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# Effective Handoff Communication

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Additional information is available at the end of the chapter

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## Abstract

The patient handoff—the transfer of patient related health information from one caregiver to another—has come under increased scrutiny in recent years. This is due to many factors including high-profile and well documented incidents of medical errors, a subsequent magnified focus on patient safety by the general public, and changes in resident work hours which have had the unintentional consequence of increasing the number of necessary handoffs during a given patient hospitalization. As medical care becomes more specialized and increasingly fragmented, handoffs are necessary in order to maintain consistency of information and plans of care. However, despite this increased focus, errors in transferring medical information are still common. In order to meet standards, many training organizations and medical institutions mandate lengthy handoffs at all levels. While initial studies demonstrated a decrease in medical errors after implementation of a standardized handoff bundle, more recent evidence calls into question those results. Certainly many components are necessary, can improve handoff communications, and reduce errors during a patient sign-out. However, more is not always better, and caregivers should not blindly attempt to transfer information unless there is medical necessity. Achieving a balance between “safe” and “effective” communication is the goal that we are still trying to achieve.

**Keywords:** handoff, sign-out, physician communication

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## 1. Introduction

The patient handoff—the transfer of patient related health information from one caregiver to another—has come under increased scrutiny in recent years. As medical care becomes more specialized and increasingly fragmented, handoffs are necessary in order to maintain consistency of information and plans of care. High-profile incidents of medical errors, a magnified focus

on patient safety by the general public, and changes in resident work hours have all brought increased attention to patient handoffs. The unintended consequence has been a significant increase in the number and focus of handoffs a patient requires during hospitalization. However, despite this increased focus errors in transferring medical information are still common.

Communication among medical providers is a crucially important aspect to maintaining safe medical care. This becomes even more important as medical care becomes more complex, and more healthcare workers become involved in the care. This chapter evaluates the types and necessary components to effective handoffs, with particular attention placed on the current evidence concerning patient handoff communications and how they affect patient care and medical errors.

### **1.1. Clinical vignette**

A group of residents meet for evening sign-out at the end of a long shift. Two residents arrive who are assigned to the night float service that month to receive the sign-out. The handoffs take place in the resident lounge, where many residents from other services are working and talking. The outgoing residents begin describing all the patients on each list to the night float team, taking time out to tell funny anecdotes about the day. The evening sign-out takes approximately one hour to cover over 100 current inpatients. That evening, Ms. Smith, a 53 year old female who is postop day #4 after a colostomy reversal begins to have shortness of breath and tachycardia, with a SpO<sub>2</sub> of 89%. The night float resident gets paged about the patient, but cannot recall anything special about her or any specific details to differentiate her from the other 100 patients that they recently discussed during sign-out. The resident evaluates the patient and reviews her history and hospital course on the electronic medical record system, noting that she has been doing well postoperatively but has a history of congestive heart failure and takes daily diuretics at home, which has not yet been prescribed as an inpatient. A CXR is ordered and demonstrates pulmonary edema. Lasix is given and the patient improves.

## **2. Importance of handoffs**

Without a doubt, as medical care becomes more specialized, the care of patients consequently becomes more fragmented. Resident work hour restrictions have also contributed to this increased fragmentation. Several studies and organizations, namely the Accreditation Council for Graduate Medical Education (ACGME) and Joint Commission on the Accreditation of Healthcare Organizations (JCAHO), have emphasized the training of residents in effective handoff communications, as well as recommending the implementation of consistent evaluations of the handoff communication systems to ensure the transition of adequate patient care between physicians [1, 2].

In order to understand why effective handoffs are paramount to safe patient care, it is important to appreciate the adverse consequences that result from a lack of adequate communication. Errors in communication between treating providers have been implicated in delayed diagnostic evaluations, medications errors, and more patient complications [3]. Lapses in communication are currently considered the leading cause of unexpected events that lead to

serious physical harm or even death to the patient [4]. This has led the Agency for healthcare research and quality (AHRQ) and the accreditation council for graduate medical education (ACGME) have made the improvement of patient handoffs a priority in order to promote the improvement of patient safety [5, 6]. These agencies recognize the importance of an effective handoff and communication system to prevent errors that may lead to significant patient harm, ultimately resulting in better the care of the patient.

A key factor that has necessitated the increased use of handoff communication systems has been the advent of restrictions to resident physician duty hours. In 2003, the ACGME instituted the 80-hour work week in an attempt to reduce resident fatigue and thus improve patient safety [7]. A survey conducted by Antiel et al. found that as of 2013, most residency program directors agree with the current duty hour restrictions and resident workloads, indicating that the restrictions in resident duty hours are here to stay [8]. These restrictions have constituted one of the main reasons why handoffs have become so important. The unintended consequences have been a “shift work” mentality among residents striving to adhere to duty hour restrictions and more transitions of care that must necessarily occur. The resultant increase in necessary sign-outs and handoffs during a particular patient’s hospitalization has risen as the rules have become ever more stringent. For example, after the implementation of the 16-hour limit, a typical PGY-1 resident participated in excess of 300 handoffs per week [9]. This many handoffs can lead to residents unfamiliar with a patient’s condition, and the patient and family members may even sense a lack of continuity of care. Therefore, more research has been devoted to the creation and effective utilization of handoff systems [6, 7]. The ACGME has recommended not only implementation of a handoff communication system, but also the evaluation and training of residents as part of their residency training as a whole [10]. Thus, the importance of adequate communication between physicians and effective handoffs cannot be underestimated. To avoid miscommunication between treating physicians as they enter or leave their now shortened shifts, detailed handoffs are now the standard when it comes to modern graduate medical education.

The increasing complexity of medicine as a field has led to an increase in specialization, and thus a tendency towards more fragmented care. A hospitalized patient, who would have had a single physician care for them 30 years ago, now may have dozens of physicians, consultants, specialists, residents, and medical students take part in their care. As this becomes more frequent in medical practice, the ability to provide consistent and satisfactory communication between providers will continue to prove paramount. Organizations such as the ACGME and JCAHO continue to place increased emphasis on the improvement on handoff communication and highlight another reason why handoffs are an important part of medical care. This aspect of medical care will continue to be at the forefront of the continued efforts to improve quality of care and patient safety for the foreseeable future.

### **3. Characteristics of an effective handoff**

Prior to the implementation of duty hour limitations, little focus was placed on physician handoff practices. However, since the advent of duty hour restriction in 2003, examination

of transitions of care, resident handoffs, and physician sign-outs have become a topic of much research. Multiple investigations have attempted to determine how this process is optimally conducted and what actually constitutes an effective handoff that successfully improves patient safety. Particular measures in the literature that have been studied include length of hospital admission, delays in care, ordering of unnecessary laboratory tests, and adverse safety events. However, because historically handoff procedures in medicine have not been well studied or standardized, even now there is no true consensus on a standardized approach or universal curriculum for handoffs. Therefore, some studies suggest using handoff models from other industries, especially other high-risk industries such as commercial aviation. In these fields handoff systems are standardized and typically involve aspects that are thought to improve success, such as utilizing specific checklists, face-to-face communication, and meeting in a designated/non-distracting environment [11].

As the topic of handoffs continues to remain in focus, multiple national healthcare organizations have weighed in. The Joint Commission made a “standardized approach to hand-off communications” a National Patient Safety Goal in 2006 [1]. Current ACGME Common Program requirements include transitions of care as a requirement for patient safety [6]. The ACGME’s requirements for handoffs/transitions of care are defined as:

1. Programs must design clinical assignments to minimize the number of transitions in patient care.
2. Sponsoring institutions and programs must ensure and monitor effective, structured hand-over processes to facilitate both continuity of care and patient safety.
3. Programs must ensure that residents are competent in communicating with team members in the hand-over process.
4. The sponsoring institution must ensure the availability of schedules that inform all members of the health care team of attending physicians and residents currently responsible for each patient’s care [10].

In our example vignette, the residents participated in mandatory handoff procedures, but it was likely not optimal. This is just one example, and in reality the current practice of handoffs can vary widely among residency programs across the country. A handoff can be as short as one minute for a whole patient list [12]. The location of the handoff is not always standard and it may be conducted almost anywhere. Content of a given handoff is rarely standardized, and is generally up to the discretion of the physician giving the handoff. All of these inconsistencies in the handoff process may lead to suboptimal care. Improvement of the handoff process requires greater attention to closed loop communication with team members.

Multiple items have been suggested in the literature to improve the handoff process [9]. An effective handoff first requires a tool to make the process simpler and easier, so as not to rely solely on the memory of the physician. A consistent and updated list of patients should be maintained and utilized to assist with sign-outs. This could be a computerized check out tool, whether a Word document, Excel spreadsheet, or linked into the electronic medical record



(EMR). While a written sign-out list is beneficial, it should not be a substitute for verbal communication with team members. The use of electronic communication alone could lead to inadequate handoff and lead to missed information [10]. Effective communication skills such as “read back” should be used to guarantee that information is accurately passed along. This is best accomplished by face-to-face interactions [9]. Many experts recommend a systematic way of proceeding during sign-outs, such as a specific system or mnemonic. It is also vital to allow enough time for a complete check out on each patient. Handoffs should be completed at the beginning and at the end of each shift in order to keep changing teams adequately informed. It has been shown that morning handoffs are often ignored and that one in three events that occur overnight are not reported to the day team [12]. This can lead to adverse outcomes as the oncoming day team is not aware of most current events. It is also recommended that handoffs take place in a quiet, well-lit, designated area that respects patient confidentiality. This place should also include access to computers [9]. Efforts should be taken to minimize distractions and interruptions from phone calls and non-emergent pages during this designated time [12]. The example handoff at the beginning of this chapter lacked many of these suggested best practice items, and subsequently the quality of the handoff suffered and the information passed on to the night float residents during the sign-out was ineffective for the problem that occurred during that shift.

Residents have a significant stake in successfully implementing effective handoffs, not only because of their involvement in patient care, but because they are the ones most often performing said handoffs. Among residents surveyed, the following items were found to be important in improving the handoff process: up-to-date room number, recent cognitive/cardiopulmonary status, problems the patient has already experience and treatment already tried, code status and level of care discussions, and results that were likely to return while covering physician was on-call and what to do, and any psychosocial issues [9]. It is of note that handoffs are conducted most of the time by interns.

Ultimately while organizations such as JCAHO and ACGME recommend training in and evaluation of effective handoff communications, a major obstacle is that it is unclear exactly what “effective handoff communication” entails. There is not currently a proven best practice standard for handoff communication. Several methods have been proposed (SBAR, I-PASS), but do not work in all situations for all levels of medical caregivers. A truly effective handoff would be the most efficient transfer of only the necessary information required to care for the patient. However, it is still unclear exactly what components of a handoff are necessary, and which components are superfluous and do not improve communication or contribute to patient safety.

#### **4. Obstacles to effective handoffs**

It is well documented in the literature that issues in handoff communications exist among residents and can lead to adverse events. These issues can be related to communication, the handoff process itself, or even hospital or system-wide problems.

### 4.1. Communication failures

Communication failures in transition of care are one of the most frequently cited contributing factors to adverse and sentinel events. While they are a frequent cause of errors, unfortunately miscommunications are commonplace during resident handoffs. In a study of pediatric interns, the most important piece of information about a patient was not communicated 60% of the time [13]. Additionally, another 60% of the time post-call and on-call interns did not agree on rationale for items discussed during the handoff [13]. Although the interns did not often agree on necessary items, they still rated handoff quality as high, suggesting that they overestimated the effectiveness of their own handoffs.

Distractions also represent a major obstacle to effective communication. Distraction is documented as the cause of up to half the errors that occur in the aviation industry [14]. Studies have been conducted to define what type of distractions and disruptions plague the handoff process. Anderson et al. found that distractions were common, being present in 48% of handoffs observed, and these distractions were often multiple [14]. It was found that junior residents often had more distractions [14]. Pages and phone calls were the most common offenders being present 38 and 33% of the time. Increased number of distractions led to significantly increased time spent on handoff. Despite these factors, just as the residents above, those surveyed did not feel the distractions negatively impacted their handoff process. Hasan et al. found distractions even more common, at 70% of handoffs, and more numerous averaging five distractions per handoff [15]. Extraneous staff entering/exiting room was found to be the most common distraction in this study.

Distractions may slow the momentum of the handoff, negatively impacting the process. This most commonly happens when opportunities for teaching are taken and when a large number of side conversations are present in the area where the handoff occurs. This emphasizes the importance of handoffs taking place in a quiet area away from other hospital personnel. Many of these distractions were present in the example vignette, as the handoff did not take place in a designated quiet room free of distractions. Many of these distractions can lead to an increased time to complete handoffs, and take away from other clinical or education activities.

An interesting barrier to effective handoffs is resident relationships with each other. The presence of a hierarchy negatively affected the handoff process, while a good relationship between the residents was associated with more positive outcomes [15]. This accentuates the importance of developing a hierarchy-free environment during handoffs. Handoff should be dynamic and a forum to ask questions in an active discussion [16]. This is more easily achieved in a collegial environment of peers.

### 4.2. Ineffective handoff processes

Many causes of poor handoffs are a result of the handoff process itself. In order for any standardized approach to communication to succeed, it is important that all team members are properly aware of and educated about the process before implementation. However, residents often do not receive any formal training in handoff communications and procedures. Additionally, even if residents are required to participate in formal handoff procedures, there is often a lack of instruction

or guidance in the form of a standardized handoff process. Standardizing the handoff process has been shown to significantly improve feelings of confidence related to the handoff [15].

Other obstacles are often more intrinsic to the residents and day-to-day operations of residency. These obstacles to effective handoff are things such as team members being unavailable at the time of handoff, feeling the EMR is difficult [17]. The most significant problem repeatedly stated however is time constraints [17]. The feeling of time constraint as an obstacle to proper handoffs underscores the importance of designated time and space for handoff communications.

Interns are typically the team members who most often participate in handoffs, creating an inherent problem where the least knowledge and experienced members are responsible for the transfer of important information. Observations are conflicting on whether postgraduate levels affect quality of handoff, however. Inadequate plans from upper levels residents has been suggested as an additional obstacle to effective handoffs. There are some observations that handoff was superior when completed by a PGY-2 or greater, but this has not been validated by additional studies [15].

#### **4.3. System processes and barriers**

Creating the necessary culture where handoffs are accepted can be a major hurdle to implementation. Without buy in from senior leadership, administrators, and respected peers, even the most well designed handoff would be doomed to fail. Many institutions continually promote a “culture of safety” in order to point out the rationale and benefits to patients. Including residents into this process can improve success, as they have a natural stake in promoting patient safety. In one resident survey, 59% of residents considered patient safety was compromised due to ineffective/problematic handoff and 12% reported the harm to the patient was major [18].

The 2011 ACGME revisions to duty hour requirements has also had unintended consequences related to handoffs. As interns are the ones most frequently participating in handoffs, the 16 h rule has created so-called “double sign-outs” or receiving sign-out on another service’s patients, followed by signing those patients out to a subsequent shift of cross coverage [17]. As the frequency of double sign-outs or handoffs is common, this has caused interns to have major concerns about treatment plans for these patients or failure to carry out said plans.

The complexity of the obstacles facing patient handoffs is great, but not insurmountable. As ongoing research and standardization of the handoff process continues, improvement is inevitable. Handoffs are a vital part of patient care and need to be in a state of constant evaluation for best practices to minimize adverse outcomes caused by these obstacles.

### **5. Handoff models**

Many models have been developed in an effort to systematically address the common barriers to effective handoff communication. There is still only limited data on the effect of specific models on patient safety and outcomes. Generally, handoffs are composed of verbal and written components.



5.1. Verbal handoff models

5.1.1. SBAR

The most commonly utilized handoff model currently used in healthcare is “SBAR.” SBAR stands for situation, background, awareness, recommendation and refers to four topics that should be addressed for a complete and efficient transfer of information about a patient. It was developed by Dr. Michael Leonard on behalf of Kaiser Permanente in an effort to develop a verbal communication paradigm to aid physicians in cultivating a shared mental model of each patient’s clinical picture and in the spirit of reducing communication errors known to be a root cause of adverse events [19]. The goal of this model was to transcend communication differences between interdisciplinary team members so that all members have the same knowledge of each patient’s clinical situation. It establishes a framework of communication for what information is relayed and how, which is paramount in cultivating teamwork and a culture of patient safety [20].

The physician guidelines for SBAR tool are presented in **Table 1**: [generously provided for redistribution by the Institute for Healthcare Improvement in the spirit of patient safety].

Of the verbal communication models in healthcare, SBAR is one of the oldest and most widely known. SBAR was designed specifically to target communication hurdles that can arise in healthcare settings, such as different training backgrounds, hierarchy, poor working relationships, or differences in communication styles, which makes it broadly applicable in healthcare [19]. Many early studies describing implementation of a verbal communication model and the effects on patient safety outcomes utilized SBAR. In 2004, after a community hospital implemented an institution wide adoption of the SBAR verbal communication tool the rate of adverse events went from 89.9 per 1,000 patient days to 39.96 per 1000 patient days the following year [19]. Since then, several studies have been conducted with similar results [19, 21]. Given that physicians constantly have to communicate with other professionals on the health-care team, and that improved interdisciplinary communication improves patient safety, it

	Definition	Instructions
Situation	The event happening at the present time that has warranted the SBAR communication	Identify self, unit, patient, room number Briefly state the problem, when it happened, and how severe.
Background	Pertinent background information related to the situation	Admitting diagnosis and date of admission Most recent vital signs Pertinent medications, allergies, and lab results (including date and time done and results of previous tests for comparison) Code status
Assessment	The current assessment of the situation	
Recommendation	What is the recommendation or what does he/she want?	Notification that patient has been admitted Patient needs to be seen now Order change

**Table 1.** Physician guidelines for SBAR tool.

is reasonable to deduce how resident training using the SBAR model is advantageous. Its impact on hierarchies and facilitation of open communication is of particular use in residency where steep hierarchies often exist and have been shown to impede communication. Effective verbal tools, such as SBAR, improve all aspects of clinical communication, not just physician-physician interactions.

Practically speaking, implementation of the SBAR verbal communication strategy for resident handoffs is relatively straightforward and requires minimal time investment. Tews et al. [22] piloted an SBAR training program among first year Emergency Medicine residents during their first year curriculum from 2008 to 2011 in an effort to improve inter-physician communication skills. The residents were individually presented a case developed by faculty and asked to present to an examiner who evaluated their presentation according to a 17-item SBAR checklist adopted from Haig et al. [19]. Following the initial presentation, they had a 1 h didactic session on patient safety and SBAR presentations. After the didactic session they were re-evaluated and given a survey. They found statistically significant improvement in scores post training compared with pre training. After the training session they were given an SBAR pocket card with instructions for reference. A few months later they were given another case to present and were re-evaluated. They found no statistically significant difference in scores from the initial post training evaluation, suggesting good retention of skills acquired from the initial training session. Additionally, the implementation of SBAR was well received by the residents according to surveys. Residents reported their training was effective, had potential to prevent medical errors in communication, and were more comfortable with case presentations. Although this study showed promise in the practicality of integrating SBAR verbal handoff skills into resident curriculum, it should be noted that this was done in the setting of emergency room transitions of care, and thus we cannot necessarily be extrapolated to other settings or specialties.

Although SBAR is a verbal communication model that is broadly applicable across healthcare settings, it does have some limitations, especially in physician-physician handoffs. It is unrealistic and overly simplistic to expect a standardized verbal communication structure to be the most efficient form of communication among all specialties. There is very little research specifically on SBAR applied to physician-physician communication—most studies have been on nurse-nurse or interdisciplinary communication. Physicians communicate with each other differently than they do other members of the healthcare team, which is likely attributed to training, shared fund-of-knowledge, and culture [19]. Given the complexity of information transferred between physicians during handoffs and fundamental differences in communication style, it is intuitive that a handoff tool so broadly applicable in healthcare settings such as SBAR is not particularly well suited for such information transfer. One of the most prominent criticisms of SBAR is its shortcomings in the settings of intensive care units and complex patient [23].

#### *5.1.2. Signout*

While SBAR is widely known across healthcare settings, it is not the only available verbal handoff model. In a review done by Riesenberget al. of the handoff mnemonics in literature, SBAR was the most frequently cited at 32 out of 46 total articles [24]. The only two verbal

handoff strategies reviewed by Riesenbergh with any post-implementation data were SBAR and SIGNOUT. Horwitz et al. [25] originally developed the SIGNOUT model in an effort to implement a standardized verbal sign-out curriculum. They prioritized concrete language, sufficient description of clinical picture, anticipatory guidance, and clear plans with rationales for all assigned tasks [25].

#### 5.1.3. Signout mnemonic: (adapted from Horwitz et al. [25])

**S**—Sick or DNR? (emphasize unstable patients, designate DNR/DNT patients)

Example: “This patient is pretty stable—she is a full code”

**I**—Identifying data (name, age, gender, diagnosis)

Example: “Ms. Smith is a 68-year-old woman admitted for mesenteric ischemia.”

**G**—General hospital course

Example: “She came in with sudden onset severe abdominal pain, nausea, and vomiting. Abdominal CT suggested embolic SMA occlusion. Status post SMA embolectomy, postop day 1.”

**N**—New events of the day

Example: “Lactic acid and WBC counts are trending down. She had low urine output for a few hours this morning, but we increased her fluids to 150 and it has picked back up.”

**O**—Overall health status/clinical condition

Example: “She is normotensive, 98% on room air, and afebrile.”

**U**—Upcoming possibilities with plan and rationale

Example: “If her oxygen level decreases overnight, turn off her fluids and give her a 40 mg of Lasix.”

**T**—Tasks to complete during shift with plan and rationale

Example: “Her wound VAC seal alarm keeps going off, please go change the adhesive dressing. Leave the sponge.”

**?**—Opportunity for questions and clarification.

The SIGNOUT model was intended to address some of the shortcomings of SBAR, particularly the information required in complex clinical situations and inter-physician communication. Unfortunately, Horwitz et al. [25] did not utilize an evaluation tool to objectively measure the quality of handoffs post-implementation, and their evaluation was based solely on resident surveys. Additionally, there is no data on any patient or safety outcomes after implementation of the SIGNOUT model. Essentially, there is very limited data on the SIGNOUT verbal communication model and its impact on quality of resident handoffs and patient safety. However, SIGNOUT was further elaborated and a source of inspiration for a resident handoff education bundle known as I-PASS, discussed in further sections.

5.2. Written handoff tools

Although limited research has been done on specific verbal handoff models, there have been even fewer studies to elucidate best practices for the written handoff document. Written hand-off documents traditionally contain a list of patients a provider or team is responsible for and corresponding demographics and clinical information. In the era of information technology we have seen a shift from paper-based hand-written handoffs to computer-based handoff tools. It is hopefully apparent that with all the technology at our disposal, manually writing hand-off documentation for each patient is archaic and a poor utilization of time. Computer-based handoff tools are either standalone documents (i.e., word or excel document) or integrated into the hospitals electronic medical records. Vidyarthi et al. [9] were one of the first to set out to make recommendations on resident handoffs, and they proposed that the content of written handoff be divided into five categories based on the mnemonic ANTICipate (Administrative data, new information, tasks, illness, contingency planning/code status). These items were validated by both expert opinions and subsequent resident evaluations of the tool.

Anticipate checklist (adapted from Vidyarthi et al. [9])	
• Administrative data	• Patient name, age, gender
	• MRN, room number
	• Admission date
	• Primary team
	• Family contact information
• New information	• CC, brief HPI, dx/ddx
	• Updated list of medications with doses
	• Allergies
	• Assessment and plan by system with dates
	• Current status: mental, cardiopulmonary, vitals. Note stability and patient norm
	• Recent procedures and significant events
• Tasks	• Specific tasks that need to be done in that shift
	• Highlight any results expected to come back and what to do about them
• Illness	• Illness severity—stable, watcher, unstable
• Contingency Planning/code status	• Anticipate possible issues and provide detailed plans for what to do when they arise
	• Brief statement of therapies that were successful and unsuccessful for that patient
	• Family/psychosocial situation
	• Code status

According to a review of literature on handoff tools by Abraham et al. [26] in 2012, there has been a shift in increased use of EMR-integrated sign-out tools since 2008. This is likely due to

federal mandates pushing for standardization of electronic health records. The shift towards EMR-integrated written handoff tools is ideal because they are inherently more amenable to standardization initiatives by automatically populating current and accurate patient data from multiple sources in a patient's electronic chart [26].

The Joint Commission requires institutions to standardize patient handoffs and the ACGME requires residency programs to ensure their graduates are proficient in handoff skills, but neither organization provides any guidelines for essential components of the written handoff process [1, 10]. Though studies on standardized written handoff tools have been shown to decrease medical errors, no studies to date have been done on which elements of the written handoff document contribute to this improvement. Rosenbluth et al. [27] compared the written handoff tools of nine different academic institutions and found considerable variability between them. Their panel of experts made recommendations for best practices regarding essential elements of a written handoff document. A list of the essential elements agreed upon by the panel are as follows:

- Patient identifiers (name, MRN, date of birth)
- Hospital service identifiers (attending name, team/service, room number)
- Admission date
- Age
- Weight
- Illness severity
- Patient summary
- Action items
- Situation awareness/contingency plans
- Allergies
- Medications (preferably an auto-populated med list)

The following items the panel categorized as recommended, but not essential:

- Primary language
- Emergency contact
- Primary care provider
- Code status
- Labs
- Access
- Ins/outs
- Vitals



Although there have not been any data driven recommendations on which elements of information are essential for the written handoff document, there is some data to support that the structure of the information in the handoff document matters. Interestingly, the structure of written handoff documents has been shown to influence verbal communication during handoffs [26]. Traditionally, written handoffs have been constructed in a SOAP format—organized by subjective information, objective information, assessment/plan in problem list and associated interventions. Abraham et al. [26] compared the verbal communication patterns of care teams using traditional problem-based formatted written handoff documents with a novel systems-based document, called HAND-IT. It was designed to mirror medical school training by body system and organized by relevance of critical-care workflow—pulmonary, cardiovascular, infectious disease, renal/genitourinary, gastrointestinal/liver/nutrition, neurology, endocrinology, hematology [26]. Each category is organized in a checklist to include physical exam findings, laboratory data, current medications, problem list, and assessment/plan. Additional categories such as patient admission, pending tasks, and contingency plan were developed for information that does not fit neatly into body system categories. They quantitated communication between teams by defining a communication event as the passing of a message through a channel for a particular purpose and rated exchanges based on effectiveness and efficiency. From this, communication events (CE) were categorized as ideal or non-ideal. Ideal CEs contained information that was sufficient and accurate. Exchanges that required additional information were considered non-ideal CEs and represented communication breakdown. They described the following four common types of communication breakdowns:

1. Incomplete information from senders: inability of the outgoing team to provide requested information.
2. Inaccurate and conflicting information: inability of outgoing team to provide correct information.
3. Irrelevant information: inability of outgoing team to provide appropriate information.
4. Incomplete or inaccurate information from team: inability of rest of the team to provide complete and accurate information.

Abraham et al. [26] found that teams using their HAND-IT written handoff document had more ideal CE communication and fewer non-ideal CEs than teams using the traditional SOAP format. Use of the SOAP format was associated with significantly more Type 1 and Type 4 errors. HAND-IT utilization was associated with significantly fewer communication breakdowns regarding diagnostic evaluation, management, or treatment. These findings indicate that teams using HAND-IT had more streamlined communication based on more complete information on their patients and a clearer understanding of their clinical condition.

### **5.3. I-Pass handoff bundle**

The most comprehensive analysis of physician handoffs has been conducted on a combination of guidelines for both verbal and written handoff components, as well as a structured handoff curriculum for residents, called I-PASS [23]. The designers of the I-PASS handoff bundle set

out to combine techniques that optimize verbal and written handoff strategies in addition to a resident curriculum to implement it all. Taking inspiration from SBAR and SIGNOUT verbal strategies and combining with resident input, they developed the mnemonic I-PASS (illness severity, patient summary, action list, situation awareness and contingency plans, and synthesis by receiver), which served as a foundation for their verbal and written handoff strategy. I-PASS has gained popularity due to its focus on risk stratification, promoting early detection of patients most likely to decompensate and prompting providers to come up with contingency plans should the patient condition worsen. Table of I-PASS curriculum can be found in **Table 2**. Starmer and colleagues designed a resident curriculum on effective handoffs based on principles of the Team STEPPS approach to integrating teamwork into practice to improve the quality, safety, and efficiency of healthcare [18, 23]. I-PASS was first implemented in pediatric units at two hospitals, which after promising results was expanded to the pediatric units of nine Boston area hospitals [28, 29].

The authors looked at medical errors, adverse events, assessments of written handoffs, and resident workflow during their evaluation of the efficacy of the handoff model. There was a reduction in medical errors from 33.8 to 18.3 per 100 admissions after implementation on both units combined. Preventable adverse events were reduced from 3.3 to 1.5% after implementation. There were no changes in rates of non-preventable adverse events. Interestingly, 77% of errors and adverse events were related to medications. Although both units had improvement in quality of written handoff documents, the unit utilizing EMR-integrated tool showed significantly less data omissions (reduced omissions in 11 of 14 categories) compared to the unit utilizing the word processing tool (reduced omissions in 2 of 14 categories). There was no significant change in overall time spent at the computer or in time spent editing computerized handoff documents, but the time spent writing on printed copies of handoff documents decreased significantly. The amount of time spent with patients and families increased from 8.3 to 10.6%. The amount of time devoted to verbal handoffs did not change.

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2-h communication training session based on TeamSTEPPS
Introduction of I-PASS mnemonic to standardize verbal handoffs
1 h role-playing session to practice skills from workshop
Computer module to allow for independent learning
Restructure verbal handoffs so both oncoming and off-going team members are present
Relocation of handoff to private, quiet space
Introduction of periodic handoff oversight by a chief resident or attending by a minimum of one observed handoff per resident per month to provide resident feedback
Faculty development program
Process-change and culture-change campaign to ensure program adoption and sustainability
EMR-integrated computerized handoff tool created to auto-populate useful and necessary patient information, and also contained free-text fields for: patient summary, to-do list, and contingency planning

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**Table 2.** I-PASS curriculum.

Following the success of the initial I-PASS study, it was expanded to nine institutions [29]. All used standardized I-PASS written handoff tools—seven utilized EMR-integrated, while two utilized word processing. Across all nine institutions, combined medical-error rate decreased from 24.5 to 18.8 per 100 admissions. Preventable adverse events decreased from 4.7 to 3.3 per 100 admissions. Quality of verbal and written handoffs significantly improved at all nine sites, but only six institutions saw statistically significant reductions in error rates. For all combined sites there was no change in time spent with families, creating/editing handoff document, working at the computer, or writing on printed copies of handoff document.

Although the follow-up I-PASS study re-demonstrated improvement in the quality of verbal and written handoff skills without impacting resident workflow or time devoted to handoffs, the magnitude of its impact on medical errors and adverse events was less impressive than the initial study. The I-PASS handoff bundle is designed to be customizable to serve the needs of the unit using it. All subjects of these two studies were inpatient pediatric units at academic medical centers, and despite their similarity, institutions showed marked variability in their in their outcomes, ranging from 45% relative reduction to an 18% relative increase in medical errors. The variability between institutional responses calls into question the reproducibility of the effects of I-PASS on clinical outcomes, the ultimate goal of improved patient handoffs.

Studies conducted at small community pediatric residency programs demonstrated improved resident satisfaction, organization, and quality of handoffs while the time devoted to the hand-off process remained unchanged [30, 31]. Neither study had data on patient outcomes. These studies by Walia, Huth [30], and colleagues demonstrated that the I-PASS handoff bundle is effective at improving the quality of physician handoffs in programs with fewer resources to devote to implementation. Unfortunately, lack of patient outcome data precludes these studies from evaluating clinical significance of the bundle.

#### **5.4. Maybe less is more**

In order to meet standards, many training organizations and medical institutions mandate lengthy handoffs at all levels. This is done not only to attempt to reduce medical errors, but also often for bureaucratic compliance. While initial studies demonstrated a decrease in medical errors after implementation of a standardized handoff bundle, more recent evidence calls into question those results.

Another shortcoming on the previously discussed I-PASS studies is they were conducted on inpatient pediatric units and thus give limited information on how useful the bundle would be to other fields. Clarke and colleagues at M.D. Anderson Cancer Center addressed this when they adopted the I-PASS handoff bundle and modified it to accommodate their needs as a surgical oncology service [32]. All residents in the study completed the standard I-PASS handoff bundle training. They used the I-PASS approach to create a standardized electronic handoff tool with a database framework. Information was entered into a centralized secure database from resident responses through a structured data form with point-and-click and drop-down menus to speed entry of patient identifiers, acuity, ongoing issues, on-call tasks, and attending preferences (crystalloid vs. colloid, etc.) [32].

Overlapping responsibilities in the OR present a unique barrier to handoffs in surgical fields. Therefore, patient risk stratification guided the type of verbal handoff conducted for each patient, and only higher acuity patients were verbally handed off. Patients were divided into several categories: “watchers” were patients recommended to have the electronic handoff supplemented by a phone call, while “unstable” patients required a face-to-face handoff. Patients categorized as “stable” were not verbally handed off to the oncoming team. Percent of handoffs completed, accuracy of handoffs, number of documented postoperative checks, time required to create action lists for all patients (surrogate for workflow), mortality, duration of stay, and 30-day readmission rates in the pre- and post-intervention periods were measured. Only 21% of patients during the post-intervention period necessitated a verbal handoff to supplement the electronic handoff based on their illness severity. Overall, handoff compliance increased from 73 to 96%. The time spent preparing electronic handoffs decreased from  $15 \pm 2$  to  $5 \pm 1$  min. Outcome data of the randomly sampled surgical oncology patients (14%) during the study periods showed no statistically significant change in duration of stay (4.8 vs. 4.2 days;  $P = 0.19$ ) or 30 day readmission rate (8.3 vs. 5.9%;  $P = 0.43$ ). The I-PASS handoff bundle with modified electronic handoff tool linked to institutional database resulted in increased compliance, improved workflow, decreased communication errors, with no statistically significant impact on patient outcomes. Although the patient outcomes had positive trends, this study was not sufficiently powered to show changes in outcomes related to enhanced communication [32]. This study demonstrated adoption of I-PASS handoff bundle, with modifications to suit needs of the service can at the very least serve to achieve bureaucratic compliance of standardized handoffs without sacrificing workflow and even achieve improved communication and workflow efficiency.

The premise of standardized handoff recommendations and concomitant resident education made by the Joint Commission and ACGME is to improve patient care by reducing the number of errors due to communication breakdown. The effort to improve communication by standardizing the handoff process, while well intentioned, is proving to have only marginal effects on patient outcomes [29, 32, 33]. A large randomized trial by Clanton and colleagues compared a rigorous formal handoff and a minimalistic approach found no significant differences in patient outcomes [33]. This study differed from most recent handoff studies by virtue of being a randomized controlled trial, whereas previous studies all evaluated outcomes in only a before-and-after model, which can be subject to significant bias. Additionally, this study was conducted by implementing two different interventions: Formal vs. focused handoff methods during the study period. Before implementation all residents received formal training on SBAR verbal handoff mnemonic and participated in simulation to hone skills. The formal handoff protocol called for both written and verbal components, took place in a private, quiet environment, face-to-face in the presence of senior residents. Focused handoffs were minimalistic and informal with focus on high-acuity patients. The setting of these handoffs was left to the discretion of the residents and at times omitted when there were no high-acuity patients to discuss. The written component of handoffs generated from the patient list in the EMR remained the same throughout the study period and was used in both



formal and focused handoffs. Outcome data consisted of mortality, negative events, adverse events, length of stay, and ICU length of stay. Handoffs were evaluated randomly by trained observers during the study period to obtain data on duration, number of tasks assigned, and number of patients handed off. Formal handoffs had a mean of  $35.2 \pm 11.5$  patients and took  $20.6 \pm 8.2$  min with an average number of assigned tasks  $5.7 \pm 4.9$ . Significantly less time was devoted to focused handoffs with a mean duration of  $6.7 \pm 9.5$  min to discuss an average of  $6.3 \pm 9.9$  patients. They found a slightly increased length of stay in the focused handoff group compared to the formal handoff group (5.50 vs. 5.88 days), but no statistically significant difference in mortality, negative events, or adverse events.

## 6. Recommendations/further research

The recent studies by Clarke et al. [32] and Clanton et al. [33] demonstrated that more communication does not equal better communication or better patient care. They showed that brief, thoughtful communication at the discretion of physicians trained in effective handoffs produced outcomes on par with labor intensive and time consuming handoffs. We speculate that the lack of influence formal handoffs have on patient outcomes is multifactorial. The amount of detail relayed in formal handoffs is far too much for anyone to reasonably retain and apply in a clinical fashion. No formal research has been done on the retention of information in handoffs, which could be an opportunity for future exploration. Furthermore, medical information is rapidly accessible to medical professionals and when intervention requiring application of individual patient information is necessary it is unreasonable to expect that the practitioner is going to act without consulting the chart first, making many details in formal handoffs superfluous [33].

We recommend departments adopt a handoff system that fits their individual needs. We encourage resident involvement and resident input throughout development and implementation of the handoff protocol, especially as the process is evolving, in an effort to create a system that best serves its users. Specific approaches, such as integration with an EMR, as well as utilizing effective communication strategies are recommended for any handoff and should result in fewer errors [9]. However, a trial-and-error approach with continuous self-evaluation is a reasonable strategy to take when making modifications to the process. It is important not to lose sight of the objective in improving communication during transitions of care—improved patient outcomes. If the time-consuming handoff systems improve communication by objective standards but have no meaningful impact on patient outcomes, then the effort is futile. The ultimate goal of the handoff is to reduce medical errors that stem from communication breakdown, and as of yet there is not enough data to support that any method in particular achieves this. Wasting time complying with bureaucratic rules is not in the best interest of your patients. It is clear that more is not always better, and we would caution caregivers to utilize effective strategies, rather than blindly attempt to transfer information without medical necessity. Achieving a balance between “safe” and “effective” communication is the goal that we are still trying to achieve.



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