

# Symposium

## Introduction

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### Pharmacotherapy for Pediatric Acute and Critical Care

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The saying “Children are not little adults” may be even more true in the area of pediatric pharmacotherapy. Each phase of medication delivery, from order writing through administration, is vastly different from that of the adult world, and each step is fraught with potential risks. Appropriate pediatric drug delivery methods and medication safety advancement are of highest concern.<sup>1</sup> Weight-based dosing is used with pediatric patients, providing an individualized dose and regimen, possibly increasing the chance of calculation errors. Many of the medications used for our youngest patients also require dilution, which offers another opportunity for error. Unlike adult patients, young children do not have the knowledge base to question providers at the time of administration, which removes a layer of protection for pediatric patients.<sup>1</sup>

Although many technologies and methods are described in the literature concerning medication safety and error prevention, many of these have not been studied in the pediatric population.<sup>2</sup> Newer methods may produce unexpected risks that have yet to be realized or considered. New preventive technologies, such as bar codes, electronic health records, computer order entry systems, and “smart pumps,” are designed to make the system safer but can, in some instances, create new and different challenges, including complacency among those caring for pediatric patients.<sup>3</sup>

In life-threatening situations, such as pediatric emergencies, clinicians must be well versed in timely and appropriate care, which starts with having a solid understanding of pediatric adult life support guidelines, which are a cornerstone of acute care. Staying current with the most recent changes in these guidelines is a challenge for all clinicians caring for pediatric patients; in addition, clinicians must incorporate meaningful practice strategies for dealing with these life-or-death situations.

During the past decade, the focus on decreasing the mortality rate in patients who are septic has increased. Varying targets for novel therapies have been investigated, largely with disappointing results. In addition to these new strategies for sepsis management, several tried and true methods are available to improve outcomes for these patients, with clear evidence to support their usage. An understanding of these pharmacological interventions in pediatric sepsis is vital. In addition, the importance of early screening and detection,

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fluids, and antibiotics cannot be overstated. Finally, appropriate hemodynamic monitoring and targeted vasoactive therapy round out the pediatric patient's care.

We are all feeling the pinch from increased regulatory scrutiny from organizations such as The Joint Commission and decreased reimbursement from third-party payers such as the Centers for Medicare & Medicaid Services. Moving forward, patient satisfaction scores will be a key element to satisfying both of these requirements along with solid outcomes. Pain is considered the fifth vital sign because of its influence on the patient's stay and on a family's impression of the hospital experience, which is never more important than dealing with pain in pediatrics. Diligence and staying proactive are requirements to optimize pain management and sedation in this setting. Comfort is a must. A thorough understanding of the therapeutic options, patient variables, and assessment and monitoring tools that yield the best overall outcomes will be increasingly important in an ever-changing and competitive health care environment.

Optimal nutritional status is yet another key ingredient in pediatric patients. Bone, muscle, and organ development are all reliant on appropriate nutrient intake. Optimal nutritional status can most often be achieved by oral or enteral feeding regimens. If the gut does not work, making it impossible to achieve adequate nutritional support enterally, parenteral nutrition may be required. Reluctance to initiate this therapy in many children is justifiable, with concerns that are based on the short- and long-term complications that may exist. Through appropriate strategies and following evidence-based approaches championed by organizations such as the American Society of Parenteral and Enteral Nutrition, these complications can be lessened or eliminated, and parenteral nutrition can be safely administered.

The human element of pediatric pharmacotherapy will always be important. Pediatric

patients will always need to have providers who are competent and well versed in the latest evidence and have reasonable workloads and healthy work environments that reduce fatigue and distraction.<sup>4</sup> These patients will also need interdisciplinary team members who are critical thinkers and who are able to collaboratively interpret and make meaning of the current evidence for individual patients. Developing relationships with critical care clinical pharmacists is a particularly important step in this collaborative effort, which is especially important because a sizeable number of medications have been studied only in the adult population and are being used in the pediatric population in an off-label manner.<sup>5,6</sup> Remember that an error or adverse event is not necessary for pediatric patients to be affected negatively by medications.

This symposium addresses the current knowledge and evidence related to a wide variety of topics concerning the implementation of quality pharmacotherapy in pediatric patients in acute and critical care. We hope that new insights will be gained by health care providers as they reflect on personal practice and strive for positive outcomes for patients.

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