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Bringing Implementation Science to the Intensive Care Unit

Jeremy M. Kahn, MD, MS^{1,2}

¹Clinical Research, Investigation and Systems of Modeling of Acute Illness (CRISMA) Center, Department of Critical Care Medicine, University of Pittsburgh School of Medicine, Pittsburgh, Pennsylvania, USA

²Department of Health Policy and Management, University of Pittsburgh Graduate School of Public Health, Pittsburgh, Pennsylvania, USA

A depressing truism of modern health care is that clinicians routinely fail deliver evidence-based treatments proven to save lives [1]. In the intensive care unit (ICU), a growing body of literature demonstrates that a large proportion of critically ill patients do not receive guideline recommended care, leading to preventable morbidity and mortality [2]. Part of this quality gap is surely circumstantial—the art of medicine dictates that we base treatment decisions not only on population-based evidence but also on each individual patient’s likelihood of benefit, such that sometimes delivering a guideline-recommended treatment to a specific patient is simply not necessary. Yet just as surely part of the quality gap is our collective failure to consistently translate clinical evidence into practice. Physicians are human beings and we are subject to all the foibles and frailties of human beings. When patients don’t receive guideline recommended practices such as lung protective ventilation [3] or spontaneous breathing trials [4], it may be because the physicians made a well-reasoned decision not to provide those practices. But it would be wrong to ascribe all quality gaps to well reasoned decisions on the part of health care providers. Despite our best intentions, we make mistakes.

Implementation science is the scientific discipline dedicated to fixing this problem. Defined as the “study of the mechanisms by which effective health care interventions are either adopted or not adopted” [2], implementation science integrates principles from epidemiology, health services research, operations management, organizational psychology, and behavioral economics to understand why health care quality gaps exist and develop novel approaches to close those gaps. Implementation science itself is not new—for decades health care providers have studied ways to speed translation of evidence into practice and more efficiently adopt new therapies. What is new is the consensus among health care providers that the quality gap is real, and that dedicated approaches are necessary to close the quality gap and ensure that all eligible patients receive evidence-based practices.

In this section of *Current Opinion in Critical Care* a number of international experts in the field of critical care delivery review the concept of implementation science and describe its

Contact: Jeremy M. Kahn, MD, MS, Professor of Critical Care Medicine and Health Policy & Management, University of Pittsburgh, Scaife Hall Room 602-B, 3550 Terrace Street, Pittsburgh, PA 15221, Phone: 412.683.7601, jeremykahn@pitt.edu.

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relevance to the modern critical care practitioner. In the first review article, Dr. Curtis Weiss (pp. 000–000) reviews the underlying reasons why we fail to consistently deliver evidence-based practices in the ICU. He itemizes the many barriers to consistent delivery of evidence-based care practice, focusing on lung protective ventilation, daily awakening and breathing trials, and early adequate sepsis resuscitation. In doing so he raises perhaps the most important lesson of implementation science, which is the need to approach quality gaps in a systematic fashion using robust conceptual frameworks. When we try to improve performance without an understanding of why performance is bad in the first place, we are setting ourselves up to fail.

The next two articles take a deeper dive into specific clinical areas—the acute respiratory distress syndrome (ARDS) and sepsis. ARDS and sepsis are both high-risk, high-cost critical illness syndromes for which known evidence gaps exist. Dr. Michael Sjoding (pp. 000–000) tackles ARDS, highlighting the key quality gaps and outlining potentially valuable strategies for implementing best practices. Drs. Vikramjit Mukherjee and Laura Evans (pp. 000–000) tackle sepsis, specifically focusing on the new Surviving Sepsis Campaign clinical practice guidelines and how to best integrate them into daily practice. Both articles discuss foundational implementation strategies like education, yet both also dig deeper, exploring more innovative approaches such as the application of principles from behavioral economics and bioinformatics. In doing so the authors envision the “next generation” of implementation efforts which seamlessly integrate implementation work into daily practice, a concept known as the learning health care system [5].

Taken together, the articles in this section remind us that within the biomedical research enterprise generating new knowledge is only half the battle. We must also perform research into ways to better adopt that knowledge into practice. Similarly, in the realm of clinical practice showing up to the ICU each day with a goal of providing high quality critical care is only part of our jobs. We must also regularly assess our performance and work to provide our patients with evidence-based treatments. Only by merging implementation science with clinical practice can we ensure that every ICU patient experiences the best possible outcome.

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