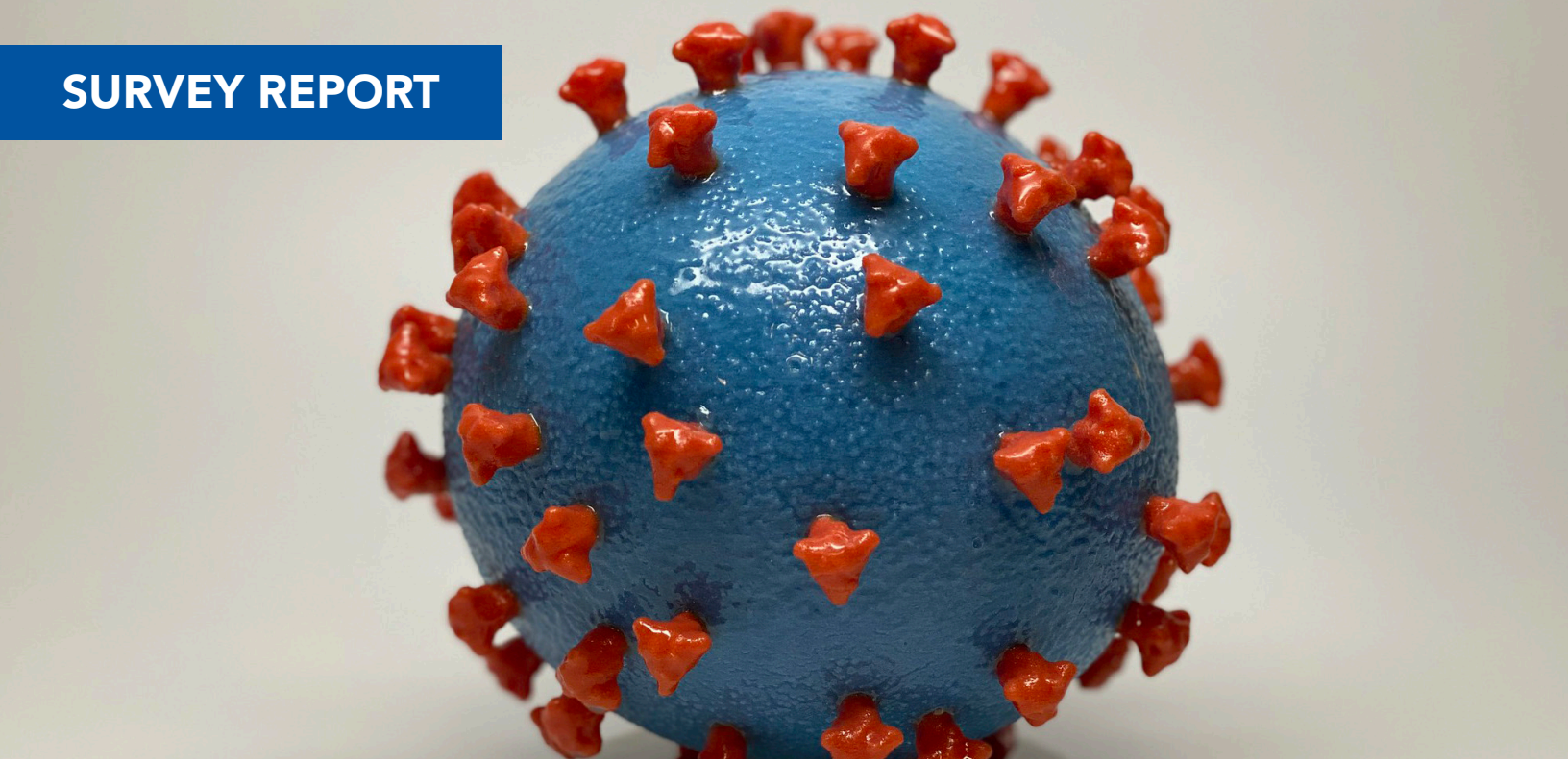
SURVEY REPORT



COVID-19: The Effects on the Practice of Pediatric Emergency Medicine

PEDIATRIC EMERGENCY MEDICINE PRACTICE
AN EVIDENCE-BASED APPROACH TO PEDIATRIC EMERGENCY MEDICINE ▲ EBMEDICINE.NET

JUNE 2020

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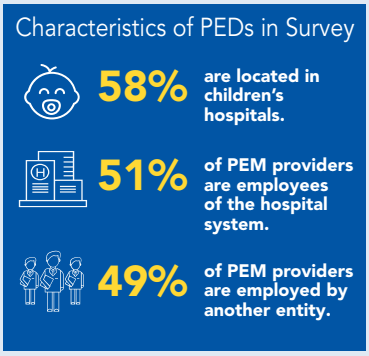
An informal survey of 65 pediatric emergency department leaders in North America—from 30 U.S. states and 4 Canadian provinces—revealed **changes in operations**, **infrastructure**, **staffing**, **and clinical care that were undertaken as a result of the COVID-19 pandemic.** The changes identified by the survey respondents were driven by reductions in pediatric patient volumes, a surge of adult patients, clinical considerations related to containment of infection, and financial factors. Survey respondents also reported **effects of the pandemic on academic training programs and provider wellness.** This report uses the survey responses to provide a snapshot of the adaptability of pediatric emergency medicine departments and clinicians during a public health emergency.

Survey of North American Pediatric Emergency Department Leaders

To qualify the impact of COVID-19 on pediatric emergency medicine (PEM) practice and pediatric emergency departments (PEDs) in North America, an informal survey of PED chiefs and medical directors was conducted using a 30-item questionnaire. The survey was created using SurveyMonkey® and distributed via email to 135 members of the Pediatric Emergency Medicine North American Chiefs online forum. The survey was open from April 12, 2020 through April 20, 2020. To maintain anonymity, identifying information and institutional affiliations were not collected, except when volunteered by respondents. The survey posed questions in the following broad categories:

- PED characteristics
- PED structure
- PED clinician employment arrangements
- PED patient volume
- SARS-CoV-2 testing
- Patient management
- Personal protective equipment (PPE) availability
- Changes and innovations implemented in the PED due to the pandemic

For many of the questions, respondents had the option to add free-text responses to clarify or elaborate on their answers. The questions about innovations allowed open-ended responses in order to capture as much information as possible.



Forty-one percent of recipients completed the survey, representing PEDs in 30 states in the United States and in 4 Canadian provinces. Among the 65 PEDs represented, 38 (58%) were part of children's hospitals; 23 (35%) were part of university hospitals; and 4 (6%) were part of community hospitals. Fifty-one percent of the PEM clinicians at these PEDs were employees of the hospital system, while 49% were employees of another entity.

The survey results do not include data from all PEDs in North America and captured only a point in time in mid-April 2020. Given the variations in infection peaks and the timing of the pandemic's progression in different geographic regions, PED experiences may vary by locality, and some answers may be predicated on the respondents' local circumstances at the time of the survey.

Additional Data Sources

Searches were performed on PubMed, *medRxiv* (a repository of papers published before peer review), and LitCovid (a hub for publications related to COVID-19 that is curated by the National Library of Medicine). All searches used the terms *COVID-19* OR *coronavirus* AND *pediatric* OR *infant* OR *child* to identify literature published since December 2019 that addressed aspects of the COVID-19 pandemic related to pediatric populations. Citations were narrowed to those that pertained specifically to the effect of the pandemic on the practice of PEM. Articles that focused on epidemiology or clinical care of COVID-19 patients were excluded, with the exception of articles that also addressed PED space, patient flow, clinicians, or clinician wellness. An additional search was conducted on LitCovid to identify articles about the impact of COVID-19 on emergency medicine in general.

Data from a study of preparedness and response to COVID-19 in PEDs in Europe, which was conducted by the Research in European Paediatric Emergency Medicine (REPEM) and Paediatric Emergency Research in the United Kingdom and Ireland (PERUKI) research networks, was shared by lead author Sylvia Bressan, MD, PhD, of Università di Padova in Italy. The data provide context for comparison of the European experience with the North American experience. Information about the experience in Latin America, obtained from members of the Latin American Pediatric Emergency Medicine Society (SLEPE), was shared by Camilo E. Gutiérrez, MD, Director of Global Health Programs for the Division of Emergency Medicine at the Children's National Hospital in Washington, DC.

Introduction

Anecdotal information shared in various pediatric emergency medicine (PEM) electronic discussion groups in March and April 2020 indicated that pediatric emergency departments (PEDs) and PEM clinicians were experiencing the coronavirus disease 2019 (COVID-19) pandemic differently from their adult colleagues, particularly regarding patient volumes and operational challenges. These differences may be explained by preliminary evidence suggesting that the disease burden of COVID-19 is skewed toward the adult population. Although the full impact of COVID-19 on children is the subject of ongoing study,[1-4] one author observed that the risk of severe COVID-19 infection appears to be lower for a child than for the pediatrician who is caring for that child.[5] Informed by survey data, this report describes the impact of the COVID-19 pandemic on the practice of PEM and highlights how PEDs and PEM clinicians have adapted.

Patient Volume, Environment, and Flow

Many of the survey respondents reported making adjustments to PED operations during the pandemic in response to decreased patient volume or demands presented by the surge of patients coming to adult emergency departments (EDs) for evaluation of COVID-19 symptoms. These changes included expanding the age of patients seen in the PED, commingling of adult and pediatric patients, and modifying the ED environment and patient flow.

Patient Volume

The PEDs represented in the survey reported a 65% reduction, on average, in daily patient volume compared to the average number of daily visits before the start of the pandemic. The timing of the reduction in average daily patient visits differed from site to site, likely correlated with the rate of COVID-19 cases in the local area. A study conducted by the Research in European Paediatric Emergency Medicine (REPEM) and Paediatric Emergency Research in the United Kingdom and Ireland (PERUKI) research networks found a similar trend, as more than half of the pediatric centers surveyed reported > 50% reductions in patient volume.[6] Information obtained from members of the Latin American Pediatric Emergency Medicine Society (SLEPE) suggested that PED visits have also decreased in Latin America. While no published data were available on PED volumes in China as of May 2020, a downward trend in ED volume was reported at the Hunan Children's Hospital in Hunan Province, which borders Hubei Province in China.[7]

Patient Age

Survey respondents reported that their PEDs typically treated patients aged ≤ 21 years, on average. At the time of the survey, 26% of the represented PEDs had increased the maximum patient age in response to the pandemic. Among those PEDs, the average increase was 13 years and the median increase was 9 years. This finding is consistent with a statement issued in April 2020 by the American College of Emergency Physicians in support of the redeployment of clinicians who are board-certified or board-eligible in PEM by the American Board of Pediatrics, to allow those clinicians to treat patients outside of the typical pediatric age range and increase access to care during the pandemic.[8]

Some state Governors in the United States have issued waivers that grant immunity from liability to healthcare providers involved in the pandemic response,[9] and some state legislatures have enacted these provisions into law for the period of the public health emergency.[10] This qualified immunity protects healthcare providers who may be practicing outside of their scope, provided their actions are not grossly negligent. These progressive measures address concerns about the legal liability presented by redeployment.

Repurposing or Relocating Pediatric Emergency Department Space

The concept of evacuating the PED to another location to provide surge space for adult ED or adult inpatients applies only to PEDs that are not located in free-standing children's hospitals. Several

respondents reported that plans were drawn up for PED relocation; however, only 2 respondents indicated that a relocation had occurred or was imminent at the time of the survey. Some respondents reported closure of some part of their PED facility (eg, the fast track area) to repurpose the space for adult ED operations. One respondent reported that admitted adult ED patients were being boarded in the PED while awaiting transfer to an inpatient floor. The boarded patients were cared for primarily by pediatric ED nurses. Because the majority of the survey respondents work in children's hospitals, relocation was not applicable to their settings.

Pediatric Emergency Department Patient Flow

Many of the PEDs represented in the survey reported that they had altered physical space and patient flow to support infection control principles. Survey respondents reported expediting of patients, especially those with symptoms of COVID-19, to negative pressure rooms (if available) or to rooms with doors that could be shut. Others reported that the use of hallway beds was minimized to decrease risk of transmission, or that intentional patient placement was implemented to enforce minimum space requirements between patients outside private rooms. These modifications were likely made possible by the low volume of pediatric patients.

A majority of respondents who answered an open-ended question about changes to PED flow and physical environment reported that their PEDs had implemented some type of split-flow process, with suspected COVID-19 patients separated from patients who had no COVID-19 risk factors or symptoms. The processes they described included:

- Separate waiting areas, entrances, and exits for the 2 categories of patients
- Dedicated teams assigned to each patient category
- Team assignments scheduled for either the entire shift or for a set number of hours for each team
- A split-flow process beginning prior to triage to maintain a separate flow process throughout the PED encounter
- Use of clinical spaces outside of the ED to evaluate and treat patients who were not suspected to have COVID-19

Many respondents reported that their PEDs had enacted a process to assess, treat, and discharge low-acuity patients. This process included assigning a clinician in triage so that patients could be evaluated and discharged without the need to continue to the main PED area. One PED reported conducting rapid assessment and disposition of low-acuity patients in a tent outside the PED.

Within the main PED, one respondent reported successful conversion of existing patient space into negative pressure rooms, while another respondent reported using an existing negative pressure room as the main resuscitation room to maximize protection of patients and staff.

Future Adjustments

As the pandemic progresses, there is much to be learned about the evolution of the PED experience and response. While some PEDs reported repurposing space to accommodate COVID-19 patient demand from the adult ED, there were also reports of closures of patient spaces, such as fast track and urgent care areas, due to a lack of pediatric volume. Similarly, some processes established in preparation for an expected surge of COVID-19 patients were abandoned because so few pediatric patients presented for care. It is reasonable to increase the age of patients seen in the PED to redistribute the surge of patients at adult EDs, but a strategy of setting a maximum age limit that excludes the geriatric population is a preferable match for the skillset of PEM clinicians.

It remains to be seen how PEDs will contract or expand in response to future demands. There is a general perception within the PED community that the decreased volume is a result of low-acuity patients not presenting for care. While the survey did not assess the acuity of patients seen in the PEDs, it would be helpful to understand the characteristics of the patients presenting to PEDs during the pandemic, including their acuity and disposition.

Clinical Care

Testing Protocols and Practices

The initial testing criteria released by the United States Centers for Disease Control and Prevention (CDC) for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) focused on individuals with symptoms and a travel history to affected areas, and testing required the coordination and approval of local health departments. The criteria later advanced to a priority list favoring hospitalized patients and healthcare workers who had symptoms, with discretion afforded to facilities to determine their local practice.[11] One respondent noted the interesting phenomenon of parents requesting COVID-19 testing for themselves when they brought their children to the PED.

It has been widely reported that SARS-CoV-2 testing has been hampered by nationwide limitations in the availability of supplies and laboratory capacity. These deficiencies in testing capacity are reflected in the survey responses. Seventy-two percent of respondents reported that the ability to test for SARS-CoV-2 at their PED was limited by a shortage of testing kits or testing supplies. Among those who had access to testing, 67% reported that they had access to a rapid test, defined as a test that will provide a result in < 12 hours. Overall, there was wide variation in test availability, turnaround times, and testing protocols.

One respondent described the effect of the sensitivity and specificity of the rapid test on testing protocols. At the respondent's facility, a negative rapid test result would not be reported until confirmatory testing was performed because of the high rate of false negatives elicited by the rapid test. The time frame for receipt of the confirmatory result (up to 16 hours) was affected by many factors: the method of confirmatory testing, variability of laboratory staffing, availability of testing supplies and reagents, and the need for batch testing. Negative test results were often delayed, leading to delays in bed assignment and inpatient transfers.

No respondents reported testing all PED patients for SARS-CoV-2 at the time of the survey. In some cases, this was explained by limited testing capacities within the respondent's hospital system. Just 32% of respondents reported testing all admitted PED patients, while 65% reported testing only admitted patients for whom there was a clinical suspicion for COVID-19. Twenty-seven percent reported testing all patients with suspected COVID-19 who were discharged. Patients were referred to local testing centers by several of the PEDs that were not testing discharged patients with symptoms compatible with COVID-19. While those referrals may have been welcomed by patients, many testing centers have changing hours of operations, require an appointment, test only if fever is present, and are overwhelmed with volume.

72%

of PEDs reported that their ability to test for SARS-CoV-2 was limited by a shortage of testing kits or testing supplies.

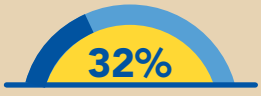
67%

of PEDs had access to a rapid test (result in < 12 hours).

Which patients were being tested for SARS-CoV-2 in the PED?

65%

of PEDs were testing admitted patients only if there was clinical suspicion of COVID-19.



32%

of PEDs were testing all admitted patients.

27%

of PEDs were testing all patients with suspected COVID-19 who were discharged.

0%

of PEDs were testing all patients.

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Other Testing Strategy Considerations

Survey respondents described other considerations that were used to determine which patients could be tested for COVID-19:

- Patients with a positive contact history
- Patients who had received recent treatment as inpatients or ED patients in another hospital
- Patients with prolonged fever
- Patients with respiratory distress, regardless of the presence of fever
- Patients with high-risk medical conditions (eg, chronic lung or heart disease, diabetes, morbid obesity, immunosuppression, high medical complexity)
- Patients who required procedural sedation, general anesthesia, or aerosolizing procedures
- All patients admitted to the intensive care unit, regardless of diagnosis
- Patients discharged to group homes, prison, or skilled nursing facilities

Approach to Specific Patient Populations

No treatments have been approved for COVID-19 in children, although a number of potential treatments are currently under investigation.[12,13] The therapies being provided currently are symptom-dependent and range from no treatment (for asymptomatic children) to supportive care, including oxygen or antibiotics for patients with pneumonia.[14] The presence of comorbid illness may be a risk factor for severe disease in children,[15-17] but definitive evidence is lacking, due to the low number of pediatric COVID-19 cases.

When asked about the use of COVID-19–specific protocols, 46% of survey respondents indicated that they have implemented these protocols. When asked about the specific patient populations targeted, immunocompromised or oncology patients and respiratory patients were the most common answers.

While the content of site-specific protocols was beyond the scope of this survey, respondents were asked about patients requiring breathing treatments or airway interventions. For patients requiring respiratory treatments, 77% of respondents reported that their PEDs were using metered-dose inhalers (MDIs) instead of nebulizers for albuterol treatments, when possible, to reduce risk of aerosolization of respiratory droplets. This is consistent with published recommendations.[18,19] Several centers reported the use of breath-actuated nebulizers instead of standard nebulizer supplies. One respondent reported that MDIs were being reserved for patients who had COVID-19–like symptoms, due to shortage of

Safe Strategies for Airway Interventions

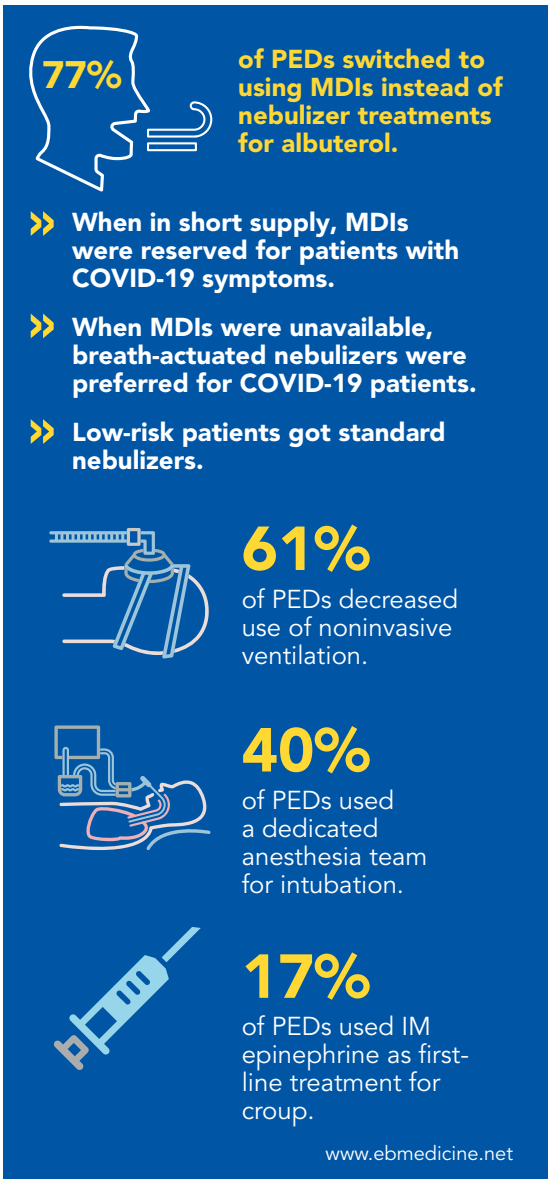
Survey respondents described multiple strategies that were implemented to maximize the safety of PED clinicians and staff, including:

- Use of dedicated anesthesia teams for intubation
- Minimizing the number of staff members involved in resuscitations
- Preferential use of video laryngoscopy
- Use of intubation boxes
- Use of air filters on bag-valve masks
- Performing intubations in negative pressure rooms

albuterol MDIs in the United States after the start of the pandemic. Standard nebulizers continued to be used for low-risk patients.

The majority of respondents preferred to give any type of respiratory treatment in a negative-pressure room, when available. For patients with croup, 17% of respondents reported giving subcutaneous or intramuscular epinephrine, when needed, rather than nebulized epinephrine. Some respondents reported using epinephrine MDIs for croup and were considering using them for patients with asthma exacerbations if albuterol MDIs were in short supply.

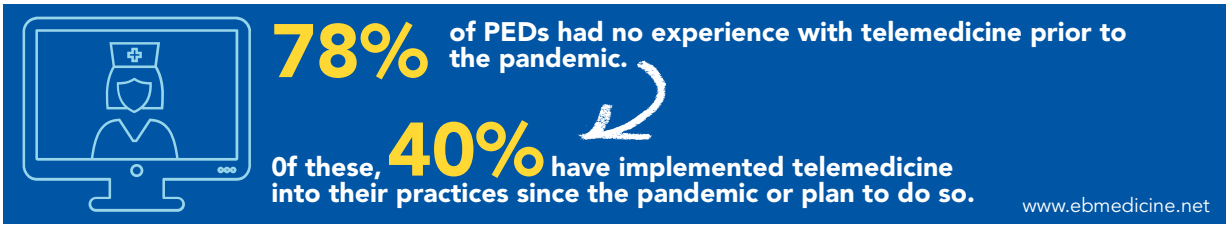
Sixty-one percent of survey respondents indicated that their PEDs were trying to limit or prevent the use of noninvasive ventilation and move to intubation after oxygen supplementation had been maximized. Forty percent of respondents reported the use of dedicated anesthesia teams for intubation. These practices are in alignment with consensus guidelines that recommend minimizing aerosolization of respiratory secretions, minimizing the number of people in the room, and recognizing that asymptomatic patients may be shedding the virus.[20,21]



Interactions With Patients and Families

Responses to open-ended questions related to patient care indicated that the PEDs represented had implemented many changes in their workflows to limit the amount of personal protective equipment (PPE) used per patient, as well as to limit the exposure of clinicians and staff to patients who were positive or potentially positive for SARS-CoV-2. Some of the PEDs had restricted the ED triage process to a true sorting process, deferring the full triage to a bedside nurse wearing full PPE. Persons under investigation for SARS-CoV-2 infection were sometimes seen by a single clinician (often the attending physician) or the attending physician would not repeat the examination if the patient was seen by a fellow or an experienced resident. One survey respondent described a process in which patients were assessed while still in their car. If the patient was deemed to be low acuity, vital signs were obtained and SARS-CoV-2 testing was performed without the patient having to enter the hospital building.

Survey respondents reported that physical examinations were being kept very brief and focused for well-appearing patients. Clinicians might stand at the doorway to obtain histories, rather than standing or sitting near the patient, or use phones or tablets to obtain histories or communicate with patients through a closed door, especially for follow-up questions, updates, or when the patient or caregiver needed something from a staff member. Many respondents stated that their PEDs were limiting visitors to 1 parent or family member for pediatric patients and some were allowing no visitors for patients aged ≥ 18 years. Visitors were typically screened for infectious symptoms, positive contact histories, and fever. In many cases, families were not allowed to leave the patient room until discharge and signatures on discharge papers were deferred.



Incorporation of Telemedicine

Before the COVID-19 pandemic, the implementation of telemedicine was limited by training costs, reimbursement restrictions, software constraints, and lack of adequate equipment. Since the start of the pandemic, there have been calls to expand telemedicine nationally, and some of those barriers have been overcome.[22] In many hospital systems, telemedicine has been put in place rapidly to continue delivery of care while physical distancing is the accepted social norm.

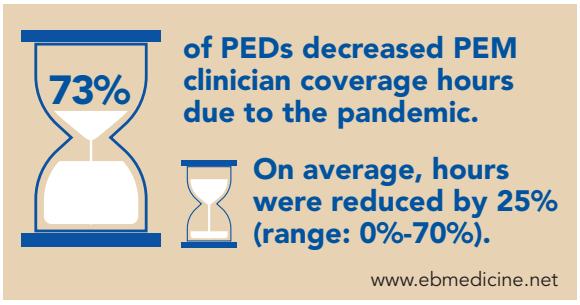
In some locations, telemedicine software is now being used when patients present to the PED for evaluation, in order to limit exposure of the PED staff to patients, especially patients whose history and symptoms are indicative of COVID-19. Some PEDs are also using this technology to assist with triage of patients; to communicate with patients behind closed doors; and to replace in-person behavioral health consultations, limiting the exposure risk to mental health clinicians. Parents can assist the clinician with a handheld physical examination kit (where available) that allows the clinician to see vital signs, hear heart and lung sounds, and examine the ears and throat.

Many PEDS (including 22% of those represented in the survey) have begun using telemedicine for virtual urgent care, medical screening examinations in the PED, and follow-up communication after PED discharge.[23] A majority of survey respondents (78%) indicated that their PEDs had no previous experience with telemedicine; among those respondents, 40% had implemented or planned telemedicine initiatives since the start of the pandemic. Most of these initiatives involved telemedicine ED visits for their communities. Several of the survey respondents reported that telemedicine shifts were being used to replace unnecessary clinical shifts in the setting of low patient volumes.

Clinicians and Staff

Redeployment

The strategy of redeploying PEM staff can be considered by institutions that have a shortage of healthcare workers. This approach has the support of the American College of Emergency Physicians[8] and is facilitated by waivers issued by individual states to provide qualified immunity for medical providers during the period of the COVID-19 emergency.[9,10] Eleven percent of survey respondents indicated that PEM clinicians at their PEDs had been redeployed to care for adult patients. Some PEDs reported shifting of advanced practice providers (physician assistants and nurse practitioners) and nursing coverage hours to the adult ED. It was also reported that some adult EDs had enlisted the assistance of PEM physicians from affiliated PEDs. If needed during the PEM provider redeployment, some PEDs utilized pediatric generalists or subspecialists.



Reduction in Pediatric Emergency Department Clinician Coverage

Sustained lower-than-expected PED volume has had an effect on staffing strategies as well as on the PED environment. A majority (73%) of survey respondents reported that their PEDs have decreased PEM clinician coverage hours by an average of 25% (range: 0%-70%) in response to decreased patient volumes.

Trimming Coverage

Changes to PEM clinician coverage due to reduced PED volumes included the following configurations, according to survey respondents:

- Clinical time diverted to administrative time
- Converting shifts into "on call" shifts as a back-up for surge volume
- Incorporating PED providers into a surge call for the adult ED
- Reduction or complete abandonment of nonphysician (eg, physician assistant and nurse practitioner) coverage
- Transfer of physician assistant clinical hours to the adult ED
- Eliminating overnight PEM clinician coverage in PEDs where adult ED providers could absorb pediatric volume
- Limits in scribe and PED nursing hours

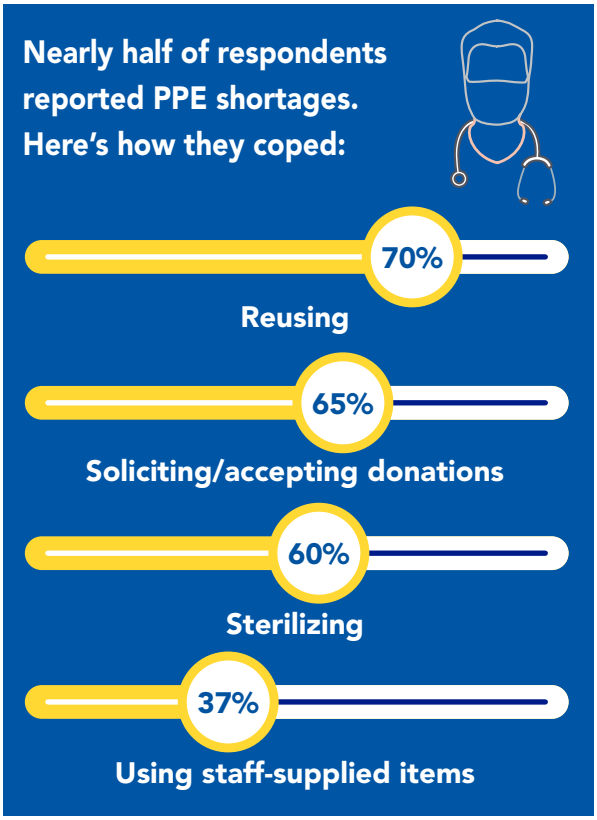
Infection Control

The importance of protecting the healthcare workforce from COVID-19 cannot be overstated.[24] In the United States, 22% of reported COVID-19 cases occurred among healthcare personnel (though available data are limited).[25] In Europe, data from the REPEM/PERUKI survey of children's centers revealed that 25% of respondents reported having ED staff members who tested positive for SARS-CoV-2, while 69% reported staff members at the hospital had been infected.[6] In pediatrics, the risk of transmission from patients to staff members may be heightened because many children are thought to be asymptomatic carriers, and may not be tested unless they present with obvious symptoms of COVID-19 or reported exposure. Thus, children may play a role in spreading the disease to vulnerable staff members.[26,27]

Sixty-seven percent of survey respondents reported that at least 1 staff member at their PED (eg, physician, nurse, or patient care technician) had lost clinical time due to COVID-19 symptoms or exposure (range: 1-30 staff members). Sixty-five percent of respondents reported that clinical duties had been limited or altered for clinicians who might be at risk of severe disease due to chronic medical conditions or advanced age; modification of clinician roles included exemption from all clinical care or from evaluating or treating persons under investigation. These data underscore the significance of the efforts that PED leaders have implemented to protect staff from exposure to the virus.

Personal Protective Equipment

It has been well documented that PPE shortages have affected clinicians' ability to safely care for patients with COVID-19.[6,28] In this survey, 46% of respondents reported that there had been some level of shortage in the supply of PPE for their PEDs since the start of the pandemic. To overcome PPE shortages or extend current supplies, 70% of respondents were reusing PPE, 60% were sterilizing



PPE, 65% were soliciting or accepting donations of PPE, and 37% reported that clinicians and staff were supplying at least some of their own PPE. One respondent reported saving all used N95 masks for potential sterilization and future reuse.

There was much variation among respondents regarding applications of PPE in different clinical scenarios. Some of these strategies may be local and others are dictated by national bodies such as the CDC, which has changed its guidance over time.[29] Many survey respondents reported that patients and family members were being masked upon entrance to the hospital. A majority of respondents reported that staff members were donning full PPE with N95 masks for aerosolizing procedures and intubations, with some PEDs using full PPE with N95 masks for all patients as well, due to the heightened suspicion for asymptomatic COVID-19 infections. It was reported that some PEDs had teams using powered air-purifying respirators for all aerosolizing procedures and/or other complex procedures, such as intubations or central line placement.

Reducing Exposure

Survey respondents described these approaches being utilized in PEDs to reduce exposure of clinicians and other staff members to SARS-CoV-2:

- Limiting or altering clinical duties for providers at risk for severe disease
- Instituting temperature checks for all staff members reporting for duty
- Limiting intubation procedures to only the most experienced clinicians
- Implementing a staff rotation schedule in PPE and non-PPE areas
- Requiring use of masks throughout shifts
- Offering SARS-CoV-2 testing to all staff members
- Enforcing physical distancing during shifts
- Limiting the number of staff in the break room
- Teleconferencing for staff huddles

Staff Wellness

Stress and anxiety can lead to increased medical errors and contribute to burnout,[30] so it is important for PED leaders to be cognizant of the added stressors introduced by the pandemic and provide strategies and resources to help staff members cope.[31-33] Data from China, including a study of pediatricians, indicates that caregivers on the front lines of the pandemic have an increased risk of anxiety, depression, insomnia, and stress.[34,35] These concerns are reflected in the survey results. An open-ended response field was included to capture PED experiences with staff morale, fatigue, and stress, and innovations meant to address these concerns. In general, respondents reported that clinicians and other staff members in their PEDs were experiencing heightened stress and anxiety, despite the lower clinical burden on shifts.

Sources of Stress

Stress and anxiety among PEM clinicians and other PED staff members were identified as coming from multiple sources, including:

- Work-related issues, such as fast-paced change in administrative directives, protocols, and practices
- Availability and use of PPE and testing supplies
- Staffing cuts
- Personal fears about coming to work and possible contagion
- Concern about the health of family and friends
- Uncertainty about the future in general

Many respondents indicated that their staff members were also apprehensive about the stress level of colleagues, especially those who were deployed to other units to assist with the pandemic response. Some reported feelings of guilt about their colleagues in the adult ED, who were perceived to be experiencing more pain as a result of the pandemic, although this pain was not qualified. These feelings may be unique to PEM clinicians, or it may be a phenomenon affecting healthcare workers across all specialties who do not have repeated exposure to or direct responsibility for caring for patients with COVID-19.

Concern for job stability among PEM staff was reported, likely due to the unknown future of pediatric ED volumes. In PEDs at which physicians are employed by private groups (49% of survey respondents), concerns were reported about the potential for salary decreases related to reimbursement-based compensation models. While one respondent reported that their PED physician group had qualified for a small business loan to supplement payroll under the Coronavirus Aid, Relief, and Economic Security Act, the full financial impact of the COVID-19 pandemic is just beginning. Children's hospitals face losses in revenue in the setting of reduced hospital encounters and suspension of elective procedures, amid both ongoing and additional expenses.[36]

Expressions of community support in the form of donations of food and PPE were reported by survey respondents to be uplifting to PED staff members. This is in contrast to the experience of some PEM clinicians in Latin America, who described encountering discrimination, physical assault, denial of access to facilities or public transportation, and threats of eviction due to concern about contamination. According to SLEPE members, this has generated an outcry from medical societies and local officials.

Employee Wellness Initiatives

Survey respondents shared some of the initiatives being implemented in PEDs to help staff members cope with the pandemic:

- Increased access to psychologic support services via open, scheduled group meetings focused on mental health, virtual or in-person assistance, and webinars on mental health and coping strategies
- Wellness groups
- Periodic staff rounds for "check-ins"
- Increased social interaction among staff (eg, open video chat rooms or "virtual happy hours")
- Daily journaling
- Humor
- Increased information flow
- Increased in-person rounding by PED leadership
- Rotating assignments and limiting shifts when possible
- Employee incentives
- Community support and donations

Clinician Wellness Resources

- Uniformed Services University - Center for the Study of Traumatic Stress
- The Schwartz Center - Resources for Healthcare Professionals Coping With the COVID-19 Pandemic

Academic Teaching Programs

The majority of respondents indicated that medical student clinical education had been suspended, with no students rotating in the PEDs. The most commonly cited reasons for the cessation of this practice were safety and decreased patient care opportunities due to low volume. In the few PEDs that were continuing medical student clinical rotations, students were restricted from seeing persons under investigation and from participating in resuscitations due to PPE scarcity.

Most respondents reported that resident and fellow education had also been affected. Several hospitals had removed trainees from clinical care. Many residents had been redeployed to the busiest clinical areas, including the adult ED, adult COVID-19 inpatient units, or adult intensive care units. Some PEDS saw changes in shift hours, with trainees providing less coverage. For the fellows and residents who remained in the PED, educational opportunities were impacted by a reduction in patient care opportunities due to fewer patient visits.

Fellows and residents were often restricted from codes and intubations and from treating persons under investigation, in order to conserve PPE. Some sites reported using an intubation team for all intubations, which also affected the opportunity for fellows to gain valuable experience in airway management. External arrangements or affiliations were also altered, as fellows and residents who were on elective rotations or rotations at other hospitals returned to resume clinical duties at their home institutions.

However, one respondent commented that didactic teaching in the PED was on the rise at their institution, as senior clinicians had more time to focus on education because of decreased patient volume. Another respondent reported that academic teaching programs continued unabated at their institution. All major academic conferences have embraced the use of video technology, though the number of conference hours at many sites has declined, and training, including simulation, has been put on hold.

Conclusion

The COVID-19 pandemic continues to test the health infrastructure of the world. Although pediatric patients have been affected minimally as compared to adults, the pandemic still challenges the practice of PEM, the spaces in which it is practiced, and its practitioners. This highly transmissible virus has led to decreased PED volumes, alterations in the ages of the patients treated, and repurposing of what had been clinical space for pediatric patients before the outbreak. Patient flow and interactions with patients' families have been changed to protect patients, families, and clinicians from contracting the virus. There are no specific treatments recommended for children, but additional steps have emerged in the treatment of the sickest children, or those with a need for respiratory treatments, in order to minimize contaminating the PED space. All of this is occurring in the context of evolving recommendations and testing strategies, as well as fluctuating supplies of PPE, resulting in stress and worry for clinicians who are already concerned about their personal health and the health of their families and their colleagues.

For additional information on the management of COVID-19 in pediatric patients, see the *Pediatric Emergency Medicine Practice: EXTRA* supplement titled "COVID-19: The Impact on Pediatric Emergency Care," available at: www.ebmedicine.net/COVID-PEMP-EXTRA.

Key Survey Takeaways

- PED volume has decreased at many facilities since the start of the pandemic.
- The maximum age of patients seen in some PEDs has been raised so that clinicians can assist with the surge of patients at adult EDs.
- Many PEDs not located in free-standing children's hospitals have plans to relocate or repurpose space to accommodate adult patients.
- Most PEDs have enacted a split-flow process, with suspected COVID-19 patients separated from patients without COVID-19 risk factors and/or symptoms.
- Testing practice varies among PEDs.
- Many PEDs have implemented clinical protocols for patients who are at risk for severe COVID-19 disease.
- PEDs are using MDIs to reduce the risk of aerosolization of respiratory droplets; the use of noninvasive ventilation is being minimized for the same reason.
- PEDs reported shortages of supplies of PPE.
- Telemedicine has been employed rapidly to continue delivery of care while minimizing exposure risk to patients and providers.
- PEM clinicians were redeployed to care for adult patients.
- The majority of PEDs have had to decrease PEM provider coverage as a response to decreased volume.
- The majority of PEDs reported that at least 1 staff member had lost clinical time due to COVID-19 symptoms or exposure.
- Stress and anxiety among PED staff are common and stem from concerns about personal health, the health of family members and colleagues, a changing work environment, and job stability.
- Education of medical students, residents, and fellows has been affected by the COVID-19 pandemic in various ways.

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