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Design and Implementation of a Sustainable, University-Based, Emergency Medical Response Service

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Doctorate of Nursing Practice Comprehensive Project:

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Section I

Abstract

Collegiate-based emergency medical services (EMS), designed primarily to provide prehospital basic life support and emergency services, can enable nurses and other health care professionals who understand community health and social network issues to maximize health promotion objectives for university and college campus communities. These EMS systems also provide vital support to city and county emergency services and promote positive community relationships in neighboring areas. Further, they can provide excellent opportunities for students to develop critical skills for success in the health care and business worlds. The sustainability of collegiate-based EMS systems are primarily related to their effect, benefit, and cost. Systems that are financially neutral or that can generate revenue and those that are deemed necessary and contribute positively to the general mission, vision, and values of their university or college and community are more likely to be sustained. The EMS at the University of San Francisco was developed and implemented to improve campus health and safety, to address health promotion and prevention issues, and to contribute to community relations. This project demonstrates the impact, sustainability, and contributions of such a service to a university campus and its positive contribution to the health of its urban community.

Keywords: Collegiate, emergency medical service, university, work experience

Section II

Introduction

Collegiate-based emergency medical services (EMS), designed primarily to provide prehospital basic life support and emergency services, can enable nurses and other health care professionals who understand community health and social network issues to maximize health promotion objectives for university and college campus communities. Nurses, particularly those who are involved in interdisciplinary and community partnerships and understand the needs of today's collegiate communities, are ideally suited to provide leadership in the design, development, planning, and evaluation of health promotion and protection-focused programs. The health care industry and consumers depend upon nurses in the ongoing effort to improve quality of health and find cost-effective solutions that will improve and maintain well-being in communities.

Health care providers play an important role in public health and social networks. To that end, the American Public Health Association, the National Association of EMS Physicians®, and the National Highway Traffic Safety Administration (NHTSA) have collaborated in issuing a number of policy statements on this role in recent years. The connection between collegiate campus health and the bedside is evidenced everyday in emergency room admissions, ambulatory care clinics, and acute care facilities. From alcohol poisoning and drug overdose to cardiac arrest, college and university campus communities and their environments are replete with real and potential health problems. A collegiate-based EMS system can help to educate the campus community by disseminating health and safety information, role modeling, providing classes in American Heart Association cardiopulmonary resuscitation and first aid, and mentoring

the role of emergency medical technician (EMT). College-based EMS also provide an opportunity for transformational growth of the campus community and partnerships by offering health- and business-related teaching, learning, internships, and clinical placements for EMTs, emergency room physicians, nurses, and public safety and public health students.

Background Knowledge

History of emergency medical services. Modern EMS systems are designed to provide high quality, acute prehospital care; improve public safety through disease prevention and injury control programs; participate in national surveillance to detect diseases and health care problems, and contribute to disaster and terrorism preparedness. Much is to be considered when exploring the history of EMS systems, and one can generalize that their development was, and continues to be, a response to the needs of medicine and society. An appreciation of EMS history allows one to better understand what is needed to ensure accurate triage, timely treatment, and transport in the development and sustainability of an EMS system.

EMS were originally designed for prehospital care and transport. Historically, their focus was the treatment and transport of wounded soldiers. The first EMS system to be documented occurred during the time of Napoleon's army. During the American Revolution, two important forces melded to create an EMS system. U.S. generals recognized the need to transport their wounded soldiers to specific points of care, at which they were categorized by severity of injury (Boyd, 1982; Boyd, 2010; Kennedy, Cohen, & Thomas, 2006; Mullins, 1999). The system, however, was not well-organized and lacked effectiveness. It was not until much later, during the American Civil War, that

an organized EMS system was developed to treat and evacuate soldiers from the field. William A. Hammond, MD, the Surgeon General of the United States Army, developed a system of gathering places for the injured. Soldiers were first treated in the field with dressings for wounds and morphine and whiskey for pain and then transported to field hospitals (Boyd, 1982; Boyd, 2010; Robbins, 2005). At the field hospitals, patients underwent further triage where they were treated or transported to general hospitals away from the front line, sometimes in cities. Although the system provided triage and acute care, it was extremely disorganized. As a result, soldiers were not treated or transported in a timely or organized manner, and many died.

To aid Hammond in improving battlefield medicine, he appointed Jonathan Letterman, MD, to be medical director of the Army of the Potomac. Letterman initiated monumental improvements in transportation of the wounded, which laid the foundation of subsequent EMS systems as transportation-based systems. He also streamlined supply processes, defined triage processes, kept excellent records, and categorized responders by level of capability (Boyd, 1982; Boyd, 2010; Pozner, Zane, Nelsen & Levine, 2004; Shah, 2006). In 1864, President Abraham Lincoln signed legislation to establish a uniformed ambulance service for the armies (Boyd, 1982). And thus the foundations of our current EMS systems were laid.

The United States Sanitary Commission, which was created in 1861 to support sick and wounded soldiers during the Civil War, also contributed to EMS development. The commission trained nurses; collected, organized, and delivered supplies; and equipped hospitals (Kennedy et al., 2006). It also trained nurses for the army and codified the system. This was perhaps its biggest contribution because it established a

process for treating and sanitizing environments. The American Red Cross, founded by Clara Barton in 1881, has since assisted with major advances in prehospital care, first by developing outposts for first aid in response to an overburdened medical system and then by offering the first, nonmedical provider first aid courses, which was a significant contribution to prehospital care (Boyd, 1982; McKay, 1985).

In the United States, modern EMS systems were formed in response to the publication, *Accidental Death and Disability: The Neglected Disease of Modern Society* (National Research Council (U.S.), Committee on Trauma and Committee on Shock, 1971), which concluded that accidental death was the nation's primary, and a costly, public health problem. Soon thereafter, formal training of prehospital personnel began. Nurses, firefighters, and ambulance drivers were trained to administer care at the scene and during transport. As a result, patient mortality decreased significantly. Although paramedic units were formed, they were not allowed to function independently; nurses were assigned to lead, supervise, and monitor them to assure capability, quality, and safety. As prehospital care grew rapidly, the federal government soon realized the need to establish national standards for both the care and transportation of prehospital care patients. This spurred the Department of Transportation and the NHTSA to develop national standards of care and curricula for EMTs; they also defined the components EMS systems.

During the late 1960s, medicine and the field of health care in general were experiencing significant advances. Trauma and intensive care units, lifesaving equipment and medications, community education in cardiopulmonary resuscitation (CPR), and advanced mobile transport units were all developed. Not long after mobile critical care

units were developed, death rates declined (Page, 1979). With the development of mobile units, the need for qualified prehospital personnel increased, which led to the formal training of prehospital personnel at various EMT levels, paramedics at various levels, and nursing. Although paramedic units were formed, they were not allowed to function independently; nurses or physicians were assigned to lead, supervise, and monitor them to assure capability, quality, and safety. The first nonphysician, mobile transport unit was not established until 1968; soon after, tiers of EMS personnel were formed (Boyd, 1982; McKay, 1985). In 1973, the Emergency Medical Service Systems Act was passed, which authorized prehospital care providers not only to respond to traffic accidents and coronary events but also to other medical emergencies. This legislation opened the doors for full integration of the EMS system into the country's health care system.

EMS systems are an integral component of today's U.S. health care system. Their effectiveness is measured as a whole, from first contact in the field to patients' return to home or care facility. EMS systems have the singular responsibility to respond to individuals whenever and wherever they need emergency care: in their homes, places of employment, or leisure locations. Given the breadth of their service demands and the complex certification structure of their personnel, EMS systems must have well-defined, evidence-based guidelines. Since 2008, the NHTSA has worked with the National Association of State EMS Officials to develop evidence-based guidelines for emergency medical systems (NHTSA, 2009; NHTSA, 2013). The National EMS Advisory Council (NEMSAC, 2012), through the Federal Interagency Committee on EMS has approved the evidence-based model progression to advance the field of EMS. Its adaptation process is

in progress to advance the field and broaden research and quality measurements. A summary of EMS service personnel training, certification and scope, based on California Code of Regulations, Title 22. (State of California, Department of Industrial Relations, Division of Labor Standards Enforcement. 2013), can be found in Appendix A, Emergency Medical Services and Emergency Medical Technician Personnel Information.

San Francisco Emergency Medical Services. San Francisco has been at the forefront in providing emergency medical services. In 1915, it opened Mission Emergency, which was a central location for all medical emergencies. In the 1930s, it expanded its operations to include seven, satellite, emergency hospitals under the direction of the San Francisco Public Health Department's chief surgeon (Mullins, 1999). In the 1960s, spurred by technical and pharmacological advances applied in the battlefields of Korea and Vietnam, trauma care for all changed dramatically. In 1972, San Francisco General Hospital (SFGH) received a grant from the National Institutes of Health (NIH) and became a designated NIH research trauma center. In 1983, San Francisco consolidated its trauma services, closing satellite hospitals, and keeping SFGH open as Mission Emergency. Mission Emergency was designated a Level I Trauma Center in 1991.

Mission Emergency remained under the Public Health Department until 1997 at which time the San Francisco Fire Department assumed responsibility for all response-related, trauma services. These services, which are linked to a multilingual emergency dispatch service, are under the leadership of the San Francisco Department of Emergency Management, which also manages disaster preparedness. Anne Kronenburg, a USF

graduate, is the current Executive Director of the Department of Emergency Management; Rob Dudgeon is Deputy Director and leads the Division of Emergency Services. Clement Yeh, MD, serves as the medical director for 911 Communications and the Department of Emergency Management; John Brown, MD, serves as EMS Medical Director and also oversees the emergency room physician-training program at the University of California, San Francisco's (UCSF's) School of Medicine. Mission Emergency is staffed by faculty physicians from the UCSF Medical Center. Compensation for services is provided by contract between UCSF and the City and County of San Francisco. The university is not part of the hierarchical structure of the San Francisco Public Health Department or the Department of Emergency Management. The organizational structure chart for the San Francisco trauma system can be found in the 2001 City and County Trauma Care System Plan, (San Francisco Department of Emergency Management, 2005, p. 22) and is included in this document as Appendix B, the Department of Emergency Management functional chart. No collegiate- or university-based EMS system has operated within the City and County of San Francisco.

Collegiate-based emergency medical systems. The history of collegiate-based emergency response systems dates back to 1968 when Cedarville University of Ohio, formally Cedarville College, received a fire truck from the local fire department and was designated an American Red Cross rescue team. The student-led group formed the Cedarville College Fire Department, which in 1971 morphed into the Cedarville Rescue Squad and then the Cedarville EMS in 2002. The Cedarville EMS expanded its services in response to campus and community needs for first aid, prehospital care, and practical application of classroom content. Since that time, many college and university campuses

have instituted student-run or led EMS services. As of March 2006, data were available for 175 collegiate-based EMS groups, 145 of which were identified as providing services (Fisher, Ray, Savett, Milliron, & Koenig, 2006). These organizations, frequently student led, offer unique learning opportunities and help students throughout campus to develop professional relationships, to apply what they learn, and to be successful elements of change in health care.

A campus-based EMS responds to situations as dictated by a campus's layout, environment, population, and community. Characteristically, these systems receive calls that are medical or trauma related (one fourth each) and usually are campus based without transport (83%); most (76%) are dispatched through campus police (King, Zachariah, Cone, & Clark, 1996). The EMS systems also help campus communities to identify and respond, with recognition education and CPR, to life threatening or potential emergency situations.

The National Collegiate Emergency Medical Foundation (NCEMF) offers guidance to collegiate-based EMS programs. The foundation was created in the early 1990s as a nonprofit resource to advance research and scholarship and to promote campus-based emergency response groups. At present, the NCEMF has over 250 members throughout the United States. It currently provides a forum for communication and problem solving in addition to assisting collegiate campuses in developing EMS programs. Collegiate-based EMS programs are usually supported and advised by physicians, nurses, local EMS systems, or a combination of health care providers. For example, Santa Clara University's EMS program is led by a nurse practitioner, while Loyola Marymount University, West Los Angeles, and Georgetown University,

Washington, DC, are led by both a nurse practitioner and a physician. Collegiate- based EMSs are designed in response to the specific needs of the communities they serve. Thus, the support of campus administration and community stakeholders is key to the success of any collegiate EMS.

Emergency medical service systems of the future. Although EMS systems are the health care system's safety net, they can also serve as part of a social support network, offering health promotion and protection. The EMS system of the future will be a community-based system, one able not only to respond to emergencies but also to help treat, identify, and modify acute and chronic health risks and illness. It will accomplish this by identifying health trends, education, and partnerships with other disciplines. The EMS model of the future will be fully integrated with other health care providers and agencies to meet community needs, streamline services, and decrease costs (Delbridge et al., 1998; O'Connor et al., 1999). As health care in the U.S. moves forward, new EMS systems must take into account the history that drives EMS, the reliance on evidence-based protocols and performance measures, and full integration into future health care structures Lang et al., 2012). EMS is the link that completes the circle of care: The system often initiates patient contact and returns patients to their home or base environment. As our health care system evolves, researchers should explore the expansion of EMS systems to assume responsibility for nonemergent care issues such as assessment and follow-up. Might this close the gap on follow-up and serve to expand and complete the health care continuum?

Advancement of nursing through emergency medical service development. EMS development can positively affect the advancement of nursing. EMS systems, led

by nurses, can promote interdepartmental, interdisciplinary, and health care system relationships. These leadership roles have been broadly endorsed by national policy makers (American Association of Colleges of Nursing [AACN], 1995; Galuska, 2012; Institute of Medicine, 2011; Robert Wood Johnson Foundation, 2013) who believe that nurse leaders can improve and sustain health care provisions, systems, and safety. Today's nurses are called upon to fill a variety of roles and are encouraged by the American Academy of Nursing (AACN, 1995) and others in health care leadership to expand their interdisciplinary participation as health care evolves.

By developing and participating in EMS systems, nursing demonstrates that it is at the forefront in offering innovative responses to the health care needs of communities. On a university campus, like the University of San Francisco (USF), a nurse, as educator, consultant, and innovator, can help the institution to establish a mutually rewarding "connection" with community partners, while fulfilling its educational mission. USF's aim is to produce engaged, successful men and women who take the initiative to create positive change and do so with respect for others and the environment.

This project, the development of a campus-based EMS, is person-centered, population- and community-based, and focuses on the wellness of the university population. Its aim is to make USF better prepared to respond to emergencies and disasters, focusing on campus resilience to disaster, and alignment with community resources. USF was selected as one of the 7 campuses in the nation to participate in the Department of Homeland Security Campus Resilience Pilot Program, an initiative that helps campuses train for, respond to and recover form emergency situations. The Homeland Security Newswire quoted USF's Peter Novak stating "Resilience planning

combines the best of emergency planning with preventative education and crisis management" "It will be incredibly valuable to us as an institution and to the community". (U.S. Department of Homeland Security, 2013). San Francisco's Division of Emergency Services promotes a culture of preparedness, offering community education to insure accurate and efficient response to emergencies. This project empowers those on USF's campus and in nearby neighborhoods to access such education and participate in emergency response. It showcases nurses as innovators in health care, as they create ways to improve the health care delivery system at USF, in its adjacent neighborhood, and in the City and County of San Francisco.

Local Problem

USF, with its urban location, 55-acre campus, and large population (10,017 students, 787 faculty, over 1,700 staff), experiences a significant number of medically related situations that require response. Sometimes, the situations are urgent or emergent. Currently, they are triaged by nonmedical public safety officers and privately trained dispatch professionals. The Department of Public Safety on campus receives at least 3 to 20 medically related calls per week. Most often, the calls involve alcohol or minor trauma. The calls are all routed through the Department of Public Safety's dispatch office, which uses a hybrid triage system. If calls involve nonemergent situations, the Department of Public Safety dispatches campus personnel; if the situation is determined to be an emergency, the Department of Public Safety can simultaneously alert San Francisco's EMS system. The dispatch professional relies on a list of situations and medical conditions to determine if the San Francisco EMS should also be dispatched.

Often, the Department of Public Safety transports students who refuse ambulance service or, on request, in seemingly nonemergent situations because there are no health care services on campus. This and the aforementioned processes can create several problems: safety, legal liability, added demand on San Francisco's EMS service, cost, scope of service, and potential, substandard EMS care. Both actual and potential individual and larger scale emergency health situations need evidence-based solutions to improve campus health, response, readiness, and resilience (i.e., the university's ability to respond and rebound in an organized way to emergencies and disasters). .

Aim Statement:

The goal of this evidence-based EMS was to develop a system of trained medical personnel to evaluate medically related situations, using predetermined, safe protocols for medical occurrences, calls, and situations on USF's campus. The evaluation and treatment of patients, using emergency medical technicians, certified as EMT-Basic/Defibrillator (B/D) personnel, along with adherence to established standards and protocols, will also provide safe treatment and appropriate transport of patients. It will provide valuable clinical and business experiences for the students and form new, professional relationships between the USF and the local EMS system, while expanding the role of nurses, meeting community health care needs, and improving campus resilience.

The Campus Resilience Pilot Program kickoff meeting and assessment workshops were coincidently scheduled in late summer and coincided closely with the launching of the campus EMS program. Developing an EMS was expected to take 1 year (fall 2012 through summer 2013); implementation was targeted for the fall semester in

2013. All program components were researched and vetted by consulting USF's Department of Risk Management, the Office of General Counsel, and Public Safety and Dispatch and San Francisco's EMS, Fire Department, Paramedics Association, and Police Department, as appropriate. The proposed program complied with state certification, licensing boards, and federal law and agencies, such as the Health Insurance Portability and Accountability Act, the NHTSA, the National Incident Management System, and the Occupational Safety and Health Administration. Success was measured by evaluating, monitoring, and attaining the following measures:

- Program implementation for weekend nights in fall 2013.
- 90% attainment of applicable NHTSA performance markers.
- Satisfaction of program within the USF community.
- Self-sustaining financial stability by fall 2014 (1 year anniversary).
- Contributing to the Campus Resilience Pilot Program through the provision of education and readiness.

Intended Improvement and Purpose of Change

The design and implementation of a sustainable, university-based, EMS system to protect health and improve campus safety through education, training, partnership, and teamwork was, and is, the intended improvement of service. This EMS system will improve services for USF's Campus Resilience Pilot Program designation, emergency services, public safety, and health promotion departments. Improvement in service will address the potential and actual medical safety and response issues on campus, educate and prepare the campus for emergencies, and provide students and others with valuable

opportunities for service, professional development and leadership in health care, and business and systems management.

Review of Evidence

The purpose of this literature review was to establish how student-led and run health services provide students with professional environments that change behavior and empower students to know what to do in practice, while filling gaps in service and in education. In addition, the review supports the design and implementation of an EMS at USF to meet university and community needs by contributing to the development of emergency services, health care work (Bradley & Benedict, 2010; National Research Council, 2007; Teich & Faddoul, 2012), and preparedness. This review assembled previous research on successful student-led and run health care services in order to support need, intent, and provide a feasible and sustainable service. To guide my research, I developed sets of questions using the PICOT framework as a guide (Craig & Smyth, 2008). PICOT questions address these elements in evidence-based practice: P (population/patient problem), I (intervention), C (comparison), O (outcome), and T (time). As applied to this project, my answers to PICOT questions were as follows:

P = Students leading health care clinics and services;

I = Components of successful and sustainable student-led and run services;

C = Development of health care services on college campuses by administration or others;

O = Successful student led and run health care services on college campuses and in the community, quality and safety outcome, return on investment, sustainability;

T = Fall semester 2012 - fall semester 2013

The questions that narrowed the search most effectively were these: What are the attributes of successful student-led health care services? What is the role of faculty or professional leadership in student-led organizations?

Several searches of the literature were conducted. The first search was guided by these keywords: Student agencies, student run, sustainability, experiential learning, collegiate, medical services, teamwork, public health, emergency, and prehospital. The second search used these keywords: leadership, student run, service learning, EMS system quality, formation of EMS systems, sustainability, and interprofessional education. With the assistance of USF's research librarian, the databases of CINAHL, Cochrane, Fusion, Google Scholar, MEDLINE, Ovid, and PubMed were reviewed; the search was expanded thereafter to include business and education databases. Later searches involved reference lists, texts, and authors and keywords such as nursing leadership, health professional, education, education and supervision of unlicensed personal, and health care team. The search was limited to articles written in English. The yield was subsequently reviewed for validity, year published, relevance to topic, application to topic, and attributes of development of student-run agencies. The Johns Hopkins Nurse Evidence-Based ratings practice scale and the Appraisal of Guidelines Research and Evaluation in Europe (AGREE) tool (AGREE Collaboration, 2001; see Appendices C and D), were used to rate the quality and strength of the literature.

Provision, opportunity, and sustainability of professional environments. Student-run health care services provide students with real clients and real emergency medical service and learning engagement opportunities Dang, Dudley, Truong, Boyle, &

Layson-Wolf, 2012; Jamesley, Palmisano, & Lawrence, 2013; Kim, Clasen, & Canfield, 2003; Ponto, Paloranta, & Akroyd, 2011; Stephenson, Stephenson, & Mayes, 2012). They also provide communities (institutional, local, regional, state, national, and global) with more socially responsible leaders who are aware of and can meet their needs (Barch, Harris, & Bonsall, 2012; Perry & Katula, 2001; Ricketts & Bruce, 2008; Soria, Nobbe, & Fink, 2013; Taylor, 2007; Zimmerman-Oster & Burkhardt, 1999). Investing in and sustaining these types of projects provides universities and communities with valuable services, especially those associated with public health and health promotion (Dempsey, Barry, & Battel-Kirk, 2010; Dempsey, Battel-Kirk, Barry, & the CompHP Project Partners, 2011; Patrick, Capetola, & Nuttman, 2012; Pender, 1987; World Health Organization [WHO], 1986). Student-run health services provide unique opportunities for students, and researchers have studied their long-term effectiveness on diversity and cultural competence (Gu, McElroy, & Corcoran, 2012) and performance (Simpson & Long, 2007). Additional research is needed on their effect on disease outcomes and their impact on practice behaviors that extend beyond direct campus or clinic services (Gu et al., 2012; Meah, Smith, & Thomas, 2009; Smith & Lister, 2011).

The literature on successful student-led and run services in the health sciences (e.g., dentistry, medicine, nursing, and physical therapy) and other areas such as consulting and advertising (Black, Palombaro, & Dole, 2013; Bush & Miller, 2011; Campbell, Gibson, O'Neill, & Thurston, 2013; Cundiff, Nadler, & Scribner, 2011; Dang et al., 2012; Liang, Koh, & Lim, 2011; Ponto, 2011; Simpson & Long, 2007) agree that these services benefit clients, patients, students, and communities. Despite over 185 student-led and run emergency medical response services in the United States and a

foundation, the NCEMF, to support them, the literature on these services, although positive, is minimal (Fisher, Ray, Savett, Milliron, & Koenigh, 2006; King, Zachariah, Cone, & Clark, 1996). Only three peer-reviewed articles were found that surveyed EMS systems on college campuses (Fisher et al., 2006; King et al., 1996; Pimentel, Hirshon, Barnueto, & Browne, 2012).

Provision of emergency medical services under nursing leadership. Student-led services require partnerships between educational institutions and the community they serve (Jackson et al., 2007; Palombaro;,Seifer, 1998; Seifer, 2000). The Carnegie Foundation for the Advancement of Teaching (2013) defines community engagement as "the collaboration between institutions of higher learning and their larger communities for the mutual beneficial exchange of knowledge and resources in the context of partnership and reciprocity" Driscoll (2008) further explains the Carnegie Community Engagement Classification's intentions for partnerships with a community that can build trust and lead to opportunities for education, training, and funding. To maintain positive community relationships, improve quality and safety of care, and measure effectiveness, evaluating these relationships is just as important as it is to establish them (Borden & Perkins, 1999, Sherwood & Barnsteiner, 2012; Smith & Lister, 2011).

Student-led services can be sustained by using public relations and marketing strategies that are guided and supported by faculty (Bush, 2009; Bush & Miller, 2009; Cundiff et al., 2011; Dees & Hall, 2012; Lachowetz, Todd, & Dees, 2009) and health promotion. According to the Ottawa Charter (WHO, 1986), health promotion involves strengthening community action, creating supportive environments, gaining personal skills, reorienting health services, and contributing to public policy development. Most

student-led health services promote health in some way, while providing valuable education on issues communities need (Brill, Ohly, & Stearns, 2002; Mayne & Glascoff, 2002; Shafik et al., 2010; Smith & Lister, 2011). When students provide services that meet health care needs, they strengthen the health of a community overall. As a result, students become community leaders in health care with purpose and a sense of social responsibility.

Based on the literature, application-based, service learning or student-led work appears to create socially responsive and responsible students. By participating in these services, students acquire knowledge; develop skills in team building, communication, and leadership (Stephenson et al., 2012; Zanchetta, Scwind, Aksenchuk, Gorospe, & Santiago, 2013), and feel empowered to make changes in health promotion and protection (Patrick et al., 2012). Enabling students to acquire these competencies meets university goals for social justice and service and national goals for addressing individual health and the health of populations through prevention and protection. Patrick and colleagues' (2012) findings also address the positive relationship between competency in health promotion and level of sustainability through work-integrated learning.

In 2011, Hymel et al. (2011) presented evidence by the American College of Occupational and Environmental Medicine (ACOEM) that supports the integration of health promotion and protection. As explained in Hymel's (2011) work, the workplace is becoming part of the health care team in new models of health promotion and protection, the common elements for which have been promulgated by the National Safety Council, the National Institute of Occupational Health and Safety and international organizations such as the WHO, the European Union's Safety and Health at Work Strategy, and the

United Kingdom's National Health Service. The silo of health at the workplace and health at home is coming down. Sorenson et al. (2013) has recommended goals that challenge professionals to collaborate on this integration within and outside their organizations, while training future professionals to focus on the health of working people and contributing to integration as national priorities of public health, emergency preparedness, and occupational health divisions., according to Hymel (2011) the ACOEM has recommended that programs be developed that promote synergy between students, employees, and the community to respond to the new health care system as part of the workplace and workforce as we reform policies, programs and processes. Nursing leaders are well suited to develop these programs and work to reform the healthcare system. Khoury, Blizzard, Moore, and Hassmiller (2011) believe that nurses should have more input in planning and management, while increasing quality of care, promoting wellness, and making health care decisions. In developing prevention and health promotion and protection services, nurses can showcase and model their organizational and leadership capabilities.

Nurse leaders understand what it takes to improve health through programs that are focused on health protection and promotion using quality, safety and customer satisfaction. *The Future of Nursing: Leading Change, Advancing Health,* which was issued by the IOM in 2011, addresses the education and skills that nurse leaders must have to lead programs as the health care industry evolves. Nursing's leadership skill set fits well with those of other health care professionals in designing and redesigning programs in varied interdisciplinary practice environments (Clarke & Hassmiller, 2013; IOM, 2011). Hassmiller and Combes (2012) point out that nurses' knowledge of patient

care and education in administration, education, and finance are the same skills and experiences that the American Hospital Association requires of health care board members. Nurses possess a breadth of leadership skills and capabilities that are well-suited for the development of health care programs that can meet the needs of the public from the national arena to the college campus (Blouin and Buturusis, 2012; Sorenson, Iedema, & Serverinsson, 2008). Offering health care students, especially nursing students, the opportunity to participate in student-led services can provide an environment in which nursing and health care leadership can be cultivated. Galuska's (2012) metasynthesis finds that these practice environments are key to leadership development in nursing.

Nurses work with and respond to people's needs, be they patients, students, or the system that serves them. Nurses lead and work side-by-side as team members with licensed and unlicensed personnel. Clear and effective communication and clarity in role scope, performance expectations, and procedures affects safety, quality, satisfaction, and perceptions (Machen, Dickinson, Williams, Widiatmoko, & Kendall, 2007; McLaughlin et al., 2000). Nurses have long partnered with paramedics and medical dispatch centers. Studies have found that these partnerships complement each other, improve prehospital and emergent care (Forslund, Kihlgren, & Sorlie, 2006; Machen et al., 2007) and allow health care teams to better meet the public's health care needs.

In its document, *Nursing Professional Development: Nursing Scope and Standards* (American Nurses Association, 2010), the American Nurses Association states that the public expects nursing's ultimate goal to be the assurance of safe, high quality health services for all. The successful pursuit of this goal demands competence, technology,

and innovation. Nursing's target populations and audiences should include peers, students, multidisciplinary teams, and community members. Bradley and Benedict (2010) opine that collaboration now includes both interdisciplinary teams, which usually means health related disciplines, and interprofessional teams, which may include participants from any profession, most commonly the educational disciplines.

Although limited literature on student-led, collegiate EMS makes it necessary to borrow concepts from other disciplines, the evidence described above suggests several conclusions about collegiate-based EMS systems and their development, sustainability, and effectiveness within broader EMS and health care systems. First, student-led health care programs benefit health prevention, health promotion, and health care delivery. Numerous articles on student-led, health care programs in business (Hart & Mrad, 2013), dentistry (Dharamsi et al., 2010), dietetics (Stephenson et al., 2012), medical clinics and services (Balasooriya et al., 2013; Gu et al., 2012; Meah et al., 2009), nursing (Ponto et al., 2011; N. Smith & Lister, 2011; Zanchetta et al., 2013), pharmacy (Mehta, Reschke, Cable, & McDowell, 2003), physical therapy (Black et al., 2013), and public health (Wood & Lee, 2012) have described their success in providing professional services and in forming strong community partnerships. Second, to be sustainable, projects must be of high quality and serve a need, be it for students, a university, or the local or larger community. Access to resources and sharing of expertise is also important for sustainability (Beck, 2005; Black et al., 2013; Palombaro et al., 2011). Sharing expertise through interdisciplinary partnerships strengthens skills, education and training, and improves quality of care and satisfaction. Third, the effect of student-led programs is measurable and positive, as based on the development of students' skills, leadership, and

social responsibility. Training students in specific skills, protocols, and processes improves their capability and confidence, while improving the overall quality of patient care (Black et al., 2013; Meah et al., 2009; Palombaro et al., 2011). Fourth, community and service partners are integral to the success and sustainability of a service (Black et al., 2013; Palombaro et al., 2011), and community partners benefit from the students engagement, skills and contributions of by expansion of the partners mission (Condo & Martin, 2002). Fifth, nursing's scope, skills, knowledge, and leadership competency are well-suited to the development of projects that rely on interprofessional education and practice to develop solutions to health care needs. Nursing partnership and leadership in such service programs answer the IOM's beckoning call for nursing participation in the health care system. Sixth, student-led, medically related services not only fill health care gaps but also promote health while providing meaningful opportunities for students' professional growth and development (Roberts & Mays, 1998; S. D. Smith, Johnson, Rodriguez, Moutier, & Beck, 2012). This in turn builds and strengthens communities and saves costs. Finally, administrative investment and support of student-led service programs and compensation for associated faculty and advisors are essential to the survival of such programs. Integrating these programs into the curricula and administrations of educational institutions will help to insure their sustainability.

Conceptual/Theoretical Framework

USF's EMS program used several, related, conceptual and theoretical frameworks and models with unifying themes: community health, quality service, and evidence-based practice as an integrated approach to health protection, prevention, and promotion through service and education. The program's model was adapted from three others: the

spectrum of prevention model, a framework espoused by USF's Health Promotion Services; the partnership and sustainability conceptual model; and the national EMS model. All of these models are focused on providing safe, quality care to people and depend on the interrelatedness of approaches to strengthen public health programs in the interpersonal environment with professional, multidisciplinary, and interdisciplinary participation. In addition, the EMS model contributes readiness for every kind of emergency, public education, and system sustainability. For programs to be successful, strategies are needed that are based on evidence and strong frameworks.

Spectrum of prevention. The new spectrum of prevention: a model for public health practice is based on a framework (Cohen, 1999) that was developed by Lawrence Cohen, Director of the Prevention Institute in Berkeley, California. It enables the integration of individual, professional, organizational, and community-wide efforts to develop programs that affect public health. It is an excellent tool for improving collaboration and coordination among agencies and programs and within large institutions (Rattray, Brunner, & Freestone, 2002). The model proposes that there are seven aspects of prevention that are interrelated and dependent on each other:

1. *Strengthening individual knowledge and skills* refers to health education from trained professionals or community members who provide individuals with information and opportunities that enable them to learn new skills and/or change attitudes. Community members can then use this new information to educate others and become activists for health policy or organizational change. In this project, health education comprised peer-led, basic life support and first aid training, which have proved to have excellent outcomes

and sustainability (Harvey, Higenbottam, Owen, Hulme, & Bion, 2012; Perkins, Hulme, & Bion, 2002a).

2. *Promoting community education* refers to reaching a critical mass of individuals to raise community awareness about specific health issues. University-sponsored community health education on alcohol poisoning, seeking medical attention, and disaster preparedness exemplify applications of this aspect.
3. *Education of providers* means committed professional individuals or groups who can encourage health behaviors by modeling, educating, and advocating for change within institutions and communities. Emergency service professionals can be such models and can propel an institution forward with preparedness, work to improve campus resilience and education on health protection, prevention and promotion.
4. *Fostering coalitions and networks* refers to community and government organizations, policy makers, businesses, and health providers who are working together for legislative and organizational change. Bringing people together from various agencies who share common goals can facilitate the sharing of resources and strengthen planning and interventions for prevention and health. USF's EMS program works with government (San Francisco Department of Emergency Management divisions; San Francisco Fire Department, San Francisco Emergency Medical Services Agency, San Francisco Division of Emergency Communications) and community agencies [San Francisco Paramedic Association], businesses [King American

Ambulance Company and American Medical Response (AMR®) Ambulance Company, and Environmental Services], and health professionals on and off campus for all training, planning, and program implementation.

5. *Mobilizing neighborhoods and communities* to help create a safe, healthy, and prepared environment is important to advance public health issues. Recruiting diverse leadership, maximizing resources, and developing long-term and dynamic solutions with a community is essential. As an integral part of the community, the USF EMS program works with students, faculty, and the administration to determine and prioritize its real issues.
6. *Changing organizational practices* refers to change or modification of policies or practices to improve the health and safety of an organization. Working in tandem with other university departments and mining the data generated by the EMS program can identify needed changes.
7. *Influencing policy and legislation* requires the mobilization of communities, education, and the development of networks. Perhaps USF's EMS program can identify needed policy changes and advocate for them as public health goals.

The spectrum of prevention model offers a framework for program development that complements the existing goals of USF's Health Promotion Services.

Health Promotion Services. According to the USF Health Promotion website, USF's Health Promotion Services is charged to "enhance the students quality of life by promoting wellness through education and access to quality healthcare while assisting to provide a healthy campus community for student success". In collaboration with the

USF community, Health Promotion Services s promotes a culture of healthy lifestyles, delivers advice on health messages and harm reduction advice, and works towards the development of a more humane and safer environment on the campus and ultimately in the world.

The EMS program and the university's Health Promotion Services share collaborative goals as evidenced by the former's provision of peer-based emergency response, using peer education and mentorship to improve the health and lives of the campus community, while helping to prevent medical emergencies. The EMS program's current and future educational initiatives for campus health promotion include hand awareness and hygiene, bystander CPR, recognition of alcohol poisoning, and an understanding of the American College of Emergency Physicians' "10 Top Reasons to Call EMS" (Conlon, 2009). The partnership between Health Promotion Services and nursing through the development of the campus EMS program will impact the health of the community and perhaps ultimately have a global impact.

Partnership and sustainability. Leffers and Mitchell's (2010) conceptual framework for partnership and sustainability in global health nursing was adapted for program development, effective partnerships, and guidance for a nurse on program sustainability. For the purposes of this project, global health aspects were easily replaced with the local community and organizations. Leffers and Mitchell's model is premised on partnership and engagement to identify local needs before planning or interventions begin. It is a collaborative model led by nurses to create sustainable interventions or programs for public health. The model's focus is on processes for sustainability and partnership beginning with the key components of partner factors.

Partner factors involve the personal attributes and expectations of nurses and their knowledge of their organization and their awareness of cultural and other perspectives. Nurses must be willing to share information, to be open to the views of others, and meet partners in their own environment. Nurses must also take personal risks to advocate for social justice and sustainable outcomes. The factors of host partners depend on expectations, the impact of the organizational environment, finances, resources, and politics. The processes of partnership include engagement, bridging, collaboration, capacity building, and mutual goal setting. The design of the USF program was preceded by partnership development using collaboration and consultation. Assessing the organizational and broader community was paramount in our program development.

Research is key. Research must be conducted into available resources; the political and organizational climate, participation readiness, community engagement, and project ownership for sustainability. As with most projects, when deliverables are what partners need, invest in, and are empowered to maintain, the more sustainable a project becomes. Hence, the development of a student-led EMS program in a collegiate setting must be designed not only for the health of individuals but also for the health of the broader community.

Emergency medical services. EMS is a patient-centered system whose components must work together to be ready and able to respond in an emergency. Such a system is highly integrated with public health, health care and public safety systems and employs the principles and resources of each system (Meisel, Carr, & Conway, 2012). An EMS system reflects a partnership that responds to the needs of individual communities. It uses a collaborative model to establish services, which vary depending

on the provider, although essential components remain the same.

The essential components of an EMS system are private and public agencies and organizations; communication and transport networks; trauma systems; rehabilitation facilities; highly trained professionals; volunteer and career prehospital personnel; physicians, nurses, and therapists; administrators and government offices; and an informed public that knows what to do in a medical emergency.

Description of the project model. USF, a private institution, has integrated its EMS program with the City and County of San Francisco's EMS system. The former provides multidisciplinary expertise from its own campus and interdisciplinary professionals from the community to provide expert service. It uses its own communications dispatch and is also connected to the San Francisco Department of Emergency Management, Division of Emergency Communications dispatch. The program uses a communications system, emsCharts®, that has the potential to be integrated with the broader trauma system's local hospitals. The project provides training and works to improve campus preparedness and resilience in medical emergencies.

The national EMS model (National Highway, Traffic and Safety Administration, EMS Homepage, 2013; Institute of Medicine Committee on the Future of Emergency Care in the United States Health System, 2007) recommends that an EMS system must have several essential components: public access, communication systems, clinical care, human resources, medical direction, evaluation, integration of health services, information systems, EMS research, legislation and regulations, and system finance. This project has addressed each component using the following objectives:

- Public access is achieved as the emergency response service serves the

campus community and neighboring communities within its service boundaries. Community members also use campus facilities and attend campus functions. It offers education to the public and is involved in community outreach to further educate the public on health prevention and protection.

- The communication system is housed within USF's Department of Public Safety, which handles operational communications, dispatch, and emergency communications. It is integrated with the San Francisco Department of Emergency Management. The program has its own integrated reporting system.
- The program uses human and other resources from the university and community.
- The program functions under the direction of a medical director whose expertise is in pediatrics, global health, hospital medicine, and public health. The director works closely with the San Francisco Division of Emergency Services' medical director.
- Clinical care follows the San Francisco Department of Emergency Management EMT protocols and is evaluated for quality and safety. The data generated is evaluated and shared with the San Francisco Division of Emergency Services to improve care provisions and meet community needs.
- Finally, the system is designed to be financially self-sustaining, receiving revenues generated by its education classes and standby event staffing. USF's Department of Student Life and the university provided funds for start-up

costs, and the university provides stipends for the medical director and advisors.

The main focus of the program is students, faculty, staff, bystanders, the community, and program partners. The model relies on nurses' knowledge and skills to assist people in learning to care for themselves in order to promote and protect health and prevent illness. The program is centered around five key concepts: (a) advocacy, a key strategy for the achievement of health promotion aims; (b) evidence-based practice standards because they provide scientific and patient-specific safety and best practice standards; (c) teaching and learning in a collegiate setting for transformational growth of the community; (d) interdisciplinary collaboration between health care providers and supporting partners within the university and city; (e) health maintenance, protection, and prevention through timely care and response to emergencies, communication, and environmental health and considerations.

Reflecting the Jesuit philosophy of service and care for others, USF's Emergency Medical Response Service (USF-EMRS) is a collegiate-based, emergency response system that is designated to improve health and safety on the hilltop campus and community for students, faulty, and bystanders. A diagram of the model is presented in Appendix E.

Section III

Methods

Ethical Issues

The USF-EMRS is compliant with legal, environmental, and ethical requirements for the provision of prehospital health care and health services. Its services are provided in relation to an engaged learning, working environment by volunteer student professionals. The development, implementation, and sustainability of the program has relied on the university's leadership and belief in service for the university, community, and greater good through the learning engagement of student volunteers and contributions from community partnerships. The EMRS must remain consistent with Jesuit, institutional, and professional values and operate under those principles. According to the Center for Ethics in Health Care at the Oregon Health and Science University's charter (2011-2014), institutional ethics apply to practices, policies, and procedures and how they reflect an institution's values and moral principles. The EMRS is guided by Jesuit philosophy and values, USF's mission and values, the partnership departments' (Housing and Residential Education, Health Promotion Services, and Student Life) missions, and EMS and EMT role expectations and values. All fit together seamlessly. Based on this integration of missions and values, the mission statement for the EMRS was crafted as follows: The University of San Francisco Emergency Medical Response Service is a collegiate based, emergency response system that is designated to improve health and safety on the hilltop campus and community for students, faculty, and bystanders.

Ethical issues can arise when these values conflict with the mission, operations, and management of the service. The EMRS's work on campus and in the community aligns with and is guided by Jesuit and institutional values. In providing this service, the university is responding to its responsibility to address the needs of students who are pursuing professions in the human services. Linking practice with theory and demonstrating commitment to core values is essential when preparing leaders of the future or in this case first responders. The EMRS practice environment also contributes to community wellness addressing USF's passion for justice and commitment to the community. The service also addresses USF's higher standard value by allowing students to improve their competence, to learn the highest performance standards and to strengthen their knowledge, skills, and values (Behrman, McKenna, Richardson, & Freitag, 2013).

Academic excellence speaks to the application of knowledge to make the world a better place; providing health education, health care, and engagement opportunity does that. Justice speaks to putting thought into action; the EMRS accomplishes that with its work and volunteer efforts. The service provides opportunities for everyone (squad, community member, or alumni) and provides nondiscriminatory service and outreach. As a student-led professional organization, the EMRS must gain the trust and confidence of the community through integrity and fidelity. As students learn and grow into their professional or civilian roles they demonstrate their credibility as professionals and also validate that they are highly motivated individuals that are easily directed to assume professional role behaviors.

Students engaged in the EMRS complete a course on the Health Insurance Portability and Accountability Act, sign an oath of confidentiality, and review policies on working with fellow students, teachers, bystanders, and other professionals. This privacy rule, added to the Health Insurance Portability and Accountability Act in 2003, addresses all written, oral, and electronically identifiable patient information (Grace, 2009). The EMRS demands ethical behaviors of all those associated with it and adheres to ethical principles and laws in all patient care activities. Breeches of privacy or confidentiality; unprofessional behavior; illegal acts; or misuse of technology, equipment, or funds will result in immediate action by the associate dean of student development and the faculty advisor.

The communication and documentation system purchased by the service, emsCharts®, protects patient information and meets national, state, and local security mandates. The web-based system requires training, permission, and certification verification from the system administrator prior to password entry. It is not linked to USF's information technology systems and maintains patient information on a separate, secure server. After patient information is submitted by an EMT, only the medical director or a designated health care provider with access to the emsCharts® system can access it. Physicians in local hospital emergency departments will have access to the system when the system is adopted state wide through the National Emergency Medical Services Information System, and are given a case number for reference. To view patient records, they must log in at a registered health care institution, with a license number and a reason for access. EMTs use their social security and EMT certification numbers to access emsCharts®. The university's communications officer works directly with the

medical director on documentation issues that are not confidential. Each month, the EMRS medical director convenes a meeting with the EMTs and the faculty advisor, who is a registered nurse, to review and discuss recent cases. Case review is blinded.

All security and access issues are approved by the Associate Vice Provost of Student Life and administered by the Department of Public Safety and the USF One Card office that is charged with maintaining security for identification and access cards for the campus. Student identification cards for EMTs grant them access to buildings but not to individual residence rooms, with the exception of the on-call rooms in Lone Mountain's Pacific Wing 1 hr before and 1 hr after assigned shifts. The EMRS faculty advisor, vice president, education coordinator, and materials officers have access 24/7; squad members have room access on Friday and Saturdays from 1700 to 0900. The Department of Public Safety monitors all access card activity. No visitors are allowed in the on-call room; physical presence is on a "need to be there" basis.

Prospective members of the EMRS are screened by the Associate Vice Provost of Student Life for academic and conduct standings, in accord with regulations of the Family Educational Rights and Privacy Act (FERPA), also known as the Buckley Amendment, which was made law in 1974. At the collegiate level, FERPA regulates the confidentiality of records and sharing of student information. USF's EMRS has contracted with CertifiedBackground.com, an online, secure personal information, background screening and drug testing management system. The results of EMT submissions are screened by the faculty advisor and can be viewed by the Associate Vice Provost of Student Life. The EMRS verifies health requirements, certifications, background screening, and drug testing. In compliance with FERPA, no conduct or

health information is released to the faculty advisor. Students' overall practice performance is assessed by the academic faculty advisor; confidentiality is maintained as part of the collegiate and professional advisor student relationship.

Although USF does not have a medical ethics committee, it adheres to both ethical and professional standards. USF has an institutional review board. This project was not presented to USF's Institutional Review Board because it was approved by the provost as a new departmental division. USF is committed to upholding safety, confidentiality, and quality standards, keeping data safe and adhering to all standards and legal requirements. USF has made a long-term commitment to the EMRS program, financially and administratively. Showing her support and commitment, the provost featured the EMRS at the 2013 fall commencement. The EMRS fulfills the missions and values of the Jesuits, EMS institutions, and health care professionals, while decreasing the burden on the local EMS.

The EMRS also addresses the burden of health care costs and strain on emergency systems. Community emergency response systems have been shown to decrease demand on emergency systems, which is largely driven by public misperceptions of the need for medical care (Roberts & Mays, 1998). Although Roberts and Mays (1999) found patchy quality and service and lack of evidence of cost-effectiveness, they also found that community emergency response systems can decrease the burden on other EMS systems. The EMRS's ability to assess and triage medical situations and make professional decisions on patient care eases the strain on the local EMS system and decreases costs for medical transport and emergency room visits.

Setting

USF's EMRS serves the City and County of San Francisco and, more directly, its university campus. San Francisco is a close-knit city, especially in regard to health care and EMS services. It is a small city, 46.9 square miles, and the second most densely populated city in the United States, 17.179.2 persons per square mile (Bay Area Urban Areas Security Initiative, 2013), with a population just over 825,000 (U.S. Census Bureau, 2011). The city's EMS needs and response depend on exemplary communication and the interdependence of multidisciplinary agencies and people. San Francisco's Department of Emergency Management provides emergency services to a catchment of about 1.5 million persons daily, which includes commuters and tourists.

USF's EMRS serves the university's hilltop campus, a 55-acre area. Because all emergency medical services are time driven, location, effective communication, and access are essential to an effective operation. Response time is affected by geography, familiarity with structural commonalities within buildings, and access. The USF campus has 7 service areas and 27 buildings, all structurally different; 9 are residence halls. Because the complex layout of the hilltop campus can often challenge the local EMS service, a campus-based response system can decrease response time significantly (Jamesley et al., 2013; NHTSA, 2013). The on-call EMT quarters are centrally located, next to the densest population of dormitory residence, at Lone Mountain. This location offers storage for supplies, parking for transportation vehicles, and "down the hill" foot response. The Department of Public Safety and dispatch offices are also located at Lone Mountain and the Jesuit Residence that houses the university president; emergency command communication lines are also located there in the event of disaster or mass

trauma. With its communication capabilities, visual hilltop campus, and its proximity to nearby neighborhoods, USF is well-positioned as a gathering spot in large disasters.

Impact on nearby neighborhoods (i.e., Laurel Heights, Inner Richmond, Hayes Valley, Western Addition, and the outlying community) is anticipated with improving EMS resources (education and service) for the community and by decreasing system burden. Additional educational outreach to adjacent communities on emergency preparedness and response will hopefully strengthen the university's campus resilience because preparedness of the surrounding communities will render their need for assistance from USF. Community strength through the provision of education will also increase both community and USF's capacity to return to a functioning level or to baseline. The EMRS currently provides on-campus, formal, informal, and community outreach, first aid courses, CPR courses, and continuing education courses. The provision of additional resources for medical response preparedness is being offered in various formats to address established needs to diverse client populations.

The university's faculty and students reflect the diversity of San Francisco itself. They hail from more than 35 countries and 38 states, including the District of Columbia and Guam. The ethnic diversity of the undergraduate student body is as follows: 34% White, 23% Asian, 19% Latino, 16% international, 4% African American, and 1% each Pacific Islander and Native American. Students' age range is also quite broad, from older adults, 50 or more, who are enrolled in The Fromm Institute for Lifelong Learning, to grade school children, brought to campus by youth programs. The campus also boasts a large Reserve Officers' Training Corps program and many students who are veterans of the armed forces. The campus population's socioeconomic background is also varied and

reflects its adjacent neighborhoods. Students come to USF for many reasons and with varying personal and professional experiences; they all need access health care and can benefit from prevention and health protection services.

Health Promotion Services oversees the students' medical insurance, immunizations, alcohol education, health promotion services, and some other resources. The university currently has a contractual agreement with the Dignity Health Medical Group to provide USF students with free, outpatient, primary care during business hours and by appointment. Students must be registered for credit hours and show proof of insurance to receive services. They are charged for immunizations, laboratory services, diagnostic services, and incurred fees. Students enrolled in a health maintenance organization are encouraged to use those services. During "off hours," Pacific Family Practice, which is not contracted with the university, is available for urgent medical and psychiatric appointments; this family practice clinic is referenced on the Health Promotion Services' webpage. Its offices are open from 0800-2100 on weekdays and from 1000-1600 on Saturdays. No other medical resources are listed on the Health Promotion Services website.

In years past, USF has supported students with a health clinic onsite. Discussions are underway on the possibility of bringing such a service back to campus through the School of Nursing and Health Professions. Such a clinic would most likely operate during weekday business hours and possibly provide services to the underserved in adjacent neighborhoods.

Planning the Intervention

The most successful collegiate-based EMS programs are student–led. They have

been created through cross collaboration that involves departments, partnerships, and teamwork between a college or university and a community (NCEMSF, 2012). Community includes local (private and non government community service organizations) and government (San Francisco City and County) EMS services and training facilities, transport and dispatch bases, neighbors, and geographical considerations. A campus's administration, faculty, departments, and vendors as well as its resources and community partners play a vital role in a program's success. With most health care projects, planning occurs after establishing need, securing administrative support, forging community and campus partnerships, and providing financial resources. At USF, creating an EMS system was decided upon before need was established and financial resources were confirmed.

Development of the USF EMRS. The university's administration initiated strategic planning for a collegiate EMS program by convening a team of capable individuals known to have expertise and interests in cross collaboration. The vice provost for student life envisioned the possibility of an EMS system on campus based on the successful experience of other Jesuit universities (i.e., Georgetown University, Washington, DC, and Santa Clara University, Santa Clara, CA). The associate vice provost and dean of student development proceeded to gather administrative support for the project from the director of Health Promotion Services and administrative assistants from all involved departments. A relationship with the San Francisco Paramedic Association was established.

The San Francisco Paramedic Association's EMT-B educator and its professional education manager began training nine USF students during the summer of 2012. A

partnership was later formed between the association and the university to provide EMT-B training courses. In the fall of 2012, the dean of the School of Nursing and Health Professions was asked to identify a faculty member with expertise in program development and implementation. It was then, that the author was appointed to the role of faculty advisor. The author felt a professional and ethical responsibility to provide this service to the university campus. Longest (2004) states that that professionals who work on health projects have obligations to their profession that include advancement of knowledge, contributions to healthcare reform and furthering social values. It is the author's goal to meet these obligations.

At the time of the author's appointment, the need for an EMS program had not been established. According to Williams (1969) and Spradley (1980), planning changes in systems or behaviors must be purposeful, designed to effect improvements and contribute to individual satisfaction and social well-being. Change can also further organizational objectives (Roussel et al., 2006). One of USF's objectives and part of its strategic plan is the "San Francisco advantage". This advantage is based on San Francisco's dynamic provision of opportunities to serve as an extended classroom. USF's campus resiliency pilot involvement, and the provision of EMRS service to further USF's organizational goals. It was therefore necessary to establish need and linkage of EMRS to USF's organizational goals.

The initial step was to verify and establish a clear need for an EMS service. This was done by conducting a situation analysis. A SWOT (i.e., strength, weaknesses, opportunities, threats) analysis was also performed to determine the program's viability

as a business enterprise and to measure its potential for implementation, success, and sustainability (see Table 1).

Table 1

SWOT (Strengths, Weaknesses, Opportunities, Threats) Analysis of Proposed EMS Program

Strengths	Weaknesses
• Provides evidenced based, protocol driven, emergency health service to campus • Improves campus response readiness to medical emergencies and disasters • Establishes new and enhances existing community partnerships and relationships to contribute to the improvement of San Francisco EMS • The program has engaged, eager and invested students, advisors, partners and faculty who wan to see program succeed • The program has the support of the administration, SFEMSA and the community partners	• Organization offers limited investment for startup and upfront program costs • There is a small cohort of certified EMTs who are USF students and turnover due to graduation and class schedules and impacts expansion potential • The service is limited in hours and days of operation due to limited staffing • The service will need time to be established, recognized and utilized through advertising and word of mouth • The professional inexperience of the student EMT volunteers requires faculty and advisor time incurring cost.
Opportunities	Threats
• Provides students with both engaged learning and service opportunities • Provides an opportunity for USF's SON&HP, HPS, and the USF community to participate in health care service redesign • Potential for revenue stream to be used for campus resilience and disaster preparedness enhancement • To improve student and parent satisfaction with health protection and safety on campus • Potential for education and outreach to impact SFDEM	• Campus departments resistance to change in service • Community EMS transport personnel potential for lack of acceptance of campus program until credibility can be established • Students "feeding" campus EMT pool from partnership SFPA EMT training program breaking supply chain and causing decrease return on investment • Students potentially leaving service due to possibility of overburdening as there are few in numbers • Potential for administrative, salaried or stipend personnel to

	leave service prior to solidification of student program leadership

Note. EMT = emergency medical technician; USF = University of San Francisco; EMS = emergency medical services; SFEMSA = San Francisco Emergency Medical Services Agency; SON&HP = School of Nursing and Health Professions; HPS = Health Promotion Services; SFPA = San Francisco Paramedics Association; SFDEM = San Francisco Department Emergency Management

Based on EMS System Guidelines (California Emergency Medical Services Authority, 1994) and guidelines of the International Academies of Emergency Dispatch (2012; see Table 2), operational need based on call type and volume at USF was established. Call records from the Department of Public Safety's Dispatch Communications Center were reviewed to determine medically related call volume, occurrence times, and types. These then were compared with the International Academies' call types to establish the need for EMT-B level triage for transport.

Table 2

International Academies of Medical Dispatch ® Incident Call Types

Card	Category	Card	Category
1	Abdominal pain/problems	20	Heat/cold exposure
2	Allergic reactions/animal stings/envenomation	21	Hemorrhage/lacerations
3	Animal bites/attacks	22	Inaccessible incident/entrapments
4	Assault/sexual assault	23	Overdose/poisoning ingestion)
5	Back pain (nontraumatic/not recent)	24	Pregnancy/childbirth/miscarriage
6	Breathing problems	25	Psychiatric/suicide attempt
7	Burns/explosions	26	Sick calls (should be sick person according to MPDS Version 12)
8	Carbon Monoxide/inhalation/HazMat	27	Stab/gunshot/penetrating trauma
9	Cardiac or respiratory arrest/death	28	Stroke (CVA)
10	Chest pain	29	Traffic/transportation accidents
11	Choking	30	Traumatic injuries
12	Convulsions/seizures	31	Unconscious (near)
13	Diabetic problems	32	Unknown Problem (man down)

14	Drowning/diving/SCUBA accident	33	Interfacility transfer/palliative care
15	Electrocution/lightning	34	Automatic crash notification
16	Eye Problems/injuries	35	Health care practitioner referral
17	Falls	36	Flu-like symptoms (possible H1N1)
18	Headache	37	Interfacility transfer specific to medically-trained callers
19	Heart problems/AICD		

Note. MPDS = Medical Priority Dispatch System; HazMat = hazardous material; CVA = cerebrovascular accident; AICD = automatic implantable cardioverter defibrillator.

The Department of Public Safety's Dispatch Communications Center keeps excellent records on all calls and dispatches. To obtain current information on types of calls, incidences, and dispositions of EMS calls at USF, records for spring, summer, and fall 2012 were examined. Most calls were related to near unconsciousness (suspected alcohol intoxication and/or drug overdose). Other calls, in order of frequency, were for abdominal pain, transport and evaluation by a health care provider, minor trauma/lacerations and burns, convulsions or seizures, flu-like symptoms, diabetic emergencies, and unknown problems, also known as "man down" (see Table 3). Assessment, with or without San Francisco Emergency Medical Services Agency transport, was requested for roughly 50% of all calls. The Department of Public Safety transport for calls not assessed by San Francisco Fire Department paramedics occurred regularly; transport refusal after assessment by San Francisco Fire Department Paramedics occurred for 40% of calls. The Department of Public Safety transported several patients a week in 2012. Many refused professionally qualified EMS assessment after initial contact with the Department of Public Safety.

Table 3

USF Dispatch Communications Center Calls by Frequency, 2012

Rank	Category	Rank	Category
1	Near unconsciousness (alcohol intoxication)	6	Flu-like symptoms
2	Abdominal pain	7	Unknown problem (man down)
3	Transport and HCP evaluation	8	Assault/sexual assault
4	Minor medical trauma	9	Overdose/poisoning (ingestion)
5	Convulsions or seizure	10	Diabetic emergencies

Note. USF = University of San Francisco; HCP = Health Care Provider

After careful review of the call and transport data, professional medical evaluation and determination for safe transport at the university was sought. The USF Department of Public Safety Dispatch Communications Center's call algorithm was also reviewed and judged to need further alignment with San Francisco's dispatch call protocols because the center did not have professional medical assessment or evaluation directing its responses. Information on dispatch call differences, medical situation omissions, and unnecessary dispatches to the San Francisco Department of Emergency Management Division of Emergency Communications Fire/EMS Dispatch are provided in Table 4.

Table 4

Comparison of Medical Emergency Dispatches: USF DPS and the SFDEM

USF DPS Dispatch Command Center Medical Emergency	SFDEM Dispatch Medical Emergency Policy 1020
Victim or caller requests an ambulance.	No SFEMS category
Victim is having chest pains.	Unstable cardiac or respiratory arrest
Victim is experiencing shortness of breath, difficulty breathing, or is choking.	Unstable airway
No such category at USF DPS	Respiratory distress RR < 10 or > 29 with altered mental status
No such category at USF DPS	Shock SBP < 80 or HR > 120 with poor

	skin signs (cool, pale, or diaphoretic)
Victim is seriously bleeding. This means a puddle (opposed to a trickle) or spurting (opposed to oozing) blood.	Trauma patient with any of the above (respiratory distress or shock) or who is unconscious or with uncontrolled bleeding
Victim has over dosed on drugs or has been poisoned.	No such category at SFEMS
Victim is having seizure or convulsion.	Status seizure
Victim is a diabetic who is not alert.	No such category at SFEMS
Victim has sustained major trauma (i.e., involved in a 519, fell off a building).	No such category at SFEMS
Victim has a serious fracture (i.e., obvious deformity, exposed bone, bleeding).	No such category at SFEMS
Victim has persistent abdominal pain.	No such category at SFEMS
Victim has major burns (i.e., entire arm).	No such category at SFEMS
Victim is unconscious.	No such category at SFEMS
No such category at USF DPS	Obstetrical emergencies (third trimester bleeding, prolapse, nuchal cord, imminent breech delivery)

Note. USF = University of San Francisco; DPS = Department of Public Safety; SFDEM = San Francisco Department of Emergency Management; SFEMS = San Francisco Emergency Medical Services; RR = respiratory rate; SBP = systolic blood pressure; HR = heart rate.

The training and services of the Department of Public Safety's dispatch personnel were also deemed deficient. According to the San Francisco Department of Emergency Management, all dispatch personnel should be trained in EMS prearrival instructions, health care provider CPR and first aid, call triage, response, assignments, and certified as EMS dispatchers. At USF, all but the provision of prearrival instructions are embedded within established employment requirements, providing another indication for an EMS service on campus.

After need was established for an EMS program, USF's Department of Risk Management and Office of the General Counsel were asked to address regulatory, legal, liability, and feasibility standards. Toolkits, examples and resources provided by the San

Francisco Department of Emergency Management, State of California Emergency Medical Services Authority, North Cumberland County Emergency Medical Services Business Plan and Budget (North Cumberland County, 2013), based on the United States Department of Health and Human Services, Medical Reserve Corps and Division of Civilian Volunteer Medical Reserve Corps Getting Started and Strategic Planning toolkits (2006a, 2006b) were used in this effort. Using California's Emergency Medical Services Authority guidelines (1994), the San Francisco Department of Emergency Management Prehospital Provider Standards (2011), the NCEMSF's Start-Up Guidelines (2012), safety and quality strategies based on nursing (Sherwood & Barnsteiner, 2012), and the San Francisco Department of Emergency Management's five year master strategic plan (2013), a plan for a collegiate, student-run, EMS service was devised.

The USF EMRS. The operational structure of USF's EMRS was designed to be part of a tiered system, based on evidence, protocols, and best practices to ensure compliance and sustainability. It was designed to function under the direction of a medical director. EMS systems are most successful when a physician director mentors at multiple levels of the service (Key, 2002). USF's EMRS medical director works closely with and is mentored, in part, by the San Francisco's Emergency Medical Services Agency's medical director (O. Medzirhasky, personal communication, September 9, 2013). In addition to the direction and mentorship of a medical director and the valuable guidance of the San Francisco Department of Emergency Management Emergency Medical Services Agency and the San Francisco Fire Department's EMS, established, evidence-based protocols provide professional assessment standards and offer guidance on efficient care delivery and timely response.

USF's EMRS uses protocols of the San Francisco Department of Emergency Management, San Francisco Emergency Medical Services Agency, and EMT-B to meet state and local EMT-B and EMS requirements. The program is designed to complement San Francisco's EMS system, which is centrally dispatched and in which roughly 75% of San Francisco firemen are EMT certified. The tiered system allows for valuable and sometimes scarce resources to be used efficiently. Tiered response systems are designed as follows: The first level of response involves EMTs who are closest to an emergency but cannot transport patients. The second level of response involves a medical aid unit, staffed by EMTs and sometimes paramedics, in a privately owned ambulance that can transport patients. The third and last tier involves fire department paramedics who are trained to administer advanced life support (ALS). All San Francisco Fire Department medical transport units are staffed as third tier units. USF's service serves as a first tier response system and is able to triage to save both second and third tier ALS responders for more critical calls.

USF's EMRS does not transport patients. It defers that function to city-wide ambulance response units who can respond appropriately and by protocol. Since program inception, the Department of Public Safety transports, as a courtesy, only medically stable patients who do not, require EMS transport, during EMRS service hours. The development of protocols for the transportation of medical patients during off-schedule hours is under discussion but currently discouraged. During off-duty hours, Department of Public Safety officers respond to emergencies, take patients' name, address, health insurance, chief complaint, and any other pertinent information until a tier two or three transport unit arrives. All Department of Public Safety officers can perform

CPR and administer first aid and all unit automobiles are stocked with Automated External Defibrillator's. The Automated External Defibrillators are however not routinely carried form the automobiles to the scene by the Department of Public Safety officers.

The San Francisco Fire Department EMS Paramedic Division is staffing its ambulances with one paramedic and one EMT to conserve resources, save costs, and meet increased response needs. Emergencies at the BLS level comprise most EMS calls during the day; those at the ALS level are more frequent in the afternoon and evening. At USF, most medical emergency calls occur on Thursday, Friday, and Saturday evenings and nights followed by Monday and Thursday during the day. Conventional wisdom believes that this occurs because of campus influx, established student behaviors ("Thirsty Thursdays"), and class schedules. Because most core and major classes are held on Monday and Wednesday, the campus population is at its highest on those days. The EMRS can alleviate strain and inappropriate use of community EMS resources and provide a lifesaving service before San Francisco EMS units can arrive, if assessment, ALS, or transport is required.

USF's EMRS is activated through the central campus emergency number. USF dispatchers have been trained to activate the system with the campus public safety service officers or San Francisco Fire/EMS Dispatch communications response or a combination of the both, depending on the algorithm for medical call dispatch. Although the average response time for San Francisco Fire Department's EMS Division for an ALS call is 4.6 minutes in the 90^{th} percentile, response can take up to and over 9 minutes (San Francisco Fire Commission, 2004) The city's system requires an average of 3.1 min from call to dispatch (San Francisco Department of Emergency Management, 2013) and level 2 calls

have a required response time of up to 20 minutes. Thus, total time elapsed from call initiation to on scene response is more than 13 min for most calls. On campus dispatch and simultaneous response, in accord with USF policy, the EMRS, and public safety officers, will save vital response time when access and safety issues arise. At USF, the campus police must always deem a situation safe and clear before medical interventions proceed.

Response time for the EMRS is targeted to be less than 8 min, from dispatch to on scene. The service currently provides two volunteer EMT-B certified EMTs on Friday and Saturday nights, whose call shifts are scheduled from 1900 to 0700. USF plans to expand its EMRS to meet the needs of the university as more students volunteer for the service. Student EMTs who hold an officer role in EMRS are mentored by the faculty advisor who oversees the engaged learning experience for each student.

Leadership training. During the EMRS's first semester of operation, the initial volunteer group, 10 members, grew to 17. Seven, of the initial group of 10, have since taken positions as officers. Students elected officers based on their area of interest to the following positions: president, vice president, public relations and development officer, communication systems manager, administrative assistant, materials and supplies manager, and education coordinator. The addition of an environmental and disaster preparedness officer and a secretary, which has been filled with a graduate student, occurred during the first few months of the program. Position descriptions were written by the student EMT president, then reviewed and approved by USF's associate vice provost. The descriptions are contained in the EMRS charter, reviewed each semester, and updated to meet program needs and changes for success.

All active squad members are EMT-B certified and learn the complexity of starting an emergency response service, gain experience in the field, and work to acquire professional acumen and business sense. As the EMRS continues to develop, students will continue to participate in learning systems operations, practice skills, and explore ways to identify mistakes and channel setbacks into positive outcomes. Table 5 lists the benefits of becoming a leader and member of the EMRS.

Table 5

USF EMRS Leader and Member Benefits

• Your time • Your experience • Your talent • Your empathy • Your faith	• Critical thinking skills • Leadership lessons • Practical life skills • Communications ability • Problem solving mindset • Ability to prioritize • Know where to go for information • How to calm panicked persons • Know how to open an airway • How to call for help • How to give a patient care report • Documentation skills • Asserting yourself • Making ethical decisions • Respecting confidential information • Know how to budget • Learn to write a bid specification • Understand the value of a contract • Learn to make judgment calls • Earn lifelong friends • Stop severe bleeding • Interact with other responders • Interacting with bystanders • Maintain a professional bearing • Understand maintaining your equipment • Embrace lifelong learning • Know that change is good • Feel how good it is to help a stranger • Great resume material

	• That tremendous feeling of making a difference

Note. USF = University of San Francisco; EMRS = Emergency Medical Response Service.

Bimonthly planning meetings were well-attended by the student volunteer EMTs and advisors. The NCEMSF Toolkit provided the student team with the resources to develop a collegiate-based EMS system. Thereafter, the students were charged with constructing a constitution. At USF, a student club requires a particular type of constitution.. Later, when the EMRS was designated a division of the Department of Student life the constitution was amended to the meet requirements of a student-led departmental division. The vice provost determined that the service would have its best chance for success as part of the Division of Student Life. This decision was based on funding, procurement of resources, administrative support, and sustainability. The EMRS constitution can be found in Appendix F.

USF's EMTs work collaboratively with the Department of Public Safety and the Departments of Student Housing and Residential Education. They are supported by the faculty advisor, a San Francisco Paramedic Association advisor, and the medical director, Oliver Medzihradsky, who is a hospitalist and a pediatrician with a Master's in Public Health; he was recruited to USF by the faculty advisor. The physician's work is focused on health care access in underserved populations, pediatric infectious disease, and population-based education. He works closely with the director of medical services at the San Francisco Emergency Services Agency, John Brown, who is board certified in emergency medicine. The director of medical services at the San Francisco Emergency Medical Service Agency's practice is based at SFGH, where he also serves as an Associate Clinical Professor of the Department of Emergency Medicine through UCSF's

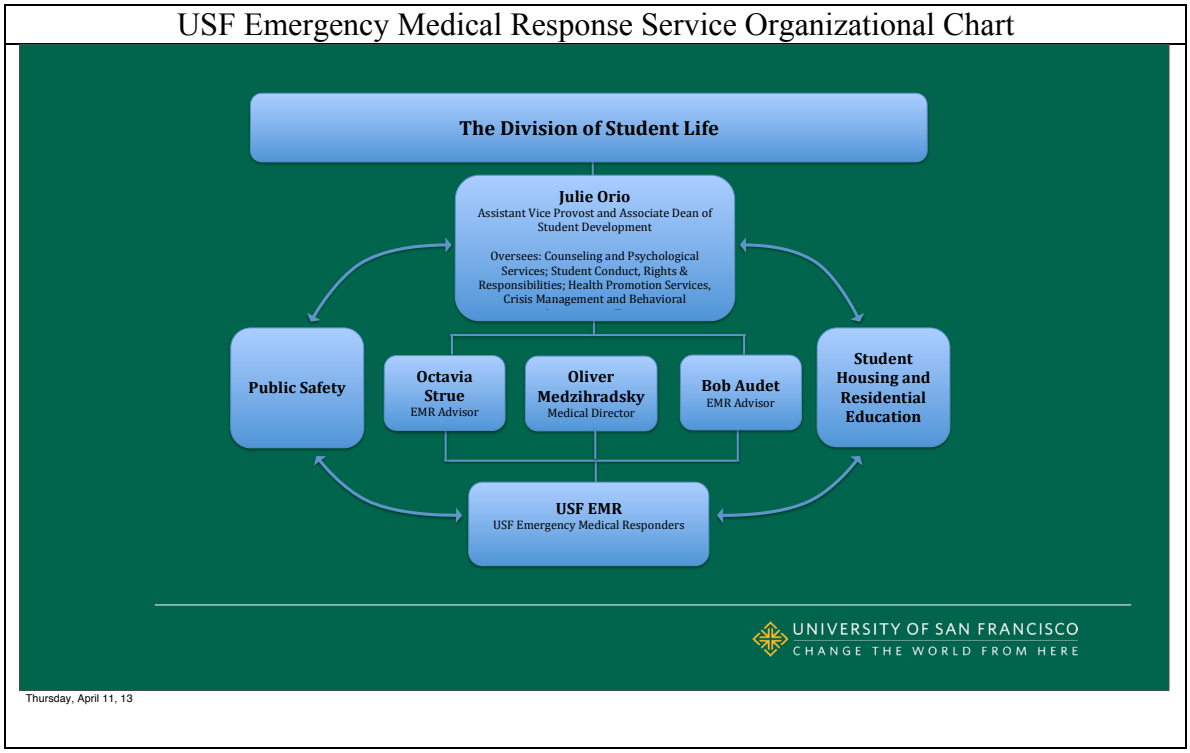
School of Medicine. He has also provided students with a continuing education course and models the role of mentor and advisor.

The faulty advisor is charged to help the students with professional development and surveillance skills, empowering them to question processes and to critically observe the system, its services, and the practice of the EMTs. The faculty advisor supports all program management and oversees the student officers.

Current organizational structure. The USF EMRS, which is a division of the Department of Student life, functions under the leadership of Peter Novak, Vice Provost of Student Life, who reports to Jennifer Turpin, Academic Vice President and Provost (USF, 2013). Julie Orio, Associate Vice Provost and Associate Dean of Student Development, oversees the program together with the faculty advisor, the author; Robert Audet, Chief Operating Officer for the San Francisco Paramedic Association and EMT advisor; and the medical director, Oliver Medzihradsky. Student EMTs work directly with the administration as they develop the EMRS and acquire the skills, knowledge, and attitudes needed for successful implementation and management of the service.

The EMRS organizational chart (see Figure 1) delineates the role responsibilities for the campus service. Appendices F, G and H describe the roles of the students, San Francisco Paramedic Association advisor, and USF-EMRS medical director, respectively.

Brief descriptions of some of the student leader positions and their responsibilities are also posted on the EMRS website (USF EMRS, 2013) and USF's Blackboard Learning site, access to which is restricted EMRS personnel only.



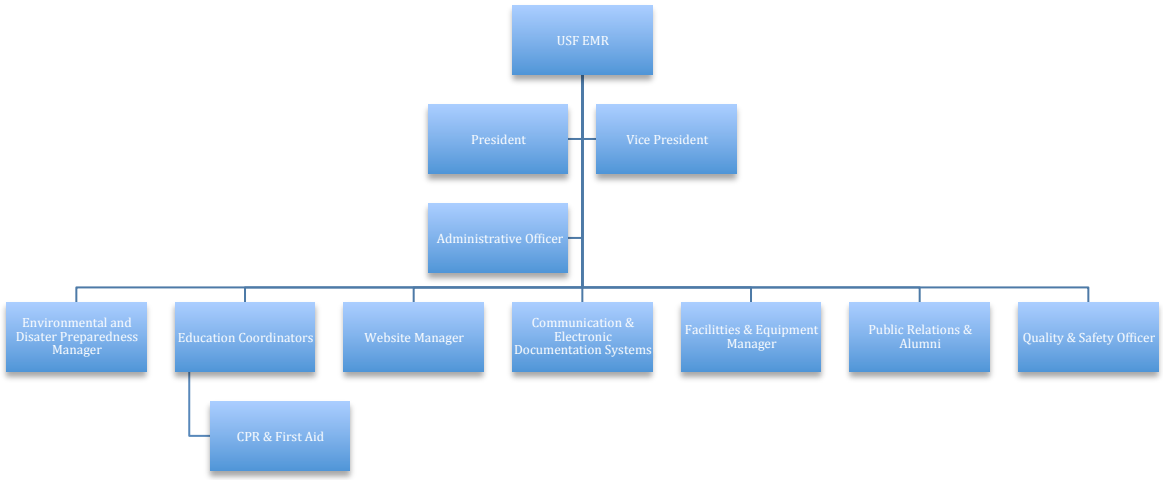


Figure 1. Organization chart of USF's Emergency Medical Response Service.

Building relationships with partners. Effective partnerships are the key to any health program. All programs have internal and external stakeholders whose relationships with those programs may be positive, neutral, and negative. To strengthen

the likelihood of positive program outcomes, relationships between a program and its stakeholders must be established and managed through effective communication. Longest (2004) writes that "communicating with stakeholders provides many opportunities for managers to put into practice their commitment to ethical behaviors" (p.186). Initially, USF's Department of Public Safety and Health Promotion Services and the San Francisco Paramedics Association were the first to support the development of an EMRS on campus. In the spring of 2012, a meeting was convened of external stakeholders: the medical director of the San Francisco Emergency Medical Services Agency, the EMS assistant deputy chief of the San Francisco Fire Department, directors and representatives of ambulance companies that service San Francisco, the medical director of the EMRS, and the internal leadership team. The Department of Public Safety was also invited to communicate intent and convey transparency. The outcome of the meeting proved to be extremely positive: USF announced its plans to provide EMS services on campus at the BLS level without transport. The San Francisco Emergency Medical Service Agency's medical director provided USF's medical director and administrative team with valuable insights into state, city, and county policies and regulations as well as jurisdiction and licensure information. The Fire Department's EMS assistant deputy chief offered field training opportunities, transport solutions, and other supportive information. All of the ambulance companies agreed to work with the campus and offered field training opportunities for its EMTs.

Following the external stakeholders meeting, a meeting of internal stakeholders was held to accelerate planning and implementation. Those stakeholders included managers and assistants of Environmental Services; the executive director and chief of

the Department of Public Safety, patrol and dispatch lieutenants, and several patrol and dispatch officers; the director of Health Promotions Services, representatives of the Student Housing and Residential Education, Staff and Community Development departments and EMRS advisors. The meeting's purpose was to present the program's objectives, to describe its potential impact, and to secure stakeholder contributions to the program. Campus stakeholders were made aware that the program would reward their efforts and investment in its development. USF's Web Communications & Services was contacted after the initial meeting to investigate the feasibility of creating a website before the fall 2013 semester. Over the summer of 2013, the faculty advisor created the website content and worked with Web Communication & Services and Health Promotion Services to construct the site. The website was launched at the same time as the service for consistency, impact and ensure the success and sustainability of this service. All stakeholders must be engaged and committed for the success and sustainability of such a service.

Planning the intervention for sustainability. The sustainability of the EMRS program depends upon the collaboration and interdependence of all stakeholders and persons using or affected by its services. It is also dependent upon the perceived and actual contributions the service provides to the larger system. With program sustainability a paramount goal, the planning, design, and evaluation methods of the EMRS project were researched and implemented by the faculty advisor, the associate vice provost, and the medical director based on their professional and personal experiences using several tools and references (Bryson, 2011; U.S. Department of Commerce, 2000) and the Health Services Co-Design Toolkit (Waitemata District Health

Board, 2010). Program planning followed a thorough review of the literature and the quality and safety protocols of health care, specifically EMS. USF's EMRS needs to continually demonstrate its credibility and prove both its service effectiveness and cost-effectiveness as a contributing division to USF and the San Francisco community.

As evidenced by our research, collegiate-based EMS systems are known to give high quality care, but their personnel are trained below standard and receive less than adequate medical direction (King, 1996; NCEMSF, 2012). Systems fail largely because of inadequate financial support and/or because of changes in administration support for the service and the students. One of this service program's greatest advantages is student investment in making it financially independent. To that end, they teach CPR and first aid courses and are available for standby services that need EMTs. Ensuring program ownership and using the PDCA (plan-do-check-act) system provided a structure and foundation.

Late in the spring semester of 2013, before the service program was implemented, the student leadership named the program, wrote its constitution, designed its official clothing, and offered their first CPR courses on campus. EMRS squad members advertised the program by word of mouth, offered reduced, "introductory" rates for CPR classes, and offered American Heart Association hands only CPR or "sidewalk CPR" campus-wide training at student gatherings. The American Heart Association and the NCEMSF use hands only CPR to educate large numbers of people to perform CPR for perfusion only effects. Hands only CPR has been shown to more than double the chance of survival for sudden collapse (Sayre et al., 2008). The goal of such events was to provide service and promote goodwill on campus. By its work, the EMRS is its own best

marketer. Hopefully, this will contribute to its future sustainability and success. The success of projects is measured by their implementation and sustainability. A Gantt chart illustrating the development and project schedule of the EMRS can be found in Appendix I.

Implementation of the Project

USF's EMRS began work as planned with the commencement of the fall semester in 2013. All onboarding and legal documents and contracts were developed by the faculty advisor and approved by USF's Risk Management and Council. The operations, educational, onboarding, contracts, and agreements can be found in Appendix J).
The EMRS was represented at Don's Fest, a welcoming festival at the university. Additionally, squad members assisted with freshman student move in, meeting many students, faculty, and parents over the weekend. On start-up of the EMRS, a squad of 10 EMTs were available for service on Friday and Saturday nights, using two EMT-B trained, California-certified, and San Francisco-registered, USF student volunteers.

In addition to their certification, the first group of EMTs received mandatory field training from the San Francisco Fire Department for two shifts and from two ambulance companies for another two shifts; two field trainings on campus were scheduled for the first 2 months of the program to ensure competency, safety and quality. The EMTs also received training from the Department of Public Safety, spending 6 hr on shift with an officer and 4 hr with the dispatch officer to learn communications and establish working relationships. A total of 82 additional training hours were provided to the group. The EMRS currently requires the aforementioned trainings prior to service for all EMTs joining the EMRS.

The EMRS continues to hold bimonthly meetings on campus to address departmental processes and concerns and is charged to resolve at least 80% of the agenda items during these meetings. Space is scheduled through the Department of Student Life. The EMRS was allotted space for the on-call room that serves as its hub of operations. Therein it stores all equipment for the active service and classes and houses communications devices. Additional space, next to the Department of Public Safety in the University Center, has been allocated for administrative work and records keeping. Dedicated space is thought to have a positive impact on student learning outcomes and agency protocols for sustainability (Bush & Miller, 2011; NCEMSF, 2012).

Planning the Study of the Intervention

The EMRS project is intended to improve the quality, safety, and service of medically related emergencies on the USF campus. It aims is to improve assessment and to accurately identify indications for the transport of patients to a higher level of care. An analysis of the gaps and deficiencies in the current system was conducted. Needed improvement was identified for these areas: the provision of prehospital emergency medical assessment services on campus; accurate patient assessment to avoid undue strain on the city's EMS system and to avoid delay of vital services; the provision of professional, prehospital, medical assessment on campus to defuse potential liability issues for the university. In planning the evaluation of the EMRS, expert stakeholders were solicited, and existing benchmarks and evaluation tools were identified.

Successful implementation of the program was to be measured by its operation on weekend nights using protocol-driven, EMS responses that increased in volume over time as the service became more established. To be successful, the EMRS would have to be

recognized and established as a credible service, capable of providing safe and professional services at eventually no cost to the university. Additionally, the service would be measured by its ability to educate the community, fulfilling its commitment to public education and prevention awareness.

The student and administrative leaders decided to use (a) San Francisco Department of Emergency Management benchmarks for EMT response, (b) national (NHTSA, 2009) and California standards (State of California, Dept. of Industrial Relations, 2013; State of California, Emergency Medical Services Authority, 1993; State of California, Emergency Medical Services Authority, 2013) for EMS personnel performance, (c) the emsChart® system response evaluation tools tracking system, and (d) the Department of Public Safety's call response evaluation tools and system.

A student self-evaluation and peer performance evaluation tool was also developed (see Appendix M) to monitor adherence to San Francisco Emergency Medical Service protocols for skills and knowledge, teamwork, collaborative care, professional development, professionalism and leadership. The San Francisco Fire Department's guidelines for EMT performance and California's Emergency Medical Services Authority system standards and guidelines were adopted to evaluate the performance of the squad members and the service. By using additional recommendations for first responder evaluation from the State of California and the Institute of Medicine Committee on the Future of Emergency Care in the United States (2006) a more informed evaluation process was developed. The systems evaluation included processes focuses on the patient, participant, and volunteer, and addresses measures that prevent failure and harm by detecting and analyzing injury, potential injury, and or breech of protocols or

established processes. The EMRS also uses the Joint Commission's National Patient Safety Goals that were adapted from hospital and critical access goals: using patient identification, communication between caregivers, suicide identification, initiating medication reconciliation, and awareness of inherent population risks (Joint Commission, 2013).

The faculty advisor developed the initial strategy for the EMRS, based on information and objectives recommended by the vice provost for Student Life, the SFPA's advisors, and several students. A Gantt chart was developed to plan and track the process and to provide evidence of achieving milestones (see Appendix I). Although the associate vice provost was expected to lead the developmental phase, she was on leave for several months. In her absence, the faculty advisor, the author, coordinated the effort with the San Francisco Paramedic Association advisor, under advisement from the medical director and the city's Emergency Medical Services Agency assistant deputy chief.

The faculty advisor, a San Francisco native, has a strong background in forming partnerships, program development, and implementing safety and quality processes. In a nursing career that has spanned more than 30 years, her expertise in both acute care and public health is wide ranging. Regarding the former, she has extensive experience in critical care (coronary care, emergency medicine, medical intensive care, surgical intensive care, and transplantation) and acute, medical-surgical, and perioperative care (endoscopy, orthopaedic surgery, and short-stay surgery). Many of the patients she has cared for entered the acute care arena through the EMS system. The faculty advisor's public health work has included direct patient care and with the implementation of new

county and private programs and policies. As an educator, her 15 years of experience has given her unique insights into educating a diverse population at many levels: in the classroom, clinical setting, and in simulation.

The faculty advisor's educational background also qualifies her for her position within the EMRS. Having received a BSN and an MSN in Clinical Systems Management from USF, the author is intimately aware of the Jesuit mission, the campus environment, and the university's processes. The EMRS project has offered the faculty advisor a unique opportunity to apply her extensive professional education and experience to such an innovative program, promoting in the process the role of the nurse as an integrated partner in health care delivery.

The San Francisco Paramedic Association advisor, the chief operating officer and education manager at the San Francisco Paramedic Association, holds a master's degree in business administration. He has successfully implemented a collegiate-based EMT program in the past and is passionate about the success of the USF service. Together, the advisors, the associate vice provost and the students led the development and implementation of the program and created the necessary evaluation processes.

Methods of Evaluation

The quality of an EMS system is measured by how well in reduces disability and death. The EMRS uses all of the EMS performance indicators promulgated by the NHTSA (2009); how well the program performs will determine its value to the campus and community. EMS systems are protocol driven and use evidence-based guidelines in providing care. The EMRS will continue to do likewise. Each EMS system has slightly different perspectives on quality; the system at USF will also measure prevention and

health protection education outcomes.

The Department of Public Safety call tracking system sends end-of-shift reports to the medical director and the faculty advisor. All medical calls are reviewed for response time, protocol adherence, and quality performance by the medical director, the quality and safety officer, and faculty advisor. Patient information is provided each reviewer on a need-to-know basis. Call reviews are performed by using emsCharts®, electronic DPS shift report alerts, and debriefings at monthly squad meetings. In addition, EMRS has recently developed a call quality data sheet (see Appendix K) to help with data collection for NHSTA and USF-EMRS quality measures. It will be completed after each call by the EMT and sent directly to the quality and safety officer for data entry.

Program evaluation includes the following tools and sources:

- NHTSA EMS program evaluation tool (see Appendix L), which includes system design and structure, human resources (culture, training, credentialing, and safety), clinical care and outcomes, response, finance/funding, quality management, and community demographics
- San Francisco Paramedic Association EMT-B training outcomes and emergency medicine quality service indicators (El Sayed, 2012) are used to measure EMRS service. Feedback is shared with squad members after at least one semester of service to the EMRS and again before graduation from the university.
- EMT performance review and peer performance review (see Appendix M) is completed every semester for each EMT who volunteers for the service.
- A call quality data sheet is used for data collection and ease of data entry for

later analysis.

- Community satisfaction and learning assessment is based on CPR and first aid class training numbers, group and department trainings, "sidewalk CPR participant numbers", individual evaluations of classes and courses, and evaluation of other outreach, health protection and disaster preparedness initiatives. Classes taught by EMRS members use standardized tools from the American Heart Association and NCEMSF for course evaluation. Evaluations for continuing education courses are provided by the SON&HP and the SFPA.

Two tools are under development to assess

- University satisfaction with EMRS campus goals, specifically the provision of EMS coverage, contributions to disaster and emergency preparedness, provision of a engaged learning environment, improved campus health services.
- Patient satisfaction with the EMRS. Development is pending input from the NCEMSF's conference in Boston, February 28-30, 2014. USF approval will be sought thereafter. The tool will adhere to FERPA and patient privacy mandates.

The EMRS will continue to evaluate its educational classes, outreach and efforts to improve prevention education, health protection awareness and promotion of disaster and emergency response readiness by assessment of class evaluations and by tallying numbers of people educated. All classes are based on American Heart Association CPR and first aid course curriculum and use the American Heart Association course evaluation tools. The evaluations are reviewed after each class by the instructors in order to provide

the instructors with immediate feedback on their teaching and the class. The evaluations are then reviewed by the quality and safety officer and the faculty advisor. Aggregate data and a summary of comments are presented to the EMRS at monthly meetings and kept for record. The San Francisco Paramedic Association, who regulates and issues the certification cards each semester, also has access to the evaluations and reviews them periodically as per American Heart Association requirements. The development and launch of a formal education and preparedness campaign is expected for the end of the spring 2014 semester.

Evaluation of finances and funding outcomes will continue to be based on predetermined budget goals; revenue from education; continuing education unit courses for EMTs, paramedics, and register nurses awarded by the San Francisco Paramedic Association and USF's School of Nursing and Health Professions; and staffing of standby events. In addition, donations will be monitored by USF's Office of Development and projection calculations will occur each semester. Progress toward the cost-neutral goal will also be evaluated each semester by the associate vice provost, the faculty advisor, and a finance department representative.

Analysis

USF's EMRS is a program designed to improve health services on campus and in its surrounding community. The university's EMS system contributes to community EMS systems by (a) decreasing unnecessary EMS calls to the city Fire Department, while providing prehospital medical care on campus; (b) taking an increasing number of calls from students who respond more readily to professional peers than other professionals;

and (c) contributing to campus learning and readiness to respond to emergency situations. The analysis addresses the following three questions:

1. Can an EMS system (a) improve safety on the USF campus through early identification and treatment of medical emergencies, (b) reduce strain on San Francisco's EMS system, and (c) reduce health care costs for such services, while meeting national EMS evaluation benchmarks?
2. Can a student-led and run EMS service on USF's campus increase calls for professional help, assessment, and identification of medical emergent situations, especially those related to alcohol and drug intoxication?
3. What effect on campus resilience will the EMRS, outreach education, and certification classes offered by the service have on improved emergency preparedness, readiness, and response?

The following analysis examines the effectiveness of the EMRS by comparing its call volumes, types of call, and need for transport for a higher level of care with those of the Department of Public Safety before the EMRS was initiated. Evaluation tools comprise the Department of Public Safety dispatch call evaluation database, the call quality data sheet, and emsCharts® program analysis. All call response and scene times are stamped, recorded, and compared with like times for the San Francisco Department of Emergency Management's Division of Emergency Communications Fire/EMS Dispatch using NHTSA EMS Performance Measures. The report index of incidents handled by USF's EMRS is reviewed each month and then again at the end of each semester with aggregate data. Reports are reviewed by the medical director, quality and safety officer, advisors, and the associate and vice provosts. Essential to EMRS evaluation is call data

on day and time, type of initial complaint, who responded and their response times, and disposition of the incident and transport outcomes. All identifying information is omitted. Barriers precluding the EMRS from initiating help are also identified. The medical director and quality and safety officer have begun to develop a framework for operational quality assurance.

To assess the effect of health promotion services, the numbers of events, attendance, and class evaluations are reviewed and compared with class standards of the American Heart Association and improvement measures for disaster and emergency preparedness promulgated by the Department of Homeland Security's Campus Resilience Pilot Program. The EMRS is now working with the emergency management coordinator of disaster preparedness to ensure emergency preparedness training and education and assistance with personal disaster plans.

Section IV

Results

Program Evaluation/Outcomes

Operational shifts and calls. The EMRS responded to 16 calls (over 34 call shifts) during its first semester of operation. All but three calls were related to alcohol or drug intoxication. One shift ended early, 00:22, due to staff error. After assessing patients, EMTs determined the need for transport to an acute care or detoxification facility for 80% of the alcohol- or drug-related calls and for 100% of the medical- or minor trauma- related calls. In the fall of 2013, the EMRS was called upon 47% of the time it was operational; thus far, in the spring of 2014, demand has risen to 87%, an increase of 30%.

The NHTSA EMS program evaluation tool. The NHTSA EMS Prehospital Data Set (NHTSA, 2009) program evaluation tool was used to assess the EMRS (see Table 6). The EMRS did not address any items in the Clinical Care and Outcome attribute category that include defibrillation, electrocardiograms, cardiac arrest, and major trauma, therefore those attributes were not listed in Table 6. The service did not collect information on pain scales or pain scale response to treatment.

Table 6

NHTSA EMS Prehospital Data Set Selected Program Evaluation Attribute Categories: A Comparison with EMRS Data

NHTSA Attribute Categories	USF EMRS Response Data Input Fall 2013	USF EMRS Response Data Input Spring 2013 (Preliminary)
System Design and Structure (S)	The EMRS is dispatched by USF's Patrol Division and	Unchanged.

1.1(S) Emergency Dispatch Type: Which Emergency Medical Dispatch Protocol Reference System (EMDPRS) does the EMS dispatch center use? 1. APCO 2. Medical Priority Dispatch System 3. Power Phone 4. Other 5. None	Dispatch Communications Center, which uses its own dispatch reference system.	
1.2(S) Emergency Dispatch Impact of Response Mode: Does your agency base its lights-and-siren use response mode on the EMDPRS it uses?	USF does not allow lights or sirens on campus. The electric cart currently used is not identifiable as an emergency response vehicle.	Unchanged. The automobile has clearly identifiable EMRS magnetic door signs.
1.3(S) Emergency Medical Dispatch Impact on Response Mode: Does your agency base its responder level (ALS/BLS) dispatch on the EMDPRS it uses?	USF's dispatch service bases its responses on its medical reference system - with some inconsistency. DPS officers are sometimes dispatched to the scene for assessment of ALS when calls do not provide clear need. Dispatch assessment questioning lacks medical insight and process.	Unchanged.
2.0 Human Resources Annual Turnover Rate: What is the turnover rate for EMS providers?	The turnover rate from graduation is 13% this semester. Withdrawal from service is 6% this semester.	Anticipated 11% for May 2014. Withdrawal from service is currently 0.44%..
10.0 Response: What are the mean (10.1) and 90th percentile (10.2) emergency patient response time intervals?	Mean from dispatch call to scene 10.2 min; 90th percentile from dispatch to arrival at scene: /11.5 min. Type of service requested: BLS. Mode of response: Cart and foot.	Mean from dispatch call to scene 8.6 min; 90th percentile from dispatch to arrival at scene 8.6 min. Type of service requested: BLS and standby BLS.
10.3- Mean Emergency Scene	Arrived at scene/left scene:	22.36 min

Interval 10.4- 90th Percentile Emergency Scene Interval: What are the mean (10.1) and 90th percentile (10.2) emergency scene time intervals?	unavailable	26.08 min from zero Maximum 42 min.
10.5 Mean Emergency Transport Interval: What are the mean (10.5) and 90th percentile (10.6) emergency transport time intervals?	Left scene to arrival at destination: n/a	n/a
11.0 Finance and Funding: What is the total EMS cost per capita?	Start-up costs to $1.15 per person. Annual and semester cost not available.	Unavailable.
12.0 Quality (Q) Patient Care Satisfaction Rate: What percentage of patients is satisfied with their EMS experience?	Patient satisfaction assessment tool under development. FERPA regulations prohibit direct contact other than through the Student Development Office.	Plans under development to survey campus departments working with and using the EMRS.
13.0 Quality (Q) Patient Care Satisfaction Survey Rate: What percentage of patients does your EMS agency/system survey to measure patient satisfaction?	Plan to survey 100%.	Under development.
14.0 Quality Rate of Appropriate Oxygen Use: What percentage of patients in respiratory distress received oxygen?	0/0	3/3
16.0 Delay-Causing Crash Rate per 1,000 EMS Responses: What is the rate of EMS crashes per 1,000 responses?	0	0
17.0 Community Demographics 17.1- Call Complaint Distribution 17.2- Call Complaint Rate: What is the number and distribution of primary complaints to which EMS responds?	No complaints about calls were filed by patients during the fall 2013 semester, which involved 34 shifts. No response needed.	No complaints about calls filed thus far for 12 completed shifts, ending 2/28/2014. No response needed.

Note. Source of attribute categories in the first column is from the National Highway Transportation and Safety Administration Emergency Medical Services Prehospital Data Set attribute identifier measures format (NHTSA, 2009) ; USF = University of San Francisco; EMRS = Emergency Medical Response Service; EMDPRS = Emergency Medical Dispatch Protocol Reference System; EMS = emergency medical services; APCO = Association of Public Safety Communications Officials; ALS = advanced life support; BLS = basic life support; DPA = Department of Public Safety; FERPA = Family Educational Rights and Privacy Act.

A patient satisfaction tool is currently under development. Follow-up on patient care outcomes is conducted confidentially by the Department of Student Development. Patient feedback has been uniformly positive. However, two negative reports were initially filed by the Department of Public Safety regarding the EMRS response time from dispatch to arrival on scene time, and three complaints were filed by Student Disability Services regarding transport cart care and lack of adherence to cart care process. After Student Disability Services informed EMRS personnel about needed special cart care, a checklist for cart care was established. The EMTs identified mechanical and electrical issues with the Student Disability Services cart that have rendered it unusable; the cart is outdated and parts are no longer available. Because of the cart's unreliability, EMTs now use an automobile, which was donated to the program by the Department of Public Safety.

Students and faculty on campus have voiced positive feedback about EMRS courses, outreach, and standby services. Course evaluations have been positive. Outreach impact data have not been not collected. As of March 1, 2014, however, the service has begun to collect data on how many persons have been educated in "fast first aid" and sidewalk CPR. Standby services have not been formally evaluated. However, Department of Public Safety officers and the sports event manager have voiced laudatory comments about EMRS contributions to the safety of events. Several student groups and clubs have also lauded the service for providing excellent information sessions and

sidewalk CPR teaching. Subsequent to a request for student body feedback on the EMRS, several students asked if it would be possible to call the EMTs without having the Department of Public Safety respond. Students revealed that they would call more often for medical questions and assessments if the Department of Public Safety patrol were not dispatched with the EMRS. This is alarming. It suggests that the EMRS is not being used to its full potential because students fear repercussions from the Department of Public Safety and Student Development.

Education and training. The education and training of 15 EMTs, during and after completion of onboarding, took place throughout the fall semester of 2013. However, compliance with national and state certification and health clearance was poor; only 30% of prospective EMTs completed the required documentation as the fall semester began. Ninety-seven percent of background checks and drug testing was completed. At present, all student EMTs are in compliance, although reaching this mandatory goal was difficult; a great deal of follow-up was required, and three student EMTs needed an additional 90 days to satisfy all requirements. An EMT who was not in compliance left the service. Discussion is now underway whether to add the clearance process of the USA Patriot Act to the background process. The School of Nursing and Health Professions has already adopted the former in its clinical site requirement procedure.

Cross training of Department of Public Safety patrol and dispatch officers and EMRS EMTs occurred over a 2-day period, August 7 and 14, 2013. The EMT CPR instructors taught Department of Public Safety personnel CPR and first aid; the Department of Public Safety trained the EMTs on radio dispatch, radio use, and communication codes. The departments shared their missions, procedures, services and

the EMRS' EMT scope of practice. Subsequently, two, live, simulated, patient scenarios were conducted together. The scenarios involved allergic reaction with alcohol intoxication and establishment of scene safety with seizure. Although the cross training was effective, separate training has been instituted for the Department of Public Safety's dispatch/communications and patrol personnel; all EMTs have completed experiences with both the dispatch center and field observations with Department of Public Safety officers. All of the EMTs who participated in the simulated EMS scenarios requested further simulations, as did the Department of Public Safety's patrol officers.

Four EMTs are currently onboarding this spring. Probationary members who joined the service after September of 2013 were the first to complete an onboarding, certification, and semester-long training with a field training officer before independent shift work, as originally planned. EMT performance review and peer performance review tools were distributed in November 2013 and analyzed (see Table 7).

Table 7

Self and Peer Evaluation of EMRS Squad Members

Categories	Self-Evaluation	Peer Evaluation
Person-centered care & evidence-based practice.	Skills management & clinical knowledge. *N* = 11 8 = meet expectations 2 =exceed expectation 1 = n/a	Completion of work assignments. *N* = 11 1 = does not meet expectations 7 = meet expectations 3 = exceed expectations
Teamwork & collaboration	Collaborative care, personal safety and safety of others. *N* =11 4 = meets expectations 4 = exceeds expectations 2 = consistently exceeds	Helpfulness and collaborative practice. *N* = 11 1 = does not meet expectations 3 = meets expectations 3 = exceeds expectations

	expectations 1 = n/a	4 = consistently exceeds expectations
Communication & documentation	EMS communication skills, interpersonal communications and use of communication equipment. *N* = 11 2 = does not meet expectations 6 = meets expectations 2 = exceeds expectations 1 = n/a	Initiates and completes patient and quality related documentation. *N* = 11 2 = does not meet expectations 5 = meets expectations 4 = exceeds expectations
Professional development & work-related polices	*N* = 11 1 = does not meet expectations 7 = meets expectations 3 = consistently exceeds expectations	Contributes to EMRS growth *N* = 11 4 = meets expectations 4 = exceeds expectations 3 consistently exceeds expectations
Leadership	*N* = 11 4 = meets expectations 7 = consistently exceeds expectations	*N* = 10 5 = meets expectations 5 = consistently exceeds expectations
Goals for next semester	Attend NCEMSF conference. Find more ways to help others and the EMRS. Learn new skills; enhance own and others performance; become a CPR instructor; take on leadership role; improve radio communication skills; expand EBP knowledge base on ETOH patients; gain more experience; attend more meetings; learn about delegation; continue to develop sustainable processes; refine scheduling process and program evaluation	What I like best about this person: kind, professional, hardworking, good team member, dedicated.
Comments: Enjoy being on the service, learned		Suggested areas for growth: being more firm with

much, great semester, want to do more, very supportive people and program		expectations, improve delegation skills, spread too thin, timeliness.

Note. *N* = number; EMS = emergency medical services; EMRS = Emergency Medical Response Service; NCEMSF = National Collegiate Emergency Medical Services Foundation; CPR = cardiopulmonary resuscitation; EBP = evidence-based practice ; ETOH = ethanol.

Student performance met no less than 90% of goals for all categories. The EMRS has responded to areas that need improvement by providing at least three continuing education opportunities each semester and has formalized the documentation training process to include the technique called *SBAR* (situation, background, assessment, recommendation), preparatory modules, and content assessment with return demonstration and practice. Evaluations will be completed each subsequent semester for each EMT who volunteers for active duty; the evaluations will be kept in each EMT's personnel file. The EMRS will also track alums and is developing an assessment tool to determine if membership in the service has had any effect on employment or other opportunities.

The American Heart Association's CPR for Healthcare Providers, Heartsaver®, and first aid courses are taught to provide the campus community with information and skills on prevention and health protection. Public information and education is a minimum standard put forth by the State of California Emergency Medical Services Authority (1993). Its guidelines for minimum standards include collaboration to promote injury control and preventive medicine; dissemination of information to the public about EMS system design and operations, access, health and safety habits, and appropriate use of emergency departments; promotion of citizen disaster preparedness activities; and

promotion of CPR and first aid training for the general public. USF's EMRS has met the minimum standards in all areas.

The EMRS also provides CPR and first aid courses for those students who are required to have such certifications as prerequisites for clinical courses and for employment. For example, students in the School of Nursing and Health Profession's clinical nursing programs, the School of Education's student teaching programs, the Dual Degree Teacher Preparation program, and the College of Arts and Sciences' kinesiology practicums must have such certifications. CPR and first aid are considered to be lifesaving skills and strengthen the community's ability to respond to and rescue people in emergency medical situations.

CPR and first aid classes also generate revenue (see Table 8). The purchase and selling of mandatory American Heart Association books began as a pilot program in July 2013. The books were provided by the San Francisco Paramedic Association and were sold to students at cost. However, the process was cumbersome, and books were only available through registration. The USF Bookstore now has a CPR and first aid class schedule and works to maintain par levels of 30 books for each class type. Class size is limited to 30 students. The EMRS purchases books at a faculty discount of 15% and sells the books at list price plus $5 for handling to those students who fail to purchase them before class. Net profit is used to purchase snacks for the EMTs, which are kept in the on call room.

To date, participants in the CPR and first aid classes have numbered 189, which is roughly 2% of the campus population. A new campaign, named *10,000 Strong, Ready to Respond*, is promoting the goal of educating a thousand persons on campus every year for

10 years. For the 2013-2014 academic year, we have only achieved 20% of that goal, with 3 months remaining. The EMRS has also trained and certified individuals in several campus departments: the Department of Public Safety, the Gleeson Library, and the School of Management. Three additional departments are seeking training and certification: the Office of Contracts and Grants, the Jesuit community, and the Leo T. McCarthy Center. In addition the Student Philanthropy Committee has registered 27 members for a private class in CPR.

Table 8

CPR and First Aid Class Income and Costs for 2013-2014

Month	Number of Cards/Cost	Roster Costs	Class Charge Per Student/Total	Net Income
April	30/150.00	20.00	50.00/1,500.00	1,330.00
May	19/95.00	20.00	45.00/855.00	740.00
June	12/60.00	20.00	65.00/780.00	700.00
July	43/215.00	60.00	65.00/2,795.00	2,515.00
August	25/125.00	60.00	65.00/1,625.00	1,690.00
September	5/25.00	20.00	65.00/325.00	280.00
October	8/40.00	20.00	65.00/520.00	460.00
November	12/60.00	80.00	65.00/780.00	640.00
December	16/80.00	20.00	65.00/1,040.00	940.00
January	13/65.00	20.00	45.00/585.00 - 198.20	301.80
February	6/30.00	20.00	65.00/390.00	340.00
Totals to date	189/945.00	360.00	10,996.80	9,936.80

The EMRS also provides continuing education courses that are required for EMTs and registered nurses. The continuing education units for EMTs are awarded by the San Francisco Paramedic Association, the continuing education units for registered nurses are awarded by the School of Nursing and Health Professions. Those seeking only learning enhancement, not certification or continuing education units, are welcomed. Classes are

advertised through local EMS transport agencies, the city Fire Department, local hospitals, and throughout campus.

The EMRS has also partnered with the San Francisco Paramedic Association and E.S.C.A.P.E. Training Consultants to provide a Controlling Aggressive Responses Effectively Certificate Course for nurses, first responders, and students who deal with patients and community members who might encounter aggressive behavior in the workplace. Forty-nine persons completed the one-day, two-session course, which was offered as part of National Collegiate EMS Week, along with sidewalk CPR and Heartsaver® classes for the community. The EMRS has also offered Pediatric Education for Prehospital Professionals, which is published by the American Academy of Pediatrics. Eight EMRS squad members attended the course, which was taught at no cost by the San Francisco Paramedic Association's EMT advisor.

All courses types offered by EMRS are designed to address minimum public information and education standards, advertising, EMRs finance, health prevention and promotion efforts, experience building, continuing educational opportunities and public relations issues. Thus far, the courses have all met EMRS goals, evaluation criteria, and standards.

EMT training course. The EMT training course, which is offered by the Department of Biology (Bio 205.01) in partnership with the SFPA, has enrolled 15 students for credit over the past fiscal year. Previously enrolled were 12 students, including the original eight participants from the summer of 2012. Sixteen students from the EMT training course have volunteered for the EMRS and have received additional

training and work experience through the service. USF continues to provide monies for the difference between unit costs and San Francisco Paramedic Association course costs.

Membership. The ability of the EMRS to provide service depends on the number of EMTs who can take call. Student schedules vary, and the EMRS stresses an "academics first" approach. Community members and alumni do not take call. Onboarding members are ready for service during the last 4-6 weeks of the semester. Table 9 provides membership information.

Table 9

USF EMRS Membership

Spring 2013	Summer 2013	Fall 2013	Spring 2014
Active = 12	Active = 8	Active = 11	Active = 13
Community = 0	Community = 0	Community = (2)	Community = (4)
Onboarding = 0	Onboarding = (3)	Onboarding = (3)	Onboarding = (4)
Graduating = 2	Graduating = 0	Graduating = 0	Graduating = (2)
Left service = 2	Left service = 0	Left service = (2)	Left service = 0
Total = 10	Total = 11	Total = 11(14)	Total = 13 (17)

Note: Numbers in parentheses indicate inactive members for all or a portion of the semester.

Section V

Discussion

Summary

The EMRS project has made significant contributions to the health and safety of the USF campus, contributed to engaged learning opportunities, met local and state performance benchmarks, contributed to the university's mission and goals, and improved medical response readiness on campus. Based on an analysis of the data and personal comments, USF's EMRS is indeed able to provide professional, protocol-driven, and needed, field assessment and triage, improving access to timely professional care in the prehospital environment.

Since program inception, the EMRS's EMTs have responded to 46 medical calls, of which 71% resulted in transport for further monitoring and medical intervention. Most calls were related to alcohol or drug intoxication, based on EMT assessment and adherence to the San Francisco Department of Emergency Management's EMT protocol criterion. Before the EMRS was operationalized, these types of patients were underserved.

Having a student-led and run EMS service on USF's hilltop campus encourages student calls for professional help, assessment, and identification of medically emergent situations, especially those related to alcohol and drug intoxication. As a result, requests for service from students has significantly increased. Feedback from students who follow EMRS recommendations to call for help when a friend is intoxicated indicates that they feel more comfortable accessing emergency care from professional peers, an observation supported by the literature. The problem of excessive alcohol and drug consumption on

college campuses is widely known (Casa, 2007; National Center on Addiction and Substance Abuse, 2007; Perkins, 2002b; Perkins, Meilman, Leichliter, Cashin, & Presley, 1999; Wechsler, Davenport, Dowdall, Moeykens, & Castillo, 1994) and is a target for health protection prevention and promotion (Gintner & Choate, 2003). In addition to the university's mandatory alcohol and drug prevention program, *Think About It,* for first-year and transfer students, USF's Health Promotion Services (2013) and Counseling and Psychological Services (2013) post many resources on their websites. The university also requires students who violate its alcohol policy to attend a brief motivational intervention.

The EMRS has exercised professional judgment and discretion when requesting ambulance service through the San Francisco Emergency Medical Services Authority. This has resulted in fewer calls to the San Francisco Emergency Medical Services Authority for triage, easing strain on and reducing costs for the San Francisco Department of Emergency Management system. For example, EMRS personnel judged that 13 of 46 calls to the service did not require transport; the savings in ambulance costs alone amounted to at least $3,700. In addition, manpower hours and freeing up the San Francisco Emergency Medical Services Authority system saved vital resources for the community. Minimizing emergency room costs (over $1,000 dollars for each transported admission) is also a significant return on investment for the EMRS program.

The squads' response times have improved significantly since the start of the service. Early on, the battery run cart; the EMTs' unfamiliarity with campus locations, equipment, and call response processes; and the team leader's role as director and delegator might have all played a part in the slower times recorded. As the students

involved in the EMRS have developed their skills and gained experience, they have contributed to the development of checklists and processes to standardize the service, all of which have made on scene response faster. And, by the end of the fall semester 2013, the service had addressed the lack of timestamp entries for the initial dispatch call, arrival on scene, time at the scene, and arrival time of outside EMS or transport for all calls. All data are now being entered. The location of the EMRS's on-call room at Lone Mountain, Pacific Wing has been a good choice both for response location and designated program space. There is ample space for supplies and parking for the automobile; and, close proximity to the Department of Public Safety facilitates personal communication and team building. The Department of Public Safety also stores the EMRS's oxygen tanks in their space. Obtaining space for classes or meetings has not been a problem.

Other improvements and cost savings have resulted from the EMRS providing standby medical response coverage at events. At an annual concert for predominately undergraduate students, the EMRS was called to respond and offered aid to students, two of whom required transport. Feedback from the Department of Public Safety was most positive, stating that the EMRS improved the safety of the concert for everyone (D. Lawson to J. Orio, personal communication, February, 10, 2014). One finding related the concert and ultimately to communications, safety and patient transport indicates the need for a change, or at the least a realignment in USF's Department of Public Safety dispatch communication processes. Although the Department of Public Safety's intent is well meaning, it is creating potentially unsafe situations by entrusting the care of intoxicated persons to nonmedical personnel who transport patients and accept refusal of service without professional assessment, both of which pose potential liability concerns for the

university. In addition, Department of Public Safety personnel continue to use the USF dispatch call process, which differs from that of the San Francisco Division of Emergency Communications Fire/EMS Dispatch. An incident of miscommunication resulted in the lack of vital triage information that impacted the transport of two patients. The San Francisco Fire Department's EMS Division assistant deputy chief and medical director and the EMRS medical director and faculty advisor will work with USF to construct a dispatch system providing a common language in April 2014. A more uniform language and standardized dispatch communication process will improve allocation of resources, help identify trends and provided data for local, state and national benchmarking (Dawson, 2006). Improvements in EMS communications also provide information on patient care improvements and community educational needs.

The EMRS has also has begun staffing sporting events at a rate lower than other services in San Francisco. It charges $25/hour per EMT and a flat rate of $25 for processing. The cost of supplies is prorated for the event type, depending on injury volume and supply usage. Other services (e.g., King American Ambulance Company and OnSite Medical Services Inc.) often charge more than double what the EMRS charges. Requests for standby service at sporting events have been increasing. The EMRS has now booked requests for the rest of the semester. The standby service will be evaluated at the end of the current semester.

The EMRS's educational efforts on emergency preparedness, readiness, and response has strengthened the campus's resilience. Its work has also strengthened existing relationships and is creating new partnerships within the university and with the San Francisco Division of Emergency Services Disaster Preparedness/Community

Education and Outreach and others from the San Francisco Department of Emergency Management (Data Collection and Statistics; 911 Call Evaluation, Fire/EMS Dispatch; San Francisco Fire Department Division of Emergency Services and the Citywide Emergency Management Program). The EMRS has provided CPR and first aid education to 189 people from the USF campus and nearby residents. One of these groups has been an entire USF school and another a department. The EMTs have also provided sidewalk CPR and education on fast first aid, hand washing and hand awareness, alcohol safety, and early stroke identification at monthly campus club tabling events, various fraternity and sorority events, and at student-parent welcoming festivals. The EMRS has printed contact cards for stroke signs, when to call for alcohol poisoning, first aid and sidewalk CPR references. The cards will provide references for the learners and help collect data on how many people are trained by EMRs through these informal methods on campus. The EMRS has just launched a new campaign, called 10,000 Strong; Ready to Respond, the aim of which is to educate 1,000 people each year for 10 years on medical response and disaster preparedness. The EMRS also services all campus first aid kits and automatic external defibrillators. And, it has begun working with the Department of Public Safety's Disaster Preparedness Office to address the Campus Resilience Pilot Program project.

The students' efforts and commitment to the EMRS is commendable. Only two students have left the active squad, citing conflicts with studies, outside interests, or employment. Little turnover has occurred due to graduation; two original members graduated before the program started. All officers have shown a solid commitment to the EMRS constitution, their duties, and the objectives of the service. Almost all students

have taken on additional roles within the service and are recruiting new members. Four new members have joined the service this spring. Camaraderie is excellent, and the leadership within the group is becoming more evident. The group shows pride in their work and in the service. Self and peer evaluations have also demonstrated the work ethic of this professional team.

Advisors have been pivotal in guiding student learning, particularly in developing their professional skills and teaching them the business processes needed to run a service. The time commitment of the faculty advisor, which has exceeded expectations, seems to be critical to the success and sustainability of the service. The EMT advisor has focused on the certification of CPR and first aid courses because his agency, the San Francisco Paramedic Association, is the service's American Heart Association sponsor. He now works 5 hr per week and is paid through a stipend. He serves as a CPR instructor, consults on CPR and EMT issues, attends bimonthly meetings, and acts as a field training officer when able. He also provides the EMTs networking opportunities with courses and events around the San Francisco Bay Area.

The EMRS faculty advisor, the author, is a registered nurse. Her involvement in the EMRS, university initiatives, and campus health care needs has significant implications for the advancement of nursing and advanced nursing practice. Under the direction of a nurse, the EMRS provides students of nursing and health care more engaged learning in health services and a structure for the development of student-led and run services. A new health center to service the campus and adjacent community might be one of those projects. The EMRS project also contributes to the development of strong campus and community partnerships. These partnerships build strong bonds and

provide a forum where USF and students can exchange ideas, benefit from expert advice, and explore employment opportunities. Above all, this project illuminates the work that nurses in leadership positions can offer to health care innovation and reform.

Relation to Other Evidence

Preliminary analysis of USF's EMRS bears out findings reported in the literature review. First, the EMRS has forged campus and community partnerships that strengthen EMS. On campus, the service works side-by-side with Department of Public Safety officers, dispatch and disaster preparedness personnel, and assists the Department of Public Saftey in data retrieval, improvement of medical dispatch communications, and campus safety. Working with the Department of Public Safety's officers, the service's EMTs have shown professionalism and gained the officers' trust and confidence as first responders. An analysis of the EMRS's communications system has helped to identify needed improvements in the Department of Public Safety's dispatch call system as well. The EMRS is now working with the city's Emergency Medical Services Agency deputy chief and medical director, and the USF medical director and Department of Public Safety to improve interoperability between USF and the San Francisco Department of Emergency Management. This collaboration will strengthen community ties while addressing needed improvements in response times, responder safety, and alignment of internal and external communication through a common language, as recommended by the NHTSA (2010).

Solid relationships have been forged with San Francisco's Fire Department, Emergency Medical Services Agency, and the Department of Emergency Management and the three primary ambulance companies who provide emergency transport for San

Francisco's 911 system. Shared EMT training opportunities and EMT work have led to the employment of two USF EMTs and fostered regular communication between all agencies regarding the EMRS. The EMRS also keeps monies local. All equipment and uniforms are purchased through San Francisco Bay Area companies. Staying local also supports USF's initiative regarding the advantages of education and connections in San Francisco and supports findings that sustainable, collegiate-based EMS programs are usually successful in small urban schools that have strong ties to their community (Behrman et al, 2013; Fisher et al., 2006; King et al., 1996; Leffers & Mitchell, 2010). USF's EMRS does not support the isolation of collegiate-run systems from their community EMS that King and colleagues (1996) describe.

USF's partnership with the SFPA involves far more than the education of future EMTs and the provision of an advisor. The EMTs who complete USF's EMT training course with the San Francisco Paramedic Association and volunteer for the EMRS receive additional training and work experience. These experienced EMTs join the workforce of local EMS systems with prevention knowledge, leadership, and business experience, which reflect recommended guidelines for future EMS systems (NHTSA, 2010).

Second, based on the observation of advisors and the university's administration, the EMRS program has measurably strengthened the students' leadership capabilities, their skills as EMTs, their capability to teach lifesaving skills, their business acumen, and their responsibility and accountability to the university. The program's officers meet monthly to address needed organizational changes in order to meet the demands of the service. They have updated the charter, refined organizational communications, and

taken command of public relations. And, once a month, they meet with the associate vice provost to review the program's financial standing. The literature clearly indicates that students take on professional roles and provide excellent service through student-led and run programs when given appropriate guidance and opportunity. The evaluations of CPR classes taught by EMRS students also support the literature (G. D. Perkins et al., 2002a; Harvey et al., 2012): Peer-taught CPR is of high quality, sustainable, and often better understood than courses taught by experienced clinical staff.

Third, the EMRS has been responsible for an increase in the hospital admissions of USF students for alcohol intoxication. Although current literature does not speak to this finding, it appears that students feel more comfortable in asking for help and rehabilitation from peers than other health care professionals. It also brings to the forefront research on EMS evaluation and direct transport to detoxification facilities, bypassing hospital emergency departments (Ross, Schullek, & Homan, 2013), and new recommendations for peer, alcohol-related teaching (U.S. Dept of Education, 2010). Future research is needed to determine if a gap in service exists for this student population. Finally, such research may guide the university in developing future programs to address this health problem.

Barrier to Implementation/Limitations

Barriers to implementation comprised lack of time and personnel to do the preparatory work of the project. Most of the preliminary planning was accomplished in the spring semester 2013 without the consistent involvement of the associate vice provost- associate dean of student development who was on leave. Although her administrative assistance and that of the vice provost's administrative assistant were

extremely helpful, the extra work added considerable stress to their already heavy workload. The actual work of implementation was accomplished over the summer months, which posed another set of problems. Many key staff members and departmental staff were on vacation throughout the summer, causing time sensitive documents and targets to often be delayed or overlooked. All but three student officers were away from campus; those who remained were either enrolled in classes or periodically vacationing, limiting their time for the project. The student president and administrative officer graduated in 2013, and the president-elect and education coordinator were away for the summer. As a result, the faculty advisor, the author, gained a unique insight into all aspects of the project, including the students' responsibilities and work. The burden of the workload to meet implementation target dates was heavy and posed a significant barrier. To alleviate the administrative workload, the service has now added a graduate student who is available to EMRS students, advisors, and the administration for a one-semester appointment. Although the use of a graduate assistant has been helpful, frequent turnover has the potential to limit productivity during times of retraining.

Turnover has affected more than one aspect of the program. Specifically, student turnover continues to limit the number of days the EMRS can provide services. And, student life creates other ongoing limitations: conflicting class schedules, graduations, and a steep learning curve in the formation of leadership and professional skills. The EMRS had planned to add coverage on Thursdays, but that was postponed until the fall of 2014 because student availability on Thursdays was not adequate. The EMRS is exploring 6-hr shifts during the day and 12 hr night coverage to address this issue.

Program coverage and the EMRS's volunteer-based, EMT class recruits are also concerns and potential limitations. The course offered for credit by USF and taught by the San Francisco Paramedic Association trains only a limited number of candidates who are not required to work for the EMRS upon completion of their studies. The service is working to ensure that more students join the service after completing the San Francisco Paramedic Association course to gain work experience, to serve the university community, and to fulfill national EMS goals. A new, precourse, information session and interview seems to have improved enrollment and student awareness of the EMRS's benefits. With five of the new EMT graduates showing strong interest in the service and only two graduating seniors, the squad should be 21 members strong by fall 2014. The EMRS is also exploring the possibility of requiring mandatory university service to offset San Francisco Paramedic Association course costs and to "lock in" student EMT services. Other streams of revenue are being explored.

Although the project began on schedule, not all was in place. A working roll out created limitations. Most of these operational problems have been rectified, but they are worth mentioning to help those creating such a program avoid like problems:

- Implementing the service before the onboarding of all EMTs was completed posed several problems. The EMTs perceived that the onboarding process was disorganized and, therefore, not as important to professional obligations. This was unavoidable: Most students were unable to complete the onboarding process because they were on vacation. To address this problem, the onboarding of EMTs is now completed in the first 2 months of the semester.

- USF support services did not fully understand the needs of the nascent EMRS program. Unfamiliarity with time-sensitive medical matters and health care regulations and processes created difficulties, especially with supply ordering. Operating without necessary supplies posed significant challenges and stressed the community partners who felt responsible for providing emergent supplies for the safety and success of the service. The EMT supply officer has recently devised a spreadsheet and process, based on his military training as a supply officer, and is working directly with the distributor and the faculty advisor. No further problems of this kind have been encountered.
- The financial limitations of a small "start-up" budget also caused concern, but they have not limited the EMRS's success.

Integrating the EMRS within the Division of Student Life has provided the service with more administrative resources and support. It also aligned the student and patient privacy regulations [Family Educational Rights and Privacy Act (FERPA) and Healthcare Insurance Portability and Accountability Act (HIPAA)] for screening and liability issues for the EMTs, partners, and patients. It supported the appointment of a faculty advisor, an EMT advisor, and a medical director. It also engendered support from various campus departments. Nonetheless, this type of structure has elicited complaints of increased workload from some departments who have felt obligated to provide support for the EMRS, but who have been less that invested in it. Another limitation bears mention: Neither student leaders nor the faculty advisor have been fully involved in funding the service, raising a question of transparency. This situation may cause distrust

and undermine the development of the students' business acumen and sense of financial and program responsibility.

During implementation of the EMRS at USF, a similar service at Santa Clara University, Santa Clara, CA, experienced advisor turnover; the vacancy disrupted program operations. Since then, Santa Clara students have consulted with USF's faculty advisor and student officers for advice on how to ensure that its operational structure is sustainable. This experience has given EMRS personnel increased motivation and ignited their interest in the financial aspects of the program. It has also underscored the critically important role of the nurse as faculty advisor plays in the sustainability of the program.

Interpretation

Six months after initial implementation of the EMRS, program evaluation, based on data and personal feedback, has confirmed several positive effects of the new service. The EMRS is providing professional, prehospital service to the campus and decreasing strain on local EMS. Use of the service has been increasing each month due to increased campus awareness of its services, student trust in peer providers, and credibility of service. The service is also generating income close to projections for financial self-sufficiency; classes contribute an increasing stream of revenue. The EMRS is contributing to the goals of Health Promotion Services and EMS work on campus by educating the campus community and others and contributing to prevention, protection, and preparedness in the event of medical emergencies or a disaster. The service has expanded its educational program and started a 10-year educational campaign, adding to its impact and sustainability. The EMRS has met state standards for performance and has addressed national EMS goals as well as USF initiatives for health care education.

EMRS students are gaining valuable learning and application experiences as they engage in health care roles and services. Peer and student self-evaluations describe volunteering for the EMRS as a positive contribution to their professional development. They also report being better able to manage the stressors of first responder work and have more confidence in their skills as EMTs and business. Behrman and colleagues (2013) have emphasized that providing students with community participation is an important faculty responsibility. EMS leaders also agree that preparing first responders with knowledge, skills, and values as well as wellness and prevention education is needed for the delivery of competent service that meets the highest performance standards (NHTSA, 2011). The EMRS also fulfills the mission and goals of the university for service, justice for a more humane world, and the San Francisco advantage.

The process of planning and implementing this project made clear that a student-led and run organization is best supported by advisors who understand business, have professional skills, "speak" the health care language, and can commit the time to students and the service needed for its success. The role of advisors bears further research to ensure future programs' best outcomes and sustainability.

The success of the EMRS has implications for the development of other student-led services. For example, the School of Nursing and Health Professions is planning a student-led, campus health clinic that will eventually serve the nearby community; it might benefit from the EMRS experience. The service's interdisciplinary and partnership model can also enhance clinical education models in various campus schools.

A thorough evaluation of the EMRS must consider its effect on the students as they pursue careers, lifelong learning, and service. In addition, the program's impact on

the university's goals and its impact on the larger community needs to be a more integral part of the evaluation process. Gathering data on the program's stakeholders and the employers of these students must also be considered. Finally, the types of calls handled by the EMRS should be compared with those of other college and university campuses in San Francisco to determine if there are similar campus-specific medical issues and health promotion needs.

One target for further investigation is the large volume of alcohol and drug-related calls being that are transferred to local emergency departments because of the lack of a "perceived as appropriate for students" detoxification center. Further exploration with community agencies and partners on the need for a designated place for collegiate and other insured intoxicated patients would benefit the community as it would decrease demand on emergency departments while providing specialized services. Exploring additional ways to curb collegiate drinking and to provide structured rehabilitation to these patients might also benefit patients and the community.

While the impact of the new EMRS on USF's campus and the San Francisco community is being collected, information is also needed on its influence on the development of other student-led EMS services in the area. Such data might be difficult to collect, but it would further demonstrate the EMRS's effect on students, graduates, employers, campus resilience, EMS, and advanced nursing roles in health care delivery and innovation.

Conclusions

Collegiate-based, student-led EMS systems are a unique way of providing cost effective, sustainable, and high quality prehospital care to campus communities. These

types of services can enhance the protection and preservation of life and decrease strain on local EMS services in the early stages of an emergency event. These services can also protect the environment, gather evidence that contributes to the improvement of public health by identifying trends and gaps, and educate the community on emergency preparedness. Collegiate EMS systems are also well-designed to fill gaps in health care delivery by using students in professional roles at little or no additional cost to the health care system.

Engaged learning opportunities that prepare first responder volunteers to be experienced EMTs and that provide them with business acumen and professional skills contribute to the preparation of graduates for careers that are sustainable, relevant, and responsive to the health care needs and trends of the community. Linking these students with community partners also strengthens relationships and aligns the needs of the university, community, and employers. Services like these can not only address gaps in health care and contribute to its reform but also serve as interdisciplinary educational environments that promote engaged clinical education. Collegiate EMS systems not only provide valuable services but also invest in students and the communities they serve.

Section VI

Other Information

Finances and Funding

The analysis of the project's "return on investment" is based on financial information and financial assumptions and projections. Collegiate- and community-based emergency services *can* save general health care cost (NHTSA, 2011). When engagement of local EMS systems can be avoided, significant savings accrue to patients and the health care system in general. This program's goal, at the very least, is to be financially self-sufficient and to contribute to the safety of USF's campus and nearby community by providing the resources for emergency preparedness. Revenue projections and estimates of return on investment suggest a high possibility of success.

Before the EMRS was implemented, financial projections were based on the experience of the most proximate and similarly structured collegiate-based program, that at Santa Clara University, Santa Clara, CA. According to that university, a campus call for BLS averages $25.00, a considerable health care cost savings when compared with usual transport at the BLS level (about $400), which does not include medical assessment or treatment. For the 13 patients the EMRS assessed and released in the fall semester 2013, savings amounted to $4,875 in transport costs ($5,200 vs. $325).

Reducing unnecessary visits to emergency departments also provides cost savings. In a recent, national study of patient charges in emergency departments (Caldwell, Srebotrjak, Wong, & Hsia, 2013), the mean outpatient visit cost $1,233. The study also found that 18-24 year olds comprise 18.2% of emergency department visits and that most (58.4%) are insured. Calculating the 13 visits that were deemed

unnecessary for transport, another $16,029 in health care costs were saved when adding avoided patient emergency room costs. In its initial semester of operation, the EMRS conservatively saved students and their families $20,904 by assessing, treating, and releasing patients on campus.

Ongoing costs. Ensuring program quality and meeting state and local EMS regulations for performance and training are reflected in the start-up and ongoing costs of the EMRS. The all-volunteer, student-run service incurs onboarding costs for each EMT (see Table 10). Initial field trainings for each EMT to verify competency and practice also adds cost. Field training officers are hired on a per diem or stipend rate of $20 per hour. The EMRS provides a field training officer for onboarding of two, mandatory, 7-hr shifts for each of its EMTs. Thereafter, additional field training is required until EMTs are deemed competent, safe, and capable by the field training officer and the San Francisco Paramedic Association EMT advisor. The field training officer can accommodate two to four EMTs during one shift, depending on an EMT's level of experience, making the cost $35 per EMT for a four-person shift and $70 per EMT for an inexperienced EMT, if a paid FTO is used. As the EMRS has matured, field training officers are only used for onboarding new EMTs, in the fall and in the spring for two 7-hr shifts. A volunteer alumnus, a past member, fills in as field training officer when able. There is also one paid field training officer position to cover program training and skill verification. The San Francisco Paramedic Association EMT advisor also serves as an field training officer, when available, as part of his 5 hr per week stipend. Thus far, the cost incurred for field training officers has been $1,634.49, not counting 97 hrs of volunteer and advisor time. Because the cost of field training can vary, it was not

included in the calculations presented in Table 10. The approximate cost of onboarding each EMT is $400, accounting for some variability. Nineteen EMTs have been boarded onto the service.

Table 10

Onboarding Cost for Active EMT Squad Volunteers

Item	Cost /EMT Squad
Certifiedbackground.com: health requirements, certifications (HIPPA, CPR, CAEMR-B), drug screening and background verification, RN licensure, MD licensure, and health insurance verification.	$112.00
Uniform shirt (galls)	$26.99
Uniform Jacket (galls)	$119.99
EMT patch	$6.99
Cap	$19.99
Beanie	$3.29
CPR/dress polo (includes logo embroidery)	$39.99
Respirator fit testing $420/day/14 students	$42.85
OSHA readiness to work and respiratory clearance	No cost/DHC
Field training	Variable
Total	$372.09

Note: EMT = emergency medical technician; HIPPA = Health Insurance Privacy and Portability Act; CPR = cardiopulmonary resuscitation; CAEMR-B = California Emergency Medical Responder-Basic; RN = registered nurse; MD = medical doctor; OSHA = Occupational Safety and Health Administration; DHC = Dignity Health Care.

Certifications and processes needed for EMT practice are contracted to a national company, HR Options®. The company's Certified Background service, which the School of Nursing and Health Professions also uses, verifies preset targets and is managed by the faculty advisor. Once an EMT has completed the process, the EMRS issues an official clearance form. Because the target data for the School of Nursing and Health Professions and the EMRS differ, information on those who use the service for both programs cannot be shared. Thus, cost savings did not apply when verifications were merged for the 30-40% of the EMTs who are nursing students. Collaboration with

the school of nursing was attempted for respirator fit testing on two occasions. Savings for both departments were calculated, as the agency that provides the service charges per visit and hour. The EMRS will continue to collaborate with the School of Nursing and Health Professions to apply this savings. Annual fit testing will occur in late fall.

The EMTs share uniform shirts, which are laundered by the program ($1.25 per shirt, an approximate $25 total each month). Towels and sheets are laundered each week by the advisor as a volunteer contribution to the program. The uniform squad jacket, shirt, baseball cap, beanie, and EMT patch, purchased when an EMT is onboarded, are recycled when a squad member leaves the service. The jackets' name flaps can be replaced for $5.99; allowing the purchase of jackets with the current number of EMTs capped at four per size while feasible; a considerable savings. Because most squad members were not wearing the baseball cap, it has been omitted from the standard, individual purchase order for further savings; it can be requested. The CPR and dress polo shirt are also recycled after students graduate. CPR and dress uniforms also include tan pants; a black belt; and black socks, shoes, or sneakers. The EMTs provide their own pants, belts, boots, socks, and optional turtleneck and/or tactical, soft shell fleece navy jacket. An optional student-designed EMRS sweatshirt is bulk ordered in October and February and is available to students for purchase. The sweatshirt must comply with uniform policy standards (see Appendix N).

Fixed and periodic costs. Student Housing and Residential Education provides the service' on-call rooms. There are two rooms, adjoined by a full bathroom, in Lone Mountain's Pacific Wing, a residence hall. All furnishings have been provided by the university. Bedding, hygiene items, cleaning supplies, and administrative supplies were

budgeted for $1,500 (see Table 11).

Table 11

Cost of On-Call and Supply Room Items

Supply	Unit Cost	Quantity	Total Cost ($)
Sheet set	49.99	8	320.00
Quilt set	129.99	4	416.00
Blanket	39.99	4	128.00
Pillow	19.99	4	64.00
Towels	8.99	8	56.00
Washcloth	1.99	12	16.00
Mattress pad	19.99	6	64.00
*Hand sanitizer	3.99	2	7.98
*Soap (all in one) 32 ounce	8.99	1	8.99
*Paper towelettes	1.99	8	15.92
Bucket	2.99	1	2.99
*Bathroom cleaner	4.99	1	4.99
*Sanitation cloths (disposable)	3.99	4	15.96
*Toilet brush/wand/pads (disposable)	12.99	1 set	12.99
Binders	1.99	5	23.88
*Pens (black)	.99	12	11.88
*Notepads (intake)	.99	12	11.88
Bulletin board	12.99	1	12.99
*Dry erase markers	1.29	4	5.16
Hooks (pack of 6)	5.99	2	11.98
Storage bins (underbed)	7.99	1	95.88
Storage bins (medical supply, 3 sizes to fit supply cabinets with labels/U Line Product/order set	300.00	1	300.00
Hamper	14.99	1	14.99
			($1,637.45)

Note: Items marked with an asterisk will be restocked annually, in summer, as needed.

Start-up costs for the EMRS were mainly for supplies. (A full list of supplies can

be found in Appendix O and the current budget and expenses in Appendix P). EMTs require medical and emergency response supplies. The service is set up to handle two emergencies simultaneously and deploy two, fully equipped, BLS teams for events, disasters, or critical situations. The estimated cost of supplies and replacement supplies for one year, projecting two to five calls per three, day/night, weekend shifts, was estimated at $30,000 and budgeted for $15,000 for the initial semester because of the allowance the program received from the Department of Student Life. Item costs were based on local suppliers (e.g., those used by Environmental Services, the School of Nursing and Health Professions, and American Medical Response) and costs provided by Santa Clara University's EMT program. Total material cost for service start-up was $14,237.45. Initially, there were 10 EMTs at a cost of $3,072.09. Since that time, the service has onboarded additional EMTs.

With the purchase of an electronic documentation system ($500), total, program start-up costs were $18,409.05. At this time, the program shows a deficit of $8,409.05. With proper advertising, registration, and processes, the service is projected to be debt-free within a 24 month payback period based on projected course revenues.

Stipends, salaries, and tuition. The costs of appointed positions vary by time commitment and role. The medical director's weekly or monthly time commitment is estimated at 10 hr per month. Because the university strongly discourages stipends, it no longer funds those types of positions. All employees and consultants must be formally hired through Human Resources. The medical director must be an employee of USF in order to meet liability, insurance, and the criterion for directorship of the program. The San Francisco Paramedic Association EMT advisor has contracted with the university for

5 hr a week for 1 year. This includes bimonthly meetings, CPR instructor training, consultation, and field training officer work. The faculty advisor is the faculty of record for the 2-unit, EMT Training Course, Biology 205. Currently, the SFPA charges $2,400 for the course; students are required to pay a non-refundable deposit of $250 upon registration. This deposit is only kept by the EMRS if the student does not successfully complete the course. Since the inception of the deposit requirement only one student has dropped the course after registration.

USF's tuition for undergraduate Arts and Sciences students is $965 per unit. The Student Life department currently covers the difference ($470), with a cap of 20 students annually for an estimated cost of $9,400, if all spaces are filled. The EMRS's original nine students were registered in the summer of 2012. The class offered in the fall of 2012 met its registration limit; two students dropped out after registration. See Table 12 for course data.

Table 12

EMT Training Course Registration and Completion

Semester	Spring 2013	Summer 2013	Fall 2014	Spring 2014	Total
Enrolled	10	5	10	9	34
Completed	8	2	7	(8)	(25)

Note: USF's fiscal year begins in July. The totals are from summer to summer semesters. Numbers appearing in parentheses are tentative upon course completion.

Classes are held 3 days a week for 11 weeks and 5 days a week for the summer session. Total course hours are 164; skills training accounts for an additional 24-30 hr. Increasing assigned units for the course to cover tuition and salary and addressing course load credit for the students were explored. Also explored was an option of a USF-San Francisco

Paramedic Association partnership by adding field work credit hours in the school of nursing's simulation laboratory and with the EMRS. Unfortunately, the School of Nursing and Health Professions does not have the capacity and process to accommodate such a proposal at this time.

The dean of the school of nursing and the vice provost of Student Life have negotiated the faculty advisor position and share six units of her teaching load. This demonstrates interdepartmental support and work for the common good, as encouraged by USF's provost. Most collegiate-based programs have a full-time faculty position and/or a full-time medical director assigned to their service.

Donations and allowance. The EMRS received $10,000 from USF and $5,000 from a private donor for its start-up costs. Several in-kind donations have also been received from the San Francisco Paramedic Association, the military, staff, faculty, and private citizens. The EMRS will rely upon the university's Development Department to solicit donations in the future. A link on the EMRS's website allows the campus community and the public to donate at will.

Revenue. Under the supervision of the San Francisco Paramedic Association, the EMRS is an American Heart Associate education provider. Its EMTs and EMRS community members (alums and students not on the active EMRS squad) who are certified CPR instructors offer classes to the USF and San Francisco community that will provide a steady revenue stream to support the service. The San Francisco Paramedic Association has promised to train CPR instructors free of charge once a year, in the fall, to support the service. Training takes place at the San Francisco Paramedic Association offices where equipment and resources are available.

In the spring of 2013, the EMRS, together with other USF departments, conducted a needs and feasibility assessment. It discovered that the Recreational Sports Department's Koret Health and Recreation Center currently offers Red Cross CPR and Lifesaving classes. After discussion with Koret Center personnel, it was mutually agreed that Koret would continue to offer Red Cross Lifesaving courses and that the EMRS would offer the CPR courses on campus. The Athletic Department also offers Red Cross CPR training to coaches and staff; however, it declined an offer for the EMRS to train its coaches and staff in the American Heart Association's Heartsaver® program at cost (roster and cards).

The EMRS offers American Heart Association Health Care Provider BLS, Heartsaver®, and First Aid classes at regular intervals, two to three classes a month during fall and winter and one class a month in summer. The cost of each CPR or First Aid class is $65 per student, a competitive rate in San Francisco. The roster for each class costs $20, and each CPR card issued is $5.00, bringing revenue for a 36-person class to $2,140, minus the cost of disposables ($100.80/36 persons) to $2,039.20. Initially, the EMRS borrowed mannequins (six) from the Koret Center, and the San Francisco Paramedic Association donated mannequins to accommodate up to 36 students (2-3 students per mannequin). In the fall of 2013, the EMRS purchased its own CPR mannequins, automated external defibrillators, and supplies. The cost of mannequins to support 36 students is shown in Table 13. Classes run with a minimum of three students raise $160, which is the cost of outfitting three CPR instructors or one squad member. CPR instructors can become certified as American Heart Association instructors and join the EMRS as community members without active squad membership, but they must have

at least one year of EMT experience.

Table 13

CPR Class Costs

CPR, SFPA, and Disposable Costs	Total Costs 2013-2014
CPR, SFPA and disposable costs: $20 per class roster and $5 per participant card. o $120/24 students or $150/30 students CPR disposables $60/24 students or $75/30 students o 0.93/participant/lungs o 0.66/participant/pads o 0.91/participant/mouthpiece Mannequins 12/36 students/3 per mannequin $2,000 CPR instructor kits, course DVD, and manuals $650 AED training units 6/$600 **AHA texts $15.00/ per student	*($1,305) Variable (see Table 6) $3,250
	*($4,555)

Note: CPR = cardiopulmonary resuscitation; SFPA = San Francisco Paramedics Association; AED = automated external defibrillator; * = costs in parentheses are tabulated through February 28, 2014. **AHA = American Heart Association, texts purchased separately and available in the USF Bookstore.

The School of Nursing and Health Professions alone has more than 200 students and faculty who need annual certification and recertification. The Schools of Education, Kinesiology, and Sports Sciences also have Heartsaver® First Aid requirements. The EMRS projects a minimum of 20 classes (36 students per class), which would generate an annual revenue of $40,784. With the inauguration of the new 10,000 Strong Campaign, potential income goals rise to 1,000 persons annually. Minus $5 per card and rosters (33 courses with 30 students, $833.25 minimum), revenue would rise to roughly $59,000. Classes continue to be offered to departments and groups with a minimum 12 students. The projected annual revenue from CPR and First Aid courses is at minimum $3,200 (3 person class x 20) and a maximum of $40,000 (36 person class x 20), depending on the number of CPR and First Aid classes, group classes, and events

attended and continuing education unit (CEU) classes offered and attended.

The EMRS is also available, for a fee, for standby services at large campus events. Its members agree that the standby service reflects the EMRS's commitment to campus safety and to the university by making its charges minimal. The cost of standby services is $25 per EMT, based on crowd numbers and environmental conditions, a $25 administrative fee, and an additional fee for events that require a lot of supplies.

The EMRS continues to provide CEU courses for EMTs, paramedics, registered nurses, and other health care personnel. The cost of these courses vary, but they are offered at a significant saving for USF students and free for current squad members. "Appetizer CEUs" include an appetizer and certificate for a 1 hr CEU for $10, a reasonable cost when compared with other offerings in the San Francisco Bay Area ($59.95 for eight CEU's/$7.49 each CEU). Most of the 1-hr CEU classes are taught at no cost by emergency medicine residents from UCSF or paramedics from the San Francisco Fire Department's Division of EMS. CEU certificates are provided by the San Francisco Paramedic Association, also at no cost. A recent course offered in collaboration with the San Francisco Paramedic Association netted the EMRS $675 (see Table 14). Although not a large revenue generator, such classes will strengthen existing partnerships, help build professional relationships, and bring EMS providers and systems in San Francisco together.

Table 14

CARE Certificate Course

CARE Course November 17, 2013	Income/Expense
SFPA registrations for CARE/SAVE	$1,680
USF registrations for CARE	$4,100

Gross revenue	$2,420
Protective consulting solutions fee	($3,425)
Net revenue	$675

Note: CARE = Controlling Aggressive Responses Effectively Certificate Course; SFPA = San Francisco Paramedics Association; SAVE = Safely Addressing Violent Encounters Certificate Course; USF = University of San Francisco.

Although projected costs have been accurate, course revenue has been lower than expected. The reasons for this are many: poor advertising, competition with other vendors on campus, lack of communication with campus deans, and the understanding that the EMRSs has sole right to provide American Heart Aassociation CPR and First Aid courses on campus. The service is currently in debt because of equity in the supplies and materials needed to run the service. As stated by a faculty member in the School of Management "debt is cheaper than equity;" currently, we have concurrent debt and equity. Costs and revenue thus far are presented in Table 15.

Table 15

Summary of Cost and Revenue for the EMRS

Category	CPR	CEU	Start-up Cost		EMT Onboarding
Projection	$3,200-$40,000	0	30,000		
Actual	$9,936.80	$675	29,297.51	($18,000)	7,068
Costs	($4,555)	0		$1,634.49	
Total	$5,381.80	$675	29,297.51	$19, 634.49	7,068

Note: EMRS = Emergency Medical Response Service; CPR = cardiopulmonary resuscitation; CEU = continuing education unit; EMT = emergency medical technician.

The return on investment of the project will justify the costs. After the initial payback period the EMRS will be able to contribute to the campus by providing monies for safety and disaster preparedness in addition to being self sufficient. The return on

investment has also been calculated with the indirect benefits from a decrease in healthcare costs to students and the community (see table 16).

Table 16

EMRS Direct and Indirect Return on Investment Predictions

	Now	12 months	24 months	3 years	4 years
Gains -investment costs	(15,000 +10,000) – 56,000	25,000 (courses/ 500 people) –	37,500 (courses/750 people)	50,000.00 (courses/1000 people	50,000 (courses/1000 people)
Investment costs	56,000	1,500 + 500.00 (disposable supplies + 8,000 EMT onboarding + 18,000.00 salaries)= 36,000.00	1,500 + 500.00 (disposable supplies + 8,000 EMT onboarding + 18,000.00 salaries)= 36,000.00	1,500 + 500.00 (disposable supplies + 8,000 EMT onboarding + 18,000.00 salaries)= 36,000.00	1,500 + 500.00 (disposable supplies + 8,000 EMT onboarding + 18,000.00 salaries)= 36,000.00
Indirect healthcare cost savings	@ 13 patients 21,229.00	@25 patients 40,825.00	@30 patients 48,990.00	@35 patients 57155.00	@40 patients 65,320.00
Direct ROI	-0.732	-0.305	0.027	0.388	0.388
Indirect ROI	-0.174	0.828	1.388	1.976	2.481

Note: @ = at; EMT = emergency medical technician; ROI = return on investment

EMRS leaders have made changes to ordering, inventory, and uniform purchasing to address some of these overages. Program supplies are projected to be covered by one full-class (30 students) per semester. It would be advisable to have a student financial officer serve as a liaison between the administration, the faculty advisor, and the materials officer. A graduate student from the School of Management would align well with the proposed role. The dean of the school has been contacted for response.

Section VII

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Section VIII

Appendices

Appendix A

Emergency Medical Services and Emergency Medical Technician Personnel Information

Emergency Medical Services Personnel
The Emergency Medical Services personnel are classified by level of medical education, clinical training and certification or licensure. Each state and county has different classification requirements and certification protocols. First responders, usually police or fire, are those with minimal training, most often a basic lifesaving classes such as Cardiopulmonary resuscitation (CPR) and automatic external defibrillator (AED) and first aid. An EMT-Basic/Defibrillator (B/D) can provide basic medical care to include airways, dressings, assessment, glucose and assist with patients own medications, perform CPR and defibrillate. There are additional skills that can be included in scope, depending on state and county regulations. These include the administration of epinephrine pens, Duodote kits, naloxone administration and perilaryngeal airways. The EMT Intermediate (I) can, in addition to EMT Basic/Defibrilator (B/D) scope, can administer some medications, gain intravenous access and intubate. Paramedics or EMT-P's, can administer medications by various routes, access pediatric patients and perform some acute emergent care hospital functions such as external cardiac pacing and crycoidotomy. There are also specialty care transport paramedics and nurses who mainly function as a mobile acute care facility providers between agencies. For registered nurses, additional certifications in trauma, emergency or disaster nursing are usually required to function in these roles.

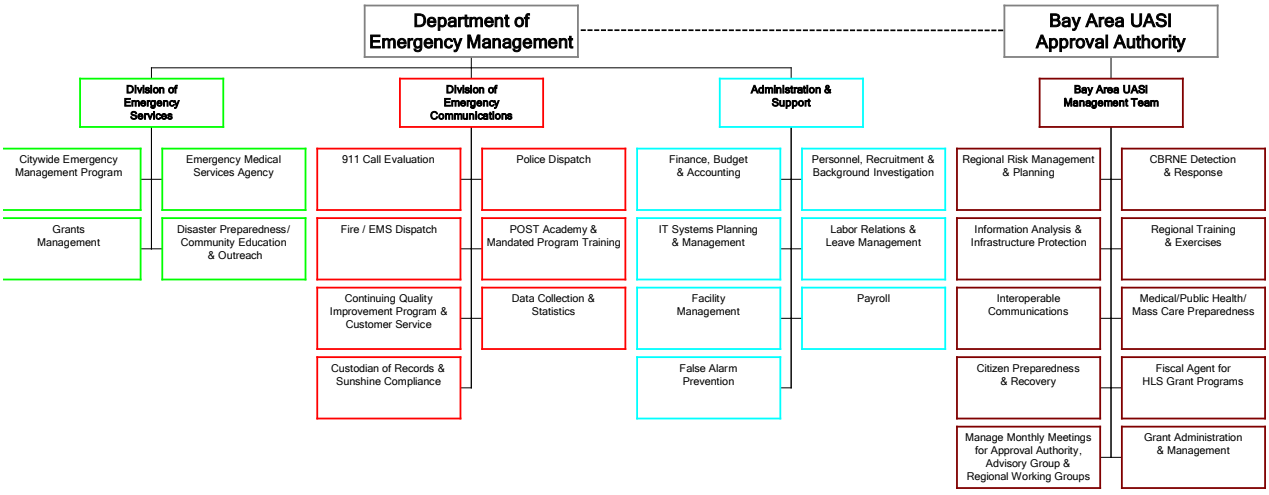
Emergency Medical Technician Certification and Training and Requirements
Emergency Medical Technician (EMT) certification varies upon level of training, skills verification and eligibility. EMT Basic/Defibrilator candidates must be 18 years of age and have completed a minimum 120 hours of training (110 hours didactic and 10 hours of clinical training) and have passed the exam administered by the National Registry of Emergency Medical Technicians® (NREMT). The certification is given locally and applies statewide. It is valid for two years and there is a twenty-four-unit continuing education requirement as well as a skills verification process prior to each recertification. All EMTs must register nationally with the NREMT, pass the nationally governed state accepted examination (NREMT Examination) and register locally to complete the certification and readiness to work process. In order to provide patient care EMTs must also complete a multitude of requirements that are either required or recommended by the state, local level or employer. These include but are not limited too: a background check, drug and illegal substance testing, field training and skills verification.

Emergency Medical Technician Governing Bodies
The NREMT's primary purpose is to ensure competence of the EMT. It was founded in 1970 under the recommendation of the Committee of Highway, Traffic and Safety to establish uniform standards for training and examination of EMS personnel, specifically pre-hospital ambulance personnel. It has since evolved along with the EMS system to include all pre-hospital personnel and has established important educational and training standards as well as continuing education and certification/recertification requirements. State certification and local (city and county) registration varies. In the State of California the governing body is the California Emergency Medical Services Authority (CEMSA). The laws, regulations and legislation for

EMTs in the state of California are referenced through this agency, most being under the California Code of Regulation, Title 22. Locally, in San Francisco, the City and County of San Francisco Emergency Management Agency (SFDEMA), provides oversight and manages laws and regulations with the Health Department. Each city and county in California has varying requirements, protocols and procedures, dependent on population, resources, geography and medical direction and needs.

Appendix B

City and County of San Francisco Department of Emergency Management Functional Chart



Appendix C

Literature Review using the Johns Hopkins Nurse Evidence-based Practice Rating Scale

Evidence Rating Scale

Level I	Experimental study/randomized controlled trial (RCT) or meta analysis of RCT
Level II	Quasi-experimental study
Level III	Non-experimental study, qualitative study, meta-synthesis
Level IV	Opinion of nationally recognized experts based on research evidence or expert consensus panel (systematic review, clinical practice guidelines)
Level V	Opinion of individual expert based on non-research evidence. (Includes case studies; literature review; organizational experience e.g. quality improvement and financial data; clinical expertise or personal experience).

A High	Research	Consistent with results with sufficient sample size, adequate control, and definitive conclusions; consistent recommendations based on extensive literature review that includes thoughtful reference to scientific evidence
	Summative Reviews	Well-defined, reproducible search strategies; consistent results with sufficient numbers of well defined studies; criteria-based evaluation of overall scientific strength and quality of included studies; definitive conclusions
	Organizational	Well-defined methods using rigorous approach; consistent results with sufficient sample size; use of reliable and valid measures
B Good	Research	Reasonable consistent results, sufficient sample size, some control, with fairly definitive conclusions; reasonably consistent recommendations based on fairly comprehensive literature review that includes some reference to scientific evidence
	Summative Reviews	Reasonably thorough and appropriate search; reasonably consistent results with sufficient numbers of well defined studies;

		evaluation of strengths and limitations of included studies; fairly definitive conclusions
	Organizational	Well-defined methods; reasonably consistent results with sufficient numbers; use of reliable and valid measures; reasonably consistent recommendations
	Expert Opinion	Expertise has been clearly evident
C Low Quality or major flaws	Research	Little evidence with inconsistent results; insufficient sample size, conclusions cannot be drawn, undefined, poorly defined or limited search strategies; insufficient evidence with inconsistent results; conclusions cannot be drawn
	Summative Reviews	Undefined, or poorly defined methods; insufficient sample size; inconsistent results; undefined, poorly defined or measures that lack adequate reliability or validity
	Organizational	Undefined, or poorly defined methods; insufficient sample size; inconsistent results; undefined, poorly defined or measures that lack adequate reliability or validity
	Expert Opinion	Expertise is not discernable or is dubious

Note: Newhouse R., Dearholt, S., Poe, S., Pugh, L.C., White, K. The Johns Hopkins Evidence-Based Practice Appraisal. The Johns Hopkins Hospital.

Table 1

Evidence that student-led or run healthcare services provide students with leadership, professional engagement, and medical service opportunities and serve community needs.

Author/ Article	Study Design	Study Results	Conclusions/findings	Relevance	Evidence Rating/ Quality
Bush & Miller, 2011	Descriptive statistical research	Electronic survey of 83 (61% /51 respondents) student communicatio ns agencies using 1-5	Student run agencies are beneficial to learning and application of skills, understanding business processes and developing professional skills.	The aim of this study was to determine how student run agencies fill voids in curriculum in skill and	III/B

		Likert scale asking 36 questions to answer "what are the characteristics of student run agencies?" and "How does an agency versus a student organization operate, advisers time commitment to agency and effect of dedicated space?" Only half (48.9%) of the agencies offer course credit. Agencies have been in existence for average of 4 years and are consistently underfunded (32% adviser report underfunding and 65.2% report no funding). Main faculty contribution is time, with little support or release time. Workspace varies (38% have own; 34% share	Consideration of developing processes and protocols would enhance students' preparation for the profession. Adviser's time commitment is critical to the agencies success. Agencies that are managed out of school department rather than student organization have more support.	professional development and what determines their success.	

		with other student agency. Processes and protocols were not uniform. All incorporate business practices under student leadership and direction with over 2/3 volunteer. 95.6% of advisors agree that student agencies are extremely (66.7% or fairly (28.9% beneficial to student learning.			
Dang et al. 2010	Descriptive, evaluative, outcomes recommendation	Student led immunization clinic provided 153 immunizations with 42 underserved first time influenza recipients by 12 immunizers and 18 pharmacy student volunteers with 4 faculty. Patient s were satisfied and 25% reported they would	Barriers were short planning period and lack of communication with and input from stakeholders. Site selection is important. Core team needs experts familiar with legal issues. Identify multidisciplinary team early and delegate responsibilities. Collaboration with partners and communication are essential. The 13 step process developed might with	The 13 step planning process and lessons learned can easily be applied to other student led healthcare projects.	V/B

		have not received the vaccination elsewhere.	development of help other student led healthcare partnership projects. Faculty support in planning and implementation is		
Dharams et al. 2010	Descriptive statistical survey, recorded open interviews, focus groups used to assess experiences	21 of 36 medical and dental students participated in surveys, not all students answered all questions. 5 of 7 community facility partners answered surveys	Majority of students (62%) felt the experiences were valuable in areas of communication; health promotion and planning; patient education and management; addressing health disparities, and working with staff. Students evaluation skills, project planning implementation and communication skills were improved as was their social responsibility to work with underserved populations. Interprofessional learning was also examined.	The aim of the study was to assess educational impact, social responsibility, professionalism and community service	III/C
El Sayed, 2012	Review	Used 46 references, high quality (I-III, A-B) with two frameworks	Examines quality measurements in EMS to align with IOM report *Emergency services at the Crossroads* (2006) with EMS performance indicators (Quality, process & structure). Found lack of evidence based prehospital interventions.	The aim of the review was to explore and present feasible ways to measure quality in EMS service that EMS systems and medical directors can use in their systems.	IV/B

			Compared clinical care indicators. Explored design strategies for measures of quality in EMS.	Applies to evaluation of quality in any EMS system.	
Fisher et al., 2006	Data search using the National Collegiate Emergency Medical Services Foundation database, analysis and synthesis	145 of 175 registered collegiate based EMS provided services; types were 8.3% first responders, 66.2% BLS and 9.7% ALS with AEDs available to 75.9% of the services. 48% operated 24/7 with average response time of 2.6 min (95% CI ,2.35-2.91 min) with 29 members. Average call volume per year was 568 (95% CI, 317-820)	Collegiate-based EMS systems provide valuable services with excellent response times most likely due to familiarity of environment. Students feel safe calling peers. There are about 4-5 new systems each year with some closing due to funding or lack of support. Administrative support is key as is medical and paramedic direction, to success. When students start these systems it can take up to 3 years to build. Provide high quality service.	Aim of the analysis report was to describe the current state of collegiate based EMS systems. In comparison to last survey of these systems, they are of better quality and have more support, though poorly funded by the campuses.	IV/B
Gu et al. 2012	Descriptive statistical study, survey on a 5 point Likert scale	104 medical students (100%) completed a 20 item survey and identified the student run medical clinic as important educational experiences (81%) and over half	Minority students (60%; CI 32 to 88), females (59%; 95% CI 43 to 76) and residents (64%; 95 CI, 36 to 93) indicated more strongly the importance of the clinic as a reason to apply to the university. This supports the belief of the national health	Students clearly indicated the importance of a student run health care clinic as a positive educational experience. This can be applied to students from	III/B

		reported the student run clinic as a reason they applied to the university and program.	care organizations that diverse student populations support improved quality and access for underserved populations.	health services and other fields providing prehospital care on campuses.	
Jamesley et al. 2013	Expert opinion, descriptive	Emergency medical technicians on college campuses run prehospital care programs and mentor future squad members	Describes a student led prehospital service and the advantages of having university students deliver first response on campuses. Also cites these services as becoming inspirations for new generations of medical directors and emergency physicians.	Rare opinion and description of collegiate based student run prehospital service and its benefits.	V/C
King et al., 1996	Descriptive cohort, survey	An assessment using questionnaires of the characteristics of collegiate based EMS systems was mailed to 1,503 campuses. 919 (61%) responded; 234 (25%) had an EMS system and 31 (3.4%) were considering starting one. The type of patient mot frequently seen was medical (57%) and 39% trauma. Of the services 57%	The systems respond to campus emergencies effectively but often lack the appropriately trained prehospital personnel. The medical direction is often by proxy.	The aim of the study is to determine how many of these programs exist and what characteristics they possess. With better leadership, structure and alignment with community agency EMS as well as using EMT's or paramedics as responders the systems will be more effective.	V/B

		transported patient and 83% responded only on the campus they served. 76% were dispatched by campus police and exist on small urban campuses. 50% have medical directors. There is at least one EMT on 60% of the systems the rest use first aid providers. %)% have medical directors of which 18% are from the community and 64% are student health physicians.			
Kim et al. 2003	Descriptive, organizational	Dietetic students engaged in service learning for 49 students over 5 weeks in the geriatric population	Application of assessment skills and community engagement were benefits. Student were evaluated and provided evaluation that confirmed benefit of community engagement in real life situations.	Supports community engagement and students application of their work in heath services fields.	V/B
Meah et al. 2009	Review, evaluation of descriptive, observational,	Retrieved data about operations, finances,	Student run clinics are an ideal approach to teaching students, helping them	Student run clinics improve and provide	IVA

	prescriptive, retrospective and cross sectional studies	patient demographics, and aciutiy of complaints for 59 of 111 student run clinics in 49 medical schools. Reviewed 23 articles on student run clinics.	conceptualize knowledge and care for patients. They promote student independence and self- directed learning and provide experiences with administrative issues, program design, modification, and sustainability; outreach and interdisciplinary personnel; quality evaluation and student education.	healthcare to the underserved through student led efforts and institutions of competencies in undergraduate and graduate education. Student and communities benefit from theses clinics. More research is needed to increase qualitative and quantitative data regarding skills, patient care, navigation of the multidisciplinary system and partnerships. Also pointed out the limitations in the literature regarding faculty support and oversight.	
Palombaro et al. 2011	Descriptive observational evaluation; case report and qualitative evaluation	Feasibility and sustainability using an 8 essential element model were established	Best strategies were alignment of university and program missions; involving student in all aspects of planning,	The aim of the study was to describe a student led physical therapy clinic organizational	II/B

		and presented using a levels of achievement rubric to the American Physical Therapy Association. Evaluated 380 hours of service, 297 visits and 122 students (34% of student body).	implementation and services; working with community partnerships as equals; supporting faculty and mentors; clear communication about the program; diversification of funding strategies; literature support and outcomes assessment; and start small and build on strengths	model that is sustainable, meets student and community needs. Student led clinics are sustainable, cost effective and provide students professional opportunities and needed service to the community	
Ponto et al. 2011	Summative review, short time study, questionnaires	40 students gained skills and experience and became part of team; 34 clients provided feedback that students were professional and knowledgeable	Nurse managed health centers using students' as providers are an effective way to provide valuable healthcare services and improve skills and professional experiences to nursing students. Education provided by the students can reduce hospital visits and save on healthcare costs	The aim of the study was to evaluate the impact of students as care providers to clinics and healthcare while assessing their learning and practice.	III/B
Roberts & Mays, 1998	Systematic Review	34 studies reviewed alternative or secondary resources for access to emergency care reducing costly primary hospital care in the United Kingdom	Emergency care interventions from minor injuries, telephone triage, redirection of inappropriate emergency room attenders and costs to emergency department users were identified. There was no evidence on the cost effectiveness of alternative methods of care. There are very	Prehospital care can serve as a secondary resource for treatment of minor injuries, triage and assessment. Cost free prehospital emergency care can save on patient costs for	IV/A

			few resources outside the emergency room for patients but providing more resources does not address the problem of using or misusing the emergency room.	patients who seek inappropriate primary care or emergency services	
Smith & Lister, 2011	Descriptive cohort study	Design and implementation of a collaborative (Department of Health) model for service improvement project for nursing students with learning disabilities	Healthcare related service improvement projects can be used by learners as measures of achievement of competencies. All reported professional growth and being a "real" team member. Student led projects break learning barriers, increase students understanding of quality improvement and collaboration with other healthcare professionals.	Students who lead service projects	
Stephenson et al. 2012	Descriptive, cohort study; 1-7 (7= very important) Likert-like scale	66 dietetic students rated real life application in college coursework 6.31, also citing success as a student; ability to work with peers. Problem solving above 6.0. 64% of 11 consumers or partners were extremely satisfied with	Students realized that collaboration with multidisciplinary teams enhances learning and success; projects must be mutually beneficial to stakeholders. The project supported the community and university education.	The aim of the project was to assess the student and partner perceived value. It also examined delivery of health education with community partnerships	III/B

		the project			

Table 2

Evidence that the provision of healthcare programs under nursing leadership offers a unique set of skills, and qualities that improve healthcare quality, safety and costs.

Author/ Article	Study Design	Study Results	Conclusions/findings	Relevance	Evidence Rating/ Quality
Blouin & Buturusis, 2012	Expert opinion, summative review of studies and exemplars	Review of 2 studies on nursing leadership effects on quality and safety Presented 3 exemplars and a framework on quality and safety of nurse leaders	Citing the Institute of Medicine study *The Future of Nursing Leading Change, Advancing Health* call for leadership to transform healthcare the author provides a framework for transformational leadership for nurse leaders in all areas of practice and healthcare work.	Supports nursing leadership in healthcare reform; provides exemplars, and a tool.	V/B
Galuska, 2012	Meta-synthesis of qualitative studies, interpretive synthesis	Used 7-phase approach (Noblit & Hare, 1998). Reviewed 21 qualitative or mixed method studies, interviewing a total of 786 nurses at various stages in the profession	Meta-synthesis identified 3 themes; opportunity structure for the provision of leadership empowers nurses and mentorship; relationship factors with roles of colleagues and mentors had significant impact (or detriment) on leadership development; positive organizational culture that celebrates success and supports leaders is needed for growth	Practice environments are key to nursing success, many organizations have power dynamics that are detrimental to the development of full potential. Findings are a basis for action.	III/A
Hassmillller, 2012	Expert opinion	n/a	Explored reluctance of hospitals to welcome	Nurses can lead	V/A

			nurse leaders to boardroom and applied this to Institute of Medicines, 2011 report on *The Future of Nursing; Leading Change, Advancing Health. Made clear connections with nurses skill sets and knowledge and what is required for leadership positions*	healthcare projects, systems and have skill sets needed to engage with team members and stakeholders.	
Khoury et al., 2007	Expert Opinion and opinions of leaders in healthcare; survey, telephone interviews	1,500 health care leaders from different areas (public, private, academia, trade) were interviewed.	Leaders in government (23%) felt that nurses had influence in healthcare reform decision making compared to 14% of others. Most respondents (75%) felt that government as a group had the highest influence followed by insurance companies (56%). Barriers to nursing leadership were identified as lack of knowledge and management skills.	The aim of the Gallup Poll was to determine how nursing is viewed by healthcare and other decision makers and opinion leaders. Public and some expert opinion of nurses in healthcare leadership roles lacks confidence in the nurses ability to reform the healthcare system. Nurses in leadership positions working with the public, governmental and private sectors can help change opinion.	V/B

Sorenson, R., 2008	Qualitative, ethnographic study, with interviews and focus groups over 3 years.	Total of 29 nurses and 4 managers. Found problems with multidisciplinary fragmentation; inter and intra professional barrier that prevent nurses form communications	In an ICU environment found that nurses must become good political advocates and act on opportunities that present themselves in leadership roles in order to have their contribution accepted. Senior nurses are well placed to lead in organizations and seem to raise organizational effective questions more readily. Nurses must become skilled multidisciplinary team members and serve on organizational and governmental committees and contribute to policy and practice development.	The aim of the study was to examine nursing leadership and its potential contribution to healthcare services and organizations. Senior nurses are well positioned and encouraged to take on leadership roles in organizations and provide mentorship.	II/B

Appendix D

Agree Domains Scale: City and County of San Francisco, Department of Emergency Management. (2011)

Domain 1-scope and purpose 3.83

1. The overall objectives of the guideline is (are) specifically described. 4.0
2. The clinical question(s) covered by the guideline is (are) specifically described. 3.7
3. The patients to whom the guideline is meant to apply are specifically described. 3.8

Standardized domain 1 score (scale, 0-100)

Domain 2- stakeholder involvement 3.72

4. The guideline development group includes individuals from all relevant professional groups 4.0
5. The patient views and preferences have been sought 3.0
6. The target users of the guideline are clearly defined 4.0
7. The guideline has been piloted among target users 3.9

Standard domain 2 score (scale 0-100)

Domain 3-rigor of development 3.92

8. Systematic methods were used to search for the evidence 3.9
9. The criteria for selecting the evidence are clearly described 3.9
10. The methods for formulating the recommendations are clearly described 3.8
11. The health benefits, adverse effects, and risks have been considered in formulating the recommendation 3.9
12. There is an explicit link between the recommendations and the supporting evidence 4.0
13. The guideline has been externally reviewed by experts prior to its publication 4.0
14. A procedure for updating the guideline is provided 4.0

Standard domain 3 score (scale 0-100)

Domain 4-clarity and presentation 3 .87

15. The recommendations are specific and unambiguous 4.0
16. The different options for management of the condition are clearly presented 3.6
17. Key recommendations are easily identifiable 4.0
18. The guideline is supported with tools for application 3.9

Standard domain 4 score (scale 0-100)

Domain 5- Applicability 3.83

19. The potential organizational barriers in applying the recommendations have been discussed 3.9
20. The potential cost implications of applying the recommendations have been considered. 3.9
21. The guideline presents key review criteria for monitoring and or audit purposes 3.7

Standard domain 5 score (scale 0-100)

Domain 6-editorial independence 3.7

22. The guideline is editorially independent from the funding body 3.8
23. Conflicts of interest of guideline development members have been recorded 3.6

Standard domain 6 score (scale 0-100)

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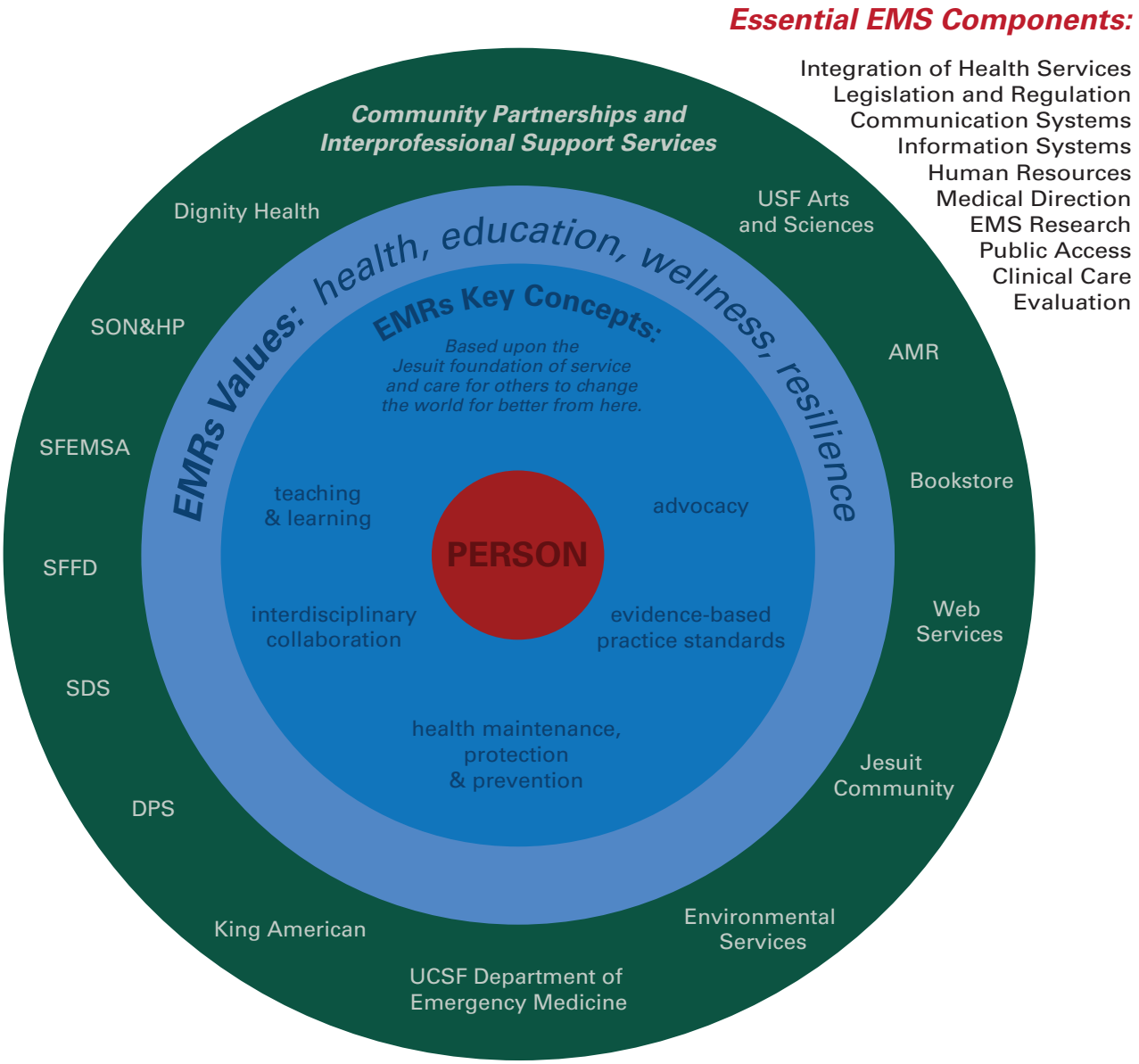
Note: Each item is rated on a 4 point scale ranging form 4 (strongly agree) to 1 (strongly disagree, with 2 mid points: 3 (agree) and 2 (disagree). The scale measures extent to which a criterion item has been fulfilled

Appendix E

Diagram of the USF Emergency Medical Response Service model



Appendix F

University of San Francisco Emergency Medical Response Service Constitution

Emergency Medical Responders at the University of San Francisco

This document, adapted from the constitution guide used by registered student organizations at USF, will serve as a guide for the structure and activities of the Emergency Medical Responders team at the University of San Francisco. Final adoption of this document as well as any future modifications must be approved by the Division of Student Life.

ARTICLE I (Name)

Section 1. The name of this organization shall be <u>Emergency Medical Response Service of USF (USF EMRs)</u>

ARTICLE II (Purpose)

Section 1. USF EMRs - "Improving health and safety here, one emergency at a time!" This is an organization with the intention of providing medical attention to the USF community in the case of an emergency. Valuing reliability, efficiency, safety, education, and prevention, we strive to sustainably decrease the number of incidence of emergency situations on campus. This purpose does not contradict the University's mission or its Catholic, Jesuit character.

ARTICLE III (Affiliation)

Section 1. This organization is affiliated with the National Collegiate EMS Foundation.

ARTICLE IV (Membership)

Section 1. All members of the organization must be matriculated, currently enrolled students at the University of San Francisco. Voting membership is restricted to matriculated, currently enrolled students at the University of San Francisco. Student members must also either be county certified EMTs or have plans to begin certification within 6 months of membership.

Section 2. Membership in the organization will not be denied to anyone on the basis of race, color, religion, religious creed, ancestry, national origin, age (except minors), sex, gender identity, sexual orientation, marital status, medical condition, or disability.

Section 3. No member of this organization shall engage in hazing including but not limited to physical abuse, causing excessive mental stress, verbal abuse, or subservience (see Fogcutter Student Handbook for descriptions). Furthermore, students may not commit any act that causes or is likely to cause bodily danger, physical harm, or personal degradation or disgrace resulting in physical or mental harm to any fellow student or person attending this institution.

Section 4. All general student members must have a minimum cumulative GPA of 2.5, while officers must maintain a cumulative GPA of 3.0.

ARTICLE V (Officers)

Section 1. All officers of this organization must be matriculated, currently enrolled undergraduate students at the University of San Francisco. The President and Treasurer of this organization must maintain a minimum overall 3.0 grade point average, must be enrolled in at least 12 units per semester, and must be in good standing with the University of San Francisco during their term of office. Officers may miss no more than 3 meetings in a single semester without previously agreed upon special circumstance.

Section 2. At least two officers are required to meet with designated Student Life staff to review university policies and procedures regarding space reservations, financial procedures, and other administrative functions.

Section 3. The term of office shall be from the time of election in February, considering transitions from former board to new, through the following spring semester. These terms reflect the process for organization registration outlined by SLE, including holding elections no later than April 1 each year. Exceptions must be approved by Student Life in advance of registration.

To promote leadership diversity and foster student growth, official positions will consistently rotate each year. The progression will be as follows: Administrative Assistant → Financial Coordinator, Financial Coordinator → PR Officer, PR Officer →Administrative Officer, Administrative Officer → Vice President, Vice President → President, President → Administrative Assistant.

Section 4. The officers of this organization will be a President, a Vice-President, a Public Relations Officer, a Financial Coordinator, an Administrative Officer, Facilities Manager, Education Coordinator, Quality and Safety Officer, IT/Electronic System Officer and an Administrative Assistant.

Section 5. Vacancies will be published at which point elected officials will meet and divide responsibilities of the vacated position until a permanent solution can be decided upon. Depending on the position vacated, either the natural progression of positions listed above will be referenced and a new group member will be welcomed as an entry level elected official, or a new official will be appointed by the board members to the available position.

ARTICLE VI (Duties of Officers)

Section 1. The President shall preside at all meetings, lead elections and votes, meet with designated Student Life staff, communicate on a regular basis with elected officials and advisors, assist all elected officials as needed, and be knowledgeable of EMT protocols.

Section 2. The Vice-President shall assume the duties of the President in his/her absence, support elected officials as needed, and attend leadership training as indicated.

Section 3. The Administrative Assistant shall record minutes of each meeting, maintain accurate records of all business pertaining to the organization, receive and respond to all official correspondence, send out messages from elected officials, and meet with designated staff as needed.

Section 4. The Financial Coordinator shall strategize organization funding, collect and disburse funds as directed by the organization, make monthly financial reports to the general memberships, and document all funding and spending. Additional training may be required to align financial practices with university procedures.

Section 5. The Public Relations Coordinator should draw attention to the organization through visual exposure, events, volunteer work, and health education. The position also entails tracking campus events and keeping track the approximate number of people on campus. This includes speakers, sports games, concerts, etc.

ARTICLE VII (Nominations and Elections)

Section 1. When the Vice President is elected they become the President elect for the next year. During the nomination/election process at the end of the year the current Vice President then assumes the office of President for the next year.

Section 2. For all other positions: a member must be nominated for said position. Once nominated, they may accept or reject the nomination. If they accept the nomination the member must give a brief impromptu speech as to why they should be elected into that particular position. In the case of multiple nominations and acceptances for one position there will be a secret ballot vote completed by the board. The member receiving the majority of the votes will take said position for the following year.

Section 3. Elections will take place in mid-spring no later than April 1, which reflects the process for organization registration outlined by SLE. Exceptions must be approved by Student Life in advance of registration.

ARTICLE VIII (Advisors)

Section 1. The organization must have a University advisor. This person must hold at least a bachelors degree and be employed as a faculty or staff member by the University of San Francisco.

Section 2. The advisor shall be a non-voting member of the organization.

Section 3. The duties of the advisor shall be to:

a. Assist the organization in fulfilling their mission and purpose
b. Be knowledgeable of the organization's constitution and bylaws and assist the organization's members in interpreting them
c. Be knowledgeable of University policies and procedures regarding student organizations and ensure organization compliance to the best of their ability
d. Be aware of the organization's activities
e. Be aware of the organization's financial standing and all financial

transactions using the organization's funds
f. Attend organization meetings.
g. Attend e-board meetings.

ARTICLE IX (Meetings)

Section 1. The frequency of general meetings will occur twice each month, every other Monday at 5:30 pm (room may vary). Elected officials are required to attend both monthly meetings.

Section 2. Both the president and a majority of the membership have the authority to call special meetings. At least 24 hours notice must be provided

Section 3. The quorum for general meetings is at least 30% of the membership. For elected official meetings, at least 4 officials must be present.

Section 4. The parliamentary authority of this organization shall be Robert's Rules of Order, Revised.

ARTICLE X (Committees)

Section 1. The president has the authority to name committees and committee chairpersons.

ARTICLE XI (Events/Activities)

Section 1. Sponsored or co-sponsored activities are not inconsistent with the acceptable conduct at an American university committed to the Roman Catholic moral tradition, and activities do not foster hatred or intolerance of others because of their race, color, religious creed, ancestry, national origin, age, sex, gender identity, sexual orientation, marital status, medical condition, or disability.

Section 2. USF EMRs will participate in sobering events in the Bay Area throughout the year, will sponsor lectures at USF's campus from medical professionals, advocate for opportunities for continuing education credits, and will work with paramedic associations to certify students as EMTs.

Section 3. USF EMRs will be represented at the New Years Eve Sober House with the San Francisco Paramedic Association.

ARTICLE XII (Dues/Fees)

Section 1. Dues for USF EMRs membership will be restricted to the cost of EMT certification and licensure.

ARTICLE XIII (Amendments)

Section 1. An amendment to this constitution may be presented by any elected official or by three or more general group members. Its application must be decided upon by a majority of elected officials.

Section 2. An amendment to the group must be presented to the president who will then organize a vote at the following elected official meeting. A decision will be made by the following full group meeting.

Section 3. The number of votes needed to adopt the amendment will be a majority of the elected officials.

Section 4. The amendment becomes effective immediately upon vote of the membership, unless otherwise stated.

*** Adopted on _____.**
(Record the date that the constitution is adopted by membership)

Appendix G

San Francisco Paramedic Association advisor position description

Qualifications:

Applicant must be a nationally register paramedic and be certified in the state of California. A bachelor's degree and five years experience as a paramedic and EMS instructor is required. Experience working within a college run EMT is essential. Excellent service and problem solving skills and the ability to act independently, use judgment and multi-task in a busy environment are required. The candidate must possess strong written and oral communication skills and have a commitment to, and understanding of a diverse urban institution. A demonstrated interest in and commitment to the mission of a Jesuit institution is required.

University of San Francisco
Division of Student Life
Office of the Vice Provost of Student Life

POSITION TITLE: Advisor to Student Emergency Medical Association

SUPERVISOR: Vice Provost of Student Life

PART-TIME: (12 month position; hours vary)

GENERAL SCOPE OF POSITION:

The advisor of the student emergency medical services reports directly to the vice provost of student life and is primarily responsible for the oversight of and coordination of the campus student EMT program. Responsibilities will focus primarily on helping students build an emergency medical services program on the USF campus. The advisor will work closely with the faculty advisor and the EMT medical director in carrying out the duties of this position.

As a member of the larger staff in Student Life, the advisor to the Student Emergency Medical Association collaborates with other areas to create leadership and intercultural competence opportunities that support student learning and development in the Jesuit Catholic tradition. The mission of Student Life is to fully support holistic student development within a social justice framework centered in preparing students to be caring, socially responsible citizens in our global and local community.

SPECIFIC DUTIES AND RESPONSIBILITIES:

- Research and write policies as applicable to the management of a campus EMT program.
- Recruit external speakers and resources to promote the continuing education of the student EMTs.
- Arrange for ride-along opportunities with local external resources for students participating in the campus EMT program.
- Coordinate with local agencies in securing proper authorization
- Ensure protocols follow all local and state standards
- Coordinate and attend onsite organizational and training meetings with the faculty advisor, medical director and students in anticipation of a September 2013 release of the campus EMT program.
- Together with faculty advisor and Medical Director, assist students in creating a fully functioning campus EMT program targeted to begin operation in the fall of 2013.

Appendix H

USF-EMRS medical director position description

Qualifications:

Applicant must be a currently licensed medical doctor. Excellent service and problem solving skills, and the ability to act independently, use judgment and multi-task in a busy environment are required. The candidate must possess strong written and oral communication skills and have a commitment to, and understanding of a diverse urban institution. A demonstrated interest in and commitment to the mission of a Jesuit institution is required.