PANHANDLE HEALIH

A QUARTERLY PUBLICATION OF THE POTTER-RANDALL COUNTY MEDICAL SOCIETY

SUMMER 2021 | VOL 31 | NO. 3

Looking Back: COVID Pandemic One Year Later



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President's Message

by Neil Veggeberg, MD

Now that the numbers are beginning to come down, it is going to be an interesting time. When looking at the history of major events, it is fascinating to look at how people pick up the pieces. Restaurants are beginning to get busier, and they are having a hard time finding enough staff to fill their needs. Traffic which had been light is now picking up. It seems there is more traffic now than there was before the pandemic. It is almost like the population grew by 50% but we did not know it since everyone was staying at home. Outpatient clinics are getting busier.

The availability of products is somewhat haphazard. Due to such rapid exchange of information, if any product gets a minor degree of scarcity, once the word gets out it causes a second wave as people hoard the product. I wanted to get parts for my bicycle. To complete the repair, I had to go to the local bike shop and then 4 different websites. Now I have little boxes showing up coming from all over the country. I had to be adventuresome and go out beyond Amazon for my purchases.

Fortunately, in our medical specialty, we have been able to keep our flow of supplies up. We do face the potential problem of a circuit going out on our image intensifier and then have it be out of service for an indefinite period due to lack of parts. I must admit I did get worried that our supply of Decadron would run out. It did not.

Another area of interest is going to be the long-term effects of COVID. The patients we cared for with prolonged cases of COVID had neurological, pulmonary, and cardiac deficits we had never seen before. As is common in rehab, there is no definite text to refer to, and you must design your treatment program based on similar types of problems and training. Post-polio syndrome does have similar templates to follow. Overtraining of athletes also has similar patterns. You are being faced with decreased cardiac output with a significant increase in heart rate, severe problems with oxygen absorption, and neurologic deficits in peripheral nerves that follow no historical patterns. COVID-induced cognitive deficits affect focus and concentration and are dissimilar to those seen in strokes and head injuries. It is hard to do rehab on someone who cannot focus, cannot breathe, has a heart rate of 130 and has bizarre peripheral nerve injuries. As it is with many things in life, we go slow and set longterm goals.

Now is the time to determine what medical problems became worse during the pandemic due to neglect and which ones may have improved due to less invasive treatments being carried out. I worked in a busy ER in a county hospital at one time. The interns all got to leave one evening for a meeting while the attending physicians ran the ER. We felt sure there was going to be pandemonium when we returned. Much to our amazement, the ER was almost empty and was incredibly quiet. The explanation was that the more experienced doctors were able to use their clinical acumen to determine who needed tests and who did not. By doing this they shortened the average time per visit, since the patients were not waiting for lab results.

It has certainly been a time for leadership and cooperation. At one of the high school programs I participated in, a student asked me what was the most difficult part of being a doctor. I thought for a moment. My answer was that, when there is an emergency in the hospital, a properly-trained team should appear. The members of the team know their responsibilities. The diagnosis is often clear. If they all do their jobs, the results should be the best they could be, based on the situation. But every once in a while, something goes wrong. Everyone stops; no one knows what to do, especially you. This is when they turn to you and say, "What do we do now?"





Guest Editor's Message: Science, the Pandemic and the Golem

by Scott Milton, MD

golem is a being in Jewish mythol-A ogy, formed from clay or mud and anthropomorphic in nature. A golem is highly mutable, and the symbolism derived from the golem is limitless. Typically, when a golem is created it is small and amorphic. Over time, the golem grows larger and more powerful and therefore becomes more capable of performing beneficial tasks. However, a golem is always flawed, just as humans are flawed, and can make mistakes, sometimes quite costly. It could be argued that most golems have the best intentions and over time perform much good. And as a golem grows so does the core of knowledge the golem possesses within itself. Also, a golem can grow more quickly or be injured by external forces or even by its creator. Therefore, the core of knowledge that is truthful and beneficial tends to grow haphazardly and is often flawed and imperfect. Superman could be considered a modern golem. Superman could be counted on to save the day, although he could not reveal his true self during daily life and was weakened or injured by kryptonite. Superman's capacity to perform good works was almost limitless, but he was clearly flawed and imperfect.

Modern medicine, which is evidence-based and derived from knowledge gained by the scientific method, has many characteristics similar to the golem. Just like a golem, the knowledge base at the start of this pandemic was tiny and amorphic because this was a new virus. The initial knowledge was flawed from the beginning because of delays in warning the rest of the world after its recognition in Communist China. Once the genomic sequence was made available, however, the blueprint for a vaccine was created within a matter of weeks. The development of a widely-available test was initially delayed by none other than the CDC, as the test created there was flawed and led to inaccuracies in diagnosis. The

guidance of the CDC for wearing masks was also imperfect and initially delayed, until it became clear that this new virus was highly contagious and at times could be aerosolized. It seemed as though the CDC, the preeminent worldwide institution in investigating new diseases, had failed us. How could this be true in the 21st-century? How could great scientists like Anthony Fauci seem so unsure and sometimes flawed? Perhaps it would be useful to review the discovery of another great advancement in medicine, antibiotics.

Penicillin was discovered in the late 1920s by Alexander Fleming. The scientist had returned from vacation and noticed one of his Petri dishes, inoculated with Staph aureus, was covered with mold and the colonies of Staph had been eradicated. The potential benefit to patients and society was immediately recognized, but efforts to produce the drug in large quantities failed, and this discovery was forgotten for several years. Efforts to mass-produce penicillin were reinitiated in the late 1930s prior to the start of World War II. Pfizer pharmaceuticals, based in Chicago, assembled a large team of employees and asked them to fan out across the city to find mold. An employee noticed a moldy cantaloupe at local grocery store; upon further analysis

it so happened that this mold produced thousands of times more penicillin naturally. The penicillin that is used today is still derived from this particular colony of mold. However, by the mid to late 1940s, as the use of penicillin became widespread, resistance to penicillin quickly developed, and the potential cost to society of widespread antibiotic use was noted in Fleming's acceptance speech for the Nobel prize. Only recently has it been recognized that there is a further cost to the use of widespread antibiotics. The microbiome, the bacteria that live naturally in us and on us, is adversely affected by the use of antibiotics. The use of antibiotics causes significant loss of diversity of our microbiome; there is mounting evidence that this loss of diversity may be linked to the widespread development of now-common diseases such as obesity, diabetes and possibly autoimmune disease. And it appears that this impact is greatest when antibiotics are used excessively in children younger than the age of two, before the microbiome has been completely developed. When viewed metaphorically as a golem, antibiotics have been and continue to be clearly beneficial to us individually and as a community of humans. But as our knowledge and our use of antibiotics has expanded over the

| continued on page 8



decades, it's also becoming clear that a cost, both immediate through the development of resistance and long-standing through the loss of diversification of our microbiome, had been underestimated. This golem, the knowledge base of antibiotics, calls on healthcare providers to use antibiotics only when there appears to be clear need to do so. Further, this golem was formed over an 80-year period, in contrast to the knowledge base gained over the last year from the pandemic.

The golem of the current pandemic, in typical fashion, has dealt with issues such as the initial identification of the virus, the use of masking and other preventive measures such as social distancing, treatment for hospitalized patients, and the manufacture and distribution of vaccines in manner that can only be described as well-intentioned but sometimes clumsy. However, this golem is extraordinary for many reasons. It has grown exponentially faster than the example previously mentioned, that of penicillin and antibiotics. And while mistakes were clearly made – such as the lack of testing and the initial indecisiveness of the effectiveness of masking – these mistakes were quickly recognized and corrected, in contrast to the decades needed to recognize the impact of antibiotic use on the microbiome.

It is useful to view science and the advancement of knowledge through the scientific method metaphorically by analogy with the golem. A golem, when initially formed or created, is small and amorphic and is always imperfect. The golem is often well-intentioned but, as it grows, can be clumsy and make mistakes. The core of knowledge derived from the advancement of science grows over time, and the benefit to humans increases as this grows. But science, like the golem, created by humans, is imperfect. Evidence-based medicine, dependent on science and the scientific method, is still only a practice, not an exercise in perfection. The core of knowledge at present clearly suggests that social distancing and wearing masks are effective. The treatment of patients hospitalized with COVID 19 remains frustrating, as the current available drugs are only

marginally beneficial. The true "home run" in this pandemic appears to be the development and distribution of vaccine. Almost all evidence suggests that these vaccines are not only highly effective but safe. The mRNA technology used in the Pfizer and Moderna vaccines appears to be a true advancement in medicine and likely will continue to be a technology utilized in the future. Maybe this golem is actually not that unusual – with the exception that it has grown so quickly and has affected so many.

Scott Milton was raised in the Texas Panhandle. He is trained in Infectious Diseases and is currently an Associate Professor of Medicine at Texas Tech Amarillo as well as the Health Authority for Amarillo and Potter and Randall County.

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Purpose Panhandle Health strives to promote the health and welfare of the residents of Amarillo and the Texas Panhandle through the publication of practical informative papers on topics of general interest to most physicians while maintaining editorial integrity and newsworthiness.

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Editorial: The Pandemic Year in Pediatrics

by Raphael Mattamal, MD

A gainst their better judgement, the deditors of *Panhandle Health* have seen fit to invite me to share my thoughts again, this time on what lessons we have learned from the COVID-19 pandemic, since I last submitted a rant for the Fall 2020 issue. And guys, we need to talk. Because this did NOT go well at all.

Nationally, we have lost more than half a million Americans to COVID-19, making it the third leading cause of death in the U.S. behind heart disease and cancer (which is a bit alarming since the other two are not transmissible airborne diseases). It has been bad enough to reduce our average life expectancy, cripple our economy, exacerbate an already-burgeoning mental health crisis, and highlight the fact that politically we cannot even agree on basic reality and facts.

Regionally, we have managed to pull off more than 50,000 confirmed cases and nearly 1400 deaths for a population of just over 400,000 in the 26 counties of the Texas Panhandle. For those keeping score, about 1 in 300 of us died from this thing in the past year. That does not sound too abysmal in theory but is awful on a per capita basis. If the NYC metropolitan area had the same rate of fatalities, they would be looking at 70,000 deaths.

Applying that to the U.S. population at large, that would amount to more than a million deaths, confirming that we did more than twice as badly as the national average. Applying that to the world population at large, that would be about 25 million deaths, worse than the number of fatalities in World War I. These numbers also give us a regional case fatality rate in confirmed cases of about 2.6%. Obviously, the real case fatality rate is lower, once we factor in the number of COVID-19 cases that were not counted due to asymptomatic carriers or others not wanting (or able) to be tested. For those who are riding the "you counted cases multiple times" train, I will concede that point, if you concede that this would only increase the case fatality rate even more. Any notion that the Panhandle region did well with COVID-19 is fantasy of the highest order.

Unfortunately, a few of my coworkers have been hospitalized. One person I know has died. Another colleague, a young, healthy man, got bilateral pulmonary emboli. One of my residents has lost her father-in-law. Another of my residents has lost a classmate from medical school. One of my best friends at the hospital has lost four relatives to this. Totally comparable to influenza, right? We just crammed a decade's worth of influenza deaths into a single year.

Personally, I am doing great. My INTJ personality has been having a field day spending time with my family at home. My wife and I have a beautiful and healthy baby girl, my patients at the hospital have done well in general, and I lost some weight! Part of that happened when I got COVID in August, leading to anorexia and heart inflammation with a troponin of 125, but, you know, details.

Anyway, let us get down to brass tacks. We have learned a lot of lessons from the pandemic so far. I will split it up into what we have learned from a pediatric standpoint, public health standpoint, and what is on the horizon. The last one is encouraging, at least.

The Kids are NOT Alright

Nothing has reinforced how important school is than the disastrous attempts at substituting virtual and distanced "learning" for a proper education. Most of my medical students and residents could be described as fully functional adults, and they have difficulty with Zoom didactics; so to expect young school-age kids to learn properly while staring at a laptop is a fool's errand, not to mention a straight mockery of the American Academy of Pediatrics' recommendation on reducing screen time in children. The fact that it was not an absolute priority to provide safety equipment, financial support, and (later) vaccines early to schoolteachers and staff to keep in-person learning functional is, unfortunately, a sad continuation of this country's difficulty in providing a proper education to much of its youth.

We have inherited the dividends of this lack of educational support in our politics and effectiveness of public health messaging (see "snake oil" section for further details). It should be an absolute priority in the future not only to keep schools open (barring the apocalypse), but to support them with the monies, equipment, and staffing they need to properly and safely educate our children. We also need to get that pressure off the backs of their parents, so that they can do what they need to do at home and work to stay sane and keep society running. (Do not get me started on what I think of how we handle child care and maternity / paternity leave here.)

One of the worst consequences of this interruption in schooling is the staggering toll on mental health that has occurred, especially in children. Admissions for suicidal ideation and attempts have skyrocketed, further taxing an already overburdened mental healthcare system that has been underfunded and understaffed for decades. The only silver lining on the mental health front is that completed suicides seem to be down during the pandemic. I would rather have more suicidal ideation patients than successful suicides in the community, but that is not saying much. The current situation reinforces the need to provide better and more accessible mental health resources in schools and outpatient settings before it becomes a serious ER, inpatient, or mortician concern. Like the education front, this is a long- festering issue that has only

been exacerbated by the pandemic. You cannot blame COVID for everything.

From an infectious disease standpoint, children seem to be doing much better on average. This is not saying much, given the previous statistics and the fact that internal medicine and family practice have been steamrolled by COVID in the past year. Cases of influenza, RSV, community acquired pneumonia, etc. have dropped precipitously, and the inpatient pediatric census is noticeably smaller. Though this has caused financial difficulties for children's hospitals and pediatric clinics, I cannot say with a straight face that I wish we had more sick children on my unit. It has allowed us to focus more on those acute patients who have not substantially decreased in number, such as new cancer diagnoses, trauma cases, or unusual and rare diseases.

The primary struggle from an academic center standpoint has been ensuring that our residents have enough experience and variety of patients to be effective pediatricians in the future - a concern shared nationwide, not just in the Panhandle. I am somewhat concerned that I have interns on my team who have not yet admitted a viral bronchiolitis, though the status asthmaticus patients have continued coming in to help reinforce how to treat acute respiratory failure. Multisystem Inflammatory Syndrome in Children (MIS-C) cases have helped residents learn how to address acute cardiogenic and hypotensive shock, broaden their differential diagnosis, and manage multiorgan system dysfunction. Thankfully, the census is coming back up and patients who had missed well-child checks and vaccines are coming back to the clinics locally, giving us an opportunity to play catch-up with preventative medical care.

Snake Oil goes Mainstream

One of the common topics that come up in medical school interviews is whether the applicant is being pressured to pursue being a physician by their family, rather than viewing it as a personal goal or calling. I had the opposite problem. My mother actively discouraged me from pursuing medicine and wanted me to go for my PhD in biomedical engineering. When I asked her why, she said that anyone of reasonable intelligence with enough hard work could become an MD. I had disagreed vehemently at the time. Seeing how a sizeable minority of physicians has reacted to this crisis, though, I reluctantly admit I can see her point now.

That is not to say that doctors are stupid, nor am I egotistical enough to think I am smarter than anybody else. What I am noticing, however, is that, just like any other job, medical providers are human – and with our common humanity come our own internal biases, reticence to admit mistakes, and difficulty with thinking logically from time to time. This unfortunately manifests itself in practices that are inconsistent with good data and sound science, leading to outcomes that may not benefit our patients and, in the worst-case scenario, may do harm.

I guess what I am trying to say is that, if you are still prescribing hydroxychloroquine or chloroquine to treat COVID-19, you are not doing a service to your patient. Your patient with mild COVID got better after HCQ? Wow, so did mine after I sent them to the voodoo priestess to do a chicken bone reading, but my idea was equally efficacious – and without the



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iatrogenic long QT problem.

That was not meant to just be a joke. Please stop doing it! I can understand trying it out back in the Spring of 2020 when the virus was new, we were desperate to try anything (since we had no clear therapeutic options substantiated by data at the time) and were watching patients die on the ventilator.

Some practitioners may not have read the French paper from the International Journal of Antimicrobial Agents that started this whole thing up (1). Their patients with milder COVID symptoms got better after HCQ and azithromycin, if you ignore the fact that they excluded people who went to the ICU or died (seriously, that was their exclusion criteria)! I definitely understand not knowing about the subsequent official statement, within a couple of weeks of publication, noting that the article does not meet expected standards for peer review (less than 24 hours between submission and publication), especially since the lead author is the Editor in Chief at the same journal and is not going to reject his own work, or that another lead author is under scrutiny for suspect data in other publications - since the retraction after the sensationalist headline in the news always gets less attention by default (2).

What I do not understand is people doubling down on something that clearly does not work in subsequent large scale prospective studies (3). It is OK to admit you were wrong at first. I have made mistakes in patient care before. Trying HCQ out early in a global pandemic does not make you a bad physician. Continuing to do so, however, raises that question. It demonstrates that quite a few of us have an inability to revisit past decisions, revise our practice of medicine based upon new data, or even admit that there was a problem in the first place with what we were doing.

Some providers went down this HCQ rabbit hole based on the recommendations of a scientifically illiterate demagogue whose politics matched theirs (of course, I am talking about Bolsonaro of Brazil). This is not scientific evidence. The subsequent mantra is that it has not been studied with high dose zinc or Flintstone's vitamins or whatever nonsense. Some people have taken the fact that Vitamin D deficient individuals do worse with COVID (spoiler alert: they do worse with everything) to suggest that large slugs of Vitamin D after COVID diagnosis can help (spoiler alert: it does not). That should not be surprising, since it is analogous to trying to buckle your seat belt after you crash. Some people have moved on to ivermectin, which is a very effective medication against hookworm in dogs but not against a viral disease like COVID in people.

Hope on the Horizon

COVID cases in the hospital have dropped substantially with the deployment of the vaccines, and I must give massive amounts of credit to Amarillo for being a model of getting it out to the community, especially our most vulnerable populations. I am optimistic that, with a good dedicated public health effort, we will be able to move back to a new, tolerable normal.

I am not Nostradamus but have been batting at least 0.800 on COVID predictions, and one of the best things coming out of this pandemic will likely be the demonstrated efficacy of mRNA vaccines and treatments for different illnesses. The novel mRNA vaccines against SARS-CoV-2, while not perfect, seem to be substantially more effective at preventing symptomatic COVID-19 disease and asymptomatic COVID-19 carriage with a more benign side effect profile than traditionally-developed adenovirus vector vaccines.

This has the potential to be revolutionary over the next few years to decades in medicine, especially since the technology for developing these COVID vaccines has been derived from decades of research into making mRNA treatments for certain cancers. With a large-scale proof of concept that mRNA-derived medical treatment can be safe and effective, we are likely to see this concept used to treat or prevent other diseases. The technology is already being applied to see if we can finally develop vaccines for HIV or even malaria. The future in this regard looks potentially very bright.

We have also seen some micro and macro changes in society, many of which

have the potential to be for the better. The images of clear, smog-free skies during lockdowns have inspired not the desire for more lockdowns (which, although effective in reducing COVID spread, have negative economic consequences), but for new drives for environmentally friendly policy and technology. Companies and corporations that historically have kept all their office workers in the physical building are seeing the financial benefit of having some departments work from home, which opens the potential for increased employee satisfaction and work/life balance, less commuting and traffic, and a larger recruitment pool when certain employees can work from anywhere. Some of my colleagues in Amarillo are here because their spouses can now work long distance from a small city. We have the potential to slowly eke out a brave new world. We just need to work toward making sure it is a better one.

P.S. If you are reading this and have not gotten your COVID vaccine despite being eligible, shame on you. Go get it. If you are a pediatrician reading this and have not gotten it, double shame on you. You have been trained in preventative medicine. Practice what you preach.

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Raphael Mattamal completed medical school and pediatric residency training at Texas Tech University Health Sciences Center in Amarillo. Currently, he is a pediatric hospital medicine attending at TTUHSC and the Chief of Pediatrics at Northwest Texas Healthcare System. He is occasionally as snarky in person as he is in the preceding article.

Editor's note: Not all the members of the editorial board agree with all the assertions in the preceding editorial, although at least one does. RSU.









Looking Back on the COVID-19 Pandemic: Psychological and Psychiatric Effects

by Steve Urban, MD, MACP, with assistance from Pam Kirby, PsyD, Jave Rush, MD, and Amy Stark, MD

The COVID 19 pandemic has forever changed our lives. Although medical writers had written with trepidation of a reprise of the 1918 influenza pandemic, and although influenza, Ebola, and others had threatened us, nobody was truly prepared for the magnitude of the global pandemic. Sure, it could have been worse (SARS had a case fatality rate of 10%, and MERS 40%), but the degree of devastation - in terms of economic disruption and political unrest, as well as morbidity and mortality - is unprecedented in our lifetimes. Over 3 million people have succumbed to the virus worldwide, with over 560,000 of these deaths in the U.S. alone. Everybody knows someone who died of COVID; many of our friends and relatives died alone in a hospital room and were buried without a real funeral.

Other articles in this issue address changes wrought by COVID-19 changes in ICU care, in obstetric and pediatric care, in the response of governmental agencies to the pandemic, among others. This article will address the devastation brought by COVID-19 to the nation's psyche - how the pandemic has affected the practice of psychology and psychiatry. Although I am not a psychiatrist, I have surveyed the recent literature and will try to summarize it for our readers. In addition, I have interviewed three practitioners - psychiatrists Dr. Amy Stark and Dr. Jave Rush, and psychologist Dr. Pam Kirby - in order to supplement the numbers with real-life experiences. I hope to summarize in short scope the pervasive effects of the pandemic - how it has affected the mental health of COVID patients and the population in general, and how it has affected the practice of psychiatry and clinical psychology.

Neuropsychological effects of SARS-CoV-2 infection

Although COVID viremia affects the endothelium of blood vessels and so has

widespread systemic effects on all organs, it does not specifically infect the central nervous system. The cerebrospinal fluid is usually clear, and the virus is rarely grown from the CNS. Delirium, however, is a common feature of hospitalized patients with COVID - probably more common than is usually seen in other critically ill, hospitalized patients. The tendency for all severely ill patients to experience delirium is exacerbated by fear of the unknown, by isolation from loved ones, and by disruption of daily routine due to quarantine procedures. Between 10 and 30% of all hospitalized COVID patients develop delirium - especially those in critical care units. Among the elderly, the rate of delirium is 40-50% - in intubated patients, it is as high as 70% (1). In addition, approximately 2% of hospitalized COVID patients suffer ischemic strokes - especially those with elevated D-dimer and fibrinogen levels. Intracerebral hemorrhage occurs in about 0.5%. Finally, cerebral venous sinus thrombosis is diagnosed in approximately 40/million inpatients (a rate about 8 X higher than outpatients who have received the Astra-Zeneca and J&J vaccines).

We have known since the publication of the BRAIN-ICU study in 2013 (2) that mental status changes of delirium can last for months. In this study (done before the COVID era), 26% of patients with delirium continued to have mental status changes severe enough to qualify as mild dementia after 3 months, with only modest improvement after 12 months. Many COVID patients complain of "brain fog" for weeks to months after the acute illness. Dr. Amy Stark notes that emotional lability and difficulty concentrating have been common in her patients - often accompanied by physical symptoms such as exertional tachycardia and postural hypotension. These bothersome symptoms tend to improve - but slowly, over weeks and often months.

Isolated care reports have described new-onset psychosis in non-hospitalized patients with COVID infection. These case reports emphasize hallucinations and paranoid ideation, as well as fairly prompt response to antipsychotics and a tendency for the psychosis to resolve without recurrence. Such cases, however, appear to be rare; none of the three practitioners that I interviewed have seen this.

Psychological symptoms such as depression, anxiety, and insomnia, however, are common in COVID survivors. Initial surveys from China found troublesome post-COVID symptoms in 50-80% (insomnia) and 30-50% (depression and anxiety). Some of these patients appear to have adjustment reactions - not severe or prolonged enough to qualify as Major Depressive Disorder (MDD) or Generalized Anxiety Disorder (GAD) but many suffer from more prolonged and challenging symptoms. In a systematic review (3), the incidence of MDD in the months after COVID was 30-40%, and that of GAD was 25-40%. As many as 20-30% of survivors - especially those who had been in the ICU - experience PTSD symptoms such as flashbacks and depersonalization lasting at least 4-8 weeks. About 1/3 of these patients had not carried a DSM-5 diagnosis before being infected. Risk factors for psychiatric deterioration have included female sex, severity of the COVID episode, persistent physical symptoms such as shortness of breath, and having family members with COVID infection.

Psychological effects of the pandemic in the general population

Obviously, the pandemic has affected the entire population, not just those who are or have been sick with the virus. Loss of loved ones, isolation and quarantine, economic fears, political unrest, changes in the educational system, and many more – all have taken their toll on the population as a whole. Not only have patients with pre-existing psychological conditions relapsed, but many people, under stresses never before encountered, have developed new symptoms and psychiatric conditions.

As with COVID patients, patients who have not themselves had the virus manifest a high incidence of insomnia, anxiety and depression. Surveys of the general population have revealed the prevalence of anxiety, depression and PTSD symptoms each to be between 30 to 40%. In general, these symptoms have been more frequent in women, people under age 40, the unemployed and student population, and those with pre-existing psychiatric diagnoses (4). Jave Rush noticed a surge in patients in the summer of 2020 – after an initial lull where patients either felt an initial resilient response or were afraid to contact their providers for fear of infection. Jave, who has a large nursing home practice, also noticed a spike of depressive symptoms in confined elderly patients -

due to fears of death from nursing home outbreaks as well as isolation, as they could not interact with their loved ones for months on end.

Pam Kirby noticed that many patients felt confined, threatened, and alone. She points out that those living paycheck to paycheck were stressed by layoffs and furloughs, while those with jobs requiring them to go into work suffered anxiety from fear of workplace exposure. Symptoms like agoraphobia, depersonalization, and burnout were common. Amy Stark points out that patients in an abusive home situation were stressed by having the abuser around all the time. Those with family members in the hospital often felt guilt from fear that they had infected their loved ones and despair that their loved ones were dying alone, either in the ICU or in nursing homes. Families were torn apart by political and civil unrest - issues like who to vote for or whether or not to wear a mask in public could further divide already troubled

families. As Pam Kirby says, "Loss was everywhere."

The effect of the pandemic on patients with alcoholism and substance abuse has been deleterious as well (5). The many anecdotal reports of people drinking away their hours of confinement have been supplemented by studies showing 10-20% increase in alcohol consumption, especially in women aged 30-60, those who had to provide home care for school children, and those who habitually drink at home. Interestingly, binge drinking may actually have decreased – partly because college students returning home felt less free to overindulge, and partly due to the closing of almost all bars and taverns. Patients with substance abuse may have had more difficulty in procuring their drugs, but this didn't stop the death rate due to substance abuse from reaching its highest level ever, with 87,000 deaths from October 2019 to September 2020

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> Be a part of the circle. In 2006, Potter-Randall County Medical Society introduced the Circle of Friends, a program designed with the business of medicine in mind. Members of the Circle of Friends are companies that pay an annual fee to participate in Medical Society events. Their financial commitment allows PRCMS to provide quality programs throughout the year, such as the Annual Meeting, Doctors Day, Resident Reception, Family Fall Festival, Retired Physicians Lunch and Women in Medicine. In return, these companies are invited to attend these events and discuss with the physicians the benefits that their companies offer a physicians practice.

We are grateful for the support of these organizations and anticipate another great year of serving the needs of our members. The purpose for Circle of Friends is to provide a valuable base of

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The Medical Society thanks all of its supporters as it offers new opportunities to its membership. If your business is interested in being a part of our Circle of Friends, please contact Cindy Barnard at 355-6854 or e-mail prcms@suddenlinkmail.com. (a 29% increase over the previous year). The spike in deaths due to overdose was especially marked in April and May of 2020, perhaps related to the closure of many substance abuse treatment facilities. In addition, in-hospital mortality from COVID in patients with substance abuse disorder has been reported to be higher.

The effect on suicide has been surprising. In the first months, there were several high-profile suicides, and the rate of suicidal ideation (as measured by telephone questionnaires) increased - especially among young Black and Hispanic men. The doctors I interviewed agreed that suicidal ideation increased significantly in their patient populations. Recent preliminary statistics, however, show a decrease in death by suicide, from an annual incidence of 48,342 in 2018 down to 44,834 in 2020, with a 5% decline over the past year (5). Nobody understands these data, and some have questioned their validity.

Effects in practitioners – doctors, nurses, and other front-line workers

Next, I want to turn to the psychological and behavioral effects of the pandemic on frontline workers – first responders, doctors, nurses, respiratory therapists, and many others (7). Initial studies (often from China) reported

symptoms of insomnia, depression and anxiety in between 40 and 50% of health care workers. The initial stresses of fear of infection, fear of taking the virus home to family members, and isolation were compounded by shortages of PPE and by overwork. The working conditions for front-line workers have been likened to battlefield surgery with a continuous flood of new patients and a seemingly unending stream of deaths. PTSD symptoms were common, increasing by 50 % above baseline levels in these alreadystressed workers. Symptoms of depersonalization and burnout often stretched into chronic dissatisfaction. The AMA reports that rates of physician retirement increased by 10%, despite many cases where workers deferred retirement plans to stay on the front lines.

Amarillo practitioners have had a wealth of experience in caring for health care workers in this, as Jave Rush said, "Our worst year ever." For the first several months – months of fear, quarantine, overwork, loss, and grief – and before the robust protective effect of PPE had been demonstrated – many workers experienced insomnia and anxiety. But the practitioners I interviewed also noted that many front-line providers tended to "gut it up." Jave Rush was impressed by the resilience of ER and ICU provid-

POTTER RANDALL COUNTY MEDICAL SOCIETY (PRCMS) OFFERS HELP TO TROUBLED PHYSICIANS

If you, or a physician you know, are struggling with addiction, depression or burnout and are unsure what to do or whom to contact, the Potter-Randall County Medical Society is here to help. We offer face-to-face confidential sessions with the PRCMS Physician Health and Wellness Committee, made up of your physician peers who know and understand recovery. Please don't struggle alone when help is a phone call or an email away. Whether you are calling for yourself, your practice partner, or as a family member of a physician, contact Cindy Barnard, PRCMS Executive Director, at 806-355-6854 or prcms@suddenlinkmail.com. Membership in DBCM6 is not presedon.

PRCMS is not required.

ers, many of whom, as Amy Stark notes, "were used to chaos." Both Amy and Pam Kirby, however, worry that this may represent "pseudo-stoicism," perhaps adaptive at first but leading to undercurrents of burnout in the long run. Amy Stark points out that some outpatient doctors and nurses suffered as well, both from fear of being infected by asymptomatic patients and by dismay that they were not themselves on the front line. Amy notes that women providers were pulled both ways – wanting to help and yet burdened by new child care responsibilities and fear of infecting their family members.

Each of my interviewees used the same term – "suffering in silence" – to describe the plight of many of these workers. Amy Stark said that silence seemed the only option for workers whose tragic work circumstances were mirrored by fears of infection, child care needs, and economic worries at home. Rather than rehashing the same gloomy stories, practitioners tended to clam up.

Pam Kirby recounts the experiences of several nurses. Short-staffed much of the time, many worked for weeks and months without vacation or time off. When RAC nurses came in to fill the breach, their much higher salaries further discouraged our own nurses. When nurses encountered mask-refusers and COVID-deniers in the community, Pam says that many felt "betrayed by the culture."

Nurses as well as patients suffered from the absence of family members at the bedside – in terms of help with little tasks (like getting the patient a glass of water) as well as the lack of emotional support. Having a family member who dies alone is tragic for the grieving family but is almost as difficult for nurses, who are often the only source of care and comfort in their patients' last hours. Pam points out that even Neonatal ICU nurses and babies suffered from lack of "holders", volunteers who usually give babies a point of human contact but who were unable to hold the babies due to the quarantine.

Changes in clinical practice.

Finally, I want to address changes in the practice of psychiatry and psychology brought on by the pandemic. The

first major change was the closing down of offices and the fairly rapid transition to remote services (i.e. telepsychiatry and telepsychology). By April, Medicare had decided to OK payment for telepsychiatry at levels comparable to in-person visits. Although assessments of tele services vary among my interviewees from "better than nothing" to "acceptable in most cases" - several problems were soon apparent. Computer access was a problem for many poorer patients. Furthermore, as everybody knows, it is hard to establish eye contact and a caring relationship over Zoom. The furtive looks of the paranoid or the tics and posturing of the patient with Tourette's are much less apparent via telemedicine. Amy Stark points out that extrapyramidal reactions to antipsychotics and blood pressure lability from stimulants and other medicines are difficult to assess on line. This can be a particular problem with acutely ill, hospitalized patients – but, for the last year, almost all visits at psychiatric facilities have been conducted remotely, for fear of infecting the providers.

Practitioners recount several issues with telepsychiatry that I hadn't considered. One is how to assure privacy, especially when there is a controlling or abusive relationship at home. Amy Stark notes that it is hard to know if the threatening family member is listening in or even present in the room. Pam Kirby has had some patients who contrive to leave the house, using their cars as a private space for the tele-visit. Amy Stark points out that the patient who complains of suicidal ideation presents a problem as well. Where are they? How do you get help for them? A third hurdle is patient preference; some patients were hurt or angry that their doctor could not open up the office just for them (this can be a particular problem for patients who are reluctant to see a psychiatrist in the first place). Finally, Amy notes that it is hard to do a quantitative mental status exam on line. How do you make sure the patient is not making notes while taking their MoCA exam?

Providers are now facing the question of the long-term role of telepsychiatry. Amy notes that, now that the pandemic appears to be abating, some

insurers are already threatening to stop paying comparably for tele-psych visits. Although she thinks that "maybe 50%" of follow-up visits can be conducted remotely, she worries that her flexibility to choose remote vs in-person visits may be impaired. Jave Rush has been using telepsychiatry for patients in rural and underserved-areas since 2013 and feels that most follow-up visits can be conducted via Zoom. Jave points out as do the other doctors - the advantages of a remote visit for patients who live far away or who cannot take off from work. Jave uses as an example of the benefit of telepsychiatry underserved communities like South Dallas, where few psychiatrists practice but where patients are often in greatest need.

Pam Kirby raises another issue that I hadn't thought deeply enough about – the personal effect of the pandemic on the doctor. Providers have themselves often lost loved ones or colleagues to the pandemic; Pam notes that the counselling community has lost 5 practitioners -2 to COVID directly – in the past year. She describes this "levelling" effect of the pandemic – the provider may be suffering as much as the patient. Even a simple welcome – "how are you doing" – or a goodbye at the end of the visit seems fraught with significance; you know that you may not see this patient again.

This brief review of the subject merely outlines some of the ways in which the COVID pandemic has changed the practice of psychiatry and psychology. Like many, I tend to think about the effects on ER docs, intensivists, ICU nurses etc., without giving proper consideration to the stresses endured by doctors with a largely outpatient practice. Doctors like psychiatrists and general practitioners take care of patients who continue to suffer aftereffects of COVID. They deal with ongoing problems and new stress-related symptoms in the general population. At the same time, they have to manage a practice and attend to their own emotional health (personal loss) as well as physical health (COVID exposure). The pandemic has had deep and protracted effects on our whole society. Its effects on psychiatry have been troubling, profound, and seem likely to be long-lasting, as well.

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COVID-19: Public Health in Action

by Casie Stoughton, MPH

I remember as a little girl wondering why my grandmother always had large stocks of paper towels, canned goods, and other non-perishable items in her pantry. My mother told me it was because she had grown up during the Great Depression. The meaning of that statement never hit home for me until one afternoon in March 2020.

I ran to the grocery store to pick up a few items and was greeted by empty shelves where canned foods and toilet paper used to be. It was at that moment that I knew our lives would be changed by a novel virus from the other side of the world.

Generally, when we think of public health emergency preparedness, we think of being prepared for terrorist threats, such as smallpox, anthrax, and botulism, or natural disasters such as hurricanes and wildfires. These emergencies require clear action in the form of a vaccine, an antibiotic, a shelter or an evacuation plan.

When the first cases of SARS-CoV2 began to appear in the United States, we knew that this response would be different and on a larger scale than anything we had faced before.

The Amarillo Department of Public Health was quick to mobilize.

"We didn't have to motivate our staff," said Carol Hill, assistant director. "They were motivated on their own."

The 40 full-time staff members of the Amarillo Public Health Department already had experience with contact investigation, data gathering, and reporting for diseases such as sexually-transmitted infections, tuberculosis, and Hansen's Disease. They quickly adapted and expanded these systems for contact investigation, contact tracing, and analysis to help fight the virus that was quickly spreading across the US.

Our staff members worked long days to make these systems as efficient as possible – nobody took a day off from March until July of 2020.

Supplies

In the first days of the COVID-19 pandemic, supplies such as personal protective equipment (PPE) and testing materials were in short supply.

Thankfully, Amarillo Public Health had already acquired a small stockpile of N95 masks from previous emergencies through public health emergency preparedness funding. APH was able to utilize this stockpile and furnish PPE to local hospitals and clinics upon request.

Joe Mike Briseno, Health Informatics Program Manager, said a great deal of work had to happen behind the scenes to get supplies where they were needed.

"We were glad to get our staff all they needed to succeed for what matters most – patient care," he said.

Initially, testing for COVID-19 was hampered by a critical shortage of both swabs and viral transport media. I remember scouring Amazon every evening before going to sleep and purchasing every Dacron-tipped swab I could find.

Once swabs became more readily available, we realized that viral transport media (VTM) would be the next hardto-find component. During a conversation with Dr. Todd Bell, we discussed the fact that there had to be a way to produce VTM. That conversation resulted in Texas Tech School of Pharmacy in Amarillo producing VTM for the Panhandle and much of Texas. This was a huge success for Texas Tech and the Panhandle. It is this Panhandle spirit – the ingenuity of our people, and the dedication of our healthcare providers – that helped our area thrive.

Testing

The next challenge we faced was to make testing widely available. In partnership with the Texas Tech School of Medicine, Amarillo Public Health set up a drive-through testing site at the Rex Baxter building at the fairgrounds. Several other organizations provided support, including the Amarillo Police Department, Amarillo Fire Department, Potter County Sheriff's Office, Potter County Judge, and the City of Amarillo.

After testing hundreds of people, the clinic was eventually moved to a cityowned facility, the old Coca-Cola warehouse just south of Hodgetown. In total, our team tested more than 13,000 people for COVID-19. As patient demand decreased, the clinic was moved to the public health department facility. Since it is important to make sure that everyone in our community has access to testing, the city clinic's services were provided free of charge.

Our testing team leader Mark Price said he is grateful for his team and their bravery. In the beginning, there was a lot of fear surrounding the novel coronavirus and its rapid spread. Amid the uncertainty, patients were afraid to be tested. Staff members were afraid of getting infected. However, our staff members faced their fears and came in to do their jobs every day. Because of the protocols and processes in place, no staff members got sick. "They trusted the PPE and the protocols," Price said. "We were glad to use the plans we have developed over the past 20 years. The process of testing and drivethrough and the partnerships didn't happen overnight."

Contact Tracing

The team at Amarillo Public Health has provided contact tracing for all COVID-19 positive patients in Potter and Randall counties. As case numbers increased, staffing needs would change – sometimes rapidly. We held morning meetings in which our team leaders would go over guideline changes for the day. Staff assignments could vary from day to day, requiring flexibility from our full-time and part-time staff.

At the onset of the pandemic, there was no surveillance or formalized contact tracing form for COVID-19. The team at Amarillo Public Health used their professional experience to build these forms during the most stressful time in the pandemic.

"The team pulled together to serve the community and each other while emotions were high," said Laurie Burton, nursing home team leader.

Part of the stress of contact tracing is not knowing how each contact would react to the call. Reactions ranged from thankfulness to anger. Some patients reacted aggressively when faced with the news of their possible exposure. The contact tracing team, knowing that many of these behaviors were driven by fear, responded by giving factual, professional, and compassionate information to each patient.

Early guidance stated that patients should be monitored by phone daily. These calls evolved beyond simple monitoring to comfort. One nurse described a call to a patient who had just learned that their spouse had died. The nurse was able to lend a compassionate ear to this patient in their time of need.

Alice Mayberry, monitoring team lead, said the monitoring calls gave public health staff the opportunity to provide compassionate care for the patients.

"Patients counted on us to call them daily," she said. "It was something really worthwhile."

Aside from the emotional impact of disease and isolation, the pandemic and resulting quarantines had a significant economic impact on individuals as well. Organizations from around the community, including Potter County, SnackPack 4 Kids, St. Stephen United Methodist Church, and Oasis Baptist Church, generously provided groceries and other tangible help to families who were in isolation and quarantine.

Sometimes, a patient's need was greater than the services that could be provided by the Health Department. In these cases, the public health team helped coordinate and connect individuals in need to outside organizations that had the resources. Marcos Nerios, the social services team leader, said this was the most impactful part of the COVID-19 response.

"Lending a hand to those deeply impacted, physically seeing and giving something they could use, made a hard situation better," he said.

Infusion Center

Amarillo Public Health also operated a bamlanivimab infusion center, providing monoclonal antibody treatment to patients who qualified under the Emergency Use Authorization (EUA). More than 150 patients were treated during the time that the infusion center was operational, with only four patients requiring subsequent hospitalization. Many lives were saved by this effort. The team is thankful for the partnership between BSA Healthcare System, Northwest Texas Healthcare System, Amarillo Fire Department and the Panhandle Regional Advisory Councils (RAC).

Vaccination Center

Beginning December 23, 2020, Amarillo Public Health began providing COVID-19 vaccines at the Amarillo Civic Center. We used a tried-and-true clinic model with the goal of vaccinating as many people as possible, as quickly as possible, with the fewest barriers. So far, our team has given more than 118,000 COVID-19 vaccinations through the clinic at the Amarillo Civic Center.

The COVID-19 response in Potter and Randall Counties has been a picture of flexibility, teamwork, and success. It would not have been possible without the support of the Amarillo Fire Department, Police Department, Civic Center, Public Library, Facilities, Environmental Health, Parks and Recreation, and countless outside agencies. This was a true team effort and would not have been possible otherwise.

The COVID-19 pandemic has made an indelible mark on our lives, including the lingering physical and emotional toll of infections, the loss of loved ones, the effects of isolation on children's education and mental health, and many more. However, our community's collective response to the pandemic shows a bright side – that people can withstand adversity through flexibility and teamwork.

Laci Scott, contact investigation team lead, said the pandemic will be remembered as a turning point in people's careers.

"We used to tell H1N1 war stories – but now we will tell COVID-19 war stories for the remainder of our careers," she said.

Casie Stoughton has served as the Director of Public Health for Amarillo Public Health/Amarillo Area Public Health District for six years. She has been with the department for 17 years working in immunizations, TB control and epidemiology. Ms. Stoughton completed her bachelor's degree in Nursing in 2004 at West Texas A&M University and Masters in Public Health in 2015 at the University of North Texas Health Science Center. Ms. Stoughton developed a passion for health care while working in a mission hospital in Honduras for eight months in 2001; public health was a natural extension of this work.



A Novel Coronavirus Pandemic: The Northwest Texas Experience

by Brian Weis, MD, PhD, FACP

 \mathbf{S} uffice it to say that not a single element of the hospital operations at Northwest Texas Healthcare System was untouched by the SARS-CoV-2 pandemic of 2020. From the care of patients to the service of food, Mother Nature's microscopic curveball, or, maybe more appropriately, knuckleball (given its unpredictable course) dramatically altered how all of the hospital personnel managed their responsibilities in the facility. The devastation from the virus has been widely reported. At Northwest, there have been over 1700 individuals hospitalized with complications of the infection, and 269 persons have ultimately succumbed to the virus since the beginning of the pandemic. Given so much attention to the negative effects of the outbreak, I wish to focus on the positives and lessons learned at Northwest over the last year. Like so many occurrences in this world, COVID-19 provided further insight into the human spirit.

The Staff: At the heart of every hospital is the staff of individuals who provide the services supporting the objective of caring for people in need. As the breadth of the pandemic became recognized in the first quarter of 2020, drastic changes in how the personnel at Northwest conducted their business were required. With the cessation of elective cases and the falling daily census, furloughs were necessary to retain required staff members at a time when staffing down was critical to the financial stability of the institution. Interruptions in the standard supply chain made securing the appropriate Personal Protective Equipment (PPE) for those who remained in the hospital, and, especially those working directly with COVID patients, extremely difficult but vitally important. Despite such threats to both personal and financial well-being, the Northwest staff faced the growing pandemic concerns with courage and

optimism. It is hard to forget the night when the Senior Management team convened at the hospital to notify the staff of the first confirmed COVID positive patient in the facility. The announcement was first met with anxiety, as was immediately evident on the faces of the nighttime personnel. But this quickly gave way to resolve and the declaration that "we are ready". As the months went by in 2020, optimism and enthusiasm gave way to pessimism and fatigue, especially with the surge in the fall of the year. However, not a day passed when yet another example of human compassion was observed, as members of the hospital staff became the surrogate family of those isolated with their illness. Ultimately, the courage and perseverance of the persons in every department of the hospital is what allowed the hospital to pull through. From the extreme nursing and respiratory care in the COVID units to the physical redesign, security considerations, and augmented environmental service of the facility to minimize the risk of viral spread, all of the staff showed tremendous ingenuity, commitment, and a "can do" attitude in facing the unique threat of a novel coronavirus.

The Medical Staff: Being a young physician at the time, I remember the early days of the HIV pandemic: the fear of the unknown, the anger of having to confront such a threat, and the realization that this is what comes with being a professional in healthcare. The pandemic of 2020 was no different. The physicians, residents, and licensed independent practitioners all courageously jumped into action. Realizing that every provider was critical but at risk, new methods of caring for patients while minimizing exposure were devised, from the use of telemedicine in the facility to modified rounding strategies to assure that back-up providers would be available should a physician or advanced practitioner become ill. It was obviously exhausting having to work daily with the additional burdens of mask, face shield, and countless changes of PPE. It was also challenging for our medical residents, as much of their training routines were affected, but they adapted and performed admirably under the difficult circumstances. While no doubt a learning experience, I can only hope that such a pandemic will be a once-in-a-career event for them. Across the board, members of the medical staff generously offered their services to the hospital and the patients even when their own livelihoods were threatened by the suspension of non-emergent procedures or routine clinic practice. The possibility of contracting the virus was only a part of the larger threat of the pandemic to many professionals supporting themselves and their staff in the healthcare business.

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The Community: Northwest has defined itself as a community hospital during the 96 years of its existence. In 2020, the community reciprocated the support in a multitude of ways. In recognition of the personal danger in which hospital staff members were being placed on a daily basis, support from the community quickly poured into the facility. From the provision of sewn masks by individuals and churches to extensive food and meal distributions from local retailers, banks, and businesses, the morale of the hospital employees was constantly bolstered by the awareness that the community recognized the challenges in caring for those afflicted with COVID-19. And then there were the words. From signs and posters on the perimeter of the hospital property to a dramatic and beautifully done "chalking" of motivational messages to the medical staff outside one hospital entrance, it became truly evident that we are all in this together. Despite the many challenges that local businesses faced during the pandemic, the outpouring of support for the hospital by such

UPCOMING EVENTS 2021 AMA **House of Delegates** Annual Meeting Iune 12-16 Hyatt Regency Chicago, IL AMA House of Delegates Interim Meeting Nov. 13-16 Walt Disney World Swan and Dolphin Resort Orlando, FL TMA

Advocacy Retreat Dec. 3-4 Omni Barton Creek Austin, TX community resources was nothing less than inspirational. All of these gestures throughout the many dark months of 2020 were instrumental in supporting the spirit of hospital personnel.

The Leadership: It has been an incredible privilege of mine to work with the individuals in leadership roles both inside and outside of Northwest over the last twelve months, in particular. From the Northwest Texas Healthcare System, Baptist St. Anthony's, and Veteran Affairs Hospital leadership teams to those of the City of Amarillo, the Amarillo Department of Public Health, and the Texas Tech Schools of Medicine and Pharmacy, this community is fortunate to have insightful and decisive leaders throughout these key entities. During the first weeks of the pandemic, information and recommendations from experts would change as often as several times a day. Northwest Texas established its Incident Command structure in early March, and this team originally met twice daily during the early months in an effort to maneuver as quickly as the public information changed. Flexibility and adaptability were key attributes for all in leadership during that early period.

Along with making difficult decisions on a daily basis concerning both clinical care and financial challenges, a great deal of effort amongst the Northwest leadership team was devoted to the management of disinformation and anxiety amongst the hospital staff. Despite frequent updates on the latest COVID-19 information to all hospital personnel from both the Incident Command leader and the hospital CEO, rumor and speculation were rampant concerning the dangers of the virus, the inadequacy of masks and PPE, or the fiscal health of the institution. Ultimately, it was the consistency of the messaging from leadership both at the hospital and city level that assuaged many of the fears created within the hospital personnel and the community at large from unfounded speculation. Given that there exist few resources on proper leadership during a viral pandemic, it certainly felt at times as though

we were attempting to build the airplane while flying it. However, what became very evident were the multiple examples of community and facility leaders taking responsibility to see that the workers and citizens of the Amarillo area were given the best considerations possible, despite the threat at hand.

As the hospital currently enjoys a reprieve in the COVID action, furniture is now being returned to the reopened waiting rooms, temporary barriers are being removed, visitors are being welcomed again into the facility, and mountains of acquired PPE are finding more permanent homes. In other words, Northwest is once again looking and feeling like the pre-COVID Northwest of early 2020. However, we remain ready, prepared, and vigilant to address any new surges until this pandemic has finally receded. No one on the staff remains unchanged from the experiences of the last twelve months. We have seen the lows of human despair and suffering, and we have witnessed the highs of human compassion and ingenuity. I can only express my utmost respect for the personnel of the hospital and my colleagues in leadership roles throughout the facility. Quite frankly, it has been real. I truly believe that Northwest is a better healthcare facility because of the COVID experience. If the next great pandemic can wait several decades to materialize, I will not be in a position to have to worry about it. But, I do think that many valuable lessons incurred at the facility, local, and national levels need to be well documented for posterity because, appreciating the complexity of Mother Nature, this will happen again.

Dr. Brian Weis obtained his undergraduate degree at Georgetown University (where he majored in theology!) and his medical degree, residency training, and PhD in biochemistry from the University of Texas Southwestern Medical School in Dallas. Before becoming Chief Medical Officer at Northwest Texas Hospital, he was a faculty member in the department of internal medicine at Texas Tech SOM in Amarillo, where he was honored for both teaching and administrative excellence.



COVID-19: A Year in Review – A CMO's Perspective at BSA

by Michael Lamanteer, MD

There is a sign that hangs in one of the main hallways at BSA Hospital. As of the date I'm writing this article, it reads: *"2,400 COVID-19 lives saved.....and counting."*

h my, what a difference a year makes. Thinking back on the past 12 months, how glad we are to be in the position we are today compared with April of 2020! Our experience over the past year at BSA Health System has been one that will be remembered and recounted for years to come. I recall returning from our annual Ardent Leadership Meeting in Nashville, Tennessee, in early March of 2020. We were celebrating our accomplishments of 2019, where our performance was leading the organization across all measured pillars - people, service, quality, growth, and financial. Coming off that high of sorts, we were certainly paying close attention to the events around the world, and specifically in some areas of our country that were the first to be affected by COVID-19. Not long thereafter, on March 19th, we had our first patient with confirmed COVID-19^h. We began to realize the impact of having an inpatient in our facility as it related to employee exposure. Conflicting reports from respected healthcare professionals and facilities in other parts of our country had us initially believing that co-infection was unlikely. My thoughts raced back to some of the lessons many physicians were taught during the early stages of their training - it's unlikely that your patient is presenting acutely with two new diagnoses. The resultant backtracking to identify potentially exposed healthcare personnel and the rigorous review of critical details related to a defined, potential exposure were soon to become very familiar to us. And yes, you can have two new infections at once. Specifically, early in our experience, influenza and COVID-19.

A not-so-favorite phrase we began to recite often to affected staff - "you need to be quarantined" - suddenly had us fearing the absurd. Will we soon not have enough staff to manage a specific unit? Will there be enough staff to cover a specific service line, to prevent diversion of patients away from our hospital? Those questions became reality as more and more employees required a "quarantined" designation. Two weeks out of work - no exceptions. Too many unknowns to take the risk of early "re-entry" into the workplace. Additional questions then began to build. "If I'm positive but I don't have any symptoms, why can't I return to work sooner?" "My child is positive for COVID. They are a household contact, but they really live in a separate area of the house. Can I avoid quarantine?" The unfortunate answer to almost every one of these questions early on was a non-negotiable "no".

We became obsessed with ensuring the safety of our patients, employees, medical staff members, and other team members who were in regular contact with both COVID positive and non-COVID positive patients, realizing the risk of exposure was not isolated to those sources known to be infected. As we all know now, the concept of a disease that is likely to be most transmissible before a patient becomes symptomatic was not well appreciated when it comes to illnesses primarily transmitted by respiratory means. Thus, personal protective equipment became the crux of our efforts to protect staff. Our prompt realization that the supply of N95 respirators, isolation gowns, nitrile gloves, eye protection equipment, head protection materials, and PAPRs (often referred to as 'space suits'), was simply not going to be adequate if a significant surge in hospital cases ensued. We quickly decided that PAPRs were not going to be an option. The risk of self-contamination when "doffing" that gear was the greatest concern. Our team members working in the supply chain arena worked feverishly to acquire these items from all potential sources. We were also graciously provided some PPE by individuals and organizations that had additional supply that could be shared. We began to reprocess N95 masks per CDC guidelines. We were tasked with ensuring that very detailed specifications were followed for decontamination and reuse, understanding the entire time that supply was not going to keep up with the pace of demand as hospital numbers continued to grow.

Our first 'peak' of inpatient COVID volume occurred in May of 2020. At that time, we reached a total of 54 patients with confirmed COVID-19 in the hospital. We noticed the interesting phenomenon that a consistent fifty percent of our inpatient census was requiring ICU level care. Of those in the ICU, it also remained consistent that fifty percent were requiring endotracheal intubation and mechanical ventilation to manage their rapidly progressive respiratory failure. We also witnessed the grim reality of a sharp decline in a patient's overall prognosis once the requirement for mechanical ventilation became a reality. We certainly had our success stories. Our physicians, nurses, and caregivers across all disciplines can recite examples of some amazing "saves" patients who had a very poor outlook due to the severity of illness during the early phase of their infection, but who were amazingly discharged from the hospital off circulatory and ventilatory supportive measures – nothing less than a miraculous recovery due to outstanding efforts from our front-line caregivers and the grace of God.

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The second peak we experienced in November of 2020 was the real peak. We didn't understand what a surge in COVID volume was until that time. By November 17th, we had hit a total volume of 200 confirmed cases of COVID-19 in our admitted population of patients. At that time, 56% of our entire inpatient census was secondary to the effects of COVID-19. We had to handle the sudden harsh reality of an ICU census that was well beyond our historical capacity. Normally, 48 total ICU beds at BSA is a packed house; expansion to our step-down Intermediate Care Unit allows for critically ill patients who are recovering to be downgraded to a less acute setting. We expanded to a capacity of 94 total ICU beds in our facility. We were tasked with creating ICU beds in areas that were never designed to be ICUs. Creativity from our nursing leaders to tackle serious staffing shortages and extreme dedication from our healthcare personnel to battle long hours and sleepless nights were displayed in full array. Our medical staff and nurses managing these patients on the front lines on a daily basis made me extremely proud. Covering one another to ensure that patients were getting appropriate care and sacrificing days off, rest, sleep, and time with their families was admirable. I can also say that not a single provider ever complained about the work. As a dear friend and colleague of mine once said, "time to put your head down and keep making sandwiches" - in reference to the fact that, when the volume is high and conditions seem overwhelming, taking one patient at a time and continuing to move forward is the best way to cope with a seemingly impossible high-volume situation.

The multitude of COVID-specific issues we were facing daily was significant. Testing capabilities and turnaround times were major limiting factors for months. Lack of testing supplies, reliance on sendout tests, and the resultant need to keep patients with tests pending in isolation, led to augmented burn rates of critically short supplies (e.g. N95 respirators) during the early months of the pandemic. Once we were able to move rapid PCR testing into our own laboratory, that situation became a "game-changer" for us. Determining COVID positivity rapidly for patients under investigation allowed a far better transition of those patients requiring admission to the medical-surgical wards in the appropriate units.

Our BSA Facilities Team was faced with an enormous task. We had to create negative pressure rooms to house a very large number of COVID-positive patients. Traditional negative pressure rooms were very few in number and not congregated. Our team's ability to improvise and produce a negative pressure environment for all ICU rooms plus additional units on our general medical wards was a true display of ingenuity and hard work.

Finally, it should not be overlooked that our patients were suffering not only from their physical illness during this time frame. They had to battle loneliness in the setting of significant illness – and not only the COVID positive patients. The restrictions we had to put in place in terms of visitation, the lack of physical contact from healthcare staff, and the masked and gowned appearance of our direct healthcare providers for safety purposes, all adversely impacted the patient experience and provider-patient relationship. Human touch and connection are critical aspects of healing.

In summary, the past year has been exhausting. Reviewing countless agency updates and the most recent evidence from expert panels and societies. Implementing urgent policy and protocol changes to protect our patients and our staff. Working with facility leaders to ensure our Incident Command structure was addressing all critical areas. Collaborating with healthcare leaders across our region to ensure that our messaging was sound, consistent, and well-intended. Partnering with neighboring hospitals and healthcare leaders to address some of the most challenging issues. Working with our City of Amarillo Leadership to ensure that we were keeping the citizens of our community at the forefront of our decision-making endeavors. Witnessing front-line staff covering each other's back to maintain our ability to manage an enormous population of critically ill patients.

One of the most positive aspects resulting from this horrible pandemic has been the outstanding sense of community we experienced. The challenge was huge, but our healthcare providers in Amarillo rose to the challenge. We were only one part of the entire region's response, but we rose to the incredible challenge. That is why we say: at BSA, we have had 2,400 COVID-19 lives saved...and counting.

Dr. Lamanteer graduated cum laude from Jefferson Medical College in Philadelphia, Pennsylvania in 1996. He then completed his Internal Medicine residency at the Milton S. Hershey Medical Center in Hershey, PA in 1999. After practicing as a full-time internist and hospitalist for Wellspan Health in York, PA for ten years, he then moved to Amarillo to join the BSA Hospitalist Group. Since 2012, he has been Chief Medical Officer and Senior Vice President for Medical Affairs at BSA Health System.

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Critical Care adaptations during the COVID-19 Pandemic

by Kishore Yalamanchili, MD

The Intensive Care Unit and the Emergency Department have been the epicenters of the COVID pandemic. While many of the issues were logistical – e.g., finding enough personal protective equipment (PPE), ventilators and healthy non-quarantined doctors, nurses and respiratory therapists to use them – some changes in ICU practice have emerged. I will not go into the various pharmaceutical agents that we have tried – many have proven minimally effective or worse – but I will discuss some of the changes in approach and management of the ICU patient that COVID has brought about.

During this pandemic, medical wards faced shortages of PPE such as caps, gowns, masks, and gloves. These items were used in very high numbers by staff entering rooms to prevent surface and airborne spread of viral particles. In order to conserve these materials, a variety of practices were implemented. To reduce entry into rooms, medication pumps and ventilator screens were placed outside of rooms, when possible, using extension tubing and cables. These modifications allowed some of the medical staff functions to be completed without entering rooms as frequently. These changes did lead to substantially higher use of IV tubing supplies but reduced usage of the scarcest PPE supplies. In addition, technological advances (including miniaturization) have made modern ventilators dramatically smaller and more cost-effective. Unlike the garbage can-sized ventilators of past decades, modern machines are portable, less prone to malfunction, and much easier to clean. This is especially important when ward or ER space is recruited to serve as a makeshift ICU, as has occurred in many parts of the country.

Oxygen delivery and prone positioning

Fortunately, during this pandemic, care capacity was greatly improved by the development of high flow nasal cannula oxygen delivery devices (2). Traditional nasal cannulas, Venturi masks, and

non-rebreather masks are unable to comfortably deliver 100% oxygen and high flow simultaneously. For many patients, the adaptation of high flow oxygen systems prevented a substantial number of ventilator days which would have been otherwise required. Many patients with COVID pneumonia and acute respiratory distress syndrome utilized high flow cannulas for their oxygen needs both before and after ventilator liberation. The use of high flow systems dramatically increased the beds available for severely hypoxemic patients. An interesting side effect of high flow cannulas is the very annoying noise of constant high flow air for days or weeks at a time.

Prone positioning of patients assists in transiently improving oxygenation of patients with acute respiratory distress syndrome by redistributing blood flow to areas of the lung with less atelectasis. The mechanism of action is thought to be improvement of ventilation perfusion mismatch by periodically increasing blood flow to the better oxygenated anterior areas of the lung less affected by gravity pooling of secretions and inflammatory mediators. Beneficial effect on oxygenation was often immediate and sometime dramatic.

Proning had been studied before COVID, but the pandemic made its use commonplace and helped staff and doctors alike become adept in its use. It was used in most patients with requiring highflow oxygen, with the main limiting factor being patient tolerance. Some patients, particularly obese patients, find prone posture extremely uncomfortable. Patients who could tolerate prone posturing were kept on their stomachs for as much time as possible, often at least 18 hours a day. Patients on the ventilator were turned frequently "like a pancake". Challenges in maintaining personal hygiene, positioning of tubes and catheters, and accomplishing physical therapy maneuvers can well be imagined, but the nursing and support staff, despite being overburdened with work, rose to the challenge of keeping these desperately ill patients prone and oxygenated.

Anticoagulation and sedation

Decisions about anticoagulation have posed difficult dilemmas for ICU practitioners during the pandemic. Early on, it became clear that COVID patients were in a hypercoagulable state. Case series reported numerous patients with venous thromboses and pulmonary emboli (PE); the difficulty of suspecting and diagnosing PE in a patient with white-out on chest x-ray is obvious. In addition, autopsy studies showed that, despite prophylactic anticoagulants, the lungs of COVID patients were often riddled with micro-emboli. For this reason, some institutions began using prophylactic intermediate-dose (0.5 mg/Kg BID) or full-dose (1 mg/kg BID) enoxaparin in all patients, only to see a major increase in bleeding complications. Achieving the middle road between clotting and bleeding has proved to be a very difficult path to walk. The most recent studies suggest that the safest course is continued use of standard low-dose prophylactic dose enoxaparin, combined with intense vigilance for the development of clots in legs, lungs, and other organs.

Prior to COVID, common practice included the use of minimal sedation and daily interruption of sedation for ventilated patients. For the past two decades, this has been common practice, as some studies showed reduced time on mechanical ventilation with this strategy (1). Many patients with COVID developed severe acute respiratory distress syndrome (ARDS) with poor lung compliance, tachypnea, and profound work of breathing. These problems resulted in issues with ventilator synchrony, and thus deeper sedation and paralytics became fairly commonplace. We suspect there is more than a passing association with subsequent neuromuscular weakness related to such prolonged sedation and paralytic use. Coupled with the catabolic effects of dexamethasone for the treatment of COVID-19 ARDS, we may have additionally potentiated issues of neuromuscular weakness. There have also been reports of a high rate of neuromuscular pathology caused directly by the SARS-CoV-19 virus.

Undernutrition and debility

Patients with COVID-19 suffer from severe loss of appetite and subsequent protein calorie malnutrition. While many viral and bacterial illnesses had caused similar features in the past, COVID has resulted in particularly long clinical courses. Poor appetite, prone position, oxygen masks, and intubation are examples of some of the impediments to receiving oral nutrition. To mitigate this, we made early use of enteral feeding tubes the norm. Many patients were started on tube enteral nutrition within the first days of arrival if nutrition intake appeared marginal. For many other illnesses, the disease or associated anorexia passes within a reasonable time, such that early vs late nutrition studies have often been inconclusive. For COVID, early nutrition was deemed reasonable even in the face of cachexia (where nutrients may not be fully utilized by the body).

Hospitalizations for COVID pneumonia often require protracted hospital and recuperation periods. This is relevant from the perspective of atelectasis, as previously noted, due to unusually long time periods of patients remaining immobile in hospital beds. The immobility has been multifactorial and includes the common intensive care culprits, including connected monitors, tubes and lines, restraints, oxygen cannulas, intubation, sedation, paralytics, dyspnea, fatigue, and neuromuscular de-conditioning. Before COVID, there had been an increasing trend toward early physical therapy in the intensive care units. This disease presented new challenges. Early mobilization and prone positioning required more physical therapy resources in a pandemic-strained environment of reduced manpower, containment of disease spread, and preservation of scarce resources (PPE). Patients often had too many impediments to participate in physical therapy, leading to a feedback loop of increasing de-conditioning. Many patients required extensive stays of 2-8 weeks or more in post-acute care settings for ongoing physical therapy. There were patients whose progressive deterioration led to palliative care and eventual death long after the acute phase of the illness was completed.

Among the more frustrating elements for patients with COVID has been their very protracted isolation for weeks within the hospital and the inaccessibility of family members to hospital facilities. Many patients used video conferencing on personal devices to maintain some contact. Portable cellular video conferencing technology could not have come at a better time. Early in the course of the pandemic, some staff were communicating with patients via video chat in order reduce room entry and PPE usage for some tasks. The use of video communication for inpatients has become routine at this point.

The pandemic and evidence-based medicine collide

Finally, the pandemic has produced a dramatic collision of evidence-based medicine with a global pandemic that initially called for treatment decisions to be made on the basis of very limited data. Basically, we had few proven therapies in a setting where everybody wanted to do something. On the basis of personal experience and pressure from the internet (the two worst ways to make medical decisions), reasonable doctors would make mutually contradictory decisions. Initial published information was of necessity based on single-institution, retrospective and uncontrolled experience - much of which proved to be wrong. Part of the emphasis on "doing something" was driven by what I call "post-facto guilt." The doctor would think: what if studies, when finally completed, show that treatment X was beneficial, and I had not used it? Anxiety about post-facto guilt probably accounts for initial enthusiasm for treatments such as hydroxychloroquine and convalescent plasma which have, in controlled studies, been shown to have no benefit. In addition, the sheer number of recommendations was bewildering. "Expert opinion" depended on which institution you were looking at; many recommendations were contradictory. Ultimately, in my opinion, the conservative guidelines from the National Institutes of Health turned out to be the most reliable sources for ICU practice.

Looking back on the last year, ICU practitioners have seen a few real improvements - the confirmation of the protective effect of PPE, the widespread use of prone posturing and high flow oxygen cannulas - and some confirmation of practices already in place. We have learned that inflammation, hypercoagulability, and cytokine activation produce a very tenacious disease process and that weaning COVID patients from the ventilator is slow and often impossible. We have confirmed that protracted ICU stays lead to long-term problems with undernutrition and debility. We have again learned that preliminary and anecdotal evidence is often wrong and that serious viral illnesses are exceedingly difficult to treat. And, finally, we have learned that the best way to handle epidemic viral diseases is by vaccination.

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One Year Into the Pandemic: COVID Research in the Texas Panhandle

by Mark Sigler, MD

I can recall the first reports I heard of a "novel coronavirus" in December 2019. I remember discussing this new virus with infectious disease specialist Dr. Taylor Carlisle in the hallways of Baptist St. Anthony's Hospital. At the time, no cases had been reported outside Wuhan, China, and there was uncertainty regarding whether this newly recognized coronavirus would remain isolated in China, spread regionally, or ultimately involve the entire international community. (Admittedly, there is still uncertainty to this day regarding the ultimate duration of the COVID-19 pandemic, and whether there will be a true "end" to COVID-19). Following formal recognition in the New England Journal of Medicine in January 2020 (1), there was an increasing sense locally that SARS-CoV-2 would likely spread to Amarillo, although whether it would be an isolated case or series of cases (versus widespread involvement) was unclear. Regardless of the number of cases that ultimately developed, once we identified the need to be active in investigating putative therapeutics, it was imperative that the research be done well and in an organized fashion.

Given Amarillo's relatively late involvement in COVID-19 (in comparison to Seattle, New York City and other national and international travel hubs), there were limited options regarding involvement in the first iteration of randomized controlled trials. However, in April 2020 (around the time of Amarillo's first COVID-19 patient), we were contacted regarding participation in the Mayo Clinic's trial investigating the use of convalescent plasma. Although not a blinded, randomized trial, it was prospective in nature, and this was felt to be beneficial. Additionally, it would give us a therapy we could offer patients in the hospital while adding to the general body of medical evidence involving COVID-19 therapeutics. In retrospect, this proved to be an excellent initial study for us in Amarillo, as the first surge of COVID-19 occurred

and the mechanics of running a large, quickly-moving study were elucidated. On April 12, 2020, the first subject in Amarillo was enrolled in the Mayo Clinic study. Although severely ill and initially requiring mechanical ventilation with prone positioning and paralytic administration secondary to severe ARDS, he was ultimately successfully extubated and discharged home, where he remains active as a local healthcare provider. In all, over 30 patients were enrolled in this study.

In June 2020, we were contacted by Regeneron regarding involvement in their randomized, double-blind, placebo-controlled study for inpatient and outpatient subjects with COVID-19. In comparison to the convalescent plasma study, the Regeneron trial would involve intensive inpatient and outpatient follow-up, and it was clear that a one- or two-person research team would not be able to conduct the trial in a responsible fashion. This ultimately resulted in a fairly unique collaboration between Texas Tech University Health Sciences Center (my employer) and Pharmatex, LLC (a research group affiliated with the Cardiology Center of Amarillo, with extensive experience in industry-sponsored research). By essentially all criteria, this partnership and the conduct of the trial locally was a marked success. We enrolled our first inpatient at the end of August 2020, and this was quickly followed by the first outpatient enrollment.

During the first month of the Regeneron trial, there was a growing familiarity within the community regarding the presence of the study and local access to it. Enrollment during the first month occurred at a steady pace that was felt to be manageable by all of the investigators (myself, Dr. Tarek Naguib and Dr. David Brabham). Following the first month of local enrollment, however, we experienced an exponential increase in the number of outpatients and inpatients referred to our study center. We

were quickly faced with a difficult question: how to maintain availability to study enrollment for our community, while also maintaining fidelity to the study protocols (involving 10-15 laboratory draws and nasopharyngeal swabs for every subject enrolled for 30 days)? The answer to this came in the form of flexibility and growth in Pharmatex and its staffing – Dr. Brabham rapidly expanded the staff at Pharmatex to meet the demand for trial enrollment. Despite the small size of Amarillo and the need to rapidly increase research staff to conduct the trial, TTUHSC and Pharmatex were eventually asked to speak at a Regeneron meeting to discuss the processes that resulted in both high enrollment and high fidelity to the intensive study protocols. At the conclusion of the inpatient trial, our local Amarillo site was ranked fifth out of 150 international sites in study enrollment. I believe this reflected the work done at TTUHSC and Pharmatex, as well as the investment of the local medical community in actively participating in research that will meaningfully affect the course of the COVID-19 pandemic.

Although one of the most important markers of research success is enrollment (in addition to a minimal number of protocol deviations/subject withdrawals), as clinicians we also hope for a positive outcome from our trials. Over the summer of 2020, one of the driving factors for our enthusiasm to work with Regeneron was their previous success in developing monoclonal antibody therapies - these included a very successful Ebola therapy, a biologic therapy for asthma (dupilumab - brand name Dupixent) and significant success in ophthalmologic therapy. They used a similar platform to develop their combined monoclonal antibody therapy for COVID-19, and we were optimistic that this promised clinical success. Initial results for the first 275 outpatient subjects enrolled demonstrated reduced viral load and fewer medically-attended visits (2). In February 2021, analysis by the independent data monitoring committee was performed and led to the placebo arm of the trial being discontinued secondary to efficacy of the antibody cocktail in reducing hospitalization rate and death (3). Furthermore, because of the dual antibody-combination, there is optimism that there will continue to be ongoing activity against new SARS-CoV-2 variants (4).

As the Regeneron studies came to a close, we were contacted regarding participation in National Institutes of Health (NIH)-sponsored research. This has created a natural segue as we progress in our local research involvement. Over the summer, we anticipate involvement as a clinical site for the ACTIV-5/Big Effect Trial, an NIH-sponsored study evaluating the combinations remdesevir/lenzilumab. remdesevir/risankizumab, or remdesevir/ placebo in treating inpatients with severe COVID-19. Without strong community involvement in the Regeneron studies, along with the collaboration between TTUHSC and Pharmatex, it is unlikely that we would have been invited to be a clinical site for a platform trial such as ACTIV-5.

Although there have been challenges in conducting research in a relatively small medical community, the last year has allowed us to be active in contributing to the medical body of knowledge regarding treatment of COVID-19. I am optimistic that our success in conducting research will facilitate ongoing involvement in both COVID-19 and non-COVID-19 studies. Perhaps most importantly, we need to thank our patients for their willingness to enroll in studies that will improve how we treat those with COVID-19. We are 1 year into the pandemic, and we know far more now than we did in the spring and summer of 2020 regarding how to treat COVID-19; the research work done locally in Amarillo has contributed significantly to this body of knowledge.

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Dr. Mark Sigler attended medical school at Creighton University School of Medicine and completed his internal medicine residency at Texas A&M/Scott and White in Temple, Texas. He then completed a pulmonary/Critical Care fellowship at Texas Tech in Lubbock before coming to Amarillo. Dr. Sigler is currently an assistant professor in the internal medicine department at Texas Tech in Amarillo, where he is engaged in teaching, research and patient care in the pulmonary disease and critical care medicine division.

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Emergency Management Perspectives on COVID-19

by Kevin Starbuck, CEM, TEM, CPM

On January 20, 2020, the first confirmed U.S. case of a novel coronavirus that originated in Wuhan, Hubei Province, China, was identified in Snohomish County, Washington. Within two months of the first identified U.S. case, on March 18,2020, two patients tested positive for the novel coronavirus in the Amarillo area, drawing our community into the growing global pandemic. As the Amarillo area has surpassed the first anniversary, it allows reflection on our community's approach to the COVID-19 pandemic.

Much of my career is focused on emergency management and homeland security, with the last five years working in city management overseeing community services, including public health and emergency management. With these perspectives, I look at how our community has navigated the challenges of the last year. As a starting point, I want to provide a summary of the mission of emergency management:

"Emergency Management protects communities by coordinating and integrating all activities necessary to build, sustain, and improve the capability to mitigate against, prepare for, respond to, and recover from threatened or actual natural disasters, acts of terrorism, or other man-made disasters." -(FEMA)

While the COVID-19 pandemic fits within the framework of emergency management, there is an inherent bias in the profession toward natural and man-made disasters. Born out of the civil defense programs of the 1950s, as well as seminal disasters such as September 11th and Hurricane Katrina, emergency management services, as refined over the years, now provide direction to local, state, and federal efforts. The advent of homeland security has done little to change that dynamic, as preparedness for biological incidents was primarily focused on the threat of bioterrorism (e.g., Tokyo sarin attack in 1995; U.S. anthrax attacks in 2001). Even precursor disease incidents such as the West Nile Virus (1999), Severe Acute Respiratory Syndrome (SARS, 2003), H1N1 influenza (2009), and Ebola (2014) have done little to change the focus in emergency management, as these diseases within the U.S. were primarily localized and managed within the existing public health and healthcare infrastructures.

Despite these biases, emergency management's functional components offer a tool kit to manage, coordinate, and support response to any large-scale disaster. As awareness of COVID-19 was growing in early 2020, we realized that public health would serve as our community's first line of defense against the pandemic, but that our traditional public safety and



Lyndsee Cantly Graphic Designer

0: 806.373.5919 D: 806.486.1772 PANHANDLE PRESORT SERVICES 920 SW 9th Ave. - Amarillo, TX 79101 emergency management would play a crucial supporting role as well.

Resource management and the support of mass operations such as materials distribution, testing, and vaccination all proved to be areas well-suited to emergency management, especially in partnership with public health. These functions have a basis in natural disaster response, such as response to a hurricane with mass evacuation, sheltering of people, and the distribution of water and ice to areas impacted. Our ability to surge staffing and equipment to accomplish activities that do not require specialized infrastructure helped provide an important component in the overall response.

This was best demonstrated in the pandemic's early months, when lockdowns and supply chain shortages created pressures on basic needs for the community. The utilization of public safety-based incident command teams to work with private sector partners on food and pet supply distribution and traffic control for the drive-thru testing site demonstrated the strength of emergency management efforts to create flexible solutions.

COVID-19 has given rise to virtual tools such as Zoom and Teams that have vastly improved coordination. Similarly, emergency management has traditionally employed software tools, such as VEOCI and Everbridge, to enhance operations. These tools allowed for improved situational awareness; they helped establish a virtual process to manage resource requests and temporary worker assignments, and they helped create a patient investigation form for citizens who were conducting contact tracing.

Conversely, the juxtaposition of roles highlights the limitations of government to provide specialized response to a pandemic. An example of this played out in the early months of COVID-19 response, when we experienced a surge in cases from the meat processing industry. In preparation for an anticipated spike in cases at local hospitals, a rapid planning effort was initiated to evaluate medical surge options through an alternate care site. The simple answer is that there was no solution beyond the healthcare infrastructure that already existed within the community. While an incredibly talented and well-versed team evaluated the usage of hotels, the Civic Center, tents, or legacy medical facilities as potential alternate care sites, our best answer turned out to be support of our primary care hospitals.

This planning effort came to reality in late 2020 with the deployment of over 1,400 healthcare professionals to the Amarillo and Lubbock region to manage a sudden influx of patients into hospitals. The State of Texas was called upon to initiate contracts with healthcare staffing agencies to pull professionals from across the country, thus providing a resource that had not previously existed within the governmental framework. This created its own challenges but demonstrated the ability to expand the existing healthcare infrastructure based on high demand.

The question becomes: how do we address these biases and limitations to better prepare our community for future disasters? We need to start with a more realistic view of our planning situations and assumptions and to base them on a whole-community approach that genuinely addresses all hazards. The fact is that the health and medical components of any disaster rest first of all with our private sector healthcare infrastructure. While efforts have been made to include healthcare in emergency planning, COVID-19 has exposed a gap in the level of engagement. Legacy programs like the Metropolitan Medical Response System (MMRS) and Medical Reserve Corp (MRC) should be revisited for potential pathways to improve healthcare integration with community emergency management and to identify options to create a local surge capacity.

We have a solid foundation to address these challenges through the relationships that have been fostered over the past year. These pathways will break down the biases in our approach to emergency management and will set us on a course to promote a whole-community approach. Furthermore, emergency management must adapt to embrace a public-private partnership approach that fully utilizes our critical infrastructure partners and the private sector supply chain. By embracing these lessons, we will have a more resilient community and will be better prepared for future disasters.

Kevin Starbuck is the Deputy City Manager for the city of Amarillo, Texas, overseeing the community services portfolio of his many departments. Before the transition to city management, Kevin served for 20 years in numerous emergency management leadership and specialist roles with the Amarillo/Potter/Randall Office of Emergency Management and as a contractor for the U.S. Department of Energy (DOE), Pantex Plant. Kevin has Bachelor of Science in Emergency Administration and Planning from the University of North Texas and a Master of Arts in Security Studies, Homeland Defense and Security from the Naval Postgraduate School.

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Antidotes vs. Anecdotes: A Review of Ineffective COVID-19 Treatments

by Jon D. Bush, MD

Since the onset of COVID-19 in December of 2019 and the declaration of a global health emergency in January of 2020, scientists around the world have raced to come up with effective treatments to combat the virus. In the face of a new, widespread pathogen with few available therapeutic options, healthcare providers have had to balance the Hippocratic injunction "primum non nocere" (first, do no harm) with "desperate times call for desperate measures". Unfortunately, several well-intentioned attempts to treat COVID-19 have, to this point, proven to be ineffective.

Hydroxychloroquine

Hydroxychloroquine was an early favorite to quell the pandemic, initially touted as a cure by politicians and even granted emergency use authorization (EUA) by the U.S. Food and Drug Administration (FDA) in March, 2020. This medication was developed in 1946 to treat and prevent malaria and is also used to treat autoimmune conditions like rheumatoid arthritis and lupus.

Initial studies of hydroxychloroquine looked promising. In vitro, it was shown to raise the pH inside cell endosomes, possibly making it difficult for the SARS-CoV-2 virus to fuse to cell membranes. It also prevented release of viral particles from infected cells, theoretically preventing the spread of the virus through the body. Early in the "hydroxy" debate, an opinion piece in Newsweek by a professor of epidemiology at Yale reported early (flawed) studies and promoted hydroxychloroquine as an effective treatment. Shortly afterwards, a You Tube video was circulating by "America's Frontline Doctors". This group of healthcare providers, wearing white coats and touting hydroxychloroquine as a cure based on anecdotal experience, proliferated on social media.

In October of 2020, The New England Journal of Medicine released the results

100 % Membership

Thanks to the group practices* whose entire physician staff are members of Potter-Randall County Medical Society and TMA. Amarillo Medical Specialists Amarillo Family Physicians Clinic Amarillo Heart Group Amarillo Urology Cardiology Center of Amarillo High Plains Radiological Association Panhandle Eye Group Texas Oncology Women's Healthcare Associates Amarillo Anesthesia Consultants on hydroxychloroquine from the RECOVERY trial (2). This randomized, controlled, open-label platform trial from England had multiple treatment arms (and will be a recurring reference in this article). For hydroxychloroquine the primary outcome was 28-day mortality. Results showed that hydroxychloroquine did not produce a lower incidence of death at 28 days compared to usual care.

The World Health Organization (WHO) launched the SOLIDARITY trial to investigate potential COVID-19 treatments (13). This randomized trial included 12,000 patients in 500 hospital sites in over 30 countries. Its interim results, published in October 2020, showed that hydroxychloroquine had little or no effect on mortality, initiation of mechanical ventilation, or duration of hospital stay.

Another study out of Catalonia, Spain, first reported in November 2020, described an open-label, cluster-randomized trial involving asymptomatic contacts of patients with PCR-confirmed COVID-19 (7). This study showed that post-exposure therapy with hydroxychloroquine did not prevent SARS-CoV-2 infection or symptomatic COVID-19 in healthy persons exposed to infected patients. Currently, the WHO and the FDA do not recommend hydroxychloroquine for treatment or prevention of COVID-19 (4).

Azithromycin

Well-known for its overuse in respiratory infections of all causes, prescriptions for this macrolide antibiotic have been a common parting gift at urgent care centers and walk-in clinics for decades. It makes sense that it would be considered as a possible treatment for a brand new respiratory viral pandemic.

The early promise of effectiveness was not unfounded. Though indicated for bacterial infections (non-resistant Strep, Chlamydia, Mycoplasma, pertussis, gonorrhea, MAC, Salmonella, Shigella, Campylobacter, typhoid, babesiosis), azithromycin does have some antiviral effects in vitro. It has been shown to inhibit viral cell wall binding to bronchial epithelial cells and incorporation of the virus into the cell. It possesses some anti-inflammatory effects and can influence modulation of macrophage action. With widespread availability and a favorable safety profile, azithromycin became a common initial treatment for COVID-19.

One arm of the RECOVERY trial compared azithromycin plus usual care to usual care alone in hospitalized patients (9). It showed no change in 28-day mortality, no decrease in hospital length of stay, and no difference in risk of progression to mechanical ventilator use. The PRINCIPLE trial, a UK-based open-label, multi-arm randomized trial, found that azithromycin (and doxycycline, for that matter) did not reduce recovery time for COVID-19 patients (1). More recent studies are evaluating the potential for antibiotic resistance due to overuse during the pandemic.

Lopinavir/Ritonavir

It is reasonable to deduce that antiretroviral protease inhibitors might also inhibit SARS-CoV-2 viral replication, as they do for HIV. The RECOVERY trial also had a lopinavir-ritonavir arm, once again comparing the medications plus usual care to usual care alone. This arm of the RECOVERY trial was actually stopped early due to no clinical benefit seen (3). In addition, the plasma drug concentrations in typical dosing of this medication combination are far below levels needed to inhibit SARS-CoV-2 replication in vitro. It is estimated that levels of 60-100 times greater would be needed, which would lead to increased drug side-effects and toxicity (10).

Ivermectin

Next to hydroxychloroquine, this

medication has created the most controversy of any of the COVID-19 potential treatments. Ivermectin is approved by the FDA for the treatment of strongyloidiasis and onchocerciasis (river blindness), two conditions caused by parasitic worms. There are also topical forms of the drug for treatment of head lice and rosacea. It has been previously touted as a possible treatment for viral illnesses including Zika, HIV and yellow fever; however, none of the studies for these indications showed it to be effective.

In vitro, ivermectin has shown antiviral activity. It disrupts the intracellular transport process used by viruses to enhance infectivity and was felt possibly to interfere with binding of the SARS-CoV-2 spike protein to the cell membrane. It possesses some anti-inflammatory effects.

On March 4, 2021, JAMA published the results of a double-blind, randomized study comparing time to resolution of symptoms with ivermectin to placebo. 476 patients were studied, all with mild disease and symptoms for 7 days or less. No difference was seen between the two groups (5).

Still, well-respected physicians have continued to use ivermectin to treat COVID-19 and have promoted its effectiveness anecdotally. This attention prompted the assembly of a guideline-development group to evaluate its potential use. The group consisted of international clinical care experts from multiple specialties, an ethicist, and patient partners. They reviewed data from 16 randomized controlled trials including both inpatients and outpatients. The panel determined that the evidence for effectiveness of ivermectin for the treatment of COVID-19 was of "very low certainty". It was felt that many of the studies were small and confounded by the use of simultaneous treatments. The WHO recommends that ivermectin be used only within clinical trials (12), and the FDA does not support its use for treatment of COVID-19 (5).

Vitamins and Supplements (C, D, zinc)

Vitamins and nutritional supplements have been used for centuries to treat nearly every medical condition known to man, as well as to maintain or enhance normal health. I will briefly discuss the three most commonly seen as components of COVID-19 concoctions.

All 3 of these supplements have been linked to studies claiming to show improved immune function and even to shortened duration of other viral illnesses such as common colds and flu. A retrospective study at the University of Chicago has shown a relationship between high serum vitamin D levels and less frequent COVID-19 positivity, especially in Black people (6). Unfortunately, to date, there are no quality studies linking vitamin C, vitamin D, or zinc to improved outcomes with regards to treating COVID-19.

The COVID A to Z Study was an open-label, randomized trial at multiple hospitals in Ohio and Florida and ran from April to October 2020 (11). Its results showed no difference in length of illness, severity of symptoms, hospitalizations, or deaths in patients taking high doses of zinc and/or vitamin C versus placebo. The study was stopped early for futility after 214 patients were enrolled.

| continued on page 32



Another randomized clinical trial compared treating hospitalized patients with moderate to severe COVID-19 with a large (200,000 IU) single dose of vitamin D3 to placebo (8). There was no difference in length of hospital stay.

Practicing evidence-based medicine during a pandemic with a novel virus is a challenge as we starve for any bit of data to indicate that one form of therapy is superior to another. In the hospital setting this past year, I witnessed all providers, including myself, ordering unproven and unstudied medication regimens on COVID-19 patients of all levels of severity. Almost unanimously, these treatments were used with documentation of careful explanation to the patients that, though not yet proven to be effective, the treatment may provide benefit based on our experience with past, similar disease processes (desperate times call for desperate measures) and the risk of serious side effects was minimal (first, do no harm). It is reassuring to know we live in a time when high quality, randomized, controlled studies can be organized and published faster than ever, putting aside profit and non-urgent research for the benefit of the population, ultimately allowing us to provide our patients with the best available, evidence-based care.

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COVID-19 and Palliative Care/Hospice: Lessons Learned

Randy Stewart, MD, FACP

"I think for all of us this felt like the most unnatural thing we'd ever experienced in our careers, because the medicine that is given for people who are taking their last breath is primarily the hand of someone who loves them."

— Chaplain Maria McLain Cox

s the US healthcare system strug-Agled to care for the influx of severely ill patients with COVID-19, the need for hospice (supportive care and symptom management for those felt to be in the last 6 months of life) and palliative services (specialized medical care to manage symptoms of patients living with serious medical illness who may be still seeking curative care) rose exponentially both in the inpatient and outpatient settings. The US has experienced over 500,000 COVID-19 deaths, with the majority occurring in a health care setting. While the need for compassionate end of life care grew during COVID-19, providing this care to patients with a highly transmissible and lethal infectious disease presented unprecedented challenges.

The outbreak of COVID-19 early in the pandemic in a long-term care facility in King County, Washington resulted in a resident case fatality rate of over 50%. This outbreak set the stage for a near-complete shutdown of nursing facilities to ancillary staff and family visitation. The strict visitation limitation eventually became the norm for healthcare facilities across the country. Early in the pandemic, there was a paucity of information regarding the risk and modality of spread, along with a shortage of adequate Personal Protective Equipment, making it essential to limit contact with high-risk groups. A retrospective review of the risk of patients contracting COVID-19 from health care workers wearing masks was found to be less than 1%. Another report, published in July 2020, reviewed a Springfield hair salon that required both stylists and patrons to wear masks. Two COVID-

infected hair stylists cut the hair of over 139 clients over the first 5 and 8 days of symptomatic infection. After extensive contact tracing no primary or secondary cases were found, further proof of the effectiveness of properly worn masks in preventing COVID spread.

The recent COVID pandemic has raised concerns regarding what effect social isolation has on health and mortality, especially in high-risk populations including the elderly, both home-based and those in long care term facilities. Social isolation can be defined as the absence of social interactions, contacts and relationships with family, friends and society at large in both secular and religious activities. It is worth noting that social isolation is an independent risk factor from loneliness and depression. Recent research indicates that increased mortality as a result of social isolation is nearly as high as the increased risk seen in moderate smokers and higher than that associated with obesity and hypertension. Mortality decreased by 41% in diabetics moderately supported from social isolation and 55% in a well-supported cohort.

What are the lessons learned from the COVID pandemic in those patients who are appropriate for hospice and palliative care? The first lesson is the importance of advanced care planning in this patient population. Discussions within families and health care providers regarding code status, medical power of attorney, and directives to physicians (living wills) before high-risk patients suffer serious life-threatening illness is of paramount importance. As patients were admitted with serious health conditions during the COVID pandemic without the benefit of their family's presence, it became extremely difficult to determine the medical wishes of many of these patients. Nearly one third of patients over 65 years old have never communicated to their family care preferences if they became

seriously ill. This resulted in many cases defaulting to aggressive care against the true wishes of the patients. Complicating the decision of aggressive versus symptom driven hospital care is a 2017 Texas state law regulating in-hospital do-not resuscitate orders which made this process much more bureaucratic and burdensome. In addition, a recent court challenge on the resolution of futility in end-of-life care found in the Texas Advance Directives Act may ultimately take this decision out of the hands of physicians and back to the courts. Robert Fine, MD, clinical director of Baylor Scott and White's Office of Clinical Ethics and Palliative Care, expressed his concern that COVID has actually placed more intrusions on physician's ability to have meaningful end of life discussions.

Another lesson is learning to adapt to the pandemic as the science changed. Many in medicine felt that following the science meant doing everything in our power to prevent the spread of COVID, without factoring in the adverse health effect on older, chronically ill patients from social isolation. Without attempting to utter a Trumpism, the cure cannot be worse than the disease. Based on available evidence and using appropriate PPE and social distancing, it appears that in-person meetings between patients, health care workers and their family could have been a routine part of care for these highrisks patients much earlier in the pandemic. This was especially true of those hospitalized with life-threatening illness and those in hospice and long-term care settings. Many patients in these high-risk groups suffered severe depressive symptoms, not having seen spouses, children and grandchildren in over a year. As one famous "physician" once said, "the head bone is connected to the heart bone, and don't you forget it." This is only one of many things Hawkeye Pierce of MASH fame taught us as young physicians.

Probably the most profound product of the COVID pandemic is the unprecedented grief - grief that has affected patients, families and healthcare workers across the country. Grief is difficult to quantify and can present in many forms. Many families struggle with the sudden unexpected loss and inability to be present with their loved one as they face death. Health care workers, facing overwhelming numbers of critically ill patents, in many cases became the surrogate family for these patients. This only served to intensify their feelings of grief and helplessness. It is important moving forward that grief is recognized and addressed in surviving family members and healthcare workers to prevent the development of complicated grief and PTSD. Unlike a natural death in pre-COVID times, for families who have lost loved ones to COVID-19, bereavement after COVID may be distorted and intensified by "not being there." A study in the journal of Death Studies (yes, this really does exist) surveyed over 800 American adults who lost a loved one to COVID-19. Survey results showed an alarming two thirds of respondents described grief that was dysfunctional, anguishing and preoccupying. These same adults reported that this grief seriously impaired their ability to manage their children's needs, perform their work roles and maintain intimate relationships. Neimeyer and Lee (4) reported risk factors associated with intensified feelings of grief which included their loved one dying alone, their own feelings of isolation, and disappointment in the quality of the funeral or memorial service.

We can only hope the next pandemic is at least another 100 years away, but the lessons learned from COVID-19 can certainly be applied going forward. Having a knowledge and respect for patients and their health care choices, and making these choices patient-driven medical decisions and not legislative decisions is critical. Just as important is learning that the treatment of illness must involve the whole person (physical, social, psychological and spiritual), not just the disease process. And lastly, we have recognized that the impact of serious illness extends well beyond the patient to their families and other loved ones. Dealing with serious illness, coupled with the restraints of COVID-19, has placed patients, loved ones and family members at high risk for complicated grief and post-traumatic stress disorders.

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What We Have Learned after a Year with COVID-19: Maternal and Maternal-Child Health

Jonathan Werner, MD, with assistance from Hena Tewari, MD

Pregnancy is a unique, exciting, and sometimes fearful endeavor that mothers and fathers endure with the promise of sweet joy, wrapped in a neat swaddle, to be delivered in nine months. When discussing pregnancy, the images of a baby shower, the first ultrasound, baby announcements, and the first meeting of the newborn baby are conjured and bring happiness. However, being pregnant and delivering during COVID-19 have brought many changes and, oftentimes, anxiety for the mother and family to these normally pleasant images. This same anxiety has extended to providers with the unique challenges of providing maternal and maternal-child care during this time.

The first question that we had as clinicians was wondering whether our pregnant patients were more at risk for severe COVID-19, morbidity, and mortality than the general population. This worry was founded with the memory of the H1N1 influenza pandemic, where pregnant women made up 5% of deaths while making up 1% of the population. They also had a 7 times increased risk of ICU admission (4, 6). Similarly, with COVID-19, data from the Centers for Disease Control and Prevention (CDC) and others suggest that pregnant women are at higher risk of severe COVID-19 than their nonpregnant peers (2). This is reflected by the fact that the CDC now includes pregnant women in the "increased risk" category. Pregnant women are at an increased risk of ICU admission, need for mechanical ventilation, and death (10). Additionally, maternal comorbidity, including gestational diabetes and obesity, further increase this risk (5). Thankfully while mothers are at increased risk of severe COVID-19 they do not appear to have as high of risk as in the H1N1 pandemic.

With the knowledge that pregnant women are at higher risk of severe COVID-19, how can mothers pro-

tect themselves and their families? The American College of Obstetrics and Gynecology (ACOG) and the CDC have several guidelines which we are all familiar with. They have recommended that pregnant women continue their regularly scheduled prenatal appointments while emphasizing physical distancing, PPE, and hygiene that has been recommended to the general population (9). Many hospitals have continued with regular scheduling of elective inductions and cesarean sections. Some have also implemented universal COVID-19 screening for staff and patient safety. There is some concern about aerosolization of COVID-19 during the second stage of labor, when mother is pushing, due to excessive and forceful ventilation. Some hospitals have encouraged universal N-95 and face visors for hospital staff during the second stage of labor. However, the overall risk of aerosolization remains much lower than traditional aerosolizing procedures such as intubation. Patients and support personnel should be encouraged to wear facemasks whenever possible.

Despite our patient's and the clinician's best efforts, some pregnant mothers contract COVID-19. Once a mother has confirmed or suspected COVID-19, the clinician should triage the patient's risk for severe disease. There are several criteria that can be used to assess for increased risk including shortness of breath, difficulty breathing, coughing blood, chest pain or pressure, inability to tolerate liquids, signs of dehydration, or confusion. If the patient has any of these symptoms, they should be encouraged to present to an emergency department for further evaluation. If the disease progresses to severe COVID-19, careful consideration of both obstetric patients, mother and fetus, must be taken. Severe COVID-19 should be treated similarly for the pregnant and non-pregnant patient. Chest x-rays and CT scans should not be deferred or delayed if indicated. The clinician must remember that the fetus is creating increased metabolic and respiratory needs for the mother. There may come a time when respiratory collapse is imminent. The clinician will need to balance the timing of delivery in regards to the patient's estimated gestational age and clinical status. This decision should be made in conjunction with the appropriate specialists including the intensivist, maternal fetal medicine specialist, neonatologist, and obstetrician.

If the patient does not show signs of severe disease, the patient does not require any changes to their prenatal care or timing of delivery. Additional fetal surveillance is also not recommended. Timing of delivery should be guided by the usual obstetrical indications. If appropriate, the clinician could consider doing telehealth visits during the mother's contagious period to reduce exposure to staff and other patients.

Another quandary is whether mother and baby should be separated after birth in a COVID-19 positive mother. Early and close contact with mother and baby has several benefits that have been previously documented including increased success of breastfeeding, bonding, and promotion of family-centered care. When deciding whether to separate mother and baby, the first question to ask is whether the mother will be able to separate from baby after discharge. If mother will be the primary caregiver during their infectious period after discharge, then mother and baby should not be separated. While the evidence is sparse, so far there has been no difference in the rate of transmission if the neonate is cared for in a separate room or stays in the mother's room. However, there may be some cases where separation is preferrable. These situations include when mothers are too ill to care for their newborn or if the neonate is at higher risk for severe illness such as preterm, underlying medical condition, or need for higher level of care. Ultimately, the decision should be

shared between the clinician and the parents, with the current data presented to the mother.

If the mother decides that she will remain with her newborn after a positive COVID-19 test, some precautions should be taken to reduce the risk of transmission to the newborn. Mother should use a mask or face covering and adhere to strict hand hygiene before contact with the newborn. The newborn should be placed greater than 6 feet from the mother as often as possible. Physical barriers such as a temperature controlled isolette could also be considered.

A mother's decision to breast or bottle feed should be supported regardless of her COVID-19 infection status. Currently it is not known whether COVID-19 can be transmitted through breastmilk or if transmitted viral components are infectious. One case report has detected SARS-CoV-2 RNA in breastmilk, but the majority of studies have not found virus in the breastmilk (4). The larger risk to the infant is the transmission of virus through respiratory droplets while in close con-

tact with the mother. In order to breastfeed, the mother can make the decision to express the milk via a pump or manual expression in order to decrease the likelihood of transmission. The mother should also be taught the importance of hand hygiene and cleaning of bottles and pump. If the mother decides to directly feed from the breast, she should wear a mask and practice good hand hygiene.

The decision on vaccinating pregnant and breastfeeding mothers has also been complex. As has been elucidated, pregnant women are at higher risk of severe infection. The initial vaccine trials for the currently approved vaccines did not include pregnant or breastfeeding mothers. Initially there was conflicting advice on whether this population should be vaccinated. The World Health Organization has not recommended vaccination for pregnant or breastfeeding mothers due to the lack of available research. However, the CDC and The American College of Obstetricians and Gynecologists have recommended vaccination due to the severity of the disease, reproductive safety in animal studies, and no indication that the vaccines are unsafe during pregnancy or breastfeeding. Using the V-Safe vaccine registry of pregnant women who have been vaccinated, there has not been an increase in morbidity above the background incidence of miscarriage, stillborn, growth restriction, preterm birth, congenital anomalies, among others. At the time of writing this article, Pfizer/ BioNTech has started studying the vaccine in pregnant mothers, which has been applauded by many women health specialists.

The decision whether to get vaccinated as a pregnant or breastfeeding mother should be a personal educated choice. The information that should be available should include the level of activity of the virus in the community, the potential efficacy of the vaccine, the risk of potential severity of maternal and neonatal disease, and the safety data for the mother and fetus. Acetaminophen has been established as being safe in pregnancy, and mothers who have fever as a side effect of vaccination should take acet-

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aminophen to reduce the fever. Since the advent of the vaccines, additional studies have shown that antibodies have been transferred to the neonate through pregnancy. COVID-19 antibodies have also been found in breastmilk. However, it is unknown if this transfer of antibodies offers protection to the newborn (3).

Even the hospital visitation policy has been brought into question regarding the spread of COVID-19. Both hospitals in Amarillo allowed one adult to accompany the mother during childbirth, while general patients were not allowed a single visitor for most of the previous year. The decision to limit guests was made while balancing the wellbeing of health care professionals, benefits to the patient, and the health of the community. The implementation of restrictions on support personnel could result in increased adverse maternal outcome and fear. Flexibility and individualization in the application of visitor restriction for the unique clinical situation should be encouraged.

One thing that is clear during the pandemic is that even seemingly inconsequential decisions can have drastic and lasting consequences. My wife and I had our second-born daughter in May of 2020, at the height of the unknown period in the COVID-19 pandemic. There are several things that we learned during this unexpected journey. Life throws curveballs. Being a good father, husband, and man of God during residency is a tough task without a pandemic. Adding the stressors of raising a newborn during a pandemic was challenging. Our resolve was tested, but we learned to thrive during hardship and make the best out of the cards we were dealt. The pandemic has gifted my family with increased time with each other and our closest family and friends. Due to fewer distractions and this increased time, our relationships with each other and this small group of people has strengthened. We have learned that this unique bond is our greatest human gift. All over the world, people have sacrificed time with their loved ones and financial stability so that strangers can live and flourish. We have all learned what is most important in our lives and how to maximize the joy we receive from our activities. The pandemic is not the last trial we will persevere as a family or as mankind. Hopefully, the lessons we

learned during this time can be used to make the next hardship more endurable.

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Dr. Hena Tewari was born and raised in Lucknow, India. She graduated from King George's Medical College in India in 1993 and completed an OB-GYN residency there in 1997. She and her family later emigrated to the United States, and *she completed another OB-GYN residency* (including chief residency) at Mount Sinai Hospital in Chicago in 2008. She came to Texas Tech University Health Sciences Center in Amarillo in 2012. She took up the position of Clerkship Director for 3rd year medical students in 2016, and was promoted to Associate Professor in 2017. She is married and, with her husband Ravi Bharadwaj (himself is an internist and geriatric specialist), has two wonderful daughters. Dr. Tewari enjoys meditation, music, reading, and spending quality time with family and friends.



Pediatric Residency in the COVID Pandemic: A Lost Year?

by Schyler Z. Grodman, MD

There are events which forever alter the L course of history, and those who manage to live through those events. In this century alone, we have seen 9/11, the Great Recession, and the COVID-19 pandemic. The last of these will impact and influence generations of physicians, especially those who were training during this time, in a myriad of ways. Learning first-hand how to function in a healthcare system stretched to the very limits of its resources. Conducting rounds with social distancing, and with an understanding that not every resident or medical student would be able to see every patient due to limited PPE. Attending lectures and morning reports through Zoom, without the physical proximity of co-residents, leading to stunted team-building. Not having access to our own simulation center, thus losing out on practice in running codes and performing hands-on procedures. Having to cover shifts for co-residents who had to quarantine due to COVID exposure, or functioning as an intern at the start of second year because the incoming class was unable to arrive on time due to travel restrictions. Most unexpected of all, from the perspective of pediatric residents here in Amarillo, was the sharp decline in pediatric admissions to our inpatient service.

During COVID, pediatric admissions plummeted; gone were the so-called "soft admissions" where a dehydrated child would be admitted overnight, receive IV fluids, and be discharged in the morning. Gone were the RSV bronchiolitis patients, admitted for an oxygen saturation of 88% in the ER, and discharged a day or two later after spending their entire hospitalization with saturations above 94%. The purpose of residency is to learn by observing and by doing, to have actual patients with ailments we must know how to diagnose and manage for our board exams. Without having patients to manage, what do we learn during residency? Many were left with time to sit and read the wide array of textbooks at our disposal, and ironically to return to the time when we were medical students, left to study things we had not actually experienced in practice. There was little to be done about this circumstance, however, as parents were

just not bringing their children to the ER or to the clinic, out of fear of their children contracting COVID.

This is not to say, however, that things were completely quiet. The pediatric floor was bereft of children...only to be replaced by adults admitted with COVID. We would sit in our resident room, physically separated from our patients, who were all being kept in the Pediatric Intensive Care unit across the hall. We lived in a world where there were sick patients nearby, but they were not ours to manage, not ours to treat... not ours to help.

Across the country, residents from all departments were pulled to manage sick COVID patients. Many of my classmates from medical school - whether they be internists, surgeons, pediatricians, ER physicians, or even psychiatrists - were thrown into ICUs to manage ventilators. Text threads were soon filled with frontline observations from classmates, dealing with different therapies, ventilator settings, patient time-lines...all intermingled with well-wishes, encouragement, and the ever-present hope that we were all safe and healthy. Some were able to get through their days unscathed, others grew fatigued, one or two even tested positive for COVID (thankfully, none of my classmates were hospitalized).

But here in Amarillo, in our Pediatrics department, we were not pulled to cover the adult census. While friends were having to learn intensive management on the fly, based on protocols which seemed to change hourly, my fellow pediatric residents and I were shielded from the direct line of fire. Sure, we would have the occasional MIS-C patient, but for the most part we were not placed in as great a risk as other departments at Northwest Texas Hospital, or as pediatric residents at other hospitals. While we are, and will always be, grateful that we were not as exposed as other residents, there will always be the nagging question - could we have done more for the common cause? Could we have helped more patients, more healthcare

workers, more of our patient population?

Given all of the above, it would be easy, if not understandable, to consider the past year lost - that, instead of growing as future pediatricians, we had a year of stagnation wherein we saw fewer patients, had fewer meaningful lectures, and were less of an asset to our healthcare system. Yet on closer look, one might see that much can be gained from this past year. Yes, we may have seen fewer pediatric patients admitted to the floors during the height of the pandemic, but during that time we learned how to better use our limited resources. Yes, we did not get to spend time in the physical company of our colleagues, but through Zoom and other methods of communication, we were still able to become close as colleagues. Things originally thought to be best taught in person were able to be taught over Zoom - we even noticed improved attendance at morning reports and lectures (residents just needed WiFi and a phone to attend lecture, as opposed to leaving their various services). We have shared in a common struggle with residents from across the country, and we provided the best possible care we could for our patient population here in Amarillo.

So how do we move forward? Simply, we must glean the lessons of the past year, and apply them towards our futures. Maybe we don't need as many in-person lectures to supplement our education during residency. Perhaps we learn how to more efficiently utilize medical resources, such as PPE, in day-to-day patient care. Perhaps we will be better able to communicate with families and patients about the importance of hygiene, given the context of this pandemic. Above all, however, must be to realize that during this pandemic, perhaps we actually found more than we lost.

Dr. Grodman is currently a Pediatric Resident at Texas Tech, Amarillo. Prior to residency, he attended medical school at Columbia University Vagelos College of Physicians and Surgeons (where he also received a Masters of Science in Global Health), and undergraduate school at the University of Pennsylvania.



Long-term Sequelae of COVID-19

Sheryl Williams, MD

A few months ago, when this issue of *Panhandle Health* was in the planning stages, Dr. Urban suggested (read assigned) to me an article on "long COVID-19". Little did I know how difficult this was going to become. The problem is not a lack of information, but rather the deluge of articles that have recently been published and are continuing to come out even after this article goes to press. With the caveat that the information is current as of early April, this article will define and explore the long-term implications of the novel COVID-19 virus infection and pandemic. Long term sequelae of COVID-19 can be broken down into the emotional and physical effects of severe COVID-19 requiring prolonged stays in the ICU, persistent COVID-19, and the social implications of the pandemic. This is a brief review as each topic in itself could span volumes.

As a hospitalist, I have seen the effects of long-term intensive care stays on patient outcomes. Well-known are the effects of prolonged intubation, sedation, and paralytics. UpToDate (14) has an excellent review of Post-intensive Care Syndrome (PICS) and estimates that up to one-half of the 4.8 million U.S. yearly survivors of ICU stays will suffer from cognitive, psychiatric, and physical dysfunction. The BRAIN-ICU study (15) demonstrated in a multicenter, prospective cohort study that 25% of patients who survived either medical or surgical ICU stays had cognitive impairment equivalent in severity to mild Alzheimer's disease at 12 months, and one third had impairment suggestive of moderate traumatic brain injury. Specific to COVID-19, neuromuscular weakness such as critical illness polyneuropathy (CIN) and critical illness myopathy (CM) have both been identified in COVID-19 patients after prolonged mechanical ventilation (1). In addition, reports of injuries due to prone positioning such as brachial plexus damage and radial, median, and sciatic nerve injury have been reported.

Further work by Malik et al. (12) showed that 14% of the patients in his series had peripheral nerve injury across 21 different anatomical distributions; of those, 91% had a history of prone positioning during their ICU stay.

Severe lung damage from ARDS is common and often results in palliative care. However, several centers in the US and in Japan have successfully performed lung transplantation. Chicago's Northwestern Medicine performed the first successful double lung transplant due to COVID-19 last year, and last month performed the same double lung transplant from a donor who had successfully recovered from COVID-19. As reported recently in Japan, surgeons in Kyoto performed the first lung tissue transplant from living donors for a woman with severe lung damage from COVID-19 who had been on the ventilator for three months (8).

Patients with or without ICU stays, hospitals stays, or acute symptoms at all are being recognized as having longterm effects of virus infection. There are now multiple studies documenting persistent or "long COVID-19" symptomatology. Logue, et al. (11) published a small study of 234 patients up to 9 months after infection. Their cohort had a high proportion of outpatients with mild disease. Persistent symptoms were reported in 1/3 of the patients. Fatigue was the most common symptom, followed by loss of taste or smell and cognitive dysfunction (brain fog). Thirty percent of the patient reported worsened healthcare-related quality of life and 8% reported negative impacts on at least 1 activity of daily living. Even young patients who apparently have recovered from uncomplicated COVID-19 can have sustained neuropsychological deficits when screened for mild cognitive deficits (17).

Another study from Italy found up

to 87% of their patients had at least one persistent symptom at 6 months (4). Common physical symptoms included fatigue (most prevalent), dyspnea, chest discomfort, cough, and anosmia, although a host of symptoms were also reported including joint pain, myalgias, headache, vertigo, and GI complaints. Psychological symptoms included PTSD, memory deficits, poor concentration, and anxiety or depression. Another large study, published as a pre-print article, collected data through a web-based, crowd-sourced survey of 3,762 respondents from 56 countries (7). The most frequent symptoms were fatigue, post-exertional malaise, and cognitive dysfunction. Respondents with symptoms lasting greater than 6 months also reported relapses triggered by exercise, physical or mental activity, or stress. Almost half of those patients reported needing either a reduced work schedule or inability to work at all.

A Lancet study examined over 200,000 patients diagnosed with COVID-19 and found an estimated incidence of neurological or psychiatric diagnosis in the following 6 months of 33%, much higher than the comparative cohorts (16). Another very large retrospective cohort study from the UK looked at the long-term morbidity of COVID-19 (2). Their study looked at over 47,000 patients admitted to the hospital and found a 29% increased risk of re-admission and 12% mortality rate within 120 days. There was also a higher rate of multisystem organ dysfunction, not confined to elderly patients.

The UK National Institute for Health and Care Excellence (NICE) defines the stages of COVID-19 infection as acute for symptoms lasting up to 4 weeks, ongoing symptomatic for symptoms ranging from 4-12 weeks, and post-COVID syndrome as "signs and symptoms that develop during or after an infection consistent with COVID-19 which continue for more than 12 weeks and are not explained by an alternative diagnosis" (6).

In December 2020, the NIH held a workshop to summarize what is known about those patients who do not fully recover (5), now dubbed Post-Acute Sequelae of SARS-CoV-2 infection or PASC. The NIH was awarded \$1.15 billion in funding over the next four years to support research on this emerging problem. Many hospitals and health systems including Baylor College of Medicine and UTMB Health are creating COVID-19 recovery programs, or post-COVID clinics, to support patients who experience lingering symptoms weeks or months after being cleared of the illness - a population now widely known as "COVID-19 long-haulers" (3). The World Health Organization is also working to establish a clinical description for long-COVID symptoms and is hosting global meetings, eventually to create a unified clinical description.

The impact of COVID-19 in the long term is not just related to individual patients. As noted above, there is a toll associated with post-hospital care of this virus that includes increased mortality, hospital re-admissions and need for supportive care. Costs to our healthcare system are staggering from treating the virus itself but now include the care and treatment of the post-COVID survivor. Last year, all-cause mortality rates in the US rose 23%, of which 75% could be ascribed to COVID-19. The percentage of deaths among non-Hispanic Black individual was 16.9%, reflecting racial disparities in COVID-19 mortality figures (18). Excess deaths not related to COVID-19 are thought to reflect "either immediate or delayed mortality from undocumented COVID-19 infection, or non-COVID-19 deaths secondary to the pandemic, such as from delayed care or behavioral health crises. Death rates from several non-COVID-19 diseases (e.g., heart disease, Alzheimer disease) increased during surges."

The cost is not just in lives lost, but in the effects on surviving family members. As of February of this year, an estimated 37,300 children under the age of 17 had lost at least 1 parent to COVID-19 (10). "Children who lose a parent are at elevated risk of traumatic grief, depression, poor educational outcomes, and unintentional death or suicide, and these consequences can persist into adulthood. Sudden parental death, such as that occurring owing to COVID-19, can be particularly traumatizing for children and leave families ill-prepared to navigate its consequences. Moreover, COVID-19 losses are occurring at a time of social isolation, institutional strain, and economic hardship, potentially leaving bereaved children without the supports they need." African American children are disproportionately affected, making up 20% of those losing a parent to the virus by demographic modeling.

A JAMA Network editorial sums up the long-term effects of the pandemic: "The burden of a pandemic, of course, extends well beyond mortality. Morbidity alone may be responsible for as much as 40% of the health costs of COVID-19. The loss of employment and decline in productivity in multiple sectors, disrupted schooling, and the shutdown of entire industries like in-person live entertainment and much of travel have upended life for nearly all of society. The corresponding economic loss – estimated as high as \$16 trillion in the US, or about 90% of the gross domestic product – is staggering" (9).

A final cost in terms of lives lost and burnout is found within the healthcare community itself. We have all experienced, in one way or another, disruption to our lives and livelihood over the past year. Many were infected; indeed, we lost local members of our healthcare community to this virus. Medical students and residents had interruptions and re-design of their education. Clinicians were expected to manage severely ill patients despite shortages of PPE, manpower deficits, and uncertain therapeutics, all the while trying to provide support to families and patients isolated from each other; sometimes they were the only solace for patients dying alone. Isolation extended to many healthcare workers themselves, afraid to bring this pestilence home to their friends and families.

Internationally, all healthcare workers are "known to be at risk for anxiety, depression, burnout, insomnia, moral distress, and post-traumatic stress disorder. Under usual working conditions, severe burnout syndrome affects as many as 33% of critical care nurses and up to 45% of critical care physicians. Extrinsic organisational risk factors - including increased work demands and little control over the work environment - and the trauma of caring for patients who are critically ill have been heightened by the COVID-19 pandemic and represent important exacerbating factors for poor mental health among health-care work-

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ers" (13). Furthermore, COVID-19 has had a disproportionate effect on women healthcare workers. "Women comprise 70% of the global health and social care workforce, putting them at risk of infection and the range of physical and mental health problems associated with their role as health professionals and carers in the context of a pandemic. The pandemic exacerbated gender inequities in formal and informal work, and in the distribution of home responsibilities, and increased the risk of unemployment and domestic violence. While trying to fulfil their professional responsibilities, women had to meet their families' needs, including childcare, home schooling, care for older people, and home care. Burdened by these obligations, women had reduced academic productivity relative to men, as evidenced by fewer women being part of the cohort producing new knowledge about the pandemic" (13).

Long-term effects of the pandemic include both the physical and mental sequela of infection as well as broad societal costs. As we slowly emerge from the acute battle with the virus, we now must count the costs of surviving and rise above the carnage. We cannot individually be expected to solve the world's pandemic problems, but collectively we can prove that we are Panhandle Strong!

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HISTORY OF MEDICINE



The COVID-19 Vaccine: What Happened and What We Know as of Now

by Rouzbeh K. Kordestani, MD, MPH

Over 150 million doses of the COVID-19 vaccine have been administered to people in the United States. Almost 1/3 of the entire adult population has received at least one dose. With the backdrop of close to six hundred thousand deaths (here in the United States) and over three million deaths worldwide, it is hard to imagine that we would and should consider this vaccine development a success. To truly understand this effort, however, we need to look at the disease and at vaccine development in general.

The COVID-19 virus was encountered in late 2019 in Wuhan, China. Its RNA sequence was quickly defined and its impact was grasped as early as January 2020. By February 2020, the World Health Organization (WHO) forecasted that any effective vaccine would take approximately 18 months to develop. Based on normal channels of testing, with Phase I through III trials, this time estimate was thought to be valid.

Initial efforts

This, however, was not to be any normal effort. For the first time in history, an unprecedented effort both nationally and internationally was directed towards the development of the COVID-19 vaccine. It is estimated that 84-90% of attempts at vaccine development fail, and the effort comes with tremendous financial costs. Most often only large companies have the ability and the funding to handle the financial risk that comes with developing a vaccine. Again, the vaccine development effort with COVID-19 was different. First of all, multiple smaller and more innovative companies were able to exchange ideas with larger, more established pharmaceutical entities. In this way, far larger combinations of vaccines were considered. At one point, in September 2020, it was estimated that up to 321 vaccines were in development. Just as important was that the effort was not focused only in one area around the world - it was truly a worldwide effort. The effort

was conducted 40% in North America, 30% in Europe and 30% in Asia, as estimated by the Collaboration for Epidemic Preparedness and Innovations (CEPI).

In this worldwide effort, other unusual circumstances also differentiated the COVID vaccine effort. In regards to costs, the COVID-19 vaccine effort was again different. The initial estimates of costs for the full development of a vaccine were estimated at 35 billion dollars by the WHO. This was the amount needed to fund the Global Collaboration to Accelerate the Development, Production and Equitable Access to the COVID-19 vaccine. The effort was hampered by President Trump's decision to withdraw the United States from the international health effort. That decision, however, was quickly reversed on January 21, 2021 by the newly elected President Biden. The new American president quickly reaffirmed America's commitment to the timeline and to the financial efforts needed to develop and distribute the vaccine. It must be noted here that many countries not only contributed to this international effort but also had their own nationally-based research and development working side by side.

As companies and countries began to succeed, their efforts became public. The first country to request and be given certification was China. In June of 2020, it received approval in a few countries for its trial vaccine for COVID. Soon thereafter, in August, Russia followed suit and started production of its Sputnik V vaccine. By September of 2020, no European or North American company or effort had produced a certifiable vaccine.

Several months before, in May 2020, Operation Warp Speed was unveiled by the Trump Administration with the express purpose of funding and rapidly moving a vaccine through the clinical trial process(es). It recognized efforts and collaborations with seven companies, including Moderna, Johnson & Johnson, Merck, Pfizer, Astra-Zeneca and Oxford University. It must be noted here that Pfizer quickly pulled out of any association with the program because it considered the program too inundated with inefficiencies. It also refused any and all funding from the government. As of September 2020, again, no North American vaccine had been proven ready for use.

The Centers for Disease Control (CDC), the Food and Drug Administration (FDA) and the Project BioShield Act of 2004

The Project BioShield Act of 2004 (Public Law 108-276) created, among its many provisions, the Emergency Use Authorization (EUA). This tool was created for emergency civilian and/or military use of health methods, medications or therapies in times of need. With the EUA, the authorizing agencies could approve the use of life-saving therapies during times of extreme need. Since its inception in 2004, the EUA has been used by the Food and Drug Administration (FDA) to allow companies/universities/scientific groups to make available to the public a drug, a vaccine or a therapy without going through the normal lengthy clearance and regulatory process that often slows down drug development.

The Centers for Disease Control was first started in 1946 as an attempt to keep malaria from overrunning the continental U.S. As many interested private groups such as the Rockefeller Foundation did not have a foothold in government, a government/public service entity was needed to assume the role. Its initial role was to help stop the spread of malaria. The CDC was established in Atlanta since malaria was endemic at that time in the southern states. Eventually, it became a division of the United States Public Health service and began its efforts in other areas not related to malaria. Throughout its history, the

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CDC has been associated with scientific studies and efforts in controlling infectious disease. To many in the world, the CDC sets one of the highest standards in disease control and vaccine development.

In the case of COVID-19 and the ensuing pandemic, unfortunately, the CDC was placed in an impossible situation. For the first time in its history, the CDC was politically manipulated. Since its inception in 1946, the CDC has been led by scientific teams, and its access has been guarded. The American political machine has had an understanding not to interfere with the scientific processes of the CDC or that of the FDA. That was the case until the pandemic of 2020. For the first time, political operatives exercised control of the CDC. The scientific efforts were sidelined. As the pandemic and its ramifications became apparent, the Trump Administration pushed the CDC and the FDA to produce results. As any scientist would surmise, science cannot be rushed. The CDC was forced to make EUAs readily available. In March of 2020, at the insistence of President Trump, an EUA was given for the use of chloroquine and hydroxychloroquine for the treatment of COVID-19 infection. This EUA was given based on early speculative data. Once actual data was collected, it became obvious that the treatment was ineffective and, in some cases, dangerous. The (forced) EUA was revoked in June of 2020, against the backdrop of continued political pressure.

In an effort to bolster and renew confidence in the vaccine development process, in September 2020, the nine largest pharmaceutical groups signed a pledge not to forego any of their usual steps in the development of a vaccine to treat COVID-19. The pledge angered the Trump Administration. However, in light of the failed efforts and a history of vaccine mishaps, it was reasoned that transparency was the only way to bring confidence to the vaccine deployment program. This was on the eve of the development of the COVID-19 vaccines.

Vaccines and Public Confidence/Trust

The effectiveness of vaccines depends not only on the science used for its development but also on the public's confidence and trust in the process - in their scientists and in their respective governments. As studies show, in the United States, the people's confidence in their government unfortunately has waned over the last five decades. In fact, many Americans view their government as adversarial. Moreover, they distrust what their government says or does. That distrust makes any effort such as a national vaccination campaign difficult. Incidents like the Tuskegee Trials in 1932, the Cutter Lab incident in 1955, and the Swine Flu rollout in 1976 are examples of failed government programs or vaccination efforts that helped to shake the public trust.

Between 1932 and 1972, the United States Public Health Service and the Centers for Disease Control (CDC) performed a study in Tuskegee, AL of untreated syphilis in the black male population. The patients were not made aware that they were in fact being studied as part of a control arm. Enrolled black male subjects were given placebos and left untreated in the control arm of the study, even though penicillin and other drug therapies were available. In fact, in an



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attempt to keep the control group unaffected, regular physicians of these patients were instructed to avoid treating them with the appropriate antibiotics. The study concluded in 1972. By current standards, the study is considered inhumane and is seen as ethically abusive.

As polio was an ever-present disease in the early 20th century, the development of the polio vaccine was eagerly anticipated. One of the labs that was responsible for the production of the polio vaccine was the Cutter Lab in Berkeley, California. While completing the production of the polio vaccine, the scientists at the Cutter Labs made an error in their processing methods and produced a polio vaccine that had not been inactivated. The vaccine, given to over 200,000 children in five western states in the continental U.S., was actually virulent. Within days of receiving the vaccine, thousands of children began to exhibit symptoms of polio. This led to a national effort to find the problem. The processing error was soon discovered. Unfortunately, by that time, 40,000 kids had contracted a mild to severe case of polio, leaving 200 children paralyzed and 10 dead. Because of this incident, the initial public confidence in the effectiveness of the polio vaccine was shaken. In fact, in certain parts of the United States, the incident almost derailed the polio vaccination efforts.

In 1975, an early version of the Swine Flu presented in East Asia. As it expanded and spread across East Asia, U.S. health authorities, fearing an overwhelming pandemic, sounded the alarm. They hastily began preparing a vaccine to battle this virus. An early vaccine was designed and quickly tested. Unfortunately, as the vaccine was rushed through, it did not get tested as others do. Some patients in the vaccinated group soon began to display neurological sequelae similar to clinical symptoms of Guillain-Barre Syndrome. The vaccine was quickly pulled and held in reserve. Fortunately, the Swine Flu of 1976 did not become a pandemic and only a handful of cases were documented.

The North American/European Vaccine Development Effort

As the Chinese and the Russians began to produce their vaccines, it became obvious that their vaccines had little efficacy and even less supply. For a COVID-19 vaccine to be used effectively, it had to be scalable in order to generate hundreds of millions of doses to be used throughout the world in many populations.

The first group to develop a vaccine that was efficacious and scalable was Pfizer. Pfizer had begun its early trials in mid-2020. It had shunned the financial support of Operation Warp Speed. It did so because it considered any government partnership as a "slowing process." It also noted that the program focused more on production capacity than on the actual efficacy of the vaccine. Pfizer instead chose to partner with BioNT in Germany to develop the first North American/European COVID-19 vaccine. The vaccine it developed was based on a messenger RNA (mRNA) platform. The mRNA delivery system enables the cells to produce and present the surface protein of the SARS-2 virus. This "spike" protein then activates the host's immune system and affects an immune response.

The Pfizer/BioNT vaccine received its EUA on December 11th, 2020. This vaccine has been shown to be 95% efficacious in preventing symptomatic COVID infection after its two doses. Its two doses are separated by a 21-day window. The first and second injection each contain approximately 30 micrograms of the vaccine. After receiving both shots, the vaccinated adult is strongly protected against severe symptoms of the COVID virus. The most common side effects of the injection are local pain, fatigue, bruising, headaches, muscles pains and aches. It is noted that side effects are common after either the first or the second dose. A few cases of anaphylaxis have been documented.

On the 18th of December of 2020, only one week after Pfizer/BioNT was given its EUA, Moderna received an EUA for its COVID-19 vaccine. Similar to Pfizer/ BioNT, the Moderna vaccine uses mRNA as its delivery method. It too has to be administered in two doses. As opposed to the Pfizer/BioNT vaccine, the Moderna vaccine uses a much larger inoculum (100 micrograms) to evoke its effect. Its two doses are separated by 28 days. Like the Pfizer/BioNT vaccine, body aches, pains, headaches, chills, and muscle aches are common. As with any vaccine, anaphylaxis can rarely be encountered. The number of anaphylaxis cases seen with the Moderna vaccine is similar to that of Pfizer/BioNT's vaccine. The efficacy and protection given by the Moderna vaccine mirrors that of the Pfizer/BioNT vaccine and is documented at 94%.

On February 27th of 2021, an EUA was given to Johnson & Johnson for its COVID-19 vaccine. Unlike the other two vaccines, the J&J vaccine is a viral vector vaccine. It is delivered using an adenovirus, not mRNA. Adenovirus is a common cold virus and has often been used as a delivery system for vaccines. J&J chose to proceed with this type of delivery system because it mimicked one developed recently against the Ebola virus.

The J&J vaccine is also different from the other two North American vaccines in that it is a one- shot vaccination. Interestingly, the single J&J dose contains more antigen than the other two vaccines combined. As the logistics of administering two individual shots to hundreds of millions of people can be daunting, a single shot may prove advantageous in many arenas. The early data show that the efficacy of the one-shot J&J vaccine is approximately 85%. This was from multinational studies, across all adult age groups. Recently, the J&J vaccine has been noted rarely to produce blood clot formation a few weeks after the vaccine administration. This prompted a momentary halt in the vaccine rollout to the general public, but this moratorium has since been lifted as the benefit of the vaccine far outweighs these rare (but serious) complications.

Conclusion

It is said that "there are decades when nothing happens and then there are weeks when decades happen." This is a surreal time in history. Our lives seem to be on hold. Hundreds of thousands of fellow Americans are dead. Many thousands more will die in the near future. In the world at large, millions have died and millions more will be adversely affected. Yet, there is now hope. We now have several effective vaccines. More importantly, the efforts needed to prevent this disease have shown us that the indominable human spirit is alive and well – we will prevail here and abroad!

The COVID-19 vaccines and their development have forced us to see beyond our borders and to work together to save

ourselves and our fellow human kind. Through this effort, we have mobilized human thought and science on an unprecedented scale.

Maybe we all needed such a disease, such a challenge, to show us all what is truly possible in this moment in history. It may be necessary to witness such efforts to realize what we are made of and what we can truly accomplish, for ourselves, for our children, and for future generations.

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COVID-19 in the Elderly Population

by Brandon Wei, MS3, and Ravi Bharadwaj, MD

As we mark the first anniversary of the nationwide lockdowns, it is important to acknowledge that there is still much to learn about COVID-19 and the risks that come with this infection. One group we do know about, however, is the elderly population, which has been uniquely affected during the pandemic.

1. How does COVID-19 present in the elderly?

Early signs of COVID-19 in the elderly are similar to the general population. Symptoms such as cough, fever, chills, difficulty breathing, muscle aches, loss of taste and smell, vomiting, and diarrhea are common. One difference to note is that, because older people have lower basal body temperatures than younger people, fever may be minimal or absent. A single temperature reading over 100° F or multiple readings over 99° F may be a sign of infection.

Progression of the disease can also be faster in the elderly, who have a higher risk of requiring hospitalization, admission to intensive care units, invasive mechanical ventilation, and death.

The CDC has listed the following warning symptoms to seek immediate medical help:

- Trouble breathing
- Persistent chest pain
- New-onset confusion
- Inability to stay awake
- Pale/gray/blue skin, lips, or fingernails This is not an exhaustive list of symptoms, and, if you feel that you are experiencing any other severe symptoms, you should contact a medical provider as soon as possible.

2. Why are the elderly higher risk?

While older age does not correlate with contracting the disease, it has been clearly established that older age is the greatest risk factor for progression to severe complications and death due to COVID-19. In addition, comorbid conditions such as diabetes, hypertension, respiratory, and cardiovascular disease, which are commonly seen in the elderly, further predispose to severe complications with COVID-19. One such complication is acute respiratory distress syndrome, or ARDS, a life-threatening inflammatory lung disease. Not surprisingly, patients with existing heart issues are more likely to develop cardiac complications as well (1).

Aging is multifactorial and complex; so there are many reasons why the elderly may be more severely affected by COVID-19. One explanation has to do with changes in the immune system that come with age. As a person ages, the immune system gradually loses its ability to recognize and destroy pathogens such as the COVID virus. Surprisingly, the aging immune system can paradoxically produce an overactive immune response, leading to the dangerous inflammatory condition known as cytokine storm. Cytokine storm is present in 50% of fatal COVID-19 cases, many times in the elderly, and is also closely related to the progression to ARDS as mentioned above. Incidentally, this is why dexamethasone, a steroid that helps suppress inflammation, is widely used to treat severe COVID-19 (2).

3. Is it possible for older people to have asymptomatic COVID-19?

Yes, even though the elderly are at higher risk for developing severe disease, it is still possible to be asymptomatic. One study in a skilled nursing facility showed that about 40% of residents who tested positive for COVID-19 remained asymptomatic throughout their disease. Thus, if you have been exposed, it is still important to get tested even if are not currently experiencing any symptoms.

4. Are people living in nursing homes or other long-term care facilities still at high risk?

It is true that people living in grouped housing such as nursing homes have been at much higher risk of contracting and spreading the disease, due both to the congregate nature and to underlying health risks of the elderly population. However, in Texas, over 70,000 residents and 60,000 staff have been vaccinated. The most recent CDC data show that the rate of confirmed COVID-19 cases in nursing homes has dropped down to a low of 0.5 per 1,000 people at the end of March (compared to a peak of 31.5 per 1,000 as recently as this January). Still, as nursing homes begin to operate normally once more, it is important to continue practicing the same infection prevention and control methods (3).

5. What should I do if I have COVID-19 infection?

The most important thing is not to panic as most patients, even most elderly patients, will recover. Many elderly patients who are not sick enough to require hospitalization will qualify for antibody treatments, which are quite effective in preventing worsening infection. At home, patients should stay physically active, do breathing exercises, and maintain good nutrition. If shortness of breath at rest or with mild exertion develops, patients may require hospitalization to receive more advanced treatments including medications for COVID and oxygen.

6. How effective are the COVID-19 vaccines in the elderly?

The Pfizer (4) and Moderna (5) 2-dose vaccines both show an efficacy of around 93-95% in the general population, with slightly reduced effectiveness in the elderly. Initial data for the Johnson & Johnson 1-dose vaccine shows an efficacy of 66.3% in the general population (6), with similar numbers in the elderly. The CDC is still recommending that individuals 65 and older should be the first group to be vaccinated. Additionally, remember that it takes two weeks after your last shot before you are considered fully immunized, as it takes time for your body to build up immunity.

7. Are the COVID-19 vaccines safe in the elderly?

According to initial data, elderly vaccine recipients may actually experience fewer side effects – both local (pain at injection site) as well as systemic (fatigue, headache, muscle pain, fever) – than younger people. The incidence of serious adverse events for all three vaccines is similar to placebo. It is important to note that these vaccines are still undergoing continuous clinical trials to assess their safety and efficacy. The FDA has given an Emergency Use Authorization for their administration, and the CDC recommends getting whichever vaccine is available.

8. Should immunocompromised and cancer patients get the COVID-19 vaccine?

Current data shows that cancer patients are another group at high risk for severe COVID-19 complications. Thus, it is the recommendation of the CDC as well as the National Comprehensive Cancer Network (NCCN) that cancer patients get vaccinated if possible.

There are, however, two groups of cancer patients where a delay in vaccination may be indicated. Cancer patients on immunosuppressants after stem cell transplants or CAR T-cell therapy or patients receiving aggressive chemotherapy should delay vaccination until 3 months after their treatment is complete. This is based on data from vaccines for other diseases that show reduced efficacy when given to immunosuppressed patients. In one study involving immunosuppressed patients, only 17% had detectable antibodies after one dose of mRNA vaccine (7), although the number rose to 54% after the second dose. People with other medical conditions (such as rheumatoid arthritis, lupus, or psoriasis) needing immunosuppression may have decreased antibody response as well.

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Executive Director's Message

by Cindy Barnard, Executive Director

ore than a year ago, the United MStates diagnosed its first case of COVID-19. In that year, we began to wear masks, social distance of six feet, and relentlessly wash our hands. Today, the CDC has relaxed those rules: NO MORE MASKS for those who have been fully vaccinated except on public transportation (planes, trains, buses, etc.). This is a monumental change since the

onset of the pandemic. It is a clear indication that the number of patients with COVID has significantly decreased... at last! In this last year, we have learned a tremendous amount about the virus. Almost immediately, we learned that bats are most likely responsible for the COVID pandemic. We saw a group of people called "long haulers" whose COVID symptoms are present for

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months instead of two weeks (mild cases) to six weeks (severe cases); the duration of the disease has stumped doctors. On the other hand, there is still a tremendous amount about the virus that remains unknown, i.e. we still have no definitive answer as to why children 5-17 constitute less than 10% of all COVID cases. Even more mysterious is why kids under 4 are only part of a 2% group.

The management of COVID-19 patients is one thing that we have mastered to some degree. Three vaccines are now available, although we do not have successful anti-viral treatment as yet. The fight against COVID-19 has been aggravated by the spread of misinformation. One example of this was Trump's mistaken though fleeting idea that injecting bleach might be a treatment for COVID. The controversy over wearing masks has finally ended because of the clear results of cities initiating mask laws with the almost immediate results of lowering patient statistics. Scientists believe that in one more year, we will have "herd immunity", but that does depend on the evolution of the virus. Will we be using public transportation, going to the movies, attending large indoor concerts and social events, etc. - in essence, returning to our former lives? Justin Lessler (PhD, MHS, Associate Professor at Johns Hopkins Bloomberg School of Public Health) says with regard to the future a year from now, "It's hard to say anything with much certainty". However, it seems very optimistic that the mask law has been rescinded as of today (April 14, 2020).

Fortune magazine featured an article called "15 Ways Life Has Changed Since the Onset of the COVID Pandemic". The first change is that 42% of our work force is now working from home. The

second change is that we are experiencing a "distorted sense of time" because we have lost our normal routines and are separated from "work, school, dates, social outings, sports events, ceremonies, travel, etc." We heard, particularly in the first few months, how many people felt that each day was an eternity. Many didn't even know (or care) what day of the week it was. The third change is that our gyms and fitness centers closed, so that working out became impossible. Mail order gym equipment experienced a much higher degree of sales, and delivery was often delayed due to a backlog of orders. The fourth is that "essential workers" became a well-known phrase, and those workers experienced a rise in "customer gratitude". The fifth is that certain items experienced "pandemic-fuelled shortages, i.e.toilet paper, Clorox, bikes, and even coins (small change). Sixth is the new dilemma of working parents, i.e. affordable/available childcare, children at home engaged in on-line school, etc. A change in food was the seventh dramatic change. People began to cook at home (many restaurants were closed). Food hoarding was common. Also, online grocery shopping and home delivery became the norm for many shoppers. Class inequality was more evident than ever as COVID ravaged poorer communities (number 8). Lost jobs were often held by women and/or people of color working in the service industry. The ninth change was almost entirely unsuccessful. This was a mostly failed attempt to replace "traditional school" with remote learning. Disadvantaged students often did not even own a computer or internet connection. Obviously, less academic-oriented students did a minimum of "classroom work" - and special needs students were completely left behind. At last, we saw a positive result of the pandemic (number 10) an interest in and appreciation of our nation. National parks were full (after they finally opened) as people wanted physical activity after months of isolation. I actually visited one I had never seen before last weekend - Caprock State Park. (I highly recommend it - magnificent!) The eleventh change was a major

negative - the loss of many women in the workplace. Many had lost their babysitter and were forced to stay home to care for their children. Thirty years of progress for working women was erased in less than a year. These negative changes were part of our mental health crisis (number 12). The isolation and stress of the past year finally moved mental health issues to the front burner, and understandably so. Number 13: the college experience changed significantly, which is really sad. Because schools restricted students to their rooms, they missed out on what many feel is the best part of college - relationships! Everything has now changed - from shorter sports seasons (better than some schools, which have cancelled sports events entirely) to online classes which involve no faceto-face student interaction. FOMO (fear of missing out) is prevalent and is a legitimate and pervasive feeling because these kids ARE missing out. Numbers fourteen and fifteen are essentially more of the same.

In general, it has been an extremely difficult year. It seems that the negatives have outweighed the positives. Families have experiences serious losses - friends as well as close relatives. Students have suffered immeasurably with virtual classes instead of the classroom experience. Can you imagine trying to teach a first grader to read virtually? Or trying to find reference books for a paper in a virtual library? But on the positive side, we have always been a nation of positive thinkers. One major upside is that the family unit has for the most part become much closer. The easing of the mask restriction has many trickle-down results. For example, I believe it signals the beginning of the end of the pandemic. It follows that the general national feeling will become more optimistic, and we will see an improvement in the economy. We will again see people on our streets and hopefully, many businesses will reopen. Finally, the major depressive feeling of our citizens will be replaced with energy, optimism, and happiness.

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