

Disease prevention & health promotion: what's critical care got to do with it?

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Abstract: Health systems are increasingly investing in efforts to prevent disease and promote health for populations. By and large, these prevention-related interventions have not been inclusive of critical care and the intensive care unit (ICU). However, we suggest that there is value—to patients, families, health systems, and society at large—in extending this continuum into the ICU setting and including the ICU in disease prevention and health promotion efforts. Including the ICU in this continuum allows the critical care perspective to inform (I) advocacy for prevention; (II) efforts to improve disparities in health and health care; (III) mitigation of the negative effects of critical illness and injury as well as ICU exposure; and (IV) promotion of health and well-being in the community. As disease prevention and health promotion rise as priorities within health systems, critical care can and should join, even help lead, the effort.

Keywords: Prevention; critical care; health disparities; life course theory; well-being

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Health systems are increasingly investing in efforts to prevent disease and promote health for populations (1-3). In doing so, leaders of health systems have come to understand that health care alone is not enough to prevent disease and produce health (4). These efforts have also fostered the understanding that there is a continuum from the community to the clinical setting, and disease prevention and health promotion interventions placed along this continuum are vital to the ultimate improvement of population health. The frontlines for such prevention efforts in the clinical setting have historically included the outpatient primary care clinic, the emergency department, and occasionally the general inpatient setting. By and large, these prevention-related interventions have not been inclusive of critical care and the intensive care unit (ICU). However, we suggest that there is value—to patients,

families, health systems, and society at large—in extending this continuum into the ICU setting and including the ICU in disease prevention and health promotion efforts.

While critical care is not typically viewed as a natural stakeholder in prevention efforts, the ICU should no longer be a black box from a public health perspective. The epidemiology, experience, and outcomes of patients and families who enter into and emerge from the ICU should inform the disease prevention and health promotion efforts of their health systems. Including the ICU in this continuum allows the critical care perspective to inform (I) advocacy for prevention; (II) efforts to improve disparities in health and health care; (III) mitigation of the negative effects of critical illness and injury as well as ICU exposure; and (IV) promotion of health and well-being in the community.

Community to ICU: advocating for prevention

Though not typically viewed as population health stakeholders, pediatric intensivists have been effective prevention advocates for years, particularly for efforts related to trauma and emergency preparedness. Pediatric intensivists have informed and supported the passage of local, regional, and federal policy related to emergency response and disaster preparedness (5). They have also leveraged their expertise and experience to inform policies aimed at a reduction in the incidence of drowning, a decrease in the morbidity and mortality resulting from motor vehicle accidents, and the prevention of gun-related injury and death (6,7). More recently, pediatric intensivists have contributed to campaigns to decrease the incidence of vaccine-preventable illness and death (8), and to increase awareness and early recognition of sepsis (9). They have also joined other physicians and healthcare professionals to advocate on behalf of public health insurance programs (5). The critical care perspective has been vital to each of these efforts and has the potential to be utilized across many more contexts.

The ICU: improving disparities

As health systems seek a deeper understanding of health disparities, they must look to the ICU setting. Enumeration of disparities that reach the ICU would further motivate and contextualize intervention deployment, highlighting areas where disparity reduction in the health and health care of populations could be achieved. While disparities—or equity gaps—in health and health care have been studied in non-ICU populations for decades, equity gaps within the ICU have only recently been examined. Not surprisingly, similar to the general inpatient population, racial and socioeconomic disparities are present in the PICU population and show differential outcomes (10). For example, a recent study conducted in a population of 4,676 children from Tennessee found that African Americans were significantly more likely to be admitted to the pediatric ICU (PICU) than their non-Hispanic white peers, even after adjusting for co-morbidities [adjusted odds ratio (AOR) 2.1; 95% CI: 1.7–2.7] (11). Moreover, children of color and children from families with lower socioeconomic status are often more ill on arrival to the ICU and are more likely to die prior to ICU discharge (12–14).

Disparities in PICU, as in the health system, are likely multi-factorial. Studies suggest that such disparities can

result in part from a lack of access to high quality primary care and preventive services (11,15–17). Perhaps connected to this relative dearth of prevention, there is also evidence that racial and ethnic minority children and those from lower socioeconomic households have a higher prevalence of chronic disease (18–20). The effects of these gaps in access to care and disparities in both prevalence and control of illness are further exacerbated by the social determinants of health (SDH), defined by the World Health Organization as, “*the conditions in which people are born, grow, live, work and age*” (21). Specific SDH include a lack of access to healthy foods, lack of safe housing including exposure to mold and lead, and exposure to air pollution, among many other contextual factors (22). These SDH clearly also can relate back to the accessibility of quality care and, potentially, to the prevalence of environmentally-mediated disease.

It is essential that health systems also understand and intervene on equity gaps in therapies and outcomes for patients receiving care in the ICU. For example, a multi-site study of 5,749 PICU admissions showed a shorter length of stay (LOS) for uninsured children (0.86; 95% CI: 0.80–0.92) compared to publicly and privately insured children; notably, this disparity persisted even when analyses include adjustment for the increased probability that the uninsured children were likelier to die. The same study demonstrated a 4% decrease in resource use for African American children compared to Caucasian children, which approached but did not reach statistical significance (14,23,24). This area of great concern, however, has been understudied.

Factors that influence disparities, many of which are rooted in SDH, extend into the ICU. As such, a deeper understanding of these factors and targeted actions could prevent ICU-based disparities while simultaneously contributing to larger disease prevention efforts across the health system as a whole. Actions could target specific, potentially-movable outcomes or therapies. For instance, they could extend to mitigating the differences in how families are engaged in the care of their children (25–28). Literacy and language barriers as well as lack of culturally appropriate engagement with the patient and family can lead to miscommunication or misunderstanding, increasing feelings of mistrust (29,30). These issues are not unique to the ICU but may be even more important to manage given the high stakes of the environment—the severity of the disease and the added transition many children face as they go from one unit to another or from hospital-to-home with continued care needs. It naturally follows that a deeper consideration of the context in which transitions and

these care needs occur will determine the extent to which morbidity persists.

ICU to community: preventing the negative effects of critical illness and injury

The field of critical care has been engaging more and more in the prevention and mitigation of the negative effects that ICU stays can have, and that can burden patients and their families as they return to the community to live, grow, work, and play. Over the last decade, intensivists have widened their focus from largely preventing mortality to also preventing, or at least minimizing, the morbidity that results from critical illnesses and injuries, and the resultant exposure to the ICU (31). As general pediatrics has advanced the concept of toxic stress (32) and adult medicine specialists have begun to examine “post-hospital syndrome” (an acquired, transient period of vulnerability to a range of adverse health events following an acute hospitalization) (33), adult and pediatric intensivists alike have begun studying “post-intensive care syndrome” (i.e., new or worsening impairment in physical, mental, or cognitive health after critical illness that persists beyond discharge from the acute care setting) (34). The field is beginning to recognize the long-term mental health effects of ICU stays for not only the patient but also the family, and develop efforts to prevent these effects (35-38). ICUs are increasingly promoting early mobility (39,40) and are taking a burgeoning focus on patient-centered outcomes such as quality of life and school performance (41,42). In these ways, critical care is now engaging in efforts to prevent morbidity along the latter part of the continuum, from ICU back into community. In this, the PICU is picking up outcomes that have long been the purview of primary care pediatrics, outcomes that are vital to upholding the broader definition of health and well-being that is being increasingly agreed upon, that of a “state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” (43).

Beyond prevention to promotion

The role that critical care plays in preventing morbidity and mortality is vital. Including critical care in broader prevention efforts, health systems may better identify and leverage opportunities for the prevention of illness and injury as well as the prevention of secondary harm due to critical care use. Beyond prevention, however, PICUs can

also be places to promote child, adolescent, and family health and well-being. Patients and families encounter critical care at highly vulnerable, stressful times. For those who require critical care, might health systems and ICUs manage the experience in ways that not only minimize disease and harm but also foster health and well-being?

Life course theory has demonstrated how many different health trajectories are possible for any one person (44). As a child grows and develops, she encounters negative and positive factors that influence her trajectory towards suffering or thriving throughout her childhood and into her adulthood. Negative factors may include poverty, lack of health services, and toxic stress while positive factors may include parent emotional health, being read to, and appropriate discipline (44). Life course theory demonstrates how our systems and policies may optimize health and well-being, by not only minimizing negative, health-harming factors but also fostering positive, health-promoting factors. To that end, the ICU experience could be transformed so that patients and families not only suffer less mortality and morbidity but also experience post-traumatic growth (i.e., positive change resulting from the struggle with trauma) (45).

By broadening their approach to prevention and promotion, and including critical care in the efforts, health systems could foster health and well-being through positive health practices along the care continuum. In times of crisis, critical care could systematically encourage strengths and assets, such as greater resilience, deeper sense of meaning and purpose, stronger interpersonal connections, and greater sense of belonging. Potential interventions could include encouraging strength-based, culturally appropriate, trauma-informed care; fostering mindfulness practices for patients, families, and providers; embedding strength- or asset-based frame into communications and interactions with parents and among team members; and enhancing valuable connections among patients and providers across the care continuum including the community; among many others.

As disease prevention and health promotion rise as priorities within health systems, critical care can and should join, even help lead, the effort.

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Footnote

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