest	0.08	-25	20	1	79	6.12
Most likely	2.93	-10	20	2.5	83	4.

2022 could be the year of stability and transformation, with new global leadership…we will be into the new normal, which will be lower than previous 2-3% growth norms due to on-shoring and nationalism… The strengthening of three levels of geostrategic and geoeconomic multilateralism and the structural redefinition of the globalization process will allow the rethinking of trade relations under the axes of the digital economy and new technologies. This will define new markets and change in the production matrices whose first visible advances will be in 2022… New products and customer's confidence coming out of Covid fear. Innovation and quality would start to take over and global trade to some extent we may say will be back… World trade will suffer the consequences of global financial crisis and depression…Late recovery - only in 2022 (long V or W)… TPP and TPIC or equivalents back in place.

Working from home will permanently change the way societies live and work and negatively impact certain types of commercial real estate and some current management paradigms. More "on-shoring" of critical industries will provide more jobs within individual nations. Automation will increase wherever possible to reduce risk & liability to companies from humans getting sick and government mandated business shutdowns. Most developed Economies will have begun a recovery and hopefully some much needed restructuring

3.4 Comments and consequences:

Digital services trade may expand tremendously, but much of that is not recognized for its full value for tax purposes and so might not be reflected in trade figures either.

Demand for physical goods should recover briskly in 2022, and perhaps to 2019 levels as part of catch up. But persistent reduced employment from failed businesses and reduced business and leisure travel will continue to dampen trade through at least half of 2022… Pressure to relocate supply chain sources will begin to show results in late 2022… A couple of offsetting factors could be continued flows of humanitarian assistance and health supplies and equipment to strengthen or rebuild overwhelmed health systems in Latin America and Africa purchased with loans from development financial institutions (DFIs) and other donors. However, another consequence that might be manifesting by 2022 would be increased local production of health supplies and equipment as part of longer term better preparedness in South and SE Asia, Latin America and Africa…It may be easier for companies with markets in the US and Europe to relocate production away from China to other low cost producer countries without bringing a significant portion of it to those markets. So, the negative impact of that on trade will still be slight in 2022… 2020 will be economically terrible; 2021 a little better; and 2022 will begin improving. All of this is predicated on a shock and necessity changing the social contract that binds a nation together or governments will fall, perhaps even violently. New industries and ways of doing business, going to school, and daily life will change for the better after some adjustment… Globalization and international organizations influence will recede, then start to recover, in different forms, in five years…The market always adapts by innovating.

New opportunities bring new faces to the table with resources such as rare earths and tech demanded gasses…More consolidation and concerns for monopoly by large tech and energy organizations… Anti-globalization movement will be strengthened by declines while regionalization will expand… Immigration of experts, labor, and international university students will be affected… Circular economy develops as dependence from other countries is seen as undesirable for a growing quantity of strategic products (which were not considered as strategic before). This boosts local production which in turn promotes local employment… Growing acknowledgement that China cannot be trusted and they refuse to change their approach creating isolation and animosity… Struggles between the US and China will continue, plus political instability by Russia… Countries will review their trading partners and approaches, business models will be reviewed and countries will look to promote different products in the markets, leading to a new world trading mechanism and blocks… More complex environments due to the emergence of the digital economy…In a depression, we could see protectionism, de-globalization and much re-shoring. In an optimistic scenario, global trade will find a new balance… If new social contracts are not enacted within a reasonable period of time, like within the next year, then social unrest could upset the economic apple cart including trade.

4.1 How many quarters from June 30, 2020 will it take for the number of those in extreme poverty return to the level of January 2020?

Number of responses: 122

Estimates:

	Mean	Min	Max	Median	Count	Std
Highest	16.13	2	80	15	94	11.47
Lowest	7.67	0	35	7	93	5.61
Most likely	10.9	-2	34	9.5	96	7.11

The number of people being forced into extreme poverty will not have peaked until sometime in late 2021 or events late as by mid-2022. Since the global economic recovery will be very uneven, places like Latin America and Africa might not be able to bring those who will have fallen back into extreme poverty out of it for many years because of ongoing socio-political turmoil exacerbating economic underperformance, as is happening in Venezuela, Bolivia, Zimbabwe to mention a few at present, and threatening to expand in many other countries. Also, reestablishment of overwhelmed healthcare systems might take precedent over poverty alleviation… Poverty is a key factor in Covid scenarios. In the informal economy they have to get out each day such people are almost indifferent against fear, theycannot think of it… The informal economy takes over important sectors and strengthened by organized crime gangs in weak democratic governments… Returning them to their January 2020 levels of misfortune is not a worthy ambition. Instead leaders should look at what might happen if poverty was eliminated by providing a living income for everyone…Fewer jobs for younger people, house evictions will be more common, taxes will be lower and hence, countries will have less money for public services…Although recovery to January 2020 levels may take several years, improved global healthcare and wellbeing will help dramatically reduce poverty.

It is already clear that even advanced countries will have difficulty in establishing a new normal in less than two years. The consequences for those in extreme poverty are almost unthinkable. I fear that even our worst predictions may prove to be optimistic…Public policies will likely not be dedicating to combating poverty in the short-term, but more at stabilizing growth and reforming health-care…Starvation will not be tolerated; unrest will be met with checks and Universal Basic Income (UBI) disguised so

that conservatives believe it is temporary… Not sure it's wise to focus on this group. It's the next level up, those who have been struggling to keep out of poverty, who are most likely to have the percentages most often cited above. A "higher" group, those who have lost their small businesses, may have even more difficulty getting back to where they were before covid-19… The increases in national debt will make it extremely difficult to initiate anti-poverty programs in the next few years.

4.2 Comments and consequences:

Recovering from extreme poverty will take longer than economic recovery… Without massive external support, it is unlikely that Lower Income Countries (LIC) will have the means for massive numbers of people to work themselves out of extreme poverty; hence, another generation of children will be malnourished and as a result never be able in their lifetimes to achieve nearly their true potential in life… Another consequence of increased poverty would be opportunists like Russia or ill-intentioned politicians fermenting further turmoil in order to bring more countries under their influence or at least out from under the influence of the US and Europe, with resultant decline in democracy, increased nationalism and dictatorships… Informal economy is increasing mainly in developing countries, reducing tax collection,and increasing corruption, international debt, and non-transparency. This together with poor rule of law will undermine developing economies...New trade partnerships will disrupt GDP in many countries, and high-skill production will be on-shored, especially in pharmaceuticals and other advance technology. Less money in developed economies will mean less aid to developing ones… There will be tens of millions dead from a variety of viruses, reversing progress in measles, malaria, and AIDS leading to starvation, migrations, war, terrorism, and chaos with a few peaceful, safe places, to keep candles burning. I hope we don't lose the Internet… Certain skills and industries have become obsolete far quicker than expected; the unemployed lack the training for new skills to participate in the new economy post-2020. The new Covid-19 -induced poverty will linger with effects still felt on the next generation. Opportunities will diminish and the chances of getting out of poverty reduced… There are data that show that people in the US that fall into extreme poverty never recover or return to an earlier level, particularly if they lose their housing. 20 quarters or 5 years is the minimum it would take to pass affordable housing policies nationwide (US).

The threshold for extreme poverty at or below average individual income of US$1.90/day is arbitrary and should not be used read Jason Hickel's answer to Pinker at https://www.jasonhickel.org/blog/2019/2/3/pinker-and-global-poverty

UBI (in many forms) is accelerated as jobs do not come back in traditional form… Millennium Development Goal 1 to eradicate extreme poverty and hunger, is less likely to be achieved, but the pandemic has also stimulated people of conscience worldwide to rethink economics and join those in poverty to transform society…It depends countries' ability to generate confidence in resuming levels of activity even better than those existing in January 2020… New biological technologies could reduce global poverty leading to better healthcare worldwide facilitates global well-being.

Transnational organized crime is deepening and expanding territorial control and social management, preventing a planned return to levels of human development.Poverty is the political capital of populism and makes it more difficult to resume development and growth; democracies will be weakened… This very much depends on what the most advanced and wealthy countries do. The USA could do more in the Americas.Europe and the UK can do more in Africa. More wise investment will be needed to bring to fruition the human and natural resources of these areas. This will also require improvements in governance within those impoverished nations. As supply chains for resources shorten, it could bring mutual advantages for everyone involved. I am optimistic over the long term… China will play a huge role in reducing poverty as well as poverty rates in African and India should decrease. China global investments will be key driver of poverty reduction.

5.1 What percent will global debt across all sectors increase (year over year) in 2020?

Number of responses: 117

Estimates:

	Mean	Min	Max	Median	Count	Std
Highest %	25.57	-50	200	20.5	80	29.5
Lowest %	7.23	-80	80	8	73	16.79
Most likely %	15.34	-25	120	15	73	18.16

The world is approaching the levels of debt not seen since WW2… Central bankers have indicated without exception that they will step in to provide whatever is needed. Development Financial Institutions (DFIs) have also stated that they will increase their lending significantly to offset the consequences of COVD-19. Governments that have the borrowing means have also committed to providing economic relief to citizens. And finally citizens are demanding compensation for staying at home for extended periods of

time, many without being able to work from their homes, which means they would otherwise starve. Many large companies in 2020 have already taken advantage taking down lines of credit or issuing new debt to ensure they have cash resources to weather the pandemic, however long it may last…Global debt is managed by a few highly ideological entities, so we must see new debt relief mechanisms…Figures for US, UK, EU are more or less known, but what about Chinese (domestic) debt?...Global economic crisis at the end of year. Debt won't be workable when banks at default.

5.2 What percent will global debt across all sectors increase (year over year) in 2021?

Number of responses: 116

Estimates:

	Mean	Min	Max	Median	Count	Std
Highest %	17.44	-10	70	15	75	13.75
Lowest %	4.52	-44	50	5	72	10.12
Most likely %	8.8	-27	40	9	73	8.14

The big debt increase in 2020 will provide a higher base from which debt to grow in 2021; hence, the amount of new debt can be greater without the percentage growth increasing. The demand for additional debt will be there in 2021, to rescue failing businesses and jobs and cities, counties and states and financially failing health systems and needed infrastructure projects to create jobs for the many unemployed as a result of the pandemic… 2021 will be revival and damage control… Restart of the economy, helping nations that are struggling will require this level of debt to invest in what will be a long recovery… Much of the debt will be used to service pre-COVID debt, to provide money to keep both international and domestic economies functioning and to prevent massive defaults in the planet's financial system from crashing the entire system… Either quick recovery (perhaps with more debt) or austerity policies in many countries (less debt)… post-COVID, plus on-shoring of high-skills production, will see increased debt in many countries.

5.3 What percent will global debt across all sectors increase (year over year) in 2022?

Number of responses: 116

Estimates:

	Mean	Min	Max	Median	Count	Std
Highest %	13.68	0	70	11	74	11.77
Lowest %	3.63	-25	40	3	71	7.41
Most likely %	7.16	-10	30	6	72	6.74

Central banks and governments will use any means possible within legal bounds to keep the world financial system stable and once some equilibrium is reached, money and credit will have to be available to pay for the restructuring of domestic economies across the board. New financial instruments, currencies, modern money theory (MMT), new international exchange agreements, etc. will be used before the end of the decade to achieve those ends. Some sooner rather than later… Longer term, debt levels will approach historic levels, then begin to decline… Back to normal. Banks are stable again… Global wide investments will require a long-term strategy to build a new equitable economy… While economies will be recovering, it will take additional debt to achieve that… Conservative backlash as the specter of COVID death recedes.

5.4 Comments and consequences:

DIFs, central banks, governments, private banks all will have their own agendas for making sure that the pandemic and the current BLM social upheavals don't lead to a worsening global economy beyond the pandemic. The IMF is reconsidering its entire lending criteria and introducing entirely new facilities to allow them to respond to the current set of global circumstances to which they've not previously ever had to respond… Currently, the greatest threat is not the disease itself but the economic fallout of essentially shutting down the planetary economy. We have never done that before in human history. By doing that we have exposed the fragile economic, social, and political systems that bind us together as individual nations and a world family. COVID, and the response to it, has pushed the world into a financial crisis that could result in a global financial depression… Consequences of these increases in debt will vary depending upon leadership in specific countries their ability to craft visions and programs for safely moving forward and resolving the racial inequities and inspiring new, more efficient, resilient and sustainable economic growth and jobs creation.

In Europe, corporate lending dropped 40% in March, 2020 and remains tight not helped by negative rates. The Fed in the US is buying corporate debt [JG including sub-prime small business loans] but this isn't doing much to resolve debt so much as support Euro dollar flows/liquidity. If we quantify global poor global debt it might be higher but we don't have a very good way of calculating this… Slow borrowing due to Covid-19 will challenge the development paradigm in developing countries… there will be a remodeled development framework…states should focus their spending on people, housing, education, and health…At least three years' time to recover. Economies depending on sale of goods and products would suffer more.

Consequences will likely include inflation and all that it entails. Tensions may rise between haves and have nots, unless investments are made in low income nations, the population movements, wars, trafficking and other crimes will continue to grow. Threats of more wars may proliferate… People in poorer nations will emigrate more and more… Social unrest will face backlash and brutal quashing; the system seeks status quo yearning for normalcy… Global debt growth will reduce future capacity and resources to address future challenges… Debt is a highly political issue… Financial institutions of all kinds will fail, irretrievably. Currency, credit, gone to chaos…Poverty increases… More countries will refuse to pay their debt defaulting like Argentina in 2001. Pension fund will lose their value pushing people

6.1 Will mass migration (on the scale of Syria or greater) and social discord lead to new military actions delay the economic recovery?

Number of responses: 122

Estimates	Number of responses:
Absolutely yes:	12
Most likely:	31
50-50 chance:	32
Not likely:	35
Absolutely no:	0

The UN estimates that 1.6 billion people will lose their livelihood; that's a lot of radicalized and angry people… High income countries would be well advised to develop a Marshal Plan for low income nations with an emphasis on education, jobs, health and food production… There will certainly be changes in migration patterns, but the military actions may not be widespread. It would depend on political leadership and consensus about what to do with economic and humanitarian crises… Such mass migration and military actions are expected to take place in regions with low economic contribution to

global economy, so their negative impact on global economy is not likely… Covid-induced loss of livelihood will cause the tide of refugees around the world to swell. Larger armies will be sent to guard borders. Within countries, leaders will use social media to enlarge protest movements. Violence will result in many places. Business, investor confidence will remain shaky for some time… What one might see within larger countries such as Brazil and the US as a result of job losses due to COVID-19, could be migrations of a similar scale, with the possible social unrest, less likely military interventions and delays in economic recovery… As social and economic situation gets worse migration will increase dramatically.

Despite all recovery measures, many low-income countries will be hit hard. More unrest, more migration, more conflicts is a good guess… Wars will be smaller and co-located with social discord in developing countries, with the superpowers less likely to intervene… What one might see within larger countries such as Brazil and the US as a result of job losses due to COVID-19, could be migrations of a similar scale, with the possible social unrest, less likely military interventions and delays in economic recovery… Human nature is to avoid movement during pandemic. On the other side host countries would also not be welcoming. Military actions under these times would not take place. A status quo would continue for migration of any kind or reason for almost two years.

6.2 Comments and consequences:

When people migrate to areas of other populations of different ethnic groups, conflict is inevitable. Since several of these are likely to occur it is hard to imagine all will be peacefully enough to avoid military actions… Many receiving countries will increasingly close their borders to migration, which will intensify regional military conflicts, but not affect the world economy as much… Hunger will cause mass exoduses, poverty will lead to social discontent and that will strain borders… Population movements are going to happen. Leaders must devise plans to either make the immigrants productive parts of their new country or find ways for them to be able to return home safely and productively… The US will have a new President who will see the benefit of supporting other nations in keeping their people at home… The US showed it can really work for the migrants, if not for the indigenous hosts. Social discord is healthy, if it results in the social ills that led to discord are remedied. Many would argue that military action in WW2 is what really brought the US out of its economic woes…Rich nations will be more and more selective on accepting migrant… Increased nationalist sentiments and racism will strengthen immigration control as the pandemic is difficult to control… There will be substantial internal refugees, even in the United States… Intense focus on new therapy development will be accompanied by minimal migration, but new biological technologies

will be applied unequally, encouraging some migration to healthier states. As healthcare improves worldwide migration will be reduced.

The pandemic and climate change may increase migration pressures, but the countries to which migration flows are directed are well placed to stop these flows; the pandemic will be a convenient excuse to tighten migration rules and can be used to explain social and economic problems that have very different causes… Mass migration will be mismanaged by the nations, retaining migrants at their borders; drug traffic will be a new form of employment for these migrants; leading to increase police and possibly military actions… People prefer to either return to their native homes or to remain where they are due to risks associated with travel…Social distance may not allow future migrations at high level; same is with military action in near future this may not be possible; however, China may do actions on limited level especially in regions of conflicts… Venezuela has now the second largest mass migration in current history, and it is not due to the coronavirus, it is due to the Maduro-virus…Mass migration will increase, but I do not think it will escalate to new military actions, unless they take it as an excuse to advance actions already planned previously or for other interests… There will be less incentive for migration from poorer countries if the advanced countries are in a deep recession with strained social services, social unrest, fewer jobs, tightening immigration rules… Investing in building opportunities for lower income countries could save money in the long run.

7.1 How many quarters from June 30, 2020 will it take for international travel to pass the 4th Quarter 2019?

Number of responses: 120

Estimates:

	Mean	Min	Max	Median	Count	Std
Most	14.52	2	80	12	95	9.86
Least	6.92	0	20	6	92	3.86
Most likely	9.61	1	25	10	97	4.64

Even with a vaccine, it will take a long time for international travel to recover past the 2019 Q4 because: 1) people will continue to be concerned about acquiring other viruses overseas; 2) acceleration of trends towards digitization of businesses with telecommuting, virtual meetings, etc. will become for at least a few years preferred business strategies until their natural limitations are realized; and 3) even any backlog

or pent up demand will not fully compensate for the cutbacks in flights and air seats available for international travel for some years to come… Some airlines will face bankruptcy… Traveling internationally will be a luxury and a priority for the affluent… Travel will be expensive again, leaving many people behind… Tele-commuting and virtualization will become new safe normal…See Fast Future's Air Travel Post Corona study… Once there is successful treatment and vaccine, the pent up demand for business and pleasure travel will soar… Population growth and economic expansion in Asia it will increase the numbers.

7.2 Comments and consequences:

Airlines that are owned by governments will survive; other airlines will be in trouble… Long-distance flight might return sooner than short flights because of cost increases and ecological limitations…While lower fuel costs will lower flight costs for air carriers, the current guidelines for safe travel will require increased expenditures (more intense cleaning of aircraft between flights, installation of more expensive air cleaners for planes and airports, greater separation between travelers on planes)… As we have seen with reopening attempts in the US, many people will go and do things that are not safe… If too much travel ensues too quickly, we can anticipate a second wave hitting soon. If that happens, travel by air will suffer serious losses that will change the entire industry… It is not just flying but also what happens when you get "there."

Air travel should be broken down separately into Passenger Air and Cargo Air. Tourist travel will remain extremely slow to recover because of fear of catching COVID, the lack of disposable income, new customs and security requirements, visa hassles, and bans on travelers from COVID infected areas. Inter-regional travel of distances less than 2000 miles may increase slightly but again will recover slowly.In 2019 Air Freight hauled 61.2 metric tons of Cargo Internationally, but due to business closings and lost wages there will be less demand for most cargo other than necessities. However, as economies pick up air cargo will recover much faster than passenger travel and that Air Tonnage will recover to the December 2019 level in the next 8-12 quarters. If current "Passenger configured" air frames can be reconfigured to haul Cargo in place of people, this will add to the number of available cargo carriers and reduce the overall price of Air freight making it cheaper to ship and perhaps expand or create more new cargo routes and maybe save some moribund and near bankrupt airlines over the next 2 years. This could be an opportunity… International air travel will continue growing once the pandemic is ended. https://www.flightglobal.com/strategy/how-the-airline-industry-has-been-hit-by-the-crisis/138554.article

Airlines already have razor thin profits, so a number of regional and small country airlines will fail. LATAM and Avianca have already filed for bankruptcy… The international routes may recover more quickly than domestic travel now that people are getting used to telecommuting and remote meetings… Families will not have money to spend for air travel so holidays will be closer to home… Post Covid 19 will fuel personal flight vehicle production, international air travel will morph to a fast speed and arrival time to limit exposure to potential threats.

8.1 Will multilateral collaboration create some kind of a Global New Deal giving new hope to the world?

Number of responses: 120

Estimates	Number of responses:
Absolutely yes:	6
Most likely:	15
50-50 chance:	40
Not likely:	48
Absolutely not:	5

The US depression lead to the New Deal followed by WWII which lead to the UN, World Bank, IMF, and other multi-lateral organizations… The EU would be in favor of a Global New Deal, but China and Russia would only pay lip service to it, and the US position depends on the elections…My optimism is wholly dependent upon a new president in the US. The world has missed having a nation willing to lead and play well with others. In partnership with willing nations, a spirit of collaboration can lead to a grand new world. Russia has been allowed to hit far above their worth for too long. Leadership in the global recovery is something the US is built for… Of course, the pandemic is a global problem. At the same time, solving this problem does not require a new mechanism of cooperation between states. However, some states may adjust their development to account for the increased likelihood of epidemics or pandemics. Perhaps general international rules or guidelines for transport and HoReCaExpo will be developed in connection with the pandemic… New US leadership will rebuild relationships and recognition that global problems have to be addressed by global solutions… The most likely "New Deal" can only follow an economic collapse.

As long as China, Russia and the United States do not accept that they have to share the wealth, something like a new deal is not possible… International response and role of big nations (purchase of medicine and other equipment) has exposed many weakness. Only a fewacted intelligently like Turkey, the rest blocked the border and

supply… Countries will look for their own interests before looking at the worldwide interests. Instead of international solidarity, it is power politics as usual. Any Global New Deal would have to be favoring the interests of the great economic and political nations… There is a very high level of mistrust across nations at the moment and it is likely to just escalate rather than reduce… The USA's influence is waning, China manipulates money and leverages trade deals in its favor, no one else (and no consortium) is strong enough to get global deals a chance. Even if there is a collapse, countries will retreat to their borders and we will see a restart of regional deals like the new NAFTA, not a global deal.

8.2 If some kind of a Global New Deal is created, what would be its key elements?

More like a Trans-Institution with Stronger G-20, re-structured UN system, greater role of multinational corporations and NGOs, making a more coherent system, employing artificial narrow intelligence, systems theory, while taking global governance more seriously… Universal basic incomes with advancing robotic technology that replaces labor to the benefit of workers impacted, universal high quality health care, sustainable climate change action, renewable energy and considerable scientific effort on the level of national and international defense (WHO) to anticipate and get ahead of to fight microbial infections/outbreaks and maximize human microbiome/immuno defenses…

More scientific collaboration is fundamental…Data standardization and cross border sharing of data in the public interest…Emergency programs that eliminate starvation through effective stockpiling and distribution… Redefinition of capitalism that helps assure a more equitable distribution of profits… More transparency, less bureaucracy… Changes in values… Trans-Institution synergies and coopetition.

Center round some vaccine or treatment for Covid-19. A vaccine would need decentralized manufacture and distribution on a cost plus, not profit-making basis, and be distributed first where it was most needed. For this to be possible there would have to be a major effort on key Sustainable Development Goals (food, sanitation, health services) so that the infrastructure would be in place to deliver this in poor countries…

Rescuing human civilization and achievements… Transparency of health information sharing, eliminating poverty… Participation (of citizens as well) and transparency; common database protocols worldwide; a major global institute guiding without force; new values (collaboration and ethics)… US 2030 SDG strategy and addressing Millennium Project Global Challenges… Clear national leadership in the COVID response and public work programs (a la CCC in 1930s). New alliances and cross border coordination of needs and resources… Greater cooperation and exchanges of people and technologies between all countries of the world.

United Nations… Nuclear disarmament, accept the Paris agreements, and promote the SDGs… Collaboration on research, technology, and science… Water and food access for all… Universal Basic Income (UBI)…Address global warming… Sustainable technologies, communication and education technologies, tele-medicine, cyber policies, digital currency… Debt to support the real economy… Reduce poverty and inequality, and increase the universal wage… Solidarity among countries and populations… Honesty, clear political strategies, truth and global security… Agreement of the nature of the world public goods. Global resolution on fundamental human values. A ranking of country according to a Happiness Index and how they treat their most vulnerable citizens… Global resolutions to increase taxation on biggest fortunes and control offshore paradises… Health or artificial intelligence… Freedom of movement… Leading countries to help low income countries… Sustainable and regenerative economy, based on more robust rules of law and ways to control corruption. A new kind of conscious Natural Capitalism… Improvement of merchandise distributions… Jobs deregulations, mass media communications with liberty…Wellbeing, wellness artificial intelligence…Minimum social floor, sustainable development, gender equality, and reduction of social gaps...

New international currency for trade and services, reformulation of the IMF, the World Bank and other international financial organizations…. Equitable distribution of influence among the largest and smallest players and some yet unavailable set of resources to support such an effort… Regional cooperation, nationalism and strong long term strategic partnership… A stable economic system would be needed before you could establish one… Health and safety as elements of national sovereignty…Change of the USA President… Equitable trade, and world bank supporting individual economies, international zones for commerce that are not controlled by local economies, enterprise zones to foster new industries… Building local economies and regional trading blocs… Countries are in survival and economic recovery mode. Mistrust was created around reporting and impact of Covid-19 and rebuilding trust will take time to re-establish… A global new deal will have to be inclusive, accountable, transparent and have a spirit of trust. The multilateral organizations of the past may need to be defunded to make resources available to upstarts with fresh ideas, approaches and people. The UN's good old boys and girls will have to pledge to put the power in the communities where real work is done. The “One Percent” will have to share generously through philanthropy and taxation.Pandemic-related elements, reducing negative environmental impacts, restoring the environment, and creation of an epidemic safe urban environment.

8.3 Where would the leadership come from to create such a Global New Deal?

United Nations

United States

China

European Union

UN and EU

Germany with Angela Merkel

USA; CHINA, BRICS, EU

G7 and OECD nations

China and Pakistan

EU and PR China

EU, China, Europe, India, Brazil

EU, China, Africa

Australia, India, China, Africa

New generation from any country

Citizen Corporations and NGOs

A neutral or a low profile country

Mainly from Germany and the USA (if the President changes)

US-China with EU, G-20, and corporations like Apple, Tencent, Microsoft, and Alibaba.

United Nations, new US administration, new dogma from China, Russia and EU

New US President who will see the benefit of supporting other nations and lead.

The UN will initiate and other global institutions (IMF, WB, G7 etc.) will join the effort.

A global networking instrument connecting people around the world

Countries producing food, pharmaceutical and medical products

One of the global powers (USA, Russia or China) and probably with the support of the European Union or ASEAN…Universal riots of citizens leading to the emergence of a new class of leaders supported by mass citizens mobilization… UN Secretary-General (but Guterres has been largely invisible so far). A group of Prime Ministers / Presidents / Elder Statesmen from small countries, particularly those well-qualified such as Gro Harlem Brundtland, a doctor (Norway) and Angela Merkel, a chemist (Germany). Small countries have on the whole done best at dealing with Covid-19. They would need to find a way to "assume power" through their ability and trustworthiness. China could do it, but its terms might not be acceptable. (Roughly 80% of all active ingredients for all medicines come from China - The Economist, 1st February, 2020, p. 56.). International Charity / Charities. Former UK Foreign Secretaries, Jeremy Hunt and David Miliband (Miliband is now working for an international charity) called for the international community to stop "global bickering" and work in unison in an article in The Sunday Times, 17th May, 2020.

For an international order to really work, nation-states and regional collections of nation-states and trade alliances have to fix things at the lowest echelons of governance first. Once this is done, decent and competent leadership will emerge that could contribute on the international stage… Depending on the US elections in November, leadership could come from the US and Europe. Not sure about China and Russia… It could come from the EU, but is best if it comes from a coalition of different partners. It is not likely to come from the USA in the short term… While the UN might be glad to step up, the US at this time would not, nor the EU be able - the most promising possibility would be a group outside of the World Trade Organization, but with its support… I do not see a future where any country's leadership will drop their concerns to benefit others. Even if we see a general collapse, the political conditions are not there to see something like the Marshall Plan emerge… Each nation select five leaders to serve as delegates to build the new deal. Within the five, there must be diversity of ethnicity, age and socio-economics. If there is to be an executive council, it will not guarantee a permanent seat to a nation just because it is rich or of a particular ethnicity… Taking most directions from social, economic and environmental structures of Nordic countries… Europe, for the region of Spain, for its liberal social policy and its interests in Latin America and the close historical ties with the region

9.1 If you have other thoughts about strategies for addressing the international socio-economic impacts of the COVID-19 pandemic, please add them here.

More scientific collaboration is fundamental…Any strategy that does not put a focus on a new paradigm for the prevention and treatment of chronic disease, including the challenge presented by viruses, is not going to be effective in the long run… Change of paradigm leaving the relics of the past medialization…I think we are at a point where the United Nations could become a much more important entity as part of a new world order… Restructure the institutional, risk, profitability and viability conditions of the agrifood chains worldwide, under sustainability criteria… Use more futures research and scenarios when planning… Make good practices accessible to many… It is going take leadership at a global scale to recognize that everything is interconnected and interdependent and solutions are global in nature and require a collaborative approach. We did this in the Paris Climate Accord - time to take it to the next level.

If people are thrown out of work because Governments made the decision to shut down their economies, then it is incumbent upon said Governments to support their people financially until an economy can effectively reopen and the people can go to work again. Whether this disease is vanquished or we just learn to live with it. Real Economies are grown from the bottom up just like a tree or a tulip. Give The People money which is now missing from their pockets and not to the banks, hedge funds, or the tax man, and the People will grow the economy back. Probably better than it was before and quicker… There are strong forces working to disassemble capitalism in favor of socialist economies. Much of this is driven by a desire to improve the lot of life for everyone, and to eliminate poverty and health concerns. This well-intentioned effort, though, intensifies the conflicts of trade, jobs and economies. I see this continuing, and COVID is not only a real health issue, but is being used as a political one as well. We need to create a future that provides a universal safety net, but also encourages people to be productive, to care for their own future, and to create a stronger sense of community instead of tearing down the current structures and vaguely hoping for the best…We need to understand and recognize that Existing Global Leadership got us into this mess. That current systems have failed and created wealth and health disparities… Society needs to hear the voice(s) of reason and facts. Emotional responses and mistrust in Governments abound, and as such Governments have 'lost' their authority. Society needs guidance and real honest solutions or 'pointers' on the way forward.

Promote home office, create incentives for entrepreneurs, more tax for incomes, and create universal incomes… Create community inclusion currencies to revitalize depressed economies: https://www.youtube.com/watch?v=bHM1DRHSUPw

Seek policies, organizations, and methods that could produce revolutionary biotechnologies during the search for a COVID-19 therapy… It is going to be difficult for

a Global New Deal to address Covid-19 unless it simultaneously addresses the world's other major problems e.g. climate change and poverty…Target support for the most vulnerable families using existing programs in societies, instead of universal schemes based on new programs; emergency loans for liquidity needs of companies without discriminating sectors and not the acquisition of shares or rescue of companies; and finally focus on removing trade and regulatory barriers and allowing flexible responses from the private productive sector. Likewise, it insists on maintaining transparency and accountability mechanisms… I have faith that God will help… International moratorium on sovereign debts, regional compensated trade agreements global investment in training for a more advance economy….We need to counter all efforts that limits freedom of movement… I don't see in this set of question any clue about strategies for addressing the international socio-economic impacts of COVID-19. It is a survey about growth predictions, which seems to be based on an implicit representation of the future as a continuation of the past and present with economy at the center… Developed countries as well as international monetary institutions should help to reduce financial burden of developing and under developed countries… Social distancing and online jobs, technology can effect social integration that can lead to future social tolerance… Thank you.

9.2 Additional Comments:

Much of the developing world does not have not have face masks, access to clean water, sufficient healthcare, live in densely populated areas, marking large-scale outbreaks inevitable - more likely on the second wave since it will take time to get to many of the parts of the poorer countries… A key outcome should be how these answers and insights could impact Red Cross… The pandemic is an opportunity to rethink spending...In addition to asking for consequences, how about benefits?

We must not allow restrictions and control mechanisms necessary during the emergency, to continue after the pandemic to reduce freedom… It's been heartwarming how the people of Vietnam have come together to support quarantine, stay home, and masks. That country has achieved the best results of any large country when it comes to dealing with covid-19. I only wish people and organizations at all levels could summon up that kind of will to promote a healthcare rather than the current sickcare paradigm.

A technology question would be nice, say treatments, techie approaches to prevention, AI, etc… Congratulations! Good technical exercise… Thank you for allowing me to participate in this study. My desire is to provide some thoughts and assessments that

could be useful and work toward the betterment of our circumstances in these rapidly changing times… Thank you… Thanks…Excellent questionnaire!