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# Patient Handoffs: Pediatric Resident Experiences and Lessons Learned

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## Abstract

*Background:* Within pediatrics, there is a paucity of data on pediatric resident handoff systems. *Methods:* Seventy-seven of 139 eligible pediatric housestaff participated in a cross-sectional survey that was distributed at an annual residency fall retreat in September 2007. *Results:* Seventy-three percent of the respondents noted uncertainty regarding patient care plans due to receipt of an incomplete verbal handoff. Nursing questions, phone, and page interruptions were noted barriers to giving an effective verbal sign-out. Personal fatigue was also reported to affect the accuracy of housestaff's written sign-outs more than verbal sign-outs (43% vs 23%,  $P = .026$ ). Only 19% of the residents reported that written sign-outs were reflective of current patient information and care plans. *Conclusion:* Written and verbal patient handoffs were perceived by pediatric housestaff to be important parts of patient care but often incomplete. New systems that provide a more protected handoff environment, reduce housestaff fatigue, and standardize the handoff procedure may be useful.

## Keywords

pediatrics, medical education, internship and residency, handoffs, patient transfer, communication

## Background

The clinician sign-out, or patient handoff,<sup>1-3</sup> is the process of transferring patient-specific clinical information and care plans between health care providers. Patient handoffs among medical housestaff traditionally occur either through verbal intern-to-intern or resident-to-resident communications at the end of work shifts, or by passing off written sign-out documents, containing key patient information, between the departing and incoming on-call housestaff. The combination of the Accreditation Council for Graduate Medical Education's (ACGME's) 2003 resident work hour restrictions, and increasingly complex inpatient and outpatient trainee clinical commitments, has increased the frequency and intricacy of resident-to-resident sign-outs on inpatient medical wards.<sup>4</sup>

Preliminary studies showing communication deficiencies among housestaff handoffs have prompted individual programs across various medical specialties to implement and evaluate new sign-out interventions.<sup>1,5-15</sup> Such interventions have generally taken either the form of new computerized sign-out tools or educational curricula, designed to standardize and thereby improve patient handoffs between housestaff.<sup>12,16-19</sup> Some residency programs have

also consulted with other industries, including aviation communication experts, to gain insight on how to best standardize the intricate communication processes involved in resident sign-out.<sup>5,20</sup>

Root cause analyses by the Joint Commission have indicated that failures in physician communication during transfers of care are major contributors to inpatient adverse events.<sup>21</sup> To this end, in 2006, the Joint Commission made standardization of communication among caregivers a new National Patient Safety Goal, requiring hospitals to implement uniform approaches for patient handoffs.<sup>21</sup> Similarly, in 2007, the World Health Organization included the goal of redesigning processes surrounding communication during patient handoffs as one of their 9 patient safety solutions.<sup>22</sup>

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In December 2008, the Institute of Medicine (IOM) also issued a report revisiting the issue of resident duty hours and patient safety.<sup>23</sup> Among their many recommendations to enhance patient safety were both proposed limitations on the number of consecutive hours worked by a trainee and the general suggestion for programs to further improve housestaff's patient handoff systems. The IOM also specifically recommended that residency programs better allow and incorporate ample time for handoffs to occur between the departing and incoming interns/residents, but the exact mechanisms for providing these patient handoffs were not specified. Currently, there is no identified single best practice method, that is, verbal and/or written sign-outs, for giving/receiving patient handoffs and transmitting sentinel patient information.<sup>23</sup>

Within the field of pediatrics there is a paucity of data on housestaff sign-out systems.<sup>1-3</sup> Handoffs regarding hospitalized children may be especially critical as pediatric housestaff are often not able to rely on their patients to verbalize their own health care plans and needs. In particular, there have been no reports that have sought to truly quantify pediatric housestaff perceptions of the barriers and outcomes of their verbal and written handoffs.<sup>1,3</sup> In our study, we surveyed pediatric interns and residents with the goal of obtaining (a) a baseline assessment of their current sign-out practices and (b) a quantitative assessment of their perceptions of specific handoff processes. We were specifically interested in housestaff perceptions of current written and verbal handoff systems, as well as what types of personal or environmental factors they perceived to be adversely affecting these transfers of care.

## Methods

Institutional approval was granted to distribute 2 anonymous, self-administered surveys to 45 eligible interns and 94 eligible junior and senior residents of the Boston Combined Residency Program in Pediatrics (BCRP), at their annual Fall Retreat in September 2007. We included all housestaff who had completed at least 1 inpatient ward month prior to administration of the survey. Any intern who had not completed an inpatient ward month by the time of the survey administration was excluded from participation.

Question categories were based in part on findings from a 2005 University of Chicago qualitative critical incident analysis, which assessed internal medicine residents' communication failures from inadequate sign-out on an inpatient ward.<sup>13</sup> Categories of communication failures identified in that study, as well as categories of

content omissions, were used as a basis for Likert-type questions.

Both intern and resident surveys obtained baseline demographic information from respondents. According to traditional workflows of the BCRP, both interns as well as junior and senior residents perform separate intern-to-intern and resident-to-resident verbal handoffs of patient care. These handoffs almost always occur in a ward conference room, at the end of a 24-hour call shift, 12-hour work day, or midday prior to an intern or resident leaving for an afternoon outpatient clinic rotation. Both interns and residents use a written sign-out during their verbal handoff process, but the written sign-out is almost exclusively updated by junior and senior residents. Information is entered for each patient on an inpatient service and is based on what the residents deem sentinel to a patient's care. Therefore, in our study, all interns and residents were asked about their verbal sign-out practices and experiences, but questions regarding inpatient written sign-out systems were limited only to junior and senior residents. The current majority of our written sign-outs use a Microsoft Word document with manually imported information by the junior or senior residents, which is kept separate from the electronic medical record.

A 12-item survey, with subcategories, was administered to interns. The intern survey was designed to assess their perceptions and experiences with current inpatient, verbal handoffs. Any intern who had not completed an inpatient ward month by the time of the survey administration was excluded. A similar 19-item survey, with subcategories, was administered to junior and senior residents; this survey characterized residents' perceptions and experiences with both the inpatient verbal handoff and written sign-out systems. Similar question stems were used for both verbal and written sign-out survey items and comprised mainly of discrete, Likert-type questions and closed-ended questions. Likert-type responses were rated on a scale from 1 to 5 (1 = *Strongly agree*, 2 = *Agree*, 3 = *Neither agree nor disagree*, 4 = *Disagree*, 5 = *Strongly disagree*; 1 = *Always*, 2 = *Very often*, 3 = *Sometimes*, 4 = *Rarely*, 5 = *Never*). Respondents were also offered a sixth choice of "Do Not Know" for each Likert-type item (6 = *Do not know*). Residents were also administered one open-ended question at the end of the survey, providing room for additional comments. Open-ended responses did not contribute to the survey results.

Survey response analyses were conducted with both SPSS Version 16 (Chicago, IL) and SAS Version 9.1 analysis software (Cary, NC). "Do not know" and missing responses were excluded. Response frequencies to verbal handoff questions were analyzed together for

**Table 1.** Respondents' Demographics

	Respondents, n (%)
Gender	
Male	21 (27.3)
Postgraduate year	
1	34 (44)
2	25 (33)
3	18 (23)
Mean age, years ( $\pm$ SD)	28.5 $\pm$ 2.25

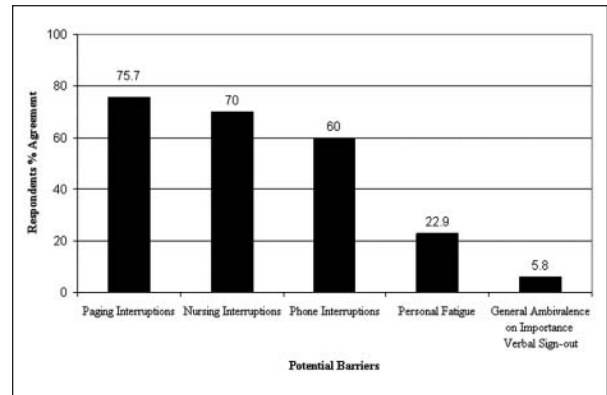
interns and residents, as well as separately using unpaired *t* tests. Junior and senior resident response frequencies to written sign-out questions were also analyzed. Response frequencies were then dichotomized into 2 groups: (a) percent agree, consisting of “Strongly Agree and Agree” responses and “Always and Very often” responses, versus (b) percent Disagree, consisting of “Neither agree nor disagree, Disagree, and Strongly disagree” responses and “Sometimes, Rarely, and Never” responses. Comparisons between percent Agree responses were then performed using  $\chi^2$  analyses or Fisher exact tests where appropriate.

## Results

Seventy-seven out of the 139 possible BCRP interns and residents (55%) completed and returned the survey: 34 out of 45 interns (76%) and 43 out of 94 junior and senior residents (46%; Table 1). Four of the 34 interns were excluded because they had yet to rotate through an inpatient ward month.

### Verbal Sign-Out

Eighty-three percent of interns and residents responded that they generally completed formal, intern-to-intern, or resident-to-resident verbal sign-outs, on an inpatient ward service, approximately 2 to 3 times per day. All intern and resident respondents agreed that obtaining verbal handoffs represents an important aspect of medical care. Ninety percent professed agreement with the statement that face-to-face communication is the best means of providing accurate sign-out to their colleagues. Almost 85% felt that the verbal sign-out at the start of a shift is more useful than the written sign-out at a start of an on-call shift. Junior and senior residents were more likely than interns to agree that they had a systematic method for providing verbal sign-out to their colleagues (76% vs 40%,  $P = .002$ ). Interns were also more likely to agree that formal feedback sessions on their verbal handoffs would help improve their verbal sign-outs skills (73% interns vs

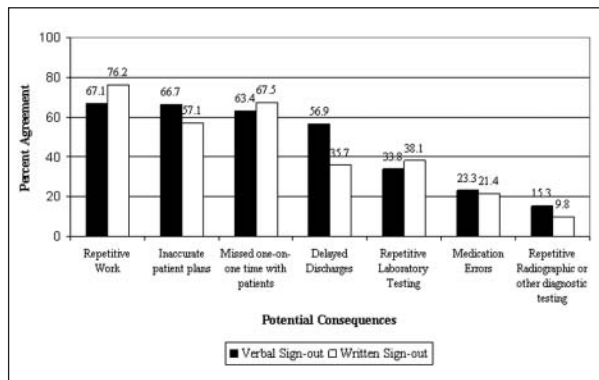


**Figure 1.** Housestaff percent agreement on barriers that may affect their ability to give efficient, verbal handoffs, N = 73

52% residents) and that training sessions at pediatric training program retreats may be useful for improving verbal communication skills (70% vs 52%), although neither of these trends were statistically significant.

Almost 73% of all intern and resident respondents noted they had experienced uncertainty in the past regarding a patient care plan because of receiving an incomplete verbal handoff. Interns and residents were then asked to rate how often in the past 3 months various environmental or personal factors (specifically, interruptions from nursing staff, pagers, and phone calls, as well as personal fatigue and general personal ambivalence on the importance of verbal handoffs) affected their ability to give efficient, verbal, resident-to-resident sign-outs (Figure 1). More than 60% of the housestaff agreed that paging, nursing, and phone interruptions had affected their ability in the past to give a complete verbal sign-out. Almost 23% housestaff felt that personal fatigue affected their ability to give effective verbal handoffs.

Interns and residents were then asked to rate how often in the past 3 months inaccurate verbal sign-out led to the following negative outcomes: repetitive work, medication errors, inaccurate patient plans, repetitive laboratory or radiographic/other diagnostic testing, delayed discharges, or missed one-on-one time with their patients (Figure 2). Approximately two thirds of all interns and residents agreed that incomplete sign-out led to repetitive work, inaccurate patient plans, and missed one-on-one time with patients; more than 50% of the respondents also agreed that inaccurate patient sign-out led to delayed hospital discharges (Figure 2). Twenty-three percent also agreed that inaccurate verbal sign-outs led to subsequent medication errors.



**Figure 2.** Percent agreement from housestaff regarding potential consequences from having received inaccurate, verbal or written handoffs

Verbal respondents, N = 73. Written respondents, N = 43. No statistically significant differences between responses were seen, except for delayed discharges ( $P < .034$ , using a Fisher exact test).

### Written Sign-Out

Ninety percent of all junior and senior residents felt that obtaining a written sign-out was an important aspect of patient care. Despite this finding, only 19% of the residents agreed with the statement that written sign-outs at the start of their shifts were up to date. Only 17% agreed that a written sign-out was more useful and accurate while on-call than the verbal sign-out that they receive at the start of a shift. Conversely, only 7% of the residents agreed with the statement that updating a daily, written sign-out was unnecessary. More than two thirds of the residents (69%) agreed that they did not have adequate time at the end of an on-call shift to update a written sign-out. Almost 74% of the residents reported leaving late from the hospital because of their having to stay and update the written sign-out sheet. There was unanimous agreement among all residents surveyed that a Web-based, computerized, written sign-out, with synched data from current patient computer systems, would be an integral piece to improving written sign-out systems.

### Verbal Versus Written Sign-Out

When asked which handoff items should be included in verbal and/or written sign-out, residents agreed that patient problem lists and diagnoses, patient care plans, "To Do" lists, abnormal laboratory values, and pending specialty consults should be included in both verbal and written sign-outs (Table 2). Residents also significantly agreed that patient allergies, medications, and advance care directives should be included in a written sign-out only, rather than in both written and verbal sign-outs

(Table 2). Housestaff also agreed that nursing, paging, and phone interruptions were barriers for giving both effective verbal and written sign-out (Table 3). Housestaff were more likely to report that personal fatigue affected their written sign-out than their verbal sign-out (43% vs 23%,  $P = .026$ ; Table 3).

Finally, our study found general agreement among interns and residents that repetitive work, inaccurate plans, and missed one-on-one time with patients and families were perceived consequences of having received either inaccurate verbal or written sign-out plans (Figure 2). Housestaff were more likely to report feeling that inaccurate written sign-outs were associated with delayed discharges than with inaccurately received verbal sign-outs ( $P < .034$ ; Figure 2).

## Discussion

Physician-to-physician communication during inpatient handoffs between pediatric interns and residents is an essential component of high-quality patient care for hospitalized children. The results of our preliminary survey suggest that pediatric housestaff perform patient handoffs with high frequency often in settings that are not conducive or properly designed to give effective patient handoffs. Within our program, housestaff perceive themselves to be dependent on both accurate written and verbal sign-outs, in order to reduce a number of poor outcomes, including repetitive work, formulation of inaccurate patient plans, missed one-on-one time with patients, and delayed patient discharges.

Despite widespread policy efforts to bring clinician communication to the forefront of improving patient care, the exact factors affecting the quality of physician sign-out practices and patient care outcomes have not been extensively examined, especially within the field of pediatrics.<sup>1,3</sup> The results of our pediatric program's survey corroborate some of the internal medicine handoff literature, which suggests that specific environmental factors, such as nursing interruptions, pages, and phone calls, play a role in inhibiting effective handoffs.<sup>6,15</sup> Our work must also be coupled with the IOM recommendations to enhance patient safety. With the IOM's recommendations to decrease the number of consecutive hours worked by trainees and allow for more specified handoff time among housestaff, our data corroborate that our housestaff still perceive definite environmental barriers to their handoffs, as well as negative consequences from having insufficient patient verbal and written sign-outs. These results denote the continued need for more medical education within the realm of housestaff handoffs to improve patient safety and physician communication.

**Table 2.** Comparison of Percent Agreement Among Interns and Resident Respondents for Items to Be Included in a Verbal Versus Written Handoff

Items Included in Verbal/Written Handoff	Percent Respondents Agreement		PValue <sup>a</sup>
	Verbal (N = 73)	Written (N = 43)	
Patient problems and diagnoses	97.2	100.0	.272
Patient allergies	17.1	97.6	<.001
Medication lists and changes	29.6	64.3	<.001
Vital signs	15.7	9.5	.352
Pertinent physical exam findings	49.3	31.0	.057
Abnormal laboratory values	80.3	81.0	.931
Pending specialty consults	85.9	83.3	.711
Patient care plans	94.4	97.6	.417
To do lists	98.6	97.6	.705
Advance care directives	35.3	61.9	.007

<sup>a</sup>Chi-square analysis.

**Table 3.** Comparison of Percent Agreement Among Interns and Resident Respondents for Which Barriers Have Affected Their Verbal Versus Written Sign-Outs

Potential Barriers for Giving an Effective Patient Handoff	Percent Respondents Agreement		PValue <sup>a</sup>
	Verbal (N = 73)	Written (N = 43)	
Nursing interruptions	70.0	69.1	.916
Paging interruptions	75.7	76.2	.955
Phone interruptions	60.0	64.3	.652
Personal fatigue	22.9	42.9	.026
General ambivalence on the importance of the sign-out	5.8	9.5	.462

<sup>a</sup>Chi-square analysis.

Our survey also greatly highlights the finding that housestaff perceive personal fatigue as negatively affecting their handoff processes. With 43% of the residents agreeing that their personal fatigue affects their written sign-out, and 23% of the interns and residents feeling it affects their verbal communication skills, fatigue is noted to be a significant personal barrier to effective sign-out. A previously published study at one of our residency program's home institutions also denoted that there had been no notable changes in our housestaff's total hours of work or sleep since ACGME's original 2003 implementation of intern/resident work hour restrictions.<sup>4,24</sup> Therefore, personal fatigue may be more of a complex issue for housestaff rather than simply limiting consecutive resident duty hours.<sup>23,25,26</sup> The exact workflow and processes contributing to persistent housestaff fatigue still need to be better elucidated if we are to modify any impact of resident fatigue on patient handoff systems.

We also agree that better safeguards need to be implemented to improve verbal information transmission and reduce information omissions. Although the relative effectiveness of various verbal sign-out mnemonics

on patient care outcomes remains unclear, they may benefit in standardizing housestaff's handoff processes.<sup>16,27</sup> Within our study we noted that interns were more interested in receiving formal training on verbal communication processes than their senior resident colleagues. It may be that interns are at an earlier stage in their career and have not yet developed their own systematic method for giving verbal handoffs and therefore are more accepting of additional handoff/communication training.

Finally, we were concerned with our survey data showing that less than 25% of our residents agreed that their written sign-outs were typically up to date at the start of a shift, thereby potentially increasing the chance for miscommunication and subsequent medical errors. At our institution, since both interns and residents use resident-updated written sign-out sheets multiple times a day, written sign-out errors may be perpetuated in duplicate. Because our current written sign-out system is primarily updated at the end of the residents' work shift, personal fatigue may again contribute to inaccurate patient-specific data elements within our sign-out documents. This may also further explain our finding that almost 75% of the

residents report leaving late from the hospital because of the need to update the written sign-out. In the future, new written handoff systems that are able to better limit dependency on resident-entered information into sign-out documents may not only improve the accuracy of patient handoffs but may also have a positive impact on work hours.

As pediatric inpatient medicine evolves into a discipline responsible for increasing numbers of complex care patients, it will be imperative for interns and residents to have accurate up-to-date written sign-out information, imported directly from the electronic medical record, including patients' daily weights, medication lists, allergies, and care plans.<sup>28</sup> Future studies will still need to better evaluate the utility of linking a written sign-out system with the electronic medical record with patient care outcomes and resident quality of life.

Our study has a number of important limitations. First, we realize our survey was an original survey, cross-sectional in nature, leaving it subject to reporting bias. Second, we only queried a small sample size of interns and residents at a single program with its own resident handoff systems and institution-specific processes of care, which may limit the generalizability of our findings. Because of the survey nature of our study, we were unable to link our pediatric housestaff perceptions with subsequent patient outcomes, which would be important for future prospective studies. Finally, we only succeeded in capturing the perceptions of a limited number of senior resident respondents, possibly because of their lack of attendance at a program retreat or disinterest in the topic. Nevertheless, we designed this study to provide a starting point for dialogue, as our own and other pediatric institutions begin to implement processes of change within their current intern and resident handoff systems.

## Conclusion

Physician-to-physician communication, and in particular housestaff sign-outs, are complex interactions to study. Our study has corroborated the importance of verbal and written sign-out systems and prior findings of environmental barriers to verbal and written sign-outs. Patient handoff systems that rely on resident-driven data entry may lead to inaccurate transfers of care as well as duplicate work, unnecessary testing, medication errors, inaccurate patient plans, and missed one-on-one patient time. Personal fatigue may also contribute negatively to patient handoffs. Understanding the impact of computer models for improving written sign-outs may be a crucial step for

academic health centers as we move toward new work hour restrictions. By accepting the IOM challenge to improve and standardize the quality of patient handoff systems, we may not only enhance communication but ultimately offer higher quality healthcare to our pediatric patients.

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