



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.

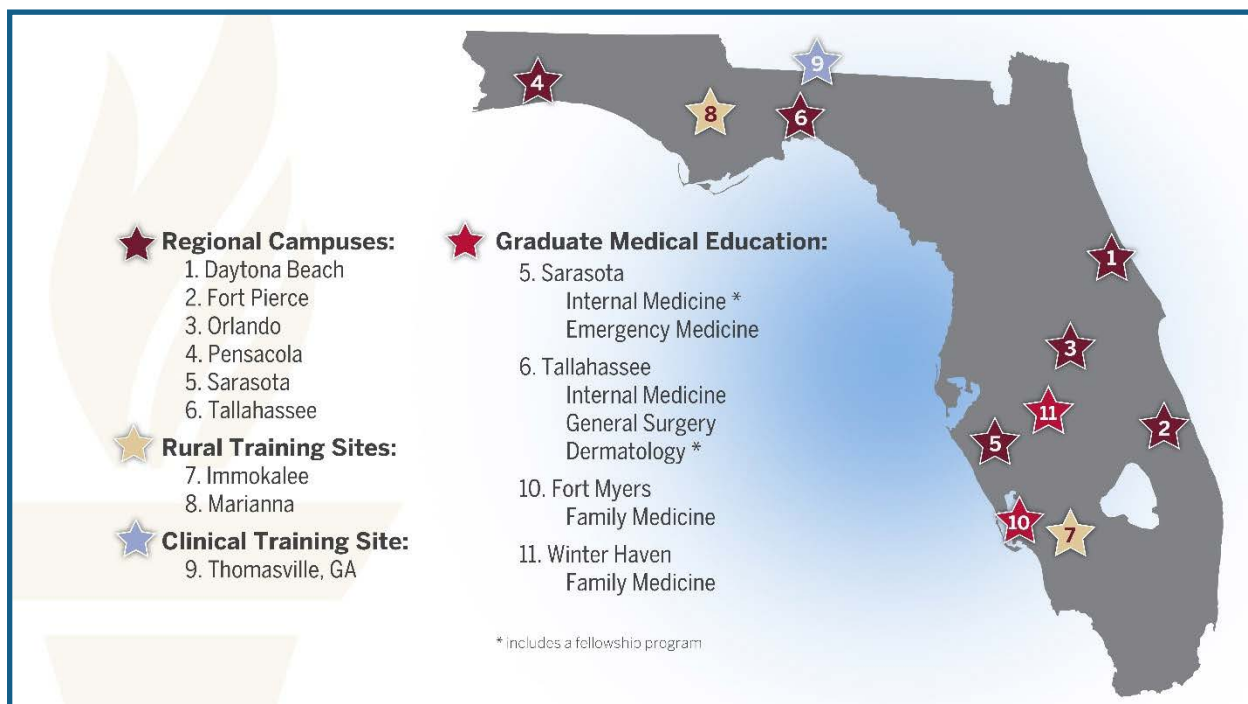


Figure 1: Florida State University College of Medicine UME and GME Programs

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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