

## Education



### IMPLEMENTATION OF AN EMERGENCY DEPARTMENT SIGN-OUT CHECKLIST IMPROVES TRANSFER OF INFORMATION AT SHIFT CHANGE

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**Abstract—Background:** Transitions of care are ubiquitous in the emergency department (ED) and inevitably introduce the opportunity for errors. Few emergency medicine residency programs provide formal training or a standard process for patient handoffs. Checklists have been shown to be effective quality-improvement measures in inpatient settings and may be a feasible method to improve ED handoffs. **Objective:** To determine if the use of a sign-out checklist improves the accuracy and efficiency of resident sign-out in the ED. **Methods:** A prospective pre-/postinterventional study of residents rotating in the ED at a tertiary academic medical center. Trained research assistants observed resident sign-out during shift change over a 2-week period and completed a data collection tool to indicate whether or not key components of sign-out occurred and time to sign out each patient. An electronic sign-out checklist was implemented using a multi-faceted educational effort. A 2-week postintervention observation phase was conducted. Proportions, means, and nonparametric comparison tests were calculated using STATA. **Results:** One hundred fifteen sign-outs were observed prior to checklist implementation and 114 were observed after. Significant improvements were seen in four sign-out components: reporting of *history of present illness* increased from 81% to 99%, *ED course* increased from 75% to 86%, *likely diagnosis* increased from 60% to 77%, and *team awareness of plan* increased

from 21% to 41%. Use of the *repeat-back* technique decreased from 13% to 5% after checklist implementation and time to sign-out showed no significant change. **Conclusion:** Implementation of a checklist improved the transfer of information without increasing time to sign-out. © 2014 Elsevier Inc.

**Keywords—**sign-out; handoffs; checklist; emergency department; resident education

### INTRODUCTION

Emergency care is characterized by multiple transitions in patient responsibilities, both as patients leave the emergency department (ED) and as providers change shifts. Patients in an ED setting are often complex, requiring ongoing assessment and multiple interventions. Communication breakdowns among physicians are a commonly recognized source of error and are associated with 61% of sentinel events (1). Patient handoffs are times when this is particularly true, as transitions of care create the potential for critical information to be missed or distorted (2–5).

Recently, much attention has been paid to improving the transfer of information during transitions of care of patients in all clinical settings, particularly among residents (6–8). Improving and standardizing transitions of care was a Joint Commission national patient safety goal in 2009 (9). In addition, the Quality Improvement and Patient Safety Section of the American College of Emergency

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Physicians identified sign-out as a target for patient safety, particularly in the ED setting (10). Although sign-outs happen on a frequent basis in the ED, very few studies have examined how to best standardize and improve this process. Checklists have been shown to be effective in several different clinical settings in terms of decreasing medical errors and morbidity, and may be a feasible option in an ED (11,12).

In our study, we examined the impact of introducing a standardized sign-out checklist on resident handoffs. Our objective was to determine if the use of a sign-out checklist improves the accuracy and efficiency of resident sign-out in the ED as measured by reduced omission of key information, communication behaviors, and time to sign out each patient.

## MATERIALS AND METHODS

We performed a prospective evaluation of a novel sign-out checklist to improve ED-to-ED resident physician handoffs at shift change using a pre-/postintervention design. This was a pilot study conducted from November 7, 2011 to December 15, 2011 at a tertiary academic medical center with an annual ED volume of 53,000 visits and an admission rate of 38%. As part of an initiative to improve physician communication and handoffs at shift change, a standardized electronic checklist involving key elements was developed by the study investigators (Figure 1). The components of the checklist were based on existing literature and previously validated tools regarding safe handoffs in other non-ED settings (13–17). The components of the checklist included history of present

illness, ED course, pending studies, likely disposition, anticipated issues, and algorithms for disposition. Several characteristics specific to our institution, including completion of discharge instructions, admission request to the ED observation unit, and ordering of home medications, were also included in the checklist, as the investigators deemed these elements important for streamlining sign-outs. An effort was undertaken to promote the use of the sign-out checklist, including a verbal announcement during resident didactics, and two separate e-mails sent to all ED residents and residents from other specialties rotating in our ED during the study period. The sign-out checklist was also posted in a print version near resident computers in the ED and made available through the ED electronic patient information system.

Prior to the implementation of the sign-out checklist, a small team of hired, ED clinical research assistants (RAs) were trained on the elements and use of the checklist in a structured, nonclinical setting. Training included verbal instruction on coding of the checklist elements and resident communication behaviors using the data collection tool. A brief sign-out demonstration video was also created for the purposes of this study, and the RAs were required to watch this during their training. During a 2-week period, a convenience sample of handoffs involving first and second-year residents was observed by the RAs during the afternoon change of shift. Sign-outs involving medical students, attending physicians, and sign-out to inpatient services were excluded. Given the supervisory role of third-year emergency medicine (EM) residents at our institution, sign-outs involving these residents were also excluded.

The RAs used a standardized binary data collection form to record whether or not items on the checklist were completed as residents signed out patients. Communication behaviors including use of the repeat-back technique, requests for additional information, and team awareness of plan (resident, attending, and nurse understood and have communicated about the care plan) were also recorded in a binary fashion. Finally, the length of time for each sign-out as well as the specialty and postgraduate year (PGY) of the resident were documented. The RA was not a member of the clinical team nor did he/she participate in the sign-out or serve in a supervisory role. Residents were aware of the RA's presence but were not privy to the items on which they were being evaluated.

One week after the preintervention observation period, the checklist was electronically linked to the ED electronic tracking system for resident use during sign-out. Residents were made aware of its availability at this time, as described above. A 2-week period of observation was conducted in a similar fashion to the preimplementation phase, 1 week after the checklist was implemented. All data were entered into Microsoft Access 2003 (Microsoft Corporation, Redmond, WA) and analyzed using STATA 11.0 (College Station, TX). A  $\chi^2$  analysis was performed to compare proportions and a Wilcoxon rank-sum was used to compare means. The project was submitted to the local Institutional Review Board, who determined that our activities were quality improvement and as such do not require further review under federal guidelines. The procedures followed were in accord with the standards on the use of human subjects at the institution where the study was performed.

### DASHBOARD SIGN-OUT CHECKLIST

- Brief HPI
- ED Course
- Pending studies
- Algorithms for disposition on MD comments (i.e. If CT negative → discharge home)
- Anticipated issues (i.e. likely triggers, patient might not be agreeable to admission, etc)
- Patients with likely discharge:
  - Discharge instructions and Rx completed?
- Observation patients:
  - DI completed
  - In observation status
  - Home meds entered in POE
  - Needed tests ordered
- Admitted patients:
  - Status of bed request
  - Status of sign-out to inpatient team and nursing
  - Resident chart completed
- Ask questions for clarification!

**Figure 1. Electronic sign-out checklist for residents rotating in the ED.** HPI = history of present illness; ED = emergency department; CT = computed tomography scan; Rx = prescription; DI = discharge instructions; POE = provider order entry.

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