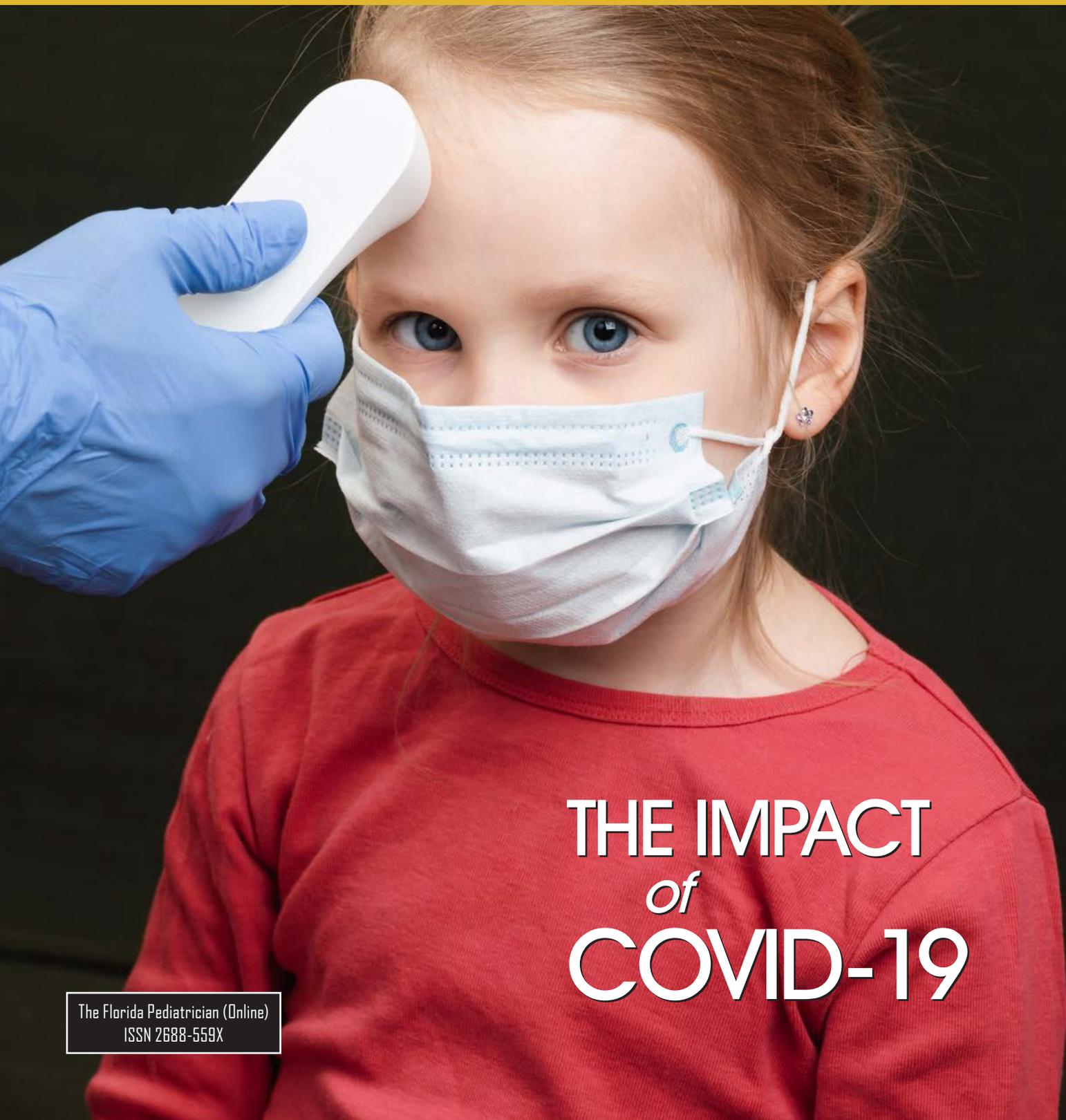


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THE IMPACT *of* COVID-19

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Editor's Note

Dear Colleagues,

To say the least, 2020 has been a challenging year by any criteria. So many lives lost. So tragic.

I would have said thank goodness it is 2021! I hope for a better future. Unfortunately, 2021 did not start well for our nation but for different reason and the pandemic numbers are getting only worse.

To give some perspective, the population of the United States is around 331,000,000 and the total deaths in the United States from COVID-19 (as of 1/21) was 383,352 over a 9-month period. This means one in every 863 Americans has died because of COVID. Mind boggling! Our nation has never seen anything like this in peace time. Even in wartime we have not seen this much death.



To put the tragedy of the pandemic in perspective, combat deaths during the American Civil War were 218,222. American combat deaths during the Second World War were 291,557. In fact, all the American combat deaths in First World War, the Revolutionary War, the War of 1812, the Mexican American War, the Korean War, the Vietnam War, the Iraq Wars, and the Afghan War were 152,139. These are all sobering numbers. Unfortunately, we are still in midst of the pandemic, and deaths will continue. At this rate, I dread that we will soon cross all American lives lost in Second World War, which were 405,399, by March, and all deaths from the Civil War, estimated to be 655,000, before we bring coronavirus under control.

Fortunately, we now have means to fight coronavirus. We need the will to defeat coronavirus. Make no mistake: this is a war, and the foe is unrelenting. The availability of coronavirus vaccines has brought into our armamentarium the means to defeat the virus. As in previous wars, we all must participate to defeat this enemy.

We all must do our part and get vaccinated and encourage others to get vaccinated. It is mindboggling that 40-60% of healthcare workers are either reluctant or not planning to take the coronavirus vaccine. I hope they will change their minds once they see their colleagues getting vaccinated and publicizing that fact that the vaccine is safe.

There is another important point that will help make the coronavirus vaccine campaign successful. We need to educate ourselves about the expected reactogenicity in the first 24-48 hours of receiving the vaccine so that we can not only know what to expect but also manage the expectations of our patients. If patients know what to expect, they will not be as concerned. The reactogenicity of the coronavirus vaccine is less than from the shingles vaccine and somewhat more than the influenza vaccine. We want to make sure everyone understands this so that they do not panic or get overly concerned after the first dose of the vaccine and return for the second dose. A single dose of the current vaccines does not protect against Coronavirus. While the first dose will protect, we need both doses, and we need everyone to return for the second dose to get the necessary protection against Coronavirus disease.

We rolled up our sleeves to produce tanks, aircrafts, and ships during the Second World War. Now let us roll up our sleeves for the vaccine. We fired shots to defeat our enemy and protect our way of life. Now we need to receive shots to defeat our current enemy to protect our way of life. Get schools open, businesses open, and let us get back to our normal way of life.

Finally, we know that the vaccines protect against disease and not infection, so even after receiving the vaccine we need to continue to use masks, practice social distancing, and follow smart isolation.

We have huge search light at the end of this proverbial dark tunnel, but it is useless unless we make use of this light to guide us onto the right path, to protect ourselves and our country against coronavirus. It will take 90% of people to be immunized before we will have any semblance of herd immunity.

I know we can do it. After all, is this not what the American spirit and American exceptionalism are all about? Your country needs you, and you need the coronavirus vaccine. Be among those who can say that they did their part for themselves, their family, their neighbors, their city, their state, and their country.

So, go out and get vaccinated and encourage others to get their shots.

A handwritten signature in black ink that reads "M. Rathore/MD". The signature is fluid and cursive.

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CASE REPORT

Terra Firma-Forme Dermatosis

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CASE:

A 9-year-old girl presents for a well child visit. Her only concern on the day of the visit is a “dirty-looking rash” on her neck. The patient’s mother first noted the rash several weeks before and thought it was dirt. When the brown area persisted after the patient bathed, mom herself tried to wash it off with warm water, soap and a wash cloth but it remained. The patient states that the rash “feels funny when it’s touched” but otherwise it does not bother her at all. The rash is located in the anterior neck and crosses the midline. The patient and her mother deny significant changes in the lesion since they first noted it. Her past medical history is significant only for eczema which is well controlled with emollients. Her family history is negative for diabetes, acanthosis nigricans and other skin conditions.

On physical exam, the patient is a thin, well-appearing girl with good hygiene. Her growth curves and BMI are normal. Her exam is normal with the exception of the skin exam in her neck area. Her skin exam reveals brown, slightly raised, rough “dirt like” plaques on her anterior neck at midline and extending laterally along the anterior border of the sternocleidomastoid muscle where it gradually fades (Figure 1).



Figure 1: The skin lesion extending across the anterior neck area.

At the time of the visit, the diagnosis was uncertain. The patient was sent home with instructions to observe and seek further care if the rash persisted. At the end of the clinic day, the provider conducted a literature search to attempt to identify the skin findings. Upon discovery of the likely diagnosis, the mother was contacted and instructed to attempt to gently wipe off the rash with an alcohol swab. The mother called the office the next day to report that the intervention had worked and that the child's skin lesions were completely removed (Figure 2). The patient tolerated the wiping with alcohol without any major discomfort. The resolution of this skin lesion with an alcohol swab is consistent with the diagnosis of Terra Firma-Forme Dermatitis. Two months following the intervention, the neck remained clear and the lesion had not returned.



Figure 2: The area of the neck showing resolution of the lesion after rubbing with alcohol.

TERRA FIRMA-FORMA DERMATOSIS

Terra Firma-Forme Dermatitis (TFFD) is also referred to as Duncan's Dirty Dermatitis after Duncan who first described the condition in 1987.¹ It is named for the Latin term "Terra Firma" which means "solid earth" as the lesions often resemble dirt or earth on the skin. A literature search for TFFD reveals 61 entries in PubMed, most of which describe the condition as rare. However due to its benign nature, it is likely significantly under reported. The majority of cases are described in children and adolescents (88.6% with a mean age of 10.4 years) and involve the trunk (27.8%) and extremities (26.6%).²

Case reports also describe involvement of the face and neck, but to a lesser degree. The classic presentation is that of asymptomatic dirt-like plaques with a slightly papillomatous surface that cannot be removed with ordinary soap and water cleansing. Interestingly, the lesions completely disappear upon swabbing with 70% ethyl or isopropyl alcohol.³ The wiping with alcohol is both therapeutic and diagnostic. While most cases of TFFD can be diagnosed clinically and with the alcohol test, there are several reports of histological studies from skin biopsies. When done, biopsies show lamellar hyperkeratosis, focal orthokeratosis in whorls and increased melanin in the hyperkeratotic areas and basal layer.^{1,5} It has been postulated that the condition arises due to delayed or incomplete keratinization with retention of melanin of unknown etiology.^{1,6}

The differential diagnosis for Terra Firma-Forme Dermatitis includes acanthosis nigricans, confluent and reticulated papillomatosis of Gougerot and Carteaud, pityriasis versicolor, some forms of ichthyosis, linear epidermal nevus, dermatosis neglecta and seborrheic keratosis (Table 1).³ It may be difficult to differentiate between some of these diagnosis clinically, thus the alcohol swab test should be done prior to obtaining laboratory studies or biopsies. TFFD and confluent reticulated papillomatosis may be clinically indistinguishable and histologically very similar. However the latter classically does not wipe off with an alcohol swab and is generally treated with systemic retinoid or antibiotic therapy. Acanthosis nigricans is characterized by hyperpigmented velvety plaques usually in the neck and body folds and is associated with obesity and insulin resistance. Acanthosis nigricans is generally managed by treating the underlying cause with physical activity and diet modification. Pityriasis versicolor is a very common superficial fungal infection characterized by hyperpigmented, hypopigmented or erythematous scaly macules, usually on the trunk. Dermatitis neglecta is very similar to TFFD and does wipe off with alcohol. Some have suggested that they are part of a continuum or that they are the same entity and thus use the terms synonymously.³ Individuals with dermatosis neglecta fail to adequately clean the skin often due to hyperesthesia or prior trauma. This leads to a build-up of hyperpigmented adherent scales.⁵

DIFFERENTIAL DIAGNOSIS OF TERRE FIRMA-FORME DERMATOSIS
Acanthosis Nigricans
Confluent and Reticulated Papillomatosis of Gougerot and Carteaud
Pityriasis Versicolor
Ichthyosis
Linear Epidermal Nevus
Dermatitis Neglecta
Seborrheic Keratosis

Table 1

CONCLUSION

Terra Firma-Forme Dermatitis is a benign skin condition that is best diagnosed clinically and is easily resolved by cleaning the affected areas with 70% ethyl or isopropyl alcohol. Lack of awareness of this condition may lead to a more invasive and expensive work up, including a laboratory work up and dermatology referrals. The diagnosis of Terra Firma-Forme Dermatitis should be considered in all unusual causes of hyperpigmentation and the alcohol swab test should be attempted prior to initiation of any other testing.

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CASE REPORT

Children and Chickens: 11-month-old Infant with a Salmonella Deep Neck Infection

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CASE PRESENTATION

An eleven-month-old female presented to the Emergency Department (ED) for decreased oral intake, fussiness, and fever. The infant had been seen twice at her pediatrician's office in the preceding four days with low-grade fevers (Tmax 100.3), nasal congestion, and mild cough, along with progressively decreasing oral intake and urine output thought to be related to a viral upper respiratory infection. Point of care influenza and strep testing were negative. She was ultimately brought to the ED because she was becoming increasingly fussy and refusing to take any fluids for almost 18 hours despite trying small volumes. Per parental report, she had started choking on her post-nasal drip and had a few episodes of posttussive emesis. Her urine output had further decreased with only one damp diaper 8 hours prior to ED arrival. The last dose of antipyretic was 12 hours prior to presentation to the ED. Review of systems was additionally positive for one hard stool the day of admission. Her mother denied respiratory distress, drooling, diarrhea or rash.

Her past medical history was significant for uncomplicated term delivery, normal newborn screen and resolved gastroesophageal reflux. She was undergoing evaluation by occupational therapy for feeding aversion to table foods. She also had a history of a 5-day, self-resolved diarrheal illness at 5 months of age, which was presumed to be *Salmonella* as brother had *Salmonella* PCR positive enteritis at that same time. No other history of recurrent infections and no prior antibiotics. Immunizations were up to date, including seasonal influenza vaccination.

The infant did not attend daycare, rather maternal grandparents cared for her and her sibling during the day. Grandparents live on a farm with numerous animals, including backyard chickens.

Upon arrival to the ED, vital signs included: temperature 99.3, pulse 110 beats per minute, respiratory rate 32 breaths per minute, oxygen saturation 100% on room air, and weight 8 kg (18th percentile). This weight represented a 440 g weight loss in the past 4 days. She appeared listless and was lying in mother's arms. Her conjunctivae and tympanic membranes were normal. Initially she had full range of motion of her neck without swelling and shotty anterior cervical lymphadenopathy. Her oral exam demonstrated chapped lips, mildly erythematous posterior oropharynx and tonsils 2+ without exudates, uvula was midline. Gingivae and dentition normal. Her pulmonary and abdominal exams were unremarkable. She was tachycardic with regular rhythm and no murmur. She was noted to have delayed capillary refill of 4 seconds.

She was given ondansetron followed by an attempt at oral rehydration, which she did not tolerate. After a 20 mL/kg normal saline fluid bolus, she had normalized capillary refill, improved tachycardia and appeared more alert, but she continued to refuse oral intake. Upon re-examination she was noted to have developed a hoarse cry without stridor or respiratory distress. Her oral exam showed prominence of the left pharyngeal wall and she had developed left-sided neck swelling with palpable firmness extending from the angle of the mandible to the mid-neck. There was no warmth on palpation or erythema of the overlying skin.

HOSPITAL COURSE

Given the change in her physical exam with acute-onset left-sided neck swelling, further workup was obtained including complete blood count (CBC), basic metabolic panel (BMP) and C-reactive protein (CRP) along with a computer tomography (CT) of the neck. She was empirically started on clindamycin 40 mg/kg/day divided every 6 hours.

Blood work: CRP 177.8 mg/L (0-5 mg/L), WBC 23.1 (6-17.5), hemoglobin 12.4 (9.5-13.5), platelets 519,000 (150-450,000), neutrophils 69% (35-85), lymphocytes 17% (25-65), monocytes 13% (2-10). BMP was normal.

The contrast CT demonstrated a large left parapharyngeal abscess (PPA) measuring 3.5 cm x 3.0 cm at the greatest dimension and 3.5 cm vertical. There was substantial mass effect with displacement of the hypopharynx and the epiglottis, but the airway remained patent. There were irregular contours and a thin enhancing wall (Image 1). The lesion may have begun as a suppurative lymph node, but had progressed to extracapsular extension and abscess.

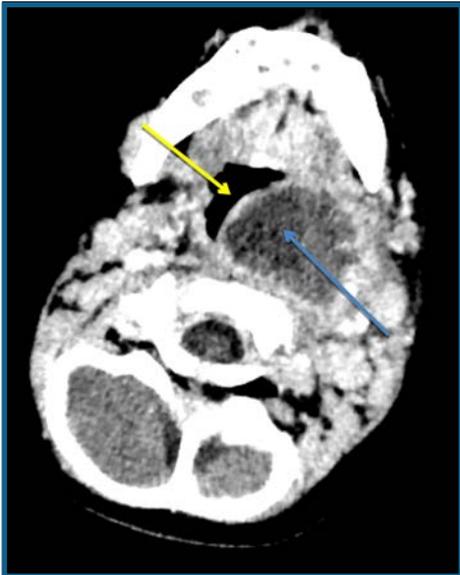


Image 1: Contrast enhanced CT demonstrating a large left parapharyngeal abscess (PPA) measuring 3.5 cm x 3.0 cm at the greatest dimension and 3.5 cm vertical with irregular contours and a thin enhancing wall (blue arrow). Mass effect with displacement of the hypopharynx and the epiglottis (yellow arrow).

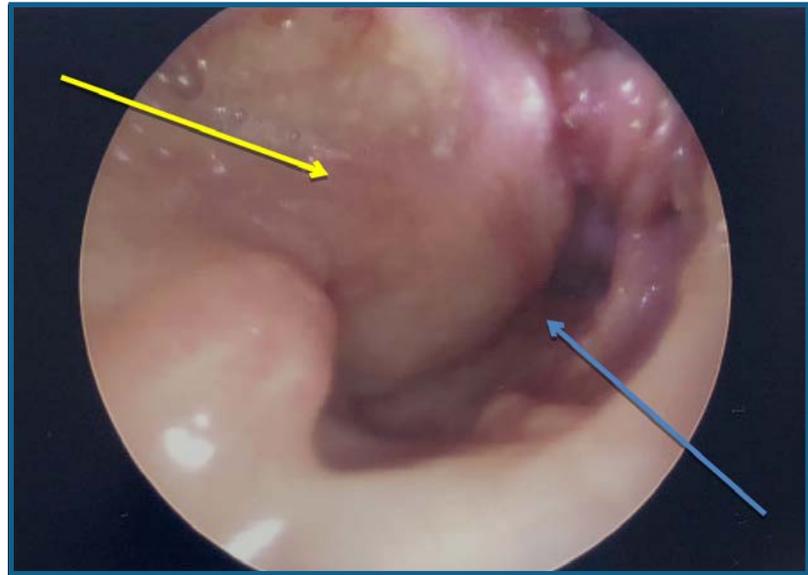


Image 2: Intraoperative image of swelling of the left parapharyngeal space (yellow arrow) with displacement of the epiglottis to the right. Partial collapse of the airway secondary to mass effect (blue arrow).

Pediatric ENT evaluated the infant and surgical incision and drainage was recommended. An intraoral surgical approach was used and 9 mL of purulent material was aspirated and both aerobic and anaerobic cultures were sent (Image 2). She was admitted to the pediatric intensive care unit immediately after surgery due to her high-risk airway, but was transferred to the regular pediatric floor within 24 hours. During her three-day hospitalization, she was continued on IV clindamycin. Within 24 hours following her surgery, she started tolerating oral fluids well. She was discharged home on oral clindamycin to finish a total 10-day course.

FINAL DIAGNOSIS AND PATIENT FOLLOW-UP

The cultures, obtained during surgical incision and drainage, grew 3+ *Salmonella* species, not typhi, and 1+ staph aureus (both sensitive to clindamycin). Fungal culture was negative. No acid-fast bacillus on direct smear.

At her recheck appointment 4 days after hospital discharge, her fevers and fussiness had resolved and oral intake was back to baseline. Physical exam demonstrated resolution of her neck swelling and there was a healing incision in the left parapharyngeal region without drainage.

She had presumed diarrheal illness secondary to salmonella at 5 months of age, but no other history of recurrent bacterial or viral infections. Given the rarity of salmonella as the cause of a PPA, pediatric infectious disease recommended an immunologic work-up including: CBC with differential, CRP, immunoglobulins IgG, IgA and IgM, IgG subclasses (1,2,3 and 4), total complement and vaccination titers (Tetanus Ab IgG, Haemophilus Influenza B IgG, and Pneumococcal Serotypes IgG-14 Ab). These labs were all normal for age.

DISCUSSION

The parapharyngeal space is an inverted pyramid, which extends from the base of the skull to the hyoid bone. Deep neck space abscesses, including retropharyngeal (RPA) and parapharyngeal (PPA) abscesses, are uncommon, but do occur more commonly in the pediatric than adult population: national yearly incidence is 4.6 per 100,000 children.^{1,2} Studies differ in the mean age at diagnosis from 2.9-4.4 years and male to female ratio from 1.6:1 to 3:1.^{3,4} In children, PPA typically occurs by direct continuity of infection or indirectly by lymphatic drainage of the retropharyngeal lymph nodes, which can be more prominent in children.⁵ Upper respiratory tract infection (67%) and odontogenic source (25%) are the most common causes of PPA in children.¹ There is a seasonal distribution to PPA with increased incidence in the winter months, which is consistent with the fact that many PPA are often preceded by a viral upper respiratory tract infection.¹

Initial presenting symptoms of PPA can often be subtle and difficult to discern, especially in young children who are unable to verbalize their symptoms. PPA will frequently begin with a prodromal phase, including fever and upper respiratory symptoms, and then progress to include localized neck and pharyngeal complaints.⁴ Common symptoms reported, in patients old enough to articulate, include decreased neck range of motion, neck pain, neck mass, sore throat and pain/difficulty swallowing.^{4,6} A Danish retrospective study demonstrated the most consistent physical exam findings of PPA include the following: trismus, posterior pharyngeal erythema and edema, pharyngeal asymmetry, neck swelling and torticollis.⁶ Signs of airway compromise are a late finding and if present, need to be taken very seriously.⁴

Although management of PPAs remains controversial, the use of diagnostic imaging, typically by contrast enhanced CT, is recommended almost universally. A CT can help differentiate a drainable abscess from cellulitis and can also assist in surgical planning, if required.² Signs on CT that may indicate the presence of PPA include ring enhancement, central lucency and “scalloping” or irregularity of the abscess wall.⁴ Ultrasound has been used for diagnosis, more commonly in adults, but sensitivity depends on the skill of the technician and it may not be adequate to visualize deeper abscesses.²

Appropriate treatment is important to decrease the risk of developing complications, which occur in 2-3% of cases.² Complications can include airway obstruction, sepsis, mediastinitis, carotid artery aneurysm or rupture, Lemierre’s syndrome, cranial nerve IX-XII palsy and necrotizing fasciitis.^{1,2} Although the incidence of PPA has increased over the past decade, complication rates have decreased secondary to earlier diagnosis, improved surgical methods and superior antibiotics.⁴ There is not a consensus regarding treatment protocol for PPA: options include surgical incision and drainage combined with intravenous (IV) antibiotics versus more conservative medical management with IV antibiotics only. This decision often depends on location, size of the abscess and age of the patient. A retrospective case study by Cheng *et al.* concluded a 48-hour trial of IV antibiotics only is a reasonable approach in smaller (<2.2 cm) abscesses in stable children older than 4 years of age.³ Surgery is recommended as the initial treatment in younger children, larger symptomatic abscesses or if there is no improvement after 48 hours of antibiotics.⁵ Surgical approach (external

vs intraoral) is determined based on location of the abscess and risk to surrounding structures.⁵ More recent studies have demonstrated that the use of the intraoral approach is associated with decreased operating time and need for postoperative IV antibiotics as well as reduced length of hospital stay postoperatively.⁴

The most common organisms that cause parapharyngeal abscesses are *Staphylococcus aureus*, *S. viridans*, group A streptococci and oral anaerobes (*Prophyromonas*, *Fusobacterium* and *Peptostreptococcus*)^{1,2}, with recent studies citing a prevalence of up to 61% for methicillin-resistant *S. aureus* (MRSA) as the causative organism.⁵ Cheng *et al.* has also reported a higher incidence of PPA caused by MRSA in children less than 15 months of age.³ Less frequent isolated organisms include *Haemophilus* spp., Gram-negative enteric organisms and polymicrobial infections.¹ Antibiotic therapy is targeted to cover the aforementioned bacteria with empiric regimens including anaerobic coverage (metronidazole or clindamycin), plus penicillin combined with either beta-lactamase inhibitor (amoxicillin with clavulanic acid) or beta lactamase-resistant antibiotic (cefoxitin, cefuroxime, imipenem or meropenem): additionally, clindamycin or vancomycin is added if there is concern for MRSA.⁵ If surgical incision and drainage is required, antibiotic selection can then be narrowed based on culture results.

Given the patient's young age and lack of risk factors, it was surprising when the identified pathogen causing her PPA was *Salmonella*. A PubMed literature review confirmed the rarity of this diagnosis with only 2 previous case reports of children under 18 years of age with *Salmonella* as the cause of a deep neck abscess.^{7,8} A majority of the 21 documented cases of *Salmonella* identified in neck infections occurred in older (ages 24-70) and/or immunocompromised patients.

A case report by Su *et al* reported that localized salmonellosis infections rarely occur in patients without underlying illness and are present in less than 8% of patients hospitalized for a *Salmonella* infection.⁷ Thus, a localized *Salmonella* infection in a healthy child, as seen in our patient, is exceedingly rare. Her only known risk of exposure to *Salmonella* was backyard chickens at her grandparent's home. Although the infant did not personally touch the chickens, the grandparents did care for the chickens while she was at their home and used their eggs for cooking.

The backyard chicken (BYC) movement in the USA has increased human contact with poultry and subsequently, human contact with the *Salmonella* pathogen.⁹ With this change, there has been a subsequent increase in live poultry-associated salmonellosis (LPAS) outbreaks.¹⁰ In the United States from 1990 to 2014, 53 outbreaks of human salmonellosis linked to live poultry were verified which resulted in 2,611 documented illnesses, 387 recorded hospitalizations and five known deaths.¹⁰ Median patient age at the time of infection was 9 years.¹⁰ Of those infected by LPAS, chick and duckling exposure were reported by 85% and 38% of patients, respectively.¹⁰ The incidence of *Salmonella* infection due to live poultry exposure is increasing. In a 6-month period alone in 2018, 334 people were infected with *Salmonella* from confirmed contact with live poultry, and of those infected, 31% were younger than 5 years of age, as was our patient.¹¹

It is well known that ingestion of inadequately cooked eggs or chicken meat can lead to *Salmonella* infection, but people often do not understand or acknowledge the risk of infection through direct handling of the birds or indirect contact with contaminated bedding and living structures.¹² Poultry will often have no clinical signs of infection, but still intermittently shed *Salmonella* bacteria, which can lead to infection.¹² Review of the LPAS outbreak data from 1990-2014 determined that high-risk practices were common, including keeping poultry inside households (46% of patients) and kissing poultry (13% of patients).¹⁰ Despite the increase in LPAS, there is limited research surrounding the BYC movement and private poultry owners' practices. One such study was performed in Seattle to better understand the knowledge base and hygiene practices of urban backyard poultry owners regarding *Salmonella*. It showed that while almost all of the participants knew that exposure to *Salmonella* is an inherent risk associated with raising poultry and harvesting eggs, their reported and observed practices promoted risk of transmission of *Salmonella*.¹² Approximately 25% of participants reported snuggling and kissing birds or eating/drinking near them.¹²

While infection from salmonella secondary to live poultry exposure is clearly on the rise, there are few studies of BYC and their prevalence of *Salmonella*. A study conducted in 2019 of 50 residents in Boston investigated the habits of backyard chicken-human interactions and assessed the prevalence of *Salmonella* in those flocks.⁹ Interestingly, they discovered that many chickens were treated as pets (75%) with frequent handling and inadequate hygiene practices but that the overall incidence of *Salmonella* was low (<2% of flocks).⁹

CONCLUSION

Despite lower than expected carrier status of *Salmonella* by chickens, in a limited number of studies, there has been a growing burden of BYC-associated diseases. Since children are at higher risk for improper hand hygiene, parents must remain vigilant and teach proper handling techniques. Pediatricians should ask about backyard poultry exposure and discuss the importance of proper hygiene to help decrease the risk of LPAS infection. Simple rules for parents include: washing hands after touching chickens or touching their roaming areas, never letting chickens inside the house, wearing separate shoes while taking care of

chickens, keeping children under 5 years of age from handling chickens and not eating food near chickens.¹¹

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GRADUATE MEDICAL EDUCATION

Adapting Pediatric Residency Education During the COVID-19 Pandemic, A Novel Approach

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PROBLEM

Our residency program made several adaptations to balance the safety and well-being of our residents while preserving a robust educational curriculum. Mid-March 2020 we removed all of our residents from electives, development and advocacy rotations, and significantly altered the remaining clinical schedules to minimize potential exposure to SARS-

CoV-2. With a large portion of the residents working from home, we needed to adapt and create new educational experiences for them.

APPROACH

Our approach to adapting our educational curriculum was to address the individual needs of those on home electives and to continue residency-wide education using technology for meetings and conferences.

INDIVIDUAL APPROACH

For each remote rotation we developed specific required activities. This included: PREP questions, NEJM modules, quizzes, virtual journal article reviews, and participation in virtual conferences (academic half day, noon conference, journal club). A book and movie list was created and residents were responsible for completing a written reflection. Residents also completed online telehealth and FEMA disaster response courses. They worked with a faculty preceptor and participated in weekly check-ins, virtual rounding, and telehealth visits. Those on the infectious disease elective participated in the COVID follow-up telehealth clinic. Residents completed a weekly activity log and submitted appropriate documentation of assignments.

RESIDENCY WIDE APPROACH

We continued all educational conferences virtually via Microsoft Teams. The lectures remained interactive by utilizing the chat function. We continued interactive board review sessions. The virtual conferences allowed us to engage more residents in shared educational experiences across multiple clinical sites. We had twice weekly resident case conferences and weekly journal clubs led by residents.

WELLNESS

The book/movie experience was popular. We have had weekly virtual resident open forums and a virtual happy hour for our incoming interns. We hosted a debrief happy hour for residents to share their experiences with the virtual curriculum and book/movie reflections.

OUTCOME

We have had an increase in faculty/resident participation in conferences. Attendance increased from 7-12 residents and 1-5 faculty for in-person conferences to 14-25 residents and 4-9 faculty during virtual conferences. Evaluation response rate also increased, giving the residents more feedback on their presentations. Previously, residents would receive 1-6 survey responses, which is now up to 8-15 survey responses. Residents have engaged in independent learning and have been productive during this time. We hosted a virtual resident research day where twelve residents presented their research/QI projects to their peers and faculty using Teams. Faculty judges engaged with residents in scholarly discussion and 5 projects were presented at a virtual Grand Rounds attended by many pediatric faculty and visiting academicians. Additionally, residents have embraced new technology through telehealth.

NEXT STEPS

We have seen significant improvement in faculty/resident participation in conferences and will offer a virtual option in the future. While there is no substitute for real patient care, the virtual curricula can be utilized to supplement and strengthen existing rotations. Many residents have also gained valuable skills in self-directed learning and adapting to telehealth, which will be an advantageous skill for their future careers.

BOOK LIST

- Coma by Robin Cook
- Inferno by Dan Brown
- Charlatans by Robin Cook
- The Last Lecture by Randy Pausch
- Cell by Robin Cook
- The Andromeda Strain by Michael Crichton
- Wit by Margaret Edson
- Complications: A surgeon's notes on an imperfect science by Atul Gawande
- Being Mortal: Medicine and What Matters in the End by Atul Gawande
- Better: A Surgeon's Notes on Performance by Atul Gawande
- Cutting for Stone: A Novel by Abraham Verghese
- The Emperor of All Maladies: A Biography of Cancer by Siddhartha Mukherjee
- The Anatomy of Hope by Jerome Groopman
- Splendid Solution: Jonas Salk and the Conquest of Polio by Jeffrey Kluger
- The Demon Under the Microscope by Thomas Hager
- The House of God by Samuel Shem
- The Immortal Life of Henrietta Lacks by Rebecca Skloot
- Handle with Care by Jodi Picoult
- Panic in Level 4: Cannibals, Killer Viruses, and Other Journeys to the Edge of Science by Richard Preston
- The Hot Zone: A Terrifying True Story by Richard Preston
- Mountains Beyond Mountains: The Quest of Dr. Paul Farmer, a Man Who Would Cure the World by Tracy Kidder
- Any AAP sponsored book (such as Raising an Organized Child, Building Resilience in Children and Teens, etc. Must have AAP emblem on book)
- The Reason I Jump: Naoki Higashida – interview of a child with autism
- Vaccine: Arthur Allen – history of vaccinations, starting with small pox
- The Great Influenza, The Story of the Deadliest Pandemic in History by John Barry – nonfiction about the 1918 flu pandemic
- Internal Medicine, A Doctor's Stories by Terrence Holt – short stories of a doctor in training
- Patients Come Second by Paul Spiegelman and Britt Berrett – discussion on self-care and how to support the healthcare workers to provide the best care
- Attending, Medicine, Mindfulness, and Humanity by Ronald Epstein, MD – how doctors think and what matters most

REFLECTION

Title:

Author:

Publication/Release Date:

Brief summary of the book/movie (1-2 paragraphs)

What is/are the main theme(s) of the book/movie? (1-2 paragraphs)

Personal Reflection (2-3 paragraphs). Consider the following questions:

- What did you like/not like?
- What messages did you take away?
- What lessons were learned?
- After reading/watching have you changed your thinking on the topic?
- Do you feel this book/movie will impact your medical practice?

MOVIE LIST

- Patch Adams (1998)--true story of an amazing doc
- One Flew Over the Cuckoo's Nest (1975)—life in a psychiatric ward
- Something The Lord Made (2004)--story of Black cardiologist and pioneering white CT surgeon
- Lorenzo's Oil (1992)--development of treatment for adrenoleukodystrophy
- John Q (2002) suspense of child needing transplant
- And the Band Played On (1993) Story about early AIDS and death
- Wit (2001) -Professor with ovarian cancer facing death
- Wonder (2017)-- child with Treacher-Collins syndrome and how world responds
- Five Feet Apart (2019) –CF patients and interaction
- Contagion (2011)—Pandemic
- Outbreak (1995)—thriller, outbreak of disease
- Awakenings (1990)—Patients with unexplained Parkinson's like disease
- The Diving Bell and the Butterfly (2007)—pt. with locked in syndrome's memoir
- Bubble Boy (2001)—Immunodeficient boy and love story
- The Painted Veil (2006)—China in 1920s during cholera
- Brain on Fire (2016)-Reporter in psych hospital actually isn't crazy!
- Extraordinary Measures (2010)—kids with fatal disease
- My Sister's Keeper (2009)— girl who sues parents for medical emancipation to help sib with ALL
- Lion in the House Documentary (2006) – 5 children and their families as they fight cancer
- Temple Grandin (2010) – Woman with autism who revolutionizes a business practice
- ReMoved (youtube, 3 part video) – children in the foster care system
- I Can Do This But I Can't Do That (HBO documentary) – children with ADHD/learning d/o
- The Madness of King George (1994) – biography comedy-drama about porphyria
- Super Size Me (2004) – American diet documentary
- The Hate You Give (2018) – ACEs and racism (also a book)
- The Fault in Our Stars (2014) – CF and relationships
- Still Alice (2014) – early onset Alzheimer's disease and family bonds
- Ma Ma (2014, Penelope Cruz) – mother diagnosed with breast cancer
- Paper Tigers (2015) – high school's struggle to succeed
- Angst (2017 Documentary) – interviews with persons with anxiety (including Michael Phelps)
- Some titles are also books. You can choose either form. If there is another movie, not on this list, that you would like to watch and reflect on please have it approved by us ahead of time
- Dr. Dabrow's favorites—Cuckoo (classic), Sister's Keeper (book), Brain on Fire (book), Lorenzo's Oil

REFLECTION

Title:

Release Date:

Brief summary of the movie (1-2 paragraphs)

What is/are the main theme(s) of the movie? (1-2 paragraphs)

Personal Reflection (2-3 paragraphs). Consider the following questions:

- What did you like/not like?
- What messages did you take away?
- What lessons were learned?
- After watching have you changed your thinking on the topic?
- Do you feel this movie will impact your medical practice?



GRADUATE MEDICAL EDUCATION

GME and Telemedicine: The Future is Right Now

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A new decade did not usher physicians into 21st-century medicine. It was the COVID 19 pandemic. The foundation of pediatric graduate medical education traditions dramatically shifted to accommodate safe healthcare practices. These necessary, albeit difficult changes, fundamentally altered the core teaching and didactic opportunities for pediatric residents. As a result of social distancing guidelines that limit face-face encounters, telehealth has now come to the forefront of our outpatient pediatric graduate medical education as a supplement to in-person clinical education.^{7,8}

THE EXPANSION OF TELEHEALTH DURING COVID-19

Before 2020, the American Medical Association noted a modest increase in the use of digital health technology (DHT) from 2016-2019.¹ Among these DHT, the use of remote health tools (what many consider telehealth) had the greatest increase in this survey of 1300 physicians. However, it was in the early months of 2020 that DHT, particularly remote health tools and specifically synchronous telehealth modalities, made an impactful entry into medicine. By April 2020, in-person ambulatory visits were at their lowest, with offices seeing a steep decline by mid-March, and telehealth visits were at their highest.²

Many pediatricians, including those at UHealth and Jackson, decreased in-person visits dramatically to prepare for the surge. These efforts aimed to conserve PPE, mitigate community spread, and protect vulnerable health professionals. An increase in telemedicine visits to provide primary care and acute care to children across our community resulted. The Centers for Medicare & Medicaid Services (CMS) waivers for health care providers facilitated Medicare, Medicaid, and CHIP enrollees to obtain medical services through telehealth. As a result, telemedicine and digital health tools became commonplace across the United States.³

INTEGRATING TELEHEALTH AND GRADUATE MEDICAL EDUCATION

During the initial peaks of the pandemic, residency programs encountered significant challenges including trainee safety and health, well-being and burn-out in high impacted areas, low surgical case volumes, and the pivot from in-person to telemedicine

visits. The American Council for Graduate Medical Education (ACGME) used its Extraordinary Circumstances policy to develop a process by which programs and hospitals could continue to provide care to patients and support trainees of all levels, referred to as “Emergency Status”.⁴

Programs across the country began using telehealth to allow residents to work while being isolated as a patient under investigation (PUI), as well as to safeguard residents with comorbid conditions. Since many non-essential in-person clinic services were canceled, telehealth served to continue patient care. The transition to telehealth for residency programs remained difficult as telehealth remained a relatively neglected aspect of GME until recently. (i.e. only child adolescent psychiatry mentioned Telehealth in its ACGME core competencies).^{5,6} Questions emerged, such as how many rotations telehealth-accessed rotations count towards ACGME program requirements and what resources are available to teach telemedicine principles to trainees. And now, as these opportunities begin to decrease and in-person visits increase, how does a program continue to incorporate telemedicine into its curriculum? It is in answering these questions that GME leadership across the country will forge new curricular components to augment the pediatric residency training.

A NOVEL AMBULATORY CLINICAL TRAINING VENUE USING TELEHEALTH

At our institution, a rapid expansion of telehealth practices occurred immediately after the pandemic arrived. Faculty were immediately required to complete computer-based learning modules and get approval from respective division chiefs to practice telemedicine. Preserving the medical home while limiting exposure risks was the primary goal. Pediatric residents continued outpatient rotations, including continuity clinics, via telemedicine. Residents on Hospital Inpatient, ICUs and Emergency Medicine rotations continued clinical duties in person. Pilot telehealth programs in the Pediatric Mobile Clinic and School-based Health clinics aided the large-scale roll-out system-wide. Across both health systems, attendings completed computer-based training in telemedicine etiquette, documentation, and billing practices. We established an innovative telemedicine clinic for newborns born to COVID+ mothers whereby residents evaluated, cared for, and counseled in the absence of a physical exam and anthropometric data.

Resident education in telemedicine practices occurred simultaneously with the transition. A combination of didactics with case-based learning served as a primer for phone triaging as a remote health tool and specifically synchronous telehealth modalities. Highlights of the first few weeks included all at-home residents to cover the after-hours ambulatory pager. They were the first point of contact for the three academic practices at UM/Jackson. Residents triaged ambulatory concerns based on scarcely updated COVID guidelines. They were rapidly exposed to critical decision-making on testing indications, home isolation protocols, and emergency referrals.⁹

Telehealth for patient care generated a distance-learning/clinical education tool for our residents. Resident-patient phone encounters were reviewed daily in a sign-out, much like inpatient rotations, and they followed the patient’s clinical course. Direct observation was a predominant feature of telehealth as a teaching tool. For example, faculty members could focus entirely on the trainee’s patient interview techniques, rapport, observation of the home space, and counseling. Junior residents and students were often directly observed by the attending, while senior residents followed the more traditional model of taking a history and reporting to the attending. The development of illness scripts could be observed in real-time. In most instances, both the resident and the attending were remote. Residents received more individualized feedback facilitating trainee’s ability to perform clinical assessments.

STRENGTHS AND LIMITATIONS OF TELEHEALTH IN GME

Although a non-traditional didactic method, telehealth offered several advantages for pediatric GME. Primarily, a telemedicine model limits occupational health exposure to residents while still offering patient access to essential ambulatory care. In particular, the telemedicine model accommodates residents who may have been disproportionately affected by the pandemic, and may not be able to physically come to the brick and mortar establishment due to socioeconomic, family, medical or transportation issues. To provide timely feedback during these visits, we appropriated time before and after each clinical visit to provide direct observational feedback to our residents on clinical decision making. As such, by integrating our residents into this telemedicine model, we welcomed the natural evolution of medicine with modern technology.

As with any new technological advances, we encountered several challenges to the implementation of ambulatory telemedicine, and the encumbrances at both of our clinical sites could be extrapolated to other high-volume medical centers. Primarily, integrating telemedicine into a multi-lingual, diverse clinical setting remains arduous given the inherent difficulties of consent, translation, technological literacy, and scheduling. These issues were centered in our hospital-based underserved clinic where socioeconomic disparities exacerbated the limitations of telemedicine. In an already time-limited environment, lack of follow-up, poor internet connection, guardian unavailability hindered access to telemedicine for these patients. Over the initial few months, it became clear that our educational model must be tailored to mitigate the disparities for this already vulnerable population. We continue to brainstorm for process improvement options to improve quality access or our underserved population.

The physical exam is the cornerstone of medical learning. With telemedicine, we have effectively removed the familiar touch of examining the lungs and ears of a sick child at the bedside. Common screening tests at well-child visits such as vision and blood pressure checks have been voided, and the quintessential “history and physical” has been replaced with “history”. Albeit necessary, this shift during the pandemic may have devalued the physical exam.

The global pandemic has provided us a unique yet demanding opportunity to adapt our graduate medical education model to meet the needs of our trainees and patients. Our ability to rapidly shift our teaching paradigm to acclimate the needs of this pandemic exemplifies our innate ability to evolve. With our success in this prolonged trial period during the pandemic, we remain optimistic about the future of medicine as we equilibrate in these trying new times.

LESSONS LEARNED AND FUTURE DIRECTIONS

Interestingly, despite preaching the strengths of telemedicine, as clinical faculty, we still felt it important to keep the interns from it. We prioritized in-person learning in the clinic, to adequately familiarize them with the fundamentals of primary care. While their telemedicine training has been methodical, computer-based learning and even dynamic case-based learning has been offered through Yale’s Primary Care Curriculum. We hope any program looking to expand their telehealth training can methodically emulate our model. Proper etiquette and general ground rules should also be overtly stated. Early in our experience with trainees, essential telehealth professionalism rules were expressed and emphasized: 1) silent space, 2) maintain eye-contact (camera must be on), 3) maintain attention to your patient (no concomitant responsibilities).

We need to continue to be innovative on how we can use telemedicine to our advantage. Anchor appropriate milestones to telemedicine experiences, while still ensuring enough hands-on experiences. Future areas of growth would be to survey residents of their perception and learning from telemedicine experiences and how we can improve upon our current processes.

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GRADUATE MEDICAL EDUCATION

How Our GME Department and Pediatric Residency Program Met the GME Training Challenges of the COVID-19 Pandemic: Reflections from the Trenches

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Graduate Medical Education (GME) training in this pandemic time can only be described as “unusual” to say the least. Yet, as a sponsoring institution of a large pediatric residency program and 15 subspecialty fellowships at a freestanding children's hospital, we were fortunate not to have had to declare “Emergency Status” based on the ACGME definition. This article serves as a reflective account of how GME adapted to the challenges brought about by a pandemic. Despite the uncertainty about COVID-19 and its preventive measures, our institution quickly implemented daily temperature screening, a mask mandate in all areas of the hospital, and remote working for non-clinical departments. At the GME level, all didactic sessions, meetings, and educational gatherings were converted into virtual format. The lockdown and canceling elective surgeries and outpatient visits for 6-8 weeks, allowed the GME department to explore opportunities and implement strategies in the learning environment to allow the smooth continuation of clinical training while maintaining the safety of patients, staff, faculty, and trainees. While social distancing became part of our workflow, we implemented several measures to maintain the nurturing and guiding effects of the learning environment to support the trainees and continue to comply with the institutional ACGME Clinical Learning Environment Review (CLER) principles:

GLOBAL INSTITUTIONAL MEASURES

1. **Strong focus on communication & teamwork with hospital leadership** – Early on, an adhoc Medical Pandemic Subcommittee of Incident Command was formed, which included representatives from all departments and divisions. Both of us, along with the Pediatric Chief residents, represented the GME department. The subcommittee initially met via conference calls daily and continues to meet on a weekly basis. This was key to brainstorm solutions on institutional matters with all stakeholders involved.
2. **Focus on well-being** – The Nicklaus Children’s Hospital Psychology Department recognized early on the physical, mental, and financial stress that this pandemic might have on employees, faculty, and trainees. A psychology hotline was established and was staffed 7 days a week. All trainees and employees were encouraged to call the hotline for support when needed.
3. **Being together while distancing** – In order to maintain some sense of normalcy and continue our mission of education and training, all educational conferences were continued after setting up the training programs with the needed technology for virtual education, rounding, and communication. From daily conferences, to Grand Rounds, to recurring CME meetings, we transformed medical education into a virtual world and continued to train and educate physicians in-house and in the community. The common fellowship curriculum was also continued as planned using virtual medium. One of the positive aspects of this transformation is that we experienced increased in attendance, engagement, and participation from all attendees.
4. **Technology in clinical care** – As clinical services, particularly in the outpatient setting, started adopting telemedicine, it was important to credential and train all of our residents and fellows, which allowed them to be active, supervised participants in the use of telemedicine. A structured curriculum is currently being developed. Telemedicine was also included as part of the virtual orientation for incoming trainees. Throughout all aspects of training, we made sure that supervision, mentoring, and support were not compromised in any way.

As we reflect back on the past few months, we have made significant strides to adapt to the “new normal” in terms of virtual patient care, teaching, graduation, orientation, and recently recruitment. Our GME department has lead, along with hospital leadership, the adaptation to these new challenges. We used the opportunities that these unprecedented challenges presented to continue to advance the excellence in GME training we strive for, while maintaining quality training, well-being, and safety of the trainees. This is illustrated by the specific measures taken by our large pediatric residency program to foster these principles

TRAINING PROGRAM-SPECIFIC MEASURES

1. **Protecting the health of our residents** – While patient care continued uninterrupted on the inpatient wards, intensive care units, emergency room and ambulatory clinic, it was essential to develop workflows and strategies to keep our residents healthy and safe. Workflows were modified in all of these clinical areas to cohort and limit exposure to COVID positive and PUI patients and to conserve PPE. PPE training sessions were held and a donning and doffing observation buddy system was put in place. The program also divided its residents into an active pool assigned to hospital-based rotations and a reserve pool assigned to remote learning rotations. This allowed for a healthy replacement workforce which would be available for cross-coverage if any of the active team residents were exposed or fell ill and required quarantine
2. **Developing self-directed learning elective curricula** – The transition of residents on outpatient elective rotations to remote learning experiences necessitated the development of 13 subspecialty specific self-directed learning curricula. The program worked quickly to design curricula, which consisted of a blend of assigned readings, board-review questions, online modules and virtual presentations. Residents in remote learning rotations continued to participate virtually in all daily conferences.
3. **Learning about COVID-19** – Keeping up with all the new information being published on COVID-19 infections proved to be challenging. Yet, everyone understood that there was much to be learned from those who had already seen surges in COVID-19 infections worldwide and had the difficult task of managing these patients with limited evidence to support their decisions. Our program thus launched a weekly resident-run COVID-19 journal club and also participated in the weekly COVID-19 educational sessions run by our hospitalist group. Additionally, our very resourceful Clinical Effectiveness Team, which the chief residents and I participate in, embarked on the daunting task of developing algorithms for patient testing, diagnostic evaluation and management of COVID-19 and MIS-C patients.

4. Mastering trainees' contact tracing – Little did we know that contact tracing would become a skill that we would soon need to master with much diligence. The chief residents and the program director worked closely with our medical staff leadership, infectious diseases division, and infection prevention and control department to develop COVID-19 exposure pathways based on the ever-fluid CDC guidelines. These pathways were implemented across the institution. We quickly learned to ask all the right questions: how close were you to the source, for how long, what PPE were you wearing... then make a decision. Quarantine? Test or not? Test when? Retest? Return to work? All good questions whose answers changed frequently as new information became available. Incidentally, we found ourselves becoming a resource for others and often fielded questions from our other fellowship program directors and fellows.
5. Anticipating a new recruitment world – As we all have become more adjusted and accepting of COVID-19 in the workplace, we gear up for a new recruitment cycle, which brings altered timelines, virtual interviews and a lot of anxiety for both applicants and programs. The logistics can be planned, and the technology can be tested. Although we all try to be innovative, we also worry how virtual interviews will capture the true essence of an applicant and the engrained culture of a program in order to reach that perfect fit we all try to achieve.

As our county's COVID positivity rates finally decrease and we enter phase 3 of the recovery plan, we reflect on everything that has happened over these past 6 months. We embrace everything we have learned, applaud the hard work, cherish the collaboration and remain cautiously ready to respond if a resurgence appears. Interprofessional teamwork, quick adaptation, and relying on data, evidence, and science are all valuable lessons learned that would be beneficial in preparing to address future potential unexpected emergencies such as future outbreaks or natural disasters such as hurricanes. It was clearly necessary in pandemic times that the hospital, outpatient office practices, and patient services significantly modify their processes, protocols, and the way care is provided. However; maintaining accredited training and education required additional attention to conferences, gatherings, call rooms, lunches, and other team-based educational activities that could potentially cascade into avoidable exposures across the training programs.

Although our daily "normal" has definitely changed and we miss our close gatherings and displays of affection, we continue to be saddened by the losses, hopeful for the sick, and proud to have been able to serve our patients and community.



GRADUATE MEDICAL EDUCATION

Adapting to the New Norm: Didactic Curriculum During Residency Training during the COVID-19 Pandemic

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BACKGROUND

The Accreditation Council for Graduate Medical Education (ACGME) common program requirements (CPR) mandate that training programs provide a broad range of educational activities to their trainees consistent with the program aims and goals.¹ These should include structured didactics that can comprise a broad range of activities such as lectures, conferences, simulations, case discussions, grand rounds, and critical appraisal of the medical literature aka journal club. Under usual circumstances, all programs provide a broad array of these activities in person, either during a dedicated day of the week (commonly referred to as educational half day), or daily during a hour set aside for resident education. The ongoing COVID-19 pandemic necessitated that healthcare facilities prioritize urgent patient care, cancel elective procedures/surgeries, and maintain social distancing to mitigate the spread of this highly contagious novel virus. Educational programs were challenged with the need to adhere to these guidelines to ensure the safety of their trainees while also meeting their educational needs.

APPROACH/METHODS

Our pediatric residency program adapted to this challenge by utilizing a multi-pronged approach, leveraging the framework presented by Abraham Maslow's "Theory of Human Motivation."² Maslow's framework is based on a hierarchy of essential needs that must be met before the eventual "self-actualization". In this case, the essential need for the trainee was a safe work environment.

To comply with social distancing policies and ensure safety, all elective rotations and longitudinal outpatient experiences (LOEs) were canceled. Instead, residents participated in telehealth visits that increasingly became the norm as the pandemic progressed. Some in-patient hospital services reverted partially to virtual encounters whereby the history

portion of the encounter was conducted via FaceTime so as to decrease the amount of time spent face-to-face in the actual patient room. In addition, this would allow the team to focus more on the physical examination of the patient. The work environment's safety was optimized by providing training on the proper use of personal protective equipment (PPE) in the form of video tutorials, and ensuring all residents had sufficient PPE. Residents watched a video on proper donning and doffing of PPE per CDC guidelines. Apart from the PPE provided by the hospital, our program went a step further and purchased protective eye wear and respirator masks for all out trainees very early on in the pandemic.

All Educational activities (noon conferences, weekly board review) were moved to a cloud-based platform (Zoom) providing both audio and video conferencing. Faculty also conducted weekly case-based discussions on a variety of topics to further enrich the curriculum. Hopkins modules and online readings were assigned to fill the gap created by the disruption of LOEs. A new virtual elective on Narrative Medicine was created, and the format of other existing electives such as Patient Safety, Ethics and Genetics were modified so that these, too, could be done virtually

We also dedicated a weekly conference to resident wellness. Situational updates and news from the ACGME and American Board of Pediatrics (ABP) on the evolving COVID-19 situation were provided during these weekly meetings. In addition, platooning our schedules (utilizing a two-team system) allowed personal time for family/self-care and wellness activities, thus helping to mitigate some of the stress naturally associated with the evolving grim situation.

OUTCOMES TO DATE

We conducted an anonymous survey to gauge the residents' satisfaction with these educational interventions approximately two months into the change. The survey was completed by 37/39 of the residents. A 5-point Likert scale was utilized with a "high score" defined as a rating of 4-5. The percentage of respondents who gave a "high" rating on each category is shown in the provided table.

RATING CATEGORY	Percentage of Respondents Giving High Rating
QUALITY	
Clarity of the education given on PPE	94.5
Promptness and ease of the transition to online educational didactics	81
Comparability of the online conferences to in-person meetings	81
SATISFACTION	
Program effort to minimize interruptions of educational activities	89
Responsiveness to feedback on the curriculum	89
Study time allowed to complete educational requirements	84
Wellness online sessions	81

Table: Resident Satisfaction Survey of Program Interventions (N = 37)

The average attendance rate during didactic sessions increased from 47% in the four weeks immediately prior to the pandemic to 66% at four weeks after these changes were implemented.

In addition, we were able to hold pediatric advanced life support-based simulation activities in our simulation center. Platooning our schedules (utilizing a two-team system), allowed such activities to be conducted with ease without any disruptions in patient care.

All graduating residents were all able to successfully complete their ACGME and ABP requirements for training and meet the registration requirements for the ABP examination. All other residents continuing in the program were able to advance to the next level. Though several residents had modifications made to their schedules to make up for activities interrupted by the complete cessation of patient care such as LOE's and certain out-patient experiences, most notably in surgical subspecialties such as otorhinolaryngology and orthopedics.

REFLECTIONS

As the pandemic continues to rage on with no signs of abating, while we have resumed all clinical care and educational activities, there have definitely been several modifications made along the way. Virtual visits in the clinical setting have become as much the norm as in-person encounters. In certain specific instances such as children with complex medical conditions, in particular those using equipment such as home ventilators, besides the obvious physical convenience, virtual visits actually offer a unique advantage in that the patient can be observed in their home environment.

Our didactic curriculum and training has continued to utilize the cloud based platform and limit in-person meeting attendance unless trainees are on site and can do so while maintain appropriate distancing. Our residents expressed satisfaction with the PPE education they received. In addition, several appreciated the efforts made by the program to purchase PPE independent of the hospital system. They commented that this made them feel safe and that they felt a general sense of wellbeing that the program administration cared about them. High rates of resident satisfaction were demonstrated for the quality and program efforts to maximize their productivity using these new platforms.

While it still may be too early to tell, it is conceivable that the COVID-19 pandemic may have changed the face of graduate medical education (GME) forever. Increased use of virtual learning platforms and self-directed learning strategies are likely going to be the way of the future, and exclusive in-person conference attendance may become a thing of the past. It is presently unclear what impact this may ultimately have on traditional methods of GME training, future performance on standardized board examinations, and most importantly, how this will all translate to patient care outcomes. We believe it highly likely that future learning strategies will be a combination of all of these methodologies.

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GRADUATE MEDICAL EDUCATION

Impact of the COVID-19 Pandemic on Graduate Medical Education at the Florida State University College of Medicine

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BACKGROUND

COVID-19 is an ongoing global pandemic caused by the human-to-human transmission of severe acute respiratory coronavirus 2 (SARS-CoV-2). This novel coronavirus, first identified as the causative agent for a contagious respiratory infection in December 2019, was declared a Public Health Emergency of International Concern by the World Health Organization in January 2020 and subsequently declared a global pandemic in March 2020. The COVID-19 pandemic has impacted the state of Florida significantly, creating new and previously unimagined stresses on the health care system. The pandemic has affected graduate medical education in many ways across the country. This article focuses on the challenges, innovations and opportunities that the COVID-19 pandemic has brought to bear on the Florida State University (FSU) College of Medicine's (COM) Graduate Medical Education (GME) Programs, with emphasis on two particular programs in internal medicine and family medicine. However, modifications occurred in all GME programs.

The Accreditation Council for Graduate Medical Education (ACGME) initially instituted categorization of three different stages depending upon the impact of the pandemic on normal institutional and GME operations during the early months of the pandemic. Effective July 1, 2020 this transitioned to either non-emergency or emergency categories. In the non-emergency category, all usual residency requirements remain in place. Designated Institutional Officials from each sponsoring institution can designate their institution in the emergency category if the pandemic is having a significant impact on operations. Even under the emergency situations, the institution must continue to adhere to the work-hour requirements, provide adequate training and supervision, and ensure that fellows are functioning in their primary specialty, even if some operations are impacted. The ACGME has advocated for appropriate personal protective equipment (PPE) for all residents and fellows. Sponsoring institutions and programs have been encouraged to attend to resident, faculty, and staff well-being during planning, throughout a surge, and in the aftermath of the potential trauma of a surge. The ACGME has published guidance online, “Well-Being in the Time of COVID-19.”

Although based in Tallahassee, the FSU COM operates in a distributive model with six regional campuses spread throughout the state and with GME programs operated in partnership with five major clinical partners (Figure 1). With the onset of the pandemic, different programs experienced changes in the local rates of infection at different times. GME programs have struggled with maintaining and preserving their existence while facing severe budgetary cuts, as well as balancing clinical demands while maintaining a healthy clinical working and learning environment. The key to success in this crisis has been the ability of residency programs to be flexible and pivot whenever necessary.

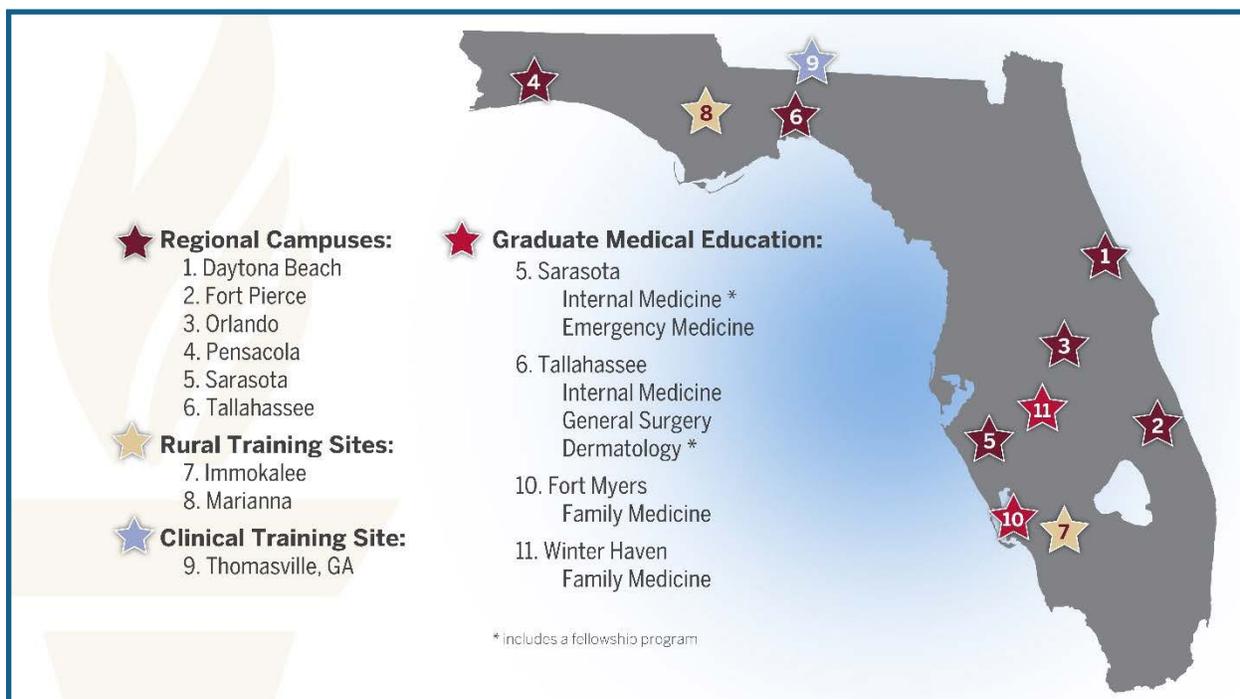


Figure 1: Florida State University College of Medicine UME and GME Programs

The Florida state-wide and local responses, including shutdowns, as well as holds placed upon non-emergent surgical procedures, impacted residency and fellowship training. In compliance with the Florida Governor’s directive, admissions for elective surgery and procedures were suspended. The support of hospital leadership to ensure the safety of trainees and faculty has been important. The medical-based specialties experienced a significant decrease in outpatient visits, with a resultant increase in both telehealth and phone visitations.

Use of personal protective equipment (PPE) became scarce at some locations, but trainees reported that they had adequate access to PPE to perform their duties. The pandemic impacted didactic training, with many of the larger programs shifting to Zoom conferences, while smaller programs were able to use face covering and social distancing to continue in-person didactic sessions. Resident schedule adjustments balance the needs of the hospital and the well-being of trainees. Outpatient experiences initially were cancelled due to the pandemic. There was some improvement noted in outpatient clinic volumes and return of surgical procedures by the end of June 2020, although this had not normalized to

pre-pandemic volumes. Resident graduation celebrations for those who had completed their training in June were held virtually, except for small programs with limited number of trainees. New-resident orientations were conducted virtually for many programs, which did not create the same degree of comradery and bonding among the residents or between faculty and residents.

INPATIENT SERVICES

The FSU COM Internal Medicine (IM) program located at Sarasota Memorial Health Care System (SMH) shifted the majority of the resident rotations to inpatient infectious disease and pulmonary critical care where their support was most needed, while maintaining a shadow team out of the hospital setting doing research and intensive study rotations to provide a back-up in case of quarantines. In order to decrease exposures, to date most of the COVID-19 patients have not been admitted directly by the residents to the hospital. If residents did provide care to COVID-19 patients, both the program leadership and the hospital worked to provide PPE to all residents and faculty, including N-95's, face shields, or powered air purifying respirators (*Image 1*). The SMH program has direct access to the hospital epidemiologist who addressed case-by-case exposures with us and arranged for rapid testing and/or quarantine. To date, none of the IM residents have contracted SARS-CoV-2.



Image 1: Each resident is provided with personal protective equipment

By contrast, at the FSU COM Family Medicine (FM) program located at Lee Health (LH) in Fort Myers, residents did manage patient known or suspected of having COVID-19. Certain floors and units were designated for these patients. The resident team manages the FM clinic patients when they are admitted to Lee Memorial Hospital, along with their core faculty. Except for the lack of a medical student, this team composition has not changed during the pandemic.

The inpatient medicine teams at LH FM were required to wear full PPE, which they would pick up each morning from the central supply office, while rounding in the hospital. It took considerably more time to complete inpatient rounds each day, especially because of the extra time needed to don and doff PPE. Rounds were structured in such a way that the patients in the COVID-19 units were seen last, which made rounding less methodical. Since the management of moderate-to-severe COVID-19 has largely been done in the inpatient setting, the FM residents had the rare opportunity to participate in the care of these patients. They were able to see how the medical community grappled with the use of therapeutic approaches that had not been proven effective yet through high-quality research.

The most noticeable impact of the pandemic on the inpatient medicine service for FM was a drastic reduction in patient volumes. Even though the FM patients are typically medical, rather than surgical, the daily census decreased from an average of 14 to 16 patients to as low as five patients. This was noticed across the health system, as patients' fear of contracting COVID-19 in hospitals kept them from seeking inpatient medical care.

OUTPATIENT SERVICES

The primary source of experiential clinical education for FM residents is the ambulatory clinic, otherwise known as the Family Medicine Center (FMC). On March 10, 2020, along with other clinics in the Lee Health network, several changes were made to the clinic schedule and operations. These changes were driven by concerns about the continued availability of PPE for all clinicians and were put into place before we had widespread local community spread of COVID-19. Specifically, all 'routine' follow-up visits for specialty and primary-care clinics were cancelled, and only patients with urgent symptoms would be seen. Well-child visits for children aged less than five, and prenatal visits continued as usual. The number of providers and staff in clinics were impacted as follows:

1. The Babcock Ranch satellite clinic was closed.
2. All faculty clinics were cancelled
3. Only two residents would be scheduled to be in clinic on any half day, with one faculty member supervising them.
4. The morning clinics were for 'clean' cases, such as well-child and prenatal visits.
5. The afternoon clinics were for patients with fever or any respiratory symptoms.

These changes greatly reduced the number of in-person patient visits available to our residents, particularly final-year residents who were due to graduate at the end of June. These reductions were mitigated to some extent by the introduction of virtual visits using synchronous video technology.

USE OF TELEMEDICINE

In early March 2020, the Department of Health and Human Services (DHHS) encouraged health-care providers to utilize telehealth services to provide care to patients during the COVID-19 Public Health Emergency. The DHHS Office of Civil Rights (OCR), in particular, ruled that HIPAA-covered health-care providers, may, in good faith, provide telehealth services to patients using remote-communication technologies, such as commonly used apps, including FaceTime, Facebook Messenger, Google Hangouts, Zoom or Skype, even if the application did not fully comply with HIPAA rules.

On March 18, 2020, the ACGME permitted residents/fellows to participate in the use of telemedicine to care for patients affected by the pandemic. Both of these directives allowed the FM program to rapidly increase the number of virtual visits we offered to patients (*Tables 1 and 2*). The residents and faculty offered to use their own personal devices until the health system could purchase cameras and microphones for the computers in our clinic.

MONTH	IN-PERSON VISITS	Virtual visits	Total
January	1546	0	1546
February	1538	0	1538
March	1073	0	1073
April	326	582	908
May	619	874	1493
June	1121	599	1720

Table 1: Visits at the Lee Memorial Hospital Family Medicine Center

MONTH	IN-PERSON VISITS	Virtual visits	Total
January	218	0	218
February	211	0	211
March	170	0	170
April	0	0	0
May	164	6	164
June	215	4	219

Table 2: Visits at the Babcock Ranch Clinic

This expanded use of telehealth services allowed residents in their final post-graduate year to complete their training on time, having met all the ACGME requirements for a minimum of 1,650 visits in their continuity clinic during their three years of training. It also allowed them to learn how to use different video-conferencing platforms, experimenting with apps such as Doximity video and Doxy.me while awaiting the rollout of the health system's own software. The residents developed a better understanding of and ability to take advantage of this novel way of providing health care which they will doubtless use in their future careers.

While allowing for the accumulation of total clinic visits, the increased use of virtual visits affected the residents' education in several ways:

1. The number of clinic procedures decreased dramatically during the first few months of the pandemic, particularly when only virtual visits were offered. Procedures are an important part of the residents' clinical education that could not be performed virtually.
2. Interdisciplinary clinical care was impacted negatively. In our integrated clinical care model, residents learn from interaction with faculty physicians, non-physician faculty, such as, the pharmacist, nutritionist and psychologists, as well as with their fellow residents and clinical staff. Virtual visits, while allowing for some interaction with the faculty physician, made it difficult to re-create these other sources of a resident's clinical education and doubtless affected their overall experience.
3. Medical students usually rotate in the FMC and work with the residents. This allows the resident to take on a teaching role and contributes to enhancing their professional maturity and clinical decision making. Medical and other students were removed from clinical rotations and did not return until later in the year.

The SMH IM resident continuity clinic experienced lower volumes, however, the program continued in-person care to meet the needs of a vulnerable underserved population who did not have adequate access to the technology required for telehealth visits.

CURRICULUM CHANGES

Because large in-person meetings were no longer advisable, both programs quickly changed weekly residency-wide didactic sessions to a virtual platform. This allowed continuation of this important aspect of resident education without missing even one weekly session. In the FM program, didactics delivered to the much smaller teams on the inpatient medicine service continued to be offered in person. While virtual didactics have been very well received, residents and faculty have lamented the loss of the social interaction that occurs weekly during these afternoon sessions. Some sessions that require hands-on interaction, such as musculoskeletal workshops, have been more difficult to deliver remotely.

The SMH IM program noted that residents both in the hospital and at home were able to access both noon report and academic half-day conferences, as could faculty both in and out of the hospital. To date, the program has maintained a hybrid model allowing some more at-risk faculty to stay safe and aids in compliance with ongoing social distancing requirements (*Image 2*). The program increased computer access in various sites for the residents to decrease the number of providers working in the resident work room.



Image 2. To comply with social distancing guidelines, a hybrid model for didactics allows both in person and virtual participation.

The geriatrics longitudinal curriculum at the SMH IM program had to be completely rethought as skilled-nursing facility access was not available at the height of the pandemic. Rapid COVID-19 testing was very limited, and the level of testing necessary to ensure safety to the nursing-home patients could not be assured. For some weeks, all ambulatory geriatric experiences were deferred. Geriatric faculty provided continuity of care with that population and provided didactics via a virtual teaching platform to our residents. Currently the residents rotate in skilled-nursing and long-term care facilities for one week every month, with monthly negative COVID-19 tests required prior to onboarding.

Despite the increased responsibility and workload in certain COVID-19 teams, the holistic, educational aspect of residency and fellowship training is often deprioritized in favor of service provision. At the LH FM program, the experience was different in that the residents were not required to provide service with little or no educational benefit on any of the services with which they worked. Being a relatively new program, the hospital is staffed adequately to provide services even if the residents are not available. Due to the potential shortage of PPE, residents were pulled from various rotations, including the intensive care unit, adult and pediatric emergency departments, and inpatient pediatrics. There also were several rotations that could not continue because the clinics or services were suspended or closed, including orthopedic surgery, dermatology, and ophthalmology.

The most common type of change to various rotational experiences was the cancellation of a clinical experience due to closure of a specialty clinic or need to limit the number of people in a clinical area, such as the pediatric emergency room or inpatient pediatric service. Pediatric rotations in the FM program returned to normal as of July 2020. As of the current time, most of the experiences either have returned to normal or have been reinstated with some changes.

While all these changes negatively impacted the residents' clinical experience and training, they were necessary in the interest of their safety. The program responded with curricular innovation, such as experimenting with online modules for dermatology and orthopedic surgery.

PANDEMIC RESPONSE ELECTIVE

At LH FM, some of the residents who were not able to attend their regular rotations were placed in a new pandemic-response elective between April and June 2020. Rotation objectives were that the resident will:

1. Provide patient care that is compassionate, appropriate, and effective for the treatment of health problems, particularly with updated protocols for treatment of COVID-19;
2. Evaluate emerging studies regarding SARS-CoV-19 and COVID-19, and critically evaluate their validity and reliability to our patient population;
3. Relay protocols and answer clinical questions from patients, staff, and physicians at an appropriate level;
4. Advocate for patients with access-to-care issues; and,
5. Describe the Lee Health system approach to public health crises with focus on communication, organization, and leadership.

This elective was a unique opportunity for the FM resident to experience a health system's response to a public health crisis. Residents reviewed emerging studies, protocols, and CDC guidance related to SARS-CoV-2 testing, prevention, treatment, and epidemiology. They shared this information with colleagues during huddles and didactics. Residents worked in the Lee Health Incident Command Center, the hub of the health system's response to the pandemic, to assist system leadership in answering clinical questions from physicians and staff calling in to the command center, learning firsthand how communication and response is structured in a public health crisis. They managed PPE supplies, availability of tests and prioritization of who should be tested first, as well as troubleshooting of issues arising on a minute-to-minute basis throughout the health system. They participated in weekly medical staff conference calls regarding COVID19 updates.

As needed, resident physicians staffed the COVID-19 test collection sites and ED triage tents. This involved review of patients identified to be a risk for COVID-19 through videoconferencing to determine whether they needed to be evaluated in the emergency department or were stable enough to be referred for outpatient testing. This did not involve any direct exposure to potentially infectious patients as the triage was conducted by way of videoconference, with the patients outside in a tented area and the residents inside the emergency department itself.

CLINICAL TREATMENT AND RESEARCH

Throughout the pandemic, the SMH IM program sought ways to provide meaningful experiences to the residents, beyond patient care, that also add value to the health-care system. Residents were incorporated into SMH COVID-19 Treatment and Research Task Forces. The treatment group was led by Dr. Karen Hamad, Associate Program Director. This multidisciplinary group, inclusive of residents, faculty, nursing, hospital leadership and pharmacy, meets weekly to identify best practices, create and update the SMH COVID-19 treatment protocols and order sets, and suggest additional system improvements. Residents are charged with reviewing the medical literature under the direction of the journal club director and the chief resident. Changes to COVID-19 treatment protocols are made in real time. Recommendations from this taskforce are disseminated to all the physicians treating COVID-19 patients, as well as to the larger SMH staff via daily updates. This group also provides input and recommendations to the Research Task Force to help drive clinical trial initiatives at the health-care system level. By incorporating the residents in this type of hospital initiative, their exposure to hospital leadership, policy making, crisis intervention and management, is broadened and their visibility as vital and integral members of the health-care system is raised.

The COVID-19 Research Task Force is led by Dr. Robert Smith, Director of Research, Dr. Wiese-Rometsch, Program Director, Dr. Manuel Gordillo, Infectious Diseases, and Dr. Kirk Voelker, Director SMH Clinical Research Center. In collaboration with the COVID-19 Treatment Task Force, this group identifies opportunities to conduct treatment protocols. Early on, residents were involved in the review of patient health records for submission to Department of Health officials for SARS-CoV-2 testing. The initiative to contact and enroll COVID-19 survivors was spearheaded and led by residents, leading to increased convalescent plasma donation in the community. SMH has been on the front lines of clinical research, including the early Remdesivir, convalescent plasma, and three arms of the Regeneron trials. Residents working with faculty on all these scholarly projects has resulted in regional and national presentations and publications (*Table 3*). More than once, our residents were asked to present to the hospital leadership with updates pertaining to the research initiatives.

MEETING / PUBLICATION	TITLE	Authors
Arrieta J, Galwankar S, Lattanzio N, et al. Common clinical characteristics and complications determining the outcome in a COVID-positive predominantly geriatric population. J Emerg Trauma Shock. 2020; Vol 13: 2; 131-134.		
Accepted for Poster Presentation 2020 AMA Research EXPO	Effectiveness in COVID-19 Patients of Plasma Infusions Derived from Survivors: All-Hands Marshaled	Natalia Lattanzio MD, Caitlin Bass MD, Cristina Acosta Diaz MD, et al.
Accepted for Poster Presentation 2020 ACP Florida Chapter Meeting	Direct Vs. Indirect Admission of COVID-19 Patients to Intensive Care from Emergency Department	Justin George, MD; Talal Alkayali MD, Katherine Burns MD, Stephanie Williams MD, et al.
Accepted for Poster Presentation 2020 ACP Florida Chapter Meeting	In-Hospital Glycemic Dysregulation Associated with Worse Outcomes in COVID-19"	Lisette Rodriguez, MD; Robert A. Smith, PhD
Accepted for Poster Presentation 2020 ACP Florida Chapter Meeting	Effectiveness of COVID-19 Convalescent Plasma Infusion Within 48-Hours of Hospitalization with	Natalia Lattanzio, MD; Cristina Acosta-Diaz, MD., Caitlin Bass, MD., et al.

Table 3: Resident scholarship related to COVID-19 at SMH

VIRTUAL RECRUITMENT

Perhaps one of our greatest challenges throughout this crisis has been facing the need to interview and recruit the next class of residents virtually. Recognizing the need for a stronger online presence, program websites were updated, and the residents have started a program-specific Instagram account, which they update and maintain. New online programming promotes the program, highlighting its strengths. Promotional videos, including tours, pre-recorded overviews, and glimpses into the life of a resident are now available online for potential candidates. Interview sessions are conducted virtually, requiring training of interviewees, faculty, and all involved in the process. Back-up platforms are secured in the event of technological failure on any given interview day. Residents are involved in each interview day to be able to ensure their input on the incoming resident class.

RESIDENT WELLNESS

The COVID-19 pandemic has caused anxiety and stress to all members of the global society, and our residents and faculty are no exception.⁶ The usual activities by which the programs promote wellness could not be held in person. For the LH FM program, these included office potlucks, quarterly resident team-building days and staff luncheons. The annual residency retreat will not be held in the normal way this coming spring. The residents have come up with innovative solutions, including playing virtual games and building crafts while on a Zoom session.

To address the ongoing increased stresses of the pandemic on health-care providers and more specifically, the residents, the SMH IM program incorporated new topics into the wellness curriculum. Sessions included facing the impact of COVID-19 on the residents as physicians and human beings, dealing with end-of-life issues in patient care via telehealth, and open forums to discuss fears and debriefing opportunities (*Image 3*).



Image 3: Wellness Activity: Internal Medicine residents created this puzzle with the guidance of Wellness Director, Jill Scarpellini-Huber, Ph.D. This activity emphasizes that each resident has an important role in our program.

The SMH IM program leadership has worked extensively to preserve its sense of humor and maintain a high bar for quality patient care, patient and resident safety, and leadership in fields both clinical and research based. Current residents have all expressed gratitude to be part of a residency program that took such intentional care with their personal and professional well-being during this incredibly trying time. Both programs are apprehensive but hopeful that the interview season will go well and yield a new class of wonderful, resilient residents to join the programs in July 2021.

SUMMARY

In summary, the COVID-19 pandemic has affected residents' educational experiences in multiple ways. While some of these could be characterized as initially negative, they have enabled the programs to develop innovative solutions, many

of which will doubtless outlast the pandemic. As additional surges approach Florida, the programs have made operational changes that will allow them to be more flexible in adapting to additional changes while continuing their academic focus and clinical training. The support of the administration at the FSU COM, as well as the leadership of the clinical institutions have enabled the FSU COM GME programs not only to survive, but to continue to thrive. As the fall season turns to winter here in Florida, the expected return of snowbirds and the confluence of influenza and SARS-CoV-2 pose continued threats to both capacity and community. The GME leadership and faculty remain vigilant as physicians, leaders, and educators, and will be ready to pivot as new challenges arise.

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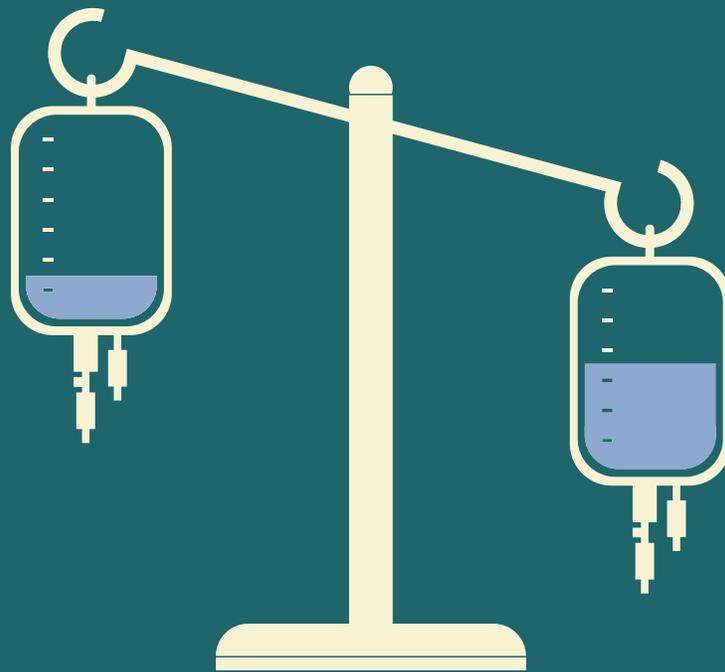


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