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Lisa Delsignore, MD, Phoebe Yager, MD, Kimberly Whalen, RN, MS, CCRN, Jenna Pacheco, PharmD, BCPPS, Tamara Vesel, MD, Sara Ross, MD

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Voices of Pandemic Care: Perspectives from Pediatric Providers During the First SARS-CoV-2 Surge

Authors:
Lisa Delsignore MD, Tufts Children's Hospital, ldelsignore@tuftsmedicalcenter.org, Tufts Medical Center, Division of Pediatric Critical Care, 800 Washington Street, Box 93, Boston, MA 02111

Phoebe Yager MD, Massachusetts General Hospital, pyager@mgh.harvar.edu, Massachusetts General Hospital for Children, Pediatric Intensive Care Unit, 55 Fruit Street, Boston, MA 02114

Kimberly Whalen RN, MS, CCRN, Massachusetts General Hospital, kwhalen3@partners.org, Massachusetts General Hospital for Children, Pediatric Intensive Care Unit, 55 Fruit Street, Boston, MA 02114

Jenna Pacheco, PharmD, BCPPS, Tufts Children's Hospital, jpacheco2@tuftsmedicalcenter.org, Tufts Medical Center, 800 Washington Street, #420, Boston, MA 02111

Tamara Vesel, MD, Tufts Medical Center, tvesel@tuftsmedicalcenter.org, Tufts Medical Center, Division of Palliative Care, 800 Washington Street, South Bldg 7th Fl, Boston, MA 02111

Sara Ross MD, Tufts Children's Hospital, sross3@tuftsmedicalcenter.org, Tufts Medical Center, Division of Pediatric Critical Care, 800 Washington Street, Box 93, Boston, MA 02111

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Corresponding Author: Sara Ross, sross3@tuftsmedicalcenter.org

Synopsis: Pediatric providers were called upon to care for adult patients well beyond their typical scope of practice during the first surge of the SARS-CoV-2 pandemic. Here we share novel viewpoints and innovations from the perspective of providers, consultants and families. We will enumerate several of the challenges encountered, including the need to lead while supporting our teams, balancing competing responsibilities to children while caring for critically

ill adult patients, preserving the model of interdisciplinary care, maintaining communication with families and finding meaning in work during this unprecedented crisis.

Keywords: pandemic, perspectives, critical care, scope of practice, palliative care, interdisciplinary care

Key Points:

- Strong physician and nursing leadership with a focus on provider well-being was essential to providing care during the pandemic.
- With proper supervision and support, scope of practice can be expanded to deliver effective and safe care.
- The rapid onslaught of the first SARS-Cov-@ surge created opportunities for pediatric care innovation and exceptional interdisciplinary teamwork
- Palliative care is well-positioned to bridge the gap between care teams and families while providing emotional support to providers and patients, alike.

Introduction

Pediatric providers were called upon to care for patients outside their typical scope of practice during the first surge of the SARS-CoV-2 pandemic. Providers were forced to think creatively while working within established hospital systems and to utilize resources collaboratively across units and teams. Already published in the literature are examples of collaboration between pediatric and adult critical care groups, descriptions of how Pediatric Intensive Care Units (PICUs) were repurposed to safely care for adults including triage paradigms and care team structures, observations of staffing challenges and resource allocation, along with demographic and outcome data.[1-8] Our collective aim is not to duplicate what has been described elsewhere, but to supplement it by providing perspectives from interdisciplinary pediatric critical care team providers, consultants, and families impacted by the first SARS-CoV-2 surge.

The authorship team is comprised of pediatric providers from two Boston hospital systems: Tufts Children's Hospital (TCH) and Mass General Hospital for Children (MGHfC), both pediatric hospitals within larger academic medical centers providing care to patients of all ages. We share our perspectives bourn of our collective experiences during the first SARS-CoV-2 surge acknowledging that our PICUs approached care of critically ill adults similarly. Our perspectives are informed by challenges and imperatives faced, including the need to lead and support teams through change, balancing long-standing duty to children while contributing to care of critically ill adults, preserving interdisciplinary care and connection to families while expanding scope of practice and the need to find meaning in our work.

Caring for Patients by Caring for the Teams

Shortly after New York, Massachusetts experienced its first wave of SARS-CoV-2 in March 2020, forcing hospitals to rapidly redeploy resources and alter organizational structure to accommodate the torrent of acutely ill patients, primarily adults. Overwhelmed by the volume of patients requiring ICU-level care, Mass General Hospital (MGH) announced its decision to convert MGHfC's 14-bed PICU to an adult intensive care unit (ICU). This decision sparked a host of reactions for staff – anxiety, fear, pride, grief, and anger. Faced with the dual challenges of transitioning from treating children to treating adults ***and*** implementing dynamic COVID-19 care recommendations, PICU leadership strongly advocated to preserve the PICU nurse-physician team rather than redeploy providers to other units. This allowed us to capitalize on years of established trust in a familiar environment facilitating rapid adjustment and preserving morale.

Despite recognized gaps in knowledge and experience specific to adult critical care, consensus yielded the decision to have the pediatric intensivist serve as primary physician for adult patients. To address these gaps, we expanded our team to include internal medicine and combined internal medicine-pediatric residents, and an adult intensivist consulted on every patient. The adult intensivist reviewed care plans with the team twice daily and was available to field questions at any time. Subspecialty consultation was delivered by adult providers. To extend the expertise of PICU nurses, nurse dyads comprised of a PICU nurse and an adult medical/surgical nurse were created, to jointly care for two patients. The PICU and adult nurses partnered, complementing one another's experience and skill set. Together they boosted one another's confidence in their ability to care for patients beyond the normal scope of practice. Delivering care in a familiar environment with trusted physicians and leadership promoted a sense of security for PICU nurses during this unfamiliar experience.

One of the core questions asked of PICU leadership was, "What does the team need to provide safe care?" We realized that unless our providers felt safe themselves, it would be extremely difficult for them to provide safe care. Our routine morning nurses' huddle organically morphed into a full team huddle, including physicians, respiratory therapists, nurses, and unit leadership. We dedicated time to review, demonstrate and practice donning and doffing procedures. We shared important updates and solicited feedback from bedside providers to optimize workflows. We also used this time to identify the nurse-resident team caring for each patient and to welcome new members of the team including their home unit and typical scope of practice. In this way, the huddle prioritized team member safety, empowered them to speak-up when concerns arose, defined limits of expertise and ensured a shared mental model for the day ahead.

Knowledge is power, and thus there was ample attention paid to education. Much of the fear initially harbored by the team stemmed from uncertainty regarding how SARS-CoV-2 is spread and lack of experience donning and doffing PPE. Having nurse-physician leadership physically present on the unit every day was important when we were dealing with serious concerns of personal safety. This promoted bidirectional communication and solidarity and care for the team. Before receiving the first adult patient, PICU nurses floated to the adult ICUs to observe typical bedside care and familiarize themselves with other aspects of adult ICU nursing workflow. Dual-sided pocket guides with adult medication dosing on one side and local ICU COVID management guidelines on the other were created and distributed. In response to the lack of ACLS certification among some members of the team, we invited an ACLS provider to review the algorithms and each provider was given an ACLS pocket guide.

With respect to patient selection, we grappled with several questions, including whether to admit critically ill adult patients with COVID-19 versus without, define age limits for patients cared for by pediatric providers, preferentially accept lateral transfers from legacy ICUs versus newly admitted patients directly from the emergency department who had not yet been stabilized. Ultimately, it was decided that the best approach was to have the pediatric team focus on a single disease entity, that being COVID-19 Acute Respiratory Distress Syndrome (ARDS), especially since that is what created the greatest clinical need. Although the original plan was to limit care to younger adult patients, ultimately the age limit was abandoned as there was greater comfort caring for older patients with fewer co-morbidities by comparison to younger patients with significant co-morbidities, including cardiac disease.

The longstanding role of the MGHfC's PICU in the Northeast Regional Biothreats Team played a critical role in enabling a safe and rapid redirection to caring for adults with a high consequence infectious disease like COVID-19. Many nurses and physicians on our team had already been trained to respond to such a threat. These individuals assumed leadership roles within the PICU and institution employing expertise in infection control concepts while helping to oversee much of the institutional response to the pandemic. These relationships forged the basis for critical communication and promoted safe and efficient transition to adult care.

Family-centered care is the generally accepted standard in Pediatric Critical Care Medicine. Though family members were not allowed at the bedside during the first SARS-CoV-2 surge, we applied our family-centered culture of care to our adult patients as best we could. We encouraged family members to help us complete "All About Me" posters to display at their loved

one's bedside. This added a human element and helped our team know each patient behind the tubes and devices. It brought greater meaning to our work. This also conveyed our attempt to grasp and respect the personhood of each patient and our singular goal to return them to their families. When this was not possible, we ensured and communicated to families that their loved one did not die alone.

It goes without saying that the physical and emotional stress placed on healthcare workers during this pandemic has been enormous. Stretching beyond the typical scope of practice is sufficiently difficult, but doing so while concerned for personal safety and the health of one's own family and loved ones compounds the challenge. This prompted deliberate attention to the well-being of the team and its individual members. In addition to the team huddle, pediatric psychiatrists and members of our palliative care team visited the unit daily to check-in and provide support. They held resiliency rounds on a regular basis. The institution established a peer-to-peer warm line to coach ICU and non-ICU providers preparing to have anticipated difficult conversations with families and to offer emotional support any staff or physicians in need during these dark times. Celebrating the everyday successes, like extubations and discharges, also helped to lift the team's spirits.

Strong nurse and physician leadership played a significant role the transition to caring for adult critically ill patients. Beyond ensuring providers had the necessary supplies and medications needed to care for this new patient population, active presence on the unit and timely engagement and responsiveness to articulated needs were crucial to team success. We consistently adhered to the grounding principle that in order to provide safe and effective care

the team needed to feel safe and supported; we believe this principle was critical to sustaining the team and facilitating ongoing excellent care.

Maintaining Care of Pediatric Patients

In early March 2020, we scrambled to prepare for the first wave of critically ill adults into our PICU space at TCH while wrestling with our duty to continue to provide care for children. Early data suggested that COVID-19 disease in children was less severe than in adults, and with the public health guidance intended to limit transition, we anticipated a low volume of critically ill pediatric COVID-related respiratory illness. That being said, we needed to maintain access to critical care resources for vulnerable populations of children (e.g. those with chronic illnesses, technology dependence, immunosuppression). This was all the more imperative given that two of the four local tertiary and quaternary PICUs had been fully transitioned to care for critically ill adults at the surge onset.

To maintain capacity to care for critically ill children, a satellite PICU space (5 virtual beds with the ability to flex to 8 beds) was created on our existing inpatient pediatric ward. We effectively began sharing this unit, which included not only bed spaces, but also nursing staff and other resources. This required many hours of planning and preparation with key stakeholders from interdisciplinary groups (physicians, nursing, pharmacy, respiratory therapy, infection prevention, environmental services, telecommunications) prior to admitting our first patient into this satellite PICU. Several adaptations to the environment were required to accommodate ICU level patients.

As an interdisciplinary team, we obtained and reformatted portable patient monitors to approximate ICU monitoring capabilities, including the ability to display end-tidal CO_2, arterial line, and central venous pressure waveforms. We positioned these monitors strategically to be viewable from the central nursing station since these rooms did not have central monitoring. We distributed emergency airway and other supplies in each room to mimic resources available in our standard PICU rooms. We simulated emergency responses and adjusted the nomenclature of our units to ensure responders arrived to the "new" space easily and in a timely fashion. Telecommunications created a new centralized phone number so that calls dispatched through the operator and paging systems were directed appropriately. Pharmacy updated the medication dispensing units to include medications readily available in our standard PICU in addition to those routinely available on the ward.

In order to staff the satellite PICU, we flexed and utilized the expertise of our nursing staff by integrating floor level nurses, supported by a PICU nurse, into the bedside staffing model for PICU patients. To balance the acuity and needs of all units, we adopted a flexible resident staffing model shared by the cadre of residents covering the pediatric floor, satellite PICU, and the newly created adult ICU staffed and supervised by pediatric ICU care providers. After admitting our first patient, we collected feedback daily during a morning interdisciplinary bedside safety huddle to ensure we were addressing unanticipated needs and maintaining a high degree of situational awareness while delivering safe, effective care for all of our patients.

While this planning and preparation consumed the attention of numerous stakeholders, individual team members had their own personal concerns to reconcile with professional duties. Some had personal medical conditions that put them at risk of developing severe COVID illness.

Others had difficulty managing the increased shift lengths required to staff additional teams. Importantly, we welcomed dialogue regarding individual limitations and found creative ways to mitigate risk and extend and sustain our human resources. For example, one of our pregnant providers took the lead in our satellite PICU caring for pediatric non-COVID patients while liaising with our Medical Intensive Care colleagues via phone to expedite transfer of adult patients to the repurposed PICU. By all measures the satellite PICU was a success. At the height of the SARS-Cov2 pandemic we consistently cared for 2-4 pediatric patients in the satellite space. This allowed us to maintain access for critically ill children in our referral network, provide ongoing exposure for our trainees to pediatric patients, and taught us how to work creatively and collaboratively to make the most of our combined resources.

Innovations in Interdisciplinary Care Delivery

Clinical pharmacists are among the numerous non-physician providers who contribute to the work of an ICU on a daily basis. Over the last decade, the recognition of pediatric clinical pharmacists as essential members of the multidisciplinary care team in PICUs has expanded as the standardization of education and infrastructure for training pediatric clinical pharmacists has evolved.[9-10] At TCH our pediatric clinical pharmacists round daily with the inpatient teams, gathering and analyzing the most up-to-date scientific and clinical information on how to deliver safe and effective pharmacotherapy.

When the TCH PICU transitioned to care for critically ill adults (both COVID-positive and non-COVID), pediatric clinical pharmacists remained key members of the interdisciplinary care

team. The pediatric clinical pharmacists continued to support care of pediatric patients in the satellite ICU while collaborating with adult clinical pharmacists to ensure appropriate management of adults beyond the typical scope of practice.

Before the first critically ill adult with COVID was admitted to the PICU, the pediatric clinical pharmacists worked closely with pharmacy leadership and adult critical care clinical pharmacists to ensure continuity in the medication use process and standardization of educational content for clinicians. High yield, adult critical care pharmacy content, including common medications and dosing, was curated and made accessible to all housestaff via physical binders in the PICU and electronically in a centralized repository that could be easily accessed while rounding. Frequent meetings with this group were held throughout the pandemic to advise physicians about anticipated drug shortages and the use of alternate medications as we continued to maintain supply.

To facilitate appropriate exchange of expertise inherent to the interdisciplinary team while acknowledging social distancing requirements and the need to conserve personal protective equipment (PPE), a hybrid rounding system was piloted utilizing Health Insurance Portability and Accountability Act (HIPAA)-compliant video conferencing alongside an in-person skeleton rounding team. Pediatric clinical pharmacists, palliative care physicians, adult consultants and residents tending to order-entry were some of the remote participants. A substantial amount of time was expended to operationalize hybrid rounding teams. Strategies that contributed to the success of the model included use of personal devices and headphones, limiting background noise by keeping everyone but the presenter muted, using the chat feature to minimize interruptions and having a designated member to display labs and other portions of

the electronic health record to the entire group. With ongoing iterative feedback we were able to effectively streamline hybrid rounds and expand to include other consulting providers from outside of the ICU who could weigh-in with recommendations when relevant.

Despite the success of the hybrid rounding format and the safety it provided to our team members during the uncertainty of the pandemic, the constraints of providing remote pharmacy support were not insignificant. The successful practice of a critical care pharmacist relies on situational awareness gathered through the sight and sound of being present on the unit; whether that be visually assessing a patient, providing a timely response to a drug information question, or anticipating how a patient's therapeutic drug profile may need to change based on their clinical status. As such, there was a greater demand placed on bedside providers, who were also adapting to this new patient population, to be in more consistent communication throughout the day with remote consultative providers.

Although pharmacy support was consistently remote and allowed for meaningful contribution to the team, the opportunity to experience the comradery that is typical of an inclusive multi-disciplinary team was diminished. Nevertheless, invaluable lessons were learned including the importance of being part of a creative team and the experience of expanding expertise beyond the typical scope of practice.

Perspectives of Pediatric Trainees

The ways in which scope of practice were challenged in response to depleted resources during the pandemic are numerous, as providers in nearly all disciplines were expected to expand

their competency and consider deployment to care for patients in ways they hadn't to date. In response, non-internal medicine trainees, attendings and nurses were among the first to be considered for deployment to care for the overwhelming influx of adult patients at teaching hospitals. At both institutions, pediatric intensivists expressed concerns regarding potential exposure to medico-legal action from practicing outside one's scope. Fortunately, through meetings with hospital lawyers, emergency privilege extensions and federal and state liability protections were provided to pediatric healthcare workers. Indemnifying pediatric providers however, was only one hurdle to expanding scope of practice. Several models of redeployment of pediatric providers and resources have been described in the literature [1-8], but only a few articles include the perspectives of pediatric trainees.[11-13] As published by Kazmerski, et al. with 72% of pediatric faculty and trainees categorizing pediatric trainees as essential personnel during the pandemic, the perspectives of pediatric trainees are under-reported, especially given the response of this group in the face of tremendous societal need.[12] The perspectives of two pediatric residents were captured for the purposes of this manuscript.

Both residents noted that, although they although care for adults with multiple complex co-morbidities was a departure from normal, the relative proximity to the broad and largely adult-based medical school curriculum was helpful. Furthermore, working in a familiar environment relying on established relationships, teams and processes allowed for the focus of the trainee to be merely on gaining comfort and competence with the expanding clinical medicine. Working with baseline interdisciplinary team members, such as pediatric nurses, palliative care, social workers and pharmacists allowed for streamlined communication and care delivery. The addition of a weekly multidisciplinary debrief to discuss practices and processes

that were working well as well as where care could improve may have further contributed to all providers feeling more aligned in our approach to caring for patients outside our typical scope of practice.

Naturally, fear of medical errors and harm to patients secondary to lack of established competence in caring for adult patients was pervasive among pediatric trainees. Though efforts were made to address knowledge gaps while the first surge was anticipated, uncertainty and anxiety persisted. Trainees derived a sense of security from shared decision-making between PICU and adult pulmonary critical care providers.

Finally, trainees with exposure to models of care in other countries recalled a generally larger scope of practice abroad with the expectation that physicians of all specialties maintain a broad understanding of medical modalities. Acceptance and more routine exposure to a more varied patient population contributes to a less restrictive personal definition of scope of practice. Interestingly, in the United States there is a trend in both adult and pediatric training and care environments toward super-specialization. More intensified training with increased expertise of providers and standardized protocols focusing on a narrow patient population and set of diseases lends itself to more consistent care plans, the ability to integrate new data and quality measures more rapidly, and ultimately to better patient outcomes. Cardiac and neuro ICUs across pediatrics and adult medicine are excellent examples of this. This does, however, introduce the question of whether we are disadvantaged relative to other countries in our ability to be nimble during a global pandemic, as we call upon more specialized providers to harken back to their broad-based undergraduate training.

Palliative Care: Easing the Burden

The COVID-19 pandemic led to a surge in critically ill and end-of-life patients around the world. With specialization in communication, decision-making and symptom management in critical illness, palliative care at TMC rapidly recognized the need to fill gaps that would inherently exist between the care teams and patients' families. Through in-person and remote consultation, members of the palliative care team were successfully embedded into all ICUs, including the repurposed PICU caring for critically ill adults. Given the nature of the hybrid-rounding model in the PICU, the pediatric palliative care physician would join rounds remotely each morning and liaise with families in the afternoons. Some of the functions of the palliative care team during this time were to:

- obtain additional personal history of patients
- provide frequent updates on patient condition and care plan to families given visitation limitations
- provide guidance on anticipatory grief, hope and realistic goals of care to families
- provide a consistent point of contact for patients who moved between several units during extended hospitalizations
- support complicated health care proxy (HCP) scenarios, including identifying the HCP and moderating difficult family decisions
- provide grief and bereavement support to staff

After the first phase of the pandemic, the palliative care research team was interested in the research question, "How has the COVID-19 pandemic led to changes in the utilization,

perceptions and understanding of palliative care among critical care physicians, hospital leaders, and spiritual care providers?" We conducted 25 in-depth interviews between August and October 2020. Qualitative findings indicated that the pandemic reinforced positive perceptions of palliative care and palliative care connected providers, patients, and families, supported providers, and contributed to hospital efficiency.[14]

In particular, providers identified collaboration with palliative care to have relieved some of the workload and reduced emotional burden by taking the lead in time-consuming, emotionally draining discussions with patients and families. With regards to bereavement, all respondents were proponents of incorporating greater bereavement support into patient care at TMC. Most believed that palliative care providers are well-suited to play a leading role in that process and continue to provide an avenue for families to communicate with the care team after the death of a loved one.

As a marker of the important role palliative care played in support of families during the pandemic, we'd like to share this note from an 89-year-old sister who's brother died at TMC while his relatives were in Atlanta and Arizona.

> *"I was so deeply touched by the write up you gave to the BlueCross BlueShield reporter about my brother and my family and your effort to ease the distance between us. Thank you so very much for that beautiful tribute to my family and especially to my brother.*
>
> *Your calls to M [his nephew] and me were very precious in that you were so calming and caring. That meant so much and added to the comfort of making our decisions. Both M and I feel as if we made the right call and hope that B [my brother] is, at last, at peace.*

With love,

E [B's sister]"

Conclusion

The Codes of Ethics published by the American Medical Association, American Nursing Association, and American Society of Health-Systems Pharmacists each respectively addresses the long-standing responsibility of physicians, nurses, and pharmacists in protecting and promoting the health of the public.[15-17] While these vignettes are a small sampling of the experiences of pediatric providers in meeting that call, our hope is that through these stories we've shared some unique viewpoints and innovations, and that we've provided a window into the contributions of pediatric teams to our communities. It was not only our responsibility to do so, but an honor to be a cornerstone of care delivery during the pandemic.

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