# Direct Admission to Hospital: A Mixed Methods Survey of Pediatric Practices, Benefits, and Challenges

*JoAnna K. Leyenaar, MD, MPH; Emily R. O'Brien, BA; Natasha Malkani, BS; Tara Lagu, MD, MPH; Peter K. Lindenauer, MD, MSc*

From the Division of Pediatric Hospital Medicine, Department of Pediatrics, Tufts Medical Center, Boston, Mass (Dr Leyenaar and Ms O'Brien); Tufts University School of Medicine, Boston, Mass (Dr Leyenaar, Ms Malkani, Dr Lagu, and Dr Lindenauer); and Center for Quality of Care Research, Baystate Medical Center, Springfield, Mass (Dr Lagu and Dr Lindenauer)
The authors declare that they have no conflict of interest.
Address correspondence to JoAnna K. Leyenaar, MD, MPH, Division of Pediatric Hospital Medicine, Department of Pediatrics, Tufts Medical Center, 800 Washington St, Boston, MA 02111 (e-mail: jleyenaar@post.harvard.edu).
Received for publication March 28, 2015; accepted July 3, 2015.

## 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 using 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. One hundred three respondents (95%) reported that their hospitals accepted direct admissions, and 45 (50%) expressed the view that more children should be admitted directly. Perceived benefits included the following: improved efficiency; patient and physician satisfaction; earlier access to pediatric-specific care; continuity of care; and reduced risk of nosocomial infection. Risks and challenges included the following: difficulties determining admission appropriateness; inconsistent processes; provision of timely care; and 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 health care systems, many also reported challenges and safety concerns. Our results may inform subsequent epidemiologic and patient-centered outcomes research to evaluate the safety and effectiveness of direct admissions.

**KEYWORDS:** child; direct admission; emergency room volume; health resources/utilization; hospital medicine; patient admission; pediatrics

**ACADEMIC PEDIATRICS** 2016;16:175–182

## 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.

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."[1] The proportion of hospital admissions originating in EDs has increased by more than 40% since the 1990s, with more than a million children admitted to hospitals through EDs annually.[2,3] 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 nonelective pediatric admissions in the United States.[4] Direct admissions may reduce ED crowding and decrease health care costs, yet their safety and effectiveness remain underinvestigated.[4,5] 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 though EDs.[5] 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.[4,5] 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 database (2009). The database provides a comprehensive census of hospitals in the United States, representing more than 6200 hospitals.[6] Using a random number generator, a random sample of 200 hospitals with EDs as well as pediatric beds was selected, stratified by 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 nonneonatal, nonmaternal, pediatric hospitalization patterns).[7] 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 used a mixed methods approach including both closed- and open-ended questions to encourage nuanced, detailed responses.[8,9] Closed-ended questions included: 1) hospitals' demographic characteristics, 2) if and when direct admissions were accepted, 3) direct admission rate, 4) sites from which direct admissions were accepted, 5) satisfaction with the direct admission process on a 5-point Likert scale, 6) presence of formal and informal criteria to assess direct admission appropriateness, and 7) belief that more children should be admitted directly. Open-ended, free-text response questions included: 1) average daily census for pediatric medical-surgical patients, 2) rationale for limiting direct admissions to certain times, 3) benefits and challenges of direct admissions, 4) changes to improve satisfaction with direct admissions, 5) description of formal and informal direct admission criteria, 6) perspectives regarding the populations, conditions, or diseases that particularly benefit from direct admission and for which direct admission is not recommended, and 7) perceptions of families' direct admission experiences relative to admission through EDs. We conducted cognitive interviews with 10 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 e-mail in July and August 2014 and survey completion reminders were sent via e-mail up to 3 times. Respondents were provided with a $25 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.[10] To facilitate qualitative analysis, we uploaded responses to Dedoose, a mixed methods data management program.[11] Three members of our study team (EO, NM, JL) reviewed all responses and used a general inductive approach to identify relevant concepts, developing a codebook that outlined these concepts and associated definitions.[9] Ten percent of responses were double coded, with areas of disagreement resolved collaboratively and code definitions revised accordingly. After assurance of coding agreement, the remaining free-text responses were coded by 1 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.[12,13]

## 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 (interquartile range 5–12) pediatric patients reported at general community hospitals, 20 (interquartile range 14–28) at children's hospitals nested within larger hospital systems, and 50 (interquartile range 38–60) at freestanding children's hospitals.