Journal of General Practice
ISSN: 2329-9126

Markova et al., J Gen Practice 2015, 3:4
DOI: 10.4172/2329-9126.1000203

Research Article Open Access

# Implementing an Institutional Objective Simulated Handoff Evaluation (OSHE) for Assessing Resident Handoff Skill

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**Receiving date:** September 09 2015; **Accepted date:** October 26 2015; **Published date:** October 29 2015



## Abstract

**Introduction:** In order to properly educate residents about the communication components involved in effective handoff delivery, interventions that promote demonstration of skill with real-time feedback are essential. Our institution developed a focused intervention for all residency programs to improve handoff education by implementing standardized written and verbal templates throughout all specialties. We decided upon a common framework for education and evaluation of resident handoff competency: the objective simulated handoff evaluation (OSHE) originally developed by Farnan et al. Handoffs are critically important for patient quality of care and safety.

**Methods:**Residents completed the objective simulated handoff evaluation in pairs where the junior resident completed a verbal and written hand off using a simulated case to a senior resident in the same specialty. The senior residents provided feedback on the verbal handoff and faculty scored the written templates. The junior residents were surveyed pre-and-post to assess resident handoff education prior to the exercise and to gather feedback.

**Results:** Residents rated their ability to pick up a new service significantly higher after the objective simulated handoff evaluation, (Mdn=4), U=308, p=0.005, r=0.34, in contrast to their initial rating (Mdn=3). Additionally, residents reported higher confidence in making contingency plans, (Mdn=4), U=311, p=0.005, r=0.35, compared to baseline (Mdn=3). Performing a read back showed improvement, (Mdn=4), U=321, p=0.01, r=0.31, when compared to the pre-survey (Mdn=3). Finally, when to perform a read-back also improved post-objective simulated handoff evaluation, (Mdn=4), U=323, p=0.01, r=0.32, when compared to the baseline (Mdn=3).

**Conclusion:** Our institution-wide focus on standardization demonstrated that residency programs can collaborate productively despite their specialty-specific differences in transfers of care. Handoff education is essential in positively affecting patient care.

**Keywords:** OSHE; Handoff skills; Resident handoff education; Transitions of care education; Simulation education; Resident communication skills; Graduate medical education

## Introduction

Resident training and education on handoffs and transitions of care (TOC) have been a focus of concern since the duty hour restrictions from the Accreditation Council for Graduate Medical Education (ACGME) were instituted in 2003. As a result of duty hour restrictions, there has been an increase in the number of times physicians transfer patient health care information to a receiving physician, commonly known as a handoff. Communication failures are the most frequently cited type of handoff problem that can negatively affect patient care [1]. In fact, communication is one of the top three root causes of sentinel events reported by the Joint Commission annually [2]. Handoffs are vulnerable to a myriad of environmental influences that can lead to communication breakdown, such as background noise, missing or incorrect information, and too much information that detracts from the most important aspects of a case [3].

Analyses of resident malpractice claims isolate communication failures connected to handoffs ranged of 19-43%, depending on the setting [4]. Still, residents struggle with handoff skill development and are prone to cognitive biases that are difficult to surmount [5]. Other contributing factors emanate from medical student education; handoff education is not a widespread component of undergraduate medical education; in fact, fewer than 9% of U.S. medical schools include handoff education as part of the curriculum, though residents need to be able to care for patients when they start residency [6]. Many residency programs struggle to develop methods for effectively teaching handoff skills and assessing resident handoff ability [7-11]. It is not surprising that residents do not feel adequately prepared to deliver a handoff coupled with carrying substantial doubt about their handoff skills [12,13].

In response to the acknowledged gap in residency education concerning handoffs, the ACGME, Institute of Medicine (IOM), and the Agency for Healthcare Research and Quality (AHRQ) have declared handoff education as key in improving patient safety and encourage focused interventions. The ACGME urges residency programs to design resident handoff education curricula that emphasize the demonstrable impact of efficient communication of vital information and provide training of a standardized handoff method [14]. Some teaching hospitals have shown that implementing handoff education programs can significantly reduce medical errors without increasing the time previously used to transfer care [15]. A major challenge is the lack of a validated tool for assessing TOC [16]. There is also no consensus regarding the use of handoff mnemonics [17,18]. The main objective of this project is to assess the effectiveness of the institution-wide resident handoff educational intervention and training utilizing an objective simulated format. We hypothesize that a standardized approach to handoff training will be well-accepted by faculty and resident and will increase resident knowledge and understanding of the importance of TOC.

## Methods

An educational intervention was used to test the effectiveness of the Objective Simulated Handoff Experience, which was originally piloted by Farnan and colleagues, with a cohort of residents across the institution for the 2013-2014 academic year [19]. Residents conducted a verbal and written handoff to another resident using a simulated history for a patient in their specialty along with a short event video that could impact the course of care. Data were collected pre-and-post to measure self-reported improvements in perceived handoff skill, along with faculty scoring of the written templates.

This project was initiated by Wayne State University (WSU)'s Graduate Medical Education department in southeast Michigan, which provides oversight and assists with developing curricular innovations for eight residency programs with over 150 residents, partnering with five major hospital sites.

In 2012, an institution-wide TOC Task Force was established to implement protocol and standards within the WSU's Graduate Medical Education programs. All residency programs elected a resident and a faculty member to the Task Force, to join a quality engineer, a GME educator, and the DIO. The Task Force was to evaluate current practices across the institution, identify gaps, and ultimately ensure the quality and safety of patient care when transfer of responsibility occurs. An evaluation that mapped out the TOC process across programs identified the need for standardization. Task Force members developed a written handoff template with elements relevant to all specialties and adopted the Summary, Active issues. If-then contingency planning, Interactive questioning, and Read-back (SAIF-IR) mnemonic to organize the verbal handoff per institutional policy [20]. The next step was to implement an active learning exercise to test resident application of TOC knowledge that would invite multi-source feedback.

A cohort of 82 residents from all programs participated in the activity from September through November 2013 (Table 1).

| Program | Overall N | N Junior Residents |
|---|---|---|
| Dermatology | 8 | 4 |
| Family Medicine | 12 | 6 |
| Internal Medicine | 24 | 12 |
| Orthopaedic Surgery | 8 | 4 |
| Otolaryngology | 6 | 3 |
| Physical Medicine and Rehabilitation | 8 | 4 |
| Transitional Year | 12 | 12 |
| Urology | 4 | 2 |
| | 82 | 41 |

**Table 1:** OSHE participants by program and junior status.

Smaller programs conducted the Objective Simulated Handoff Evaluation (OSHE) at their sites, whereas the larger programs used the institution's simulation center to accommodate recording larger groups for easier recording. The Task Force targeted all residents early in their training (PGY1-2) to deliver the simulated handoff to a more senior resident. Residents completed the exercise in pairs consisting of one junior resident (PGY1 or 2) and one senior resident (PGY 2 or 3) in their specialty. One exception was made for Transitional Year (all PGY 1); these residents paired up together for the exercise. This project was deemed exempt from IRB application per 45 CFR 46.101(b)(2).

The OSHE consisted of a didactic session on handoffs to provide a basic foundation for the importance of handoffs and to relay effective communication strategies that was paired with a direct-observation exercise. The Chair of the Task Force developed and delivered the sessions to all programs personally. Specifically, the didactic session focused on the role of handoffs in reducing medical errors, how standardized handoffs lead to improved patient outcomes, reviewing the institutional policy on verbal and written handoffs, and communication skills relevant to handoffs. A set of instructions for the logistics of OSHE completed the didactic portion. For a process map of the OSHE (Figure 1).

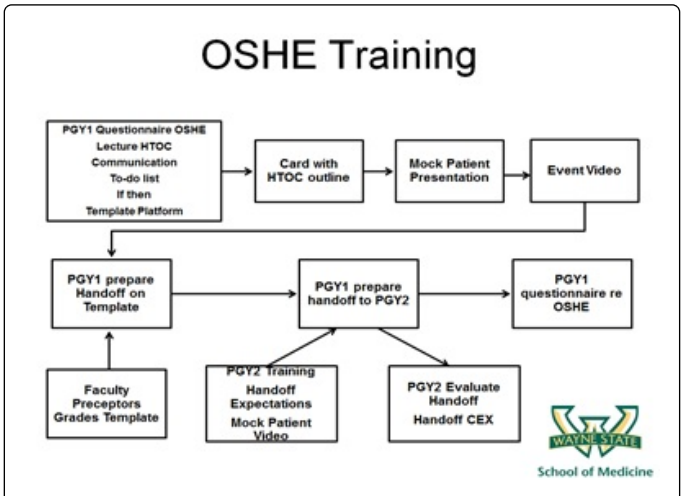
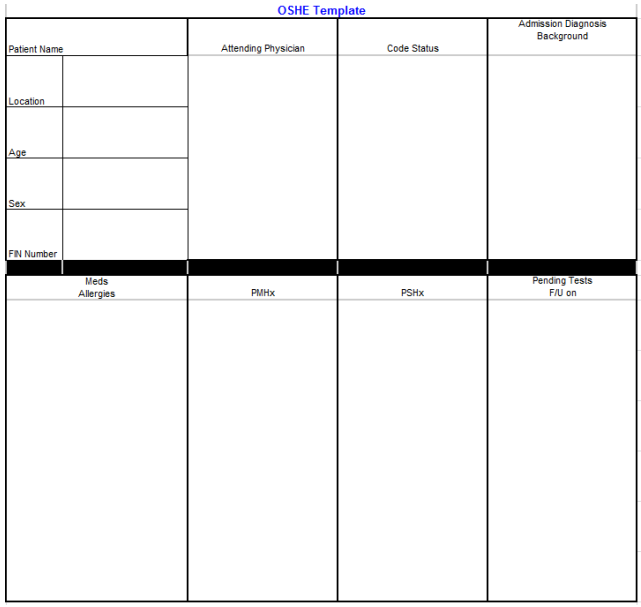



**Figure 1:** OSHE process map.

After the didactic portion, residents were scheduled to complete a written and verbal handoff exercise. To maintain relevancy for each specialty, all programs were asked to design materials for their program participants that were evaluated by the Task Force for

consistency. Each program identified a faculty champion who produced a case for their specialty, scored the written template, and provided feedback to the resident. Case content consisted of patient history information for medical and surgical procedures, medications, admitting diagnosis, healthcare tem information, pending tests for follow up, along with extraneous information that was not relevant to a handoff. A corresponding two minute video for each case was created by each program and it included information on the patient that could impact the course of care for the patient, which served as a challenge for the residents.

The written portion was completed using a standardized template that was produced approved by the Task Force (Figure 2).

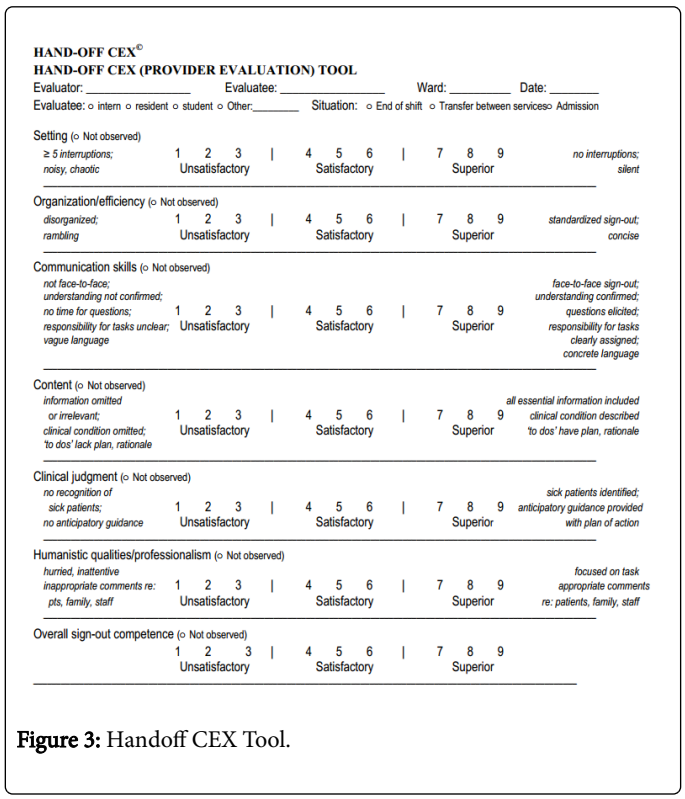


OSHE Template

| Patient Name | | Attending Physician | Code Status | Admission Diagnosis Background |
|---|---|---|---|---|
| Location | | | | |
| Age | | | | |
| Sex | | | | |
| FIN Number | | | | |
| Meds<br>Allergies | | PMHx | PSHx | Pending Tests<br>F/U on |

**Figure 2:** Standardized written template.

Scored by the program's faculty champion using the same criteria outlined by Farnan and others. A total of twenty points could be earned for the proper inclusion and identification of patient identifying information, a concise summary and active problem list, medication list, listing what should be done for the patient, and a contingency plan. The verbal portion was scored by senior resident in each pair, using the validated Handoff CEX (Figure 3).



**HAND-OFF CEX©**
**HAND-OFF CEX (PROVIDER EVALUATION) TOOL**

Evaluator: _____ Evaluatee: _____ Ward: _____ Date: _____

Evaluatee: ○ intern ○ resident ○ student ○ Other:_____ Situation: ○ End of shift ○ Transfer between services○ Admission

Setting (○ Not observed)
≥ 5 interruptions; noisy, chaotic — 1 2 3 Unsatisfactory | 4 5 6 Satisfactory | 7 8 9 Superior — no interruptions; silent

Organization/efficiency (○ Not observed)
disorganized; rambling — 1 2 3 Unsatisfactory | 4 5 6 Satisfactory | 7 8 9 Superior — standardized sign-out; concise

Communication skills (○ Not observed)
not face-to-face; understanding not confirmed; no time for questions; responsibility for tasks unclear; vague language — 1 2 3 Unsatisfactory | 4 5 6 Satisfactory | 7 8 9 Superior — face-to-face sign-out; understanding confirmed; questions elicited; responsibility for tasks clearly assigned; concrete language

Content (○ Not observed)
information omitted or irrelevant; clinical condition omitted; 'to dos' lack plan, rationale — 1 2 3 Unsatisfactory | 4 5 6 Satisfactory | 7 8 9 Superior — all essential information included clinical condition described 'to dos' have plan, rationale

Clinical judgment (○ Not observed)
no recognition of sick patients; no anticipatory guidance — 1 2 3 Unsatisfactory | 4 5 6 Satisfactory | 7 8 9 Superior — sick patients identified; anticipatory guidance provided with plan of action

Humanistic qualities/professionalism (○ Not observed)
hurried, inattentive inappropriate comments re: pts, family, staff — 1 2 3 Unsatisfactory | 4 5 6 Satisfactory | 7 8 9 Superior — focused on task appropriate comments re: patients, family, staff

Overall sign-out competence (○ Not observed)
1 2 3 Unsatisfactory | 4 5 6 Satisfactory | 7 8 9 Superior

**Figure 3:** Handoff CEX Tool.

Used by Farnan and colleagues. The Handoff CEX allows the receiving senior physician to score the setting, organization level, communication skills, content, clinical judgment, and humanistic qualities. Both the verbal handoff and feedback from the senior resident were recorded and the videos were released to program directors and faculty champions. After the OSHE, a short debriefing session, led by the GME educator, allowed participants to reflect and provide verbal feedback on the experience.

To assess the impact of the handoff intervention, junior residents, who perform the simulated handoff, completed a brief survey on handoff education and self-reported hand off practices (Table 2)

| | |
|---|---|
| Handoffsa | 1.83 ± 0.82 |
| Standardized handoffsa | 3.64 ± 0.91 |
| Handoffs supervised by attendingsa | 2.44 ± 0.77 |
| How efficient are your handoffs currently? b | 2.16 ±1.18 |
| How comfortable are you with cross-covering? b | 2.36 ± 0.91 |
| What is the quality of your patient-related communication skills? b | 2.24 ± 0.72 |
| How well were handoffs taught in medical school? b | 3.24 ± 1.09 |
| How well have handoffs been taught/reviewed in residency thus far? b | 2.48 ± 0.96 |

aScale is (1) Not important at all, Not that important, Important, Very important, (5) Extremely important bScale is (1) Outstanding, Very well, Average, Poor, (5) Extremely Poor

**Table 2:** Means and standard deviations for survey items on resident handoff education pre-OSHE.

Prior to the educational intervention OSHE portion using a web-based survey tool. This survey was repeated immediately after the OSHE with additional items to gather feedback on the experience.

As the data were collected anonymously, aggregate unpaired data were analyzed descriptively and comparisons were made using Mann-Whitney U tests. All analyses were performed using version 20 of the Statistical Package for the Social Sciences (SPSS).

## Results

There were 25 responses out of 41 possible received from the junior residents delivering the handoff for the pre-OSHE survey that covered previous handoff experience and education in medical school and in residency. The 61% response rate is low and could be due to not providing insufficient time allotted to recruiting participation. See Table 2 to view the survey items released prior to the OSHE. All survey item choices were five Likert scale choices ranging from negative to positive ratings, such as very poor to outstanding. When asked to rate how well handoffs were taught in medical school, 1 (4%) resident rated them as "outstanding", 6 (25%) reported "very well", 7 (28%) rated them as "average", while the majority 11 (44%) rated them as "poorly" taught. In contrast, residents rated their handoff education more favorably in residency, 4 (16%) reported "outstanding", 9 (36%) rated them "very well", 8 (32%) rated them as "average", and only 4 (16%) categorized handoffs as poorly taught. The majority of the respondents, 15 (60%) acknowledged that standardized handoffs were very important, but the same amount did not consider attending supervision of handoffs as very important. This sentiment was reflected in resident responses regarding who is typically present in verbal handoffs, with 13 (52%) reporting a senior resident and the remaining 12 (48%) stating another resident was present. Ten (40%) stated that they have a face-to-face handoff more than 60% of the time and 10 (40%) report not completing a written or typed handoff for each transfer of care. Resident self-report of patient-related communication skills ranged from average (40%) to great (44%) and superior (16%).

The receiving senior residents rated the junior residents at 8.14 (range 4-9, maximum of 9) on average for sign-out competence using the Handoff CEX. The most frequently occurring comments from the evaluating resident were: missing information, lack of conciseness, and the contingency plan was not clearly communicated. No other analyses were performed on other Handoff CEX variables because of the handoff taking place in a simulated environment and due to potential confound in the eight cases. As previously stated, faculty champions scored the written templates. The average score that faculty assigned for the written template was 14.87 (range 7-20, maximum 20). The most common areas where residents failed to earn all of the points were in the anticipatory guidance component of the handoff and for summarizing the medications completely.

Upon completing the OSHE, the junior participants were surveyed to gather resident input on the OSHE experience, self-reported changes in handoff competency, and to evaluate the utility of the exercise. A total of 40 junior residents completed the post-OSHE survey. See Table 3 for a comprehensive list of the items. Items that were delivered pre-and-post were analyzed to identify self-reported in specific handoff topics: overall handoff competency, picking up a new service of patients, making contingency plans, performing a read-back, knowing when to perform a read-back, and extracting information from patient charts. A Mann-Whitney U test was used to test the hypothesis that resident handoff knowledge and understanding would improve after the OSHE by comparing pre and post median ranks (Table 3).

| Please rate how well you know how to perform the following[a] | Pre | Post | Mann-Whitney Test (p) |
|---|---|---|---|
| A handoff | 3.46 ± 0.67 | 3.28 ± 0.74 | U=388 (p=0.10) |
| Pick up a new service of patients | 3.50 ± 0.63 | 3.97 ± 0.68 | U=308 (p<0.05) |
| Make a contingency plan | 3.71 ± 0.74 | 3.95 ± 0.82 | U=311 (p<0.05) |
| A read-back | 3.60 ± 0.74 | 4.05 ± 0.70 | U=321 (p<0.05) |
| When to perform a read-back | 3.68 ± 0.86 | 4.18 ± 0.70 | U=323 (p< .05) |
| Extract information from patient charts | 4.03 ± 0.76 | 4.23 ± 0.73 | U=480 (p=0.77) |
| [a]Scale: (1) Outstanding, Very well, Average, Poor, (5) Extremely Poor | | | |

**Table 3:** Self-report comparisons on resident handoff survey items pre-and-post OSHE.

Residents rated their ability to pick up a new service significantly higher after the OSHE, (Mdn=4), U=308, p=0.005, r=0.34, in contrast to their initial rating (Mdn=3). Additionally, residents reported higher confidence in making contingency plans, (Mdn=4), U=311, p=0.005, r=0.35, compared to baseline (Mdn=3). Performing a read back showed improvement, (Mdn=4), U=321, p=0.01, r=0.31, when compared to the pre-survey (Mdn=3). Finally, when to perform a read-back also improved post-OSHE, (Mdn=4), U=323, p=0.01, r=0.32, when compared to the baseline (Mdn=3).

Regarding resident feedback on the utility of the OSHE experience, 23 (58%) regarded the handoff didactic session as helpful preparation

for the OSHE and 25 (63%) residents responded that their understanding of the critical importance of handoffs improved (Table 4).

| | Strongly Disagree | Disagree | Undecided | Agree | Strongly Agree | No response |
|---|---|---|---|---|---|---|
| The preceding lecture provided prior to the OSHE prepared me for the OSHE. | 2.50% | 7.50% | 27.50% | 45.00% | 12.50% | 5.00% |
| I have a better understanding of the critical importance of effective handoffs. | 5.00% | 22.50% | 7.50% | 45.00% | 17.50% | 2.50% |
| The OSHE helped me identify aspects of handoffs I need to improve. | 5.00% | 20.00% | 22.50% | 40.00% | 7.50% | 5.00% |
| The feedback from the PGY2 matched my self-assessment. | 2.50% | 0.00% | 25.00% | 40.00% | 7.50% | 25.00% |
| The feedback from the PGY2 was useful. | 2.50% | 2.50% | 20.00% | 37.50% | 10.00% | 27.50% |
| The written template was intuitively designed. | 12.50% | 10.00% | 17.50% | 32.50% | 12.50% | 15.00% |
| The written handoff prepared me for the verbal handoff. | 10.00% | 5.00% | 20.00% | 32.50% | 10.00% | 22.50% |
| Both the written and verbal handoff contained the same information. | 7.50% | 15.00% | 17.50% | 32.50% | 10.00% | 17.50% |
| My handoffs will improve as a result of the OSHE. | 7.50% | 15.00% | 32.50% | 32.50% | 7.50% | 5.00% |
| The GME module on handoffs helped prepare me for today. | 5.00% | 17.50% | 27.50% | 37.50% | 5.00% | 7.50% |
| My patient care will improve after today. | 5.00% | 17.50% | 32.50% | 35.00% | 5.00% | 5.00% |

**Table 4:** Survey items released post-OSHE.

The remaining responses positively favored the learning experience, and represented 40-50% of residents. Written comments indicated that senior residents desired more direction and instruction on giving feedback to the junior residents they were evaluating.

## Discussion

The Task Force reviewed the faculty and resident data produced by OSHE in a debriefing session to discuss the outcomes of the exercise and to make recommendations for the coming academic year. Residents mentioned that the experience raised their awareness about handoff communication. They also felt familiar with the OSCE concept, as they all participate in simulated patient cases as they enter their programs [21]. Faculty valued that individual cases were designed for each program while the handoff itself was standardized. The participating faculty who scored the written templates identified that resident education on anticipatory guidance and "if/then" statements needed to be more emphasized in resident handoff education. While faculty raised the concern about anticipatory guidance, it is possible that the lack of familiarity with the standardized patient case could have contributed to the low scores in this area [22] Faculty noted there was limited variability in resident scores on the Handoff CEX. This limited variability may be partially explained by senior residents wanting more instruction on how to give feedback to the junior resident. We decided that training on delivering feedback to senior residents using the Handoff CEX was to be added to the didactic component.

We supported the hypothesis that implementing a standardized approach to handoff training would be well-accepted by faculty and resident and would increase resident knowledge and understanding of the importance of TOC. The effect sizes are small, but resident knowledge in specific areas of handoff did improve after the OSHE (Table 3). Repeated comparisons are needed to gauge whether OSHE would have a stronger impact on handoff skill. Another limitation was that comparisons were only made on the resident delivering the handoff; in the future, gathering perceptions from the senior residents could broaden our understanding of resident handoff education needs. Faculty expressed caution surrounding the general impact of the OSHE. While it is positive that there were specific improvements in handoff education pre-and-post OSHE, it must be remembered that these improvements were self-reported by the participants, and subject to bias. Furthermore, it is acknowledged that a self-reported improvement is not indicative of an actual improvement. Ideally, programs could expand this educational experience to direct observation of actual handoffs in the clinical learning environment, which is an achievable goal [23]. This direction requires careful assessment, as previous studies have noted that standardization does not ubiquitously result in improved patient outcomes [24]. However, other programs have demonstrated in improvement in using the Handoff CEX post-OSHE implementation and continued improvement in resident handoff efficiency over time [25]. Our written template the scoring system and surveys have not been validated in the same way the Handoff CEX has [26]. Though, we did have similar observations to those in the Farnan et al. article and the tools proved useful across our different specialties. Notably, our endeavor is the only known institution-wide handoff education intervention to date.

Institutional educational interventions such as the one we described accomplish several objectives simultaneously. Implementing the institution-wide OSHE provided a powerful method that not only to educate the incoming cohort of residents on high quality of handoff practices, but also to educate senior residents and faculty on the same processes. OSHE is a form of deliberate practice that permits rehearsal of important skills while building resident comfort-level at the same time [27]. OSHE is a demonstration of GME and program

engagement, permits policy monitoring that does not detract from its educational focus. The exercise served as a baseline evaluation tool and as a widespread educational intervention that is now used annually at our institution. OSHE is a simple, but effective experience for sampling how faculty and residents deliver handoffs and provide an ongoing opportunity to refine handoff education, ultimately affecting the quality and safety of patient care [26].

## Conclusion

The success of the OSHE was facilitated by the well-functioning Task Force, which met monthly and had membership that spanned all programs. All sessions were made as a group, and this assured that specialty needs were incorporated into the written and verbal templates so that we could adopt a standardized approach that was relevant for all specialties.

One challenge is universal buy-in to the OSHE experience across the institution. For example, Dermatology residents have previously reported that their transfers of care has less importance to their specialty as they do not frequently engage in acute care activities. Although, residents were able to apply some of the general principles of transfers of consultation service care, which occurs monthly in Dermatology. The Task Force recommended that programs include an open discussion and address resident concerns from each specialty with their faculty champion, who can incorporate resident feedback into their OSHE case for future resident cohorts.

Based on the improvements noted post-OSHE, the Task Force decided to include the OSHE for all junior residents the beginning of the academic year in the schedule of our regular OSCEs that take place in July and August. In addition, it was decided that all programs would host their own didactic session with GME support. Doing so will support a proper orientation of new residents and produce on-going conversation of handoffs that are important to GME as we review and update our policy. The next steps are to assure that monitoring of the Transitions of Care policy happens on a continuous basis at the program level and both the written and verbal templates are utilized consistently by the residents and faculty. Annually, GME requests that programs indicate how the Transitions of Care policy is monitored in the Annual Program Evaluation submitted to the GMEC. We want to ensure that residents maintain the skillset acquired through the OSHE and we have encouraged programs to link the educational experience to patient outcomes. Our institution-wide focus on standardization demonstrated that residency programs can collaborate productively despite their specialty-specific differences in transfers of care.

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