Hand-off Communications

Research in the Healthcare Industry

Hand-off Communications

High-reliability organizations (eg, nuclear power industry, aviation cockpits, air traffic control, Navy carrier flight decks, NASA and Mission Control) have developed, studied, and formalized effective methods for safe transitions in operations. These approaches have included effective team communication tools and strategies that have become a part of their organizational cultures. These methods are based on a deep knowledge of human factors and engineering design for safety. High-reliability organizations acknowledge human fallibility; system complexity; ambiguity and uncertainty; limitations of individuals in learning, training, and attention; continuity gaps; negative impact of fatigue on human performance; dynamic conditions; difficult decision making under time constraints; and numerous system vulnerabilities. Fortunately, the healthcare industry is beginning to recognize the origins of medical errors within the healthcare delivery system. Healthcare organizations are now integrating successful lessons from these high-reliability institutions to design safer systems for patients. The requirement of The Joint Commission, formerly the Joint Commission on Accreditation of Healthcare Organizations, to implement a standardized approach to “hand-off” communications and transitions in health care, creates an unrivaled opportunity to improve healthcare quality and safety. The information transfer problem has plagued patient care for decades. Using these tools will make it possible to improve dramatically the transfer of information.

In health care, significant differences among the terms used often do not appear. “Hand off” and “handover” are terms that suggest the transfer of information and knowledge along with authority and responsibility among care providers. Sign-over, sign-off, sign-out, and check-out rounds relate to clinicians transferring care to a covering physician or team for on-call responsibility. Nursing change-of-shift, shift change, change-over, and “giving report” focus more on the exchange of patient information (and responsibility) at the end of a given time period or shift and the beginning of the next. Briefings or huddles suggest a method of bringing together another like-practitioner or team to obtain a clear picture of the current status and plan before or after a transient absence (relief for lunch or a break), during momentary cross-covering while one professional is focused on another task, or at the beginning of a procedure or event.

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Transition Methods

A number of publications and studies have focused on effective transfer of information, authority, and responsibility at shift change in industries where services or operations are carried out round-the-clock. An excellent summary of the literature, with conclusions, was written in 1996 as a technical report, *Effective Shift Handover*.[1] A basis for guidance in the handover process as well as suggestions for lessons learned and best practices were offered, with recognition that the research is imperfect and that some inferences are drawn from other known industrial incidents. The following represents general guidance from this technical report for conducting an effective shift handover:[1]

- Conduct the handover face-to-face.
- Be certain that handover is two-way, with both participants taking joint responsibility for ensuring accurate communication.
- Use verbal and written means of communication
- Give as much time as necessary to ensure accurate communication.

Note: In addition to those items listed above, a handover should be based on a predetermined analysis of the information (key elements) needs of the oncoming staff.

The report suggests that communication skills should be part of the employee selection and development process within organizations. The opportunity to better refine the specific data elements should be included in the information exchange along with the ability to better design the information support systems (eg, log, templates, IT systems) to aid the handovers.

Analysis of industrial incidents focused on areas of increased risk and poor outcome, including the following[1]:

- During plant maintenance, particularly when this work continues over shift change
- When confusion exists about the details of work performed or not performed
- When safety systems have been overridden
- During deviations from normal working (procedures)
- Following a lengthy absence from work (takes more time to get into gear)

- When handovers are between experienced and inexperienced staff

Observations about communication, human factors considerations, and implications for hand offs include the following[1]:

- Two-way communication with feedback/questioning is essential.
- Thorough communication should have high priority, especially when confusion is apparent or suspected.
- Natural language is naturally ambiguous.
- Miscommunication and misunderstanding are most likely in the face of widely differing mental models held by oncoming and outgoing personnel.
- The capacity of communication channels is limited; therefore, unnecessary information should be eliminated.
- Overconfidence and complacency are common and should be countered by setting standards of communication and developing individual and organizational communication skills.

The Australian Council for Safety and Quality in Health Care produced an excellent evidence-based analysis: Clinical Handover and Patient Safety—Literature Review Report in March 2005.[2] This report substantiated and referenced the harm produced by ineffective hand offs and medical transitions, stating that ineffective handover can lead to the following:

- Wrong treatment
- Delays in medical diagnosis
- Life-threatening adverse events
- Patient complaints
- Increased healthcare expenditure
- Increased hospital length of stay
- "…and a range of other effects that impact on the health care system" (including litigation)[2]

Unfortunately, the literature does not as yet identify specific best practices for hand offs; however, it does deem hand offs an area ripe for future quality research. The committee

categorized the analysis of the scientific studies into system factors, organizational cultural factors, and individual factors, with statements, opinions, and conclusions presented in the following table.

Table 1: System, Organizational/Cultural, and Individual Factors

System Factors	Organizational/Cultural Factors	Individual Factors
• Multidisciplinary decision-making on rounds reduced medical error. • Continuity providers were more accurate and safer than on-call team providers. • Staffing levels may affect quality of hand offs. • Research should be designed to evaluate and measure clinical handovers relative to patient quality and safety.	• Communication consists of four elements: o sender o message o receiver o feedback • Organizational attitudes and behavioral norms affect teamwork. • Hiring practices should include communication skills. • Processes should be determined for structured minimum level of information required for hand off. • Verbal AND written information should be used for hand offs. • A continuous improvement model, with an empowerment culture, will drive innovations with care transition improvements. • Systems should be in place to provide accurate information when cross-covering teams are providing emergency care.	• Competent practitioners should be recruited. • Organizations should promote training and learning for staff members. • Minimum information sets should be determined and staff members should be held accountable for following clear protocols. • Training should be provided to increase individual skill level for hand-off communication. • Clinician knowledge deficits should be corrected.

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Transitions in Care in Practice

Emily Patterson and coauthors identified strategies employed during hand offs and described them in four settings with high consequences for failure.[3] They concluded that these principles, tools, and strategies could be applied in healthcare operations and "jumpstart" endeavors to design or modify hand offs to improve patient safety. The primary areas for observational studies included space shuttle mission control, nuclear power, railroad dispatching, and ambulance dispatching. Of interest, the hand off was seen as both a point of vulnerability and a potential time of recovery and error detection (fresh set of eyes). Analysis of 21 hand-off coordination and communication strategies revealed similarities and differences compared to healthcare settings, which did not have updated "see-at-a-glance" information systems and depended on indirect or delayed communication systems, such as pagers, recorders, phones, faxes, and hand-written notes rather than immediate links. The wide variability of hand offs across healthcare systems creates further challenges not seen in the industrial settings. Problem areas identified by the authors for health care include timing-schedules, limited information technology system support, indistinct responsibility transfers, and the potential tradeoff between effectiveness and efficiency.

Hand off

Point of vulnerability
---AND---
Opportunity for error detection and recovery

The table below lists Hand-off Coordination and Communication Strategies[3]:

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Table 2: Hand-off Coordination and Communication Strategies

Observed hand-off strategies used to enhance effectiveness:

- Face-to-face verbal updates with interactive questioning
- Limiting any interruptions during update
- Additional updated information from teammates (other than one being replaced)
- Topics initiated by oncoming as well as outgoing
- Limit initiation of operator actions during update (wait until after hand off)
- "Read-back" to ensure that information was accurately received
- Include outgoing team's stance/opinion toward (oncoming's) changes to plans and contingency plans

Strategies to improve hand-off update efficiency and effectiveness:

- Outgoing writes summary before hand off
- Oncoming assesses current status
- Information updated in the same order every time
- Oncoming scans historical data before update
- Oncoming reviews data changes from automated, sensor-derived system prior to hand off/update

Suggestions for improving coordination with others:

- Assure unambiguous transfer of responsibility
- Make it clear AT-A-GLANCE which personnel are responsible for which duties at a particular time
- Delay transfer of responsibility when concerned about status/stability of the process[4]

Loss of Data in Nursing Handover

Pothier, Monteiro et al observed the handover of 12 simulated patients over five consecutive handover cycles between nurses. Three handover styles were used, and the amount of data loss was recorded for each style. The purely verbal handover style resulted in the loss of all data after three cycles. A note-taking style resulted in only 31% of data being transferred correctly after five cycles. When a printed form was included with the verbal handover, data loss was minimal. The authors recommend that nursing and medical staff include a printed data sheet as part of the handover process.[4]

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Operating Room

The **preoperative brief** is a powerful tool to "bring the entire OR team onto the same page" (shared mental model); remove incorrect assumptions; clarify the intended plan and contingency plans; obtain key information from surgeons, anesthesia provider, circulating nurse, and surgical technologist or scrub nurse that enhance patient care safety and quality; and develop counter-strategies to common pitfalls, errors, and complications.

This sharing of information, opening the door to multidisciplinary communication and working together (mutual support), creates and sustains a teamwork approach that values input from all team members. Such an environment sets the stage for improved communications, including hand-offs between anesthesia providers for breaks or shift change, and hand-offs between circulating nurses or scrub technicians as they move in and out of ongoing cases. These **hand-off briefs** offer the continuity needed to maintain awareness of the original preoperative brief and of updated information changed by the dynamic nature of surgical cases. Many root cause analyses of sentinel events have pointed to the need for being less hierarchical in the operating room setting, improving the sharing of information, using better team decision making, and improving the hand offs along the care continuum from preop, through surgery, to the postanesthesia care unit, and finally through inpatient or home care. Using structured briefs, supportive information technology systems, and improved continuity documentation affords a striking opportunity to improve the quality and safety of patient care. The spectrum of communication tools available to improve care in the operating room includes preop and hand-off briefs, closed-loop communication check-backs, read-backs, call-outs of important information necessary for team situational awareness, and feedback for team performance improvement.

Figure 1: Hand-off Example: Operating Room through Discharge Home…Maintaining Continuity

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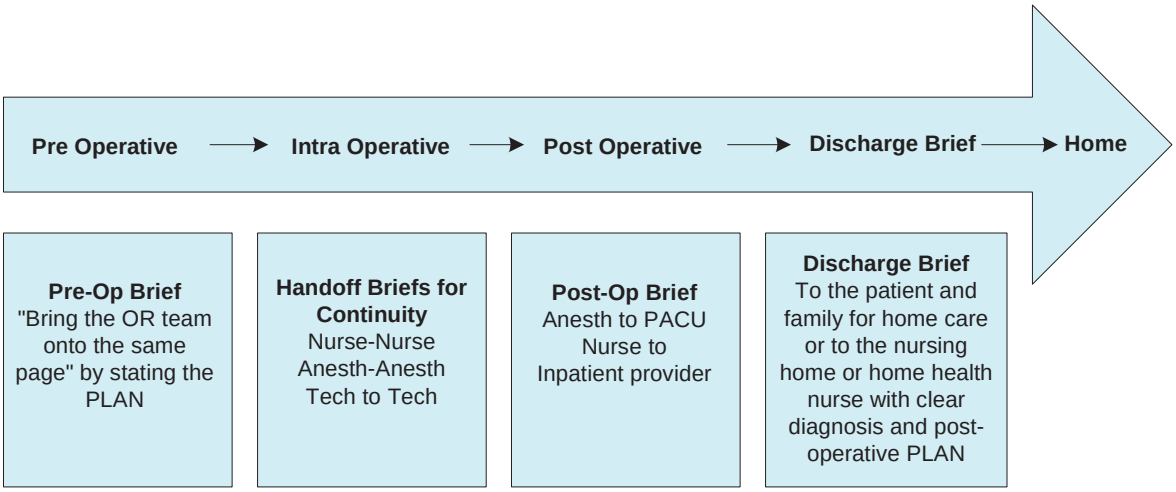

Information Technology

Over time, with advances in the Electronic Health Record (EHR) and potential agreement in developing a Continuity of Care Record (CCR) with focused research on the processes of transitions in care, computer-assisted hand-offs will become a reality. For given work units (microsystems), it is possible to identify what data elements are necessary to improve the quality and safety of patient hand offs. It will be further possible to populate these data fields from computer programs having accurate, updated, and appropriate information elements sufficient to support hand offs across the continuum of care. Work has been done in the United Kingdom using a prototype “clinical handover appliance” to meet the clinical requirements of doctor-to-doctor hand off at shift change and for clinical coverage.[5] The goals were to make the process more accurate, write an action plan and to-do list, improve documentation, and decrease physician time required in preparing and completing hand offs. Some goals were met with a relatively low-tech display system. An important by-product of the project was establishing a physician hand-off routine and meeting time.

Many healthcare systems have developed and are testing information technology support systems for nursing shift change, including Kaiser Permanente and the University of Michigan. Information support systems (both hardware and software), if properly designed and tested, could be extremely beneficial in hand offs and continuity of care.

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