

The Impact of the COVID-19 Pandemic on Pediatric Graduate Medical Education: Lessons Learned and Pathways Forward

Rebecca Blankenburg, MD, MPH, Javier Gonzalez del Rey, MD, MEd, Megan Aylor, MD, John G. Frohna, MD, MPH, Heather McPhillips, MD, MPH, Ross E. Myers, MD, Linda A. Waggoner-Fountain, MD, MEd, Laura Degnon, CAE, and Patricia Poitevien, MD, MSc

Abstract

In this article, the authors describe the impact of the COVID-19 pandemic on pediatric graduate medical education (GME), including the impact on clinical experiences for trainees, teaching methods used, trainee wellness, GME leader wellness and support, and the traditional interview process. A thorough literature review was done to identify impacts of the COVID-19 pandemic on pediatric GME. In addition, information was collected through Association of Pediatric Program Directors

virtual cafes and conferences. Positive changes for GME from the COVID-19 pandemic included: the rapid transition to telehealth; asynchronous learning allowing for increased cross-program collaboration; innovative online teaching modalities; increased flexibility and decreased cost of online recruitment; and shared innovations across pediatric GME. Challenging aspects of the COVID-19 pandemic included: decreased learning about common childhood illnesses, such as bronchiolitis, acute otitis media, and

influenza; decreased patient volumes and patient complexity in clinics and inpatient wards, leading to less practice developing efficiency, time management, and triaging skills; and an increased burden on trainees, including moral distress and decreased support from one another and other social supports. The COVID-19 pandemic has highlighted important opportunities in U.S. educational systems. As medical educators move forward, it will be important to learn from these while mitigating the negative impacts.

The COVID-19 pandemic has had profound effects on medical education—across undergraduate medical education and graduate medical education (GME) and across specialties. As an organization, the Association of Pediatric Program Directors (APPD), which helps support the educational leadership of the 200 pediatric residency programs and 900 pediatric fellowship programs across the United States, actively adapted to best support pediatric GME during the COVID-19 pandemic. In this paper, we describe the immeasurable impacts of the COVID-19 pandemic on pediatric GME, including the impact on clinical experiences for our trainees, changes in teaching methods used, impacts on trainee wellness and on GME leader wellness and support, and changes to program recruitment and the traditional interview process. We also highlight lessons learned from the COVID-19

pandemic, future areas of study, and pathways forward.

COVID-19 Pandemic's Impacts on Trainees' Clinical Experiences

The COVID-19 pandemic impacted residents' and fellows' clinical experiences by changing the variety and number of patients seen, altering resident team structure and schedules, and emphasizing telemedicine.

Reduced clinical exposures

One of the most important elements of residency training is the clinical exposure, which cements information and theory learned during medical school years. Medical decision making is based on several learning principles, which include, but are not limited to: pattern recognition, probabilities, differential diagnosis creation, and treatment thresholds. As the U.S. population incorporated protective behaviors during the pandemic, such as mask wearing, handwashing, and staying home, and there was limited exposure in schools and other commonly used public areas, there was a significant downward shift in the transmission of common seasonal illnesses. Decreased pediatric emergency department visits and patient admissions resulted in limited clinical exposure for pediatric trainees

during this time.¹ This affected not only the important educational exposure to pathology but also trainees' opportunities to develop other competencies in the areas of organization, efficiency, and prioritization.

Moving forward, we need to carefully assess the experience and skills of trainees to ensure they are ready to provide independent care. This highlights the importance of competency-based education to assess trainees' skills and target opportunities appropriately. Educators should develop tailored educational plans to provide the opportunity to further develop targeted knowledge, skills, and attitudes before graduation.

Altered trainee team structures

During the early stages of the pandemic, medical students were removed from all clinical experiences. Many GME programs altered their team structure to have residents cover inpatient services in "platoons," small groups of trainees assigned to units with fewer scheduled transitions of care and intended to provide focused care to hospitalized patients. This was done in an attempt to minimize exposures if a trainee developed COVID-19, so that it would not spread quickly through the training program. In addition, a majority of

Please see the end of this article for information about the authors.

Correspondence should be addressed to Rebecca Blankenburg, 725 Welch Rd., Mail Code 5906, Palo Alto, CA 94304; telephone: (650) 497-8979; email: rblanke@stanford.edu.

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programs had a substantial reduction of ambulatory experiences for general and subspecialty pediatrics. A small subset of programs redeployed their pediatrics residents to serve on the adult medicine wards and intensive care units.²

Due to decreased clinical opportunities, it quickly became clear that virtual rotations were needed for those not seeing patients in person. New virtual electives were developed and often included preexisting modules, such as the Institute for Healthcare Improvement modules, modules adapted from resources in APPD ShareWarehouse, and Association of American Medical Colleges MedEdPORTAL. Curricula were shared across training programs through the APPD listserv, including a previously designed national curriculum in neonatology.³

Intensified use of telehealth

Telecommunication has had a long-standing role in health care and has been used by pediatricians for education, research, consultation, and direct care of patients.⁴ The potential benefits of telemedicine include improved patient access to care, provider outreach, and resource utilization, particularly in underserved regions.⁵ Due to limited availability of personal protective equipment (PPE) and adequate room capacity to allow for physical distancing, telehealth utilization flourished during the COVID-19 pandemic.

As telehealth became a critical method of health care delivery, pediatric training programs quickly adapted to incorporate, train, and supervise medical students, residents, and fellows in the provision of care via telehealth. In the outpatient setting, many general pediatric and subspecialty clinics converted a large number of visits to telehealth, often incorporating trainees for the first time. Faculty preceptors developed new skills in the virtual environment, modifying their processes to adequately supervise trainees remotely while allowing for autonomy, and supervising multiple trainees at once. Preceptors noted that overseeing encounters via telehealth allowed them to directly observe and provide timely feedback on trainees' provision of patient care and interpersonal communication with patients.⁶⁻⁸

In the inpatient setting, teams employed telehealth in new and creative ways to minimize the number of people entering a patient room and overall PPE use.⁹ Telehealth was used by primary teams to assess and communicate with patients and families. With many academic health centers limiting medical student, and sometimes resident and fellow, presence on campus, telehealth allowed trainees to participate in clinical encounters remotely.

Recognizing the enduring role of telehealth in the care of pediatric patients, the APPD engaged in the Telemedicine in Pediatric Training National Collaborative, aimed at developing a comprehensive pediatric training curriculum for teaching and evaluating best practices in telemedicine. Additionally, the APPD and the American Board of Pediatrics collaborated to develop a competency-based Telehealth Entrustable Professional Activity for pediatric residents and fellows. We envision that the increase in telehealth utilization will endure long after the COVID-19 pandemic has been controlled. Educators will need to further refine curricula, study its effectiveness, develop meaningful assessment tools, and understand where disparities remain and how we may best address them.

Changes in Teaching Methods Used

With the abrupt onset of the COVID-19 pandemic, residency and fellowship program leadership had to quickly adjust educational experiences and conferences for learners.¹⁰ Programs developed virtual platforms for morning reports, noon conferences, and grand rounds.¹¹ In many situations, conference attendance improved due to lack of travel and decreased patient commitments. Presenters became more facile with interactive features of virtual teaching sessions, rather than simply recording classic lectures. Block teaching sessions were modified to have multiple, physically separated, small-group, in-person sessions as well as virtual sessions. Some programs adapted low-fidelity, virtual simulation exercises with success. National seminars were created and shared virtually so widespread groups of learners could benefit from a single resource. Trainees reported that they missed the social interactions

that were part of in-person didactic conferences.²

Moving forward, it will be important to assess what topics can be taught well (and learned well) over a virtual platform and what topics will be best taught face-to-face. Woolliscroft speculates that the emergence of a handful of national or international "superstar virtual educators" will develop, which may in turn eliminate or greatly modify the educational responsibilities of many current faculty.¹² We anticipate that some topics will likely still require significant face-to-face education but, perhaps, with enhanced technology, partnering with video game developers, the military, and others working at the forefront of augmented and virtual reality will be fruitful. It will be important to assess learners' acquisition and maintenance of knowledge as it is taught in new formats, including reviewing In-Training Exams and American Board of Pediatrics certifying examinations.

Effects on Resident Wellness

Before the COVID-19 pandemic, clinician well-being had already been identified as a national priority by the National Academy of Medicine, the American Medical Association, and the Association of American Medical Colleges.¹³⁻¹⁶ In 2017, the Accreditation Council for Graduate Medical Education developed common program requirements and launched its "Back to Bedside" initiative to promote resident wellness and combat resident burnout at the program and sponsoring institution level.¹⁷⁻¹⁹ Just as these important initiatives were beginning to take root, the COVID-19 pandemic added additional and unforeseen challenges.

The tragic death by suicide of Dr. Lorna Breen, the medical director of the emergency department at NY-Presbyterian Allen Hospital in April 2020, brought into painful focus what was and is at stake for providers. As a community, clinicians mourned her loss and leaders in GME re-doubled efforts to examine and address resident wellness and burnout in this new landscape.²⁰ A cross-sectional survey of 393 trainees found that trainees exposed to COVID-19 patients were significantly more stressed and experienced greater

burnout than trainees who were not exposed to COVID-19 patients.²¹ Women trainees were found to have higher stress, and the pandemic was noted to significantly worsen proximal stressors, such as those related to childcare and work–family balance.

De Brier and colleagues identified 4 important risk factors associated with poor mental health outcomes for health care workers (HCWs) in the pandemic: direct contact with patients, working in high-risk units, high risk of exposure, and working on the frontline. Additionally, they found that HCWs who were quarantined or who experienced fear or perceived more risk of becoming infected or infecting others were at risk for poor mental health outcomes.²² Like many HCWs, trainees served on the pandemic's frontline and were asked to take on significant work burdens and personal risks to facilitate lifesaving care for patients. The long hours worked in critical care units and emergency departments impacted the broad clinical education they hoped to receive. For pediatric trainees, deployment to adult units and decreases in pediatric patient volumes threatened the very foundation of their clinical education. Furthermore, trainees often rely on each other for socialization, but were not able to interact through normal social events due to the pandemic. Finally, trainees who identify as Black, Indigenous, or people of color (BIPOC) were exposed to devastating statistics that showed their communities were being impacted disproportionately by the COVID-19 pandemic, which deepened fear and anxiety around outcomes for themselves and their family members.

Training programs responded by maintaining frequent communication with residents and fellows via email, social media, and video conferencing. Updating trainees as to the evolving landscape of best practices during the COVID-19 pandemic, while also not overburdening them with unnecessary information, was critical at the outset of the pandemic and remained important as vaccine and surge planning took place. Notably, this communication was specific to the various regions across the country and its success relied heavily on information being provided at the institutional, local, state, and federal levels. Transparency on the part of

program leaders helped to address residents' concerns regarding fairness.

Program directors worked closely with trainees to create sustainable and flexible work schedules to provide the clinical coverage needed at many hospitals, while also keeping duty hours, trainee control over their time, and trainee wellness in mind. Program leaders partnered with their colleagues in mental health and employee assistance programs to secure appropriate mental health care for trainees. Important milestone events for trainees, such as graduations, resident retreats, and holiday parties, were adapted to take place in a virtual format. Communication via social media was supported by many program leaders to maintain connectivity in the absence of in-person gatherings.

Supports for Pediatric GME Leaders

In response to rapid changes due to the COVID-19 pandemic, the APPD developed daily, 1-hour virtual cafés for GME leadership to come together and share challenges, adaptations, best practices, and lessons learned.²³ In the first month, 24 virtual sessions were held, with a mean of 255 participants on "All APPD" virtual cafés and 114 participants on other virtual cafés. Members shared 36 educational innovations, 11 clinical innovations, and 52 wellness innovations. The virtual cafés led to significant changes in pediatric GME leaders' approaches to educational, clinical, and administrative issues. In addition, pediatrics residency and fellowship leaders reported feeling more connected to other APPD members and more engaged with the organization as a result of the virtual cafés. These virtual cafés continue 18 months later.

Changes in Program Recruitment

To support both applicants and residency and fellowship programs, it was important to collaborate with other stakeholders, including program directors, program coordinators, department chairs, medical students, residents, and fellows. In April 2020, APPD released its initial letter to the pediatric community that identified 3 principles for recruitment: (1) helping learners find programs that match their career goals, (2) providing educational programs with a consistent approach

to recruitment, and (3) creating a fair and equitable application process for both learners and programs. The letter emphasized the need for holistic review of applications, recognizing that applicant experiences in medical school or residency might be different because of the pandemic, and there would be fewer opportunities for in-person electives at different programs. APPD also recommended that programs interview all applicants virtually, even local applicants, and programs consider how to market themselves to applicants.²⁴

To support programs as they approached recruitment season, APPD began a series of virtual cafés dedicated to recruitment and the virtual interview process. The program coordinators executive committee also developed a robust set of tools to support programs for the virtual interview process (<https://apps.appd.org/shareWarehouse/index.cfm?page=recruitmentToolbox>). In August 2020, APPD partnered with @FuturePedsRes, a group of medical students with a presence on Twitter, and the Council of Medical Student Education in Pediatrics to host a series of regional webinars for medical students interested in pediatrics. APPD regional leaders developed an overview of programs in their geographic areas and participating programs developed a standardized infographic for their program. Presentations were recorded and placed on YouTube for future access by interested students. Over half of all residency programs (n = 138) participated in the webinar series, with several hundred applicants attending each session.²⁴

Discussion

In this paper, we describe the profound impacts of the COVID-19 pandemic on pediatric GME nationally. Some of the adaptations made in pediatric training were important steps forward and will hopefully be sustained as we emerge from this crisis. These include the rapid transition to telehealth, which can improve patients' access; asynchronous learning allowing for increased cross-program collaboration; innovative online teaching modalities; and increased flexibility and decreased cost of online recruitment. In addition, pediatric programs across the country have been

able to share their innovations through virtual cafés in a remarkably effective and collaborative environment unlike anything we have done previously.

Other changes that have negatively impacted on our trainees include decreased clinical exposures to common childhood illnesses; decreased patient volumes and patient complexity in clinics and inpatient wards, leading to less practice developing efficiency, time management, and triaging skills; and decreased social support from one another, with the inability to socialize outside of work and less in-person support from families and friends, which may have a particularly negative impact on our trainees who are parenting during residency or fellowship.

Perhaps most impactful for our trainees in pediatrics has been the stark inequities that this pandemic has uncovered. Most pediatricians choose this career to make the world a better place for children and families, and the COVID-19 pandemic has unmasked how unjust our health care system is for Black and Hispanic families as well as other families of color. This impact has been disproportionately felt among our residents and faculty from BIPOC backgrounds. As we look forward, we must do so with all of the hope and optimism that comes with caring for children, but through a lens that centers on equity and social justice as we continue to innovate.

Areas that need more study

There are many areas that require further study as they are likely to persist even as we begin to relax some of our pandemic-related restrictions. We need to determine what supplemental education is necessary for trainees, given the lack of clinical exposure to common childhood infections. We anticipate that increased use of telehealth will continue and teaching the practical and nuanced aspects of telehealth will be another learning objective to place in an already full curriculum. As we emerge from stricter physical distancing rules, it will be important to determine when to prioritize virtual learning over in-person learning and vice versa. It will be helpful to better understand the impact of the virtual interview season on applicants and programs, particularly on underrepresented in medicine applicants. Finally, we need to understand the

ramifications of the trauma experienced by many physicians and what recovery looks like for countless HCWs.

Recommendations for moving forward

As we move forward, we have a number of recommendations for medical educators:

1. Use robust assessment methods of learners' competencies to identify the gaps in patient exposures and skills caused by the pandemic;
2. Augment learners' education with individualized learning opportunities based on their assessment, including additional patients, skills stations, simulation, and coaching;
3. Continue educational collaborations and joint teaching sessions across programs;
4. Continue to optimize telehealth opportunities;
5. Continue virtual cafés as a way of supporting educational leadership;
6. Consider a hybrid interview season, including virtual interviews for all, and only using in-person second looks if helpful to the applicant; and
7. Continue to dismantle medical and structural racism in all that we do.

The COVID-19 pandemic has highlighted important opportunities in our educational systems—opportunities that hold the potential to lead to better medical education and ultimately better care of children, families, and communities.

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R. Blankenburg is president, Association of Pediatric Program Directors, and associate chair of education and clinical professor, Stanford University School of Medicine, Palo Alto, California.

J. Gonzalez del Rey is past president, Association of Pediatric Program Directors, and associate chair for education and professor, Cincinnati Children's Hospital Medical Center, University of Cincinnati College of Medicine, Cincinnati, Ohio.

M. Aylor is secretary-treasurer, Association of Pediatric Program Directors, director, Pediatrics Residency Program, and associate professor, Oregon Health & Science University, Portland, Oregon.

J.G. Frohna is a past member-at-large, Association of Pediatric Program Directors Board, vice chair of education and director, Pediatrics Residency Program, and professor, University of Wisconsin School of Medicine and Public Health, Madison, Wisconsin.

H. McPhillips is a member-at-large, Association of Pediatric Program Directors Board, director, Pediatrics Residency Program, and professor, Seattle Children's Hospital, University of Washington, Seattle, Washington.

R.E. Myers is a member-at-large, Association of Pediatric Program Directors Board, associate director, Pediatrics Residency Program, and associate professor, Rainbow Babies and Children's Hospital, Cleveland, Ohio.

L.A. Waggoner-Fountain is a member-at-large, Association of Pediatric Program Directors Board, associate director, Pediatrics Residency Program, and professor, University of Virginia School of Medicine, Charlottesville, Virginia.

L. Degnon is executive director, Association of Pediatric Program Directors, McLean, Virginia.

P. Poitevien is president-elect, Association of Pediatric Program Directors, director, Residency Program, and assistant professor, Hasbro Children's Hospital, Warren Alpert Medical School of Brown University, Providence, Rhode Island.

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