

Early, Unanticipated PICU Transfers: Is There a Need for Improvement?

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Triage of patients to the PICU or general ward has important quality and cost implications. Mistrigging a patient to the general ward may cause delays in needed care, with the potential for increased morbidity and mortality.^{1,2} However, mistrriage of patients who do not require critical care interventions to a PICU also has consequences, including increased health care costs for the family; use of limited PICU beds, nurses, and physicians; and heightened familial stress.³⁻⁵ Additionally, there may be different expectations for testing and treatment in the ICU environment compared with the acute care ward, even for similar cases, resulting in unneeded tests and treatments.^{6,7}

In this month's issue of *Hospital Pediatrics*, Nadeau et al⁸ describe characteristics and outcomes of a cohort of pediatric patients triaged to the general ward who were subsequently transferred to the PICU within 24 hours of admission (early PICU transfers) between 2007 and 2016. The authors found that 841 of 82 397 (1%) general ward admissions required early PICU transfers. The median time to PICU transfer was 9.1 hours, with an interquartile range of 5.1 to 14.9 hours, meaning that only a small proportion of transfers occurred within the first few hours after admission. A majority of transfers (65%) were due to respiratory deterioration. Of the 841 subjects transferred, 525 (62%) did not require a critical intervention within 72 hours of hospitalization. The authors defined critical interventions as the need for extracorporeal membrane oxygenation, cardiopulmonary resuscitation, cardioversion or defibrillation, emergent operative procedure, vasoactive infusion, noninvasive positive pressure ventilation (including high-flow nasal canula [HFNC]), invasive mechanical ventilation, and management of intracranial pressure. Among the 316 who did receive a critical intervention, 197 (23% of the total transferred cohort) received the intervention within 1 hour of transfer.

The study has several strengths, including the largest sample size reported on this topic and a specific definition and timing of critical care interventions. Overall, the author's results are consistent with those of previous small studies of rates of early PICU transfers, revealing that the event is rare, with ~1% of patients in the general ward requiring early PICU transfers.⁹⁻¹¹

The study does have important limitations. First, it is challenging to decipher which of the 525 subjects who were transferred to the PICU and did not receive a critical intervention truly needed a transfer to the PICU. It is likely that some required more intensive bedside care and monitoring, such as patients with bronchiolitis needing frequent suctioning or patients with altered mental status needing frequent neurologic examinations. These indications for ICU transfer would not have met the authors' definition of "critical intervention" but do

www.hospitalpediatrics.org

DOI: <https://doi.org/10.1542/hpeds.2019-0058>

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HOSPITAL PEDIATRICS (ISSN Numbers: Print, 2154-1663; Online, 2154-1671).

FINANCIAL DISCLOSURE: The authors have indicated they have no financial relationships relevant to this article to disclose.

FUNDING: No external funding.

POTENTIAL CONFLICT OF INTEREST: The authors have indicated they have no potential conflicts of interest to disclose.

Drs Flaherty and Schroeder jointly conceptualized the commentary, drafted the initial manuscript, and approved the final manuscript as submitted.

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represent commonly accepted reasons for ICU-level care. On the other hand, some of the interventions defined as critical (particularly HFNC, which represented one-quarter of the critical interventions) may not always warrant ICU care. As reviewed by Kline et al,¹² several large children's hospitals have created protocols for the use of HFNC on the general ward. Had the hospital in the study by Nadeau et al⁸ allowed HFNC on the ward, the proportion of patients requiring critical interventions in the PICU would have been even lower.⁸

The authors suggest that there should be investment in further resources to better understand (and ideally prevent) these early transfers. Historically, unanticipated events, such as early PICU transfers, revisits to the emergency department, and readmission to the hospital, have been viewed as markers of suboptimal care and have been common targets for various quality improvement efforts. In practice, many of us take these "bounce backs" or "bounce ups" personally (a sign that our clinical judgment could have been better). However, given the large portion of the subjects able to stay on the general ward for >4 hours and the low number of subjects needing urgent intervention, an alternative view can be given to a majority of the subjects in the study. Specifically, many of the subjects were appropriately triaged to the floor, monitored, and safely transferred when their condition deteriorated and required PICU care. By most standards, it would appear that the institution involved in this investigation by Nadeau et al⁸ is performing admirably. The rate of early PICU transfers was low, and the rate of subjects with early transfers requiring immediate critical intervention was an even lower (197 of 82 397 or 0.2%). So, is this proportion really high enough to warrant being the target of future research and improvement efforts? Or is it just right? Might it actually be too low?

Consider these hypothetical examples. In hospital A, a patient with mild or moderate

respiratory distress is hospitalized on the ward, subsequently worsens, is then transferred to the PICU for closer observation but does not receive any critical interventions beyond observation, and so is transferred back to the ward the next day. In hospital B, the nearly identical patient is admitted directly to the PICU, similarly does not receive critical interventions, and is transferred to the ward the next day. Which hospital is better? What about hospital C, where the similar patient is hospitalized on the ward but is never transferred to the PICU? If early, unanticipated PICU transfers were accepted as a quality measure, then hospital A is underperforming. But how can we recognize that hospital C has provided the highest value care, in which value is defined as quality or outcomes divided by cost? Unfortunately, most existing quality metrics in the field of pediatrics surround underuse, rather than overuse, of health care resources.¹³ This imbalance may fuel a culture that is less forgiving of omission errors (eg, failure to admit a patient to the PICU) than commission errors (eg, admitting a patient to the PICU who did not need it). If we embrace improvement in health care value as a shared goal, it is imperative that we shift this imbalance. In the case of the appropriate triage of patients who are hospitalized, this shift may mean placing more emphasis on the patients who came to the PICU but should not have and less emphasis on those who should have come to the PICU but did not.

In a small number of recent studies that were focused on patients admitted to the PICU who do not receive critical care interventions, the authors concluded that there may be a sizeable portion of patients mistriaged to the PICU.^{14,15} Additional work is now emerging to identify patients with specific diseases who can safely be cared for outside of the PICU.^{16,17} These studies reveal that PICU overuse is likely a "low hanging fruit" that can be easily studied. Although the recent work by Nadeau et al⁸ provides us with useful information about patients mistriaged to the ward, similar investigations on patients mistriaged to the PICU may ultimately

translate to substantial improvements in health care value.

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Hospital Pediatrics originally published online April 25, 2019;

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Hospital Pediatrics originally published online April 25, 2019;

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