A Blueprint for Pediatric Emergency Resource Reallocation During the COVID-19 Pandemic

An NYC Hospital Experience

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Objective: We present a blueprint for the reallocation of pediatric emergency resources in response to the COVID-19 pandemic.

Methods: New York-Presbyterian Hospital – Weill Cornell Medical Center is an urban, quaternary, academic medical center, a level 1 trauma center, and a regional burn center located in New York City. The novel coronavirus (COVID-19) pandemic created a unique challenge for pediatric emergency medicine. As the crisis heightened for adult patients, pediatric emergency services experienced a significant decline in volume and acuity.

Results: We offer guidelines to modify physical space, clinical services, staffing models, and the importance of steady leadership. Pediatric emergency space was converted to adult COVID-19 beds, necessitating the repurposing of nonclinical areas for pediatric patients. Efficient clinical pathways were created in collaboration with medical and surgical subspecialists for expedited emergency care of children. We transitioned staffing models to meet the changing clinical demands of the emergency department by both reallocation of pediatric emergency medicine providers to telemedicine and by expanding their clinical care to adult patients. Concentrated communication and receptiveness by hospital and department leadership were fundamental to address the dynamic state of the pandemic and ensure provider wellness.

Conclusions: Modification of physical space, clinical services, staffing models, and the importance of steady leadership enabled us to maintain outstanding clinical care for pediatric patients while maximizing capacity and service for adult COVID-19 patients in the emergency department.

Key Words: COVID-19, resource, reallocation

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Disaster management guidelines and protocols for infectious disease outbreaks that can overwhelm standard hospital resources have centered on increasing space and medical support.[1] Epidemics and pandemics such as the severe acute respiratory syndrome, Ebola, H1N1 influenza, and even seasonal influenza surges have prompted international, national, state, and local authorities to implement and revise disaster response frameworks to guide hospital planning models.[2–5] Pediatric disaster coalitions and organizations provide recommendations to prepare and manage children in disasters.[6]

As the novel coronavirus (COVID-19) pandemic spread, our institution activated disaster planning at all levels. In the emergency department (ED), leadership and hospital administration partnered with emergency medical services (EMS) to generate plans for expansion of space, supplies, and staff. As the crisis heightened for adult patients in our hospital, the pediatric emergency service presented a unique challenge in resource allocation: decrease in volume and acuity. We present a blueprint for the reallocation of pediatric emergency resources in a large New York City university–based hospital in response to the COVID-19 pandemic.

METHODS

The New York-Presbyterian Hospital – Weill Cornell Medical Center is 1 of 10 hospitals that comprise the New York-Presbyterian (NYP) network, with campuses located in 4 boroughs of New York City and in Westchester County (New York). The New York-Presbyterian Hospital – Weill Cornell Medical Center is an urban, quaternary, academic medical center, level 1 trauma center, and regional burn center. Our ED sees more than 70,000 annual adult visits per year with an overall admission rate of 30%. Our pediatric ED (PED), located in a dedicated area within the main ED, cares for approximately 17,000 patients younger than 21 years, with a 15% admission rate.

On March 3, 2020, the first case of COVID-19 was reported in New York City, with the first fatality reported 1 week later.[7] By March 25, the pediatric emergency census dropped, from an average of 50 visits per day to less than 10. The adult ED experienced an overall increase in acuity of patients requiring a multitude of ED resources. The decline in the pediatric census generated a re-evaluation of the pediatric disaster response and reallocation of resources to better meet the critical needs of the adult emergency service.

RESULTS

The pediatric response to the COVID-19 pandemic implemented change in 4 domains: *physical space*, *clinical services*, *staffing models*, and *leadership*. Our goal was to continue to provide outstanding and safe pediatric care while at the same time supporting the adult emergency COVID-19 crisis.

Physical Space

Our PED consists of 3 open bays, 2 negative-pressure isolation rooms, 2 neutral pressure examination rooms, and a state-of-the-art positive-pressure resuscitation space. We also routinely use an additional seven hallway stretchers for patient overflow within our pediatric emergency space. In response to COVID-19, on March 26, we reallocated all of the pediatric bays and rooms to adult COVID-19 patients. The space was used for adult COVID-19 patients who were admitted but awaiting bed assignments. Their care was provided by adult emergency medicine (EM) providers or the adult inpatient team.

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We reconfigured the remaining PED space to safely examine and manage pediatric patients. We converted the pediatric waiting area to a clinical space by replacing the waiting area furniture with 3 stretchers and privacy screens. We repurposed the negative-pressure pediatric triage room, which is adjacent to the waiting area, as a safe space for aerosolization treatment. We enlisted additional clinical space by placing stretchers with disposable curtains along an external hallway within the ED for noninfectious patients. We relocated our pediatric procedure cart, crash cart, and personal protection equipment (PPE) cart to the waiting area for ease of access and use to care for pediatric patients. We maintained the pediatric resuscitation room, fully equipped and functional, for acutely ill pediatric patients or trauma, as we retained our level 2 pediatric trauma designation, pediatric trauma surgeons, and operating room availability for emergencies. The resuscitation room positive pressure was deactivated to neutral pressure as COVID-19 patients may be cared for there. Our infant warmer was maintained as we anticipated the potential for an increase in extramural births during this crisis. Adult-aged patients managed by pediatric emergency medicine (PEM) providers were cared for in this space as well. We continued receiving EMS transports throughout this pandemic.

Physical Space—Tips

- *Creative use of nonclinical space for pediatric patients, using additional stretchers, privacy screens, and mobile supplies.*
- *Maintain a designated area for pediatric resuscitation*
- *Use of negative pressure areas and deactivation of positive pressure areas to accommodate COVID-19 patients.*
- *Maintain infant warmer and supplies for extramural births.*

Clinical Services

Our PED cares for patients up to age 21 years. In response to the decline in pediatric emergency visits, our PEM providers transitioned to care for patients through their 35th birthday. This age cutoff was arbitrarily decided upon. This included both COVID-19 complaints and those with other medical concerns. The emergency triage nurse assigned these adult patients to pediatric providers. Patients who were intoxicated, incarcerated, critically ill, or in respiratory failure were excluded and sent to the adult ER. The PEM providers cared for COVID-19–suspected adult patients, using clinical algorithms available on our shared network, with adult EM provider backup available for real-time consultation. Adult patients who progressed to respiratory failure were transitioned to adult EM providers for advanced management, whereas pediatric patients with respiratory failure continued their care by the PEM providers. The Department of Anesthesiology, in collaboration with the Department of Emergency Medicine, developed a critical airway algorithm, which included anesthesia management of all adult and pediatric intubations.

In response to the now limited space and capacity for pediatric emergency care, we developed expedited clinical pathways for urgent and emergency surgical conditions to provide safe care and reduce time in the PED. Our affiliated orthopedic hospital, Hospital for Special Surgery (HSS), adjoined to our hospital, implemented an advanced outpatient clinic to care for emergency orthopedic conditions in patients of all ages. After a rapid clinical assessment and administration of analgesia, we transferred patients requiring urgent orthopedic care to HSS for imaging and reduction procedures. Staff from HSS collected the patient from the PED and brought them to HSS, located next door. Because of the reduction in clinical space designated for children, we discontinued performance of procedural sedation on children in the PED. Procedural sedation was done by anesthesia at HSS.

In response to COVID-19, we transferred all pediatric patients requiring psychiatric evaluation to an extended observation bed (EOB). The EOB, part of our Comprehensive Psychiatric Emergency Program, is located within our hospital. It was previously reserved for adult psychiatry patients with 1 adolescent bed. Child psychiatry evaluated and managed all pediatric mental health patients directly in the EOB, so that these patients no longer required their extensive evaluation process in the PED space.

We streamlined our algorithm for evaluating patients with suspected acute abdomen and/or appendicitis. This included laboratory studies, an ultrasound, and a focused limited-exposure computerized tomography scan for equivocal cases. We discontinued use of magnetic resonance imagings to reduce time periods of evaluation in the PED.

We continued to care for emergencies, such as head injury, trauma, and burns, in our PED resuscitation area, with onsite consultation by pediatric neurosurgery, trauma, and burn surgery. Medical subspecialty services provided remote consultation with clinic or telemedicine follow-up.

In an effort to expand hospital capacity for adult patients with COVID-19, and based on the very low inpatient pediatric census, our institution relocated all pediatric inpatient services, including the pediatric intensive care unit to NYP network's free-standing children's hospital, Morgan Stanley Children's Hospital (MSCH). Therefore, all pediatric patients in the PED requiring admission and/or surgery were transferred to MSCH. A collaborative partnership with hospital leadership, subspecialists, the PED at MSCH, the NYP Transfer Center, and the NYP EMS was essential to ensure a successful and efficient transfer process. All transfers were made through the NYP transfer center using NYP EMS for successful transport.

Clinical Service—Tips

- *Expand clinical care by PEM providers to adult patients (+35 years).*
- *Collaborate with subspecialists and surgeons to develop efficient clinical pathways for expedited emergency care of children.*
- *Transfer patients who require procedural sedation to an alternate service outside of the PED.*
- *Relocate psychiatry patients to a safe space external to the PED.*
- *Develop a streamlined transfer and/or admission process for children.*

Staff Reallocation

In response to COVID-19, we reallocated our physician staff with the following goals in mind:

1. to collectively minimize exposure to COVID-19 in clinical providers
2. to reduce potential community-based exposure during commute to work
3. to promote social distancing in the PED clinical work area
4. to reallocate the medical providers to meet the changing clinical demands.

During peak hours in the PED, we previously had double or triple coverage. To limit the number of possible exposures to COVID-19, we modified our PED attending clinical schedule to single attending coverage. A second PEM provider was available as backup if needed. In the past, the PED was also covered by a combination of 2 pediatric residents, a nurse practitioner, and a

PEM fellow. We decreased the number of total providers present at 1 time to a maximum of 2, including the PEM attending, to allow for social distancing within the PED.

We reassigned PED nurses to care for adult COVID-19 patients who were boarding in PED. One PED nurse was designated to work alongside the PEM provider, caring for pediatric and adult patients, but was also available to help with adult ED patients.

Reallocated PEM physicians previously assigned to clinical shifts covered telemedicine shifts in response to increasing demands for virtual urgent care visits. Coverage for telemedicine was expanded from 8 to 16 hours per day. Pediatric emergency telemedicine providers previously cared for pediatric patients exclusively and functioned as a virtual urgent care. During the COVID-19 pandemic, our adult and pediatric telemedicine visits surged to 15 times its normal capacity. Because of increased demand, PEM physicians expanded their scope of practice and managed patients of all ages with COVID-19 symptoms in addition to all pediatric complaints. Clinical practice guidelines and simulation training programs were developed to educate and train PEM providers to manage and recognize respiratory distress in adult COVID-19 patients via telemedicine.

Child life specialists previously assigned to the PED transitioned their care to provide support for COVID-19 adult patients and their families. Child life also provided support for hospital staff by distributing comfort care and food during the day to critical care and ED units.

Staff Reallocation—Tips

- *Reallocate medical staff to meet changing clinical demands of the ED.*
- *Enhance safety considerations for PEM providers.*
- *Expand emergency virtual urgent care services for patients of all ages with increased PEM provider coverage.*
- *Reassign PED nurses to care for adult COVID-19 patients.*
- *Reallocate emergency Child Life specialists to provide support to children of COVID-19 patients and hospital staff.*

Steady and Receptive Leadership

Concentrated communication was essential to address the dynamic state of this viral pandemic. Emergency department leadership conducted in-person morning and evening huddles and frequently rounded with front-line staff. Daily e-mails and live video updates by ED and hospital leadership provided New York City, NYP Hospital, and ED patient statistics and updates. Faculty meetings were transitioned to video conferencing and allowed for sharing of experience and ideas in real time to effect change. Information included rapidly evolving guidelines, recommendations for testing, PPE, consultation and surgical modifications, and changes in all domains—*physical space, clinical service, and staff reallocation*.

Managing wellness and staff morale was imperative during this crisis. Food and comfort care, parking and lodging options, scrubs, and PPE were provided daily for all staff. Psychological support was made available through virtual group and individual sessions. Zoom family dance parties and virtual staff communication platforms offered a creative forum to exchange experiences and boost spirits. Above all, fundamental to effective leadership, is for staff to be recognized and respected.

Leadership—Tips

- *Concentrated communication to maximize faculty situational awareness.*
- *Staff advocacy and support by meaningful and tangible acts.*
- *Use of Zoom to foster staff alliances and promote wellness.*

DISCUSSION

The COVID-19 pandemic posed unique considerations for pediatric EM. The reduction in pediatric patient census caused urgent reevaluation of resources to adapt to the needs of this infectious disease crisis. This pediatric emergency response, including modifications in physical space, clinical service, and staffing models, while fostering steady leadership, has enabled us to provide outstanding care to pediatric patients while maximizing capacity and clinical care for adult COVID-19 patients in the ED.

Creative innovation, flexibility by providers, collaboration with specialty and surgical services, effective communication, and receptive administration are essential to address the challenges in emergency care for children and PEM providers during the COVID-19 crisis.

REFERENCES

1. Einav S, Hick JL, Hanfling D, et al, Task Force for Mass Critical Care; Task Force for Mass Critical Care. Surge capacity logistics: care of the critically ill and injured during pandemics and disasters: CHEST Consensus Statement. *Chest*. 2014;146(suppl 4):e17S–e43S.
2. New York State Comprehensive Emergency Management Plan: Pandemic Annex. New York State Disaster Preparedness Commission, March 2020. Available at: http://www.dhses.ny.gov/planning/cemp/documents/Pandemic-Annex.pdf. Accessed April 16, 2020.
3. Stoto MA, Nelson C, Higdon MA, et al. Lessons about the state and local public health system response to the 2009 H1N1 pandemic: a workshop summary. *J Public Health Manag Pract*. 2013;19:428–435.
4. Madad S, Moskovitz J, Boyce MR, et al. Ready or not, patients will present: improving urban pandemic preparedness. *Disaster Med Public Health Prep*. 2020;1–4.
5. World Health Organization. *Pandemic Influenza Preparedness and Response: A WHO Guidance Document*. Geneva: World Health Organization; 2009.
6. Frogel M, Flamm A, Sagy M, et al. Utilizing a pediatric disaster coalition model to increase pediatric critical care surge capacity in New York City. *Disaster Med Public Health Prep*. 2017;11:473–478.
7. NYC Health. Covid-19 data. Available at: https://www1.nyc.gov/site/doh/covid/covid-19-data.page. Accessed April 16, 2020.