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CHEST

PICU in the MICU

How Adult ICUs Can Support Pediatric Care in Public Health Emergencies

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Initial waves of the COVID-19 pandemic have largely spared children. With the advent of vaccination in many older age groups and the spread of the highly contagious Delta variant, however, children now represent a growing percentage of COVID-19 cases. PICU capacity is far less than that of adult ICUs. Adult ICUs may need to support pediatric care, much as PICUs provided adult care earlier in the pandemic. Critically ill children selected for care in adult settings should be at least 12 years of age and ideally have conditions common in children and adults alike (eg, community-acquired sepsis, trauma). Children with complex, pediatric-specific disorders are best served in PICUs and are not recommended for transfer. The goal of such transfers is to maintain critical capacity for those children in greatest need of the PICU's unique abilities, therefore preserving systems of care for all children.

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Earlier waves of the COVID-19 pandemic have largely spared children; however, an increased risk for severe illness and death has been described in older adolescents, children with obesity, children with developmental disorders, and Black or Hispanic children, similar to that seen in adults.[1] In the first waves of the pandemic, PICUs in many centers modified their admission criteria to assume care of younger adult patients, decompressing adult ICUs and increasing critical care capacity in their regions.[2] In general, COVID-19 in children has been less severe, with less direct impact on pediatric hospital care than in adult settings.[3]

In the summer of 2021, this situation changed. After a period of marked decline in COVID-19 incidence with the availability of vaccines, case rates and hospitalizations again rose sharply in many countries, in part because of the emergence of the highly contagious Delta (B.1.617.1) variant.[4] Because vaccines against SARS-CoV-2 remain highly protective against hospitalization and death, this wave has become a pandemic of the unvaccinated.[5] The current vaccines available in the United States are presently authorized for use in people ≥ 12 years of age; however, vaccine uptake in eligible children remains incomplete, similar to older groups.[6] This leaves children among

ABBREVIATIONS: CCI = chronic critical illness; CCP = critical clinical prioritization; CF = cystic fibrosis; CSC = crisis standards of care; ECMO = extracorporeal membrane oxygenation; HSCT = hematopoietic stem cell transplantation; PCCI = pediatric chronic critical illness; SOT = solid organ transplantation

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those most susceptible to SARS-CoV-2 infection, and PICU capacity has been confronted by marked increases in demand because of COVID-19 and other reemergent infections (eg, respiratory syncytial virus) in many regions.[7]

Surge Continuum Framework to Increase PICU Capacity

With dwindling ICU capacity, much attention has been given to crisis standards of care (CSC) protocols, in the press and by government agencies. As a critical care community, we must harness much energy to plan and build ICU surge capacity in a community effort to avoid the need for CSC protocols. This must also be true for PICU surge capacity, given the potentially catastrophic moral distress we could encounter in a pediatric CSC scenario.

We propose using the established surge continuum framework to use understood nomenclature to build PICU surge capacity as subsequently described. In 2014, the American College of Chest Physicians (CHEST)[8] and the Task Force for Mass Critical Care recommended that health systems use a previously described framework for critical care surge responses. In this framework, responses to a disaster are divided into conventional (where existing hospital resources are sufficient to meet increased demand), contingency (where additional resources, such as staff and space, are needed but the normal standard of care can be met), and crisis (where severe resource limitations force a modification in standards of care).[8,9]

More recently, a transition between contingency and crisis has been proposed, a critical clinical prioritization (CCP) level. CCP reflects a stage before a formal crisis where physicians modify their use of resources in ways that are broadly within the standard of care but vary in important ways. For example, patients requiring continuous renal replacement therapy might receive treatment for 12 h/d instead of 24 h/d, allowing two patients to receive therapy instead of one. This CCP level, while still falling within the boundaries of contingency care, is an indicator that a system is approaching crisis.[10]

Of the approximately 84,000 staffed nonneonatal ICU beds in nonfederal hospitals in the United States, only 5,115 (6.0%) are pediatric beds[11]; these also have less surge capacity and tend to be consolidated in densely populated cities.[12] Additionally, there are fewer health care workers skilled at caring for younger children, and pediatric supplies are not available at all hospitals. The surge continuum framework previously cited can increase PICU capacity during emergencies in a standard fashion, based on regional requirements. Similar principles were used by PICUs to increase adult ICU capacity for the adult COVID-19 ICU surge during the first COVID-19 wave in the United States.[13] In 2011, the Pediatric Emergency Mass Critical Care Task Force[14] emphasized that all hospitals, pediatric or otherwise, must maintain a baseline capacity to care for children in the event of a mass casualty event or similar emergency. Using the concepts of conventional, contingency, CCP, and crisis responses, we propose in Table 1 specific age cutoffs for pediatric care in adult ICUs. The goal of this structure is to avoid crisis by increasing capacity during the contingency and CCP phases.

Lessons Learned From Pediatric Intensivists Caring for Adult Patients

In March 2020, COVID-19 first swept through the United States and led to unanticipated surges in adult ICUs; pediatric physicians, nurses, and others were recruited to help increase system capacity. Although not specifically trained in adult medicine, the underlying concepts in respiratory failure and sepsis management are similar. In many centers, adult hospitalists assisted during rounds and managed patients' chronic needs, whereas pediatric professionals focused on the acute management of respiratory failure, shock, and other ICU concepts. Invasive procedures could be performed by practitioners with training in both adult and pediatric care (eg, pediatric surgeons, anesthesiologists). These concepts can be similarly applied to adult ICUs should PICUs be confronted with a pediatric surge.

TABLE 1] Pediatric to Adult ICU Surge Continuum

Category	Age Cutoffs	Comments
Conventional	≥ 18 y	Standard adult ICU admission criteria
Contingency	≥ 15 y	Equipment size and medical dosing will be generally the same as in adult, consistent with trauma system practices
Critical clinical prioritization	≥ 12 y and > 40 kg	Using a cutoff of 12 y and 40 kg, one can typically use adult medication doses and equipment sizes

In 2020, C.S. Mott Children's Hospital (Ann Arbor, Michigan) established such a program to support adult care using the following concepts:

- Creating common protocols adapted within every ICU. For example, all facilities within a system should use similar criteria for extracorporeal membrane oxygenation (ECMO) initiation or ventilator liberation.
- Prioritizing transfer of adult patients to the PICU with single-system illness when possible. Similarly, adults should be transferred from the PICU when beds in adult ICUs become available.
- Overlapping skill sets when possible, always including staffing with at least one physician with appropriate adult training in the PICU.
- Conducting twice-daily multidisciplinary rounds with the entire team to review the availability of supplies (eg, personal protective equipment), changes in protocols, bed availability, and plans for ventilator care, including prone positioning and extubation. Twice per week, video conferences were held to discuss patient triage between units, patient transport, staffing requirements, and protocol development.
- Centrally managing schedules and clinical staffing based on flux in patient demand and capacity.

We suggest these lessons be applied, but in reverse, to provide pediatric care in adult units. A proposed staffing model for pediatric patients in an adult ICU is presented in Figure 1.

Patient Tracking

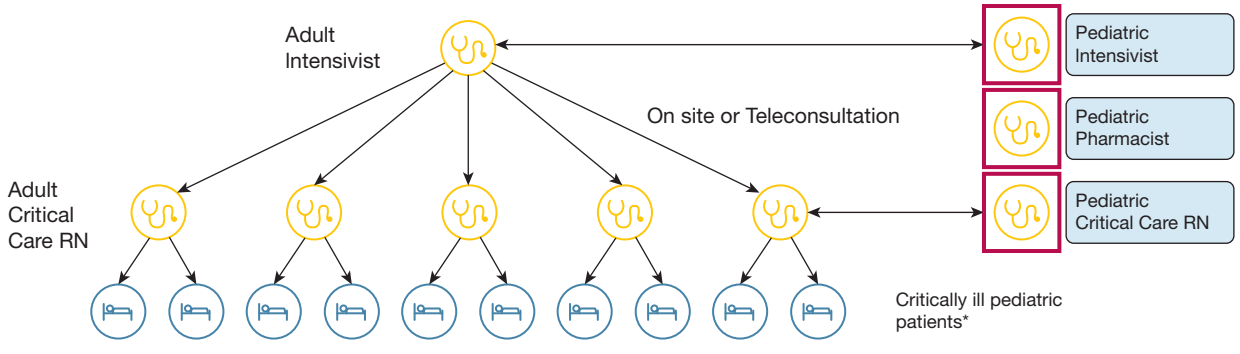
A clear system for tracking children displaced to adult facilities is vital. This was critically underlined after Hurricane Katrina in 2005, when < 25% of > 2,400 displaced children were reunited with their parents 2 weeks after the disaster.[15] Keys to implementation of such a system include the following: (1) advanced planning for communication throughout the regional system of care; (2) inclusion of schools, daycare centers, law enforcement, EDs, and transport services in planning and tracking; and (3) predesignation of appropriate transport teams and admission criteria for children in adult ICUs vs PICUs.[16]

It is important that the date, time, location, and manner of entry into the system are documented. Protocols designed for photographic tracking within the system and regional distribution of pediatric patients should be nested within local and regional surge planning.[17] For additional guidance, the American Academy of Pediatrics reunification toolkit is a useful resource (Table 2).

Critical Equipment, Supply, and Management Concerns

In selecting adolescents to be managed by adult intensivists, much of the equipment used in this population are consistent with what is already used in adult ICUs. A critically ill 12-year-old who is > 40 kg may be intubated with a 6.5 to 7.0 cuffed endotracheal tube and have a 7.5 French central venous catheter placed, for example.

Younger children (< 12 years of age) receiving care in nonpediatric hospitals can be managed based on a length-based system in the hospital. Such patients may require equipment not typically stocked in an adult ICU. A color-coded supply cart (with appropriate equipment stocked by length-based color) can assist nonpediatric physicians with appropriately sized resuscitation equipment. Ancillary equipment should be evaluated with special



- * In contingency care, starting with pediatric patients ≥ 15 y of age; during crisis care, extending to children as young as 12 y of age and > 40 kg.
- Number of patients and beds for graphic purposes only. Brief daily pediatric experienced RN, pharmacist and physician consultation with 24/7 available consultant to support adult ICUs of various sizes.

Figure 1 – *Proposed staffing model for the care of critically ill children in adult ICUs. RN = Registered Nurse.*

TABLE 2] Selected Online Reference Materials for Pediatric Critical Care Medicine

Name	Subject Matter	Website
American Academy of Pediatrics Reunification Toolkit	Disaster medicine reference with focus on reuniting children with families	https://www.mthcc.org/assets/aap-reunification-toolkit-2018-08.pdf
LearnPICU	General pediatric CCM reference, sponsored by Stanford	http://www.learnpicu.com/
OPENPediatrics	General pediatrics reference with CCM content, sponsored by Boston Children's Hospital; free registration required	https://www.openpediatrics.org/
PCRRT.com	Pediatric CRRT and critical care nephrology reference	http://www.pcrrt.com/
Pediatric Trauma Society	Trauma resources and clinical practice guidelines	https://pediatrictraumasociety.org/resources/clinical-resources.cgi
PedsCCM.org	General pediatric CCM reference	http://www.pedsccm.org/clinical-resources.php
SCCM Rapid Resource Center	MIS-C reference information from the Society of Critical Care Medicine	https://www.sccm.org/COVID19RapidResources/Resources/Mulitsystem-Inflammatory-Syndrome-in-Children
Seattle Children's COVID-19 Pathway	Pediatric COVID-19 treatment guidance, including MIS-C management	https://providernews.seattlechildrens.org/wp-content/uploads/COVID-19-Pathway-final-7-9-20.pdf

CCM = critical care medicine; CRRT = continuous renal replacement therapy; MIS-C = multisystem inflammatory syndrome in children.

attention to airway supplies, including laryngeal mask airways, video laryngoscopy, and bronchoscopy.

These younger children should be weighed and medications administered according to standard medication references. When a scale is not available or in emergency situations, length-based systems can rapidly estimate weights and therefore appropriate medication doses and equipment sizing. Standardized tape-based methods that correlate body length with weight are sufficiently accurate for the calculation of drug doses.[18,19] Length-based resuscitation aids can also reduce the number of nonautomatic decisions (and hence cognitive load) when taking care of a smaller child, improving both dose accuracy and time to intervention. Pediatric code sheets are amenable to length-based dosing and can be especially helpful in environments less familiar with pediatric resuscitation, when the cognitive load for physicians can be high.

Pharmacists must be closely involved with any pediatric dosing plan in a nonpediatric hospital. Medication supplies should be evaluated by the pharmacy for availability of standard pediatric concentrations of common medications for the age group receiving care, including vaccinations. Special attention should be paid to medication differences in smaller children (ie, < 12 years of age and/or 40 kg) including the following: (1) maximum total dose limits (in addition to the dose/kg), (2) age-specific weight-based dosing (especially in infancy and related to glomerular filtration rate, such as with vancomycin), (3) obesity (especially with sedation and volume of distribution, and ventilator management and ideal body weight), (4) failure to thrive (as is common in pediatric chronic critical illness [PCCI]), (5) medication pump library access to weight-based dosing, and (6) online order entry capability for pediatric-appropriate doses.

Indications for noninvasive and invasive ventilation and for central venous catheterization in adolescents are similar to those in young adults. As expected, this population tends to be resilient with better outcomes than older adults, assuming no significant comorbidities. Although infants and younger children are more likely to present in cold shock (eg, vasoconstriction with delayed capillary refill, tachycardia, and poor contractility), necessitating epinephrine for fluid-refractory hypotension, adolescents are more likely to present in distributive shock with bounding pulses and flash capillary refill. For them, initial vasopressor therapy with norepinephrine is reasonable.[20] Of note, the definition of hypotension for children is derived from the formula of systolic BP < 70 + 2 (age in years) until it reaches 90 mm Hg. Therefore, a 12-year-old patient would have the same threshold for systolic hypotension as an adult (systolic BP < 90 mm Hg).[21]

TABLE 3] Pediatric Conditions Recommended as Suitable for Care in an Adult ICU in Older Children and Those Not Recommended for Adult ICU Care

Suitable	Not Recommended
Community-acquired sepsis	Congenital heart diseases with residual disease
Cystic fibrosis	Active pediatric malignancy
Sickle cell disease	Chronic kidney disease and end-stage kidney disease
Solid organ transplantation, if the adult ICU is part of a transplant center	Pediatric chronic critical illness
Hematopoietic stem cell transplantation, if the adult ICU is part of a transplant center (in selected cases)	…
Diabetes mellitus	…
Adolescent trauma (if the adult ICU is part of a trauma center) and poisonings	…
Critical illness caused by COVID-19 pneumonia	…
Multisystem inflammatory syndrome in children	…

Mechanical ventilation should be managed the same as for a young adult, using ARDSnet criteria to calculate predicted body weight to optimize tidal volumes at 4 to 8 mL/kg.[22]

Common PICU Diagnoses

The admitting diagnosis and comorbidities of the ill child in the PICU will play a major role in the decision to transfer to an adult ICU. Certain diseases are common in both adults and older children, and an adult intensivist will have little difficulty managing these conditions (and may have considerable experience in these disorders). A previous comparison of 12-year-old to 19-year-old patients admitted to adult vs PICUs in the United Kingdom found similar mortality rates in both groups.[23] Conversely, other diseases are largely unique to pediatrics, and children suffering from these often have complex needs requiring extensive expertise that will be lacking in adult ICUs. A summary of relevant diagnoses is found on Table 3.

Pediatric Illnesses Likely Suitable for Care in an Adult ICU

Community-Acquired Sepsis

Community-acquired sepsis includes the following: pneumonia, bacterial meningitis, or pyelonephritis.

Cystic Fibrosis

With improvements in cystic fibrosis (CF) care, patients commonly survive to adulthood; therefore, many adult intensivists are familiar with CF management in the ICU. Additionally, many US-trained intensivists are also trained in pulmonary medicine and have additional expertise in CF; however, this may not be true in other countries.

Sickle Cell Disease

Many adult intensivists have considerable experience with sickle cell disease given the increased lifespan, especially given the limited differences between adult and adolescent management in the acute setting.

History of Solid Organ Transplantation

In solid organ transplantation (SOT) recipients, the underlying immunosuppression and complications are similar in older children and younger adults. Institutional expertise may be more important than age; a 15-year-old patient with a history of kidney transplantation might be better served in an adult SOT center than in a pediatric center without SOT experience.

Hematopoietic Stem Cell Transplantation

Similarly, hematopoietic stem cell transplantation (HSCT) in adolescents may share similar underlying disease processes (eg, acute lymphoblastic leukemia) as young adults. ICU readmission is common among critically ill pediatric HSCT recipients, with 29% of children with HSCT admitted to PICUs in one series requiring three or more such admissions.[24] In these cases, patients may acquire features of PCCI (subsequently described) and therefore be best served in a pediatric center.

Diabetes Mellitus

The management of diabetic ketoacidosis and other hyperglycemic crises are not significantly different in

adolescents, and both adult and pediatric intensivists are likely to have wide experience.

Adolescent Trauma, Poisonings, and Other Ingestions

Assuming affected children are in good health prior to their injury or poisoning, they can be managed safely with appropriate specialty consultation.

Critical Illness Because of COVID-19 Pneumonia

Therapy for severe pediatric illness because of COVID-19 pneumonia may include supportive care, glucocorticoids, thromboprophylaxis, antiviral medications (remdesivir), and immunomodulators (eg, IL-6 antagonists, Janus kinase inhibitors). It is fair to assume that a typical adult intensivist today is intimately familiar with COVID-19 management.

Multisystem Inflammatory Syndrome in Children

This postviral inflammatory complication of COVID-19 occurs in younger adults but is more common in children. As a new and relatively rare disorder, it is likely that few intensivists (adult or pediatric) have extensive experience outside of large referral centers. In both cases, reference to institutional multisystem inflammatory syndrome in children guidelines (Table 2) and rheumatology consultation will be useful.

Pediatric Illnesses Preferably Managed in a PICU

There are conditions for which continued PICU care is necessary, even when they occur in older children. These include the following:

- Congenital heart disease in patients under the routine care of a pediatric cardiologist (eg, single ventricle physiology, repaired defects with significant residual disease). Adult intensivists and cardiologists rarely have significant experience in these disorders.
- Pediatric malignancies, particularly those treated on a Children's Oncology Group protocol, with infrequent exceptions (eg, some cases of acute lymphoblastic leukemia that normally could receive care in either the adult or pediatric settings).
- Chronic kidney disease and end-stage kidney disease in children under the routine care of a pediatric nephrologist. As with heart disease, these differ in their etiology, metabolic effects, and management from adult disease.
- PCCI. A common population receiving care in PICUs are children with PCCI, defined as children who remain hospitalized in a PICU for $>$ 14 consecutive days or have a history of prolonged ICU stays and two or more acute care of ICU admissions within 12 months, plus either ongoing dependence on one or more forms of technology to sustain vital functions (eg, ventilator, gastrostomy) and/or persistent multisystem disease.[25] These children may include survivors of serious neonatal illnesses, children with significant developmental delay, children with chromosomal or rare genetic disorders, survivors of complex polytrauma, or members of other groups with particularly debilitating clinical courses.

Chronic critical illness (CCI) is described in adults, and patients with CCI have been estimated as reflecting 7.6% of all adult ICU admissions.[26] Adults with CCI have a high mortality rate, with $>$ 60% dying in-hospital and $>$ 50% of survivors dying within 6 months of discharge.[27] Children with PCCI have a more variable risk of death and may comprise $\geq$ 40% of patients admitted to PICUs.[28] Although acute issues seen in these children may be within an adult intensivist's scope of practice, the complex multidisciplinary nature of care for these children and their families requires an institutional infrastructure that will almost certainly be absent in an adult center.

Informed Consent and Pediatric Decision-making

Critically ill children who are unable to communicate are treated as a similar adult patient would be: emergency care is rendered first and not delayed for contacting the parent or guardian, as mandated by the Emergency Medical Treatment and Active Labor Act. In the ICU, most care that is delivered is necessary for the survival and well-being of the child. In this context, the goals of care are established by the care team along with parents or guardians. It is not legally necessary to solicit specific assent from minor children; however, they should be fully informed of the treatment plan and decision-making process, if able. If there is discord between the care team and parents, ethics consultation should be obtained. If there are concerns that harm or neglect has occurred to the child, the local Child Protective Services organization should be contacted.[29]

Visitation, Family Support, and Staff Wellness

Visitation needs for the parents and guardians of children may differ from those of families of adult patients. Although family visitation is important for all patients, these rights are often limited in the setting of COVID-19. We suggest that two adult visitors, typically

parents or guardians, be authorized daily visitation for a hospitalized child in an adult ICU, to the greatest extent possible while maintaining staff and patient safety.[30] Critical care physicians in an adult ICU may be accustomed to dying adults, but it is probable that the prospect of a dying child would be uniquely distressing; family visitation, along with appropriate team-based and individual psychosocial support, may be important for patient and physician well-being alike.

Palliative and End-of-Life Care

Discussions surrounding pediatric end-of-life care, as in adults, primarily involves the immediate family, but specifically the parents or guardians. There are excellent publications that provide guidance on palliative care in children that go beyond the scope of this article; readers should refer to these publications for further insights.[31,32] As is typical in the delivery of critical care, end-of-life issues should involve a multidisciplinary team and include social workers, chaplains, and palliative care experts when available.

Brain Death Evaluations

The current pediatric brain death guidelines were last updated in 2011.[33] The pediatric brain death evaluation is similar to adults. Unlike in adults, a second confirmatory examination is a criterion for brain death and is to be performed after a 12-h period of observation in children > 30 days to 18 years of age. There are technical considerations in the assessment of suspected brain death in children with COVID-19, including risks of aerosolization during apnea testing and transmission concerns if cerebral perfusion testing in the nuclear medicine suite is to be performed. In all cases, appropriate precautions including personal protective equipment are necessary.[34]

Subspecialty Consultation

Adult intensivists know that patient care in the ICU requires more expertise than the specialty of critical care medicine alone. Like with adults, pediatric subspecialty services are essential to the care of critically ill children. Although consultation practices vary between institutions, the need for pediatric subspecialist input will be increased when cared for in an adult ICU. Contingency planning should incorporate subspecialist availability both in-person and through telemedicine services. Unlike adult subspecialists, pediatric medical and surgical subspecialists are even fewer in number and more likely to be concentrated at dedicated referral centers.[35,36] Establishing a mechanism for formal collaboration with such a center will be useful for the adult ICU providing pediatric care.

PICUs will have varying levels of capability; these were previously described as level 1 or level 2 PICUs, but guideline statements have defined PICUs as quaternary/specialized (eg, dedicated units for transplant or congenital heart disease), tertiary (capable of providing ECMO and other advanced general therapies), and community (capable of core ICU interventions such as invasive mechanical ventilation and care for septic shock, for example, but potentially lacking other therapies such as ECMO).[37] These capabilities are summarized in Table 4. Contingency plans should make every effort to meet the established standard of care for PICU services, which include subspecialty services as subsequently listed.

Specific consultative considerations include the following:

- Anesthesia. Anesthesia services for patients outside of infants and toddlers are often routinely covered by nonpediatric specialists, except for patients with

TABLE 4] Essential Capabilities for Pediatric ICUs by Tier

Tier	Capabilities
Community PICU	• Provide pediatric resuscitation and routine mechanical ventilation (invasive or noninvasive) • Attending physicians can be general pediatricians, family physicians, or adult or pediatric intensivists • Community-based, shorter-term stays without complex subspecialty access
Tertiary PICU	• Provide pediatric resuscitation and advanced mechanical ventilation (conventional at high PEEP, high-frequency, or advanced CPAP/BiPAP) • Provide full or almost full spectrum of pediatric subspecialty access • Attending physicians are pediatric intensivists
Quaternary/specialized PICU	• Provide pediatric resuscitation and all levels of lung, heart, and kidney support (including ECMO and CRRT) and typically manage complex multisystem pediatric disease • Provide full spectrum of pediatric subspecialty access

CRRT = continuous renal replacement therapy; ECMO = extracorporeal membrane oxygenation; PEEP = positive end-expiratory pressure. (Adapted with permission from Hsu et al.[37])

significant underlying comorbidities. Anesthesiologists and nurse anesthetists must be facile in pediatric vascular access and airway management.

- Surgical services. Routine surgical needs can often be provided by nonpediatric surgeons outside of infancy and excluding congenital or subspecialty surgical care.
- Cardiology. Cardiology assessments for suspected and known congenital heart disease should be completed by a pediatric cardiologist, whereas adult cardiology input may be sufficient for common ICU issues (eg, assessment of cardiac function). Adolescents are more tolerant of tachycardia and have improved vascular tone when compared with older adults. Great care should be taken in assessing adolescents with normal BP but other signs of impaired perfusion because they may be in impending shock in the absence of hypotension.
- Pulmonology. Bronchoscopy in children requires equipment based on age and endotracheal tube size. In general, patients $>$ 12 years of age with an endotracheal tube size of $\geq$ 6.0 should allow passage of an adult-sized bronchoscope. Lavage volumes in pediatric patients are usually smaller than those used in adults. Bronchoscopy in younger patients requires the assistance of pediatric pulmonologists and intensivists, at a minimum.
- Neurology. ICU-related neurologic issues require pediatric-specific consultation because seizure presentation and therapy differ significantly in younger patients. Similarly, the etiology and therapy for neurovascular diseases also differ from adults and will benefit from a pediatric neurologist.
- Nephrology. Although ICU-acquired acute kidney injury can likely be managed as with adult patients, electrolyte and fluid management will likely require a pediatric nephrologist, especially as related to renal replacement therapies. Dialysis catheter insertion in patients $\leq$ 12 years of age will need specialist input.

Telecritical Care

Telemedicine services are a valuable tool for consultation with pediatric intensivists and consulting subspecialists. Peer-to-peer consultation or routine participation in daily rounding may be appropriate based on individual site factors, but a standard approach should be defined prior to initiating contingency care. Modern telemedicine technology allows for in-depth assessment and interactive abilities by the remote physician but may be too time consuming during surge operations without an established system and support team. Pediatric telehealth services have grown in recent years, particularly in response to the COVID-19 pandemic, in part because of the efforts of the Supporting Pediatric Research on Outcomes and Utilization of Telehealth (SPROUT) program, an initiative of the American Academy of Pediatrics.[38] Most of the impact of the program has been in outpatient care, and as mentioned previously, pediatric subspecialists (including intensivists) are few in number. Care will be necessary to identify mechanisms for appropriate telehealth referrals, including hospital credentialing and licensure issues. Lower fidelity approaches (eg, telephone calls) may be used as an alternative to synchronous consultation, but appropriate security and privacy considerations must be addressed.

Summary

There are more similarities than differences between the critical care of adults and older children. Much as PICUs provided care for adult patients early in the COVID-19 pandemic, adult ICUs should be able to support pediatric care for well-selected patients. Clear admission criteria, appropriate protocols, and the availability of regular pediatric consultation can permit adult centers to help preserve effective care for all children.

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