

Bracing for Impact:

One Family Medicine Residency Program's Response to an Impending COVID-19 Surge

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Abstract:

The University of Colorado Family Medicine Residency watched as the first cases of COVID-19 were being reported in the United States along with the rest of the nation in March 2020. Concern grew as epidemiological models began to predict alarming hospital bed shortages for the state. Massive scheduling adjustments were needed as faculty and residents found themselves in groups at high risk for severe COVID-19 and residents found themselves dismissed from non-essential learning experiences in an effort to conserve PPE and limit exposures. A dedicated Surge Team was formed to tackle these issues while continuing to support our goals of maximizing patient safety, resident education, and physician wellness. The Surge Team created a plan that was implemented in 2 main phases. Phase 1 assumed business as usual with increased layers of backup for both residents and faculty. Phase 2 redistributed unassigned residents and inpatient faculty to increase capacity for adult medicine and COVID-19 patients on our essential services. Lessons learned from these surge efforts may help inform similar decisions being made by other residency programs presently and in the future.

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Corona virus disease 2019 (COVID-19) has become a pandemic that is challenging healthcare systems around the world. In Colorado, the first COVID-19 case was reported in March 2020¹ and epidemiological models predicted alarming hospital bed shortages for our state². As Governor Polis called for the reinstatement of inactive health care workers, preparations for a possible surge were already underway at the University of Colorado Hospital (UCH).³ In mid-March our Family Medicine Inpatient Service (FMIS) began admitting patients suspected of having COVID-19 and was it clear that we needed to coordinate efforts with the hospital and other residency programs to mobilize providers and teams to prepare for an impending surge of hospitalized patients with COVID-19.

The University of Colorado Family Medicine Residency (UCFMR) is a 13-13-13 resident program and is part of a larger Graduate Medical Education system made up of several programs serving 1100 resident and fellows. Like many Family Medicine residency programs, our physicians work in both inpatient (17 inpatient trained faculty) and outpatient settings. We have two essential inpatient services at two hospitals UCH and Denver Health Hospital. In this article, we will focus on changes made in the UCH system to address the demands of the developing pandemic and fulfill our teaching mission. At UCH, our FMIS runs year-round, 24-hours a day and is composed of two teams; FM A, which is adult medicine only, and FM B which is a Maternity Care service with adult medicine overflow. These teams cover an average total of 12-16 patients and are generally comprised of two day faculty attendings, three day residents (two upper-level residents and one intern), one resident on a swing shift, one resident and one faculty attending on night coverage.

As pandemic concerns mounted, we were faced with multiple simultaneous dilemmas. It became apparent that some of our own resident and attending physicians belonged to the at-risk population for complications from COVID-19 (e.g. on immunosuppressive therapy, pregnant, etc.). We reassigned approximately 6% of residents and 18% of faculty from direct patient care to virtual care care due to these concerns.. Meanwhile, because of growing efforts at rotation sites to minimize

provider exposure, preserve personal protective equipment (PPE), and allow for social distancing, many of our residents found themselves unassigned. At this time we also saw a potential need for increased staffing at our hospitals as projections of bed and inferred provider shortages were being released. We assembled a “Surge Team” composed of our inpatient director, program director, interested inpatient faculty, and chief residents to tackle these issues while maximizing patient safety, resident education, and physician wellness. We approached our COVID-19 response in 2 phases. These phases will be described in detail below and a complete timeline for the events, responses, and interventions described herein is outlined in Table 1.

Phase 1: Preserve our providers, create backup systems, and communicate across specialties

Faculty:

Faculty without risk volunteered to take shifts from those who would benefit from working from home. Utilizing our 14 remaining inpatient faculty, a schedule was created whereby all but 1 provider were able to have ≥ 2 weeks (a built in quarantine period to allow for exposure/illness) away from inpatient care and there were at least 2 back up faculty on backup call for each day through the end of May. In order to minimize transitions of care, we scheduled providers for a minimum of 5 continuous days on service. Three exceptions were made (effecting a total of 9 days of our initial 2 month surge schedule) in which 3 day stints were allowed due to availability and to avoid overburdening certain providers. Additionally, in preparation for the next phase, our department began surveying outpatient providers regarding their skillset (most recent inpatient, ICU, and OB experiences) and availability. An emergency volunteer pool of approximately 30 providers was created and tiered based on recency of experience.

Residents:

The pre-pandemic backup system was expanded from one to three residents per day due to anticipated need for emergency coverage for illness/exposure or increased patient volumes. In addition,

for continuity's sake, backup residents were assigned to 5-7 day blocks rather than our previous schedule which scattered backup call throughout the month.

Family Medicine Inpatient Service:

We ensured any person under investigation (PUI) for COVID-19 was assigned to FM A to minimize exposure to moms/babies on our FM B service and placed elderly/immunocompromised adult patients preferentially on our FM B service as well. We contacted our obstetrician and pediatrician colleagues, who we have had the fortune to work alongside on labor and delivery for well over a decade, and they readily agreed to assume the care of our laborers, postpartum, and newborn patients in the event of overwhelming adult medicine patients due to COVID-19.

Interdisciplinary Communication and Coordination:

In mid-March our Associate Dean of Education began to convene a two times a week meeting of the program directors of the seven largest programs including Family Medicine to communicate about clinical and educational needs across programs and hospitals. Our Family Medicine Program Director (PD) became one of two PDs appointed to implement a Resident Reassignment System (RRS). The availability, ICU experience, and hospital access/badging status of each of 1100 residents and fellows were obtained by requesting that PDs from each program complete a spreadsheet with this information.

Phase 2: Increase capacity and create opportunities for displaced learners

Faculty:

We identified a backup inpatient faculty member, utilizing our existing backup call schedule, who could staff a new 3rd team (FM C) in the event of a surge of COVID-19 cases in the hospital. We also created a rotating weekly schedule for the first tier of outpatient provider volunteers who could be called to cover the outpatient duties of any inpatient trained faculty member called into the hospital. A second tier of outpatient providers was identified to cover the outpatient duties of the first tier of

outpatient providers should they themselves be called into hospital duties.

Residents:

We redeployed all displaced residents to one of our two essential services or to the essential services of other departments in need (see below). The residents assigned to our essential services were divided into a total of four teams, two to cover each hospital. Each team was allocated three day residents, one swing resident, two night residents, and two backup residents. The backup residents not only served as a built-in backup call pool for each team but also provided support from home to the teams including leading virtual teaching sessions, calling consults, and preparing discharge summaries. While we considered a 7-days-on/14-days-off model, we did not have the staffing to support this, and therefore adopted a 7-days-on/7-days-off model. This schedule still allowed for consistent time off and at least one week of recovery in the event of illness, relying on our backup call system for further needs.

We faced the dilemma of how to continue education for our residents in this new landscape. COVID-19 presented some learning opportunities in and of itself; residents both attended and helped to organize virtual lectures on COVID-19, underwent focused PPE training, some received supervised hands COVID-19 care experience, other volunteered to perform contact tracing, and finally all the residents had to learn how to practice family medicine virtually. In addition to virtual clinic sessions and didactics, residents were challenged to engage in more intense self-directed learning during non-hospital weeks. The residency leadership prepared a weekly bulletin with other virtual learning sessions, continuing medical education, maintenance of certification, and research opportunities. Residents were required to log their activities during these off-service weeks.

Family Medicine Inpatient Service:

As COVID-19 admissions began to climb, our OB and Pediatrics teams assumed the care of our Maternity Care service in accordance with the aforementioned contingency plan. With the added

resident power, we doubled the capacity of our inpatient service (12 to 24 patients) with an emergency schedule in place that would allow for even further capacity increases if needed. The FM A team transitioned into a COVID-19 only team and was staffed by one resident and one faculty attending to minimize provider exposure and help with the surge of COVID-19 patients requiring hospitalization.

Interdisciplinary Communication and Coordination:

As both service and resident needs were rapidly evolving, GME leaders increased their program director meetings to three times per week. The RRS utilized the aforementioned resident database to assign qualified and available residents to services in need. Through this system, four of our Family Medicine residents ($\approx 10\%$) were reassigned to the COVID-19 ICU and Pulmonary Step-down teams.

Lessons Learned:

Streamlined and centralized communication is paramount during rapid change. Due to sweeping schedule and team structure changes, communication regarding questions and troubleshooting was happening at all hours of the day via phone, email, and impromptu virtual meetings. While this communication was necessary, it was inefficient. To streamline this, our Surge Team scheduled a recurring weekly virtual meeting to address questions/concerns, create fixes to problems identified by those on service, and to allow for the current inpatient team leaders to provide essential practice/system updates to the oncoming team leaders. Additionally weekly update emails and a standing virtual session during didactics were implemented to reach all residency providers. While initially, the faculty member on service at the start of the pandemic was communicating needs and updates to our OB, pediatric, and hospitalists colleagues by default, we quickly appointed (and maintained in the case of our inpatient director) individual faculty liaisons to communicate with each specialty service both as needed and at recurring meetings. This allowed us to adjust our service changes with the fluctuating needs of the hospital.

Prepare to be initially overstaffed. As no projection has proved perfect, we rolled out our surge

resident schedule several days prior to patient volumes supporting it. To address excess staffing, the residents initially began alternating shifts in an attempt to make time off equitable. However this resulted in unnecessary disruptions to continuity and unnecessary provider exposure. We quickly learned that excess residents should be assigned to a backup role for blocks of shifts if volumes were low, despite the risk of unequal hospital shifts.

Complete separation of teams caring for patients with and without COVID-19, while ideal, was ultimately not sustainable for our service. Due to the rise and fall of cases of patients with COVID-19, we had to have a hybrid service (FM A taking both COVID-19 and non-COVID-19 patients) both at the onset of our COVID-19 surge and as those cases began to fall while non-COVID-19 admissions began to rise again. We have depended on appropriate use of PPE, hand hygiene, and prioritizing seeing any immunocompromised patients prior to seeing any COVID-19 patients, when possible, to minimize the risk of cross contamination. To date, we are not aware of any case of hospital acquired COVID-19 on our service.

It has become clear that for the medical field at large, and for medical education specifically, COVID-19 is not a hurdle to cross, but rather a new steady state to which we must adapt. We have presented to you our specific experiences in adjusting to this new reality. We hope the lessons we are learning from this endeavor can help guide other residency programs as they are adapting to the COVID-19 landscape.

Table 1		
Date	Event	Description
March 5, 2020	First case of COVID-19 in Colorado	
March 12, 2020	Need for new backup call system identified for both residents and faculty	We needed backup providers for: <ul style="list-style-type: none"> • Faculty and residents who needed to minimize risk of COVID-19 exposure • Faculty and residents who may contract the illness either from the community or work exposure
March 13, 2020	First UCH inpatient diagnosed with COVID-19	
	<ul style="list-style-type: none"> • Developed a contingency plan for our Maternity Care service • Developed a contingency plan to take more adult inpatients 	<ul style="list-style-type: none"> • Ensured PUIs would not be on our Maternity Care service • Contacted both the OB/GYN and Newborn Nursery Directors regarding the care of our moms/babies in the event of a surge of adult patients • Contacted the Clinical Director of Hospital Medicine regarding our ability to admit more adult inpatients if needed
	Enhanced Resident Backup call schedule finalized	
March 17, 2020	Faculty Backup Call Schedule Finalized	12 of our inpatient providers that had no contraindication to COVID-19 patient care/exposure divided up shifts and days so that all but 1 provider had >2 weeks off between stints and there were 2 back up providers on any given day in the event of a provider getting ill
March 19-22, 2020	Department of Family Medicine Sends surveys all providers regarding clinical experience and skills	A survey regarding clinical skills (most recent inpatient, ICU, obstetric experience) and availability to work in the hospital in the event of a surge to inform planning for emergency reassignment of providers
March 26, 2020	Formal Surge Planning Team Created within the Family Medicine Residency Program	A team of faculty & residents create a schedule to increase the capacity of our inpatient service utilizing residents that are likely to be displaced from other rotations
March 30, 2020	Phase 2 Resident Reassignment Schedule Finalized	A schedule reassigning displaced residents into the UCH FM hospital schedule to increase capacity and create learning experiences was created
April 6, 2020	<ul style="list-style-type: none"> • Resident Reassignment Schedule Implemented • OB & Peds assume care of FM Maternity Care service • FM capacity increased from 12-24 patients 	
April 10, 2020	FM A becomes a dedicated COVID-19 team	

¹Updated information on COVID-19. Colorado Governor Jared Polis. 5 March 2020. Accessed at <https://www.colorado.gov/governor/news/updated-information-covid-19> on 3 May 2020.

²Institute for Health Metrics and Evaluation. COVID-19 Projections. 2020; Accessed at <https://covid19.healthdata.org/united-states-of-america/colorado> on 1 May 2020.

³Daley J. Like Emergency Medicine Special Forces, Colorado Doctors and Nurses Get Ready To Combat Coronavirus. CPR News. 15 March 2020. Accessed at <https://www.cpr.org/2020/03/15/like-emergency-medicine-special-forces-colorado-doctors-and-nurses-get-ready-to-combat-coronavirus/> on 1 May 2020.