

Key Takeaways from Pediatric Emergency Department Response to COVID-19

In an effort to share knowledge and experience for future pandemic planning efforts, we have compiled a summary of Children's Hospital of Philadelphia's (CHOP) emergency department (ED) response to the COVID-19 pandemic as the virus spread throughout the Philadelphia region in the first two months after identification of cases in our area. This document serves as a summary of one children's hospital's initial response to the pandemic. CHOP's ED, situated within an academic, free-standing children's hospital, cares for more than 100,000 patients a year. Our COVID-19 response initiatives were informed through collaboration and information sharing with our partners at other pediatric EDs throughout the country, literature review and expert opinion, and conversation with the CHOP Bioresponse Team. Care standards were then developed and moved forward by our ED multi-disciplinary COVID response team. Our response was driven by the need to best protect our patients and staff, to continue to provide high-quality care for all patients and develop our team capability to potentially provide resources and assistance to our colleagues in adult medicine.

We organized our response efforts into the broad categories of administrative/communications, clinical care, information technology, advocacy, education and research, and have included below key takeaways from our experiences.

Administrative/Communication

- As the pandemic unfolded, it quickly became evident that we would need additional, well-defined leadership and communication strategies. A COVID committee was formed, initially with daily meetings, to efficiently navigate and lead the emergency department's response. We developed new roles, including a CPOD (Physician COVID Person of the Day) and CPOD-RN (Registered Nurse COVID Person of the Day), to clearly delineate responsibility for daily communications, exposure tracing (working in concert with the hospital-wide team) and answering staff questions. Our care model was adjusted on an almost daily basis to minimize staff exposures and maximize patient safety and continue provision of efficient care. In addition, team members rounded and communicated in-person daily with the clinical teams over the first weeks of the pandemic to address acute concerns, change practice as we learned, educate on new initiatives and provide support.
- For consistent, streamlined communication, we sent a daily evening "COVID communication" email to all ED staff with key messages from the day that supplemented the morning situational email we have sent regularly for years. This strategy eliminated the redundancy that can occur with the distribution of many emails from multiple sources throughout one day, and provided staff with a consistent summary ("one-stop shopping") of key information, reducing information overload. It also included a concise summary of relevant information from the hospital wide daily communication, helping the ED team digest the vast amount of information.

- Typically, our team performs patient care/safety huddles on shifts throughout the day; with the arrival of coronavirus, we transitioned to “remote huddling” through the development of a 4-5 minute easily accessible podcast that nursing leadership organized and sent out each night, addressing key updates and questions that were asked that day. This communication supplemented the daily emails and allowed for continued “conversation” between the RN leaders and the frontline staff.
- In order to provide opportunities for staff to ask questions in real-time and anonymously, we developed a Google document to collect questions, with a corresponding FAQ document to catalog answers.
- We held weekly remote meetings with the entire division to provide updates and opportunity for Q&A.

***Key Takeaways:** Frequent, succinct communications and ample opportunity for staff to ask questions and express concerns was key in maintaining staff morale, in providing consistent messaging, in implementing new workflows/procedures, and in sharing information to keep patients and staff safe.

Clinical Care

- Much of the team’s effort was directed towards adjusting and refining our clinical care model. For example, ED team members (MD and RN), as longstanding participants in CHOP’s Hospital Bioresponse Team, began monitoring the outbreak with the rest of the Bioresponse Team in mid-January, and began sharing information with the entire ED team while starting preparations for our response.
- In early March, as the pandemic spread, we convened daily committee meetings to review response planning, processes, and problems, and we developed multi-disciplinary workgroups (listed below) to divide tasks and maximize efficiency.

Workgroups	
Adult Care	PPE Group
Clinical Committee	Research Group
COVID Nursing Operations	Resuscitation
CPOD (physician)	Simulation
Discharge/PT communication	Social Distancing
EPIC Documentation, etc.	Staffing
Exposures Follow Up	Staff Communication
Fit Testing	Supplies
Lab Group	Surge/Emergency Preparedness
Pathway Group	Trainee Education
Patient/Family COVID resources, Integrative Health	Transport/EMS
Patient Transports	Telehealth
Parent and Family Visitation	Wellness

- We realized that the issue of tracking exposure of staff to patients with COVID-19 was of utmost importance, and so, while hospital processes were being developed, we quickly created an internal contact tracing system to manage ED patient and employee exposures.

- In addition, we sought the advice and guidance of colleagues around the country to anticipate future needs and identify potential areas for development or opportunities to improve upon current local practice.
- We developed multiple specific clinical care initiatives starting in March:
 - **Space adjustments:** We moved triage and greeting to the ED entrance, allowing for screening, immediate masking of patients/families and, then, appropriate triage and cohorting of patients. We also reconfigured the hospital welcome space and the ED waiting room to allow for patient cohorting by symptoms/exposure, and reconfigured ED clinical care teams to support patient cohorting by symptoms/exposure.
 - **Clinical pathway:** We developed and frequently revised (at times, daily) [a novel coronavirus clinical pathway](#), which provided a hierarchical process map with supplemental information to standardize all processes around the care of the suspected or confirmed COVID-19. An EPIC order set was developed for SARS-CoV-2 PCR (screening vs diagnostic) and discharge instructions guiding suspected/confirmed COVID care were created. When a COVID-related multisystem inflammatory disorder (MIS-C) was identified, we quickly developed a pathway for the evaluation of these patients as well.
 - **Special attention for the safe, efficient care of critically ill children:** Critically ill often require aerosol generating procedures, which have the highest risk of transmitting the virus to others. We collaborated with colleagues from Respiratory Therapy, Infection Prevention and Control, Critical Care, and Pulmonology to review procedures and mitigation techniques, and developed guidance for staff throughout the institution. We also rapidly re-vamped our resuscitation procedures, including creating a second resuscitation bay space; developing a remote “command center;” using novel communication devices, designating locations for donning/doffing PPE with PPE monitor guidance; and minimized staff who provided care at the bedside. To put these actions into practice, we practiced with frequent resuscitation simulations, some unannounced, including during evenings and weekends. We also created emergency airway bags with appropriate PPE including N95 and HEPA filters for unanticipated respiratory events.
 - **Testing:** We developed a [testing algorithm](#) to determine who needed testing, which included all admitted patients, and a robust follow-up plan for notification of test results.
 - **Collaboration:** We partnered with our local EMS systems to ensure safe and appropriate transfer of care. We attended daily (and later tri/bi-weekly) hospital bioresponse meetings to ensure alignment and collaboration with our infection prevention and control team, supply, and the other inpatient (as well as outpatient) clinical care teams.
 - **Other clinical care initiatives:** Examples include surge planning (for pediatric or adult patients); advocating for appropriate PPE and participating in conservation efforts; training ED staff to serve as PPE monitors and as N95 fit testers; additional training on the safe use of restraints for behavioral health patients; transition to a remote registration process to limit staff contact with patients; and adjustment of the care team model, including development of a robust back-up call system for all levels of providers for exposure or illness and the use of technology (e.g., iPads, centralized monitors) to limit patient exposures.

***Key Takeaways:** The many aspects of clinical care that we needed to adjust quickly required breaking issues down into subsets with small teams responsible for specific tasks and providing

autonomy for these groups to move forward with changes, while working with hospital teams/leadership. We then relied on these teams to report back to our larger group so changes occurred efficiently. Additionally, the development of a clinical pathway that was updated as needed allowed for consistent and appropriate care to be delivered by the entire team.

Information Technology

- We developed an order for COVID-19 testing, and updated it to include indication—screening or diagnostic—to assist others involved in a patient’s care (such as consultants and inpatient teams).
- We added COVID testing data to the ED dashboard in EPIC to provide information to the entire team in real time.
- We obtained iPads for telemedicine consults and for video interpretation.

***Key Takeaway:** Technology, particularly an existing electronic health record that allowed for nimble changes, was key to our response efforts.

Advocacy

- Keeping in mind that the pandemic was creating many economic hardships for our patients and families, beyond their medical issues, and understanding that the ED was often the only location families were traveling to outside of their homes, our advocacy team developed processes to provide meals in the ED, developed a list of community resources to provide at discharge, and developed a process with the CHOP Social Work Division to routinely offer support to all families.

***Key Takeaway:** The ED is a safety net location, and a few simple interventions allowed us to address much more than the health needs of our patients and families.

Education

- As a teaching hospital with a commitment to education, we quickly revamped our educational platform to ensure continued trainee learning while allowing for social distancing in times outside of clinical shifts. We transitioned to a remote curriculum, but maintained three novel Pediatric Emergency Medicine (PEM) faculty- or fellow-delivered lectures per week.
- We developed a PEM learning bank with online lectures available for review by trainees outside of clinical environment.
- We created and deployed educational modules for nurses on a new platform to provide remote access to yearly skills lab.

***Key Takeaways:** It’s important to remember all aspects of an academic hospital’s mission, and technology and a dedicated team allowed us to adjust to remote learning quickly.

Research

- As the pandemic spread, the quantity of scientific research related to COVID-19 increased exponentially. We realized this information was of vital importance and would affect our clinical care, and we wanted to ensure we were on the cutting edge of incorporating new information into our work. However, the amount of literature was

too much for people to read and process individually. Therefore, we convened a research workgroup led by our research directors to review and summarize COVID-related literature.

- Inter-disciplinary teams provided a weekly digest with data by category, such as general epidemiology, transmission, diagnosis, treatment, high-risk populations and health care workers considerations.
 - Over 250 articles were reviewed and summarized in the first five weeks.
- Additionally, our researchers collaborated on multiple COVID-19-related research projects, including biomarker studies, serology testing, chest x-ray findings and the epidemiology of COVID testing among pediatric patients.

***Key Takeaways:** Summarizing research findings through careful review of the literature provided important knowledge for our team, and allowed everyone to feel comfortable that our approach was based on the most up-to-date knowledge.

In summary, the most important takeaways from our COVID-19 response are that members of a team can be engaged in small, well-defined tasks—which can be combined to allow for appropriate, safe care—and that communication around up-to-date information and decision-making significantly allays concerns. We were well-poised to rapidly respond given the leadership structure within our division and our ED that provided significant support and our ability to rapidly deploy small teams with decision-making capabilities. For example, in addition to the division chief, our physician leadership team includes a medical director/associate division chief, as well as several associate medical directors with intricate knowledge of ED operations and medical technology. We also received support from the director of education and the director of research, and the director of global health & bioresponse in those areas. Our nursing leadership includes several senior nurses with experience in patient safety and operations, as well as disaster preparedness.

Although we did not gather quantitative data to assess the success of the described initiatives, through our twice-daily RN/MD walk-rounds and our weekly divisional meetings with Q&A, it was clear that our staff appreciated these efforts and we quickly witnessed a reduction in anxiety around caring for patients with COVID-19. We also plan to continue many of our remote educational interventions, and have used this experience to further develop other programs—such as an educational pediatric emergency medicine podcast and our advocacy initiatives—that would likely have stalled without the enhanced infrastructure related to the pandemic. We hope this information proves valuable for planning around future COVID-19 outbreaks and/or for other pandemics.

There were many individuals who contributed to the success of these efforts in the CHOP ED.

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