FEEDBACK IN EMERGENCY MEDICAL SERVICES: A MISSING CORNERSTONE

by

Stephen E. Taylor

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Philosophy

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ABSTRACT

The purpose of this mixed methods constructivist grounded theory (CGT) study is to explore how paramedics and medical directors (MDs) in the United States perceive outcomes feedback regarding its type, quality, and quantity. This type of feedback, which can influence their critical thinking skills, knowledge base, and job satisfaction, is crucial to their professional development. In this study, patient outcomes feedback refers to general patient information, including emergency department assessment, treatment, diagnosis, admission or discharge decisions, and the overall outcome of the patient's hospital experience. The conceptual framework, focusing on the perspectives of paramedics and medical directors, is based on Creswell and Poth's mixed methods research. This framework shaped the study, survey, and interview questions about MDs' and paramedics' experiences with feedback on outcomes, influencing factors, and the feedback processes' effects on participants. This study addresses the lack of research on feedback on patient outcomes for paramedics, offering an emerging perspective and potential to enhance paramedics' critical thinking skills. MDs and paramedics were purposively recruited for interviews using snowball and convenience survey sampling. Data collection involved interviews, memoing, and theoretical reflexivity, which informed the coding processes. The data were analyzed through initial coding, category development, and theoretical coding and then merged with quantitative and qualitative survey data to inform the CGT on outcomes feedback. The convergence of these processes resulted in a finalized theory that links the knowledge gap from a constructivist perspective to EMS feedback, enhancing clinical decision-making and resilience.

Keywords: EMS, medical director, paramedic, feedback, outcome, resilience

Dedication

This manuscript is dedicated to my parents, who always believed in my higher education. Though they did not have the opportunity to witness the fruits of their labor, they held onto hope. I wish they could have seen this day. As 1 Corinthians 13:7 reminds us, love "always protects, always trusts, always hopes, always perseveres" (New International Version, 1978/2011). This journey was neither my intention nor my plan, but fueled by a third-grade teacher who noted on my report card that I never finished my work. Thank you for the lifelong inspiration.

Also, I want to dedicate this work to all EMS responders. I have had the pleasure of working with, supervising, advocating, and learning from some of the best people in the business. From my more than four decades of EMS work, I have learned that simple is never easy, or is easy, simple. I hope this work highlights some facets of the EMS profession and that resultant change occurs to improve, protect, and benefit them as clinicians and the communities they serve.

Acknowledgments

I want to sincerely thank the faculty and staff of Liberty University for their unwavering support, guidance, and commitment to honorable teaching practices. Quick responses to assignments and replies to questions in the timeliest fashion were helpful for the issue in question. As a student, they allowed me to feel comfortable that I had a team dedicated to my academic achievement. Their encouragement and rigorous yet fair courses have been instrumental in shaping my success in this academic journey.

To my friends, colleagues, first responders, and students with whom I have been privileged to work over the past four decades, your collective wisdom and experiences have enriched my life in ways beyond measure. You should take pride in your chosen work, answering the call 24/7/365, often without the recognition you deserve. I also want to extend my heartfelt thanks to the EMS physician medical directors and paramedics who graciously shared their thoughts and perspectives, significantly contributing to the advancement of this project and the EMS profession.

A debt of gratitude is owed to my committee members, Dr. Marybeth Mitcham – Chair, Dr. Michael Furtado, and Dr. Donald Reed, who agreed to share their experiences and knowledge with me and graciously answered their summer emails. Dr. Mitcham's encouraging notes, insightful reviews, and questions from the committee have provided invaluable perspectives, guiding me through the dissertation challenges while keeping me focused on the path I set for myself. While not the most easily accessible route, it has been a path of transformative discovery and knowledge acquisition, surpassing this manuscript.

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List of Abbreviations

Advanced EMT (AEMT)

Advanced Life Support (ALS)

American Board of Emergency Medicine (ABEM)

Basic life support (BLS)

Cardiac Arrest Registry to Enhance Survival (CARES)

Cardiopulmonary Resuscitation (CPR)

Clinical Performance Feedback Intervention Theory (CP-FIT)

Constructivist Grounded Theory (CGT)

Diabetic Ketoacidosis (DKA)

Do Not Resuscitate (DNR)

Electrocardiograph (EKG)

Electronic Health Record (EHR)

Emergency Department (ED)

Emergency Medical Record (EMR)

Emergency Medical Services (EMS)

Emergency Medical Technician (EMT)

Emergency Medicine (EM)

Emergency Room (ER)

Face-to-Face (FTF)

Fellow of the Academy of EMS (FAEMS)

Grounded Theory (GT)

Health Information Exchange (HIE)

Health Information Portability Accountability Act (HIPAA)

Information Technology (IT)

Institutional Review Board (IRB)

Intensive Care Unit (ICU)

International Classification of Diseases (ICD)

Medical Director (MD)

Medical School/Residency Training (MSRT)

National Association of EMS Physicians (NAEMSP)

National Association of EMTs (NAEMT)

National EMS Information System (NEMSIS)

National Highway Traffic Safety Administration (NHTSA)

Objective Structured Clinical Examination (OSCE)

Paramedic (PM)

Performance Improvement (PI)

Quality Assurance/Quality Improvement (QA/QI)

ST-segment Elevation Myocardial Infarction (STEMI)

Standard Deviation (SD)

The Department of Transportation (DOT)

United States Department of Agriculture (USDA)

CHAPTER ONE: INTRODUCTION

Overview

Feedback in medical education is crucial to developing cognitive discernment skills for differential diagnosis and achieving expected performance levels. Feedback is the provision of specific information about a person's performance in contrast to a predetermined performance standard to enhance overall capabilities (Burgess et al., 2020). Cash et al. (2017) highlighted that delivering feedback to Emergency Medical Services (EMS) paramedics has been identified as lacking and, in some instances, completely absent. However, it is foundational for improving patient outcomes. Cash et al. further emphasized the importance of timely, actionable, consistent feedback, which is necessary to enhance clinical performance and decision-making. A lack of access to feedback hinders the improvement process and continued learning (Cash et al., 2017). This study aims to gain perspectives on the importance of United States 911 suburban/rural paramedics and medical directors' feedback and the potential effects of providing the necessary feedback for learning to improve patient outcomes and paramedic resiliency.

Background

Emergency Medical Services (EMS) were birthed from the recommendations of the 1966 National Academy of Sciences, Nation Research Council paper, "Accidental Death and Disability: The Neglected Disease of Modern Society" (Cowley, 1982). The paper was commissioned due to the spiraling increase in motor vehicle accident deaths, disability, financial costs, and the staggering burden on medical services. In 1965, Cowley (1982) observed that a quarter of the American population experienced a traumatic injury. The year saw 52 million individuals sustaining injuries, leading to hospitalization for 2 million people. Tragically, most victims were younger, with an entire life ahead of them, whereas cardiovascular and other

chronic diseases occur later in life (Cowley, 1982). The commission published 11 recommendations for creating an out-of-hospital EMS system and the Highway Safety Act of 1966.

Further federal funding and implementation of the recommendations led to the Emergency Services Act of 1973, which allowed the explosion of EMS systems across the country. Nearly a quarter century later, a Blue Ribbon Conference was convened to analyze the current state of EMS, key attributes that EMS contributes to the healthcare system, and where EMS should go in the future. The paper titled "The EMS Agenda for the Future" evaluated the essential elements of the EMS healthcare delivery system and created a roadmap for future EMS growth (Delbridge et al., 1998). Nearly two decades later, The Department of Transportation (DOT) National Highway Traffic Safety Administration (NHTSA) commissioned a new report in 2019, "EMS Agenda 2050: A People-Centered Vision for the Future of Emergency Medical Services." Firmly grounded as the safety net for the United States healthcare system, a new vision addressed the challenge of integrating EMS into the healthcare system, allowing for a seamless flow of patient information through health information exchanges from the patient's initial encounter with EMS. Seamless integration allowed feedback on patient care and outcomes for quality performance improvement and outcomes based on best practice medicine. These measures shaped EMS medical education, practice, and patient care with collaborative learning from interprofessional healthcare clinicians (Leggio et al., 2019).

Situation to Self

I have enjoyed a long career in public service spanning over four decades, working for county government, community colleges and performing as a Senate appointee for the North Carolina EMS Advisory Council. Additionally, I served as a Regional Past President of the

Eastern Regional Advisory Committee for Trauma and held various other positions within the healthcare community. I began as an Emergency Medical Technician (EMT) volunteer, completed my paramedic program through East Carolina University, and rose to the position of a county EMS agency Deputy Public Safety Director. Beginning in 1985, I began teaching EMT courses and pursuing my credentials as an EMS instructor, teaching community college students EMT, EMT Intermediate (now AEMT), paramedic programs, and mobile intensive care nurse training. For over a quarter century, I provided EMS and cardiopulmonary resuscitation (CPR) training, which students used to assist their communities—my teaching years afforded me a rich environment to witness and participate in the maturation of EMS systems in North Carolina. During this time, I became keenly aware of the lack of patient outcome information or effective feedback on the patients I treated and those personnel I supervised. Like many of my colleagues, I too often remember the haunting memories of only knowing the front end of the patient experience without being afforded the benefit of the resolution of what were likely the worst days in the lives of countless patients.

My experience may be unique in some respects, but I share the same desire with other clinicians to know that what was done for the patient in crisis made a difference and improved their outcomes. Though my experience may create biases, I have been open to constant reflectivity, transparency, and openness to seek peer review to form the basis of my research findings.

Need for the Study

Vigil et al. (2019) found that EMS personnel face extreme levels of professional hazards on the job, including short-term and chronic stress. These stressors encountered on the job lead to burnout, depression, anxiety, substance abuse, and suicide (Vigil et al., 2019). Particularly

notable is the finding by Vigil et al. (2019) that these stressors produce a 2.4 times greater incidence of mortality in EMS suicide than the general public, which is younger and predominately male. The lack of feedback and "not knowing" about patient outcomes enhances EMS stressors (Vigil et al., 2019). A lack of feedback may lead to dire consequences for medical professionals with burnout, depression, competence, feelings of isolation, loneliness, and misdiagnosis or perception of providing inadequate patient treatment (Sargeant, 2019). O'Hara et al. (2015) pointed to the lack of feedback to EMS clinicians to explore the effect on expanding education and skills and the existence of "attitudinal and structural barriers" (p. 52) that permeate the EMS workforce in the United States. Both quality and quantity of feedback are opportunities that may improve patient care and workforce resiliency (Cash et al., 2017; McGuire et al., 2021; Morrison et al., 2017; Wilson et al., 2022a).

Statement of the Problem

There is a paucity of research addressing patient outcomes feedback from paramedic clinicians and the medical directors' viewpoint, as well as the potential to enhance critical thinking skills in paramedics (Safi-Keykaleh et al., 2022). Paramedic clinicians increasingly make complex clinical diagnoses, assessing and treating patients in their homes. EMS clinicians are determining alternative clinical destinations and specialty care treatment centers (stroke, heart, pediatric, sepsis, trauma) while bypassing closer local community hospitals (Bahouth et al., 2022; Choi et al., 2014). Initially, paramedics could perform advanced life support (ALS) interventions only after consulting with a physician or mobile intensive care nurse over the radio or telemetry. This approach gave way to protocolized ALS treatment strategies with strict adherence to the guidelines. Today, treatment is based on the paramedic's critical thinking skills, the patient's presentation, and the utilization of multiple protocols and treatment regimens to care

for patients (Shah, 2006). Patients often present without standardized ailments, necessitating multiple protocols to develop the best treatment for the patient's presenting complaints, signs, and symptoms (Andersson et al., 2019). Performance and patient outcomes feedback becomes a critical component of quality assurance, patient safety, and medical education, yet are deficient in nearly half of the EMS professionals surveyed, presenting a hindrance in directing quality improvement in competency and knowledge (Cash et al., 2017; Wilson et al., 2022b). Unlike medical schools, where feedback is synonymous with education between learners and educators, it is in stark contrast to the infrequent prehospital feedback that lacks context and is mostly correctional and unidirectional in nature (Huffman et al., 2021; van de Ridder et al., 2008). Another contrast is the lack of clinical and educational feedback and the need to develop self-assessment skills as a lifelong learner, the ability to process practical feedback/criticism, and the application of the feedback for improving patient outcomes (van de Ridder et al., 2015).

Since the 1980s, this researcher has envisioned a day when the patient's information would be available in-home at the patient's bedside and after the call for follow-up. Currently, patients who encounter EMS must be able to provide a medical history, allergies, and a list of medications to the paramedic. When patients, families, or bystanders cannot provide the information, EMS clinicians must make preliminary diagnoses and treatment decisions without benefiting from the patient's medical history. Most encounters with a medical provider today are charted electronically. Yet, there is non-existent or limited sharing of information, and in some states, state law prohibits sharing information with EMS without consent. Data sharing or consent requirements are currently ineffective for critically injured or ill patients who cannot consent to sharing information (Horahan & Holland, 2014; McGuire et al., 2021). In the author's experience, knowing the patient's current interaction with the healthcare system and outcomes

may help shape the paramedic's treatments, experiences, and decision-making processes for future patient encounters.

Purpose of the Study

The purpose of this study is to gain perspectives on the importance of paramedics' and medical directors' feedback and the potential effects of providing the feedback necessary to improve patient outcomes and paramedic resiliency. EMS medical directors are essential in overseeing clinical practice, performance improvement, and education. This study also sought medical director's perceptions of their roles as medical directors providing feedback and how they envision their feedback's value, quality, and quantity while providing oversight of their EMS systems. Apart from the medical director's furnishing feedback, paramedic clinicians may receive some feedback from other sources, and this study solicited their views on the value and importance of having feedback processes in place. Additionally, the timeliness, quality, and quantity of feedback received and the method(s) of feedback that they view would be most beneficial and ideally prudent within the EMS system.

Significance of Study

Feedback for improving clinical performance is crucial for developing paramedics' critical thinking skills. Few studies assess the views or approaches of EMS clinicians in receiving or utilizing outcomes feedback (Wilson et al., 2021). In a study by Bing et al. (2017), findings from Boehler et al.'s research in 2006 indicated that students' proficiency in suturing only improved when provided with feedback addressing their deficiencies rather than receiving positive reinforcement. Conversely, Saraf et al. (2014) discovered that positive feedback notably enhanced student performance in obstetrical simulations. These contradictory arguments in the

literature fail to provide a consistent framework to improve actual skills, whereas the recipient's perceptions believe the feedback improves their work (Bing-You et al., 2017a).

Methods for paramedic clinicians to obtain feedback on outcomes are deficient, and medical directors may have a perceived lack of credibility in EMS care or in training on how best to deliver feedback (Foerster et al., 2018). The significance of Foerster et al. (2018) led to an increased understanding of the limitations of current knowledge on the role feedback plays in clinical education from the EMS clinician's perspective. Moreover, Foerster et al. identified whether further education for medical directors is needed to provide appropriate feedback, what type of feedback is necessary, and the quality of feedback: a balance of directive or correctional feedback with education or informational directed feedback on patient outcomes.

Research Questions

This mixed methods constructivist grounded theory (CGT) study is based on the constructivist approach based on the phenomenology of the value of outcomes feedback involving clinical EMS experiences. The study's primary purpose is to delve into the paramedics' and medical directors' perceptions of the type, quality, and quantity of feedback on outcomes impacting their critical thinking skills and knowledge base. This feedback may also influence their overall job satisfaction. Also, the study explored the medical director's training to provide feedback, which may affect whether feedback is provided and the type, quality, and quantity of outcomes feedback. EMS medical director's views and background on the importance of delivering outcomes feedback are significant contributions to the literature as the research literature on this topic is scarce. This research may assist in establishing a foundation by setting a baseline when receiving feedback on outcomes and pinpointing potential methods for providing such feedback. Also, research on EMS outcomes feedback may create a solid baseline of

knowledge coupled with critical thinking skills integral to analytic reasoning and rapidly processing information. Outcomes feedback combined with experience, reasoning, and rapid processing, paramedics simultaneously must weigh multiple treatment options and alter a management strategy based on ongoing patient assessments (Perona et al., 2019).

Overview of Methodology

A CGT approach informed the research questions and associated survey and interview questions regarding how medical directors and paramedics experience feedback, what influences their views, and how the feedback processes affect the participants. A mixed methods approach was used to gather researcher-developed surveys that contain a Likert scale, semi-structured and open-ended questions to gather viewpoints, processes used, interactions, and demographics of medical director and paramedic respondents. Constructivist grounded theory allowed the researcher to explore the participants' views, gaining insight into the effects of feedback or lack of feedback on their professional development and patient care. The inductive nature of the study necessitated an emerging design but did not alter questioning after data collection and field entries began to inform the research problems. The social constructivism framework strives to understand the world in which participants live and work. Although extensive, the researchers' experiences in the EMS field shaped the interpretation of the participants' views and data without distorting the true meaning. The researcher emphasized participants' views, values, and assumptions during the co-construction of the concepts and constructs (Creswell & Poth, 2018).

Process coding was performed on the in vivo comments as natural to the interviewee's original words, valid in context and categories to their meaning, and less of the interviewer's interpretation. The interviewees' descriptive responses were open-coded, followed by intermediate coding, and links between earlier coding and relationships developed into themes

from the respondents. The themes developed from the analyzed data, concepts, and coding formed the theory's basis.

Face-to-face interviews online or in person began with a general global question regarding the interviewee's viewpoint on the role of feedback in prehospital care. Upon reflection and memoing, themes emerged based on the interviewees. Outcome feedback nurtures clinician's practice by building confidence and improving assessments, honing or correcting influences that were distracting to the most accurate diagnosis, ultimately creating a theme of perceptions on enhancing patient outcomes together with building clinician confidence (El Saadawi et al., 2010). Capturing the respondent's true meaning through facial expressions, tones, and other nonverbal gestures was both elucidative and indispensable.

Searching for viewpoints in education processes for medical school/residency training (MSRT) and paramedic training brought out stark differences in clinical feedback. While paramedics are seldom provided outcomes feedback, at best, inconsistent and may be described as "few and far between" (Morrison et al., 2017, p. 91). In MSRT, feedback was immediate, with recommendations for corrective actions, and it noted that immediacy was "better" than delayed feedback "months later." Additionally, MSRT provided education on the role of self-assessment and the importance of self-seeking feedback to fill the gap when immediate feedback was unavailable or delayed. Feedback was shown to improve MSRT students' learning experience and increase learning to corroborate the proper use of feedback to enhance and speed the learning processes. Lifelong learning education and exemplary behaviors in paramedic class failed to model learning behaviors needed to seek constant improvement, self-assessment, and achieve lifelong learning goals. A general concept in the literature emphasizes the importance of balanced feedback in medical education. It highlights the requirement for learning environments

to enable students to nurture lifelong learning habits and contemporaneously understand the significance of feedback. Furthermore, the learning environment should further emphasize the need for self-assessment and actively seeking feedback when immediate feedback is not readily accessible (Ramani et al., 2017). The paramedic interviewees shared their experiences with prehospital education, and comparisons were noted to other health professions, such as nursing and medical residency.

Assumptions

Viewpoints were sought for high-acuity encounters when life threats are perceived, and the resultant feedback is essential for reinforcement of correct assessments or learning from these cases. These patients have a high risk for potentially poor outcomes but a high reward for accurate diagnosis, early treatment, and varying degrees of critical care and destination decisions. Much of the information received about patients is from specialty centers (stroke and trauma) as part of their hospital unit credentialing requirements. Some feedback is disseminated directly to the crews in a unidirectional fashion, noting key hospital performance indicators but with little quantitative or qualitative information about nuances of patient presentation, whether the crews met their EMS performance measures and the appropriateness of the prehospital treatment. The prehospital measures are left to the EMS agencies or medical directors to develop and provide feedback, which may neither be immediate nor in-depth based on the unidirectional format.

Definition of Terms

The following are terms used throughout this study:

1. *Relativism* assumes multiple mentally constructed realities (Denzin & Lincoln, 2018).

2. *Subjectivism* is a belief that is based on the perception of the observer, and the observer is shaped by the observation (Denzin & Lincoln, 2018)

3. *Constructionism* supposes a relativist ontology that merits transactional knowledge (Denzin & Lincoln, 2018).

4. *Postpositivist*s value the origination of a hypothesis, research question, research sites, and sampling techniques and strategies with a priori design that is not confined to physical observations (Denzin & Lincoln, 2018).

5. *Interpretivists* are guided by their beliefs on how the world should be viewed and understood; "objective reality can never be captured" (Levers, 2013, p. 3).

6. *Feedback* should be "specific information about the comparison between a trainee's observed performance and a standard, given with the intent to improve the trainee's performance" (Burgess et al., 2020, para. 1).

7. *EMS medical director* is an actively engaged physician directing and leading the clinical performance of an EMS system supported by evidence-based medicine (*The Role of the Physician Medical Director in Emergency Medical Services Leadership*, 2023).

8. *EMT* is an Emergency Medical Technician who provides prehospital emergency medical care for an EMS system (*Emergency Medical Technicians (EMT) | National Registry of Emergency Medical Technicians*, n.d.).

9. *FAEMS physicians* are a subspecialty of emergency physicians who have contributed to the association and the practice of EMS medicine (*FAEMS – Fellowship Program | NAEMSP | NAEMSP*, n.d.).

10. *Paramedic* is a medical professional trained and credentialed to assist healthcare professionals and render advanced prehospital emergency treatment, similar to the

emergency department, often observed before or during patient transportation to a

medical facility (WebMD, 2023).

11. AEMT is an advanced emergency medical technician who provides primary and limited

advanced medical care within the prehospital EMS system (*Advanced Emergency*

Medical Technicians, n.d.).

Limitations and Delimitations of the Study

Constructivist grounded theory implores the researcher to conduct the literature review ahead of data collection to inform the work from within the literature, prescribing the work for subsequent chapters (Charmaz, 2014). Charmaz departs from Glaser and Straussian grounded theory (GT), where the researcher is advised to conduct the review after developing the theory. As a novice GT researcher, this author used peer mentors when combing through the data for inspiration to avoid becoming encumbered by the data's breadth, losing direction in the coding process, and missing ideas and themes. Constructivist grounded theory is not a hurried process, and researchers must push back the impatience of task completion and ground the theory based on the data. This deliberate progression avoids the risk of disorder and breaching methodological processes of coding, categorizing, theoretical coding, and memoing with theoretical sampling until the theory development emerges based on the data's conceptual framework and inductive analysis of a constricted theory. This theory is a construct of the participant through my research lens (Chun Tie et al., 2019; Hussein et al., 2014).

The author must remain cognizant of self-biases, focus on proper methodological processes in CGT, and maintain an open but informed view of the current literature with a judicious and analytical understanding. Moreover, the researcher upheld a revisionist stance when handling the data, coding, theories, and categories, remaining open to adjustments and modifications while concurrently aligning with the participant data. The study focused on paramedics and suburban/rural 911 EMS systems, which may not be generalizable to large urban EMS systems. The United States Department of Agriculture (USDA) defined the rural population density as areas with less than 50,000 population (*USDA ERS - Data Documentation*

and Methods, 2019). Suburban was described as a population density of 50,000 to 250,000 people (*Locale Classifications and Criteria*, 2022).

Research Organization

Emergency Medical Services have become the gateway for patients with healthcare needs. From the beginning, EMS has grown to provide a safety net for the healthcare system in the United States. Further integrating electronic records would allow paramedics to provide timely patient care based on the patient's medical history and provide feedback for learning, which is necessary for clinical education. This study aims to understand the perspective on outcomes feedback from paramedics and medical directors to understand the most appropriate means to address clinical learning and functional approaches for feedback and improve critical judgment.

Chapter two provides the foundation of current literature and understanding of the theoretical framework on which the study is conducted, the impacts of feedback in the learning process, feedback in clinical education, and the current state of outcomes feedback for EMS and paramedics in the US.

Chapter three describes the participants and methods for conducting the (CGT) study. The chapter further supports the data collection tools and the processes to collect, process, code, analyze, and test theoretical samples and to build a model or construct a theory.

Chapter four introduces the identified themes and sub-themes from the data, discussing the perspectives on participant outcomes feedback as co-constructed by the researcher.

Chapter five includes recommendations and conclusions from the research questions. Discuss major themes that unfolded within the research data and analysis and discuss the needs for future research. Implication and additional research possibilities were also explored.

CHAPTER TWO: LITERATURE REVIEW

Overview

This literature review investigates the theoretical framework and related literature for this study of feedback in EMS. The review begins with the theoretical framework, which integrates Kathy Charmaz's (2006, 2014, 2017, 2021) exploration of the theory of CGT. Constructivist grounded theory explores the views and perceptions of the participants constructed with the researcher's experience. This framework was utilized as the study looks at feedback and its importance in clinical medicine. The types of feedback are explored along with the feedback process. The benefits and challenges of feedback, along with best practices, tools, and technologies, are reviewed. The literature uncovers feedback's prominent role in clinical medicine, education, and practice. The practice of medicine begins with acknowledging a commitment to lifelong learning. This theme is essential as learners transition to become practitioners and remain learners. The necessity for professional feedback for professional growth does not diminish but continues and nurtures growth. Paramedics are recognized healthcare clinicians but lack significant opportunities to obtain feedback on patient outcomes for continued growth and knowledge development. The literature on EMS outcomes feedback is scarce and lacks sufficient investigation as the literature review on EMS feedback provides. The chapter concludes with EMS feedback.

Theoretical Framework

Developing a framework for conducting qualitative research commences with the author's comprehension of their ontology, encompassing their philosophy regarding what they

believe and perceive as their reality (ontology). Additionally, it involves exploring how they have come to attain their belief (epistemology).

In the context of qualitative research, a researcher employs a framework influenced by their personal beliefs and experiences and those of the participants. These elements coalesce to shape the research and enable the exploration of the landscape from diverse perspectives, much like the vibrant views of a thunderous waterfall. The philosophical theory should align with the researcher's approach to ensure a cohesive research endeavor. This literature review forms the foundation of the research framework, drawing upon the principles of CGT as expounded by theorists such as Glaser, Strauss, Corbin, and Charmaz. Within the constructivist framework, the utilization and exploration of feedback are central, offering valuable insights into its applicability within the context of paramedic medical practice.

According to the American Philosophy Association, philosophy entails actively engaging with life's questions, encompassing all aspects of nature and human existence. Philosophy involves asking, arguing, and defending fundamental truths by applying rigorous standards of evidence (Audi, 2017). Creswell and Poth (2018) define philosophy as a research process that employs formative abstraction. The process often entails developing a collection of constructs or models to explain or predict a phenomenon under scrutiny, collectively forming a theory. As Strauss (1995) elucidates, theories provide a strategic lens through which phenomena can be comprehended, facilitating the transition from concrete encounters to abstract representations (Anfara & Mertz, 2015).

Philosophical Framework

Theories consist of various foundational elements, including concepts, constructs (or categories), and propositions. Concepts serve as basic terms that help differentiate events or

sensations, enabling discrimination between them, whether in the past or the future, and providing a foundation for later grouping. Concepts may interconnect or associate with each other to form higher-level arrangements of thought known as constructs or, in GT, categories as they progress toward more advanced levels of abstraction. Notably, not every concept evolves into a construct or category. Categories represent the initial framing of theories, and subsequent abstractions are identified as core categories or propositions, serving as expressions of constructive relationships that advance the depth and detail of the GT (Anfara & Mertz, 2015; Corbin & Strauss, 2015).

Grounded theory is frequently employed to gain analytical insights into lived experiences within specific contexts. These insights are derived from descriptions and accounts provided by participants, forming the basis for constructing theories or hypotheses and laying the groundwork for formal theory development. Grounded theory facilitates the conceptualization of participants' experiences, focusing on induction-based coding and categorization by researchers, thus co-constructing data analysis (Levitt, 2021).

Evolution of Grounded Theory

The roots of CGT can be traced back to earlier theories, notably Glazer and Strauss's pioneering work, "The Discovery of Grounded Theory: Strategies for Qualitative Research" (1967). Glaser and Strauss's early work adopted an inductive approach, in contrast to the deductive testing commonly associated with quantitative methodology. Due to its meticulous analysis and thoroughness, their approach achieved comparative status with quantitative theory (Bryant & Charmaz, 2007). Subsequently, Glazer and Strauss took divergent paths, with Glazer endorsing a positivist view, as evident in "Theoretical Sensitivity" (1978), and Strauss and Corbin advocating a postpositivist perspective, demonstrated in "Qualitative Analysis for

Qualitative Scientists" (1987) and "The Basics of Qualitative Analysis" (1990). These early GTs underscored the importance of considering the researchers and their perspectives during the research process (Morse et al., 2021).

Constructivism

Charmaz's departure from prior iterations of GT primarily revolved around the effort to tackle perceived shortcomings, notably the deficiency in responsiveness to the researcher's investigation and analyses. Charmaz (2021) introduced the term "constructivist" to distinguish her approach from social constructionist research prevalent at the time (Charmaz, 2014, 2021). Constructivists assert that researchers actively construct their understanding of the world through intellectual processes, whereas constructionists emphasize the role of social relationships in shaping their worldview (Creswell, 2014; Mills et al., 2014). Further development of the constructivist theory was influenced by other scholars, including Gupta, Lincoln, and Lynham, leading to a shift from positivism/postpositivism to a more pragmatic epistemology (Denzin & Lincoln, 2018). From the constructivist perspective, participants' and researcher's views contribute to the multiple social realities and data and theory generation process. Interpretive analysis through coding and categorization, coupled with theoretical sampling, provides transparency within the framework of the theory (Charmaz, 2014).

Reflexivity in Grounded Theory

Researchers differ in their approaches to reflexivity within CGT. While Glaser and Strauss advocated avoiding literature research before data collection to maintain sensitivity to the data and uphold the researcher as a "blank slate" (Timonen et al., 2018), others argue that delaying the literature research is unrealistic given current institutional requirements and the need for pre-existing data to focus and justify research questions (Timonen et al., 2018). Some

researchers find prior research helpful but remain reflexive about their influence on the data (Dunne, 2011; Hallberg, 2010; Timonen et al., 2018). Charmaz (2018) notes that an increasing number of grounded theorists acknowledge the improbability and limitations of a lack of familiarity with relevant sources, emphasizing the role of researchers' knowledge and experience in shaping research questions (Charmaz, 2014a; Charmaz & Thornberg, 2021; Timonen et al., 2018). Charmaz (2014) illustrates how Glaser and Strauss's and Corbin's and Strauss's versions of GT, as well as CGT, allow for sensitive and flexible applications of prior literature without imposing preconceived ideas, emphasizing the importance of remaining open to the world as encountered in research (Timonen et al., 2018)

In summary, philosophy involves active engagement with life's questions, encompassing all aspects of human existence. Developing theories within qualitative research involves abstracting concepts into constructs, categories, and propositions. As a research approach, GT has evolved, with CGT representing a departure from earlier versions. Constructivist grounded theory emphasizes the researcher's active role in constructing understanding, and various scholars, including Charmaz, have influenced the theory's evolution. The reflexive nature of GT research remains a debate, with researchers differing on the extent to which prior literature and personal knowledge should influence the research process. Ultimately, CGT seeks to maintain openness to the encountered world and allow data to shape theoretical accounts.

Feedback

Feedback is integral to social engagement, influencing both personal perceptions and as a professional means of information exchange. Feedback enables individuals and organizations to assess their progress by comparison with predetermined standards to enhance overall performance while adapting to changing circumstances. Clinical professionals rely on feedback

for self-reflection and feedback to make timely improvements for improving patient outcomes (B. Brown et al., 2019). The following review explores the nuanced landscape of clinical feedback, focusing on its goals, benefits, problems, and types.

Introduction

Clinical feedback is a critical component of healthcare, serving as a cornerstone in medical education. Feedback plays a critical role in the improvement of patient care and the professional development of healthcare professionals. Regular feedback communication regarding a clinician's performance, patient outcomes, and areas for improvement is necessary for continued growth and staying abreast of current best practices. Healthcare is evolving continually and is fast-paced. Clinical feedback offers valuable insights for healthcare professionals to refine their skills, improve patient safety, and promote evidence-based practice. The importance of feedback and the significance of feedback in promoting quality among healthcare clinicians are fundamental to life-long learning and continued growth (Brookhart, 2018).

Clinical feedback promotes continuous learning and improvement in healthcare. Through ongoing assessments and feedback mechanisms, clinicians enhance their ability to appreciate their strengths and weaknesses, allowing them to focus on areas with opportunities to improve. According to several authors in Lee et al. (2018), constructive feedback in clinical settings encourages reflective practice and fosters self-awareness and refinement of clinical competencies (Lee et al., 2021). Feedback encourages healthcare clinicians to identify their learning needs and proactively address them. Moreover, clinical feedback underwrites the development of a philosophy of accountability and professionalism within healthcare organizations and aligns the goals of individual clinicians with those of the institution (Jonge et al., 2022; Weinstein, 2015).

Furthermore, clinical feedback directly impacts patient care, quality, and safety. Regular feedback loops identify errors or substandard practices, allowing timely mediation and avoiding harm to patients. The Institute of Medicine (2001) emphasizes regular feedback and performance improvement in enhancing healthcare quality. Effective clinical feedback also promotes evidence-based practice, encouraging clinicians to stay abreast of current guidelines and research publications to inform their decision-making processes (Boud & Molloy, 2013). Accordingly, the importance of clinical feedback in healthcare surpasses individual professional growth by influencing improved patient outcomes and the overall quality of healthcare.

Clinical feedback is a cornerstone of healthcare, fostering continuous learning, professional development, patient quality, and safety. It empowers clinicians to be reflective and self-identify their strengths and areas for improvement, cultivating a culture of accountability and excellence. Furthermore, clinical feedback is pivotal for enhancing patient care, preventing oversights, and encouraging evidence-based practice. As healthcare continues to evolve, recognizing and harnessing the importance of clinical feedback remains essential for ensuring the highest standards of care delivery.

Types of Clinical Feedback

Two principal types of clinical feedback, formative and summative, serve separate purposes in the assessment and learning processes. By understanding the differences and applications of formative and summative feedback, healthcare educators and professionals can augment the quality of education and patient care (Boud & Molloy, 2013; Brookhart, 2018).

Formative Feedback

Formative feedback, often referred to as developmental or constructive feedback, is an ongoing and dynamic process of assessment designed to inform learners of their progress, areas

for improvement, and motivation to engage in needed learning activities to promote their skill and knowledge development (Burgess et al., 2020; Hattie & Timperley, 2007). Formative feedback occurs during the learning process, allowing learners to understand their strengths and weaknesses, make improvements, and progressively refine their skills. Formative feedback focuses on specific, actionable recommendations for improvement, narrowing the gap between actual and terminal performance measures. In clinical settings, formative feedback can involve peer evaluations, self-assessment, and mentorship, helping learners build competence through continuous reflection and adjustment (Norcini & Burch, 2007).

One characteristic form of clinical formative feedback is regular clinical preceptorship sessions, where experienced healthcare professionals provide ongoing guidance to learners. During these sessions, instructors observe the learners' clinical performance, offer constructive feedback on their strengths and areas for improvement, and collaboratively set goals for skill enhancement (Burgess et al., 2020). For instance, a nursing student might receive formative feedback on their strategy to prioritize patient care, with the instructor emphasizing effective clinical judgment with patients, thorough clinical examination, and accurate medication dosing as areas for improvement (Arrogante et al., 2021).

Summative Feedback

In contrast, summative feedback comprehensively evaluates a learner's performance after a learning period or clinical experience. Summative feedback's primary purpose is to determine the overall level of competence or achievement, typically through standardized assessments, exams, or objective structured clinical examinations (Van Der Vleuten & Schuwirth, 2005; Wallenstein & Ander, 2015). Summative feedback provides a final judgment of performance and is often used for certification, licensure, or module completion. While the nature of the

summative assessment may restrict immediate opportunities for improvement during the assessment, summative feedback plays a crucial role in enabling educators and learners to pinpoint areas that require further learning and provide growth opportunities (Cilliers et al., 2010).

The Objective Structured Clinical Examination (OSCE), which has used the accepted objective measurement since 1975 for interpersonal communication skills, is one example of clinical summative feedback. In an OSCE, students rotate through various clinical stations, each designed to assess different skills and competencies representing a broad spectrum of "disease, acuity and patient demographics" (Wallenstein & Ander, 2015, p. 122). Trained assessors evaluate the learner's performance against predefined criteria, and a final score is provided based on their overall performance. Medical students may be evaluated on their history-taking, physical examination, and communication skills during an OSCE (C. Brown et al., 2021; Wallenstein & Ander, 2015).

Comparison and Integration

Formative and summative feedback are not mutually exclusive but work together within a comprehensive assessment/feedback loop framework (Carless & Boud, 2018). Formative feedback fosters a learner's growth by pinpointing improvement areas and delivering actionable guidance. Conversely, summative feedback comprehensively evaluates the learner's overall performance. When these two types of feedback are integrated effectively, they establish a balanced assessment approach that concurrently supports both the learning process and accountability. This integration helps ensure that healthcare professionals attain competence and consistently demonstrate the capability to deliver high-quality care (Arrogante et al., 2021; Carless & Boud, 2018).

The Feedback Process

The clinical feedback process typically follows a structured sequence involving establishing clear expectations, directly observing the performance, providing timely feedback, and setting goals for improvement areas. The cyclic feedback process described by Burgess et al. (2020) as the planning the learning, learning, observed practice, feedback, assessment, and identifying outcomes underpins the elemental role of continuous learning and enhancement in clinical medicine (Burgess et al., 2020; Ramani & Krackov, 2012). Nevertheless, it is imperative to recognize and accommodate cultural and individual differences in implementing feedback processes, as these factors can significantly influence how feedback is dispensed and absorbed (Lee et al., 2009; Watling & Ginsburg, 2019).

Feedback Providers

In clinical settings, feedback can originate from various sources, including faculty instructors, preceptors, peers, and patients (Sargeant et al., 2010). Faculty members and preceptors are frequently considered the primary feedback source based on their expertise and administrative roles. Feedback providers should be able to offer timely, specific, and actionable feedback, avoiding vague comments like "continue to gain more experience" (Ritchie et al., 2020). They may furnish formative feedback for developmental purposes or summative feedback for assessing overall competence (Ramani & Krackov, 2012). Formative feedback also supports learners' development and improves the quality of patient care. Additionally, the context and setting in which feedback is provided can influence its effectiveness. The culture and setting in the clinical environment, "the learners' emotional state," and the faculty's communication skills shape how feedback is conveyed and accepted (Bing-You et al., 2017).

Feedback Recipients

Feedback recipients in clinical settings are typically learners, such as medical students, residents, or practicing clinicians, who play an indispensable role in the feedback process. Learners actively seek, receive, and process feedback; their openness to feedback is crucial (Watling & Ginsburg, 2019). Receptivity, self-reflection, and desire for improvement and growth are principal attributes of effective feedback recipients. Learners' summation of the feedback and commitment to the follow-up plan helps promote mutual understanding of the content (Roshal et al., 2021). Recipients provided well-organized and structured feedback demonstrated improved knowledge retention and patient outcomes, promoting receptivity and demonstrating self-reflection and development for learning through feedback (Roze des Ordons et al., 2020; Watling & Ginsburg, 2019).

Delivery of Feedback

Feedback delivery is a complex process that often demands time and planning. Feedback delivery should primarily be delivered through face-to-face interaction or written summative feedback. Evaluators may also generate feedback for learners through a systematic approach or multi-source feedback. Ideally, a trained facilitator should deliver feedback in person (Archer, 2010a). Yaris (2011) reported that real-time feedback led to improved resident satisfaction with timeliness (59% v. 81%) and quality (72% v. 89%), p = .01, of feedback (Yarris et al., 2011). Formative and especially summative feedback delivered in written form hardly motivates or improves performance when the learner has been remediated to unidirectional scrutiny of performance; they may neither agree with nor verify, and timeliness has passed. Learners develop resentment and mistrust of the facilitator, evaluator, or faculty member while not having input into an actionable plan to improve the noted discrepancies from standards. Learners can

develop defensiveness and experience humiliation without learner engagement (Burgess et al., 2020).

While both forms, written and face-to-face feedback, may be necessary, negative feedback requires further elaboration and an action plan to produce positive results. When providing written feedback, scaffolding may assist the learner by deconstructing the task, explaining the objective, and contrasting the learners' current education status and expected goals. Ultimately, the scaffold is removed gradually, and the learner progresses toward the goal (Archer, 2010a). Additionally, effective feedback should be "timely, specific, actionable, and task-oriented rather than person-oriented" (Watling & Ginsburg, 2019, p. 79).

Benefits of Feedback in Clinical Medicine

Feedback plays a pivotal role in clinical medicine, fostering improvements in patient care and healthcare professionals' development while enhancing teamwork. The multifaceted advantages of feedback within healthcare examine the impacts on patient outcomes, professional growth within the healthcare organization, and collaboration among healthcare teams. By understanding these values, healthcare organizations can realize the need for effective feedback mechanisms to deliver better healthcare (Baker et al., 2006).

Improved Patient Care

Effective feedback processes in clinical medicine directly and significantly impact patient care. Constructive feedback helps healthcare clinicians identify areas for improvement in their clinical practice. When clinicians obtain feedback about their performance, they can adjust and refine their practices to deliver improved evidence-based care, leading to enhanced patient outcomes (Edmondson & Lei, 2014). Additionally, feedback can help identify systemic issues

within healthcare organizations, leading to needed improvements in protocols and practices that enhance the overall quality of care (Rosen et al., 2018).

Professional Development

Feedback is a basis of professional development in clinical medicine. Continuous self-assessment and reflection are essential for healthcare professionals to grow and stay current in their field (Archer, 2010a). Constructive feedback from peers, facilitators, and supervisors provides valuable insights into one's strengths and areas for opportunities, guiding professional growth (Molloy et al., 2020). Moreover, feedback fosters a culture of lifelong learning among healthcare professionals, encouraging them to engage in ongoing education and skill enhancement to serve their patients better (Burgess et al., 2020). Developing a culture of feedback within the institutions should be coupled with practical strategies and culture change. The likability culture, where learners often provide vague, "good job on the art line placement" or "nice working with you today," provides very little usable feedback and is frequently misconstrued. Programs should ensure that feedback is provided consistently and in a timely manner so modifications and improvements can be observed (Buckley et al., 2020).

Enhanced Team Collaboration

Effective teamwork is essential in clinical medicine, where interdisciplinary collaboration is often obligatory for desirable patient care outcomes (Baker et al., 2006). Feedback mechanisms promote enhanced team collaboration by facilitating open communication and mutual understanding among healthcare team members (Edmondson & Lei, 2014). Through feedback, team members can share insights, address conflicts, and adjust their roles and responsibilities to ensure seamless care coordination (Baker et al., 2006). Furthermore, feedback creates a supportive team culture that encourages trust and respect among coworkers (Rosen et

al., 2018). Feedback should be a bidirectional course of information and understanding. Fluit et al. (2013) demonstrated that residents can safely provide feedback to facilitators and faculty, supplying expressive team-based feedback while promoting honesty and improving the educational experience (Fluit et al., 2013).

Considerations

Even though the benefits of feedback in clinical medicine are apparent, there are obstacles to its successful implementation. Some healthcare professionals may resist feedback due to concerns about criticism or a lack of time for reflection and improvement (Bing-You & Trowbridge, 2009). Addressing these barriers requires a culture shift within organizations, prioritizing feedback as essential to professional development and patient care (Molloy et al., 2020). Additionally, healthcare institutions must ensure that feedback is provided in a constructive and bidirectional manner to encourage acceptance and utilization by healthcare professionals (Ramani & Krackov, 2012).

Challenges in Providing and Receiving Feedback

Providing and receiving feedback has long been recognized as an integral piece in supporting and enhancing the learning process. In the education process, whether clinical medicine or education, feedback is badgered with challenges that impact its effectiveness and acceptance (Burgess et al., 2020; Henderson et al., 2019). Multifaceted challenges within this context focus on resistance to feedback, cultural and ethical considerations, and the delicate balance between positive and constructive feedback (Hernandez & Wang, 2022; Natesan et al., 2023; Watling et al., 2013).

Resistance to Feedback

Resistance to feedback remains a pervasive issue in clinical medicine. Despite their dedication to patient care, many healthcare professionals exhibit defensiveness and reluctance when receiving feedback (Perrella, 2017). This reluctance can be attributed to several factors, including fear of judgment, concerns about reputation, and the cultural nature of healthcare organizations (Archer, 2010a; Jug et al., 2019; Ritchie et al., 2020). The fear of negative repercussions can lead to feedback avoidance or rejection, hindering professional or learners growth and posing risks to patient safety (Hernandez & Wang, 2022; Sari et al., 2023).

Cultural and Ethical Considerations

Cultural and ethical considerations add complexity to the feedback process in clinical medicine. Healthcare is a global field with diverse practitioners, each influenced by their cultural values and ethical frameworks (Sari et al., 2023). Providing feedback that respects cultural differences and adheres to ethical norms can be challenging. Moreover, cultural and ethical variations may affect how feedback is received, with some individuals being more receptive to specific approaches than others. Striking the right balance between universal feedback principles and cultural sensitivity is crucial (AlMahmoud et al., 2017; Berlinger & Berlinger, 2017; Sari et al., 2023).

The influence of cultural diversity can be found in the healthcare workforce itself. Immigrants comprise 28% of the U.S.'s 958,000 physicians and surgeons and 38% of the home health aides, representing only 17% of the U.S. population (Batalova, 2020). Cultural competency is essential to reduce disparities in healthcare. In the United States, healthcare professionals care for many diverse populations, making cultural competency crucial for understanding the patient's needs and developing the understanding and trust of the physician

(Rukadikar et al., 2022). To further illustrate the knowledge of patient mistrust, only 20% of resident physicians across multiple specialties reported training dealing with patient mistrust, and half received training on recognizing and grasping patient-physician differences (Valente et al., 2020).

Balancing Positive and Constructive Feedback

Balancing positive and constructive feedback is another critical challenge in clinical medicine. Healthcare professionals often struggle to balance recognizing achievements and addressing areas for improvement (Bing-You et al., 2017). Overt positivity may hinder growth by masking weaknesses, while overly critical feedback can lead to demotivation and burnout (Natesan et al., 2023; Ramani et al., 2019). Striking this balance requires skillful communication and an understanding of individual needs and preferences among clinicians (Jug et al., 2019; Kornegay et al., 2017).

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Best Practices for Effective Feedback

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Many studies have shown the value of learner growth through performance feedback. However, institutions and learners often still struggle with missed opportunities and the application of a one-size-fits-all feedback application. Research literature in medical education suggests that feedback is affected by the influences of "social interaction and cultural aspects on feedback" (Van Der Leeuw et al., 2018, p. 1). Clinical education appears to have shifted from postpositivist views toward a more comprehensive sociocultural perspective focusing on the individuals' framework and interwoven learning (Van Der Leeuw et al., 2018). Three fundamental best practices for delivering effective feedback have been described in clinical medicine: specificity and clarity, regular feedback sessions, and two-way communication.

Specificity and Clarity

Specificity and clarity are fundamental elements of effective communication in clinical medicine. When providing feedback, it is essential to be precise about observed behaviors or procedural actions, avoiding vague or ambiguous language like "good job" or "great having you with us today." Instead of stating these broad, open statements that leave more questions about the behaviors or performances that led up to the glowing summations. "You developed a good rapport with the patient using an empathic tone, introduced yourself, used the patient's preferred name, approached at their eye level, and completed a comprehensive history and cardiovascular assessment." This type of detail provides effective reinforcing feedback for the learner to build on and continue to perform (Burgess et al., 2020; Kritek, 2015; Natesan et al., 2023).

Regular Feedback Sessions

Regular feedback sessions are crucial in clinical medicine, ensuring ongoing professional growth. Feedback should not be limited to yearly performance appraisals or summative reviews but should be integrated regularly into daily clinical practice. Regular sessions provide timely guidance to promptly address issues, allowing time to make necessary improvements. Retention and acceptance may also be supported by regular feedback. Frequent feedback fosters a culture of continuous learning and improvement within healthcare organizations and education, ultimately leading to better patient care (Archer, 2010a; Burgess et al., 2020; Lefroy et al., 2015).

Two-Way Communication

Two-way communication is essential for effective feedback in clinical medicine. It involves an open and collaborative exchange between the feedback provider and recipient. Healthcare professionals and learners should be encouraged to ask questions, seek clarification, and engage in discussions to understand better the feedback provided. Two-way communication

not only ensures that feedback is well-received but also promotes a supportive and respectful environment where clinicians feel comfortable sharing their perspectives and concerns (Griffiths et al., 2021; Kritek, 2015; Myers & Chou, 2016; Ramani & Krackov, 2012).

Actionable Plan Strategy

Effective feedback must include an actionable plan for improvement and the next steps for improvement. After timely and clear feedback, the facilitator or faculty member should work with the feedback recipient to develop a plan to achieve the desired performance results. Plans should not be hierarchically developed from the top down, but a two-way communication conversation should be used to establish the desired performance, where the learner or clinician formulates specific steps to achieve performance outcomes. Without an actionable plan, learners are left with unusable information, feeling inadequate and lost. Actions can mitigate shame or lowered self-esteem, which may worsen performance even further. Timely, clear, specific, regular, and actionable feedback promotes adequate concordance with learning measures and increases the likelihood of acceptance while developing a shared representation of expectations and competencies (Kornegay et al., 2017; Lefroy et al., 2015; Natesan et al., 2023).

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Feedback Tools and Technologies

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Cutting-edge technology has provided new feedback tools and technologies that can substantially affect feedback processes in clinical medicine. The role of electronic health records (EHRs), simulation, and web tools provide learners with experiential learning opportunities and feedback for learners and healthcare professionals. Evaluation of the utilization of these technologies highlights their potential to enhance feedback practices and contribute to continuous improvement in clinical care.

Electronic Health Records

Electronic Health Records (EHRs) have become obligatory tools at all levels of clinical medicine for operations management, patient safety, and support clinical workflows. Electronic Health Records have not been viewed as favorable by health professionals as their workloads increased without seeing the benefits of collecting the additional data. Limited data is readily available for health professionals to review their performance and perform quality reviews (Shaw et al., 2019).

These health records provide a vast patient data repository, offering healthcare professionals insights into their initial clinical decisions and comparisons with outcome treatments and diagnoses. Electronic Health Records enable practitioners to review past cases, identifying areas where best practices may have varied. Feedback from data repositories allows learners and health professionals opportunities for self-reflection and review of strategies deployed for formative professional development. Some health professionals expressed concern over the potential use of data for punitive actions (Shaw et al., 2019).

Moreover, data repositories can populate feedback dashboards that illuminate patients' progress after floor admission, further treatment, and escalation to more intensive care units. Prior use of the EHR was to document real-time patient times within the department or to assist operations management. Feedback dashboards can deliver continual feedback, allowing time for self-reflection. By leveraging EHRs as feedback tools, healthcare professionals can receive balanced feedback, both positive and negative, customizable levels of feedback based on clinician preference, and ultimately enhance patient care (Strauss et al., 2022).

Simulation

Simulation-based training is widely used in healthcare education and feedback delivery. High-fidelity life-like simulators and standardized patient encounters allow healthcare professionals to practice clinical skills and decision-making repetitively in a controlled environment before attempting to perform them on actual patients, increasing performance, safety, and confidence (Liu et al., 2023). Simulated scenarios may mirror real clinical situations, allowing formative and summative feedback on critical decision points and performance under similar cognitive loads in actual practice. Instructors and facilitators can provide immediate formative feedback on behaviors observed during simulations, enabling learners to understand the effects of their choices. The immersive nature of simulation-based feedback enhances learning and skill development, ultimately resulting in improved clinical practice (Liu et al., 2023; Williams et al., 2019).

Web-based tools designed to be completed in brief narrative form can provide timely and increased feedback responses to learners. Cost-effective and simple to deploy within an institution, these tools can simplify data collection for learners' milestone objectives. QuikNotes, Survey Monkey, Google Forms™, and Qualtrics are a few examples (Natesan et al., 2023).

Feedback in EMS

In EMS, consistent, timely, and actionable feedback on performance is paramount. Despite its significance, EMS clinicians often lack regular feedback to enhance performance (Cash et al., 2017). This deficiency underscores the need for improvements in the feedback process within EMS, aligning with the broader acknowledgment of the positive impact of feedback on improving patient outcomes and enhancing quality improvement (QI), along with

exploring paramedics' perception of feedback and the importance of medical director involvement in the feedback processes.

Four distinct modes of EMS feedback that influence EMS clinicians and patients are patient outcomes, clinical performance, protocol adherence, and EMS resiliency. Understanding these feedback mechanisms is critical for EMS agencies to improve operations and deliver better community care.

Patient Outcomes

Patient outcomes are crucial indicators for assessing the effectiveness of EMS care. These outcomes encompass survival rates, recovery times, and long-term health status, providing valuable data that allows EMS agencies to evaluate the impact of their interventions and make necessary adjustments to their protocols and practices (Mears et al., 2010). However, it is essential to note that the aggregated effect of EMS feedback across numerous intervention types and outcomes cannot be resolved by a current evidence-based review of the "aggregated effect of EMS feedback" due to multi-study and system dissimilarities (Wilson et al., 2023b, p. 10).

Performance improvement (PI) audits and feedback are pivotal in improving EMS care quality. Wilson et al. (2021) stated that small to moderate positive improvements in patient care interventions are associated with PI audit and feedback. Feedback also has a modest but significant positive effect on quality outcomes (Wilson et al., 2021). Challenges in EMS data systems and resource constraints acknowledge the difficulty in obtaining data use agreements and limited personnel availability for outcomes data analysis (Fishe et al., 2023).

Effective feedback mechanisms within the EMS system are essential for minimizing errors, gaps, delays, and inefficiencies. Feedback enables EMS to validate clinical impressions and assess hospital notifications' effectiveness in significant trauma cases, ST-segment elevation

myocardial infarction (STEMI), stroke, and critical interventions to determine the appropriateness of hospital destination decisions (Gunderson et al., 2021). Cash et al. (2017) found that EMS professionals predominantly found feedback valuable for improving their practices, even though feedback from medical directors, who are authoritative sources for suggesting improvements, was received only 21% of the time. Seeking and providing more regular and timely reviews of patient care activities may optimize the feedback process by medical directors and enhance training and QI efforts (Cash et al., 2017).

Furthermore, the importance of feedback in PI within the prehospital setting is emphasized, with EMS professionals and clinicians recognizing its significance (Cash et al., 2017). Timely outcomes feedback from hospitals and EMS agencies significantly influences critical assessment and forming diagnostic impressions in decision-making for EMS clinicians (Fishe et al., 2023). The lack of a systematic way for paramedics to receive timely feedback once patients have been transferred to hospitals is a notable concern, blocking the conversion of experiences into knowledge (Hodell et al., 2016). Feedback has also been found to improve interventions like CPR compression depth and rate statistically, albeit not necessarily patient outcomes (Lyngby et al., 2021).

Feedback on patient outcomes is an integral component of EMS care improvement. While challenges exist regarding data systems, resource constraints, and the consistency of feedback, it remains a valuable tool for enhancing patient care. Efforts to optimize the feedback process involve more actively engaged medical directors, which can facilitate timely feedback and contribute to better patient outcomes and QI in EMS care. Even if not always positive, the desire for more feedback underscores its importance in enhancing patient care and safety within the EMS system (Wilson et al., 2022a, 2023b). However, studies have highlighted the

inconsistency and infrequency of feedback received by EMS professionals, including feedback on patient outcomes and documentation (Morrison et al., 2017). Despite these challenges, feedback remains valuable in enhancing overall patient care.

Clinical Performance

Clinical performance feedback involves evaluating EMS clinicians' medical skills, diagnostic accuracy, and treatment decisions. Peer reviews, clinical audits, and supervisor and medical director assessments contribute to this feedback form. Analyzing clinical performance feedback helps identify areas where additional training or resources may be required, ultimately leading to higher-quality care (Stoecklein & Youngquist, 2018).

Feedback plays a crucial role in enhancing clinical performance across various healthcare disciplines, promoting the development of confidence, clinical skills, and competence (Adamson et al., 2018; Archer, 2010b). However, in the context of paramedicine, there is a noticeable gap in the literature concerning paramedicine students' feedback experiences during clinical placements (Carroll et al., 2023). It is essential to deliver consistent and timely actionable feedback on performance in the field of EMS. Unfortunately, EMS clinicians often do not receive regular feedback to improve their performance, highlighting the need to improve the feedback process (Cash et al., 2017).

Despite the challenges in the feedback process, EMS professionals have overwhelmingly reported that they find the feedback they receive supports improving their patient care practices (Cash et al., 2017). The presence of feedback on patient outcomes and EMS clinician performance significantly influences EMS clinicians' preferences for feedback, consistent with prior studies that underline the implications of feedback in shaping EMS outcomes and practice

(Fishe et al., 2023). Feedback on performance is particularly crucial for trainees and less experienced EMS professionals to ensure safe and effective patient care (Gugiu et al., 2021).

Performance feedback serves not only as a tool for individual improvement but also as a source of aggregate data for agency and hospital comparison, performance trending, and ongoing feedback to agencies involved in patient diagnosis and transport (Langabeer et al., 2014). However, it is essential to acknowledge that feedback in EMS can be limited in detecting minor improvements in patient outcomes, especially when many studies lack the power to address patient-centered outcomes. The structure and framework for debriefing sessions and the content of feedback sessions often remain unreported in EMS settings (Lyngby et al., 2021).

The significance of providing students with frequent, detailed feedback on their performance during clinical placements is often understated (Margolis et al., 2009). The effectiveness of feedback is influenced by various factors, including baseline performance levels, the source of feedback, and the incorporation of explicit action plans (Snowsill et al., 2023). Recent initiatives, such as the National EMS Management Association's position statement and the 'EMS Agenda 2050 Report, emphasize the need for EMS clinicians and systems to receive rapid feedback on patient outcomes to improve performance metrics, QI, and education (Wilson et al., 2022a).

A Wilson et al. (2023) meta-analysis review supports a moderate positive effect for various feedback types within EMS, including clinical performance and patient outcome feedback. However, there seems to be a tendency among EMS professionals to associate feedback more with patient outcomes rather than clinical performance feedback (Wilson et al., 2023a). The challenges of providing feedback to EMS personnel are compounded by their siloed

geographical distribution and largely unsupervised work, which hinders follow-up on patients and performance (Wilson et al., 2023a).

Although the benefits of feedback are well-documented in healthcare, there is a paucity of literature on paramedic outcomes feedback in the U.S., and there exists a need for more research to explore EMS experiences and preferences of outcomes feedback, including during clinical placement (Cash et al., 2017; McGuire et al., 2021; Wilson et al., 2023b). The consistent and timely delivery of actionable feedback is vital for enhancing EMS clinicians' knowledge, growth, and performance and ensuring safe and effective patient care (Cash et al., 2017; Maria et al., 2019; Patterson et al., 2019). Efforts to improve the feedback process, including combining PI audit and patient outcomes feedback, can potentially enhance education, decision-making, and overall performance in EMS, leading to improved outcomes (Carroll et al., 2023; Pepe & Stewart, 1986).

Protocol Adherence

Protocol adherence feedback is centered around compliance with established EMS protocols and guidelines. Quality assurance programs and regulatory feedback ensure that EMS clinicians follow standardized procedures. Monitoring and analyzing this feedback assists in maintaining consistency and adherence to best practices (Lincoln et al., 2022; Wilson et al., 2021).

Following the standard of care or local protocols is an essential component of healthcare, and adherence to protocols often undergoes scrutiny through quality assurance audits to ensure patient safety. However, Foerster et al. (2018) observed that these audits or reviews sometimes overemphasize strict protocol adherence, potentially leaving little room for evaluative reasoning. The need for striking a balance between adherence and flexibility in protocols becomes evident,

as demonstrated by Hodell et al. (2016), who emphasized the importance of bi-directional

communication, particularly in the context of adherence to stroke guidelines.

In EMS, protocol adherence is a multifaceted issue affecting various aspects of care.

Wilson et al. (2021) highlighted its impact on the bundle of stroke care delivery, patient

satisfaction, survival, documentation, clinical decision-making, cardiac arrest metrics, and EMS

run times. The research found that feedback substantially enhanced documentation and protocol

adherence, resulting in large outcome effects (Wilson et al., 2021).

Hodell et al. (2016) emphasized the importance of bi-directional communication in

improving adherence to guidelines, drawing attention to its successful application in the

cardiovascular literature. Two-way communication can enhance understanding of protocols and

foster effective implementation in emergencies (Hodell et al., 2016).

Even though protocol adherence is crucial, it is equally important to consider the broader

implications of feedback. Audit and feedback, often called clinical performance feedback, is a

common practice in clinical settings (Wilson et al., 2021). Research has shown that audit and

feedback can lead to small to moderate enhancements in patient care by enhancing healthcare

professionals' observance of desired clinical practices (Wilson et al., 2023a).

The significance of feedback is highlighted by the development of the Clinical

Performance Feedback Intervention Theory (CP-FIT) (Wilson et al., 2023a). This theory

acknowledges the multifaceted impact of feedback on clinical performance and patient care,

patient safety, and personnel well-being. Despite the existence of such theories, the actual

application of the feedback theory in practice is limited, with most studies focusing on audit and

feedback. However, there are specific opportunities for enhancing feedback to EMS personnel,

including combining audit and patient feedback to improve decision-making (Wilson et al., 2023a).

The absence or presence of feedback on patient outcomes significantly influences EMS clinicians' preferences, highlighting its pivotal role in shaping practice (Fishe et al., 2023). Hodell et al. (2016) shed light on paramedics' challenges, emphasizing the need for feedback on stroke-related education and the structural challenges imposed by protocols and forms. Feedback loops integrated into standardized protocols have become integral in promoting communication and collaboration among EMS clinicians and hospitals in ongoing QI processes (Wilson et al., 2023b).

The dynamic and uncontrolled nature of the prehospital environment often makes following linear protocols as if they were a cookbook recipe challenging. Sound clinical judgment becomes essential in such situations, mainly when resources are scarce (Pepe & Stewart, 1986). Recognizing the importance of feedback in enhancing EMS performance, a condition-specific regional network established a "breach-reporting" (feedback to EMS to use less inflammatory wording) initiative to provide feedback when EMS personnel deviated from protocols, focusing on learning and improvement rather than criticism (Wilson et al., 2023b, p. 8). Another notable initiative involves providing hospital-directed feedback to an EMS organization on compliance with state protocols and documentation (Wilson et al., 2023b).

While protocol adherence or quality assurance is necessary for healthcare, feedback is vital in optimizing performance and improving patient care. Striking a balance between protocol compliance and the flexibility to exercise clinical judgment is essential. Audit and feedback, underpinned by theories like CP-FIT, offer opportunities for improvement. Feedback's

multifaceted impact extends beyond clinician performance to patient care, safety, and personnel resiliency, making it a central element in healthcare quality improvement (Wilson et al., 2022a).

EMS Resiliency

Feedback significantly influences paramedics' well-being, including their mental health, job satisfaction, and resilience. Morrison et al. (2017) emphasized the positive potential of feedback, highlighting its capacity to enhance paramedics' job satisfaction, improve their confidence, and bolster overall morale. Illuminating the potential adverse effects of negative feedback, Morrison et al. (2017) noted negative sentiments such as fear, shame, and concerns about its influence on self-esteem and overall well-being. Morrison et al. (2017) further revealed that feedback's delicate balance between constructive and negative is crucial to encourage the recipient and serve the intended purpose of improvement. It is essential to understand that feedback underscores the subtle balance between constructive and negative feedback to serve the intended aim (Morrison et al., 2017).

The effects of feedback on paramedics' mental health have been a source of growing concern in EMS. Despite the inherent challenges of their profession, research has been relatively limited in exploring protective factors that could enhance paramedics' resilience (Musso et al., 2019). Paramedics often face high levels of stress and burnout, and feedback can play a pivotal role in either exacerbating or easing these issues (Morrison et al., 2017). Adverse outcomes, including disengagement, self-blame, substance abuse, and denial, have been linked to post-traumatic stress disorders, aligning with the burnout and well-being issues observed among medical residents (Musso et al., 2019). Positive feedback recognizing paramedics' performance and effort can enhance their well-being and job satisfaction (Wilson et al., 2022a). The absence

of feedback has notably been identified as a source of dissatisfaction among EMS clinicians, highlighting its importance in maintaining job satisfaction (McGuire et al., 2021).

Feedback is closely associated with healthcare professionals expanding their knowledge base and developing clinical skills, competence, and confidence (Adamson et al., 2018). Healthcare feedback can potentially enhance clinical performance and foster resilience (Morrison et al., 2017). Paramedics who receive feedback recognizing their competence and performance while positively impacting patient care experience increased job satisfaction. Outcomes feedback also supports building a culture of encouragement and improved communication interchange among peers, further cultivating overall well-being (Wilson et al., 2022a).

Carroll et al. (2023) research on feedback's impact on paramedicine students' well-being is limited but further illustrates the detrimental effects of destructive and unstructured feedback on students' self-esteem, confidence, and well-being. Paramedic administrators and educators should be attentive to feedback's impact on mental health, especially considering the increasing evidence of stress and burnout among prehospital healthcare clinicians (Morrison et al., 2017). A further opportunity exists for timely and structured feedback mechanisms to advance patient care and satisfaction across the EMS system (McGuire et al., 2021).

As in other healthcare settings, feedback in paramedicine can profoundly impact mental health, job satisfaction, and resilience. Positive feedback can enhance well-being and job satisfaction, while negative feedback may induce negative sentiment and apprehension about self-worth (Carroll et al., 2023). Recognizing the importance of feedback and implementing structured feedback processes promotes improved patient care and clinician well-being. (McGuire et al., 2021).

Quality Improvement Outcomes

Performance Enhancement

Feedback is imperative for fostering the development of clinical skills, providing invaluable insights into past performance to enhance future capabilities while developing clinician confidence (Adamson et al., 2018). This principle is firmly established across diverse healthcare disciplines, underscoring feedback as a cornerstone for bolstering self-assurance and competence across the healthcare landscape (Archer, 2010b).

The advancement of healthcare systems has brought about significant changes, with electronic medical records, the standardization of EMS data through the National EMS Information System (NEMSIS), and the implementation of state-based quality programs and systems of care quality initiatives like the Cardiac Arrest Registry to Enhance Survival (CARES) or Mission Lifeline. These developments have given rise to many quality measures increasingly linked to clinical excellence (Bourn et al., 2021). A vital aspect of quality management activities is the need for substantial bidirectional information sharing between EMS agencies and receiving healthcare facilities. It is imperative for accurate quality assurance to exist that hospital outcome data be exchanged with EMS agencies and the EMS clinicians involved in patient care (Vithalani et al., 2022).

Despite the evident advantages, bidirectional data sharing fails to be commonplace within the healthcare landscape (Vithalani et al., 2022). The recent expansion of EMS services into a broader scope of practice further accentuates the critical need for prompt feedback and seamless data exchange to support the ongoing endeavors of Quality Assurance and Quality Improvement (QA/QI) (Gunderson et al., 2021). This bi-directional data sharing is indispensable, as hospitals rely on EMS data to ensure clinical continuity, conduct their internal QA/QI processes, and

actively participate in clinical quality assessments and research registries (Gunderson et al., 2021).

Within the field of EMS, feedback mechanisms, particularly feedback loops for routine cases and aggregated reports, still need to be employed. Nevertheless, there are notable exceptions, namely in the applications of clinical registry reports for specific medical conditions like severe trauma, stroke, STEMI, and out-of-hospital cardiac arrest (Gunderson et al., 2021). The ongoing evolution of feedback practices in EMS and the broader healthcare landscape emphasizes the significance of enhancing bidirectional data sharing for improved clinical outcomes and overall quality of care.

Education

The importance of feedback is widely acknowledged across various healthcare disciplines, yet a noticeable research gap exists concerning paramedicine students' encounters with feedback during their clinical placements (Carroll et al., 2023). In paramedicine, mentors, often paramedics themselves, perceive a need for training to prepare them to provide comprehensive student feedback. Consequently, there is a tendency to offer positive feedback irrespective of the student's performance, highlighting the significance of the mentor-student relationship, which is critical to building trust with new students and embodying positive role models (Carroll et al., 2023).

For trainees and new EMS professionals, receiving performance feedback is particularly beneficial as it supports their formative development and ensures safe and effective patient care. A key challenge lies in effectively evaluating paramedic performance and aligning it with appropriate evaluation tools within the learning environment, presenting an ongoing priority (Staple et al., 2018). Additionally, it is noteworthy that a paramedic's prior educational

experiences, from high school to university graduate studies, significantly influence their learning styles within the paramedicine domain. These expansive educational backgrounds present considerable difficulties in education development and implementation (Staple et al., 2018).

Clinical placement is a fundamental component of healthcare education and a common practice in training healthcare professionals. The hands-on experience, noted by Kennedy et al. (2015), is often characterized as being "thrown into the deep end" (p. 1041) and serves as a critical phase when commencing a healthcare career. While some consider it a tradition or rite of passage, it creates an opportunity to showcase the student or novice's ability to handle pressure, develop essential skills, and build confidence within the peer group. The ongoing exploration of feedback dynamics within the paramedicine educational framework is essential for enriching the learning experience and promoting proficient skill development among future paramedics (Kennedy et al., 2015).

Clinical Outcomes

Regular communication and joint conferences between EMS and hospitals are vital for building trust and providing adequate feedback (Langabeer et al., 2014). The perception of feedback when provided to participants is generally positive, with central subthemes incorporating asking for feedback, a desire for feedback, strengths of current feedback systems, and adaptive informal feedback structures (Morrison et al., 2017). However, paramedics have raised concerns about the feedback they currently receive, highlighting issues related to the lack of routine and timely feedback, feedback structure, integration between feedback and disciplinary action, feedback bias, and the perceived value of feedback (Morrison et al., 2017).

Formalizing hospital-to-pre-hospital feedback can be challenging due to resource constraints and information governance issues (Snowsill et al., 2023). Feedback that combines patient outcomes with clinical performance feedback is a valuable initiative in paramedicine, aiming to deepen learning and improve personnel well-being (Wilson et al., 2023). Understanding patient outcomes may enable paramedics to evolve their roles, contributing to the interrelatedness of the entire healthcare system (Eaton-Williams et al., 2020). Timely outcomes further encourage feedback-seeking behavior, and alternative feedback types and outcomes are fundamental to enhancing continued learning and expanding paramedics' knowledge base (Wilson et al., 2023a).

Quality Assurance

Feedback is instrumental in various aspects of quality assurance within EMS. Key performance indicators such as ambulance times, protocol adherence, cardiac arrest performance, clinical decision-making, and documentation are closely monitored. The feedback produced a statistically significant positive effect in 73% across all outcome measures. Feedback to EMS professionals influences behavior change, which permits significant positive effects on outcome measures in most cases, with a moderate positive overall statistical effect (Wilson et al., 2023b). Paramedics often express the need for closure from a call with feedback, especially in critical cases or with patients with uncertain diagnoses (Eaton-Williams et al., 2020). Feedback also contributes to refining clinical performance and competence (Adamson et al., 2018).

Job Satisfaction

Effective feedback can positively impact paramedics' job satisfaction, boost their confidence, and increase motivation. Feedback amplifies overall performance yet is still underutilized (Morrison et al., 2017). Increasing the frequency of feedback and reducing

obstacles to accessing performance data can help shift the culture within EMS towards more positive outcomes (Morrison et al., 2017). Participants in various studies demonstrated firm commitments to their clinical performance, development, and the advancement of their paramedic practice (Eaton-Williams et al., 2020). Additionally, outcomes feedback may alleviate the high levels of work-related stress, absenteeism, and retention difficulties observed in the EMS workforce (Eaton-Williams et al., 2020).

Perceptions of Paramedic Feedback

Jeruzal et al. (2019) reviewed feedback from various groups following pediatric calls, shedding light on the significant impact of culture and communication on paramedics' coping and recovery processes, particularly in challenging, although infrequent, encounters with pediatric patients. These findings emphasize the need for a supportive cultural environment within EMS systems to assist paramedics in emotionally taxing situations. Additionally, more training in pediatrics was requested yearly, along with system changes to allow for additional recovery time for complex cases (Jeruzal et al., 2019).

Moreover, feedback-related challenges have been identified within EMS systems. One significant issue is the need for systematic case-based feedback from hospitals to the prehospital community, promoting effective communication and coordination between these healthcare entities. One paramedic reported, "There's a lack of follow-up that's very universal in this field because, I mean, we drop a patient off at a particular hospital, and then we won't go back for, you know, almost two, three days... "Hey, what happened with So-and-so?" And they're like, "Oh, wait. That was 40 patients ago" (Hodell et al., 2016, p. 418). The importance of bi-directional communication, where information flows between prehospital and hospital settings, has been

exemplified in scenarios like adherence to stroke guidelines with feedback on most stroke patients (Hodell et al., 2016).

Jensen et al. (2021) reported other studies that established challenges related to communication failures between ambulance professionals and hospital clinicians during patient handovers in the emergency department, which can lead to frustration and fragmented communication. Nurses or hospital clinicians were too busy to take the verbal report or just started treating the patient without listening to the paramedic's handoff (Jensen et al., 2021). These challenges underscore the significance of enhancing feedback processes and communication pathways to optimize patient care and paramedic experiences within the EMS system.

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How Paramedics Perceive Feedback

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Within QI in paramedicine, some notable perceptions and challenges impact the feedback process. Morrison et al. (2017) noted that paramedics often perceive a link between formal feedback systems and disciplinary actions, which can create apprehension and resistance toward feedback. Furthermore, the feedback system may be viewed with recognized bias and a tendency towards providing negative or corrective feedback, potentially leading to reluctance to accept constructive feedback. Incorporating discipline with feedback creates an environment with resistance to discussing errors and variations in paramedic responsiveness to feedback, further complicating the QI process (Morrison et al., 2017).

Paramedics Perception

Paramedics' perceptions extend to the quality assurance system itself. Some paramedics perceive a lack of trust or a strained working relationship with the physician medical oversight system, reflecting the need for improved collaboration. Additionally, there is a perception that the

current continuing medical education model focuses on testing rather than delivering educational content, indicating a potential need for reform in paramedic education. Foerster et al. (2018) report that despite medical oversight groups' efforts to promote an education-based culture, these perceptions persist, underlining the intricacies of promoting positive feedback and a QI domain within paramedicine. These perceptions underscore the importance of addressing the human factors and organizational dynamics that influence paramedic feedback and QI processes (Foerster et al., 2018).

Challenges in Feedback

EMS QI is necessary to ensure optimal patient care, but EMS personnel need assistance seeking outcomes feedback for their performance (Wilson et al., 2022a). Wilson et al. noted that the episodic nature of autonomous EMS work makes it difficult to obtain feedback, hindering their ability to improve their knowledge base and assessment skills. This challenge is magnified in busy urban centers where outcome feedback is often scarce (Hodell et al., 2016). Hodell et al. explained that paramedics often must take the initiative to seek feedback. Other times, a paramedic offers an account, "A lot of times the only QI we get is if we really piss somebody off at the hospital. And then we feel like we're under the gun," wrote (Hodell et al., 2016, p. 419). This lack of timely and systematic feedback leaves them unable to convert their experiences into knowledge, highlighting a fundamental gap in the learning and QI process (Hodell et al., 2016).

Impacts of Feedback on Paramedic Practice

Furthermore, EMS agencies encounter structural challenges in obtaining feedback. Hodell et al. (2016) noted that paramedics' comments on the clear impact of the lack of call-specific feedback and stroke-related education. Access to hospital patient data remains a significant bottleneck for EMS leadership, restricting quality PI measures and outcome data to

paramedics (Redlener et al., 2018). The need for data sharing is bidirectional, with hospitals requiring EMS information for clinical continuity of care and their QA/QI processes. EMS should be obliged to receive the patient's outcome data from hospitals to fulfill the same need (Gunderson et al., 2021). The QI processes explicitly highlight the challenges posed by initiatives like the CARES and the National Cardiovascular Data Registry ACTION registry-Get with the Guidelines. In these initiatives, data collection is manually extracted and time-consuming, primarily reliant on EMS clinicians contributing their data. Unfortunately, there is a significant lack of reciprocal data sharing. This issue of one-sided data provision is particularly prevalent within these registries (Hodell et al., 2016).

Additionally, the classification and coding of EMS data pose substantial challenges. EMS documents are typically based on chief complaints rather than diagnoses, making translating EMS records into acceptable ICD-9 or ICD-10 codes arduous. Establishing a standardized problem-based classification scheme is crucial to enable the efficient sharing of EMS data and facilitate billing and reimbursement based on services provided. However, implementing EMS information systems is more complex, requiring significant configuration, testing, and ongoing personnel training (Mears, 2015). Despite these challenges, there is a national consensus that EMS agencies should have access to hospital patient data to improve their performance, patient outcomes, and safety (Gunderson et al., 2021).

In the context of addressing these issues, the Health Information Technology for Economic and Clinical Health of 2009 has provided initial grant funding for Health Information Exchange (HIE) programs in the United States, offering opportunities for improving data sharing and QI in EMS (Gunderson et al., 2021). Overall, the challenges associated with obtaining timely feedback and establishing efficient data-sharing mechanisms in EMS underscore the need for

comprehensive adjustments and collaborative efforts to enhance the quality and safety of care in this critical healthcare sector (Wilson et al., 2023b).

Benefits of Interconnected Databases

Jensen et al. (2021) reported that several studies supported concerns about poor communication during handoffs and explored the impact of interconnected databases on QI in enhancing patient information between EMS and Emergency Departments (ED). The study included observations of the usage of the charting tool and layout of electronic Patient Medical Records (ePMR), which was pivotal in facilitating data collection and providing a clinical overview of patients' assessments and treatment. The ePMR has elaborately entailed the collective work and patient care processes. This combined approach was reported to enhance collaboration between EMS and ED in Denmark. In 2021, Jensen et al. found that after the implementation of the automatic transfer of patient data to the ePMR on mobile tablet computers, one EMS professional noted, "It is much easier to deliver an emergency patient than it was before we had the ePMR. The ePMR is a good tool as we now collaborate more actively" (p. 4). The ePCR positively affected patient-professional interactions, allowing seamless communication without impeding the ambulance professionals' rapport with patients (Jensen et al., 2021).

In other circumstances, interconnected healthcare data systems could provide paramedics with information to provide care in accordance with a patient's predetermined care plan. However, while the potential benefits of interconnected databases were recognized, practical and technical challenges were acknowledged, affecting the ability to consistently meet the treatment plan (Patterson et al., 2019). On the positive side, paramedics could anticipate feedback on

patient outcomes that could benefit their work engagement, improve well-being, and contribute to their professional development (Eaton-Williams et al., 2020).

Bidirectional databases and feedback mechanisms hold significant promise in the EMS and ED context, aligning with the well-established literature on the value of feedback in healthcare. Feedback on outcomes helps paramedics build confidence, promotes clinical skill development, and improves clinical performance (Adamson et al., 2018). Furthermore, paramedics were observed as envious of other healthcare professions (nursing, family practice, physical therapy) access to outcome information, which they effectively utilized for improved diagnostic and treatment purposes. Interconnected databases can improve diagnostic and clinical decision-making skills, enabling safer autonomous practice and more efficient healthcare system navigation (Eaton-Williams et al., 2020).

Nevertheless, there are concerns regarding the potential overload of feedback, with some clinicians feeling that feedback on all patients might be excessive and prefer the ability to choose which incidents to receive feedback (Eaton-Williams et al., 2020). A practical approach could involve a combination of mandatory reviews for critical interventions and patients, coupled with paramedics having the discretion to initiate other feedback selections. Any information system that consolidates data from various EMS systems should establish comprehensive policies and procedures to safeguard the confidentiality of EMS systems' identities. These measures should prohibit the disclosure of EMS agency information to external entities or the public without the explicit consent of the respective EMS agency (Mears, 2015). Furthermore, information governance challenges for specific EMS feedback initiatives highlight the requirement for solid data management and security protocols to ensure patient confidentiality is preserved (Wilson et al., 2023a).

Importance of Medical Director Involvement

Medical directors' active participation in enhancing quality in EMS cannot be overstated. However, multiple research endeavors have underscored the constrained involvement of medical directors in delivering feedback to EMS professionals. Several studies have highlighted the limited engagement of medical directors in providing feedback to EMS professionals. The study conducted by Cash et al. in 2017 found that medical directors offered feedback sporadically, contributing only 20.6% of the feedback. Additionally, when medical directors provided feedback, it typically took more than four days, occurring 45% of the time (Cash et al., 2017).

This lack of engagement is further underscored by the finding that EMS professionals received feedback from medical directors only 21% of the time, despite medical directors being authoritative sources for suggesting patient care improvements (Cash et al., 2017). Stoecklein and Youngquist (2018) do not recommend peer-to-peer feedback in cardiac arrest performance reviews, as it increases the likelihood of diminishing the significance of cardiac arrest care unless conducted directly by the medical director. In their 2022 study, Vithalani et al. underscore the significance of quality management programs within EMS agencies, stressing that such programs should encompass prospective, concurrent, and retrospective activities while maintaining vigilant oversight from medical directors. Effective enhancement of care processes necessitates seamless collaboration between operational and training leadership (Vithalani et al., 2022). However, the statewide study by Garfinkel et al. (2020) points out that medical directors need assistance in implementing protocols, with only 21% considering their organizational leadership slightly receptive to implementing evidenced-based sepsis protocols. Still, most medical directors (79%) believe access to core measures is vital to assessing EMS clinician performance (Garfinkel et al., 2020).

Medical directors play a pivotal role in setting clinical priorities for EMS agencies, but various barriers, including logistical and financial constraints, hinder their efforts (Slifkin et al., 2009). Ensuring adequate funding for rural EMS agencies remains a challenge, and a physician serving as a system medical director must have adequate involvement to take accountability for the medical care these agencies provide. Redlener et al. (2018), in a national survey containing 95% of respondents with call volumes of 25,000 or less, 39.2% reported serving in the role without compensation, 17.4% on a stipend, and 4.2% hourly, and 26.6% salaried. 12% reported other for payment. Medical directors report that 25.6% participate less than five hours per month, 35.7% are not engaged monthly at all, and 8.8% are unknown. Rural areas were reported with an odds ratio of less likely (0.47) than half to follow clinical quality metrics (Redlener et al., 2018).

Dyson et al. (2020) suggested that better-performing EMS services are defined by organizational environments that encourage excellence. The role of the system medical director is highlighted as multifaceted, promoting QI and improving patient outcomes to fostering positive organizational cultures (Dyson et al., 2020). Finally, Levy and Gallagher (2021) stress the importance of nonpunitive QI processes, a just culture environment, and the need for accessible patient outcome information, examining how medical directors can facilitate these aspects for EMS agencies. Enhancing the community's well-being can be most efficacious when medical directors have complete access to information encompassing the entirety of a patient's journey through various transitions of care (Levy & Gallagher, 2021). The involvement and commitment of medical directors are crucial in advancing the quality of care in EMS, emphasizing the need for ongoing support and collaboration in this field.

Summary

Feedback in clinical learning underpins the foundational concepts of continuous learning. Cultural and individual differences must be reconciled within any learner feedback, as these elements impact the delivery and consumption of the intended feedback. As Ende (1983) astutely states, "Like giving feedback, receiving it properly is not always a simple passive act. It requires maturity, honesty, and selfless commitment to the goal of improving clinical skills" (p. 781). The main goal of feedback is to foster improvements toward appreciable goals and skills development. Effective feedback serves its purpose when it is delivered promptly, clearly articulated, and focused on achieving specific objectives.

Clinical medicine outcomes can be directly influenced by effective performance feedback. Feedback in clinical medicine is also bidirectional, enhancing interdisciplinary teamwork and contributing to protocol and practice enhancements of patient safety and quality of care. While an integral piece of the learning process, feedback delivery faces many challenges, from resistance to fear, reputation, and organizational culture. Additionally, culturally diverse practitioners add another layer of complexity, requiring evaluators to provide feedback with cultural competence to ensure it is well-received and does not hinder the learner's growth or pose risks to patient safety. Balancing feedback while considering the learner's sociocultural perspectives and development requires regular feedback sessions, two-way communication, clarity, and specificity. Incorporating tools and technologies integrating patient dashboards and simulation can propagate improved performance. These technologies promote formative and summative feedback at crucial decision points, enabling numerous learning opportunities without risking patient safety.

Unlike other clinical fields, EMS lacks consistent and actionable feedback on outcomes. Clinically, paramedics are left wondering what happened to the patient, if the patient survived, and whether the assessment and treatments align with the patient's hospital assessment. Even though the benefits of feedback are well described in the literature, there is limited literature on the experiences and preferences of outcomes feedback in the United States. Furthermore, the literature on EMS preferences in receiving feedback remains mute. Despite mandated electronic patient reports, data systems still neglect to provide EMS with two-way patient information. Most feedback in EMS, centers around protocol adherence and may only provide sparse outcomes information even on high patient acuities, such as stroke, heart attack, and severe trauma. Despite being infrequent, these feedback outcomes have demonstrated improved patient outcomes.

Nevertheless, nearly half of all EMS fail to receive feedback, and consistency is absent. Paramedics have expressed wanting feedback on outcomes but perceive a lack of trust or disciplinary action combined with feedback. The benefits of collaborative patient data exchanges are predominately unrealized even though both hospitals and EMS capture similar data. Some studies suggest paramedics may benefit from outcomes feedback by promoting well-being and job satisfaction.

Active engagement of medical directors is necessary to ensure patient safety and compliance with clinical best practices. The literature often underscores the limited involvement of medical directors, noting irregular and inconsistent participation. Medical directors are pivotal as authoritative leaders in determining clinical appropriateness, although paramedics receive peer-to-peer feedback. A study by Redlener et al. (2018) revealed that 39% of medical directors provided services without compensation.

EMS organizations that foster a positive culture of excellence and clearly define QI objectives are more likely to enhance patient outcomes. However, it is important to recognize that medical directors are pivotal in advancing healthcare and promoting data collaboration, given their prevailing seat at the decision-making table. As such, the purpose of this study is to gain perspectives on the importance of United States 911 suburban/rural paramedics and medical directors' feedback and the potential effects of providing the necessary feedback for learning to improve patient outcomes and paramedic resiliency; the methods for addressing this research are outlined in Chapter 3.

CHAPTER THREE: METHODS

Overview

This chapter explores the methodologies employed in developing a grounded theory to uncover the significance of feedback from the viewpoints of paramedics and medical directors. This research seeks to address this question due to the lack of substantial empirical evidence. Furthermore, this chapter delineates the methodology for a mixed methods approach and provides a rationale for selecting this methodology. The chapter demonstrates how the research questions align with the chosen theoretical framework while examining how the researchers' experiences and potential biases may affect the study's outcomes. This examination further advances the reasoning behind the choice of research settings and participants and the established criteria for their inclusion. The data collection and analysis methods underwent thorough evaluation within the research design. The chapter also discusses strategies to ensure the study's trustworthiness and ethical considerations and concludes with a summary of the key points.

Design

The choice to employ a mixed methods CGT approach is driven by the recognition that specific research questions require a broader understanding than can be attained through qualitative or quantitative methods alone. Constructivist grounded theory allows participants to tell their stories, views, and perspectives to advance beyond description, generating a theoretical understanding (Creswell, 2014). The mixed method (see Figure 1) approach strengthens the credibility of the emerging theory and amplifies its generalizability, capitalizing on the strengths of quantitative research methods (Guetterman et al., 2019).

Figure 1

Mixed Methods Convergent CGT Process

Mixed Methods Convergent CGT Process

Research Questions
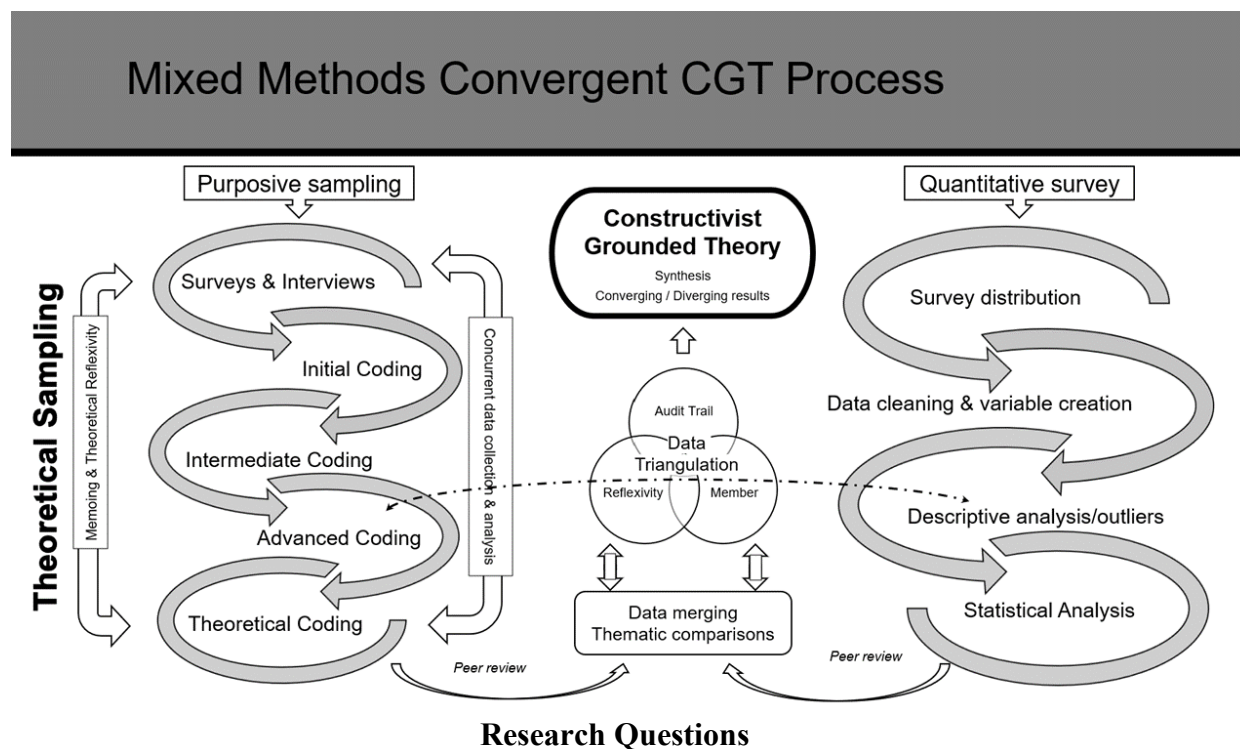
The investigative focus of this CGT study is centered around the research questions, acting as the guiding principles for the study's direction and the structure for data collection. The study's purpose is to develop a systematically grounded theory by engaging in a constructivist approach firmly rooted in the phenomenology of outcomes feedback derived from clinical EMS experiences. The primary purpose is to investigate how paramedics and medical directors perceive outcomes feedback, in terms of type, quality, and quantity, that can influence their critical thinking skills, knowledge base, and job satisfaction. Additionally, the study burrows into the perspectives and training of medical directors in delivering feedback, a crucial factor in determining the nature and effectiveness of outcomes feedback dispensed. The significance of this research is distinguished considering the lack of existing literature on the subject. It aims not only to contribute to the body of knowledge but also to lay the groundwork for the effective

reception of outcomes feedback and to identify the best methods for its delivery. Furthermore, the study explores the barriers to providing feedback, considering its impact on improving patient outcomes while reinforcing paramedic resiliency.

The author designed a structured interview guide for medical directors (see Appendix H) and paramedics (see Appendix I) consisting of semi-structured and open-ended questions to effectively capture the participants' viewpoints. This approach allows for a comprehensive representation of their perspectives, promoting a depth of insight into the subject matter. Moreover, the study embraced flexibility and reflexivity, facilitating an adaptive and responsive inquiry process. The interactions with participants were dynamic and of an evolving nature that unearthed fresh insights and novel conceptualizations shaped by each participant's points of view and unique frames of reference. This approach ensures that the research remains attuned to the evolving dynamics of the field and captures a rich mosaic of experiences and perspectives (Charmaz & Thornberg, 2021).

EMS Research Questions

1. How do paramedics perceive their experiences receiving patient information and outcomes feedback from hospitals/medical providers?

2. How do paramedics receive feedback on their patients' outcomes?

3. How do paramedics perceive feedback conveyed during their medical education and training?

4. How does not knowing a patient's outcome affect paramedics' current well-being and knowledge base to apply in future cases?

Medical Director Research Questions

1. How do medical directors perceive experiences sharing patient information and outcomes feedback from hospitals/medical providers?

2. How do medical directors view their role in providing outcomes for EMS personnel?

3. How do medical directors describe the feedback mechanisms they experienced in their medical training?

4. How do medical directors view the effects of providing regular, timely feedback to paramedics on their overall well-being and knowledge base to apply in future cases?

Online Surveys

Survey questions were administered via Qualtrics, allowing prospective interviewees to self-select and a more extensive sample to be collected for comparative purposes. The survey design adopted a dichotomous structure, serving as a single survey for medical directors and paramedics. The initial survey question (see Appendix F or Appendix G) determined the participant's highest credentialed role, providing a foundation for branching into role-specific queries.

Demographic questions were included to categorize participants based on their roles, community size, service call volume, gender, and software capabilities to enhance the breadth of data collected. Additionally, preference questions concerning feedback were presented to EMS professionals and physicians. The survey featured several qualitative, semi-structured, and open-ended questions, allowing participants to provide rich and varied responses, contributing to the depth of the research findings. This comprehensive approach is designed to provide a holistic understanding of the subject matter by incorporating diverse perspectives and preferences.

Setting

The setting of this research is communities in the United States with less than 250,000 residents; however, the survey was conducted online and distributed at regional or national conferences, and interviews were conducted in-person or by Microsoft Teams. More specifically, the research was conducted by engaging participants at various national and regional conferences focused on emergency medical services (EMS) and attended by physicians. The survey was disseminated electronically and by posted flyer (see Appendix B) and social media pages (see Appendix K) featuring a consent form link and a QR code that allows paramedics and medical directors to submit their responses anonymously and conveniently. The purposive selection of medical directors for interviews attempted to ensure a diverse and comprehensive representation of the experiences of suburban and rural medical directors. Recommendations were sought to identify potential 911 paramedic interviewees within the researcher's professional network, and interview invitations were extended to eligible candidates. Additionally, other paramedics and MDs had the option to self-select for follow-up interviews while participating in the survey.

While in-person interviews were initially preferred for the depth of interaction and rapport, they can build, due to practical considerations, including fiscal constraints, time limitations, and geographical distances, necessitated conducting interviews online through Microsoft Teams. Once the researcher conducted several interviews online, the online methods became preferable due to the availability of repetitively rewatching interviews as needed. Despite these constraints, the researcher believed these recorded and transcribed in-person or online interviews offered valuable insights and fostered enhanced resonance with participants. The diverse and dynamic gathering sites of national and regional conferences are considered optimal for data collection, as they allow for a rich exploration of participants' backgrounds and

the potential for new insights to emerge during the research process (Charmaz & Thornberg, 2021). These environments should provide a rich setting where the researcher can engage in theory construction from the start of the research, sharpen comparative analyses throughout the sampling process, and improve any subsequent theoretical sampling (Charmaz, 2015b).

Participants

Paramedics and EMS physicians were selected for face-to-face (FTF) interviews through a purposeful theoretical sampling process at different EMS and physician conferences. They also had the opportunity to enroll themselves via survey participation, to offer recommendations from their respective agencies, or to have in-person interactions with the researcher. To meet the selection criteria, paramedics must be actively practicing, aged 18 years or older, operating in a rural or suburban setting (with less than 250,000 residents), and actively responding to 911 emergency calls. On the other hand, physician medical directors were chosen from the National Association of Emergency Medical Services Physicians or actively providing EMS system medical oversight with a minimum of two years of experience in their role providing medical oversight. A common prerequisite for all participants is their willingness to engage in discussions regarding the shared feedback phenomenon in the realm of EMS. This willingness to actively participate in the research is crucial to the selection process.

Sample size adequacy in qualitative research depends on many factors and nuances of the study. For this study, the sample size chosen was aimed at achieving theoretical saturation, a point at which the inclusion of additional data no longer provides meaningful insights for creating further categorical creation (Vasileiou et al., 2018). The planned sample size, determined through a combination of purposive, snowball, and theoretical sampling, is anticipated to include a cohort of 6 to 10 interview participants for each group. These groups comprise knowledgeable

EMS clinicians and physicians, exhibiting high homogeneity in the research context. (Moser & Korstjens, 2017).

The collection of data from both physicians and paramedics is paramount to gaining a comprehensive understanding of feedback from each of these distinct perspectives. This significance arises from existing literature demonstrating the underutilization or non-utilization of feedback in various contexts. The researcher implemented a rigorous review process to ensure the survey questions' validity. These questions were evaluated by a panel of seasoned EMS medical directors who are experienced and board-eligible but who were not part of the data sample. Similarly, senior EMS personnel assessed the appropriateness of the survey questions.

Through a comparative analysis of feedback-receivers' and feedback-givers' views, this research strived to uncover the dynamics of feedback usage. This analysis comprised positive and negative feedback usage, underscoring the desire for feedback, methods, applications, and potential strategies to enhance feedback-receivers' receptivity. By inspecting these varied perspectives, the study aims to provide broader external validity to its findings and offer valuable insights into the multi-faceted nature of feedback utilization (Abi-Esber et al., 2022). Pseudonyms were assigned to each individual to safeguard the confidentiality of all participants.

Procedures

Once the Institutional Review Board (IRB) approval was obtained, the survey was pilot-tested by two individuals from each group, paramedics and physicians who were not part of the study, and knowledgeable researchers. Written consent was obtained from all interview participants. The surveys included a verbal consent statement by selecting the option to "agree to participate." Before consenting, participants received an explanation of the study's purpose and a statement noting the voluntary nature of their participation (see Appendix E). Survey participants

were also informed that they may withdraw from the study at any time by simply closing the survey and that their data was not used. Interviewees were given the opportunity to withdraw from the research by stating their intent to the researcher, and their data would have been destroyed. There were no occurrences of withdrawing from the research by participants. The survey did not collect any personal or identifiable information. All survey participants wishing to receive a copy of the consent agreement were offered the researcher's contact information, and a copy of the consent form was sent. In-person participants received a copy of the content agreement on-site.

The pilot study aims to determine if the survey and interview questions accurately assess the research questions for clarity and to derive appropriate responses from the questions, enhancing the clarity and accuracy of the information collected. The criteria for selecting pilot participants were aligned with those used in the main study for focused interviews. It is crucial to avoid unclear or ambiguous questions to ensure that responses stay on topic and reflect the intended focus, minimizing complexity in interpreting the responses (Linder & Fox, 2023). The piloted questions enhanced response quality and improved the research's trustworthiness, validity, and reliability (Malmqvist et al., 2019).

After completing the pilot and addressing unclear questions, the researcher sampled potential participants with flyers and social media posts. Survey participants could either self-select through survey responses or be recommended by another interview participant if they met the enrollment criteria. EMS personnel may self-select through the survey instrument or be referred by colleagues. The researcher used QR codes at national conferences to encourage self-enrollment and identify additional interviewees for the study. Once identified, participants were contacted for private interviews with the participant's consent. Data, including audio recordings,

were collected and securely stored using password-protected, dual-authenticated applications, while written files were safeguarded with at least one locking mechanism.

The researcher employed purposive or snowball sampling to choose candidates to participate in the interview process. The EMS physician medical directors chosen for this research were experienced in their field, possessing extensive knowledge of EMS systems, design, and software usage. For the survey participants selected for interviews, the aim is to represent a diverse cross-section of rural and suburban EMS systems in the United States. Snowball sampling may also be utilized, as one medical director or paramedic participant could recommend another who qualifies within the research's target population and inclusion criteria. Although multiple sampling techniques were used initially in data collection, theoretical sampling guided the researcher in gaining a deeper understanding of the phenomenon (Charmaz, 2014a).

The Researcher's Role

The researcher in a CGT study assumes a unique role. This researcher contributes over four decades of professional expertise encompassing EMS, clinical practice, education, business, and public administration. Drawing insights from various perspectives, including fieldwork, education experience, and administrative work, the researcher strongly emphasizes self-reflection and aims to align their experiences with those of the study's participants. This author brings his own field experiences in combination with the participants to unveil the multiple realities, truths, and subjective experiences (relativist ontology) to the study while representing (subjectivist epistemology) of paramedic practice (how the author knows reality) that is shaped by influences of perception of the perceived observations which shaped the methodologies and data analysis used with the social constructivism of the author's and paramedic's clinical views

(Creswell & Poth, 2018; Levers, 2013). Moreover, the researcher's extensive background equips them with valuable insights and assumptions, and they are committed to an engaged approach with reflexivity when co-constructing and shaping the research data (Charmaz, 2021). Bias is prevalent in almost every research endeavor (Pannucci & Wilkins, 2010). The researcher must maintain a commitment to self-reflection and the belief that existing literature highlights the inadequate utilization of feedback in EMS education and professional development despite the scarcity of such literature. The researcher is aware of this epistemological stance. Nevertheless, this study sets out on a journey to determine whether these observations in the literature and the participants' experiences are distinctive. According to Charmaz (2014), theoretical sensitivity serves as a guiding force for research but performs merely as an initial reference to stimulate the researcher's exploration of more profound ideas.

The researcher accepts the possibility of unconscious and influence bias of the data, as has been argued by some researchers (Allan, 2003; Glaser, 2007). Furthermore, the researcher maintains an open, non-committed position that prior research is provisional and imperfect. The participants' selection process, recurrent data collection, incessant reflexivity, data deliberation, and comparisons of codes and categories all contribute to maintaining transparency and enabling ongoing comparisons and theory revisions. This approach allows data coding and categorization to coexist until further analysis and theoretical sensitivity permit the storyline to develop and become established as a grounded theory (Charmaz & Thornberg, 2021).

Data Collection

Before gathering data, pilot surveys and interviews with two medical directors and paramedics were conducted to ensure the clarity, content, and validity aligned with the intended research (Foley et al., 2021). Pilot studies aid researchers in clarifying questions, approaches, and

data collection methods. The data collection techniques, such as surveys and interviews, may necessitate acquiring supplementary data to confirm the effectiveness of triangulating information from additional sources, thereby enhancing the study's credibility (Anfara & Mertz, 2015; Creswell & Poth, 2018; Levitt, 2021). Furthermore, this mixed methods approach capitalized on a multi-step convergent approach (see Figure 1) to separately collect quantitative and qualitative data, analyze, merge datasets for comparisons, and draw inferences while integrating parallel data to understand best the groups' concordances or discordances of the research questions. This approach to data collection allowed data triangulation of the two datasets, one qualitative and one quantitative, to produce a more robust and generalizable CGT (Creswell & Clark, 2018). This study was qualitatively driven and enhanced with postpositivism quantitative data assumptions and relied on the effectiveness of both qualitative and quantitative additions and iterations. These joint interpretive arrangements offer promising integrated findings while striving to derive a cohesive research theory highlighting the research problem (Charmaz, 2014b).

Before reaching the conference venue, QR code flyers and social media scripts with accompanying descriptions were printed for research purposes. Additionally, the researcher found mutually agreed upon, quiet, and discreet locations most suitable for potential participants. Conference packets contained a brief description and QR code or hyperlink displayed in the session and vendor areas to attract interested participants. Additionally, social media postings were open to all members within the conference area, and social media accounts displayed the QR code or link to the survey. The data collection process commenced by gathering surveys and conducting purposive interviews with paramedics and medical directors.

Online Surveys

Data collection commenced with the distribution of a Qualtrics survey. The survey

contained both medical director (see Appendix F) and paramedic (see Appendix G) questions

dichotomized by the level of license or credential. For reference, the definition of "Patient

outcomes feedback" is general patient information encompassing the emergency department

assessment, treatment, diagnosis(es), admission or discharge decisions, and the overall outcome

of the patient's experience during their hospital encounter. The medical director's survey

addresses physicians' views from the National Association of EMS Physicians (NAEMSP)

medical directors, allowing for self-nomination for interviews. The paramedic survey, which was

deployed simultaneously, allowed professional NAEMSP paramedics to complete the survey,

alerting the researcher to other paramedics for follow-up interviews.

National and regional EMS conferences were also attended to identify additional

interviewees further. Consent for the surveys was identified at the beginning of the survey, with

an option to select to consent to the study, fill out the information, or close the survey, deleting

the data from the dataset. The survey allowed participants to contact the researcher and receive

an electronic copy of the consent agreement through email.

Medical Director Surveys

Physician medical director surveys gathered demographic and professional characteristics

anonymously. The survey instrument allowed for the best representative cohort to represent the

views of the EMS medical directors of U.S. suburban/rural 911 systems with populations of less

than 250,000 citizens. The semi-structured and open-ended question format informs the research

questions and descriptively explains their viewpoints.

The first seven questions established the descriptive demographics of the medical directors participating. Demographic characteristics help define the sample and make comparisons during the evaluative phase of the research (Creswell & Clark, 2018). Questions 8 through 10 highlighted the values and significance of the medical director's experiences with data sharing from the hospitals. Questions 12 to 15 are semi-structured questions on the medical directors' views on sharing feedback on outcomes. Questions 16 and 18 addressed the perspectives of the medical director's experience and their views on adequate medical training to provide effective feedback to EMS clinicians. Questions 19-23 inquired about providing outcomes feedback, how, when, which calls they may provide outcomes on, and their experiences after having a chance to reflect on all the previous questions. Question 24 addressed their views on receiving patient outcomes feedback on their ED patients and connectivity with their practice. These questions gathered the views, values, and perceptions relating to the timeliness and utility of feedback experienced. Additionally, these questions build upon previous literature by Cash et al. (2017), Foerster et al. (2018), O'Hara et al. (2015) and Wilson et al. (2022).

Paramedic Feedback Surveys

The survey, completed by paramedics anonymously, allows for open, uninhibited responses to gather background and demographic data. The responses portrayed the views of the EMS cohort of U.S. suburban/rural 911 systems for comparisons during the evaluative phase of the quantitative analysis. The question format is semi-structured and open-ended to elucidate the research questions and gather the paramedics' perspectives.

Questions 1 through 8 collected descriptive and demographic data to define the paramedic survey cohort. Determining demographic traits proves helpful when delineating the

sample and conducting comparisons in the evaluative stage of the research (Creswell & Clark, 2018). Questions 9-15 address the paramedic's views on receiving actual feedback from patient encounters. Questions 16-18 informed the paramedic's views on their education experience and feedback usage. Questions 19-24 solicited paramedics' views on the effect of unknown patient outcomes and improving the knowledge base to apply in future patient encounters. The questions endeavor to discover the views of paramedics on the value of feedback. The survey questions assemble the views of paramedics on the values and insights relative to the importance of feedback usage. These questions also build upon previous literature by Cash et al. (2017), Foerster et al. (2018), O'Hara et al. (2015) and Wilson et al. (2022).

Interviews

Interviews were completed FTF and comprised interview questions based on medical directors (see Appendix H) and paramedics (see Appendix I). These open-ended questions from each interview guide delve into the backgrounds, experiences, views, and perceptions of the role of feedback for each interviewee. An interview guide promotes systematic congruity and analysis by staying on topic while soliciting answers to parallel questions for medical directors and paramedics (Creswell & Clark, 2018; Creswell & Poth, 2018). Interviews were recorded using a password-protected voice recorder or in MS Teams and backed up by a personal iPhone with an entry lock. Audio recordings were transcribed by a professional transcription service provider and reviewed by the researcher for accuracy. Raw data from the transcriptions were re-coded using pseudonyms for the participants' names. Names were not associated with the transcribed interviews nor returned to the participants for review. Each interviewee's transcribed answers were reviewed to ensure precise and accurate wording.

Question one is a broad, open-ended question to search for the interviewee's experiences providing or receiving feedback on patient outcomes. This question is related to one of the topic research questions, RQ1, and aligned with several literature reviews on feedback in EMS by Cash et al. (2017), Foerster et al. (2018), O'Hara et al. (2015) and Wilson et al. (2022). Questions two through four delve deeper to gather the meanings and values for providing and receiving feedback on patient outcomes. Question five queries the participant's medical education to discover feedback mechanisms to improve performance and gain additional knowledge. Questions six through eight broaches where paramedics get outcomes from, what mode would be the best to receive the patient outcomes data, and what patient encounters would be advantageous to improve outcomes and application to future patients. Question nine asks for the participant's feelings on accessing or inability to access the health data systems containing vital patient information before emergency treatment is initiated to elucidate the benefits and harms that may result from inaccurate or lacking pertinent information. Question ten is open-ended to allow the participant to elaborate or cover any information they feel is relevant to the researcher on feedback.

Open-ended Medical Director Interview Questions

1. What are your experiences with providing patient outcomes feedback provided to EMS personnel? RQ1

2. What are your views on the value(s) for EMS providers receiving patient outcomes feedback? RQ2

3. Who would be the most competent person to send out patient outcomes feedback for formative knowledge-based learning? RQ2

4. How would you describe the way you currently deliver feedback to EMS? RQ2

5. What are your experiences with feedback conveyed during the clinical portion of your medical education? RQ3

6. Who provides feedback on patient outcomes in the ED? RQ4

7. What process of communication would you prefer to deliver outcomes feedback? RQ4

8. What would be your thoughts on the types of patient encounters that (EMS) would be advantageous to increasing the knowledge base for future application and improving outcomes? RQ4

9. Describe the significance of accessing patient's information, such as their medical history, current medications, and prior care, before beginning EMS patient care. RQ4

10. What additional suggestions regarding feedback to improve outcomes do you have?

Open-ended Paramedic Interview Questions

1. What are your experiences with receiving patient outcomes feedback provided to EMS personnel? RQ1

2. What are your views on the value(s) for EMS providers receiving patient outcomes feedback? RQ2

3. Who would be the most competent person to send out patient outcomes feedback for formative knowledge-based learning? RQ2

4. How would you describe the way you currently receive feedback? RQ2

5. What are your experiences with feedback received during the clinical portion of your paramedic medical education? RQ3

6. Who provides feedback on patient outcomes to you in your system? RQ4

7. What process of communication would you prefer to receive outcomes feedback? RQ4

8. What would be your thoughts on the types of patient encounters that (EMS) would be advantageous to increasing the knowledge base for future application and improving outcomes? RQ4

9. Describe the significance of accessing patient's information, such as their medical history, current medications, and prior care, before beginning EMS patient care. RQ4

10. What additional suggestions regarding feedback to improve outcomes do you have?

Data Analysis

The mixed methods constructivist grounded theory uses the convergent study design with data analysis. The quantitative data was analyzed after the last survey had been completed and after the qualitative analysis had been coded and categorized. The quantitative and qualitative data were analyzed using SPSS version 28 and NVivo version 12 software, respectively. Additionally, some portions of the qualitative data were manually analyzed.

Qualitative Data Analysis

As the data was retrieved, initial coding commenced along with the beginning of categorical identification. Along with transcription, memoing enriched the interview notes with detailed "thoughts, feelings, and analytical insights" (Birks & Mills, 2023, p. 16). Memoing was a repetitive process connecting coded data to categories, facilitating the intuitive process of organizing participant data to develop theories and ensuring a "chain of custody" for future decision-making (Birks & Mills, 2023).

After conducting purposive sampling for several interviews and reviewing analytic memos, codes, and potential categories, theoretical sampling using abduction reasoning based on the data was applied to inform inductive inferences. Intellectual sensitivity is crucial as the researcher initiates conceptualizing categories, becoming immersed in their intuitions and the

data. Intermediate coding reveals core categories, and as the data may become repetitive, it allows for an analytic review of categories, sub-categories, and selective coding to focus on realizing the data theoretically (Birks & Mills, 2023). As more data is collected, coded, and categorized, the researcher, equipped with theoretical sensitivity data source triangulation from multiple sources, was combined with investigator triangulation and peer checking, and utilization of advanced coding techniques facilitated data integration into a merging with the quantitative data (Creswell & Clark, 2018).

Quantitative Data Analysis

The survey data was checked for data errors, re-code items, and variables created. A codebook was established for reference. The data was inspected for distribution and outliers, and a descriptive analysis of principal variables was reviewed. Inferential statistics were used to analyze the data using descriptive and rank percentages, and the Mann-Whitney test was used as a nonparametric test to test hypotheses. Internal and external validity was examined in the data analysis.

Data Convergence Strategy

Data integration from both methods was inspected for congruence or divergence of parallel themes with qualitative data as the primary case selector. The researcher then summarized the quantitative data and compared it to the primary research questions and past studies (Creswell & Clark, 2018). Likewise, the qualitative data was summarized by discussing the relationship between the primary research questions and past studies in the literature. The researcher's role, reflexivity, and personal views help shape the analysis until the process develops a storyline that immerses the theory into the existing conceptual framework. The final theory should comprehensively explicate all the theoretical framework data and processes while

considering the researcher's reflexivity and sensitivity to formulate a comprehensive rationale for the grounded theory. The phenomenon's nature aligns with a constructivist paradigm, which relies upon the participants' perspectives, forming the basis of the surveys and interviews (Birks & Mills, 2023; Creswell & Clark, 2018).

Trustworthiness

Trustworthiness in qualitative research is a critical facet closely aligned with concepts of validation and reliability. This parallel between these terms emphasizes the importance of ensuring the rigor and integrity of qualitative studies. In quantitative research, trustworthiness is often evaluated through internal and external validity, reliability, objectivity, and qualitative research relies on different criteria established by Lincoln and Guba (1985).

In quantitative research, internal validity is the assurance that any change in the dependent variable is directly attributed to the independent variable. Conversely, external validity pertains to the extent to which the study findings can be generalized to broader populations or settings. Reliability in quantitative research relates to consistency and reproducibility, emphasizing the significance of repeatability of the study (Creswell, 2014). Objectivity is crucial in quantitative analysis as it focuses on minimizing researcher bias and ensuring that the study is conducted impartially (Reiss & Sprenger, 2014).

In as much as the principles laid out by Lincoln and Guba (1985) are needed, Morse et al. (2002) pointed out that standards, while helpful per se, fail to establish the research as "useful and relevant." Enhancing the credibility of the research involves guiding the reader transparently through each step of the applied methods, ultimately strengthening the study's rigor. Morse et al. further stated that conditions and criteria employed after the study could not guide the research in real-time and, consequently, cannot be utilized proactively to address potential threats to the

reliability and validity of the study (Morse et al., 2002). This study began by adopting the

primary criteria of credibility, dependability, confirmability, and transferability as leading

principles following the convergent CGT proposed by Creswell and Poth (2018). These

standards provided essential direction for the research process.

Credibility

Credibility refers to the believability, conceptual rendering, and accuracy of the data to

the extent the findings describe the participants' reality. Furthermore, credibility is achieved by

conducting the research methodically to guide the readers through each research phase and

demonstrate confidence in the researcher's depiction (Guba & Lincoln, 1982; Kyngäs et al.,

2020). The study's internal validity is enriched by methodological triangulation of the multiple

data sources and different data collection methods, convergent approach and migration of

quantitative and qualitative data, and convergent or divergent themes. Data sampling is

maximized using anonymous surveys aided by in-person interviews with paramedics and

medical directors. Journaling and memoing further add richness to the data. Peer checking

provides the researcher feedback on analysis, and the theoretical model supports the model and

data triangulation. Non-participatory medical directors and paramedics assisted with peer

debriefing to stimulate additional researcher reflexivity (Creswell, 2014). Transparency and

strong reflexivity further aid the reader's view of the research, adding more credibility to the

findings (Charmaz & Thornberg, 2021)

Dependability

Dependability relates to the reliability of the research, corroborated by well-documented

and integrated processes. An audit trail of dates (see Appendix L), processes, reflective notes,

and coding process (see Appendix K) assisted the researcher in advancing through the processes

and analytical methods. Voice recordings and transcriptions allow continued examination to strengthen the research findings further and reanalyze portions of the dataset to ensure consistency (Creswell, 2014; Kyngäs et al., 2020).

Confirmability

Dependability relates to the reliability of the research, corroborated by well-documented and integrated processes. An audit trail of dates, processes, and reflective notes assists the reader in advancing through the processes and analytical methods. Voice recordings and transcriptions allowed peer examination to strengthen the research findings further and reanalyze portions of the dataset to ensure consistency (Guba & Lincoln, 1982; Kyngäs et al., 2020).

Transferability

Transferability is the extent to which the research can be applied in other settings and groups. Thick descriptions recorded during the interview process, reflexivity, and memoing assist in discerning the participants from the researcher, enabling the reader to transpose the findings to another setting. Maximum variation of the participants also allows a transference from one setting to another (Creswell, 2014).

Ethical Considerations

Ethical considerations in this study focus on the participants. The participant's right to confidentiality, privacy, and respect, combined with the inherent risks of data breaches, are of paramount concern. All reasonable methods were adopted to mitigate the exposures, but they remain. Participants had the right to withdraw from participation at any time and have their data destroyed. Data management strategies previously described are locked and passworded files, with dual authentication and encryption when possible. Pseudonyms were implemented to maintain confidentiality (Creswell, 2014).

Analytical issues, from the researcher's assumptions to biases, were minimized by frequent reflexivity, peer and member checking of the analysis, and data review to ensure the complete picture of the data is represented. The researcher also refrained from participants if there was a direct supervisory relationship (Creswell & Poth, 2018).

Summary

Chapter three describes the methods that were used to conduct the research study. This mixed methods CGT study illustrates and compares the differences in feedback between physician medical directors' and paramedics' views. A survey instrument was deployed to gather quantitative information from several large groups, followed by individual interviews. The mixed methods approach was chosen to enhance data sampling, generalizability, and transferability.

This chapter describes the setting, participants, researcher's role, data collection, and analyses. The IRB written consent for surveys and interviews (see Appendix D and Appendix E) is also reviewed in this chapter. Data collection instruments and interview questions are detailed to inform the reader. Data analysis provides for a convergent design of qualitative data, code, categorized, and theory development and merged with the quantitative data for additional development and continued reflexivity before formulating a CGT.

CHAPTER FOUR: FINDINGS

Overview

This chapter presents the findings from an extensive data analysis to illuminate the perspectives and procedural dynamics associated with outcomes feedback among paramedics and medical directors. The first section begins with participant survey data analysis followed by interviewee demographic information and detailed narrative summaries describing the experiences of each participant. Subsequently, the results of the themes and their theoretical underpinnings are explored. The analysis reveals six overarching themes: (a) the significance attributed to patient outcomes feedback, (b) the encountered hurdles in delivering feedback effectively, (c) the utility of outcomes feedback in educational contexts and chart reviews, (d) the multifaceted challenges and opportunities inherent in educational initiatives, (e) the vital role of accessing patient data and documentation, and (f) the promotion of lifelong learning and improved data analysis skills. These emergent themes coalesce around the central tenet of the vital role of outcomes feedback within Emergency Medical Services (EMS). The theoretical framework utilized in this study incorporates the merger of existing concepts to engender a novel theoretical perspective. Specifically, it integrates elements of outcomes feedback, disparities in theoretical frameworks, formal feedback integration, and the delicate balance between adherence to protocols and frontline care provision. The theoretical integration of these themes reveals a new theory, linking the knowledge divide from a constructivist approach to EMS feedback for improved clinical decision-making and resilience. The chapter concludes by addressing the research inquiries posed at the outset, thereby encapsulating the broad insights garnered through the study's careful examination of outcomes feedback within the EMS domain.

Participants

The following sections include survey data and impart a narrative of each participant's perceptions and experiences of paramedics' patient outcomes feedback, clinical education feedback, and the medical directors' perceptions and experiences of their clinical education and providing outcomes feedback. The study involved many participants, with sixteen interviews of eight paramedics and eight medical directors. Pseudonyms were assigned to each participant by the researcher. An anonymous survey was conducted, with 40 participants responding. Three participants were excluded from the analysis due to failing to meet the inclusion criteria and involvement in systems with a population greater than 250,000, which was beyond the study scope. Thirty-seven survey participants met the inclusion criteria to be analyzed and compared to the interviewees.

The anonymous survey included 12 medical directors and 25 paramedics, with paramedics making up 67.4% of the survey cohort. Medical directors' years of EMS experience were evenly distributed, with 33.3% having 2 to 5 years, 33.3% having 6 to 9 years, and another 33.3% having ten or more years of experience. In contrast, most paramedics (76.0%) had ten or more years of experience, with only 20.0% having 2 to 5 years and 4.0% having 6 to 9 years. Sex distribution between MDs was 50.0% male and 50.0% female, and paramedics 68% male and 32% female. Survey participant service populations, MDs were principally from suburban areas (66.7%), while paramedics were more evenly distributed between suburban (44.0%) and rural (56.0%) areas. Regarding call volume, MDs were primarily associated with higher call volumes, with 50.0% serving in areas with 20,001 - 35,000 calls, 16.7% from both greater than 35,000 and 10,001 to 20,000 annual calls, and areas with 10,000 calls or less represented 16.6%. In contrast, paramedics' distribution was observed at 64.0% serving in areas with call volumes of 10,000 or

less, 16% with 10,001 to 20,000 calls, 12% with call volumes of 20,001 to 35,000, and 8% greater than 35,000 annual calls. The use of bidirectional software, MDs and paramedics reported varied levels of familiarity, with 33.3% of MDs and 36.0% of paramedics affirming its use. In comparison, 58.3% of MDs and 52.0% of paramedics stated they did have access. Medical directors and paramedics noted they were unsure whether their system's software could provide patient outcomes, 8.3% and 12.0%, respectively (see Table 1). Twenty-five of the surveyed paramedics were asked how many patient encounters they experienced weekly. Eight paramedics (32%) experienced less than five encounters, 11 (44%) reported 5 to 19 encounters, and 6 (24%) experienced 20 to 30 calls, as displayed in Table 2.

The demographics of the interview participant's credentials were evenly divided between MDs (8) and paramedics (8) and derived from eight states. The distribution of EMS experience among MDs was relatively uniform, with 37.5% having 2-5 years, 25.0% having 6-9 years, and another 37.5% having ten or more years of experience. On the other hand, paramedics had a majority, 62.5% with ten or more years of experience, 37.5% having 2 to 5 years, and none with 6 to 9 years of experience. The distribution by sex was equally spread in both categories among MDs and paramedics, with 50.0% male and 50.0% female. There was a comparable difference regarding the population served, with a majority of MDs, 62.5%, serving in suburban areas and 37.5% in rural areas. In contrast, paramedics were inversely distributed, with 37.5% in suburban areas and 62.5% in rural areas. Regarding call volume, MDs were primarily associated with higher call volumes, with 50.0% serving in areas with 20,001 - 35,000 calls, 25% with 10,001 to 20,000, and 5,001 to 10,000 and greater than 35,000, both with 12.5%. In contrast, paramedics had 50.0% serving in areas with less than 5000 calls, 25% with 10,001 to 20,000, and 5,001 to 10,000 and 20,001 to 35,000, both with 12.5%. The usage of bidirectional software was reported

to be relatively low among MDs and paramedics, with only 25.0% of MDs and 37.5% of paramedics affirming its use. In comparison, the majority (75.0% of MDs and 50.0% of paramedics) stated they did not use it, and 12.5% of interviewed paramedics were unsure (see Table 1).

The interviewed medical directors had a mean of 10.5 years in their EMS role and a range of 31. In contrast, the interviewed paramedics had a mean of 12.75 and a range of 24. Five of the eight MDs interviewed were boarded as EMS specialists; three were not EMS boarded but were boarded in emergency medicine, and one MD was not EMS or EM boarded (see Table 3).

The survey and interview findings revealed consistent distributions in EMS experience among MDs and paramedics, with paramedics generally possessing more years of experience, particularly those with ten or more years in the field. Distribution by sex remained evenly balanced across interviews, but the surveys reflected a more workplace-based representation of more male than female respondents within the paramedic group. Similarly, both data sources indicated differing geographic distributions, with paramedics more prevalent in rural areas while MDs more commonly found in suburban settings. However, while the general trends aligned, there were incongruities in specific percentages, particularly in the breakdown of EMS experience and call volume categories. Additionally, there were variations in reported usage of bidirectional software between surveys and interviews, suggesting potential shifts in technology adoption or differing interpretations and knowledge among respondents. These differences highlight the importance of considering multiple data sources to thoroughly understand the subject matter, as each data collection method may capture unique insights or nuances.

Table 1

Surveyed and Interviewed Comparison by Credential

Survey by Credential				Interview by Credential			
	EMS Experience	**Frequency**	**Percent**		**EMS Experience**	**Frequency**	**Percent**
MD	2-5 yrs	4	33.3	MD	2-5 yrs	3	37.5
	6-9 yrs	4	33.3		6-9 yrs	2	25.0
	10+ yrs	4	33.3		10+ yrs	3	37.7
	Total	12	100		Total	8	100
Paramedic	2-5 yrs	5	20.0	Paramedic	2-5 yrs	3	37.5
	6-9 yrs	1	4.0		6-9 yrs	0	0.0
	10+ yrs	19	76.0		10+ yrs	5	62.5
	Total	25	100		Total	8	100
	Sex	**Frequency**	**Percent**		**Sex**	**Frequency**	**Percent**
MD	Male	6	50.0	MD	Male	4	50.0
	Female	6	50.0		Female	4	50.0
	Total	12	100		Total	8	100
Paramedic	Male	17	68.0	Paramedic	Male	4	50.0
	Female	8	32.0		Female	4	50.0
	Total	25	100		Total	8	100
	Population	**Frequency**	**Percent**		**Population**	**Frequency**	**Percent**
MD	Suburban	8	66.7	MD	Suburban	5	62.5
	Rural	4	33.3		Rural	3	37.5
	Total	12	100		Total	8	100
Paramedic	Suburban	11	44.0	Paramedic	Suburban	3	37.5
	Rural	14	56.0		Rural	5	62.5
	Total	25	100		Total	8	100
	Call Volume	**Frequency**	**Percent**		**Call Volume**	**Frequency**	**Percent**
MD	Less than 5000	1	8.3	MD	Less than 5000	0	0.0
	5001 - 10,000	1	8.3		5001 - 10,000	1	12.5
	10,001 - 20,000	2	16.7		10,001 - 20,000	2	25.0
	20,001 - 35,000	6	50.0		20,001 - 35,000	4	50.0
	Greater than 35,000	2	16.7		> 35,000	1	12.5
	Total	12	100		Total	8	100
Paramedic	Less than 5000	14	56.0	Paramedic	Less than 5000	4	50.0
	5001 - 10,000	2	8.0		5001 - 10,000	1	12.5
	10,001 - 20,000	4	16.0		10,001 - 20,000	2	25.0
	20,001 - 35,000	3	12.0		20,001 - 35,000	1	12.5
	Greater than 35,000	2	8.0		> 35,000	0	0.0
	Total	25	100		Total	8	100
	Bidirectional Software	**Frequency**	**Percent**		**Bidirectional Software**	**Frequency**	**Percent**
MD	I do not know	1	8.3	MD	I do not know	0	0.0
	No	7	58.3		No	6	75.0
	Yes	4	33.3		Yes	2	25.0
	Total	12	100		Total	8	100
Paramedic	I do not know	3	12.0	Paramedic	I do not know	1	12.5
	No	13	52.0		No	4	50.0
	Yes	9	36.0		Yes	3	37.5
	Total	25	100		Total	8	100

Table 2

Surveyed Paramedics Weekly Patient Encounters

How many patient encounters in a week do "you" average?		
Weekly Reported Encounters	Frequency	Cumulative Percent
1	2	8
2	1	12
3	2	20
4	3	32
5	2	40
6	1	44
8	1	48
10	2	56
12	2	64
15	1	68
19	2	76
24	1	80
25	1	84
30	4	100
Total	25	

Table 3

Medical Directors Certification

ABEM - EMS board-certified or board-eligible

	Surveyed MDs		iMDs	
	Frequency	Percent	Frequency	Percent
Yes	4	100.0	5	62.5
No	0	0.0	3	37.5
Total	4	100.0	8	100.0

ABEM - EM board-certified or board-eligible

	Surveyed MDs		iMDs	
	Frequency	Percent	Frequency	Percent
EM board-certified ABEM	2	66.7	n/a	n/a
Not EM boarded	1	33.3	n/a	n/a
Total	3	100.0		

Interview Demographics

Paramedics

Paramedic 1

Paramedic 1 (PM1) is a nearly 40-year-old male with ten years of experience as a paramedic. He is employed by a fire/rescue department in a rural area serving a population of less than fifty thousand, bolstered by tourists in season, increasing the summer population. He reports the agency responds to less than 5,000 calls per year, some requiring evacuation by air or boat. The duration of the transport may exceed two hours. Their EMS software does not provide bidirectional data sharing or patient outcomes.

Paramedic 2

Paramedic 2 (PM2) is a male in his late twenties with four years of experience as a paramedic. He is a fire/rescue supervisor in a suburban county with a population of less than 150,000 and is also served by a major university hospital. The Department answers about twenty-three thousand calls for EMS service and transports to comprehensive stroke and interventional cardiac hospitals. Their EMS software does not share patient data with the hospital, and it must be pulled into the hospital charting system manually.

Paramedic 3

Paramedic 3 (PM3) is a male in his early thirties who has been involved in EMS for six years, three of them as a paramedic. He is full-time employed by a county municipal EMS service serving a suburban population of more than 60,000. The county EMS service answers a little over 15,000 calls a year. He also reports that the EMS software sends patient information to the hospital's charting software and receives some data from the hospital.

Paramedic 4

Paramedic 4 (PM4) is a middle-aged female paramedic with 14 years of experience. A fire/rescue agency employs her in a rural county with a population of around 4500. She works in a popular tourist destination for more than 500,000 people annually during the peak summer months. The service responds to less than 5000 calls per year. She reports that her EMS charting software does not transmit data back to EMS personnel.

Paramedic 5

Paramedic 5 (PM5) is in her forties and is an experienced female paramedic of 17 years. She works for a municipal government EMS agency in a county of 120,000. The EMS service responds to almost 15,000 calls annually, and EMS software is connected to the hospital charting system. It transmits data but receives very few outcomes back on her patients from the EMS software.

Paramedic 6

Paramedic 6 (PM6) is a male in his mid-forties and a paramedic in a municipal EMS agency with almost 25 years of service. He lives in a county with around 50,000 residents, but during the summer and shoulder months, the population swells to over 150,000 additional tourists each week. He reports that their software is bidirectional and receives data from some hospitals but not their local hospital, where he transports most of his patients. Critical patients are flown or ground transported and may take anywhere from 1 to 2 hours, depending on the bed availability at the receiving hospital.

Paramedic 7

Paramedic 7 (PM7) is a female paramedic with three years of experience working in a very rural county with a population of less than 5,000. She is currently employed by a Fire

/Rescue service that transports patients over long distances and sometimes to two neighboring states. Her EMS charting system does not share data.

Paramedic 8

Paramedic 8 (PM8) is female and a 27-year EMS veteran for a Rural municipal agency in a county of less than five thousand. She reports that her agency responds to less than 5,000 calls annually and is a nature destination for hiking and the outdoors. Tourists cause the population to rise anywhere from 1,000 to above 3,000 visitors during weekends and the summer months. She notes that the EMS charting system is not bidirectional, and they receive no outcomes from data sharing with hospitals.

Medical Directors

Medical Director 1

Medical Director 1 (MD1) is American Board of Emergency Medicine (ABEM) and is EMS board eligible but not currently EMS boarded. MD1 has five years of EMS experience as a physician. He is a medical director for a population of less than 50,000 and a municipal EMS agency that responds to around 10,000 calls annually. The EMS agencies' software provides for bidirectional. The County serves a summer tourist population of well over one million visitors annually, creating challenges for the EMS agency.

Medical Director 2

Medical Director 2 (MD2) is ABEM, and EMS boarded with over ten years of EMS experience in medical direction and EMS education. She serves a population of less than 150,000 and responds to less than 20,000 calls annually. She reports that the EMS agency does not have bidirectional data exchange with the hospitals they transport to. MD2 also serves as a regional medical director over other areas.

Medical Director 3

Medical Director 3 (MD3) is boarded in another specialty but has an EMS background. He has six years of experience as a medical director and serves a population of under 250,000 with an annual call volume of under 35,000 calls per year. The EMS agency's software is not configured for bidirectional data sharing, and no patient outcomes are provided to EMS through the software.

Medical Director 4

Medical Director 4 (MD4) is ABEM and EMS-certified, with over 15 years of experience as a medical director. The population of the EMS service area is less than 150,000, and EMS runs less than 20,000 calls per year. She reports that the EMS charting software does not receive data on patient outcomes.

Medical Director 5

Medical Director 5 (MD5) is ABEM and EMS-certified, with over ten years of experience as a medical director. The population of the EMS service area is less than 250,000, and EMS runs more than 50,000 calls for service per year. She reports that the EMS charting software receives limited patient outcome data.

Medical Director 6

Medical Director 6 (MD6) is ABEM-boarded but not EMS-certified, with less than five years of experience as a medical director. The population of the EMS service area is less than 50,000, and EMS runs more than 10,000 calls per year. She reports that the EMS charting software does not receive patient outcomes data. MD6 also serves as a regional medical director for other areas in her state.

Medical Director 7

Medical Director 7 (MD7) is ABEM-boarded but not EMS-certified, with more than five years of experience as a medical director. The population of the EMS service area is less than 50,000, and EMS runs more than 20,000 calls per year. He reports that the EMS charting software does not receive patient outcomes data.

Medical Director 8

Medical Director 8 (MD8) is ABEM-boarded and EMS-board-eligible. He has five years of experience as an EMS system medical director and medical director for EMS education. The population of the EMS service area is less than 150,000, and EMS runs more than 20,000 calls per year. He reports that the EMS charting software does not receive patient outcome data. He also serves as an assistant medical director in neighboring areas within his state.

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Interview Summaries

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Paramedics

Paramedic 1

In his role as a paramedic in a rural setting with limited hospital access, PM1 underscores the significance of obtaining feedback on patient outcomes to enhance medical knowledge and decision-making processes. He emphasizes the crucial role of the feedback loop in professional growth, stating,

> I work in a pretty austere environment. I would treat it somewhat akin to Alaska..., but you know, you throw in some bad weather and some other things. And you know, you're talking, you might be with a patient for four or five hours and going on a boat. (Interview, February 7, 2024)

Reflecting on his paramedic training, PM1 acknowledges receiving both positive and negative feedback, which contributed significantly to his development. He found the feedback loop and exposure to patient outcomes in the ER particularly valuable for learning. During clinical education, PM1 further described the hospital setting as,

> A little bit more of kind of choose-your-own-adventure, and it is what you make of it. Paramedics can opt to stand over in the corner on their phones or be less engaged or involved by going to different rooms seeking out patients. I think, you know, it just depends on the student and what they want to make of that, asking questions, being curious, and taking an active role in their education. (Interview, February 7, 2024)

Paramedic 1 stresses the importance of an involved medical director who can provide detailed feedback on cases and lead ongoing training. Monthly case reviews with the medical director facilitate knowledge-building for future cases in his current practice.

> Paramedic 1 notes, whereas medical directors are actually getting in the charts, look at lab values and procedures and, you know, see all the things, the intake and discharge notes and get a more complete picture about what happened rather than when we call (the ED inquiring about a patient outcome), they say, Oh, we had a stroke, and then hang up. (Interview, February 7, 2024)

Paramedic 1 noted that these case reviews enrich their collective knowledge for future patients. PM1 believes this feedback loop is "very valuable" for professional growth. "But I think having more regular feedback would be valuable, you know, less minor cases that it's probably not worth physician's time to try and call these places for individual cases to gather up all that information." Paramedics should learn from outcomes feedback and not be a punitive thing. If somebody hears by direct or indirect

means, "Oh, they went to the hospital and died, like then the medics kind of wondering like, oh, crap, what did I do?" In these situations, the medical director's direct access to the patient's chart can help the paramedic understand the patient's condition better and provide feedback if any assessments were missed, treatments were not given, or whether the patient had underlying or medical issues that were not considered.

Paramedic 1 emphasizes the importance of gathering medical history from patients before initiating care. When patients are unable to provide a detailed history, being able to look up the patient's information would "paint a more complete picture" before treating the patient. He cautions about potential biases if not utilized appropriately. He stresses that while various forms of feedback are helpful, feedback, particularly derived from patient outcomes, is instrumental in enhancing paramedic knowledge and patient care; the manner in which a knowledgeable medical director delivers feedback is crucial to maximize benefits and mitigate potential downsides such as bias.

The challenging rural environment in which PM1 operates necessitates longer patient interactions and limited access to downstream hospital care, rendering outcomes feedback even more valuable for improving patient outcomes. Recalling his paramedic training experiences underscores the significance of the feedback loop and access to patient outcomes in the emergency department, highlighting its invaluable role in the learning process.

From PM1's perspective, an engaged medical director who can access hospital records, offer detailed case feedback, and lead regular, focused training sessions is essential. He commends his system medical director for his monthly review sessions, contributing to continuous education and improvement within the paramedic team.

For PM1, feedback proves especially beneficial in navigating complex cases with ambiguous presentations. It allows for refining differentials and accumulating new knowledge essential for informing future care decisions. Additionally, he underscores the importance of obtaining outcomes data on various conditions, such as chest pain, abdominal pain, altered mental status, and major trauma.

While acknowledging the potential utility of accessing prior patient medical history, PM1 is cautious about introducing bias and underscoring the necessity for training on its proper utilization. Furthermore, he emphasizes the value of seeking advice from medical control during complex cases, highlighting its potential for providing valuable in-the-moment feedback and learning opportunities.

Paramedic 2

Paramedic 2, working in a suburban EMS system, shares his experiences receiving feedback on patient outcomes and its impact on his professional growth. He notes that most feedback he receives, primarily through electronic charting software, tends to focus on critiquing his care decisions rather than providing constructive information for improvement. He expresses the importance of outcomes feedback for learning from patient encounters, stating,

> I'll be honest, my experience has typically been, most of the time, any feedback that I get is asking for clarification on, you know, interventions that were made, or decision-making paradigms that were made for patient care. Or, you know, critiquing and saying, hey, you probably should have considered doing it this way. (Interview, February 29, 2024)

Reflecting on the nature of feedback, Paramedic 2 suggests that constructive feedback emphasizing positive reinforcement and knowledge building around complex patient

presentations would be more beneficial. He highlights the significance of feedback coming from emergency physicians or those directly involved in patient care, stating,

> I think from a knowledge base to me, the positive feedback, the constructive feedback of, Hey, you did a really good job here, or, this is what the patient was experiencing, and you kind of missed this (in your assessment). It's understandable if you didn't think about such and such. So maybe include that next time. To me, that's a big knowledge boost. That's a big; you don't know what you do not know. (Interview, February 29, 2024)

Paramedic 2 stresses the value of face-to-face (FTF) feedback, suggesting that it can be more meaningful than electronic feedback, which often feels like questioning or criticism. He desires feedback on patient outcomes and key learning points from cases, particularly for complex presentations like altered mental status, explaining,

> I think some FTF feedback or even some email feedback where I think, just by the very nature, the default status has felt like if you are getting a message in the patient care reporting software, it feels like you are being questioned, or it feels like you have done something wrong. (Interview, February 29, 2024)

Drawing from his experiences, PM 2 identifies specific scenarios, such as altered mental status calls, where outcomes feedback could significantly enhance his differential diagnosis skills. He also sees potential benefits in having access to recent patient medical records, which could aid in identifying underlying problems and providing earlier treatment.

> As an example, let's say it's altered mental status patient. I would say the feedback might tend to be Hey, you know, next time, we need to make sure we get an EKG on every altered mental status patient. So making sure we're covering the bases and we're doing all

the right things, but not so much, hey, this was the outcome of the patient. (Interview, February 29, 2024)

Paramedic 2 recalls instances where feedback on missed diagnoses, such as an elderly patient later diagnosed with an unusual presenting STEMI, has prompted him to reflect on his practice and recognize patterns for future cases. He emphasizes the importance of receiving feedback on the ultimate cause in complex cases like altered mental status, noting that it would improve his knowledge base and ability to create a comprehensive differential diagnosis. Furthermore, he highlights the necessity of constructive outcomes feedback, especially for ambiguous patient presentations, to continually enhance his knowledge and patient care.

Paramedic 3

Paramedic 3 draws attention to the limitations of the current patient outcomes feedback system, pointing out that while it provides the ICD-10 diagnosis code, it lacks critical details regarding clinical findings and the hospital's diagnostic process. He advocates for more comprehensive discharge summaries, believing they would significantly enhance paramedics' abilities to assess and differentiate future patients. He also highlights the challenge of providing practical training when feedback is predominantly corrective and lacks the whole clinical context from the hospital. He expresses frustration with the system's imbalance, where the medical director has access to detailed hospital records while paramedics do not, hindering their understanding of patient outcomes and diagnoses. He advocates "assigning an EMS liaison or case manager at the hospital to review EMS cases, follow up on outcomes, and provide

meaningful feedback tied to protocols. This could facilitate collaboration and learning rather than just correcting errors" (PM3, Interview, February 20, 2024).

To further tackle these issues, he suggests various software improvements, including more detailed discharge summaries, assigning dedicated case managers to review cases and provide feedback, and granting access to relevant parts of hospital records. He emphasizes the importance of positive feedback alongside corrective measures, promoting improving EMS practices. His position is derived from his experiences in the EMS field. He advocates for improved communication with hospitals, formal processes for reporting concerns, and increased transparency in feedback mechanisms. He states, "The only way you really find out anything is when you make a mistake, somebody can tell you in the hospital, or your paramedic (preceptor) actually invest in you is like, Hey, I got an outcome on that patient" (PM3, Interview, February 20, 2024).

He emphasizes the need for collaboration between EMS and hospital physicians to review cases and jointly clarify learning points from outcomes. Additionally, he stresses the importance of granting EMS access to hospital medical records, which, with proper training, can inform better care decisions and reduce guesswork. PM3 believes that sharing data from hospital committees with EMS agencies would demonstrate performance and improvement opportunities more effectively than individual feedback alone.

Reflecting on his student experiences, PM3 notes the lack of outcomes feedback, highlighting the necessity for proactive efforts to learn about patient outcomes. "I don't think students got any feedback on their patients unless they texted people. So yeah, it would probably be beneficial to have tag numbers for students, put them in the system, and then allow them to see outcomes."

Ultimately, he argues for improving continuity of care between EMS and hospitals through transparent, non-punitive feedback and open communication, ensuring that EMS clinicians are regarded as valued care team members.

Paramedic 4

Paramedic 4 regards patient outcomes feedback as indispensable, irrespective of whether the outcome is favorable or unfavorable. However, a prevailing reluctance exists to actively seek feedback in public forums, particularly when the MD is perceived negatively, as individuals fear that an abrasive demeanor may deter inquiries. She states that the essence of feedback lies in its potential to obtain lessons from every patient interaction, regardless of the treatment's appropriateness or the outcome's nature. While various medical stakeholders, including the medical director, QA personnel, or representatives of clinical systems, can offer feedback, they must be apprised of the patient's treatment and discharge outcomes. "Feedback is everything to determine whether you treated the patient correctly or not, was there something to learn, or was the patient's diagnosis what we treated them for" (PM4, Interview, January 26, 2024).

Face-to-face interactions are preferred as the most effective means of soliciting feedback, particularly when revisiting a facility to inquire directly about a patient's diagnosis. Nonetheless, challenges arise when patients are transported from remote locations, necessitating reliance on electronic patient charting platforms to access pertinent patient information. There is a degree of reluctance surrounding the use of email for feedback due to security concerns associated with personal accounts. Conversely, during her clinical education, PM4 describes her clinical preceptor's course medical director as consistently providing feedback on treatment and care, motivated by their commitment to nurturing students' skills and facilitating their professional growth. The current medical director conducts monthly focused training on any issues or trends

in quality assurance and responds to requests for follow-up with positive knowledge base learning without demeaning paramedics. She suggests through her experience that "physicians are about 50-50 in properly delivering feedback as some are naturals, while others lack basic (delivery) skills" (PM4, Interview, January 26, 2024).

Paramedic 4 says the acquisition of patient outcomes is viewed as notably arduous during busy shifts, prompting the utilization of various methods such as FTF communication, texting the medical director, or seeking information upon returning to the hospital. Feedback concerning specific cases, such as pediatrics, sepsis, and unconventional calls, is invaluable for enhancing future encounters. Despite her preference for straightforward feedback for individual and system improvement, some individuals need more skills to deliver constructive criticism effectively, underscoring the necessity for education in feedback delivery techniques. Many times, patient information is unavailable due to the patient's mental status or inability to remember or understand their medical condition. A succinct current version of the patient's medical record would be "extremely helpful" and significantly improve patient care, particularly in scenarios where patients and their families cannot furnish comprehensive medical histories, medications, and current medical interactions.

Paramedic 5

Paramedic 5 provides an extensive history of nearly three decades of experience in both EMS and hospital settings. Her interview spotlights the significant gap in patient outcomes feedback within EMS, highlighting the potential value such feedback could enhance EMS clinicians' skills and critical thinking abilities and ultimately improve patient care. She emphasizes the need for an EMS liaison position at hospitals to bridge the divide between EMS

protocols and hospital treatments, facilitating more effective feedback mechanisms and education on diagnoses and chronic conditions.

> Knowledge of both sides (hospital and EMS) that would have access to the patient's information on the EMS side of the report and also be able to access the outcomes, the treatment through the discharge of the patient, whether it's from the emergency room or the hospital so that they had that information piece so that both of those could come together. (Interview, January 29, 2024)

In her experience, PM5 has had to actively seek feedback through FTF conversations with familiar hospital staff, indicating a need for more structured feedback mechanisms within EMS. During her paramedic clinical training, she found the absence of constructive feedback concerning, highlighting the need for more structured feedback to support professional growth. "So much knowledge and education could be gained by having that connection." PM5 supports granting EMS clinicians access to patient medical records before treatment, believing it could enhance diagnostic accuracy and prevent adverse outcomes, especially in cases where patients lack understanding of their medical history. Paramedic 5 notes that in her experience, the patient population is "very, very uneducated on their patient's history and what they have actually been diagnosed with." She provides an example of a heart failure patient who did not know they had heart failure despite being treated for it. She further highlights challenges in assessing patients in emergencies when they are unresponsive or only semi-responsive. She notes it can be challenging to determine their baseline condition and underlying medical issues without access to their current medical history. She also suggests improving education in areas such as sepsis and chronic disease management, which are identified as knowledge gaps among EMS clinicians.

Moreover, PM5 acknowledges the detrimental impact of insufficient feedback on EMS clinicians, leading to frustration, disengagement, and even career stagnation. She underscores the importance of building resilience among EMS clinicians to cope with these challenges, emphasizing the role of improved communication systems and access to patient data in mitigating frustration and enhancing engagement, growth, and quality of care. Furthermore, she states, "Frustration with lack of feedback leads to disengagement, poor patient care, or career change..." While FTF communication is preferred but unrealistic, access to the patient's chart or electronic transmission of the patient's treatment summary and outcome would be beneficial for improving paramedic knowledge and patient outcomes.

Paramedic 5 stresses the importance of creating feedback loops within EMS. Paramedic 5 strongly advocates for integrated health IT systems, mobile devices for real-time record access, and interoperable EHR systems to facilitate communication and information sharing across care settings. She views resilience as essential for EMS clinicians to withstand the difficulties posed by limited feedback and unknown patient outcomes, emphasizing the potential benefits of improving feedback mechanisms for professional development and patient care quality.

Paramedic 6

Paramedic 6 has over 25 years of experience as a paramedic, draws from his experience, and highlights the criticality of acquiring patient medical history during assessments. He emphasizes, "Prior knowledge of a frequent patient's history significantly guides assessments and subsequent treatment." EMS clinicians may need access to this information to ask pertinent questions, hindering accurate diagnosis and treatment. For instance, knowing a patient's

medication regimen prompts targeted inquiries about adherence, enriching the assessment process and potentially influencing treatment decisions.

Additionally, PM6 advocates for a supportive approach to feedback delivery within EMS settings. He articulates, "The majority of EMS clinicians seek affirming feedback to validate their care decisions." This sentiment reflects a desire for constructive critique rather than punitive measures. Virtual meetings are a viable solution, balancing interaction needs with operational challenges. He highlights the importance of fostering trust and learning through non-punitive feedback channels, promoting a culture of continuous improvement among EMS teams.

Access to patient medical history before arrival on scene emerges as a transformative asset for EMS clinicians. He observes, "Accessing medical history could significantly aid in diagnosis and treatment decisions, particularly regarding medications." This insight underscores the pivotal role of comprehensive patient information in enhancing prehospital care delivery. However, operational hurdles such as geographic constraints and fragmented hospital networks complicate data sharing, necessitating innovative solutions to streamline information exchange.

Moreover, PM6 elucidates the profound emotional toll of unresolved high-risk calls on EMS clinicians. He reflects, "The absence of closure exacerbates the emotional strain, especially in cases involving pediatric patients or traumatic scenarios." Clinicians need feedback mechanisms to validate their efforts and outcomes to avoid burnout. Furthermore, "finding out via Facebook the patient succumbed to their injuries took an emotional toll," as they lacked formal closure or outcomes information from the hospital. Addressing this issue requires clinical support and acknowledgment of the psychological impact of unresolved cases on frontline responders. This real-world example underscores why closure through confirmed patient outcomes is vital to EMS's mental health and resilience after complex incidents.

Paramedic 6 supports a multifaceted approach for addressing feedback delivery preferences that prioritizes supportive interaction versus unidirectional methods. He stresses, "FTF interaction facilitates bidirectional communication crucial for understanding lessons from calls." Virtual platforms offer a workable alternative, mitigating logistical constraints while maintaining humanized interaction. Paramedic 6 cautions against relying solely on written communication, emphasizing the value of nuanced dialogue in fostering learning and growth within EMS teams.

Paramedic 7

Paramedic 7 is a paramedic in a rural part of the U.S. with long transport times to the nearest hospital, which may be in another state. She emphasizes the challenge of receiving minimal feedback on patient outcomes after transporting them to hospitals, particularly noting the disparity between different hospitals in different states that receive her patients. She mentions the necessity of persistently initiating contact to obtain information, which she finds problematic in tracking down her medical director or someone who cared for the patient; she explained,

> We sometimes have a really hard time getting feedback about them; you can call repetitively, and you get passed from one person to the next; there's just no good point of contact. We called to get feedback on the patient, and they flat refused to give it to me. It's like pulling teeth, most of the time. (Interview, January 13, 2024)

In her view, feedback is crucial for understanding the impact of interventions and improving care in the future. Paramedic 7 believes receiving feedback from the receiving physician or the physician overseeing the patient's care would be most beneficial. "Our medical director is very hands-off. We need to know what we did made a difference or if we can improve on what we do in those situations," she emphasized.

Reflecting on her paramedic clinical education and training, PM 7 notes the need for more feedback on patient outcomes despite receiving good formative feedback on her skills and performance during calls from her preceptors. "I was in six different locations. So very rarely did you get any feedback about patients she cared for."

Paramedic 7 and her team must self-seek feedback by contacting the hospital and asking their medical director to follow up. She prefers verbal feedback, through a phone call or debrief, to allow for questions and discussion rather than written communication through email, "but if I got feedback, through email, or whatever, that would be beneficial as well." She would like to receive regular feedback on additional encounters such as DKA patients, sepsis, respiratory distress, environmental, and rarely performed procedures.

Paramedic 8

Paramedic 8 has over 30 years of experience in EMS. She does not get automatic feedback on patient outcomes through her electronic medical record system. Instead, she relies on monthly run reviews with her medical director and informal follow-ups with hospital staff to get outcome information, especially for critical cases. She feels regular feedback on outcomes would improve her education and patient care. However, she notes challenges in receiving timely and comprehensive feedback due to limited resources and a need for integrated data systems. It would help her to confirm the correct treatment and reveal "pearls" to tuck away for similar future cases.

Paramedic 8 reported receiving plenty of patient care and feedback on outcomes during clinical training, adding,

> When I got out of school, I had a medical director for 13 to 14 years, from whom I never got one bit of personal feedback. I'd get some feedback on patients but not the care that I

gave, whether that care was good or bad, whether it was phenomenal or not. I never got any feedback from my system medical director. (Interview, January 31, 2024)

Paramedic 8 described a multimodal feedback system as necessary due to the rural nature of her work. She prefers FTF feedback, which allows for more interaction and occurs monthly. However, she also texts her current medical director directly. The system's bidirectional software could be helpful and may work, but the software has not been configured for her to receive feedback on patient outcomes.

Based on the nature of the patient, PM8 prefers feedback delivered via text, phone call, or FTF. For her, "positive feedback is as important as negative feedback, in her view." Overall, she appreciates her current medical director's educational approach of presenting complex cases to the group for discussion rather than scolding individuals, noting,

> I feel like the way the negative feedback is given, in the way I've watched different medical directors drilling one of the medics that missed something. Beating them up over it isn't helpful; it just demoralizes people, so try to give the feedback in an educational manner rather than saying, you suck. Everybody here wants to do the best job they can. (Interview, January 31, 2024)

Paramedic 8 feels that a lack of feedback on critical cases can negatively impact her mentally and physically. Knowing that she did everything possible for the patient can prevent her from undue stress, anxiety, and losing sleep.

> I just won't let it go until I get feedback. People in our profession also pride themselves on resiliency. And for me, when I'm not okay, but by the time I realize I'm not okay, I'm not okay! When you figure out you know, it's way beyond that, it's way beyond okay. (Interview, January 31, 2024)

Medical Directors

Medical Director 1

Medical Director 1 perceives that EMS crews highly value feedback on patient outcomes for educational purposes and to close the loop on patient care. He has had positive experiences providing such feedback to EMS crews, noting their appreciation for closing the loop on their patients. However, accessing patient information across different healthcare systems can be challenging, depending on which hospital system the patient was delivered. This challenge arises due to the cumbersome or prohibitive nature of accessing different EHRs or making phone calls. Despite these challenges, he tries to provide feedback when crews inquire about specific patients and conducts random chart reviews for additional crew feedback. Nevertheless, time constraints combined with access to multiple charting systems prevent reviewing all critical cases.

As a medical director, MD1 believes his feedback carries weight and helps build rapport with EMS crews. Feedback delivery methods vary, with formal case reviews reserved for high-acuity cases and informal messages for routine feedback. Medical Director 1 highly valued timely feedback during his medical education, which helped solidify his practical knowledge. Additionally, he suggests that EMS could benefit from more training in high-risk patient encounters, such as refusals or delivering bad news.

Integration of EHR systems is a potential solution to the challenges of accessing patient information. This integration could enable crews to engage in more self-directed follow-up and generate discussions. Overall, EMS crews' appreciation for patient outcomes feedback, the challenges of accessing patient information, and the potential benefits of integrating EHR systems underscore the importance of ongoing education and communication in improving EMS outcomes.

Medical Director 2

Medical Director 2 underscores the vital importance of providing feedback on outcomes to EMS personnel despite acknowledging the challenges posed by current systems. She actively incorporates outcomes data into her regular practice, stating, "I think it is actually much work in the current system to deliver it, but I think it is extraordinarily worthwhile." This dedication is evident as she reviews specific charts and provides follow-up data on patients transported to the hospitals, which allows her access.

In dealing with high-acuity cases such as STEMI, stroke, and trauma, MD2 relies on standardized reports on agency performance, which she receives from hospital coordinators at different centers. Their training director then disseminates these reports to EMS personnel, illustrating a structured approach to feedback dissemination within the EMS system. Furthermore, MD2 actively encourages new paramedics to engage in the feedback process by expressing interest in receiving follow-up requests from them on patients they may have questions about or need closure on. This collaborative practice results in her receiving daily or every other day requests for patient outcomes from EMS personnel, fostering a culture of continuous learning and improvement. She strongly demonstrates a commitment to this process of providing outcomes feedback directly to EMS personnel, noting, "I think the lack of being able to get outcomes on your patients is one of the greatest barriers we have to clinical development, like the continued competency of EMS clinicians, because they are essentially, in many systems, blinded." She believes that personalized feedback aids in the learning and development of EMS personnel, enhancing their clinical decision-making and recognition as valuable patient care team members.

Medical Director 2 emphasizes the empowerment of EMS personnel by sharing outcomes data as frequently as possible, even in as close to real-time as current systems allow. While formalized reports on high acuity cases offer valuable feedback, she stresses the effectiveness of personalized follow-up requests for continuous EMS learning. She said, "Fundamentally when we say you can't access it, we're saying you're not a valuable part of this patient's care, like you don't deserve to have the feedback." This assertion underscores the necessity of providing EMS personnel with access to patient outcomes data to support their clinical development and ensure the highest quality of patient care.

Medical Director 3

Medical Director 3 notes that collaboration between hospitals and EMS enhances patient care and outcomes. One crucial aspect is providing feedback to EMS clinicians regarding patient outcomes. However, it is essential to strike a balance in the feedback provided. He remarks, "If you're giving a lot of feedback on every patient, then it loses its meaning because the impactful ones get lost in the volume. Quality over quantity is critical, ensuring that feedback is meaningful and impactful."

Certain medical conditions present opportunities for valuable feedback for EMS clinicians. MD3 highlights the significance of abdominal pathology, stating, "If I had to pick one broad category... inter-abdominal stuff? We don't go over a lot of that, underscoring the importance of targeted feedback on specific medical scenarios that paramedics encounter."

Moreover, timely intervention is critical in emergency medical situations. The decision-making process regarding patient transport can significantly impact outcomes. EMS professionals often navigate gray areas, balancing the urgency of hospital transport with patient refusal. As one practitioner emphasizes, "That's probably the biggest gray area discerning when

there is or is not something lurking under the surface that could be life-threatening." Effective feedback can help in refining this decision-making process.

Sepsis is among the conditions that warrant particular attention. It is often underrecognized, both in prehospital and hospital settings. Paramedics need to be equipped with the knowledge and skills to identify and manage septic patients effectively. Urgent interventions can be lifesaving, as highlighted by the analogy drawn to treating unstable trauma patients or stroke victims.

In addition to medical proficiency, MD 3 believes EMS clinicians need further training in soft skills to navigate challenging situations effectively. Communication, delivering death notifications, and handling challenging family encounters are areas where paramedics could seek further training. This holistic approach to education and feedback, encompassing clinical and interpersonal skills, is essential for optimizing prehospital care and improving patient outcomes.

Medical Director 4

Medical Director 4 emphasizes the importance of providing feedback on patient outcomes to EMS clinicians to enhance their diagnostic and treatment skills, which is widely acknowledged within the medical community. She observed "that over time, it (feedback) actually improves their ability to diagnose and treat the patients. This feedback loop not only aids the individual EMS clinicians but also contributes to overall patient care quality."

However, MD 4 notes that providing such feedback is challenging. Time constraints and strict HIPAA regulations often hinder the timely dissemination of patient outcomes information to EMS personnel. Despite these obstacles, feedback is crucial for their professional growth and development. She indicated, "I think they're very interested in having it, and they very much want to know."

Preferences for the feedback format vary, with verbal communication being favored, mainly when additional educational insights are necessary. This personal interaction allows for a deeper understanding and discussion of cases, which can be more impactful than email correspondence. Medical Director 4 places significant value on receiving feedback on patient outcomes, particularly once the final diagnosis is known. The feedback loop validates their efforts and allows for reflection and improvement in future encounters. "I think feedback for all priority red patients is important," remarked one practitioner, underscoring the broad applicability of feedback across various patient encounters, including refusals and cases like sepsis.

Accessing a patient's medical history before providing care is significant for effective treatment. However, it's also acknowledged that this information can influence perception and potentially introduce bias, and cautioned, "Having it is quite helpful to frame, but on the other hand, it can color you too." Thus, there is a need for awareness and mindfulness to mitigate any bias that may arise.

Furthermore, efforts are underway to improve EMS dispatch accuracy and reduce clinician bias based on dispatch information. Strategies such as prioritizing direct patient interaction over solely relying on dispatch details are advocated. "I prefer, and I train the residents, to go see the patient, talk to the patient, first look at the patient, then look at the record," stated one practitioner, highlighting the importance of firsthand assessment.

Finally, feedback plays a central role in the growth and development of EMS clinicians. She asserts, "I feel pretty strongly about that. Obviously, they have to be motivated to do it. But in my opinion, if they aren't motivated, this is probably not the right position for them in the first

place." This emphasis on feedback underscores its indispensable nature in fostering excellence within the EMS profession.

Medical Director 5

Medical Director 5 highlights the multifaceted challenges of providing timely and constructive feedback to EMS clinicians on patient outcomes and care: "I think it's a complicated process. There's a lot of value to it (in feedback). It also validates whether they were right or did things that significantly improve the patient's chances of survival or outcome." Time constraints and the complexities of patient cases often hamper the efficient delivery of feedback. However, the value of feedback, even in cases where uncertainty persists, cannot be overstated. She highlighted, "I think it's hugely valuable, even for me as an ER doc, a lot of times, you admit the patient to the hospital that you really don't know exactly what's wrong with them."

She notes that opportunities exist to enhance EMS software and data-sharing mechanisms to facilitate better tracking of patient outcomes and feedback dissemination. These improvements could streamline the feedback process, allowing for more timely and targeted interventions. Additionally, it's essential to teach EMS clinicians how to give and receive feedback effectively. As noted by this practitioner, "I think the biggest thing, you know, so we talked about giving feedback, but we do a poor job of teaching people how to receive feedback."

Feedback on complex or unusual patient cases serves not only to expand clinician knowledge but also to address knowledge gaps. However, feedback must be consistently delivered respectfully and free from biases, especially concerning frequent users of EMS services. Tone and approach play a significant role in receiving and providing feedback, as exemplified by her experience, "I think the medical director is good (to provide feedback), as

long as it's not negative; I have a physician who's a very good teacher, but he's very dry, and very flat in the delivery. His comments should be more appreciated."

Given their clinical expertise and authority, medical directors are uniquely positioned to provide feedback to EMS clinicians. However, the manner in which feedback is delivered can significantly impact its effectiveness. Clinicians may interpret feedback differently based on the demeanor and tone of the person providing it. Therefore, it is crucial for medical directors to ensure that feedback is delivered in a constructive and supportive manner. This approach is paramount to the success of feedback in promoting learning and self-improvement within the EMS community, and it underscores the responsibility and accountability of medical directors in this process.

Medical Director 6

Medical Director 6 strongly supports providing timely feedback on patient outcomes to EMS clinicians, paramount for enhancing their medical knowledge and informing future patient care practices. She affirms that feedback "adds to that database of EMS treatment." This iterative process of feedback accumulation contributes significantly to building a robust knowledge base among EMS personnel, ultimately leading to improved patient outcomes.

Accessing a patient's medical history and prior care records is instrumental in guiding emergency response and facilitating accurate differential diagnosis. MD6 recognizes the limitations of relying solely on patient accounts, observing, "Patients are horrible historians on the best of days. And they're even worse historians when they're sick, when scared, or when injured or under the influence." Real-time access to a patient's medical history underscores the invaluable role of medical records in providing essential context for effective decision-making during emergencies.

Different approaches to delivering feedback to EMS clinicians, ranging from informal text messages to more formal written reviews, are employed. However, regardless of the mode, there is a consistent emphasis on maintaining professionalism and discretion, mainly when providing negative feedback. As one practitioner stated, "I always practice the is if you have something negative to say, you say that in private. And if you have something positive to say, you say that in public."

This approach helps mitigate potential embarrassment and fosters a supportive environment conducive to learning and improvement.

When reviewing cases for quality improvement, MD6 believes the focus should primarily be on addressing documentation and patient care issues. While direct patient care concerns may arise, these issues can often be attributed to documentation deficiencies rather than lapses in clinical judgment. She highlights that "oftentimes, thankfully, it's a documentation issue and that the documentation is unclear." By prioritizing documentation clarity and accuracy, EMS clinicians can ensure comprehensive and well-documented patient care, ultimately enhancing overall service quality and patient outcomes.

Medical Director 7

Medical Director 7 recognizes the pivotal role of EMS personnel in patient outcomes and emphasizes: "They're there for first impressions." This view underscores the importance of feedback that aids in enhancing assessments and differentials, gathering vital information that may later serve as a portion of the diagnosis.

Furthermore, MD7 believes EMS clinicians place a high value on feedback from medical directors and physicians due to the practical insights derived from emergency department work. He articulated, "I think they value feedback a lot, especially coming from an EMS active medical

director, someone who is seeing them day in and day out, who gives timely feedback." He emphasizes the unique perspective and expertise that ED physicians can bring to the feedback process.

For delivering outcomes feedback to EMS clinicians, MD7 advocates for a collaborative approach that combines FTF communication and written feedback. This method not only facilitates dialogue but also underscores the importance of EMS personnel's insights and opinions, as expressed by MD7: "So I would say a combination of both, to get a dialogue started, to see what the feedback was, to understand the situation, and to get their valuable opinion about it."

Moreover, MD7 highlighted the critical importance of accessing a patient's medical history, current medications, and prior care before EMS intervention. MD7 asserted, "So basic information, I think, is very significant. So, for example, they need to know the patient's past medical history and meds." This acknowledgment underscores the necessity of comprehensive patient information to provide appropriate care effectively.

Medical Director 7 considers prompt feedback not just significant; "it's a catalyst for positive change in EMS practices." It empowers EMS clinicians to adapt swiftly, potentially averting repetitive detrimental effects. MD7 elaborated on this by stating, "And that procedure or medication could have potential detrimental side effects. But if you give feedback promptly, it may effect a change in treatment, stop that particular issue, and we may see better outcomes." He maintains that the importance of providing prompt feedback cannot be overstated, as it directly and significantly transforms patient care outcomes.

Medical Director 8

Medical Director 8 underscores the importance of providing feedback on patient outcomes to EMS clinicians, citing feedback's role in enhancing job satisfaction and facilitating learning. As MD8 articulated, "I think it's really important. I think it's really good and leads to better job satisfaction when you get feedback." This appreciation emphasizes the positive impact that feedback can have on EMS clinicians' morale and professional growth.

Moreover, MD8 points out the urgent need for improved access to real-time patient data, particularly the patient's history, allergies, and medications. MD8 stresses, "This is a significant issue. We need to know their history, their allergies, their medications." He underscores the immediate need for streamlined processes and improved access to patient data to enhance EMS care delivery.

Furthermore, MD8 emphasizes the value of a dedicated medical director providing and overseeing feedback. MD8 states, "It's not just about replying to emails. It's about being vested and interested in providing feedback." This sentiment underscores the importance of feedback from medical directors genuinely invested in education and improvement in the EMS system and personnel, thus elevating the role of the medical director in EMS care.

Additionally, MD8 identifies critical clinical areas, such as differentiating chronic disease processes, decompressing trauma patients, and caring for sick patients, where feedback could significantly enhance EMS knowledge and outcomes. MD8 noted, "How do you differentiate between chronic diseases? It's so difficult sometimes. I think having follow-ups for those in terms of knowing a final diagnosis and treatments is really important for the crews." He underscores the potential benefits of targeted feedback in addressing specific clinical challenges and improving patient care outcomes.

Survey Questions Results

Forty participants filled out surveys initially. However, three participants who chose a service population exceeding 250,000 and failed to meet the inclusion criteria were excluded from the cohort, resulting in 12 medical directors and 25 paramedic respondents, thirty-seven total remaining in the study group. The analysis incorporated inferential tests such as the Mann-Whitney U Test, ranked percentages, and descriptive statistics. Significance was set at $p < .05$.

Twelve MDs responded to the survey questions. When asked, what value do you place on patient outcomes feedback for paramedics? Of medical directors, 58.3% valued outcome feedback for paramedics as extremely important, 33.3% as very important, and one medical director valued it as moderately important. When asked, how important do you view your role as a system medical director or assistant medical director in providing patient outcomes feedback to paramedics? Most MDs viewed their role as extremely important 75.0% or very important 25.0% in providing patient outcomes. How would you grade the importance of "how paramedics view patient outcomes feedback?" Most MDs indicated that paramedics viewed outcomes feedback as extremely important or important 58.3%, very important 25.0%, and moderately important 16.7%. Lastly, paramedics were asked, how would you view the system medical director's participation in providing feedback on patient outcomes? The majority of paramedics viewed the MDs' participation as extremely important, 56.0%; very important, 36.0%; moderately important, 4.0%; and slightly important, 4.0% (see Table 4).

Table 2

Survey Perspectives on Values and Roles

Extremely important	Very important	Moderately important	Slightly important	Not important
7 (58.3%)	4 (33.3%)	1 (8.3%)	0 (0.0%)	0 (0.0%)
MD: How important do you view your role as a system medical director or assistant medical director in providing patient outcomes feedback to paramedics				
9 (75.0%)	3 (25.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
MD: How would you grade the importance of "how paramedics view patient outcomes feedback."				
7 (58.3%)	3 (25.0%)	2 (16.7%)	0 (0.0%)	0 (0.0%)
PM: How important would you view the system medical director's participation in providing feedback on patient outcomes?				
14 (56.0%)	9 (36.0%)	1 (4.0%)	1 (4.0%)	0 (0.0%)

Medical directors were surveyed on their experiences providing regular outcomes feedback to paramedics. The MDs' responses were neutral and diverse, with 33.3% finding it difficult and 33.3% finding it easy to provide feedback, and four MDs had a neutral response (see Table 5).

Table 3

MD: What has been your experience providing outcomes feedback of patient cases "regularly" to paramedics from a call?

Very difficult	Difficult	Neutral	Easy	Very easy
1 (8.3%)	3 (25.0%)	4 (33.3%)	3 (25.0%)	1 (8.3%)

* Never was not selected and omitted

Medical directors' views regarding whether their post-graduate training adequately prepared them to deliver effective feedback are pretty divided. While 66.7% (25% strongly agreed and 41.7% somewhat agreed) felt their training was beneficial for providing effective feedback,

33.3% (8.3% somewhat disagreed and 25% strongly disagreed) did not share this sentiment

(see Table 6).

Table 4

MD: Please rate your level of agreement with the following statement: My postgraduate training adequately prepared me to deliver effective feedback to paramedics.

Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
3 (25.0%)	5 (41.7%)	0 (0.0%)	1 (8.3%)	3 (25.0%)

Paramedics indicated that timing for receiving patient outcomes feedback varies widely: 12.0%

receive it within 1-2 days, 16.0% within 3-5 days, and 4.0% within 6-9 days. However, a

concerning 48.0% reported waiting ten or more days, while an additional 20.0% stated they

never received such feedback (see Table 7).

Table 5

PM: How quickly do you receive patient outcomes feedback from your medical director(s)?

1-2 days	3-5 days	6-9 days	10+ days	never
3 (12.0%)	4 (16.0%)	1 (4.0%)	12 (48.0%)	5 (20.0%)

Half of the MDs surveyed believe paramedics should receive patient outcomes feedback within

1-2 days following ED disposition, 41.7% suggest receiving feedback within 3-5 days, and 8.3%

indicate that feedback should be delivered within 6-10 days (see Table 8).

Table 6

MD: Ideally, how quickly should paramedics receive patient outcomes feedback after ED disposition?

1-2 days	3-5 days	6-10 days	11+ days
6 (50.0%)	5 (41.7%)	1 (8.3%)	0 (0.0%)

Most paramedics, 88.0%, preferred receiving feedback on critical patient outcomes within 1-2 days after hospital disposition, with the remaining 12.0% preferring feedback within 3-5 days (see Table 9).

Table 7

PM: How quickly would you want to receive feedback on patient outcomes on critical patients after hospital disposition?

1-2 days	3-5 days	6-10 days	11+ days
22 (88.0%)	3 (12.0%)	0 (0.0%)	0 (0.0%)

The MD's responses were distributed across multiple communication modes, with "email" being the most used method at 41.7%. "Face-to-face" or "verbal" communication represented 25.0% of responses; the "other" category accounted for 33.3% (see Table 10).

Table 8

MD: What method do you use to deliver patient outcomes feedback to paramedics the most?

email	face-to-face (verbal)	Other	none	other
5 (41.7%)	3 (25.0%)	4 (33.3%)	0 (0.0%)	0 (0.0%)

Medical directors take a mixed approach to attaching patient outcomes feedback to disciplinary action. The majority, 41.7%, indicated that patient outcomes feedback is provided alongside disciplinary action. Twenty-five percent of the MDs replied that patient outcomes feedback is sometimes provided with disciplinary action, and the remaining 33.3% stated that patient outcomes feedback is provided separately from disciplinary action (see Table 11).

Table 9

MD: When providing disciplinary action, is patient outcomes feedback attached?

No, patient outcomes feedback is provided separately	Yes, patient outcomes feedback is provided with disciplinary action	Sometimes, patient outcomes feedback is provided with disciplinary action	Do not send patient outcomes feedback at all.
4 (33.3%)	5 (41.7%)	3 (25.0%)	0 (0.0%)

Paramedics expressed a range of perspectives regarding the frequency with which patient outcome feedback is linked to disciplinary actions. A minority, about 12.5%, view this association as occurring "most often," 33.3% perceive disciplinary action as somewhat often tied to patient outcome feedback, and half of the respondents (50.0%) reported that patient outcome feedback is "not very often" linked to disciplinary actions. Only 4.2% believe patient outcome feedback is "never" associated with disciplinary actions (see Table 12).

Table 10

PM: Overall, how often do you believe that patient outcome feedback is linked to disciplinary actions?

Most often	Somewhat often	Not very often	Never
3 (12.5%)	8 (33.3%)	12 (50.0%)	1 (4.2%)

Overall, paramedics generally feel their initial clinical education provided them with a good foundation to care for acutely ill patients. 28.0% describe their education as "extremely adequate," 52.0% as "somewhat adequate," and 8% as "somewhat inadequate" (see Table 13).

Table 11

PM: Did your initial clinical education provide you with enough feedback and skills practice to prepare you to have the knowledge and skill base to care for ALL of the acutely ill patients you encounter?

Extremely adequate	Somewhat adequate	Neither adequate nor inadequate	Somewhat inadequate	Extremely inadequate
7 (28.0%)	13 (52.0%)	3 (12.0%)	2 (8.0%)	0 (0.0%)

During their clinical education, Paramedics reported receiving comments on areas for opportunity or improvement with varying frequency. A majority of paramedics, 44.0%, indicated that they received feedback "sometimes," 24.0% selected receiving comments "most of the time," A smaller percentage, 8.0%, reported "always" receiving comments, and one (4%) of the respondents reported receiving comments about "half the time." However, 20.0% stated they "never" received comments attached to their action plans (see Table 14).

Table 12

PM: How often did you receive comments in the areas for opportunity or improvement during your clinical education? (action plans)

Never	Sometimes	About half the time	Most of the time	Always
5 (20.0%)	11 (44.0%)	1 (4.0%)	6 (24.0%)	2 (8.0%)

Paramedics' responses for receiving outcomes feedback on their critical patients, with 8.0% reporting that they "always" receive such feedback, and 44.0% receiving feedback "most of the time." However, there is still a significant minority of paramedics who do not consistently receive outcomes feedback, with 40.0% reporting receiving feedback "sometimes," 4.0% " about half the time," and another 4.0% stating that they "never" receive feedback on critical patients (see Table 15).

Table 13

PM: Do you receive patient outcomes feedback on all your critical patients?

Always	Most of the time	About half the time	Sometimes	Never
2 (8.0%)	11 (44.0%)	1 (4.0%)	10 (40.0%)	1 (4.0%)

Medical directors indicate a strong desire for follow-up on patients transferred post-admission to a higher level of care. The majority, 75.0%, indicated they "always" wanted follow-up on these

patients, and 16.7% of medical directors preferred follow-up "most of the time." One MD stated

that they "sometimes" desired follow-up, and none of the MDs selected "about half of the time"

(see Table 16).

Table 14

MD: As a physician, would you desire follow-up on your patients who have been transferred post-admission to a higher level of care (ICU or transferred to another hospital) for more specialized care?

Always	Most of the time	About half the time	Sometimes
9 (75.0%)	2 (16.7%)	0 (0.0%)	1 (8.3%)

Variability exists in the responses for the timeliness of feedback on patient outcomes received by

paramedics. A minority, 12.0%, reported receiving feedback "within one day," and 36.0%

selected receiving feedback within 2-4 days. Additionally, 12.0% mentioned receiving feedback

within 5-7 days, and 4.0% reported receiving feedback within 8-14 days. However, a significant

portion, 32.0%, reported receiving feedback after 15 days or more, and 4.0% of paramedics

noted that they "never" received feedback on patient outcomes (see Table 17).

Table 15

How quickly do you receive feedback on patient outcomes?

within one day	2-4 days	5-7 days	8-14 days	greater than 15 days	never
3 (12.0%)	9 (36.0%)	3 (12.0%)	1 (4.0%)	8 (32.0%)	1 (4.0%)

Feedback Statistics

Question: What percentage of ALL the feedback you (medical directors) give paramedics is

"positive" feedback, or what percentage of "positive" feedback do you (paramedics) receive?

The value requested (number only) was a continuous statistical variable compared by credential

group, medical directors, and paramedics. The groups were not normally distributed. While the

means and frequencies are quite different, the assumption is that medical directors tend to

overestimate the perceived amount of positive feedback given to paramedics. The mean positive feedback score was higher in the MD group (M = 70.08, SD = 22.24) compared to the Paramedic group (M = 51.52, SD = 43.32). Also, the groups were not normally distributed, making the median a better statistical representation of the MD group (Mdn= 70.5, SD = 22.24) compared to the Paramedic group (Mdn = 80.9, SD = 43.32). The frequency table (see Figure 2.) reveals the medical directors had all but one value at or above 60%, whereas paramedics had a much-varied response, with 44% of the sample reporting below 60%. A Mann-Whitney U test revealed no statistical significance between groups in this cohort, p = .514.

Figure 2

Frequency of Positive Feedback

PM Frequency	5	1	1	3	1	1	2	1	6	2	1	1	25
Pos # Reported	0	2	3	5	33	60	80	87	90	95	98	100
Cumulative %	20	24	28	40	44	48	56	60	84	92	96	100
MD Frequency	0	0	0	1	3	1	1	2	1	1	1	1	12
Pos # Reported	0	0	0	15	60	65	66	75	80	90	95	100
Cumulative %	0	0	0	8.3	33.3	41.7	50	66.7	75	83.3	91.7	100
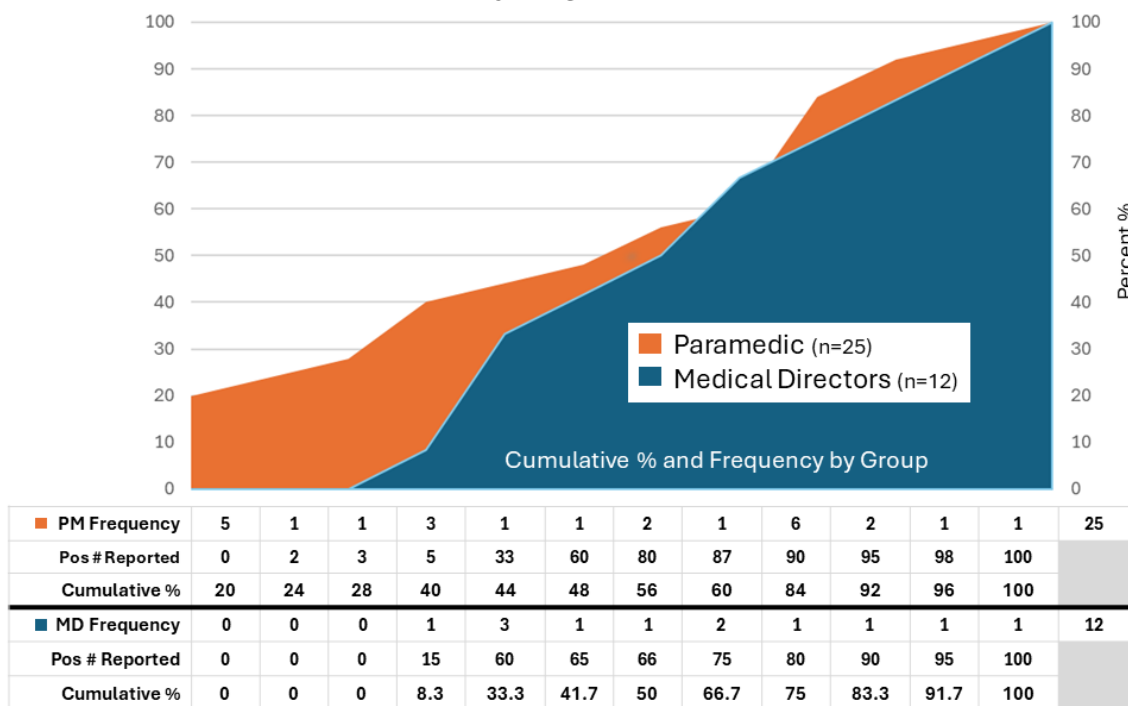
Question: What method would you prefer to receive patient outcomes feedback regularly? Among the total PMs surveyed (24 out of 25), the top two most preferred methods for receiving feedback on patient outcomes were email and digital formats, including ePCR software. Both

methods were equally favored, with 13 participants selecting each as their first or second choice. In contrast, the least favored methods for receiving feedback were written reports and verbal communication, with 11 participants ranking them as their third or fourth choice out of the available options. Also noteworthy, five participants only provided their first choice, which suggests a strong preference for a particular method without considering alternative options. Question: Rank the order of feedback type received by paramedics or provided by medical directors:

Physicians ranked delivering formative feedback (70.0%) and summative feedback (63.6%) the highest for feedback delivery. General knowledge feedback ranked third (40.0%), followed by corrective (45.4%), procedural (20.0%), and protocol adherence feedback (18.1%). In contrast, paramedics had different perspectives. They perceived knowledge-based feedback (41.6%) as the most delivered, followed by protocol adherence (39.1%) and corrective feedback (39.1%). Formative feedback (34.7%) was less distinguished by paramedics, while summative (21.7%) and procedural feedback (17.3%) were less perceived. These findings highlight distinct views between physicians and paramedics, underscoring the importance of tailored feedback mechanisms to meet the diverse needs of healthcare professionals (see Table 18 and Figure 3).

Table 16

Rank Order Comparison of Perceived Feedback Type

Physicians		Physicians		Paramedics
Feedback Type	n	Percentage Rank (1 or 2)	n	Percentage Rank (1 or 2)
Formative	11	70.0%	24	34.7%
Summative	12	63.6%	24	21.7%
General Knowledge	11	40.0%	24	41.6%
Corrective	12	45.4%	24	39.1%
Procedural	11	20.0%	24	17.3%
Protocol Adherence	12	18.1%	25	39.1%

Figure 3

Ranks by Category and Role
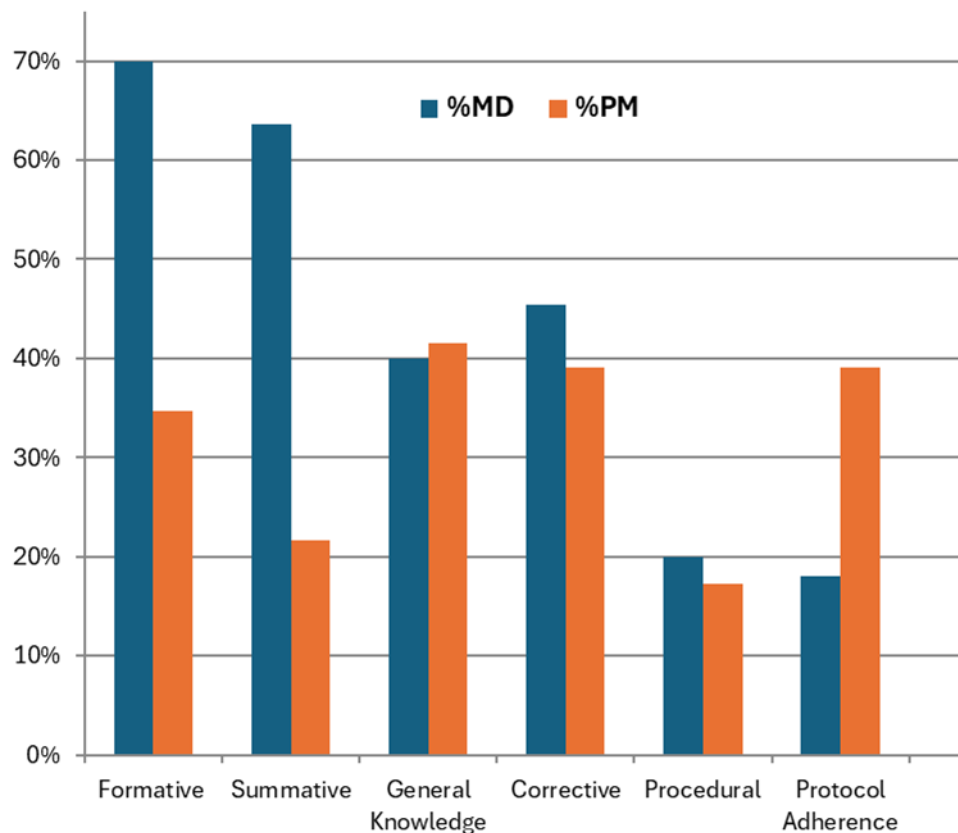
SURVEY OPEN RESPONSES

Medical Record Access

Survey participants' perspectives vary among paramedics on "the value of having a patient's electronic medical record before EMS intervention." Most view it as a valuable asset, especially for patients with vague or unknown medical histories or those who are unresponsive. It is beneficial for assessing allergies, medical history, and current medications, particularly in unconscious patients. Paramedics commented, "I would find it quite beneficial to have an official medical record on all patients," "This should be a no-brainer," and "This would be great, especially in patients who are poor historians or unresponsive" (Anonymous, 2024). However,

some issues exist, such as potential delays in treatment, overreliance on records, and errors within the records themselves. Paramedics also expressed reservations, "Focusing more on the record than the patient in front of you" (Anonymous, 2024). Also, "people getting lazy and just going off of that record instead of asking the patient questions" (Anonymous, 2024). Despite mixed opinions, many agree that having access to previous records can aid in providing better and improved care. However, there is a need for standardized formats and training to navigate the information efficiently. While most see it as pivotal in treatment, assessment, and care, others express reservations about potential encumbrances.

Medical directors strongly support EMS accessing a patient's electronic medical record before beginning treatment. They emphasize the value of such access as "essential," "critical," and "incredibly valuable, particularly for having access to patient problem lists, medications, and allergies" (Anonymous, 2024). Medical directors highlight the benefits of readily available comprehensive medical history, medication lists, and allergy information, primarily when patients cannot provide this information themselves. They note the importance of knowing basic medical history and previous encounters to inform future patient care decisions. Despite recognizing challenges such as limited availability and potential confusion in agencies with a mix of BLS and ALS clinicians, medical directors stress the significant advantages of accessing electronic medical records to provide context, guide treatment, and ensure better patient outcomes. Additionally, they highlight that access to the patient's record would "provide excellent context for the medics- know what to expect and if the patient can't talk, would be the ONLY source of information" (Anonymous, 2024).

Patient Outcomes

Not knowing a patient's outcome can have significant impacts on EMS clinicians, leading to uncertainty about treatment effectiveness, missed learning opportunities, and emotional distress. One paramedic expressed, "Not knowing a patient's outcome can make you second guess your treatment. Was it appropriate or not appropriate? "It's like a black hole. Did I do the right thing for my patient?" (Anonymous, 2024). Another paramedic noted that not knowing was a "lost opportunity to expand my knowledge skill set to do better on the next or similar encounter" (Anonymous, 2024). Knowing patient outcomes could benefit future encounters with patients with similar complaints. Another shared the experience of working in a small system, stating, "I always appreciate knowing patient outcomes to help review patient care and guide future decision-making" (Anonymous, 2024). This sentiment reflects that not knowing outcomes denies practitioners valuable learning opportunities, particularly in complex cases. The lack of feedback can result in complacency, questioning one's abilities, and hindering professional growth. As another paramedic said, "Without knowing the outcome, you have no way to know if you treated a patient effectively. You can't grow without results." Others expressed, "It was often frustrating and left me feeling empty," "It helps to know the outcome from a closure standpoint," and "It feels like the missing link" (Anonymous, 2024). Many emphasize the importance of timely feedback to improve future patient care, suggesting processes such as regular QA/QI reviews, integration of hospital records into EMS systems, and open communication channels with medical directors. Access to patient outcomes is crucial for enhancing clinical practice and ensuring better patient outcomes.

Medical directors encounter numerous barriers when attempting to provide patient outcomes to EMS. The first challenge is limited access to patient records if the patient is not

transported within the medical director's healthcare system. Additionally, the lack of systems interoperability makes it time-intensive to track down patient information across various hospitals. As one medical director noted, "Systems don't talk to each other, it is time intensive, clinicians don't always flag cases, so it is also a matter of identifying them myself and then racking down the follow-up" (Anonymous, 2024). Time constraints also impede the process, with another medical director mentioning, "Time to gather information."

Moreover, issues such as the misunderstanding or misapplication of HIPAA regulations and the lack of streamlined feedback mechanisms significantly impede the delivery of patient outcomes. As underscored by another medical director, "Misunderstanding/misapplication of HIPAA" (Anonymous, 2024). Ease of obtaining feedback. If paramedics have to request feedback, they are less likely to do so if they have to log in to a separate site to view feedback. These barriers, when combined, have a profound impact on the ability of medical directors to provide comprehensive patient outcomes to EMS clinicians, potentially compromising the quality of patient care.

Regular and Timely Feedback

Paramedics expressed a varied perspective on ensuring regular and timely feedback on patient outcomes. Some practical measures include integrating patient tracking and hospital charting into EMS electronic data systems. In contrast, others suggest organizational improvements, such as establishing QA/QI teams dedicated to distributing and reviewing feedback. Paramedic recommendations for timely feedback delivery include specific timelines, such as feedback within 24 hours or up to a week after the EMS call. Other paramedics highlight the importance of communication channels with medical directors and monthly run reviews for comprehensive learning opportunities. Paramedics stress the significance of feedback for

continuous improvement and suggest solutions such as automated processes, email notifications

of patient outcomes, and close collaboration with medical directors or designated liaisons. The

consensus of paramedics emphasizes efficient systems and transparent communication to

facilitate ongoing learning. "I would love to see the ePCR system have some type of click box to

mark this (the patient for follow-up)" (Anonymous, 2024). Others highlight the importance of

communication channels with medical directors and monthly run reviews for comprehensive

learning opportunities. Paramedics stress the significance of feedback for continuous

improvement and suggest solutions like automated processes, email notifications of patient

outcomes, and close collaboration with medical directors or designated liaisons. Paramedics

emphasize the need for efficient systems and transparent communication to facilitate ongoing

learning and enhance patient care.

Medical directors emphasize the importance of sharing patient information regarding

patient outcomes feedback with EMS clinicians. They view it as an essential aspect of patient

care, noting that there is no way to reflect on and modify patient impressions without hospital

follow-up. One medical director states, "Patient outcomes feedback is essential for reflecting on

and modifying impressions" (Anonymous, 2024). Additionally, MDs believe patient outcomes

are critical for EMS. Another medical director adds, "It's critical for EMS quality assurance,

education, and learning" (Anonymous, 2024). Some medical directors have implemented

systems to facilitate feedback, such as QR codes for EMS to submit follow-up requests or email

functions in EMS charting systems for crews to request feedback on patient outcomes or their

performance. Despite recognizing its significance, some medical directors face challenges

accessing patient records across various healthcare systems, making the process time-consuming

or prohibitive. One medical director mentioned, "I do not have access to the EMR for all of my

receiving hospitals, which leaves me searching for care everywhere in EMRs, which may or may not have the outcomes I am searching for" (Anonymous, 2024). Nonetheless, they express no reservations about providing this information, as it contributes to ongoing learning and improvement in EMS patient care.

Disciplinary Action

Paramedics suggest several methods to prevent disciplinary action by providing effective feedback to EMS clinicians. They emphasize the importance of addressing issues in real-time rather than waiting for extended periods, with suggestions including anonymous reviews and real-time feedback transmission for review. Many advocate reframing feedback as a training opportunity rather than punishment and emphasize the need for a just culture system that focuses on re-teaching and extra training rather than punitive measures. Paramedics stress the importance of creating a non-punitive feedback environment that encourages open discussion and learning. Suggestions include involvement in state-approved continuous QI processes, consistent and respectful feedback, and a just culture mentality where clinical errors are addressed through reeducation and remediation rather than disciplinary action. Implementing a just culture and potentially a patient safety organization would protect the information for QA/QI from being utilized for disciplinary action. QA/QI should never be punitive. It destroys the ability to learn" (Anonymous, 2024). Overall, effective feedback is seen as essential for continual education, self-improvement, and better patient care.

<div align="center">

Results

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The ensuing section characterizes the findings of this study. The first section describes the process of theme development. Subsequently, the next six sections describe themes: (a) the importance of patient outcomes feedback, (b) challenges in feedback delivery, (c) the value of

outcomes feedback in education and chart reviews, (d) challenges and opportunities in education, (e) importance accessing patient data and documentation, and (f) promoting lifelong learning and data analysis. The final section illustrates the theoretical integration of feedback discrepancies, formal feedback integration, and the balance between protocol adherence and delivering frontline care to unmask a new theory, linking the knowledge divide from a constructivist approach to EMS feedback for improved clinical decision-making and resilience.

Theme Development

A systematic process grounded in constant reflexivity was deployed in each stage of data sampling, memo development, and coding, facilitating the development of themes within this study. The initial coding phase adopted an iterative approach, creating in vivo codes that authentically reflected the participants' voices. Integral to this process was the practice of memoing, which facilitated the capture of not only the spoken words of participants but also their actions and cues, providing valuable insights into the nuances of their responses and how questions were delivered and answered.

Subsequently, focused or intermediate coding was undertaken to identify emerging core categories that organized the codes into categories. This dynamic phase took raw coding and transformed the initial coding into more abstract concepts as core categories emerged and were refined by theoretical reflexivity. The seedlings of themes began to take shape during this phase as concurrent data collection and coding fit into the budding categories.

The coding process is provided in the hierarchical table in Appendix K. Each theme had three to four coding levels resulting from 3735 initial and in vivo codes. In the hierarchical table, these are the fifth level of the coding process. The in vivo codes were not included in the coding system. The resultant inclusion of the in vivo codes would have generated 103 pages of codes,

potentially distorting the reader's perception. The decision to exclude the in vivo codes from the table was deliberate, as such an extensive presentation of codes could overwhelm and mislead the reader, detracting from the clarity and coherence of the findings.

The coding process utilized in this study is detailed in the hierarchical table provided in Appendix K. This table presents the fifth level of coding, representing the culmination of a comprehensive analysis involving three distinct coding levels for each theme. It is important to note that although the in vivo codes were crucial for the coding system, they were not explicitly incorporated into the hierarchical table.

Instead, the hierarchical table focuses on the higher-level categories and subcategories derived from the coding process, providing a concise yet comprehensive overview of the data's thematic organization. This approach ensures that the reader is presented with a manageable representation of the coding outcomes, facilitating a clearer understanding of the analytical framework employed in this study.

The intermediate level coding became the fourth level of system codes. There are 25 processes or intermediate codes that serve as subcategories. The third level of system codes is comprised of 18 categories. The second level is comprised of six themes. The core category of improving EMS knowledge (knowledge gaps) through outcomes feedback is at the top level within the code system (see Figure 4).

The central question of this study was, "What are the perspectives on outcomes feedback by EMS medical directors and paramedics?" *Outcomes feedback* was defined as the general patient information encompassing the emergency department assessment, treatment, diagnosis(es), admission or discharge decisions, and the overall outcome of the patient's experience during their hospital encounter. These characteristics were thoroughly examined

through sub-questions. The data was carefully evaluated based on the sub-questions and collectively for emerging themes to effectively explain the central question and core category.

The core category that developed was improving EMS knowledge (knowledge gaps) through outcomes feedback. The sub-question themes, centered around the experiences and perceptions of EMS medical directors and paramedics, support the core category. These themes include (a) the significance attributed to patient outcomes feedback, (b) the encountered hurdles in delivering feedback effectively, (c) the utility of outcomes feedback in educational contexts and chart reviews, (d) the multifaceted challenges and opportunities inherent in educational initiatives, (e) the vital role of accessing patient data and documentation, and (f) the promotion of lifelong learning and improved data analysis skills. These themes played an integral role in developing the core category, as demonstrated by improving EMS knowledge through the outcomes feedback model in Figure 4.

This grounded theory study aims to explain the perceptions of EMS medical directors and paramedics. The intention was to understand their experiences and develop a theory based on these feedback experiences on outcomes in EMS. The theory is explained in theoretical integration.

Figure 4

EMS Outcomes Feedback Model
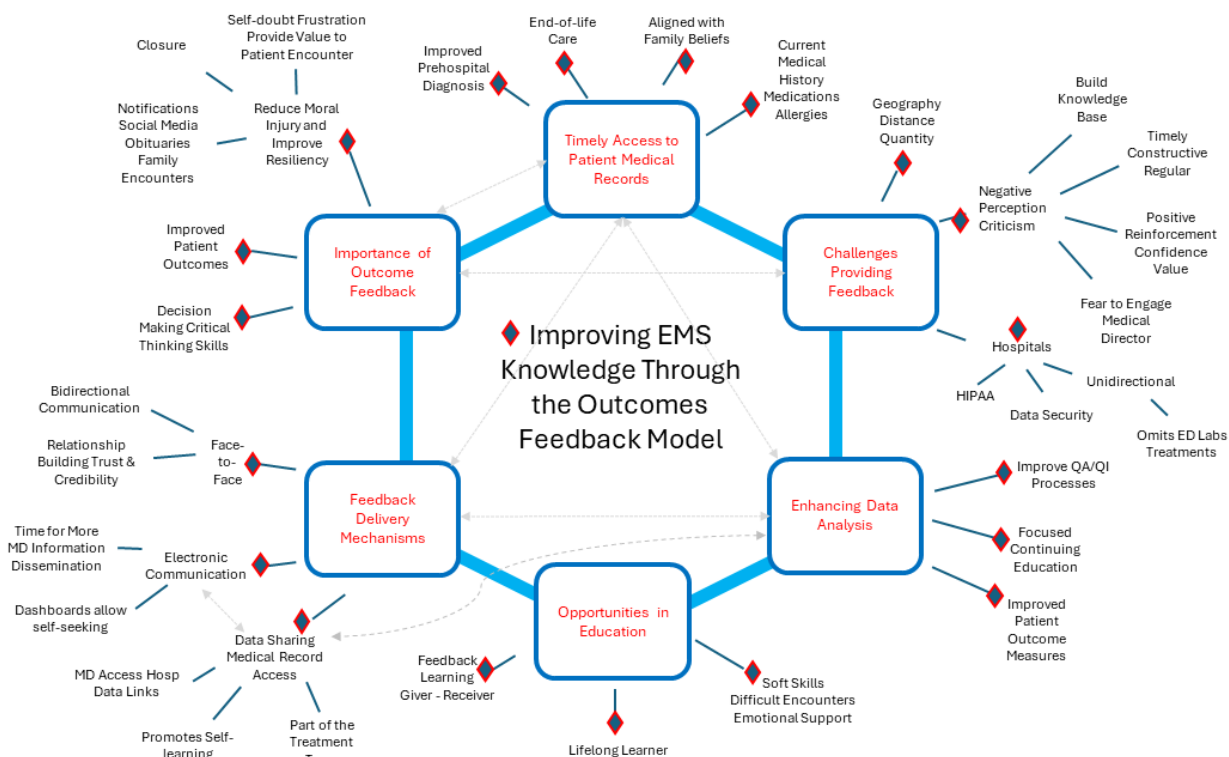
Importance of Outcomes Feedback

Feedback closure is essential in EMS as it provides validation and closure for clinicians regarding their judgments and actions. Without adequate outcome feedback mechanisms, EMS clinicians may experience a range of negative emotions, including guilt, self-doubt, and feelings of inadequacy, stemming from uncertainty about patient outcomes and the effectiveness of their interventions. As one medical director aptly puts it, "Fundamentally, when we say you can't access that, we're saying like you're not a valuable part of this patient's care. Right, like you don't deserve to have the feedback" (MD2, Interview, February 2024). This sentiment underscores the importance of ensuring EMS clinicians feel valued and included in the feedback loop. The absence of feedback leaves EMS clinicians vulnerable to moral injury, leading to self-criticism,

self-blame, and emotional exhaustion. MD2 emphasizes the necessity of automatic feedback to support clinician growth, stating, "If we want people to feel valued and to grow as clinicians, we have to make feedback automatic because the medical directors don't have the bandwidth or the time to do that" (MD2, Interview, February 2024).

Conversations within the paramedic community reveal the real-life impact of the lack of feedback on a clinician's mental health and morale. One clinician's frustration is palpable as they express their need for closure, stating, "It just leaves you wondering, and you can only take so much before you just say I am tired of always wondering or I'm tired of finding out via Facebook, or I'm having to look in the newspaper obituaries or check on the funeral home for outcomes" (PM6, Interview, February 2024)). This personal account illustrates the psychological toll of constantly seeking information on patient outcomes through disparate and often unsatisfactory channels. It underscores the urgency of improving feedback processes in EMS.

One interviewee expressed that the validation obtained from feedback is essential, addressing the human inquisitiveness of understanding the outcomes of their actions and preventing them from being left in an indeterminate state. They stated, "That validation that I do everything and sometimes just that human curiosity of what the heck happened? And not being left in limbo?" (PM6, Interview, February 2024).

Moreover, feedback serves as a vehicle for expanding the knowledge base of EMS clinicians and refining their clinical decision-making skills. By learning about missed diagnoses, alternative treatment options, and patient outcomes, clinicians can adjust their approaches to future cases, improving the accuracy of their assessments and treatment plans. As MD2 (Interview, February 2024) underscores, "allows me to take ownership of sort of my own

learning and my own feedback." These experiences highlight the importance of being able to self-seek patient outcomes regularly.

In addition to enhancing clinical skills, feedback facilitates self-evaluation and self-improvement among EMS clinicians. By analyzing their own performance and thought processes, EMS clinicians can identify areas of strength and areas for growth. As emphasized by interviewees MD1 (Interview, February 2024) and PM2 (Interview, February 2024), this reflective practice prompts clinicians to evaluate themselves critically, acknowledging what went well and identifying opportunities for improvement. Paramedic 2 stated, "Okay, evaluate yourself and reflect on what went well, what could have gone better."

Furthermore, feedback is integral to fostering continuous learning and growth within the EMS profession. Recognizing that learning is a lifelong journey, clinicians understand the importance of ongoing feedback and adaptation. As several interviewees, MD3 (Interview, January 2024) and MD4 (Interview, January 2024) asserted, the process of learning and change is constant, driving clinicians from being "good to better" throughout their careers.

Lastly, feedback is pivotal in identifying gaps in the EMS system's protocols, training, and processes. By engaging in feedback discussions, clinicians and organizations can pinpoint areas for improvement, ultimately enhancing patient care delivery. This systemic approach to feedback acknowledges that improvement is not solely about individual performance but also about refining the broader systemic frameworks within the EMS systems (MD4, Interview, January 2024). Paramedic 4 (Interview, January 2024) noted, "It's actually a system; how can we make the system better, to help you do your job better, easier.". Despite variations in perspectives influenced by roles and experiences, all interviewees agree on the significance and

value of outcomes feedback for fostering learning and growth within EMS. Nonetheless, effectively providing feedback on outcomes poses challenges within many systems.

Challenges in Providing Outcomes Feedback

Providing feedback by EMS medical directors faces several significant challenges, as noted by several MDs, MD1 (Interview, February 2024) and PM6 (Interview, February 2024). Geographic distance emerges as a prime obstacle, with medical directors often far from EMS crews, hindering regular in-person interactions necessary for some types of effective feedback. A clinician describes the austere environment they work in, akin to Alaska, where they may spend extended periods with a patient during transport to a hospital, highlighting the logistical challenges of providing feedback. "I work in a pretty austere environment; I would treat it somewhat akin to Alaska. Also, you throw in some bad weather and some other things, and you're talking, you might be with a patient for four or five hours" (PM1, Interview, February 2024). While virtual meetings can partially address this issue, they may not be appropriate for corrective feedback and may lack FTF conversations' depth and personal connection.

Another significant challenge in providing feedback to EMS clinicians is the limited access to patient outcomes. This lack of information restricts the ability of EMS crews to provide meaningful feedback (PM1, Interview, February 2024). Clinicians express their frustration over the difficulty in obtaining patient outcome data, resorting to unconventional methods like checking social media or obituaries for updates (PM8, Interview, January 2024). This lack of feedback impedes EMS learning and improvement and hampers medical directors' ability to make informed decisions and provide valuable guidance. Many physicians, MD1 (Interview, February 2024), MD2 (Interview, February 2024), MD4 (Interview, January 2024), and MD5 (Interview, January 2024) face challenges in providing timely feedback because of busy

schedules and restricted or easy access to patient records. These systemic barriers hinder their efforts to provide feedback to EMS clinicians.

Ineffective feedback delivery methods, such as late, impersonal, or punitive feedback, exacerbate the challenge of providing constructive criticism and recognition. This discrepancy with EMS clinicians' preferences for timely, FTF, and constructive feedback underscores the need to remodel feedback mechanisms and culture within EMS education programs and healthcare systems (MD2, Interview, February 2024); (PM6, Interview, February 16, 2024); (PM7, Interview, January 2024). Addressing these systemic issues is crucial to improving feedback delivery, fostering a culture of continuous learning, and enhancing patient care outcomes in EMS. As MD2 reflects on the value of feedback-sharing patient outcomes, she emphasizes its importance in honing diagnostic decision-making and clinical judgment, "I think it's actually a lot of work and the current system to deliver it, but I think it's extraordinarily worthwhile. I think, actually, just sharing a patient's outcome is one of the most useful and influential types of feedback that you can give as a medical director because a lot of it is things are a judgment call on care" (MD2, Interview, February 2024) despite acknowledging the challenges in delivering feedback regularly.

The challenges EMS clinicians face in receiving hospital data pose significant obstacles to delivering optimal patient care and improving EMS professional practice. Limited access to patient outcomes and follow-up data after transporting patients to the hospital severely hampers EMS personnel's ability to enhance their knowledge and refine patient care practices. Without feedback on the effectiveness of their interventions, EMS clinicians struggle to identify areas for improvement and need to gauge the impact of their actions on patient outcomes when available. Furthermore, the difficulty in receiving timely, constructive feedback from physicians and

hospital staff compounds this issue. At the same time, FTF feedback is highly valued but not always feasible due to various logistical constraints (PM1, Interview, February 2024). (PM2, Interview, January 2024); (PM5, Interview, January 2024); (PM6, Interview, January 2024); (PM8, Interview, January 2024).

The inconsistency in feedback between hospitals and healthcare systems further exacerbates the challenge. Some facilities may provide more robust feedback, leading to disparities in learning opportunities for EMS clinicians. Logistical challenges stemming from geography, resource limitations, and incompatible data systems hinder care coordination and information sharing between EMS and hospitals, particularly in rural or remote areas (PM6, Interview, February 2024); (PM5, Interview, January 2024); (PM8, Interview, January 2024). This fragmented landscape impedes the seamless exchange of vital patient information necessary for delivering efficient and effective care.

Concerns surrounding privacy regulations like HIPAA create additional barriers to data sharing and communication between healthcare clinicians. While acknowledging the importance of patient confidentiality, EMS clinicians face challenges in navigating these regulations and obtaining access to necessary patient data for follow-up care. Similarly, the lack of integrated electronic records systems and interoperability between EMS and hospital EMRs compounds the issue. This lack of integration makes accessing patient medical histories and medications before providing care in the field significantly challenging, hindering the ability to make well-informed clinical decisions (MD2, Interview, February 2024); (MD4, Interview, January 2024); (PM3, Interview, February 2024); (PM6, Interview, February 2024).

Overall, EMS clinicians' frustration with the lack of feedback and access to patient data affects morale and mental health and compromises patient care quality (PM5, Interview, January

2024); (PM6, Interview, February 2024); (PM8, Interview, January 2024). Addressing these challenges is not the sole responsibility of EMS clinicians but requires collaborative efforts between EMS, hospitals, and regulatory bodies. By working together, streamlined data-sharing processes, enhanced interoperability between systems, and prioritized feedback mechanisms could support continuous learning and improvement in EMS practice.

Timely Access to Patient Medical Records

Access to the patient's medical record would significantly enhance care, as highlighted by multiple sources. Paramedic 1 (Interview, February 2024) illustrates the importance of this access, stating, "More accurate diagnoses and treatment decisions since EMS would have a fuller picture of the patient's medical history, current medications, and recent care." Adding to this sentiment, MD2 (Interview, February 2024) articulated, "Access would enable EMS clinicians to tailor their care more precisely to each patient by understanding their medical conditions, medication compliance, potential drug interactions, and individual needs.

Additionally, access to medical records could lead to faster emergency diagnostic times and treatment initiation by eliminating guesswork about underlying causes. Moreover, access to medical records could improve diagnostic accuracy and facilitate better continuity of care between EMS and receiving facilities (PM3, Interview, February 2024); (PM5, Interview, January 2024); (PM6, Interview, February 2024). Additionally, understanding a patient's normal baseline and previous interventions would be invaluable for providing tailored care, reducing medication errors, and improving clinician education and diagnostic skills (MD2, Interview, February 2024); (PM1, Interview, February 2024).

Furthermore, accessing the patient's medical record and advance directives would help EMS personnel understand the patient's medical history, current conditions, medications, and

end-of-life wishes. "EMS plays this huge role in the diagnostic trajectory of a patient, the information that they collect, the pre-notifications, and what the handoff looks like and what information they have collected" (MD2, Interview, February 2024). "Knowing the patient's medical history and beliefs can provide insight into their chronic illnesses, prior hospitalizations, and perspectives on life-sustaining treatments" (PM5, Interview, January 2024). Another paramedic highlights the importance of understanding and respecting patients' end-of-life wishes, "tailoring their approach to the individual patient" with effective communication between EMS clinicians and patients (PM6, Interview, February 2024).

Additionally, quotes from several clinicians further emphasize the significance of having access to patient records. PM5 (Interview, January 2024) stressed, "I think having that access would make a world of difference. I think having a picture (of the patient) of what we're going into before we get there. " Similarly, MD3 (Interview, January 2024) expresses the importance of access by saying, "I think it's invaluable," and MD8 (Interview, January 2024) thinks,

> That's really important because so often, patients and their families are so health illiterate, or all you have is a patient name, they're unconscious, they can't provide any history. I mean, it's huge for us (EMS) knowing their allergies, knowing their medications, and getting a history. (MD8, Interview, January 2024)

However, despite the benefits of having access to patient information, there is a need to address potential biases. "Careful training to avoid assumptions is advised to ensure that EMS personnel provide care aligned with patient values, preferences, and medical history while maintaining unbiased assessment" (MD4, Interview, January 2024). Another physician raises concerns about the risk of bias, stating, "Some noted the need to avoid anchoring bias and still fully assess the patient themselves" (MD5, Interview, January 2024). While access to patient

records is crucial for informed decision-making and personalized care, mitigating biases and ensuring unbiased assessment in emergencies is essential without undermining patient assessments and access to essential patient information.

Enhancing Data Analysis

Enhancing data analysis to support QA/QI processes in EMS are crucial for improving patient outcomes and clinical practice. Interviews with medical directors and EMS personnel highlight the importance of providing timely and constructive feedback on patient outcomes to support EMS personnel in enhancing their clinical skills and diagnostic decision-making (MD2, Interview, February 2024); (MD3, Interview, January 2024); (MD4, Interview, January 2024); (PM8, Interview, January 2024). This feedback should focus on time-critical diagnoses and conditions commonly missed or challenging to diagnose in the field, not just STEMI, stroke, and trauma, ensuring a comprehensive approach to continuous improvement (MD2, Interview, February 2024); (MD3, Interview, January 2024); (MD4, Interview, January 2024).

Moreover, feedback delivery methods must be personalized and adaptable, utilizing various modalities such as FTF interactions, text messages, and ePCRs based on the situation and preference (MD2, Interview, February 2024); (MD3, Interview, January 2024); (MD5, Interview, January 2024). Access to real-time patient medical history, medications, and advance directives is emphasized by medical directors as essential for accurate diagnoses and treatment in emergencies, underscoring the importance of streamlined data sharing between EMS and hospital EHR systems (MD3, Interview, January 2024); (MD4, Interview, January 2024); (PM3, Interview, February 2024). Integrating EMS and hospital data systems, charting software, and communication protocols could facilitate patient outcome tracking and feedback delivery (PM1,

Interview, February 7, 2024); (PM6, Interview, February 2024); (MD2, Interview, February 2024).

Overall, patient outcome feedback is beneficial and invaluable for EMS personnel. It catalyzes and enhances their diagnostic decision-making and clinical judgment, ultimately improving patient care. Outcomes feedback fosters a culture of learning and improvement within EMS. As one medical director aptly states, "Providing patient outcomes feedback to EMS personnel is invaluable for improving clinical practice" (MD4, Interview, January 2024).

Opportunities in Education

Opportunities in EMS education to support lifelong learning, effective giver and receiver of feedback, and the development of challenging encounters and soft skills are crucial for advancing the professionalism and clinical competency of EMS personnel. However, one aspect that deserves special attention is incorporating comprehensive training on giving and receiving feedback into paramedic curriculums. "I think the biggest thing, you know, so we talked about giving feedback, but we do a poor job of teaching people how to receive feedback" (MD5, Interview, January 2024). Teaching paramedics about receiving feedback is a pivotal step in preparing clinicians for continuous improvement through constructive criticism. Several MDs noted that incorporating training on giving and receiving feedback into EMS education could better prepare clinicians for lifelong learning and continuous improvement through constructive criticism and knowledge base learning (MD4, Interview, January 2024) and (MD5, Interview, January 2024).

Furthermore, enhancing continuing education and lifelong learning opportunities is essential for advancing EMS personnel's skills and knowledge base. Also, more training on complex cases should be offered, and regular feedback sessions and case reviews should be

provided to foster skill refinement and development. Medical Director 2 underscores the importance of ongoing education, stating, "Emphasizing that initial training is just the start, and skills require continuous improvement" (MD2, Interview, January 2024). However, it's not just about technical skills. Improving education on soft skills like communication and empathy is equally crucial for effective patient care, including training for delivering bad news and addressing mental health issues. As emphasized by PM6 and MD3, "Training for delivering bad news" (PM6, Interview, January 2024) and "interacting with distressed patients/families" (MD3, Interview, January 2024) are essential components of this education.

The role of EMS educators and policymakers is not just crucial but also invaluable. Their efforts in integrating technology and providing comprehensive training are instrumental in fostering a culture of continuous learning within EMS. By providing EMS clinicians with more automatic access to patient medical records and outcomes data, they can remove barriers to their clinical development. Medical Director 2 highlights the significance of technology integration, stating, "I think from an individual clinician level, I think like we have to figure out the technology, and then we just need to be integrated with the pre-hospital and hospital records, and that they have access to the information like I have access to the information" (MD2, Interview, January 2024). Overall, these education opportunities underscore the importance of creating a culture of continuous learning and improvement within EMS, ultimately enhancing patient care outcomes and advancing the professionalism of EMS personnel.

Feedback Delivery Mechanisms

It is mainly evident from the transcripts that FTF feedback is highly valued within the EMS community due to its capacity for dialogue, clarification, and personalized learning experiences. Face-to-face feedback allows immediate interaction, enabling EMS clinicians to

seek clarification on specific points, discuss their actions in detail, and receive personalized

feedback tailored to their needs (PM6, Interview, January 2024); (MD2, Interview, January

2024). Quotes such as " I'd prefer and always prefer to do it in person; I am not always able to"

(MD3, Interview, January 2024), "I like to do more things face to face, just so that I know that

I'm invested in them and their own feedback," (MD7, Interview, January 2024) and "I'd love it if

it could all be in person" (MD1, Interview, January 2024) support many of the MD's views

preferring FTF but logistically, it is just not possible. However, many MDs acknowledge that this

mode may only sometimes be feasible due to practical constraints such as time limitations and

geographic distances. Face-to-face or in-person feedback is necessary for more nuanced cases,

underlining the importance of this mode (MD1, Interview, January 2024) and (MD2, Interview,

January 2024).

While FTF feedback is the preferred mode, it is essential to recognize the role of

electronic communication methods such as email or software systems as viable alternatives,

mainly when immediate in-person interaction is not possible. These methods offer the advantage

of providing a record of feedback and enabling some level of back-and-forth communication.

However, they may lack the interpersonal connection of FTF interactions (PM1, Interview,

January 2024); (MD2, Interview, January 2024); (MD6, Interview, January 2024). Despite

lacking interpersonal connection through FTF interaction, electronic feedback delivery offers

other advantages. It allows for feedback documentation as a reference for future improvement

efforts (MD2, Interview, January 2024).

Furthermore, it can accommodate the timely delivery of feedback, which is crucial for

maximizing learning potential as details are fresh and practices can be adjusted promptly (PM1,

Interview, January 2024); (PM8, Interview, January 2024). Emphasis should be placed on

providing feedback close to the patient encounter to ensure relevance and effectiveness (MD2, Interview, January 2024); (PM7, Interview, January 2024). Nevertheless, MDs still play a valuable role in facilitating feedback delivery, especially when supplemented with other modes.

Electronic feedback saves medical directors time by streamlining the process of delivering feedback to EMS personnel. Unlike FTF interactions, electronic feedback can be composed and sent efficiently without the need for scheduling meetings or coordinating with multiple individuals. Digital feedback allows MDs to provide timely feedback without being constrained by their busy schedules (MD2, Interview, January 2024); (MD6, Interview, January 2024). Electronic feedback can facilitate asynchronous communication, allowing MDs to provide feedback at their convenience and allowing EMS personnel to review and respond to feedback when it best suits their schedule. This flexibility benefits both parties and eliminates the need for synchronous communication, which can be challenging to coordinate in busy healthcare environments (MD2, Interview, January 2024); (MD6, Interview, January 2024). "Honestly, some sort of automated system where they (EMS) could access the ED and hospital chart themselves" would be preferred (MD8, Interview, January 2024).

Verbal feedback is highly valued within the EMS community for its ability to allow for asking clarifying questions and providing detailed explanations. It should be noted that verbal feedback is particularly appreciated for its capacity to provide clarification and develop a rapport with two-way feedback and detail compared to written feedback alone (MD2, Interview, January 2024). However, written feedback is also highly valued as a reference, indicating that a combination of verbal and written feedback may be optimal for comprehensive learning experiences (PM6, Interview, January 2024).

Hospital data sharing fosters collaboration within EMS teams by enabling members to exchange critical information. Access to patient records, incident reports, and outcomes data would allow EMS personnel to make real-time informed decisions, improving care delivery quality. For example, sharing data on patient history, medications, and previous hospital visits enables EMS teams to tailor their approach and treatment plans according to individual patient needs, leading to better outcomes (PM3, Interview, January 2024); (PM7, Interview, January 2024); (PM8, Interview, January 2024). This collaborative process, involving all stakeholders, ensures that the best possible care is provided to patients, making them feel included and part of the patient care continuum.

Moreover, data sharing supports self-learning among EMS personnel by providing valuable insights into their performance and areas for improvement. For instance, access to feedback on patient outcomes, diagnoses, and treatment protocols allows EMS clinicians to reflect on their practices, identify learning opportunities, and refine their skills accordingly. They can also compare their performance with their peers, identify trends, and implement best practices, all of which contribute to their professional development (PM2, Interview, January 2024); (PM6, Interview, January 2024); (MD2, Interview, January 2024). By leveraging data for self-assessment and continuous learning, EMS personnel can enhance their clinical competence and adaptability in responding to diverse emergencies (MD5, Interview, January 2024); (PM8, Interview, January 2024).

Furthermore, data sharing demonstrates the value of EMS to stakeholders, including healthcare institutions, policymakers, and the public. Access to comprehensive data sets showcasing EMS performance metrics, response times, patient outcomes, and cost-effectiveness allows stakeholders to evaluate the impact and efficiency of EMS services (MD1 Interview,

January 2024); (PM2, Interview, January 2024); (PM3, Interview, January 2024). This data-driven approach enables EMS agencies to advocate for resources, implement evidence-based practices, and improve service delivery aligning with community needs (PM8, Interview, January 2024); (PM6, Interview, January 2024); (MD2, Interview, January 2024).

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Research Questions Responses

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This section compiles the answers to the research questions that informed this study. One central question encompassed the purpose of the study, which was to determine the perspectives on outcomes feedback by EMS medical directors and paramedics. Three sub-questions supported the central question. The sub-questions focused on how paramedics received feedback on outcomes. At the same time, medical directors were solicited for their role in providing paramedics with feedback and experience each encountered during their medical education and training. Paramedics were queried for the effect of not knowing a patient's outcome on their well-being and knowledge base on future patients and the medical director's view on providing timely, regular feedback to paramedics and the paramedic's well-being and knowledge base to apply in future patient encounters. The processes were grounded in data focusing on suburban and rural paramedics and medical directors.

Central Question: How do paramedics and medical directors perceive their experiences in receiving or providing outcomes feedback from hospitals/medical providers?

From the discussions, valuable insights were gained that paramedics are deeply committed to their work and highly value feedback on patient outcomes as it directly influences their clinical skills and decision-making abilities. The current feedback mechanisms have been identified as opportunities for growth and development and often need to be improved, leaving these dedicated professionals with limited or no information on what happens to the patients they

transport to hospitals. Paramedics strongly desire more specific feedback tied to patient

outcomes, including treatments and discharge diagnoses and the accuracy of their field

impressions. This sentiment is echoed by medical directors who, like the paramedics, appreciate

the importance of outcomes feedback in improving patient care and clinical judgment (MD2,

Interview, January 2024).

Despite recognizing its significance, providing and receiving meaningful feedback on

outcomes is a complex challenge for paramedics. Some have experienced feedback that focuses

more on corrections rather than learning opportunities (PM1, Interview, January 2024), while

others receive feedback primarily for clarification or critique of care decisions rather than patient

outcomes (PM2, Interview, January 2024). These perspectives highlight the need to shift towards

more constructive and actionable feedback that emphasizes learning opportunities and positive

outcomes, a change that could benefit these dedicated professionals.

On the other hand, medical directors are taking a proactive approach in seeking and

providing outcomes feedback, recognizing its value in improving diagnostic decision-making

and clinical judgment (MD1 Interview, January 2024). EMS software vendors need to establish

consistent processes for delivering timely and individualized feedback to EMS personnel, such

as implementing systems with dedicated outcomes tabs and MDs conducting regular reviews

(MD2, Interview, January 2024); (MD3, Interview, January 2024). Despite logistical challenges,

many medical directors are steadfast in their emphasis on the importance of outcomes feedback

and their determination to overcome barriers to provide it when feasible (MD2, Interview,

January 2024); (MD3, Interview, January 2024); (MD3, Interview, January 2024); (MD5,

Interview, January 2024); (MD8, Interview, January 2024).

Overall, the importance of outcomes feedback for enhancing patient care and outcomes among EMS personnel is widely acknowledged despite differing viewpoints on its feasibility. Fundamentally, it is crucial to note that the consensus leans heavily towards its significance in improving clinical practice and patient care. These interviews have highlighted the urgent need for better processes and systems to deliver timely and individualized outcomes data to EMS personnel to maximize its impact on patient care.

RQ2: How do paramedics receive outcomes feedback, and how do medical directors view their role in providing outcomes feedback?

Paramedics hold a deep-seated regard for outcomes feedback, perceiving it as a vital tool for honing their expertise and refining patient care. Despite their dedication, the current feedback mechanisms fall short, often delayed, and need more detail. As reported by PM6 (Interview, January 2024), the feedback they receive is "extremely limited," with PM7 (Interview, January 2024) highlighting "its minimal" nature, if any at all. Furthermore, the absence of a streamlined process, such as the lack of activation for outcome notifications in EMS software, presents a significant challenge, potentially leaving paramedics unaware of critical feedback. This discrepancy underscores a systemic issue that hampers the flow of crucial information necessary for professional development and patient care improvement expressed by PM3,

> If you're a paramedic or EMT, you can have an outcomes tab that your name is associated with a chart outcome; you will get a notification that says it's coming across, and that's the biggest complaint most people have is they have to turn that feature on. So if you get hired and they (EMS software administrators) didn't turn the feature on, you never get an outcome. (PM3, Interview, January 2024)

Despite their challenges, paramedics demonstrate a strong willingness to embrace feedback, whether it is constructive or critical. Paramedic 2 articulates the importance of feedback in illuminating potential gaps in care, expressing a desire for a close communication loop with patient outcomes to ensure the accuracy of their treatments, adding,

> I think feedback is really important. I have so many patients where I take them to the ED, and I want to know, did I miss something? Is there something I should have done different? Is there something else I should have been thinking about? And if I don't, a kind of close communication loop with the result, then I never really know if my treatment was accurate." (PM2, Interview, January 2024)

However, the manner in which feedback is delivered plays a crucial role in its effectiveness. Negative or abrasive feedback, as noted by PM4, fails to foster a conducive learning environment and discourages paramedics from seeking further feedback, thereby hindering their professional growth (PM4, Interview, January 2024). This example underscores the need for a more supportive feedback culture, which could significantly enhance paramedics' learning experience and professional development.

Paramedics are acutely aware of the immense educational value that outcomes feedback holds. They highlight the knowledge and insights that could be gleaned from understanding patient outcomes. One example of feedback value may be gleaned from PM5's statement,

> So much knowledge and education could be gained by having that connection [feedback]. So, if we're able to interact and have that feedback in a learning environment for the outcomes of the patients that we took in, I think that would be a huge step in the positive direction. It has actually been the missing puzzle piece. (PM5, Interview, January 2024)

Paramedic 5 aptly describes outcomes feedback as the 'missing puzzle piece,' underscoring its potential to bridge the gap between clinical practice and continuous learning. However, various barriers impede the realization of this potential, including limited access to patient records, communication gaps between EMS and hospitals, and personnel shortages for dedicated feedback roles. These obstacles underscore the need for systemic improvements and collaborative efforts to facilitate the seamless exchange of feedback between EMS personnel and healthcare institutions (PM5, Interview, January 2024).

Paramedics' perspectives on outcomes feedback accentuate the intrinsic value of enhancing clinical practice and patient care. Despite facing challenges in its receipt and implementation, paramedics remain committed to leveraging feedback as a stimulus for professional growth and improvement. Addressing the systemic barriers and fostering a culture of constructive feedback are essential steps toward utilizing the full potential of outcomes feedback in EMS practice.

Medical directors perceive outcomes feedback as a cornerstone of EMS education and performance enhancement, recognizing its profound impact on clinical skills, diagnostic decision-making, and patient care (MD1 Interview, January 2024); (MD3, Interview, January 2024). Medical directors acknowledge their pivotal role in providing detailed feedback, leveraging their medical expertise to offer constructive and educational insights (MD1 Interview, January 2024); (MD2, Interview, January 2024); (MD3, Interview, January 2024). While some outcomes feedback may be disseminated by training officers or hospital liaisons, the medical director's input is highly valued due to their depth of knowledge and familiarity with protocols (MD2, Interview, January 2024); (MD6, Interview, January 2024); (MD7, Interview, January 2024).

Despite the recognized importance of outcomes feedback, medical directors encounter significant challenges in accessing patient outcome data and delivering timely feedback. Limitations with electronic health record systems and data-sharing agreements present formidable barriers to obtaining necessary information (MD1 Interview, January 2024). (MD2, Interview, January 2024); (MD8, Interview, January 2024). However, they emphasize the need for personalized communication and constructive feedback to foster a culture of continuous improvement among EMS personnel (MD5, Interview, January 2024); (MD6, Interview, January 2024). "I do think they (paramedics) always respect feedback from the medical director more, as long it's not provided in a punitive manner" (MD5, Interview, January 2024).

Medical directors stress the significance of providing feedback across various cases, not just critical ones, to build comprehensive clinical skills among EMS clinicians (MD2, Interview, January 2024). Prompt feedback allows EMS clinicians to "change the way that [they] approach a patient" (MD7, Interview, January 2024). They advocate for feedback that is not punitive but instead serves as a catalyst for learning and growth (MD1 Interview, January 2024); (MD3, Interview, January 2024). EMS crews value FTF feedback from medical directors, which carries more weight and fosters a collaborative learning environment (MD5, Interview, January 2024); (MD6, Interview, January 2024).

Moreover, outcomes feedback is viewed as instrumental in developing EMS clinicians' clinical judgment, especially for less common conditions they may encounter infrequently. Medical directors underscore the importance of knowing the final diagnosis to enable EMS personnel to effectively refine their diagnostic decision-making and clinical judgment (MD2, Interview, January 2024).

Medical Director 2 further emphasizes I think information on what was the final diagnosis is really important for people to develop their right like their diagnostic decision making and their clinical judgment. In the absence of having, like, what was the actual diagnosis for the patient, we're really robbing people of their opportunities to improve. (MD2, Interview, January 2024)

In essence, medical directors recognize outcomes feedback as vital to EMS education and performance improvement. While challenges persist in accessing patient data and delivering feedback, a combination of software solutions and personalized communication strategies holds promise for overcoming these obstacles and providing robust feedback to EMS personnel. Through constructive feedback and personalized engagement, medical directors aim to motivate continuous improvement among EMS crews, ultimately enhancing patient care outcomes.

RQ3: How do paramedics perceive feedback conveyed during their medical education and medical directors describe feedback mechanisms experienced in their medical education?

Paramedic Education Feedback

The feedback paramedics receive during their training programs varies greatly depending on the program. Feedback is often rare and nonexistent, leaving paramedics without guidance on their performance during clinical rotations and field training (PM7). Constructive criticism and formative assessments are rare, contributing to a need for more development in critical clinical skills.

When feedback does occur, it is typically delivered verbally in post-incident debriefings or during shift changes (PM1, Interview, January 2024); (PM8, Interview, January 2024; (PM7, Interview, January 2024). Written feedback via email or documentation systems is less common, further limiting the opportunities for paramedics to receive detailed and documented insights into

their performance. The quality of feedback is heavily reliant on individual instructors, with some demonstrating a more significant commitment to providing thorough, constructive feedback than others (PM1, Interview, January 2024); (PM2, Interview, January 2024). The source of feedback often comes from attending physicians or nurses with whom students have built relationships rather than from a standardized program feedback system. Paramedic 2 states, "my clinicals were very much checking boxes to satisfy my graduation requirements. Any feedback would have been from self-seeking from whatever nurse I was working with to try to better understand why did we do this."

One significant challenge paramedics face is a lack of transparency regarding patient outcomes. Students are often left in the dark about what happens to patients after they leave their care, as access to patient data is restricted (PM1, Interview, January 2024); (PM5, Interview, January 2024). This lack of insight into patient outcomes significantly hampers paramedics' ability to learn from their experiences and improve their practice. By highlighting the crucial role of transparency in patient outcomes, EMS educators and medical directors can be spurred to provide more comprehensive feedback, thereby enhancing the learning experience for paramedic students.

Despite the challenges, it is noteworthy that paramedics are generally receptive to feedback when it is provided. This recognition of its value in improving patient care underscores the importance of feedback in the learning process. However, the culture of feedback in many EMS education programs remains underdeveloped. Some paramedics highlight an interest in the need to provide feedback to EMS students, while PM2 reflects on "minimal feedback" received during clinical rotations; this suggests a need for refinement or improvement in feedback practices across paramedic training programs. Emphasis on the receptiveness of paramedics to

feedback should make students feel valued and understood, fostering a sense of trust and openness in the learning environment (PM2, Interview, January 2024); (PM5, Interview, January 2024).

The current state of feedback in paramedic training programs needs further review. Regular, high-quality, and transparent clinical skill development feedback could better prepare paramedics for the field, ultimately improving patient care outcomes.

Medical Director Education Feedback

Most MDs receive regular positive feedback from their program director during meetings, which likely reinforces effective practices. Medical Director 3 reflects on receiving positive feedback during medical school, suggesting that recognizing strengths and achievements can motivate learners. "At the end of the shift to give you some feedback on something, you know, like one thing you did well, one thing they would like to see you improve on next time" (MD5, Interview, January 2024). Medical Director 5 mentions colleagues who highlight one thing that was done well during shifts, providing positive reinforcement and encouragement.

Medical Director 2 recounts receiving direct verbal and written feedback from attendings during residency, including formal sessions. This constructive feedback likely focused on areas for improvement and offered actionable suggestions for skill development. Attendings who provided difficult private feedback were noted as the most influential. Some MDs prefer FTF communication to address discrepancies, focusing on constructive dialogue to resolve issues (MD2, Interview, January 2024).

Medical Director 1 also mentions receiving negative feedback during their medical training, highlighting areas for improvement. Other MDs contrast their experience of receiving negative feedback during residency, suggesting that constructive criticism can play a crucial role

in identifying areas for growth. Still, MDs reflect on learning from mistakes and negative feedback, noting the importance of honest feedback even when it is difficult to hear (MD1, Interview, January 2024).

Medical Director 8 reminisces about the immediacy of feedback in medical school and residency, where access to patient charts allowed for real-time feedback on patient care. "It was a lot easier for me because I could just access the hospital chart and get right into it." Medical Director 8 emphasizes the importance of giving feedback close to the time of the event to facilitate learning and improvement (MD8, Interview, January 2024). Medical Director 6 also mentions learning from real-time feedback during their time as a resident, highlighting its effectiveness in driving immediate reflection and action. "I have always learned more from the things that I have messed up and been called on; those are real memorable" (MD6, Interview, January 2024); (MD2, Interview, January 2024).

Overall, these experiences highlight the diverse types of feedback physicians receive throughout their training, ranging from positive reinforcement to constructive criticism and real-time feedback. Each type plays a crucial role in shaping professional development and fostering continuous improvement in clinical practice.

RQ4: How does not knowing a patient's outcome affect paramedics' current well-being and knowledge base to apply in future cases and the medical director's views on the effect of providing regular, timely outcomes feedback to paramedics on their overall well-being and knowledge base to apply in future cases?

Paramedic well-being is intricately intertwined with the feedback and closure they receive after high-risk calls, particularly those involving pediatric patients or emotionally charged situations. Paramedic 6 shares a poignant personal reflection on the emotional toll a lack

of closure or follow-up can take on clinicians. They recount instances where they comforted distraught family members without knowing the patient's fate, which can lead to burnout over time. Paramedic 5 echoes this sentiment, expressing frustration from unresolved questions about past patients and noting the potential for burnout or disengagement among EMS clinicians needing the desired feedback and learning opportunities. This lack of closure and feedback can foster negativity, impacting job performance and personal relationships and ultimately affecting overall well-being (PM5, Interview, January 2024).

Paramedic 8 underscores the importance of seeking feedback and closure after calls, vividly illustrating the emotional weight of not knowing the outcome of patients they have treated, especially when it involves acquaintances or loved ones. "I'll push to get feedback. I just will not let it go until I get feedback. You definitely can lose sleep over it" (PM8, Interview, January 2024). The uncertainty surrounding patient outcomes can lead to internal struggles and psychological distress, even when clinicians believe they are coping adequately (PM8, 2024). Medical Director 2 further highlights the importance of accessing patient outcomes for paramedics, emphasizing that it is not just about clinical development but also about recognizing the value and autonomy of EMS clinicians. The inability to access patient outcomes can undermine paramedics' sense of contribution and efficacy in patient care, ultimately impacting their well-being and professional satisfaction (MD2, Interview, January 2024). Another medical director noted,

> Medical directors have the privilege of self-seeking worrisome patients. But when
> I have interesting patients or a patient that I was worried about, one of those that
> keeps me up at night, I regularly go back and look at what ends up happening to

them. I think they (paramedics) should have that feedback as well. I think it's

really important for job satisfaction. (MD8, Interview, January 2024).

One of EMS's properties is the ability to proactively identify cases that may lead to

concerning outcomes. However, this also highlights the disparity of patient accessibility,

where EMS takes the lead in initial contact, evaluation, and intervention before

transferring the patient to the hospital clinical staff. While medical directors may be

aware of the importance of these initial assessments, they may not fully appreciate the

long-term toll of not having closure and the repetitive nature of seemingly endless patient

treatments without resolution. This "black hole," as referred to by MD3, can adversely

affect paramedic resiliency.

Collectively, the narratives of paramedics and medical directors underscore the shared

understanding of the vital role that feedback and closure play in paramedic well-being. The

absence of patient outcomes and feedback can lead to emotional distress, frustration, and burnout

for paramedics, emphasizing the necessity for open communication and support structures within

EMS systems. Providing timely feedback and closure can bolster paramedics' professional

growth and protect their mental and emotional well-being in the demanding emergency medical

services environment, averting detrimental impacts on job performance and personal

relationships.

Summary

Chapter Four provides rich descriptive data about each participant. There were 16

interview participants, eight paramedics, and eight medical directors, encompassing eight states

across the U.S. Also, thirty-seven participants, including 12 MDs and 25 paramedics, responded

to the survey for data converging and generalizability. The data analysis was conducted

independently and within the scope of the research questions to address each question, develop themes, and discover a core category. The themes that emerged were (a) the importance of patient outcomes feedback, (b) challenges in feedback delivery, (c) the value of outcomes feedback in education and chart reviews, (d) challenges and opportunities in education, (e) importance accessing patient data and documentation, and (f) promoting lifelong learning and data analysis. The core category that emerged was linking the knowledge divide, a constructivist approach to EMS feedback for improved clinical decision-making and resilience. Outcomes feedback was defined as the general patient information encompassing the emergency department assessment, treatment, diagnosis(es), admission or discharge decisions, and the overall outcome of the patient's experience during their hospital encounter. Each participant shared different experiences within their framework of outcomes feedback, and participants acknowledged the crucial role outcomes feedback has on their knowledge, decision-making, and subsequent treatment of their patients.

The subsequent section provides a detailed analysis of the survey inquiries and their corresponding responses, thereby enriching the understanding of the interviewee's viewpoints. This analysis not only sheds light on the potential generalizability, discordances, and concurrences of the respondents' views and capabilities but also demonstrates the coherence and reliability of the research. The access to records before EMS treatment, patient outcomes feedback, regular and timely feedback, and disciplinary actions with feedback reported by the participants, as crucial contextual factors, play a significant role in explicating the interview data in a broader sense, thereby reinforcing the interview responses and the magnitude of the views and perceptions of medical directors and paramedics.

The theoretical integration revealed a merging of the conceptual framework, which arose from within the participant's experiences and congruently within the constructive grounded theories (Birks & Mills, 2023; Charmaz, 2014b, 2015b, 2015a, 2017, 2021; Charmaz & Thornberg, 2021) The new theory, linking the knowledge divide and a constructivist approach to EMS feedback for improved clinical decision-making and resilience, was native of the participants' experiences, inductive inferences, and continued reflexivity by the researcher.

In the final section, the chapter answered the research questions. The central question was focused on the perceptions of medical directors and paramedics and the importance of outcomes feedback in expanding the knowledge base of paramedics.

CHAPTER FIVE: CONCLUSION

Overview

This study delves into the vital role that feedback plays and the role that MDs play in delivering feedback to paramedics in improving patient outcomes and promoting the resiliency of paramedics. The subsequent section commences with a summary of the findings. The ensuing discussion section contextualizes these results within the existing literature and conceptual frameworks. The implications section then details the research's theoretical, empirical, and practical consequences. The following section provides valuable insights for interpretation within the limitations and delimitations section. Finally, the chapter concludes with proposed recommendations for future research that guide further exploration and advancement in this critical field. Overall, this study contributes to the existing literature by providing crucial insights into the role of feedback for clinicians in improving patient outcomes and paramedic resilience.

Summary of Findings

The analysis of the coded interviews and surveys reveals six overarching themes. Thematic analysis from initial coding and memoing, with concurrent data collection and reflexivity, was developed with NVivo software and constant reflexivity. Open-ended questions guided the researcher through the inductive coding, developing a grounded theory framework. These hierarchical set of themes were: (a) the significance attributed to patient outcomes feedback, (b) the encountered hurdles in delivering feedback effectively, (c) the utility of outcomes feedback in educational contexts and chart reviews, (d) the multifaceted challenges and opportunities inherent in educational initiatives, (e) the vital role of accessing patient data and documentation, and (f) the promotion of lifelong learning and improved data analysis skills.

These emergent themes come together around the central principle of the vital role of outcomes feedback within EMS. The theoretical framework in this study incorporates the melding of existing concepts to generate a fresh theoretical perspective. Specifically, it integrates elements of outcomes feedback, disparities in theoretical frameworks, formal feedback integration, and the delicate balance between adherence to protocols and frontline care provision. The theoretical integration of these themes reveals a new theory, linking the knowledge divide from a constructivist approach to EMS feedback for improved clinical decision-making and resilience.

The integration of findings has resulted in the development of a novel theoretical framework, illuminating the dynamics of outcomes feedback in paramedic practice and its effects on patient care and resilience. Brookhart (2018) noted that feedback has been paramount in medical education and practice for decades. However, due to the autonomous nature of EMS practices and the knowledge-based growth of paramedics, knowledge-based learning has been hampered by a lack of patient outcomes affecting patient care (Eaton-Williams et al., 2020) and Morrisson et al. (2017) note that feedback affected paramedic mental health. The overarching concept of this theory incorporates not only the paramedic's perspectives but also the MD's perspectives. Patient outcomes feedback was predefined at the beginning of the survey and interviews. The researcher used the definition to clarify or prompt participants about the type of feedback referenced in the questions.

Many EMS systems often miss opportunities to provide positive EMS feedback and its impact on patient outcomes. This qualitative study, conducted through semi-structured interviews, did not aim to quantify the overall prevalence of positive feedback. Instead, it sought

to explore the views of a diverse group of paramedics and MDs on outcomes feedback and its prevalence within the study cohort.

Positive feedback is widely viewed as necessary by paramedics. Confirming the paramedic's treatment not only reassures the paramedic that the assessment and treatment were in line with the patient's underlying complaint but also holds the potential to change practice and provide opportunities for self-based learning. Medical directors also acknowledged positive feedback's importance and perceived it as a critical element in EMS practice.

Within this cohort, paramedics' perceptions of positive feedback are diverse, reflecting that several paramedics received no feedback on patient outcomes. MDs perceived a higher range of positive feedback given compared to paramedics' perceptions of receiving MD feedback. This discrepancy may be attributed to the sample size, the diverse and autonomous nature of paramedic practice in rural and suburban settings, and the challenges of MDs providing feedback on outcomes for paramedics.

The study not only underscores the importance of positive feedback in EMS and its potential impact on patient outcomes but should also serve as a call to action. It highlights the pressing need for more structured and widespread feedback mechanisms within EMS systems, underlining the urgency of such systems for improving patient outcomes and paramedic resiliency. STEMI and stroke programs are examples of how feedback can affect practice changes by paramedics (Langabeer et al., 2014; Morrison et al., 2017).

The central query shaping this study was "How do paramedics and medical directors perceive their experiences in receiving or providing outcomes feedback from hospitals/medical providers?" These perceptions were formed by the personalized experiences of paramedics and MDs and the prominent factors that led to the finalized theory: Feedback importance, challenges

in providing feedback, timely access to medical records, enhancing data sharing, opportunities in education, and feedback delivery mechanisms. The influential factors leading to the finalized concept are provided in Figure 4 (*EMS Outcomes Feedback Model ch4).*

Three subquestions supported the central question that guided this study. The first subquestion was centered on the MD's delivery and the paramedics' receipt of outcomes feedback. Paramedics were asked, "How do paramedics receive feedback on patient outcomes"? Conversely, MDs were asked, "How do medical directors view their role in providing outcomes feedback for EMS personnel?" Paramedics receive feedback through multi-modal channels, including text, software, and face-to-face interactions (FTF), which depend on geographical factors and MDs' availability to access patient information. Despite a strong desire for more frequent feedback on patient outcomes, many paramedics receive limited and occasionally delayed feedback, sometimes delayed for weeks. Additionally, some paramedics reported that certain MDs were not actively involved in providing feedback on outcomes, as described in their experiences.

Medical directors viewed outcomes feedback as crucial to the learning and development of paramedics' differential diagnosis abilities and critical thinking. Some MDs encountered challenges accessing medical records, leading to difficulty in providing outcomes feedback. Furthermore, the process of extracting information from hospital records for outcomes feedback reports was often time-consuming, even when records were readily accessible. All MDs in this study agreed that providing feedback on outcomes was "very" to "extremely" important.

The second subquestion was, "How do paramedics perceive feedback conveyed during their medical education and training?" Paramedics' experiences in education varied widely. Some received real-time feedback on their patients and outcomes, while others described their clinical

education as primarily focused on skill acquisition and fulfilling requirements. Many paramedics

noted a lack of constructive or formative education opportunities, often having to proactively

seek clinical feedback from preceptors, with patient outcomes feedback particularly scarce.

Although formal feedback mechanisms exist, they are seldom documented or provided during

clinical education, leaving paramedics to rely on sparse information.

In contrast, MDs were asked, "How do medical directors describe the feedback

mechanisms they experienced in their medical training." Medical directors have a structured

process for clinical education, which includes real-time feedback on patient care and outcomes.

They utilize various mechanisms, such as corrective feedback, building knowledge bases, and

summative feedback. Many MDs emphasize the importance of one-on-one corrective feedback,

appreciating the time invested by senior clinicians in providing timely and honest evaluations.

Additionally, they value feedback from mentors and attendings, even when it involves

uncomfortable conversations, as it fosters improvement and strengthens team dynamics. Patient

outcomes were readily accessible to practicing physicians through the EMR and communication

with other care teams. Medical directors expressed during their education that mechanisms of

feedback were discussed on ways to receive and give feedback even though several felt

unequipped to provide effective feedback for paramedics.

The third subquestion addresses, "How does not knowing a patient's outcome affect

paramedics' current well-being and knowledge base to apply in future cases?" while also

exploring "How do medical directors view the effects of providing regular, timely feedback to

paramedics on their overall well-being and knowledge base to apply in future cases?" The lack of

patient outcomes can lead to negative consequences for paramedics, including self-doubt, moral

distress, and burnout. Paramedics may question their abilities or leave EMS without proper

feedback on whether their interventions helped or harmed patients. The lack of patient outcomes leaves paramedics' education incomplete, hindering their ability to expand knowledge and improve future care. At the same time, paramedics who can self-seek outcome data and systematic feedback from MDs are more efficient and impactful in improving clinical acumen across the profession.

Medical directors widely support the idea that regular, timely feedback positively impacts paramedics' well-being and professional development. Outcome feedback validates paramedics' skills, reinforces good practices, and highlights areas for improvement. Additionally, MDs stress that feedback is crucial in closing the learning loop, allowing paramedics to develop beyond their initial training. Consequently, MDs advocate for consistent feedback to foster paramedics' well-being, professional growth, and the quality of patient care.

Discussion

The upcoming sections discuss the discoveries concerning the literature and theoretical framework outlined in Chapter Two. These discussions elucidated any validation or alignment of the study's findings with existing literature. Furthermore, any deviations or expansions from the existing literature are further clarified.

Relationship to Empirical Literature

A 2021 national EMS data report showed that 69% of the 50 million annual calls were cared for by a paramedic-capable unit in the U.S. (Hoffman et al., 2022). While the views of all EMS credentials levels have value, the study sought to narrow the scope of this research to paramedics' views on patient outcomes feedback as they represent the largest number of 911 patient encounters. Accordingly, this research study incorporates interviews and surveys demonstrating that paramedics highly value feedback on patient outcomes. These findings and

information are essential for several reasons: feedback enhances their knowledge base, improves diagnostic skills, provides learning opportunities from clinical encounters, and validates their treatment decisions and strategies. Despite recognizing its importance, paramedics report dissatisfaction in receiving limited or no regular and timely feedback on patient outcomes.

Medical directors in this study also emphasize the importance of feedback for professional development and improving patient care. The benefits of consistent feedback for paramedics have been well-documented in the literature. Carroll et al. (2019) and Pepe and Stewart (1986) highlighted feedback's benefits, advocating for feedback in the ongoing education and improvement of paramedics. Furthermore, multiple studies have acknowledged the necessity to provide timely and effective feedback, highlighting the potential for significant improvement in patient care through this practice (Burgess et al., 2020; Cash et al., 2017; Kornegay et al., 2017; Lefroy et al., 2015; Natesan et al., 2023; C. J. Watling & Ginsburg, 2019). Despite understanding the importance of outcomes feedback, many MDs in this study struggled with opportunities to improve outcomes feedback delivery.

Cash et al. (2017) conducted a comprehensive survey among nationally registered paramedics in the United States, revealing that feedback, when provided, often arrived late and typically came from partners, supervisors, and hospital staff, with MDs least commonly providing feedback. However, as presented in Chapter 4, the survey found that only one in five paramedics received feedback regularly. This finding underscores the significant gap between the recognized importance of feedback and the current practices in providing it, indicating a need for systematic improvements to ensure that paramedics receive the timely and consistent feedback necessary for their professional growth and ensure quality patient care.

Gunderson et al. (2021) highlighted the necessity of establishing a robust bilateral exchange between hospitals and EMS through a NAEMSP position statement and white paper, advocating for widespread implementation. While some EMS systems benefit from outcomes feedback, many agencies still need to be connected to a collaborative system, exemplified by the National Emergency Medical Services Management Association. Without such feedback, paramedics may perceive their clinical decision-making and performance as sufficient, continuing their current practices without necessary adjustments, thus missing crucial opportunities to enhance patient care (Cash et al., 2017). Additionally, McGuire et al. (2021) conducted a regional study that identified similar missed opportunities for improving patient outcomes, noting minimal feedback from MDs. The lack of feedback can be especially pronounced in rural and suburban EMS agencies, where lower call volumes further diminish the chances for paramedics to seek patient outcomes after hospital interactions (McGuire et al., 2021).

The NAEMSP further emphasized in their 2018 position statement that "EMS must prioritize patient outcomes" ("Defining Quality in EMS," 2018). Efforts to improve quality in EMS necessitate a comprehensive and automatic exchange of patient data and outcomes on a large scale, facilitating bidirectional communication. This integration should occur seamlessly across all involved parties caring for the patient. Such initiatives require collaboration with hospitals and local health entities to ensure effective implementation and integration of data-sharing systems. Moreover, it is essential that EMS agencies of varying sizes are equipped with and can effectively utilize this technology to enhance their service capabilities ("Defining Quality in EMS," 2018).

Participant Demographics

The survey and interview demographics covered eight U.S. states, with a balanced

distribution of MDs regarding EMS experience, while paramedics tended to have more years of

experience. Sex distribution was equal in interviews, but the survey population was

predominantly male. Half of the paramedic participants from the interviews and surveys reported

annual system call volumes between 20,001 and 35,000, with half of the interview paramedics

reporting fewer than 5,000 annual calls. The MDs were predominately EMS-certified by the

American Board of Emergency Medicine (ABEM) or certified in emergency medicine. Only one

MD was not boarded in emergency medicine but was certified by the American Board of

Medical Specialties with a hospital-based critical care component. The study sought to seek

expert views on EMS from an MD's perspective and sought other MDs who were not ABEM

credentialed, but they failed to respond. There were notable differences between interview and

survey populations: surveys favored suburban MDs and rural paramedics, whereas the interviews

represented more MDs from the suburban areas and paramedics from rural areas. Distributions

by call volume were not equally distributed but were representative of each call volume grouping

except paramedics with an annual call volume greater than 35,000.

A recent National Association of Emergency Medical Technicians survey found similar

results. Forty percent felt they did not receive positive feedback on excellent performance; nearly

half reported access to outcomes feedback. Additionally, 37% felt their agency failed to support

their health, wellness, and resilience (NAEMT, 2022).

Many MDs and half of the paramedics highlighted the need for operational bidirectional

EMS software, with some expressing uncertainty about their systems' capabilities. Normalizing

data sharing underscores the critical need for bidirectional health data information exchanges in

EMS. Surveyed paramedics reported patient encounter frequencies: one-third saw fewer than five patients, 44% between 5 and 19, and just less than a quarter saw 24 to 30 weekly patients. These distributions were similar to a comprehensive national registry study with over thirty-two thousand responses and frequencies of 25%, 43%, and 25%, respectively (Cash et al., 2017).

These data suggest that the opportunity for self-seeking feedback is lessened with the frequency of patient encounters and hospital transports and more reliance on informal processes such as peer-to-peer for outcomes or other less conventional methods. Moreover, as in other European studies, the patient may have already transitioned out of the initial treatment point, shift changes may have occurred, and nursing staff cannot always address the depth of the paramedic's questions (Eaton-Williams et al., 2020). Nonetheless, nearly half of this study cohort received feedback in 10 or more days, but 20% never received any outcomes feedback, continuing a trend in the literature of a lack of "timely feedback" (Cash et al., 2017; Eaton-Williams et al., 2020; McGuire et al., 2021). In a medical practitioner's sense, timely feedback should be delivered when the recipient is emotionally and cognitively able to act upon the specific information (Murdoch-Eaton & Sargeant, 2012), meaning that when the information is available, the recipient can still apply the information in a reasonable time frame. The researcher could not find a definitive time frame in a clinical practice applicable to EMS. A suitable timely manner for outcomes feedback for EMS would be when it is relevant to the recipient as soon as the information is available, such as when the patient is discharged from the ED or hospital. Timely access to medical records would facilitate and expedite the feedback process.

Providing Feedback

The MD's challenges cited during interviews and surveys included difficulties accessing records and the time-consuming nature of retrieving, summarizing, and distributing these

records. Despite the consensus of all but one MD, paramedics should receive feedback on patient outcomes within five days of emergency department discharge, with half advocating for 1-2 days. The actual provision of this feedback has been inconsistent at best. One-third of the MDs reported difficulties providing timely feedback, while another third remained neutral about the process. Nonetheless, all paramedics desired patient outcomes on critical patients within five days after hospital discharge, and 88% wanted the information within two days. The paramedics' time frames may represent the time between shifts and the time to review and revise their assessment and treatment plans for a subsequent patient encounter.

The complexity of providing feedback also increased with the size of the system due to time constraints, difficulties in accessing records, the increased volume of cases requiring summary, and occasionally, MDs were unable to access patient records at all if the patient was admitted to a hospital where the MD did not have clinical privileges. Paramedics reported receiving feedback on outcomes on slightly over half of all critical patient encounters. Similarly, Cash et al. reported that 30% of EMS professionals had not received feedback within 30 days, and "about 50% received feedback on the care they provided." Furthermore, according to Cash et al., the definition of feedback was widely interpreted to include multiple sources and feedback in general (Cash et al., 2017). In this study, cohort feedback was clearly defined and intended to be patient outcomes feedback, but this researcher feels that the general feedback may be intertwined with the respondents' replies and comments.

Feedback is not just a necessity for knowledge-base improvement. Morrison et al. (2017) found that feedback improved mental health and job satisfaction and resolved patient outcomes, diagnoses, and treatments, allowing closure and closing the feedback loop (Morrison et al. 2017). Several participants were noted to have difficulty not knowing the patient's outcomes or

discovering outcomes most unprofessionally, such as Facebook, obituaries, or other family encounters. While nearly most MDs and paramedics denote feedback as necessary, there seems to be a disconnect in making this a reality. While further noting that there has been some software integration, some lack the knowledge to operate it, even knowing whether they have it, much less advocating for the instrument(s) that would unburden MDs and enlighten paramedics.

Challenges Providing Feedback

The lack of timely and consistent outcomes feedback hampers knowledge growth, job satisfaction, and patient outcomes. Most participants, MDs, and paramedics wanted the same result: consistent, timely feedback, but challenges in this study prevented MDs from meeting the needs of the paramedic's growth, hampering patient outcomes improvement. Cash et al. (2017) reported that timely and consistent feedback from MDs optimized performance. Despite similar findings with Cash et al., paramedics in this study continue to desire consistent feedback promptly from an appropriate source. However, a third of MDs reported difficulties delivering the feedback, and only another third noted minimal difficulty providing outcomes feedback. This study found that 37.5% of suburban MDs versus 25% of rural MDs reported more difficulty providing outcomes feedback. The rural challenges were access to patient charts and geography. At the same time, the suburban MDs noted difficulties with the quantity and lack of a consistent mechanism to deliver the feedback regardless of the mode of delivery, FTF, email, or through the EMS charting software. Unlike McGuire et al. (2021), rural MDs were inclined to be able to provide more FTF feedback and training than their suburban counterparts. While they still have access issues, the rural paramedics shared many of the same characteristics reported by McGuire et al. and are less likely to experience frequent encounters in the ED with their MDs for patient feedback (McGuire et al., 2021).

Timely Access to Patient Medical Records

Access to patient records impedes the accurate diagnosis of complicated patients and sometimes places paramedics at odds with the patient's end-of-life desires or family's wishes. Paramedics believe that without a do not resuscitate (DNR) order in place with the patient, they are obliged to begin resuscitating the patient. These beliefs place prehospital clinicians in conflict with the patient's family, even when efforts would be futile (Waldrop et al., 2020). Forty-one percent of paramedics surveyed by Waldrop et al. (2020) found they were conflicted when asked not to resuscitate by the family, and no DNR was available even though EMS regularly provides resuscitative treatment and withholds or terminates resuscitation in the field. The false hope of survival by compelling resuscitation complicates the comprehension and acceptance of death by family members (Waldrop et al., 2020). Access to the patient's medical record could afford paramedics the ability to abide by the patient's or family's predetermined care plans. The performance of CPR on a patient with DNR orders is unethical and fails to respect the autonomous decisions of the patients or families (Haddad et al., 2021).

In most cases, paramedics do not have access to a patient's EHR; they are forced to make crucial decisions based on observable symptoms and any information they can gather on the scene, significantly complicating their tasks. The lack of access to vital medical history, such as prior conditions, allergies, and ongoing treatments, may affect the accuracy of initial assessments and emergency interventions. Consequently, this reliance on limited information not only increases the likelihood of suboptimal initial treatments but also escalates the paramedics' cognitive workload, enhancing the potential for stress and misdiagnosis (Kapalo et al., 2020). Several paramedics and MDs note in interviews the significance of this disparity, suggesting the invaluable nature of the patient's information provided about prior medical conditions,

medications, and ongoing treatments. Kapalo et al. (2020) also noted the potential for bias toward developing a care plan without a full assessment; this study also recognizes the potential of this bias. Enabling real-time bidirectional data access to EHRs through secure technologies may mitigate these challenges. Furthermore, other solutions should include enhancing paramedic training for high-pressure situations with limited information and endorsing policies that facilitate the rapid and secure exchange of medical information during emergencies from within the EMS and hospital patient charting systems. As physicians noted in their survey responses, most wanted feedback on admitted patients who had been transferred to a higher level of care or transferred for more specialized care; respectfully, paramedics should enjoy and deserve the same learning opportunity and closure.

Enhancing Data Sharing

By improving data sharing, the ability to have real-time data to adjust QA/QI processes focusing continuing medical education on the needs that will best enhance patient outcomes and new medical advances. Allowing bidirectional data sharing to improve the healthcare climate from within the silos that prehospital care and EDs practice would realize EMS as "part of the team" is a time that has come. This study's interviews revealed the lost opportunities to improve, and paramedics suffered from the lack of closure. The MDs interviewed agreed that not only does EMS deserve validation of diagnosis and closure for difficult calls, but it also empowers paramedics to take ownership of their continued growth and adaption of assessment techniques to drive and improve patient outcomes.

The goal should be data-sharing and integration within the healthcare system to improve efficacy. As Dr. Greg Mears adeptly stated, "EMS must be bold and demand to join hospitals and

healthcare systems at the table" (Mears, 2020, para. 15). Ensuring timely and appropriate patient treatment must remain the focus of sharing data; this is what is best for the patient (Mears, 2020).

Bidirectional data sharing with patient outcomes, including a limited data set, would ensure the opportunity to meet the needs of paramedics desiring information within desired timeframes while easing the burden of MDs, both suburban and rural, to oversee patient care instead of being the conduit of information on patient outcomes. Furthermore, bidirectional data sharing would allow paramedics to make more informed inquiries, confirming assessments and diagnoses or overlooked ones. Bidirectional data-sharing technologies are available today but have not been fully integrated.

Opportunities in Education

Both MDs and paramedics identified significant opportunities for additional education regarding feedback. One-third of the surveyed MDs indicated a need for more training on delivering effective feedback to paramedics. Both groups emphasized that added education on giving and receiving feedback and prehospital medicine is a lifelong process rather than a one-time certification. Participants elaborated on the missed opportunities to grow and expand their practice and knowledge base, highlighting that ongoing education is crucial for maintaining high-quality patient care and professional development standards.

Among paramedics during their initial training process, less than half reported receiving outcomes feedback or clinical plans for their next clinical opportunity. At the same time, 20% stated they had never received any feedback, plans, or outcomes information. Consistent feedback is necessary for paramedics to learn from their experiences and improve their clinical skills. MDs and paramedics noted that comprehensive feedback education should be integrated into their training programs, educational workshops, and real-time feedback mechanisms.

Providing feedback on patient outcomes would enable prehospital healthcare clinicians to be better equipped to deliver and receive constructive feedback, ultimately improving patient outcomes and fostering a culture of continuous quality improvement in prehospital care.

Feedback Delivery Systems

Realizing FTF is a nonpractical frequent delivery mode, prehospital clinicians still appreciate knowledge-based and formative feedback in person through continuing education or focus groups with the MD. The MD's direct engagement often seems underappreciated by MDs but can become the underpinning of the culture, creating trust, credibility, and realistic performance expectations. When performance is not the only reason to have an FTF with the MD, positive reinforcement increases, and negative connotations diminish. When MDs are engaged in regular activities outside of performance review, a culture of belonging and more profound understanding is acquired and appreciated by paramedics. MDs who never or rarely visit the stations, fail to appear on non-critical calls, and perform less FTF time with paramedics seem less appreciated and are seen as not understanding "what it is like in the field."

Electronic communication has the features to be the most efficient mechanism for timely and regular feedback that the MD should oversee. Bidirectional data sharing must become normalized as the standard process of patient outcomes feedback in EMS. EMS shares data with the hospitals through HL7, and most EMS software can or should have the ability to provide patient outcomes. Patient outcomes feedback must be more than the ICD-10 code or a short discharge summary to truly envelop the greatest value, allowing paramedics to self-seek patient information, improve assessment techniques, and ask more informed questions. Procedures, lab values, and EKGs are just a few elements of the limited but complete dataset for bidirectional data sharing.

Eliminating the time-consuming process of MDs hunting for and providing summaries for EMS would allow them to focus on higher-level quality assurance and quality improvement issues and develop evidenced-based patient care strategies to improve their communities and EMS systems. Enhancing this process by automation is a sentiment widely shared among MDs, suggesting the need for hospitals to reciprocate with data sharing. Hiding behind HIPAA regulations should no longer be acceptable; instead, there should be a system that supports the delivery of care aligned with the patient's needs, prior treatments, and prior autonomous decisions. These discrepancies may be best described in an article in The Regulatory Review, stating that "within the US, inequality is increasing, and many less privileged groups (EMS) have limited access to technology. Early adopters will most likely come from the top tier of society" (Majumder, 2021). Suburban and rural EMS is far from the top tier and is least likely to be able to afford additional initial start-up costs, creating more disparities in prehospital care.

This aligned care approach would provide closure for paramedics, addressing the educational and mental health issues they face from the lack of outcomes feedback. These changes would create a more integrated healthcare system that effectively acknowledges and incorporates EMS's contributions. By ensuring EMS is fully informed and supported, the system would drive patient care forward and improve outcomes that cultivate support and resilience for EMS professionals.

Medical Director Oversight

Interestingly, EMS MDs are a much-unknown commodity. While EMS is a subspecialty of emergency medicine, this author could find no literature on the demographic composition of approximately 9,300 EMS MDs in the United States. A recent study by Sharkey-Toppen et al. (2023) revealed that very little standardization exists for requirements to be an EMS MD. No

state requires an EMS subspecialty certification; even one state, Montana, permits a physician assistant to oversee EMS.

Notwithstanding, any licensed physician in family practice, OB-GYN, pediatrics, or any field can oversee an EMS organization. This is despite position statements from the American College of Emergency Physicians, the National Association of EMS Physicians, and the Federal Emergency Management Agency encouraging board certification in emergency medicine. Also apparent is the lack of requirements for one-quarter of the states for EMS MDs to participate in any EMS activity, education, quality improvement, or mass gathering incidents (Sharkey-Toppen et al., 2023). In effect, these MDs can be nothing more than signatories without requirements to oversee the systems for which they may be responsible. The lack of participation by an MD appears to be sub-optimal for any EMS system.

Disciplinary Action

Nearly half of the surveyed paramedics felt that outcomes feedback was linked to disciplinary action, while a third of MDs reported that outcomes feedback was delivered separately. Morrison et al. (2017) raised concerns that feedback associated with outcomes undermined paramedics' perceived educational value for knowledge-based learning and fostered a lack of trust. Combining disciplinary action with outcomes feedback generates apprehension and tension, creating the perception that the activity is primarily corrective or adverse. This perception fosters more resistance for paramedics to openly discuss errors or thought processes, complicating the Quality Improvement (QI) process. However, Wilson et al. (2022) found that paramedics were more accepting of negative feedback when presented sensitively, avoiding the impression of disciplinary action. Paramedics and MDs need to be aware of the sensitive nature of the feedback and focus on the learning aspects of outcomes feedback by separating the two

when possible. Allowing paramedics the ability to achieve self-seeking patient outcomes could reduce this perception of negativity when confronted with criticisms and corrective feedback for knowledge-based learning. Open discussion is crucial for developing an advanced knowledge base and improving techniques such as assessment, as it makes paramedics feel valued and integral to the process.

Implications

The results of this study have theoretical, empirical, and practical implications. Theoretically, the study expands the applicability of the central theory regarding the importance and disparity of outcome feedback in EMS and develops a new theory to highlight the significance of outcome feedback in EMS performance and resilience. Empirically, the findings advance current literature by providing insights into MDs' and paramedics' perceptions and views on outcomes feedback. Practically, the findings have the potential to impact the current roles of EMS paramedics and MDs in providing and receiving feedback on outcomes.

Theoretical Implications

The study's theoretical implications enhance the applications by merging existing concepts to create a novel theoretical perspective. This integration reveals a new theory that bridges the knowledge gap from a constructivist approach to EMS feedback, aiming to improve clinical decision-making and resilience. Specifically, it incorporates elements of outcomes feedback, disparities in theoretical frameworks, formal feedback integration, and the balance between adherence to protocols and frontline care provisions, all of which directly affect clinical practice.

The new theory, which addresses the knowledge divide in EMS feedback to enhance clinical decision-making and resilience, was developed by integrating multiple emerging themes.

This integration offers a comprehensive understanding of the knowledge gap in EMS and its impact on paramedics and MDs. The literature review highlighted the disparity between paramedics and other medical professionals, emphasizing that paramedics are often the only care team members unaware of the efficacy of their patient assessments, treatments, and outcomes. This theory, derived from the research questions, may guide future studies on the importance of structured outcomes feedback and its effects on paramedic resilience and improved patient outcomes.

Empirical Implications

The focus of this study was to explore the perceptions and views of suburban and rural paramedics and MDs with populations under 250,000 citizens. Informed by literature, interviews, and surveys, a knowledge-based feedback theory model was developed. This model consists of six processes related to the importance and delivery of feedback: (a) the significance attributed to patient outcomes feedback, (b) the hurdles encountered in delivering feedback effectively, (c) the utility of outcomes feedback in educational contexts, and chart reviews, (d) the multifaceted challenges and opportunities inherent in educational initiatives, (e) the vital role of accessing patient data and documentation, and (f) the promotion of lifelong learning and improved data analysis skills.

Previous research has examined paramedic disparities, system approaches, and systems outside the U.S. However, this study's unique focus on the combined processes involving MDs and paramedics within the U.S. contributes significantly to the literature. It provides valuable insights that may assist future research on the role of outcomes feedback, its effects on resilience, and system performance, underscoring the importance of improving feedback processes.

Furthermore, this study documents U.S. MDs' unique views and issues in providing feedback on outcomes. It highlights the potential need for additional education for MDs on delivering feedback and a more developed system structure for feedback delivery. The literature is enhanced by addressing MDs' perspectives, some of their needs in overseeing EMS systems, and the potential for improvements in patient care.

Practical Implications

The practical implications of EMS outcomes feedback are significant and multifaceted, affecting various aspects of EMS. Emergency medical services that provide paramedics feedback on patient outcomes may improve clinical decision-making, training and education, accountability, self-motivation, resiliency, and job satisfaction. Furthermore, EMS systems may improve patient care and outcomes, support MDs, enhance system performance, and reduce disparities.

Improved Clinical Decision-Making

One significant implication is the improvement of clinical decision-making. Providing paramedics with feedback on patient outcomes enhances their ability to understand the effectiveness of their interventions and adjust their practices accordingly. This feedback loop helps refine clinical skills and decision-making processes, improving patient care (El Saadawi et al., 2010; van de Ridder et al., 2015). Several participants in this study noted enhanced clinical decision-making for paramedics who receive outcomes feedback to strengthen their future decision-making (PM1, Interview, January 2024); (PM2, Interview, January 2024); (MD2, Interview, January 2024).

Training and Education

Outcomes feedback also plays a crucial role in enhancing training and education. It is a valuable educational tool, allowing paramedics to learn from real cases and improve their knowledge and skills. Integrating this feedback into training programs and chart or focused reviews on patient outcomes enhances their ability to understand the effectiveness of their interventions and adjust their practices accordingly. This study found that paramedics and MDs participating in or delivering training sessions with outcomes feedback had high value, although they were often delayed for geographical reasons or focused training sessions.

Accountability and Motivation

Outcomes feedback empowers paramedics, allowing them to seek patient outcomes themselves. This knowledge instills a sense of responsibility and drives a culture of high-quality and continuous improvement within EMS teams. Empowerment is crucial for maintaining high standards of care and ensuring that paramedics are not just a siloed part of the healthcare system but integral to it, constantly endeavoring to deliver the best possible patient outcomes.

Resilience and Job Satisfaction

Outcomes feedback also enhances resilience and job satisfaction among paramedics. Receiving feedback on patient outcomes helps paramedics manage the psychological requirements of their jobs by providing closure and a sense of accomplishment. Hence, feedback can improve their resilience, job satisfaction, and overall well-being, contributing to a more stable and dedicated workforce. Many examples were portrayed within the study of the need for closure and knowing that the care provided benefited the patient.

Improved Patient Care and Outcomes

Effective outcomes feedback may directly translate into better patient care and outcomes. By understanding the effects of their treatments, paramedics can refine their assessments and techniques. These refinements can improve patient care and satisfaction, instilling higher trust in EMS service capabilities. Ensuring that paramedics are aware of the outcomes of their interventions is not just important but crucial for continuous improvement in patient care, giving the patients confidence that EMS is providing the most appropriate care for their best outcome (B. Brown et al., 2019; Cash et al., 2017; van de Ridder et al., 2015). Study participants believed that outcomes feedback could improve skills and had the potential to improve diagnostic ability, leading to quicker, more appropriate care and improving outcomes.

Support for Medical Directors

Outcomes feedback also supports MDs in their roles. Medical directors can use this feedback to oversee and evaluate paramedics' performance, identify improvement areas, and provide targeted training and support. Outcome feedback ensures that high standards of care are maintained within the EMS system and that paramedics receive the guidance they need to excel in their roles. Study MDs used outcomes feedback in QA/QI, chart review, and focused training sessions. Providing outcomes directly to paramedics could allow MDs more time to focus on system and patient quality issues instead of simplistic reviews, which might be delegated to a trusted source experienced in delivering feedback and current evidenced-based medicine.

Enhance System Performance

Structured outcomes feedback also benefits system performance and efficiency. Effective feedback can highlight systemic issues and inefficiencies within the EMS system, prompting necessary changes and improvements. Informing policy and protocol adjustments based on this

feedback can enhance the overall performance and efficiency of the EMS system, leading to better resource utilization and patient outcomes.

Reduction of Disparities

Additionally, outcomes feedback can help reduce disparities in care. By providing consistent and structured feedback, all paramedics—regardless of location or resources—gain access to the same information as the hospital patient care team, supporting their efforts to improve practice. This uniformity addresses and reduces disparities in the quality of care, ensuring that all patients receive high-quality EMS services that align with patients' and families' care plans and best evidence-based practices.

Advocacy

The successful implementation of patient outcomes feedback, as reported by Gunderson et al. (2021) and Mears (2020), will require the active participation of EMS administrators, MDs, and healthcare policymakers. Advocating for EMS feedback amid HIPAA challenges and state regulations related to patient information necessitates a concerted effort from various stakeholders within the healthcare system. EMS leadership and associations must take the lead in emphasizing the importance of outcomes feedback for EMS. Leaders within EMS organizations, including chiefs, senior paramedics, and EMS MDs, should actively promote patient data sharing. National and state EMS associations should also play a crucial role by lobbying for policy changes and providing guidance on navigating HIPAA regulations where needed.

Delimitations and Limitations

The study has several delimitations. In this study, one delimitation is the restriction to only 911 EMS systems in suburban and rural areas with populations less than or equal to 250,000 citizens. Paramedics were chosen, excluding other prehospital levels and transport

services, as they have more training than other levels and may be more likely to make team leadership decisions affecting patient care. Furthermore, paramedic units represent the largest number of events in prehospital care in the United States. This study excludes the more populated urban areas (greater than 250,000) where resources may be more plentiful, and MDs may be full-time employees of the EMS system. This study focused on the perceptions and views of paramedics and MDs. The study only used interviews and surveys to capture data. Focus groups could have added additional views and data for improved generalizability. The study also did not delve into technological solutions and barriers outside of the participants' experiences, including institutional factors that might influence participant's experiences and the acceptance and implementation of patient outcomes feedback.

This study also has several limitations. The survey, which was not validated and used solely as a convenience sample for comparing with interviewees, was influenced by prior studies by Cash et al. (2017), Foerster et al. (2018), O'Hara et al. (2015) and Wilson et al. (2022). It was pilot-tested with two experienced EMS MDs and two experienced paramedics who did not participate in the main study. The purposive and some snowball sampling could have limited the breadth of perspectives. This method may not have captured some points of view. However, the repetitiveness of participant responses satisfied the researcher's inquiry, resulting in no new themes and an informed representation of the population. Of particular note could be hospital-based EMS systems in which the EMS clinicians could access the patient charting system or increase the frequency of contact with hospital personnel to seek outcomes feedback, as Cash et al. (2017) noted.

Furthermore, it is crucial to understand that the study's focus on suburban and rural EMS systems is not a limitation but a deliberate choice to delve into the unique operational dynamics

of feedback delivery in these specific settings. While this focus may limit some generalizability of the findings, it provides valuable insights into environments often overshadowed and proportionally more underfunded, unlike larger EMS systems. The survey contributes to generalizability but cannot fully account for the unique dynamics that may be present in these settings. Despite potentially sharing some standard system components, some EMS systems may be more autonomous due to geography, population demographics, and available resources. However, the study's potential for enhancing its generalizability and comprehensiveness is significant. Improved generalizability could be improved by expanding the study to incorporate a more extensive and diverse population sample, further informing the research and its findings.

Another potential limitation of this study is selection or network bias. This bias may have arisen from participants self-selecting or being recruited through snowball sampling, initiated from purposive sampling contacts. The survey was advertised via flyers and shared by interested third parties through posts or emails. While it is unknown how many participants completed both the survey and interviews, it is likely that some interviewees also participated in the survey, thereby introducing the potential for survey response bias.

The study included participants from a national physicians' conference with nearly 2,000 attendees, including physicians, MDs, and paramedics. The researcher purposively sought willing and diverse participants to ensure objectivity and mitigate confirmation bias. Snowball sampling was used to increase the likelihood of capturing a more comprehensive range of perspectives and to limit researcher bias. These measures aimed to ensure the research's objectivity and the findings' validity.

Similar to the studies by Cash et al. (2017) and McGuire et al. (2021), the commingled views of what constitutes patient outcomes feedback may have led to an underestimation of the

quantity of effective outcomes feedback, even though the type of feedback was defined at the beginning of each interview and survey. Some participants had to be redirected from peers' general feedback and performance to patient outcomes feedback. The use of "feedback" may have confounded some responses the researcher could not account for regarding feedback on patient outcomes requiring prompting on the outcomes feedback term used in this study. This effort should have mitigated most of the unclear responses in the interviews. Peer checking, reflexivity, and an audit trail were employed to reduce the potential for homogeneity bias.

The study included participants from eight U.S. states, which may only account for some of the diverse perceptions of MDs and paramedics across the U.S. Additionally, recall bias may have been a factor, as participants were relied upon to recall past training events from prior years. However, these events were significant, and paramedics and MDs had little difficulty remembering and clearly citing specific details of these events during their interviews.

Recommendations for Future Research

This study provided evidence of the views and perceptions of outcomes feedback from various MDs and paramedics across the United States. Future studies should be conducted to explore EMS systems by stratifying population-based and revenue-funded systems, which could provide essential insights into adopting feedback initiatives. Different systems may have varying capacities for implementing feedback mechanisms, influenced by their resources and organizational structures. Understanding these differences could be instrumental in tailoring feedback initiatives that are feasible and effective within diverse EMS systems contexts.

Future research should seek to understand the impact of barriers on data-sharing within hospital care systems, which could be another crucial area of further research. These barriers, often rooted in concerns over privacy, data security, and possible misapplication of sensitive

information, are further complicated by hospitals' robust data sets and natural risk aversion. The misapplication of HIPAA regulations is a recurring issue that needs to be addressed.

Ensuing research should also explore the characteristics of behavior change and barriers to self-seeking, which could enlighten the understanding of paramedic engagement in their healthcare journey. Various factors, including motivation, departmental support, and the perceived benefits of the change, influence behavior change should be reviewed along with barriers such as lack of knowledge, fear, and logistical constraints that can impede self-seeking behaviors by overcoming these obstacles. Many EMS systems fail to embrace feedback as a mechanism for improvement, often perceiving feedback as more of a "personal" criticism.

Further examination of the delivery and reception of educational feedback are critical components of effective learning environments. For feedback to be impactful, it must be constructive, respectful, and tailored to the learner's needs. Additionally, these findings suggest investigating clinical education feedback and reviewing the quantity and type of structured feedback from preceptors. For each shift or session block, preceptors should provide specific feedback emphasizing strengths and areas for improvement, fostering a continuous learning environment while evaluating improvements in clinical skills, confidence, and competence among trainees. Many clinical education institutions fail to provide students with feedback in areas that need improvement out of fear of damaging their professional relationships.

Further research should explore potential shifts in feedback from summary-based to application-based methods by MDs and their impact on enhancing paramedics' higher-order thinking skills, focusing on applying critical thinking skills in practical scenarios while requiring a shift in feedback culture to emphasize problem-solving and analytical skills. When MDs shift

their focus from corrective feedback to knowledge-based learning that evaluates the impact on critical thinking skills, outcomes may improve.

The psychological impact of feedback on paramedic resilience, job satisfaction, and perceived value of job performance is profound. Positive feedback can enhance job satisfaction and a sense of professional value. Constructive feedback helps build resilience by equipping paramedics with strategies to cope with the stresses of their job. Longitudinal studies show that ongoing education and feedback could contribute to sustained improvements in these areas. Many paramedics receive no feedback, resulting in lost opportunities for continued growth and improvement and sometimes a loss of professional value.

A mixed-method approach involving a larger sample size of candidates and using validated survey instruments would provide a more generalizable and comprehensive understanding of feedback mechanisms. This approach would offer a richer understanding of how feedback is perceived and its impact over time.

Exploring EMS systems in longitudinal studies, feedback from multiple sources—peer-to-peer, verbal, digital platforms, and MD-driven could be investigated, gaining valuable insights into their effectiveness and sustainability over time for different systems. These studies should aim to identify best practices and highlight the most impactful feedback delivery methods, ensuring that feedback remains a cornerstone of a culture of continuous improvement in healthcare, with direct implications for enhancing paramedic performance and engagement.

Summary

This mixed methods constructivist grounded theory study, shaped by the experiences and perceptions of EMS clinicians, delved into outcomes feedback. The study blended qualitative and quantitative approaches and endeavored to broadly understand how feedback is delivered,

received, and utilized in the EMS context. Participants, including physicians, MDs, and paramedics from a national conference and eight U.S. states, brought a diverse range of vital and passionate perspectives. Data collection involved surveys and in-depth interviews, with the survey instrument based on prior studies and pilot-tested with experienced EMS professionals. The qualitative component involved iterative coding, thematic analysis, and thematic reflexivity grounded in constructivist principles to co-create the meaning of the participant's perspectives. The theoretical integration of the themes, analysis, and reflexivity introduces a new theory, connecting the knowledge gap from a constructivist perspective of EMS outcomes feedback to enhancing clinical decision-making and resilience.

Since the U.S. national survey on feedback by Cash et al. (2017) and the regional study of outcomes feedback of one U.S. system by McGuire et al. (2021), outcomes feedback for EMS professionals, particularly 911 paramedics, remains elusive. While minimal gains may have been achieved in some localities and feedback may be offered for some outcomes, outcomes feedback remains disconnected from many systems due to data-sharing agreements, a lack of standardized feedback mechanisms, limited data collection and analysis resources, and a culture that fails to prioritize feedback. Education and structured system mechanisms should be developed to inform EMS clinicians of the closure from their assessments and treatments, along with an extensive collaborative effort for real-time data sharing to ensure optimal patient outcomes.

This study highlights several key findings: (a) there is significant variability in how feedback is delivered and perceived across different EMS systems, impacting the effectiveness of feedback in improving patient outcomes; (b) effective feedback delivery and reception require specific training for EMS MDs and paramedics, which is currently lacking in many EMS education programs, with simulation-based training and structured feedback models identified as

potential solutions; and (c) feedback is crucial for continuous professional development, enhancing both technical skills and emotional resilience among EMS clinicians.

The direct impact of regular, structured feedback on patient care and outcomes cannot be overstated. Outcomes feedback is a catalyst for EMS clinicians to learn from their experiences, leading to enhanced clinical skills and better decision-making in emergency situations. For instance, one paramedic shared a scenario where timely and constructive feedback after a high-stress call led to significant improvements in their subsequent performance. By understanding specific areas for improvement and receiving positive reinforcement for what was done well, the paramedics could refine their skills, resulting in better patient care in future patient encounters.

Resiliency is a crucial area where feedback mechanisms can make a substantial impact. Feedback is not just about technical performance; it also plays a vital role in emotional support and resilience, which has been missing for many in EMS for too long. For instance, an MD shared an example where consistent feedback sessions helped a team of paramedics build emotional resilience. By creating a supportive environment where feedback was given and received openly, the team developed stronger coping mechanisms and fostered a culture of performance improvement and camaraderie, which proved invaluable during a particularly challenging series of calls. Regular feedback helps EMS clinicians process their experiences, reduce burnout, and maintain their mental health, ensuring they remain effective and motivated in their highly demanding roles.

This study underscores the critical importance of structured and well-delivered feedback in EMS settings. Effective feedback mechanisms can significantly enhance EMS clinicians' overall performance and well-being, improving patient care and promoting resiliency. However,

implementing new feedback training programs may face challenges such as resource constraints,

resistance to change, and the need for cultural shifts within EMS organizations.

REFERENCES

Abi-Esber, N., Abel, J. E., Schroeder, J., & Gino, F. (2022). 'Just letting you know … '

Underestimating others' desire for constructive feedback. *Journal of Personality and Social Psychology*, *123*(6), 1362–1385. https://doi.org/10.1037/pspi0000393

Adamson, E., King, L., Foy, L., McLeod, M., Traynor, J., Watson, W., & Gray, M. (2018).

Feedback in clinical practice: Enhancing the students' experience through action research. *Nurse Education in Practice*, *31*, 48–53. https://doi.org/10.1016/j.nepr.2018.04.012

Advanced Emergency Medical Technicians. (n.d.). National Registry of Emergency Medical Technicians. Retrieved September 18, 2023, from https://nremt.org

Allan, G. (2003). A Critique of Using Grounded Theory as a Research Method. *Electronic Journal of Business Research Methods*, *2*(1), Article 1. https://academic-publishing.org/index.php/ejbrm/article/view/1168

AlMahmoud, T., Hashim, M. J., Elzubeir, M. A., & Branicki, F. (2017). Ethics teaching in a medical education environment: Preferences for diversity of learning and assessment methods. *Medical Education Online*, *22*(1), 1328257. https://doi.org/10.1080/10872981.2017.1328257

Andersson, U., Maurin Söderholm, H., Wireklint Sundström, B., Andersson Hagiwara, M., & Andersson, H. (2019). Clinical reasoning in the emergency medical services: An integrative review. *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine*, *27*(1), 76. https://doi.org/10.1186/s13049-019-0646-y

Anfara, V. A., & Mertz, N. T. (Eds.). (2015). *Theoretical Frameworks in Qualitative Research* (2nd ed.). SAGE Publications Ltd.

Archer, J. C. (2010a). State of the science in health professional education: Effective feedback. *Medical Education*, *44*(1), 101–108. https://doi.org/10.1111/j.1365-2923.2009.03546.x

Archer, J. C. (2010b). State of the science in health professional education: Effective feedback. *Medical Education*, *44*(1), 101–108. https://doi.org/10.1111/j.1365-2923.2009.03546.x

Arrogante, O., González-Romero, G. M., López-Torre, E. M., Carrión-García, L., & Polo, A. (2021). Comparing formative and summative simulation-based assessment in undergraduate nursing students: Nursing competency acquisition and clinical simulation satisfaction. *BMC Nursing*, *20*(1), 92. https://doi.org/10.1186/s12912-021-00614-2

Audi, R. (2017). *The Field of Philosophy*. American Philosophical Association. https://www.apaonline.org/page/undergraduates (Original work published 1981)

Bahouth, H., Abramov, R., Bodas, M., Halberthal, M., & Lin, S. (2022). The Feedback Form and Its Role in Improving the Quality of Trauma Care. *International Journal of Environmental Research and Public Health*, *19*(3), Article 3. https://doi.org/10.3390/ijerph19031866

Baker, D. P., Day, R., & Salas, E. (2006). Teamwork as an Essential Component of High-Reliability Organizations. *Health Services Research*, *41*(4 Pt 2), 1576–1598. https://doi.org/10.1111/j.1475-6773.2006.00566.x

Batalova, J. B. J. (2020, May 13). *Immigrant Health-Care Workers in the United States*. Migrationpolicy.Org. https://www.migrationpolicy.org/article/immigrant-health-care-workers-united-states-2018

Berlinger, N., & Berlinger, A. (2017). Culture and Moral Distress: What's the Connection and Why Does It Matter? *AMA Journal of Ethics*, *19*(6), 608–616. https://doi.org/10.1001/journalofethics.2017.19.6.msoc1-1706

Bing-You, R. G., & Trowbridge, R. L. (2009). Why Medical Educators May Be Failing at Feedback. *JAMA*, *302*(12), 1330–1331. https://doi.org/10.1001/jama.2009.1393

Bing-You, R., Hayes, V., Varaklis, K., Trowbridge, R., Kemp, H., & McKelvy, D. (2017a). Feedback for learners in medical education: What is known? A scoping review. *Academic Medicine*, *92*(9), 1346. https://doi.org/10.1097/ACM.0000000000001578

Bing-You, R., Hayes, V., Varaklis, K., Trowbridge, R., Kemp, H., & McKelvy, D. (2017b). Feedback for Learners in Medical Education: What Is Known? A Scoping Review. *Academic Medicine*, *92*(9), 1346–1354. https://doi.org/10.1097/ACM.0000000000001578

Birks, M., & Mills, J. (2023). *Grounded Theory: A Practical Guide* (3rd ed.). SAGE.

Boud, D., & Molloy, E. (2013). *Feedback in Higher and Professional Education: Understanding It and Doing It Well*. Taylor & Francis Group. http://ebookcentral.proquest.com/lib/liberty/detail.action?docID=1101395

Bourn, S. S., Mackey, K. E., & Redlener, M. (2021). Defining, measuring, and improving quality. In *Emergency Medical Services* (pp. 432–445). John Wiley & Sons, Ltd. https://doi.org/10.1002/9781119756279.ch113

Brookhart, S. M. (2018). Summative and Formative Feedback. In *The Cambridge Handbook of Instructional Feedback* (pp. 52–78). Cambridge University Press. https://doi.org/10.1017/9781316832134.005

Brown, B., Gude, W. T., Blakeman, T., van der Veer, S. N., Ivers, N., Francis, J. J., Lorencatto, F., Presseau, J., Peek, N., & Daker-White, G. (2019). Clinical Performance Feedback Intervention Theory (CP-FIT): A new theory for designing, implementing, and evaluating feedback in health care based on a systematic review and meta-synthesis of qualitative

research. *Implementation Science: IS*, *14*(1), 40. https://doi.org/10.1186/s13012-019-0883-5

Brown, C., Morse, J., Nesvadba, D., & Meldrum, A. (2021). Twelve tips for introducing simulation based assessment in the objective structured clinical examination. *Medical Teacher*, *43*(4), 380–383. https://doi.org/10.1080/0142159X.2020.1789084

Buckley, C., Natesan, S., Breslin, A., & Gottlieb, M. (2020). Finessing Feedback: Recommendations for Effective Feedback in the Emergency Department. *Annals of Emergency Medicine*, *75*(3), 445–451. https://doi.org/10.1016/j.annemergmed.2019.05.016

Burgess, A., van Diggele, C., Roberts, C., & Mellis, C. (2020). Feedback in the clinical setting. *BMC Medical Education*, *20*(2), 460. https://doi.org/10.1186/s12909-020-02280-5

Carless, D., & Boud, D. (2018). The development of student feedback literacy: Enabling uptake of feedback. *Assessment & Evaluation in Higher Education*, *43*(8), 1315–1325. https://doi.org/10.1080/02602938.2018.1463354

Carroll, A. G., Peddle, M. R., & Malik, G. (2023). Undergraduate paramedicine students' experiences of feedback during clinical placement on-road: A scoping review. *Nursing & Health Sciences*, *25*(1), 18–29. https://doi.org/10.1111/nhs.12995

Cash, R. E., Crowe, R. P., Rodriguez, S. A., & Panchal, A. R. (2017). Disparities in feedback provision to emergency medical services professionals. *Prehospital Emergency Care*, *21*(6), 773–781. https://doi.org/10.1080/10903127.2017.1328547

Charmaz, K. (2014a). *Constructing Grounded Theory* (2. ed.). SAGE.

Charmaz, K. (2014b). *Constructing Grounded Theory* (2nd ed.). SAGE.

Charmaz, K. (2015a). Grounded Theory: Methodology and Theory Construction. In J. D. Wright

 (Ed.), *International Encyclopedia of the Social & Behavioral Sciences* (2nd ed., pp. 402–

 407). Elsevier. https://doi.org/10.1016/B978-0-08-097086-8.44029-8

Charmaz, K. (2015b). Teaching Theory Construction With Initial Grounded Theory Tools: A

 Reflection on Lessons and Learning. *Qualitative Health Research*, *25*(12), 1610–1622.

 https://doi.org/10.1177/1049732315613982

Charmaz, K. (2017). The Power of Constructivist Grounded Theory for Critical Inquiry.

 Qualitative Inquiry, *23*, 34–45. https://doi.org/10.1177/1077800416657105

Charmaz, K. (2021). The Genesis, Grounds and Growth of Constructivist Grounded Theory. In

 Developing Grounded Theory: The Second Generation Revisited (2nd ed., pp. 153–187).

 Routledge. https://doi.org/10.4324/9781315169170

Charmaz, K., & Thornberg, R. (2021). The pursuit of quality in grounded theory. *Qualitative*

 Research in Psychology, *18*(3), 305–327.

 https://doi.org/10.1080/14780887.2020.1780357

Choi, B., Tsai, D., McGillivray, C. G., Amedee, C., Sarafin, J.-A., & Silver, B. (2014). Hospital-

 directed feedback to emergency medical services improves prehospital performance.

 Stroke, *45*(7), 2137–2140. https://doi.org/10.1161/STROKEAHA.114.005679

Chun Tie, Y., Birks, M., & Francis, K. (2019). Grounded theory research: A design framework

 for novice researchers. *SAGE Open Medicine*, *7*, 2050312118822927.

 https://doi.org/10.1177/2050312118822927

Cilliers, F. J., Schuwirth, L. W., Adendorff, H. J., Herman, N., & van der Vleuten, C. P. (2010).

 The mechanism of impact of summative assessment on medical students' learning.

Advances in Health Sciences Education, *15*(5), 695–715. https://doi.org/10.1007/s10459-010-9232-9

Corbin, J., & Strauss, A. (2015). *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory* (4th ed.). SAGE Publications, Inc.

Cowley, R. A. (1982). Accidental death and disability: The neglected disease of modern society — Where is the fifth component? *Annals of Emergency Medicine*, *11*(10), 582–585. https://doi.org/10.1016/S0196-0644(82)80437-X

Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed). SAGE Publications.

Creswell, J. W., & Clark, V. L. P. (2018). *Designing and Conducting Mixed Methods Research* (3rd ed.). SAGE Publications.

Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry & research design: Choosing among five approaches* (4th ed.). SAGE Publications, Inc. https://us.sagepub.com/en-us/nam/qualitative-inquiry-and-research-design/book246896

Defining Quality in EMS. (2018). *Prehospital Emergency Care*, *22*(6), 782–783. https://doi.org/10.1080/10903127.2018.1448495

Delbridge, T. R., Bailey, B., Chew, J. L., Conn, A. K. T., Krakeel, J. J., Manz, D., Miller, D. R., O'Malley, P. J., Ryan, S. D., Spaite, D. W., Stewart, R. D., Suter, R. E., & Wilson, E. M. (1998). Ems agenda for the future: Where we are … where we want to be. *Prehospital Emergency Care*, *2*(1), 1–12. https://doi.org/10.1080/10903129808958832

Denzin, N. K., & Lincoln, Y. S. (Eds.). (2018). *The SAGE Handbook of Qualitative Research* (5th ed.). SAGE Publications, Inc.

Dunne, C. (2011). The place of the literature review in grounded theory research. *International Journal of Social Research Methodology*, *14*(2), 111–124. https://doi.org/10.1080/13645579.2010.494930

Dyson, K., Brown, S. P., May, S., Sayre, M., Colella, M., Daya, M. R., Roth, R., & Nichol, G. (2020). Community lessons to understand resuscitation excellence (culture): Association between emergency medical services (EMS) culture and outcome after out-of-hospital cardiac arrest. *Resuscitation*, *156*, 202–209. https://doi.org/10.1016/j.resuscitation.2020.09.020

Eaton-Williams, P., Mold, F., & Magnusson, C. (2020). Exploring paramedic perceptions of feedback using a phenomenological approach. *British Paramedic Journal*, *5*(1), 7–14. https://doi.org/10.29045/14784726.2020.06.5.1.7

Edmondson, A. C., & Lei, Z. (2014). Psychological Safety: The History, Renaissance, and Future of an Interpersonal Construct. *Annual Review of Organizational Psychology and Organizational Behavior*, *1*(1), 23–43. https://doi.org/10.1146/annurev-orgpsych-031413-091305

El Saadawi, G. M., Azevedo, R., Castine, M., Payne, V., Medvedeva, O., Tseytlin, E., Legowski, E., Jukic, D., & Crowley, R. S. (2010). Factors affecting feeling-of-knowing in a medical intelligent tutoring system: The role of immediate feedback as a metacognitive scaffold. *Advances in Health Sciences Education*, *15*(1), 9–30. https://doi.org/10.1007/s10459-009-9162-6

Emergency Medical Technicians (EMT) | National Registry of Emergency Medical Technicians. (n.d.). Retrieved September 18, 2023, from https://nremt.org

FAEMS – Fellowship Program | NAEMSP | NAEMSP. (n.d.). National Association of EMS Physicians. Retrieved September 18, 2023, from https://naemsp.org/membership/faems/

Fishe, J. N., Smotherman, C., Burcham, S., Martin-Gill, C., Richards, C. T., Powell, J. R., Panchal, A. R., & Salloum, R. G. (2023). Measuring the implementation preferences of emergency medical services clinicians using discrete choice experiments. *Prehospital Emergency Care*, *0*(ja), 1–15. https://doi.org/10.1080/10903127.2023.2177365

Fluit, C. v, Bolhuis, S., Klaassen, T., DE Visser, M., Grol, R., Laan, R., & Wensing, M. (2013). Residents provide feedback to their clinical teachers: Reflection through dialogue. *Medical Teacher*, *35*(9), e1485–e1492. https://doi.org/10.3109/0142159X.2013.785631

Foerster, C. R., Tavares, W., Virkkunen, I., & Kämäräinen, A. (2018). A survey of front-line paramedics examining the professional relationship between paramedics and physician medical oversight. *Canadian Journal of Emergency Medicine*, *20*(2), 238–246. https://doi.org/10.1017/cem.2017.36

Foley, G., Timonen, V., Conlon, C., & O'Dare, C. E. (2021). Interviewing as a vehicle for theoretical sampling in grounded theory. *International Journal of Qualitative Methods*, *20*, 1609406920980957. https://doi.org/10.1177/1609406920980957

Garfinkel, E., Tanigawa, M., Margolis, A., & Levy, M. (2020). Implementing a statewide Prehospital sepsis protocol: Perspectives of emergency medical services medical directors. *Cureus*. https://doi.org/10.7759/cureus.10781

Glaser, B. G. (2007). Constructivist Grounded Theory? *Historical Social Research / Historische Sozialforschung. Supplement*, *19*, 93–105. https://www.jstor.org/stable/40981071

Griffiths, J., Schultz, K., Han, H., & Dalgarno, N. (2021). Feedback on feedback: A two-way street between residents and preceptors. *Canadian Medical Education Journal*, *12*(1), e32–e45. https://doi.org/10.36834/cmej.69913

Guba, E. G., & Lincoln, Y. S. (1982). Epistemological and methodological bases of naturalistic inquiry. *ECTJ*, *30*(4), 233–252. https://doi.org/10.1007/BF02765185

Guetterman, T. C., Babchuk, W. A., Howell Smith, M. C., & Stevens, J. (2019). Contemporary approaches to mixed methods–grounded theory research: A field-based analysis. *Journal of Mixed Methods Research*, *13*(2), 179–195. https://doi.org/10.1177/1558689817710877

Gugiu, M. R., Cash, R., Rivard, M., Cotto, J., Crowe, R. P., & Panchal, A. R. (2021). Development and Validation of Content Domains for Paramedic Prehospital Performance Assessment: A Focus Group and Delphi Method Approach. *Prehospital Emergency Care*, *25*(2), 196–204. https://doi.org/10.1080/10903127.2020.1750743

Gunderson, M. R., Florin, A., Price, M., & Reed, J. (2021). Nemsma position statement and white paper: Process and outcomes data sharing between EMS and receiving hospitals. *Prehospital Emergency Care*, *25*(2), 307–313. https://doi.org/10.1080/10903127.2020.1792017

Haddad, G., Li, T., Turrin, D., Owens, C., & Rolston, D. (2021). A descriptive analysis of obstacles to fulfilling the end of life care goals among cardiac arrest patients. *Resuscitation Plus*, *8*, 100160. https://doi.org/10.1016/j.resplu.2021.100160

Hallberg, L. R.-M. (2010). Some thoughts about the literature review in grounded theory studies. *International Journal of Qualitative Studies on Health and Well-Being*, *5*(3), 10.3402/qhw.v5i3.5387. https://doi.org/10.3402/qhw.v5i3.5387

Hattie, J., & Timperley, H. (2007). The Power of Feedback. *Review of Educational Research*, *77*(1), 81–112.

https://www.proquest.com/docview/214113991/abstract/CB92DC2A88054FC3PQ/1

Henderson, M., Ryan, T., & Phillips, M. (2019). The challenges of feedback in higher education. *Assessment & Evaluation in Higher Education*, *44*(8), 1237–1252.

https://doi.org/10.1080/02602938.2019.1599815

Hernandez, M. R., & Wang, J. T. (2022). Feedback in Medical Education is a Journey; Pack More than a Sandwich. *World Federation of Societies of Anesthesiologists*, *36*, 41–46.

Hodell, E., Hughes, S. D., Corry, M., Kivlehan, S., Resler, B., Sheon, N., & Govindarajan, P. (2016). Paramedic perspectives on barriers to prehospital acute stroke recognition. *Prehospital Emergency Care*, *20*(3), 415–424.

https://doi.org/10.3109/10903127.2015.1115933

Hoffman, K., Peterson, S., Fisher, B., & Ehlers, J. (2022, November 4). *2021 NEMSIS National EMS Data Report*. NEMSIS. https://nemsis.org/2021-nemsis-national-ems-data-report/

Horahan, K., & Holland. (2014). *Health Information Technology and Emergency Medical Service*. Health IT Buzz. https://www.healthit.gov/buzz-blog/health-information-exchange-2/health-technology-ems-aspr-launches-campaign-improve-prehospital-care

Huffman, B. M., Hafferty, F. W., Bhagra, A., Leasure, E. L., Santivasi, W. L., & Sawatsky, A. P. (2021). Resident impression management within feedback conversations: A qualitative study. *Medical Education*, *55*(2), 266–274. https://doi.org/10.1111/medu.14360

Hussein, M., Hirst, S., Salyers, V., & Osuji, J. (2014). Using Grounded Theory as a Method of Inquiry: Advantages and Disadvantages. *The Qualitative Report*.

https://doi.org/10.46743/2160-3715/2014.1209

Jensen, F. B., Ladefoged, K. T., Lindskou, T. A., Søvsø, M. B., Christensen, E. F., & Teli, M. (2021). Understanding the effect of electronic prehospital medical records in ambulances: A qualitative observational study in a prehospital setting. *International Journal of Environmental Research and Public Health*, *18*(5), 2330. https://doi.org/10.3390/ijerph18052330

Jeruzal, J. N., Boland, L. L., Frazer, M. S., Kamrud, J. W., Myers, R. N., Lick, C. J., & Stevens, A. C. (2019). Emergency medical services provider perspectives on pediatric calls: A qualitative study. *Prehospital Emergency Care*, *23*(4), 501–509. https://doi.org/10.1080/10903127.2018.1551450

Jonge, L. P. J. W. M. de, Minkels, F. N. E., Govaerts, M. J. B., Muris, J. W. M., Kramer, A. W. M., Vleuten, C. P. M. van der, & Timmerman, A. A. (2022). Supervisory dyads' communication and alignment regarding the use of workplace-based observations: A qualitative study in general practice residency. *BMC Medical Education*, *22*. https://doi.org/10.1186/s12909-022-03395-7

Jug, R., Jiang, X. "Sara," & Bean, S. M. (2019). Giving and Receiving Effective Feedback: A Review Article and How-To Guide. *Archives of Pathology & Laboratory Medicine*, *143*(2), 244–250. https://doi.org/10.5858/arpa.2018-0058-RA

Kapalo, K. A., Bonnell, J. A., & LaViola, J. J. (2020). Outside the Box: Contextualizing User Experience Challenges in Emergency Medical Technician (EMT) and Paramedic Workflows. In C. Stephanidis, G. Salvendy, J. Wei, S. Yamamoto, H. Mori, G. Meiselwitz, F. F.-H. Nah, & K. Siau (Eds.), *HCI International 2020 – Late Breaking Papers: Interaction, Knowledge and Social Media* (pp. 133–150). Springer International Publishing. https://doi.org/10.1007/978-3-030-60152-2_11

Kennedy, S., Kenny, A., & O'Meara, P. (2015). Student paramedic experience of transition into the workforce: A scoping review. *Nurse Education Today*, *35*(10), 1037–1043. https://doi.org/10.1016/j.nedt.2015.04.015

Kornegay, J. G., Kraut, A., Manthey, D., Omron, R., Caretta-Weyer, H., Kuhn, G., Martin, S., & Yarris, L. M. (2017). Feedback in medical education: A critical appraisal. *AEM Education and Training*, *1*(2), 98–109. https://doi.org/10.1002/aet2.10024

Kritek, P. A. (2015). Strategies for Effective Feedback. *Annals of the American Thoracic Society*, *12*(4), 557–560. https://doi.org/10.1513/AnnalsATS.201411-524FR

Kyngäs, H., Kääriäinen, M., & Elo, S. (2020). The trustworthiness of content analysis. In H. Kyngäs, K. Mikkonen, & M. Kääriäinen (Eds.), *The Application of Content Analysis in Nursing Science Research* (pp. 41–48). Springer International Publishing. https://doi.org/10.1007/978-3-030-30199-6_5

Langabeer, J. R., DelliFraine, J., Fowler, R., Jollis, J. G., Stuart, L., Segrest, W., Griffin, R., Koenig, W., Moyer, P., & Henry, T. D. (2014). Emergency medical services as a strategy for improving ST-Elevation myocardial infarction system treatment times. *The Journal of Emergency Medicine*, *46*(3), 355–362. https://doi.org/10.1016/j.jemermed.2013.08.112

Lee, K. B., Vaishnavi, S. N., Lau, S. K. M., Andriole, D. A., & Jeffe, D. B. (2009). Cultural Competency in Medical Education: Demographic Differences Associated With Medical Student Communication Styles and Clinical Clerkship Feedback. *Journal of the National Medical Association*, *101*(2), 116–126. https://www.proquest.com/docview/214029644/abstract/833620DE9ED341F8PQ/1

Lee, M., Phua, D., & Heng, K. (2021). The use of a formative OSCE to prepare emergency medicine residents for summative OSCEs: A mixed-methods cohort study. *International Journal of Emergency Medicine*, *14*, 62. https://doi.org/10.1186/s12245-021-00383-4

Lefroy, J., Watling, C., Teunissen, P. W., & Brand, P. (2015). Guidelines: The do's, don'ts and don't knows of feedback for clinical education. *Perspectives on Medical Education*, *4*(6), 284–299. https://doi.org/10.1007/s40037-015-0231-7

Leggio, W. J., Neeley King, K., Gienapp, A., Bergsten, D., Yu, Y., & Gausche-Hill, M. (2019). Executive summary of educational content from EMS Agenda 2050. *Prehospital Emergency Care*, *23*(5), 708–711. https://doi.org/10.1080/10903127.2019.1584257

Levers, M.-J. D. (2013). Philosophical Paradigms, Grounded Theory, and Perspectives on Emergence. *SAGE Open*, *3*(4), 2158244013517243. https://doi.org/10.1177/2158244013517243

Levitt, H. M. (2021). *Essentials of Critical-Constructivist Grounded Theory Research*. American Psychological Association.

Levy, M., & Gallagher, J. M. (2021). Medical oversight of EMS systems. In *Emergency Medical Services* (pp. 1–15). John Wiley & Sons, Ltd. https://doi.org/10.1002/9781119756279.ch70

Lincoln, E. W., Reed-Schrader, E., & Jarvis, J. L. (2022). Ems Quality Improvement Programs. In *StatPearls*. StatPearls Publishing. http://www.ncbi.nlm.nih.gov/books/NBK536982/

Linder, J. A., & Fox, C. R. (2023). Simplicity Matters—Overengineering Feedback Can Be Counterproductive. *JAMA Internal Medicine*, *183*(3), 220–222. https://doi.org/10.1001/jamainternmed.2022.6528

Liu, A., Duffy, M., Tse, S., Zucker, M., McMillan, H., Weldon, P., Quet, J., & Long, M. (2023). Concurrent versus terminal feedback: The effect of feedback delivery on lumbar puncture skills in simulation training. *Medical Teacher*, *45*(8), 906–912. https://doi.org/10.1080/0142159X.2023.2189540

Locale Classifications and Criteria. (2022). National Center for Education Statistics (NCES) Locale Classifications and Criteria. https://nces.ed.gov/surveys/annualreports/topical-studies/locale/definitions

Lyngby, R. M., Händel, M. N., Christensen, A. M., Nikoletou, D., Folke, F., Christensen, H. C., Barfod, C., & Quinn, T. (2021). Effect of real-time and post-event feedback in out-of-hospital cardiac arrest attended by EMS: A systematic review and meta-analysis. *Resuscitation Plus*, *6*, 100101. https://doi.org/10.1016/j.resplu.2021.100101

Majumder, M. A. (2021, August 18). *The HIPAA Right of Access and Data Sharing | The Regulatory Review*. The Regulatory Review. https://www.theregreview.org/2021/08/18/majumder-hipaa-right-of-access-and-data-sharing/

Malmqvist, J., Hellberg, K., Möllås, G., Rose, R., & Shevlin, M. (2019). Conducting the pilot study: A neglected part of the research process? Methodological findings supporting the importance of piloting in qualitative research studies. *International Journal of Qualitative Methods*, *18*, 1609406919878341. https://doi.org/10.1177/1609406919878341

Margolis, G. S., Romero, G. A., Fernandez, A. R., & Studnek, J. R. (2009). Strategies of high-performing paramedic educational programs. *Prehospital Emergency Care*, *13*(4), 505–511. https://doi.org/10.1080/10903120902993396

Maria, S., Hlushak, A., & Diamond, A. (2019). Development of a tool to monitor paramedic clinical placements: A case study of innovation overcoming tradition. *Australasian Journal of Paramedicine*, *16*, 1–9. https://doi.org/10.33151/ajp.16.644

McGuire, S. S., Luke, A., Klassen, A. B., Myers, L. A., Mullan, A. F., & Sztajnkrycer, M. D. (2021). It's time to talk to prehospital providers: Feedback disparities among ground-based emergency medical services providers and its impact on job satisfaction. *Prehospital and Disaster Medicine*, *36*(4), 486–494. https://doi.org/10.1017/S1049023X21000601

Mears, G. (2015). Data management and information systems. In D. C. Cone, J. H. Brice, T. R. Delbridge, & J. B. Myers (Eds.), *Emergency Medical Services* (pp. 517–525). John Wiley & Sons, Ltd. https://doi.org/10.1002/9781118990810.ch73

Mears, G. (2020, September 3). *Interoperability Has Come a Long Way, but There Is Much to Be Done*. ZOLL Data Systems. https://www.zolldata.com/blog/interoperability-has-come-a-long-way-but-there-is-much-to-be-done

Mills, J., Birks, M., & Hoare, K. (2014). *Qualitative Methodology: A Practical Guide*. SAGE Publications, Inc. https://doi.org/10.4135/9781473920163 (Original work published 2014)

Molloy, E., Boud, D., & Henderson, M. (2020). Developing a learning-centred framework for feedback literacy. *Assessment & Evaluation in Higher Education*, *45*(4), 527–540. https://doi.org/10.1080/02602938.2019.1667955

Morrison, L., Cassidy, L., Welsford, M., & Chan, T. M. (2017). Clinical performance feedback to paramedics: What they receive and what they need. *AEM Education and Training*, *1*(2), 87–97. https://doi.org/10.1002/aet2.10028

Morse, J. M., Barrett, M., Mayan, M., Olson, K., & Spiers, J. (2002). Verification Strategies for Establishing Reliability and Validity in Qualitative Research. *International Journal of Qualitative Methods*, *1*(2), 13–22. https://doi.org/10.1177/160940690200100202

Morse, J. M., Bowers, B. J., Charmaz, K., Clarke, A. E., Corbin, J., Porr, C. J., & Stern, P. N. (2021). *Developing Grounded Theory: The Second Generation Revisited* (2nd ed.). Routledge. https://doi.org/10.4324/9781315169170

Moser, A., & Korstjens, I. (2017). Series: Practical guidance to qualitative research. Part 3: Sampling, data collection and analysis. *The European Journal of General Practice*, *24*(1), 9–18. https://doi.org/10.1080/13814788.2017.1375091

Murdoch-Eaton, D., & Sargeant, J. (2012). Maturational differences in undergraduate medical students' perceptions about feedback. *Medical Education*, *46*(7), 711–721. https://doi.org/10.1111/j.1365-2923.2012.04291.x

Musso, M., Tatum, D., Hamer, D., Hammarlund, R., Son, L., & McMahon, P. (2019). The relationship between grit and resilience in emergency medical service personnel. *Ochsner Journal*, *19*(3), 199–203. https://doi.org/10.31486/toj.18.0144

Myers, K., & Chou, C. L. (2016). Collaborative and Bidirectional Feedback Between Students and Clinical Preceptors: Promoting Effective Communication Skills on Health Care Teams. *Journal of Midwifery & Women's Health*, *61*(S1), 22–27. https://doi.org/10.1111/jmwh.12505

NAEMT. (2022). *NAEMT 2022 National Report EMS Engagement*. NAEMT: Advancing the EMS Profession. https://www.naemt.org/naemt-2022-national-report-ems-engagement

Natesan, S., Jordan, J., Sheng, A., Carmelli, G., Barbas, B., King, A., Gore, K., Estes, M., & Gottlieb, M. (2023). Feedback in medical education: An evidence-based guide to best

practices from the council of residency directors in emergency medicine. *Western Journal of Emergency Medicine*, *24*(3), 479–494. https://doi.org/10.5811/westjem.56544

New International Version. (2011). *1 Corinthians 13:7*. Bible Gateway.

https://www.biblegateway.com/passage/?search=1+Corinthians+13%3A7&version=NIV

(Original work published 1978)

Norcini, J., & Burch, V. (2007). Workplace-based assessment as an educational tool: AMEE Guide No. 31. *Medical Teacher*, *29*(9–10), 855–871.

https://doi.org/10.1080/01421590701775453

O'Hara, R., Johnson, M., Siriwardena, A. N., Weyman, A., Turner, J., Shaw, D., Mortimer, P., Newman, C., Hirst, E., Storey, M., Mason, S., Quinn, T., & Shewan, J. (2015). A qualitative study of systemic influences on paramedic decision making: Care transitions and patient safety. *Journal of Health Services Research & Policy*, *20*(1), 45–53.

https://doi.org/10.1177/1355819614558472

Pannucci, C. J., & Wilkins, E. G. (2010). Identifying and Avoiding Bias in Research. *Plastic and Reconstructive Surgery*, *126*(2), 619–625.

https://doi.org/10.1097/PRS.0b013e3181de24bc

Patterson, R., Standing, H., Lee, M., Dalkin, S., Lhussier, M., Exley, C., & Brittain, K. (2019). Paramedic information needs in end-of-life care: A qualitative interview study exploring access to a shared electronic record as a potential solution. *BMC Palliative Care*, *18*, 108.

https://doi.org/10.1186/s12904-019-0498-2

Pepe, P. E., & Stewart, R. D. (1986). Role of the physician in the prehospital setting. *Annals of Emergency Medicine*, *15*(12), 1480–1483. https://doi.org/10.1016/S0196-0644(86)80948-9

Perona, M., Rahman, M. A., & O'Meara, P. (2019). Paramedic judgement, decision-making and cognitive processing: A review of the literature. *Australasian Journal of Paramedicine*, *16*, 1–12. https://doi.org/10.33151/ajp.16.586

Perrella, A. (2017). Room for improvement: Palliating the ego in feedback-resistant medical students. *Medical Teacher*, *39*(5), 555–557. https://doi.org/10.1080/0142159X.2016.1254757

Ramani, S., Könings, K. D., Ginsburg, S., & van der Vleuten, C. PM. (2019). Feedback Redefined: Principles and Practice. *Journal of General Internal Medicine*, *34*(5), 744–749. https://doi.org/10.1007/s11606-019-04874-2

Ramani, S., Könings, K., Mann, K. V., & van der Vleuten, C. (2017). Uncovering the unknown: A grounded theory study exploring the impact of self-awareness on the culture of feedback in residency education. *Medical Teacher*, *39*(10), 1065–1073. https://doi.org/10.1080/0142159X.2017.1353071

Ramani, S., & Krackov, S. K. (2012). Twelve tips for giving feedback effectively in the clinical environment. *Medical Teacher*, *34*(10), 787–791. https://doi.org/10.3109/0142159X.2012.684916

Redlener, M., Olivieri, P., Loo, G. T., Munjal, K., Hilton, M. T., Potkin, K. T., Levy, M., Rabrich, J., Gunderson, M. R., & Braithwaite, S. A. (2018). National Assessment of Quality Programs in Emergency Medical Services. *Prehospital Emergency Care*, *22*(3), 370–378. https://doi.org/10.1080/10903127.2017.1380094

Reiss, J., & Sprenger, J. (2014). *Scientific Objectivity*. https://plato.stanford.edu/archives/fall2014/entries/scientific-objectivity/

Ritchie, K. C., Sjaus, A., Munro, A., & George, R. B. (2020). An interpretive phenomenological analysis of formative feedback in anesthesia training: The residents' perspective. *BMC Medical Education*, *20*, 493. https://doi.org/10.1186/s12909-020-02402-z

Rosen, M. A., DiazGranados, D., Dietz, A. S., Benishek, L. E., Thompson, D., Pronovost, P. J., & Weaver, S. J. (2018). Teamwork in Healthcare: Key Discoveries Enabling Safer, High-Quality Care. *The American Psychologist*, *73*(4), 433–450. https://doi.org/10.1037/amp0000298

Roshal, J. A., Chefitz, D., Terregino, C. A., & Petrova, A. (2021). Comparison of self and simulated patient assessments of first-year medical students' Interpersonal and Communication Skills (ICS) during Objective Structured Clinical Examinations (OSCE). *BMC Medical Education*, *21*, 107. https://doi.org/10.1186/s12909-021-02540-y

Roze des Ordons, A. L., Gaudet, J., Grant, V., Harrison, A., Millar, K., & Lord, J. (2020). Clinical feedback and coaching – BE-SMART. *The Clinical Teacher*, *17*(3), 255–260. https://doi.org/10.1111/tct.13084

Rukadikar, C., Mali, S., Bajpai, R., Rukadikar, A., & Singh, A. K. (2022). A review on cultural competency in medical education. *Journal of Family Medicine and Primary Care*, *11*(8), 4319–4329. https://doi.org/10.4103/jfmpc.jfmpc_2503_21

Safi-Keykaleh, M., Khorasani-Zavareh, D., Ghomian, Z., & Bohm, K. (2022). A model to explain the challenges of emergency medical technicians' decision making process in emergency situations: A grounded theory. *Journal of Injury and Violence Research*, *14*(1), 53–63. https://doi.org/10.5249/jivr.v14i1.1604

Saraf, S., Bayya, J., Weedon, J., Minkoff, H., & Fisher, N. (2014). The relationship of praise/criticism to learning during obstetrical simulation: A randomized clinical trial. *Journal of Perinatal Medicine*, *42*(4), 479–486. https://doi.org/10.1515/jpm-2013-0247

Sargeant, J. (2019). Future research in feedback: How to use feedback and coaching conversations in a way that supports development of the individual as a self-directed learner and resilient professional. *Academic Medicine*, *94*(11S), S9. https://doi.org/10.1097/ACM.0000000000002911

Sari, S. M., Suhoyo, Y., Mulyana, D., & Claramita, M. (2023). The interactional communication of feedback in clinical education: A focused ethnographic study in a hierarchical and collectivist culture. *Heliyon*, *9*(3), e14263. https://doi.org/10.1016/j.heliyon.2023.e14263

Shah, M. N. (2006). The formation of the emergency medical services system. *American Journal of Public Health*, *96*(3), 414–423. https://doi.org/10.2105/AJPH.2004.048793

Sharkey-Toppen, T., Kurth, J. D., Saadoon, O., Yang, B., Gibbons, E., Powell, J. R., & Panchal, A. R. (2023). State Requirements for Medical Directors in the United States. *Prehospital Emergency Care*, *27*(6), 786–789. https://doi.org/10.1080/10903127.2022.2098435

Shaw, T., Janssen, A., Crampton, R., O'Leary, F., Hoyle, P., Jones, A., Shetty, A., Gunja, N., Ritchie, A. G., Spallek, H., Solman, A., Kay, J., Makeham, M. A., & Harnett, P. (2019). Attitudes of health professionals to using routinely collected clinical data for performance feedback and personalised professional development. *Medical Journal of Australia*, *210*(S6), S17–S21. https://doi.org/10.5694/mja2.50022

Slifkin, R. T., Freeman, V. A., & Patterson, P. D. (2009). Designated medical directors for emergency medical services: Recruitment and roles. *The Journal of Rural Health*, *25*(4), 392–398. https://doi.org/10.1111/j.1748-0361.2009.00250.x

Snowsill, M., Cracolici, G., Wieder, T., & Allen, G. (2023). Facilitated hospital-to-pre-hospital feedback for professional development (PHEM Feedback): A service evaluation using a self-reported questionnaire to understand the experiences of participating pre-hospital clinicians in the first year of operation. *British Paramedic Journal*, *8*(1), 42–52. https://doi.org/10.29045/14784726.2023.6.8.1.42

Staple, L., Carter, A., Jensen, J. L., & Walker, M. (2018). Paramedic learning style preferences and continuing medical education activities: A cross-sectional survey study. *Journal of Allied Health*, *47*(1), 51–57.

https://www.proquest.com/docview/2018571864/abstract/D9ED62F0296E49CDPQ/1

Stoecklein, H. H., & Youngquist, S. T. (2018). The Role of Medical Direction in Systems of Out-of-Hospital Cardiac Arrest. *Cardiology Clinics*, *36*(3), 409–417. https://doi.org/10.1016/j.ccl.2018.03.008

Strauss, A. T., Morgan, C., Khuri, C. E., Slogeris, B., Smith, A. G., Klein, E., Toerper, M., DeAngelo, A., Debraine, A., Peterson, S., Gurses, A. P., Levin, S., & Hinson, J. (2022). A patient outcomes–driven feedback platform for emergency medicine clinicians: Human-centered design and usability evaluation of linking outcomes of patients (loop). *JMIR Human Factors*, *9*(1), e30130. https://doi.org/10.2196/30130

Tavares, W., Eppich, W., Cheng, A., Miller, S., Teunissen, P. W., Watling, C. J., & Sargeant, J. (2020). Learning Conversations: An Analysis of the Theoretical Roots and Their Manifestations of Feedback and Debriefing in Medical Education. *Academic Medicine*, *95*(7), 1020–1025. https://doi.org/10.1097/ACM.0000000000002932

The Role of the Physician Medical Director in Emergency Medical Services Leadership. (2023). American College of Emergency Physicians. https://www.acep.org/patient-care/policy-

statements/the-role-of-the-physician-medical-director-in-emergency-medical-services-

leadership

Timonen, V., Foley, G., & Conlon, C. (2018). Challenges When Using Grounded Theory: A

Pragmatic Introduction to Doing GT Research. *International Journal of Qualitative

Methods*, *17*(1), 1609406918758086. https://doi.org/10.1177/1609406918758086

USDA ERS - Data Documentation and Methods. (2019). U.S. DEPARTMENT OF

AGRICULTURE. https://www.ers.usda.gov/data-products/rural-definitions/data-

documentation-and-methods/

Valente, J., Johnson, N., Edu, U., & Karliner, L. S. (2020). Importance of Communication and

Relationships: Addressing Disparities in Hospitalizations for African-American Patients

in Academic Primary Care. *Journal of General Internal Medicine*, *35*(1), 228–236.

https://doi.org/10.1007/s11606-019-05392-x

van de Ridder, J. M. M., McGaghie, W. C., Stokking, K. M., & Cate, O. T. J. (2015). Variables

that affect the process and outcome of feedback, relevant for medical training: A meta-

review. *Medical Education*, *49*(7), 658–673. https://doi.org/10.1111/medu.12744

van de Ridder, J. M. M., Stokking, K. M., McGaghie, W. C., & ten Cate, O. T. J. (2008). What is

feedback in clinical education? *Medical Education*, *42*(2), 189–197.

https://doi.org/10.1111/j.1365-2923.2007.02973.x

Van Der Leeuw, R. M., Teunissen, P. W., & Van Der Vleuten, C. P. M. (2018). Broadening the

Scope of Feedback to Promote Its Relevance to Workplace Learning. *Academic

Medicine*, *93*(4), 556–559. https://doi.org/10.1097/ACM.0000000000001962

Van Der Vleuten, C. P. M., & Schuwirth, L. W. T. (2005). Assessing professional competence: From methods to programmes. *Medical Education*, *39*(3), 309–317. https://doi.org/10.1111/j.1365-2929.2005.02094.x

Vasileiou, K., Barnett, J., Thorpe, S., & Young, T. (2018). Characterising and justifying sample size sufficiency in interview-based studies: Systematic analysis of qualitative health research over a 15-year period. *BMC Medical Research Methodology*, *18*(1), 148. https://doi.org/10.1186/s12874-018-0594-7

Vigil, N. H., Grant, A. R., Perez, O., Blust, R. N., Chikani, V., Vadeboncoeur, T. F., Spaite, D. W., & Bobrow, B. J. (2019). Death by Suicide—The EMS Profession Compared to the General Public. *Prehospital Emergency Care*, *23*(3), 340–345. https://doi.org/10.1080/10903127.2018.1514090

Vithalani, V., Sondheim, S., Cornelius, A., Gonzales, J., Mercer, M. P., Burton, B., & Redlener, M. (2022). Quality Management of Prehospital Airway Programs: An NAEMSP Position Statement and Resource Document. *Prehospital Emergency Care*, *26*(sup1), 14–22. https://doi.org/10.1080/10903127.2021.1989530

Waldrop, D. P., Waldrop, M. R., McGinley, J. M., Crowley, C. R., & Clemency, B. (2020). Managing Death in the Field: Prehospital End-of-Life Care. *Journal of Pain and Symptom Management*, *60*(4), 709-716.e2. https://doi.org/10.1016/j.jpainsymman.2020.05.004

Wallenstein, J., & Ander, D. (2015). Objective Structured Clinical Examinations Provide Valid Clinical Skills Assessment in Emergency Medicine Education. *Western Journal of Emergency Medicine: Integrating Emergency Care with Population Health*, *16*(1). https://doi.org/10.5811/westjem.2014.11.22440

Watling, C., Driessen, E., Van Der Vleuten, C. P. M., Vanstone, M., & Lingard, L. (2013). Beyond individualism: Professional culture and its influence on feedback. *Medical Education*, *47*(6), 585–594. https://doi.org/10.1111/medu.12150

Watling, C. J., & Ginsburg, S. (2019). Assessment, feedback and the alchemy of learning. *Medical Education*, *53*(1), 76–85. https://doi.org/10.1111/medu.13645

WebMD. (2023). *What Is a Paramedic?* WebMD. https://www.webmd.com/a-to-z-guides/what-is-a-paramedic

Weinstein, D. F. (2015). Feedback in Clinical Education: Untying the Gordian Knot. *Academic Medicine*, *90*(5), 559–561. https://doi.org/10.1097/ACM.0000000000000559

Williams, K.-L., Dunne, C., & Parsons, M. H. (2019). Emergency Department Presentation of a Patient with a Severe Upper Gastrointestinal Bleed: A Simulation Case for Training Emergency Medicine Residents. *Cureus*, *11*(1), e3908. https://doi.org/10.7759/cureus.3908

Wilson, C., Howell, A.-M., Janes, G., & Benn, J. (2022a). The role of feedback in emergency ambulance services: A qualitative interview study. *BMC Health Services Research*, *22*(1), 296. https://doi.org/10.1186/s12913-022-07676-1

Wilson, C., Howell, A.-M., Janes, G., & Benn, J. (2022b). The role of feedback in emergency ambulance services: A qualitative interview study. *BMC Health Services Research*, *22*(1), 296. https://doi.org/10.1186/s12913-022-07676-1

Wilson, C., Janes, G., Lawton, R., & Benn, J. (2021). The types and effects of feedback received by emergency ambulance staff: Protocol for a systematic mixed studies review with narrative synthesis. *International Journal of Emergency Services*, *10*(2), 247–265. https://doi.org/10.1108/IJES-09-2020-0057

Wilson, C., Janes, G., Lawton, R., & Benn, J. (2023a). Feedback for emergency ambulance staff: A national review of current practice informed by realist evaluation methodology. *Healthcare*, *11*(16), Article 16. https://doi.org/10.3390/healthcare11162229

Wilson, C., Janes, G., Lawton, R., & Benn, J. (2023b). Types and effects of feedback for emergency ambulance staff: A systematic mixed studies review and meta-analysis. *BMJ Quality & Safety*. https://doi.org/10.1136/bmjqs-2022-015634

Yarris, L. M., Fu, R., LaMantia, J., Linden, J. A., Hern, H. G., Lefebvre, C., Nestler, D. M., Tupesis, J., & Kman, N. (2011). Effect of an Educational Intervention on Faculty and Resident Satisfaction with Real-time Feedback in the Emergency Department. *Academic Emergency Medicine : Official Journal of the Society for Academic Emergency Medicine*, *18*(5), 504–512. https://doi.org/10.1111/j.1553-2712.2011.01055.x

Appendix A

IRB Approval Letter

LIBERTY UNIVERSITY.
INSTITUTIONAL REVIEW BOARD

December 21, 2023

Stephen Taylor
Marybeth Mitcham

Re: IRB Exemption - IRB-FY23-24-853 FEEDBACK IN EMERGENCY MEDICAL SERVICES: A MISSING CORNERSTONE

Dear Stephen Taylor, Marybeth Mitcham,

The Liberty University Institutional Review Board (IRB) has reviewed your application in accordance with the Office for Human Research Protections (OHRP) and Food and Drug Administration (FDA) regulations and finds your study to be exempt from further IRB review. This means you may begin your research with the data safeguarding methods mentioned in your approved application, and no further IRB oversight is required.

Your study falls under the following exemption category, which identifies specific situations in which human participants research is exempt from the policy set forth in 45 CFR 46:104(d):

Category 2.(iii). Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording) if at least one of the following criteria is met:
The information obtained is recorded by the investigator in such a manner that the identity of the human subjects can readily be ascertained, directly or through identifiers linked to the subjects, and an IRB conducts a limited IRB review to make the determination required by §46.111(a)(7).

For a PDF of your exemption letter, click on your study number in the My Studies card on your Cayuse dashboard. Next, click the Submissions bar beside the Study Details bar on the Study details page. Finally, click Initial under Submission Type and choose the Letters tab toward the bottom of the Submission Details page. Your information sheet and final versions of your study documents can also be found on the same page under the Attachments tab.

Please note that this exemption only applies to your current research application, and any modifications to your protocol must be reported to the Liberty University IRB for verification of continued exemption status. You may report these changes by completing a modification submission through your Cayuse IRB account.

If you have any questions about this exemption or need assistance in determining whether possible modifications to your protocol would change your exemption status, please email us at irb@liberty.edu.

Sincerely,
G. Michele Baker, PhD, CIP
Administrative Chair
Research Ethics Office

Appendix B

Recruitment Flyer for Online Surveys

Research Participants Needed

Feedback in Emergency Medical Services

- Are you a US EMS 9-1-1 System Medical Director, Assistant Medical Director, or paramedic with two or more years of experience in their current position or credentialing level with transport capability?

- Is your service community population less than 250,000 people?

If you answered **yes** to either of the above questions,
you may be eligible to participate in a research study.

The purpose of the study is to identify the current perspectives and use of outcomes feedback in EMS in the US, and I am inviting you to participate in a research study.

Participants will be asked to complete an online survey, which will take approximately 15-20 minutes to complete. Participation will be completely anonymous, and no personal or identifying information will be collected.

Participants should not expect to receive a direct benefit or compensation from participating in this study. Benefits to society include discovering the benefits of outcomes feedback for patients, EMS, and EMS system medical directors by sharing patient outcomes.

If you would like to participate and have not already done so, scan the attached QR code or use the hyperlink to direct you to the. Instructions will be supplied to obtain an electronic copy of the online consent form.

A consent document is provided on the first page of the survey. Contact the researcher to request a copy. The consent document contains additional information about my research. After you have read the consent form, please select "agree to participate" to proceed to the survey. You may opt out of the survey anytime by simply closing your browser before completing the survey.

Contact the researcher if you have any questions:
Stephen Taylor, a doctoral candidate in the Allied Health School of Health Sciences at Liberty University, is conducting this study. Please contact Stephen Taylor at [contact info] for more information.
Liberty University IRB – 1971 University Blvd., Green Hall 2845, Lynchburg, VA 24515

Appendix C

Verbal Interview Recruitment

Hello (EMS Professional),

As a graduate student in the College of Health Sciences at Liberty University, I am conducting research to understand further the role of outcomes feedback in EMS and data sharing as part of the requirements for a PhD. The research aims to identify the current perspectives and use outcomes feedback in EMS in the US, and I am inviting you to participate in a research study.

Participants must be participants must work in a 911 EMS system with transport capability, working in a community population of less than 250,000 citizens, and have two (2) or more years of experience as a Paramedic, EMS medical director, or assistant medical director providing EMS oversight. Participants, if willing, will be asked to participate in a voice-recorded interview session of ten questions, which should take approximately 45 minutes to complete the procedure interview. Names will be assigned a pseudonym to protect your confidentiality, and any other identifying information you provide will remain confidential. Interviewees will be asked to review developed themes and confirm agreement within a six-month period.

Would you like to participate? Yes, that's great; what time can we meet to conduct the interview? No, I understand. Thank you for your time.

A consent document will be given to you at the time of the interview. The consent document contains additional information about my research. If you choose to participate, you will need to read and sign the consent document at the time of the interview. Consent will be reviewed and obtained before conducting the in-person interview.

Thank you for your time. Do you have any questions?

This study's researcher is **Stephen Taylor, Paramedic, PhD(c), FAEMS**. If you have questions later, **you are encouraged** to contact him at [contact info]. You may also contact the researcher's faculty sponsor, Dr. Marybeth Mitcham, at █████████@liberty.edu. If you have any questions or concerns regarding this study and want to talk to someone other than the researcher, **you are encouraged** to contact the IRB. Our physical address is Institutional Review Board, 1971 University Blvd., Green Hall Ste. 2845, Lynchburg, VA, 24515; our phone number is 434-592-5530, and our email address is irb@liberty.edu.

Appendix D

Survey Research Consent

Title of the Project: Feedback in Emergency Medical Services: A Missing Cornerstone
Principal Investigator: Stephen Taylor, Doctoral Candidate, Department of Health Sciences, Liberty University.

You are invited to participate in a research study. To participate, you must work in an EMS 911 system serving less than 250,000 residents and be a paramedic with two (2) or more years of experience or an EMS medical director or assistant medical director providing EMS oversight. Taking part in this research project is voluntary.

Please read this entire form and ask questions before deciding whether to participate in this research. Read to the bottom to participate.

Background Information: This study aims to gain perspectives on the importance of paramedics' and medical directors' feedback and the potential effects of providing the feedback necessary to improve patient outcomes and paramedic resiliency. Furthermore, this study will also seek medical director's perceptions of their roles as medical directors providing feedback and how they envision their feedback's value, quality, and quantity while providing oversight of their EMS systems. Apart from the medical director's furnishing feedback, paramedic clinicians may receive some feedback, and this study will solicit their views on the value and importance of having feedback processes in place.

Procedures: If you agree to be in this study, I will ask you to do the following:
1. You will be asked a series of questions regarding your involvement with your EMS system and feedback. The survey will take approximately 15 minutes.

Risks: The expected risks from participating in this study are minimal, which means they are equal to the risks you would encounter in everyday life.

Benefits: Participants should not expect to receive a direct benefit from participating in this study. Benefits to society include discovering the benefits of outcomes feedback for patients, EMS, and EMS system medical directors by sharing patient outcomes.

Anonymity: The records of this study will be kept private. The surveys are completely anonymous. Published reports will not include any information that will make it possible to identify any subject. Research records will be stored securely, and only the researcher will have access to the records.

- Data will be stored on a password-locked computer, and transcripts will be stored in a locked drawer. After three years, all electronic records will be deleted, and all hardcopy records will be shredded.

Compensation: Participants will not be compensated for participating in this study.

Voluntary Nature of the Study: Participation in this study is voluntary. Your decision whether to participate will not affect your current or future relations with Liberty University. If you decide to participate, you are free not to answer any questions or withdraw at any time prior to submitting the survey without affecting any relationships.

How to Withdraw from the Study If you choose to withdraw after the interview, please close the survey and your browser before completing the survey. Should you choose to withdraw, data collected from you will be destroyed immediately and will not be included in this study.

Contacts and Questions: The researcher conducting this study is Stephen Taylor. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact him at [contact info]. You may also contact the researcher's faculty sponsor, Dr. Marybeth Mitcham, at ███████@liberty.edu.

If you have any questions or concerns regarding this study and want to talk to someone other than the researcher, **you are encouraged** to contact the IRB. Our physical address is Institutional Review Board, 1971 University Blvd., Green Hall Ste. 2845, Lynchburg, VA, 24515; our phone number is 434-592-5530, and our email address is irb@liberty.edu.

Disclaimer: The Institutional Review Board (IRB) is tasked with ensuring that human subjects research will be conducted in an ethical manner as defined and required by federal regulations. The topics covered and viewpoints expressed or alluded to by student and faculty researchers are those of the researchers and do not necessarily reflect the official policies or positions of Liberty University.

Statement of Consent: Before agreeing to be part of the research, please be sure that you understand what the study is about.

You may contact the researcher for a copy of this document for your records. If you have any questions about the study later, you can contact the researcher using the information provided above.

I have read and understood the above information. I have asked questions and have received answers. I consent to participate in the study.

   [Survey questions>>]

Appendix E

Consent to Participate in Research Interviews

Title of the Project: Feedback in Emergency Medical Services: A Missing Cornerstone
Principal Investigator: Stephen Taylor, Doctoral Candidate, Department of Health Sciences, Liberty University.

You are invited to participate in a research study. To participate, you must work in a 911 EMS system with transport capability, work in a community population of less than 250,000 citizens, and have two (2) or more years of experience as a Paramedic, EMS Medical Director, or assistant Medical Director providing EMS oversight. Taking part in this research project is voluntary.

Please read this entire form and ask questions before deciding whether to participate in this research. Read to the bottom to participate.

Background Information: This study aims to gain perspectives on the importance of paramedics' and medical directors' feedback and the potential effects of providing the feedback necessary to improve patient outcomes and paramedic resiliency. Furthermore, this study will also seek medical director's perceptions of their roles as medical directors providing feedback and how they envision their feedback's value, quality, and quantity while providing oversight of their EMS systems. Apart from the medical director's furnishing feedback, paramedic clinicians may receive some feedback, and this study will solicit their views on the value and importance of having feedback processes in place. Additionally, the timeliness, quality, and quantity of feedback received and the method(s) of feedback that they view would be most beneficial and ideally prudent within the EMS system.

Procedures: If you agree to be in this study, I will ask you to do the following:
2. The interview will take approximately 45 minutes. During the interview session, you will be asked 10 open-ended questions, which will be audio-recorded for transcription and should last approximately 40-50 minutes. Interviews will take place in-person or online with MS Teams or ZOOM.
3. If you choose to participate in the interview process and upon your agreement, you may be contacted for review of thematic developments after the interview process. This would take place via phone or video conferencing software.
4. Interview participants may be asked to review developed themes and confirm agreement within a six-month period.

Risks: The expected risks from participating in this study are minimal, which means they are equal to the risks you would encounter in everyday life.

Benefits: Participants should not expect to receive a direct benefit from participating in this study. Benefits to society include discovering the benefits of outcomes feedback for patients, EMS, and EMS system medical directors by sharing patient outcomes.

Confidentiality: The records of this study will be kept private. The interviews will be kept confidential. Data from interviews that may contain names will be redacted and pseudonyms substituted after transcribing the transcripts of the interview. Names will not be stored with data. Any identifying information shared during the interview will be redacted in the transcription process. Published reports will not include any information that will make it possible to identify a subject. Research records will be stored securely, digital records password-protected, and paper files locked in a file cabinet or drawer and kept in a secure fashion. Only the researcher will have access to the records.

- Participant interviews will be kept confidential by replacing names with **pseudonyms**.
- Interviews will be conducted in person in a location or online where others will not easily overhear the conversation.
- Data collected from you may be used in future research studies. If data collected from you are reused, any information that could identify you will be removed beforehand.
- Data will be stored on a <u>password-locked computer</u>, and transcripts will be stored in a <u>locked file cabinet or drawer</u>. After three years, all electronic records will be deleted, and all hardcopy records will be shredded.
- Recordings will be stored on a <u>password-locked computer</u> until participants have reviewed and confirmed the accuracy of the transcripts and then deleted/erased. The researcher and committee chairman will have access to these recordings if requested.

Compensation: Participants will not be compensated for participating in this study.

Voluntary Nature of the Study: Participation in this study is voluntary. Your decision whether to participate will not affect your current or future relations with Liberty University. If you decide to participate, you are free not to answer any questions or withdraw at any time without affecting any relationships.

How to Withdraw from the Study If you choose to withdraw during the interview simply notify the researcher and the interview will cease. After the interview, please notify the researcher at the email address/phone number in the next paragraph. Should you choose to withdraw, data collected from you will be destroyed immediately upon notification and will not be included in this study.

Contacts and Questions: The researcher conducting this study is Stephen Taylor. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact him at [contact info]. You may also contact the researcher's faculty sponsor, Dr. Marybeth Mitcham, at ████████@liberty.edu.

If you have any questions or concerns regarding this study and want to talk to someone other than the researcher, **you are encouraged** to contact the IRB. Our physical address is Institutional Review Board, 1971 University Blvd., Green Hall Ste. 2845, Lynchburg, VA, 24515; our phone number is 434-592-5530, and our email address is irb@liberty.edu.

Disclaimer: The Institutional Review Board (IRB) is tasked with ensuring that human subjects research will be conducted in an ethical manner as defined and required by federal regulations. The topics covered, and viewpoints expressed or alluded to by student and faculty researchers are those of the researchers and do not necessarily reflect the official policies or positions of Liberty University.

By signing this document, you are agreeing to be in this study. Make sure you understand what the study is about before you sign. You will be given a copy of this document for your records. The researcher will keep a copy with the study records. If you have any questions about the study after you sign this document, you can contact the study team using the information provided above.

Statement of Consent: *I have read and understood the above information. I have asked questions and have received answers. I consent to participate in the study.*

☐ The researcher has my permission to audio-record me during the interview session as part of my participation in this study. _____ (Initials)

_____
Printed Subject Name

_____
Signature & Date

Appendix F

Medical Directors Survey Questions

This study's researcher is **Stephen Taylor, Paramedic, PhD(c), FAEMS**. If you have questions later, **you are encouraged** to contact him at [contact info]. You may also contact the researcher's faculty sponsor, Dr. Marybeth Mitcham, at ▮▮▮▮▮▮@liberty.edu. If you have any questions or concerns regarding this study and want to talk to someone other than the researcher, **you are encouraged** to contact the IRB. Our physical address is Institutional Review Board, 1971 University Blvd., Green Hall Ste. 2845, Lynchburg, VA, 24515; our phone number is 434-592-5530, and our email address is irb@liberty.edu.

Patient information and outcomes feedback is necessary for clinical medicine. The researcher wants to collect data related to this process to understand further how this process works, recommend improvements, and understand the perspective of medical directors and EMS, particularly paramedics.

This 26-question survey has <u>22</u> multiple-choice, yes/no, short responses, and <u>four</u> brief narrative questions. The survey will take approximately 20 minutes to complete.

Advance arrow (→) to proceed to consent agreement.

Definition: *"Patient outcomes feedback" is defined as general patient information encompassing the emergency department assessment, treatment, diagnosis(es), admission or discharge decisions, and the overall outcome of the patient's experience during their hospital encounter.*

Patient Outcomes Feedback

1. Are you EMS board-certified or board-eligible ABEM?

    a. Yes

    b. No – Are you EM board-certified or board-eligible with ABEM?

        i. EM board-eligible ABEM

        ii. EM board-certified ABEM

        iii. Not boarded

2. Does your EMS software provide bidirectional (two-way) links to patient outcomes?

    a. I do not know

    b. No

    c. Yes

3. How many years have you been involved in EMS at your current level?

    a. _____ years (round greater than six months to next year)

4. What is your sex?

    a. male

    b. female

    c. other

    d. prefer not to disclose

5. What is the population of your service area?

    a. greater than 250,000

    b. 150,000 to 249,999

    c. 50,001 to 149,999

    d. less than 50,000

6. What type of 911 agency with transport capability are you primarily engaged with?

    a. fire EMS

    b. government, third service non-FD

    c. private agency hospital

    d. tribal

    e. other

7. What is your annual call volume?

    a. less than 5,000

    b. 5001 – 10,000

    c. 10,001 -20,000

    d. 20,001 – 35,000

    e. 35,001-50,000

    f. >50,000

8. Does your EMS software provide bidirectional (two-way) links to patient outcomes?

    a. I do not know

    b. No

    c. Yes

9. Describe your views on the value of having a patient medical record before EMS begins treating the patient. RQ1

    a. Short answer

10. What value do you place on patient outcomes feedback for paramedics? RQ2

    a. Extremely important

    b. Very important

    c. Moderately important

    d. Slightly important

    e. Not at all important

11. What type of feedback do you provide <u>most often</u> to paramedics? **Rank Order** (1 most frequent, 7 - I don't receive feedback) RQ2

    a. Corrective Feedback: addresses and rectifies errors or mistakes in performance or behavior.

    b. Formative feedback: provided during learning to guide improvement and development.

    c. Summative Feedback: provided at the end of a learning point or task to evaluate overall performance or achievement.

    d. Procedural Feedback: emphasizes the process or steps followed rather than the outcome.

    e. Protocol Adherence Feedback: compliance with established protocols, guidelines, or procedures.

    f. General Knowledge Feedback: addresses gaps in overall understanding or knowledge base.

    g. I do not give feedback.

12. What are your thoughts or experiences on sharing patient information with EMS regarding patient outcomes feedback? RQ1

    a. Short answer

13. Explain any barriers you face providing patient outcomes feedback to EMS clinicians.

    RQ2

    a. Short answer

14. What percentage of ALL the feedback you give paramedics "positive" feedback? RQ2

    a. _____ % positive (number only)

15. What method do you use to deliver outcomes feedback to paramedics the most? RQ2

    a. written (memo, letter)

    b. email

    c. face-to-face (verbal)

    d. none

    e. other

16. Rate your level of agreement with the following statement: My post-graduate training

    adequately prepared me to deliver effective feedback to paramedics. RQ3

    a. Strongly disagree

    b. Disagree

    c. Neutral

    d. Agree

    e. Strongly agree

17. Describe the specific acute calls and high-risk medical procedures for which you

    regularly furnish feedback on patient outcomes. RQ4

    a. Short answer

18. How would you grade the importance of "**how paramedics view patient outcomes feedback.**" RQ 4

    a. Extremely important

    b. Very important

    c. Moderately important

    d. Slightly important

    e. Not important at all

19. Ideally, how quickly should paramedics receive patient outcomes feedback after ED discharge? RQ4

    a. 1-2 days

    b. 3-5 days

    c. 6-10 days

    d. 11+ days

20. When providing disciplinary action, is patient outcomes feedback attached? RQ 4

    a. No, patient outcomes feedback is provided separately.

    b. Yes, patient outcomes feedback is provided with disciplinary action.

    c. Sometimes, patient outcomes feedback is provided with disciplinary action.

    d. Do not send patient outcomes feedback at all.

21. What has been your experience providing outcomes feedback of patient cases "regularly" to paramedics from a call? RQ4

    a. Very difficult

    b. Difficult

    c. Neutral

    d. Easy

    e. Very easy

    f. Do not provide patient outcomes feedback.

22. Describe what you would consider as the best method to assure "regular and timely" patient outcomes feedback to EMS. RQ1

    a. Short answer

23. As a physician, would you desire follow-up on your patients who have been transferred post-admission to a higher level of care (ICU or transferred to another hospital) for more specialized care? RQ1

    a. Always

    b. Most of the time

    c. About half the time

    d. Sometimes

    e. Never

    End of Survey [All completed surveys]

Thank you for your participation in this survey.

If you are interested in participating in the interview process, click this link to a new page to contact the researcher. [link to researcher]

This study's researcher is **Stephen Taylor, Paramedic, PhD(c), FAEMS**. If you have questions later, **you are encouraged** to contact him at [contact info] text is OK. You may also contact the researcher's faculty sponsor, Dr. Marybeth Mitcham, at ██████████@liberty.edu.

Appendix G

Paramedic Survey Questions

This study's researcher is **Stephen Taylor, Paramedic, PhD(c), FAEMS**. If you have questions later, **you are encouraged** to contact him at [contact info]. You may also contact the researcher's faculty sponsor, Dr. Marybeth Mitcham, at ████@liberty.edu. If you have any questions or concerns regarding this study and want to talk to someone other than the researcher, **you are encouraged** to contact the IRB. Our physical address is Institutional Review Board, 1971 University Blvd., Green Hall Ste. 2845, Lynchburg, VA, 24515; our phone number is 434-592-5530, and our email address is irb@liberty.edu.

Patient information and outcomes feedback is necessary for clinical medicine. The researcher wants to collect data related to this process to understand further how this process works, recommend improvements, and understand the perspective of medical directors and EMS, particularly paramedics.

This 24-question survey has 20 multiple-choice, yes/no, short answers, and four brief narrative questions. The survey will take approximately 15 minutes to complete.

Advance arrow (→) to proceed to consent agreement.

Definition: *"Patient outcomes feedback" is defined as general patient information encompassing the emergency department assessment, treatment, diagnosis(es), admission or discharge decisions, and the overall outcome of the patient's experience during their hospital encounter.*

Patient Outcomes Feedback

1. What is your highest credentialed /licensing level in EMS?

    a. Physician / Medical Director

    b. Paramedic

2. How many years have you been involved in EMS at your current level?

    a. _____ years (round greater than six months to next year)

3. What is your sex?

    a. male

    b. female

    c. other

    d. prefer not to disclose

4. What is the population of your service area?

    a. greater than 250,000

    b. 150,000 to 249,999

    c. 50,001 to 149,999

    d. less than 50,000

5. What type of 911 agency with transport capability are you primarily engaged with?

    a. fire EMS

    b. government, third service non-FD

    c. private agency

    d. hospital

    e. tribal

f. other

6. How many patient encounters in a week do **"you"** average?

   a. _____ (number only)

7. What is your annual call volume?

   a. less than 5,000

   b. 5001 – 10,000

   c. 10,001 -20,000

   d. 20,001 – 35,000

   e. 35,001-50,000

   f. >50,000

8. Does your EMS software provide bidirectional (two-way) links to patient outcomes?

   a. I do not know

   b. No

   c. Yes

9. Do you receive outcomes feedback on all your critical patients? RQ2

   a. Always

   b. Most of the time

   c. About half the time

   d. Sometimes

   e. Never

10. How quickly do you receive feedback on patient outcomes? RQ2 (cash et al)

    a. Within one day

    b. 2-4 days

    c. 5-7 days

    d. 8-14 days

    e. Greater than 15 days

    f. Never

11. What type of feedback do you receive the <u>most often</u>? **Rank Order** (1 most frequent, 7 -

    I don't receive feedback) RQ2

    f.   Corrective Feedback: addresses and rectifies errors or mistakes in performance or

       behavior.

    g. Formative feedback: provided during learning to guide improvement and

       development.

    h. Summative Feedback: provided at the end of a learning point or task to evaluate

       overall performance or achievement.

    i. Procedural Feedback: emphasizes the process or steps followed rather than the

       outcome.

    j. Protocol Adherence Feedback: compliance with established protocols, guidelines,

       or procedures.

    k. General Knowledge Feedback: addresses gaps in overall understanding or

       knowledge base.

    l. I do not give feedback.

12. How quickly would you want to receive feedback on patient outcomes on critical patients

    after hospital discharge? RQ2

    a. 1-2 days

    b. 3-5 days

    c. 6-10 days

    d. 11+ days

13. Describe your views on the value of having a patient's electronic medical

    record <u>before</u> EMS begins treating the patient. (free text field) RQ2

    a. Short answer

14. What percentage of "positive" feedback do you receive? RQ2

    a. _____ % positive (number only)

15. How often did you receive comments in the areas for opportunity or improvement during

    your clinical education? (action plans)

    a. Never

    b. Sometimes

    c. About half the time

    d. Most of the time

    e. Always

16. Did your initial clinical education provide you with enough feedback and skills practice

    to prepare you to have the knowledge and skill base to care for the acutely ill patients you

    encounter? RQ3

    a. Extremely adequate

    b. Somewhat adequate

    c. Neither adequate nor inadequate

    d. Somewhat inadequate

    e. Extremely inadequate

17. How important would you view the system medical director's participation in providing

   outcomes feedback? RQ 4

       a. Extremely important

       b. Very important

       c. Moderately important

       d. Slightly important

       e. Not important at all

18. Describe **<u>at least two</u>** patient encounters you "regularly" want to receive feedback on

   patient outcomes. RQ4 (other than stemi, stroke, trauma, cardiac arrest)

       a. Short answer

19. Overall, how often do you believe that patient outcome feedback for paramedics is linked

   to disciplinary actions? RQ4

       a. Most often

       b. Sometimes

       c. Not very often

       d. Never

20. How does not knowing a patient's outcome affect you?

       a. Short answer

21. What method would you prefer to receive outcomes feedback regularly? (Rank top 2)

   RQ4

       a. Email

       b. Electronic/digital in ePCR software

       c. Written

      d.   Verbal

      e.   Other -add a comment below.

22. Describe what you would consider as the best process to ensure "regular and timely"

    patient outcomes feedback to EMS clinicians.

      a.   Short answer

23. How would you describe the best way to distribute feedback and disciplinary action on

    patient outcomes? RQ4

      a.   Short answer

    End of Survey [All completed surveys]

Thank you for your participation in this survey.

    If you are interested in participating in the interview process, click this link to a new page to contact the researcher. [link to researcher]

    This study's researcher is **Stephen Taylor, Paramedic, PhD(c), FAEMS**. If you have questions later, **you are encouraged** to contact him at [contact info]; texting is ok. You may also contact the researcher's faculty sponsor, Dr. Marybeth Mitcham, at ▮▮▮▮▮▮▮@liberty.edu.

Appendix H

Medical Director's Interview Questions

race, gender
Date, time, and location of interview:

Definition: *"Patient outcomes feedback" is defined as general patient information encompassing the emergency department assessment, treatment, diagnosis(es), admission or discharge decisions, and the overall outcome of the patient's experience during their hospital encounter.*

Research Problem Statement
This qualitative grounded theory study aims to discover/understand the views of EMS for feedback outcomes within the EMS system. At this stage in the research, the views/processes of outcomes feedback can be defined as how outcomes feedback impacts EMS's role in advancing the knowledge base, assessment skills, education, correct diagnosis on patient encounters, and job satisfaction.
Questions

1. What are your experiences with providing patient outcomes feedback provided to EMS personnel? RQ1

2. What are your views on the value(s) for EMS providers receiving patient outcomes feedback? RQ2

3. Who would be the most competent person to send out patient outcomes feedback for formative knowledge-based learning? RQ2

4. How would you describe the way you currently deliver feedback to EMS? RQ2

5. What are your experiences with feedback conveyed during the clinical portion of your medical education? RQ3

6. Who provides feedback on patient outcomes in the ED? RQ4

7. What process of communication would you prefer to deliver outcomes feedback? RQ4

8. What would be your thoughts on the types of patient encounters that (EMS) would be advantageous to increasing the knowledge base for future application and improving outcomes? RQ4

9. Describe the significance of accessing patient's information, such as their medical history, current medications, and prior care, before beginning EMS patient care. RQ4

10. What additional suggestions regarding feedback to improve outcomes do you have?

Thank you for your time, and if further information is needed, may I follow up with you?

Appendix I

Paramedic Interview Questions

Age, race, gender
Date, time, and location of interview:

Definition: *"Patient outcomes feedback" is defined as general patient information encompassing the emergency department assessment, treatment, diagnosis(es), admission or discharge decisions, and the overall outcome of the patient's experience during their hospital encounter.*

Research Problem Statement
This qualitative grounded theory study aims to discover/understand the views of EMS for feedback outcomes within the EMS system. At this stage in the research, the views/processes of outcomes feedback can be defined as how outcomes feedback impacts EMS's role in advancing the knowledge base, assessment skills, education, correct diagnosis on patient encounters, and job satisfaction.

Questions
1. What are your experiences with receiving patient outcomes feedback provided to EMS personnel? RQ1

2. What are your views on the value(s) for EMS providers receiving patient outcomes feedback? RQ2

3. Who would be the most competent person to send out patient outcomes feedback for formative knowledge-based learning? RQ2

4. How would you describe the way you currently receive feedback? RQ2

5. What are your experiences with feedback received during the clinical portion of your paramedic medical education? RQ3

6. Who provides feedback on patient outcomes to you in your system? RQ4

7. What process of communication would you prefer to receive outcomes feedback? RQ4

8. What would be your thoughts on the types of patient encounters that (EMS) would be advantageous to increasing the knowledge base for future application and improving outcomes? RQ4

9. Describe the significance of accessing patient's information, such as their medical history, current medications, and prior care, before beginning EMS patient care. RQ4

10. What additional suggestions regarding feedback to improve outcomes do you have?

Thank you for your time, and if further information is needed, may I follow up with you?

Appendix J

Recruitment: Social Media

ATTENTION EMS Colleagues: I am conducting research as part of the requirements for a doctorate in Health Sciences at Liberty University. This study aims to gain perspectives on the importance of paramedics' and medical directors' feedback and the potential effects of providing the feedback necessary to improve patient outcomes and paramedic resiliency. To participate, you must work in a 911 EMS system with transport capability, work in a community population of less than 250,000 citizens, and have two (2) or more years of experience as a paramedic, EMS medical director, or assistant medical director providing EMS oversight. Participants will be asked to provide insights on their practice and views of their EMS experience with patient outcomes. There is no compensation for participating in the research. The survey is voluntary and anonymous and should take about 20 minutes to complete. A consent document will be provided on the first page of the survey. Please review this page, and if you agree to participate, click the "proceed to survey" button at the end. Please click here (hyperlink to online survey). If you want to participate in the interview process (about 45 minutes) and meet the study criteria, please contact the researcher by clicking a separate link at the end of this post. To contact the researcher, click here: [hyperlink to contact researcher].

Facebook

ATTENTION EMS: I am conducting research as part of the requirements for a Doctor of Health Sciences degree at Liberty University. This study aims to gain perspectives on the importance of paramedics' and medical directors' feedback and the potential effects of providing the feedback necessary to improve patient outcomes and paramedic resiliency. To participate in a research study, you must work in an EMS 9-1-1 system serving less than 250,000 residents, with two (2) or more years of experience serving as a Paramedic or an EMS medical director or assistant medical director providing oversight. There is no compensation for participating in the research. Taking part in this research survey is voluntary and anonymous. Participants will be asked to complete an anonymous online survey, which should take 15-20 minutes. A consent document will be provided on the first page of the survey. Please review this page, and if you agree to participate, click the "proceed to survey" button at the end. Click here to access the survey [survey hyperlink]. If you want to participate in the interview process and meet the study criteria, please contact the researcher by clicking a separate link at the end of this post. To contact the researcher, click here: [hyperlink to contact researcher].

Twitter

Are you a 9-1-1 Paramedic or EMS medical director or assistant medical director with 2 or more years of experience serving a population of less than 250,000 citizens? Click here for more information to participate in a research study on outcomes feedback anonymously: [insert link to anonymous survey]

Appendix K

Coding Process

Core Category: Importance of Outcomes Feedback

Outcomes Feedback Importance

    Improved Patient Outcomes

    Improve Critical Thinking and Decision Making

    Reduce Moral Injury and Improve Resiliency

        Closure

        Mitigate Frustration and self-doubt

        Value to Patient Encounters

        Proper Notification of Outcomes

            Reducing third-party notifications (Facebook, Obituaries, Family)

Challenges Providing Feedback

    Distance

        Geography

        Quantity

    Negatively Perceived

        Timely, Regular, Constructive

        Build Knowledge Base

        Positive Reinforcement, Confidence, Value

        Fear to Engage MD

    Hospitals

        HIPAA

        Data Security

        Unidirectional

Timely Access to Patient Medical Records

    Improve Prehospital Diagnosis

    End-of-life Care

    Aligned with Family Beliefs

    Current Medical History

Enhance Data Analysis

    Improve QA/QI Processes

    Focused Continuing Education

    Improve Patient Outcomes

Opportunities in Education

    Develop Soft Skills with Difficult Encounters, Emotional Support

    Lifelong Learner

    Feedback Learning, Giver – Receiver

Feedback Delivery Systems

    Face-to-Face

        Bidirectional Communication

        Building Trust and Credibility

    Electronic Communication

        Dashboards allow for Self-seeking

        Increase MD Time for Focused Information, Systems Improvement

    Data-sharing Medical Records Access

        MD Access to EMS Hospital Data

        Promote self-learning

        Realized Part of the Patient Care Team

Appendix L

Audit Trail

Date	Action	Reflexive Actions Taken
Week	IRB Approval (12/21/23)	Plan for upcoming dissemination of Materials
1/7/2024	Conducted pilot studies on surveys	MDs and paramedics reviewed questions for ambiguity and clarity
1/10/2024	Study commenced	Posted flyers and social media at a conference
1/13/2024	3 Interviews	initial coding and memoing
1/20/2024	1 Interview	Surveys active responses, initial coding, memoing
1/27/2024	2 Interviews	initial coding and memoing
2/3/2024	5 Interviews	initial coding and memoing
2/10/2024	1 Interview	initial coding and memoing - reflexivity and recoding
2/17/2024	1 Interview	initial coding and memoing
2/24/2024	1 Interview	initial coding, memoing, and category development, similar themes developing
3/2/2024	2 Interviews (Feb)	initial coding, memoing, recoding, and category development (no new thematic development noted)
3/10/2024	Survey intake completed	Review transcripts and interview recordings, compiling summaries from transcripts. Lots of Reflection this week
3/17/2024	Survey data pulled, demographics, variable creation	Theoretical reflexivity and thematic development with peer checking, memoing, Nvivo instrumental in data aggregation, imported variable into SPSS
3/24/2024	Survey data analysis - descriptive & demographics	Theoretical reflexivity and thematic development Note: Lots of data – daunting at first, took extraordinary amounts of time sifting through the data.
3/31/2024	Data merging	Reflexivity and emotional stoppage from similar experiences
4/7/2024	Data merging synthesis	Writing and compiling interviews reconciling thematic developments and core category
4/14/2024	Emailed results draft ch4	Remain reflexive and challenge ideas
4/21/2024	revise draft Chapter 4	Remain reflexive and challenge ideas

4/28/2024	revise draft Chapter 4	Remain reflexive and challenge ideas
5/5/2024	Chapter 5 development	Remain reflexive and challenge ideas
5/12/2024	Chapter 5 development	Remain reflexive and challenge ideas
5/19/2024	Chapter 5 development	Remain reflexive and challenge ideas
5/26/2024	Manuscript development Ch 1-4	Remain reflexive and challenge ideas
6/2/2024	Manuscript development Ch 1-5	Remain reflexive and challenge ideas
6/7/2024	Manuscript development Ch 1-5	Editing and corrections