response in premature infants with mild-to-moderate respiratory distress. In this regard, we agree with the comment by Madney et al (1) that the experimental period of 3 hours may be considered too short to investigate the full treatment response to a single dose and the possible need for repeat dosing. Indeed, after achieving our objective of identifying an appropriate dose of surfactant nebulization for the treatment of respiratory distress in our preclinical setting and demonstrating the safety of the technique using an e-Flow nebulizer (2), we undertook a long-term study to evaluate the efficacy of this technique over the critical period of 72 hours after surfactant administration (7). Our results confirm that the nebulization of 400 mg/kg of poractant alfa is effective in our animal model, given the 50% lower risk of respiratory failure (requiring intubation and mechanical ventilation) in the first 72 hours after surfactant administration treatment than nCPAP alone. Unfortunately, we did not test the repeat dosing option in this study setting.

Finally, the authors raise an important question regarding the translation of the results obtained in our preclinical study to clinical practice. It is known that to better understand the pathophysiology of neonatal RDS and verify novel treatment approaches, RDS animal models have been extensively used for many years, and we would like to argue are still very much needed today. Nonetheless, while it is true that animal models provide a valuable bridge between laboratory research and the clinic, we agree, of course, that translating our results (and indeed the results from any preclinical experimental model) to human infants requires caution. Of note, a clinical trial to investigate the safety, tolerability, and efficacy of nebulized poractant alfa has been recently closed European Union Drug Regulating Authorities Clinical Trials Database Number: 23016-004547-36. More details on the outcomes of this clinical trial, and perhaps other future studies in the field, will be needed to understand the risk-benefit profile for this therapeutic option and, in turn, the potential role of surfactant nebulization in premature infants with RDS.

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The Role of the Pediatric Intensivist in the Coronavirus Disease 2019 Pandemic

To the Editor:

The outbreak of infections by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV2) was officially declared a Public Health Emergency of International Concern by the World Health Organization (WHO) on January 30, 2020, after the initial cases in China continued to rise and new cases started to be reported from several other countries in Asia and Europe. On March 12, 2020, with over 20,000 cases and almost 1,000 deaths in the European region, the WHO declared the outbreak a pandemic (1). To this day, the number of SARS-CoV2 infections (coronavirus disease 2019 [COVID-19]) continues to rise worldwide bringing along an alarming number of deaths.

The Global Preparedness Monitoring Board of the WHO, in its 2019 "A World At Risk Report," stated that although progress had been made, worldwide efforts to face a health emergency remained "grossly insufficient" (2). Although ICUs have had to prepare for pandemic situations in the past and guidance has been provided by professional societies (3), the current unprecedented situation continues to overwhelm healthcare systems and economies around the world. Governments are facing socioeconomic, logistic, and organizational challenges that may change the way our societies and healthcare systems function forever.

THE ICU CONUNDRUM

The availability of ICU beds varies greatly among countries (4) and depends on several factors such as the number of beds per 100,000 habitants, the socioeconomic status, the prevalence of chronic illnesses, and overall health status of the population

and management choices (i.e., different admission and discharge criteria).

During the current pandemic, special attention has been paid to ICU bed and ventilator availability. Many hospitals in Italy, Spain, the United Kingdom, or the United States have been forced to expand their ICUs outside of their regular spaces using nonconventional locations like operating theaters, wards, or postoperative care units as ICUs. These ad hoc spaces commonly lack the complex architecture and resources of a conventional ICU making logistics challenging.

Although healthcare systems around the world have been able to expand their capacity in terms of ICU beds, ventilator availability has been a major problem. With a saturated global market that cannot meet the demand of these high-tech devices, physicians and respiratory therapists have turned to alternative management strategies including careful selection of the patients who will benefit the most from invasive ventilatory support, extended use of noninvasive support, off-label use of noninvasive ventilation devices, or anesthesia machines for invasive mechanical ventilation or even ventilator splitting (i.e., using one ventilator to support two or more different patients) (5). Likewise, governments, academic institutions, private companies, and individuals have made an enormous effort to increase the offer of ventilators including, in some cases, homemade devices.

With an increased ICU bed capacity and ventilator availability, the next challenge arises: critically ill adults with COVID-19 are highly complex patients who have important requirements of specialized ICU management, including nursing, respiratory support, and supportive care. The increased complexity along with the elevated number of patients requiring intensive care adds up to the high number of healthcare workers affected by COVID-19 in creating severe staffing problems among institutions worldwide.

PEDIATRIC CRITICAL CARE MEDICINE

Although Goran Haglund established the first ever PICU in Gothenburg, Sweden, in 1955, Pediatric Critical Care Medicine is a relatively young subspecialty (e.g., the pediatric section of the Society of Critical Care Medicine was created in 1981) that has rapidly evolved into a highly complex field (6). Pediatric intensivists are highly skilled, highly specialized physicians who treat, on a day-to-day basis, severely ill children with life-threatening diseases such as congenital heart disease, trauma, and infectious diseases. PICUs are high-acuity units where children in a wide range of ages receive state of the art care around the clock, including invasive mechanical ventilation, extracorporeal life support, or continuous renal replacement therapies.

HOW CAN WE HELP?

COVID-19 seems to somewhat spare children with those who show symptoms rarely evolving to need PICU admission (7). This situation leaves pediatric critical care teams relatively unexposed to the infection and with a maintained or decreased workload.

In an unprecedented situation for ICUs around the world and with healthcare systems suffering severe shortages of equipment and staff, pediatric critical care physicians can be of great value in providing temporary support to adult ICUs (8). With advanced knowledge in physiology and, specifically, respiratory support, pediatric intensivist can be integrated into ICU teams and under the constant supervision of adult ICU consultants can exceptionally perform fellow-level tasks that may help alleviate the burden these teams are suffering.

Pediatric teams have been providing resources and logistic support to adult ICUs in our regions for the last month and a half. This process has been driven by institution-wide protocols and well-meaning improvisation with very little specific guidance, leading to significant heterogeneity in practice. Questions remain as to whether admitting adult patients to PICUs or deploying pediatric intensivists to adult ICUs should be the preferred model. We encourage professional societies from the critical care field, both adult and pediatric, to develop and distribute consensus statements that at a national level may provide help and support on how to integrate mixed teams in which pediatric intensivists can have clearly defined roles and responsibilities.

All authors contributed equally to the writing process.

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The authors reply:

The coronavirus disease 2019 (COVID-19) pandemic has stretched institutional resources in some locations necessitating novel solutions. Our recent article (1), published in *Pediatric Critical Care Medicine*, perspective provided guidance to adapt PICUs to care for infected adults. Rodriguez-Rubio et al (2) highlight an important alternative role for pediatric intensivists outside the PICU in supporting adult ICUs in the fight against the COVID-19 pandemic. Pediatric intensivists are comprehensively trained in principles of critical care (e.g., respiratory physiology and mechanical ventilation) which can be easily transposed to adult patients making them qualified to oversee care in an adult ICU as described (2). Our recent perspective (1) should provide pediatric providers with clinical guidance important in caring for adult patients with COVID-19 and highlight common adult situations rarely encountered in pediatrics. This guidance can be applied in an adult or pediatric hospital. A number of the issues raised by Christian and Kissoon (3) can be overcome if pediatric intensivists oversee the care of adults with COVID-19 in a primary adult setting.

This appears to be the strategy used in Spain and Italy (2). An interesting alternative recently reported (4) is the care of adults with COVID-19 within a PICU located in a primarily adult hospital. In these situations, the hospitals had in place the supplies and systems needed to care for adults. Likewise, there exist academic pediatric hospitals which are connected by halls or bridges to adult centers readily permitting the use of adult consultants and equipment/supplies overcoming many of the challenges pointed out by Christian and Kissoon (3). We agree with these authors that these approaches are preferred prior to bringing adults into a PICU where the care of adults is uncommon.

In a COVID-19 surge, one must consider whether the scarcity lies in trained personnel or appropriately equipped critical care settings, or both. Admitting adults to a PICU in a children's hospital is sensible when ICU equipped spaces with optimal monitoring, gases, vacuum, etc. are scarce. This avoids creating ad hoc ICUs in schools or stadiums which have been proposed for surge capacity but have clear limitations. Adults brought to a pediatric setting may benefit from services uncommon in adult hospitals such as pet, art, music, and "child life" therapies and rooms designed to permit a family member to remain during the hospitalization. Thousands of adults have died in heartbreaking isolation from their loved ones without any form of solace in their final days—a situation rarely permitted in pediatric hospitals.

A "one size fits all approach" is unlikely to be universally effective or feasible during this pandemic. However, the pandemic does provide an opportunity to consider related nonpandemic patient care issues such as where and how to care for adults with congenital heart disease, cystic fibrosis, sickle cell, or muscular dystrophies where pediatric providers/hospitals may have greater expertise. We appreciate the innovative approaches and dedication exhibited by our colleagues in Spain and Italy as they bravely confront this pandemic and prove that pediatric intensivists can save lives regardless of the age.

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Pediatric Sepsis: Subphenotypes to Enrich Clinical Trial Entry Criteria

To the Editor:

We read with great interest the article by Carcillo et al (1) published in a recent issue of *Pediatric Critical Care Medicine*. Studies with biomarkers in adults with sepsis and acute respiratory distress syndrome (ARDS) have shown that identification of specific subphenotypes could lead to a better identification of patients that could be more responsive to interventions. In ARDS, a combination of biomarkers and clinical data improved the understanding of the patient profiles and may influence entry criteria of clinical trials. Recent trials support that the presence of ARDS subphenotypes may demand distinct treatment approaches, regarding, for example, fluid management or other specific therapies (2). In Statins for Acutely Injured Lungs for Sepsis study (3), two subphenotypes (hyper-inflammatory subphenotype or not) were tested for distinct treatment response to statin. Although the use of statin did not show treatment effect, hyper-inflammatory" subphenotype patients had higher mortality