CONTINUING PROFESSIONAL EDUCATION NEEDS ASSESSMENTS IN EMERGENCY MEDICAL SERVICES

by

SCOTT RYAN FRASARD

(Under direction of Wendy E. A. Ruona)

ABSTRACT

Emergency Medical Services (EMS) continuing professional education (CPE) continues to focus on standardized programs and a complex system of education credits for recertification/relicensure rather than whether the CPE produced any changed in patient outcomes. While EMS preservice education has developed significantly since the 1980's with the inclusion of advancements in adult education best practices, EMS CPE has not followed suit. Though various individuals and organizations have called for more localization in CPE efforts, EMS still witnesses a lack of meaningful CPE designed to address specific learning needs unique to the local area or an individual prehospital care provider.

This study was designed to understand EMS educators' practices of conducting needs assessments to identify and prioritize CPE for prehospital care providers. This quantitative study utilized a 97-item survey instrument to examine four major aspects that impact CPE topic selection (*sources of information, factors that influence CPE decision making, strategies to collect data,* and *strategies to analyze data*) with a comprehensive catalog of CPE offered by EMS educators.

EMS educators identified as Training Officers with the National Registry of Emergency Medical Technicians (NREMT) served as the population for this study. From the population, 634 responses were deemed usable, resulting in an 18.4% adjusted return rate. Respondents ranged in age from 20 to 68, with a mean of 44.1, were primarily Caucasian (93.8%), male (75.2%), certified/licensed at the paramedic level (75.0%) for between 1 to 37 years (mean = 16.12 years), and Nationally Registered (71.4%). Most had some college, but no degree (31.2%) and did have some formal training in adult education and needs assessment.

The responses revealed that recertification/relicensure is the primary driver of EMS CPE. EMS educators have a dependence on mandates and recommendations from others over extent data, which biases CPE decision-making. EMS educators do recognize the limitations that scarce resources play in what ultimately CPE is conducted while restricted EMS educator authority may prevent evidence-based CPE needs from being conducted. Finally, while needs assessments strategies were frequently used, they may not be used to their fullest.

INDEX WORDS: Emergency Medical Services, EMS, continuing education, continuing professional education, learning needs, needs assessment, EMS education, EMS educator, EMS instructor

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by

SCOTT RYAN FRASARD

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Major Professor:	Wendy E. A. Ruona
Committee:	Laura Bierema James Cannady Thomas Valentine

Electronic Version Approved:

Maureen Grasso
Dean of the Graduate School
The University of Georgia
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DEDICATION

I dedicate this dissertation to the two most important people in my life: my mother, Patricia Frasard, and my wife, Tanya Harris.

It was my mother's belief in my academic abilities that provided the motivation to pursue this degree. Despite being held back in high school and taking ten years after I barely graduated to go to college, she never wavered from her belief that I could achieve whatever I set out to accomplish. Every "I'm so proud of you" helped me move forward when all I wanted to do was quit. I love you, Mom!

My wife provided me with the support I needed to successfully complete my dissertation. She gave me countless hours of help in thinking through concepts, considering alternatives, looking up resources, editing my writing, and working with me to produce the final document you are holding in your hands. She provided me with the strength and encouragement to push through, especially in the dark moments, when quitting seemed an option. Without a doubt, I would not have finished this dissertation and degree without her unwavering love and support. I love you, Tanya!

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I will never forget Dr. Laura Bierema's question to me as I was nearing the end of my master's degree: "Have you ever thought about a Ph.D.?" Until then, I had never considered continuing beyond the master's level. Her seemingly insignificant question became a life-changing inquiry for which I thank her.

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the lens of both an academic and a paramedic helped me clarify a number of issues in the development of my study.

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Finally, I would like to thank my family and friends for their support throughout the dissertation process.

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CHAPTER 1

INTRODUCTION

Continuing professional education (CPE) is a vital part of any profession, and a continuous challenge. All professions struggle with issues such as the extremely rapid rate of knowledge expansion, making "it virtually impossible for practitioners to keep up with new information and current skills" (Queeney, 2000, p. 383). To complicate this matter is the dwindling funds available for CPE. Escalating costs and diminishing budgets require continuing professional educators to be more selective in the use of scarce resources to produce and conduct CPE that will achieve effective results (Queeney, 1995). In order to design and develop effective CPE, very specific instructional topics aimed at addressing specific knowledge or skill gaps are necessary. No longer can program planners simply provide programs for professionals. Instead, they must move towards being a major contributor to support ongoing professional competence (Queeney, 2000). To do this, identifying and prioritizing educational needs is paramount. One field that is extremely susceptible to advances and change in knowledge is the medical profession, where people's lives are at stake.

Knowledge in the medical field is constantly changing and advancing. Bloom (2005) notes that, "New and effective healthcare interventions continue to become available" (p. 383) and this continuous production of new knowledge requires a steady stream of CPE to keep healthcare professionals up to date on the latest and most relevant knowledge available. Additionally, Cooke, Irby, Sullivan, and Ludmerer (2006) note that not only has "the knowledge base for medical practice hypertrophied… but the delivery of care has also become vastly more complicated, and the expectations of the public [are]

higher" (p. 1341). These vastly changing aspects of clinical care and the overall healthcare delivery system has made the practice of healthcare extremely complex and demands continuous learning for all the specialized focus areas within the system.

The healthcare system in the United States is a collection of many specialty areas, one of which involves the transportation of people to hospitals and other healthcare facilities by trained medical specialists. Just like a chain, each link in the system is dependent on all other links for its overall strength and effectiveness. The Emergency Medical Services (EMS) system is a critical link in this chain of healthcare. Annually, millions of people access healthcare services via EMS. In 2003, 16.2 million people were transported to hospitals by EMS and made up a significant portion of the 114 million emergency department (ED) visits (Larkin, Claassen, Pelletier & Camargo, 2006). Many of those seen each year in EDs place a heavy reliance on EMS for access to healthcare, especially the elderly, without which they would have no way to get to definitive care. In 2004, 34.9% of all EMS transports to EDs involved patients age 65 and older (McCaig & Nawar, 2006). This number will only increase as baby boomers join the retired.

Modern EMS can be traced back to the ancient Greeks and Romans where injured soldiers were removed from the battlefields in chariots (Institute of Medicine, 2007). This was repeated throughout history, but it was not until the twentieth century that many of the foundations of modern EMS began. Since then, many advances in the delivery of prehospital care of the sick and injured have been made that clearly impacted the mortality and morbidity of those who have needed EMS. A few of these advances include the splinting of broken extremities, advent and use of mobile external defibrillators, cardiopulmonary resuscitation (CPR), and pharmaceutical intervention for acute cardiac

conditions (Stewart, 2006). The greatest development came in 1966 with the landmark publication, *Accidental death and disability: The neglected disease of modern society* (National Academy of Sciences, National Research Council (NAS/NRC), 1966), which emphasized the importance of properly equipped ambulances, properly trained ambulance staff, and an effective system of ambulance deployment. This report outlined 29 recommendations to address the epidemic problem of death on America's highways, 11 of which applied directly to EMS. Of these 11, one recommendation specifically noted the importance of developing a nationally accepted text, training aids, and courses for emergency personnel (NAS/NRC, 1996). This report is considered the "White Paper" of EMS as it outlined much of what are now the EMS systems we are accustomed to in the United States. With such drastic changes and evolutions with the EMS system, the necessity for formalizing the EMS education system became imperative.

Initially, the educational focus in EMS was centered on preservice preparation. Through the Highway Safety Act in 1966, funding was made available to develop a national EMS education curriculum and develop more extensive advanced life support training programs (Institute of Medicine, 2007). The education developments that followed in the 1970s and 1980s included a national standard curriculum for EMTs (to include the intermediate and paramedic levels), the development of a first responder program for non-EMS personnel, and the establishment of organizations that promoted EMS education and educational efforts. Later, in the 1990s and into the new millennium, a greater emphasis was placed on improving preservice education including a shift from a standardized curriculum to *core content* and program accreditation in order to provide for preservice program flexibility at the local level. These aspects were viewed as important

for EMS to move forward with changes in the field as well as a desire to move into a professional status within the medical community. Problematic, however, was that at no point during all these developments was there an equivalent advance in EMS educator development, specifically in the area of CPE. This issue is significant in that CPE represents the majority of the learning that a prehospital care provider will participate in during his or her career and where standardized curricula traditionally does not provide sufficient or appropriate learning opportunities beyond the accumulation of credit hours for recertification or relicensure.

The CPE of prehospital care providers following initial certification/licensure is a critical aspect of EMS education. Given both the ever-changing nature of prehospital medicine and the complexity of medicine in general, it is vital that prehospital care providers are current in their field, especially considering that patients' lives are at stake. Additionally, it is not feasible or practical to include every conceivable lesson that an prehospital care provider will need to know over the lifetime of his or her career into a preservice education program. As such, CPE has been tied to the recertification/ relicensure of prehospital providers so that, ideally, each individual would continue to develop knowledge, skills, and abilities over the course of their career. This is illustrated by the fact that forty-six out of 50 states now require National Registry certification as the means to certify/recertify.

However, it cannot be assumed that CPE opportunities exist that can provide a *valuable* contribution to a prehospital care provider's current reservoir of knowledge. Part of the role of the EMS educator is to decide on and create CPE opportunities. Unfortunately, though, the EMS educational system has not invested the time and

resources to fully develop its CPE aspect of EMS education as it has the preservice education aspect.

The programs that EMS educator typically advertise and conduct for the purposes of CPE are based in part or wholly on the National Highway Transportation Safety Administration's (NHTSA) refresher curricula for the EMT and paramedic. These curricula were in response to EMS educators' demand for a program that could be taught to practicing prehospital care providers for the purposes of fulfilling the CPE requirements for recertification/relicensure (NHTSA, 2001a). These curricula provided the EMS educator with content and a course of instruction designed to refresh current knowledge. The authors acknowledged that these curricula were designed to maintain competence and knowledge via content review and not for furthering education. The authors were also careful to stress that these curricula are *not* designed for CPE despite its development being in response to such a demand. These curricula were designed after an analysis of the prehospital care providers' scope of practice, and regionalized, localized, or individualized training needs were not (and could not) be addressed in such a standardized curriculum.

In addition to standardized refresher curricula, additional CPE opportunities are available to the EMS educator and prehospital care provider in the form of proprietary CPE courses offered by a variety of host organizations. These courses, such as PreHospital Trauma Life Support (PHTLS) and Advanced Cardiac Life Support (ACLS), are usually one or two days (8-16 hours) in length, provide detailed information on the specific topic as well as practical application of skills, and offer industry-recognized certification for those who participate in the program. The content of each course

typically includes lecture or discussion on material that is both a review and new as compared to each level's preservice education. For the entry-level Prehospital care providers who choose to take these courses, they are exposed to new information that is generally taught to more advanced-trained providers and thus broadens the knowledge base of these participants. Those that are certified to teach these courses must have previously participated in and successfully passed the course and then participated in an instructor course, where the administrative policies and procedures for the course and the host organization are presented. Some of these courses also include teaching demonstrations as a practical application of teaching skills, but not always. Each course that an EMS educator becomes certified to teach allows that educator yet another opportunity to provide more variety within his or her CPE offerings. However, this still does not account for identifying the need for the topic, something that these standardized courses do not incorporate into their developmental curricula. EMS educators still have to decide what course(s) to teach based on local or individual need even though the course curricula is already designed and developed. For this, an EMS educator would have to conduct his or her own needs assessment to select and then develop customized training that addresses identified educational needs.

While EMS educators have been trained to be excellent presenters of content and have produced competent prehospital care providers, for the most part they have not been formally trained in how to conduct a needs assessment as part of an overall instructional design process, something that is critical in developing customized and needs-specific training. The *EMS Education Agenda for the Future* (NHTSA, 2000) noted that this critical step of identifying important and relevant training content is usually relegated to

the individual EMS educator's "perceived needs rather than practice analysis and research" (p. 14). By not including such formal training in any EMS educator development curricula on needs assessment, the EMS educator is left guessing as to what CPE to offer. Additionally, there is a greater risk of offering CPE that will not fill the gaps that are assumed, thereby ultimately resulting in not delivering on the purpose and promise of continuing education in EMS—that is, educated and continuously improving medics to deliver top-quality patient care.

The importance of how CPE needs are identified and prioritized by the EMS educator cannot be overstated. The way in which the EMS educator goes about conducting a needs assessment strongly influences the process and the outcome. This in turn forms the foundation of CPE and provides the direction in planning and developing CPE. Unfortunately, however, defining what a need is and how to assess for it is poorly understood among adult educators (Aherne, Lamble & Davis, 2001). No single, widely accepted definition of "need" exists in the adult education (AE), instructional design (ID), or human resource development (HRD) literature. Types of "need" in the educational context vary and include such needs as felt needs, expressed needs, comparative needs, real needs, shared needs, blind needs, normative needs, and undiscovered needs. Just as there is a wide range of "needs" that can be identified, so are there numerous processes for assessing needs. In the AE and CPE literature, these processes are typically focused on either identifying potential CPE topics or negotiating which topics are taught first.

While many definitions of what constitutes a "need" and a "needs assessment" exists, some basic concepts of each are critical and yet are still not incorporated into any EMS educator development curricula. Overall, one can say that a need represents a state

of being where a gap exists between what is known and not known. Yet, the EMS educator's perspective and knowledge as it relates to educational needs plays a key role in influencing the definition of "need." To make the decision about what CPE is necessary, EMS educators must understand the differences between needs, wants, and demands. Additionally, EMS educators need to be able to discern between educational needs and non-educational needs and when CPE is an appropriate intervention.

Further, EMS educators should understand the complexities of using decision-making tools which result in determining CPE offerings that best meet the educational needs of the individual prehospital care provider (Queeney, 1995). A well-designed needs assessment can provide EMS educators with solid data from which better decisions can be made. One thing that is agreed upon by most in AE, ID, and HRD is that a needs assessment, generally speaking, is a subjective act where a value judgment is made by someone (Cervero & Wilson, 2006; Igarashi, Suveges, & Moss, 2002). This judgment may or may not include the collection and analysis of related data. Of the various definitions of need assessments, one aspect does transcend all – that education can play a key role in satisfying the need (Caffarella, 2002). Since EMS educators are not formally trained on conducting needs assessments, as indicated by nationally recognized instructor curricula, how does this knowledge make its way into the knowledge base of EMS educators and instructional planners? Or, does it? This is an important issue in that the identification and prioritizing of CPE needs is the most important first step in developing sound programs that have any hope of impacting the lives of the people who rely on EMS for part of their healthcare needs.

Problem Statement

The EMS system is a critical component in the overall healthcare continuum. In 2003 alone, 114 million people were seen in emergency rooms throughout the United States, 16.2 million of who were transported there by EMS (Larkin, Claassen, Pelletier & Camargo, 2006). Many advances in prehospital medicine have brought with them the need for continuous learning by prehospital care providers. As a result, initial training programs have been improved over the years to address the learning needs of those entering the field. The same organization that developed these curricula has also developed curricula for CPE as well. The broad diversity of service deployment models and characteristics of the communities served throughout the United States, however, dictates that a localized approach to CPE be employed in order to be optimally effective (KBEMS, 2007; ODHS, EMSTS, 2006) and to better ensure that each EMS professional is more qualified to effectively meet the demands of the job.

The system for preservice EMS education has advanced, becoming more formalized and producing highly knowledgeable and competent prehospital care providers. The CPE of these same prehospital care providers after initial certification/licensure, however, has not followed suit. This is unfortunate because CPE represents the greatest amount of education prehospital care provider receive throughout their EMS career and it is also required for relicensure. While EMS educators do provide CPE, these programs typically are not based on a systematic assessment of educational need (NHTSA, 2000) and are, instead, too often based on standardized CPE curricula. EMS educators are trained to present curricula developed on predetermined topics in a "canned" curriculum that is often out of date (NHTSA, 2000), and falls quite short of the

espoused idea of an optimally effective localized approach. A comparison of initial EMS education curricula with available standardized CPE curricula demonstrates a repetition of initial content with a lack of new information. Further we know from best theory and research in AE, ID, and HRD that training is most effective when based on a rigorous needs assessment. Without the *right* CPE at the *right* time in the *right* context for the *right* prehospital care provider, training will likely become a fruitless activity with little or no practical value. Having more knowledge about needs assessment would enable EMS educators to accurately identify the learning needs of individual prehospital care providers thus developing more relevant CPE and having a potentially greater impact on patient outcomes. And yet, even with ample encouragement from the EMS field and evidence from AE, ID, and HRD, no curriculum for training EMS educators specifically addresses the issue of needs assessment to inform the design of CPE programs.

Comparing the current understandings and practices in EMS education against the best theories and practices from the fields of AE, ID, and HRD will identify gaps that could benefit from adopting such theories and practices. However, a comparison regarding needs and needs assessment practices cannot yet be made, as it is unknown what EMS educators turn to for information for a needs assessment, how that information is collected, and what strategies are currently used to make decisions about CPE. Further, we do not have evidence regarding what factors influence the CPE offering selections. While a universal approach to conducting a needs assessment in EMS is improbable, understanding where the field currently stands on the matter is a necessary first step to bring about needed change.

Purpose and Research Questions

The purpose of this study is threefold: (a) to explore how EMS educators currently make decisions regarding what CPE to provide, (b) what affects those decisions, and (c) to describe the current range of CPE offerings available to prehospital care providers. Specifically, the study is guided by the following questions:

1. What sources of information do EMS educators utilize to identify and prioritize potential CPE offerings?
2. What influences affect the needs assessment processes EMS educators use to identify and prioritize potential CPE offerings?
3. What strategies do EMS educators utilize to collect and analyze data about potential CPE offerings?
4. What CPE is offered by EMS educators?

Significance of the Study

This study will contribute to the knowledge base of CPE by mapping EMS educators' current understanding and practices around curriculum decisions (what the fields of AE, ID, and HRD would call needs assessment). Knowing the sources CPE planners turn to for information regarding CPE needs and the strategies used to obtain the information, especially in the EMS context, will contribute to the literature a baseline measure of what is actually transpiring in the field. Finally, this study will contribute to the knowledge base by exploring the factors that influence why and how often rigorous and systematic needs assessments are conducted for the purposes of identifying and prioritizing CPE, something that is not very prevalent in the current literature.

The findings of this study could offer practical significance to a variety of stakeholders within and associated with EMS to include federal, state, and local EMS education policy makers, individual EMS educators, and professional organizations. Potential practical significance to each of the stakeholders include: (a) an accurate description of the practices of instructional planners in terms of curriculum design, (b) a comparative analysis of EMS educators' practices in CPE decision making and best practices in AE, ID, and HRD, and (c) a description of the dynamics and forces that drive and affect CPE in the EMS context.

A rich description of the current practices of EMS educators regarding how CPE topics are identified and prioritized is essential to improving EMS education. This will help answer the question of the extent to which the field relies on ready-made, prescriptive curricula or how much EMS educators do their own curriculum design and development. Though this sounds simplistic, it is an essential piece of knowledge that is necessary in order to address a bigger need – targeting CPE to fill specific gaps in knowledge, skill, and performance. Without this description, the field is missing a necessary element to connect education to patient outcomes. Merely following a curriculum which may be outdated or one which is not designed to meet a specific need is doomed to being marginally effective at best. Using the knowledge gained from this study, stakeholders in EMS education would be able to contribute to improving the effectiveness of CPE and "…improve the empirical basis of EMS education" (NHTSA, 2000, p. 14).

Another practical significance for the results of this study is to have a comparative analysis of EMS educators' actual practices in CPE decision making and the best

practices in AE, ID, and HRD in a single source. It will help us see first-hand what is being done in EMS education compared side-by-side with what experts in the various fields of adult education advocate are the best practices for effective adult learning. From this, EMS educators will be able to determine what steps are necessary to improve CPE in order for meaningful learning to take place. Further, by examining current practices against best practices, opportunities for designing instructor development curricula could be realized and be made EMS-context specific.

Finally, having a description of what the dynamics that drive and affect CPE in the EMS context will provide the EMS educator with valuable information regarding barriers, enablers, and opportunities to make CPE have the most impactful influence on patient care possible. Though much has been written about the politics of CPE program planning (Cervero & Wilson, 2006), the EMS field has its own set of unique circumstances that are best understood by those in the field. Having a context-specific description of these circumstances and how each element drives CPE will arm stakeholders with useful information from which strategic program planning can take place in order to maximize learning outcomes.

Whether on the front lines of EMS education in the form of an instructor or instructional planner, or on the oversight end of the spectrum with policy and certification/licensure concerns in mind, these practical applications of study results could impact many lives. By establishing a point of reference for a much-needed dialogue in the EMS education community, changes in EMS CPE can begin to take shape and be based on a sound understanding of where we are currently as compared to where we want to be in the future.

Definition of Terms

The following terms are defined for the purposes of clarity in this study:

CPE: Educational activities conducted after preservice education and initial certification/licensure as an EMS provider. The purpose of these activities include furthering knowledge and skills bases, advancing professional stature for the individual, orientation to new processes or equipment, or remediation of deficient knowledge and/or skills.

Educational need: The difference between a desired state of knowledge or skill and the current assessed state of knowledge or skill that can be influenced with CPE.

Emergency Medical Service: A system of healthcare providers and transportation methods to move victims of traumatic and medical emergencies from the location of the incident to a facility of definitive care.

Emergency Medical Technician (EMT): A prehospital care provider who, with 110-400 hours of training (basic and intermediate, respectively) (NREMT, 2008a; NREMT, 2008b; NREMT, 2008b), assesses patients and provides medical care of various levels of invasiveness. With many variations of EMT levels state to state, this definition includes care less than what a paramedic can provide. Examples of care include basic airway management, oxygen administration, cardiopulmonary resuscitation, splinting, newborn delivery, limited pharmaceutical administration, and limited electrical and intravenous therapy.

Needs assessment: An activity or activities employed to collect and analyze relevant information to enable EMS educators to identifying and prioritize instructional topics for educational activities within the CPE realm.

Non-educational need: The difference between a desired state of something other than knowledge or skill that can best be influenced by something other than CPE.

Paramedic: A prehospital care provider who, with 1,000 or more hours of preservice training (NREMT, 2008a; NREMT, 2008b; NREMT, 2008b), assesses patients and provides medical care the same as EMTs but in addition, provides more advanced care. Examples of care in addition to EMTs include invasive airway management, electrocardiography, a broad range of pharmaceutical administration and electrical therapy. The hallmark of this level is a greater emphasis on and use of critical clinical decision making skills.

Prehospital care provider: An emergency medical technician (EMT) or paramedic.

Preservice education: Educational activities conducted prior to certification/licensure to participate in a given profession. The outcome of this type of education is to prepare practitioners with a baseline level of cursory education to practice within his or her chosen profession.

CHAPTER 2

REVIEW OF THE LITERATURE

This chapter's purpose is to outline the theoretical perspective underlying this study and review the related research. The purpose of this study is threefold: (a) to explore how EMS educators currently make decisions regarding what CPE to provide, (b) what affects those decisions, and (c) to describe the current range of CPE offerings available to prehospital care providers. Specifically, the study is guided by the following questions:

1. What sources of information do EMS educators utilize to identify and prioritize potential CPE offerings?
2. What influences affect the needs assessment processes EMS educators use to identify and prioritize potential CPE offerings?
3. What strategies do EMS educators utilize to collect and analyze data about potential CPE offerings?
4. What CPE is offered by EMS educators?

This review of related research in the literature is presented in four major sections. The first section reviews the pertinent literature regarding CPE in the EMS, physician-oriented, and nursing-oriented fields, with a focus on discovery of key issues in each field's CPE. The second section includes an overview of needs assessment literature outside the EMS context. Attention is paid to definitions of needs and needs assessments, the importance of conducting such assessments, descriptions of various assessment models that have been developed, and strategies for data collection, data analysis, and

decision making. Finally, I review the relevant literature on needs assessment specific to the EMS field, specifically the lack of needs assessment as it relates to CPE.

Continuing Professional Education in Emergency Medical Services

Emergency Medical Service (EMS) workers provide an invaluable service to the citizens and visitors of the jurisdictions they cover. According to Burt, McCaig and Valverde (2006), approximately 16.2 million visits to a hospital emergency department (ED) in 2003 were from ambulance transports. Of these, almost 70% of these transports were the result of unintentional injuries. A report published by the Center for Disease Control in 2002 found that 161,269 deaths occurred in the United States as the result of injuries, with 81% of these deaths being caused by (in descending order): motor vehicle traffic (27.3%), firearm (18.8%), poisoning (16.4%), fall (10.6%), and suffocation (7.9%) (Miniño, Anderson, Fingerhut, Boudreault & Warner, 2006). On the front line of care for these victims of injury are the prehospital providers that make up the workforce of EMS systems across the nation.

EMS is a dynamic field, as is medicine in general, and prehospital care providers must continue to learn as the industry changes. Since 1985, the length of the paramedic curriculum has grown to a minimum of 1000-1200 hours of instruction, which includes didactic, clinical, and field experience (NHTSA, 1998). This growth in program hours is the result of, and a contributor to, the expanded role of the paramedic, dictating a greater need for better and more effective CPE in order to maintain skills as well as increase the depth and breadth of knowledge and skills of those paramedics currently in practice. Unfortunately, very little evidence-based research provides any sound foundation for the decisions as to what topics to teach, how to teach those topics, or what impact (if any)

these educational efforts have on patient outcomes. In recent years, the pediatric and geriatric patient populations have received attention as to the effectiveness of its respective training, but this does not necessarily provide support for current CPE practices across the continuum of prehospital care. Topics such as airway management predominate the literature, but fall under the same umbrella of not comprehensively representing the entire paramedic curriculum for a sufficient CPE focus. Further, evaluation processes have not yielded sufficient evidence to support claims of changes in paramedic behaviors after participating in CPE programs.

Issues in EMS Continuing Professional Education

As the field of EMS continues to develop, the issues surrounding CPE become more pronounced. Among the most prevalent issues in the literature are: (a) access to CPE, (b) connecting CPE to patient outcomes, and (c) achievement following training. These three issues are well documented in the EMS literature and thus attract the most dialogue. The latter two issues can be directly impacted by employing a needs assessment process, especially as it relates to performance of both individuals within EMS service and the overall EMS service. An EMS educator needs to incorporate a sound needs assessment process into the CPE regimen so that he or she can, "…determine what, if any, impact CPE has had on the enhancement and improvement of professional practice" (Queeney, 2000, p. 384).

Access to Continuing Professional Education

Where a prehospital care provider can find and attend CPE has remained a difficult problem to solve. Providers of CPE specific to EMS include the employers, technical schools/colleges, and private providers. Technology and distributive education

have become key components in access to CPE, both in the delivery and recipient of CPE.

In the field of EMS, employers of prehospital care providers are considered the first-choice provider of CPE for their employees. When a prehospital care provider works for an EMS organization, there is an expectation by the employee that the service will provide the necessary education for recertification/relicensure and changes in operations. Two issues, however, exist with an EMS service offering employees CPE – service size and available resources; these two issues are not mutually exclusive. Larger EMS services typically have staff with the certifications necessary to teach CPE programs requiring instructor certification or have staff dedicated to providing educational services. Additionally, financial resources are more readily available in these services, as is access to facilities and equipment for educational purposes. These services are also among the busier services with a vast amount of experience and expertise available to enhance education activities. Smaller EMS services typically lack these opportunities in sufficient quantity or quality, limiting access to CPE. These smaller services, often in rural areas, have access problems due to distance to CPE providers when none are readily available internally.

The technical schools and colleges providing preservice prehospital care provider education are alternative options for access to CPE. These schools offer a diversified service mix of preservice training and CPE as a way to retain previous consumers and attract new consumers of education. In many situations, the same instructors of the preservice training conduct the CPE in between regularly scheduled preservice programs or in conjunction with the preservice programs. In the former situation, with CPE

conducted at the convenience of the instructor between preservice programs, the courses are typically open to any prehospital care provider who wishes to attend. Problematic to access, though, is timing convenient to the instructor may not be convenient to prehospital care providers. Further, because of lack of time between programs, there may not be a sufficient or diversified array of offerings and there may be a significant delay until the course is offered again, if it is offered again at all. In the latter situation, where the CPE is provided in conjunction with the preservice program, the course is often limited in access, offered only to those who attended the preservice program.

The most prevalent source of CPE for prehospital care providers are the myriad of private, for-profit CPE providers. However, while there are many private companies offering EMS CPE, not all private providers seek approval through state EMS offices to grant continuing education hours applicable to the prehospital care provider for recertification/relicensure. According to the Continuing Education Coordinating Board for Emergency Medical Services (CECBEMS), as of March 2010, there are 97 providers accredited to grant continuing education hours acceptable by the National Registry of Emergency Medication Technicians (NREMT) for prehospital care provider recertification. This leads to a low supply and high demand, as there are approximately 270,000 Nationally Registered prehospital care providers (NREMT, 2010) needing access to accredited continuing education hours.

Using computer technology in distributive education formats to teach EMS CPE has become more popular among the recipients of such education. Online and computer-based CPE offers an inherent flexibility, allowing anytime, anywhere learning that is more conducive to the prehospital care provider working long shifts and multiple jobs.

One important feature of any distributive-type education is its effectiveness to impart knowledge (Porter, 1991). The ability to improve practical skills may be impacted with CPE via distributive education (Báez, Sztajnkrycer, Smester, Giraldez & Vargas, 2005; Levitan, Goldman, Bryan, Shofer & Herlich, 2001), but distributive education cannot be a replacement for every instructor-led course (Jerin & Rea, 2005). Despite this, there is promise that interactive CD-ROM training can improve performance (Sanddal et al., 2004). Little difference has been shown in learning or retention rates when comparing face-to-face learning environments and distributive education formats. Hobbs, Moshinskie, Roden, and Jarvis (1998) found no statistical difference in mean test scores or attrition rates between classroom and either a satellite-based audio/video network or two-way audio/graphic computer network. The abilities of prehospital care providers to perform triage in simulated patient environments were also significantly increased after an Internet-based training program with retention when evaluated one month later (Báez, Sztajnkrycer, Smester, Giraldez & Vargas, 2005). Likewise, student satisfaction and improvement in test scores resulted from a hybrid of classroom and online format (Thweatt & O'Keefe, 2004).

Cost is another key advantage of using technology and other forms of distributive education to increase access of CPE to prehospital care providers. In a study comparing web-based training versus traditional classroom-based training, Jerin and Rea (2005) found cost decreased from a maximum of $82 per module of training delivered in a traditional method to $3 per module of training delivered in a web-based method. One such program, a 12-lead electrocardiography program, realized significant cost decreases as a result of distributive learning. The downside to employing such technology is the

startup expenses, which can be as high as $9,534 per module (Dreyer, Rodriguez & Lewll, 2004). This leaves many individual EMS services unable to develop or employ this method of delivery, but has opened up many doors for entrepreneurs who want to become independent CPE providers.

While using computer technology to obtain CPE through distributive education formats has many advantages in creating access to EMS CPE, some certifying agencies have restricted how many CPE credits for recertification/ relicensure can be earned via these formats. Even though online CPE programs are capable of providing quality education, not all certifying organizations have fully embraced this medium for education. For example, the NREMT allows a maximum 10 hours of distributive learning during the 2-year recertification cycle for any level of EMT (NREMT, 2008a, 2008b, 2008c). States such as California and Iowa do not allow more than 50% of continuing education for recertification/relicensure to be obtained by distributive education (California Code of Regulations, 2004; IDPH BEMS, 2010).

Connecting Education to Patient Outcomes

A recent review of the EMS literature resulted in relatively few studies found about CPE and resulting patient outcomes. Most of the studies related to the feasibility of a basic level prehospital care provider performing an advanced procedure or the adoption of a new procedure. Little has been done to connect EMS CPE educational efforts to patient outcomes, creating a dearth in the literature, and making it difficult to understand the impact of EMS CPE on patient outcomes.

Three studies focused on basic EMTs performing advanced procedures in the prehospital setting to demonstrate feasibility. In one study, basic EMTs were capable of

providing appropriate medication administration of an inhaled respiratory drug with improved patient clinical outcomes (Markenson et al., 2004). These patients were tracked from the point of basic EMT involvement with the patient through to discharge from the hospital and included accuracy of assessment as well as improvement of respiratory rate, peak flow, oxygen saturation, and level of respiratory failure. Two studies considered the feasibility of basic EMTs placing endotracheal tubes in the prehospital setting for adult patients who were not breathing (Sayre et al., 1998; Pratt & Hirshberg, 2005). Both of these studies concluded that basic EMTs could learn the procedure following an appropriate training sequence. One study found an acceptable level of success rates (Pratt & Hirshberg, 2005), while the other found cause for concern due to a success rate of about 50% (Sayre et al., 1998).

Prehospital rapid-sequence intubation (RSI) has been a controversial topic due to the inherent dangers of administering drugs that paralyze all muscles of the body, including those that control vital functions, such as breathing. As concluded by Kaye, Frascone and Held (2003), paramedics had an extremely high success rate of intubating patients using the RSI method and credit this success rate to the training program. While this study did not follow the patient through to discharge from the hospital, it did include a continuous quality improvement/quality assurance (CQI/QA) process in collecting data and following the study's progress. Another study, which focused on the success of a training program to teach paramedics how to perform intraosseous (IO) infusion in children, concluded the participants could achieve an acceptable success rate (87%) in the prehospital setting with very few complications (Anderson et al., 1994). The patients were tracked through to discharge and all survived. Like the previous study, this study

attributed the success of patient outcomes to the training program. Similarly, Watts et al. (2004) found the implementation of a brain injury management guideline, to include a training component, did significantly improve the outcomes of those patients included in the study. While some fatalities still occurred, these were reduced from 34.6% to 17.0%.

One study demonstrating the link between CPE and patient outcomes is the introduction of the Prehospital Trauma Life Support (PHTLS) program in Trinidad and Tobago. The outcomes of this CPE course demonstrated a significant positive impact after its introduction. Ali, Adam, Gana and Williams (1997) found that mortality was significantly lower post-PHTLS for both blunt and penetrating trauma (18.6% down to 12.8% and 8.9% down to 5.6%, respectively) as was disability from trauma (91.4% down to 60% for minor disability and 40% down to 8.6% for major disability). Fatality rates from trauma decreased as well with 15.7% down to 10.6% of those included in their study dying as a result of trauma after the introduction of PHTLS.

Achievement Following Training

Achievement in EMS CPE programs typically involves measuring cognitive and psychomotor abilities. A common way to objectively measure the degree of change resulting from the educational intervention is to administer pre- and post-tests. Almost every study reviewed reported increases of knowledge after participating in CPE as compared to before (see: Báez et al., 2005; Crocco et al., 2003; French et al., 2006; Funk, Groat & Verdile, 2000; Gordon et al., 2005; Miller, Issenberg, Petrusa, Gordon & Scott, 2004; Porter, 1991; Scott et al., 2006; Spaite et al., 2000; Weiss, Ernst, Blanton, Sewell & Nick, 1999). The one exception was the result of a randomized, prospective multisite comparison of training methods for pediatric CPE (Sanddal et al., 2004). The authors

report, “No differences were noted in written measurements between or among the groups” (p. 94). All of these post-course cognitive evaluations took place immediately following the instruction.

In a study of knowledge sustainability, decay in knowledge was found to occur in less than 180 days after initial training and reaches a low point that remains stable over five years (Miller et al., 2004). Crocco et al. (2003) found only a modest decline in stroke knowledge (18% increase over pretest scores) in a six-month follow-up test after the initial training. Latman and Wooley (1980) studied knowledge and skill retention rates in three levels of prehospital care providers (basic, intermediate and paramedic) and found all three levels showed deterioration with time, but no more than a total of 10% in a 24-month period as measured by a written test. Paramedics appeared to lose knowledge at a slower rate, but these rates appear to be influenced by frequency of use. Prehospital care providers who participated in CPE experienced an 11% better overall retention than nonparticipants.

Psychomotor ability before and after CPE followed a similar trend to cognitive achievement, with improvements in performance demonstrated immediately following the education. One study, which focused on skill maintenance after a focused and directed CPE program, found skill performance can be improved via CPE (De Lorenzo & Abbott, 2007). This improvement in skill was maintained over a six-month period. This finding was also noted by Davis et al. (2007) after implementing an algorithm-based difficult airway curriculum using human simulators, though follow-up after the post-course skills evaluation was not described. A study of preservice paramedic programs in three key skill areas were tested and found skill decay took place with the fastest

deterioration taking place in the skill that required the most sophistication to perform (Zautcke, Lee & Ethington, 1987). The skills that had the most time elapsed since training and were used the least were reported as having greater skill deterioration than those used more frequently. From this, the authors suggest that CPE may be more individualized to account for these deteriorations.

Needs Assessment in the EMS Literature

Prominent educational leaders in EMS indicate a needs assessment is a necessary aspect of CPE. Identification of specific performance areas that could be improved with training is the goal of a needs assessment (Florida Association of EMS Educators, 1998; New York State Bureau of EMS, 2004). Nixon (2006) notes that training officers must evaluate the current state of knowledge, skills, and attitudes and compare these to standards in order to identify performance gaps that may be addressable with training. McKenna (2007) expresses a similar notion in that it is important to determine the perceived educational needs of the learners. Further, the most important part of a needs assessment "involves drafting appropriate questions" (¶ 2). What is not clear in regards to needs assessments in EMS CPE is whether or not needs assessments are used to identify training topics, or if these topics are selected prior to conducting a needs assessment for the purpose of content development.

The review of the EMS CPE literature demonstrated a lack of specific dialogue related to needs assessment. Implicitly, a demonstrated need is noted in a number of studies reviewed, however, there is no clear identification of how the training need was determined. Most studies that included reference (implicitly or explicitly) to a needs assessment referred to the literature as support for the developed training topic (Bray et

al., 2005; Davis et al., 2007; Báez et al., 2005; Gordon et al., 2005; Stratton et al., 1991; Van Dyk, Cloyd, Rea & Eisenberg, 2004). In addition to a literature review, Kaye et al. (2003) used a document analysis from their own EMS service as a part of their quality assurance program to identify a clear need for training. Wyatt, Fallow, and Archer (2004), used document review and observational data related to trauma patient care within their organization in deciding what to include for training. The most frequently observed purpose for these studies was to determine impact on performance following training, specifically focusing on the methods employed for the training (Bray et al., 2005; Davis et al., 2007; Gordon et al., 2005; Kaye et al., 2003; Pratt & Hirshberg, 2005). These studies, however, lacked information on why or how the specific training filled an identified performance gap.

One study (Miller et al., 2004) specifically described the needs assessment aspect of the research and even noted the use of "a modified ADDIE… model for curriculum development" (p. 240). Included in this process was a curriculum advisory committee and subject matter experts to identify learning needs. Of primary interest to the committee was the length of the course and training delivery methods. However, not clear from the assessment description was whether the training need was identified as a part of the assessment or whether the assessment was for the purpose of content development.

EMS Educator Development

Instructor development in EMS education is not well represented in the EMS literature. In the past few years, there appears to be an increased emphasis on instructor competence in the preservice training of prehospital care providers, but little, if any, emphasis has been placed on instructors that specifically teach CPE programs. Teaching

a prepared curriculum is the prevalent model in EMS education, though the prescriptive nature of this model has come under scrutiny in recent years (NHTSA, 2000). The Commission on Accreditation of Allied Health Education Programs (CAAHEP) has published standards and guidelines for accrediting EMS programs and included qualifications for the program director, medical director, and faculty. In this document, there is a call for those teaching in preservice EMS programs to be "capable through academic preparation, training and experience to teach the courses or topics to which they are assigned" (CAAPHEP, 2005, p. 7). While vague, this standard does imply the importance of being *prepared* for a teaching role rather than the concept "that a 'good clinician' is a 'good teacher'" (Ruple, Frazer, Hsieh, Bake & Freel, 2004, p. 211). This sentiment is shared by Russ-Eft, Dickison and Levine (2005) in their study of instructor quality on student performance. They demonstrated empirically that both the quality of materials used and student preparedness in preservice education both are related to the quality of the instructor. The instructor quality was not relegated to only technical knowledge and expertise of being a practitioner of prehospital medicine, but also of how to teach adults. Even the National Association of EMS Educators (NAEMSE) states, "These instructors need to have optimal preparation and educational resources" (NAEMSE, 2004, p. 321).

The emphasis on preservice training has left CPE in EMS to mostly fend for itself, though it has not completely been ignored. The authors of the national guidelines for EMT-paramedic and EMT-intermediate CPE (NHTSA, 1999) minimally address the issue of instructors of CPE, stating only that, "Teaching EMS related programs is an important attribute to the EMS profession" (p. 20). They do not expound to describe what

attributes or qualifications are necessary or desirable for this important position. While CPE is valued as an essential component of the profession (NAEMSE, 2004), it is still an area with deficiencies. To improve EMS CPE will require evidence-based research to help produce, measure, and assure continued competency of the prehospital care providers (Sayre, White, Brown & McHenry, 2002). The NAEMSE does take a stand on the quality of CPE by stating, "…continuing medical education (CME) is an essential component of every EMS system" and "the ultimate goal of all EMS education, including CME, is improvement of patient care" (NAEMSE, 2004, p. 2).

Educator curricula.

A very popular source for CPE in EMS are off-the-shelf, standardized courses teaching topics that are practical in nature and are designed around topical areas (i.e. trauma, cardiac, pediatrics, etc.). These courses provide the learner with a certification and, as such, are required to be taught by certified instructors. Typically these instructors are prehospital care providers in the EMS or closely related field, who have participated in the course as a learner and have progressed through a process to be certified as an instructor by the host organization. Being a source of instructor development, these instructor curricula were examined for content related to needs assessment; specifically, anything that would help instructors learn about conducting needs assessments. Because the host organization has already decided the CPE topic, the instructor development program focuses on organizational philosophies, program administration, and logistics related to that program versus a general overview of adult education principles, though at times these are superficially addressed. Because the host organizations assume that anyone receiving instructor certification for a course desires to and will teach that course

and because curricula for the courses are predetermined, the instructor courses contain no content regarding conducting needs assessments in order to identify the learning needs. To illustrate this, curricula from the American Heart Association's (AHA) *Core Instructor Course* and the National Association of Emergency Medical Technicians' (NAEMT) *Prehospital Trauma Life Support* (PHTLS) Instructor programs are reviewed below. In addition, the *2002 National Guidelines for Educating EMS Instructors* is analyzed below for the extent to which they contain content around needs assessment.

The AHA has several standardized courses, all of which require separate instructor certifications in order to teach the course. The *Core Instructor Course* is designed to, "…provide a foundation for teaching and facilitating regardless of an instructor's candidate's area of interest and specialization… [and a] consistent and uniform instructor training, eliminating material that is repetitive across disciplines while ultimately creating more effective ECC instructors" (Lifesaver Associates, ¶ 4). AHA programs support the mission of the organization via standardized curricula, which assumes the content included is desired by the learner or learner's organization to address a learning need. As such, the function of the instructor in AHA programs is to "enhance learning" (AHA, 2000, p. 1-23) and not to identify what needs to be learned. During the discipline-specific instructor program, emphasis is placed on the instructor candidate being able to successfully demonstrate all skills and procedures to be taught as well as, "a thorough knowledge of course organization; course content, including appropriate BLS skills; Instructor responsibilities; and the AHA guidelines for the specific discipline" (AHA, 2008b, p. 51). This indicates program administration and --presentation are keys

to successful education and needs assessment is not within the domain of the instructor for any of the AHA educational programs.

PHTLS, a program designed to teach basic and advanced components of medical care for trauma patients, is another standardized curriculum which allows very limited modification in design and no modification in content or administration (McSwain, 2007). The instructor program is a single day curriculum with topics on program administration, teaching techniques, and provider course content. Much detail is provided regarding the host organization's structure and function as well as the policies and procedures for conducting a PHTLS provider course. Nowhere, however, is identifying the learning needs of individuals discussed or even introduced. As with the AHA courses, it appears implicit that such a program will fill a need to learn more about trauma care. As indicated in the PHTLS provider text, "the PHTLS course provide[s] the necessary tools to save lives" (Salomone & Pons, 2007, p. 8), which one could surmise is the result of a needs assessment, however how the needs assessment process is not something within the scope of the instructor.

The *2002 National Guidelines for Educating EMS Instructors*, developed by the National Association of EMS Educators (NAEMSE), does cover a variety of information relative to adult education principles and practices in order to develop *presenters* of information, but not necessarily *instructional designers* of programs. None of the goals or objectives of this program specify any cognitive, affective, or performance goals related to conducting a needs assessment. Further, the professional skills set outlined by this curriculum, which describe those attributes identified for the EMS educator, do not include any skill or set of skills that can be attributed to conducting a needs assessment.

One skill set, however, in this document does indirectly imply an element of needs assessment in its professional attribute stating that, "The EMS educator plans instruction based upon knowledge of subject matter, the attributes of the adult learner, and curriculum goals" with, "…the process of curriculum development" (NAEMSE, 2002, p. 27) being part of a cognitive goal to achieve this attribute. This is the closest reference to needs assessment found in this document.

In California, an instructor curriculum exists to address the gap in instructor development relative to needs assessment. The Contra Costa County Fire-EMS training consortium (CCTC) curriculum guidelines, "describes and defines a standardized process for creating new training" (CCTC, 2007, p. 1). Specifically, the curriculum details how to identify learning needs and provide strategies for this assessment. A survey instrument is included in the curriculum to identify topics, skills, and training priorities at both the agency and county levels. Unfortunately, this is the exception and not the rule. No other such curriculum specific to EMS education at a state or local level could be identified despite an extensive literature review of publically available information.

EMS education textbooks.

A review of the textbooks written specifically for the development of the EMS educator demonstrates an overall lack of a thorough explanation and comprehensive coverage of the topic of needs assessment. With the focus of developing EMS education residing primarily with *preservice* education, reliance on prescribed, standardized curricula is the norm; however, according to the National Guidelines for Educating EMS Instructors (NAEMSE, 2002), "Each time an instructor teaches, even if they are using a prepared lesson plan, they need to modify it to their specific needs" (p. 38). This indicates

that the instructor, even though he or she may not actually need to revise a curriculum, will need to know how to identify when and why curriculum modification would need to take place. Such modification would therefore need to be based on identifying learners' needs prior to implementing the change.

To date, only four textbooks published specific to EMS education have been identified. The first book, *Foundations of Education: An EMS Approach* (Cason, 2006) "serves as the link to applying the concepts of the 2002 National Guidelines for Educating EMS Instructors" (p. xv) and is the text used in the National Association of EMS Educators' instructor course. This book represents one of the most recent publications for EMS educators on issues related to principles of adult education. The other three books, *Teaching EMS: An Educator's Guide to Improved EMS Instruction*, (Parvensky, 1995), *Instructional Methods in Emergency Service, second edition*, (McClincy, 2002), and *Foundations for the Practice of EMS Education* (Alexander, 2006) round out the compilation of texts written with the specific context of EMS education in mind. Though many other texts covering similar principles of adult education exist and are referenced in these texts and the instructor guidelines, these books are identified in the EMS community as key reading for becoming an instructor. While all identify needs assessment as a part of EMS education, these texts lack significant discussion on the topic, with the exception of the Alexander's 2006 book.

Teaching EMS: An Educator's Guide to Improved EMS Instruction (Parvensky, 1995) was one of the first texts written specifically with EMS educator development in mind. It focuses on the learning process of the adult learner as well as the components of EMS education and managing an EMS program (such as an EMT program); however,

little attention is paid to needs assessment. The only reference to needs assessment in this text is located as a role and responsibility of the EMS educator as designer. Acknowledging that not all instructors will fall into the function of an instructional designer within the preservice EMS education domain, the author notes, "Some instructors choose to be involved with instructional design… [and] as a designer, the instructor is usually concerned with identifying needs and developing training programs to meet those needs" (p. 90). Typically the EMS educator follows a prescribed curriculum someone else designed and developed. However, the instructor may, in fact, need to modify any given lesson plan within the curriculum to meet various learning needs. While not necessarily a primary concern for those that teach in the preservice domain of EMS education with prescribed curricula, those responsible for CPE rely heavily on identifying learning needs of currently certified or licensed prehospital care providers in order to make such training meaningful for the participants and stakeholders.

Instructional Methods in Emergency Service, 2nd edition (McClincy, 2002) is similar to the previously described text in that it focuses on the learning process of the adult learner as well as the components of EMS education and managing an EMS program. Some emphasis is placed on assessing certain aspects of the learner, but not on educational needs of the learner or other context. Specifically, the author notes, "Adult learning brings a variety of learning and emotional states to a classroom… [and that] instructors determine the perspective that the student is coming from and respond appropriately to the student's actions" (p. 30). This sort of assessment is purported to identify backgrounds and demographic data relevant to special needs, environmental

accommodations, and the "class mix" (p.28) and not to identify any sort of needs related to a gap in knowledge.

McClincy (2002) does, however, note that, "If instructors are writing a lesson plan that does not use a standardized curriculum, they must develop objectives based on their research of a topic" (p. 68). The very nature of CPE being focused on advancing knowledge and/or improving knowledge in the context of current practice is something that cannot be found in a standardized curriculum as contextual factors preclude this. The "research" the author suggests in this text is "vital when writing a lesson plan" and consists of "Look[ing] in textbooks, reference manuals, and trade journals" (p. 68). When no curriculum exists, instructors "and the training institute staff must jointly decide on the teaching approach and then design the lesson plans and course materials for the new curriculums" (p. 82). These general principles described by the author are inclusive of all guidance on needs assessment as it relates to EMS education in this book. These guidelines fail to provide any concrete assistance to identify educational needs.

One of the most current texts on EMS education, *Foundations of Education: An EMS Approach* (Cason, 2006) follows a similar format as the previous two in terms of general content, though additional topics and many tools are included for the reader to use in his or her practice as an instructor. The author specifically refers to conducting a needs assessment in two places: culturally relevant contexts pertaining to any given prescribed curriculum and distance education. In the former, "A needs assessment, or evaluation, should be conducted by the EMS educator for the purpose of ascertaining which terms, customs, and other cultural elements should be introduced into the curriculum to best serve local, regional, and national needs" (p. 58). In the latter, Cason

notes that instructional design is the most important part of distance education and introduces the Schiffman model of instructional design, which identifies the important activities in curriculum design and development. Specifically, "Conducts needs assessment" (p. 203) is identified as the first step in this instructional design model, but this concept is not elaborated upon. What is not discussed in this book is what constitutes a needs assessment, the steps and tools involved, strategies instructors can take to conduct such an assessment, how to analyze collected data, or what decisions the instructor must make relative to these data. Cason does, however, note that, "the knowledge and process awareness needed to develop plans may be beyond the scope of the typical Emergency Medical Services (EMS) instructor" (p. 95) and suggests that advanced instructor training programs may teach these concepts.

One thing all three of these texts have in common is they are preservice curriculum-centered, and therefore, none explicitly address the domain of CPE. Because they are preservice curriculum-centered, an overarching assumption in all three texts is that the curriculum is already designed and developed. Thus, any mention of needs assessment in the books relate to the modification of the prescribed curriculum to meet the contextual needs of the learner, and do not address selection and development of CPE for certified prehospital care providers. These texts are written to support the development of EMS *presenters* instead of EMS *instructional designers* or *program planners,* the latter two being what is needed for EMS CPE.

A significant departure from the previous three text presented thus far is Alexander's (2006) *Foundations for the Practice of EMS Education.* While "The skeleton of this text is the 2002 National Highway Traffic Safety Administration Guidelines for

EMS Educators" (p. xi), it goes well beyond the scope of this instructor curriculum to include the process of educational planning and curriculum development processes, among others. Specifically, this text spends three chapters on topics related to developing education, with an entire chapter devoted to determining and communicating educational needs. The author notes that, "Needs analysis is an essential step in making sure your program meets a true educational need" (p. 127) and offers in-depth details on conducting such assessment including explanations of different types of assessment strategies to identify performance gaps and the preparation of a training proposal. The topics included in this book represent a dramatic departure from all other resources found specifically for EMS instruction and education in that it goes beyond being a source to help prepare the *presenter* of EMS education and is a source to help prepare the *designer* of EMS education.

Other EMS publications.

The Federal Emergency Management Agency (FEMA) published a guide to develop effective standard operating procedures (SOPs) for EMS and fire services. This publication includes a chapter on conducting a needs assessment. Though this description of needs assessment, "…focuses on internal and external factors that affect SOPs" (FEMA, 1999, p. 19), the steps involved in the process are described in sufficient detail so as to be followed much like a recipe and could potentially be applied to identifying training needs in a similar manner. The steps outlined are: (a) develop organizational support for conducting the needs assessment, (b) develop a plan of action, (c) review current SOPs, (d) gather information on internal factors affecting SOPs, (e) consider external factors affecting SOPs, (f) develop a list of required SOPs based on the needs

identified in step d, (g) analyze existing SOPs based on the information gathered in prior steps, and (h) create a formal needs assessment document. What is not included in the model is a focus on learning needs, making this document potentially flawed in being applicable to identifying learning needs.

EMS systems evaluations related to CPE and educators.

Several states have conducted their own research involving the state of EMS components within their jurisdiction. In Kansas, the NHTSA Technical Assistance Team (TAT) recommended managers of EMS services perform a needs assessment of personnel and report these to the Kansas Bureau of EMS to assist with a statewide strategic workforce plan. Additionally, CPE requirements for prehospital care providers need to be updated to enable state recertification/relicensure while preserving maximum local flexibility. This indicates the recognition of the importance of CPE and different needs of prehospital care providers located in all areas of the state (KBEMS, 2007).

Finally, in Oregon, the NHTSA TAT conducted an evaluation of the state of EMS components similar to that conducted in Kansas. The TAT noted, "The connection between identified quality improvement needs and continuing education as a performance improvement tool is weak" (ODHS, EMSTS, 2006, p. 17). Further, the TAT recommends that community colleges should assess EMS educator needs and qualifications for initial education and CPE. These recommendations indicate CPE efforts are ineffective and an issue may lie in the competencies of the instructors to develop and teach these and other programs.

Educator certification/license requirements.

As with prehospital care providers, instructors throughout the United States are classified differently from state to state. A review of the state offices of EMS for all 50 states revealed information on instructor certification/license in 30 of the 50 states. Of the 30 states, 18 (60%) explicitly note the acceptance of the *2002 National Guidelines for Educating EMS Instructors* as meeting the requirement for instructor development for the purpose of certification/licensure. Typically, however, because this is a curriculum for general instructor development, every state also includes state-specific requirements in addition to this curriculum prior to the issuance of an instructor certification/licensure, whether that certification is full or provisional. An example of this is the State of Washington, which requires candidates for Senior EMS Instructor certification to complete an instructor training course "…By the U.S. Department of Transportation, National Highway Traffic Safety Administration, or an instructor course from an accredited institution of higher education" as well as "Successful completion of a DOH approved OTEP/BLS evaluator workshop" (Washington State Department of Health, 2002, p. 3). Similarly, Georgia specifies EMS instructor courses include: (a) Georgia Department of Human Resources (DHR) EMS Rules and Regulations Chapter 290-5-30, (b) Official Code of Georgia Annotated (O.C.G.A.) 31-11, (c) Georgia DHR OEMS Procedures, and (d) 2002 National Guidelines for Educating EMS Instructors (Georgia OEMS, 2007). So while the national instructor program is intended to develop instructors' competences as it relates to teaching, it is not intended to be specific enough to meet individual states' needs relating to administrative and procedural information for that state in conducting EMS courses within the state.

Generally, there are between one and four levels of instructor certifications throughout the United States. States that have only one level of instructor certification (n=8, 12.5%) use titles such as *EMS instructor*, *primary instructor*, or *lead instructor*. This singular instructor designation does not, however, recognize that any given instructor can teach all levels of EMT programs. Missouri, for example, has only one level instructor certification, but according to the Code of State Regulations, EMS instructors must have, "current licensure and at least two (2) years clinical experience in the level of certification instructed or higher" (2007, p. 21). Thus, someone who is certified as an EMT cannot teach the paramedic program, a higher level of training. The other most frequently used hierarchy of EMS instructor follows the states' levels of providers, specifically EMT-Basic, EMT-Intermediate, and EMT-Paramedic (n=11, 37%) to include Georgia, Kentucky, Maine, Minnesota, and South Carolina.

Three states have a special instructor certification for those who are designated as training officers or instructors for his or her respective service. Kansas has two levels, (Training Officer I and II) that are certified to coordinate CPE for certified personnel, and in the case of the training officer II, teach a first responder program (KSA 65-6110, 2004). Interestingly, in order for CPE to be approved by the Kansas Board of EMS, applications made by the training officer to the board must include, among other items, training needs assessments (Kansas Board of EMS, 2000). This represents the only explicitly stated reference to conducting a needs assessment found relative to CPE in EMS during this analysis of state EMS instructor certifications. The other two states, Utah and West Virginia have similar instructor certifications, training officer and squad

training officer, respectively. In Utah, the training officer, "is responsible for developing and directing all CME training within their organization" (UEMS, 2007, p. 3).

Two states (6.7%) have instructor certifications beyond that of the primary or lead EMS instructor. In Florida, a program director certification exists whereby the certified person, "has the overall responsibility for the direction and coordination of the course planning, organization, operation, administration, periodic review, program evaluation, continued development, effectiveness and approval of the programs offered at their training facility" (FBEMS, 2007, p.4). Tennessee has a similar certification, the EMS Program Director/Administrator, in which the certified person is, "…responsible for the overall coordination of all EMS Programs. The individual shall act as a liaison between faculty, the sponsoring agency, students, the local medical community, and the Division of Emergency Medical Services" (Tennessee DEMS, n.d., p. 1).

Within the documentation on each state's educator certification, nothing is noted to indicate that a needs assessment for the purposes of developing a CPE program is necessary, though this is clearly within the function of EMS educators. Additionally, in the states reviewed, there is no indication that preparation for *instructional design* is an emphasized prerequisite skill for the purpose EMS educator certification at any level in the states reviewed.

Summary of the EMS Literature

The EMS literature as it relates to CPE lacks significant inclusion of needs assessments. The EMS field recognizes the importance of CPE for the purpose of professional development; however, the efforts of EMS educators typically has remained with issues of access to CPE and connecting training to patient outcomes. Merely finding

and participating in quality CPE that is meaningful to the individual -and/or service he or she represents is problematic, especially in more rural areas. Distance education has helped to bridge this divide, but oversight bodies have not fully embraced this medium to sufficiently satisfy all CPE requirements for EMS provider recertification/relicensure. Standardized CPE and refresher courses are plentiful, especially in the more urban areas, and afford CPE opportunities; however, these almost never are the result of any sort of assessment to determine the educational needs of its participants. Further, assessment of achievement following these programs is typically limited to the measurement of knowledge gained immediately following training, with little connection of training to actual improvement of patient outcomes. What appears most frequently are feasibility studies and improvements in test scores. Very few studies indicated the use of a needs assessment as part of the CPE development process and apparent was the influence of CPE wants or desires versus actual needs. Educator development focuses on preservice instruction and not CPE. Both educator curricula and textbooks lack sufficient discussion of needs assessment. Additionally, certification requirements, in states that have educator certifications, vary more than do the prehospital care provider certifications/licenses.

Continuing Professional Education in the Medical Profession

Because EMS education is so young, it is important to look at other medical professions to see what CPE has been done in similar fields. Reviewing the literature in the medical field, I focused on physicians and nurses, since these two professions closely approximate the EMS field in terms of patient acuity (at least in the emergency setting), provider autonomy and decision-making, and the potential to impact patient outcomes. In the physician-oriented literature, the three most prevalent themes were CPE effectiveness,

reformation of CPE systems, and the context of CPE/practice-based learning. In the nursing-oriented literature, the four most prevalent themes included CPE's impact on patient outcomes, planning and conducting CPE, voluntary versus mandatory participation in CPE, and defining CPE in the nursing context. Between these two related professions, the nursing profession has demonstrated clearly advantageous results from the use of conducting needs assessments as part of developing CPE.

A Scan of the Physician-Oriented CPE literature

In the physician-oriented CPE literature definitive themes about what is taking place with CPE were noticeable. The single most prevalent theme in the literature was the effectiveness of CPE. As noted by several studies, including both of direct research with CPE programs and literature reviews, the traditional lecture method of CPE was ineffective in terms of bringing about change in physician behavior, and to a much lesser degree change in patient outcomes (Davis, O'Brien, Fremantle, Wolf, Mazmanian & Taylor-Vaisey, 1999; Bauchner, Simpson & Chessare, 2001; Grimshaw et al., 2001; Tu & Davis, 2002; Spivey, 2005; Mansouri & Lockyer, 2007; Tian, Atkinson, Portnoy & Gold, 2007). While this method does provide an economical method of transferring information to the physician participant due to the ability to reach a larger number of participants at one time, the passive nature of this method has "demonstrated a lack of effect on physicians' performance… or sizable gaps between real and ideal performance" (Davis et al., 1999). Simply creating, publishing, or otherwise passively disseminating some information related to patient care, such as a new treatment guideline, does not improve patient care (Bauchner, Simpson & Chessare, 2001).

Reform of CPE for physicians has been a hot topic of debate over the last decade or so (Nahrwold, 2005). In a study of CPE issues in the medical profession, Kristofco, Shewchuk, Casebeer, Bellande, and Bennett (2005) used a nominal group technique to elicit and prioritize key attributes of an ideal continuing medical education (CME) institute. From their study, the top priorities were (in descending order): (a) linking CME to continuous improvement, (b) developing and promoting programs based on gaps in healthcare outcomes and evidence-based content, and (c) providing access to needs data relevant to target audiences. Their study also found agreement among the participants on issues such as adopting evidence-based practice and accountability of CME for its role in changing physician behavior and patient outcomes. Further, the data collected and analyzed "fit closely with the concept of a learning organization based on the principles and values of continuous improvement" (p. 225) with the authors using a description of such an organization as defined by Peter Senge in 1990. Spivey (2005) also called for CME reform, citing issues such as needed performance improvement, the demand for change by regulators and accreditors of CME providers, public demands for up-to-date doctors, commercial funding biasing CME, deficiencies in patient safety and public health, and overall global trends in CME. Nahrwold (2005) echoed this call for changes in CME and noted that physicians learn from many experiences. Bennett et al., (2000), define six core competencies for physician educators to facilitate the vision of a reformed CME system: (a) guide physician learners in assessing their learning needs, (b) study the role of continuing professional development to enhance physicians' knowledge, performance, and health studies, (c) design a CME list of effective educational strategies, (d) cooperate with other CME providers to maximize the ability of CME to meet varied

physician learning needs, (e) ensure systems of measuring improvement link CME to health outcomes, and (f) enhance the professional development of CME educators.

Where physicians learn is as important as what they learn. Cervero (2003) suggests the use of practice-based learning as a strategy of CME that is ongoing and occurs where and when a physician needs it most – in the office, hospital, or other place of his or her medical practice. This would allow physicians to reflect on real-time interactions with patients and to take advantage of this situation as an opportunity to learn. "If physicians are going to make good judgments, then they need to learn from their experience in the swamp of practice" (p. S12). This model of education assumes that the process of clinical practice cannot be separated from physician learning, though the two can be distinguished. Mazmanian and Davis (2002) remind us, "physicians benefit from reflecting on their progress and development" (p. 1059) and physicians should participate in activities which offer personal involvement in thinking about professional practice and in identifying their own learning needs. This concept of developing learning objectives based on physician need has caught the eye of accrediting organizations and there is a "call for a learner-centered model of CME, one that supports the professional development of individual physicians who confront questions derived from practice" (Regnier, Kopelow, Lane & Alden, 2005, p. 175). One concern expressed is that of individuals' abilities to accurately assess learning needs (Davis, Mazmanian, Fordis, Van Harrison, Thorpe & Perrier, 2006). Having reviewed the literature on self-directed learning, self-assessment, and self-reflection of physicians, the authors concluded physicians have a limited ability to accurately self-assess and processes in place using

these data for professional development activities may need to rely more on external assessment methods.

Overall, the literature revealed that while CME can be beneficial, some forms of CME are better than others. Instead of asking whether or not CME is effective, providers and consumers of CME should ask *what* kind of CME is effective (Roberston, Umble & Cervero, 2003). This emphasis underscores the important of accurately assessing learners' educational needs. Reform of CME systems and credit for CME should include affordances for physician-centered learning as well as alternative methods and locations in which the learning takes place in order to improve knowledge, skills, and attitudes that impact patient outcomes in measurable ways.

A Scan of the Nursing-Oriented CPE Literature

Much of the nursing-oriented CPE literature revolves around a few key themes. These themes include measuring the effectiveness of CPE in terms of patient outcomes, factors important in planning and conducting CPE, and whether CPE should be mandatory or voluntary for recertification/relicensure purposes. Even defining what constitutes CPE and whether it is necessary for the nursing profession seems to be an issue within this literature.

Practically every research article reviewed addressed the need to evaluate the effectiveness of CPE in the nursing profession. Most specifically, studies addressed the need to evaluate the impact on patient care resulting from CPE rather than just on whether the objectives of the program were met and participants were satisfied. Furze and Pearcey (1999) note that the literature base has a greater concentration of this latter outcome evaluation in CPE rather than impact evaluation. One problem identified was

participant opinions, rather than clinical criteria, are used in evaluating CPE. There needs to be a research agenda in the nursing profession to explore the links between classroom theory and clinical practice using validated evaluation techniques (Jordan, Coleman, Hardy & Hughes, 1999; Jordan, 2000; Griscti & Jacono, 2006). This goal of achieving improved patient care and outcomes as a result of CPE is of utmost importance in program evaluation (Ferguson, 1994; Nolan, Owens & Nolan, 1995; Griscti & Jacono, 2006). Interestingly enough, evaluation of outcomes beyond participant achievement are not emphasized when it comes to most distributive education methods such as computer-aided instruction and web-delivered programs (Neafsey, 1997; Billings & Rowles, 2001; Lewis, Davies, Jenkins & Tait, 2005).

Enablers of a positive impact from CPE were addressed in many studies to include the personal attributes of the participants (Nolan, Owens & Nolan, 1995; Barriball & White, 1996; Furze & Pearcey, 1999; Jordan, Coleman, Hardy & Hughes, 1999), a sense of self-efficacy, and understanding of how CPE will enhance skills, knowledge, and professional status were all important. Jordan (2000) also noted, "improved care is more likely to be attributed to financial incentives than education programmes" (p. 462). The environment in which the nurse works contributes to the transfer of knowledge gained in CPE programs (Hogston, 1995; Nolan, Owens & Nolan, 1995; Francke, Garssen & Huijer Abu-Saad, 1995; Jordan, Coleman, Hardy & Hughes, 1999) by supporting the learner in his or her efforts to participate in the programs and applying knowledge gained to the job of caring for patients, which includes the role of nurses' clinical managers (Gould, Kelly, Goldstone & Maidwell, 2001).

Barriers to effective CPE were also identified in the literature and included both the personal and environmental factors just mentioned. A key barrier addressed in the literature is access to CPE programs. Attempts to address this concern involve the use of alternative delivery methods (Neafsey, 1997; Billings & Rowles, 2001; Lewis, Davies, Jenkins & Tait, 2005). One of the earlier studies on the use of computer-assisted instruction (CAI) determined that CAI "consistently resulted in greater achievement, with modest effect sizes, than conventional methods of instruction" (Neafsey, 1997, p. 165). Though this achievement is impressive, "the evaluation of the effectiveness of CBL [computer based learning], with regard to the transfer of knowledge and/or skills to the learner, is difficult" (Lewis et al., 2005, p. 589). According to a survey of nurses as to their preferences of delivery methods of CPE, Charles and Mammary (2002) noted that in-person conferences were the preferred delivery mode while interactive video ranked third. In this study, most nurses earned CPE credits through satellite broadcasts resulting from an inability to attend face-to-face conferences, necessitating a wide variety of delivery methods be available to overcome this obstacle.

The debate as to whether CPE should be mandatory or voluntary was prevalent in several studies. According to Perry (1995), the literature shows the majority of experienced nurses are in favor of compulsory in-service training courses in order to keep practitioners, especially those that are deemed "laggards" (p. 767) up to date with current trends while opponents argue that forced participation does not result in learning. Other issues such as staff satisfaction, staff retention, and quality of care are central to the issue of mandatory CPE. Levett-Jones (2005) supports the notion of mandatory CPE by stating, "Perhaps the question we should be asking in light of current financial constraints is not

can we afford to invest in continuing education for nurses, but instead, *can we afford not to?*" (p. 232; italics in the original). Proponents of a voluntary system of CPE cite that nurses have a personal sense of commitment to their own professional development (Barriball & While, 1996), a desire to further knowledge (Griscti & Jacono, 2006), or to increase job satisfaction (Robertson, Higgins, Rozmus & Robinson, 1999). Even the United Kingdom Central Council for Nursing (UKCC) seems to support the voluntary participation notion by viewing the verification of practitioner participation in CPE for purposes of relicensure being "incompatible with personal accountability" (Hogston, 1995, p. 587), raising the question as to whether CPE should be mandated.

Defining what is considered CPE is yet another issue prevalent in the nursing literature. According to the American Nurses Association (ANA), CPE is defined as, "Systemic professional learning experiences designed to augment the knowledge, skills, and attitudes of nurses and therefore enrich the nurses' contributions to quality health care and their pursuit of professional career goals" (ANA, 2000). The literature offers no consensus on how to define the term (Perry, 1995; Barriball & While, 1996; Griscti & Jacono, 2006). Whether the definition includes activities that are planned (Hogston, 1995) or part of some unplanned, informal, self-directed learning (Jarvis, 2005), determining what to include continues to escape a commonly shared definition and thus impacts the debate of voluntary versus mandatory CPE participation requirements.

Summary of the Physician- and Nursing-Oriented CPE Literature

In summary, the physician-oriented literature demonstrates CPE is not only necessary for the continuing development of the physician's knowledge base, but also has a significant impact on the individual physician's performance and overall patient care.

What the physician learns is as important as where he or she learns – context and content cannot be separated and be maximally effective. Identifying what needs to be learned through a systematic needs assessment process may very well be linked to improving the health outcomes of the patients being treated. While physician involvement in identifying learning needs is important, relying only on self-identification of learning needs can result in inaccurate assessments of educational needs, if done in isolation.

The nursing field places heavy emphasis on connecting the effectiveness of CPE to impact on patient care. The enablers and barriers to CPE and their contributions to the practice of nursing have led to a debate of mandated versus voluntary CPE for the purposes of relicensure. At the core of this debate is personal accountability on the part of the practicing nurse and the assessment of learning needs of each nurse over prescribed CPE topic mandates that may or may not address specific learning deficiencies. As with EMS provider and physician CPE, the importance of a needs assessment as part of the CPE development process is prevalent in the nursing literature (Blanzola, Lindeman & King, 2004; Procenca & Shewchuk, 1997; Tanner, 2002)

Needs and Needs Assessments

The concepts of need and needs assessment are well represented in the education literature. As it relates to education or learning, seven main themes emerged as being significant to this topic: (a) the importance of a needs assessment in CPE, (b) defining needs, (c) defining needs assessment, (d) needs assessment frameworks and methodologies, (e) data analysis, (f) decision making, and (g) models of needs assessment. As a significant issue in designing and developing meaningful CPE, this

section details these six themes and the importance it plays in CPE for prehospital care providers.

Importance of Needs Assessment in Continuing Professional Education

Swanson (2007) reminds us, "If you don't know where you are going, you will likely end up someplace else" (p. 58). This quote captures the essence of the importance of needs assessment in CPE. A well-planned direction for improvement of knowledge or performance begins with an understanding of the current status of the individuals, organization, and context for which an educational intervention is proposed. Assessing various needs, "will provide solid data on which to base decisions regarding program content, but also format, delivery mode, and audience, as well as marketing issues such as promotion and scheduling" (Knox, 2002, p. 8). Engaging in such an endeavor will enhance the planning process and increase the value of the intervention to the recipients, including both the participants and the patients these participants will care for in the future. Even if an educational need is *evident* or *obvious*, in order to make the best decisions regarding the allocation of scarce resources to address that need, there has to be some investigation to validate and define the need (Stone & Koskinen, 2002). Doing so will eliminate or reduce conjecture and assumptions pertaining to these perceived needs and provide evidence to support decisions.

Numerous studies support the idea that professionals do not always accurately assess their own educational needs (Cordero, Cadavid, Fernández-Llimós, Díaz, Sanz & Loza, 2004; Fitzgerald, White, & Gruppen, 2003; Igarashi, Suveges & Moss, 2002; Mann, 1998). This is a crucially important aspect for the inclusion of a needs assessment involving the collection of data. Designing education around wants and demands will

likely not result in the desired outcome – solving an educational need that impacts the organization. So, while a professional should be aware of his or her own educational needs, it is important to use a method to objectively assess these needs (Norman, Shannon & Marrin, 2004) so that accurate, meaningful, and productive CPE results. Increased objectivity in assessing educational needs has increased in recent years (Myers, 1999) and plays a key role in making sound decisions about how to prioritize CPE.

Building on the idea that some sort of needs assessment is conducted every time a CPE program is designed, differentiating between the decision made and data collection is a key element in establishing the importance of a needs assessment. Cervero and Wilson (2006) assert that, "needs assessments are essentially judgments" (p. 111) made by a person, which is not the same thing as the collection of evidence. "Planners always assess what those needs are, whether or not they collect empirical evidence as a basis for that assumption" (p. 111). Though the program planner's experience and intuition may indicate a need, substantiating that experience or intuition is needed to "prove" the need to the organization. Thus, collecting information to determine if a training situation exists and what training would be required to address the situation is the basis of a needs assessment (Sims, 1998). Further, Sleezer (1993) notes that training is but one component of any organization's performance improvement program and the training involved must be developed systematically. This involves assessing what training needs to be included and establishing the value the training will add. When expressed in financial terms, the needs assessment can be used to calculate a return on investment, which can be an important decision-point for organizations (Tobey, 2005). Identifying accurately where

learning needs exist, though costing more upfront, will result in long-term savings and investment (Pennington & Green, 1976).

Conducting a needs assessment not only identifies topics for training opportunities, it also provides more intangible rewards. Learning for the purposes of a current position or function is one consideration for trainers, but so are future positions or functions. Being able to accurately identify future learning needs can help reduce turnover within an organization by demonstrating to the workforce of an organization that their career advancement is important and a necessary concern for sustainable success (Blanzola, Lindeman & King, 2004; Buick & Muthu, 1997; Hanna, Norman & Redfern, 2001; Proenca & Shewchuk, 1997; Tanner, 2002).

Defining "Needs"

According to Aherne, Lamble, and Davis (2001), "The concept of need is one of the most widely used and poorly understood in adult and continuing learning" (p. 9). The literature is full of various definitions of needs and needs assessment. A single, common definition that transcends all applications and is accepted by all its practitioners does not exist (Aherne, Lamble, & Davis, 2001). At the core of the difficulty of a unified definition is the plethora of types of identified "needs" to which an assessment is designed to identify. Implicit in any definition, however, is the fact that assessing needs, in and of itself, is essentially a judgment (Cervero & Wilson, 2006) and "a subjective act – a value judgment – is made" (Igarashi, Suveges, & Moss, 2002, p. 60). As such, a generalized set of specific and prioritized needs across time and location is not possible (Booth & Lawrence, 2001).

In reviewing the literature on needs, I found a wide variety of different needs, with at least 18 named "needs" ranging from those an individual expressed to those of an organization, and even related to society as a whole. These needs range from focusing on what individuals feel he or she requires educationally to focusing on what organizations have identified as a necessary element of the overall strategy for achieving the organization's mission. Depending on the author and his or her perspective, different needs are emphasized and these needs are given different names. While some needs with different names convey the same or similar definition, unique needs are identified and defined.

Caffarella (2002) describes an educational need as being most often defined as "a discrepancy or gap between what presently is and what should be" (p. 114). In all, a few key authors, whose works are heavily cited in the adult education literature, capture a majority of the wide range of definitions available for the term "needs," while throughout their combined literature, one common denominator can be found: the focus on identifying educational needs. These authors, include Bradshaw (1972), Aherne, Lamble, and Davis (2001), and Queeney (1995). This section will explore their views on needs in education emphasizing their similarities and differences.

Bradshaw's taxonomy of needs.

Bradshaw (1972) was one of the earliest writers on the subject of social needs. He identifies four types of needs of society at large, but his model is widely accepted as specifically relevant to healthcare workers' needs (Gibson, 1998; Asadi-Lari, Packham & Gray, 2003). These four include: (a) normative needs, (b) felt needs, (c) expressed needs, and (d) comparative needs.

Normative needs are those that experts in the field identify as a need for those doing the work. An example of this in the EMS context would be the National Registry of EMTs, which dictates what clinical areas and the number of CPE hours in each area anyone wishing to recertify would need to obtain in order to renew his or her certification/license. These needs can also be identified by a panel of experts (Furze & Pearcey, 1999).

Felt needs are those that an individual identifies as what he or she wants to participate in or feels he or she needs in terms of CPE. This definition of a need is similar to "perceived needs" or "self-identified needs" (Igarashi, Suveges & Moss, 2002; Mann, 1998; Warise & Green, 2008) in that it is the individual participant who decides. Queeney (1995) identifies these as wants or desires, which do have a valid place in planning CPE, but which may not necessarily be a true need in terms of improving some underlying performance problem or developmental challenge. Individuals assessing their own needs may be problematic because of self-assessment abilities of individuals. People are not always aware of what learning needs they have, may be unable to accurately assess these needs, or tend to focus on topics they already perform well (Igarashi, Suveges & Moss, 2002; Mann, 1998; Norman, Shannon & Marrin, 2004). However, the idea of individuals' inability to accurately identify learning needs is not assumed by all, specifically Mathews and Nunley (1992) who note that new nurses were adequately prepared to identify their own learning needs. This can, "make explicit the learner's perception of a gap between current and desired proficiencies" (Knox, 2002, p. 52) and are valuable to consider.

Expressed needs, according to Bradshaw (1972), are those felt needs that are translated into action; an articulated demand for the felt need to be satisfied. Unlike felt

needs, the individual with an expressed need is demanding this specific need be addressed (Cowley, Bergen, Young & Kavanagh, 2000). This need may or may not have an educational basis and represents only what individual desires.

Finally, Bradshaw's (1972) comparative needs come from a comparison of knowledge and practice of an individual or the organization with another individual or organization. This comparison may be within the same organization or with an outside organization. The same is described by Aherne, Lamble, and Davis (2001) in which, "characteristics of those in receipt of a good or service with those who are not" (p. 10). In this sense, comparative needs may be strategic in nature and represent a relationship between organizational mission, agenda, and human resource development needs (Sims, 1998).

Aherne, Lamble and Davis' constructs of needs.

Aherne, Lamble and Davis (2001) offer constructs of needs to aid in the understanding of various needs for the planner of continuing medical education. They identify one that Bradshaw identified, comparative needs, but include others: (a) real needs, (b) blind needs, (c) hidden needs, and (d) shared needs. Each of these types of needs focuses on some sort of gap between what currently exists within an organization and what should exist.

Real needs are those deficiencies that actually exist in an individual, group, organization, or community and can be empirically demonstrated. Here, deficiencies are performance or knowledge levels that are less than what is desired or required. These needs, however, "may or may not be recognized by those who have the need" (p. 10). These differ from wants or demands since they identify true learning or performance gaps

(DeSilets, 2006) and are similar in nature to assessed needs (Igarashi, Suveges & Moss, 2002; Queeney, 1995).

Blind needs are those needs that are not initially detected by the learner until he or she is presented with some sort of data to identify such needs. Beach (1982) would call these blind needs as well, but the needs are perceived by the managers and not staff. Inversely, when staff is aware of a need and the management is not, a hidden need is said to exist.

Shared needs are those needs that both staff and managers or other authorities are aware of and are in agreement about (Aherne, Lamble and Davis, 2001; Beach, 1982). Included in these needs are the concerns of the stakeholders of the organization (While, Ullman & Forbes, 2007) or the priority of the needs of a group (Dent, Asadpour, Weiland & Paltridge, 2007).

Queeney's characteristics of needs.

Like other categorization frameworks, Queeney (1995) defines all needs as some sort of discrepancy between current and desired states of being. She is careful to note, however, that these "may or may not reflect wants or demands" (p. 81). In her classification of needs, she considers several characteristics of needs and explains them in terms of, "a series of mutually exclusive pairs" (p. 82). These pairings of needs include: (a) perceived versus assessed needs, (b) felt versus expressed needs, (c) normative versus comparative needs, (d) discrepancy versus maintenance needs, and (e) current versus anticipated needs. Within each type, needs can be either one or the other, but never both.

A perceived need is one where an individual believes he or she has a need. Originating from the individual, this need may differ significantly from an assessed need,

but does give an indication as to the area(s) of weakness or comfort for that individual. Typically, these perceived needs are not associated with something the individual does regularly (Queeney, 1995). The value in this type of need relates to the motivation the individual has in participating in continuing education; if someone believes there is something he or she must learn, that person will be more likely to participate in continuing education. Assessed needs, on the other hand, are identified through some sort of assessment process, which provides evidence to support claims of the need.

A felt need, according to Queeney (1995), "exists when people are reluctant to recognize their educational need" (p. 83). The individual is consciously aware of the need, but does not want to discuss the need. Other times, the felt need is such because the individual has not actively considered the need, feels threatened by the need, or embarrassed that the need exists. During an assessment of needs, an individual with a felt need may view the assessment as a test with the potential for failure. Conversely, an expressed need is one where the individual outwardly articulates the felt need, admitting there is a need to learn something. This individual would most likely view an assessment of needs as a tool to confirm his or her suspicion and to determine how an educational program can best assist in fulfilling this need.

A normative need is a description of deficiencies identified through an assessment as compared to some standard. Experts in the field establish the standard, which states what knowledge, skills, or performance abilities should be met. Comparative needs, on the other hand, are needs which are compared not to a standard, but rather other individuals or groups.

A discrepancy need is one where knowledge and skill has dropped below a defined level. An example of this may be a rarely used skill or rarely accessed piece of information. This gap is the first of three definitional emphases suggested by Leigh, Watkins, Platt, and Kaufman (2000). This is also similar to Atwood and Ellis' (1971) definition of a real need since an objective deficiency is identified and needs to be met. Maintenance needs, however are more difficult to identify and "often are not discovered until they have deteriorated into discrepancy needs" (pp. 85-86).

Current versus anticipated needs classifies needs along a time continuum. In this sense, current needs are those concerned with ongoing activities or those activities related to current responsibilities. Taking a forward-looking approach to identifying needs would steer one to anticipated needs. These would be based on future changes in situations of the individuals involved. Examples would include preparing for a career change, promotion, or some sort of lifestyle change, such as an impending period of unemployment.

Analysis of needs definitions based on evidence to support.

In analyzing these different types of needs, I explored each in terms of the use of evidence to support the claim of "need." Evidence to support a claim of need comes as a result of a systematic assessment. For my analysis, I used Merriam-Webster's definition of "evidence" as an outward sign or something that furnishes proof. This approach sorted each need as: (a) supported with evidence, (b) not supported with evidence, or (c) not explicitly supported with evidence. This analysis is summarized in Table 1.

Table 1

Analysis of Needs Based on Evidence to Support

Category	Need
Supported with Evidence	Real needs Assessed needs Discrepancy needs Maintenance needs Blind needs
Not Supported with Evidence	Felt needs Expressed needs Perceived needs
Not Expressly Supported with Evidence	Comparative needs Normative needs Hidden needs Shared needs Current needs Anticipated needs

Needs that are supported with evidence are the result of some sort of assessment. In this respect, an assessment uses some process that results in data the assessor can use to support the claim of need. The process can be simple or complex, but involves the collection and analysis of data. A real need, being one that *actually* exists rather than *thought* to exist requires evidence to establish the reality. Assessed needs are just that – the result of an assessment, which inherently produces data. Discrepancy needs, are more easily identified through an assessment and are associated with some standard, which needs data to support its position as a standard. Similarly, a maintenance need requires measurement against a standard, but as Queeney (1995) notes, these maintenance needs are usually not discovered until it has deteriorated to a discrepancy need. Finally, blind needs are "identified through audits, records, reports, and key informant interviews with

authority sources/decision makers" (Aherne, Lamble & Davis, 2001, p. 10), which are assessments resulting is data to support the claim of need.

Needs that are not supported with evidence are typically based on what someone feels or voices, but typically cannot provide support for this claim. Felt, perceived, and expressed needs fall in this category based on the reflection of the individual. While these needs may be elicited during an assessment, they are an indication of the individual's perspective, and when taken in isolation are not sufficient data to support a need. These are good indications of a want or demand, which may differ significantly from a need (Queeney, 1995).

Finally, some identified needs may be supported with evidence, though not explicitly stated to be identified by evidence. Comparative needs, for example, simply compares knowledge and practice of one individual or group with another (Bradshaw, 1972; Queeney, 1995). The comparison may be of evidence or it may be of perception. In a similar manner, normative needs involves a comparison, but instead of comparing a data point against another data point, it is compared against a standard. This standard can be arbitrary or it can be the result of an assessment, both by experts. Hidden and shared needs fall into this category and can be identified through reviewing published data or benchmarking or by a simple report of an individual who was asked about their views (Aherne, Lamble & Davis, 2001). Current and anticipated needs relate to ongoing activities within an organization, shifts in individuals' responsibilities, or changes in the environment. These can be arbitrary or based on "employment projections, trend data, and other information" (Queeney, 1995, p. 86).

Summary of definitions of needs.

In the above section, various perspectives of "needs" were explored and are summarized in Table 2. Among the definitions discussed, all have some degree of educational involvement. Bradshaw's (1972) taxonomy of needs centers on how the need is identified, whether by the individual, an expert, or by a comparison with someone else or by some standard. Aherne, Lamble, and Davis (2001) classify by who does the identifying. Situated in a work setting, needs can be apparent to the staff whom actually do the work or by the management who oversees the workers. Depending on the group that identifies a given need, one group or the other may not see the need or both may see the need. In either case, the need is one that is real and based on a deficient state. Queeney (1995) views needs as a set of paired comparisons where, like Aherne, Lamble, and Davis, a state of deficiency in performance or knowledge is said to exist.

Unlike others, Queeney (1995) is careful to distinguish wants or demands from actual needs. Her mutually exclusive pairing of needs helps to understand key differences between those needs that are sensed by the learner or identified through an assessment. This includes whether or not the learner explicates the need or keeps it to him- or herself, whether the need is based on a standard or as compared to another person or group, is a need based on deterioration of knowledge or skill or to maintain a current state of knowledge or skill, or whether it addresses a current need or a need somewhere in the future.

In examining how EMS CPE educators conceptualize *needs*, an emphasis in my study will be placed on Queeney's (1995) taxonomy. Influenced by Bradshaw, Queeney's taxonomy embodies the essence of all three reviewed taxonomies and her

Table 2

Summary of Needs

Author(s)	Type of need and description
Bradshaw (1972)	Normative: Identified by experts. Felt: Identified by self. Expressed: Felt needs translated into action. Comparative: Needs as compared to someone or something else.
Aherne, Lamble & Davis (2001)	Real: Actual need based on deficiency. Blind: Needs identified by management but not staff. Hidden: Needs identified by staff but not management. Shared: Needs identified by both staff and management.
Queeney (1995)	Perceived vs. assessed: Thought to exist versus systematically determined to exist Felt vs. expressed: Self-identified versus self-identified and made explicit. Normative vs. comparative: Expert identified versus a comparison with someone or something else. Discrepancy vs. maintenance: Deterioration of knowledge versus preserving current knowledge. Current vs. anticipated: Needs of current job or position and needs of a future job or position.

pairings are broad enough to capture the majority of the 18 needs identified in the literature. Further, her description of needs best reflects my EMS education experiences over the last 15 years. I will, however, be viewing the needs as ten individual needs rather than mutually exclusive pairings of needs. Doing so provides for a logical approach to examining the yet unstudied area of how EMS CPE educators identify and prioritizes CPE needs. In EMS, educational designers tend to focus on the perceived needs of the prehospital care providers with little or any “evidence” to substantiate these needs prior to taking action. Additionally, there tends to be a heavy focus on current deficiency needs in order to bring substandard knowledge and performance up to an acceptable level.

Defining "Needs Assessment"

Queeney (1995) offers one of the most comprehensive definition of what a needs assessment is for CPE: "Needs assessment is a decision-making tool for continuing educators' use in identifying the educational activities or programs they should offer to best meet their clients' – and society's – educational needs" (pp. 1-2). Though the literature does not have a single definition encompassing all situations where a needs assessment is used (Watkins, Leigh, Platt & Kaufman, 1998), the process Queeney defines combines data collection with making value judgments (Knox, 2002). It is said that needs assessments are essentially judgments and a common mistake made by practitioners relative to this concept is confusing this with data collection (Cervero & Wilson, 2006). Thus, the total process of a needs assessment includes identifying gaps, prioritizing the order of importance these gaps, and selecting interventions to reduce the gaps (Rothwell & Kazanas, 2004). For this study, I define a needs assessment as an activity or activities employed to collect and analyze relevant information to enable EMS educators to identifying and prioritize educational topics for educational activities within the CPE realm. This combines both the data collection and analysis with the judgment call made by the assessor.

Emphasizing a process and not an isolated activity, Lawson (1998) defines a needs assessment as, "the process of determining the cause, extent, and appropriate cure for organizational ills" (p. 1). This is similar to Knox's (2002) perspective that the process can help identify problems and opportunities since preconceived ideas of what is happening and why does not exist; it is up to those conducting the assessment to discover relevant facts and overlay values to create understanding and propose solutions. Gupta,

Sleezer, and Russ-Eft (2007) share a process orientation in their definition by stating a needs assessment, "is a diagnostic process that relies on data collection, collaboration, and negotiation to identify and understand gaps in learning and performance and to determine future actions" (p. 15). Since needs assessments involve many people, the processes are inherently political. As such, multiple interests are going to be involved and negotiating conflicting priorities among stakeholders becomes a significant facet of any assessment (Cervero & Wilson, 2006).

Lastly, needs assessment can be defined by the level to which they probe potential issues of need. Queeney (1995) suggests that assessments can range from simple to complex. On the simple end of the spectrum, such assessments may be based on a single person's observation or opinion of what is going on. Conversely, a complex assessment may involve a number of steps, measurement instruments, and interpretations of data before a conclusion is rendered. Kaufman and English (1979) identified six levels of increasingly complex forms of needs assessments: (a) alpha focuses on the nature and cause of problems, (b) beta focuses on employee performance with solutions that have cost-benefit practicality, (c) gamma explores alternative solutions to performance problems, (e) delta examines the difference between what is and what should be, (e) epsilon looks at differences between desired and actual performance results, and (f) zeta involves a continuous evaluation and regular feedback to maintain performance.

Some authors differentiate between needs assessments and needs analyses. Rothwell and Kazanas (2004) see the difference between these are in the details. Specifically, they say a needs assessment identifies gaps and places them in order of priority. A needs analysis, which happens after a needs assessment, attempts to uncover

the causes of these gaps. Whereas an assessment provides justification for allocating resources to address an identified gap (Aherne, Lamble & Davis, 2001), an analysis reaches deeper to identify influences of causation, which may not include needs addressable with education. Gould, Kelly, White, and Chidgey (2004) assert that a "Training needs analysis is the initial step in a cyclical process which contributes to the overall training and educational strategy" (p. 471). The authors describe three aims of a training needs analysis, which mirror more of an instructional design process than just identifying education topics or causation of gaps: (a) planning, (b) execution, and (c) outcomes. Dent, Asadpour, Weiland, and Paltridge (2008) and While, Ullman, and Forbes (2007) describe similar definitions of a training needed analysis, which focus on identification of tasks, knowledge, or skills necessary to perform a specific function on the job with the latter including a process for which these skills can best be acquired. Lastly, Sheperd (1995) asserts there are three aims of a needs analysis: (a) assess/examine perceived learning needs relevant to current and future development, (b) identify nurse managers' perception of direct reports' learning needs, and (c) to provide information for program planners in order to build meaningful education. Based on the varied, yet similar description of *needs analysis* in the literature and how different authors use *needs assessment* and *needs analysis* similarly or interchangeably, there does not appear to be a significantly different meaning attached to each so as to call them completely different concepts.

Needs Assessments Frameworks and Methodology

As stated above, needs assessments can take many forms and exist along a continuum from simple to complex (Queeney, 1995). All of these forms would constitute

a needs assessment. In fact, by merely considering the options for training topics, a CPE planner is, by definition, engaging in a needs assessment since, "Planners' judgment about whose interests matter and what their needs are constitute the needs assessment" (Cervero & Wilson, 2006, p. 117).

How complex a needs assessment should be is based on the resources available (Caffarella, 2002; Queeney, 1995; Cervero & Wilson, 2006). While an inclusive process of data collection and analytical processing of findings may yield an accurate reflection of training needs and be the ideal, if an organization does not have the resources available to conduct such an assessment, this method may be of little benefit. One has to work within the constraints of his or her unique situation. "With an ambitious needs assessment, availability of resources such as money, technical services, volunteers, and in-kind contributions can be crucial for successful implementation" (Knox, 2002, p. 51). Such assessments are time-consuming and expensive and "few organizations are willing to make that kind of investment" (Lawson, 1998, p. 3). Thus, how well a needs assessment is planned and conducted is more important to its usefulness and value than how sophisticated the process (Queeney, 1995).

The complexity of the structure will impact the strategies used to collect data, if data is to be collected. As suggested by Rothwell and Kazanas (2004), a needs assessment plan is needed that addresses several key issues to include data collection methods and specifications for instruments and protocols. These two components of the assessment plan will dictate what tools will be used and in what manner in order to collect needs assessment data. While no one method of identifying CPE topics is ideal, some needs assessment techniques are better suited to individualized situations than

others. Caffarella (2002) offers the following criteria to help the program planner determine which technique(s) will be best for his or her needs assessment situation (p. 122):

- Consider characteristics of the target group(s) for the potential programs(s);
- Determine how much involvement is reasonable in collecting data from potential respondents;
- Estimate time, cost, and other constraints;
- Ascertain type and depth of data required;
- Consider ability of planning staff members to use the technique(s);
- Use, where appropriate, a combination of techniques that yield different kinds of data.

Queeney (1995) proposes a similar set of criteria, but includes considering the range of feasible program possibilities as well as determining which types of needs are most relevant in the current situation. Additionally, Pearce (1998) offers a four-stage process to determine whether a structured needs assessment is even warranted. In her model, she tells us to start by voicing ideas about the proposed program followed by conducting an initial assessment to identify general needs. Next, the planners' reasons for the program are examined followed by asking the question of whether a structured needs assessment is needed. Using any one of these methods or a combination thereof will provide the program planner ample information as to how detailed and/or structured a needs assessment should be as well as which techniques should be used to collect the data.

Models of Needs Assessments

A number of models have been developed over the years to show the process of conducting a needs assessment. Most of these models are part of a larger process of planning programs or of instructional design. While this list is not all-inclusive, five models appear frequently in the literature and warrant discussion. These models include the: (a) Purpose-Based Assessment (Rossett, 1987), (b) Systems Approach Model (Murk & Wells, 1988), (c) Four Phase Needs Assessment Model (Burton & Merrill, 1991), (d) Organizational Elements Model (Kaufman, Rojas & Mayer, 1993), and (f) Triple-Mode Model (Houle, 1980).

Purpose-based assessment.

According to Rossett (1987), "Successful assessments are based on careful planning" (p. 226). Her six-step training needs assessment model focuses on systematic planning to investigate performance problems. Her approach emphasizes the need to carefully look at and understand any given problem before committing resources to address the problem. Her first step is to assess the context in which the problem exists, allowing one to anticipate what resources and constraints may be faced during the rest of the process. Second, the purpose(s) for conducting the training needs assessment must be defined. This provides clear direction for the rest of the process. Third, the proper tools and techniques should be selected to collect data. These are the typical strategies and tools such as task analysis, interviews, questionnaires, reviewing performance data, and the like. Next is developing a training needs assessment plan. This represents the first real product of the assessment process where a written plan is developed using the information gathered in the previous steps and "forces you to write down what you have

figured out about context, purpose and information-gathering options" (p. 236). Being a holistic picture, this general plan is advanced with step five, which "is the designer's work sheet for planning the details of each stage of inquiry" (p. 239). Throughout the process, there is only one training needs assessment planner (step four), but there will be many stage planners, each one detailing a single stage of the overall plan. The final step of the process is to communicate the results. This occurs in two ways: during the training needs assessment and after the assessment is complete. In the former, the planner communicates findings during the process. In the latter, results of the entire process are shared and recommendations are made.

Systems approach model.

Designed as a program planning model, this model is composed of five interrelated, but independent, components. Each component is such that they can be worked through in a linear fashion or can be processed simultaneously two or three at a time. Focusing on the needs assessment component of the model, key elements Murk and Wells (1988) suggest including are: (a) the major purpose of the training, (b) who will be attending, (c) the target population's needs and interests, (d) educational and financial limitations, (e) categorizing and evaluating currently existing programs for fit, and (f) establish training priorities. As part of this assessment, both formal and informal assessment techniques are employed to collect empirical data, with surveys, questionnaires, and personal conversations being key assessment tools. Since the model is designed to be started at any point, the program planner has the ability to take a systematic approach to planning and designing effective programs "according to the conditions or most pressing need or urgency" (p. 47).

Four phase needs assessment model.

According to Burton and Merrill (1991), there are four basic phases of activities associated with determining learning needs. The only difference between a needs assessment at a lower level, such as a course of instruction, and a higher level, such as learning goals at a state or national level, is "largely in the degree of specificity of goals" (p. 26). As such, the model is a simple one. The first phase involves identifying a broad range of possible goals. This can use a variety of approaches, including surveys, committees, group brainstorming sessions, a Delphi technique, or the like. The second phase takes these broad goals and prioritizes them in order of importance. Using a broad spectrum of input, this list of priorities should be a consensus and is the "'ought to be' portion of the needs assessment" (p. 27). Phase three identifies discrepancies between expected and actual performance and is composed of two parts: (a) determining current performance levels, and (b) comparing current performance to desired performance. In the final step of the process, priorities for action are set. This involves subjective decision-making and can be accomplished in a number of ways to include setting criteria, cost analysis, priority of length or utility, or similar.

Organizational elements model.

Kaufman, Rojas, and Mayer's (1993) Organizational Elements Model of needs assessment links and defines an organization's desired external and internal results across five elements: (a) inputs, (b) processes, (c) products, (d) outputs, and (e) outcomes. Additionally, three levels of needs assessments are considered in relation to these elements: mega, macro, and micro. This model of needs assessment considers both the internal and external factors that may be influential in organizational problems. Each

level has its own separate process for assessment and attempts to identify alternative methods and means to address each level's issues. The mega-level needs assessment focuses on the "organization's ideal vision, including indicators of its impact on the survival and quality of life of its external clients and society" (Kaufman, Rojas & Mayer, 1993, p. 14), such as public health, safety, or the environment. The macro-level needs assessment focuses on what the organization delivers to external clients in terms of quality of products. It is a process "for identifying and resolving gaps between the actual and desired quality of what your organization delivers to external clients" (p. 53). Micro-level needs assessments "determine individuals' and/or groups' required performance in terms of measurable accomplishments" (p. 16). It focuses on closing gaps in quality results of individuals and groups within the organization that are produced and delivered to others within the organization. Findings from assessments within each of these levels and among each of these elements represent potential training needs of members of organization. Once these are presented for concurrence on priority, training interventions can be developed.

Triple-mode model.

Houle's (1980) model for planning CPE programs is comprised of ten steps, the first six of which focus on identifying learners' needs. In the first step, a list of criteria for essential performance elements is developed. This is to "discover what is essential to the most effective operation of the entity" (p. 231). Next, these criteria are reviewed to decide how they are best accomplished. This is done using professionals in the field. Following this step, a determination is made of what would be substandard performance. Fourth, these standards are then presented to workers in the profession for approval and

buy-in. Fifth, data are collected on current staff performance in the entity in question. Finally, these data are compared against the standards set in the earlier steps in order to identify performance deficits. Additionally, an inquiry into the cause of these deficits is made during this sixth step so as to identify reasons for the performance gaps. These steps, as the first steps in Houle's program planning model, systematically assess needs for improving performance.

Analysis of needs assessment models based on evidence, subjectivity, and politics.

In analyzing the different models of needs assessments, I explored each in terms of the use of evidence, the allowance of subjectivity, and the potential for political influence in the process of identifying needs. Each modeled combines evidence, subjectivity, and politics in varying amounts, which has the potential to yield different results, and thus, different types of needs. Further, the environment in which the needs assessment is conducted may be best suited to a particular combination of evidence, subjectivity, and politics.

As with the previous analysis of needs above, I employed the use of Merriam-Webster's definition of "evidence" as an outward sign or something that furnishes proof. The more a model uses empirical data as the source of evidence, the more the decision can be based on this evidence, and thus, have the potential to yield more needs supported by evidence. The model that uses the most empirical evidence to support needs assessment results is the purpose-based assessment (Rossett, 1987). This model weighed heavily on a systematic process for investigating performance problems with an emphasis on understanding the problem, defining the purpose for assessing the needs, selecting and using proper tools for collecting and analyzing data, considering resources and

limitations, and careful documentation of the process throughout. Thus, of the five models presented, this model has the potential to yield the most real, assessed, discrepancy, maintenance, and blind needs. The model that uses evidence the second most to support the needs assessment results is the systems approach (Murk & Wells, 1988). Like the purpose-based assessment, knowing the purpose for the assessment is important, as are the limitations that impact the results. This systematic process prioritizes the training needs of the target population and factors in the availability of ready-made programs that could potentially satisfy those needs.

As mentioned, each model offers a different level of allowance for subjectivity. Subjectivity results from the inclusion of stakeholder judgment; the more weight that is placed on judgment, the more subjective, and subsequently less objective, the needs assessment process. The four phase needs assessment model (Burton & Merrill, 1991) uses data primarily in the form of stakeholder input on possible goals, thus allowing for a high level of subjectivity as compared to the purpose-based assessment, which focuses primarily on empirical data in the form of performance indicators. Though in the four phase needs assessment model, systematic processes for evaluating stakeholders' viewpoints on goals is used to determine a prioritized list of actions needed, the systematic process does allow for a decidedly more subjective determination of performance discrepancies while assessing need. Similarly, the Triple-mode model (Houle, 1980) allows for a high level of stakeholder subjectivity when determining what is essential and for establishing criteria to evaluate performance elements, though care is used to identify causation and assessing needs for improving performance. The most subjective of the five models is the organizational elements model (Kaufman, Rojas, &

Mayer, 1993). Their approach places less emphasis on the collection and analysis of empirical data, choosing to focus, instead, on a large range of stakeholders' perspectives and the perceived gaps in performance.

Politics results from the degree of influence a stakeholder or stakeholder group has on the needs assessment process. This differs from subjectivity in that with subjectivity, all stakeholders have the potential to be heard equality. For models influenced by politics, one particular stakeholder or stakeholder group has the potential to hold more sway over the process and the outcome of the process than all other stakeholders. While no needs assessment model is completely immune from the influence of politics, those utilizing the most empirical data to assess needs are inherently less susceptible to the sway of a stakeholder than those with processes that seek the judgment of stakeholders. Therefore, the purpose-based assessment model and the systems approach model are less likely to be politically influenced than four phase needs assessment model, the organizational elements model, and the triple-mode model.

Summary of models of needs assessments.

A multitude of models of needs assessment exists throughout the CPE literature. Among these, five emerge as significant for identifying CPE needs within organizations. Each of these models share common elements as well as unique features, which enable each to have a slightly different focus during the needs assessment process. A summary of these elements are included in Table 3. The Purpose-Based Assessment (Rossett, 1987) emphases careful planning during the needs assessment process and focuses on improved performance with resource constraints in mind. The model stresses the need to formally document the details of the assessment as a tool to accurately complete the

process and successfully identify CPE needs. This model uses a high level of empirical data and allows for less subjectivity than other models. It also has a higher potential to be resistant to the influence of politics.

The Systems Approach Model (Murk & Wells, 1988) takes a similar systemic view of the organization in the assessment process, but the focus is on the needs and interests of those who will be attending the CPE as well as resource limitations that may impact the CPE. In this model, both formal and informal techniques are employed to collect data for the assessment and prioritizing CPE needs is a major concern. This model uses a high level of empirical data, but allows for some subjectivity with the inclusion of the target population's interests.

Burton and Merrill's (1991) Four Phase Needs Assessment Model concentrates on the learning needs of CPE participants and identifies a broad range of CPE opportunities in an initial phase with prioritization of those opportunities is a later phase. This model is prone to subjectivity, as judgment by assessors is emphasized in this model whereby the decision-makers can use a variety of criteria for priority based on what is most important to them at the time of the assessment.

The Organizational Elements Model (Kaufman, Rojas & Mayer, 1993) takes a broader perspective of the organization's responsibility to stakeholders in assessing CPE needs, specifically its internal and external clients as well as society at large. Five elements are involved in the assessment process including the inputs available, processes involved, products and outputs produced, and the outcomes that result. Like the Four Phase Needs Assessment Model, this model is inherently more subjective.

Houle's (1980) Triple-Mode Model is a multi-step process focusing on the learners' CPE performance needs. The majority of the steps in this model are used to determine factors related to the learners, such as what is most important to them, how they best learn, what performance measures are important, and how learner buy-in can be made. The CPE needs identified using this model is deficiency-oriented in that substandard performance is taking place. Unique, however, is that the causes of the deficiencies are considered during the assessment process.

As noted earlier, while no one method of identifying CPE topics is perfect,there are some needs assessment techniques that are better suited than others to an individualized situation. In the context of assessing and prioritizing EMS CPE needs, selected needs assessment techniques should allow for both the collection empirical data and the inclusion of stakeholder judgment. Further, the selected needs assessment techniques should also allow for the management of the influence of politics, as too much political influence in the needs assessment process can result in lower quality results. Additionally, any assessment should take into consideration the abundance of standardized courses available for EMS CPE.

Thus, for this study, I am influenced mostly by the systems approach (Murk & Wells, 1988) to assessing needs. This approach is most appealing due to its whole-system orientation, as the educational intervention is but one aspect of successful continuing professional education. Aspects beyond the classroom need to be considered as the educational planner attempts to identify and prioritize continuing professional education topics. In addition, two specific elements of the organizational elements model (Kaufman, Rojas & Mayers, 1993) have influenced my approach to studying needs

Table 3

Key Elements of Needs Assessment Models

Model	Key Elements of Model												
	Systemic Assessment	Performance-based	Learner-focused	Formal(F) / Informal(I) process	Financial considerations	Expertise considerations	Resource considerations	Data collection	Identify CPE needs	Prioritize needs	External considerations	Results –oriented	Identify non-CPE needs
Purpose-Based Assessment	x	x		F			x	x	x				
Systems Approach Model	x		x	F/I	x		x	x	x	x		x	
Four-Phase Needs Assessment Model	x	x		F	x			x	x	x			
Organizational Elements Model	x	x		F				x	x	x	x	x	
Triple-Mode Model	x	x		F				x	x	x			

assessments for continuing professional education in EMS: consideration for internal and external forces and impact on individual, group, organization, and external client levels. With my experience in EMS education, the systems approach with the two elements from the organizational elements model makes the most sense for my study approach and are present in my measurement framework presented in chapter 3.

Techniques for Data Collection

Various techniques can be used to collect data for the purposes of conducting a needs assessment. In the literature, no less than 21 different techniques are described. A list of the most commonly used techniques is provided in Table 4. Among these techniques, the most commonly referenced are surveys, interviews, observations, and task

analysis, and thus, will be discussed in this section. The Delphi technique is a more complex technique for identifying needs that the nursing field has used extensively and will be included as well. While a multitude of techniques exist and have been used in the literature, I will limit discussion to these techniques mentioned because they are the most prevalent and yield good results by those who employ them in a needs assessment process. Finally, a discussion of data collection strategies as described by Johnson and Turner (2003) will conclude the section as the influencing framework used in this study.

Of all the techniques to collect data mentioned in the literature, by far, the most commonly used technique is the survey or questionnaire (Cordero et al., 2004; Furze & Pearcey, 1999; Pololi, Dennis, Winn & Mitchell, 2003; Rosette, 1987). A survey can be used to identify CPE topics or used to develop content after a CPE topic is selected. Using this technique, a variety of data can be collected to include the respondents' perceived or felt needs or their opinions to what should be included as CPE as well as scheduling or delivery preferences (Dillman, 1999; Gibson, 1998). Unfortunately, to design a custom survey that will accurately assess the desired information is a complex process requiring careful design of the survey items (Mann, 1998). Writing such items is a difficult task and needs to be done while taking into consideration the audience, as people taking surveys are often untrained and undisciplined in assessing personal knowledge and skills (Spivey, 2005). Additionally, items should be asked in such a way that the respondent is forced to critically reflect on his or her needs. Of particular importance while using a survey is to include items regarding contextual information, as it is -important to have a "thorough understanding of the individual and contextual characteristics" (Guthrie & Schwoerer, 1994, p.419). Often, the use of surveys is in

Table 4

Data Collection Techniques from the Literature

Technique
Advisory committee
Brainstorming session
Delphi Technique
Dialogue
Document analysis
Expert panels
Focus groups
Group sessions
Literature review
Nominal group technique
Observations
Qualitative interviews
Self-assessment
Staff audits
Surveys
Task analysis
Tests

conjunction with other techniques (Mann, 1998), such as the Delphi technique, or to corroborate other findings (Gould, Kelly, Goldston & Maidwell, 2001).

Another frequently used method of data collection involves interviewing respondents directly. Interviews "allow instructional designers the flexibility to question knowledgeable people, probing for information as necessary" (Rothwell & Kazanas, 2004, p. 68; Gupta, Sleezer & Russ-Eft, 2007). Structured interviews follow a set of questions where deviation does not take place, whereas an unstructured interview allows the interviewer to deviate from planned questions as needed to obtain critical details. Interviews can be accomplished one-on-one with the respondent or in a group, over the phone, in person, or online (Caffarella, 2002). Typically, only a few open-ended questions, which are intended to solicit personal views and opinions, are asked (Creswell,

2003). Though this method does provide instant feedback and flexibility, it can be expensive and time-consuming to conduct and requires a person skilled in interviewing (Caffarella, 2002; Gupta, Sleezer & Russ-Eft, 2007; Rothwell & Kazanas, 2004; Lawson, 1998).

A number of other techniques for collecting data have been used for the purpose of identifying CPE needs. Among these, observation of performance and task analysis appear to be common (Caffarella, 2002; DeSilets, 2007). With observations, the subject's job performance is observed as it happens, providing the researcher with the actual characteristics of the job to include things such as "time-motion studies, task listings, behavioral frequency counts, the recording of critical activities or events, and unstructured observations" (Caffarella, 2002, p. 120). Further, in a task analysis, "a flowchart is made that depicts the steps (for a procedural task) or the principles, guidelines, and causal models (for a heuristic task) experts would use to decide what to do when" (van Merriënboer & Kester, 2008, p. 449). This detailed process of task deconstruction allows the educational designer to separate steps in a task performance into discrete steps (Sullivan, Ortega, Wasserberg, Kaufman, Nyquist & Clark, 2008). According to Loughner and Moller (1998), this involves five distinct functions: (a) inventorying tasks, (b) describing tasks, (c) selecting tasks, (d) sequencing tasks and task components, and (e) analyzing performance and content levels. Another technique for collecting data involves the use of a group of people for the purpose of brainstorming ideas or coming to a consensus on ideas, as in a nominal group technique (Rothwell & Kazanas, 2004).

The Delphi technique, developed by the RAND Corporation in the 1960's, is a method for collecting data for identifying CPE needs that blends together multiple techniques (Burton & Merrill, 1991; Queeney, 1995). This method is particularly useful when multiple perspectives are desired or when a wide range of possibilities are sought. Unique to this process is that after generalities are identified, recursive steps are used to refine these until specific needs are identified. Though many variations of this technique exist, the general process involves approximately three rounds of questioning as follows:

- First, open-ended questions are asked of the respondents.
- Second, round one questions are processed into a questionnaire asking respondents to rate importance of the items.
- Third, round two answers are processed into a second questionnaire asking respondents to rank the agreement of priority.

One of the strengths of this method is its ease of administration. Being written communication, this technique does not require all members of the responding group to be in one place at one time (Knox, 2002; Queeney, 1995), though small group interaction can be used as a means for data collection via the Delphi technique (Rothwell & Kazanas, 2004). A drawback to this technique is the number of respondents needed for sufficient data. Without enough responses, the data may not be meaningful enough to make appropriate decisions (Queeney, 1995).

This technique has been successfully used in the medical field with nurses. Gibson (1998) used the Delphi technique to identify a diverse range of views on both blind and hidden needs of nurses' continuing professional development needs. In her study of needs, five areas were considered: (a) current needs, (b) future needs, (c)

approaches to learning preferred by the respondents, (d) factors that helped or motivated the respondents, and (e) factors that hindered or demotivated the respondents. This technique "proved to be a useful method for identifying a wide range of issues having an impact [on learning]" (p. 456). This is particularly significant given learning needs alone are not the only factors at play in professional development.

In a similar study, Broomfield and Humphris (2001) used a Delphi technique to investigate the educational needs of general practitioners as they relate to cancer education. In their study, a panel of experts in the field of general practitioners was selected and administered open-ended questions regarding patient management and associated training needs. The responses were used to develop the next questionnaire, which asked respondents questions on a Likert scale rating importance. The responses then were used to generate the next questionnaire, which asked respondents questions rating agreement of priority using a Likert scale. In this study, the use of experts brings to light one of the other critiques of this technique – defining and selecting the experts.

Johnson and Turner (2003) propose there are six major types of data collection methods: (a) questionnaires, (b) interviews, (c) focus groups, (d) tests, (e) observations, and (f) analysis of secondary data. This compilation of strategies encompasses all strategies noted above and provides a concise framework for conceptualizing this study. Additionally, this framework is repeatedly cited in the literature on mixed method research and is highly recommended as the typology to follow (Leech & Onwuegbuzie, 2010; Onwuegbuzie, Jiao & Collins, 2007).

Data Analysis

There are three main ways data can be analyzed and needs prioritized: (a) themes, (b) statistics, and (c) requests/mandates. Reliability and validity is of concern with the data. Further, since program planners are making judgments about learners' needs relative to their interests, it will always remain a political process and value-laden (Cervero & Wilson, 2006).

Once data are collected, they can be sorted and analyzed by way of themes or categories (Gupta, Sleezer & Russ-Eft, 2007). Whether these categories are selected from another course or emerge from the data, they provide a picture of what needs exist. Frequency of appearance of a particular subject or event may indicate a need. For example, in a study of the learning needs of dietetic technicians, registered (DTR) and registered dietitians (RD), Keim, Johnson, and Gates (2001) collected data from learning portfolios completed by the DTRs and RDs and identified learning needs using a content analysis process. By reading each portfolio and entering data into a qualitative analysis software package, they were able to analyze "the perceived learning needs for common phrases and…generated major and subcategory frequencies based on the number of times a category was mentioned" (p. 699). Similarly, Hannon (2000) interviewed physician interns regarding training needs and priorities following medical school. The interviews employed open-ended questions in a semi-structured format. As transcripts of the interviews were analyzed, topics were noted in the margins and these descriptive data were organized into major themes of issues discussed by more than 80% of the interviewees. In a survey-based strategy for data collection, Robinson, Barry, Renick, Bergen, and Stratos (2001) collected data from primary care physicians on their interest

in specific geriatric topics. On the survey, these topics were provided and the responses collected were summarized by frequency of selection. Further statistical analyses were conducted as well, however, the frequencies were considered "to differentiate level of interest among geriatric topics, rather than between geriatrics and other competing interests" (p. 967).

Statistics can be used to provide a more detailed examination of the data or to provide a basis for prioritizing the results. "In most needs assessment, quantitative data analyses are limited to descriptive statistics" (Gupta, Sleezer & Russ-Eft, 2007, p. 68), but can also provide test "evidence" of a particular phenomena. Often these data are analyzed using descriptive measures such as frequencies, means, medians, and modes (Rothwell & Kazanas, 2004) with frequency distribution being most common (Knox, 2002). Other measures often used include an indication of range, or the spread of measures, and standard deviation (Gupta, Sleezer & Russ-Eft, 2007). An example of quantitative analysis using simple statistics includes a study of educational and organizational needs of staff nurses and occupational therapists using a Delphi technique. The statistics generated included mean competence scores in each of six methods as well as mean competency scores for a combination of four methods. Additionally, a Spearman's rho was reported, which gave an indication that participation in post-qualification training tended to report the highest levels of competence. An example of a more in-depth and complex statistical analysis is that of Bray, Martin, Cooper, Barger, Bernard, and Bladin (2005), who used several statistical procedures to score and test measures from their study of use of a stroke scale by paramedics. These analyses included a Student's t-test, confidence intervals, chi-squared analysis, and a

nonparametric Mann-Whitney rank test. While most of the studies reviewed included descriptive statistics (mean, median, standard deviation, etc.) other statistical tests were noted to be used in analyzing quantitative data, to include: analysis of variance (ANOVA) (Claflin, 2005; Fitzgerald, White & Gruppen, 2003; Gould, Kelly, Goldstone & Maidwell, 2001; Stratton et al., 1991; While, Ullman & Forbes, 2007; Witzke et al., 2008); factor analysis (Guthrie & Schwoerer, 1994; Pololi, Dennis, Winn & Mitchell, 2003; While, Ullman & Forbes, 2007), Fisher's LSD (Báez et al., 2005); regression analysis (Guthrie & Schwoerer, 1994); Chronbach's alpha (Claflin, 2005; Guthrie & Schwoerer, 1994; Pololi, Dennis, Winn & Mitchell, 2003); Pearson product-moment coefficient (Fitzgerald, White & Gruppen, 2005; Igarashi, Suveges & Moss, 2002), and; Spearman's rank (Igarashi, Suveges & Moss, 2002; Milne & Roberts, 2002).

Interestingly, in Claflin's (2005) study of CPE needs of acute and long-term care nurses, use of different statistical procedures resulted in a difference of significance. Thus, the statistical procedure used impacted the priority of needs. Specifically she found that with ANOVA, the topic of "pressure ulcers" was a priority, however with a post-hoc test (Tukey's HSD method), significance was not identified. This illustrates the importance of the program planner understanding the strengths and limitations of statistical procedures, should they be used, as well as understanding the appropriate use of each testing procedure.

Decision-Making

From these data analyses, a potentially long list of training ideas has to be prioritized. Caffarella (2002) suggests three major factors, individually or in some combination, need to be considered to select the topic or topics for training. First, the

people factor focuses on the knowledge and skill of those involved and the question of whether these people already know or do not know the content proposed. The second major factor includes organizational and environmental factors. This would include those things outside of the individual, such as lack of proper equipment, newly imposed legislation, or change in organizational philosophy. The third factor, cost, considers the time, money, and staff involved in the intervention. It is an analysis of the costs of the proposed training as compared to the benefits that may be realized as a result of the training.

Politics, and not just data collected, also impacts the identification and prioritization of CPE. Influential persons from both inside and outside the organization may dictate certain topics take priority, independent of and sometimes even in contradiction to any data collection or analysis. From within the organization, an influential person, whether the influence is based on hierarchy or some other factor, may direct CPE topic selection in a biased direction. Similarly, outside the organization, factors such as changes in the field, scope of practice, legislative mandates, or certifying/licensing body mandates may influence the priority of training topics. Despite evidence demonstrating objectively certain facets of need, "Educational planners should also be aware that interests related to political needs are often as important as educational needs, if not more so" (Cervero & Wilson, 2006, p. 115) and, thus, need to include this in the decision making process. It is important to remember that decisions are made throughout the needs assessment process and not relegated to any particular part of the process.

Regardless of how topics are finally selected, an important concept to consider is to triangulation of results (Hicks & Hennessy, 1998). “Combining at least two data points enriches assumptions and increases validity in the identification of learning needs and helps to overcome the weakness of any one technique” (DeSilets, 2007, p. 112). Since a large number of factors influence these decisions, investigating such an important issue as CPE should involve a multi-stakeholder perspective and include multiple measurements, when and where appropriate, and feasible. No topics are equally prioritized by different methods (Cantillon & Jones, 1999; Milne & Roberts, 2002; Queeney, 2002). Additionally, failing to consider different methods and perspectives can have an impact on generalizability. Sampling issues, for example, may discourage full generalizability to a larger population (Booth & Lawrence, 2001). Thus, a set of prioritized needs for a small, select group of prehospital care providers may not be the same set of priorities for another group of the same size or a larger group.

Chapter Summary

While there is research available on the CPE of prehospital care provider, the volume available pales in comparison to other closely-related medical fields. Issues that prehospital care providers have to contend with relative to CPE include access to programs while those who conduct these programs face issues of achievement, connecting CPE to patient outcomes, and educator development. A review of the studies published emphasized evaluating teaching methods and feasibility of lower levels of providers performing more advanced levels of care. Needs assessment was rarely discussed in the EMS literature and when it was, it usually focused on topic development versus isolating learning needs.

The curricula to date used to prepare EMS educators has succeeded in developing presenters, but not in developing educational designers. None of the curricula for EMS educators, whether it be to conduct one-day training courses or a full paramedic program, adequately address assessing needs for CPE. Further, the texts written specifically for the EMS instructor mention the importance of needs assessment but offer no guidance in doing so. The only exception is *Foundations for the Practice of EMS Education* by Melissa Alexander (2006). This book dedicates three chapters to instructional design matters and includes an entire chapter on needs assessment.

A review of state qualifications for instructor status revealed a similar disappointment in the lack of preparation of the instructor for identifying CPE needs. Additionally, studies within state jurisdictions demonstrate a need for CPE to be tailored to the local audience, which would necessitate the conducting of needs assessments.

Other related fields demonstrated different issues of importance. The physician literature carried themes of CPE effectiveness, CPE system reform, and a focus on context being included as important for physician learning. The nursing field, which is where the majority of CPE research emerged from, had themes related to impact of CPE on patient outcomes, program planning, and the voluntary versus mandatory nature of CPE as a component of relicensing of nurses.

The needs assessment literature demonstrated an ongoing debate on defining needs and needs assessment. Various definitions of what constitutes a "need" as it relates to CPE remains pervasive in the literature and has produced a large number of interpretations. Regardless of the definition, the overall concept of a needs assessment is the identification of a current state of existence relative to a desired state, with the gap

between the two being the "need." While it is commonly accepted that identifying needs is an important part to the success of a CPE program, no consensus exists as to what is involved in assessing those needs.

A large number of strategies and tools are available for data collection in needs assessments with surveys, interviews, and focus groups rounding out the most frequently used. How data are collected is directed by the scope of the assessment, the strategy or strategies used, assessor experience and knowledge, and available time and resources. Likewise, how the data are analyzed depends on the type of data collected as well as the strategy for data collection. A common theme across the literature is the importance of not basing decisions on any one result, or to "triangulate" results for maximum effectiveness.

The literature was in agreement that no one method for determining CPE need is better than another. Additionally, there appeared to be no model that accounted for all factors potentially influencing CPE decision-making. Some would argue that assessing all relevant factors is not practical due to the infinite number of contextual issues at play.

Overall, it is clear that EMS needs a change in how CPE programs are selected along with connecting these programs to patient outcomes. Despite support for this, there is no apparent movement in the direction to prepare instructors to take on this role. The needs assessment literature is clear as to the benefits and importance of this aspect of program planning, yet EMS has not adopted these principles for CPE.

CHAPTER 3

METHODOLOGY

This chapter describes the methods used to answer the study's research questions. The broad purpose of the study was to understand the practices used by Emergency Medical Service (EMS) educators to identify and prioritize continuing professional education (CPE) and what influences their decision making process for selecting their CPE offerings. In the process, I will provide a description of what CPE is currently offered to prehospital care providers throughout the United States. To accomplish this broad purpose, four research questions were posed:

1. What sources of information do EMS educators utilize to identify and prioritize potential CPE offerings?
2. What influences affect the needs assessment processes EMS educators use to identify and prioritize potential CPE offerings?
3. What strategies do EMS educators utilize to collect and analyze data about potential CPE offerings?
4. What CPE is offered by EMS educators?

This chapter is organized into eight sections. The first section describes the measurement framework of the study and why this framework is appropriate to answer the research questions. The second section describes the process followed to design the survey used in the study. The third and fourth sections describe the study population and sample selection, respectively. The fifth and sixth sections describe the data collection and data preparation, respectively. The seventh section describes the data analysis while the final section describes the limitations of the study and researcher bias.

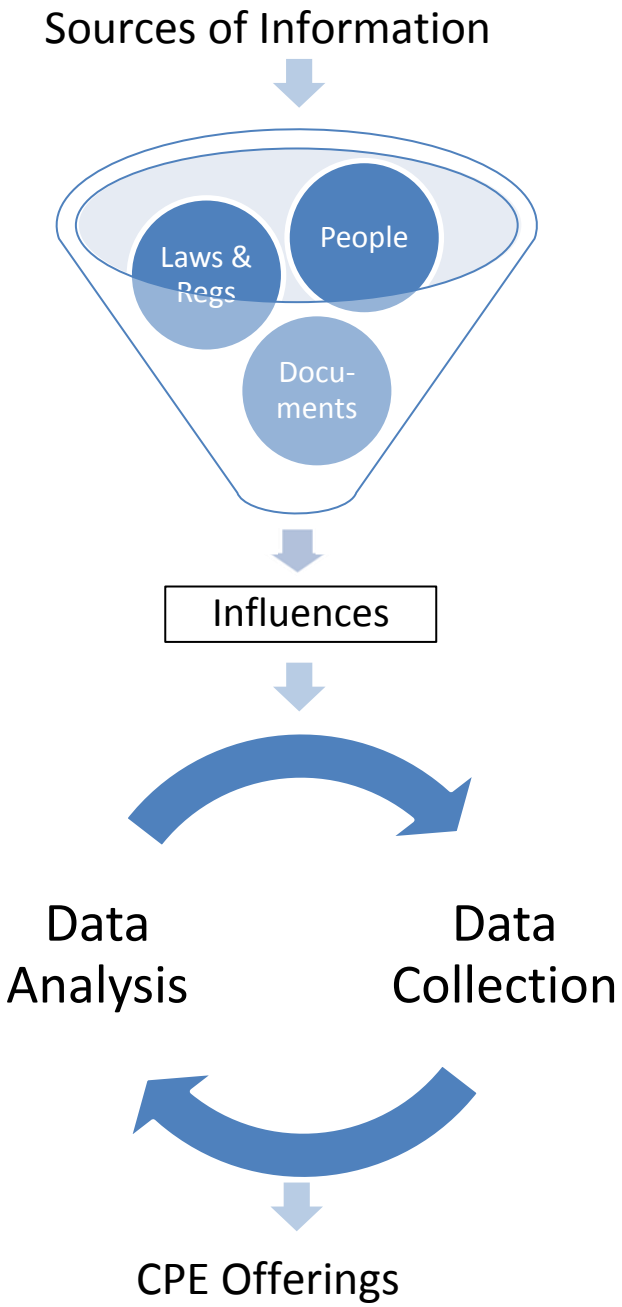
Measurement Framework

This study sought to expand upon the current body of knowledge relating to needs assessments for CPE, specifically within the context of EMS education. This study was rooted in the concept that many influences impact how the EMS educator decides what should be provided as CPE and in what order of priority. These influences reside both inside and outside his or her control. Cervero and Wilson (2006) note that the process for identifying and prioritizing training needs is a matter of democratically negotiating the needs of stakeholders and is primarily based on the program planner's judgment. Others, such as Queeney (1995) and Gupta, Sleezer, and Russ-Eft (2007) assert that data collection and analysis are essential in making these decisions. Caffarella (2002) indicates that there are numerous sources of ideas for education and training programs as well as techniques for program planners to elicit program ideas.

While reviewing CPE and needs assessment literature, it became apparent to me that these views are critically important in making an informed decision on both topics for instruction and the order of priority for implementation, especially in the EMS context. Over many months of reading, writing, thinking, listening, and dialoguing, I experimented with different aspects of this phenomenon and came to understand the overarching process is a combination of the following elements: many input sources of information, many available strategies to collect and analyze data, as well as the influences that ultimately converge to produce a prioritized list of CPE needs. This is reflected in Figure 1. Therefore, the measurement framework for this study was a composite of these elements of needs assessment theories to best fit the realities of the EMS context.

Figure 1

Conceptual Framework for Studying the Process to Identify and Prioritize CPE in EMS



Through careful review and analysis of the various theories, I first clarified the components for the study that would ultimately be measured by items on a survey instrument. For the purpose of this study, I defined a needs assessment as an activity or set of activities employed to collect and analyze relevant information to enable EMS educators to identify and prioritize instructional topics for educational activities within the CPE realm. Given this definition, I selected the following four components to frame this study: (a) sources of information, (b) various influences on the needs assessment process, (c) various strategies for collecting and analyzing data, and (d) the resulting outputs. Table 5 defines each of these components.

Table 5

Definition of Needs Assessment Components

Component	Definition
Sources of information	The places from where ideas for CPE topics come.
Influences affecting the needs assessment process	Those internal, external, tangible, and intangible forces that influence the needs assessment process.
Strategies to collect and analyze data	The various ways data is retrieved from their source in a form that is valuable to the assessor and the formality in which they are analyzed.
CPE offerings	The results of the needs assessment process in the form of the CPE that is ultimately offered.

Sources of Information

In order to make an informed decision about what CPE to offer, one has to consider existing information. This information resides within different places and in different forms. Generally speaking, there are three main sources of information: (a) laws and regulations, (b) people, and (c) documents. As a regulated field, EMS is guided and

governed by a variety of laws and regulations. A few examples of these are the minimum requirements for certification/licensure and recertification/relicensure, the scope of practice for the various levels of prehospital care providers, the equipment necessary on ambulances, and the protection of private health information. Given the differences among the states for each of these examples and the fact that the EMS field is dynamic, laws and regulations tend to change over time and as such, provide a rich source of data that affects CPE.

The people who work in the EMS field and impact or influence the practices of prehospital care providers are another rich source of data. In particular, the prehospital care providers themselves, who toil on the ambulances and provide direct patient care, offer valuable insights into the unique CPE needs. Further, patients and their loved ones, receiving nurses and physicians, equipment vendors, and those who manage and supervise the EMS organizations all have a stake in what CPE is provided. As such, these various perspectives of what CPE are needed should not be ignored.

Given the very nature of the EMS field, a large variety of documents are generated on a regular basis as a product of the services provided by prehospital care providers. These documents are generally divided into administrative documents or patient care documents. Examples of administrative documents include records of supplies, equipment and vehicles functioning, attendance, employee matters, or quality improvement processes. Patient care documents, meanwhile, typically include the reports generated by prehospital care providers documenting patient encounters. These documents record the activities performed in practically every aspect of EMS operations and as such, hold very detailed clues to CPE needs.

Influences Affecting the Needs Assessment Process

Since the needs assessment process typically involves more than one person, there is an inherent political process that takes place. As such, many variables influence this process. The EMS organizations where CPE take place are filled with multiple stakeholders with competing needs that can be addressed with CPE. On a foundational level, the purposes for conducting a needs assessment can differ from person to person or situation to situation. The identified purpose then sets the stage for the rest of the process for determining CPE needs. Further, the values, beliefs, and assumptions of the individual members of the organization, as well as the organization itself, create unseen forces that affect decisions and actions of the needs assessor. These influences can come from outside the organization, too, from stakeholders such as vendors, medical staff at receiving facilities, patients, family members, or local/national political groups. Finally, the needs assessor him- or herself creates an influence with his or her values, beliefs, assumptions, and standing in the organization. Even when being careful, the lens through which the needs assessor views the issues at hand can influence the process and, ultimately, decisions made about CPE.

Strategies to Collect and Analyze Data

Collecting and analyzing data is a key component of the needs assessment process. Having data to consider and analyzing that data to make sound decisions is necessary to demonstrate a true CPE need, change resulting from CPE, and return on investment in the CPE. Without data and data analysis, any claim of effect of or result from CPE is most likely anecdotal and unsubstantiated. Six general methods exist to collect data: surveys, interviews, focus groups, tests, observations, and analysis of

secondary data such as documents, physical data, and archived research records (Johnson & Turner, 2003). These methods of collecting and analyzing data can be accomplished formally, with a written plan involving several steps and employing sophisticated analysis using statistics. Data can also be collected informally with unplanned, impromptu opportunities and analyzed with nothing more than intuition.

CPE Offerings

As a result of the needs assessment process, three outcomes are generally realized. The first outcome is an identification of learning and/or performance gaps. These gaps are the differences between a desired state and the actual state at the time of the assessment. These are potentially addressable with education, but not always. The second outcome is a sum total list of all potential CPE topics. From these possible CPE topics a final list of topics prioritized based on those things deemed important by the needs assessor is generated. This third outcome denotes those CPE topics that should be dealt with first, then second, then third, and so on.

Instrumentation

For this study, a survey was used to gather relevant data. According to Babbie (1990), survey research has three general objectives: (a) description, (b) explanation, and (c) exploration. For this study, I focused only on description. In order to have a sound understanding of why certain CPE topics were selected while other topics were not selected, it was important to have a rich description of attributes that influence the needs assessment process as well as the process itself. Both the influences and the processes had certain attributes, which were measured using a survey instrument.

A multi-faceted, researcher-designed instrument was developed for the purpose of measuring the four distinct constructs: *sources of information, influences affecting the needs assessment process, strategies to collect and analyze data,* and *CPE offerings*. This instrument consisted of a web-based, self-completion survey designed to gather the demographics of the participating EMS services and the people charged with planning CPE for EMS services, as well as participants' understandings about the four areas. The steps in the instrument development process for *each* of the four constructs followed a parallel process and were conducted separately, but simultaneously. The following sections describe the seven-step instrumentation process, which is depicted in Table 6.

Table 6

Survey Development Process

1. Development and refinement of the item pool
2. Development of the response scale
3. Development of the prototype survey
4. Pre-pilot review of the prototype survey
5. Development of the pilot survey
6. Testing the pilot survey
7. Construction of the final survey

Development and Refinement of the Item Pool

In developing the preliminary item pool, I focused on those situations in EMS service educational activities that are related to CPE. The first step involved was the development and refinement of the preliminary item pool. The focus of this procedure

was to develop items that potentially represented the key issues surrounding the identification and prioritization of the CPE needs of prehospital care providers. These issues involved the sources of information EMS educators accessed, the influences that affected the needs assessment process, and ultimately the CPE that these EMS educators offered. The preliminary items were developed from three primary sources: (a) a review of the CPE and needs assessments literature, (b) informal interviews with EMS educators, and (c) a brainstorming session with a group of adult education graduate students and faculty members. During interaction with these primary sources, I identified potential items for each of the four categories and sorted the items into each construct as they came about.

Along the way, some exploration was needed to pin down the precise categories used and the definitions of each construct (sources of information, influences affecting the needs assessment process, strategies to collect and analyze data, and CPE offerings). Exploration made the categories clear and understandable through the literature review, the interviews, and brainstorming. Additional refinements in the survey were made immediately following the prospectus defense using feedback from my dissertation committee, fellow adult education doctoral students, and EMS educators.

Development of the Response Scale

My goal was to develop a response scale that would best measure the knowledge and practices of the survey participants regarding the sources of information and strategies employed to determine a prioritized listing of CPE needs for prehospital care providers. An explanation of each construct's scale is located in Table 7.

Table 7

Construct, Response Scale, and Rationale

Construct	Response Scale Used	Rationale
Sources of information	Respondents rate the frequency of use of each source using a 4-point Likert scale: never, seldom, often, and always.	Frequency is the best way of understanding how much or often EMS educators seek certain types of sources in the needs assessment process.
Influences affecting the needs assessment process	Respondents rate the importance of each influence using a 4-point Likert scale: not important, little importance, some importance, and very important.	Importance is the best way of understanding to what degree an influence affects the needs assessment process.
Strategies to collect and analyze data	Respondents rate the frequency of use of each strategy using a 4-point Likert scale: never, seldom, often, and always.	Frequency is the best way of understanding how much or often EMS educators employ specific strategies for data collection and analysis in the needs assessment process.
CPE offerings	Open-ended numeric response.	An open-ended response is the best way of collecting accurate data on how many times a given course is offered as CPE.

The prototype survey consisted of five sections, each correlating to one of the four constructs plus a fifth section to obtain demographic information. The first section asked items about the construct *sources of information* using a 4-point Likert scale. This allowed for an accurate identification of how often each of the major sources is considered during the needs assessment process. The second section asked items about the construct *influences affecting the needs assessment process* using a 4-point Likert

scale. This allowed for an accurate identification of how much each of several stated influences affect the needs assessment process. The third section asked items about the construct *strategies to collect and analyze data* using a 4-point Likert scale. This allowed for an accurate identification of how often each of several stated strategies for data collection and methods to assess the data were used during the needs assessment process. The fourth section listed a series of commonly taught CPE topics to measure the construct *CPE offered*. The open-ended response format allowed for an accurate description of the frequency at which each CPE topic was offered. Finally, the fifth section asked demographic information about the respondent's EMS provider level, years certified, academic preparation, and formal training related to needs assessments. It also asked demographic information about the EMS service to include service type and size.

The 4-point Likert scale was selected in order to provide the most "information possible about where respondents stand compared to others" (Fowler, 1995, p. 52) while having a simplified presentation for respondents to easily comprehend (Dillman, 2007). Additionally, the 4-point scale format helps to "prevent artificial clustering around a midpoint" (Witkin & Altschuld, 1995, p. 135). Finally, by forcing respondents to select a definitive response rather than opting out with a "neutral" or "not applicable" option, eliminates biases such as acquiescence responding and can increase operational validity by reducing halo effects (Brown & Maydeu-Olivares, 2011). These characteristics were desirable for this study in order to accurately describe the needs assessment practices of EMS educators.

Description of the Prototype Survey

The prototype survey instrument included a total of 87 items measuring each of the four constructs. The items on the prototype instrument appear in Tables 8 through 11.

The first section of the prototype survey included an eligibility screener. This prompted the respondent to indicate whether or not (a) his or her affiliated EMS service provided CPE, and (b) the person taking the survey is involved in making decisions about CPE. If either of these statements were false, the participant was sent to a screen thanking him or her for participating and gave instructions on submitting the survey. If both statements were true, the respondent was directed to the second section, which had questions relating to sources of information for generating CPE topics.

Items measuring the sources of information from which EMS educators generate ideas for CPE offerings asked the respondents to indicate the frequency with which they use these sources. Of the 13 items in this section, 12 items related directly to a single frequency question of various source types. Though not all-inclusive, these items asked about the most frequently observed specific sources from each of the three major categories: laws and regulations, people, and documents. The stem, "Given the following list, how frequently do you use these sources to generate ideas for CPE?" began this section with the items to follow. The thirteenth item was an open-ended response item asking for any other sources not captured by the previous 12, which allowed respondents to provide their own written account of sources they rely on for information. The items for the pilot survey instrument are located in Table 8.

The third section had questions about the various influences that impact the needs assessment process. The 16 items in this section included 15 items related directly to a

single importance question of the various influences on the needs assessment process. The language in the items was carefully crafted so as to be sensitive to respondent perception without being off-putting. These items included influences from those forces inside and outside the organization, the purpose for conducting the needs assessment, available resources related to both conducting the needs assessment itself as well as the CPE, and the lens through which the assessor views the world in which he or she lives. This section began with the stem, "Given the following list, how much importance does each of the following factors impact what is offered as CPE?" with the items to follow.

Table 8

Items Measuring Sources

Item Language
1. Recommendations from people within my EMS service.
2. Recommendations from people outside my EMS service.
3. Recommendations from advisory committees.
4. Mandates from the state office of EMS.
5. Mandates from the National Registry of EMTs.
6. EMS supply/equipment vendors.
7. Data from patient care reports.
8. Data from reports other than patient care reports.
9. Federal/state/local laws.
10. EMS-related magazines.
11. Scholarly journals.
12. The Internet.

The sixteenth item was an open-ended response item, which asked for any other influences not captured by the previous 15, allowing respondents to provide his or her own written account of influences experienced or perceived during the needs assessment process. The items for the prototype survey instrument are located in Table 9.

The fourth section had questions about how data for the needs assessment are collected and analyzed. The 17 items in this section were grouped by one of two major areas: strategies to collect data and strategies to analyze data. There were 12 items related

Table 9

Items Measuring Factors Influencing Decision-Making

Item Language
1. Recommendations from my supervisor.
2. Recommendations from my EMS service's chief/director.
3. Recommendations from my EMS service's staff.
4. Recommendations from others outside of my EMS service.
5. Having adequate time to conduct the CPE.
6. Having adequate money to conduct the CPE.
7. Having adequate equipment to conduct the CPE.
8. Having adequate instructors to conduct the CPE.
9. Having adequate expertise to conduct the CPE.
10. My EMS service's history of offering the CPE.
11. My personal interest in teaching the CPE.
12. My personal interest in learning the CPE.
13. My personal sense of the CPE's importance.
14. My personal fear of offering the CPE.
15. My personal fear of not offering the CPE.

directly to a single frequency question of the strategies to collect data representing each of the most frequently used observed strategies. These items began with the stem, "Given the following list, how frequently do you use each of the following to collect data to generate ideas about what CPE to offer?" Following these items were three items related directly to a single frequency question of the strategies to analyze data representing each of the most frequently used observed strategies. These items began with the stem, "Given the following list, how frequently do you use each the following to analyze data

collected?" There was also an open-ended response item, which allowed respondents to indicate other strategies not previously identified, based on his or her experience. The items for the prototype survey instrument are located in Table 10.

Table 10

Items Measuring Strategies to Collect and Analyze Data

Item Language
Strategies to Collect Data
1. Surveying EMS staff.
2. Interviewing EMS staff.
3. Brainstorming with my EMS service's staff.
4. Brainstorming with others outside my EMS service.
5. Administering written knowledge exams.
6. Administering practical skills exams.
7. Observing the target audience for deficiencies.
8. Reviewing patient care reports.
9. Reviewing reports other than patient care reports.
10. Reviewing physical evidence from EMS-related activities (i.e., biohazard material left on EMS equipment).
11. Reading articles from EMS-related magazines.
12. Reading articles from scholarly journals.
Strategies to Analyze Date
1. Identifying patterns in the data.
2. Conducting statistical analysis of the data.
3. Using my subjective impressions of the data.

The fifth section had questions related to the CPE offered at the respondent's EMS service. A single question asked the respondent to fill in the number of times in the previous two years any of the 26 courses listed were taught at their service: "Approximately how many times in the last two years has your service offered each of the following? (please enter whole numbers only)". The courses listed were commonly

taught, standardized courses nationally marketed to prehospital care providers.. Instructor courses were not included in this list as a generic course for two reasons: (1) instructor courses are not commonly conducted for the purpose of filling a continuing education gap, but rather to develop prehospital care providers as certified instructors; and (2) most of the listed standardized courses have an associated instructor course; to list each instructor course would have made this survey section prohibitively long and would have potentially influenced response rates. A single open-ended response item allowed the respondents to include any course or course description and the correlating count as it best fit his or her unique situation. The items for the prototype survey instrument are located in Table 11.

The sixth section had individual EMS educator and service demographic questions. These items focused on aspects of the individual EMS educator (n=10) and the EMS service (n=3) deemed relevant as potentially influential in the needs assessment process. At the conclusion of the sixth section, the participant was sent to a page thanking him or her for participating and gave instructions on submitting the survey. The items for the prototype survey instrument are located in Tables 12 and 13.

Table 11

Items Measuring CPE Offerings

Item Language
1. Basic Cardiac Life Support
2. Advanced Cardiac Life Support
3. Advanced Cardiac Life Support for Experienced Providers
4. Advanced Pediatric Life Support
5. Emergency Pediatric Care
6. Neonatal Resuscitation Course
7. Pediatric Advanced Life Support
8. Pediatric Education for Prehospital Providers
9. Prehospital Pediatric Care
10. PreHospital Trauma Life Support
11. International Trauma Life Support
12. Advanced Trauma Life Support Basic Burn Life Support
13. Advanced Burn Life Support
14. Core Disaster Life Support
15. Basic Disaster Life Support
16. Advanced Disaster Life Support
17. National Disaster Life Support
18. Basic Hazmat Life Support
19. Advanced Hazmat Life Support
20. Advanced Medical Life Support
21. Advanced Stroke Life Support
22. Geriatric Education for Emergency Medical Services
23. Basic Wilderness Life Support
24. Advanced Wilderness Life Support
25. Refresher course, based on the National Standard Curriculum

Table 12

Items Measuring EMS Service Characteristics of Study Respondents

Item Language
1. In which state is your EMS service located?
2. Which best describes you EMS service?
3. Approximately how many people are part of your EMS service?
4. Approximately how many transport vehicles does your EMS service operate on a typical day?

Table 13

Items Measuring Personal Characteristics of Study Respondents

Item Language
1. What is your age?
2. What is your gender?
3. What is your race?
4. What is your current prehospital certification/licensure level?
5. Approximately how many years have you been certified/licensed at your current EMS level?
6. Are you currently certified by the National Registry of EMTs?
7. What is your highest academic degree?
8. For the degree indicated in the previous question, what was your academic major?
9. Do you have any formal training/education in the following areas? (check all that apply)

Pre-pilot Review of the Prototype Survey

The pre-pilot investigation consisted of an expert-panel review of the prototype instrument with EMS educators. This was conducted in order to refine the survey items. The pre-pilot review took place as a SurveyMonkey online survey and involved several EMS educators selected specifically for this purpose. Following each item, space was provided for the reviewer to give feedback. The purpose of the pre-pilot review was to

test and refine the survey instrument. Specifically, the pre-pilot review attempted to answer the following questions:

1. Do the proposed data collection methods work?
2. Is the survey instrument technically adequate?

Once the review panel took the survey, follow-up phone conversations and emails took place to probe areas in need of clarification or changes in order to make the survey best suited to EMS educators. Recommendations from this first investigation were used to revise the survey. Additionally, input from my doctoral advisory committee members aided in the fine-tuning of survey items and response scales in order to maximize data utility.

Development of the Pilot Survey

A pilot survey was developed with the input of the pre-pilot expert panel and members of my doctoral advisory committee. This survey was built within the SurveyMonkey platform and formatted as though it were the final survey.

Testing the Pilot Survey

A formal test of the pilot survey took place to address two concerns: (a) rate of return, and (b) determination of bad survey items. In order to ensure a large enough sample of willing study participants was obtained, the pilot study was conducted in a similar manner as the actual study and yielded an estimate of the potential response rate for the complete investigation. This also provided enough information to calculate the minimum number of surveys required for the actual investigation. A total of 436 survey invitations were sent with 168 identifying him- or herself as qualified for the study and

completed the survey, resulting in a 38.5% response rate. Another 28 accessed the survey, but indicated he or she was not qualified to participate in the pilot study.

Finally, in terms of reliability, it was important to determine whether or not any bad items existed among the dimensions measured with this survey instrument. Assuring that each item was situated within the right construct being measured was paramount. To do this, the pilot study was used to ensure there was observed variance and not too much missing data so as to suggest a potential problem with the item. Issues such as verbiage and spelling were also considered during the pilot study. Adjustments, to include item alterations, deletions, or additions, were made following the pilot study.

Construction of the Final Survey

Once the pilot study was administered, results analyzed, and the survey revised into its final form, there were 97 items included. The final form was similar to the pilot form in that there were five sections. The first section measured demographics of the EMS services and individuals participating in the study, the second section measured the sources of data for the needs assessment, the third section measured various factors related to influences on the process, the fourth section measured the strategies for collecting data, analyzing data, and making decisions, and the fifth section measured the outcomes of the needs assessment process. Once the final survey instrument was developed, it was sent to each committee member with an accompanying memo describing the changes made and intent for moving forward. As is a common practice, committee members had ten days to review the final survey instrument and respond with any suggestions or concerns before the online instrument went live for data collection.

After receiving committee approval, The University of Georgia's Institutional Review Board was provided an updated instrument and a request form for approval.

After collecting and analyzing the pilot study data, some minor changes were made to the instrument in preparation for the final study. These changes included clarifying one of the eligibility statements to give potential participants a better understanding about whether his or her service type qualified, clarifying one of the listed courses to better indicate that the course was intended for physicians, and adding four additional courses to the list for a total of 30 courses. Since so much work went into developing the prototype and pilot instruments, very little changes were needed for the final instrument. The final instrument is located in Appendix A.

Validity

The validity of the instrument was largely based in the development process. An extensive review of the literature, field input from EMS educators, and consultation with my doctoral advisory committee coupled with item refinement led to the items included in the prototype survey instrument. Validity was further enhanced by having an expert critique of the prototype instrument by both adult educators and EMS educators.

Population of Interest

The population for this study, as well as the pilot testing process, were EMS educators registered with the National Registry of Emergency Medical Technicians (NREMT) as Training Officers. Typically, these individuals are ones who are actively involved in EMS education and hold responsibility for authorizing EMS students to test with the NREMT. As such, these individuals would be involved, in some way, with planning, developing, and conducting CPE for prehospital care providers. Their

knowledge of current practices associated with identifying and prioritizing EMS CPE were the best source of information to inform this study combined with the easiest and most practical method of identifying and contacting study participants.

Sample Selection

The sample for this study was EMS educators who were registered with the NREMT as a Training Officer. To identify these individuals, I contacted the NREMT's Research Director and requested a data set of registered Training Officers to whom I would send a link to my survey. A request letter was sent and after an approval process with the NREMT, my request was approved. This request letter is included in Appendix B. I received a data set containing 4,696 records with first and last names, email addresses, and EMS service affiliation. These data were cleaned of 326 duplicate records yielding a total of 4,370 potential participants. From these, 10% were randomly selected for the pilot study. According to Dillman (2007), pilot studies generally have a sample of 100 to 200 respondents with larger samples, if resources allow, with the goal being 100-150 responses to analyze in order "to make reasonably precise estimates of whether respondents are clustering into certain categories of questions" (p.147). Drawing a 10% sample from the data set provided a realistic opportunity to achieve this goal and still have a sufficient data set for the final study.

Of the population, 1,073 responded to the study and 634 surveys were deemed usable. The respondents ranged in age from 20 to 68, with a mean of 44.10. The respondents were 75.2% male and 24.8% female. An overwhelming majority (93.8%) of the respondents were Caucasian. Of the remaining respondents, 0.5% were African American, 1.7% were American Indian or Alaskan Native, 0.5% were Asian, 2.7% were

Hispanic or Latino, 0.2% were Native Hawaiian or other Pacific Islander, 0.2% were some other race, and 0.5% were two or more races. These demographics were similar to findings of an EMS workforce study conducted by Brown, Dickison, Misselbeck, and Levine (2002). Respondents of this study had an average age of 35.0, were 70.1% male, 91.3% Caucasian, 3.1% Hispanic, 2.4% African American, 2.1% American Indian or Alaskan Native, 0.9% Asian, and 0.2% Native Hawaiian.

The majority (75.0%) of the respondents were paramedics with the remaining being EMT-Basics (13.4%), EMT-Intermediates at the I-85 or equivalent level (4.6%), EMT-Intermediates at the I-99 or equivalent level (3.0%), and 3.6% classifying themselves as "other." Table 15 contains a listing of "other" certification/license levels. Some of the respondents who selected "other" were Critical Care Paramedics and were appropriately classified as "Paramedics" on this scale. Respondents were certified at these levels between 1 and 37 years with a mean of 16.12 years and 71.4% of these respondents were Nationally Registered.

The majority (31.2%) of the respondents had some college, but had not yet earned a degree. Of those that did have a degree of some sort, 25.0% had an associate degree, 27.1% had a bachelor degree, 11.1% had a master's degree, and 1.6% had a doctorate degree. Respondents without college included 2.5% with a high school diploma and 1.4% whom had a technical certificate/diploma. Brown, Dickison, Misselbeck, and Levine (2002) found slightly different educational achievements; 52.1% had earned an associate's degree, 42.4% had earned a bachelor's degree, and 10.7% had earned a graduate degree. The top five academic majors representing 51.8% of all respondents' degrees were Emergency Medical Services/Management (17.3%), Nursing (10.8%),

Education (8.9%), Fire Science (7.4%), and Business (7.3%). A complete summary of academic majors listed by participants is provided in Appendix F. In addition, respondents had formal training/education in developing continuing professional education (63.4%), program planning (59.8%), assessing educational needs (57.6%), instructional design (53.3%), program planning (52.1%), adult education theory (51.2%), organizational development, (47.3%), and human resource development (26.5%). Table 14 contains a complete listing of the personal characteristics of study respondents.

The respondents were associated with a variety of EMS services, the largest portion being fire department-based EMS services (35.2%). Other service types included third EMS services (20.3%), private EMS services (19.2%), hospital-based EMS services (12.9%), aeromedical (4.4%), first responder only (2.8%), and education only (1.7%). In addition, 3.3% of the services were classified by respondents as "other." Table 17 contains a listing of "other" EMS service types. Appendix G lists the states in which these services are located.

Data Collection

In this study, data were collected using a web-based survey. Once the final list of study subject EMS services was identified and contact information was compiled, a modified Tailored Design Method (Dillman, 2007) was followed to distribute the survey. This method followed a four-step process: (a) prenotice email, (b) thank you contact, (c) reminder email, and (d) final contact.

The first step included making the initial contact with the study subject. This was accomplished via email to each specific Training Officer. The email was sent at the onset of the study and included detailed information about the study, why and how he or she

Table 14

Personal Characteristics of Study Respondents (n=634)

Variable	Value	
Age (in years)	M = 44.10	SD = 9.29
Gender		
Male	n = 474	75.2%
Female	n = 156	24.8%
Race		
Caucasian	n = 587	93.8%
Black or African American	n = 3	0.5%
American Indian or Alaskan Native	n = 11	1.7%
Asian	n = 3	0.5%
Hispanic or Latino	n = 17	2.7%
Native Hawaiian or other Pacific Islander	n = 1	0.2%
Some other race	n = 1	0.2%
Two or more races	n = 3	0.5%
Certification Level		
EMT-Basic	n = 85	13.4%
EMT-Intermediate (I-85 or equivalent)	n = 29	4.6%
EMT-Intermediate (I-99 or equivalent)	n = 19	3.0%
Paramedic	n = 475	75.0%
Other	n = 25	3.6%
Years at current certification level	M = 16.12	SD = 8.525

Variable	Value	
Nationally Registered?		
Yes	n = 452	71.4%
No	n = 181	28.6%
Highest Academic Degree?		
High School Diploma	n = 16	2.5%
Certificate/Diploma	n = 9	1.4%
Some college, but no degree yet	n = 198	31.2%
Associates degree	n = 158	25.0%
Bachelor degree	n = 172	27.1%
Master's degree	n = 70	11.1%
Doctorate (Ph.D., Ed.D., M.D., etc.)	n = 10	1.6%
Formal Training (by area)		
Assessing educational needs	n = 365	57.6%
Developing continuing professional education	n = 402	63.4%
Instructional design	n = 338	53.3%
Program planning	n = 379	59.8%
Program evaluation	n = 330	52.1%
Adult education theory	n = 330	52.1%
Human resource development	n = 168	26.5%
Organizational development	n = 300	47.3%

Table 15

Other Certification/License Levels of Study Respondents (n=25)

Variable	Value	
Nurse	n = 20	80.0%
First Responder	n = 1	4.0%
Physician	n = 2	8.0%
Physician Assistant	n = 2	8.0%

Table 16

Service Characteristics of Study Respondents (n=634)

Variable	Value	
Service Type		
Hospital-based EMS service	n = 82	12.9%
Fire department-based EMS service	n = 223	35.2%
Third EMS service	n = 129	20.3%
Private EMS service	n = 122	19.2%
Aeromedical (rotary or fixed-wing)	n = 28	4.4%
First responder only	n = 18	2.8%
Educational only	n = 11	1.7%
Other Service-affiliated Personnel	n = 21	3.3%
Paid	M = 109.38	SD = 243.89
Volunteer	M = 35.68	SD = 90.16
Typical number of EMS units (per day)	M = 9.83	SD = 28.33

Table 17

Other EMS Service Types (n=21)

Variable	Value	
Military	n = 10	47.6%
Industrial	n = 3	14.3%
National Park Service	n = 3	14.3%
Search and Rescue	n = 2	9.5%
Tribal	n = 2	9.5%
University	n = 1	4.8%

was selected to participate, the importance of participant participation, confidentiality and consent, and directions for accessing the online survey via SurveyMonkey.com. The contact information provided by the NREMT was uploaded to SurveyMonkey in order to track responses, send scheduled reminder emails, and prevent respondents from responding to the survey more than once. The first request for participation email is located in Appendix C.

The second step included a follow-up thank you email to those participants who completed the survey. This took place immediately following the completion of the survey and expressed appreciation for participating in the study. The second request for participation email is located in Appendix D.

During this time period, the SurveyMonkey website was monitored for responses. Participants who had not participated were sent a reminder email eight days after the initial email, which was automatically generated by SurveyMonkey. During the pilot

study, a two-week time period was selected, but the response patterns demonstrated participants responded within the first week or not at all without a reminder. This reminder email communicated that a previous request to participate was sent eight days prior as well as a synopsis of why the study was being conducted. Further, it provided directions to the website where the survey was located along with login information. The final step in the process involved a final contact attempt to encourage those who still have not participated in the study to do so. This final contact was made via email to the Training Officer eight days after the first reminder email. In the event that participation by the subject was not done so within one week following the final contact, non-participation was assumed. The final request for participation email is located in Appendix E.

For the final study, a total of 3,877 invitations to participate were sent. Of these invitations, 1,073 respondents accessed the survey for a raw response rate of 27.7%. Of the 3,877 invitations sent, 111 invitations bounced back as undeliverable, for an adjusted response rate of 28.5%. After the data were prepared for analysis, there were a total of 634 usable responses, making a final response rate of 18.4%. See the next section for details on data preparation.

This study was a first study of EMS CPE and as such set out to describe various phenomena associated with CPE needs assessment practices. Because of the number of variables that were necessary to measure, a fairly lengthy survey was required to adequately describe the current state, which Dillman (2007) stated can lead to lower response rates. While low response rates have the potential to introduce nonresponse bias (Dillman, 2007; Shih & Fan, 2008) respondent interest in the subject may play a bigger

role (Fowler, 2002). The response rate of this study was a similar response rate that was experienced by Brown, Dickison, Misselbeck, and Levine (2002), who had a 31.1% response rate of the EMS workforce. Finally, "there is no agreed-upon standard for a minimum acceptable response rate (Fowler, 2002, p. 42).

Data Preparation

After all data were collected and before analysis began, I conducted a five-step cleaning process to ensure the highest quality data was used for this study. This included an evaluation of study eligibility, evidence of CPE offerings, implausible data, EMS service size, and data completeness. Through this process, the original 1,073 records were reduced by 439 unusable records, for a total of 634 usable records in the data set.

The first step involved removing records of those respondents who self-identified as unqualified for the study by indicating "At least one of the statements above is false" on the first page of the survey. This indicated that the service the respondent was affiliated with did not provide CPE or that the respondent was not one of the people who was involved in making decisions about CPE (n=93).

Second, the remaining records were evaluated for evidence of the EMS service offering CPE by looking at the fifth section of the survey; if participants did not indicate that at least one course of any of the listed courses in the survey had been offered in the last two years, it was decided that the respondent was ineligible for study inclusion on the basis that his or her service did not provide CPE (condition one of the eligibility statement). This step eliminated 150 additional records.

The third step involved removing those records with implausible data. Implausible data included excessive numbers of classes taught (impossible to teach in the

stated time frame) and a comparison of number of total service members to number of transport vehicles typically operated on a daily basis (impossible staffing scenario). This eliminated a total of 84 records from the data set.

The fourth step included removing those services with fewer than 20 total members (n=111). This cut point was determined by examining the impact of various cut points from fewer than five to 50 total service names and through member consensus. Data examination demonstrated the most effective reduction in data to be fewer than 20 members by evaluating the total number of potentially eliminated records as a proportion of the remaining records. Through dialogue with my dissertation committee members, this number was acceptable based on the idea that services with fewer than 20 members will most likely not engage in a needs assessment process involving data collection and analysis.

Finally, in order to have sufficient data for analysis and to reduce missing data points, those records with more than 25% missing data from the personal and service characteristics items were eliminated (n=1).

Data Analysis

Data analysis was conducted using SPSS 18.0 statistical software package. For each of the four research questions, I used means, standard deviations, frequencies, and ranks to describe current practices. All analysis was done at an item level. No items were combined as an additive scale or index.

The first step in SPSS was to ensure each variable was appropriately labeled as nominal, ordinal, or categorical. Second, the frequencies, means, and standard deviations were calculated. In addition, the minimum and maximum values of each item were

reviewed to ensure the range of responses were appropriate in light of the intended responses.

Research question #1 (What sources of information do EMS educators utilize to identify and prioritize potential CPE offerings?) was designed to determine where EMS educators seek out ideas to generate CPE topics. To answer research question #1, means, standard deviations, frequencies, and item rank were calculated.

Research question #2 (What influences affect the needs assessment processes EMS educators use to identify and prioritize potential CPE offerings?) was designed to determine what tangible and intangible forces drive the decision-making process in determining what CPE topics are ultimately offered to prehospital care providers. To answer research question #2, means, standard deviations, frequencies, and item rank were calculated.

Research question #3 (What strategies do EMS educators utilize to collect and analyze data about potential CPE offerings?) was designed to determine if and how EMS educators collect and analyze data to inform EMS educators as to the appropriate CPE topics to offer to prehospital care providers. To answer research question #3, means, standard deviations, frequencies, and item rank were calculated.

Research question #4 (What CPE is offered by EMS educators?) was designed to provide a snapshot description of the types and frequencies of CPE offerings available to prehospital care providers throughout the United States. To answer research question #1, means, standard deviations, frequencies, and item rank were calculated.

Limitations of the Study

This study was based on a large convenience sample of EMS educators registered as Training Officers with the NREMT. Thus, generalizing study results to any non-Training Officer population should be approached with caution. Additionally, respondents self-selected to participate and these responses were further reduced to include those EMS services with more than 15 certified members. This could result in an over inflation of findings. While the total number of EMS services in the United States was known, it was not assumed that each EMS service had at least one registered Training Officer nor was it assumed that only one Training Officer existed at any one EMS service. Further, the convenience sample used does not completely represent all of the EMS educators throughout the United States who are engaged in CPE decision-making.

Complicating this study was another study conducted shortly before by the NREMT using the same population of participants. Direct email feedback from several potential participants indicated that they believed they had already taken this survey despite having no record of such activity. This led me to believe that confusion existed among the sample as to whether or not they had taken this survey, potentially skewing the response rate.

Finally, the response rate of the study (18.4%) determined how valid the data was in depicting how EMS educators in the United States conducted needs assessments for CPE. Another study of the EMS workforce demonstrated a low response rate of 31.1% (Brown, Dickison, Misselbeck, & Levine, 2002), though valuable data were obtained, which informed the EMS field. The descriptive nature of this study, however, was aimed

at highlighting the various phenomena associated with conducting CPE needs assessments, a first study of this kind.

CHAPTER 4

FINDINGS

The broad purpose of the study was to understand the practices used by Emergency Medical Service (EMS) educators to identify and prioritize continuing professional education (CPE) and what influences their decision making process for selecting CPE offerings. In the process, I will provide a description of what CPE is currently offered to prehospital care providers throughout the United States. This chapter presents the results of the statistical analysis described in the preceding chapter. The findings will be presented separately in relation to the four research questions:

1. What sources of information do EMS educators utilize to identify and prioritize potential CPE offerings?
2. What influences affect the needs assessment processes EMS educators use to identify and prioritize potential CPE offerings?
3. What strategies do EMS educators utilize to collect and analyze data about potential CPE offerings?
4. What CPE is offered by EMS educators?

Findings Related to Research Question #1

The first research question asked, "What sources of information do EMS educators utilize to identify and prioritize potential CPE offerings?" The 12 items were measured on a 4-point Likert scale (1=Never, 2=Seldom, 3=Often, and 4=Always). Table 18 depicts the means, ranks, standard deviations, and frequencies of the 12 items measuring the sources of information EMS educators use to generate ideas for CPE

Table 18

Means, Ranks, and Frequencies for Items Measuring Sources of Information (n=634)

Item	Mean	SD	Rank of Mean	Frequencies: Never n	Never %	Seldom n	Seldom %	Often n	Often %	Always n	Always %
4. Mandates from the state office of EMS	3.37	0.76	1	9	1.4%	80	12.6%	212	33.4%	333	52.5%
5. Mandates from the National Registry of EMTs	3.08	0.86	2	29	4.6%	122	19.2%	249	39.3%	228	36.0%
1. Recommendations from people within my EMS service	3.06	0.47	3	4	0.6%	41	6.5%	505	79.7%	84	13.2%
9. Federal/state/local laws	3.03	0.80	4	16	2.5%	147	23.2%	272	42.9%	199	31.4%
7. Data from patient care reports	3.00	0.64	5	13	2.1%	88	13.9%	415	65.5%	116	18.3%
2. Recommendations from people outside my EMS service	2.61	0.57	6	17	2.7%	224	35.3%	381	60.1%	11	1.7%
3. Recommendations from advisory committees	2.45	0.74	7	68	10.7%	240	37.9%	293	46.2%	28	4.4%
8. Data from reports other than patient care reports	2.44	0.72	8	48	7.6%	294	46.4%	252	39.7%	36	5.7%
10. EMS-related magazines	2.38	0.61	9	37	5.8%	323	50.9%	265	41.8%	7	1.1%
12. The Internet	2.30	0.67	10	58	9.1%	342	53.9%	213	33.6%	16	2.5%
11. Scholarly journals	2.25	0.65	11	68	10.7%	347	54.7%	209	33.0%	8	1.3%
6. EMS supply/equipment vendors	2.11	0.60	12	75	11.8%	422	66.6%	128	20.2%	7	1.1%

Note: *n*'s vary slightly due to missing data.

topics in descending order based on rank of mean. Overall, the most significant source of information used to generate CPE ideas comes from the governing bodies that control certification/licensure. This is not a surprising finding, since to work and earn a living, EMS personnel must remain certified or licensed without any lapse. Interestingly, the state offices of EMS are looked to most frequently for CPE topic ideas over the National Registry. Other major sources of CPE topic ideas include (in descending order): *recommendations from people within my EMS service*, *federal/state/local laws*, and *data from patient care reports*. The least frequently used source of information for generating CPE topic ideas (in ascending order) include: *EMS supply/vendors*, *scholarly journals*, *the Internet*, and *EMS-related magazines*.

In addition to the quantitative data collected regarding the sources of data used to generate CPE topic ideas, respondents were provided the opportunity to share other sources of information with an open-ended item. A total of 90 respondents provided 85 unique answers to this open-ended item. The top five additional sources and frequencies are listed in Table 19 below in descending order. A complete listing of all additional sources as stated by the respondents is provided in Appendix H.

Findings Related to Research Question #2

The second research question asked, "What influences affect the needs assessment process EMS educators use to identify and prioritize potential CPE offerings?" The 15 items were measured on a 4-point Likert scale (1=Never, 2=Seldom, 3=Often, and 4=Always). Table 20 depicts the means, ranks, standard deviations, and frequencies of the 15 items measuring the factors influencing EMS educators' decision-making process regarding CPE topics in descending order based on rank of mean.

Table 19

Other Sources of Information for CPE Topic Generation

Source Name	Source Definition	Frequency*
Medical Director	The physician medical director for the EMS service or receiving hospital.	24 (28.2%)
Conferences	EMS or EMS-related conferences, which provide information to attendees on the latest directions in the EMS field.	11 (12.9%)
Quality Assurance Activities	The various activities that EMS services use to identify best practices and problems within the service's control.	10 (11.7%)
Protocols	The guidelines prehospital care providers follow when providing patient care.	9 (10.5%)
Trends	Themes in the field as the field changes over time or themes within the EMS service as the service changes over time.	8 (9.4%)

* Note: Frequencies are based on 85 responses by 90 respondents

Overall, the most frequent factors that influence the decision-making process include (in descending order) *having adequate expertise*, *having adequate instructors*, *having adequate equipment*, r*ecommendations from my EMS service's chief/director, having adequate time, recommendations from the EMS service's staff* and *having adequate money to conduct the CPE*. Interestingly, five of the seven top factors point to the importance of the logistics and resources involved in conducting CPE.

The least influential factors in the decision-making process for CPE include (in ascending order): the EMS educator's *personal fear of offering the CPE, personal fear of not offering the CPE, recommendations from others outside of the EMS service, the EMS service's history of offering the CPE*, and the EMS educator's *personal interest in teaching the CPE*.

Table 20

Means, Ranks, and Frequencies for Items Measuring Factors Influencing Decision Making (n=634)

Item	Mean	SD	Rank of Mean	Frequencies: Not Important n	Not Important %	Slightly Important n	Slightly Important %	Moderately Important n	Moderately Important %	Very Important n	Very Important %
9. Having adequate expertise to conduct the CPE	3.55	0.61	1	4	0.6%	29	4.6%	212	33.4%	387	61.0%
8. Having adequate instructors to conduct the CPE	3.49	0.68	2	10	1.6%	38	6.0%	214	33.8%	371	58.5%
7. Having adequate equipment to conduct the CPE	3.48	0.67	3	8	1.3%	39	6.2%	225	35.5%	359	56.6%
2. Recommendations from my EMS service's chief/director	3.42	0.72	4	13	2.1%	47	7.4%	229	36.1%	339	53.5%
5. Having adequate time to conduct the CPE	3.37	0.70	5	11	1.7%	49	7.7%	265	41.8%	305	48.1%
3. Recommendations from my EMS service's staff	3.35	0.63	6	4	0.6%	41	6.5%	313	49.4%	267	42.1%
6. Having adequate money to conduct the CPE	3.34	0.80	7	21	3.3%	68	10.7%	221	34.9%	322	50.8%
13. My personal sense of the CPE's importance	3.06	0.87	8	10	1.6%	96	15.1%	408	64.4%	118	18.6%
1. Recommendations from my supervisor	3.02	0.84	9	36	5.7%	104	16.4%	299	47.2%	191	30.1%
12. My personal interest in learning the CPE	2.93	0.92	10	72	11.4%	307	48.4%	226	35.6%	19	3.0%
11. My personal interest in teaching the CPE	2.85	0.95	11	32	5.0%	266	42.0%	306	48.3%	29	4.6%

Item	Mean	SD	Rank of Mean	Frequencies							
				Not Important		Slightly Important		Moderately Important		Very Important	
				n	%	n	%	n	%	n	%
10. My EMS service's history of offering the CPE	2.79	0.90	12	57	9.0%	237	37.4%	262	41.3%	76	12.0%
4. Recommendations from others outside of my EMS service	2.52	0.65	13	21	3.3%	295	46.5%	281	44.3%	34	5.4%
15. My personal fear of not offering the CPE	2.12	1.03	14	214	33.8%	198	31.2%	130	20.5%	79	12.5%
14. My personal fear of offering the CPE	1.68	0.84	15	327	51.6%	198	31.2%	77	12.1%	25	3.9%

Note: *n*'s vary slightly due to missing data.

In addition to the quantitative data collected regarding the factors influencing decision making, respondents were provided the opportunity to share other influential factors with an open-ended item. A total of 51 respondents provided 54 unique answers to this open-ended item. The top six additional factors influencing decision making and frequencies are listed in Table 21 below in descending order. A complete listing of all additional factors as stated by the respondents is provided in Appendix I.

Table 21

Other Factors Influencing Decision Making

Influencing Factor Name	Influencing Factor Definition	Frequency*
Recertification Requirements	The requirements of certifying/licensing bodies to renew the certification/license to practice as a prehospital care provider.	10 (19.6%)
Trends	Themes in the field as the field changes over time or themes within the EMS service as the service changes over time.	9 (17.6%)
Provider Interest	The personal learning interests of the prehospital care provider.	6 (11.7%)
Quality Assurance	The various activities that EMS services use to identify best practices and problems within the service's control.	6 (11.7%)
EMS Chief/Director	The person who is in charge of the entire EMS service and who possesses authority and political power.	5 (9.8%)
Medical Director	The physician medical director for the EMS service or receiving hospital.	5 (9.8%)

* Note: Frequencies are based on 51 responses by 54 respondents

Findings Related to Research Question #3

The third research question asked, "What strategies do EMS educators utilize to collect and analyze data about potential CPE offerings?" The 12 items were measured on a 4-point Likert scale (1=Never, 2=Seldom, 3=Often, and 4=Always). Table 22 depicts the means, ranks, standard deviations, and frequencies of the 12 items measuring the strategies EMS educators use to collect data for generating CPE topics in descending order based on rank of mean. Additionally, Table 23 depicts the means, ranks, standard deviations, and frequencies of the three items measuring the strategies EMS educators use to analyze collected data. As it relates to the data collection strategies, EMS educators rely most frequently upon *reviewing patient care reports* for generating CPE topics. This is followed by (in descending order) *observing the target audience for deficiencies, brainstorming with the EMS staff, administering practical skills exams, survey staff, and interviewing staff*. The least frequently used methods of collecting data include (in ascending order): *reading articles, administering written knowledge exams, reviewing reports other than patient care reports,* and *brainstorming with others outside the EMS service*. Of interest in these findings is the disparity of exam use to collect data between the cognitive and skills exams. EMS educators favor the use of skills exams over knowledge exams for use in generating CPE topic ideas.

Once collected, data are analyzed in order to generate CPE topic ideas. In descending order, EMS educators most frequently *identify patterns in the data, use subjective impressions of the data,* and *conduct statistical analysis of the data* in order to determine what CPE topics should be considered.

In addition to the quantitative data collected regarding the strategies to collect and analyze data used to generate CPE topic ideas, respondents were provided the opportunity to share other strategies for data collection and analysis with an open-ended item. A total of 24 respondents provided 12 unique answers to the *data collection* open-ended item and 18 respondents provided 7 unique answers to the *data analysis* open-ended items. The data provided was either unrelated to the question asked or a repeat of one of the quantitative, closed-ended items in the survey. As such, the quantitative data were recoded accordingly to reflect the open-ended responses and no table was generated to report these additional strategies. A complete listing of all additional collection and analysis strategies as stated by the respondents is provided in Appendices J and K, respectively.

Findings Related to Research Question #4

The fourth research question asked, "What CPE is offered by EMS educators?" The 30 open-ended items were measured with respondents entering the approximate number of courses taught within the last two years. Table 24 depicts the means, ranks, standard deviations, and frequencies of the 30 items measuring the courses taught in descending order based on rank of mean. EMS services did not teach all courses listed in the survey instrument and as such, "zero" was a frequently entered number of times many of the courses were taught for any given EMS service.

By far, the most frequently taught courses were *Basic Cardiac Life Support* and *Advanced Cardiac Life Support*. This is not a surprise as these two courses are typically required in order to maintain certification/licensure as a prehospital care provider. The next most frequent courses taught include (in descending order): *Emergency Vehicle*

Table 22

Means, Ranks, and Frequencies for Items Measuring Data Collection Strategies (n=634)

Item	Mean	SD	Rank of Mean	Frequencies							
				Never		Seldom		Often		Always	
				n	%	n	%	n	%	n	%
8. Reviewing patient care reports	3.21	0.70	1	11	1.7%	69	10.9%	332	52.4%	222	35.0%
7. Observing the target audience for deficiencies	3.00	0.63	2	10	1.6%	96	15.1%	408	64.4%	118	18.6%
3. Brainstorming with my EMS service's staff	2.93	0.61	3	13	2.1%	99	15.6%	438	69.1%	83	13.1%
6. Administering practical skills exams	2.84	0.74	4	23	3.6%	162	25.6%	343	54.1%	104	16.4%
1. Surveying EMS staff	2.69	0.73	5	35	5.5%	193	30.4%	340	53.6%	64	10.1%
2. Interviewing EMS staff	2.61	0.67	6	33	5.2%	215	33.9%	349	55.0%	34	5.4%
10. Reviewing physical evidence from EMS-related activities	2.56	0.82	7	57	9.0%	237	37.4%	262	41.3%	76	12.0%
11. Reading articles from EMS-related magazines	2.52	0.67	8	32	5.0%	266	42.0%	306	48.3%	29	4.6%
4. Brainstorming with others outside my EMS service	2.42	0.67	9	38	6.0%	319	50.3%	249	39.3%	26	4.1%
9. Reviewing reports other than patient care reports	2.41	0.77	10	66	10.4%	290	45.7%	230	36.3%	46	7.3%
5. Administering written knowledge exams	2.40	0.81	11	75	11.8%	282	44.5%	218	34.4%	56	8.8%
12. Reading articles from scholarly journals	2.31	0.71	12	72	11.4%	307	48.4%	226	35.6%	19	3.0%

Note: *n*'s vary slightly due to missing data.

Table 23

Means, Ranks, and Frequencies for Items Measuring Data Analysis Strategies (n=634)

Item	Mean	SD	Rank of Mean	Frequencies							
				Never		Seldom		Often		Always	
				n	%	n	%	n	%	n	%
1. Identifying patterns in the data	2.80	0.68	1	28	4.4%	138	21.8%	398	62.8%	70	11.0%
3. Using my subjective impressions of the data	2.73	0.70	2	28	4.4%	177	27.9%	363	57.3%	61	9.6%
2. Conducting statistical analysis of the data	2.58	0.78	3	49	7.7%	233	36.8%	287	45.3%	65	10.3%

Note: *n*'s vary slightly due to missing data.

Operator's Course, *Pediatric Advanced Life Support, refresher courses based on the National Standard Curriculum, Assessment and Treatment of Trauma, Hazardous Materials Awareness, Pediatric Education for Prehospital Providers,* and *PreHospital Trauma Life Support*. Among the least frequently taught courses include (in ascending order): *Advanced Wilderness Life Support, National Disaster Life Support, Advanced Disaster Life Support, Advanced Hazmat Life Support,* and *Advanced Trauma Life Support (For Physicians)*.

In addition to the quantitative data collected regarding the courses taught in the last two years, respondents were provided the opportunity to share other courses taught with an open-ended item. A total of 82 respondents provided 70 unique usable answers to this open-ended item. A large proportion of the responses included inservice-type classes of short duration that were not comparable to either the courses listed in the closed-ended portion of the survey nor to a refresher course, which follows the National Standard Curriculum. These courses were not included in the following table as a result of the lack of comparability. These course additions were analyzed for themes of categories along with example course names and are listed in Table 25 according to frequency by category. The number of times these additional classes were taught was not consistently reported by respondents so a frequency by course is not included in this table. A complete listing of all additional courses taught as stated by the respondents is provided in Appendix M.

Table 24

Rank Order and Frequency Listing of CPE Classes Taught During Last Two Years (n=634)

Item #	Item	# of Times Offered			
		Mean Rank	Mean per Resp.	SD	n for all Resp.
1	Basic Cardiac Life Support	1	10.95	15.75	6,941
2	Advanced Cardiac Life Support	2	4.86	7.58	3,080
29	Emergency Vehicle Operator's Course (any type)	3	3.45	5.22	2,188
7	Pediatric Advanced Life Support	4	3.39	6.34	2,150
30	Refresher course, based on the National Standard Curriculum	5	2.26	4.03	1,436
13	Assessment and Treatment of Trauma	6	2.08	3.77	1,319
21	Hazardous Materials Awareness Course	7	1.96	3.12	1,241
8	Pediatric Education for Prehospital Providers	8	1.82	4.43	1,156
10	PreHospital Trauma Life Support	9	1.81	4.50	1,146
4	Advanced Pediatric Life Support	10	1.32	3.46	838
3	Advanced Cardiac Life Support for Experienced Providers	11	1.18	3.10	746
5	Emergency Pediatric Care	12	1.14	2.86	725
6	Neonatal Resuscitation Course	13	1.06	3.08	671
11	Pediatric Emergency Assessment, Recognition, & Stabilization	14.5	0.97	2.68	617

Item #	Item	# of Times Offered			
		Mean Rank	Mean per Resp.	SD	n for all Resp.
26	Geriatric Education for Emergency Medical Services	14.5	0.97	1.95	616
12	International Trauma Life Support	16	0.89	2.59	565
9	Prehospital Pediatric Care	17	0.83	2.70	524
15	Basic Burn Life Support	18	0.61	1.77	386
25	Advanced Stroke Life Support	19	0.51	1.24	322
24	Advanced Medical Life Support	20	0.50	1.30	320
22	Basic Hazmat Life Support	21	0.44	1.27	281
18	Basic Disaster Life Support	22	0.29	0.87	181
16	Advanced Burn Life Support	23	0.28	0.77	178
17	Core Disaster Life Support	24	0.18	1.03	113
27	Basic Wilderness Life Support	25	0.16	0.71	103
14	Advanced Trauma Life Support (For Physicians)	26.5	0.14	0.68	88
23	Advanced Hazmat Life Support	26.5	0.14	0.53	91
19	Advanced Disaster Life Support	28	0.11	0.55	69
20	National Disaster Life Support	29	0.09	0.53	54
28	Advanced Wilderness Life Support	30	0.06	0.38	41

Note: *n*'s vary slightly due to missing data.

Overall, respondents indicated that much of the CPE training in their responses were the specialty topics taught during regular training and not as a designated course. These CPE topics were taught during inservice or similar style training sessions. Another overall theme among the categorized CPE courses were trauma courses with an emphasis on care of combat victims and trauma for nurses involved in prehospital care. Technical rescue courses were prevalent, which is not surprising given the proportion of fire department EMS services represented by this survey.

Table 25

Other CPE Classes Taught During Last Two Years

Category	Example Course Names/Topics	Frequency*
Trauma	Tactical Combat Casualty Care Curriculum Trauma Nurse Core Curriculum Transport Nurse Advanced Trauma Course Traumatic Brain Injury Course	10 (14.3%)
Technical Rescue	Vehicle Extrication Confined Space Rescue Ice Rescue Technical Training Marine Rescue Technician Technical Rope Rescue	9 (12.9%)
Respiratory	Advanced Airway Procedures Difficult Airway Management	8 (11.4%)
Safety	Helicopter Safety Highway Incident Scene Safety Self Defense in EMS OSHA Biohazard Training	7 (10.0%)
MCI	START Triage Training National Incident Management System	6 (8.6%)
EMS Operations	HIPAA Compliance Training Preceptor Training	5 (7.1%)
Instructor	Basic Cardiac Life Support Instructor EMS Instructor	4 (5.7%)

Category	Example Course Names/Topics	Frequency
Cardiac	12 Lead Electrocardiography STEMI Awareness	4 (5.7%)
Other	EMS Supervisor Training Interfacility Transport Course	4 (5.7%)
Critical Care	Critical Care Paramedic	3 (4.3%)
Medical	Advanced Life Support for Basic Providers Basic Medical Life Support Stroke Awareness	3 (4.3%)
Terrorism	Nerve Agent Casualty Course Toxic Terrorism Course	2 (2.9%)
Hazardous Materials	Hazardous Materials Operations Course Hazardous Materials Technician Course	2 (2.9%)
Aviation	Flight EMS Training	1 (1.4%)
Pediatric	Pediatric International Trauma Life Support	1 (1.4%)
Pharmacology	Basic Pharmacology	1 (1.4%)

* Note: Frequencies are based on 70 responses by 82 respondents

Summary

This chapter represented the findings of the research study. In summary, the major findings of the research were that EMS CPE topics tend to be driven by recertification/relicensure requirements. Additionally, having adequate resources to conduct CPE (i.e., instructors, equipment, time, and money) play a major role in the EMS educator's decision-making process when trying to prioritize CPE topics to offer. When collecting data during a needs assessment, strategies that look at the EMS educator's EMS service performance (i.e., patient care reports, observations of the target audience, brainstorming with the EMS staff, and administering practical skills exam) are the most

frequently employed strategies. These data are most frequently analyzed for themes via subjective methods more often than statistical methods. Lastly, the most frequently offered CPE courses in the last two years by EMS services focused on those courses needed to maintain prehospital care provider certification/licensure.

CHAPTER 5

SUMMARY, CONCLUSIONS, AND IMPLICATIONS

The purpose of this chapter is to interpret the findings presented in Chapter 4. These findings will be discussed in relation to the relevant literature. This chapter is divided into six major sections: (1) overview of the study, (2) discussion of the findings, (3) comparison of needs assessment models to current practices, (4) conclusions, (5) implications for research and practice, and (6) recommendations for future research.

Overview of the Study

The broad purpose of the study was to understand the practices used by Emergency Medical Service (EMS) educators to identify and prioritize continuing professional education (CPE) and what influenced their decision making process for selecting CPE offerings. Four research questions guiding the study were:

1. What sources of information do EMS educators utilize to identify and prioritize potential CPE offerings?
2. What influences affect the needs assessment processes EMS educators use to identify and prioritize potential CPE offerings?
3. What strategies do EMS educators utilize to collect and analyze data about potential CPE offerings?
4. What CPE is offered by EMS educators?

A 97-item survey instrument was developed by the researcher to specifically address the four research questions by means of gathering data from EMS educators registered with the National Registry of Emergency Medical Technicians (NREMT) as Training Officers. The online survey was designed as a self-assessment of the frequency

that different sources were used to generate CPE topic ideas, strategies used to collect data, and strategies to analyze collected data as well as the sense of importance of factors that influence decisions. Additionally, the survey was designed to collect data on how many of a variety of classes were taught in the last two years as CPE. These sources, collection and analysis strategies, influencing factors, and list of courses taught were developed through a review of the literature and dialogue with adult and EMS educators. The survey consisted of 12 items that measured the frequency of use of sources to generate CPE topic ideas, 15 items that measured the importance of influencing factors, 12 items that measured the frequency of use of strategies to collect data, three items that measured the frequency of use of strategies to analyze data, and 30 items that measured the frequency of classes taught. Each of these sets of items had an open-ended "other" item, which collected any data that did not neatly fit within the items presented. Finally, 20 items asked demographic information about the respondent and the EMS service with which he or she was affiliated.

Discussion of the Findings

Findings Related to Research Question #1

Frequencies and rank ordering of the 12 item means were used to answer the question: "What sources of information do EMS educators utilize to identify and prioritize potential CPE offerings?" The means reflected the self-assessed frequency in which EMS educators used each source to generate CPE topic ideas. As noted in the previous chapter, the most frequently used source of information came from governing bodies that control certification/licensure, followed by people associated with the EMS field and then by documents of various types.

Governing bodies that control certification/licensure were powerful drivers in EMS CPE, evidenced by 85.9% of respondents stating they "always" or "often" (52.5% and 33.4%, respectively) turn to mandates from the state office of EMS and an additional 75.3% of respondents stating they "always" or "often" (35.0% and 39.3%, respectively) turn to mandates from the NREMT to generate CPE topic ideas. That mandates from state EMS offices were the most frequently used sources of information to generate CPE topic ideas, followed by mandates from the NREMT, was not surprising due to the current certification/licensure structure in the EMS field. While the NREMT is the predominant vehicle for initial certification/licensure, it only provides "a valid, uniform process to assess the knowledge and skills required for competent practice by EMS professionals" (NREMT, 2010, ¶ 8). This verification process results in a certification of knowledge and skills, but not authorization to practice. After initial certification/licensure to practice has been granted at the state level, each state's requirements for recertification/relicensure may differ from the NREMT, which would explain why the state EMS office source is the primary source of CPE topic ideas. While having a system of recertification/relicensure is a positive in that it addresses the public's safety interests by allowing only competent individuals to practice in the field, it does nothing to ensure that actual performance gaps are being addressed. To address actual performance gaps, EMS educators need to seek out specific information from within their own organizations that speak to performance needs rather than relying heavily on mandates from the state offices of EMS to generate CPE topic ideas. Doing so would support one of the *EMS Education Agenda for the Future* goals of improving the empirical basis of education by

determining appropriate learning needs (NHTSA, 2000) and the call by reports for more tailored CPE (see: KBEMS, 2007; ODHS, EMSTS, 2006).

People, most notably front-line prehospital care providers, were another major source of information by which EMS educators gathered data to generate CPE ideas. Recommendations from people within the EMS educator's own EMS service were the third most frequently used source to generate CPE topic ideas, with 13.2% respondents "always" using this source and 79.7% "often" using this source. Additionally, although less frequently, EMS educators turned to recommendations from people outside their own EMS service (1.7% "always"; 60.1% "often") and advisory committees (4.4% "always"; 46.2% "often") as sources for CPE topic ideas. Since individuals are typically poor judges of personal learning needs (Cordero, Cadavid, Fernández-Llimós, Diaz, Sanz & Loza, 2004; Fitzgerald, White & Gruppen, 2003, Igarashi, Suveges & Moss, 2002; Mann, 1998) and people "often have strong opinions that they confuse with facts" (Witkins & Altschuld,1995, p. 47), these sources must be used with caution when making decisions about CPE needs. Recommendations taken in isolation, without supporting evidence, may be a good indication of a want or demand, but not an actual need (Queeny, 1995). Supporting evidence would be necessary to identify if the recommendations address real needs, assessed needs, discrepancy needs, maintenance needs, or blind needs.

Two interesting findings from this study pointed to the frequency by which the EMS medical director and EMS conferences were used as sources of information. While the former could be classified as "recommendations from people within my EMS service," a large number (n=24) specifically noted the medical director as "other sources of information for CPE topic generation," which demonstrated the influence of EMS

medical directors on CPE. Typically, the medical director for any given EMS service is one who has "active participation in the emergency management of acutely ill and injured patients" (ACEP, 2007, ¶ 7), giving the medical director direct insight into actual practice of prehospital care providers. However, as Davis et al. (2006) concluded, physicians, like others, have a limited ability to accurately assess learning needs using judgment alone. Thus, as with any recommendation, evidence is necessary to identify if the recommendation is founded on fact or opinion.

EMS or EMS-related conferences were the second most frequently (n=11) identified "other source for CPE topic generation," though information gathered from conferences could also be classified as "recommendations from people outside my EMS service." Conferences typically draw prehospital care providers into highly-publicized venues in which the participants share the latest knowledge and practices. While conferences may be an excellent source for generating CPE topic ideas, the ideas must be evaluated against the context of the EMS educator's own service to determine if the CPE topic ideas would address real needs, assessed needs, discrepancy needs, maintenance needs, or blind needs.

While serial publications, specifically EMS trade magazines (1.1% "always"; 41.8% "often") and scholarly journals (1.3% "always"; 33.0% "often"), were also used to generate CPE topic ideas, the data showed that these external sources were used less frequently than internal sources. Magazines (i.e., *Journal of Emergency Medical Services* and *EMS Magazine*) were used with more frequency than peer-reviewed, scholarly journals, which may be an indication of the perceived value placed on evidence-based practice in EMS, a concern raised in the *National EMS Research Agenda* (NHTSA,

2001b). EMS magazines provide a ready source of information through featured articles and editorials, frequently written by those established in the field and reflecting current topics of interest. Featured articles often reduce studies from scholarly journals to a language understandable by most EMS educators, highlighting the salient results. Yet, while EMS magazines in the field are generally accepted sources of credible information used to generate CPE topics, as a secondary resource they may contain influences that could steer CPE decisions in a less-than-optimum direction, since the featured articles are the results of the authors' filters and the repetitious appearance of author names may point to the homosocial reproduction tendencies in EMS whereby like reproduces like. The EMS educator using a trade magazine would do well to compare generated CPE topic ideas from this source against the context and needs of the EMS organization in which he or she works, so as to not commit time, energy, and resources to wants in lieu of needs.

Finally, extant data (Tobey, 2005) were sought out less frequently in the form of patient care reports (18.3% "always"; 65.5% "often"), data from reports other than patient care reports (5.7% "always"; 39.7% "often"), and articles or studies from scholarly journals (1.3% "always"; 33.0% "often"). EMS educators can use these data as exact information of the context in which they operate in order to clarify assumptions or describe the extent of an issue (Barbazette, 2006) or to provide information on causal or contributing factors (Witkin & Altschuld, 1995). However, it should be noted that the results from the survey show that people from within the EMS service were more frequently used to generate CPE topic ideas in the needs assessment process than extant data. This may be explained by the lack of trained people within the EMS field (NHTSA,

2001b) who have requisite research skills and knowledge to effectively differentiate between actual needs from wants. While 57.6% of the respondents reported having been formally trained in conducting needs assessments, the survey results begged the question of the content of this training and underscored the importance of having sufficient depth and breadth of knowledge rather than merely learning tips or techniques, something EMS generally desires. As Sayre, White, Brown and McHenry (2002) remind us, EMS CPE will require evidence-based research to help assure continued competency of the prehospital care providers. Not incorporating extent data more frequently than was discovered by this study creates an incomplete picture of performance issues for the EMS educator, which is unnecessary when hard, factual data readily exists and can be used for generating CPE topic ideas. EMS educators are failing EMS CPE by underutilizing the evidence-based research and extant data that exists and by not contributing more to evidence-based practice.

In summary, the results of the study indicated an overreliance on mandates from state EMS offices and the NREMT to generate CPE topic ideas. The third most utilized source for generating CPE topic ideas was recommendations from people within the EMS educator's service. The combination of mandates and recommendations was sought more frequently than data from patient care reports and data from reports other than patient care reports. This reliance on mandates and recommendations over extant data undoubtedly included biases in the process of generating CPE topic ideas. This creates a situation in which mandates are leading EMS CPE topic generation rather than EMS CPE needs fulfilling the mandates.

Findings Related to Research Question #2

Frequencies and rank ordering of the 15 item means were used to answer the question: "What influences affect the needs assessment processes EMS educators use to identify and prioritize potential CPE offerings?" The means reflected the self-assessed frequency of how important each factor was in influencing the decision-making process of EMS educators while selecting CPE topics. During evaluation of the results, three general patterns emerged: (a) resources available for CPE activities were the most influential factors, (b) interests of people were the second most influential factors, and (c) fears were the least influential factors.

Overall, this study revealed that the most influential set of factors when deciding what CPE to offer to prehospital care providers are those related to resources. EMS educators were influenced by having adequate: (a) expertise (61.0% "very important"; 33.4% "moderately important"), (b) instructors (58.5% "very important"; 33.8% "moderately important"), (c) equipment (56.6% "very important"; 35.5% "moderately important"), (d) time (48.1% "very important"; 41.8% "moderately important"), and (e) money (50.8% "very important"; 34.9% "moderately important"). The influence of resource availability in deciding CPE topics points to EMS educators being acutely aware that any CPE selected must fit within the constraints of the EMS services' resources. Given the resources needed to conduct EMS CPE, it is quite likely that CPE for prehospital care providers is focused primarily on renewal of certifications/licenses in order for these EMS services to continue operating in a legal fashion. Thus, the politics of program planning (Cervero & Wilson, 2006) as they relate to needed resources such as

time, money, equipment, instructors, and expertise may contribute to barriers for CPE beyond that which is minimally required.

Competing interests from multiple stakeholders was also a major factor in deciding what CPE was offered to prehospital care providers, and topping the list of people who influenced these decisions was the EMS chief/director (53.5% "very important"; 36.1% "moderately important"). Interestingly, while recommendations from the EMS service's chief/director fell below having adequate expertise, instructors, and equipment to conduct CPE, it was more important than having adequate time to conduct the CPE. This pointed to the power of the EMS chief/director in CPE decision-making, so that when given a recommendation for a CPE topic from the EMS chief/director, the EMS educator may be placed in a position to find the time to create or conduct the CPE. This may be at the cost of another CPE program, program quality, or require that the EMS educator find an appropriate mix of delivery types, to include distributive forms of CPE, to accommodate all requests. Or, conversely, if the EMS chief/director recommended minimal or limited CPE topics, the EMS educator may have been placed in a position of not being able to create CPE to close performance gaps. While the EMS chief/director, with his or her global view of the EMS service, may be an excellent source of information to generate CPE topic ideas, it must be noted that the role of the chief/director is one of making business and operational decisions related to the overall service, so that the interests and priorities of the chief/director may not be in line with actual educational needs. In terms of adult education, the influence of recommendations from the chief/director may dissuade a thorough needs assessment, which would separate wants from needs and clearly articulated CPE that was needed to close performance gaps.

The direct consumers of CPE are the prehospital care providers themselves, those on the front line of patient care who are in need of continuous learning opportunities to remain certified/licensed and to remain knowledgeable about current medical trends and procedures. Being on the front line, prehospital care providers are able to give EMS educators information related to daily operations that can be compared to knowledge and performance standards. It was no surprise, then, that a large majority of EMS educators (42.1% "very important"; 49.4% "moderately important") included the potential CPE audiences' desires as part of the needs assessment. Including these stakeholders in the needs assessment process allowed for the identification of Queeney's (1995) perceived and expressed needs, Aherne, Lamble, and Davis' (2001) hidden and shared needs, and Bradshaw's (1972) felt and expressed needs. However, it should be noted that recommendations from the EMS service's staff fell below most factors related to resources and below recommendations from the EMS service's chief/director. This leads one to believe that EMS educators are probably hearing what is needed, but are restricted in what they can provide because of resource limitations and directives from above. Additional supporting evidence includes the fact that the most frequently cited "other influencing factor" supplied by respondents was "recertification requirements" (n=10, 1.5%).

As indicated by the data, the EMS educator's own personal sense of the CPE's importance (18.6% "very important"; 64.4% "moderately important"), interest in learning the CPE (3.0% "very important"; 35.6% "moderately important"), and teaching the CPE (4.6% "very important"; 48.3% "moderately important") were at play when deciding what CPE to offer. According to Evans and Dyar (2010), the EMS educator is typically

positioned below the supervisor on the development hierarchy, who then is positioned below the chief/director. This organizational structure is contradicted in part by the evidence from this study in terms of influencing factors whereby the EMS educator had more influence in CPE decision-making than did supervisors. Specifically, the EMS educator relied on his or her own personal sense of the CPE's importance more than recommendations from his or her direct supervisor (30.1% "very important"; 47.2% "moderately important"), while less than recommendations from the EMS chief/director. As suggested by Hughes (2004), the supervisor may have limited impact on workplace learning due to factors of trust and perceived limitations of authority. The higher level of importance for recommendations from the EMS chief/director, meanwhile, may be attributable to the EMS chief/director's level of authority over the entire EMS service, including the EMS educator. The data compared to the literature suggests that EMS educators are given responsibility in terms of EMS CPE decision-making without the benefit of a supervisory position in the reporting hierarchy and with limited ability to exercise authority under the EMS chief/director.

The least influential stakeholder in the possible factors were people outside of the EMS educator's service. As viewed through the lens of an EMS educator, people outside of one's own EMS service will most likely lack insight into the needs of the prehospital care providers at that service and as such do not carry much weight with the EMS educator when he or she makes CPE decisions. Interestingly, this finding matched closely with sources of information such as articles from EMS-related magazines (1.1% "always"; 41.8% "often"), scholarly journals (1.3% "always"; 33.0% "often), or the Internet (2.5% "always"; 33.6% "often") – all typically produced by people outside of

one's own EMS service. This may indicate a reluctance of EMS educators to see value in outsiders' opinions or expertise as it relates to CPE.

Overall, the least influential factors when deciding CPE were related to the fear of offering (3.9% "very important"; 12.1% "moderately important") or not offering (12.5% "very important"; 20.5% "moderately important") any given CPE topic. While, at first glance, fear in the CPE decision-making process does not seem of statistical significance, there may be practical significance when examining the number of respondents who indicated fear of not offering the CPE as "very important" (n=79, 12.5%) in the decision-making process. Though fear of not offering the CPE ranked fourteenth of the fifteen CPE decision-making influencing factors, listing the data set in order of the number who selected "very important" placed fear of not offering the CPE as the tenth most influential factor. This placed it above personal interest in learning the CPE (3.0%), personal interest in teaching the CPE (4.6%), the EMS service's history of offering the CPE (12.0%), recommendations from others outside the EMS service (5.4%), and personal fear of offering the CPE (3.9%). Tisdell (1998) noted that, "If an idea is too contrary to our belief system… it may be too scary to even consider" (p. 144). Thus, the number of EMS educators who felt that fear of not offering the CPE was "very important" demonstrated that emotions and politics, and not necessarily data, may have steered CPE decision-making.

In summary, the findings for Question #2, demonstrated that availability of resources for CPE activities were the most influential factors, followed by recommendations from stakeholders. Resource limitations combined with directives from EMS chief/directors, who are responsible for service operations and not necessarily

trained in CPE needs assessment practices, creates potential for less-than-optimal CPE. This dilemma in which EMS educators find themselves is much like the swamp of professional practice described by Schön (1987) in that EMS educators are forced to deal with issues of recertification/relicensure, what Schön would call "the high ground." Meanwhile, the more meaningful issues of prehospital care provider performance, which requires more diligence to effectively manage, are left to chance. As a result, the EMS educator must choose "…remain[ing] on the high ground where he can solve relatively unimportant problems according to prevailing standards of rigor or shall he descend to the swamp of important problems and nonrigorous inquiry" (p. 3). That recommendations from the EMS service's staff fell below resource availability and recommendations from EMS chiefs/directors in influence suggests that EMS educators are hearing the CPE needs and wants of the service during the needs assessment process, but are unable to act upon the information because of resource limitations and directives from more powerful entities. While the perception is that EMS educators are placed in a position of making CPE decisions, the data shows that the influence of the EMS educators' own sense of the CPE importance fell well below that of other stakeholders. Essentially, EMS educators were given responsibility for EMS CPE, but not necessarily the authority or the resources to conduct the CPE. Further, only those stakeholders outside of the EMS service had a lesser amount of influence, which may point to the lack of importance that EMS educators place on experts and authors in EMS or other fields, such as adult education. Finally, while not statistically significant, there may be a practical significance regarding the number of respondents who stated that fear of not offering the CPE was "very important" in the decision-making process. With the power of EMS chiefs/directors over

the EMS services and the influence of recommendations from EMS chiefs/directors that was shown in the data, there is the real potential that at least some EMS educators are acting and responding to the recommendations because of politics and emotions, and not due to agreement of the recommendation for the CPE.

Findings Related to Research Question #3

Frequencies and rank ordering of the 12 item means that focused on data collection strategies and the three item means that focused on data analysis were used to answer the question: "What strategies do EMS educators utilize to collect and analyze data about potential CPE offerings?" The means reflected the self-assessed frequencies of strategies use to both collect and analyze data from needs assessment activities.

The most frequently used data collection strategy by the respondents was reviewing patient care reports (35.0% "always"; 52.4% "often"). As a quality assurance strategy, this aims to identify prehospital care provider actions that are substandard according to predetermined criteria by means of indirect measures – those things that were documented by prehospital care providers. Problematic, however, is that such criteria are not "fully substantiated by scientific literature, are controversial in some situations, or are infrequent in occurrence" (Myers et al., 2008, p. 147). Additionally, with documentation error rates between 7.4% and 73.9% (Brice, Friend & Delbridge, 2008; Carter, Davis, Evans & Cone, 2009; Riley, Burgess & Schwartz, 2004) there could be little assurance that the data collected from these reports are an accurate reflection of prehospital care provider performance. The combination of ill-defined review criteria, inaccurate documentation, and reviewer bias may yield results that do not reflect true learning needs.

Following review of patient care reports, the next five most frequently used methods of collecting data involved direct interaction with the service's prehospital care providers: (a) observing the target audience (18.6% "always"; 64.4% "often"), (b) brainstorming (13.1% "always"; 69.1% "often"), (c) administering practical skills exams (16.4% "always"; 54.1% "often"), (d) surveying (10.1% "always"; 53.6% "often"), and (e) interviewing being the most popular (5.4% "always"; 55.0% "often"). These methods are typically more time consuming and resource-dependent than reviewing patient care reports, but can be useful to capture valuable data about what CPE to offer.

Among the least used strategies for collecting data were brainstorming with others outside the EMS service (4.1% "always"; 39.3% "often"), reviewing reports other than patient care reports (7.3% "always"; 36.3% "often"), administering written knowledge exams (8.8% "always"; 34.4% "often"), and reading articles from scholarly journals (3.0% "always"; 35.6% "often"). It is interesting to note, however, that brainstorming, interviewing, and surveying EMS staff were preferred over administering knowledge exams (8.8% "always"; 34.4% "often"). First, these three strategies for collecting data are time consuming and could be expensive, especially when compared to conducting a knowledge exam. Second, these three strategies are more likely to gather data related to wants and not necessarily needs, whereas knowledge exams are direct measures of one's knowledge of the topic, assuming the exams measure what they are intended to measure. If used properly, knowledge exams are capable of being an objective data collection tool, which could accurately indicate areas of weakness that are addressable with CPE. It is also interesting to note that practical exams were favored over knowledge exams. Practical exams are more costly to administer due to equipment, time, space, and

evaluator needs. Additionally, practical exams were more susceptible to rater bias, even when grading rubrics are used to measure performance. This preference may also indicate the value of performance capabilities over knowledge capabilities in EMS.

Overall, this study revealed that data analysis strategies, when employed, are not very sophisticated and rely primarily on the EMS educators' subjectivities. Primarily, EMS educators identified patterns in the data (11.0% "always"; 62.8% "often"), followed by use of subjective impression of the data (9.6% "always"; 57.3% "often"). Conducting statistical analysis of the data (10.3% "always"; 45.3% "often") was the least frequently used analysis strategy. While rigorous data collection and analysis may provide accurate indicators of learning needs, one must consider the resources available (to include knowledge and expertise) in order to be successful (Knox, 2002). As Queeney (1995) notes, it is more important to work within the limitations when assessing learning needs than to develop a sophisticated process that cannot be implemented. Given the nature of EMS and those who make up the workforce, it is no surprise that more subjective, less analytical methods are employed to identify CPE needs. With regulatory mandates, service chiefs/directors, and medical directors' influences having such powerful effects on what CPE is taught, EMS educators are left with little sense of purpose for conducting a rigorous needs assessment and have little impetus to determine any other CPE outside of what is told to be taught.

Findings Related to Research Question #4

Frequencies and rank ordering of the 30 class offerings item means were used to answer the question: "What CPE is offered by EMS educators?" The means reflected the self-assessed frequency of how many times each course was offered per study participant.

In addition, the total number of courses taught across all study participants gave a glimpse as to the popularity of each course.

Three of the top five most frequently taught courses included those typically necessary for continued certification/licensure as a prehospital care provider. It was beyond the scope of this study to determine what each individual state required in order to renew prehospital care provider certifications/licenses, so the NREMT's recertification requirements was used as a comparison. According to the NREMT (2008a; 2008b; 2008c; 2008d), prehospital care providers of all levels are required to have current *Basic Cardiac Life Support* certification in order to recertify. In addition, all advanced-level prehospital care providers are required to have current *Advanced Cardiac Life Support* certification in order to recertify. Further, the NREMT requires some quantity of refresher education, not to include these two required courses, in order to recertify/relicense. These three classes, *Basic Cardiac Life Support* (n=6,941; 10.95 mean per respondent), *Advanced Cardiac Life Support* (n=3,080; 4.86 mean per respondent), and refresher course based on the National Standard Curriculum (n=1,436; 2.26 mean per respondent), represented 40.6% of all CPE courses listed, a clear indication of the influence this certification organization has on CPE selection.

The third most frequently taught CPE class over the past two years among the services represented in this study was the *Emergency Vehicle Operator's Course* (EVOC) or its equivalent (n=2,188; 3.45 mean per respondent). While the course is not a requirement for becoming a prehospital care provider or maintaining licensure, select governing agencies require it as a prerequisite to being allowed to drive an ambulance. A study published in 2010 for the Wisconsin State Patrol, for example, found that 11 states

required ambulance drivers to complete EVOC training or its equivalent (CTC & Associates, 2010). Further, the Commission on Accreditation of Ambulance Services (2009) requires a driver training program for all personnel with driving privileges as one of the standards necessary for service accreditation. In addition to meeting mandates, courses designed to teach prehospital care providers how to safely operate an ambulance, especially those that involve the use of driving simulators, have the potential to improve an individual's ability to drive an ambulance (Lindsey, 2004). However, it should be noted that Sanddal, Sanddal, Ward, and Stanley (2010) found inadequate vehicle operator training was a contributing factor in ambulance crashes during 2007 to 2009, resulting in 982 injuries and 99 fatalities. Thus, to make a positive impact on prehospital care providers, EMS educators need to ensure that the EVOC course or its equivalent closes performance gaps in addition to meeting any training, certification, or service accreditation requirements.

With a large variety of pediatric courses readily available to EMS educators, the next group of major courses taught most frequently focused on pediatric emergencies, to include *Pediatric Advanced Life Support* (n=2,150; 3.39 mean per respondent), *Pediatric Education for Prehospital Providers* (n=1,156; 1.82 mean per respondent), and *Advanced Pediatric Life Support* (n=838; 1.32 mean per respondent). It should be noted that in order to be recertified by the NREMT, all levels of prehospital care providers are required to have pediatric training. Additionally, EMS educators can take advantage of the Federal Emergency Medical Services for Children Program, which provides grant funding for pediatric training (United States Department of Health and Human Services, n.d.). The combination of pediatric training being mandated by the NREMT, the wide

variety of pediatric courses, and the potential of grant funding may have made these courses frequent CPE choices, though they may not have addressed any specific knowledge or performance deficiencies among the services' prehospital care providers.

The seventh most frequently taught course, the *Hazardous Materials Awareness Course* (n=1,241; 1.96 mean per respondent), was yet another training that met mandates for prehospital care providers. Fire departments typically have hazardous materials teams responsible for dealing with these types of emergencies. With 35.2% of the study respondents representing fire departments, the popularity of hazardous materials courses could be attributed to this aspect of the service demographics. The Occupational Safety and Health Administration (OSHA) has a federal mandate for employers to protect the health and safety of employees through proper training for those who may respond to an emergency with the potential for hazardous materials. According to 29 CFR 1910.120 workers who are engaged in emergency response, no matter where it occurs, must have hazardous materials training at a minimum of the awareness level. Further, annual refresher training is required for workers trained at the first responder awareness level (OSHA, n.d.). Thus, once again, EMS educators were most likely responding to mandates from a governing body rather than assess learning needs when offering the *Hazardous Materials Awareness Course*.

Least frequently taught courses were wilderness rescue courses, to include *Basic Wilderness Life Support* (n=103; 0.16 mean per respondent) and *Advanced Wilderness Life Support* (n=41; 0.06 mean per respondent), along with disaster response courses, to include *Basic Disaster Life Support* (n=181; 0.29 mean per respondent), *Core Disaster Life Support* (n=113; 0.18 mean per respondent), *Advanced Disaster Life Support* (n=69;

0.11 mean per respondent), and *National Disaster Life Support* (n=54; .09 mean per respondent). The wilderness life support courses are designed to prevent and effectively manage emergency medical situations outside traditional medical facilities where access to the patient is difficult due to environmental extremes and care is hampered because of limited equipment (AWLS, n.d.). Since these locations are typically serviced by small, often volunteer organizations, it leaves little doubt that issues of resources contributed to the lack of courses offered. In contrast, the disaster response courses were borne from a need to better prepare healthcare professionals for mass casualty events by standardizing emergency response training nationwide and taking an all-hazards approach (American Medical Association, 2011). Unlike the wilderness rescue courses, the National Disaster Life Support series of courses can be offered with grant funding from the Department of Health and Human Services under the Bioterrorism Training and Curriculum Development Program (Coule & Schwartz, 2009). With all parts of the United States at risk from terrorist attacks, natural disasters, and other events causing mass causalities, and grant funding available to meet the influencing factor of having financial resources for conducting CPE, one must question why these disaster courses are not more frequently taught. The answer to that question may lie, once again, in the issue of recertification/relicensure. The EMS educator, when negotiating CPE prioritization, may have been forced to choose courses meeting recertification/relicensure needs over those that would meet current or future learning or performance needs.

Overall, the courses taught by EMS educators who participated in this study demonstrated three key patterns. First, those courses specifically required for successful recertification/relicensure or accreditation, both on the individual and service levels, were

the most frequently taught courses, demonstrating the influence of mandates from certification/licensure and accreditation organizations over CPE prioritization and selection. Second, the availability of funding in the form of grants may not have had much weight to CPE selection as evidenced by the frequency of pediatric courses versus the infrequency of disaster courses in CPE taught. Finally, the type of EMS service may have influenced the type of CPE offered based on typical services provided as evidenced by the frequency of hazardous materials courses associated with fire department-based EMS and select locations offering wilderness trainings.

Conclusions

From this study, I was able to draw four major conclusions. This section will summarize these conclusions in light of the findings.

Conclusion 1: Recertification/Relicensure is the primary driver of EMS CPE.

Based on the data from the *sources of information*, *factors that influence decision-making*, and the *courses taught in the last two years*, it is apparent that meeting recertification/relicensure requirement was the most pressing concern for EMS educators. Various certifying organizations' requirements determine what CPE is ultimately taught though there is little, if any, supportive evidence to justify the topics and hours selected to meet these requirements. These systems of CPE are purported to be in place for the public's safety, but the evidence from this study seems to point to a conflict in actual learning needs as compared to the arbitrary requirements. While the need to protect the public with adequate accountability measures is necessary, if not appropriately designed, the system can inhibit professional growth of the members of the field and the field itself.

Conclusion 2: EMS educators rely on mandates and recommendations from others over extent data, which may bias CPE decision-making.

Depending too much on mandates from governing bodies and recommendations from people without confirmation with extent data may produce CPE decisions that are biased. The result will be CPE that serves the governing bodies and recommending people while not necessarily addressing knowledge and performance gaps that may exist. Further, the influence that authority figures have over EMS educators may actually dissuade a thorough needs assessment, which will limit differentiation of wants from needs. Thus, when one does not triangulate data from more than one source (DeSilets, 2007) to make such CPE decision, validity suffers and there is less likelihood that actual CPE needs are being addressed.

Conclusion 3: Scarce resources are key factors in CPE decision-making.

Similar to educators in other fields, EMS educators are keenly aware of the limitations posed by having inadequate resources to conduct CPE. Resources such as time, money, equipment, instructors, and expertise are all critically important for EMS educators to deliver CPE to prehospital care providers in need and without adequate supplies of each, CPE cannot be conducted. Even if the most perfect educational solution to bridge the most challenging performance gaps were designed, it could not be implemented without adequate resources. The constraints posed by having inadequate resources to conduct CPE, then, may impact CPE quality and ability to improve participant performance, leading to less than optimal training. That EMS educators acknowledge this reality demonstrates thoughtful consideration of what CPE can be effectively conducted given the constraints of EMS.

Conclusion 4: EMS educators are not necessarily given the appropriate authority to make CPE decisions.

With the heavy influence the EMS chief/director and medical director have on the EMS educator coupled with the suggested position of EMS educators within organizational hierarchies, EMS educators may not be afforded a commiserate amount of authority to effectively conduct CPE activities capable of bridging knowledge and performance gaps to improve patient outcomes. The EMS community has not fully embraced the importance of CPE and the level of professionalism and authority EMS educators must possess to effectively integrate CPE as a strategic operational success component. Therefore, EMS education should be viewed as a subspecialty in the field and not just an activity conducted by prehospital care providers.

Conclusion 5: EMS Educators do use some needs assessment strategies to identify CPE, but not to their fullest potential.

The data collected demonstrated that EMS educators do follow some of the practices of other adult educators when it comes to conducting needs assessments for identifying and prioritizing CPE. Much improvement is needed within the EMS field to move from the current practices to a performance-based focus. EMS educators are failing EMS CPE by underutilizing the evidence-based research and extant data that exists and by not contributing more to evidence-based practice. EMS education has a disconnect between identifying actual learning needs versus learning wants and a dependence on utilizing available ready-made programs versus developing learning to address specific learning needs. Most importantly, the findings suggest that EMS views the purpose of CPE as meeting recertification/relicensure mandates rather than bridging performance

gaps. In this way, EMS and EMS educators fail the prehospital care provider by maintaining a current system that refreshes previous knowledge rather than developing human resources to advance the field.

Conclusion 6: The courses taught reflect the assessed needs.

In light of the data collected in this study, EMS educators appear to select CPE topics needed to meet assessed needs. As indicated in Conclusion 1 above, CPE is needed to meet recertification/relicensure requirements. In addition, EMS educators use data from quality improvement activities illuminate learning needs of prehospital care provider knowledge and skills. With this data, EMS educators can identify and prioritize CPE to fill these learning gaps.

Implications for Research and Practice

This study was the first of its kind in the EMS field to provide a baseline measure of EMS educators' practices to identify and prioritize CPE. While not perfect due to a low response rate, a sufficient number of study participants provided valuable information, which will advance the EMS education field and contribute to the overall dialogue in the HRD, ID, and AE literature.

Implications for Emergency Medical Services Education

This study was informed by the HRD, ID, and AE literature as well as the collective wisdom of EMS educators to assess three major elements of needs assessments in the EMS field: sources of information to generate CPE topic ideas, factors that influence the decision-making process, and strategies for collecting and analyzing data. In addition, a detailed description of the CPE courses taught in the last two years to prehospital care providers illustrated how these elements came together and resulted in

CPE. Guided by the literature, this study was able to identify the practices of EMS educators that led to CPE. These findings serve as a starting point for further research in discovering relationships among these variables and how these practices affect patient outcomes.

This study contributes in practical ways to those stakeholders involved in EMS and EMS education: EMS educators, EMS policy makers, and EMS professional organizations.

EMS educators.

From this study, EMS educators are provided detailed information about the current practices being used to generate CPE topic ideas, how to collect and analyze these data, and what factors they can expect to encounter during the needs assessment process that will most likely influence any decisions. Assuming that EMS educators will use best practices from the adult education, instructional design, and human resource development fields, the results of this study will help to educate by providing this overview and also provide an explicit way to engage reflection about their own practice and how it compares to those in the study or what they would hope to be doing. Hopefully, it will stimulate motivation, engage other practices and enhance their own needs assessment practices in order to maximize learning outcomes. For EMS educators who are on the administrative side of EMS education, knowing the enablers and barriers and deepening understanding of how these can affect the education process may stimulate action to more effectively identify and prioritize CPE that will maximize learning opportunities and outcomes.

EMS policy makers

EMS policy makers, being on the leading edge of EMS, clearly yield the power to shape the EMS landscape. Using the results of this study, EMS policy makers can engage in more frank dialogues with EMS stakeholders about the purposes of certification/licensure and the role that CPE plays in recertification/relicensure. EMS policy makers can use the findings from this study to reevaluate the blanket approach of certain CPE practices associated with recertification/relicensure currently used in the EMS field. Moving away from current practices such as refresher training and minimum hours of training for recertification/relicensure, to a more strategic role of CPE as part of an overall human resource and organization development process, EMS policy makers may have more impact with what EMS exists to do – provide better patient outcomes. Continuing a system of recertification/relicensure where CPE is merely a number that prehospital care providers must achieve will not support a culture of learning and professional growth. This idea could extend further in that EMS policy makers can also use these results to make important decisions about EMS educator preparation, the role and preparation of instructional designers in EMS, and how to connect EMS outcome measures to CPE from a policy perspective.

EMS professional organizations.

Similar to EMS policy makers, EMS professional organizations are in a leading position and yield power to shape the EMS landscape. Using the results of this study, these organizations can develop CPE for EMS educators on topics related to needs assessments. Additionally, with a combination of preparatory programs and certifications, the professionalization of EMS education, and in particular in the areas of needs

assessments and instructional design, can take hold. Recognizing EMS education as a subspecialty in the EMS field with preparatory programs and certification will not only draw much needed attention, but also establish standards and accountability not currently available industry-wide.

Implications for HRD, ID, and AE

This study contributes to the CPE and needs assessment literature by surfacing the practices used by EMS educators and the factors that influence the decisions made when identifying and prioritizing EMS CPE needs. This study contributes to dialogue in the HRD, ID, and AE literature in three major areas: needs assessment practices, the influence of politics in CPE decision-making, and mandatory versus voluntary CPE.

In terms of needs assessment practices, the literature review and framework used in this study may help other scholars and practitioners think about CPE needs assessments in different ways, which may result in more impactful CPE. The study provides additional evidence of the various factors influencing CPE decision-making. In particular, the data collected points to political influences, contributing additional information to the current literature regarding the subjectivity and politics involved in needs assessment practices. Finally, this study contributes to the dialogue on mandatory versus voluntary CPE by evidencing the influences of mandatory CPE for relicensure/recertification when conducting learning needs assessments.

Recommendations for Future Research

This quantitative study is a beginning to understanding how EMS educators identify and prioritize continuing professional education for prehospital care providers. Future research could continue to investigate the findings of this study or approach the

research from a different perspective. This section outlines a few avenues for future research.

One of the limitations of the study is the population from which data was collected. Since this convenience sample may not accurately represent the larger population of EMS educators future studies may be conducted with a more inclusive population of those involved in EMS CPE. Additionally, individual states could use this study to investigate their respective state instead of a national study.

Being a quantitative study, conclusions as to why specific findings were obtained cannot be effectively drawn. A qualitative study of the relationships among the constructs and variables could more thoroughly reveal the deeper meanings that exist, particularly with the factors that influence the decision-making process. Additionally, a qualitative study could reveal other sources of information for generating CPE topic ideas, factors that influence the decision-making process, and strategies used to collect and analyze data.

While many studies have identified positive patient care outcomes following training, there is an opportunity to conduct more comprehensive examinations of how a collection of CPE topics (i.e., a curriculum) can be designed to maximize positive patient outcomes. Additionally, examining how non-classroom CPE formats, especially those formats that capitalize on learning in the "swamp" of practice such as reflective practice, impact patient care by providing the right CPE to the right person at the right time, may serve the EMS field well as a more impactful strategy for continuous learning.

Finally, this study revealed the scarce amount of research specific to EMS education. While many studies exist and the volume of research is on the rise, there is

still opportunity for educators to pursue various research agendas, especially as it relates to the effectiveness and practicality of CPE in EMS.

Though modern EMS has been around in its familiar form for about 50 years, there is still a lot of growing the field can do, especially in the area of education. This study took interest in one specific aspect of EMS education – needs assessment in continuing professional education. While this study informs several important features of CPE and needs assessments in the EMS context, there is still much more to learn as the field tries to develop optimal processes, which can ultimately be linked backed to patient outcomes.

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APPENDIX A

FINAL VERSION OF STUDY SURVEY

EMS CPE Final Survey

Thank you for accessing this survey. This survey is part of a study about the practices and influences of EMS continuing professional education (CPE) educators as they relate to identifying and prioritizing CPE topics.

This survey will collect data that will aid in describing the current trends of the field in three main areas: (1) the range of continuing professional education (CPE) offerings by various types of EMS services for their employees or others, (2) how EMS educators make decisions regarding what CPE to provide and/or purchase, and (3) what factors affects these decisions.

Please read the following statements to determine your eligibility for the study:

- My service (Transport, non-transport, educational, or other) provides continuing professional education.
- I am one of the people at my service involved in making decisions about continuing professional education.

◯ Both statements above are TRUE.

◯ At least one of the statements above is FALSE.

EMS CPE Final Survey

Study Consent

This is notification of informed consent for the research study entitled "Continuing Professional Education Needs Assessment in Emergency Medical Services." The purpose of this research is to understand current trends of continuing professional education (CPE) offerings, strategies used by EMS educators to identify and prioritize CPE topics, and influences on the decision-making process. This research activity is being conducted by the below individual, under the supervision of Dr. Wendy Ruona, and the results may be published.

Scott R. Frasard, M.Ed., NREMT-P
Sr. Instructional Designer, Cardinal Health
Doctoral Candidate, The University of Georgia
850 College Station Road
Athens, GA 30602-3552
(770) 490-0426
pmdc3573@uga.edu

To participate in this study you must be at least 18 years of age. As a participant in this study, you will complete an online survey about your practices and experiences with planning CPE. There are no foreseen risks to your participation other than the potential for discomfort resulting from reflecting on sensitive issues; however your participation is voluntary. You may refuse to participate, withdraw your participation at any time without penalty or loss of benefits to which you are otherwise entitled, or skip any questions that you feel uncomfortable answering. It should take approximately 15 minutes to complete the online questionnaire.

Your responses will be confidential and will not be associated with your name or email address; however, a unique identifier will be assigned to each respondent that has no meaning outside of the survey website. If necessary, this unique identifier will allow you to return to an incomplete survey and be taken directly to the point of exit.

By participating in this study, the EMS field will benefit. Individually, you may gain a better understanding of the various influences that impact the needs assessment process for developing CPE, something that will help you in your role as an EMS educator. The field as a whole may benefit in that EMS education staekholders may have a better understanding of the practices EMS educators use in curriculum design in order to help the field provide more effective CPE to the right people at the right time.

Please note the following:
Internet communications are insecure and there is a limit to the confidentiality that can be guaranteed due to the technology itself. However, once the completed survey is received by the researcher, standard confidentiality procedures will be followed. In addition, only summary data will be reported.

If you have any questions, do not hesitate to ask now or at a later date. You may contact Scott Frasard, Study Director, at (770) 490-0426 or pmdc3573@uga.edu.

Additional questions or problems regarding your rights as a research participant should be addressed to IRB Chairperson, Institutional Review Board, University of Georgia, 612 Boyd Graduate Studies Research Center, Athens, Georgia, 30602; Telephone (706) 542-3199; E-mail Address IRB@uga.edu.

Please indicate your participation:

◯ Yes, I am at least 18 years of age and give consent to participate in this study.

◯ No, I do not give consent to participate in this study.

EMS CPE Final Survey

How often do you use these sources to generate CPE topic ideas?

	Never	Seldom	Often	Always
Recommendations from people within my EMS service	○	○	○	○
Recommendations from people outside my EMS service	○	○	○	○
Recommendations from advisory committees	○	○	○	○
Mandates from the state office of EMS	○	○	○	○
Mandates from the National Registry of EMTs	○	○	○	○
EMS supply/equipment vendors	○	○	○	○
Data from patient care reports	○	○	○	○
Data from reports other than patient care reports	○	○	○	○
Federal/state/local laws	○	○	○	○
EMS-related magazines	○	○	○	○
Scholarly journals	○	○	○	○
The Internet	○	○	○	○

Please list any other sources you use to generate CPE topic ideas:

EMS CPE Final Survey

How important is each of the following factors when deciding what CPE to offer?

	Not Important	Slightly Important	Moderately Important	Very Important
Recommendations from my supervisor	○	○	○	○
Recommendations from my EMS service's chief/director	○	○	○	○
Recommendations from my EMS service's staff	○	○	○	○
Recommendations from others outside of my EMS service	○	○	○	○
Having adequate time to conduct the CPE	○	○	○	○
Having adequate money to conduct the CPE	○	○	○	○
Having adequate equipment to conduct the CPE	○	○	○	○
Having adequate instructors to conduct the CPE	○	○	○	○
Having adequate expertise to conduct the CPE	○	○	○	○
My EMS service's history of offering the CPE	○	○	○	○
My personal interest in teaching the CPE	○	○	○	○
My personal interest in learning the CPE	○	○	○	○
My personal sense of the CPE's importance	○	○	○	○
My personal fear of offering the CPE	○	○	○	○
My personal fear of not offering the CPE	○	○	○	○

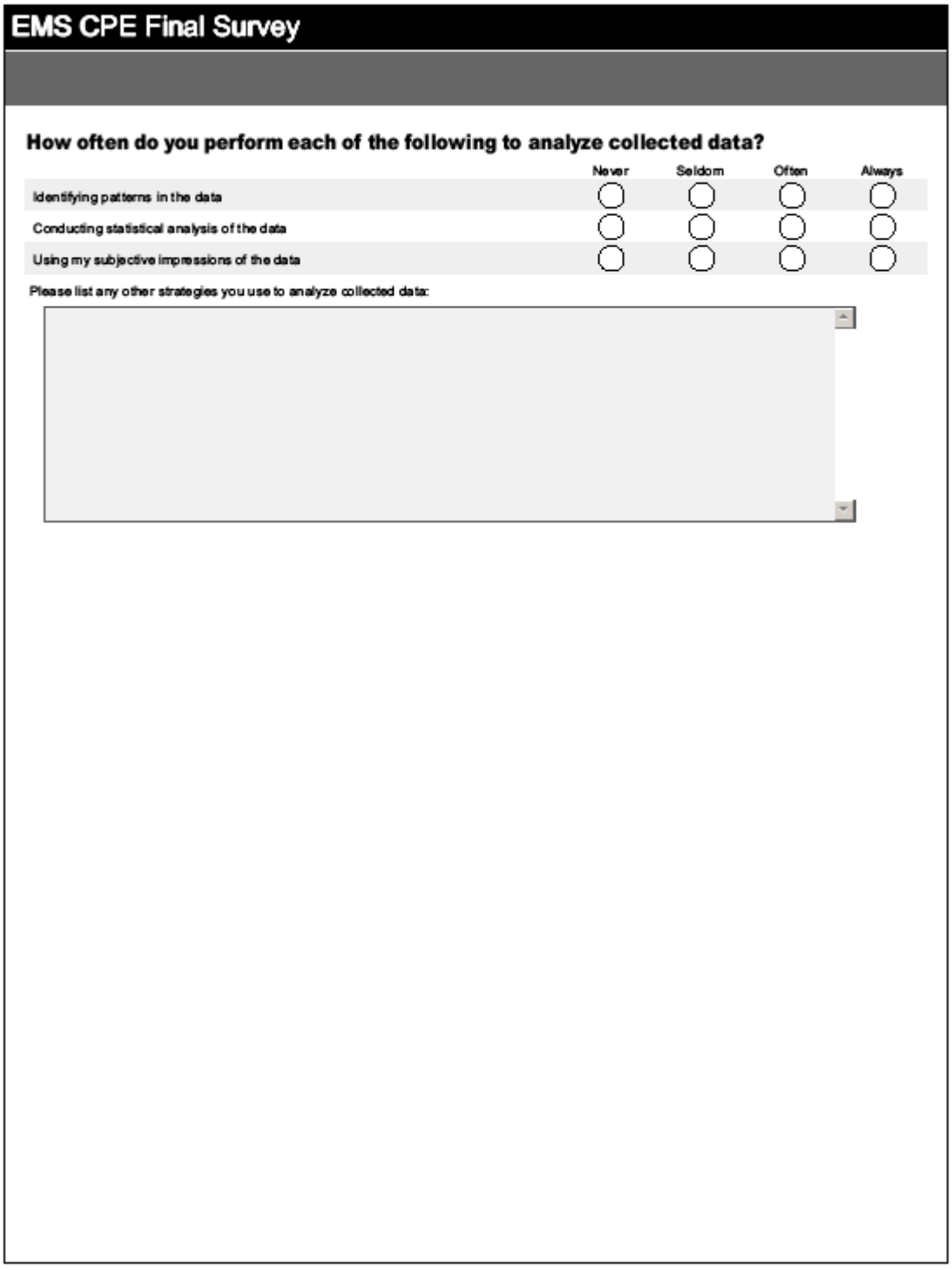
Please list any other factors that are important when deciding what CPE to offer:

EMS CPE Final Survey

How often do you use each of the following strategies to collect data about what CPE to offer?

	Never	Seldom	Often	Always
Surveying EMS staff	○	○	○	○
Interviewing EMS staff	○	○	○	○
Brainstorming with my EMS service's staff	○	○	○	○
Brainstorming with others outside my EMS service	○	○	○	○
Administering written knowledge exams	○	○	○	○
Administering practical skills exams	○	○	○	○
Observing the target audience for deficiencies	○	○	○	○
Reviewing patient care reports	○	○	○	○
Reviewing reports other than patient care reports	○	○	○	○
Reviewing physical evidence from EMS-related activities (i.e., biohazard material left on EMS equipment)	○	○	○	○
Reading articles from EMS-related magazines	○	○	○	○
Reading articles from scholarly journals	○	○	○	○

Please list any other strategies you use to collect data about what CPE to offer:



EMS CPE Final Survey

How often do you perform each of the following to analyze collected data?

	Never	Seldom	Often	Always
Identifying patterns in the data	○	○	○	○
Conducting statistical analysis of the data	○	○	○	○
Using my subjective impressions of the data	○	○	○	○

Please list any other strategies you use to analyze collected data:

EMS CPE Final Survey

Approximately how many times in the last two years has your service offered each of the following?
(Please enter whole numbers only)

Basic Cardiac Life Support	
Advanced Cardiac Life Support	
Advanced Cardiac Life Support for Experienced Providers	
Advanced Pediatric Life Support	
Emergency Pediatric Care	
Neonatal Resuscitation Course	
Pediatric Advanced Life Support	
Pediatric Education for Prehospital Providers	
Prehospital Pediatric Care	
PreHospital Trauma Life Support	
Pediatric Emergency Assessment, Recognition, & Stabilization	
International Trauma Life Support	
Assessment and Treatment of Trauma	
Advanced Trauma Life Support (For Physicians)	
Basic Burn Life Support	
Advanced Burn Life Support	
Core Disaster Life Support	
Basic Disaster Life Support	
Advanced Disaster Life Support	
National Disaster Life Support	
Hazardous Materials Awareness Course	
Basic Hazmat Life Support	
Advanced Hazmat Life Support	
Advanced Medical Life Support	
Advanced Stroke Life Support	
Geriatric Education for Emergency Medical Services	
Basic Wilderness Life Support	
Advanced Wilderness Life Support	
Emergency Vehicle Operator's Course (any type)	
Refresher course, based on the National Standard Curriculum	

EMS CPE Final Survey

List any other CPE courses your EMS service has taught in the last two years and include the approximate number of times each were taught:

EMS CPE Final Survey

EMS Service Information

In which state is your EMS service located?

State:

Which best describes your EMS service?
(Select only one)

- ◯ Hospital-based EMS service
- ◯ Fire department-based EMS service
- ◯ Third EMS service (Government)
- ◯ Private EMS service
- ◯ Aeromedical (rotary or fixed-wing)
- ◯ First responder only
- ◯ Educational only
- ◯ Other

(please describe)

Approximately how many people are part of your EMS service?

Paid

Volunteer

Approximately how many transport vehicles does your EMS service operate on a typical day?

Enter a whole number:

EMS CPE Final Survey

Background information

What is your age?

Enter a whole number:

What is your gender?

- ◯ Male
- ◯ Female

What is your race?

- ◯ White
- ◯ Black or African American
- ◯ American Indian or Alaska Native
- ◯ Asian
- ◯ Hispanic or Latino
- ◯ Native Hawaiian or other Pacific Islander
- ◯ Some other race
- ◯ Two or more races

What is your current prehospital certification/licensure level?

- ◯ EMT Basic
- ◯ EMT Intermediate (I-85 or equivalent)
- ◯ EMT Intermediate (I-99 or equivalent)
- ◯ Paramedic
- ◯ Other (please specify)

Approximately how many years have you been certified/licensed at your current EMS level?

Enter a whole number:

Are you currently certified by the National Registry of EMTs?

- ◯ Yes
- ◯ No

EMS CPE Final Survey

What is your highest academic degree?

- ◯ High school diploma
- ◯ Certificate/Diploma
- ◯ Some college, but no degree yet
- ◯ Associates degree
- ◯ Bachelor degree
- ◯ Master's degree
- ◯ Doctorate (Ph.D., Ed.D., M.D., etc.)

For the degree indicated in the previous question, what was your academic major?

Do you have any formal training/education in the following areas?
(Check all that apply)

- ☐ Assessing educational needs
- ☐ Developing continuing professional education
- ☐ Instructional design
- ☐ Program planning
- ☐ Program evaluation
- ☐ Adult education theory
- ☐ Human resource development
- ☐ Organizational development

EMS CPE Final Survey

Thank you for participating in this study. Your input will be of great value to the EMS education community and will aid in the growth of knowledge about the practices in continuing professional education.

Contact the Researcher:

Please contact the researcher with any comments, questions, or problems, or to request an executive summary of the research findings, which should be available around May 2011.

Phone: (770) 490-0426
Email: pmdc3573@uga.edu

Sincerely,

Scott R. Frasard, M.Ed., NREMT-P
Sr. Instructional Designer, Cardinal Health
Doctoral Candidate, The University of Georgia
850 College Station Road
Athens, GA 30602-3552
(770) 490-0426
pmdc3573@uga.edu

APPENDIX B

REQUEST LETTER FOR DATA SET FROM THE NREMT

The University of Georgia

College of Education
Department of Lifelong Education, Administration, and Policy
Programs in Adult Education, Educational Administration & Policy, Qualitative Research

May 17, 2010

Dr. Greg Gibson
Research Director
National Registry of Emergency Medical Technicians
Rocco V. Morando Building
6610 Busch Boulevard
P.O. Box 29233
Columbus, OH 43229

Dear Dr. Gibson:

As a long-time paramedic, educator, and now doctoral candidate, I am reaching out to you for assistance with my dissertation research. I am a Nationally Registered paramedic and have been in EMS for almost 20 years with the majority of my career in the metropolitan Atlanta [GA] area. Currently, I am the Education Program Manager at HealthONE EMS in Englewood, CO.

My study will examine the current practices and influences in developing continuing professional education (CPE) for emergency medical services. Specifically, the purpose of this study is to: (a) explore how EMS instructional planners currently make decisions regarding what CPE to provide, (b) identify what affects those decisions, and (c) describe the current range of CPE offerings available to prehospital care providers.

This quantitative study explores the practices used by emergency medical services (EMS) educators to identify and prioritize continuing professional education (CPE) topics and those influences that impact the decision-making process. Specifically, this study will explore and describe the sources of information used in identifying CPE topics, the internal and external influences affecting the process, the strategies used to collect and analyze any data collected, and a right description of the CPE offered to prehospital care providers.

I have recently defended my research proposal with my dissertation committee and will be distributing a web-based survey asking EMS educators various questions about the sources of information they seek regarding needed CPE topics, factors that influence their decision-making, the strategies they use to collect and analyze data, and what CPE they have offered at their EMS service in the last two years. A paper copy of the survey is enclosed for your review.

850 College Station Road • 317 River's Crossing • Athens, Georgia 30602-4811
Telephone (706) 542-2214 • Fax (706) 542-5873

One of my committee members suggested that your organization might be able to help with my research. My specific need for this study is a list of EMS training officer contacts to include names and email addresses. Ideally, these data would be made available so I may send my survey directly to potential study participants. Alternatively, I could provide you with the link and ask you to distribute the survey, though this strategy is not preferred by my committee. In either case, I do believe that working with the National Registry of EMTs as a sponsor will help in collecting data for this important research.

If a dataset is provided to me, rest assured that the information will be used only to distribute research-related information and will not be used for any other purpose. None of the information will be released to anyone not associated with this study and I am happy to sign a nondisclosure agreement.

In return for the training officer dataset, I will prepare a research brief for the NREMT. If there are other things that you desire instead, I will be willing to discuss these further.

This unfunded study is being supervised by Dr. Wendy Ruona, Associate Professor at the University of Georgia and will be reviewed by the University's institutional review board. Dr. Ruona may be contacted by phone at (706) 542-4474 or e-mail at wruona@uga.edu.

If you have any further questions or comments, please feel free to contact me at (770) 490-0426 or pmdc3573@uga.edu.

Sincerely,

Scott Frasard, M.Ed., NREMT-P
Doctoral Candidate, Adult Education
Education Program Manager, HealthONE EMS
Englewood, CO

Approved By Wendy Ruona, Ph.D.
Associate Professor Adult Education
Major Professor

APPENDIX C

FIRST REQUEST FOR PARTICIPATION EMAIL

Dear [Name of Subject],

Emergency medical services (EMS) is a dynamic field borne out of the need to bring life-saving measures to the site of illness and injury. As medicine changes and EMS builds in complexity, the need for current prehospital care providers to learn and grow increases. EMS educators have a primary role to further the knowledge and abilities of these prehospital care providers. Yet, a large portion of continuing professional education (CPE) consists of refresher or remediation. Therefore, it is critical to identify the practices EMS educators use to identify and prioritize CPE topics in order to understand how to improve this aspect of EMS education to include professional growth.

I am writing to request your participation in a research study to describe the current landscape of CPE in EMS and identify the factors influencing the identification and prioritization of CPE topics. You have been chosen as one of the EMS educators whose input will represent the profession of more than 19,000 licensed ambulance services in the United States; therefore, your input is very valuable. The results will benefit the field as we will become better equipped to train new teachers and educate practicing teachers to implement empowering practices which result in student leadership development.

As a current EMS educator, I recognize the value of your time. Your participation is completely voluntary. The survey is designed to take about 15 minutes to complete. Your input is valuable to the study and I appreciate your consideration.

To complete the survey, simply follow the link for online completion. I personally guarantee the confidentiality of your responses.

Survey Link: [survey link]

This link is uniquely tied to this survey and your email address; please do not forward the message for other individuals to complete.

With appreciation,

Scott Frasard
Doctoral Candidate, Adult Education

Additional questions or problems regarding your rights as a research participant should be addressed to IRB Chairperson, Human Subjects Office, University of Georgia, 612 Boyd Graduate Studies Research Center, Athens,
Georgia, 30602; Telephone (706) 542-3199; E-mail Address IRB@uga.edu.

APPENDIX D

SECOND REQUEST FOR PARTICIPATION EMAIL

Dear [Name of Subject],

The New Year is almost upon us and the National Registry recertification deadline is just around the corner. As a current EMS educator I know how busy this time of year can be and wanted to follow up to an email you received on November 4, 2010 requesting your participation in a survey of EMS educators.

One of the greatest rewards of being an EMS educator is contributing to the growth of our field. I am currently conducting a research study to identify the practices of EMS educators in identifying and prioritizing continuing professional education. This study is part of my doctoral studies at the University of Georgia, under the supervision of Dr. Wendy Ruona.

You have been chosen as one of the EMS educators whose input will represent the profession of more than 19,000 licensed ambulance services in the United States; therefore, your input is very valuable. The results will benefit the field as we will become better equipped to train new teachers and educate practicing teachers to implement empowering practices which result in student leadership development. Your participation is voluntary and your responses will be confidential. No individual data will be used, only summary data will be reported. The survey is designed to take about 15 minutes to complete. Your input is valuable to the study and I appreciate your consideration.

To complete the survey, follow the link for online completion.

Survey Link: [survey link]

This link is uniquely tied to this survey and your email address; please do not forward the message for other individuals to complete.

With appreciation,

Scott Frasard
Doctoral Candidate, Adult Education

Additional questions or problems regarding your rights as a research participant should be addressed to IRB Chairperson, Institutional Review Board, University of Georgia, 612 Boyd Graduate Studies Research Center,
Athens, Georgia, 30602; Telephone (706) 542-3199; E-mail Address IRB@uga.edu.

APPENDIX E

FINAL REQUEST FOR PARTICIPATION EMAIL

Dear [Name of Subject],

As an EMS educator, you make a difference every day in the lives of not only prehospital care providers, but also the patients they treat. It is important that we continue to understand the best practices of continuing professional education so that we can continue to improve the field.

As a current EMS educator, I understand how "full your plate" can be.
However, I'm writing to bring your attention to a survey participation request you received on
November 4, 2010. You have been chosen as one of the advisors whose input will represent the profession of more than 19,000 licensed ambulance services; therefore, your input is very valuable.

I am currently conducting a research study to identify the practices of EMS educators in identifying and prioritizing continuing professional education. This study is part of my doctoral studies at the University of Georgia, under the supervision of Dr. Wendy Ruona.

The results will benefit the field as we will become better equipped to train new teachers and educate practicing teachers to implement empowering practices which result in student leadership development. Your participation is voluntary and your responses will be confidential. No individual data will be used, only summary data will be reported. The survey is designed to take about 15 minutes to complete. Your input is valuable to the study and I appreciate your consideration.

To complete the survey, follow the link for online completion.

Survey Link: [survey link]

This link is uniquely tied to this survey and your email address; please do not forward the message for other individuals to complete.

With appreciation,

Scott Frasard
Doctoral Candidate, Adult Education

Additional questions or problems regarding your rights as a research participant should be addressed to IRB Chairperson, Institutional Review Board, University of Georgia, 612 Boyd Graduate Studies Research Center,
Athens, Georgia, 30602; Telephone (706) 542-3199; E-mail Address IRB@uga.edu.

APPENDIX F

SUMMARY OF ACADEMIC MAJORS

Academic Major	*n*	%
EMS	93	17.3%
Nursing	58	10.8%
Education	48	8.9%
Fire Science	40	7.4%
Business	39	7.3%
Biology	25	4.7%
Science	20	3.7%
Healthcare Administration	18	3.4%
Management	18	3.4%
Criminal Justice	13	2.4%
Fire Service Administration/Management	10	1.9%
Public Administration	10	1.9%
Political science	7	1.3%
Psychology	7	1.3%
Engineering	6	1.1%
Health science	6	1.1%
Public Safety	6	1.1%
Emergency Health Science	6	1.1%
Computer Science	5	0.9%
Liberal Arts	5	0.9%
Public Health	5	0.9%
Law Enforcement	5	0.9%

Academic Major	*n*	%
Accounting	4	0.7%
Communications	4	0.7%
Law	4	0.7%
Exercise Science	3	0.6%
General	3	0.6%
Organizational Leadership	3	0.6%
Pre medicine	3	0.6%
Sociology	3	0.6%
Divinity	2	0.4%
English	2	0.4%
Graphic Design	2	0.4%
Health	2	0.4%
Justice Administration	2	0.4%
Leadership	2	0.4%
Medical technology	2	0.4%
Medicine	2	0.4%
Microbiology	2	0.4%
Military	2	0.4%
Paralegal	2	0.4%
Technology	2	0.4%
Zoology	2	0.4%
Environmental	2	0.4%

Academic Major	*n*	%
Animal Science	1	0.2%
Art	1	0.2%
Aviation	1	0.2%
Community Health	1	0.2%
Counseling	1	0.2%
Dental Hygiene	1	0.2%
Economics	1	0.2%
Emergency Management	1	0.2%
Forensic Science	1	0.2%
Geology	1	0.2%
History	1	0.2%
Holistic medicine	1	0.2%
Homeland Security	1	0.2%
Horticulture	1	0.2%
Human Services	1	0.2%
Industrial psychology	1	0.2%
Manufacturing Engineering	1	0.2%
Marine engineering	1	0.2%
Math	1	0.2%
Molecular science	1	0.2%
Music	1	0.2%
Natural resources	1	0.2%

Academic Major	*n*	%
Occupational Safety	1	0.2%
Organizational Behavior	1	0.2%
Physician Assistant	1	0.2%
Recreation	1	0.2%
Security	1	0.2%
Social Work	1	0.2%
Spanish	1	0.2%
Sports medicine	1	0.2%
Ethics	1	0.2%
Chemistry	1	0.2%

APPENDIX G

OTHER EMS SERVICE TYPES

Other Service Type	*n*	%
Military	18	50.0%
Search and Rescue	3	16.7%
Private	1	2.0%
Education	0	0.0%
First Responder	1	2.0%
Industrial	5	10.2%
University	1	2.3%
Tribal	3	7.0%
National Park Service	4	10.0%

APPENDIX H

ADDITIONAL SOURCES OF INFORMATION

Most of the topics come from other EMS agencies that sugest things that have worked for them. Also many topics are state mandated so with time and money restraints they must be used first.

We have used Simulator training EMS conference ideas

Topics we learned from EMS symposiums - deal is service pays for classes in return for which we ask the class attendees to bring the information back and train the rest of us.

EMS book publishers

Conferences/courses

Conferences and Training Courses

Conferences and classes I have attended. Current topics that are pertinent to my personnel (e.g. bedbugs are infesting fire departments---so I created a CE related to that)

Conferences

Conferences

conferences

Clinical Investigations, Conversations with other Clinical Services Managers

State EMS association

knowledge of current trends at clinical bedside

arival of new equiptment

Identified problem areas within the facilities we service.

Self-inspired creativity.

EMS conferences

Department of Defense requirements.

EMS Educators within our district

Itemized... identified topic from QA/QI driven data, mostly.

EMS Forums on the internet for talking with colleagues in the field.

Brady Study Guide and JEMS Mag.

Base Hospital, County EMS Association

state protocols, Med Direction

Regions hospital education Dept.

Participation in research projects

Other than patient care reports, we utilize Survey Monkey on a topic of questions. We also utilize our scheduling program to hold bi-monthly clinical testing to gauge potential weaknesses. From there we hold classes on the subject content that we deem to be weak. We do one on one con-ed for those that may show a weakness that is not shared as a whole throughout the company.

Non-EMS, healthcare relevant sources such as nursing, respiratory therapy, and physician materials

National Standard Curriculum Refresher

Medical Director, Other Instructors, and my won topics that hold interest and are new

Medical director imput local and area hopitals

Medical Director

Medical director

Medical Director

Medical Director

Medical Direction

Many CPE topics are mandated by State EMS due to the type of skills we provide.

Illness/injuires specific to the intended audience. Work/industry related hazards and areas of interest.

I use a lot of the EMT perioticals and protocals from the Air Force Core tasks.

EMT Textbooks

US Coast Guard sources Complies with national standards

The National Standard of Care is where I get alot of my topics from

My own determinations based on my interpretations of needs of my EMS system.

DOT EMS curricula International Trauma Life Support Historical Education files in the EMS office Pedicatric Emergencies for Prehospital Providers (PEPP) Basic Arrythmias Develope Courses myself which I feel need covered.

Air Force Medical Operations Agency

Physician Specialists, i.e., neurointervention for clot retrieval; cardiothoracic for LVAD's in the community.

I try to address any areas that need refreshed as well as any new information to keep my staff curent.

Broad brush science magazines such as Discover and Science News.

We try to look at our QA/QI data and drive CPE topics by protocol and/or treament errors that appear to be problematic within the organization

Quality data and benchmarks

QA/QI activities Medical Director input

QA/QI Report writing HIPAA Medical Director Commercial Products-EMS Jane

Protocols and protocol revisions

In-house QA/lCQI results.

Information/Feedback from our medical directors.

current events,

Chankges in policy and procedures, weather, new equipment.

Our regional EMS system has a two-year category rotation. FOr each six month period the focus is on traume for 6-months, cardiac for 6-months, medical for 6-months then fundementals (OB, pharmacology, et al.) Within these six-month blocks SOPs are reviewed, PCRs are reviewed to illustrate cases pertinent to the SOPs and then the curent best practices and research are added in.

Military related EMS topics.

Medical resource director and hospital

Local EMS Associations meetings and annual events, I.e. county and state (IEMSA), lead to many varied topics for cont. ed.

Paramedic and EMT text books

We do "shift training" - 1-2 hours per shift, every other week. I attempt to review the entire scope of practice over the course of the year, focusing on new literature, new equipment, seldom-performed skills, areas requiring improvement (QA/QI), and suggestions/requests. We also invite outside instructors in on a regular basis.

IFSAC, NFPA

We map out the two year recert period and all the State requirements, and formulate a two year training plan to avail all members the hours needed for recertification.

Student feedback

Since we strive to make CPE interesting for the participants, most new ideas are generated by what the faculty finds interesting in the current literature, new products, drugs, and devices, and changes in clinical practice

Our training topic are mostly centered around NREMT Recertification requirements. EMS magazine AHA Currents State Protocols and EMS Rules/Laws Provider request

Recent interesting or special calls for service

DVD's and special speakers on certain topics.

We work collabortively as a Region - Four Resource hospitals and we create CE for our entire region of providers so that geographically all of our providers are educated the same.

our medical director

Operational Medical Director

my boss!

Most of our training is based on the needs for re-certification, our demographics, and data collected from our run charts.

JEMS, EMS World

Ideas comes from our physicians, textbooks and other organizations, such as the FAA for our annual recertification for Air Ambulance operations. We work the the sheriff's office to plan our drills for our Marine Rescue Technicians and our EMT's & Paramedics work in conjunction with the Dive Rescue Team. We work with SOLO to generate practical skills scenarios for our Wilderness EMT refreshers. We try to generate scenario based education and use our practical skills.

Requests from the Medical Director and Staff Director.

Refresher type oriented classes based off of the new EMT Curriculum.

Quality Improvement statistics

new protocols, medical director

Military Career Development Curriculum (CDC) requirements.

I think you about covered it.

Hybrid Education approved topics

Hospital based physicians

Dot national standard curriculum

Deficiencies noted in annual competency training.

AHA FEMA TEEX Homeland Security

24/7 EMS videos are used often in my classroom.

APPENDIX I

ADDITIONAL FACTORS INFLUENCING DECISION-MAKING

a lot of times it will come from a First Responder or EMT asking about a particular thing that will get us to look into doing a class on it.

ability to attract meaningful number of learners to topic

all are state or NR requirements

Anticipated participation; available space to conduct

As prehospital coordinator and an ALS base station, I have a lot of lattitude in the continuing educations process and topics. The chiefs in the EMS services that I base rely on me to provide the necessary training. If they did recommend it would be as I indicated. My supervisor is not versed in the prehospital realm therefore does not normally recommend.

Aside from the requirements of National Registry and the state, we try to look at trends to see where training is needed and have the need direct the CE.

Attempting to identify trends, new material, unusual medical calls

Available personal time to plan and prepare

Availablility of qualified instructors seems to be our biggest road-block.

Being able to get a topic to hold the interest of the students and keeping them engaged in topic

Being able to have adequate attendance making time and costs worthwhile. Ensuring that if turnout is large having adequate space for CPE.

Changes in the standards of practice i.e. STEMI's

Clinical practice and changing recommendations also play a role

Does it meet the mission, will this help my staff perform up to standards.

Funding has the biggist facter.

I am the Chief

I am the EMS service director.

I am very fortunate to work in the largest teaching institution in the state. I have access to multiple levels of education and instructors, so it is not that hard for me to offer quality CPEs to my crew members.

I do what I'm told. Military life is great for followers.

I don't feel that my personal fears or wants is as important as those of the folks I am teaching.

I wish my agency placed more emphasis on CPE.

If I understood the last two questions correctly. If I am unsure if I know the subject matter well enough to teach it I look for outside instructors who have the expertise.

if it is one nat'l reg will accept

If the educational company that I hire is qualified and certified to teach a particular subject matter

It must be interesting to have good class attendance.

Making sure CPE"s are generated for EMS not Nursing or Drs

Medical Director's input, Performance improvement, annual competency test scores

Most all of our non alphabet courses are QI based.

My Medical director's sense of urgency/ need/ enthusiasm for the CPE offering.

My personal feelings towards CPEs is not important. I have to take the "personal" out of it. I offer the CPE to better our EMS capabilities and because it is the right way to develope EMTs/Medics.

My service is very supportive of CPE and provides the necessary resources for our employee's education needs.

New evidence base practice updates from AHA, NAEMT, ABA etc...

Not sure what "My EMS service's history of offering the CPE" means, unless it's like a class that we're known for doing...

Operational Medical director

Personnel scheduling. Making sure that personnel are going to be able to make the training they need to have.

Q/A and Q/I process

Rotating the topics---if we haven't talked about street drugs in a while, then we need to revisit since they change on a regular basis. I schedule skills practice and testing the same way---some are covered on a regular basis, but others are rotated.

Scheduling... I have about 250 medics that I provide CPE's for and trying to provide enough dates and times so that everyone can attend is very difficult.

Service Medical Director suggestions are Very Important

Squad/Service input on topics of interest and concern.

State mandate New treatments and other modalities

Subjects identified as needing trainup, or new information or equipment that has come along. Some things like OSHA are an annual Federal requirement.

The ability of my service to maintain proficency in required skills as needed to offer appropriate care for our patients

Time and money.

Timeliness Relevant to current practices

to keep all medics up on new procedures or equipment we may utilize, and improve any performance in patient care I deem necessary.

We also base CPE on which skills/scenarios are seldom used to keep our skills and knowledge base updated.

We are always looking for better ways to improve our practice. We want what is new, up-to-date and critical to our continuing care. We do not want something boring, repetative and just watch the PPT's and sleep.....

We have a very small department and if any of the employees want an CPE I will conduct it or find someone else to do it.

We have an active Medical Director that makes requests. Our organization has always been willing to supply whatever is needed to ensure our staff receives the best most up-to-date inservices. Not to say my budget is unlimied but if it is felt to be important by myself and/or the Medical Director the organizations sees that the educational opprotunity is available.

We must offer continuing education that helps our employees meet NREMT within the two year period. Unfortunately, their curriculum does not always match what we need to focus on for practical reasons. There are few NREMT required CE hours on ICS, MCI,HAZMat,yet these are critical for people to regularly train on.

We need to cover all of the criteria required by the National Registry & by Washington State Department of Health but our agency is made up primarily of volunteers, so we like to keep continuing education fresh, interesting and relevant. I don't want to waste their time. We do a lot of scenario based education. We'll run a scenario, talk about it and run it again. Our EMT's feel like they've not only learned something but are able to

immediately implement what they've learned & leave feeling successful. We also focus on any issues that are brought up in our QA/QI meetings.

We use a base outline which incorporates the state and national guidelines on topics, then incorporate additional topics driven by PCR review and quality management/peer review recommendations. We also contuct monthly skills sessions with the employees with different skills reviewed each month.

When deciding on training I lookk at the service's overall need for the training. Factors that come in to this desion are the experence in EMS that the providers do or do not have. My fear of training a certian subject does also matter. What my people are or are not taught is not under my or anyone else's control. This is my GREATEST fear. This is why I will provide training in certian areas others may not. I think the subjects that we fear to teach should be aggeressivly taught inhouse to our providers this way we can control this type of training and make sure it is done correctly before one or more of our providers takes a class else where that we have no way of monitoring content for factuality.

APPENDIX J

ADDITIONAL DATA COLLECTION STRATEGIES

We use our QA/QI Committee findings to generate topics for training. We also use unusual cases our MPD has seen in the ER. We offer King County, Washington's EMSONLINE for both our Basic and Advanced providers. Our volunteers earn VIP points for attending meetings and doing extra and they can use those points to attend classes, conferences or buy EMS related equipment.

We survey employees annualy, meet with the training staff (FTOs and Preceptors) monthly, Peer Review Committee monthly, Quality Management Committee quarterly

We offer what the Coast Guard says we offer and the timeline to complete it.

We maintain a binder of articles for review at the various duty stations, the staff are encouraged to read and discuss them with their shift paramedics. Their paramedic is empowered to assign CE credit following their review of the article, based on time spent.

Training with other departments.

The best way to determine what areas need developed is by observing.

Technology changes also influence education.

State EMS mandates certain topics be covered at specified intervals.

Requirements for recertification

QA/QI on EMS Reports

Our training is based off of our agencies QA data and know deficiencies with exception being state and national requirements.

Our OMD will see deficiencies on calls and will ask us for training classes.

Our department conducts a patient survey every three years and compares the results with a national survey. Any deficiencies noted are addressed through training.

Observing Hands-on response is the best way for us.

My focus is organizational learning (acute care facility), so I look at a broad spectrum of data to decide what CPE to offer.

Medical based data driven studies

Listening to base banter and "water cooler" talk about trends and topics on the minds of the staff.

Lessons learned from medical response exercises (Mass Casualty, Hazmat response, Auto Extrication)

internet search

I have to quantify some of my answers. Reviewing physcical evidence does not apply as I do not always see the EMS Equipment so never closely matches that. My QI/QA process really does give me alot of data. I also listen to all communication reports of patients brought to our facility and collect data for training from those communications.

I am always keeping my mind open to new ideas and topics to cover. Most of the people in the department just dont understand where or how to find CME therefore they are of little help on topics. We are a small rural agency

Emailing a topic list to our providers and asking what they want to review / learn. Must be within their scope of practice! Listening. Some will not admit they might be weak in a given area and you don't get to see them use a skill but ready room talk often fills in a lot of blanks.

Changes in local EMS agency protocols

again what state requires, National Registry has really hurt my ability to offer appropriate classes that are needed

APPENDIX K

ADDITIONAL DATA ANALYSIS STRATEGIES

When analysising data for trends there is a group of people involved including myself, the EMS Coordinator and EMS Medical Director.

We don't have the ability to collect much statistical data but do what we can. Our MPD watches for tends and we focus our training on any deficiencies found or increases in types of patients we're seeing. We also gear our training toward seasonal changes. We have more water related calls in the summer and focus a lot more on environmental issues in the late spring to prep for that.

We are currently working towards becoming NEMSIS compliant. Therefor, we hope to improve in this area in particular.

Very limited time to adequate research in the areas to determine patterns/statistics.

TEMSIS - an evolving patient care computer based reporting system which is required in our state. A great tool for analysis from the local level up, but a serious retention reducer in the volunteer squads. Providers must hand off a written patient drop off report to the receiving hospital staff, then complete a TEMSIS report. Labeled "Time thief" by volunteers it is having a negative impact on retaining our most skilled providers as they are the ones responsible for doing these reports.

Run review and random call reviews along with call reviews where problems were rencountered.

Q A reviews

Objective impressions of data collected. Medical Director review of data

Numbers speak for themselves. When we have something fall out we go to the source and either get the whole story or educate the crew.

Monthly Peer Reviews.

I try to meet the identified needs of the providers as well as meet mandated training requirements.

I do not have access to data after it is input or submitted. Impossible to identify any paterns if I do not have access to it.

I am again very fortunate that my medical directors are directly involved in research and look at the data on a monthly basis. Also, some of my staff have gone back to school for advanced degrees and they are always doing research projects.

I always use objective impressions of the data: I have a team that analyzes the data and helps determine what course of action is needed.

Data is also collected and reported by our Quality and Compliance Department

Biennial Testing with comprehensive analysis for trending, validity and reliability.

At this time, our data collection is not accurate enough to base decisions on. We hope to soon employ electronic patient care reports which should allow more efficient and accurate use of data.

As I said earlier we are very small and done analyze if its needed we do it.

APPENDIX L

ORIGIN STATES OF PARTICIPANT EMS SERVICES

Origin State	*n*	%
Alabama	19	2.2%
Alaska	2	0.2%
Arizona	30	3.5%
Arkansas	10	1.2%
California	33	3.9%
Colorado	30	3.5%
Connecticut	5	0.6%
Delaware	8	0.9%
District of Columbia	5	0.6%
Florida	11	1.3%
Georgia	25	2.9%
Hawaii	0	0.0%
Idaho	11	1.3%
Illinois	7	0.8%
Indiana	23	2.7%
Iowa	18	2.1%
Kansas	8	0.9%
Kentucky	27	3.2%
Louisiana	27	3.2%
Maine	7	0.8%
Maryland	16	1.9%
Massachusetts	9	1.1%

Origin State	*n*	%
Michigan	8	0.9%
Minnesota	23	2.7%
Mississippi	10	1.2%
Missouri	20	2.3%
Montana	22	2.6%
Nebraska	12	1.4%
Nevada	7	0.8%
New Hampshire	21	2.5%
New Jersey	12	1.4%
New Mexico	6	0.7%
New York	8	0.9%
North Carolina	22	2.6%
North Dakota	18	2.1%
Ohio	40	4.7%
Oklahoma	27	3.2%
Oregon	13	1.5%
Pennsylvania	32	3.7%
Rhode Island	6	0.7%
South Carolina	30	3.5%
South Dakota	12	1.4%
Tennessee	24	2.8%
Texas	45	5.3%

Origin State	*n*	%
Utah	5	0.6%
Vermont	9	1.1%
Virginia	36	4.2%
Washington	22	2.6%
West Virginia	11	1.3%
Wisconsin	23	2.7%
Wyoming	2	0.2%

APPENDIX M

ADDITIONAL COURSES TAUGHT

WV Mass Casualty Incident Awareness/Operations 2 times WV Class 3 Interfaciltiy Transport Course 3 Times

wilderness life support courses (basic or advanced) at least as offered in Utah routinely teach the performance of skills way outside of the scope of practive of the persons attending and teaching the courses and are thus NOT eligible for CEU or other "offical" recognition. They are and should be considered self-help, first aid type training.

We have provided 3 State Approved EMS Instructor courses along with 2 State approved EMS Instructor refresher courses

we go through advanced airway procedures, medication reviews, radio use, HIPPA regulations, all types of splinting to include various traction types, LifePack12 protocols, glucometry use & data, sports medicine to include helmet removal & airway control, immobolization, rapid extrications sequences, multiple scenarios, mass casualty situations, emergency trauma alert drills with area hospitals & law enforcement, crime scene preservation and lots of forst aid & CPR/AED classes year round

Vehicle Extrication-2 EMT-Intermediate Class for 2010/2011

Vascular Acess devices 2 times, LVAD inservice 1, advanced Pharmacology 4

Vanessa K Free Driver Training - 4 times in two years in addition to EVOC courses.

UMBC CCEMTP Class x1 Univ. AZ Toxic terrorism course x1

Typically, we don't do CE courses; we apply for course numbers from the state that can be applied over the year and we do individual classes on individual subjects. Such as the Trauma Triage Plan for the region and we conducted that class 4 different times and we try to do a skills fair every year with skills that we don't get a whole lot of practice

at i.e. high risk, low need and those were done 4 different times.

Traumatic Brain Injury,

Trauma Nursing Core Course 4; Transport Nurse Advanced Trauma Course 2

Transport Nurse Advanced Trauma Course - paid for employee participation - 9

STABLE - 17

Training academy for flight service - 10 times (4 week academy to prepare employees for helicopter EMS.

TNATC-Taught by some of our flight nurses at our faciltiy although the course belongs to TANATC.-2 times in the last two years.

TEMSIS(computer updates) NH protocol updates every 2 years Vehicle Extrication Carbon Monoxide Emergency Childbirth

Technical Rope Rescue Proficiency Course - 2; Technical Rope Rescue Refresher - 4; Confined Space Rescue Refresher - 4; Hazmat Technician Refresher - 4; Trench Rescue Refresher - 4; Auto Extrication Refresher - 4

TCCC 8 times

TCCC (Tactical) -4

Tactical Paramedic Paramedic Training Program EMT Training Program

Tactical Medicine -1 Single Subject CPE (Advanced Airway, Toxicology, Environmental Emergencies, etc.) - 14

Stroke Awareness (x2), STEMI Awareness (x2), Medical Emergecies (x1)

STEMI recognition - 4

State transition courses which cover skills required in our state protocols that are not included in the current national curriculum. 2 each at basic and intermediate level.

STABLE Course - 2 times Blood Borne Pathogens Course - 2 times HIPPA Compliance Course - 2 times Patient Care Report Review - 2 times

stable - 1

skills related course offerings -12 lead interpretation, capnography,basic pacemakers, Run Review - 2 Winter Search and Rescue (review and practice snowmobile skills/avalanche beacon use - patient locate - 4 Extended scope of EMT basic skills - 4 Patient packaging (familiarization with Teton wheeled litter, skills practice Yosemite tie-in system) - 4

Rapid Sequence Intubation Critical Care Course (March & April 2011

Quarterly ALS Skill review (8) Monthly CPE for both BLA and ALS Providers (24) Continuous use of on line LMS (ongoing)

Preceptor/field training officer 5 EMR course with refreshers 5 All EMT level courses 10 EMS Instructor courses 2

PHTLS - 8

PEPP

Pediatric ITLS 2 times

Pediatric drowning Advanced airway devices Cric kits Spinal immobilization review Emergency childbirth Mass Casualty Triage Protocol updates Medication reviews

PEC Safe Gulf/ Safe Land NCCER Basic Safety Core NIMS 100, 700

Our classes are a mix of oferrings between our department and nursing education of our parent company. We also offer STABLE (6), various EMD continuing education (20), HazMat Operations Level (4), EMT-B Initial cert training that staff can attend as refresher (4), TNCC (4), ENPC (2), as well as classes developed in-house specific to

our service and the use of distributive education

OSHA biohazard training-6 Farm injuries-2 Difficult airway training-4 Protocol training-8 documentation-4 START triage-4

Orientation Academy (5) MCI Review (1) County Protocol Update (2) ALS Assist Skills (5)

OEC refresher 2 EMT-OEC Bridge 1

Nerve Agent Casualty Course 8

National Reg Skills-2 START Triage-1 Stroke Care-Aircraft Rescue-1 Airway Review-3 Vech Extracation and Trauma Care-2 Cardiac Emergency-3 Transfering Patients Safley-4 IV Review-5 OB Emergencies-1 Pediatric Emergencies-1

Medication Administration Course and EMT Instructor Course

MCI-3

MCI - 24, WMD - 24, Neurologic Emergencies - 24, Shock/Trauma - 24, expanded scope/infrequently used skills - 6; 12 -lead - 6; preceptor/FTO workshops 6; advanced airway - 2; (these are some of the instructor based classes - also provide multiple on-line CE via Target Safety)

Mandatory Advanced Airway Management for ALS providers - Annually This is taught by outside experts and the operational medical director, most of the curriculum comes from the Ron Walls course.

LVAD training for the prehospital provider 4 times Helicopter safety 3 Mechanical ventilation 3

IV and drug usage, diabeties education and vehicle extraction.

Ice Rescue Technician Training 2 OB/GYN 1

Home Grown: Medical Director's Update: Trauma - 4 Medical Director's Update: Medical - 4 Local Protocol Updates: 2 Various BLS/ALS Trauma and Medical Updates: 4

HIPPA 6, Basic Medical Life Support/Assessment 12, Basic Stroke/Altered Mental Status 8

Highway Incident Scene Safety - twice, Landing Zone Operations - twice, HazMat Operations - three or four. Most of our CE consists of generic CE courses, and not ones that lead to certification. In our area, our hospitals take care of the "four-letter" courses (ACLS, PALS, ITLS, ABLS, etc), and we encourage providers to attend these offerings. We do ACLS and PALS in-house about once a year.

Haz-Mat OPS NIMS ICS MCI ALS Assit Pediatric Emergencies Geriatric Emergencies Burn Support other than that which was listed.

Haz Mat OPS Refresher 4 Haz Mat Tech Refrsher 2

First Responder 2X

EMS Safety from NAEMT

Difficult Airway (8 times) IV Certification for EMTs (4 times)

Diabetic-2 Combitube-1 Nebs-1 NREMT computer login- hours-register

Critical Care Paramedic Refresher

CPR,CCR, EZ IO use,Caponography,Pharicology classes on changes of medication carried by providers.

CPR instructor course - 1 CPR refresher - 2

Confined Space Awareness - 2 Difficult Airway & RSI - 8 EMT-B - 2 EMT-I - 1 Paramedic Bridge - 1 ALS Foundations - 1 EMS Supervisor - 2 All courses noted

above are the number of class batteries offered. Each "offering" is on multiple dates, i.e. PALS was offered in 2010 and we ran several courses that year.

cold weather emergencies 1, hunting emergencies 1, water emergencies 1, stroke care 1, IV therapy 2, advanced airway 1, NREMT-B course 1, scene safety 1,

Chemical, Biological, Nuke, and Explosive

Case Reviews - 5 Chemical Suicides in Vehicles - 2 Oxygen and Respiratory Care - 2 ALS EMT Course - 4 C-Spine Stabilization - 4

cardiac rthymn recognition-4 basic ff rehab support-1 confined space awareness-2 ice rescue and rehab support-2 trauma traige-1 low angle rescue-2 self defense-1 back and lifting health-1

Carbon Monoxide Poisoning: EMS and Fire Service Implications Renal Failure and Dialysis Practical Hospital Evacuation Program Flail Chest To Hell and Back: An Educational Program on the Reality of Burn Injury Poisoning and Overdose

Mechanism of Injury Trauma Assessment and Interventions Hypothermia and Cold Injuries Geriatric Considerations Introduction to Trauma Simulations for Realistic Training

CALS - 4 Customized training - 20 Run review/QA/QI - 24

Basic Pharmacology--2 Advanced Pharmacology--2

Basic Obstetrics and Gynecology - 2 environmental emergencies - 2 cold water rescue - 1 bsic review of allergies and treatments - 2 Sprains, Strains and Fractures - 3 radio operations - 2 Documentation - 4

Basic MCI and Refresher Courses-8 times Advanced Airway Management Labs-4 times

Aviation Safety, Self Defense in EMS, Through the Eyes of the Patient

ALS for the BLS provider - 4 classes Advanced 12-lead - 2 classes Sp02 for the BLS provider - 2 classes CPAP for the BLS provider -2 classes

Airway support-4 Drug Administration-4 Mass Casualty-1

Airway In-service - 2, Psych In-service - 2, Geriatric In-service - 1, Burn Course - 2, CPI - 3, Stroke in-service - 2. Our ACLS, PALS courses are taught by the hospital so our instructors help teach these courses and our employees attend them.

Air Ambulance Certification - Initial & Renewal Classes taught annually Marine Recue Technician - Initial & Renewal Classes taught annually Wilderness EMT 2x/yr Wilderness First Aid 4 x/yr CPR >6x/mo PEARS Once every 2 yrs Leadership Class 1x/yr 12 Lead for EMT Basics 1/yr ACLS for Basics 1x/yr Evaluator or Instructor Training 1x/yr

AHA's ECG and Pharmacology

Active Shooter Future of EMS Drugs of Abuse Chest Pain Traumatic Brain Injury ICS (overview) Sexual Assault MCI Drill Call/Report Review x2 OSHA/BBP standard training State Protocol Update Abdominal Pain Nuero All x1 except as noted

12-lead recognition and ACS Treatment- 12 Clinical Application of Capnography in both non-intubated and intubated patients - 12 Protocol Review and Testing - 20 Cardiac Arrest Management/Scene Choreography - 12 Advanced/Basic Skill practice - 12

12 lead EKG 2 Advanced 12 Lead EKG 2 Airway and Advanced Airway techniques 1 OB Trauma 2 Medical Assessment 2 Medical, legal and ethical issues 2

12 Lead ECG Recognition 4 Hours, NIMS 300 and 400 28 Hours, Pulmonary

Hypertension 4 Hours, Airbag and Hybrid Vehicle Safety 4 Hours, Excited Delirium 4 Hours, Capnography 4 Hours

12 Lead Analysis (Tim Phallin)

1 - Patient Assessment and Triage 1 - Communication 1 - Spinal Injur/Backboard 1 - Shock 2 Diabetic