

Interfacility Transfers: A Process Ridden With Improvement Opportunities

Michelle Y. Hamline, MD, PhD, Jennifer L. Rosenthal, MD, MAS

Most pediatric emergency department visits occur in hospitals that see <15 children per day¹ and have insufficient pediatric resources.² As a result, nearly 350 000 children are transferred from hospital to hospital each year, and this number has increased over time.³ Unfortunately, the process of transferring patients between hospitals is fraught with communication breakdowns, diagnosis discordance, and delays in care.^{4,5} Handoffs during transitions of care are the leading cause of serious medical errors,⁶ and interfacility transfers inherently impose heightened risk by involving handoffs across different hospitals. Moreover, transfers impose additional direct (eg, transport accidents) and indirect (eg, psychological distress, unwarranted testing) risk to patients.

Among the population of transferred pediatric patients, children with ≥ 1 complex chronic condition (CCC) are a particularly vulnerable population at risk for harm. Their complex medical needs often necessitate complex interventions that pretransfer emergency departments might not be prepared to manage. The patient care handoff during the transfer also likely involves more complex information relative to handoffs of children without a CCC. Furthermore, children with a CCC have an increased likelihood of transfer relative to their nonmedically complex counterparts.⁷ Despite prioritized efforts to improve care for children with CCCs, we lack research focused on improving care for these children during the transfer process.

In this issue of *Hospital Pediatrics*, White et al⁸ begin to address this important literature gap. They used the 2012 Healthcare Cost and Utilization Project Kids' Inpatient Database (KID) to conduct a cross-sectional analysis of pediatric hospitalizations to describe the characteristics of hospitalizations among children with ≥ 1 CCC who experienced an interfacility transfer. They additionally examined the length of stay, the odds of receiving critical care services, and the odds of in-hospital mortality associated with interfacility transfer among CCC hospitalizations using weighted regression models to examine associations between the outcomes and transfer status. Transfer status was categorized into (1) CCC hospitalizations with no transfer and (2) CCC hospitalizations with a transfer admission source and a disposition of discharge or death.

Although others have previously characterized pediatric interfacility transfers and associated outcomes,^{7,9,10} White et al⁸ specifically described the transfer patterns and associated outcomes among patients with a CCC using a nationally representative discharge database. The authors found that 14% of CCC hospitalizations involved an interfacility transfer, whereas only 12% of non-CCC hospitalizations involved an interfacility transfer. In adjusted

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Address correspondence to Michelle Y. Hamline, MD, PhD, Department of Pediatrics, University of California, Davis, 2516 Stockton Blvd, Sacramento, CA 95817. E-mail: mhamline@ucdavis.edu

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Department of Pediatrics,
School of Medicine,
University of California,
Davis, Sacramento,
California

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analysis, hospitalized patients with a CCC who were transferred in and who were discharged or died had a longer length of stay compared with hospitalized patients with a CCC who were not transferred. The transferred in and discharged or died group was also more likely to receive critical care services and more likely to die during that hospitalization. In fact, in adjusted analysis, the transferred in and discharged or died hospitalizations had nearly 4 times the odds of in-hospital mortality compared with the nontransfer hospitalizations.

In light of these findings, we are left with important questions we must answer. First, what aspects of the transfer process are independent risk factors for increased use and mortality among CCC hospitalizations? To improve CCC hospitalization outcomes, we must identify the modifiable risk factors. Unfortunately, we lack evidence supporting what transfer process factors, if any, we must address. As recognized by White et al,⁸ study limitations precluded them from accounting for important variables that should be in their causal pathway. For example, the study design prohibited linkage of patients across encounters. Without knowing the child's illness severity on presentation to their index hospital, we cannot determine if the outcomes of increased use and higher mortality are a result of the transfer process or a result of the child's disease trajectory. Although the authors attempted to control for illness severity by adjusting for hospitalization resource intensity scores for kids (H-RISK), the H-RISK imputes illness severity from resource use during the hospitalization and, in this case, was necessarily calculated only from inpatient KID data.¹¹ Therefore, the H-RISK may not reflect the full scope of a child's illness severity without incorporating data before transfer.

Furthermore, because the KID includes only inpatient encounters, we lack any information on the pretransfer hospital characteristics. Recent evidence demonstrates that increased emergency department pediatric readiness is associated with decreased mortality.¹² Potentially, pediatric readiness is the greatest risk factor for poor transfer

outcomes. The National Pediatric Readiness Project, established in 2013, has developed a multiphase quality-improvement project to address the pediatric readiness of emergency departments nationwide, offering an implementation toolkit designed to help emergency departments establish staffing guidelines, equipment, policies, and protocols to more effectively care for children.¹³ Such efforts are a crucial step to improving transfer outcomes and will likely hold particular importance for highly vulnerable patients with a CCC.

In addition to improving care at pretransfer emergency departments, we must do what we can to optimize the transfer process itself until we have more evidence that allows us to determine where to target improvement efforts. Even if future research determines that the transfer process is not an independent risk factor for increased use and higher mortality among CCC hospitalizations, previous research supports the need to improve pediatric transfers.^{4,9,14,15} Many transfers are necessary and lifesaving, but others are not and cause preventable harm to patients and families. Much of the preventable harm is due to lack of information sharing and lack of shared decision-making with families, which heightens stress, increases burdens, and hinders family-physician trust.⁹ Additionally, up to 39% of pediatric transfers are avoidable.^{10,14} Among the necessary transfers, children often arrive to an ICU without needing that level of care.¹⁶ Such overtriage imposes additional distress and burden. Undertriage also occurs, increasing patient safety risks. The task of addressing these numerous interfacility transfer issues brings us to the next question: how do we optimize the transfer process?

White et al⁸ mention the use of standardized handoff scripts as 1 potential means to improve transfer outcomes. Previous work has shown that pediatric interfacility verbal and written handoffs are often incomplete.¹⁵ Improved handoff documentation in interfacility transfers has been associated with reduced mortality, fewer adverse events, and improved resource use through avoidance of work duplication.¹⁷ Handoff scripts have been used in other settings to

improve the consistency of handoff communication and the documentation of handoff elements within hospitals.¹⁸ Such scripts have been associated with reduced medical errors and decreased adverse event rates.¹⁸ Optimization of the transfer process requires that such work be translated to pediatric interfacility transfer handoffs as well.

Another underused intervention that must be further studied but is a promising solution to the above transfer problems is the use of telemedicine. With virtual face-to-face communication and a means for providers to remotely meet and assess patients, telemedicine has advantages over standard telephone communication and can result in care that is of higher quality, more family centered, and more accessible.^{19,20} Use of telemedicine to provide expert consultation before initiating a transfer can mitigate family stress^{9,21} and improve triage appropriateness.^{16,21} Telemedicine use can improve information sharing, shared decision-making, and coordination. Family participation in conversations with the pediatric consultant allows for more informed decisions, thereby increasing family understanding, reassurance, and trust and reducing stress and risk factors for prolonged distress. Also, by improving the consulting physician's ability to remotely assess the patient's illness severity and medical needs, telemedicine overcomes some factors that contribute to overtriage and undertriage.

Although telemedicine might be a means to optimize the transfer process, the body of literature examining telemedicine use during transfers is limited and largely consists of nonexperimental research studies. As telemedicine increasingly becomes a more readily available technology, we call for researchers to evaluate the impact of this intervention on patient outcomes, ideally by conducting randomized controlled trials. Lastly, despite the limitations of this present study by White et al,⁸ their important work adds to the growing collection of evidence highlighting the important need to prioritize pediatric transfer research, particularly for children with a CCC.

REFERENCES

1. Gausche-Hill M, Ely M, Schmuhl P, et al. A national assessment of pediatric readiness of emergency departments [published correction appears in *JAMA Pediatr*. 2015;169(8):791]. *JAMA Pediatr*. 2015;169(6):527–534
2. Schappert SM, Bhuiya F. Availability of pediatric services and equipment in emergency departments: United States, 2006. *Natl Health Stat Rep*. 2012;(47):1–21
3. França UL, McManus ML. Trends in regionalization of hospital care for common pediatric conditions. *Pediatrics*. 2018;141(1):e20171940
4. Rosenthal JL, Okumura MJ, Hernandez L, Li ST, Rehm RS. Interfacility transfers to general pediatric floors: a qualitative study exploring the role of communication. *Acad Pediatr*. 2016;16(7):692–699
5. Philpot C, Day S, Marcdante K, Gorelick M. Pediatric interhospital transport: diagnostic discordance and hospital mortality. *Pediatr Crit Care Med*. 2008;9(1):15–19
6. Joint Commission on Accreditation of Healthcare Organizations. Joint Commission Center for Transforming Healthcare releases targeted solutions tool for hand-off communications. 2012. Available at: https://www.jointcommission.org/assets/1/6/tst_hoc_persp_08_12.pdf. Accessed August 31, 2018
7. Rosenthal JL, Hilton JF, Teufel RJ II, Romano PS, Kaiser SV, Okumura MJ. Profiling interfacility transfers for hospitalized pediatric patients. *Hosp Pediatr*. 2016;6(6):345–353
8. White MJ, Sutton AG, Ritter V, Fine J, Chase L. Interfacility transfers among patients with complex chronic conditions. *Hosp Pediatr*. 2020;10(2):e20190105
9. Rosenthal JL, Li ST, Hernandez L, Alvarez M, Rehm RS, Okumura MJ. Familial caregiver and physician perceptions of the family-physician interactions during interfacility transfers. *Hosp Pediatr*. 2017;7(6):344–351
10. Li J, Monuteaux MC, Bachur RG. Interfacility transfers of noncritically ill children to academic pediatric emergency departments. *Pediatrics*. 2012;130(1):83–92
11. Richardson T, Rodean J, Harris M, Berry J, Gay JC, Hall M. Development of hospitalization resource intensity scores for kids (H-RISK) and comparison across pediatric populations. *J Hosp Med*. 2018;13(9):602–608
12. Ames SG, Davis BS, Marin JR, et al. Emergency department pediatric readiness and mortality in critically ill children. *Pediatrics*. 2019;144(3):e20190568
13. Remick K, Gausche-Hill M, Joseph MM, Brown K, Snow SK, Wright JL; American Academy of Pediatrics Committee on Pediatric Emergency Medicine and Section on Surgery; American College of Emergency Physicians Pediatric Emergency Medicine Committee; Emergency Nurses Association Pediatric Committee. Pediatric readiness in the emergency department [published correction appears in *Pediatrics*. 2019;143(3):e20183894]. *Pediatrics*. 2018;142(5):e20182459
14. Mohr NM, Harland KK, Shane DM, Miller SL, Torner JC. Potentially avoidable pediatric interfacility transfer is a costly burden for rural families: a cohort study. *Acad Emerg Med*. 2016;23(8):885–894
15. Rosenthal JL, Romano PS, Kokroko J, Gu W, Okumura MJ. Receiving providers' perceptions on information transmission during interfacility transfers to general pediatric floors. *Hosp Pediatr*. 2017;7(6):335–343
16. Harvey JB, Yeager BE, Cramer C, Wheeler D, McSwain SD. The impact of telemedicine on pediatric critical care triage. *Pediatr Crit Care Med*. 2017;18(11):e555–e560
17. Usher MG, Fanning C, Wu D, et al. Information handoff and outcomes of critically ill patients transferred between hospitals. *J Crit Care*. 2016;36:240–245
18. Starmer AJ, Spector ND, Srivastava R, et al; I-PASS Study Group. Changes in medical errors after implementation of a handoff program. *N Engl J Med*. 2014;371(19):1803–1812
19. Dharmar M, Kuppermann N, Romano PS, et al. Telemedicine consultations and medication errors in rural emergency departments. *Pediatrics*. 2013;132(6):1090–1097
20. Dharmar M, Romano PS, Kuppermann N, et al. Impact of critical care telemedicine consultations on children in rural emergency departments. *Crit Care Med*. 2013;41(10):2388–2395
21. Sauers-Ford HS, Hamline MY, Gosdin MM, et al. Acceptability, usability, and effectiveness: a qualitative study evaluating a pediatric telemedicine program. *Acad Emerg Med*. 2019;26(9):1022–1033

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