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ICU Attending Handoff Practices: Results from a National Survey of Academic Intensivists

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SUPPLEMENTAL DIGITAL CONTENT

Supplemental Digital Content 1. Survey instrument.

Abstract

Objective—To characterize intensivist handoff practices and expectations and to explore perceptions of the patient safety implications of attending handoffs.

Design—Cross-sectional electronic survey administered in 2014.

Setting—One hundred sixty nine U.S. hospitals with critical care training programs accredited by the Accreditation Council for Graduate Medical Education.

Subjects—Academic intensivists recruited via e-mail invitation from a database of 1,712 eligible academic intensivists.

Interventions—None.

Measurements and Main Results—661 intensivists completed the survey (completion rate 38.6%). Responses were received from at least one individual at 147 of 169 (87.0%) unique hospitals represented in the study database. 573 (87%) respondents reported participating in handoffs at the end of each ICU rotation. A variety of communication methods were used for end-of-rotation handoffs including in-person discussion (92.9%), telephone calls (83.9%), e-mail messages (69.0%), computer-generated documents (64.6%), and text messages (23.6%). Mean satisfaction with current handoff process was rated as 68.4 on a scale from 0-100 (SD 22.6). 55.4% of respondents said that attending handoffs should be standardized, but only 13.3% (76/572) of those participating in end-of-rotation handoffs reported using a standardized process. Specific handoff topics, including active clinical issues and resuscitation status, were reportedly discussed less frequently than would be ideal ($p < 0.001$ for the difference between reported frequency and ideal frequency). In free-text comments, 76 (11.5%) respondents expressed skepticism that attending handoffs were necessary given the presence of residents and fellows and given a lack of agreement about necessary content. 200 respondents (30.8%) reported knowing of an adverse event (inappropriate treatment, cardiac arrest, death) attributable to inadequate attending handoffs.

Conclusions—ICU attending handoffs in the United States exhibit marked heterogeneity, and intensivists do not agree about the value of attending handoffs. Additionally, some intensivists perceive a link between suboptimal attending handoffs, inappropriate treatment, and serious adverse events that warrants further study.

Keywords

critical care; process assessment (health care); patient handoff; medical staff; hospital; patient safety; health care surveys

INTRODUCTION

Patient handoffs are an active area of investigation given their association with adverse events and preventable patient harm.^{1,2} Although handoffs have been a topic of increasing interest to regulatory agencies^{3,4} and patient safety advocates,⁵ not all providers engaging in handoffs are equally represented in the scientific literature. Handoffs between resident physicians^{1,6-11} have been well-studied following the institution of duty-hours restrictions.^{12,13} Attending physicians' handoffs have not received the same level of

scrutiny.^{6,14} Within the few investigations¹⁴⁻¹⁶ of attending physicians, intensivists are particularly understudied.^{17,18}

Critically ill patients depend on ICU attending physicians to develop care plans, coordinate and oversee the activities of the ICU team, and serve as the ultimate arbiter of patient care decisions.¹⁹ The attending role is generally fulfilled by multiple individuals on a rotating schedule,²⁰ requiring that responsibility for patient care be handed off on a regular basis.^{17,18} To understand more about intensivist handoffs, we previously conducted qualitative interviews of academic intensivists in the United States.¹⁸ The findings from that study helped define the breadth of handoff practices amongst academic intensivists, but did not offer insight into the frequency with which these practices are used. The goal of the present study was to query a more representative sample of academic intensivists about current handoff practices, ideal handoff practices, and barriers to achieving ideal handoffs, and the impact that attending handoffs may have on patient safety. Given communication research linking gender to communication styles²¹ and our previous work highlighting the importance of experience in handoffs,¹⁸ we also sought to test whether handoff perceptions varied between male and female intensivists, those with different levels of experience, between attendings who had and had not received handoff training, and between attendings who reported knowledge of a handoff-related adverse events versus those who did not.

MATERIALS AND METHODS

This is a cross-sectional survey of academic intensivists in the United States.

Human subjects protections

This study was reviewed and deemed exempt by the Institutional Review Board at the University of Pennsylvania (protocol # 816515).

Instrument development

The survey instrument (Supplemental Digital Content 1 – survey) was developed for this project. Questions stemmed from themes identified in our previously published qualitative study of ICU attending handoffs.¹⁸ This prior study revealed four themes for exploration: (1) logistics of attending handoffs (e.g. frequency, modes of communication), (2) current handoff practices as contrasted with (3) ideal handoff practices, and (4) perceived patient safety implications of attending intensivist handoffs. Five intensivists at the University of Pennsylvania tested the survey instrument for readability and question clarity.

Inclusion criteria

Academic intensivists were chosen as the population of interest because our previous work suggested that attending handoff communication would be substantially affected by the presence of residents and fellows) in academic settings, making it difficult to study academic and non-academic settings simultaneously. Given the frequent mention of the fellow's role in handoff communications in our previous work, we chose to further restrict the study population to academic intensivists in critical care fellowship training programs. Academic intensivists were identified from a database of academic critical care physicians

in critical care fellowship programs that was first developed in 2006²² and updated in 2012.²³ After distributing the e-mail invitations, we conducted a manual search of the internet using the Google search engine to find updated e-mail addresses for intensivists whose invitations bounced back.

Exclusion criteria

Intensivists who participated in instrument development or testing were excluded from the study, as were respondents who indicated that they are clinically inactive. We excluded the single pediatric intensivist who responded, because the study was designed to capture only adult programs.

Recruitment

We invited intensivists to participate in the survey via an electronic mail message sent in March 2014. Reminder messages were sent at one-week intervals for a total of three e-mail contacts. All surveys were completed by May 2014.

To determine whether there would be a differential response to our survey invitation based on the incentive offered, we randomized participants to receive one of two incentives: (1) a \$25 [Amazon.com](https://www.amazon.com) gift card or (2) a chance to win \$1000 (estimated chances of winning were 1:200). The difference in response rate related to incentive arm (40.4% versus 36.0%, $p=0.054$) did not achieve statistical significance. All gift cards were distributed by May 2014 and lottery notifications were made in June 2014.

Survey administration

The survey was administered via the Qualtrics platform, (Qualtrics, Provo, Utah), a web-based survey administration tool. Individualized survey links allowed incentive distribution, targeting of follow-up messages, and precise determination of response rate.

Data analysis – quantitative data

We used bivariate statistics to compare the demographic characteristics of responders versus non-responders. A p -value of <0.05 was considered statistically significant. For the study group, we used summary statistics to characterize distributions of responses about handoff practices and attitudes. Within the study group, we used bivariate statistics to compare participant characteristics (Kruskal-Wallis and ANOVA tests for continuous variables, chi-square tests for categorical variables). The Wilcoxon signed-rank test was used to compare Likert-type items characterizing respondents' reported handoff practices and their stated preferences for handoffs. Missing values were not imputed; the number of respondents for each item is reported with each percentage presented in the *Results* section. Based on historical communication research,²¹ our clinical experience, and findings from our previous work, we decided *a priori* to test differences between participants in the following groups: women versus men, less intensivist experience versus more experience, history of handoff training versus no history of handoff training, and previous experience with a handoff-related adverse event versus no such experience. For these comparisons, we used rank sum tests to compare responses, with a p -value of 0.004 indicating statistical significance given multiple comparisons (Bonferroni correction, with 0.05 divided by 13 comparisons). For

other comparisons, a p-value of 0.05 was considered statistically significant. All statistical testing was performed using Stata software (version 13.0, StataCorp LLP, College Station, Texas).

Data analysis – qualitative data

We analyzed free-text responses using a content analytic approach.²⁴ We created a codebook using first open coding, then axial coding to identify important themes, then characterized the frequency with which each theme occurred. One intensivist (MBL-F) and one trained non-clinician researcher (MLC) independently coded all free-text responses. The software program NVivo (version 10, QSR International, Doncaster, Victoria, Australia) was used for textual data management and for calculating intercoder reliability.

RESULTS

Participants

Of the 2,128 intensivists in the original dataset, invitations were able to be delivered to 1,864 individuals. 763 (40.9%) of the invited individuals responded, of which 690 were eligible to participate (Figure 1). We received responses from at least one individual at 147 of 169 (87.0%) unique hospitals represented in the study database. After excluding incomplete responses, physicians not in active practice, and one individual involved in study design, the study dataset comprised 661 complete responses (38.6% completion rate). Comparison of responders and non-responders (Table 1) showed similar gender and geographic distribution between the two groups, but anesthesiologists were over-represented in the respondent group (20.9% of respondents were anesthesiologists versus 12.4% of non-responders, $p<0.001$), and the respondents as a group had a later median residency completion year than non-respondents.

Among the respondents, 79.6% were male, 51.9% specialized in internal medicine, and 70.0% reported >10 years in clinical practice (Table 2). A majority (384/662, 58.0%) reported receiving some form of handoff training as part of residency or fellowship, quality improvement coursework, simulation coursework, or other respondent-defined educational activity. Handoff training was more commonly reported by intensivists with fewer than 10 years in practice (69.7%) as compared to those with more than 10 years in practice (53.6%, $p<0.0001$), but was not associated with gender. Attendings reporting having knowledge of a handoff-related adverse event were more likely to report having had handoff training of some kind (65.5% of those who reported knowing of an event had training compared to 55.2% training among intensivists without knowledge of a handoff-related adverse event, $p=0.01$).

Survey findings

Findings are derived from responses to both closed-ended questions ($n=661$) and open-ended questions (552 responses from 373 intensivists). We present the responses to study questions grouped by themes: (1) logistics of handoffs, (2) current handoff practices, (3) ideal handoff practices, and (4) patient safety implications of handoffs.

Logistics—573/660 (86.8%) of respondents participated in handoffs at the end of each ICU rotation (1, 2 or 4 weeks in duration for 95.6% of respondents). Just under half participated in nightly handoffs (316/647, 48.8%). A variety of communication methods were used at least sometimes for end-of-rotation handoffs (Figure 2), including in-person discussion (92.9% of the time), telephone calls (83.9%), e-mail messages (69.0%), computer-generated documents (64.6%), and text messages (23.6%). Attendings in practice for 10 or more years reported higher usage of computer-generated documents for handoffs (70.6% used them at least sometimes) than did those in practice for fewer than 10 years (50.9%, $p<0.0001$). Media usage did not differ according to gender, handoff training, or knowledge of a handoff-related adverse event.

Current Practices—To characterize current handoff practices, we asked about handoff satisfaction, standardization, and the frequency of discussion of specific topic areas. A minority (76/572, 13.3%) of respondents currently use a standardized handoff process at the end of each ICU rotation. Mean satisfaction with current handoff process was rated as 68.4 on a scale from 0-100 (SD 22.6). There was a small but statistically significant difference in handoff satisfaction between intensivists with differing years in practice: senior intensivists (those with 10 or more years in practice) reported higher satisfaction (mean 70.4 ± 21.6) than respondents with fewer than 10 years in practice (63.6 ± 24.3 ; $p=0.001$). There was no association of handoff satisfaction with sex, handoff training, or knowledge of a handoff-related adverse event.

We asked respondents to report the frequency with which they discussed certain content areas, using 5-point Likert-type items, where 1 corresponded to “never” and 5 corresponded to “always” (Table 3). Active clinical issues were most consistently discussed (median 5, IQR 5-5), and code status in patients without limits on resuscitation (“full code”) were least consistently discussed (median 3, IQR 2-5). Free text-responses offered more insight into the numerical responses: “Our handoffs are centered around the patient's active issues/problems. That may be a family issue, a medical issue, a code status issue, etc.” “Labs would not need discussion in a patient made comfort care w/o lab draws.”

When asked about the importance of intensivist handoffs, mean importance was rated at 83.9 (SD 15.7) on a scale from 0-100. Attendings reporting knowledge of a handoff-related adverse event rated importance (87.7 ± 12.6) more highly than those who had not (82.4 ± 16.5 , $p=0.0002$). There was a non-significant difference in importance ratings between women and men toward women rating importance higher than men (87.6 ± 12.0 for women, 83.0 ± 16.4 for men, $p<0.007$), and no difference according to years of ICU experience. Despite high importance ratings, analysis of the free-text responses revealed a fundamental split with respect to the value of attending handoffs. Some believed that attending handoffs were absolutely essential to good patient care ($n=56$), while others expressed skepticism about the utility of attending handoffs ($n=76$). In the latter group, three themes emerged as problems. First, in a given physician group, there may not be consensus about what types of information are important to convey (“Biggest barrier is often attending judgment on value of what information should be passed on”). Second, the information transmitted in handoffs has the potential to bias subsequent evaluation and management (“Prevents fresh approach to patients and locks in tunnel vision”). Third, the presence of residents and fellows was

cited as a reason that attending handoffs might not be necessary at all (“We have fellows and residents that present the patients so a handoff is not necessary unless there are specific issues or nuances”).

Indeed, the effect of residents and fellows on attending handoffs was frequently mentioned in free-text responses (n=67). Some respondents felt that the presence of trainees obviated the need for attending handoffs (“In our system critical care fellows do much of the hand-off communication. I think they do as good a job as the attendings, if not better”), while others thought that the attending was even more important in this context (“I find house officers and even fellows do not always know all the details, nor have they necessarily been present for discussions with the patients and/or family members. It also does not set a good example for trainees to have an attending walk in and not be familiar with the issues confronting the patients and the ICU team”).

Ideal Practices—With respect to ideal handoff practices, the majority of respondents (629/661, 95.2%) indicated that attending handoffs should occur at the end of each ICU rotation. In contrast, there was no consensus about whether attending handoffs should be standardized. When asked this question, 361/652 (55.4%) said “yes”, 140/652 (21.5%) said “no”, and 151/652 (23.2%) were not sure. Among intensivists currently using standardized handoffs, 55/74 (74.3%) said “yes” to this question. Several respondents expressed distaste at the idea of a handoff checklist (“I would not accept a requirement to fill out yet another form or interact yet another time with the EHR which is an already adequately burdensome impediment to patient care,” “I find the thought of more checklists and protocols very disheartening”).

There was more agreement about the ideal content of attending handoffs. Active clinical issues and limits on resuscitation received median ratings of 5 (“always”; IQR 5-5) on the Likert item asking how often each topic should be discussed. Discussion of every patient (median 5, IQR 4-5), discussion of family dynamics (median 4, IQR 3-5), and discussion of code status in “full code” patients (median 4, IQR 3-5) were additional important content areas. Comparison of actual and ideal handoff practices revealed small but statistically significant differences between reported practice and normative practice. For instance, the median (IQR) reported discussion of code status in “full code” patients was 3 (2-5), and the ideal frequency had a value of 4 (3-5), $p<0.001$. This relationship held for all of the content areas queried: discussion of every patient, active clinical issues, limits on resuscitation, laboratory values, and family dynamics. Subgroup analyses revealed that, for the content item “Every patient is discussed”, there was no statistically significant difference between reported and ideal frequency for women ($p=0.0443$), experienced intensivists ($p=0.064$), those reporting handoff training ($p=0.08$), or those reporting knowledge of a handoff-related adverse event ($p=0.49$). In contrast, men, less-experienced intensivists, those without handoff training, and those without knowledge of a handoff-related adverse event reported that the frequency with which they discussed every patient during handoff was less than the ideal frequency ($p<0.002$ for all subgroup comparisons).

In free-text comments about the ideal content of handoffs, some respondents indicated that the “big picture” is a more appropriate focus for attending handoffs:

“I do think, in our teaching ICU, that the big picture is what should be discussed between attendings, along with minutiae that affect the day to day leadership. For example, I don't really care how many days of antibiotics the patient has had, just need to know that they are adequate, that a stop date is rationally determined and that we know what we are treating.”

Barriers to achieving ideal handoff practices included time constraints (“massive time use to do formal sign off, every night, every weekend, every change of rotation”), fatigue (“Fatigue at the end of service; have just come home at 7 pm on a Sunday and now need to spend an hour on the phone for the next attending”), disagreement about what should be included in handoffs (“Some lack the ability to prioritize, and participating in handoffs with these folks is painful”), and colleague engagement (“Some colleagues do not care about the opinion of others giving them handoff”). Lack of formal expectations about handoffs from ICU leadership may also be a concern: 336/661 (50.8%) of respondents said that there were no clear expectations about handoffs, and one respondent specifically cited this as a factor limiting the value of attending handoffs.

Patient Safety—30.8% of respondents (200/650) reported experience with adverse events that they attributed to inadequate attending handoffs. This experience was associated with small but statistically significant differences in ratings of handoff importance: respondents who knew of such an adverse event thought that handoffs were more important than those that had not (87.7 vs. 82.4, $p<0.001$). 178 respondents offered free text descriptions of adverse events that they attributed to attending handoffs; qualitative analysis divided these responses into three categories: serious adverse events (defined as death, cardiac arrest, or stroke), treatment errors, and family communication issues (Box 1).

DISCUSSION

We found that while most intensivists participate in handoffs, attending handoff practices in academic critical care are highly variable. There is some agreement across intensivists about important content items for attending handoffs, including mention of every patient and discussion of code status in patients with limits on resuscitation. Interestingly, there are small but significant differences between the frequency with which attendings report discussing key content items as compared to an ideal frequency. Additionally, there is disagreement about the value of attending handoffs and about the need for handoff standardization. Barriers to attending handoffs include inadequate time, colleague engagement, and unclear expectations from colleagues and leadership. Numerous respondents reported adverse events related to inadequate handoffs, including missed diagnoses, unnecessary testing and interventions, and preventable death. Though most intensivists agreed that their handoffs are important, a subset of the respondents questioned whether intensivist handoffs are necessary in an academic setting given the presence of residents and fellows.

The study's most important limitation was the modest response rate of 36.9%. Although there is no necessary relationship between the response rate and the presence of non-response bias,²⁵ our response rate raises the possibility that the findings do not generalize to

all academic critical care practices in the United States. Reassuringly, our response rate is consistent with other studies using the same database.^{22,23,26} Physicians historically have a low response rate, and this already low rate is decreasing over time.²⁷ Nevertheless, evidence suggests that non-response bias may not be problematic in this population, and some authors have argued that a lower-than-conventional response rate might be acceptable.²⁸ Additionally, we received responses from the majority (87%) of hospitals in the study database, increasing the likelihood that our sample is representative of practices with Accreditation Council for Graduate Medical Education-accredited training programs in critical care medicine. The statistically significant difference seen between responders and non-responders with respect to specialty was similar to the difference observed in a different study using the same database.²³ The difference in residency completion year likely reflects a difference in age, and may be related to our use of an electronic survey platform.

An additional concern is that we surveyed only academic intensivists caring for adult patients. In the interview study preceding this survey, we conjectured that the presence of trainees would change attending handoffs in important ways, as would the presence of parents of pediatric patients. For the same reason, we limited this study's population to academic intensivists in adult ICUs. Some of the responses we received validated this supposition; the presence of housestaff was cited by numerous intensivists as a factor diminishing the importance of attending handoffs. We recognize that most critical care is actually delivered outside of academic settings with fellowship trained-intensivists.²⁹ Therefore, future studies examining handoffs in non-academic practice and in pediatric ICUs are vital to developing a complete picture of attending handoffs.

This work also has important strengths. To our knowledge, this is the first survey to report handoff practices and expectations of a national sample of attending intensivists. For a topic with few norms, this work may facilitate hypothesis generation about the impact of attending intensivist handoffs on patient safety, and may help in development of best practice guidelines. With respect to standardization, a strategy used to improve handoff quality in other settings,¹ we noted that this practice was uncommon in our sample. Additional research is needed to more fully characterize intensivist handoff standardization strategies, and to determine whether standardization improves the quality of attending handoffs.

Another asset of this study was the basis of study questions on themes elicited through qualitative inquiry. The question topics and answer choices were based on interviews with a national sample of intensivists, which increases the content validity of the instrument. Finally, our use of quantitative and qualitative analysis offers a richer picture of intensivist handoffs than would have been achieved with either approach in isolation. Complicated social phenomena such as handoffs are amenable to study with a mixed methods approach, and our study may offer a template to other researchers conducting similar investigations.

Going forward, more research is needed to understand how attending handoffs might bolster or threaten patient safety. There has been regulatory pressure to standardize handoffs,³ which may reduce errors when applied to task-based handoffs such as those conducted by residents.¹ Given our findings, however, it is unclear whether attending handoffs would be

suitable to this type of intervention and whether intensivists as a group would embrace attempts to restructure the way that they communicate. Studies that rigorously assess relationships between communication practices and patient outcomes are therefore essential to guide best practices regarding hand-offs.

CONCLUSIONS

ICU attending handoffs in the United States exhibit marked heterogeneity, and intensivists do not agree about the value of attending handoffs. Additionally, some intensivists perceive a link between suboptimal attending handoffs, inappropriate treatment, and serious adverse events that warrants further study.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Box 1

Adverse events related to attending handoffs.

Event type, number reported	Illustrative quotes
Treatment errors (inappropriate initiation, continuation, or discontinuation of therapy, or delays in treatment); n=92 ($\kappa=0.82$)	<p>"The patient's code status was not clarified on the handoff and he underwent full resuscitation only to be informed by the family that he was a DNR. The oncoming attending had to perform withdrawal after coding him and apologizing to the family."</p> <p>"The plan for ventilator management and sepsis management was not discussed and the patient continued on suboptimal therapy."</p> <p>"Failure to communicate non-contiguous bowel after damage-control laparotomy that resulted in blind-end blowout and bowel ischemia."</p>
Family communication issues; n=31 ($\kappa=0.59$)	<p>"Patient was to go to OR one morning, but new finding on echocardiogram over weekend necessitated ICU attending "clearance" to proceed with surgery. Though from a medical standpoint it did not make a difference if surgery occurred on [that day or the next], family had high expectations that it would occur [on that day], and was very upset when "clearance" occurred too late for surgery. Family expectations were not clearly communicated to incoming ICU attending; patient did not suffer, but the family's (and, therefore, medical staff) psyche did."</p> <p>"Extreme family dissatisfaction with change of care plan following attending hand-off without family knowledge."</p>
Serious adverse events (stroke, cardiac arrest, death); n=18 ($\kappa=0.71$)	<p>"Failure to communicate difficult airway anatomy led to death following a planned extubation that failed."</p> <p>"A patient died due to failure to communicate that a surgical service was considering an operation but the receiving attending was unaware and never followed up with the surgical service."</p>

κ statistic indicates agreement between coders on the classification of comments into the three categories above.

Survey response rate.

Figure 1. Survey response

*Other reasons for exclusion included duplicated entry in database (n=4), participation in study design (n=1) and clinical practice in ICU (n=1). **Denominator for completion rate was 1712 (number of e-mail invitations sent to eligible individuals).

Figure 2. ICU attending handoff communication methods and use frequency

Question was only asked of those respondents reporting regular handoffs for on-service/off-service transitions (n=566). Shades of gray correspond to proportions of Likert-type responses (white = never, darkest gray = always). Exact response percentages are as follows (never/rarely/sometimes/usually/always): in-person conversation (1.6%/5.5%/22.8%/42.1%/28.1%), telephone calls (2.9%/13.3%/36.2%/37.3%/10.4%), e-mail messages (15.4%/15.6%/26.5%/26.9%/15.6%), computer-generated document (24.7%/10.7%/16.8%/20.2%/27.6%), text messages (54.4%/22.0%/15.5%/8.0%/0.2%).

Table 1

Characteristics of responders versus non-responders

Attribute	Eligible individuals (n=1,712)	Non-respondents (n=1,051)	Study sample ^a (n=661)	P-value
Gender (n, %)				0.27
<i>Female</i>	322 (18.8%)	189 (18.0%)	133 (20.1%)	
<i>Male</i>	1,390 (81.2%)	862 (82.0%)	528 (79.9%)	
Specialty (n, %)				<0.001
<i>Anesthesiology</i>	268 (15.7%)	130 (12.4%)	138 (20.9%)	
<i>Medicine</i>	1,094 (63.9%)	696 (66.2%)	398 (60.2%)	
<i>Surgery</i>	350 (20.4%)	225 (21.4%)	125 (18.9%)	
Geographic region (n, %)				0.26
<i>West</i>	319 (18.6%)	196 (18.7%)	123 (18.6%)	
<i>Midwest</i>	392 (22.9%)	235 (22.4%)	157 (23.8%)	
<i>South</i>	463 (27.1%)	301 (28.7%)	162 (24.5%)	
<i>Northeast</i>	537 (31.4%)	318 (30.3%)	219 (33.1%)	
Residency completion year, median (IQR)	1992 (1985-1999)	1991 (1983-1998)	1994 (1987-2001)	<0.001

Percentages do not all sum to 100% because of rounding error.

^a Study sample excludes intensivists who opted out (n=19) or did not complete the survey (n=10).

Table 2

Study sample self-reported demographics (n=661)

Attribute	N (%)
Gender^a	
<i>Female</i>	135 (20.4%)
<i>Male</i>	526 (79.6%)
Specialty	
<i>Anesthesiology</i>	112 (16.9%)
<i>Medicine (incl. pulmonary)</i>	343 (51.9%)
<i>Surgery (incl. trauma)</i>	117 (17.7%)
<i>>1 specialty</i>	78 (11.8%)
<i>Other^b</i>	11 (1.7%)
Years in practice	
<i><10 years</i>	195 (29.5%)
<i>10 years</i>	463 (70.0%)
<i>Missing</i>	3 (0.5%)
ICU type	
<i>Medical</i>	312 (47.2%)
<i>Surgical-trauma</i>	159 (24.1%)
<i>Medical-surgical</i>	96 (14.5%)
<i>Cardiothoracic</i>	63 (9.5%)
<i>Other^c</i>	35 (5.3%)
Handoff training	
<i>None</i>	278 (42.1%)
<i>Some</i>	384 (58.1%)
<i>QI training in residency/fellowship</i>	272 (41.2%)
<i>QI course</i>	144 (21.8%)
<i>QI simulation</i>	33 (5.0%)
<i>Other QI training</i>	54 (8.2%)
Know of handoff-related adverse event	
<i>Yes</i>	200 (30.3%)
<i>No</i>	451 (68.2%)
<i>Missing</i>	10 (1.5%)

QI: quality improvement

^dRespondents were able to pick more than one type of training. QI: quality improvement.^aRespondents were asked to select female, male, or transgender. No respondents selected the transgender option. 32 respondents did not indicate gender on the survey; gender for these individuals was collected from the contact database.^bOther specialties included emergency medicine (n=6), gynecology (n=1), infectious diseases (n=1), neurology (n=2), and pediatrics (n=1).

^c Respondents were asked to select the ICU type in which they worked most frequently. “Other” ICU types included neurosciences/neurotrauma (n=13), burn (n=5), transplant (n=5).

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Table 3

Frequency with which handoff content areas are addressed as compared to ideal frequency, for intensivists reporting that they regularly conduct off-service handoffs (n=573).

CONTENT ITEM	FREQUENCY				
	Always	Often	Sometimes	Rarely	Never
Every patient is discussed.	Reported	372 (65.7%)	119 (21.0%)	50 (8.8%)	20 (3.5%)
	Ideal	418 (74.6%)	79 (14.1%)	45 (8.0%)	16 (2.9%)
Active clinical issues are discussed.	Reported	443 (78.6%)	108 (19.2%)	13 (2.3%)	0
	Ideal	506 (90.7%)	46 (8.2%)	6 (1.1%)	0
For a patient who is "FULL CODE", code status is discussed.	Reported	154 (27.3%)	100 (17.7%)	154 (27.3%)	43 (7.6%)
	Ideal	200 (35.7%)	82 (14.6%)	188 (33.6%)	22 (3.9%)
For a patient who is HAS LIMITS ON RESUSCITATION, code status is discussed.	Reported	305 (54.1%)	178 (31.6%)	61 (10.8%)	17 (3.0%)
	Ideal	422 (75.5%)	85 (15.2%)	43 (7.7%)	9 (1.6%)
Laboratory and diagnostic studies are discussed. ^a	Reported	102 (18.0%)	215 (38.0%)	215 (38.0%)	28 (5.0%)
	Ideal	138 (24.8%)	181 (32.5%)	215 (38.6%)	22 (4.0%)
Family dynamics are discussed.	Reported	107 (19.1%)	267 (47.6%)	177 (31.5%)	10 (1.8%)
	Ideal	189 (33.9%)	204 (36.6%)	156 (28.0%)	8 (1.4%)
Family members participate in attending handoffs.	Reported	6 (1.1%)	13 (2.3%)	24 (4.3%)	109 (19.3%)
	Ideal	17 (3.1%)	23 (4.1%)	102 (18.3%)	179 (32.1%)
Attending physicians attempt to personally notify family members when they go off service.	Reported	86 (15.2%)	231 (40.7%)	172 (30.3%)	62 (10.9%)
	Ideal	181 (32.4%)	212 (37.9%)	133 (23.8%)	29 (5.2%)

Percentages do not sum to 100% because of rounding error. P-values all <0.001, except where noted. P-values were calculated for the difference between reported and ideal discussion frequency for each content item when these were compared using a test of medians for matched pairs (Wilcoxon signed rank).

^aP-value = 0.004.