




COMMENTARY

The roles of a pediatric pulmonologist during the COVID-19 pandemic

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Abstract

Pediatric pulmonologists have been involved in the care of adult COVID-19 patients in a variety of ways, particularly in areas with a high concentration of cases. This invited commentary is a series of questions to Dr Mikhail Kazachkov, a pediatric pulmonologist at New York University, about his experiences to date in a major COVID-19 “hotspot” and his thoughts about how other pediatric pulmonologists facing this situation can best support their colleagues.

KEYWORDS

epidemiology, Children's Hospital, COVID-19, pediatric pulmonologist

INTRODUCTION

The COVID-19 pandemic has resulted in high morbidity and mortality among older adults, particularly those with underlying medical conditions including hypertension, diabetes, obesity, and COPD.^{1,2} Data relevant to optimizing or improving care for these patients have emerged rapidly, and the shared anecdotal experience of care teams in high-prevalence areas has been extremely helpful for other centers preparing for possible surges in cases. Fortunately, to date, the incidence of severe COVID-19 disease among children has remained relatively low.

While the brunt of caring for patients infected with COVID-19 has clearly been shouldered by physicians, nurses, and respiratory therapists in emergency medicine, internal medicine, adult critical care, and adult pulmonology services, in some locations the scale of the problem has required the direct involvement of other specialists, including pediatric pulmonologists. Dr Mikhail Kazachkov, Division Chief of Pediatric Pulmonology Division at New York University's Langone Medical Center, is one such physician. We posed a series of questions to Dr Kazachkov about his experiences to date and

his thoughts about how other pediatric pulmonologists facing this situation can best support their colleagues.

1 | DESCRIBE THE ROLES YOU HAVE HAD IN YOUR CENTER'S RESPONSE TO COVID-19

When NYU was hit with COVID pandemics, it became clear that with the increasing volume of admissions, rapid increase in number of intensive care unit (ICU) patients, and the need for multiple hospitals to expand staffing, our adult pulmonary physicians would be spread thin very quickly. I offered to help and was assigned to Langone Orthopedic Hospital (LOH) in March of 2020. By that time, all elective orthopedic surgeries had been canceled and the decision was made to open this hospital to COVID-19 patients. Most of the admitted patients were transferred from other NYU Hospital sites and had moderate disease; many of them had significant comorbidities and often required extensive rehabilitation services which were in

place at this orthopedic hospital. There was only one adult pulmonary/ICU physician left on staff at LOH because everybody else was deployed to ICUs on main campus.

I joined a pulmonary consultation and ICU service. My main role was to round with medical teams to identify sicker patients who could require ICU care due to rapid disease progression, and provide pulmonary consultation to them. If an ICU transfer was deemed necessary, I, together with my pulmonary/ICU team, would assume their intensive care. Simultaneously, I was a member of a rapid response team and therefore had to be readily available during codes and emergencies.

2 | WHAT HAVE BEEN THE MOST IMPORTANT ASPECTS OF TEAMWORK, AND WHAT WOULD YOU SAY HAS BEEN THE MOST VALUABLE SKILL YOU BRING, AS A PEDIATRIC PULMONOLOGIST FUNCTIONING AS PART OF A TEAM PROVIDING ADULT COVID-19 CARE?

First of all, I would like to say that it was very challenging experience for me. I have been a pediatric pulmonologist for many years and have a decent amount of experience as a PICU physician. However, my expertise in adult medicine was limited before this assignment. Luckily, I had great mentors there; Dr Ezra Dweck, Director of Pulmonary and Critical Care at LOH, and his team quickly adopted me as their “junior” team member, and provided valuable education and supervision.

The team, like everyone else around the world, was challenged by previously unknown issues and humbled by the magnitude of COVID-related medical problems. At the same time, we were learning the proper interpretation of clinical signs and laboratory tests as well as setting the principles of respiratory management together. Several patients on our service had certain comorbidities which were in my expertise spectrum: there were adult patients with tracheostomies and restrictive lung disease related to neurological disorders and chest deformities. These conditions were very familiar to me and other pediatric pulmonologists involved in the management of children with respiratory manifestations of neurological diseases, so I was glad that my experience was able to help the team provide proper care for these patients.

3 | HAVE YOU CONTINUED TO CARE FOR CHILDREN WITH RESPIRATORY DISORDERS AS WELL? HAS IT BEEN IMPORTANT TO STRICTLY COMPARTMENTALIZE YOUR ACTIVITIES FOR INFECTION CONTROL PURPOSES?

Our Division of Pediatric Pulmonology at NYU continued to provide care to our patients. Similar to many other pediatric pulmonary divisions in the countries affected by COVID-19 pandemics, we adapted

telemedicine, temporarily suspended pulmonary function testing, and clinical research studies. However, we continued with a full spectrum of emergency services including outpatient assessments in our clinic and inpatient service. I continued to function in the capacity of Division Chief and also provided consultation and emergency bronchoscopy service at our Hassenfeld Childrens’ Hospital. Of course, most of the pediatric wards were turned into adult COVID-19 units; however, we kept several pediatric and PICU beds open. We admitted several pediatric patients with severe COVID-related lower airway disease. All of them had significant comorbidities and preexisting conditions. Similarly to our colleagues at other COVID-19 “hot spots” we were very pleased to find out that the majority of our patients with chronic pulmonary diseases did very well. Many of them had a mild or moderate course, which we were able to handle on an outpatient basis. Several of our chronic patients with cystic fibrosis and severe restrictive lung disease had to be admitted due to exacerbations of their pulmonary diseases unrelated to COVID-19, and were kept in a “non-COVID” pediatric unit completely separated from the rest of the hospital. At the end of the pandemic outbreak, we started to see patients with multisystem inflammatory syndrome in children but only two of them required pulmonary consultations and care. My adult and pediatric patients were situated in separate hospital buildings. I used different sets of scrubs between wards, and of course, never shared my personal protective equipment (PPE) between pediatric and adult patients. In addition, to improve infectious control, all hospital employees underwent mandatory COVID-19 PCR testing, and antibody testing. We did our best to separate COVID Team members from the personnel working at “non-COVID” units of the hospital, but it proved to be a very difficult thing to do because more and more medical personnel were called to join the “COVID Army.” At the peak of the pandemic crisis, many of us worked on the COVID-19 wards but continued taking care of children in our direct pediatric subspecialty practices.

4 | WHAT ARE THE MOST IMPORTANT WAYS A HEALTH CARE CENTER OR SYSTEM CAN SUPPORT A PEDIATRIC PULMONOLOGIST WHO IS ASKED TO BE PART OF THE COVID-19 CARE TEAM?

When the pandemic started, many nonpulmonary physicians joined the “COVID Army.”

We were all required to go through an orientation process where we were instructed on the logistics and organization of COVID care at NYU (which with time became very well structured). All personnel were divided into highly specialized teams, some of them quite unique and devised specifically for COVID. Some examples of those teams were:

- a. Medicine and ICU teams, which worked in MICU and COVID step-down wards. They consisted of one to two senior (pulmonary/ICU) and two to three junior physicians. The latter were comprised of various specialists including orthopedic surgeons, cardiologists, pediatricians, and many others.

- b. Bronchoscopy teams which consisted mostly of thoracic surgeons. Their role was to provide emergency bronchoscopy service to prevent "loss" of endotracheal tubes due to plugging and to help with management of atelectasis related to formation of large mucus plugs.
- c. Tracheostomy teams consisting mostly of interventional pulmonologists and ear, nose and throat surgeons. They performed percutaneous and standard tracheostomies on patients who required long term ventilation.
- d. Rapid response teams formed from anesthesiologists. These teams responded to codes, intubated patients, and inserted central lines.
- e. ECMO teams which brought together ECMO attendings and cardiothoracic surgeons. At certain time points, we had more than 20 ECMO patients at NYU's main campus.
- f. Communication teams composed mostly of medical students. Although they were not allowed to directly care for patients, they provided vital communication to family members.

It is very important to mention that each team also employed nurses, nurse practitioners, physician assistants, respiratory therapists, medical assistants, and many other supporting staff, which were absolutely instrumental in keeping the teams functioning. I personally would like to acknowledge the outstanding role of our pediatric, medical, and surgical residents and fellows, who functioned in various capacities on all teams and became major contributors to the process.

After the teams were established, all non-ICU physicians received a full day of training in a simulation lab. It was rather intense and included hands-on training in resuscitation and management of common acute conditions with special attention to acute respiratory distress syndrome. Our main training experience, however, started in the wards and ICUs where we began our practical learning of COVID-19.

At this stage, the situation has evolved quite a bit. Our medical community has been studying COVID-19 practically and academically for several months now, and has accumulated a vast amount of data which is summarized in guidelines, pathways, and algorithms.^{3,4} I think that every health care system has the responsibility to prepare appropriate educational materials and pathways, which can be used in case we have to deal with COVID-19 surges again. It seems logical to imagine that our leading medical organizations and societies would contribute to their development.

5 | FROM YOUR PERSPECTIVE, WHAT ARE THE MOST IMPORTANT THINGS CHILDREN'S HOSPITALS OR RESPIRATORY PROGRAMS SHOULD DO TO BE READY FOR WAVES OF COVID-19 OR OTHER FUTURE EPIDEMICS OF THIS TYPE?

I think many of us have considered the potential situation where the pediatric pulmonology community is faced with a new respiratory

illness comparable with COVID-19 in its infectiousness and severity. I certainly hope that it never happens; however, history just taught us a severe lesson, and we, therefore, cannot deny the possibility of such an occurrence. There are several important factors, which in my opinion would define our readiness:

- a. Ability to expand ICU and step-down beds. Here at NYU, we were able to increase our adult ICU bed capacity by 800% within the first 2 weeks of the pandemic-related admission surge. I think this ability was critical to our success in dealing with the gigantic wave of sick patients in an efficient and organized way.
- b. Setting up a process for the rapid formation of specialized teams would define a hospital's ability to be clinically efficient in fighting a new pandemic.
- c. Thorough understanding of the epidemiology of the virus, as well as availability of clear guidelines on usage of PPE and negative pressure rooms, would be critical in preventing spread of infection to patients and personnel.
- d. Availability of human resources. The NYU experience shows that respiratory therapists and nurses were in the highest of demand. Hospitals should have in place a recruitment plan which would allow for rapid expansion of medical staff.

Equally important, we all have to be mentally and emotionally ready to stay calm and be able to work efficiently under the tremendous stress of a pandemic. I witnessed my colleagues coming to work every day with an optimistic attitude and an enormous desire to win this fight. This was the most important factor of them all.

6 | WHAT EMOTIONAL IMPACT DID IT HAVE ON YOU?

It was a very trying time. The magnitude of pandemic, amount of disease, and death around resulted in recalibration of the scale of values for many of us. I think that fundamental values, such as faith, hope, and love were cherished, and certain "material" things seemed to become bleaker. The COVID-19 pandemic has left us with scars in our souls, but also, in a way, made us better physicians and better human beings, I hope.

CONFLICT OF INTERESTS

The authors declare that there are no conflict of interests.

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How to cite this article: Kazachkov M, Noah TL, Murphy TM. The roles of a pediatric pulmonologist during the COVID-19 pandemic. *Pediatric Pulmonology*. 2020;55:2592–2595.
<https://doi.org/10.1002/ppul.25010>