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The Perils of Cross Coverage

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Case Objectives

- Explain the recently instituted ACGME duty hour regulations for 2011 as they pertain to handoffs and care transitions.
- Describe educational mechanisms available to ensure trainees execute standardized, safe, and effective handoffs, without omitting critical information.
- Identify the opportunities for handoff evaluation, including the application of a framework for clinical supervision.

The Case

A 70-year-old woman was admitted to the intensive care unit (ICU) with acute change in mental status a few days after lumbar laminectomy. Her medical history was significant for a ventriculoperitoneal (VP) shunt for suspected normal pressure hydrocephalus. She was febrile with nuchal rigidity. Her white blood cell (WBC) count was over 20,000 cells/?l. Blood cultures were positive for *E. coli,* and appropriate antibiotic therapy was initiated. The patient responded well—she began to have brief but meaningful conversation with her family. Her WBC started to trend down, and she was afebrile for 48 hours.

On day 4 of her ICU admission, a Friday, she exhibited fluctuating mental status with prolonged episodes of drowsiness. The ICU team attributed this to recent use of sedatives. Signout to the incoming night float team did not highlight the change in mental status. Over the course of the ensuing night she became drowsier. The night float team assumed it was her baseline mental status. After transfer to the incoming cross-covering team for the weekend, the patient was found comatose.

Magnetic resonance imaging (MRI) showed ventriculitis with possible infectious cerebritis. The patient developed generalized tonic clonic seizures and was treated with IV phenytoin. She was emergently transferred to surgery for removal of the VP shunt and placement of ventricular drain for intraventricular gentamycin. The patient received 8 days of intraventricular gentamycin with resolution of ventriculitis as documented by negative *E. coli* cultures from the ventricular cerebrospinal fluid. She made a gradual recovery after spending 6 weeks in the ICU.

Subsequent root cause analysis determined that earlier recognition of the change in mental status might have altered the patient's course. It identified inadequate signout to the night float team as the primary reason why that team did not identify the patient's deteriorating mental status.

The Commentary

Given recent efforts to reduce resident duty hours, the above case is, and may continue to be, an example of the harm that can occur without adequate handoff communication and coverage systems. The most recent iteration of the duty hour regulations, released in July 2011 (1), were informed by a landmark Institute of Medicine report released in 2008.(2) While the maximum 80-hour workweek for residents remained unchanged from the earlier 2003 changes, the new regulations limit shifts for first-year residents to 16 hours or less. These changes not only increased the frequency of handoffs, but also created a patchwork of coverage systems, including day and night float services that led to a marked increase in times that residents care for patients for whom they lack primary knowledge.

New ACGME Regulations for Handoffs

The most recent ACGME requirements also address handoffs and do so across three domains: service structure and systems, education, and evaluation.(3) First, programs must ensure that clinical service schedules minimize the number of transitions. This is, of course, especially difficult in the context of resident work hour reductions, which inherently increase handoff frequency. Moreover, resident coverage has become more fragmented with the use of day and night floats, giving rise to a "double handoff." Often, a primary team resident, who has firsthand knowledge of a patient, provides a handoff to a covering resident who is providing "long day" coverage until a night float resident arrives later. This second handoff between the covering resident and the night float is particularly vulnerable because neither the sender nor receiver is familiar with the patient. To avoid this, restructuring team schedules and composition can maximize the amount of time that someone from the primary team is present and enhance team–patient continuity through multiple handoffs. For example, this could be achieved through staggering the start and stop time of primary team members to increase the amount of time someone who knows the patient is present. Ensuring adequate overlap between shifts to prioritize the handoff process also becomes critical. In addition, residency programs must now ensure that trainees are competent in performing handoffs. As a result, programs are currently developing new handoff curricula.(4) Because programs must also monitor and ensure that handoffs are safe and effective, various evaluation mechanisms are being developed and implemented.

Emerging Handoff Curricula

Although numerous curricula and instructional methods have been developed to promote effective handoff communication, there is no consensus on "best approach." However, a recent review by handoff educators and researchers highlights the multiple techniques that could be used in a curricular blueprint, ranging from video-based workshops, case-based discussions, structured didactics, or interactive simulations.(4) While some curricula have resulted in clinical practice change, linking handoff education to patient outcomes remains elusive due to a lack of handoff-specific patient outcomes.(5)

A common way to teach and improve verbal handoffs is through mnemonics, the most common of which is SBAR (situation, background, assessment, recommendation).(5) Although the effectiveness of handoff mnemonics in clinical medicine is unknown (6), they can improve retention of knowledge in other clinical scenarios, such as long-term retention of the Ottawa Ankle Rules or improved decision making in pharmacotherapy.(7,8) Using an ordered structured format during handoffs, including new events of the day and anticipatory guidance, is a recommendation from other high-reliability industries.(9) In the above vignette, such a framework may have resulted in the inclusion of the patient's baseline mental status and the inclusion of an "if/then" statement, such as "if the patient's mental status worsens, then please review the medication list and consult neurology."

However, even under optimal conditions for verbal handoffs (e.g., a dedicated room and protected time with minimal interruptions and attending-level supervision), one study demonstrated that receivers could not identify the most important issue for 60% of patients they cared for.(10) The primary team's rationale was also often lacking or even contradictory. Evidence from communication psychology highlights that senders are stifled by an egocentric heuristic, assuming receivers can access the same information they do.(11) Therefore, in handoffs, senders underestimate how much information receivers need, not just about clinical status but also the rationale behind that assessment. Of relevance to this case, a study of internal medicine intern signout demonstrated that adverse events and near misses during cross-coverage situations were associated with omissions of baseline mental status, as well as the primary care team's rationale for their actions.(12) In the case above, the primary team's failure to include the patient's baseline mental status and rationale for their assessment is an example of the egocentric heuristic. Receivers may also be affected by information overload, distractions, and their own competing work, all of which might prevent them from understanding and acting on clinical information raised during handoffs.

In addition to verbal handoff education, the use of night float and weekend coverage teams, such as in this case, makes it important to ensure written signouts are high quality. Without a foundation to build a shared mental model, adequate clinical documentation and written signouts become paramount to ensuring safe care during coverage periods. Despite this, few curricula target written signout documentation. The OSHE, or objective structured handoff experience, is an immersive learning activity in which learners practice written signout creation, integrate static and dynamic video-based clinical information, and then verbally hand off the "patient" and receive feedback from a trained "receiver."(13) Practice-based approaches to improve written signout, including the use of audit tools, have shown promise in improving clinical practice.(14) Lastly, the increasing use of handoffs facilitated via the electronic health record (EHR) or stand-alone electronic signout platforms (with or without EHR integration) can standardize and improve clinical documentation during handoffs. Unfortunately, the same dangers that plague electronic documentation, such as copy and paste errors, failure to update, and information overload, can get in the way of expected improvements in written signout quality with the shifts to computerized records.(15) The proper use of this technology during handoffs remains an unaddressed educational gap.

Finally, educational programs to date do not stress the fundamental aim of the handoff: to create a shared mental model for patient care through an interactive dialogue. Instead, most education focuses on senders, with little attention on receiver ability to listen, comprehend, and process information. A potential mechanism to foster this shared vision is the use of pre-handoff rounds, when incoming and outgoing teams visit and examine high-risk patients.

Assessing Competence at Handoffs

Although approaches to assessing handoff competence can include simulation, direct observation, peer evaluation, or chart audit, validating evaluation metrics remains a challenge.(16)

Direct observation can be facilitated through the use of instruments, such as the Handoff CEX, a 9-item role-based anchor to assess handoff behaviors in the domains of setting, communication skills, professionalism, and overall handoff performance. Direct observation has also been shown to result in improved self-reported confidence in handoffs.(17)

Peers can serve as a natural and powerful conduit for evaluation to occur. Although peer evaluation can suffer from the halo effect, it can also delineate those exceptional performers from those that are performing below average and need remediation.(18) While most evaluations have focused on senders, handoffs are more than a one-way communication, which makes it necessary to evaluate receivers on use of active listening behaviors, such as interactive questioning, read-back, or note-taking.(19) More often than not, handoff receivers use passive listening behaviors, such as head nodding and eye contact, which are not an adequate signal of comprehension.

In addition to evaluating communication, creating written signouts and executing verbal handoffs requires the clinical judgment to generate an appropriate patient synopsis, with relevant action items, anticipatory guidance, and corresponding rationale. Approaches to enable critical evaluation of these skills are needed. In addition, evaluation of the transfer of professional responsibility is also critical to ensuring handoff competence.

As trainees mature clinically, they traverse milestones of clinical performance. The same is true of handoff skills. For example, by 12 months, residents should be able to effectively communicate with other caregivers to maintain continuity during transitions of care.(20) While broad-based milestones such as these have been developed for use by residency programs, the need for more detailed handoff-related milestones persists given the variety and diverse skills that various handoffs require.

Faculty supervision is not a traditional feature of handoffs, partly due to their settings and timing, often at night or "on the fly." However, the recent focus on resident supervision provides a natural opportunity to integrate handoff evaluation with clinical supervision of trainees (Table). The ACGME-defined levels of clinical supervision, from direct to indirect with immediate availability to oversight, can be applied to handoff evaluation. Faculty charged with direct supervision of trainees could utilize an instrument, such as the Handoff CEX, to directly observe handoff performance on a variety of domains and roles (sender or receiver). As trainees demonstrate competence at this stage, they could be indirectly supervised but have attendings coaching residents on handoff communication prospectively and encouraging the primary team to note the attending's availability for questions. Finally, attendings can provide oversight, or review of care after it has been provided, through review of cross-coverage events and the companion written signout that was given to the covering physicians.

Take-Home Points

- Structured templates and mnemonics can standardize information during handoffs to prevent omissions of critical data.

- Ensuring a member of the primary team with knowledge of the patient is present during handovers can preserve team–patient continuity and informed discussion of critical information.
- To address the egocentric heuristic, senders must appropriately calibrate the information they transmit to ensure receivers are able to properly understand.
- Use of night float and coverage teams requires corresponding investments to improve clinical documentation of written signouts that not only focus on daily events, but also rationale for primary team actions and anticipatory guidance.
- A framework for enhancing supervision set forth by the ACGME presents an opportunity to guide, evaluate, and improve resident handoffs.

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Table

Table. Integrating handoff evaluation with supervision of trainees.

Supervision Type	Handoff Strategies
Direct	• Attending or senior resident observes handoffs using direct observation tool, such as the Handoff CEX, and provides feedback on how to improve performance.
Indirect	• During clinical rounds, prior to handoff occurring, attending reviews and discusses important elements of handoff, such as anticipatory guidance and to-do items with residents. In above case, attending could say, *"When you hand off this patient later today, what is important to include and why?"* • Primary attending specifies covering residents should contact them when facing clinical issue for which they are uncertain or specific clinical scenario for sick patient. In this case, attending could say to primary team physicians, *"Tell the covering team to call me if this patient's mental status continues to worsen."*
Oversight	• Attending or senior resident reviews cross-cover events that have occurred overnight and also reviews written signout provided to identify areas of improvement.

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