Commentary
COVID-2019—A Personal Account of an Academic Institute’s Response to the Pandemic

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Abstract: The unprecedented introduction and spread of SARS-CoV-2, responsible for the COVID-19 epidemic, had many varied and unanticipated consequences for the United States and other countries. In addition to the direct effects of human infection, multiple industries, commodities, and jobs were impacted. This review describes the impact on an academic institution, with a chronological account of events related to constantly changing perceptions and understanding of the pandemic. Although a personal account, the objective is to document how leadership was able to adjust to circumstances in order to support research activities, student education, and the academic goals of our land grant university. It is hoped that these examples will inspire and better prepare us for a subsequent event and avoid what for the COVID-19 situation might be summarized as a progression from procrastination-pandemic-panic-pandemonium-endemic

Keywords: COVID-19; SARS-CoV-2; response; university; research

1. Introduction

This account of Kansas State University’s (hereinafter referred to as “University”) Biosecurity Research Institute’s (BRI) response to the COVID-19 pandemic associated with SARS-CoV-2 infections is written as a personal account, with dates to highlight how quickly things were changing during 2020, how decisions influenced work at the BRI, and how University leadership enabled us to be nimble and responsive and contribute much to our understanding of the new virus. The BRI is a high containment facility that, since 2009, has enabled safe and secure research on 33 different pathogens, including 15 select agents that infect plants, livestock, other animals, and humans, with some that are food-borne.

1.1. The Pandemic Begins

In January 2020, we were completing our annual preventative maintenance activities in order to bring our multi-room area back online so that we could commence the carefully planned and coordinated research studies with livestock. We had 20 studies planned encompassing research on the African swine fever virus, classical swine fever virus, Japanese encephalitis virus, highly pathogenic porcine reproductive and respiratory virus, Rift Valley fever virus, and an E. coli project. On the horizon from my daily check of ProMed, was a virus that in my pathogen-specific folders was listed as “China Corona”. The first reports of an “Undiagnosed pneumonia” had first appeared in late 2019, with the etiologic agent being identified as a novel coronavirus on 8 January 2020. The virus was named “2019-nCov” the n standing for novel. By 21 January there had been 258 cases in Wuhan, with 51 cases seriously ill, 12 critically ill, and six fatalities. Cases in four Chinese provinces had been reported, with cases also reported in Japan, Thailand, and South Korea. On 21 January, the first U.S. case was identified in Washington State. The patient had traveled from Wuhan. Nancy Messonnier, director of the CDC’s National Center for Immunization and Respiratory Disease, said the risk posed by the virus to the general American population is low but that older adults with underlying health conditions may...
be at increased risk. “This is an evolving situation and, again, we do expect additional cases in the United States and globally”, she said. On 24 January the University’s daily online news bulletin “K-State Today” released a Special Issue “Update on Coronavirus”. It reiterated that “CDC continues to believe the risk of novel coronavirus to the American public remains low at this time.” and listed general measures to prevent the spread of respiratory viruses, including washing hands, avoiding contact with sick people, and staying home when you are sick.

On 27 January, I published a “Coronavirus Outbreak” statement for the readers of the journal Vector-Borne and Zoonotic Diseases, that despite various alarmist pronouncements, I was optimistic, although acknowledging that it was a fast-moving situation. The first Kansas case was reported on 28 January, but as we entered February, all looked well, with nothing to worry about other than enabling the first of our 20 planned animal studies to begin. Pigs arrived, and studies on highly pathogenic porcine reproductive and respiratory viruses began, with studies on African swine fever virus and E. coli soon to follow in March. Little did we suspect that these would be the last of our carefully planned 20 studies for the year.

On 30 January, the World Health Organization (WHO) declared the coronavirus outbreak a “public health emergency of international concern” [1]. The British Broadcasting Company (BBC) news app that I check on my phone every morning reported on 3 February that China was accusing the United States of causing panic and spreading fear, while a week later, Arab media claimed that the U.S. had created nCoV for “biological war” against China. The WHO was active and, on 6 February called for $675M for their response activities. On 11 February, the WHO contributed further to the discussion by officially naming the disease COVID-19, and the International Committee on Taxonomy of Viruses (ICTV) named the agent as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).

What was ultimately to become frequent university announcements began on 28 February, that in addition to repeating advice on how to avoid infections, also notified the community that the University’s Infectious Disease Advisory Committee was meeting weekly to coordinate preventative measures, that the Lafene Health Center was working with local and state health departments, that students abroad were being contacted, and that the University’s Emergency Management Group was being revived to assemble functional experts to coordinate possible responses and resources, and develop emergency and contingency plans on an expedited basis. Another announcement was that technology for coronavirus antivirals had been licensed to Cocrystal Pharm Inc. Reassuring and looking good still, right?

A 4 March guidance to students traveling on spring break was followed a day later by a change in the University travel policy with “a travel ban for countries with warnings” which precluded faculty-led or university-sponsored trips to countries that were CDC warning level 3 or U.S. State Department travel advisory level 4. Within a couple of days, arrangements had been made for a 14-day required quarantine of a student group returning from Italy.

As we observed the spread and escalating numbers of COVID-19 human cases and with discussions on voluntary and possibly mandatory measures to fight the disease, we began to realize that our research plans at the BRI would likely be disrupted.

On 6 March the BRI submitted a contingency of operations plan to the University compliance office. BRI Managers had worked hard to review every employee and categorize them to develop a contingency plan that would maintain a functional, safe, and secure facility if the university decided to reduce the staffing level for the purposes of minimizing virus transmission. I admit that my feelings were hurt when I realized that regardless of how the criteria were considered, I was regarded as non-essential. As a harbinger of bad news and things to come, on 7 March the University of Washington was the first to announce that it was shutting down all in-person classes. Based wholly on CDC guidelines, the university published “answers to employee questions” on 10 March. On 11 March, the WHO declared the spreading coronavirus as a global pandemic [2]. The following day, an urgent message from K-State President Myers declared that the university was suspending in-person classes on all campuses the week of 16–20 March, and strongly encouraged
students to travel home or remain at home until in-person classes resumed. From 23 March, until further notice, classes would be taught remotely, with telecommuting as an option for some employees. Large campus community events of more than 100 people would be handled on a case-by-case basis. A follow-up announcement on 13 March stated that “Students, by and large, are at low risk for serious complications related to the virus, it’s the people around you who are put at risk if you return to the area”. Life was changing... emphasized further personally by an email from McDonald’s where I received breakfast and coffee every morning at about 5:30 am, discussing their efforts to stop the spread, and another email from my favorite restaurant, Old Chicago, where I drink a beer in the evening... I was less affected by the cessation of athletic events and the closure of the museum, the daycare center, and the student union. An announcement from President Myers on 15 March, declared that all classes would be taught remotely and that all employees who were able to work remotely via telecommuting or other methods should do so immediately. As the head of the BRI, I had to identify mission-critical functions that required people to report to campus and to notify them that they were required to be physically present. The new era had begun, but as most K-State buildings began to close, plans were in place for the BRI to remain fully operational, with a carefully planned rotation of staff.

Based on discussions with university leaders and administrators, especially the vice president for research, I made the case that we should leverage the university’s expertise and facilities in order to address some of the many questions that were being asked about this new virus. On 16 March I emailed investigators, telling them that experiments with SARS-CoV-2 were regarded as “mission critical” and that we would do everything possible to accommodate studies with the virus. On 17 March, the University Research Compliance Office (URCO) announced that the Institutional Biosafety Committee (IBC) and Institutional Animal Care and Use Committee (IACUC) would reduce meeting frequency to once a month, with priority for reviewing protocols aimed at developing vaccines/therapeutics against SARS-CoV-2. On 20 March, I emailed researchers saying that after ongoing animal studies had been completed, no others would be initiated unless they were on SARS. I also told them that all samples had to be securely stored until the University President approved the resumption of non-mission-critical research. The first problem was that we had to obtain the virus. I had been in France on 12-13 February for a meeting with the European Virus Archive. A presentation there described how they had many isolates of the virus and were distributing these for research to many investigators. In the U.S., the situation was very different. Despite the increasing number of human cases, and therefore presumably many isolations being made, nobody seemed willing or able to provide us with the virus. I was told that, although the samples were being sent to the CDC, the virus was not being made available for researchers. At some point in mid-March, a friend called me to say that they had heard that the virus would become available from the American Type Culture Collection-managed BEI Resources in the near future. We immediately began the paperwork to register with the BEI and, on 23 March placed our order for item number NR-5228—Isolate USA-WA1/2020 of SARS-Related Coronavirus 2. The wait began... but then we were told that additional paperwork was required—an Emergency Use Simple Letter Agreement for the Transfer of Materials Related to SARS-CoV-2 between BEI Resources and the university, which we submitted on 26 March. At the same time, Dr. Juergen Richt, from the College of Veterinary Medicine, had also requested the virus. He had already submitted IBC forms and IACUC forms requesting approval to conduct studies with pigs and cats. Juergen received the virus on 24 March, while ironically, perhaps, our shipment arrived on 1 April. On this day, my IBC application was reviewed with approval after minor changes on 9 April. On the same day, the IACUC approved Juergen’s pig and cat protocols. Under these very unusual circumstances, both the IBC and the IACUC conducted a remarkable job and held special meetings to review protocols. A condition for all of the work with SARS was that all work was conducted in the BSL-3/Ag laboratories and that Powered Air Purifying Respirators (PAPR) had to be used. Also, while working with SARS-CoV-2, research teams
were required to develop a procedure to report that all team members were asymptomatic every day that work was being conducted with the virus and to report their daily symptom status to the biosafety team.

The time during which we were waiting for the virus and for approval of protocols was not wasted. I was looking to see how gaps in our knowledge of the virus could be filled. On 18 April, I contacted Tracey McNamara to ask about submitting a manuscript to VBZ on SARS-CoV-2 and animals. With Larry Glickman, and K-State’s Juergen Richt as co-authors, a manuscript “A Critical Needs Assessment for Research in Companion Animals and Livestock Following the Pandemic of Covid-19 in Humans” was submitted on 21 April. Reviews were expedited, and after revision, the paper was published online on 6 May, ref. [3] with a corresponding promotional press release. Almost simultaneously, I was processing a manuscript for the journal Vector-borne and Zoonotic Diseases, “What we need to consider during and after the SARS-CoV-2 pandemic.” with Richt as a co-author that was ultimately published on 29 May [4].

1.2. Research Begins

By 2 April, members of the Richt group had broken out the virus and were growing it on cells to produce stocks. Members of the Higgs and Vanlandingham research group followed suit. Studies with swine began 23 April. The cat study required the purchase of various environmental enrichment components but began at the BRI on 30 April.

The second study on SARS-CoV-2 was the first performed anywhere in the world to evaluate whether or not the virus could infect and be transmitted by mosquitoes, or put another way, whether or not mosquitoes were susceptible to infection and able to transmit the virus. Statements had been made to reassure the public that this was not the case, but experimental data were lacking. On 28 April, I donned personal protective equipment (PPE), put on the PAPR, and entered the Arthropod Containment Level Three (ACL-3) insectary to work hands-on with SARS-CoV-2 for the first time [5]. I began to anesthetize *Aedes aegypti* and *Ae. albopictus* mosquitoes and counted them into dishes on ice for inoculation. The following day, we inoculated *Culex quinquefasciatus* and then, on 30 April, injected the second cohort of *Aedes*. During periods of waiting for mosquitoes to chill, I made notes on sticky notes in anticipation of the manuscript to be written. For several hours a day, on three consecutive days, mosquitoes were inoculated and then placed in cartons in an environmental chamber until sampling times. A total of 488 mosquitoes were injected with SARS-CoV-2, and 125 were injected with a medium as controls. Mosquitoes were maintained for up to 14 days, but starting on 6 May, samples and uninfected controls were titrated on Vero cells. With data collected and analyzed, by 27 May, the manuscript was written and submitted to Scientific Reports. The resultant peer-reviewed paper that was released online on 17 July was rapidly disseminated in over 600 news outlets and published in 42 countries in 18 languages. I conducted multiple radio interviews, and Kansas Governor Laura Kelly visited the BRI to be appraised for COVID research on 6 August.

Other experiments that followed were a study from 18 May to 12 June with midges, mosquitoes, and houseflies by a USDA team led by William Wilson [6,7]; another cat study from 26 June to 3 August; and two studies with hamsters, the first from 16 June to 6 July, and the second from 13 October to 3 November. After this, the BRI’s animal research area was closed down and decontaminated for its planned annual preventative maintenance work.

Throughout this time, informative announcements continued to be released by the university’s communications and marketing. This made us feel appreciated, although because of what seemed like ever-changing recommendations, rules, and regulations, it was not always easy to understand how these correlated with “so-called” facts, knowledge, and understanding. To give context to the environment in which the BRI continued to conduct research on SARS-CoV-2, some key events are listed below. We moved to a phase 2 reopening plan on 22 May 2020, that allowed gatherings of up to 15 people,
which was increased to 45 people for the phase 3 plan on 8 June. On 23 June, it was announced that “Effective immediately, students, faculty, staff, and visitors—including contractors and vendors—must wear face coverings over their mouths and noses while on K-State campuses. The policy specifically mentions coverings in all hallways, public spaces, classrooms, and other common areas of campus buildings. Face coverings also are required anytime people are unable to maintain 6 feet of social distancing—even inside an office or outside on K-State campuses.” An executive order by Governor Laura Kelley published on 2 July imposed broader mandates. On 10 July, the university announced a fourth round of staff furloughs that, by this time, encompassed a total of 1,868 employees. Resumption to in-person classes occurred on 18 August, although it was emphasized on the 26 that “Everyone (faculty, staff, students, contractors, vendors, and visitors) must wear face coverings over their mouths and noses in all indoor and outdoor spaces while you are on university property unless you are alone in your own private office or workspace or are alone outdoors.” Employees were issued with K-State branded masks in an EWAW (Every Wildcat a Wellcat) kit on 8 September.

Travel restrictions were lifted on 17 May 2021. On the same day, a modification of the mask mandate allowed “Fully vaccinated people to participate in outdoor activities and recreation without a mask, except in certain crowded settings and venues such as live performances, parades or sports events”. On 2 June, face coverings and social distancing became optional, but then on 30 July, it was announced that on 2nd August, masks were again mandatory indoors on university property. On 22 October, it was announced that the university would comply with federal COVID-19 vaccine requirements that had been issued by President Biden on 9 September. Since, like many academic institutes, the university was a recipient of substantial federal funding, the decision was made that it fell within the categories of employers that were bound to abide by this requirement. Although exemption would be considered, the timeline stated that “On Dec. 1, employees who have not submitted vaccine cards or requested exemptions will be notified that they have the option to resign or be terminated.”

Documentation to prove vaccination/immunity for purposes of travel, for example, to enter a country when traveling from one that is endemic for a disease such as yellow fever, has a long history [8]. However, the requirement to provide proof of vaccination in order to retain one’s employment was controversial. For some reason, proof of vaccination seemed to take precedence over natural immunity resulting from infection. While embraced by some who believed that this measure was essential to protect others and limit virus transmission, many believed that this was an overreach of government authority and an intrusion into individual freedom to make personal health decisions. Given that vaccines were fast-tracked, were approved by the U.S. Food and Drug Administration by emergency use authorization without going through the normal evaluation process, and have subsequently been associated with various health issues, including fatal outcomes, controversies remain, and legal challenges are ongoing. On 7 December, K-State paused its COVID-19 vaccine requirement due to a legal challenge that blocked the mandate. It was not until 1 March 2022 that all requirements for masks officially ended. For all University communications related to COVID-19, see https://www.k-state.edu/covid-19/communications/ (accessed on 9 July 2024).

1.3. Helping the Community

At the same time as research was beginning in 2020, the University’s College of Veterinary Medicine’s Veterinary Diagnostic Laboratory (KVDL) had applied for and been approved to conduct human testing in laboratories at the BRI. Long before the COVID pandemic, BRI and KVDL had an ongoing agreement for BRI to provide BSL-3 space support so that KVDL could qualify as a Tier 1 laboratory in the USDA National Animal Health Laboratory Network (NAHLN). Additionally, the KVDL Rabies laboratory had an ongoing Clinical Laboratory Improvement Amendments (CLIA) certification to perform diagnostic testing on human samples, which allowed for an expedited CLIA inspection of the BRI BSL-3 space and subsequent certification for KVDL to perform COVID testing on human samples at BRI. The time from conception to activation of KVDL COVID diagnostic
1.4. Unexpected Problems

A problem not previously experienced was that the public demand for PPE, particularly face masks, quickly revealed that supplies were exhausted. Increased production and importation could simply not keep up with the demand, and so priorities for distribution to those most in need, for example, health care providers, were established. For the BRI, based on experience, our research support staff would anticipate how much disposable PPE—masks, laboratory coats, gloves, etc. would be required for the year and place orders accordingly. In 2020, our normal supply companies were not able to fill these pre-orders. In Manhattan, members of the National Agricultural Biosecurity Center (NABC) worked with emergency response leadership to collect PPE from various university buildings and then send it to Kansas City, where it was inventoried and redistributed. For researchers at the BRI working on COVID-19, some PPE was allocated to us. Reflective of the supply and demand inequity, prices began to increase. At its peak, in 2022, the cost of some PPE, such as coveralls, had increased 2.4 times. This translated into the fact that for some studies when a researcher went into containment, it cost up to $53.56 in disposable PPE.

An unusual component of the BRI research portfolio is the area designated for food-borne pathogen research. In the early days of the pandemic, it was noticed that workers in meat and poultry processing facilities seemed to have unusually high levels of infections. A project funded by the USDA and in part supported by the State of Kansas National Bio and Agro-defense Facility (NBAF) transition funds commenced on 7 February 2021. It involved the construction of a mock meat processing factory line to evaluate virus dispersal and infectivity in products and on different types of surfaces. As part of other studies, the survivability of the virus under different environmental conditions on different surface types was also investigated [9].

By the end of 2020, studies had been conducted with pigs, cats, hamsters, mosquitoes, and houseflies and BRI-associated researchers had published seven papers [3,4,10–14]. In 2021, studies on SARS-CoV-2 made up ten of the planned 22 research projects at the BRI, and new animal work included sheep, ferrets, and white-tailed deer, with eight related publications in 2021 [6,7,9,15–19].

1.5. Working with Industry

Something for which we were unprepared was the number of companies that contacted us to inquire about us performing contract research related to COVID-19. The proposed work was highly variable, but there was frequently a lack of understanding of the required approval processes, time to completion, and costs. An industrial project proved the effectiveness of dry hydrogen peroxide in accelerating the decay of SARS-CoV-2 on nonporous hard surfaces [17].

1.6. Vaccine Development and Availability

While researchers were working on a wide variety of projects during 2020, great efforts were being made elsewhere to develop and evaluate vaccine candidates. On 11 December 2020, the U.S. Food and Drug Administration (FDA) granted an Emergency Use Authorization (EUA) for Pfizer’s BioNTech COVID-19 vaccine, with a recommendation for use in all people 16 years of age or older. An EUA soon followed for the Moderna COVID-19 vaccine for people 18 years or older. An EUA was issued for the one-shot Johnson and Johnson COVID-19 vaccine on 27 February 2021. Interestingly, the BRI contributed to the testing of the first mRNA vaccine for the Zika virus as described in a 2017 publication [20], which in 2022 received the BIAL Award as the most significant biomedical publication in the previous 10 years. On 2 October 2023, the two scientists involved in the development of this first mRNA vaccine, Drew Weissman and Katalin Kariko, received the Nobel Prize for Physiology and Medicine. One account of the fascinating sequence of COVID-related events

2. Lessons Learned

Despite an awareness of cases of a new human disease occurring in China in December 2019, reports of cases spreading to other countries, and previous knowledge of highly transmissible and pathogenic related viruses (SARS and Middle East Respiratory Syndrome), we were remarkably unprepared to respond to the virus when it was introduced into the U.S. From publicly available information sources, we knew where cases were occurring and knew that it would sooner or later get here. Responses included legislation and laws by federal agencies and, in some cases, inconsistent interpretations and implementations of these by state agencies, local health authorities, and employers from large to small. Some people believe that these actions were too little and too late, while others believe that they were government overreach and a premature overreaction to an evolving situation, some consequences of which were disproportionally extreme.

Undeniably, the number of U.S. cases and fatalities and the progression from epidemic to the now endemic persistence of the virus warranted responses at the national level; however, as described above, statements and messages to the general public were often confusing and seemingly contradictory. In part, this was due to a lack of understanding. Statements and decisions were made and then, soon after, were modified because of new data becoming available. What nobody could probably have predicted was the extent of the impact of these responses and the various rules and regulations that were implemented. In 2020, we had mask mandates, travel restrictions, vaccine requirements, and many other actions that impacted individuals, small businesses, and whole industries. Some commodities, such as certain foods and, for some reason, toilet paper, were in short supply, while hand sanitizers and snazzy face masks were everywhere. Personal relationships changed, behaviors changed, business practices changed, businesses failed, and societal norms were challenged and modified, perhaps forever. We now have a cohort of the population that accepts wearing masks as normal even in situations where they are not at risk of infection, where working from home with reduced interpersonal relationships is normal, and where ordering online from stores that are no longer open all day and having groceries brought to your car in a designated parking space is the way to shop.

Some of the impacts of COVID-related responses seem trivial, and indeed, some may be for the better. However, although three years may seem like a long time, now that many of our freedoms have been restored, in reality, three years is likely not long enough in order for us to see the long-term effects of, for example, young people being educated in relative isolation at critical developmental times of their lives.

For K-State’s BRI, we learned that with administrative support, dedicated staff, and qualified and motivated scientists, we can be nimble, make changes, and respond to a new challenge—in this case, a new biological threat. One might say that, for us, COVID was cohesive. It brought us together as a team with determination, commitment, and a common goal of taking on a new challenge and learning about it in order to effectively respond to it.

One hopes that looking back, we have learned lessons from things that we performed well, but more importantly, learned from things that we performed poorly—decisions made too quickly, interpretation of incomplete data, formulation and implementation of regulations that did not achieve the intended goals, and indeed may have exacerbated a situation. One hopes that we have learned from the COVID experience so that we will be better prepared for whatever emerges next, but I cannot help but wonder whether or not this will be the case. As described below, my somewhat cynical attitude with respect to what we learn from history is based on experience.

The introduction of the West Nile virus (WNV) in the U.S. in 1999 revealed that the U.S. lacked expertise with arthropod-borne viruses. In response to this truly unpredictable introduction of a new virus into the U.S., government funding for research and training was increased. As WNV spread throughout the U.S. and became endemic, a sense of acceptance,
perhaps complacency, prevailed, and the need for continued funding seemed unnecessary. In 2005, cases of chikungunya virus occurred in La Reunion with subsequent spread on a global scale to many countries, including the U.S. In 2013, an outbreak of the Zika virus in French Polynesia infected 28,000 people and was a warning of things to come. In 2015, cases of Zika reported in Brazil progressed to a multi-country epidemic, including 1000 cases in the U.S. in 2016. For both chikungunya and Zika viruses, the U.S. made substantial increases in federal funding for research and training, because, as with the WNV in 1999, we lacked appropriate expertise and understanding.

3. Conclusions

As 2020 drew to a close, it had been a remarkably unusual but productive year at the BRI. Despite all of the highly disruptive consequences of the COVID-19 pandemic, eight studies with SARS-CoV-2 have been performed at the BRI, and seven papers by researchers or staff working at the BRI have been published or submitted [3,4,10–14]. In 2021, studies on SARS-CoV-2 made up ten of the planned 22 research projects at the BRI, and new animal work included sheep, ferrets, and white-tailed deer. An additional eight papers were published on SARS-CoV-2 in 2021 [6,7,9,15–19].

Projects in 2022 included nine SARS-CoV-2 projects with 17 publications [21–37], and in 2023, we supported two SARS-CoV-2 studies, providing more data for 10 publications [38–47]. Overall, BRI staff, biosafety staff, and researchers associated with the BRI have published a remarkable total of 42 SARS-related papers, with five additional manuscripts related to PPE, decontamination, etc. [48–52] that were prompted by research related to SARS-CoV-2. Although some of the publications by K-State researchers were reviews or based on collaborative research not performed at the BRI, one cannot underestimate the impact that university faculty and collaborators have had on the field. Including the publications by researchers affiliated with the BRI, a total of 215 COVID-related publications were published since 2020 by K-State faculty and staff—too many to cite below. For 2024, we have three studies planned at the BRI on SARS-CoV-2.

One might ask if my optimism for the minimal disruption that I expressed in January 2020 was naivety. I think not. As the sequence of events outlined above shows, things happened quickly, and decisions were made quickly, but sometimes, they also changed quickly and sometimes on a daily basis. I believe that the university leadership performed well and made decisions based on what were thought to be facts at the time. We listened to constant news coverage of COVID-19 and frequent updating of community case numbers, which had little scientific value but reinforced the importance of behaviors and PPE, which was often worn incorrectly. Many would say that some Federal Agencies made decisions with new-found power and influence and were able to mandate and enforce regulations that were not always well aligned with facts and reality.

The wide-ranging impact of COVID-19 on the U.S. was unprecedented, and some aspects of our lives are likely to change forever. We have a cohort of the population that was raised with masking and lack of social interaction, which are a critical part of early human development as the norm. The footprints painted on floors to help keep us apart by an often-restated “safe” distance may have faded, but I still see some people wearing masks while driving alone in their cars. We played our part and contributed to the understanding of the virus; however, some questions remain unanswered, and mystery remains. Despite continuing accusations and much speculation, we will, for example, likely never know the full truth of where the virus came from. One thing for sure is that COVID-19 is not over, and SARS-CoV-2 will continue to evolve. When the next pathogen emerges, and there will surely be a next one, let us hope that we learn from past successes and mistakes. Acknowledging that circumstances can change, decisions and actions should not be made in haste but be rational and proportional to the risks. Making wrong decisions or unsubstantiated statements quickly because of the concern that doing or saying nothing reflects weakness or indecisiveness can cause confusion and erode trust. As COVID showed us, regaining trust, restoring relationships, and recovery to “normal” can take years.
Funding: This research received no external funding.

Acknowledgments: The author appreciates the suggestions and comments from friends and colleagues during the preparation of this manuscript.

Conflicts of Interest: The author declares no conflict of interest.

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