

# Communication and Shared Understanding Between Parents and Resident-Physicians at Night

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## ABSTRACT

**BACKGROUND AND OBJECTIVE:** Communication breakdowns between members of the health care team compromise patient safety and experience. Communication breakdowns with parents, an important but often overlooked part of the health care team, are understudied. Parents may play a particularly important role in nighttime care given decreased staffing and inadequate transitions of care at night. We studied communication breakdowns evidenced by lack of shared understanding between parents and night-team residents about the reason for admission and care plan.

**METHODS:** We conducted a prospective cohort study of parents ( $n = 286$ ) and night-team senior residents ( $n = 34$ ) from May 1, 2013 to October 31, 2013. Parents and residents rated communication and described patients' reason for admission, overall plan, and overnight plan. Two physician investigators independently reviewed ( $\kappa = 0.63$ ) resident-parent dyads, assigned subsequently dichotomized 4-point overall agreement scores, and rated plan complexity. Using clustered logistic regression, we evaluated relationships among demographics, plan complexity, and shared understanding. We also examined resident and parent perceptions of shared understanding.

**RESULTS:** We analyzed data from 257 parent-resident dyads. Among these, 45.1% were rated as lacking shared understanding (agreement score = 1 or 2). In multivariate analysis, higher plan complexity ( $P < .001$ ) and length of stay ( $P = .002$ ) were associated with lack of shared understanding; lower parental education was a borderline predictor ( $P = .05$ ). When surveyed, parents and residents reported that they shared an understanding with one another about care plans in 86.0% and 73.1% of cases, respectively.

**CONCLUSIONS:** Parents and night-team residents frequently lack shared understanding. Family-centered care initiatives to improve parent-provider communication and shared understanding may help empower parents as partners in safe and high-quality nighttime care.



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www.hospitalpediatrics.org

DOI:10.1542/hpeds.2015-0224

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

**FINANCIAL DISCLOSURE:** Dr Landrigan has served as a paid consultant to Virgin Pulse to help develop a Sleep and Health Program. He is supported in part by the Children's Hospital Association for his work as an Executive Council member of the Pediatric Research in Inpatient Settings network. In addition, Dr Landrigan has received monetary awards, honoraria, and travel reimbursement from multiple academic and professional organizations for teaching and consulting on sleep deprivation, physician performance, handoffs, and safety and has served as an expert witness in cases regarding patient safety and sleep deprivation; the other authors have indicated they have no financial relationships relevant to this article to disclose.

Communication breakdowns among members of the health care team contribute to >60% of “sentinel events,” the most serious adverse events in hospitals.<sup>1</sup> Communication breakdowns with parents, an important but often overlooked part of the health care team, are understudied.<sup>2-4</sup> Parents play a key role in hospital care. This may be particularly true at night, a time typically characterized by decreased staffing,<sup>5,6</sup> increased provider workload, inadequate transitions in care,<sup>7-9</sup> and lack of bedside rounds.

Communication breakdowns can result in lack of shared understanding between patients and health care providers. This can lead to dissatisfaction with care<sup>10,11</sup> and undermine efforts to effectively engage patients and families as members of the care team, a key principle of family-centered care.<sup>12</sup> Lack of shared understanding also has the potential to diminish patient safety by impairing achievement of a “shared mental model,” an organized understanding of relevant information shared by team members that facilitates situational awareness<sup>13,14</sup> (the perception, understanding, and ability to project future events in a dynamic environment) and ensures patient safety.<sup>15-17</sup>

Poor handoffs are 1 type of communication breakdown that can affect shared understanding.<sup>18</sup> In the wake of changes in resident-physician work schedules leading to increased handoffs and reliance on night shift providers, we hypothesized that there would be substantial lack of shared understanding between parents and nighttime residents. Therefore, we sought to evaluate prevalence and predictors of lack of shared understanding between parents and nighttime residents about the reason for admission and care plan for hospitalized children.

## METHODS

### Setting and Study Population

We conducted a prospective cohort study of parents and nighttime senior residents of 0- to 17-year-old patients hospitalized in 2 inpatient wards at a tertiary care children’s hospital from May through October 2013. We included nonsurgical general, pediatric short stay, and

subspecialty (eg, adolescent) patients. Data were collected as part of a targeted nighttime communication intervention study directed at senior residents, nurses, and families of the unit’s most active patients, namely, those for whom miscommunications were particularly likely to be hazardous. Participating senior residents identified the 2 most active patients, defined as patients who were newly admitted, had concerning or changing clinical statuses, acute management needs, or puzzling diagnoses.

Each ward was staffed by a night team consisting of a supervising senior resident and intern who worked together closely to manage patients covered during the day by 2 daytime teams. Although daytime teams participated in family-centered rounds, night teams did not. Unit overnight census was typically ~20 to 25 patients. Residents worked consecutive 13-hour weeknight shifts (Sunday–Thursday evenings, 5:30 PM–6:30 AM) over a 2-week period. They started their shift with a joint in-person handoff held in the resident conference room between the day and night teams of senior residents and interns.

During the 6-month study period, research assistants conducted assessments each Monday through Thursday night, the 4 weeknights the primary night team was on service. They gathered written reports from resident and parent subjects, who each rated various aspects of parent-provider communication on a 5-point Likert scale and independently described, using open-ended responses, the reason for admission, overall plan for hospitalization, and, using closed-ended responses, the overnight plan. Study instruments were developed with a survey methodologist’s assistance and piloted and cognitively tested in the study units before data collection. We collected self-reported resident and parent demographic data and hospital administrative record-based patient demographic and clinical data. We also collected sign-out data each evening to reflect the daytime team’s conceptualization of the care plan as documented by the daytime senior resident.

Parents provided verbal consent for participation in the study using a study

information sheet; residents provided written informed consent. The hospital institutional review board approved the study.

### Exclusions

We excluded non-English-speaking parents because we lacked nighttime interpreter resources. We excluded parents of patients primarily admitted by the night team earlier that evening in order to capture patients who had undergone a transition in care from the daytime to nighttime provider team. We also excluded parents of patients  $\geq 18$  years old, in state custody, or boarding on the pediatric unit awaiting inpatient psychiatric placement.

### Outcomes

Our primary outcome was prevalence of lack of shared understanding between parents and senior residents regarding a major aspect of the reason for admission or overall or overnight care plan, as rated by independent reviewers. We additionally analyzed parent and resident perceptions of shared understanding and parent experience with nighttime communication in the hospital.

### Rating Shared Understanding

Two physician investigators independently reviewed parent and resident responses (Table 1). First, they rated the plan as simple or complex, with complex plans being those involving  $\geq 2$  body systems (eg, asthma exacerbation with increase in seizure frequency) or  $\geq 2$  consultations (eg, gastroenterology and nutrition), or those deemed diagnostic dilemmas (eg, patient with fevers and back pain undergoing oncologic and rheumatologic workup).

Next, they evaluated each dyad to determine whether the parent and resident had shared understanding, which they determined based on whether the respondents agreed on what the reviewer deemed key elements of the reason for admission, overall plan for hospitalization, and detailed overnight plan for the next 12 hours. Based on their overall assessment of each parent-resident dyad’s responses for these domains, raters assigned each dyad a summary overall agreement score on a 4-point Likert scale (1 = complete disagreement, 4 = complete agreement).



TABLE 1 Continued

	Simple Plan		Complex Plan	
	Parent Response	Resident Response	Parent Response	Resident Response
Urine to lab Placing IV			IV fluids Physical therapy Eye exam	
Overall agreement score		1 of 4 <sup>§</sup>		2 of 4 <sup>§</sup>
C. Parents and residents reporting contradictory information				
Overall reason for admission or transfer	N/A	N/A	"Pain"	"Fever + polyarthralgias"
Overall medical plan for the hospitalization	N/A	N/A	"Find out diagnosis + treatment plan"	"W/u and c/s rheum, dermat, and gen ped team"
Medical plan for the next 12 h	N/A	N/A	Pain medications Blood to lab Physical therapy Discharge home	Pain medications Blood to lab Antibiotics IV fluids
Overall agreement score		N/A		1 of 4 <sup>§</sup>

Examples of parent-resident dyads demonstrating (I) vs lacking (II) shared understanding. For those lacking shared understanding, dyads were divided into the following: residents reporting elements not reported by parents (A), parents reporting elements not reported by residents (B), and parents and residents reporting contradictory information (C). c/s, consult; CSF, cerebrospinal fluid; IV, intravenous; IWG, intravenous immunoglobulin; w/u, workup.

<sup>a</sup> Open-ended question

<sup>b</sup> Closed, multiple-answer question with optional fill-in-the-blank (eg, "monitoring for \_\_\_") and "other" categories. Respondent free text responses for these questions indicated by underlining

<sup>c</sup> Steroids not mentioned by parent, but parent and resident generally agreed about reason for admission and plan.

<sup>d</sup> Cardiology/echo not mentioned by parent, but parent and resident generally agreed about reason for admission and plan.

<sup>e</sup> Possibility of sepsis and monitoring of cultures not mentioned by parent; resident's overall plan focused on hydration and sepsis rule-out, whereas parent's focused on poor intake and vomiting.

<sup>f</sup> Psychological and neurological plans as well as underlying behavioral explanation and treatment of lesion not recognized by parent; stiffness not mentioned by parent; consults not specified by parent.

<sup>g</sup> Parent included constipation as part of the reason for admission and included treatment of constipation as part of the overall plan; also added a number of imaging tests to the plan for the next 12 h.

<sup>h</sup> Although seemed to agree about the overall reason for admission, parent and resident disagreed about the overall plan, and parent added several items to the plan for the next 12 h.

<sup>i</sup> Lack of agreement regarding reason for admission and details of overall plan and plan for the next 12 h; contradiction in disposition.

Scores were subsequently dichotomized (eg, scores of 1 or 2 = lacked shared understanding) for purposes of analysis. Investigators' preconsensus agreement about ratings was good ( $\kappa = 0.63$  for dichotomized scores).

Physician reviewers characterized reasons for lack of shared understanding as parent additions (parent reported additional elements not reported by resident), resident additions (resident reported additional elements not reported by parent), or resident-parent contradictions (resident and parent reported contradictory information). Finally, after independent review, raters came to consensus to resolve any differences.

We separately compared the night senior resident's report of the reason for admission and the overnight and overall plan to the patient sign-out document, which was typically completed by the outgoing daytime senior resident.

### Predictors of Lack of Shared Understanding

We assessed which parent (age, gender, race, ethnicity, income, education, and primary language spoken at home), resident (age, gender, race, and ethnicity), and patient (age, insurance, length of stay, plan complexity, and complex chronic condition [CCC] count) characteristics were associated with lack of shared understanding.

We used the CCC system to indicate children with likely medical complexity. The CCC system uses *International Classification of Diseases, Ninth Revision, Clinical Modification*, codes to identify medical conditions expected to last  $\geq 12$  months and involve several organ systems or 1 organ system severely enough to require specialty pediatric care and hospitalization in a tertiary care center.<sup>19</sup>

Most variables were analyzed dichotomously, including insurance, CCC count, race, income, and education (public vs nonpublic; 0 CCC vs  $\geq 1$  CCC, white vs nonwhite, income  $< \$50\,000$  vs  $\geq \$50\,000$ , high school or less vs college or more, respectively). Age and length of stay remained continuous.

**TABLE 2** Baseline Patient, Parent, and Resident Characteristics

Patient characteristics (n = 324) <sup>a</sup>	
Age, y, mean (SD)	6.7 (5.8)
Age, y, n (%)	
<1	71 (21.9)
1–4	86 (26.5)
5–7	45 (13.9)
8–11	36 (11.1)
12–17	86 (26.5)
Gender, n (%)	
Female	159 (49.2)
Male	164 (50.8)
Race, n (%)	
African American	41 (12.7)
Asian or Pacific Islander	12 (3.7)
White	180 (55.6)
Other	64 (19.8)
Unknown	27 (8.0)
Ethnicity, n (%)	
Hispanic, Spanish, or Latino	30 (9.3)
Not Hispanic, Spanish, or Latino	225 (69.6)
Unknown	69 (21.0)
Primary Insurance, n (%)	
Public	115 (35.5)
Nonpublic	197 (60.8)
Unknown	12 (3.7)
CCC, n (%) <sup>b</sup>	
0	234 (72.2)
$\geq 1$	89 (27.5)
Unknown	1 (0.3)
Length of stay, d, mean (SD)	4.3 (5.5)
Plan Complexity, n (%)	
Simple	147 (57.2)
Complex	110 (42.8)
Parent characteristics (n=286) <sup>c</sup>	
Age, y, mean (SD)	36.9 (8.8)
Gender, n (%)	
Female	217 (75.9)
Male	59 (20.6)
Unknown	10 (3.5)
Parent/caregiver relationship, n (%)	
Parent	265 (92.7)
Other	11 (3.8)
Unknown	10 (3.5)
Race, n (%)	
African American	35 (12.2)
Asian or Pacific Islander	16 (5.6)
White	176 (61.5)
Other	42 (14.7)
Unknown	17 (5.9)

**TABLE 2** Continued

Ethnicity, n (%)	
Hispanic, Spanish, or Latino	34 (11.9)
Not Hispanic, Spanish, or Latino	241 (84.3)
Unknown	11 (3.8)
Primary language spoken in home, n (%)	
English	229 (80.1)
Other	40 (14.0)
Unknown	17 (5.9)
Education, n (%)	
High school or less	57 (19.9)
Some college or 2-y degree	67 (23.4)
4-y college graduate	68 (23.8)
More than 4-y college degree	82 (28.7)
Unknown	12 (4.2)
Household income	
<\$15 000	37 (12.9)
\$15 000–\$29 999	26 (9.1)
\$30 000–\$49 999	23 (8.0)
\$50 000–\$99 999	38 (13.3)
\$100 000–\$149 999	46 (16.1)
>\$150 000	69 (24.1)
Unknown	47 (16.4)
Senior resident characteristics (n = 34) <sup>c</sup>	
Age, y, mean (SD)	30 (2.1)
Gender, n (%)	
Female	24 (71)
Male	10 (29)
Senior resident position, n (%)	
2nd year	6 (18)
3rd year	26 (76)
4th year	2 (6)
Race, n (%)	
African American	1 (3)
Asian or Pacific Islander	5 (15)
White	25 (74)
Other	3 (9)
Ethnicity, n (%)	
Hispanic, Spanish, or Latino	1 (3)
Not Hispanic, Spanish, or Latino	33 (97)

<sup>a</sup> Based on hospital administrative data.

<sup>b</sup> The CCC system uses *International Classification of Diseases, Ninth Revision, Clinical Modification*, diagnoses codes to identify medical conditions that can be expected to last at least 12 months and to involve several organ systems or 1 system severely enough to require specialty pediatric care and some period of hospitalization in a tertiary care center.<sup>18</sup>

<sup>c</sup> Based on survey response data.

## Perceived Understanding and Nighttime Parent Experience

Parents rated on a 5-point Likert scale their experience with various aspects of nighttime communication in the hospital, including whether they were updated about what happened with their child that day, whether they were updated about symptoms for which they/the medical staff were monitoring overnight, and whether they had an opportunity to ask nighttime providers questions.

Parents also rated on a 5-point Likert scale perceptions of shared understanding by indicating their agreement with the statement, "My child's nighttime doctors and I have the same understanding about my child's medical plan for the night." Residents likewise assessed perceived shared understanding using the corresponding statement, "The family and I have the same understanding of the overnight medical plan for this patient." We dichotomized parent and resident responses into "strongly agree or agree" and "strongly disagree, disagree, or neither agree nor disagree" for analysis.

## Statistical Analyses

We modeled bivariate associations among parent, resident, and patient characteristics and lack of shared understanding using logistic regression clustered by resident because residents filled out multiple reports each. We performed multivariate analyses using clustered logistic regression with manual backward selection, choosing as candidate variables those characteristics that were related to lack of shared understanding on bivariate analyses with  $P < .1$ . We additionally evaluated parent experience with communication in the hospital and parent and resident perceptions of shared understanding at night using descriptive statistics. We used SAS 9.3 (SAS Institute Inc., Cary, NC) for all analyses.

## RESULTS

### Sample Characteristics

Most eligible parents (95%,  $n = 286$ ) and senior residents (97%,  $n = 34$ ) consented to participate in the study (Table 2). Among consented subjects, response rates were

87.7% for parents and 96.0% for senior residents. In total, there were 257 resident-parent dyads in where both a parent and resident completed a report on a particular patient. Parent mean age was 37 years (SD 8.8); parents were predominantly female (75.9%), white (61.5%), primarily English-speaking at home (80.1%), and college educated (75.9%), with annual household incomes  $> \$50,000$  (53.5%). Mean patient age was 6.7 years (SD 5.8), and mean length of stay was 4.3 days (SD 5.5). Patients were predominantly non-publicly insured (60.8%) and had no CCCs (72.2%). Patient plans were rated as complex in 42.8% of cases. Senior residents were predominantly female (71%), white (74%), and in their third year of residency training (76%).

### Prevalence of Shared Understanding

We found lack of shared understanding in 45.1% of parent-resident dyads. Among dyads lacking shared understanding, 62.5% represented resident additions of key elements of the reason for admission or care plan relative to parent reports, 29.2% represented parent additions of key elements relative to resident reports, and 8.3% represented contradictions between resident and parent reports.

We found that the night senior resident's responses generally agreed with those documented by the outgoing day senior resident in the patient sign-out document. They agreed about the reason for admission in 92.9% of cases, the overall plan in 70.6% of cases, and the overnight plan in 93.3% of cases.

### Predictors of Shared Understanding

In bivariate analyses (Table 3), nonwhite parent race and lower parent education were significant predictors of lack of shared understanding. Public insurance, length of stay, and plan complexity were significant patient-level predictors of lack of shared understanding. No resident characteristics were significantly associated with shared understanding.

In multivariate analysis (Table 4), increased plan complexity (odds ratio [OR] 2.96, 95% confidence interval [CI]: 1.76–4.97,  $P < .001$ ) and longer length of stay (OR 1.08, 95% CI:

**TABLE 3** Bivariate Predictors of Lack of Shared Understanding

Characteristic	OR	95% CI	P
<b>Patient</b>			
Age	1.04	1.00–1.09	.05
Insurance			
Public	2.02	1.27–3.20	.003 <sup>b</sup>
Nonpublic	Ref		
Length of stay	1.15	1.09–1.21	$< .001^b$
CCC count <sup>a</sup>			
$\geq 1$	1.58	0.97–2.58	.07
0	Ref		
Plan complexity			
Complex	3.58	2.24–5.73	$< .001^b$
Simple	Ref		
<b>Parent</b>			
Age	1.01	0.98–1.03	.68
Gender			
Male	1.65	0.90–3.02	.11
Female	Ref		
Race			
Nonwhite	1.98	1.12–3.49	.02 <sup>b</sup>
White	Ref		
Ethnicity			
Non-Latino	1.38	0.66–2.89	.40
Latino	Ref		
Income			
$< \$50,000/\text{yr}$	1.42	0.89–2.28	.14
$\geq \$50,000/\text{yr}$	Ref		
Education			
High school or less	2.50	1.40–4.47	.048 <sup>b</sup>
College or more	Ref		
Language, primary spoken at home			
Other	1.78	0.92–3.45	.09
English	Ref		
<b>Resident</b>			
Age	0.98	0.84–1.14	.76
Gender			
Male	0.68	0.41–1.16	.16
Female	Ref		
Race			
White	1.18	0.74–1.87	.49
Nonwhite	Ref		
Ethnicity			
Non-Latino	1.47	0.89–2.44	.13
Latino	Ref		

<sup>a</sup> The CCC system uses *International Classification of Diseases, Ninth Revision, Clinical Modification*, diagnosis codes to identify medical conditions that can be expected to last at least 12 months and to involve several organ systems or 1 system severely enough to require specialty pediatric care and some period of hospitalization in a tertiary care center.<sup>18</sup>

<sup>b</sup> Statistical significance:  $P < .05$ .

**TABLE 4** Multivariate Predictors of Lack of Shared Understanding

Characteristic	OR	95% CI	P
<b>Patient</b>			
Insurance			
Public	1.37	0.78–2.41	.28
Nonpublic	Ref		
Length of stay	1.08	1.03–1.14	.002 <sup>a</sup>
Plan complexity			
Complex	2.96	1.76–4.97	.001 <sup>a</sup>
Simple	Ref		
<b>Parent</b>			
Race			
Nonwhite	1.46	0.67–3.17	.34
White	Ref		
Education			
High school or less	1.97	0.99–3.92	.05
College or more	Ref		

<sup>a</sup> Statistical significance:  $P < .05$ .

1.03–1.14,  $P = .002$ ) were significant predictors of lack of shared understanding. Lower parental education (OR 1.97, 95% CI: 0.99–3.92,  $P = .05$ ) was a borderline significant predictor.

### Perceived Shared Understanding and Nighttime Parent Experience

Residents reported that they agreed or strongly agreed that they had the same understanding of the plan as families in 73.1% of cases. Parents reported that they agreed or strongly agreed that they had the same understanding as their nighttime doctors of their child's plan in 86.0% of cases.

When asked about their experience with nighttime communication in the hospital, >80% of parents agreed or strongly agreed that they were updated about the day's events, were updated about the overnight plan, understood the overnight medical plan, were thought of as an important part of the health care team, and had enough of a chance to ask their doctors questions (Fig 1). Although 87.3% of parents agreed that they were updated about what symptoms the medical staff would look out for overnight, only 71.8% of parents reported that they were updated about what symptoms they themselves should look for overnight.

## DISCUSSION

In this study of communication and shared understanding between parents and nighttime residents, we found that despite high reported parent experience scores at night and high perceived rates of shared understanding by parents and residents, actual shared understanding at night was much lower. Parents and nighttime senior residents lacked shared understanding about key aspects of patients' reason for admission and care plan in 45.1% of cases. Lack of shared understanding was more likely for patients with longer hospital stays and more complex care plans and appeared more common for parents with lower education.

Our high parent experience scores at night were similar to high overall parent experience scores found in other studies of hospitalized children.<sup>20–22</sup> Our shared understanding results were also similar to an adult study, which found lack of agreement between patients and physicians regarding the primary diagnosis and medication changes in 36% and 54% of instances, respectively.<sup>23</sup>

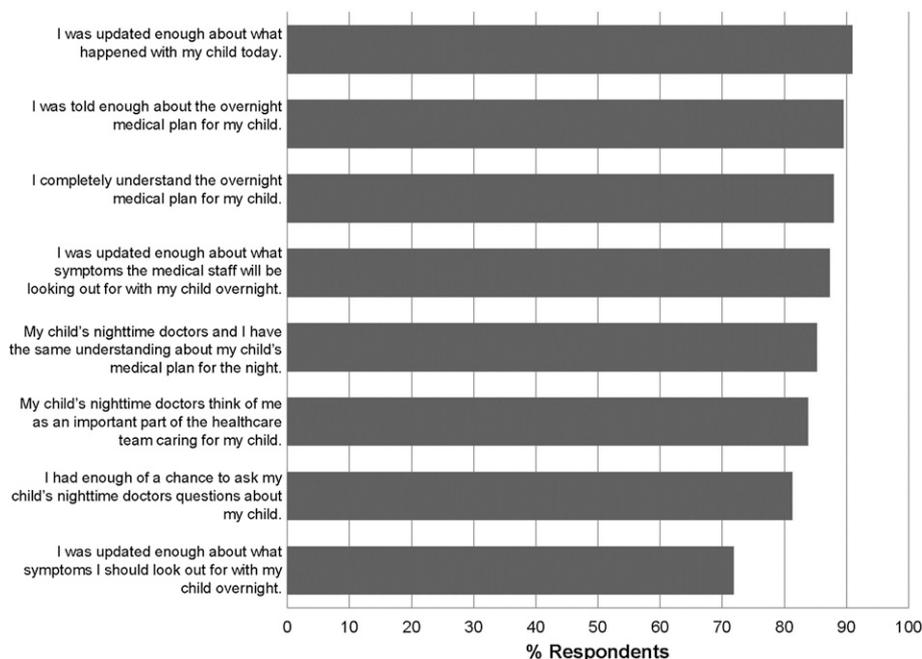
Failure to achieve shared understanding between parents and providers may affect patient safety and other outcomes. When team members lack common goals and communication about patient care, outcomes such as safety,<sup>16,24–27</sup> length of stay, and charges<sup>28</sup> can suffer. Because parents are an integral part of the health care team (a key principle of family-centered-care)<sup>12</sup> lack of shared understanding about reasons for admission, overall, and overnight plans between providers and parents may have similar implications for these outcomes. This represents a lost opportunity for parents to serve as key partners in ensuring the safety and quality of hospital care. This may be particularly true at night, when parents are often at their children's bedside and hospitals typically have decreased staffing<sup>5,6,29</sup> and busier providers who may not know patients as well.<sup>9,30</sup> In addition to affecting safety, lack of shared understanding at night may affect parent experience because communication with nighttime providers is associated with overall parent experience of hospitalization.<sup>3</sup>

Our low observed shared understanding rates may reflect failures in communication at many points. They may reflect inadequate communication between parents and nighttime doctors, a common parent concern at night.<sup>3</sup> Shared understanding may be affected by resident knowledge and communication skills. Our results may reflect inadequate communication between nighttime physicians and nighttime nurses, who often transmit information to families. They may additionally result from suboptimal or incomplete information transfer between daytime and nighttime providers during handoffs, which are particularly subject to communication lapses.<sup>17,8,31–33</sup> However, given that we found relatively good agreement between the nighttime senior's responses and the sign out (which was updated by the daytime senior before change of shift), breakdowns in communication between the daytime and nighttime resident teams are unlikely to fully explain our observed lack of shared understanding at night. Other possibilities, which we did not measure directly but warrant further study, include breakdowns in daytime parent-nurse, parent-physician, and nurse-physician communication.

It is unclear whether shared understanding between parents and daytime physicians (or between parents and daytime nurses) would be better than what we found at night. This warrants further study, particularly if daytime parent-provider breakdowns in communication are a primary underlying contributor to lack of shared understanding. Additionally, shared understanding between interprofessional providers themselves (eg, nurses and physicians) during the day and night is unknown. Also unknown is the daytime and nighttime nurse's role in facilitating team shared understanding.

Given the complexities of communication, several such factors may contribute simultaneously, and additional research is needed to further examine their interplay. Ultimately, improving communication at each of these points may enhance shared understanding and allow parents to be truly engaged as partners in ensuring the safety and quality of inpatient care.

### % Parents Responding Agree or Strongly Agree



**FIGURE 1** Nighttime parent experience. Percentage of parents ( $n = 286$ ) reporting they agree or strongly agree with various statements regarding their understanding of their child's care and the quality of nighttime communication with their child's providers. Response choices included 1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, and 5 = strongly agree.

Many interventions are possible that may enhance shared understanding but which require further study. Hospitals and providers can implement universal health literacy precautions<sup>34–36</sup> (including emphasizing plain language, teach-back, following up with patients, and encouraging patient participation) and use multimodal communication strategies (including whiteboards, multidisciplinary bedside handoffs, team briefs, and huddles)<sup>37–39</sup> to enhance communication. Communication training, including both family-centered and interprofessional communication, can be integrated in residency and nursing curricula. Providers may wish to pay particular attention to how they communicate with parents of complex patients with longer lengths of stay. These are patients for whom providers may incorrectly assume shared understanding but who may particularly benefit from improved communication given their particular vulnerability to safety lapses.<sup>40,41</sup> Additionally, given their bedside presence, parents at night may be uniquely positioned to help with contingency planning, an area

that parents rated least highly in this study. Explicitly informing parents about signs and symptoms for which to monitor may be a targeted high-yield intervention to enhance shared understanding and safety. These interventions are likely to be limited by workflow, staffing, and resource constraints, particularly at night, and require further evaluation through rigorously tested studies.

This study had several limitations. We collected data from 2 medical units in a tertiary care children's hospital from predominantly female, white, higher income parents, all of which limit generalizability. Additionally, because we intentionally sampled parents and residents of the most active patients to emphasize cases for which miscommunication might be most consequential, our results may be biased toward lower shared understanding. Conversely, our inclusion of only English-speaking parents may bias our results toward higher levels of shared understanding. Also, although our  $\kappa$  between reviewers was good, assessing shared understanding is by nature

subjective and somewhat imprecise, and there may be other components of shared understanding, like details about contingency planning, that we did not directly assess.

Lastly, we chose to evaluate shared understanding between the parent and the senior rather than the intern. Given their participation in the sign out at the beginning of the night, their higher level of training, and their responsibility for directing overnight care, we believed the senior was best equipped to answer questions about the reason for admission and overall/overnight plan in real time. It is unclear whether intern-parent shared understanding would be lower or higher; this is a topic of future study.

Our study was designed to focus on nighttime communication. Nighttime care by covering residents often represents more than half of care provided to patients in hospitals and is particularly error prone.<sup>30,42,43</sup> Lack of shared understanding between night-team residents and parents therefore has the potential for serious

safety and quality lapses. Interventions to improve shared understanding between members of health care teams, including parents, are needed both at night and during the day. The impact on safety of team-based interventions to improve communication and shared understanding is an important area for further research.

## CONCLUSIONS

We found that although most parents reported good experience with nighttime

communication during their children's hospitalization, parents and nighttime residents in fact lacked shared understanding nearly half the time. This may reflect a missed opportunity for engaging families as members of the health care team, particularly at night, when their input may be especially valuable. Interventions to improve communication with parents have the potential both to improve shared understanding and to activate parents as partners in ensuring the

safety and quality of inpatient care, particularly at night.

## Acknowledgments

We thank parent partners Brenda Allair and Katie Litterer for providing valuable parent perspectives and all the families, residents, and research assistants who participated in this study. We also thank Thomas Mangione, PhD, for his assistance with reviewing the study survey instruments.

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**FUNDING:** Supported by Agency for Healthcare Research & Quality grant NRSA T32 HS000063 (trainee: Alisa Khan; principal investigator [PI]: Finkelstein), Agency for Healthcare Research & Quality grant K12HS022986 (scholar: Alisa Khan; PI: Finkelstein), an internal Boston Children's Hospital Program for Patient Safety and Quality grant (PI: Alisa Khan), and a Taking on Tomorrow Innovation Award in Community/Patient Empowerment (PI: Christopher Landrigan/Alisa Khan). The views expressed herein are those of the authors and do not necessarily represent those of the funding sources. Funded by National Institutes of Health (NIH).

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

Dr Khan conceptualized and designed the study, obtained funding, acquired data, performed statistical analyses, analyzed and interpreted data, drafted the initial manuscript, and critically reviewed and revised the manuscript for important intellectual content; Ms Rogers provided intellectual advice and guidance for the study, obtained funding, and critically reviewed and revised the manuscript for important intellectual content; Dr Forster helped analyze data and critically reviewed and revised the manuscript for important intellectual content; Ms Furtak participated in study design, tabulated articles, helped perform the literature review, provided administrative support, and critically reviewed and revised the manuscript for important intellectual content; Dr Schuster helped design the study and interpret data and critically reviewed and revised the manuscript for important intellectual content; Dr Landrigan supervised the study, obtained funding, conceptualized and designed the study, analyzed and interpreted data, and critically reviewed and revised the manuscript for important intellectual content; and all authors approved the final manuscript as submitted.

This trial has been registered at [www.clinicaltrials.gov](http://www.clinicaltrials.gov) (identifier NCT01836601).

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