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## Direct admission to hospital: a mixed methods survey of pediatric practices, benefits and challenges

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### Abstract

**Background**—Direct admissions account for 25% of pediatric unscheduled hospitalizations. Despite this, our knowledge of direct admission practices and safety is limited. This study aimed to characterize direct admission practices, benefits and challenges at a diverse sample of hospitals, and to identify diagnoses most appropriate for this admission approach.

**Methods**—We conducted a national survey at a stratified random sample of 177 US hospitals, employing both closed- and open-ended questions. Descriptive statistics were calculated to summarize numeric responses while qualitative content analysis was performed to identify emergent themes.

**Results**—Responses were received from 108 hospitals (61%). Hospitals represented all geographic regions and employed varied emergency medicine and inpatient care models. 103 (95%) respondents reported that their hospitals accepted direct admissions and 45 (50%) expressed the view that more children should be admitted directly. Perceived benefits included: (i) improved efficiency; (ii) patient and physician satisfaction; (iii) earlier access to pediatric-specific care; (iv) continuity of care; and (v) reduced risk of nosocomial infection. Risks and challenges included: (i) difficulties determining admission appropriateness; (ii) inconsistent processes; (iii) provision of timely care; and (iv) patient safety. Populations and diagnoses reported as most appropriate and inappropriate for direct admission varied considerably across respondents.

**Conclusions**—While respondents described benefits of direct admission for both patients and healthcare systems, many also reported challenges and safety concerns. Our results may inform

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subsequent epidemiologic and patient-centered outcomes research to evaluate the safety and effectiveness of direct admissions.

## Keywords

patient admission; direct admission; emergency room volume; hospital medicine

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## Introduction

Emergency department (ED) utilization continues to increase across hospitals in the United States, with the Institute of Medicine describing ED crowding as a “national epidemic”.<sup>1</sup> The proportion of hospital admissions originating in EDs has increased by more than 40% since the 1990s, with more than one million children admitted to hospitals through EDs annually.<sup>2,3</sup> Despite this, studies exploring alternative approaches to hospital admission are lacking.

Direct admission to hospital, defined as hospital admission without first receiving care in the hospital’s ED, is the most common alternative to ED admission, accounting for 25% of all non-elective pediatric admissions in the United States.<sup>4</sup> Direct admissions may reduce ED crowding and decrease healthcare costs, yet their safety and effectiveness remain under-investigated.<sup>4,5</sup> Among children with pneumonia, direct admission has been shown to be associated with decreased costs, with no significant differences in rates of transfer to the intensive care unit (ICU) or hospital readmission relative to children admitted through EDs.<sup>5</sup> However, rates and outcomes of direct admission vary considerably across hospitals, underscoring the need for research characterizing how practices differ across hospitals and how this variation may influence patient safety and quality of care.<sup>4,5</sup> To our knowledge, there have been no previous studies characterizing direct admission systems, policies and procedures at hospitals in the United States, nor studies determining which populations are best suited for this admission approach.

Physicians providing inpatient care are key stakeholders in the hospital admission process, frequently having experience with both direct and ED admissions. To ascertain their perspectives and experiences, we conducted a mixed-methods survey querying hospitals’ direct admission practices and their associated benefits and challenges, and characterizing the populations and conditions considered appropriate and inappropriate for this admission approach.

## Methods

### Study population

We conducted a national web-based survey of inpatient pediatric medical directors (or designates) at a stratified random sample of hospitals in the United States, identified using the American Hospital Association (AHA) database (2009). The AHA database provides a comprehensive census of hospitals in the United States, representing more than 6200 hospitals.<sup>6</sup> Using a random number generator, a random sample of 200 hospitals with EDs as well as pediatric beds was selected, stratified based on hospital size (10% small hospitals

[<200 total beds], 25% medium hospitals [200–400 total beds], and 65% large hospitals [>400 total beds], aligning with national non-neonatal, non-maternal, pediatric hospitalization patterns).<sup>7</sup> The survey was distributed to 177 of these 200 hospitals, as we were unable to identify the pediatric medical directors at the remaining hospitals. The study protocol was approved by the Tufts Medical Center Institutional Review Board.

### Survey Instrument

Given the paucity of previous research in this area, we employed a mixed methods approach including both closed- and open-ended questions to encourage nuanced, detailed responses.<sup>8,9</sup> Closed-ended questions included: (i) hospitals' demographic characteristics, (ii) if and when direct admissions were accepted, (iii) direct admission rate, (iv) sites from which direct admissions were accepted, (v) satisfaction with the direct admission process on a 5-point Likert scale, (vi) presence of formal and informal criteria to assess direct admission appropriateness, and (vii) belief that more children should be admitted directly. Open-ended, free-text response questions included: (i) average daily census for pediatric medical-surgical patients, (ii) rationale for limiting direct admissions to certain times, (iii) benefits and challenges of direct admissions, (iv) changes to improve satisfaction with direct admissions, (v) description of formal and informal direct admission criteria, (vi) perspectives regarding the populations, conditions, or diseases that particularly benefit from direct admission and for which direct admission is not recommended, and (vii) perceptions of families' direct admission experiences relative to admission through EDs. We conducted cognitive interviews with ten pediatric hospitalists and primary care providers (PCPs), not included in the final sample, to ensure that the questions were consistently understood as intended and that the response options were sufficiently comprehensive. The survey was distributed by email in July and August 2014 and survey completion reminders were sent via email up to three times. Respondents were provided with a \$25.00 gift card upon survey completion. The survey is available from the author upon request.

### Analysis

Descriptive statistics were calculated to summarize numeric responses while qualitative content analysis was performed to assess responses to the open-ended, free-text responses.<sup>10</sup> To facilitate qualitative analysis, we uploaded responses to Dedoose, a mixed-methods data management program.<sup>11</sup> Three members of our study team (EO, NM, JL) reviewed all responses and employed a general inductive approach to identify relevant concepts, developing a codebook that outlined these concepts and associated definitions.<sup>9</sup> Ten percent of responses were double-coded, with areas of disagreement resolved collaboratively and code definitions revised accordingly. Following assurance of coding agreement, the remaining free-text responses were coded by one member of the study team (EO). Related codes were subsequently organized in categories to identify emergent themes. Upon completion of this qualitative content analysis and consistent with established mixed-methods techniques, we enumerated the frequency with which emergent themes were described.<sup>12,13</sup>

## Results

### Respondents

Responses were received from 108 hospitals, representing a response rate of 61%. Hospitals represented all geographic regions of the United States, reflecting diverse hospital types and program models (Table 1). Approximately half of participating hospitals had full-time pediatric EDs while one-quarter had no dedicated pediatric ED. Residents were involved in inpatient care at the majority of hospitals, but at one-fifth of hospitals resident involvement was limited to either part-time patient coverage or care for a proportion of admitted patients. Almost all participating hospitals reported having pediatric hospital medicine services, but less than half had pediatric hospitalists in-house around-the-clock. The median daily census was 15 pediatric medical-surgical patients, with a range of 1 to 200 patients. The median daily census varied across hospital types, with a median of 8 [IQR 5–12] pediatric patients reported at general community hospitals, 20 [IQR 14–28] at children's hospitals nested within larger hospital systems, and 50 [IQR 38–60] at freestanding children's hospitals.

### Direct admission procedures and guidelines

A total of 103 respondents (97%) reported that their hospitals performed pediatric direct admissions. Reported reasons for not performing direct admissions included inconsistent inpatient physician coverage and policies requiring all admitted patients to undergo preliminary assessment in the ED, driven by an aim for more timely physician evaluation upon arrival at the hospital. Direct admission rates varied from <10% to >50% of pediatric hospitalizations; this variation was observed at both children's hospitals and general community hospitals, with no significant difference in direct admission rate across hospital types. Overall, 29% (n=28) of respondents reported that they were highly satisfied with the direct admission processes at their hospitals, while the remainder reported intermediate levels of satisfaction. Half of respondents (n=45, 50%) expressed the view that more children should be admitted directly.

Direct admissions were described as originating in a variety of settings, with 96% (n=91) accepting direct admissions from PCP offices, 88% (n=84) from EDs geographically separate from the admitting hospital, 81% (n=77) from subspecialty clinics, and 42% (n=40) from patients' homes. At general community hospitals, 76% (n=26) of respondents reported that PCP offices were the most frequent source of direct admissions, while at freestanding children's hospitals and children's hospitals nested in larger hospitals, EDs were the most frequent sources of direct admissions at more than half of hospitals [52% (n=13) and 54% (n=20) respectively]. At children's hospitals, PCP offices were reported as the most common source of direct admissions by less than one-third of respondents.

One-third of respondents (n=31) reported that their hospital had a formal pediatric direct admission policy, while one fifth of respondents (n=18) were unsure if direct admission policies were in place. Relatedly, 27% of respondents (n=25) reported having formal criteria to evaluate the appropriateness of potential direct admissions while 53% (n=50) reported applying informal criteria. Free-text responses describing these formal and informal criteria aligned with seven major themes: (i) conditions and populations appropriate and

inappropriate for direct admission; (ii) requisite pre-hospital assessments; (iii) clinical stability/need for emergent care; (iv) triage procedures; (v) role of physician judgment; (vi) availability of adequate staffing and beds; and (vii) time of day. These themes, thematic frequencies, and associated representative quotes are shown in Table 2.

With respect to requisite pre-hospital assessments, respondents described limitations regarding the settings and providers from where and whom direct admissions were accepted, and time periods within which patients must have been seen by referring healthcare providers prior to hospital admission. These time periods ranged from assessments required within 4 hours of planned admission to the day of planned hospital admission (Table 2). Criteria regarding patients' need for emergent care were discussed in the context of time periods within which patients were anticipated to require hospital-based care upon arrival. These time periods varied across hospitals, with direct admissions limited at some hospitals to those who required care no sooner than 60 minutes upon arrival to 4–6 hours upon arrival at the hospital. Triage procedures included protocols requiring physician-to-physician verbal handoffs, vital signs assessment in the accepting ED, application of the Pediatric Early Warning Systems scores to assess clinical stability, and teleconferences with transporting ambulance teams. The role of physician judgment in accepting direct admissions was discussed in the context of past experiences, referring physicians' practice styles, and the limitations of direct admission policies to determine direct admission appropriateness.

More than 80% of respondents (n=83) reported that their hospitals accepted direct admissions at any time of day. Reasons for limiting direct admissions to particular times of day included policies against accepting direct admissions when attending physicians were not in the hospital, and quality and safety concerns given limited staffing in hospitals at night.

### **Populations and diagnoses appropriate for direct admissions**

When asked to list specific populations and diagnoses most appropriate and inappropriate for direct admissions, respondent's answers varied considerably and no populations or diagnoses were described by more than one-third of respondents (Table 3). The most frequently described populations considered appropriate for direct admissions encompassed two broad categories – stable, uncomplicated patients and children with chronic illnesses. With respect to stable, uncomplicated patients, respondents described, “uncomplicated ‘bread and butter’ admissions” from PCP and specialty clinics, and “stable patients with complete work-ups,” particularly those who had failed outpatient management. Regarding children with chronic illnesses, respondents described direct admissions as particularly beneficial for: (i) children with “slowly progressive chronic illnesses” such as failure to thrive and chronic heart disease; (ii) children with co-morbid autism, in order to “avoid another frightening experience and more strangers,” (iii) specialty patients such as children with cystic fibrosis, to facilitate “definitive therapies started earlier,” and (iv) children with medical complexity, described as “better known to us than our ER or outside ER.” Respondents most frequently recommended against direct admission for: (i) children with respiratory and neurologic illnesses, citing concerns for clinical deterioration, and (ii)

children requiring surgical evaluation, specifically nonspecific abdominal pain, appendicitis and trauma.

Respondents described three populations as both most likely to benefit from direct admissions and most inappropriate for this admission approach. These included: (i) infants requiring rule-out sepsis evaluations, with some respondents describing that “work-up and treatment is faster in the ER,” while other cited reduced risks of nosocomial infections when admitted directly; (ii) children with medical complexity, with risks of clinical deterioration balanced with the aforementioned perceived benefits; and (iii) asthma exacerbations.

### Benefits, risks and challenges

Perceived benefits of direct admission aligned with five themes: (i) improved efficiency of the admission process; (ii) patient, family and physician satisfaction; (iii) earlier access to pediatric-specific care; (iv) continuity of care; and (v) reduced risk of nosocomial infection. These themes, coding frequencies and representative quotes are summarized in Table 4.

With respect to improved efficiency of the admission process, respondents discussed decreased ED utilization, lower healthcare costs, and “more timely initiation of definitive care.” Direct admissions were also described as facilitators of patient, family, and referring provider satisfaction. Given that not all hospitals have dedicated pediatric ED facilities, direct admission was described as a means for patients’ to more readily access pediatric-specific care, including pediatric-specific nurses, hospitalists and treatment guidelines. The benefit of continuity of care was discussed in the context of direct communication between referring and accepting healthcare providers, providing opportunities to “reality check” the appropriateness of direct admissions and contributing to more “seamless admission processes.” Finally, respondents described perceived decreased risk of nosocomial infection, particularly for neonates and immunocompromised patients by “bypassing the exposures” to communicable diseases in the ED.

Perceived risks and challenges aligned with four themes: (i) difficulties determining direct admission appropriateness; (ii) inconsistent direct admission processes; (iii) hospital workflow and provision of timely care; and (iv) concerns for patient safety (Table 4).

Difficulties determining direct admission appropriateness were discussed by respondents in the context of insufficient patient acuity to warrant hospital admission, resulting in unnecessary hospitalizations, and the converse problem of high patient acuity, resulting in hospital admissions that required intensive care and were inappropriate for general inpatient beds. With respect to inconsistent direct admission processes, respondents discussed: (i) poor communication between referring and accepting healthcare providers, including inaccurate assessments of patient acuity and active issues; (ii) lack of formal triage procedures upon arrival at the hospital; (iii) limited administrative infrastructure resulting in delays in patient registration and order entry; and (iv) unstandardized workflow processes, with respondents describing direct admission processes as “too cumbersome” and “unstandardized”. Unstandardized processes were discussed specifically in the context of hospital workflow and provision of timely care, with respondents reporting: (i) insufficient staffing to accommodate the time and resource demands associated with direct admissions;



(ii) poor communication within the healthcare team, resulting in “stealth admissions” without nurse, attending physician and/or resident awareness; and (iii) greater difficulties arranging for procedures and consultations for patients who had been directly admitted.

Concerns for patient safety underpinned many respondents’ reports about the challenges of direct admissions, discussed in the context of: (i) potential for clinical deterioration prior to admission, due to transportation or other delays from the time the admission was accepted until the patient and family arrived on the floor, “uncontrolled transitions from ambulatory to inpatient”, and deterioration due to natural disease course; (ii) potential need for intensive care upon admission, resulting in patient harm or potential for harm; and (iii) potential delays in providing care, due to unstandardized direct admission processes and competing demands on staff.

## Discussion

This mixed-methods analysis summarizes pediatric direct admission practices across a diverse sample of hospitals in the United States, describing components of direct admissions guidelines and characterizing physicians’ perspectives regarding the benefits and challenges of this admission approach. Although only a fraction of respondents were highly satisfied with the direct admission processes at their hospitals, 50% reported their belief that more children should be admitted directly, citing benefits for both patients and healthcare systems. Conversely, the perceived risks and challenges illuminate several opportunities for further studies and quality improvement initiatives.

Direct admissions constitute one-in-four unplanned pediatric hospitalizations nationally.<sup>4</sup> Despite this, research examining the safety and effectiveness of this admission approach is limited to two adult studies and two pediatric studies, all retrospective cohort analyses. The first study among adults with sepsis found that direct admission was associated with increased mortality compared to ED admission.<sup>14</sup> This finding was confirmed in a second study, but was not observed among adults with less emergent conditions including pneumonia, asthma or cellulitis.<sup>15</sup> In contrast, children with pneumonia admitted directly received fewer diagnostic tests and had substantially lower total hospital costs than children admitted through EDs, with no significant differences in adverse outcomes including readmission and transfer to the ICU.<sup>5</sup> Similarly, in a study of unplanned pediatric ICU transfers, no significant difference in rates of unplanned transfer was seen between children admitted directly and those admitted through the ED.<sup>16</sup> The risks and benefits of direct admission described in the present study provide contextual details that may explain these disparate findings: poorly standardized triage and workflow processes may result in delays in care and patient harm, while improved care coordination between referring and accepting healthcare providers and care initiation outside of EDs may reduce resource utilization. We hypothesize that formal direct admission policies and workflow processes, reported by only one-third of respondents, may provide a means of achieving these benefits while mitigating risks of harm.

When asked to identify conditions and populations most appropriate and inappropriate for direct admission, there was no consensus among respondents and several conditions were

reported as both appropriate and inappropriate for this admission approach. This response variation suggests a need for subsequent studies exploring direct admission safety and effectiveness for specific populations and diagnoses, and raises important questions about how contextual factors unique to particular hospitals may impact direct admission effectiveness. The conditions and populations most frequently recommended for direct admission are prevalent; neonatal hyperbilirubinemia (excluding in-hospital births), failure to thrive, children with medical complexity, cancer hospitalizations and skin and soft tissue infections together account for more than 800,000 pediatric hospitalizations annually.<sup>17–21</sup> Increasing direct admissions among these populations of children, when safe, could considerably decrease ED utilization. However, further studies determining the comparative effectiveness of direct and ED admission for these populations are necessary first steps.

Historically, direct admissions accounted for a greater proportion of hospital admissions, facilitated by physicians who provided both outpatient and hospital-based care for their patients.<sup>2,22</sup> However, as hospitalists have assumed greater responsibility for inpatient care, the proportion of hospitalizations originating as direct admissions has decreased.<sup>22</sup> While this change in care is undoubtedly multifactorial, the discontinuity between outpatient and inpatient settings intrinsic to many hospital medicine programs may contribute to several of the challenges described by respondents. A growing body of research illustrates the vital role of effective communication between inpatient and outpatient providers at the time of hospital discharge, with several quality improvement initiatives dedicated to improving direct communication.<sup>13,23–26</sup> Our results suggest potential benefits of analogous research to evaluate communication processes at the time of hospital admission. Similarly, just as patient triage is a fundamental component of emergency medical care with a vast literature documenting the reliability and validity of ED triage processes and their implications for patient safety, our findings suggest a need for evaluation of triage systems and workflow processes for direct admissions.<sup>27–29</sup>

By asking a combination of closed- and open-ended questions and applying mixed-methods analysis, this research provides important contextual details regarding direct admission processes, benefits and challenges. However, our results should be interpreted in light of some limitations. First, although our response rate well exceeds the average response rate for physician surveys, response bias may influence the generalizability of our results.<sup>30,31</sup> Specifically, the significant proportion of respondents who endorsed having pediatric hospital medicine services may reflect an increased likelihood of response by hospitalists relative to pediatricians providing both inpatient and outpatient care. However, we are reassured that the proportion of respondents from small, medium and large hospitals aligned with our stratification approach. Second, our application of qualitative content analysis may have resulted in coding misclassification. We attempted to minimize this by following established analysis procedures to ensure consistency in code application. Third, unlike traditional qualitative research, use of an electronic survey did not allow us to probe respondents for additional details regarding their perspectives. However, we attempted to mitigate this potential limitation by sampling a large number of physicians from diverse hospitals, using a comprehensive database of hospitals in the United States as our sampling frame.



Increasing the number of direct admissions to hospital may improve care coordination and reduce resource utilization, aligning directly with the goals of the patient-centered medical home model.<sup>32,33</sup> However, expansion of direct admission practices should occur in light of their potential risks and challenges. This study provides a framework informed by hospital stakeholders across the United States that may guide future research, essential to inform direct admission guidelines and quality improvement initiatives.

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## Abbreviations

<b>AHA</b>	American Hospital Association
<b>ED</b>	emergency department
<b>ICU</b>	intensive care unit

## References

1. Institute of Medicine. Hospital-based emergency care: At the breaking point. Washington, DC: National Academies Press; 2006. Available at [http://www.nap.edu/openbook.php?record\\_id=11621](http://www.nap.edu/openbook.php?record_id=11621).
2. Schuur J, Venkatesh A. The growing role of emergency departments in hospital admissions. *N Engl J Med*. 2012; 367(5):391–393. [PubMed: 22784039]
3. Wier, L.; Hao, Y.; Owens, P.; R, W. [Accessed February 26, 2015] Healthcare Cost and Utilization Project Statistical Brief 157. Overview of Children in the emergency department. 2010. <http://www.hcup-us.ahrq.gov/reports/statbriefs/sb157.pdf>.
4. Leyenaar J, Shieh M-S, Lagu T, Pekow PS, Lindenauer PK. Direct admission to hospitals among children in the United States. *JAMA Pediatr*. 2015; 169(5):500–502. [PubMed: 25774452]
5. Leyenaar JK, Shieh M, Lagu T, Pekow PS, Lindenauer PK. Variation and outcomes associated with direct admission among children with pneumonia in the United States. *JAMA Pediatr*. 2014; 168(9): 829–836. [PubMed: 25003562]
6. The American Hospital Association. American Hospital Association Data and Directories. Available at: <http://www.aha.org/research/rc/stat-studies/data-and-directories.shtml>.
7. Agency for Healthcare Research and Quality HCUPnet. <http://hcupnet.ahrq.gov/HCUPnet.jsp>.
8. Sofaer S. Mixed methods in public health services research. Academy Health Webinar. Available <http://academyhealth.org/Training/ResourceDetail.cfm?itemnumber=7916>.
9. Curry, La; Nembhard, IM.; Bradley, EH. Qualitative and mixed methods provide unique contributions to outcomes research. *Circulation*. 2009; 119(10):1442–1452. [PubMed: 19289649]
10. Hsieh H-F, Shannon SE. Three approaches to qualitative content analysis. *Qual Health Res*. 2005; 15(9):1277–1288. [PubMed: 16204405]
11. Dedoose Version 5.0.11, web application for managing, analyzing, and presenting qualitative and mixed method research data. Los Angeles, CA: SocioCultural Research Consultants, LLC; 2014. ([www.dedoose.com](http://www.dedoose.com)).
12. Sandelowski M. Focus on Research Methods Real Qualitative Researchers Do Not Count : The Use of Numbers in Qualitative Research. *Res Nurs Health*. 2001:230–240. [PubMed: 11526621]
13. Leyenaar J, Bergert L, Mallory L, et al. Pediatric Primary Care Providers' Perspectives Regarding Hospital Discharge Communication: A Mixed Methods Analysis. *Acad Pediatr*. 2015; 15(1):61–68. [PubMed: 25444655]

14. Powell ES, Khare RK, Courtney DM, Feinglass J. Lower mortality in sepsis patients admitted through the ED vs direct admission. *Am J Emerg Med.* 2012; 30(3):432–439. [PubMed: 21354751]
15. Kocher KE, Dimick JB, Nallamothu BK. Changes in the source of unscheduled hospitalizations in the United States. *Med Care.* 2013; 51(8):689–698. [PubMed: 23752257]
16. Reese J, Deakyne S, Blanchard A, Bajaj L. Rate of preventable early unplanned intensive care unit transfer for direct admissions and emergency department admissions. *Hosp Pediatr.* 2015; 5(1):27–34. [PubMed: 25554756]
17. Simon T, Berry J, Feudtner C, et al. Children with complex chronic conditions in inpatient hospital settings in the United States. *Pediatrics.* 2010; 126(4):1–10. [PubMed: 20566603]
18. Care of Children and Adolescents in US Hospitals: HCUP Fact Book, Healthcare Cost & Utilization Project (HCUP). [http://archive.ahrq.gov/data/hcup/factbk4/bk4fig6\\_7.htm](http://archive.ahrq.gov/data/hcup/factbk4/bk4fig6_7.htm).
19. Wolff M, Schinasi DA, Lavelle J, Boorstein N, Zorc JJ. Management of neonates with hyperbilirubinemia: improving timeliness of care using a clinical pathway. *Pediatrics.* 2012; 130(6):e1688–e1694. [PubMed: 23147974]
20. Thompson RT, Bennett WE, Finnell SME, Downs SM, Carroll AE. Increased length of stay and costs associated with weekend admissions for failure to thrive. *Pediatrics.* 2013; 131(3):e805–e810. [PubMed: 23439903]
21. Price RA, Stranges E, Elixhauser A. Healthcare Cost and Utilization project. Statistical Brief #132. Pediatric cancer hospitalizations, 2009. 2012; 28(15):1–12. Found at <http://www.hcup-us.ahrq.gov/reports/statbriefs/sb132.jsp>.
22. Morganti, KG.; Bauhoff, S.; Blanchard, J., et al. The Evolving Role of Emergency Departments in the United States. RAND Corporation; 2013. p. 1-79.
23. Snow V, Beck D, Budnitz T, et al. Transitions of Care Consensus Policy Statement American College of Physicians-Society of General Internal Medicine-Society of Hospital Medicine-American Geriatrics Society-American College of Emergency Physicians-Society of Academic Emergency Medicine. *J Gen Intern Med.* 2009; 24(8):971–976. [PubMed: 19343456]
24. Kripalani S, Lefevre F, Phillips CO, Williams MV, Baker DW. Deficits in Communication and Information Transfer Between Hospital-Based and Primary Care Physicians. *JAMA.* 2007; 297(8):831–841. [PubMed: 17327525]
25. Bell CM, Schnipper JL, Auerbach AD, et al. Association of Communication Between Hospital-based Physicians and Primary Care Providers with Patient Outcomes. *Journal of General Internal Medicine.* 2009; 24(3):381–386. [PubMed: 19101774]
26. Oduyebo I, Lehmann CU, Pollack CE, et al. Association of self-reported hospital discharge handoffs with 30-day readmissions. *JAMA Intern Med.* 2013; 173(8):624–629. [PubMed: 23529278]
27. Van Veen M, Moll HA. Reliability and validity of triage systems in paediatric emergency care. *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine.* 2009; 17:38.
28. Green, Na; Durani, Y.; Brecher, D.; DePiero, A.; Loiselle, J.; Attia, M. Emergency Severity Index version 4: a valid and reliable tool in pediatric emergency department triage. *Pediatr Emerg Care.* 2012; 28(8):753–757. [PubMed: 22858740]
29. Durand A-C, Gentile S, Devictor B, et al. ED patients: how nonurgent are they? Systematic review of the emergency medicine literature. *Am J Emerg Med.* 2011; 29(3):333–345. [PubMed: 20825838]
30. Field TS, Cadoret C, Brown M, et al. Surveying Physicians Do Components of the “Total Design Approach” to Optimizing Survey Response Rates Apply to Physicians? *Med Care.* 2002; 40(7):596–605. [PubMed: 12142775]
31. Grava-Gubins I, Scott S. Effects of various methodologic strategies: Survey response rates among Canadian physicians and physicians-in-training. *Canadian Family Physician.* 2008; 54(10):1424–1430. [PubMed: 18854472]
32. Hall, Ma; Lord, R. Obamacare: what the Affordable Care Act means for patients and physicians. *BMJ.* 2014; 349:g5376. [PubMed: 25338761]

33. Greenberg JO, Barnett ML, Spinks Ma, Dudley JC, Frolkis JP. The “medical neighborhood”: integrating primary and specialty care for ambulatory patients. *JAMA Intern Med.* 2014; 174(3): 454–457. [PubMed: 24474526]

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### What's New

This mixed-methods survey summarizes direct admission practices across US hospitals and characterizes physicians' perspectives regarding the benefits and challenges of this admission approach. These results can inform subsequent research and quality improvement initiatives focused on improving admission safety and effectiveness.

**Table 1**

## Hospital characteristics

Characteristic	n	(%)
Hospital type:		
Freestanding children's hospital	28	(26)
Children's hospital within larger institution	40	(37)
General community hospital	39	(36)
Hospital size:		
Small hospital (<200 beds)	14	(14)
Medium hospital (200–400 beds)	26	(26)
Large hospital (> 400 beds)	60	(60)
Geographic region:		
Northeast	27	(29)
Midwest	24	(26)
West	18	(19)
South	25	(27)
Hospital location:		
Urban	65	(61)
Suburban	36	(34)
Rural	5	(5)
Emergency department model:		
Pediatric ED 24 hr/day	59	(56)
Pediatric ED < 24 hr/day	21	(20)
No pediatric ED	25	(24)
Intensive care availability:		
Pediatric ICU	82	(77)
Adult ICU that will admit children	5	(5)
No pediatric ICU beds	19	(18)
Resident involvement in inpatient service:		
Full resident coverage (24hr/day)	58	(55)
Partial resident involvement (<24hr/day)	22	(21)
No resident involvement	18	(17)
Hospital medicine model:		
No pediatric hospitalists	1	(1)
Pediatric hospitalists in-house 24hr/day, 7 days a week	44	(44)
Pediatric hospitalists in-house <24hr/day, 7 days a week	56	(55)
Median daily census pediatric medical-surgical patients	15	[8–37]

**Table 2**

Formal and informal criteria applied in the direct admission process, presented thematically with representative quotations from respondents.

<b>Theme 1: Conditions and populations appropriate for direct admissions (n=17, 17%)*</b>
<i>Most direct admissions are for patients with chronic illness who have a slow progression requiring admission ...They are seen in clinic, and then directly admitted, rather than going through a needless ED evaluation. Ideally, I would like all patients with respiratory problems to be evaluated within the ED prior to transfer to the floor. These are the patients that we most commonly have to transfer emergently to the PICU within a short time from admission. We can get quite busy with delivery attendance, well newborn service, circumcisions, NICU coverage so it makes me nervous when I can't get right to the unit to see a patient. We therefore never take respiratory patients, or patients who need a whole sepsis evaluation and urgent antibiotics.</i>
<b>Theme 2: Requisite pre-hospital assessments (n=27, 26%)</b>
<i>There must be a medical evaluation to determine the need for hospitalization. In our rural location, we are an hour and a half away from the nearest ICU (which is not a pediatric ICU). Someone needs to assess the patient to determine if our hospital can take care of the patient, whether transfer to a larger facility is necessary and what resources there are if our hospital isn't the optimal place for the patient. Nothing need be fixed with physicians with whom we have a working relationship. In those instances, the patients are generally as described. In other instances, it is possible to have a patient other than as described. In instances of this being an ongoing problem with referring physicians, we have elected to have patients evaluated in the ED before transfer to the ward.</i>
<b>Theme 3: Clinical stability/need for emergent care (n=27, 26%)</b>
<i>No urgent intervention required in first 60 minutes of arrival to floor. Stable without intervention (except nebs or oxygen) for two hours after arrival. Patients should be ok without any intervention, study or medication for 4-6 hours.</i>
<b>Theme 4: Triage procedures (n=21, 20%)</b>
<i>All of our pediatric direct admits are instructed to enter through our emergency department entrance where they are assessed quickly for stability by a triage nurse. If they are deemed stable they are then directed to proceed to the admissions desk and then to the pediatric unit. If they are recognized to need immediate or urgent intervention then they are sent through the ED queue for treatment and stabilization. Primary physicians and/or affiliates will call the hospitalist attending physician to discuss an admission and an MD to MD hand-off will be provided with demographics and clinical information about the patient. PEWS [Pediatric early warning system] score, vitals, history and PE [physical exam] reported by referring physician.</i>
<b>Theme 5: Role of physician judgment (n=25, 24%)</b>
<i>Within our policy there are guidelines for what should not come directly to the floor. But they are guidelines and are interpreted and reviewed with each clinical situation. Our group has gotten very good at asking questions of our callers to determine if the child should first go to our ED for immediate and rapid care, and we will choose that route if need be. Hospitalists know a direct admit when they hear it? I am sort of joking but it is true. I find it hard to have hard rules on who can and cannot be a direct admit...maybe guidelines but not a policy?</i>
<b>Theme 6: Availability of adequate staffing and beds (n=7, 7%)</b>
<i>In our busy season, if we do not have a bed that will be open within a 30 minute window on our pediatric unit, the patient will also be referred for initial treatment in the ED. [We] will refuse a direct admission if no bed immediately available---patient is then is sent to the ED and is unhappy.</i>
<b>Theme 7: Time of day (n=8, 8%)</b>
<i>We are in-house from 7 AM to 7 PM and sometimes later. If in-house and [the] patient sounds stable, we will admit to the floor. Once home, all come through our ED. We only admit when our hospitalists are in house.</i>

\* number/percent of respondents discussing theme



**Table 3**

Populations and diagnoses most frequently recommended as appropriate and inappropriate for direct admission.

<b>Populations and diagnoses recommended for direct admission</b>	<b>Populations and diagnoses described as inappropriate for direct admission</b>
Neonatal hyperbilirubinemia (n=27, 26%)*	Respiratory distress (including asthma and bronchiolitis) (n=33, 32%)
Failure to thrive (n=14, 14%)	Acute abdominal pain/ concerns for surgical abdomen (n=11, 11%)
Children with medical complexity (n=10, 10%)	Infants admitted to rule-out sepsis (n=10, 10%)
Hematology-oncology patients** (n=10,10%)	Neurological disorders*** (n=7, 7%)
Skin and soft tissue infections (n=9, 9%)	Trauma (n=6, 6%)
Infants admitted to rule-out sepsis (n=8, 8%)	Children with medical complexity (n=5, 5%)
Asthma exacerbations (n=5, 5%)	Neonates (n=3, 3%)

\* Number/percent of respondents discussing population/condition

\*\* Respondents discussed both protocolized treatments and acute illnesses when immunocompromised

\*\*\* Including but not limited to seizures

**Table 4**

Benefits, risks and challenges of direct admission, presented thematically with representative quotations and thematic frequencies.

<b>PERCEIVED BENEFITS</b> (n=number of respondents discussing theme)
<b>Theme 1: Patient, family and physician satisfaction (n=78, 76%)</b>
<i>Families are generally more satisfied with direct admissions. It has a VIP feel and they are taken to a room faster. Admissions from the ED unfortunately wait a fair bit of time to get to the inpatient bed...and that is after having waited to be seen in the ED, wait for results, and then wait for a bed. Anyone that has been a direct admit in the past wants to be directly admitted again! PCPs are more likely to send their patients to our hospital because we allow direct admits and our competitors do not.</i>
<b>Theme 2: Improved efficiency of the admission process (n=74, 72%)</b>
<i>Avoidance of the ED for patients and families is the greatest benefit---lower costs, quicker movement to the inpatient service which is more comfortable, avoidance of long ED waits, fewer providers involved such that there is less chance for communication errors and inconsistencies; fewer history and physical exams done on any single, usually tired, patient... From a PCP perspective, if they see a patient in the office and believe they need admission, they usually don't want the patient to incur additional expense or an exam by a non-pediatric ED person. Patients are not stuck in the ED (which is not a peds ED) for hours when we know they are going to be admitted. This is not family-centered. If we can avoid the cost, and inconvenience of the ED for patients that definitely need to be admitted then we try to do that.</i>
<b>Theme 3: Earlier access to pediatric-specific care (n=14, 14%)</b>
<i>Our ED has great staff in general but it is not a pediatric environment and is one more stop or delay for a sick child and their anxious family. ... Up-to-date pediatric care (our ER docs do a great job, but they are not pediatric specific ER docs, so do not know a lot of the newest guidelines).</i>
<b>Theme 4: Continuity of care (n=12, 12%)</b>
<i>Direct admits all go through a transfer center, and an accepting hospitalist always has a conversation with a referring provider, so there is a communication mechanism in place to 'reality check' that a direct admit is appropriate. Their caregiver has directly spoken to their new caregiver and they have a sense of security and continuity with that...</i>
<b>Theme 5: Reduced risk of nosocomial infection (n=5, 5%)</b>
<i>Newborn babies are not exposed to the illnesses in the ED waiting room. Immunocompromised hosts [are] at risk for greater exposure to infectious disease in the ED.</i>
<b>PERCEIVED RISKS AND CHALLENGES</b>
<b>Theme 1: Difficulties determining direct admission appropriateness (n=53, 51%)</b>
<i>There is risk with everything we do! The risk of direct admissions is that the child arrives on the inpatient ward unit sicker than billed, or much healthier than represented on the phone and doesn't need to be admitted at all. These do not trump (in my opinion) the huge risk of ballooning costs and getting lots of unnecessary care in an ED prior to getting to our service. We never know if the patient is actually as being described. There are a significant number of admits where they are described as 'fine' then arrive needing the ICU or significant resuscitation, or the opposite where a patient is billed as very sick and actually doesn't need admission.</i>
<b>Theme 2: Inconsistent direct admission processes (n=51, 50%)</b>
<i>The process needs to be standardized. We currently have an open policy re: direct admissions and utilize them based upon our judgment. It would be useful to have a policy regarding suitable and unsuitable candidates for direct admission. We often lack in depth information regarding ED or inpatient transfers. We also sometimes are unable to get sufficient information to clarify if the patient is safe to come directly to the floor or needs to go to ED. A consistent triage assessment component is missing, since patients may come from a private office, subspecialty clinic or in-hospital general pediatric clinic. It would help not to have to make 5 phone calls for each admission from another ER: I have to call the charge nurse, patient utilization nurse, sometimes bed control, the residents, and of course the referring ER physician. This takes a lot of time!</i>
<b>Theme 3: Hospital staff workflow/provision of timely care (n=41, 40%)</b>
<i>Nursing staff can be easily overwhelmed by direct admits that require more of their time – blood work, IVs, etc – than the patient that comes through the ED “packaged”. There used to be a big problem with “stealth” admissions, where (often a specialist) would arrange an admission but not communicate to the inpatient attending or residents so a family would show up at a room and the medical team didn't know they were coming. If patients require urgent evaluation this does not happen as well when patients are directly admitted – blood work, radiology, consultation often takes longer on the floor than in the ED.</i>
<b>Theme 4: Concerns for patient safety (n=37, 36%)</b>
<i>During periods of high workload, it may be difficult for a hospitalist to arrive shortly after the directly admitted patient does. In those instances, greater reliance must be placed in the description of the referring physician and upon the floor nursing staff. There is, in these instances, increased risk that something may be missed.</i>

*I think from a safety point of view, peds ER assessment prior to coming up to floor is the only guarantee that unstable patients not get to floor where care could be suboptimal.*

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