# Development of a Program to Mitigate Loss of Critical Information During Patient Handover

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**Certification Statement**

I hereby certify that this paper constitutes my own product, that where the language of others is set forth, quotation marks so indicate, and that appropriate credit is given where I have used the language, ideas, expressions, or writings of another.

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**Abstract**

The problem was that the Ridgefield Department (RFD) had no formal policy or practices to prevent loss of critical information during EMS patient handover. The purpose of this Applied Research Project (ARP) was to develop a program to mitigate loss of critical information that may occur during patient handover in the RFD. Action methodology guided the following three questions: (a) What contributes to the potential for information loss during patient handover within the RFD? (b) What communication frameworks may be adopted to minimize loss of critical information that occurs during patient handover within the RFD? (c) What are the essential components of a patient handover program that should be adopted by the RFD? The data collection procedures included a questionnaire and an interview. The results showed that patients under care of the RFD experience factors that contribute to potential loss of critical information during EMS patient handover. The recommendations included the adoption of policy and practice guidelines to improve patient handover communications as well as their ongoing evaluation and refinement.

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**Development of a Program to Mitigate Loss of Critical Information During Patient Handover**

The World Health Organization cites (2007) communication during patient handover as a critical failure point in healthcare that can cause, "serious breakdowns in the continuity of care, inappropriate treatment, and potential harm to the patient" ( p. 1). In the United States, the Joint Commission (2006a or b) has identified, "Inadequate communication between care providers… is consistently the main root cause of sentinel events" (p. 46). Sentinel events are defined by the Joint Commission as, "a patient safety event that results in death, permanent harm or severe temporary harm and intervention is required to sustain life" ("Sentinel Event Policy and Procedures," 2017, p.1). In 2005, the Joint Commission (2006b) reported that 70% of sentinel events were the result of communication failure with 50% of these occurring during patient handover (p. 9). Breakdown in communications is a significant liability with one United States malpractice insurance agency reporting it to be the most common causal factor in claims related to patient handover (Schoenly, 2010 p. 2). This potential failure point isn't isolated to hospital care. In a joint statement The American College of Emergency Physicians, Emergency Nurses Association, National Association of EMS Physicians, National Association of Emergency Medical Technicians, and National Association of State EMS Officials issued a joint statement calling for:

> A defined processes for the contemporaneous face-to-face communication of key information from emergency medical services providers to health care providers in an emergency department are critical to improving patient safety, reducing medicolegal risk, and integrating EMS with the health care system. (American College of Emergency Physicians, 2014 p. 503)

The nature of information loss and corruption at the heart of patient handover problems was such that the problem may become apparent, but the cause may not be obvious unless it is specifically sought out (The Joint Commission, 2010 p. 51). Just as they introduce the possibility of patient harm, handovers can also present great opportunities to improve patient outcome, but these too often go unrecognized (Cohen & Hilligoss, 2009, pp. 5-12).

Patient handover presents risks for the healthcare industry in general, and EMS services specifically, it has significant potential to affect the Ridgefield Fire Department and the citizens it protects. The Ridgefield Fire Department, through its commitment to improving the safety of the citizens of and visitors to the Town of Ridgefield, is obligated to develop policies and practices to mitigate such risks.

The problem was that the Ridgefield (CT) Department has no formal program to prevent communication failure during EMS patient handover. The purpose of this Applied Research Project (ARP) was to develop a program to mitigate loss of critical information that may occur during patient handover in the RFD. Action methodology guided the following three research questions: (a) What contributes to the potential for information loss during patient handover within the RFD? (b) What communication frameworks may be adopted to minimize loss of critical information that occurs during patient handover within the RFD? (c) What are the essential components of a patient handover program that should be adopted by the RFD?

## Background and Significance

The town of Ridgefield, located in the center of Fairfield County Connecticut, is primarily a bedroom community of approximately 35 square miles serving a population of 24,638 residents according to the 2010 US Census (Mapquest, 2018 Town of Ridegfield; United States Census Bureau, 2010, Town of Ridgefield). First settled by English colonists more than

300 years ago, it was the site of the revolutionary war Battle of Ridgefield in 1777 in which American Generals David Wooster and Benedict Arnold attempted to hold off British forces as they sought to return to ships in the Long Island Sound. Today Ridgefield continues to be a town of important cultural significance boasting the Keeler (Revolutionary War) Tavern, the Weir Farm National Historic Site, the Phineas Lounsbury Governor's Mansion, the Ridgefield Playhouse, the Aldrich Contemporary Art Museum, and the Cass Gilbert Fountain, along with other sites of regional and national significance (Sanders, 2003 pp. 1-53)

Figure 1.

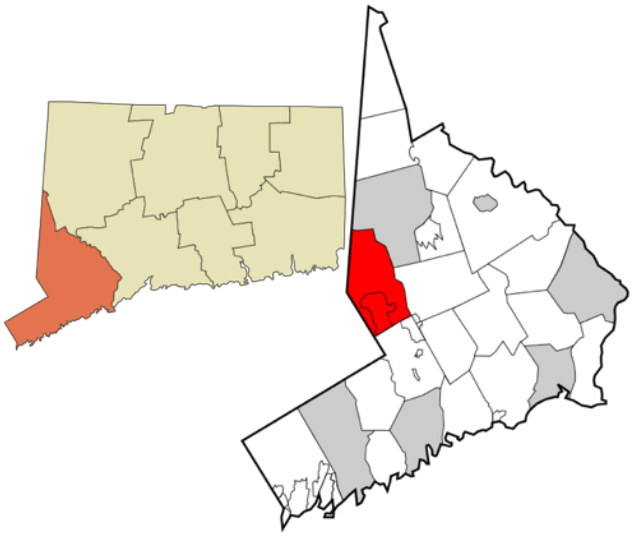


*Figure 1. Map of the Town of Ridgefield, Connecticut within Fairfield County (United States Census Bureau, 2010, Town of Ridgefield)*

The town of Ridgefield is a local form of government in the state of Connecticut. It is governed by boards, committees and commissions, chiefly by the Board of Selectmen consisting of four elected selectpersons under the direction of a fifth member of the Board, the First Selectman (Town of Ridgefield, Connecticut, Government section 2018). The First Selectman is the chief elected official and handles day-to-day operations within the town (Town

of Ridgefield, Connecticut, Government section 2018). The town of Ridgefield is a full-service town providing: (a) administration, (b) police, (c) fire and EMS, (d) planning and zoning, (e) parks and services, (f) public works, and (g) a community center (Town of Ridgefield, Connecticut, 2018, Departments section).

First established in April 1896 in response to the December 8, 1885 Great Main Street Fire of Ridgefield which destroyed most of the Town's business district, the Ridgefield Fire Department is tasked through Town Charter to protect life and property and to enforce all laws, ordinances, and regulations related to fire safety (Burford, 2011 Number 1.1.1.1). The department is further tasked with providing emergency medical services, hazardous materials and rescue response, and providing assistance (Burford, 2011 Number 1.1.1.1; Marconi & Tappe, 2013 p. 15).

The Ridgefield Fire Department is the sole provider of fire and EMS to the town of Ridgefield (Marconi & Tappe, 2013 p. 15; Town of Ridgefield, Connecticut, 2018). The department staffing consists of a full-time career fire chief, full-time career assistant chief, department administrator, and fire marshal (Burford, 2011 Number 1.1.1.1). The fire chief is responsible for the maintenance and administration of the department as well as the oversight of all departmental functions (International Fire Service Training Association, 2014 p. 1; Town of Ridgefield Human Resources Department, 2014b). The department maintains four shifts of eight to nine full-time career firefighters, all of whom are certified at a minimum of EMT level, and sixteen of whom are paramedics (Burford, 2011 Number 1.1.1.1). Each shift has two officers, one Captain who acts as shift commander at Headquarters, and one Lieutenant who supervises the Ridgebury Fire Station and acts as acting shift commander at Headquarters in the absence of the Captain (Burford, 2011; Town of Ridgefield Human Resources Department, 2014a).

The department also maintains a volunteer component of approximately fifty firefighters who work under the career chief and assistant chief, but maintain their own internal leadership structure (Burford, 2011, Number 1.1.1.1). These firefighters and officers have a variety of qualifications, but primarily service in support role to the career personnel (Burford, 2011 Number 1.1.1.1).

Department physical resources and infrastructure include a centrally located headquarters station that houses the majority of the career and volunteer personnel as well as most of the fire apparatus including: (a) one lead fire engine, (b) three ambulances, (c) a rescue truck, (d) an aerial ladder truck, and (e) two water tanker trucks (Marconi & Tappe, 2013 p. 15). An outlying station in the Ridgebury district houses one primary fire engine and one spare (Marconi & Tappe, 2013 p. 15).

*Figure 2. Map of the Town of Ridgefield, Connecticut showing Ridgefield Fire Departments stations indicated as red dots.*

In 2017 the Ridgefield Fire Department responded to 3,217 emergency calls, of which 2,108 were calls involving emergency medical services and 1,109 calls were for fire, hazardous

materials, rescue, and public assistance response that required no emergency medical services (Chief Jerry Myers, 2018). The EMS and non-EMS combined calls have increased by approximately 75% over the past 15 years. These numbers are projected to continue to rise as the Town development proceeds to increase the number of residents and expands a commercial and industrial base (M. Grasso, personal communication, May, 15, 2018; Pharmaceutical-technology, 2016). As a result, any factors that affect the quality of care, such as failures of effective communication during patient handover, will become more significant as EMS call volume continues to increase. In the light of potential communication failures, the patient harm that they may produce, and the potential liability for the RFD to fail to mitigate such harm, it was important that research be conducted to understand the potential for information loss, identify frameworks that may be adopted to mitigate this loss, and develop and adopt a policy and program for RFD staff to be able to apply these frameworks.

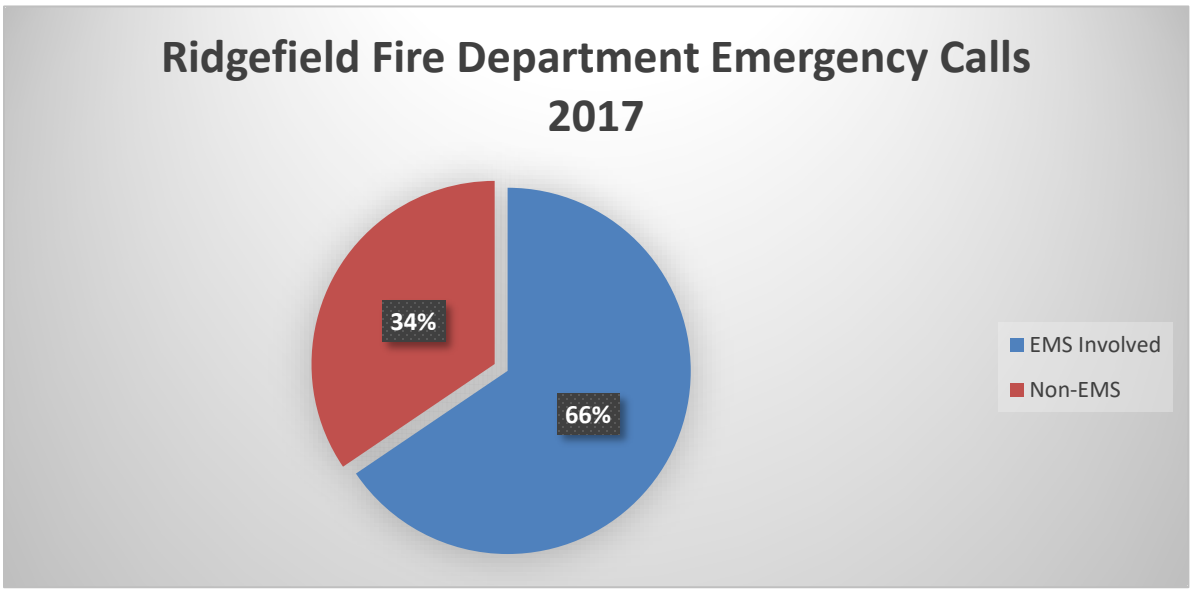



*Figure 3. Ridgefield Fire Department Emergency Calls EMS Involved vs Non-EMS Calendar Year 2017*

Through evaluating prior research and development of new research to improve emergency service delivery at the Ridgefield Fire Department this research is relevant to the following National Fire Academy's Executive Development course R0123 (2016) terminal learning objectives (TLO):

- "Conduct scholarly research in a digital platform" (National Fire Academy, 2016, pp. 2-3)
- "Describe the interconnection between scholarly work and an article in a peer-reviewed journal and argue the benefits of contributing to a body of knowledge within a community of scholars" (National Fire Academy, 2016, pp. 2-3)
- "Relate what they learned in the course to their team experiences and to their own work environments, and reinforce key concepts presented in the previous course units and the relationship of those concepts to their own work responsibilities." (National Fire Academy, 2016, pp. 2-3)

This Applied Research Project takes the approach that the Ridgefield Fire Department should view the problem from different perspectives as is described by Heifetz and Linsky (2002) in the Executive Development course as imperative to, "changing attitudes, values, and behaviors" (p. 13). Through development of a new policy to enhance patient care handover and improve communications at the Ridgefield Fire Department this research is relevant to the U.S. Fire Administration's Strategic Plan Fiscal Years 2014-2018 goal three: "Enhance the fire and emergency services' capability for response to and recovery from all hazards," including: (a) key initiative one: "Enhance fire and emergency services capabilities to respond to and recover from all hazard students through training, education, exercise and evaluation," (b) key initiative two:

"Enhance data driven decision-making through information sharing among federal, state, local, tribal and territorial partners," (c) key initiative three: "Promote a culture of health, wellness and behavior that enhances emergency responder safety and survival," and (d) key initiative five: "Encourage the adoption of technological tools to enhance fire and emergency services' capability of, preparation for, response to, and recovery from all hazards" (United State Fire Administration, 2018, pp. 9-12).

## Literature Review

This section summarizes key findings of those who have previously published documents related to the research problem and clearly describes how such information influenced the author's research effort (National Fire Academy, 2018, p. 27). Initial searches using both Internet search engines and staff and resources at the National Fire Academy Learning Resource Center returned adequate results of literature related to patient care handover in general healthcare contexts. Virtually no information was available specific to the multiple patient handovers in different contexts that typically occur in emergency medical services provided by the Ridgefield Fire Department or other departments that provide similar EMS. As a result, it was decided to use an integrative literature review process. This methodology approached the inclusion of diverse sources of information evaluated not necessarily for their achievement of the goals stated in each paper, but rather for their ability to contribute to the improvement of applied patient care and organizational performance of emergency medical services (Souza et al., 2010, pp. 102-103). According to Souza et al., this methodological approach is often used in the field of nursing to integrate disparate research often from outside of the profession to synthesize new applied healthcare practices where little or no prior relevant research exists (2010, p. 105). The integrative review process used here follows a model

established by the most comprehensive literature review currently available on the topic of patient handover. Cohen and Hilligoss say of their 2010 review:

> This is not the first literature review in this area, but it is the most extensive, and it differs in purpose from earlier reviews. We have organized our treatment of the research with the aim of contributing directly to efforts to improve handoffs, and, in particular, to addressing the issue of how handoffs should be standardized. We do so by raising issues with implications for handoff improvement and discussing current knowledge on those issues. Our review also includes research on handoffs as carried out by several different types of medical professionals (physicians, nurses, technicians, ambulance drivers, ...) since all these groups engage at some points in processes that meet our definition of a handoff, all are potentially subject to Joint Commission requirement 2e, and all are relevant to the overall goals of improving patient outcomes and safety. Moreover, many problems of achieving better handoffs prove to be similar despite surface differences in the content of communications, so the groups have much to learn from each other. (Cohen & Hilligoss, 2010, p. 3)

The past 20 years has seen work to significantly improve healthcare in a way that most practitioners do not even realize. In November 1999, the Institute of Medicine Committee on of Healthcare in America released a document that shocked the medical world, reporting that at least 44,000 and as many as 98,000 people die in hospitals each year as a result of preventable medical errors (Committee on Quality of Health Care in America & Institute of Medicine, 1999, pp. 1-5). Beyond the cost in human lives, this report stated that: (a) preventable errors resulted in additional treatment, disability, (b) lost income and productivity costing between $17 billion, and (c) $29 billion per year in hospitals in the United States alone (Committee on Quality of Health

Care in America & Institute of Medicine, 1999, pp. 1-5). Subsequent studies have shown that this initial report may have significantly underestimated the incidence and impact of medical error. The introduction of new information tools allowed researchers to revise numbers to almost 400,000 deaths per year in 2018 placing medical error as the third leading cause of death in the United States (American Hospital Association, 2018 Resource Center section; Makary & Daniel, 2016 p. 1).

When preventable medical errors occur the root cause is so often found to be communication failure during patient handover that the Wall Street Journal refers to handover as "the Bermuda Triangle of health care" (Landro, 2006, p. 1). This problem is not unique to the United States. In 2007 the World Health Organization has identified improving communication, specifically during patient handover, as one of its top patient safety solutions, stating:

> The hand-over (or hand-off) communication between units and between and amongst care teams might not include all the essential information, or information may be misunderstood. These gaps in communication can cause serious break- downs in the continuity of care, inappropriate treatment, and potential harm to the patient. (p. 2)

In patient handover guidance from the British Medical Association (2007), Professor Sir John Lilleyman, Medical Director for the United Kingdom's National Patient Safety Agency describes handover of care as, "one of the most perilous procedures in medicine, and when carried out improperly can be a major contributory factor to subsequent error and harm to patients" (p. 2). Communication failure is a major source of medical liability for providers and organizations comprising of 30% of malpractice claims and $1.7 billion in malpractice costs over 5 years in all healthcare sectors including emergency medical services (Crico Strategies, 2016 p. 4).

The Joint Commission (2017) first issued National Patient Safety Goal Requirement 2-E requiring all accredited hospitals "implement a standardized approach to 'handoff' communications, including an opportunity to ask and respond to questions" as of January 1, 2006 (p. 2). In 2017 this became Joint Commission Provision of Care standard PC.02.02.01 element of performance (EP) 2 (p. 2). While the Joint Commission has established this as a care standard for their accreditation of hospital, it does not specify an exact handover procedure to be used in the hospital, nor does it address handovers that occur into or outside of the hospital, as in the case of EMS.

In a 2008 literature review Wong and Yee identified factors that contribute generally to communication failure at patient handover including: (a) lack of handover-specific education, (b) complex cases, (c) unclear responsibility, (d) high cognitive and communication loads, (e) fatigue, (f) lack of written report, (g) nonstandard language and nonstandard format (pp. 20-47). In addition to these factors Horwitz et al (2009) added information being misunderstood and uncorrected and reporting party being unfamiliar with patient (pp. 704-707). In 2010 Cohen and Hilligoss added factors of strict hierarchy, an incomplete data set, time pressures and high task loads (pp. 11-24). Focusing on patient handover in the emergency department Cheung et al. (2010) supports these findings and adds to them a lack of written data, stress, complex cases, absence of safety culture, lack of organizational support, lack of "red flags" for high acuity patients, and ambiguous moment of transition (pp. 172-176).

Specific to EMS handover in the emergency department Thakore and Morrison (2001) identified barriers including unclear responsibility, unstructured report, insufficient information, inattentiveness and lack of professional respect as significant factors (pp. 293-295). To these a 2014 review of literature on EMS patient handover by Wood, K., Crouch, R., Rowland, E., &

Pope, C. (2014) added interference, distractions, lack of professionalism, lack of professional respect, and high variability in handover procedure (pp. 578-579).

Many US and international studies identified similar barriers to effective communication, one study sought to stratify factors based on provider perceptions. Using a Likert scale to measure frequency Fitzpatrick, McKenna, Duncan, Laird, Lyon and Corfield identified and rated the following barriers to effective EMS handover communication in descending order of criticality (2018, p. 6).

- Interruptions
- Variability of handover
- Lack of coordination between responders
- Lack of structured handover process
- Lack of clear lead
- Poor verbal communication skills
- Lack of written data (p. 6)

Yet patient handover is not simply an event where errors should be avoided. Kalyani et al. argue that EMS patient handover presents significant opportunities for to enhance patient care, stating that, "It plays an important role in maintaining continuity of care and also a key role in teaching new students, promoting team cohesion, emotional support, socialization, maintaining social order, patient safety, and mistake detection " (p. 1). Likewise, the Department of Defense (2005) says that patient handovers present not only a points vulnerability, but also potential times of recovery and fresh clinical perspective (p. 17).

There were similar themes when it came to recommendations to improve patient handover communications. Brindley and Reynolds (2011) recommended a list of critical

communication-specific education and practices brought from other industries including: (a) commercial aviation, (b) nuclear power generation, (c) the fire service, and (d) the military. Those practices were applied to the field of healthcare including (a) “flying by voice” or thinking aloud, (b) combating mitigating language or speaking up/being heard, (c) graded assertiveness or collegial assertiveness, (d) five-step advocacy, (e) use of a standardize report format mnemonic such as SBAR, (f) step back method to avoid tunnel vision, (g) “below 10,000 feet” focus on priority communication, (h) closed loop communication and (i) repeat back communication (p.157). Similarly, Patterson, Roth, Woods, Chow, & Gomes, 2004, pp. 125-132). sought to take effective handover communication lessons from observations of the NASA Johnson Space center, nuclear power generation plants, railroad and ambulance dispatch centers and apply them to healthcare operations, including: (a) the use of face-to-face reports, (b) interactive questioning, (c) team questioning, (d) limiting of interruptions, (e) topics initiated by reporting as well as receiving parties, (f) limiting multitasking, including all reporting teams stance on changes to plans, (g) read back and summary after report, (h) use of a standard format, (i) receiving parties scans written data prior to report, (j) team access to data, (k) ensuring the use of up-to-date info, (l) handover of written paperwork separate from verbal report, (m) unambiguous transfer of responsibility, (n) clear responsibilities, (o) team members review each other's updates, (p) reporting party oversees receiving's work following handover and a delay of transfer if immediate priorities supersede (Patterson, Roth, Woods, Chow, & Gomes, 2004, pp. 125-132).

One item identified in virtually every article was a recommendation for the use of a simple mnemonic to aid in providing a structured format for patient handover. What is not agreed on is what mnemonic/format should be used. Cohen and Hilligoss (2010) found that while there is evidence of such mnemonics reducing communication failure rates in-hospital the

suggestion was made that of the many mnemonics available, selectin of the right mnemonic may be context dependent (p. 30). Likewise, Riesenberg, Leitzsch and Little (2009) evaluated 24 different structured handover mnemonics but failed to find any that have been validated, stating:

> We call for rigorous outcomes studies designed to (1) assess the effectiveness of handoff mnemonics, (2) determine the elements of handoffs that lead to improved patient outcomes, (3) determine the best mnemonics for different settings and different practitioners, and (4) identify the best implementation strategies. (p. 202)

The Accreditation Council for Graduate Medical Education (2011) requirements for handoffs provides recommendations to improve patient handover communications include: (a) minimizing the number of total handovers, (b) communications-specific education, (c) handover-specific education,(d) use of direct eye contact between providers on both sides of the handover, (e) allowing time for questioning, (f) minimizing distractions and interruptions, including written or electronic medical records, (g) use of flags or alerts for high acuity/high priority patients, and (h) allowing the opportunity for "read-back" to confirm proper transfer of patient (2011, pp. 1-3). In support of recommendations such as these, Laxmisan et al. (2007) asserts that:

> Information transfers and shift changes are another necessary aspect of the working environment of the emergency department and cannot be avoided. However, these processes are not necessarily a vulnerable point if steps are taken to ensure the continuity of information flow. (p. 810)

While much of the literature focused on minimum required data elements and error-correction practices, Wood, Crouch, Rowland and Pope focused on soft-skills reporting that effective handovers were characterized as confident and succinct presented by paramedics who were assertive and able to speak loudly. Effective receivers in the emergency department were

ones who were attentive receiving personnel who actively listened and provided feedback (p. 578). Similarly Dawson, King, and Grantham (2013) emphasized the importance effective of EMS provider handover utilizing: (a) a confident and succinct report, (b) active listening, (c) professional respect, (d) eye contact, (e) common organizational values, (f) positive professional relationship, (g) common expectations, (h) communication and handover specific education and openly displayed documentation (pp. 397-402). In addition, Fitzpatrick, et al. emphasize the importance of both sides of any EMS patient handover working to ensure a shared "mental model" of the patient situation (pp. 8-10). Brindley and Reynolds (2011) define a mental model as, "an understanding of the situation, task, and resources" emphasizing that "Without a common or shared mental model, the cognitive resources of the entire team cannot be fully leveraged" (p. 156).

There is great agreement across the literature on many of the factors that have potential to disrupt communications during EMS patient handover, as well as on recommendations to mitigate those factors. An additional issue mentioned by virtually all literature was that significant knowledge gaps remain (Bigham et al., 2012, p. 35; Bost, Crilly, Wallis, Patterson, & Chaboyer, 2010, p. 218; Carayon & Wood, 2010, p. 4; Cheung et al., 2010, p. 177; Cohen & Hilligoss, 2010, p.2; Dawson et al., 2013, p. 403; Goldberg et al., 2017, p. 17; Horwitz et al., 2009, p. 701; Woodson & Stein 2018, Conclusion section; Bronsky 2018, p. 1; Kalyani et al., 2017, p. 708; Patterson & Wears, 2010, pp. 131-132; Riesenberg, Leitzsch, & Little, 2009, p. 202; Wong & Yee, 2008, pp. 2-3; Wood et al., 2014, p. 579). Specifically, Horwitz et al. (2009) states:

> Transfers of care among providers have been identified as a major source of medical error, yet the contribution of transfers to error remains unclear. To reduce errors, a more

complete understanding of the processes involved in transferring patient care is needed. (p. 701). Riesenberg, Leitzsch and Little (2009) assert: “Small studies and anecdotal reports will not yield the essential answers” (p. 202). Woodson and Bronsky:

> No single solution to preventing medical errors exists, and the best interventions focus on creating a culture of safety and collaboration. Any solution needs to start with improving communication among the many different members of the care team. EMS agencies can be the driver behind change, bringing members of the regional system of care together to ensure everyone is on the same page. ( p. 1)

While the literature review revealed many recommendations to incorporate during the actual handover process there were few recommendations for implementing an overall program to improve handover communications other than communication-specific education. Only McKee addressed this issue making the following recommendations:

- Demonstrate leadership’s commitment to successful hand-offs and other aspects of a safety culture.
- Standardize critical content to be communicated by the sender during a hand-off—both verbally and in written form.
- Conduct face-to-face hand-off communication and sign-outs between senders and receivers in locations free from interruptions, and include multidisciplinary team members, the patient and family, as appropriate.
- Standardize training on how to conduct a successful hand-off.
- Use electronic health record capabilities and other technologies to enhance hand-offs.

- Monitor the success of interventions to improve hand-off communication and use the lessons to drive improvement.
- Sustain and spread best practices in hand-offs and make high-quality hand-offs a cultural priority.

This recommendation was intended to apply only to hospital handover, the essential components of an EMS-specific patient handover improvement program remains unclear. Talbot and Bleetman (2007) emphasize the need for a larger patient handover communications program to help ensure effective integration of the individual handover recommendations stating, "communications training, clinical team leadership and team discipline must be developed further to support the communication process between ambulance crews and the ED team" (p. 541).

The majority of literature focused on patient handover of high priority patients, specifically trauma patient. It remains unclear if it may be crucial to apply the same recommendations in a program intended for all patient handovers, including low priority patients.

In the words of the Joint Commission (2010):

> Those interested in improving handoffs will realize after reading the article that we cannot simply "improve handoffs" with a checklist or some training. We must instead review our handoff processes. Relevant improvement will only come after understanding that different clinical scenarios require different handoffs. Each handoff must be reviewed, dominant framings discovered, and changes thoughtfully designed to fit work flow and be measurable (p. 57).

By identifying key barriers and recommendations, as well as knowledge gaps, the literature review contributed to the development of tables of factors, presenting a clearer understanding of the issues potentially pertinent to patient handover communications in the Ridgefield Fire Department. However, even after consolidation of the terms used to describe these factors and grouping these factors by themes, there were still too many factors to be reasonable for questionnaire respondents to select from. Thus, the choices were further consolidated to ensure that the questions in the questionnaire were of reasonable length and an additional choice of "Other" was added in order to allow respondents to add in any factor that may not be found on the consolidated list.

## Procedures

The procedures used for this applied research project were an analysis of responses to a questionnaire and analysis of a series of interviews. A questionnaire was distributed to all categories of personnel who may participate in patient handovers to or from Ridgefield Fire Department personnel at any point in the continuum of care from first response to specialist physicians at destination emergency departments, including all members of the Ridgefield Fire Department. To facilitate distribution and enhance responses the author made direct contact with the chief and supervisory personnel confirming participation of the Ridgefield Police Department as first responders, Georgetown, West Redding, Redding Ridge, and Danbury Fire Departments along with City of Danbury Emergency Medical Services mutual aid partners, Ridgefield Visiting Nurses Association as well as Ridgefield Primary Care Center, PhysicianOne Primary Care Center, Laurel Ridge Health Care Center and Benchmark Senior Living as trained healthcare providers working in the community, and finally emergency department staff including technicians, nurses, physician assistants, attending physicians, and trauma surgeons at

both Danbury and Norwalk Hospitals as destination hospitals to which Ridgefield Fire Department transports. An email and flyer (Appendix C) were created to explain the purpose and function of the questionnaire and to facilitate and encourage participation. Responses were obtained from all categories except assisted living and physician office staff, visiting nurses, and emergency department staff technicians.

While a great deal of literature exists addressing the problem of communication failure during patient handover as well as recommendations for successful communication frameworks, there is wide range of terminology across this literature to describe similar concepts. In order to overcome this language barrier, key literature from 2009 to 2018 has been compiled (Appendix A). From the data in Appendix A, Table 1 and 2 were created utilizing common terminology to describe similar concepts identified within the literature. These tables were used as the basis for response choices for many of the questions within the questionnaire.

Table 1

*Barriers to Successful Patient Handover Communication Using Unified Terminology and Grouped by Themes*

| | Extrinsic | Intrinsic | |
|---|---|---|---|
| **Environmental** | **Organizational** | **Personal** | **Interpersonal** |
| Interuptions | High communication loads | Lack of communications education | Lack of professionalism |
| Distractions | High task loads | Lack of hand over education | Lack ofprofessional respect |
| Interference | High cognitive loads | Lack of standard language | Innatentiveness |
| | Fatigue | Unstructured report | Strict hierarchy |
| | Stress | Lack of Red Flags | Information misunderstood |
| | Time pressures | Lack of wrtten data | Absence of safety culture |
| | Complex cases | Reporter unfamiliar with patient | Linear reporting |
| | Insufficient information | | Unclear lines of reporting |
| | Poor timing | | Ambiguous moment of transition |
| | Variability | | Lack of error correction |
| | Lack of organizational support | | Unclear responsibility |
| | Multiple hand overs | | |

Table 2

*Recommendations to Promote Successful Patient Handover Communication Using Unified Terminology and Grouped by Themes*

| | Extrinsic | Intrinsic | |
|---|---|---|---|
| **Environmental** | **Organizational** | **Personal** | **Interpersonal** |
| Minimize interuptions | Communication job aids | Communication specific education | Foster professionalism |
| Minimize distractions | Organizational safety culture | Hand over specific education | Foster colleageality |
| Minimize interference | Standard formats | Standard formats | Eye contact |
| | Eye Contact | Prioritize patient Red Flags | Crew resources management |
| | Standard formats | Include written or electronic medical records | Read back / error correct |
| | Organizational safety culture | Include patient | Grassroots safety culture |
| | Reduce number of handovers | | Include team |
| | | | Specify "Patient is now yours" |
| | | | Read back / error correct |
| | | | Provider Identification |

The questionnaire consisted of 22 questions (Appendix B) focusing on perceptions of the types of personnel along the continuum of care who may handover to or from Ridgefield Fire Department personnel, the perceived numbers of patient handovers that may be experienced by any single patient during the course of their care and perceptions of critical failures of handover communications including resulting outcomes. Further questions centered around the barriers listed in Table 1 and the recommendations listed in Table 2. In order to improve participation and completion of the questionnaire, information on these tables was consolidated to create a reasonable selection of choices for respondents, with the addition of a choice of “other” for respondents to reply with responses above and beyond the list where appropriate. The author actively recruited questionnaire responses from both within and without the department using the email and flyer (Appendix C) in order to ensure that perspectives from both sides of patient handover communication were represented.

In an effort to provide a more comprehensive picture of the essential components of a patient handover program, a series of brief interviews was conducted by telephone and email with the lead authors of key papers from the literature review as well as EMS educators and executives from around the world. Interviewees were selected based on their knowledge and experience in the administration of patient handover improvement or similar programs as well as their ability to provide a variety of perspectives on the questions. All interview questions and responses were catalogued (Appendix D).

A limitation inherent to the use of questionnaires and interviews was that these instruments can, at best, only gather data on the perceptions of the respondents rather than providing an objective assessment of actual handover practices observed directly or recorded and later reviewed. Additional limitations included the number of responses and lack of participation of some categories of personnel who report or receive patient handovers to or from RFD personnel. The low numbers in some categories of respondents may increase the likelihood that individual responses not indicative of the respondent category as a whole may skew the results. In some cases, respondent categories received no responses and are wholly unrepresented, eliminating important perspectives from being represented in the data. Reminder phone calls, emails, and flyers were distributed at 30-day intervals in order to help overcome this limitation.

A limitation of the interviews was that the small number of interviewees allowed within the scope of the project restricts the information and perspectives that can be obtained. Also, while interviewees may be experts in the field of EMS patient handover communications, their experience and recommendations may have limited transferability to the operations of the Ridgefield Fire Department.

## Results

The patient handover communications information loss and recommendations questionnaire garnered 54 responses to the 22 questions over the course of three months from March 2018 to May 2018. In response to question 1 of the 38 RFD staff who were sent the questionnaire only 19 responded (50%). Of the non-RFD staff who participated there was 1 non-EMS certified mutual aid partner, 13 EMS certified mutual aid partners, 5 Ridgefield police officers, 3 emergency department nurses, 3 physicians assistants, 7 attending physicians, 1 trauma surgeon, 1 hospital trauma coordinator and 1 rapid response trauma nurse.

In question 2 respondents identified the following care providers as potentially reporting or receiving handover to or from RFD personnel.

- Assisted Living or Skilled Nursing Facility Staff
- Visiting Nurse
- Physician's Office Staff
- Mutual Aid Partner of Ridgefield Non-Ems Certified
- Mutual Aid Partner of Ridgefield Ems Certified
- Ridgefield Police Department
- Ridgefield Fire EMT
- Ridgefield Fire Paramedic
- ED Staff Technician
- ED Staff Nurse
- ED Staff PA/APRN
- ED Attending Physician
- Trauma Surgeon

Of these the least frequently identified were Ridgefield Policed, identified by 18 of the responses (33.33% of total responses). The top three most frequently identified were ED staff nurse with 42 responses (77.78% of total responses), assisted living or skilled nursing facility staff with 39 responses (72.22% of total responses), and physician's office staff with 38 responses (70.37% of total responses).

In question three respondents indicated that they perceived that on a typical emergency call a patient will experience between one and five handovers including EMS handover at the emergency department. The largest number replied of respondents, 27 (50%), that a patient

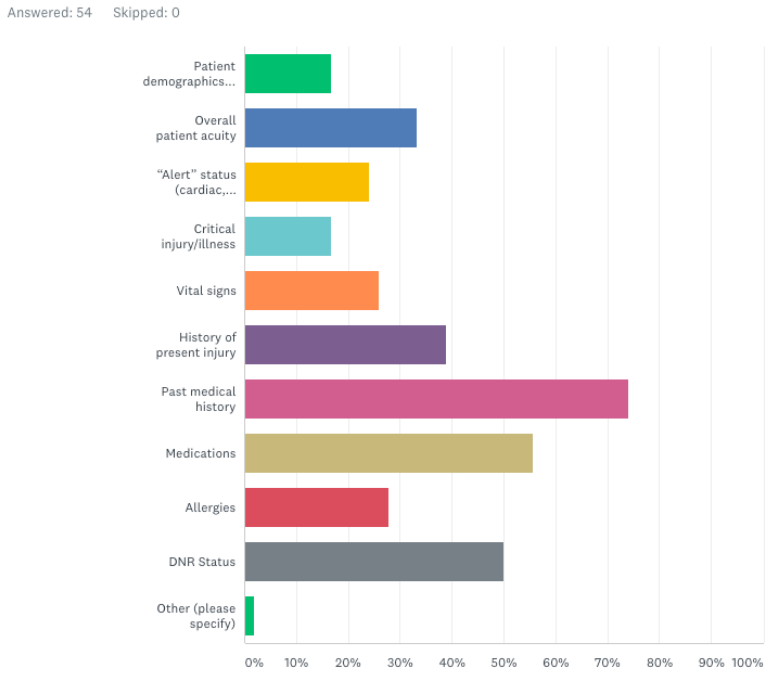
typically experienced three handovers while 14 (25.93%) replied that hat a patient typically experienced two handovers, 10 (18.52%) replied that a patient typically experienced four handovers, 2 (3.70%) replied that patients typically experienced only one hand over and only 1 respondent (1.85%) replied that they believed patients typically experience as many as five handovers. In question 4 a total of 34 (62.96%) of respondents indicated that they perceived that the minimum number of patient handovers that might reasonably occur is only two while 14 (25.93%) believed that number was only one handover and 6 believed that minimum number was 6 (11.11%). In question 5 concerning the largest number of patient handovers that might reasonably occur from arrival of the first responder up to and including handle of the emergency department the majority of respondents were evenly split with 18 each (33.33%) believing that number to be either four or five. Only 2 (3.70%) respondents believe that number to go as high as seven handovers while 1 (1.85%) respondent replied that he or she believed the maximum number of handovers to be one. In question 6 the majority of respondents replied that typically they are only directly involved in one handover 24 (44.44%) or two handovers 19 (35.19%) while other responses put that number as high as five handovers.

When respondents were asked in question 7 what their approximation of the percentage of handovers where critical information was missed either by sender or receiver the average among all 54 responses was that 28% of handovers involved critical information missing. Similarly, when asked in question 8 for an approximation of the percentage of handovers where critical information was either misreported by the sender or misunderstood by the receiver the average among all 54 responses was (27%).

Figure 4 illustrates the perceptions of respondents who were asked in question 9 what critical patient information they believed is most commonly missed, misreported, or

misunderstood with an allowance for respondents to check all applicable items. The single "Other" response represented Glasgow coma score or altered mental status information.

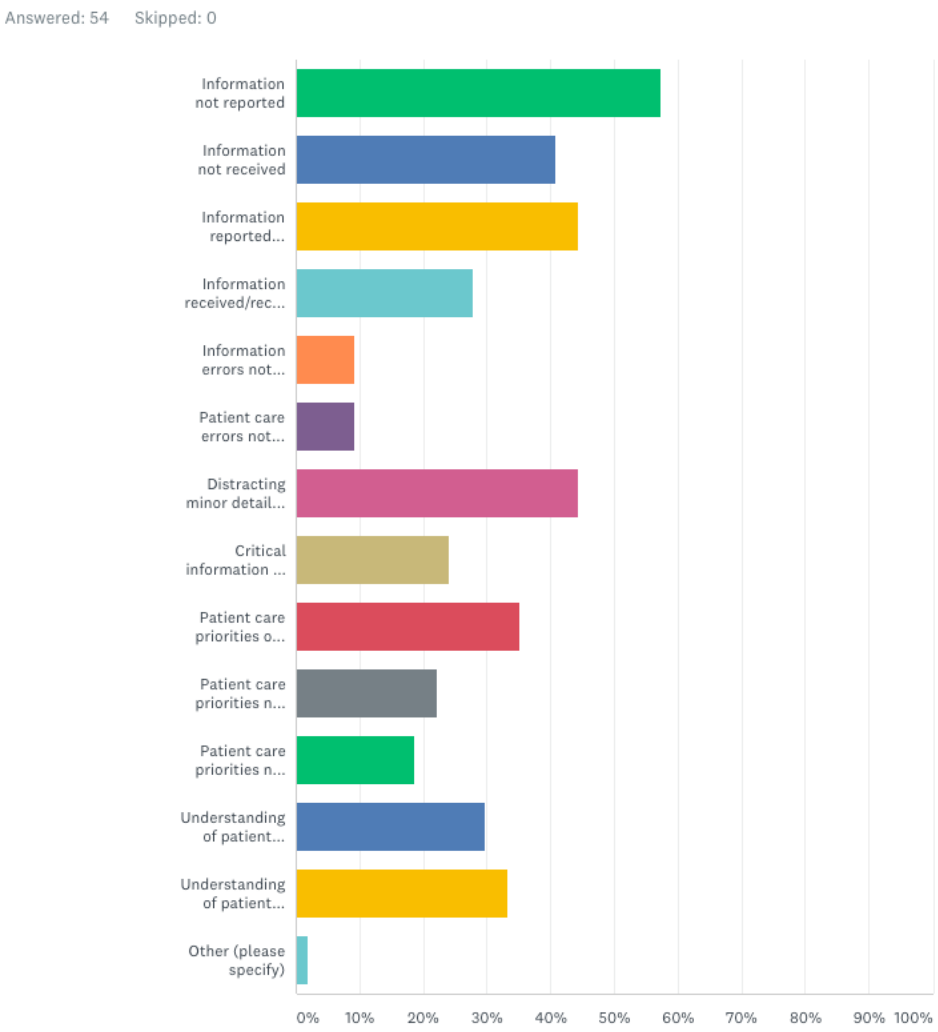
Figure 4




What critical patient information is most commonly missed, misreported, or misunderstood?

Figure 5 illustrates the perceptions of respondents who were asked in question 10 what errors occur most frequently during patient handover with an allowance for respondents to check all applicable items. The single "Other" response represented information that may be passed to an RFD staff member who does not share the information with the RFD staff member who is later the reporting party in another handover.

Figure 5




*What errors occur most frequently during patient hand-off?*

In question 11 respondents were asked what their approximation of the percentage of handovers where no critical information was missed either by sender or receiver the average among all 54 responses was that 61% of handovers involved no critical information missing. When asked in question 12 if they had every directly witnessed or become aware of critical patient information being missed, misreported, or misunderstood 45 (83.33%) responded yes with the remaining 9 (16.67%) replying that they had not. When asked in question 13 if they might briefly describe any impact that missing, misreported, or misunderstood information had

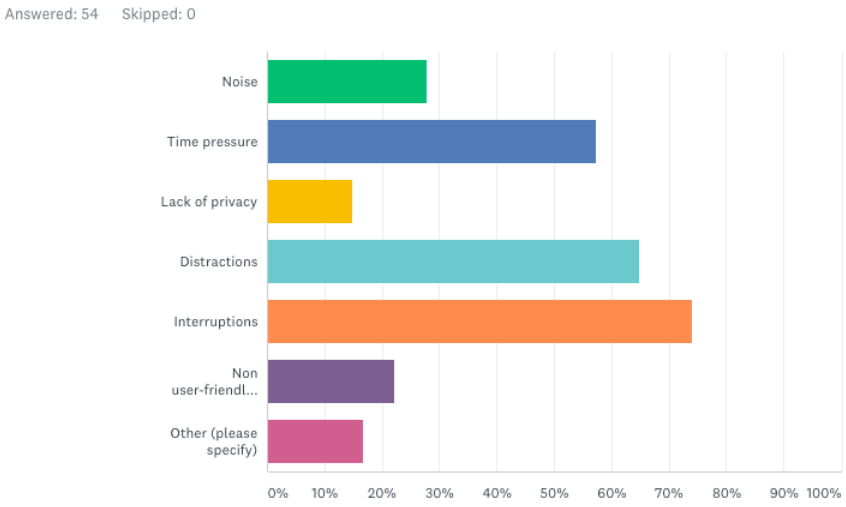
on patient outcome without including any identifying information, the anonymized responses were as follows.

- Delay of care continuum and re-testing at bedside
- Patient became angry when ambulance staff went to transport because info was not passed on properly from police to fire department
- Arrest on scene vs warrant arrest
- You feel as though the information you have is not important sometimes... as the receiving facility is overwhelmed and will figure it out on their own when they get there
- Patient was being treated for a possible stroke and turned out that it was only hypoglycemia.
- Information that could be given to change the course of treatment.
- The PT was in the early stages of pregnancy and this was not reported until after medications were administered
- Forced complete revaluation of care given and planned treatments to be revaluated
- RN misunderstands information but still does something different even when clarified
- EMT stated patient here for headache, did not mention patient had chest pain and this really affected patient outcomes, not good
- Delay in care provided, delay in disposition
- Poor report given to receiving staff, thus leading to poor patient care
- Blood thinner not reported, delayed reversal agent

- Delay of care (mentioned by 3 respondents)
- ED receiving team did not allow me to report MOI and team began Tx prior to understanding injuries found. Resulting in a non-displaced Fx becoming a severely displaced Fx needing surgical intervention.
- Delays in care as well as hospital having to John Doe people due to improper paper work from sending facility
- In a trauma alert, the EMT and I were thorough in our assessment and treatment but in the ED the nursing staff listened to only the doctors in the room and the doctors barely listened to us. They must have doubled efforts in PT care 5-6 times before I just left the room and didn't continue my report because no one was listening.
- DNR (do not resuscitate directive) status not shared until Family speaks on their behalf during traumas. Patient is over 90 years old.
- Not identifying generic names of anticoagulants
- Negative outcomes
- Wrong meds given, DNR not honored
- Missed associated injuries and smoke inhalation risk when focus was on the severe traumatic injury.
- Critical trauma patient was handed over to ED staff who were not attentive to the report, instead focusing on rapidly moving the patient over, interrupting critical care and beginning their assessment from square one.
- Delayed evaluation by ED physician
- Delay in proper diagnosis

Figure 6 illustrates the perceptions of respondents who were asked in question 14 what external or systemic conditions increase the chance of failure during patient handover communication with an allowance for respondents to check all applicable items. The "Other" responses included the use of standardized patient reporting sheets, poor radios, busy days, incompetent providers at assisted living and extended care facilities, non-provider friendly receiving staff, environmental noise, listening skills of receivers and communicating skills of reporters, inattentiveness, staff not believing information to be relevant, lack of understanding of scope of practice of EMS providers.

Figure 6

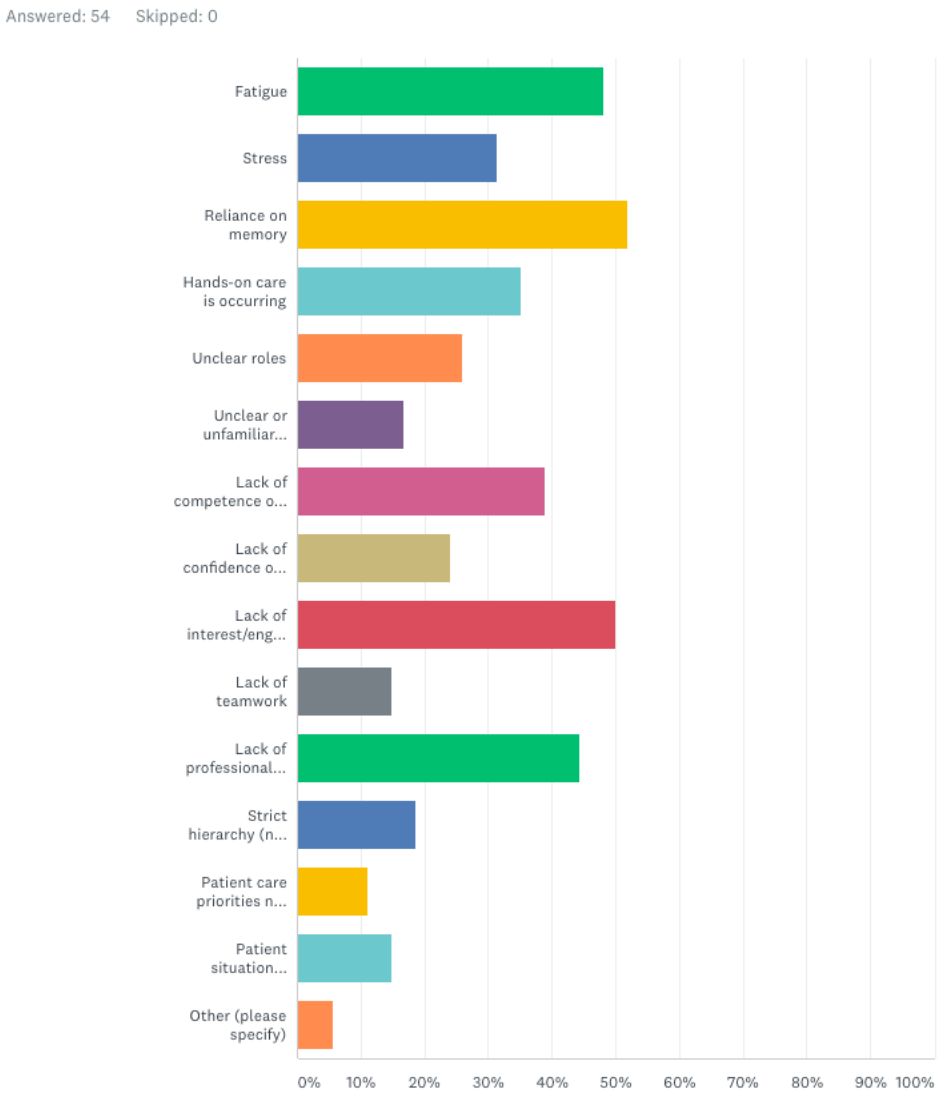



*What external (systemic) conditions increase the chance of failure during patient handoff?*

Figure 7 illustrates the perceptions of respondents who were asked in question 15 what internal or personal conditions increase the chance of failure during patient handover communication with an allowance for respondents to check all applicable items. The "Other" responses included a lack of patient handover system, the lack of a "moment of silence" during

handover of patients to ED staff during trauma alerts, and a lack of RFD ability to obtain pertinent information from the emergency scene.

Figure 7

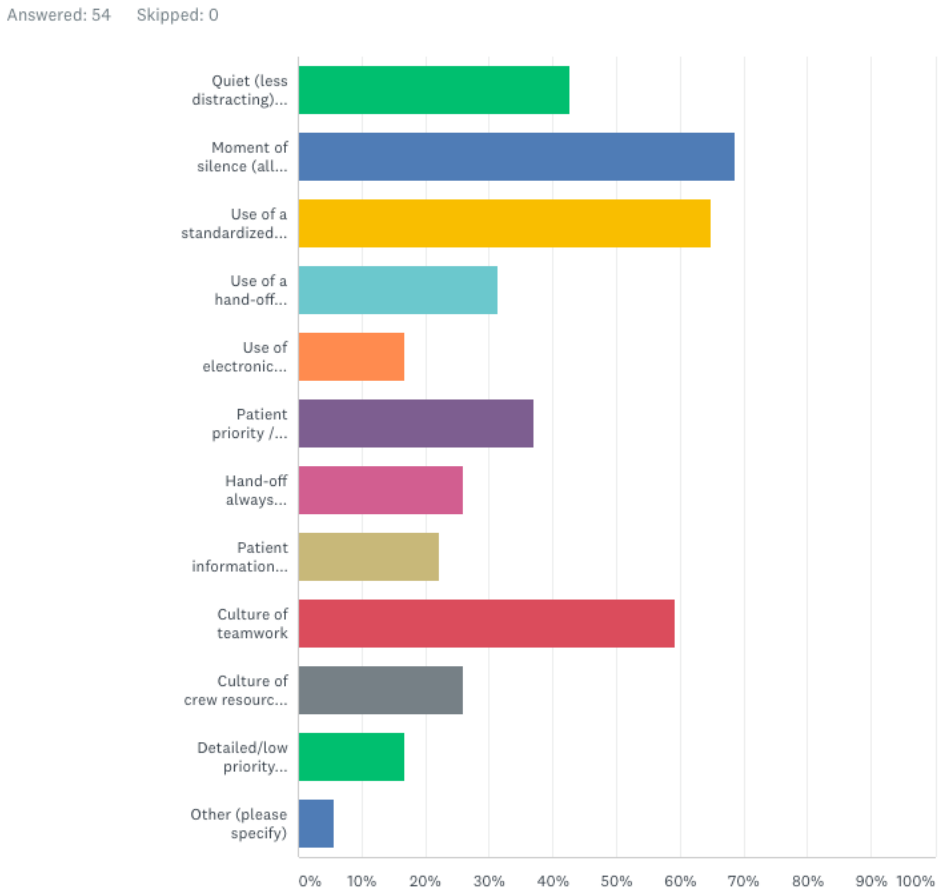



*What internal (personal) conditions increase the chance of failure during patient handoff?*

Figure 8 illustrates the perceptions of respondents who were asked in question 16 what external or systemic conditions increase the chance of success during patient handover communication with an allowance for respondents to check all applicable items. The “Other”

responses included nursing staff prepared to receive information at time of handover, effective crew resource management and clear expectations of what information is needed and why.

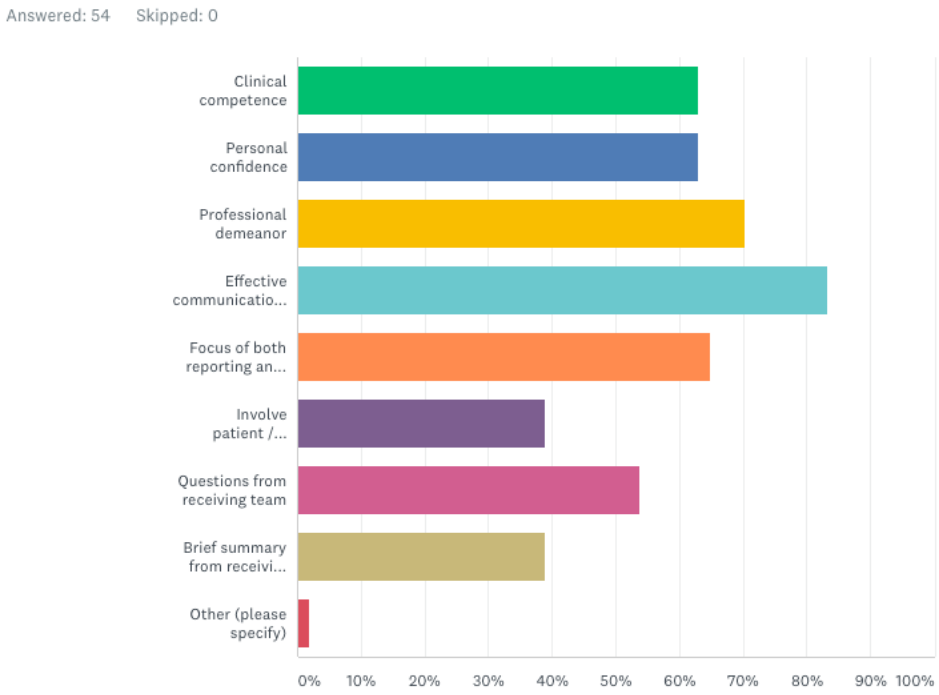
Figure 8




*What external (systemic) conditions increase the chance of success during patient handoff?*

Figure 9 illustrates the perceptions of respondents who were asked in question 17 what internal or personal conditions increase the chance of success during patient handover communication with an allowance for respondents to check all applicable items. The single "Other" response was an interest in the reason that the patient was there.

Figure 9




*What internal (personal) conditions increase the chance of success during patient handoff?*

In question 18 when respondents were asked if they currently follow a standardized handover procedure 31 (57.41%) said yes while 24 (44.44%) said no. When asked in question 19 to briefly describe the procedure if they use one the responses were as follows:

- Moment of silence for trauma and alert patients (10 responses)
- Direct contact with receiving HCW
- Emergency committals: fill out form and pass on to paramedic
- Direct communication between paramedic and officer/supervisor on scene
- A systematic standard report including the initial interview of patient, events that led to patient chief complaint, and prompt to activate 911. Questions pertinent to patient's condition (if applicable). Constantly acquiring information. The standard report for me includes a who, what (happen, and led to chief complaint),

Treatment given (before EMS), Med. history, medications, allergies, Treatment (After EMS contact), Changes.

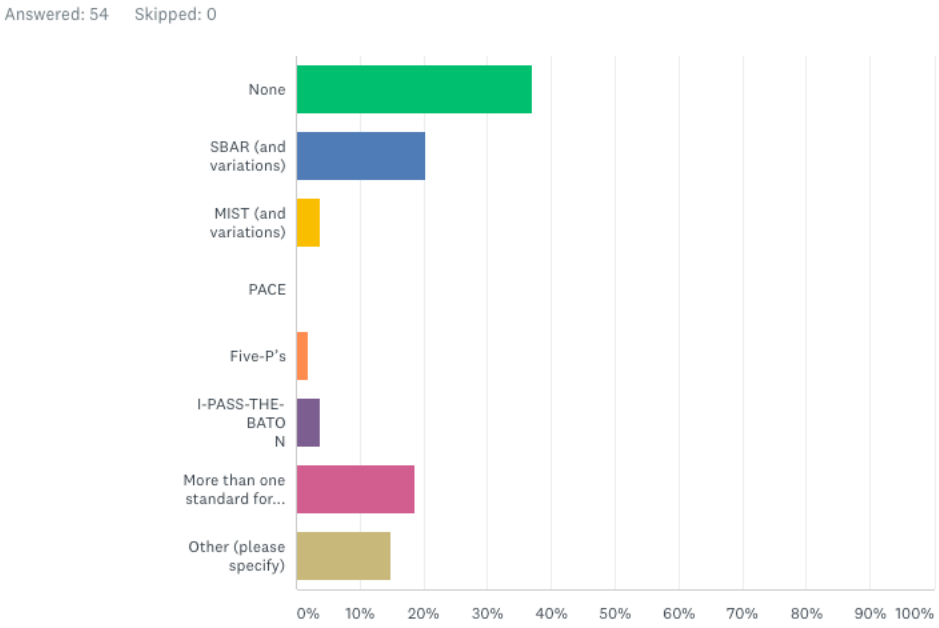
- I ask who is receiving report or make sure I have the MD in charge to report to so we can be on one page
- We use the SBAR format, Situation, background, assessment and recommendation format
- Direct eye contact, annunciate and speak clearly, a detailed story from start to finish
- Report from charge nurse with EMS, bedside report with EMS, inclusion of patient if medically possible.
- CHART method
- We don't have a procedure but I have used my system which has worked for a while
- Patient handoff before moving the PT, ensure the correct folks are there so you do not do things twice and miss something
- Face to face to the receiving person. Making eye contact. Make sure the receiver understands the information
- Maintain patient. ABCs, wait for direct eye contact with staff and begin report with most critical aspect of illness/injury. Save details for the paperwork.

In question 20 when respondents were asked if they follow this procedure on every handover 21 (42.00%) said yes while 29 (58.00%) said no. Respondents were then asked in question 21 when or why they would use a standardized handover procedure if not for every patient. Responses were as follows:

- Alerts (3 responses)
- Only for trauma alerts (8 responses)
- When a patient is 100% in transport
- Typically, only for acute/critical patients do we use the moment of silence. Structured hand-off between pre-hospital providers and physician (me) would be ideal of course, but not always feasible on every patient due to time constraints.
- Sometimes ER is busy & md is tied up. I have also had RN not come into room & I have had to look for them
- Staff not always available for hand-off, Crew hands-off to available staff - not staff who will be caring for patient
- The only time I wouldn't use it is if I'm ignored by the receiver which does happen. Quite frequently
- Depends on situation
- Always use
- Inconsistent. No pattern

Figure 10 illustrates the perceptions of respondents who were asked in question 22 what standardized or structured handover format they primarily use for critical information. The "Other" responses included BLS, a face-to-face report, CHART, moment of silence, and two respondents reported using systems of their own design.

Figure 10




*What standardized / structured handoff format do you primarily use for critical patient information?*

The results of the first portion this questionnaire address the question of what contributes to the potential for information loss during patient handover within the RFD. Questions 1 through 6 of the questionnaires returned results that showed that patient handover is an event that occurs with frequency and across many professional boundaries, potentially presenting a significant opportunity for communication failure. Questions 7 through 13 show that respondents perceive that information is lost during more than 25% of patient handover events and that respondents believe that they can specifically identify this information loss and, often, the resulting negative impact that it can have on patient care. In questions 14 and 15 respondents specifically identify external and internal conditions that have the potential to increase the chance of information loss during patient handover.

The results of the latter portion of this questionnaire addressed the question of what communication frameworks may be adopted to minimize loss of critical information during

patient handover within the RFD. In questions 16 and 17 respondents specifically identify external and internal conditions that have the potential to minimize the chance of information loss during patient handover. In questions 18 through 22 respondents describe current procedures already in place (or lack thereof) to minimize patient handover communication failure and resulting negative impact on patient care.

Through data collected from this questionnaire the answer to the question, "What contributes to the potential for information loss during patient handover within the RFD?" was found to be the following:

- A high total number of patient handovers
- A lack of job aid with standard format and minimum data set
- Interruptions
- Noise
- Time pressure
- Non-user-friendly technology
- Lack of provider competence
- Lack of provider confidence
- Inattentiveness / lack of engagement
- Lack of common understanding
- Fatigue
- Stress
- Reliance on memory
- Hands-on care occurring
- Unclear roles

- Lack of professional respect
- Unclear mental model
- Lack of universal use of current communication recommendations

Through data collected from this questionnaire the answer to the question, "What communication frameworks may be adopted to minimize loss of critical information that occurs during patient handover within the RFD?" was found to be the following:

- Use of a "moment of silence" for report
- Use of a standardized format
- Minimizing distractions
- Use of low-tech handover forms/job aides
- Use of electronic triage, alert, handover software
- Reporting patient priority first
- Completing handover before transferring patient
- Supporting a culture of teamwork
- Supporting a culture of crew resources management
- Detailed information transferred via patient medical record
- Clear expectations among reporting and receiving parties
- Clinical competence
- Personal confidence
- Professional demeanor
- Use of effective communication skills
- Focus of both reporting and receiving team leaders (eye contact)
- Incorporating an opportunity for questions from the receiving team

- Incorporating a brief summary (read-back) from the receiving team

A series of brief interviews was conducted by telephone and email with select individuals with expertise in EMS patient handover communications improvement. Five interviews were conducted to obtain expert opinion and broad perspectives to help identify essential components of a patient handover program that should be adopted by the RFD. Each interview consisted of a brief introduction email (Appendix E) and a follow up transcribed or recorded telephone call or email (Appendix D).

Dr. David Fitzpatrick (personal communication, August 14, 2018) (Appendix D) was contacted as an EMS practitioner, educator, international perspective, and lead author of two recent papers on the subject of improving EMS patient handover communications (Fitzpatrick, Maxwell, & Craigie, 2018; Fitzpatrick, McKenna, et al., 2018). Over the course of the interview Dr. Fitzpatrick identified the primary essential element of any EMS patient handover communication program to be the development of the "shared mental model" (Fitzpatrick, personal communication, August 14, 2018) (Appendix D). This is defined by Cannon-Bowers as “knowledge structures held by members of a team that enable them to form accurate explanations and expectations for the task and in turn, to coordinate their actions and adapt their behavior to demands of [their unique domain]”. Dr. Fitzpatrick further emphasized that the program be designed so that providers do not have to rely on memory. “Consider using low-tech or high-tech job aids to help carry information in standardized format from point of capture to patient handover” (Fitzpatrick, personal communication, August 14, 2018) (Appendix D) Finally, Dr. Fitzpatrick stated that the prior elements must be supported by education and that this education must be supported by the relevant organizations and involve all relevant

stakeholders that may be involved in patient handoff communications (Fitzpatrick, personal communication, 2018) (Appendix D).

Regarding the question of handoff communication improvement programs being "one-size-fits-all", Dr. Fitzpatrick says, “It is unlikely there is one solution or set of solutions that is applicable to all patient handover communications, but it is likely that the many elements will help most, if not all situations” (Fitzpatrick, personal communication, August 14, 2018).

Dr. Rhiannon Talbot (personal communication, August 14, 2018) (Appendix D) was contacted due to her activities as a consultant in emergency medicine, the equivalent of an attending emergency department physician in the United States, as well as for her international perspective, and she is the lead author of a key paper on the subject of improving EMS patient handover communications (Talbot & Bleetman, 2007). She identified the key elements of an effective handover system to include training and education, involvement of all relevant stakeholders, use of a common, structured format, and the opportunity for two-way communication (Talbot, personnal communication August 14, 2018) (Appendix D).

Regarding the concept of such a system being designed as one-size-fits-all, Dr. Talbot thought that this may be not only possible, but a good idea (Talbot, personnal communication August 14, 2018) (Appendix D). She expressed concern that in attempting to design or utilize different systems for differing patient priorities, patients with apparent low-risk conditions whose priority issues simply have not yet become apparent. “It is particularly a problem in falsely reassuring people that a patient is ‘fine’, who then may deteriorate unnoticed in busy conditions” (Talbot, personnal communication August 14, 2018, para 2) (Appendix D).

Mr. Ahed Al Najjar (personal communication, August 14, 2018) (Appendix D) Head of the Life Support Training Unit and EMS Researcher at Prince Sultan bin Abdulaziz College for

Emergency Medical Services of King Saud University, Saudi Arabia was contacted as an EMS researcher and educator and for an international perspective. Mr. Al Najjar succinctly proposed the following key elements be incorporated into patient handoff communication improvement programs: Providing education, mentoring and real time feedback (Ahed Al Najjar Najja personal communication, August 14, 2018) (Appendix D).

Mr. Al Najjar further suggested that:

> "One size does not fit all…due to lack of dedicated time to complete patient records and participate in handover, personal style, lack of structure and formality, lack of effective information management technology and systems for sharing clinical information, increased numbers of patients under the care of a single team (high priority vs low priority patients), frequency with which lead consultant changes, frequent movement of patients between facilities and specialized facilities, involvement of multiple specialist teams (Basic/ Advance/ specialized) and transfer to other health professionals in the community or other institutions/agencies" (Ahed Al Najjar personal communication, August 14, 2018) (Appendix D)

Retired FDNY EMS Deputy Chief Peter Hosey (personal communication, August 14, 2018) (Appendix D) was invited to contribute due to his experience as a clinical provider and high-level supervisor in a fire-based EMS system. Chief Hosey provided a wealth of context, identifying essential elements of a patient handover communications improvement program include involving all relevant stakeholders, but keeping in mind the challenges of obtaining buy-in from stakeholders for whom EMS is not their primary responsibility (P. Hosey, personal communicaiton, August 14, 2018) (Appendix D).

Chief Hosey also identified barriers to implementing a one-size-fits-all program in that high priority calls may have a different set of stakeholders than low priority emergencies (P. Hosey, personal communication, August 14, 2018) (Appendix D). Chief Hosey noted that, "FDNY firefighters through the CAD system respond based on segment type. Thus a high priority or segment one, two (cardiac/respiratory arrest, choking etc. are gonna get an Engine response automatically as well as an ALS/ BLS units" (P. Hosey, personal communication, August, 14, 2018, para 2) (Appendix D).

Mr. Mike Emond (personal communication, August 14, 2018) (Appendix D) was invited to interview due to his clinical experience as an emergency department nurse and his role as a supervisor and project manager at Danbury Hospital, the primary destination hospital for the Ridgefield Fire Department. Mr. Emond explained that he believes that principles that apply to bedside nursing handover reports may offer a model for an EMS handover communication program for the RFD (M. Emond, personal communicaiton, August, 14 2018) (Appendix D). He, too, emphasized the importance of education as a part of the initiative as well as the importance of emphasizing the "why" of the program to participants in order to increase buy-in (M. Emond, personal communication, August 14, 2018) (Appendix D).

Mr. Emond recommends that, rather than a one-size-fits-all program approach that the focus should be on fundamental elements, but with alternative options, stating, "The basics should be in place, but there may be one-off situations where facilities may have flexibility" (Michael Emond, personal communciation Augsut 14, 2018) (Appendix D).

Through data collected from this series of interviews the answer to the question, "What are the essential components of a patient handover program that should be adopted by the RFD?" was found to be the following:

- A focus on a shared mental model
- Designed to use job aides to avoid reliance on memory
- Education supported by stakeholder organizations and personnel
- Inclusion of a common, standard format
- Incorporation of two-way communication
- Mentoring
- Real-time feedback
- Obtaining buy-in from stakeholders
- Focusing on fundamental elements while allowing flexibility

In answering the research questions, the data collected from the questionnaire and the series of interviews led directly to the creation of the Patient Handover Program Needs Analysis and Proposal (Appendix F) as well as the Patient Handover Communications Department Policy Proposal (Appendix G).

## Discussion

That communication failure during patient handover occurs frequently and is a major contributing factor to patient harm both globally and in the United States has been well established (The Joint Commission, 2006b, p. 9; World Health Organization, 2007, p. 1). That this problem extends specifically to the realm of prehospital care has also been established (American College of Emergency Physicians, 2014, p. 503). This data (Appendix B) supported prior findings and confirmed that similar communication failures have been observed to occur and lead to real and potential harm for patients under the care of the Ridgefield Fire Department. While no legal action has yet resulted from these failures, precedent exists to make this a significant liability for the department, the Town of Ridgefield, and individual staff members. (Schoenly, 2010, p. 2). Furthermore, each patient handover presents not only a risk, but also

opportunities to correct previous errors, gain a fresh perspective, enhance learning, promoting team cohesion, providing emotional support as well as realize other benefits that may slip away without careful management (Cohen & Hilligoss, 2010, pp. 5-12; Kalyani et al., 2017, p. 1). While this was not specifically addressed in this research, prior literature suggests that these benefits may be realized as patient handover communication at the RFD is improved.

Prior works have identified many factors that may contribute to communication failure during patient handover both generally and specific to the context of EMS (Carayon & Wood, 2010, pp. 578-579; Cheung et al., 2010, pp. 172-176; Cohen & Hilligoss, 2010, pp. 11-24; Horwitz et al., 2009, pp. 704-707; Thakore & Morrison, 2001, pp. 293-295; Wong & Yee, 2008, pp. 20-47). Fitzpatrick specifically identified the top seven critical barriers to contributing to potential information loss during patient handover as interruptions, variability, lack of coordination, lack of clear lead, poor verbal skills and lack of written data (2018, p. 6). Through the portions of the questionnaire developed to determine what factors contribute to the potential for information loss during patient handover within the RFD this research (Appendix B) found agreement that these same factors affect RFD EMS operations. Even with the well-used option for respondents to add in any additional factors they perceived, after consolidation of terminology virtually all factors from prior literature were identified as present in some form and no factors were identified that were outside of prior research.

In order to take advantage of opportunities and mitigate risks that patient handovers present, Brindley and Reynolds (2011, p. 155) as well as Patterson et al. (2010, p. 52) point to lessons from industries outside of healthcare to identify factors in effective communications Other prior research complimented these findings with similar factors being recommended for both general healthcare and prehospital environments (Accreditation Council for Graduate

Medical Education, 2011, p. 202; Carayon & Wood, 2010, p. 7; Michael D. Cohen & Hilligoss, 2010, p.30; Dawson et al., 2013, pp. 397-402; Fitzpatrick, Maxwell, et al., 2018, p. 1; Fitzpatrick, McKenna, et al., 2018, pp. 8-10; Riesenberg et al., 2009, p. 202). Through the portions of the questionnaire developed to determine what communication frameworks may be adopted to minimize loss of critical information that occurs during patient handover within the RFD this research again found agreement (that respondents perceived these same factors have the potential to positively affect RFD EMS operations even though only a few of these are currently in use. Even though the option existed within the questionnaire for respondents to add in any additional factors they perceived, after consolidation of terminology no factors were identified that were outside of prior research.

McKee's (2017) recommendations for the essential components of a patient handover program including demonstrating leadership commitments, standardization, promote effective face-to-face communication, include training, leverage technology, monitor progress and spread best practices provided the only publicly available, detailed and explicit framework for a patient handover improvement program found in the literature (McKee, 2017, para 1). Yet the importance of such an overall program to the effective use of any factors to improve handover communications is noted by Talbot and Bleetman (2007, p. 541) and reiterated by Talbot (personal communication, 2018) in her personal interview. This theme was reiterated across all of the interviews, stressing the importance most especially of organizational support and effective education in agreement with the prior literature (Najjar, personal communication August 14, 2018; Fitzpatrick, personal communication, August 14, 2018; Emond, personal communication, August 14, 2018; Hosey, personal communication, August 14, 2018; Talbot, personal communication, August 14, 2018) (Appendix D).

While this research is in near full agreement with the findings of prior work, large gaps remain in the application of identified recommendations. However, Cheung et al. (2010) caution that, “Simple solutions are elusive, especially because of the number and complexity of issues involved” (p. 177). Wong and Yee (2008) emphasized the importance of change management techniques when implementing any such changes noting that the use of these strategies greatly increases the chance of successful application of the recommendations as well as the satisfaction of both patients and providers (p. 52). While the action research methodology has produced a patient handover program needs analysis and proposal along with a draft policy, the body of prior research makes it clear that this is only the first step in an ongoing effort to continue to refine patient handover communications for the Ridgefield Fire Department. Support by the chief of the Department, the line and staff officers, firefighters, and those from and to whom patient handover is reported and received must all support the changes that this research recommends in order to realize the benefits and avoid the hazards identified by the prior literature.

## Recommendations

The key findings of the literature (Appendix A) were found through the results of this research to be applicable to the Ridgefield Fire Department. Results identified that many of the factors identified in the literature to potentially cause information loss and patient harm are present at the RFD. Results further identified that providers along the continuum of care perceive the presence and value of many facets of communication that may be adopted to minimize information loss during patient handover, however few of these are currently in use. Furthermore, a panel of global experts provided information to potentially fill in knowledge gaps left by the existing literature on the essential components of a wholistic program to improve patient handover. This research produced data adequate to develop and recommend the use of a

patient handover communications improvement policy and program, as was the stated goal of this research.

Based on the data, the following recommendations are made for consideration by the Ridgefield Fire Department. The first recommendations is conceptual approval by the RFD Chief of the policy and program proposal that resulted from this research. Once the RFD Chief has approved the concepts the relevant stakeholder agencies identified in this research should be contacted to participate in and assist in refining of both the policy and the program.

The second recommendations is to investigate available options for electronic communication and alerting tools as well as field-proven electronic data capture and electronic heath records that may be available for use by the RFD to further improve patient care and handover communications. This investigation should be accompanied by possible low-tech solutions that may achieve many of the same results as the technology driven options. The RFD Chief may recommend that this investigation be taken up by the EMS Coordinator, another line officer, or a subcommittee of line officers.

The third recommendations is, as indicated in the proposal, that this program will be regularly evaluated and revised. As indicated by the wealth of research on this topic that has come to light over just the past 10 years, globally this is an evolving topic with much being learned and improved on a regular basis. New research, as it becomes available, should be incorporated into on-the-ground observations by healthcare providers to continue to refine the policy and the program, but most importantly providers' ability to apply these tools to improve patient handover communications. It is further recommended that additional research on this topic be encouraged and supported by the RFD and its staff, especially where such research may be applicable to field EMS operations.

The fourth recommendations is that the RFD explore the potential transferability of the lessons of this research to all emergency communications. With an investment in research and resources to improve general communication education, the RFD may have the potential to apply these practices to improve fireground and other emergency operations communications.

As indicated by many of the responses to the questionnaire, there are many factors involved in improving patient handover communication and many steps that involve change occurring at organizations outside of the RFD. This should not discourage RFD staff from adopted the policies and practices recommended by this research. As identified by Woodson and Bronsky (2018),

> No single solution to preventing medical errors exists, and the best interventions focus on creating a culture of safety and collaboration. Any solution needs to start with improving communication among the many different members of the care team. EMS agencies can be the driver behind change, bringing members of the regional system of care together to ensure everyone is on the same page. ( 2018, Conclusion, para 1)

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# Appendix A
## Literature Review Summary With Key Elements Derived

| Title | Lead Author | Publication | Year | Lit. Rev | Meta-analysis | Interviews | ED | EMS | Communication Failures | Handoff Key Findings |
|---|---|---|---|---|---|---|---|---|---|---|
| The Eric Cassell Lecture | Department of Medicine | Perspectives in Biology and Medicine | 2000 | N | N | N | ED | EMS | Communication is a root cause of preventable medical errors. Need to build in checks and redundancy. | |
| Gaps in the continuity of care and progress on patient safety | Cook | British Medical Journal | 2000 | – | – | N | ED | EMS | Communication is a root cause of preventable medical errors. Need to build in checks and redundancy. | |
| A survey of the perceived quality of patient handover by medical staff in the accreditation area. | Thakkar | Emergency Medicine Journal | 2004 | – | – | N | ED | EMS | Communication is a root cause of preventable medical errors. Need to build in checks and redundancy. | |
| Communication breaks as clinical staff in the emergency department rest | Cabana | The Medical Journal of Australia | 2002 | – | – | N | ED | EMS | Communication is a root cause of preventable medical errors. Need to build in checks and redundancy. | |
| Profiles in patient safety: emergency care transitions. | Arnold | Academic Emergency Medicine | 2003 | | | | ED | EMS | | |
| Handoff Strategies in settings with high consequences for failure | Patterson | Anesthesiology Clinics of North America | 2004 | | | | | EMS | | |
| Lost in Translation: Challenges and Opportunities in Physician-to-Physician Communication During Patient Handoffs | Solet | Academic Medicine | 2005 | | | N | | | | |
| Department Of Defense Patient Safety Program Healthcare Communication Training: An Initiative Taken to Care | Department of Defense | Department of Defense | 2003 | | | | | | | |

| Title | Recommend Standardized Framework | Recommend Communication Flow Assessments | Handoffs Complications | Handoffs Information Loss | Handoffs Interruptions/Barriers | Handoffs Role-specific | Handoffs Standardized | Handoffs Team-based | Handoffs Training/Education | Handoffs Verbal | Handoffs Written | Recommend Standardized Framework | Recommend Communication Flow Assessments | Handoffs Key Findings |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| The Eric Cassell Lecture | | | | | | | | | | | | | | Communication is a root cause of preventable medical errors. Need to build in checks and redundancy. |
| Gaps in the continuity of care and progress on patient safety | | | | | | | | | | | | | | The complexity of health care makes it very challenging to study safety systematically. One practice is multi-level communication, particularly difficult to identify as it is also trying to identify a lack of silence in a room filled with noise. |
| A survey of the perceived quality of patient handover by medical staff in the accreditation area. | | | | | | | | | | | | | | |
| Communication breaks as clinical staff in the emergency department rest | | | | | | | | | | | | | | |
| Profiles in patient safety: emergency care transitions. | | | | | | | | | | | | | | |
| Handoff Strategies in settings with high consequences for failure | | | | | | | | | | | | | | Effective staff to recognize potential hazards of handoffs and continue to open lines to initiate corrective actions, and ensuring team responsibility. Study cites gaps in the ED and report best practices. Factors to reduce handoff errors: communication and patient accessibility through team and handoff briefings. Incomplete handoffs and addressing strategies to avoid missed diagnoses. Role personal information is commonly lost in reports. Team situational awareness and provide confirmation options to reduce by short timeframes of critical tasks. |
| Lost in Translation: Challenges and Opportunities in Physician-to-Physician Communication During Patient Handoffs | | | | | | | | | | | | | | The current flow from communication training to emergency departments and other similar investigations |
| Department Of Defense Patient Safety Program Healthcare Communication Training: An Initiative Taken to Care | | | | | | | | | | | | | | Highlighting quality and recording confidence over variables with high validity issues and consider as not how to predictors and how quality problems |
| | | | | | | | | | | | | | | Standardized handoffs to recognize potential hazards of handoffs and continue to open lines to initiate corrective actions, and ensuring team responsibility. Study cites gaps in the ED and report best practices. Factors to reduce handoff errors: communication and patient accessibility through team and handoff briefings. Incomplete handoffs and addressing strategies to avoid missed diagnoses. Role personal information is commonly lost in reports. Team situational awareness and provide confirmation options to reduce by short timeframes of critical tasks. |
| | | | | | | | | | | | | | | See recommended communication flow assessments |
| | | | | | | | | | | | | | | The handoff process must be standardized and that standard must evolve as we learn more about the best practices. |
| | | | | | | | | | | | | | | Recommend communication flow assessments. Organizational support, such as PASSOP, the MATTER, and a checklist. Team building, and the conditions of care, as a checklist, time pressure, or economic to avoid missing key information, missed information, and adequate sufficient time, trends and error effective and checks of communication, data tracking, should be available. |
| | | | | | | | | | | | | | | Two common, compliance theory or communication through policy, use of communication |

| Title | Lead Author | Publication | Year | Lit Rev | Framework | Interv | Health Inform | ED | EMS | Identified Barriers | Modified Interventions | Missed Clinical Complications | Recommended Communication Frameworks | Recommended Standardized Frameworks | Desired Key Findings |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A descriptive review in home accounts of Emergency Department discharge | Blair | The Wall Street Journal | 2006 | – | – | X | | | | High cognitive load, complex instructions, high workload, environmental factors | Many possible | Preventable medical errors | Standardized Protocols | I PASS the BATON, BEATS | Standardized protocols could reduce medical errors and improve patient safety. Patient-centered communication and clear discharge instructions are crucial for effective handoffs. |
| Safe Handovers: Safe Patients | British Medical Association | British Medical Association | 2006 | S | – | X | | | | Distractions, interruptions | Many possible | Wrong site surgery | Verbal | Various | Standardized protocols and checklists can improve communication and reduce errors during patient handovers. |
| Handoffs Caused Errors at the Heart: EHR | Landro | Wall Street Journal | 2006 | – | – | X | | | | Multiple hand overs, lack of communication, lack of standardized format, lack of hand over information, inadequate handover, lack of training, lack of workflow | Many possible | Preventable medical errors | Standardized Protocols | Various | Standardized protocols can improve communication and reduce errors during patient handovers. |
| SBAR: A Shared Mental Model for Improving Communication Between Clinicians | Riley | Patient Safety | 2006 | – | – | X | | | | Lack of standardization, unstructured report, unwillingness to share information, lack of communication | Many possible: SBAR, or other information given at verbal handovers by the sender, errors were accurately collected by EDIDAT before the introduction of EDIDAT. Only 40.2% of the information given at verbal handover by the sender was correct. EDIDAT format was accurately collected by EDIDAT. | Unspecified events | Standardized Protocols | SBAR | Standardization in handoff events and improvement of safety culture. Information of SBAR structure. |
| Reduction of information by emergency department staff at medication handovers: do standardized approaches work? | Thakur | British Medical Journal | 2006 | – | – | X | | | EMS | Not reported | Many possible | Unspecified events | Verbal | Various | Standardized protocols can improve communication and reduce errors during patient handovers. |
| Common mistakes during patient hand overs | World Health Organization | World Health Organization | 2007 | S | – | X | | ED | | Incomplete information, information overload, incomplete notes, high workload, environmental factors, fatigue, lack of standardized handoffs, environmental noise | Many possible | Unspecified events | Verbal | Various | Standardized protocols can improve communication and reduce errors during patient handovers. |
| Handoff Communications: Handing the Ball to Change | FELP | Before Harm | 2007 | – | – | X | | ED | | Interruptions, high cognitive load, high workload | Many possible | Preventable medical errors | Standardized Protocols | Various | Standardized protocols can improve communication and reduce errors during patient handovers. |
| The continuing clinician decision-making and cognitive load sharing and effort from handoffs in emergency care | Lawrence | Advances in Medical Education and Emergency Medicine | 2007 | – | – | X | | ED | | Interruptions, high cognitive load, high workload | Many possible | Preventable medical errors | Standardized Protocols | Various | Standardized protocols can improve communication and reduce errors during patient handovers. |
| Patient handovers: Time for a change? | Jacobs | Emergency Nursing | 2007 | – | – | X | | | EMS | Inadequate time, lack of standardized handoffs, environmental noise, lack of training, lack of workflow, lack of communication, lack of information, lack of standardized language | Many possible | Unspecified events | Verbal | Various | Standardized protocols can improve communication and reduce errors during patient handovers. |
| A Structured Professional-Based Literature Review regarding the Effectiveness of Improved Information in Clinical Handovers | Wang | Australian Clinician Nurse Safety and Quality in Health Care | 2008 | – | – | X | | | | Inadequate time, lack of standardized handoffs, environmental noise, lack of training, lack of workflow, lack of communication, lack of information, lack of standardized language | Many possible: Verbal handover, Written handover, Electronic handover, Standardized handover, Structured handover, Checklist handover, Mnemonic handover, Training handover, Simulation handover, Audit handover, Feedback handover, Other handover | Unspecified events: Medication errors, Diagnostic errors, Communication errors, Documentation errors, Procedural errors, Equipment errors, Environmental errors, Other errors | Verbal: Face-to-face handover, Telephone handover, Video handover, Written handover: Paper-based handover, Electronic handover, Standardized handover, Structured handover, Checklist handover, Mnemonic handover, Training handover, Simulation handover, Audit handover, Feedback handover, Other handover | Various: Standardized handover, Structured handover, Checklist handover, Mnemonic handover, Training handover, Simulation handover, Audit handover, Feedback handover, Other handover | Standardized protocols can improve communication and reduce errors during patient handovers. |

| Title | Lead Author | Publication | Year | Lit. Rev. Framework / Intervention / Healthcare | ED | EMS | Modified Barriers | Modified Interventions | Recommended Communication Mechanisms | Recommended Standardized Elements | Discussed Key Findings |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Adequacy of information transferred at critical sign- and flu hospital handover of care: a pilot prospective survey | Ramsingh, | Quality and Safety in Health Care | 2008 | X | | | High cognitive workload and task loads; ineffective communication; workloads; ambiguous assessments | Many possible | Training on communication, use of communication systems | Minimum specified | Patient hand-over is a significant point of risk in relation to the flow of information. Failures at this point are a primary cause for clinical errors. |
| Patient Handover at Emergency Centers | Wallis, | South Africa Emergency Medicine Society of | 2008 | — | | EMS | Not reported | Many possible | Standardized communications | Use MIST, ABCDE, AMPLE, ASHICE, CUBAN, DESIRST, GEBIRR, HANDOFFS, IPASSTHEBATON, MIST, PACE, PEDIATRIC, SBAR, I-SBAR, SBART, SHARED, SHARED, SBEBRIEF, SBAR, STEC, A.P.R., T.P., P.A.S.T.R.Y.Z | When EMS arrives to deliver or collect a patient from an Emergency centre, the handover is often an in-hand-over event. EMS staff should remain outside directly with the Emergency Centre Staff member. For the duration of the handover, all activities should be directed at this communication. A tool for rigorous outcomes studies designed to (1) assess the effectiveness of handoff communication, (2) determine the characteristics of handoffs that lead to optimal patient outcomes, (3) determine the best communication practices for different settings and different practitioners, and (4) identify the best implementation strategies. |
| Systematic Review of Handoff Mechanisms in Intensive | Arora, Bloomberg, | Archives of Internal Medicine Quality | 2009 | X | | | Many possible | Many possible | Standardized communication formats | Minimum specified | Failures in transition between the ED and informal communication between providers and receiving physicians are frequent and have serious consequences for patient care and their recovery. In multiple parts of the world, the handover of patients from one healthcare professional to another is a critical time. Poor, and incomplete exchange of information between providers can lead to adverse events. Standardized communication tools, even when implemented correctly, cannot overcome poor communication practices. Efforts to address these processes must focus on the person and not simply implement protocols and tools. Every body engineer patient safety at a key point in their participation. |
| Dropping the baton: a qualitative analysis of failures during the transition from emergency department to inpatient care | Horwitz, | Annals of Emergency Medicine | 2009 | — | ED | | Key patient information (e.g., medications, allergies, code status) missing | Many possible | Standardized communication formats | Minimum specified | Mnemonics: Mnemonics that are used to facilitate the handover process. Most are aimed at the effects to the same. Several mnemonics have been identified. |
| Information Loss in Emergency Medical Services Handovers of Trauma Patients | Carter, | Patient Information and Decision Making | 2009 | — | EMS | Not reported | Insufficient information, information loss, not enough time, high workload, repetitive tasks, high patient pressure, lack of feedback, another source of information | 22.1% of key prehospital data points for Trauma a were" patients were reported by EMS, but not recorded in hospital chart (including hypotension, GCS, and other vital signs). | Standardized communication formats | Minimum specified | Mnemonics: Mnemonics that are used to facilitate the handover process. Most are aimed at the effects to the same. Several mnemonics have been identified. |
| The published literature on handoffs in hospitals: deficiencies identified in an extensive review | Cohen and Hilligoss, | Quality & Safety in Health Care | 2010 | — | | | Strict hierarchy, authority gradient, lack of communication, information, lack of trust, poor relationships, inadequate skills (IT), time pressures, high task loads | This review has not identified any study done on the best way to communicate. Fully distinguish consequences of handoffs per se from consequences of poor/unsafe handover practices. Changes in handover practices should be prioritized and in an interesting, controlled fashion. | Minimum recommended | Minimum specified | Mnemonics of "handoff-ing" and "handover-ing" data is the use of work as an action patients record number |

| Title | Lead Author | Publication | Year | Lit Rev | | | ID | Barriers/Facilitators | Modifiers/ Interventions Less | Recommended Communication Frameworks | Recommended Standardized Protocols | Discussed Key Findings |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Patient handoffs: Standardized and reliable measurement tools are needed | Petterson | Journal on Quality and Patient Safety | 2018 | | H | | | Standardized report, lack of standard language; | 2005–2006 of information and is not standardized | Non-specific | SBAR | [1] From Fig 1, information processing is the most prevalent in the patient handover literature (~[2]. From Fig 2, chronological narratives, compliance, highlighting deviations from typical narratives, and [3] From Fig 3, confidence, basic acknowledge of the [4] From Fig 4, the thought process is recorded through the communication to identify processes as communication, and actions; [4] From Fig 4, accountability, or explanation the transfer of responsibility and authority; [5] From Fig 5, social interactions, considers the perspective of the participants in the exchange; [6] From Fig 6, distributed cognition, addresses how a transition is more than providers efforts a network of specialized practitioners performing distributed roles who carry or carry out the transitioning at the same time; [7] From Fig 7, collected events, relates to how group tasks are facilitated as social actors for example; [8] In an organization or other population are organized and measured over time. |
| Patient safety—the role of human factors and systems engineering | Carayon | Studies in health technology and informatics | 2018 | | H | | | Lack of communication, lack of written data, complex care, multiple hand-overs, poor training | Many specific | Non-specific | SBAR | Several reasons for a lack of progress or lack of a successful project for patient safety include lack of role data and patient safety and medical [Lyons I, Lingard & Kramer A, 2009]; Charles Vincent, et al., 2013] or the organizational level [Feng, et al., 2008; Carayon, 2006; Charles Vincent, et al., 2004]; difficulty in engaging clinicians in patient safety as personal motivation [Hart, 2008; Charles Vincent, et al., 2004] and challenges in redesigning and re-planning care practitioner systems and processes [Lyons I, Lingard & Kramer A, 2009; Vincent & Blandford, 2014]. The latter areas for the first improvement in patient safety is directly related to the disruption of human factors and systems engineering. |
| Bridging Silos Through Strong Communication Systems | Schmaltz | Chemical | 2018 | | H | | | Multiple hand-overs, complex care, lack of care connection, together within the wide patient | Many specific | No program or modification case | Standardized communication framework; Handover: mnemonic of handoffs; Hand communication; and information, communication; and information; | SBAR | Adding structured verbal communication and reducing conflicting data in addition, ensuring time in care connection. In addition, ensuring time in developing a conversation care connection coffee between caregivers, ensure between patient hands. Share role with team to reinforce clinical safety and risk reduction. |
| Improving Handoffs in the Emergency Department | Chang | Annals of Emergency Medicine | 2018 | | H | | ED | Lack of written data, high-risk tasks, stress, fatigue, high cognitive loads, time pressures, complex care, absence of a daily routine, lack of organizational support, inadequate, omission of transition, as other risk flags, multitasking | Many specific | No specific | SBAR; the 5-Ps; I PASS the BATON; HANDOFF; and SAGE CUUT | Simple solutions are obscure, especially because of the inherent complexity of issues involved. This was the most vital complexity of issues involved. This with the providers a roadmap on how to conceptualize the ED handoff process, understand its vulnerabilities, improve its function, and ensure we [4] From Fig 4, information processing is the most prevalent in the patient handover literature (~[2]. From Fig 2, chronological narratives, compliance, highlighting deviations from typical narratives, and [3] From Fig 3, confidence, basic acknowledge of the [4] From Fig 4, the thought process is recorded through the communication to identify processes as communication, and actions; [4] From Fig 4, accountability, or explanation the transfer of responsibility and authority; [5] From Fig 5, social interactions, considers the perspective of the participants in the exchange; [6] From Fig 6, distributed cognition, addresses how a transition is more than providers efforts a network of specialized practitioners performing distributed roles who carry or carry out the transitioning at the same time; [7] From Fig 7, collected events, relates to how group tasks are facilitated as social actors for example; [8] In an organization or other population are organized and measured over time. |

| Title | Lead Author | Publication | Year | Jul flow | J | H | EMS | Standardized Barriers | Identified Intervention | Site-Specific Considerations | Recommended Communication Frameworks | Recommended Standardized Protocols | Overall Key Findings |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Clinical handover of patients arriving by ambulance to the emergency department—a literature review | Black | International Emergency Nursing | 2010 | J | I | | EMS | Interference, distractions, lack of preferred communication, lack of preferred environment, short turnaround time, high patient acuity, high communication load, lack of role clarity, lack of standard language, lack of handover education, lack of communication, variability | Illness specific | Site specific | Standardized communication and handover training, standardized handoff, mnemonic use, handover-specific education, written data provided, performance | Knowledge gaps exist concerning handover information, communication of poor handover, true clinical responsibility, short perception of handovers, staff training and review—time of receipt models strategies to improve clinical handover. Evidence of strategies being implemented and further research is required to examine the ongoing effects of implementing the strategies. |
| Improving medical communication in critical care medicine | Billings | Seminars in Cardiothoracic and Vascular Anesthesia | 2011 | | H | | | Shift, hierarchy, indirect communication, lack of communication, lack of communication, lack of error reporting, electronic health record, safety culture | Illness specific | Site specific | | | Communication and handover, for both handovers and ongoing, critical and emergency care settings. Highlighting, controlling, signaling, language, protocol, confirming, five-step mnemonic, SBAR, they teach or enhance, role in ED care, clinical key communication, report back communication |
| Handoff Communication During Flipped Models and Effects Analysis to Improve the Transition in Care Process | Fleming | Health Care Manager (Lippincott Williams & Wilkins) | 2011 | | H | | | Communication, lack of communication, lack of communication, lack of error reporting, electronic health record, safety culture | Illness specific | Site specific | Standardized communication and handover training, standardized handoff, mnemonic use, handover-specific education, written data provided, performance | SBAR | Communication, particularly at patient hand over, role as a legal protected patient, poor understanding in emergency healthcare delivery systems. |
| Accelerate Acceleration in Cardiac Arrest Graduate Medical Education | | | | | | | | | | | | | |
| How ACCOAST Biomarkers Can Identify Clinical Triggers That Silence Their Adverse Events to Hospitals May Be Too Times Greater Than Previously Measured | Chen | Health Affairs | 2011 | | H | | | Cancer complexity | Illness specific | ineffective care delivery and patient safety breaches | | | |
| Medical Safety in Emergency Medical Services: A Systematic Review of the Literature | Higham | Prehospital Emergency Care | 2012 | J | | | EMS | There is little research that is EMS specific | Illness specific | Site specific | Standardized communication and handover training, standardized handoff, mnemonic use, handover-specific education, written data provided, performance | SBAR, MIVAT | Standardized handoff there ads any facilitate effective patient handoff |
| Massachusetts Director Helps Patient Handoffs | Wheeler | Massachusetts Nurse | 2011 | | | | EMS | Illness specific | Illness specific | Site specific | Standardized communication and handover training, standardized handoff, mnemonic use, handover-specific education, written data provided, performance | SBAR | There is a paucity of scientific literature regarding patient safety in EMS. Research is needed to improve our understanding of problems in order to develop strategies to patient safety and to guide interventions. |

| Title | Lead Author | Publication | Year | Un Rev | Interpersonal Barriers | Identified Information Loss | Re-coding Complications | Recommended Communication Frameworks | Recommended Standardized Protocols | Overall Key Findings |
|---|---|---|---|---|---|---|---|---|---|---|
| Identifying high clinical risk communication failures in handovers | Drew | Emergency Medicine | 2012 | – | Lack of professional role, lack of professional respect, power differences, reporting, and clear accountability, lack of medicine roles, lack of communication, interruptions, lack of handover information | Interruptions, unclear lines of reporting | personalistics lead to report information correctly given during | no mention type standard | MIST-AMBO | Clear identification of times as risk here, reporting and receiving, medic type standard. Follow-up examples after receive to confirmed, never delegated because of lack of time of information and unresolved lack of handovers. |
| Effective Communication Between Providers in Physicians Implement Patient Handoffs | Gallagher | Journal of Emergency Medical Services | 2012 | | | | | | | |
| Effects of medical errors and preventable adverse events during hospitalization following discharge: retrospective chart review | Starmer | Journal of the American Medical Association | 2013 | H | Communication breakdowns, high interruptions, Multitasking | EDO staff estimated loss time 30% of shift data from EMS report | Mistakes | | | |
| Improving the hospital clinical handover between providers and the urgent department staff: a literature review | Dawson | Emergency Medicine Australasia | 2013 | – | Not reported | Minor specific | Minor specific | Standardized communication aimed handover training, standardized handover, use of electronic medical record | STARRSBIRT | The high-acuity level is an ED's. It is for patients and staff and for patient's safety perceptions. Prospective communication records of staff may be different from check others. Each ED communication mentions may be the optimal selection for a particular encounter. The need to have information and documents overall efficiency of handoff and medical. Identified patient time-critical tasks and other time. For handovers. Survey staff satisfaction. Assist for failed communication, consistent, active listening, patient is and respect, eye contact, communication. Confidence, consistent, active listening, patient is and respect, eye contact, communication. Improving patient, patient preferred and relationship, communication, opportunities, and handover specific communication, step displayed. Focus reduction. Verbatim, written or electronic or medical record, medical environment, verbal or written communication, patient is and respect, patient preferred, communication,

| Title | Lead Author | Publication | Year | Lit Rev | ED | EMS | Interdisciplinary | Identifies Information Loss | Identifies Complications | Recommended Communication Frameworks | Recommended Standardized Protocols | Overall Key Findings |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Communication during handover in the pre-hospital/hospital interface: an Early Warning Score as an instrument for communication in emergency nursing: a nursing theory in clinical application | Di Delegge | International Emergency Medicine | 2014 | - | | EMS | Interdisciplinary | Yes | Non-specific | Communication specific communication tool, communication, clinical reasoning, Patient | | |
| Cognitive support for a better handoff: does it improve the quality of medical communication at shift change in an emergency department? | Gillet | European Journal of Emergency Medicine | 2013 | - | ED | | Complete picture, clear picture, distractions, interruptions, interference | Yes | Non-specific | | Standardized Mnemonic, pre-formatted talk | Communication tools and interventions were implemented into clinical practice, [2] communication was documented, [3] patient identification, [4] clinical pathology was recorded, [5] medical history, [6] medications, [7] patient's current condition, [8] time of treatment, [9] significant events, other tests conducted, [10] diagnosis, [11] Communication tools and interventions were implemented into clinical practice, [2] communication was documented, [3] patient identification, [4] clinical pathology was recorded, [5] medical history, [6] medications, [7] patient's current condition, [8] time of treatment, [9] significant events, other tests conducted, [10] diagnosis, [11] Standardized

| Title | Lead Author | Publication | Year | Jul. flow | ∗ | ED | EMS | Interruption Barriers | Interruption Facilitators | Intervention Lacs | Recommend ed Communication Frameworks | Recommend ed Standardized Protocols | Overall Key Findings |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| The Impact of Public Litigation on Theatre of Care in the Emergency Department. | Pressfield | Journal of Emergency Medicine | 2015 | | | | EMS | Lack of professional role, lack of professionalism | | Illness specific | | | During these transitions, significant key clinical information was not passed from EMS to ED staff. The data were inconsistent with EMS and ED staff's transfer perceptions. Professionalism and effective communication between providers during the transition episodes of patients at EMS-ED interfaces. |
| Medical error—the third leading cause of death in the US | Makary | BMJ | 2016 | | X | | | Not reported | | Illness specific | Communication failure is a major contributor to preventable medical errors which are the third leading cause of death in the US | | |
| Malpractice Risks in Communication Failures | OIG ED | The Risk Management Foundation of the Harvard Medical Institutions, Inc. | 2016 | | X | | | Not reported | | Illness specific | | | |
| Alert, Agnostic Living Things: Is Time Ontologically Relevant in the Emergency Department? | O Toole | EMS World | 2016 | | | | EMS | Prioritizing, lack of risk flags, information sharing | | Illness specific | Communication failures is a major source of medical liability in practice and legislation. Late capture of data and communication in the pre-alert ED, and are hence critically at fault for many preventable errors in the handoff, which can | | |
| Scotland Denial Alert 38: Inadequate hand-off communication | The Joint Commission | The Joint Commission | 2017 | X | X | | | Inconsistent information, absence of a safety culture, lack of communication, time constraints, poor listening skills, distractions, lack of standardized protocols, high cost, hands, high cognitive loads, fatigue | | Illness specific | Communication failures in U.S. hospitals and medical practices were responsible at least in part for 30 percent of all preventable deaths, resulting in 1,744 deaths and $2.7 billion in malpractice costs over five years | Illness nonspecific | See resources and communication frameworks | Illness specified | Scotland Denial Alert 38 reviews contributing factors, solutions, an overall, guiding improvement efforts, and The Joint Commission's related organizational |
| The Way Communication Is Key | Mellon | The Joint Commission | 2017 | | | | | Unclear flows of information, lack of standardized language, unstructured signals, inadequate information, lack of verbal communication, information overload of providers | Failures in hand-offs can result in a sequence of misunderstandings and adverse events. Best case scenario: medication errors, medical malpractices, communications and errors lack of life. | Illness specific | Evidence-based communication frameworks: 1. Interdisciplinary Communication Tools: a. Situation-Background-Assessment-Recommendation (SBAR) b. Communication Tools for Critical Tests and Critical Results c. Read-back Protocols 2. Standardized Communication Tools: a. Standardized Handoff Communication Tools b. Checklists for Communication 3. Interdisciplinary Rounds: a. Multidisciplinary Rounds b. Interdisciplinary Bedside Rounds 4. Communication Training: a. Crew Resource Management (CRM) b. Team STEPPS 5. Use of Electronic Medical Records to Facilitate Communication: a. Electronic Medical Records b. Computerized Provider Order Entry (CPOE) c. Clinical Decision Support Systems (CDSS) | See resources and communication frameworks | |

| Title | Lead Author | Publication | Year | Jet flow | EMS | ED | Intervention Barriers | Identified Information | Recommend ed Communication Improvements | Recommended Handoff Protocols | Overall Key Findings |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Communication in a Crisis | Wilson | Life in The Fast Lane | 2017 | | | ED | Interpersonal, Organizational, Lack of Standard Methodology, Technology Problems, Limited Knowledge, High Workload, High Cognitive Load, Differential Environment, Differential Equipment, Differential Resources, Differential Expectations | Many specific | Site specific | Establish a shared mental model, establish role of resources and support, parallel communication, collaborative communication | | There are numerous communication challenges that can help healthcare providers of all levels better coordinate with other healthcare providers and patients. The differing perspectives of EMS and ED staff can be categorized generally as intrinsic and extrinsic and presented challenges to effective hand over communication. |
| Perceptions of Patient Handover among Prehospital and Emergency Department Members: a Qualitative Study | Kalyani | Emergency Medicine International | 2017 | | | | | | | | |
| Quantitative Analysis of the Content of EMS Handoff of Critically Ill and Injured Patients to the Emergency Department | Goldberg | Prehospital Emergency Care | 2017 | | EMS | | Not reported | Many specific elements were recorded in 61/75 (81%) of handoffs, EMS provided a description of the scene and its 3/75 (4%) handoffs, 31/75 (41%) of handoffs, EMS provided a brief description of the scene and its 3/75 (4%) handoffs, 31/75 (41%) of handoffs, EMS provided objective data, including vital signs, in 75/75 (100%) handoffs, and 31/75 (41%) of handoffs, EMS provided a description of the scene and its 3/75 (4%) handoffs, 31/75 (41%) of handoffs, EMS provided objective data, including vital signs, in 75/75 (100%) handoffs, and 31/75 (41%) of handoffs, EMS provided a description of the scene and its 3/75 (4%) handoffs, 31/75 (41%) of handoffs, EMS provided objective data, including vital signs, in 75/75 (100%) handoffs, and 31/75 (41%) of handoffs, EMS provided a description of the scene and its 3/75 (4%) handoffs, 31/75 (41%) of handoffs, EMS provided objective data, including vital signs, in 75/75 (100%) handoffs, and 31/75 (41%) of handoffs, EMS provided a description of the scene and its 3/75 (4%) handoffs, 31/75 (41%) of handoffs, EMS provided objective data, including vital signs, in 75/75 (100%) handoffs, and 31/75 (41%) of handoffs, EMS provided a description of the scene and its 3/75 (4%) handoffs, 31/75 (41%) of handoffs, EMS provided objective data, including vital signs, in 75/75 (100%) handoffs, and 31/75 (41%) of handoffs, EMS provided a description of the scene and its 3/75 (4%) handoffs, 31/75 (41%) of handoffs, EMS provided objective data, including vital signs, in 75/75 (100%) handoffs, and 31/75 (41%) of handoffs, EMS provided a description of the scene and its 3/75 (4%) handoffs, 31/75 (41%) of handoffs, EMS provided objective data, including vital signs, in 75/75 (100%) handoffs, and 31/75 (41%) of handoffs, EMS provided a description of the scene and its 3/75 (4%) handoffs, 31/75 (41%) of handoffs, EMS provided objective data, including vital signs, in 75/75 (100%) handoffs, and 31/75 (41%) of handoffs, EMS provided a description of the scene and its 3/75 (4%) handoffs, 31/75 (41%) of handoffs, EMS provided objective data, including vital signs, in 75/75 (100%) handoffs, and 31/75 (41%) of handoffs, EMS provided a description of the scene and its 3/75 (4%) handoffs, 31/75 (41%) of handoffs, EMS provided objective data, including vital signs, in 75/75 (100%) handoffs, and 31/75 (41%) of handoffs, EMS provided a description of the scene and its 3/75 (4%) handoffs, 31/75 (41%) of handoffs, EMS provided objective data, including vital signs, in 75/75 (100%) handoffs, and 31/75 (41%) of handoffs, EMS provided a description of the scene and its 3/75 (4%) handoffs, 31/75 (41%) of handoffs, EMS provided objective data, including vital signs, in 75/75 (100%) handoffs, and 31/75 (41%) of handoffs, EMS provided a description of the scene and its 3/75 (4%) handoffs, 31/75 (41%) of handoffs, EMS provided objective data, including vital signs, in 75/75 (100%) handoffs, and 31/75 (41%) of handoffs, EMS provided a description of the scene and its 3/75 (4%) handoffs, 31/75 (41%) of handoffs, EMS provided objective data, including vital signs, in 75/75 (100%) handoffs, and 31/75 (41%) of handoffs, EMS provided a description of the scene and its 3/75 (4%) handoffs, 31/75 (41%) of handoffs, EMS provided objective data, including vital signs, in 75/75 (100%) handoffs, and 31/75 (41%) of handoffs, EMS provided a description of the scene and its 3/75 (4%) handoffs, 31/75 (41%) of handoffs, EMS provided objective data, including vital signs, in 75/75 (100%) handoffs, and 31/75 (41%) of handoffs, EMS provided a description of the scene | Many specific elements, | Site specific | Standardized Emergency Department Handoff Protocol | While patient handoff is a critical component of safe and effective patient care, many challenges remain. Standardized communication tools, such as the I-PASS handoff bundle, have been shown to improve the quality and safety of patient handoffs. Analysis also identifies the need for additional research to further refine these tools and address the unique challenges of different healthcare settings. Ongoing efforts to implement and evaluate these tools are crucial for enhancing patient safety and reducing medical errors. |
| The EMS-ED Handoff: A Critical Moment in Patient Care | National Association of EMS Physicians | National Association of EMS Physicians | 2017 | | | | | | | | |
| Effect of Standardized Handoff Curriculum on Improved Clinician Preparedness in the Intensive Care Unit | Hueler | | | | | | | | | | |

| Title | Lead Author | Publication | Year | Urban/Rural | Population | Intervention Barriers | Intervention Facilitators | Recommended Communication Frameworks | Recommended Standardized Protocols | Overall Key Findings |
|---|---|---|---|---|---|---|---|---|---|---|
| Clinicians' and nurses' views on the acceptability of using a tablet-based clinical decision support tool for the assessment of patients with acute abdominal pain in the Emergency Department: a qualitative study | Fitzpatrick | Emergency Medicine Journal | 2018 | Urban | ED | Interruptions, variability and unstructured report, lack of standard templates, lack of communication between clinicians, lack of verbal data, unclear responsibility, poor timing, lack of patient consultation, lack of patient consent | Lack of verbal data, poor timing, lack of patient consultation, lack of patient consent | Need more standardization, having the most important information that support clinical decision making and delivery, and the clinical benefit/value of the handover tool. | ASHICE, DIMDST, MIST, ATMIST, SBAR, I-MIST, SIDAR with SBAR | Nurses do not be carefully selected for research as they regularly conduct the procedures and collect clinical variables required for the study. The nurses are not fixed, but are trained, ATMIST meets the most preferred |
| Effective Communication in EMS | Williams | Journal of Emergency Medical Services | 2018 | Urban | EMS | Lack of verbal data, poor timing, variability, unstructured report, lack of patient consultation, lack of patient consent | Poor specific | Patient at the base | Mobile App | Though the trial is part of micro simulation between caregivers during transfer of care, standardized caregivers, variances, confidence patients to a high likelihood that communication errors occur and lead to delays and other negative outcomes. We single variable preceding or related events, and that lead interventions focus on providing a culture of safety and collaboration EMS agencies can be the direct technical changes, bringing more of the big-level systems of care together as one caregiver is on the same page. |
| The feasibility, acceptability and preliminary testing of a novel, low-tech intervention to improve pre-hospital data recording for patient handover to the Emergency Department | Fitzpatrick | BMC Emergency Medicine | 2018 | - | EMS | Lack of verbal data | EDDs of which is retained as first handover where relying on memory alone, but adhere to standardized, positive time saver score, a lot of information was | Lack of adherence and delays as information is requested | 1. Common obstacle to parallel 2. Use effective thinking, 3. Handover practices are [illegible] 4. Allow / The development of clinical as mobile and the. | Just not Timers a short and effective communicating key information |
| Accuracy of pre-hospital trauma notification calls | James | Emergency Medicine Journal | 2018 | - | EMS | Not reported | Lack of verbal data | 80% of EMDS themes extraction forms recorded key information | 11 and or and more things of patients by EDI trauma team | Care coordination specific collaboration |

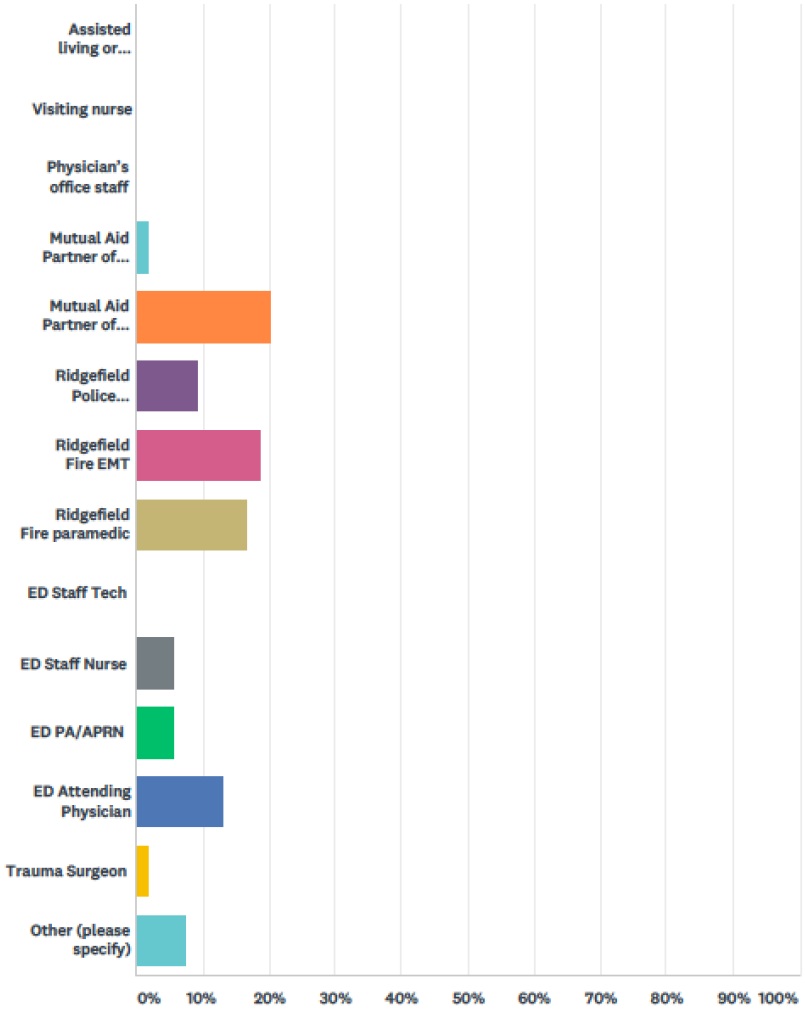
# Appendix B

## Patient Handover Communication Loss and Recommendations Questionnaire

National Fire Academy EFO Applied Research Questionnaire: Communication Loss During Patient Care Hand Off SurveyMonkey

### Q1 Please choose the category that best describes your relationship to Ridgefield Fire Department EMS.

Answered: 54 Skipped: 0



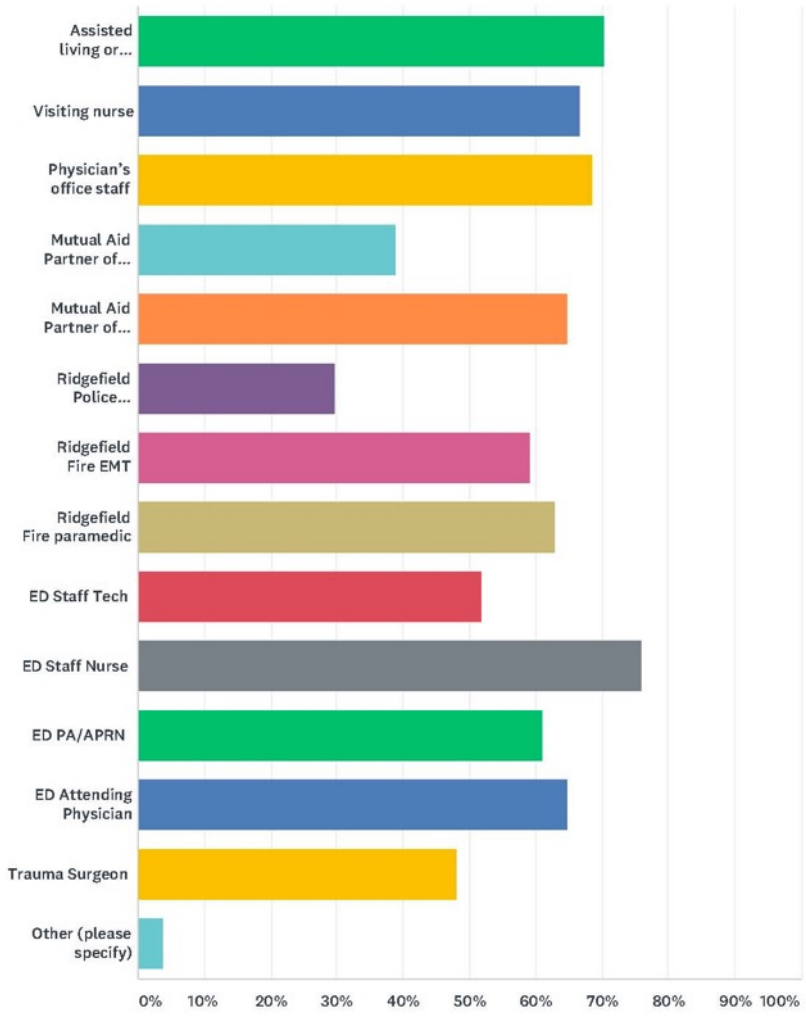

| ANSWER CHOICES | RESPONSES | |
|---|---|---|
| Assisted living or skilled nursing facility staff | 0.00% | 0 |
| Visiting nurse | 0.00% | 0 |
| Physician's office staff | 0.00% | 0 |
| Mutual Aid Partner of Ridgefield Fire, non-EMS certified | 1.85% | 1 |

National Fire Academy EFO Applied Research Questionnaire: Communication Loss During Patient Care Hand Off — SurveyMonkey

| | | |
|---|---|---|
| Mutual Aid Partner of Ridgefield Fire, EMS certified | 20.37% | 11 |
| Ridgefield Police Department | 9.26% | 5 |
| Ridgefield Fire EMT | 18.52% | 10 |
| Ridgefield Fire paramedic | 16.67% | 9 |
| ED Staff Tech | 0.00% | 0 |
| ED Staff Nurse | 5.56% | 3 |
| ED PA/APRN | 5.56% | 3 |
| ED Attending Physician | 12.96% | 7 |
| Trauma Surgeon | 1.85% | 1 |
| Other (please specify) | 7.41% | 4 |
| TOTAL | | 54 |

## Q2 In your observation, which of these providers are involved in hand-off to or from Ridgefield Fire Department staff? PLEASE CHECK ALL THAT APPLY

Answered: 54 Skipped: 0

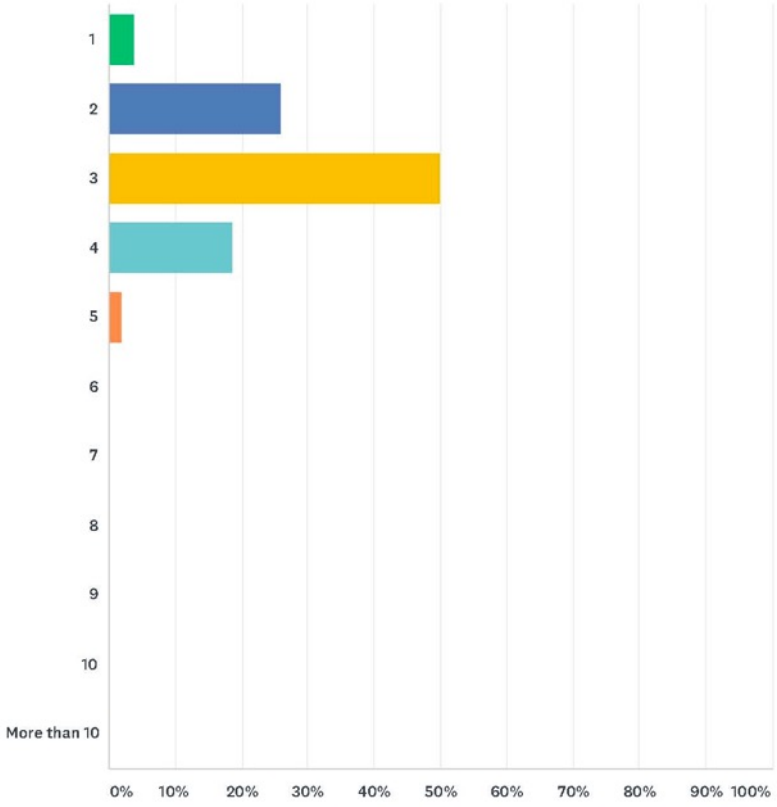



| ANSWER CHOICES | RESPONSES | |
|---|---|---|
| Assisted living or skilled nursing facility staff | 70.37% | 38 |
| Visiting nurse | 66.67% | 36 |
| Physician's office staff | 68.52% | 37 |

| National Fire Academy EFO Applied Research Questionnaire: Communication Loss During Patient Care Hand Off | | SurveyMonkey |
|---|---|---|
| Mutual Aid Partner of Ridgefield Fire non-EMS certified | 38.89% | 21 |
| Mutual Aid Partner of Ridgefield Fire EMS certified | 64.81% | 35 |
| Ridgefield Police Department | 29.63% | 16 |
| Ridgefield Fire EMT | 59.26% | 32 |
| Ridgefield Fire paramedic | 62.96% | 34 |
| ED Staff Tech | 51.85% | 28 |
| ED Staff Nurse | 75.93% | 41 |
| ED PA/APRN | 61.11% | 33 |
| ED Attending Physician | 64.81% | 35 |
| Trauma Surgeon | 48.15% | 26 |
| Other (please specify) | 3.70% | 2 |
| Total Respondents: 54 | | |

## Q3 Typically, how many separate patient hand-offs occur from arrival of the first responder all the way up to and INCLUDING hand-off at the emergency department? (e.g. nursing facility staff hands-off to first responding EMT, the EMT hands-off to the transporting paramedic, and the transporting paramedic hand-off the patient to ED staff = 3)

Answered: 54 Skipped: 0

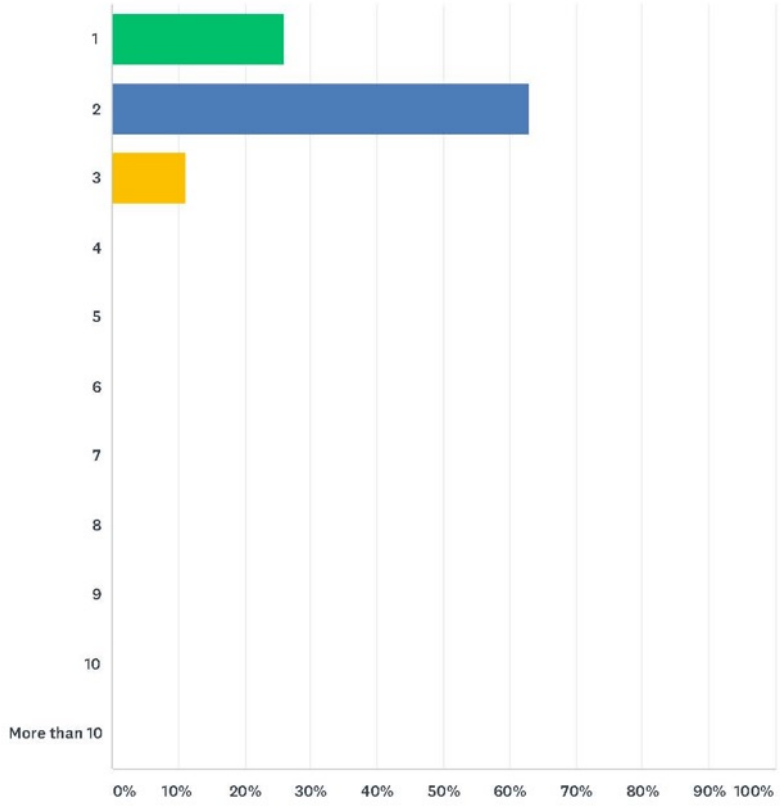



| ANSWER CHOICES | RESPONSES | |
|---|---|---|
| 1 | 3.70% | 2 |
| 2 | 25.93% | 14 |
| 3 | 50.00% | 27 |
| 4 | 18.52% | 10 |
| 5 | 1.85% | 1 |
| 6 | 0.00% | 0 |

| | | |
|---|---|---|
| 7 | 0.00% | 0 |
| 8 | 0.00% | 0 |
| 9 | 0.00% | 0 |
| 10 | 0.00% | 0 |
| More than 10 | 0.00% | 0 |
| TOTAL | | 54 |

## Q4 What is the fewest number of patient handoffs that might reasonably occur from arrival of the first responder up to and INCLUDING hand-off at the emergency department?

Answered: 54 Skipped: 0

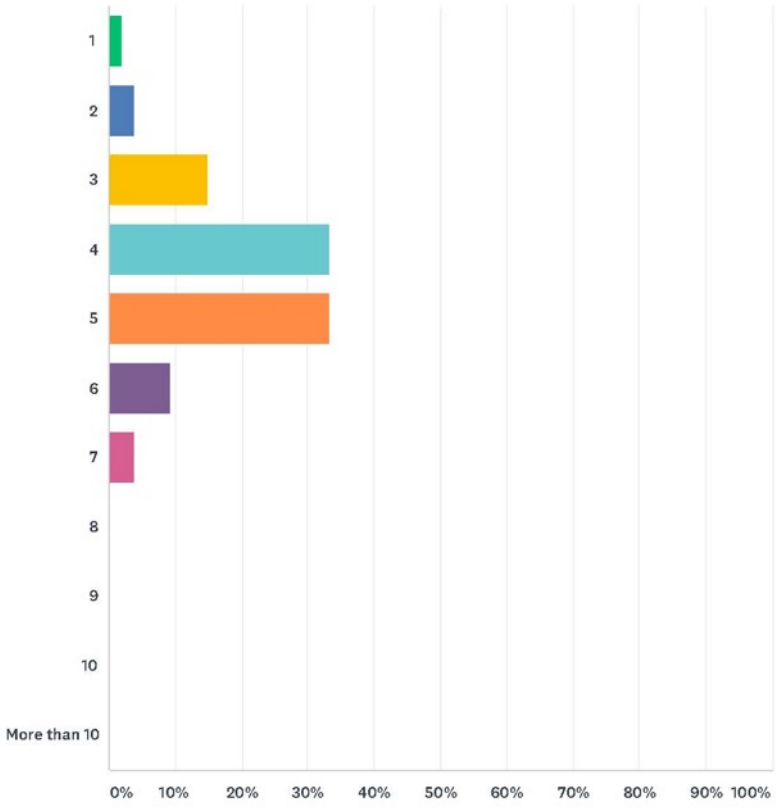



| ANSWER CHOICES | RESPONSES | |
|---|---|---|
| 1 | 25.93% | 14 |
| 2 | 62.96% | 34 |
| 3 | 11.11% | 6 |
| 4 | 0.00% | 0 |
| 5 | 0.00% | 0 |
| 6 | 0.00% | 0 |
| 7 | 0.00% | 0 |
| 8 | 0.00% | 0 |

| | | |
|---|---|---|
| 9 | 0.00% | 0 |
| 10 | 0.00% | 0 |
| More than 10 | 0.00% | 0 |
| TOTAL | | 54 |

## Q5 What is the largest number of patient handoffs that might reasonably occur from arrival of the first responder up to and INCLUDING hand-off at the emergency department?

Answered: 54 Skipped: 0



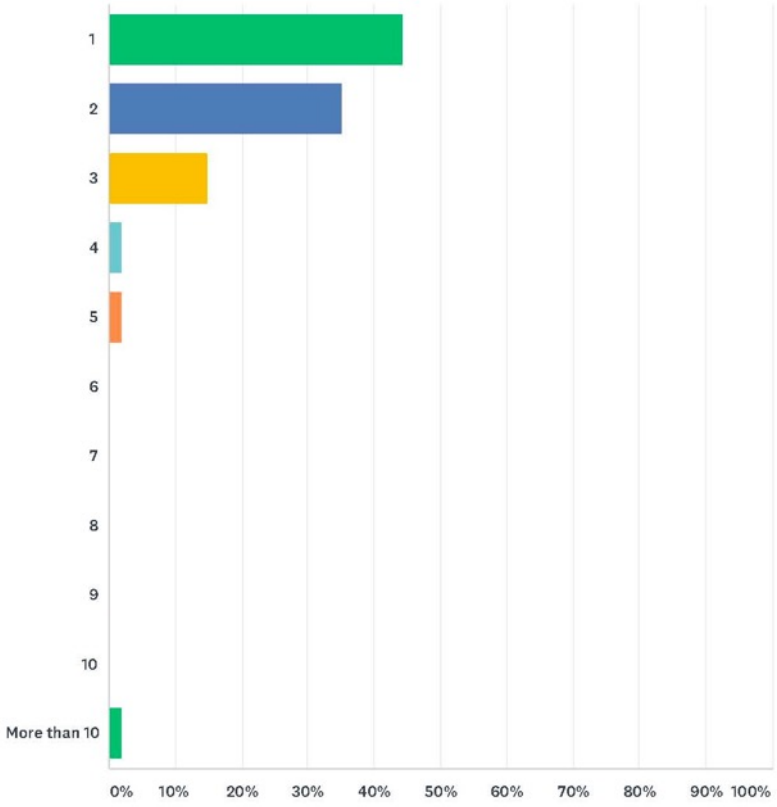

| ANSWER CHOICES | RESPONSES | |
|---|---|---|
| 1 | 1.85% | 1 |
| 2 | 3.70% | 2 |
| 3 | 14.81% | 8 |
| 4 | 33.33% | 18 |
| 5 | 33.33% | 18 |
| 6 | 9.26% | 5 |
| 7 | 3.70% | 2 |
| 8 | 0.00% | 0 |

| | | |
|---|---|---|
| 9 | 0.00% | 0 |
| 10 | 0.00% | 0 |
| More than 10 | 0.00% | 0 |
| TOTAL | | 54 |

National Fire Academy EFO Applied Research Questionnaire: Communication Loss During Patient Care Hand Off SurveyMonkey

## Q6 Typically, how many of these hand-offs involve YOU directly?

Answered: 54 Skipped: 0



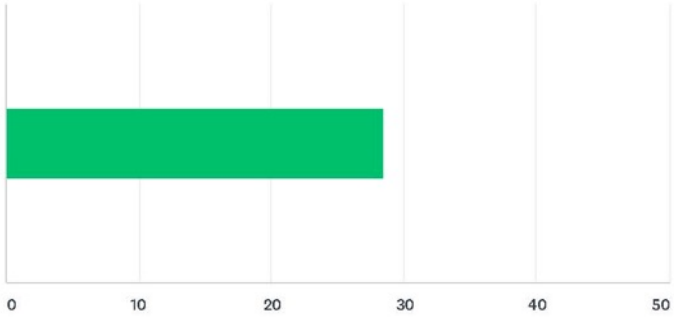

| ANSWER CHOICES | RESPONSES | |
|---|---|---|
| 1 | 44.44% | 24 |
| 2 | 35.19% | 19 |
| 3 | 14.81% | 8 |
| 4 | 1.85% | 1 |
| 5 | 1.85% | 1 |
| 6 | 0.00% | 0 |
| 7 | 0.00% | 0 |
| 8 | 0.00% | 0 |
| 9 | 0.00% | 0 |
| 10 | 0.00% | 0 |

National Fire Academy EFO Applied Research Questionnaire: Communication Loss During Patient Care Hand Off — SurveyMonkey

| | | |
|---|---|---|
| More than 10 | 1.85% | 1 |
| TOTAL | | 54 |

## Q7 What is your approximation of the percentage of these hand offs where critical patient information is missed (not reported / not received) either by the sender or the receiver?

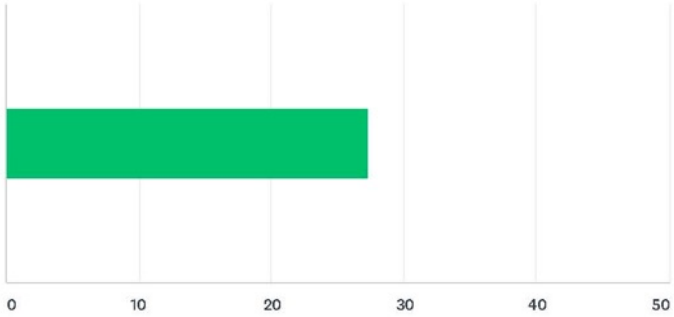
Answered: 54 Skipped: 0




| ANSWER CHOICES | AVERAGE NUMBER | TOTAL NUMBER | RESPONSES |
|---|---|---|---|
| | 28 | 1,537 | 54 |
| Total Respondents: 54 | | | |

## Q8 What is your approximation of the percentage of these hand offs where critical patient information is either misreported by the sender, or misunderstood by the receiver?

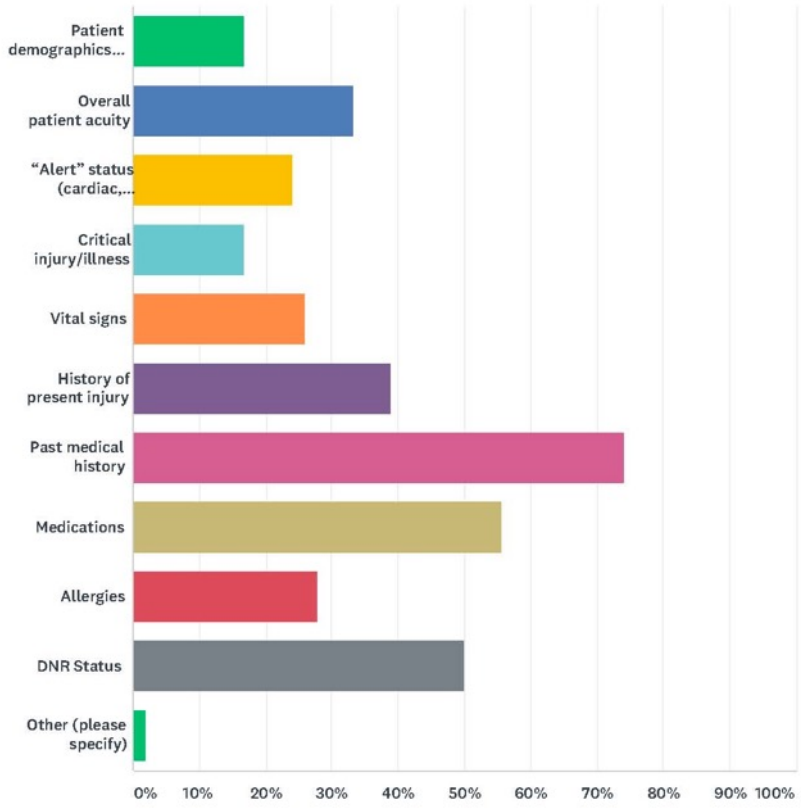
Answered: 54 Skipped: 0




| ANSWER CHOICES | AVERAGE NUMBER | TOTAL NUMBER | RESPONSES |
|---|---|---|---|
| | 27 | 1,475 | 54 |
| Total Respondents: 54 | | | |

## Q9 What critical patient information do you believe is most commonly missed, misreported, or misunderstood? PLEASE CHECK ALL THAT APPLY

Answered: 54 Skipped: 0



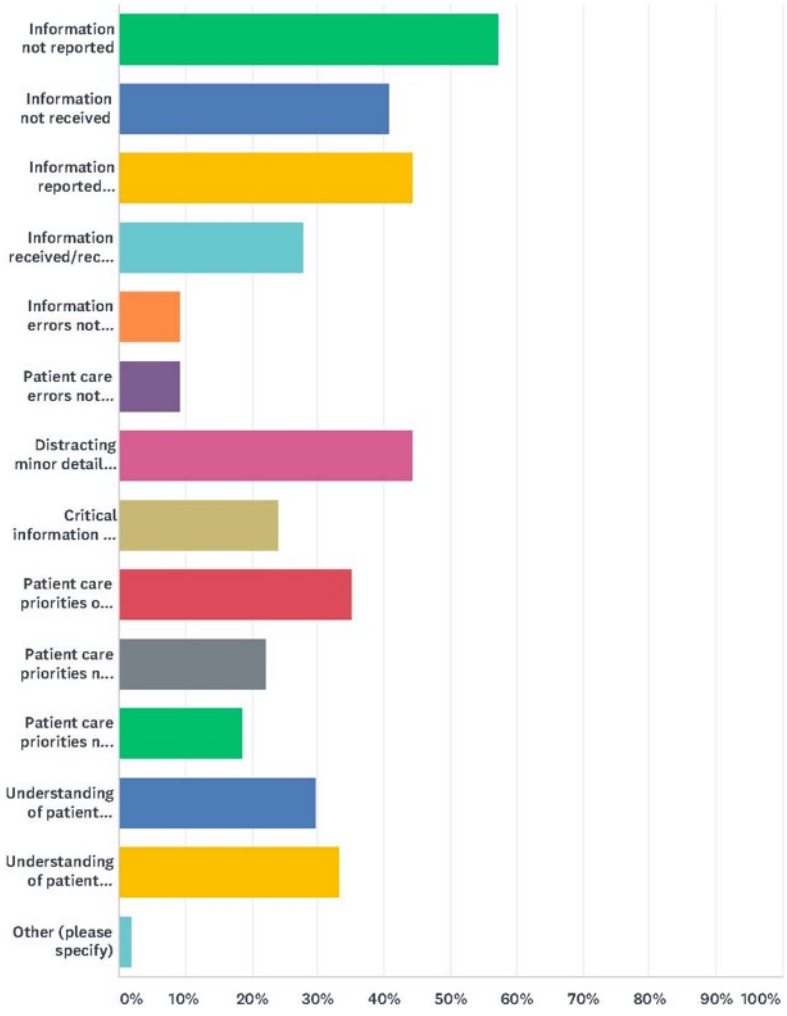

| ANSWER CHOICES | RESPONSES | |
|---|---|---|
| Patient demographics (name, age, address, etc.) | 16.67% | 9 |
| Overall patient acuity | 33.33% | 18 |
| "Alert" status (cardiac, trauma, stroke, or sepsis) | 24.07% | 13 |
| Critical injury/illness | 16.67% | 9 |
| Vital signs | 25.93% | 14 |
| History of present injury | 38.89% | 21 |
| Past medical history | 74.07% | 40 |
| Medications | 55.56% | 30 |

National Fire Academy EFO Applied Research Questionnaire: Communication Loss During Patient Care Hand Off — SurveyMonkey

| | | |
|---|---|---|
| Allergies | 27.78% | 15 |
| DNR Status | 50.00% | 27 |
| Other (please specify) | 1.85% | 1 |
| Total Respondents: 54 | | |

## Q10 What errors occur most frequently during patient hand-off? PLEASE CHECK ALL THAT APPLY

Answered: 54 Skipped: 0

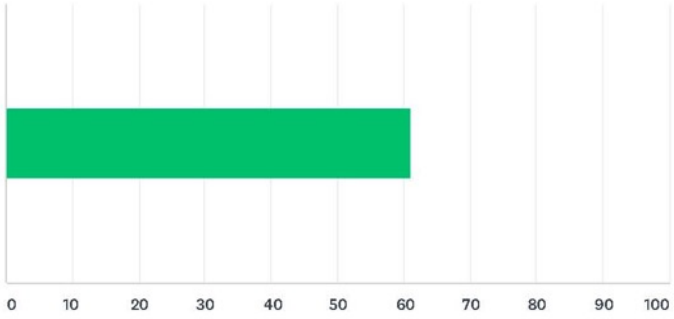



| ANSWER CHOICES | RESPONSES | |
|---|---|---|
| Information not reported | 57.41% | 31 |
| Information not received | 40.74% | 22 |
| Information reported incorrectly | 44.44% | 24 |
| Information received/recorded incorrectly | 27.78% | 15 |

| National Fire Academy EFO Applied Research Questionnaire: Communication Loss During Patient Care Hand Off | SurveyMonkey | |
|---|---|---|
| Information errors not corrected | 9.26% | 5 |
| Patient care errors not corrected | 9.26% | 5 |
| Distracting minor details reported or requested | 44.44% | 24 |
| Critical information not emphasized or requested | 24.07% | 13 |
| Patient care priorities or situation have been pre-supposed | 35.19% | 19 |
| Patient care priorities not shared between reporting and receiving teams | 22.22% | 12 |
| Patient care priorities not shared among all members of receiving team | 18.52% | 10 |
| Understanding of patient situation (mental model) not shared between reporting and receiving teams | 29.63% | 16 |
| Understanding of patient situation (mental model) not shared among all members of receiving team | 33.33% | 18 |
| Other (please specify) | 1.85% | 1 |
| Total Respondents: 54 | | |

## Q11 What is your approximation of the percentage of hand offs where NO critical patient information is missed, misreported, or misunderstood?

Answered: 54 Skipped: 0

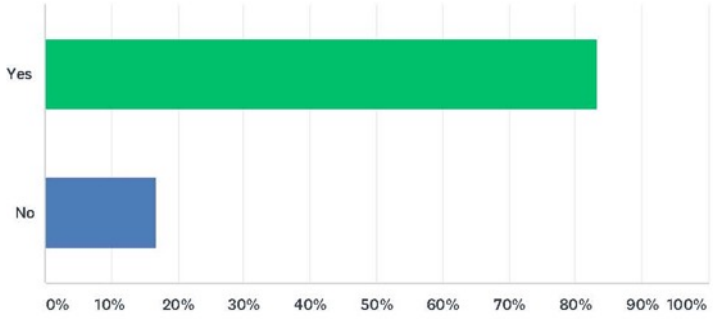



| ANSWER CHOICES | AVERAGE NUMBER | TOTAL NUMBER | RESPONSES |
|---|---|---|---|
| | 61 | 3,302 | 54 |
| Total Respondents: 54 | | | |

National Fire Academy EFO Applied Research Questionnaire: Communication Loss During Patient Care Hand Off SurveyMonkey

## Q12 Have you ever directly witnessed or become aware of critical patient information missed, misreported, or misunderstood?

Answered: 54 Skipped: 0




| ANSWER CHOICES | RESPONSES | |
|---|---|---|
| Yes | 83.33% | 45 |
| No | 16.67% | 9 |
| TOTAL | | 54 |

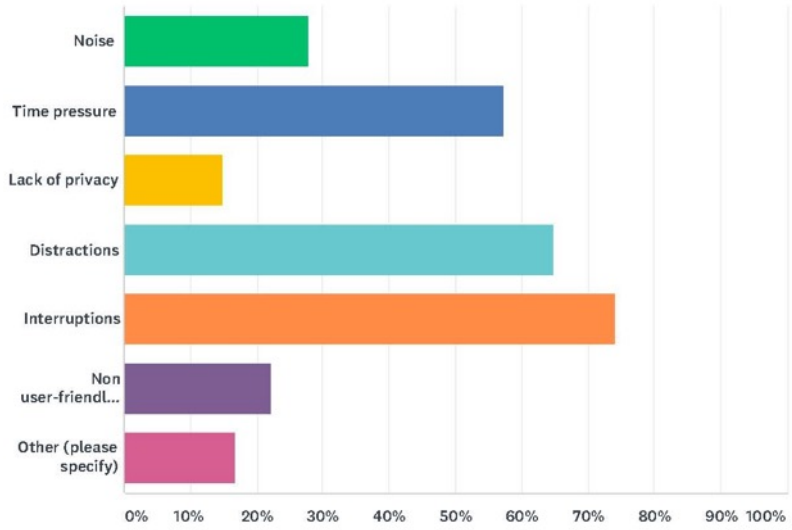
## Q13 If so, please briefly describe what impact this had on patient care and outcome. Do not include names or identifying information for anyone involved.

Answered: 43 Skipped: 11

| # | RESPONSES | DATE |
|---|---|---|
| 1 | Delay of care continuum and re-testing at bedside | 4/20/2018 7:59 AM |
| 2 | Patient became angry when ambulance staff went to transport because info was not passed on properly from police to fire department | 4/13/2018 12:29 PM |
| 3 | arrest on scene vs warrant arrest | 4/12/2018 3:14 PM |
| 4 | n/a | 4/12/2018 8:06 AM |
| 5 | You feel as though the information you have is not important sometimes.. as the the receiving facility is overwhelmed and will figure it out on their own when they get there | 4/11/2018 2:36 PM |
| 6 | na | 4/11/2018 12:43 PM |
| 7 | None | 4/11/2018 11:39 AM |
| 8 | Patient was being treated for a possible stroke and turned out that it was only hypoglycemia. | 4/10/2018 11:10 AM |
| 9 | None was able to correct with supervisor | 4/10/2018 8:51 AM |
| 10 | usually involves patient mental status, medications or history. | 4/9/2018 7:08 PM |
| 11 | information that could be given to change the course of treatment. | 4/6/2018 9:13 PM |
| 12 | med history | 4/5/2018 8:29 PM |
| 13 | The PT was in the early stages of pregnancy and this was not reported until after medications were administered | 4/5/2018 1:35 PM |
| 14 | Forced complete revaluation of care given and planned treatment s to be revakuated | 4/4/2018 12:37 PM |
| 15 | RN misunderstands information but still does something different even when clarified | 4/4/2018 9:36 AM |
| 16 | EMT stated patient here for headache, did not mention patient had chest pain and this really affected patient outcomes, not good | 4/3/2018 3:58 PM |
| 17 | delay in care provided, delay in dispo | 4/3/2018 3:20 PM |
| 18 | poor report given to recieving staff, thus leading to poor patient care | 4/3/2018 12:31 PM |
| 19 | my experience would include past medical history info and meds. | 4/3/2018 2:34 AM |
| 20 | Blood thinner not reported, delayed reversal agent | 4/2/2018 7:04 PM |
| 21 | variable | 4/2/2018 5:34 PM |
| 22 | delay of care | 4/2/2018 3:38 PM |
| 23 | ED receiving team did not allow me to report MOI and team began Tx prior to understanding injuries found. Resulting in a non-displaced Fx becoming a severely displaced Fx needing surgical intervention. | 4/2/2018 2:28 PM |
| 24 | Whether a patient is anticoagulated, code status, recent acute medical issues, recent hospitalizations/treatments or interventions | 4/2/2018 1:00 PM |
| 25 | Delays in care as well as hospital having to John Doe people due to improper paper work from sending facility | 4/2/2018 12:41 PM |
| 26 | unknown | 4/2/2018 10:14 AM |
| 27 | Correction made prior to leaving facility prohibited misdirected care | 3/30/2018 11:54 PM |
| 28 | In a trauma alert, the emt and I were thorough in our assessment and treatment but in the ED the nursing staff listened to only the Drs in the room and the Drs barely listened to us. They must have doubled efforts in PT care 5-6 times before I just left the room and didn't continue my report because no one was listening. | 3/30/2018 8:55 PM |
| 29 | DNR status not shared until Family speaks on their behalf during traumas. Patient is over 90 years old. | 3/30/2018 5:37 PM |
| 30 | Delay in care | 3/30/2018 3:54 PM |
| 31 | Not identifying generic names of anticoagulants | 3/30/2018 12:38 PM |
| 32 | Negative outcomes | 3/30/2018 12:24 PM |
| 33 | As a paramedic, we assume information may be incorrect or lacking and so always verify needed information | 3/30/2018 11:54 AM |
| 34 | Wrong meds given, dnr not honored | 3/30/2018 11:29 AM |
| 35 | Missed associated injuries and smoke inhalation risk when focus was on the severe traumatic injury. | 3/30/2018 10:49 AM |
| 36 | No impact on patient care. Any problems received were corrected by patient care. | 3/28/2018 10:36 PM |
| 37 | Typically it is information that is not passed on by the staff or bystanders, and pt does not relay information to provider when asked, but remembers critical information once they are talking to a doctor at the ER. | 3/28/2018 10:30 PM |
| 38 | Critical trauma patient was handed over to ED staff who were not attentive to the report, instead focusing on rapidly moving the patient over, interrupting critical care and beginning their assessment from square one. | 3/28/2018 9:16 PM |
| 39 | Wrong w10 with pt no critical errors made but clerical | 3/28/2018 8:38 PM |
| 40 | Frequently nursing homes provide the wrong packet of info for the patient | 3/28/2018 7:22 PM |
| 41 | Unknown | 3/28/2018 6:25 PM |
| 42 | Delayed evaluation by ED physician | 3/28/2018 1:46 PM |
| 43 | Delay in proper diagnosis | 3/28/2018 11:45 AM |

## Q14 From your perspective, what external (systemic) conditions increase the chance of FAILURE during patient hand-off? PLEASE CHECK ALL THAT APPLY

Answered: 54 Skipped: 0

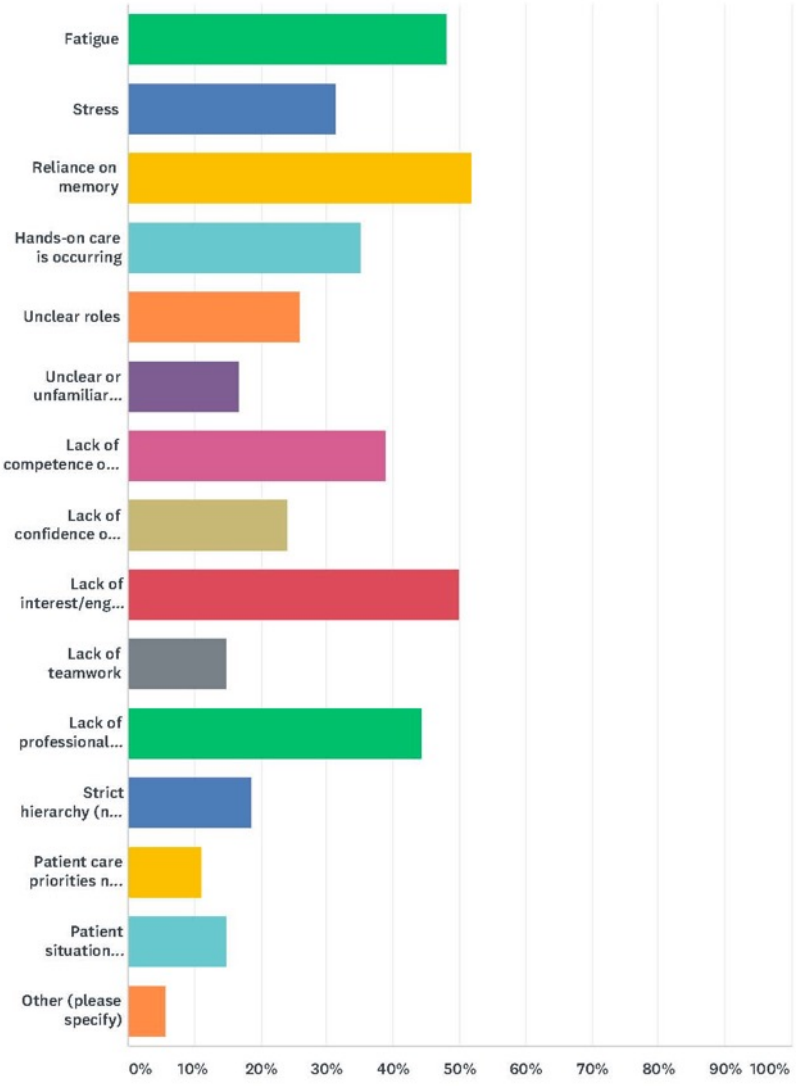



| ANSWER CHOICES | RESPONSES | |
|---|---|---|
| Noise | 27.78% | 15 |
| Time pressure | 57.41% | 31 |
| Lack of privacy | 14.81% | 8 |
| Distractions | 64.81% | 35 |
| Interruptions | 74.07% | 40 |
| Non user-friendly technology | 22.22% | 12 |
| Other (please specify) | 16.67% | 9 |
| Total Respondents: 54 | | |

National Fire Academy EFO Applied Research Questionnaire: Communication Loss During Patient Care Hand Off SurveyMonkey

## Q15 From your perspective, what internal (personal) conditions increase the chance of FAILURE during patient hand-off? PLEASE CHECK ALL THAT APPLY

Answered: 54 Skipped: 0



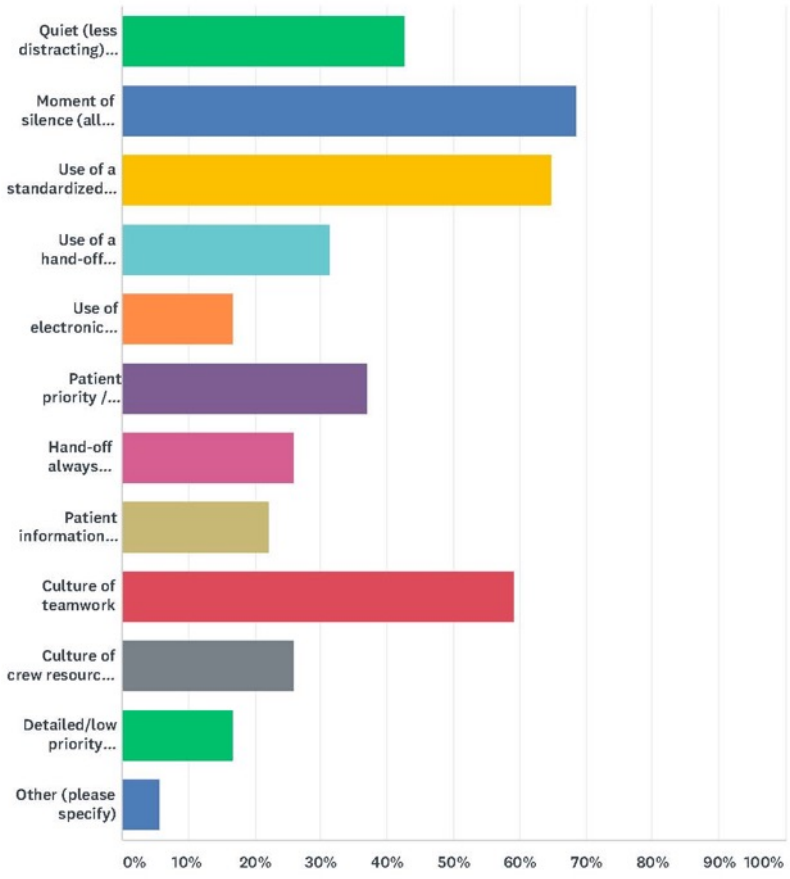

| ANSWER CHOICES | RESPONSES | |
|---|---|---|
| Fatigue | 48.15% | 26 |

National Fire Academy EFO Applied Research Questionnaire: Communication Loss During Patient Care Hand Off — SurveyMonkey

| | | |
|---|---|---|
| Stress | 31.48% | 17 |
| Reliance on memory | 51.85% | 28 |
| Hands-on care is occurring | 35.19% | 19 |
| Unclear roles | 25.93% | 14 |
| Unclear or unfamiliar language / jargon | 16.67% | 9 |
| Lack of competence of the reporting or receiving individual | 38.89% | 21 |
| Lack of confidence of the reporting or receiving individual | 24.07% | 13 |
| Lack of interest/engagement from the reporting or receiving individual | 50.00% | 27 |
| Lack of teamwork | 14.81% | 8 |
| Lack of professional respect | 44.44% | 24 |
| Strict hierarchy (no one questions team leader) | 18.52% | 10 |
| Patient care priorities not clear | 11.11% | 6 |
| Patient situation (mental model) not clear | 14.81% | 8 |
| Other (please specify) | 5.56% | 3 |
| Total Respondents: 54 | | |

## Q16 From your perspective, what external (systemic) conditions increase the chance of SUCCESS during patient hand-off? PLEASE CHECK ALL THAT APPLY

Answered: 54 Skipped: 0



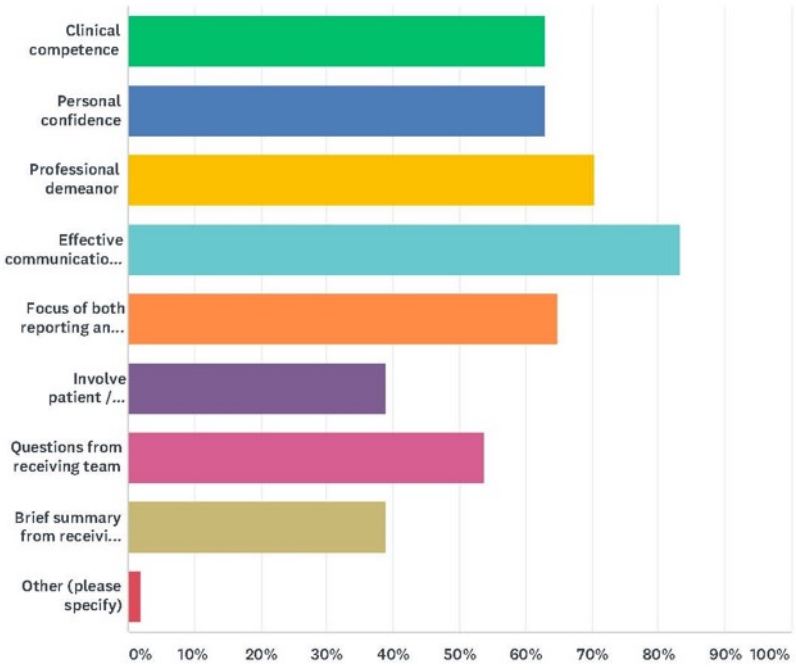

| ANSWER CHOICES | RESPONSES | |
|---|---|---|
| Quiet (less distracting) area | 42.59% | 23 |
| Moment of silence (all team members focus on the reporting individual) | 68.52% | 37 |
| Use of a standardized/structured hand-off report format | 64.81% | 35 |
| Use of a hand-off checklist or job aid | 31.48% | 17 |
| Use of electronic triage / alert / hand-off software | 16.67% | 9 |
| Patient priority / alert status always reported first | 37.04% | 20 |

| National Fire Academy EFO Applied Research Questionnaire: Communication Loss During Patient Care Hand Off | SurveyMonkey | |
|---|---|---|
| Hand-off always completed before moving patient | 25.93% | 14 |
| Patient information displayed for all reporting / receiving teams to view | 22.22% | 12 |
| Culture of teamwork | 59.26% | 32 |
| Culture of crew resource management | 25.93% | 14 |
| Detailed/low priority patient information transferred via paperwork or electronic medical record | 16.67% | 9 |
| Other (please specify) | 5.56% | 3 |
| Total Respondents: 54 | | |

National Fire Academy EFO Applied Research Questionnaire: Communication Loss During Patient Care Hand Off SurveyMonkey

## Q17 From your perspective, what internal (personal) conditions increase the chance of SUCCESS during patient hand-off? PLEASE CHECK ALL THAT APPLY

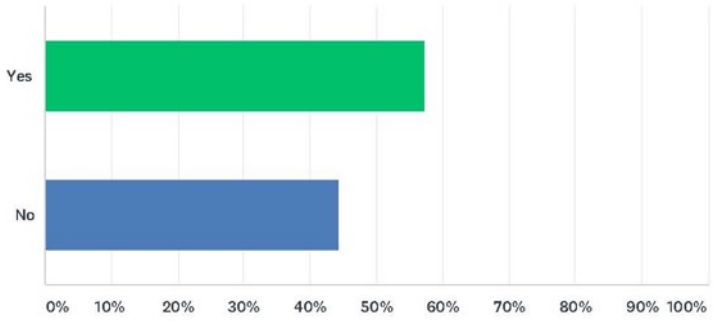
Answered: 54 Skipped: 0




| ANSWER CHOICES | RESPONSES | |
|---|---|---|
| Clinical competence | 62.96% | 34 |
| Personal confidence | 62.96% | 34 |
| Professional demeanor | 70.37% | 38 |
| Effective communication skills | 83.33% | 45 |
| Focus of both reporting and receiving team leaders | 64.81% | 35 |
| Involve patient / patient's family | 38.89% | 21 |
| Questions from receiving team | 53.70% | 29 |
| Brief summary from receiving team | 38.89% | 21 |
| Other (please specify) | 1.85% | 1 |
| Total Respondents: 54 | | |

## Q18 Do you currently follow a standardized hand-off procedure? (e.g. specified hand-off location, moment of silence for report, must make direct eye contact, etc.)

Answered: 54 Skipped: 0




| ANSWER CHOICES | RESPONSES | |
|---|---|---|
| Yes | 57.41% | 31 |
| No | 44.44% | 24 |
| Total Respondents: 54 | | |

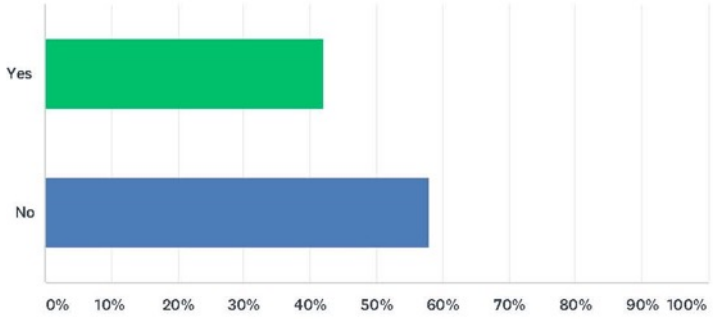
## Q19 If so, please briefly describe this procedure.

| # | RESPONSES | DATE |
|---|---|---|
| 1 | Direct contact with eceiving HCW | 4/20/2018 7:59 AM |
| 2 | Emergency commitals: fill out form and pass on to paramedic | 4/13/2018 12:29 PM |
| 3 | direct communication between paramedic and officer/supervisor on scene | 4/12/2018 3:14 PM |
| 4 | moment of silence | 4/12/2018 8:06 AM |
| 5 | None | 4/11/2018 2:36 PM |
| 6 | na | 4/11/2018 12:43 PM |
| 7 | minute of silence | 4/11/2018 11:39 AM |
| 8 | Moment of silence for trauma and alert patients | 4/8/2018 9:05 PM |
| 9 | A sytematic standard report including the initial interview of patient, events that led to pt chief complaint, and prompt to activate 911. Questions pertinent to patient's condition (if applicbale). Constantly acquiring information. The standard report for me includes a who, what (happen, and led to chief complaint), Treatment given (before EMS), Med. history, medications, allergies, Treatment (After EMS contact), Changes. | 4/6/2018 9:13 PM |
| 10 | n/a | 4/5/2018 8:29 PM |
| 11 | none | 4/5/2018 1:35 PM |
| 12 | moment of silence for trauma patient | 4/5/2018 2:18 AM |
| 13 | No | 4/4/2018 12:37 PM |
| 14 | I ask who is receiving report or make sure I have the MD in charge to report to so we can be on one page | 4/4/2018 9:36 AM |
| 15 | We use the SBAR format, Situation, background, assessment and recommentation format | 4/3/2018 3:58 PM |
| 16 | moment of silence | 4/3/2018 3:20 PM |
| 17 | direct eye contact, annunciate and speak clearly, a detailed story from start to finish | 4/3/2018 12:31 PM |
| 18 | Report from charge nurse with EMS, bedside report with EMS, inclusion of patient if medically possible. | 4/3/2018 2:34 AM |
| 19 | moment of silence | 4/2/2018 2:28 PM |
| 20 | Only really relates to alert ro trauma patients, not used in all patients | 4/2/2018 1:00 PM |
| 21 | moment of silence | 4/2/2018 10:14 AM |
| 22 | CHART method | 3/30/2018 11:54 PM |
| 23 | We don't have a procedure but I have used my system which has worked for a while | 3/30/2018 8:55 PM |
| 24 | Moment of silence as report is given to ED or trauma doctor. | 3/30/2018 5:37 PM |
| 25 | Moment of silence and eye contact | 3/30/2018 12:38 PM |
| 26 | NA | 3/30/2018 11:54 AM |
| 27 | pt handoff before moving the PT, ensure the correct folks are there so you do not do things twice and miss something | 3/30/2018 11:02 AM |
| 28 | Moment of silence | 3/30/2018 10:49 AM |
| 29 | Face to face to the receiving person. Making eye contact. Make your the receiver understands the information, | 3/28/2018 10:36 PM |
| 30 | n/a | 3/28/2018 10:30 PM |
| 31 | Maintain pt. ABCs, wait for direct eye contact with staff and begin report with most critical aspect of illness/injury. Save details for the paperwork. | 3/28/2018 9:16 PM |
| 32 | Only in trauma cases | 3/28/2018 6:25 PM |
| 33 | Don't take pt till you know what's going on, don't leave pt till you know you the person in charge understands info | 3/28/2018 11:45 AM |
| 34 | Eye contact, standard set of pt. info relayed, hand off of written demographics, vitals, meds, allergies, med Hx | 3/28/2018 11:10 AM |

National Fire Academy EFO Applied Research Questionnaire: Communication Loss During Patient Care Hand Off SurveyMonkey

## Q20 Do you use this procedure on every patient hand-off?

Answered: 50 Skipped: 4




| ANSWER CHOICES | RESPONSES | |
|---|---|---|
| Yes | 42.00% | 21 |
| No | 58.00% | 29 |
| Total Respondents: 50 | | |

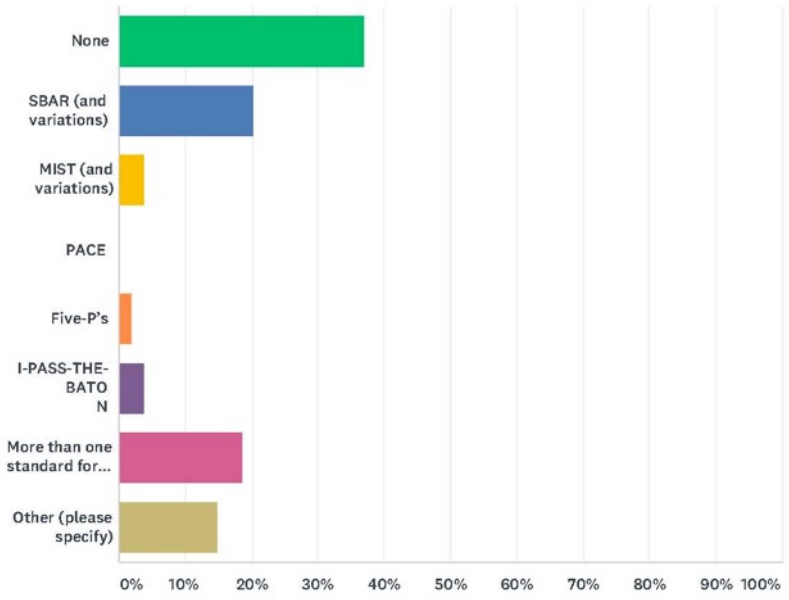
## Q21 If no, please describe when/why you use this standardized hand-off procedure.

Answered: 28 Skipped: 26

| # | RESPONSES | DATE |
|---|---|---|
| 1 | Aerts - different type of communication/report | 4/20/2018 7:59 AM |
| 2 | When patient is 100% in transport | 4/13/2018 12:29 PM |
| 3 | only for trauma alerts | 4/12/2018 8:06 AM |
| 4 | None | 4/11/2018 2:36 PM |
| 5 | na | 4/11/2018 12:43 PM |
| 6 | none | 4/10/2018 8:51 AM |
| 7 | Typically only for acute/critical patients do we use the moment of silence. Structured hand-off between pre-hospital providers and physician (me) would be ideal of course, but not always feasible on every patient due to time contraints. | 4/8/2018 9:05 PM |
| 8 | Simple, but not perfect. | 4/6/2018 9:13 PM |
| 9 | n/a | 4/5/2018 8:29 PM |
| 10 | n/a | 4/5/2018 1:35 PM |
| 11 | only used for traumas | 4/5/2018 2:18 AM |
| 12 | No | 4/4/2018 12:37 PM |
| 13 | Sometimes ER is busy & md is tied up. I have also had RN not come into room & I have had to look for them | 4/4/2018 9:36 AM |
| 14 | trauma | 4/3/2018 3:20 PM |
| 15 | n/a | 4/3/2018 2:34 AM |
| 16 | Trauma only | 4/2/2018 7:04 PM |
| 17 | traumatic patients | 4/2/2018 2:28 PM |
| 18 | Staff not always available for hand-off, Crew hands-off to available staff - not staff who will be caring for patient | 4/2/2018 1:00 PM |
| 19 | Only standard is moment of scilence on traima alerts | 4/2/2018 12:41 PM |
| 20 | trauma | 4/2/2018 10:14 AM |
| 21 | The only time I wouldn't use it is if I'm ignored by the receiver which does happen. Quite frequently | 3/30/2018 8:55 PM |
| 22 | Depends on situation | 3/30/2018 12:38 PM |
| 23 | NA | 3/30/2018 11:54 AM |
| 24 | Alert pts | 3/30/2018 11:29 AM |
| 25 | Always use | 3/30/2018 10:49 AM |
| 26 | n/a | 3/28/2018 10:30 PM |
| 27 | Trauma only | 3/28/2018 6:25 PM |
| 28 | inconsistent. No pattern | 3/28/2018 1:46 PM |

## Q22 What standardized/structured handoff format do you primarily use for critical patient information?

Answered: 54 Skipped: 0




| ANSWER CHOICES | RESPONSES | |
|---|---|---|
| None | 37.04% | 20 |
| SBAR (and variations) | 20.37% | 11 |
| MIST (and variations) | 3.70% | 2 |
| PACE | 0.00% | 0 |
| Five-P's | 1.85% | 1 |
| I-PASS-THE-BATON | 3.70% | 2 |
| More than one standard format depending on context | 18.52% | 10 |
| Other (please specify) | 14.81% | 8 |
| TOTAL | | 54 |

## Appendix C

### Patient Handover Communication Loss and Recommendation Questionnaire Introductory Letter and Flyer

Dear fellow clinician,

Please take a moment (actually about 6 minutes) to complete the questionnaire with the link below.

(HANDOFF needs to be in all-CAPS)

This questionnaire is part of an original applied research project to benefit emergency services in our area. The purpose is to gather perspectives from different healthcare providers to improve patient care hand-off.

The questionnaire is totally anonymous and is being sent to all primary care, first-responder, prehospital, and in-hospital clinicians that interface directly with the Ridgefield Fire Department.

Feel free to share this link with others in the Ridgefield area that interface with Ridgefield Fire Department.

I believe that the data collected for this year-long project will help improve the quality and ease of transfer of patient care to and from EMS for thousands of patients in our area.

Thank you for participating and let me know if you have any questions.

--
*Capt. Rommie L. Duckworth, LP*
*EMS Coordinator*
*Ridgefield Fire Department*
*rfdrduckworth@ridgefieldct.org*
*(203) 431-2725*

## Appendix D

## Patient Handover Program Development Interviews

Transcript of telephone interview with David Fitzpatrick, PhD, DipMC, RCSEd, Senior Lecturer, Faculty of Health Sciences and Sport, University of Stirling, UK. Tel: 01786 466 282, email: david.fitzpatrick@nhs.net on 8/14/18 at 0825 EDT.

- In broad terms, what are the essential elements of a patient handover improvement program?

The subject of patient handover communications is extremely complex and subtle and involves many, many factors. This is further complicated by the fact that while many of these factors have been studied and would seem logically to lead to improvement of patient hand off communications, there is little evidence that might lead one to put together a definitive list.

In terms of an overall program I would say most important element is for all components of the program to focus on both parties in the handover to share a "mental model" of the patient. All efforts must be directed towards this shared understanding between the reporting and receiving teams as to the patient's current status and needs.

Of course, many factors can help this including working to decrease the cognitive load on providers, ensuring that both reporting and receiving party is use a standardized format, perhaps with one of the mnemonics such as ATMIST.

Another factor is ensuring that providers are not delivering their patient information from memory alone. The subject of one of my recent studies was on using a simple card to write down information as it was captured in the field, allowing it to be repeated back accurately using a standard format with which hospital staff would be familiar. Consider using low-tech or high-tech job aids to help carry information in standardized format from point of capture to patient

handover. This also helps avoid the problem of data being lost or corrupted at the point of acquisition. Certainly, there is a lot of technology being developed to aid in this as well, but I don't think you necessarily need to use technology in your overall plan if there are barriers to implementation is there sometimes aren't.

The other key factor that has to be a part of any overall plan to improve patient handover communications has got to be education. It needs to have the support of the organizations involved. Needs to involve all the stakeholders. There is no one-size-fits-all solution and it is a complex issue, but if we can land a man on the moon then surely you can improve handovers in your agency.

- Can a program be "one size fits all" or must a program address differences in clinical situations; for example, high priority vs low priority patients?

It is unlikely there is one solution or set of solutions that is applicable to all patient handover communications, but it is likely that the many elements will help most, if not all situations. While there is no one-size-fits-all solution or set of solutions, I think there is a definite benefit in incorporating some of these important factors across all patient handoff situations. For instance, the mnemonic ATMIST tends to work well for high priority patients, especially trauma patients, mostly because it focuses on physiological parameters, however the mnemonic SBAR may be more widely adaptable and useful for situations that are is not as critical. That's an excellent question and certainly is a potential topic for further research.

Email interview with Dr. Rhiannon Talbot, Consultant in Emergency Medicine, Ysbyty Gwynedd, Wales, UK on 8/14/18.

Hi Rommie,

My pleasure - no worries at all.

Essential elements;

Handover is one the fundamentals for good safe patient care. A good handover system involves multiple elements in order that information is given and received clearly. Improving this process means identifying barriers to this information exchange. These barriers are often in the form of interruptions, or multiple exchanges happening simultaneously which disrupts the flow. At this critical stage it has been demonstrated that important information can be lost, which can put patient safety at risk. There is evidence that a structured handover format can aid in information exchange. This works if both teams giving/receiving handover are trained in the same format. Familiarity with these structured formats also gives chance for a 'challenge and response' type interaction, to ensure that all relevant information is transferred.

One size fits all;
A unified approach to handover is more likely to be effective and safe. The difficulty in labelling a patient 'high priority' or 'low priority' is that is can lead to a bias in those receiving the handover. It is particularly a problem in falsely reassuring people that a patient is 'fine', who then may deteriorate unnoticed in busy conditions. Having said that - good handover systems allow those involved in its process to evaluate the information being given, and means that if immediate care is required this can be communicated quickly. For example - if an airway has impending problems - then the handover can be put on hold whilst this is dealt with and resumed again when the patient is stabilized. A 'one size fits all' approach also means less training of current staff, and a quicker improvement process. Simplicity is the key, people under stress will remember simple training/mnemonics and not long complicated systems.

I hope that is useful Rommie - if it is completely not what you wanted then please do let me know! I am happy to add/subtract as needed.

Many thanks

Rio

Dr. Rhiannon Talbot
Consultant in Emergency Medicine
Ysbyty Gwynedd

On 14 Aug 2018, at 15:05, Rommie Duckworth <romduck@gmail.com> wrote:

Dr. Talbot,

Thank you so much for agreeing to assist with this research to help develop a local patient handover improvement program.

I have only two questions. Please feel free to answer these a succinctly as using bullet points or with as much detail as you wish.

- **In broad terms, what are the essential elements of a patient handover improvement program?**

- **Can a program be "one size fits all" or must a program address differences in clinical situations; for example, high priority vs low priority patients?**

As we discussed, this information is part of an applied research project for the National Fire Academy Executive Fire Officer Program and will be used to develop a local patient handover improvement program and, potentially, the basis of future research.

Again, your participation is greatly appreciated!

--
**Capt. Rommie L. Duckworth, LP**

EMS Coordinator
Ridgefield Fire Department
6 Catoonah St.
Ridgefield, CT 06877
(203) 431-2725

*rfdrduckworth@ridgefieldct.org*

Email interview with FDNY EMS Deputy Chief (Ret.) Peter Hosey on 8/14/18.

Ok. Here we go Rommie.
First, my experience was originally back when NYC*EMS, a part of the New York City Health and Hospital Corporations. HHC a public benefit corporation was more interested in running some 18 municipal hospitals and EMS was certainly not one of their stronger commitments per say and had little choice in their mandate. Having said that, zone majority of EMS units, about 75% were run by NYC*EMS under a separate umbrella and somewhat treated like one of the 18 or so hospital centers. In 1977, the EMS budget was in the area of 16 million. The other 25% of EMS units were run by Voluntary Hospitals like St. Vincent's, Booth Memorial etc. and the City gave each institution a small stipend of like 25k to run either a BLS/ALS unit within the City system. In 78, when I became a medic, we covered the entire a Borough of Queens and as time went on, various hospitals like a Booth Memorial, Jamaica Hospital started to run ALS. Interestingly, the EMS system was designed around the NYPD CAD system and not the present day FDNY.
So, up until 1996, EMS interacted with NYPD and ESU, since every 911 call prompted a police response and FDNY had little involvement less of course there was a fire scene, MCI etc. This being the post era of the Bronx, Brooklyn etc. burning meant that we dealt with police officers probably 95% of the time. We were essentially in charge of all patient care, thus we never had to be concerned about patient handover except in maybe potential crime scene incidents and medivacs, since NYPD ran all medivacs and a medic accompanied the patient on the ship during transport.
In 1996, when FDNY took over EMS, the fire guys were very unhappy since they felt that EMS was not what they signed up for. Mayor "G" had already closed I think two firehouses and Fire Commissioner Von Essen who went from union President to Fire Commissioner, folks speculated that if FDNY did not readily take over EMS, then the Mayor would close a firehouse every month? Remember that fire calls were way down an EMS calls by 96 average >4K per month! While a few FD were EMTs in the 80's and 90's, FDNY refused to pay the firefighters to recertification their EMT cards. Contractually, firefighters were given 96 hours of overtime as a minimum each year even if they did not work any o/t. Thus, FDNY began CFR training using the 96 hours of o/t. Those first few years after 1996 were tough for both Fire and EMS folks, since neither one wanted the merge and often there were not so nice incidents and finger pointing. Notwithstanding, the difference in remunerations between fire/EMS was very significant. Furthermore, fire guys, especially the engine companies got screwed since as CFRD companies were responding to many, many calls in a shift that they were not used to doing. So today, most of the firefighters came through the back door doing EMS first and then after just passing the competitive examination for firefighter, became firefighters and naturally understand what role they play and after twenty years except the fact that their calls now are EMS vs the somewhat occasional working fire that they may get in a typical 24-hour shift!

Your second question is again interesting since my experience has been somewhat unique, due to the call volume in NYC. When I retired, EMS did on the average 5,000 calls a day vs maybe 1200 fire calls. Again, the FDNY budget is in excess of 1 billion dollars a year and while it may have taken twenty years or so, we have excellent equipment, manpower etc. to accomplish any job that comes our way. As you know after September 11, 2001, everything changed not only in NYC but every fire department. Often, we have medical doctors responding to the everyday dyspnea and chest pain to confinement that are real challenges for any service. I can remember that a firefighter would have chest pains etc. and were put right back to work vs now when if symptomatic, you are going to get treated and evaluated fairly and consistently within a defined protocol. FDNY firefighters through the CAD system respond based on segment type. Thus, a high priority or segment one, two (cardiac/respiratory arrest, choking etc. are gonna get an Engine response automatically as well as an ALS/ BLS units! MVA's, working fires get duel responses as well!

Well, my friend I hope this helps you and I probably gave you more than what you bargained for but I was there before and after the merge, thus I hold no bias!

--

Peter M. Hosey, EMT-P, MS
FDNY EMS Deputy Chief (ret)
"Never, Never Forget the 343 and still counting"

On Tue, Aug 14, 2018 at 12:31 PM Rommie Duckworth <romduck@gmail.com> wrote:
Chief Hosey,

Thank you so much for agreeing to assist with this research to help develop a local patient handover improvement program.

I have only two questions. Please feel free to answer these a succinctly as using bullet points or with as much detail as you wish.

- **In broad terms, what are the essential elements of a patient handover improvement program?**

- **Can a program be "one size fits all" or must a program address differences in clinical situations; for example, high priority vs low priority patients?**

As we discussed, this information is part of an applied research project for the National Fire Academy Executive Fire Officer Program and will be used to develop a local patient handover improvement program and, potentially, the basis of future research.

Again, your participation is greatly appreciated!

--
**Capt. Rommie L. Duckworth, LP**

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*rfdrduckworth@ridgefieldct.org*

Email interview with Mr. Ahed Al Najjar, Head, Life Support Training Unit, EMS Researcher Emergency Medical Services Department, Prince Sultan bin Abdulaziz College for EMS, King Saud University on 8/14/18.

Dear Rommie

the below upon my current info, experience and few literatures, let me know if that's helpful ...?

- **In broad terms, what are the essential elements of a patient handover improvement program?**

Systems need to be put in place to enable and facilitate handover
Providing education
Mentoring
Real time feedback to motivated EMS staff may lead to improvements in handover communication methods, humble positive patient outcomes
Continuity of care is main to protect patient safety and is established by continuity of information
Consider safe handover which will lead to safe patients

- **Can a program be "one size fits all" or must a program address differences in clinical situations; for example, high priority vs low priority patients?**

One size does not fit all…due to lack of dedicated time to complete patient records and participate in handover, personal style, lack of structure and formality, lack of effective information management technology and systems for sharing clinical information, increased numbers of patients under the care of a single team (high priority vs low priority patients), frequency with which lead consultant changes, frequent movement of patients between facilities and specialized facilities, involvement of multiple specialist teams (Basic/ Advance/ specialized) and transfer to other health professionals in the community or other institutions/agencies and finally it should be aligned with what we want to accomplish.

--

**Ahed Al Najjar,** FPHC- RCSEd, FAHA, MPH, DOHS, FP-CI, NREMT-TO.
AHA Training Center Coordinator I AHA Senior Regional Faculty MENA
Head, Life Support Training Unit I EMS Researcher
Head, Community Services Unit

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Department of Community Emergency Health and Paramedic Practice, School of Primary and Allied Health Care, Faculty of Medicine, Nursing and Health Sciences, Monash University

**International Editorial Board**
Journal of Emergency Medical Services (JEMS) I **Reviewer and Author**, Medicine Journal, Medicine - Wolters Kluwer Health, ISSN: 0025-7974

Email interview with Mr. Michael Emond, RN, Project Manager and Emergency Department Nursing Supervisor at Western Connecticut Health Network: Danbury Hospital on 8/14/18.

We instituted Bedside shift report and I think the same principles apply. Purpose- for patient safety. Allows for transparency, accountability and opportunity for real time information. Increases patient engagement, safety and satisfaction. This was not easy to hardwire at first. You need to educate but it is important to stress the 'why' it is important. That will make staff buy in a lot easier than just telling them they have to do it.

When EMS arrives with a patient, EMS ALWAYS gives report to the nurse. For critical patients (traumas)- there is a mandatory moment of silence in the room so the paramedic can give a verbal report to the entire team. I do not think it is necessarily a one size fits all. The basics should be in place, but there may be one off situation where facilities may have flexibility.
Hope this was helpful
Best,
Mike

**From:** Rommie Duckworth [mailto:romduck@gmail.com]
**Sent:** Tuesday, August 14, 2018 10:34 AM
**To:** Emond, Michael C.
**Subject:** Duckworth: Patient Handover Improvement Applied Research Project

Mr. Emond,

Thank you so much for agreeing to assist with this research to help develop a local patient handover improvement program.

I have only two questions. Please feel free to answer these a succinctly as using bullet points or with as much detail as you wish.

- **In broad terms, what are the essential elements of a patient handover improvement program?**

- **Can a program be "one size fits all" or must a program address differences in clinical situations; for example, high priority vs low priority patients?**

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**Capt. Rommie L. Duckworth, LP**

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(203) 431-2725

*rfdrduckworth@ridgefieldct.org*

## Appendix E

## Patient Handover Program Development Interview Request Email

Dear _____,

I am working on an applied research project for the National Fire Academy Executive Fire Officer Program that will be used to develop a local patient handover improvement program and, potentially, the basis of future research.

I am hoping that you might be able to help me out by briefly answering two questions as well as potential follow-up questions.

If you can do so, please let me know and I will send you those questions in a separate email.

--

**Capt. Rommie L. Duckworth, LP**

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(203) 431-2725

*rfdrduckworth@ridgefieldct.org*

## Appendix F

## Patient Handover Program Needs Analysis and Proposal

**Training Needs Analysis and Program Proposal: Patient Handover Communications**

**Need:** As a paramedic level service, the Ridgefield Fire Department has an expectation set by its administration, its medical director and, most importantly, the citizens whom it serves that members of the department will be able to effectively handover patients into, through and out of the care of EMS providers of the Ridgefield Fire Department.

Based on the results of my Executive Fire Officer Program Applied Research Project I have found patient handover communications to be an extremely common event that presents an enormous liability risk for the Ridgefield Fire Department and its staff, but more importantly it presents a high risk of introducing errors into patient care that may significantly contribute to patient harm.

Like any other high-risk skill, effective patient handover communications must be supported by department policy and culture as well as trained and tested to the mastery level.

Please see the attached Applied Research Project for details in support of this proposal as well as the attached draft policy.

**Program Coordinator:** Capt. Rommie L. Duckworth, EMS Coordinator

**Formats Proposed:**

One two-hour session to include all components identified in the draft policy Training and Education section.

**Program Overview:** This program offers a unique blend of lecture, role-play and practical scenarios. The program focuses on fundamental concepts that can be employed in a variety of ways to assist firefighters in being able to employ methods to rapidly and effectively report and receive patient handovers. The program concludes with practical scenarios and testing (competency of 100% of each skill and algorithm choice = passing). As with previous training programs this combination has been selected to be a great success in terms of student skills retention and street performance. A unique addition to this program is the inclusion of stakeholders outside of the department. The purpose being to help ensure that all providers along the continuum of care are operating with shared expectations and a similar tool set as well as to provide outside perspective and feedback to improve this program, the associated policy and department operations overall.

**Program evaluation:** In addition to student feedback which will be acquired at the conclusion of the program, I propose that staff be evaluated for skills retention at 6 months and one year to identify and correct specific skill weaknesses as well as to evaluate the overall effectiveness of the program. The format for skills evaluation will follow an abbreviated form of the initial skills evaluation stations with a summary report to follow each evaluation session.

**Conclusion:** If you have any questions or would like to discuss any aspects of the program, please contact me at the address below. I look forward to presenting this program to the department and am confident that our staff will find this program informative, efficient and highly enjoyable!

Capt. Rommie L. Duckworth
Ridgefield Fire Department
6 Catoonah St.
Ridgefield, CT 06877

## Appendix G

### Patient Handover Communications Department Policy Proposal

***Ridgefield Fire Department Draft Policy for Patient Handover Communications***

This policy is proposed to be a part of a larger Ridgefield Fire Department initiative directed at achieving improved patient handover communications.

1) **Purpose:**
    a. To minimize negative impact on patients under the care of Ridgefield Fire Department by improving patient handover communications.
2) **Scope:**
    a. All patient handover communications to and from Ridgefield Fire Department personnel at all points along the continuum of care
2) **Authority, Responsibility and Administration:**
    a. The EMS Coordinator, having authority designated by the Chief over all EMS operations shall be in charge of overseeing implementation of this policy and associated programs as well as reviewing it at least annually and updated it as necessary
    b. Sworn company officers (captains and lieutenants) will have the primary responsibility for assuring that all members shift remain compliant with the policy
    c. Firefighter/paramedics and firefighter EMTs will be responsible for their own compliance with the policy as well as the compliance of their team when acting in a team environment
3) **Training and Education:**
    a. Initial training will occur on-duty for all current fire department staff.
    b. Initial training will be incorporated into the orientation program for all newly hired fire department staff who will be assigned mentors
    c. Review and refresh training will occur on a bi-annual basis or as needed.
    d. Training will include all elements of the procedure and methods
    e. Training will include components of the following training modules
        i. Effective communications
        ii. Teamwork
        iii. Crew resource management
        iv. Situational awareness
4) **Procedure and Methods:**
    a. At all times work to reduce the total number of patient handovers required along the continuum of care
    b. Maintain a profession and collegial demeanor at all times when reporting or receiving patient handover to or from any parties along the continuum of care
    c. Work to avoid distractions and interruptions to the handover process
    d. Use standardized forms, job aides, and technology as supplied by the Ridgefield Fire Department in order to minimize errors in the capture, use, and handover of patient information
    e. Avoid relying on memorization of key patient data whenever possible
    f. Work to ensure a clear mental model is shared by both reporting and receiving parties
    g. Use standardized SBAR format for communications

i. Situation
ii. Background
iii. Assessment
iv. Recommendations

h. Report patient "alert status" or priority information as the first part of "Situation"
i. Incorporate fundamentals of handover communication on both high and low priority patients
j. Provide complete handover communications prior to transfer of care
k. Use a "moment of silence" when transferring Trauma Alert patients
l. Employ and encourage a brief summary (read-back) from the receiving party in order to:
    i. Gain a fresh perspective
    ii. Correct errors
    iii. Ensure a share mental model
    iv. Leverage learning opportunities
m. When reporting or receiving patient handover remain attentive and engaged in the handover process
n. Engage in formal and informal educational opportunities with colleagues along the continuum of care including
    i. Assisted living or skilled nursing facility staff
    ii. Visiting nurses and home health aides
    iii. Physician office staff
    iv. Ridgefield Police Officers
    v. Mutual aid partners of Ridgefield Fire Department
    vi. Other Ridgefield Fire Department staff
    vii. Emergency department staff

**5) Support structures**

a. The Ridgefield Fire Department will furnish standardized forms, job aides, and technology in order to facilitate the effective capture, use, and handover of patient information
b. The Ridgefield Fire Department will support a culture of teamwork and crew resources management both within the department and with emergency response colleagues
c. The Ridgefield Fire Department will support the professional competence and confidence of Ridgefield Fire Department and, where possible, that of our colleagues of other emergency response agencies
d. The Ridgefield Fire Department will work to combat issues that affect the safety of Ridgefield Fire Department staff, our colleagues of other emergency response agencies and those patients under our care including
    i. Stress
    ii. Fatigue
    iii. High task load
    iv. High time pressure
    v. Cognitive overload