Guest Editorial

A Perspective on SARS-CoV-2, the Most Dangerous Virus in History

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In the middle of the SARS-CoV-2 pandemic, there are many unknowns, and an article could be outdated as soon as it is written. While data-dependent answers must be provisional, many pressing questions must be asked. This is the most dangerous virus, not in terms of direct casualties from COVID-19, although these are extensive, but in terms of the indirect casualties from the nationwide shutdown and the unprecedented assaults on civil liberties. Dr. Dave Janda, retired orthopedic surgeon and political commentator, calls it the "freedom-stripping virus." Among the casualties are freedom to prescribe or even to discuss non-officially-approved preventative or treatment measures.

A Personal Perspective on Dr. Fauci's Role Early in the AIDS Epidemic

In the 1980s, Anthony Fauci, M.D., current head of the National Institute of Allergy and Infectious Disease (NIAID), who is now called "America's doctor"[1] and has been the most visible federal scientific voice on COVID-19, is said to have been very influential in the U.S. response to the adult immune deficiency syndrome (AIDS) epidemic. I don't remember hearing his name then, but I was involved in our small community hospital's response as chairman of the Laboratory Services, Infection Control, and Blood Utilization Committee at Carondelet St. Joseph's Hospital in Tucson, Arizona, from 1988–1991, and chairman of the Department of Internal Medicine from 1992–1993.

At the time AIDS was considered to be almost universally fatal, and thought to be far more readily transmitted than it has turned out to be. Fauci wrote in *JAMA* that AIDS might be transmitted through "routine close contact, as within a family household."[2] He did not, however, recommend taking drastic preventive measures based on unconfirmed speculation.

A big concern at our hospital was needlestick injuries. The ubiquitous boxes for used needles date to that time. But what were we to do if a worker got stuck? Did we tell the person to abstain from sex while waiting weeks or months for a blood test? Could we test the patient, if we knew which patient was the source, and inform the worker of the result? The answer to that was no, because it would compromise the patient's privacy and result in stigma. Recall that an early name for AIDS, predominantly in the lay press, was "gay-related immune deficiency" (GRID). The epicenter for early cases was gay bath houses, but soon the emphasis was on "it's the virus" (not the promiscuous anal sex), and "anybody can get it" (true, but some behavior is high risk).

The next question was whether to offer prophylaxis with zidovudine (azidothymidine), which has significant adverse reactions, just in case the patient was positive.

Another issue was whether to take extra precautions in treating a patient known to be positive or high risk. It was decided that that would be stigmatizing; hence, "universal precautions." It was also considered to be unethical to refuse care or alter the type of care provided to an AIDS patient because of the risk of infecting the doctor or dentist,[3] the staff, other patients, or their families.

Dr. Fauci's policies did not end AIDS. Although the disease might have been contained with standard public health measures including contact tracing, it was allowed to spread unchecked, as investigative journalist Randy Shilts recounted in his 2007 internationally best-selling book *And the Band Played On*. At present, 1.1 million Americans are living with human immunodeficiency virus (HIV), and 38,000 new HIV infections occur each year. There are also "significant demographic and geographic disparities in new infections concentrated mostly among men who have sex with men and racial/ethnic minorities"[4]—disparities Fauci called "unacceptable" with regard to a higher mortality rate from COVID-19 among minorities.[5]

During the 1980s, Fauci worked with activists to amend the way the government handles clinical drug trials, increasing the number of patients who had access to experimental HIV/AIDS treatments. AIDS patients could not "wait a few years" for results of clinical trials, under "absurd and outdated rules," writes National Public Radio (NPR) guest host Dave Davies. After Fauci saw a few protests, he thought, according to Davies, "If I had a disease in which the result was that I would die no matter what, and the government was telling me, 'You can't try anything that might work under any circumstances,' I'd be ramming down the doors, too."[6]

Fauci now proposes to end the HIV pandemic by an enormously expensive strategy that includes massive testing, "treatment as prevention," and greatly expanded pre-exposure prophylaxis (PrEP) with an anti-retroviral drug cocktail.[7] These drug cocktails are both expensive and toxic.

For AIDS, there are antibodies, but these are evidently not protective. The search for a vaccine continues, as this would be a "nail in the coffin" for the epidemic—"together with all the other preventative modalities."[4] There is no mandatory testing, no aggressive or mandatory contact tracing of individuals, no quarantine, and no restriction of or even strong advice not to engage in high-risk activities. Anybody might get infected through accidental contact with bodily fluids, especially blood, though the risk is now said to be low. The "game changer" has been effective (though not curative) treatment. Nonetheless, deaths continue. As of May 7, 2020,

the average disease deaths per day worldwide was 2,089 for COVID-19 and 2,110 for HIV/AIDS.[8] Keep in mind that people apparently do clear the COVID-19 virus when they recover, and the pathogenetic mechanism appears to be self-limiting, although long-term consequences cannot be excluded. In contrast, the chronic state of HIV is known and expected based on its effect on the immune system.

Contrast the initial response to AIDS, when it was thought to be rapidly fatal and highly contagious, with the policy that Fauci and others recommend on COVID-19. "Universal precautions" are not enough for COVID-19. Widespread testing with quarantine of individuals who test positive, or even of their contacts, is contemplated. Requirements for "immunity passports" (e.g. COVI-PASS™) to travel, work, engage in normal activity, or even live with your family are feared. Meanwhile, everyone is treated as possibly contagious. Medical care that is deemed "non-essential" is being forbidden, as facilities sit empty, medical professionals are furloughed, and many hospitals and practices face bankruptcy. Long-approved drugs with an excellent safety profile (hydroxychloroquine, azithromycin, and zinc) are being suppressed or even forbidden because of lack of sufficient controlled efficacy trials and FDA approval for a new indication—which is not required for the "off-label" uses for which about one in five prescriptions is currently written.[9] Suddenly, drugs used for more than 60 years for malaria prophylaxis by millions of people, with rare adverse effects, are deemed too dangerous for protecting people from this sometimes deadly virus.

Life has continued despite far worse plagues throughout history. The American War of Independence was fought during a smallpox epidemic. People recognized the risks and took precautions as they could. Locking down the economy—prison terminology—is unprecedented. Fauci says "social distancing" cannot be relaxed until there are "essentially no new cases, no deaths for a period of time." Former presidential advisor Ezekiel Emmanuel, M.D., flatly stated that there is "no choice" but to stay locked down indefinitely: "Realistically, COVID-19 will be here for the next 18 months or more. We will not be able to return to normalcy until we find a vaccine or effective medications." Bill Gates says return to normalcy is possible "when we have an almost perfect drug to treat COVID-19, or when almost every person on the planet has been vaccinated against coronavirus."[10]

What does this mean? Before this impossible goal is reached, would the whole world be a leper colony except for those certified as "safe" by an authority approved by the UN's World Health Organization (WHO)?

COVID-19 Mortality

In most cases, COVID-19 is mild or asymptomatic. While some said that the outbreak was no worse than a bad influenza season, others said that mortality, if one got COVID-19, was 20 times worse than influenza, and that transmissibility was much higher. But the case mortality rate and the infection mortality rate depend on the number of persons diagnosed or infected, and this denominator cannot be determined without widespread testing. It may turn out that COVID-19 is not much worse than influenza, and considerably less devastating than the 1918 influenza pandemic because COVID-19 mostly spares the young.

There is also uncertainty in the numerator. An unconfirmed but "suspected" diagnosis of COVID-19 may be listed as the cause of death on death certificates. There is a financial incentive to overdiagnose. Under the Coronavirus Aid, Relief, and Economic Security (CARES) Act, §4409, the Medicare weighting factor for each diagnosis related group will be increased by 15 percent if a patient has a principal or secondary diagnosis of COVID-19. According to a Minnesota state senator, Dr. Scott Jensen, Medicare pays a hospital $4,600 for simple non-COVID pneumonia, $13,000 for COVID-19, and $39,000 if a COVID-19 patient is placed on a ventilator.[11]

In a pandemic, one would expect the all-cause mortality rate to increase. But for the first part of 2020 through Apr 5, the U.S. all-cause mortality was about 14.92/100,000, a multi-year low.[12] One factor in the fear of COVID-19 could be gross overcounting of COVID-19 deaths.[13]

As of April 19, a comparison of deaths from COVID-19 with deaths in recent influenza epidemics, as a percentage of the population, is shown in Figure 1. The toll projected by the Institute for Health Metrics and Evaluation (IHME) gives the mortality, as a percentage of the U.S. population, only about one-fourth that of the 1958 Asian flu.[14] These pandemics were small compared with bubonic plague, smallpox, the "Spanish flu" (1918-1919), and HIV/AIDS.[15]

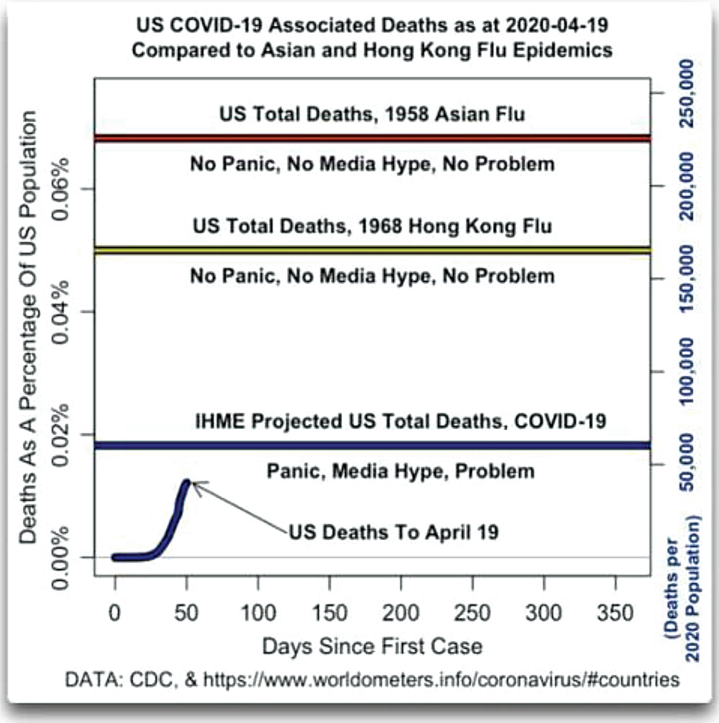

Figure 1. U.S. COVID-19 Deaths Compared with 1958 and 1968 Epidemics.[14] Reprinted with permission.

To determine the infection fatality rate (IFR), widespread testing is imperative. Where it has been done, antibody testing has revealed a surprisingly high rate of infected and recovered people. A study in Santa Clara County, California, concluded that the virus had infected 2.5 percent to 4.2 percent of residents, 50 to 85 times more than the number of official cases at that date. In Los Angeles County, 4.1 percent had antibodies. Based on the results of these studies, COVID-19's IFR would be in the range of 0.12 percent to 0.2 percent, far less than the fearsome rates used to justify a universal quarantine. An antibody study from a high school in Oise, France, released on Apr 18, showed that 25.9 percent of the pupils, teachers, and parents had been exposed to the virus. An antibody study of New York State, released on Apr 23, showed that in New York City, about 21 percent tested positive. With 11,267 deaths, and approximately 1.73 million exposures, the IFR would be about 0.65 percent for New York City, three times higher than in California, possibly because of a higher intensity of exposure in the densely populated city.[16]

Immunity

SARS-CoV-2 may be "novel" to today's population, but all the world's pathogens are novel to a newborn infant, who has only limited and temporary passive immunity from maternal antibodies. Yet the human race survived for millennia without vaccines or drugs. Europeans survived smallpox, which wiped out many native American populations when Europeans introduced it into the New World.

The adaptive immune system, which "remembers" previously encountered pathogens and produces antibodies and killer T cells to defend against specific organisms, takes a couple of weeks to respond. Without the initial line of defense, the innate immune system, animals would never survive. The innate system has physical barriers—skin, epithelial cells, mucus, and cilia—and phagocytic cells and cells that produce antimicrobial peptides called defensins.[17]

What determines whether an exposure becomes an infection? Surely the size of the inoculum must be relevant. This concept was applied in variolation, an early attempt to protect against smallpox, in which people were inoculated with a small amount of pus from a smallpox victim in the hope that they would have a mild case that would prevent a severe case later. General George Washington instituted variolation among the Continental Army in 1777.[18] This was dangerous; some died. It seems likely that in populations in which smallpox was endemic, people who had small exposures developed immunity on their own, even from an inapparent infection. This would explain a mortality of 30 percent,[8] compared with nearly 100 percent in naïve native Americans. Eradicating natural smallpox and ending vaccination has left the entire world vulnerable, so that preserved cultures of variola could be used to develop a devastating biological warfare weapon.

Immunization cannot occur without exposure to the wild organism, or to a vaccine containing killed organisms or attenuated strains. How do babies get exposed? They touch everything and put almost everything, especially their fingers, in their mouths. The germs first encounter the innate immune system, at least reducing the potentially infective inoculum.

In a videotaped interview that had 5 million views before YouTube censors removed it, California physicians Dan Erickson and Artin Massihi dared to suggest that people might be developing immunity when touching their face. It was time to end shelter-in-place orders, they suggested. Initially intended as a short-term measure to protect the most vulnerable patients and the medical system, the harmful effects were outweighing benefits, and impeding the development of natural immunity.[19]

Recovering patients do have antibodies, and convalescent serum is being tried for treating seriously ill patients.[20,21] Some patients have reportedly relapsed or become reinfected, leading to fears that "herd immunity" will not develop naturally. The WHO says there is currently "no evidence" showing that people who have recovered from the coronavirus are not at risk of becoming infected again.[22] There has been no explanation of how vaccine-induced immunity would avoid this problem.

A group of German researchers led by virologist Christian Drosten compared T cells from recovered COVID-19 patients with those from uninfected patients. Surprisingly, they saw that 34 percent of patients had reactive T cells despite never having contact with SARS-CoV-2. Is there some cross-immunity to COVID-19 because of previous contact with other coronaviruses? Drosten warned against over-interpretation of results. One could certainly not conclude that one-third of the population is immune. "Alternate explanations for a milder or symptom-free course might be initially encountering fewer virions or being in better shape [my translation]," Drosten said.[23]

Transmissibility

SARS-CoV-2 is a respiratory virus, and no evidence has been presented for food-borne transmission, or transmission through skin. Nevertheless, obsessive disinfection of surfaces—likely a good idea in the gym for other reasons such as methicillin-resistant *Staphylococcus aureus* (MRSA)—is part of the re-opening ritual.

SARS-CoV-2 does persist for a time, even for days, on surfaces. How significant is this? Drosten points out that virus placed on surfaces can indeed be recovered in cell cultures, but the amount may be far too small to be infectious, and decreases very rapidly as droplets dry up. If one touches a doorknob, the virus immediately encounters an acidic milieu on one's skin. The press instantly sounded an alarm over the recovery of virus in the environment.[24] On May 21, the CDC appeared to walk back its earlier warnings and said the virus "does not spread easily from touching surfaces."[25]

Based on estimates of the R_0 ("R-naught" or reproduction number—the average number of additional persons that a carrier will infect), COVID-19 has been called extremely contagious, even more contagious than influenza. But is this true? Schools have been closed for a few weeks during influenza season because of a high absentee rate. But in an

extreme case of possible COVID-19 exposure on the aircraft carrier USS Theodore Roosevelt, where 4,800 men and women were exposed to multiple individuals with the virus several times per day, day after day, 4,140 (more than 86 percent) of those sailors did not contract the disease. The National Basketball Association tested hundreds of players, staff, and media to come up with 14 cases of COVID-19.[26]

Bill Gates wrote, "There is also strong evidence that [COVID-19] can be transmitted by people who are just mildly ill or even presymptomatic"[27]—an assertion that appears to be widely accepted. However, as pointed out by Joel E. Yaeger, M.D., and LuAnne Yaeger, M.D., in a letter to Pennsylvania Gov. Tom Wolfe,[28] the language in the reference he cited was far less certain: "It is unclear whether persons who show no signs or symptoms of respiratory infection shed SARS-CoV-2."[29] Other reports cited by Yeager and Yeager similarly use words such as "possible," "suggest," and "might occur."

The transmission rate of COVID-19 was 1 percent to 5 percent among 38,000 Chinese people in close contact with infected patients, according Zunyou Wu, M.D., Ph.D., chief epidemiologist of the Chinese Centers for Disease Control and Prevention, Beijing, who gave an update on the epidemic at the Conference on Retroviruses & Opportunistic Infections (CROI 2020). He also stated that patients were most infectious at the onset of symptoms when they spiked a fever and started coughing, but their ability to spread the infection dropped after that, and that transmission from presymptomatic people is rare.[30]

A study that traced the 2,761 contacts of the first 100 COVID-19 patients identified in Taiwan found 22 secondary cases for a secondary attack rate of 0.7% (95% CI, 0.4%–1.0%). The transmission rate to household contacts was about 5%. The 299 contacts with exclusive presymptomatic exposures were also at risk, with an attack rate of 0.7% (95% CI, 0.2%-2.4%).[31]

How does this compare with the transmissibility of influenza? A review of 37 articles describing 60 influenza outbreaks in long-term care facilities, between 1980 and 2011, showed influenza attack rates ranging from 1.3% to 65% with a nonadjusted mean of 28%. There was no evidence that higher vaccination rates were associated with a reduction in attack rates.[32]

In designing public health measures, it is important to know the mode of transmission. Is it (1) the ballistic flight of large droplets connected to sneezing, coughing, and labored breathing, (2) tiny aerosol droplets that remain indefinitely suspended in an airborne state and can travel over large distances, or (3) contaminated surfaces. Available international data about "superspreaders," which might help elucidate the likely modes of transmission, is extremely limited. Canadian journalist Jonathan Kay catalogued 58 "superspreading events" (SSEs) in 28 different countries plus ships at sea.[33]

With caveats about the limitations of the data, Kay found that parties, funerals, religious meet-ups, and business networking sessions all seem to have involved the same type of behavior: extended, close-range, face-to-face conversation—typically in crowded, socially animated spaces. With few exceptions, the SSEs took place indoors, where people tend to pack closer together in social situations, and where ventilation is poorer. Of the 54 SSEs for which underlying activities could be identified, only 11 did not involve either religious activity, a party, a funeral, a cruise, or extended face-to-face professional networking. Four of the SSEs were outbreaks at meat-processing plants, in which densely packed workers must communicate with one another amidst the ear-piercing shriek of industrial machinery. High levels of noise seem to be a common feature of SSEs, as such environments force conversationalists to speak at extremely close range. Related factors may be at play in old-age homes, where conversations are held at much closer range than is socially typical because of hearing impairment. Three of the SSEs involved mass sports spectacles, "during which fans regularly rain saliva in all directions."

Common activities that are not represented among these SSEs include watching movies in a theater, being on a train or bus, attending theater, opera, or symphony. People are surrounded by strangers in densely packed rooms, but are expected to sit still and talk in hushed tones.

Kay suggests that "public-health rules that guard against non-existent threats may actually make the problem worse." Should we be constantly disinfecting surfaces in a restaurant when the problem might be forced air convection that transmits large droplets long distances?

What Is the Evidence for Policy?

The American Medical Association and others call for "science-based" treatments and have apparently done nothing to protect physicians' rights to prescribe empiric therapy based on information as it becomes available. But where is the "evidence-based" policy?

Masks

According to Dr. Trisha Greenhalgh, professor of primary care at the University of Oxford, COVID-19 could be the "nemesis of evidence-based medicine." Advice to wear a mask is not based on unequivocal evidence, but rather invokes the precautionary principle. One experiment showed that only one-36th as many droplets from a cough were caught 8 inches away if the person wore a mask with two layers of cloth. Thus, there was potential benefit and presumably little harm.[34]

Models predict that if 80 percent of the population wore masks that were 60 percent effective, the R_0 would drop below one, enough to stop the spread of disease. Although there are many other variables, case and death rates have reportedly been reduced within weeks in regions that have adopted widespread mask wearing. A cloth mask helps protect others from the wearer. An N-95 mask helps protect the wearer from others, but it does not filter exhaled air passing through the exhaust valve.[35]

Mask wearing is not completely safe. N95 masks may induce an initial hypoxia and hypercapnia. This increased CO_2 overstimulates respiratory drive, creating shallow hyperventilation (of which the person may be unaware) resulting in decreased CO_2 and compensatory increase of chloride. This leads to the picture of overcompensated respiratory alkalosis

by mild metabolic acidosis with normal anion gap (increased chloride, decreased CO_2).[36]

A position paper by Mediziner und Wissenschaftler für Gesundheit, Freiheit und Demokratie (MWGFD, Physicians and Scientists for Health, Freedom, and Democracy) states: "From a medical point of view, the general obligation to wear mouth protection in public places that is still being introduced cannot be justified at all. Even the WHO points out that there is no scientific evidence to justify wearing a mouthguard in public without acute respiratory syndromes. Wearing a mask also endangers the health and life of people with severe lung diseases (cancer, COPD, asthma), heart diseases, hypertension, as well as mentally unstable people and children [Google translate]."[37]

If the virus lands on the conjunctiva, tears will wash it into the nasopharynx. Without eye protection, mask-wearing may be mostly ritual as far as protecting the wearer.

Lockdowns

Although "re-opening" may be portrayed in the media as a balance between lives and mere livelihoods, there is no evidence that generalized lockdowns save lives. A simple one-variable correlation of deaths per million and days to shutdown showed virtually no correlation.[38]

Approximately half the U.S fatalities have occurred in nursing homes. Yet in some states such as Illinois tens of thousands of businesses have been uprooted, ostensibly to protect a population that is mostly outside the ebb and flow of daily commerce, writes David Stockman, who is a former director of the Office of Management and Budget.[39]

The decision to impose the UK lockdown was based on "crude mathematical guesswork," although it was called "following the science," write British journalist Matt Ridley and member of Parliament David Davis.[40]

"Following the science" on the U.S. lockdown strategy led Jeffrey Tucker of the American Institute for Economics Research to a 2006 plan that became the heart of President George W. Bush's playbook for pandemic response. It started with a computer simulation done by a 14-year-old high-school student with the help of her father, a scientist at the Sandia National Laboratories, which became policy over the objections of epidemiologists and infectious disease specialists.[41]

There is no evidence that lockdowns work, writes statistician William Briggs. Using data from www.worldometers.info/coronavirus, he prepared a histogram for COVID-19 deaths per million population in countries having a population greater than 1 million, broken down by whether the country had a government-imposed lockdown involving at least half of its population (Figure 2). The scale is by log base 10, a necessity because of the enormous variability in death rates. Countries which did not have lockdowns, shown in green, are clustered at the lower end of death rates, but the evidence is far from conclusive.

Because of the potential for population density to play a role, Briggs also plotted the death rate per million by the population, for countries with at least one million population (Figure 3).[42] (The U.S. death rate is given as 257 per million.)

This graph does not prove that lockdowns do not work, as there are so many confounding variables: e.g. climate, population density, severity of lockdown, time lockdown imposed, and population variables such as age and state of health. But the burden of proof is on those who would deprive people of their liberty and use of their property, and there is no evidence that lockdowns *do* work.

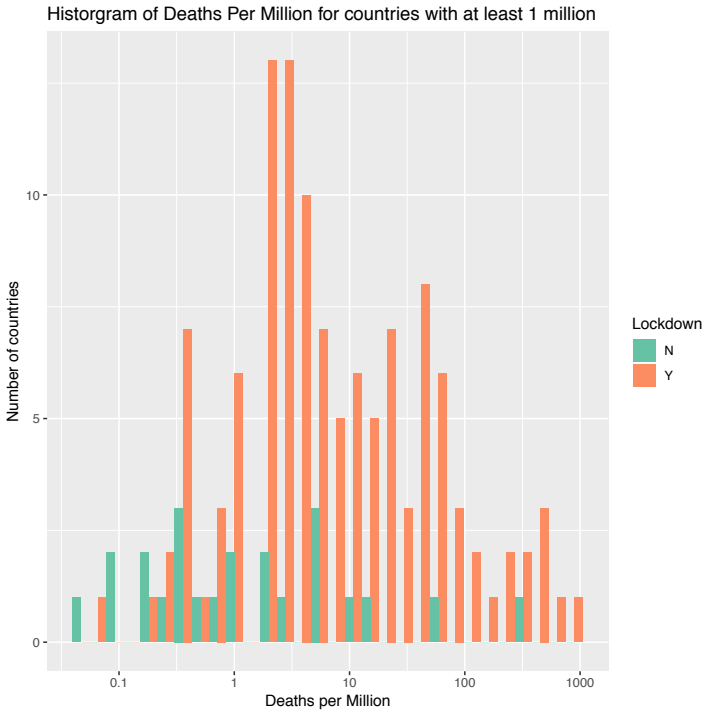

Figure 2. Number of countries by COVID-19 death rate per million.[42] Reprinted with permission.

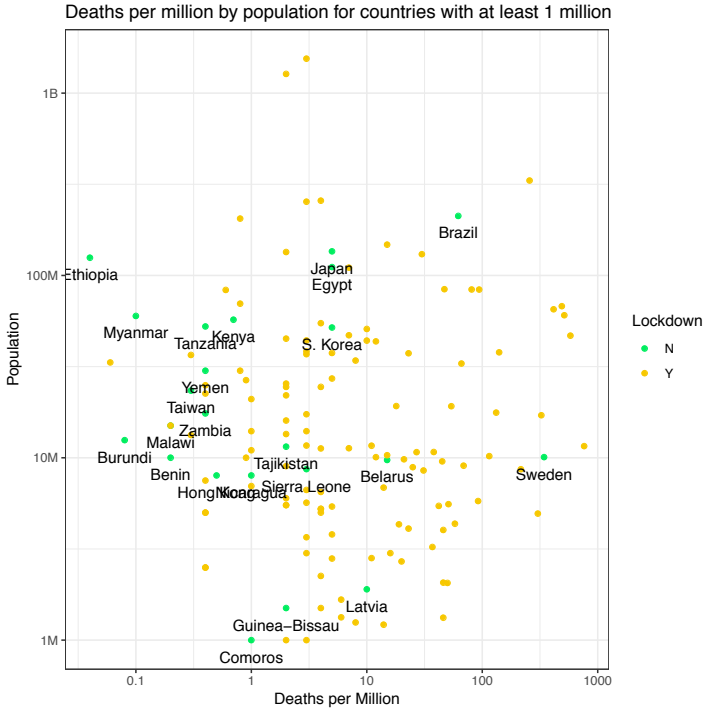

Figure 3. Deaths per Million from COVID-19, versus population.[42] Reprinted with permission.

It takes about 20 days for an intervention to effect an appreciable decline in deaths. If deaths begin to decline very rapidly after a policy measure is put in place, it suggests the real force reducing deaths occurred much earlier. Deaths began to decline in Spain, France, and Lombardy too soon to be a lockdown effect. This was so in all 11 cases with adequate applicable data.[43]

Lockdowns are to be distinguished from other public health measures, which may be effective, such as travel restrictions, masks, centralized quarantine of infected or exposed persons, moderate limits on assemblies, and school cancellations.

Social Distancing

The new idea of 6-foot "social distancing," which is being obsessively implemented even in outdoor queues, was "conjured up out of nowhere," stated Robert Dingwall of the New and Emerging Respiratory Virus Threats Advisory Group (Nervtag).[44] Actually, recommendations for a separation of 3 feet came from WHO, and 6 feet from CDC. Such public health recommendations are based on older models of droplet transmission from 1897 and the 1930s. These models are oversimplified and do not account for factors that may lead to long-distance transmission. A 2020 report from China demonstrated that SARS-CoV-2 virus particles could be found in the ventilation systems in hospital rooms of patients with COVID-19. Whether these data have clinical implications with respect to COVID-19 is unknown.[45]

Dingwall also stated, "We cannot sustain [social distancing measures] without causing serious damage to society, to the economy and to the physical and mental health of the population."[44]

Potential Prophylaxis and Therapy

The status of scientific trials was presented by Professor Stuart Ralston, Chair of the Commission on Human Medicines, in episode 13 of the Royal Society of Medicine COVID-19 series on "Drug and Other Therapeutic Options." His message was mostly negative: Do not prescribe azithromycin off label, and do not advise taking vitamin D to prevent or treat. There is currently no evidence of effectiveness of chloroquine or hydroxychloroquine and no reason to think BCG vaccine might be helpful. On the positive side, he said there might be a vaccine by early 2021 and that remdesivir shows "some promise." He added that we must not cut regulatory corners, but we can speed things up. He mentioned trials of lopinavir/ritonavir, steroids, inhaled interferon, and convalescent plasma.[46] Important omissions included high-dose vitamin C, zinc, hyperbaric oxygenation, and low-dose radiation.

Surely this is a time for learned societies to promote innovation and to look at older, long-overlooked therapies. However, complex, new, expensive therapies and vaccines are in the spotlight, and anything that WHO disapproves will rapidly disappear from social-media sites.[47] Most states have issued unprecedented administrative orders to restrict "off-label" use of long-approved antimalarial drugs chloroquine and hydroxychloroquine for COVID-19.[48] AAPS monitors and publicizes growing evidence of the benefits of HCQ for prevention and early treatment.[49] The media immediately leaps on any negative reports, such as the *Lancet's* data mining of electronic records from 671 institutions,[50] which shows again what we already know: late treatment is unlikely to help, and severely ill patients with COVID-19 need cardiac monitoring.

Potential modalities are far too numerous to mention here, but this crisis should cause a reexamination of our whole approach. Should we invest billions in drugs or vaccines tailored to one specific organism, which, like so many others in the past, might become irrelevant? Or should we focus on approaches that effectively protect against transmission, strengthen our immunity, calm devastating physiologic responses such as cytokine storm, or have broad-spectrum effects against viruses, which could save lives threatened by other current or emerging viral diseases?

For reducing airborne transmission, the antimicrobial efficacy of ultraviolet (UV) light has long been established. Germicidal UV light can efficiently inactivate both drug-sensitive and multi-drug-resistant bacteria, as well as differing strains of viruses. It can disinfect surfaces also. Its widespread use in public settings has been very limited because conventional UV light sources can induce cancers and cataracts, but far-UVC light generated by filtered excimer lamps emitting in the 207 to 222 nm wavelength range can effectively inactivate bacteria and viruses of micron or smaller dimensions, without being able to penetrate the nonliving stratum corneum of human skin or the outer tear layer.[51]

For identifying infected individuals, fever screening is insensitive, as fever may develop late or not at all. During any upper respiratory viral infection, the infected tissues send out chemical distress signals such as nitric oxide (NO), which cells begin to manufacture within hours of infection. A device similar to the breathalyzers used to screen for alcohol intoxication is under development.[52]

Vitamin D is essential for defending against respiratory infections.[53] In an Indonesian study, nearly half the COVID-19 patients with insufficient or deficient Vitamin D levels died. Only 16 of 388 patients (4.2 percent) with normal levels died. When adjusted for age, sex, and co-morbidity, Vitamin D-insufficient patients were approximately 7.63 times more likely to die than patients with normal values ($p < .001$); Vitamin D-deficient patients were approximately 10 times more likely to die ($p < 0.001$). A normal level of serum 25(OH)D level was defined as > 30 ng/ml; an insufficient level was 21–29 ng/ml, and a deficient level was < 20 ng/ml.[54]

Zinc also appears to be essential in fighting viral infections. Many suggest combining zinc supplementation with hydroxychloroquine (HCQ) or chloroquine (CQ) in treating COVID-19. These drugs act as zinc ionophores, enabling zinc cations to enter cells. One mechanism of zinc's antiviral activity is inhibition of RNA-dependent RNA polymerase, essential to the replication of coronaviruses and a number of other viruses.[55] Other ionophores that might be considered, especially when government blocks off-label use of HCQ or CQ, include quercetin (a bioflavonoid), epigallocatechin-

gallate (green tea polyphenol); ivermectin (an antiparasitic agent), and resveratrol. Quercetin plus zinc is being tested as an antiviral in human clinical trials for the treatment of COVID-19.[56] Quercetin was previously shown to target the early steps of viral entry and to protect mice against Ebola infection.[57]

Many antibiotics have shown effectiveness against viral infections, current dogma to the contrary. Stricker and Fesler observed that none of their 700 active patients with Lyme disease who were on prolonged combined antibacterial therapy have developed severe COVID-19. They reviewed the extensive medical literature that demonstrates antiviral effects of numerous antibacterial agents, including macrolides, tetracyclines, metronidazole, and ciprofloxacin.[58] Macrolides have been shown to be effective against rhinovirus, respiratory syncytial virus, and influenza, and also to have immunomodulatory effects.[59]

COVID-19 patients die because they cannot oxygenate their blood. Extracorporeal membrane oxygenation (ECMO) may buy time in the hope that the body can fight off the disease and resolve the inflammatory exudates, microthrombi, and other pathologies, many resulting from the "cytokine storm." An old technology used to a small extent, successfully, in the 1918 influenza pandemic—hyperbaric oxygenation—is in some clinical trials. The scarcity of chambers and the logistic difficulties in treating critically ill patients could be overcome by pressuring the whole intensive care unit in a repurposed pressure chamber previously used as an airplane.[60] Hyperbaric oxygenation also can have dramatic, persisting effects on disease pathophysiology, especially inflammation.[61]

Aside from corticosteroids, which are often used, agents that might address cytokine storm syndrome and relieve respiratory distress include oral or intravenous glutathione, glutathione precursors (N-acetyl cysteine), and alpha lipoic acid.[62]

Intravenous vitamin C, potentially in massive doses up to 100 g titrated to effect, is a long known but generally neglected mode of therapy that, among other effects, may calm the cytokine storm. The first randomized controlled trial of COVID-19 began in Wuhan, China, in February.[63] Richard Cheng, M.D., Ph.D., claims that high-dose vitamin C has been officially included in the Shanghai Government COVID-19 treatment plan. He is also claiming that the initial results from the trial are positive. Some of his videos have been removed from YouTube for "violating terms of service," but some may still be accessible.[64]

A still older mode of therapy, tested for viral as well as bacterial pneumonia in the 1930s and 1940s, is low-dose X-irradiation of the lungs. Albert Oppenheimer, M.D., claimed to have cured 45 of 56 (80 percent) of patients with viral pneumonia with doses less than 100 *r* (1 roentgen is 0.258 mC/kg).[65] Low doses (< 100 cG) decrease levels of pro-inflammatory cytokines.[66] Since radiation, unlike antiviral drugs, does not target the virus, it presumably would not exert selective pressure leading to viral resistance. Seven clinical trials for low-dose radiation in COVID-19 are listed on ClinicalTrials.gov.

With official hopes pinned on "a vaccine," some are asking about the effect of the most used vaccine in the world, with about 130 million children immunized yearly: Bacillus Calmette-Guérin (BCG), developed early in the 20th century to protect against tuberculosis. BCG also appears to protect against unrelated pathogens, especially respiratory tract infections and neonatal sepsis. The mechanisms responsible for its effects on "reprogramming innate immunity" have been studied in detail only in the last decade. Ecologic studies suggest that regions mandating BCG have lower mortality from COVID-19.[67] A systematic review concluded that: "There is a lack of evidence that BCG vaccine protects against COVID-19. Currently, two clinical trials are ongoing to determine if BCG vaccination protects healthcare workers during the COVID-19 pandemic."[68] Max Planck Institute is testing a genetically improved version of BCG, VPM 1002, to see whether it can protect medical workers against COVID-19.[69]

Many other modalities have been proposed, and some success is claimed. Patients admitted to a U.S. hospital, however, will undergo therapy dictated by the institution's protocol, heavily influenced by government agencies, third-party payers, and non-governmental organizations such as specialty boards, with many undisclosed relationships, financial conflicts, political agendas, and rigid preconceived notions.

For the purpose of preventing death in a seriously ill patient, the most important information is probably the mechanism of death. Yet, while tens of thousands have died, few autopsy studies have been reported. Autopsies on the first 12 patients who died of COVID-19 in a hospital in Hamburg, Germany, found that seven (58 percent) of them had undiagnosed deep vein thrombosis, suggesting that the virus may cause abnormal blood clotting. The direct cause of death in four patients was massive pulmonary embolism.[70] In 10 autopsies conducted in Augsburg, Germany, none of the patients had thrombotic events in major vessels.[71] When such embolism has occurred, even a perfectly effective antiviral agent cannot save the patient. Well-intentioned but overreaching agenda-driven infection control protocols continue to impede critical pathology research[72] and performance of therapeutic and diagnostic procedures such as CT angiography.[73]

Conclusions

Response to the COVID-19 pandemic is revealing that a virus much worse than SARS-CoV-2 is proliferating wildly in our population, threatening the existence of our Constitutional Republic. Fear and guilt have apparently overcome our resistance to the totalitarian virus. The pretext of "science" and "evidence-based medicine" is masking authoritarianism that disregards, discredits, and attempts to cancel methods that could save thousands of lives threatened not just by COVID-19, but by many other diseases, both old and emerging.

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