

## Preface



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Guest Editor

*“Our food should be our medicine and our medicine should be our food.”*  
—Hippocrates

The past 50 years of medicine and critical care have brought great advances in the treatment of disease with novel pharmacologic agents. Largely ignored has been the vital role of basic nutrients and calories in the treatment of critical illness and injury. The shortcomings of our field in delivering nutrition to our sick patients are highlighted by recent data from a worldwide survey of critical care nutrition practice involving nearly 3000 patients. These data reveal ICUs worldwide deliver approximately 50% of the calories we as physicians prescribe to our patients for the first 2 weeks of ICU care.<sup>1</sup> Imagine if you as an ICU physician prescribed 1 g of vancomycin to be given daily to your patient dying of MRSA sepsis and you discovered 2 weeks later that only 500 mg were delivered each day? This would never be tolerated, yet this is a daily occurrence in every ICU in the world (except ironically in Burn Intensive Care Units, where perhaps the most severely injured patients in the hospital reside). This travesty of poor critical care nutrition delivery has resulted from years of poorly designed or nongeneralizable trials in the fundamental feeding and nutrition support of our patients. Further, there has been a lack of laboratory-based exploration into the mechanistic science underlying the risks and benefits of nutrition and nutrient administration following injury and illness.

Presently, we are in a “revival” period in clinical nutrition in critical care. This is particularly true in the area of “pharmaconutrition.” We have recently discovered that adequate nutrition may hinge not only on how many calories we provide, but also on our ability to provide key pharmacologically acting nutrients. For example, rapid mobilization of amino acids stored in muscle is a vital mechanism for survival following acute illness. These amino acids are used as obligate nutrient sources for the immune system and gut. Recent data indicate that these amino acids also serve as a key stress signals that initiate activation of fundamental cell protective pathways following an insult. For various teleologic reasons, the body becomes rapidly depleted of these substrates and their supplementation may be fundamental for optimal recovery. These data have helped spawn the new field of “nutritional pharmacology.”

The “revival” in critical care nutrition is highlighted by a significant number of new randomized, controlled (often multicenter) clinical trials examining the benefits of nutrition therapy and pharmaconutrition, which have been completed or are under way. These will finally begin to answer the ultimate questions regarding the outcome benefit of various forms of nutrition therapy. Further, mechanistic laboratory advances in our understanding of the role of nutrients as pharmacologic agents are now being translated into focused trials of specific nutrients. These trials examine nutrition’s effect on clinically relevant end points, such as length of stay, infectious morbidity, and survival. It is exciting that we have begun to apply basic clinical pharmacology, molecular biology, and clinical research principles to our study of nutrition in critical illness. Thus, the critical care field can look with anticipation to forthcoming answers on how to best use nutrition therapy to improve patient outcomes. We hope these data will finally answer the questions about how to administer the right nutrients, in the right amounts, at the right time.

In this issue of *Critical Care Clinics*, the clinical and mechanistic evidence for optimal delivery of calories and specific pharmaconutrients is reviewed. Key topics reviewed in this issue include how many calories should be fed and by what route, data for the use of specific nutrients, and finally how to evaluate the plethora of often conflicting nutritional guidelines that exist in critical care. Discussions of the evolutionary role of nutrition in critical illness are undertaken and fundamental challenges to long-held paradigms in nutrition (like the use of gastric residuals) are brought forth.

I would like to thank the authors for generously contributing their time and expertise in the preparation of this issue. I would also like to acknowledge the Elsevier editorial staff for their tireless support and patience in bringing this issue to completion. I sincerely hope that this issue serves as a timely and current reference to “reintroduce” critical care practitioners to the importance of nutrition in critical illness and to the rapidly growing field of nutritional pharmacology.

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## REFERENCE

1. Cahill NE, Dhaliwal R, Day AG, et al. Nutrition therapy in the critical care setting: what is “best achievable” practice? An international multicenter observational study. *Crit Care Med* 2010;38(2):395–401.