PANHANDLE HEALTH

A QUARTERLY PUBLICATION OF THE POTTER-RANDALL COUNTY MEDICAL SOCIETY

WINTER 2020 | VOL 31 | NO. 1

Telemedicine

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President's Message

by Neil Veggeberg, MD

After all this time I would have thought the COVID pandemic would have been different. I felt that, when they relaxed the rules about social gathering, it would stabilize, but instead it has grown substantially. It is certainly quickly on the way to outstripping the medical community's abilities. It is spreading enough to be a continued threat to our hospitals and health care workers. It is interesting that it is has such a disparate presentation. In the past it seemed like everyone who got the flu had significant symptoms and there was no question you had something. People in the same family with COVID range from no symptoms to symptoms severe enough to be in the ICU. I understand studies are ongoing to try to discern who is most likely to be hit the hardest.

We do not seem to have much control over the disease. The treatments have gotten better but certainly no "magic bullet" has been found up to the writing of this article. A vaccine is coming soon, but due to the massive number of people in this world it may take a while to vaccinate enough people to slow the spread. Our hospitals are doing their best to control the disease once it reaches a dangerous level.

It is incumbent on everyone to help slow the spread. Outdoor activities with everyone spread apart is probably the safest, and a closed environment where people exercise or loudly exhale is probably the worst. Until the vaccines come out, the only protection or control will be social distancing and wearing masks. The hope is that we can make this all voluntary. There comes a point where personal liberty and safety of the community become balanced. A good case of that would be Andrew Speaker in 2007. He was found to have a multi drug resistant form of TB. He was advised not to travel. Instead he traveled extensively for a wedding. While away, the CDC determined he had an even worse form of TB than they had first realized. After returning to the country, he received an isolation order from the CDC. Supposedly this was the first such order in over 40 years.

Fear-based reactions are common. This list is from an NIH article regarding Ebola. (1)

1. Fear and stress interfere with cognitive processing.
2. Personal assessment of risk is hampered by lack of information.
3. Individuals' risk assessments are poor even with good information.
4. Individual actions are influenced by the actions of other individuals.
5. Mass actions are influenced by the actions of the masses.
6. Fear-driven actions may escalate and reach a tipping point when compounded by a collapse of the individual's or the community's values and cultural references, and/or an erosion of systems of governance and public order.

It appears that we have at least gone through the first 5 stages. I hope we can avoid the sixth. In the meantime, it is tough. People still get cancer, have heart attacks and can get sick for other reasons. This is the main reason for keeping hospitalizations to a minimum.

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(1) Curr Psychiatry Rep <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5241909/> . 2016; 18(11): 104. Published online 2016 Oct 13. doi: 10.1007/s11920-016-0741-y <https://dx.doi.org/10.1007%2Fs11920-016-0741-y>

Our Next Issue Of *Panhandle Health*

Features:

Overcoming Barriers: Physicians' Stories

Letters to the Editor

Dear Cindy,

It was good to speak to you again. As a former editor of peer-reviewed medical journals, I continue to admire *Panhandle Health*, which is timely, relevant, informative, useful, well-written, well-designed, and, above all, well-edited. When one considers that peer-reviewed state medical society journals are a distant memory, the Potter-Randall County Medical Society is all the more remarkable for making medical journalism a priority. The 30th Anniversary Edition of *Panhandle Health* is a tour de force.

I believe that the journal could be an instrument for change on COVID. It's hard to single out just one article from the Fall issue, but Dr. Mattamal's "Thoughts from the 'Frontline'", with its capitalized plea to wear a mask, should be on the desk of every elected official in Texas. Even if Texas didn't favor Biden, surely Potter-Randall physicians can take the lead in supporting his science-based approach. What an important step that would be toward uniting us.

Again, congratulations.

Sincerely,
Alan Blum, MD
Professor and Gerald Leon Wallace MD Endowed Chair in Family Medicine – University of Alabama School of Medicine

October 1, 2020
RE: Fall Edition 2020 of *Panhandle Health* Medical Society

Dear Neil,

I was quite disappointed in this particular edition. Your own wife has been here 30 years working for pediatrics. There was not one woman mentioned in this edition that had been here for so long including not only your wife, but Robin Martinez, Sheryl Williams, Ernestine Smith, Marita Sheehan, Leora Andrews, Victoria Thompson, Gayle Bickers, Grace Stringfellow, Deborah McCollum, Loralu Raburn, Jan Swan, Pamela Chander, Panpit Klug, Stacie Morgan, Janet Schwartzenberg, Debora Carrizo, Karen Cutts, Holly Mitchell, Ruth Pilco-Jaber, Olga Smirnova, Shari Medford, Meganne Walsh, Mary Ann Piskun, Joyce Chuachingo, Shilpa Saralaya, Susan Neese, Estelle Archer, Grace Archer, Susan Goetz, Elaine Cook, Rhodesia Castillo, Elizabeth Archer, Dhana Cox, Anita Ravipati, Kathleen Clark, Ruby Saulog, Amber Dobler-Dixon, Taghreed Maaytah, Carmen Werner, Tracy Crinic, Luzma Houseal, Aniceta Velky, and myself.

Sincerely,
M. R.Thurmond-Anderle, M.D.

Editor's reply

Dr. Thurmond-Anderle's point is well-taken, and the editorial board will strive to do better to represent our women physicians. Although *Panhandle Health* has previously published articles on pioneer women physicians (Drs. Nan Gilkerson, Evelyn Powers, Ernestine Smith, and Leora Andrew) and has devoted an issue to women physicians in the Panhandle (as outlined in my introductory essay in the last issue), we certainly should have chosen some of the deserving retirees on Dr. Thurmond-Anderle's list to give proper honor to the years of service provided by our women physicians. We have already made strides to increase female representation on our editorial board by inviting Dr. Sheryl Williams to join us; if any other women would like to volunteer to help provide editorial assistance to *Panhandle Health*, please contact Cindy Barnard at the PRCMS office.

S.V.
Steve Urban

Editor's Message:
Telemedicine and COVID-19

by Scott Milton, MD, FACP

The current pandemic has accelerated the use of telemedicine in caring for patients in both the inpatient and outpatient settings. Telemedicine can be defined as the use of telecommunication technology and electronic information to provide healthcare at a distance. The current health care crisis has been addressed by Medicare and many other insurance plans to provide reimbursement for telemedicine visits. These provisions have provided relief to both the provider and patient. Furthermore, communication between provider and patient can be maintained and, in some ways, augmented.

There are several benefits, some subtle and some obvious, from utilizing telemedicine. Many patients travel long distances in order to see and receive their medical treatment and follow up. Significant cost and time can be saved by conducting an office follow up via phone. It is significantly safer for many people to avoid traveling relatively long distances, especially elderly people driving on narrow country roads in poor weather or in the dark. Obviously, there is decreased risk in contracting any contagious illness including COVID when a face-to-face office visit is avoided. This advantage exists for the providers as well. The use of personal protective equipment or PPE can be diminished and conserved by practicing via telemedicine when at all possible. This is true in both the inpatient and outpatient setting. More subtle advantages include improved communication when interviewing the patient in the comfort of their own home. I have found patients more relaxed and eager to talk about their current problems, both medical and nonmedical, while conducting my interview. Usually patients have their medications readily available in the home, and their regimens can be reviewed more easily and more efficiently. I also find it easier to conduct an interview via telephone and review the medical records in my computer at the same time. I have always found it distracting for both the physician and patient to attempt utilizing a computer while conducting an interview and exam. This may be more of a reflection of my age and stubbornness in the era of the electronic medical record.

Clearly the biggest disadvantage in telemedicine is the loss of physically examining patients and the comfort derived from touching patients. I'm often involved in the care of wounds or other areas of the body that may be infected and so need to be physically examined and visualized. Trying to make a determination of clinical progress or failure based on the phone description of a wound by your patient is asking too much of both the patient and provider. Sometimes photographs can be exchanged either via phone or by photographs taken by a home healthcare company. However, many times these photographs are inadequate, and subtle findings such as erythema, warmth or fluctuance can be misjudged or missed altogether. Another disadvantage of telemedicine is relying on phone calls to be made at a scheduled time. When patients do not answer phone calls as scheduled, the patient will call at a later time and ask for the interview to occur. This has been frustrating and time-consuming and leads many times to staying after scheduled office time to finish an interview. Another disadvantage is the confusion that can be caused when entering an office visit into the medical record for patients who were not available. I have developed a habit of producing at least a small note for patients where an interview is not made. This lessens the confusion for the billing team and reduces the possibility of inadvertently charging for services. Another important disadvantage is the uncertainty that a generated charge for services rendered will not be rejected by the payor. Apparently, specific wording must be included in the record that states that the patient is aware that the phone interview will be billed as an office visit. It is therefore the responsibility of the provider rendering the interview to make the patient aware of this fact.

The use of telemedicine is another example of how an existing technology and its use has been increased and augmented out of necessity during this pandemic. There are clear benefits and disadvantages when utilizing telemedicine. Further advancements will continue to be made in this area that will offer improved care at a distance. But I think it's also safe to say that there is no substitute for a face-to-face interview and viewing with your own eyes the parts of your patient's body that can be visually inspected and listening to those parts of the body that cannot be visualized. There's a certain level of communication that can be lost when a physician and patient must conduct their interactions at a distance. I'm most curious to see what the future holds after the pandemic and how many of these technological changes that were either caused by or accelerated by the pandemic will become permanent and will be considered the standard of care.

In Memoriam

Robert Cotton, M.D.
Family Physician,
died on June 15, 2020
at the age of 85.
He was a member of the
Potter-Randall County
Medical Society for 59 years.

Executive Director's Message

by Cindy Barnard, Executive Director

Before I introduce our Winter issue of *Panhandle Health*, I must put out an emergency call to our physicians for the need for Board and/or Committee members of our Medical Society. I am certainly aware that Covid-19 has many of our doctors working incredibly long hours, particularly at BSA and Northwest Texas Hospitals, but in order to keep our Society running smoothly and efficiently, we MUST fill our Committee and Board positions with physicians willing to donate a bit of their time and energy to the Society. PLEASE, MEDICAL SOCIETY PHYSICIANS: WE NEED YOU! Call the Society office at 355-6854 and ask for me, Cindy Barnard (email is prcms@suddenlinkmail.com), and I can go into more detail with the duties of Board and/or Committee membership. I assure you that this is far from a huge obligation so again, PLEASE, HELP US keep the Society running smoothly by assuming an active role in our Board and/or a variety of Society Committees. The Society is here for YOU, OUR PHYSICIANS, as well as the public, so DOCTORS, PLEASE HELP US! I feel certain that there are physicians who will step up and help us out during this crucial pandemic. Thank you!

And now to our magazine, the Winter issue—Telemedicine. This issue contains an abundance of information about the newer practice method of telemedicine. Telemedicine is defined in Texas law to be "remote services provided to a patient by a physician licensed in Texas." I've not heard any complaints from patients regarding the lack of personal contact in practices using telemedicine. In fact, most think the benefit of a virtual encounter outweighs the risk of a patient sitting in a full waiting room as well as contact with many differing medical staff members, even though masked. The advantages of receiving medical care in your home are enormous, especially during our current Covid-19 pandemic. Not only do you avoid exposure to Covid-19 but also, you enjoy the convenience and safety of staying home and yet, at the same time and location, seeing your doctor—online. Read the articles in this issue about telemedicine. If you have not participated in a telemedicine call from one of your doctors, I predict that it won't be long. I also predict you will like it: it's easy, efficient, relatively fast, and ever so convenient! Most insurance companies cover telemedicine services. It appears to be the wave of the future, especially for certain medical specialties.

As the year ends, I want to thank the 2020 Board of Directors for their service and dedication to our Society. Under the leadership of our President, Dr. Neil Veggeberg, and even with Covid, your Society has enjoyed an exceptional year. The following physicians deserve an enormous thank you for their support as well:

Executive Committee 2020
Neil Veggeberg, MD, President

TMA Delegates: Rodney B. Young, M.D., Daniel Hendrick, M.D., Rouzbeh Kordestani, M.D., Robert Gerald, M.D., Ryan Rush M.D., Evelyn Sbar, M.D.

Alternate delegates: Tarek Naguib, M.D., Neil Veggeberg, M.D.

Board of Censors: Evelyn Sbar, M.D., Tarek Naguib, M.D., William Biggs, M.D., Tetyana Vasylyeva, M.D.

Committee Chairmen: *Retired Physicians*, Mitch Jones, M.D. & Richard McKay, M.D. *Panhandle Health* Editor: Scott Milton, M.D., *Physician Health & Wellness:* Robin Martinez, M.D.

Another thank you goes to the 2020 *Panhandle Health* Editorial Board, led by Dr. Scott Milton, Editor, an extremely busy doctor due to Covid-19. Other Editorial Board members are Tracy Crnic, M.D., Steve Urban, M.D. (Copy Editor), Rouzbeh Kordestani, M.D., Paul Tullar, M.D., Ravi Bharadwaj, M.D., and Zane Grodman, M.D. We truly owe a special thanks to Steve Urban who has given of his time and verbal expertise above and beyond the duties of a copy editor. His dedication has been unwavering and invaluable.

A final thank you goes to our 2020 "Circle of Friends" for their continued financial support and generosity. Their commitment is absolutely essential to the success of all our events. They are Amarillo National Bank, Baptist Community Services, Neely, Craig & Walton Insurance Agency, Texas Medical Association Insurance Trust, Texas Medical Liability Trust, Happy State Bank, Cenveo Amarillo, Daryl Curtis, CLU, CHFC, Physicians Financial Partners, Boxwell Brothers Funeral Home, and Leslie Massey, Farmers Insurance Agency.

What a year this has been! Covid-19 has affected virtually everyone's life, from young to old. We mourn the passing of a little kindergartner from Coronado Grade School. And we sincerely hope that a vaccine will put an end to this dreaded disease! PLEASE WEAR YOUR MASKS, and practice social distancing when at all possible. These small steps are not that difficult, and you may be saving your own life, not to mention that of your neighbors. BE SAFE!

In Memoriam

Kenneth Johnston, M.D.
Orthopedic Surgeon,
died June 19, 2020
at the age of 86.
He was a member of the
Potter-Randall County
Medical Society for 50 years.

Telehealth and Telemedicine in the Age of the Pandemic

by Rouzbeh K. Kordestani, MD, MPH

The world has changed. It is hard to imagine what the world was like only a few months ago. The daily routines are gone. The simplicity has vanished.

Within this new reality, medicine and its delivery have also irrevocably changed. Medicine, surgery and health care delivery have now been transformed.

Telemedicine and telehealth are the new standards. As we move forward with this new paradigm, we need to look at what we have, its benefits and its detractors. However, we also need to look at how we arrived here.

It is too easy simply to blame COVID as the evil that changed everything. COVID-19 is not evil. It is simply a disease process. More exactly, it is a disease process that managed to catch the modern world off guard. Telemedicine/telehealth (TM/TH) were already entities at the forefront of medicine. They were needed to address the disparities of health care delivery in rural, poor and hard to access areas. Aptly put, they are the ultimate application of technology to decrease human suffering. COVID simply forced the advancement and acceptance of this technology.

Patient concerns with telemedicine in the pre-COVID Era

Prior to the pandemic, studies showed that, when patients were approached, their dissatisfaction with telemedicine was mostly related to cost. As health care costs have risen and the overall financial burden to patients has soared, the actual cost of care outweighed all other concerns. This had in turn a direct impact on patient satisfaction. A secondary concern was the availability of the technology needed. Patient interaction and the transmission of information is critical to the success of any telemedicine/telehealth system. Prior to the pandemic, patients expressed that the technology at times was too much for them. The technology was too burdensome, and overall effectiveness was adversely affected. Also, many patients in rural areas simply did not have the technology or the ability to engage in the needed technology. This made TH/TM virtually inaccessible. These patients would invariably be seen through the more accepted and routine medical channels.

Patient concerns with telemedicine in the post-COVID Era

With the arrival of the pandemic, telemedicine/telehealth has become commonplace. On analysis, though, its acceptance is dependent on several critical factors. Health and system experts note that the effectiveness of TH/TM is dependent on how it meets six factors: 1. safety; 2. effectiveness; 3. patient centeredness; 4. cost; 5. timeliness; and 6. overall efficiency.

In the post-COVID world, the paradigm shift placed safety as the highest factor of concerns, with the most direct impact on patient satisfaction. Needless to say, TH/TM offers patients a much more secure and safe way to see their physicians. They can avoid waiting rooms, hospitals and other health care areas that might expose them to the virus.

Next to safety, the patient-focused nature of TH/TM has been found to have the greatest impact on satisfaction. Patients find that, within this new paradigm, they seem much more the focus of attention. There is no mad rush to and from the office. Patients no longer need to strategically accommodate to their physician's schedule. They find their schedules to be more malleable along with those of the physicians. They note that the physician is not distracted. Their test results and information are easily accessible. The visits are interactive and educational. They feel they are able to communicate their concerns. They no longer feel that their time is wasted. In this way, the doctor-patient visit has regained its importance.

Using these factors, the effectiveness of TH/TM can be gauged along with its impact on patient satisfaction. Even though no large review is yet available with data from this pandemic, some preliminary information is actually accessible. This data shows a direct and favorable relationship between TH/TM and patient satisfaction. Since New York was the center of the initial COVID pandemic and response, logically it would have the earliest data. Ramaswamy, Yu et al studied the New York Medical Center system, pre- and post- March 4th, 2020 (pre- and post-COVID). They noted an 8729% increase in video visit utilization. They evaluated this astronomical increase in regard to overall patient satisfaction. They noted a

significant increase in patient satisfaction with telemedicine as compared to the pre-COVID window. They did however notice some areas of dissatisfaction, in particular with first visits, female gender and the younger patient population. All other categories showed dramatic increases in patient satisfaction when compared to more traditional visits.

Telehealth/Telemedicine and the Health Care Provider

Even though telemedicine seems to have made headway with patients, for it ultimately to succeed it has to also be accepted by physicians and other health care professionals. While patient satisfaction is important, physician satisfaction also needs to be taken into account. Health care professionals and physicians have different foci and points of concern. Their attention is more focused on 1. cost; 2. reimbursement; and 3. care delivery and information security.

Cost is always a concern for physicians, be they in university settings, group practice or in solo ownership. In all of these settings, the cost of delivery of care in telemedicine/telehealth has been projected to be far less. The labor costs and the overall fiscal burden has been estimated to be less than half of traditional visits. In some cases, the cost of acquiring the needed technology many be initially high, but these are quickly amortized. More importantly, as more and more technological advances are realized, the capital costs have been projected to continue to decrease.

Next to cost, reimbursement for telemedicine and tele-visits has always been a concern. Traditionally, remote visits and telehealth delivery have been reimbursed at only a fraction of an actual physician face-to-face visit. However, since COVID, the Centers for Medicare and Medicaid Services (CMS) has changed its policies, bringing these visits and their reimbursement into parity with more traditional doctor visits. In this way, physicians and medical teams are no longer penalized for offering care through the telehealth/telemedicine avenue. They no longer have to look at this modality as a money-loser. They can now incorporate it effectively into their health delivery plans.

Last but not least, a concern of many health care professionals is the safety of patient information and data through the telemedicine/telehealth internet platform. Cybersecurity and internet security have always been concerns when health care delivery is involved. The Health Insurance Portability and Accountability Act (HIPAA-1996) includes clear requirements in regard to patient information access online. In the age of COVID, however, HIPAA rules and access have been modified. This new modification has not only allowed for easier and more effective health care delivery, it has also allowed physicians not to feel overwhelmed when trying to engage in telemedicine. This of course will pose challenges as time goes on. Our brief experience during the pandemic, though, shows that multi-specialty health delivery is possible and safe through the internet.

Conclusion

COVID and the pandemic of 2020 have pushed mankind into a new age of health care and health care delivery. Some of these changes were inevitable. COVID simply made these changes occur faster and harder. We realize now that telemedicine/ telehealth (TM/TH) is here to stay. Because of COVID and the patient's needs during this pandemic, TM/TH has been forced into the forefront of medicine. Using patient satisfaction as a milestone, key factors have been highlighted. Along with this, increased patient safety standards and a new focus on patient agendas have done much to make TH/TM a true success. Other factors such as cost savings will continue to make it an important aspect of the new health care reality.

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In Memoriam

Bob Stafford, M.D.
Orthopedic Surgeon,
died February 19, 2020
at the age of 82.
He was a member of the
Potter-Randall County
Medical Society for 50 years.

Tele-Learning and Tele-Interviewing for Students During the Current COVID-19 Pandemic

by Paul Tullar, MD, FACOG

Medical schools have been making on-line pre-recorded learning opportunities available for their first and second year medical students for many years, at least 15-20 years. The first and second years of medical school are usually spent acquiring basic science knowledge, such as anatomy, microbiology, biological statistics, cell physiology, organ physiology, and (later on) abnormal pathophysiology in different diseases. Classically, most of these courses have been taught with lectures, with audio-visual augmented material (slides) and some in-person laboratory work (for instance, gross anatomy labs, among many others). Many medical students have appreciated the opportunity to hear on-line, pre-recorded lectures, often available to hear and repeat, sometimes available to speed up the rate of replay, if desired. Many medical schools have developed curricula that offer this on-line instruction. Some medical students still prefer to sit in and listen to real-time lectures, and hands-on laboratory courses are difficult to accomplish on-line, though supplementary material can be recorded and available on the student's time schedule.

How effective has this on-line instruction been, and how does it compare to in-person, small group, patient-based instruction? There have been articles published about on-line instruction of medical students learning heart sounds, compared to mastery of this auditory material as learned in small groups with real patients and cardiologists. The on-line mastery of this hearing and interpretation of heart sounds was favorable (1).

With the advent of the COVID 19 pandemic and the general lockdowns of school classrooms, this on-line availability of medical educational material has been vital. Typically, in the third and fourth years of medical school, medical students have learned clinical medicine in the various specialties (such as Family and Community Medicine, Pediatrics, Obstetrics and Gynecology, General Surgery, Psychiatry, Internal Medicine, etc.) by seeing real patients in-person, with real medical and surgical resident doctors, as well as faculty doctors in clinics and at the bedside in hospitals. These third and fourth year medical students classically have had a chance to see, talk with, discuss diagnosis and care plans for these patients in real life, with their clinic or hospital doctors in the places where decisions are made, care is taken and treatments are delivered. In seeing and talking with patients, students begin to understand better the connection between what they have learned in their first two years, and the clinical medical care their future patients will need.

Again, with the advent of the COVID-19 pandemic in March 2020, many third and fourth year medical students were sent home and told not to come in to the hospital to avoid disease exposure. At this time, some on-line courses were put together to help utilize the expertise of clinical faculty physicians who were on the front lines fighting this pandemic, and who were using public health tools in the initial response to the pandemic. Faculty members, searching for measures to slow the spread, to avoid such rapid transmission, to keep medical resources available for those who were sick, or for those who were caring for those who were sick, were supplemented at Texas Tech School of Medicine with some automated on-line modules available through the Harvard School of Public Health and through the London School of Tropical Medicine. Further Zoom meetings with medical school faculty doctors who were operating drive-through testing, faculty doctors who were caring for medical intensive care patients, faculty doctors in different specialties whose work was complicated by COVID-19 transmission and illness allowed third and fourth year medical students to learn COVID as it was happening. Trauma in COVID-19 patients complicated surgical care. COVID-19 complicated prenatal care and labor and delivery for pregnant women and for their doctors and nurses.

This learning opportunity – to learn from medical personnel who were strug-

gling to cope with a pandemic while the information about this virus was still coming in, to coordinate this with the best available public health tools on-line – was felt too important an educational opportunity to pass up. Texas Tech medical students who were involved with this on-line course felt it to be well worth doing, during a time when they could not learn by doing inside the hospitals. The medical students pointed out that on-line live courses made it possible to continue learning without having to arrange expensive travel and that it was a good use of an unusual crisis opportunity, but that it was difficult to interact electronically (as opposed to in person). They felt that it would be difficult to learn procedures or examination techniques without actually being there in person. As an on-line instructor, I would agree that it was more difficult to see who was participating, especially if they had their cameras off and microphones muted. On the other hand, the Zoom environment can be quite distracting if everyone has their microphones on continuously, and if everyone is talking, clearing their throats, with bystanders at home making noise (dogs, cats, etc.) while the lecture is taking place or while questions are being asked and answered.

Eventually, it became clear that proper use of Personal Protective Equipment (PPE), careful repetitive and timely hand washing, and the use of sanitizing hand gel all lowered transmission from patients to their health caretakers enough that non-emergent hospital care could be resumed. Medical students were allowed to return in a limited way to clinical teaching in late May and June, with some direct care of patients, while still keeping them away from the most infectious patients in the higher risk circumstances. Nevertheless, some social distancing adaptations have been thought to be necessary to mitigate risk of COVID -19 transmissions to medical students, resident teaching doctors and medical school faculty. Two places where in-person interviews have traditionally been emphasized are medical school application interviews and post-doctoral residency training application interviews.

For medical schools in fall 2020, medical school admission interviews will be on-line, either on Zoom or on another on-line audio/video service like it. This limits the interpersonal contact between interviewer and interviewee, for better (less chance of viral transmission) and for worse (less chance to interact to decide if the student really wants to go to that medical school, and less chance to really get to know that student and to see if they would be the best fit for that medical school). Medical school faculty involved in the admissions system are gearing up for this new process as this article goes to press.

For specialty residency training applications this fall, residency application interviews will be conducted on-line, as required by American College of Graduate Medical Education (ACGME, the national governing body for medical residencies). Thus, the medical school faculty and current residents, who usually conduct in-person interviews to decide who will be offered a residency position, will have to make do with on-line (Zoom or similar) interviews this fall. The same potential problems noted above regarding limited information from on-line interviews apply here, too. This will be done to try to balance the additional safety for the interviewees and interviewers with the sacrifice of intimacy of in-person interviews. Preparations for our graduating medical students, soon to become doctors, and preparations for our resident and faculty interviewers are also taking place as this article goes to press. This topic will be covered in more depth in another article within this issue of *Panhandle Health*.

Has the COVID-19 pandemic and the necessity-driven innovation brought about anything good? Some medical students in Lubbock were able to innovate by using 3-D printers to produce previously unavailable Personal Protective Equipment (PPE) while they were not in class. When opportunities to interact with local Lubbock social service agencies precluded Lubbock first and second- year medical students from getting in-person knowledge of these agencies, attention turned to on-line interviews with an Amarillo health service agency (The Turn Center), giving students the needed understanding of what local health services agencies can do, while exposing the Amarillo agency workers wider exposure to Lubbock medical students than they otherwise would have had. While Amarillo's OB-GYN residency had been able to produce all its own didactic teaching for OB-GYN residents and rotating third and fourth year medical students before the pandemic, the lockdown-induced decrease in availability of these teaching resources encouraged access to national OB-GYN teaching resources (through the American College of OB-GYN collaboration), allowing our Amarillo OB-GYN residents and medical students to collaborate with many different viewpoints about choices in OB-GYN care on a regional (Lubbock) and on a national basis, through regional and national Zoom meetings.

Overall, the risks to medical students and to their teachers (both resident and faculty doctors) have forced more innovation – in on-line teaching, in on-line learning, and in on-line Zoom lectures and interviews. There are benefits and hindrances in this, but this innovation, born of necessity in the 2020 COVID-19 pandemic, has moved this kind of communication and teaching automation more rapidly forward than the careful evolution in teaching and communications that preceded it.

Many thanks to Dr. Betsy Jones, Department of Medical Education, School of Medicine, Texas Tech University Health Sciences Center in Lubbock.

With thanks to Dr. Lara Johnson, Department of Pediatrics, School of Medicine, Texas Tech University Health Sciences Center at Lubbock.

Many thanks to Dr. Teresa Baker, Department of OB-GYN, School of Medicine, Texas Tech University Health Sciences Center at Amarillo, and several of our Amarillo medical students and our Amarillo resident doctors.

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Telemedicine Billing in the Era of COVID-19

by Hayley Gibler Williams, MS4, Maranda Reddoch, C.P.C., Ravindra M. Bharadwaj M.D., M.P.H.

Your patient is unable to come to the office. Perhaps they're worried about the risk of contracting COVID-19, they're exhibiting symptoms of COVID-19, or they live too far away from the clinic. The option of conducting a clinic visit via telehealth (phone or video communication) is not new, but you're not sure how to bill for it. Now what? The CMS Interim Final Rule 5331, which was issued on April 30, 2020, has provided guidelines for telemedicine in the era of COVID-19. These guidelines are retroactively effective from March 1, 2020 through the end of the emergency declaration.

First, we will go over some definitions you should know: An **E/M service** is an evaluation and management service. A **telehealth visit** is a visit with a provider that uses telecommunication systems that has audio and video capabilities between a provider and a patient. A **virtual check-in** is a brief (5-10 minutes) check-in with the practitioner via telephone or other telecommunication device to decide whether an office visit or other service is needed. A virtual check-in is always instigated by the patient. A remote evaluation of recorded video and/or images would also be considered a virtual check-in. An **E-visit** is a communication between a patient and their provider through an online patient portal. **Telephone services** are non-face-to-face E/M services provided using telephone audio.

One addition to documentation includes reporting the Place of Service (POS). You should report the POS equal to what it would have been had the service been furnished in-person. For example, if a patient normally would have come to your outpatient clinic for an appointment, the POS would be the clinic.

For **telehealth visits**, use Modifier 95 to indicate that the service rendered was actually performed via telehealth. For **virtual check-in visits**, use HCPCS codes G2010 and G2012. For **E-visits**, use CPT codes 99421, 99422, and 99443 and HCPCS codes G2061, G2062, and G2063. For audio-only services (i.e., **telephone services** or any visit without video), use

CPT codes 99441 for services that are 5-10 minutes in length, 99442 for services that are 11-20 minutes in length, and 99443 for services that are 21-30 minutes in length. Modifier 95 should also be used for audio-only services. It should be noted that which service to bill and whether Modifier 95 is needed ultimately depends on insurance guidelines. When determining time for time-based services, use current 2020 CPT times instead of the 2021 proposed times.

Another issue that providers may encounter is how to bill when working with residents. We will divide this topic into two sections: Primary Care Exception (PCE) clinic visits and Non-PCE clinic visits.

Primary Care Exception (PCE) clinics include Family Medicine, General Internal Medicine, Pediatrics, and Ob/Gyn. The teaching physician can provide direct supervision by interactive telecommunications technology either during or immediately after the visit for all levels of office/outpatient E/M services furnished in primary care centers (i.e., the PCE setting). Residents in a PCE setting can now provide all levels of office/outpatient E/M services that would normally occur in a primary care setting, telephone E/M services (CPT codes 99441-99443 based on time spent with the patient), transitional care management services (CPT codes 99495-99496), online digital evaluation and management services (CPT codes 99421-99423), interprofessional telephone/internet/electronic health record referral services (CPT code 99452), brief communication technology-based service (HCPCS code G2012), and remote evaluation of recorded video and/or images submitted by an established patient (HCPCS code G2010).

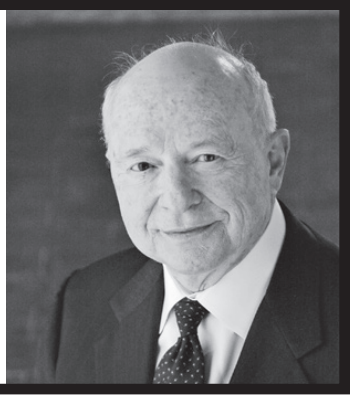
For Non-Primary Care Exception (Non-PCE) clinics, the resident may participate in a service furnished in a teaching setting, and the physician fee schedule payment is made if the teaching physician is present during the key portion of the service using audio/video real-time communications technology for any service or procedure for which payment is being sought. In the case of E/M services, the teaching physician must be present during the portion of the service that determines the level of services billed using audio/visual real-time communication technology.

As telemedicine gains popularity, many independent telemedicine service providers have created tools for solo practitioners and small practices, such as Doxy.me, which provides streamlined telemedicine services to providers and clinics. These include HIPAA-compliant video call services, screen sharing, file transfer, and payment collection—just to name a few. Some services are free to use, but the billing feature requires a subscription. From the patient's perspective, they only need to click a personalized link to join the meeting; no software downloads or accounts are required. Increased efficiency can enhance the telemedicine experience for both providers and patients, adding to improved patient satisfaction.

Billing and coding can be difficult for all physicians. Here are the main takeaways: Modifier 95 indicates that the visit was conducted via telehealth. Telephone/audio visits use CPT codes 99441-99443 depending on time spent, in addition to the use of Modifier 95. In PCE clinics, residents can resume most of the same responsibilities, and supervising physicians must observe directly or immediately after the visit. In Non-PCE clinics, the supervising physician must be present during the key portion of the visit. Telemedicine services, such as Doxy.me, are available to streamline the telemedicine process. When in doubt, contact your institution's billing and coding department for the most accurate information.

In Memoriam

James Hefner, M.D.
Anesthesiologist,
died on May 12, 2020
at the age of 85.
He was a member of the
Potter-Randall County
Medical Society for 27 years.



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Matchmaker, Matchmaker... Zoom Me a Match?

by Schyler Z. Grodman, MD, MS

(Note: All medical students interviewed for this piece will remain anonymous, so as not in any to way impact their outcomes in the upcoming match)

This fall, prospective residents and residencies will engage in a long-standing process, the National Residency Match Program (or NRMP), to assign new residents to residency programs. Applicants from across the country, and around the world, will apply to residency programs. Those programs will read through thousands of applications, select those applicants that they deem to be a good fit for their program, and invite them to interview. The applicants will then interview, and, after the interview season ends, applicants and programs alike will submit rank lists. Those lists will be entered into a computer, which will match applicants to programs, and the match will conclude on Match Day, 2021, with applicants finding out where they will spend their next 3-7 years of training, depending on the specialty. That is how it has been done since 1952 (the algorithm itself even merited a Nobel Prize for its creators in 2012).

However, given the COVID pandemic, the 2020-2021 NRMP will be unlike any other in history, with almost all interviews being conducted over Zoom. No traveling to various cities, staying in hotels, going out to dinner with residents the night before the interview. No waking up early the following day, putting on a suit you had to iron following your trip, visiting the hospital itself, meeting residency coordinators and staff while waiting in hallways for 20-30 minute interviews. For this match, applicants and programs will have to undergo the entire process with the understanding that the first physical encounter may be July 1st, 2021, at the start of the next academic year.

Given these issues, how are applicants – and residency programs – reacting? How are applicants preparing to interview for residency over Zoom and to rank programs without ever seeing them in person? How are programs going about selecting, interviewing, and ranking applicants without seeing them in person, without gauging how they interact with current residents, residency staff, and faculty?

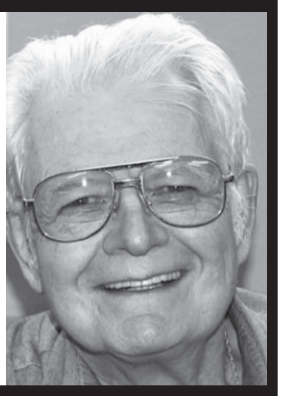
To begin with, the impact on the match process has already been in place for some time; with the risks of COVID, many hospitals have stopped allowing outside medical students to complete away rotations, leading to "Zoom Rotations" for medical students. Per Dr. Samer Zaid-Kaylani, Residency Director for the Pediatric Residency Program at Texas Tech Amarillo, "COVID has limited the elective experience for many students," meaning that applicants seeking experience with outside programs have had to seek alternative methods. "We have not been able to do real away rotations," says one 4th year medical student at Texas Tech Amarillo. "Instead, we've done "away" rotations over Zoom. So, we kind of know some people where we are applying, but it's not the same. You would be sent work to do, maybe some patient information, then log onto Zoom and answer those questions and see rounds. It's almost like lectures, but since this is the only way to do an "away", you just take what you can." So, while medical students have been able to use away rotations in prior years to gain more experience and to improve their chances of matching into the more competitive specialties, that option is effectively off the table for this cycle.

The loss of in-person away rotations removes another key aspect of interviews: how do applicants interact with residents and residency staff during the interview day, or even the night before the interview (when most programs have had a social event for applicants to meet current residents)? In speaking with Dr. ASM Islam, Residency Director for the Internal Medicine Residency Program at Texas Tech Amarillo, the issue of determining the "fit" of applicants for a residency program is made all the more difficult when all interviews are conducted over Zoom.

"First person interviews allow for more feedback from other people" within the residency program (residents, faculty, staff, etc.). Without those in-person encounters, Dr. Islam worries, there is an inability to see how applicants may "gel," or get along with the residents currently in the program. Having a sense of how applicants interact with current residency staff is especially important for International Medical Graduates (IMGs), who not only need to adapt to a new work

In Memoriam

Todd Overton, M.D.
Obstetrician and Gynecologist,
died on January 23, 2020
at the age of 82.
He was a member of the
Potter-Randall County
Medical Society for 46 years.



environment, but perhaps a completely new social setting both inside and outside of work. One of the ways that programs are trying to recreate the social atmosphere of the interview season is by having Zoom "Meet and Greets" the night before interview day, where applicants can meet and chat with current residents. In my own department, Pediatrics, we have already started conducting these Zoom social events; usually an hour long; they are loose affairs where applicants can ask questions of the residents.

Interview days themselves have also had to change. Per another 4th year medical student at Texas Tech Amarillo, "I'll have an interview around noon or something, so there are days where I tell the resident I'm working with that I have to leave, then I go home, change, turn on my ring light, have my interviews, and then, if there's still time, I go back to my rotation." Of course, having interviews over Zoom leads to a previously absent variable: where the applicants conduct their Zoom meetings. "The medical school has offered separate rooms for us to use for interviews," says the same 4th year student, "but they have also given us guidance about what types of places we should use for interviews: choosing places that are not too distracting, avoiding anything controversial in the background (since that might be used to judge us), and trying to have ring lights."

Of course, the end result of all these interview – the ranking of applicants and programs – will also be dramatically impacted by COVID. For one thing, "Nobody will cancel interviews," per Dr. Islam, so "programs may have to rank more people, even those who are not strong matches, or who might not be as interested, and broaden their pool of potential matches." Likewise, per Dr. Zaid-Kaylani, "students are much more anxious this year as compared to previous years; so they are applying to many more programs than previous years as a back-up plan."

So, how do programs adapt to the Zoom interview cycle? For one thing, doing all interviews virtually has helped to reveal gaps in publicly available information about programs; while an applicant puts all their information on their application, residency programs have, in the past, been able to inform applicants on interview day in person about the details of their program. Per Dr. Islam, "The questions we get asked by the applicants help to show us the gaps on our websites." Additionally, "There's not as much out there about Amarillo as there is about other cities," so there is also the need to inform applicants about life in Amarillo.

Undoubtedly, COVID will have an impact upon the 2020-2021 NRMP match. However, per Dr. Zaid-Kaylani, "we will not know the impact of (COVID) on interviewing until the season is done, and the match results are out, and then we can figure out how much of a true impact this has had on the process." But with a greater number of IMGs applying to US residency programs, the utilization of Zoom meetings across all industries and fields, and the cost of travel, might virtual interviews become a staple of the NRMP in the future? Dr. Islam would say yes; "Two years ago, we had to go through the SOAP to fill our program. We conducted virtual interviews. Those residents that we got through the SOAP are now among our top performers." To best adapt to the potential for Zoom to become a standard for residency interviews, Dr. Islam suggests that "we need to synchronize the interview process at all levels: institutional, program, and department." Zoom interviews "may become the new norm; so we have to restructure and have a better screening system in place for applicants." The field of medicine always seeks to improve; the process by which residents are matched to residency programs is no different. Though the circumstances under which interviews for the NRMP will be conducted this year are not ideal, perhaps they open a window into the future of the match, a future that may provide previously undiscovered opportunities both to applicants and to programs.

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Pandemic Update

by Scott Milton, MD

As we all are aware, the COVID-19 pandemic continues to rage here in the United States and across Europe. On the day I write this, 100,000 cases have been diagnosed in the United States. Numbers locally also reflect increasing, ongoing community-wide transmission. Currently there have been more than 24,000 individual cases confirmed in Potter and Randall Counties. There have been more than 230 confirmed deaths; over one-third of these deaths occurred during the month of November. The hospitalization rate, a number calculated by the state as the total number of confirmed COVID cases divided by the number of licensed beds, has far exceeded 15% for several weeks now and has caused businesses to reduce occupancy to 50% and has also caused resources such as ventilators and nursing staff to be allocated to West Texas and to our community. Further, elective procedures performed in the hospitals have been halted. It appears that, at the time of this writing, over 40% of hospitalized patients are hospitalized with COVID. This is a staggering number, and there appears to be no letup in the current surge.

Over the last six months our expertise in treating patients hospitalized with COVID pneumonia has advanced. Strategies involving the complicated respiratory care necessary in treating these patients have significantly improved. For example, patients are encouraged to position themselves in a prone position as this appears to improve the ventilatory capacity of ill patients. Patients requiring mechanical ventilation are many times placed in a prone position as well for the same reason. There are currently two drugs that appear to be effective in hospitalized patients with COVID pneumonia. These are dexamethasone and remdesivir. These two drugs have been discussed in my previous article relating to COVID. Other drugs currently in clinical trials may yet further improve the treatment of these individuals. An effective antiviral drug that could be administered orally and therefore prior to admission to the hospital would be invaluable.

The risk factors causing patients to become so ill as to require hospitalization include advanced age, type II diabetes, obesity, and other chronic conditions such as heart and lung disease, thyroid conditions, and renal disease. Also, those who are immunocompromised are also at increased risk. Once hospitalized, patients have a 15 to 20% chance of requiring intensive care. Those requiring mechanical ventilation have a significant risk of death, approaching 40 to 50%. The overall mortality rate has significantly declined as physicians have learned how best to treat patients and what drugs are most useful. Also important is that many younger people such as college age students are becoming infected. Statistically fewer in this age category require medical attention. However, these individuals infect other people who may eventually require treatment and hospitalization. The most feared factor that would markedly increase mortality would be the depletion of intensive care beds and ventilators, or of the skilled professionals necessary to staff them. It is clear that, at this point in time, these resources are becoming strained; indeed our hospitals are dependent upon nurses who are being brought from outside our community. Efforts are also being made by the hospitals to obtain physicians to assist the hospitalists and critical care physicians in our community. At this time, approximately 40% of all individuals hospitalized in our community are COVID patients. Our hospitals have been scrambling to obtain beds and have begun placing two patients infected with COVID in one room. More ventilators have been obtained from outside our area through various sources as well. At the time of this writing, I am worried the hospitals will not be able to keep up with this ongoing surge and that these resources will have to be rationed. This would be a tragic outcome for everyone involved.

Therefore, the most important immediate task is to prevent overwhelming our local hospital resources. As mentioned many times, there are simple public health measures that can be effective – but only if there is a concerted effort by our citizens to comply. The most important of these measures is just wearing a mask. It is sad that many of our citizens have not worn masks up to this point in time. Apparently, there is widespread belief that masks are ineffective. Others believe but this is an infringement upon their personal rights or somehow a reflection of weakness. I would implore every citizen and healthcare worker to view wearing masks as not only effective but the duty of every citizen to protect vulnerable individuals and to preserve the limited resources in our community. Another important measure is to avoid congregating. If activities in which individuals are gathering are planned, every effort should be made for these activities to be performed outdoors, where there is clearly less risk of transmitting COVID. All citizens should continue to practice social distancing and should wash hands frequently. If exposed, citizens should quarantine themselves for two weeks. I believe that all travel should be avoided unless absolutely necessary until this surge has abated. The holidays will be especially difficult as many Americans travel and colleges will be releasing their students. I would implore our citizens to be very thoughtful about protecting family members most vulnerable during this time.

In summary, we are entering a surge that will likely last for weeks and will cause many hospitalizations and deaths. Furthermore, many will be unable to work because they're ill or quarantined, causing further hardship. As your Health Authority, I would ask that all panhandle citizens be compliant with the public health measures mentioned in this article. There's still a chance that we could "bend the curve" of the surge, save lives, and lessen economic hardship in our community. Indeed, these measures should be viewed as our vehicle through these dark times until a vaccine becomes available. Most experts believe this surge will last into early next year. A vaccine likely will be available by then, although it will first be administered to essential workers and highly vulnerable individuals such as nursing home patients. So, until this deadly pandemic is controlled, please wear a mask and stay safe.

Happy Holidays

from the Potter-Randall County Medical Society Resident Members

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Geoffrey Wright, MD

Spotlight on New Members

Board of Censors Report: The following were approved for membership on January 21, 2020:

REGULAR MEMBERSHIP:

KANAKAMEDALA, MADHAVA R., M.D.
RADIATION ONCOLOGY (RO)
1000 S. Coulter, #100, Amarillo TX 79106. Graduated from Guntur Medical College, University of Health Sciences, Guntur, Andhra Pradesh, India 1997. Residency and Fellowship, University of Mississippi Medical Center, Jackson MS 2008-2014.

TRANSFER MEMBERSHIP:

AL-NASSIR, KALIL, M.D.
PULMONOLOGY (PUD)
1215 S. Coulter, #204, Amarillo TX 79106. Transfer from Harris County Medical Society. Graduated from University of Baghdad, College of Medicine, Baghdad, Iraq 2000. Internship and Residency at Lutheran Medical Center, Brooklyn NY 2006-2009. Fellowship at Mayo Clinic, Rochester MN 2009-2010 (Critical Care Medicine). Fellowship at John H. Stroger, Jr. Hospital of Cook County, Chicago IL 2010-2012.

COOPER, TYLER, M.D.
ORTHOPEDICS (ORS)
1600 Coulter, #306, Amarillo TX 79106. Transfer from Bell County Medical Society. Graduated from Texas Tech University Health Science Center, Lubbock TX 2012. Residency at Scott & White, Temple TX 2012-2017. Fellowship at Wake Forest Baptist Health Center, Winston-Salem NC 2017-2018 (Sports Medicine).

WEINHEIMER, RACHEL, M.D.
GENERAL SURGERY (GS)
1000 S. Coulter, #100, Amarillo TX 79106. Transfer from Harris County Medical Society. Graduated from University of Texas Southwestern Medical Center, Dallas TX 2013. Residency at Penn State Hershey Medical Center, Hershey PA 2013-2018. Fellowship at University of Texas Colon and Rectal Clinic, Houston TX 2018-2019 (Colon and Rectal Surgery).

LIFE MEMBERSHIP:

ALZEERAH, MASOUD A., M.D.
CARDIOVASCULAR/THORACIC SURGERY (CDS)
3511 Kensington Place, Amarillo TX 79121.

DAVID, JOHN L., M.D.
OBSTETRICS/ GYNECOLOGY (OBG)
18 Carnoustie Lane, Amarillo TX 79124.

RODRIGUEZ, PABLO S., M.D.
INFECTIOUS DISEASE (ID)
7808 Stuyvesant, Amarillo TX 79121.

URBAN, ROBERT S., M.D.
INTERNAL MEDICINE (IM)
6307 Calumet, Amarillo TX 79109

Board of Censors Report: The following were approved for membership on May 19, 2020:

REGULAR MEMBERSHIP:

BURSON, ANNA M.D.
FAMILY MEDICINE (FM)
1215 S. Coulter, #100, Amarillo TX 79106. Graduated from Louisiana State University School of Medicine, Shreveport LA, 1996. Internship and Residency at University of Texas Health Center (Family Practice), Tyler TX, 1997-2000.

DEAR, JAMESON C., M.D.
ORTHOPEDICS (ORS)
1301 S. Coulter, #103, Amarillo TX 79106. Graduated from University of Texas Southwestern Medical School, Dallas TX, 2010. Internship and Residency at University of Texas Health Sciences Center, San Antonio TX, 2010-2015. Fellowship at Kaiser Permanente Orange County Sports Medicine, Irvine CA, 2015-2016 (Orthopedic Sports Medicine).

GAINES, NATALIE, M.D.
UROLOGY (U)
1900 MediPark, Amarillo TX 79106. Graduated from Texas Tech University Health Science Center, Lubbock TX, 2010. Internship and Residency at Texas Tech University Health Sciences Center, Lubbock TX, 2010-2015. Fellowship at Beaumont Health, Royal Oak MI, 2015-2017 (Female Pelvic Medicine and Reconstructive Surgery).

McKENNA, RYAN F., D.O.
ANESTHESIOLOGY/PAIN MEDICINE (APM)
6826 Plum Creek Dr., Amarillo TX 79124. Graduated from Texas Tech University Health Sciences Center, Lubbock TX, 2012. Internship at University of Colorado, Denver CO, 2012-2013. Residency at University of Missouri, Columbia MO, 2013-2016. Fellowship at Texas Tech Health Sciences Center, Lubbock TX, 2016-2017 (Pain Management).

NIX, ANASTACIA, M.D.
FAMILY MEDICINE (FM)
P. O. Box 50925, Amarillo TX 79159. Graduated from Texas Tech University Health Sciences Center, Lubbock TX, 2010. Internship and Residency at McClennan County Family Medicine Program, Waco TX, 2010-2013.

SCOTT, MEGAN M., M.D.
FAMILY MEDICINE (FM)
3113 Ross, Regence Health Network, Amarillo TX 79103. Graduated from University of New Mexico School of Medicine, Albuquerque NM 2016.

SHEAR, WILLIAM S., M.D.
GASTROENTEROLOGY (GE)
6700 W. 9th, Amarillo TX 79106. Graduated from University of Arizona College of Medicine, Tucson AZ, 2004. Internship and Residency at University of Virginia, Charlottesville VA,2004-2007 (Internal Medicine). Fellowship at University of Virginia, Charlottesville VA, 2007-2011 (Gastroenterology and Hepatology).

TRANSFER MEMBERSHIP:

WEINHEIMER, KENT, M.D.
ORTHOPEDICS (ORS)
Transfer from Dallas County Medical Society. 1600 S. Coulter, Bldg. B, Amarillo TX 79106. Graduated from University of Texas Southwestern Medical School, Dallas TX, 2013. Internship and Residency at Penn State, Hershey PA 2013-2018. Fellowship at Baylor College of Medicine, Houston TX, 2018-2019 (Hand Surgery).

LIFE MEMBERSHIP:

CHANDLER, PAMELA, M.D.
OBSTETRICS & GYNECOLOGY (OBG)
126 Dewey Avenue, Amarillo TX 79124.

PATE, VIRGIL ALBERT, M.D.
UROLOGY (U)
18 Edgewater, Amarillo TX 79106.

Board of Censors Report: The following were approved for membership on July 21, 2020:

FIRST YEAR MEMBERSHIP:

JIANG, RUIYANG, M.D.
UROLOGY (U)
1900 MediPark, Amarillo TX 79106. Graduated from University of Texas Southwestern Medical Center, Dallas TX 2014. Internship and Residency at Duke University, Durham NC 2014-2020.

SMITHEE, RYAN, M.D.
INTERNAL MEDICINE (IM)
1212 S. Coulter, F/4, Amarillo TX 79106. Graduated from Texas A & M Health Science Center, College of Medicine, College Station TX 2017. Internship and Residence at Vanderbilt University Medical Center, Nashville TN 2017-2020.

REGULAR MEMBERSHIP:

PROFFER, AMY, M.D
ANESTHESIOLOGY (AN)
3312 Danvers Drive, Suite A, Amarillo TX 79106.
(Rejoined). Graduated from University of Texas Health Science Center, San Antonio TX 1999. Internship and Residency at Wake Forest Baptist Medical Center, Winston Salem, NC 1999-2003.

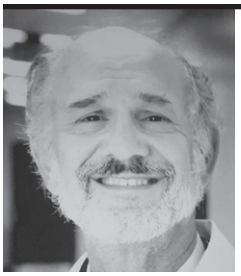
VASYLYEVA, TETYANA L., M.D.
NEPHROLOGY (NEP) / PEDIATRIC NEPHROLOGY (PN)
1400 S. Coulter, Amarillo TX 79106.
Graduated from Dniepropetrovsk Medical Institute, Dniepropetrovsk, Ukraine 1980. Fellowship (Internal Medicine/Nephrology) at University of Texas Health Science Center, San Antonio TX 2001-2003. Fellowship (Pediatrics/Endocrine) at University of Texas Health Science Center, San Antonio TX 2003-2004. Internship and Residency (Pediatrics) at Texas Tech Health Science Center, Amarillo TX 2004-2006. Fellowship (Pediatric Nephrology) at Harvard Medical School, Boston MA 2006-2008.

Board of Censors Report: The following were approved for membership on November 17, 2020:

REGULAR MEMBERSHIP:

VINEYARD, DAVID D., M.D.
OBG (OBSTETRICS & GYNECOLOGY)
1400 S Coulter, Amarillo TX 79106
Graduated from University of Texas Southwestern Medical Center at Dallas, Dallas Texas 1997. Residency at Texas A & M/Scott & White, Temple TX 1997-2001.

WILLIAMS, JAMES M., D.O.
EM (EMERGENCY MEDICINE)
1501 S. Coulter, Amarillo TX 79106.
Graduated from Philadelphia College of Osteopathic Medicine, Philadelphia Pennsylvania 1991. Internship and Residency at Brooke Army Medical Center, San Antonio Texas 1991-1993.



COVID Vaccine Development: Current Status

by Steve Urban, MD

Development of a safe and potent vaccine against SARS-CoV-2, the viral agent of the disease COVID-19, was identified early in the pandemic as an issue of paramount importance. Given the high transmissibility of this virus and the frequency of spread by asymptomatic carriers, public health containment measures—measures successful against even deadlier coronavirus illnesses like SARS-1 and MERS—quickly proved insufficient. The effectiveness of antiviral drugs (such as remdesivir) has been limited. Therefore, most experts have emphasized vaccine development if we are ever to control this deadly outbreak. U.S. and international agencies have gone all-in with this effort; the much-publicized Operation Warp Speed in the U.S is the most expensive and intensive effort ever undertaken to develop and deploy an effective vaccine. The purpose of this paper is to summarize the issues and to give a status report of where we stand in SARS-CoV-2 vaccine development.

With the exception of a dedicated cabal of fanatics and Luddites, everyone acknowledges that vaccines represent one of the triumphs of preventive medicine (the others being sanitation and food-product safety). You only have to read accounts of a smallpox epidemic or talk to a colleague who has treated patients with tetanus to get an inkling of the benefit. This immense topic will not be covered here, but I will say a few words to help us understand the challenges of COVID-19 vaccine development.

A brief history of vaccine development

The first vaccinations involved the direct inoculation of a weakened form of the pathogen into the recipient. The first "attenuated" vaccine was Edward Jenner's cowpox inoculation (the word "vaccine" derives from Latin *vacca* for cow). The Sabin oral polio vaccine (no longer used) was a live but weakened form of the polio virus that rarely (but not NEVER) caused paralytic disease in the recipient. These pathogens were initially grown in animals but more successfully in cell culture. Because inoculation with live organisms actually causes infection in the host, these vaccines usually prove quite potent and provide long-lasting immunity. Live virus vaccines still in common use include measles, mumps, and rubella (MMR), chickenpox and shingles vaccines, and rotavirus vaccines.

Another development was the use of killed organisms—especially viruses—as antigens to provoke prolonged immunity. Initially, whole dead viruses were injected. Although they do not grow and proliferate in the host, they nonetheless provoke an acceptable immune response. Current examples include the injectable Salk polio vaccine, the hepatitis A vaccine, and the rabies vaccine.

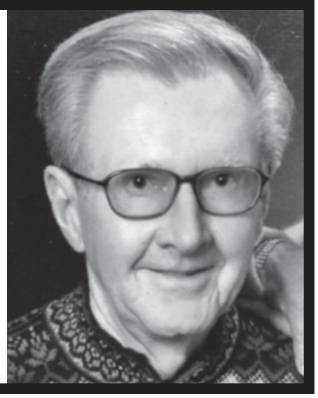
An important step was the development of vaccines against specific target molecules, first extracellular toxins produced by the pathogens (e.g. tetanus or diphtheria toxins) and subsequently critical parts of the pathogen itself (e.g. Pneumovax®, composed of the immunogenic polysaccharides from the capsule of the pneumococcus). Modern conjugate vaccines usually contain molecules from the pathogen, often chemically bound to an unrelated protein (such as tetanus toxoid) to enhance immunogenicity. Effective new vaccines against bacteria such as the pneumococcus (Prevnar®) or *Haemophilus influenzae* use this targeted approach. Obviously, there is no risk of actual infection when only a small fragment of the germ is inoculated into the host.

These time-tested methods of vaccine development are being studied to combat COVID-19 (ref 1). Two vaccines using a live attenuated form of SARS-CoV-2, both developed in China (the Wuhan Institute vaccine and the Sinopham vaccine) have received limited approval in a few countries. Several protein-based vaccines targeting viral subunits are under intense study. In the United States, these include the Novavax product and the Sanofi-GSK vaccine, both of which are supported by funding from Operation Warp Speed. The Novavax vaccine targets SARS-CoV-2's spike protein, while the Sanofi-GSK candidate targets a subfragment of the spike protein. Both proteins are produced by recombinant methods and, like many protein subunit vaccines, both require adjuvants to increase potency.

Several Operation Warp Speed candidates employ novel platforms. Since these may not be familiar to all our readers, I

In Memoriam

John Kaczmarek, M.D.
Anesthesiologist,
died on October 28, 2020
at the age of 80.
He was a member of the
Potter-Randall County
Medical Society for 36 years.



will briefly review the concepts behind them.

Novel vaccine platforms: RNA-based vaccines

RNA based vaccines don't contain the whole virus (attenuated or dead) or protein fragments of the virus but instead contain artificially-made messenger RNA. The mRNA enters the cells and directs the cell's own ribosomes to make viral antigens, which are transported to the cell surface. Then the recipient's own cells (especially dendritic cells) present these antigens to antibody-producing B cells and antiviral T-cells – thus producing the immune response that (hopefully) will prevent subsequent infection with that virus.

It turns out that RNA is easy to produce in the lab and that the process can readily be scaled up to industrial quantities using in vitro replication. Furthermore, once a company is ramped up to produce a vaccine against one antigen, it is similarly easy to produce a new vaccine—you just use the same process but put a new sequence of RNA into the mix, and, voila, a new vaccine. This is one reason why messenger RNA vaccines are so attractive—they can be the centerpiece in a rapid-response, vaccine-on-demand system.

I'm not going to go into the technicalities of this process (for more information, see reference 2), but I'll mention a few issues relating to vaccines currently in Phase 3 trials. First of all, you can inject mRNA directly into the skin or muscle, but this is a very inefficient method. Your body has extracellular RNAses to break down foreign genetic material; in addition, RNA is a large, negatively charged molecule that minimally traverses cell membranes. So, vaccines actually in development package the RNA—usually in liposomes—so it can be taken up by endocytosis and then released into the cytosol, where the protein-producing ribosomes are located.

Another problem with mRNA vaccines is that immunity wanes pretty rapidly after vaccination. Scientists have come up with several clever ways to boost the duration of antigen production. The commonest is the use of self-replicating mRNA. Here, the injected mRNA doesn't just include the viral antigen that you want; it also encodes an RNA-dependent RNA synthetase (usually derived from an alphavirus), which is also translated into protein by the recipient's cells. This way, copies of the mRNA are regenerated, and the antigen-production process is repeated over and over again – thus prolonging the effect of the vaccine. Other methods of enhancing antigen production include the addition of adjuvants (some also translated directly from the mRNA), the use of variant nucleosides (such as pseudouridine) which are harder for cells to break down, or the substitution of common codons for uncommon ones—all tools of mRNA engineering of which modern technology is easily capable.

The net effect of this process is that the encapsulated mRNA is injected into muscle, where it is taken up by endocytosis (probably by myocytes or macrophages) and delivered to ribosomes. The mRNA

| *continued on page 26*

PANHANDLE HEALTH

A Publication of the Potter-Randall County Medical Society

Editorial Policy and Information for Authors

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.

Spectrum *The Journal* seeks a wide range of review articles and original observations addressing clinical and non-clinical, social and public health, aspects as they relate to the advancement of the state of health in the Texas Panhandle. Pertinent letters to the editor, news submissions, and obituaries listings are accepted pending editorial review. The Editorial Board accepts or rejects submissions based on merit, appropriateness, and space availability.

Submission process Material should be e-mailed to the editor at prcms@suddenlinkmail.com or mail a hard copy to Cindy Barnard, PRCMS, 1721 Hagy, Amarillo, TX 79106. A recent photograph of the author (optional) and a curriculum vitae or a biographical summary are also to be submitted.

Conflict of Interest Authors must disclose any conflict of interest that may exist in relation to their submissions.

Journal Articles Manuscripts should be double-spaced with ample margins. Text should be narrative with complete sentences and logical subheadings. The word count accepted is generally 1200 to 1500 words. Review articles and original contributions should be accompanied by an abstract of no more than 150 words.

References References to scientific publications should be listed in numerical order at the end of the article with reference numbers placed in parentheses at appropriate points in text. The minimum acceptable data include:

Journals: Authors, article title, journal, year volume, issue number, inclusive pages.

Books: Author, title, place of publication, publisher, year.

Web sites: URL of the site and the date the information was accessed.

Other sources: Enough information must be included so that the source can be identified and retrieved. If not possible, the information for source should be included parenthetically in the text.

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then directs these cells to produce the desired protein(s). Finally, these protein antigens are displayed on cell surfaces to activate both B cells and T cells.

Again, messenger RNA vaccine production can be quickly scaled up to industrial levels, and RNA technology drives the two vaccines that lead the pack in Operation Warp Speed. The first is the Moderna vaccine (produced in partnership with the NIH). Moderna began its Phase 3 trial in July and has already accrued over 30,000 patients. The second product is the Pfizer vaccine (made in partnership with German and Chinese companies), which has enrolled 43,000 patients. Both vaccines have demonstrated vigorous antibody and T-cell responses, and both groups have reported very promising preliminary results of their phase 3 trials, with around 95% effectiveness. Pfizer has the advantage of already having large vaccine production capacity but the disadvantage that the vaccine requires storage at -70^0 C or below to retain stability. A major concern with mRNA technology is that no RNA vaccines have ever been approved for use in the US.

Viral vector vaccines (ref 4)

These vaccines use innocuous viruses to carry genetic information to body's immune system. This is kind of like using an attenuated virus (as in the MMR vaccine), except that in this case the virus is not the one that you really care about. The viral vector is just the mule that totes the antigen into the host. Most vector vaccines use a non-pathogenic adenovirus that has been genetically modified to express the desired protein antigen. No viral vector vaccines have been approved for widespread use in the US, but Merck's Ebola vaccine—which is available in commercial quantities—is a viral vector vaccine (it uses the vesicular stomatitis virus as the mule). In open trials from 2016-2018, this vaccine appeared to be 97% effective in preventing of Ebola infections; so this gives hope that a COVID viral vector vaccine will be similarly effective.

Two vaccines in Operation Warp Speed use viral vectors. The first is the Johnson and Johnson vaccine (made in partnership with Janssen and scientists in the Beth Israel/Deaconess system).

Company	Funding ($)	Phase 3 Trials	Doses (millions)	Details
J&J, Janssen	1.5 billion	9/22/20	100	proprietary adenovirus vector
Moderna	2.4 billion	7/27/20	100	genetically modified mRNA, liposomal
AstraZeneca	1.2 million	8/26/20	300	"Oxford" vax, adenovirus vector, 1 shot
Novavax	1.6 billion	9/24/20	100	spike protein vax, nanoparticle delivery
Pfizer	1.95 billion	7/27/20	100	mRNA vax, great production capacity
Sanofi/GSK	2 billion	planned 12/20	100	adenovirus viral vector vax

Comments: Dates are when enrollment in Phase 3 trials was started. "Doses" is the number of doses ordered by OWS. AstraZeneca trial was paused for 6 days in September due to a patient with transverse myelitis. J&J trial was recently paused for 11 d due to an enrolee's stroke. Both RNA vaccines (Moderna and Pfizer) have completed phase 3 trials and appear to be very effective. They will be considered by the for EUA by the FDA soon, perhaps by the time this article goes to print.

J&J had enrolled 60,000 patients in their phase 3 trial by September. The second is the Astra Zeneca vaccine (made in partnership with Oxford University). This is the vaccine whose development was held up for a week or so in July when one of the trial patients developed transverse myelitis (subsequently found to be due to MS); recent preliminary reports about the effectiveness of this vaccine have been very encouraging. A third viral vector vaccine, produced by Merck, is close to Phase 3 trials but has not yet been funded by Operation Warp Speed. Many viral vector vaccines in earlier stages of development can be administered via oral, intranasal, or even transdermal routes. The Russian COVID vaccine (named "Sputnik 5" by our friend Putin) is a viral vector vaccine.

The Approval Process

The expedited approval process planned for the COVID epidemic has generated considerable controversy. Never has a vaccine passed from the test tube to patient approval in less than 2 years (that record is held by the Ebola vaccine). A tug-of-war exists between our need to ensure safety and efficacy and our desire to put this pandemic behind us as quickly as possible. After having read quite a bit about this controversy, I'm confident that we will have excellent efficacy and good short-term safety data before the vaccine is approved. The organization responsible for approval is the Federal Drug Association (FDA); so I will briefly explain the FDA approval process.

The FDA's usual intensive approval process for vaccines is called Biologic License Application (BLA); this corresponds to a New Drug Application for pharmaceuticals. The BLA process requires that the vaccine be conclusively demonstrated to be safe, pure, and potent. Although there are several mechanisms whereby novel drugs can be more rapidly approved (called Accelerated Approval, often used for new cancer drugs), the FDA has made it clear that, since vaccines will be given to otherwise healthy patients, rapid vaccine approval will be through the more stringent Emergency Use Authorization (EUA). EUA, established in response to fears of bioterrorism by the Bioshield Statute of 2004, requires that a formal declaration of emergency be issued (it has been). To get EUA, Phase 1 and 2 studies are not enough, and evidence based on surrogate markers, like antibody response, is not good enough either. The FDA will require data from trials involving at least 15,000 patients and has strongly urged the inclusion of high-risk groups (including ethnic minorities and the elderly) in the phase 3 trials. The FDA will demand at least 8 weeks of safety data and will insist on at least 50% effectiveness. Both the FDA and the independent Advisory Committee on Immunization Practices (ACIP) review vaccine development on a weekly basis.

Durability of response and rare side effects will be assessed after EUA has been granted.

You may have heard that 4 vaccines have been approved for limited use worldwide—three from China and one from Russia. These vaccines were "approved" before Phase 3 studies had been accrued (or, in most cases, even started). Two of these vaccines are attenuated live virus vaccines (not being considered in the U.S.) and two are viral vector vaccines. Russia's Sputnik 5—again, a viral vector vaccine – was developed at their Gamaleya Research Institute and has reportedly been administered to some elements of Russian military and also to Putin's family members. This may be a good opportunity for us finally to win the Cold War.

Operation Warp Speed (ref 3)

In April, the administration initiated Operation Warp Speed (OWS). This is a combined effort by the National Institutes of Health, the Center for Disease Control, and Department of Defense, among others, to rapidly address the COVID pandemic. Vaccine development is a keystone of this project, although OWS addresses therapeutics (like remdesivir and antibody cocktails), testing capabilities, and even issues like transport media, cell culture supplies, and syringe availability. The expressed goal is to have 300 million doses of vaccine ready for distribution by January 2021. Starting from 15 initial applicants, OWS has granted funding to six companies for vaccine development. A seventh, Merck, has been late to the game but has purchased 2 biotech companies and now has 2 viral vector vaccines in active development. The accompanying table summarizes the current status of vaccine development funded by OWS:

Production and distribution

Once a vaccine has been proven safe and effective to the satisfaction of the FDA, the battle is only half won. Public health experts say that the "last mile"—i.e. getting the vaccine from the manufacturer to the patient's arm—can be as challenging as vaccine development. Several of the vaccines will require at least 2 doses, and some will require storage at -70 degrees (rather than simple refrigeration). Maintaining a "cold chain" (i.e. making sure that the vaccine in not inactivated by inadvertent exposure to warmer-than-required conditions) will be important in either case.

OWS leaders hope to start vaccine distribution in January. They anticipate a short period of limited availability (maybe a month or two). During this period, about 20 million health care workers will be first in line, followed by nursing home residents, essential workers (80 million), people with high-risk medical conditions such as diabetes and obesity (estimated 100 million), and finally those above 65 in age (only 50 million, since many of them fall into one of the above categories). Each state will be responsible for its own implementation; so we will have 50 different schemes. States are actively planning their distribution network as we speak. Ethical issues raised by OWS are being hotly debated; for instance, should Americans come first, or should we vaccinate health care workers in other countries before distributing the vaccine to all Americans?

Another interesting question will be: how many U.S. citizens will be standing in line to receive the vaccine? Estimates range from just above 50% to about 75% (most experts believe that at least 70% infection/vaccination rate will be necessary to establish herd immunity). The final number will certainly depend on results of safety and efficacy testing. In addition to the negativity of anti-vaxxers, patients trying to decide will face several issues. First of all, safety data will short-term (8 weeks). Although most previous vaccine side effects have occurred within this time period, many OWS vaccines involve completely new platforms. Messenger RNA vaccines have never been certified. Although mRNA is not incorporated into the genome and is degraded over time inside the cell—making long-term side effects unlikely—we really don't know for sure. Viral vectors should be safe and non-pathogenic (certainly less likely to cause disease than attenuated viruses, for instance), but they have had very limited use previously (i.e. Ebola vaccine). Furthermore, enhancement of severe respiratory symptoms (perhaps due to heightened Th2 response) was noted in a previous MERS trial. I personally will accept the risk—partly because I want to get on with my life, and partly to help protect everybody else. Even people who care only about themselves can take comfort in the fact that vaccine-associated conditions (even those only tenuously associated with vaccination) are compensated by the federal government.

In conclusion, the process of development of a SARS-CoV-2 vaccine has proceeded far more speedily than with any previous vaccine. The U.S. government, and governments across the world, facing trillions of dollars of lost revenue and medical costs, to say nothing of countless hospitalizations and over a million fatalities, have unleashed modern scientific techniques and distribution models in the effort. We may have definitive data from the phase 3 trials by the time this article goes to print, and certainly we will have several different vaccine platforms to compare and to choose from. Overall, we should be encouraged: (1) preliminary data on antibody and T-cell responses are as good or better than with the natural infection, (2) the coronavirus genome is much more stable than constantly mutating viruses like influenza and HIV, and (3) reinfection, albeit documented, is rare. Although we are better at managing severe COVID than we were 6 months ago, and although antivirals and antibody cocktails may provide some benefit, our ability to control the worst pandemic of the past century will likely depend on the development of safe, effective and easily distributable vaccines.

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A Patient's Guide to Strokes in 2020: *Time is Brain, Pandemic or Not*

by Hayley Gibler Williams, MS4

Emergency rooms across the world have seen a decline in visits during the COVID-19 pandemic, largely due to fears of contracting coronavirus during the visit. As a result, when patients finally come to the emergency room, symptoms are often much more severe. A study in Italy found that stroke symptoms from March to April of 2020 were reported much later, with a significant increase in severity of symptoms at the time of presentation, when compared to the same time of year in 2019. In China, the number of time-sensitive stroke treatments decreased significantly during the COVID-19 pandemic, again likely due to avoidance of the emergency room. Delayed reporting of stroke symptoms was not the only condition to suffer: since the outbreak of COVID-19, patients with symptoms of myocardial infarction (heart attack) have also been noted to wait too long as well. Waiting too long to go to the emergency room can lead to serious complications such as permanent neurologic symptoms or permanent cardiac damage, which could have been avoided if the patient had come to the emergency room in a timely manner.

Ask any healthcare provider in the Texas panhandle, and they will tell you a similar story of delayed medical care amongst patients, friends, and family members. The story is all too familiar, often starting when a patient notices serious symptoms such as chest pain, facial droop, or numbness—instead of heading to the emergency room or their doctor's office, they wait at home. Why? The story continues: more often than not, the patient reports a fear of contracting COVID-19 at the emergency room or doctor's office. Many times, the patient waits at least one day with symptoms they suspect are serious, yet they are reluctant to seek care. They finally get help when their symptoms either progress or fail to disappear, and unfortunately, sometimes it's too late to provide proper treatment. Delayed treatment, specifically stroke management, has affected not only the U.S. but many parts of the world. This all-too-common mistake reiterates the need for public education on the symptoms of stroke, including uncommon symptoms.

The acronym F.A.S.T., coined by the American Stroke Association, is commonly printed on fliers, bulletins, and patient handouts to help patients, particularly at-risk patients, remember which stroke symptoms to be on the lookout for. F stands for "face drooping," A stands for "arm weakness," S stands for "speech difficulty," and T stands for "time to call 911." Other stroke symptoms include sudden numbness, confusion, trouble seeing, trouble walking, or severe headache. Many patients and their family members know the F.A.S.T. acronym but don't realize a stroke can present in many more ways than this. Because strokes can affect any portion of the brain, patients should be counseled that any sudden change in their baseline neurologic status should be concerning for a stroke.

Patients know they're supposed to get to the emergency room quickly, but it's less common to know exactly why. Some people have heard of the clot-buster, tPA (also known as tissue plasminogen activator or alteplase), but they are not familiar with its time constraints. tPA can only be given up to 4.5 hours from the onset of stroke symptoms—ideally, it is given as soon as symptoms arise. Additionally, tPA cannot be given to every patient with stroke-like symptoms. Head imaging (CT scan) must prove that there are no signs of bleeding within the brain. After that, the physician must run through a long check list to ensure the patient is still a candidate for tPA. This includes no recent surgery, no recent trauma, and not taking blood thinners, just to name a few. Once the patient is confirmed to be a candidate for tPA, it is administered as quickly as possible. This process happens rapidly: a common saying in the hospital is "time is brain," meaning that reversal of the stroke in a timely manner is key. The longer a patient goes with stroke symptoms,

the higher the risk of these symptoms becoming permanent.

The public should be aware that the clock starts at the time the patient was last known to be normal. For example, if a patient goes to bed at 10:00 p.m. and was at their baseline neurologic status at that time but wakes up at 6:00 a.m. the next day with stroke symptoms, the last known normal time would be 10:00 p.m. If the patient gets to the emergency room by 6:30 a.m., he or she would not be eligible to receive tPA because the last known normal was over 4.5 hours prior.

However, there are additional therapies (such as mechanical thrombectomy) which also have time constraints, although they're not as strict as those for tPA. Mechanical thrombectomy, which is a procedure where a physician inserts a device through the arteries to physically disrupt the clot, can be employed for selected patients up 16-24 hours after symptom onset. Not everyone who has a stroke is a candidate for mechanical thrombectomy: Usually mechanical thrombectomy is reserved for clots in larger vessels of the brain.

tPA and mechanical thrombectomy are treatments for a type of stroke called "acute ischemic stroke" which involves clotted blood vessels in the brain. Another type of stroke is hemorrhagic stroke, which occurs when a vessel within the brain starts bleeding. Hemorrhagic strokes can also be life-threatening, but their treatment is completely different from ischemic strokes. Many times, treatment of hemorrhagic stroke involves a variety of procedures to stop the bleeding.

A TIA, or transient ischemic attack, is a temporary blockage of a blood vessel that causes stroke-like symptoms that last for seconds to hours. A TIA is also considered an emergency because it means a real, potentially irreversible stroke could occur in the future. Although it's easy to simply brush it off, especially when the symptoms resolve quickly on their own, you should still go to the emergency room so that you can undergo a workup and get started on preventive medications so that a real stroke is less likely to occur in the future.

It's impossible to know exactly which type of stroke you're having if you start to experience stroke-like symptoms. This is why it's important to go straight to the emergency room as soon as you notice any difference from your baseline neurologic status. Stroke-like symptoms are taken very seriously in the emergency room, and you'll be able to get the proper workup once you arrive. Furthermore, emergency rooms (and hospitals in general) take precautions to prevent the spread of germs, including the coronavirus, from one patient to the next. The risks of waiting at home for your stroke-like symptoms to disappear heavily outweigh the risks of contracting coronavirus at the hospital. But, as always, it's important to wear a mask and practice social distancing when you can. Ultimately, if something doesn't feel normal to you, the best option is to go to the emergency room. Time is brain, pandemic or not.

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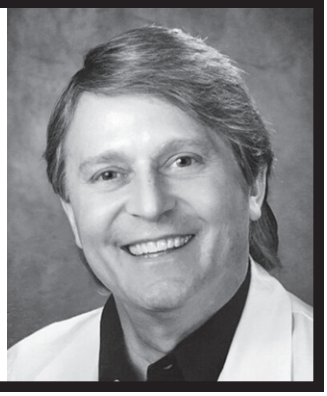
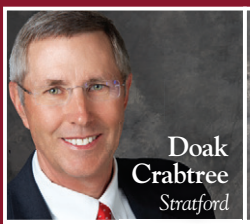
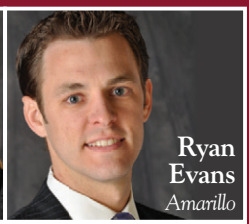
In Memoriam

Douglas Lewis, D.O.
Neurologist,
died on May 23, 2020
at the age of 58.
He was a member of the
Potter-Randall County
Medical Society for 22 years.







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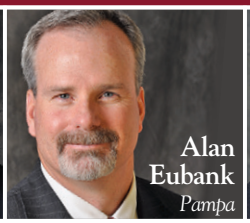

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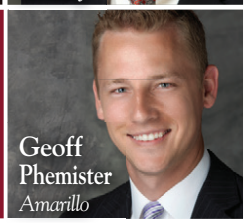

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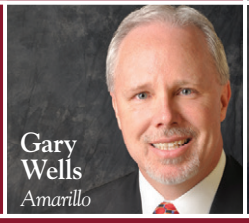

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Cannabinoid Hyperemesis in the Adolescent Patient

by Avery Bramnik, MSIV; Stacy Philip, MSIV; Todd Bell, MD; Rodney Young, MD; Steven Urban, MD

Introduction

As the use, availability, and legalization of recreational and medical cannabis continues to rise, cannabinoid hyperemesis syndrome (CHS) has become increasingly omnipresent. CHS is characterized by chronic cannabis use and cyclic nausea, vomiting, and abdominal pain, usually relieved by hot water bathing, followed by symptom-free periods in between cycles (1)(2). Since nausea and vomiting have such a wide-ranging differential diagnosis, there can be significant delays in the diagnosis of CHS. These patients may be dehydrated, yet hemodynamically stable, and may undergo extensive and expensive workups, which may be ambiguous and unrevealing. Evaluation of a patient with CHS should always start with a detailed history, including, but not limited to, habits and substance use.

Case Presentation

A 17-year-old female with no previous medical history presented to the emergency department, accompanied by her mother, with four days of intractable nausea, vomiting, sharp/cramping diffuse abdominal pain, and chest pain (6/10, non-radiating, increased with inspiration). She had experienced decreased oral intake with accompanying decreased urinary output. However, she denied diarrhea, constipation, cough, fever, or chills. She also denied recent travel or known sick contacts. Her family history included gallbladder disease and diverticulosis. She had no prior surgeries or hospitalizations. She reported a recent history of self-harm in the form of cutting her wrists but denied current suicidal thoughts. She denied current alcohol or tobacco use; however, there was no initial documentation of illicit substance use.

On preliminary physical exam in the emergency department, the patient was in no acute distress, and, although she was tachycardic at 105 bpm, her other vital signs were within normal limits. On abdominal exam, she had right upper quadrant (RUQ) tenderness to palpation and a positive Murphy's sign. Labs demonstrated hemoconcentration, as well as increased BUN and urine specific gravity, consistent with moderate dehydration, as well as low lipase, negative *H. pylori*, and a negative urine pregnancy test. Additional labs, including urinalysis, CMP, and CBC were otherwise unremarkable. An EKG was completed to rule out cardiac and pulmonary etiologies of her chest pain. The results of the EKG were normal. RUQ ultrasound demonstrated a positive sonographic Murphy sign as well as biliary sludge, without gallstones (Image 1).

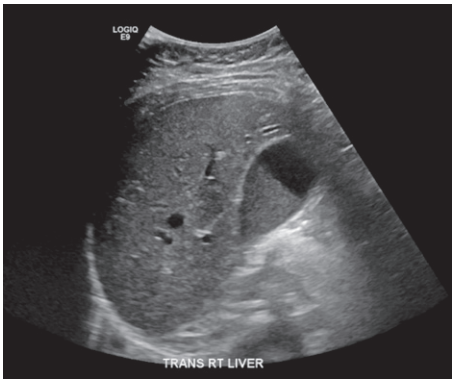

Image 1. RUQ ultrasound showing biliary sludge with a positive sonographic Murphy sign and no evidence of gallstones.

The surgery team was consulted and, on their exam, did not appreciate focal RUQ tenderness. CT abdomen was obtained to rule out further intra-abdominal pathology and demonstrated diverticulosis, without evidence of diverticulitis, and a distended gallbladder, without surrounding inflammatory change or biliary ductal dilatation (Image 2). It was determined the patient was not a surgical candidate at that time.

The patient was given ibuprofen, acetaminophen, and fentanyl for pain relief. She was also started on famotidine and an antacid to provide relief of her chest pain secondary to repetitive vomiting. This regimen eventually relieved her chest pain; however, she continued to have intractable nausea and vomiting, which led the patient to be admitted to the pediatric floor for symptomatic management and rehydration.

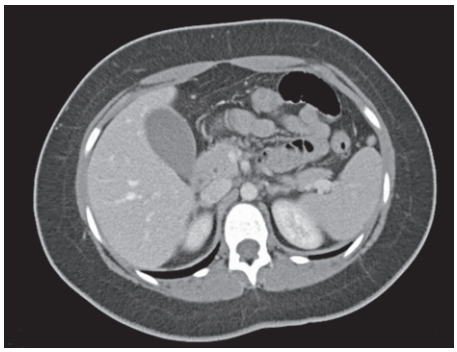

Image 2. CT abdomen showing distended gallbladder without surrounding inflammatory change or biliary ductal dilatation.

The physical exam on the pediatric floor was significant for diffuse abdominal tenderness, without focal RUQ tenderness, rebound, or guarding, and a negative Murphy sign. On further evaluation, the patient reported heavy daily marijuana use for the last 5-7 years, with an increase in use in the last few days, up to approximately one gram of marijuana/day, which is a significant amount. A urine drug screen was obtained and was in fact positive for cannabinoids. The patient further reported taking numerous hot showers a day, which would temporarily relieve her nausea, vomiting, and abdominal pain.

Standard antiemetics including ondansetron and prochlorperazine did not provide adequate relief of her nausea and subsequent anorexia. At this time, she was started on a trial of cyproheptadine 4 mg BID, which is an appetite stimulant, has antidopaminergic characteristics at higher doses, and has been shown through limited evidence to be helpful in the acute management of CHS

| *continued on page 32*

(2). Soon after administration of cyproheptadine, her symptoms improved, and she was able to tolerate food, with no further episodes of emesis. The patient was counseled on discontinuing marijuana use and was discharged home with cyproheptadine, with advice to follow up with her primary care provider.

Differential Diagnosis

The extensive differential diagnosis of nausea and vomiting includes a broad range of pathologic conditions affecting the gastrointestinal tract, peritoneal cavity, central nervous system, as well as endocrine and metabolic functions (2). The clinical presentation of CHS can be quite similar to that of cyclic vomiting syndrome (CVS), a functional gastrointestinal disorder (3). Thus, when a patient presents with symptoms corresponding to CVS but concurrently uses cannabis, it can be difficult to discern whether the true underlying condition is CHS or CVS. However, if cannabis use precedes the onset of the symptoms, in combination with a history of compulsive hot water bathing or showering, this should alert clinicians to recommend a trial of cannabis cessation, which may in fact support the true diagnosis (3).

Discussion

CHS is an underrecognized disorder in adults, and even more so among adolescents and the pediatric population. However, this condition should be considered in the differential diagnosis of patients with intractable nausea and vomiting refractory to standard antiemetics, especially in patients who describe frequent hot water bathing to relieve nausea. In addition to compulsive hot water bathing, CHS should also come to mind when patients report relief of symptoms with the use of topical capsaicin (3).

Classically, CHS progresses through three distinct phases including the prodromal phase, the hyperemetic phase, and the recovery phase. In the prodromal phase, the patient typically develops early morning nausea, fear of vomiting, and abdominal discomfort (4). The hyperemetic phase is characterized by incapacitating nausea and profuse vomiting (4). Most patients also complain of mild abdominal pain and weight loss, as well as symptomatic relief achieved by compulsive hot water bathing. The recovery phase begins with cessation of cannabis use and can last days to months (5).

Although there has been limited research on the supportive and symptomatic treatment of CHS, such therapy remains the mainstay of treatment throughout the hyperemetic phase. This may include volume repletion with intravenous fluids, as well as the use of antiemetics such as ondansetron and prochlorperazine. However, standard antiemetics are often ineffective in the management of CHS. This can lead to the use of multiple doses of different, unrelated, and perhaps off-label pharmacologic agents to control the nausea and hyperemesis of CHS (1). Some medications that have been studied, though in a limited manner, in the treatment of CHS include dopamine antagonists, serotonin antagonists, antihistamines, anticholinergics, benzodiazepines, and corticosteroids (1). In our patient, cyproheptadine, a serotonin 5-HT_2 and histamine H_1 antagonist which has been used to stimulate appetite and reduce anorexia from cyclic nausea and vomiting, was chosen, as standard antiemetics proved ineffective (6).

Limited data supports the use of topical capsaicin cream for symptomatic relief of the pain associated with CHS (3). The use of oral analgesics for the accompanying abdominal pain in CHS has also been proposed; however, the use of opioids is heavily debated and should be undertaken with caution in this population, as it could worsen hyperemesis and in turn potentially lead to opioid dependency (3).

Another effective treatment during the hyperemetic phase is the use of hot water showers. This behavior has been shown to reduce nausea, vomiting, abdominal pain, and loss of appetite. Although the exact mechanism of this phenomenon is not known, it has been suggested that

hot water bathing may act by correcting the cannabis-induced disequilibrium of the thermoregulatory system of the hypothalamus (2).

Patients with CHS can often have health complaints that may mimic other conditions. Our patient was experiencing referred chest pain, likely from the GI manifestations of CHS. The literature has described several cases of CHS with esophagogastroduodenoscopy findings revealing varying grades of esophagitis and gastritis. As a result, acid suppression therapy with medications such as proton pump inhibitors or H2 receptor blockers should be given routinely (2); indeed, famotidine and antacids were successful in relieving this patient's chest pain.

Ultimately, the most effective and definitive treatment of CHS is cessation of cannabis use (2)(3). The risk for relapse following the hyperemetic phase is high if the patient does not abstain from cannabis use (2). Thus, cessation of cannabis should be emphasized by clinicians as the only proven cure for CHS (1). Studies have demonstrated that referring patients to drug rehabilitation programs may play a role in aiding long-term cessation of cannabis use (2).

Prior to diagnosis, patients with CHS may suffer for many years with these potentially debilitating symptoms on a cyclical basis (5), may present several times to health care facilities with similar symptoms, and may receive multiple diagnostic tests and invasive procedures without a clear diagnosis or treatment plan.

In addition to the delay in diagnosis often associated with CHS (due to the expansive differential diagnosis for nausea and vomiting), the incomplete initial social history taken on our patient further contributed to a delay in diagnosis. The importance of obtaining a complete history is further emphasized by the potentially nonessential workup, including unnecessary imaging (with attendant radiation exposure) and laboratory testing.

In the future, being able to quickly narrow down the list of differential diagnoses for nausea and vomiting may afford significant improvements for the patient. These benefits include reducing the length of hospital stay, eliminating unnecessary expensive diagnostic studies, curtailing the use of potentially harmful medications (such as opioids), and decreasing overall medical costs related to this condition.

Conclusion

This case is important because it emphasizes the central role of a thorough history and physical, including specific questions about habits and substance use history, in the evaluation of patients with nausea and vomiting, even in the pediatric or adolescent population. Had this patient been asked about illicit drug use in the initial stages of her hospital visit, it is possible that her admission could have been avoided or, at the least, could have been accomplished with fewer costly and invasive tests. To avoid under-recognition of this syndrome, cannabis use should be explicitly addressed and documented in the chart, especially when no other explanation for the symptoms of intractable nausea and vomiting exists. This reiterates the importance of obtaining a complete social history, even in the pediatric and adolescent population.

Despite the increasing prevalence of CHS, there is limited high-quality research involving the best pharmacologic treatment approach to this condition. Patients often do not respond to standard antiemetic therapy and may require non-traditional treatment for symptom alleviation. Treatment failure with standard antiemetics is suggested by the large number of case studies and reports on CHS where multiple non-traditional pharmacologic agents were required to control the patient's symptoms. Thus, it is important to recognize CHS early on in order to provide appropriate and adequate symptomatic management, in addition to recommending cannabis cessation, which stands as the best form of treatment for CHS. Future investigations are needed to define the etiology and pathophysiology of CHS. This in turn would help define the best method of symptomatic management and treatment for the condition.

Ultimately, recognition of CHS is imperative to help avoid multiple, prolonged hospital visits, as well as costly and unproductive diagnostic evaluation. This may also help providers educate patients on the less common effects of cannabis use, which may be seen more frequently with the rising number of states in the United States allowing medical or recreational marijuana use. Overall, clinicians taking care of patients with CHS should provide their patients with the appropriate resources for cannabis cessation, as this is the only curative treatment.

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Cybersecurity and the Net: *A Brief Historical Review*

by Rouzbeh K. Kordestani, MD, MPH

In late 2020, United Health Systems (UHS) was the victim of the largest ransomware attack in U.S. history. All in all, 410 medical facilities (including Northwest Texas Healthcare) were affected. The ransomware corrupted the databases of these many centers requiring a complete systemic shutdown. This attack affected the delivery of care to an estimated 45 million Americans. The delay in services and care severely hampered the lives of millions of Americans for over 10 days. This was especially disruptive since it occurred during the COVID-19 pandemic. The economic impact is estimated to be in the hundreds of millions of dollars for each region. The cost in lives and hardship is far harder to ascertain.

As time goes on, it seems that we are less and less shocked by the events of the day. However, a serial examination of recent history shows that computer attacks, ransomware and malware are increasing geometrically. As our society and our lives are more dependent on computers and automation, we are even more at risk for exposure to these new harmful entities. In the first three quarters of 2019, 7.2 billion malware attacks were launched, as well as 151.9 million ransomware attacks (Security Magazine, Oct 22, 2019). In comparison, in 2015, only about 2 million malware infections were detected, along with an additional 750,000 ransomware cases (Kaspersky Security Bulletin, December 15, 2015). In simple math, between 2015 and 2019, malware attacks have increased 7000 fold while ransomware attacks have increased over 200 fold.

To understand the true nature of our predicament and where we are, we need first to look at the history of the internet and how this misadventure started.

ARPANet, the Intranet and the Internet

From the early 1950s to the early 1960s, multiple early generation computers were built. However, most of these early computers were large, expensive, and hard to access. For the same reason, these computers were located either on large military or industrial facilities or on university campuses. In an attempt to make communication between these computers easier, intranets were established. These were connection points between computers within the same company or the same university setting. Unfortunately, since computer access was scarce and computers themselves were few and far between, there was only a handful of intra-net systems in existence

As computers became more prevalent in the late 1960's, there was an expressed need to establish connections between computers, systems, companies and university settings. The mindset was that the internet should be a place of trust, to be used to exchange ideas between all of these centers. In the United States, the Department of Defense and its research arm, DARPA (Defense Advanced Research Project Agency) began the development of a system to connect these many intranets.

The initial idea of the ARPANet (Advanced Research Project Agency Network) was begun in 1966, as there was a perceived need for remote access to data and the need to transfer data in patch formats. In this way, large amounts of data and information could be transferred between computers. To make sure that there was a semblance of control, transmission the Control Protocol (TCP) and Internet Protocol (IP) were established. After the establishment of funding and standards, multiple university (Stanford/MIT/UCLA) and business groups were contracted to establish the initial system connections. These connections were soon established, and the models were set. The Internet in its modern form was born in 1981.

In 1990, as more systems began to accept TCP/IP as the standard, the ARPANet was officially decommissioned. The intent was to let university systems and the private sector take over the commercialization of the established connections, now formally referred to as the INTERNET.

The Birth of Cybersecurity

As computers evolved, it became obvious that data present on computer systems needed security. Initially, the security needed for such data was simply to fend off unwanted physical access. Early on, if someone wanted to steal data or information, they would literally have to access the specific mainframe and manually take the data. Initial security systems were geared to forestall such theft. However, as systems evolved, face-to-face physical access was no longer needed to steal information. This could be done with a whole host of new tools. And so were born viruses and worms.

We extend our support to all who are on the front lines during the ongoing Covid-19 pandemic.

We wish to thank all Healthcare Workers, Law Enforcement, Firefighters and EMT's, for your tireless efforts in helping the people of the Texas Panhandle.

The first documented computer worm was the creation of Robert T. Morris. In 1988, Morris was a graduate student at Cornell University. He was curious about the actual size of the Internet. As part of a graduate project, and in an attempt to gauge the size of the Internet, he designed a program to infiltrate every UNIX system in the world. By infiltrating individual units, he reasoned his program could enumerate the number of connections and in turn the extent of the actual Internet. Unfortunately, Morris' worm worked too well. Once it began to infiltrate systems, it started to replicate itself too effectively. It infected computer after computer until most computers linked through the Internet were affected, and the interconnection between all these computers ground to a halt. In this way, the worm exposed the vulnerability of an interconnected system of computers with free access. Soon after Morris' worm was contained, fail safes began to be constructed.

As the internet grew, there was a veritable explosion of newer types of malware. More aggressive and malicious viruses were being seen daily. Initial viruses with names like I LOVE YOU and Melissa spearheaded the way, causing systemic damage and worldwide computer system shutdowns. The presence of such viruses and their quick compromise of systems only highlighted the need for advanced cybersecurity.

The Birth of the Anti-Virus(es)

As the number of viruses increased and their threat to computer systems and their contained data became more obvious, anti-viruses and their development became a hot topic. In the early 1990s, there was tremendous growth in cybersecurity. The focus was on viruses and how to block them. This intense desire for control and security has continued to this day. It is estimated that hundreds of types of cybersecurity software exist today. The cybersecurity market has grown to an estimated 37 billion dollar a year business, with corporate giants such as McAfee and Microsoft competing for market share. Companies now routinely spend millions of dollars trying to contain the threat posed by cyber-attacks, malware, and ransomware.

The Hacked, the Hackers and ANONYMOUS

As computer viruses and malware became more common, more computers and computer users were affected. A victim of malware or an attack is referred to as having been "hacked." The one perpetrating the attack is referred to as a "hacker." This is reminiscent of the relationship between a predator and its prey.

As mentioned earlier, the recent UHS hack in 2020 is the largest in U.S. history. It was especially notable for the loss of medical data. However, other formidable compromises have occurred. The Yahoo, Inc, systemic hack in 2013 and again in 2016 was responsible for the leakage of data on close to 3 billion individual accounts. A more frightening and insidious hack occurred in December 2015, compromising the voter data bases in the United States with data loss affecting 191 million voters (*IT Pro Portal Magazine*, November 14, 2019;).

As these hacks occur, the hacked sometimes wonder how this may have happened. In review, cybersecurity analysts note that most often the hack comes in the form of tainted data or an unknown access, like a Trojan horse. Cybersecurity experts note that most often the largest infiltrations occur through Microsoft Office (47.5%) and through the use of unsecured browsers (23.7%). They also note that most users are unaware that their mobile communication devices are unprotected, with up to 49% of smartphones having no built-in cyber security system.

As the hacked become less of a focus, the hackers become of particular interest. Hackers were once thought to be geniuses while the hacked were victims being led to their slaughter. At other times, hackers were considered only as thieves since their focus was to gain access to information in order to rob a system of its riches. One of the most famous hacker groups was/is ANONYMOUS. The group first came to light on October 1, 2003 as it hacked the website and the databases of the Church of Scientology, causing distributed denial of services (DDoS). The group was found to be a loose cooperative of hackers from multiple different online and offline communities. Since its initial appearance in 2003, the group has had many resurrections and has completed worldwide hacks at the U.S. Department of Defense (DoD) and at the U.S. Department of State.

Even though ANONYMOUS has proven to be contained in the danger that it poses, other cyber groups have emerged as worldwide threats. One such group is Lazarus. Very little is known about the Lazarus group or their members. What is known about them is their attacks. The attacks are mostly systemic and financially driven. In 2017, for example, the Lazarus Group used the WannaCry Attack virus to compromise most health institutions in Europe, halting medical service delivery for almost one week. A similar attack was used only one month later to attack Ukraine, causing shutdowns in banks, financial systems, ministries, and in the electrical grid. This attack was so extensive that it soon went beyond the Ukrainian borders and affected other countries in Europe such as France, Russia, Poland, and Italy. The Lazarus group was also thought to instigate the hack and shutdown at Sony Studios in 2014. It has been reported that the Lazarus group was sponsored by the North Korean dictator Kim Jong-un to shut down Sony Studios in response to their release of movie that he disliked.

Cybersecurity Law

Much of cybersecurity law has not yet been written. There are rules and regulations that seem to have regional or territorial effectiveness. However, no set of comprehensive standards applies to the Internet, since the Internet does not fall under the rules of any one country. That being said, each country and each grouping of countries has done its best to propose guidelines for security.

In the United States, in 2003, the Federal Information Security Management Act (FISMA) was passed. This law defines a series of rules to be applied to securing government assets and Internet technologies/data/intellectual property. Recently, more formalized guidelines and updates to the law have been rolled out under the umbrella of

| *continued on page 36*

the Department of Homeland Security (DHS). In 2018, the Cybersecurity and Infrastructure Agency Act was passed, creating the Cybersecurity and Infrastructure Security Agency (CISA), a stand-alone agency under the DHS with responsibility for cybersecurity for the nation.

Another directive that has been in place since 2012 is the Federal Cybersecurity Research and Development task force. This federal task force creates new guidelines every four years. It operates on the premise that no system is foolproof. It uses the assessment of historical data to make recommendations for effective risk detection and security implementation for all federal, private and public systems.

Like U.S. efforts, other rules and laws exist throughout the world in an attempt to limit the Internet. These are too many to list here. However, suffice it to say, the Internet has no one ruler, nor one set of laws. There is no all-encompassing rule governing the Internet. That in itself is a major part of the challenge.

Conclusion

The Internet was begun with the hopes of bettering mankind with the sharing of ideas amongst the best of human minds. It has now lived through its 30th birthday. It has grown to be a far different child than when born. The Internet is now home to the best and to the worst of human natures and affairs. It is the progenitor of space systems and robotic technologies beyond prior hopes and dreams, and yet it is the reservoir of the lowest practitioners of hate speech, bigotry and pedophilia.

A great deal of humanity exists in this new world of the Internet. As the Internet grows and as we become more dependent on it, we need to understand its limitations and its faults. Cybercrimes and cyber-access are part of our future. For this reason, cyber-awareness and cybersecurity are necessary to move forward into this new world. As this article has tried to show, these topics will now be intertwined – they cannot be separated. In the future, as we become more cyber-dependent, we need to become more cyber-aware, and more cyber-secure. We need to be aware of ourselves, our exposures and how best to use the Internet to make our lives more fulfilling without become cyber-prey.

Terms of Interest (most common/ simplest definition – from Wikipedia/ other net sources):

ANONYMOUS – a decentralized international activist/hacktivist collective/ movement that is widely known for its various cyberattacks against several governments, government agencies, corporations, and the Church of Scientology.

Anonymity Network – An anonymity network enables users to access the Web while blocking any tracking or tracing of their identity on the Internet. This type of online anonymity moves Internet traffic through a worldwide network of volunteer servers. Anonymity networks prevent traffic analysis and network surveillance - or at least make it more difficult.

ARPANet – Advanced Research Projects Agency Network was an experimental computer network that was the forerunner of the Internet.

Computer slave – A slave is a computer or peripheral device that operates under the control of another computer peripheral.

Cyber Command – United States Cyber Command (USCYBERCOM) is one of the eleven combat divisions within the Department of Defense (DoD). Its purpose is to unify all cyberspace operations and to strengthen DoD cyberspace capabilities.

Cybersecurity – the state of being protected against the criminal or unauthorized use of electronic data, and the measures taken to achieve this.

DARPA – The Defense Advanced Research Projects Agency is an organization of multiple project groups (military and its contractors) that work under the Department of Defense umbrella for special projects; DARPA research is the founder of what eventually became the internet and the ARPANet.

DARPANet – a term sometimes used for the ARPANet, the early network from which today's Internet evolved.

DDoS – short for distributed denial of service.

DDoS attack – a cyberattack where the incoming traffic flooding the victim originates from many different sources. This effectively makes it impossible to stop the attack simply by blocking a single source.

DoS – Denial of service.

DoS attack – a cyberattack in which the perpetrator seeks to make a machine or network resource unavailable to its intended users by temporarily or indefinitely disrupting services of a host connected to the Internet. Denial of Service is typically accomplished by flooding the targeted machine or resource with superfluous requests in an attempt to overload systems and prevent some or all legitimate requests from being fulfilled.

Hacked – someone has accessed your account/system without your knowledge.

Hacker – a person who uses computers to gain unauthorized access to data.

Internet – a global computer network providing a variety of information and communication facilities, consisting of interconnected networks using standardized communication protocols.

Intranet – a local or restricted communications network, especially a private network created using World Wide Web software.

Malware – software that is specifically designed to disrupt, damage, or gain unauthorized access to a computer system.

Ransomware – a type of malicious software designed to block access to a computer system until a sum of money is paid.

Virus – A computer virus is a piece of code which is executed in a target computer to hamper the smooth functioning of the PC.

Worm – A computer worm is a type of malware that spreads copies of itself from computer to computer. A worm can replicate itself without any human interaction, and it does not need to attach itself to a software program in order to cause damage.

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