

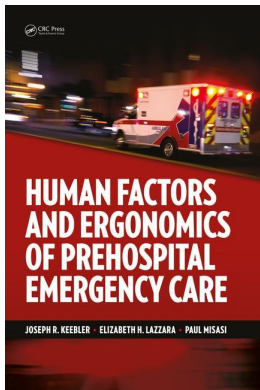
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Joseph R. Keebler, Elizabeth H. Lazzara, Paul Misasi

Communication and Patient Care Handover

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11 Communication and Patient Care Handover

Prehospital Emergency Preparation

Heather C. Lum and Shane E. Halse

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INTRODUCTION

EMS professionals, who are medically trained first responder personnel, act as a collaborative unit in their effort to care for the sick and injured patients being transported from the scene of an incident to the hospital. In this short window of time, there is a plethora of information that the EMS staff are collecting about the patient’s history, vitals, and changing medical state, all of which have to be documented and handed over to the ED staff upon arrival at the hospital. In an ideal world, this handover process is smooth, succinct, and thorough. However, this is not always the case. In this chapter, the patient handoff process will be examined, along with the common pitfalls and areas in which improvements are needed.

In an emergency medical situation, EMS professionals and first responders, including firefighters, paramedics, and EMTs, are the primary individuals on the scene who will assess and care for the patient. In a time-critical and stressful environment, these individuals are responsible for gathering as much information as possible about the patient. This is particularly difficult due to how diverse the patients are and how unique the situation and circumstances may be. Patients reflect all sections of society and can be of any age, race, or ethnicity, with a plethora of different acute or chronic illnesses or injuries to account for. Further, the scene of an emergency can take place almost anywhere—be it a burning building, the floor of an office, or the side of a road. Therefore, information collection and processing occur from the moment that the EMS staff arrives on the scene and must be quick and accurate. This information is collected and broken down into different criteria and includes the types shown in Table 11.1.

This information not only is often recorded in written form on patient care sheets but can also be verbally shared with the ED staff upon arrival at the hospital. The handover process between EMS and ED is often performed quickly due to the time-sensitive nature of getting the patient to the next stage of their care. Figure 11.1 is a summary of how the handover process works from beginning to end.

TABLE 11.1
Prehospital EMS Checklist

Type of Information	Examples
Mechanism of injury/illness	Respiratory distress Ejection from a vehicle Penetrating injury to the trunk Gunshot wounds Burns Punctures
Medical/vitals	Airway compromise Severe hemorrhage Cardiac chest pain Anaphylaxis Unconsciousness Cardiogenic shock Blood pressure
Medical history	Previous/similar episodes Medications Allergies General demographics such as age and gender
Treatments given	Any medications given Any procedures started

Source: Adapted from Welsh Ambulance Services NHS Trust, *WAST Standard Operating Procedure: Hospital Pre-alerting*, Welsh Ambulance Services NHS Trust, Denbighshire, UK, 2010.

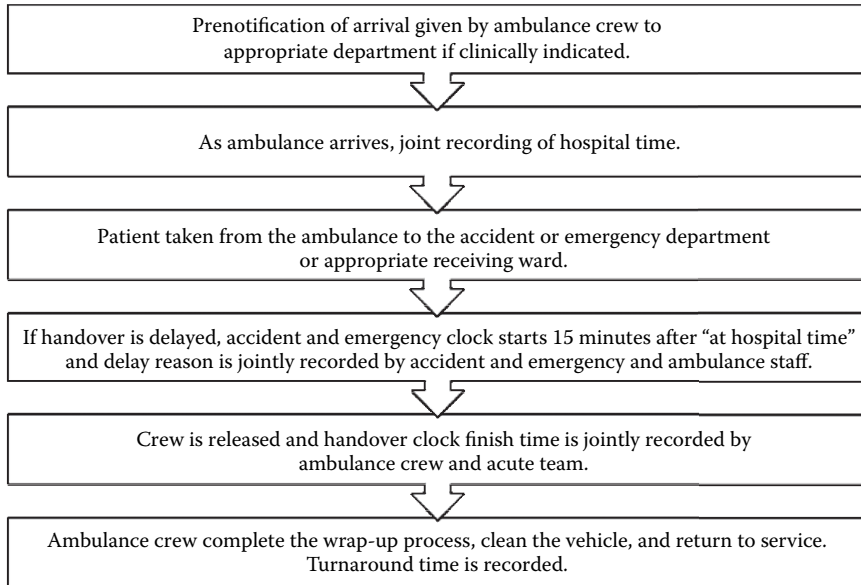


FIGURE 11.1 Flow chart of handover process. (Adapted from Gatling, E., and Ansell, J., *Ensuring Timely Handover of Patient Care—Ambulance to Hospital*, National Health Service, London, 2008.)

In an ideal scenario, this handover process is performed smoothly with all of the pertinent and necessary details about the patient being shared between the EMS providers and the ED. However, given what we know about human cognition and teamwork, the patient may be at the receiving end of the adverse effects of communication and information transfer failures. This breakdown in communication can happen from multiple fronts and for a variety of reasons. In this chapter, this handover process will be examined including the challenges in communication, the pitfalls of the process, and best practices for improved handover process.

TIME PRESSURE

Eckstein and Chan (2004) examined the effect of emergency room (ER) crowding on ambulance availability and off-load time. Astonishingly, in Los Angeles, they found that one out of every eight transports yielded a transfer wait time of at least 15 minutes, with 8.4% of incidents yielding a wait time greater than 1 hour. What this means is that ambulances and their EMS staff are effectively grounded and out of service until they can complete the handover process. This results in a loss of nearly five million hours of EMS system productivity in a given year (Williams, 2006). Also, this impacts the patient's quality of care including delay of definitive care, poor pain control, delayed time to antibiotics, and prolonged hospital stay. To combat this problem, several states have attempted to create a more streamlined and efficient handover process. In some instances, patient transfer time has been reduced to only a few

minutes. While this means a reduced wait time for patients, it also leads to increased time pressure for EMS staff to transfer the vital patient information to the hospital staff in an effective manner. Information transfer under time pressure and stress often leads to information loss (Pries et al., 2003). This is expanded upon further in the following sections regarding cognition and stress.

COGNITION AND STRESS

The relationship between stress and cognitive processes is not a new one. However, it is only within the past 30 to 40 years that more definitive explanations for this phenomenon have surfaced (Sandi, 2013). Stress is the perception that situations are physically and psychologically dangerous (Atkinson et al., 1996). It is the result of physical, mental, and emotional burdens; therefore, stress is impacted by an individual's explanation, evaluation, and direction of the situation (Altunas, 2003). Because stress is so pervasive and influential, decision-making under stress is a vital tool, because individuals are forced to process large amounts of information in very little time and must act accordingly. In order to make an effective decision, the correct context and timing must be applied appropriately. In the context of patient handovers, the task of transferring critical information about a patient in a timely matter is inherently a stressful one (Solet et al., 2005).

Under a significant amount of stress, our decision-making abilities can be negatively impacted and we are likely to make incorrect decisions possibly leading to mistakes. When people experience a great deal of stress, they tend to possess tunnel vision, which leads to poor decision-making (Dirkin, 1983). Much of the research on stress conducted in the laboratory typically finds that stress hinders decision-making when individuals become overloaded with information (Harris et al., 2005). Stress or arousal has been a defining factor that has been studied through its effects on cognition and performance. For nearly a century, this relationship has been explained through the use of the Yerkes–Dodson law. This law is described graphically as an inverted U shape with the optimal performance coinciding with a medium amount of arousal. Performance is diminished when the arousal level is too low or too high (Yerkes & Dodson, 1908). This view has been criticized by researchers such as Michael Mendl (1999) for being too simplistic to explain the complex relationship between stress and cognition. Mendl does concede, however, that this law may be a good heuristic for unifying a theory of stress and cognition. For instance, Preston et al. (2007) found that participants who experienced stress took longer to develop advantageous decision-making strategies. What this means for the handover process is that stress can affect the ability to properly transfer critical and time-sensitive information between the EMS professionals and the ER staff. The process and considerations of information transfer are described in further detail in the next section.

COMMUNICATION AND INFORMATION TRANSFER

Information transfer, regardless of the context, is an exercise in communication between two or more entities. In order to ensure adequate transmission of information, it must be encoded and stored, accurately remembered, and accurately

communicated. Additionally, the team and communication literature has established a number of factors that influence the accuracy and reliability of information transfer during time-sensitive scenarios. In the following section, age of information, attentional focus, distractors, explicit communication, and consistency are examined as they relate to the handover process.

AGE OF INFORMATION

Several cognitivists, including Baddeley (1976), have expounded on the notion of the information age or the idea that information is subject to forgetting. The information age can be thought of as a shift from knowing data offhand to not knowing offhand but rather being able to search for it through technological means. The information age is largely dependent on transfer from short-term to long-term memory, rehearsal, and elapsed time. Likelihood of error has been shown to increase with the age of information (Salthouse, 1996).

ATTENTIONAL FOCUS

We can only attend to so much in the world. One way to increase the efficacy of attentional focus is through the use of team-based practices. This involves all members of the response team focusing their attention on information as it is generated, rather than only one person doing so. Salas et al. (2005) found that this common attentional focus leads to backup behavior among the group, which ultimately leads to increased accuracy in recall. Backup behavior has generally been defined as helping other team members perform their roles under high levels of workload and is thought to be critical for effective team performance (Porter et al., 2003). In this instance, backing up other's behavior ensures that information is indeed transferred through multiple sources. However, ED personnel are often attending to multiple tasks while the EMS staff is giving the verbal handover (Owen et al., 2009). This lack of active listening can severely compromise the ability to encode and retain this information later. By promoting backup behavior, limitations in attentional focus can be mediated and overcome.

DISTRACTORS

One assumption made in real-world scenarios is that there is always noise in the system; that is, no system is devoid of distractions and it is these distractions that make up the noise. Such noise diverts attention away from the information that is being generated and transferred, which can lead to problems in encoding and storing such information. This noise can be from relevant sources (e.g., another piece of vital information being said at the same time) or irrelevant noise (e.g., alarms going off, others talking in the background). In any effect, there is a plethora of research that has found that noise impairs the recall of information even if the particular noises are well known (Rabbitt, 1968; Murthy et al., 1995). While no system can be completely noise-free, the idea of reducing the noise can improve the recall of the information. Training responders to ignore distractions, actively reduce noise, or filter distractions out can result in reduced overall noise.

EXPLICIT COMMUNICATION AND EASE OF INFORMATION TRANSFER

If transfer is performed through a direct retrieval method, it should yield better encoding and retrieval. That is, the more that information is presented in a clear, concise, and direct manner, the easier it will be to understand it. This is called the transfer-appropriate processing theory, in which information retrieval is facilitated if the encoding corresponds to the way that the information is to be retrieved (Brown, 1997). Also, there is often a lack of common language between the EMS staff and the hospital staff. It was reported that the ER nurses, when unable to decipher the verbal handover clearly due to lack of common language, instead used other means such as their own patient assessment and written reports (Owen et al., 2009). Even when this information is in written form, it may be omitted or altered during transfer if nurses are unable to read that information or they choose to ignore it. In one study, researchers investigated this discrepancy and found that of 100 records, 26 had some form of discrepancy. These discrepancies included previous medical history, frequency of event, timing of events, allergies, drugs taken, and others (Murray et al., 2012). By empirically investigating these discrepancies, we should be able to resolve them by generating a better understanding between the involved parties. For example, if terminology and lingo are an issue, then establishing a standard for jargon could aid in guiding the words used during transfer. This solution would also help alleviate the issue of consistency in which many different words are used each with similar meanings or in which one word may have multiple meanings.

CONSISTENCY

The other issue with information transfer is the lack of consistency across county, state, and country. In other words, regulations vary as to what information is written and can be reported via radio, and what can be verbally shared is often quite different between units. Again, this can lead to a lack of common language and be frustrating for the individuals trying to transfer the information as well as the receiver of said information. A set of nationwide or worldwide standard practices could help systematize performance and maintain consistency across units.

IMPROVING THE HANDOVER PROCESS

Clearly, in many handover cases, there are deficiencies and adverse effects that occur when the process is not performed optimally. Although a critical component in patient care, there are gaps in the handover process that are in need of attention and improvement. There has been a plethora of research on this process but only a limited number that have focused on possible solutions. From the research that is available, it is clear that special attention should be made to the communication of necessary information between EMS and the ED staff. More specifically, recommendations for improvements to the handover process include guideline development to standardize the process, greater use of information technology facilities, ongoing feedback to staff, and quality assurance and educational training activities.

TIME–ACCURACY TRADEOFF

There is a tricky balance between having a brief and thorough handover. As Hayden et al. (2001) discussed, if a handover is too brief, then important information may not be passed. This can lead to a “negative handover,” in which essential information is not documented and that information is then lost (Tobin et al., 2000). What is documented needs to be accessible and legible and to conform to the standardization process for acronyms and protocol. Standardized protocols ensure that vital information is not missed and also streamline the process to aid in faster handover times while allowing for the transition of more information. Indeed, researchers have found that using handover protocols reduces the time spent conducting the handoffs while also increasing the amount of information being transferred (Lazzara et al., 2014).

ELECTRONIC REPORTS

One possible means to facilitate quicker information transfer may be the use of electronic patient reports. Raptis et al. (2009) compared paper-based and electronic-based medical reports and found that those who used electronic records achieved better continuity and higher amount and accuracy of information. However, this study was conducted for transfer of care information between hospital night teams. In general, many of the studies that have looked at electronic reports focus on those patients already admitted (Mandl et al., 1998). What is lacking is research focused on the more time-critical nature of information transfer and reports in the handover process between EMS and ED staff. As Talbot and Bleetman (2007) mention, electronic patient report forms are currently under development and may provide a partial solution for the transfer of prehospital information to ED staff. The key here is that electronic records may be a partial solution. While technology may help, it is still essential to focus on communication and protocol training so that important prehospital information is not lost or misinterpreted regardless of the record keeping method.

USE OF CHECKLISTS AND STANDARDIZATION

Where electronic patient reports may not be a viable solution yet, checklists are a method for improving team performance when routine tasks can be identified. For example, a checklist for verifying the safety of inserting intravenous lines lowered the infection rate by 11% at one institution, preventing an estimated eight deaths and saving \$2 million in just over 1 year (Wu et al., 2002). These checklists could be designed in a traditional format or electronic format depending on the needs and resources of the adopting agency. A redesigned electronic checklist should allow EMS crews at the accident scene and, during transport, to rapidly enter information that is essential for the ED team. The benefit of a checklist is that it reminds the EMS crew of what is needed and limits their effort to collecting essential information only.

Use of standardized protocols is one clear recommendation that seemed to resonate throughout the research literature on transitions of care (Riesenberg et al., 2009). Standardization aids providers in regard to what information is reported and how

reports are prepared. It is especially important to make communication events as concise as possible to limit the time spent on erroneous or unnecessary information being collected and shared (Penner et al., 2003). Additionally, it may be prudent for multiple or adjoining counties or jurisdictions to adopt the same protocol. This can be accomplished through a reporting system such as E-STAT, which stands for events prior (why EMS was called), subjective findings, triage/time, allergies/assessment, and treatment (Thakore & Morrison, 2001). EMS staff often service multiple hospitals and areas; therefore, it is essential that they are able to “speak the same language” to any ED about the essential patient information regardless of the location.

TRAINING AND TEAM TRAINING

The importance of proper training cannot be understated. Training has been shown to combat issues with improper or inaccurate handover and communication discrepancies. There is currently a lack of formal education in patient handover at all levels of training (Manser & Foster, 2011). Through standardization and improvement in information records, the handover process can be improved. But these efforts must work in concert with training of both the EMS and the ED staff. Communication training, clinical team leadership, and team discipline must support the communication process between EMS crews and the ED team to ensure that important prehospital information is not lost or misinterpreted.

CONCLUSION

The handover process is a vital piece of the puzzle when it comes to patient care due to the multiple deficiencies and issues that can occur in communication between EMS and hospital staff. For instance, one study revealed that in Australian emergency departments, nearly 10% of patients may be adversely affected due to the result of poor communication (Ye et al., 2007). In the United States, preventable medical errors are abundant, and 70% of those are due to communication breakdowns (Joint Commission, 2012). Likewise, timely and effective communication between EMS and the receiving hospital has the potential to save lives and improve patient eligibility for time-sensitive therapies such as stroke medications and other thrombolytic therapies (Abdullah et al., 2008). What is needed is a systematic investigation of the problems reported in the handover process and the solutions that will yield the more fruitful results. While this has been conducted in other aspects of patient handover such as nursing and physician handoffs within the hospital (Riesenberg et al., 2009, 2010), further investigation is needed in the prehospital context given the unique nature of the task.

Human factors science is integral to interdisciplinary research aimed at understanding and improving patient handover (Harvey et al., 2007). The contribution of human factors science in supporting current research and improvement efforts ranges from the definition and measurement of technical as well as nontechnical skills related to patient handovers, to the design, implementation, and evaluation of handover processes and supporting tools as well as targeted educational interventions. Effective communication and teamwork are essential for the provision of

high-quality and safe patient care. Of course, the aim of both EMS professionals and the ED staff is always smooth and efficient patient transfer. Placing an emphasis on training with structured communication tools can decrease the risk of communication failures. Understanding the importance of effective communication and what it contributes to the continuity of patient care and enhanced patient safety is indispensable for the EMS provider. A summary of these key points is found in Table 11.2.

TABLE 11.2
Summary of Key Points

Issue	Description
Communication and Information Transfer	
Age of information	One technique to avoid this is to have critical information presented closer to the time of patient transfer, thus reducing the time elapsed. In addition, critical information should also be readily available and require updates regularly, which would assist in the rehearsal and allowing responders to move these data from short-term to long-term memory.
Attentional focus	A technique to reduce attentional focus could be to use three-way communication.
Distractors	While no system can be completely noise-free, the idea of reducing the noise can improve the recall of the information. Training responders to ignore the distractions and noise or, rather, to filter the distractions out can result in reduced overall noise.
Explicit communication and ease of information transfer	By investigating these discrepancies, we would be able to resolve them by generating a better understanding between the involved parties.
Consistency	Consistency in terminology and practice would also help alleviate the issue of consistency in which many different words are used each with similar meanings or in which one word may have multiple meanings.
Improving the Handover Process	
Standardization	Develop or adopt a common lingo in which EMS and EDs can communicate and thus speak the same language.
Time–accuracy tradeoff	Standardized protocols ensure that vital information is not missed and also streamline the process to aid in faster handover times while allowing for the transition of more information.
Electronic reports	This is only a partial solution, and it is still essential that to focus on communication and protocol training be the focus so that important prehospital information is not lost of or misinterpreted regardless of the record keeping method.
Checklists	The benefit of a checklist is that it reminds the EMS crew of what is needed and limits their effort to collecting essential information only.
Training and team training	Communication training, clinical team leadership, and team discipline must support the communication process between EMS crews and the ED team to ensure that important prehospital information is not lost or misinterpreted.

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